BIG KAISER

Volume 2

HIGH PERFORMANCE TOOLING SOLUTIONS



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MEGA Micro Chuck

Ultra slim design eliminates any interference.



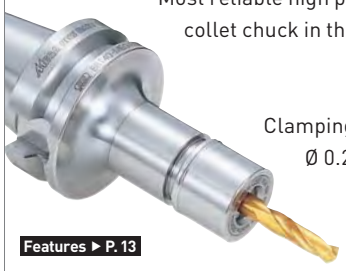
Clamping range:
Ø 0.45 - 8.05

Features ▶ P. 12

BBT Shank	46
BDV Shank	96
HSK Shank	128/163/170
Cylindrical Shank	208
BIG CAPTO Shank	178
For N/C Lathe	242

MEGA New Baby Chuck

Most reliable high precision collet chuck in the world.



Clamping range:
Ø 0.25 - 25.4

Features ▶ P. 13

BBT Shank	48
BDV Shank	97
HSK Shank	130/165/171
BIG CAPTO Shank	179

MEGA E Chuck

Original and exclusive design for small endmilling.



Clamping range:
Ø 3 - 12

Features ▶ P. 14

BBT Shank	52
BDV Shank	99
HSK Shank	134/172
BIG CAPTO Shank	182

MEGA Double Power Chuck

Specialist for heavy-duty cutting.



Clamping range:
Ø 3 - 42

Features ▶ P. 15

BBT Shank	53
BDV Shank	100
HSK Shank	135/173
BIG CAPTO Shank	183

New Baby Chuck

High precision collet chuck for various applications.



Clamping range:
Ø 0.25 - 20

Features ▶ P. 16

BT Shank	56
DV Shank	102
HSK Shank	138
Cylindrical Shank	209
For N/C Lathe	238

New Hi-Power Milling Chuck

Reliable milling chuck with slim design.



Clamping range:
Ø 3 - 42

Features ▶ P. 17

BBT Shank	58
BDV Shank	104
HSK Shank	139
Cylindrical Shank	211
BIG CAPTO Shank	185
CK Shank	201

MEGA Perfect Grip

Unique design anti pulling out cutter milling chuck.



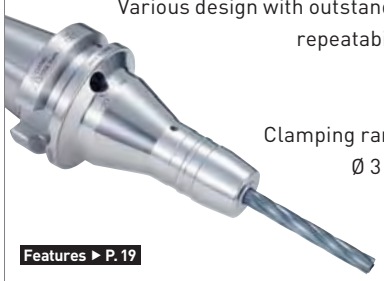
Clamping range:
Ø 16 - 32

Features ▶ P. 18

BBT Shank	55
DV Shank	101
HSK Shank	137

Hydraulic Chuck

Various design with outstanding repeatability.



Clamping range:
Ø 3 - 32

Features ▶ P. 19

BBT Shank	60
BDV Shank	106
HSK Shank	141/167
Cylindrical Shank	210
BIG CAPTO Shank	186

MEGA Synchro Tapping Holder

Improves thread quality and tool life.



Tapping range:
M1 - M36

Features ▶ P. 20/21

BBT Shank	66
BDV Shank	108
HSK Shank	146
Cylindrical Shank	215
BIG CAPTO Shank	187
CK Shank	203
For N/C Lathe	242

Shrink Chucks

Shrink fit solution with BIG-PLUS interface.



Clamping range: Ø 4 - 25

BBT Shank	64
BDV Shank	107
HSK Shank	144
Cylindrical Shank	212

Face Mill Arbors

Eliminates chatter for smoother finish.



BBT Shank	72
BDV Shank	111
HSK Shank	148
BIG CAPTO Shank	190

Smart Damper for Milling

Unique modular damping face mill arbor.



Features ▶ P. 22

BBT Shank	73
BDV Shank	112
HSK Shank	149

Side Lock Holders



Clamping range: Ø 6 - 50

BBT Shank	68
BDV Shank	109
BIG CAPTO Shank	188

CK Shanks

Various CK shanks for boring systems.



Features ▶ P. 27

BBT Shank	74
BDV Shank	113
HSK Shank	150/168
Cylindrical Shank	214
BIG CAPTO Shank	192
Reductions, Extensions	196

Dyna Test

Precision measuring tools of the highest quality for machine tool maintenance.



Features ▶ P. 42

BBT Shank	93
BDV Shank	126
HSK Shank	174
BIG CAPTO Shank	193

Millturn Tooling HSK-T

Unique modular turning system.



Modular Turning Tools	218

Millturn Tooling BIG CAPTO

Modular turning tools and high precision rotary tool holders.



Modular Turning Tools	228
Rotary Tool Holders	178

N/C Lathe Tooling

For improved efficiency and reliability of production on NC lathe.



For N/C Lathe	237

Tool Assembly Stations



Torque Fit
With integrated torque measuring system.

Kombi Grip
For HSK and BIG CAPTO.

Features ▶ P. 42

Torque Fit	284
Tooling Mate	283
Kombi Grip	283

Cleaners

Maintain accuracy of high precision collet chucks.

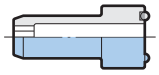


α Taper Cleaners	286
TK Cleaner	286
α Wiper Cleaners	286
α Tooling Cleaners	287
Spindle Cleaners	287

Pull Stud Bolts / Coolant Pipes



Pull Stud Bolt



Coolant Pipe
For HSK form A and E.

Coolant Pipes	175
Pullstud Bolts	288
Pullstud Wrenches	289

Angle Heads

Eliminates multiple set up.

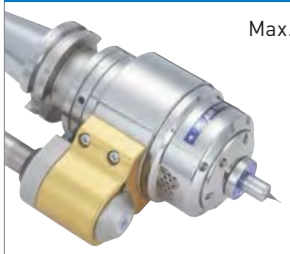


Features ▶ P. 24

BBT Shank	78
BDV Shank	116
HSK Shank	152
Stop Block	290

Air Turbine Spindles

Max. 120 000 min^{-1}



Features ▶ P. 25

BBT Shank	88
BDV Shank	121
HSK Shank	160/169

High Spindles

4, 5, 6 times speed increaser.



Features ▶ P. 26

BBT Shank	92
BDV Shank	125

Rough Boring Heads

SW: Perfect roughing.



Features ▶ P. 35

SW, Ø 20 - 203	297
TW, Ø 20 - 203	306
MW, Ø 16 - 21	296

Digital Fine Boring Heads EWE

EWE: Wireless communication to the BIG KAISER app.



Features ▶ P. 30

EWE, Ø 2 - 152	312/332
EWE, Ø 41 - 203	349

Fine Boring Heads EWN/EWB

EWN 04-7: The smallest boring head in the world.



Features ▶ P. 31

EWN, Ø 0.4 - 152	313/333/344
EWN, Ø 20 - 203	351
EWB, Ø 2 - 50	314/334
EWB, Ø 32 - 105	358
EWB-AL, Ø 100 - 203	358
EWB-UP, Ø 25 - 100	360

Smart Damper Boring Heads

Anti-vibration boring bars.



Features ▶ P. 23

SW Smart Damper	299
EWD/EWN Smart Damper	350
BBT Smart Damper Shanks	75
BDV Smart Damper Shanks	114
HSK Smart Damper Shanks	151
Smart Damper Extensions	197

Large Diameter Boring Tools

Lightweight tools
Ø 200 - 3 000 mm.



Features ▶ P. 36

Series 318, Ø 200 - 620	367
Series 318, Ø 620 - 3 000	374
Series 317, Ø 200 - 620	379

Indexable Inserts

Specially selected inserts
for boring operations.



Features ▶ P. 37

Indexable Inserts	386
CBN/PCD Inserts	407
Boring Cutters	414

Fullcut Mill



FCM and FCR type
Super smooth cutting
with low cutting force.

Features ▶ P. 38

FCM Integral Type	444
FCM Cylindrical Type	450
FCM Arbor Type	451
FCR Integral Type	455
FCR Cylindrical Type	458
Contact Grip	462

Speed Finisher



High speed cutter for
incredibly smooth
surface finish.

Features ▶ P. 40

Speed Finisher	468

Surface Mill



Unique design
face mill cutter.

Surface Mill	467

C-Cutter Mini



Ultra high feed
chamfer mill.

Features ▶ P. 41

Multi Insert Type	476
Single Insert Type	477
Bolt Hole Type	478
CKB Type	479

C-Cutter

Extensive chamfering range.



Standard Type	482
Universal Type	482
CKB Type	483

R-Cutter

Automated R-chamfering.



Front and Back Chamfering	488
Front Chamfering	489
CKB Type	490

Slot Milling Cutters



Cylindrical Type 494
CK Type 494
Arbor Type 494

BF-Cutter

Back spot facing tool for cap screw hole.



BF-Cutter 496

Center Boy

Center and chamfer in one.



C-Centering Cutter 487
Center Boy 492

Edge Detector

3D and 2D touch sensor detecting work position.



Point Master 498
Accu Center 503

Tool Offset Sensor

Magnetic tool offset sensor.



Base Master 501
Tool Master 503

Alignment Tool for ATC Arm

For maintenance of machine tool spindle.



ATC Alignment Tool 504

Dyna Contact

A ceramic taper gauge for machine taper inspection.



Dyna Contact 506

Level Master

2-axis simultaneous detection leveler.



Features ▶ P. 43

Level Master 507

Centering Tool for Lathes

Easy centering for lathes with static dial gauge.



Features ▶ P. 43

Centering Tool for Lathes 508

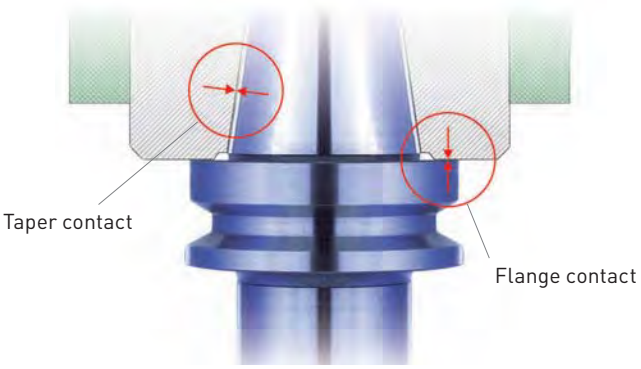
The Original Simultaneous Taper and Flange Fit Spindle System for Steep Taper

BIG-PLUS® SPINDLE SYSTEM DUAL CONTACT

The BIG-PLUS spindle system exceeds all other interface concepts thanks to simultaneous taper and face contact between machine spindle and tool holder. Furthermore the system offers full interchangeability with existing machines and tool holders.

In a first step a taper contact is resulting during entering the tool into the machine spindle. Due to the pull-in force the tool taper expands the spindle in the elastic range. The tool is pulled further into the spindle until the tool flange reaches the surface of the spindle nose.

Advantages
- Improved surface finish & dimensional accuracy
- Extended tool life
- Prevention of fretting corrosion caused by heavy cutting
- Improvement of ATC repeatability
- Elimination of Z-axial movement at high speeds
- Improved roundness of boring operation



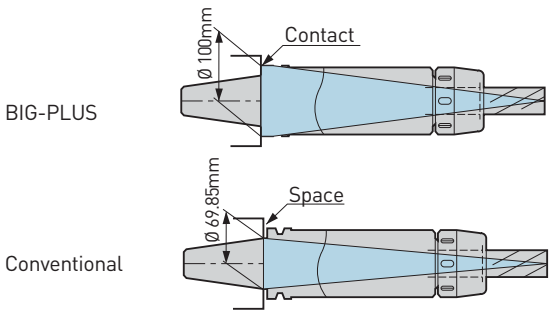
Basic concept

The BIG-PLUS Spindle System is based on the most current available standards in JIS B6339 and DIN 69871.

A conventional steep taper tool holder is supported on a reference diameter called the gauge face. On the contrary, a BIG-PLUS tool holder is supported on the flange face, which brings remarkable improvement to rigidity.

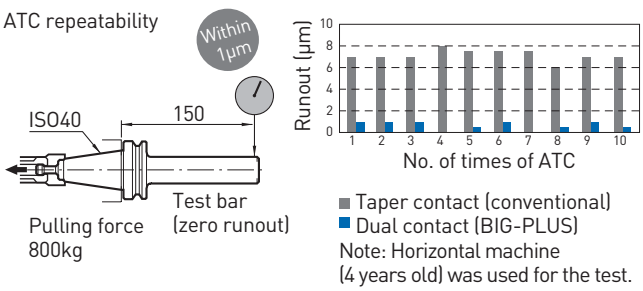
	Conventional	BIG-PLUS
BT50	Ø 69.85	Ø 100
BT40	Ø 44.45	Ø 63
BT30	Ø 31.75	Ø 46

Increased contact diameter (example of BT50)



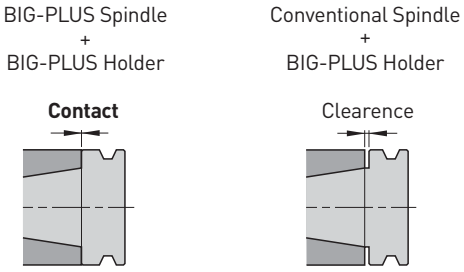
Improvement of ATC repeatability

The BIG-PLUS spindle System assures the highest precision location of the tool holder in the spindle when using the ATC for loading tools, as a result of the dual contact which precisely positions the tool holder within 1 micron.



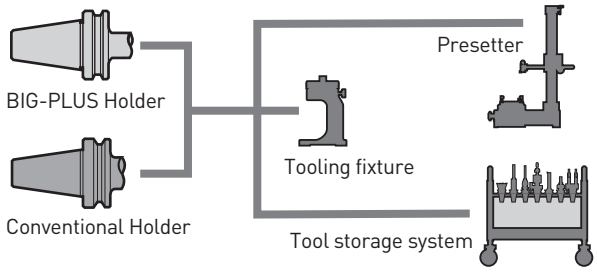
Perfect interchangeability

BIG-PLUS tool holders can be used on existing standard machine spindles. Existing standard tool holders can also be used on BIG-PLUS spindles. In this case, simultaneous contact cannot be attained.



Although other simultaneous contact systems require exclusive new accessories, the BIG-PLUS spindle uses existing accessories such as a presetter and tool holder fixture as it is based on a conventional steep taper shank. Further, it is not necessary to modify tool magazines and ATC devices of existing machines.

Existing accessories utilized



Note:

BIG-PLUS tools are available as BBT or BDV in page 45 - 94 and 95 - 126.

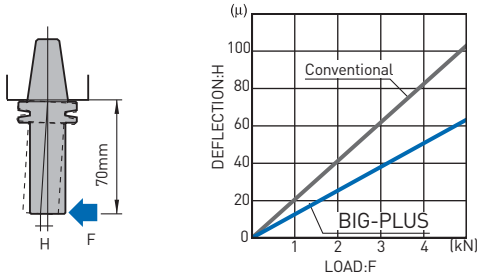


Minimized deflection for maximum machining, accuracy and superior finish

With BIG-PLUS simultaneous contact, machining rigidity is greatly enhanced due to the larger contact diameter of the tool holder flange face. This larger face contact combined with the taper contact works together to resist deflection. With less deflection, greater machining accuracy and superior finish can be achieved.

Comparison of deflection

BT40



Deflection of machine spindle is included. Vertical machine was used for the test.

Face milling application



BIG-PLUS | Standard

Machine tool:	#40 (horizontal machining center)
Cutter:	Face milling Ø 125 (6 cutting edges)
Work material:	A2017 Duralumin
Cutting depth:	2.4 mm

Caution: The Original Simultaneous Taper and Flange fit Spindle System for Steep Taper

More than 85% of not original dual contact BIG-PLUS® are not in tollerance

There are many manufacturers who claim to have dual contact tooling system:
But only a few have an official license of BIG-PLUS®. Without a license, these manufacturers haven't the master gauges nor the measuring devices or the tolerances for defining the critical dimension of the distance between the taper gauge line and the tool flange.
However, according to our inspection*, 85% of the tested tool holders are out of the official BIG-PLUS® tolerance. Only original BIG-PLUS® tool holders enable the benefits and strengths of a BIG-PLUS® spindle system. BIG KAISER controls 100% of its BIG-PLUS® tool holders and therefore guarantees that all products are in the tight BIG-PLUS® tolerance.

BIG-PLUS® SPINDLE SYSTEM DUAL CONTACT

BIG-PLUS is the trademark guarantee to maximize your machine capability.

* Inspection results or samples of non-licensed dual contact tooling measured according to the BIG-PLUS® standard.

HSK Tooling Systems

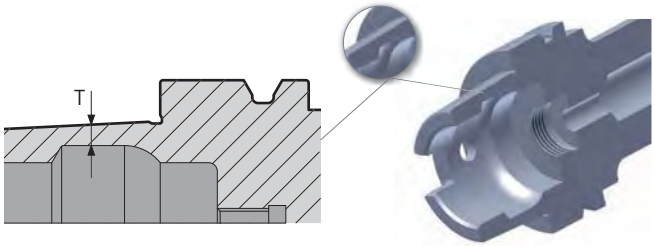
Selected materials and strict control of dimensional accuracy for the optimum quality. Wide range of standard holders to meet all production requirements.





Premium material selection

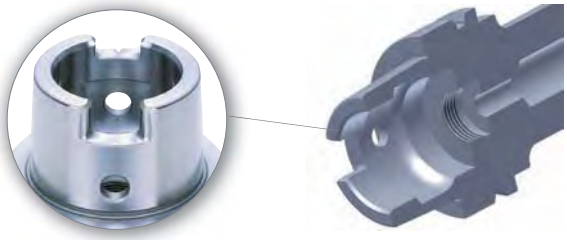
Since HSK is a hollow taper shank, the material has a critical role for optimum performance. BIG KAISER uses carefully selected high grade alloy steels. Particularly, BIG KAISER uses die steel materials for HSK 40 and smaller where the cross section of shank taper is very thin.



HSK Size	25	32	40	50	63	100
T	1.09	1.25	1.92	2.60	3.47	5.17

Drive key form

HSK shanks according to form A are designed to carry out torque transmission by the round shaped key-way at the end of the taper. Because of the importance of this round shaped geometry, BIG KAISER provides finishing of this feature after heat treatment.



Great variety of HSK

Following HSK types are standardized to offer the best possible solution. Other types are also available upon request.

HSK-A32/A40/A50/A63/A100/A125

HSK-E25/E32/E40/E50

HSK-F63/F80M



HSK turning tools

HSK-T63 / T100 (ISO 12164-3)

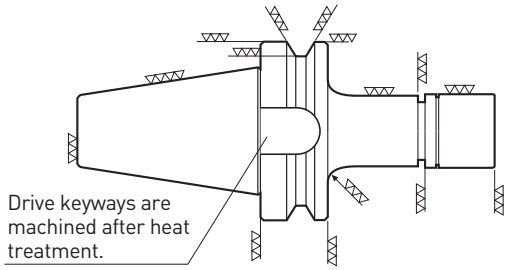
Unique modular type of turning system offer various solution for turning applications.



MEGA CHUCK SERIES



Precision ground and balanced for high speed machining
MEGA Chucks are micro mirror ground finished on all surfaces to assure perfect concentricity for high speed machining. The drive keyway is machined after heat treatment.

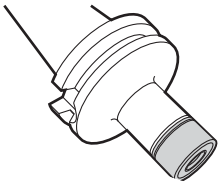


Easy and firm clamping by the MEGA Wrench
The unique MEGA Wrench has a one way clutch system with roller bearings and a ratchet function which is capable of safely and evenly applying force to the entire nut periphery.





Notch-free design MEGA NUT prevents vibration and reduces noise
Vibration at high speeds is eliminated with the use of notch free designed nuts, which offer superior balance and concentricity.



Perfect quality control



All tools are marked with serial no. as a proof of a high quality and good traceability. 100% tools are inspected its quality to guarantee high performance.

Tool identification service available



As an experienced partner for tool management solutions, BIG KAISER is ready to provide its tooling with various solutions for tool identification such as data matrix codes or ID sensors.

4 chuck types for different high speed machining requirements

MEGA Micro Chuck
For micro drills and end mills
Clamping range:
Ø 0.45 - 8.05 mm



MEGA New Baby Chuck
For carbide drills,
reamers and end mills
Clamping range:
Ø 0.25 - 25 mm



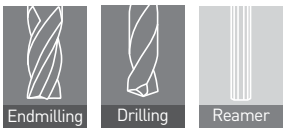
MEGA E Chuck
For end mills and reamers
Clamping range:
Ø 3 - 12 mm



MEGA Double Power Chuck
For end mills
Clamping range:
Ø 3 - 42 mm



MEGA MICRO CHUCK®



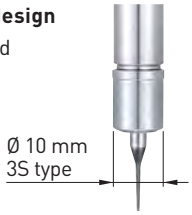
- max. 50 000 min^{-1}
- Clamping range: Ø 0.45 - 8.05
- 0.1 mm increments for higher precision





Nut diameter 10, 12, 14 & 18mm, extremely slim design

Slim design avoids interference. Ideal for small mold making combining high speed and high precision capability.



High concentricity

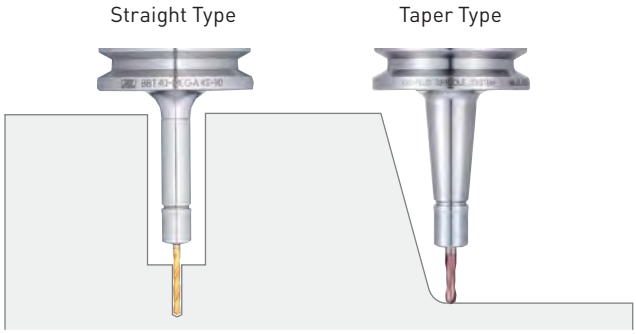
100% concentricity inspection. Within 1 µm at nose is guaranteed.



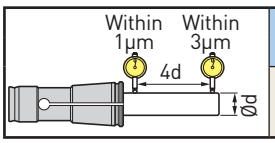
High precision Micro Collet

Three versions are available

Straight Type: where access is restricted
Taper Type: for increased rigidity
Cylindrical Shank Type: for increased versatility



Collet concentricity



Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

Efficient coolant supply



Sealing nut for MEGA6S and MEGA8S brings various solution for micro machining such as high pressure coolant supply and dust proof.

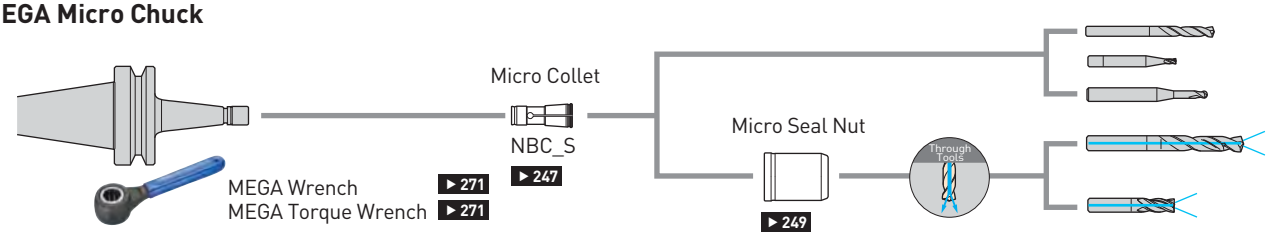


Cylindrical Shank Type

Flexible tool layout, for tighter and deeper area

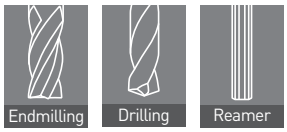


MEGA Micro Chuck



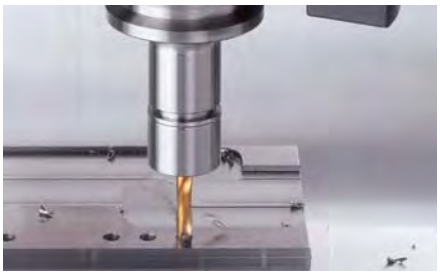
MEGA NEW BABY CHUCK®

High speed design, offered in six different size collet series, utilizes ultra precision New Baby Collets which guarantee a runout at the collet nose of less than 1 micron.



- max. 40 000 min^{-1}
- Clamping range: Ø 0.25 - 25.4





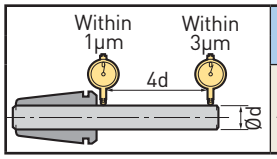
High precision collet, close to submicron

100% inspection to guarantee accuracy. Material, production, heat treatment, everything is selected for precision.



High precision NBC Collet

Collet concentricity



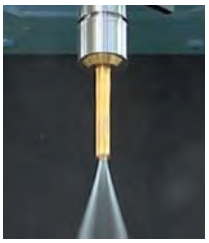
Collet Class	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

2 way coolant supply

Sealed collet nut MEGA Perfect Seal

- Standard NBC Collet is used
- High dust resistance
- Max. coolant pressure 7 MPa





Through Tools
Tools with holes



Jet Through
Tools without holes

Various collet and nut selection

Various type of collet and nut can bring the best solution for your demand.

NBC Standard
For general



NBC-E collet
For end mill



FONBC collet
For coolant-through tools



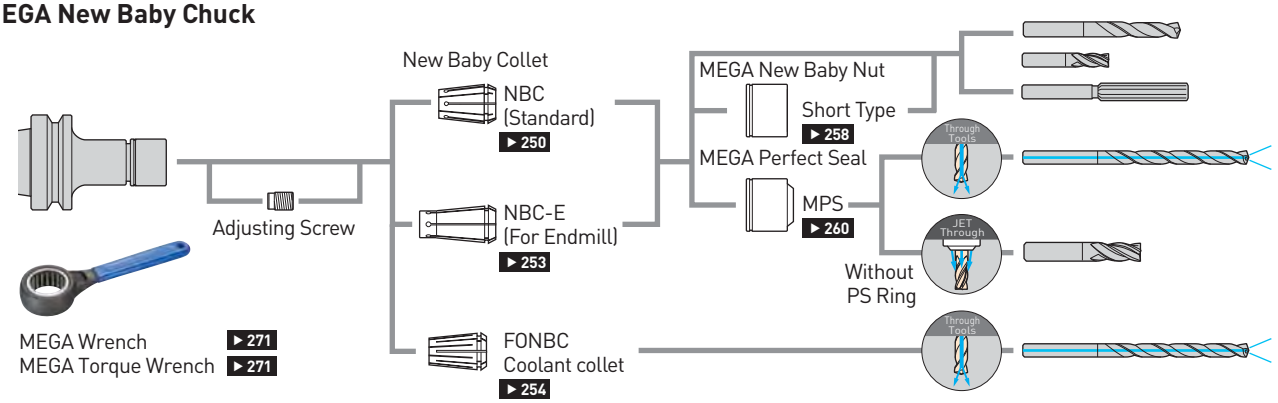
MGN nut
For high speed



MPS nut
For efficient coolant supply

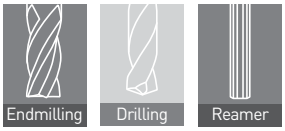


MEGA New Baby Chuck



MEGA E CHUCK®

Collet chuck designed exclusively for endmilling up to Ø 12 mm with high concentricity and rigidity.



- max. 40 000 min^{-1}
- Clamping range: Ø 3 - 12





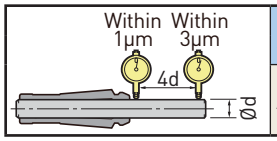
High concentricity

100% inspection to guarantee accuracy within 1µm runout at collet nose.



High precision MEGA E Collet

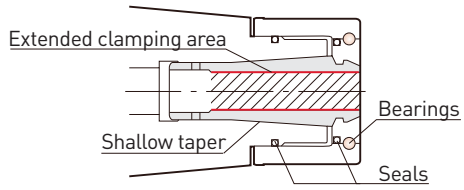
Collet concentricity



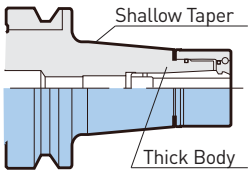
Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

High grip collet

Gripping force is an important element for endmilling with a collet chuck. The long gripping length of the collet in the MEGA E series provides a powerful gripping force. The shallower taper of the collet improves concentricity in order to achieve better surface finishes and longer cutting tool life.



Substantial and tapered body design



Thick body eliminates chatter and deflection. Tapered extension provides the rigidity to prevent vibration.

Slit-through coolant

Coolant is reliably directed to cutting surface through slits in the collet. Tool life is extended together with improved surface finish as a result of smooth chip evacuation.

- Max. coolant pressure 7 MPa



For coolant-through tools
Sealed collet nut to supply coolant reliably through cutting tool.

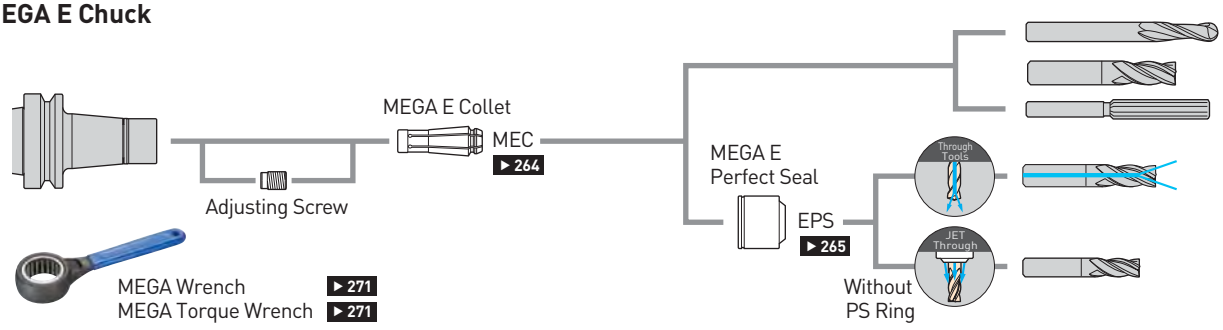




Ideal for burnishing drills and reamers due to extended gripping length.

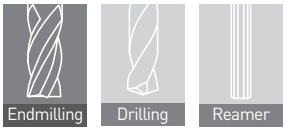
MEGA E Perfect Seal

MEGA E Chuck



MEGA DOUBLE POWER CHUCK®

Flange contacting nut and simultaneous taper & flange contact assure highest rigidity.



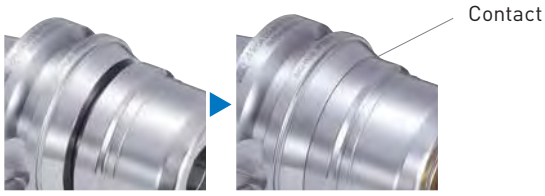
- max. 30 000 min^{-1}
- Clamping range: Ø 3 - 42
- Ideal for solid machines





Stabilizing contact between flange and nut provides exceptional rigidity

The expanded contact diameter of the nut of the MEGA Double Power Chuck to the flange provides the highest rigidity as if the chuck and nut were one solid piece. This superior rigidity assures heavier duty machining without chatter.



Released Tightened

Cutting conditions

Coated carbide endmill Ø32, 4-flutes Workpiece: SS400 (JIS) V282 m/min S2,800min-1 F1 120 mm/min	BBT50-MEGA32D-105 Radial d = 14 mm Power 15.2KW	Other manufacturer (L = 90) Radial d = 9.5mm Power 9.2 KW
		

Secure coolant supply

Two types are designed for the most effective coolant supply.

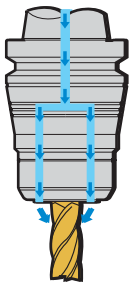
- Improved surface finish
- Extended tool life
- Smoother chip evacuation
- Cooling & lubrication of tools



Type D
through tools



Type DS
jet through



Various type of straight collets are available.

For jet through
PJC collet



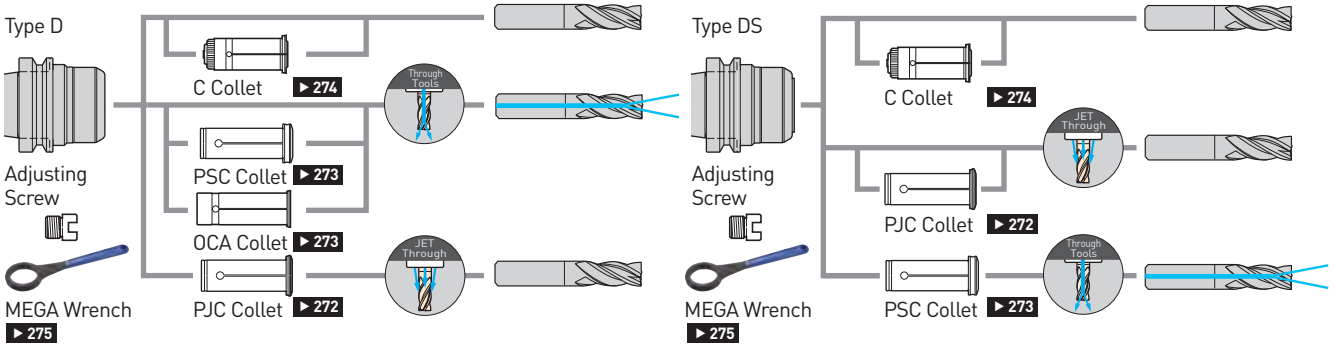
For through tools
PSC collet



For through tools
OCA collet

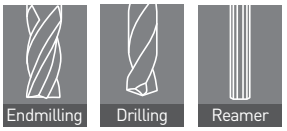


MEGA Double Power Chuck



New Baby Chuck

New Baby Chuck is capable of achieving high spindle speeds as required for drilling and end milling with smaller diameter cutting tools.



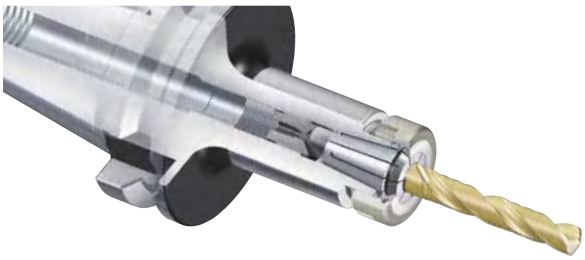
- Clamping range: Ø 0.25 - 20





Ideal combination of taper angle and collet projection length

New Baby Chuck satisfies all requirements for accuracy, clamping force and clamping range, by utilizing the ideal 12° taper angle.

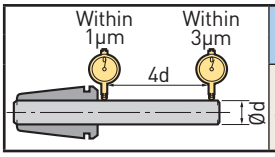


High concentricity



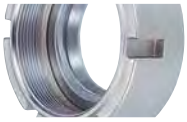
Each collet is inspected and double checked to meet maximum runout tolerance permitted.

Collet concentricity



Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

The nut is a key to achieve the highest precision of a collet

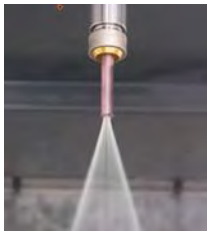


- Since the threads greatly influences accuracy, they are finished after heat treatment. Therefore, bad influence from clamping action is eliminated, which enhance clamping performance.
- A nut incorporates a thrust bearing with steel balls that prevents stress to a collet and allows a smooth clamping force to a collet.

For high pressure coolant supply

- Standard NBC Collet is used.
- High dust resistance
- Max. coolant pressure 7 MPa



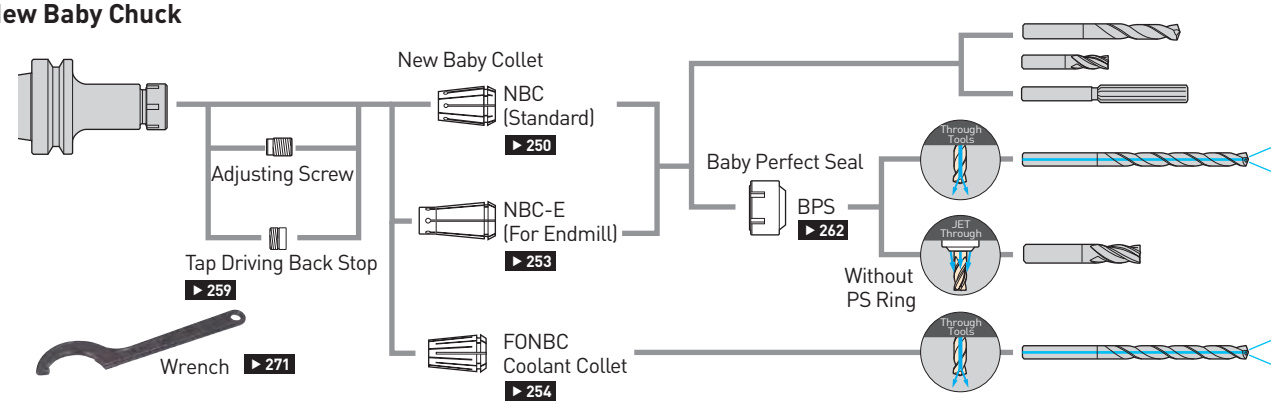


Through Tools
Tools with holes



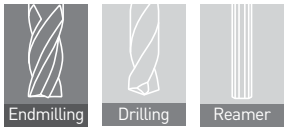
Jet Through
Tools without holes

New Baby Chuck



New Hi-Power Milling Chuck

New Hi-Power Milling Chuck combines the high accuracy with high torque capability and rigidity.



- Clamping range: Ø 3 - 42



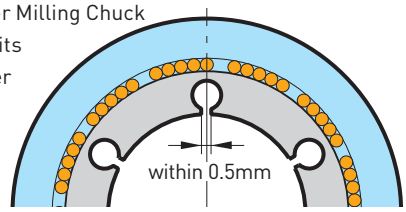


High rigidity design for heavy cutting



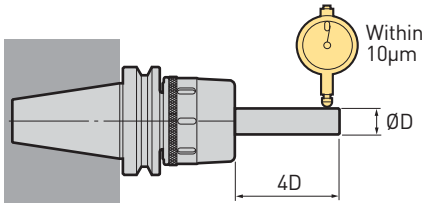
Secure and reliable slit design

The annular section needs to be substantial in order to provide rigidity but retain the ability to collapse in order to provide sufficient grip. The section of the Hi-Power Milling Chuck has combined holes and slits at regular intervals in order to combine both requirements.



Precise concentricity

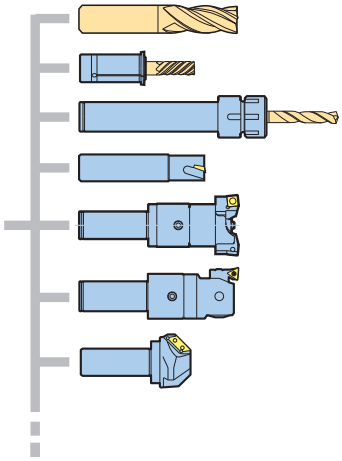
Concentricity is assured by the integral design and clamping by mechanical compression of the annular section by the rolling bearing system. All models are inspected and double checked to meet maximum runout tolerance permitted. (within 10µm at 4D).



Basic tool for various applications

New Hi-Power Milling Chuck is a good basic tool. Not only for milling tool, but also for boring tools, chamfering tools and various applications.





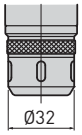
HMC12J type

Super slim design milling chuck with peripheral coolant supply function is also available.

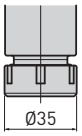




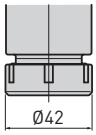
HMC12J



NBS13



NBS16



MEGA Perfect GRIP®

Features 100% security against pulling out the cutting tool under any torque load.

- Accepts industry standard Weldon flat milling cutters
- No special grinding of milling cutter required
- Flood jet-through coolant
- Available with BBT40/50/DV50 and HSK-A63/100/125







Simple, easy handling with secure clamping

1. Place the exclusive key grip into the Weldon flat of the end mill shank.
2. Insert the end mill with the key grip in alignment with one of the three key grip grooves inside the milling chuck.
3. Rotate the end mill approximately 20° clockwise until the key grip stops securely against the stopper pin.
4. Finish clamping the tool until the clamping nut contacts the positive stop of the chuck body.

Flood jet-through coolant

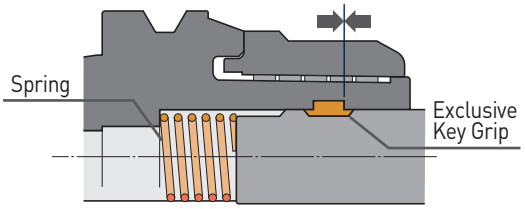
The key grip grooves provide channels for high volume coolant to the cutter. Effective end milling of HRSA's requires a high volume of coolant to the cutting edge to dissipate heat and aid in the removal of chips.





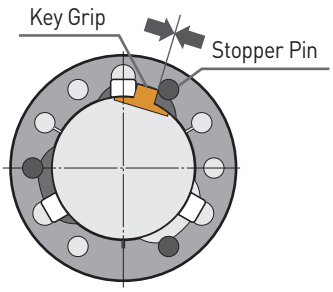
Non-Pullout mechanism

The Key Grip engages in the groove of the chuck body to ensure no tool pullout.



Non-Slip mechanism

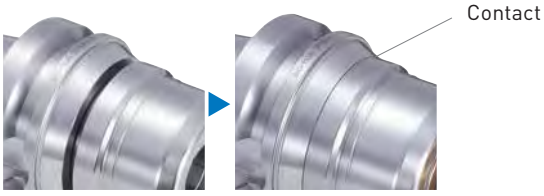
The Key Grip maintains contact with the stopper pin to prevent any slip under high torque.





Perfect contact between flange and nut

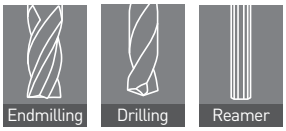
The expanded contact diameter of the nut of the MEGA Perfect Grip to the flange provides the highest rigidity.



Released Tightened

HYDRAULIC CHUCK

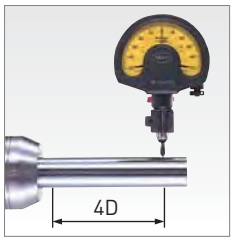
Ultra precision hydraulic clamping chuck holder with various additional features.







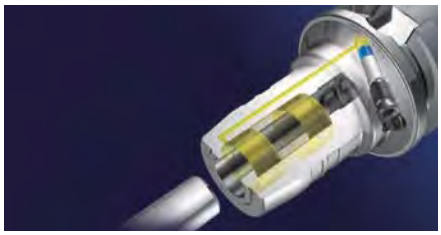
Runout accuracy less than 3 µm



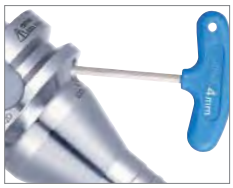
High precision runout accuracy less than 3µm at 4d improves the workpiece surface finish and extends tool life.

Integral sleeve construction

Compared with the traditional two-part construction sealed with O-rings, BIG KAISER Hydraulic Chucks are long lasting and maintenance free. Also the rigidity is greatly improved by the short projection length and dual pressure points.



Easy clamping with 1 wrench



The cutting tool can be clamped or unclamped easily and securely with just 1 wrench. Extremely good repeatability and runout accuracy are guaranteed.

Various selection of Hydraulic Chuck

The Hydraulic Chucks come in a variety of design and function to cover specific demands within high precision application.

- Slim and high speed
- Slim design available from Ø 3 mm
- Jet-through coolant supply





Super Slim Type

Super compact and high speed (max. 60 000 min^{-1})





Cylindrical shank with coolant-through

Jet-through coolant supply (max. 30 000 min^{-1})





Coolant to cutting tool periphery

MEGA SYNCHRO® Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



- Tapping range: M1 - M36







39 body models and 188 tap holder models are available
New large tap series achieves the max. M36. An extensive variety of bodies suitable for many spindle types. Short, middle & long tap holders are standardized to cover between M2 and M36.
The slim design avoids interference.

Secure drive system
Body and tap holder are fixed with a drive key in the rotation direction as well as the square of the tap.

Tool periphery
Coolant is supplied through slits of the tap holder.

Through tool
Coolant is supplied through both the tool and the slits of tap holder.

Coolant through center capability for all models
Coolant is supplied both through the tool and to the tool periphery simultaneously.



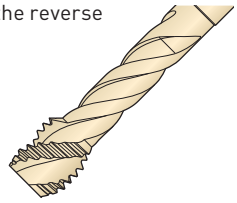
MEGA Synchro Tapping Holder compensates for synchronization errors with any type of tap

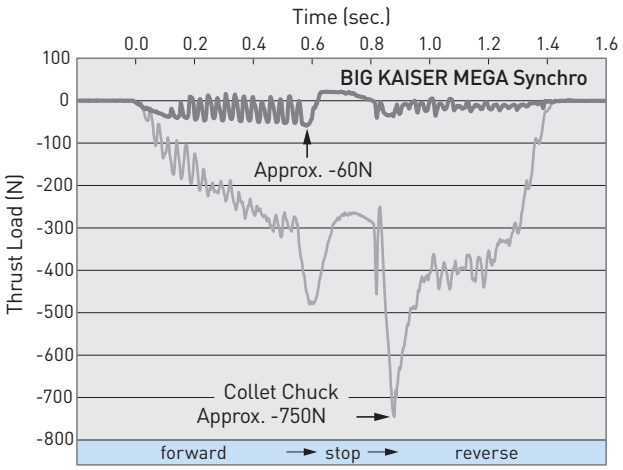
Minimized thrust load to both the tap and workpiece improves thread quality and tap life.

Load to tap – spiral tap

Spiral grooves on spiral tap cause loading in the reverse direction, similar to an end mill.

- M6 P1
- V: 20 m/min (1 060 min^{-1})
- Measured by Kistler dynamometer





Result

MEGA Synchro reduces load to approx. 60N. This is less than 1/10th of the load compared to a collet chuck. Approx. 750N of reversal load is applied to a tap held with a collet chuck.

Comparison of surface finish

Tapping of exotic materials tends to cause a compressed burr on the thread surface. BIG KAISER MEGA Synchro compensates for synchronization errors and minimizes cutting load.

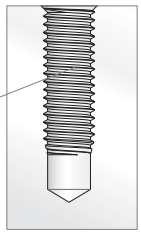
Spiral tap
M5 P0.8 Material : SNCM420(41CrNiMo2)



Collet chuck



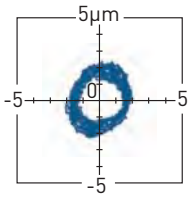
MEGA Synchro



For small tap MGT3 (M1 - M3)

Eliminated synchronization errors and minimized dynamic runout.
Plotted position of a test bar (at 16 mm distance on 4 mm diameter).





For large tap MGT36 (M22 - M36)

Smooth tapping for large tapping.



Smart Damper Series

Unique dynamic damping system eliminates vibration for higher productivity.

Anti-Vibration

- Unique damping system for milling and boring
- Center through coolant supply



Damping mechanism

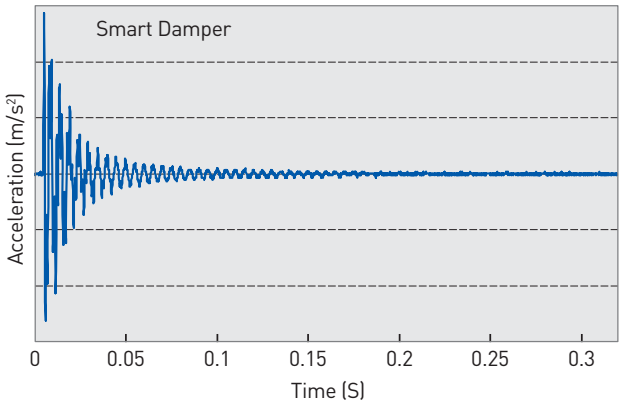
Smart Damper incorporates unique damping mechanism functioning both counter and friction dampers. Patent-pending counter weight maximizes effect of the friction damper. Vibration is absorbed effectively and higher machining accuracy is achieved.

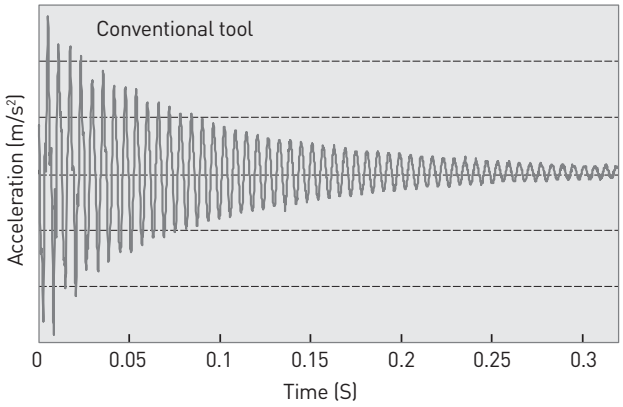


Face Mill Arbor Type FMH

Comparison of oscillatory waveforms

Smart Damper incorporates a unique counter force damping mechanism by friction dampers. Vibration is absorbed effectively and higher machining accuracy is achieved.





Face milling of C55 with high feed cutter

Holder	Radial depth of cut (mm)				Condition
	5	10	20	30	
Standard Holder	○	X	X		V=90m/min Fz=1.0/tooth Ap=2.0mm Overhang=347mm
Smart Damper	○	○	○		

Smart Damper achieves 6x deeper depth of cut.

Super finish surface with tough condition
Fine boring of ductile cast iron (FCD500) with horizontal MC
BIG-PLUS BBT50

Holder	Cutting speed (m/min)				Condition
	25	50	100	150	
Holder without damper	○	X	X		Dia=Ø68mm Depth=408mm (L/D=6) Insert radius=R0.4 Feed=0.2mm/rev Depth of cut=m0.3mm/Ø
Built-in Damper Smart Damper BBT50-CK-6DP-451	○	○	○		

X = Chattering ○ = Good ◎ = Excellent surface finish

6 times greater productivity. Superior surface finish and better tool life due to increased cutting speed.

Smart Damper CK Boring Tools

Wide variety, such as extension type, integral type, fine boring, rough boring are available depending on your application.



EWD/EWN Fine Boring Type
Damping function integrated in the head achieves the best surface finish.

SW Rough Boring Type
Damping function integrated in the head maximizes cutting performance.

CK Shank Integral Type
Damping function integrated in CK shank offers more flexibility in selecting the boring head.

CK Extension Type
Easy update of the existing CK boring to a damping boring tool.

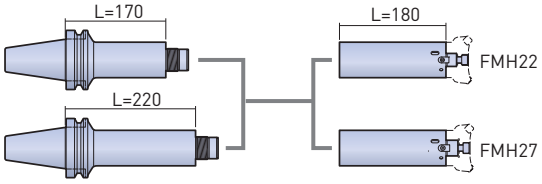
Smart Damper Face Mill Arbor

Replaceable damper head enables use on various basic holders.





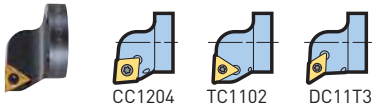
Combination examples BBT50



Smart Damper Turning

Newly developed for boring applications on turning machines. It performs perfectly in both roughing and finishing. Several cartridges are available for ISO insert, depending on the application.







Angle Head

Angle Heads eliminate multiple set-ups, combine vertical, horizontal and angular operations on one machine. One original set-up saves time, speeds production and guarantees accuracy.

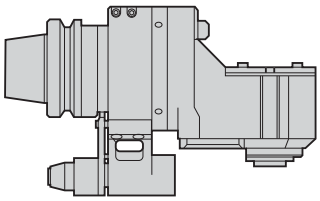
- Max. 6 000 min^{-1}
- Coolant-through from the locating pin





Compact design assures rigidity

Overhang is minimized for added rigidity and strength. As a result, the projection length with cutting tool is shorter, which reduces the overall load on the Angle Head and thus improves the unit's cutting capability. The minimized overhang helps to eliminate interference with the ATC and adjacent storage pockets in the tool magazine. High Rigidity S-type, which has a steel housing and a stronger locating pin assembly, is also available.



Unique coolant jacket



Jacket allows coolant coming through the stop block to be efficiently directed to the tool cutting edge while simultaneously cooling the Angle Head.

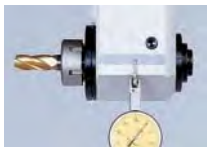
Innovative sealing method



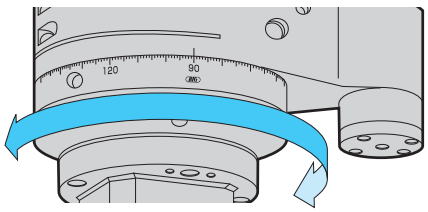
The advanced non-contact sealing method prevents coolant and particle contamination better than any other sealing method.

Cutter head adjustable 360°





Reference faces are provided on both sides of all heads for easier setting of a cutter direction.



Superior quality components



For smooth and powerful operation and to minimize noise and vibration, all Angle Heads are equipped with hardened and ground chrome-nickel steel spiral bevel gears, super precision hardened and ground spindles, and high precision angular contact ball bearing.

Various executions of Angle Head

More types are available to offer the best solution for your demand.

AG90 NBS type



AG90 Build-Up type



AGU type



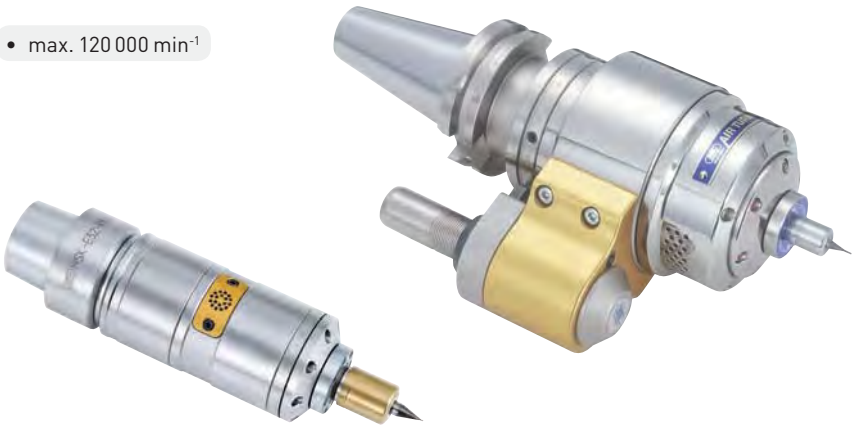
Small bore type



AIR TURBINE SPINDLE

High-speed micro-machining can be done on a normal machining center, eliminating the need of an expensive high-speed machine.

- max. 120 000 min^{-1}



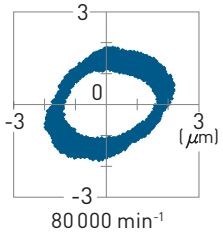


Dynamic runout accuracy

Most problems associated with micro-machining are caused by poor dynamic runout of a machine spindle. We have established a runout measuring system that can detect spindle movement during rotation at high speed and achieved the best dynamic runout accuracy.

- Improved machining accuracy
- Superior surface finish
- Extended tool life

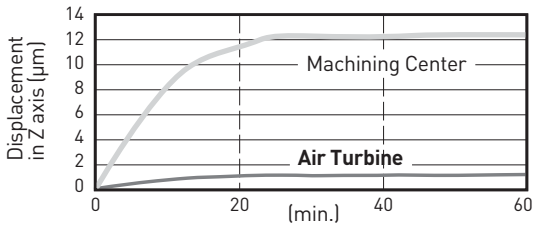
Plotted position of a test bar at the max. spindle speed (see image on the right).



Minimal thermal displacement

Air turbine drive prevents thermal expansion of the spindle, which is essential for high accuracy micro-machining.

Axial displacement compared to operating time

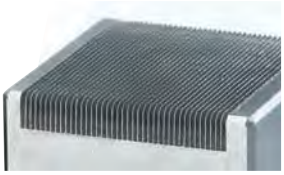


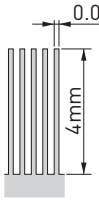
Application examples

RBX7

Aluminum A2017

Outstanding runout accuracy permits perfect thin wall cutting.



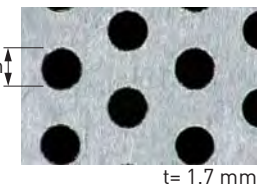


Cutter	Ø 0.5 mm rib-endmill
Spindle Speed	70 000 min^{-1}
Cutting Feed	1 500 mm/min
D.O.C	ap = 0.02 mm

RBX5

Stainless steel SUS303

Tool life is doubled with over 1 200 holes and cutting time is reduced to 1/3.



Cutter	Ø 0.5 mm solid drill
Spindle Speed	40 000 min^{-1}
Cutting Feed	20 mm/min
Peck	0.01 mm

Automatic tool change



ATC type is available by supplying air via a stop block to enhance productivity with unmanned operation.

3 types of Air Turbine Spindle

RBX5 = 50 000 min^{-1}
RBX7 = 80 000 min^{-1}
RBX12 = 120 000 min^{-1}

Application Range		RBX5	RBX7	RBX12
Drill	Ø < 0.1 mm	△	△	○
	Ø 0.1 - 0.3 mm	○	○	⊙
	Ø 0.3 - 0.5 mm	○	⊙	○
	Ø 0.5 - 1.0 mm	⊙	○	△
	Ø 1.0 - 1.5 mm	△	x	x
End Mill	Ø < 0.5 mm	○	⊙	⊙
	Ø 0.1 - 1.0 mm	⊙	⊙	△
	Ø 1.0 - 1.5 mm	⊙	△	x
Jig Grinding		⊙	⊙	○

⊙ Optimum
○ Acceptable
△ Dependent upon cutting conditions
x Not recommended for use

High Spindle

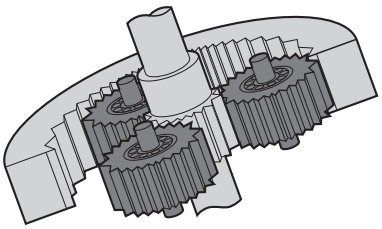
Precision speed increaser tool improves drilling and end-milling performance on existing machines by multiplying the spindle speed by 4, 5, or 6 times.

- max. 24 000 min^{-1}

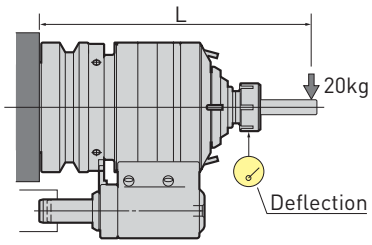




Reinforced gear driving system
The planetary gears, which have been constantly upgraded since the development of the first „High Spindle" back in 1970, achieves smooth operation with minimal heat generation and high torque transmission.



Rigidity increased 1.7 times
Larger diameter body and spindle with double angular contact bearings and reinforced locating pin assembly greatly increase rigidity.



Model	L	Deflection	Comparison
BBT40-GTG5-10-140-65	200	36 µm	58 % less
BBT50-GTG6-10-158-80	220	25 µm	78 % less
BBT50-GTG4-16-177-80	240	11 µm	93 % less

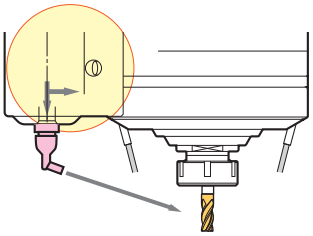
Reduce load to machine spindle
Continuous use at high spindle speeds will reduce the life of a machine spindle due to the excessive load to the motor and bearings. The High Spindle reduces this load and greatly extends the life of a costly machine spindle.

Multi-directional coolant supply
Universal Coolant Nozzles are capable of being adjusted to suit the length of cutting tool. Thus, the maximum coolant delivery to the cutting edge is assured.

Note: High Spindle can be operated without coolant running through the housing.

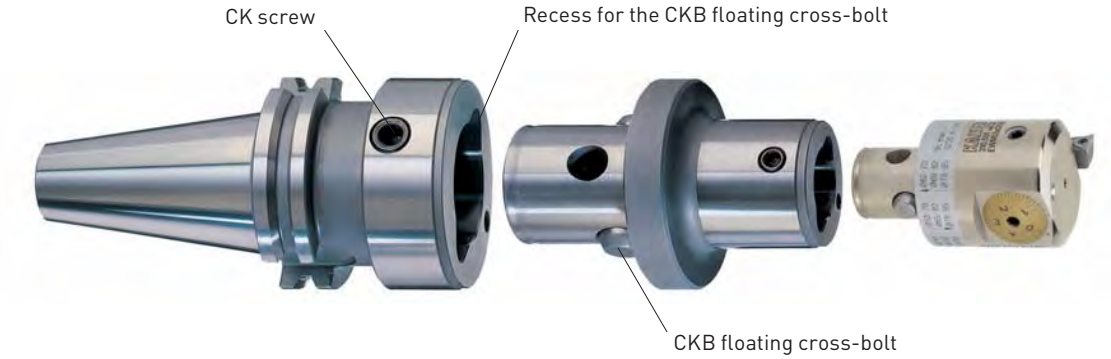


Pinpoint coolant jet for shorter cutting tools
A 1/8 pipe tap thread is provided in the High Spindle so that various types of customer supplied coolant-jet nozzles can be utilized which will provide pinpoint delivery to the cutting edge of short tools (BDV/BBT taper models only).



CK, CKB, CKN: Various Connections - One System

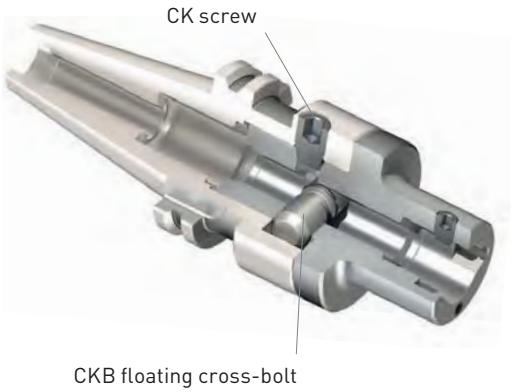
Based on a cylindrical connection with radial locking screw, the world-famous modular precision tool system BIG KAISER CK has continuously been improved over the years, and has adapted to customer's needs and the increases in machine tool performance. Compatibility to existing tools has always been a requirement for newer designs. This means that all BIG KAISER connections are almost 100% compatible, and all the components are kept in stock.

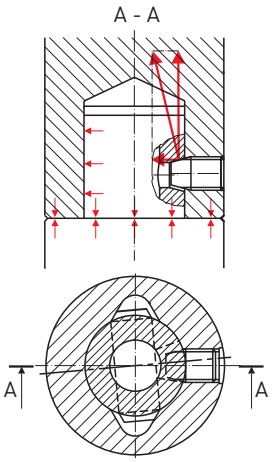


CKB Connection: Highly Efficient and Easy to Handle

The modular components are clamped with the lateral locking screw (CK-screw). The floating cross bolt is automatically centred in the trapezoid-shaped recesses in the mating part and ensures an absolutely uniform distribution of the torque forces.

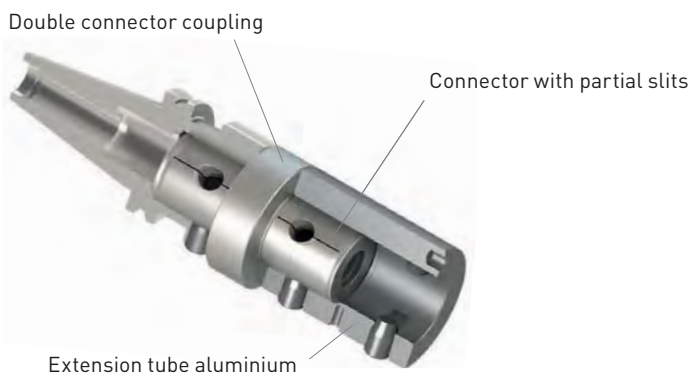
- Simple, efficient operation -no special equipment or tools needed
- Maximum rigidity due to high preloading forces and large contact surfaces
- Precise cutting edge location even when using several adapters
- High interchange accuracy, maximum radial change error is 0.002 mm

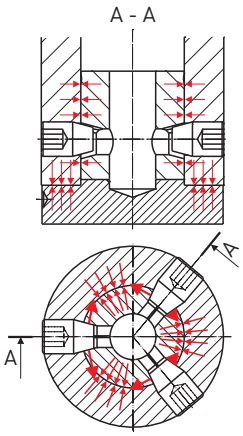




CKN Connection: for Lightweight and High Performance Tools

Based on a 3-screw-connection and a male pilot with 3 partial slits, the CKN connection is designed for lightweight- and high performance tools. The main components for the lightweight program are double connector couplings made of steel and extension tubes made of aluminium. The high performance program for enhanced radial stiffness is entirely made of steel components.

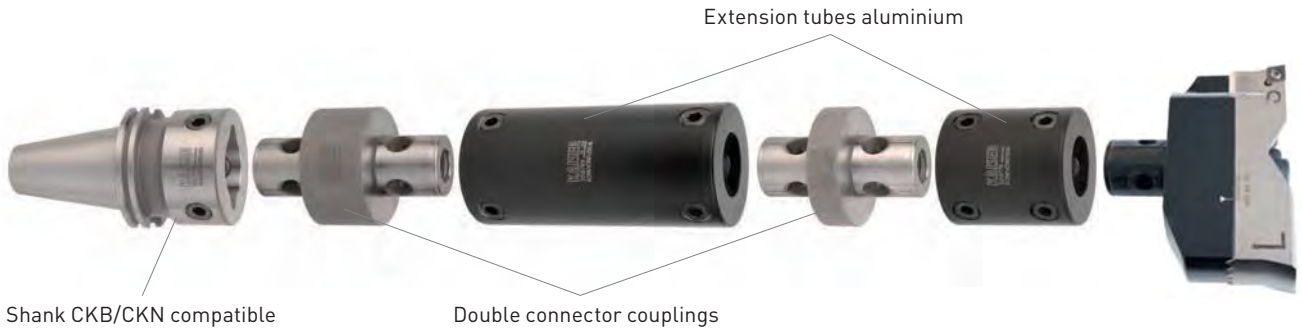




CKN Connection: Lightweight Program

The double connector coupling enables the use of aluminium extension tubes which result in a considerable weight reduction for larger tools. The torque transmission from the aluminium tube to the connector made of steel over three screws guarantees no reduction of cutting performance in comparison to tool combinations made of steel only.

CKN: the strongest tool connection for lightweight tools



CKN Connection: High Performance Program

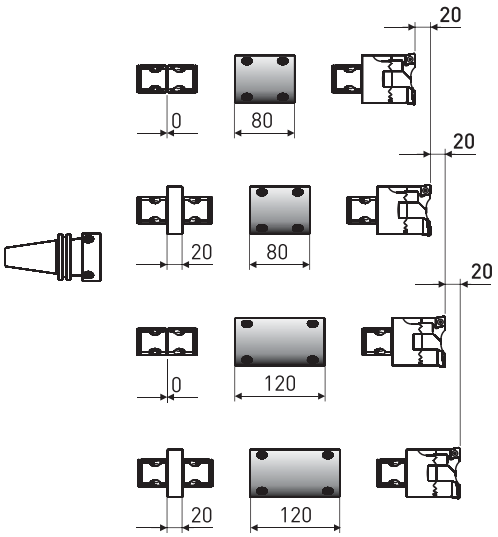
Tool combinations made of steel components, offer highest bending resistance for heavy duty milling with long tools.



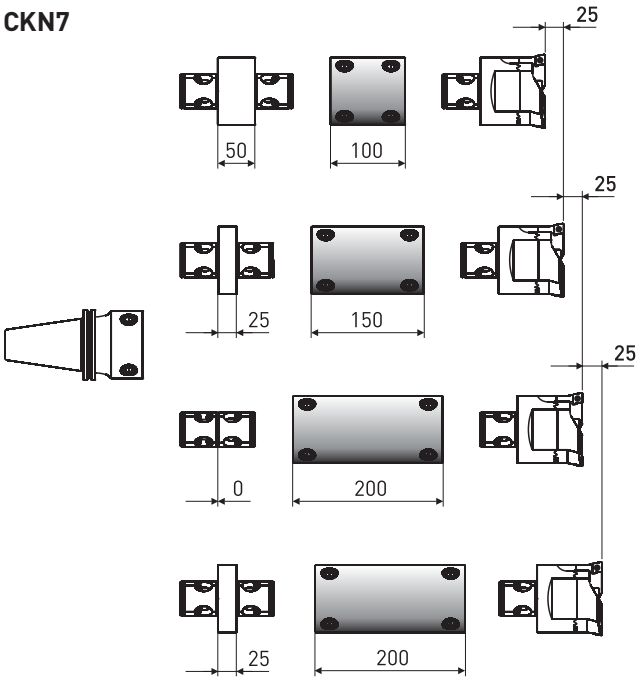
Optimized Tool Lengths

A few millimeters difference in tool lengths can determine whether a boring operation will be successful or not. The CKN components are made with a very fine length graduation of 20 mm for CKN6 and 25 mm for CKN7.

CKN6



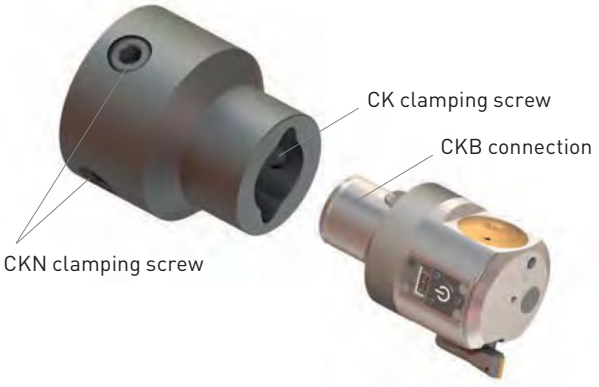
CKN7

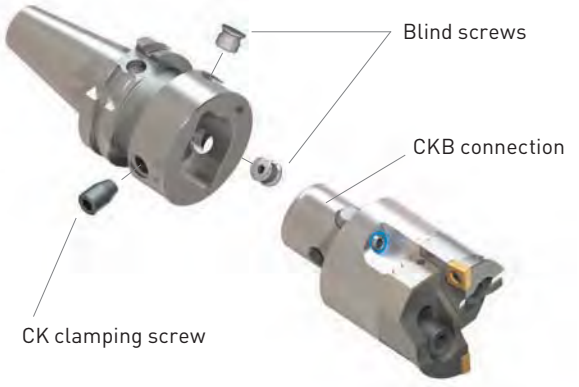


- Double connector coupling made of steel and aluminium extensions for the transmission of high torques
- Weight reductions up to 50% and equal cutting performance, compared to tool combinations made of steel
- Reduced weight allows easier handling and eliminates manual tool change in many cases
- Max. rigidity of the tool connection due to high clamping force and expansion of the slotted tool connector
- Vibration damping due to the use of different materials

Compatibility CKN - CKB

For compatibility reasons, the CKN shanks will be delivered with only one CK screw and two blind screws assembled. For CKN assemblies, the remaining two CK screws will be supplied with the mating component having the male CKN connection.





EWE Digital Fine Boring Heads

Fine boring heads EWE with digital display and direct electronic measuring system on the tool carrier, feature absolute setting accuracy. The boring heads are designed for ultra precise boring operations in the range from Ø 2 to Ø 152 mm with highest spindle speeds.

Same accessories for fine boring heads EWE and EWN.

- Boring range: Ø 2 - 152



EWE 2-152



EWE 2-32

Body protection grade: IP 69K
The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe from dust and high pressure spray water according to the protection category IP69K.

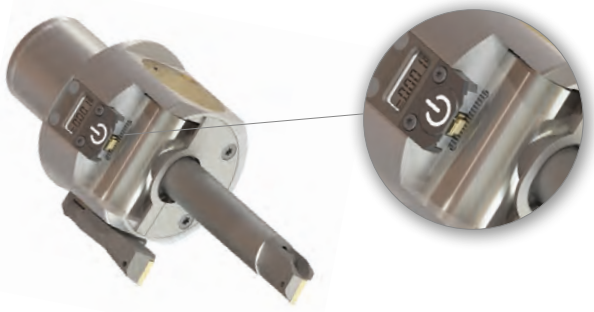
Digital display with a resolution of 0,001 mm Ø and Piezo button



Automatic switch off function which always stores the last displayed value and integrated power management for optimized battery life.

Piezo button for maintenance-free use

Electronic components – made by BIG KAISER
All electronic components are entirely developed and manufactured in the electronic lab of BIG KAISER in Switzerland. Before shipping, every digital boring head is calibrated and tested separately.



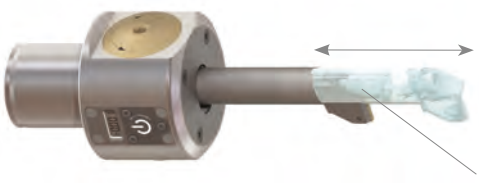
Integral execution available
Can be used for cylindrical bar from dia 2-80 and with peripherical insert holders from dia 80-152mm.



EWE 2-152 HSK-A63

Maximum rotation speed: 14 000 min-1
Tool carrier in center position allows n max. of 14 000 min^{-1} due to minimized imbalance.

Variable length adjustment of the tool holder
Best cutting results are only reachable if the tool holder is as short as possible. The EWE features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



Tool holder

EWE is defined as "Evolution" model of original digital boring head called EWD. Accessories of EWE are fully compatible with EWD and EWN.

EWN Fine Boring Heads

Fine boring heads with centric boring bars in modular and integral execution for accurate, high performance boring operations.

Same accessories for fine boring heads EWN and EWE.

- Boring range: Ø 0.4 - 152

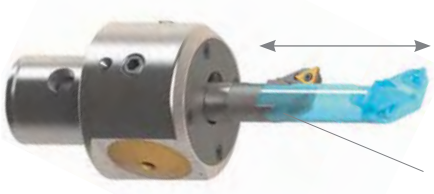


EWN 2-152



EWN 2-32 EWN 04-22 EWN 04-15 EWN 04-7

Variable tool length adjustment of the tool holder
Best cutting results are only reachable if the tool holder is as short as possible. The EWN features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



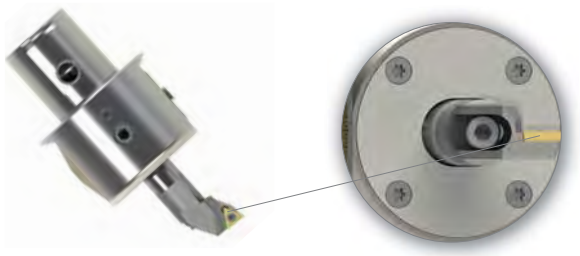
Tool holder

Large dial disc for a parallax-free reading
Thanks to the use of a vernier, diameter adjustments of 0.001 mm can be executed precisely.

Many integral executions available
In addition to the boring heads with CK-connection integral executions of the EWN 2-152 are available for DV, HSK, BT and BIG CAPTO spindles.



Fine balanced when tool carrier is set in center position
Tool holders made of carbide with adjustable insert holders permit diameter setting on the insert holder. The heavy tool holder remains in the center position and does not create any imbalance. The imbalance created by the insert holder is in most cases insignificant.



EWN 2-152: Huge boring range with just one tool
Additional boring range with peripherical insert holders from Ø 80 - 152 mm.

Ø 2 - 54 mm Ø 54 - 80 mm Ø 80 - 152 mm



EWE Digital Fine Boring Heads

The boring heads EWE with digital technology combine all advantages of the analogue boring heads EWN. Thanks to the large display with a resolution of 0.001 mm Ø bores with extremely tight tolerances can be machined.

Fine boring heads EWE and EWN feature equal boring ranges and body dimensions and allow the use of the same accessories.

- Boring range: Ø 41 - 203



EWE 68

Digital display with a resolution of 0,001 mm Ø



Automatic switch off function which always stores the last displayed value and integrated power management for optimized battery life.

Piezo button for maintenance-free use.

Body protection grade: IP 69K

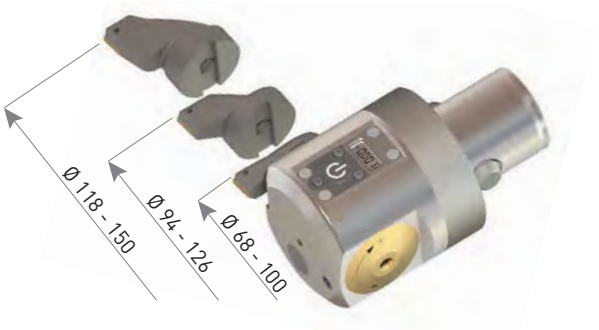
The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe form dust and high pressure spray water according to the protection category IP69K.

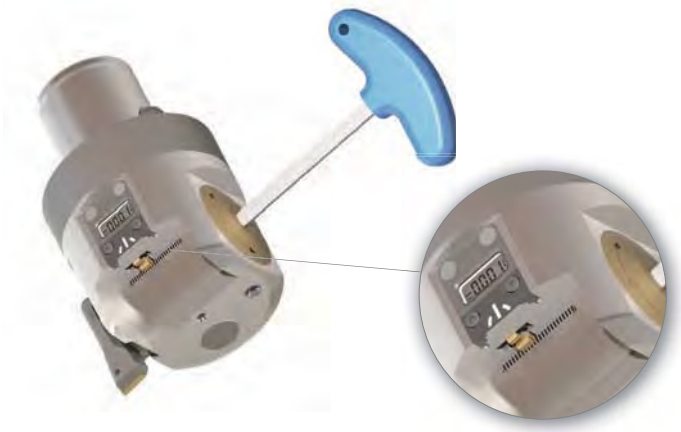
Large boring range

Every EWE has a large work range due to three different insert holders. For example: The EWE 68 can manufacture a diameter range from Ø 68 to 150 mm.

Direct measuring diameter allows corrections in both directions

With a direct electronic measuring system on the tool carrier and a resolution of 0.001 mm Ø, the fine boring heads EWE enable diameter corrections with an unmatched accuracy.





EWE is defined as "Evolution" model of original digital boring head called EWD. Accessories of EWE are fully compatible with EWD and EWN.

EWN Fine Boring Heads

The fine boring heads EWN series 310 cover a range of Ø 20 - 203 mm with only 7 fine boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.

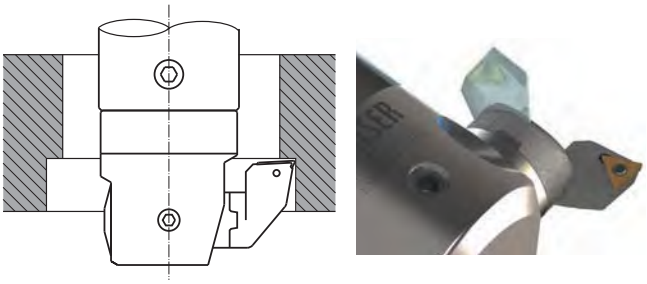
Fine boring heads EWN and EWE feature equal boring ranges and body dimensions and allow the use of the same accessories.

- Boring range: Ø 20 - 203



EWN 53

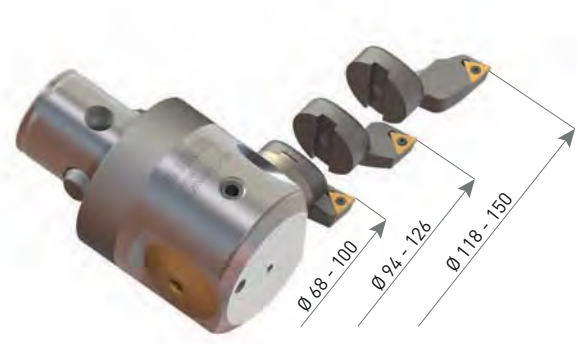
Back boring
Insert holder can be mounted in opposite direction for an easy changeover to back boring.



Versatile tool
Insert holders for many types of inserts (TP, TC, CC with different angles) as well as accessories for face grooving are available.



Large boring range
Every EWN fine boring head has a large work range due to three different insert holders. For example: The EWN 68 can manufacture a diameter range from Ø 68 to 150 mm.



Suitable with outer diameter turning system
Fine boring heads EWN/EWE are suitable for OD turning applications in the diameter range Ø 16 - 2856 mm. There are two different OD turning systems available.

Ø 16 - 120 mm



Ø 49 - 2856 mm



EWB Balanced Fine Boring Head

The precision balancing of the EWB with peripherical insert holder occurs automatically by the adjustment of the diameter. The EWB with centric boring bar is precisely balanceable via a balancing ring. To balance the whole tool combination there are prebalanced shanks and components available. Even at max. speeds, balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.

- Max. speed: 2 000 m/min



EWB 41

Aluminium executions available

The fine boring heads EWB-AL are made of high tensile aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%. This means that weight problems during ATC and handling are eliminated.



Self balancing mechanism

A counterweight built into the boring head compensates for the imbalance caused by the movement of the tool carrier.



Ready to work

The EWB fine boring heads will be delivered with assembled insert holder.



EWB 2-50



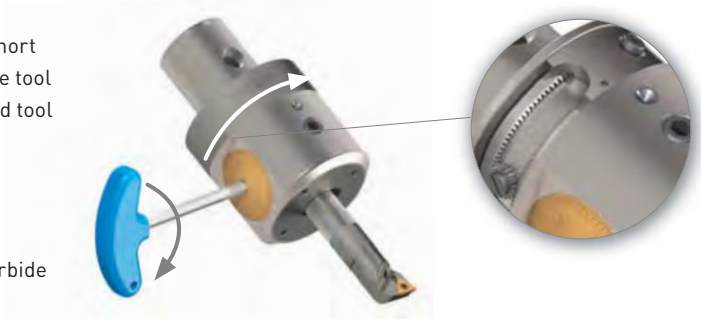
EWB 2-32

Precisely balanceable

The EWB fine boring heads have an integrated balancing mechanism. The imbalance of the boring head is compensated by a unique manually adjustable balancing ring.

Variable length adjustment of the tool holder

Best cutting results are only reachable if the tool holder is as short as possible. The EWB features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



Boring bars made of carbide

For optimized cutting results dedicated boring bars made of carbide are available.

SW Rough Boring Heads

The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.

- Boring range: Ø 20 - 203

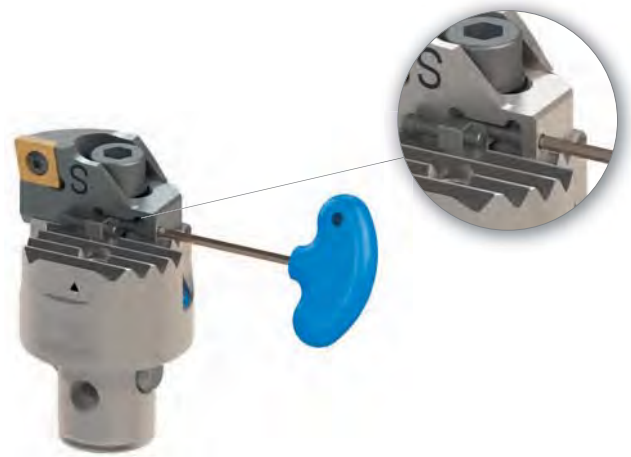


SW 68

Accessories for different applications
On the same body insert holders for back boring, chamfering or face grooving can be mounted.



Precise presetting
Presetting of the tool diameter and length without presetter thanks to fixed tool length and diameter scale.



SW AL: Aluminium executions available



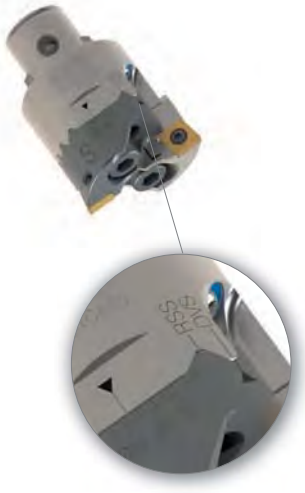
The rough boring heads SW AL of BIG KAISER set new standards for high performance roughing. The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance. Moreover it is more economical than circular interpolation milling when you have to execute deep bores. The rough boring heads are available in the sizes from SW 68 AL up to SW 148 AL.

BALANCE/STEP cut: Simply switch insert holders
A tool body with supports for insert holders of different heights, and insert holders of different lengths, provide an unmatched versatility to the new roughing tool. Without changing any components and without length adjustment, two different roughing methods, the rotationally-symmetrical-roughing (RSS/BALANCE) and the double offset roughing (DVS/STEP), can be executed.

RSS/BALANCE



DVS/STEP



Series 318 Large Diameter Boring Tools

The series 318 is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.

- Boring range: Ø 200 - 620
- Boring range: Ø 620 - 3 000



DV40 and HSK-A63 up to 340 mm
Even on machines with smaller spindles the series 318 can be operated.



Innovative construction
Coolant supply through all components directly to the cutting edge. High strength and hard coated aluminium, and nickel coated steel components for scratch resistant and rust protected surfaces.

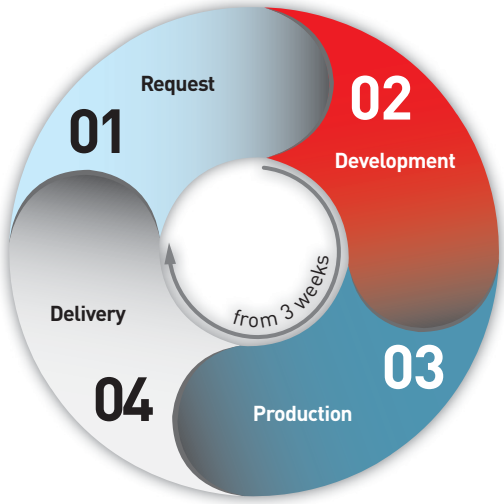
Versatile system
Series 318 is for various applications such as rough boring, fine boring, OD turning, and face grooving.



Roug Boring | Fine Boring | Face Grooving | OD Turning

BIG KAISER Special Tools

You need an insert holder or a shank in a special execution for your BIG KAISER boring head? No problem: the BIG KAISER team for special tools will quickly and professionally deal with your request.



Your advantages
- Offer in 24h
- Delivery from 3 weeks
- Competent advice from our experienced team

Insert holders
- Roughing with free insert selection for the SW rough boring heads
- Insert holder in any shape and size for the EWN/EWE fine boring heads
- For contouring, chamfering or OD turning



Tools for several diameters
- Rough boring tool with fixed insert pockets and cartridges. Thanks to CKB connection, the tool is independent of a spindle system
- Fine boring tool with BIG KAISER adjustment cartridges
  Adjustment precision: 0.01mm Ø



BIG KAISER Insert Development

The customer shall reach the best possible results in terms of performance, precision and cost efficiency for all boring operations with BIG KAISER rough and fine boring tools. Therefore, not only outstanding boring tools are required, but also inserts, specially designed for boring, which fulfil the highest demands.



«The selection of the indexable insert is decisive for the machining process and reduces production costs.»

Stefan Appenzeller, Head of Product Management BIG KAISER

The results of the developments and tests are shown in the BIG KAISER app. In there, you'll find the most suitable inserts for the variety of workpiece materials and machining processes in relation to the tool configuration. The app shows precise cutting data for all applications.

Download on the App Store

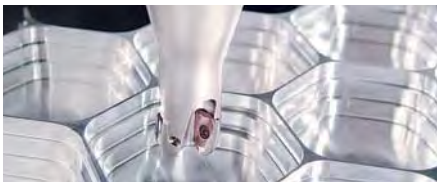
GET IT ON Google Play



FULLCUT MILL

Indexable insert endmills with both excellent sharpness and toughness, achieving the performance of solid endmills.

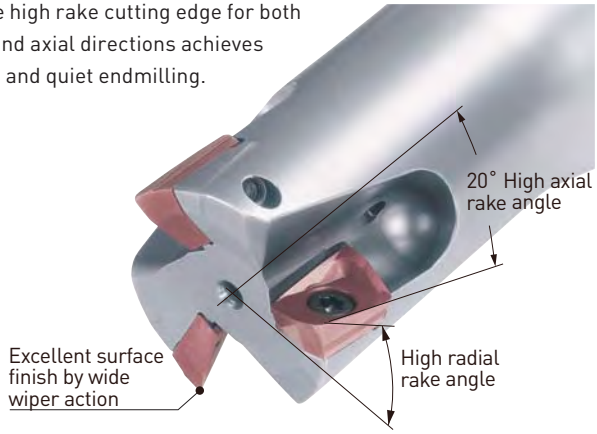






Sharp cutting edge by both high radial and axial rake angles

Positive high rake cutting edge for both radial and axial directions achieves smooth and quiet endmilling.



Amazing cutting performance, brought by integral deign and face contact body

Integral design style with taper shank and flange contact with the machine spindle provides higher precision and rigidity thus achieving cutting conditions only otherwise available on larger machines.

BBT and BDV type

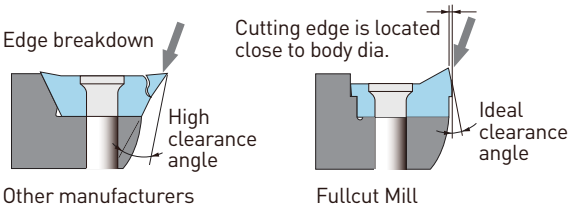


HSK type





Strong cutting edge reduces edge chipping



Contact Grip

- Threaded coupling with taper and face contact
- Resistant to chatter due to the dual contact connection
- FCM or FCR heads can be installed on the base holder



Ø 16 - 32 mm

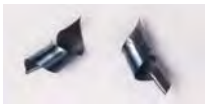
Amazing cutting performance even on #40 taper machine

Comparison of axial DOC between integral type with face contact and straight shank type. 3.6 times higher cutting performance than other manufacturer.

Cutting condition

Machine:	BBT40 (BIG-PLUS)
Slot milling:	20 mm
Work material:	C50 (S50C)
Spindle speed:	2 400 min^{-1}
Speed:	V = 150 m/min
Feed:	0.12 mm/tooth

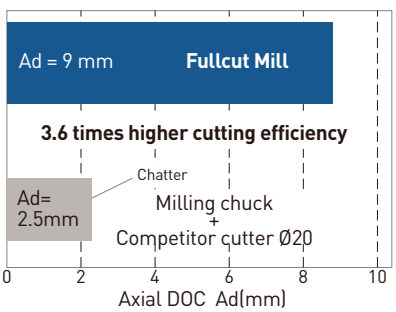






Excellent surface





Fullcut Mill Type FCR

Unique inserts designed for ramping make multi-functional cutting possible.



- Cutter: Ø 16 - 33

Higher rigidity with integral body with dual contact system.

BBT and BDV Type



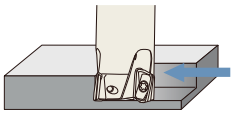
HSK Type



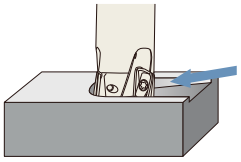
Cylindrical Shank Type



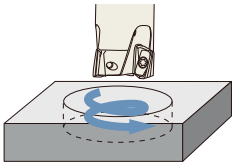
Shoulder Milling



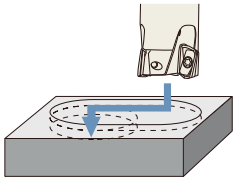
Ramping



Helical Milling

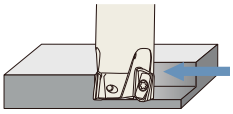


Peck-Drilling



Fullcut Mill Type FCM

Shoulder Milling





- Cutter: Ø 12 - 100

A variety of shanks including simultaneous fit with integral body.

BBT and BDV Type



HSK Type



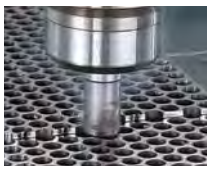
Cylindrical Shank Type



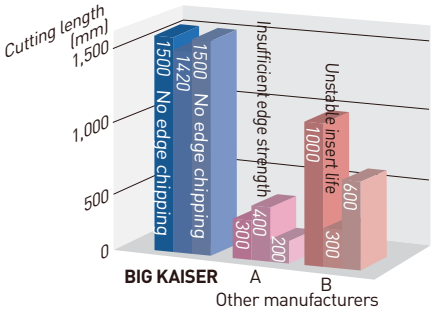
Arbor Type



Tough cutting edge of Fullcut Mill is proven



An evaluation of cutting length/life as measured when machining the most arduous workpiece by milling over a continuous series of holes. This is the condition most likely to cause edge chipping.

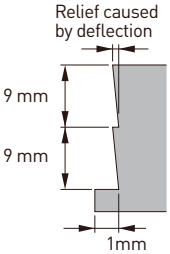


Finishing with indexable endmill - Why not?

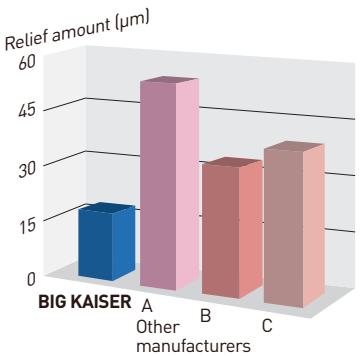


Insert with the minimum nose radius of 0.2mm and superb squareness to achieve high precision end milling comparable with solid carbide tools.

Work material:	SUS304
Vertical M/C:	No. 40
Cutter dia.:	Ø 25 mm
Feed:	0.12 mm/tooth



Squareness is influenced by the cutting parameters, work materials, rigidity of machine and workpiece, etc.



SPEED Finisher

Amazing improvement of surface finish at high speed cutting.
RZ = 0.55 µm with aluminum die casting ADC12
RZ = 0.67 µm with gray cast iron FC250

- Cutter: Ø 50, Ø 63, Ø 80, Ø 100, Ø 125





Quick adjustment of cutting edge height

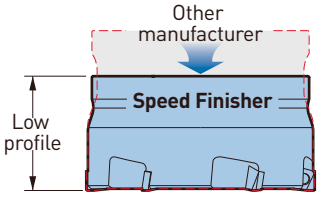
After clamping the insert, lifting screw lifts up the insert directly by revolving the lifting nut from its side. Simple construction aids easy adjusting operation. Fine pitch thread of the lifting screw ensures precise adjustment.





Lightweight & high rigidity

Low-profile cutter body enhances rigidity, minimizes vibration and distortion, leading to the minimized height difference of the machined surface. Lighter weight resulted from reduced mass aids performance on small machine tools such as BT30 spindle.



PL Presetter

Exclusive PL Presetter shortens the setup time further up to 15 sec./insert while avoiding chipping of the cutting edge.

- The cutting edge presetting is required



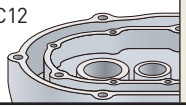
Secure coolant supply to the cutting edges

Coolant is supplied to the cutting edge directly in combination with the Face Mill Arbor type FMH. Especially effective to avoid built-up edges when cutting aluminum and possible re-cutting of the swarf.



Application example

(Cutter: Ø 80 mm)

Workpiece	Conditions	Surface Roughness	Height Difference	No. of Workpieces	Result
Crankcase ADC12 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min^{-1} Feed rate: 9 550 mm/min Depth of cut: 2.5 mm	Ra=0.08 µm Rz=0.55 µm	Within 1 µm	24 000	Rough and finish processes are combined in a single operation.

C-CUTTER mini

Compact design with 4 inserts and small cutting diameter. High performance chamfer cutter to achieve ultra high feed rate by reducing the cutting diameter to the lowest limit.

- For multi-functional cutting: chamfering, back chamfering and face milling



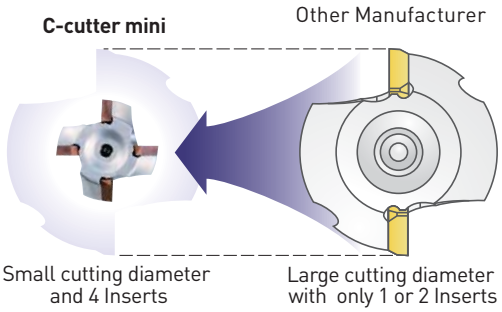


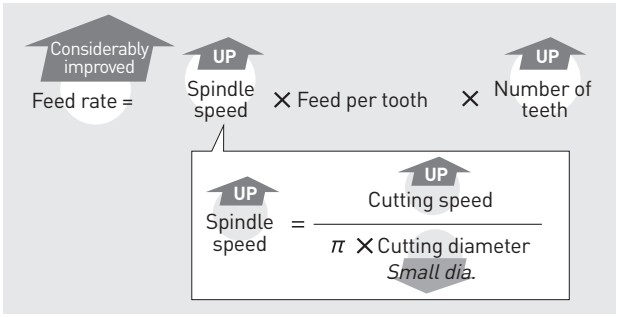
4 Inserts, small diameter and new coating achieve triple effect

1. Superb design. Ultra high feed by 4 Inserts.
Compared with 1 or 2 inserts per cutter, a 4 insert cutter multiplies feed rate.

2. Increased spindle speed by ultra compact diameter
A smaller tool diameter means faster spindle speeds.

3. Latest coating (ACP200) increases the cutting speed.
Wear resistant multi layer PVD coating increases the cutting speed.

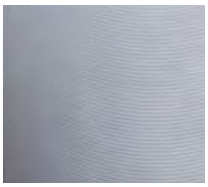




World smallest hex insert
Highly-efficient back chamfering from 6 mm starting hole diameter. 3-corner insert saves cost.



Versatility of the insert
Sharp cutting edge of C-Cutter mini insert make superior surface finish. The same insert can be used with BIG KAISER's original design face mill arbor, Surface Mill.





Surface Mill Rz = 1.42
Material = C50
V = 200 m/min
Fz = 0.2 mm/min
Ap = 3
Ad = 75

New series for starting hole for tapping are available from M8 to M20 range



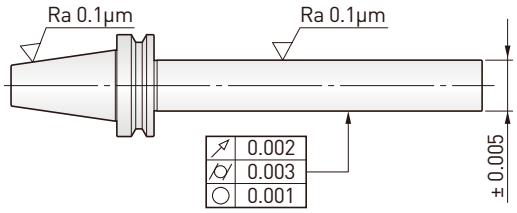


DynaTest





Precision standard of BIG KAISER Test Arbors
BIG KAISER provides high quality test bars, produced under a strict quality control system.



Runout	0.002 mm
Roundness	0.001 mm
Cylindricity	0.003 mm
Roughness	Ra: 0.1 μm
Diameter tol.	± 0.005 mm

Alminum case
An aluminum case is provided to protect and store the test bars. (Some models are provided in a wooden box.)



Calibration certificate and traceability system
BIG KAISER can offer a calibration certificate with traceability on request as per ISO9000 requirements.

Torque Fit

Controlling tightening torque for BIG KAISER Tool assembly station with integrated torque measuring system.

- Digital display helps to reach the proper torque
- Tightening values for BIG KAISER collet chuck series data are preset
- Beeping on & after the proper tightening
- User mode for the customized torque value
- Error LED lightening at the overtightening
- Replaceable adaptors available for different interfaces



The starting point for the high precision cutting is proper tightening.

Insufficient tightening	Variant cutting	Cutting Error
	edge position	Dimensional Error
Over tightening	Collet deformation	Shorter Cutter Life
	Deteriorted runout	Shorter Tool Holder Life

Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously. LED and buzzer indication when leveling is complete.

Wireless

- LED lamp + beep sound
- Simultaneous 2-axis detection saves the extra time & cost of using 2 levelers.
- 0.01 mm/m readable value



Standard Type



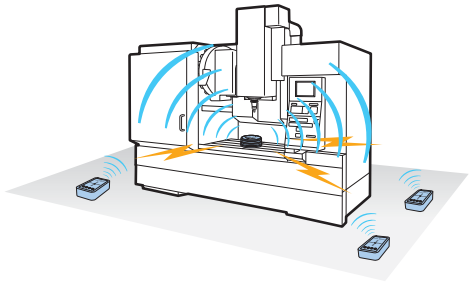
Wireless Type



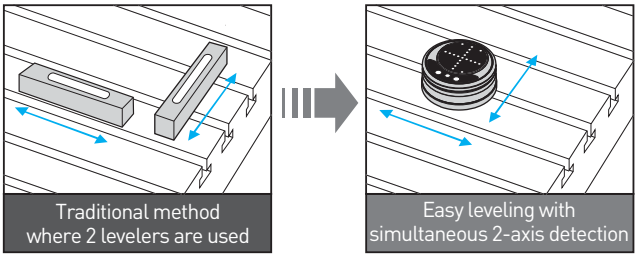


Easy leveling with the remote display

Leveling by the single operator can be achievable by the use of the remote display while 2 operators have been necessary until now to allow them to conduct the level detecting inside the machine housing and the table leveling from outside of the machine separately.



Simultaneous 2-axis detection



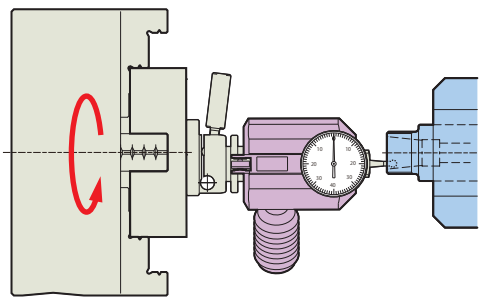
Centering Tool for Lathes

Revolutionary centering tool for lathe machines that allows the operator to fix the center very easily and quickly.

- Centering the tool holder while watching the dial gauge made possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 0.01mm)
- Magnet base allows for flexible mounting positions
- Compact designed body is suitable for small lathe machining







Tool Holders BBT/BT, JIS B 6339

MEGA Micro Chuck	46 - 47
MEGA New Baby Chuck	48 - 51
MEGA E Chuck	52
MEGA Double Power Chuck	53 - 54
MEGA Perfect Grip	55
New Baby Chuck	56 - 57
New Hi-Power Milling Chuck	58 - 59
Hydraulic Chucks	60 - 63
Shrink Chucks	64 - 65
MEGA Synchro Tapping Holder	66 - 67
Side Lock Holders	68 - 69
Morse Taper Holders	70
Holders for Screw-On Cutters / Side Cutter Arbors	71
Face Mill Arbors	72
Smart Damper	73
CK Shanks	74 - 76
BIG CAPTO Basic Holder	77
Angle Heads	78 - 87
Air Turbine Spindle / High Spindle	88 - 92
Dyna Test	93

A.1

MEGA Micro Chuck Type T

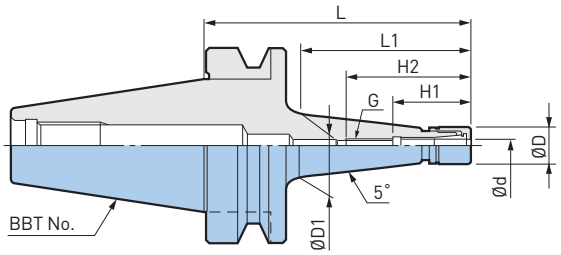
Taper-off design minimizes interference and maximizes rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1





BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 0.45 - 8.05 mm**

Model	Order No.	Ød	ØD	ØD1	L	L1	H1	H2	G	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BBT30-MEGA3S - 45T	**969.209**	0.45 - 3.25	10	11.5	45	20	22	38	M4 P0.7	40 000	NBC3S-	MGN3S	0.42
- 75T	**969.210**			16	75	48							0.45
- 90T	**969.211**			18.5	90	63				35 000			0.48
-MEGA4S - 75T	**969.214**	0.45 - 4.05	12	17.5	75	48	26.5	47	M5 P0.8	40 000	NBC4S-	MGN4S	0.47
- 90T	**969.215**			20.0	90	63				35 000			0.50
-MEGA6S - 60T	**969.218**	0.45 - 6.05	14	16.5	60	33	28.5	49	M7 P0.75	40 000	NBC6S-	MGN6S	0.45
- 75T	**969.319**			19	75	48							0.47
- 90T	**969.220**			22	90	63				35 000			0.51
-105T	**969.221**			24.5	105	78				30 000			0.56
-120T	**969.222**			22	120	93				25 000			0.62
-MEGA8S - 75T	**803.597**	2.95 - 8.05	18	23.0	75	48	31	50.5	M9 P0.75	40 000	NBC8S-	MGN8S	0.51
-105T	**803.598**			28.0	105	78				30 000			0.62
BBT40-MEGA3S - 90T	**969.322**	0.45 - 3.25	10	17.5	90	58	22	38	M4 P0.7	28 000	NBC3S-	MGN3S	1.1
-120T	**969.323**			23	120	88				22 000			1.2
-MEGA4S - 60T	**969.324**	0.45 - 4.05	12	14	60	28	26.5	47	M5 P0.8	35 000	NBC4S-	MGN4S	1.0
- 90T	**969.326**			19.5	90	58				28 000			1.1
-120T	**969.328**			24.5	120	88				22 000			1.2
-MEGA6S - 60T	**969.330**	0.45 - 6.05	14	15.5	60	28	28.5	49	M7 P0.75	35 000	NBC6S-	MGN6S	1.1
- 75T	**969.331**			18.0	75	43				32 000			1.1
- 90T	**969.332**			21	90	58				28 000			1.1
-105T	**969.333**			23.5	105	73				25 000			1.1
-120T	**969.334**			26	120	88				22 000			1.2
-135T	**969.335**			29	135	103				20 000			1.3
-MEGA8S - 90T	**801.720**	2.95 - 8.05	18	24.5	90	58	31	50.5	M9 P0.75	30 000	NBC8S-	MGN8S	1.2
-120T	**803.601**			30	120	88				22 000			1.2

1. MEGA nut is included.

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▸ 247	Micro Seal Nut  ▸ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

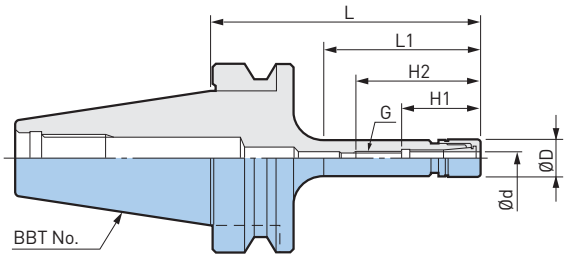
MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

BIG-PLUS Dual-Contact

Coolant Through Hole





BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 0.45 - 8.05 mm**

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BBT30-MEGA6S - 90	**969.504**	0.45 - 6.05	14	90	62	28.5	49	M7 P0.75	40 000	NBC6S-	MGN6S	0.47
-105	**800.058**			105	73							0.49
-MEGA8S - 90	**803.608**	2.95 - 8.05	18	90	60	31	50.5	M9 P0.75	35 000	NBC8S-	MGN8S	0.51
BBT40-MEGA4S - 90	**969.506**	0.45 - 4.05	12	90	53	26.5	47	M5 P0.8	35 000	NBC4S-	MGN4S	1.0
-MEGA6S - 90	**969.508**	0.45 - 6.05	14			28.5	49	M7 P0.75		NBC6S-	MGN6S	1.0
-MEGA8S - 90	**803.599**	2.95 - 8.05	18		55	31	50.5	M9 P0.75	30 000	NBC8S-	MGN8S	1.1

1. MEGA nut is included.

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▸ 247	Micro Seal Nut  ▸ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	**Model**	**Order No.**	**Model**	**Order No.**	**Model**	**Model**	**Model**	**Order No.**	**Model**	**Order No.**
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

MEGA New Baby Chuck

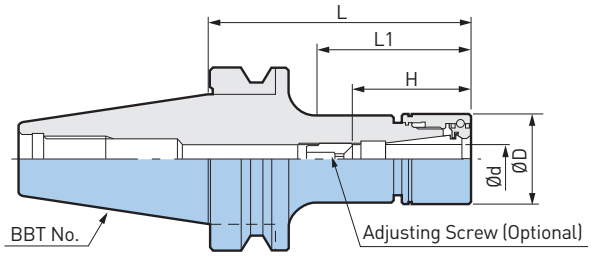
Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1



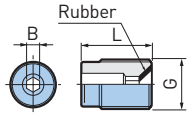


BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	H	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BBT30 -MEGA6N - 60	**969.509**	0.25 - 6	20	60	32	23 - 43	40 000	NBC 6-	MGN6	0.47
- 75	**969.341**			75	47		35 000			0.50
- 90	**969.510**			90	62		30 000			0.53
-105	**969.342**			105	77		20 000			0.56
-120	**969.343**			120	90					0.59
-MEGA8N - 60	**969.511**	0.5 - 8	25	60	34	26 - 45	40 000	NBC 8-	MGN8	0.51
- 75	**969.344**			75	49		35 000			0.56
- 90	**969.512**			90	64		30 000			0.61
-105	**969.345**			105	79		18 000			0.67
-120	**969.346**			120	92					0.72
-MEGA10N - 60	**969.513**	1.5 - 10	30	60	34	38 - 48	40 000	NBC10-	MGN10	0.54
- 75	**969.347**			75	49		30 000			0.61
- 90	**969.534**			90	64		25 000			0.68
-105	**969.348**			105	79		18 000			0.75
-120	**978.207**			120	94		15 000			0.82
-MEGA13N - 60	**969.516**	2.5 - 13	35	60	34	44 - 63	40 000	NBC13-	MGN13	0.57
- 75	**969.349**			75	49		30 000			0.67
- 90	**969.517**			90	64		25 000			0.77
-105	**969.350**			105	79		18 000			0.87
-120	**969.518**			120	94		15 000			0.97
-MEGA16N - 60	**969.519**	2.5 - 16	42	60	37	48 - 63	35 000	NBC16-	MGN16	0.61
- 75	**969.351**			75	52	48 - 68	25 000			0.75
- 90	**969.520**			90	67		20 000			0.89
-105	**969.352**			105	82		18 000			1.04
-MEGA20N - 60 *	**969.521**	2.5 - 20	46	60	-	70	30 000	NBC20-	MGN20	0.64
- 75	**969.353**			75	-	51 - 68	20 000			0.78
- 90	**969.522**			90	-		15 000			0.93
-105	**969.354**			105	-		13 000			1.08
-MEGA25N - 85 *	**806.379**	15.5 - 25.4	60	85	-	80	12 000	NBC25-	MGN25	1.13

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used.
4. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4
MEGA25N	MGN25	**806.388**	MGR60L	**969.468L**	NBC25-	-	NBA25B	**806.389**	M27	20	4

Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	H	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BBT40 -MEGA6N - 60	**969.523**	0.25 - 6	20	60	27	23 - 43	35 000	NBC6-	MGN6	1.0
- 75	**969.361**			75	38					1.1
- 90	**969.524**			90	53					1.1
-105	**969.362**			105	68		20 000			1.2
-120	**969.363**			120	83					1.2
-135	**969.525**			135	98					1.2
-165	**969.526**			165	128		14 000			1.2
-200	**969.527**			200	163		9 000			1.3
-MEGA8N - 60	**969.528**	0.5 - 8	25	60	27	26 - 45	35 000	NBC8-	MGN8	1.0
- 75	**969.364**			75	38					1.1
- 90	**969.529**			90	53					1.1
-105	**969.365**			105	68		20 000			1.2
-120	**969.366**			120	83					1.2
-135	**969.530**			135	98					1.3
-165	**969.531**			165	128		14 000			1.3
-200	**969.532**			200	163		9 000			1.4
-MEGA10N - 60	**969.533**	1.5 - 10	30	60	27	38 - 48	35 000	NBC10-	MGN10	1.1
- 75	**969.367**			75	38					1.2
- 90	**969.514**			90	53					1.2
-105	**969.368**			105	68		20 000			1.3
-120	**969.369**			120	83					1.4
-135	**969.535**			135	98					1.4
-165	**969.536**			165	128		15 000			1.5
-200	**969.537**			200	163		10 000			1.7
-MEGA13N - 60	**969.538**	2.5 - 13	35	60	31	44 - 63	35 000	NBC13-	MGN13	1.1
- 75	**969.370**			75	40					1.2
- 90	**969.539**			90	55					1.3
-105	**969.371**			105	70		20 000			1.4
-120	**969.372**			120	85					1.5
-135	**969.540**			135	100					1.6
-165	**969.541**			165	130		15 000			1.8
-200	**969.542**			200	165		10 000			2.0
-MEGA16N - 60	**969.543**	2.5 - 16	42	60	31	48 - 68	30 000	NBC16-	MGN16	1.2
- 75	**969.373**			75	40					1.3
- 90	**969.544**			90	55					1.4
-105	**969.374**			105	70		20 000			1.6
-120	**969.375**			120	85					1.7
-135	**969.545**			135	100					1.8
-165	**969.546**			165	130		15 000			2.0
-200	**969.547**			200	165		10 000			2.3
-MEGA20N - 60	**969.548**	2.5 - 20	46	60	31	51 - 68	30 000	NBC20-	MGN20	1.1
- 75	**969.376**			75	42					1.3
- 90	**969.549**			90	57					1.4
-105	**969.377**			105	72		20 000			1.6
-120	**969.378**			120	87					1.8
-135	**969.550**			135	102					1.9
-165	**969.551**			165	132		15 000			2.1
-200	**969.552**			200	167		10 000			2.5
-MEGA25N- 75	**806.380**	15.5 - 25.4	60	75	47	64-74	24 000	NBC25-	MGN25	1.6
- 90	**806.381**			90	62		20 000			1.9
-105	**806.382**			105	77		19 000			2.2
-120	**806.383**			120	92		17 000			2.5

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

For BBT50, refer to the following page.

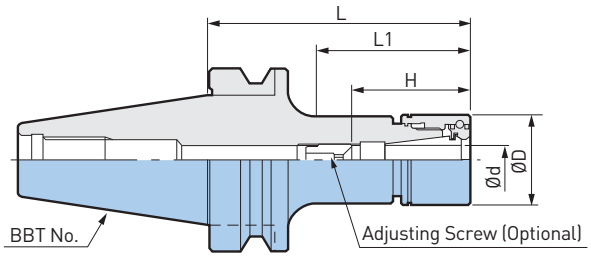
MEGA New Baby Chuck

Dual-Contact

Coolant Through Hole

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



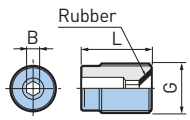


BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	H	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BBT50 -MEGA6N - 90	**969.553**	0.25 - 6	20	90	37	23 - 43	20 000	NBC 6-	MGN6	3.7
-120	**969.554**			120	67					3.8
-165	**969.555**			165	112		14 000			3.9
-200	**969.556**			200	147		9 000			4.0
-MEGA8N - 90	**969.557**	0.5 - 8	25	90	42	26 - 45	20 000	NBC 8-	MGN8	3.8
-120	**969.558**			120	67					3.9
-165	**969.559**			165	112		16 000			4.1
-200	**969.560**			200	147		11 000			4.2
-MEGA10N - 90	**969.561**	1.5 - 10	30	90	42	38 - 48	20 000	NBC10-	MGN10	3.9
-120	**969.562**			120	67					4.0
-165	**969.563**			165	112		16 000			4.3
-200	**969.564**			200	147		13 000			4.7
-250	**969.565**			250	197		8 000			4.7
-300	**969.566**			300	247		5 500			4.9
-MEGA13N - 90	**969.567**	2.5 - 13	35	90	42	44 - 63	18 000	NBC13-	MGN13	4.0
-120	**969.568**			120	67					4.2
-165	**969.569**			165	112		16 000			4.5
-200	**969.570**			200	147		12 000			4.7
-250	**969.571**			250	197		8 000			5.0
-300	**969.572**			300	247		5 500			5.3

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4
MEGA25N	MGN25	**806.388**	MGR60L	**969.468L**	NBC25-	-	NBA25B	**806.389**	M27	20	4

Model	Order No.	Ød	ØD	L	L1	H	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BBT50 -MEGA16N - 75	**969.573**	2.5 - 16	42	75	31	48 - 68	17 000	NBC16-	MGN16	4.0
- 90	**969.574**			90	42					4.2
-120	**969.575**			120	72					4.4
-165	**969.576**			165	117		16 000			4.8
-200	**969.577**			200	152		13 000			5.1
-250	**969.578**			250	202		10 000			5.5
-MEGA20N- 75	**969.579**	2.5 - 20	46	75	31	51 - 68	16 000	NBC20-	MGN20	4.1
- 90	**969.580**			90	42					4.2
-120	**969.581**			120	72					4.5
-165	**969.582**			165	117		15 000			4.9
-200	**969.583**			200	152		13 000			5.3
-250	**969.584**			250	202		10 000			5.7
-MEGA25N- 90	**806.384**	15.5 - 25.4	60	90	46	64 - 74	19000	NBC25-	MGN25	4.3
-120	**806.385**			120	72		17 000			4.9
-165	**806.386**			165	117		15 000			5.8
-200	**806.387**			200	152		13 000			6.4

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

MEGA E Chuck

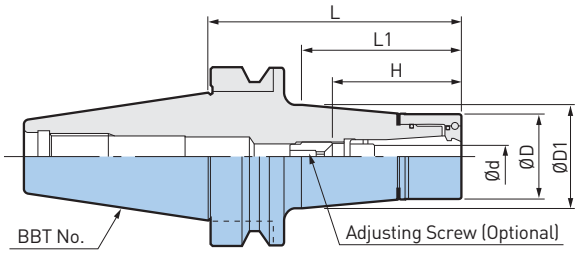
Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

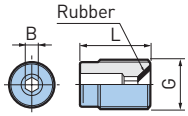




BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 3 - 12 mm**

Model	Order No.	Ød	ØD	ØD1	L	L1	H	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BBT30 -MEGA6E - 75	**968.167**	3 - 6	25	30	75	50	37 - 45	35 000	MEC6-	MEN 6	0.62
-MEGA8E - 50	**968.170**	3 - 8	30	30.5	50	25	42 - 51	40 000	MEC8-	MEN 8	0.53
- 75	**968.171**			35	75	50		35 000			0.68
-MEGA10E - 50	**968.174**	3 - 10	35	35.5	50	25	48 - 58	39 000	MEC10-	MEN10	0.57
- 75	**968.175**			40	75	51		35 000			0.77
-MEGA13E - 50	**968.178**	3 - 12	42	42.5	50	27	50 - 58	38 000	MEC13-	MEN13	0.61
- 75	**968.179**			42	75	52	50 - 60	34 000			0.86
- 90	**968.180**				90	67		25 000			1.01
-105	**968.181**				105	82					1.17
BBT40 -MEGA6E - 60	**968.183**	3 - 6	25	26.5	60	28	37 - 45	30 000	MEC6-	MEN 6	1.1
- 90	**968.185**			31.5	90	58					1.3
-135	**968.188**			39	135	103		27 000			1.6
-MEGA8E - 60	**968.191**	3 - 8	30	31	60	28	42 - 48	30 000	MEC8-	MEN 8	1.2
- 90	**968.193**			36	90	58	42 - 51				1.3
-135	**968.196**			44	135	103		27 000			1.8
-MEGA10E - 60	**968.199**	3 - 10	35	36	60	29	48 - 58	30 000	MEC10-	MEN10	1.3
- 90	**968.201**			41	90	58					1.5
-135	**968.204**			49	135	103		27 000			2.0
-MEGA13E - 60	**968.207**	3 - 12	42	43	60	29	50 - 60	30 000	MEC13-	MEN13	1.3
- 75	**968.208**			45	75	43					1.5
- 90	**968.209**			48	90	59					1.7
-105	**968.210**			51	105	75		29 000			1.9
-120	**968.211**			53.5	120	91					2.1
-135	**968.212**			56	135	106		26 000			2.4
-165	**968.213**			57.5	165	137		22 000			2.8
-200	**968.214**			62.5	200	173		16 000			3.7
BBT50 -MEGA6E -120	**968.217**	3 - 6	25	36	120	77	37 - 45	20 000	MEC 6-	MEN 6	4.0
-MEGA8E -120	**968.221**	3 - 8	30	40.5			42 - 51		MEC 8-	MEN 8	4.1
-MEGA10E -120	**968.225**	3 - 10	35	45.5			48 - 58		MEC10-	MEN10	4.2
-MEGA13E - 90	**968.228**	3 - 12	42	46.5	90	47	50 - 60	18 000	MEC13-	MEN13	4.0
-120	**968.229**			52	120	77					4.4
-165	**968.230**			59	165	121		16 000			5.2

1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA E Nut 		MEGA Wrench 		MEGA E Collet  ▶ 264	MEGA E Perfect Seal  ▶ 265	Adjusting Screw 	Rubber 			
MEGA E Chuck	**Model**	**Order No.**	**Model**	**Order No.**	**Model**	**Model**	**Model**	**Order No.**	**G**	**L**	**B**
MEGA6E	MEN6	**968.461**	MGR25	**969.456**	MEC6-	EPS6-	NBA6B	**961.527**	M7	12	2
MEGA8E	MEN8	**968.462**	MGR30	**969.458**	MEC8-	EPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10E	MEN10	**968.463**	MGR35	**969.460**	MEC10-	EPS10-	NBA10B	**961.572**	M14	16	3
MEGA13E	MEN13	**968.464**	MGR42	**969.462**	MEC13-	EPS13-	NBA13B	**961.598**	M18	20	4

MEGA Double Power Chuck Type D

Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.

BIG-PLUS Dual-Contact

Coolant Through Hole



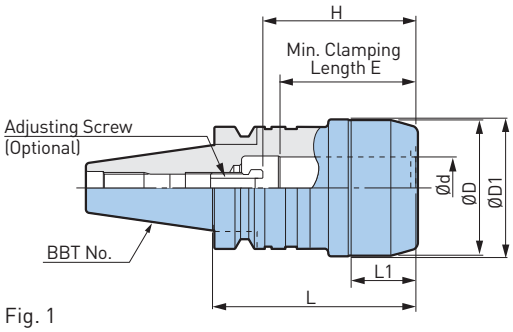


Fig. 1

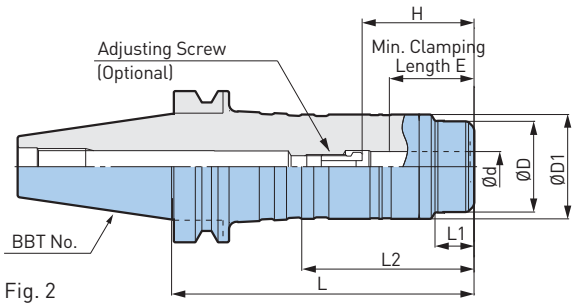


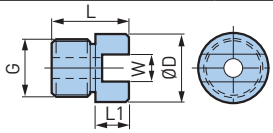
Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 3 - 32 mm**

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	max. min^{-1}	Weight (kg)
BBT40 -MEGA16D - 75A	**801.711**	2	16	42	53	75	25	38	71	55	30 000	1.5
-105A	**801.730**					105						2.1
-MEGA20D - 75A	**803.148**		20	50	55	75	34	44	69 - 79	56		1.6
-105A	**803.116**					105						2.0
-MEGA25D - 75A	**801.731**	1	25	62	63	75	39	-	73 - 83	57	27 000	2.0
-105A	**803.198**					105			71 - 81		26 000	2.3
-MEGA32D - 90A	**803.199**		32	70	71	90	33	-	71 - 81	64		2.1
-105A	**803.131**					105			79 - 89			2.4
-135A	**803.135**					135					22 000	3.1
BBT50 -MEGA20D -105	**969.593**	2	20	60	69	105	25	36	69 - 79	56	20 000	5.1
-MEGA25D -105	**969.595**		25	70	77	105	32	45	76 - 86	65		5.4
-135	**969.596**					135					19 000	6.5
-165	**968.033**					165					17 000	7.6
-MEGA32D -105	**969.597**		32	80	86	105	39	54	78 - 95	71	20 000	5.4
-165	**968.037**					165					15 000	8.5
-200	**968.038**					200		129			12 000	9.9

1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. As a back stop for cutting tools for the MEGA16D models, a commercially available hex socket head screw can be used.

For Straight Collet ▶ 272

Accessories									
	MEGA Wrench 		Adjusting Screw 						
MEGA Double Power Chuck	**Model**	**Order No.**	**Model**	**Order No.**	**ØD**	**L**	**L1**	**G**	**W**
BBT30 -MEGA16DS	MGR46L	**969.465L**	-	-	-	-	-	-	-
-MEGA20DS	MGR50L	**969.464L**	HMA-16	**962.311**	19	27	6	M16P1.5	8
BBT40 -MEGA16D/DS	MGR42L	**969.462L**	-	-	-	-	-	-	-
-MEGA20D/DS	MGR50L	**969.464L**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-MEGA25D/DS	MGR62L	**969.469L**							
-MEGA32D/DS	MGR70L	**969.470L**	HMA-M16S	**962.312**					10
BBT50 -MEGA16DS	MGR46L	**969.465L**	-	-	-	-	-	-	-
-MEGA20D/DS	MGR60L	**969.468L**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-MEGA25D/DS	MGR70L	**969.470L**							
-MEGA32D/DS	MGR80L	**969.471L**	HMA-M24	**962.313**	30	36	9.5	M24P1.5	10

MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1





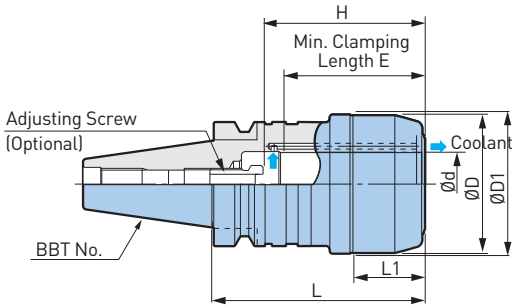


Fig. 1

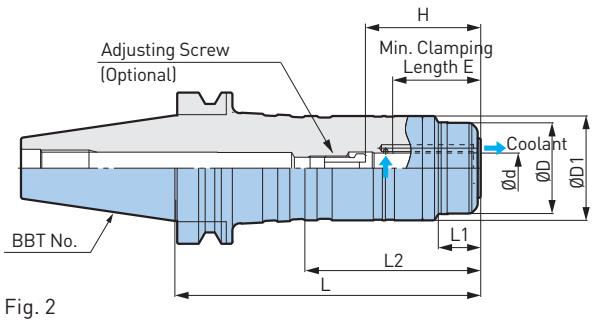


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 3 - 32 mm**

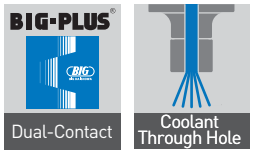
Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	max. min^{-1}	Weight (kg)
BBT30 -MEGA16DS - 60	978.030	1	16	46	47	62.5	28	-	64	52	30 000	0.76
-MEGA20DS- 65	978.184		20	50	51	67.5	33		62		25 000	0.82
BBT40 -MEGA16DS - 75A	801.712	2	16	42	53	77	27	40	73	57	30 000	1.5
-105A	803.149					107						2.1
-135A	803.117					137					25 000	2.7
-165A	803.200					167					22 000	3.3
-MEGA20DS- 75A	803.150		20	50	55	77	36	46	71 - 81	58	30 000	1.6
-105A	803.118					107						2.0
-120A	803.201					122					27 000	2.3
-135A	803.132					137					25 000	2.6
-165A	803.161					167					22 000	3.2
-200A	803.189					202					20 000	4.1
-MEGA25DS- 75A	803.119	1	25	62	63	77	41	-	75 - 85	59	27 000	2.0
-105A	801.713					107			73 - 83		26 000	2.3
-135A	803.162					137					24 000	3.0
-165A	803.136					167					21 000	3.7
-MEGA32DS- 90A	803.202		32	70	71	92	35	-	73 - 83	66	26 000	2.1
-105A	803.133					107			81 - 91			2.4
-135A	803.137					137					22 000	3.1
-165A	803.163					167					16 000	3.7
-200A	803.187					202					16 000	4.5
BBT50 -MEGA16DS -105	968.708	2	16	46	55	107.5	26	36	73	52	21 000	4.6
-135	968.076					137.5						5.2
-165	968.077					167.5					19 000	5.7
-MEGA20DS-105	968.709		20	60	69	107.5	28	38	71 - 81	58	20 000	5.1
-135	968.710					137.5					19 000	6.0
-165	968.080					167.5					17 000	6.8
-MEGA25DS-105	968.711		25	70	77	107.5	34	47	78 - 88	67	20 000	5.4
-135	968.712					137.5					19 000	6.5
-165	968.083					167.5					17 000	7.6
-MEGA32DS- 90	968.086		32	80	86	94.5	42	57	80 - 97	73	20 000	4.8
-105	968.713					107.5						5.4
-135	968.714					137.5					18 000	7.0
-165	968.087					167.5					15 000	8.5
-200	968.088					202.5		131			12 000	9.9

1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. As a back stop for cutting tools for MEGA16DS, a commercially available hex socket head screw can be used.

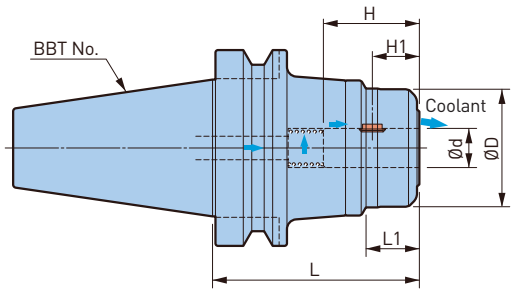
For Straight Collet ▶ 272
For Adjusting Screw ▶ 274
For MEGA Wrench ▶ 275

MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.









BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 16 - 32 mm**

Model	Order No.	Ød	ØD	L	L1	H	H1	MEGA Wrench	Weight (kg)
BBT40 -MEGA16DPG - 75	**806.362**	16	46	75	24	47	23	MGR46L	1.7
-MEGA20DPG -100	**806.363**	20	60	100	27	49	24	MGR60L	2.1
BBT50 -MEGA16DPG -105	**805.449**	16	46	105	24	47	23	MGR46L	4.6
-165	**805.450**			165					5.8
-MEGA20DPG -105	**805.451**	20	60	105	27	49	24	MGR60L	5.1
-165	**805.452**			165					6.9
-MEGA25DPG -105	**805.453**	25	70	105	33	55	23	MGR70L	5.4
-165	**805.454**			165					7.7
-MEGA32DPG -105	**805.455**	32	80	105	41	59		MGR80L	5.6
-165	**805.456**			165					8.4

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

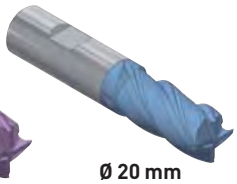
Weldon Shank Standards

(DIN1835-1)

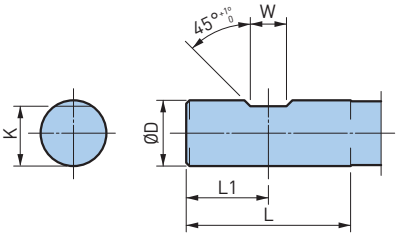
The following standard shank is required for MEGA Perfect Grip.



Ø 25/32 mm



Ø 20 mm



ØD		L	L1	W		K	
Nominal	Tolerance			Nominal	Tolerance	Nominal	Tolerance
16	h6	48	24	10	+ 0.05 0	14.2	h13
20		50	25	11		18.2	
25		56	32	12		23	
32		60	36	14		30	

Caution

In case you are adding your own flat, the tool projection length in the MEGA Perfect Grip will be decided by the flat position. Refer to H1 in the MEGA Perfect Grip chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

Spare Parts					Accessories	
	Key Grip 		Spring 		MEGA Wrench 	
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA16DPG	PKG16-2P	**805.492**	PSP1519	**805.496**	MGR46L	**969.465L**
MEGA20DPG	PKG20-2P	**805.493**	PSP1823	**805.497**	MGR60L	**969.468L**
MEGA25DPG	PKG25-2P	**805.494**	PSP2420	**805.498**	MGR70L	**969.470L**
MEGA32DPG	PKG32-2P	**805.495**	PSP3128	**805.499**	MGR80L	**969.471L**

1. Key grip is available in a package of 2 pcs.
2. As key grip is an consumable item, it is recommended to replace on a regular basis.

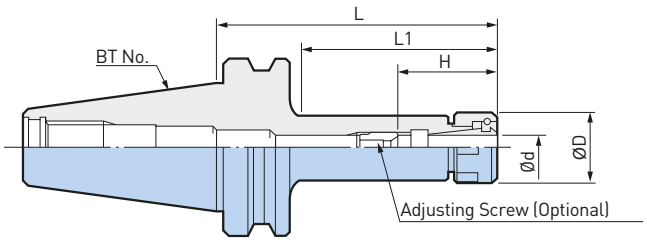
New Baby Chuck

The original high precision collet chuck to perform all machining applications.

Coolant Through Hole

A.1





Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
BT30 -NBS6 - 60	**961.917**	0.25 - 6	20	60	32	20 - 40	NBC6-	NBN6	0.44
- 75	**961.902**			75	47				0.47
- 90	**961.918**			90	62				0.51
-120	**800.031**			120	90				0.57
-NBS8 - 60	**961.919**	0.5 - 8	25	60	33	23 - 42	NBC8-	NBN8	0.46
- 90	**961.920**			90	63				0.55
-NBS10 - 60	**961.921**	1.5 - 10	30	60	34	35 - 45	NBC10-	NBN10	0.51
- 75	**961.908**			75	49				0.58
- 90	**961.922**			90	64				0.66
-120	**800.597**			120	94				0.81
-NBS13 - 60	**961.923**	2.5 - 13	35	60	34	41 - 60	NBC13-	NBN13	0.50
- 90	**961.924**			90	64				0.72
-NBS16 - 60	**961.925**	2.5 - 16	42	60	37	45 - 65	NBC16-	NBN16	0.53
- 90	**961.926**			90	67				0.81
-NBS20 - 60	**961.915**	2.5 - 20	46	60	38	48 - 58	NBC20-	NBN20	0.55
- 90	**961.916**			90	68	48 - 65			0.90
-120	**800.029**			120	98				1.26
BT40 -NBS6 - 90	**961.932**	0.25 - 6	20	90	53	20 - 40	NBC6-	NBN6	1.2
-135	**961.933**			135	98				1.3
-NBS8 - 90	**961.935**	0.5 - 8	25	90	53	23 - 42	NBC8-	NBN8	1.2
-135	**961.936**			135	98				1.3
-NBS10 - 90	**961.938**	1.5 - 10	30	90	53	35 - 45	NBC10-	NBN10	1.2
-120	**968.604**			120	83				1.4
-135	**961.939**			135	98				1.5
-NBS13 - 90	**961.941**	2.5 - 13	35	90	55	41 - 60	NBC13-	NBN13	1.4
-135	**961.942**			135	100				1.7
-NBS16 - 90	**961.944**	2.5 - 16	42	90	55	45 - 65	NBC16-	NBN16	1.5
-120	**968.610**			120	85				1.8
-135	**961.945**			135	100				1.9
-NBS20 - 60	**961.946**	2.5 - 20	46	60	28	48 - 65	NBC20-	NBN20	1.2
- 90	**961.947**			90	57				1.5
-120	**968.613**			120	87				1.9
-135	**961.948**			135	102				2.1
-165	**961.959**			165	132				2.5

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

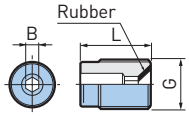
For Tap Driving Back Stop ▶ 259

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
BT50 -NBS6 -120	**961.962**	0.25 - 6	20	120	67	20 - 40	NBC6-	NBN6	4.0
-165	**961.963**			165	112				4.1
-200	**961.964**			200	147				4.2
-NBS8 -120	**961.966**	0.5 - 8	25	120	67	23 - 42	NBC8-	NBN8	4.1
-165	**961.967**			165	112				4.2
-NBS10 -120	**961.970**	1.5 - 10	30	120	67	35 - 45	NBC10-	NBN10	4.1
-165	**961.971**			165	112				4.4
-200	**961.972**			200	147				4.6
-NBS13 - 90	**961.975**	2.5 - 13	35	90	42	41 - 60	NBC13-	NBN13	4.2
-120	**961.976**			120	67				4.4
-165	**961.977**			165	112				4.7
-200	**961.978**			200	147				5.0
-NBS16 -120	**961.983**	2.5 - 16	42	120	72	45 - 65	NBC16-	NBN16	4.4
-165	**961.984**			165	117				4.8
-200	**961.985**			200	152				5.2
-NBS20 - 90	**961.988**	2.5 - 20	46	90	42	48 - 65	NBC20-	NBN20	4.2
-120	**961.989**			120	72				4.5
-165	**961.990**			165	117				4.9
-200	**961.991**			200	152				5.3
-250 *	**961.992**			250	202				5.9

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Coolant-through hole is not available.
4. Nut-less model available upon request.

For Tap Driving Back Stop ▶ 259

Spare Parts			Accessories								
	New Baby Nut 		Wrench 		NBC Collet  ▶ 250	Baby Perfect Seal  ▶ 262	Adjusting Screw 				
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	**961.526**	NBK6	**961.525**	NBC6-	BPS6-	NBA6B	**961.527**	M7	12	2
NBS8	NBN8	**961.549**	NBK8	**961.548**	NBC8-	BPS8-	NBA8B	**961.550**	M9	13	2.5
NBS10	NBN10	**961.571**	NBK10	**961.570**	NBC10-	BPS10-	NBA10B	**961.572**	M11	16	3
NBS13	NBN13	**961.597**	NBK13	**961.596**	NBC13-	BPS13-	NBA13B	**961.598**	M14	20	4
NBS16	NBN16	**961.631**	NBK16	**961.630**	NBC16-	BPS16-	NBA16B	**961.632**	M18	20	4
NBS20	NBN20	**961.679**	NBK20	**961.678**	NBC20-	BPS20-	NBA20B	**961.680**	M21	20	4

New Hi-Power Milling Chuck Type S

The original design of slit structure assures heavy and finish end milling with high power and precision.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1



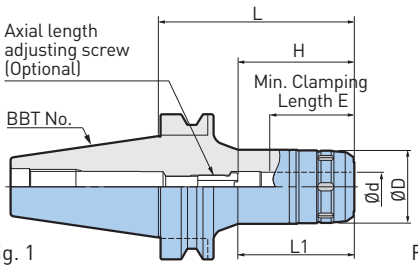


Fig. 1

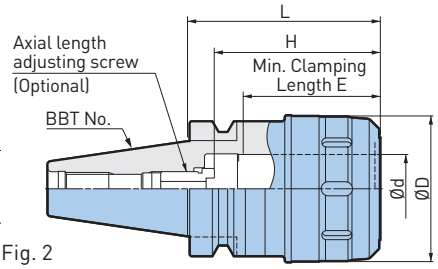


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 3 - 42 mm**

Model	Order No.	Fig.	Ød	ØD	L	L1	H	E	Wrench	Weight (kg)
BBT30 -HMC16S - 70 *	**964.101S**	1	16	43	70	47	71	55	FK45-50L	0.78
-HMC20S - 75	**964.102S**	2	20	50	75	-	56 - 66	56		0.93
-HMC25S - 90	**964.103S**		25	55	90		64 - 74	57	FK52-55	1.12
-HMC32S -105	**978.181S**		32	62	105		70 - 80	58	FK58-62L	1.41
BBT40 -HMC16S - 75 *	**964.190S**	1	16	43	75	45	71	55	FK45-50L	1.3
-120 *	**800.144**				120	90				1.8
-HMC20S - 75	**964.191S**		20	50	75	46	69 - 79	56		1.4
-105	**964.194S**				105	75				1.9
-120	**964.196S**				120	90				2.1
-HMC25S - 75	**964.192S**		25	59	75	47	73 - 83	57	FK58-62L	1.5
-105	**964.195S**				105	77				2.1
-135	**800.146**				135	107				2.8
-HMC32S - 90	**978.279S**	2	32	68	90	-	71 - 81	64	FK68-75L	2.0
-105	**800.147**				105		79 - 89			2.3
-135	**800.148**				135					3.0
BBT50 -HMC16S -105 *	**800.278**	1	16	43	105	57	71	55	FK45-50L	4.2
-135 *	**800.279**				135	80				4.6
-165 *	**800.280**				165	100				5.0
-200	**800.281**				200	120				5.8
-HMC20S -105	**800.282**		20	50	105	57	69 - 79	56		4.3
-135	**800.283**				135	80				4.8
-165	**800.284**				165	100				5.4
-200	**800.285**				200	125				6.0
-HMC25S -105	**800.287**		25	59	105	57	76 - 86	57	FK58-62L	4.5
-135	**800.288**				135	87				5.2
-165	**800.289**				165	105				5.9
-200	**800.290**				200	125				7.5
-HMC32S -105	**800.291**		32	68	105	64	88 - 98	72	FK68-75L	4.6
-135	**800.292**				135	89				5.4
-165	**800.293**				165	105				6.4
-200	**800.294**				200	130				7.4
-HMC42S -105	**806.709**		42	85	105	65	93 - 105	73	FK80-90L	5.2

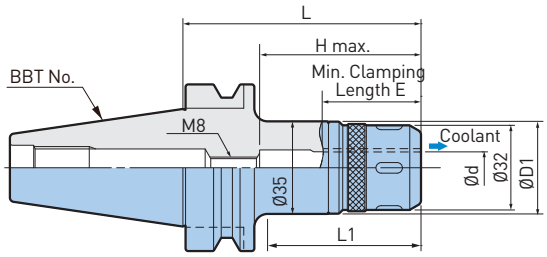
1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. * As a back stop for cutting tools for the HMC16S models, a commercially available hex socket head screw can be used.

For Straight Collet ▶ 272 - 274
For Wrench ▶ 275

New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.







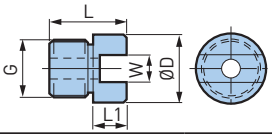
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 6 - 12 mm

Model	Order No.	Ød	ØD1	L	L1	H max.	E	Wrench	Weight (kg)
BBT30 -HMC12J - 60	**805.814**	12	35	60	38	65	43	FK31-33	0.58
BBT40 -HMC12J - 90	**805.815**			90	63				1.4
-120	**805.816**			120	70				1.6
BBT50 -HMC12J -105	**805.817**			105	67				4.0
-135	**805.818**			135	70				4.3
-165	**805.819**			165	90				4.7

1. Wrench is to be ordered separately.

For Straight Collet ▶ 272

Accessories									
	Wrench 		Adjusting Screw 						
New Hi-Power Milling Chuck	Model	Order No.	Model	Order No.	ØD	L	L1	G	W
BBT30/40/50 -HMC12J	FK31-33	**806.462**	-	-	-	-	-	-	-
-HMC16S	FK45-50L	**801.037**	-	-	-	-	-	-	-
-HMC20S			HMA-M16	**962.311**	19	27	6	M16P1.5	8
BBT30 -HMC25S	FK52-55	**962.294**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-HMC32S	FK58-62L	**801.038**	HMA-M16S	**962.312**					10
BBT40/50 -HMC25S	FK58-62L	**801.038**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-HMC32S	FK68-75L	**801.039**	HMA-M16S	**962.312**					10
-HMC42S	FK80-90L	**804.771**	HMA-M24	**062.313**	30	36	95	M24P1.5	10

Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1



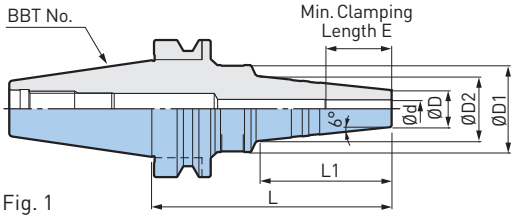


Fig. 1

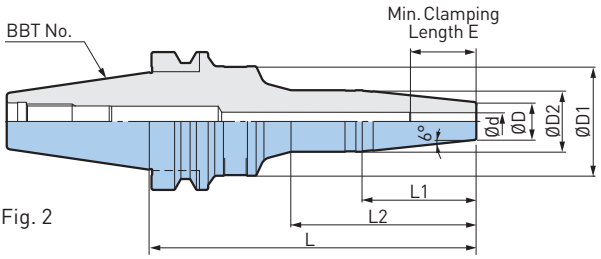


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 3 - 12 mm**

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	L2	E	Weight (kg)
BBT30 -HDC3S - 90	805.462	1	3	14	42	25	90	50	-	16	0.65
-HDC4S - 60	803.053		4		46	20	60	28		19	0.51
- 90	805.820				42	25	90	50			0.65
-HDC5S - 90	805.821		5							22	0.65
-HDC6S - 90	803.054		6							25	0.65
-HDC8S - 90	803.055		8	17		28				31	0.67
-HDC10S - 90	803.051		10	19	44	30				33	0.70
-HDC12S - 90	803.052		12	21	46	32				36	0.72
BBT40 -HDC3S - 90	805.463	1	3	14	38	24	90	44	-	16	1.3
-HDC4S - 60	803.060		4			19	60	22		19	1.2
- 90	803.061					24	90	45			1.3
-135	805.464	2			44	26	135	57	84		1.4
-HDC6S -110	803.062	1	6		38	27	110	60	-	25	1.3
-150	803.063	2			48	26	150	57	85		1.6
-HDC8S -110	803.064	1	8	17	40	30	110	60	-	31	1.4
-150	803.065	2			50	28	150	52	85		1.7
-HDC10S -110	803.056	1	10	19	42	32	110	60	-	33	1.4
-150	803.057	2			50	30	150	52	85		1.7
-HDC12S -110	803.058	1	12	21	44	34	110	60	-	36	1.4
-150	803.059	2			50	32	150	52	85		1.8
BBT50 -HDC6S -150	803.068	2	6	14	52	26	150	57	83	25	4.2
-200	805.822				56		200		100		4.6
-HDC8S -150	803.069		8	17	54	28	150	52	83	31	4.3
-200	805.823				58		200		100		4.7
-HDC10S -150	803.066		10	19	56	30	150		83	33	4.3
-200	805.824				60		200		100		4.8
-HDC12S -150	803.067		12	21	58	32	150		83	36	4.4
-200	805.825				62		200		100		4.8

1. Adjusting screw and straight collet can not be used.

For Inner Bore Cleaner ▶ 286

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Maximum performance to high-precision operation at 5-axis machining.

BIG-PLUS Dual-Contact

Coolant Through Hole





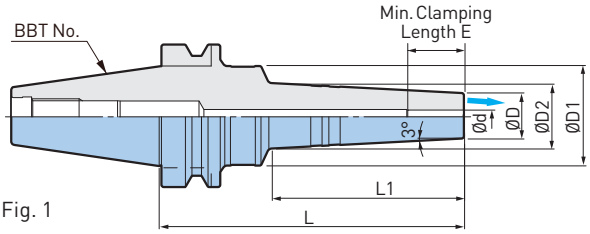


Fig. 1

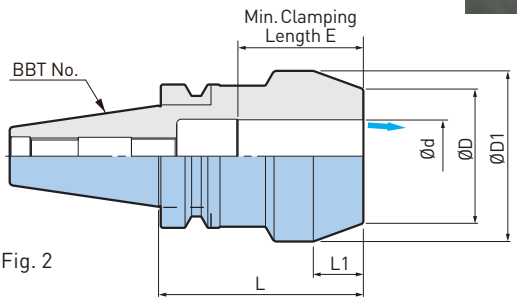


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	E	Weight (kg)
BBT30 -HDC4J - 60	**805.077**	1	4	20	46	23	60	28	19	0.54
-HDC6J - 90	**805.078**		6		42	26	90	50	25	0.69
-HDC8J - 90	**805.079**		8	22		28			31	0.71
-HDC10J - 90	**805.080**		10	24	44	30			33	0.74
-HDC12J - 90	**805.081**		12	26	46	32			36	0.76
-HDC16J - 90	**805.480**		16	34		40		49	43	0.86
-HDC20J - 90	**805.481**		20	38	52	43		40		0.96
BBT40 -HDC4J - 90	**805.082**	1	4	20	38	25	90	45	19	1.3
-135	**805.549**				44	30	135	85		1.5
-HDC6J - 90	**805.083**		6		38	25	90	45	25	1.3
-135	**805.084**				44	29	135	85		1.5
-HDC8J - 90	**805.085**		8	22	40	27	90	45	31	1.3
-135	**805.086**				46	31	135	85		1.6
-HDC10J - 90	**805.087**		10	24	42	29	90	45	33	1.3
-135	**805.088**				48	33	135	85		1.6
-HDC12J - 90	**805.089**		12	26	44	31	90	45	36	1.3
-135	**805.090**				50	35	135	85		1.7
-HDC16J - 90	**805.482**		16	34	46	40	90	46	43	1.4
-135	**805.483**				50	44	135	89		1.9
-HDC20J - 90	**805.484**		20	38	48		90	47		1.5
-135	**805.485**				53	48	135	90		2.0
-HDC25J - 90	**805.677**		25	51	63	56	90	41	49	1.9
-HDC32J - 90	**805.678**	2	32	59	75	-		20	56	2.3
BBT50 -HDC6J -120	**805.091**	1	6	20	48	26	120	55	25	4.1
-HDC8J -120	**805.092**		8	22	50	28			31	4.1
-HDC10J -120	**805.093**		10	24	52	30			33	4.2
-HDC12J -120	**805.094**		12	26	54	32			36	4.2
-HDC16J -120	**805.486**		16	34	58	41		56	43	4.4
-HDC20J -120	**805.487**		20	38	62	45				4.5
-HDC25J -120	**805.679**		25	48	70	58		59	49	5.2
-HDC32J -120	**805.680**		32	58	78	67		60	56	5.6

1. Adjusting screw cannot be used.
2. Straight collet can be used for HDC16J or bigger Ød size models.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Standard

For high precision machining in automotive, aerospace, Medical and Die & Mold.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1



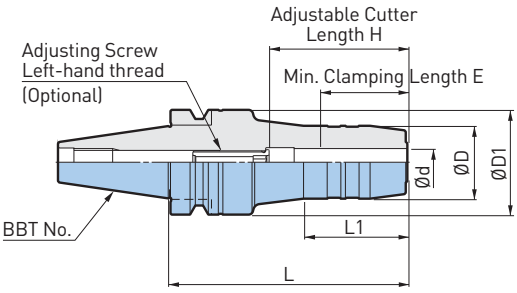


Fig. 1

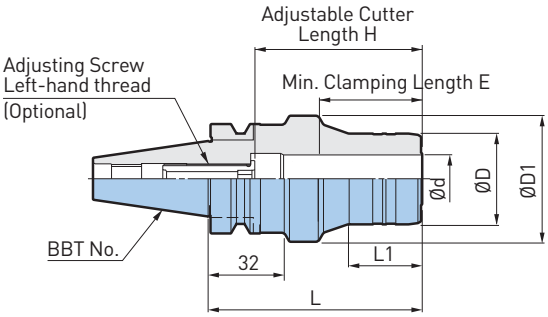


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 25 mm

Model		Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Adjusting Screw (optional)	Weight (kg)
BBT30 -HDC6	- 45	**978.071**	1	6	30	46	45	7	35 - 50	28	HDA6-05020	0.61
	- 75	**978.034**			26		75	40	28 - 50		HDA6-05032	0.67
	-105	**978.073**					105	43				0.82
-HDC8	- 45	**978.075**	1	8	32	46	45	7	35 - 50		HDA8-06020	0.61
	- 75	**978.076**			28		75	41	28 - 50		HDA8-06032	0.69
	-105	**978.078**					105	44				0.84
-HDC10	- 45	**978.080**	1	10	34	46	45	7	45 - 55	33	HDA10-08015	0.60
	- 75	**978.081**			30		75	36	33 - 55		HDA10-08032	0.74
	-105	**978.083**					105	45				0.91
-HDC12	- 45	**978.085**	1	12	36	46	45	7	55 - 60	38	HDA12-10010	0.58
	- 75	**978.086**			32		75	36	38 - 60		HDA12-10032	0.75
	-105	**978.088**					105	45				0.94
-HDC16	- 45 **	**978.092**	1	16	42	46	45	7	70	43	-	0.55
	- 75	**978.025**			38		75	35	43 - 70		HDA16-12030	0.77
	-105	**805.550**					105	47			HDA16-12037	1.06
-HDC20	- 60 *	**978.095**	2	20	38	53	60	-	43 - 54		HDA16-12030	0.77
	- 75	**978.038**					75	16	46 - 70			0.85
	-105	**805.551**	1			46	105	40	43 - 70		HDA16-12037	1.02
-HDC25	-105	**978.097**	2	25	55	63	105	44	52 - 80	52	HDA25-16039	1.60

1. Straight collet (reduction sleeve) is available.
2. * Straight collet can not be used.
3. ** Adjusting screw can not be used.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286
For Adjusting Screw ▶ 282

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Standard



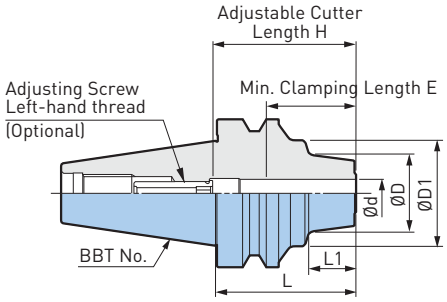


Fig. 1

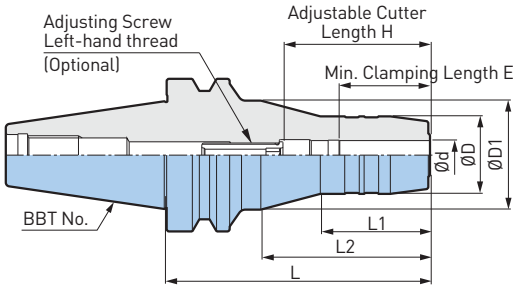


Fig. 2

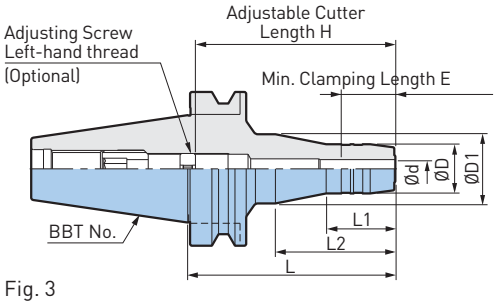


Fig. 3

BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 3 - 31 mm**

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	Adjusting Screw (optional)	Weight (kg)
BBT40 -HDC6 - 60	800.131	1	6	27	45	60	19	-	28 - 50	28	HDA6-05032	1.2
- 90	978.343	2		26		90	44	50				1.4
-110	800.128					110		70				1.5
-HDC8 - 90	978.192		8	28	45	90		50			HDA8-06032	1.4
-HDC10 - 60	800.088	1	10	31	45	60	20	-	33 - 55	33	HDA10-08032	1.2
- 90	978.027	2		30		90	45	50				1.4
-110	800.085					110		70				1.5
-HDC12 - 60	978.046	1	12	33	45	60	20	-	38 - 60	38	HDA12-10032	1.2
- 90	800.096	2		32		90	45	49				1.4
-110	800.093					110		69				1.6
-HDC14 - 90	978.028		14	34	45	90	46	49	43 - 70	43	HDA16-12037	1.4
-HDC16 - 90	978.193		16	38	45		47					1.4
-HDC18 - 90	978.194		18	40	45		48					1.5
-HDC19 - 75 *	800.111		19	49.2	-	75	43	-	111		-	1.4
-HDC20 - 90	800.115		20	42	45	90	48	50	43 - 70		HDA16-12037	1.4
-110	800.112				50	110		70				1.7
-HDC24 - 75 *	800.116		24	63	-	75	47	-	104	45	-	1.6
-HDC31 - 75 *	805.826		31	74			30		76	56		1.8
BBT50 -HDC6L -105	800.023	3	6	26	45	105	44	48	80 - 120	28	HDA6-20010	4.2
-HDC8L -105	800.027		8	28			45					4.2
-HDC10L -105	800.264		10	30						33		4.2
-HDC12L -105	800.268		12	32						38		4.2
-HDC16L -105	800.272		16	38	47		47			43		4.3
-HDC19L - 90 *	800.001		19	49.2	-	90	45	-	149		-	4.2
-HDC20L -105	800.002		20	42	50	105	47	48	71 - 111		HDA20-12047	4.4
-HDC24L - 90 *	800.008		24	63	-	90	41	-	149	45	-	4.5
-HDC31L - 90 *	800.015		31	72			45		147	56		4.5

1. Straight collet (reduction sleeve) is available.
2. * Adjusting screw cannot be used. "H" is the max. tool shank length can be inserted for these models.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286
For Adjusting Screw ▶ 282

Shrink Chuck Slim

Slim design avoids interference with the side wall and draft of the mold.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1



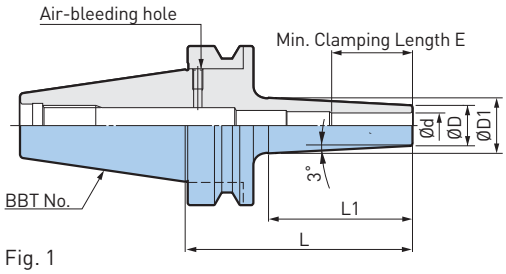


Fig. 1

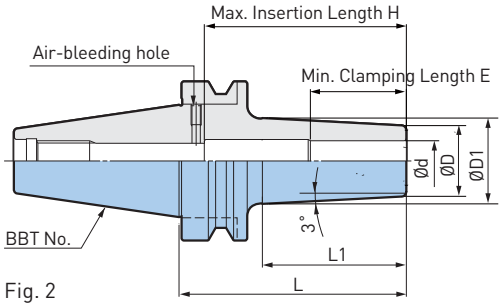


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 6 - 12 mm**

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	E	H	Weight (kg)
BBT30 -SRC6S -105	**978.179**	1	6	10	18	105	77	26	-	0.48
-SRC8S -105	**978.180**		8	13	21					0.51
-SRC10S -105	**800.063**	2	10	16	24			32	62	0.55
-SRC12S -105	**978.007**		12	19	27			36	72	0.60
BBT40 -SRC6S -120	**800.168**	1	6	10	19	120	86	26	-	1.1
-165	**978.136**				23.5	165	127			1.3
-SRC8S -120	**978.205**		8	13	22	120	86			1.2
-165	**978.137**				26.5	165	129			1.3
-SRC10S -120	**978.367**		10	16	25	120	86	32		1.2
-165	**978.138**				29.5	165	129			1.4
-SRC12S -120	**800.163**		12	19	28	120	87	36		1.3
-165	**978.139**				33	165	131			1.5

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

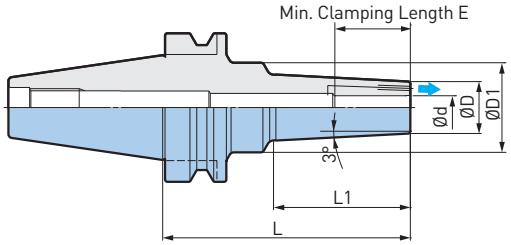
Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

Shrink Chuck Jet Through

Efficient coolant supply to the cutting tool periphery.

BIG-PLUS Dual-Contact

Coolant Through Hole



BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 6 - 12 mm**

Model	Order No.	Ød	ØD	ØD1	L	L1	E	Weight (kg)
BBT40 -SRC6J -105	**804.751**	6	16	32	105	55	26	1.3
-SRC8J -105	**804.752**	8	19	35				1.3
-SRC10J -105	**804.749**	10	22	38		58	32	1.4
-SRC12J -105	**804.750**	12	24	40		63	36	1.4
BBT50 -SRC6J -165	**804.755**	6	16	42	165	93	26	4.1
-SRC8J -165	**804.756**	8	19	45		99		4.2
-SRC10J -165	**804.753**	10	22	48		103	32	4.3
-SRC12J -165	**804.754**	12	24	50		108	36	4.3

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

Shrink Chuck Standard

Substantial body provides higher rigidity. Available from 4 mm clamping diameter.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

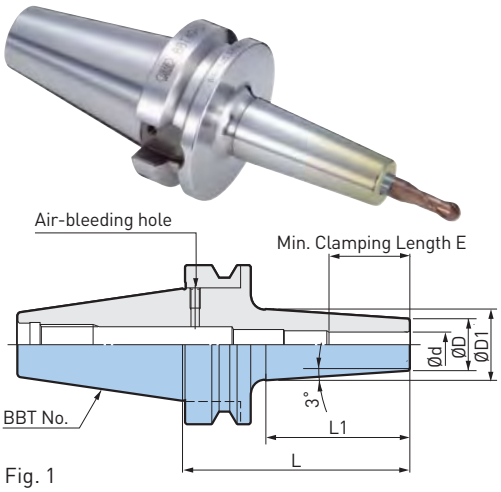


Fig. 1

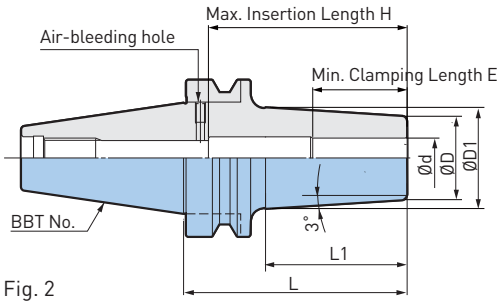


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 4 - 20 mm**

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	E	H	Weight (kg)
BBT30 -SRC4 - 75 *	**978.001**	1	4	10	15	75	44	16	-	0.45
-SRC6 - 75	**978.002**		6	14	19		47	26		0.47
-SRC8 - 75	**978.003**		8	18	23					0.51
-SRC10 - 75	**978.004**	2	10	22	27			32	62	0.56
-SRC12 - 75	**978.005**		12	24	29			36	72	0.58
-SRC16 - 75	**978.006**		16	28	33		48	38	80	0.62
BBT40 -SRC4 - 90 *	**978.291**	2	4	10	15.5	90	52	16	-	1.1
-SRC6 - 90	**978.056**	1	6	14	20		57	26		1.1
-SRC8 - 90	**978.057**		8	18	24					1.2
-SRC10 - 90	**978.058**		10	22	28			32		1.2
-SRC12 - 90	**978.059**		12	24	30			36		1.2
-SRC16 - 90	**978.060**	2	16	28	34			38	80	1.3
-165	**800.164**				42	165	132			1.9
-SRC20 - 90	**978.061**		20	34	40	90	57	42	100	1.4
-165	**800.165**				48	165	132			2.1
BBT50 -SRC6 -105	**978.105**	1	6	14	20.5	105	61	26	-	3.7
-165	**800.354**				26	165	116			3.9
-SRC8 -105	**978.107**		8	18	24.5	105	61			3.8
-165	**800.355**				30	165	116			4.0
-SRC10 -105	**978.109**		10	22	28.5	105	61	32		3.8
-165	**800.350**				34	165	116			4.2
-SRC12 -105	**978.111**		12	24	30.5	105	61	36		3.9
-165	**800.351**				36	165	116			4.2
-SRC16 -105	**978.113**		16	28	34.5	105	61	38		3.9
-165	**978.114**				40.0	165	116			4.3
-SRC20 -105	**978.115**		20	34	40	105	61	42		4.0
-165	**800.352**				46.0	165	116			4.6

1. Use carbide cutter within a tolerance of h6.
2. * Use carbide cutter within a tolerance of h5.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

MEGA Synchro Tapping Holder

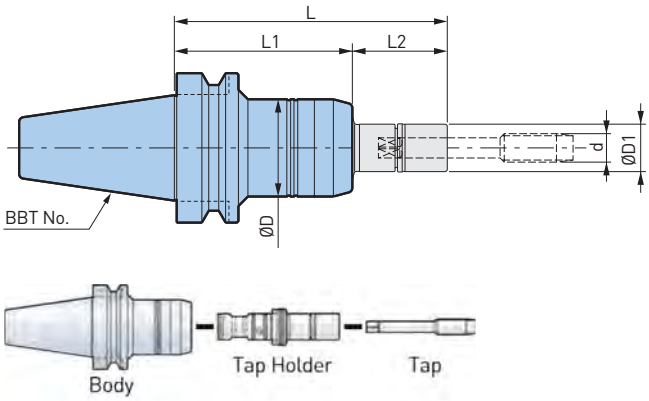
Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1





BIG-PLUS tools can be used in machining centers with conventional BT spindles.

M3 - M20 mm

Model	Order No.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
BBT30 -MGT6 - 70	**965.401**	MGT6 -d- 30	M3 - M8	36	16	100	70	30	0.69
		- 70				140		70	
		-100				170		100	
-MGT12 - 70	**965.402**	MGT12-d- 30	M5 - M12 P1/8	41	20	100	70	30	0.74
		- 70				140		70	
		-100				170		100	
-MGT20 -110	**965.403**	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	145	110	35	1.45
		- 85				195		85	
		-115				225		115	
BBT40 -MGT6 - 75	**965.404**	MGT6 -d- 30	M3 - M8	36	16	105	75	30	1.3
		- 70				145		70	
		-100				175		100	
-MGT12 - 75	**965.405**	MGT12-d- 30	M5 - M12 P1/8	41	20	105	75	30	1.4
		- 70				145		70	
		-100				175		100	
-MGT20 - 95	**965.406**	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	130	95	35	1.8
		- 85				180		85	
		-115				210		115	
BBT50 -MGT6 - 90	**965.407**	MGT6 -d- 30	M3 - M8	36	16	120	90	30	3.9
		- 70				160		70	
		-100				190		100	
-MGT12 - 90	**965.408**	MGT12-d- 30	M5 - M12 P1/8	41	20	120	90	30	4.0
		- 70				160		70	
		-100				190		100	
-MGT20 -105	**965.409**	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	140	105	35	4.4
		- 85				190		85	
		-115				220		115	

1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.



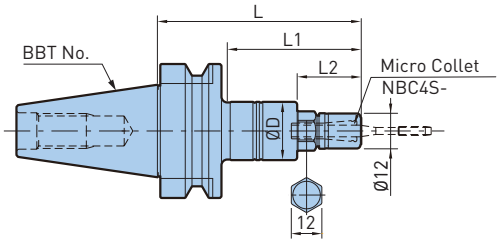
For Tap Holder ▶ 276
For Accessories ▶ 280
For MEGA Wrench ▶ 281

MEGA Synchro Tapping Holder

For small Tap MGT3

BIG-PLUS Dual-Contact





BIG-PLUS tools can be used in machining centers with conventional BT spindles. **M1 - M3**

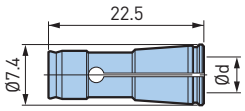
Model	Order No.	Tapping Range	ØD	L	L1	L2	Weight (kg)
BBT30 -MGT3 -70	**965.400**	M1 - M3	20	70	46	22	0.49
BBT40 -MGT3 -90	**805.723**			90	61		1.2

1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

For Accessories ▶ 281

Micro Collet for MGT3





Model	Order No.	Tapping Range			Tap Shank
		DIN371	ISO529	JIS	Ød
NBC4S-2.5AA	**961.468**	M1 - M1.8	M2		2.5
-2.8AA	**968.353**	M2 - M2.6	M2.2, M2.5		2.8
-3.0AA	**961.470**	-	-	M1 - M2.6	3.0
-3.1AA	**968.355**	-	M3		3.15
-3.5AA	**961.472**	M3	-		3.5
-4.0AA	**961.474**	-	-	M3	4.0

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ 247

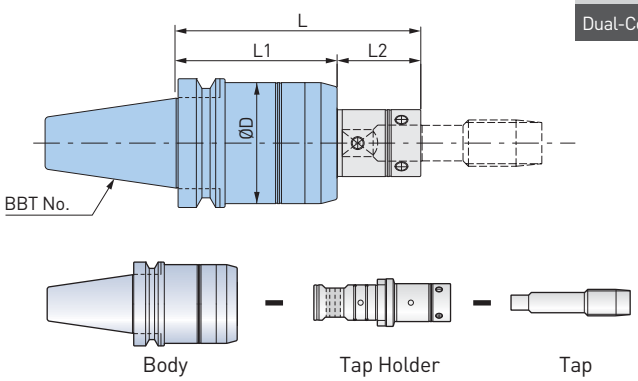
For large Tap MGT36

BIG-PLUS Dual-Contact

Coolant Through Hole

Compensation for synchronization error eliminates heavy thrust load of large diameter tapping.





BIG-PLUS tools can be used in machining centers with conventional BT spindles. **M22 - M36**

Model	Order No.	Tapping Range	ØD	L	L1	L2	Weight (kg)
BBT50-MGT36-125	**800.323**	M22 - M36 P5/8 - P1	94	190	125	65	7.2

1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.



For MGT36 Tap Holder ▶ 279

For Accessories ▶ 280

Side Lock Holders for Weldon

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1



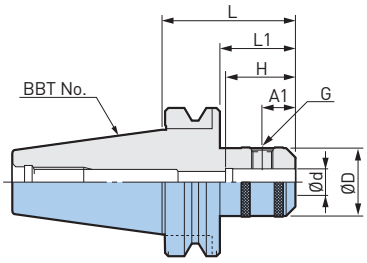


Fig. 1

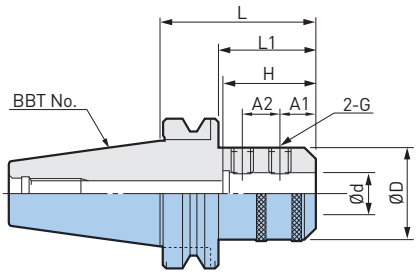


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

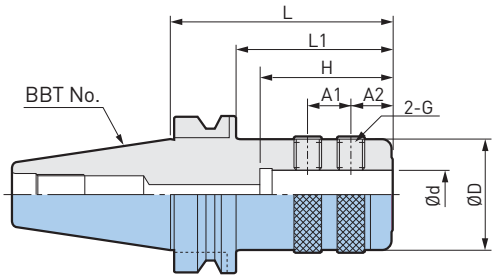
Ø 6 - 50 mm

Model	Order No.	Fig.	Ød (H5)	ØD	L	L1	A1	A2	H	G	Weight (kg)
BBT30 -ISL6 - 60	**961.394**	1	6	25	60	38	18	-	85 *	M6	0.52
-ISL8 - 60	**961.395**		8	28						M8	0.55
-ISL10 - 60	**961.396**		10	35			20		45	M10	0.64
-ISL12 - 60	**961.397**		12	42			22.5		48	M12	0.74
-ISL16 - 60	**966.341**		16	48			24		53	M14	0.81
BBT40 -ISL12 - 75	**961.362**	1	12	42	75	48	22.5	-	110 *	M12	1.5
-ISL16 - 75	**961.363**		16	48			24		53	M14	1.5
-ISL20 - 75	**961.364**		20	52			25		55	M16	1.6
-ISL25 - 90	**961.365**	2	25	63.5	90	63	24	25	60	M18xP2	2.1
-ISL32 -105	**961.366**		32	72	105	-		28	82	M20xP2	2.9
BBT50 -ISL16 - 90	**961.367**	1	16	48	90	52	24	-	145 *	M14	4.4
-ISL20 - 90	**961.368**		20	52			25			M16	4.5
-ISL25 -105	**961.369**	2	25	65	105	67	24	25	60	M18xP2	4.6
-ISL32 -105	**978.017**		32	72				28	90	M20xP2	5.3
-ISL40 -120	**978.018**		40	90	120	82	30	32			6.5
-ISL50 -121	**978.294**		50	99.5	121	83	35	35		M24xP2	7.2

1. "H" is the max. tool shank length that can be inserted into the holder.
2. H dimension marked with * indicates this dimension to the back end of the retention knob.
3. Use a cutting tool in accordance to DIN 1835 B/DIN 6535 HB.

Side Lock Holders for Drills





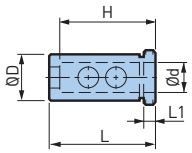
BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 20 - 40 mm**

Model	Order No.	Ød	ØD	L	L1	A1	A2	H	G	Weight (kg)
BBT30 -TSL20 - 75	**978.314**	20	48	75	-	14	14	50	M10	0.98
-TSL25 - 80	**978.315**	25		80		15	20	56	M16	0.97
-TSL32 - 85	**805.243**	32	63	85			20	60		1.38
BBT40 -TSL16 - 90	**800.175**	16	48	90	63	14	14	48	M10	1.7
-TSL20 - 90	**800.177**	20		90	63			50		1.7
-TSL25 - 90	**800.179**	25				15	20	56	M16	1.6
-TSL32 -105	**978.318**	32	63	105	78			60		2.4
-TSL40 -105	**978.317**	40	68		-		25	70		2.4
BBT50 -TSL16 - 90	**800.369**	16	48	90	52	14	14	48	M10	4.2
-TSL20 - 90	**800.374**	20						50		4.2
-TSL25 -105	**800.375**	25		105	67	15	20	56	M16	4.3
-TSL32 -105	**800.380**	32	63					60		4.8
-TSL40 -105	**800.385**	40	68				25	70		4.8

1. "H" is the max. tool shank length that can be inserted into the holder.
2. Not compatible with Weldon DIN 1835B.

SL Sleeves for TSL Side Lock Holder





Model	Order No.	Ød	ØD	L	L1	H
OSL25 -16	**962.596**	16	25	62	5.5	48
-20	**962.597**	20				50
OSL32 -16	**962.586**	16	32	66	5.5	48
-20	**962.598**	20				50
-25	**962.599**	25				56
OSL40 -16	**804.678**	16	40	76	5.5	48
-20	**804.679**	20				50
-25	**962.581**	25				56
-32	**962.582**	32				60

Morse Taper Holders

Precise finish of inner taper guarantees high concentricity.

BIG-PLUS Dual-Contact

A.1



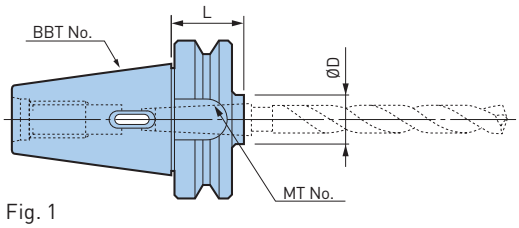


Fig. 1

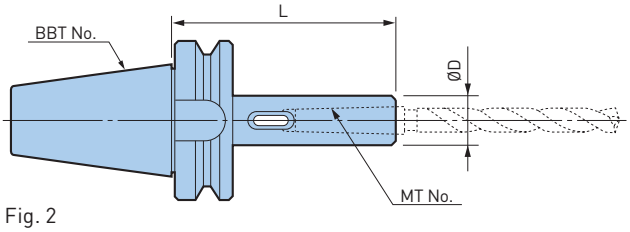


Fig. 2

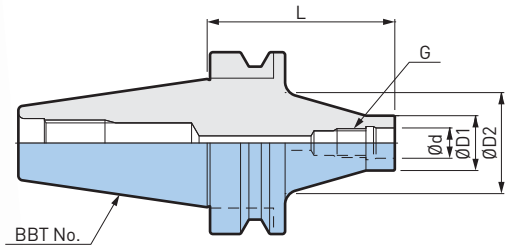
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Fig.	MT No.	ØD	L	Weight (kg)
BBT30 -MTA1 - 60	**978.274**	1	1	25	60	0.52
-MTA2 - 60	**978.254**		2	32		0.55
-MTA3 - 80	**978.255**		3	40	80	0.74
BBT40 -MTA1 - 45	**978.399**	1	1	25	45	1.0
-120	**800.158**	2			120	1.3
-MTA2 - 45	**978.164**	1	2	32	45	1.0
-120	**800.159**	2			120	1.6
-MTA3 - 75	**978.400**	1	3	40	75	1.0
-135	**800.160**	2			135	1.7
-MTA4 - 90	**978.165**		4	50	90	1.6
BBT50 -MTA1 - 45	**800.329**	1	1	25	45	3.9
-120	**800.325**	2			120	4.2
-MTA2 - 45	**800.335**	1	2	32	45	3.9
-135	**800.330**	2			135	4.3
-MTA3 - 45	**800.341**	1	3	40	45	3.8
-150	**800.336**	2			150	4.6
-MTA4 - 75	**800.347**	1	4	50	75	3.9

Holders for Screw-On Cutter

General metric screw-on type cutting tools can be used with these models.



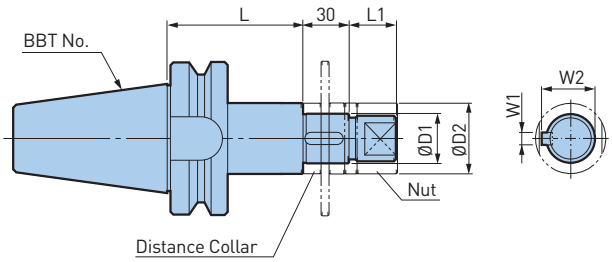


BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	ØD1	ØD2	L	G	Weight (kg)
BBT30 -M10 - 19 - 45	**806.601**	10.5	19	35	45	M10	0.45
-M12 - 24 - 40	**806.602**	12.5	24	40	40	M12	0.45
-M16 - 29 - 35	**806.603**	17	29		35	M16	0.41
BBT40 -M10 - 19 - 65	**806.604**	10.5	19	35	65	M10	1.1
-M12 - 24 - 60	**806.605**	12.5	24	40	60	M12	1.1
-M16 - 29 - 55	**806.606**	17	29	45	55	M16	1.2

Side Cutter Arbors





BIG-PLUS tools can be used in machining centers with conventional BT spindles.

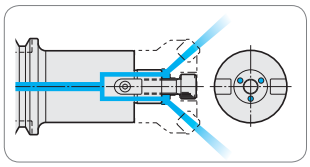
Model	Order No.	ØD1 (h6)	W1	W2	ØD2	L	L1	Weight (kg)
BBT40 -SCA25.4 - 75	**804.760**	25.4	6.35	27.78	40	75	25	1.9
-120	**804.762**					120		2.3
-SCA31.75 - 75	**804.761**	31.75	7.92	34.92	46	75	30	2.4
BBT50 -SCA25.4 - 90	**804.757**	25.4	6.35	27.78	40	90	25	4.7
-135	**804.763**					135		5.1
-SCA31.75 - 90	**804.758**	31.75	7.92	34.92	46	90	30	5.1
-135	**804.764**					135		5.7
-SCA38.1 - 90	**804.759**	38.1	9.52	42.06	55	90	36	5.8
-135	**804.765**					135		6.8

1. Nut is included.
2. Distance collars of 5 mm, 8 mm, 10 mm and 12 mm are included.

Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.





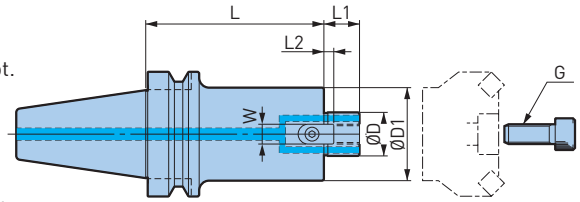


Fig. 1

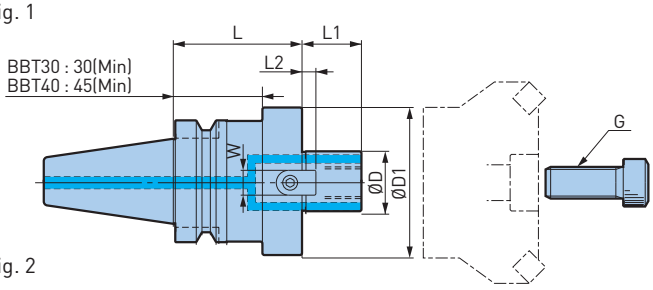


Fig. 2

BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Fig.	ØD (H6)	ØD1	L	L1	Drive Keys		G	Weight (kg)
							L2	W		
BBT30 -FMH16 - 37 - 35	978.326	1	16	37	35	16	5	8	M8	0.55
-FMH22 - 47 - 45	978.259	2	22	47	45	18	5	10	M10	0.77
-FMH22 - 60 - 45	805.569			60	45	18	5	10	M10	0.90
-FMH27 - 60 - 45	978.273		27	60	45	20	6	12	M12	0.94
BBT40 -FMH16 - 37 - 40	800.066	1	16	37	40	16	5	8	M8	1.1
-FMH22 - 47 - 45	978.145	1	22	47	45	18	5	10	M10	1.3
- 60	978.324				60					1.5
- 90	800.074				90					1.9
-150	978.378				150					2.7
-FMH22 - 60 - 45	978.368	1	22	60	45	18	5	10	M10	1.5
- 60	800.075				60					1.8
- 90	978.208				90					2.5
-FMH27 - 60 - 45	978.219	1	27		45	20	6	12	M12	1.5
- 60	800.079				60					1.8
- 90	978.128				90					2.5
-FMH27 - 76 - 60	800.080	2	27	76	60	20	6	12	M12	2.1
- 90	800.081				90					2.8
-FMH32 - 96 - 60	978.035	2	32	96	60	22	7	14	M16	2.4
BBT50 -FMH16 - 37 - 60	800.207	1	16	37	60	16	5	8	M8	3.8
-105	800.204				105					4.1
-150	800.205				150					4.5
-200	800.206				200					4.9
-FMH22 - 47 - 60	978.129	1	22	47	60	18	5	10	M10	4.1
-105	978.130				105					4.7
-150	978.131				150					5.3
-200	978.148				200					6.0
-250	800.221				250					6.7
-FMH22 - 60 - 60	978.403	1	22	60	60	18	5	10	M10	4.2
-105	978.167				105					5.2
-150	800.224				150					5.2
-FMH27 - 60 - 45	800.237	1	27	60	45	20	6	12	M12	3.9
- 90	978.174				90					5.0
-150	978.175				150					6.3
-200	800.235				200					7.4
-250	978.029				250					8.5
-300	800.236				300					9.6
-FMH32 - 96 - 45	978.132	1	32	96	45	22	7	14	M16	4.2
- 90	978.133				90					6.8
-150	978.143				150					10.2
-200	978.183				200					13.3
-300	800.256				300					19.0
-FMH40 -100 - 45	978.149	1	40	100	45	26	8.5	16	M20 (MBA-M20H)	4.4
- 75	961.371				75					6.2
-105	961.372				105					8.1

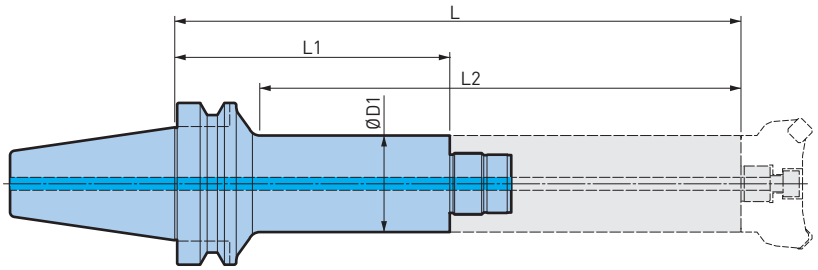
1. Hexagon socket head cap screw is included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282

Smart Damper Basic Holders for Mills





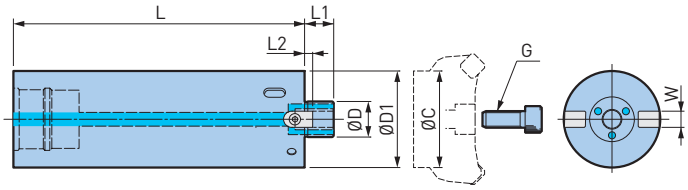


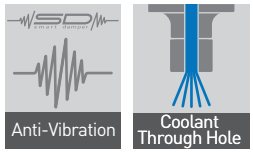
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	ØD1	L	L1	L2	Damper Head Model	Weight (kg)
BBT50 -SDF36 - 47 - 70	**806.579**	47	250	70	197	FMH DP-47	4.3
-120	**806.580**		300	120	247		5.0
-170	**804.975**		350	170	297		5.6
-220	**804.970**		400	220	347		6.3
BBT50 -SDF36 - 60 - 70	**806.581**	60	250	70	197	FMH DP-60	4.6
-120	**806.582**		300	120	247		5.7
-170	**804.973**		350	170	297		6.7
-220	**804.974**		400	220	347		7.8

Smart Damper Damper Heads for Mills





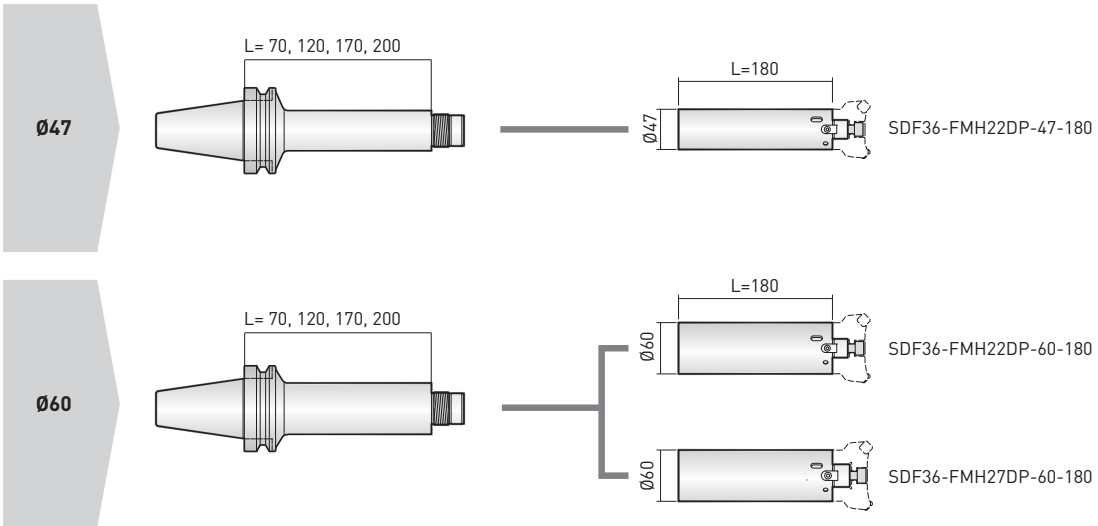


Model	Order No.	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)
SDF36-FMH22DP -47 -180	**804.969**	22	47	180	18	5	10	M10	FK45-50L	36	3.0
-60 -180	**804.971**	22	60		18	5	10	M10	FK58-62L	49	4.5
FMH27DP -60 -180	**804.972**	27	60		20	6	12	M12		46	4.5

1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282
For Wrench ▶ 275

Combinations

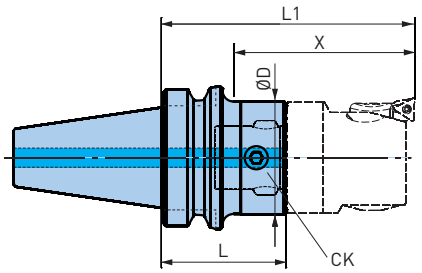


CK Shanks with Center Through Coolant

BIG-PLUS Dual-Contact
Coolant Through Hole

A.1





BIG-PLUS tools can be used in machining centers with conventional BT spindles.

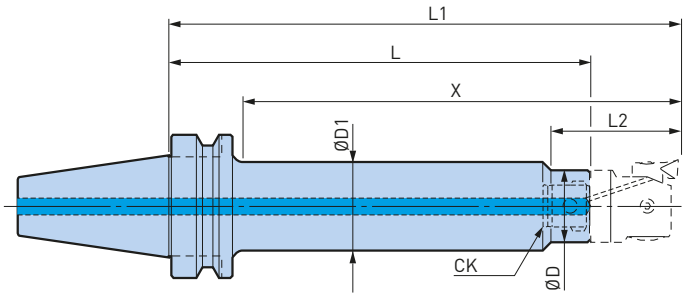
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BBT30 -CKB1 - 72	**328.308**	CKB1	19	72	104	73	0.51
-CKB2 - 83	**328.260**	CKB2	24	82.5	118	93	0.57
-CKB3 - 39	**328.272**	CKB3	31	39	79	53	0.45
-CKB4 - 73	**328.261**	CKB4	39	73	120	93	0.78
-CKB5 - 63	**328.262**	CKB5	50	63	120	93	0.80
-CKB6 - 64	**328.289**	CKB6	64	64	135	108	0.93
BBT40 -CKB1 - 72	**869.017**	CKB1	19	72	104	73	1.1
-CKB2 - 83	**806.680**	CKB2	24	82.5	118	88	1.2
-CKB3 - 124	**806.681**	CKB3	31	124	164	133	1.5
-CKB4 - 118	**806.284**	CKB4	39	118	165	133	1.8
-CKB5 - 108	**806.682**	CKB5	50	108	165	133	2.1
-CKN6 - 46	**323.832N**	CKN6	63.5	46	117	85	1.0
-CKN6 - 61	**323.831N**	CKN6	63.5	61	132	100	1.3
BBT50 -CKB1 - 102	**869.002**	CKB1	19	102	134	73	4.0
-CKB2 - 113	**869.011**	CKB2	24	112.5	148	107	4.0
-CKB3 - 124	**806.683**	CKB3	31	124	164	122	4.3
-CKB4 - 178	**869.015**	CKB4	39	178	225	182	4.9
-CKB5 - 183	**806.684**	CKB5	50	183	240	197	5.9
- 263	**806.685**	CKB5	50	263	320	277	7.0
-CKN6 - 72	**323.874N**	CKN6	63.5	72	143	100	4.0
-CKB6 - 229	**806.686**	CKB6	64	229	300	257	8.2
- 289	**806.687**	CKB6	64	289	360	317	9.7
-CKN7 - 86	**323.871N**	CKN7	90	86	203 (173)	160 (130)	4.9
-CKB7 - 136	**323.875**	CKB7	90	136	253 (223)	210 (180)	7.4
-CKB7 - 183	**806.688**	CKB7	90	183	300 (270)	257 (227)	9.9
- 243	**806.689**	CKB7	90	243	360 (330)	317 (287)	12.7

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

Extra Long CK Shanks with Center Through Coolant





BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	CK	ØD	ØD1	L	L1	L2	X	Weight (kg)
BBT50 -CKB4 - 48 - 193	**806.690**	CKB4	39	48	193	240	65	197	5.5
- 238	**806.692**				238	285		242	6.1
-CKB5 - 62 - 243	**806.693**	CKB5	50	62	243	300	80	257	8.1
- 303	**806.694**				303	360		317	9.5
-CKB6 - 72 - 259	**806.695**	CKB6	64	72	259	330	100	287	10.3
- 314	**869.018**				314	385		342	12.0
- 80 - 289	**806.696**			80	289	360		317	12.9
- 349	**806.697**				349	420		377	15.2

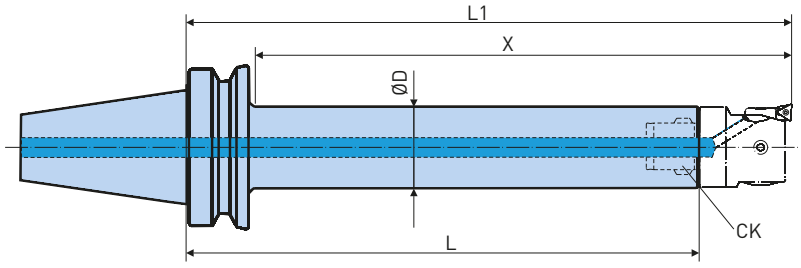
1. L1, L2 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

Fine Boring Heads ▶ Chapter B

Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole finish boring.





BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BBT50 -CKB5DP - 314	**328.228**	CKB5	50	314	371	318	7.8
-CKB6DP - 380	**328.230**	CKB6	64	380	451	408	12.3

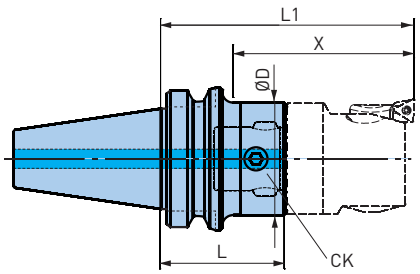
1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

A.1

CK Shanks with Center Through Coolant





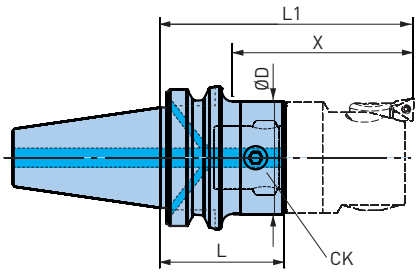
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BT30 -CKB1 - 35	**323.707**	CKB1	19	34.5	67	40	0.35
-CKB5 - 38	**329.866**	CKB5	50	38	95	68	0.48
BT40 -CKB6 - 46	**326.160**	CKB6	63.5	46	117	85	1.0
-CKB6 - 61	**323.731**	CKB6	63.5	61	132	100	1.3
BT50 -CKB6 - 72	**323.770**	CKB6	63.5	72	143	100	4.0
-CKB7 - 86	**323.771**	CKB7	90	86	203 (173)	160 (130)	5.0

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

CK Shanks with Center and Flange Through Coolant





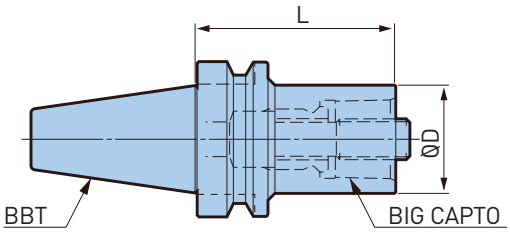
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BT30 -CKB3 - 34ADF	**323.705**	CKB3	31	34	74	47	0.39
BT40 -CKB3 - 42ADF	**323.738**	CKB3	31	42	82	50	0.97
-CKB4 - 65ADF	**326.141**	CKB4	39	65	112	80	1.2
-CKB5 - 55ADF	**323.730**	CKB5	50	55	112	80	1.2
-CKB5 - 105ADF	**326.153**	CKB5	50	105	162	130	1.9
-CKN6 - 46ADF	**323.735N**	CKN6	63.5	46	117	85	1.0
-CKN6 - 61ADF	**323.736N**	CKN6	63.5	61	132	100	1.3
BT50 -CKN6 - 72ADF	**323.775N**	CKN6	63.5	72	143	100	3.9
-CKB6 - 132ADF	**323.777**	CKB6	63.5	132	203	160	5.4
-CKN7 - 86ADF	**323.776N**	CKN7	90	86	203 (173)	160 (130)	5.0

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Heads ▶ Chapter B

BIG CAPTO Basic Holders





BIG-PLUS Dual-Contact

Coolant Through Hole

A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	BIG CAPTO	ØD	L	Weight (kg)
BBT40 -C3 - 30	**973.598**	C3	32	30	1.0
-C4 - 40	**802.350**	C4	40	40	1.1
-C5 - 50	**973.600**	C5	50	50	1.2
-C6 - 75	**973.601**	C6	63	75	1.7
BBT50 -C3 - 40	**973.602**	C3	32	40	3.6
-C4 - 40	**973.603**	C4	40		3.6
-C5 - 40	**973.604**	C5	50		3.5
-C6 - 50	**973.605**	C6	63	50	3.5
-C8 - 70	**803.736**	C8	80	70	4.0

1. Clamp bolt is included.

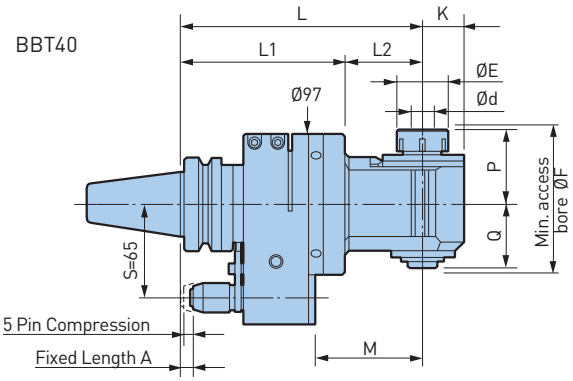
For BIG CAPTO Tools ▶ Chapter A4

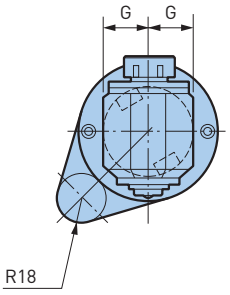
New Baby Chuck Type

BIG-PLUS Dual-Contact

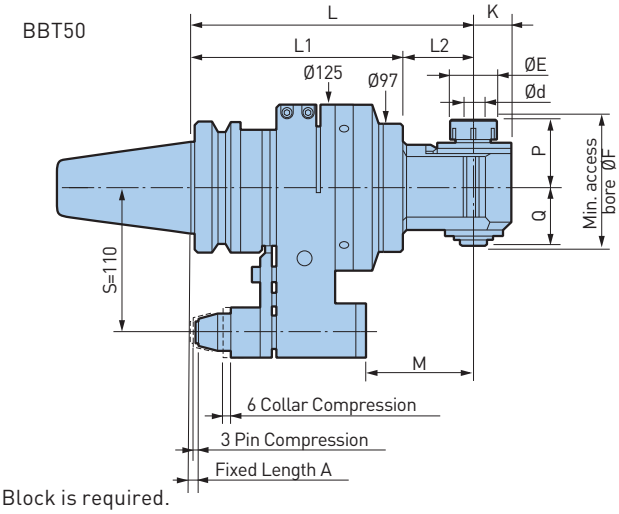
It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

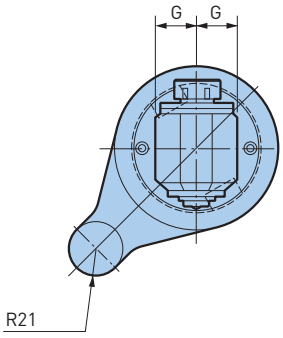














Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min^{-1}	Weight (kg)
BBT40 -AG90/NBS6 -170	802.463	0.25 - 6	20	21	17	170	115	55	77	33	29	67	NBC6	6 000	5.1
-200	802.465					200		85	107						5.3
-230	802.467					230		115	137						5.5
-260	802.469					260		145	167						5.7
-AG90/NBS10 -170	802.449	1.5 - 10	30	30	25	170	115	55	77	45	43	91	NBC10	6 000	5.5
-200	802.451					200		85	107						5.9
-230	802.453					230		115	137						6.2
-AG90/NBS13 -170	802.455	2.5 - 13	35	31	28	170	115	55	77	52	45	101	NBC13	6 000	5.6
-200	802.457					200		85	107						6.0
-230	802.459					230		115	137						6.3
-AG90/NBS20S -165S	802.462	2.5 - 20	46	35	33	165	112	53	72	65	62	132	NBC20	3 000	8.0
BBT50 -AG90/NBS6 -215	802.515	0.25 - 6	20	21	17	215	160	55	82	33	29	67	NBC6	6 000	12.6
-245	802.518					245		85	112						12.8
-275	802.521					275		115	142						13.0
-305	802.524					305		145	172						13.2
-AG90/NBS10 -215	802.494	1.5 - 10	30	30	25	215	160	55	82	45	43	91	NBC10	6 000	13.0
-245	802.497					245		85	112						13.4
-275	802.500					275		115	142						13.7
-AG90/NBS13 -215	802.503	2.5 - 13	35	31	28	215	160	55	82	52	45	101	NBC13	6 000	13.1
-245	802.506					245		85	112						13.5
-275	802.509					275		115	142						13.8
-AG90/NBS20 -230	802.512	2.5 - 20	46	35	35	230	160	70	97	65	62	132	NBC20	3 000	14.2

1. The standard fixed length A is 8 mm for BBT40 and 6 mm for BBT50. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290

New Baby Chuck Type Extra Long Type

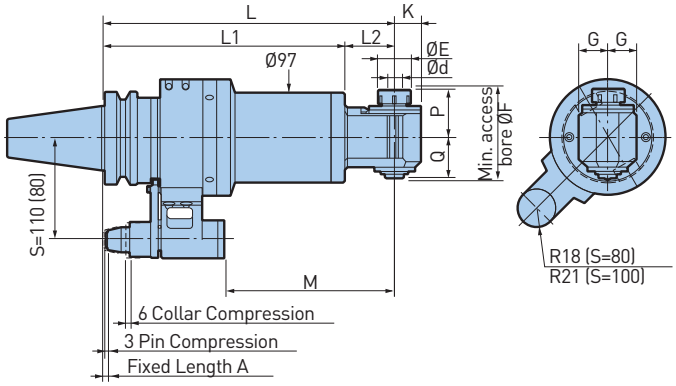
For drilling and key slotting in deep hole of large workpiece.

BIG-PLUS Dual-Contact

A.1



Exclusive Stop Block is required.



BIG-PLUS tools can be used in machining centers with conventional BT spindles. **Ø 0.25 - 20 mm**

Model		Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min^{-1}	Weight (kg)
BBT50 -AG90/NBS6	-315LS	**805.035**	0.25 - 6	20	21	17	315	260	55	182	33	29	67	NBC6	6 000	18.9
	-345LS	**805.036**					345		85	212						19.1
	-375LS	**805.037**					375		115	242						19.3
	-405LS	**805.038**					405		145	272						19.5
-AG90/NBS10	-315LS	**805.047**	1.5 - 10	30	30	25	315	260	55	182	45	43	91	NBC10		19.3
	-345LS	**805.048**					345		85	212						19.7
	-375LS	**805.049**					375		115	242						20.0
-AG90/NBS13	-315LS	**805.057**	2.5 - 13	35	31	28	315	260	55	182	52	45	101	NBC13		19.4
	-345LS	**805.058**					345		85	212						19.8
	-375LS	**805.060**					375		115	242						20.1
-AG90/NBS20	-330LS	**805.067**	2.5 - 20	46	35	35	330	260	70	197	65	62	132	NBC20	3 000	20.5
BBT50 -AG90/NBS6	-415LS	**805.039**	0.25 - 6	20	21	17	415	360	55	282	33	29	67	NBC6	6 000	23.3
	-445LS	**805.040**					445		85	312						23.5
	-475LS	**805.041**					475		115	342						23.7
	-505LS	**805.042**					505		145	372						23.9
-AG90/NBS10	-415LS	**805.050**	1.5 - 10	30	30	25	415	360	55	282	45	43	91	NBC10		23.7
	-445LS	**805.051**					445		85	312						24.1
	-475LS	**805.052**					475		115	342						24.4
-AG90/NBS13	-415LS	**805.061**	2.5 - 13	35	31	28	415	360	55	282	52	45	101	NBC13		23.8
	-445LS	**805.062**					445		85	312						24.2
	-475LS	**805.063**					475		115	342						24.5
-AG90/NBS20	-430LS	**805.069**	2.5 - 20	46	35	35	430	360	70	297	65	62	132	NBC20	3 000	24.9
BBT50 -AG90/NBS6	-515LS	**805.043**	0.25 - 6	20	21	17	515	460	55	382	33	29	67	NBC6	6 000	27.7
	-545LS	**805.044**					545		85	412						27.9
	-575LS	**805.045**					575		115	442						28.1
	-605LS	**805.046**					605		145	472						28.3
-AG90/NBS10	-515LS	**805.053**	1.5 - 10	30	30	25	515	460	55	382	45	43	91	NBC10		28.1
	-545LS	**805.054**					545		85	412						28.5
	-575LS	**805.055**					575		115	442						28.8
-AG90/NBS13	-515LS	**805.064**	2.5 - 13	35	31	28	515	460	55	382	52	45	101	NBC13		28.2
	-545LS	**805.065**					545		85	412						28.6
	-575LS	**805.066**					575		115	442						28.9
-AG90/NBS20	-530LS	**805.070**	2.5 - 20	46	35	35	530	460	70	397	65	62	132	NBC20	3 000	29.3

1. The standard fixed length A is 6 mm. Other lengths are available upon request.
2. Clamping nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmill model NBC - EAA can not be used.
4. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290

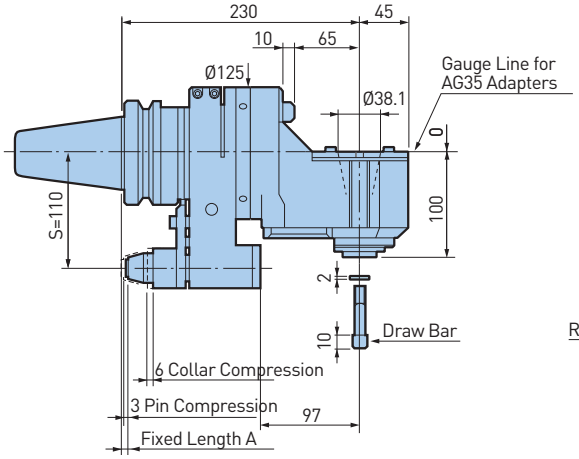
Build-Up Type

BIG-PLUS Dual-Contact

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle.
Also helps minimize interference problems with ATC and storage problems within the magazine.

A.1







Exclusive Stop Block is required.

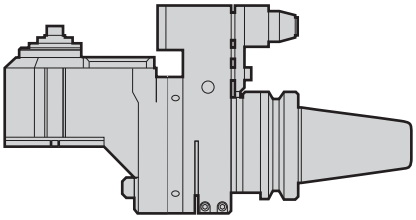
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

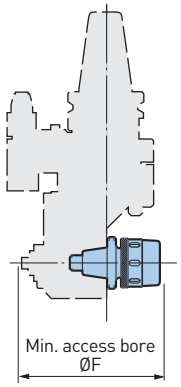
Model	Order No.	Max. min^{-1}	Weight (kg)
BBT50 -AG90/AGH35-230	**802.489**	3 000	15.0
-AG90/AGH35-230S	**802.490**	3 000	16.3

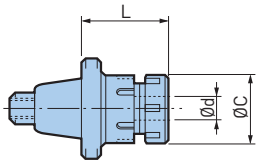
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.

For Stop Block ▶ 290
For Adapters ▶ 81

AG35 adapters





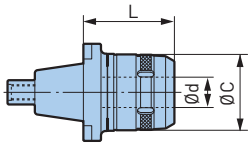


New Baby Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -NBS10	**962.793**	1.5 - 10	47	30	162	0.6
-NBS13	**962.794**	2.5 - 13	54	35	168	0.7
-NBS16	**962.795**	2.5 - 16		42	170	0.8
-NBS20	**962.796**	2.5 - 20		46		0.9

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250
For Wrench ▶ 271

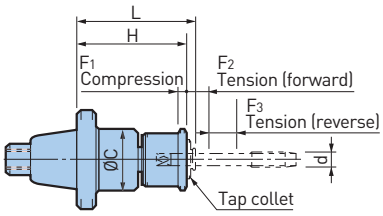


New Hi-Power Milling Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -HMC20S	**802.742**	20	60	50	178	1.5

1. Wrench (FK45-50L) is included.

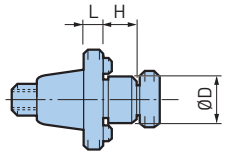
For Straight Collet ▶ 272



Auto Tapper Type B (automatic depth control)

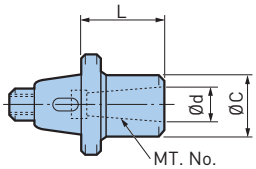
Model	Order No.	d	L	ØC	H	F1	F2	F3	Weight (kg)
AG35 -ATB12E	**802.435**	M4 - M12	80	40.5	72	0.5	5	4	1.0
-ATB20E	**802.436**	M8 - M20	115	57.5	102.5		6.5	5	1.7

1. Please contact BIG KAISER agent for tap collet.



Face Mill Arbor

Model	Order No.	ØD	L	H	Weight (kg)
AG35 -FMH22 -30	**802.740**	22	30	18	1.0
-FMH27 -20	**802.741**	27	20	20	1.0



Morse Taper Adapter

Model	Order No.	Ød	MT. No.	L	ØC	ØF	Weight (kg)
AG35 -MT1	**962.785**	12.065	1	50	24	164	0.6
-MT2	**962.786**	17.78	2	60	32	180	0.7

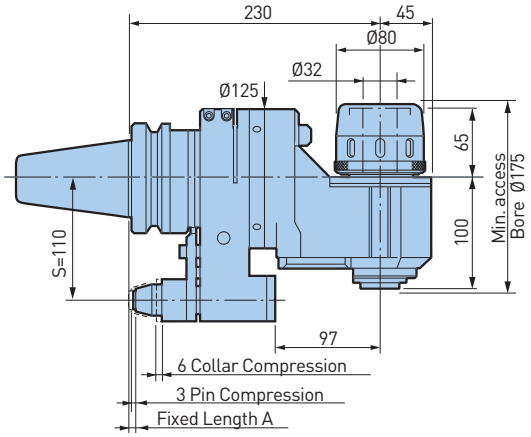
HMC Type

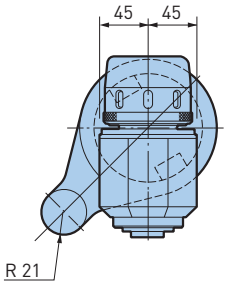
BIG-PLUS Dual-Contact

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.

A.1









Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Max. min^{-1}	Weight (kg)
BBT50 -AG90/HMC32-230	**802.492**	3 000	16.8
-AG90/HMC32-230S	**802.493**	3 000	18.1

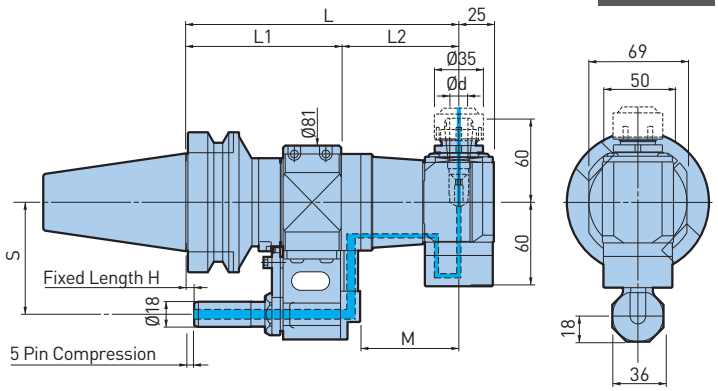
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. The standard fixed length A is 6 mm, other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.

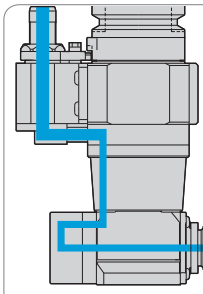
For Stop Block ▶ 290
For Straight Collet ▶ 272

OAG Type

BIG-PLUS Dual-Contact







Max. coolant pressure 20 bar
Coolant is supplied from the Stop Block through the cutting tool.



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	L	L1	L2	M	Collet Model	Nut Model	Max. min^{-1}	Weight (kg)
BBT40 -OAG90-13-170	**802.482**	2.5 - 13	170	86	84	70.5	NBC13	BPS13	5 000	6.0
BBT50 -OAG90-13-195	**802.545**		195	111						9.2

1. The standard fixed length A is 6 mm other lengths are available upon request.
2. Standard "S" is 80 mm for BBT50 and 65 mm for BBT40.
3. New baby nut and wrench are included. New baby collet is to be ordered separately.

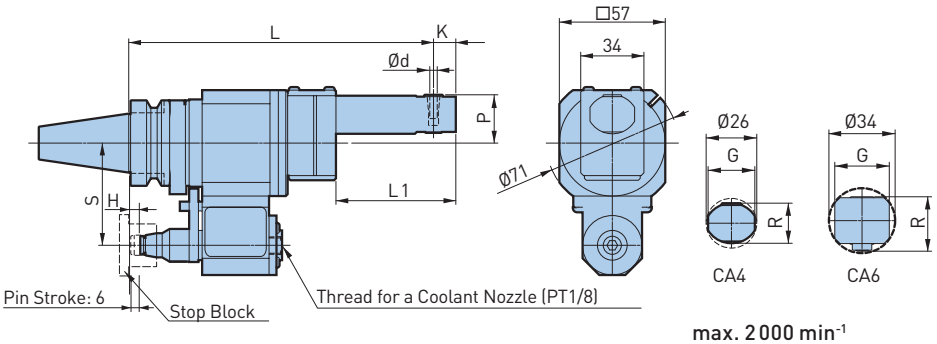
For New Baby Collet ▶ 250
For Baby Perfect Seal ▶ 262
For Stop Block ▶ 290

Light Weight Type for BBT30





Exclusive Stop Block is required.



max. 2 000 min^{-1}

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	L	L1	K	P	G	R	Ratio	Collet Model	Weight (kg)
BBT30 -AG90-CA4SG-164	**805.570**	3 - 4	164	64.5	12	26	24	21	1 : 1.13	CA4 -	1.90
-AG90-CA6SG-164	**805.571**	3 - 6	164	67	14.5	28	28	28.5	1 : 0.91	CA6 -	1.98

1. H and S dimension and angle must be indicated before ordering.
2. Tolerance of the cutting tool shank must be within h7.
3. Exclusive collet is to be ordered separately.

For Exclusive Collet ▶ 84
For Stop Block ▶ 290

Small Bore Type

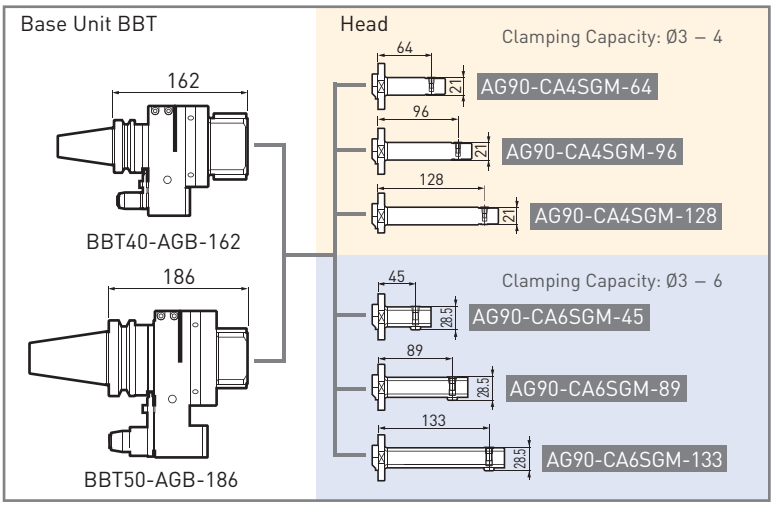
BIG-PLUS Dual-Contact

Angular operation in a Ø 30 mm bore (min.) is possible. Modular heads enhance versatility. Head is aligned with spindle center for easy programing.

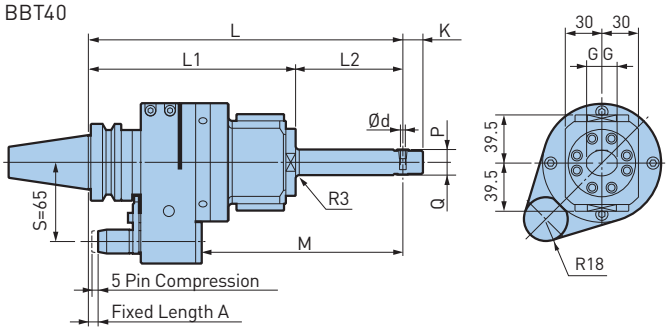
A.1





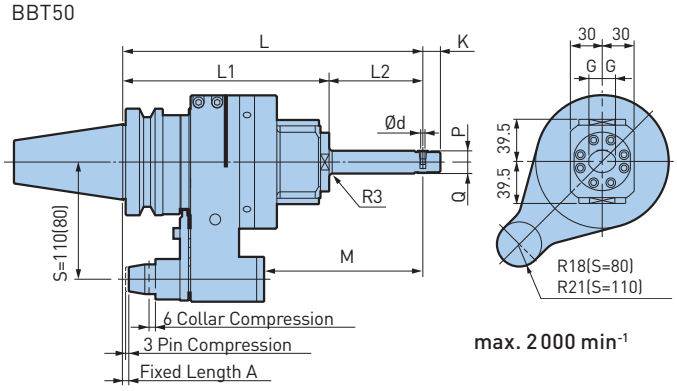


BBT40



max. 2000 min^{-1}

BBT50



max. 2000 min^{-1}



Exclusive Stop Block is required.

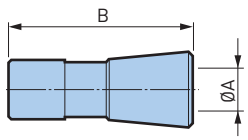
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Base	Head	Ød	G	K	L	L1	L2	M	P	Q	Speed Ratio	Weight (kg) S=65	S=80	S=110
BBT40-AG90 -CA4SGM -226	802.473	BBT40-AGB-162	AG90-CA4SGM - 64	3 - 4	12.5	16.5	226	170	56	133	10.5	10.5	1:1.06	5.6	-	-
-258	802.474		- 96				258		88	165				5.7		
-290	802.475		-128				290		120	197				5.8		
-CA6SGM -207	802.476		AG90-CA6SGM - 45	3 - 6	15	20	207		37	114	12.5	16	1:0.77	5.7		
-251	802.477		- 89				251		81	158				5.9		
-295	802.478		-133				295		125	202				6.1		
BBT50-AG90 -CA4SGM -250	802.529	BBT50-AGB-186	AG90-CA4SGM - 64	3 - 4	12.5	16.5	250	194	56	117	10.5	10.5	1:1.06	-	11.9	12.5
-282	802.531		- 96				282		88	149					12	12.6
-314	802.533		-128				314		120	181					12.1	12.7
-CA6SGM -231	802.535		AG90-CA6SGM - 45	3 - 6	15	20	231		37	98	12.5	16	1:0.77	-	12	12.6
-275	802.537		- 89				275		81	142					12.2	12.8
-319	802.539		-133				319		125	186					12.4	13

1. Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
2. Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
3. Internal coolant can not be used.
4. Exclusive collet is to be ordered separately.

For Stop Block ▶ 290

Exclusive Collet for Small Bore Type and Light Weight



Model	Order No.	ØA	B
CA4 -3	804.666	3	16.5
-3.5	804.667	3.5	
-4	804.668	4	

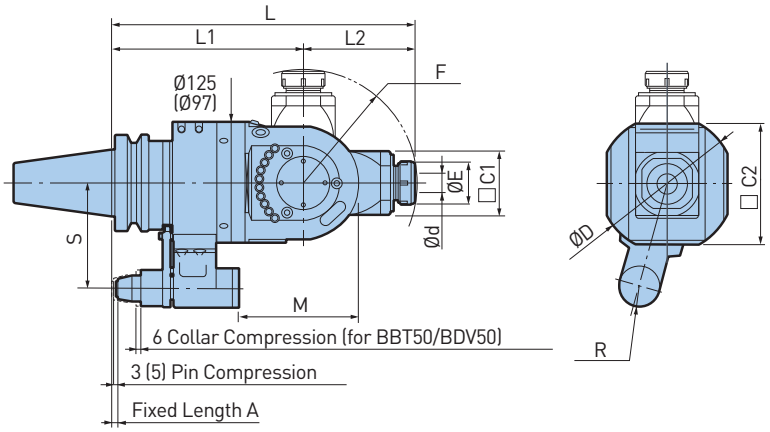
Model	Order No.	ØA	B
CA6 -3	804.669	3	22
-4	804.670	4	
-5	804.671	5	
-6	804.672	6	

Universal Type

BIG-PLUS Dual-Contact

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.







Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	ØE	ØD	□C1	□C2	L	L1	L2	M	F	R	S	Collet Model	Max. min^{-1}	Weight (kg)
BBT40 -AGU/NBS13-270	**802.480**	2.5 - 13	35	115	51	97	270	170	100	124	102	18	65	NBC13	6 000	9.7
BBT50 -AGU/NBS20-315	**802.318**	2.5 - 20	46	140	65	125	315	200	115	125	118	21	110	NBC20	4 000	20.8

1. Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
2. Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
3. Figures in ( ) in the drawing indicate dimensions for BBT40.
4. New baby nut and wrench are included.
5. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290



Easily adjustable spindle angle from 0° to 90°.



Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

AGU30 Type

BIG-PLUS Dual-Contact

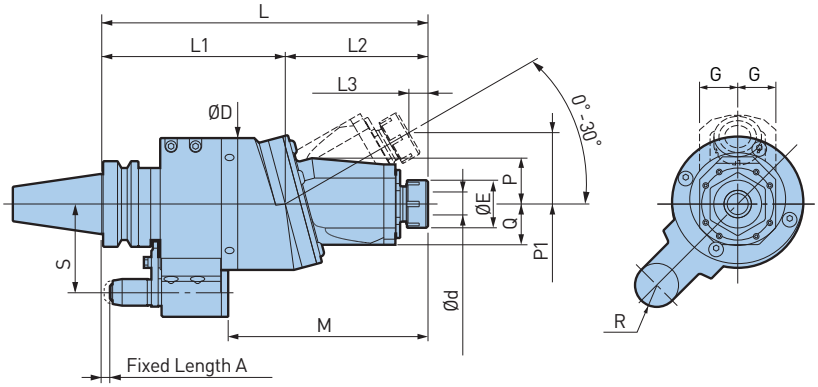
Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.

A.1





Exclusive Stop Block is required.



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

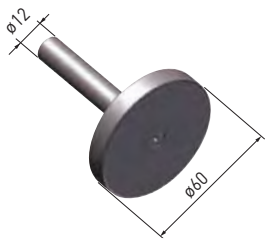
Model	Order No.	Ød	ØD	ØE	G	L	L1	L2	L3 max.	Q	P	P1 max.	R	S	M	Collet Model	Max. min^{-1}	Weight (kg)
BBT40 -AGU30/NBS13-240	**802.481**	2.5 - 13	97	35	29	240	135	105	14	30	34	52.5	18	65	147	NBC13	6 000	6.9
BBT50 -AGU30/NBS20-295	**802.544**	2.5 - 20	125	46	36.5	295	165	130	17	39	45	65	21	110	162	NBC20	4 000	16.1

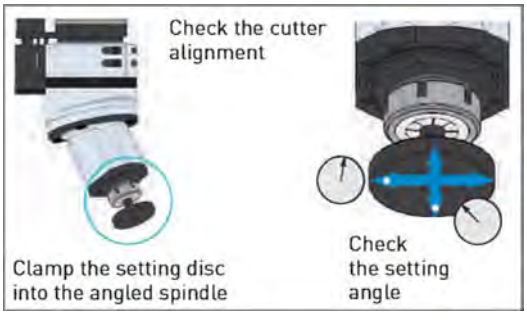
1. Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40.
   Other lengths are available upon request.
2. Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
3. New baby nut, wrench and setting disc are included.
4. Coolant can be supplied through the locating pin.

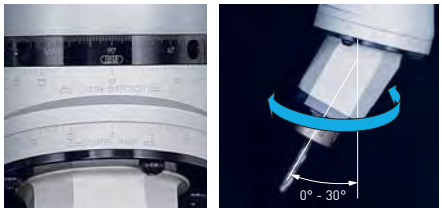
For New Baby Collet ▶ 250
For Stop Block ▶ 290

Setting Disc (Included Accessory)

For precise adjustment of the spindle angle or direction.







Spindle angle is easily adjustable from 0° to 30° using the scale indication on the body.

Application Examples



AG90-Series (Build-Up Type)

Standard Type
BBT50-AG90/AGH35-230
(with AG35-FMA25.4-20)
Workpiece: Carbon Steel C55
Cutter: 80 mm Face Mill
Cutting Depth: 2 mm
Spindle Speed: 600 min^{-1}
Cutting Speed: 150 m/min.
Cutting Feed: 360 mm/min.

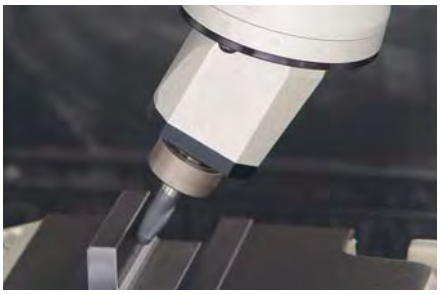
S-Type
BBT50-AG90/AGH35-230S
(with AG35-FMA25.4-20)
Workpiece: Carbon Steel C55
Cutter: 80 mm Face Mill
Cutting Depth: 3 mm
Spindle Speed: 600 min^{-1}
Cutting Speed: 150 m/min.
Cutting Feed: 360 mm/min.



AG90-Series (HMC Type)

Standard Type
BBT50-AG90/HMC32-230
Workpiece: Carbon Steel C55
Cutter: 20 mm Face Mill
Cutting Depth: 3 mm
Spindle Speed: 400 min^{-1}
Cutting Speed: 25 m/min.
Cutting Feed: 72 mm/min.

S-Type
BBT50-AG90/HMC32-230S
Workpiece: Carbon Steel C55
Cutter: 20 mm Face Mill
Cutting Depth: 4 mm
Spindle Speed: 400 min^{-1}
Cutting Speed: 25 m/min.
Cutting Feed: 72 mm/min.



AGU-Series (AGU30 Type)

BBT40-AGU30/NBS13-240
Workpiece: Pre-hardened steel (HRC40)
Cutter: R5 2-flute carbide ball end mill
Cutting Depth: Ad = 0.1 mm
Spindle Speed: 6 000 min^{-1}
Peck Feed: Pf = 0.4
Cutting Speed: 90 m/min.
Cutting Feed: 900 mm/min.

Special Designs

Our long experience and expertise enables us to design and manufacture special custom made Angle Heads for almost any customer application.

Special angle



Special length



Coolant feeder



BBT30



Air Turbine Spindle

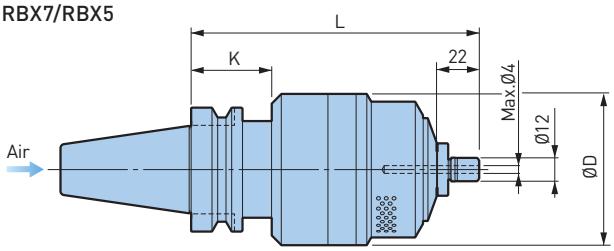
BIG-PLUS Dual-Contact

Center Through Type

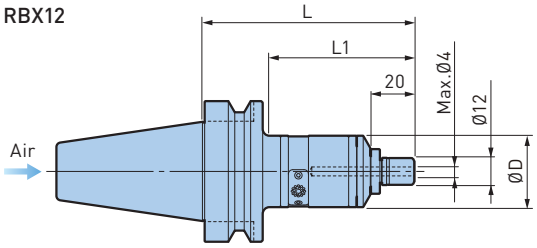
A.1



RBX7/RBX5



RBX12



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Operation Speed (min^{-1})	L	L1	ØD	K	Nut Model	Weight (kg)
BBT30 -RBX12C -4S- 95	**804.890**	100 000 - 120 000	95	70	32	-	MGN4S-HG	0.7
BBT40 -RBX5C -4S-150	**802.403**	40 000 - 50 000	150	-	96	43	MGN4S	4.1
-RBX7C -4S-150	**802.409**	60 000 - 80 000			78			3.1
-RBX12C -4S- 95	**804.891**	100 000 - 120 000	95	65	32	-	MGN4S-HG	1.3
BBT50 -RBX5C -4S-160	**802.415**	40 000 - 50 000	160	-	96	53	MGN4S	7.3
-RBX7C -4S-160	**802.420**	60 000 - 80 000			78			6.3

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247
For Air Filter ▶ 90

Caution

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

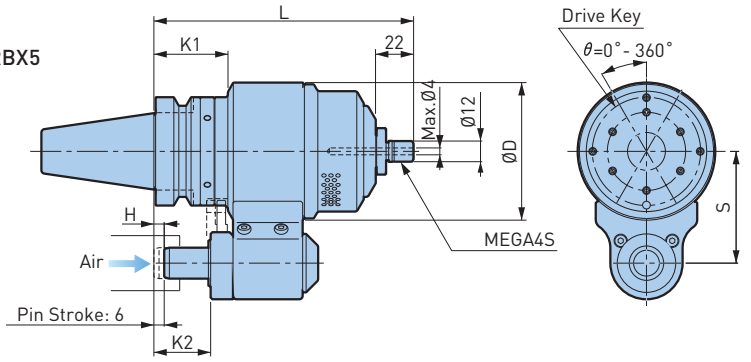
Air Turbine Spindle

Side Through Type

BIG-PLUS Dual-Contact

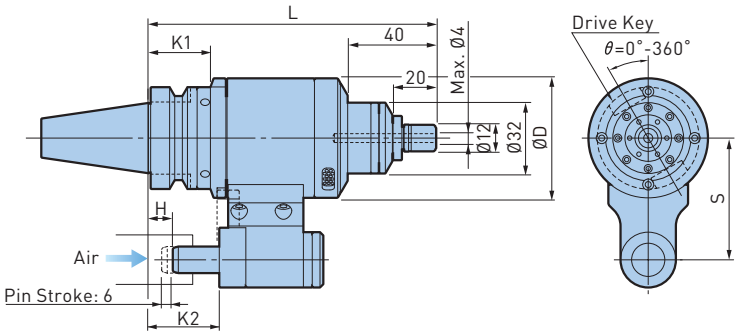


RBX7/RBX5





RBX12





Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Operation Speed (min^{-1})	L	ØD	K1	K2	S	H	Nut Model	Weight (kg)
BBT30 -RBX7 -4S-152-55	**802.395**	60 000 - 80 000	152	80	28	33	55	-10 - 22	MGN4S	2.7
-RBX12 -4S-130-55	**804.883**	100 000 - 120 000	130	54	28	32	55	0 - 20	MGN4S-HG	1.7
BBT40 -RBX5 -4S-151-65	**802.398**	40 000 - 50 000	151	96	43	33	65	-24 - 21	MGN4S	5.0
-RBX7 -4S-151-65	**802.404**	60 000 - 80 000	151	80	43	33	65	-24 - 21	MGN4S	4.0
-RBX12 -4S-135-65	**804.885**	100 000 - 120 000	135	63	-	33	65	-24 - 21	MGN4S-HG	3.0
BBT50 -RBX5 -4S-166-80	**802.411**	40 000 - 50 000	166	100	58	48	80	-9 - 36	MGN4S	9.7
-RBX7 -4S-166-80	**802.416**	60 000 - 80 000								8.7

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247
For Air Filter ▶ 90
For Stop Block ▶ 290

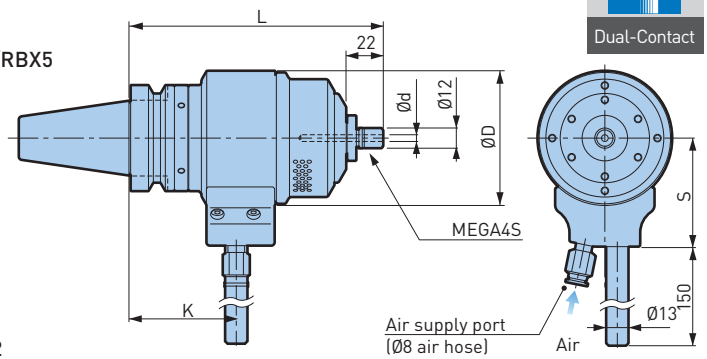
Air Turbine Spindle

BIG-PLUS Dual-Contact

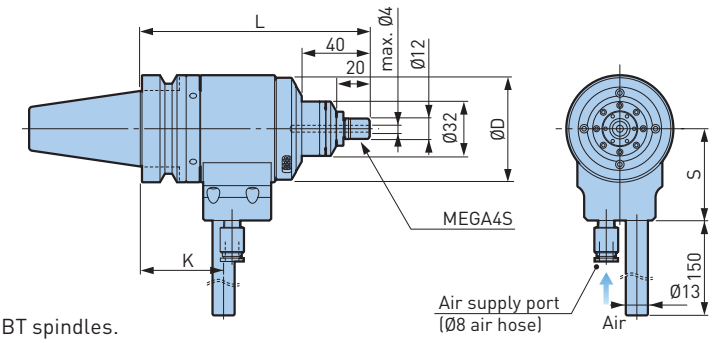
Manual Type



RBX7/RBX5



RBX12





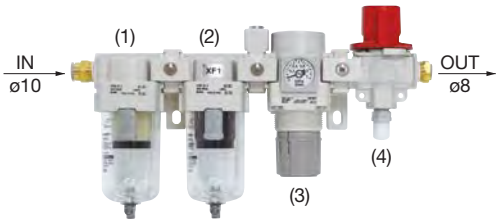
Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Operation Speed (min^{-1})	L	ØD	K	S	Nut Model	Weight (kg)
BBT30 -RBX7 -4S-152H	**802.396**	60 000 - 80 000	152	80	64.5	65	MGN4S	2.7
-RBX12 -4S-130H	**804.886**	100 000 - 120 000	130	54	46	50	MGN4S-HG	1.7
BBT40 -RBX5 -4S-151H	**802.399**	40 000 - 50 000	151	96	63	71	MGN4S	5.0
-RBX7 -4S-151H	**802.405**	60 000 - 80 000		80		65		4.0
-RBX12 -4S-135H	**804.887**	100 000 - 120 000	135	63	49	54	MGN4S-HG	2.7
BBT50 -RBX5 -4S-166H	**802.412**	40 000 - 50 000	166	100	78	80	MGN4S	9.7
-RBX7 -4S-166H	**802.417**	60 000 - 80 000						8.7

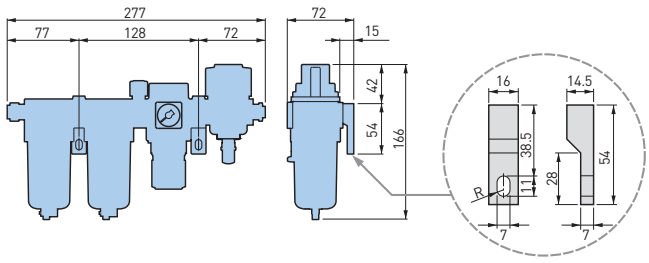
1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

Air Filter Regulator for RBX



Model XF1

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).



Model	Order No.
XF1	**962.661**

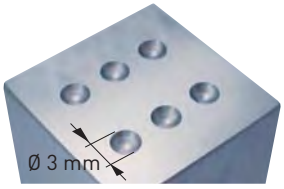
Accessories for RBX

Accessories							
	MEGA Nut 		Exclusive Nut 		MEGA Wrench 		Micro Collet  ▶ 247
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model	Order No.	Model
RBX12-4S	-	-	MGN4S-HG	805.747	MGR12	**969.450**	NBC4S-
RBX7-4S	MGN4S	**969.481**	-	-			
RBX5-4S	MGN4S	**969.481**	-	-			

Application Examples

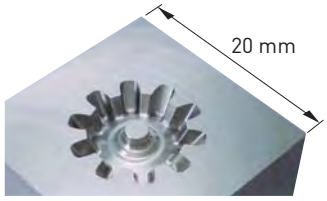
RBX12

Dimpling on sintered HSS
Machining time 90 sec./hole



Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min^{-1}
Cutting Feed	1 500 mm/min
D.O.C	ap = 0.01 mm

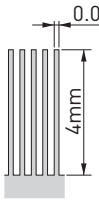
Milling on die steel
Machining time 23 min.

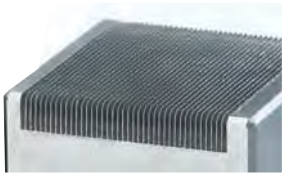


Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min^{-1}
Cutting Feed	2 400 mm/min
D.O.C	ap = 0.01 mm

RBX7

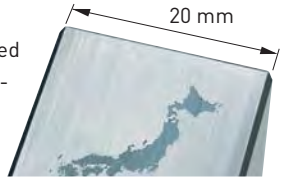
Aluminium A2017
Outstanding runout accuracy permits perfect thin wall cutting.





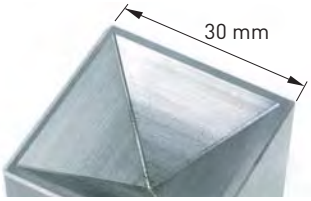
Cutter	Ø 0.5 mm Rib-endmill
Spindle Speed	70 000 min^{-1}
Cutting Feed	1 500 mm/min
D.O.C	ap = 0.02 mm

Prehardened steel HRC40
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of 5 µ clearly visible.



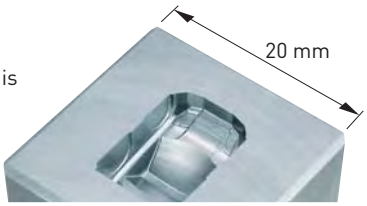
Cutter	R0.1 mm Ball nose endmill
Spindle Speed	80 000 min^{-1}
Cutting Feed	400 mm/min
D.O.C	ap = 0.01 mm

Prehardened steel HRC40
Overall cutting length of 656 m can be achieved with one ball nose endmill. Drastically extended tool life.



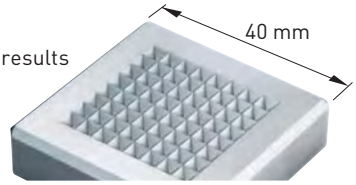
Cutter	R0.5 mm Ball nose endmill
Spindle Speed	65 000 min^{-1}
Cutting Feed	4 200 mm/min
D.O.C	ap = 0.02 mm; ae = 0.05 mm

Prehardened steel HRC40
Original 5hour operation in MC is reduced to 2 hours.



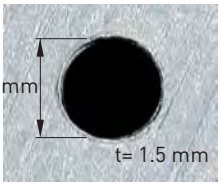
Cutter	R0.2 mm Ball nose endmill
Spindle Speed	70 000 min^{-1}
Cutting Feed	1 000 mm/min
D.O.C	ap = 0.01 mm

Prehardened steel HRC40
No thermal expansion of spindle results in finely detailed surface finish.



Cutter	R0.5 mm Ball nose endmill
Spindle Speed	75 000 min^{-1}
Cutting Feed	400 mm/min
D.O.C	ap = 0.02 mm

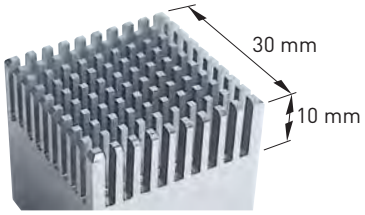
Aluminium A2017
High-precision drilling is possible without center drill operation. Even after 3500 holes, no problems can be found on the cutting edge.



Cutter	Ø 0.3 mm Solid drill
Spindle Speed	75 000 min^{-1}
Cutting Feed	200 mm/min
Peck	0.03 mm

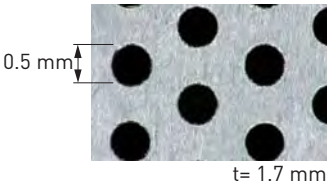
RBX5

Prehardened steel HRC40
Even a taper endmill that has high cutting forces can achieve stable cutting.



Cutter	Ø 1.5 mm Rib-endmill
Spindle Speed	40 000 min^{-1}
Cutting Feed	1 000 mm/min
D.O.C	ap = 0.05 mm

Stainless steel SUS303
Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.



Cutter	Ø 0.5 mm Solid drill
Spindle Speed	40 000 min^{-1}
Cutting Feed	20 mm/min
Peck	0.01 mm

High Spindle GTG Type

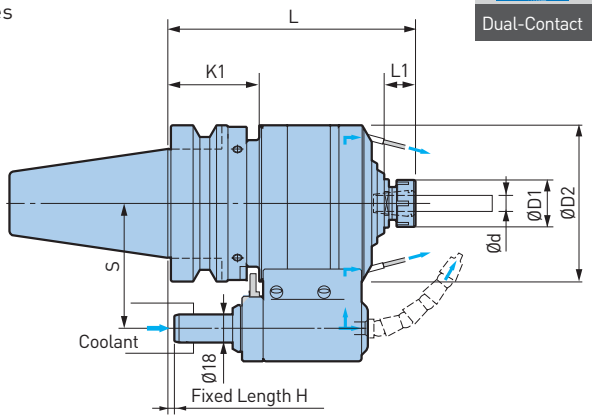
BIG-PLUS
Dual-Contact

Speed Increaser

High Spindle improves drilling and end-milling performance on existing machines by multiplying the spindle speed 4, 5 or 6 times.

A.1







Exclusive Stop Block is required.

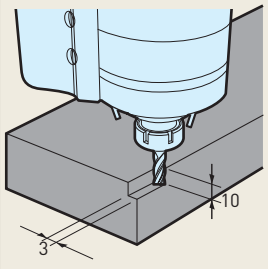
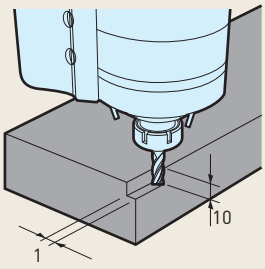
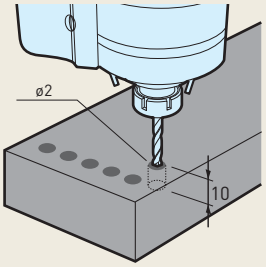
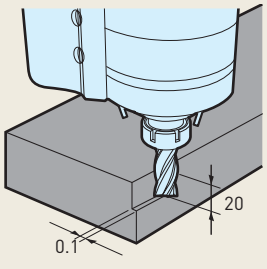
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	L	L1	ØD1	ØD2	K1	S	Collet	Speed Ratio	Max. min^{-1}	Weight (kg)
BBT40 -GTG5-10-140	**802.964**	1.5 - 10	140	20	30	80	43	65	NBC10	4.67	20 000	4.8
BBT50 -GTG6-10-158	**802.970**	1.5 - 10	158	20	30	100	58	80	NBC10	5.67	20 000	8.8
-GTG4-16-177	**802.968**	2.5 - 16	177	25.5	42	110	58	80	NBC16	3.80	15 000	10.6

1. The standard fixed length H is 6 mm. Other lengths are available upon request.
2. In case of more than 30 min. continuous use, rotation speed must be reduced by 20%.
3. Please do not use with neat oil coolant.
4. Nut, wrench and following collet are included.

For Stop Block ▶ 290
For Collet ▶ 250

Application Examples

Model	BBT40-GTG5-10-140	BBT50-GTG6-10-158	BBT50-GTG6-10-158	BBT50-GTG4-16-177
Cutter	Solid carbide endmill Ø8 / 2 flutes	Solid carbide endmill Ø6 / 2 flutes	Solid carbide drill Ø2	Solid carbide drill Ø16
Workpiece Material	Duralumin (A-2017)	S55C / CK55	Duralumin (A-2017)	Duralumin (A-2017)
Revolution	20 000 min^{-1}	16 000 min^{-1}	20 000 min^{-1}	15 000 min^{-1}
Feed Rate	3 000 mm/min	3 500 mm/min	2 000 mm/min	1 000 mm/min
Result	High metal removal rate 90 cm^3/min	High metal removal rate 35 cm^3/min	Extended tool life 1200 holes by 1 drill	Surface roughness Ry max. 2 µm
				

Dyna Test

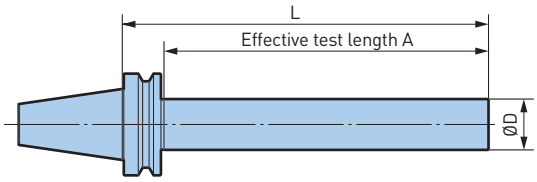
Periodic inspection of machine tools to control production stability.

BIG-PLUS Dual-Contact

BIG-PLUS BT Type

Shorter models are ideal for measuring ATC repeatability.



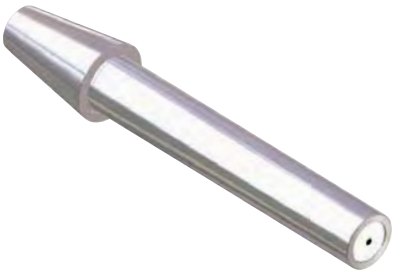


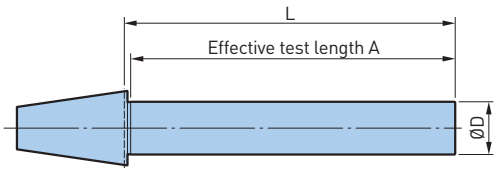
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	L	A	ØD	Weight (Kg)
BBT30 -32 - L150	**800.054**	150	125	32	1.1
- L235	**961.264**	235	210		1.5
BBT40 -50 - L200	**800.065**	200	170	50	2.8
- L350	**978.119**	350	320		4.3
BBT50 -50 - L200	**800.184**	200	159	50	5.2
- L360	**978.290**	360	319		6.9

1. Taper length is in accordance with JIS BT standard.

Basic Type





Model	Order No.	L	A	ØD	Weight (Kg)
NT30 -32 - L150	**801.759**	150	142	32	1.0
- L225	**978.253**	225	217		1.4
NT40 -50 - L200	**801.760**	200	184	50	2.5
- L335	**801.761**	335	319		3.9
NT50 -50 - L200	**801.762**	200	191	50	3.8
- L335	**801.763**	335	326		5.3

Tool Holders DV/BDV (DIN 69871)

MEGA Micro Chuck	96
MEGA New Baby Chuck	97 - 98
MEGA E Chuck	99
MEGA Double Power Chuck	100
MEGA Perfect Grip	101
New Baby Chuck	102 - 103
New Hi-Power Milling Chuck	104 - 105
Hydraulic Chucks	106
Shrink Chucks	107
MEGA Synchro Tapping Holder	108
Side Lock Holders	109
Holders for Screw-On Cutter	110
Face Mill Arbors	111
Smart Damper	112
CK Shanks	113 - 115
Angle Heads	116 - 120
Air Turbine Spindle / High Spindle	121 - 125
Dyna Test	126

A.2

A.2

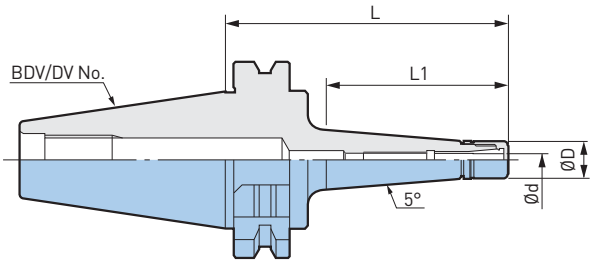
MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

BIG-PLUS Dual-Contact

Coolant Through Hole





BIG-PLUS tools can be used in machining centers with conventional spindles. **Ø 0.45 - 8.05 mm**

Model	Order No.	Ød	ØD	L	L1	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
DV30 -MEGA6S - 60T	**805.016**	0.45 - 6.05	14	60	36	40 000	NBC6S-	MGN6S	0.41
-MEGA8S - 75T	**805.246**	2.95 - 8.05	18	75	51	35 000	NBC8S-	MGN8S	0.48
BDV40 -MEGA3S - 90T	**969.302**	0.45 - 3.25	10	90	60	28 000	NBC3S-	MGN3S	0.9
-MEGA4S - 90T	**969.305**	0.45 - 4.05	12	90	60	28 000	NBC4S-	MGN4S	1.0
-MEGA6S - 60T	**969.307**	0.45 - 6.05	14	60	30	35 000	NBC6S-	MGN6S	0.9
- 90T	**969.308**			90	60	28 000			1.0
-120T	**969.309**			120	90	22 000			1.1
-MEGA8S - 90T	**806.747**	2.95 - 8.05	18	90	60	28 000	NBC8S-	MGN8S	1.0

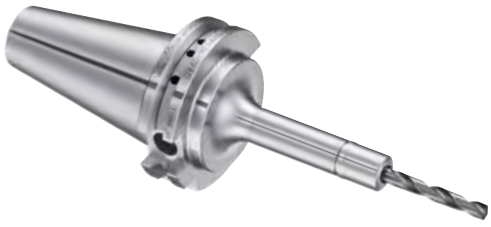
1. MEGA nut is included.

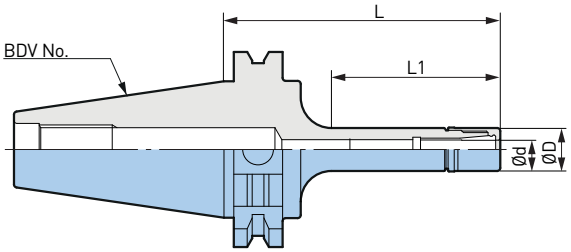
MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

BIG-PLUS Dual-Contact

Coolant Through Hole





BIG-PLUS tools can be used in machining centers with conventional spindles. **Ø 0.45 - 6.05 mm**

Model	Order No.	Ød	ØD	L	L1	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BDV40 -MEGA6S -90	**969.208**	0.45 - 6.05	14	90	55	35 000	NBC6S-	MGN6S	1.1

1. MEGA nut is included.

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▸ 247	Micro Seal Nut  ▸ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

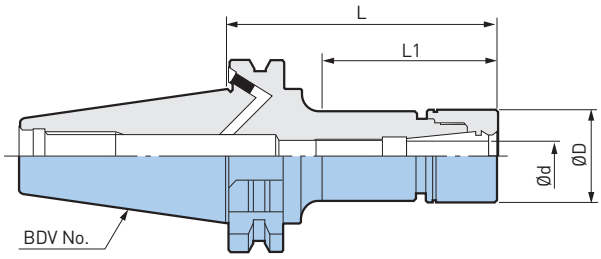
MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

BIG-PLUS Dual-Contact

Coolant Through Hole

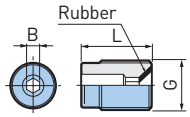




BIG-PLUS tools can be used in machining centers with conventional spindles. **Ø 0.25 - 25.4 mm**

Model	Order No.	Ød	ØD	L	L1	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
DV30 -MEGA10N - 75	**805.247**	1.5 - 10	30	75	54	30 000	NBC10-	MGN10	0.60
BDV40-MEGA6N - 90	**969.224**	0.25 - 6	20	90	55	35 000	NBC6-	MGN6	1.1
-135	**969.225**			135	100	20 000			1.2
-MEGA8N - 90	**969.229**	0.5 - 8	25	90	57	35 000	NBC8-	MGN8	1.1
-135	**969.230**			135	102	20 000			1.3
-MEGA10N - 90	**969.234**	1.5 - 10	30	90	59	35 000	NBC10-	MGN10	1.2
-135	**969.235**			135	104	20 000			1.4
-MEGA13N - 90	**969.239**	2.5 - 13	35	90	61	35 000	NBC13-	MGN13	1.3
-135	**969.240**			135	106	20 000			1.6
-165	**969.241**			165	136	15 000			1.8
-MEGA16N - 90	**969.244**	2.5 - 16	42	90	65	30 000	NBC16-	MGN16	1.5
-135	**969.245**			135	110	20 000			1.9
-165	**969.246**			165	140	15 000			2.2
-MEGA20N - 60	**969.248**	2.5 - 20	46	60	40	30 000	NBC20-	MGN20	1.3
- 90	**969.249**			90	70				1.6
-135	**969.250**			135	115	20 000			2.0
-165	**969.251**			165	145	15 000			2.3
-200	**969.252**			200	180	10 000			2.6
-MEGA25N - 90	**806.375**	15.5 - 25.4	60	90	70	19 000	NBC25-	MGN25	1.8
-120	**806.376**			120	100	16 000			2.3

1. MEGA nut is included.
2. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4
MEGA25N	MGN25	**806.388**	MGR60L	**969.468L**	NBC25-	-	NBA25B	**806.389**	M27	20	4

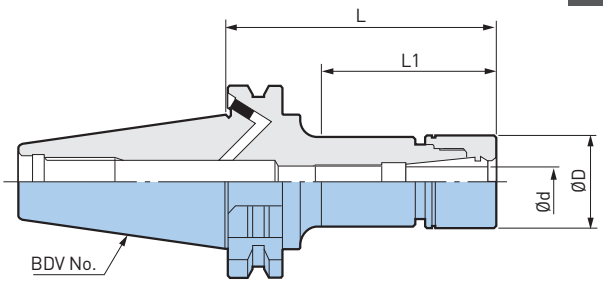
MEGA New Baby Chuck

Dual-Contact

Coolant Through Hole

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



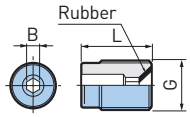


A.2

BIG-PLUS tools can be used in machining centers with conventional spindles. **Ø 0.25 - 25.4 mm**

Model	Order No.	Ød	ØD	L	L1	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BDV50 -MEGA6N - 90	**969.253**	0.25 - 6	20	90	50	20 000	NBC6-	MGN6	3.0
-120	**969.254**			120	80				3.0
-165	**969.255**			165	125	14 000			3.1
-MEGA10N - 90	**969.261**	1.5 - 10	30	90	55	20 000	NBC10-	MGN10	3.2
-120	**969.262**			120	80				3.3
-165	**969.263**			165	125	16 000			3.5
-MEGA13N - 90	**969.267**	2.5 - 13	35	90	55	18 000	NBC13-	MGN13	3.2
-120	**969.268**			120	80				3.4
-165	**969.269**			165	125	16 000			3.7
-MEGA16N - 90	**969.274**	2.5 - 16	42	90	55	17 000	NBC16-	MGN16	3.4
-120	**969.275**			120	85				3.7
-165	**969.276**			165	130	16 000			4.1
-200	**969.277**			200	165	13 000			4.4
-MEGA20N - 90	**969.280**	2.5 - 20	46	90	55	16 000	NBC20-	MGN20	3.5
-120	**969.281**			120	85				3.8
-165	**969.282**			165	130	15 000			4.3
-200	**969.283**			200	165	13 000			4.6
-MEGA25N -105	**806.377**	15.5 - 25.4	60	105	77	16 000	NBC25-	MGN25	4.0
-135	**806.378**			135	107	15 000			4.6

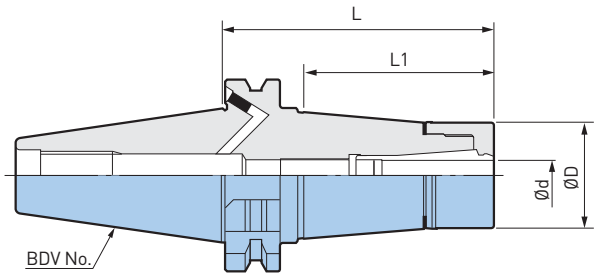
1. MEGA nut is included.
2. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4
MEGA25N	MGN25	**806.388**	MGR60L	**969.468L**	NBC25-	-	NBA25B	**806.389**	M27	20	4

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.



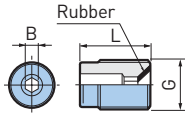


BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 3 - 12 mm

Model	Order No.	Ød	ØD	L	L1	max. min^{-1}	Collet Model	Nut Model	Weight (kg)
BDV40 -MEGA6E - 90	**968.142**	3 - 6	25	90	60	30 000	MEC6-	MEN6	1.2
-MEGA8E - 60	**968.144**	3 - 8	30	60	30		MEC8-	MEN8	1.2
- 90	**968.145**			90	63				1.3
-MEGA10E - 60	**968.147**	3 - 10	35	60	33		MEC10-	MEN10	1.3
- 90	**968.148**			90	64				1.4
-MEGA13E - 60	**968.150**	3 - 12	42	60	35		MEC13-	MEN13	1.5
- 90	**968.151**			90	61				1.7
-120	**968.152**			120	95	29 000			1.9
BDV50 -MEGA6E -120	**968.154**	3 - 6	25	120	90	20 000	MEC6-	MEN6	3.3
-MEGA8E -120	**968.156**	3 - 8	30				MEC8-	MEN8	3.4
-MEGA10E -120	**968.159**	3 - 10	35				MEC10-	MEN10	3.6
-MEGA13E - 90	**968.161**	3 - 12	42	90	60	18 000	MEC13-	MEN13	3.6
-120	**968.162**			120	90				3.8
-165	**968.163**			165	137	16 000			4.4

1. MEGA E nut is included.
2. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA E Nut 		MEGA Wrench 		MEGA E Collet  ▶ 264	MEGA E Perfect Seal  ▶ 265	Adjusting Screw 				
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6E	MEN6	**968.461**	MGR25	**969.456**	MEC6-	EPS6-	NBA6B	**961.527**	M7	12	2
MEGA8E	MEN8	**968.462**	MGR30	**969.458**	MEC8-	EPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10E	MEN10	**968.463**	MGR35	**969.460**	MEC10-	EPS10-	NBA10B	**961.572**	M14	16	3
MEGA13E	MEN13	**968.464**	MGR42	**969.462**	MEC13-	EPS13-	NBA13B	**961.598**	M18	20	4

MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique design ensures efficient coolant supply to the cutting tool periphery.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.2





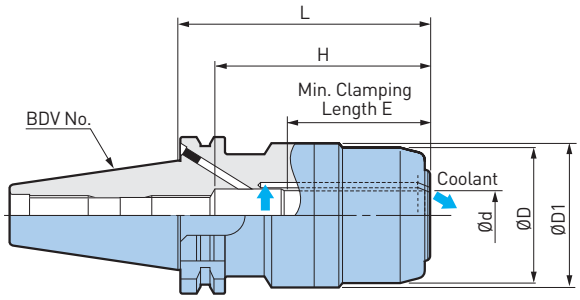


Fig. 1

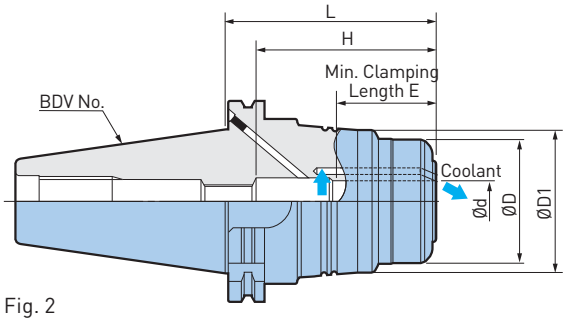


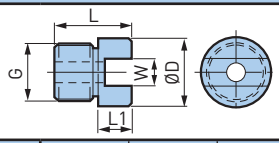
Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles. **Ø 3 - 42 mm**

Model	Order No.	Fig.	Ød	ØD	ØD1	L	H	E	max. min^{-1}	Weight (kg)
BDV40 -MEGA16DS - 90A *	**803.075**	1	16	42	52.6	92	73	57	25 000	1.8
-MEGA20DS -100A	**803.076**		20	50	55	102	71 - 81	58	22 000	1.9
-135A	**805.596**					137			20 000	2.5
-MEGA25DS -100A	**803.077**		25	62	62.7	102	73 - 83	59	18 000	2.4
-135A	**805.597**					137			16 000	3.0
-MEGA32DS -100A	**803.078**		32	70	70.7	102	78 - 88	66	12 000	2.2
-135A	**805.598**					137			10 000	3.0
BDV50 -MEGA16DS - 70 *	**969.023**	2	16	46	55	72.5	73	52	20 000	3.5
-MEGA20DS -100	**969.025**		20	60	69	102.5	71 - 81	58	20 000	4.9
-135	**805.753**					137.5			19 000	5.7
-MEGA25DS -105	**968.059**		25	70	77	107.5	78 - 88	67	18 000	5.4
-135	**805.600**					137.5			17 000	6.3
-MEGA32DS -105	**968.060**		32	80	86	107.5	80 - 97	73	15 000	5.7
-135	**805.601**					137.5			13 000	6.7
-MEGA42DS -105	**968.061**	1	42	99	99.7	107	90 - 107	73	12 000	6.1

1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw can not be used.

For Straight Collet ▶ 272

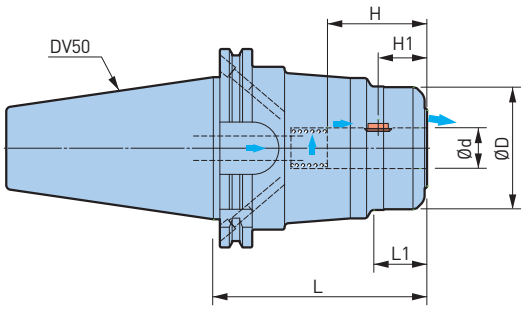
Accessories									
	MEGA Wrench 		Adjusting Screw 						
MEGA Double Power Chuck	Model	Order No.	Model	Order No.	ØD	L	L1	G	W
BDV40 -MEGA16DS	MGR42L	**969.462L**	-	-	-	-	-	-	-
-MEGA20DS	MGR50L	**969.464L**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-MEGA25DS	MGR62L	**969.469L**							
-MEGA32DS	MGR70L	**969.470L**	HMA-M16S	**962.312**					10
BDV50 -MEGA16DS	MGR46L	**969.465L**	-	-	-	-	-	-	-
-MEGA20DS	MGR60L	**969.468L**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-MEGA25DS	MGR70L	**969.470L**							
-MEGA32DS	MGR80L	**969.471L**	HMA-M24	**962.313**	30	36	9.5	M24P1.5	10
-MEGA42DS	MGR99L	**969.472L**							

MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.

Coolant Through Hole







Ø 20 - 32 mm

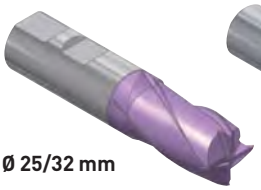
Model	Order No.	Ød	ØD	L	L1	H	H1	MEGA Wrench	Weight (kg)
DV50 -MEGA20DPG -105ADF	**805.808**	20	60	105	27	49	24	MGR60L	5.1
-MEGA25DPG -105ADF	**805.809**	25	70		33	55	23	MGR70L	5.4
-MEGA32DPG -105ADF	**805.810**	32	80		41	59		MGR80L	5.6

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

Weldon Shank Standards

(DIN1835-1)

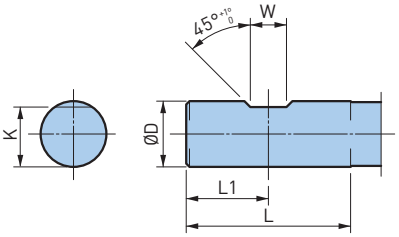
The following standard shank is required for MEGA Perfect Grip.



Ø 25/32 mm



Ø 20 mm



ØD		L	L1	W		K	
Nominal	Tolerance			Nominal	Tolerance	Nominal	Tolerance
20	h6	50	25	11	+ 0.05 0	18.2	h13
25		56	32	12		23	
32		60	36	14		30	

Caution

In case you are adding your own flat, the tool projection length in the MEGA Perfect Grip will be decided by the flat position. Refer to H1 in the MEGA Perfect Grip chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

Spare Parts					Accessories	
	Key Grip 		Spring 		MEGA Wrench 	
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA20DPG	PKG20-2P	**805.493**	PSP1823	**805.497**	MGR60L	**969.468L**
MEGA25DPG	PKG25-2P	**805.494**	PSP2420	**805.498**	MGR70L	**969.470L**
MEGA32DPG	PKG32-2P	**805.495**	PSP3128	**805.499**	MGR80L	**969.471L**

1. Key grip is available in a package of 2 pcs.
2. As key grip is an consumable item, it is recommended to replace on a regular basis.

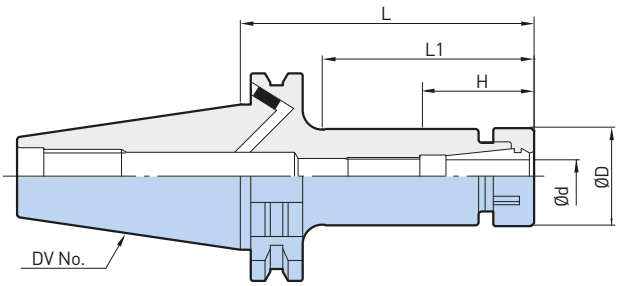
New Baby Chuck

The original high precision collet chuck to perform all machining applications.

Coolant Through Hole

A.2





Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
DV40 -NBS6 - 60	**961.831**	0.25 - 6	20	60	34	20 - 40	NBC6-	NBN6	0.9
- 90	**969.032**			90	60				1.0
-135	**961.833**			135	105				1.0
-NBS8 - 60	**969.034**	0.5 - 8	25	60	34	23 - 42	NBC8-	NBN8	0.9
- 90	**961.835**			90	62				1.0
-135	**969.036**			135	107				1.2
-NBS10 - 60	**969.037**	1.5 - 10	30	60	34	35 - 45	NBC10-	NBN10	1.0
- 90	**969.038**			90	64				1.1
-135	**961.839**			135	104				1.4
-NBS13 - 60	**969.040**	2.5 - 13	35	60	37	41 - 60	NBC13-	NBN13	1.0
- 90	**969.041**			90	66				1.2
-135	**969.042**			135	106				1.6
-NBS16 - 60	**969.043**	2.5 - 16	42	60	38	45 - 65	NBC16-	NBN16	1.1
- 90	**969.044**			90	68				1.4
-135	**969.045**			135	113				1.8
-NBS20 - 60	**969.046**	2.5 - 20	46	60	40	48 - 65	NBC20-	NBN20	1.3
- 90	**969.047**			90	70				1.6
-135	**969.048**			135	115				2.0
-165	**969.059**			165	145				2.3
-200	**969.060**			200	180				2.6

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

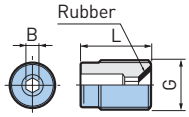
For Tap Driving Back Stop ▶ 259

Ø 0.25 - 20 mm

Model		Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
DV50 -NBS6	-120	**969.062**	0.25 - 6	20	120	85	20 - 40	NBC6-	NBN6	2.8
	-165	**969.063**			165	125				3.1
-NBS8	-120	**969.066**	0.5 - 8	25	120	80	23 - 42	NBC8-	NBN8	3.2
	-165	**969.067**			165	130				3.0
-NBS10	- 90	**969.069**	1.5 - 10	30	90	60	35 - 45	NBC10-	NBN10	2.9
	-120	**969.070**			120	85				3.0
	-165	**969.071**			165	130				3.2
-NBS13	- 90	**969.075**	2.5 - 13	35	90	60	41 - 60	NBC13-	NBN13	3.0
	-120	**961.876**			120	80				3.4
	-165	**969.077**			165	125				3.7
-NBS16	- 90	**969.082**	2.5 - 16	42	90	60	45 - 65	NBC16-	NBN16	3.0
	-120	**969.083**			120	85				3.9
	-165	**969.084**			165	130				4.3
	-200	**969.085**			200	165				4.6
-NBS20	- 75	**969.087**	2.5 - 20	46	75	45	48 - 65	NBC20-	NBN20	3.1
	- 90	**969.088**			90	60				3.2
	-120	**961.889**			120	85				4.0
	-165	**969.090**			165	130				4.5
	-200	**969.091**			200	165				4.8

1. New baby nut is included.
2. Nut-less model available upon request.

For Tap Driving Back Stop ▶ 259

Spare Parts			Accessories								
	New Baby Nut 		Wrench 		NBC Collet  ▶ 250	Baby Perfect Seal  ▶ 262	Adjusting Screw 				
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	**961.526**	NBK6	**961.525**	NBC6-	BPS6-	NBA6B	**961.527**	M7	12	2
NBS8	NBN8	**961.549**	NBK8	**961.548**	NBC8	BPS8-	NBA8B	**961.550**	M9	13	2.5
NBS10	NBN10	**961.571**	NBK10	**961.570**	NBC10-	BPS10-	NBA10B	**961.572**	M11	16	3
NBS13	NBN13	**961.597**	NBK13	**961.596**	NBC13-	BPS13	NBA13B	**961.598**	M14	20	4
NBS16	NBN16	**961.631**	NBK16	**961.630**	NBC16-	BPS16-	NBA16B	**961.632**	M18	20	4
NBS20	NBN20	**961.679**	NBK20	**961.678**	NBC20-	BPS20-	NBA20B	**961.680**	M21	20	4

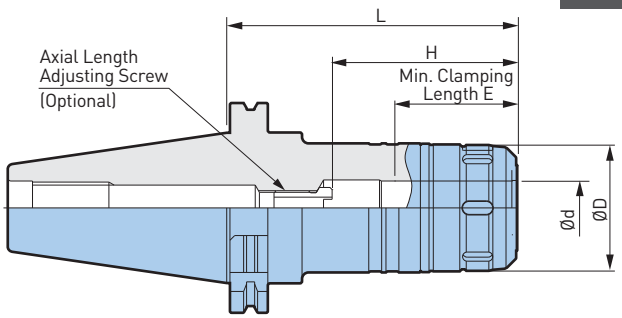
New Hi-Power Milling Chuck Type S

BIG-PLUS Dual-Contact

Coolant Through Hole

The original design of slit structure assures heavy and finish end milling with high power and precision.





A.2

BIG-PLUS tools can be used in machining centers with conventional spindles. **Ø 3 - 42 mm**

Model	Order No.	Ød	ØD	L	H	E	Wrench	Weight (kg)
BDV40 -HMC20S - 85	**962.121S**	20	50	85	69 - 79	56	FK45-50L	1.6
-105	**800.972**			105				1.9
-120	**800.973**			120				2.1
-HMC25S - 95	**800.975**	25	59	95	71 - 81	57	FK58-62L	2.0
-105	**800.974**			105				2.2
-HMC32S - 95	**962.124S**	32	68	95	79 - 89	64	FK68-75L	2.1
-105	**800.976**			105				2.3
-135	**800.977**			135				3.0
BDV50 -HMC20S -105	**805.430**	20	50	105	69 - 79	56	FK45-50L	3.9
-135	**805.431**			135				4.3
-HMC25S -105	**805.424**	25	59	105	76 - 86	57	FK58-62L	4.2
-135	**805.433**			135				4.8
-HMC32S -105	**804.995**	32	68	105	88 - 98	72	FK68-75L	4.4
-135	**805.435**			135				5.2
-165	**805.436**			165				6.0
-HMC42S -135	**805.438**	42	85	135	93 - 105	73	FK80-90L	6.3

1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.

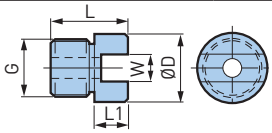
For Straight Collet ▶ 272

Accessories

Wrench



Adjusting Screw

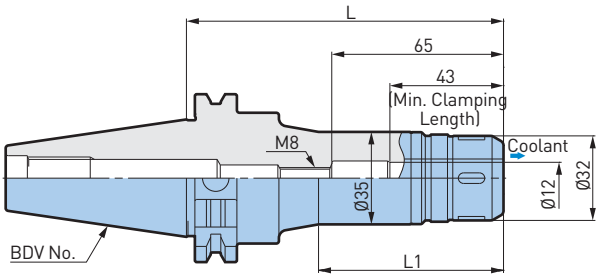


New Hi-Power Milling Chuck	Model	Order No.	Model	Order No.	ØD	L	L1	G	W
BDV40 -HMC20S	FK45-50L	**801.037**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-HMC25S	FK58-62L	**801.038**							
-HMC32S	FK68-75L	**801.039**	HMA-M16S	**962.312**					10
BDV50 -HMC20S	FK45-50L	**801.037**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
-HMC25S	FK58-62L	**801.038**							
-HMC32S	FK68-75L	**801.039**	HMA-M16S	**962.312**					10
-HMC42S	FK80-90L	**804.771**	HMA-M24	**962.313**	30	36	9.5	M24P1.5	

New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.







BIG-PLUS tools can be used in machining centers with conventional spindles. **Ø 6 - 12 mm**

Model	Order No.	L	L1	Wrench	Weight (kg)
BDV40 -HMC12J - 90	**806.810**	90	55	FK31-33	1.4
-120	**806.811**	120	70		1.6
BDV50 -HMC12J -105	**806.812**	105	70	FK31-33	3.5
-135	**806.813**	135			3.8

1. Wrench is to be ordered seperately.

For Straight Collet ▶ 272

Accessories		
	Wrench 	
New Hi-Power Milling Chuck	Model	Order No.
BDV -40/50 -HMC12J	FK31-33	**806.462**

A.2

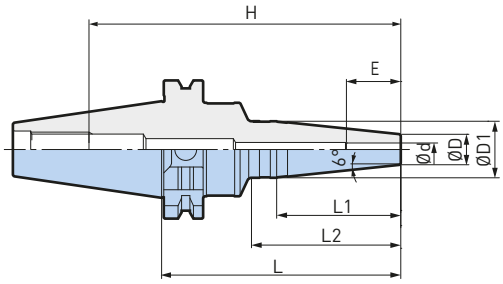
Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

BIG-PLUS Dual-Contact

Coolant Through Hole





BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 4 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	L2	H	E	Weight (kg)
BDV40 -HDC 4S -110	**806.347**	4	14	26	110	57	68	145	19	1.2
-HDC 6S -110	**806.348**	6							25	1.2
-HDC 8S -110	**806.349**	8	17	28		52	69		31	1.3
-HDC10S -110	**806.350**	10	19	30					33	1.3
-HDC12S -110	**806.351**	12	21	32			70		36	1.3

1. "E" indicates the minimum clamping length.
2. Adjusting Screw and straight collet cannot be used.
3. „H"indicates the maximum cutting tool insertion length.

For Inner Bore Cleaner ▶ 286

Hydraulic Chuck Standard



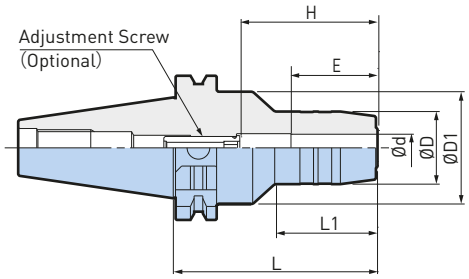


Fig. 1

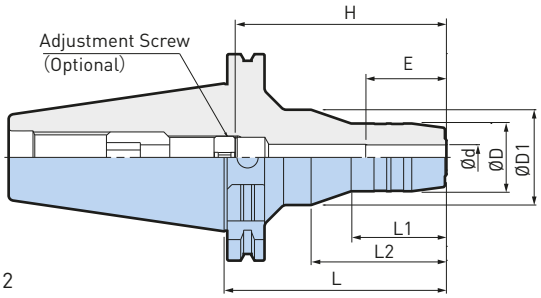


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 3 - 20 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	Adjusting Screw	Weight (kg)
BDV40 -HDC 6 - 90	**806.352**	1	6	26	49.5	90	43	-	28 - 50	28	HDA6-05032	1.3
-HDC 8 - 90	**806.353**		8	28							HDA8-06032	
-HDC10 - 90	**806.354**		10	30			44	-	33 - 55	33	HDA10-08032	
-HDC12 - 90	**806.355**		12	32					38 - 60	38	HDA12-10032	
-HDC14 - 90	**806.356**		14	34								1.4
-HDC16 - 90	**806.357**		16	38			47	-	43 - 70	43	HDA16-12037	
-HDC18 - 90	**806.358**		18	40			49	-				
-HDC20 - 90	**806.359**		20	42			51	-				
-HDC31 - 90	**806.441**		31	62	74		22	-	91	56	-	1.9
BDV50 -HDC12L -105	**806.360**	2	12	32	45	105	44	63	100 - 120	38	HDA6-20010	3.2
-HDC20L -105	**806.361**		20	42	50		46	63	71 - 111	43	HDA20-12047	3.3

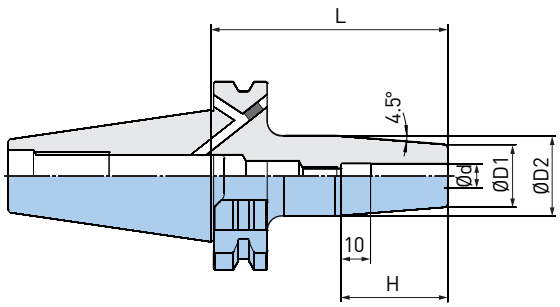
1. "E" indicates the minimum clamping length.
2. "H" indicates the adjustment length with an adjusing screw.

For Adjusting Screw ▶ 282
For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286

Shrink Chuck Standard

Substantial body provides higher rigidity.





BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 6 - 25 mm

Model	Order No.	Ød	ØD1	ØD2	L	H	Weight (kg)
BDV40 -SRC6D - 80	490.506	6	21	27	80	36	1.0
-120	490.556				120		1.2
-SRC8D - 80	490.508	8			80		1.0
-120	490.558				120		1.2
-SRC10D - 80	490.510	10	24	32	80	42	1.1
-120	490.560				120		1.3
-SRC12D - 80	490.512	12			80	47	1.1
-120	490.562				120		1.3
-SRC14D - 80	490.514	14	27	34	80		1.1
-SRC16D - 80	490.516	16				50	1.1
-120	490.566				120		1.4
-SRC18D - 80	490.518	18	33	42	80		1.3
-SRC20D - 80	490.520	20				52	1.2
-120	490.570				120		1.6
BDV50 -SRC6D - 80	490.606	6	21	27	80	36	2.8
-160	490.656			38	160		3.5
-SRC8D - 80	490.608	8		27	80		3.5
-160	490.658			38	160		3.5
-SRC10D - 80	490.610	10	24	32	80	42	2.8
-160	490.660			41	160		3.5
-SRC12D - 80	490.612	12		32	80	47	2.8
-160	490.662			41	160		3.5
-SRC14D - 80	490.614	14	27	34	80		2.9
-160	490.664			44	160		3.6
-SRC16D - 80	490.616	16		34	80	50	2.8
-160	490.666			44	160		3.6
-SRC18D - 80	490.618	18	33	42	80		3.0
-160	490.668			50	160		3.9
-SRC20D - 80	490.620	20		42	80	52	3.0
-160	490.670			50	160		3.9
-SRC25D -100	490.625	25	44	53	100	58	3.5
-160	490.675			61	160		4.5

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

BIG-PLUS Dual-Contact

Coolant Through Hole

A.2



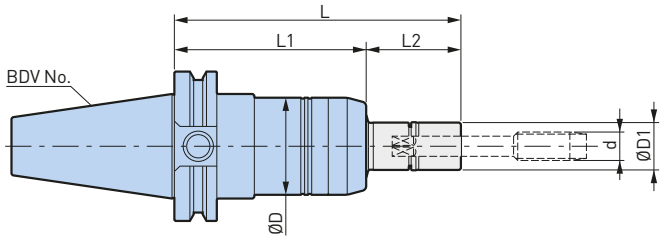


Fig. 1



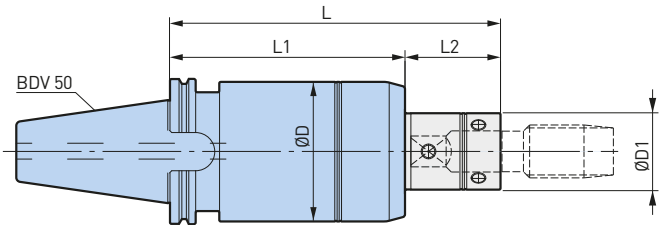
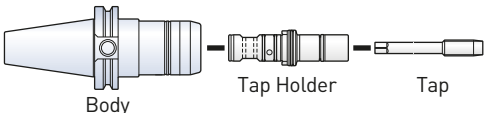


Fig. 2



BIG-PLUS tools can be used in machining centers with conventional spindles.

M3 - M36

Model	Order No.	Fig.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
BDV40 -MGT6 - 80	**963.401**	1	MGT6 -d - 30	M3 - M8	36	16	110	80	30	1.3
			- 70				150		70	
			-100				180		100	
-MGT12 - 80	**963.402**		MGT12 -d - 30	M5 - M12 P1/8	41	20	110		30	1.3
			- 70				150		70	
			-100				180		100	
-MGT20 -105	**963.403**		MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	140	105	35	1.9
			- 85				190		85	
			-115				220		115	
BDV50 -MGT6 - 85	**963.404**	1	MGT6 -d - 30	M3 - M8	36	16	115	85	30	3.2
			- 70				155		70	
			-100				185		100	
-MGT12 - 85	**963.405**		MGT12 -d - 30	M5 - M12 P1/8	41	20	115		30	3.2
			- 70				155		70	
			-100				185		100	
-MGT20 -105	**963.406**		MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	140	105	35	3.8
			- 85				190		85	
			-115				220		115	
BDV50 -MGT36 -160	**805.002**	2	MGT36-d - 65	M22 - M36 P5/8 - P1	94	30 - 50	225	160	65	8.7

1. Tap Holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. MEGA Wrench is not required for MGT36.



For Tap Holder ▶ 276
For Accessories ▶ 280
For MEGA Wrench ▶ 281

Side Lock Holders for Weldon



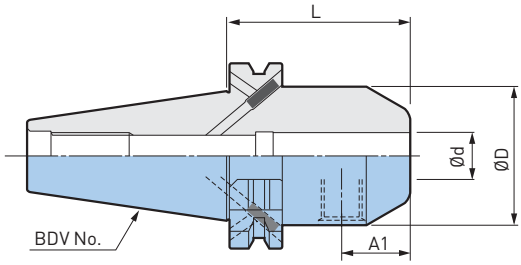


Fig. 1

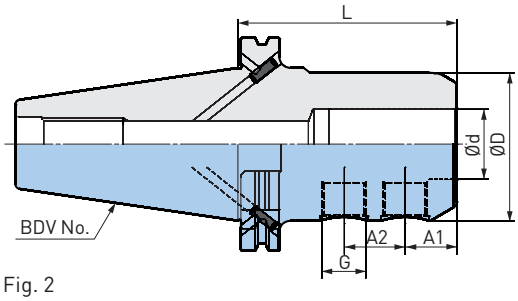


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 6 - 40 mm

Model	Order No.	Fig.	Ød	ØD	L	A1	A2	G	Weight (kg)
BDV40 -ISL6 - 50	**490.106**	1	6	25	50	17.5	-	M6	0.9
-ISL8 - 50	**490.108**		8	28			-	M8	0.9
-ISL10 - 50	**490.110**		10	35		19.5	-	M10	1.0
-ISL12 - 50	**490.112**		12	42		22.0	-	M12	1.1
-ISL14 - 50	**490.114**		14	44			-		1.1
-ISL16 - 63	**490.116**		16	48	63	23.5	-	M14	1.3
-ISL18 - 63	**490.118**		18	50			-		1.3
-ISL20 - 63	**490.120**		20	52		24.5	-	M16	1.4
-ISL25 -100	**490.125**	2	25	65	100	23.5	25	2 - M18	2.5
-ISL32 -100	**490.132**		32	72		23.5	28	2 - M20	2.6
BDV50 -ISL6 - 63	**490.206**	1	6	25	63	17.5	-	M6	2.7
-ISL8 - 63	**490.208**		8	28			-	M8	2.8
-ISL10 - 63	**490.210**		10	35		19.5	-	M10	2.9
-ISL12 - 63	**490.212**		12	42		22.0	-	M12	3.0
-ISL14 - 63	**490.214**		14	44			-		3.0
-ISL16 - 63	**490.216**		16	48		23.5	-	M14	3.1
-ISL18 - 63	**490.218**		18	50			-		3.1
-ISL20 - 63	**490.220**		20	52		24.5	-	M16	3.2
-ISL25 - 80	**490.225**	2	25	65	80	23.5	25	2 - M18	3.9
-ISL32 -100	**490.232**		32	70	100		28	2 - M20	4.5
-ISL40 -100	**490.240**		40	90		29.5	32		5.5

1. Use a cutting tool in accordance to DIN 1835 B / DIN 6538 HB

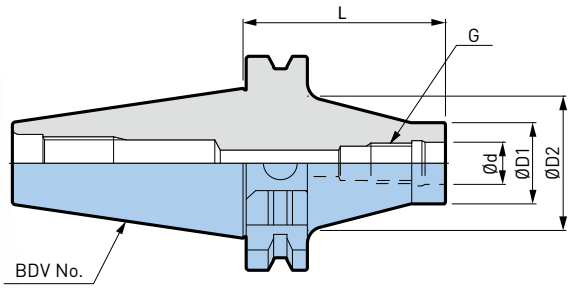
Holders for Screw-On Cutter

Dual-Contact

Coolant Through Hole

General metric screw-on type cutting tools can be used with these models.





A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	ØD1	ØD2	L	G	Weight (kg)
BDV40 -M10-19 - 65	**806.607**	10.5	19	35	65	M10	1.0
-M12-24 - 60	**806.608**	12.5	24	40	60	M12	1.0
-M16-29 - 55	**806.609**	17	29	45	55	M16	1.1

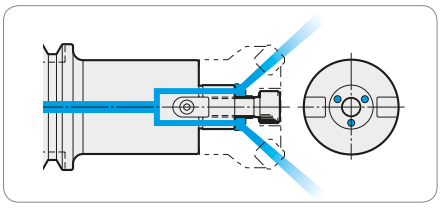
Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.

BIG-PLUS Dual-Contact

Coolant Through Hole





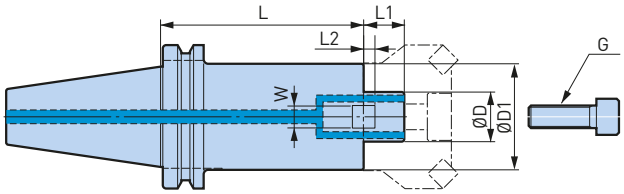


Fig. 1

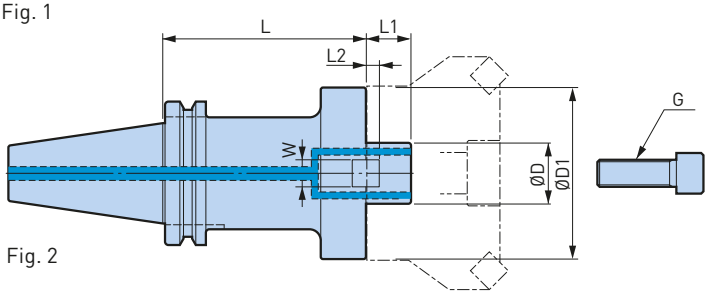


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Fig.	ØD	ØD1	L	L1	Drive Keys		G	Weight (kg)
							L2	W		
BDV40 -FMH22 - 47 - 45	805.584	1	22	47	45	18	5	10	M10	1.2
- 90	805.585				90					1.8
-150	805.604				150					2.5
- 60 - 50	805.605	2		60	50					1.4
- 90	805.606				90					2.0
-FMH27 - 60 - 50	805.586		27	60	50	20	6	12	M12	1.4
- 90	805.608				90					2.0
- 76 - 60	805.609			76	60					1.9
- 90	805.610				90					2.3
-FMH32 - 96 - 60	805.611		32	96	60	22	7	14	M16	2.1
BDV50 -FMH22 - 47 - 60	805.758	1	22	47	60	18	5	10	M10	3.1
-105	805.623				105					3.7
-150	805.624				150					4.3
-200	978.226				200					4.9
- 60 - 60	805.626			60	60					3.5
-105	805.627				105					4.4
-150	805.628				150					5.4
-200	805.629				200					6.5
-FMH27 - 60 - 45	805.630		27	60	45	20	6	12	M12	3.2
- 90	805.631				90					4.1
-150	805.632				150					5.4
-200	805.633				200					6.5
- 76 - 45	805.635			76	45					3.6
- 90	805.636				90					5.1
-150	805.637				150					7.2
-200	805.638				200					8.9
-FMH32 - 96 - 50	805.639	2	32	96	50	22	7	14	M16	4.1
- 90	805.640				90					6.2
-150	805.641				150					8.4
-200	805.642				200					10.4
-FMH40 -100 - 50	805.643		40	100	50	26	8.5	16	M20	4.3
- 75	805.644				75					5.6
-105	805.645				105					6.9

1. Hexagon socket head cap screw is included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

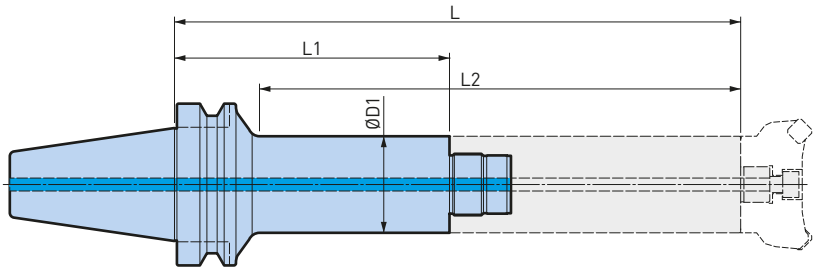
For Clamp Bolt ▶ 282

A.2

Smart Damper Basic Holders for Mills

Anti-Vibration | Dual-Contact | Coolant Through Hole





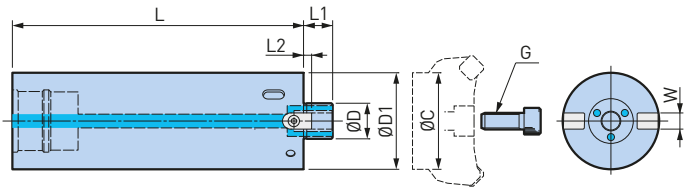
BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	ØD1	L	L1	L2	Damper Head	Weight (kg)
BDV50 -SDF36 - 47 -170	**805.296**	47	350	170	325	FMH DP-47	4.9
- 60 -170	**805.298**	60	350	170	325	FMH DP-60	6.2
-220	**805.299**		400	220	375		7.3

Smart Damper Damper Heads for Mills

Anti-Vibration | Coolant Through Hole



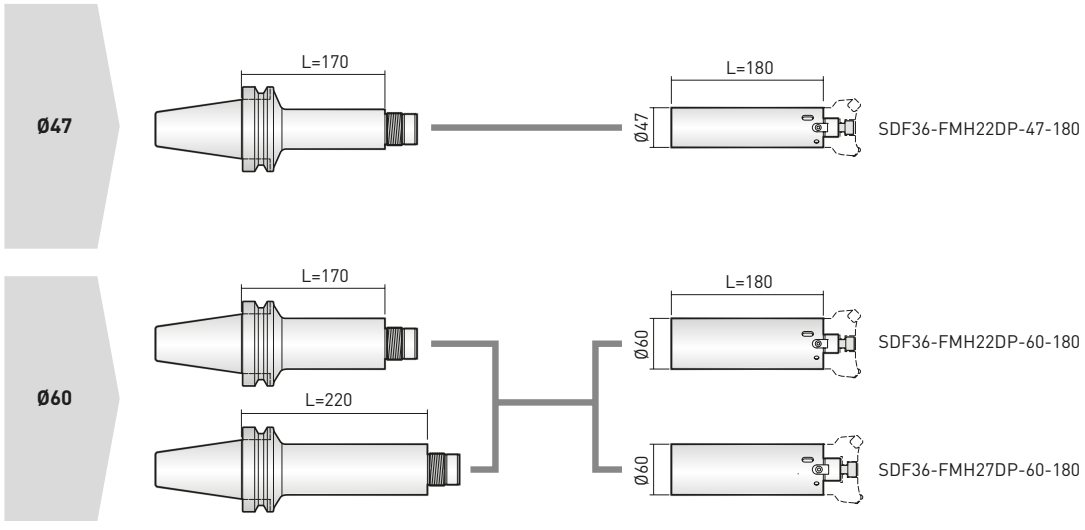


Model	Order No.	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)
SDF36-FMH22DP - 47 -180	**804.969**	22	47	180	18	5	10	M10	FK45-50L	36	3.0
- 60 -180	**804.971**		60						FK58-62L	49	4.5
-FMH27DP - 60 -180	**804.972**	27			20	6	12	M12		46	4.5

1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

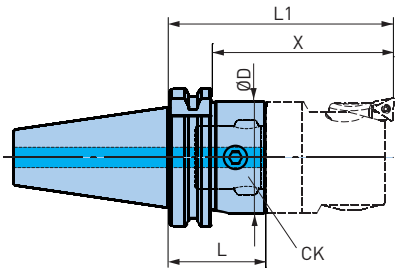
For Clamp Bolt ▶ 282
For Wrench ▶ 275

Combinations Basic Holder Damper Head



CK Shanks with Center Through Coolant





BIG-PLUS tools can be used in machining centers with conventional spindles.

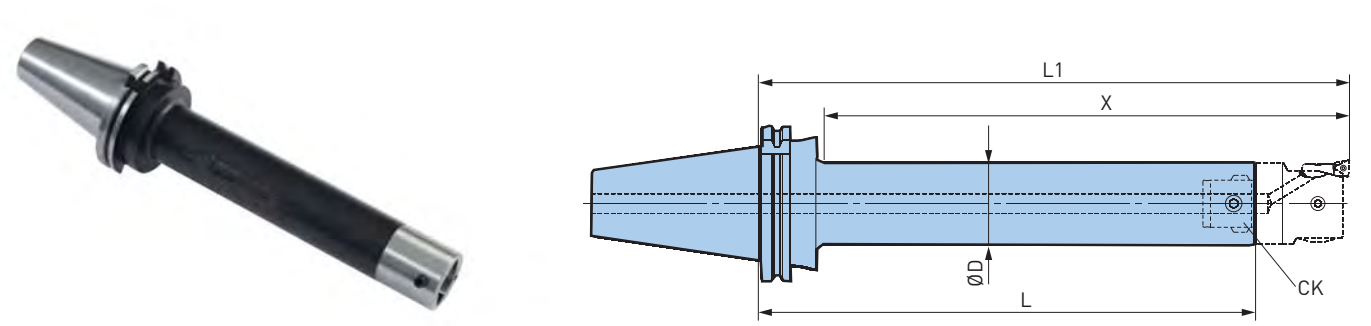
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BDV40 -CKB4 - 73ADF	**323.826**	CKB4	39	73	120	80	0.9
-CKB5 - 43ADF	**323.825**	CKB5	50	43	100	60	1.0
-CKN6 - 59	**323.821N**	CKN6	63.5	59	130	90	1.1
BDV50 -CKB5 - 83ADF	**323.868**	CKB5	50	83	140	100	2.9
-CKN6 - 69	**323.860N**	CKN6	63.5	69	140	100	3.4
-CKN6 - 129	**323.864N**	CKN6	63.5	129	200	160	4.8
-CKN6 - 229	**323.865N**	CKN6	63.5	229	300	260	7.0
-CKN7 - 83	**323.861N**	CKN7	90	83	200 (170)	160 (130)	4.5
-CKB7 - 133	**323.862**	CKB7	90	133	250 (220)	210 (180)	7.0
-CKN7 - 243	**323.866N**	CKN7	90	243	360 (330)	320 (290)	13.2

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Head ▶ Chapter B

Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole fine boring.



BIG-PLUS tools can be used in machining centers with conventional spindles.

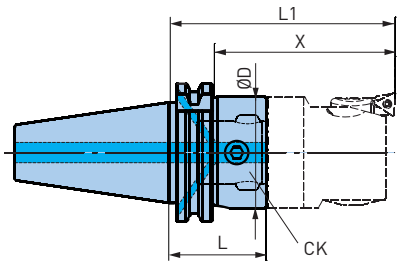
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BDV50 -CKB5DP -301	328.233	CKB5	50	301	358	318	7.5
-CKB6DP -377	328.235	CKB6	64	377	448	408	12.1

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Head ▶ Chapter B

CK Shanks with Center and Flange Through Coolant





Coolant Through Hole

A.2

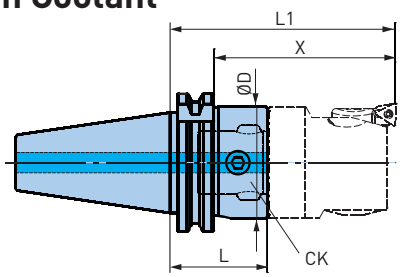
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
DV30 -CKB3 - 31ADF	**323.701**	CKB3	31	31	71	47	0.38
DV40 -CKB1 - 91ADF	**326.011**	CKB1	19	90.5	123	83	1.2
-CKB2 - 85ADF	**326.021**	CKB2	24	84.5	120	80	1.2
-CKB3 - 35ADF	**323.728**	CKB3	31	35	75	50	0.9
-CKB3 - 80ADF	**326.031**	CKB3	31	80	120	80	1.3
-CKB4 - 73ADF	**326.041**	CKB4	39	73	120	80	1.3
-CKB5 - 43ADF	**326.057**	CKB5	50	43	100	60	1.1
-CKB5 -143ADF	**326.054**	CKB5	50	143	200	160	2.6
-CKN6 - 59ADF	**323.726N**	CKN6	63.5	59	130	90	1.2
-CKB6 - 99ADF	**323.722**	CKB6	63.5	99	170	130	2.1
-CKB6 -129ADF	**326.064**	CKB6	63.5	129	200	160	2.8
DV50 -CKB3 -130ADF	**325.933**	CKB3	31	130	170	130	3.8
-CKB4 - 93ADF	**325.942**	CKB4	39	93	140	100	3.7
-CKB4 -153ADF	**325.944**	CKB4	39	153	200	160	4.3
-CKB5 - 83ADF	**325.952**	CKB5	50	83	140	100	3.8
-CKB5 -143ADF	**325.954**	CKB5	50	143	200	160	4.7
-CKB5 -183ADF	**325.955**	CKB5	50	183	240	200	4.6
-CKN6 - 69ADF	**323.765N**	CKN6	63.5	69	140	100	3.5
-CKN6 -129ADF	**323.767N**	CKN6	63.5	129	200	160	4.9
-CKB6 -169ADF	**325.965**	CKB6	63.5	169	240	200	5.5
-CKN6 -229ADF	**323.768N**	CKN6	63.5	229	300	260	7.2
-CKN7 - 83ADF	**323.766N**	CKN7	90	83	200 (170)	160 (130)	4.8
-CKN7 -273ADF	**323.769N**	CKN7	90	273	390 (360)	350 (320)	13.7

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Head ▶ Chapter B

CK Shanks with Center Through Coolant





Coolant Through Hole

Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
DV30 -CKB1 - 32	**323.703**	CKB1	19	31.5	64	40	0.35
-CKB5 - 50	**326.005**	CKB5	50	50	107	83	0.6
DV40 -CKB5 - 43	**326.050**	CKB5	50	43	100	60	0.9
-CKB6 - 59	**323.721**	CKB6	63.5	59	130	90	1.2
DV50 -CKB6 - 69	**323.760**	CKB6	63.5	69	140	100	3.4
-CKB6 - 129	**325.964**	CKB6	63.5	129	200	160	4.7
-CKB7 - 83	**323.761**	CKB7	90	83	200 (170)	160 (130)	4.6

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Head ▶ Chapter B

A.2

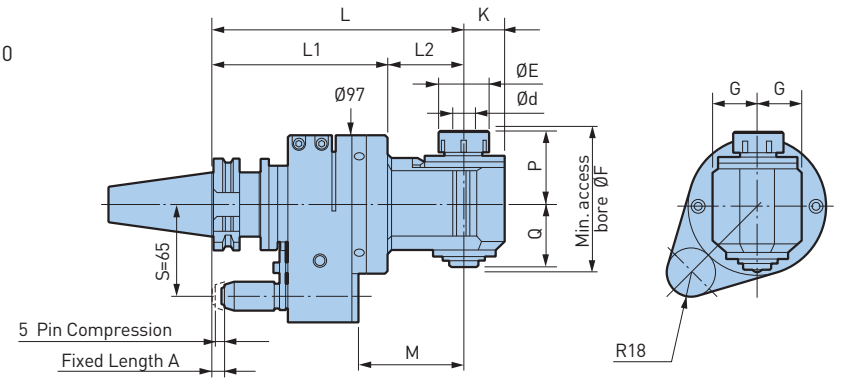
New Baby Chuck Type

BIG-PLUS Dual-Contact

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

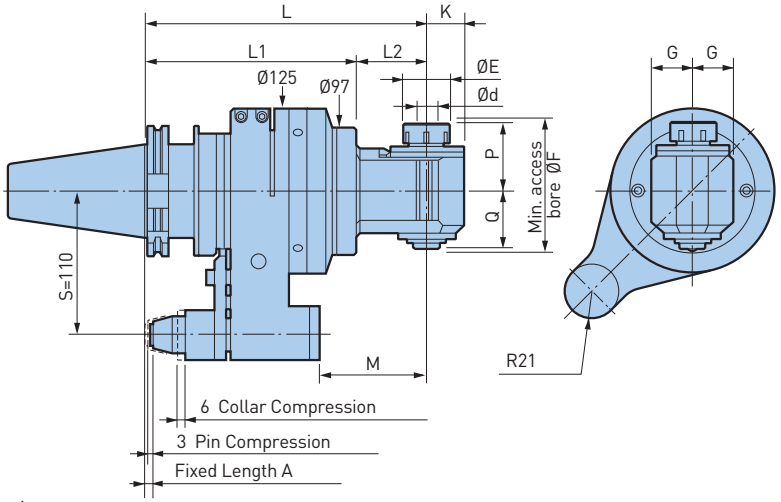


BDV40





BDV50





Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min^{-1}	Weight (kg)
BDV40 -AG90/NBS6 -180	802.553	0.25 - 6	20	21	17	180	125	55	77	33	29	67	NBC6	6 000	5.1
-210	802.554					210		85	107						5.3
-240	802.555					240		115	137						5.5
-270	802.556					270		145	167						5.7
-AG90/NBS10 -180	802.546	1.5 - 10	30	30	25	180	125	55	77	45	43	91	NBC10	6 000	5.5
-210	802.547					210		85	107						5.9
-240	802.548					240		115	137						6.2
-AG90/NBS13 -180	802.549	2.5 - 13	35	31	28	180	125	55	77	52	45	101	NBC13	6 000	5.6
-210	802.550					210		85	107						6.0
-240	802.551					240		115	137						6.3
-AG90/NBS20S -175S	802.552	2.5 - 20	46	35	33	175	122	53	72	65	62	132	NBC20	3 000	8.0
BDV50 -AG90/NBS6 -215	802.569	0.25 - 6	20	21	17	215	160	55	82	33	29	67	NBC6	6 000	12.6
-245	802.570					245		85	112						12.8
-275	802.571					275		115	142						13.0
-305	802.572					305		145	172						13.2
-AG90/NBS10 -215	802.562	1.5 - 10	30	30	25	215	160	55	82	45	43	91	NBC10	6 000	13.0
-245	802.563					245		85	112						13.4
-275	802.564					275		115	142						13.7
-AG90/NBS13 -215	802.565	2.5 - 13	35	31	28	215	160	55	82	52	45	101	NBC13	6 000	13.1
-245	802.566					245		85	112						13.5
-275	802.567					275		115	142						13.8
-AG90/NBS20 -230	802.568	2.5 - 20	46	35	35	230	160	70	97	65	62	132	NBC20	3 000	14.2

1. The standard fixed length A is 8 mm for BDV40 and 6 mm for BDV50. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.

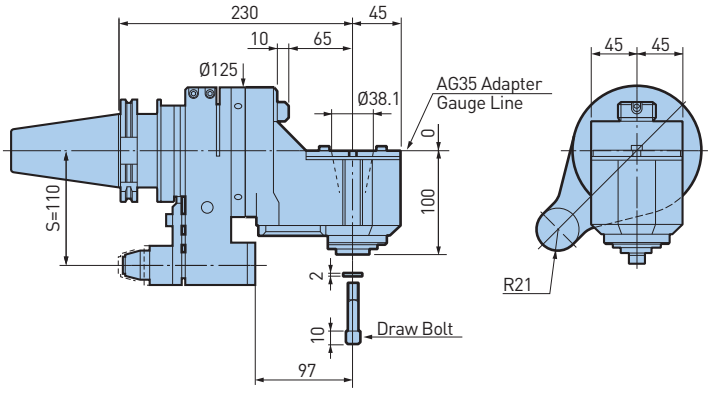
For New Baby Collet ▶ 250
For Stop Block ▶ 290

Build-Up Type

BIG-PLUS Dual-Contact

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle.
Also helps minimize interference problems with ATC and storage problems within the magazine.





MAX. 3,000 min-1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

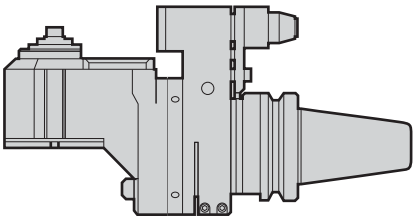
Model		Order No.	Max. min^{-1}	Weight (kg)
BDV50	-AG90/AGH35-230	**802.558**	3 000	15.0
	-AG90/AGH35-230S	**802.559**	3 000	16.3

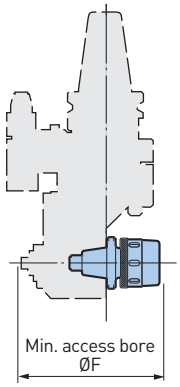
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.

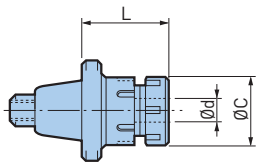
For Stop Block ▶ 290
For Adapters ▶ 118

A.2

AG35 adapters





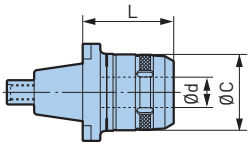


New Baby Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -NBS10	962.793	1.5 - 10	47	30	162	0.6
-NBS13	962.794	2.5 - 13	54	35	168	0.7
-NBS16	962.795	2.5 - 16		42	170	0.8
-NBS20	962.796	2.5 - 20		46		0.9

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250
For Wrench ▶ 271

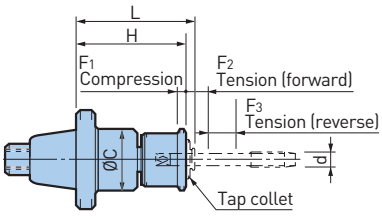


New Hi-Power Milling Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -HMC20S	802.742	20	60	50	178	1.5

1. Wrench (FK45-50L) is included.

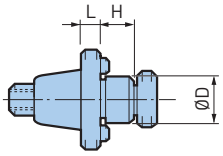
For Straight Collet ▶ 272



Auto Tapper Type B (automatic depth control)

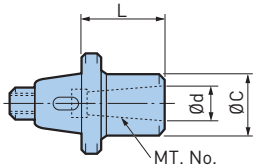
Model	Order No.	d	L	ØC	H	F1	F2	F3	Weight (kg)
AG35 -ATB12E	802.435	M4 - M12	80	40.5	72	0.5	5	4	1.0
-ATB20E	802.436	M8 - M20	115	57.5	102.5		6.5	5	1.7

1. Please contact BIG KAISER agent for tap collet.



Face Mill Arbor

Model	Order No.	ØD	L	H	Weight (kg)
AG35 -FMH22 -30	802.740	22	30	18	1.0
-FMH27 -20	802.741	27	20	20	1.0



Morse Taper Adapter

Model	Order No.	Ød	MT. No.	L	ØC	ØF	Weight (kg)
AG35 -MT1	962.785	12.065	1	50	24	164	0.6
-MT2	962.786	17.78	2	60	32	180	0.7

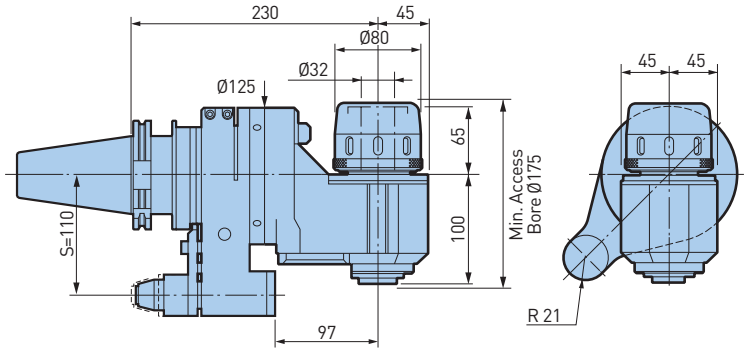
HMC Type

BIG-PLUS Dual-Contact

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.



BDV50



MAX. 3,000 min-1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model		Order No.	Max. min^{-1}	Weight (kg)
BDV50	-AG90/HMC32 -230	**802.560**	3 000	16.8
	-AG90/HMC32 -230S	**802.561**	3 000	18.1

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.

For Stop Block ▶ 290
For Straight Collet ▶ 272

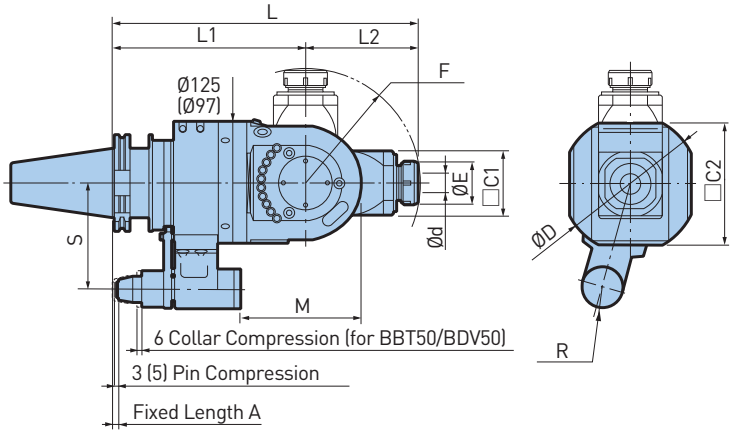
Universal Type

BIG-PLUS Dual-Contact

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.

A.2







Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	ØE	ØD	□C1	□C2	L	L1	L2	M	F	R	S	Collet Model	Max. min^{-1}	Weight (kg)
BDV40 -AGU/NBS13-280	**802.557**	2.5 - 13	35	115	51	97	280	180	100	124	102	18	65	NBC13	6 000	9.7
BDV50 -AGU/NBS20-315	**802.573**	2.5 - 20	46	140	65	125	315	200	115	125	118	21	110	NBC20	4 000	20.8

1. Standard fixed length A is 6 mm for BDV50 and 8 mm for BDV40. Other lengths are available upon request.
2. Order No. for BDV50 is with S = 110. S = 80 type for BDV50 is available upon request.
3. Figures in ( ) in the drawing indicate dimensions for BDV40.
4. New baby nut and wrench are included.
5. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250
For Stop Block ▶ 290



Easily adjustable spindle angle from 0° to 90°.



Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



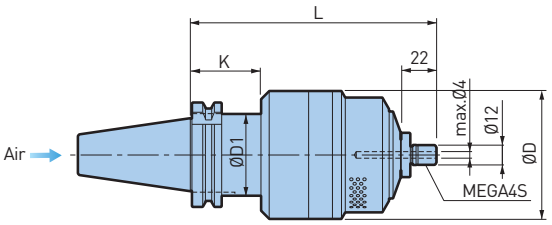
Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

Air Turbine Spindle

Center Through Type

BIG-PLUS Dual-Contact





A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Operation Speed (min^{-1})	L	ØD	ØD1	K	Nut Model	Weight (kg)
BDV40 -RBX5C -4S-150	**962.642**	40 000 - 50 000	150	96	49.6	43	MGN4S	4.1
-RBX7C -4S-150	**801.040**	60 000 - 80 000		78				3.1
BDV50 -RBX5C -4S-145	**802.422**	40 000 - 50 000	145	96	68	38	MGN4S	6.8
-RBX7C -4S-145	**802.424**	60 000 - 80 000		78				5.8

1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

For Air Filter ▶ 123
For Micro Collet ▶ 247

Caution

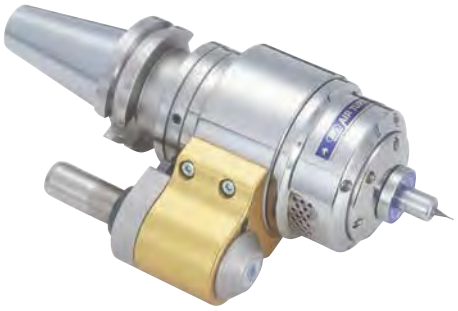
Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

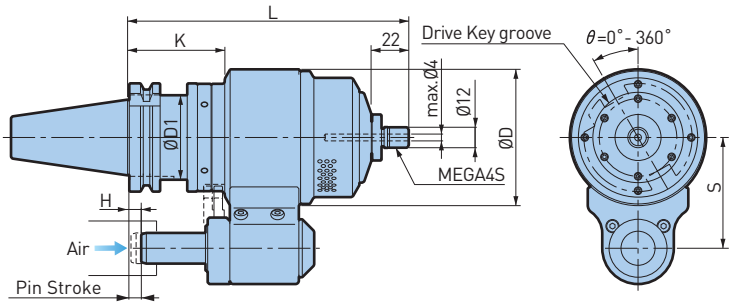
Air Turbine Spindle

Side Through Type

BIG-PLUS Dual-Contact

A.2







Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model			Order No.	Operation Speed (min^{-1})	L	ØD	ØD1	K	S	H	Nut Model	Weight (kg)
BDV40	-RBX5	-4S-165-65	**962.668**	40 000 - 50 000	165	96	49.6	57	65	-10 - 35	MGN4S	5.0
	-RBX7	-4S-165-65	**962.667**	60 000 - 80 000		80						4.0
BDV50	-RBX5	-4S-170-80	**962.670**	40 000 - 50 000	170	100	68	62	80	-5 - 40	MGN4S	9.7
	-RBX7	-4S-170-80	**962.669**	60 000 - 80 000								8.7

1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

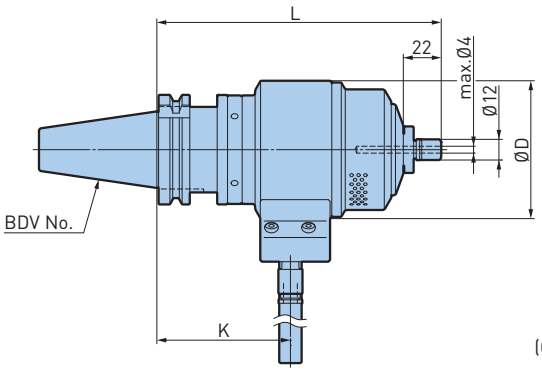
For Micro Collet ▶ 247
For Air Filter ▶ 123
For Stop Block ▶ 290

Air Turbine Spindle

Manual Type

BIG-PLUS Dual-Contact





A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

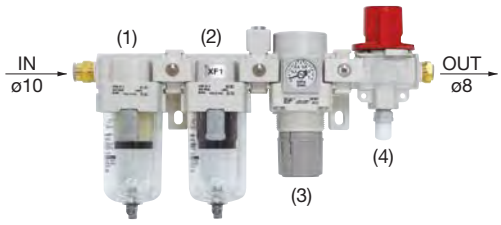
Model	Order No.	Operation Speed (min^{-1})	L	ØD	K	S	Weight (kg)
BDV40 -RBX5 -4S-165H	**962.649**	40 000 - 50 000	151	96	63	71	5.0
-RBX7 -4S-165H	**801.681**	60 000 - 80 000		80		65	4.0
BDV50 -RBX5 -4S-170H	**802.421**	40 000 - 50 000	166	100	78	80	9.7
-RBX7 -4S-170H	**802.423**	60 000 - 80 000					8.7

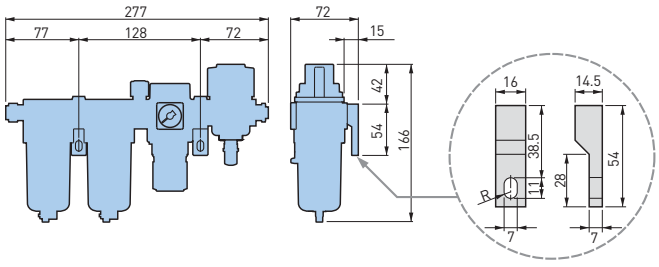
1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

Air Filter Regulator for RBX

Model XF1

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).





Model	Order No.
XF1	**962.661**

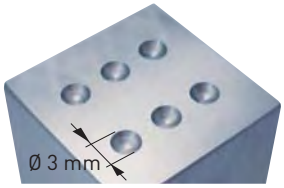
Accessories for RBX

Accessories					
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▸ 247
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model
RBX7-4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-
RBX5-4S					

Application Examples

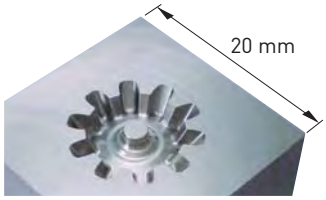
RBX12

Dimpling on sintered HSS
Machining time 90 sec./hole



Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min^{-1}
Cutting Feed	1 500 mm/min
D.O.C	ap = 0.01 mm

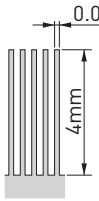
Milling on die steel
Machining time 23 min.

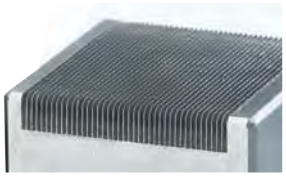


Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min^{-1}
Cutting Feed	2 400 mm/min
D.O.C	ap = 0.01 mm

RBX7

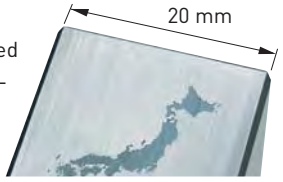
Aluminium A2017
Outstanding runout accuracy permits perfect thin wall cutting.





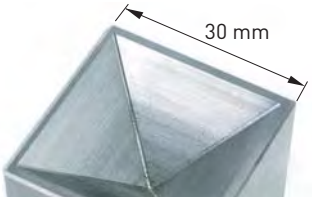
Cutter	Ø 0.5 mm Rib-endmill
Spindle Speed	70 000 min^{-1}
Cutting Feed	1 500 mm/min
D.O.C	ap = 0.02 mm

Prehardened steel HRC40
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of 5 µ clearly visible.



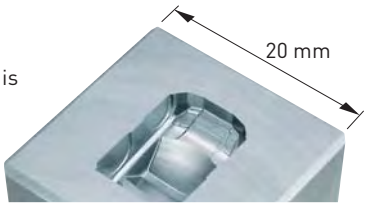
Cutter	R0.1 mm Ball nose endmill
Spindle Speed	80 000 min^{-1}
Cutting Feed	400 mm/min
D.O.C	ap = 0.01 mm

Prehardened steel HRC40
Overall cutting length of 656 m can be achieved with one ball nose endmill. Drastically extended tool life.



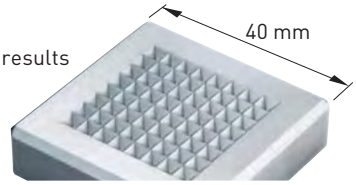
Cutter	R0.5 mm Ball nose endmill
Spindle Speed	65 000 min^{-1}
Cutting Feed	4 200 mm/min
D.O.C	ap = 0.02 mm; ae = 0.05 mm

Prehardened steel HRC40
Original 5hour operation in MC is reduced to 2 hours.



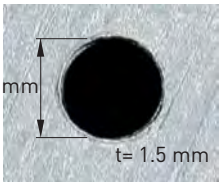
Cutter	R0.2 mm Ball nose endmill
Spindle Speed	70 000 min^{-1}
Cutting Feed	1 000 mm/min
D.O.C	ap = 0.01 mm

Prehardened steel HRC40
No thermal expansion of spindle results in finely detailed surface finish.



Cutter	R0.5 mm Ball nose endmill
Spindle Speed	75 000 min^{-1}
Cutting Feed	400 mm/min
D.O.C	ap = 0.02 mm

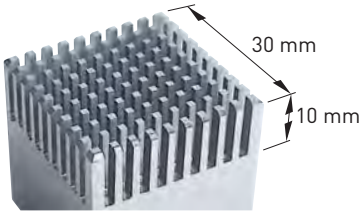
Aluminium A2017
High-precision drilling is possible without center drill operation. Even after 3500 holes, no problems can be found on the cutting edge.



Cutter	Ø 0.3 mm Solid drill
Spindle Speed	75 000 min^{-1}
Cutting Feed	200 mm/min
Peck	0.03 mm

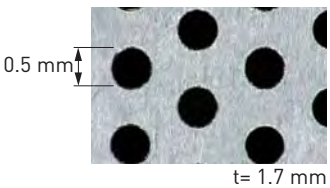
RBX5

Prehardened steel HRC40
Even a taper endmill that has high cutting forces can achieve stable cutting.



Cutter	Ø 1.5 mm Rib-endmill
Spindle Speed	40 000 min^{-1}
Cutting Feed	1 000 mm/min
D.O.C	ap = 0.05 mm

Stainless steel SUS303
Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.



Cutter	Ø 0.5 mm Solid drill
Spindle Speed	40 000 min^{-1}
Cutting Feed	20 mm/min
Peck	0.01 mm

High Spindle GTG Type

BIG-PLUS Dual-Contact

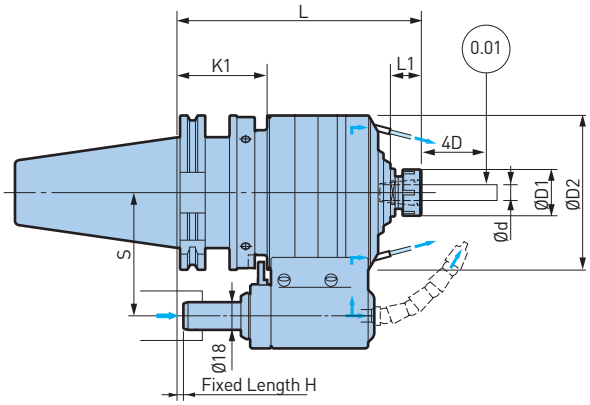
Speed Increaser

High Spindle improves drilling and end-milling performance on existing machines by multiplying the spindle speed 4, 5 or 6 times.





Exclusive Stop Block is required.



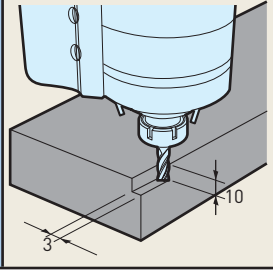
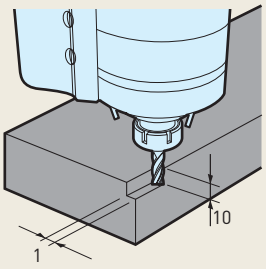
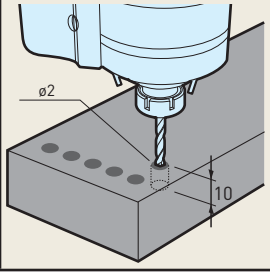
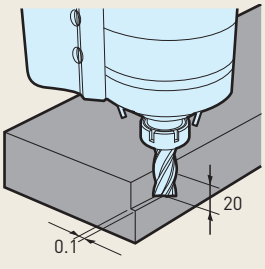
BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	L	L1	ØD1	ØD2	K1	S	Collet Model	Speed Ratio	Max. min^{-1}	Weight (kg)
BDV40 -GTG5-10-155	**802.975**	1.5 - 10	155	20	30	80	58	65	NBC10 -	4.67	20 000	5.0
BDV50 -GTG6-10-163	**802.977**	1.5 - 10	163	20	30	100	63	80	NBC10 -	5.67	20 000	9.0
-GTG4-16-182	**802.976**	2.5 - 16	182	25.5	42	110	63	80	NBC16 -	3.80	15 000	10.8

1. The standard fixed length H is 6 mm. Other lengths are available upon request.
2. In case of more than 30 min. continuous use, rotation speed must be reduced by 20%.
3. Please do not use with neat oil coolant.
4. Nut, wrench and following collet are included.

For Stop Block ▸ 290
For Collet ▸ 250

Application Examples

Model	BBT40-GTG5-10-140	BBT50-GTG6-10-158	BBT50-GTG6-10-158	BBT50-GTG4-16-177
Cutter	Solid carbide endmill Ø8 / 2 flutes	Solid carbide endmill Ø6 / 2 flutes	Solid carbide drill Ø2	Solid carbide drill Ø16
Workpiece Material	Duralumin (A-2017)	S55C / CK55	Duralumin (A-2017)	Duralumin (A-2017)
Revolution	20 000 min^{-1}	16 000 min^{-1}	20 000 min^{-1}	15 000 min^{-1}
Feed Rate	3 000 mm/min	3 500 mm/min	2 000 mm/min	1 000 mm/min
Result	High metal removal rate 90 cm^3/min	High metal removal rate 35 cm^3/min	Extended tool life 1200 holes by 1 drill	Surface roughness Ry max. 2 µm
				

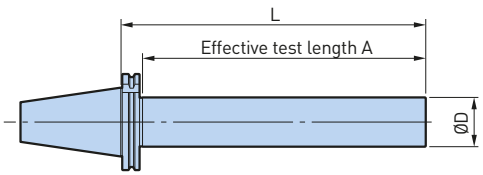
Dyna Test

Periodic inspection of machine tools to control production stability.

BIG-PLUS Dual-Contact

BIG-PLUS DV Type





BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	L	A	ØD	Weight (Kg)
BDV40 -50 - L340SD	**802.834**	340	310	50	4.2
BDV50 -50 - L340SD	**961.269**	340	318		5.9

1. The drive key slot are symmetrical to allow BDV dyna test bar to be indexed 180 degrees.

Tool Holders HSK

	HSK-A	HSK-E	HSK-F
MEGA Micro Chuck	128 - 129	163 - 164	170
MEGA New Baby Chuck	130 - 133	165 - 166	171
MEGA E Chuck	134		172
MEGA Double Power Chuck	135 - 136		173
MEGA Perfect Grip	137		
New Baby Chuck	138		
New Hi-Power Milling Chuck	139 - 140		
Hydraulic Chucks	141 - 143	167	
Shrink Chucks	144 - 145		
MEGA Synchro Tapping Holder	146 - 147		
Face Mill Arbors	148		
Smart Damper	149		
CK Shanks	150 - 151	168	
Angle Heads	152 - 159		
Air Turbine Spindle	160 - 162	169	
Dyna Test	174	174	174
Coolant Pipes	175	175	175

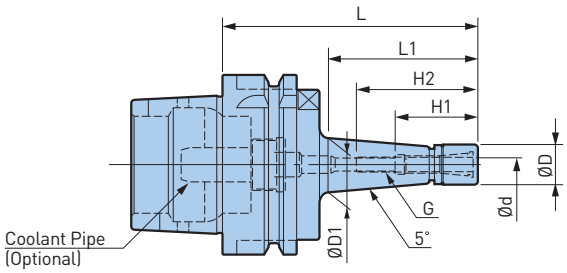
A.3

MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole





A.3

Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H1	H2	G	max. min^{-1}	Collet Model	Weight (kg)
HSK-A32-MEGA6S - 50T*	**806.804**	0.45 - 6.05	14	14.8	50	22	28.5	33	-	45 000	NBC6S-	0.17
- 60T*	**978.370**			16.0	60	30		43	-	40 000		0.18
-105T	**978.372**			22.1	105	76		63	M7 P0.75	35 000		0.27
HSK-A40-MEGA3S - 75T	**968.936**	0.45 - 3.25	10	16.0	75	44	22	38	M4 P0.7	32 000	NBC3S-	0.28
- 90T	**968.937**			18.0	90	60				28 000		0.31
-MEGA4S - 60T	**968.934**	0.45 - 4.05	12	14.0	60	27	26.5	44	M5 P0.8	35 000	NBC4S-	0.27
- 90T	**802.355**			20.0	90	60		47		28 000		0.33
-105T	**802.356**			23.0	105	76				25 000		0.37
-MEGA6S - 60T*	**968.925**	0.45 - 6.05	14	16.0	60	29	-	40	-	35 000	NBC6S-	0.28
- 75T	**968.926**			19.0	75	45	28.5	49	M7 P0.75	32 000		0.31
- 90T	**968.927**			21.5	90	60				28 000		0.34
-105T	**802.357**			25.0	105	76				25 000		0.39
HSK-A50-MEGA6S - 75T	**805.828**	0.45 - 6.05	14	17.0	75	36	28.5	49	M7 P0.75	30 000	NBC6S-	0.52
-105T	**805.251**			22.5	105	66				25 000		0.60
HSK-A63-MEGA3S - 75T	**968.961**	0.45 - 3.25	10	14.0	75	36	22	38	M4 P0.7	32 000	NBC3S-	0.8
-120T	**968.963**			21.5	120	81				25 000		0.9
-MEGA4S - 75T	**805.259**	0.45 - 4.05	12	15.5	75	36	26.5	47	M5 P0.8	32 000	NBC4S-	0.9
- 90T	**968.966**			18.0	90	51				28 000		0.9
-120T	**968.968**			23.5	120	81				25 000		1.1
-MEGA6S - 60T	**968.970**	0.45 - 6.05	14	15.5	60	23	28.5	37	M7 P0.75	35 000	NBC6S-	0.8
- 75T	**968.971**			17.0	75	36		48		32 000		0.9
- 90T	**805.260**			20.0	90	51		49		28 000		0.9
-105T	**968.973**			22.5	105	66				25 000		0.9
-120T	**805.261**			25.0	120	81				22 000		1.0
-135T	**968.975**			27.5	135	96				20 000		1.0
-MEGA8S - 90T	**801.724**	2.95 - 8.05	18	23.5	90	51	31	50.5	M9 P0.75	30 000	NBC8S-	0.9
-120T	**803.603**			28.5	120	81				22 000		1.1

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Internal thread (G) is not available.

For Coolant Pipe ▶ 175

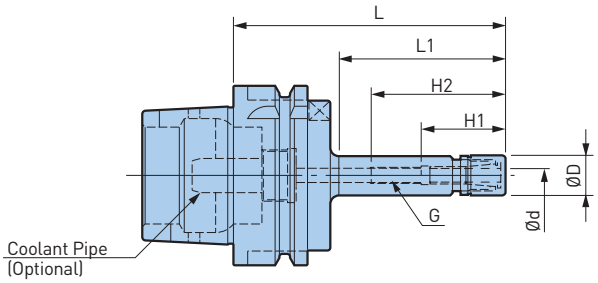
Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▶ 247	Micro Seal Nut  ▶ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

Coolant Through Hole





A.3

Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min^{-1}	Collet Model	Weight (kg)
HSK-A32-MEGA6S - 60 *	**805.174**	0.45 - 6.05	14	60	30	23.5	43	-	38 000	NBC6S-	0.18
-105	**978.104**			105	76		49	M7 P0.75	32 000		0.26
HSK-A40-MEGA3S - 60	**968.933**	0.45 - 3.25	10	60	26	22	39	M4 P0.7	30 000	NBC3S-	0.26
-MEGA4S - 60	**968.931**	0.45 - 4.05	12		27	26.5	44	M5 P0.8		NBC4S-	0.26
- 90	**968.932**			90	57		47		25 000		0.29
-MEGA6S - 60 *	**968.929**	0.45 - 6.05	14	60	28	-	40	-	30 000	NBC6S-	0.27
- 90	**968.930**			90	58	28.5	49	M7 P0.75	25 000		0.30
HSK-A50-MEGA6S - 75	**805.250**	0.45 - 6.05	14	75	36	28.5	49	M7 P0.75	30 000	NBC6S-	0.6
HSK-A63-MEGA4S - 75	**968.965**	0.45 - 4.05	12	75	36	26.5	48	M5 P0.8	30 000	NBC4S-	0.8
-105	**805.257**			105	61		47		25 000		0.9
-MEGA6S - 75	**968.803**	0.45 - 6.05	14	75	36	-	48	M7 P0.75	30 000	NBC6S-	0.9
-105	**805.258**			105	61	28.5	49		25 000		0.9
-MEGA8S - 90	**803.600**	2.95 - 8.05	18	90	48	31	50.5	M9 P0.75	30 000	NBC8S-	0.9

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Internal thread (G) is not available.

For Coolant Pipe ▶ 175

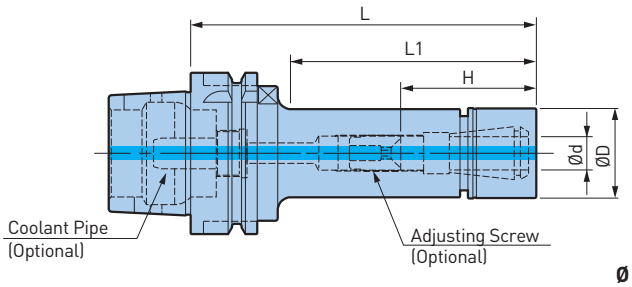
Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▶ 247	Micro Seal Nut  ▶ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	**Model**	**Order No.**	**Model**	**Order No.**	**Model**	**Model**	**Model**	**Order No.**	**Model**	**Order No.**
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole





Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	H	Max. min^{-1}	Collet Model	Weight (kg)
HSK-A32 -MEGA6N - 75	**979.010**	0.25 - 6	20	75	37	23 - 43	30 000	NBC6-	0.25
-MEGA8N - 50 *	**806.800**	0.5 - 8	25	50	26	32	33 000	NBC8-	0.23
HSK-A40 -MEGA6N - 60 *	**968.940**	0.25 - 6	20	60	30	33	35 000	NBC6-	0.31
- 75	**968.941**			75	45	23 - 38	30 000		0.34
- 90	**968.942**			90	60	23 - 43			0.37
-MEGA8N - 60 *	**968.943**	0.5 - 8	25	60	30	41	35 000	NBC8-	0.35
- 90	**968.945**			90	60	26 - 44	30 000		0.44
-MEGA10N - 60 *	**968.946**	1.5 - 10	30	60	26	40	35 000	NBC10-	0.42
- 90	**968.948**			90	54	38 - 48	30 000		0.56
-MEGA13N - 75 *	**968.949**	2.5 - 13	35	75	55	55	25 000	NBC13-	0.55
- 90 *	**968.950**			90	70	64			0.64
-MEGA16N - 75 *	**968.951**	2.5 - 16	42	75	55	53	20 000	NBC16-	0.65
- 90 *	**968.952**			90	70	63	15 000		0.78
-MEGA20N - 90 *	**968.953**	2.5 - 20	46			66		NBC20-	0.86
HSK-A50 -MEGA6N - 75	**805.252**	0.25 - 6	20	75	37	23 - 43	30 000	NBC6-	0.6
-100	**978.031**			100	60		25 000		0.6
-135	**968.745**			135	93		20 000		0.7
-MEGA8N - 75	**968.738**	0.5 - 8	25	75	37	26 - 37	30 000	NBC8-	0.6
-100	**978.239**			100	62	26 - 45	28 000		0.7
-135	**803.629**			135	96		20 000		0.8
-MEGA10N - 75 *	**805.253**	1.5 - 10	30	75	38	46	33 000	NBC10-	0.7
-100	**978.261**			100	63	38 - 48	25 000		0.8
-135	**803.622**			135	98		20 000		1.0
-MEGA13N - 75 *	**805.254**	2.5 - 13	35	75	40	46	28 000	NBC13-	0.7
-100	**801.179**			100	65	44 - 56	25 000		0.9
-135	**803.620**			135	100	44 - 63	18 000		1.1
-MEGA16N - 75 *	**805.255**	2.5 - 16	42	75	49	48	28 000	NBC16-	1.0
-100	**803.623**			100	74	48 - 55	20 000		1.1
-135	**803.619**			135	109	48 - 68	15 000		1.4
-MEGA20N - 75 **	**805.256**	2.5 - 20	46	75	49	47	20 000	NBC20-	0.9
-100	**968.742**			100	74	51 - 54	15 000		1.3
-135	**803.624**			135	109	51 - 68	10 000		1.8
-MEGA25N - 95 *	**806.370**	15.5 - 25.4	60	95	69	65	12 000	NBC25-	1.3

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
5. ** NBC-E collet and adjusting screw can not be used.
6. Nut-less model available upon request.

For Coolant Pipe ▶ 175



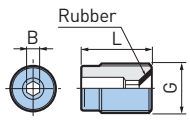
Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	H	Max. min^{-1}	Collet Model	Weight (kg)
HSK-A63 -MEGA6N - 75	**968.811**	0.25 - 6	20	75	35	23 - 38	35 000	NBC6-	0.9
- 90	**805.262**			90	48	23 - 43	30 000		0.9
-105	**968.812**			105	63				0.9
-120	**968.981**			120	76		25 000		1.0
-135	**968.813**			135	91		20 000		1.0
-165	**968.814**			165	121		15 000		1.0
-MEGA8N - 75	**968.815**	0.5 - 8	25	75	35	26 - 38	35 000	NBC8-	0.9
- 90	**805.263**			90	50	26 - 45	30 000		1.0
-105	**968.816**			105	63				1.0
-120	**968.982**			120	76		25 000		1.1
-135	**805.264**			135	91		20 000		1.1
-165	**968.818**			165	121		15 000		1.2
-MEGA10N - 75 *	**968.819**	1.5 - 10	30	75	36	50	33 000	NBC10-	1.0
- 90	**805.265**			90	50	38 - 45			1.0
-105	**968.820**			105	65	38 - 48	25 000		1.1
-120	**968.983**			120	80				1.2
-135	**805.266**			135	93		20 000		1.3
-165	**968.822**			165	123		15 000		1.4
-MEGA13N - 75 *	**968.823**	2.5 - 13	35	75	37	49	30 000	NBC13-	1.0
- 90 *	**805.267**			90	51	64			1.1
-105	**968.824**			105	66	44 - 56	25 000		1.2
-120	**968.984**			120	81	44 - 63	20 000		1.3
-135	**805.268**			135	96				1.4
-165	**968.826**			165	125		15 000		1.7
-MEGA16N - 75 *	**968.827**	2.5 - 16	42	75	39	48	30 000	NBC16-	1.1
- 90 *	**805.269**			90	54	63	25 000		1.3
-105	**968.828**			105	69	48 - 54	20 000		1.4
-120	**968.985**			120	84	48 - 68	15 000		1.5
-135	**968.829**			135	99				1.7
-165	**968.830**			165	129		10 000		2.0
-200	**968.831**			200	164		8 000		2.4
-MEGA20N - 75 *	**968.832**	2.5 - 20	46	75	39	51	30 000	NBC20-	1.2
- 90 *	**805.270**			90	54	61	25 000		1.4
-105	**968.833**			105	69	51 - 54	20 000		1.5
-120	**968.986**			120	84	51 - 68	15 000		1.7
-135	**805.271**			135	99				1.8
-165	**968.835**			165	129		10 000		2.3
-200	**968.836**			200	164		8 000		2.7
-MEGA25N - 90 *	**806.371**	15.5 - 25.4	60	90	-	63	20 000	NBC25-	1.8
-120 *	**806.372**			120		90	12 000		2.2

1. MEGA nut is included. Coolant pipe is to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screws can not be used.
4. Nut-less model available upon request.

For Coolant Pipe ▶ 175

For A100 + 125, refer to the following pages.

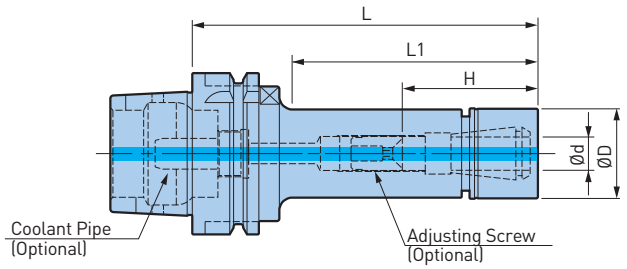
Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4
MEGA25N	MGN25	**806.388**	MGR60L	**969.468L**	NBC25-	-	NBA25B	**806.389**	M27	20	4

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole





A.3

Ø 0.25 - 25.4 mm

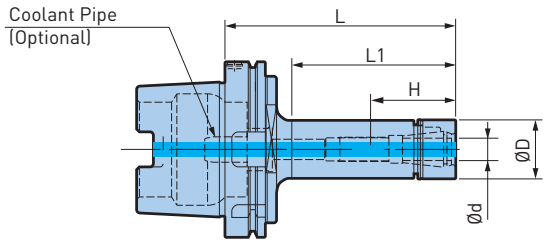
Model	Order No.	Ød	ØD	L	L1	H	Max. min^{-1}	Collet Model	Weight (kg)
HSK-A100-MEGA6N - 90	**968.841**	0.25 - 6	20	90	43	23 - 43	20 000	NBC6-	2.5
-105	**801.146**			105	58		18 000		2.5
-120	**968.842**			120	73				2.5
-135	**801.147**			135	88		14 000		2.5
-165	**968.843**			165	113		12 000		2.6
-MEGA8N - 90	**968.844**	0.5 - 8	25	90	43	26 - 45	20 000	NBC8-	2.5
-105	**968.989**			105	58		18 000		2.6
-120	**968.845**			120	73				2.6
-135	**968.990**			135	88		14 000		2.7
-165	**968.846**			165	113				2.7
-MEGA10N - 90	**968.847**	1.5 - 10	30	90	43	38 - 45	20 000	NBC10-	2.6
-105	**968.991**			105	58	38 - 48	18 000		2.7
-120	**968.848**			120	73				2.7
-135	**968.992**			135	88		14 000		2.8
-165	**968.849**			165	113				3.0
-MEGA13N - 90 *	**968.850**	2.5 - 13	35	90	43	55	18 000	NBC13-	2.7
-105 *	**968.993**			105	58	70	16 000		2.8
-120	**968.851**			120	73	44 - 63			2.9
-135	**968.994**			135	88		14 000		3.0
-165	**968.852**			165	118				3.2
-200	**968.853**			200	148		10 000		3.5
-MEGA16N - 90 *	**968.854**	2.5 - 16	42	90	47	55	15 000	NBC16-	2.8
-105 *	**968.995**			105	58	70	14 000		2.9
-120	**968.855**			120	73	48 - 68			3.1
-135	**968.996**			135	88		13 000		3.2
-165	**968.856**			165	118				3.6
-200	**968.857**			200	151		10 000		4.0
-MEGA20N - 90 *	**968.858**	2.5 - 20	46	90	47	55	15 000	NBC20-	2.9
-105 *	**968.997**			105	58	70	14 000		3.0
-120	**968.859**			120	73	51 - 68			3.2
-135	**968.998**			135	88		13 000		3.3
-165	**968.860**			165	118				3.8
-200	**968.861**			200	153		10 000		4.3
-MEGA25N -120 *	**806.373**	15.5 - 25.4	60	120	78	85	12 000	NBC25-	3.8
-165	**806.374**			165	123	64 - 74	10 000		4.6

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Coolant pipe is to be ordered separately.
4. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
5. Nut-less model available upon request.

For Coolant Pipe ▶ 175

Coolant Through Hole



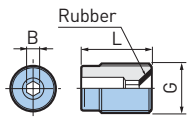


Ø 2.5 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Max. min-1	Collet Model	Weight (kg)
HSK-A125-MEGA20N-120	**805.290**	2.5 - 20	46	120	72	51 - 68	12 000	NBC20-	4.7
-165	**806.575**			165	117		10 000		5.2

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Coolant pipe is to be ordered separately.
4. Nut-less model available upon request.

For Coolant Pipe ▶ 175

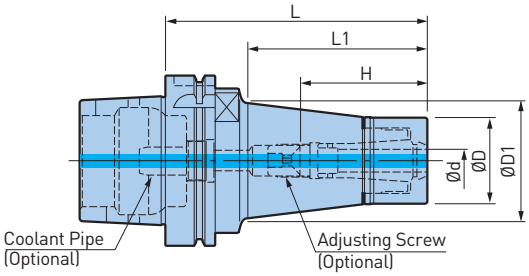
Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4
MEGA25N	MGN25	**806.388**	MGR60L	**969.468L**	NBC25-	-	NBA25B	**806.389**	M27	20	4

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

Coolant Through Hole



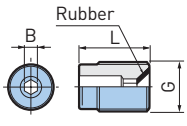


Ø 3 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	Max. min^{-1}	Collet Model	Weight (kg)
HSK-A40 -MEGA6E - 60 *	**968.235**	3 - 6	25	26	60	24	41	35 000	MEC6-	0.39
-MEGA8E - 65 *	**968.238**	3 - 8	30	34	65	30	44		MEC8-	0.46
-MEGA10E - 70 *	**968.241**	3 - 10	35	35	70	35	48	30 000	MEC10-	0.52
- 90	**968.242**				90	55	48 - 52	25 000		0.67
-MEGA13E - 70 *	**968.243**	3 - 12	42	42	70	35	50	30 000	MEC13-	0.62
HSK-A50 -MEGA8E - 75 *	**803.222**	3 - 8	30	33	75	40	42	30 000	MEC8-	0.7
-MEGA10E - 75 *	**978.170**	3 - 10	35	38			48		MEC10-	0.8
-MEGA13E - 75 *	**978.010**	3 - 12	42	-		49	50		MEC13-	0.9
-100	**803.220**			-	100	74	50 - 55	25 000		1.1
HSK-A63 -MEGA6E - 65 *	**968.247**	3 - 6	25	26.5	65	28	43	30 000	MEC6-	0.9
- 90	**968.248**			30	90	51	37 - 45			1.0
-105	**968.249**			33	105	66		29 000		1.1
-MEGA8E - 67 *	**968.252**	3 - 8	30	31.5	67	30	45	30 000	MEC8-	0.9
- 90	**968.253**			35	90	52	37 - 45			1.1
-105	**968.254**			38	105	68	42 - 51	29 000		1.2
-MEGA10E - 75 *	**968.257**	3 - 10	35	37.5	75	37	48	30 000	MEC10-	1.1
- 90 *	**968.258**			40	90	53	64			1.2
-105	**968.259**			43	105	69	48 - 58	29 000		1.4
-120	**968.260**			46	120	85		28 000		1.5
-MEGA13E - 75 *	**968.262**	3 - 12	42	44	75	31	49	30 000	MEC13-	1.2
- 90 *	**968.263**			45	90	46	64			1.4
-105	**968.264**			46	105	61	50 - 57	29 000		1.6
-120	**968.265**			47.5	120	77		28 000		1.8
-135	**968.266**			47	135	92		26 000		1.9
HSK-A100-MEGA13E - 90 *	**968.287**	3 - 12	42	46	90	48	50	18 000	MEC13-	2.9
-105	**968.288**			48.5	105	63	50 - 61			3.1
-120	**968.289**			51.5	120	78		16 000		3.3
-135	**968.290**			54	135	93		14 000		3.6
-165	**968.291**			59	165	123				4.2

1. MEGA E nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Adjusting screws can not be used. "H" is the max. tool shank length can be inserted for these models.
5. Nut-less model available upon request.

For Coolant Pipe ▶ 175

Spare Parts			Accessories								
	MEGA E Nut 		MEGA Wrench 		MEGA E Collet  ▶ 264	MEGA E Perfect Seal  ▶ 265	Adjusting Screw  				
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6E	MEN6	**968.461**	MGR25	**969.456**	MEC6-	EPS6-	NBA6B	**961.527**	M7	12	2
MEGA8E	MEN8	**968.462**	MGR30	**969.458**	MEC8-	EPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10E	MEN10	**968.463**	MGR35	**969.460**	MEC10-	EPS10-	NBA10B	**961.572**	M11	16	3
MEGA13E	MEN13	**968.464**	MGR42	**969.462**	MEC13-	EPS13-	NBA13B	**961.598**	M14	20	4

MEGA Double Power Chuck Type D

Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.

Coolant Through Hole



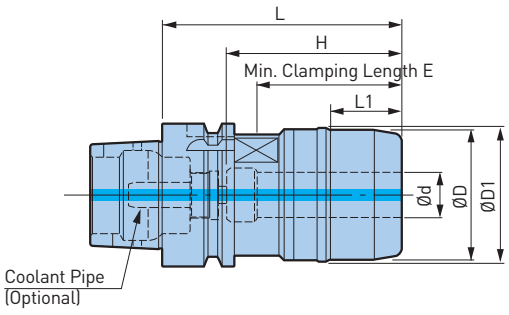


Fig. 1

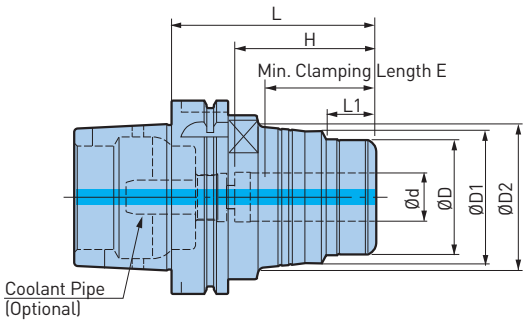


Fig. 2

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	Max. min^{-1}	Weight (kg)
HSK-A40 -MEGA16D - 80	**803.105**	1	16	46	-	-	80	25	62	50	18 000	0.75
HSK-A50 -MEGA16D - 85	**803.085**	1	16	46	-	-	85	25	62	50	25 000	1.0
-MEGA20D - 85 *	**978.011**		20	50			86	30	63	51	20 000	1.1
HSK-A63 -MEGA16D - 90A	**801.734**	2	16	42	53	-	90	25	65	55	28 000	1.5
-MEGA20D - 90A	**801.737**		20	50	55			34		56		1.6
-MEGA25D -100A	**803.101**	1	25	62	63		100	39	75	57	24 000	2.0
-MEGA32D -105A	**803.080**		32	70	70.7		105	33	80	64		2.2
HSK-A100-MEGA20D -105	**968.105**	2	20	60	69	74	105	25	73	56	18 000	4.1
-MEGA25D -105	**968.108**		25	70	77	85		32		65		4.5
-MEGA32D -115	**968.111**		32	80	86	-	115	39	83	71		5.0
-135	**968.112**						135		103		16 000	5.8

1. Wrench and coolant pipe is to be ordered separately.
2. "H" is the max. tool shank length that can be inserted.
3. * Adjustable straight collet (AC20-) can not be used.

For Straight Collet ▶ 272
For Coolant Pipe ▶ 175

MEGA Wrench



MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
HSK -A40/A50 -MEGA16D,16DS	MGR46L	**969.465L**	HSK -A100 -MEGA16DS	MGR46L	**969.465L**
HSK -A50 -MEGA20D,20DS	MGR50L	**969.464L**	-MEGA20D,20DS	MGR60L	**969.468L**
HSK -A63 -MEGA16D,16DS	MGR42L	**969.462L**	-MEGA25D,25DS	MGR70L	**969.470L**
-MEGA20D,20DS	MGR50L	**969.464L**	-MEGA32D,32DS	MGR80L	**969.471L**
-MEGA25D,25DS	MGR62L	**969.469L**	-MEGA42DS	MGR99L	**969.472L**
-MEGA32D,32DS	MGR70L	**969.470L**	HSK -A125 -MEGA20DS	MGR60L	**969.468L**
			-MEGA25DS	MGR70L	**969.470L**
			-MEGA32DS	MGR80L	**969.471L**
			-MEGA42DS	MGR99L	**969.472L**

MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique design ensures efficient coolant supply to the cutting tool periphery.

Coolant Through Hole





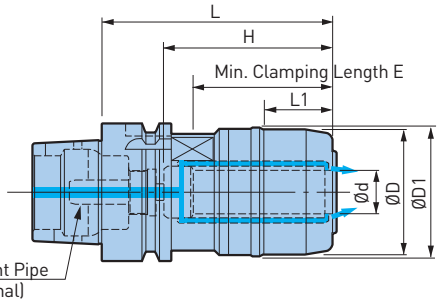


Fig. 1

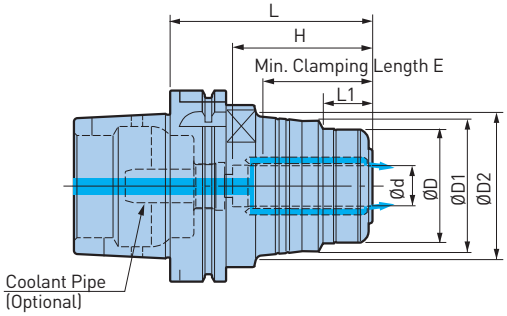


Fig. 2

Ø 3 - 42 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	Max. min^{-1}	Weight (kg)
HSK-A40 -MEGA16DS - 80	**803.106**	1	16	46	-	-	82.5	28	64	52	18 000	0.75
HSK-A50 -MEGA16DS - 85	**801.688**	1	16	46	-	-	87.5	28	64	52	25 000	1.0
-MEGA20DS - 85	**803.088**		20	50			88.5	33	65	53	20 000	1.05
HSK-A63 -MEGA16DS - 80A	**803.089**	2	16	42	53	-	82	27	57	52	25 000	1.3
-MEGA20DS - 90A	**803.090**		20	50	55		92	36	67	58		1.6
-120A	**801.740**						122		87		23 000	2.1
-MEGA25DS -100A	**803.102**	1	25	62	-		102	41	77	59	22 000	2.0
-MEGA32DS -105A	**803.081**		32	70	-		107.5	35	82	66		2.2
HSK-A100-MEGA16DS -105	**968.131**	2	16	46	55	63	107.5	26	73	52	18 000	3.5
-MEGA20DS -105	**968.121**		20	60	69	74	107.5	28	75	58		4.1
-135	**968.122**						137.5		87		16 000	5.0
-165 *	**968.123**						167.5				15 000	5.9
-MEGA25DS -105	**968.124**		25	70	77	85	107.5	34	75	67	18 000	4.5
-135	**968.125**						137.5		92		16 000	5.6
-MEGA32DS -115	**968.127**		32	80	86	-	117.5	42	85	73	18 000	5.0
-135	**968.128**						137.5		105		16 000	5.8
-165	**968.129**						167.5		107		14 000	7.1
-MEGA42DS -115	**968.130**	1	42	99	-	-	117	42	85	80		5.5
HSK-A125-MEGA20DS -135	**805.658**	2	20	60	69	80	137.5	64.4	87	58	8 000	6.7
-165 *	**805.659**					79	167.5	124.4			7 000	7.6
-MEGA25DS -135	**805.660**		25	70	77	83	137.5	94.4	92	67	8 000	7.1
-MEGA32DS -135	**805.750**		32	80	86	93	137.5	87.4		73		7.8
-165	**805.661**						167.5	117.4	107		6 000	9.1
-MEGA42DS -120	**805.662**	1	42	99	99.7	-	122.5	77.7	85	80	7 000	7.9

1. Wrench and coolant pipe is to be ordered separately.
2. "H" is the max. tool shank length that can be inserted.
3. * Adjusting screw (HMA-M16) can be used.

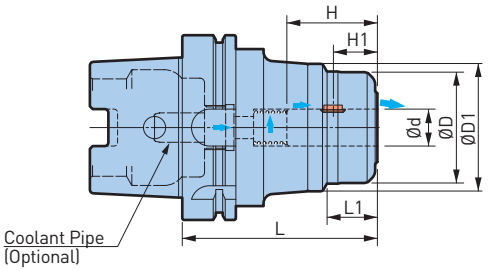
For Coolant Pipe ▶ 175
For Straight Collet ▶ 272
For Adjusting Screw ▶ 274
For MEGA Wrench ▶ 275

MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.

Coolant Through Hole







Ø 16 - 32 mm

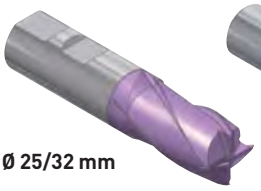
Model	Order No.	Ød	ØD	ØD1	L	L1	H	H1	MEGA Wrench	Weight (kg)
HSK-A63 -MEGA16DPG - 90	**806.364**	16	46	55	90	24	47	23	MGR46L	1.6
-MEGA20DPG-100	**806.365**	20	60	69	100	27	49	24	MGR60L	2.1
HSK-A100-MEGA20DPG-105	**805.457**	20	60	69	105	27	49	24	MGR60L	4.1
-MEGA25DPG-105	**805.458**	25	70	77		33	55	23	MGR70L	4.5
-MEGA32DPG-115	**805.459**	32	80	86	115	41	59		MGR80L	5.0
HSK-A125-MEGA20DPG-135	**806.627**	20	60	69	135	27	49	24	MGR60L	6.8
-MEGA25DPG-135	**806.628**	25	70	77		33	55	23	MGR70L	7.2
-MEGA32DPG-135	**806.629**	32	80	86		41	59		MGR80L	7.9

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.
4. Coolant pipe is to be ordered separately.

Weldon Shank Standards

(DIN1835-1)

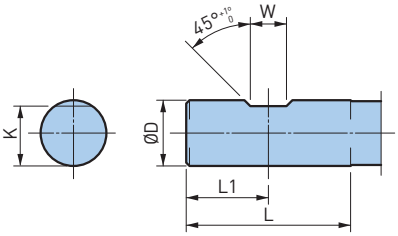
The following standard shank is required for MEGA Perfect Grip.



Ø 25/32 mm



Ø 20 mm



ØD		L	L1	W		K	
Nominal	Tolerance			Nominal	Tolerance	Nominal	Tolerance
16	h6	48	24	10	+ 0.05 0	14.2	h13
20		50	25	11		18.2	
25		56	32	12		23	
32		60	36	14		30	

Caution

In case you are adding your own flat, the tool projection length in the MEGA Perfect GRIP will be decided by the flat position. Refer to H1 in the MEGA Perfect GRIP chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

Spare Parts					Accessories	
	Key Grip 		Spring 		MEGA Wrench 	
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA20DPG	PKG20-2P	**805.493**	PSP1823	**805.497**	MGR60L	**969.468L**
MEGA25DPG	PKG25-2P	**805.494**	PSP2420	**805.498**	MGR70L	**969.470L**
MEGA32DPG	PKG32-2P	**805.495**	PSP3128	**805.499**	MGR80L	**969.471L**

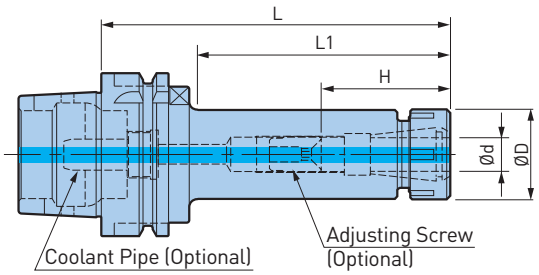
1. Key grip is available in a package of 2 pcs.
2. As key grip is an consumable item, it is recommended to replace on a regular basis.

New Baby Chuck

The original high precision collet chuck to perform all machining applications.

Coolant Through Hole





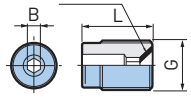
A.3

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Gewicht (kg)
HSK-A63 -NBS6 - 75	**968.771**	0.25 - 6	20	75	35	20 - 35	NBC6-	NBN6	0.9
-105	**968.772**			105	63	20 - 40			0.9
-135	**968.773**			135	91				1.0
-NBS8 - 75	**968.775**	0.5 - 8	25	75	35	23 - 37	NBC8-	NBN8	0.9
-105	**968.776**			105	61	23 - 42			1.0
-135	**968.777**			135	91				1.1
-NBS10 - 75 *	**968.779**	1.5 - 10	30	75	35	48	NBC10-	NBN10	1.0
-105	**968.780**			105	63	35 - 45			1.1
-135	**968.781**			135	93				1.3
-NBS13 - 75 *	**968.783**	2.5 - 13	35	75	37	48	NBC13-	NBN13	1.0
-105	**968.784**			105	67	41 - 55			1.2
-135	**968.785**			135	97	41 - 60			1.5
-NBS16 - 75 *	**968.787**	2.5 - 16	42	75	37	45	NBC16-	NBN16	1.1
-105	**968.788**			105	67	45 - 55			1.4
-135	**968.789**			135	97	45 - 65			1.8
-165	**968.790**			165	127				2.0
-200	**968.791**			200	162				2.4
-NBS20 - 75 *	**968.792**	2.5 - 20	46	75	39	48	NBC20-	NBN20	1.2
-105	**968.793**			105	69	48 - 53			1.5
-135	**968.794**			135	99	48 - 65			1.9
-165	**968.795**			165	129				2.3
-200	**968.796**			200	164				2.7
HSK-A100 -NBS6 -120	**968.572**	0.25 - 6	20	120	68	20 - 40	NBC6-	NBN6	2.5
-165	**968.573**			165	113				2.6
-NBS8 -120	**968.575**	0.5 - 8	25	120	73	23 - 42	NBC8-	NBN8	2.6
-165	**968.578**			165	113				2.7
-NBS10 -120	**968.580**	1.5 - 10	30	120	73	35 - 45	NBC10-	NBN10	2.7
-165	**968.581**			165	113				2.9
-NBS13 -120	**968.583**	2.5 - 13	35	120	73	41 - 60	NBC13-	NBN13	2.9
-165	**968.584**			165	113				3.2
-NBS16 -120	**968.587**	2.5 - 16	42	120	73	45 - 65	NBC16-	NBN16	3.1
-165	**968.588**			165	118				3.5
-NBS20 -120	**968.593**	2.5 - 20	46	120	73	48 - 65	NBC20-	NBN20	3.3
-165	**968.594**			165	118				3.8

1. New baby nut is included. Coolant pipe is to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.
4. * Adjusting screws can not be used. "H" is the max. tool shank length can be inserted into these models.

For Coolant Pipe ▶ 175
For Tap Driving Back Stop ▶ 259

Spare Parts			Accessories								
	New Baby Nut 		Wrench 		NBC Collet  ▶ 250	Baby Perfect Seal  ▶ 262	Adjusting Screw 				
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	**961.526**	NBK6	**961.525**	NBC6-	BPS6-	NBA6B	**961.527**	M7	12	2
NBS8	NBN8	**961.549**	NBK8	**961.548**	NBC8-	BPS8-	NBA8B	**961.550**	M9	13	2.5
NBS10	NBN10	**961.571**	NBK10	**961.570**	NBC10-	BPS10-	NBA10B	**961.572**	M11	16	3
NBS13	NBN13	**961.597**	NBK13	**961.596**	NBC13-	BPS13-	NBA13B	**961.598**	M14	20	4
NBS16	NBN16	**961.631**	NBK16	**961.630**	NBC16-	BPS16-	NBA16B	**961.632**	M18	20	4
NBS20	NBN20	**961.679**	NBK20	**961.678**	NBC20-	BPS20-	NBA20B	**961.680**	M21	20	4

New Hi-Power Milling Chuck Type S

Coolant Through Hole

The original design of slit structure assures heavy and finish end milling with high power and precision.



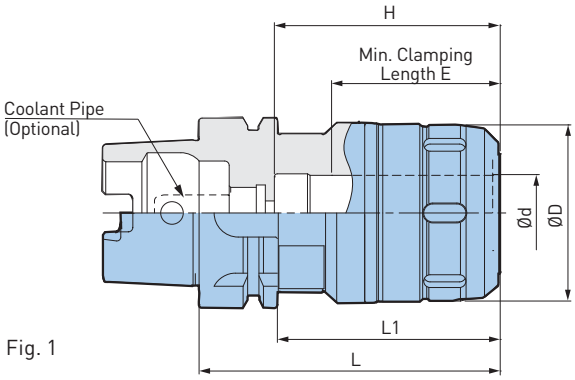


Fig. 1

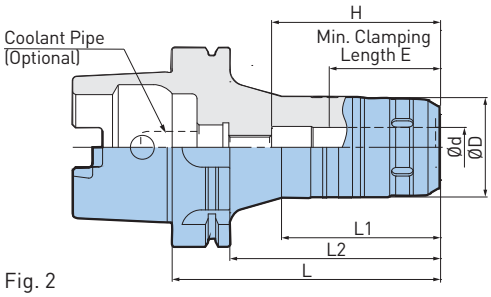


Fig. 2

Ø 3 - 42 mm

Model	Order No.	Fig.	Ød	ØD	L	L1	L2	H	E	Wrench	Weight (kg)
HSK-A40 -HMC20S - 85	**805.100**	1	20	50	85	65	-	66	56	FK45-50L	0.9
HSK-A50 -HMC20S - 90	**805.101**	1	20	50	90	64	-	66	56	FK45-50L	1.2
-HMC32S -115 ****	**806.595**		32	62	115	89	-	69	58	FK58-62L	1.6
HSK-A63 -HMC20S - 90	**965.511S**	1	20	50	90	64	-	65	56	FK45-50L	1.5
-120 **	**805.102**				120	94		85			1.9
-HMC25S -100	**968.136S**		25	59	100	74		75	57	FK58-62L	1.9
-135 *	**805.103**				135	109		66 - 76			2.5
-HMC32S -110	**968.137S**		32	68	110	84		85	64	FK68-75L	2.3
-135 **	**805.104**				135	109		90			2.6
-165 *	**805.105**				165	139		79 - 89			3.2
HSK-A100 -HMC20S -105	**805.106**	1	20	50	105	76	-	73	56	FK45-50L	3.0
-135 ***	**805.107**	2			135	80	106	85			3.5
-165 *	**805.108**				165	100	136	69 - 79			4.1
-HMC25S -105	**805.110**	1	25	59	105	76	-	73	57	FK58-62L	3.3
-135 ***	**804.917**				135	106		90			3.9
-165 *	**805.111**	2			165	105	136	76 - 86			4.8
-HMC32S -115	**805.112**	1	32	68	115	86	-	83	72	FK68-75L	3.9
-135	**805.113**				135	106		103			4.4
-165 ***	**805.114**	2			165	105	136	105			5.4
-200 *	**805.115**				200	130	171	90 - 100			6.4
-HMC42S -115	**805.117**	1	42	85	115	86	-	83	73	FK80-90L	4.9

1. Wrench and coolant pipe are to be ordered separately.
2. "H" is the max. tool shank length that can be inserted into the holder.
3. * Axial length adjusting screw can be used. **/ *** Commercially available hex socket head screws can be used as a back stop (**=M8 /***=M12). Coolant is blocked by utilizing these commercial screws.
4. **** Only the straight collet (C32-) can be used.

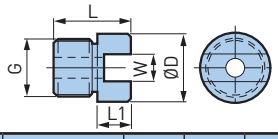
For Coolant Pipe ▶ 175
For Straight Collet ▶ 272

Accessories

Wrench



Adjusting Screw



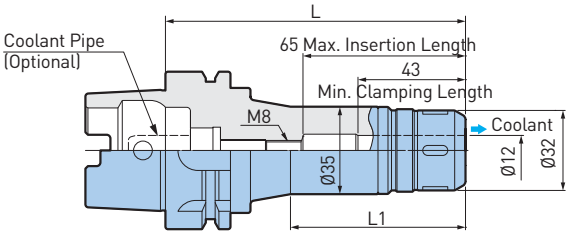
New Hi-Power Milling Chuck		Model	Order No.	Model	Order No.	D	L	L1	G	W
HSK -A40/A50/A63/A100	-HMC20S	FK45-50L	**801.037**	HMA-M16	**962.311**	19	27	6	M16P1.5	8
HSK -A63/A100	-HMC25S	FK58-62L	**801.038**		**962.312**					
HSK -A50	-HMC32S	FK58-62L	**801.038**							
HSK -A63/A100	-HMC32S	FK68-75L	**801.039**	HMA-M16S						10
HSK -A100	-HMC42S	FK80-90L	**804.771**	-	-	-	-	-	-	-

New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.

Coolant Through Hole







A.3

Ø 6 - 12 mm

Model	Order No.	L	L1	Wrench	Weight (kg)
HSK-A63 -HMC12J - 90	**805.829**	90	52	FK31-33	1.1
-120 *	**805.830**	120	70		1.4

1. Wrench is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. * Hex socked head screw (M8) can be used as an adjusting screw.

For Straight Collet ▶ 272
For Coolant Pipe ▶ 175

Accessories		
	Wrench 	
New Hi-Power Milling Chuck	**Model**	**Order No.**
HSK -A63 -HMC12J	FK31-33	**806.462**

Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

Coolant Through Hole



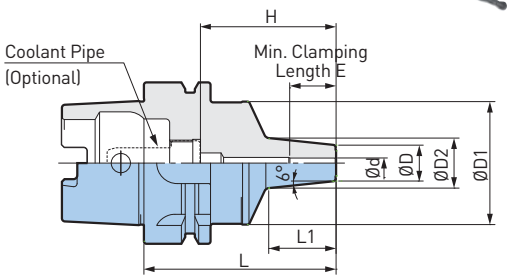


Fig. 1

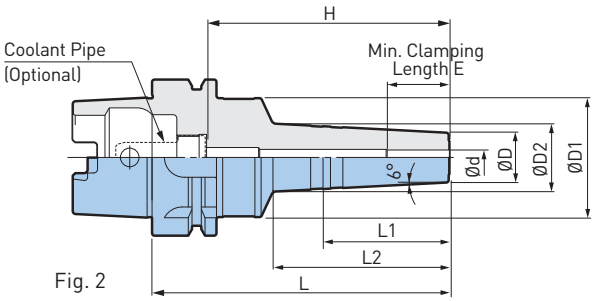


Fig. 2

Ø 4 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	L2	H	E	Weight (kg)
HSK-A40 -HDC4S - 65	**805.527**	1	4	14	33	21	65	28	-	49	19	0.33
HSK-A50 -HDC4S - 75	**805.548**	1	4	14	40	21	75	31	-	55	19	0.8
HSK-A63 -HDC3S - 90	**805.465**	1	3	14	48	24	90	43	-	68	16	1.1
-HDC4S - 75	**803.072**		4			20	75	26		53	19	1.0
-120	**805.466**	2				26	120	57	72	98		1.1
-HDC6S -120	**803.073**		6						70	98	25	1.1
-HDC8S -120	**803.074**		8	17		28		52		95	31	1.2
-HDC10S -120	**803.070**		10	19		30				94	33	1.2
-HDC12S -120	**803.071**		12	21		32				93	36	1.2

1. Adjusting screw and straight collet can not be used.
2. Coolant pipe is to be ordered separately.
3. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ 175
For Inner Bore Cleaner ▶ 286

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Exert maximum performance to high-precision operation at 5-axis machining.







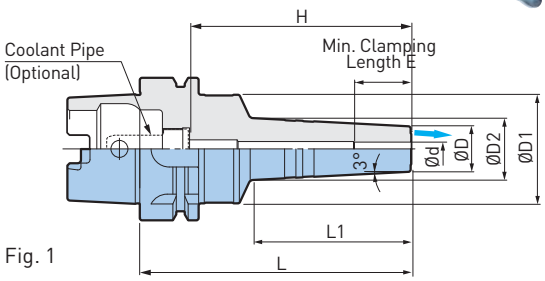


Fig. 1

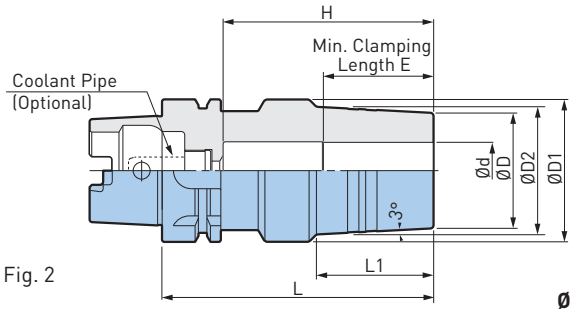


Fig. 2

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	Weight (kg)
HSK-A63 -HDC4J - 75	**805.477**	1	4	20	48	23	75	29	53	19	1.0
-HDC6J -120	**805.096**		6			28	120	70	98	25	1.2
-HDC8J -120	**805.097**		8	22		30			95	31	1.2
-HDC10J -120	**805.098**		10	24		32			94	33	1.3
-HDC12J -120	**805.099**		12	26		34			93	36	1.3
-HDC16J -120	**805.478**		16	34		43		76	92	43	1.5
-HDC20J -120	**805.479**		20	38					91		1.5
-HDC25J -120	**805.831**	2	25	51	63	57		50	93	49	2.1
-HDC32J -120	**805.832**		32	60	69	-		53		56	2.3

1. Adjusting screw can not be used.
2. Straight collet can be used for HDC16J or bigger Ød size models.
3. Coolant pipe is to be ordered separately.
4. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ 175
For Inner Bore Cleaner ▶ 286
For Straight Collet ▶ 272

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Standard

For high precision machining in automotive, aerospace, medical and die & mold.

Coolant Through Hole



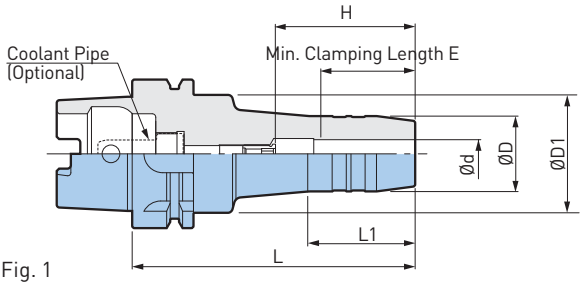


Fig. 1

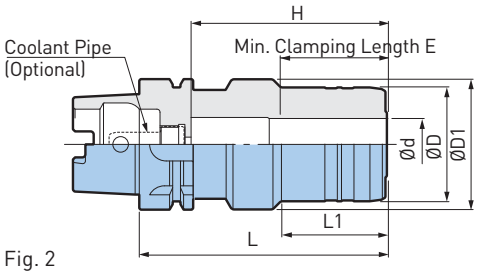


Fig. 2

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Adjusting Screw (Optional)	Weight (kg)
HSK-A63 -HDC6 - 70 *	**801.222**	1	6	26	50	70	24	46	28	-	1.0
-120	**978.402**					120	44	28 - 48		HDA 6-05032	1.2
-150	**801.221**					150					1.4
-HDC8 -120	**979.202**		8	28		120		28 - 48		HDA 8-06032	1.3
-HDC10 - 80 *	**801.196**		10	30		80	35	55	33	-	1.1
-120	**979.203**					120	45	33 - 53		HDA 10-08032	1.3
-HDC12 - 85 *	**801.201**		12	32		85	40	60		-	1.1
-120	**979.204**					120	45	38 - 58	38	HDA 12-10025	1.4
-HDC14 -120	**801.205**		14	34							1.4
-HDC15 -120	**801.208**		15	37				58 - 68	43	HDA 16-12015	1.5
-HDC16 -120	**978.404**		16	38			46				1.5
-HDC18 - 90 *	**801.215**		18	40		90		65		-	1.3
-HDC20 - 90 *	**801.217**		20	42			48				1.3
-120	**979.206**					120		58 - 68		HDA 20-16015	1.6
-HDC31 - 95	**806.444**	2	31	63	74	95	27	70	56	-	1.7
-HDC32 -125 *	**801.219**	2	32	60	69	125	59	100	56	-	2.4
HSK-A100-HDC8 -120	**801.143**	1	8	28	50	120	44	28 - 48	28	HDA 8-06032	2.6
-HDC10 -120	**801.126**		10	30			45	33 - 53	33	HDA 10-08032	2.7
-HDC12 -120	**801.129**		12	32			47	38 - 58	38	HDA 12-10025	2.7
-HDC16 -135	**801.133**		16	38		135	53	43 - 68	43	HDA 16-12030	3.0
-HDC20 -135	**801.136**		20	42			59	58 - 68		HDA 20-16015	3.1
-HDC32 -110 *	**801.139**		32	64	75	110	62	78	56	-	3.7

1. H indicates the adjustment length with an adjusting screw.
2. * Adjusting screw cannot be used.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175
For Inner Bore Cleaner ▶ 286
For Straight Collet ▶ 272
For Adjusting Screw ▶ 282

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Shrink Chuck Slim

Optimal operation with eliminated workpiece/jig interference is achieved in deep endmilling, wall machining and precision mold machining.

Coolant Through Hole

A.3



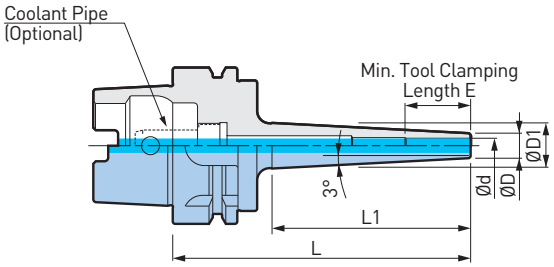


Fig. 1

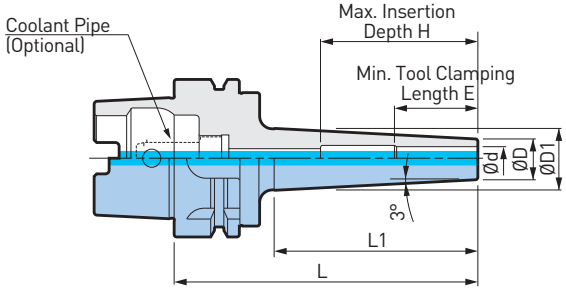


Fig. 2

Ø 6 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Weight (kg)
HSK-A63 -SRC6S - 120	**801.264**	1	6	10	19	120	81	(98)	26	0.9
- 165	**801.265**				23	165	121	(143)		1.0
-SRC8S - 120	**802.267**	2	8	13	22	120	81	(98)		1.0
- 165	**801.268**				26	165	123	(143)		1.1
-SRC10S - 120	**801.253**		10	16	25	120	81	62	32	1.0
- 165	**801.254**				29	165	123			1.2
-SRC12S - 120	**801.256**		12	19	28	120	81	72	36	1.0
- 165	**801.257**				32	165	125			1.3

1. Use carbide cutter within a tolerance of h6.
2. Coolant pipe is to be ordered separately.
3. H dimensions in ( ) are reference length up to the coolant pipe.

For Coolant Pipe ▶ 175
For Inner Boring Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

Shrink Chuck Standard

Substantial body provides higher rigidity. Available from 4mm clamping diameter.

Coolant Through Hole



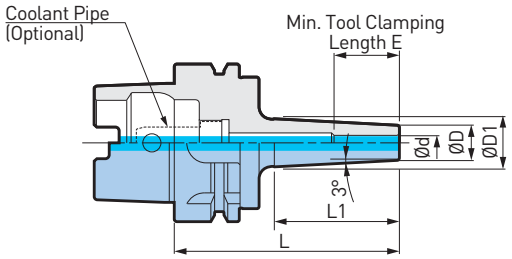


Fig. 1

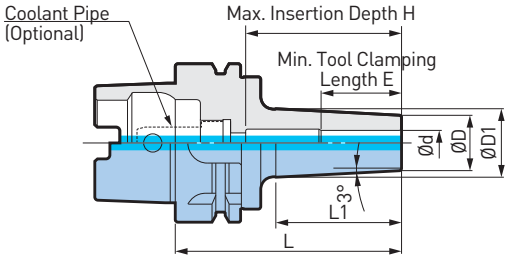


Fig. 2

Ø 4 - 20 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Weight (kg)
HSK-A63 -SRC4 - 90 *	**801.262**	1	4	10	15	90	46	(68)	16	0.9
-SRC6 - 90	**978.295**		6	14	20		51	(68)	26	0.9
- 150	**801.263**				26	150	108	(128)		1.1
-SRC8 - 90	**978.296**	2	8	18	24	90	51	(68)		1.0
- 150	**801.266**				30	150	110	(128)		1.2
-SRC10 - 90	**978.297**		10	22	28	90	51	62	32	1.0
- 150	**801.252**				34	150	111			1.3
-SRC12 - 90	**978.298**		12	24	30	90	51	65	36	1.0
- 150	**801.255**				36	150	112	72		1.4
-SRC16 - 90	**978.299**		16	28	34	90	51	65	38	1.1
- 165	**801.258**				41	165	119	80		1.8
-SRC20 - 90	**801.260**		20	34	40	90	53	65	42	1.2
- 165	**801.259**				47	165	122	100		1.9

1. Use carbide cutter within a tolerance of h6.
2. * Use carbide cutter within a tolerance of h5.
3. Coolant pipe is to be ordered separately.
4. H dimensions in ( ) are reference length up to the coolant pipe.

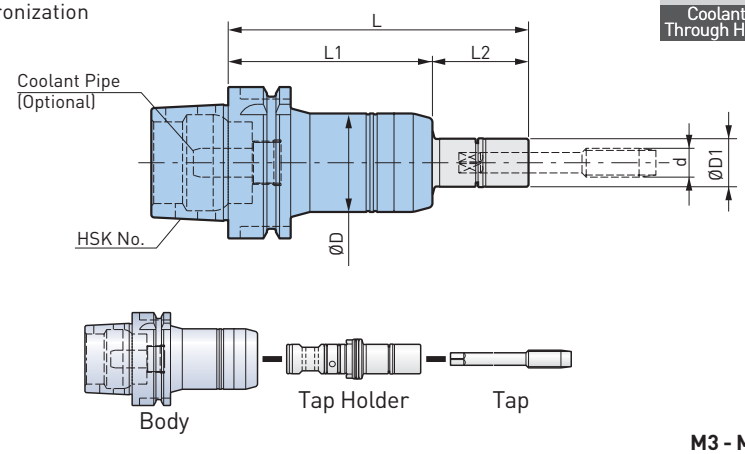
For Coolant Pipe ▶ 175
For Inner Boring Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.





Coolant Through Hole

A.3

M3 - M20

Model	Order No.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
HSK-A40 -MGT6 - 80	**965.601**	MGT6-d - 30	M3 - M8	36	16	110	80	30	0.6
		- 70				150		70	
		-100				180		100	
-MGT12 - 85	**965.602**	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	0.7
		- 70				155		70	
		-100				185		100	
HSK-A50 -MGT6 - 85	**965.603**	MGT6-d - 30	M3 - M8	36	16	115	85	30	0.8
		- 70				155		70	
		-100				185		100	
-MGT12 - 85	**965.604**	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	0.9
		- 70				155		70	
		-100				185		100	
-MGT20 -125	**978.325**	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	160	125	35	1.6
		- 85				210		85	
		-115				240		115	
HSK-A63 -MGT6 - 85	**965.606**	MGT6-d - 30	M3 - M8	36	16	115	85	30	1.1
		- 70				155		70	
		-100				185		100	
-MGT12 - 85	**965.607**	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	1.2
		- 70				155		70	
		-100				185		100	
-MGT20 -110	**965.608**	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	145	110	35	1.8
		- 85				195		85	
		-115				225		115	
HSK-A100 -MGT6 - 95	**965.609**	MGT6-d - 30	M3 - M8	36	16	125	95	30	2.6
		- 70				165		70	
		-100				195		100	
-MGT12 - 95	**965.610**	MGT12-d - 30	M5 - M12 P1/8	41	20	125	95	30	2.7
		- 70				165		70	
		-100				195		100	
-MGT20 -115	**965.611**	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	150	115	35	3.3
		- 85				200		85	
		-115				230		115	
HSK-A125 -MGT12 -105	**805.655**	MGT12-d - 30	M5 - M12 P1/8	41	20	135	105	30	4.1
		- 70				175		70	
		-100				205		100	
-MGT20 -120	**805.656**	MGT20-d - 35	M12 - M20 P1/4 - P1/2	54	30	155	120	35	4.7
		- 85				205		85	
		-115				235		115	

1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.



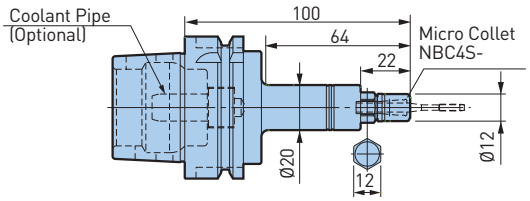
For Coolant Pipe ▶ 175
For Tap Holder ▶ 276
For MEGA Wrench ▶ 281
For Accessories ▶ 280

MEGA Synchro Tapping Holder

For small Tap MGT3



M1 - M3

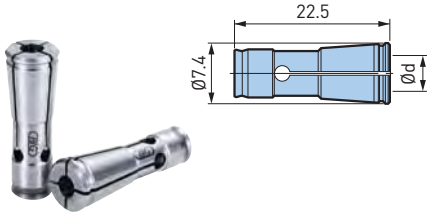


Model	Order No.	Weight (kg)
HSK-A63-MGT3-100	805.542	1.0

For Accessories ▶ 281

1. Nut is included. MEGA wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

Micro Collet for MGT3



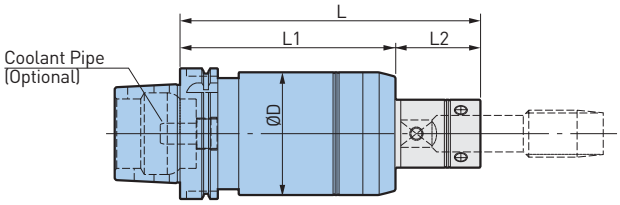
Model	Order No.	Tapping Range d			Tap Shank
		DIN371	ISO529	JIS	Ød
NBC4S-2.5AA	961.468	M1 - M1.8	M2		2.5
-2.8AA	968.353	M2 - M2.6	M2.2, M2.5		2.8
-3.0AA	961.470	-	-	M1 - M2.6	3.0
-3.1AA	968.355	-	M3		3.15
-3.5AA	961.472	M3	-		3.5
-4.0AA	961.474	-	-	M3	4.0

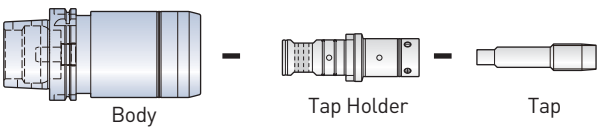
1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ 247

For large Tap MGT36







Coolant Through Hole

M22 - M36

Model	Order No.	Tapping Range d	ØD	L	L1	L2	Weight (kg)
HSK-A100-MGT36-165	801.164	M22 - M36 P5/8 - 1	94	230	165	65	8.2
HSK-A125-MGT36-170	805.657		94	235	170	65	10.1

1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.

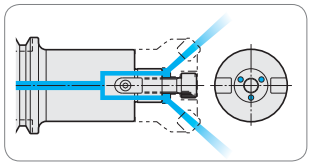


For Accessories ▶ 280
For MGT36 Tap Holder ▶ 277 / 279
For Coolant Pipe ▶ 175

Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.





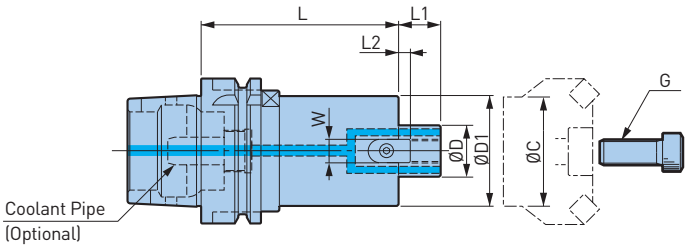


Fig. 1

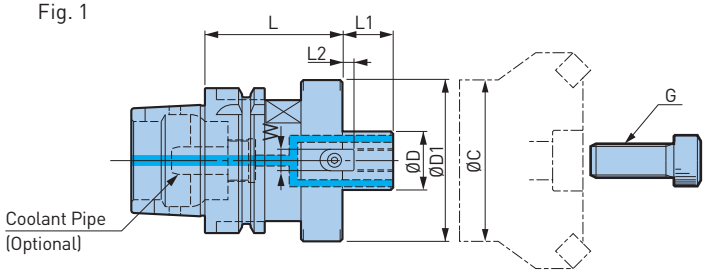


Fig. 2

Coolant Through Hole

A.3

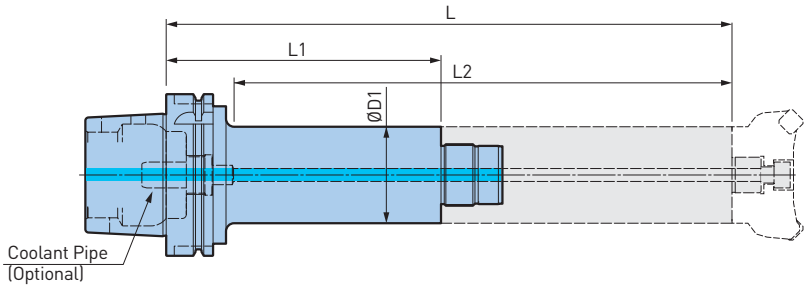
Model	Order No.	Fig.	ØD (h6)	ØD1	L	L1	Drive Keys		G	ØC min.	Weight (kg)
							L2	W			
HSK-A50 -FMH22 - 47 - 60	**805.833**	2	22	47	60	18	5	10	M10	36	0.8
-FMH27 - 60 - 60	**805.834**		27	60		20	6	12	M12	46	1.0
HSK-A63 -FMH16 - 37 - 45	**979.194**	1	16	37	45	16	5	8	M8	28	1.0
-FMH22 - 47 - 60	**801.189**		22	47	60	18	5	10	M10	36	1.3
- 90	**978.186**				90						1.7
-150	**801.188**				150						2.5
-FMH22 - 60 - 60	**805.573**	2	22	60	60	18	5	10	M10	38	1.4
- 90	**805.574**				90						1.8
-FMH27 - 60 - 60	**978.185**		27	60	60	20	6	12	M12	46	1.6
- 90	**979.196**				90						2.3
-FMH32 - 96 - 60	**805.646**		32	96	60	22	7	14	M16	58	2.0
HSK-A100 -FMH22 - 47 -105	**965.523**	1	22	47	105	18	5	10	M10	36	3.4
-150	**978.120**				150						4.0
-200	**978.121**				200						4.7
-FMH22 - 60 -105	**801.092**	1	22	60	105	18	5	10	M10	38	3.9
-150	**801.093**				150						5.4
-200	**801.094**				200						6.1
-FMH27 - 60 - 60	**801.102**	1	27	60	60	20	6	12	M12	46	2.9
- 90	**801.103**				90						3.7
-FMH27 - 76 - 60	**801.105**	1	27	76	60	20	6	12	M12	62	3.2
- 90	**801.106**				90						4.3
-FMH32 - 96 - 60	**801.118**	2	32	96	60	22	7	14	M16	80	3.8
- 90	**801.119**				90						5.5
-FMH40 -100 - 75	**801.125**	2	40	100	75	26	8.5	16	M20 (MBA-M20H)	80	4.9
-105	**801.124**				105						6.8
HSK-A125 -FMH22A - 49 - 50	**806.585**	1	22	49	50	18	5	10	M10	40	4.0
-100	**806.586**				100						4.8
-150	**806.587**				150						5.4
-200	**806.588**				200					36	6.7
-FMH27A - 60 - 90	**806.589**		27	60	90	20	6	12	M12	46	5.1
-150	**806.590**				150						6.3
-FMH32A - 78 - 60	**806.591**		32	76	60	22	7	14	M16	58	4.8
- 96 -105	**806.592**			98	105						7.8
-FMH40A - 80 - 90	**806.593**		40	80	90	28	8.5	16	M20	70	6.0

1. Hexagon Socket Head Cap Screw is included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175
For Clamp Bolt ▶ 282

Smart Damper Basic Holders for Mills





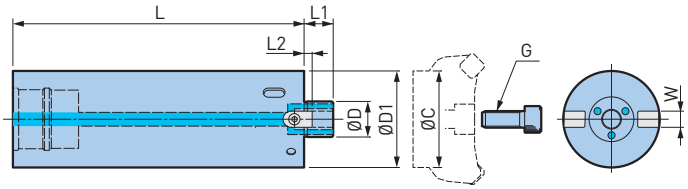
Model	Order No.	ØD1	L	L1	L2	Damper Head	Weight (kg)
HSK-A100 -SDF36 - 47 -170	**804.976**	47	350	170	310	FMH DP-47	4.4
- 47 -220	**804.978**		400	220	360		5.0
-SDF36 - 60 -170	**804.977**	60	350	170	310	FMH DP-60	5.5
- 60 -220	**804.979**		400	220	360		6.5
HSK-A125 -SDF36 - 47 -250	**806.630**	47	430	250	380	FMH DP-47	6.9
-SDF36 - 60 -250	**806.631**	60				FMH DP-60	8.0

1. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

Smart Damper Damper Heads for Mills



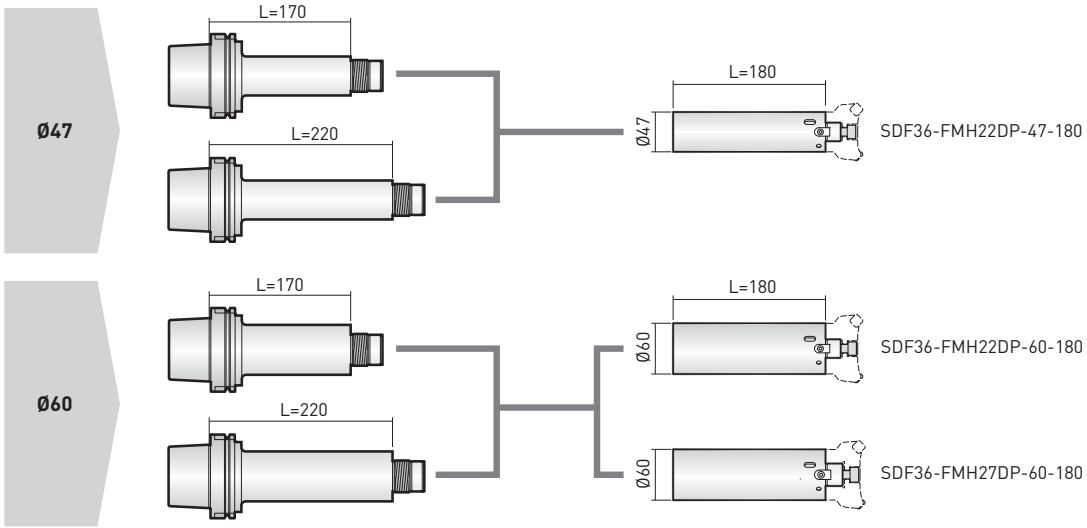


Model	Order No.	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)
SDF36-FMH22DP - 47 -180	**804.969**	22	47	180	18	5	10	M10	FK45-50L	36	3.0
- 60 -180	**804.971**		60						FK58-62L	49	4.5
-FMH27DP - 60 -180	**804.972**	27			20	6	12	M12		46	4.5

1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282
For Wrench ▶ 275

Combinations Basic Holder Damper Head

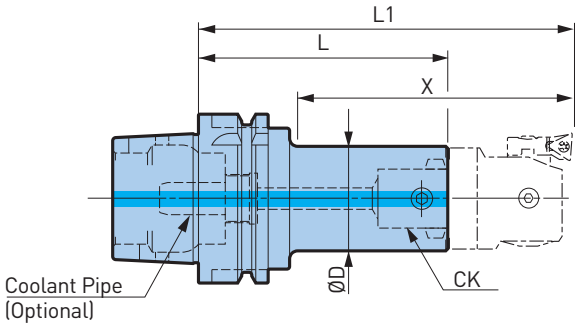


CK Shanks with Center Through Coolant

With drive key grooves and orientation notch.

Coolant Through Hole





A.3

Taper Size	Order No.	CK	ØD	L	L1	X	Weight (Kg)
HSK-A25 -CKB2 - 30	**328.279F ***	CKB2	24	30	66	50	0.18
HSK-A32 -CKB2 - 33	**328.278F**	CKB2	24	33	69	43	0.20
HSK-A40 -CKB1 - 32	**324.112F**	CKB1	19	31.5	64	40	0.22
-CKB2 - 35	**328.277F**	CKB2	24	35	71	45	0.22
-CKB3 - 40	**324.132F**	CKB3	31	40	80	55	0.26
-CKB4 - 50	**324.142F**	CKB4	39	50	97	72	0.34
HSK-A50 -CKB3 - 44	**324.232F**	CKB3	31	44	84	53	0.5
-CKB4 - 48	**324.242F**	CKB4	39	48	95	64	0.5
-CKB5 - 61	**324.252F**	CKB5	50	61	118	87	0.7
HSK-A63 -CKB1 - 79	**324.312F**	CKB1	19	78.5	111	80	0.8
-CKB2 - 96	**324.322F**	CKB2	24	95.5	131	100	0.9
-CKB3 - 71	**324.331**	CKB3	31	71	111	80	0.9
-CKB3 - 71FB	**324.331F**	CKB3	31	71	111	80	0.9
-CKB3 - 121	**324.332**	CKB3	31	121	161	130	1.2
-CKB4 - 94	**324.341**	CKB4	39	94	141	110	1.2
-CKB4 - 94FB	**324.341F**	CKB4	39	94	141	110	1.2
-CKB4 - 114	**324.342**	CKB4	39	114	161	130	1.4
-CKB5 - 59	**324.352**	CKB5	50	59	116	85	1.0
-CKB5 - 59FB	**324.352F**	CKB5	50	59	116	85	1.0
-CKB5 - 89	**324.353**	CKB5	50	89	146	115	1.4
-CKB5 - 134	**324.354**	CKB5	50	134	191	160	2.0
-CKB6 - 70	**324.361**	CKB6	63.5	70	141	110	1.3
-CKB6 - 70FB	**324.361F**	CKB6	63.5	70	141	110	1.3
-CKN6 - 70	**324.361N**	CKN6	63.5	70	141	110	1.3
-CKB6 - 100	**324.362**	CKB6	63.5	100	171	140	1.9
-CKN6 - 160	**324.367N**	CKN6	63.5	160	231	200	3.2
HSK-A80 -CKB6 - 75	**324.461**	CKB6	63.5	75	146	115	2.0
HSK-A100 -CKB3 - 124	**324.531**	CKB3	31	124	164	130	2.5
-CKB4 - 147	**324.541**	CKB4	39	147	194	160	2.9
-CKB5 - 107	**324.551**	CKB5	50	107	164	130	3.0
-CKB5 - 177	**324.552**	CKB5	50	177	234	200	3.8
-CKB6 - 78	**324.561**	CKB6	63.5	78	149	115	2.9
-CKN6 - 78	**324.561N**	CKN6	63.5	78	149	115	2.8
-CKB6 - 108	**324.563**	CKB6	63.5	108	179	145	3.5
-CKN6 - 108	**324.563N**	CKN6	63.5	108	179	145	3.4
-CKN6 - 223	**324.566N**	CKN6	63.5	223	294	260	6.0
-CKB7 - 87	**324.571**	CKB7	90	87	204 (174)	170 (140)	4.1
-CKN7 - 87	**324.571N**	CKN7	90	87	204 (174)	170 (140)	4.1
-CKB7 - 127	**324.572**	CKB7	90	127	244 (214)	210 (180)	5.8
-CKN7 - 127	**324.572N**	CKN7	90	127	244 (214)	210 (180)	5.8
-CKN7 - 267	**324.575N**	CKN7	90	267	384 (354)	350 (320)	12.0
HSK-A125 -CKB6 - 94	**869.024**	CKB6	63.5	94	165	125	4.9
-CKB7 - 123	**869.025**	CKB7	90	123	240 (210)	195 (165)	7.5

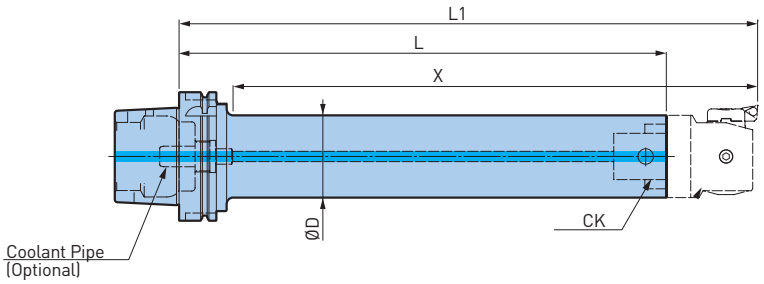
1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. HSK shanks with index "F" are precision balanced.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175
For Boring Heads ▶ Chapter B

Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole fine boring.





Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
HSK-A100 -CKB5DP - 303	**328.238**	CKB5	50	303	360	310	6.5
HSK-A100 -CKB6DP - 379	**328.240**	CKB6	64	379	450	400	11.2

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Coolant pipe is to be ordered separately.

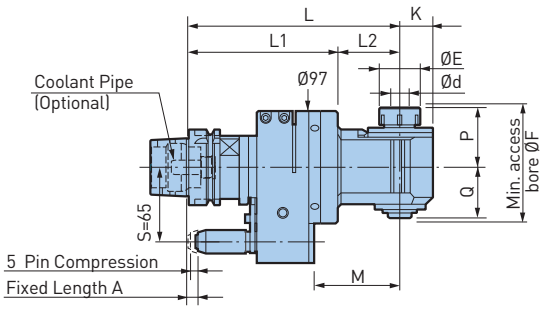
For Coolant Pipe ▶ 175
For Boring Heads ▶ Chapter B

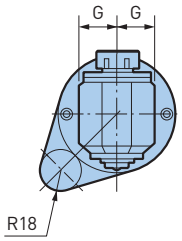
New Baby Chuck Type

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

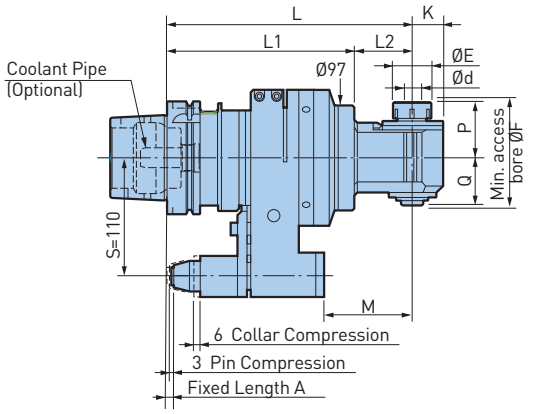


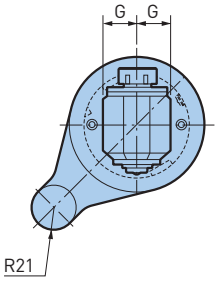
HSK-A63





HSK-A100





Exclusive Stop Block is required.

Model	Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min^{-1}	Weight (kg)
HSK-A63-AG90/NBS6 -185	802.717	0.25 - 6	20	21	17	185	130	55	77	33	29	67	NBC6	6 000	5.0
-215	802.719					215		85	107						5.2
-245	802.721					245		115	137						5.4
-275	802.723					275		145	167						5.6
-AG90/NBS10 -185	802.702	1.5 - 10	30	30	25	185	130	55	77	45	43	91	NBC10	6 000	5.4
-215	802.704					215		85	107						5.8
-245	802.706					245		115	137						6.1
-AG90/NBS13 -185	802.708	2.5 - 13	35	31	28	185	130	55	77	52	45	101	NBC13	6 000	5.5
-215	802.710					215		85	107						5.9
-245	802.712					245		115	137						6.2
-AG90/NBS20S -180S	802.716	2.5 - 20	46	35	33	180	127	53	72	65	62	132	NBC20	3 000	7.9
HSK-A100 -AG90/NBS6 -225	802.666	0.25 - 6	20	21	17	225	170	55	82	33	29	67	NBC6	6 000	11.8
-255	802.669					255		85	112						12.0
-285	802.672					285		115	142						12.2
-315	802.675					315		145	172						12.4
-AG90/NBS10 -225	802.645	1.5 - 10	30	30	25	225	170	55	82	45	43	91	NBC10	6 000	12.2
-255	802.648					255		85	112						12.6
-285	802.651					285		115	142						12.9
-AG90/NBS13 -225	802.654	2.5 - 13	35	31	28	225	170	55	82	52	45	101	NBC13	6 000	12.3
-255	802.657					255		85	112						12.7
-285	802.660					285		115	142						13.0
-AG90/NBS20 -240	802.663	2.5 - 20	46	35	35	240	170	70	97	65	62	132	NBC20	3 000	13.4

1. The standard fixed length A is 8 mm for HSK-A63 and 6 mm for HSK-A100. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

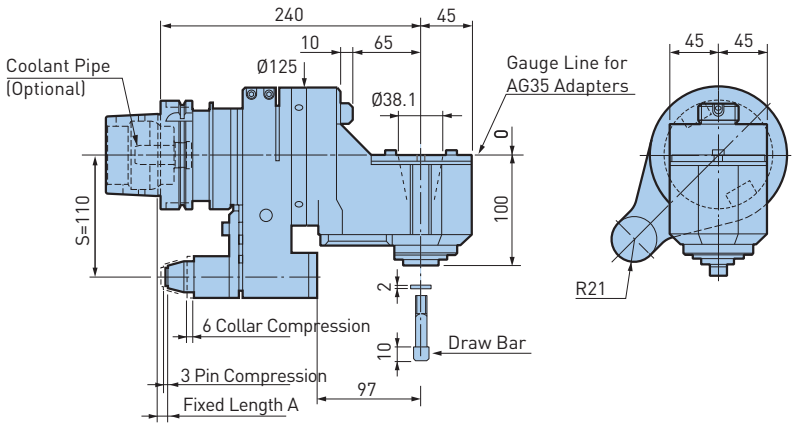
For New Baby Collet ▶ 250
For Stop Block ▶ 290

Build-Up Type

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle.
Also helps minimize interference problems with ATC and storage problems within the magazine.



Exclusive Stop Block is required.



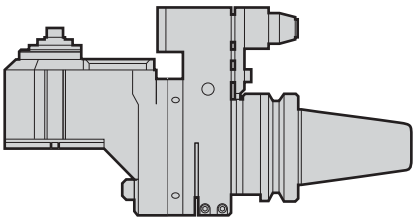
Model	Order No.	Max. min^{-1}	Weight (kg)
HSK-A100 -AG90/AGH35-240	**802.639**	3 000	14.2
-AG90/AGH35-240S	**802.640**	3 000	15.5

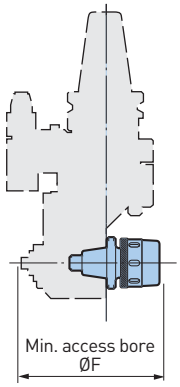
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

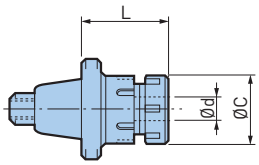
For Stop Block ▶ 290
For Adapters ▶ 154

A.3

AG35 adapters





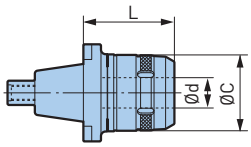


New Baby Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -NBS10	962.793	1.5 - 10	47	30	162	0.6
-NBS13	962.794	2.5 - 13	54	35	168	0.7
-NBS16	962.795	2.5 - 16		42	170	0.8
-NBS20	962.796	2.5 - 20		46		0.9

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250
For Wrench ▶ 271

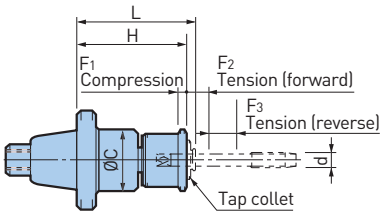


New Hi-Power Milling Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -HMC20S	802.742	20	60	52	178	1.5

1. Wrench (FK45-50L) is included.

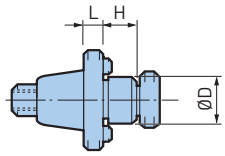
For Straight Collet ▶ 272



Auto Tapper Type B (automatic depth control)

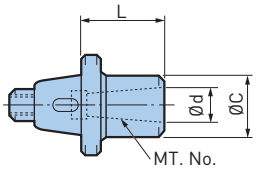
Model	Order No.	Ød	L	ØC	H	F1	F2	F3	Weight (kg)
AG35 -ATB12E	802.435	M4 - M12	80	40.5	72	0.5	5	4	1.0
-ATB20E	802.436	M8 - M20	115	57.5	102.5		6.5	5	1.7

1. Please contact BIG KAISER agent for tap collet.



Face Mill Arbor

Model	Order No.	ØD	L	H	Weight (kg)
AG35 -FMH22 -30	802.740	22	30	18	1.0
-FMH27 -20	802.741	27	20	20	1.0

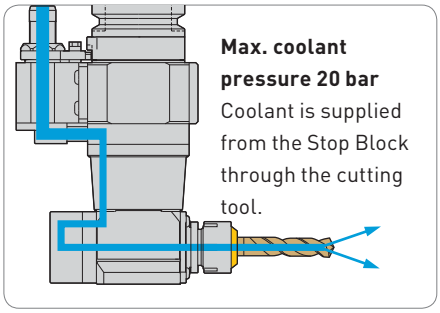


Morse Taper Adapter

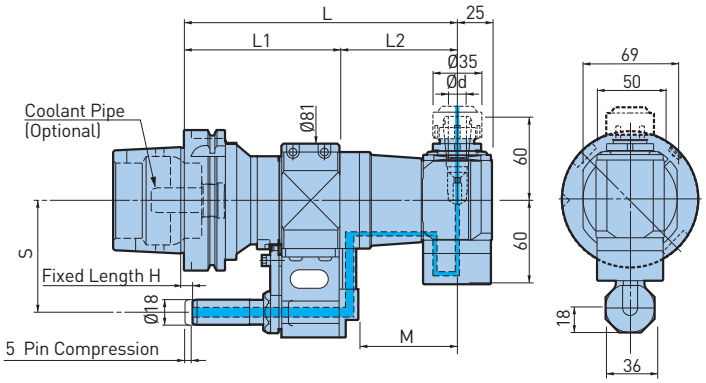
Model	Order No.	Ød	MT. No.	L	ØC	ØF	Weight (kg)
AG35 -MT1	962.785	12.065	1	50	24	164	0.6
-MT2	962.786	17.78	2	60	32	180	0.7

OAG Type





Max. coolant pressure 20 bar
Coolant is supplied from the Stop Block through the cutting tool.





Exclusive Stop Block is required.

Model	Order No.	Ød	L	L1	L2	M	Collet Model	Nut Model	Max. min^{-1}	Weight (kg)
HSK-A63 -OAG90-13-185	**802.736**	2.5 -13	185	101	84	70.5	NBC13	BPS13	5 000	5.9
HSK-A100 -OAG90-13-195	**802.697**		195	111						8.4

1. Standard fixed length A is 6 mm. Other lengths are available upon request.
2. Standard "S" is 80 mm for HSK-A100 and 65 mm for HSK-A63.
3. New baby nut and wrench are included. New baby collet is to be ordered separately.
4. Coolant pipe is to be ordered separately.

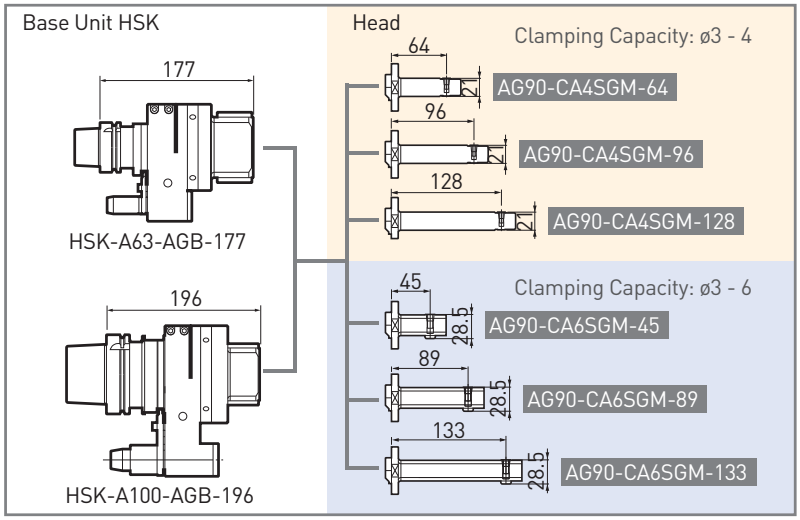
For New Baby Collet ▶ 250
For Baby Perfect Seal ▶ 262
For Stop Block ▶ 290

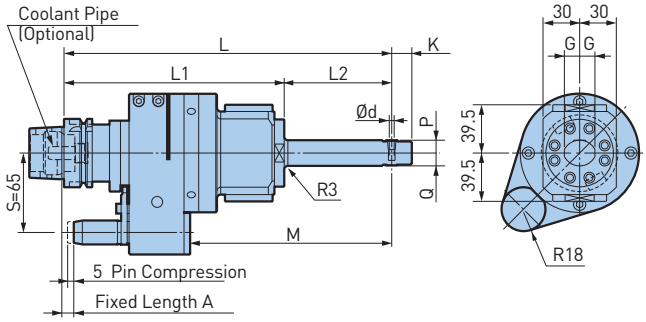
A.3

Small Bore Type

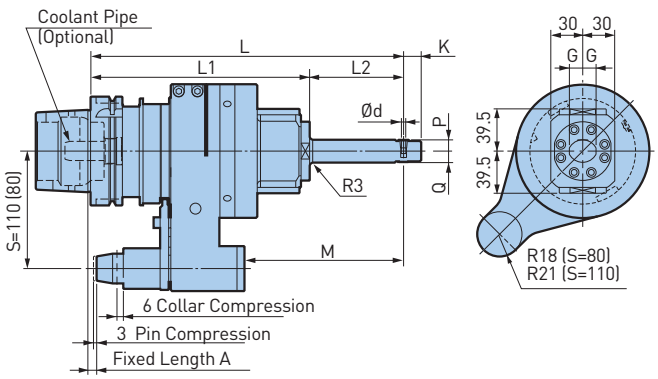
Angular operation in a Ø 30 mm bore (min.) is possible. Modular heads enhance versatility. Head is aligned with spindle center for easy programing.







HSK-A63 max. 2000 min^{-1}



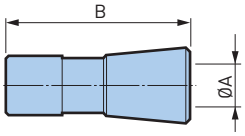
HSK-A100 max. 2000 min^{-1}

Model	Order No.	Base	Head	Ød	G	K	L	L1	L2	M	P	Q	Speed Ratio	Weight (kg) S=65	S=80	S=110
HSK-A63-AG90 -CA4SGM -241	802.727	HSK-A63-AGB-177	AG90-CA4SGM - 64	3 - 4	12.5	16.5	241	185	56	133	10.5	10.5	1:1.06	5.5	-	-
-273	802.728		- 96				273		88	165				5.6		
-305	802.729		-128				305		120	197				5.7		
-CA6SGM -222	802.730		AG90-CA6SGM - 45	3 - 6	15	20	222		37	114	12.5	16	1:0.77	5.6		
-266	802.731		- 89				266		81	158				5.8		
-310	802.732		-133				310		125	202				6.0		
HSK-A100-AG90-CA4SGM-260	802.680	HSK-A100-AGB-196	AG90-CA4SGM - 64	3 - 4	12.5	16.5	260	204	56	117	10.5	10.5	1:1.06	-	11.1	11.7
-292	802.682		- 96				292		88	149					11.2	11.8
-324	802.684		-128				324		120	181					11.3	11.9
-CA6SGM -241	802.686		AG90-CA6SGM - 45	3 - 6	15	20	241		37	98	12.5	16	1:0.77	-	11.2	11.8
-285	802.688		- 89				285		81	145					11.4	12.0
-329	802.690		-133				329		125	186					11.6	12.2

1. Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
2. Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
3. Internal coolant can not be used.
4. Exclusive collet is to be ordered separately.
5. Coolant pipe is to be ordered separately.

For Stop Block ▶ 290

Exclusive collet for Small Bore Angle Head



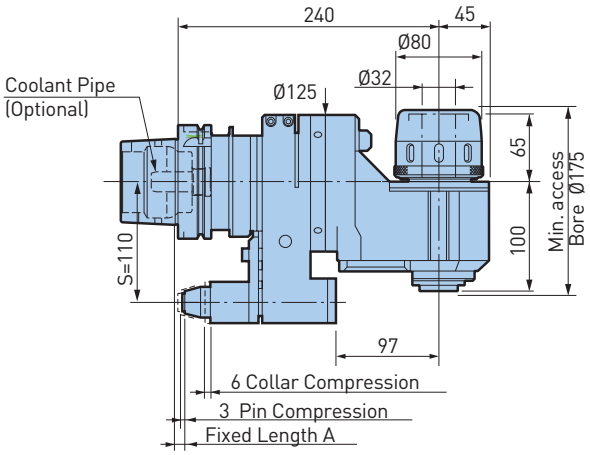
Model		Order No.	ØA	B
CA4	-3	804.666	3	16.5
	-3.5	804.667	3.5	
	-4	804.668	4	

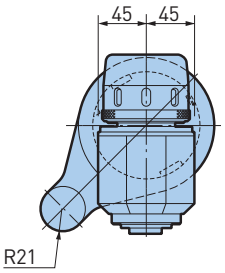
Model		Order No.	ØA	B
CA6	-3	804.669	3	22
	-4	804.670	4	
	-5	804.671	5	
	-6	804.672	6	

HMC Type

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.









Exclusive Stop Block is required.

Model	Order No.	Max. min^{-1}	Weight (kg)
HSK-A100-AG90/HMC32-240	**802.642**	3 000	16.0

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.
6. Coolant pipe is to be ordered separately.

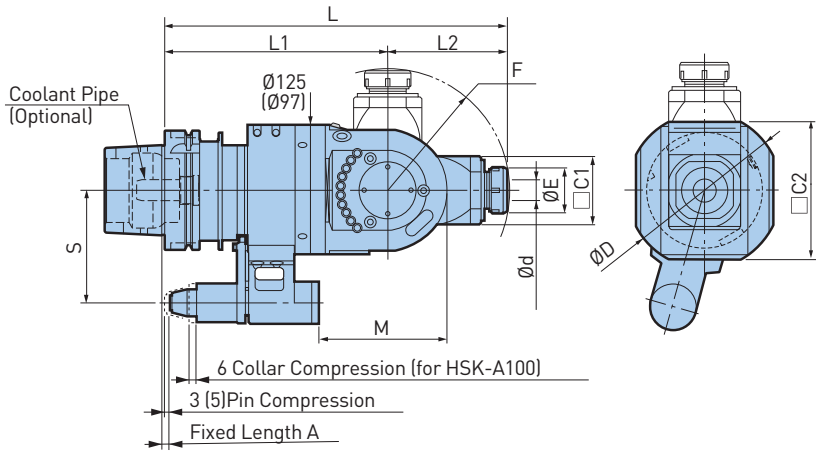
For Stop Block ▶ 290
For Straight Collet ▶ 272

A.3

Universal Type

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.







Exclusive Stop Block is required.

Model	Order No.	Ød	ØE	ØD	□C1	□C2	L	L1	L2	M	F	S	Collet Model	Max. min^{-1}	Weight (kg)
HSK-A63 -AGU/NBS13 -285	**802.734**	2.5 - 13	35	115	51	97	285	185	100	124	102	65	NBC13	6000	9.6
HSK-A100 -AGU/NBS20 -325	**802.695**	2.5 - 20	46	140	65	125	325	210	115	125	118	110	NBC20	4000	20.0

1. Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
2. Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
3. Figures in ( ) in the drawing indicate dimensions for HSK-A63.
4. New baby nut and wrench are included.
5. Coolant can be supplied through the locating pin.
6. Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250
For Stop Block ▶ 290



Easily adjustable spindle angle from 0° to 90°.



Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.

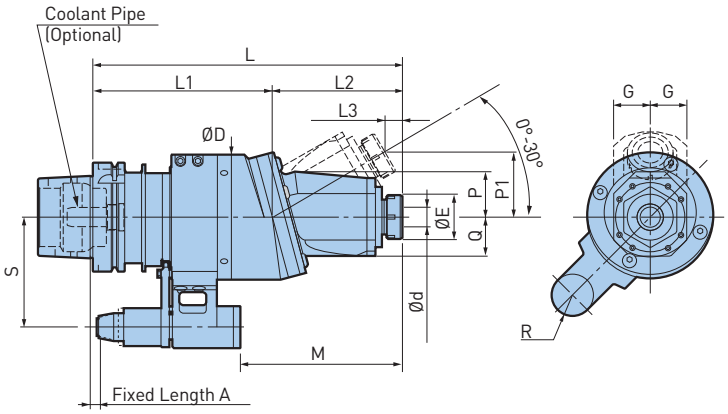


Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

AGU30 Type

Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.







Exclusive Stop Block is required.

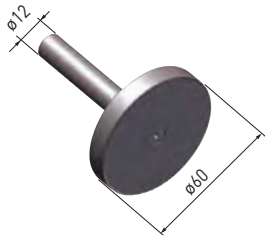
Model	Order No.	Ød	ØD	ØE	G	L	L1	L2	L3 max.	Q	P	P1 max.	R	S	Max. min^{-1}	Collet Model	Weight (kg)
HSK-A63 -AGU30/NBS13 -255	**802.735**	2.5 - 13	97	35	29	255	150	105	14	30	34	52.5	18	65	6 000	NBC13	6.8
HSK-A100-AGU30/NBS20 -305	**802.696**	2.5 - 20	125	46	36.5	305	175	130	17	39	45	65	21	110	4 000	NBC20	15.3

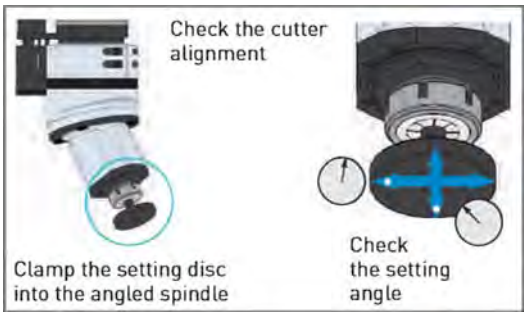
1. Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
2. Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
3. New baby nut, wrench and setting disk are included.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250
For Stop Block ▶ 290

Setting Disc (included accessory)

For precise adjustment of the spindle angle or direction.







Spindle angle is easily adjustable from 0° to 30° using the scale indication on the body.

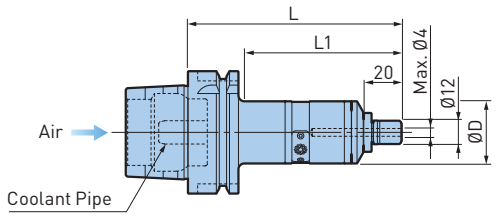
Air Turbine Spindle

Center Through Type

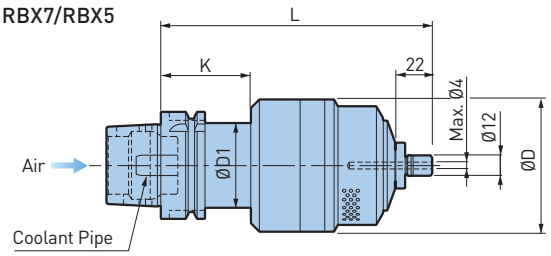


A.3

RBX12



RBX7/RBX5



Model	Order No.	Spindle Speed (min^{-1})	L	L1	ØD	ØD1	K	Nut Model	Weight (kg)
HSK-A63 -RBX5C -4S-160	**965.506**	40 000 - 50 000	160	-	96	50	53	MGN4S	3.9
-RBX7C -4S-160	**965.505**	60 000 - 80 000		-	78				2.9
-RBX12C -4S-110	**805.749**	100 000 - 120 000	110	81	32	-	-	MGN4S-HG	1.0
HSK-A100 -RBX5C -4S-165	**802.427**	40 000 - 50 000	165	-	96	68	58	MGN4S	5.9
-RBX7C -4S-165	**802.430**	60 000 - 80 000		-	78				4.9

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247
For Air Filter ▶ 162

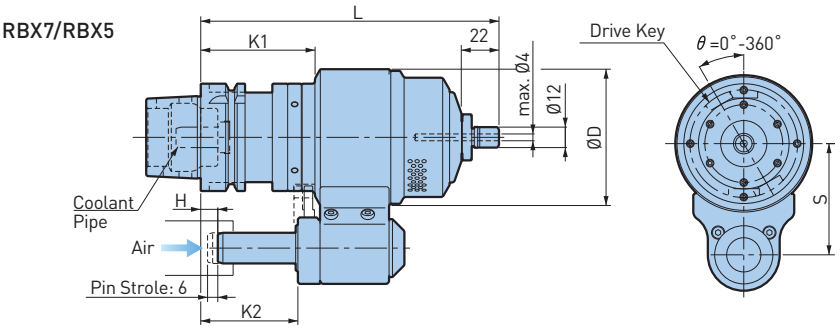
Caution

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

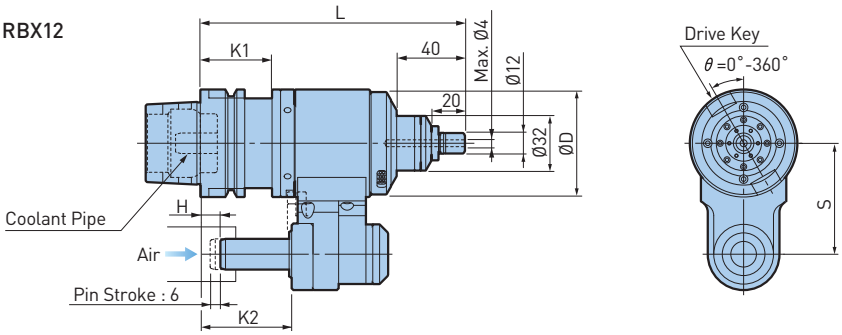
Air Turbine Spindle



RBX7/RBX5



RBX12





Exclusive Stop Block is required.

Model	Order No.	Operation Speed (min⁻¹)	L	ØD	K1	K2	S	H	Nut Model	Weight (kg)
HSK-A63 -RBX5 -4S-175-65	**802.431**	40 000 - 50 000	175	96	67	57	65	0 - 45	MGN4S	4.8
-RBX7 -4S-175-65	**802.433**	60 000 - 80 000		80						3.8
-RBX12 -4S-155-65	**805.748**	100 000 - 120 000	155	63	42	53	65	-4 - 41	MGN4S-HG	3.0
HSK-A100 -RBX5 -4S-180-80	**802.425**	40 000 - 50 000	180	100	72	62	80	5 - 50	MGN4S	9.4
-RBX7 -4S-180-80	**802.428**	60 000 - 80 000								8.4

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

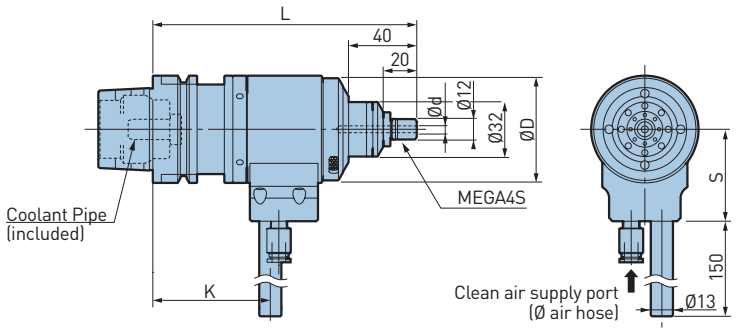
For Micro Collet ▶ 247
For Air Filter ▶ 162
For Stop Block ▶ 290

Air Turbine Spindle

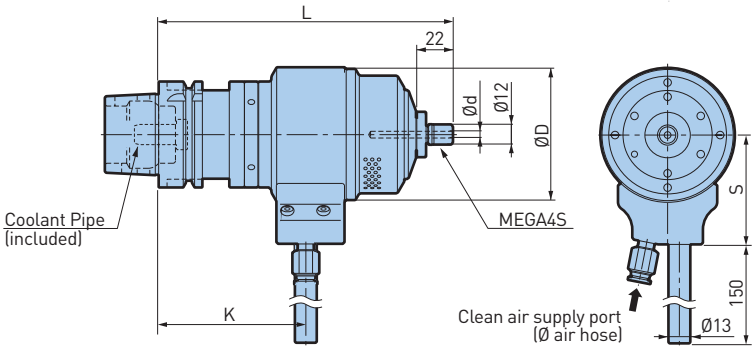
Manual Type



RBX12



RBX7/RBX5



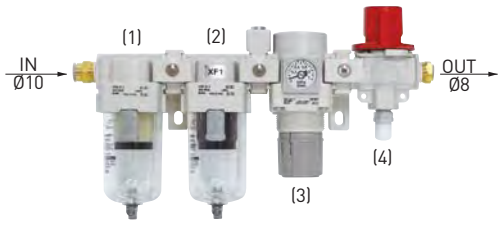
A.3

Model	Order No.	Spindle Speed (min^{-1})	Ød	ØD	L	K	S	Nut Model	Weight (kg)
HSK-A63 -RBX5 -4S-175H	**802.432**	40 000 - 50 000	0.45 - 4.05	96	175	87	71	MGN4S	4.8
-RBX7 -4S-175H	**802.434**	60 000 - 80 000		80			65	MGN4S-HG	3.8
-RBX12 -4S-155H	**806.710**	100 000 - 120 000		63	155	69	54		2.7
HSK-A100 -RBX5 -4S-180H	**802.426**	40 000 - 50 000	0.45 - 4.05	100	180	92	80	MGN4S	9.4
-RBX7 -4S-180H	**802.429**	60 000 - 80 000							8.4

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

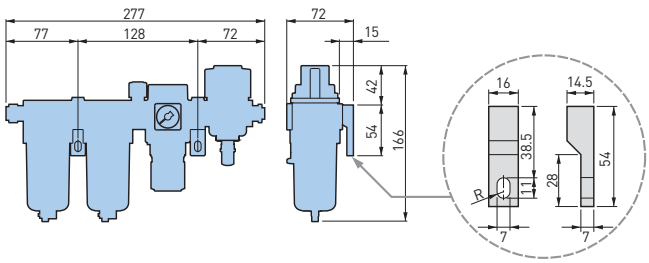
For Micro Collet ▶ 247

Air Filter Regulator for RBX



Model XF1

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).



Model	Order No.
XF1	**962.661**

Accessories for RBX

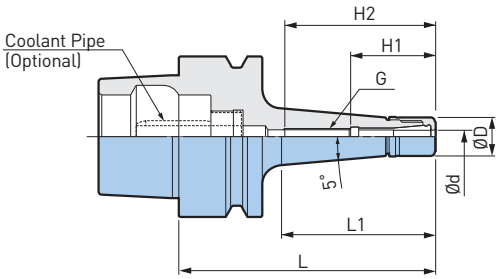
Accessories							
	MEGA Nut 		Exclusive Nut 		MEGA Wrench 		Micro Collet  ▶ 247
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model	Order No.	Model
RBX12-4S	-	-	MGN4S-HG	805.747	MGR12	**969.450**	NBC4S-
RBX7-4S	MGN4S	**969.481**	-	-			
RBX5-4S	MGN4S	**969.481**	-	-			

MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole



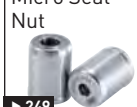


Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min^{-1}	Collet Model	Weight (kg)
HSK-E25 -MEGA3S - 45T *	**968.870**	0.45 - 3.25	10	45	32	22	32	-	50 000	NBC3S-	0.06
- 60T	**968.871**			60	48		38	M4 P0.7	40 000		0.08
-MEGA6S - 45T *	**968.874**	0.45 - 6.05	14	45	33	28.5	31	-	50 000	NBC6S-	0.08
- 60T	**968.875**			60	49		40	M7 P0.75	40 000		0.10
HSK-E32 -MEGA3S - 60T	**968.917**	0.45 - 3.25	10	60	35	22	38	M4 P0.7	40 000	NBC3S-	0.15
-MEGA4S - 45T *	**968.880**	0.45 - 4.05	12	45	23	26.5	26	-	50 000	NBC4S-	0.14
- 60T	**968.881**			60	35		46	M5 P0.8	40 000		0.16
-MEGA6S - 45T *	**968.882**	0.45 - 6.05	14	45	23	28.5	28	-	50 000	NBC6S-	0.14
- 60T	**968.883**			60	36		38	M7 P0.75	40 000		0.17
-MEGA8S - 60T *	**803.604**	2.95 - 8.05	18		38	31	43	-		NBC8S-	0.20
HSK-E40 -MEGA3S - 60T	**968.919**	0.45 - 3.25	10	60	35	22	39	M4 P0.7	40 000	NBC3S-	0.23
- 75T	**968.920**			75	50		38				0.25
-MEGA4S - 60T	**968.890**	0.45 - 4.05	12	60	35	26.5	44	M5 P0.8		NBC4S-	0.24
- 75T	**968.891**			75	50		47				0.27
-MEGA6S - 60T *	**968.892**	0.45 - 6.05	14	60	35	28.5	42	-		NBC6S-	0.24
- 75T	**968.893**			75	50		49	M7 P0.75			0.28
- 90T	**968.894**			90	65		49				0.32
HSK-E50 -MEGA6S - 80T	**968.907**	0.45 - 6.05	14	80	49	28.5	49	M7 P0.75	40 000	NBC6S-	0.48

1. MEGA nut is included.
2. * Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

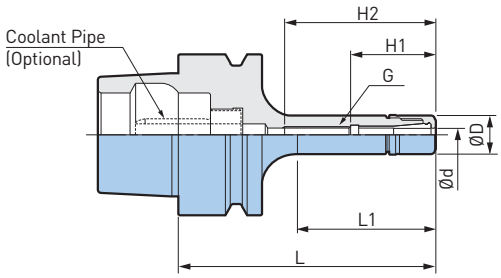
Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▶ 247	Micro Seal Nut  ▶ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	**Model**	**Order No.**	**Model**	**Order No.**	**Model**	**Model**	**Model**	**Order No.**	**Model**	**Order No.**
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**261.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

Coolant Through Hole





A.3

Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min^{-1}	Collet Model	Weight (kg)
HSK-E25 -MEGA6S - 45 *	**968.868**	0.45 - 6.05	14	45	32	28	31	-	50 000	NBC6S-	0.07
- 60	**968.869**			60	47	28.5	41	M7 P0.75	40 000		0.08
HSK-E32 -MEGA3S - 45 *	**968.914**	0.45 - 3.25	10	45	23	22	31	-	50 000	NBC3S-	0.13
-MEGA4S - 45	**968.876**	0.45 - 4.05	12	45	22	26.5		M5 P0.8		NBC4S-	0.14
- 60	**968.877**			60	34		46		40 000		0.15
-MEGA6S - 45 *	**968.878**	0.45 - 6.05	14	45	22	28.5	28	-	50 000	NBC6S-	0.14
- 60	**968.879**			60	35		38	M7 P0.75	40 000		0.15
HSK-E40 -MEGA3S - 40 *	**968.915**	0.45 - 3.25	10	40	19	22	24	-	50 000	NBC3S-	0.21
-MEGA6S - 45 *	**968.716**	0.45 - 6.05	14	45	23	27.5	27			NBC6S-	0.22
- 60 *	**968.757**			60	35	28.5	42		40 000		0.23
HSK-E50 -MEGA6S - 55 *	**978.100**	0.45 - 6.05	14	55	26	28.5	35	-	45 000	NBC6S-	0.44
- 80	**968.760**			80	44		49	M7 P0.75	40 000		0.46

1. MEGA nut is included.
2. * Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▶ 247	Micro Seal Nut  ▶ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**261.280**

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole



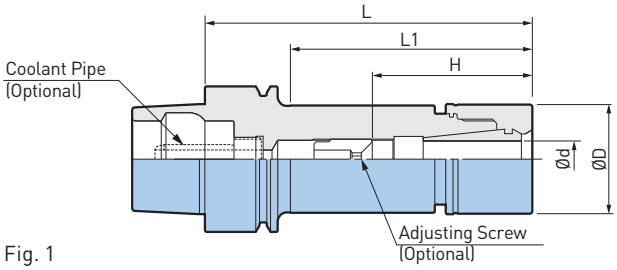


Fig. 1

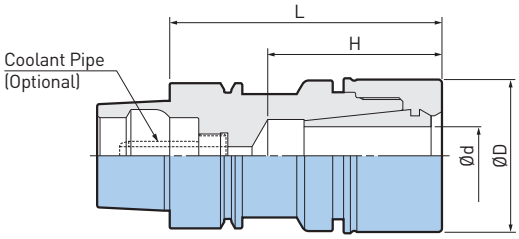


Fig. 2

Ø 0.25 - 16 mm

Model	Order No.	Fig.	Ød	ØD	L	L1	H	Max. min^{-1}	Collet Model	Weight (kg)
HSK-E25 -MEGA6N - 40 *	**968.752**	1	0.25 - 6	20	40	29	25	30 000	NBC6-	0.10
-MEGA8N - 45 *	**968.753**	2	0.5 - 8	25	45	-	30	25 000	NBC8-	0.12
-MEGA10N - 60 **	**968.754**		1.5 - 10	30	60		45	20 000	NBC10-	0.17
HSK-E32 -MEGA6N - 45 *	**968.884**	1	0.25 - 6	20	45	24	28	40 000	NBC6-	0.17
- 60	**968.885**				60	37	23 - 27	35 000		0.20
-MEGA8N - 50 *	**968.886**	1	0.5 - 8	25	50	29	33	40 000	NBC8-	0.22
HSK-E40 -MEGA6N - 50 *	**968.717**	1	0.25 - 6	20	50	26	31	40 000	NBC6-	0.26
- 60	**968.895**				60	34	23 - 26	35 000		0.28
- 75	**968.718**				75	49	23 - 41	30 000		0.31
- 90	**968.896**				90	64	23 - 43	28 000		0.35
-120	**968.897**				120	94		25 000		0.41
-MEGA8N - 55 *	**968.719**	1	0.5 - 8	25	55	31	36	40 000	NBC8-	0.31
- 75	**968.720**				75	51	26 - 41	30 000		0.38
-MEGA10N - 60 *	**968.721**	1	1.5 - 10	30	60	37	40	35 000	NBC10-	0.39
- 75 *	**968.899**				75	52	55	30 000		0.46
- 90	**968.722**				90	67	38 - 48	28 000		0.53
-MEGA13N - 65 *	**968.900**	1	2.5 - 13	35	65	44	44	30 000	NBC13-	0.45
- 75 *	**968.723**				75	54	55	25 000		0.53
- 90	**968.901**				90	69	44 - 48			0.62
-MEGA16N - 75 *	**968.905**	2	2.5 - 16	42	75	-	48	20 000	NBC16-	0.60

For Coolant Pipe ▶ 175

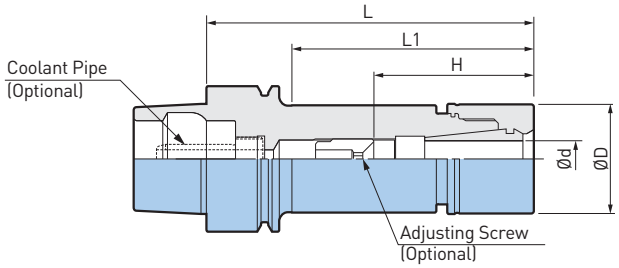
1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Adjusting screws can not be used.
5. ** NBC-E collet and adjusting screw can not be used.
6. Nut-less model available upon request.

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole





Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Max. min^{-1}	Collet Model	Weight (kg)
HSK-E50 -MEGA6N - 70	**968.728**	0.25 - 6	20	70	38	23 - 39	30 000	NBC6-	0.50
-MEGA8N - 60 *	**968.729**	0.5 - 8	25	60	30	37	40 000	NBC8-	0.52
- 90	**968.730**			90	56	26 - 45	30 000		0.62
-MEGA10N - 60 **	**968.731**	1.5 - 10	30	60	30	35	35 000	NBC10-	0.56
-MEGA13N - 70 *	**968.733**	2.5 - 13	35	70	40	45	28 000	NBC13-	0.67
- 90	**968.734**			90	60	44 - 47	25 000		0.80
-150	**968.910**			150	120	44 - 63	15 000		1.24
-MEGA16N - 90 *	**968.736**	2.5 - 16	42	90	63	65	25 000	NBC16-	1.00
-MEGA20N - 75 **	**968.764**	2.5 - 20	46	75	-	49		NBC20-	0.80
-100	**968.911**			100		51 - 54	20 000		1.10

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
5. ** NBC-E collet and adjusting screw can not be used.
6. Nut-less model available upon request.

For Coolant Pipe ▶ 175

Spare Parts			Accessories								
	MEGA Nut		MEGA Wrench		NBC Collet ▶ 250	MEGA Perfect Seal ▶ 260	Adjusting Screw				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4

Hydraulic Chuck Super Slim

Extremely slim design eliminates interference.



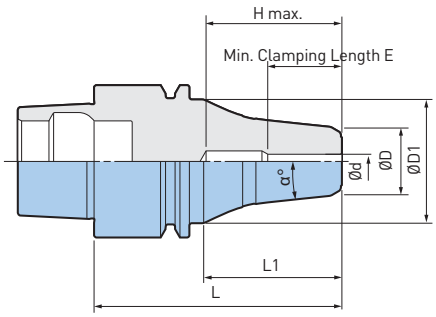


Fig. 1

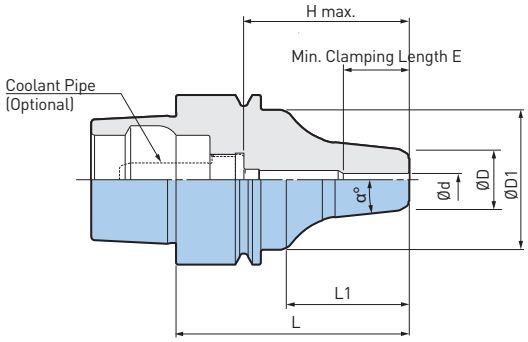


Fig. 2

Ø 3 - 6 mm

Model			Order No.	Fig.	Ød	ØD	ØD1	L	L1	E	α°	H max.	Max. min^{-1}	Weight (kg)
HSK-E25	-HDC3S	-40	**806.430**	1	3	14	20	40	27	16	6	22	60 000	0.09
	-HDC4S	-40	**806.431**		4							21		
	-HDC6S	-45	**806.734**		6	12	23	45	31		8	26		0.11
HSK-E32	-HDC3S	-52	**805.471**	1	3	14	26	52	29	16	6	28	45 000	0.19
	-HDC4S	-52	**805.472**		4					19				0.19
	-HDC6S	-57	**805.473**		6			57	34	25		33		0.20
HSK-E40	-HDC3S	-55	**805.474**	2	3	14	33	55	29	16	6	39	40 000	0.31
	-HDC4S	-55	**805.475**		4					19				0.31
	-HDC6S	-60	**805.476**		6			60	34	25		40		0.32

1. Center through coolant is not available for HSK-E25 and HSK-E32.
2. Adjusting screw can not be used.
3. Coolant pipe for HSK-E40 is to be ordered separately.

For Coolant Pipe ▶ 175
For Inner Bore Cleaner ▶ 286

Caution

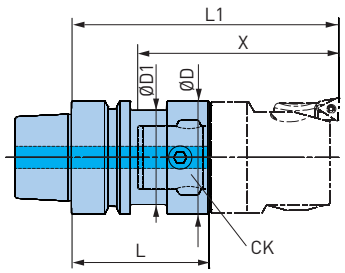
- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

CK Shanks with Center Through Hole

Symmetrical execution for high speed machine spindles

Coolant Through Hole





A.3

Model			Order No.	CK	ØD	ØD1	L	L1	X	Weight (Kg)
HSK-E25	-CKB1	-22	**328.249F ****	CKB1	19	19	22	55	40	0.05
	-CKB2	-30	**328.281F ***	CKB2	24	24 *	30	66	50	0.08
HSK-E32	-CKB1	-40	**328.257F**	CKB1	19	19	40	73	50	0.16
	-CKB2	-33	**328.280F**	CKB2	24	24	33	69	43	0.14
	-CKB3	-48	**328.151F**	CKB3	31	25.8	48	88	68	0.22
	-CKB4	-68	**328.218F**	CKB4	39	26	68	115	90	0.40
HSK-E40	-CKB1	-32	**324.111F**	CKB1	19	19	31.5	64	40	0.22
	-CKB2	-35	**324.121F**	CKB2	24	24	35	71	45	0.20
	-CKB3	-40	**324.131F**	CKB3	31	31	40	80	55	0.27
	-CKB4	-50	**324.141F**	CKB4	39	33	50	107	72	0.36
HSK-E50	-CKB3	-44	**324.231F**	CKB3	31	31	44	84	53	0.47
	-CKB4	-48	**324.241F**	CKB4	39	39	48	95	64	0.52
	-CKB5	-61	**324.251F**	CKB5	50	41	61	118	87	0.71

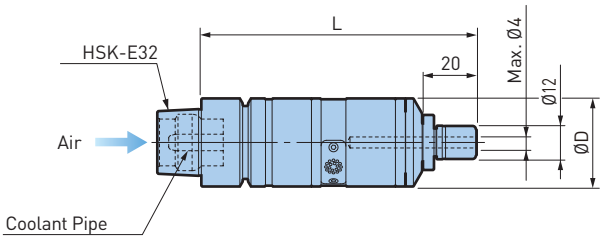
1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. * The dimension ØD1 does not correspond to the HSK standard.
3. ** Without thread for coolant tubes.
4. All shanks are precision balanced.
5. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

Air Turbine Spindle

Center Through Type





A.3

Ø 0.45 - 4.05 mm

Model	Order No.	Spindle Speed (min^{-1})	L	ØD	Nut Model	Weight (kg)
HSK-E32 -RBX12C-4S-100	**803.226**	100 000 - 120 000	100	32	MGN4S-HG	0.45

1. Nut, wrench (RBX12 : XW20), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

For Air Filter ▶ 162

Caution

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

Accessories for RBX

Accessories					
	Exclusive Nut 		MEGA Wrench 		Micro Collet  ▶ 247
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model
RBX12-4S	MGN4S-HG	**805.747**	MGR12	**969.450**	NBC4S-

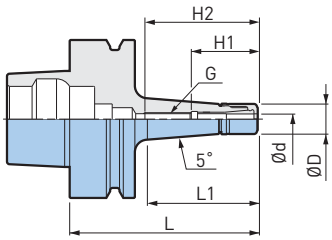
A.3

MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole





Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	Max. min^{-1}	Collet Model	Weight (kg)
HSK-F63 -MEGA6S - 75T	**803.589**	0.45 - 6.05	14	75	44	28.5	41	M7 P0.75	32 000	NBC6S-	0.7
-MEGA8S - 75T	**805.576**	2.95 - 8.05	18			31	58	M9 P0.75		NBC8S-	0.7

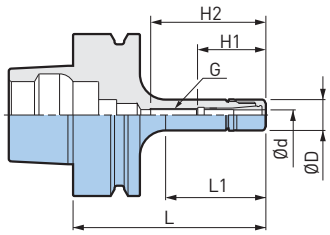
1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

MEGA Micro Chuck Type S

Coolant Through Hole





Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	Max. min^{-1}	Collet Model	Weight (kg)
HSK-F63 -MEGA6S - 90	**803.592**	0.45 - 6.05	14	90	61	28.5	49	M7 P0.75	27 000	NBC6S-	0.8
-105	**803.591**			105	76				25 000		0.8

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

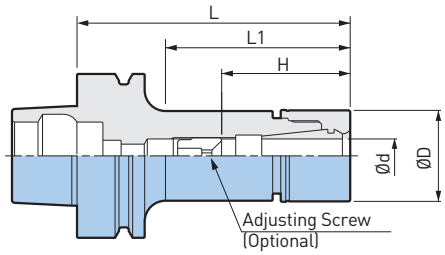
Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▶ 247	Micro Seal Nut  ▶ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole





Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Max. min^{-1}	Collet Model	Weight (kg)
HSK-F63 -MEGA6N - 90	**801.287**	0.25 - 6	20	90	53	23 - 43	30 000	NBC6-	0.8
-135	**801.677**			135	99		20 000		0.9
-MEGA8N - 90	**978.199**	0.5 - 8	25	90	54	26 - 45	30 000	NBC8-	0.9
-120	**804.962**			120	84		25 000		0.9
-MEGA10N - 90	**978.146**	1.5 - 10	30	90	54	38 - 48	30 000	NBC10-	0.9
-120	**978.152**			120	84		25 000		1.1
-MEGA13N - 75 *	**978.190**	2.5 - 13	35	75	43	47	30 000	NBC13-	0.9
- 90 *	**978.215**			90	56	61			1.0
-105	**801.283**			105	71	44 - 53	25 000		1.1
-MEGA16N - 75 *	**978.102**	2.5 - 16	42	75	43	48	30 000	NBC16-	1.0
- 90 *	**978.151**			90	58	61	25 000		1.2
-MEGA20N - 75 *	**978.047**	2.5 - 20	46	75	45	51	30 000	NBC20-	1.1
- 90 *	**978.147**			90	60	61	25 000		1.3
-105	**978.124**			105	75	51 - 58	20 000		1.4

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. Nut-less model available upon request.
5. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

Spare Parts			Accessories								
	MEGA Nut		MEGA Wrench		NBC Collet ▶ 250	MEGA Perfect Seal ▶ 260	Adjusting Screw				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4

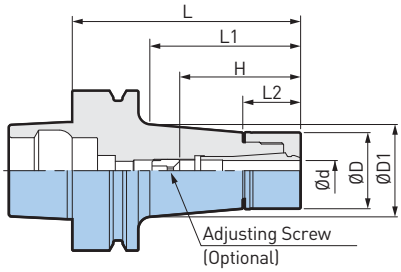
MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

Coolant Through Hole

A.3





Ø 3 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	L2	H	max. min^{-1}	Collet Model	Weight (kg)
HSK-F63 -MEGA6E - 65 *	**803.214**	3 - 6	25	28.5	65	34	21	39	30 000	MEC6-	0.8
-MEGA8E - 65 *	**803.218**	3 - 8	30	33			22.5	41		MEC8-	0.8
-MEGA10E -120	**803.213**	3 - 10	35	47	120	91	23	48 - 58	29 000	MEC10-	1.6
-MEGA13E -135	**803.216**	3 - 12	42	52	135	108	25	50 - 60	26 000	MEC13-	2.0

1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. Nut-less model available up on request.
5. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

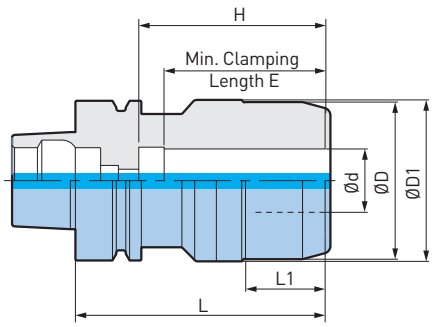
Spare Parts			Accessories								
	MEGA E Nut		MEGA Wrench		MEGA E Collet ▶ 264	MEGA E Perfect Seal ▶ 265	Adjusting Screw				
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6E	MEN6	**968.461**	MGR25	**969.456**	MEC6-	EPS6-	NBA6B	**961.527**	M7	12	2
MEGA8E	MEN8	**968.462**	MGR30	**969.458**	MEC8-	EPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10E	MEN10	**968.463**	MGR35	**969.460**	MEC10-	EPS10-	NBA10B	**961.572**	M11	16	3
MEGA13E	MEN13	**968.464**	MGR42	**969.462**	MEC13-	EPS13-	NBA13B	**961.598**	M14	20	4

MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.

Coolant Through Hole





Ø 3 - 32 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	E	Max. min^{-1}	Weight (kg)
HSK-F63 -MEGA16D - 80A	**803.092**	16	42	52.6	80	25	55	50	28 000	1.2
-MEGA20D - 90A	**803.093**	20	50	55	90	34	65	56		1.4
-MEGA25D -100A	**803.103**	25	62	62.7	100	39	75	57	25 000	1.8
-MEGA32D -105A	**803.082**	32	70	70.7	105	33.5	80	64	24 000	2.0

1. Wrench and coolant pipe are to be ordered separately.
2. "H" is the max. tool length that can be inserted.

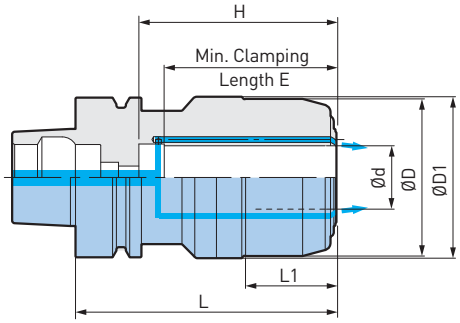
For Straight Collet ▶ 272
For Coolant Pipe ▶ 175

MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.

Coolant Through Hole







Ø 3 - 32 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	E	Max. min^{-1}	Weight (kg)
HSK-F63 -MEGA16DS - 80A	**803.095**	16	42	52.6	82	27	57	52	28 000	1.2
-MEGA20DS - 90A	**803.096**	20	50	55	92	36	67	58		1.4
-MEGA25DS -100A	**803.104**	25	62	62.7	102	41	77	59	25 000	1.8
-MEGA32DS -105A	**803.083**	32	70	70.7	107	35.5	82	66	24 000	2.0

1. Wrench and coolant pipe are to be ordered separately.
2. "H" is the max. tool length that can be inserted.

For Straight Collet ▶ 272
For Coolant Pipe ▶ 175

Accessories		
	MEGA Wrench 	
MEGA Double Power Chuck	**Model**	**Order No.**
HSK -F63 -MEGA16D/DS	MGR42L	**969.462L**
-MEGA20D/DS	MGR50L	**969.464L**
-MEGA25D/DS	MGR62L	**969.469L**
-MEGA32D/DS	MGR70L	**969.470L**

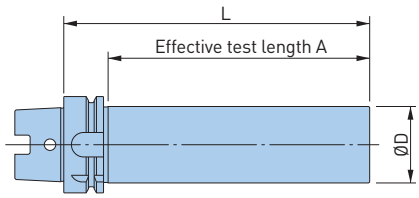
Dyna Test

Periodic inspection of machine tools to control production stability.



HSK-A Type

DIN 69893-1 & ISO 12164-1

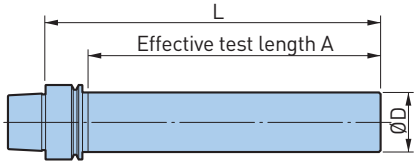


Model	Order No.	L	A	ØD	Weight (Kg)
HSK -A40-32 -L180SD	**801.169**	180	157	32	1.1
-A50-32 -L240SD	**978.198**	240	211		1.9
-A63-50 -L350SD	**978.222**	350	321	50	4.1
-A100-50 -L350SD	**801.073**	350	318		5.4

1. The drive key slots are symmetrical to allow the HSK form A dyna test bar to be indexed 180 degrees.

HSK-E Type

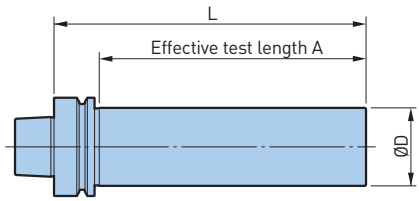
DIN 69893-5



Model	Order No.	L	A	ØD	Weight (Kg)
HSK -E25-20 -L175	**978.307**	175	163	20	0.45
-E32-20 -L180	**802.831**	180	158		0.5
-E40-32 -L180	**978.178**		157	32	1.1
-E50-32 -L240	**979.140**	240	211		1.6

HSK-F Type

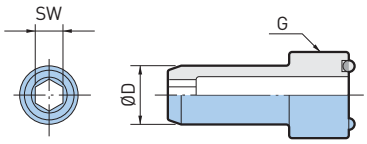
DIN V 69893-6



Model	Order No.	L	A	ØD	Weight (Kg)
HSK -F63-50 -L350	**802.832**	350	321	50	4.1

Coolant Pipes Form A/E

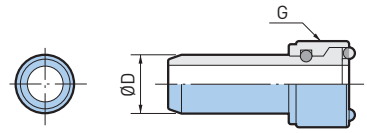
Integral type



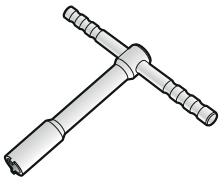
Model	Order No.	ØD	G	SW
HSK 25 -CP	978.921	5	M8 x P1	2.5
32 -CP	978.909	6	M10 x P1	3
40 -CP	978.913	8	M12 x P1	4
50 -CP	801.071	10	M16 x P1	5
63 -CP	969.475	12	M18 x P1	6
80 -CP	802.828	14	M20 x P1.5	8
100 -CP	802.351	16	M24 x P1.5	8
125 -CP	805.684	18	M30 x P1.5	10

A.3

1° swing type (DIN)

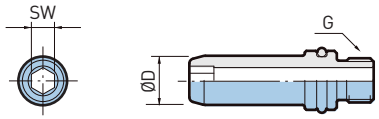


Model	Order No.	ØD	G
HSK 40 -CPM	978.907	8	M12 x P1
50 -CPM	801.690	10	M16 x P1
63 -CPM	978.910	12	M18 x P1
80 -CPM	802.827	14	M20 x P1.5
100 -CPM	802.314	16	M24 x P1.5



Clamping Wrench	Order No.
CPW-40	802.825
CPW-50	802.315
CPW-63	978.911
CPW-80	802.824
CPW-100	802.316

Coolant Pipe Form F



Model	Order No.	ØD	G	SW
HSK F63-CP	801.280	10	M9xP0.751	5

1. This model can be used for BIG KAISER Original Tool Holder only

Caution

For machines capable of supplying coolant through spindle, the coolant pipe should be fitted to all HSK holders to protect against accidental selection of coolant.

Tool Holders BIG CAPTO

MEGA Micro Chuck	178
MEGA New Baby Chuck	179 - 181
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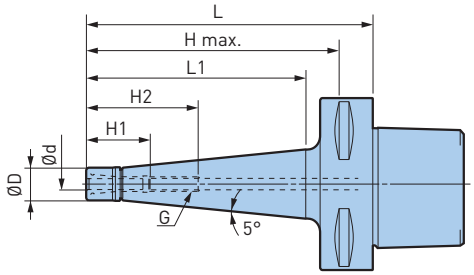
A.4

MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

Coolant Through Hole





A.4

Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	H max.	G	Collet Model	Weight (kg)
C4 -MEGA3S - 60T	**973.954**	0.45 - 3.25	10	60	35	22	38	54	M4 P0.7	NBC3S-	0.3
-MEGA6S - 60T	**973.955**	0.45 - 6.05	14			28	47	54	M7 P0.75	NBC6S-	0.3
- 90T	**805.194**			90	65		49	84			0.4
C5 -MEGA6S - 105T	**973.203**	0.45 - 6.05	14	105	79	28.5	49	98	M7 P0.75	NBC6S-	0.6
- 120T	**800.746**			120	94			113			0.6
C6 -MEGA3S - 120T	**973.204**	0.45 - 3.25	10	120	92	22.5	38.5	111	M4 P0.7	NBC3S-	1.3
-MEGA4S - 120T	**973.205**	0.45 - 4.05	12			26.5	47	111	M5 P0.8	NBC4S-	1.3
- 135T	**800.557**			135	107			126			1.4
-MEGA6S - 120T	**973.206**	0.45 - 6.05	14	120	92	28.5	49	111	M7 P0.75	NBC6S-	1.3
- 135T	**978.134**			135	107			126			1.4

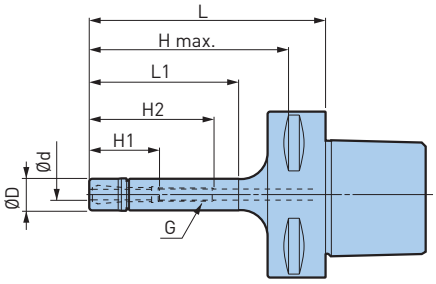
1. MEGA nut is included.

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

Coolant Through Hole





Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	H max.	G	Collet Model	Weight (kg)
C5 -MEGA4S - 75	**973.208**	0.45 - 4.05	12	75	50	26.5	47	68	M5 P0.8	NBC4S	0.4
-MEGA6S - 75	**973.209**	0.45 - 6.05	14			28.5	49		M7 P0.75	NBC6S	0.4
C6 -MEGA3S - 90	**973.210**	0.45 - 3.25	10	90	50	22.5	38	81	M4 P0.7	NBC3S	1.1
-MEGA4S - 90	**973.211**	0.45 - 4.05	12		58	26.5	47		M5 P0.8	NBC4S	1.2
-MEGA6S - 90	**973.212**	0.45 - 6.05	14			28.5	49		M7 P0.75	NBC6S	1.2

1. MEGA nut is included.

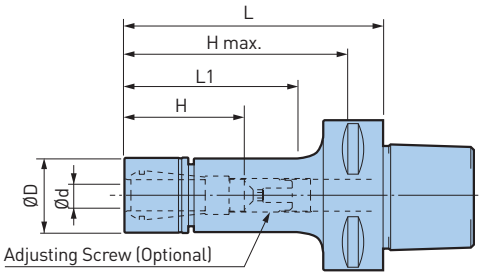
Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▸ 247	Micro Seal Nut  ▸ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole



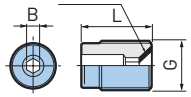


A.4

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	H max.	Collet Model	Weight (kg)
C4 -MEGA6N - 75	**978.196**	0.25 - 6	20	75	48	23 - 43	69	NBC6-	0.4
-MEGA8N - 75	**978.201**	0.5 - 8	25		49	26 - 45	69	NBC8-	0.5
-MEGA10N- 75	**978.202**	1.5 - 10	30		52	38 - 48	69	NBC10-	0.6
-MEGA13N- 75	**978.197**	2.5 - 13	35		54	64	64	NBC13-	0.7
-MEGA16N- 55 *	**978.203**	2.5 - 16	42	55	-	48	48	NBC16-	0.7
-MEGA20N- 60 *	**978.204**	2.5 - 20	46	60	-	53	53	NBC20-	0.8
C5 -MEGA6N - 60	**973.213**	0.25 - 6	20	60	34	23 - 36	53	NBC6-	0.5
- 75	**973.214**			75	49	23 - 43	68		0.5
- 90	**973.215**			90	62		83		0.5
-MEGA8N - 60	**973.218**	0.50 - 8	25	60	33	26 - 36	53	NBC8-	0.5
- 75	**973.219**			75	49	26 - 45	68		0.6
- 90	**973.220**			90	64		83		0.6
-MEGA10N- 55 *	**973.223**	1.50 - 10	30	55	31	48	48	NBC10-	0.5
- 75	**973.224**			75	49	38 - 48	68		0.6
- 90	**973.225**			90	64		83		0.7
-MEGA13N- 55 *	**973.229**	2.50 - 13	35	55	31	48	48	NBC13-	0.6
- 75	**973.230**			75	49	44 - 48	68		0.7
- 90	**973.231**			90	64	44 - 63	83		0.8
-MEGA16N- 60 *	**973.235**	2.50 - 16	42	60	38	53	53	NBC16-	0.7
- 75	**973.236**			75	53	68	68		0.9
- 90	**973.237**			90	69	48 - 63	83		1.0
-MEGA20N- 60 *	**973.241**	2.50 - 20	46	60	39	51	51	NBC20-	0.8
- 75 *	**973.242**			75	54	66	66		1.0
- 90	**973.243**			90	69	51 - 60	83		1.1

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used.
4. Nut-less model available up on request.

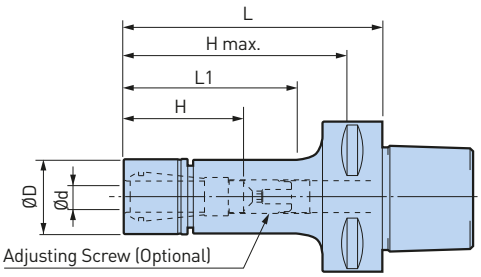
Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 	Rubber 			
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

Coolant Through Hole





A.4

Ø 0.25 - 20 mm

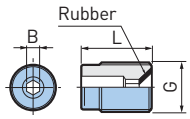
Model	Order No.	Ød	ØD	L	L1	H	H max.	Collet Model	Weight (kg)
C6 -MEGA6N - 60	973.247	0.25 - 6	20	60	30	23 - 33	51	NBC6-	1.2
- 75	973.248			75	43	23 - 43	66		1.2
- 90	973.249			90	58		81		1.2
-105	973.250			105	73		96		1.3
-120	973.251			120	88		111		1.3
-135	973.252			135	103		126		1.3
-165	973.253			165	128		156		1.4
-MEGA8N - 60	973.254	0.5 - 8	25	60	29	26 - 31	51	NBC8-	1.3
- 75	973.255			75	43	26 - 45	66		1.3
- 90	973.256			90	58		81		1.3
-105	973.257			105	73		96		1.4
-120	973.258			120	88		111		1.4
-135	973.259			135	103		126		1.5
-165	973.260			165	133		156		1.6
-MEGA10N- 60 *	973.261	1.5 - 10	30	60	32	51	51	NBC10-	1.3
- 75	973.262			75	43	38 - 45	66		1.4
- 90	973.263			90	58	38 - 48	81		1.4
-105	973.264			105	73		96		1.5
-120	973.265			120	88		111		1.6
-135	973.266			135	103		126		1.6
-165	973.267			165	133		156		1.8
-MEGA13N- 60 *	973.269	2.5 - 13	35	60	32	51	51	NBC13-	1.3
- 75 *	973.270			75	45	66	66		1.4
- 90	973.271			90	60	44 - 55	81		1.5
-105	973.272			105	73	44 - 63	96		1.6
-120	973.273			120	90		111		1.7
-135	973.274			135	103		126		1.8
-165	973.275			165	133		156		2.0
-MEGA16N- 65 *	973.277	2.5 - 16	42	65	37	56	56	NBC16-	1.5
- 75 *	973.278			75	47	66	66		1.6
- 90	973.279			90	60	48 - 57	81		1.7
-105	973.280			105	75	48 - 68	96		1.8
-120	973.281			120	90		111		2.0
-135	973.282			135	105		126		2.1
-165	973.283			165	135		156		2.4
-MEGA20N- 65 *	973.285	2.5 - 20	46	65	37	51	51	NBC20-	1.5
- 75 *	973.286			75	47	65	65		1.6
- 90	973.287			90	62	51 - 56	76		1.8
-105	973.288			105	77	51 - 68	91		2.0
-120	973.289			120	92		104		2.1
-135	973.290			135	107		111		2.3
-165	973.291			165	137				2.6
-200	973.292			200	172				2.9

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used.
4. Nut-less model available upon request.

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	H max.	Collet Model	Weight (kg)
C8 -MEGA6N - 90	**973.293**	0.25 - 6	20	90	45	23 - 43	90	NBC6-	2.4
-120	**973.295**			120	75		120		2.6
-165	**973.297**			165	120		165		2.7
-MEGA8N - 90	**973.298**	0.5 - 8	25	90	46	26 - 45	90	NBC8-	2.6
-120	**973.300**			120	75		120		2.7
-165	**973.302**			165	120		165		2.8
-MEGA10N- 90	**973.304**	1.5 - 10	30	90	45	38 - 48	90	NBC10-	2.7
-120	**973.306**			120	75		120		2.8
-165	**973.308**			165	120		165		3.0
-MEGA13N- 90	**973.311**	2.5 - 13	35	90	50	44 - 63	90	NBC13-	2.8
-120	**973.313**			120	80		120		2.9
-165	**973.315**			165	120		165		3.2
-200	**973.316**			200	155		200		3.5
-MEGA16N- 90	**973.318**	2.5 - 16	42	90	50	48 - 66	90	NBC16-	2.9
-120	**973.320**			120	80	48 - 68	120		3.2
-165	**973.322**			165	125		165		3.6
-MEGA20N- 90	**973.325**	2.5 - 20	46	90	50	51 - 68	83	NBC20-	3.0
-120	**973.327**			120	80		113		3.3
-165	**973.329**			165	125				3.8
-200	**973.330**			200	160				4.1

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used.
4. Nut-less model available upon request.

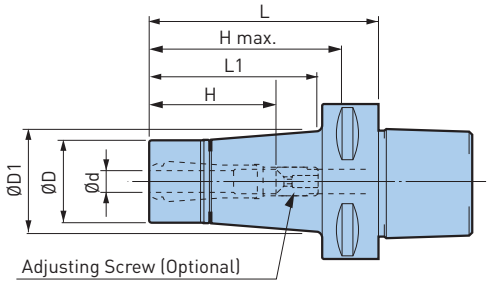
Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet  ▶ 250	MEGA Perfect Seal  ▶ 260	Adjusting Screw 				
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	**969.483**	MGR20	**969.454**	NBC6-	MPS6-	NBA6B	**961.527**	M7	12	2
MEGA8N	MGN8	**969.484**	MGR25	**969.456**	NBC8-	MPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10N	MGN10	**969.485**	MGR30	**969.458**	NBC10-	MPS10-	NBA10B	**961.572**	M11	16	3
MEGA13N	MGN13	**969.486**	MGR35	**969.460**	NBC13-	MPS13-	NBA13B	**961.598**	M14	20	4
MEGA16N	MGN16	**969.487**	MGR42	**969.462**	NBC16-	MPS16-	NBA16B	**961.632**	M18	20	4
MEGA20N	MGN20	**969.488**	MGR46	**969.465**	NBC20-	MPS20-	NBA20B	**961.680**	M21	20	4

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

Coolant Through Hole



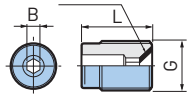


A.4

Ø 3 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	H max.	Collet Model	Weight (kg)
C4 -MEGA13E- 60*	**800.678**	3 - 12	42	-	60	-	50	50	MEC13-	0.6
C5 -MEGA13E- 60 *	**973.347**	3 - 12	42	44.4	60	39	50	50	MEC13-	0.8
- 75 *	**973.348**			44.8	75	54	68	68		0.9
- 90 *	**973.349**				90	69	50 - 60	83		1.1
C6 -MEGA6E - 75 *	**973.354**	3 - 6	25	29.5	75	48	37 - 45	66	MEC6-	1.3
- 90	**973.355**			32.1	90	63		81		1.4
-105	**973.356**			34.7	105	78		96		1.5
-120	**973.357**			37.3	120	93		111		1.6
-MEGA8E - 75	**973.361**	3 - 8	30	34.2	75	48	42 - 46	66	MEC8-	1.4
- 90	**973.362**			36.7	90	63	42 - 51	81		1.5
-105	**973.363**			39.5	105	78		96		1.7
-120	**973.364**			42.1	120	93		111		1.8
-MEGA10E- 75 *	**973.368**	3 - 10	35	39.1	75	48	66	66	MEC10-	1.5
- 90	**973.369**			41.6	90	63	48 - 58	81		1.6
-105	**973.370**			44.4	105	78		96		1.8
-120	**973.371**			47.0	120	93		111		2.0
-MEGA13E- 65 *	**973.374**	3 - 12	42	45.1	65	39	56	56	MEC13-	1.5
- 90	**973.376**			49.0	90	66	50 - 55	81		1.8
-105	**973.377**			51.4	105	80		96		2.1
-120	**973.378**			54.2	120	96	50 - 60	111		2.3
-135	**973.379**			56.8	135	112		126		2.6
-165	**973.380**			62.3	165	141		156		3.2
C8 -MEGA6E - 90	**973.382**	3 - 6	25	30.7	90	55	37 - 45	90	MEC6-	2.6
-135	**973.385**			38.5	135	100		135		3.0
-MEGA8E - 90	**973.388**	3 - 8	30	35.4	90	55	42 - 51	90	MEC8-	2.7
-120	**973.391**			43.3	135	100		135		3.2
-MEGA10E- 90	**973.394**	3 - 10	35	40.3	90	55	48 - 58	90	MEC10-	2.8
-120	**973.396**			45.6	120	85		120		3.2
-135	**973.397**			48.2	135	100		135		3.4
-MEGA13E- 90	**973.400**	3 - 12	42	47.0	90	55	50 - 60	90	MEC13-	3.0
-120	**973.402**			52.3	120	85		120		3.4
-135	**973.403**			54.9	135	100		135		3.7
-165	**973.404**			60.1	165	130		165		4.3

1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used.
4. Nut-less model available upon request.

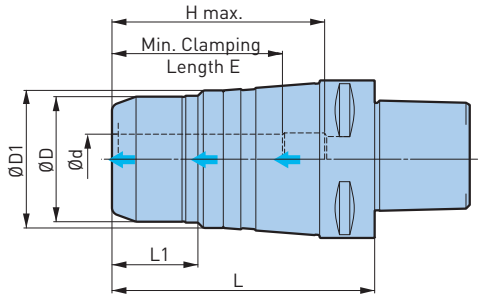
Spare Parts			Accessories								
	MEGA E Nut 		MEGA Wrench 		MEGA E Collet  ▶264	MEGA E Perfect Seal  ▶265	Adjusting Screw  				
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6E	MEN6	**968.461**	MGR25	**969.456**	MEC6-	EPS6-	NBA6B	**961.527**	M7	12	2
MEGA8E	MEN8	**968.462**	MGR30	**969.458**	MEC8-	EPS8-	NBA8B	**961.550**	M9	13	2.5
MEGA10E	MEN10	**968.463**	MGR35	**969.460**	MEC10-	EPS10-	NBA10B	**961.572**	M11	16	3
MEGA13E	MEN13	**968.464**	MGR42	**969.462**	MEC13-	EPS13-	NBA13B	**961.598**	M14	20	4

MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.

Coolant Through Hole





A.4

Ø 3 - 32 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H max.	E	Weight (kg)
C4 -MEGA16D - 70	**800.679**	16	46	46.7	70	-	64	50	0.8
-MEGA20D - 65 *	**800.681**	20	50	50.7	65	-	59	51	0.8
C6 -MEGA20D - 75A	**803.182**	20	50	55	75	34	66	56	2.0
- 90A	**803.123**				90		81		2.2
-105A	**803.110**				105		85		2.5
-135A	**803.164**				135				3.1
-MEGA25D - 75A *	**804.904**	25	62	62.7	75	39	66	57	2.1
-105A	**803.126**				105		85		2.8
-135A	**803.194**				135				3.3
-MEGA32D - 90A	**803.127**	32	70	70.7	90	33	81	64	2.5
-135A	**803.120**				135		90		3.4
C8 -MEGA16D - 70	**973.427**	16	46	55	70	23.5	71	50	2.8
-105	**973.428**				105				3.5
-MEGA20D - 75	**973.431**	20	60	69	75	25.5	75	56	3.3
-105	**973.432**				105		85		4.2
-135	**973.433**				135				5.0
-MEGA25D - 75	**973.435**	25	70	77	75	32	75	65	3.4
-105	**801.666**				105		90		4.5
-165	**973.438**				165				6.4
-MEGA32D - 90	**973.436**	32	80	86	90	39.5	90	71	4.3
-105	**973.440**				105		100		4.8
-135	**973.441**				135		105		6.0

1. * Only the straight collet (C20, 25-, OCA20-) can be used.
2. Wrench is to be ordered separately.
3. "H" is max. tool shank length that can be inserted into the holder.

For Straight Collet ▶ 272

MEGA Wrench



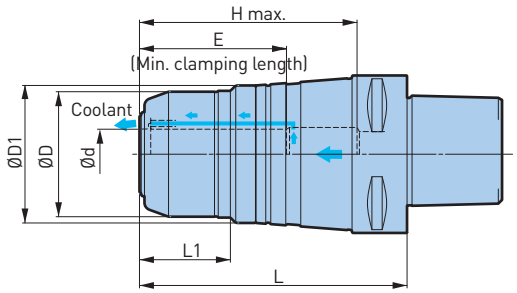
MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
C4 -MEGA16D	MGR46L	**969.465L**	C6 -MEGA16DS	MGR42L	**969.462L**	C8 -MEGA16D/DS	MGR46L	**969.465L**
-MEGA20D	MGR50L	**969.464L**	-MEGA20D/DS	MGR50L	**969.464L**	-MEGA20D/DS	MGR60L	**969.468L**
C5 -MEGA16DS	MGR42L	**969.462L**	-MEGA25D/DS	MGR62L	**969.469L**	-MEGA25D/DS	MGR70L	**969.470L**
-MEGA20DS	MGR50L	**969.464L**	-MEGA32D/DS	MGR70L	**969.470L**	-MEGA32D/DS	MGR80L	**969.471L**
-MEGA25DS	MGR62L	**969.469L**						

MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.

Coolant Through Hole







A.4

Ø 3 - 32 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	E	Weight (kg)
C5 -MEGA16DS - 65A	803.141	16	42	52.6	67	27	60	57	0.8
- 90A	803.144				92		73		1.3
-MEGA20DS - 75A	803.108	20	50	55	77	36	70	58	1.1
- 90A	803.183				92		85		1.4
-MEGA25DS - 75A	803.147	25	62	62.7	77	41	70	59	1.4
- 90A	803.179				92		85		1.7
C6 -MEGA16DS - 70A	803.145	16	42	52.6	72	27	63	57	1.6
- 90A	803.206				92		83		2.0
- 105A ***	803.184				107		73		2.3
- 135A ***	803.112				137				2.9
-MEGA20DS - 75A	803.185	20	50	55	77	36	68	58	1.9
- 90A	803.125				92		83		2.1
- 105A	803.113				107		87		2.4
- 135A *	803.166				137				3.0
-MEGA25DS - 75A **	803.114	25	62	62.7	77	41	68	59	2.1
- 90A	803.177				92		83		2.4
- 105A	803.128				107		87		2.8
- 135A *	803.195				137				3.3
-MEGA32DS - 90A	803.129	32	70	70.7	92	35	83	66	2.5
- 105A	803.167				107		92		2.9
- 135A *	803.121				137				3.4
C8 -MEGA16DS - 70	973.465	16	46	55	72.5	26	73	52	2.8
- 105 ***	973.466				107.5				3.5
-MEGA20DS - 75	973.469	20	60	69	77.5	28	73	58	3.3
- 135 *	973.471				137.5		87		5.0
-MEGA25DS - 75	973.473	25	70	77	77.5	34	77	67	3.4
- 135 *	973.475				137.5		92		5.4
- 165 *	973.476				167.5				6.4
-MEGA32DS - 90	973.477	32	80	86	92.5	42	92	73	4.3
- 105	973.478				107.5		102		4.8
- 165 *	973.480				167.5		107		7.3

1. ** Only the straight collet (C25-) can be used.
2. Wrench is to be ordered separately.
3. "H" is max. tool shank length that can be inserted into the holder.
4. * Axial length adjusting screw can be used.
5. *** Commercially available hex socket head screws (M8) can be used as a back stop.

For Straight Collet ▶ 272

MEGA Wrench



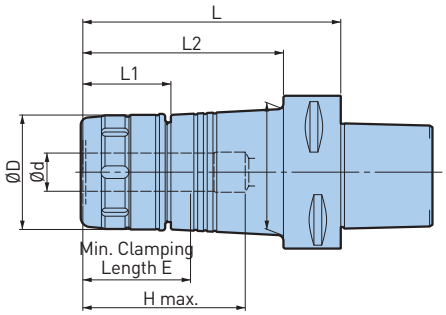
MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
C4 -MEGA16D	MGR46L	969.465L	C6 -MEGA16DS	MGR42L	969.462L	C8 -MEGA16D/DS	MGR46L	969.465L
-MEGA20D	MGR50L	969.464L	-MEGA20D/DS	MGR50L	969.464L	-MEGA20D/DS	MGR60L	969.468L
C5 -MEGA16DS	MGR42L	969.462L	-MEGA25D/DS	MGR62L	969.469L	-MEGA25D/DS	MGR70L	969.470L
-MEGA20DS	MGR50L	969.464L	-MEGA32D/DS	MGR70L	969.470L	-MEGA32D/DS	MGR80L	969.471L
-MEGA25DS	MGR62L	969.469L						

New Hi-Power Milling Chuck

The original design of slit structure assures heavy and finish end milling with high power and precision.

Coolant Through Hole





A.4

Ø 3 - 32 mm

Model	Order No.	Ød	ØD	L	L1	L2	H max.	E	Weight (kg)
C5 -HMC16S - 65	**800.734**	16	43	65	44	45	58	55	0.8
-HMC20S - 105	**800.735**	20	50	105		-	85	56	1.4
-HMC25S - 105	**803.041**	25	55		47	-	87	57	1.7
-HMC32S - 85	**803.043**	32	62	85	56	-	78	58	1.6
C6 -HMC16S - 70	**800.842**	16	43	70	44	48	61	55	1.5
-HMC20S - 75	**800.845**	20	50	75	44	53	66	56	1.7
- 105	**800.843**			105		83	85		2.3
- 120 *	**800.844**			120		98			2.5
-HMC25S - 75 **	**800.848**	25	59	75	45	53	66	57	2.0
- 105	**800.846**			105		81	87		2.5
- 135 *	**800.847**			135		133			3.1
-HMC32S - 90	**800.851**	32	68	90	54	-	81	64	2.4
- 105	**800.849**			105		-	90		2.7
- 135 *	**800.850**			135		-			3.3
C8 -HMC20 - 80	**973.680**	20	60	80	46	50	80	56	3.3
- 135 *	**973.682**			135		105	85		4.7
-HMC25 - 85	**973.684**	25	62	85	55	-		65	3.5
- 135 *	**973.686**			135		105	90		4.7
-HMC32 - 95	**973.688**	32	80	95	63	-	95	71	4.5
- 135	**973.690**			135		-	105		5.8

1. Wrench is to be ordered separatly.
2. * Axial length adjusting screw can be used.
3. ** Only the straight collet (C25-)can be used.

For Straight Collet ▶ 272

Wrench



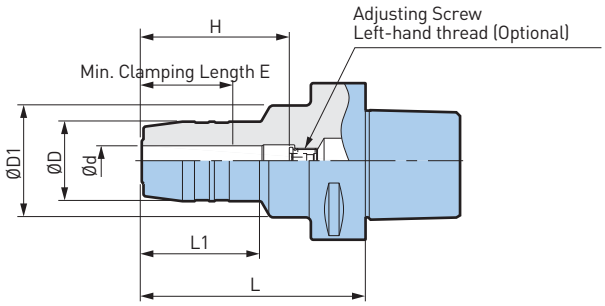
New Hi-Power Milling Chuck	Model	Order No.	New Hi-Power Milling Chuck	Model	Order No.	New Hi-Power Milling Chuck	Model	Order No.
C5 -HMC16S	FK45-50L	**801.037**	C6 -HMC16S	FK45-50L	**801.037**	C8 -HMC20	FK58-62	**962.291**
-HMC20S			-HMC20S			-HMC25		
-HMC25S	FK52-55	**962.294**	-HMC25S	FK58-62L	**801.038**	-HMC32	FK80-90	**962.292**
-HMC32S	FK58-62L	**801.038**	-HMC32S	FK68-75L	**801.039**			

Hydraulic Chuck

For high precision machining in Automotive, Aerospace, Medical and Die & Mold.

Coolant Through Hole





A.4

Ø 3- 32 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	E	H	Adjusting Screw	Weight (kg)
C5 -HDC6 - 90	**800.726**	6	26	45	90	45	28	33 - 50	HDA 6-05020	1.0
-HDC8 - 90	**800.731**	8	28						HDA 8-06020	1.1
-HDC10 - 90	**800.703**	10	30				33	43 - 55	HDA10-08015	1.1
-HDC12 - 90	**800.708**	12	32			48	38	53 - 60	HDA12-10010	1.1
-HDC14 - 90	**800.712**	14	34							1.1
-HDC16 - 90 *	**800.717**	16	38	48			43	83	-	1.2
-HDC20 - 90 *	**800.722**	20	42	50				83	-	1.2
-HDC25 - 90 *	**800.723**	25	55	63			52		-	1.7
C6 -HDC6 - 90	**800.831**	6	26	45	90	48	28	33 - 50	HDA 6-05020	1.5
-HDC8 - 90	**800.838**	8	28						HDA 8-06020	1.6
-HDC10 - 90	**800.795**	10	30				33	43 - 55	HDA10-08015	1.6
-HDC12 - 90	**800.802**	12	32				38	48 - 60		1.6
- 120	**800.799**				120			38 - 60	HDA10-08032	1.8
-HDC14 - 120	**800.806**	14	34		120					1.9
-HDC16 - 90 *	**800.815**	16	38	47	90		43	81	-	1.7
- 120	**800.812**			48	120			43 - 70	HDA16-12037	2.0
-HDC18 - 120	**800.816**	18	40	49	120					2.0
-HDC20 - 90 *	**800.822**	20	42	50	90			72	-	1.8
- 120	**800.819**				120			43 - 70	HDA16-12037	2.1
-HDC25 - 90 *	**800.825**	25	55	63	90	46	52	80	-	2.2
- 120	**800.823**				120	51		67 - 79	HDA20-16015	2.8
-HDC32 - 120	**800.826**	32	63	-	120	-	56	66 - 78		3.0

1. "H" indicates the adjustment length with an adjusting screw.
2. * Adjusting screw cannot be used.

For Straight Collet ▶ 272
For Inner Bore Cleaner ▶ 286
For Adjusting Screw ▶ 282

Caution

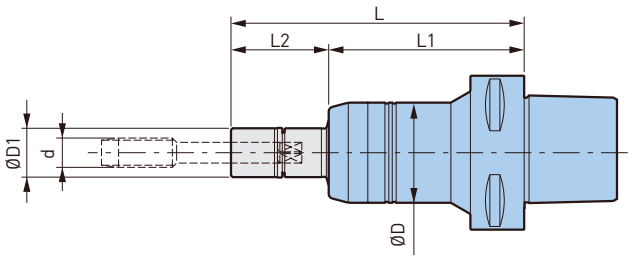
- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

Coolant Through Hole





M3 - M20

A.4

Model	Order No.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
C5 -MGT6 - 75	800.767	MGT6 -d - 30	M3 - M8	36	16	105	75	30	0.8
		- 70				145		70	
		-100				175		100	
-MGT12 - 75	800.765	MGT12 -d - 30	M5 - M12 P1/8	41	20	105		30	0.9
		- 70				145		70	
		-100				175		100	
-MGT20 - 100	800.766	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	135	100	35	1.4
		- 85				185		85	
		-115				215		115	
C6 -MGT6 - 80	973.754	MGT6 -d - 30	M3 - M8	36	16	110	80	30	1.1
		- 70				150		70	
		-100				180		100	
-MGT12 - 80	973.755	MGT12 -d - 30	M5 - M12 P1/8	41	20	110		30	1.2
		- 70				150		70	
		-100				180		100	
-MGT20 - 100	973.756	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	135	100	35	1.8
		- 85				185		85	
		-115				215		115	
C8 -MGT6 - 80	800.935	MGT6 -d - 30	M3 - M8	36	16	110	80	30	2.1
		- 70				150		70	
		-100				180		100	
-MGT12 - 80	800.933	MGT12 -d - 30	M5 - M12 P1/8	41	20	110		30	2.2
		- 70				150		70	
		-100				180		100	
-MGT20 - 95	800.934	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	130	95	35	2.6
		- 85				180		85	
		-115				210		115	

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.



For Tap Holder ▶ 276
For MEGA Wrench ▶ 281
For Accessories ▶ 280

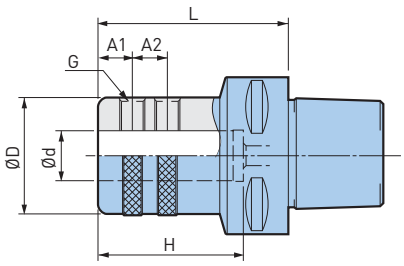
Tapping range for DIN & ISO standard

MGT Size	DIN Standard			ISO Standard	
	DIN371	DIN376	DIN353	ISO529	ISO2284
MGT6	M3 - M6	M5 - M8	-	M3 - M5	-
MGT12	M5 - M8	M8 - M12	1/8	M6, M8, M12	1/8
MGT20	M10	M12 - M20	1/4 - 1/2	M10 - M20	1/4 - 3/8

Side Lock Holders for Drills

Coolant Through Hole





A.4

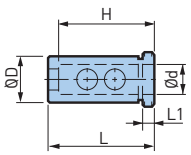
Ø 16 - 40 mm

Model	Order No.	Ød	ØD	L	A1	A2	H	G	Weight (kg)
C4 -TSL16 -56	**800.687**	16	48	56	14	14	48	M10 P1.25	0.8
-TSL20 -60	**800.688**	20		60			50		0.7
-TSL25 -77	**800.689**	25		77	15	20	56	M16 P1.5	0.8
C5 -TSL16 -60	**973.115**	16	48	60	14	14	48	M10 P1.25	0.8
-TSL20 -60	**973.116**	20					50		0.9
-TSL25 -75	**973.117**	25		75	15	20	56	M16 P1.5	0.9
-TSL32 -85	**800.775**	32	63	85			60		1.6
C6 -TSL16 -70	**973.119**	16	48	70	14	14	48	M10 P1.25	1.7
-TSL20 -70	**973.120**	20					50		1.7
-TSL25 -70	**973.121**	25			15	20	56	M16 P1.5	1.6
-TSL32 -75	**973.122**	32	63	75			60		2.0
-TSL40 -85	**973.123**	40	68	85		25	70		2.2
C8 -TSL16 -80	**973.124**	16	48	80	14	14	48	M10 P1.25	3.1
-TSL20 -80	**973.125**	20					50		3.1
-TSL25 -85	**973.126**	25		85	15	20	56	M16 P1.5	3.0
-TSL32 -90	**973.127**	32	63	90			60		3.5
-TSL40 -95	**973.128**	40	68	95		25	70		3.5

1. "H" is the max. tool shank length that can be inserted into the holder.
2. Not compatible with Weldon DIN 1835B.

SL Sleeve for TSL Side Lock Holder





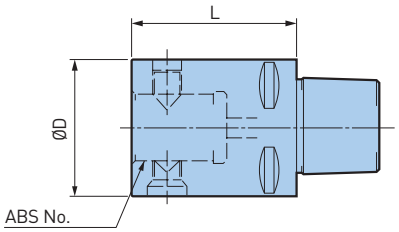
Model	Order No.	Ød	ØD	L	L1	H
OSL25 -16	**962.596**	16	25	62	5.5	48
-20	**962.597**	20				50
OSL32 -16	**962.586**	16	32	66	5.5	48
-20	**962.598**	20				50
-25	**962.599**	25				56
OSL40 -16	**804.678**	16	40	76	5.5	48
-20	**804.679**	20				50
-25	**962.581**	25				56
-32	**962.582**	32				60

ABS Shanks

KOMET®

Coolant Through Hole



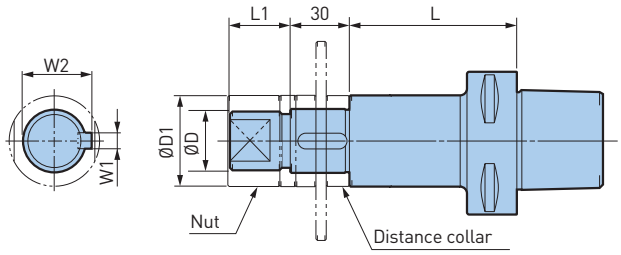


Model	Order No.	ABS No.	ØD	L	Weight (kg)
C5 -ABS50 -50	**978.140**	50	50	50	0.7
C6 -ABS50 -50	**978.032**	50	50	50	1.4
-ABS63 -60	**978.042**	63	63	60	1.8
C8 -ABS50 -50	**978.054**	50	50	50	2.6
-ABS63 -60	**978.103**	63	63	60	2.9
-ABS80 -80	**978.033**	80	80	80	3.7

A.4

Side Cutter Arbors



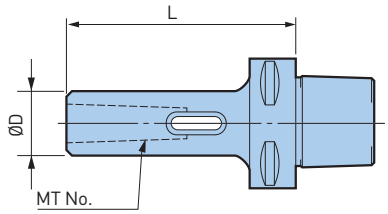


Model	Order No.	ØD	ØD1	L	L1	W1	W2	Weight (kg)
C6 -SCA25.4 -75	**800.887**	25.4	40	75	25	6.35	27.78	2.0
-SCA31.75 -75	**800.888**	31.75	46		30	7.92	34.92	2.4
C8 -SCA25.4 -90	**800.940**	25.4	40	90	25	6.35	27.78	3.3
-SCA31.75 -90	**800.942**	31.75	46		30	7.92	34.92	3.7

1. Nut is included.
2. Distance collars of 5 mm, 8 mm, 10 mm and 12 mm are included.

Morse Taper Holders





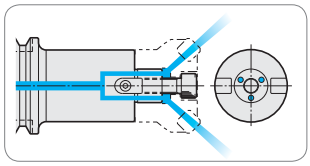
Model	Order No.	MT No.	ØD	L	Weight (kg)
C5 -MTA1 - 95	**973.572**	1	25	95	0.6
-MTA2 -110	**973.573**	2	32	110	0.8
-MTA3 -130	**973.574**	3	40	130	1.2
C6 -MTA1 - 95	**973.575**	1	25	95	1.3
-MTA2 -110	**973.576**	2	32	110	1.5
-MTA3 -130	**973.577**	3	40	130	1.9
C8 -MTA1 -105	**973.578**	1	25	105	2.6
-MTA2 -120	**973.579**	2	32	120	2.8
-MTA3 -140	**973.580**	3	40	140	3.2

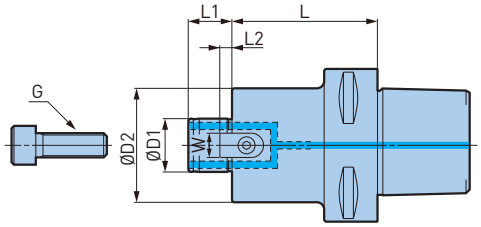
Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.

Coolant Through Hole







A.4

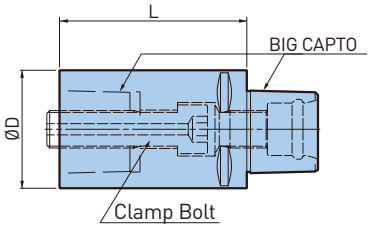
Model	Order No.	ØD1	ØD2	L	L1	L2	W	G	Weight (kg)
C5 - FMH22 - 47 - 60	973.718	22	47	60	18	5	10	M10	1.2
- 90	800.695			90					1.6
-FMH22 - 60 - 60	973.720		60	60					1.4
-FMH27 - 60 - 60	800.698	27			20	6	12	M12	1.5
C6 -FMH22 - 47 - 45	973.721	22	47	45	18	5	10	M10	1.5
- 60	973.722			60					1.8
- 90	973.723			90					2.2
-150	800.783			150					3.0
-FMH22 - 60 - 45	973.724		60	45					1.8
- 60	973.725			60					2.1
- 90	973.726			90					2.8
-FMH27 - 60 - 45	800.788	27	60	45	20	6	12	M12	1.9
- 60	800.789			60					2.2
- 90	800.790			90					2.8
-150	800.787			150					4.2
C8 -FMH22 - 47 - 60	973.727	22	47	60	18	5	10	M10	2.9
-105	973.728			105					3.5
-150	973.729			150					4.1
-FMH22 - 60 - 60	973.730		60	60					3.2
-105	973.731			105					4.2
-150	973.732			150					5.2
-FMH27 - 60 -105	800.903	27	60	105	20	6	12	M12	4.3
-150	800.904			150					5.3
-FMH32 - 96 -105	800.910	32	96	105	22	7	14	M16	6.1
-150	800.911			150					7.8

1. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
2. Hexagon socket head cap screw is included.

For Clamp Bolt ▶ 282

Extensions



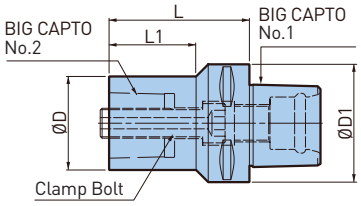


Model	Order No.	BIG CAPTO	ØD	L	Clamp Bolt			Weight (kg)
					Thread Size	Hex.	Tightening Torque	
C6-C6-100	803.738	C6	63	100	M20xP2	14 mm	170N·m	1.2
C8-C8-100	803.740	C8	80					1.7

1. Clamp bolt is included.

Reductions



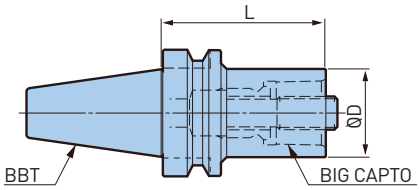


Model	Order No.	BIG CAPTO No. 1	BIG CAPTO No. 2	ØD	ØD1	L	L1	Clamp Bolt			Weight (kg)
								Thread Size	Hex.	Tightening Torque	
C6-C5-75	803.737	C6	C5	50	63	75	46	M16xP1.5	10 mm	95N·m	0.5
C8-C6-85	803.739	C8	C6	63	80	85	50	M20xP2	14 mm	170N·m	0.8

1. Clamp bolt is included.

BIG CAPTO Basic Holders





Model	Order No.	BIG CAPTO	ØD	L	Weight (kg)
BBT40 -C3-30	973.598	C3	32	30	1.0
-C4-40	802.350	C4	40	40	1.1
-C5-50	973.600	C5	50	50	1.2
-C6-75	973.601	C6	63	75	1.7
BBT50 -C3-40	973.602	C3	32	40	3.6
-C4-40	973.603	C4	40		3.6
-C5-40	973.604	C5	50		3.5
-C6-50	973.605	C6	63	50	3.5
-C8-70	803.736	C8	80	70	4.0

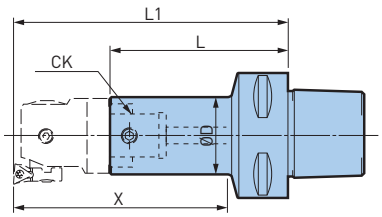
1. Clamp bolt is included.

CKB/CKN Shanks with Center Through Coolant

Basic Holder for rough and finish boring heads of the proven BIG KAISER Boring System.

Coolant Through Hole





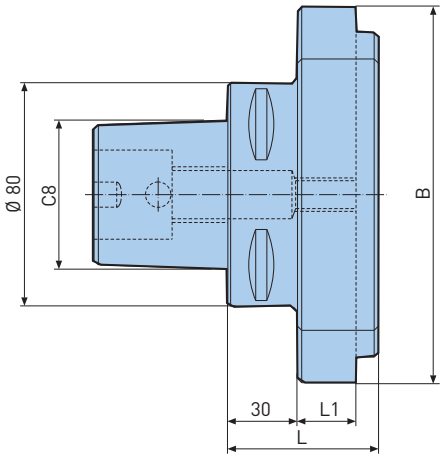
A.4

Taper Size	Order No.	CK	ØD	L	L1	X	Weight (Kg)
C4 -CKB1 - 48	**806.698**	CKB1	19	48	80	55	0.4
-CKB2 - 45	**806.699**	CKB2	24	45			0.4
-CKB3 - 40	**806.700**	CKB3	31	40		57	0.5
-CKB4 - 33	**806.701**	CKB4	39	33		62	0.5
C5 -CKB1 - 73	**806.702**	CKB1	19	72.5	105	80	0.5
-CKB2 - 85	**328.273**	CKB2	24	84.5	120	96	0.6
-CKB3 - 55	**328.223**	CKB3	31	55	95	70	0.6
-CKB4 - 48	**328.224**	CKB4	39	48	95		0.6
-CKB5 - 50	**328.226**	CKB5	50	50	107	-	0.6
-CKN6 - 50	**328.037N**	CKN6	63.5	50	121	-	1.0
C6 -CKB1 - 78	**328.321**	CKB1	19	77.5	110	83	1.2
-CKB2 - 90	**328.322**	CKB2	24	89.5	125	98	1.3
-CKB3 - 65	**328.036**	CKB3	31	65	105	78	1.3
-CKB4 - 58	**328.035**	CKB4	39	58			1.3
-CKB5 - 48	**328.034**	CKB5	50	48		79	1.3
-CKN6 - 59	**328.033N**	CKN6	63.5	59	130	-	1.6
C8 -CKB4 - 118	**806.703**	CKB4	39	118	165	130	2.4
- 178	**806.704**			178	225	190	3.0
-CKB5 - 108	**806.705**	CKB5	50	108	165	130	2.7
- 183	**806.706**			183	240	205	3.8
-CKN6 - 74	**328.053N**	CKN6	63.5	74	145	110	2.5
-CKB6 - 169	**806.707**	CKB6		169	240	206	4.8
-CKN7 - 73	**328.032N**	CKN7	90	73	190 (160)	-	3.1
-CKB7 - 123	**806.708**	CKB7		123	240 (210)	-	5.6

1. L1 and X dimensions in the table are the reference values when EWN/EWE head is attached.

For Boring Heads ▶ Chapter B

Flange for Large Diameter Boring: Ø 200 - 620 mm



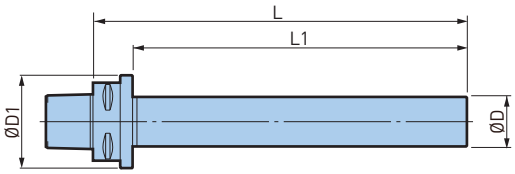
Model	Order No.	Boring Tool Series	B	L	L1	Weight (Kg)
C8-FL135-318	**328.210**	318	Ø135	55	55	3.7
C8-FL135-318-90	**328.211**					
C8-FL135-317	**328.086**	317	Ø135	55	22	3.8
C8-FL135-317-90	**328.162**					

For Large Boring Tools ▶ 366

Dyna Test

Periodic inspection of machine tools to control production stability.





Model	Order No.	ØD	ØD1	L	L1	Weight (kg)
C5 -40 -L250	**800.045**	40	63	280	250	2.8
C6 -40 -L200	**973.737**		75	232	200	2.8
-L320	**973.738**			352	320	3.8
C8 -40 -L320	**973.740**		85	360	320	4.9

Tool Holders and Components CK

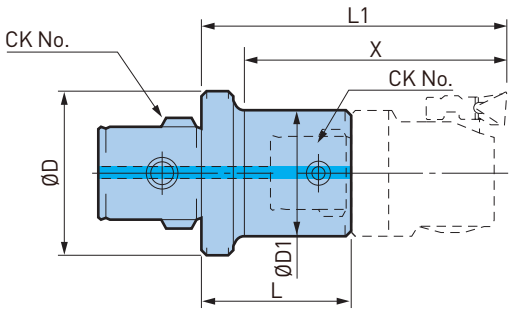
CKB/CKN Reductions Steel	196
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Tool Holders	200 - 201
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DIN 2080 / Morse Taper Shanks	204
WTO Quickflex Adapters	205

A.5

CKB/CKN Reductions Steel

Coolant Through Hole





A.5

Model	Order No.	CK	ØD	CK	ØD1	L	L1	X	Weight (kg)
CKB2 -CKB1 - 36	332.210	CKB1	24	CKB1	19	36	68.5	55	0.09
CKB3 -CKB1 - 41	332.310	CKB3	31	CKB1	19	40.5	73	60	0.15
-CKB2 - 35	332.320			CKB2	24	34.5	70	60	0.16
CK4 -CKB1 - 58	332.410	CK4	39	CKB1	19	57.5	90	75	0.23
CKB4 -CKB2 - 52	332.420	CKB4	39	CKB2	24	51.5	87	75	0.25
-CKB3 - 47	332.430			CKB3	31	47	87	75	0.30
CK5 -CKB1 - 58	332.511	CK5	50	CKB1	19	57.5	90	70	0.44
- 88	332.510					87.5	120	100	0.44
-CKB2 - 52	332.521			CKB2	24	51.5	87	70	0.42
- 82	332.520					81.5	117	100	0.55
CKB5 -CKB3 - 47	332.531	CKB5	50	CKB3	31	47	87	70	0.44
- 77	332.530					77	117	100	0.67
-CKB4 - 40	332.541			CKB4	39	40	87	70	0.54
- 70	332.545					70	117	100	0.70
CK6 -CKB1 - 67	332.611	CK6	63.5	CKB1	19	66.5	99	65	0.79
- 102	332.610					101.5	134	100	0.91
-CKB2 - 61	332.621			CKB2	24	60.5	96	80	0.70
- 96	332.620					95.5	131	115	0.80
-CKB3 - 56	332.631			CKB3	31	56	96	80	0.75
- 91	332.630					91	131	115	0.96
- 136	332.632					136	176	160	1.2
CKB6 -CKB4 - 49	332.641	CKB6	63.5	CKB4	39	49	96	80	0.8
- 84	332.645					84	131	115	1.1
- 129	332.642					129	176	160	1.5
-CKB5 - 39	332.651			CKB5	50	39	96	80	0.8
- 74	332.655					74	131	115	1.2
- 119	332.652					119	176	160	2.0
CKB7 -CKB4 - 70	332.741	CKB7	90	CKB4	39	70	117	100	1.5
- 100	332.745					100	147	130	1.7
-CKB5 - 60	332.751			CKB5	50	60	117	100	1.7
- 90	332.755					90	147	130	2.0
- 120	332.750					120	177	160	2.5
-CKB6 - 76	332.765			CKB6	63.5	76	147	130	2.3
- 106	332.766					106	177	160	2.9
CKN7 -CKN6 - 76	332.765N [1]	CKN7	90	CKN6	63.5	76	147	160	2.3

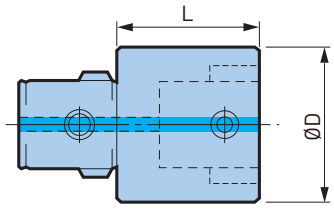
1. L1 and X dimensions in the table are the reference values when EWN/EWE head is attached.

For Boring Heads ▶ Chapter B
For Spare Parts ▶ 418

X = Boring depth, including length of corresponding boring head.

CKB/CKN Extensions Steel





Model	Order No.	CK	ØD	L	Weight (kg)
CKB1 -CKB1 - 20	331.110	CKB1	19	20	0.05
- 30	331.111			30	0.07
CKB2 -CKB2 - 30	331.220	CKB2	24	30	0.10
- 45	331.221			45	0.15
CKB3 -CKB3 - 30	331.330	CKB3	31	30	0.16
- 45	331.331			45	0.25
CKB4 -CKB4 - 40	331.440	CKB4	39	40	0.35
- 60	331.445			60	0.47
CKB5 -CKB5 - 60	331.550	CKB5	50	60	0.85
- 90	331.555			90	1.2
CKB6 -CKB6 - 60	331.660	CKB6	63.5	60	1.4
- 100	331.665			100	2.2
CKB7 -CKB7 - 100	331.775	CKB7	90	100	4.4
- 160	331.776			160	7.3
CKN6 -CKN6 - 60	331.660N *	CKN6	63.5	60	1.4
- 100	331.665N *			100	2.2
CKN7 -CKN7 - 100	331.775N *	CKN7	90	100	4.4
- 160	331.776N *			160	7.3

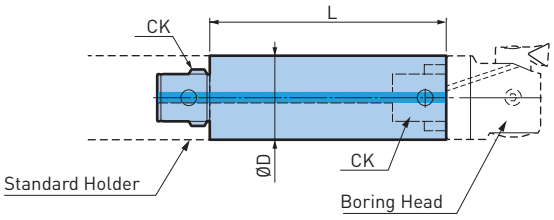
1. * Two pieces of CK-screws are included.

For Boring Heads ▶ Chapter B
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Smart Damper Extensions

Extension with integrated damping system for highly efficient deep hole finish boring.



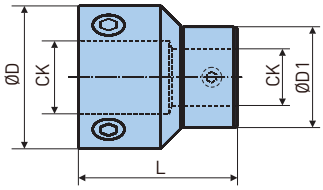


Model	Order No.	CK	ØD	L	Weight (kg)
CKB44DP - 120	389.365	CKB4	39	120	1.3
CKB55DP - 150	389.366	CKB5	50	150	2.6
CKB66DP - 180	389.367	CKB6	64	180	5.3

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CKN Reductions and Extensions System



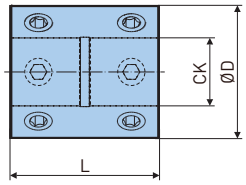


Model	Order No.	CK	CK	ØD	ØD1	L	Weight (kg)
CKN7-CKB6-100	**332.870N**	CKN7	CKB6	90	63.5	100	1.1

CKN Extensions Aluminium

A.5

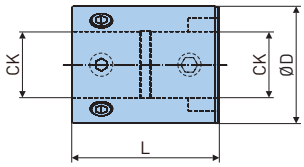




Model	Order No.	CK	ØD	L	Weight (kg)
T-CKN6-CKN6- 80	**331.867N**	CKN6	63.5	80	0.52
-120	**331.868N**			120	0.82
T-CKN7-CKN7-100	**331.877N**	CKN7	90	100	1.5
-150	**331.879N**			150	2.3
-200	**331.878N**			200	3.0

CKN - CKB Extensions Aluminium





Model	Order No.	CK	CK	ØD	L	Weight (kg)
T-CKN6-CKB6- 80	**331.860N**	CKN6	CKB6	63.5	80	0.55
-120	**331.861N**				120	0.80
T-CKN7-CKB7-100	**331.870N**	CKN7	CKB7	90	100	1.4
-150	**331.871N**				150	2.2

CKN Double Connetor Couplings



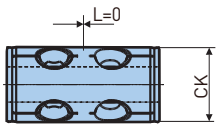


Fig. 1



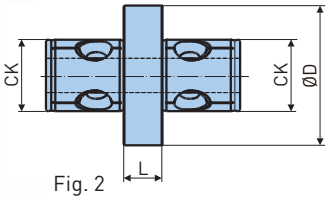
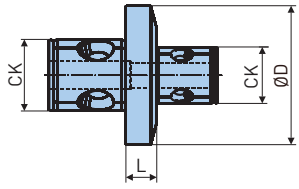


Fig. 2

Model	Order No.	Fig.	CK	ØD	L	Weight (kg)
DC-CKN6-CKN6- 0	**331.864N**	1	CKN6	63.5	0	0.45
-20	**331.865N**	2			20	0.95
DC-CKN7-CKN7- 0	**331.874N**	1	CKN7	90	0	0.95
-25	**331.875N**	2			25	1.5
-50	**331.876N**				50	2.7

CKN7 - CKN6 Double Connector Reductions



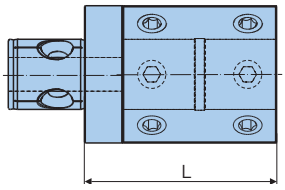


Model	Order No.	CK	CK	ØD	L	Weight (kg)
DC-CKN7-CKN6-20	**332.875N**	CKN7	CKN6	90	20	1.7

For Boring Heads ▶ Chapter B
For Spare Parts ▶ 419

Combination Example of Extensions and Reduction

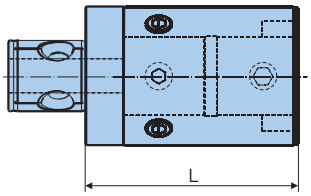
CKN-CKN Extensions



CK	CK	L	Double Connector	Extension	Weight (Kg)
CKN6	CKN6	80	331.864N	331.867N	0.97
		100	331.865N		1.5
		120	331.864N	331.868N	1.3
		140	331.865N		1.8
CKN7	CKN7	100	331.874N	331.877N	2.5
		125	331.875N		3.1
		150	331.874N	331.879N	3.2
		150	331.876N	331.877N	4.2
		175	331.875N	331.879N	3.8
		200	331.874N	331.878N	4.0
		200	331.876N	331.879N	5.0
		225	331.875N	331.878N	4.5
		250	331.876N		5.7

1. L and weight shown are as a combination of the double connector and extension.

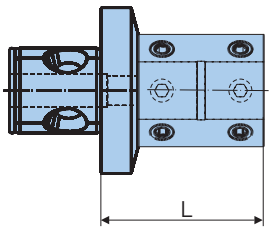
CKN-CKB Extensions



CK	CK	L	Double Connector	Extension	Weight (Kg)
CKN6	CKB6	80	331.864N	331.860N	1.0
		100	331.865N		1.5
		120	331.864N	331.861N	1.3
		140	331.865N		1.8
CKN7	CKB7	100	331.874N	331.870N	2.4
		125	331.875N		4.0
		150	331.874N	331.871N	3.2
		150	331.876N	331.870N	4.1
		175	331.875N	331.871N	3.7
		200	331.876N		4.9

1. L and weight shown are as a combination of the double connector and extension.

CKN-CKN Reductions



CK	CK	L	Double Connector	Extension	Weight (Kg)
CKN7	CKN6	100	332.875N	331.867N	2.2
		140		331.868N	2.5

1. L and weight shown are as a combination of the double connector and extension.

CKN-CKB Reductions

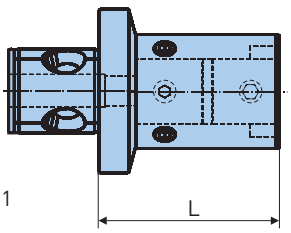


Fig. 1

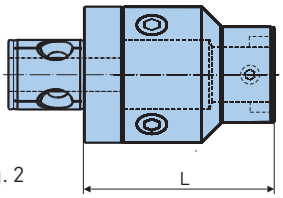


Fig. 2

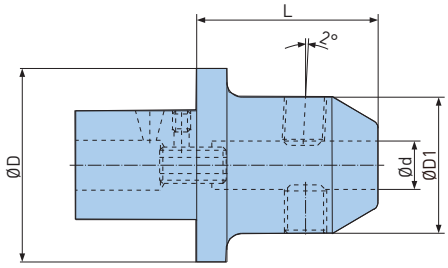
CK	CK	Fig.	L	Double Connector	Extension/Reduction	Weight (Kg)
CKN7	CKN6	1	100	332.875N	331.860N	2.1
			140	332.875N	331.861N	2.2
		2	100	331.874N	332.870N	3.3
			125	331.875N	332.870N	2.5
			150	331.875N	332.870N	3.8

1. L and weight shown are as a combination of the double connector and extension.

End Mill Holders

For end mills with cylindrical shank and clamping surface according to DIN 1835B (Weldon system) and to DIN 1835E (Whistle notch system).





Model	Order No.	CK	Ød	ØD	ØD1	L	Weight (kg)
CKB4-MC6	**335.230**	CKB4	6	39	24	50	0.23
-MC8	**335.231**		8		26	50	0.30
-MC10	**335.232**		10		32	55	0.39
-MC12	**335.233**		12		39	60	0.55
CKB5-MC6	**335.234**	CKB5	6	50	24	50	0.41
-MC8	**335.235**		8		26	50	0.43
-MC10	**335.236**		10		32	55	0.54
-MC12	**335.237**		12		38	60	0.67
-MC14	**335.238**		14		40	60	0.69
-MC16	**335.239**		16		45	62	0.79
-MC20	**335.249**		20		48	60	0.80
CKB6-MC6	**335.240**	CKB6	6	63.5	24	45	0.61
-MC8	**335.241**		8		26	45	0.63
-MC10	**335.242**		10		32	45	0.69
-MC12	**335.243**		12		38	50	0.82
-MC14	**335.244**		14		40	50	0.84
-MC16	**335.245**		16		45	50	0.90
-MC18	**335.246**		18		47	50	0.92
-MC20	**335.247**		20		48	55	1.1
-MC25	**335.248**		25		63.5	65	1.7
-MC32	**335.250 ***	CKB7	32	90	72	78	2.9
-MC40	**335.251 ***		40		80	90	3.4

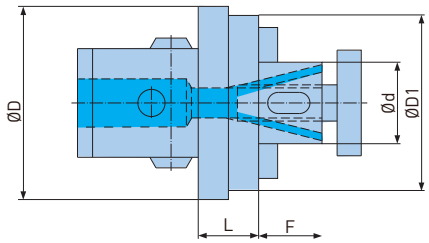
1. * Only DIN 1835B (Weldon system).

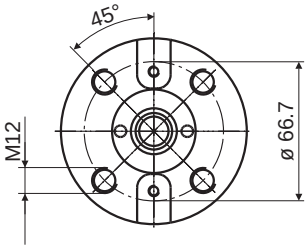
For Spare Parts ▸ 440

Milling Cutter Arbors

For milling cutters with longitudinal or transverse key ways according to DIN 841, 842, 1880 and cutter heads according to DIN 1830.







Face mill arbor 335.438N with hole circle (pitch circle)

Model	Order No.	CK	Ød	ØD	ØD1	L	F	Weight (kg)
CKB4-CMA16	**335.420**	CKB4	16	39	37	18	17	0.27
-CMA22	**335.421**		22		42		19	0.35
CKB5-CMA16	**335.423**	CKB5	16	50	40	20	17	0.42
-CMA22	**335.424**		22		47		19	0.51
-CMA27	**335.425**		27		53		21	0.64
CKB6-CMA16	**335.430**	CKB6	16	63.5	40	20	17	0.70
-CMA22	**335.431**		22		50		19	0.77
-CMA27	**335.432**		27		58		21	0.93
-CMA32	**335.433**		32		70	28	24	1.3
-CMA40	**335.434**		40		80		27	1.8
CKN6-CMA16	**335.430N ***	CKN6	16	63.5	40	20	17	0.70
-CMA22	**335.431N ***		22		50		19	0.77
-CMA32	**335.433N ***		32		70	28	24	1.3
-CMA40	**335.434N ***		40		80		27	1.8
CKB7-CMA32	**335.435**	CKB7	32	90	83	28	24	2.1
-CMA40	**335.436**		40		93		27	2.5
CKN7-CMA32	**335.437N *** [1]	CKN7	32	90	83	28	24	1.9
-CMA40	**335.438N ***		40		93		27	2.4

1. [1] Face mill arbor without longitudinal key way.
2. * As long as stock lasts.

For Spare Parts ▸ 440

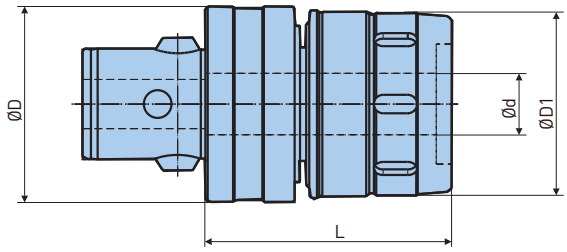
Milling Chucks

With needle-bearing chucking nut for maximum clamping force and high concentricity.



Model	Order No.	CK	Ød	ØD	ØD1	L	Wrench		Weight (kg)
							Model	Order No.	
CKB6-HMC20	**335.066**	CKB6	20	63.5	60	80	FK58-62	**962.291**	2.0
CKB7-HMC32	**335.077**	CKB7	32	90	80	112	FK80-90	**962.292**	4.8

For Straight Collet ▶ 272



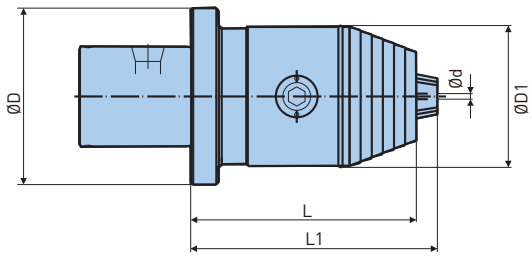
Universal Drill Chucks

With strong clamping force and high runout accuracy. Quick and simple clamping over a bevel gear.



Model	Order No.	CK	Ød	ØD	ØD1	L	L1	Wrench Order No.	Weight (kg)
CK6-DC13	**335.042**	CK6	1 -13	63.5	50	81	90	**690.817**	1.4
-DC16	**335.044**		3 -16		57	86	92		1.5

For Spare Parts ▶ 440



ER Collet Chucks

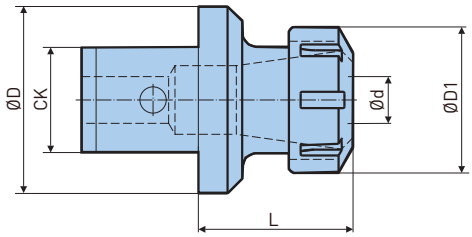
For double-taper collets slitted on both sides with extraction groove.



Model	Order No.	CK	Ød	Collet	ØD	ØD1	L	Nut Order No.	Wrench Order No.	Weight (kg)
CKB4-ER25	**335.140**	CK4	1 - 16	ER25	39	42	47	**951.076**	**951.077**	0.59
CKB5-ER25	**335.142**	CK5	2 - 20	ER25	50	42	47	**951.076**	**951.077**	0.74
CKB6-ER32	**335.164**	CK6	2 - 25	ER32	64	50	53	**951.065**	**951.009**	1.2
-ER40	**335.165**			ER40		63	65	**951.060**	**951.061**	1.7

1. Nut is included.
2. ER collets are to be ordered separately.

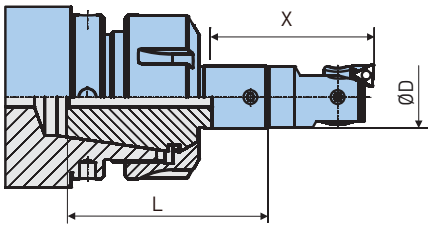
For ER Collets ▶ 266
For ER Nut ▶ 268



ER Collet Adapters

Enable the use of all BIG KAISER fine and rough boring heads of corresponding sizes on ER collet chucks.







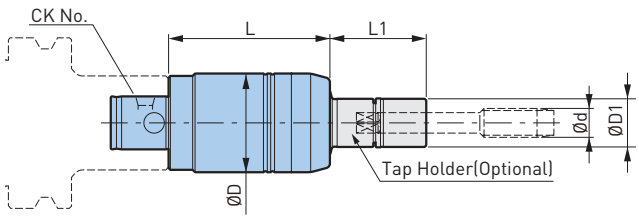
Model	Order No.	CK	ØD	L	X
ER25 -CKB1 -50	**335.130**	CKB1	19	55	50
ER32 -CKB1 -50	**335.131**	CKB1	19	61	50
-CKB2 -50	**335.132**	CKB2	24	58	50

For ER Nut ▶ 268
For Boring Head ▶ Chapter B

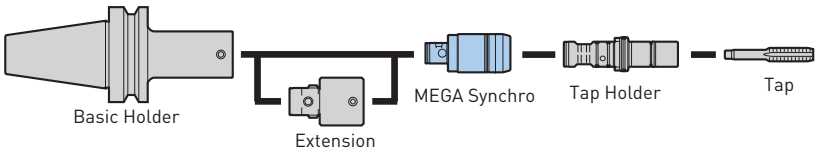
MEGA Synchro Tapping Holders

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.





Model	Order No.	CK	Ød	ØD	ØD1	L	L1	Tap Holder	Weight (kg)
CKB4-MGT6 - 62	335.764	CKB4	M2 - M6	36	16	62	30-200	MGT 6	0.5
-MGT12 - 67	335.768		M6 - M12	41	20	67	30-200	MGT12	0.6
CKB5-MGT20- 87	335.769	CKB5	M12 - M20	54	30	87	35-150	MGT20	1.2
CKB7-MGT36-137	800.949	CKB7	M20 - M36	94	32-52	137	65	MGT36	6.8



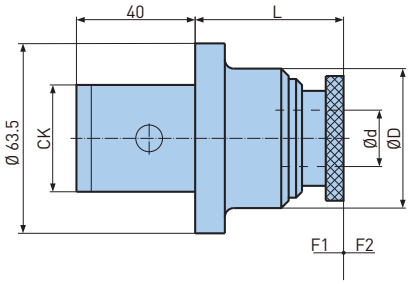


For Tap Holder ▶ 276
For Accessories ▶ 280
For MEGA Wrench ▶ 281

A.5

Tapping Holders



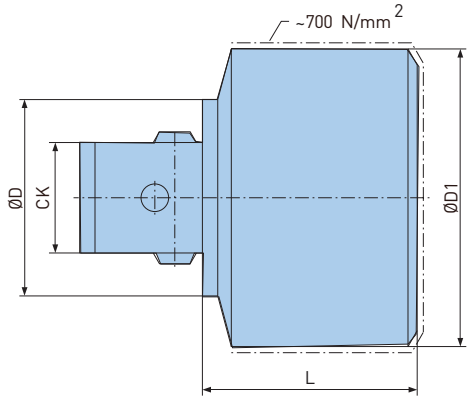


Model	Order No.	CK	Range	ØD	Ød	L	F1	F2	Weight (kg)
CK6-ATE12E	335.762	CK6	M4 - M12	47	19	50	5	10	0.87
-ATE24E	335.763		M10 - M24	64	31	80	7	14	1.6

1. F1 = length compensation compression.
2. F2 = length compensation extension.
3. Please contact BIG KAISER agent for tap collet.

Blanks

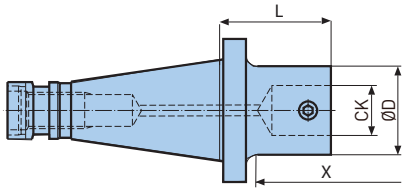
The CK connector is hardened and ground. In the marked areas (–·–·–) the blanks are unhardened and unground.



Model	Order No.	CK	ØD	ØD1	L
CKB3 -31 - 65	335.531	CKB3	31	31	65
-42 - 50	335.532			42	50
CKB4 -39 - 80	335.541	CKB4	39	39	80
-54 - 50	335.542			54	50
CKB5 -50 -100	335.551	CKB5	50	50	100
-70 - 60	335.552			70	60
CKB6 -64 -120	335.561	CKB6	64	64	120
-64 -220	335.563			64	220
-97 - 70	335.562			97	70
CKB7 -90 -180	335.571	CKB7	90	90	180

DIN 2080 Tool Holders

For manual tool change.



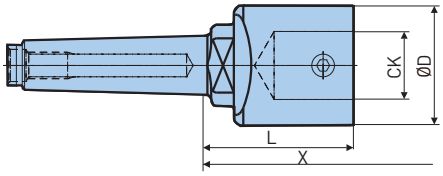
Model	Order No.	CK	ØD	L	X	Weight (kg)
DV40-DIN2080 -CKB5-39	**321.451**	CKB5	50	39	80	2.2
-CKB6-45	**321.462**	CKB6	63.5	45	100	2.4
DV50-DIN2080 -CKB6-49	**323.780 ***	CKB6	63.5	49	100	5.1
-CKB7-63	**323.781 ***	CKB7	90	63	160 (130) [1]	7.2

1. * Shanks DV50 without OTT ring groove.

A.5

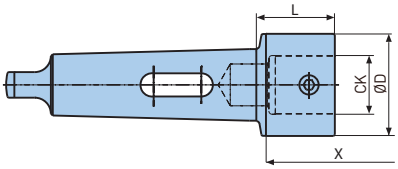
Morse Taper Shanks

With thread (SIP / Hauser)

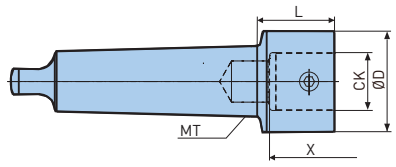


Model	Order No.	CK	ØD	L	X	Weight (kg)
MK4-CKB6-81	**322.563**	CKB6	63.5	81	130	1.6

With tang



Model	Order No.	CK	ØD	L	X	Weight (kg)
MK5-CKB6-55	**323.563**	CKB6	63.5	55	115	2.5



Model	Order No.	CK	ØD	L	X	Weight (kg)
MT3 -CKB1 -47	**806.671**	CKB1	19	47	80	0.34
-CKB2 -68	**806.712**	CKB2	24	67.5	103	0.46
-CKB3 -64	**806.713**	CKB3	31	64	104	0.56
-CKB5 -48	**806.714**	CKB5	50	48	105	0.74
MT4 -CKB1 -52	**806.715**	CKB1	19	51.5	84	0.65
-CKB2 -74	**806.716**	CKB2	24	74	110	0.78
-CKB3 -66	**806.717**	CKB3	31	65.5	106	0.86
-CKB4 -60	**806.718**	CKB4	39	59.5	107	0.97
-CKB5 -50	**806.719**	CKB5	50	49.5		1.1
-CKB6 -61	**806.720**	CKB6	64	60.5	132	1.6
MT5 -CKB4 -86	**806.721**	CKB4	39	85.5	133	2.2
-CKB5 -75	**806.722**	CKB5	50	74.5	132	2.4
-CKB6 -61	**806.723**	CKB6	64	60.5		2.5
MT6 -CKB6 -61	**806.724**	CKB6	64	60.5	132	5.1

1. In case the cutter slot is necessary, machine specifications need to be informed.

WTO QuickFlex® Adapter with CK Connection

For the WTO quick change tooling system QuickFlex®, there are adapters for BIG KAISER rough- and fine boring heads available. This offers the possibility for precise and fast machining of cross holes in the diameter range from 0.4 – 74 mm on turning machines.

QuickFlex® Adapter							Spare Parts	
Model	Order No.	CK	F1	F2	L1	L2	Screw	Wrench
ER25QF-CKB1	**470.721**	CKB1	49	19	15.5	8.5	**690.431**	**690.801**
-CKB3	**470.723**	CKB3	49	31	19.5	12.5	**690.433**	**690.803**
ER32QF-CKB1	**470.731**	CKB1	58	19	15.5	8.5	**690.431**	**690.801**
-CKB3	**470.733**	CKB3	58	31	19.5	12.5	**690.433**	**690.803**
ER40QF-CKB2	**470.742**	CKB2	71	24	18	10	**690.432**	**690.802**
-CKB4	**470.744**	CKB4	71	39	23	15	**690.434**	**690.804**
ER50QF-CKB2	**470.752**	CKB2	82	24	19	10	**690.432**	**690.802**
-CKB4	**470.754**	CKB4	82	39	24	15	**690.434**	**690.804**









Tool Holders Cylindrical Shank

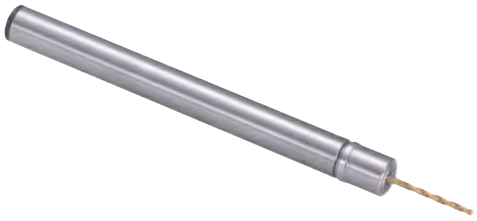
MEGA Micro Chuck	208
New Baby Chuck	209
Hydraulic Chucks	210
New Hi-Power Milling Chuck	211
Shrink Chucks	212 - 213
CK Shanks	214
MEGA Synchro Tapping Holder	215
Other Products	216

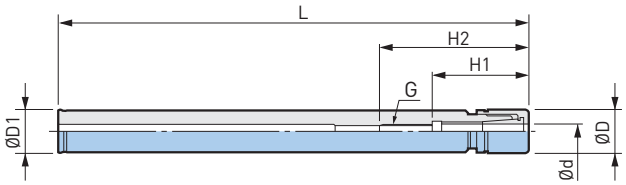
A.6

MEGA Micro Chuck

Ultra small diameter (Ø 10 - Ø 18) to avoid interference. High precision is maintained by combination with MEGA New Baby Chuck.

Coolant Through Hole





Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	ØD1	L	H1	H2	G	Collet Model	Nut Model	Weight (kg)
ST10 -MEGA3S -120	**961.777**	0.45 - 3.25	10	10	120	22	38	M4 P0.7	NBC3S-	MGN3S	0.06
ST12 -MEGA4S -130	**961.773**	0.45 - 4.05	12	12	130	26.5	47	M5 P0.8	NBC4S-	MGN4S	0.11
-160	**961.778**				160						0.13
ST14 -MEGA6S -160	**961.774**	0.45 - 6.05	14	14	160	28.5	49	M7 P0.75	NBC6S-	MGN6S	0.18
-200	**961.779**				200						0.21
ST16 -MEGA8S -160	**803.596**	2.95 - 8.05	18	16	160	31	50.5	M9 P0.75	NBC8S-	MGN8S	0.23
-200	**805.575**				200						0.25

1. MEGA nut is included.

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet  ▸ 247	Micro Seal Nut  ▸ 249	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	**969.480**	MGR10	**969.449**	NBC3S-	-	NBB3S	**968.330**	SC-NBC3S	**961.278**
MEGA4S	MGN4S	**969.481**	MGR12	**969.450**	NBC4S-	-	NBB4S	**968.364**	SC-NBC4S	**961.279**
MEGA6S	MGN6S	**969.482**	MGR14	**969.452**	NBC6S-	MGN6S-PS	NBB6S	**961.498**	SC-NBC6S	**961.280**
MEGA8S	MGN8S	**804.108**	MGR18	**801.705**	NBC8S-	MGN8S-PS	NBB8S	**805.802**	SC-NBC8S	**805.827**

MEGA Micro Chuck Set

Including convenient storage case.



Set Model	Order No.
SST12-MEGA4S-130	**961.775**

Contents

- Body / ST12 - MEGA4S - 130 (with MGN4S nut)
- Collet / NBC4S - 3.0 & 4.0 (2 pcs.)
- Wrench / MGR12

Set Model	Order No.
SST14-MEGA6S-160	**961.776**

Contents

- Body / ST14 - MEGA6S - 160 (with MGN6S nut)
- Collet / NBC6S - 3.0,4.0,5.0 & 6.0 (4 pcs.)
- Wrench / MGR14

Set Model	Order No.
SST16-MEGA8S-160	**805.412**

Contents

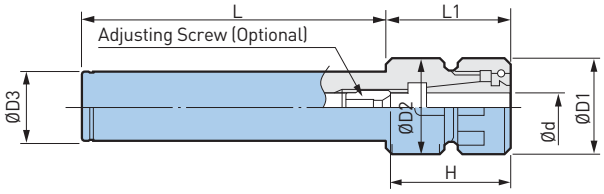
- Body / ST16 - MEGA8S - 160 (with MGN8S nut)
- Collet / NBC8S - 3.0,4.0,6.0 & 8.0 (4 pcs.)
- Wrench / MGR18

New Baby Chuck

Avoids interference when used in combination with BIG KAISER New Hi-Power Milling Chuck.

Coolant Through Hole

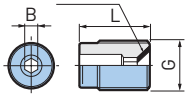




Ø 0.25 - 20 mm

Model			Order No.	Ød	ØD1	ØD2	ØD3	L	L1	H	Weight (kg)
ST20	-NBS6	-100	**961.701**	0.25 - 6	20	19.5	20	100	24	20 - 40	0.27
		-150	**961.702**					150			0.39
		-250	**961.703**					250			0.64
	-NBS8	-100	**961.706**	0.5 - 8	25	24.5		100	26	23 - 43	0.29
		-150	**961.707**					150			0.41
		-250	**961.708**					250			0.66
	-NBS10	-100	**961.711**	1.5 - 10	30	29.5		100	28	35 - 45	0.32
		-150	**961.712**					150			0.44
		-250	**961.713**					250			0.69
		-350 *	**961.714**					350			0.93
ST25	-NBS8	-150	**961.721**	0.5 - 8	25	24.5	25	150	26	23 - 42	0.62
		-200	**961.722**					200			0.81
		-250	**961.723**					250			1.00
	-NBS10	-150	**961.726**	1.5 - 10	30	29.5		150	28	35 - 45	0.65
		-200	**961.727**					200			0.84
		-250	**961.728**					250			1.03
	-NBS13	-150	**961.731**	2.5 - 13	35	34.5		150	34	41 - 60	0.67
		-200	**961.732**					200			0.86
		-250	**961.733**					250			1.05
ST32	-NBS8	-150	**961.741**	0.5 - 8	25	24.5	32	150	26	23 - 42	0.99
	-NBS10	-150	**961.746**	1.5 - 10	30	29.5			28	35 - 45	1.02
		-200	**961.747**					200			1.33
		-250	**961.748**					250			1.64
		-350 *	**961.749**					350			1.95
	-NBS13	-150	**961.751**	2.5 - 13	35	34.5		150	34	41 - 60	1.04
		-200	**961.752**					200			1.35
		-250	**961.753**					250			1.67
		-300	**961.754**					300			2.30
	-NBS16	-150	**961.756**	2.5 - 16	42	41.5		150		45 - 65	1.05
		-200	**961.757**					200			1.37
		-300	**961.758**					300			2.00
	-NBS20	-150	**961.761**	2.5 - 20	46	45.5		150		48 - 65	1.05
		-200	**961.762**					200			1.37
		-300	**961.763**					300			2.00

1. New baby nut is included.
2. * Coolant through hole is not available.
3. ''H'' indicates the adjustment length with an adjustment screw.

Spare Parts			Accessories								
	New Baby Nut 		Wrench 		NBC Collet  ▸ 250	Baby Perfect Seal  ▸ 262	Adjusting Screw  				
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	**961.526**	NBK6	**961.525**	NBC6-	BPS6-	NBA6B	**961.527**	M7	12	2
NBS8	NBN8	**961.549**	NBK8	**961.548**	NBC8-	BPS8-	NBA8B	**961.550**	M9	13	2.5
NBS10	NBN10	**961.571**	NBK10	**961.570**	NBC10-	BPS10-	NBA10B	**961.572**	M11	16	3
NBS13	NBN13	**961.597**	NBK13	**961.596**	NBC13-	BPS13-	NBA13B	**961.598**	M14	20	4
NBS16	NBN16	**961.631**	NBK16	**961.630**	NBC16-	BPS16-	NBA16B	**961.632**	M18	20	4
NBS20	NBN20	**961.679**	NBK20	**961.678**	NBC20-	BPS20-	NBA20B	**961.680**	M21	20	4

Hydraulic Chuck Super Slim

Ultra precise Hydraulic Chuck with cylindrical body eliminates any interface problem.

Coolant Through Hole



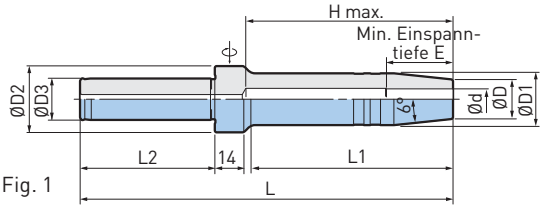


Fig. 1

Fig. 2

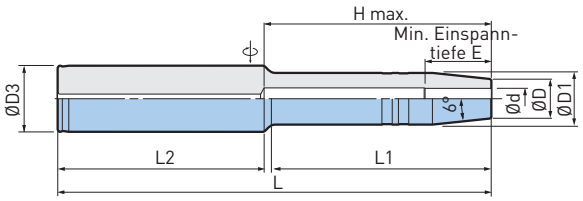
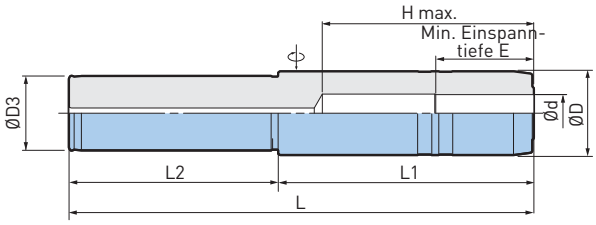


Fig. 3



Ø 4 - 20 mm

Model			Order No.	Fig.	Ød	ØD	ØD1	ØD2	ØD3	L	L1	L2	E	H max.	Weight (kg)
ST20	-HDC4S	-180	**805.835**	1	4	14	18	32	20	180	94	65	19	-	0.40
	-HDC6S	-180	**805.836**		6		20				95		25	101	0.43
	-HDC8S	-180	**805.837**		8	17	23				96		31		0.50
	-HDC10S	-180	**805.838**		10	19	25				97		33	100	0.54
	-HDC12S	-180	**805.839**		12	21	28				99		36		0.61
ST32	-HDC10S	-210	**805.595**	2	10	19	25	-	32	210	106	100	33	110	0.98
	-HDC12S	-210	**805.560**		12	21	28				108		36	109	1.06
	-HDC16	-200	**805.840**	3	16	36	-			200	110	90	43	91	1.27
	-HDC20	-200	**805.841**		20	38								90	1.28

1. Adjusting screw cannot be used.

For Inner Bore Cleaner ▶ 286
For Straight Collet ▶ 272

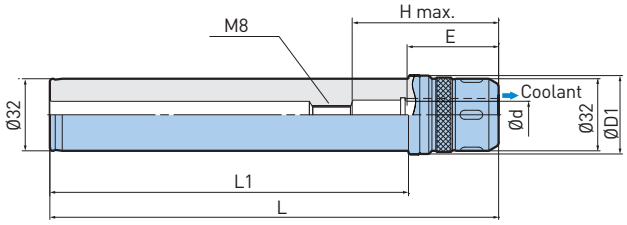
New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant

Coolant Through Hole







A.6

Ø 6 - 12 mm

Model	Order No.	Ød	ØD1	L	L1	H max.	E	Wrench	Weight (kg)
ST32 -HMC12J -120	**805.842**	12	35	120	80	65	43	FK31-33	0.7
-160	**805.843**			160	120				0.9
-200	**805.844**			200	160				1.1

1. Wrench is to be ordered separately.

For Straight Collet ▶ 272
For Wrench ▶ 275

Shrink Chuck Super Slim

Extremley slim design avoids interference with the side wall and draft of the mold.

Coolant Through Hole



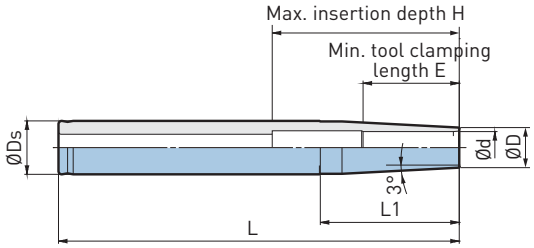


Fig. 2

A.6

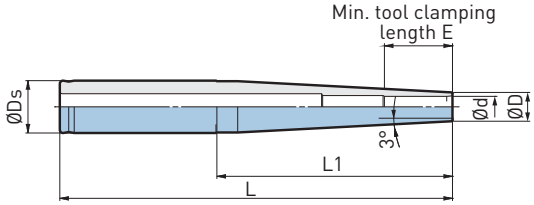


Fig. 1

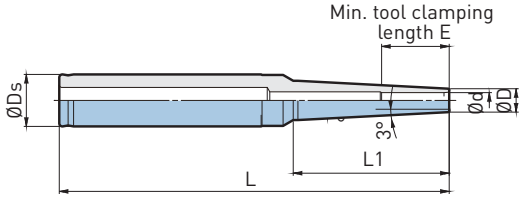


Fig. 3

Ø 4 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØDS	L	L1	H max.	E	Weight (kg)
ST12 -SRC4SS -120	**802.189**	1	4	7	12	120	51	-	16	0.10
-SRC6SS -120	**802.190**	2	6	9			32	52	26	0.10
ST20 -SRC4SS -150-K40	**802.205**	3	4	7	20	150	40	-	16	0.25
-SRC6SS -150-K60	**802.209**		6	9	20	150	60	-	26	0.25
-200	**802.210**	1				200	110			0.30
-200-K60	**802.211**	3					60			0.30
-250	**802.212**	1				250	110			0.35
-250-K60	**802.213**	3					60			0.40
-SRC8SS -150	**802.217**	1	8	11	20	150	90	-	26	0.25
-200	**802.218**					200				0.30
-250	**802.219**					250				0.40
-SRC10SS -150	**802.197**	2	10	13	20	150	71	60	32	0.25
-200	**802.198**					200				0.35
-250	**802.199**					250				0.40
-SRC12SS -150	**802.200**	2	12	15	20	150	52	70	36	0.25
-200	**802.201**					200				0.35
-250	**802.202**					250				0.45

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

Shrink Chuck Slim

Slim design avoids interference with the workpiece.

Coolant Through Hole

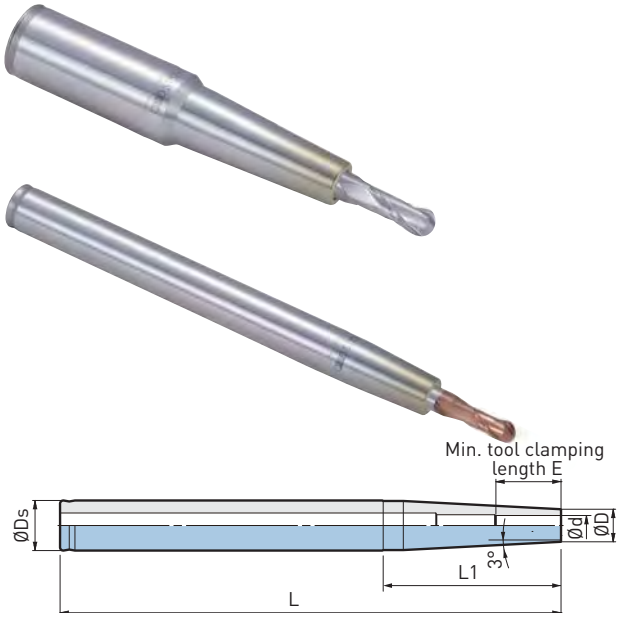


Fig. 1

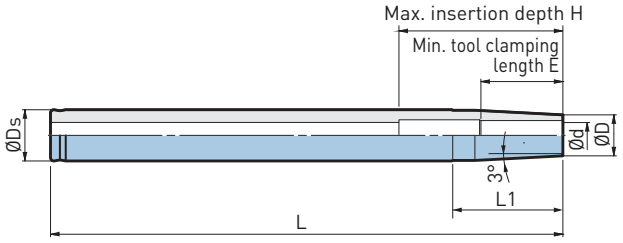


Fig. 2

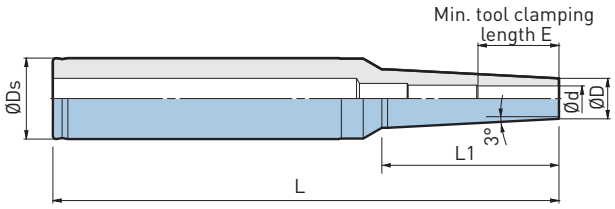


Fig. 3

A.6

Ø 8 - 20 mm

Model			Order No.	Fig.	Ød	ØD	ØDS	L	L1	H max.	E	Weight (kg)
ST20	-SRC8S	-150	**802.214**	1	8	13	20	150	71	-	26	0.25
		-200	**802.215**					200				0.35
		-250	**802.216**					250				0.45
	-SRC10S	-150	**802.194**	2	10	16	20	150	43	60	32	0.25
		-200	**802.195**					200				0.35
		-250	**802.196**					250				0.45
ST32	-SRC10S	-150-K70	**802.232**	3	10	16	32	150	70	-	32	0.50
		-200-K70	**802.233**					200				0.75
		-300-K70	**802.234**					300				1.20
	-SRC12S	-150-K70	**802.238**	3	12	19	32	150	70	-	36	0.55
		-200-K70	**802.239**					200				0.80
		-300	**802.240**	1				300	129			1.20
		-300-K70	**802.241**	3					70			1.25
	-SRC16S	-150	**802.245**	2	16	24	32	150	83	70	38	0.60
		-200	**802.246**					200		80		0.85
		-300	**802.247**					300				1.30
	-SRC20S	-150	**802.248**	2	20	28	32	150	50	80	38	0.60
		-200	**802.249**					200				0.85
		-300	**802.250**					300				1.30

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

CK Shanks

Coolant Through Hole



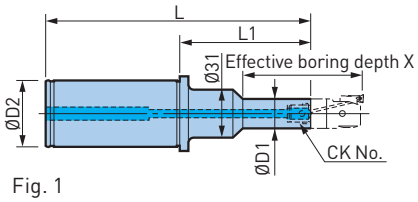


Fig. 1

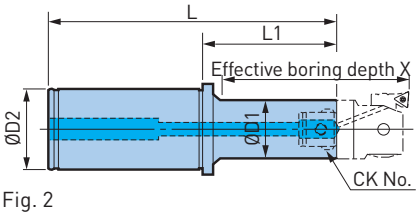


Fig. 2

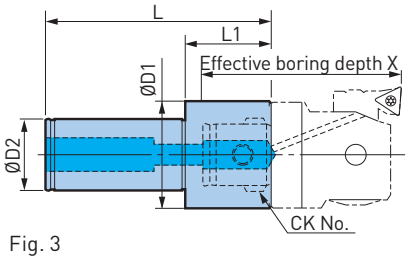


Fig. 3

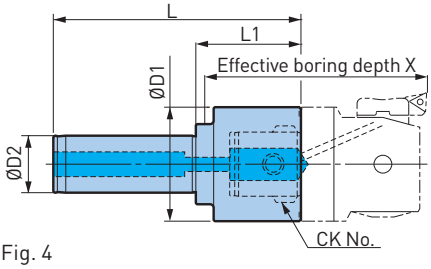


Fig. 4

A.6

Model			Order No.	Fig.	CK	ØD1	ØD2	L	L1	X	Weight (kg)
ST32	-CKB1	-77	**806.725**	1	CKB1	19	32	157	77	73	0.7
	-CKB2	-73	**978.413**	2	CKB2	24		152.5	72.5	100	0.7
	-CKB3	-69	**806.726**		CKB3	31		149	69		0.8
	-CKB4	-58	**978.406**	3	CKB4	39		138	58		0.9
	-CKB5	-48	**806.727**	4	CKB5	50		128	48		0.9
	-CKB6	-59	**978.357**		CKB6	64		139	59	125	1.5
ST42	-CKB1	-77	**806.728**	1	CKB1	19	42	157	77	73	1.0
	-CKB2	-73	**806.729**	2	CKB2	24		152.5	72.5	100	1.0
	-CKB3	-69	**806.730**		CKB3	31		149	69		1.1
	-CKB4	-63	**806.731**		CKB4	39		143	63		1.2
	-CKB5	-48	**806.732**	3	CKB5	50		128	48		1.3
	-CKB6	-59	**806.733**	4	CKB6	64		139	59	125	1.8

1. Boring head and insert are to be ordered separately.

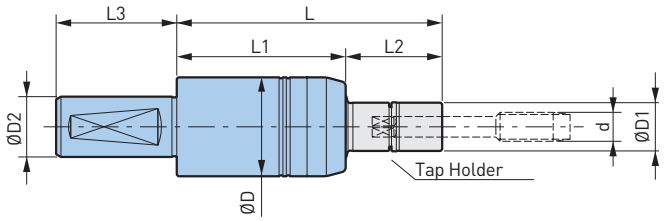
For Boring Head ▶ Chapter B

MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

Coolant Through Hole





M3 - M20

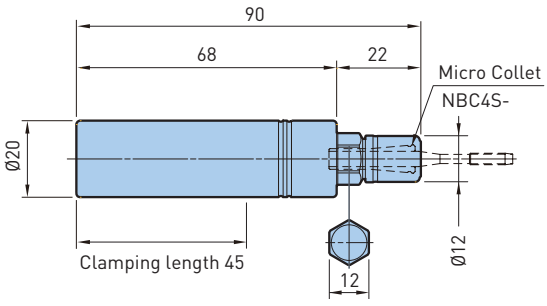
Model	Order No.	Tap Holder Model	d	ØD	ØD1	ØD2	L	L1	L2	L3	Weight (kg)
ST20 -MGT6 - 65	963.601	MGT6-d - 30	M3 - M8	36	16	20	95	65	30	40	0.5
		- 70					135		70		
		-100					165		100		
ST25 -MGT12 - 70	963.602	MGT12-d - 30	M5 - M12 P1/8	41	20	25	100	70	30	50	0.8
		- 70					140		70		
		-100					170		100		
ST32 -MGT20 - 90	963.603	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	32	125	90	35	55	1.5
		- 85					175		85		
		-115					205		115		

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. Side lock holder model TSL is recommended as a basic holder.

For Tap Holders ▶ 276
For Accessories ▶ 280
For Side Lock Holder BBT ▶ 68
For Side Lock Holder BDV ▶ 109
For Side Lock Holder BIG CAPTO ▶ 188

For small Tap MGT3





M1 - M3

Model	Order No.
ST20-MGT3-90	978.356

For Collet ▶ 281

1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

Other products with cylindrical shank



▶ 498

Point Master
- Touch probe and edge finder
- High precision stroke and interchangeable stylus for measuring different applications



▶ 503

Accu Center
- Edge finder
- Simple and precise edge finder offering repeatability within 3 µm



▶ 450

Fullcut Mill
- Indexable insert endmill
- Shoulder and slot milling cutter with both high radial and axial rake angle



▶ 476

C-Cutter Mini
- Ultra high feed chamfer mill
- 4 inserts and small tool diameter minimize cutting speed



▶ 482

C-Cutter
- Wide range chamfer mill
- Reduced number of tools and tool change time



▶ 488

R-Cutter
- Corner rounding mill
- Front & back chamfering
- 4 inserts multiply feed rate



▶ 496

BF-Cutter
- Back spot facing tool for cap screw hole
- Selected spot facing diameters suitable for cap screws



▶ 492

Center Boy
- Center and chamfer in one
- Accurate centering and chamfering can be obtained in a single operation



▶ 296

MW Rough Boring Head
- Twin-cutter boring head
- Fast and efficient roughing of small bores Ø 16 - 21 mm



▶ 487

C-Centering Cutter
- Centering and chamfer with insert
- Stable and long life time operation with insert

Modular Turning / Lathe Tools

HSK-T SERIES

Selection Guide 218 - 219

Modular Turning Tools 220 - 227

BIG CAPTO SERIES

Selection Guide 228 - 229

Modular Turning Tools 230 - 236

N/C LATHE TOOLING

Smart Damper Turning 237

Collet Chucks 238 - 242

Centering Tool 243

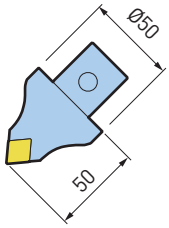
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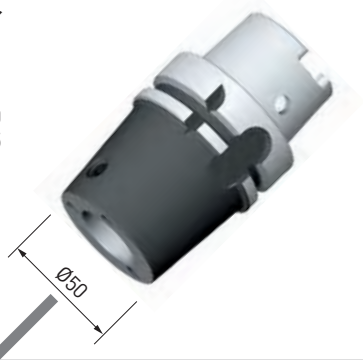
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S50
Type S basic holder

HSK-T 63 -S50 - 60
- 75
-100
HSK-T100 -S50 -115

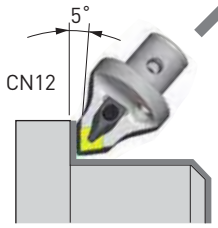
▶ 220





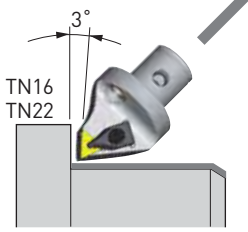
Type S cartridge ▶ 221

No. 1



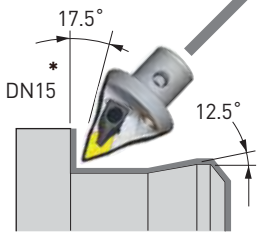
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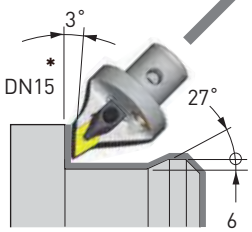
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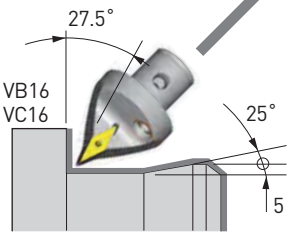
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-DDJNL-00050-15

No. 5



S50-SVQBN-00050-16

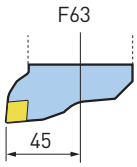
* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).

90°

F63
Type F
basic holder

HSK-T 63-F63
HSK-T100-F63

▶ 222





S63
Type S
basic holder

▶ 220

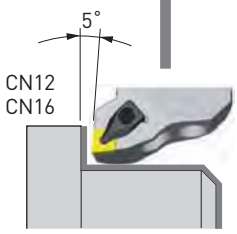


Type S cartridge ▶ 221

No. 1
No. 3
No. 5
No. 8

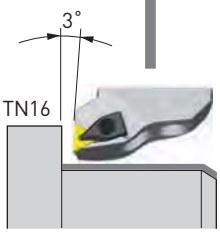
Type F cartridge ▶ 223

No. 10



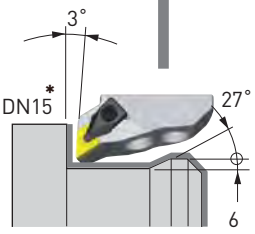
F63-DCLNR-45035-12(16)
-DCLNL-45035-12(16)

No. 12



F63-DTJNR-45035-16
-DTJNL-45035-16

No. 13

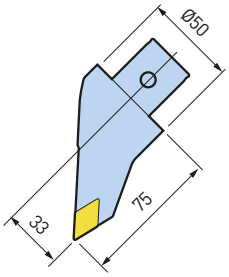


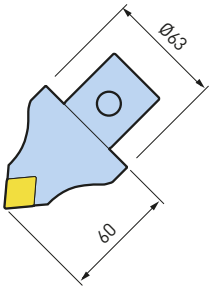
F63-DDJNR-45035-15
-DDJNL-45035-15

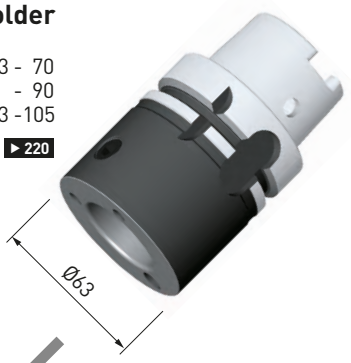
* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).

S63
Type S basic holder

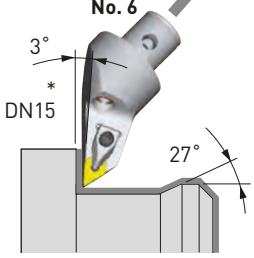
HSK-T 63 -S63 - 70
- 90
HSK-T100 -S63 -105
▶ 220





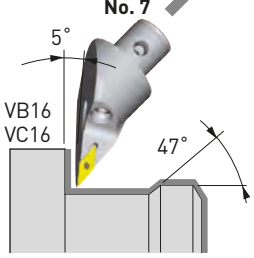


No. 6



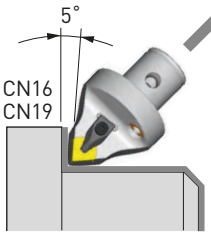
S50-DDJNR-33075-15
-DDJNL-33075-15

No. 7



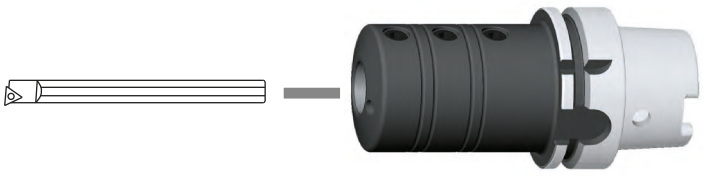
S50-SVLBR-33075-16
-SVLBL-33075-16

No. 8

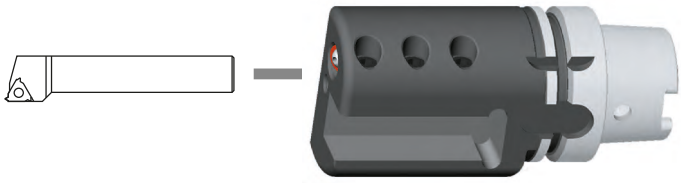


S63-DCLNN-00060-16
-DCLNN-00060-19

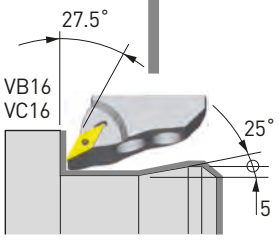
Boring bar holder
▶ 226



Square tool holder 180°
▶ 225

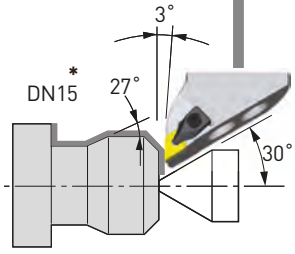


No. 15



F63-SVQBR-45035-16
-SVQBL-45035-16

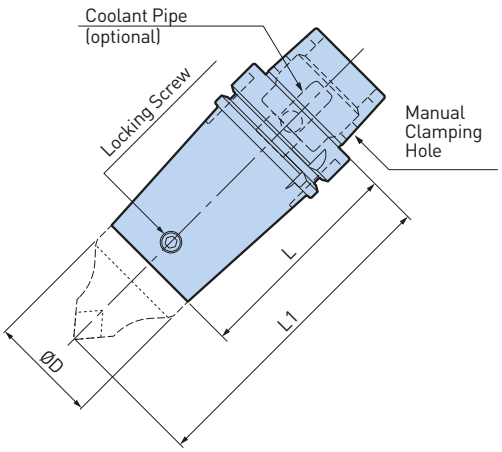
No. 18



F63-DDJNR-45055-15
-DDJNL-45055-15

45° Basic Holders Type S





Coolant Through Hole

A.7

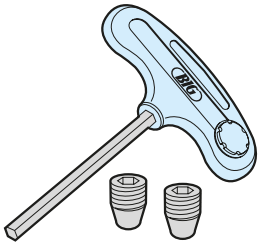
Type	Model	Order No.	ØD	L	L1	Locking Screw	Weight (kg)
S50	HSK-T63 -S50 - 60	**801.303**	50	60	110	CK5S	1.1
	- 75	**974.006**		75	125		1.4
	-100	**801.302**		100	150		1.8
S63	-S63 - 70	**805.874**	63	70	130	CK6S	1.4
	- 90	**805.875**		90	150		1.9
S50	HSK-T100 -S50 -115	**805.876**	50	115	165	CK5S	3.7
S63	-S63 -105	**805.877**	63	105	165	CK6S	4.0

1. Basic holders include a locking screw.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

Locking screw set (option)

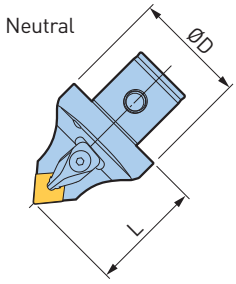
For type S basic holder

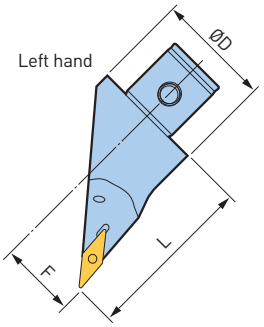


Type	Set-Model	Order No.	Screw (2p)	T-Wrench (1p)
S50	CK5S	**805.891**	M10 x P1.0	CK-T5
S63	CK6S	**805.892**	M12 x P1.0	CK-T6

45° Cartridges Type S







Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	ØD	Clamp Piece
95°	1	N	S50 -DCLNN -00050-12	**973.014**	CN1204 Rhombic 80°	0	50	50	CP2
95°	8	N	S63 -DCLNN -00060-16	**973.025**	CN1606 Rhombic 80°	0	60	63	CP3
			-00060-19	**805.724**	CN1906 Rhombic 80°				CP5
93°	2 - 1	R	S50 -DTJNR -00050-16	**973.015**	TN1604 Triangle 60°	0	50	50	CP1
		L	-DTJNL -00050-16	**973.016**					
93°	2 - 2	R	S50 -DTJNR -00050-22	**802.130**	TN2204 Triangle 60°	0	50	50	CP2
		L	-DTJNL -00050-22	**802.129**					
93°	4	R	S50 -DDJNR -00050-15	**973.017**	DN1504 * (DN1506) Rhombic 55°	0	50	50	CP2
		L	-DDJNL -00050-15	**973.018**					
93°	6	R	S50 -DDJNR -33075-15	**973.019**		33	75		
		L	-DDJNL -33075-15	**973.020**					
107.5°	3	N	S50 -DDHNN -00050-15	**973.021**		0	50		
95°	7	R	S50 -SVLBR -33075-16	**973.022**	VB1604 ** VC1604 ** Rhombic 35°	33	75	50	M3.5 ***
		L	-SVLBL -33075-16	**973.023**					
117.5°	5	N	S50 -SVQBN -00050-16	**973.024**		0	50		

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
4. ** VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

For Spare Parts ▶ 227

Coding system for cartridge

S50 - D C L N N - 00 050 - 12

- 12 – Insert Size
- 050 – Length
- 00 – Offset Value
- N – Hand
- N – Relief Angle
- L – Entering Angle
- C – Insert Shape
- D – Clamping Method
- S50 – Cartridge Type and Size

Clamping Method	
D	Double-Clamp
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°

Relief Angle	
N	0° Negative
B	5° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

90° Basic Holders Type F

Coolant Through Hole



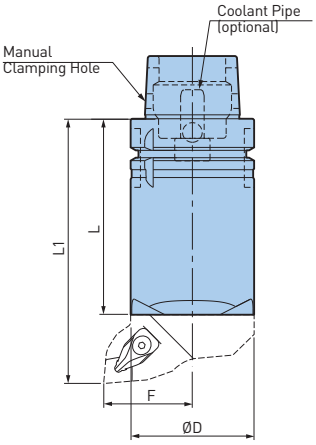


Fig. 1

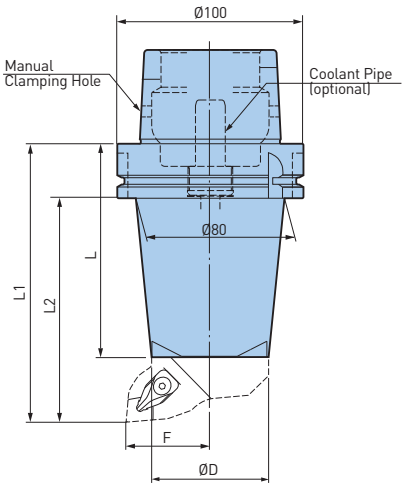


Fig. 2

A.7

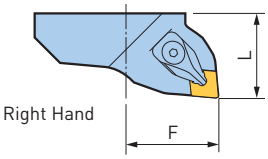
Type	Model	Order No.	Fig.	ØD	L	L1	L2	F	Weight (kg)
F63	HSK-T63 -F63 - 50	**801.301**	1	63	50	85	-	45	1.2
	- 75	**974.056**			75	110			1.8
	-100	**974.057**			100	135			2.4
	-130	**801.299**			130	165			3.1
	-170	**801.300**			170	205			4.1
F63	HSK-T100 -F63 -100	**805.878**	2	63	100	135	105	45	4.2
	-150	**805.879**			150	185	155		6.1

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

90° Cartridges Type F63



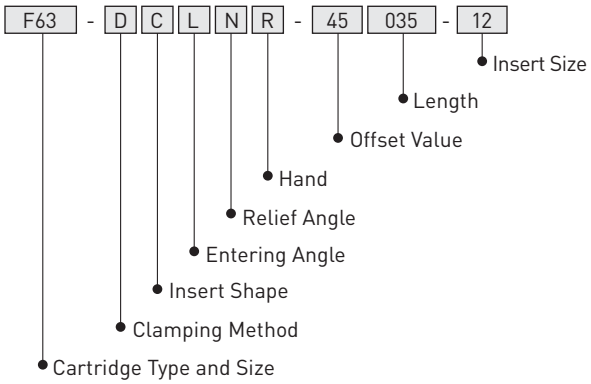


Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	Clamp Piece
95°	10 - 1	R	F63 -DCLNR -45035-12	**973.076**	CN1204 Rhombic 80°	45	35	CP2
		L	-DCLNL -45035-12	**973.077**				
95°	10 - 2	R	F63 -DCLNR -45035-16	**973.078**	CN1606 Rhombic 80°	45	35	CP3
		L	-DCLNL -45035-16	**973.079**				
93°	12	R	F63 -DTJNR -45035-16	**973.080**	TN1604 Triangle 60°	45	35	CP1
		L	-DTJNL -45035-16	**973.081**				
93°	13	R	F63 -DDJNR -45035-15	**973.082**	DN1504 * (DN1506) Rhombic 55°	45	35	CP2
		L	-DDJNL -45035-15	**973.083**				
93°	18	R	F63 -DDJNR -45055-15	**973.084**		45	55	CP2
		L	-DDJNL -45055-15	**973.085**				
117.5°	15	R	F63 -SVQBR -45035-16	**973.086**	VB1604 ** VC1604 ** Rhombic 35°	45	35	M3.5 ***
		L	-SVQBL -45035-16	**973.087**				

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
4. ** VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

For Spare Parts ▶ 227

Coding system for cartridge



Clamping Method	
D	Double-Clamp
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°
U	93°

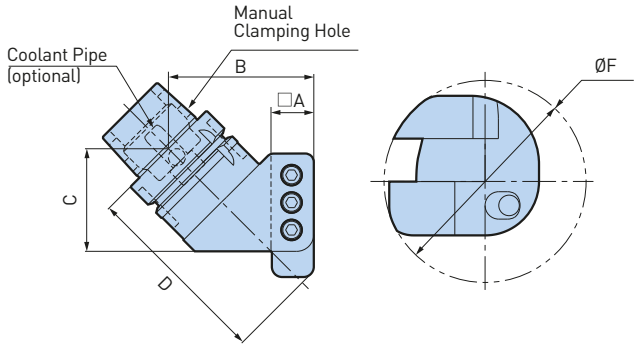
Relief Angle	
N	0° Negative
B	5° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

Square Tool Holders

Coolant Through Hole

45 Type



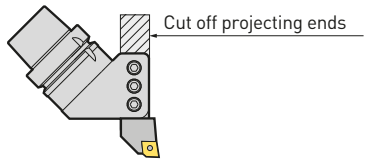
Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
R	HSK-T63 -45 -BH25R -110	**974.028**	25	85	60	110	118	2.7
L	-BH25L -110	**801.294**						

For Coolant Pipe ▶ 175

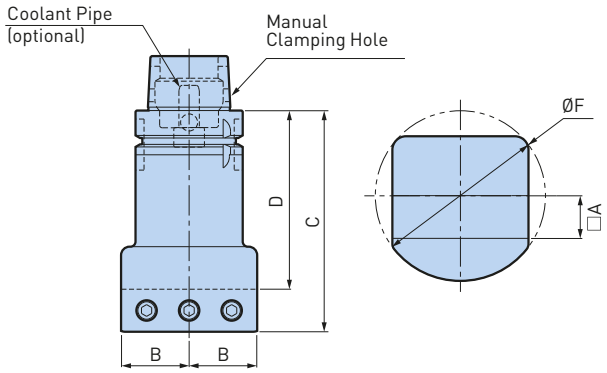
A.7

Caution

The excess length of a turning tool must be cut off to avoid interference with an ATC arm.



90 Type

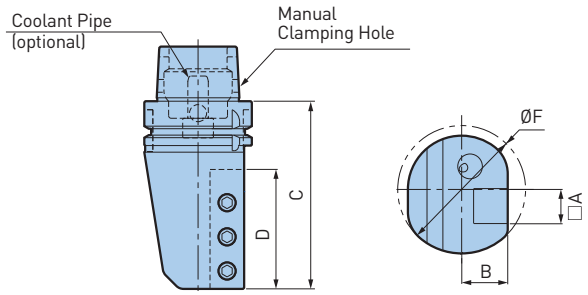


Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
N	HSK-T63 -90 -BH20N- 85	**806.246**	20	32	85	65	80	2.2
	-BH25N-100	**801.296**	25	40	100	75	100	3.3
	-BH25N-130	**801.297**			130	105		4.0
N	HSK-T100-90-BH25N-150	**805.537**	25	55	150	125	128	6.7

For Coolant Pipe ▶ 175

Coolant Through Hole

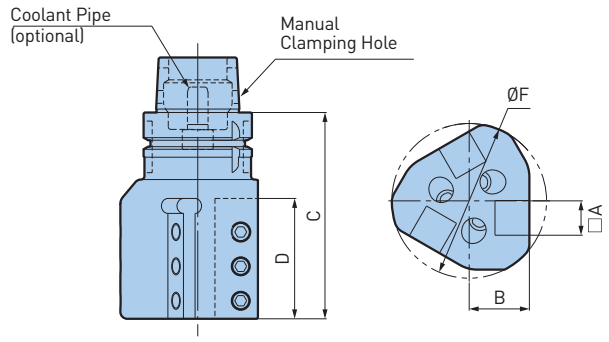
180 Type



Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
R	HSK-T63 -180-BH20R-120	806.248	20	27	120	70	75	2.7
L	-BH20L-120	806.247						
R	HSK-T63 -180-BH25R-125	806.250	25	29.5	127	80	90	3.2
L	-BH25L-125	806.249						
R	HSK-T100-180-BH25R-140	805.306	25	50	140	90	120	7.5
L	-BH25L-140	805.305						
R	-BH25R-180	805.536			180	90		9.7
L	-BH25L-180	805.535						

For Coolant Pipe ▶ 175

180 Multi Type



Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
R	HSK-T63-180-3BH20R-120	801.290	20	35	120	70	90	3.3
L	-3BH20L-120	801.289						
R	HSK-T63-180-3BH25R-125	806.252	25	45	127	80	110	5.0
L	-3BH25L-125	806.255						

For Coolant Pipe ▶ 175

Caution

60 degree indexing is required to the machine tool spindle.

Boring Bar Holders

Application: boring and thread cutting

Coolant Through Hole



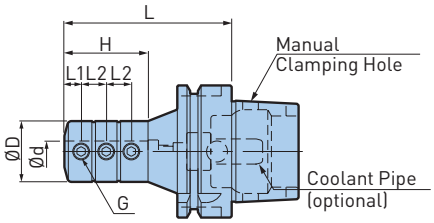


Fig. 1

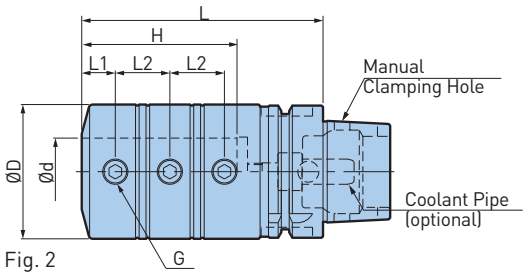


Fig. 2

A.7

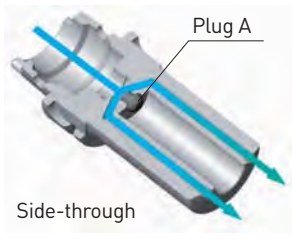
Ø 6 - 40 mm

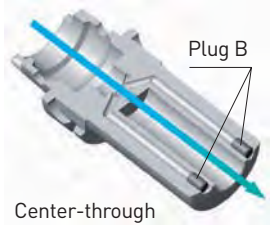
Model	Order No.	Fig.	Ød	ØD	L	L1	L2	H	G	Weight (kg)
HSK-T63 -BSL6 - 70	**979.198**		6	23	70	5	8	24	M5 P0.8	0.9
-BSL8 - 75	**801.298**		8	25	75	6	10	32	M6 P1.0	0.9
-BSL10 - 80	**979.199**	1	10	29	80	8	12	40	M8 P1.0	0.9
-BSL12 - 85	**974.100**		12	34	85		16	45		1.1
-BSL16 -100	**978.135**		16	40	100	10	21	60	M10 P1.25	1.3
-BSL20 -100	**974.102**	2	20	50		12	20			1.6
-BSL25 -110	**806.243**		25	55	110	14	23	67	M12 P1.5	1.8
-BSL32 -125	**806.244**		32	64	125	16	26	74		2.6
-BSL40 -145	**806.245**		40	80	145	18	32	91	M16 P1.5	4.0
HSK-T100-BSL16 -105	**805.880**		16	40	105	10	21	60	M10 P1.25	2.7
-BSL20 -110	**805.881**		20	50	110	12	20			3.2
-BSL25 -120	**805.538**	1	25	55	120	14	23	67	M12 P1.5	3.5
-BSL32 -125	**805.539**		32	64	125	16	26	74		4.0
-BSL40 -135	**805.540**		40	80	135	18	32	90	M16 P1.5	5.2

1. Coolant pipe is to be ordered separately.
2. Reduction sleeve (BSL sleeve) is available.

For Coolant Pipe ▶ 175
For BSL Sleeve ▶ 282

Interchangeable between center-through and side-through coolant supply by using plugs.
Adjustment for either right hand or left hand is also possible.

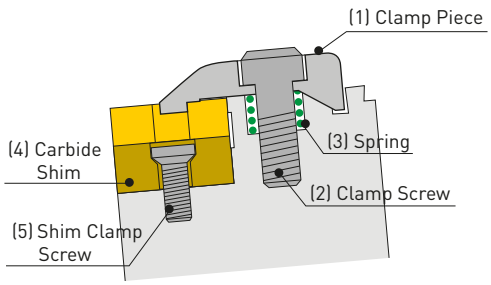




Chuck Model	Plug A	Plug B
BSL 6	M5 P0.8	M4 P0.7
8	M6 P1.0	
10		M5 P0.8
12		M6 P1.0
16		
20	M6 P1.0 *	
25	M8 P1.25 *	
32		
40		

1. Both plugs are included as standard.
2. * Button-head bolt.

Spare Parts for Carbide



Clamp Piece Set

Set Model	Order No.	(1) Clamp Piece	(2) Clamp Screw	(3) Spring	Compartible Insert
					
SCP1	**973.181**	CP1	M5 x 20	Ø8 x 10	TN16
SCP2	**973.182**	CP2			CN12, TN22 DN15
SCP3	**973.183**	CP3			CN16
SCP5	**802.133**	CP5			CN19

1. 1 pce. each of the clamp piece, clamp screw and spring are included in the set.
2. The tightening wrench is a 4mm hex wrench. T-type hex wrench is sold as Model T-4.

Carbide Shim Set

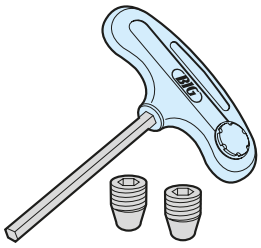
Compartible Insert	Set Model	Order No.	(4) Carbide Shim	(5) Shim Clamp Screw	Torx size
TN1604	STNS1604	**973.184**	TNS1604	M3 x 7	T10
TN2204	STNS2204	**804.821**	TNS2204	M4 x 8	T15
DN1504	SDNS1504	**973.186**	DNS1504	M4 x 8	T15
DN1506	SDNS1506	**973.187**	DNS1506	M4 x 8	T15
CN1204	SCNS1204	**973.185**	CNS1204	M4 x 8	T15
CN1606	SCNS1606	**973.188**	CNS1606	M5 x 12	T20
CN1906	SCNS1906	**802.131**	CNS1906	M5 x 12	T20

1. 1 pce. each of the carbide shim and shim clamp screw are included in the set.
2. The tightening wrench is a torx wrench. Driver-type torx wrench is sold as models DA-T10, DA-T15, and DA-T20.

A.7

For S Type (Tilt Type) Basic Holders

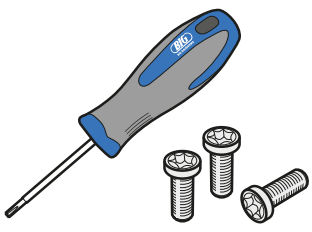
Clamping Screw Set

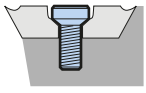


Type	Set-Model	Order No.	Screw (2p)	T-Wrench (1p)
S50	CK5S	**805.891**	M10 x P1.0	CK-T5
S63	CK6S	**805.892**	M12 x P1.0	CK-T6

Insert Clamping Screw Set

For VB16, VC16 Insert





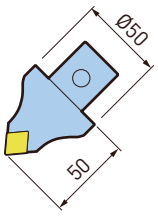
Set Model	Order No.
S3508DS	**966.273**

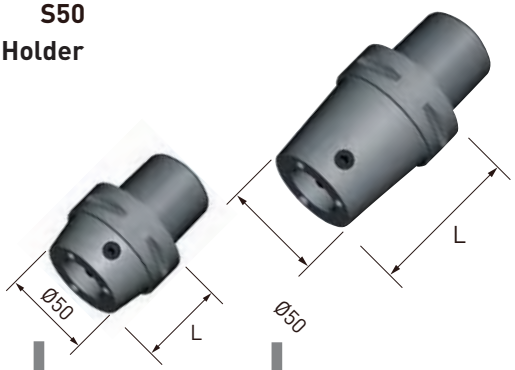
1. Set content M3.5 screw (10 pcs)
2. Driver-type wrench...DA-T15 (1 pc)

45°

S50
Type S Basic Holder

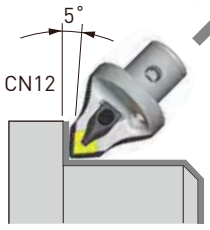
L
C5-S50- 40
- 55
- 75
-100
C6-S50- 45
- 75
-100
C8-S50-100
-135
▶ 230





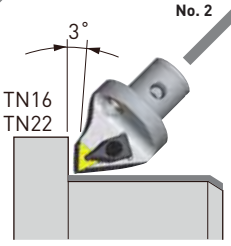
Type S Cartridge ▶ 231

No. 1



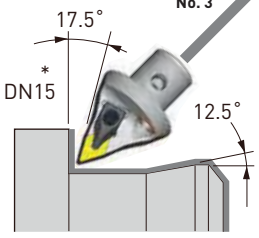
S50-DCLNN-00050-12

No. 2



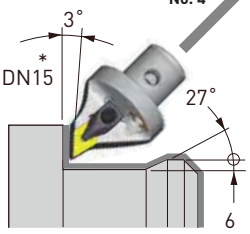
S50-DTJNR-00050-16
-DTJNL-00050-16
S50-DTJNR-00050-22
-DTJNL-00050-22

No. 3



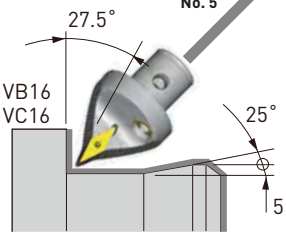
S50-DDHNN-00050-15

No. 4



S50-DDJNR-00050-15
-DDJNL-00050-15

No. 5



S50-SVQBN-00050-16

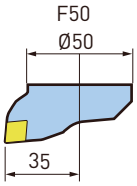
* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).

A.7

90°

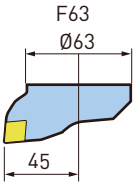
F50
Type F basic holder

C5-F50- 25
- 50
- 85
-125
▶ 232



F63
Type F basic holder

C6-F63- 30
- 75
-100
-130
-170
C8-F63- 45
-100
-130
-170
▶ 232





S50/S63
Type S basic holder ▶ 230



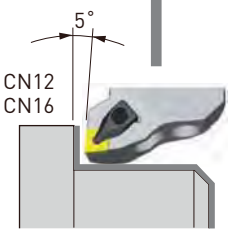


Type S cartridge ▶ 231

No. 1
No. 3
No. 5
No. 8

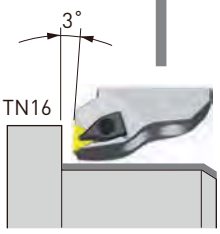
Type F cartridge ▶ 232/233

No. 10



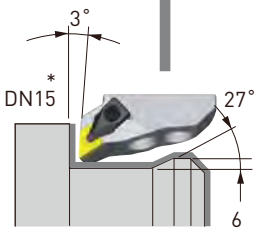
F50-DCLNR-35035-12(16)
-DCLNL-35035-12(16)
F63-DCLNR-45035-12(16)
-DCLNL-45035-12(16)

No. 12



F50-DTJNR-35035-16
-DTJNL-35035-16
F63-DTJNR-45035-16
-DTJNL-45035-16

No. 13



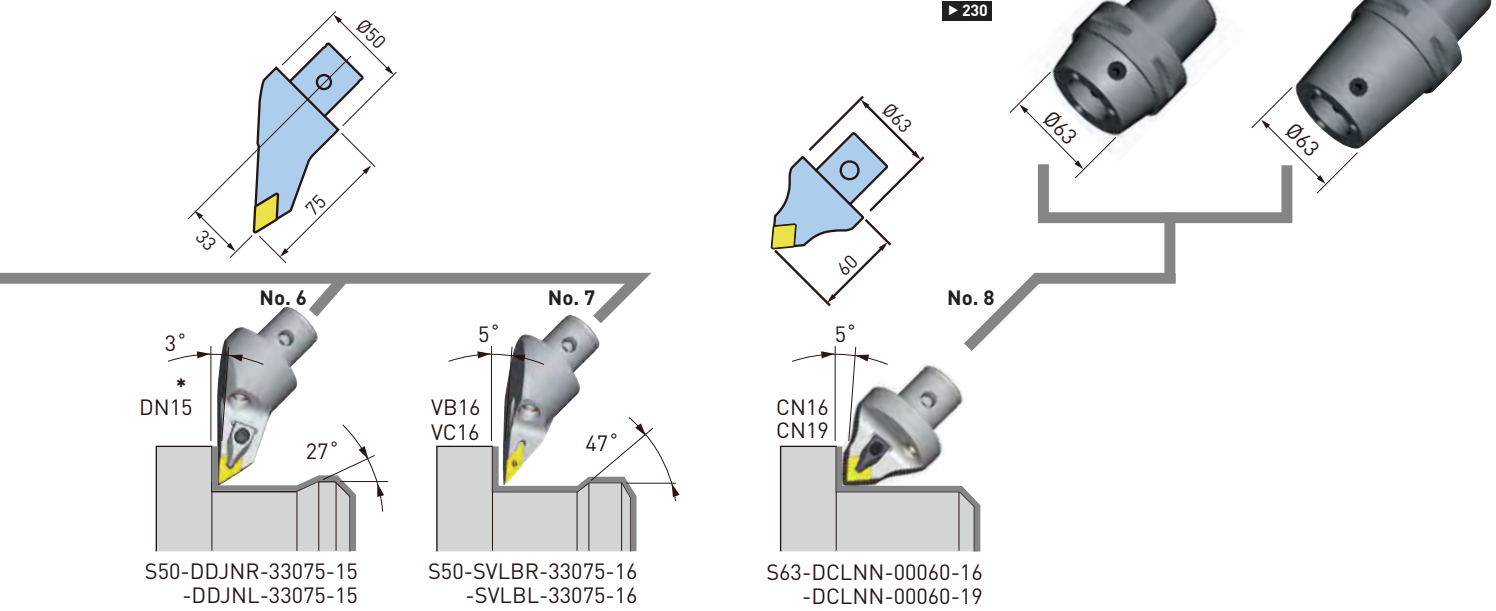
F50-DDJNR-35035-15
-DDJNL-35035-15
F63-DDJNR-45035-15
-DDJNL-45035-15

* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).

S63

Type S basic holder

C6-S63- 90
C8-S63-125
▶ 230



S50-DDJNR-33075-15
-DDJNL-33075-15

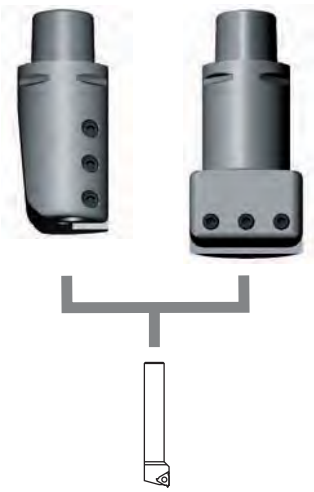
S50-SVLBR-33075-16
-SVLBL-33075-16

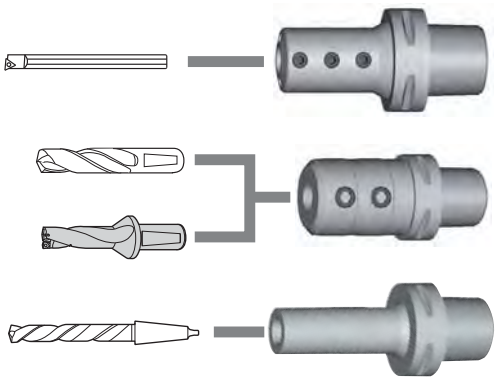
S63-DCLNN-00060-16
-DCLNN-00060-19

A.7

Square tool holder

▶ 234

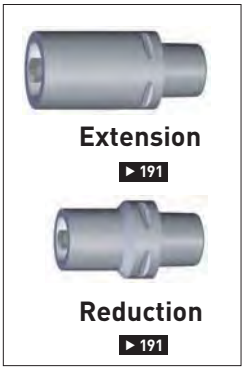




Boring bar holder
▶ 236

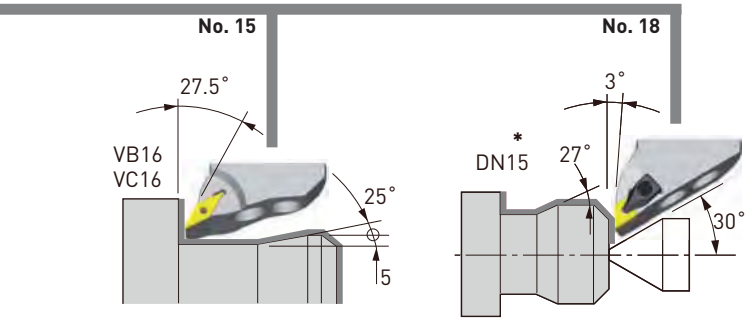
Side lock holder
▶ 188

Morse taper holder
▶ 189



Extension
▶ 191

Reduction
▶ 191



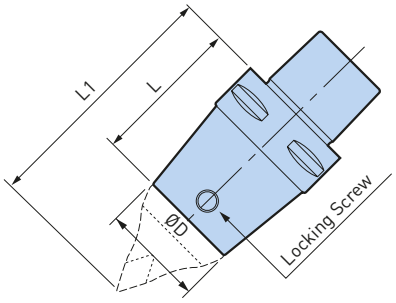
F63-SVQBR-45035-16
-SVQBL-45035-16

F50-DDJNR-35050-15
-DDJNL-35050-15
F63-DDJNR-45055-15
-DDJNL-45055-15

45° Basic Holders Type S

Coolant Through Hole





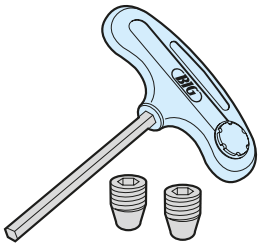
Type	Model	Order No.	ØD	L	L1	Locking Screw	Weight (kg)
S50	C5 -S50 - 40	**973.001**	50	40	90	CK5S	0.6
	- 55	**973.002**		55	105		0.8
	- 75	**973.003**		75	125		1.1
S50	C6 -S50 - 75	**973.006**	50	75	125	CK5S	1.5
	-100	**973.007**		100	150		2.0
S63	-S63 - 90	**805.530**	63	90	150	CK6S	2.1
S50	C8 -S50 -135	**973.011**	50	135	185	CK5S	4.0
S63	-S63 -125	**973.013**	63	125	185	CK6S	4.2

1. Basic holders include a locking screw.

A.7

Locking Screw Set (option)

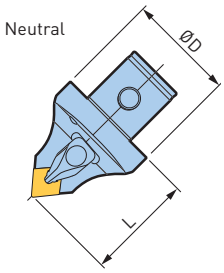
For type S basic holder

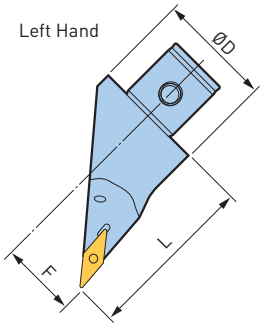


Type	Set-Model	Order No.	Screw (2p)	T-Wrench (1p)
S50	CK5S	**805.891**	M10 x P1.0	CK-T5
S63	CK6S	**805.892**	M12 x P1.0	CK-T6

45° Cartridges Type S







Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	ØD	Clamp Piece
95°	1	N	S50 -DCLNN -00050-12	**973.014**	CN1204 Rhombic 80°	0	50	50	CP2
95°	8	N	S63 -DCLNN -00060-16	**973.025**	CN1606 Rhombic 80°	0	60	63	CP3
			-00060-19	**805.724**	CN1906 Rhombic 80°				CP5
93°	2 - 1	R	S50 -DTJNR -00050-16	**973.015**	TN1604 Triangle 60°	0	50	50	CP1
		L	-DTJNL -00050-16	**973.016**					
93°	2 - 2	R	S50 -DTJNR -00050-22	**802.130**	TN2204 Triangle 60°	0	50	50	CP2
		L	-DTJNL -00050-22	**802.129**					
93°	4	R	S50 -DDJNR -00050-15	**973.017**	DN1504 * (DN1506) Rhombic 55°	0	50	50	CP2
		L	-DDJNL -00050-15	**973.018**					
93°	6	R	S50 -DDJNR -33075-15	**973.019**		33	75		
		L	-DDJNL -33075-15	**973.020**					
107.5°	3	N	S50 -DDHNN -00050-15	**973.021**		0	50		
95°	7	R	S50 -SVLBR -33075-16	**973.022**	VB1604 ** VC1604 ** Rhombic 35°	33	75	50	M3.5
		L	-SVLBL -33075-16	**973.023**					
117.5°	5	N	S50 -SVQBN -00050-16	**973.024**		0	50		

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
4. ** Both VB1604 and VC1604 inserts are suitable.

For Spare Parts ▶ 227

Coding system for cartridge

S50 - D C L N N - 00 050 - 12

- S50: Cartridge Type and Size
- D: Clamping Method
- C: Insert Shape
- L: Entering Angle
- N: Relief Angle
- N: Hand
- 00 050: Offset Value / Length
- 12: Insert Size

Clamping Method	
D	Double-Clamp
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

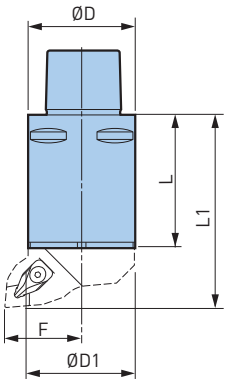
Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°

Relief Angle	
N	0° Negative
B	5° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

90° Basic Holders Type F





Coolant Through Hole

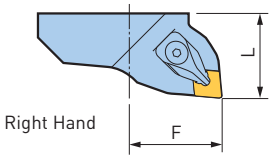
Type	Model	Order No.	ØD	ØD1	L	L1	F	Weight (kg)
F50	C5 -F50 - 25	**801.657**	50	50	25	60	35	0.5
	- 50	**973.052**			50	85		0.9
	- 85	**973.053**			85	120		1.4
	-125	**973.054**			125	160		2.0
F63	C6 -F63 - 30	**973.055**	63	63	30	65	45	0.9
	- 75	**973.056**			75	110		2.0
	-100	**973.057**			100	135		2.6
	-130	**973.058**			130	165		3.3
	-170	**973.059**			170	205		4.2
F63	C8 -F63 - 45	**973.060**	80	63	45	80	45	2.1
	-100	**973.061**			100	135		3.7
	-130	**973.062**			130	165		4.5
	-170	**973.063**			170	205		5.6

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).

A.7

90° Cartridges Type F50





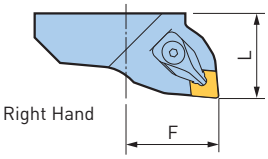
Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	Clamp Piece
95°	10 - 1	R	F50 -DCLNR -35035-12	**973.064**	CN1204 Rhombic 80°	35	35	CP2
		L	-DCLNL -35035-12	**973.065**				
95°	10 - 2	R	F50 -DCLNR -35035-16	**973.066**	CN1606 Rhombic 80°	35	35	CP3
		L	-DCLNL -35035-16	**973.067**				
93°	12 - 1	R	F50 -DTJNR -35035-16	**973.068**	TN1604 Triangle 60°	35	35	CP1
		L	-DTJNL -35035-16	**973.069**				
95°	13	R	F50 -DDJNR -35035-15	**973.070**	DN1504 * (DN1506) Rhombic 55°	35	35	CP2
		L	-DDJNL -35035-15	**973.071**				
95°	18	R	F50 -DDJNR -35050-15	**973.072**		35	50	CP2
		L	-DDJNL -35050-15	**973.073**				

For Spare Parts ▶ 227

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim DNS1506 with (option).
4. ** Both VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

90° Cartridges Type F63





Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	Clamp Piece
95°	10 - 1	R	F63 -DCLNR -45035-12	**973.076**	CN1204 Rhombic 80°	45	35	CP2
		L	-DCLNL -45035-12	**973.077**				
95°	10 - 2	R	F63 -DCLNR -45035-16	**973.078**	CN1606 Rhombic 80°	45	35	CP3
		L	-DCLNL -45035-16	**973.079**				
93°	12	R	F63 -DTJNR -45035-16	**973.080**	TN1604 Triangle 60°	45	35	CP1
		L	-DTJNL -45035-16	**973.081**				
93°	13	R	F63 -DDJNR -45035-15	**973.082**	DN1504 * (DN1506) Rhombic 55°	45	35	CP2
		L	-DDJNL -45035-15	**973.083**				
93°	18	R	F63 -DDJNR -45055-15	**973.084**		45	55	CP2
		L	-DDJNL -45055-15	**973.085**				
117.5°	15	R	F63 -SVQBR -45035-16	**973.086**	VB1604 ** VC1604 ** Rhombic 35°	45	35	M3.5 ***
		L	-SVQBL -45035-16	**973.087**				

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by with DNS1506 (option).
4. ** Both VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

For Spare Parts ▶ 227

Coding system for cartridge

F63 - D C L N R - 45 035 - 12

- 12 – Insert Size
- 035 – Length
- 45 – Offset Value
- R – Hand
- N – Relief Angle
- L – Entering Angle
- C – Insert Shape
- D – Clamping Method
- F63 – Cartridge Type and Size

Clamping Method	
D	Double-Clamp
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°
U	93°

Relief Angle	
N	0° Negative
B	5° Positive

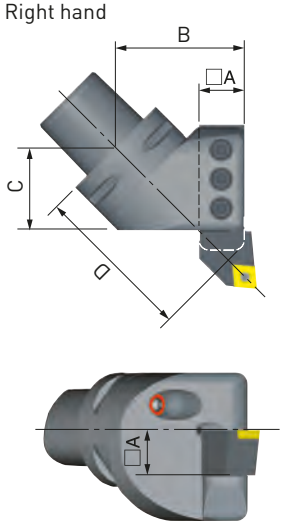
Hand	
R	Right Hand
L	Left Hand
N	Neutral

Square Tool Holders

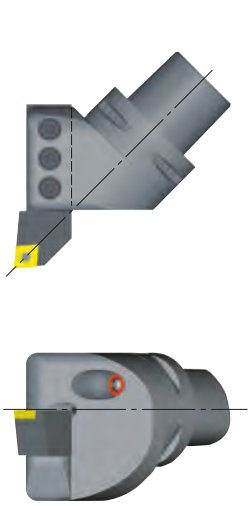
Coolant Through Hole

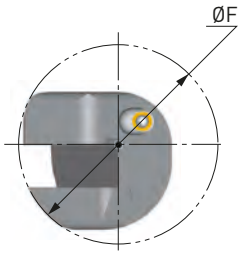
45 Type

Right hand



Left hand

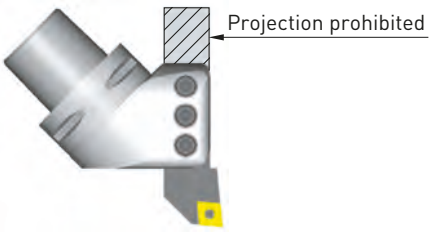




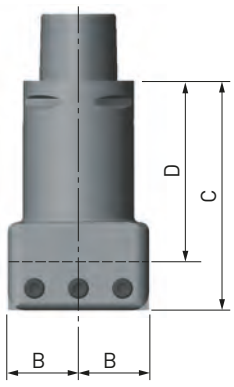
Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
R	C5-45-BH20R-5838	**973.026**	20	58	38	73	94	1.2
L	-BH20L-5838	**973.027**						1.2
R	C6-45-BH25R-7752	**973.028**	25	77	52	100	118	2.5
L	-BH25L-7752	**800.776**						2.5
R	C8-45-BH32R-85109	**973.030**	32	85	109	145	135	7.3
L	-BH32L-85109	**973.031**						7.3

Caution

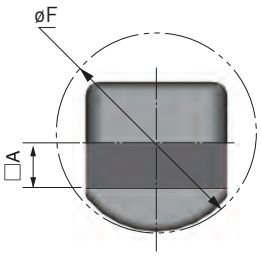
The excess length of a turning tool must be cut off to avoid interference with an ATC arm.



90 Type



Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
N	C5-90-BH20N-32058	**978.476**	20	32	58	38	80	0.9
	-32105	**801.653**			105	85		2.2
N	C6-90-BH20N-32060	**800.777**	20	32	60	40	80	2.4
	-32115	**800.778**			115	95		3.4
	-BH25N-40071	**800.779**	25	40	71	46	100	3.3
	-40130	**801.664**			130	105		4.2
N	C8-90-BH32N-51085	**800.889**	32	51	85	53	128	6.0
	-51165	**801.665**			165	133		8.7

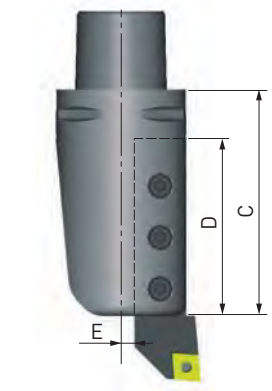


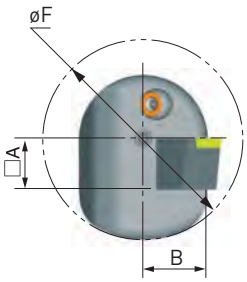
A.7

Coolant Through Hole

180 Type

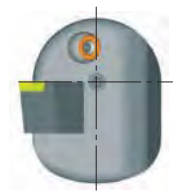
Right hand





Left hand



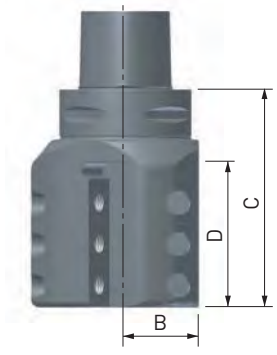


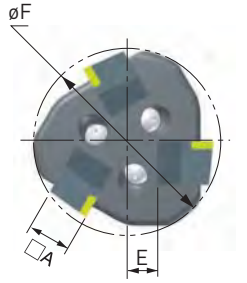
Hand	Model	Order No.	□A	B	C	D	E	ØF	Weight (kg)
R	C5-180 -BH20R -2590	**973.032**	20	25	90	65	5	80	1.6
L	-BH20L -2590	**973.033**							
R	C6-180 -BH20R -32100	**973.753**	20	31.5	100	65	11.5	80	2.6
L	-BH20L -32100	**801.663**							
R	-BH25R -32120S	**973.034**	25	29.5	120	80	4.5	90	3.1
L	-BH25L -32120S	**973.035**							
R	C8-180 -BH32R -40125	**973.038**	32	40	125	85	8	128	6.0
L	-BH32L -40125	**973.039**							

A.7

180 Multi Type

Right hand





Left hand





Hand	Model	Order No.	□A	B	C	D	E	ØF	Weight (kg)
R	C5-180 -3BH20R -100	**973.040**	20	35	100	70	15	90	2.6
L	-3BH20L -100	**973.041**							
R	C6-180 -3BH20R -110	**806.254**	20	35	110	70	15	90	3.3
L	-3BH20L -110	**806.253**							
R	-3BH25R -125	**806.256**	25	45	125	80	20	110	5.0
L	-3BH25L -125	**973.045**							
R	C8-180 -3BH25R -130	**973.046**	25	45	130	90	20	110	6.1
L	-3BH25L -130	**973.047**							

Caution

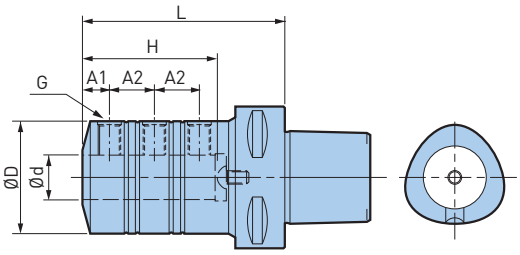
60 degree indexing is required to the machine tool spindle.

Boring Bar Holders

Application: boring and thread cutting

Coolant Through Hole



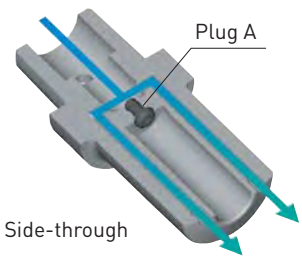


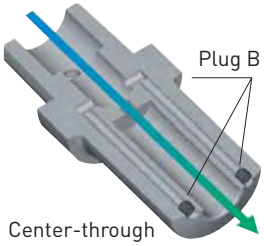
Ø 6 - 40 mm

Model	Order No.	Ød	ØD	L	A1	A2	H	G	Weight (kg)
C5 -BSL 6 - 70	**973.088**	6	23	70	5	8	41	M5 P0.8	0.6
-BSL 8 - 70	**973.089**	8	25		6	10		M6 P1.0	0.6
-BSL10 - 70	**973.090**	10	29		8	12	42	M8 P1.0	0.6
-BSL12 - 80	**973.091**	12	34	80		16	53		0.8
-BSL16 - 90	**973.092**	16	40	90	10	21	65	M10 P1.25	1.0
-BSL20 - 90	**973.093**	20	50		12	20	60		1.3
-BSL25 -100	**973.094**	25	55	100	14	23	70	M12 P1.5	1.6
-BSL32 -110	**973.095**	32	64	110	16	26	78		2.1
-BSL40 -130	**973.096**	40	80	130	18	32	93	M16 P1.5	3.7
C6 -BSL 6 - 70	**973.097**	6	23	70	5	8	41	M5 P0.8	1.4
-BSL 8 - 70	**973.098**	8	25		6	10		M6 P1.0	1.3
-BSL10 - 70	**973.099**	10	29		8	12	42	M8 P1.0	1.3
-BSL12 - 80	**973.100**	12	34	80		16	53		1.5
-BSL16 - 90	**973.101**	16	40	90	10	21	65	M10 P1.25	1.7
-BSL20 - 90	**973.102**	20	50		12	22	60		2.0
-BSL25 -100	**973.103**	25	55	100	14	26	70	M12 P1.5	2.3
-BSL32 -110	**973.104**	32	64	110	16	30	78		2.8
-BSL40 -130	**973.105**	40	80	130	18	32	93	M16 P1.5	4.3
C8 -BSL16 - 90	**973.110**	16	40	90	10	21	65	M10 P1.25	2.9
-BSL20 -100	**973.111**	20	50	100	12	22	70		3.3
-BSL25 -110	**973.112**	25	55	110	14	26	80	M12 P1.5	3.6
-BSL32 -120	**973.113**	32	64	120	16	30	88		4.1
-BSL40 -130	**973.114**	40	80	130	18	32	93	M16 P1.5	5.3

1. For sealing purpose, please use plugs according to drawing below. Both, plug A and B are included as standard.

For BSL Sleeve ▶ 282



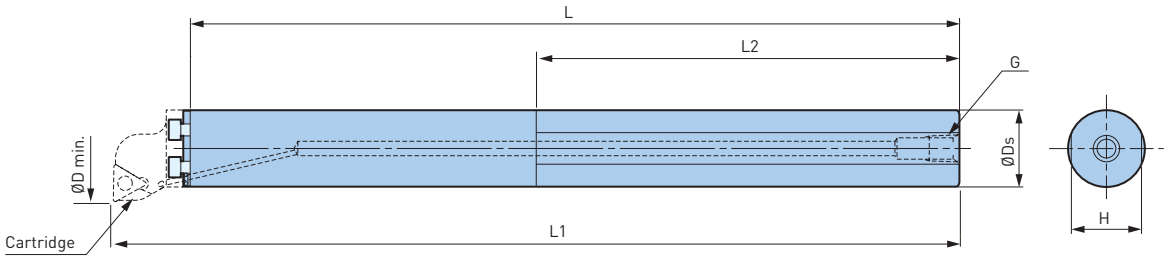


Chuck Model	Plug A	Plug B
BSL 6	M8P1.25	M4 P0.7
8	M10P1.0	
10	M12P1.5	M5 P0.8
12	M14P1.5	M6 P1.0
16	M18P1.5 (C5:M6P1.0)	
20	M6P1.0 *	
25		
32	M8P1.25 *	
40		

Smart Damper Turning







Model	Order No.	Cartridge	ØD min	ØDs	L	L1	L2	H	G	Weight (kg)
ST32-SDB40DP-320	**806.422**	B32	40	32	320	352	176	30	PT1/4	2.3
ST40-SDB50DP-410	**806.423**	B40	50	40	410	442	240	37	PT3/8	4.5

1. Clamp bolts (3 pcs.) and o-rings (2 pcs.) are included.
2. Cartridge is to be ordered separately.

Cartridges



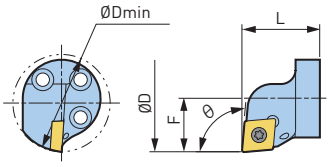


Fig. 1

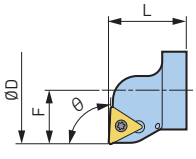


Fig. 2

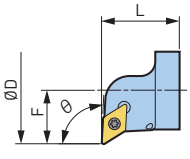


Fig. 3

Model	Order No.	Type	Fig.	Insert	Hand	ØD min.	F	L	Entering Angle
B32 -SCLCR -22032 -12	**806.424**	B32	1	CC1204	R	40	22	32	95°
-STUCR -22032 -11	**806.802**		2	TC1102					93°
-STUPR -22032 -16	**806.425**			TP1604					
-SDUCR -22032 -11	**806.426**		3	DC11T3					
B40 -SCLCR -27032 -12	**806.427**	B40	1	CC1204	R	50	27	32	95°
-STUCR -27032 -11	**806.803**		2	TC1102					93°
-STUPR -27032 -16	**806.428**			TP1604					
-SDUCR -27032 -11	**806.429**		3	DC11T3					

1. An insert clamping wrench is included in each cartridge.
2. Insert must be ordered separately (ISO standard insert can be used.)

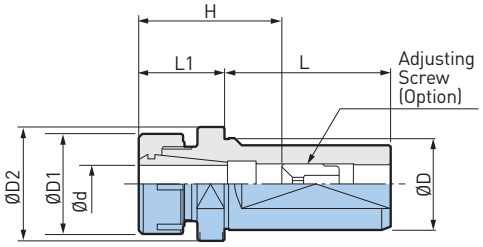
For TC11 Insert ▶ 409

New Baby Chuck Stopper

Flange as a stopper enables presetting of the tool away from machine and minimizes downtime. Shank is designed to be directly mounted into the drill holder of turret.

Coolant Through Hole

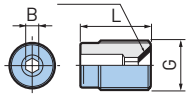




Ø 2.5 - 20 mm

Model			Order No.	Ød	ØD	ØD1	ØD2	L	L1	H
SLS25	-NBS13	- 30	**804.285**	2.5 - 13	25	35	32	54	30	41 - 60
		- 60	**804.286**						60	
SLS32	-NBS13	- 30	**804.288**	2.5 - 13	32	35	39.5	58	30	41 - 60
		- 60	**804.289**						60	
		-100	**804.287**						100	
	-NBS20	- 30	**804.291**	2.5 - 20		46	45.5		30	48 - 65
		- 60	**804.292**						60	
		-100	**804.290**						100	
SLS40	-NBS13	- 30	**804.294**	2.5 - 13	40	35	49.5	68	30	41 - 60
		- 60	**804.295**						60	
		-100	**804.293**						100	
	-NBS20	- 30	**804.297**	2.5 - 20		46			30	48 - 65
		- 60	**804.298**						60	
		-100	**804.296**						100	

1. New baby nut is included.
2. Designed to be capable of supplying coolant through the body.
3. "H" indicates the adjustment length with an adjusting screw.

Spare Parts			Accessories								
	New Baby Nut 		Wrench 		NBC Collet  ▸ 250	Baby Perfect Seal  ▸ 262	Adjusting Screw 	Rubber 			
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	**961.526**	NBK6	**961.525**	NBC6-	BPS6-	NBA6B	**961.527**	M7	12	2
NBS8	NBN8	**961.549**	NBK8	**961.548**	NBC8-	BPS8-	NBA8B	**961.550**	M9	13	2.5
NBS10	NBN10	**961.571**	NBK10	**961.570**	NBC10-	BPS10-	NBA10B	**961.572**	M11	16	3
NBS13	NBN13	**961.597**	NBK13	**961.596**	NBC13-	BPS13-	NBA13B	**961.598**	M14	20	4
NBS16	NBN16	**961.631**	NBK16	**961.630**	NBC16-	BPS16-	NBA16B	**961.632**	M18	20	4
NBS20	NBN20	**961.679**	NBK20	**961.678**	NBC20-	BPS20-	NBA20B	**961.680**	M21	20	4

New Baby Chuck Standard

Versatile as a basic holder for drills, taps, reamers and small tool bits.

Coolant Through Hole



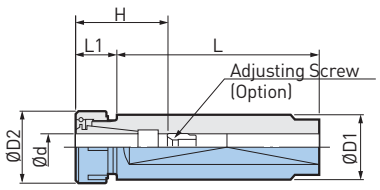


Fig. 1

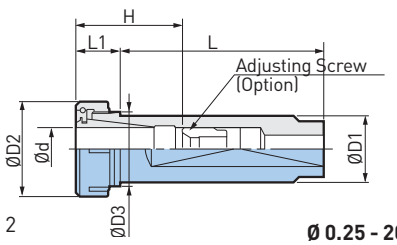


Fig. 2

Ø 0.25 - 20 mm

Model			Order No.	Fig.	Ød	ØD1	ØD2	ØD3	L	L1	H
SL16	-NBS6	- 40	802.154	1	0.25 - 6	16	20	-	40	15	20 - 40
		- 80	802.155						80		
	-NBS8	- 40	802.156		0.5 - 8		25		40	16.5	23 - 42
		- 80	802.157						80		
	-NBS10	- 40	802.152	2	1.5 - 10		30	21	40	37	35 - 45
		- 80	802.153						80		
SL20	-NBS6	- 40	802.162	1	0.25 - 6	20	20	-	40	15	20 - 40
		- 80	802.163						80		
	-NBS8	- 40	802.164		0.5 - 8		25		40	16.5	23 - 42
		- 80	802.165						80		
	-NBS10	- 40	802.158	2	1.5 - 10		30	21	40	18	35 - 45
		- 80	802.159						80		
	-NBS13	- 40	802.160		2.5 - 13		35	26	40	43	41 - 60
		- 80	802.161						80		
SL22	-NBS6	- 40	804.271	1	0.25 - 6	22	20	-	40	15	20 - 40
		- 80	804.272						80		
	-NBS8	- 40	804.273		0.5 - 8		25		40	16.5	23 - 42
		- 80	804.274						80		
	-NBS10	- 40	804.267		1.5 - 10		30		40	18	35 - 45
		- 80	804.268						80		
	-NBS13	- 40	804.269	2	2.5 - 13		35	26	40	21.5	41 - 47
		- 80	804.270						80		41 - 60
SL25	-NBS6	- 80	802.173	1	0.25 - 6	25	20	-	80	15	20 - 40
		-120	802.172						120		
	-NBS8	- 80	802.175		0.5 - 8		25		80	16.5	23 - 42
		-120	802.174						120		
	-NBS10	- 80	802.167		1.5 - 10		30		80	18	35 - 45
		-120	802.166						120		
	-NBS13	- 80	802.169	2	2.5 - 13		35	26	80	21.5	41 - 60
		-120	802.168						120		
	-NBS16	- 80	802.171		2.5 - 16		42	32	80	48	45 - 65
		-120	802.170						120		
SL25.4	-NBS6	- 80	804.282	1	0.25 - 6	25.4	20	-	80	15	20 - 40
		-120	804.281						120		
	-NBS8	- 80	804.284		0.5 - 8		25		80	16.5	23 - 42
		-120	804.283						120		
	-NBS10	- 80	804.276		1.5 - 10		30		80	18	35 - 45
		-120	804.275						120		
	-NBS13	- 80	804.278	2	2.5 - 13		35	26	80	21.5	41 - 50
		-120	804.277						120		
	-NBS16	- 80	804.280		2.5 - 16		42	32	80	48	45 - 65
		-120	804.279						120		
SL32	-NBS13	-100	802.176	1	2.5 - 13	32	35	-	100	21.5	41 - 60
		-150	802.177						150		
	-NBS16	-100	802.178		2.5 - 16		42		100		45 - 65
		-150	802.179						150		
	-NBS20	-100	802.180	2	2.5 - 20		46	36	100		48 - 65
		-150	802.181						150		

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.

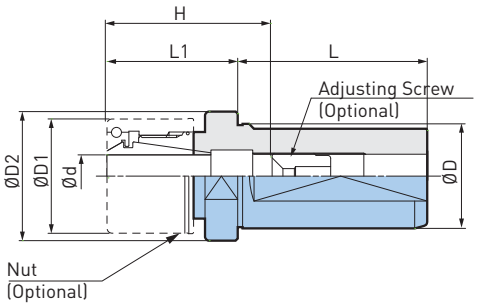
For New Baby Collet ▶ 250

MEGA ER Grip Stopper

High precision components outperform standard ER collet system.

Coolant Through Hole





Ø 2.75 - 20 mm

Model	Order No.	Ød	ØD	ØD1	ØD2	L	L1	H	Adjusting Screw
SLS25-MEGA ER20 -45/NL	**803.571**	2.75 - 13	25	35	32	54	45	42 - 62	NBA13B
-75/NL	**803.572**						75		
SLS32-MEGA ER20 -45/NL	**803.573**	2.75 - 13	32	35	39.5	58	45	42 - 62	NBA13B
-75/NL	**803.574**						75		
-MEGA ER32 -45/NL	**803.575**	2.75 - 20		50	50		45	47 - 68	NBA20B
-75/NL	**803.576**						75	50 - 68	
SLS40-MEGA ER20 -45/NL	**803.577**	2.75 - 13	40	35	49.5	68	45	42 - 62	NBA13B
-75/NL	**803.578**						75		
-MEGA ER32 -45/NL	**803.579**	2.75 - 20		50	50		45	50 - 68	NBA20B
-75/NL	**803.580**						75		

1. Nut is not included. Refer to the "accessories" table on the next page and select the suitable nut according to applications.
2. "H" indicates the adjustment length with an adjusting screw.

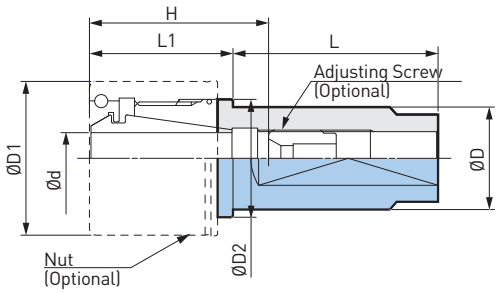
For ER Collet ▶ 266

MEGA ER Grip Standard

Flat is provided on the shank to be mounted in the tool post of the NC lathe directly.

Coolant Through Hole





Ø 1.9 - 16 mm

Model	Order No.	Ød	ØD	ØD1	ØD2	L	L1	H	Adjusting Screw
SL16 -MEGA ER11 - 40/NL	**803.554**	2.75 - 6	16	19	-	40	19	23 - 40	NBA6B
- 80/NL	**803.555**					80			
SL20 -MEGA ER11 - 40/NL	**803.560**	2.75 - 6	20	19	-	40	19	23 - 40	NBA6B
- 80/NL	**803.561**					80			
-MEGA ER16 - 40/NL	**801.714**	1.9 - 10		30	23	40	28	35 - 47	NBA10B
- 80/NL	**803.562**					80			
SL25 -MEGA ER11 - 60/NL	**803.564**	2.75 - 6	25	19	-	60	19	23 - 40	NBA6B
-100/NL	**803.563**					100			
-MEGA ER16 - 60/NL	**803.566**	1.9 - 10		30	-	60	28	35 - 47	NBA10B
-100/NL	**803.565**					100			
-MEGA ER20 - 60/NL	**803.568**	2.75 - 13		35	27	60	30	42 - 62	NBA13B
-100/NL	**803.567**					100			
-MEGA ER25 - 60/NL	**803.570**	2.75 - 16		42	33.5	60	48	44 - 67	NBA16B
-100/NL	**803.569**					100			
SL19.05-MEGA ER11 - 40/NL	**803.556**	2.75 - 6	19.05	19	-	40	19	23 - 40	NBA6B
- 80/NL	**803.557**					80			
-MEGA ER16 - 40/NL	**803.558**	1.9 - 10		30	23	40	28	35 - 47	NBA10B
- 80/NL	**803.559**					80			

1. Nut is not included. Refer to the "accessories" table below and select the suitable nut according to applications.
2. "H" indicates the adjustment length with an adjusting screw.

For ER Collet ▶ 266

A.7

Accessories

	MEGA ER Nut		MEGA ER Perfect Seal ▶ 269	MEGA Wrench		ER Nut		Wrench		Adjusting Screw				
MEGA ER Grip	Model	Order No.	Model	Model	Order No.	Model	Order No.	Model	Order No.	Model	Order No.	G	L	B
MEGA ER11	-	-	-	-	-	ERN11	**803.581**	NBK 6	**961.525**	NBA6B	**961.527**	M7	12	2
MEGA ER16	MERN16	**967.801**	MERPS16-	MGR30L	**969.448**	ERN16	**803.582**	NBK10	**961.570**	NBA10B	**961.572**	M11	16	3
MEGA ER20	MERN20	**967.802**	MERPS20-	MGR35L	**969.460L**	ERN20	**803.583**	NBK13	**961.596**	NBA13B	**961.598**	M14	20	4
MEGA ER25	MERN25	**967.803**	MERPS25-	MGR42L	**969.462L**	ERN25	**803.584**	NBK16	**961.630**	NBA16B	**961.632**	M18	20	4
MEGA ER32	MERN32	**967.804**	MERPS32-	MGR50L	**969.464L**	ERN32	**803.585**	FK45-50L	**801.037**	NBA20B	**961.680**	M21	20	4

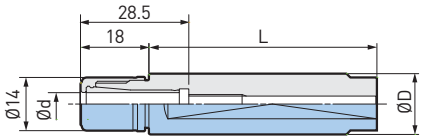
1. MEGA wrench is required for MEGA nut and MEGA ER perfect seal.
2. Wrench is for ER nut.

MEGA Micro Chuck

Coolant Through Hole

Smaller nut diameter than body allows installation into toolholder of small lathes from the back side.





Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	Collet Model
SL16 -MEGA6S -60	**803.594**	0.45 - 6.05	16	60	NBC6S-
SL20 -MEGA6S -40	**803.595**		20	40	
-80	**803.602**			80	
SL15.875-MEGA6S -60	**803.593**		15.875	60	

1. MEGA nut is included.
2. Designed to be capable of supplying coolant through the body.
3. MEGA wrench (MGR14) is to be ordered separately.

For MEGA Wrench ▶ 271
For Micro Collet ▶ 247

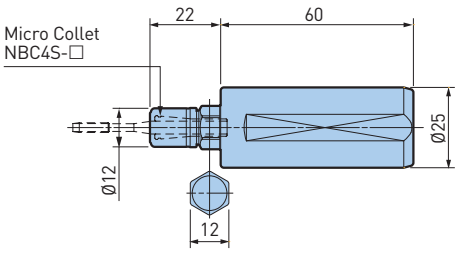
A.7

MEGA Synchro Tapping Holder

Rigid tapping attachment with error compensation

Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

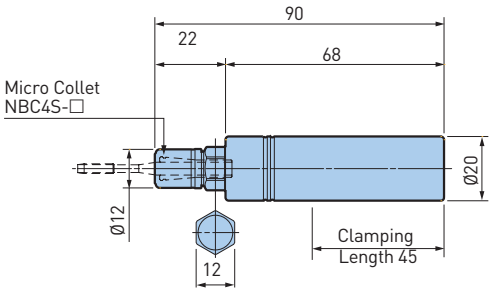




Model	Order No.
SLS25-MGT3-22	**804.115**

For Accessories ▶ 281

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.



Model	Order No.
ST20-MGT3-90	**978.356**

For Accessories ▶ 281

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.
3. There is no flat on the shank.

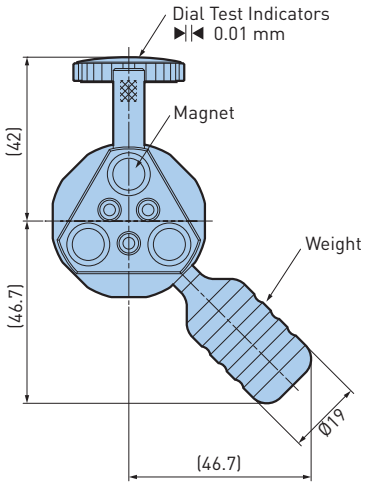
Centering Tool for Lathes

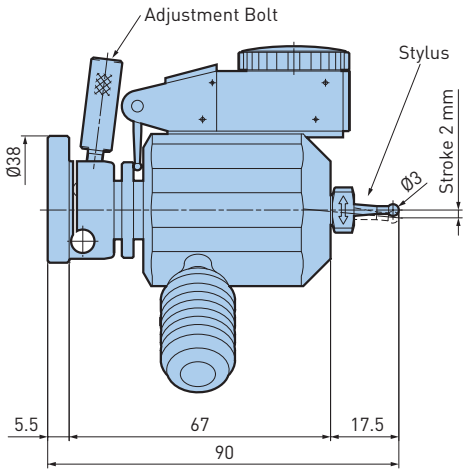
Easy Centering with Static Dial Gauge

- Centering the tool holder while watching the dial gauge is possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 0.01mm)
- Magnet base allows for flexible mounting positions







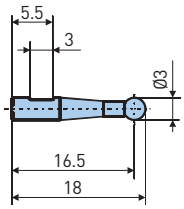


Model	Order No.	Min. Scale	Max. Spindle Speed	Weight (kg)	Stylus
CTL-90	**806.436**	0.01 mm	100 U/min	0.4 kg	ST3-CT90

1. Stylus included

Stylus for CTL-90





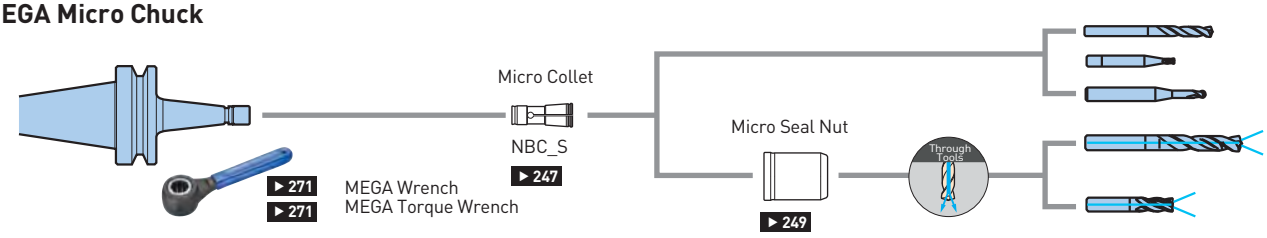
Model	Order No.	Material
ST3-CT90	**806.437**	Rubin

1. Longer stylus is also available upon request. Please contact BIG KAISER dealer.

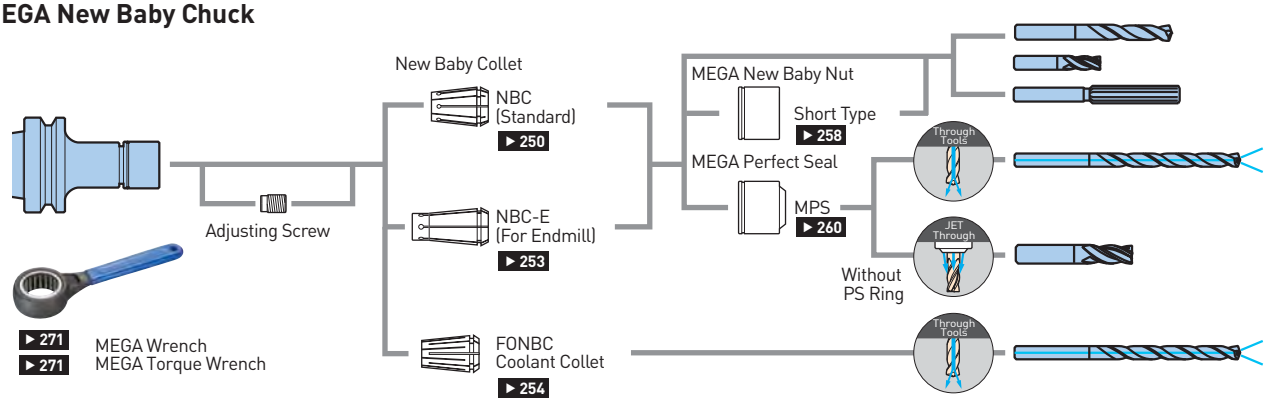
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MEGA Micro Chuck

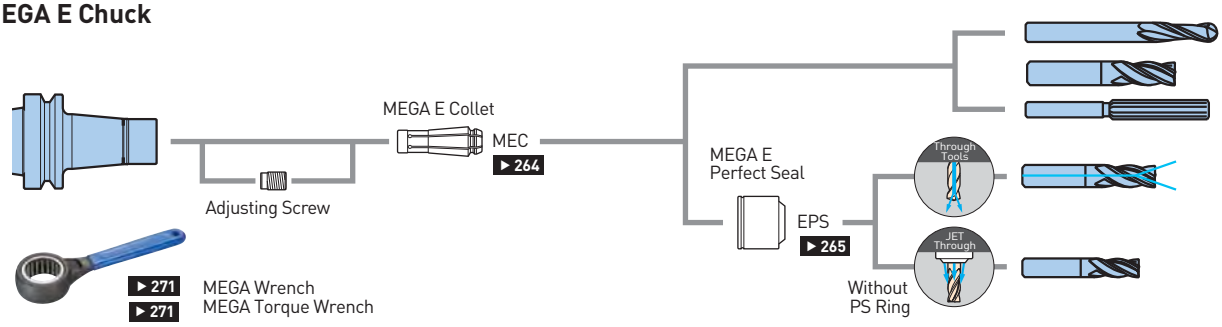


MEGA New Baby Chuck

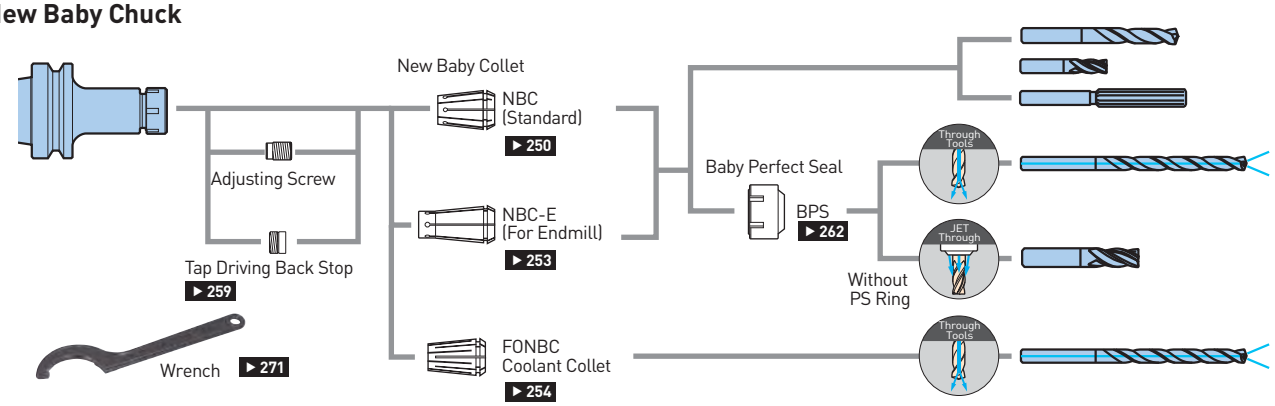


A.8

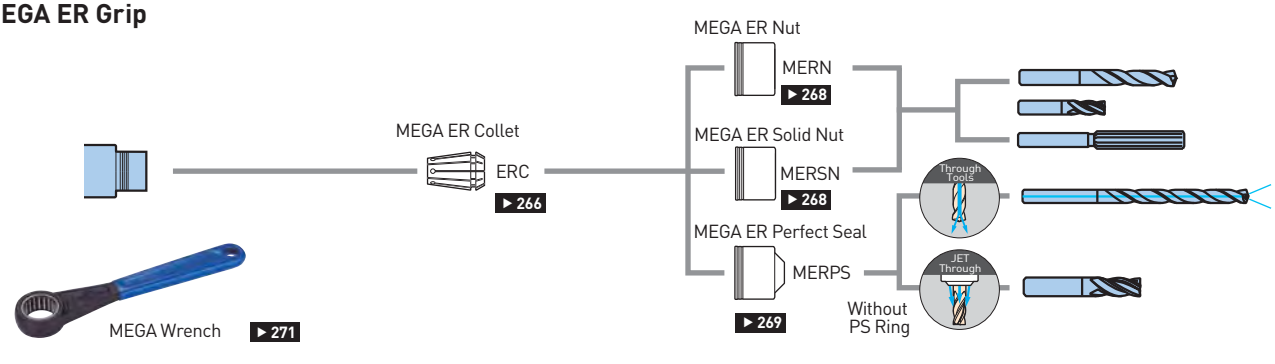
MEGA E Chuck



New Baby Chuck



MEGA ER Grip

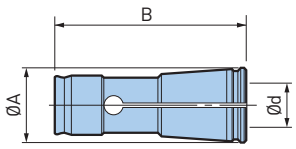


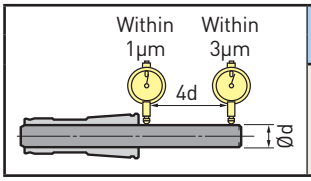
Micro Collets

For MEGA Micro Chuck

Available in 0.1 mm diameter increments to suit all the cutting tool shank sizes with maximum accuracy.
Despite their compact size, high clamping force and accuracy are achieved.







Collet Class	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

Clamping diameter: Ø 0.45 - Ø 3.25

MEGA3S		
Model	Order No.	Clamping Range Ød
NBC3S -0.5 AA	**968.301**	0.45 - 0.55
-0.6 AA	**968.302**	0.55 - 0.65
-0.7 AA	**968.303**	0.65 - 0.75
-0.8 AA	**968.304**	0.75 - 0.85
-0.9 AA	**968.305**	0.85 - 0.95
-1.0 AA	**968.306**	0.95 - 1.05
-1.1 AA	**968.307**	1.05 - 1.15
-1.2 AA	**968.308**	1.15 - 1.25
-1.3 AA	**968.309**	1.25 - 1.35
-1.4 AA	**968.310**	1.35 - 1.45
-1.5 AA	**968.311**	1.45 - 1.55
-1.6 AA	**968.312**	1.55 - 1.65
-1.7 AA	**968.313**	1.65 - 1.75
-1.8 AA	**968.314**	1.75 - 1.85
-1.9 AA	**968.315**	1.85 - 1.95
-2.0 AA	**968.316**	1.95 - 2.05
-2.1 AA	**968.317**	2.05 - 2.15
-2.2 AA	**968.318**	2.15 - 2.25
-2.3 AA	**968.319**	2.25 - 2.35
-2.4 AA	**968.320**	2.35 - 2.45
-2.5 AA	**968.321**	2.45 - 2.55
-2.6 AA	**968.322**	2.55 - 2.65
-2.7 AA	**968.323**	2.65 - 2.75
-2.8 AA	**968.324**	2.75 - 2.85
-2.9 AA	**968.325**	2.85 - 2.95
-3.0 AA	**968.326**	2.95 - 3.05
-3.1 AA	**968.327**	3.05 - 3.15
-3.175 AA	**968.328**	3.125 - 3.225
-3.2 AA	**968.329**	3.15 - 3.25

Ø A=6.06 B=18.8

Clamping diameter: Ø 0.45 - Ø 4.05

MEGA4S		
Model	Order No.	Clamping Range Ød
NBC4S -0.5 AA	**968.334**	0.45 - 0.55
-0.6 AA	**968.335**	0.55 - 0.65
-0.7 AA	**968.336**	0.65 - 0.75
-0.8 AA	**968.337**	0.75 - 0.85
-0.9 AA	**968.338**	0.85 - 0.95
-1.0 AA	**961.462**	0.95 - 1.05
-1.1 AA	**968.339**	1.05 - 1.15
-1.2 AA	**968.340**	1.15 - 1.25
-1.3 AA	**968.341**	1.25 - 1.35
-1.4 AA	**968.342**	1.35 - 1.45
-1.5 AA	**961.464**	1.45 - 1.55
-1.6 AA	**968.343**	1.55 - 1.65
-1.7 AA	**968.344**	1.65 - 1.75
-1.8 AA	**968.345**	1.75 - 1.85
-1.9 AA	**968.346**	1.85 - 1.95
-2.0 AA	**961.466**	1.95 - 2.05
-2.1 AA	**968.347**	2.05 - 2.15
-2.2 AA	**968.348**	2.15 - 2.25
-2.3 AA	**968.349**	2.25 - 2.35
-2.4 AA	**968.350**	2.35 - 2.45
-2.5 AA	**961.468**	2.45 - 2.55
-2.6 AA	**968.351**	2.55 - 2.65
-2.7 AA	**968.352**	2.65 - 2.75
-2.8 AA	**968.353**	2.75 - 2.85
-2.9 AA	**968.354**	2.85 - 2.95
-3.0 AA	**961.470**	2.95 - 3.05
-3.1 AA	**968.355**	3.05 - 3.15
-3.175 AA	**968.356**	3.125 - 3.225
-3.2 AA	**968.357**	3.15 - 3.25
-3.3 AA	**968.358**	3.25 - 3.35
-3.4 AA	**968.359**	3.35 - 3.45
-3.5 AA	**961.472**	3.45 - 3.55
-3.6 AA	**968.360**	3.55 - 3.65
-3.7 AA	**968.361**	3.65 - 3.75
-3.8 AA	**968.362**	3.75 - 3.85
-3.9 AA	**968.363**	3.85 - 3.95
-4.0 AA	**961.474**	3.95 - 4.05

Ø A=7.4 B=22.5

For MEGA6S/8S, refer to the following pages.

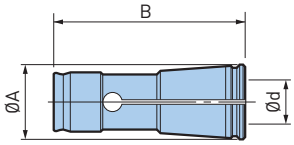
Micro Collets

For MEGA Micro Chuck

Clamping diameter: Ø 0.45 - Ø 6.05

MEGA6S		
Model	Order No.	Clamping Range Ød
NBC6S -0.5 AA	968.369	0.45 - 0.55
-0.6 AA	968.370	0.55 - 0.65
-0.7 AA	968.371	0.65 - 0.75
-0.8 AA	968.372	0.75 - 0.85
-0.9 AA	968.373	0.85 - 0.95
-1.0 AA	961.477	0.95 - 1.05
-1.1 AA	968.374	1.05 - 1.15
-1.2 AA	968.375	1.15 - 1.25
-1.3 AA	968.376	1.25 - 1.35
-1.4 AA	968.377	1.35 - 1.45
-1.5 AA	961.479	1.45 - 1.55
-1.6 AA	968.378	1.55 - 1.65
-1.7 AA	968.379	1.65 - 1.75
-1.8 AA	968.380	1.75 - 1.85
-1.9 AA	968.381	1.85 - 1.95
-2.0 AA	961.481	1.95 - 2.05
-2.1 AA	968.382	2.05 - 2.15
-2.2 AA	968.383	2.15 - 2.25
-2.3 AA	968.384	2.25 - 2.35
-2.4 AA	968.385	2.35 - 2.45
-2.5 AA	961.483	2.45 - 2.55
-2.6 AA	968.386	2.55 - 2.65
-2.7 AA	968.387	2.65 - 2.75
-2.8 AA	968.388	2.75 - 2.85
-2.9 AA	968.389	2.85 - 2.95
-3.0 AA	961.485	2.95 - 3.05
-3.1 AA	968.390	3.05 - 3.15
-3.175 AA	968.391	3.125 - 3.225
-3.2 AA	968.392	3.15 - 3.25
-3.3 AA	968.393	3.25 - 3.35
-3.4 AA	968.394	3.35 - 3.45
-3.5 AA	961.487	3.45 - 3.55
-3.6 AA	968.395	3.55 - 3.65
-3.7 AA	968.396	3.65 - 3.75
-3.8 AA	968.397	3.75 - 3.85
-3.9 AA	968.398	3.85 - 3.95
-4.0 AA	961.489	3.95 - 4.05
-4.1 AA	968.399	4.05 - 4.15
-4.2 AA	968.400	4.15 - 4.25
-4.3 AA	968.401	4.25 - 4.35
-4.4 AA	968.402	4.35 - 4.45
-4.5 AA	961.491	4.45 - 4.55
-4.6 AA	968.403	4.55 - 4.65
-4.7 AA	968.404	4.65 - 4.75
-4.7625 AA	801.743	4.7125 - 4.8125
-4.8 AA	968.405	4.75 - 4.85
-4.9 AA	968.406	4.85 - 4.95
-5.0 AA	961.493	4.95 - 5.05
-5.1 AA	968.408	5.05 - 5.15
-5.2 AA	968.409	5.15 - 5.25
-5.3 AA	968.410	5.25 - 5.35
-5.4 AA	968.411	5.35 - 5.45
-5.5 AA	961.495	5.45 - 5.55
-5.6 AA	968.412	5.55 - 5.65
-5.7 AA	968.413	5.65 - 5.75
-5.8 AA	968.414	5.75 - 5.85
-5.9 AA	968.415	5.85 - 5.95
-6.0 AA	961.497	5.95 - 6.05

Ø A=9.4 B=24.5



Clamping diameter: Ø 2.95 - Ø 8.05

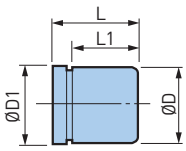
MEGA8S		
Model	Order No.	Clamping Range Ød
NBC8S -3.0 AA	801.709	2.95 - 3.05
-3.1 AA	804.132	3.05 - 3.15
-3.2 AA	804.134	3.15 - 3.25
-3.3 AA	804.135	3.25 - 3.35
-3.4 AA	804.136	3.35 - 3.45
-3.5 AA	804.137	3.45 - 3.55
-3.6 AA	804.138	3.55 - 3.65
-3.7 AA	804.139	3.65 - 3.75
-3.8 AA	804.140	3.75 - 3.85
-3.9 AA	804.141	3.85 - 3.95
-4.0 AA	801.742	3.95 - 4.05
-4.1 AA	804.142	4.05 - 4.15
-4.2 AA	804.143	4.15 - 4.25
-4.3 AA	804.144	4.25 - 4.35
-4.4 AA	804.145	4.35 - 4.45
-4.5 AA	804.146	4.45 - 4.55
-4.6 AA	804.147	4.55 - 4.65
-4.7 AA	804.148	4.65 - 4.75
-4.8 AA	804.149	4.75 - 4.85
-4.9 AA	804.150	4.85 - 4.95
-5.0 AA	801.702	4.95 - 5.05
-5.1 AA	804.151	5.05 - 5.15
-5.2 AA	804.152	5.15 - 5.25
-5.3 AA	804.153	5.25 - 5.35
-5.4 AA	804.154	5.35 - 5.45
-5.5 AA	804.155	5.45 - 5.55
-5.6 AA	804.156	5.55 - 5.65
-5.7 AA	804.157	5.65 - 5.75
-5.8 AA	804.158	5.75 - 5.85
-5.9 AA	801.746	5.85 - 5.95
-6.0 AA	801.703	5.95 - 6.05
-6.1 AA	804.159	6.05 - 6.15
-6.2 AA	804.160	6.15 - 6.25
-6.3 AA	804.161	6.25 - 6.35
-6.4 AA	804.162	6.35 - 6.45
-6.5 AA	804.163	6.45 - 6.55
-6.6 AA	804.164	6.55 - 6.65
-6.7 AA	804.165	6.65 - 6.75
-6.8 AA	804.166	6.75 - 6.85
-6.9 AA	804.167	6.85 - 6.95
-7.0 AA	804.168	6.95 - 7.05
-7.1 AA	804.169	7.05 - 7.15
-7.2 AA	804.170	7.15 - 7.25
-7.3 AA	804.171	7.25 - 7.35
-7.4 AA	804.172	7.35 - 7.45
-7.5 AA	804.173	7.45 - 7.55
-7.6 AA	804.174	7.55 - 7.65
-7.7 AA	804.175	7.65 - 7.75
-7.8 AA	804.176	7.75 - 7.85
-7.9 AA	804.177	7.85 - 7.95
-8.0 AA	801.704	7.95 - 8.05

Ø A=12 B=27

MEGA Nut

For MEGA Micro Chuck





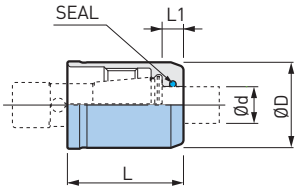
Model	Order No.	MEGA Micro Chuck	D	ØD1	L	L1
MGN3S	**969.480**	MEGA3S	10	10.3	13.0	11.0
MGN4S	**969.481**	MEGA4S	12	12.2	14.5	12.0
MGN6S	**969.482**	MEGA6S	14	14.2	17.0	14.5
MGN8S	**804.108**	MEGA8S	18	18.3	18.5	15.5

Micro Seal Nut

For MEGA Micro Chuck

Sealed nut for coolant-through tools.





MEGA6S

Model	Order No.	Ød	ØD	L	L1
MGN6S -PS3	**978.516**	3.0	14	19	3.5
-PS4	**978.513**	4.0			
-PS5	**978.517**	5.0			
-PS6	**978.511**	6.0			

MEGA8S

Model	Order No.	Ød	ØD	L	L1
MGN8S -PS3	**804.109**	3.0	18	20.2	3.5
-PS4	**804.110**	4.0			
-PS5	**804.111**	5.0			
-PS6	**804.112**	6.0			
-PS7	**804.113**	7.0			
-PS8	**804.114**	8.0			

Micro Collet Protective Cases

Exclusive case for MEGA Micro Collet.



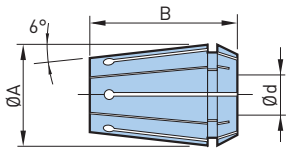
Model	Order No.	Micro Collet	No. of Spot	Size
NBB3S	**968.330**	NBC3S	50	200 x 170 x 50
NBB4S	**968.364**	NBC4S		
NBB6S	**961.498**	NBC6S	60	200 x 170 x 50
NBB8S	**805.802**	NBC8S		

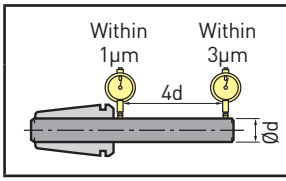
1. Micro collet is not included.

New Baby Collets Standard

For MEGA New Baby Chuck and New Baby Chuck







Collet Class	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

Clamping diameter: Ø 0.25 - Ø 6.0

MEGA6N / NBS6				
Model			Order No.	Clamping Range Ød
NBC6	-0.5	AA	961.500	0.25 - 0.50
•	-0.75	AA	961.501	0.50 - 0.75
•	-1	AA	961.502	0.75 - 1.00
•	-1.25	AA	961.503	1.00 - 1.25
•	-1.5	AA	961.504	1.25 - 1.50
•	-1.75	AA	961.505	1.50 - 1.75
•	-2	AA	961.506	1.75 - 2.00
•	-2.25	AA	961.507	2.00 - 2.25
•	-2.5	AA	961.508	2.25 - 2.50
•	-2.75	AA	961.509	2.50 - 2.75
•	-3	AA	961.510	2.75 - 3.00
	-3.175	AA	801.738	2.925 - 3.175
•	-3.25	AA	961.511	3.00 - 3.25
•	-3.5	AA	961.512	3.25 - 3.50
•	-3.75	AA	961.513	3.50 - 3.75
•	-4	AA	961.514	3.75 - 4.00
•	-4.25	AA	961.515	4.00 - 4.25
•	-4.5	AA	961.516	4.25 - 4.50
•	-4.75	AA	961.517	4.50 - 4.75
•	-5	AA	961.518	4.75 - 5.00
•	-5.25	AA	961.519	5.00 - 5.25
•	-5.5	AA	961.520	5.25 - 5.50
•	-5.75	AA	961.521	5.50 - 5.75
•	-6	AA	961.522	5.75 - 6.00

Ø A=9.5 B=14

Clamping diameter: Ø 0.5 - Ø 8.0

MEGA8N / NBS8				
Model			Order No.	Clamping Range Ød
• NBC8	-0.75	AA	978.507	0.50 - 0.75
•	-1	AA	961.531	0.75 - 1.00
•	-1.25	AA	978.500	1.00 - 1.25
•	-1.5	AA	961.532	1.25 - 1.50
•	-1.75	AA	801.744	1.50 - 1.75
•	-2	AA	961.533	1.75 - 2.00
•	-2.25	AA	978.505	2.00 - 2.25
•	-2.5	AA	961.534	2.25 - 2.50
•	-2.75	AA	978.506	2.50 - 2.75
•	-3	AA	961.535	2.75 - 3.00
	-3.175	AA	978.499	2.675 - 3.175
•	-3.5	AA	961.536	3.00 - 3.50
•	-4	AA	961.537	3.50 - 4.00
•	-4.5	AA	961.538	4.00 - 4.50
•	-5	AA	961.539	4.50 - 5.00
	-5.25	AA	801.750	4.75 - 5.25
•	-5.5	AA	961.540	5.00 - 5.50
	-5.75	AA	801.751	5.25 - 5.75
•	-6	AA	961.541	5.50 - 6.00
•	-6.5	AA	961.542	6.00 - 6.50
•	-7	AA	961.543	6.50 - 7.00
•	-7.5	AA	961.544	7.00 - 7.50
•	-8	AA	961.545	7.50 - 8.00

Ø A=12.5 B=18

Clamping diameter: Ø 1.5 - Ø 10.0

MEGA10N / NBS10				
Model			Order No.	Clamping Range Ød
• NBC10	- 1.75	AA	961.599	1.50 - 1.75
•	- 2	AA	961.551	1.75 - 2.00
•	- 2.25	AA	978.508	2.00 - 2.25
•	- 2.5	AA	961.552	2.25 - 2.50
•	- 2.75	AA	978.509	2.50 - 2.75
•	- 3	AA	961.553	2.75 - 3.00
	- 3.175	AA	961.120	2.675 - 3.175
	- 3.25	AA	801.651	2.75 - 3.25
•	- 3.5	AA	961.554	3.00 - 3.50
	- 3.75	AA	801.652	3.25 - 3.75
•	- 4	AA	961.555	3.50 - 4.00
	- 4.25	AA	801.655	3.75 - 4.25
•	- 4.5	AA	961.556	4.00 - 4.50
	- 4.75	AA	801.656	4.25 - 4.75

MEGA10N / NBS10				
Model			Order No.	Clamping Range Ød
• NBC10	- 5	AA	961.557	4.50 - 5.00
	- 5.25	AA	801.659	4.75 - 5.25
•	- 5.5	AA	961.558	5.00 - 5.50
	- 5.75	AA	801.660	5.25 - 5.75
•	- 6	AA	961.559	5.50 - 6.00
•	- 6.5	AA	961.560	6.00 - 6.50
•	- 7	AA	961.561	6.50 - 7.00
•	- 7.5	AA	961.562	7.00 - 7.50
•	- 8	AA	961.563	7.50 - 8.00
•	- 8.5	AA	961.564	8.00 - 8.50
•	- 9	AA	961.565	8.50 - 9.00
•	- 9.5	AA	961.566	9.00 - 9.50
•	-10	AA	961.567	9.50 - 10.00

Ø A=16.5 B=27

Clamping diameter: Ø 2.5 - Ø 13.0

MEGA13N / NBS13		
Model	Order No.	Clamping Range Ød
• NBC13 - 3 AA	**961.573**	2.50 - 3.00
- 3.175 AA	**961.127**	2.675 - 3.175
- 3.25 AA	**801.671**	2.75 - 3.25
• - 3.5 AA	**961.574**	3.00 - 3.50
- 3.75 AA	**801.672**	3.25 - 3.75
• - 4 AA	**961.575**	3.50 - 4.00
- 4.25 AA	**801.675**	3.75 - 4.25
• - 4.5 AA	**961.576**	4.00 - 4.50
- 4.75 AA	**801.676**	4.25 - 4.75
• - 5 AA	**961.577**	4.50 - 5.00
- 5.25 AA	**801.679**	4.75 - 5.25
• - 5.5 AA	**961.578**	5.00 - 5.50
- 5.75 AA	**801.680**	5.25 - 5.75
• - 6 AA	**961.579**	5.50 - 6.00
• - 6.5 AA	**961.580**	6.00 - 6.50
• - 7 AA	**961.581**	6.50 - 7.00
• - 7.5 AA	**961.582**	7.00 - 7.50
• - 8 AA	**961.583**	7.50 - 8.00
• - 8.5 AA	**961.584**	8.00 - 8.50
• - 9 AA	**961.585**	8.50 - 9.00
• - 9.5 AA	**961.586**	9.00 - 9.50
• -10 AA	**961.587**	9.50 - 10.00
• -10.5 AA	**961.588**	10.00 - 10.50
• -11 AA	**961.589**	10.50 - 11.00
• -11.5 AA	**961.590**	11.00 - 11.50
• -12 AA	**961.591**	11.50 - 12.00
• -12.5 AA	**961.592**	12.00 - 12.50
• -13 AA	**961.593**	12.50 - 13.00

Ø A=20.5 B=31

Clamping diameter: Ø 2.5 - Ø 16.0

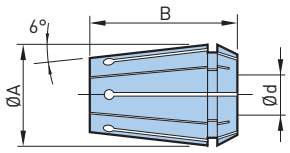
MEGA16N / NBS16		
Model	Order No.	Clamping Range Ød
• NBC16 - 3 AA	**961.601**	2.50 - 3.00
- 3.25 AA	**801.694**	2.75 - 3.25
• - 3.5 AA	**961.602**	3.00 - 3.50
- 3.75 AA	**801.695**	3.25 - 3.75
• - 4 AA	**961.603**	3.50 - 4.00
- 4.25 AA	**801.697**	3.75 - 4.25
• - 4.5 AA	**961.604**	4.00 - 4.50
- 4.75 AA	**801.698**	4.25 - 4.75
• - 5 AA	**961.605**	4.50 - 5.00
- 5.25 AA	**801.700**	4.75 - 5.25
• - 5.5 AA	**961.606**	5.00 - 5.50
- 5.75 AA	**801.701**	5.25 - 5.75
• - 6 AA	**961.607**	5.50 - 6.00
• - 6.5 AA	**961.608**	6.00 - 6.50
• - 7 AA	**961.609**	6.50 - 7.00
• - 7.5 AA	**961.610**	7.00 - 7.50
• - 8 AA	**961.611**	7.50 - 8.00
• - 8.5 AA	**961.612**	8.00 - 8.50
• - 9 AA	**961.613**	8.50 - 9.00
• - 9.5 AA	**961.614**	9.00 - 9.50
• -10 AA	**961.615**	9.50 - 10.00
• -10.5 AA	**961.616**	10.00 - 10.50
• -11 AA	**961.617**	10.50 - 11.00
• -11.5 AA	**961.618**	11.00 - 11.50
• -12 AA	**961.619**	11.50 - 12.00
• -12.5 AA	**961.620**	12.00 - 12.50
• -13 AA	**961.621**	12.50 - 13.00
• -13.5 AA	**961.622**	13.00 - 13.50
• -14 AA	**961.623**	13.50 - 14.00
• -14.5 AA	**961.624**	14.00 - 14.50
• -15 AA	**961.625**	14.50 - 15.00
• -15.5 AA	**961.626**	15.00 - 15.50
• -16 AA	**961.627**	15.50 - 16.00

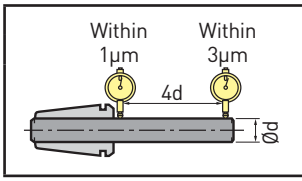
Ø A=25.5 B=35

1. • Models are included in new baby collet set ▸256.

New Baby Collets Standard







Collet Class	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

Clamping diameter: Ø 2.5 - Ø 20.0

MEGA20N / NBS20			
Model		Order No.	Clamping Range Ød
• NBC20	- 3 AA	961.641	2.50 - 3.00
	- 3.25 AA	801.718	2.75 - 3.25
•	- 3.5 AA	961.642	3.00 - 3.50
	- 3.75 AA	801.719	3.25 - 3.75
•	- 4 AA	961.643	3.50 - 4.00
	- 4.25 AA	801.722	3.75 - 4.25
•	- 4.5 AA	961.644	4.00 - 4.50
	- 4.75 AA	801.723	4.25 - 4.75
•	- 5 AA	961.645	4.50 - 5.00
	- 5.25 AA	801.726	4.75 - 5.25
•	- 5.5 AA	961.646	5.00 - 5.50
	- 5.75 AA	801.727	5.25 - 5.75
•	- 6 AA	961.647	5.50 - 6.00
•	- 6.5 AA	961.648	6.00 - 6.50
•	- 7 AA	961.649	6.50 - 7.00
•	- 7.5 AA	961.650	7.00 - 7.50
•	- 8 AA	961.651	7.50 - 8.00
•	- 8.5 AA	961.652	8.00 - 8.50
•	- 9 AA	961.653	8.50 - 9.00
•	- 9.5 AA	961.654	9.00 - 9.50
•	-10 AA	961.655	9.50 - 10.00
•	-10.5 AA	961.656	10.00 - 10.50
•	-11 AA	961.657	10.50 - 11.00
•	-11.5 AA	961.658	11.00 - 11.50
•	-12 AA	961.659	11.50 - 12.00
•	-12.5 AA	961.660	12.00 - 12.50
•	-13 AA	961.661	12.50 - 13.00
•	-13.5 AA	961.662	13.00 - 13.50
•	-14 AA	961.663	13.50 - 14.00
•	-14.5 AA	961.664	14.00 - 14.50
•	-15 AA	961.665	14.50 - 15.00
•	-15.5 AA	961.666	15.00 - 15.50
•	-16 AA	961.667	15.50 - 16.00
•	-16.5 AA	961.668	16.00 - 16.50
•	-17 AA	961.669	16.50 - 17.00
•	-17.5 AA	961.670	17.00 - 17.50
•	-18 AA	961.671	17.50 - 18.00
•	-18.5 AA	961.672	18.00 - 18.50
•	-19 AA	961.673	18.50 - 19.00
•	-19.5 AA	961.674	19.00 - 19.50
•	-20 AA	961.675	19.50 - 20.00

Ø A=28.5 B=38

Clamping diameter: Ø 15.5 - Ø 25.4

MEGA25N			
Model		Order No.	Clamping Range Ød
• NBC25	-16 AA	806.390	15.5 - 16.0
•	-16.5 AA	806.391	16.0 - 16.5
•	-17 AA	806.392	16.5 - 17.0
•	-17.5 AA	806.393	17.0 - 17.5
•	-18 AA	806.394	17.5 - 18.0
•	-18.5 AA	806.395	18.0 - 18.5
•	-19 AA	806.396	18.5 - 19.0
•	-19.5 AA	806.397	19.0 - 19.5
•	-20 AA	806.398	19.5 - 20.0
•	-20.5 AA	806.399	20.0 - 20.5
•	-21 AA	806.400	20.5 - 21.0
•	-21.5 AA	806.401	21.0 - 21.5
•	-22 AA	806.402	21.5 - 22.0
•	-22.5 AA	806.403	22.0 - 22.5
•	-23 AA	806.404	22.5 - 23.0
•	-23.5 AA	806.405	23.0 - 23.5
•	-24 AA	806.406	23.5 - 24.0
•	-24.5 AA	806.407	24.0 - 24.5
•	-25 AA	806.408	24.5 - 25.0
	-25.4 AA	806.409	24.9 - 25.4

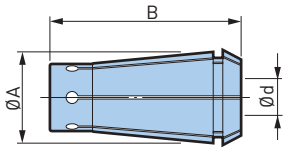
ØA=35.5mm B=52mm

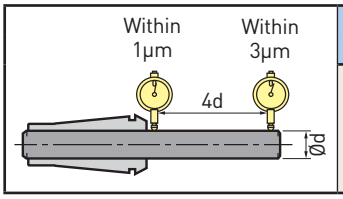
1. • Models are included in new baby collet set ▸256.

New Baby Collets for Endmills

For MEGA New Baby Chuck and New Baby Chuck







Collet Class	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

MEGA6N / NBS6		
Model	Order No.	Clamping Range Ød
NBC6 -3E AA	961.148	3
-4E AA	961.149	4
-5E AA	961.150	5
-6E AA	961.151	6

Ø A=9.2 B=17

MEGA8N / NBS8		
Model	Order No.	Clamping Range Ød
NBC8 -3E AA	961.152	3
-4E AA	961.153	4
-5E AA	961.154	5
-6E AA	961.155	6
-8E AA	961.156	8

Ø A=12 B=20

MEGA10N / NBS10		
Model	Order No.	Clamping Range Ød
NBC10 - 3E AA	801.654	3
- 4E AA	801.658	4
- 5E AA	801.662	5
- 6E AA	961.160	6
- 8E AA	961.161	8
-10E AA	961.146	10

Ø A=16 B=32

MEGA13N / NBS13		
Model	Order No.	Clamping Range Ød
NBC13 - 3E AA	801.674	3
- 4E AA	801.678	4
- 5E AA	801.682	5
- 6E AA	961.165	6
- 8E AA	961.166	8
-10E AA	961.147	10
-12E AA	961.167	12

Ø A=20 B=38

MEGA16N / NBS16		
Model	Order No.	Clamping Range Ød
NBC16 - 3E AA	961.168	3
- 4E AA	961.169	4
- 5E AA	961.170	5
- 6E AA	961.171	6
- 8E AA	961.172	8
-10E AA	961.173	10
-12E AA	961.174	12
-14E AA	961.175	14
-16E AA	961.176	16

Ø A=25 B=42

MEGA20N / NBS20		
Model	Order No.	Clamping Range Ød
NBC20 - 3E AA	801.721	3
- 4E AA	801.725	4
- 5E AA	801.729	5
- 6E AA	961.180	6
- 8E AA	801.733	8
-10E AA	961.182	10
-12E AA	961.183	12
-14E AA	961.184	14
-16E AA	961.185	16
-20E AA	961.186	20

Ø A=28 B=45

- Use only a cutting tool shank with exactly the same diameter as the collet bore diameter.
- The tolerance of the cutting tool shank must be within h7.

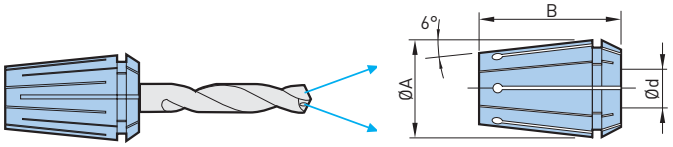
FONBC Coolant Collets

For MEGA New Baby Chuck and New Baby Chuck

Optimum collet for center-through coolant applications with coolant-through cutting tools.

- Max. Coolant pressure 7 MPa





Clamping diameter: Ø 3.0 - Ø 6.0

MEGA6N / NBS6		
Model	**Order No.**	**Clamping Range Ød**
FONBC6 -3 AA	**969.601**	3.00 *
-3.25 AA	**969.602**	3.15 - 3.25
-3.5 AA	**969.603**	3.40 - 3.50
-3.75 AA	**969.604**	3.65 - 3.75
-4 AA	**969.605**	3.90 - 4.00
-4.25 AA	**969.606**	4.15 - 4.25
-4.5 AA	**969.607**	4.40 - 4.50
-4.75 AA	**969.608**	4.65 - 4.75
-5 AA	**969.609**	4.90 - 5.00
-5.25 AA	**969.610**	5.15 - 5.25
-5.5 AA	**969.611**	5.40 - 5.50
-5.75 AA	**969.612**	5.65 - 5.75
-6 AA	**969.613**	5.90 - 6.00

Ø A=9.5 B=14 * No collapsibility

Clamping diameter: Ø 2.9 - Ø 8.0

MEGA8N / NBS8		
Model	**Order No.**	**Clamping Range Ød**
FONBC8 -3 AA	**969.615**	2.90 - 3.00
-3.5 AA	**969.616**	3.40 - 3.50
-4 AA	**969.617**	3.90 - 4.00
-4.5 AA	**969.618**	4.40 - 4.50
-5 AA	**969.619**	4.90 - 5.00
-5.5 AA	**969.620**	5.40 - 5.50
-6 AA	**969.621**	5.90 - 6.00
-6.5 AA	**969.622**	6.40 - 6.50
-7 AA	**969.623**	6.90 - 7.00
-7.5 AA	**969.624**	7.40 - 7.50
-8 AA	**969.625**	7.90 - 8.00

Ø A=12.5 B=18

Clamping diameter: Ø 2.9 - Ø 10.0

MEGA10N / NBS10		
Model	**Order No.**	**Clamping Range Ød**
FONBC10 - 3 AA	**969.627**	2.90 - 3.00
- 3.5 AA	**969.628**	3.40 - 3.50
- 4 AA	**969.629**	3.90 - 4.00
- 4.5 AA	**969.630**	4.40 - 4.50
- 5 AA	**969.631**	4.90 - 5.00
- 5.5 AA	**969.632**	5.40 - 5.50
- 6 AA	**969.633**	5.90 - 6.00
- 6.5 AA	**969.634**	6.40 - 6.50
- 7 AA	**969.635**	6.90 - 7.00
- 7.5 AA	**969.636**	7.40 - 7.50
- 8 AA	**969.637**	7.90 - 8.00
- 8.5 AA	**969.638**	8.40 - 8.50
- 9 AA	**969.639**	8.90 - 9.00
- 9.5 AA	**969.640**	9.40 - 9.50
-10 AA	**969.641**	9.90 - 10.00

Ø A=16.5 B=27

Clamping diameter: Ø 3.0 - Ø 13

MEGA13N / NBS13		
Model	**Order No.**	**Clamping Range Ød**
FONBC13 - 3 AA	**969.643**	3.00 *
- 3.5 AA	**969.644**	3.40 - 3.50
- 4 AA	**969.645**	3.90 - 4.00
- 4.5 AA	**969.646**	4.40 - 4.50
- 5 AA	**969.647**	4.90 - 5.00
- 5.5 AA	**969.648**	5.40 - 5.50
- 6 AA	**969.649**	5.90 - 6.00
- 6.5 AA	**969.650**	6.40 - 6.50
- 7 AA	**969.651**	6.90 - 7.00
- 7.5 AA	**969.652**	7.40 - 7.50
- 8 AA	**969.653**	7.90 - 8.00
- 8.5 AA	**969.654**	8.40 - 8.50
- 9 AA	**969.655**	8.90 - 9.00
- 9.5 AA	**969.656**	9.40 - 9.50
-10 AA	**969.657**	9.90 - 10.00
-10.5 AA	**969.658**	10.40 - 10.50
-11 AA	**969.659**	10.90 - 11.00
-11.5 AA	**969.660**	11.40 - 11.50
-12 AA	**969.661**	11.90 - 12.00
-12.5 AA	**969.662**	12.40 - 12.50
-13.0 AA	**969.663**	12.90 - 13.00

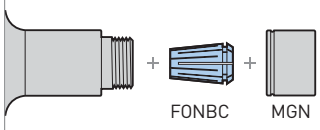
Ø A=20.5 B=31 * No collapsibility

Clamping diameter: Ø 4.9 - Ø 16.0

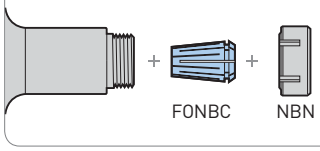
MEGA16N / NBS16		
Model	Order No.	Clamping Range Ød
FONBC16 - 5 AA	**969.669**	4.90 - 5.00
- 5.5 AA	**969.670**	5.40 - 5.50
- 6 AA	**969.671**	5.90 - 6.00
- 6.5 AA	**969.672**	6.40 - 6.50
- 7 AA	**969.673**	6.90 - 7.00
- 7.5 AA	**969.674**	7.40 - 7.50
- 8 AA	**969.675**	7.90 - 8.00
- 8.5 AA	**969.676**	8.40 - 8.50
- 9 AA	**969.677**	8.90 - 9.00
- 9.5 AA	**969.678**	9.40 - 9.50
-10 AA	**969.679**	9.90 - 10.00
-10.5 AA	**969.680**	10.40 - 10.50
-11 AA	**969.681**	10.90 - 11.00
-11.5 AA	**969.682**	11.40 - 11.50
-12 AA	**969.683**	11.90 - 12.00
-12.5 AA	**969.684**	12.40 - 12.50
-13 AA	**969.685**	12.90 - 13.00
-13.5 AA	**969.686**	13.40 - 13.50
-14 AA	**969.687**	13.90 - 14.00
-14.5 AA	**969.688**	14.40 - 14.50
-15 AA	**969.689**	14.90 - 15.00
-15.5 AA	**969.690**	15.40 - 15.50
-16 AA	**969.691**	15.90 - 16.00

Ø A=25.5 B=35

For MEGA New Baby Chuck use the standard MGN nut.



For New Baby Chuck use the standard NBN nut.



Note

Collapsibility is different from standard NBC collet.

Clamping diameter: Ø 4.9 - Ø 20.0

MEGA20N / NBS20		
Model	Order No.	Clamping Range Ød
FONBC20 - 5 AA	**969.697**	4.90 - 5.00
- 5.5 AA	**969.698**	5.40 - 5.50
- 6 AA	**969.699**	5.90 - 6.00
- 6.5 AA	**969.700**	6.40 - 6.50
- 7 AA	**969.701**	6.90 - 7.00
- 7.5 AA	**969.702**	7.40 - 7.50
- 8 AA	**969.703**	7.90 - 8.00
- 8.5 AA	**969.704**	8.40 - 8.50
- 9 AA	**969.705**	8.90 - 9.00
- 9.5 AA	**969.706**	9.40 - 9.50
-10 AA	**969.707**	9.90 - 10.00
-10.5 AA	**969.708**	10.40 - 10.50
-11 AA	**969.709**	10.90 - 11.00
-11.5 AA	**969.710**	11.40 - 11.50
-12 AA	**969.711**	11.90 - 12.00
-12.5 AA	**969.712**	12.40 - 12.50
-13 AA	**969.713**	12.90 - 13.00
-13.5 AA	**969.714**	13.40 - 13.50
-14 AA	**969.715**	13.90 - 14.00
-14.5 AA	**969.716**	14.40 - 14.50
-15 AA	**969.717**	14.90 - 15.00
-15.5 AA	**969.718**	15.40 - 15.50
-16 AA	**969.719**	15.90 - 16.00
-16.5 AA	**969.720**	16.40 - 16.50
-17 AA	**969.721**	16.90 - 17.00
-17.5 AA	**969.722**	17.40 - 17.50
-18 AA	**969.723**	17.90 - 18.00
-18.5 AA	**969.724**	18.40 - 18.50
-19 AA	**969.725**	18.90 - 19.00
-19.5 AA	**969.726**	19.40 - 19.50
-20 AA	**969.727**	19.90 - 20.00

Ø A=28.5 B=38

Clamping diameter: Ø 15.9 - Ø 25.4

MEGA25N		
Model	Order No.	Clamping Range Ød
FONBC25 -16 AA	**806.412**	15.9 - 16.0
-17 AA	**806.413**	16.9 - 17.0
-18 AA	**806.414**	17.9 - 18.0
-19 AA	**806.415**	18.9 - 19.0
-20 AA	**806.416**	19.9 - 20.0
-21 AA	**806.417**	20.9 - 21.0
-22 AA	**806.418**	21.9 - 22.0
-23 AA	**806.419**	22.9 - 23.0
-24 AA	**806.420**	23.9 - 24.0
-25 AA	**806.421**	24.9 - 25.0
-25.4 AA	**806.739**	25.3 - 25.4

Ø A=35.5 B=52

New Baby Collet Sets

For MEGA New Baby Chuck and New Baby Chuck

Contains all the major collet models to cover entire clamping range.



Model	Order No.	Capacity	Number of Collet	Case Size (Width x Length)	Corresponding Chuck Model
SNBC6AA -22	**802.187**	0.5 - 6	22	200 x 170 x 50	MEGA 6N / NBS 6
SNBC8AA -20	**802.188**	0.5 - 8	20	200 x 170 x 50	MEGA 8N / NBS 8
SNBC10AA -20	**802.183**	1.5 - 10	20	200 x 170 x 50	MEGA10N / NBS10
SNBC13AA -21	**802.184**	2.5 - 13	21	245 x 210 x 60	MEGA13N / NBS13
SNBC16AA -27	**802.185**	2.5 - 16	27	275 x 230 x 65	MEGA16N / NBS16
SNBC20AA -35	**961.676**	2.5 - 20	35	310 x 260 x 75	MEGA20N / NBS20
SNBC25AA -19	**806.656**	15.5 - 25	19	310 x 260 x 75	MEGA25N

1. Collets included in a set are shown in ▸ 250 - 252.

Cases for New Baby Collets

Exclusive case to protect and maintain the high precision collets.



Model	Order No.	Number of Holes	Case Size (Width x Length)	Corresponding Collet Model
NBB6	**961.524**	60	200 x 170 x 50	NBC 6 / FONBC 6
NBB8	**961.547**	50	200 x 170 x 50	NBC 8 / FONBC 8
NBB10	**961.569**	40	200 x 170 x 50	NBC10 / FONBC10
NBB13	**961.595**	35	245 x 210 x 60	NBC13 / FONBC13
NBB16	**961.629**	35	275 x 230 x 65	NBC16 / FONBC16
NBB20	**961.677**	45	310 x 260 x 75	NBC20 / FONBC20
NBB25	**806.657**	28	310 x 260 x 75	NBC25 / FONBC25

1. All cases can not be used with new baby collet for endmill (NBC-E).

Collet Ejectors

Easily and quickly remove New Baby Collet from MEGA nuts and New Baby Nut.







For New Baby Collet

Model	Order No.	Nut Model	Collet Model
NBC6 -CE	**969.492**	MGN6 / NBN6	NBC6 / FONBC6
NBC8 -CE	**969.493**	MGN8 / NBN8	NBC8 / FONBC8
NBC10 -CE	**969.494**	MGN10 / NBN10	NBC10 / FONBC10
NBC13 -CE	**969.495**	MGN13 / NBN13	NBC13 / FONBC13

For New Baby Endmill Collet

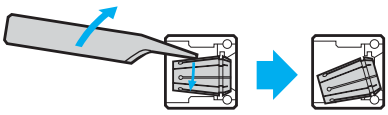
Model	Order No.	Nut Model	Collet Model
NBC6E -CE	**969.496**	MGN6 / NBN6	NBC6E
NBC8E -CE	**969.497**	MGN8 / NBN8	NBC8E
NBC10E -CE	**969.498**	MGN10 / NBN10	NBC10E
NBC13E -CE	**969.499**	MGN13 / NBN13	NBC13E

Collet Removers

For MEGA New Baby Chuck and New Baby Chuck

Model	Order No.
NBJ	**969.491**

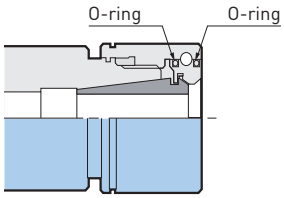




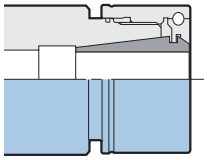
MEGA Nut

For MEGA New Baby Chuck









Standard Type

Model	Order No.	ØD	L	Chuck Body
MGN6	**969.483**	20	20.5	MEGA6N
MGN8	**969.484**	25	23	MEGA8N
MGN10	**969.485**	30	24	MEGA10N
MGN13	**969.486**	35	27	MEGA13N
MGN16	**969.487**	42	27	MEGA16N
MGN20	**969.488**	46	27	MEGA20N
MGN25	**806.388**	60	31	MEGA25N

Short Type

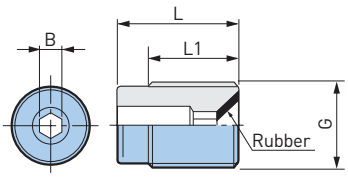
Model	Order No.	ØD	L	Chuck Body
MGN6F	**805.668**	20	18	MEGA6N
MGN8F	**805.669**	25	20	MEGA8N
MGN10F	**805.670**	30	21	MEGA10N
MGN13F	**805.671**	35	24	MEGA13N
MGN16F	**805.672**	42	24.5	MEGA16N
MGN20F	**805.673**	46	24.5	MEGA20N

A.8

Adjusting Screws

For MEGA New Baby Chuck, MEGA E Chuck, New Baby Chuck and MEGA ER Grip



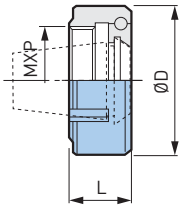


Model	Order No.	G	L	L1	B	Chuck Body
NBA6B	**961.527**	M7	12	10	2	MEGA6N / MEGA6E / NBS6
NBA8B	**961.550**	M9	13	10	2.5	MEGA8N / MEGA8E / NBS8
NBA10B	**961.572**	M11	16	12	3	MEGA10N / MEGA10E / NBS10 / MEGA ER16
NBA13B	**961.598**	M14	20	15	4	MEGA13N / MEGA13E / NBS13 / MEGA ER20
NBA16B	**961.632**	M18	20	15	4	MEGA16N / NBS16 / MEGA ER25
NBA20B	**961.680**	M21	20	15	4	MEGA20N / NBS20 / MEGA ER32
NBA25B	**806.389**	M27	20	15	4	MEGA25N

New Baby Nut

For New Baby Chuck





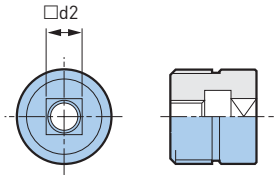
Model	Order No.	ØD	L	M x P	Chuck Body
NBN6	**961.526**	20	9.5	12 x 1	NBS6
NBN8	**961.549**	25	11	16 x 1	NBS8
NBN10	**961.571**	30	12.5	21 x 1	NBS10
NBN13	**961.597**	35	16	26 x 1	NBS13
NBN16	**961.631**	42	16	32 x 1	NBS16
NBN20	**961.679**	46	16	36 x 1	NBS20

Tap Driving Back Stops

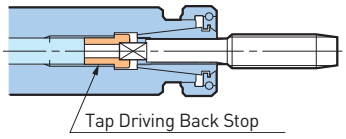
For New Baby Chuck

To suit synchronized tapping.





The square of the tap is positively located by fitting the tap driving back stop.



Tapping Tool			NBS10		NBS13		NBS16		NBS20	
Tap Size	Standard	□ d2	Model	Order No.	Model	Order No.	Model	Order No.	Model	Order No.
M8	DIN371	6.2	-		NBA13 -M8DD	**804.847**	-		-	
	JIS	5.0	NBA10 -M8	**961.681**	NBA13 -M8	**961.683**	-		-	
M10	DIN371	8.0	-		NBA13 -M14M10DD	**804.846**	NBA16 -M14M10DD	**804.852**	-	
	JIS	5.5	NBA10 -M10	**804.844**	NBA13 -M10	**961.684**	NBA16 -M10	**804.848**	-	
M12	DIN376	7.0	-		NBA13 -M12D	**961.685**	NBA16 -M12D	**804.850**	NBA20 -M12D	**804.855**
	JIS	6.5	-		NBA13 -M12	**804.845**	NBA16 -M12	**804.849**	NBA20 -M12	**804.854**
M14	DIN376	9.0	-		-		NBA16 -M14DM16D	**804.851**	NBA20 -M14DM16D	**804.857**
	JIS	8.0	-		NBA13 -M14M10DD	**804.846**	NBA16 -M14M10DD	**804.852**	NBA20 -M14	**804.856**
M16	DIN376	9.0	-		-		NBA16 -M14DM16D	**804.851**	NBA20 -M14DM16D	**804.857**
	JIS	10.0	-		-		NBA16 -M16	**804.853**	NBA20 -M16	**804.858**
M20	DIN376	12.0	-		-		-		NBA20 -M20M20D	**804.860**
	JIS	12.0	-		-		-			

1. Rigid tapping function is required on the machine tool.

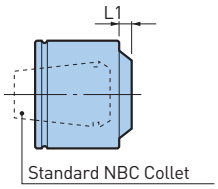
MEGA Perfect Seal

For MEGA New Baby Chuck

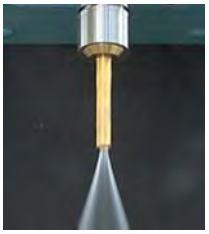
Unique design increases sealing performance with higher coolant pressure to create a „perfect seal".
Remove the PS Ring, to supply coolant to the cutting tool periphery.

- Max. Coolant pressure 7 MPa





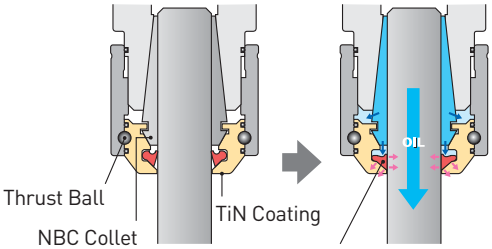
2way coolant



Through tools with PS ring



Jet through without PS ring



A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS6 -03035	**961.401**	3 - 3.5	2.3	NBC6 -3 - 3.75
-0304	**969.861**	3 - 4		-3 - 4.25
-04045	**961.402**	4 - 4.5		-4 - 4.75
-0405	**969.862**	4 - 5		-4 - 5.25
-05055	**961.403**	5 - 5.5		-5 - 5.75
-0506	**969.863**	5 - 6		-5 - 6
MPS8 -03035	**961.404**	3 - 3.5	3.9	NBC8 -3 - 4
-0304	**969.864**	3 - 4		-3 - 4.5
-04045	**961.405**	4 - 4.5		-4 - 5
-0405	**969.865**	4 - 5		-4 - 5.5
-05055	**961.406**	5 - 5.5		-5 - 6
-0506	**969.866**	5 - 6		-5 - 6.5
-06065	**961.407**	6 - 6.5	3.4	-6 - 7
-0607	**969.867**	6 - 7		-6 - 7.5
-07075	**961.408**	7 - 7.5		-7 - 8
-0708	**969.868**	7 - 8		-7 - 8
MPS10 -03035	**801.524**	3 - 3.5	3.9	NBC10 -3 - 4
-0304	**969.869**	3 - 4		-3 - 4.5
-04045	**801.525**	4 - 4.5		-4 - 5
-0405	**969.870**	4 - 5		-4 - 5.5
-05055	**801.526**	5 - 5.5		-5 - 6
-0506	**969.871**	5 - 6		-5 - 6.5
-06065	**979.986**	6 - 6.5	4.3	-6 - 7
-0607	**969.872**	6 - 7		-6 - 7.5
-07075	**801.527**	7 - 7.5		-7 - 8
-0708	**969.873**	7 - 8		-7 - 8.5
-08085	**979.987**	8 - 8.5	3.5	-8 - 9
-0809	**969.874**	8 - 9		-8 - 9.5
-09095	**801.528**	9 - 9.5		-9 -10
-0910	**969.875**	9 - 10		-9 -10

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS13 -03035	**801.529**	3 - 3.5	4.3	NBC13 - 3 - 4
-0304	**969.876**	3 - 4		- 3 - 4.5
-04045	**801.530**	4 - 4.5		- 4 - 5
-0405	**969.877**	4 - 5		- 4 - 5.5
-05055	**801.531**	5 - 5.5		- 5 - 6
-0506	**969.878**	5 - 6		- 5 - 6.5
-06065	**961.417**	6 - 6.5	4.6	- 6 - 7
-0607	**969.879**	6 - 7		- 6 - 7.5
-07075	**801.532**	7 - 7.5		- 7 - 8
-0708	**969.880**	7 - 8		- 7 - 8.5
-08085	**961.418**	8 - 8.5	4.9	- 8 - 9
-0809	**969.881**	8 - 9		- 8 - 9.5
-09095	**801.533**	9 - 9.5		- 9 -10
-0910	**969.882**	9 - 10		- 9 -10.5
-10105	**978.518**	10 - 10.5	4.2	-10 -11
-1011	**969.883**	10 - 11		-10 -11.5
-11115	**801.534**	11 - 11.5		-11 -12
-1112	**969.884**	11 - 12		-11 -12.5
-12125	**961.420**	12 - 12.5		-12 -13
-1213	**969.885**	12 - 13		-12 -13

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS16 -03035	**801.535**	3 - 3.5	4.0	NBC16 - 3 - 4
-0304	**969.886**	3 - 4		- 3 - 4.5
-04045	**801.536**	4 - 4.5		- 4 - 5
-0405	**969.887**	4 - 5		- 4 - 5.5
-05055	**801.537**	5 - 5.5		- 5 - 6
-0506	**969.888**	5 - 6		- 5 - 6.5
-06065	**801.538**	6 - 6.5	4.3	- 6 - 7
-0607	**969.889**	6 - 7		- 6 - 7.5
-07075	**801.539**	7 - 7.5		- 7 - 8
-0708	**969.890**	7 - 8		- 7 - 8.5
-08085	**801.540**	8 - 8.5	4.6	- 8 - 9
-0809	**969.891**	8 - 9		- 8 - 9.5
-09095	**801.541**	9 - 9.5		- 9 - 10
-0910	**969.892**	9 - 10		- 9 - 10.5
-10105	**801.542**	10 - 10.5	5.1	-10 - 11
-1011	**969.893**	10 - 11		-10 - 11.5
-11115	**801.543**	11 - 11.5		-11 - 12
-1112	**969.894**	11 - 12		-11 - 12.5
-12125	**801.544**	12 - 12.5	4.1	-12 - 13
-1213	**969.895**	12 - 13		-12 - 13.5
-1314	**969.896**	13 - 14		-13 - 14.5
-1415	**969.897**	14 - 15		-14 - 15.5
-1516	**969.898**	15 - 16		-15 - 16

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS20 -03035	**978.504**	3 - 3.5	4.0	NBC20 - 3 - 4
-0304	**969.899**	3 - 4		- 3 - 4.5
-04045	**801.545**	4 - 4.5		- 4 - 5
-0405	**969.900**	4 - 5		- 4 - 5.5
-05055	**801.546**	5 - 5.5		- 5 - 6
-0506	**969.901**	5 - 6		- 5 - 6.5
-06065	**801.547**	6 - 6.5	4.3	- 6 - 7
-0607	**969.902**	6 - 7		- 6 - 7.5
-07075	**801.548**	7 - 7.5		- 7 - 8
-0708	**969.903**	7 - 8		- 7 - 8.5
-08085	**801.549**	8 - 8.5	4.6	- 8 - 9
-0809	**969.904**	8 - 9		- 8 - 9.5
-09095	**801.550**	9 - 9.5		- 9 - 10
-0910	**969.905**	9 - 10		- 9 - 10.5
-10105	**801.551**	10 - 10.5	5.1	-10 - 11
-1011	**969.906**	10 - 11		-10 - 11.5
-11115	**801.552**	11 - 11.5		-11 - 12
-1112	**969.907**	11 - 12		-11 - 12.5
-12125	**978.512**	12 - 12.5		-12 - 13
-1213	**969.908**	12 - 13		-12 - 13.5
-1314	**969.909**	13 - 14	5.2	-13 - 14.5
-1415	**969.910**	14 - 15		-14 - 15.5
-1516	**969.911**	15 - 16		-15 - 16.5
-1617	**969.912**	16 - 17	4.6	-16 - 17.5
-1718	**969.913**	17 - 18		-17 - 18.5
-1819	**969.914**	18 - 19		-18 - 19.5
-1920	**969.915**	19 - 20		-19 - 20

PS Rings

Replaceable seal is installed in the MEGA perfect seal.
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Order No.	Corresponding MPS Model
PS -0304	**969.981**	MPS ☐ -03035, 0304
-0405	**969.982**	-04045, 0405
-0506	**969.983**	-05055, 0506
-0607	**969.984**	-06065, 0607
-0708	**969.985**	-07075, 0708
-0809	**969.986**	-08085, 0809
-0910	**969.987**	-09095, 0910
-1011	**969.988**	-10105, 1011
-1112	**969.989**	-11115, 1112
-1213	**969.990**	-12125, 1213

1. 1 package contains 5 pcs. (1 size).

Model	Order No.	Corresponding MPS Model
PS -1314	**969.991**	MPS ☐ -1314
-1415	**969.992**	-1415
-1516	**969.993**	-1516
-1617	**969.994**	-1617
-1718	**969.995**	-1718
-1819	**969.996**	-1819
-1920	**969.997**	-1920

Baby Perfect Seal

For New Baby Chuck

Unique design increases sealing performance with higher coolant pressure to create a "perfect seal".
Remove the PS Ring, to supply coolant to the cutting tool periphery.

- Max. Coolant pressure 7 MPa



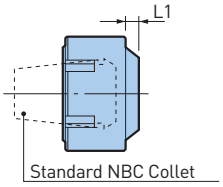
2way coolant

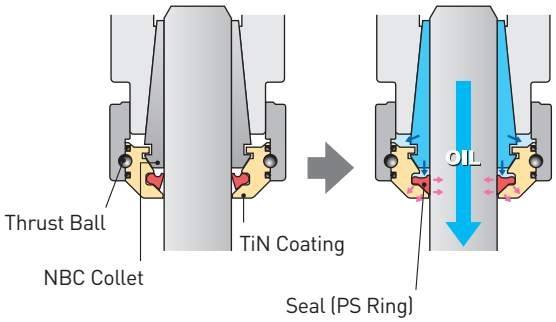


Through tools with PS ring



Jet through without PS ring





A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS6 -03035	**961.409**	3 - 3.5	2.3	NBC6 -3 - 3.75
-0304	**969.921**	3 - 4		-3 - 4.25
-04045	**961.410**	4 - 4.5		-4 - 4.75
-0405	**969.922**	4 - 5		-4 - 5.25
-05055	**961.411**	5 - 5.5		-5 - 5.75
-0506	**969.923**	5 - 6		-5 - 6
BPS8 -03035	**961.412**	3 - 3.5	3.9	NBC8 -3 - 4
-0304	**969.924**	3 - 4		-3 - 4.5
-04045	**961.413**	4 - 4.5		-4 - 5
-0405	**969.925**	4 - 5		-4 - 5.5
-05055	**961.414**	5 - 5.5		-5 - 6
-0506	**969.926**	5 - 6		-5 - 6.5
-06065	**961.415**	6 - 6.5	3.4	-6 - 7
-0607	**969.927**	6 - 7		-6 - 7.5
-07075	**961.416**	7 - 7.5		-7 - 8
-0708	**969.928**	7 - 8		-7 - 8
BPS10 -03035	**800.403**	3 - 3.5	3.9	NBC10 -3 - 4
-0304	**969.929**	3 - 4		-3 - 4.5
-04045	**800.404**	4 - 4.5		-4 - 5
-0405	**969.930**	4 - 5		-4 - 5.5
-05055	**800.405**	5 - 5.5		-5 - 6
-0506	**969.931**	5 - 6		-5 - 6.5
-06065	**800.406**	6 - 6.5	4.3	-6 - 7
-0607	**969.932**	6 - 7		-6 - 7.5
-07075	**800.407**	7 - 7.5		-7 - 8
-0708	**969.933**	7 - 8		-7 - 8.5
-08085	**800.408**	8 - 8.5	3.5	-8 - 9
-0809	**969.934**	8 - 9		-8 - 9.5
-09095	**800.409**	9 - 9.5		-9 -10
-0910	**969.935**	9 - 10		-9 -10

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS13 -03035	**800.410**	3 - 3.5	4.3	NBC13 - 3 - 4
-0304	**969.936**	3 - 4		- 3 - 4.5
-04045	**800.411**	4 - 4.5		- 4 - 5
-0405	**969.937**	4 - 5		- 4 - 5.5
-05055	**800.412**	5 - 5.5		- 5 - 6
-0506	**969.938**	5 - 6		- 5 - 6.5
-06065	**800.413**	6 - 6.5	4.6	- 6 - 7
-0607	**969.939**	6 - 7		- 6 - 7.5
-07075	**800.414**	7 - 7.5		- 7 - 8
-0708	**969.940**	7 - 8		- 7 - 8.5
-08085	**800.415**	8 - 8.5	4.9	- 8 - 9
-0809	**969.941**	8 - 9		- 8 - 9.5
-09095	**800.416**	9 - 9.5		- 9 - 10
-0910	**969.942**	9 - 10		- 9 - 10.5
-10105	**800.417**	10 - 10.5	4.2	-10 - 11
-1011	**969.943**	10 - 11		-10 - 11.5
-11115	**800.418**	11 - 11.5		-11 - 12
-1112	**969.944**	11 - 12		-11 - 12.5
-12125	**800.419**	12 - 12.5		-12 - 13
-1213	**969.945**	12 - 13		-12 - 13

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS16 -03035	**800.420**	3 - 3.5	4.0	NBC16 - 3 - 4
-0304	**969.946**	3 - 4		- 3 - 4.5
-04045	**800.421**	4 - 4.5		- 4 - 5
-0405	**969.947**	4 - 5		- 4 - 5.5
-05055	**800.422**	5 - 5.5		- 5 - 6
-0506	**969.948**	5 - 6		- 5 - 6.5
-06065	**800.423**	6 - 6.5	4.3	- 6 - 7
-0607	**969.949**	6 - 7		- 6 - 7.5
-07075	**800.424**	7 - 7.5		- 7 - 8
-0708	**969.950**	7 - 8		- 7 - 8.5
-08085	**800.425**	8 - 8.5	4.6	- 8 - 9
-0809	**969.951**	8 - 9		- 8 - 9.5
-09095	**800.426**	9 - 9.5		- 9 - 10
-0910	**969.952**	9 - 10		- 9 - 10.5
-10105	**800.427**	10 - 10.5	5.1	-10 - 11
-1011	**969.953**	10 - 11		-10 - 11.5
-11115	**800.428**	11 - 11.5		-11 - 12
-1112	**969.954**	11 - 12		-11 - 12.5
-12125	**800.429**	12 - 12.5	4.1	-12 - 13
-1213	**969.955**	12 - 13		-12 - 13.5
-1314	**969.956**	13 - 14		-13 - 14.5
-1415	**969.957**	14 - 15		-14 - 15.5
-1516	**969.958**	15 - 16		-15 - 16

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS20 -03035	**800.430**	3 - 3.5	4.0	NBC20 - 3 - 4
-0304	**969.959**	3 - 4		- 3 - 4.5
-04045	**800.431**	4 - 4.5		- 4 - 5
-0405	**969.960**	4 - 5		- 4 - 5.5
-05055	**800.432**	5 - 5.5		- 5 - 6
-0506	**969.961**	5 - 6		- 5 - 6.5
-06065	**800.433**	6 - 6.5	4.3	- 6 - 7
-0607	**969.962**	6 - 7		- 6 - 7.5
-07075	**800.434**	7 - 7.5		- 7 - 8
-0708	**969.963**	7 - 8		- 7 - 8.5
-08085	**800.435**	8 - 8.5	4.6	- 8 - 9
-0809	**969.964**	8 - 9		- 8 - 9.5
-09095	**800.436**	9 - 9.5		- 9 - 10
-0910	**969.965**	9 - 10		- 9 - 10.5
-10105	**800.437**	10 - 10.5	5.1	-10 - 11
-1011	**969.966**	10 - 11		-10 - 11.5
-11115	**800.438**	11 - 11.5		-11 - 12
-1112	**969.967**	11 - 12		-11 - 12.5
-12125	**800.439**	12 - 12.5		-12 - 13
-1213	**969.968**	12 - 13		-12 - 13.5
-1314	**969.969**	13 - 14	5.2	-13 - 14.5
-1415	**969.970**	14 - 15		-14 - 15.5
-1516	**969.971**	15 - 16		-15 - 16.5
-1617	**969.972**	16 - 17	4.6	-16 - 17.5
-1718	**969.973**	17 - 18		-17 - 18.5
-1819	**969.974**	18 - 19		-18 - 19.5
-1920	**969.975**	19 - 20		-19 - 20

PS Rings

Replaceable seal is installed in the baby perfect seal.
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Order No.	Corresponding BPS Model
PS -0304	**969.981**	BPS ☐ -03035, 0304
-0405	**969.982**	-04045, 0405
-0506	**969.983**	-05055, 0506
-0607	**969.984**	-06065, 0607
-0708	**969.985**	-07075, 0708
-0809	**969.986**	-08085, 0809
-0910	**969.987**	-09095, 0910
-1011	**969.988**	-10105, 1011
-1112	**969.989**	-11115, 1112
-1213	**969.990**	-12125, 1213

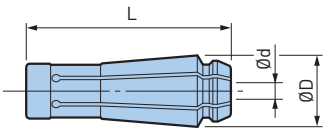
1. 1 package contains 5 pcs. (1 size).

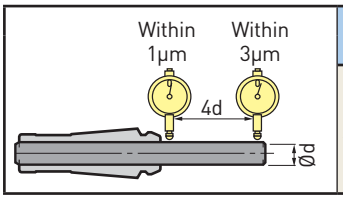
Model	Order No.	Corresponding BPS Model
PS -1314	**969.991**	BPS ☐ -1314
-1415	**969.992**	-1415
-1516	**969.993**	-1516
-1617	**969.994**	-1617
-1718	**969.995**	-1718
-1819	**969.996**	-1819
-1920	**969.997**	-1920

MEGA E Collets

For MEGA E Chuck







Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

MEGA6E			
Model	Order No.	Ød	Min. Clamping Length
MEC6 -3AA	**968.421**	3	19
-4AA	**968.423**	4	22
-5AA	**968.424**	5	25
-6AA	**968.425**	6	27

L=34.9 ØD=11.3

MEGA8E			
Model	Order No.	Ød	Min. Clamping Length
MEC8 -3AA	**968.427**	3	19
-4AA	**968.429**	4	22
-5AA	**968.430**	5	25
-6AA	**968.431**	6	28
-7AA	**801.317**	7	29
-8AA	**968.433**	8	31

L=39.4 ØD=14.1

MEGA10E			
Model	Order No.	Ød	Min. Clamping Length
MEC10 - 3AA	**968.434**	3	19
- 4AA	**968.436**	4	22
- 5AA	**968.437**	5	25
- 6AA	**968.438**	6	28
- 7AA	**801.313**	7	29.5
- 8AA	**968.440**	8	31
- 9AA	**801.314**	9	33
-10AA	**968.442**	10	37

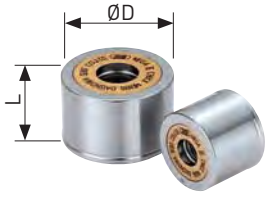
L=45.7 ØD=17.1

MEGA13E			
Model	Order No.	Ød	Min. Clamping Length
MEC13 - 3AA	**968.443**	3	19
- 4AA	**968.445**	4	22
- 5AA	**968.446**	5	25
- 6AA	**968.447**	6	28
- 7AA	**968.448**	7	29.5
- 8AA	**968.449**	8	31
- 9AA	**801.316**	9	33
-10AA	**968.451**	10	35
-11AA	**801.315**	11	37
-12AA	**968.453**	12	39

L=47.9 ØD=20.6

MEGA E Nut

For MEGA E Chuck



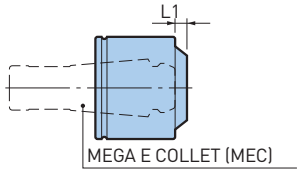
Model	Order No.	ØD	L	MEGA E Chuck
MEN6	**968.461**	25	20.5	MEGA6E
MEN8	**968.462**	30	22.0	MEGA8E
MEN10	**968.463**	35	22.5	MEGA10E
MEN13	**968.464**	42	24.5	MEGA13E

MEGA E Perfect Seal

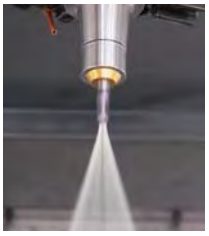
For MEGA E Chuck

- Max. Coolant pressure 7 MPa

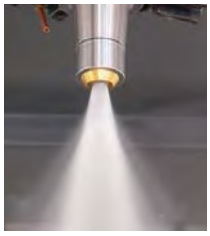




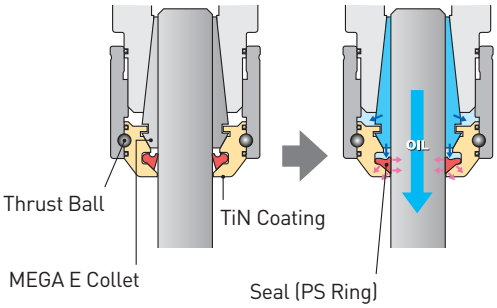
2way coolant



Through tools with PS ring



Jet through without PS ring



A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
EPS6 -03	**968.468**	3	5.6	MEC6 - 3
-04	**968.469**	4	5.2	- 4
-05	**968.470**	5		- 5
-06	**968.471**	6		- 6
EPS8 -03	**968.472**	3	6.4	MEC8 - 3
-04	**968.473**	4	6.0	- 4
-05	**968.474**	5		- 5
-06	**968.475**	6		- 6
-07	**968.476**	7	5.6	- 7
-08	**968.477**	8		- 8
EPS10 -03	**968.478**	3	6.4	MEC10 - 3
-04	**968.479**	4	6.0	- 4
-05	**968.480**	5		- 5
-06	**968.481**	6		- 6
-07	**968.482**	7	6.3	- 7
-08	**968.483**	8		- 8
-09	**968.484**	9	5.7	- 9
-10	**968.485**	10		-10

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
EPS13 -03	**968.486**	3	6.4	MEC13 - 3
-04	**968.487**	4	6.0	- 4
-05	**968.488**	5		- 5
-06	**968.489**	6		- 6
-07	**968.490**	7	6.3	- 7
-08	**968.491**	8	6.5	- 8
-09	**968.492**	9		- 9
-10	**968.493**	10		-10
-11	**968.494**	11	6.2	-11
-12	**968.495**	12		-12

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

PS Rings

Replaceable seal is installed in the MEGA E perfect seal. Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Order No.	Corresponding EPS Model
PS -0304	**969.981**	EPS ☐ -03
		-04
-0405	**969.982**	-05
-0506	**969.983**	-06
-0607	**969.984**	-07
-0708	**969.985**	-08
-0809	**969.986**	-09
-0910	**969.987**	-10
-1011	**969.988**	-11
-1112	**969.989**	-12

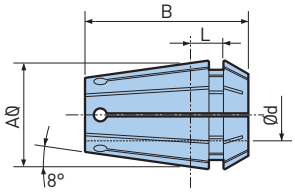
1. 1 package contains 5 pcs. (1 size).

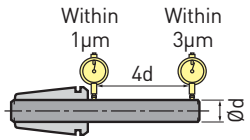
MEGA ER Collets

For MEGA ER Grip

All ERC collets are inspected twice to guarantee high runout accuracy.







Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

Clamping diameter: Ø 2.75 - Ø 6.0

MEGA ER 11		
Model	Order No.	Clamping Range Ød
ERC11 -3AA	802.836	2.75 - 3.00
-3.25AA	802.837	3.00 - 3.25
-3.5AA	802.838	3.25 - 3.50
-3.75AA	802.839	3.50 - 3.75
-4AA	802.840	3.75 - 4.00
-4.25AA	802.841	4.00 - 4.25
-4.5AA	802.842	4.25 - 4.50
-4.75AA	802.843	4.50 - 4.75
-5AA	802.844	4.75 - 5.00
-5.25AA	802.845	5.00 - 5.25
-5.5AA	802.846	5.25 - 5.50
-5.75AA	802.847	5.50 - 5.75
-6AA	802.848	5.50 - 6.00

Ø A=11 B=18 L =3.8

Clamping diameter: Ø 2.75 - Ø 13.0

MEGA ER 20		
Model	Order No.	Clamping Range Ød
ERC20 - 3AA	967.532	2.75 - 3.00
- 3.25AA	967.533	3.00 - 3.25
- 3.5AA	967.534	3.25 - 3.50
- 3.75AA	967.535	3.50 - 3.75
- 4AA	967.536	3.75 - 4.00
- 4.25AA	967.537	4.00 - 4.25
- 4.5AA	967.538	4.25 - 4.50
- 4.75AA	967.539	4.50 - 4.75
- 5AA	967.540	4.75 - 5.00
- 5.25AA	967.541	5.00 - 5.25
- 5.5AA	967.542	5.25 - 5.50
- 5.75AA	967.543	5.50 - 5.75
- 6AA	967.544	5.50 - 6.00
- 6.5AA	967.545	6.00 - 6.50
- 7AA	967.546	6.50 - 7.00
- 7.5AA	967.547	7.00 - 7.50
- 8AA	967.548	7.50 - 8.00
- 8.5AA	967.549	8.00 - 8.50
- 9AA	967.550	8.50 - 9.00
- 9.5AA	967.551	9.00 - 9.50
-10AA	967.552	9.50 - 10.00
-10.5AA	967.553	10.00 - 10.50
-11AA	967.554	10.50 - 11.00
-11.5AA	967.555	11.00 - 11.50
-12AA	967.556	11.50 - 12.00
-12.5AA	967.557	12.00 - 12.50
-13AA	967.558	12.50 - 13.00

Ø A=20 B=31.5 L =6.36

Clamping diameter: Ø 1.9 - Ø 10.0

MEGA ER 16		
Model	Order No.	Clamping Range Ød
ERC16 - 2AA	967.501	1.90 - 2.00
- 2.1AA	967.502	2.00 - 2.10
- 2.2AA	967.503	2.10 - 2.20
- 2.3AA	967.504	2.20 - 2.30
- 2.4AA	967.505	2.30 - 2.40
- 2.5AA	967.506	2.40 - 2.50
- 2.6AA	967.507	2.50 - 2.60
- 2.7AA	967.508	2.60 - 2.70
- 2.8AA	967.509	2.70 - 2.80
- 2.9AA	967.510	2.80 - 2.90
- 3AA	967.511	2.75 - 3.00
- 3.25AA	967.512	3.00 - 3.25
- 3.5AA	967.513	3.25 - 3.50
- 3.75AA	967.514	3.50 - 3.75
- 4AA	967.515	3.75 - 4.00
- 4.25AA	967.516	4.00 - 4.25
- 4.5AA	967.517	4.25 - 4.50
- 4.75AA	967.518	4.50 - 4.75
- 5AA	967.519	4.75 - 5.00
- 5.25AA	967.520	5.00 - 5.25
- 5.5AA	967.521	5.25 - 5.50
- 5.75AA	967.522	5.50 - 5.75
- 6AA	967.523	5.50 - 6.00
- 6.5AA	967.524	6.00 - 6.50
- 7AA	967.525	6.50 - 7.00
- 7.5AA	967.526	7.00 - 7.50
- 8AA	967.527	7.50 - 8.00
- 8.5AA	967.528	8.00 - 8.50
- 9AA	967.529	8.50 - 9.00
- 9.5AA	967.530	9.00 - 9.50
-10AA	967.531	9.50 - 10.00

Ø A=16 B=27.5 L =6.26

Clamping diameter: Ø 2.75 - Ø 16.0

MEGA ER 25		
Model	Order No.	Clamping Range Ød
ERC25 - 3AA	**967.559**	2.75 - 3.00
- 3.25AA	**967.560**	3.00 - 3.25
- 3.5AA	**967.561**	3.25 - 3.50
- 3.75AA	**967.562**	3.50 - 3.75
- 4AA	**967.563**	3.75 - 4.00
- 4.25AA	**967.564**	4.00 - 4.25
- 4.5AA	**967.565**	4.25 - 4.50
- 4.75AA	**967.566**	4.50 - 4.75
- 5AA	**967.567**	4.75 - 5.00
- 5.25AA	**967.568**	5.00 - 5.25
- 5.5AA	**967.569**	5.25 - 5.50
- 5.75AA	**967.570**	5.50 - 5.75
- 6AA	**967.571**	5.50 - 6.00
- 6.5AA	**967.572**	6.00 - 6.50
- 7AA	**967.573**	6.50 - 7.00
- 7.5AA	**967.574**	7.00 - 7.50
- 8AA	**967.575**	7.50 - 8.00
- 8.5AA	**967.576**	8.00 - 8.50
- 9AA	**967.577**	8.50 - 9.00
- 9.5AA	**967.578**	9.00 - 9.50
-10AA	**967.579**	9.50 - 10.00
-10.5AA	**967.580**	10.00 - 10.50
-11AA	**967.581**	10.50 - 11.00
-11.5AA	**967.582**	11.00 - 11.50
-12AA	**967.583**	11.50 - 12.00
-12.5AA	**967.584**	12.00 - 12.50
-13AA	**967.585**	12.50 - 13.00
-13.5AA	**967.586**	13.00 - 13.50
-14AA	**967.587**	13.50 - 14.00
-14.5AA	**967.588**	14.00 - 14.50
-15AA	**967.589**	14.50 - 15.00
-15.5AA	**967.590**	15.00 - 15.50
-16AA	**967.591**	15.50 - 16.00

Ø A=25 B=34 L =6.66

Clamping diameter: Ø 2.75 - Ø 20.0

MEGA ER 32		
Model	Order No.	Clamping Range Ød
ERC32 - 3AA	**967.592**	2.75 - 3.00
- 3.25AA	**967.593**	3.00 - 3.25
- 3.5AA	**967.594**	3.25 - 3.50
- 3.75AA	**967.595**	3.50 - 3.75
- 4AA	**967.596**	3.75 - 4.00
- 4.25AA	**967.597**	4.00 - 4.25
- 4.5AA	**967.598**	4.25 - 4.50
- 4.75AA	**967.599**	4.50 - 4.75
- 5AA	**967.600**	4.75 - 5.00
- 5.25AA	**967.601**	5.00 - 5.25
- 5.5AA	**967.602**	5.25 - 5.50
- 5.75AA	**967.603**	5.50 - 5.75
- 6AA	**967.604**	5.50 - 6.00
- 6.5AA	**967.605**	6.00 - 6.50
- 7AA	**967.606**	6.50 - 7.00
- 7.5AA	**967.607**	7.00 - 7.50
- 8AA	**967.608**	7.50 - 8.00
- 8.5AA	**967.609**	8.00 - 8.50
- 9AA	**967.610**	8.50 - 9.00
- 9.5AA	**967.611**	9.00 - 9.50
-10AA	**967.612**	9.50 - 10.00
-10.5AA	**967.613**	10.00 - 10.50
-11AA	**967.614**	10.50 - 11.00
-11.5AA	**967.615**	11.00 - 11.50
-12AA	**967.616**	11.50 - 12.00
-12.5AA	**967.617**	12.00 - 12.50
-13AA	**967.618**	12.50 - 13.00
-13.5AA	**967.619**	13.00 - 13.50
-14AA	**967.620**	13.50 - 14.00
-14.5AA	**967.621**	14.00 - 14.50
-15AA	**967.622**	14.50 - 15.00
-15.5AA	**967.623**	15.00 - 15.50
-16AA	**967.624**	15.50 - 16.00
-16.5AA	**967.625**	16.00 - 16.50
-17AA	**801.013**	16.50 - 17.00
-17.5AA	**967.627**	17.00 - 17.50
-18AA	**967.628**	17.50 - 18.00
-18.5AA	**967.629**	18.00 - 18.50
-19AA	**967.630**	18.50 - 19.00
-19.5AA	**967.631**	19.00 - 19.50
-20AA	**967.632**	19.50 - 20.00

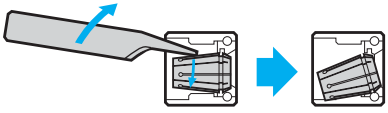
Ø A=32 B=40 L =7.16

Collet Remover

Collet Remover eases removal of the collet from the nut.

Model	Order No.
NBJ	969.491



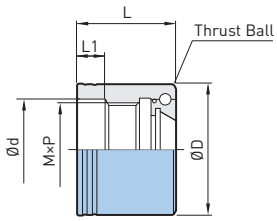


MEGA ER Nut

For MEGA ER Grip

High precision nut with ball bearing ensure outstanding runout repeatability.





Model	Order No.	ØD	L	M x P	Ød	L1	Wrench Type	Body Type
MERN16	**967.801**	30	25.0	M22 x P1.5	23.0	7.5	MGR30L	MEGA ER 16
MERN20	**967.802**	35	26.5	M25 x P1.5	27.0	7.5	MGR35L	MEGA ER 20
MERN25	**967.803**	42	27.5	M32 x P1.5	33.5	7.5	MGR42L	MEGA ER 25
MERN32	**967.804**	50	30.2	M40 x P1.5	41.0	7.7	MGR50L	MEGA ER 32

1. MEGA ER nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

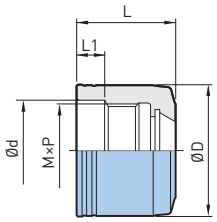
Wrench ▶ 271

MEGA ER Solid Nut

For MEGA ER Grip

Free-notch design nut for high speed machining.





Model	Order No.	ØD	L	M x P	Ød	L1	Wrench Type	Body Type
MER16SN	**805.663**	30	25.0	M22 x P1.5	23.0	7.5	MGR30L	MEGA ER 16
MER20SN	**805.664**	35	26.5	M25 x P1.5	27.0	7.5	MGR35L	MEGA ER 20
MER25SN	**805.665**	42	27.5	M32 x P1.5	33.5	7.5	MGR42L	MEGA ER 25
MER32SN	**805.666**	50	30.2	M40 x P1.5	41.0	7.7	MGR50L	MEGA ER 32

1. MEGA ER solid nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

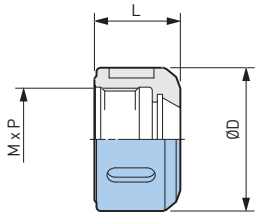
Wrench ▶ 271

ER Nut

For MEGA ER Grip

Conventional ER Nut





Model	Order No.	ØD	L	M x P	Wrench Type	Body Type
ERN11	**803.581**	19	12.3	M14 x 0.75	NBK6	ER11
ERN16	**803.582**	30	19	M22 x P1.5	NBK10	ER16
ERN20	**803.583**	35	20.5	M25 x P1.5	NBK13	ER20
ERN25	**803.584**	42	21.5	M32 x P1.5	NBK16	ER25
ERN32	**803.585**	50	24	M40 x P1.5	FK45-50L	ER32

Wrench ▶ 271

MEGA ER Perfect Seal

For MEGA ER Grip

- Max. Coolant pressure 7 MPa



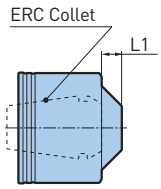
2way coolant

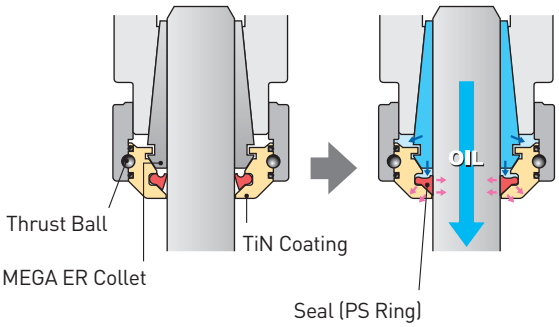


Through tools with PS ring



Jet through without PS ring





Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS16-030035	**967.850**	3.0 - 3.5	6.4	ERC16 - 3 - 3.75
-035040	**967.851**	3.5 - 4.0		- 3.5 - 4.25
-040045	**967.852**	4.0 - 4.5		- 4 - 4.75
-045050	**967.853**	4.5 - 5.0		- 4.5 - 5.25
-050055	**967.854**	5.0 - 5.5		- 5 - 6
-055060	**967.855**	5.5 - 6.0		- 5.5 - 6.5
-060065	**967.856**	6.0 - 6.5	6.8	- 6 - 7
-065070	**967.857**	6.5 - 7.0		- 6.5 - 7.5
-070075	**967.858**	7.0 - 7.5		- 7 - 8
-075080	**967.859**	7.5 - 8.0		- 7.5 - 8.5
-080085	**967.861**	8.0 - 8.5	6.1	- 8 - 9
-085090	**967.862**	8.5 - 9.0		- 8.5 - 9.5
-090095	**967.863**	9.0 - 9.5		- 9 -10
-095100	**967.864**	9.5 - 10.0		- 9.5 -10

1. 1 pce. of ps ring is included.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS20-030035	**967.865**	3.0 - 3.5	6.4	ERC20 - 3 - 3.75
-035040	**967.866**	3.5 - 4.0		- 3.5 - 4.25
-040045	**967.867**	4.0 - 4.5		- 4 - 4.75
-045050	**967.868**	4.5 - 5.0		- 4.5 - 5.25
-050055	**967.869**	5.0 - 5.5		- 5 - 6
-055060	**967.870**	5.5 - 6.0		- 5.5 - 6.5
-060065	**967.871**	6.0 - 6.5	6.8	- 6 - 7
-065070	**967.872**	6.5 - 7.0		- 6.5 - 7.5
-070075	**967.873**	7.0 - 7.5		- 7 - 8
-075080	**967.874**	7.5 - 8.0		- 7.5 - 8.5
-080085	**967.875**	8.0 - 8.5	6.9	- 8 - 9
-085090	**967.876**	8.5 - 9.0		- 8.5 - 9.5
-090095	**967.877**	9.0 - 9.5		- 9 -10
-095100	**967.878**	9.5 - 10.0		- 9.5 -10.5
-100105	**967.879**	10.0 - 10.5	6.6	-10 -11
-105110	**967.880**	10.5 - 11.0		-10.5 -11.5
-110115	**967.881**	11.0 - 11.5		-11 -12
-115120	**967.882**	11.5 - 12.0		-11.5 -12.5
-120125	**967.883**	12.0 - 12.5		-12 -13
-125130	**967.884**	12.5 - 13.0		-12.5 -13

1. 1 pce. of ps ring is included.

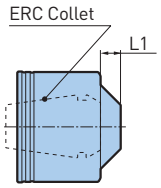
For MERS25/32, refer to the following pages.

MEGA ER Perfect Seal

For MEGA ER Grip

- Max. Coolant pressure 7 MPa





2way coolant



Through tools with PS ring



Jet through without PS ring

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS25-030035	**967.885**	3.0 - 3.5	6.3	ERC25 - 3 - 3.75
-035040	**967.886**	3.5 - 4.0		- 3.5 - 4.25
-040045	**967.887**	4.0 - 4.5		- 4 - 4.75
-045050	**967.888**	4.5 - 5.0		- 4.5 - 5.25
-050055	**967.889**	5.0 - 5.5		- 5 - 6
-055060	**967.890**	5.5 - 6.0		- 5.5 - 6.5
-060065	**967.891**	6.0 - 6.5	6.7	- 6 - 7
-065070	**967.892**	6.5 - 7.0		- 6.5 - 7.5
-070075	**967.893**	7.0 - 7.5		- 7 - 8
-075080	**967.894**	7.5 - 8.0		- 7.5 - 8.5
-080085	**967.895**	8.0 - 8.5	6.8	- 8 - 9
-085090	**967.896**	8.5 - 9.0		- 8.5 - 9.5
-090095	**967.897**	9.0 - 9.5		- 9 -10
-095100	**967.898**	9.5 - 10.0		- 9.5 -10.5
-100105	**967.899**	10.0 - 10.5	7.3	-10 -11
-105110	**967.900**	10.5 - 11.0		-10.5 -11.5
-110115	**967.901**	11.0 - 11.5		-11 -12
-115120	**967.902**	11.5 - 12.0		-11.5 -12.5
-120125	**967.903**	12.0 - 12.5		-12 -13
-125130	**967.904**	12.5 - 13.0		-12.5 -13
-130140	**967.905**	13.0 - 14.0	6.6	-13 -14.5
-140150	**967.906**	14.0 - 15.0		-14 -15.5
-150160	**801.318**	15.0 - 16.0		-15 -16

1. 1 pce. of ps ring is included.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS32-030035	**967.908**	3.0 - 3.5	6.2	ERC32 - 3 - 3.75
-035040	**967.909**	3.5 - 4.0		- 3.5 - 4.25
-040045	**967.910**	4.0 - 4.5		- 4 - 4.75
-045050	**967.911**	4.5 - 5.0		- 4.5 - 5.25
-050055	**967.912**	5.0 - 5.5		- 5 - 6
-055060	**967.913**	5.5 - 6.0		- 5.5 - 6.5
-060065	**967.914**	6.0 - 6.5	6.6	- 6 - 7
-065070	**967.915**	6.5 - 7.0		- 6.5 - 7.5
-070075	**967.916**	7.0 - 7.5		- 7 - 8
-075080	**967.917**	7.5 - 8.0		- 7.5 - 8.5
-080085	**967.918**	8.0 - 8.5	6.7	- 8 - 9
-085090	**967.919**	8.5 - 9.0		- 8.5 - 9.5
-090095	**967.920**	9.0 - 9.5		- 9 -10
-095100	**967.921**	9.5 - 10.0		- 9.5 -10.5
-100105	**967.922**	10.0 - 10.5	7.2	-10 -11
-105110	**967.923**	10.5 - 11.0		-10.5 -11.5
-110115	**967.924**	11.0 - 11.5		-11 -12
-115120	**967.925**	11.5 - 12.0		-11.5 -12.5
-120125	**967.926**	12.0 - 12.5		-12 -13
-125130	**967.927**	12.5 - 13.0		-12.5 -13
-130140	**967.928**	13.0 - 14.0	7.3	-13 -14.5
-140150	**967.929**	14.0 - 15.0		-14 -15.5
-150160	**967.930**	15.0 - 16.0		-15 -16.5
-160170	**967.931**	16.0 - 17.0	7.8	-16 -17.5
-170180	**967.932**	17.0 - 18.0		-17 -18.5
-180190	**967.933**	18.0 - 19.0		-18 -19.5
-190200	**967.934**	19.0 - 20.0		-19 -20

1. 1 pce. of ps ring is included.

PS Rings

Replaceable seal is installed in the MEGA ER Perfect Seal. Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Order No.	Corresponding MERPS Model
PS -0304	**969.981**	MERPS ☐ -030035, 035040
-0405	**969.982**	-040045, 045050
-0506	**969.983**	-050055, 055060
-0607	**969.984**	-060065, 065070
-0708	**969.985**	-070075, 075080

1. 1 package contains 5 pcs. (1 size).

Model	Order No.	Corresponding MERPS Model
PS -0809	**969.986**	MERPS ☐ -080085, 085090
-0910	**969.987**	-090095, 095100
-1011	**969.988**	-100105, 105110
-1112	**969.989**	-110115, 115120
-1213	**969.990**	-120125, 125130
-1314	**969.991**	-130140
-1415	**969.992**	-140150
-1516	**969.993**	-150160
-1617	**969.994**	-160170
-1718	**969.995**	-170180
-1819	**969.996**	-180190
-1920	**969.997**	-190200

MEGA Wrench for Collet Chucks

For MEGA Micro Chuck, MEGA New Baby Chuck, MEGA E Chuck and MEGA ER Grip



Model	Order No.	Ød	Applicable Tool Models			
			MEGA Micro Chuck	MEGA New Baby Chuck	MEGA E Chuck	MEGA ER Grip
MGR10	**969.449**	10	MEGA3S			
MGR12	**969.450**	12	MEGA4S			
MGR14	**969.452**	14	MEGA6S			
MGR18	**801.705**	18	MEGA8S			
MGR20	**969.454**	20		MEGA6N		
MGR25	**969.456**	25		MEGA8N	MEGA6E	
MGR30	**969.458**	30		MEGA10N	MEGA8E	
MGR30L	**969.448**					MEGA ER16
MGR35	**969.460**	35		MEGA13N	MEGA10E	
MGR35L	**969.460L**					MEGA ER20
MGR42	**969.462**	42		MEGA16N	MEGA13E	
MGR42L	**969.462L**					MEGA ER25
MGR46	**969.465**	46		MEGA20N		
MGR50L	**969.464L**	50				MEGA ER32
MGR60L	**969.468L**	60		MEGA25N		

MEGA Torque Wrench

For MEGA Micro Chuck, MEGA New Baby Chuck and MEGA E Chuck

With torque limiter.

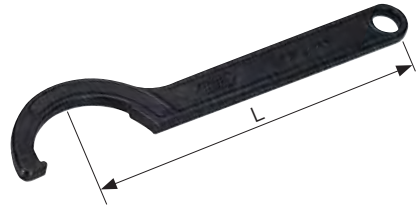


Model	Order No.	Ød	Applicable Tool Models		
			MEGA Micro Chuck	MEGA New Baby Chuck	MEGA E Chuck
MGR10TL	**805.460**	10	MEGA3S		
MGR12TL	**969.451**	12	MEGA4S		
MGR12TLS	**804.117**				
MGR14TL	**969.453**	14	MEGA6S		
MGR14TLS	**978.379**				
MGR18TL	**805.553**	18	MEGA8S		
MGR20TL	**969.455**	20		MEGA6N	
MGR20TLS	**804.119**				
MGR25TL	**969.457**	25		MEGA8N	MEGA6E
MGR25TLS	**804.121**				
MGR30TL	**969.459**	30		MEGA10N	MEGA8E
MGR35TL	**969.461**	35		MEGA13N	MEGA10E
MGR42TL	**969.463**	42		MEGA16N	MEGA13E
MGR46TL	**969.466**	46		MEGA20N	

1. TLS models are recommended to tighten 3 mm or smaller inner diameter collets.

New Baby Wrench

For New Baby Chuck and MEGA ER Grip

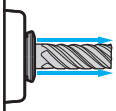
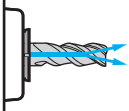
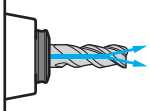
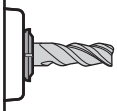


Model	Order No.	L	Applicable Nut
NBK6	**961.525**	65	NBN6/BPS6/ERN11
NBK8	**961.548**	94	NBN8/BPS8
NBK10	**961.570**	104	NBN10/BPS10/ERN16
NBK13	**961.596**	113	NBN13/BPS13/ERN20
NBK16	**961.630**	122	NBN16/BPS16/ERN25
NBK20	**961.678**	131	NBN20/BPS20

Straight Collets

For MEGA Double Power Chuck, New Hi-Power Milling Chuck and Hydraulic Chuck

Straight Collet Selection Guide

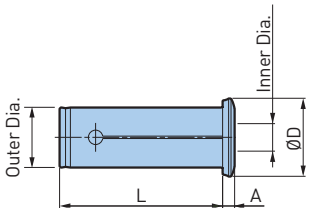
	PJC Collet	OCA Collet	PSC Collet	C Collet
				
	Periferical Coolant Supply	Through Tool Coolant Supply	Through Tool Coolant Supply	W/O Center Coolant
MEGA-D MEGA Double Power Chuck	○	○	○	○
MEGA-DS MEGA Double Power Chuck	○		○	○
HMC New Hi-Power Milling Chuck	○	○	○	○
HDC Hydraulic Chuck	○		○	

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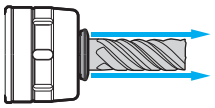
PJC Collets for MEGA-D/DS, HMC and HDC

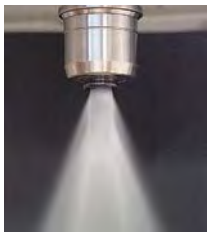
For coolant to cutting tool periphery.





Jet Through





Regardless of the type of chucks, coolant is supplied to cutting tool periphery.

Model	Order No.	A	ØD	L
PJC12 - 6	805.882	5.4	20.4	40
- 8	805.883			
-10	805.884	5.6		
PJC16 - 6	962.468	6.0	23	54
- 8	962.469	6.3		
-10	962.470			
-12	962.471			
PJC20 - 3	962.472	5.2	27	61
- 4	962.473			
- 5	962.474			
- 6	962.475			
- 7	962.476	5.7		
- 8	962.477			
- 9	962.478			
-10	962.479			
-11	962.480	6.4		
-12	962.481			
-13	804.834	6.8		
-14	962.488	7.3		
-15	804.835			
-16	962.483			

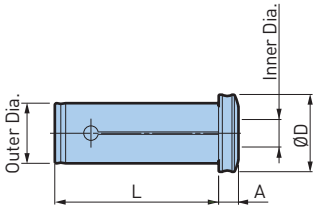
Model	Order No.	A	ØD	L
PJC25 - 6	962.484	5.0	32.5	68
- 8	962.485			
-10	962.486			
-12	962.487			
-16	962.489	5.4		
-18	801.685	5.8		
-20	962.491	6.5		
PJC32 - 6	962.492	5.0	39	74
- 8	962.493			
-10	962.494			
-12	962.495			
-14	962.496			
-16	962.497			
-20	962.499			
-25	962.500	5.4		
PJC42 -16	801.982	5.0	50.5	83
-20	801.983			
-25	801.984			
-32	801.985			

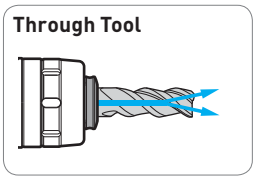
1. Model name indicates its outer dia. and inner dia. (e.g) PJC12-6: outer dia. 12 mm / inner dia. 6 mm.
2. Replacement O-ring for PJC and PSC collet are available (PJC□OR). Please contact BIG KAISER agent.
3. PJC 12 can not be used for Hydraulic Chuck (HDC12).

PSC Collets for MEGA-D/DS, HMC and HDC

For coolant-through tools.









Regardless of the type of chucks, coolant is supplied through cutting tool.

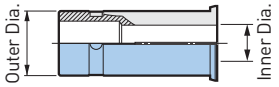
Model	Order No.	A	ØD	L
PSC20 - 3	962.437	7.7	27	61
- 4	962.438	7.5		
- 5	962.439			
- 6	962.440			
- 7	962.441	8.2		
- 8	962.442			
- 9	962.443			
-10	962.444			
-11	962.445	8.7		
-12	962.446			
-13	804.827			
-14	962.447		28	
-15	804.828			
-16	962.448			

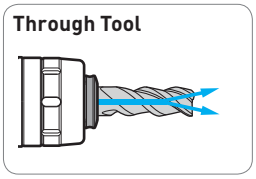
1. Model name indicates its outer dia. and inner dia.
   (e.g) PSC20-3: outer dia. 20 mm / inner dia. 3 mm
2. Replacement O-ring for PJC and PSC collet are available
   (PJC□OR). Please contact BIG KAISER agent.

Model	Order No.	A	ØD	L
PSC32 - 6	962.457	7.5	38	74
- 7	804.829	8.2		
- 8	962.458			
- 9	804.830			
-10	962.459			
-11	804.831	8.7		
-12	962.460			
-13	804.832			
-14	962.461			
-15	804.833			
-16	962.462			
-18	962.463	9.2		
-19	802.063			
-20	962.464			
-21	802.064			
-22	802.065	9.5		
-23	802.066			
-24	802.067			
-25	962.465			

OCA Collets for MEGA-D and HMC







Model	Order No.	Chuck Model
OCA16 - 6	805.156	MEGA16D HMC16(S)
- 8	805.157	
-10	805.158	
-12	805.159	
OCA20 - 6	962.401	MEGA20D HMC20(S)
- 8	962.402	
-10	962.403	
-12	962.404	
-14	978.501	
-16	962.405	
OCA25 - 6	801.747	MEGA25D HMC25(S)
- 8	801.748	
-10	805.413	
-12	801.752	
-14	805.244	
-16	962.406	
-18	805.245	
-20	962.407	

Model	Order No.	Chuck Model
OCA32 - 6	962.408	MEGA32D HMC32(S)
- 8	962.409	
-10	962.410	
-12	962.411	
-13	962.412	
-14	962.413	
-15	962.414	
-16	962.415	
-17	962.416	
-18	962.417	
-19	962.418	
-20	962.419	
-21	962.420	
-22	962.421	
-23	962.422	
-24	962.423	
-25	962.424	
-27	806.442	
-28	805.356	
-29	806.443	

Model	Order No.	Chuck Model
OCA42 - 6	801.774	MEGA42D HMC42
- 8	801.775	
-10	801.764	
-12	801.765	
-16	801.767	
-19	801.768	
-20	801.769	
-24	801.770	
-25	801.771	
-31	801.772	
-32	801.773	

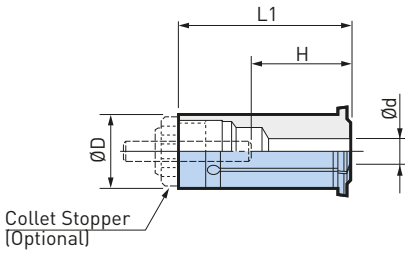
1. Model name indicates its outer dia. and inner dia. (e.g) OCA16-6: outer dia. 16 mm / inner dia. 6 mm.
2. For coolant-through tools.
3. PJC or PSC collet is recommended for MEGA-D/DS.

Straight Collets

C Collets for MEGA-D/DS and HMC

Tool projection adjustable straight collet.





Model	Order No.	Ød	ØD	L1	H	
					Min.	Max.
C16 - 6	806.465	6	16	52	30	47
- 8	806.466	8			32	
-10	806.467	10			37	
-12	806.468	12				
C20 - 6	962.260	6	20	60	30	48
- 8	962.262	8			32	
-10	962.263	10			37	
-12	962.264	12				
-14	962.265	14			40	
-16 *	962.266	16			46	-
-18 *	800.664	18			50	
AC20 -16	962.205	16			46	48
C25 - 6	962.271	6	25	68.5	30	58
- 8	962.272	8			32	
-10	962.273	10			37	
-12	962.274	12				
-14	806.478	14			45	
-16	962.276	16			46	
-18	806.477	18			48	
-20	962.278	20			52	

Model	Order No.	Ød	ØD	L1	H	
					Min.	Max.
C32 - 6	962.281	6	32	74	30	62
- 8	962.282	8			32	
-10	962.283	10			37	
-12	962.284	12				
-14	962.285	14			40	
-16	962.286	16			46	
-18	962.287	18			50	
-19	962.248	19			50	
-20	962.288	20			52	
-22	962.249	22			52	
-24	962.250	24			55	
-25	962.289	25			55	
-30 *	806.476	30	65	60	-	-
C42 - 6	800.674	6	42	89	30	77
- 8	800.675	8			34	
-10	800.665	10			40	
-12	800.666	12				
-16	800.668	16			46	
-20	800.670	20			52	
-25	800.671	25			57	
-31	800.672	31			62	
-32	800.673	32			62	
-40 *	806.198	40		79	77	-

1. Model name indicates its outer dia. and inner dia.
   (e.g) C16-6: outer dia. 16 mm / inner dia. 6 mm.
2. * Collet Stopper cannot be used.
3. AC20-16 includes Collet Stopper.

Collet Stoppers for C Collet

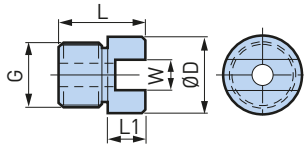


C Collet Model	Model	Order No.	L2
C16 -	AC16CS	806.197	6
C20 -	AC20CS	972.321	8
C25 -	AC25CS	804.772	8

C Collet Model	Model	Order No.	L2
C32 -	AC32CS	972.322	10
C42 -	AC42CS	804.773	10

Adjusting Screws

For MEGA Double Power Chuck and New Hi-Power Milling Chuck



Model	Order No.	ØD	L	L1	G	W	Body	
							MEGA Double Power Chuck	New Hi-Power Milling Chuck
HMA-M16	962.311	19	27	6	M16P1.5	8	MEGA 20D/DS MEGA25D/DS	HMC20S/HMC20 HMC25S/HMC25
HMA-M16S	962.312	19	27	6	M16P1.5	10	MEGA32D/DS (BBT30/40)	HMC32S
HMA-M24	962.313	30	36	9.5	M24P1.5		MEGA32D/DS (BBT50) MEGA42D/DS (BBT50) MEGA50D/DS (BBT50)	HMC32 HMC42S HMC42

1. For MEGA16D/DS and HMC16S a commercially available hex socket head screw with M8 can be used.

MEGA Wrench for Milling Chuck

For MEGA Double Power Chuck and MEGA Perfect Grip



Model	Order No.	Ød	Applicable Tool Models	
			MEGA Double Power Chuck	MEGA Perfect Grip
MGR42L	**969.462L**	42	MEGA16D/DS-□A(BBT40, HSK-A63/F63)	
MGR46L	**969.465L**	46	MEGA16D/DS (BBT30/50, HSK-A40/A50/A100)	MEGA16DPG
MGR50L	**969.464L**	50	MEGA20D/DS (BBT30/40, HSK-A50/A63/F63)	
MGR60L	**969.468L**	60	MEGA20D/DS (BBT50, HSK-A100)	MEGA20DPG
MGR62L	**969.469L**	62	MEGA25D/DS-□A(BBT40, HSK-A63/F63)	
MGR70L	**969.470L**	70	MEGA25D/DS (BBT50, HSK-A100) MEGA32D/DS (BBT40, HSK-A63/F63)	MEGA25DPG
MGR80L	**969.471L**	80	MEGA32D/DS (BBT50, HSK-A100)	MEGA32DPG
MGR99L	**969.472L**	99	MEGA42D/DS	

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FK Wrench

For New Hi-Power Milling Chuck and MEGA ER Grip

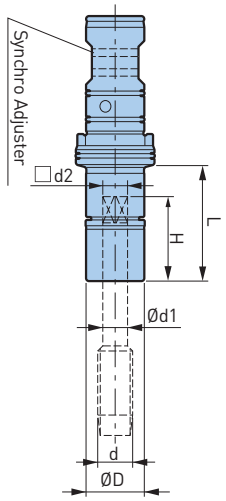


Model	Order No.	L	Clamping Range	Applicable Tool Models
FK31-33	**806.462**	153	31 - 33	HMC12J
FK45- 50L	**801.037**	242	43 - 50	HMC16S/HMC20S ERN32
FK52- 55	**962.294**	220	52 - 55	HMC25S (BBT30)
FK58- 62	**962.291**	240	58 - 62	HMC20/HMC25 (BBT50)
FK58- 62L	**801.038**	293		HMC25S (BBT40/50) HMC32S (BBT30)
FK68- 75L	**801.039**	319	68 - 75	HMC32S (BBT40/50)
FK80- 90	**962.292**	280	80 - 90	HMC32 (BBT50)
FK80- 90L	**804.771**	390		HMC42S
FK92- 100	**962.293**	280	92 - 100	HMC42

Tap Holders for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.





MGT6 (Tap size **DIN**: M3 - M8; **ISO**: M3 - M5)

Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		DIN371	DIN376	ISO529						
MGT6 -031025 - 30	963.611							30		0.12
- 70	963.612			M3	3.15	2.5	20	70		0.18
-100	963.613							100		0.23
-150	963.614							150		0.31
-035027 - 30	963.615							30		0.12
- 70	963.616	M3	M5		3.5	2.7	21	70		0.18
-100	963.617							100		0.23
-150	963.618							150		0.31
-040032 - 30	963.619							30		0.12
- 70	963.620			M4	4.0	3.15	21	70		0.18
-100	963.621							100		0.23
-150	963.622							150		0.31
-045034 - 30	963.623							30	16	0.12
- 70	963.624	M4	M6		4.5	3.4	21	70		0.18
-100	963.625							100		0.22
-150	963.626							150		0.30
-050040 - 30	963.627							30		0.12
- 70	963.628							70		0.18
-100	963.629			M5	5.0	4.0	25	100		0.22
-150	963.630							150		0.30
-200	963.631							200		0.37
-060049 - 30	963.632							30		0.12
- 70	963.633							70		0.17
-100	963.634	M5, M6	M8		6.0	4.9	26	100		0.22
-150	963.635							150		0.30
-200	963.636							200		0.37

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

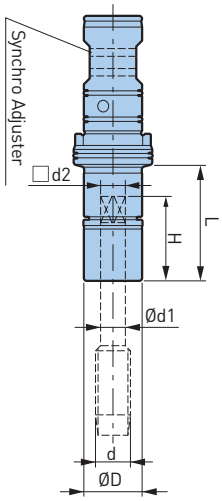
MGT12 (Tap size **DIN**: M5 - M12; **ISO**: M6 - M12)

Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		DIN371	DIN376	ISO529						
MGT12 -060049 - 30	963.637							30		0.19
- 70	963.638							70		0.29
-100	963.639	M5, M6	M8		6.0	4.9	28	100		0.36
-150	963.640							150		0.48
-200	963.641							200		0.60
-063050 - 30	963.642							30	20	0.19
- 70	963.643							70		0.29
-100	963.644			M6	6.3	5.0	28	100		0.36
-150	963.645							150		0.48
-200	963.646							200		0.60
-070055 - 30	963.647							30		0.19
- 70	963.648							70		0.28
-100	963.649		M10		7.0	5.5	28	100		0.35
-150	963.650							150		0.47
-200	963.651							200		0.59
-080063 - 30	963.652							30		0.18
- 70	963.653							70		0.28
-100	963.654	M8		M8	8.0	6.3	29	100	20	0.35
-150	963.655							150		0.46
-200	963.656							200		0.58
-090071 - 30	963.657							30		0.18
- 70	963.658							70		0.27
-100	963.659		M12	M12	9.0	7.1	30	100		0.34
-150	963.660							150		0.46
-200	963.661							200		0.58

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280



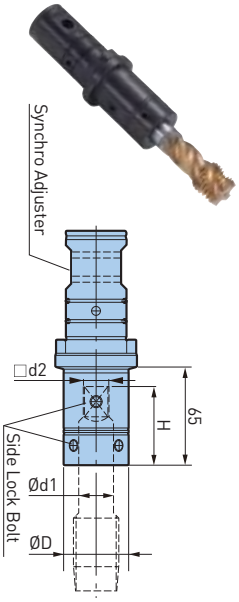


MGT20 (Tap size **DIN**: M10 - M20; **ISO**: M10 - M20)

Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		DIN371	DIN376	ISO529						
MGT20 -090071 - 35	**963.662**		M12	M12	9.0	7.1	30	35	30	0.55
- 85	**963.663**							85		0.82
-115	**963.664**							115		0.98
-150	**963.665**							150		1.17
-100080 - 35	**963.666**	M10		M10	10.0	8.0	33	35		0.54
- 85	**963.667**							85		0.80
-115	**963.668**							115		0.96
-150	**963.669**							150		1.15
-110090 - 35	**963.670**		M14		11.0	9.0	34	35		0.53
- 85	**963.671**							85		0.79
-115	**963.672**							115		0.95
-150	**963.673**							150		1.14
-112090 - 35	**963.674**			M14	11.2	9.0	34	35		0.53
- 85	**963.675**							85		0.79
-115	**963.676**							115		0.95
-150	**963.677**							150		1.14
-120090 - 35	**963.678**		M16		12.0	9.0	34	35		0.52
- 85	**963.679**							85		0.78
-115	**963.680**							115		0.94
-150	**963.681**							150		1.13
-125100 - 35	**963.682**			M16	12.5	10.0	35	35		0.52
- 85	**963.683**							85		0.77
-115	**963.684**							115		0.93
-150	**963.685**							150		1.11
-140110 - 35	**963.686**		M18		14.0	11.0	36	35		0.51
- 85	**963.687**							85		0.76
-115	**963.688**							115		0.92
-150	**963.689**							150		1.10
-140112 - 35	**963.690**			M18, M20	14.0	11.2	36	35		0.51
- 85	**963.691**							85		0.76
-115	**963.692**							115		0.92
-150	**963.693**							150		1.10
-160120 - 35	**805.173**		M20		16.0	12.0	37	35		0.51
-150	**805.172**							150		1.10

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280



MGT36 (Tap size **DIN**: M22 - M36)

Tap Holder Model	Order No.	Tap size		Ød1	□ d2	H	ØD	Weight (kg)
		DIN376	DIN353					
MGT36-180145-65	**805.240**	M22, 24	P5/8	18	14.5	45	38	1.4
-200160-65	**805.241**	M27	P3/4	20	16	51	40	1.4
-220180-65	**805.238**	M30	P7/8	22	18	53	42	1.5
-250200-65	**805.242**	M33	P1	25	20	58	49	1.6
-280220-65	**805.239**	M36	-	28	22	62	52	1.6

1. Wrench is not required.

For Accessories ▶ 280

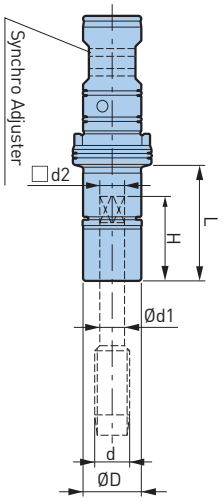
Caution

Tap shank (Ød1) and square (□ d2) must be matched. Please carefully check before order.

Tap Holders for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.





MGT6 (Tap size **JIS**: M2 - M6)

Model		Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
			Metric	Pipe	Unify						
MGT6 -M2	- 30	963.400	M2		No. 3 No. 4	3	2.5	19	30	16	0.12
	- 70	801.481							70		0.18
	-100	801.479							100		0.23
	-150	801.480							150		0.31
-M3	- 30	801.484	M3		No. 5 No. 6	4	3.2	21	30		0.12
	- 70	801.485							70		0.18
	-100	801.482							100		0.23
	-150	801.483							150		0.31
-M4	- 30	801.489	M4		No. 8	5	4	25	30		0.12
	- 70	801.490							70		0.18
	-100	801.486							100		0.22
	-150	801.487							150		0.30
	-200	801.488							200		0.37
-M5	- 30	801.494	M5		No. 10 No. 12	5.5	4.5	25	30		0.12
	- 70	801.495							70		0.18
	-100	801.491							100		0.22
	-150	801.492							150		0.30
	-200	801.493							200		0.37
-M6, U1/4	- 30	801.499	M6		U1/4	6	4.5	25	30		0.12
	- 70	801.500							70		0.17
	-100	801.496							100		0.22
	-150	801.497							150		0.30
	-200	801.498							200		0.37

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

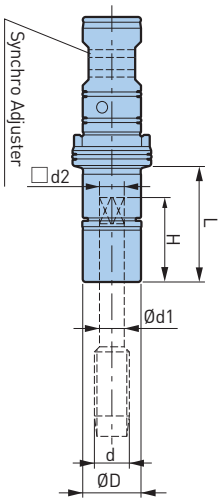
MGT12 (Tap size **JIS**: M6 - M12)

Model		Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
			Metric	Pipe	Unify						
MGT12 -M6, U1/4	- 30	978.286	M6		U1/4	6	4.5	27	30	20	0.19
	- 70	801.415							70		0.29
	-100	801.412							100		0.36
	-150	801.413							150		0.48
	-200	801.414							200		0.60
-U5/16	- 30	801.424			U5/16	6.1	5	28	30		0.19
	- 70	801.425							70		0.29
	-100	801.421							100		0.36
	-150	801.422							150		0.48
	-200	801.423							200		0.60
-M8	- 30	978.287	M8			6.2	5	28	30		0.19
	- 70	801.419							70		0.29
	-100	801.416							100		0.36
	-150	801.417							150		0.48
	-200	801.418							200		0.60
-M10, U3/8	- 30	978.288	M10		U3/8	7	5.5	28	30		0.19
	- 70	801.408							70		0.28
	-100	801.405							100		0.35
	-150	801.406							150		0.47
	-200	801.407							200		0.59
-U7/16,P1/8	- 30	801.429		P1/8	U7/16	8	6	29	30		0.18
	- 70	801.430							70		0.28
	-100	801.426							100		0.35
	-150	801.427							150		0.46
	-200	801.428							200		0.58
-M12	- 30	978.289	M12			8.5	6.5	29	30		0.18
	- 70	801.411							70		0.27
	-100	801.409							100		0.34
	-150	963.399							150		0.46
	-200	801.410							200		0.58

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280





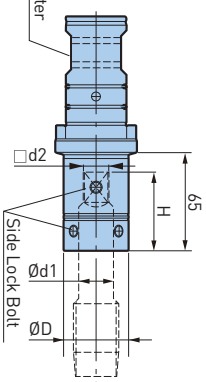
MGT20 (Tap size **JIS**: M12 - M20)

Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		Metric	Pipe	Unify						
MGT20-M12 - 35	801.433	M12			8.5	6.5	29	35	30	0.55
- 85	801.434							85		0.82
-115	801.431							115		0.98
-150	801.432							150		1.17
-U1/2 - 35	801.460			U1/2	9	7	30	35		0.55
- 85	801.461							85		0.82
-115	804.130							115		0.98
-150	804.128							150		1.17
-M14, U9/16 - 35	801.437	M14		U9/16	10.5	8	33	35		0.53
- 85	801.438							85		0.79
-115	801.435							115		0.95
-150	801.436							150		1.14
-P1/4 - 35	801.454		P1/4		11	9	31	35		0.53
- 85	801.455							85		0.79
-115	801.452							115		0.95
-150	801.453							150		1.14
-U5/8 - 35	801.462			U5/8	12	9	34	35		0.52
- 85	801.463							85		0.78
-115	804.131							115		0.94
-150	804.129							150		1.13
-M16 - 35	801.441	M16			12.5	10	35	35		0.52
- 85	801.442							85		0.77
-115	801.439							115		0.93
-150	801.440							150		1.11
-M18, U3/4 - 35	801.445	M18		U3/4	14	11	36	35		0.51
- 85	801.446							85		0.76
-115	801.443							115		0.92
-150	801.444							150		1.10
-P3/8 - 35	801.458		P3/8		14	11	33	35		0.51
- 85	801.459							85		0.76
-115	801.456							115		0.92
-150	801.457							150		1.10
-M20 - 35	801.449	M20			15	12	37	35		0.49
- 85	801.450							85		0.74
-115	801.447							115		0.89
-150	801.448							150		1.06

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280





MGT36 (Tap size **JIS**: M20 - M36; P1/4, P3/4, P1)

Tap Holder Model	Order No.	Tap size		Ød1	□ d2	H	ØD	Weight (kg)
		Size	l					
MGT36 -M20 -65	801.465	M20	65 - 68	15	12	40	32	1.2
-M22 -65	801.466	M22	71 - 74	17	13	44	34	1.3
-M24 -65	978.330	M24	74 - 77	19	15	46	39	1.4
-M27 -65	801.467	M27	80 - 83	20		50	40	1.4
-M30 -65	801.468	M30	83 - 86	23	17	52	43	1.5
-M33 -65	801.469	M33	88 - 91	25	19	57	49	1.6
-M36 -65	978.331	M36	94 - 97	28	21	61	52	1.6
-P1/2 -65	801.471	P1/2	38 - 41	18	14	42	35	1.3
-P3/4 -65	801.473	P3/4		23	17	47	43	1.5
-P1 -65	801.472	P1	49 - 52	26	21	46	50	1.7

1. Wrench is not required.

For Accessories ▶ 280

Caution

Tap shank (Ød1) and square (□ d2) must be matched. Please carefully check before order.

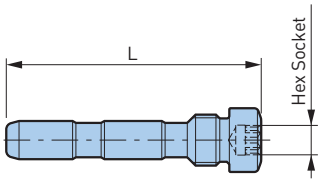
Spare Parts for MEGA Synchro Tapping Holder

MGT Set Screw

For MGT6, MGT12, MGT20, MGT36

Made of high-strength material. Secures the tap holder into body.





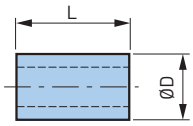
Model	Order No.	Hex Socket size	L	Body
MGT6SS	**963.711**	4	35	MGT 6
MGT12SS	**963.432**	4	40	MGT12
MGT20SS	**963.713**	5	53	MGT20
MGT36SS	**801.478**	8	92	MGT36

Synchro Adjuster

For MGT6, MGT12, MGT20, MGT36

Made of special material. Replaceable bushing in tap holder.





Model	Order No.	ØD	L	Tap Holder
MGT6SA	**963.721**	9	11	MGT 6-d-
MGT12SA	**963.722**	10	15	MGT12-d-
MGT20SA	**963.723**	14	24	MGT20-d-
MGT36SA	**801.474**	20	32	MGT36-d-

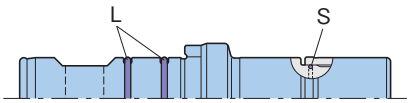
1. Set includes 5 pieces.

O-Ring Set

For MGT6, MGT12, MGT20

Set includes 1 small, 2 large size.





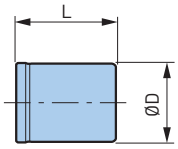
Model	Order No.	Nut. Dia	Tap Holder
MGT6 OR	**801.501**	Ø 16	MGT 6-d-
MGT12 OR	**801.420**	Ø 20	MGT12-d-
MGT20 OR	**801.451**	Ø 30	MGT20-d-
MGT36 OR	**801.470**	-	MGT36-d-

MGT Nut

For MGT6, MGT12, MGT20

Exclusive nut for MEGA synchro tapping holder.



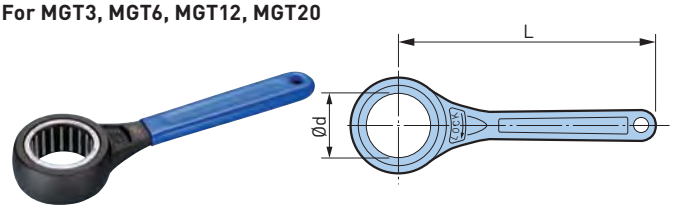


Model	Order No.	ØD	L	Tap Holder
MGN6T	**963.700**	16	19	MGT 6-d-
MGN12T	**963.702**	20	21	MGT12-d-
MGN20T	**963.703**	30	24	MGT20-d-

Accessories for MEGA Synchro Tapping Holder

MEGA Wrench

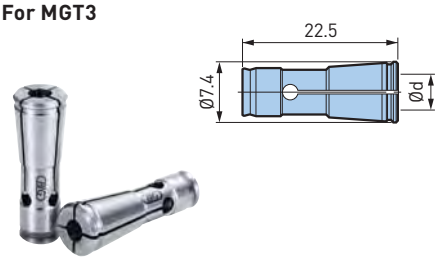
For MGT3, MGT6, MGT12, MGT20



Model	Order No.	Ød	L	Tap Holder
MGR12	**969.450**	12	90	MGT 3
MGR16	**969.446**	16	90	MGT 6-d-
MGR20L	**969.447**	20	160	MGT12-d-
MGR30L	**969.448**	30	220	MGT20-d-

Micro Collet

For MGT3



Model	Order No.	Tapping Range d			Tap Shank
		DIN371	ISO529	JIS	Ød
NBC4S-2.5AA	**961.468**	M1 - M1.8	M2	-	2.5
-2.8AA	**968.353**	M2 - M2.6	M2.2, M2.5	-	2.8
-3.0AA	**961.470**	-	-	M1 - M2.6	3.0
-3.1AA	**968.355**	-	M3	-	3.15
-3.5AA	**961.472**	M3	-	-	3.5
-4.0AA	**961.474**	-	-	M3	4.0

1. Other sizes available. Please refer to micro collet.

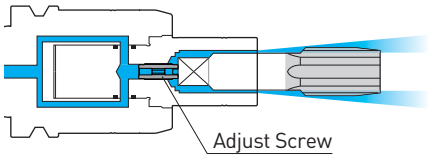
For Micro Collet ▶ 247

Adjusting Screw for MGT36

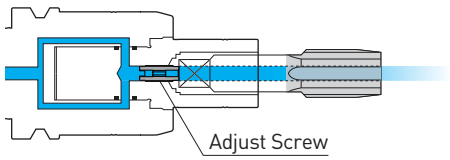
Adjustment of tap projection length (Adjustable amount: 3 mm). Coolant supply is also adjustable in 2 ways by reversing the adjust screw.

Model	Order No.
MGT36AJ	**801.464**

Tap without hole



Tap with hole



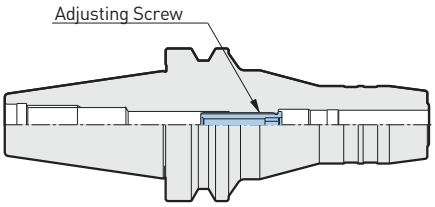
Side Lock Bolt Set for MGT36

Spare locking screw to clamp a tap.

		Tap Holder Model		
Set Model	Order No.	DIN	JIS	Bolt size
MGT36SL6	**801.476**	-	MGT36 -M20 -65	M6 x 8L (x4) + M6 x 10L (x2)
		-	-M22 -65	
		-	-P1/2 -65	
MGT36SL8	**801.477**	MGT36 -180145-65	-M24 -65	M8 x 10L (x4) + M8 x 12L (x2)
		-200160-65	-M27 -65	
		-220180-65	-M30 -65	
			-P3/4 -65	
MGT36SL10	**801.475**	MGT36 -250200-65	MGT36 -M33 -65	M10 x 12L (x4) + M10 x 14L (x2)
		-280220-65	-M36 -65	
			-P1 -65	

Adjusting Screws

For Hydraulic Chuck



One Side Hexagon Socket Type		Both Side Hexagon Socket Type	
Model	Order No.	Model	Order No.
HDA6 -05020	803.742	HDA6 -05020W	802.393
-05032	803.743	-05032W	802.394
-20010	802.390	-	-
HDA8 -06020	803.745	HDA8 -06020W	803.759
-06032	803.746	-06032W	803.760
HDA10 -08015	803.747	HDA10 -08015W	803.761
-08032	803.748	-08032W	803.762
HDA12 -10010	803.749	-	-
-10025	803.750	HDA12 -10025W	803.763
-10032	803.751	-10032W	802.383
HDA16 -12015	803.752	HDA16 -12015W	802.384
-12030	802.337	-12030W	802.385
-12037	803.754	-16037W	802.386
HDA20 -12047	802.391	-	-
HDA20 -16015	803.755	HDA20 -16015W	802.387
HDA25 -16039	803.757	HDA25 -16039W	802.389
HDA16 -12015	803.752	HDA16 -12015W	802.384
HDA20 -16015	803.755	HDA20 -16015W	802.387

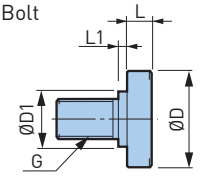
1. One side hexagon socket type can be clamped only from chuck side.

A.8

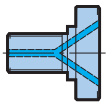
Clamp Bolts

For Face Mill Arbor FMH and Smart Damper FMH type

Clamp Bolt



Clamp Bolt with Coolant Hole



Model	Order No.	Model	Order No.	ØD	ØD1	L	L1	G
MBA -M12	802.757	TMBA -M12	802.767	33	23	10	2	12
-M12H	802.758	-	-		-		-	
-M16	802.759	-M16	802.768	40	23	10	6	16
-M16H	802.760	-	-		-		-	
-M20	802.761	-M20	802.769	50	27	14	6	20
-M20H	802.762	-	-		-		-	

Sleeve for BSL Side Lock Holder

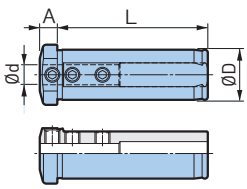


Fig. 1

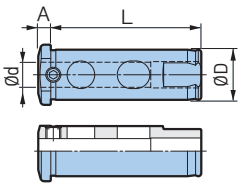


Fig. 2

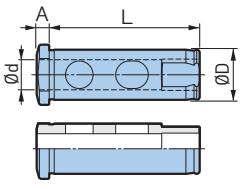


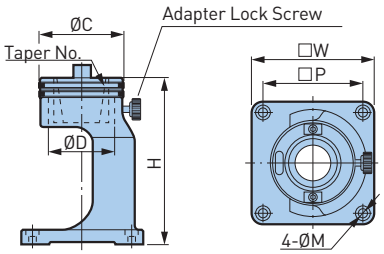
Fig. 3

Model	Order No.	Fig.	Ød	ØD	L	A
BSLA20 - 6	805.728	1	6	20	60	5
- 8	805.733		8			7
-10	805.734	2	10			5
-12	805.735	3	12			
-16	805.736		16			
BSLA32 -10	805.737	1	10	32	75	9
-12	805.738		12			
-16	805.739	2	16			6
-20	805.740	3	20			

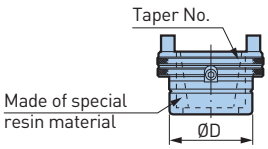
Tooling Mate

For BBT (BT) and BDV (DV)





Replaceable Adapter



Model	Order No.	Taper No.	ØC	ØD	H	□W	□P	ØM	Weight (kg)	Adapter Model
TMS40 -20	**805.489**	BT20	76	60	150	110	90	7 (for M6)	2.6	TMA40 -20
-30	**961.270**	BT30							2.6	-30
-40	**961.271**	BT40/DV40							2.4	-40
TMS50 -40	**961.272**	BT40/DV40	105	88	190	160	130	9 (for M8)	7.0	TMA50 -40
-50	**961.273**	BT50/DV50							6.0	-50

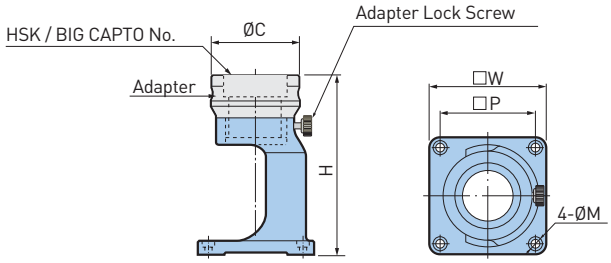
1. 1 pce. of adapter is included.
2. Adapter can be ordered individually.

For Adapter ▶ 284

For HSK and BIG CAPTO

Innovative "Two-way clutch needle roller clamping system" assures secure clamping at the tool flange periphery.





Model	Order No.	HSK / BIG CAPTO No.	ØC	H	□W	□P	ØM	Weight (kg)	Adapter Model
TMS40 - 32R	**961.339**	32/C3	76	165	110	90	7 (for M6)	3.2	TMA40 - 32R
- 40R	**961.342**	40/C4						3.0	- 40R
- 50R	**961.346**	50/C5						2.7	- 50R
- 63R	**961.338**	63/C6	87	172				2.7	- 63R
TMS50 - 80R	**802.308**	80/C8	114	215	160	130	9 (for M8)	7.1	TMA50 - 80R
-100R	**802.307**	100	124	219				6.5	-100R

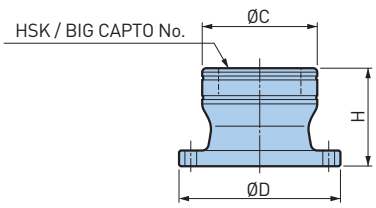
1. 1 pce. of adapter is included.
2. Adapter can be ordered individually.

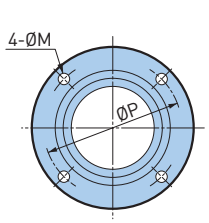
For Adapter ▶ 284

Kombi Grip

For HSK and BIG CAPTO









Model	Order No.	HSK No.	BIG CAPTO No.	ØC	ØD	H	ØP	ØM
KG 25R	**961.291**	25	-	48	79	65	62	7 (for M6)
32R	**961.292**	32	C3	55	85		69	
40R	**961.293**	40	C4	63	93	70	77	
50R	**961.294**	50	C5	75	105		89	
63R	**961.295**	63	C6	88	123.5	75	105.5	9 (for M8)
80R	**961.296**	80	C8	107	142	90	124	
100R	**961.297**	100	-	127	162	100	144	

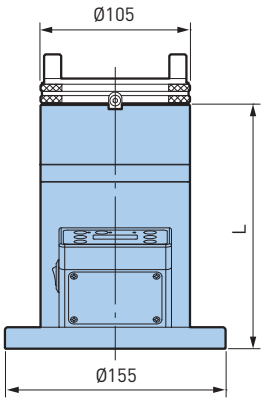
1. 4 pcs. of cap bolts to mount on the table are not included.

Torque Fit

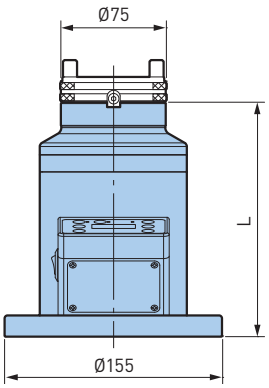
Tooling Fixture with Tightening Torque Indicate function



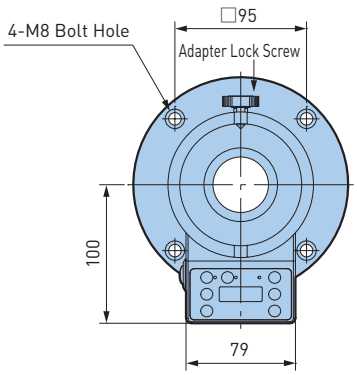
TF-50



TF-40



- Torque values of all BIG KAISER collet chucks are presetted.
- Notification by buzzer near the correct torque.
- USER-Mode allows setting of desired torque value.

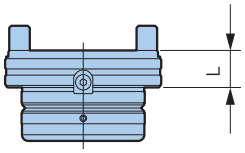


Model	Order No.	Torque Setting Range	L	Adapter	Input Voltage	Weight (kg)
TF-40	**806.737**	4 - 80 Nm	167	TMA40-	100 - 240V	8.0
TF-50	**806.738**		172	TMA50-		

1. Adapter is to be ordered seperately.

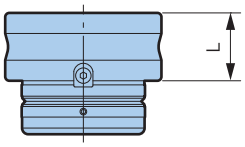
Adapter (optional)

For BT/DV



Model	Order No.	Body Model	Taper No.	L	Weight (kg)
TMA40 - 20	**805.894**	TF-40	ISO20	18	0.8
- 30	**802.944**		BT30		0.8
- 40	**802.945**		BT/DV40		0.6
TMA50 - 40	**802.942**	TF-50	BT/DV40		2.3
- 50	**802.943**		BT/DV50		1.3

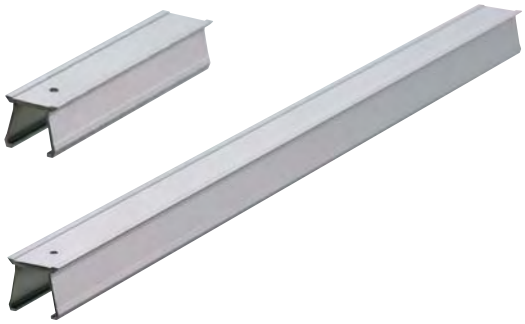
For HSK/BIG CAPTO

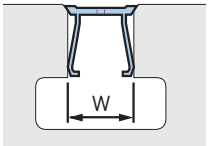


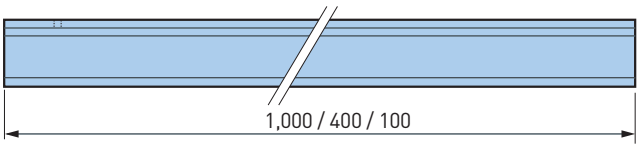
Model	Order No.	Body Model	HSK No.	BIG Capto No.	L	Weight (kg)
TMA40 - 32R	**802.948**	TF-40	32	-	33	1.4
- 40R	**802.949**		40	C4		1.2
- 50R	**802.950**		50	C5		0.9
- 63R	**972.331**		63	C6	40	0.9
TMA50 - 80R	**802.946**	TF-50	80	C8	43	2.5
- 100R	**802.947**		100	-	47	1.8

T-Slot Clean

Improve efficiency of table cleaning. Save you from cleaning T-slots packed with swarf. Quick discharge of swarf out of a machine.





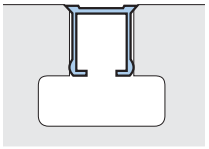




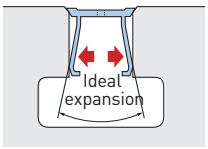
Before



After



Other manufacturer



BIG KAISER

Due to the uniquely angled shape of the table T-shot contact part, slipout is prevented and chips are completely shut out.

A.8

Standard Set

Set Model	Order No.	W	Contents of Set
TS14-S	**961.252**	14	400 mm x 4 pieces 100 mm x 4 pieces Removal pin x 1 piece
TS18-S	**961.253**	18	
TS22-S	**961.254**	22	

400 mm Set

Set Model	Order No.	W	Contents of Set
TS14-400L-100P	**961.255**	14	400 mm x 100 pieces Removal pin x 10 piece
TS18-400L-100P	**961.256**	18	
TS22-400L-100P	**961.257**	22	

1000 mm Set

For large machines

1000 mm (1 m) long version is available.

Set Model	Order No.	W	Contents of Set
TS18-1000L-10P	**802.785**	18	1000 mm x 10 pieces Removal pin x 1 piece
TS22-1000L-10P	**802.787**	22	

Chip Fan



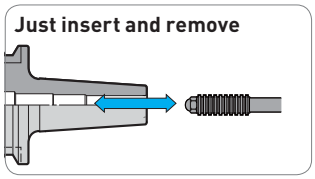
Set Model	Order No.	No. of Wings
ST20-CF125	**335.625**	7

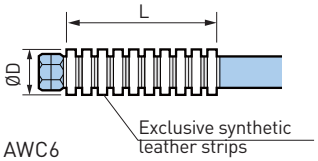
α Wiper Cleaners, Ø6 - 12

Perfect for Hydraulic Chuck and Shrink Fit Holder

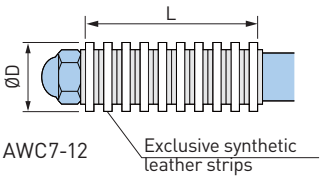
Easy cleaning by simply inserting and removing.







AWC6



AWC7-12

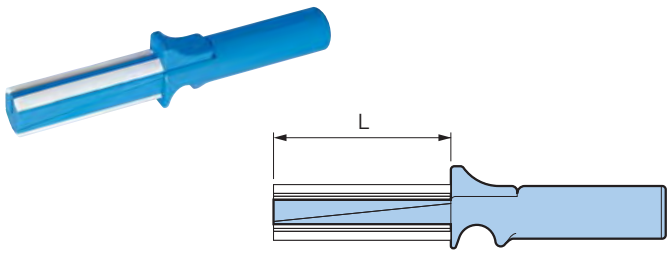
Model	Order No.	ØD	L
AWC6	978.901	6	20
AWC7	802.781	7	
AWC8	978.902	8	
AWC9	802.782	9	26
AWC10	978.903	10	
AWC11	802.783	11	31
AWC12	978.904	12	

TK Cleaners, Ø14 - 42

Perfect for Hydraulic Chuck and Milling Chuck Holder

Absolute cleaning of clamping bore by unique "slide" feature.

A.8



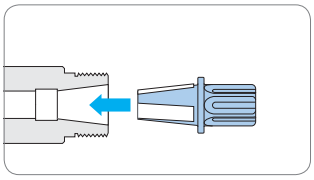
Model	Order No.	Bore Diameter (Ø)	L	Leather Strips Qty.
TKC 14	802.805	14	60	2
16	802.807	16	70	
18	802.808	18		
20	802.809	20		
25	802.810	25	80	3
32	802.811	32	100	4
40	802.812	40	105	
42	978.905	42		

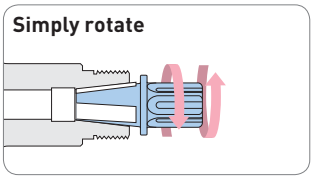
α Taper Cleaners

For internal collet taper

Maintain accuracy of high precision collet chucks.







For MEGA Micro Chuck

Model	Order No.	Suitable Model
SC-NBC3S	961.278	MEGA3S
SC-NBC4S	961.279	MEGA4S
SC-NBC6S	961.280	MEGA6S
SC-NBC8S	805.827	MEGA8S

For MEGA E Chuck

Model	Order No.	Suitable Model
SC-MEC6	961.287	MEGA6E
SC-MEC8	961.288	MEGA8E
SC-MEC10	961.289	MEGA10E
SC-MEC13	961.290	MEGA13E

For MEGA New Baby Chuck and New Baby Chuck

Model	Order No.	Suitable Model	
SC-NBC6	961.281	MEGA6N	NBS6
SC-NBC8	961.282	MEGA8N	NBS8
SC-NBC10	961.283	MEGA10N	NBS10
SC-NBC13	961.284	MEGA13N	NBS13
SC-NBC16	961.285	MEGA16N	NBS16
SC-NBC20	961.286	MEGA20N	NBS20

For ER Collet Chuck

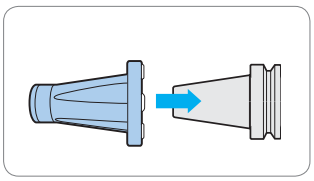
Model	Order No.	Suitable Model
SC-MER11	967.810	ER11
SC-MER16	967.811	ER16
SC-MER20	967.812	ER20
SC-MER25	967.813	ER25
SC-MER32	967.814	ER32

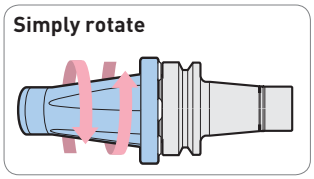
α Tooling Cleaners

For tool shank taper and flange

Particles and oil on both taper and flange of 7/24 taper holder are easily removed.







Model	Order No.	Shank Size
SCE-30	961.276	No. 30
SCE-40	961.277	No. 40

Spindle Cleaners

For machine spindle

Easy cleaning of oil or particles from the machine spindle.





For ISO taper spindle

Model	Order No.	Taper Size
SC20	804.945	No. 20
SC30	802.791	No. 30
SC40	802.793	No. 40
SC45	802.794	No. 45
SC50	802.796	No. 50



For Morse taper spindle

Model	Order No.	Taper Size
SC1	802.788	MT1
SC2	802.789	MT2
SC3	802.790	MT3
SC4	802.792	MT4
SC5	802.795	MT5
SC6	802.797	MT6



For HSK spindle

Model	Order No.	Taper Size
SC-HSK 32	802.799	HSK-A32
40	979.997	HSK-A40
50	802.800	HSK-A50
63	802.802	HSK-A63
80	802.803	HSK-A80
100	802.798	HSK-A100

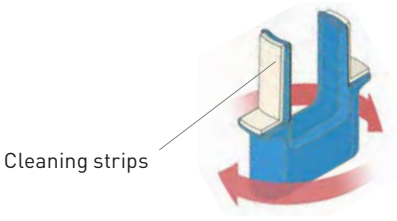
Model	Order No.	Taper Size
SC-HSK25E	979.995	HSK-E25
32E	979.996	HSK-E32
40E	979.998	HSK-E40
50E	802.801	HSK-E50

Spindle Cleaners

For BIG CAPTO

Easy cleaning of BIG CAPTO polygon taper.





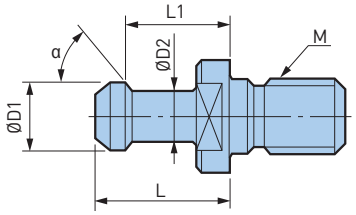
Model	Order No.	BIG CAPTO No.
SC -C3	973.194	C3
-C4	973.195	C4
-C5	973.196	C5
-C6	973.197	C6
-C8	973.198	C8

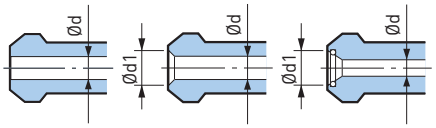
Pullstud Bolts

Before ordering

Ensure to check the dimensions of the required pullstud bolt by referring to the specification sheet of the machine tool. In the case of machines with coolant-through-spindle capability especially, provide us a copy of the pullstud bolt drawing, as sealing method may vary even among machines with the same model number.







Type 1 Type 2 Type 3

Spindle	Model	Order No.	Standard	ØD1	ØD2	L	L1	α	Ød	Ød1	Hole Type	Specification / Feature
30 (M12)	30PMG	978.956	JIS	12	8	23.4	18.4	75	None	-	-	JIS BT30
	30PMGH	978.972							4.0	-	1	JIS BT30 with hole
	30PMGH2	800.450							2.5	5.5	3	YASDA
	P30T-1MG	978.978	MAS-I	11	7	23	18	45	None	-	-	MAS-1 BT30
	P30T-1MGH	978.953							2.5	-	1	MAS-1 BT30 with hole
	P30T-2MG	978.979	MAS-II					60	None	-	-	MAS-2 BT30
	P30T-2MGH	801.785							2.5	-	1	MAS-2 BT30 with hole
	30P-1MGH	978.951	Original	11	8	23	18	45	4.0	-	1	FANUC
	P30T-2MGH3	801.787		11	7.5	23	18	60	2.5	-	1	BROTHER
	PMO30MG	802.001		11	7	23	18	45	2.5	6.5	3	DMG MORI
40 (M16)	40PMG	800.463	JIS	19	14	29	23	75	None	-	-	JIS BT40
	40PMGH	978.954							7.0	-	1	JIS BT40 with hole
	40PMGH2	800.464							7.0	-	1	MAKINO (Face G) *
	40PMGH7	978.958							4.0	5.0	2	OKUMA (Face G) *
	40PMGH4A	978.955							7.0	-	1	YASDA Ø3 side hole
	40PMGH11	978.977								10.0	3	YASDA
	40PMGH12	805.885							5.0	-	1	MITSUI
	P40T-1MG	801.807	MAS-I	15	10	35	28	45	None	-	-	MAS-1 BT40
	P40T-1MGHA	801.814							3.0	-	1	MAS-1 BT40 with hole
	P40T-1MGH1	801.808							3.5	5.5	2	
	P40T-1MGH4	801.810							3.0	7.0	3	OKUMA
	P40T-1MGH7	801.812							4.0	-	1	MAKINO (Face G) *
	P40T-1MGH8A	801.813							3.0	7.0	3	JTEKT
	P40T-2MG	801.831	MAS-II	15	10	35	28	60	None	-	-	MAS-2 BT40
	P40T-2MGHA	801.834							3.0	-	1	MAS-2 BT40 with hole
	P40T-2MGH8	801.833							3.5	5.5	2	
	P40T-2MGH1	801.832							3.0	7.0	3	OKUMA
	PVD40MG	978.975	DIN	19	14	26	20	75	7.0	-	1	DIN 69872 from A
	MP40MG	801.507	Original	15	10	25	18	90	None		-	MITSUI
	POM40MG	802.023		15	10	35	28	90	None	-	-	DMG MORI w/o hole
	PMO40MG	978.971		19	14	29	23	75	7.0	10.0	3	DMG MORI with hole
	PYN40MG	802.112		18.8	12.45	19.11	14.03	45	7.0	-	1	MAZAK

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. * End face was ground for the sealing.
4. ** End face has O-ring for the sealing.
5. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.

MEGA Pullstud Bolt

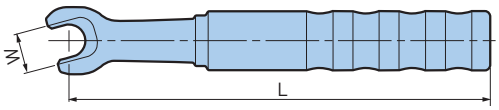
MG in the model numbers stand for MEGA Pullstud Bolt. Tensile strength is improved by utilizing tool steel. Especially recommended for the BIG-PLUS dual contact applications. (Material: X40CrMOV51)

Spindle	Model	Order No.	Standard	ØD1	ØD2	L	L1	α	Ød	Ød1	Hole Type	Specification / Feature
50 (M24)	50PH	**978.965**	JIS	28	21	34	25	75	10.0	-	1	JIS 50 with hole
	50PMGH	**800.472**										
	50PH2	**800.468**										MAKINO (Face G) *
	P50T-1	**961.331**	MAS-I	23	17	45	35	45	None	-	-	MAS-1 BT50
	P50T-1MG	**801.883**										
	P50T-1H	**801.860**							8.0	-	1	MAS-1 BT50 with hole
	P50T-1MGH	**801.885**							6.0	-	1	
	P50T-1H1	**801.861**							6.0	-	1	MAKINO (Face G) *
	P50T-1H4	**801.873**							6.0	10.4	3	JTEKT
	P50T-1H5	**961.332**							5.5	11.2	3	YASDA
	P50T-1H8	**801.867**							8.0	11.0	3	DMG MORI (Face G) *
	P50T-1MGH25	**801.889**							6.0	7.0	2	OKUMA (Face G) *
	P50T-1H19	**801.868**							4.5	-	1	TOSHIBA
	P50T-2	**801.898**	MAS-II	23	17	45	35	60	None	-	-	MAS-2 BT50
	P50T-2MG	**801.942**										
	P50T-2H	**801.925**							8.0	-	1	MAS-2 BT50 with hole
	P50T-2MGH25	**801.948**							6.0	-	1	
	P50T-2H4	**801.938**							8.0	11.0	3	DMG MORI (Face G) *
	P50T-2H14	**801.929**							6.0	7.0	2	OKUMA (Face G) *
	P50T-2MGH14	**801.944**							6.0	7.0	2	
	P50T-2H11	**801.927**							6.0	9.5	3	OKUMA
	P50T-2H15	**801.930**							6.0	10.4	3	JTEKT
	P50T-2H16	**801.931**							5.5	11.2	3	YASDA
	PVD50	**978.966**	DIN	28	21	34	25	75	11.5	-	1	DIN 69872 from A
	MP50	**801.509**	Original	24	18	31	23	90	None	-	-	MITSUI
	MP50H1	**801.517**							8.0	-	1	MITSUI with hole
	POM50	**978.967**		23	17	45	35	90	None	-	-	DMG MORI
	POM50H	**961.336**							8.0	-	1	DMG MORI with hole
	POM50H1	**961.333**							8.0	12.4	3	
	POM50H8	**802.046**		23	17	45	35	90	6.0	-	1	OKK (Face O) **
	PYN50-5	**802.120**		28.96	20.83	25.2	17.58	45	10.0	-	1	MAZAK (Face G) *

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. * End face was ground for the sealing.
4. ** End face has O-ring for the sealing.
5. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.

Pullstud Wrenches





Taper Size	Model	Order No.	W	L	Suitable pullstud specification
BBT30 BT30	PLW30	**805.544**	13	140	JIS, MAS-I, MAS-II, 30P-1MGH, P30T-2MGH3, PMO30MG
BBT40 BT40	PLW-40P	**805.886**	19	200	JIS
	PLW-P40T	**805.887**			MAS-I, MAS-II, POM40MG
	PLW-PMO40	**805.888**			PMO40MG
	PLW-PYN40	**805.889**			PYN40MG

1. If appearance shape is the same, the specification other than above is also usable.

Set Up Information



Preparing the Stop Block

The Angle Head utilizes a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle to prevent radial movement of the Angle Head during operation. Therefore, it is necessary to use a Stop Block with the proper dimensions to match the Locating Pin of the Angle Head.

1. Standard Setup of the Locating Pin

"S" Dimension

The distance from the centerline of the Angle Head spindle to the centerline of the Locating Pin.

Fixed Length "A" and "H"

The axial distance from the gauge line to the top of the Locating Pin, when the Locating Pin is properly engaged in the Stop Block.

Fixed Length "A" for Angle Head (Fig.1)

This is not adjustable by the customer. If the standard dimensional values shown below are not suitable for your machine,please contact us.

Fixed Length "H" for Air Turbine spindle and High Spindle (Fig.2)

We will deliver a set at the standard 6 mm. Otherwise, This dimension is adjustable by the customer. Four (4) Locating Pin models are available, please contact us.

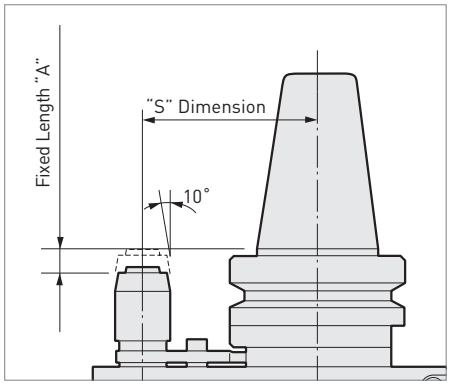


Fig. 1

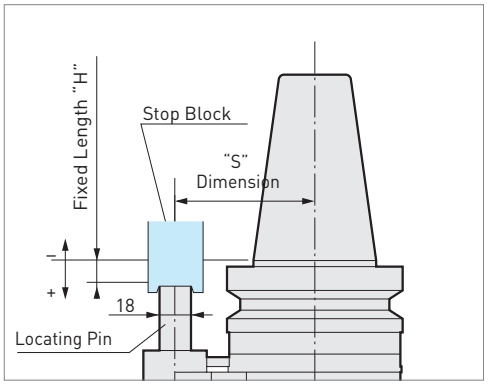


Fig. 2

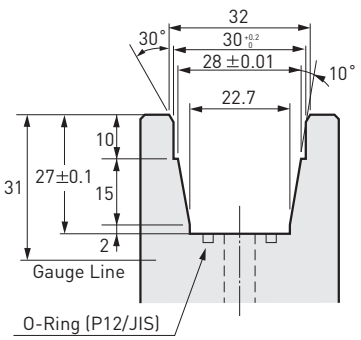
Standard Dimension	Angle Head Fig. 1		Air Turbine and High Spindle Fig. 2	
	"S"	"A"	"S"	"H"
BDV40 / BBT40 / HSK-A63	65	8	65	6
BDV50 / BBT50 / HSK-A100	80	8	80	6
	110	6		

2. Stop Block Dimensions

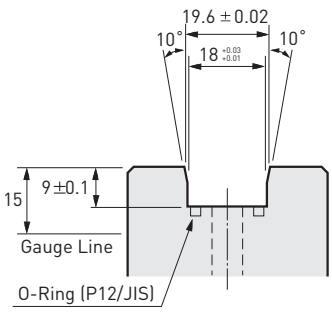
Please order a Stop Block from the machine tool builder. Refer to the following diagrams for the proper Stop Block groove dimensions.



For "S" = 110 Angle Head



Others



3. Semi-Finished Stop Block

A semi-finished Stop Block has the proper groove form for use with the Angle Head, as well as additional material to allow the user to machine the block to the correct height.

If a pre-made Stop Block is unobtainable from the machine tool builder, a semi-finished Stop Block can be used. Please consult with the machine tool builder for selection, machining, and mounting of a semi-finished Stop Block.

Fig. 1

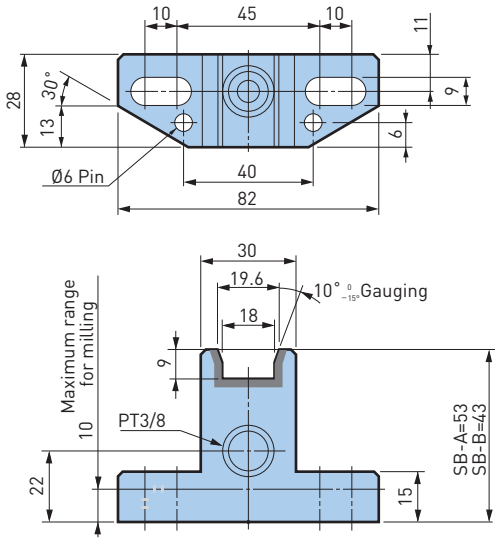


Fig. 2

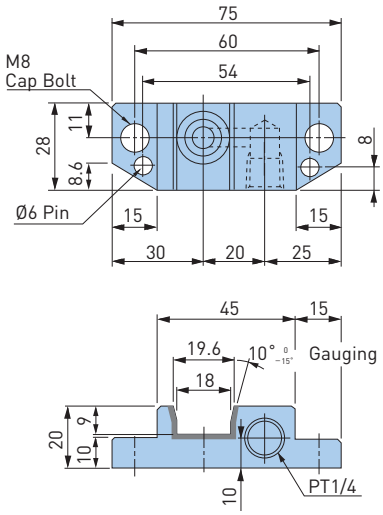
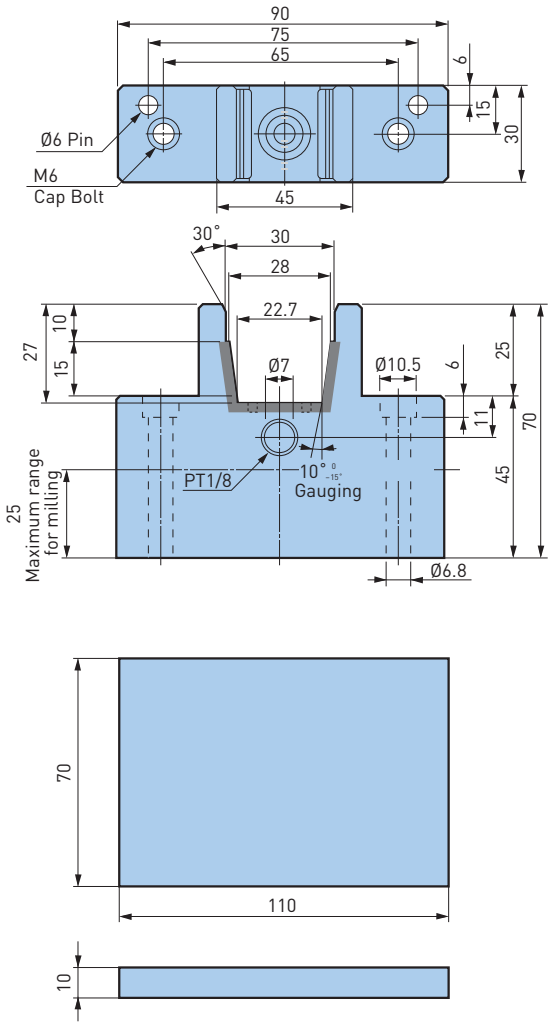


Fig. 3



Note

The sketch indicates heat treatment (HRC45-50), all other surfaces can be milled.

Model	Order No.	Fig.	For "S"
SB - A	962.571	1	65 / 80
SB - B	962.572		
SB - F	962.574	2	
SB - G/E	802.329	3	110

1. SB-F is not height-adjustable.
2. "S" is corresponding to page 290.

Rough Boring Heads

Overview	294
Application Examples for SW	295
MW Rough Boring Heads	296
SW Rough Boring Heads	297
SW-AL Rough Boring Heads	298
SW Smart Damper Rough Boring Heads	299
Insert Holders for SW	300 - 304
Face Grooving Holders for SW	305
TWN Rough Boring Heads	306
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B.1



MW Rough Boring Head

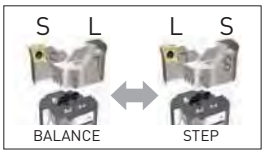
Small and powerful rough boring head: The MW comes with cylindrical shank and permits extremely fast roughing of small holes.
Ø 16 - 21 mm, ST20

▶ 296



SW Rough Boring Head

Super-versatile rough boring head for highest cutting performance: Thanks to its clever design, the SW can be used for stepped and balances roughing by simply switching the insert holders. Various accessories are available for chamfering, back boring and face grooving.
Ø 20 - 203 mm, CKB1-CKB7 and CKN6-CKN7

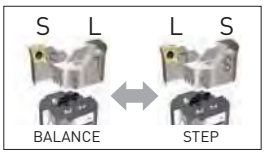


▶ 297



SW-AL Rough Boring Head

The fastest solution for deep roughing: SW-AL, built of high quality aluminum, fits perfectly on CKN components. Long tool combinations are therefore up to 50% lighter than similar tools built of steel which enhances the productivity drastically.
Ø 68 - 203 mm, CKN6-CKN7



▶ 298



SW Smart Damper Rough Boring Head

The solution for vibration-free rough boring. Its built-in patented Smart Damper technology is located close to the cutting edge and lifts the performance of rough boring on a new level.
Ø 41 - 100 mm, CKB4-CKB6



▶ 299

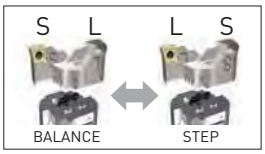


TWN Rough Boring Head

The TWN rough boring heads have been developed for economical rough boring.
Ø 20 - 153 mm, CKB1-CKB7

▶ 306

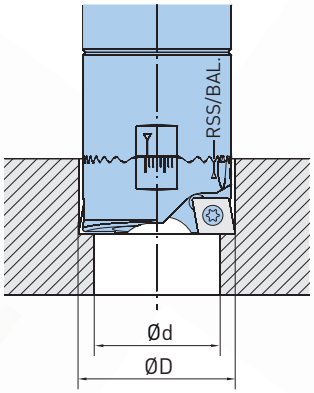
Application Examples for SW



Rough Boring Balance

Insert Holders: Type CC/SP/SC
Ø 20 - 203 mm
High feed rates

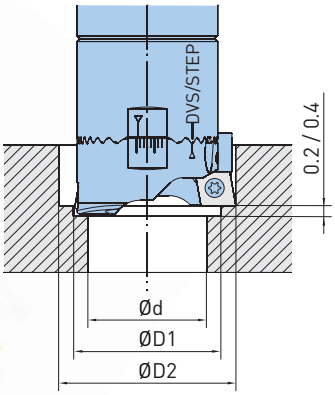




Rough Boring Step

Insert Holders: Type CC
Ø 20 - 203 mm
Double stock removal, half the feed rate

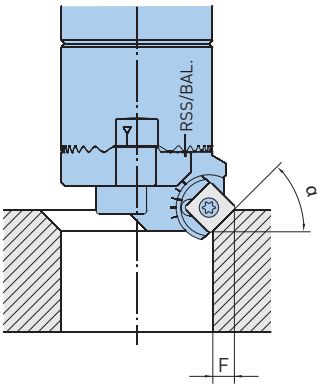




Chamfering

Ø 30 - 210 mm
Adjustable chamfer angle 15° - 75°

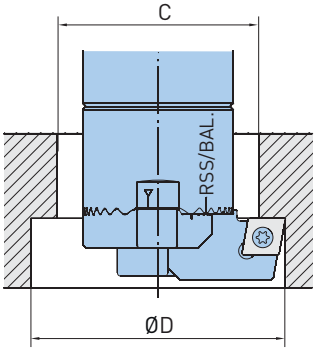




Back Boring

Ø 44 - 211 mm
Lead angle 90°





B.1

MW Rough Boring Heads, Ø 16 - 21

The MW rough boring heads permit extremely fast roughing of small holes (Ø 16-21 mm).

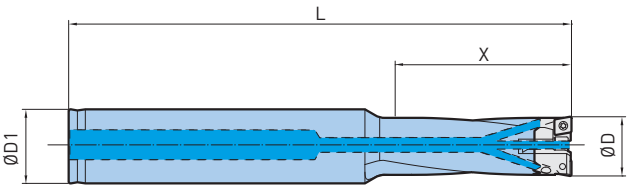




Blind holes

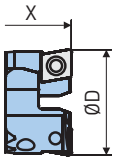


Through holes



Model	Order No.	ØD	ØD1	L	X	Weight (kg)
ST20-MW1619-64	**472.051**	16 - 19	20	150	64	0.26
ST20-MW1821-72	**472.061**	18 - 21	20	155	72	0.28

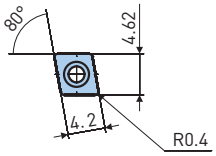
Insert Holders



Model	Order No.	ØD	X	
MW16-19-SET	**472.052**	16 - 19	64	MW 04
MW18-21-SET	**472.062**	18 - 21	72	

1. Consisting of two insert holders.

B.1

Insert						Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC
	MW0404-Z30P	**655.942**	0.4	P30	C (TiAlN-AlCrN)	+	++	++						++	+	+		
	MW0404-Z30K	**655.941**	0.4	K30	C (TiAlN-AlCrN)				++	++				++	+	+		
	MW0404-D15N	**655.940**	0.4	N15	C (DLC)						++			++	+	+		

	Model	Order No.
	Torx T6 M1.6x4.2	**694.105**

	Model	Order No.
	Torx T6	**694.181**

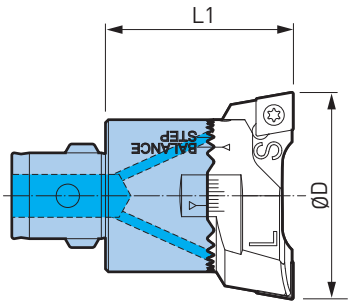
Clamping screw (10 screws and 1 wrench)
Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

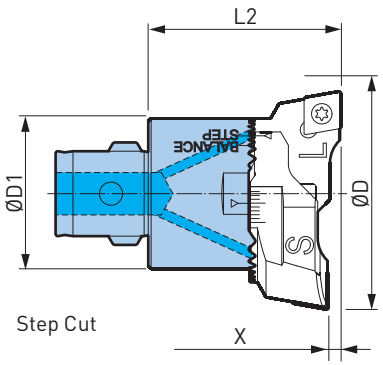
SW Rough Boring Heads, Ø 20 - 203

The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.

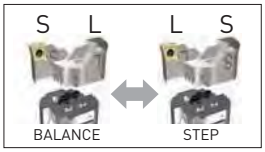




Balance Cut



Step Cut



Model	Order No.	CK	ØD	ØD1	L1	L2	X	Weight (kg)
SW20-31CKB1	**319.101**	CKB1	20 - 31	19	32.5	32.6	0.2	0.05
SW25-40CKB2	**319.201**	CKB2	25 - 40	24	35.5	35.6		0.11
SW32-51CKB3	**319.301**	CKB3	32 - 51	31	40	40.1		0.19
SW41-66CKB4	**319.401**	CKB4	41 - 66	39	47	47.2	0.4	0.36
SW53-86CKB5	**319.501**	CKB5	53 - 86	50	57	57.2		0.66
SW68-110CKB6	**319.601**	CKB6	68 - 110	63.5	71	71.2		1.18
SW68-110CKN6	**319.601N**	CKN6						1.18
SW98-153CKB6	**319.602**	CKB6	98 - 153	90	71	71.2		1.90
SW98-153CKN6	**319.602N**	CKN6						1.90
SW148-203CKB6	**319.603**	CKB6	148 - 203	140	71	71.2		2.52
SW148-203CKN6	**319.603N**	CKN6						2.52
SW98-153CKB7-87	**319.701**	CKB7	98 - 153	90	87	87.2		3.10
SW98-153CKN7-87	**319.701N**	CKN7						3.10
SW98-153CKB7-117	**319.702**	CKB7	98 - 153	90	117	117.2		4.50
SW98-153CKN7-117	**319.702N**	CKN7						4.50
SW148-203CKB7	**319.703**	CKB7	148 - 203	140	117	117.2		5.60
SW148-203CKN7	**319.703N**	CKN7						5.60

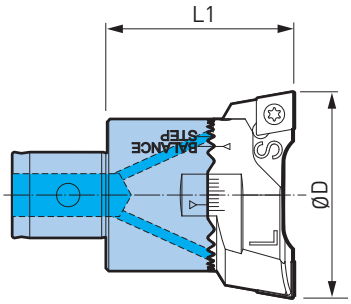
1. X = difference length of insert holders for DVS step rough boring
2. For information on CKN and CKB connections, kindly see introduction pages.

For Spare Parts ▸ 421
Insert Holders ▸ 300 - 305

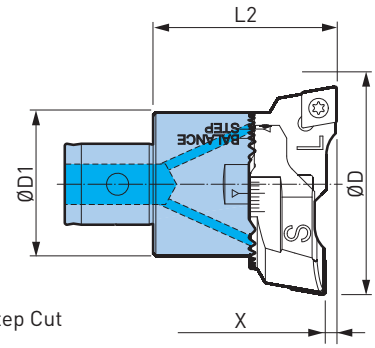
SW-AL Rough Boring Heads, Ø 68 - 203

Tool body made of high strength aluminium with CKN connection.

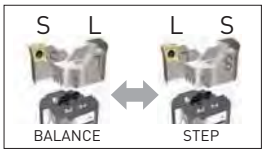




Balance Cut



Step Cut



Model	Order No.	CK	ØD	ØD1	L1	L2	X	Weight (kg)
SW68-110CKN6AL	**319.604N**	CKN6	68 - 110	63.5	71	71.2	0.4	0.5
SW98-153CKN6AL	**319.605N**	CKN6	98 - 153	90	71	71.2		0.9
SW148-203CKN6AL	**319.607N**	CKN6	148 - 203	140	71	71.2		1.1
SW98-153CKN7-87AL	**319.705N**	CKN7	98 - 153	90	87	87.2		1.3
SW98-153CKN7-117AL	**319.706N**	CKN7	98 - 153	90	117	117.2		1.9
SW148-203CKN7AL	**319.707N**	CKN7	148 - 203	140	117	117.2		2.3

1. X = difference length of insert holders for DVS step rough boring.

For Spare Parts ▸ 421
For Insert Holder ▸ 300 / 301

B.1

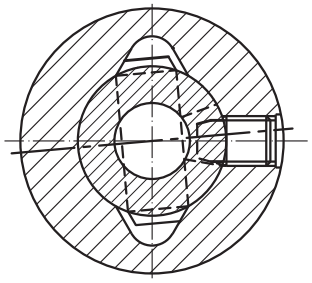
Especially made to fit on CKN components

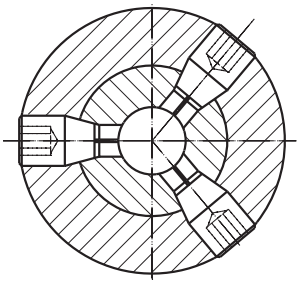


Difference CKB and CKN Connection

CKB: The most common CK connection with single clamping CK srew. Ideal for simple, efficient operations. High interchange accuracy, less than 0.002 mm radial change error, is guaranteed.

CKN: The most powerful CK connection with triple clamping CK screw. Ideal for long tool combinations and challenging operations.



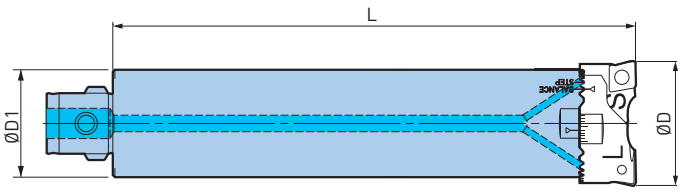


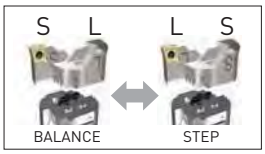
SW Smart Damper Rough Boring Heads, Ø 41 - 100

The well established dynamic damper eliminates chatter in high work loads.

Anti-Vibration







Model	Order No.	CK	ØD	ØD1	L	Weight (kg)
SW41-66CKB4-200DP	**389.405**	CKB4	41 - 66	39	200	2.4
SW53-86CKB5-225DP	**389.406**	CKB5	53 - 86	50	220	4.5
SW68-110CKB6-260DP	**389.407**	CKB6	68 - 110	64	260	8.3

For Spare Parts ▶ 421
For Insert Holder ▶ 300 / 301

B.1

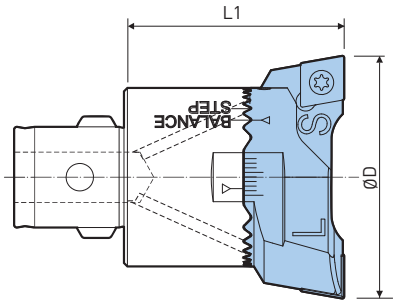


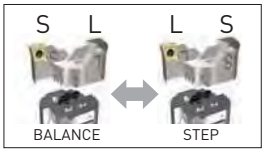
Horizontal Machine	
Smart Damper	SW41-66CKB4-200DP
Holder	BBT50-CKB4-178
Cutting Speed	200 m/min
D.O.C	Ø 4 mm
Feed	0.35 mm/rev
Coolant	Emulsion
Material	C55

Insert Holders Type CC

Standard insert holders for CC- type inserts with 90° lead angle.
Suitable for through and blind holes, as well as for rotationally-symmetrical- and double-offset-roughing.







For Boring Head	Model	Order No.	ØD	L1	
SW20	IH1SW20C	**639.413**	20 - 26	32.5	CC 06
	IH2SW20C	**639.417**	25 - 31	32.5	
SW25	IH1SW25C	**639.423**	25 - 33	35.5	
	IH2SW25C	**639.427**	32 - 40	35.5	
SW32	IH1SW32C	**639.433**	32 - 42	40	CC 09
	IH2SW32C	**639.437**	41 - 51	40	
SW41	IH1SW41C	**639.443**	41 - 54	47	
	IH2SW41C	**639.447**	53 - 66	47	
SW53	IH1SW53C	**639.453**	53 - 70	57	CC 12
	IH2SW53C	**639.457**	69 - 86	57	
SW68	IH1SW68C	**639.463**	68 - 90	71	
	IH1SW68C	**639.467**	88 - 110	71	
SW98	IH1SW98C	**639.473**	98 - 126	71 / 87 / 117 *	
	IH2SW98C	**639.477**	125 - 153	71 / 87 / 117 *	
SW148	IH1SW148C	**639.483**	148 - 176	71 / 117 *	
	IH2SW148C	**639.487**	175 - 203	71 / 117 *	
SW68	IH1SW68C16	**639.563**	68 - 90	71	CC 16
	IH2SW68C16	**639.567**	88 - 110	71	
SW98	IH1SW98C16	**639.573**	98 - 126	71 / 87 / 117 *	
	IH2SW98C16	**639.577**	125 - 153	71 / 87 / 117 *	
SW148	IH1SW148C16	**639.583**	148 - 176	71 / 117 *	
	IH2SW148C16	**639.587**	175 - 203	71 / 117 *	

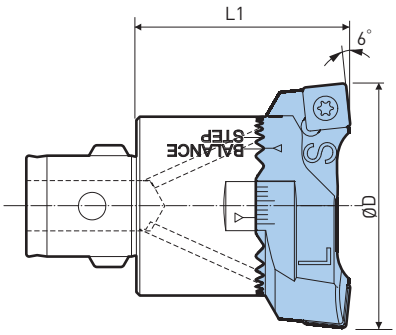
1. Consisting of two insert holders with different lengths, type S (short) and L (long).
   The insert holders are also available by the piece as spare parts.
2. * L1 depends on the length of the boring head.

For Spare Parts ▶ 422
For Insert ▶ 393 - 396

Insert Holders Type SC/SP

Inserts inclined 6° for improved entry stability under unfavourable conditions (rolled or scaled surfaces, stacked plates etc.). Only for rotationally-symmetrical application (RSS).





For Boring Head	Model	Order No.	ØD	L1	
SW20	IH1SW20S	**639.113**	20 - 26	32.5	SP 06
SW25	IH1SW25S	**639.123**	25 - 33	35.5	
SW32	IH1SW32S	**639.133**	32 - 42	40	SC 09
	IH2SW32S	**639.137**	41 - 51	40	
SW41	IH1SW41S	**639.143**	41 - 54	47	
	IH2SW41S	**639.147**	53 - 66	47	
SW53	IH1SW53S	**639.153**	53 - 70	57	SC 12
	IH2SW53S	**639.157**	69 - 86	57	
SW68	IH1SW68S	**639.163**	68 - 90	71	
	IH2SW68S	**639.167**	88 - 110	71	
SW98	IH1SW98S	**639.173**	98 - 126	71 / 87 / 117 *	
	IH2SW98S	**639.177**	125 - 153	71 / 87 / 117 *	
SW148	IH1SW148S	**639.183**	148 - 176	71 / 117 *	
	IH2SW148S	**639.187**	175 - 203	71 / 117 *	

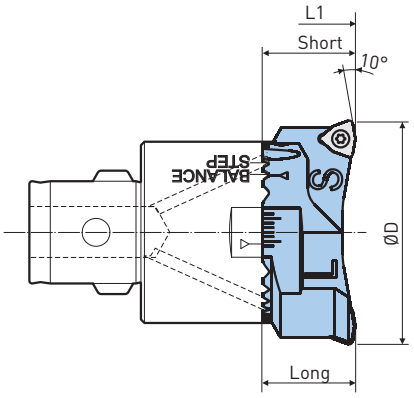
1. Set consisting of two insert holders with different lengths, type S (short) and L (long).
   The insert holders are also available by the piece as spare parts.
2. * L1 depends on the length of the boring head.

For Spare Parts ▶ 422
For Insert ▶ 397 - 399

Insert Holders Type WC

Full profile roughing permits boring with large stock allowances (30 mm and more in Ø) in a single operation with relatively low drive power.





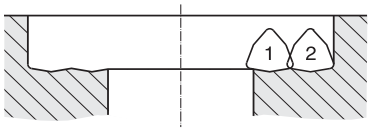
For Boring Head	Model	Order No.	ØD	L1	
SW41	IH1SW41W	**639.243**	49 - 62	47	WC 04
SW53	IH1SW53W	**639.253**	59 - 76	57	WC 05
	IH2SW53W	**639.257** *	69 - 86	57	
SW68	IH1SW68W	**639.263**	73 - 95	71	WC 06
	IH2SW68W	**639.267**	90 - 112	71	
SW98	IH1SW98W	**639.273**	106 - 134	71 / 87 /117 **	
	IH2SW98W	**639.277**	131 - 159	71 / 87 /117 **	
SW148	IH1SW148W	**639.283**	156 - 184	71 / 117 **	
	IH2SW148W	**639.287**	191 - 209	71 / 117 **	

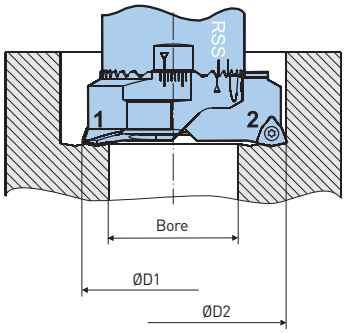
1. Consisting of two insert holders with different lengths, type S (short) and L (long).
2. * Set consisting of two insert holders with different lengths, Type S (short) and L (long) and for different boring ranges (639.255: Ø 69 - 86 mm, 639.252: Ø 59 - 76 mm). For full-profile-roughing only. Insert holders available by the piece also.
3. ** L1 depends on the length of the boring head.

For Spare Parts ▸ 422
For Insert ▸ 403 - 404

Adjustment Instructions

- Mount the insert holders on mark «RSS/BALANCE»
- Set cutting edge 2 to the final bore diameter (ØD2)
- Set cutting edge 1 corresponding to the starting bore diameter, according to the table (column ØD1).



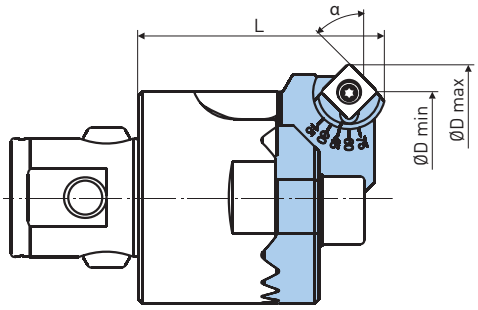


For Boring Head	Insert Holder Order No.	Starting Bore Ø	ØD1	ØD2
SW41	**639.243**	35 - 37.9	49	51 - 62
		38 - 41	52	54 - 62
SW53	**639.253**	41 - 44.9	59	61 - 76
		45 - 50	63	65 - 76
	639.257	51 - 54.9	69	76 - 86
		55 - 60	73	81 - 86
SW68	**639.263**	50 - 55.9	73	75 - 93
		56 - 61.9	79	81 - 93
		62 - 67	85	87 - 93
	639.267	67 - 72.9	90	92 - 110
		73 - 78.9	96	98 - 110
		79 - 85	102	104 - 110
SW98	**639.273**	84 - 89.9	107	109 - 129
		90 - 95.9	113	115 - 133
		96 - 102.9	119	121 - 133
		103 - 109	126	128 - 133
	639.277	108 - 114.9	131	133 - 154
		115 - 121.9	138	140 - 159
		122 - 128.9	145	147 - 159
		129 - 135	152	154 - 159
SW148	**639.283**	134 - 139.9	157	159 - 179
		140 - 145.9	163	165 - 183
		146 - 152.9	169	171 - 183
		153 - 159	176	178 - 183
	639.287	158 - 164.9	181	183 - 204
		165 - 171.9	188	190 - 209
		172 - 178.9	195	197 - 209
		179 - 185	202	204 - 209

Insert Holders Chamfering for SW

These insert holders with step-less adjustable chamfer angle from 15° to 75° are made for front chamfering and, with limitations also for back chamfering, on the rough heads for roughing SW 41 to SW 148.





For Boring Head	Model	Order No.		Diameter Range ØD 15° min - max	30° min - max	45° min - max	60° min - max	75° min - max	L
SW41	IH1SW41CF	**639.104**	SC 09	33 - 60	36 - 62	39 - 63	43 - 63	45 - 62	51
SW53	IH1SW53CF	**639.105**		45 - 76	48 - 78	51 - 79	55 - 79	57 - 78	58
SW68	IH1SW68CF	**639.106**		61 - 97	64 - 99	67 - 100	71 - 100	73 - 99	68
SW98	IH1SW98CF	**639.107**	SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	73
	IH2SW98CF	**639.108**		104 - 153	108 - 155	113 - 156	117 - 155	121 - 154	
SW148	IH1SW148CF	**639.109**		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	73
	IH2SW148CF	**639.110**		158 - 207	162 - 209	167 - 210	171 - 209	175 - 208	
SW98	IH1SW98CF	**639.107**	SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	89 / 119
	IH2SW98CF	**639.108**		104 - 153	108 - 155	113 - 156	117 - 155	121 - 154	
SW148	IH1SW148CF	**639.109**		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	119
	IH2SW148CF	**639.110**		158 - 207	162 - 209	167 - 210	171 - 209	175 - 208	

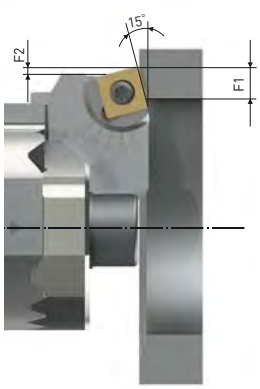
1. Insert holders must be set for balance cut.
2. L in chart indicates max. tool length with 45° chamfer angle.

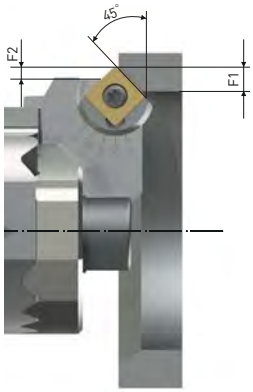
For Spare Parts ▶ 423
For Insert ▶ 398 - 399

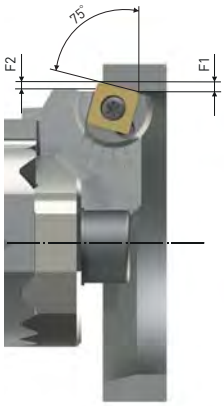
Max. radial chamfer length for front and back chamfering

Applicable for inserts with nose radius 0.4 mm

For Boring Head		Chamfer Angle 15° F1	15° F2	30° F1	30° F2	45° F1	45° F2	60° F1	60° F2	75° F1	75° F2
SW41	SC 09	7.7	0.7	6.9	1.4	5.7	1.8	4.0	1.7	2.1	1.2
SW53											
SW68											
SW98	SC 12	10.6	1.2	9.5	2.2	7.8	2.6	5.5	2.5	2.8	1.8
SW148											





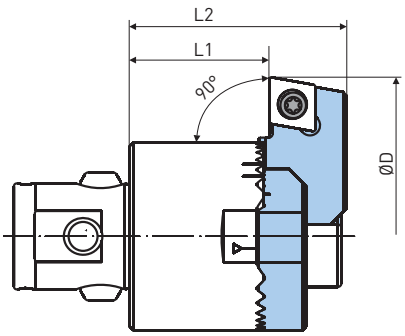


Insert Holders Back Boring for SW

These insert holders are made for back boring with the rough boring heads for roughing SW 32 to SW 148 and cover the diameter range from Ø 44 - 211 mm.

Insert holder with dead piece are available as set or as individual components.





For Boring Head	Model	Order No.		ØD	ØD1	B	L1 *	L2 *
SW32	IH1SW32BB	**639.403**	CC 09	44 - 54	31	ØD-17 / min. 31	24	38
SW41	IH1SW41BB	**639.404**		53 - 66	39	ØD-21 / min. 39	29	44
SW53	IH1SW53BB	**639.405**	CC 12	65 - 82	50	ØD-28 / min. 50	34	55
SW68	IH1SW68BB	**639.406**		81 - 103	63.5	ØD-27 / min. 63.5	41	66
SW98	IH1SW98BB	**639.407**		102 - 130	90	90	38	69
	IH2SW98BB	**639.408**		129 - 157				
SW148	IH1SW148BB	**639.409**		156 - 184	140	140	38	69
	IH2SW148BB	**639.410**		183 - 211				
SW98	IH1SW98BB	**639.407**		102 - 130	90	90	47 / 77	78 / 108
	IH2SW98BB	**639.408**		129 - 157				
SW148	IH1SW148BB	**639.409**		156 - 184	140	140	77	108
	IH2SW148BB	**639.410**		183 - 211				

1. * Insert holders must be set for balance cut.

For Spare Parts ▶ 423
For Insert ▶ 394 - 395

B.1

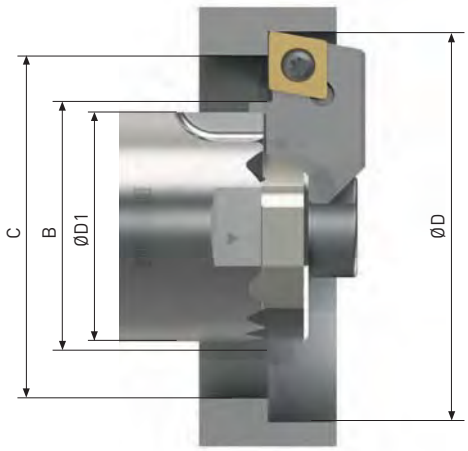
Back boring

The back bore diameter «ØD» the diameter of the entry bore «C», the diameter of the interfering edge «B», respectively of the tool body «ØD1» are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

Minimum entry bore diameter «C»: $C = \frac{ØD + B}{2} + 0.5$

Max. diameter of the interfering edge «B»: $B = 2\,(C - 0.5) - ØD$

Clearance: 0.5 mm

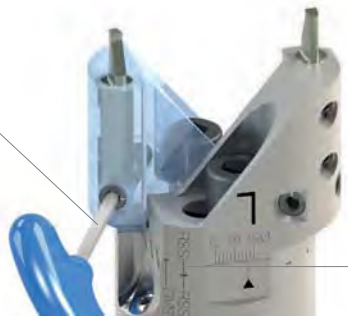


Face Grooving Holders for SW

Upgrade your existing rough boring heads SW: the face grooving holder provide the possiblity to manufacture grooves in the diameter range from Ø 53 to 203 mm.

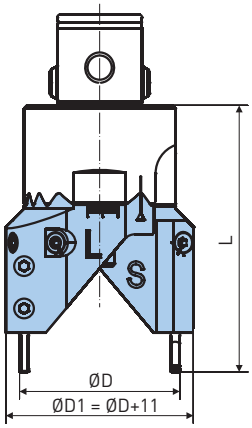


Extremley accurate tool length adjustment by eccentric bolt

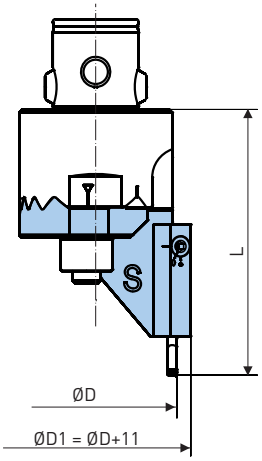


Attention: Mount the face grooving holder on mark "RSS/ BALANCE"









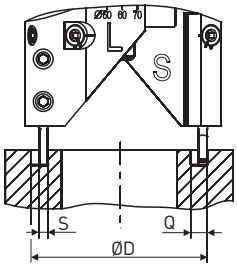
Twin Cutter Set

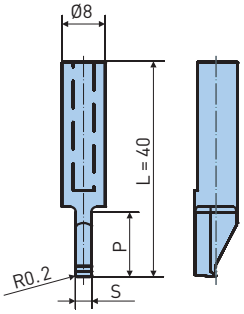
For Boring Head	Model	Order No.	ØD	L
SW53	IH1SW53FG	**639.653**	53 - 70	88
SW68	IH1SW68FG	**639.663**	68 - 90	95
	IH2SW68FG	**639.667**	88 - 110	95
SW98	IH1SW98FG	**639.673**	98 - 126	113
	IH2SW98FG	**639.677**	125 - 153	113
SW148	IH1SW148FG	**639.683**	148 - 176	143
	IH2SW148FG	**639.687**	175 - 203	143

Single Cutter Set

For Boring Head	Model	Order No.	ØD	L
SW53	IH1SW53FG-S	**639.654**	53 - 70	88
SW68	IH1SW68FG-S	**639.664**	68 - 90	95
	IH2SW68FG-S	**639.668**	88 - 110	95
SW98	IH1SW98FG-S	**639.674**	98 - 126	113
	IH2SW98FG-S	**639.678**	125 - 153	113
SW148	IH1SW148FG-S	**639.684**	148 - 176	143
	IH2SW148FG-S	**639.688**	175 - 203	143

Cutters



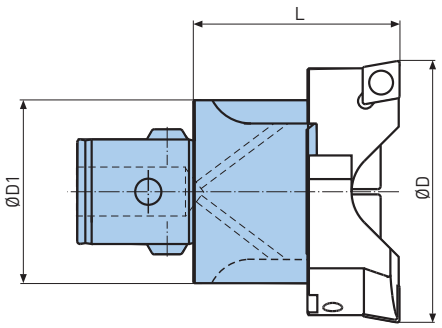


Model	Order No.	Width Cutter S	Max. Groove Width Double Cutters Q	Cutting Edge	Max. Groove Depth P
FG2-ST8-40K40	**958.601**	2	3.5	uncoated K40	12
FG3-ST8-40K40	**958.602**	3	5.5		
FG4-ST8-40K40	**958.603**	4	7.5		
FG5-ST8-40K40	**958.604**	5	9.5		
FG2-ST8-40K40C	**958.611**	2	3.5	coated P40C	
FG3-ST8-40K40C	**958.612**	3	5.5		
FG4-ST8-40K40C	**958.613**	4	7.5		
FG5-ST8-40K40C	**958.614**	5	9.5		

TWN Rough Boring Heads, Ø 20 - 203

The heads of the TWN series have been developed for economical heavy duty rough boring.





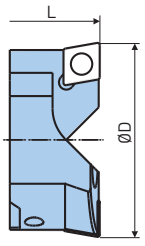
Model	Order No.	CK	ØD	ØD1	L	Weight (kg)
TWN20-31CKB1	**315.101**	CKB1	20 - 31	18.5	32.5	0.05
TWN25-40CKB2	**315.201**	CKB2	25 - 40	23.4	35.5	0.10
TWN32-51CKB3	**315.301**	CKB3	32 - 51	30	40	0.17
TWN41-66CKB4	**315.401**	CKB4	41 - 66	39	47	0.34
TWN53-86CKB5	**315.501**	CKB5	53 - 86	49	57	0.64
TWN68-110CKB6	**315.601**	CKB6	68 - 110	63	71	1.29
TWN98-153CKB6	**315.602**	CKB6	98 - 153	90	71	1.85
TWN98-153CKB7	**315.701**	CKB7	98 - 153	90	87	3.10

For Spare Parts ▸ 424

B.1

Insert Holders Type CC (Sold in Pairs)

Standard insert holders for CC- type inserts with 90° lead angle. For through- and blind holes. Symmetrical and double offset cutting edge arrangement possible.



For Boring Head	Model	Order No.	ØD	L	
TW20	IH1TW20C	**638.411**	20 - 26	32.5	CC 06
	IH2TW20C	**638.412**	25 - 31	32.5	
TW25	IH1TW25C	**638.421**	25 - 33	35.5	
	IH2TW25C	**638.422**	32 - 40	35.5	
TW32	IH1TW32C	**638.431**	32 - 42	40	CC 09
	IH2TW32C	**638.432**	41 - 51	40	
TW41	IH1TW41C	**638.441**	41 - 54	47	
	IH2TW41C	**638.442**	53 - 66	47	
TW53	IH1TW53C	**638.451**	53 - 70	57	CC 12
	IH2TW53C	**638.452**	69 - 86	57	
TW68	IH1TW68C	**638.461**	68 - 90	71	
	IH2TW68C	**638.462**	88 - 110	71	
TW98	IH1TW98C	**638.471**	98 - 126	117	
	IH2TW98C	**638.472**	125 - 153	117	
TW148	IH1TW148C	**638.471**	148 - 176	71	
	IH2TW148C	**638.472**	175 - 203	71	

For Spare Parts ▸ 424
For Insert ▸ 393 - 395

Guidelines

Insert Selection & Stock Allowance

BIG KAISER indexable inserts outlined in the Insert selection & cutting data tables have been selected to give optimum results. Grades and geometry do not have to be specified at time of order.

Insert radius is based upon 2 major factors:

1. Length/diameter ratio of tool
2. Depth of cut or material allowance
   - Select the largest nose radius available for cutting edge strength & higher feeds
   - Use small nose radius for light depth of cut & extreme L/D ratio

Insert Radius	Minimum D.O.C.	Maximum D.O.C.	L/D Ratio
0.2	0.25	1.5	>6:1
0.4	0.50	3.0	≤5:1
0.8	1.00	5.0	≤4:1
1.2	1.50	8.0	≤4:1

- D.O.C. is stock allowance/side (radius)

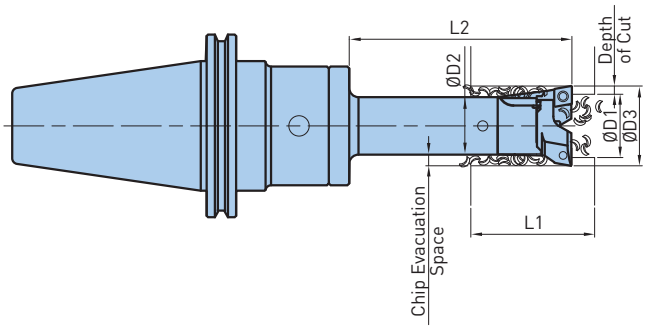
Feed

1. Feed: based on effective number of inserts, depending on roughing method
   - Balanced cutting: 2 effective inserts
   - Stepped cutting: 1 effective insert
   - Full profile cutting: 1 effective insert
2. Under normal rough boring operations, the effective feed rate is about 50% of nose radius

Insert Radius	Feed (mm/rev)	
	Balanced Cutting	Stepped Cutting
0.2	0.2 - 0.3	0.1 - 0.15
0.4	0.3 - 0.4	0.15 - 0.2
0.8	0.4 - 0.5	0.3 - 0.4
1.2	0.5 - 0.7	0.3 - 0.5

General Rule:

Boring bar should always be smaller than original hole size.



Caution

- It is very important to allow for clearance between boring bar and rough bore diameter.

Troubleshooting

Under certain conditions, it may be necessary to modify or adapt recommended cutting data and/or tooling configurations of the application. Below are general solutions to common problems.

Problem	Possible Cause	Remedy
Poor Chip Control	Feed rate too low	Increase feed rate
	Width of chip excessive (D.O.C.)	Preset tool for stepped cutting method
	Excessive stock allowance	Consult cutting data tables
Chatter & Vibration	Excessive speed	Reduce Vc, check cutting data tables
	Extreme length/diameter ratio	Shorten tool to increase stiffness
		Increase boring bar diameter to larger size
		Change boring bar to carbide or heavy metal
	Insert radius too large	Reduce nose radius of insert
	Unstable workpiece	Improve fixture and clamping support
	Lead angle on insert holders	Change to 90 degree insert holders (type CC)
Inserts Chipping or Breaking	Wrong insert	Change to tougher grade of carbide insert
		Use larger radius if available
	Severe interruption	Increase speed, decrease feed
	Chips packing and re-cutting	Check for boring bar/bore diameter clearance
		Improve chip control,increase feed
Poor Tool Life	Wrong insert	Change to higher wear resistant grade
	Excessive cutting speed	Reduce speed
	Inserts chipping	Check stock allowance and feed rate
	Coolant pressure too low	Increase through tool coolant pressure
		Adjust coolant ports of head if available
Chips Not Evacuating	Boring bar diameter too large	Reduce to smaller head and extended range holder
	Excessive stock allowance	Re-set tool for stepped cutting
	Inadequate space below bore	Elevate workpiece from table more
	Poor chip control	See above problem
Insufficient Machine Power	Excessive feed rate	Reduce feed; minimum 25% of insert radius
	Stock allowance excessive	Reset tool for stepped cutting method
	Low machine torque	RPM in area of low spindle torque; increase speed
		RPM in area of gear change; adjust RPM
		Change insert to higher rake angle
		Reduce depth of cut
Excessive Exit Burr	Excessive feed rate	Reduce feed rate
	CC type insert holders	Use square insert holders with 6 degree lead
	Cutting forces too high	Reduce depth of cut
		Reduce insert radius

Fine Boring Heads with Centric Cutting Edge

Overview	310
EWE 2-152 Digital Fine Boring Head	312
EWN 2-152 Fine Boring Head	313
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EWN 04-7 Fine Boring Head	346

B.2



EWE 2-152 Digital Fine Boring Head

Wireless communication for easy readout with the BIG KAISER app: The brandnew EWE fine boring head revolutionates fine boring process. Less operator mistakes, easier setup and a huge diameter range of Ø 2 - 152 mm. Also available as integral solution with HSK-A63. Accessories of EWD and EWN are fully compatible.

Ø 2 - 152 mm, CK6/HSK-A63

▶ 312



EWN 2-152 Fine Boring Head

Fine boring head with centric boring bars in modular and integral execution for accurate, high performance operations. The head comes with variable length adjustment of the boring bar and large dial disc for parallax-free readout.

Ø 2 - 152 mm, CK6/DV40/HSK-A63/BIG CAPTO C6

▶ 313



EWE 2-32 Digital Fine Boring Head

Smallest digital fine boring head with wireless communication to the BIG KAISER app and centric boring bar. Especially manufactured for the use on small machine tools. Accessories of EWN and EWD are fully compatible.

Ø 2 - 32 mm, CK5

▶ 332



EWN 2-32 Fine Boring Head

Fine boring head with centric boring bar in integral, modular and screw-on execution for precise machining. Developped for the use on machine tools with spindles 30 taper, HSK-A50 and bigger, as well as on lathe machines with driven tools.

Ø 2 - 32 mm, CK5/DV30/ES32

▶ 333



EWN 04-15 Fine Boring Head

Machining of small bores with high speeds on machine tools with spindles DV20, HSK-E32 and bigger.

Ø 0.4 - 15 mm, CK3/ST16

▶ 344



EWN 04-7 Fine Boring Head

World's smallest fine boring head: Thanks to its body diameter of only Ø 18.5 mm, the EWN 04-7 is the perfect solution for micro machining applications.

Ø 0.4 - 7 mm, CK1/ST6/ST10

▶ 346


SAMSUNG
Welcome
BATTERY
CR 1025
Cutting Data
EWE

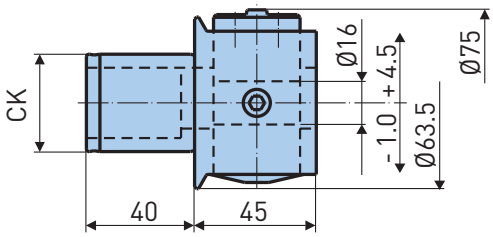

Download on the
App Store
GET IT ON
Google Play

EWE 2-152 Digital Fine Boring Head, Ø 2 - 152

Digital fine boring head in modular and integral execution for accurate, high performance boring operations. With wireless communication to the BIG KAISER app.

Wireless





Model	Order No.
EWE2-152CK6	112.110

EWE2-152HSK-A63
112.126



BIG KAISER App

B.2

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.



Cutting data



Send your data to...



History (made automatically)

This is how the app is going to support your daily challenges

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore

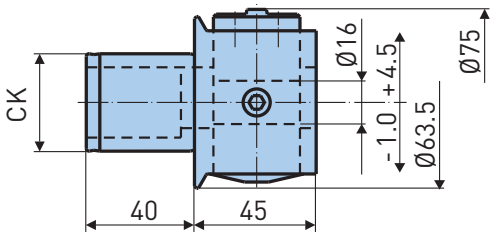
Download on the App Store

GET IT ON Google Play

EWN 2-152 Fine Boring Head, Ø 2 - 152

Fine boring heads in modular and integral execution for accurate, high performance boring operations on machine tools with spindles ISO 40, HSK-A63, BIG CAPTO C6 and bigger.





Model	Order No.
EWN2-152CK6	112.108

Other executions

EWN2-152DV40
112.121



EWN2-152BT40
112.122



EWB2-50CK6
112.107



Balanceable

EWN2-152HSK-A63
112.123



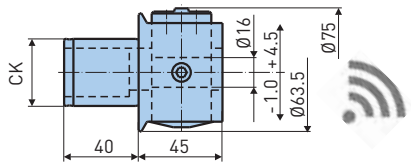
EWN2-152C6
470.108



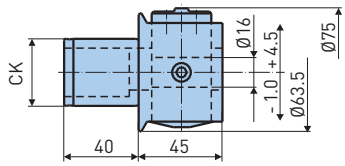
B.2

Boring Head **Order No.**

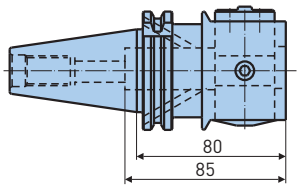
EWE2-152CK6 **112.110**



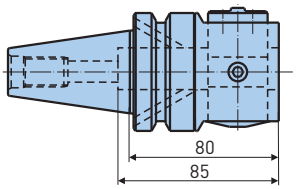
EWN2-152CK6 **112.108**



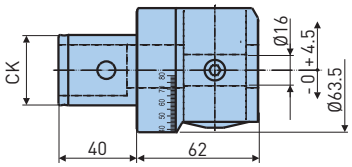
EWN2-152DV40 **112.121**



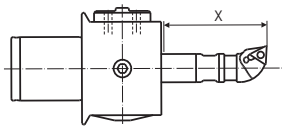
EWN2-152BT40 **112.122**



EWB2-50CK6 **112.107**



X = Boring depth

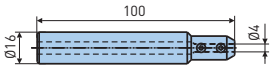


ØD

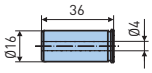
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

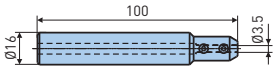
RB16-4-100 **613.424** ♦



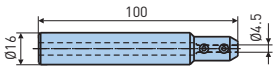
RB16-4 **613.404**



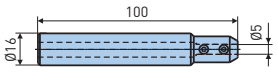
RB16-3.5-100 **613.422** ♦



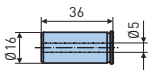
RB16-4.5-100 **613.423** ♦



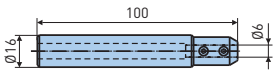
RB16-5-100 **613.425** ♦



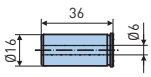
RB16-5 **613.405**



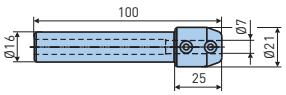
RB16-6-100 **613.426** ♦



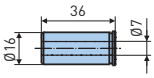
RB16-6 **613.406**



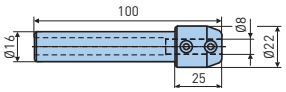
RB16-7-100 **613.427** ♦



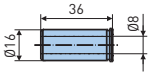
RB16-7 **613.407**



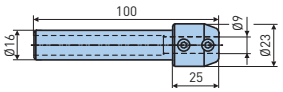
RB16-8-100 **613.428** ♦



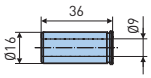
RB16-8 **613.408**



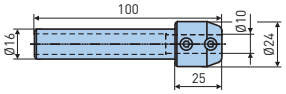
RB16-9-100 **613.429** ♦



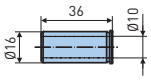
RB16-9 **613.409**



RB16-10-100 **613.430** ♦



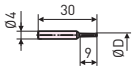
RB16-10 **613.410**



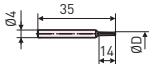
Carbide tool holders

♦ Recommended for EWB 2-50

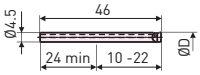
Fixed Tool Holder



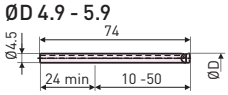
E2-4K10 **611.155** ♦
ØD 2.0 - 3.0



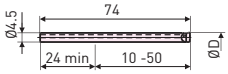
E3-4K10 **611.156** ♦
ØD 3.0 - 4.0



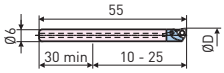
E5-ST4.5-46K10 **615.081**
ØD 4.9 - 5.9



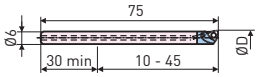
E5-ST4.5-74K10 **615.204** ♦
ØD 4.9 - 5.9



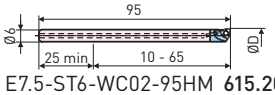
E5-ST4.5-74K10C **615.204A** ♦
ØD 4.9 - 5.9



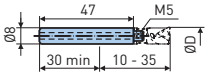
E7.5-ST6-WC02-55HM **615.084**
ØD 7.3 - 8.8



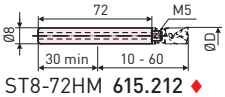
E7.5-ST6-WC02-75HM **615.085**
ØD 7.3 - 8.8



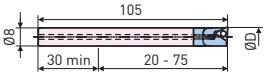
E7.5-ST6-WC02-95HM **615.202** ♦
ØD 7.3 - 8.8



ST8-47 **615.211**
ØD 8.8 - 11.8



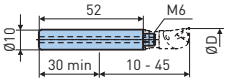
ST8-72HM **615.212** ♦
ØD 8.8 - 11.8



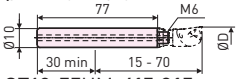
E9-ST8-TP07-105HM **615.213** ♦
ØD 8.8 - 11.8



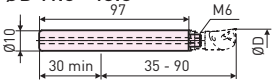
E9T
615.271 ♦
ØD 8.8 - 11.8



ST10-52 **615.214**
ØD 11.8 - 13.8



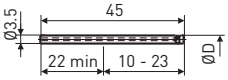
ST10-77HM **615.215** ♦
ØD 11.8 - 13.8



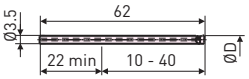
ST10-11.8-13.8-M6-97 **615.223** ♦
ØD 11.8 - 13.8



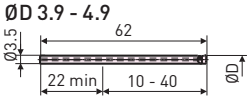
E12T
615.272 ♦
ØD 11.8 - 13.8



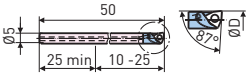
E4-ST3.5-45K10 **615.080**
ØD 3.9 - 4.9



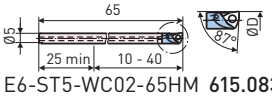
E4-ST3.5-62K10 **615.203** ♦
ØD 3.9 - 4.9



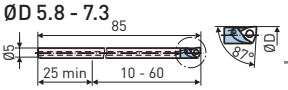
E4-ST3.5-62K10C **615.203A** ♦
ØD 3.9 - 4.9



E6-ST5-WC02-50HM **615.082**
ØD 5.8 - 7.3



E6-ST5-WC02-65HM **615.083**
ØD 5.8 - 7.3



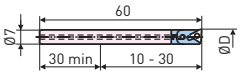
E6-ST5-WC02-85HM **615.201** ♦
ØD 5.8 - 7.3

WC 02

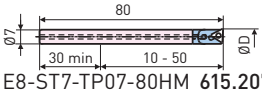


WC 02

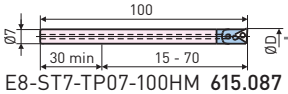




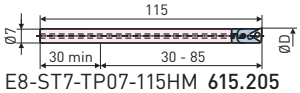
E8-ST7-TP07-60HM **615.086**
ØD 7.8 - 9.8



E8-ST7-TP07-80HM **615.207** ♦
ØD 7.8 - 9.8



E8-ST7-TP07-100HM **615.087** ♦
ØD 7.8 - 9.8



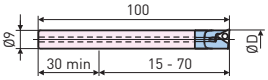
E8-ST7-TP07-115HM **615.205**
ØD 7.8 - 9.8

TP 07

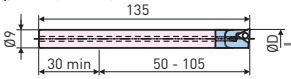


TP 07





E10-ST9-TP07-100HM **615.208** ♦
ØD 9.8 - 11.8



E10-ST9-TP07-135HM **615.206** ♦
ØD 9.8 - 11.8

TP 07

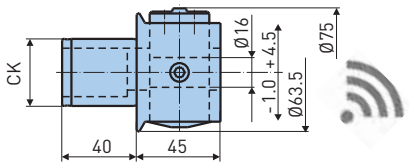


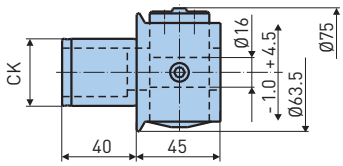
TP 07

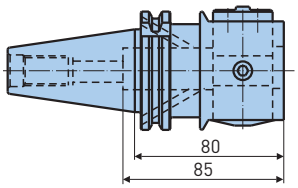


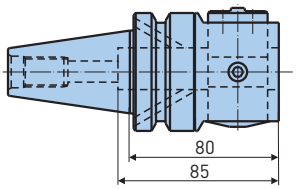
For Insert ▶ 388 - 389

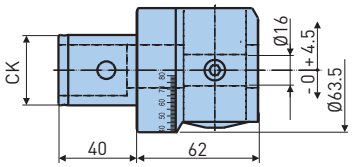
Boring Head	Order No.
EWE2-152CK6	112.110
EWN2-152CK6	112.108
EWN2-152DV40	112.121
EWN2-152BBT40	112.122
EWB2-50CK6	112.107



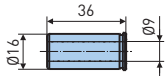




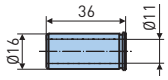




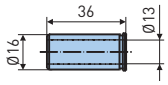
RB16-9
613.409



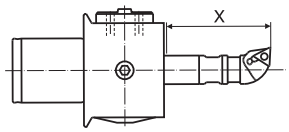
RB16-11
613.411



RB16-13
613.413



X = Boring depth



ØD

Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

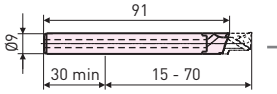
- for EWN, EWE, EWB: Lower range + 9 mm Ø

Carbide tool holders

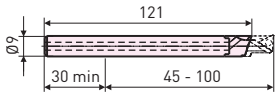
♦ Recommended for EWB 2-50

Adjustable Tool Holder

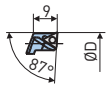
The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from Ø 9.8 - 54 mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.



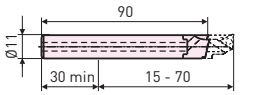
AST9-91HM10-12 **615.374**



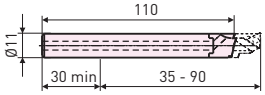
AST9-121HM10-12 **615.369**



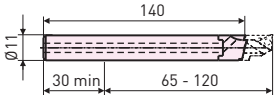
E10-12T
615.365
ØD 9.8 - 12.0



AST11-90HM12-14 **615.375**



AST11-110HM12-14 **615.376**



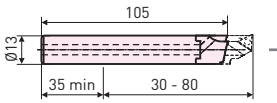
AST11-140HM12-14 **615.371**



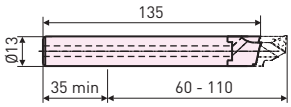
E12-14T
615.366
ØD 11.8 - 14.0

TP 07

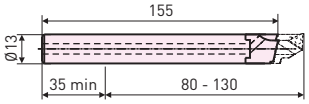




AST13-105HM14-18 **615.377**



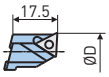
AST13-135HM14-18 **615.378**



AST13-155HM14-18 **615.373**



E14-17T
615.367
ØD 13.8 - 17.0



E15-18T
615.300
ØD 14.8 - 18.0

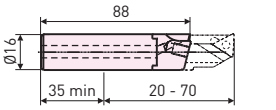
TP 07



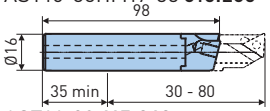
TC 11



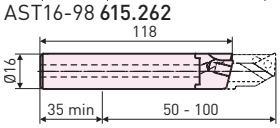
B.2



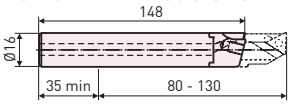
AST16-88HM17-33 **615.265**



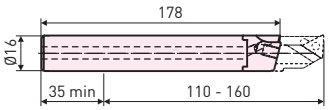
AST16-98 **615.262**



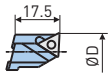
AST16-118HM17-33 **615.252**



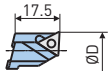
AST16-148HM17-33 **615.266**



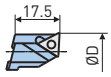
AST16-178HM17-33 **615.253**



E17-22T
615.301
ØD 16.8 - 22.0



E22-27T
615.302
ØD 21.8 - 27.0



E27-33T
615.303
ØD 26.8 - 33.0

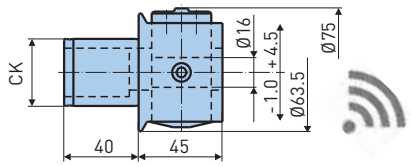
TC 11



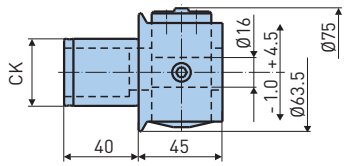
For Insert ▶ 389 - 392

Boring Head **Order No.**

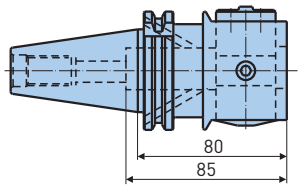
EWE2-152CK6 **112.110**



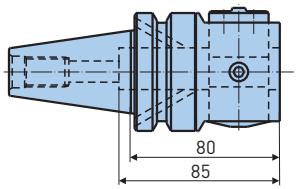
EWN2-152CK6 **112.108**



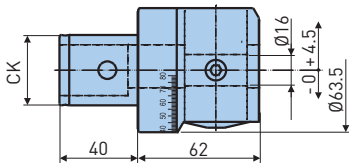
EWN2-152DV40 **112.121**



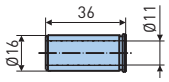
EWN2-152BBT40 **112.122**



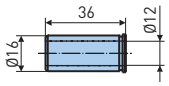
EWB2-50CK6 **112.107**



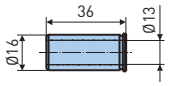
RB16-11 **613.411** ♦



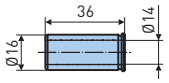
RB16-12 **613.412** ♦



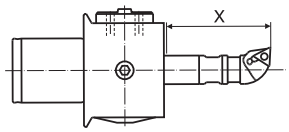
RB16-13 **613.413** ♦



RB16-14 **613.414** ♦



X = Boring depth



ØD

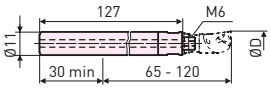
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

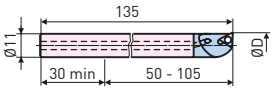
Carbide tool holders

♦ Recommended for EWB 2-50

Fixed Tool Holder



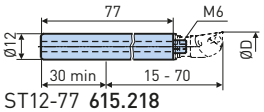
ST11-127HM **615.250** ♦
ØD 11.8 - 13.8



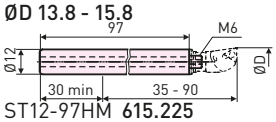
E12-ST11-TP07-135HM **615.209** ♦
ØD 11.8 - 13.8



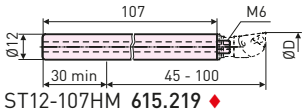
E12T
615.272 ♦
ØD 11.8 - 13.0



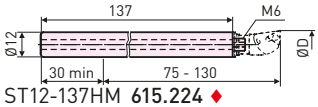
ST12-77 **615.218**
ØD 13.8 - 15.8



ST12-97HM **615.225**
ØD 13.8 - 15.8



ST12-107HM **615.219** ♦
ØD 13.8 - 15.8



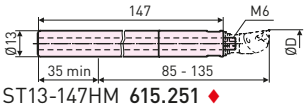
ST12-137HM **615.224** ♦
ØD 13.8 - 15.8



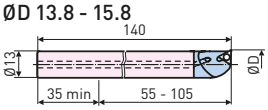
E14T
615.273 ♦
ØD 13.8 - 15.8

TP 07

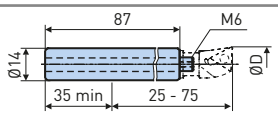




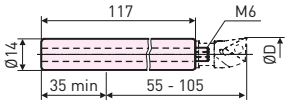
ST13-147HM **615.251** ♦
ØD 13.8 - 15.8



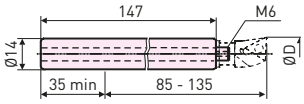
E14-ST13-TP07-140HM **615.210** ♦
ØD 13.8 - 15.8



ST14-87 **615.232**
ØD 14.8 - 17.8



ST14-117HM **615.233** ♦
ØD 14.8 - 17.8



ST14-147HM **615.221**
ØD 14.8 - 17.8



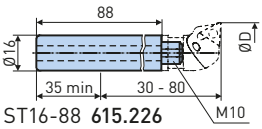
E15T
615.280 ♦
ØD 14.8 - 16.8



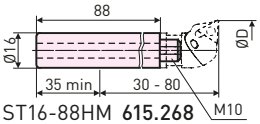
E16T
615.281 ♦
ØD 15.8 - 17.8

TC 11

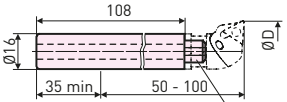




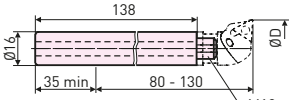
ST16-88 **615.226**
ØD 17.8 - 50.0



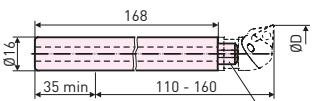
ST16-88HM **615.268**
ØD 17.8 - 50.0



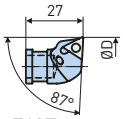
ST16-108HM **615.227** ♦
ØD 17.8 - 50.0



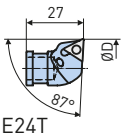
ST16-138HM **615.269** ♦
ØD 17.8 - 50.0



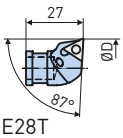
ST16-168HM **615.229** ♦
ØD 17.8 - 50.0



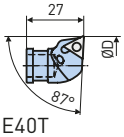
E18T
615.282 ♦
ØD 17.8 - 19.8



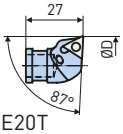
E24T
615.290 ♦
ØD 23.8 - 24.8



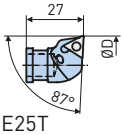
E28T
615.284 ♦
ØD 27.8 - 31.8



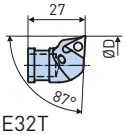
E40T
615.287 ♦
ØD 39.8 - 44.8



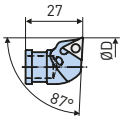
E20T
615.289 ♦
ØD 19.8 - 21.8



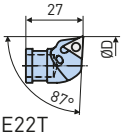
E25T
615.288 ♦
ØD 24.8 - 25.8



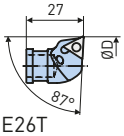
E32T
615.285 ♦
ØD 31.8 - 35.8



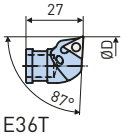
E45T
615.292 ♦
ØD 44.8 - 50.0



E22T
615.283 ♦
ØD 21.8 - 23.8



E26T
615.291 ♦
ØD 25.8 - 27.8

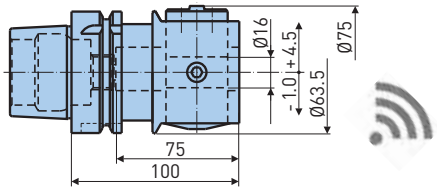


E36T
615.286 ♦
ØD 35.8 - 39.8

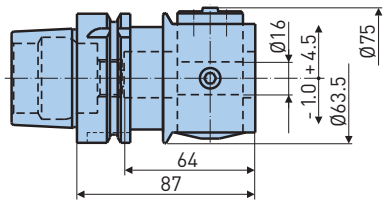
For Insert ▶ 389 - 392

Boring Head **Order No.**

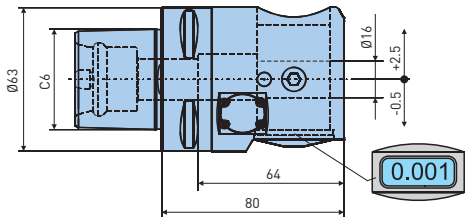
EWE2-152HSK-A63 **112.126**



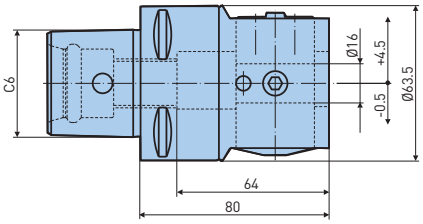
EWN2-152HSK-A63 **112.123**



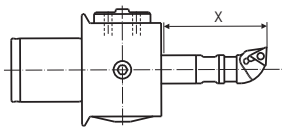
EWD2-54C6 **470.109**



EWN2-152C6 **470.108**



X = Boring depth

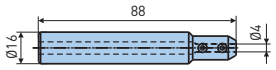


ØD

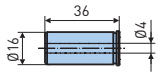
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

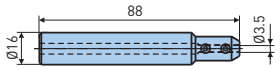
RB16-4-88 **613.434**



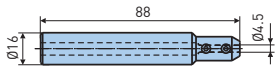
RB16-4 **613.404**



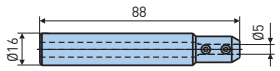
RB16-3.5-88 **613.432**



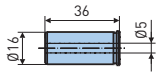
RB16-4.5-88 **613.433**



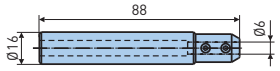
RB16-5-88 **613.435**



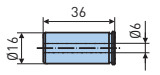
RB16-5 **613.405**



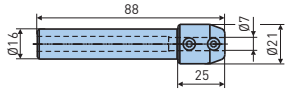
RB16-6-88 **613.436**



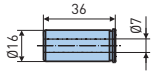
RB16-6 **613.406**



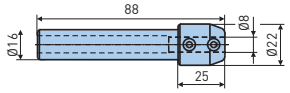
RB16-7-88 **613.437**



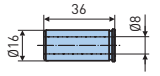
RB16-7 **613.407**



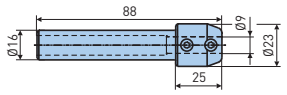
RB16-8-88 **613.438**



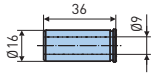
RB16-8 **613.408**



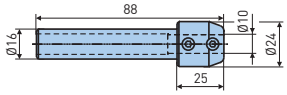
RB16-9-88 **613.439**



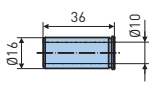
RB16-9 **613.409**



RB16-10-88 **613.440**

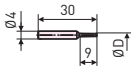


RB16-10 **613.410**

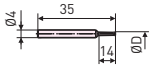


Carbide tool holders

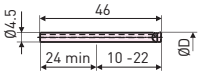
Fixed Tool Holder



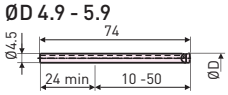
E2-4K10 **611.155**
ØD 2.0 - 3.0



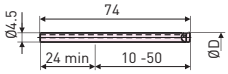
E3-4K10 **611.156**
ØD 3.0 - 4.0



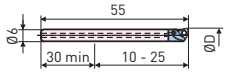
E5-ST4.5-46K10 **615.081**
ØD 4.9 - 5.9



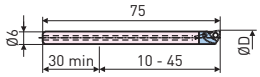
E5-ST4.5-74K10 **615.204**
ØD 4.9 - 5.9



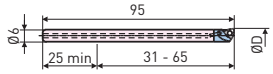
E5-ST4.5-74K10C **615.204A**
ØD 4.9 - 5.9



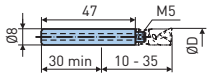
E7.5-ST6-WC02-55HM **615.084**
ØD 7.3 - 8.8



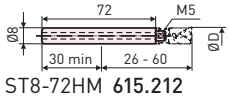
E7.5-ST6-WC02-75HM **615.085**
ØD 7.3 - 8.8



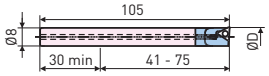
E7.5-ST6-WC02-95HM **615.202**
ØD 7.3 - 8.8



ST8-47 **615.211**
ØD 8.8 - 11.8



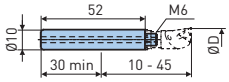
ST8-72HM **615.212**
ØD 8.8 - 11.8



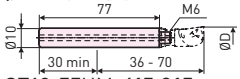
E9-ST8-TP07-105HM **615.213**
ØD 8.8 - 11.8



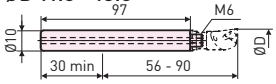
E9T
615.271
ØD 8.8 - 11.8



ST10-52 **615.214**
ØD 11.8 - 13.8



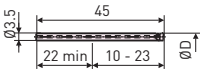
ST10-77HM **615.215**
ØD 11.8 - 13.8



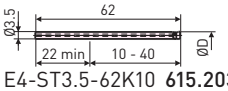
ST10-11.8-13.8-M6-97 **615.223**
ØD 11.8 - 13.8



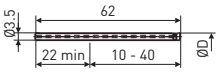
E12T
615.272
ØD 11.8 - 13.8



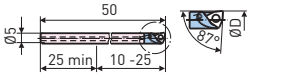
E4-ST3.5-45K10 **615.080**
ØD 3.9 - 4.9



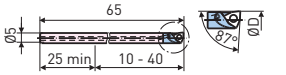
E4-ST3.5-62K10 **615.203**
ØD 3.9 - 4.9



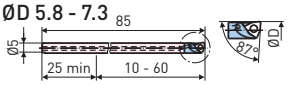
E4-ST3.5-62K10C **615.203A**
ØD 3.9 - 4.9



E6-ST5-WC02-50HM **615.082**
ØD 5.8 - 7.3



E6-ST5-WC02-65HM **615.083**
ØD 5.8 - 7.3



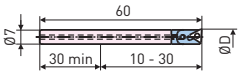
E6-ST5-WC02-85HM **615.201**
ØD 5.8 - 7.3

WC 02

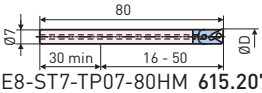


WC 02

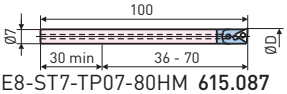




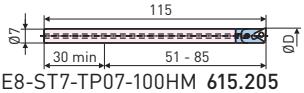
E8-ST7-TP07-60HM **615.086**
ØD 7.8 - 9.8



E8-ST7-TP07-80HM **615.207**
ØD 7.8 - 9.8



E8-ST7-TP07-80HM **615.087**
ØD 7.8 - 9.8



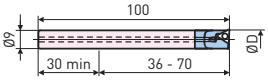
E8-ST7-TP07-100HM **615.205**
ØD 7.8 - 9.8

TP 07



TP 07

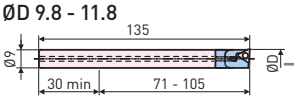




E10-ST9-TP07-100HM **615.208**
ØD 9.8 - 11.8

TP 07





E10-ST9-TP07-135HM **615.206**
ØD 9.8 - 11.8

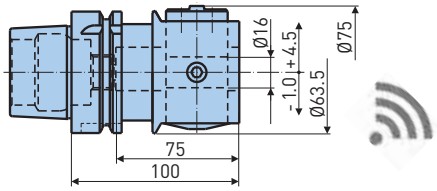
TP 07



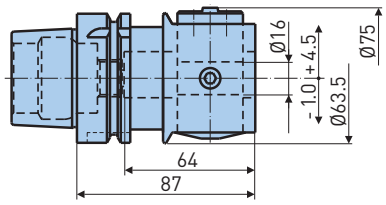
For Insert ▶ 388 - 389

Boring Head **Order No.**

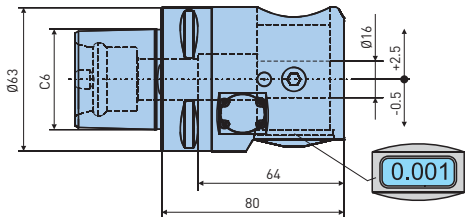
EWE2-152HSK-A63 **112.126**



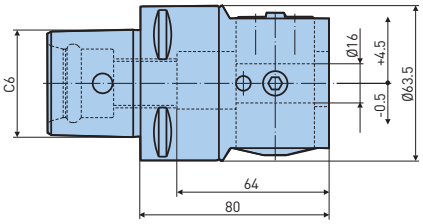
EWN2-152HSK-A63 **112.123**



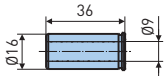
EWD2-54C6 **470.109**



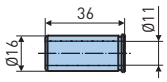
EWN2-152C6 **470.108**



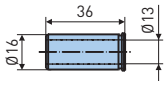
RB16-9 **613.409**



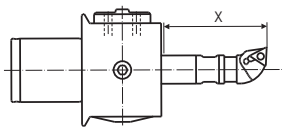
RB16-11 **613.411**



RB16-13 **613.413**



X = Boring depth



ØD

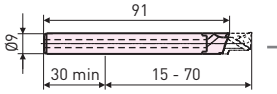
Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

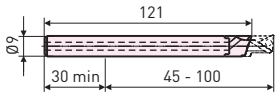
Carbide tool holders

Adjustable Tool Holder

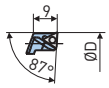
The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from Ø 9.8 - 54 mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.



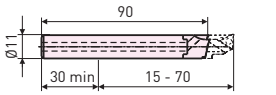
AST9-91HM10-12 **615.374**



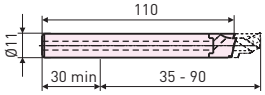
AST9-121HM10-12 **615.369**



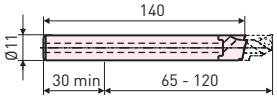
E10-12T
615.365
ØD 9.8 - 12.0



AST11-90HM12-14 **615.375**



AST11-110HM12-14 **615.376**



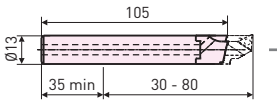
AST11-140HM12-14 **615.371**



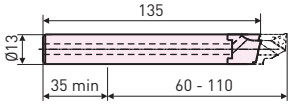
E12-14T
615.366
ØD 11.8 - 14.0

TP 07

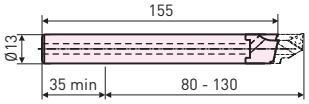




AST13-105HM14-18 **615.377**



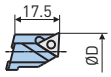
AST13-135HM14-18 **615.378**



AST13-155HM14-18 **615.373**



E14-17T
615.367
ØD 13.8 - 17.0



E15-18T
615.300
ØD 14.8 - 18.0

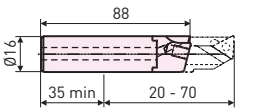
TP 07



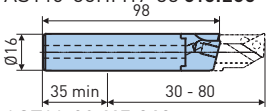
TC 11



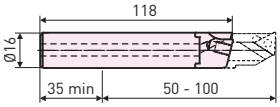
B.2



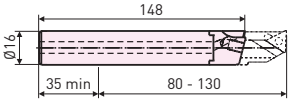
AST16-88HM17-33 **615.265**



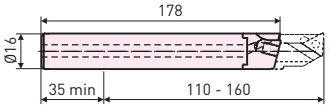
AST16-98 **615.262**



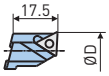
AST16-118HM17-33 **615.252**



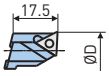
AST16-148HM17-33 **615.266**



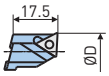
AST16-178HM17-33 **615.253**



E17-22T
615.301
ØD 16.8 - 22.0



E22-27T
615.302
ØD 21.8 - 27.0



E27-33T
615.303
ØD 26.8 - 33.0

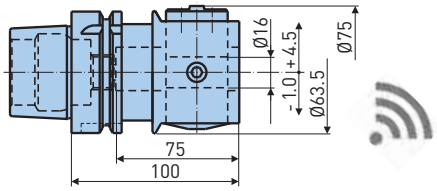
TC 11



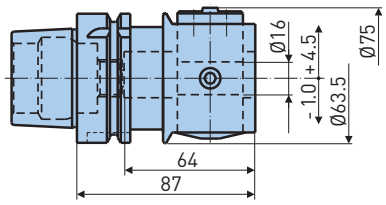
For Insert ▶ 389 - 392

Boring Head **Order No.**

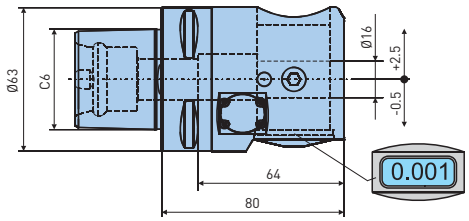
EWE2-152HSK-A63 **112.126**



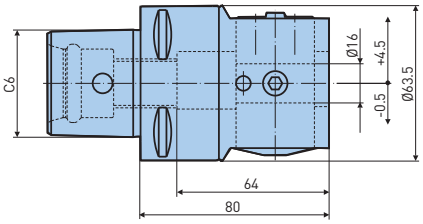
EWN2-152HSK-A63 **112.123**



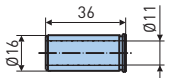
EWD2-54C6 **470.109**



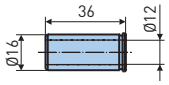
EWN2-152C6 **470.108**



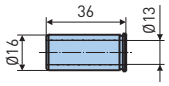
RB16-11 **613.411**



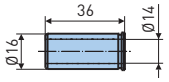
RB16-12 **613.412**



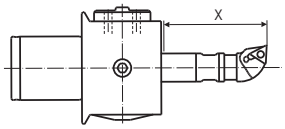
RB16-13 **613.413**



RB16-14 **613.414**



X = Boring depth



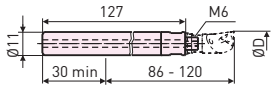
ØD

Boring range for the fine boring head EWN 2-152.
Under full use of the adjustment range, the max. boring range will be,

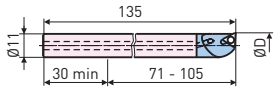
- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

Carbide tool holders

Fixed Tool Holder



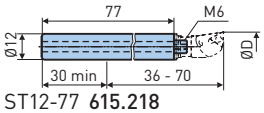
ST11-127HM **615.250**
ØD 11.8 - 13.8



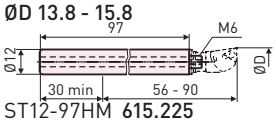
E12-ST11-TP07-135HM **615.209**
ØD 11.8 - 13.8



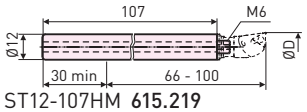
E12T
615.272
ØD 11.8 - 13.0



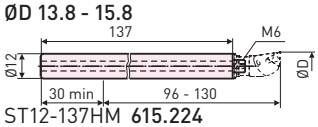
ST12-77 **615.218**
ØD 13.8 - 15.8



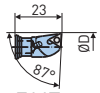
ST12-97HM **615.225**
ØD 13.8 - 15.8



ST12-107HM **615.219**
ØD 13.8 - 15.8



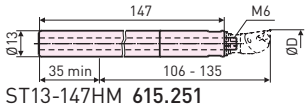
ST12-137HM **615.224**
ØD 13.8 - 15.8



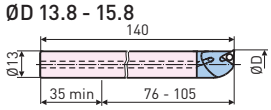
E14T
615.273
ØD 13.8 - 15.8

TP 07

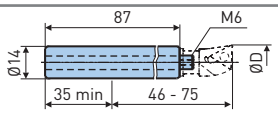




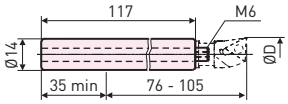
ST13-147HM **615.251**
ØD 13.8 - 15.8



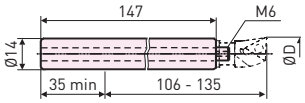
E14-ST13-TP07-140HM **615.210**
ØD 13.8 - 15.8



ST14-87 **615.232**
ØD 14.8 - 17.8



ST14-117HM **615.233**
ØD 14.8 - 17.8



ST14-147HM **615.221**
ØD 14.8 - 17.8



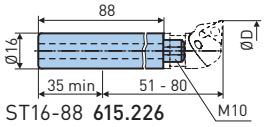
E15T
615.280
ØD 14.8 - 16.8



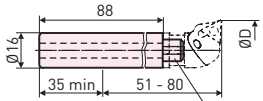
E16T
615.281
ØD 15.8 - 17.8

TC 11

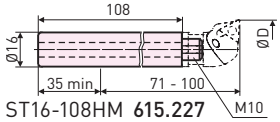




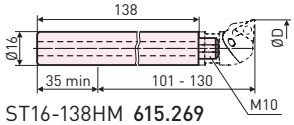
ST16-88 **615.226**
ØD 17.8 - 50.0



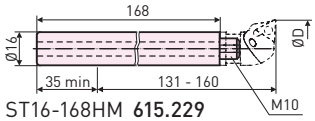
ST16-88HM **615.268**
ØD 17.8 - 50.0



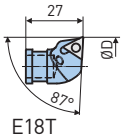
ST16-108HM **615.227**
ØD 17.8 - 50.0



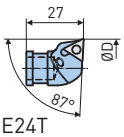
ST16-138HM **615.269**
ØD 17.8 - 50.0



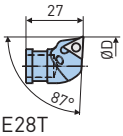
ST16-168HM **615.229**
ØD 17.8 - 50.0



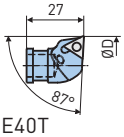
E18T
615.282
ØD 17.8 - 19.8



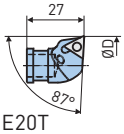
E24T
615.290
ØD 23.8 - 24.8



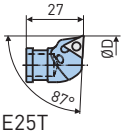
E28T
615.284
ØD 27.8 - 31.8



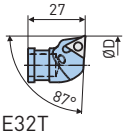
E40T
615.287
ØD 39.8 - 44.8



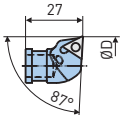
E20T
615.289
ØD 19.8 - 21.8



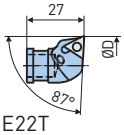
E25T
615.288
ØD 24.8 - 25.8



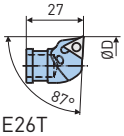
E32T
615.285
ØD 31.8 - 35.8



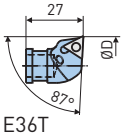
E45T
615.292
ØD 44.8 - 50.0



E22T
615.283
ØD 21.8 - 23.8



E26T
615.291
ØD 25.8 - 27.8

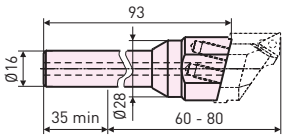


E36T
615.286
ØD 35.8 - 39.8

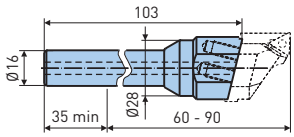
For Insert ▶ 389 - 392

Adjustable Tool Holders

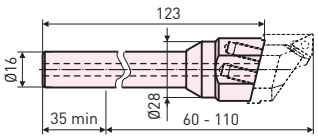
AST16-93HM32-54 **615.267**
ØD 31.8 - 54.0



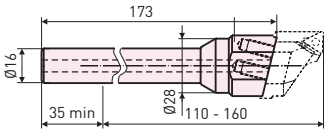
AST16-103 **615.264**
ØD 31.8 - 54.0



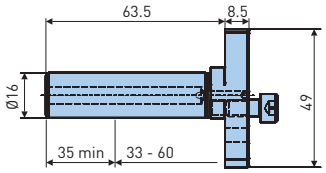
AST16-123HM32-54 **615.257**
ØD 31.8 - 54.0

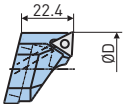


AST16-173HM32-54 **615.258**
ØD 31.8 - 54.0

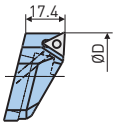


AST16-72 **615.387B**
ØD 54.0 - 80.0

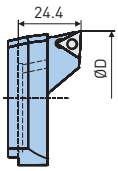




E32-40T
615.304
ØD 31.8 - 40.0



E40-54T
615.305
ØD 39.8 - 54.0



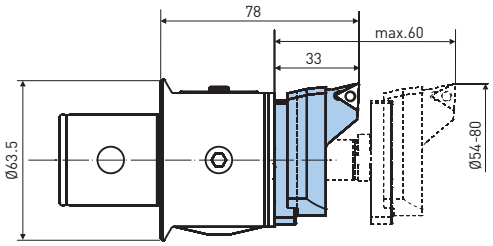
E54-80T
615.306
ØD 54.0 - 80.0

TC 11



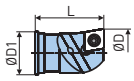
For Insert ▶ 390 - 392

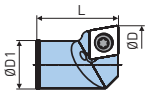
X = Boring depth



B.2

90° Insert Holders





Model	Order No.	ØD1	L	ØD	
E12C	**615.420**	10	23	11.8 - 14.5	CC 06
E14C	**615.421**	12	23	13.8 - 16.5	
E16C	**615.422**	14	23	15.8 - 18.5	
E18C	**615.423**	16	27	17.8 - 20.5	CC 09
E20C	**615.424**	16	27	19.8 - 22.5	

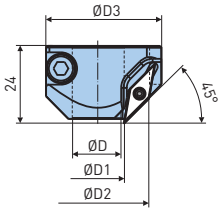
Model	Order No.	ØD1	L	ØD	
E22C	**615.425**	16	27	21.8 - 24.5	CC 09
E24C	**615.426**	16	27	23.8 - 25.5	
E26C	**615.427**	16	27	25.8 - 28.5	
E28C	**615.428**	16	27	27.8 - 32.5	
E30C	**615.429**	16	27	29.8 - 34.5	

For Insert ▶ 393 - 394

Chamfering Rings

Chamfering rings for tool holders made of steel and carbide Ø 12 and Ø 16 mm, for 45° chamfering right after boring, without tool change.





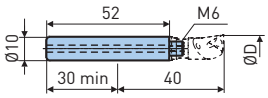
Model	Order No.	Dimensions ØD	ØD1	ØD2	ØD3	
CR13-27ST12V	**615.394**	12	12.6	27.7	35	VC 11
CR17-31ST16V	**615.395**	16	16.6	31.7	39.5	

For Insert ▶ 413

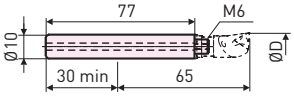
Carbide tool holders

Back Boring Holders

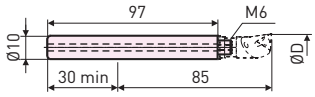
ST10-52 **615.214**
ØD 15.8 - 20.5



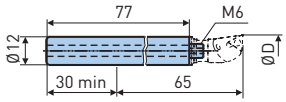
ST10-77HM **615.215**
ØD 15.8 - 20.5



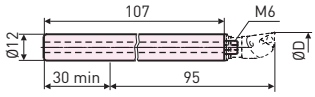
ST10-97HM **615.223**
ØD 15.8 - 20.5



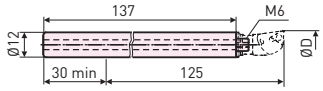
ST12-77HM **615.218**
ØD 19.8 - 25.8



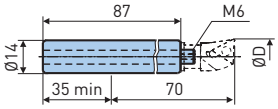
ST12-107HM **615.219**
ØD 19.8 - 25.8



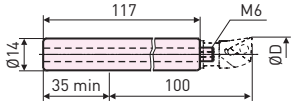
ST12-137HM **615.224**
ØD 19.8 - 25.8



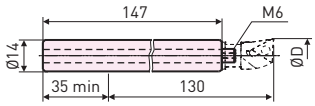
ST14-87HM **615.232**
ØD 25.8 - 28.8



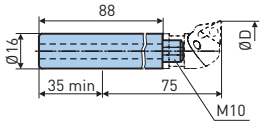
ST14-117HM **615.233**
ØD 25.8 - 28.8



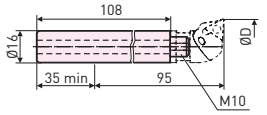
ST14-147HM **615.221**
ØD 25.8 - 28.8



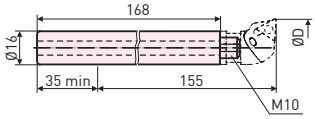
ST16-88 **615.226**
ØD 28.8 - 44.5

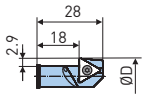


ST16-108HM **615.227**
ØD 28.8 - 44.5

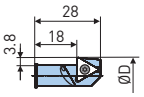


ST16-168HM **615.229**
ØD 28.8 - 44.5

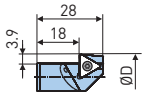




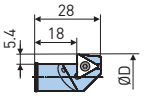
E16T-BB
615.401
ØD 15.8 -18.5
Entry Dia. 13.0



E18T-BB
615.402
ØD 17.8 - 20.5
Entry Dia. 13.9



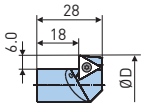
E20T-BB
615.403
ØD 19.8 - 22.8
Entry Dia. 15.9



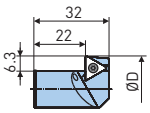
E20T-BB
615.404
ØD 22.8 - 25.8
Entry Dia. 17.4

TC 11

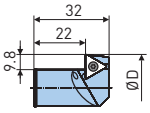




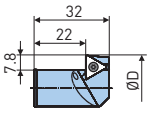
E26T-BB
615.405
ØD 25.8 - 28.8
Entry Dia. 19.9



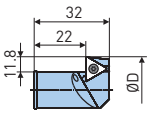
E29T-BB
615.406
ØD 28.8 - 33.5
Entry Dia. 22.4



E36T-BB
615.408
ØD 35.8 - 40.5
Entry Dia. 25.9



E32T-BB
615.407
ØD 31.5 - 36.5
Entry Dia. 23.9

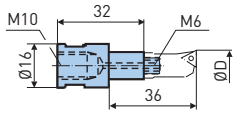


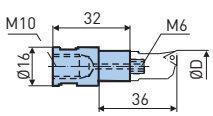
E40T-BB
615.409
ØD 39.8 - 44.5
Entry Dia. 27.9

For Insert ▶ 390 - 392

Reducers

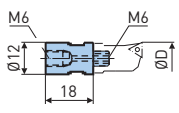
Model	Order No.	ØD	Model	Order No.	ØD
ST16-10-32	615.230	11.8 - 14.5	ST16-12-32	615.231	13.8 - 18.5

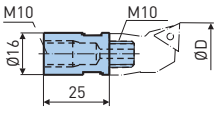




Extensions

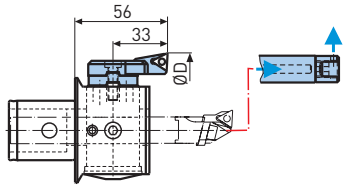
Model	Order No.	ØD	Model	Order No.	ØD
ST12-18	615.220	13.8 - 16.5	ST16-25	615.228	17.8 - 50.0



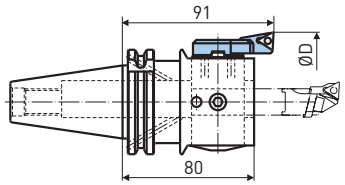


Insert Holders for EWN/EWE, Ø 80 - 152

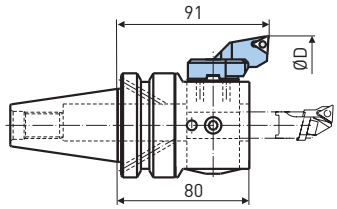
EWN2-152CK6



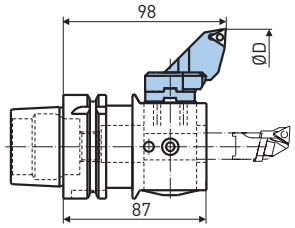
EWN2-152DV40

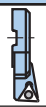
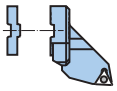


EWN2-152BT40



EWN2-152HSK-A63



	Parts	Model	Order No.	Insert	ØD
	Insert Holder	EK80-104T	**626.908**	 TC 11	80 - 92
	Spacer *	DD30-6	**626.907**		92 - 104
	Insert Holder	EK80-104T	**626.908**		
	Insert Holder *	EK104-128T	**626.909**		104 - 116
	Spacer *	DD30-6	**626.907**		116 - 128
	Insert Holder	EK104-128T	**626.909**		
	Insert Holder *	EK128-152T	**626.910**		128 - 140
	Spacer *	DD30-6	**626.907**		140 - 152
	Insert Holder	EK128-152T	**626.910**		
	Tool Holder	ST16-88	**615.226**		
	Coolant Nozzle	CN2-50	**615.392**		

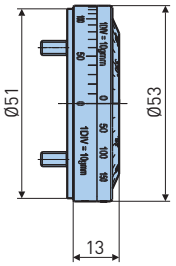
1. * Also suitable for back boring.

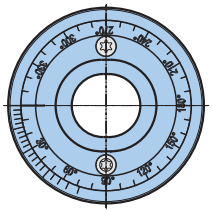
For Insert ▶ 390 - 392

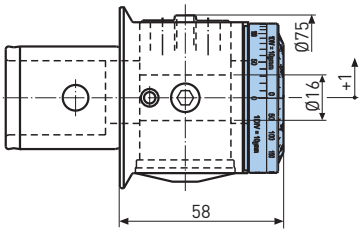
Balancing Rings

After removing the front cover plate, the balancing rings can be mounted on to the boring heads. The imbalance has to be measured on a balancing machine. The correction of the imbalance is done by moving the scale rings.

Model	Order No.
BR2-152	112.806



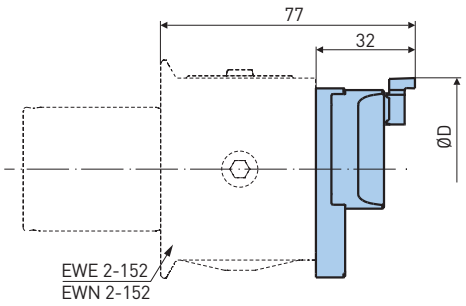




Face Grooving Holders for EWN/EWE, Ø 14 - 53

Tool holder, insert holder, and grooving insert are made for face grooving with the fine boring head EWN/EWE 2-152.





Tool- and Insert Holder

Fig. 1

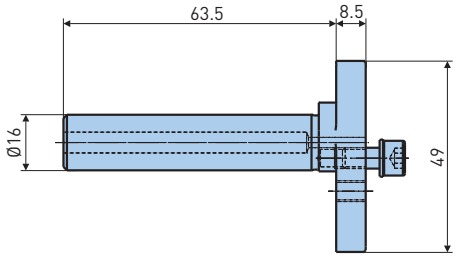
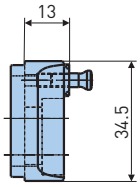


Fig. 2



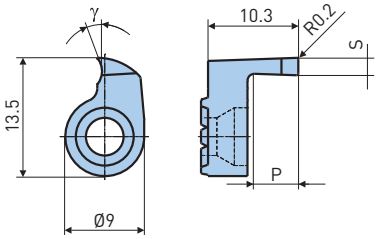
Model	Order No.	Fig.	ØD
AST16-72	**615.387B**	1	14 - 53
FGH14-54	**615.388**	2	14 - 53

For Boring Head ▶ 312
For Spare Parts ▶ 431

B.2

Grooving Inserts

For all materials.



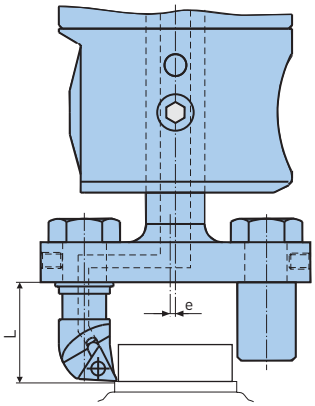


Model	Order No.	S	P	γ
RD1420P30C	**958.501**	2.0	5	20°
RD1425P30C	**958.502**	2.5		
RD1430P30C	**958.503**	3.0		

OD Turning Holders for EWN/EWE, Ø 1 - 32

By using an eccentric bar on the fine boring heads EWN/EWE 2-152, it is possible to turn outside diameters up to 32 mm with lengths up to 50 mm. The counterweight is moveable on the eccentric bar. By moving the counterweight, the imbalance can be compensated to a minimum.





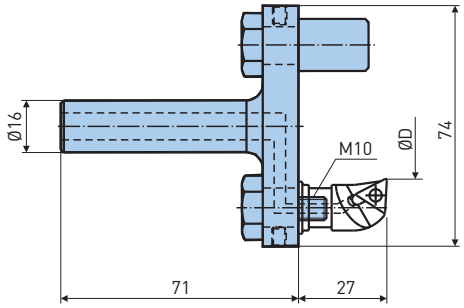
Max. Spindle Speeds		
e [mm]	L = 27 [min $^{-1}$]	L = 52 [min $^{-1}$]
0	8 000	6 000
0.5	6 000	4 500
2.5	4 000	3 500
4.5	3 000	2 500

Attention: Counter-clockwise rotation of spindle!

Remark:
Adjustment of the scale in clockwise direction and eccentric bar with cutting edge positioned as shown on the drawing, results in a smaller pin diameter.

B.2

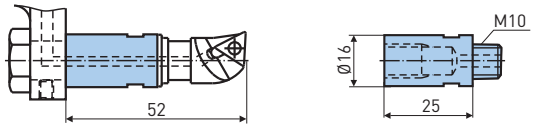
Eccentric Bar



Model	Order No.	ØD
ST16-OD-32	615.390	1 - 32

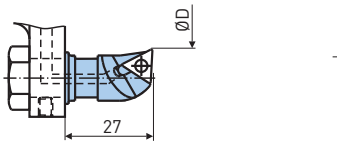
For Boring Head ▶ 312
For Spare Parts ▶ 438

Extension



Model	Order No.
ST16-25	615.228

Insert Holders



Model	Order No.	ØD	Insert
E18T	615.282	28 - 32	TC 11
E22T	615.283	24 - 28	
E26T	615.291	20 - 24	
E32T	615.285	15 - 20	
E36T	615.286	11 - 15	
E40T	615.287	6 - 11	
E45T	615.292	1 - 6	

For Insert ▶ 390 - 392

Tool Kit EWN 2-152, Ø 16.8 - 33

Model	Order No.
EWN2-152-17-33SET	112.097A



Contents	Order No.	Qty.
Boring head		
EWN2-152CK6	112.108	1
Tool holder		
AST16-118HM17-33	615.252	1
Adjustable tool holder		
E17-22T	615.301	1
E22-27T	615.302	1
E27-33T	615.303	1

Contents	Order No.	Qty.
Insert		
TCGT-110204-K10C	655.383	10
Wrench		
ETL-GRS-SW5x80	690.816	1
ETL-STS-SW6	690.806	1
ETL-STS-SW4	690.804	1
ETL-GRS-TORX-PLUS-T7-IP	694.807	1
Case		
CASE-EWD/EWN16.8-33	671.151	1

Tool Kit EWN/EWE 2-152, Ø 17.8 - 152

The tool kit EWN 2-152 and EWE 2-152, Ø 17.8 – 152 mm, is available in different versions. The versions differ in the length and the material of the tool holders and in the quantity of the inserts.

Model	Order No.
EWN2-152-18-152SET	112.837 *



Model	Order No.	Qty.
Boring head		
EWN2-152CK6	112.108 *	1
Tool holder		
AST16-72	615.387B	1
ST16-88	615.226 *	1
Insert holder		
E18T	615.282	1
E25T	615.288	1
E32T	615.285	1
E40T	615.287	1
E45T	615.292	1
E54-80TC	615.306	1
DD30-6	626.907	1
EK80-104T	626.908	1
EK104-128T	626.909	1
EK128-152TC11	626.910	1

Model	Order No.	Qty.
Insert		
TCGT-110204-M10C	655.389 *	10
Screw		
ETL-M6x20A-DIN6912	690.156	2
Wrench		
ETL-GRS-SW5x80	690.816	1
ETL-GRS-TORX-PLUS-T7-IP	694.807	1
Coolant nozzle		
CN2-50	615.392	1
Case		
CASE-EWN2-150	671.150	1

*** Other versions available**

Order No.	Model	Order No.	Qty.
112.837A	Tool holder made of steel		
	ST16-88	615.226	1
	Insert		
	TCGT-110204-M10C	655.389	2
112.837B	Tool holder made of carbide		
	ST16-108HM	615.227	1
	Insert		
	TCGT-110204-M10C	655.389	10
112.837C	Tool holder made of carbide		
	ST16-108HM	615.227	1
	Insert		
	TCGT-110204-M10C	655.389	2
112.837E	Tool holder made of carbide		
	ST16-108HM	615.227	1
	Insert		
	TCGT-110204-M20C	655.318	2
	Boring head		
	EWE2-152CK6	112.110	1



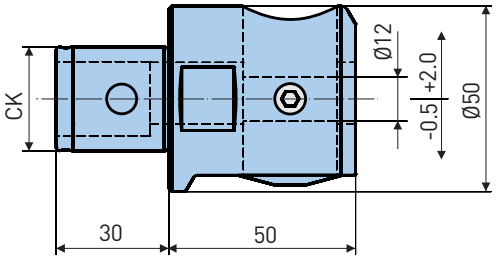
For tool kit with EWE 2-152, order 112.837E.

EWE 2-32 Digital Fine Boring Head, Ø 2 - 32

The EWE 2-32 is the smallest digital fine boring head with centre insert holder. It is especially suitable for the use on small machines.

Wireless





Other execution

EWD2-32C5
470.103



Model	Order No.
EWE2-32CK5	112.310

BIG KAISER App

B.2

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.



Cutting data



Send your data to...



History (made automatically)

This is how the app is going to support your daily challenges

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore

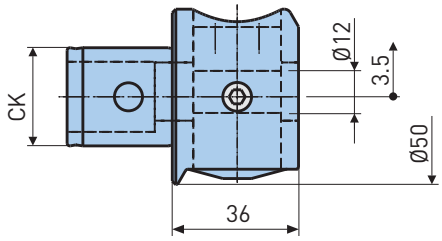
Download on the App Store

GET IT ON Google Play

EWN 2-32 Fine Boring Head, Ø 2 - 32

Fine boring head in integral, modular, and screw-on execution for the precise machining of bores.





Model	Order No.
EWN2-32CK5	112.301A

Other executions

EWB2-32CK5
112.306



Balanced

EWN2-32ES32
112.304A

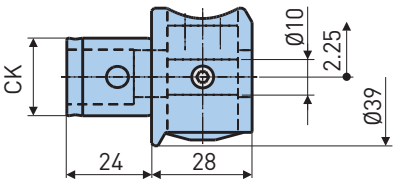


EWN2-32DV30
112.303A



EWN 04-22 Fine Boring Head, Ø 0.4 - 22





Model	Order No.
EWN04-22CK4	112.206

Other executions

EWN04-22HSK-E40
112.207

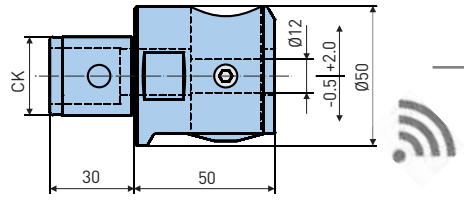


EWN04-22ES25
112.205

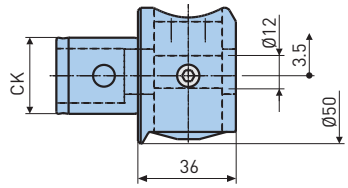


Boring Head **Order No.**

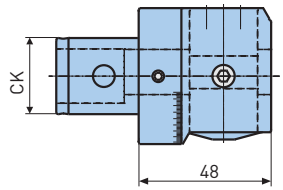
EWE2-32CK5 **112.310**



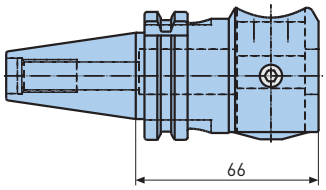
EWN2-32CK5 **112.301A**



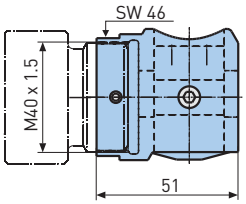
EWB2-32CK5 **112.306**



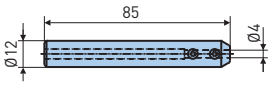
EWN2-32DV30 **112.303A**



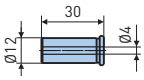
EWN2-32ES32 **112.304A**



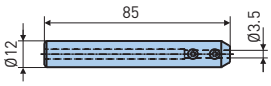
RB12-4-84 **613.324** ♦



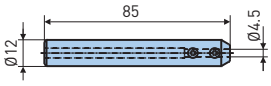
RB12-4 **613.304** ♦



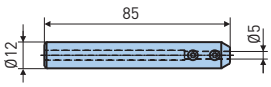
RB12-3.5-85 **613.323** ♦



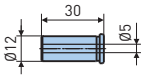
RB12-4.5-85 **613.326** ♦



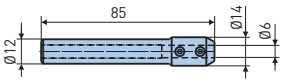
RB12-5-85 **613.325** ♦



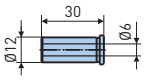
RB12-5 **613.305** ♦



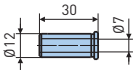
RB12-6-85 **613.327** ♦



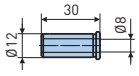
RB12-6 **613.306** ♦



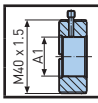
RB12-7 **613.307** ♦



RB12-8 **613.308** ♦



Sleeve for ER Tool Holder



Model	Order No.	A1
TB-ES32-ES25	112.353	M32 x 1.5
TB-ES32-ES16	112.385	M22 x 1.5

ØD

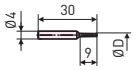
Boring range for the fine boring head EWN 2-32.
Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range + 4 mm Ø

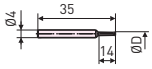
Carbide tool holders

♦ Recommended for EWB 2-32

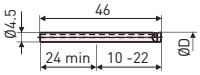
Fixed Tool Holder



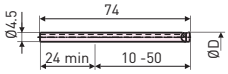
E2-4K10 **611.155** ♦
ØD 2.0 - 3.0



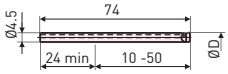
E3-4K10 **611.156** ♦
ØD 3.0 - 4.0



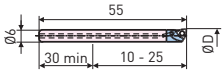
E5-ST4.5-46K10 **615.081**
ØD 4.9 - 5.9



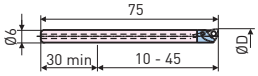
E5-ST4.5-74K10 **615.204** ♦
ØD 4.9 - 5.9



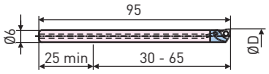
E5-ST4.5-74K10C **615.204A** ♦
ØD 4.9 - 5.9



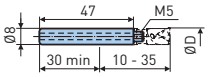
E7.5-ST6-WC02-55HM **615.084**
ØD 7.3 - 8.8



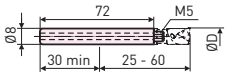
E7.5-ST6-WC02-75HM **615.085**
ØD 7.3 - 8.8



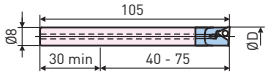
E7.5-ST6-WC02-95HM **615.202** ♦
ØD 7.3 - 8.8



ST8-47 **615.211**
ØD 8.8 - 11.8



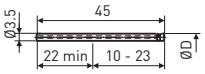
ST8-72HM **615.212** ♦
ØD 8.8 - 11.8



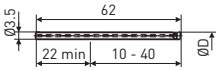
E9-ST8-TP07-105HM **615.213** ♦
ØD 8.8 - 11.8



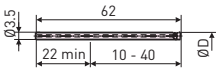
E9T
615.271 ♦
ØD 8.8 - 11.8



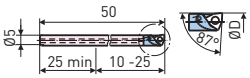
E4-ST3.5-45K10 **615.080**
ØD 3.9 - 4.9



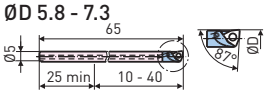
E4-ST3.5-62K10 **615.203** ♦
ØD 3.9 - 4.9



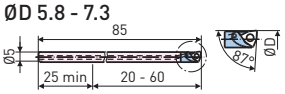
E4-ST3.5-62K10C **615.203A** ♦
ØD 3.9 - 4.9



E6-ST5-WC02-50HM **615.082**
ØD 5.8 - 7.3



E6-ST5-WC02-65HM **615.083**
ØD 5.8 - 7.3



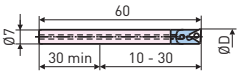
E6-ST5-WC02-85HM **615.201** ♦
ØD 5.8 - 7.3

WC 02

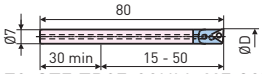


WC 02

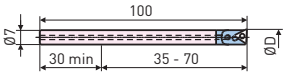




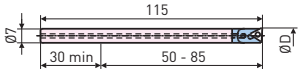
E8-ST7-TP07-60HM **615.086**
ØD 7.8 - 9.8



E8-ST7-TP07-80HM **615.207** ♦
ØD 7.8 - 9.8



E8-ST7-TP07-80HM **615.087**
ØD 7.8 - 9.8



E8-ST7-TP07-100HM **615.205** ♦
ØD 7.8 - 9.8

TP 07



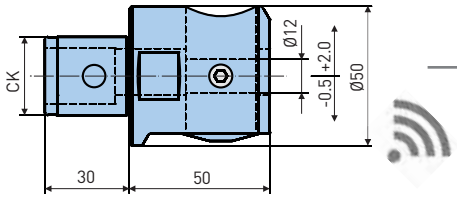
TP 07



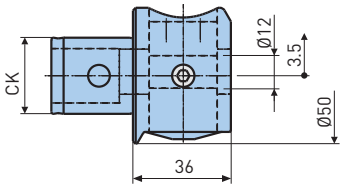
For Insert ▶ 388 - 389

Boring Head **Order No.**

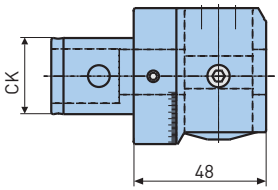
EWE2-32CK5 **112.310**



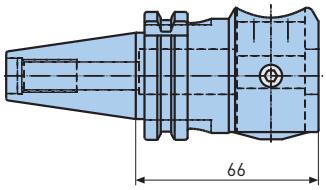
EWN2-32CK5 **112.301A**



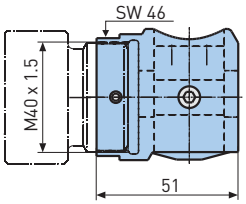
EWB2-32CK5 **112.306**



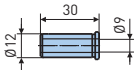
EWN2-32DV30 **112.303A**



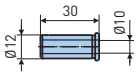
EWN2-32ES32 **112.304A**



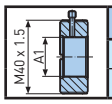
RB12-9
613.309



RB12-10
613.310



Sleeve for ER Tool Holder



Model	Order No.	A1
TB-ES32-ES25	**112.353**	M32 x 1.5
TB-ES32-ES16	**112.385**	M22 x 1.5

ØD

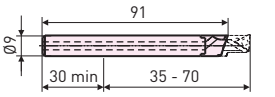
Boring range for the fine boring head EWN 2-32.
Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range +4 mm Ø

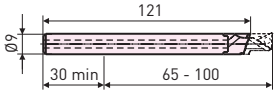
Carbide tool holders

♦ Recommended for EWB 2-32

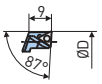
Adjustable Tool Holder



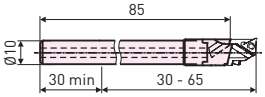
AST9-91HM10-12 **615.374**
ØD 9.8 - 12.0



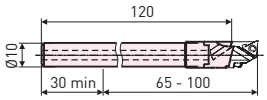
AST9-121HM10-12 **615.369**
ØD 9.8 - 12.0



E10-12T
615.365
ØD 9.8 - 12.0



AST10-85HM12-14 **615.354**
ØD 11.8 - 14.0



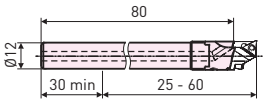
AST10-120HM12-14 **615.370**
ØD 11.8 - 14.0



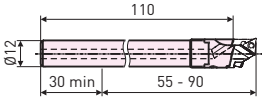
E12-14T
615.366
ØD 11.8 - 14.0

TP 07

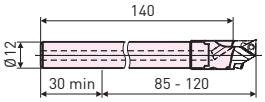




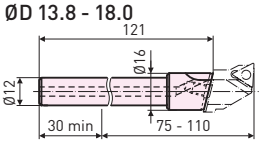
AST12-80HM14-18 **615.355**
ØD 13.8 - 18.0



AST12-110HM14-18 **615.356**
ØD 13.8 - 18.0



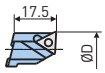
AST12-140HM14-18 **615.372**
ØD 13.8 - 18.0



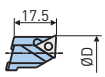
AST12-121HM17-33 **615.256**
ØD 16.8 - 33.0



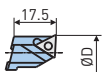
E14-17T
615.367
ØD 13.8 - 17.0



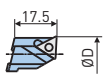
E15-18T
615.300
ØD 14.8 - 18.0



E17-22T
615.301
ØD 16.8 - 22.0



E22-27T
615.302
ØD 21.8 - 27.0



E27-33T
615.303
ØD 26.8 - 33.0

TC 11

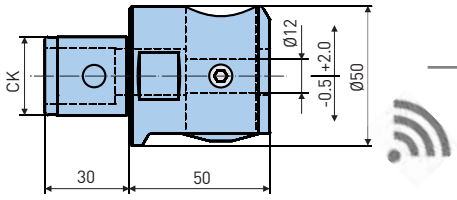


B.2

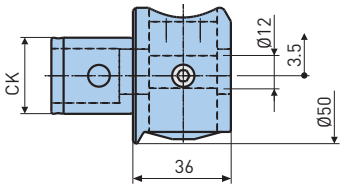
For Insert ▶ 389

Boring Head **Order No.**

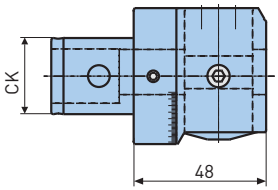
EWE2-32CK5 **112.310**



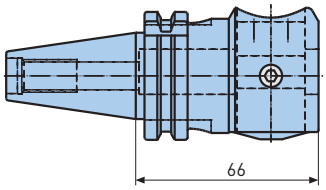
EWN2-32CK5 **112.301A**



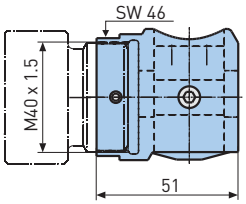
EWB2-32CK5 **112.306**



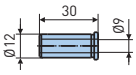
EWN2-32DV30 **112.303A**



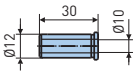
EWN2-32ES32 **112.304A**



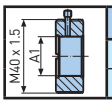
RB12-9 **613.309**



RB12-10 **613.310**



Sleeve for ER Tool Holder



Model	Order No.	A1
TB-ES32-ES25	**112.353**	M32 x 1.5
TB-ES32-ES16	**112.385**	M22 x 1.5

ØD

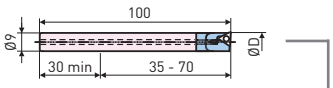
Boring range for the fine boring head EWN 2-32.
Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range +4 mm Ø

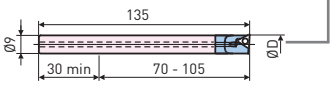
Carbide tool holders

♦ Recommended for EWB 2-32

Fixed Tool Holder



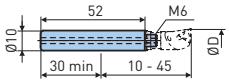
E10-ST9-TP07-100HM **615.208** ♦
ØD 10.0 - 11.8



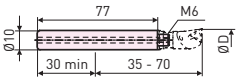
E10-ST9-TP07-135HM **615.206** ♦
ØD 10.0 - 11.8

TP 07

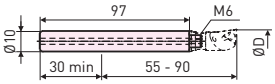




ST10-52 **615.214**
ØD 11.8 - 13.8



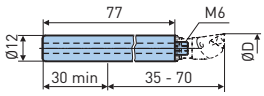
ST10-77HM **615.215** ♦
ØD 11.8 - 13.8



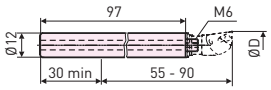
ST10-97HM **615.223** ♦
ØD 11.8 - 13.8



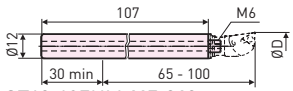
E12TP
615.272 ♦
ØD 11.8 - 13.8



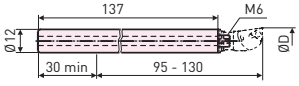
ST12-77 **615.218**
ØD 13.8 - 17.8



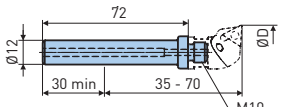
ST12-97HM **615.225** ♦
ØD 13.8 - 17.8



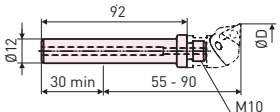
ST12-107HM **615.219**
ØD 13.8 - 17.8



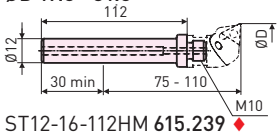
ST12-137HM **615.224** ♦
ØD 13.8 - 17.8



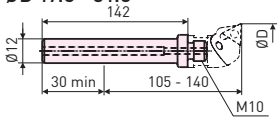
ST12-16-72 **615.234**
ØD 17.8 - 31.8



ST12-16-92HM **615.243** ♦
ØD 17.8 - 31.8



ST12-16-112HM **615.239** ♦
ØD 17.8 - 31.8



ST12-16-142HM **615.240** ♦
ØD 17.8 - 31.8



E14T
615.273 ♦
ØD 13.8 - 15.8

TP 07

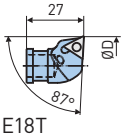




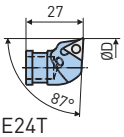
E15T
615.280 ♦
ØD 14.8 - 16.8



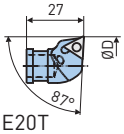
E16T
615.281 ♦
ØD 15.8 - 17.8



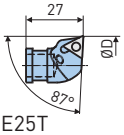
E18T
615.282
ØD 17.8 - 19.8



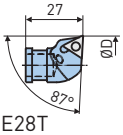
E24T
615.290
ØD 23.8 - 24.8



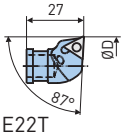
E20T
615.289
ØD 19.8 - 21.8



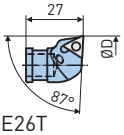
E25T
615.288
ØD 24.8 - 25.8



E28T
615.284
ØD 27.8 - 31.8



E22T
615.283
ØD 21.8 - 23.8



E26T
615.291
ØD 25.8 - 27.8

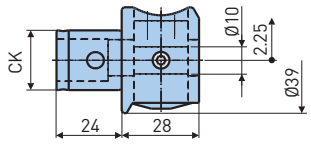
TC 11



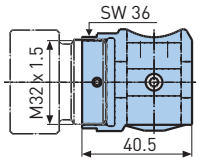
For Insert ▶ 389 - 392

Boring Head **Order No.**

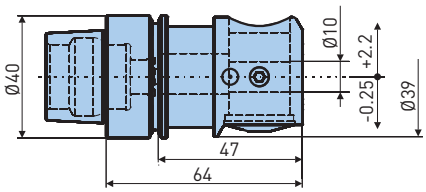
EWN04-22CK4 **112.206**



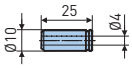
EWN04-22ES25 **112.205**



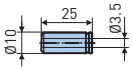
EWN04-22HSK-E40 **112.207**



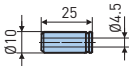
RB10-4 **613.204**



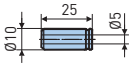
RB10-3.5 **613.202**



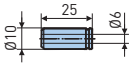
RB10-4.5 **613.203**



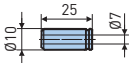
RB10-5 **613.205**



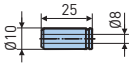
RB10-6 **613.206**



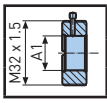
RB10-7 **613.207**



RB10-8 **613.208**



Sleeve for ER Tool Holder

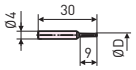


Model	Order No.	A1
TB-ES25-ES20	**112.271**	M25 x 1.5
TB-ES25-ES16	**112.272**	M22 x 1.5

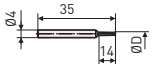
B.2

Carbide tool holders

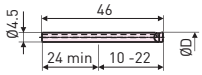
Fixed Tool Holder



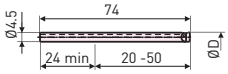
E2-4K10 **611.155**
ØD 2.0 - 3.0



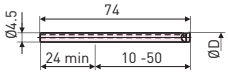
E3-4K10 **611.156**
ØD 3.0 - 4.0



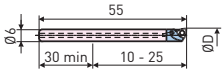
E5-ST4.5-46K10 **615.081**
ØD 4.9 - 5.9



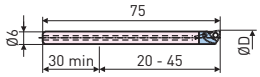
E5-ST4.5-74K10 **615.204**
ØD 4.9 - 5.9



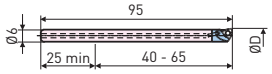
E5-ST4.5-74K10C **615.204A**
ØD 4.9 - 5.9



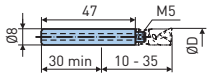
E7.5-ST6-WC02-55HM **615.084**
ØD 7.3 - 8.8



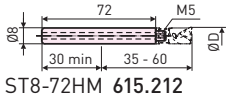
E7.5-ST6-WC02-75HM **615.085**
ØD 7.3 - 8.8



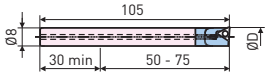
E7.5-ST6-WC02-95HM **615.202**
ØD 7.3 - 8.8



ST8-47 **615.211**
ØD 8.8 - 11.8



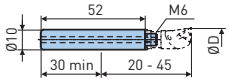
ST8-72HM **615.212**
ØD 8.8 - 11.8



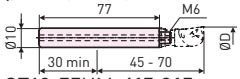
E9-ST8-TP07-105HM **615.213**
ØD 8.8 - 11.8



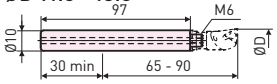
E9T
615.271
ØD 8.8 - 11.8



ST10-52 **615.214**
ØD 11.8 - 13.8



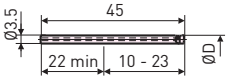
ST10-77HM **615.215**
ØD 11.8 - 13.8



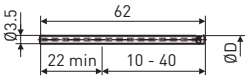
ST10-11.8-13.8-M6-97 **615.223**
ØD 11.8 - 13.8



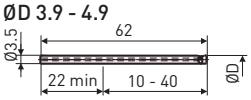
E12T
615.272
ØD 11.8 - 13.8



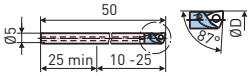
E4-ST3.5-45K10 **615.080**
ØD 3.9 - 4.9



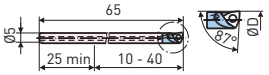
E4-ST3.5-62K10 **615.203**
ØD 3.9 - 4.9



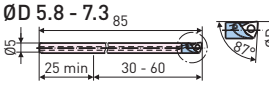
E4-ST3.5-62K10C **615.203A**
ØD 3.9 - 4.9



E6-ST5-WC02-50HM **615.082**
ØD 5.8 - 7.3



E6-ST5-WC02-65HM **615.083**
ØD 5.8 - 7.3



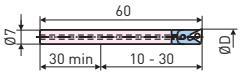
E6-ST5-WC02-85HM **615.201**
ØD 5.8 - 7.3

WC 02

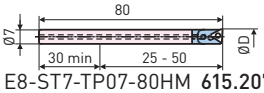


WC 02

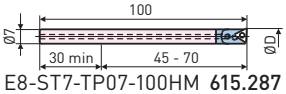




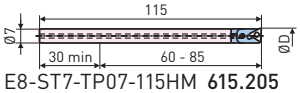
E8-ST7-TP07-60HM **615.086**
ØD 7.8 - 9.5



E8-ST7-TP07-80HM **615.207**
ØD 7.8 - 9.5



E8-ST7-TP07-100HM **615.287**
ØD 7.8 - 9.5



E8-ST7-TP07-115HM **615.205**
ØD 7.8 - 9.5

TP 07



TP 07

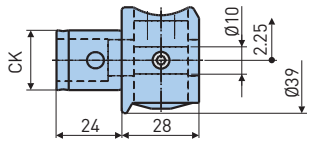


TP 07

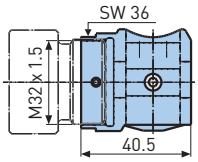


For Insert ▶ 388 - 389

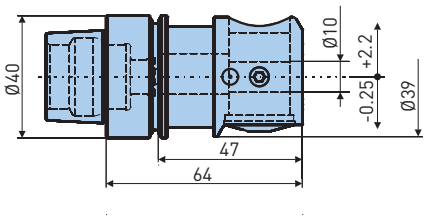
Boring Head	Order No.
EWN04-22CK4	112.206



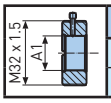
EWN04-22ES25	112.205



EWN04-22HSK-E40	112.207

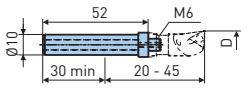


Sleeve for ER Tool Holder

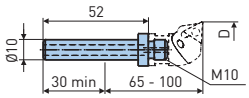


Model	Order No.	A1
TB-ES25-ES20	112.271	M25 x 1.5
TB-ES25-ES16	112.272	M22 x 1.5

Fixed Tool Holder



ST10-12-52 **615.216**
ØD 13.8 - 17.8



ST10-16-52 **615.217**
ØD 17.8 - 21.8



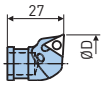
E14T
615.273
ØD 13.8 - 15.8



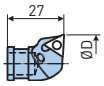
E15T
615.280
ØD 14.8 - 16.8



E16T
615.281
ØD 19.8 - 17.8



E18T
615.282
ØD 17.8 - 19.8



E20T
615.289
ØD 19.8 - 21.8

TP 07



TC 11



For Insert ▶ 389 - 392

EWN 04-15 Fine Boring Head, Ø 0.4 - 15

Fine boring heads for the machining of smallest bores with highest spindle speeds on small machine tools. The boring heads are available with both modular CK3 connection and cylindrical shanks Ø 16 mm.

Model	Order No.
EWN04-15CK3	112.505



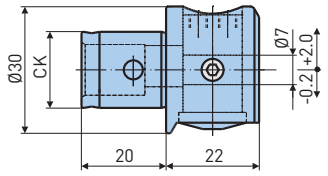
Other execution

EWN04-15ST16
112.506

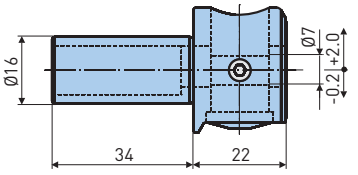


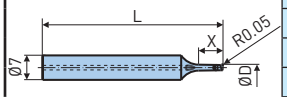
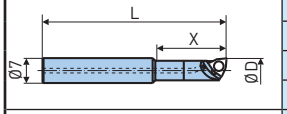
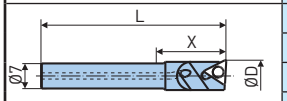
Boring Head **Order No.**

EWN04-15CK3 **112.505**



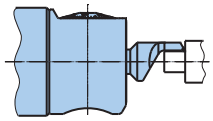
EWN04-15ST16 **112.506**

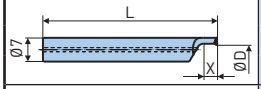
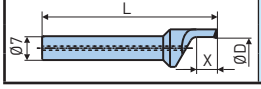


Boring Cutter	Model	Order No.	L	X	Cutting Edge	ØD
	E0.4-ST7-52K10C	**615.522**	52	1.5	K10C	0.4 - 1.0
	E0.9-ST7-52K10C	**615.524**		3		0.9 - 1.5
	E1.4-ST7-52K10C	**615.525**		5		1.4 - 2.0
	E2-ST7-52K10C	**615.501**		6		1.9 - 3.0
	E3-ST7-52K10C	**615.502**		10		2.9 - 4.0
	E4-ST7-52K10C	**615.503**		13		3.9 - 5.0
	E5-ST7-52K10C	**615.504**		16		4.9 - 6.0
						
	E6-ST7-WC02-52HM	**615.505**		20	WC 02	5.8 - 7.0
	E7-ST7-WC02-52HM	**615.506**		20		6.8 - 8.0
	E8-ST7-TP07-52HM	**615.507**		30	TP 07	7.8 - 9.0
	E9-ST7-TP07-52HM	**615.508**		30		8.8 - 10.0
	E10-ST7-TP07-52HM	**615.509**		30		9.8 - 12.0
	E12-ST7-TP07-52HM	**615.511**		30		11.8 - 15.5

For Spare Parts ▶ 429
For Insert ▶ 388 - 389

OD Turning

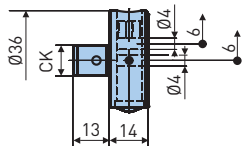


OD Turning Cutter	Model	Order No.	L	X	Cutting Edge	ØD
	OD-0-3-ST7-52K10C	**615.530**	52	2.5	K10C	0.2 - 3.0
	OD-2-6-ST7-52K10C	**615.531**		6		2.0 - 6.0

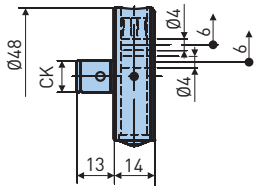
EWN 04-24/12-36 Fine Boring Heads, Ø 0.4 - 36

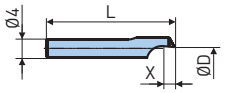
Special fine boring heads with huge diameter range for the micro industry. Dedicated cutters for OD turning and face grooving available.

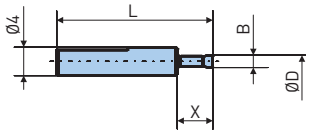
Boring Head	Order No.
EWN04-24CK1	188.133



EWN12-36CK1	188.134



OD Turning Cutters	Model	Order No.	L	X	Cutter	ØD
	OD-0.2-2.3-ST4-25K10C	615.590	25	2.2	K10C	0.2 - 2.3

Face Grooving Cutters	Model	Order No.	L	X	B	Cutter	ØD
	FG2-ST4-22K10C	689.290 *	22	5	1.75	K10C	› 12

1. *Special dimensions available on request.
2. For fine boring cutters refer to page 346 OD turning.

OD Turning



Fine Boring



Face Grooving

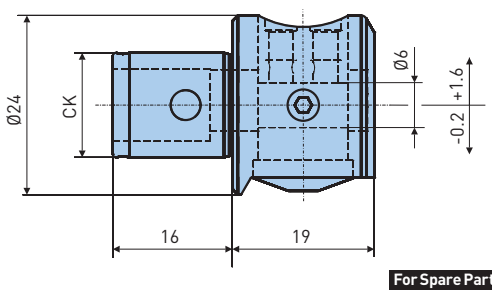


EWN 04-12 Fine Boring Head, Ø 0.4 - 12

Fine boring heads for the machining of smallest bores with highest spindle speeds on machine tools with spindles ISO 20, HSK-E25 and bigger. The boring heads are available with the modular CK2 connection and with cylindrical shanks Ø 6 and 10 mm.

Model	Order No.
EWN04-12CK2	112.507





For Spare Parts ▸ 429

EWN 04-7 Fine Boring Head, Ø 0.4 - 7

World's smallest fine boring head: Thanks to its body diameter of only Ø 18.5 mm, the EWN 04-7 is the perfect solution for micro machining applications.

Model	Order No.
EWN04-7CK1	112.503

World's smallest fine boring head.



Other executions

EWN04-7ST10
112.504

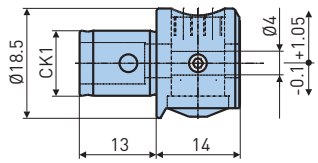


EWN04-7ST6
112.508

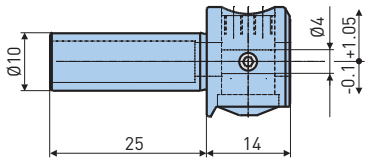


Model **Order No.**

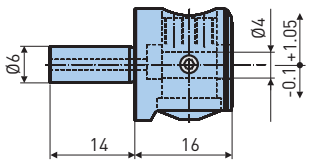
EWN04-7CK1 **112.503**

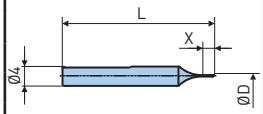
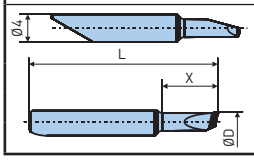


EWN04-7ST10 **112.504**



EWN04-7ST6 **112.508**

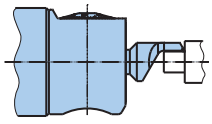


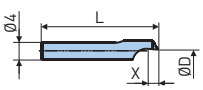
Boring Cutter	Model	Order No.	L	X	R	Cutting Edge	ØD
	E0.4-ST4-30K10C	615.541	30	1.5	0.05	K10C	0.4 - 0.9
	E0.9-ST4-30K10C	615.542		3			0.9 - 1.4
	E1.4-ST4-30K10C	615.543		5			1.4 - 2.0
	E2-ST4-30K10C	615.544		6			1.9 - 3.0
	E3-ST4-30K10C	615.545		10			2.9 - 4.0
	E4-ST4-30K10C	615.546		13			3.9 - 5.0
	E5-ST4-30K10C	615.547		16			4.9 - 7.0
	E0.4-ST4-25K10C	615.561	25	1.1	0.1		0.4 - 1.6
	E0.6-ST4-25K10C	615.562		1.5			0.6 - 0.8
	E0.8-ST4-25K10C	615.563		2			0.8 - 1.2
	E1.2-ST4-25K10C	615.564		2.5			1.2 - 1.5
	E1.5-ST4-25K10C	615.565		3.5	0.2		1.5 - 1.9
	E1.9-ST4-25K10C	615.566		4.5			1.9 - 3.0
	E0.4-ST4-25K10	615.551		1.1	0.1	K10	0.4 - 0.6
	E0.6-ST4-25K10	615.552		1.5			0.6 - 0.8
	E0.8-ST4-25K10	615.553		2			0.8 - 1.2
	E1.2-ST4-25K10	615.554		2.5			1.2 - 1.5
	E1.5-ST4-25K10	615.555		3.5	0.2		1.5 - 1.9
	E1.4-ST4-24CBN20	615.571	23.4	3.5	0.1	CBN-20	1.4 - 2.0
	E1.9-ST4-24CBN20	615.572	24.1	4.5			1.9 - 3.0
	E2.9-ST4-27CBN20	615.573	27.2	8			2.9 - 4.0
	E3.9-ST4-30CBN20	615.574	29.7	11			3.9 - 5.0
	E4.9-ST4-30CBN20	615.575	30.3	16			4.9 - 6.0

For Spare Parts ▶ 429

The boring cutters are made with flat for cutting edge orientation.
Other lengths and geometries on request.

OD Turning



OD Turning Cutter	Model	Order No.	L	X	Cutting Edge	ØD
	OD-0.2-2.3-ST4-25K10C	615.590	25	2.2	K10C	0.2 - 2.3

Fine Boring Heads with Peripherical Cutting Edge

Overview	348
EWE Digital Fine Boring Heads	349
EWD Smart Damper Digital Fine Boring Heads	350
EWN Fine Boring Heads	351
EWN BIG CAPTO Fine Boring Heads	352
Accessories	353 - 357
EWB/EWB-AL Balanced Fine Boring Heads	358
EWBD BIG CAPTO Digital and Balanced Fine Boring Heads	359
EWB-UP Balanceable Fine Boring Heads	360
EW Fine Boring Heads	361
Carbide Bars	362

B.3



Wireless

EWE Digital Fine Boring Heads

Wireless communication for easy readout with the BIG KAISER app: The brandnew EWE fine boring heads revolutionate fine boring.
Ø 41 - 203 mm, CKB1-CKB6

▶ 349



Anti-Vibration

EWD Smart Damper Digital Fine Boring Heads

The combination of the most advanced technologies to a powerful and highly productive tool: an integral digital fine boring head with an innovative and patented damping technology.
Ø 41 - 150 mm, CKB4-CKB6

▶ 350

EWN Fine Boring Heads

The EWN single cutter boring tool program for fine boring covers a range of Ø 20 - 203 mm with only 7 precision boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1 200 m/min are permitted.
Ø 41 - 203 mm, CKB1-CKB7/BIG CAPTO C3-C8

▶ 351



EWB Balanced Fine Boring Heads

Even at max. speeds the balanced EWB fine boring heads guarantee vibration-free boring, resulting in increased productivity and highest precision.
Ø 32 - 105 mm, CK3-CK6

▶ 358



EWB-AL Balanced Fine Boring Head

The fine boring heads EWB AL are made of high strength aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%.
Ø 100 - 203 mm, CK6-CK7

▶ 358



EWB-UP Balanceable Fine Boring Heads

The ultra-precision EWB-UP series sets higher standards for boring heads concerning adjustment accuracy and balance quality.
Ø 25 - 100 mm, CK2-CK6

▶ 360

EW Fine Boring Heads

These heads are designed to be used in combination with the steel or carbide-boring bars Ø 14 and Ø 16 mm out of the accessory program. In conjunction with the long carbide bar, the tool is well suited for vibration-free finishing operations in bores with unfavorable Ø/L-ratios.
Ø 15 - 22 mm, ES15/ES18

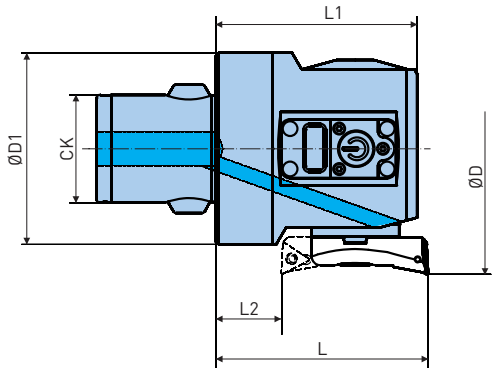
▶ 361

EWE Digital Fine Boring Heads, Ø 41 - 203

Wireless

Thanks to wireless communication with the BIG KAISER app, manufacturing precise bores has become very easy.





Model	Order No.	CK	Front Bore ØD	Back Bore ØD	ØD1	L	L1	L2	Weight (kg)
EWE41-74CKB4	**310.840**	CKB4	41 - 74	53 - 74	38	47	43	14	0.33
EWE53-95CKB5	**310.850**	CKB5	53 - 95	62 - 95	49	57	53	19	0.76
EWE68-150CKB6	**310.860**	CKB6	68 - 150	80 - 150	64	71	67.2	22	1.7
EWE100-203CKB6	**310.865**	CKB6	100 - 203	112 - 203	66.5/90 *	71	67.2	22	2.5
EWE100-203CKB7	**310.870**	CKB7			90	87	83.2	38	4.0

1. * Max. body diameter: 90 mm
2. Insert holder is to be ordered separately.

For Spare Parts ▶ 432
For Insert Holder ▶ 353 - 355

BIG KAISER App

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.



Cutting data



Send your data to...



History (made automatically)

This is how the app is going to support your daily challenges

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore

Download on the App Store

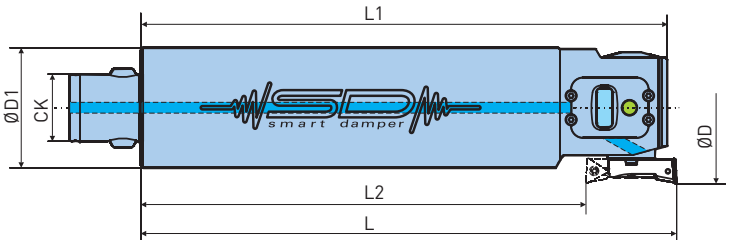
GET IT ON Google Play

EWD Smart Damper Digital Fine Boring Heads, Ø 41 - 150

Anti-Vibration

With the new EWD Smart Damper BIG KAISER combines its most advanced technologies to a powerful and highly productive tool: a digital fine boring head with an innovative and patented damping technology.





Model	Order No.	CK	Front Bore ØD	Back Bore ØD	L	L1	L2	D1	Weight (kg)
EWD41-74CKB4-200DP	**389.395**	CKB4	41 - 74	53 - 74	200	196	167	39	2.4
EWD53-95CKB5-225DP	**389.396**	CKB5	53 - 95	62 - 95	225	221	187	50	4.5
EWD68-150CKB6-260DP	**389.397**	CKB6	68 - 150	80 - 150	260	241	211	64	9.5

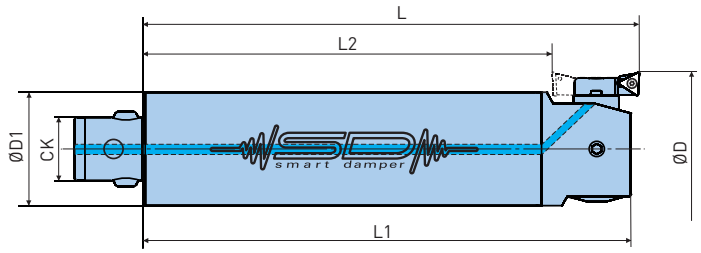
1. Insert holder is to be ordered separately.

For Spare Parts ▶ 432
For Insert Holder ▶ 353 - 355

B.3

EWN Smart Damper Fine Boring Head, Ø 41 - 150





Model	Order No.	CK	Front Bore ØD	Back Bore ØD	L	L1	L2	D1	Weight (kg)
CKB4-EWN41DP-185	**806.742**	CKB4	41 - 74	61 - 74 *	185	181	152	39	2.4
CKB5-EWN53DP-210	**806.743**	CKB5	53 - 95	74 - 95 *	210	206	172	50	4.5
CKB6-EWN68DP-240	**806.744**	CKB6	68 - 150	90 - 150	240	236.2	191	64	9.5

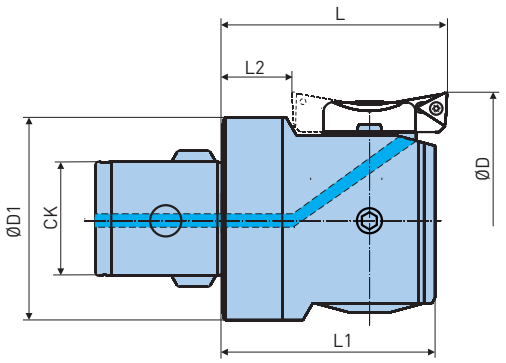
1. Insert holder (type 1) included. Other sizes are available.
2. * Attention: Use insert holders type 2 or 3 for back boring.

For Spare Parts ▶ 432
For Insert Holder ▶ 353 - 355

EWN Fine Boring Heads, Ø 20 - 203

The EWN single cutter boring tool program for fine boring covers a range of Ø 20 - 203 mm with only 7 fine boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.





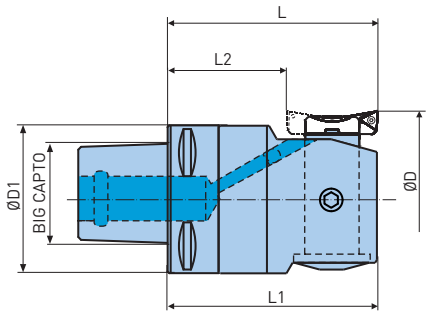
Model	Order No.	CK	Front Bore ØD	Back Bore ØD	ØD1	L	L1	L2	Weight (kg)
EWN20-36CKB1	**310.101**	CKB1	20 - 36	28 - 36	18.5	32.5	29.5	10.5	0.075
EWN25-47CKB2	**310.201**	CKB2	25 - 47	36 - 47	23.4	35.5	32.5	11.5	0.13
EWN32-60CKB3	**310.301**	CKB3	32 - 60	46 - 60	30	40	35	10	0.21
EWN41-74CKB4	**310.401**	CKB4	41 - 74	53 - 74	38	47	43	14	0.40
EWN53-95CKB5	**310.501**	CKB5	53 - 95	62 - 95	49	57	53	19	0.83
EWN68-150CKB6	**310.601**	CKB6	68 - 150	80 - 150	64	71	67.2	22	1.7
EWN100-203CKB6	**310.602**	CKB6	100 - 203	112 - 203	90	71	67.2	22	2.4
EWN100-203CKB7 -87	**310.701**	CKB7			90	87	83.2	38	3.9
EWN100-203CKB7L -117	**310.708**	CKB7			90	117	113.2	68	5.4

For Spare Parts ▶ 432
For Insert Holder ▶ 353 - 355

EWN BIG CAPTO Fine Boring Heads, Ø 32 - 203

With only 5 fine boring heads, the diameter range from Ø 32-203 mm is completely covered. The boring heads can be clamped in BIG CAPTO shanks and other polygonal basic holders, or directly in BIG CAPTO machine spindles.



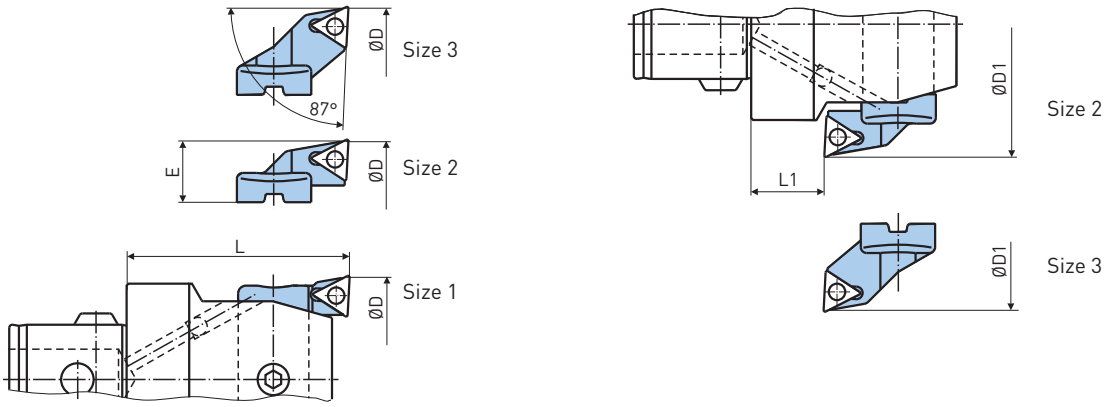


Model	Order No.	BIG CAPTO	Front Bore ØD	Back Bore ØD	ØD1	L	L1	L2	Weight (kg)
EWN32- 60C3	**470.301**	C3	33 - 60	46 - 60	32	55	50	25	0.3
EWN41- 74C4	**470.401**	C4	41 - 74	53 - 74	40	67	63	34	0.6
EWN53- 95C5	**470.501**	C5	53 - 95	62 - 95	50	77	73	39	1.1
EWN68- 150C6	**470.601**	C6	68 - 150	80 - 150	64	92	88	43	2.2
EWN100- 203C6	**470.602**	C6	100 - 203	112 - 203	90	92	88	43	2.9
EWN100- 203C8	**470.801**	C8	100 - 203	112 - 203	90	117	113	68	5.2

For Spare Parts ▶ 432
For Insert Holder ▶ 353 - 355

Insert Holders Type E

Standard holder with 87° entering angle, suitable for fine boring in through and blind holes. Three different insert holders for the extension of the diameter range and for back boring applications.

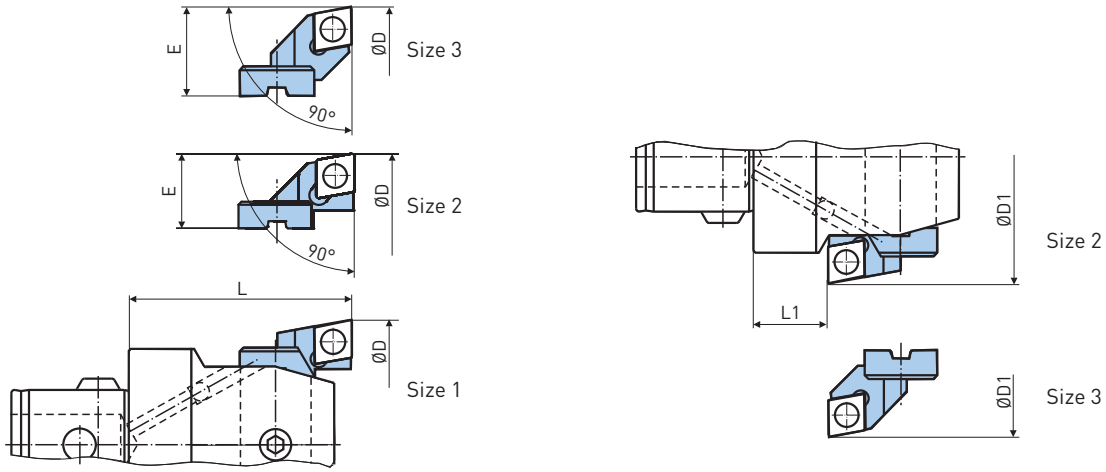


For Boring Head	Model	Order No.	Insert Holder Size	Front Bore ØD	Back Bore ØD1	E	L	L1	
EWN20	ENH1-1T	**626.111**	1	20 - 26		4.65	32.5	10.5	TP 07
	ENH1-2T	**626.112**	2	25 - 31	28 - 31	7.15			
	ENH1-3T	**626.113**	3	30 - 36	30 - 36	9.65			
EWN25	ENH2-1T	**626.121**	1	25 - 33		5.45	35.5	11.5	
	ENH2-2T	**626.122**	2	32 - 40	36 - 40	8.95			
	ENH2-3T	**626.123**	3	39 - 47	39 - 47	12.45			
EWN32	ENH3-1T	**626.131**	1	32 - 42		7.4	40	10	TC 11
	ENH3-2T	**626.132**	2	41 - 51	46 - 51	11.9			
	ENH3-3T	**626.133**	3	50 - 60	50 - 60	16.4			
EWE/EWN41	ENH4-1T	**626.141**	1	41 - 54		8.1	47	14	
	ENH4-2T	**626.142**	2	50 - 63	53 - 63	12.6			
	ENH4-3T	**626.143**	3	61 - 74	61 - 74	18.1			
EWE/EWN53	ENH5-1T	**626.151**	1	53 - 70	62 - 70	10	57	19	
	ENH5-2T	**626.152**	2	65 - 82	69 - 82	16			
	ENH5-3T	**626.153**	3	78 - 95	78 - 95	22.5			
EWE/EWN68	ENH6-1T	**626.161**	1	68 - 100	80 - 100	12.5	71	22	
	ENH6-2T	**626.162**	2	94 - 126	94 - 126	25.5			
	ENH6-3T	**626.163**	3	118 - 150	118 - 150	37.5			
EWE/EWN100	ENH6-1T	**626.161**	1	100 - 153	112 - 153	12.5	71 / 87 / 117	22 / 38 / 68	
	ENH6-2T	**626.162**	2	126 - 179	126 - 179	25.5			
	ENH6-3T	**626.163**	3	150 - 203	150 - 203	37.5			

For Insert ▶ 389 - 392

Insert Holder Type C

With 90° approach angle, suitable for semi-finish and finish boring and for stepped bores. For each boring head, insert holders with different projections are available for the extension of the boring range and for back boring.

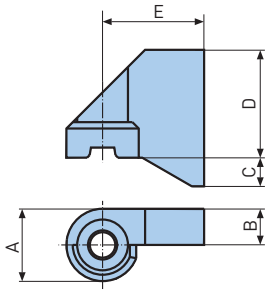


For Boring Head	Model	Order No.	Insert Holder Size	Front Bore ØD	Back Bore ØD1	E	L	L1	
EWN25	ENH 2-2C	**626.322**	2	33 - 41	37 - 41	9.5	35.5	11.5	CC 06
	ENH 2-3C	**626.323**	3	39 - 47	39 - 47	12.5			
EWN32	ENH 3-1C	**626.331**	1	32 - 42	-	7.4	40	10	
	ENH 3-2C	**626.332**	2	41 - 51	47 - 51	11.9			
	ENH 3-3C	**626.333**	3	50 - 60	50 - 60	16.4			
EWE/EWN41	ENH 4-1C	**626.341**	1	41 - 54	-	8.1	47	14	
	ENH 4-2C	**626.342**	2	50 - 63	54 - 63	12.6			
	ENH 4-3C	**626.343**	3	61 - 74	61 - 74	18.1			
EWE/EWN53	ENH 5-1C	**626.351**	1	53 - 70	62 - 70	10	57	19	
	ENH 5-2C	**626.352**	2	62 - 79	67 - 79	14.5	57	19	CC 09
	ENH 5-3C	**626.353**	3	78 - 95	78 - 95	22.5			
EWE/EWN68	ENH 6-1C	**626.361**	1	68 - 100	80 - 100	12.5	71	22	
	ENH 6-2C	**626.362**	2	78 - 110	82 - 110	17.5			
	ENH 6-3C	**626.363**	3	108 - 140	108 - 140	32.5			
EWE/EWN100	ENH 6-1C	**626.361**	1	100 - 153	112 - 153	12.5	71 / 87 / 117	22 / 38 / 68	
	ENH 6-2C	**626.362**	2	110 - 163	110 - 163	17.5			
	ENH 6-3C	**626.363**	3	140 - 193	140 - 193	32.5			

For Insert ▶ 393 - 394

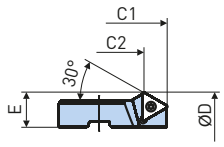
Blank Insert Holder Type ENH

If required, the blanks can be hardened. (Mat. 1.2343)



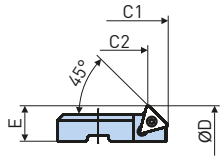
For Boring Head	Model	Order No.	A	B	C	D	E
EWN20	ENH1-B	**626.901**	8.4	4.2	2.61	11	11.8
EWN25	ENH2-B	**626.902**	10.4	5.2	3.16	10	17.2
EWN32	ENH3-B	**626.903**	11.4	5.7	4.5	17	16
EWN41	ENH4-B	**626.904**	15.4	7.7	5	20	20
EWN53	ENH5-B	**626.905**	19	9.5		25	20
EWN68/100	ENH6-B	**626.906**	29	14.5		40	26
		626.916					50

Insert Holders 30°



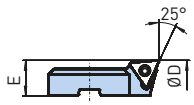
For Boring Head	Model	Order No.	ØD	E	C1	C2	
EWN25	ENH2-1T30	**626.422**	28 - 36	6.95	35.5	29.8	TP 07
EWN32	ENH3-1T30	**626.432**	36 - 46	9.4	42	33.3	
EWN41	ENH4-1T30	**626.442**	45 - 58	10.1	49	40.3	
EWN/EWE53	ENH5-1T30	**626.452**	56 - 73	11.5	57	48.4	TC 11
EWN/EWE68	ENH6-1T30	**626.462**	68 - 100	12.5	71	62.3	
EWN/EWE100	ENH6-1T30	**626.462**	100 - 153	12.5	87	78.3	

Insert Holders 45°



For Boring Head	Model	Order No.	ØD	E	C1	C2	
EWN25	ENH2-1T45	**626.423**	28 - 36	6.95	35.5	30.8	TP 07
EWN32	ENH3-1T45	**626.433**	36 - 46	9.4	42	34.8	
EWN41	ENH4-1T45	**626.443**	45 - 58	10.1	49	41.8	
EWN/EWE53	ENH5-1T45	**626.453**	56 - 73	11.5	57	49.8	TC 11
EWN/EWE68	ENH6-1T45	**626.463**	68 - 100	12.5	71	63.8	
EWN/EWE100	ENH6-1T45	**626.463**	100 - 153	12.5	87	79.8	

Insert Holders 25°



For Boring Head	Model	Order No.	ØD	E	
EWN32	ENH3-1T25	**689.197**	32 - 42	7.4	
EWN41	ENH4-1T25	**689.198**	41 - 54	8.1	
EWN/EWE53	ENH5-1T25	**689.001**	53 - 70	10	TC 11
EWN/EWE68	ENH6-1T25	**689.007**	68 - 100	12.5	
EWN/EWE100	ENH6-1T25	**689.007**	100 - 153	12.5	

For Insert ▶ 389 - 392

Back Boring Instructions

For back boring, it is required to enter into the bore off centre, with a tool adjusted to the back bore diameter. In this respect, the back bore diameter «ØD» as well as the diameters of the entry bore «C» and the tool body «ØD1», are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

Example:
Calculation of the minimum entry bore diameter «C».

Given:
- Back bore diameter ØD = 93mm
- Tool combination EWN53, with Insert holder no. 3, ØD1 = 50 mm

$$C = \frac{ØD + ØD1}{2} = \frac{93 + 50}{2} = 71.5 \text{ mm}$$

Caution:
- Counter clockwise spindle rotation is required for back boring operations.
- The cutting edge is at a shorter length than the boring head. Consider total length of tool. Check the space at the back side of the work piece.



Min. entry bore diameter «C»

$$C = \frac{ØD + ØD1}{2}$$

Max. back bore diameter «ØD»

ØD = 2C - ØD1

Max. tool body diameter «ØD1»

ØD1 = 2C - ØD

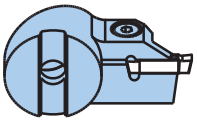
Face Grooving with EWN/EWE, Ø 53 - 3040

The insert holders and inserts are made for face grooving with the fine boring heads EWN and EWE Series 310 and with the large diameter boring tools Series 317 und 318.

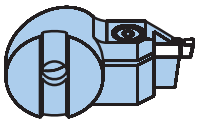


Insert Holders

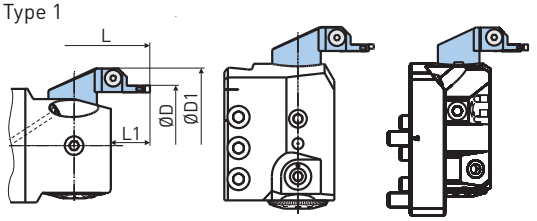
Type 1



Type 2



Type 1



Type 2



EWN/EWE 310 ▶ 349 - 352

EWN 150 ▶ 383

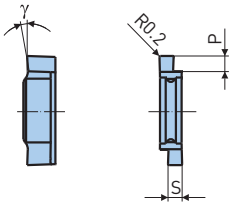
EWN/EWE 200 ▶ 369

For Boring Head	Insert holder									
	Type 1				Type 2					
	ØD	ØD1	Model	Order No.	ØD	ØD2	Model	Order No.	L *	L1
EWN/EWE53 (310.501)/(310.850)	53 - 70	ØD + 22	ENH5-1FG4	**626.935**	73 - 90	ØD - 30	ENH5-1FG4R	**626.945**	73	20
EWN/EWE68 (310.601)/(310.860)	68 - 100	ØD + 24	ENH6-1FG4	**626.936**	88 - 120	ØD - 28	ENH6-2FG4R	**626.946**	88	21
	94 - 126		ENH6-2FG4	**626.937**	114 - 146		ENH6-3FG4R	**626.947**		
EWN/EWE100 (310.602)/(310.865)	100 - 153	ØD + 24	ENH6-1FG4	**626.936**	120 - 173	ØD - 28	ENH6-2FG4R	**626.946**	88	21
	126 - 179		ENH6-2FG4	**626.937**	146 - 199		ENH6-3FG4R	**626.947**		
EWN/EWE100 (310.701)/(310.870)	100 - 153	ØD + 24	ENH6-1FG4	**626.936**	120 - 173	ØD - 28	ENH6-2FG4R	**626.946**	104	21
	126 - 179		ENH6-2FG4	**626.937**	146 - 199		ENH6-3FG4R	**626.947**		
EWN100L (310.708)	100 - 153	ØD + 24	ENH6-1FG4	**626.936**	120 - 173	ØD - 28	ENH6-2FG4R	**626.946**	134	21
	126 - 179		ENH6-2FG4	**626.937**	146 - 199		ENH6-3FG4R	**626.947**		
EWN150 (317.102A)	200 - 613	ØD + 24	ENH6-1FG4	**626.936**	220 - 633	ØD - 28	ENH6-2FG4R	**626.946**	134	21
	226 - 639		ENH6-2FG4	**626.937**	246 - 659		ENH6-3FG4R	**626.947**		
EWN/EWE200 (318.101)/(318.104)	200 - 3000	ØD + 21	ENH7-1FG4	**626.938**	220 - 3040	ØD - 28	ENH7-2FG4R	**626.948**	134	21

1. * Tool length to the CK connection

For Spare Parts ▶ 439

Inserts

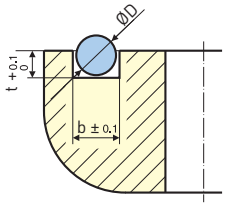


Inserts for Steel and Cast Iron			
S	P	γ	Order No.
2.5	2.7	5°	**958.425**
3.0	3.3	5°	**958.430**
3.3	3.6	5°	**958.433**
3.5	3.8	5°	**958.435**
4.0	4.3	5°	**958.440**

Inserts for Aluminium			
S	P	γ	Order No.
2.5	2.7	15°	**958.475**
3.0	3.3	15°	**958.480**
3.3	3.6	15°	**958.483**
3.5	3.8	15°	**958.485**
4.0	4.3	15°	**958.490**

Groove Dimensions

Recommended groove dimensions for given cross section diameters of O-rings, for static sealing.



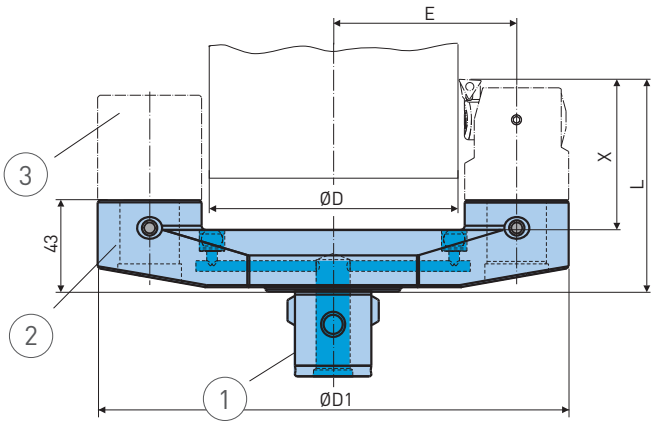
ØD	Groove Width b	Groove Depth t
1.78	2.5	1.3
2.0	2.5	1.6
2.5	3.3	1.9
2.62	3.5	2.05
3.0	4.0	2.4

Work Piece Material	Vc m/min	fn mm/rev
Construction- heat treatable steels	120 - 200	0.01 - 0.03
Stainless steels	60 - 120	0.01 - 0.02
Cast iron	80 - 160	0.02 - 0.04
Aluminium	200 - 400	0.02 - 0.04
Non-ferrous metals		

OD Turning with EWN/EWE/SW, Ø 16 - 120

This program consists of tool holders with CKB5 and CKB6 connectors, made for different turning ranges and with tool connections in the sizes CKB3, CKB4 and CKB5. The corresponding precision finish or rough boring heads and counterweights can be mounted on the tool holder either directly or by means of an extension. With this program, outer diameters in the range from Ø 16 -120 mm can be machined.





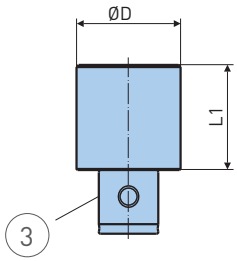
Attention: Counter-clockwise rotation of spindle! Vc max 450 m/min

ØD	Model	Order No.	Tool Holder ① CK	② CK	ØD1	E	L *	X *	Weight (kg)
16 - 44	OD16-44CKB5-CKB3	**335.906**	CKB5	CKB3	107	38	83 (113) (128)	51 (81) (96)	2.7
16 - 44	OD16-44CKB6-CKB3	**335.905**	CKB6	CKB3	107	38	83 (113) (128)	51 (81) (96)	1.5
34 - 67	OD34-67CKB6-CKB4	**335.904**	CKB6	CKB4	147	54	90 (130) (150)	58 (98) (118)	1.8
57 - 90	OD57-90CKB6-CKB4	**335.903**	CKB6	CKB4	170	65.5	90 (130) (150)	58 (98) (118)	2.1
78 - 120	OD78-120CKB6-CKB5	**335.902**	CKB6	CKB5	222	86.5	100 (160) (190)	68 (128) (158)	2.8

1. * The numbers in brackets indicate the tool length (L) and the max. pin length (X) with the use of the corresponding extensions.

For Extension ▶ 197

Counter Weight for OD Turning



Model	Order No.	Counter Weight ③ CK	ØD	L1	Weight (kg)
CW-CK3	**335.915**	CK3	31.3	35	0.20
CW-CK4	**335.913**	CK4	39	36.4	0.40
CW-CK5	**335.912**	CK5	49	49.5	0.85

For EWE ▶ 349
For EWN ▶ 351
For SW ▶ 297

Selection of the Insert Holder

Fine Boring

ØD	Tool Holder	For Boring Head	Range ØD Insert Holder Order No.		
16 - 44	335.905	EWN32	16 - 26	25 - 35	34 - 44
16 - 44	335.906	EWN32	16 - 26	25 - 35	34 - 44
		310.301	626.133	626.132	626.131
34 - 67	335.904	EWE/EWN41	34 - 47	45 - 58	54 - 67
57 - 90	335.903	EWE/EWN41	57 - 70	68 - 81	77 - 90
		310.840/310.401	626.143	626.142	626.141
78 - 120	335.902	EWE/EWN53	78 - 95	91 - 108	103 - 120
		310.850/310.501	626.153	626.152	626.151

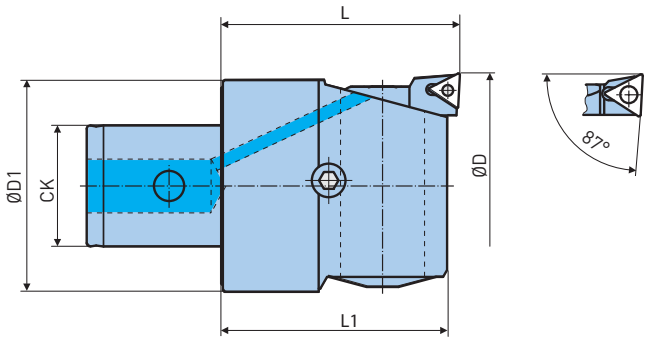
Rough Boring

ØD	Tool Holder	For Boring Head	Range ØD Insert Holder Order No.	
25 - 44	335.905	SW32	25 - 35	34 - 44
25 - 44	335.906	SW32	25 - 35	34 - 44
		319.301	639.437	639.433
42 - 67	335.904	SW41	42 - 55	54 - 67
65 - 90	335.903	SW41	65 - 78	77 - 90
		319.401	639.447	639.443
87 - 120	335.902	SW53	87 - 104	103 - 120
		319.501	639.457	639.453

EWB Balanced Fine Boring Head, Ø 32 - 105

Even at max. speeds balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.





Model	Order No.	CK	ØD	ØD1	L	L1	Weight (kg)	
EWB32-42CK3	**310.305A**	CK3	32 - 42	30	40	37	0.22	TP 07
EWB41-54CK4	**310.405A**	CK4	41 - 54	38	47	43	0.41	TC 11
EWB53-70CK5	**310.505A**	CK5	53 - 70	49	57	53	0.81	
EWB68-88CK6	**310.605A**	CK6	68 - 88	63	71	67.2	1.7	
EWB85-105CK6	**310.606A**	CK6	85 - 105	63	71	67.2	1.7	

1. EWB boring heads will be delivered with assembled insert holder.

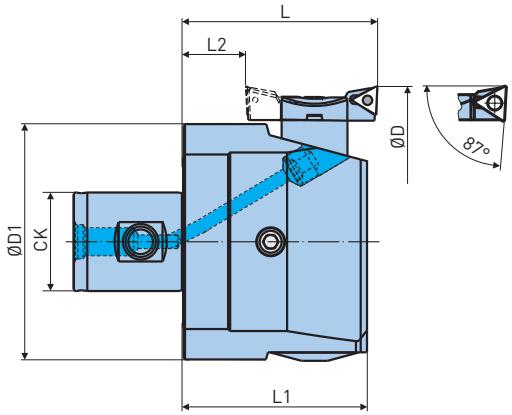
For Spare Parts ▶ 432
For Insert ▶ 389 - 392

B.3

EWB-AL Balanced Fine Boring Head, Ø 100 - 203

The fine boring heads EWB-AL are made of high strength aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%.





Model	Order No.	CK	Front Bore ØD	Back Bore ØD	ØD1	L	L2	L1	Weight (kg)	
EWB100-153CK6AL	**310.607A**	CK6	100 - 153	112 - 153	90	71	25	67	0.6	TC 11
EWB150-203CK6AL	**310.608A**		150 - 203	150 - 203	126	71	25	67	0.8	
EWB100-153CK7AL	**310.705A**	CK7	100 - 153	112 - 153	90	87	41	83	0.9	
EWB150-203CK7AL	**310.706A**		150 - 203	150 - 203	126	87	41	83	1.2	

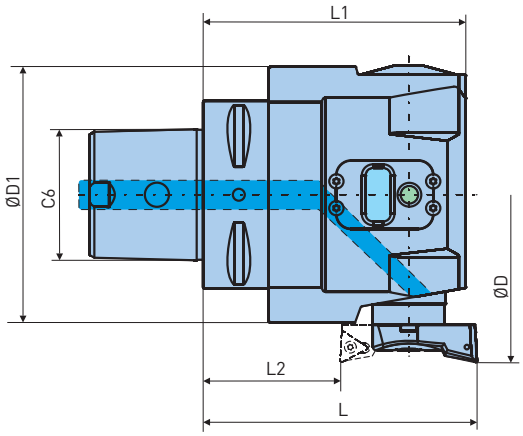
1. EWB-AL boring heads will be delivered with assembled insert holder.

For Spare Parts ▶ 432
For Insert ▶ 390 - 392

EWBD BIG CAPTO Digital and Balanced Fine Boring Heads, Ø 68 - 153

The fine boring heads EWBD combine the most advanced technologies in one spectacular tool: digital and self-balanced. In addition the ultra-light fine boring head EWBD 100 AL is the worlds first tool with BIG CAPTO shank, completely made of aluminium.





Model	Order No.	BIG CAPTO	Front ØD	Back ØD	Material	ØD1	L	L2	L1	Weight (kg)	
EWBD68-102C6	**470.606**	C6	68 - 102	80 - 102	Steel	64	92	46	88	2.1	TC 11
EWBD100-153C6AL	**470.609**	C6	100 - 153	112 - 153	Aluminium	90	92	46	88	1.4	

1. EWBD boring heads will be delivered with assembled insert holder.

For Spare Parts ▶ 432
For Insert ▶ 390 - 392

Other execution

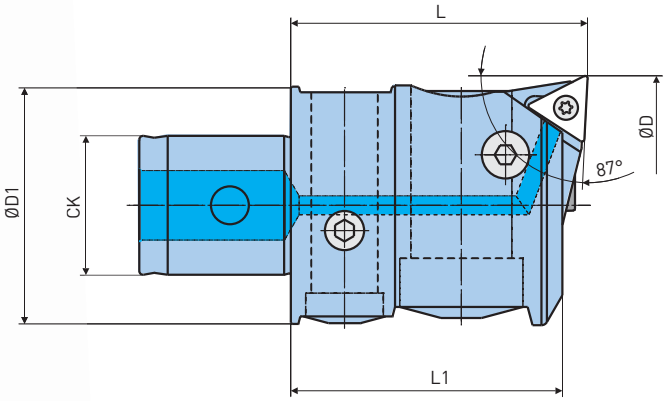
EWBD68-102C6 (Steel)
470.606



EWB-UP Balanceable Fine Boring Head, Ø 25 - 100

The ulta-precise EWB-UP series sets higher standards for boring heads concerning adjustment accuracy and balance quality. Cutting speed up to Vc max. = 2000 m/min.





Model	Order No.	CK	ØD	ØD1	L	L1	Max. Imbalance [gmm]	Weight (kg)	
EWB25-33UP-CK2	**309.201**	CK2	25 - 33	23.4	35.5	32.5	3	0.12	TP 07
EWB32-42UP-CK3	**309.301**	CK3	32 - 42	30	40	37	5	0.22	TC 11
EWB41-54UP-CK4	**309.401**	CK4	41 - 54	38	47	43	5	0.40	
EWB53-70UP-CK5	**309.501**	CK5	53 - 70	49	57	53	10	0.85	
EWB68-100UP-CK6	**309.601**	CK6	68 - 100	64	71	67.2	30	1.8	

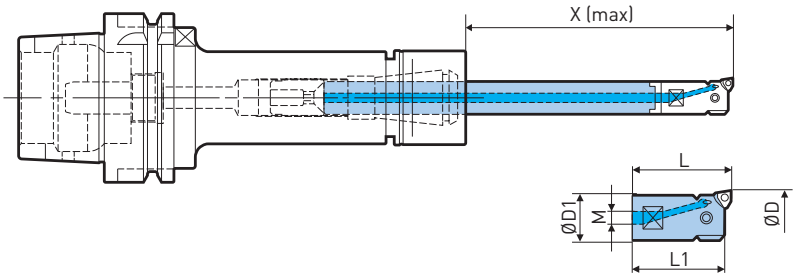
1. EWB-UP boring heads will be delivered with assembled insert holder.

For Spare Parts ▸ 433
For Insert ▸ 389 - 392

EW Fine Boring Heads, Ø 15 - 22

These heads are designed to be used in combination with the steel or carbide-boring bars Ø 14 and Ø 16 mm out of the accessory program. In conjunction with the long carbide bar, the tool is well suited for vibration-free finishing operations in bores with unfavorable Ø/L-ratios.

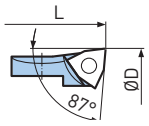




Model	Order No.	ØD	ØD1	L	M	L1	Weight (kg)
EW15M6	**310.020**	15 - 18.5	14	30	M6	27.5	0.03
EW18M10	**310.030**	18 - 22	16	36	M10	33	0.05

For Spare Parts ▶ 433

Insert Holders

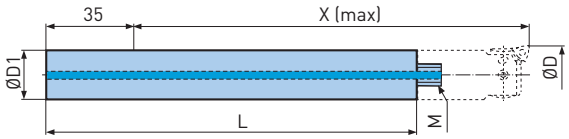


For Boring Head	Model	Order No.	ØD	L	
EW15	15EKWC02	**625.020**	15 - 18.5	30	WC 02
EW18		**625.020**	18 - 22	36	

For Insert ▶ 388

Boring Bars



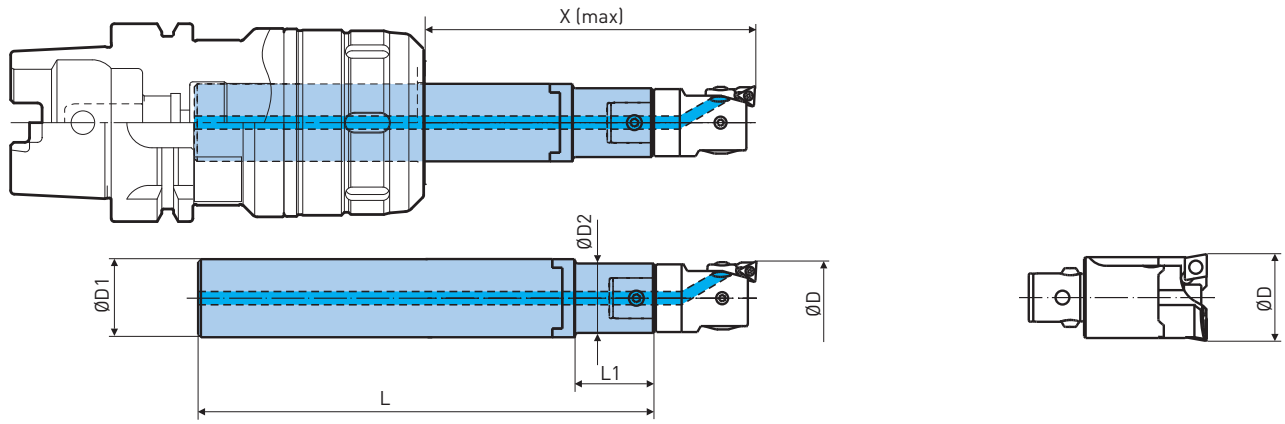


For Boring Head		Model	Order No.	Boring Bar				Weight (kg)
Type	ØD			ØD1	M	L	X (max)	
EW15	15 - 18.5	ST14-87	**615.232**	14	M6	87	82	0.09
		ST14-117HM	**615.233**			117	112	0.25
		ST14-147HM	**615.221**			147	142	0.30
EW18	18 - 22	ST16-88	**615.226**	16	M10	88	89	0.12
		ST16-108HM	**615.227**			108	109	0.26
		ST16-168HM	**615.229**			168	169	0.40

Carbide Bars

Due to maximum rigidity, a carbide bar, optimized in length and with the biggest possible diameter, guarantees the best result when machining deep bores.

For the work range from Ø 20 - 33 [47] mm, the fine graduated carbide bar program contains bars with 6 different diameters and 3 different lengths per diameter. Therefore, for every deep bore machining in this range, the optimal carbide bar is always available. The program is completed with carbide bars Ø 31 and ø 40 mm in 3 different lengths each, for the boring range from Ø 32 - 54 [74] mm. Carbide bars Ø 40 mm are also available for rent.



For Boring Heads	Model	Order No.	CK	Boring Range ØD	ØD1	ØD2	L	L1	X max.	Weight (kg)
SW20, EWN20	ST19-CKB1-140HM	335.320	CKB1	20 - 26 (31/36)	19	19	140	-	98	0.47
	ST19-CKB1-190HM	335.321					190		148	0.74
	ST19-CKB1-240HM	335.322					240		198	0.95
	ST21-CKB1-140HM	335.380	CKB1	20 - 26 (31/36)	21	19	140	26	98	0.57
	ST21-CKB1-190HM	335.381					190		148	0.81
	ST21-CKB1-240HM	335.382					240		198	1.0
	ST23-CKB1-140HM	335.383	CKB1	20 - 26 (31/36)	23	19	140	26	98	0.70
	ST23-CKB1-190HM	335.384					190		148	0.97
	ST23-CKB1-240HM	335.385					240		198	1.3
SW25, EWN25	ST24-CKB2-160HM	335.323	CKB2	25 - 33 (40/47)	24	24	160	-	121	0.86
	ST24-CKB2-220HM	335.324					220		181	1.1
	ST24-CKB2-290HM	335.325					290		251	1.8
	ST27-CKB2-160HM	335.386			27		160	28	121	1.1
	ST27-CKB2-220HM	335.387					220		181	1.5
	ST27-CKB2-290HM	335.388					290		251	2.1
	ST29-CKB2-160HM	335.389			29		160	28	121	1.2
	ST29-CKB2-220HM	335.390					220		181	1.8
	ST29-CKB2-290HM	335.391					290		251	2.4
SW32, EWN32	ST31-CKB3-200HM	335.326	CKB3	32 - 42 (51/60)	31	31	200	-	168	1.8
	ST31-CKB3-260HM	335.331					260		228	2.5
	ST31-CKB3-350HM	335.327					350		318	3.7
SW41, EWN41, EWE41	ST40-CKB4-235HM	335.328	CKB4	41 - 54 (66/74)	40	40	235	-	207	3.7
	ST40-CKB4-335HM	335.329					335		307	5.4
	ST40-CKB4-435HM	335.330					435		407	7.2

For Spare Parts ▸ 418

B.3

Hydraulic Chuck



Hi Power Milling Chuck



To clamp BIG KAISER carbide bars with shank diameter Ø 19, 24, 31 and 40, milling chuck are highly recommended.

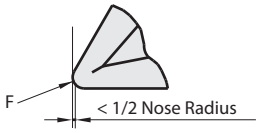
Guidelines

Major Influences of Fine Boring

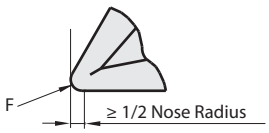
- The amount of stock to be removed (D.O.C.)
- Feed rate
- Cutting speed

For all of these influences, a balance must be obtained for optimal machining. Too much stock or too heavy of a feed rate will generate excessive cutting forces that can result in inconsistent bore size. When stock or feed rates are too light, the possibility of chatter increases due to deflection.

D.O.C

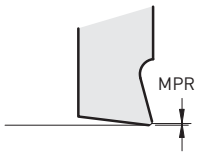


High Possibility for Deflection & Chatter:
When D.O.C. is less than half the insert nose radius, the resulting forces (F) are almost 100% radial.

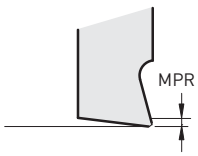


Good Stable Cut:
When D.O.C. is greater than or equal to half the insert nose radius, the resulting forces (F) are almost 100% axial.

Feed Rate



High Possibility for Deflection & Chatter:
When the feed rate is less than the hone on the insert tip, the risk of vibration increases.



Good Stable Cut:
When the feed rate is larger than the hone on the insert tip, full use of the chip breaker is allowed. This results in lower cutting forces.

Cutting Speed

Higher Speeds:

- Better surface finish
- Shorter machining times
- Better chip evacuation

As a general rule, the tool's length/diameter ratio and insert radius will determine optimum cutting speed.
*For smaller diameter bores, carbide or heavy metal bars may be required to eliminate vibration & chatter

Lower Speeds:

- Poorer surface finish
- Low chance for chatter
- Longer machining times
- High chance for built-up edge, results in shorter insert life

L/D Ratio	Max. Insert Radius	Speed Reduction
≤4:1	0.8	100% of optimum
≤5:1	0.4	75% of optimum
≤6:1	0.2	60% of optimum
≥7:1	0.2	50% of optimum

Troubleshooting

Under certain conditions, it may be necessary to modify or adapt recommended cutting data and/or tooling configurations of the application. Below are general solutions to common problems.

Problem	Possible Cause	Remedy
Poor Tool Life	Wrong insert grade	Change to higher wear resistant grade
	Excessive speed	Reduce Vc
	Poor cooling of insert	Apply through-tool coolant
	Excessive stock allowance	Decrease depth of cut
Chatter & Vibration	Excessive speed	Reduce Vc, check cutting data tables
	Extreme length/diameter ratio	Shorten tool to increase stiffness
		Increase boring bar diameter to larger size
		Change boring bar to carbide or heavy metal
	Wrong insert	Reduce nose radius of insert
		Use ground geometry inserts
	Incorrect stock allowance	Check cutting data tables
Poor Size Repeatability	Inaccurate tool changes	Worn and/or damaged tool shank; replace
		Clean spindle and tool shank
	Variation of stock allowance	Semi-finish with rough insert boring head
	Excessive spindle looseness	Use ground geometry inserts
Unacceptable Roundness	Excessive boring tool imbalance	Change to auto-balance or balanceable head
		Balance tool assembly
		Reduce speed
	Excessive cutting forces	Check stock allowance and feed rate
	Insufficient workpiece clamping	Check for uniform workpiece clamping
	Workpiece non-symmetrical	Reduce cutting forces; change to ground insert
		Increase cutting speed, reduce feed
Unacceptable Position	Original bore off position	Semi-finish with rough insert boring head
	Excessive stock allowance	Decrease depth of cut
		Decrease insert radius
		Reduce cutting forces; change to ground insert
Poor Surface Finish	Wrong insert radius	Use larger insert radius
	Excessive feed rate	Reduce feed; maximum 25% of insert radius
	Poor chip evacuation	Increase bore to boring bar clearances
		Apply through-tool coolant; adjust nozzles
		Change insert to higher rake angle
		Check depth of cut
Taper	Premature insert wear	Change to higher wear resistance insert grade
		Increase insert radius
		Change from ground to pressed geometry insert
		Increase coolant flow

Large Diameter Boring Tools

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SERIES 317

Components Ø 200 - 620	379 - 380
Rough Boring Component Selection	381 - 382
Fine Boring Component Selection	383

B.4

Large Diameter Boring Tools Series 318

The system is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.



Series 318 with Flange Only

Execution with flange only. Especially built to fit on machine tools with 40 taper spindle. For rough and fine boring, OD turning, chamfering and face grooving.

Ø 200 - 320 mm, CKB6/CKN6

▶ 367



Series 318 with Flange and Extension Slide

Edition with flange and extension slides. For rough and fire boring, OD turning, chamfering and face grooving.

Ø 200 - 620 mm, CKB7/CKN7

▶ 367

Series 318 with Bridge and Extension Slides

Edition with shanks, large bridges and extension slides. For rough and fine boring, OD turning and face grooving.

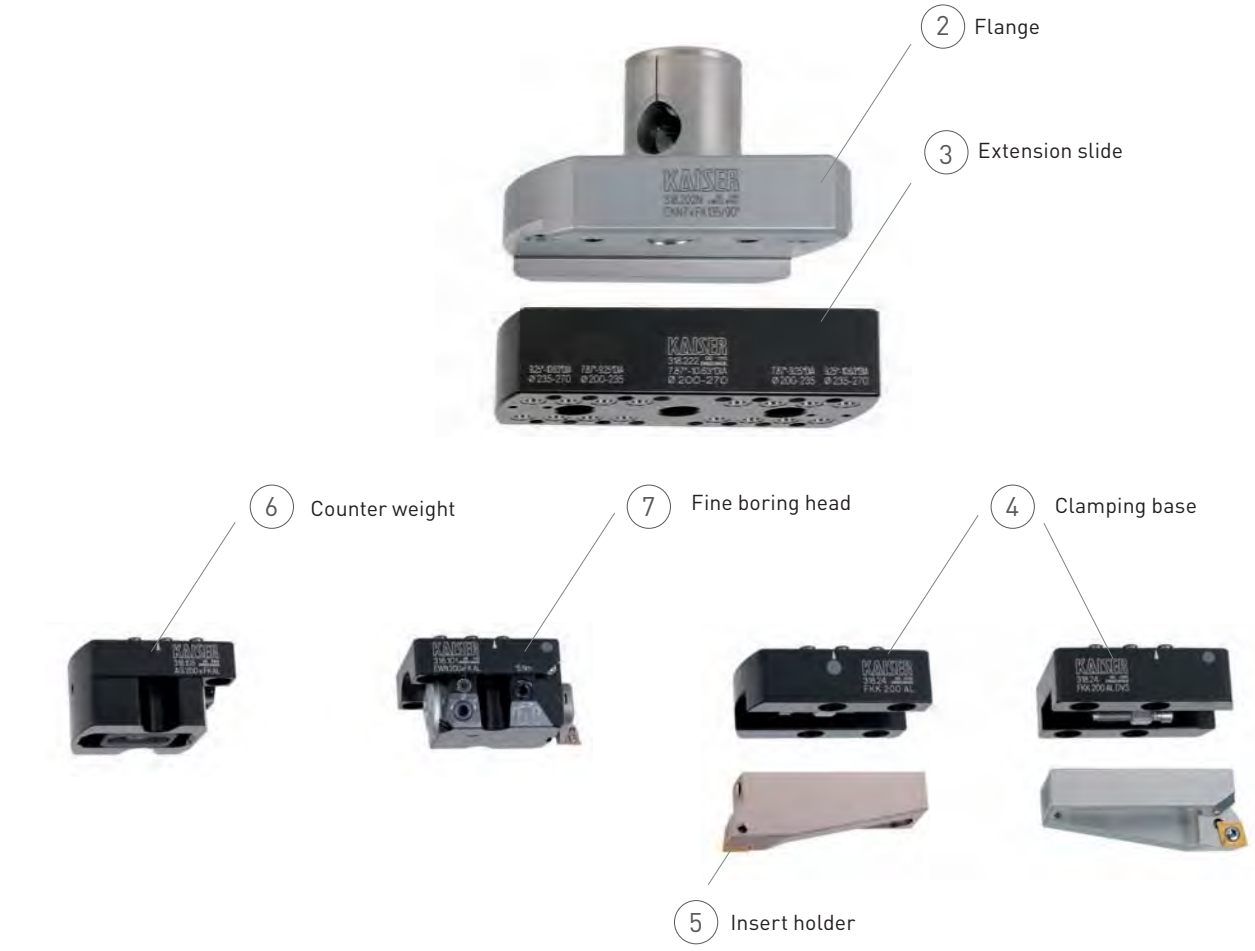
Ø 620 - 3000 mm, DV50/BT50/HSK-A100

▶ 374

Series 318 with Flange Only, Ø 200 - 340



Series 318 with Flange and Extension Slide, Ø 200 - 620



Flanges

1

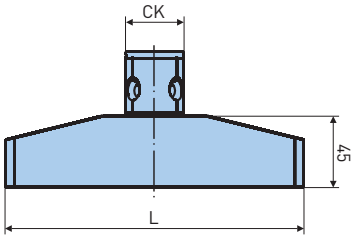


Fig. 1

2

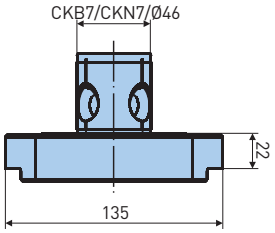


Fig. 2

Standard execution

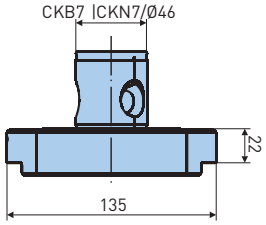


Fig. 3

Flange with cutter position rotated 90°

1

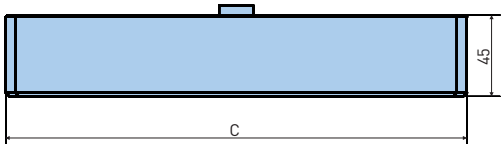
Model	Order No.	Fig.	ØD	CK	L	Weight (kg)
CKN6-FL200-270	**318.205N**	1	200 - 270	CKN6	185	1.83
CKB6-FL200-270	**318.205**	1	200 - 270	CKB6		1.83
CKN6-FL270-340	**318.206N**	1	270 - 340	CKN6	255	2.32
CKB6-FL270-340	**318.206**	1	270 - 340	CKB6		2.32

2

Model	Order No.	Fig.	CK	Weight (kg)
CKN7-FL135	**318.201N**	2	CKN7	2.80
CKB7-FL135	**318.201**		CKB7	2.75
CKN7-FL135-90	**318.202N**	3	CKN7	2.73
CKB7-FL135-90	**318.202**		CKB7	2.73

Extension Slides

3

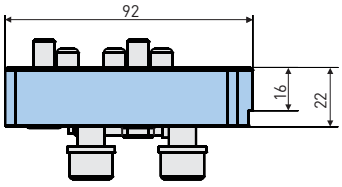


Model	Order No.	C	ØD	Max. Speed (min $^{-1}$)	Weight (kg)
SLN200-270AL	**318.222**	185	200 - 270	3 200	1.50
SLN270-340AL	**318.223**	255	270 - 340	2 400	2.04
SLN340-410AL	**318.224**	325	340 - 410	1 900	2.62
SLN410-480AL	**318.225**	395	410 - 480	1 600	3.21
SLN480-550AL	**318.226**	465	480 - 550	1 300	3.90
SLN550-620AL	**318.227**	535	550 - 620	1 200	4.40

B.4

Clamp Bases

4

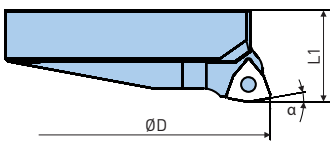


Model	Order No.	Weight (kg)
CB200	**318.240**	1.50

1. Clamp bases are sold in pairs.

Insert Holders

5



Model	Order No.	ØD	L1	Angle α	Insert	Weight (kg)
IHTW200C	**637.940**	200 - 620	34	0°	CC 12	0.71
IHTW200C16	**637.941**		34	0°	CC 16	0.71
IHTW200S	**637.942**		34	6°	SC 12	0.75
IHTW200W	**637.943**		34	10°	WC 08	0.7
IHTW200C-DVS*	**637.951**		34.4	0°	CC 12	0.35
IHTW200C16-DVS*	**637.953**		34.4	0°	CC 16	0.35

1. Insert holders is composed of 2pcs of holders.
* DVS Insert holder are delivered individually.

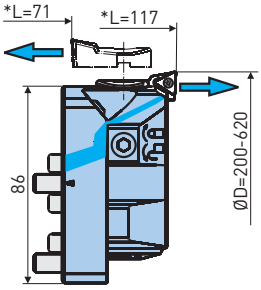
For Insert ▸ 395 - 405
For Spare Parts ▸ 434

EWN/EWE Fine Boring Heads, Ø 200 - 3000

6



EWE200AL

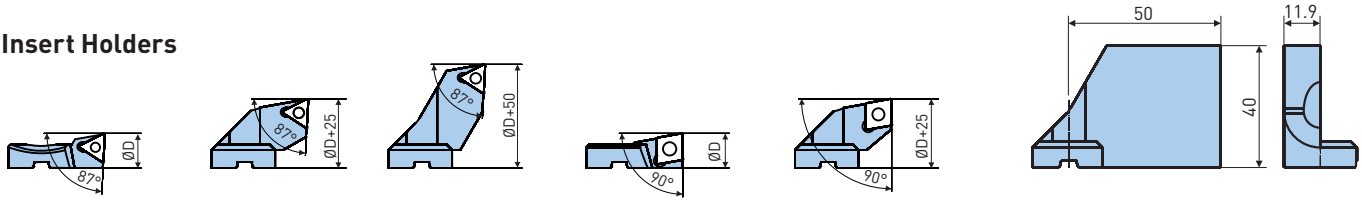




EWN200AL

Model	Order No.
EWE200AL	318.104
EWN200AL	318.101

Insert Holders



Order No.	626.271	626.272	626.273	626.371	626.372	626.917
Model	ENH7-1T	ENH7-2T	ENH7-3T	ENH7-1C	ENH7-2C	ENH7-BLANK L
Type	TC 11			CC 09		Blank

For Insert ▶ 390 - 394

Insert Holders for Chamfering and Undercuts

Fig. 1

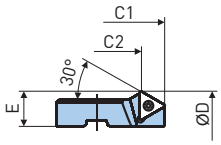


Fig. 2

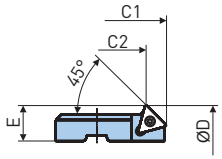
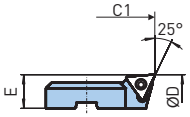


Fig. 3



Model	Order No.	Fig.	Type	C1	C2	E	
EWH7-1T30	626.472	1	30°	117	108.3	12.5	TC 11
EWH7-1T45	626.473	2	45°		109.8		
EWH7-1T25	689.189	3	25°		-		

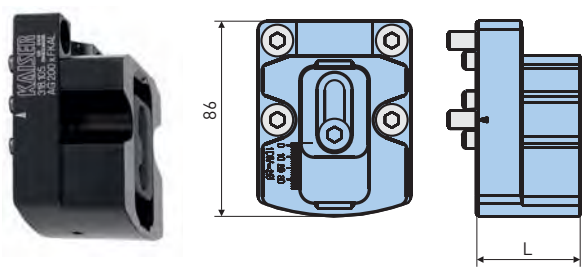
For Insert ▶ 390 - 392

Min. diameter for back boring / back chamfering = ØD min. (of the respective boring range) + 12 mm.
Example for the lowest range: Min. diameter = 200 + 12 = 212 mm

Counter Weights

There are two different counter weights available. Type 1 is made of steel and is used for coarse balancing. Type 2 is made of aluminum and contains a slide with a graduated scale for fine balancing of the tool assembly.

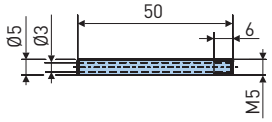
7



Model	Order No.	L	Material
CW200AL	318.105	46	Aluminium
CW200	318.107	22.5	Steel

For Spare Parts ▶ 434

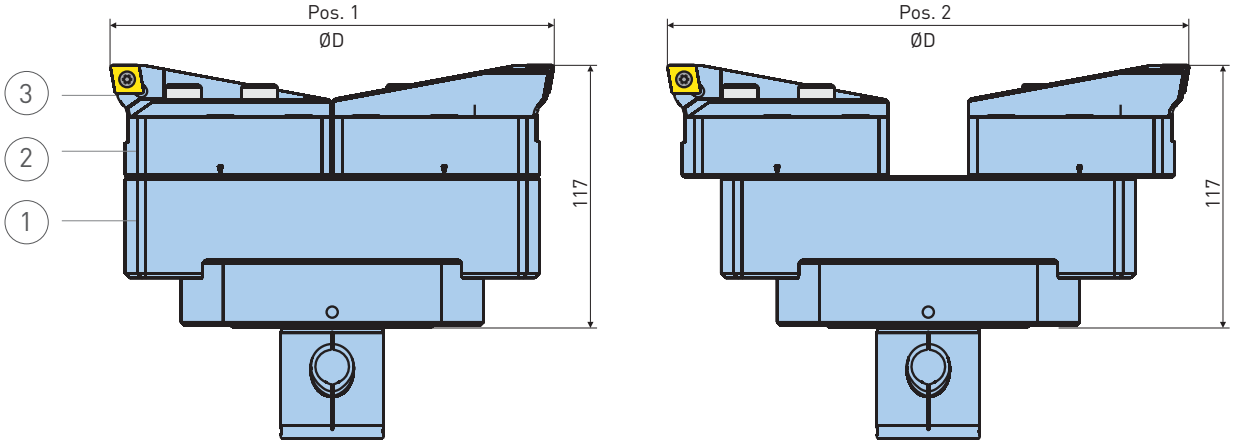
Coolant Pipe



Model	Order No.
CP-DM5-50-M5	692.415

Rough Boring Component Selection

The table below determines the components such as extension slide (1), clamp bases (2) and insert holders (3) for each diameter range (ØD) and shows in which position (1 or 2) the clamp bases (2) have to be mounted on the extension slide (1). Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale on the clamp base (2) and the marking on the insert holder (3). The required scale value is calculated by the difference between bore diameter and correction value (α). The insert holder has to be adjusted to the scale value. See example below.



Range ØD	Extension Slide	Fixed Position/Range		Clamp Bases	Insert Holders	Correction α		Max. Speed
	①	Pos. 1/ØD	Pos. 2/ØD	②	③	Pos. 1	Pos. 2	
200 - 270	318.205N	199 - 236		318.240	See page 368	200	-	3 200
	318.222		234 - 271			-	235	
270 - 340	318.206N	269 - 306				270	-	2 400
	318.223		304 - 341			-	305	
340 - 410	318.224	339 - 376				340	-	1 900
			374 - 411			-	375	
410 - 480	318.225	409 - 446				410	-	1 600
			444 - 481			-	445	
480 - 550	318.226	479 - 516				480		1 300
			514 - 551			-	515	
550 - 620	318.227	549 - 586				550	-	1 200
			584 - 621			-	585	

For Spare Parts ▸ 434

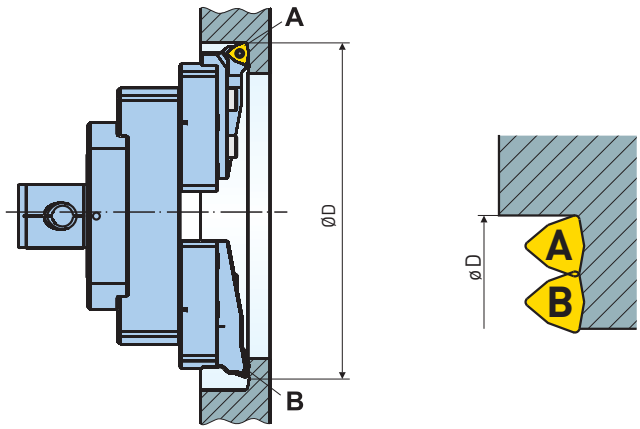
Example: Diameter setting according to scale

ØD: 430 Position: 1 Scale value: ØD - α = 430 - 410 = 20

Extension slide: 318.225 Correction value α: 410

Full Profile Roughing

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table above.



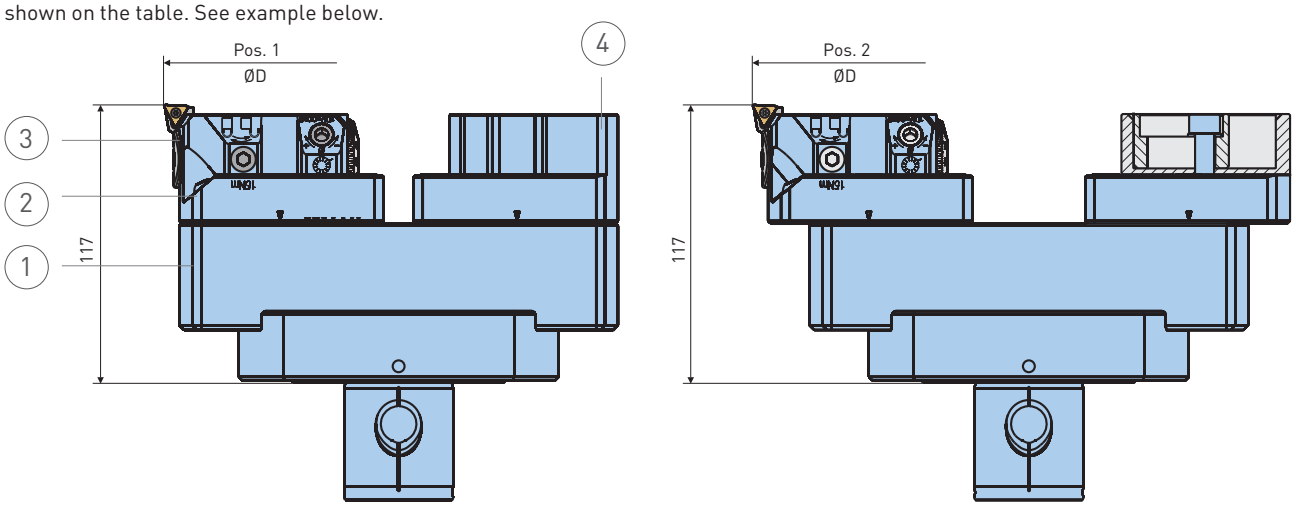
Stock Allowance [mm Ø]	Cutting Edge A [mm Ø]	Cutting Edge B [mm Ø]
22 - 29.9	ØD	D - 2
30 - 35.9		D - 6
36 - 41.9		D - 12
42 - 47.9		D - 18
48 - 53.9		D - 24
54 - 60		D - 30

Cutting Data Vc [m/min]	fn [mm/rev]
100 - 180	0.1 - 0.2

Fine Boring Component Selection

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and counter weight (4) for each diameter range and shows in which position the boring head and the counter weight have to be mounted on the extension slide.

Balancing of the tool combination takes place by adjusting the slide on the counter weight according to the scale. The correction value (α) is shown on the table. See example below.



Range ØD	Extension Slide	Fixed Position/Range		Boring Head	Insert Holder	Counter Weight	Correction α		Max. Speed
	①	Pos. 1/ØD	Pos. 2/ØD	②	③	④	Pos. 1	Pos. 2	
200 - 270	318.205N	199 - 236		318.101	626.271	318.105 (for fine balancing) 318.107	200		3 200
	318.222		234 - 271					235	
270 - 340	318.206N	269 - 306					270		2 400
	318.223		304 - 341					305	
340 - 410	318.224	339 - 376					340		1 900
			374 - 411					375	
410 - 480	318.225	409 - 446					410		1 600
			444 - 481					445	
480 - 550	318.226	479 - 516					480		1 300
			514 - 551					515	
550 - 620	318.227	549 - 586					550		1 200
			584 - 621					585	

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Example: Diameter setting according to scale

ØD:	335 H7	Counter weight:	318.105
Extension slide:	318.223	Correction value:	305
Position:	2	Scale:	D - α = 335 - 305 = 30

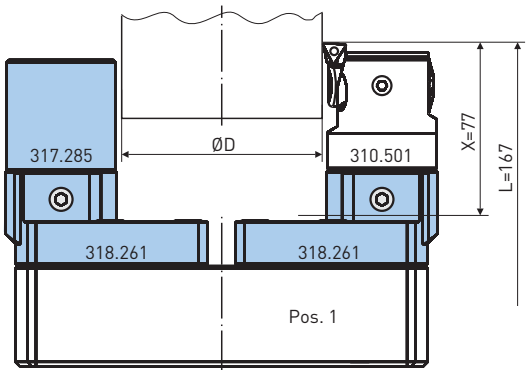
OD Turning Holders, Ø 49 - 476

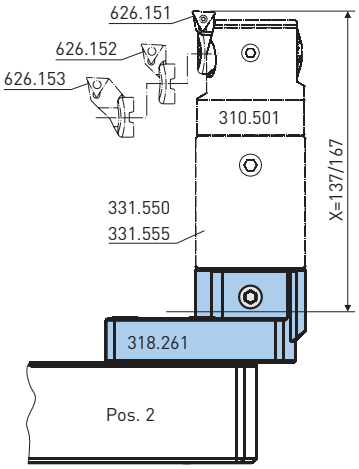
The tool holder with CKB5 connection can be mounted on any extension slide. For OD turning it is required to connect the fine boring head EWN53 x CKB5 either directly or by means of an extension to the holder. To compensate the imbalance, a second tool holder and a special counter weight have to be mounted on the opposite side of the extension slide.

Attention: Counter-clockwise rotation of spindle!



L = Distance to the CK connection.





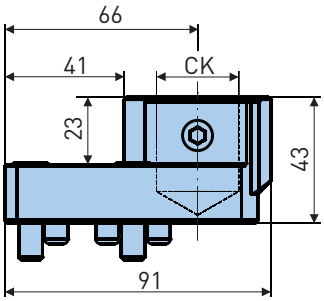
Tool Holder

Model	Order No.	CK
CB200CKB5	**318.261**	CKB5

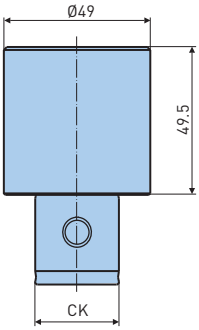
Counter Weight

Model	Order No.	CK
CW-CK5-DM49-50	**317.285**	CK5









B.4

Adjusting Table

Range ØD	Extension Slide	Pos. 1 Range with Insert Holder No: 626.153 ØD	626.152 ØD	626.151 ØD	Pos. 2 Range with Insert Holder No: 626.153 ØD	626.152 ØD	626.151 ØD
49 - 126	**318.222**	49 - 66	62 - 79	74 - 91	84 - 101	97 - 114	109 - 126
119 - 196	**318.223**	119 - 136	132 - 149	144 - 161	154 - 171	167 - 184	179 - 196
189 - 266	**318.224**	189 - 206	202 - 219	214 - 231	224 - 241	237 - 254	249 - 266
259 - 336	**318.225**	259 - 276	272 - 289	284 - 301	294 - 311	307 - 324	319 - 336
329 - 406	**318.226**	329 - 346	342 - 359	354 - 371	364 - 381	377 - 394	389 - 406
399 - 476	**318.227**	399 - 416	412 - 429	424 - 441	434 - 451	447 - 464	459 - 476

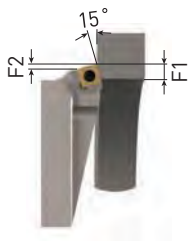
Insert Holders for Chamfering

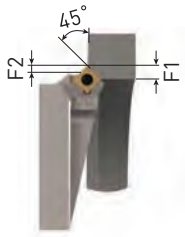
The insert holder with step-less adjustable chamfer angle from 15-75° is made for front chamfering and with limitations also for back chamfering.

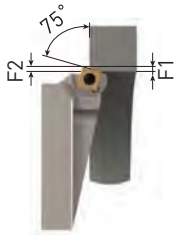
Model	Order No.
CFTW200S	637.959



ØD	Chamfer Angle α									
	15°		30°		45°		60°		75°	
	min Ø	max Ø	min Ø	max Ø	min Ø	max Ø	min Ø	max Ø	min Ø	max Ø
200 - 270	182	276	186	278	190	279	195	278	199	277
270 - 340	252	346	256	348	260	349	265	348	269	347
340 - 410	322	416	326	418	330	419	335	418	339	417
410 - 480	392	486	396	488	400	489	405	488	409	487
480 - 550	462	556	466	558	470	559	475	558	479	557
550 - 620	532	626	536	628	540	629	545	628	549	627





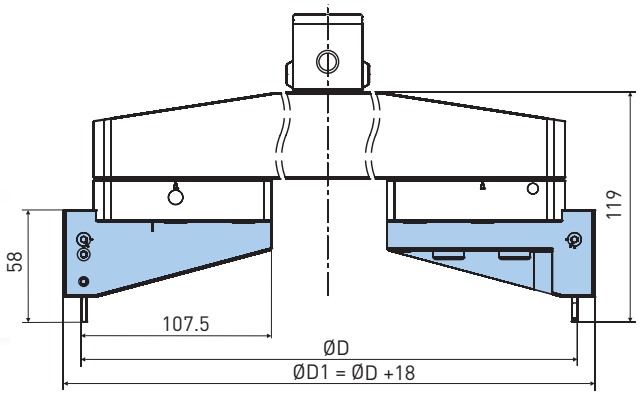


Max. Radial Chamfer Length for Front and Back Chamfering										
Insert Holder	15°		30°		45°		60°		75°	
	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
SC12	11.4	3	10.3	4	8.4	4.2	5.9	3.9	3	3

Face Grooving Holders



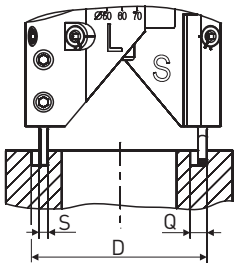


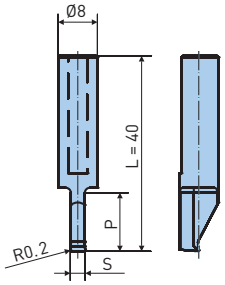


Model	Order No.	ØD
FGHTW200	637.961	198 - 3 002

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Cutters



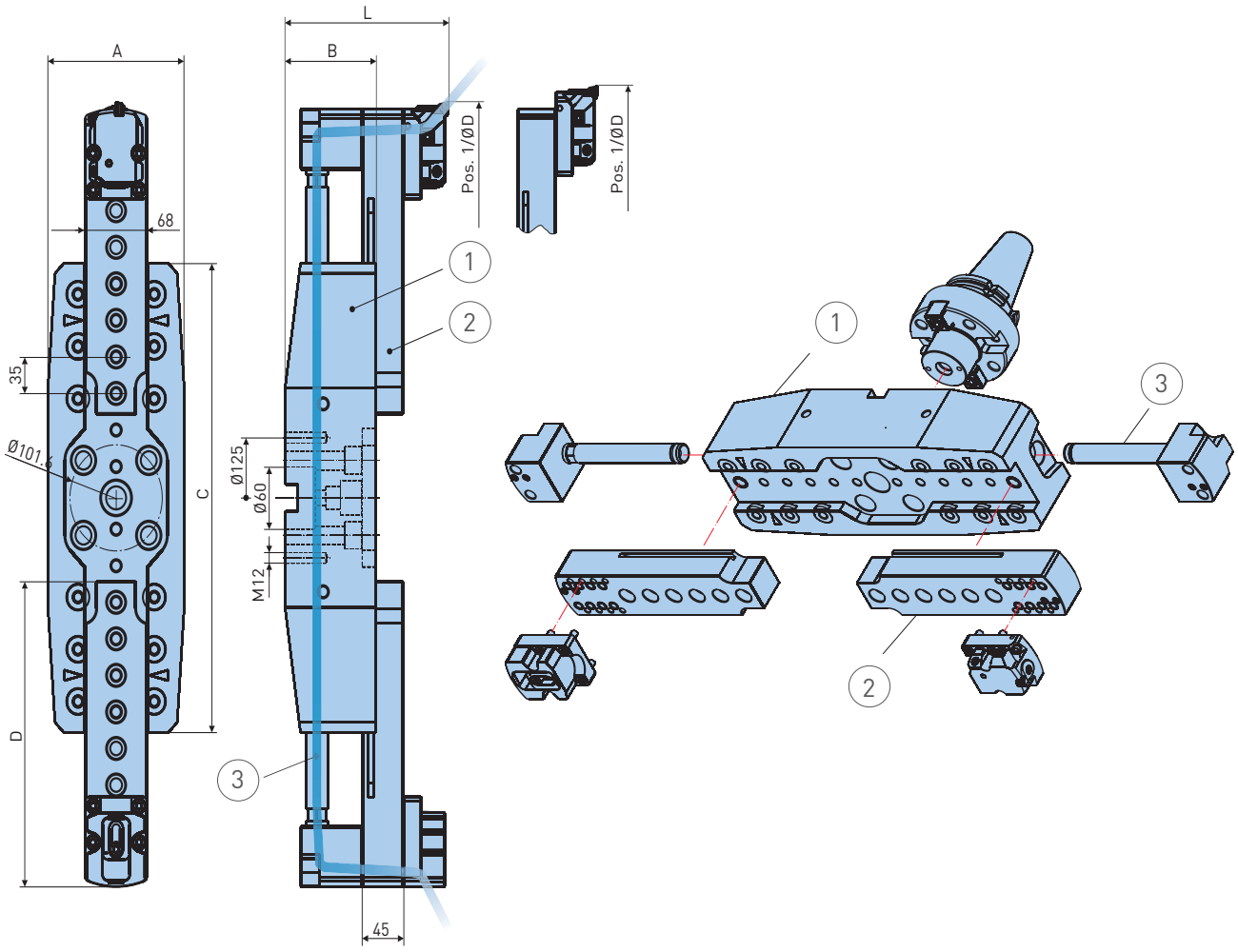


Model	Order No.	Cutter	Width of Cutter S	Max. Width of Groove Q	Max. Depth of Groove P
FG2-ST8-40K40	958.601	uncoated K40/AL *	2	3.5	12
FG3-ST8-40K40	958.602		3	5.5	
FG4-ST8-40K40	958.603		4	7.5	
FG5-ST8-40K40	958.604		5	9.5	
FG2-ST8-40K40C	958.611	coated P40C/ST, GG *	2	3.5	
FG3-ST8-40K40C	958.612		3	5.5	
FG4-ST8-40K40C	958.613		4	7.5	
FG5-ST8-40K40C	958.614		5	9.5	

* Application
AL = Aluminium
ST = Steel
GG = Cast iron

Series 318 with Bridge and Extension Slides, Ø 620 - 3000

The boring range from Ø 620 – 3 000 mm is covered with only five aluminium bridges and five pairs of extension slides. All other components such as boring head, clamp bases and insert holders are the same as for the existing light weight boring tool system Ø 200 – 620 mm.



ØD	L	A	B	C	D
620 - 830	180	150	100	450	292.5
830 - 1110	180	150	100	660	397.5
1110 - 1530	180	150	100	940	537.5
1530 - 2020	200	170	120	1360	642.5
2020 - 2510	210	190	130	1850	642.5
2510 - 3000	210	190	130	1850	1167.5

For Spare Parts ▶ 435

Rough and Fine Boring Component Selection

The table below refers to the drawings on page 374. It determines the components such as bridge (1), extension slide (2) and coolant supply (3) for each diameter range (ØD) and shows in which position (1 or 2) the roughing or finishing tools have to be mounted.

In addition, this table also serves to determine the scale values for the coarse diameter setting of the cutting edges for finishing, and to adjust the slide on the counter weight for precise balancing of finish tools. The required scale values are calculated by the difference between bore diameter and correction value (α). See example below.

		①		② *	Position		α			③ *
ØD	Model	Order No.	Model	Order No.	Pos. 1/ØD	Pos. 2/ØD	Pos. 1	Pos. 2	Model	Order No.
620 - 690					619 - 656	654 - 691	620	655		
690 - 760	BR620-830AL	**318.421**	SL620-830AL	**318.431**	689 - 726	724 - 761	690	725	CS620-1110	**318.441**
760 - 830					759 - 796	794 - 831	760	795		
830 - 900					829 - 866	864 - 901	830	865		
900 - 970	BR830-1110	**318.422**	SL830-1110	**318.432**	899 - 936	934 - 971	900	935	CS620-1110	**318.441**
900 - 1040					969 - 1006	1004 - 1041	970	1005		
1040 - 1110					1039 - 1076	1074 - 1111	1040	1075		
1110 - 1180					1109 - 1146	1144 - 1181	1110	1145		
1180 - 1250					1179 - 1216	1214 - 1251	1180	1215		
1250 - 1320					1249 - 1286	1284 - 1321	1250	1285		
1320 - 1390	BR1110-1530	**318.423**	SL1110-1530	**318.433**	1319 - 1356	1354 - 1391	1320	1355	CS1110-1530	**318.442**
1390 - 1460					1389 - 1426	1424 - 1461	1390	1425		
1460 - 1530					1459 - 1496	1494 - 1531	1460	1495		
1530 - 1600					1529 - 1566	1564 - 1601	1530	1565		
1600 - 1670					1599 - 1636	1634 - 1671	1600	1635		
1670 - 1740					1669 - 1706	1704 - 1741	1670	1705		
1740 - 1810	BR1530-2020	**318.424**	SL1530-2510	**318.434**	1739 - 1776	1774 - 1811	1740	1775	CS1530-2510	**318.443**
1810 - 1880					1809 - 1846	1844 - 1881	1810	1845		
1880 - 1950					1879 - 1916	1914 - 1951	1880	1915		
1950 - 2020					1949 - 1986	1984 - 2021	1950	1985		
2020 - 2090					2019 - 2056	2054 - 2091	2020	2055		
2090 - 2160					2089 - 2126	2124 - 2161	2090	2125		
2160 - 2230					2159 - 2196	2194 - 2231	2160	2195		
2230 - 2300	BR2020-2510	**318.425**	SL1530-2510	**318.434**	2229 - 2266	2264 - 2301	2230	2265	CS1530-2510	**318.443**
2300 - 2370					2299 - 2336	2334 - 2371	2300	2335		
2370 - 2440					2369 - 2406	2404 - 2441	2370	2405		
2440 - 2510					2439 - 2476	2474 - 2511	2440	2475		
2510 - 2580					2509 - 2546	2544 - 2581	2510	2545		
2580 - 2650					2579 - 2616	2614 - 2651	2580	2615		
2650 - 2720					2649 - 2686	2684 - 2721	2650	2685		
2720 - 2790	BR2020-2510	**318.425**	SL2510-3000	**318.435**	2719 - 2756	2754 - 2791	2720	2755	CS2510-3000	**318.444**
2790 - 2860					2789 - 2826	2824 - 2861	2790	2825		
2860 - 2930					2859 - 2896	2894 - 2931	2860	2895		
2930 - 3000					2929 - 2966	2964 - 3001	2930	2965		

1. *Single pieces.

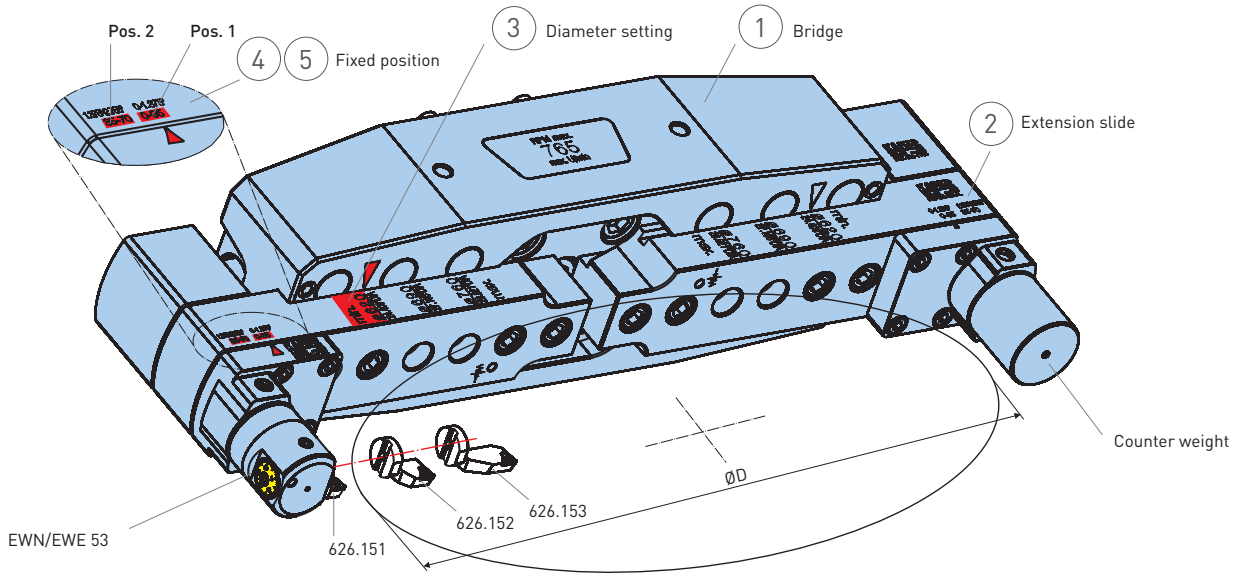
For Spare Parts ▶ 435

Example: Diameter setting according to scale

ØD:	1170 H7
Bridge:	318.423
Extension slide:	318.433
Position:	2
Counter weight:	318.105
Coolant supply:	318.442
Correction value α:	1145
Scale:	ØD - α = 1170 - 1145 = 25

OD Turning Holders, Ø 469 - 2856

Attention: Counter-clockwise rotation of spindle!

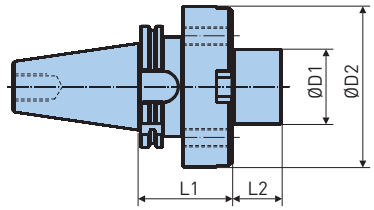


①	②		③	④ Pos. 1			⑤ Pos. 2		
Bridge	Extension Slide		Dia. Setting	Range with Insert Holder Order No:			Range with Insert Holder Order No:		
Order No.	Order No.	ØD		626.153 ØD	626.152 ØD	626.151 ØD	626.153 ØD	626.152 ØD	626.151 ØD
318.421	318.431	469 - 546	620	469 - 486	482 - 499	494 - 511	504 - 521	517 - 534	529 - 546
		539 - 616	690	539 - 556	552 - 569	564 - 581	574 - 591	587 - 604	599 - 616
		609 - 686	760	609 - 626	622 - 639	634 - 651	644 - 661	657 - 674	669 - 686
318.422	318.432	679 - 756	830	679 - 696	692 - 709	704 - 721	714 - 731	727 - 744	739 - 756
		749 - 826	900	749 - 766	762 - 779	774 - 791	784 - 801	797 - 814	809 - 826
		819 - 896	970	819 - 836	832 - 849	844 - 861	854 - 871	867 - 884	879 - 896
		889 - 966	1040	889 - 906	902 - 919	914 - 931	924 - 941	937 - 954	949 - 966
318.423	318.433	959 - 1036	1110	959 - 976	972 - 989	984 - 1001	994 - 1011	1007 - 1024	1019 - 1036
		1029 - 1106	1180	1029 - 1046	1042 - 1059	1054 - 1071	1064 - 1081	1077 - 1094	1089 - 1106
		1099 - 1176	1250	1099 - 1116	1112 - 1129	1124 - 1141	1134 - 1151	1147 - 1164	1159 - 1176
		1169 - 1246	1320	1169 - 1186	1182 - 1199	1194 - 1211	1204 - 1221	1217 - 1234	1229 - 1246
		1239 - 1316	1390	1239 - 1256	1252 - 1269	1264 - 1281	1274 - 1291	1287 - 1304	1299 - 1316
		1309 - 1386	1460	1309 - 1326	1322 - 1339	1334 - 1351	1344 - 1361	1357 - 1374	1369 - 1386
318.424	318.434	1379 - 1456	1530	1379 - 1396	1392 - 1409	1404 - 1421	1414 - 1431	1427 - 1444	1439 - 1456
		1449 - 1526	1600	1449 - 1466	1462 - 1479	1474 - 1491	1484 - 1501	1497 - 1514	1509 - 1526
		1519 - 1596	1670	1519 - 1536	1532 - 1549	1544 - 1561	1554 - 1571	1567 - 1584	1579 - 1596
		1589 - 1666	1740	1589 - 1606	1602 - 1619	1614 - 1631	1624 - 1641	1637 - 1654	1649 - 1666
		1659 - 1736	1810	1659 - 1676	1672 - 1689	1684 - 1701	1694 - 1711	1707 - 1724	1719 - 1736
		1729 - 1806	1880	1729 - 1746	1742 - 1759	1754 - 1771	1764 - 1781	1777 - 1794	1789 - 1806
		1799 - 1876	1950	1799 - 1816	1812 - 1829	1824 - 1841	1834 - 1851	1847 - 1864	1859 - 1876
318.425		1869 - 1946	2020	1869 - 1886	1882 - 1899	1894 - 1911	1904 - 1921	1917 - 1934	1929 - 1946
		1939 - 2016	2090	1939 - 1956	1952 - 1969	1964 - 1981	1974 - 1991	1987 - 2004	1999 - 2016
		2009 - 2086	2160	2009 - 2026	2022 - 2039	2034 - 2051	2044 - 2061	2057 - 2074	2069 - 2086
		2079 - 2156	2230	2079 - 2096	2092 - 2109	2104 - 2121	2114 - 2131	2127 - 2144	2139 - 2156
		2149 - 2226	2300	2149 - 2166	2162 - 2179	2174 - 2191	2184 - 2201	2197 - 2214	2209 - 2226
		2219 - 2296	2370	2219 - 2236	2232 - 2249	2244 - 2261	2254 - 2271	2267 - 2284	2279 - 2296
		2289 - 2366	2440	2289 - 2306	2302 - 2319	2314 - 2331	2324 - 2341	2337 - 2354	2349 - 2366
318.425	318.435	2359 - 2436	2510	2359 - 2376	2372 - 2389	2384 - 2401	2394 - 2411	2407 - 2424	2419 - 2436
		2429 - 2506	2580	2429 - 2446	2442 - 2459	2454 - 2471	2464 - 2481	2477 - 2494	2489 - 2506
		2499 - 2576	2650	2499 - 2516	2512 - 2529	2524 - 2541	2534 - 2551	2547 - 2564	2559 - 2576
		2569 - 2646	2720	2569 - 2586	2582 - 2599	2594 - 2611	2604 - 2621	2617 - 2634	2629 - 2646
		2639 - 2716	2790	2639 - 2656	2652 - 2669	2664 - 2681	2674 - 2691	2687 - 2704	2699 - 2716
		2709 - 2786	2860	2709 - 2726	2722 - 2739	2734 - 2751	2744 - 2761	2757 - 2774	2769 - 2786
		2779 - 2856	2930	2779 - 2796	2792 - 2809	2804 - 2821	2814 - 2831	2827 - 2844	2836 - 2856

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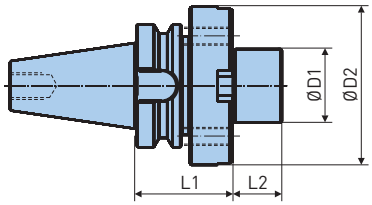
Shanks and Tool Holders for Bridge Tool Series 318, Ø 620 - 3 000

BDV, DIN 69871 AD



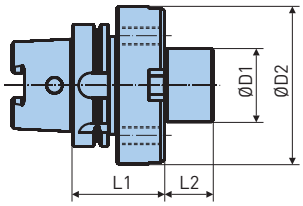
Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
BDV50-F60-75	328.215	DV50	60	129	75	40

BBT50, MAS 403/BT



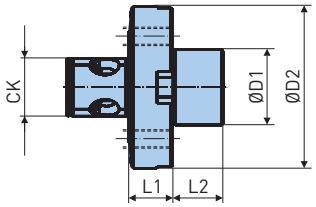
Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
BBT50-F60-85	328.213	BT50	60	129	85	40

HSK-A100, DIN 69893A



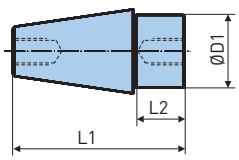
Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
HSK-A100-F60-75	328.214	HSK-A100	60	129	75	40

BIG KAISER CKN



Model	Order No.	CK	ØD1	ØD2	L1	L2
CKN7-F60	328.217N	CKN7	60	129	35	40

Centering Shank ISO 50



Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
DV50-F60	328.216	ISO 50, M24	60	-	140	40

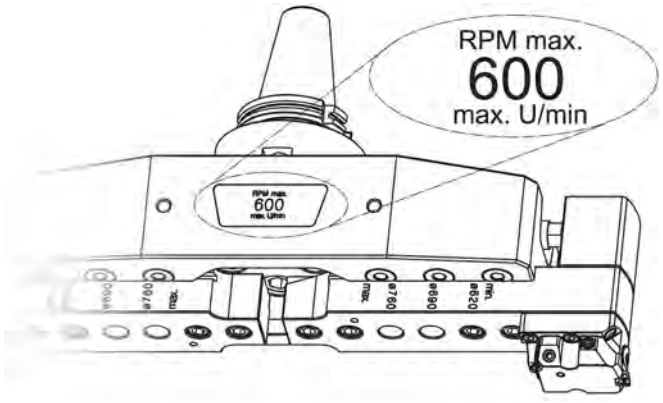
Adapter rings and spacers available on request.

B.4

For Spare Parts ▸ 420

Safety Instructions

The max. speed allowed for series 318 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].



ØD	Max. Speed [min -1]	Bridge Aluminium
619 - 831	600	318.421
829 - 1 111	450	318.422
1 109 - 1 531	350	318.423
1 529 - 2 021	250	318.424
2 019 - 2 511	190	318.425
2 509 - 3 001	150	318.425

Application Notes

1. Roughing
Ø 620 – 1 110 mm
Up to Ø 830 mm the bridge tool can be connected to the machine spindle over a tool shank, but only on a machine with good spindle taper, good spindle bearings and with the nominal retraction force available. For the range between Ø 830 – 1 110 mm, roughing is possible with the bridge bolted on to the machine spindle. If vibration occurs use just one cutting edge.

Ø > 1 110 mm
Roughing is not recommended

2. Finishing
Ø 620 – 1 110 mm
Finishing is possible with the bridge tool connected to the machine spindle over a tool shank, providing that the machine spindle is in good condition.

Ø > 1 110 mm
The bridge tool must be bolted on to the machine spindle, either directly or if required over a special flange.

Connecting the Bridge to the Machine Spindle

The bridge tool can be connected to the machine spindle over a tool shank (Fig. 1) or it can be bolted on to the spindle face (Fig. 2). A combination of both variants is also possible. A bolted connection is recommended for bore sizes Ø 1 110 mm and bigger.

Fig. 1

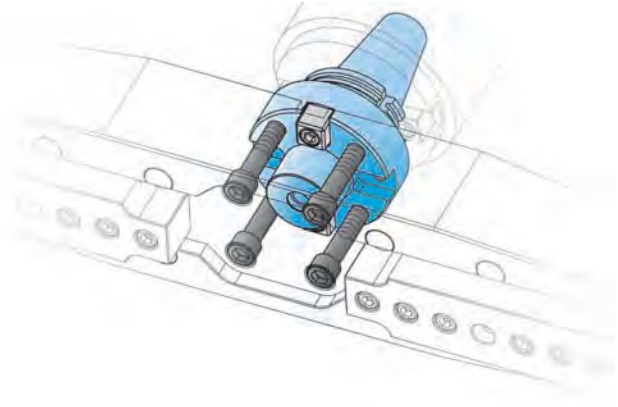
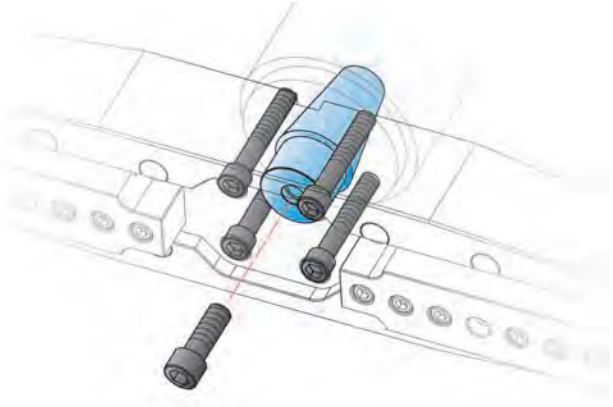
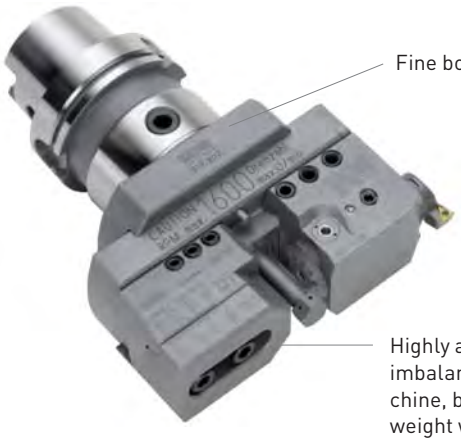


Fig. 2



Series 317, Ø 200 - 620

The modular components such as flange, extension slide, tool holder and boring head, can easily be assembled to single cutter-, rough cutter- and OD turning tools.



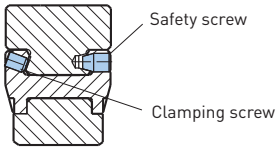
Fine boring tool for finishing

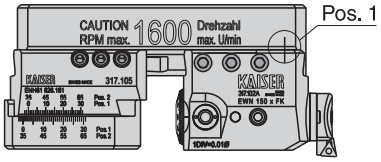
Highly accurate correction of the imbalance without a balancing machine, by means of a compensation weight with slide and scale

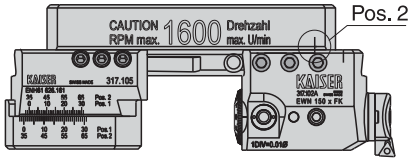


Twin cutter boring tool for roughing

With the introduction of the safety screws on roughing and finishing components as well as on the compensation weight, and with the corresponding bores in the extension slides, these components can be mounted in two fixed positions (Pos. 1 and Pos. 2) on the extension slide.







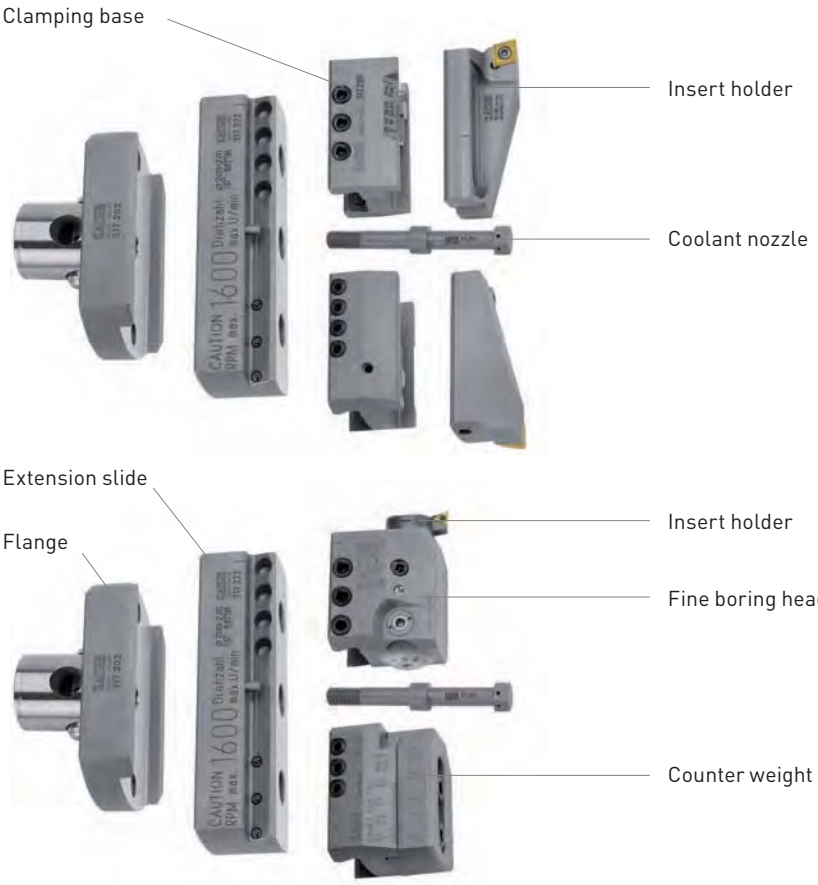
Compatibility

New components with safety screws can be mounted on existing extension slides without any restrictions whereas the safety screws have to be removed. Existing components without safety screws can as well be mounted without any restrictions on the new extension slides.

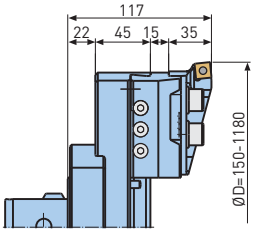
Modification

On request, safety screw modifications can be made to existing precision boring heads and extension slides to prevent tool breakage from accidentally high spindle speeds.

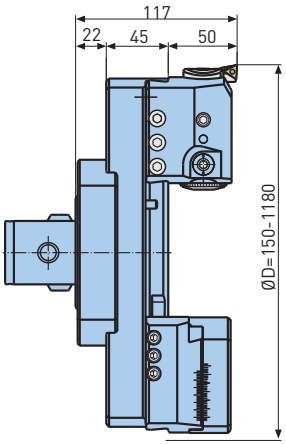
Series 317, Ø 200 - 620



Rough boring tool

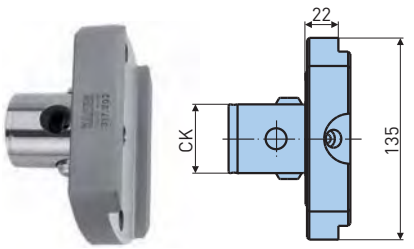


Fine boring tool



Flanges

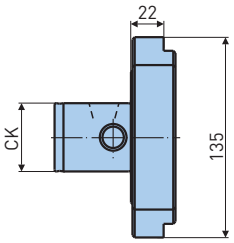
Preferred execution



Model	Order No.
CKB7/Ø46	317.202

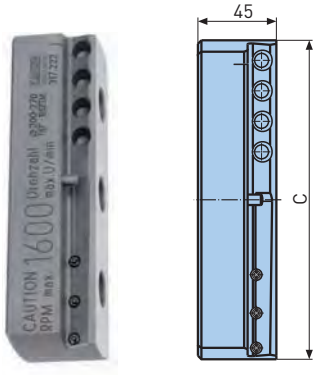
Additional executions

Flange with cutter position 90° twisted.



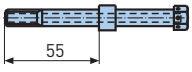
Model	Order No.
CKB7/Ø46	317.206

(1) Extension Slide Steel



Ø 150 - 620

C	Order No.	ØD [1]
183	317.222	200 - 270
253	317.223	270 - 340
323	317.224	340 - 410
393	317.225	410 - 480
463	317.226	480 - 550
533	317.227	550 - 620

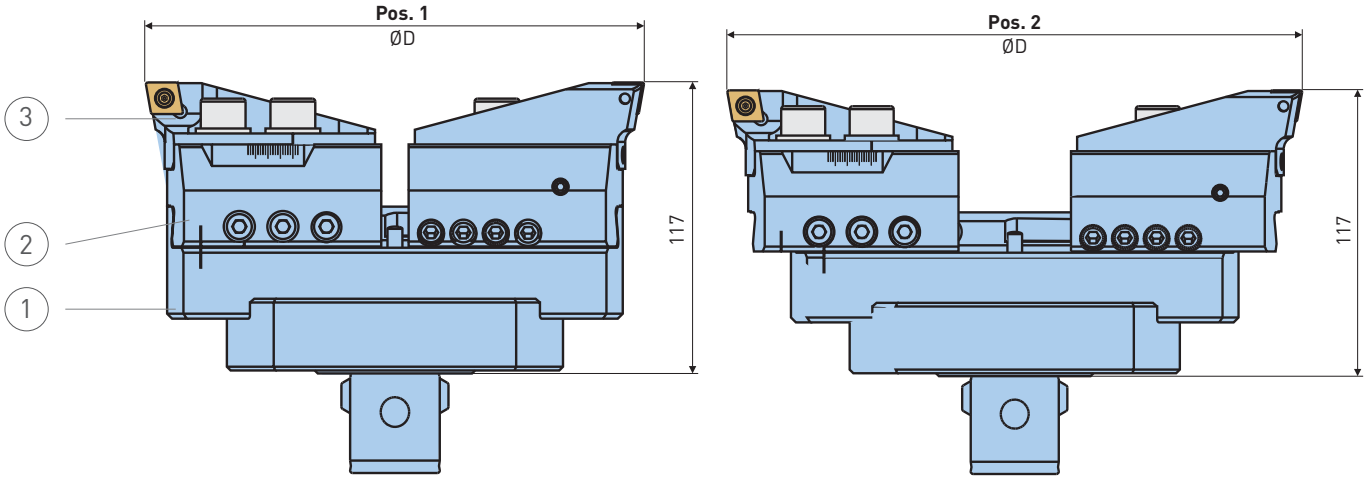
Coolant Nozzle	Order No.
	317.205

For Spare Parts ▸ 436 - 437

[1] The diameter ranges D are valid for the tool program for roughing. With the tool program for finishing, the work ranges starting from Ø 200 mm will become bigger; with insert holder type 2, order No. 626.162 by 26 mm and with insert holder type 3, order No. 626.163 by 50 mm. The minimum diameter of the respective work range will be reached with insert holder type 1, order No. 626.161.

Rough Boring Component Selection

The table below determines the components such as extension slide (1), clamping bases (2) and insert holders (3) for each diameter range and shows in which position the clamping bases have to be mounted on the extension slide. Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale on the clamping bases (2). The required scale value can be found under consideration of the correction value α on the table. See example below.



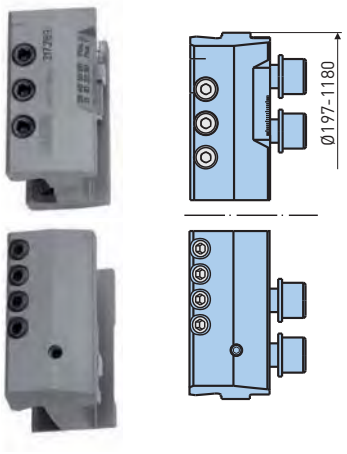
ØD	Extension Slide ①	Fixed Position/Range		Correction α
		Pos. 1/ØD	Pos. 2/ØD	
200 - 270	317.222	197 - 235	232 - 270	200
270 - 340	317.223	267 - 305	302 - 340	270
340 - 410	317.224	337 - 375	372 - 410	340
410 - 480	317.225	407 - 445	442 - 480	410
480 - 550	317.226	477 - 515	512 - 550	480
550 - 620	317.227	547 - 585	582 - 620	550

For Spare Parts ▶ 436 / 437

Example: Diameter setting according to scale

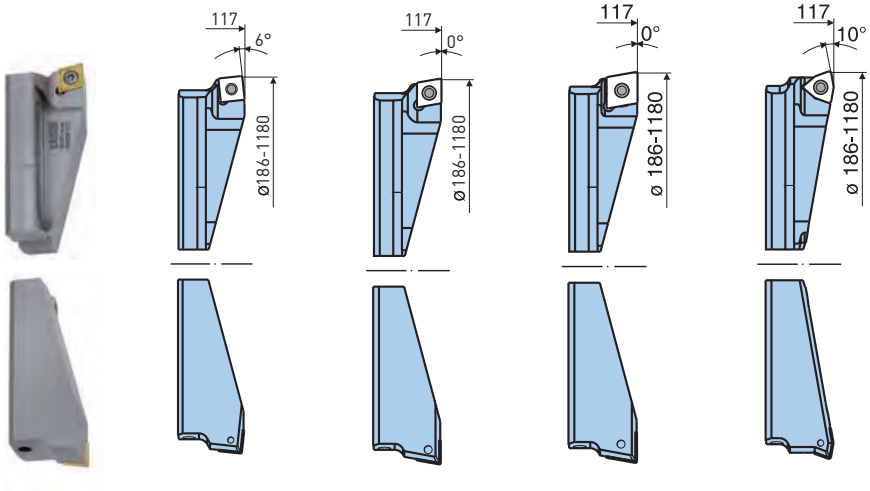
ØD:	430
Extension slide:	317.225
Position:	1
Clamping base:	317.289
Insert holder:	Ø 200 - 620
Correction value α:	410
Scale:	ØD - α = 430 - 410 = 20

② Clamping Bases, Ø 200 - 620



Order No.
317.289

③ Insert Holders, Ø 200 - 620



Order No.	637.814	637.830	637.834	637.846
Type	SC12	CC12	CC16	WC08

For Insert ▶ 395 - 405

Double offset roughing

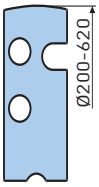
In diameter and height offset cutters allow the removal of twice the stock and with half the feed rate compared with symmetrical roughing.

The cutting edge adjusted to half the stock has to be set in front by means of the spacer.

Spacers

For double offset roughing

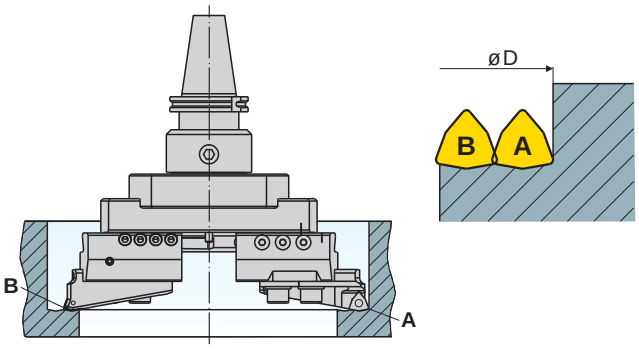
Spacer 0.5 mm	Order No.
Ø 200 - 620	317.287



Full Profile Roughing (VPS)

Adjustment instructions

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table below.



Machining Allowance [mm Ø]	Cutting Edge A [mm Ø]	Cutting Edge B [mm Ø]
24 - 29.9	ØD	D - 2
30 - 35.9		D - 6
36 - 41.9		D - 12
42 - 47.9		D - 18
48 - 53.9		D - 24
54 - 60		D - 30

Example for adjustment

Given: Boring diameter 580 mm Machining allowance 46 mm Ø
Result: Cutting edge A: Ø 580 mm
Cutting edge B: Ø 580 - 18 = Ø 562 mm

Cutting data-guide values

Cutting speed: Vc = 80-180 m/min
Feed: f = 0.1-0.2 mm/rev

Safety Instructions

The max. speed allowed for series 317 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].

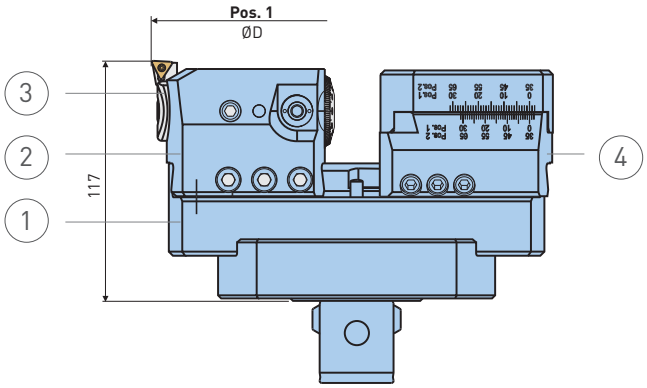
Extension slide

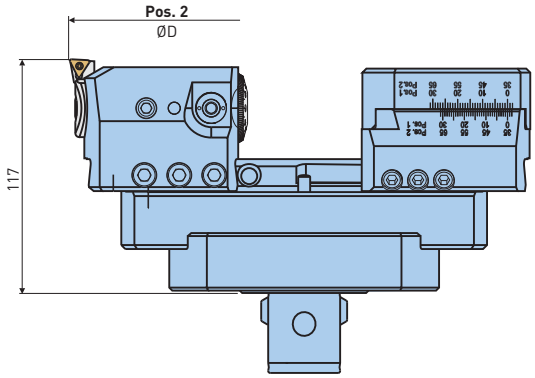


ØD	Max. Speed [min -1]	Extension Slide Steel	Extension Slide Aluminium
200 - 270	1 600	317.222	317.252 *
270 - 340	1 200	317.223	317.253 *
340 - 410	900	317.224	317.254 *
410 - 480	750	317.225	317.255 *
480 - 550	650	317.226	317.256 *
550 - 620	600	317.227	317.257 *

Fine Boring Component Selection

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and compensation weight (4) for each diameter range and shows in which position the boring head and the compensation weight have to be mounted on the extension slide.





Range ØD	Extension Slide ①	Fixed Position/Range Pos. 1/ØD	Pos. 2/ØD	Insert Holder ③	Correction α
200 - 270	317.222	198 - 228	233 - 263	626.161	200
		224 - 254	259 - 289	626.161	
270 - 340	317.223	268 - 298	303 - 333	626.161	270
		294 - 324	329 - 359	626.162	
340 - 410	317.224	338 - 368	373 - 403	626.161	340
		364 - 394	399 - 429	626.162	
410 - 480	317.225	408 - 438	443 - 473	626.161	410
		434 - 464	469 - 499	626.162	
480 - 550	317.226	478 - 508	513 - 543	626.161	480
		504 - 534	539 - 569	626.162	
550 - 620	317.227	548 - 578	583 - 613	626.161	550
		574 - 604	609 - 639	626.162	

Example: Balancing

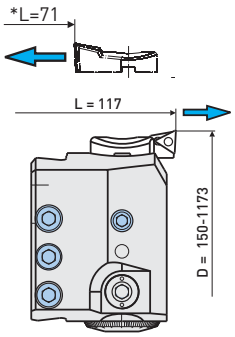
Balancing of the tool combination takes place by adjusting the slide (5) on the compensation weight according to the scale. The correction value α is shown on the table.

ØD:	335 H7
Extension slide:	317.223
Position:	2
Insert holder:	626.162
Counter weight:	317.105
Correction value α:	270
Scale:	ØD - α = 335 - 270 = 65

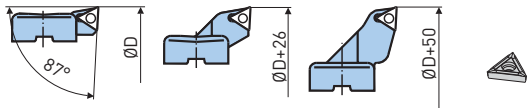
② Boring Head

Order No.
317.102A

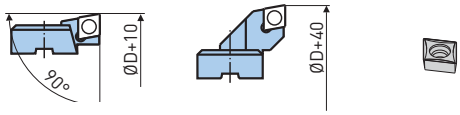




③ Insert Holders



Order No.	626.161	626.162	626.163	TC 11



Order No.	626.362	626.363	CC 09

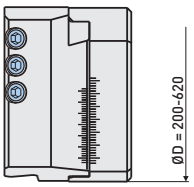
For Insert ▶ 390 - 394
For Spare Parts ▶ 436

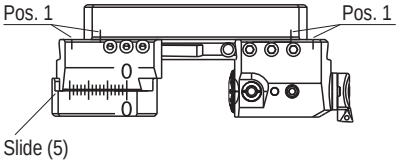
④ Counter Weight

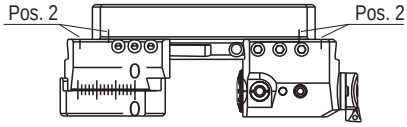
By fixing the compensation weight in the same position (pos. 1 or pos. 2) as the boring head and with the slide on the compensation weight in zero position, a large amount of the imbalance will be compensated. Fine balancing which also compensates the position of the cutting edge as well as the size of the insert holder is possible by adjusting the slide to the corresponding scale value according to the balancing table.

Order No.
317.105









Indexable Inserts and Cutters

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B.5

This catalogue contains a wide range of indexable inserts specially selected for boring with single-cutter or rough boring tools which have been tested under the most diverse working conditions.

For individual tool combinations comprehensive cutting data tables with detailed information about selection of insert, cutting speed, feed, stock allowance, ect. for different cutting methods are available on request.

Cutting materials

ISO main groups	Work piece materials	ISO application groups				
P	Carbon steels Cast steel	**P10**	**P20**	**P30**	**P40**	**P50**
M	Stainless steels	**M10**	**M20**	**M30**	**M40**	
K	Cast iron	**K10**	**K20**	**K30**		
N	Aluminium Non-ferrous metals Synthetic materials	**N10**				
S	Titanium NiCo Alloys High temperature alloys	**S10**	**S20**			

Increasing fracture strength / Toughness

Increasing abrasion resistance

Features

Uncoated carbide
Uncoated hard metal cutting materials are based on tungsten carbide with the addition of titanium carbide, tantalum carbide and cobalt as binding agents. Depending on the allotted ISO group, they are suitable for rough machining and finishing of metallic and non-metallic materials.

Coated carbide C
Coated hard metal is characterised by its high resistance to wear, its low friction coefficient and minimal built-up edge formation. The multiple coating is a good precondition for cost-effective production machining of all commonly available materials.

Cermet CT
Cermet cutting materials consist of titanium carbide and titanium nitride. They are characterised by high thermal and abrasion resistance and are suitable for finish machining and light rough-machining of steel, cast iron and light metal at high cutting speeds.

Silicon nitride SN
Ceramic cutting edges are extremely temperature-stable, highly impact-resistant and accommodate the highest cutting speeds when machining cast iron in continuous as well as in interrupted cutting.

Polycrystalline cubic boron nitride CBN
CBN cutting materials feature an extremely high wear and heat resistance. Depending on the design, CBN cutting edges are suitable for boring hardened steel, up to 70 HRC, hard cast steel, cast iron and hard nickel alloys.

Polycrystalline diamond PCD
PCD cutting edges are extremely hard and abrasion-resistant. They permit high speed finish machining of non-ferrous materials and composites.

Symbols

	= less suitable
+	= suitable
++	= first choice

ISO Code for inserts for boring and turning

T	C	G	T	11	02	04	F	N
1	2	3	4	5	6	7	8	9

1 Insert Shape

C



S



T

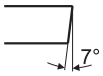


W



2 Clearance angle

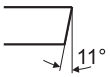
C



D



P



3 Tolerance class

Class	IC	m	s
C	± 0.025	± 0.013	± 0.025
G	± 0.025	± 0.025	± 0.13
M	± 0.05 - 0.1 1)	± 0.08 - 0.20 1)	± 0.13

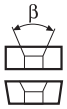
1) Dependent upon insert size

4 Chip breaker/Mounting criteria

A



W



β = 40°-60°

T



β = 40°-60°

X = Special execution

5 Insert size

Size	02	03	04	05	06	07	08	09	10	11	12	16
L [mm]	2	3	4	5	6		8		10			
IC [mm]	3.97	5.56	6.35	7.94	9.52		12.7		15.88			
L [mm]						7				11		
IC [mm]						4.2				6.35		
L [mm]					6.35			9.52			12.7	16
IC [mm]					6.35			9.52			12.7	15.88
L [mm]					6.35		8	9.52			12.7	
IC [mm]					6.35		8.0	9.52			12.7	

6 Insert thickness



01	s = 1.59
02	s = 2.38 (2.5*)
03	s = 3.18 (3.0*)
T3	s = 3.97
04	s = 4.76
05	s = 5.56

*) Special size

7 Corner radius



01	R = 0.1
02	R = 0.2
03	R = 0.3
04	R = 0.4
06	R = 0.6
08	R = 0.8
12	R = 1.2

8 Cutting edge

F



E



T



S

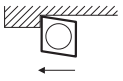


(W)

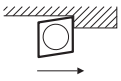
Wiper geometry, see page 392

9 Cutting direction

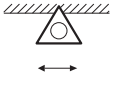
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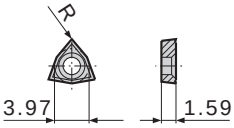
L



N



Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



WCGT 0201

Circumference ground, chip-breakers pressed & polished

	WCGT0201	**655.600**	02	FN	15°	P10CT		+	+			+				+				

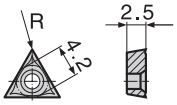
Circumference and chip-breakers ground

	WCGT 0201	**655.604**	01	FL	23°	K10CT							++				++	+		
	WCGT 0201	**655.601**	02	FL	23°	K10CT							++			++		+		
	WCGT 0201	**655.605**	01	FL	23°	K10	C (TiAlN)	+	+	+	++	++	+	+	+		++			
	WCGT 0201	**655.603**	02	FL	23°	K10	C (TiAlN)	+	+	+	++	++	+	+	+	++	+	+		
	WCGT 0201	**655.606**	01	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	+	+	+	++			
	WCGT 0201	**655.602**	02	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	++	+	+		

 Torx Plus T6 IP M2x3.6 **694.101**

 Torx Plus T6 IP **694.188**

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



TPGT 0702

Circumference ground, chip-breakers pressed & polished

	TPGT 0702	**651.802**	02	FN	15°	P10CT		++	++			+				++				
	TPGT 0702	**651.702**	04	FN	15°	P10CT		++	++			+				++				
	TPGT 0702	**651.835**	02	FL	18°	P10CT		++	++			+	+				++			
	TPGT 0702	**651.824**	01	FL	25°	K10	C (TiAlN)	+	+	+	+	+	+		+		++			
	TPGT 0702	**651.735**	03	FL	25°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+		
	TPGT 0702	**651.823**	01	FL	25°	K10							++				++			
	TPGT 0702	**651.723**	03	FL	25°	K10							++			++		++	+	

TPMT 0702

Chip-breakers pressed

	TPMT 0702	**651.713**	04	FN	15°	P10CT	C (AlCrN)	++	++	+	+	+	+			++		+		
	TPMT 0702	**651.813**	02	FN	15°	P10CT	C (AlCrN)	++	++	+	+	+	+			++		+		

TPGT 0702

Circumference and chip-breakers ground

	TPGT 0702	**651.833**	02	FL	15°	P10	C (TiAlN)	+	+	+	+	+		+	+	+	++	+		
	TPGT 0702	**651.838**	02	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		+	++			
	TPGT 0702	**651.738**	03	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		++		+		
	TPGT 0702	**651.839**	02	FL	15°	S10	C (TiAlN)			+					++	++	+	++	+	
	TPGT 0702	**651.736**	03	FL	18°	P10CT		++	++			+	+			++				
	TPGT 0702	**651.834**	02	FL	20°	P10	C (TiAlN)	+	+	+	+	+		++	+	+	++	+		
	TPGT 0702	**651.734**	04	FL	20°	P10	C (TiAlN)	++	++	+	++	++		++	+	++		+		
	TPGT 0702	**651.837**	02	FL	25°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	+	++			
	TPGT 0702	**651.737**	03	FL	25°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	++		+		
	TPGT 0702	**651.825**	02	FL	25°	K10							++			++	++			++
	TPGT 0702	**651.725**	04	FL	25°	K10							++			++				++

TPGW 0702

Circumference ground without chip-breakers

	TPGW 0702	**651.632**	03	FN	5°	K10	C (TiAlN)	+	+	+	++	+		++		++			+	
	TPGW 0702	**651.623**	03	FN	5°	K10					+			+					+	

Torx Plus T6 IP M2x4.8 **694.103**
Torx Plus T6 IP M2x4.1 **694.102** [1]

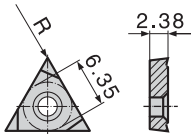


Torx Plus T6 IP **694.188**

γ Rake angle with insert on tool.
Clamping screw (10 screws and 1 wrench)
[1] For insert holders 615.205/615.207/615.507/615.508/615.271
Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



TCMT 1102

Chip-breakers pressed & polished

	TCMT 1102	**655.322**	04	FN	15°	P10CT		++	++			+				++		+		
	TCMT 1102	**655.332 ***	08	FN	15°	P10CT		++	++			+				++		+		
	TCMT 1102	**655.322A**	04	FN	15°	P10CT		++	++			+				++		+		
	TCMT 1102	**655.324**	04	FN	15°	P10CT	C (TiAlN)	++	++	+	+	+	+			++		+		
	TCMT 1102	**655.334**	08	FN	15°	P10CT	C (TiAlN)	++	++	+	+	+	+			++		+		
	TCMT 1102	**655.316**	02	FN	15°	S10	C (TiAlN)			+	+				++	++	+	++	+	
	TCMT 1102	**655.326**	04	FN	15°	S10	C (TiAlN)			+	+				++	++	+	++	+	
	TCMT 1102	**655.311A**	02	FN	15°	P20	C (Al_2O_3-TiCN)	+	+							+	+	+		
	TCMT 1102	**655.321A**	04	FN	15°	P20	C (Al_2O_3-TiCN)	+	+							+		++	+	
	TCMT 1102	**655.331A**	08	FN	15°	P20	C (Al_2O_3-TiCN)	+	+							++		++	+	
	TCMT 1102	**655.354**	04	FN	20°	M30C	C (TiAlN+ Al_2O_3)	++	++	++	+	+			++	++	++	++	++	
	TCMT 1102	**655.364**	08	FN	20°	M30C	C (TiAlN+ Al_2O_3)	++	++	++	+	+			++	++	+	++	++	

TCGT 1102

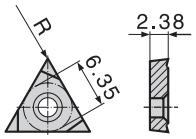
Circumference ground with chip-breakers pressed

	TCGT 1102	**655.301B**	02	FN	12°	K10	C (TiCN-Al_2O_3)	+	+	+	+	+		++		+	+	+		
	TCGT 1102	**655.302B**	04	FN	12°	K10	C (TiCN-Al_2O_3)	++	++	++	+	+		++		+		+	+	
	TCGT 1102	**655.303B**	08	FN	12°	K10	C (TiCN-Al_2O_3)	++	++	++	+	+		++		+		+	++	

TCGW 1102

Circumference ground without chip-breakers

	TCGW 1102	**655.301A**	02	FN	0°	K10	C (TiCN-Al_2O_3-TiN)				++	++				++	+	+		
	TCGW 1102	**655.302A**	04	FN	0°	K10	C (TiCN-Al_2O_3-TiN)	+	+	+	++	++				++		+	+	
	TCGW 1102	**655.303A**	08	FN	0°	K10	C (TiCN-Al_2O_3-TiN)	+	+	+	++	++				++		+	++	
	TCGW 1102	**655.305**	04	FN	0°	K10					+								++	
	TCGW 1102	**655.306**	08	FN	0°	K10					+								++	



TCGT 1102

Circumference ground, chip-breakers pressed

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC
	TCGT 1102	655.313	02	FN	15°	P10CT		++	++								++			
	TCGT 1102	655.314	08	FN	15°	M30	C(TiCN- Al2O-3TiN)	+	+	++	+	+		+		++		++	++	

TCGT 1102

Circumference ground, chip-breakers pressed & polished

	TCGT 1102	**655.369**	01	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	+	++			
	TCGT 1102	**655.379**	02	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	+	++			
	TCGT 1102	**655.389**	04	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	++	+	+		
	TCGT 1102	**655.399**	08	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	++		++	+	
	TCGT 1102	**655.363**	01	FL	23°	K10	C (TiAlN)	+	+	+	+	+	+				++			
	TCGT 1102	**655.373**	02	FL	23°	K10	C (TiAlN)	+	+	+	+	+	+				+			
	TCGT 1102	**655.383**	04	FL	23°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+		
	TCGT 1102	**655.393**	08	FL	23°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+		
	TCGT 1102	**655.378**	02	FL	23°	K10							++			+	++			
	TCGT 1102	**655.388**	04	FL	23°	K10							++			++	+	+		
	TCGT 1102	**655.398**	08	FL	23°	K10							++			++		+		
	TCGT 1102	**655.371**	02	FL	15°	P10	C (TiAlN)	+	+		+	+		+			++			
	TCGT 1102	**655.381**	04	FL	18°	P10	C (TiAlN)	+	+	+	+	+	+	+	+			+		

TCGT 1102

Circumference and chip-breakers ground

	TCGT 1102	**655.370**	02	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++		+	++	++	+	
	TCGT 1102	**655.380**	04	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++		++		++	++	
	TCGT 1102	**655.390**	08	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++		++		++	++	
	TCGT 1102	**655.372**	02	FN	20°	P10CT		+	+								++			
	TCGT 1102	**655.386**	04	FL	18°	P10CT		++	++			+	+			++				
	TCGT 1102	**655.375**	02	FL	15°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		+	++			
	TCGT 1102	**655.385**	04	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		++	+			
	TCGT 1102	**655.395**	08	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		++				
	TCGT 1102	**655.387**	04	FL	20°	K10							++			++	+			++
	TCGT 1102	**655.397**	08	FL	20°	K10							++			++				++
	TCGT 1102	**655.319**	02	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+	
	TCGT 1102	**655.327**	03	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+	
	TCGT 1102	**655.318**	04	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+	
	TCGT 1102	**655.328**	06	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+	
	TCGT 1102	**655.320**	08	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+	

Torx Plus T7 IP M2.5x6.5 **694.122**



Torx Plus T7 IP **694.189**

γ Rake angle with insert on tool.

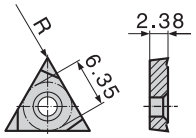
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

* as long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



Wiper TCGX 1102

Circumference and chip-breakers ground

	TCGX 1102	**655.317**	04	WL	20°	K10							++		++	++		+	+	++
	TCGX 1102	**655.315**	04	WL	20°	P10CT	C (TiAlN-TiN)	++	++			+	+	+		++		+	+	++
	TCGX 1102	**655.310**	04	WL	20°	K10	C (AlCrN)	++	++	++	++	+	+	+	+	++		+	+	++

Wiper TCGX 1102

Circumference ground, chip-breakers pressed

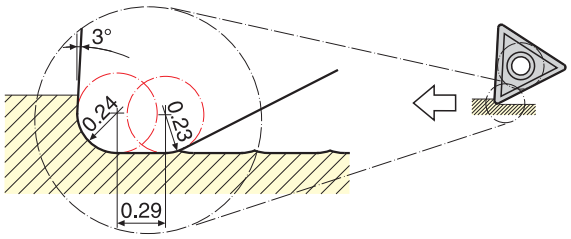
	TCGX 1102	**655.374**	04	WL	15°	K10	C (PVD Oxid)	++	++	+	+	+				++			++	
	TCGX 1102	**655.384**	04	WL	15°	P10CT		++	++			+	+			++				

B.5

Wiper geometry

Comparison with standard nose radius 0.4 mm

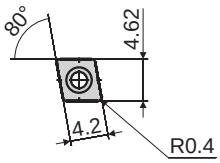
Wiper: Two times the feed rate → Same surface finish
Same feed rate → Two times better surface finish



 Torx Plus T7 IP M2.5x6.5 **694.122**

 Torx Plus T7 IP **694.189**

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



MW 0404

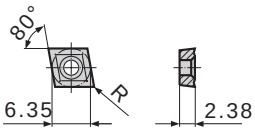
Chip-breakers pressed & polished

	MW 0404	**655.942**	04			P30	C (TiAlN-AlCrN)	+	++	++						++	+	+		
	MW 0404	**655.941**	04			K30	C (TiAlN-AlCrN)				++	++				++	+	+		
	MW 0404	**655.940**	04			N15	C (DLC)						++			++	+	+		

Torx Plus T6 M1.6x4.2 **694.105**



Torx Plus T6 **694.181**



CCMT 0602

Chip-breakers pressed & polished

	CCMT 0602	**654.840A**	02	FN	15°	P30	C (Al_2O_3-TiN)	+	+	+	+	+			+		+			
	CCMT 0602	**654.858**	04	FN	15°	K20					+	+							+	
	CCMT 0602	**654.851A**	04	FN	15°	P30	C (TiAlN)	++	++	+	+	+		+	+	++		+		
	CCMT 0602	**654.853**	08	FN	15°	P30	C (TiAlN)	++	++	+	++	++		+	+	++	+	+	+	
	CCMT 0602	**654.852**	04	FN	15°	K20	C (Al_2O_3-TiN)	+	+	+	++	++		+	+	++		+		
	CCMT 0602	**654.846**	02	FN	15°	P35	C (Al_2O_3-TiN)	++	++	++	+	+		+	+	++		++	++	
	CCMT 0602	**654.856**	04	FN	15°	P35	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++		++	++	
	CCMT 0602	**654.850A**	04	FN	15°	P20	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++				

B.5

CCGT 0602

Circumference ground, chip-breakers pressed & polished

	CCGT 0602	**654.837**	02	FN	8°	S10	C (TiAlN)			++					++	++	++	+		
	CCGT 0602	**654.847**	04	FN	8°	S10	C (TiAlN)			++					++	++	+	+		

CCMT 0602

Chip-breakers ground

	CCMT 0602	**654.877**	02	FL	23°	K10							++			++	+	+		
	CCMT 0602	**654.888**	04	FL	23°	K10							++		+	++		+		
	CCMT 0602	**654.879**	02	FL	23°	N10	C (AlCrN)						++		+	++	+	+		
	CCMT 0602	**654.889**	04	FL	23°	N10	C (AlCrN)						++		+	++		+		

Torx Plus T7 IP M2.5x6.5 **694.122**

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

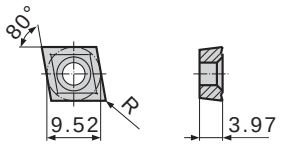
Inserts are sold in packages of 10 pieces.



Torx Plus T7 IP **694.189**

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



CCMT 09T3

Chip-breakers pressed & polished

	CCMT 09T3	**654.942**	04	FN	15°	K20	C (Al_2O_3-TiN)				++	++			+	++		+		
	CCMT 09T3	**654.952**	08	FN	15°	K20	C (Al_2O_3-TiN)				++	++			+	++		+		
	CCMT 09T3	**654.950**	08	FN	15°	P30	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++		++	+	
	CCMT 09T3	**654.935**	02	FN	15°	P35	C (Al_2O_3-TiN)	++	++	++	+	+		+	+	+	++	++	+	
	CCMT 09T3	**654.945**	04	FN	15°	P35	C (Al_2O_3-TiN)	++	++	++	+	+		+	+	++		++	++	
	CCMT 09T3	**654.955**	08	FN	15°	P35	C (Al_2O_3-TiN)	++	++	++	+	+		+	+	++		++	++	
	CCMT 09T3	**654.930A**	02	FN	15°	P30	C (Al_2O_3-TiN)	+	+	+	+	+					+			
	CCMT 09T3	**654.940A**	04	FN	15°	P20	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++		+		

CCGT 09T3

Circumference ground, chip-breakers pressed & polished

	CCGT 09T3	**654.937**	02	FN	8°	S10	C (TiAlN)			++					++	++	++	+		
	CCGT 09T3	**654.947**	04	FN	8°	S10	C (TiAlN)			++					++	++	+	+		
	CCGT 09T3	**654.957**	08	FN	8°	S10	C (TiAlN)			++					++	++		+		

CCMT 09T3

Chip-breakers ground

	CCMT 09T3	**654.977**	04	FL	23°	K10							++			++	+	+		
	CCMT 09T3	**654.987**	08	FL	23°	K10							++			++		+		
	CCMT 09T3	**654.949**	04	FL	23°	N10	C (AlCrN)						++		+	++	+	+		
	CCMT 09T3	**654.959**	08	FL	23°	N10	C (AlCrN)						++		+	++		+		

CCGW 09T3

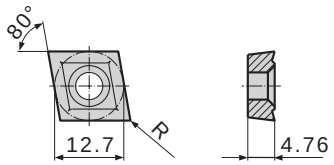
Circumference ground, without chip-breakers

	CCGW 09T3	**654.941**	04	TN	0°	SN					++	+				++		+		

 Torx Plus T15 IP M4x9.2 **694.141**

 Torx Plus T15 IP **694.193**

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



CCMT 1204

Chip-breakers pressed & polished

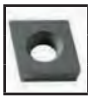
	CCMT 1204	**654.989**	04	FN	15°	K20	C (TiAlN)				++	++			+	++		+		
	CCMT 1204	**654.991**	08	FN	15°	K20	C (TiAlN)				++	++			+	++		+		
	CCMT 1204	**654.964**	04	FN	15°	P35	C (Al_2O_3-TiN)	++	++	++	+	+		+	+	++	++	++	++	
	CCMT 1204	**654.965**	08	FN	15°	P35	C (Al_2O_3-TiN)	++	++	++	+	+		+	+	++	++	++	++	
	CCMT 1204	**654.993A**	04	FN	15°	P30	C (Al_2O_3-TiN)	+	+	+	+	+					+			
	CCMT 1204	**654.988**	08	FN	15°	P30	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++		++	+	
	CCMT 1204	**654.990A**	08	FN	15°	P20	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++		+		
	CCMT 1204	**654.968**	04	FN	8°	S10	C (TiAlN)			++					++	++		+		
	CCMT 1204	**654.969**	08	FN	8°	S10	C (TiAlN)			++					++	++		+		

Chip-breakers ground

	CCMT 1204	**654.995**	04	FL	23°	K10							++			++	+	+		
	CCMT 1204	**654.992**	08	FL	23°	K10							++			++		+		
	CCMT 1204	**654.978**	04	FL	23°	N10	C (AlCrN)						++		++	++	+	+	+	
	CCMT 1204	**654.979**	08	FL	23°	N10	C (AlCrN)						++		++	++		+	+	

CCGW 1204

Circumference ground, without chip-breakers

	CCGW 1204	**654.980**	08	TN	0°	SN					++	+				++		+		

Torx Plus T20 IP M5x13.3 **694.150**



Torx Plus T20 IP **694.194**

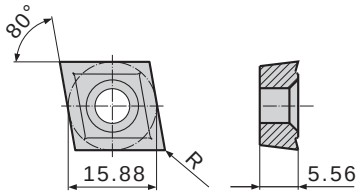
γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



CCMT 1605

Chip-breakers pressed & polished

	CCMT 1605	**654.997**	08	FN	15°	K10					+	+			+			+		
	CCMT 1605	**654.983**	08	FN	15°	K20	C (Al_2O_3-TiN)				++	++			+	++			+	
	CCMT 1605	**654.996**	08	FN	15°	P30	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++		++	+	
	CCMT 1605	**654.986**	08	FN	15°	P30	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	++		++	++	

Chip-breakers ground

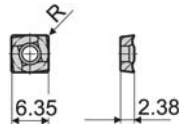
	CCMT 1605	**654.998**	08	FL	23°	K10							++		+	++			+	

 Torx Plus T20 IP M5x13.3 **694.150**

 Torx Plus T20 IP **694.194**

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

SPMT 0602



Chip-breakers pressed & polished

	SPMT 0602	**654.150**	04	FN	15°	P20	C (Al_2O_3-TiN)	++	++	++	+	+		+	+	+			+	
	SPMT 0602	**654.158 ***	04	FN	15°	K20					+								++	
	SPMT 0602	**654.152**	04	FN	15°	K20	C (Al_2O_3-TiN)				++	++		+	+	+			+	

Chip-breakers ground

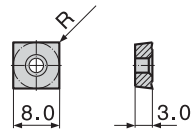
	SPMT 0602	**654.168**	04	FL	23°	K10							++		+	+			+	

Torx Plus T7 IP M2.5x6.5 **694.122**



Torx Plus T7 IP **694.189**

SPGW 0803



Circumference ground, without chip-breakers

	SPGW 0803	**654.128**	05	FN	0°	K20					++								+	

SPGT 0803

Circumference ground, without chip-breakers

	SPGT 0803	**654.183**	05	FL	5°	P20		++	++	++		+	++	+					+	

Torx Plus T7 IP M2.5x5.5 **694.121**



Torx Plus T7 IP **694.189**

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

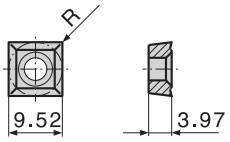
Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

SCMT 09T3



Chip-breakers pressed & polished

	SCMT 09T3	**654.259 ***	08	FN	15°	K30					+	+							+	
	SCMT 09T3	**654.240**	04	FN	15°	P20	C (Al_2O_3-TiN)	++	++	++	++	++		+		+	+	+		
	SCMT 09T3	**654.250**	08	FN	15°	P20	C (Al_2O_3-TiN)	++	++	++	++	++		+		+		+		
	SCMT 09T3	**654.251**	08	FN	15°	P30	C (Al_2O_3-TiN)	++	++	+	+	+		+		++		++	++	

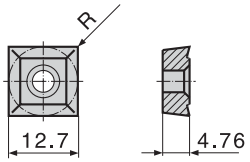
Chip-breakers ground

	SCMT 09T3	**654.277**	04	FL	23°	K10							++			+	+	+		
	SCMT 09T3	**654.287**	08	FL	23°	K10							++			+			+	

 Torx Plus T15 IP M4x9.2 **694.141**

 Torx Plus T15 IP **694.193**

Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



SCMT 1204

Chip-breakers pressed & polished

	SCMT 1204	**654.340**	04	FN	15°	P20	C (Al_2O_3-TiN)	+	+	+	+	+		+			+	+		
	SCMT 1204	**654.350**	08	FN	15°	P20	C (Al_2O_3-TiN)	++	++	++	++	+		+		+			+	
	SCMT 1204	**654.354 ***	08	FN	15°	P30		+	+	+		+						++	++	
	SCMT 1204	**654.351**	08	FN	15°	P30	C (Al_2O_3-TiN)	++	++	+	+	+		+	+	+		++	++	

Chip-breakers ground

	SCMT 1204	**654.387**	08	FL	23°	K10							++			+			+	

 Torx Plus T20 IP M4 x 11.6 **694.142**
For insert holder RW53

Torx Plus T20 IP M4x15 **694.144**
For insert holder RW 68/RW100

Torx Plus T20 IP M5 x 13.3 **694.150**
For insert holder «TW» and «SW»

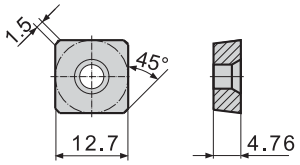
 Torx Plus T20 IP **694.194**

B.5

γ Rake angle with insert on tool.
 Clamping screw (10 screws and 1 wrench)
Inserts are sold in packages of 10 pieces.
* As long as stock lasts..

	= less suitable
+	= suitable
++	= first choice

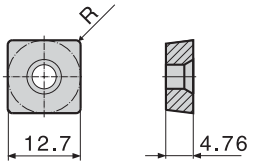
Insert								Work Piece Material								Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



SDCW 1204

Circumference ground, without chip-breakers

	SDCW 1204AE TN	688.599			7°	SN					++	+				++			++	



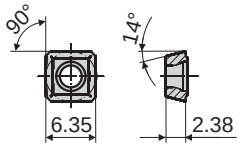
Circumference ground, without chip-breakers

	SDCW 1204	688.619 *	08	TN	7°	SN					++	+				++			+	

 Torx Plus T20 IP M4x15 **694.144**

 Torx Plus T20 IP **694.194**

WP 337-1, Ø16 - 20 mm



Chip-breakers pressed & polished

Insert Shape	Model	Order No.	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert
	WP 337-1 16/20	**655.910**	15°	P35	C (TiCN-Al_2O_3-TiN)	++	++	+	++	+						+	+
	WP 337-1 16/20	**655.911**	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed

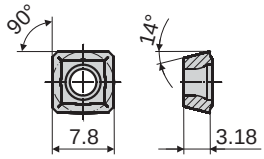
Insert Shape	Model	Order No.	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert
	WP 337-1 16/20	**655.912**	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	WP 337-1 16/20	**655.913**	15°	K40							++					+	+

Torx Plus T7 IP M2.5x5.8 **694.123**



Torx Plus T7 IP **694.189**

WP 337-2, Ø21 - 25 mm



Chip-breakers pressed & polished

Insert Shape	Model	Order No.	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert
	WP 337-2 21/25	**655.920**	15°	P35	C (TiCN-Al_2O_3-TiN)	++	++	+	++	+						+	+
	WP 337-2 21/25	**655.921**	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed

Insert Shape	Model	Order No.	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert
	WP 337-2 21/25	**655.922**	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	WP 337-2 21/25	**655.923**	15°	K40							++					+	+

Torx Plus T7 IP M3x6 **694.130**



Torx Plus T7 IP **694.189**

γ Rake angle with insert on tool.

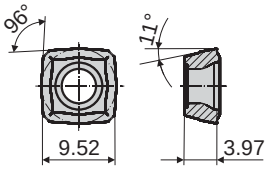
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Insert						Work Piece Material								Machining			
Insert Shape	Model	Order No.	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WP 337-3, Ø26 - 30 mm

Chip-breakers pressed & polished

	WP 337-3 26/30	**655.930**	15°	P35	C (TiCN-Al_2O_3-TiN)	++	++	+	++	+						+	+
	WP 337-3 26/30	**655.931**	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

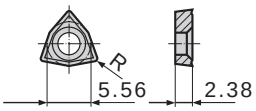
Circumference ground, chip-breakers pressed with dimples

	WP 337-3 26/30	**655.932**	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	WP 337-3 26/30	**655.933**	15°	K40							++					+	+

 Torx Plus T10 IP M3.5x8.2 **694.136**

 Torx Plus T10 IP **694.192**

WCMT 0302



Chip-breakers pressed & polished

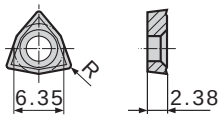
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert
	WCMT 0302	**655.620**	08	FN	15°	P45	C (TiCN-TiN)	++	++		+	+						+	+
	WCMT 0302	**655.622 ***	08	FN	15°	P45	C (TiCN)	+	+	++								+	+
	WCMT 0302	**655.621**	08	FN	15°	K20	C (Al_2O_3-TiN)				++	++	+					+	+

Torx Plus T7 IP M2.2x6 **694.110**



Torx Plus T7 IP **694.189**

WCMT 0402



Chip-breakers pressed & polished

	WCMT 0402	**655.630**	08	FN	15°	P45	C (TiCN-TiN)	++	++		+	+						+	+
	WCMT 0402	**655.632**	08	FN	15°	P45	C (TiCN)	+	+	++								+	+
	WCMT 0402	**655.631**	08	FN	15°	K20	C (Al_2O_3-TiN)				++	++	+					+	+

Torx Plus T7 IP M2.5x6.3 **694.124**



Torx Plus T7 IP **694.189**

γ Rake angle with insert on tool.

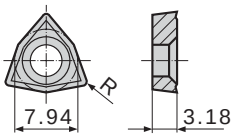
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material								Machining			
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WCMT 0503

Chip-breakers pressed & polished

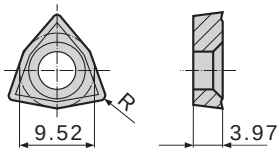
	WCMT 0503	**655.640**	08	FN	15°	P45	C (TiN)	++	++	++	+	+						+	+
	WCMT 0503	**655.644**	08	FN	15°	P40	C (TiN)	++	++	++	+	+					++	++	+
	WCMT 0503	**655.641**	08	FN	15°	K20	C (TiCN-Al_2O_3)				++	++	+					+	+

Chip-breakers pressed with dimples

	WCMT 0503	**655.642**	08	FN	15°	P45	C (TiN)	++		+						++			++

 Torx Plus T9 IP M3x8.2 **694.131**

 Torx Plus T9 IP **694.191**



WCMT 06T3

Chip-breakers pressed & polished

	WCMT 06T3	**655.650**	08	FN	15°	P45	C (TiN)	++	++	++	+	+						+	+
	WCMT 06T3	**655.654**	08	FN	15°	P40	C (TiN)	++	++	++	+	+					++	++	+
	WCMT 06T3	**655.651**	08	FN	15°	K20	C (TiCN-Al_2O_3)				++	++	+					+	+

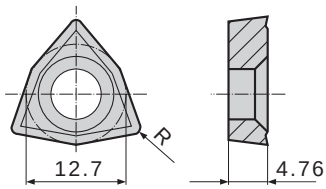
Chip-breakers pressed with dimples

	WCMT 06T3	**655.652**	08	FN	15°	P45	C (TiN)	++		+						++			++

 Torx Plus T10 IP M3.5x9.2 **694.137**

 Torx Plus T10 IP **694.192**

Insert								Work Piece Material								Machining			
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WCMT 0804

Chip-breakers pressed & polished

	WCMT 0804	**655.660**	12	FN	15°	P45	C (TiN)	++	++	++	+	+						+	+
	WCMT 0804	**655.664**	12	FN	15°	P40	C (TiN)	++	++	++	+	+					++	++	+
	WCMT 0804	**655.661**	12	FN	15°	K20	C (TiCN-Al_2O_3)				++	++	+					+	+

Chip-breakers pressed with dimples

	WCMT 0804	**655.662**	12	FN	15°	P45	C (TiN)	+		+						++			++

Torx Plus T15 IP M4x11.8 **694.143**

Torx T15 M4x8.2 **336.905**
For drills with pockets



Torx Plus T15 IP **694.193**

Torx T15 **690.186**

B.5

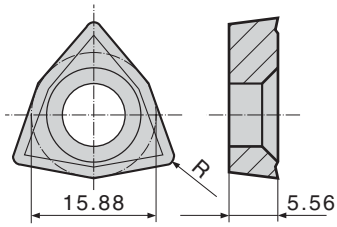
γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material								Machining			
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WCMT 1005

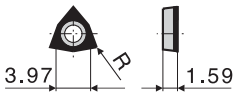
Chip-breakers pressed & polished

	WCMT 1005	**655.670**	12	FN	15°	P45	C (TiCN)	++	++	++	++	++						+	+
	WCMT 1005	**655.671**	12	FN	15°	K20					+	+	+					+	+

 Torx Plus T20 IP M5x13.3 **694.150**

 Torx Plus T20 IP **694.194**

Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC
WCGW 02																	
	WCGW 0201	**938.883**	02	FN	0°	PCD			++			++	++		+		+
	WCGW 0201	**938.884**	02	FN	0°	CBN-10		++					++	+	+		
	WCGW 0201	**938.885**	02	FN	0°	CBN-25				++	+		++				
	WCGW 0201	**948.101**	02	TN	0°	CBN-30				++			++		++	++	



Full face made with CBN/PCD, 3 cutting edges



One cutting edge made with CBN

Torx Plus T6 IP M2x3.6 **694.101**



Torx Plus T6 IP **694.188**

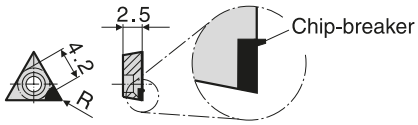
γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

CBN/PCD inserts are sold individually.

	= less suitable
+	= suitable
++	= first choice

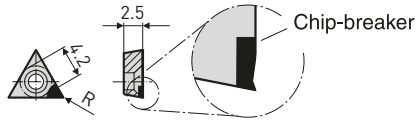
Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



TPGW 07

One cutting edge made with PCD

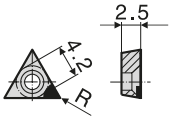
	TPGW 0702	**948.201**	04	FL	5°	PCD			+			++	++		+		++



TPGT 07

One cutting edge made with PCD

	TPGT 070202	**948.202**	02	FL	8°	PCD			++								
	TPGT 070204	**948.203**	04	FL	8°	PCD			++								



TPGW 07

One cutting edge made with PCD/CBN

	TPGW 0702	**938.840**	03	FN	5°	PCD			++			++	++		+		+
	TPGW 0702	**948.210**	02	FN	5°	CBN-15	++	++			+		+	+			
	TPGW 0702	**938.837**	03	FN	5°	CBN-10	++	+			+		+				
	TPGW 0702	**948.211**	04	FN	5°	CBN-15	++	++			+		+		+		
	TPGW 0702	**948.230**	02	TN	5°	CBN-15	++	++					++	+	++		
	TPGW 0702	**938.879**	03	TN	5°	CBN-10	++	+					++		++		
	TPGW 0702	**948.231**	04	TN	5°	CBN-15	++	++					++		++	+	
	TPGW 0702	**948.270**	01	TN	5°	CBN-30				++			++	+	+		
	TPGW 0702	**948.271**	03	TN	5°	CBN-30				++			++		++	+	
	TPGW 0702	**938.880***	03	TN	5°	CBN-25				++			++		+	+	

TPGW 07

Three cutting edges made with CBN

	TPGW 0702	**948.252**	02	FN	5°	CBN-30				++	++		+	+			
	TPGW 0702	**948.251A**	03	FN	5°	CBN-30				++	++		+				
	TPGW 0702	**948.253**	04	FN	5°	CBN-30				++	++		+				



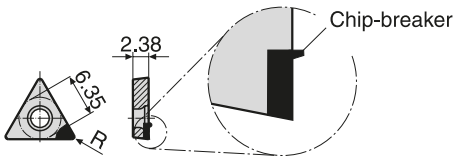
Torx Plus T6 IP M2x4.8 **694.103**

Torx Plus T6 IP M2x4.1 **694.102** [1)]



Torx Plus T6 IP **694.188**

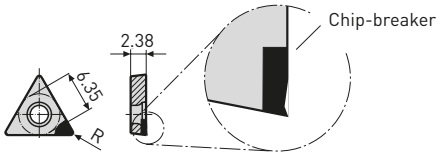
Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



TCMW 11

One cutting edge made with PCD

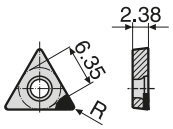
	TCMW 1102	**948.301**	04	FL	0°	PCD			+			++	++		+		++
	TCMW 1102	**948.302**	08	FL	0°	PCD			+			++	++		+		++



TCGT 11

One cutting edge made with PCD

	TCGT 110202	**948.373**	02	FL	8°	PCD			++			++	++		+		++
	TCGT 110204	**948.374**	04	FL	8°	PCD			++			++	++		+		++
	TCGT 110208	**948.375**	08	FL	8°	PCD			++			++	++		+		++



TCMW 11

One cutting edge made with PCD/CBN

	TCMW 1102	**938.841**	04	FN	5°	PCD			++			+	++		+		+
	TCMW 1102	**948.310**	02	FN	0°	CBN-15	++	++			+		++	++			
	TCMW 1102	**948.311**	04	FN	0°	CBN-15	++	++			+		++	+	+		
	TCMW 1102	**948.312**	08	FN	0°	CBN-15	++	++			+		++		+		
	TCMW 1102	**938.834**	04	FN	0°	CBN-10	++	+			+		++	+	+		
	TCMW 1102	**948.330**	02	TN	0°	CBN-15	++	++					++		+		
	TCMW 1102	**948.331**	04	TN	0°	CBN-15	++	++					++		+		
	TCMW 1102	**948.332**	08	TN	0°	CBN-15	++	++					++		++	+	
	TCMW 1102	**938.876**	08	TN	0°	CBN-10	++	+					++		+		
	TCMW 1102	**938.878***	04	FN	0°	CBN-25				++	+		+				
	TCMW 1102	**948.370**	02	TN	0°	CBN-30				++			++	+	+		
	TCMW 1102	**948.371**	04	TN	0°	CBN-30				++			++		++		
	TCMW 1102	**948.372**	08	TN	0°	CBN-30				++			++		++	+	

TCMW 11

Three cutting edges made with CBN

	TCMW 1102	**948.350A**	02	FN	0°	CBN-30				++	++		+	+			
	TCMW 1102	**948.351A**	04	FN	0°	CBN-30				++	++		+				
	TCMW 1102	**948.352A**	08	FN	0°	CBN-30				++	++		++		+		

* As long as stock lasts.

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

[1] For insert holders 615.205/615.207/615.507/615.508/615.271
CBN/PCD inserts are sold individually.

	= less suitable
+	= suitable
++	= first choice

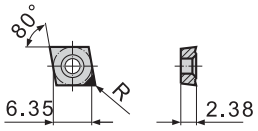
Torx Plus T7 IP M2.5x6.5 **694.122**

Torx Plus T7 IP **694.189**

B.5

Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

CCGT/W 06



One cutting edge made with PCD/CBN

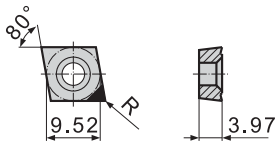
	CCGT 0602	**938.866**	04	FL	5°	PCD			++			++	++		+		
	CCGW 0602	**938.867**	04	FN	0°	CBN-10	++	+					++				

Torx Plus T7 IP M2.5x6.5 **694.122**



Torx Plus T7 IP **694.189**

CCGT/W 09



One cutting edge made with PCD/CBN

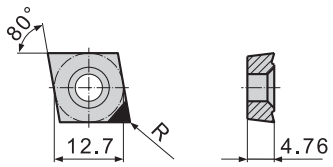
	CCGT 09T3	**938.868**	04	FL	5°	PCD			++			++	++		+		
	CCGW 09T3	**938.869**	04	FN	0°	CBN-10	++	+					++				
	CCGW 09T3	**938.835**	08	FN	0°	CBN-10	++	+					++		+		

Torx Plus T15 IP M4x9.2 **694.141**



Torx Plus T15 IP **694.193**

CCGT/W 12



One cutting edge made with PCD/CBN

	CCGT 1204	**938.870**	04	FL	5°	PCD			++			++	++	+	+		
	CCGT 1204	**938.871**	08	FL	5°	PCD			++			++	++		+		
	CCGW 1204	**938.862**	08	FN	0°	CBN-10	++	+					++		+		

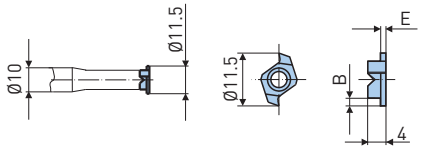
Torx Plus T20 IP M5x13.3 **694.150**

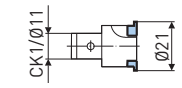


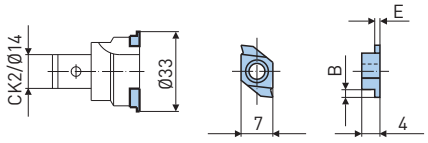
Torx Plus T20 IP **694.194**

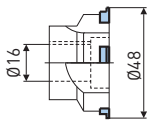
CBN/PCD inserts are sold individually.

Carbide inserts for circlip grooves as per DIN 472





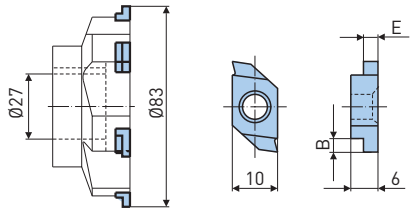




Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Capacity D	Width of Groove E	Depth of Groove B	Cast Iron	Steel	Aluminium
Type 0	958.052	K20	12 - 24	1.15	0.9	++		
	958.051	P20					++	
	958.053	K20						++
	958.056	K20	12 - 24	1.35	1.3	++		
	958.055	P20					++	
	958.057	K20						++
Blank	958.313	K20						
	958.314	P20						
Type 1	958.062	K20	22 - 34	1.15	1.1	++		
	958.061	P20					++	
	958.063	K20						++
	958.066	K20	22 - 34	1.35	1.5	++		
	958.065	P20					++	
	958.067	K20						++
	958.072	K20	34 - 50	1.65	1.6	++		
	958.071	P20					++	
	958.073	K20						++
	958.076	K20	34 - 50	1.90	2.0	++		
	958.075	P20					++	
	958.077	K20						++
	958.082	K20	50 - 85	2.20	2.2	++		
	958.081	P20					++	
	958.083	K20						++
	958.086	K20	50 - 85	2.70	2.6	++		
	958.085	P20					++	
	958.087	K20						++
Blank	958.157	K20						
	958.158	P20						

B.5

Torx T8 M3x9.0 **958.048**  Torx T8 **694.183**



Type 2	958.092	K20	> 85	3.20	3.0	++		
	958.091	P20					++	
	958.093	K20						++
	958.096	K20	> 85	4.20	3.5	++		
	958.095	P20					++	
	958.097	K20						++
Blank	958.155	K20						
	958.156	P20						

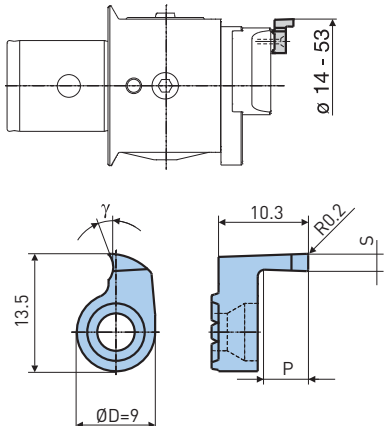
Torx T20 M5x16.5 **958.049**  Torx T20 **694.187**

Clamping screw (10 screws and 1 wrench)
Inserts are sold individually.

	= less suitable
+	= suitable
++	= first choice

Inserts for face grooves, Ø 14 - 53

(Insert holder, boring head EWN/EWE 2 - 152)



Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle γ	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.501	P30C	20°	2.0	5.0	++	++	++
	958.502			2.5		++	++	++
	958.503			3.0		++	++	++

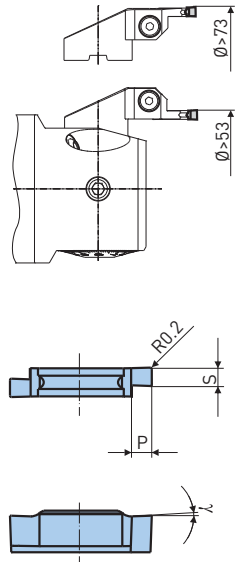
Torx Plus T15 IP M4x11.8 **694.143**



Torx T15 IP **694.193**

Inserts for face grooves, Ø 53 - 3 040

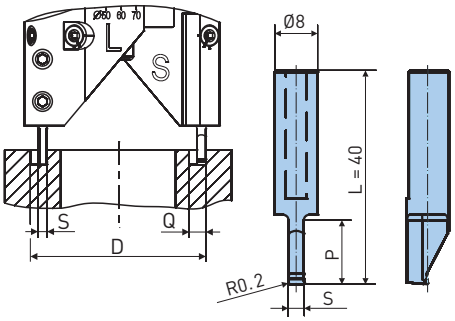
(Insert holder, boring heads EWN/EWE 53 - 100, EWN 150, EWN/EWE 200, Series 310/317/318)



Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle γ	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.425	P20C	5°	2.5	2.7	++	++	
	958.430			3.0	3.3	++	++	
	958.433			3.3	3.6	++	++	
	958.435			3.5	3.8	++	++	
	958.440			4.0	4.3	++	++	
	958.475	K10	15°	2.5	2.7			++
	958.480			3.0	3.3			++
	958.483			3.3	3.6			++
	958.485			3.5	3.8			++
	958.490			4.0	4.3			++

1. Further sizes on request

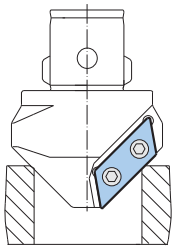
Insert holder, boring head SW 53 - 148, Series 318

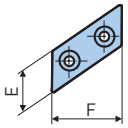


Grooving Cutter			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle γ	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.611	K40C	7°	2.0	12	++	++	
	958.612			3.0		++	++	
	958.613			4.0		++	++	
	958.614			5.0		++	++	
	958.601	K40	7°	2.0	12			++
	958.602			3.0				++
	958.603			4.0				++
	958.604			5.0				++

K10/K40 = Uncoated carbide
P20C/30C/P40C = Coated carbide AlCrN

Inserts for chamfering mills C-Cutter 45°





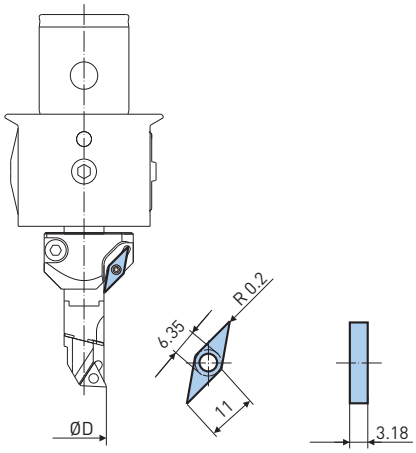
Insert					Dimensions		Screws/Wrench			Work Piece Material		
Insert Shape	Insert Type	Order No.	Grade	Capacity D	E	F	Screws	Type	Wrench	Cast Iron	Steel	Aluminium
	CW1206	**978.283**	P30	5 - 25	6.35	12.7	978.284	T6	690.834	++	+	
		800.951	P20C							+	++	
		801.753	N20C									++
	CW1909	**978.817**	P30	10 - 40 and 30 - 60	9.525	19.05	801.696	T10	690.837	++	+	
		800.952	P20C							+	++	
		801.754	N20C									++
	CW3115	**978.826**	P30	50 - 100	18.875	31.75	801.699	T20	690.838	++	+	
		800.953	P20C							+	++	
		801.755	N20C									++

1. Inserts are sold individually.

 Torx Plus T8 IP **694.190**

Inserts for chamfering rings 45°, diameter range Ø 12.6 - 39.5 mm

(Boring heads EWN/EWE 2 - 32, EWN/EWE 2 - 152, Series 112)



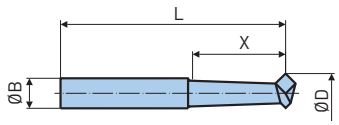
Insert						Work Piece Material		
Insert Shape	Model	Order No.	Grade	Capacity D	Rake Angle γ	Cast Iron	Steel	Aluminium
	VCMT 110302	**655.821**	P20C	12.6 - 39.5	15°	++	++	
	VCGT 110302	**655.822**	K20		23°			++

1. Inserts are sold in packages of 10 pieces.

 Torx Plus T8 IP M2.5x8.7 **694.125**

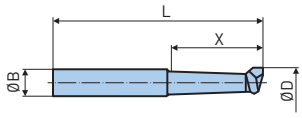
 Torx Plus T8 IP **694.190**

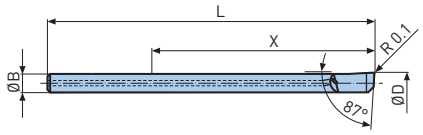
Boring cutters for fine boring heads, Series 112



Boring Cutter				Dimensions			Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	Cast Iron	Steel	Aluminium
	612.110 *	HSS	0.4 - 0.7	3	4	27		+	+
	612.111 *		0.6 - 1.0	3		28		+	+
	612.112 *		0.9 - 1.5	4		28		+	+
	612.113 *		1.2 - 1.8	5		29		+	+
	612.114 *		1.5 - 3.5	7		31		+	+
	612.116 *		3.0 - 5.5	14		38		+	+
	612.117 *		5.0 - 7.5	22		38		+	+
	612.213 *	HSS	7.0 - 9.5	28	10	56		+	+
	612.215 *		13.0 - 17.5	54		80		+	+
	611.115	K10	2.0 - 3.5	9	4	33	+	+	+
	611.116		3.0 - 5.5	14		38	+	+	+
	611.117		5.0 - 7.5	22		38	+	+	+
	611.212	K10	5.0 - 7.5	22	10	50	+	+	+
	611.213		7.0 - 9.5	28		56	+	+	+
	611.214		9.0 - 13.5	32		64	+	+	+
	611.215		13.0 - 17.5	54		80	+	+	+

Counter boring cutters for fine boring heads, Series 112



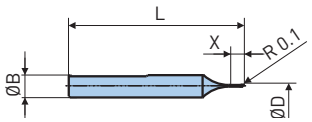


	611.152	K10	0.9 - 1.5	4	4	25	+	+	+
	611.153		1.2 - 1.8	6		27	+	+	+
	611.154		1.5 - 3.5	7		28	+	+	+
	611.155		2.0 - 3.5	9		30	+	+	+
	611.156		3.0 - 5.5	14		35	+	+	+
	611.157		5.0 - 7.5	22		38	+	+	+
	611.252 *		5.0 - 7.5	22	10	50	+	+	+
	611.253 *		7.0 - 9.5	28		56	+	+	+
	611.254 *		9.0 - 13.5	32		65	+	+	+
	611.255 *		13.0 - 17.5	55		80	+	+	+
	612.253 *	HSS	7.0 - 9.5	28	10	56		+	+
	612.254 *		9.0 - 13.5	32		65		+	+
	612.255 *		13.0 - 17.5	55		80		+	+
	615.203	K10	4.0 - 6.0	42	3.5	62		+	+
	615.203A	K10C					+	++	
	615.204	K10	5.0 - 7.0	54	4.5	74		+	+
	615.204A	K10C					+	++	

K10 = Uncoated carbide
HSS = High speed steel
K10C = Coated carbide AlCrN
* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Counter boring cutters for fine boring heads, EWN 04-7

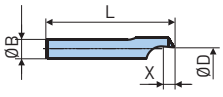


Boring Cutter				Dimensions				Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	R	Cast Iron	Steel	Aluminium
	615.541	K10C	0.4 - 0.9	1.5	4	30	0.05	+	++	++
	615.542		0.9 - 1.4	3				+	++	++
	615.543		1.4 - 2.0	5				+	++	++
	615.544		1.9 - 3.0	6				+	++	++
	615.545		2.9 - 4.0	10				+	++	++
	615.546		3.9 - 5.0	13				+	++	++
	615.547		4.9 - 7.0	16				+	++	++
	615.561		0.4 - 0.6	1.1		25	0.1	+	++	++
	615.562		0.6 - 0.8	1.5				+	++	++
	615.563		0.8 - 1.2	2				+	++	++
	615.564		1.2 - 1.5	2.5				+	++	++
	615.565		1.5 - 1.9	3.5			0.2	+	++	++
	615.566		1.9 - 3.0	4.5				+	++	++
	615.551	K10	0.4 - 0.6	1.1			0.1	+	+	+
	615.552		0.6 - 0.8	1.5				+	+	+
	615.553		0.8 - 1.2	2				+	+	+
	615.554		1.2 - 1.5	2.5				+	+	+
	615.555		1.5 - 1.9	3.5			0.2	+	+	+
	615.571	CBN -20	1.4 - 2.0	3.5		25	0.1	+	++	
	615.572		1.9 - 3.0	4.5				+	++	
	615.573		2.9 - 4.0	8				+	++	
	615.574		3.9 - 5.0	11				+	++	
	615.575		4.9 - 6.0	16				+	++	

B.5

OD turning

The boring cutters are made with flat for cutting edge orientation.

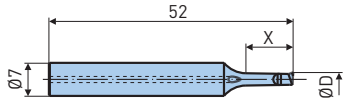


	615.590	K10C	0.2 - 2.3	2.2	4	25		+	++	++

K10 = Uncoated carbide
K10C = Coated carbide AlCrN

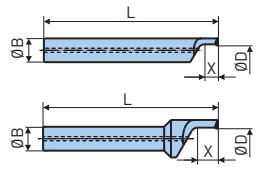
	= less suitable
+	= suitable
++	= first choice

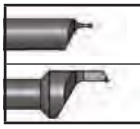
Counter boring cutters for fine boring heads, EWB 04-12 / EWN04-15



Boring Cutter				Dimensions			Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	Cast Iron	Steel	Aluminium
	615.522	K10C	0.4 - 1.0	1.5	7	52	+	++	++
	615.524		0.9 - 1.5	3			+	++	++
	615.525		1.4 - 2.0	5			+	++	++
	615.501		1.9 - 3.0	6			+	++	++
	615.502		2.9 - 4.0	10			+	++	++
	615.503		3.9 - 5.0	13			+	++	++
	615.504		4.9 - 6.0	16			+	++	++

OD turning



	615.530	K10C	0.2 - 3.0	4	7	52	+	++	++
	615.531	K10C	2.0 - 6.0	6	7	52	+	++	++

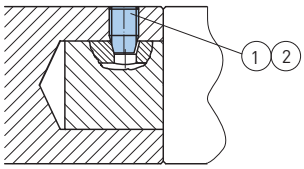
Spare Parts

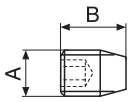
Modular Components Shanks	418 - 420
Indexable Insert Drills / Rough Boring Heads / Insert Holders	421 - 428
Fine Boring Heads / Centric Insert Holders	429 - 431
Fine Boring Heads / Peripherical Insert Holders	432 - 433
Series 318/317 Large Diameter Boring Tools	434 - 437
Face Grooving / OD Turning / Chamfering / Milling	438 - 439
Tool Holders / Tapping Attachments	440
Screws and Wrenches	441 - 442

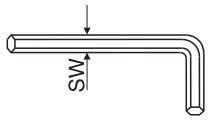
B.6

CKB connection

CK- screws and allen wrenches



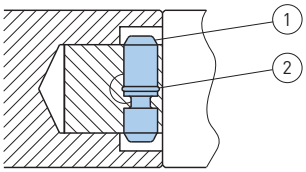


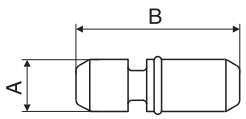


Clamping Screw					Allen Wrench		
CK	A	B	①	M [Nm] *	CK	SW	②
CK1	M4 x 0.5	5	**690.431**	1.5	CK1	2	**690.801**
CK2	M5 x 0.5	6.5	**690.432**	3.0	CK2	2.5	**690.802**
CK3	M6 x 0.75	8.5	**690.433**	4.5	CK3	3	**690.803**
CK4	M8 x 0.75	11	**690.434**	7.0	CK4	4	**690.804**
CK5	M10 x 1	14	**690.435**	14.0	CK5	5	**690.805**
CK5	M10 x 1	12	**690.594** *	14.0	CK5	5	**690.805**
CK6	M12 x 1	18	**690.436**	24.0	CK6	6	**690.806**
CK7	M20 x 1.5	29	**690.437**	45.0	CK7	10	**690.808**

1. ** Shanks 326.005 / 329.866

Cross bolts and locking rings









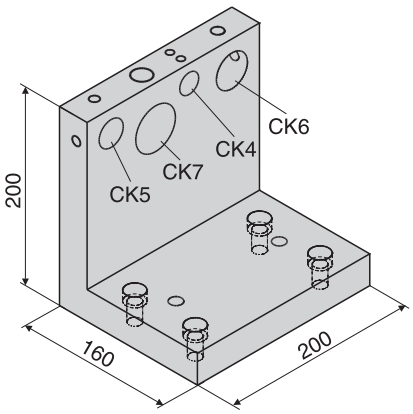
Cross Bolts				O-Ring	Snap Ring
CK	A	B	①	②	②
CKB1	4	13.5	**691.501**	**692.270**	
CKB2	5	17	**691.502**	**692.271**	
CKB3	7	22	**691.503**	**692.272**	
CKB4	8.5	26.5	**691.504**	**692.286**	
CKB5	11	33	**691.505**		**693.304**
CKB6	14	43	**691.506**		**693.305**
CKB7	18	56	**691.507**		**693.306**

CKS connection

B.6

Assembling device for reductions and extensions

The assembly device is used to tighten and loosen the CKS thread bushings in reductions and extensions. The CK connectors of reductions and extensions in the system sizes CK4 - CK7 can be mounted from both sides into the assembly device.

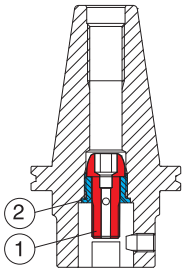


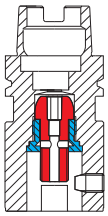
Order No.
662.600

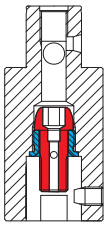
* M = Recommended torque for tightening the screws

CKS connection

CKS components







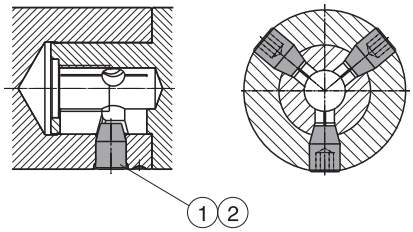
		Tension Screw			Thread Bushing	Socket Wrench with Thread	Socket Wrench		
ISO	CKS	A		M [Nm] *			L	SW	
40	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.128	120	690.656	690.853	140	10	690.848
50	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.129	160	690.656	690.853	180	12	690.855
	CKS7	M24 x 2	690.130	200	690.657	690.854	150	14	690.850

HSK	CKS	A		M [Nm] *			L	SW	
63	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.167	100	690.656	690.853	140	8	690.847
100	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.128	120	690.656	690.853	140	10	690.848
	CKS7	M24 x 2	690.168	120	690.657	690.854	140	10	690.848

	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.129	160	690.656	690.853	140	12	690.849
	CKS7	M24 x 2	690.130	200	690.657	690.854	150	14	690.850

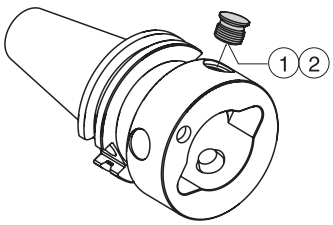
CKN connection

CK- screws and allen wrenches



	Clamping Screws				Allen Wrenches	
CKN	A	B	①	M [Nm] *	SW	②
CKN6	M12 x 1	18	690.436	24	6	690.806
CKN7	M20 x 1.5	29	690.437	45	10	690.808

Blind screws

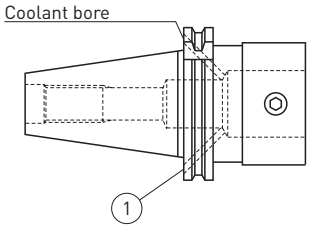


Blind Screws		Allen Wrenches	
Type	①	SW	②
CKN6	690.666	6	690.806
CKN7	690.667	10	690.810

* M = Recommended torque for tightening the screws

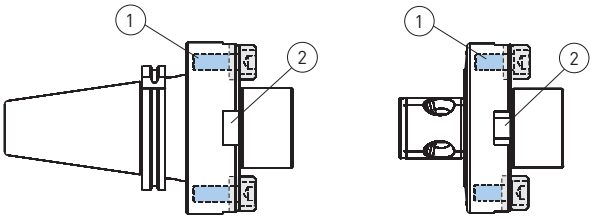
Shanks

Set screws for coolant bores



		
ISO	①	Remarks
30	690.451	
40	690.451	
	690.576	Only for shanks 323.826, 326.041
	690.419	Only for shank 326.163
50	690.576	

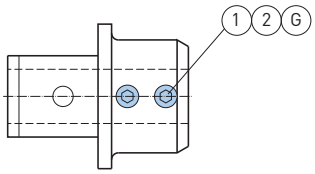
Shanks and tool holders for bridge tools Series 318, Ø 620 - 3 000 mm



		
Type	①	②
328.215	690.131	691.637
328.213	690.131	
328.214	690.131	
328.217N	690.172	

Tool holders and shanks for carbide boring bars

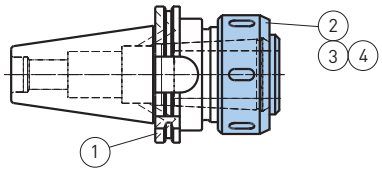
Clamp screws and Allen wrenches for tool holders with CK connection

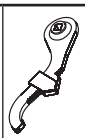


				
Type	①	M [Nm] *	G	②
335.301	690.460	8	M8	690.804
335.302	690.452	15	M10	690.805
335.312	690.469	15	M10	690.805
335.313	690.484	75	M20	690.810

B.6

Clamp nuts, hook wrenches and set screws for collet holders



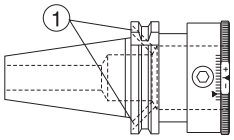
					
Type	①	②	M [Nm] *	③	④
335.342		951.108	160	951.109	951.149
335.343	690.451	951.108		951.109	
335.344	690.418	951.108		951.109	
335.352		951.128	220	951.129	
335.353	690.576	951.128		951.129	
335.354	690.576	951.128		951.129	

1. ④ Hook attachment for torque wrench

* M = Recommended torque for tightening the screws

Adjustable drill holder

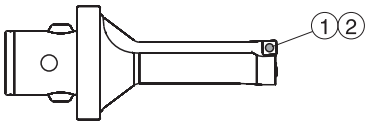
Set screws for coolant bores



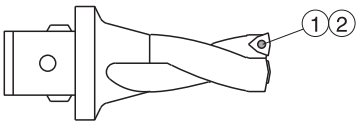
	
Type	①
336.301	690.451
336.302	690.419
336.303	690.419
336.304	690.573

Indexable insert drills, Series 336/337

Clamp screws for inserts

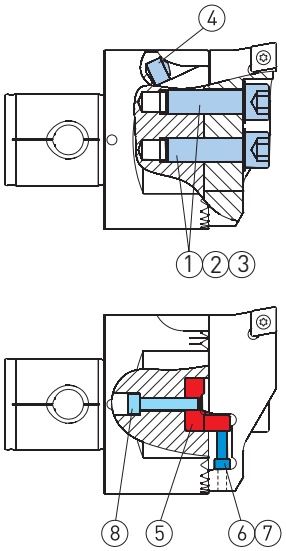


			
Type	① **	M [Nm] *	②
WP 337-1	694.123	0.7	694.807
WP 337-2	694.130	0.7	694.807
WP 337-3	694.136	1.8	694.810



			
Type	① **	M [Nm] *	②
WC 03	694.110	0.7	694.807
WC 04	694.124	0.7	694.807
WC 05	694.131	0.5	694.809
WC 06	694.137	1.8	694.810
WC 08	694.143	3.0	694.815
WC 10	694.150	6.0	694.820

Boring heads for roughing SW, Series 319

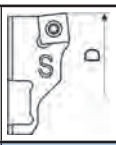
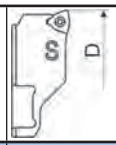
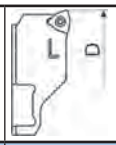


									
Type	①	②	M [Nm] *	③	④	⑤	⑥	⑦	⑧
SW20	690.188	693.175	4.0	690.803		319.150	690.191	690.819	690.184
SW25	690.157	693.176	7.0	690.804		319.250	690.192	690.819	690.186
SW32	690.108	693.177	12.0	690.805		319.350	690.193	690.811	690.189
SW41	690.163	693.178	20.0	690.806		319.450	690.194	690.812	690.189
SW53	690.105	693.179	35.0	690.807	692.409	319.550	690.195	690.812	690.189
SW68	690.106	693.179	35.0	690.807	692.406	319.650	690.196	690.813	690.101
SW98 x CKB6	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.108
SW98 x CKB7	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.173
SW148 x CKB6	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.108
SW148 x CK7	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.173

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

Insert holders

	Type CC			Type SC/SP			Type WC		
Type	D			D			D		
Preferential line									
SW20	20 - 26	639.411	639.412	20 - 26	639.111	639.112			
	25 - 31	639.415	639.416						
SW25	25 - 33	639.421	639.422	25 - 33	639.121	639.122			
	32 - 40	639.425	639.426						
SW32	32 - 42	639.431	639.432	32 - 42	639.131	639.132			
	41 - 51	639.435	639.436	41 - 51	639.135	639.136			
SW41	41 - 54	639.441	639.442	41 - 54	639.141	639.142	49 - 62	639.241	639.242
	53 - 66	639.445	639.446	53 - 66	639.145	639.146			
SW53	53 - 70	639.451	639.452	53 - 70	639.151	639.152	59 - 76	639.251	639.252
	69 - 86	639.455	639.456	69 - 86	639.155	639.156	69 - 86	639.255	639.252
SW68	68 - 90	639.461	639.462	68 - 90	639.161	639.162	73 - 95	639.261	639.262
	88 - 110	639.465	639.466	88 - 110	639.165	639.166	90 - 112	639.265	639.266
SW98	98 - 126	639.471	639.472	98 - 126	639.171	639.172	106 - 134	639.271	639.272
	125 - 153	639.475	639.476	125 - 153	639.175	639.176	131 - 159	639.275	639.276
SW148	148 - 176	639.481	639.482	148 - 176	639.181	639.182	156 - 184	639.281	639.282
	175 - 203	639.485	639.486	175 - 203	639.185	639.186	181 - 209	639.285	639.286

Additional line

SW68	68 - 90	639.561	639.562
	88 - 110	639.565	639.566
SW98	98 - 126	639.571	639.572
	125 - 153	639.575	639.576
SW148	148 - 176	639.581	639.582
	175 - 203	639.585	639.586

Clamp screws for inserts

			
Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

			
Type	**	M [Nm] *	
SP 06	694.122	0.7	694.807
SC 09	694.141	3.0	694.815
SC 12	694.150	6.0	694.820

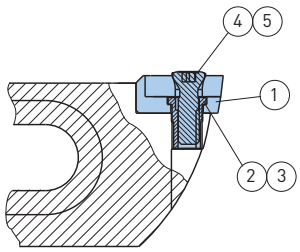
			
Type	**	M [Nm] *	
WC 04	694.124	0.7	694.807
WC 05	694.131	1.5	694.809
WC 06	694.137	1.8	694.810

B.6

* M = Recommended torque for tightening the screws

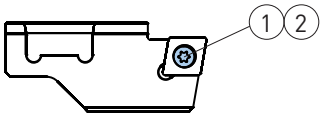
** Per package: 10 screws and 1 wrench

Insert holders SW, for chamfering



							
Type	①	②	③		④ **	M [Nm] *	⑤
639.191	695.101	691.756	690.899	SC 09	694.138	3.0	694.815
639.192	695.101	691.756	690.899		694.138		694.815
639.193	695.101	691.755	690.899		694.138		694.815
639.194	695.102	691.757	690.804	SC 12	694.145	3.0	694.815
639.195	695.102	691.757	690.804		694.145		694.815
639.196	695.102	691.757	690.804		694.145		694.815
639.197	695.102	691.757	690.804		694.145		694.815

Insert holders SW, back boring



			
Type	① **	M [Nm] *	②
639.490	694.141	3.0	694.815
639.491	694.141		694.815
639.492	694.150	3.0	694.820
639.493	694.150		694.820

			
Type	① **	M [Nm] *	②
639.494	694.150	3.0	694.820
639.495	694.150		694.820
639.496	694.150		694.820
639.497	694.150		694.820

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

Insert holders for chamfering



Fig. 1



Fig. 2

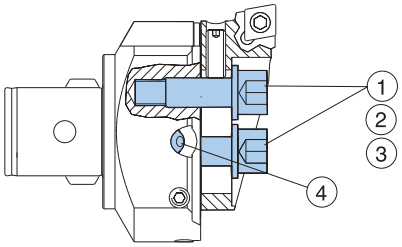
Model	Fig. 1	Model	Fig. 2		Diameter Range 15° min - max	30° min - max	45° min - max	60° min - max	75° min - max	L ***
CHF-SW41SC09	639.191	DP-SW41	639.914	SC 09	33 - 60	36 - 62	39 - 63	43 - 63	45 - 62	51
CHF-SW53SC09	639.192	DP-SW53	639.915		45 - 76	48 - 78	51 - 79	55 - 79	57 - 78	58
CHF-SW68SC09	639.193	DP-SW68	639.916		61 - 97	64 - 99	67 - 100	71 - 100	73 - 99	68
CHF1-SW98SC12	639.194	DP-SW98	639.917	SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	73 / 89 / 119
CHF2-SW98SC12	639.195				104 - 153	108 - 155	113 - 156	117 - 155	121 - 154	
CHF1-SW148SC12	639.196	DP-SW148	639.918		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	73 / 119
CHF2-SW148SC12	639.197				158 - 207	162 - 209	167 - 210	171 - 209	175 - 208	

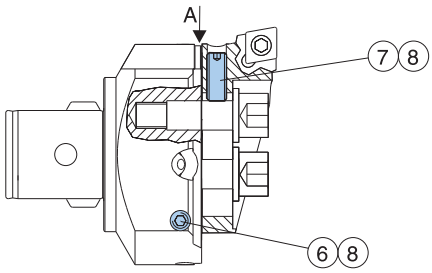
1. *** Adjustment RSS

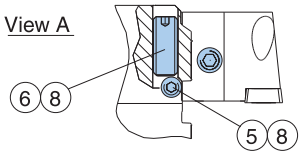
Insert holders SW for back boring

Model	Fig. 1	Model	Fig. 2		ØD	A	B	L1	L2
BB44-54SW32CC09	639.490	DP-SW32	639.913	CC 09	44 - 54	31	D-17 / min. 31	24	38
BB53-66SW41CC09	639.491	DP-SW41	639.914		53 - 66	39	D-21 / min. 39	29	44
BB65-82SW53CC12	639.492	DP-SW53	639.915	CC 12	65 - 82	50	D-28 / min. 50	34	55
BB81-103SW68CC12	639.493	DP-SW68	639.916		81 - 103	63.5	D-27 / min. 63.5	41	66
BB102-130SW98CC12	639.494	DP-SW98	639.917		102 - 130	90	90	38	69 / 78 / 108
BB129-157SW98CC12	639.495				129 - 157				
BB156-184SW148CC12	639.496	DP-SW148	639.918		156 - 184	140	140	38	69 / 108
BB183-211SW148CC12	639.497				183 - 211				

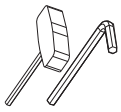
Boring heads for roughing TW, Series 315



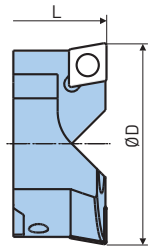




					
Type	①	②	M [Nm] *	③	④
TW20	315.160	693.180	4.0	690.803	
TW25	315.250	693.181	7.0	690.804	
TW32	315.350	693.182	12.0	690.805	
TW41	315.450	693.183	20.0	690.806	
TW53	315.550	693.184	35.0	690.807	692.409
TW68	315.650	693.184	35.0	690.807	692.406
TW98	315.750	693.185	40.0	690.810	692.406
TW148	315.750	693.185	40.0	690.810	692.406

						
Type	⑤	⑥	M [Nm] *	⑦	M [Nm] *	⑧
TW20	315.161	690.529	0.3	690.900	0.3	690.800
TW25	315.251	690.538	0.3	690.901	0.3	690.800
TW32	315.351	690.451	0.8	690.902	0.8	690.811
TW41	315.451	690.541	1.5	690.903	1.5	690.812
TW53	315.551	690.583	2.5	690.904	2.5	690.813
TW68	315.651	690.586	2.5	690.906	2.5	690.813
TW98	315.751	690.585	2.5	690.908	2.5	690.814
TW148	315.751	690.585	2.5	690.908	2.5	690.814

Insert holders TW, Type CC for RSS



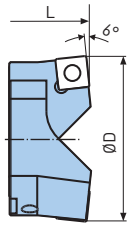
Additional line

Insert Holders Type	ØD	L	Order No.	
TW68	68 - 90	71	638.561	CC 16
	88 - 110	71	638.562	
TW98	98 - 126	71	638.571	
	125 - 153	71	638.572	
TW98	98 - 126	87	638.571	
	125 - 153	87	638.572	
TW98 L	98 - 126	117	638.571	
	125 - 153	117	638.572	
TW148	148 - 176	71	638.571	
	175 - 203	71	638.572	
TW148	148 - 176	117	638.571	
	175 - 203	117	638.572	

1. The insert holders are sold in pairs.

* M = Recommended torque for tightening the screws

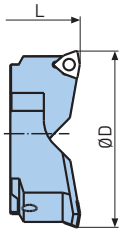
Insert holders TW, Type SC/SP for RSS



Insert Holders Type	ØD	L	Order No.	
TW20	20 - 26	32.5	638.111	SP 06
TW25	25 - 33	35.5	638.121	
TW32	32 - 42	40	638.131	SC 09
	41 - 51	40	638.132	
TW41	41 - 54	47	638.141	
	53 - 66	47	638.142	
TW53	53 - 70	57	638.151	SC 12
	69 - 86	57	638.152	
TW68	68 - 90	71	638.161	
	88 - 110	71	638.162	
TW98	98 - 126	71	638.171	
	125 - 153	71	638.172	
TW98	98 - 126	87	638.171	
	125 - 153	87	638.172	
TW98 L	98 - 126	117	638.171	
	125 - 153	117	638.172	
TW148	148 - 176	71	638.171	
	175 - 203	71	638.172	
TW148	148 - 176	117	638.171	
	175 - 203	117	638.172	

1. The insert holders are sold in pairs.

Insert holders TW, Type WC for RSS and VPS



Insert Holders Type	D	L	Order No.	
TW41	49 - 62	47	638.241	WC 04
TW53	59 - 76	57	638.251	WC 05
	69 - 86	57	638.252 ***	
TW68	73 - 95	71	638.261	WC 06
	90 - 112	71	638.262	
TW98	106 - 134	71	638.271	
	131 - 159	71	638.272	
TW98	106 - 134	87	638.271	
	131 - 159	87	638.272	
TW98 L	106 - 134	117	638.271	
	131 - 159	117	638.272	
TW148	156 - 184	71	638.271	
	181 - 209	71	638.272	
TW148	156 - 184	117	638.271	
	181 - 209	71	638.272	

1. The insert holders are sold in pairs.

Clamp screws for inserts

Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

Type	**	M [Nm] *	
SP 06	694.122	0.7	694.807
SC 09	694.141	3.0	694.815
SC 12	694.150	6.0	694.820

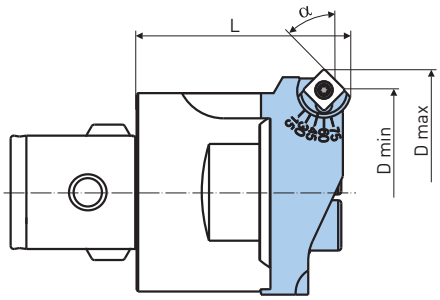
Type	**	M [Nm] *	
WC 04	694.124	0.7	694.807
WC 05	694.131	1.5	694.809
WC 06	694.137	1.8	694.810

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

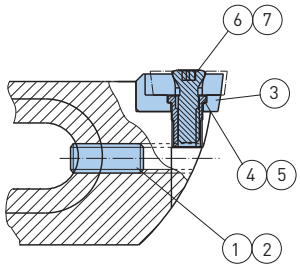
***Pair consisting of insert holders of different size. Only for full profile roughing (VPS).

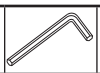
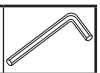
Chamfering tool TW, with adjustable chamfering angle

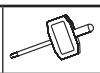


Boring Head Type	Chamfering Tool Order No.		Ø-Range
TW41	638.104	SC 09	29 - 58
TW53	638.105		43 - 75
TW68	638.106		61 - 98
TW98	638.107	SC 12	79 - 128
	638.108		109 - 158
TW148	638.107		129 - 178
	638.108		159 - 208

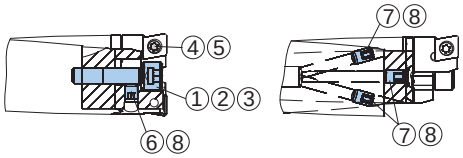
Clamp screws for inserts



					
Type	①	②	③	④	⑤
638.104	690.903	690.802	695.101	691.756	690.899
638.105	690.904	690.803	695.101	691.755	690.899
638.106	690.905	690.803	695.101	691.755	690.899
638.107	690.907	690.804	695.102	691.757	690.804
638.108	690.908	690.804	695.102	691.757	690.804

			
	⑥ **	M [Nm] *	⑦
SC 09	694.138	3.0	694.815
SC 09	694.138	3.0	694.815
SC 09	694.138	3.0	694.815
SC 12	694.145	3.0	694.815
SC 12	694.145	3.0	694.815

Rough boring heads MW



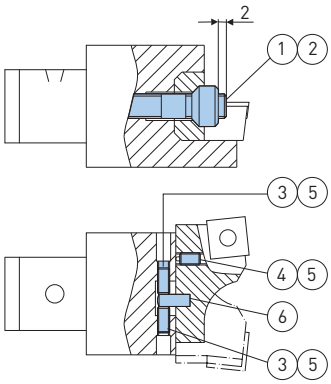
B.6

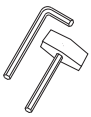
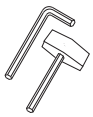
										
Type	①	②	M [Nm] *	③	④ **	M [Nm] *	⑤	⑥ **	⑦ **	⑧
MW1619	690.159	693.186	1	690.802	694.105	0.3	694.806	690.413	690.668	690.833
MW1821	690.159	693.186	1	680.802	694.105	0.3	694.806	690.668	690.668	690.833

* M = Recommended torque for tightening the screws

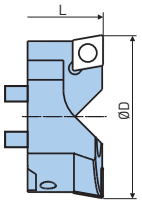
** Per package: 10 screws and 1 wrench

Boring heads for roughing RW, Series 314



								
Type	①	M [Nm] *	②	③	M [Nm] *	④	⑤	⑥
RW25	690.603	2.0	690.811	690.467	0.2	690.467	690.833	691.371
RW32	690.604	3.5	690.812	690.462	0.3	690.462	690.800	691.370
RW41	690.605	10.0	690.814	690.425	0.8	690.425	690.811	691.369
RW53	690.606	18.0	690.805	690.464	1.5	690.466	690.812	691.372
RW68	690.607	25.0	690.806	690.464	2.0	690.466	690.812	691.372
RW100	690.607	25.0	690.806	690.465	2.0	690.466	690.812	691.372

Insert holders RW, Type CC



Insert Holder Type	ØD	Order No.
Preferential line		
RW25	25 - 33	637.421 ***
	30 - 37	637.422 ***
RW32	32 - 42	637.431 ***
	40 - 48	637.432 ***
RW41	41 - 54	637.441 ***
	51 - 62	637.442 ***
RW53	53 - 70	637.451 ***
	66 - 81	637.452 ***
RW68	68 - 88	637.461 ***
	86 - 106	637.462 ***
RW100	100 - 125	637.463 ***
	125 - 150	637.464 ***
Additional line		
RW68	68 - 88	637.561 ***
	86 - 106	637.562 ***
RW100	100 - 125	637.563 ***
	125 - 150	637.564 ***

The insert holders are sold in pairs.

Clamp screws for inserts

			
Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

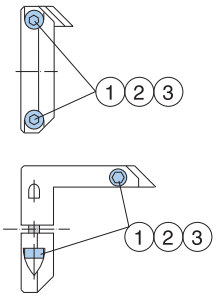
B.6

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

*** As long as stock lasts.

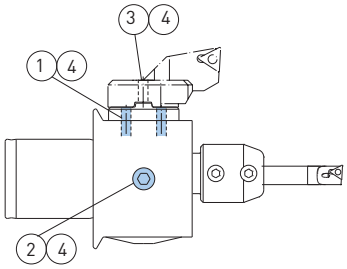
Clamp screws for chamfering rings

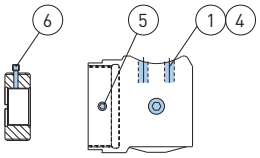


				
Type	①	②	M [Nm] *	③
20	690.101	693.175	4.0	690.803
25	690.102	693.176	7.0	690.804
32	690.103	693.176	7.0	690.804
41	690.104	693.176	7.0	690.804
53	690.105	693.131	25.0	690.807
68	690.106	693.131	25.0	690.807
90	690.106	693.131	25.0	690.807

* M = Recommended torque for tightening the screws

Fine boring heads EWN, Series 112

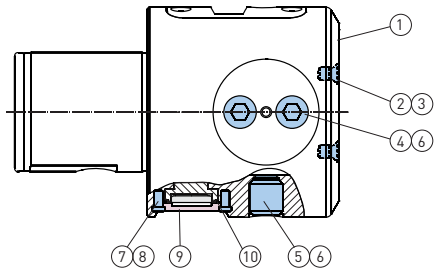


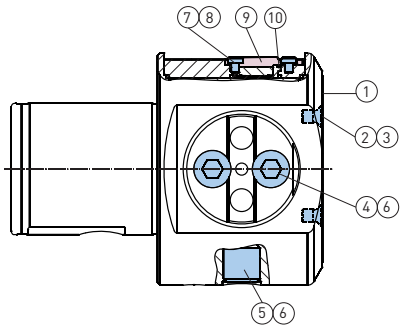


Type	①	M [Nm] *	②	M [Nm] *	③	M [Nm] *	④
EWN 04-7	690.538	0.8	690.978	0.8			690.800
EWN 04-15	690.440	1.5	690.418	1.5			690.812
EWN 04-22	690.421	2.5	690.489	2.5			690.813
EWN 2-32	690.460	5.0	690.449	5.0			690.814
EWN 2-152	690.595	10.0	690.452	10.0	690.156	12.0	690.816
EWN 04-12	690.417	1.2	690.417	1.2			690.811

Type	⑤	Type	⑥
EWN 04-22 x ES	690.417	112.271	195.003
		112.272	195.001
EWN 2-32 x ES	690.582	112.353	195.001
		112.385	195.007

Fine boring heads EWD/EWE, Series 112



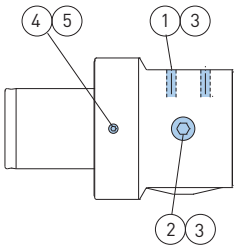


Type	①	②	③	④	M [Nm]	⑤	M [Nm]
EWD 2-54	195.081 [1] 195.127 [2]	690.981 [1] 690.614 [2]	690.843	690.457	10.0	690.469 [1] 690.995 [2]	10.0
EWD 2-32	112.371	690.611	690.836	690.460	5.0	690.996	5.0
EWE 2-152	112.804	690.614	690.843	690.457	10.0	690.995	10.0
EWE 2-32	112.371	690.611	690.836	690.460	5.0	690.996	5.0

Type	⑥	⑦	M [Nm]	⑨	⑩	⑧
EWD 2-54	690.816	690.320 [1]	4.0	112.080 [1]	692.296 [1]	690.843
		690.994 [2]	1.0	310.905 [2]	692.381 [2]	694.808
EWD 2-32	690.814	690.994	1.0	310.905	692.381	694.808
EWE 2-152	690.816	690.326	1.0	395.170	395.161	694.808
EWE 2-32	690.814	690.326	1.0	395.170	395.161	694.808

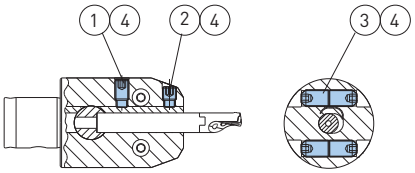
1. [1] Spare parts for boring heads with Order No. 112.109A
2. [2] Spare parts for boring heads with Order No. 112.109B

Fine boring heads EWB, Series 112



Type	①	M [Nm] *	②	M [Nm] *	③	④	M [Nm] *	⑤
EWB 2-32	690.460	4.0	690.449	4.0	690.814	112.381	0.5	690.811
EWB 2-50	690.457	8.0	690.452	8.0	690.816	690.208	1.5	690.812

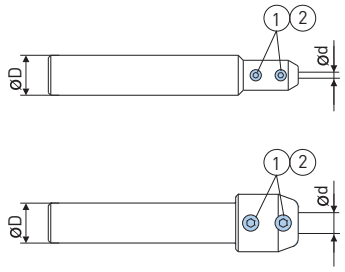
EWB 04-12 Hi-Speed



Type	①	M [Nm] *	②	M [Nm] *	③	M [Nm] *	④
EWB 04-12	690.925	3.0	690.541	3.0	690.947	3.0	690.812

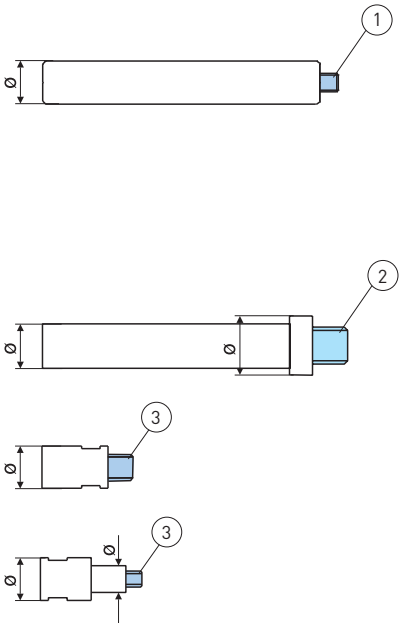
* M = Recommended torque for tightening the screws

Reducers



Type	Type			
Ø D - d	Ø D - d	①	M [Nm] *	②
12 - 3.5	16 - 3.5	690.459	0.5	690.801
12 - 4.0	16 - 4.0			
12 - 4.5	16 - 4.5			
12 - 5.0	16 - 5.0			
12 - 6.0	16 - 6.0			
	16 - 7.0	690.489	2.5	690.803
	16 - 8.0			
	16 - 9.0			
	16 - 10.0			

Tool holders



Ø	Type	G	①
8	615.088	M5	690.486
	615.211		690.486
	615.212		690.486
	615.222		690.486
10	615.089	M6	690.487A
	615.214		690.487A
	615.215		690.487A
	615.223		690.487A

Ø	Type	G	①
11	615.250	M6	690.487A
12	615.218	M6	690.487A
	615.219		690.487A
	615.224		690.487A
	615.225		690.487A
13	615.251	M6	690.487A
14	615.232	M6	690.487A
16	615.226	M10	690.488

Type	Ø	G	②
615.216	10 / 12	M6	690.487A
615.239	12 / 16	M10	690.488
615.240	12 / 16	M10	690.488
615.243	12 / 16	M10	690.488

Type	Ø	G	③
615.220	12	M6	690.487A
615.230	16 / 10	M6	690.487A
615.231	16 / 12	M6	690.487A

Screws glued in with Locite 270 or Ergo 4101.

B.6

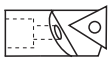
Clamp screws for inserts



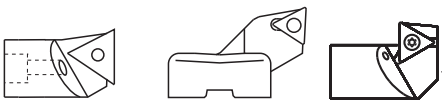
Type	**	M [Nm] *	
WC 02	694.101	0.5	694.806



Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815



Type	**	M [Nm] *	
TP 07	694.102 [1]	0.5	694.806
TP 07	694.103	0.5	694.806



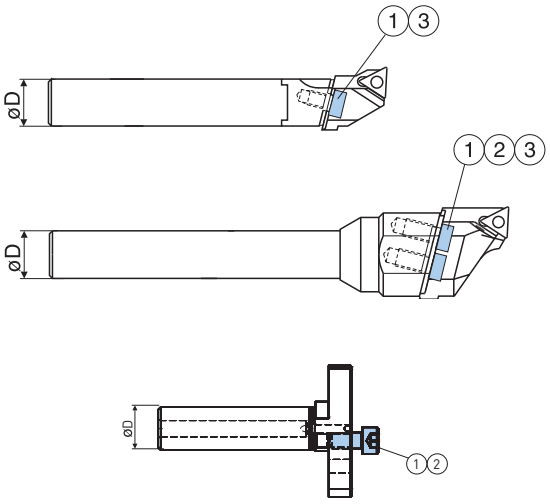
Type	**	M [Nm] *	
TC 11	694.122	0.7	694.807

[1] For Insert holder 615.086/615.207/615.087/615.205/615.271/615.507/615.508

* M = Recommended torque for tightening the screws

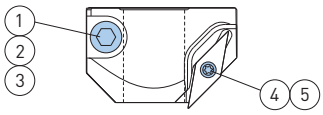
** Per package: 10 screws and 1 wrench

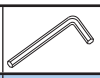
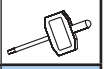
Adjustable tool holder



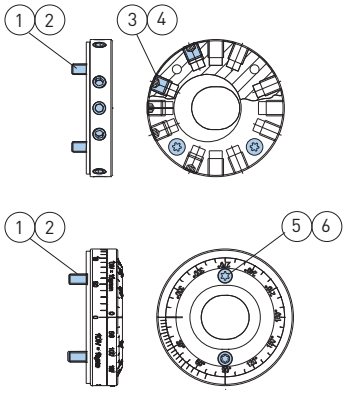
					
ØD	Type	①	②	M [Nm] *	③
9	615.369	690.323		1.0	690.837
	615.374	690.323		1.0	690.837
11	615.371	690.324		2.0	690.838
	615.375	690.324		2.0	690.838
	615.376	690.324		2.0	690.838
13	615.373	690.183		4.0	690.803
	615.377	690.183		4.0	690.803
	615.378	690.183		4.0	690.803
16	615.252	690.113		10.0	690.804
	615.253	690.113		10.0	690.804
	615.262	690.113		10.0	690.804
	615.265	690.113		10.0	690.804
	615.266	690.113		10.0	690.804
16	615.257	690.150	615.904	17.0	690.805
	615.258	690.150	615.904	17.0	690.805
	615.264	690.150	615.904	17.0	690.805
	615.267	690.150	615.904	17.0	690.805
16	615.387B	690.107	693.182	12.0	690.805

Chamfering rings



								
Type	①	②	M [Nm] *	③		④	M [Nm] *	⑤
615.394 615.395	690.157	693.181	10.0	690.814	VC 11	694.125	0.8	694.808

Balancing rings

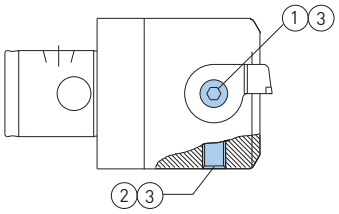


						
Type	①	②	③ **	④	⑤	⑥
112.387	690.611	690.836	690.541	690.812		
112.805	690.614	690.843	690.964	690.813		
112.806	690.614	690.843			694.141	690.965

* M = Recommended torque for tightening the screws

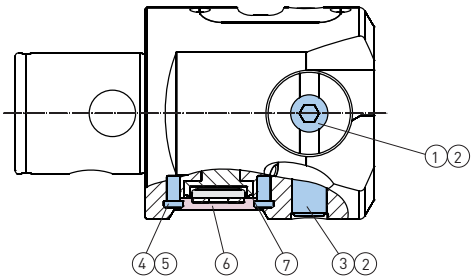
** Per package: 10 screws and 1 wrench

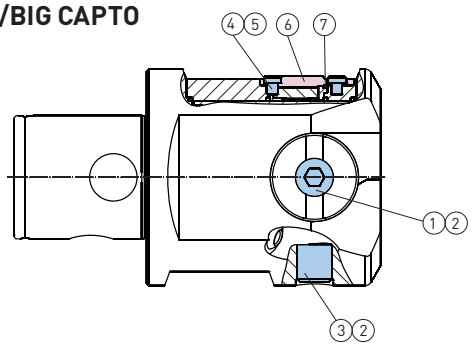
Fine boring heads EWN, Series 310

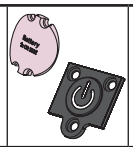


					
Type	①	M [Nm] *	②	M [Nm] *	③
EWN 20	690.135	1.0	690.410	0.5	690.811
EWN 25	690.136	1.0	690.549	0.5	690.811
EWN 32	690.137	2.5	690.550	1.5	690.812
EWN 41	690.138	3.0	690.551	2.5	690.813
EWN 53	690.139	6.0	690.552	6.0	690.814
EWN 68	690.141	12.0	690.553	10.0	690.816
EWN 100	690.141	12.0	690.553	10.0	690.816

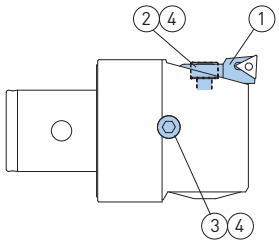
Fine boring heads EWD/EWE, Series 310/318/BIG CAPTO





										
Type	①	M [Nm] *	③	M [Nm] *	②	④	M [Nm] *	⑤	⑥	⑦
EWD 41	690.138	3.0	690.997	2.5	690.813	690.994	1.0	694.808	310.905	692.381
EWD 53	690.139	6.0	690.996	6.0	690.814					
EWD 68	690.141	12.0	690.469	10.0	690.816					
EWD 100			690.553							
EWD 200	690.140		690.469							
EWBD 68			690.580	12.0						
EWBD 100 AL										
EWE 41	690.138	3.0	690.997	2.5	690.813	690.326	1.0	694.808	395.170	395.161
EWE 53	690.139	6.0	690.996	6.0	690.814					
EWE 68	690.141	12.0	690.469	10.0	690.816					
EWE 100	690.141		690.553		690.816					
EWE 200	690.140		690.469		690.816					

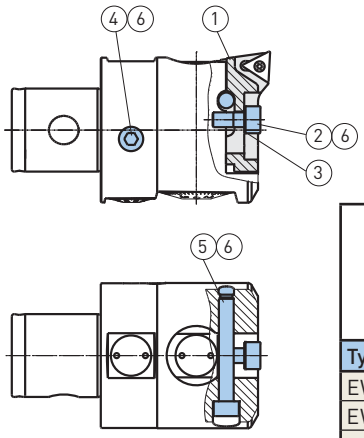
Fine boring heads EWB, Series 310



						
Type	①	②	M [Nm] *	③	M [Nm] *	④
EWB 32	626.231	690.137	2.5	690.577	2.5	690.812
EWB 41	626.241	690.138	3.0	690.578	3.0	690.813
EWB 53	626.251	690.139	6.0	690.579	6.0	690.814
EWB 68	626.261	690.140	12.0	690.580	12.0	690.816
EWB 85	626.261	690.140	12.0	690.580	12.0	690.816
EWB 100 AL	626.261	690.140	12.0	690.580	12.0	690.816
EWB 150 AL	626.261	690.140	12.0	690.580	12.0	690.816

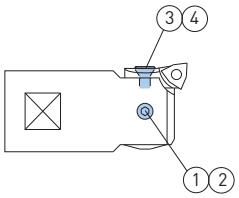
* M = Recommended torque for tightening the screws

Fine boring heads EWB-UP, Series 309



Type	①	②	③	M [Nm] *	④	M [Nm] *	⑤	M [Nm] *	⑥
EWB 25 UP	627.121	690.182	693.289	1.0		1.0	690.940	1.0	690.811
EWB 32 UP	627.131	690.179	693.186	1.5	690.550	1.5	690.180	1.5	690.812
EWB 41 UP	627.141	690.176	693.175	2.5	690.943	2.5	690.115	2.5	690.813
EWB 53 UP	627.151	690.177	693.176	4.0	690.658	4.0	690.178	4.0	690.814
EWB 68 UP	627.161	690.953	693.177	5.0	690.591	5.0	690.954	6.5	690.816

Boring heads with thread connection EW 15/EW 18, Series 310



Type	①	M [Nm] *	②	③ **	M [Nm] *	④
EW 15	690.414	0.5	690.819	694.120	1.2	694.807
EW 18	690.416	0.5	690.819	694.120	1.2	694.807

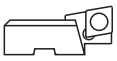
Clamp screws for inserts



Type	**	M [Nm] *	
WC 02	694.101	0.5	694.806



Type	**	M [Nm] *	
TP 07	694.103	0.5	694.806
TC 11	694.122	0.7	694.807



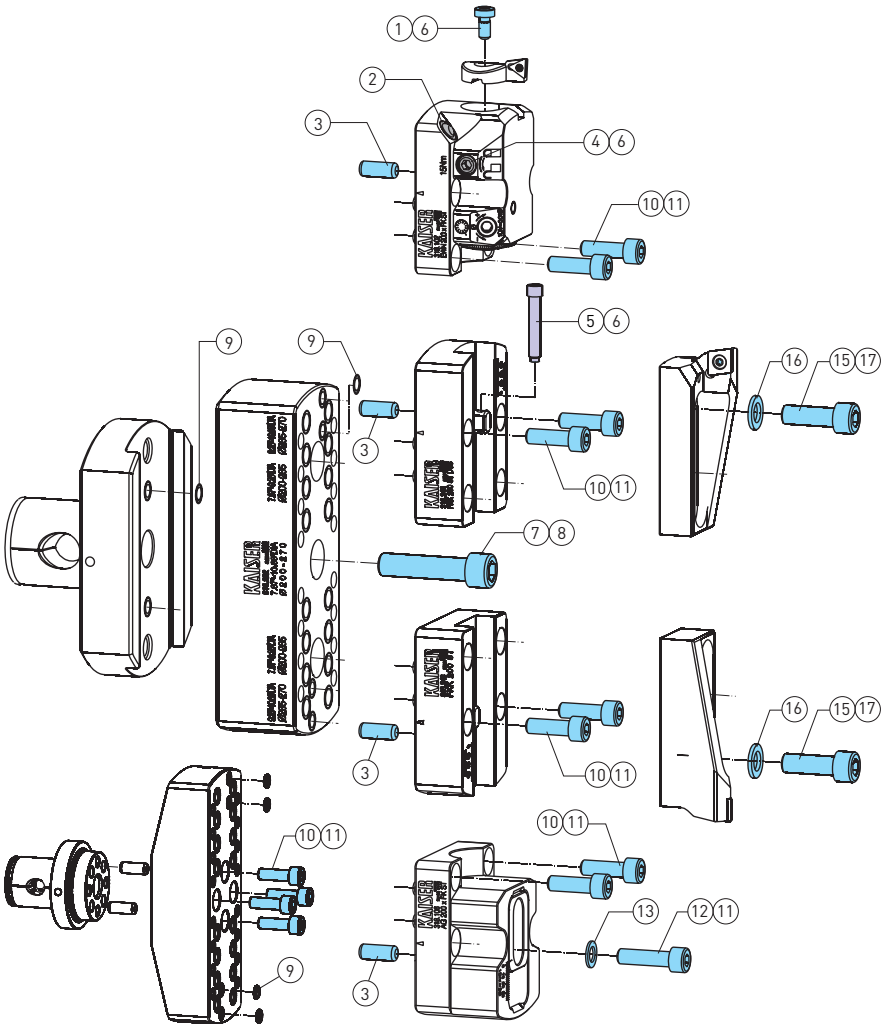
Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815

B.6

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

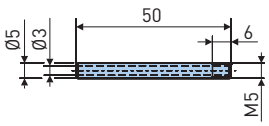
Lightweight boring tools, Ø 200 - 620 mm, Series 318



			
①	M [Nm] *	②	③
690.140	12.0	692.406	691.390
			
④	M [Nm] *	⑤	⑥
690.553	10.0	317.193	690.816
			
⑦	M [Nm] *	⑧	⑨
690.121	45.0	690.808	692.295
			
⑩	M [Nm] *	⑪	
690.163	20.0	690.806	
			
⑫	⑬	M [Nm] *	⑪
690.124	693.183	15.0	690.806
			
⑮	⑯	M [Nm] *	⑰
690.105	693.184	30.0	690.807

Coolant pipe, series 318

Model	Order No.
CP-DM5-50-M5	692.415



B.6

Clamp screws for inserts

			
Type	**	M [Nm] *	
CC 12	694.150	5.0	694.820
CC 16	694.150	5.0	694.820

			
Type	**	M [Nm] *	
SC 12	694.144	5.0	694.820

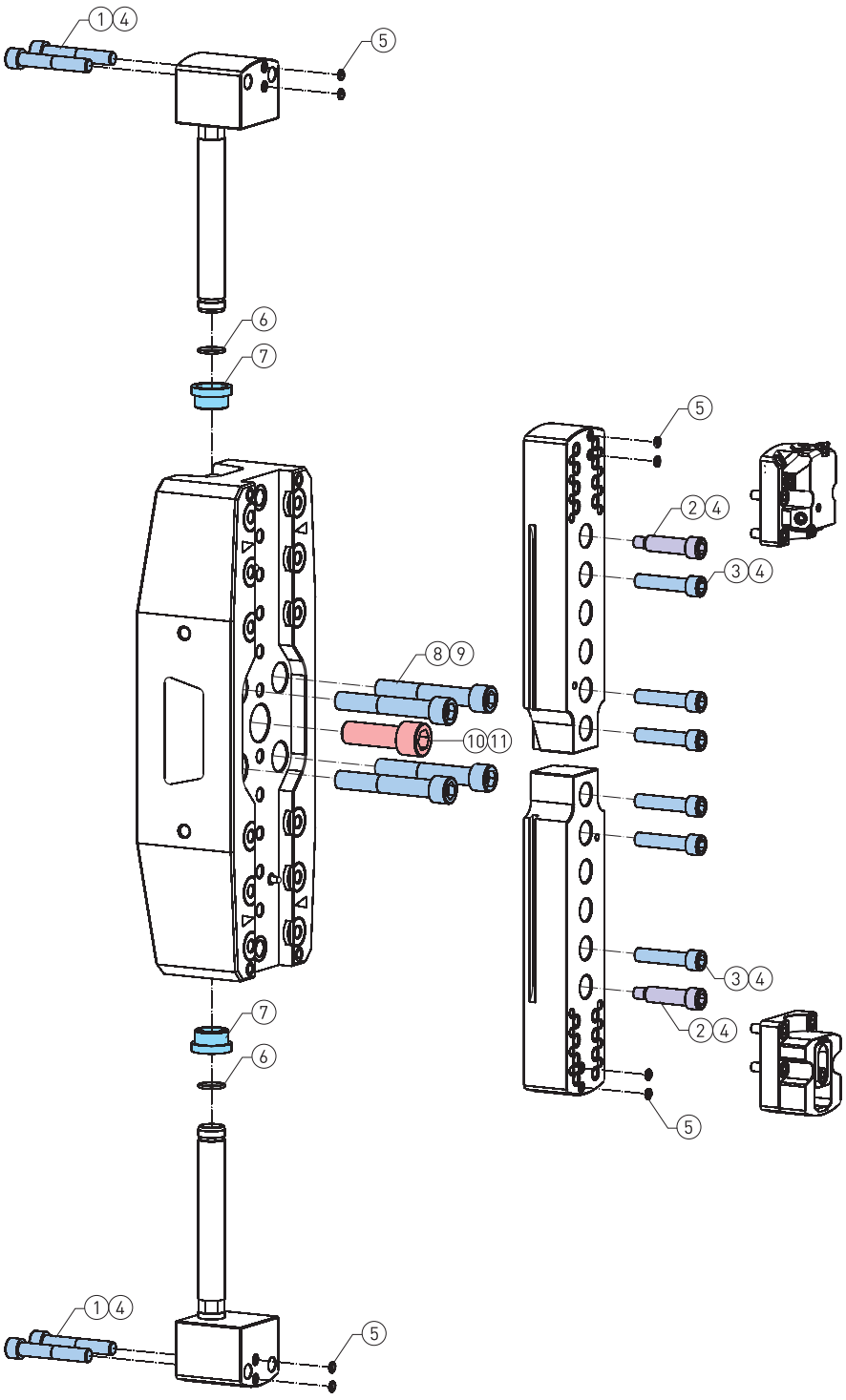
			
Type	**	M [Nm] *	
WC 08	694.143	3.0	694.815

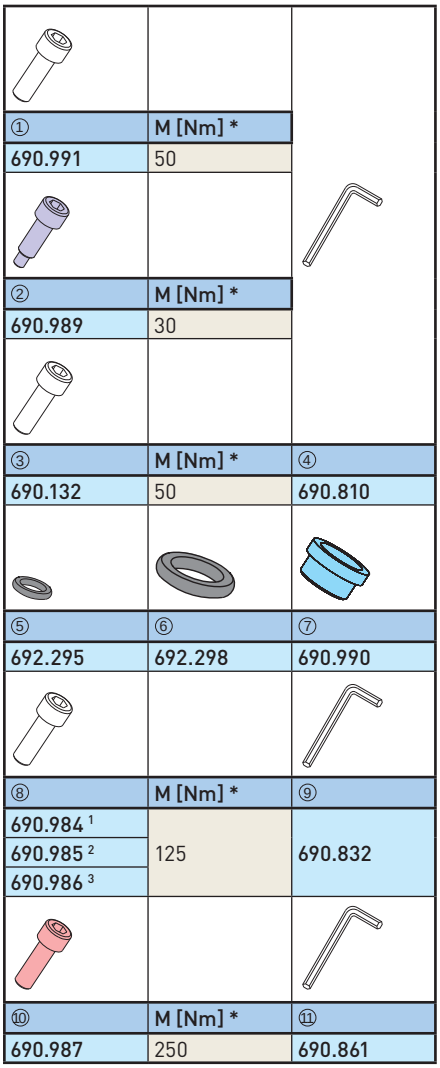
			
Type	**	M [Nm] *	
TC 11	694.122	0.7	694.807

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

Lightweight boring tools, Ø 620 - 3 000 mm, Series 318





①	M [Nm] *
690.991	50

②	M [Nm] *
690.989	30

③	M [Nm] *	④
690.132	50	690.810

⑤	⑥	⑦
692.295	692.298	690.990

⑧	M [Nm] *	⑨
690.984 [1]	125	690.832
690.985 [2]		
690.986 [3]		

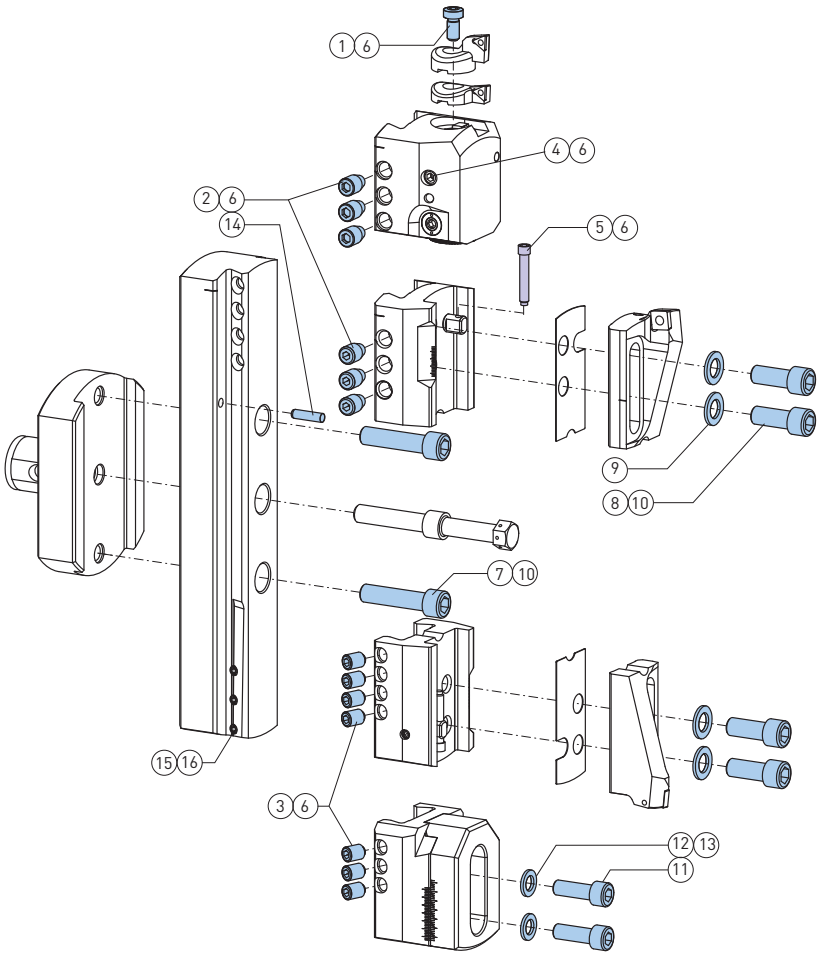
⑩	M [Nm] *	⑪
690.987	250	690.861

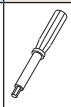
[1] For bridges 318.421/318.422/318.424
[2] For bridge 318.423
[3] For bridge 318.425

B.6

* M = Recommended torque for tightening the screws
** Per package: 10 screws and 1 wrench

Large diameter boring tools, Series 317



			
①	M [Nm] *	②	M [Nm] *
690.141	15	690.596	10
			
③	M [Nm] *	④	M [Nm] *
690.469		690.553	15
			
⑤	⑥	⑦	M [Nm] *
317.193	690.816	690.121	120
			
⑧	⑨	M [Nm] *	⑩
690.172	693.185	100	690.808
			
⑪	⑫	M [Nm] *	⑬
690.105	693.184	70	690.807
			
⑭	⑮	⑯	
691.373	317.274	690.845	

Clamp screws for inserts

			
Type	**	M [Nm] *	
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

			
Type	**	M [Nm] *	
SC 12	694.144	5.0	694.820
SD 12	694.144	5.0	694.820

			
Type	**	M [Nm] *	
WC 08	694.143	3.0	694.815

			
Type	**	M [Nm] *	
TC 11	694.122	0.7	694.807

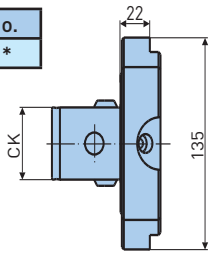
* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

Flanges steel

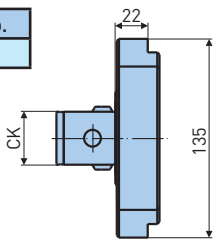
Type	Order No.
CKS7/Ø46	317.204 *

Flange with adjustable coolant nozzles mounted on both side



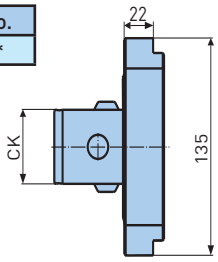
Type	Order No.
CKS6/Ø36	317.207 *

With CK6 connector for boring range 150 - 200 mm



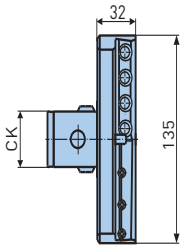
Flange aluminium

Type	Order No.
CKS7/Ø46	317.261 *



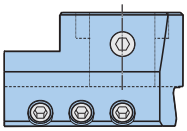
Flange CK6 with extension slide

Type	Order No.
CKS6/Ø36	317.208 *

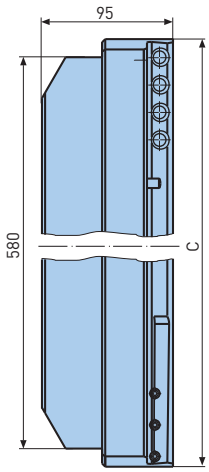


Tool holders for OD turning

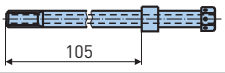
Type	Order No.
CKB5/28	317.284



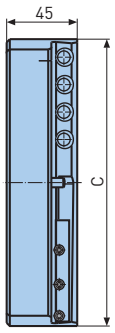
Extension slides steel



C	Boring Range D *	Order No.
603	620 - 690	317.231 *
673	690 - 760	317.232 *
743	760 - 830	317.233 *
813	830 - 900	317.234 *
883	900 - 970	317.235 *
953	970 -1040	317.236 *
1023	1040 - 1110	317.237 *
1093	1110 - 1180	317.238 *

Coolant Nozzle	Order No.
	389.221

Extension slides aluminium

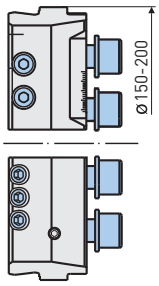


C	Boring Range D *	Order No.
183	200 - 270	317.252 *
253	270 - 340	317.253 *
323	340 - 410	317.254 *
393	410 - 480	317.255 *
463	480 - 550	317.256 *
533	550 - 620	317.257 *

B.6

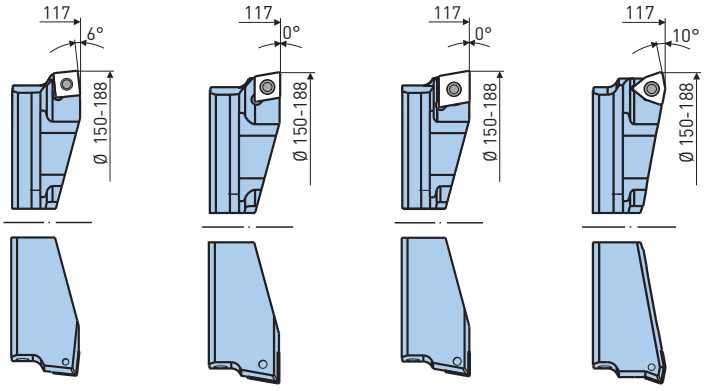
Clamping bases Ø 150 - 200

Order No.
317.288 *



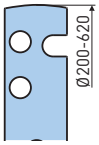
Insert holders Ø 150 - 188

Order No.	637.813	637.829	637.833	637.845
Type	SC 12	CC 12	CC 16	WC 08



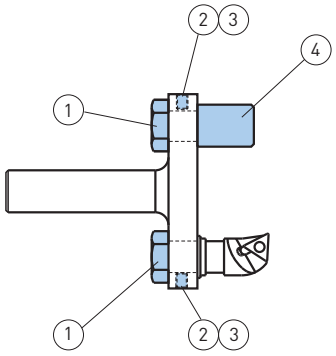
Spacers

Spacer 0.5 mm	Order No.
Ø 150 - 200	317.286



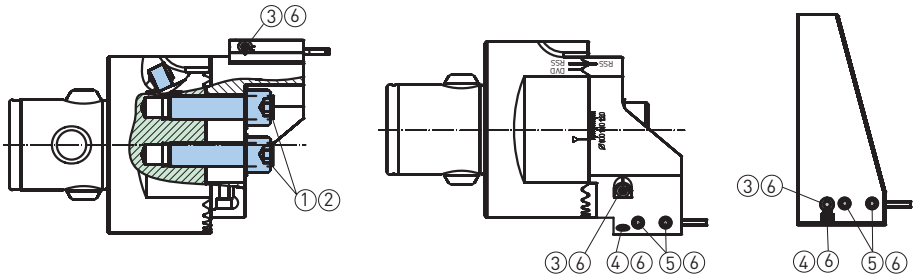
* As long as stock lasts.

OD turning / Eccentric bar



				
Type	①	②	③	④
615.390	690.716	690.573	690.813	615.903

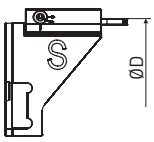
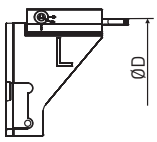
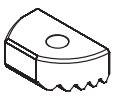
Face grooving holder SW, Series 318



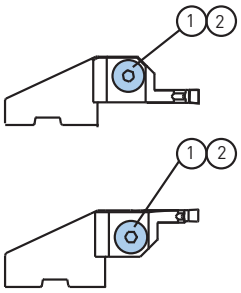
								
Type	①	M [Nm] *	②	③	④	⑤	M [Nm] *	⑥
SW53	639.691	16	690.805	639.690	690.400	690.511	2.5	690.813
SW68	639.691	16	690.805	639.690	690.400	690.622	2.5	690.813
SW98xCKN6	639.693	20	690.806	639.690	690.400	690.912	2.5	690.813
SW98xCKN7	639.693	20	690.806	639.690	690.400	690.912	2.5	690.813
SW148xCKN6	639.693	20	690.806	639.690	690.400	690.913	2.5	690.813
SW148xCKN7	639.693	20	690.806	639.690	690.400	690.913	2.5	690.813
FKW200 (Serie 318)	-	-	-	637.962	690.400	690.511	2.5	690.813

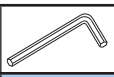
B.6

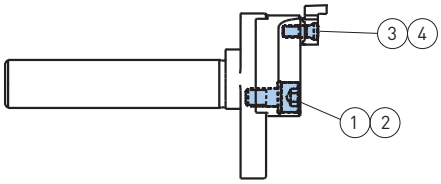
Face grooving holder / Blind Piece

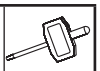
				
Type	ØD			
SW53	53 - 70	639.651	639.652	639.915
SW68	68 - 90	639.661	639.662	639.916
	88 - 110	639.665	639.666	
SW98	98 - 126	639.671	639.672	639.917
	125 - 153	639.675	639.676	
SW148	148 - 176	639.681	639.682	639.918
	175 - 203	639.685	639.686	

Insert holders for face grooving



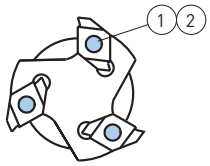
				
Type	Type	①	M [Nm] *	②
626.935	626.945	690.183	4.0	690.813
626.936	626.946			
626.937	626.947			
626.938	626.948			



						
Type	①	②	M [Nm] *	③ **	M [Nm] *	④
615.387	690.107	693.182	12.0	694.143	3.0	694.815
615.388						

Slot milling cutters

Clamp screws for inserts

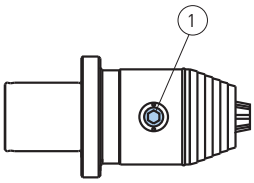


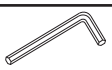
			
Type	① **	M [Nm] *	②
0	958.048	0.8	690.836
1	958.048	0.8	690.836
2	958.049	6.0	690.838

* M = Recommended torque for tightening the screws

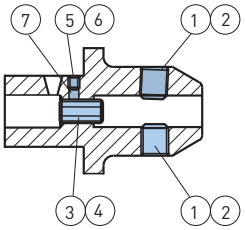
** Per package: 10 screws and 1 wrench

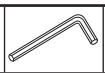
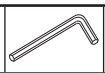
Drill chuck



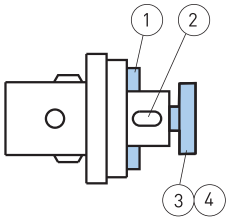
		
Type	①	M [Nm] *
335.042	690.817	20
335.044	690.817	20

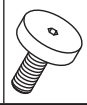
End mill holders



								
Type	①	M [Nm] *	②	③	④	⑤	⑥	⑦
6	690.477	5	690.803	690.512	690.802	690.419	690.802	691.318
8	690.478	10	690.804	690.513	690.803	690.489	690.803	691.316
10	690.479	16	690.805	690.514	690.804	690.489	690.803	691.316
12	690.480	28	690.806	690.515	690.805	690.489	690.803	691.315
14	690.480	28	690.806	690.515	690.805	690.489	690.803	691.315
16	690.481	28	690.806	690.510	690.806	690.489	690.803	691.315
18	690.481	28	690.806	690.510	690.806	690.489	690.803	691.315
20	690.482	42	690.807	690.510	690.806	690.489	690.803	691.315
25	690.483	50	690.810	690.510	690.806	690.489	690.803	691.315
32	690.484	72	690.810					
40	690.484	72	690.810					

Universal milling cutter holders

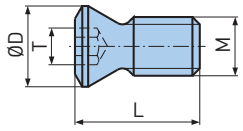


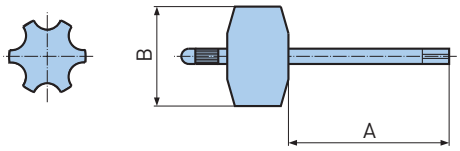
					
Type	①	②	③	M [Nm] *	④
16	691.605	691.600	690.703	18	690.805
22	691.606	691.601	690.704	35	690.806
27	691.607	691.602	690.705	70	690.807
32	691.608	691.604	690.706	80	690.810
40	691.609	691.603	690.707	80	690.809

B.6

* M = Recommended torque for tightening the screws

Clamp screws and wrenches for inserts





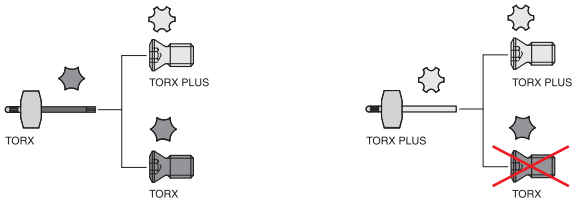
Screws

Dimensions					Torx	Torx Plus
Torx/Torx Plus	Thread M	ØD	L	Nm [1]	Order No.	Order No.
T6	M2	3.0	4.0	0.5	335.035	
T6 IP	M2	2.7	3.6			694.101
T6 IP	M2	2.7	4.1			694.102
T6 IP	M2	2.7	4.8			694.103
T7 IP	M2.2	3.5	6.0	0.7		694.110
T7 IP	M2.5	3.5	6.5			694.122
T7 IP	M2.5	3.5	5.8			694.123
T7 IP	M2.5	3.5	6.3			694.124
T7 IP	M2.5	4.3	5.5			694.121
T7 IP	M3	4.6	6.0			694.130
T8	M3	4.4	9.0	0.8	958.048	
T8 IP	M2.5	3.5	8.7			694.125
T9 IP	M3	4.4	8.2	1.5		694.131
T10	M3	4.1	7.0	1.8	335.036	
T10 IP	M3.5	4.8	9.2			694.137
T10 IP	M3.5	5.5	8.2			694.136
T15	M4	5.7	8.2	3.0	336.905	
T15 IP	M4	5.1	9.2			694.141
T15 IP	M4	5.5	11.8			694.143
T20	M5	6.6	16.5	6.0	658.049	
T20	M5	7.0	12.0		335.037	
T20 IP	M4	6.4	15.0			694.144
T20 IP	M4	6.5	11.6			694.142
T20 IP	M5	7.0	13.3			694.150

Wrench

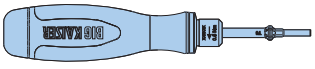
Dimensions			Torx	Torx Plus
Torx/Torx Plus	A	B	Order No.	Order No.
T6	42	26	690.834	
T6 IP				694.806
T7 IP				694.807
T8			690.836	
T8 IP				694.808
T9 IP				694.809
T10	50	34	690.837	
T10 IP				694.810
T15			690.843	
T15 IP				694.815
T20			690.838	
T20 IP				694.820

Compatibility TORX - TORX PLUS



Size	Torque	Set		Order No.
		Torque Wrench	Torx Blade	
Torx 6	0.5 Nm	694.160	694.167	694.181
Torx 7	0.7 Nm	694.161	694.168	694.182
Torx 8	0.8 Nm	694.162	694.169	694.183
Torx 9	1.5 Nm	694.163	694.170	694.184
Torx 10	1.8 Nm	694.164	694.171	694.185
Torx 15	3.0 Nm	694.165	694.172	694.186
Torx 20	5.0 Nm	694.166	694.173	694.187

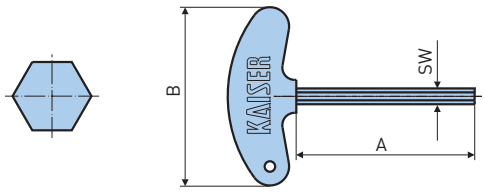
Size	Torque	Set		Order No.
		Torque Wrench	Torx Plus Blade	
Torx 6	0.5 Nm	694.160	694.174	694.188
Torx 7	0.7 Nm	694.161	694.175	694.189
Torx 8	0.8 Nm	694.162	694.176	694.190
Torx 9	1.5 Nm	694.163	694.177	694.191
Torx 10	1.8 Nm	694.164	694.178	694.192
Torx 15	3.0 Nm	694.165	694.179	694.193
Torx 20	5.0 Nm	694.166	694.180	694.194



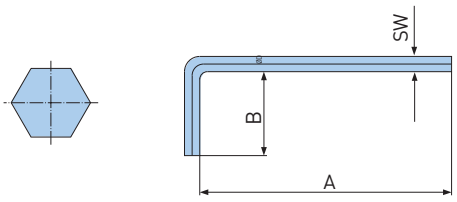
[1] Maximum tightening torque

The clamping screws for the inserts are supplied in packages of 10 pieces with a corresponding wrench.

Wrenches



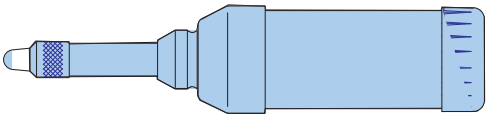
A	B	SW	Order No.
50	45	1.5	690.819
		2	690.811
		2.5	690.812
		3	690.813
		4	690.814
70	65	5	690.816
		6	690.817



A	B	SW	Order No.
42	14	1.3	690.833
50		1.5	690.800
50	16	2	690.801
56	18	2.5	690.802
63	20	3	690.803
67	24	3.5	690.899
71	25	4	690.804
80	28	5	690.805
90	32	6	690.806
100	36	8	690.807
112	40	10	690.810
200			690.808
125	45	12	690.809
140	56	14	690.832
140	63	17	690.861

Lubrication gun

Order No.
692.404A





Lubricant

For lubricating the fine boring heads type AW, EW, EWN, EWD, EWB, EWB-UP a light machine oil of the following types is recommended:

- Mobil Vactra Oil No. 2
- BP Energol HLP-32
- Klueber Isoflex PDP 94

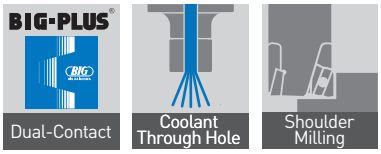
The lubricating instructions are shown in the operating instructions that are included with each head.

Indexable End Mills

Fullcut Mill FCM	444 - 450
Fullcut Mill FCM Arbor Type	451
Fullcut Mill FCM Inserts	452 - 454
Fullcut Mill FCR	455 - 458
Fullcut Mill FCR Inserts	459 - 461
Contact Grip	462 - 465
Spare Parts	466
Surface Mill	467
Speed Finisher	468 - 469

C.1

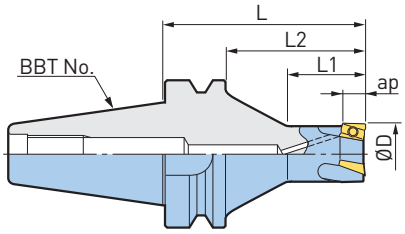
Fullcut Mill FCM



The indexable endmill that combines sharpness and rigidity has no match.

For Standard Type with FCM



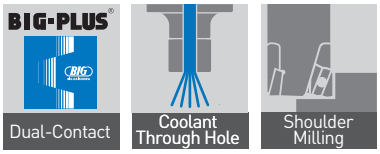


BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCM16092 - 65	**966.216**	9	65	23	43	2	ARG16	0.50
20	-FCM20093 - 65	**966.217**			28	43	3	ARG20	0.51
25	-FCM25093 - 65	**966.218**			33	43	3	ARG25	0.55
32	-FCM32113 - 65	**966.219**	11		38	43	3	ARG32	0.60
40	-FCM40114 - 50	**966.220**		50	25	28	4	ARG40	0.60
50	-FCM50115 - 50	**966.120**			28		5		0.73
16	BBT40 -FCM16092 - 85	**966.221**	9	85	23	58	2	ARG16	1.2
	-105	**966.121**		105	30	78			1.3
	-120	**966.122**		120	25	93			1.4
	-150	**966.123**		150		123			1.7
20	-FCM20093 - 85	**966.222**	9	85	28	58	3	ARG20	1.2
	-105	**966.124**		105	35	78			1.3
	-120	**966.125**		120	30	93			1.4
	-150	**966.126**		150		123			1.7
25	-FCM25093 - 85	**966.223**	9	85	33	58	3	ARG25	1.2
	-120	**966.127**		120	45	93			1.4
	-135	**966.128**		135	40	108			1.6
	-165	**966.129**		165		138			1.9
32	-FCM32113 - 85	**966.224**	11	85	38	58	3	ARG32	1.3
	-120	**966.130**		120	60	93			1.5
	-135	**966.131**		135	50	108			1.7
	-165	**966.132**		165	40	138			2.1
40	-FCM40114 - 85	**966.225**	11	85	43	58	4	ARG40	1.4
	-120	**966.133**		120	65	93			1.7
	-135	**966.134**		135	60	108			2.0
	-165	**966.135**		165	50	138			2.4
50	-FCM50115 - 70	**966.226**	11	70	38	43	5		1.5
	-120	**966.136**		120	65	93			2.2
	-135	**966.137**		135	60	108			2.4
	-165	**966.138**		165	50	138			3.0

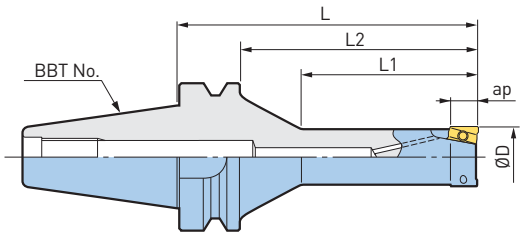
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 452
For Cutting Condition ▶ 453
For BBT50 Adapter ▶ 445



For Long Nose Type with BBT





BIG-PLUS tools can be used in machining centers with conventional spindles.

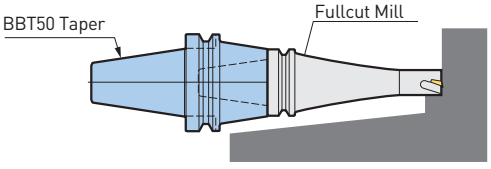
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCM16092L - 85	**966.081**	9	85	45	63	2	ARG16	0.52
20	-FCM20092L - 85	**966.082**			50	63		ARG20	0.55
25	-FCM25092L - 85	**966.083**			50	63		ARG25	0.62
32	-FCM32112L - 85	**966.084**	11		60	63		ARG32	0.71
16	BBT40 -FCM16092L -105	**966.085**	9	105	45	78	2	ARG16	1.3
	-120	**966.086**		120		93			1.4
20	-FCM20092L -120	**966.087**	9	120	60	93	2	ARG20	1.4
	-135	**966.088**		135		108			1.5
25	-FCM25092L -135	**966.089**	9	135	75	108	2	ARG25	1.5
	-150	**966.090**		150		123			1.7
32	-FCM32112L -135	**966.091**	11	135	80	108	2	ARG32	1.7
	-150	**966.092**		150	90	123			1.9

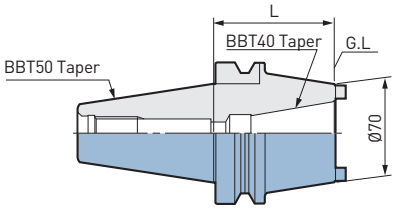
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 452
For Cutting Condition ▶ 453

Adapter for BBT50 taper shank (FCR & FCM)

An adapter for use of the BBT40 (Fullcut Mill) on BBT50/BT50 to machines.

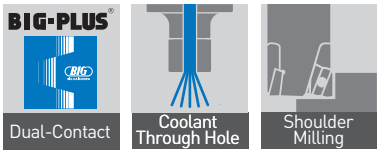




Model	Order No.	L
BBT50 -BBT40 -50	**803.730**	50
-90	**803.731**	90

Combination with the long type enables further workpiece interference countermeasures.

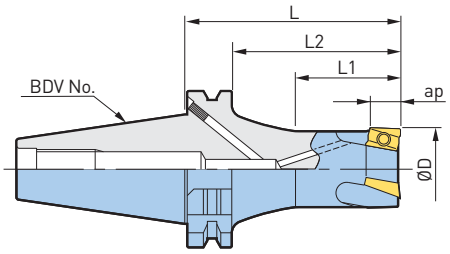
Fullcut Mill FCM



The indexable endmill that combines sharpness and rigidity has no match.

For Standard Type with BDV





BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BDV40 -FCM16092 - 85	**966.206**	9	85	23	65	2	ARG16	1.2
	-105	**966.161**		105	35	85			1.3
	-120	**966.162**		120	34	100			1.4
20	-FCM20093 - 85	**966.207**		85	35	65	3	ARG20	1.2
	-105	**966.163**		105	40	85			1.3
	-120	**966.164**		120	39	100			1.4
25	-FCM25093 - 85	**966.208**		85	33	65		ARG25	1.2
	-120	**966.165**		120	45	100			1.4
	-135	**966.166**		135	40	115			1.6
32	-FCM32113 - 85	**966.209**	11	85	38	65		ARG32	1.3
	-120	**966.167**		120	60	100			1.5
	-135	**966.168**		135	50	115			1.7
40	-FCM400114 - 85	**966.210**		85	45	65	4	ARG40	1.4
	-120	**966.169**		120	65	100			1.7
	-135	**966.170**		135	60	115			2.0
50	-FCM50115 - 70	**966.211**		70	50	50	5	ARG40	1.5
	-120	**966.171**		120	100	100			2.2
	-135	**966.172**		135	115	115			2.4

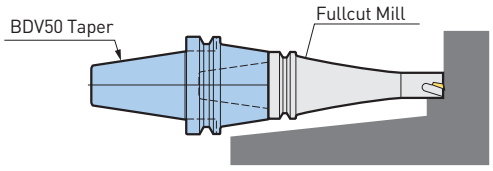
1. Wrench is included. Inserts are to be ordered separately.

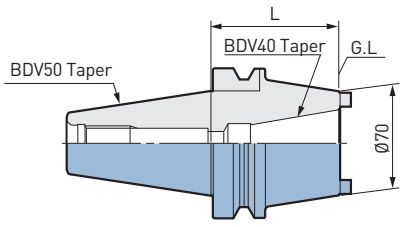
For Insert ▶ 452
For Cutting Condition ▶ 453

Adapter for BDV50 taper shank (FCR & FCM)

C.1

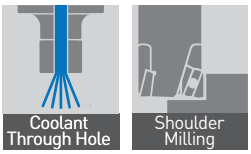
An adapter for use of the BDV40 (Fullcut Mill) on BDV50/DV50 to machines.





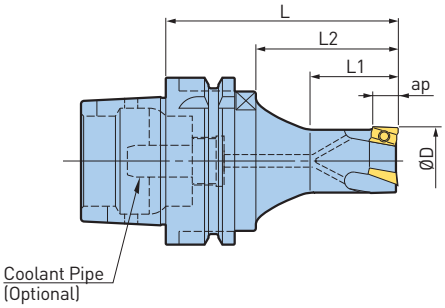
Model	Order No.	L
BDV50 -BDV40 -50	**805.856**	50
-90	**805.857**	90

Combination with the long type enables further workpiece interference countermeasures.



For Standard Type with HSK-A





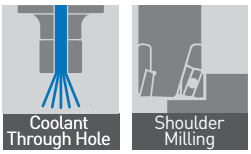
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK-A40 -FCM16092 - 65	**966.101**	9	65	23	37	2	ARG16	0.3
20	-FCM20093 - 65	**966.102**			28		3	ARG20	0.3
25	-FCM25093 - 65	**966.103**			35			ARG25	0.4
32	-FCM32113 - 65	**966.104**	11					ARG32	0.5
40	-FCM40114 - 65	**966.105**			45	-	4	ARG40	0.6
50	-FCM50115 - 65	**966.106**					5		0.7
16	HSK-A50 -FCM16092 - 75	**966.107**	9	75	23	41	2	ARG16	0.6
20	-FCM20093 - 75	**966.108**			28		3	ARG20	0.6
25	-FCM25093 - 75	**966.109**			33			ARG25	0.6
32	-FCM32113 - 75	**966.110**	11		39			ARG32	0.7
40	-FCM40114 - 75	**966.111**			48	-	4	ARG40	0.9
50	-FCM50115 - 75	**966.112**				-	5		1.0
16	HSK-A63 -FCM16092 - 85	**966.231**	9	85	23	51	2	ARG16	0.9
	-105	**966.141**		105	30	71			1.0
	-120	**966.142**		120	25	86			1.1
	-150	**966.143**		150	25	116			1.3
20	-FCM20093 - 85	**966.232**		85	28	51	3	ARG20	1.0
	-105	**966.144**		105	35	71			1.1
	-120	**966.145**		120	30	86			1.2
	-150	**966.146**		150	30	116			1.4
25	-FCM25093 - 85	**966.233**		85	33	51		ARG25	1.0
	-120	**966.147**		120	45	86			1.2
	-135	**966.148**		135	40	101			1.3
	-165	**966.149**		165	40	131			1.5
32	-FCM32113 - 85	**966.234**	11	85	38	51		ARG32	1.1
	-120	**966.150**		120	60	86			1.3
	-135	**966.151**		135	50	101			1.4
	-165	**966.152**		165	40	131			1.7
40	-FCM40114 - 85	**966.235**		85	43	51	4	ARG40	1.3
	-120	**966.153**		120	65	86			1.5
	-135	**966.154**		135	60	101			1.7
	-165	**966.155**		165	50	131			2.1
50	-FCM50115 - 70	**966.236**		70	28	28	5	ARG40	1.3
	-120	**966.156**		120	78	78			1.9
	-135	**966.157**		135	93	93			2.2
	-165	**966.158**		165	123	123			2.8

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 452
For Cutting Condition ▶ 453
For Coolant Pipe ▶ 175

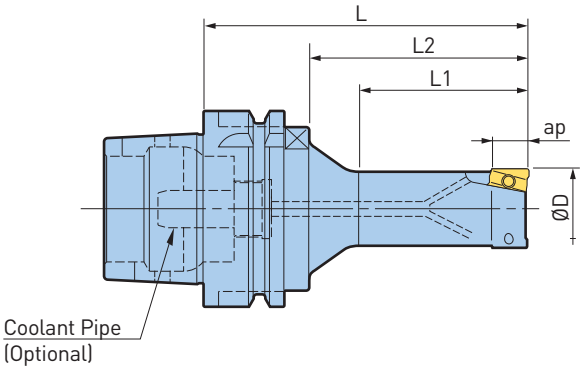
Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.



For Long Nose Type with HSK-A





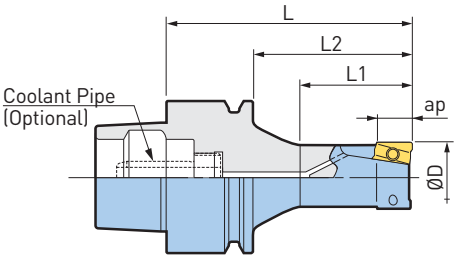
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK-A63 -FCM16092L- 85	**966.093**	9	85	40	51	2	ARG16	0.9
	-120	**966.094**		120	45	86			1.0
20	-FCM20092L-105	**966.095**	9	105	50	71	2	ARG20	1.1
	-120	**966.096**		120	60	86			1.2
25	-FCM25092L-105	**966.097**	9	105	55	71	2	ARG25	1.1
	-120	**966.098**		120	65	86			1.2
32	-FCM32112L -120	**966.099**	11	120	70	86	2	ARG32	1.3
	-135	**966.100**		135	80	101			1.4

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 452
For Cutting Condition ▶ 453
For Coolant Pipe ▶ 175

For Standard Type with HSK-E





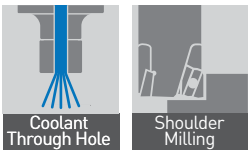
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK -E25 -FCM16092 -45	**966.173**	9	45	23	35	2	ARG16	0.17
	-E32 -FCM16092 -55	**966.174**		55	23	35			0.20
	-E40 -FCM16092 -65	**966.115**		65	28	45			0.45

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 452
For Cutting Condition ▶ 453
For Coolant Pipe ▶ 175

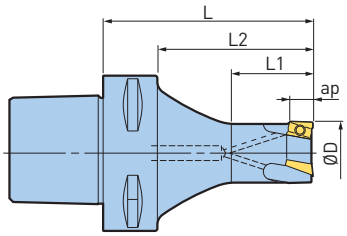
Caution

As the HSK-E type interface does not have drive key grooves, there is a risk that it may slip in the machine spindle and damage it if cutting load exceeds clamping force of the machine tool. Starting from the lowest possible conditions, increase them gradually while observing the cutting status, and find the optimum with sufficient safety margin.



For Standard Type with BIG CAPTO





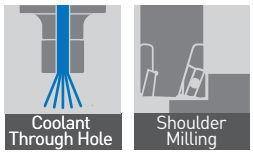
Cutter Dia. ØD	Model	Order No.	L	L1	L2	ap	No. of Inserts	Insert Size	Weight (kg)
16	C5 -FCM16092 -65	**805.858**	65	23	45	9	2	ARG16	0.5
	-90	**805.859**	90	30	70				0.6
20	-FCM20093 -65	**973.609**	65	28	45	9	3	ARG20	0.5
	-90	**805.860**	90	35	70				0.6
25	-FCM25093 -65	**805.861**	65	33	45	9	3	ARG25	0.6
	-90	**805.862**	90	40	70				0.7
32	-FCM32113 -65	**805.863**	65	38	45	11	3	ARG32	0.6
	-90	**805.864**	90	45	70				0.8
40	-FCM40114 -50	**805.865**	50	25	30	11	4	ARG40	0.6
	-90	**805.866**	90	60	70				1.0
50	-FCM50115 -50	**805.867**	50	25	30	11	5		0.7
	-90	**805.868**	90	65	70				1.0

1. Wrench is included.
2. Inserts are to be ordered separately.

For Insert ▶ 452
For Cutting Condition ▶ 453

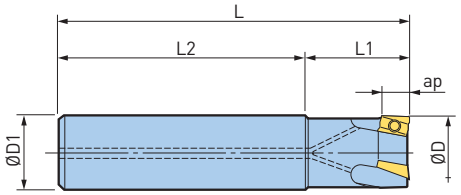
Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.



For Long Nose Type with Cylindrical Shank





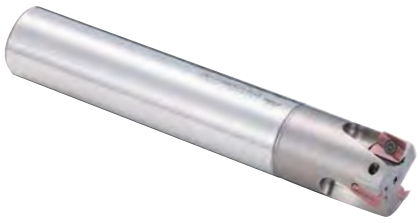
Cutter Dia. ØD	Model			Order No.	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
12	ST16	-FCM12091	- 90	**966.237**	16	9	90	15	70	1	ARG16	0.1
14		-FCM14091	- 90	**966.238**				17				0.1
16		-FCM16092	- 90	**966.239**				25	65	2		0.1
20	ST20	-FCM20093	-110	**966.240**	20	9	110	30	80	3	ARG20	0.2
25	ST25	-FCM25093	-120	**966.241**	25	9	120	35	85	3	ARG25	0.4
32	ST32	-FCM32113	-130	**966.242**	32	11	130	35	95	3	ARG32	0.7
40		-FCM40114	-130	**966.243**				40	90	4	ARG40	0.8
			-180	**802.963**			180		140			1.2
50		-FCM50115	-130	**966.244**			130		90	5		1.0

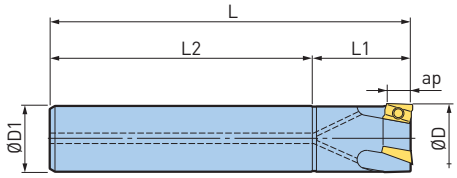
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 452
For Cutting Condition ▶ 453

For Oversize Type with Cylindrical Shank

"Thin wall" at deep pocket & deep shoulder endmilling.





Cutter Dia. ØD	Model			Order No.	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
17	ST16	-FCM17092	-120	**966.181**	16	9	120	25	95	2	ARG16	0.2
21	ST20	-FCM21092	-165	**966.182**	20	9	165	30	135	2	ARG20	0.4
		-FCM21093	-135	**966.183**			135		105	3		0.3
26	ST25	-FCM26092	-165	**966.184**	25	9	165	38	127	2	ARG25	0.6
		-FCM26093	-150	**966.185**			150		112	3		0.6
33	ST32	-FCM33112	-180	**966.186**	32	11	180	48	132	2	ARG32	1.1
		-FCM33113	-180	**966.187**			180		132	3		1.0

1. Wrench is included. Inserts are to be ordered separately.
2. For medium-heavy or heavy slot milling with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

For Insert ▶ 452
For Cutting Condition ▶ 453

Application Example

Model	ST32-FCM33112-180
Material	C55 (S55C)
Cutting Speed Vc (m/min.)	120
Feed Rate fz (mm/tooth)	0.1
Axial DOC ap (mm)	10 mm x 10 steps
Radial DOC ae (mm)	Max. 33 mm

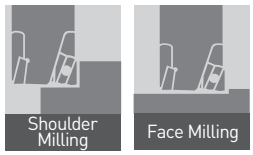
Result

Deep shoulder endmilling is achieved with 110 mm projection length and 10 mm axial depth.



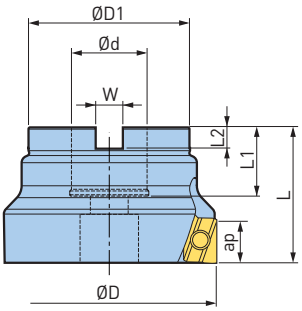
Fullcut Mill FCM, Arbor Type

Corresponding to Form FMH of new standard face milling adapter.









Form FMH

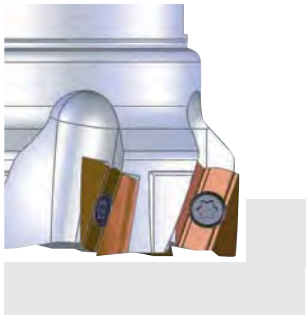
Cutter Dia. ØD	Model	Order No.	ap	Ød	ØD1	L	L1	L2	W	No. of Inserts	Insert Size	Weight (kg)
50	FMH22 -FCM50115 -40	**966.212**	11	22	47	40	20	6	10.4	5	ARG40	0.5
63	-FCM63116 -40	**966.213**								6	ARG63	0.7
80	FMH27 -FCM80116 -50	**966.214**	11	27	60	50	22	7	12.4	6	ARG80	1.2
100	-FCM100116-50	**805.461**			76						ARG80	2.0

1. Wrench is included. Inserts are to be ordered separately.

For FMH Type BBT ▶ 72
For FMH Type BDV ▶ 111
For FMH Type HSK ▶ 148
For Insert ▶ 452

Application Example

Indexable Insert Endmill, achieving the excellent squareness and fine surface finish
Machined by Fullcut Mill model: FMH22-FCM63116-40
Arbor model: BBT40-FMH22-47-45



Squareness

Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.1
Axial DOC ap (mm)	5
Radial DOC ae (mm)	0.1

BIG KAISER	10 µm
Other manufacturer	40 µm

Wiper cutting edge

Cutting Speed Vc (m/min.)	250
Feed Rate fz (mm/tooth)	0.2
Axial DOC ap (mm)	0.1
Radial DOC ae (mm)	50

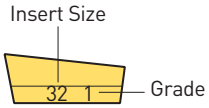
BIG KAISER	Ra=0.51 µm
Other manufacturer	Ra=1.56 µm

Fullcut Mill FCM

Indexable Inserts



Marking Description



1: ACZ310
2: DS20
P2: ACP200
M3: ACM300S
P3: ACP300
5S: ACZ350S

Model	Cutter Dia. ØD	ap	Nose R	P		M		K	N
				ACP200	ACP300	ACM300S	ACZ350S	ACZ310	DS20
ARG160902	12 - 17	9	0.2	-	978.812	-	978.805	800.488	978.801
ARG160904			0.4	978.827	966.245	805.869	966.246	966.248	966.249
ARG200902	20, 21	9	0.2	-	978.813	-	978.806	800.046	978.807
ARG200904			0.4	978.804	966.250	805.870	966.251	966.253	966.254
ARG250902	25, 26	9	0.2	-	978.814	-	978.808	800.047	978.803
ARG250904			0.4	800.048	966.255	805.871	966.256	966.258	966.259
ARG321102	32, 33	11	0.2	-	978.828	-	800.050	800.049	966.270
ARG321104			0.4	800.051	966.260	805.872	966.261	966.263	966.264
ARG401102	40, 50	11	0.2	-	800.052	-	978.819	800.053	978.821
ARG401104			0.4	978.809	966.265	805.873	966.266	966.268	966.269
ARG631104	63	11	0.4			806.257			
ARG631108			0.8	978.810	966.280		966.281	966.283	966.284
ARG801104	80, 100	11	0.4			806.258			
ARG801108			0.8	978.811	966.285		966.286	966.288	966.289

1. ACP300 is first recommendation for steel and ACM300S is first recommendation for stainless steel.

For Spare Parts ▶ 466

Caution

- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- Nose radius 0.2 inserts are suitable for light cutting.
- There is no compatibility with those of FCR type.

Insert classifications

ISO	Grade	Material	Coating
P20	ACP200	Prehardened steel	TiAlN / AlCrN
P30	ACP300	General steel	
M30	ACM300S	Stainless steel	TiAlN / TiCN
	ACZ350S	Stainless steel	
K10	ACZ310	Cast iron	
N20	DS20	Aluminium	DLC

C.1

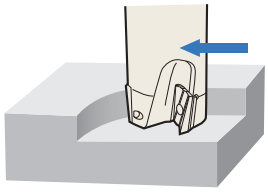
Note

It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

Fullcut Mill FCM

Recommended Cutting Condition

Shoulder milling and slot milling



Finish-light cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Cast Iron	Aluminium
	Insert Grade	ACP300		ACP200	ACM300S (ACZ350S)	ACZ310	DS20
	Cutting Fluid	Dry			Dry/Wet	Dry	Dry/Wet
Ø12 - Ø14	Speed (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	100 - 200	200 - 750
	Feed (mm/tooth)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.1 - 0.2	0.1 - 0.3
Ø16 - Ø21	Speed (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	100 - 200	200 - 1000
	Feed (mm/tooth)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.1 - 0.2	0.1 - 0.3
Ø25 - Ø33	Speed (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.2	0.1 - 0.35
Ø40 - Ø50	Speed (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	80 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.2	0.1 - 0.35
Ø63 - Ø100	Speed (m/min)	100 - 220	150 - 240	80 - 120	120 - 180	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.25	0.1 - 0.35

Caution

Fullcut Mill, FCM type, cannot be used for feeding in Z-axis such as ramping, plunging and boring.

Medium-heavy cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel	Cast Iron	Aluminium
	Insert Grade	ACP300		ACM300S (ACZ350S)	ACZ310	DS20
	Cutting Fluid	Dry		Dry/Wet	Dry	Dry/Wet
Ø12 - Ø14	Speed (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 750
	Feed (mm/tooth)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.08 - 0.18	0.1 - 0.2
Ø16 - Ø21	Speed (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.08 - 0.18	0.1 - 0.2
Ø25 - Ø50	Speed (m/min)	100 - 200	160 - 220	120 - 180	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.16	0.1 - 0.15	0.12 - 0.15	0.08 - 0.2	0.1 - 0.3
Ø63 - Ø100	Speed (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 750
	Feed (mm/tooth)	0.08 - 0.18	0.1 - 0.16	0.12 - 0.15	0.1 - 0.2	0.1 - 0.3

Caution

- Nose radius 0.2 inserts are suitable for light cutting.
- Care should be taken in the selection of both axial & radial depth of cut as well as the feed rate.
- This table is a general guideline for cutting data. Please adjust according to machine and workpiece conditions, as well as width of cutting.
- Dry cutting (including air blow) is recommended when cutting of steel, except for finishing.
- Dry cutting is recommended for stainless steel. However use soluble oil in a case where severe built-up edge occurs.

Finishing milling with axial DOC of 0.2 mm or smaller

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel	Cast Iron
	Insert Grade	ACP200		ACZ310	
	Cutting Fluid	Wet			
Ø12 - Ø100	Speed (m/min)	200 - 250			
	Feed (mm/tooth)	0.1 - 0.2			

Caution

- For aluminium alloy, same conditions as „Finish-light cutting" shown above should be applied.
- For finishing of steel, wet cutting improves both surface finish and insert life. ACZ310 grade extends the life further.

Fullcut Mill FCM

Application Examples

Slot milling



Fullcut Mill	BBT40-FCM32113-85
Insert	ARG321104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.12
Axial DOC ap (mm)	9

Only Fullcut Mill was capable of achieving this data in a No.40 spindle taper machine.

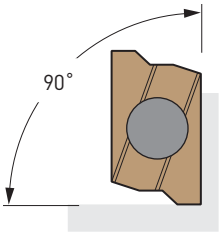


Shoulder milling



Fullcut Mill	BBT40-FCM32113-85
Insert	ARG321104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	200
Feed Rate fz (mm/tooth)	0.15
Axial DOC ap (mm)	11
Radial DOC ae (mm)	5

Excellent perpendicularity is achieved.



Face milling

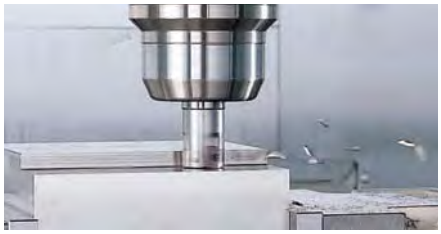


Fullcut Mill	BBT40-FCM50115-70
Insert	ARG401104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	200
Feed Rate fz (mm/tooth)	0.15
Axial DOC ap (mm)	1
Radial DOC ae (mm)	30

Finishing surface roughness was Ry = 2.53 at Vc = 200, fz = 0.15 cutting data.

	Surface Roughness Ry
BIG KAISER	2.53
Manufacturer A	3.75
Manufacturer B	4.32

Material of low machinability



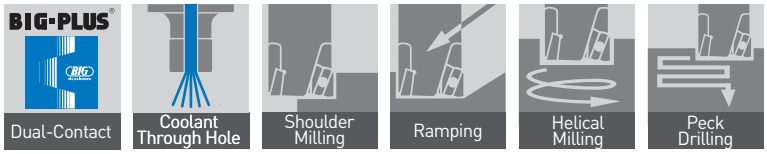
Fullcut Mill	ST25-FCM25093-120
Holder	BBT50-MEGA25D-105
Insert	ARG250904 (ACZ350S)
Work Material	SUS304 Stainless steel
Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.2
Axial DOC ap (mm)	9
Radial DOC ae (mm)	3

High efficiency and stable milling (Vf = 1140 mm/min.) is achieved.



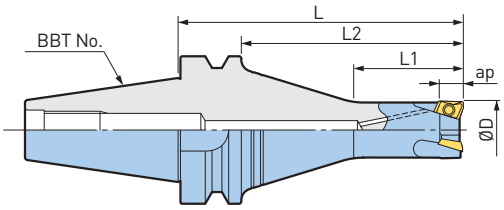
Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.



For Standard Type with BBT





BIG-PLUS tools can be used in machining centers with conventional spindles.

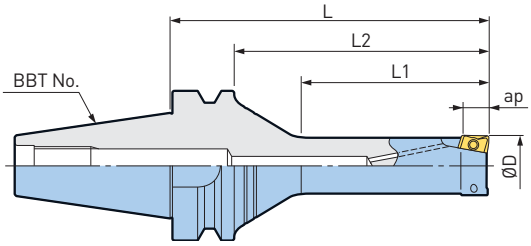
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCR16082 - 65	**966.683**	8	65	28	43	2	BRG16	0.5
20	-FCR20083 - 65	**966.685**					3	BRG20	0.5
25	-FCR25083 - 65	**966.687**			33			BRG25	0.6
32	-FCR32103 - 65	**966.689**	10		40			BRG32	0.6
16	BBT40 -FCR16082 - 85	**966.616**	8	85	25	58	2	BRG16	1.3
	-120	**966.617**		120	30	93			1.5
	-135	**966.618**		135	25	108			1.6
20	-FCR20083 - 85	**966.619**		85	35	58	3	BRG20	1.2
	-120	**966.620**		120	30	93			1.6
	-135	**966.621**		135		108			1.7
25	-FCR25083 - 85	**966.622**		85	40	58		BRG25	1.3
	-120	**966.623**		120	45	93			1.6
	-135	**966.624**		135	35	108			1.8
32	-FCR32103 - 85	**966.625**	10	85	45	58		BRG32	1.4
	-120	**966.626**		120	50	93			1.7
	-135	**966.627**		135	40	108			1.9

1. Wrench is included. Inserts are to be ordered separately.
2. Long nose type shown below is recommended for medium-heavy or heavy slot milling with long projection, exceeding L = 120 mm for 16 and 20 mm diameters / L = 135 mm for 25 or larger diameters.

For Insert ▶ 459
For Cutting Condition ▶ 460
For BBT50 Adapter ▶ 445

For Long Nose Type with BBT





BIG-PLUS tools can be used in machining centers with conventional spindles.

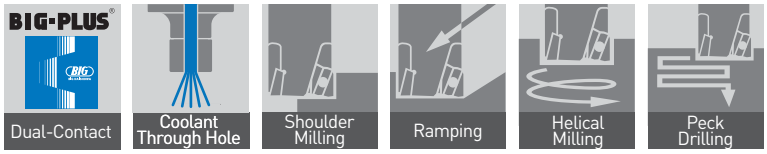
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCR16082L - 85	**966.684**	8	85	45	63	2	BRG16	0.5
20	-FCR20082L - 85	**966.686**			50			BRG20	0.5
25	-FCR25082L - 85	**966.688**						BRG25	0.6
32	-FCR32102L - 85	**966.690**	10		60			BRG32	0.7
16	BBT40 -FCR16082L -105	**966.691**	8	105	45	78	2	BRG16	1.3
	-120	**966.692**		120		93			1.4
20	-FCR20082L -120	**966.693**		120	60			BRG20	1.4
	-135	**966.694**		135		108			1.5
25	-FCR25082L -135	**966.695**		135	75			BRG25	1.5
	-150	**966.696**		150		123			1.7
32	-FCR32102L -135	**966.697**	10	135	80	108		BRG32	1.7
	-150	**966.698**		150	90	123			1.9

1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 459
For Cutting Condition ▶ 460
For BBT50 Adapter ▶ 445

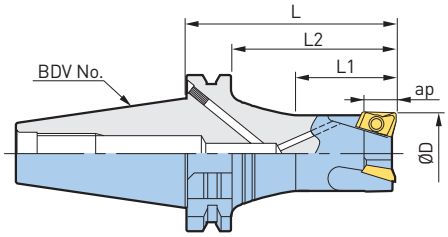
Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.



For Standard Type with BDV



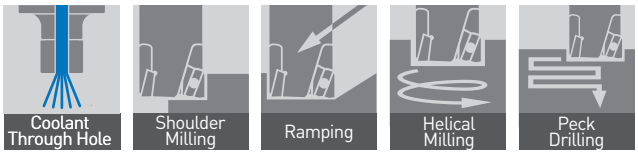


BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BDV40 -FCR16082 - 85	**966.601**	8	85	25	65	2	BRG16	1.3
	-120	**966.602**		120	30	100			1.5
	-135	**966.603**		135	25	115			1.6
20	-FCR20083 - 85	**966.604**		85	35	65	3	BRG20	1.2
	-120	**966.605**		120	30	100			1.6
	-135	**966.606**		135		115			1.7
25	-FCR25083 - 85	**966.607**		85	40	65		BRG25	1.3
	-120	**966.608**		120	45	100			1.6
	-135	**966.609**		135	35	115			1.8
32	-FCR32103 - 85	**966.610**	10	85	45	65		BRG32	1.4
	-120	**966.611**		120	50	100			1.7
	-135	**966.612**		135	40	115			1.9

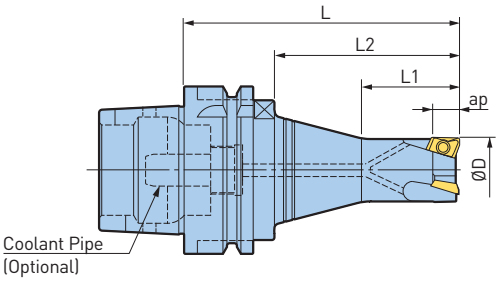
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 459
For Cutting Condition ▶ 460
For BDV50 Adapter ▶ 446



For Standard Type with HSK-A





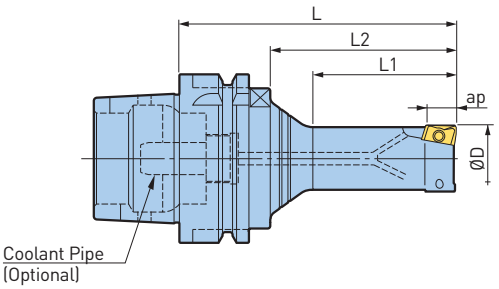
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK-A50 -FCR16082 - 75	966.671	8	75	27	41	2	BRG16	0.5
20	-FCR20083 - 75	966.672			28		3	BRG20	0.6
25	-FCR25083 - 75	966.673			33			BRG25	0.6
32	-FCR32103 - 75	966.674	10		39			BRG32	0.7
16	HSK-A63 -FCR16082 - 85	966.631	8	85	25	51	2	BRG16	0.9
	-120	966.632		120	30	86			1.1
	-135	966.633		135	25	101			1.2
20	-FCR20083 - 85	966.634		85	32	51	3	BRG20	1.0
	-120	966.635		120	30	86			1.2
	-135	966.636		135	30	101			1.3
25	-FCR25083 - 85	966.637		85	35	51		BRG25	1.0
	-120	966.638		120	45	86			1.2
	-135	966.639		135	35	101			1.4
32	-FCR32103 - 85	966.640	10	85	40	51		BRG32	1.1
	-120	966.641		120	50	86			1.4
	-135	966.642		135	40	101			1.5

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 459
For Cutting Condition ▶ 460
For Coolant Pipe ▶ 175

For Long Nose Type with HSK-A





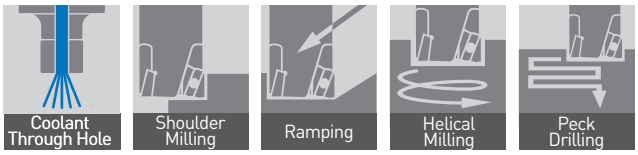
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK-A63 -FCR16082L - 85	966.675	8	85	40	51	2	BRG16	0.9
	-120	966.676		120	45	86			1.0
20	-FCR20082L -105	966.677		105	50	71		BRG20	1.1
	-120	966.678		120	60	86			1.2
25	-FCR25082L -105	966.679		105	55	71		BRG25	1.1
	-120	966.680		120	65	86			1.1
32	-FCR32102L -120	966.681	10		70			BRG32	1.4
	-135	966.682		135	80	101			1.4

1. Coolant pipe and inserts are to be ordered separately.

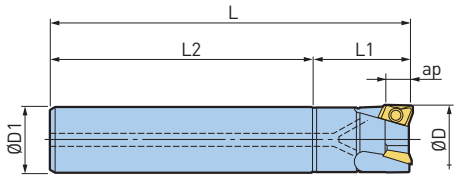
For Insert ▶ 459
For Cutting Condition ▶ 460
For Coolant Pipe ▶ 175

Fullcut Mill FCR

For Oversize Type with Cylindrical Shank.







Cutter Dia. ØD	Model		Order No.	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	ST15	-FCR16082 -120	**805.849**	15	8	120	25	95	2	BRG16	0.2
17	ST16	-FCR17082 -120	**802.191**	16	8	120	25	95	2	BRG16	0.2
20	ST19	-FCR20082 -165	**805.850**	19	8	165	30	135	2	BRG20	0.4
		-FCR20083 -135	**805.851**			135		105	3		0.3
21	ST20	-FCR21082 -165	**802.192**	20	8	165	30	135	2	BRG20	0.4
		-FCR21083 -135	**802.193**			135		105	3		0.3
25	ST24	-FCR25082 -180	**805.852**	24	8	180	35	145	2	BRG25	0.7
		-FCR25083 -150	**805.853**			150		115	3		0.6
26	ST25	-FCR26082 -165	**802.220**	25	8	165	38	127	2	BRG25	0.6
		-FCR26083 -150	**802.221**			150		112	3		0.6
32	ST28	-FCR32102 -180	**805.854**	28	10	180	48	132	2	BRG32	1.1
		-FCR32103 -180	**805.855**			180		132	3		1.0
33	ST32	-FCR33102 -180	**802.225**	32	10	180	48	132	2	BRG32	1.1
		-FCR33103 -180	**802.226**			180		132	3		1.0

1. Wrench is included. Inserts are to be ordered separately.
2. Lower cutting parameters appropriately for applications with either long projection or 3-flutes models.
3. For medium-heavy or heavy slot milling or ramping with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

For Insert ▶ 459
For Cutting Condition ▶ 460

Fullcut Mill FCR

Indexable Inserts



Model	Cutter Dia.	ap	Nose R	P	M	K	N
				ACZ350S		ACZ310	DS20
BRG160808	Ø16, Ø17	8	0.8	966.651		966.652	966.653
BRG200808	Ø20, Ø21	8	0.8	966.656		800.587	966.658
BRG250808	Ø25, Ø26	8	0.8	966.661		966.662	966.663
BRG321008	Ø32, Ø33	10	0.8	966.666		966.667	966.668
BRG321032		10	3.2	-		-	966.669

1. Inserts are available in packets of 10 pcs.

For Spare Parts ▶ 466

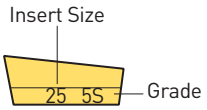
Caution

- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- There is no compatibility with those of FCM type.

Insert classifications

ISO	Grade	Material	Coating
P30	ACZ350S	General steel	TiAlN / TiCN
M30		Stainless steel	
K10	ACZ310	Cast iron	
N20	DS20	Aluminium	DLC

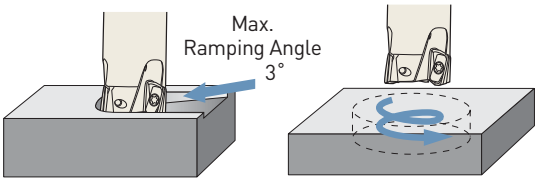
Marking Description



1: ACZ310
5S: ACZ350S
2: DS20

Fullcut Mill FCR

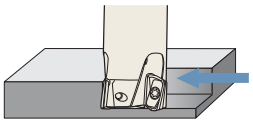
Recommended Cutting Condition



Cutter Dia.	Flat Bottom		Through Hole
	Max. Hole Dia.	Min. Hole Dia.	Min. Hole Dia.
Ø16	Ø30	Ø27	Ø22
Ø20	Ø38	Ø36	Ø29
Ø25	Ø48	Ø45	Ø39
Ø32	Ø62	Ø59	Ø48

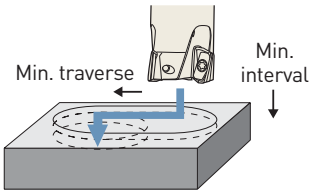
Ramping and helical interpolation

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Dry		Wet	Dry/Wet	Dry		Dry/Wet
Ø16, Ø17	Speed (m/min)	100 - 200	150 - 220	60 - 80	100 - 150	60 - 80	100 - 180	200 - 1000
	Feed (mm/tooth)	0.06 - 0.12	0.06 - 0.12	0.05 - 0.08	0.08 - 0.16	0.06 - 0.1	0.08 - 0.18	0.06 - 0.24
Ø20, Ø25, Ø26	Speed (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 100	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.06 - 0.1	0.02 - 0.18	0.1 - 0.35
Ø32, Ø33	Speed (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 120	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.06 - 0.2	0.1 - 0.35



Shoulder milling and slot milling

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Dry		Wet	Dry/Wet	Dry		Dry/Wet
Ø16, Ø20, Ø21	Speed (m/min)	100 - 200	100 - 200	60 - 80	120 - 180	80 - 120	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.18	0.08 - 0.18	0.05 - 0.1	0.12 - 0.18	0.08 - 0.12	0.08 - 0.18	0.1 - 0.3
Ø25, Ø32, Ø33	Speed (m/min)	100 - 200	100 - 200	60 - 100	120 - 180	80 - 120	100 - 180	200 - 1500
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.08 - 0.2	0.1 - 0.35



Cutter Dia.	Min. Interval	Min. Traverse
Ø16	0.5	14
Ø20	1	18
Ø25	1	23
Ø32	2	30

Plunge milling

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Air blow		Wet	Air/Wet	Air blow		Air/Wet
Ø16, Ø17	Speed (m/min)	80 - 120	80 - 120	60	80 - 120	60 - 80	80 - 160	200 - 350
	Feed (mm/tooth)	0.06 - 0.1	0.06 - 0.1	0.04 - 0.06	0.05 - 0.08	0.05 - 0.08	0.06 - 0.1	0.06 - 0.1
Ø20, Ø25, Ø26	Speed (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 500
	Feed (mm/tooth)	0.1 - 0.25	0.1 - 0.25	0.1 - 0.25	0.12 - 0.25	0.1 - 0.2	0.08 - 0.3	0.1 - 0.3
Ø32, Ø33	Speed (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 600
	Feed (mm/tooth)	0.1 - 0.3	0.1 - 0.3	0.1 - 0.3	0.12 - 0.3	0.1 - 0.2	0.08 - 0.4	0.1 - 0.3

Caution

- The table is just a reference to determine cutting conditions. It should be adjusted according to a condition of a machine tool or workpiece.
- Since chips may scatter, utilize safety enclosures.
- Do not use oil-based cutting fluid, or a fire may take place.

Fullcut Mill FCR

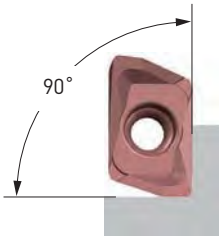
Application Examples

Bore

Dia. 38 with Helical milling



Fullcut Mill	BBT40-FCR20083-120
Insert	BRG200808 (ACZ350S)
Work Material	C50 (S50C) / Air blow
Cutting Speed Vc (m/min.)	150
Feed Rate Vf (mm/min.)	1 100
Axial DOC ap (mm)	2 mm x 3 times
Hole dia.	Ø38



For carbon steel of C50, very smooth cutting with feed rate of 1 100 mm/min and excellent squareness are achieved.

Honeycombed

Pocket with Ramping

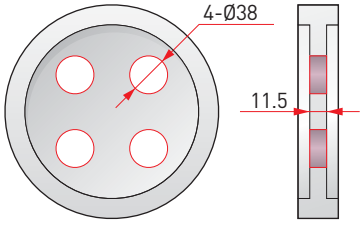


Fullcut Mill	BBT40-FCR20083-85
Insert	BRG200808 (DS20)
Work Material	A2017 Duralumin / Air blow
Cutting Speed Vc (m/min.)	750
Feed Rate Vf (mm/min.)	4 300
Axial DOC ap (mm)	6 mm x 3 times
Radial DOC ae (mm)	max. 20



For less rigid workpiece with 3 mm thickness clamped by a vise, feed rate of 4 300 mm/min on both sides of the workpiece is achieved.

Helical milling



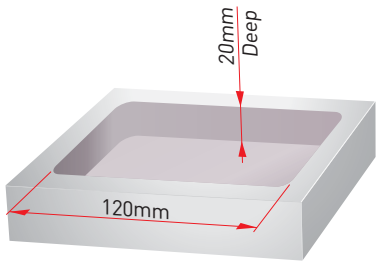
Fullcut Mill	BBT40-FCR20083-120
Insert	BRG200808 (ACZ350S)
Work Material	15CrMo5 (SCM415)
Cutting Speed Vc (m/min.)	150
Feed Rate Vf (mm/min.)	480
Axial DOC ap (mm)	4 mm x 3 times
Hole dia.	Ø38

Compared to another manufacturer

Axial DOC	**1.3 times**
Insert life	**2 times**

Stable helical milling with 4 mm axial DOC on less rigid workpiece.

Ramping



Fullcut Mill	BBT50-BBT40-50 BBT40-FCR16082-120
Insert	BRG160808 (ACZ350S)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	120
Feed Rate Vf (mm/min.)	480
Axial DOC ap (mm)	4 mm x 5 times

Compared to another manufacturer

No chatter even at higher resistance corner.

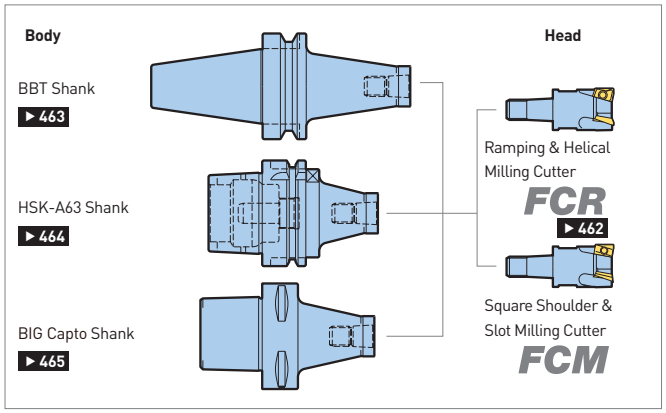
Smooth chip evacuation eliminates re-cutting of the swarf and edge chipping of the inserts.

Example of use of BBT50-BBT40 adapter. An improved result is obtained compared to the product from another manufacturer.

Contact Grip

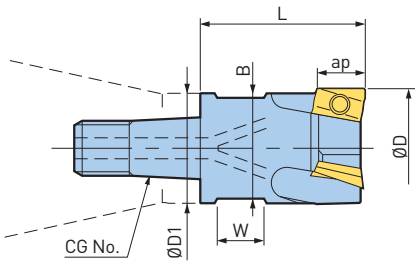
A threaded coupling with taper and face contact. Improved rigidity and accuracy from the BIG-PLUS dual contact system.





FCM Head





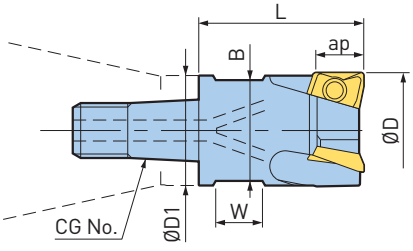
Cutter Dia. ØD	Model	Order No.	CG No.	ØD1	ap	L	No. of Inserts	Spanner Flats B	Spanner Flats W	Insert Size	Weight (kg)
16	CG15 -FCM16092 -25	**966.701**	CG15	15	9	25	2	12	6.2	ARG16	0.03
20	CG19 -FCM20092 -32	**966.702**	CG19	19	9	32	2	17	8.2	ARG20	0.07
	-FCM20093 -32	**966.703**					3				
25	CG24 -FCM25092 -36	**966.704**	CG24	24	9	36	2	22	10.2	ARG25	0.13
	-FCM25093 -36	**966.705**					3				
32	CG31 -FCM32112 -43	**966.706**	CG31	31	11	43	2	27	12.2	ARG32	0.26
	-FCM32113 -43	**966.707**					3				

1. Wrench is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

For Insert ▶ 452
For Cutting Condition ▶ 453

FCR Head





Cutter Dia. ØD	Model	Order No.	CG No.	ØD1	ap	L	No. of Insert	Spanner Flats B	Spanner Flats W	Insert Size	Weight (kg)
16	CG15 -FCR16082 -25	**966.708**	CG15	15	8	25	2	12	6.2	BRG16	0.03
20	CG19 -FCR20082 -32	**966.709**	CG19	19	8	32	2	17	8.2	BRG20	0.07
	-FCR20083 -32	**966.710**					3				
25	CG24 -FCR25082 -36	**966.711**	CG24	24	8	36	2	22	10.2	BRG25	0.13
	-FCR25083 -36	**966.712**					3				
32	CG31 -FCR32102 -43	**966.713**	CG31	31	10	43	2	27	12.2	BRG32	0.26
	-FCR32103 -43	**966.714**					3				

1. Wrench to clamp inserts is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

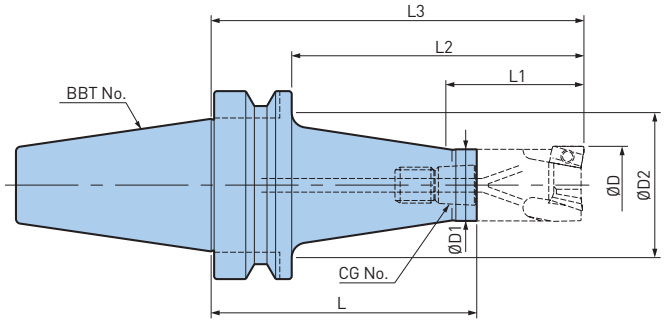
For Insert ▶ 459
For Cutting Condition ▶ 460

BIG-PLUS Dual-Contact

Coolant Through Hole

For Contact Grip with BBT





Body

BBT Shank

Head

FCR Ramping & Helical Milling Cutter

FCM Square Shoulder & Slot Milling Cutter

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Weight (kg)
BBT30 -CG15 - 50	**966.721**	16	CG15	15	40	50	31	53	75	0.5
- 80	**966.722**					80	32	83	105	0.6
-CG19 - 43	**966.723**	20	CG19	19		43	39	53	75	0.5
- 73	**966.724**				42	73	40	83	105	0.6
-CG24 - 39	**966.725**	25	CG24	24	41	39	45	53	75	0.5
- 69	**966.726**				42	69		83	105	0.6
-CG31 - 32	**966.727**	32	CG31	31	41	32	49	53	75	0.5
- 62	**966.728**				40	62	53	83	105	0.6
BBT40 -CG15 - 50	**966.731**	16	CG15	15	46	50	30	48	75	1.1
- 80	**966.732**				48	80	32	78	105	1.2
-100	**966.733**				49	100		98	125	1.3
-CG19 - 43	**966.734**	20	CG19	19	45	43	36	48	75	1.1
- 73	**966.735**				48	73	40	78	105	1.2
- 93	**966.736**				49	93		98	125	1.3
-CG24 - 39	**966.737**	25	CG24	24	39	39	41	48	75	1.0
- 69	**966.738**				48	69	45	78	105	1.2
- 89	**966.739**				49	89		98	125	1.3
-CG31 - 37	**966.740**	32	CG31	31	43	37	48	53	80	1.0
- 77	**966.741**				57	77	53	93	120	1.4
- 92	**966.742**					92		108	135	1.5
BBT50 -CG15 -115	**800.185**	16	CG15	15	90	115	30	102	140	4.4
-145	**966.746**				80	145	45	132	170	4.4
-CG19 -108	**800.186**	20	CG19	19	90	108	38	102	140	4.4
-153	**966.747**				80	153	60	147	185	4.5
-CG24 -114	**800.187**	25	CG24	24	90	114	42	112	150	4.5
-164	**966.748**					164	75	162	200	4.9
-CG31 -107	**800.188**	32	CG31	31	95	107	50	112	150	4.7
-157	**966.749**				90	157	90	162	200	5.0

1. Standard single-ended wrench is required to clamp the head.

For FCM/FCR Head ▶ 462

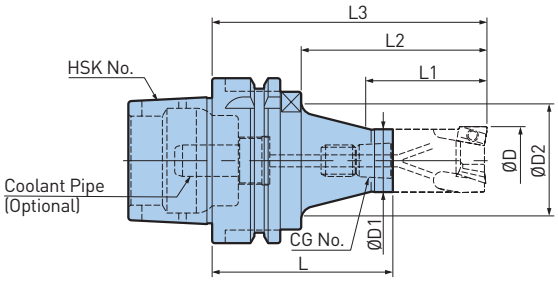
Contact Grip

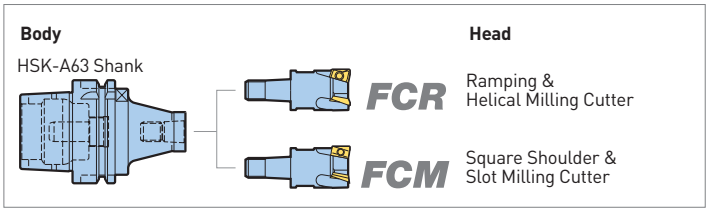
A threaded coupling with taper and face contact.

Coolant Through Hole

For Contact Grip with HSK-A







Model	Order No.	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Weight (Kg)
HSK-A63 -CG15 - 50	**966.751**	16	CG15	15	36	50	30	41	75	0.8
- 80	**966.752**				45	80	31	71	105	1.0
-100	**966.753**					100	32	91	125	
-CG19 - 73	**966.754**	20	CG19	19		73	39	71	105	
- 93	**966.755**					93	40	91	125	
-CG24 - 69	**966.756**	25	CG24	24		69	44	71	105	
- 89	**966.757**					89	45	91	125	1.1
-CG31 - 77	**966.758**	32	CG31	31		77	53	86	120	1.0
- 92	**966.759**					92		101	135	1.1

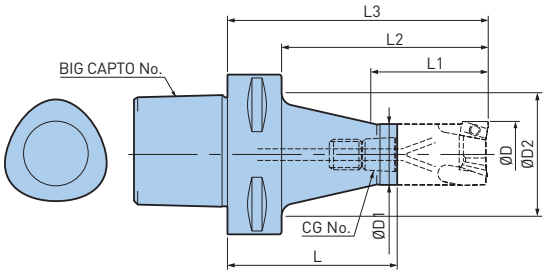
1. Standard single-ended wrench is required to clamp the head.
2. Coolant pipe is to be ordered separately.

For FCM/FCR Head ▶ 462
For Coolant Pipe ▶ 175

Coolant Through Hole

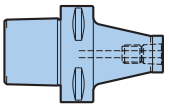
For Contact Grip with BIG CAPTO



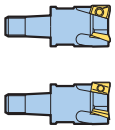


Body

BIG CAPTO Shank



Head



FCR — Ramping & Helical Milling Cutter

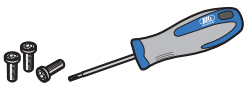
FCM — Square Shoulder & Slot Milling Cutter

Model	Order No.	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Weight (Kg)
C6 -CG15 - 50	802.822	16	CG15	15	46	50	31	53	75	0.9
- 80	802.819				48	80		83	105	1.0
-100	802.815				49	100	32	103	125	1.1
-CG19 - 43	802.823	20	CG19	19	45	43	39	53	75	0.9
- 73	802.820				48	73	39	83	105	1.0
- 93	802.816				49	93	40	103	125	1.1
-CG24 - 69	802.821	25	CG24	24		69	44	83	105	1.0
- 89	802.817					89	45	103	125	1.1
-CG31 - 77	802.818	32	CG31	31	57	77	53	98	120	1.2
- 92	802.814					92		113	135	1.3

1. Standard single-ended wrench is required to clamp the head.

For FCM/FCR Heads ▶ 462

Spare Parts for Fullcut Mill, FCM and FCR

				Insert Clamping Screw Set 		Wrench 		
FCM		FCR		Model	Order No.	Model	Order No.	Torx
Cutter Dia. Ø	Insert	Cutter Dia. Ø	Insert					Size
12	ARG 1609	-	-	S2505DS	966.271	DA-T8	966.274	T-8
14, 16, 17		16, 17	BRG1608	S2506DS	966.272			
20, 21	ARG2009	20, 21	BRG2008					
25, 26	ARG2509	25, 26	BRG2508					
32, 33	ARG3211	32, 33	BRG3210	S3508DS	966.273	DA-T15	966.275	T-15
40, 50	ARG4011							
63	ARG6311							
80, 100	ARG8011							

1. Insert clamping set contains 10 pcs screw and 1 pcs wrench.

Torque Wrench for Fullcut Mill

Torque wrench with fix Nm more precision. Ergonomic multi-component handle, particulary light and compact.

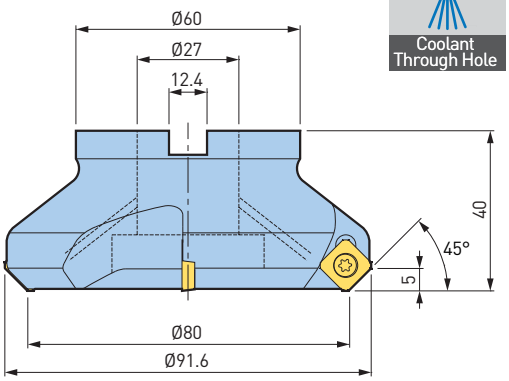
		Torque Wrench Set 	Torque Wrench Body 	Torque Wrench Bit 
Torx Size	Fixed Torque	Order No.	Order No.	Order No.
T8	0.8 Nm	694.183	694.162	694.169
T15	3.0 Nm	694.186	694.165	694.172

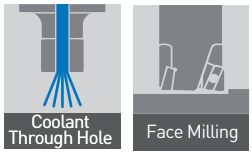
1. Torque wrench set contains 1 pcs wrench body and 1 pcs wrench bit.

Surface Mill

For superior surface finishing.





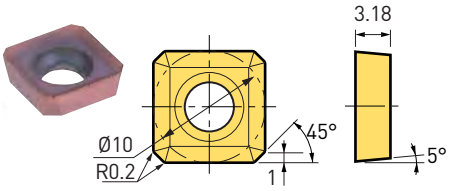


Model	Order No.	No. of Inserts	Weight (kg)	Insert Clamping Screw Set	Order No.
FM27-SFM804-40	805.890	4	0.9	S4S-T15DS	805.897

1. Wrench and screws are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.
3. MBA - M12H is required to be mounted on FMH.

For FMH Type BBT ▶ 72
For FMH Type BDV ▶ 111
For FMH Type HSK ▶ 148
For MBA - M12H ▶ 282

Indexable Inserts



Model	Order No.	Coating
CM10C1 ACP200	966.445	Multi-layer TiAlN & AlCrN for general steel
CM10C1 DS20	966.446	DLC coating for aluminum & non-ferrous

1. Inserts are available in packet of 10 pcs.

Insert Clamp Screw Set

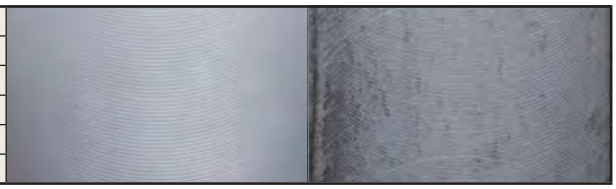
Insert clamping screw set (10) screws & (1) wrench		Driver-Type Wrench	
Model	Order No.	Model	Order No.
S4S-T15DS	805.897	DA-T15	966.275

Recommended Cutting Condition

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/t)	Axial DOC ap max (mm)
General Steel	ACP200	150-200-250	0.10-0.20-0.30	3
Prehardened Steel		180-240-300	0.10-0.25-0.40	4
Stainless Steel		160-205-250	0.15-0.23-0.30	3
Cast Iron		100-175-250	0.15-0.23-0.30	4
Aluminium, Non-ferrous	DS20	500-750-1000	0.15-0.23-0.30	5

Application Example

Work Material	C50
Cutting Speed V (m/min.)	200
Feed Rate f (mm/min.)	0.2
Axial DOC ap (mm)	3
Radial DOC ae (mm)	75
Coolant	Dry



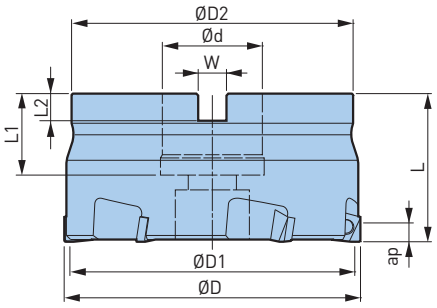
Surface Mill
Rz = 1.42

Other Manufacturer
Rz = 9.04

Speed Finisher

Amazing improvement of surface finish at high speed cutting.





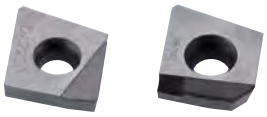
Coolant Through Hole

Model	Order No.	ØD	ØD1		ØD2	Ød	L	L1	L2	W	No. of Insert	max. min^{-1}	Clamp Bolt	Weight (kg)
			DA2200	CBN										
FM22 -PLS505 -35	**978.276**	50	46.9	44.9	47	22	35	19	6	10.4	5	20 000	M10 Cap Screw	0.4
-PLS636 -35	**978.313**	63	59.9	57.9	60	22	35	19	6	10.4	6			0.7
FM27 -PLS806 -40	**978.277**	80	76.9	74.9	76	27	40	22	7	12.4	6	16 000	M12 Cap Screw	1.2
-PLS1006 -35 *	**805.847**	100	69.9	94.9	60	27	35	24	7	12.4		12 800	MBA-M12	1.3
-PLS1256 -35 *	**805.848**	125	121.9	119.9	60	27	35	24	7	12.4		10 200	MBA-M12	1.9
FM32 -PLS1006 -42	**801.684**	100	96.9	94.9	96	32	42	24	8	14.4	6	12 800	MBA-M16	2.0
FM40 -PLS1258 -50	**805.284**	125	121.9	119.9	100	40	50	28	9	16.4	8	10 200	MBA-M20	3.3
-PLS16010 -50	**805.283**	160	156.9	154.9	100	40	50	28	9	16.4	10	8 000		4.1

1. Wrench and screws are included. Inserts are to be ordered separately.
2. When using at 12 000 min^{-1} or higher speed, contact agent for balancing of the cutter and arbor assembly.
3. Effective cutting edge length ap varies depending on insert models. Refer to the table for insert shown below.
4. Adjusting amount of cutting edge is 0.1 mm. Note this when using reground insert.
5. * Light weight design exclusive for BT30.

For FMH Type BBT ▶ 72
For FMH Type BDV ▶ 111
For FMH Type HSK ▶ 148

Indexable Inserts



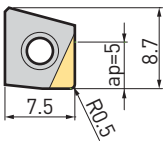


Fig. 1

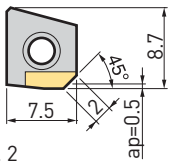


Fig. 2

Insert Model	Order No.	Workpiece	Fig.	Material	Cutting Edge Length
PL0705 DA2200	**978.278**	Aluminium & nonferrous	1	PCD	5.0
PL0705 CBN	**978.820**	Cast Iron	2	CBN	0.5

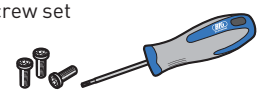
Insert Grade

DA2200	CBN
High density sintered material made of ultra-micro diamond particles. Superior hardness comparable to carbide alloy and wear resistance.	Newly designed CBN sintered body with high content rate of CBN improves toughness and thermal conductivity.

Recommended Cutting Condition

Workpiece Material		Insert Material	Cutting Speed (m/min)	Feed Rate (mm/tooth)	Coolant
Aluminium Alloy	Si Content ≤ 13%	DA2200	2 000 - 4 000	0.05 - 0.2	Wet
	Si Content > 13%		400 - 800		
Copper Alloy		DA2200	500 - 2 500	0.05 - 0.2	Wet
Gray Cast Iron		CBN	800 - 2 000	0.1 - 0.3	Dry

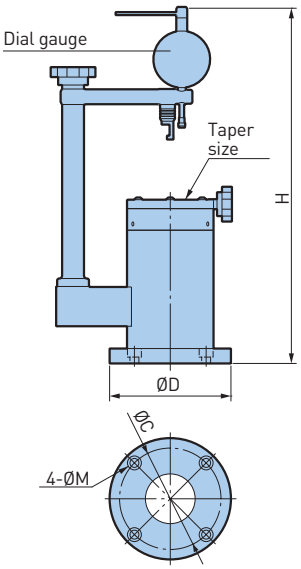
The table is a reference to determine cutting conditions. It should be adjusted according to cutting width, conditions of the machine tool and workpiece.

Spare Parts					
Lifting screw set (1) lifting screw & (1) lifting nut 		Insert clamping screw set (10) screws & (1) wrench 		Wrench 	
Model	**Order No.**	**Model**	**Order No.**	**Model**	**Order No.**
LSN35	**804.796**	S2506DS	**966.272**	DA-T8	**966.274**

Insert clamping screws and wrenches are consumables. Regular replacement and storage are recommended.

Presetter for Speed Finisher



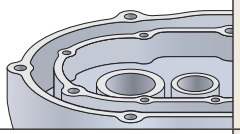
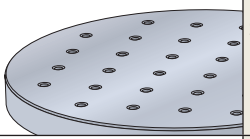
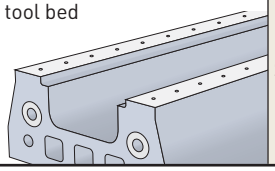


Model	Order No.	Taper Size	H	ØD	ØC	ØM	Max. Tool Length	Weight (kg)
PLP -BBT30	**804.644**	BBT30	> 417	122	102	9 (for M8)	150	7.5
-BBT40	**804.645**	BBT40						7.6
-BBT50	**804.646**	BBT50	> 502	172	149	11 (for M10)	160	17.5
-HSK63	**978.275**	HSK-A63	> 417	122	102	9 (for M8)	150	7.7

1. Dial gauge and indicator stabilizer (2 pcs. AAA batteries included) are standard accessories.
2. Min. reading of the accessory dial gauge is 0.001mm.
3. BT shank cannot be used.
4. Max. tool length indicated in the table is the dimension from the gauge line of the arbor to the cutting edge.
5. Max. cutter diameter is Ø160mm.

Application Examples

(Cutter diameter: Ø 80)

Workpiece	Conditions	Surface Roughness	Height Difference	No. of Workpieces	Result
Crankcase ADC12 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min^{-1} Feed rate: 9 550 mm/min Depth of cut: 2.5 mm	Ra = 0.08 µm Rz = 0.55 µm	Within 1 µm	24 000	Rough and finish processes are combined in a single operation.
Parts of semiconductor manufacturing equipment A5052 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min^{-1} Feed rate: 9 550 mm/min Depth of cut: 2.0 mm	Ra = 0.07 µm Rz = 0.32 µm	Within 1 µm	320	Mirror finish is achieved.
Machine tool bed FC250 	Cutting speed: 1 500 m/min Spindle speed: 6 000 min^{-1} Feed rate: 3 600 mm/min Depth of cut: 0.5 mm	Ra = 0.12 µm Rz = 0.67 µm	Within 2 µm	20	1 to 2 µm flatness is obtained.

Indexable Insert Drills and Chamfer Mills

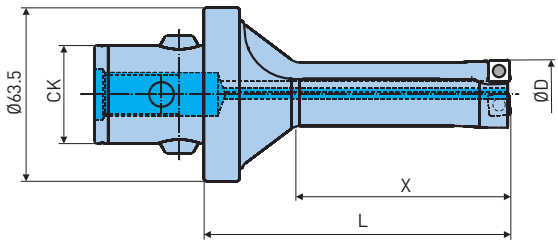
Indexable Insert Drills	472 - 475
C-Cutter Mini	476 - 481
C-Cutter	482 - 485
Chamfer Rings for Boring Heads	486
C-Centering Cutter	487
R-Cutter	488 - 491
Center Boy	492
C-Cutter Boy	493
Slot Milling Cutters	494 - 495
BF-Cutter	496

C.2

Indexable Insert Drills, Ø 16 - 30

The BIG KAISER indexable insert drills series 337 are made with straight flutes. This design guarantees a short distance for chip evacuation and a high radial and torsional rigidity.





L/D = 3 and 4

Bore Dia. ØD	Boring Depth 3 x D				Boring Depth 4 x D				Insert Type	CK No.
	Model	Order No.	X	L	For CKB6 Model	Order No.	X	L		
16	ID16-48CKB6	**337.316**	48	85	ID16-64CKB6	**337.416**	64	101	WP 337-1	CKB6
17	ID17-51CKB6	**337.317**	51	88	ID17-68CKB6	**337.417**	68	105		
18	ID18-54CKB6	**337.318**	54	91	ID18-72CKB6	**337.418**	72	109		
19	ID19-57CKB6	**337.319**	57	94	ID19-76CKB6	**337.419**	76	113		
20	ID20-60CKB6	**337.320**	60	97	ID20-80CKB6	**337.420**	80	117		
21	ID21-63CKB6	**337.321**	63	100	ID21-84CKB6	**337.421**	84	121	WP 337-2	
22	ID22-66CKB6	**337.322**	66	103	ID22-88CKB6	**337.422**	88	125		
23	ID23-69CKB6	**337.323**	69	106	ID23-92CKB6	**337.423**	92	129		
24	ID24-72CKB6	**337.324**	72	109	ID24-96CKB6	**337.424**	96	133		
25	ID25-75CKB6	**337.325**	75	112	ID25-100CKB6	**337.425**	100	137		
26	ID26-78CKB6	**337.326**	78	118	ID26-104CKB6	**337.426**	104	146	WP 337-3	
27	ID27-81CKB6	**337.327**	81	121	ID27-108CKB6	**337.427**	108	150		
28	ID28-84CKB6	**337.328**	84	124	ID28-112CKB6	**337.428**	112	154		
29	ID29-87CKB6	**337.329**	87	127	ID29-116CKB6	**337.429**	116	158		
30	ID30-90CKB6	**337.330**	90	130	ID30-120CKB6	**337.430**	120	162		

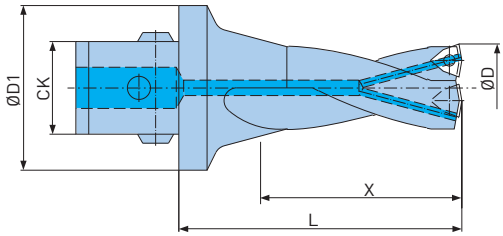
1. Inserts are to be ordered seperately.
2. Adjustable drill holder is recommended for clamping.

For Spare Parts ▸ 421
For Insert ▸ 401-402
For Drill Holder ▸ 474

Indexable Insert Drills, Ø 19.5 - 74

Insert drills in two length graduations (2xD and 3xD) with CKB tool connections.





L/D = 2

Bore Dia. ØD	Boring Depth 2 x D				Insert Type		CK No.	ØD1
	Model	Order No.	X	L	Inside	Outside		
19.5	ID19.5-39CKB5	**336.171**	39	75	WC 04	WC 03	CKB5	50
25.5	ID25.5-56CKB5	**336.172**	56	90	WC 05	WC 04		
29.5	ID29.5-65CKB5	**336.173**	65	100	WC 05	WC 05		
34.5	ID34.5-76CKB5	**336.174**	76	110	WC 06	WC 06		
39.5	ID39.5-87CKB5	**336.175**	87	125				

1. Inserts are to be ordered seperately.
2. Adjustable drill holder is recommended for clamp.

For Spare Parts ▸ 421
For Insert ▸ 403 - 404
For Drill Holder ▸ 474

L/D = 2 and 3

Bore Dia. ØD	Boring Depth 2 x D				Boring Depth 3 x D				Insert Type	CK No.
	Model	Order No.	X	L	Model	Order No.	X	L		
31	ID31-62CKB6	**336.631**	62	100	ID31-93CKB6	**336.731**	93	130	WC 06	CKB6
32	ID32-64CKB6	**336.632**	64	100	ID32-96CKB6	**336.732**	96	130		
33	ID33-66CKB6	**336.633**	66	110	ID33-99CKB6	**336.733**	99	140		
34	ID34-68CKB6	**336.634**	68	110	ID34-102CKB6	**336.734**	102	140		
35	ID35-70CKB6	**336.635**	70	110	ID35-105CKB6	**336.735**	105	150		
36	ID36-72CKB6	**336.636**	72	110	ID36-108CKB6	**336.736**	108	150		
37	ID37-74CKB6	**336.637**	74	110	ID37-111CKB6	**336.737**	111	150		
38	ID38-76CKB6	**336.638**	76	125	ID38-114CKB6	**336.738**	114	160		
39	ID39-78CKB6	**336.639**	78	125	ID39-117CKB6	**336.739**	117	160		
40	ID40-80CKB6	**336.640**	80	125	ID40-120CKB6	**336.740**	120	165		
41	ID41-82CKB6	**336.641**	82	125	ID41-123CKB6	**336.741**	123	165		
42	ID42-84CKB6	**336.642**	84	125	ID42-126CKB6	**336.742**	126	165		
43	ID43-86CKB6	**336.643**	86	140	ID43-129CKB6	**336.743**	129	180		
44	ID44-88CKB6	**336.644**	88	140	ID44-132CKB6	**336.744**	132	180		
45	ID45-90CKB6	**336.645**	90	140	ID45-135CKB6	**336.745**	135	180	WC 08	
47	ID47-94CKB6	**336.647**	94	140	ID47-141CKB6	**336.747**	141	190		
49	ID49-98CKB6	**336.649**	98	150	ID49-147CKB6	**336.749**	147	200		
51	ID51-102CKB6	**336.651**	102	150	ID51-153CKB6	**336.751**	153	200		
53	ID53-106CKB6	**336.653**	106	160	ID53-159CKB6	**336.753**	159	215		
55	ID55-110CKB6	**336.655**	110	160	ID55-165CK6	**336.755**	165	215		
57	ID57-114CKB6	**336.657**	114	165	ID57-171CKB6	**336.757**	171	220		
59	ID59-118CKB6	**336.659**	118	165	ID59-177CKB6	**336.759**	177	220		
61	ID61-122CKB6	**336.661**	122	165	ID61-183CKB6	**336.761**	183	220	WC 10	
69	ID69-153CKB6	**336.569**	153	200						
65	ID65-153CKB7	**336.665**	153	210						CKB7
74	ID74-153CKB7	**336.674**	153	210						

1. Inserts are to be ordered seperately.
2. Adjustable drill holder is recommended for clamping.

For Insert ▸ 404 - 406

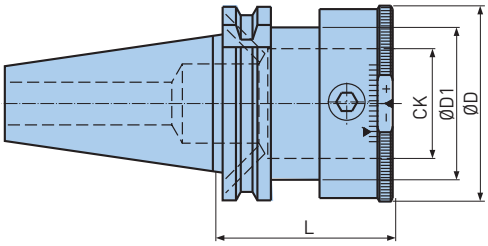
Adjustable Drill Holders for Indexable Drill

Drill holders in accordance to IT9 quality with double eccentric bush for stepless diameter adjustment of BIG KAISER insert drills with CKB6 tool connection.

Coolant Through Hole



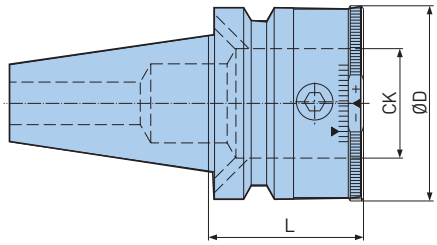
DV (DIN 69871 Form B/D)



Adjustable range: nominal dia. Ø + 1.0/-0.2 mm

Model	Order No.	CK	ØD	ØD1	L	Weight (Kg)
DV40-ADH-CKB6ADF	**336.301**	CKB6	65	50	59	1.2
DV50-ADH-CKB6ADF	**336.303**	CKB6	65	-	69	3.3

BT (MAS 403/BT)

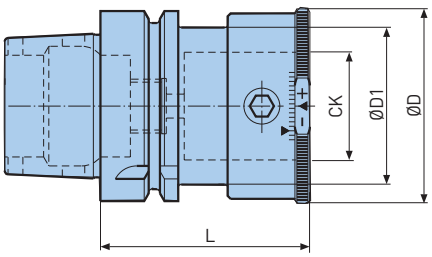


Adjustable range: nominal dia. Ø + 1.0/-0.2 mm

Model	Order No.	CK	ØD	L	Weight (Kg)
BT40-ADH-CKB6ADF	**336.302**	CKB6	65	51	1.1
BT50-ADH-CKB6	**336.304**	CKB6	65	72	3.9

C.2

HSK-A (ISO12164)



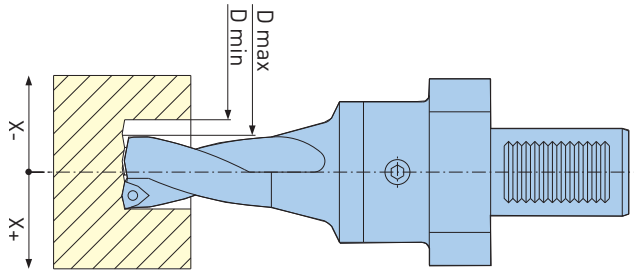
Adjustable range: nominal dia. Ø + 1.0/-0.2 mm

Model	Order No.	CK	ØD	ØD1	L	Weight (Kg)
HSK-A63-ADH-CKB6	**336.309**	CKB6	65	52.5	70	1.2
HSK-A100-ADH-CKB6	**336.310**	CKB6	65	-	83	2.9

1. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175
For Spare Parts ▶ 421

Off-Axis Use Instructions



Drill Ø	Difficult work			Favourable work		
	+X	D min.	D max.	+X	D min.	D max.
16	1.0	16.0	18.0	1.7	16.0	19.4
17	0.8	17.0	18.6	1.5	17.0	20.0
18	0.7	18.0	19.4	1.3	18.0	20.6
19	0.5	19.0	20.0	1.0	19.0	20.6
20	0.3	20.0	20.6	0.8	20.0	21.6
21	1.1	21.0	23.2	2.0	21.0	25.0
22	0.9	22.0	23.8	1.7	22.0	25.4
23	0.8	23.0	24.6	1.5	23.0	26.0
24	0.6	24.0	25.2	1.2	24.0	26.4
25	0.4	25.0	25.8	1.0	25.0	27.0
26	1.0	26.0	28.0	1.7	26.0	29.4
27	0.8	27.0	28.6	1.4	27.0	29.8
28	0.6	28.0	29.2	1.2	28.0	30.4
29	0.4	29.0	29.8	0.9	29.0	30.8
30	0.3	30.0	30.6	0.7	30.0	31.4

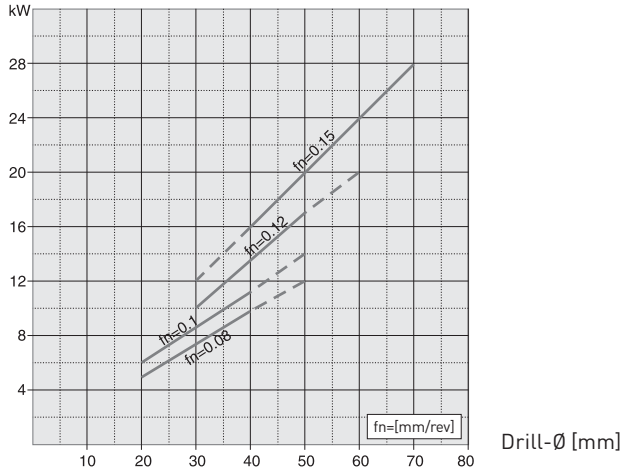
Drill Ø	Adjustable Range		Boring Dia	
	-X	+X	D min.	D max.
31	0.25	3.5	30.5	38.0
32		3.25	31.5	38.5
33		3.0	32.5	39.0
34		2.75	33.5	39.5
35		2.5	34.5	40.0
36		2.25	35.5	40.5
37		2.0	36.5	41.0
38		1.75	37.5	41.5
39		1.5	38.5	42.0
40		1.25	39.5	42.5
41		1.0	40.5	43.0
42		0.75	41.5	43.5
43		0.5	42.5	44.0
44		0.25	43.5	44.5
45	0.5	4.0	44.0	53.0
47		3.5	46.0	54.0
49		3.0	48.0	55.0
51		2.5	50.0	56.0
53		2.0	52.0	57.0
55		1.5	54.0	58.0
57		1.0	56.0	59.0
59		0.5	58.0	60.0
61		3.5	60.0	68.0
65		3.0	64.0	71.0
69		2.0	68.0	73.0
74		1.0	73.0	76.0

1. * Adjustment range with adjustable drill holder or with stationary off axis use.

Driving power

Vc=220 m/min; Material St 60

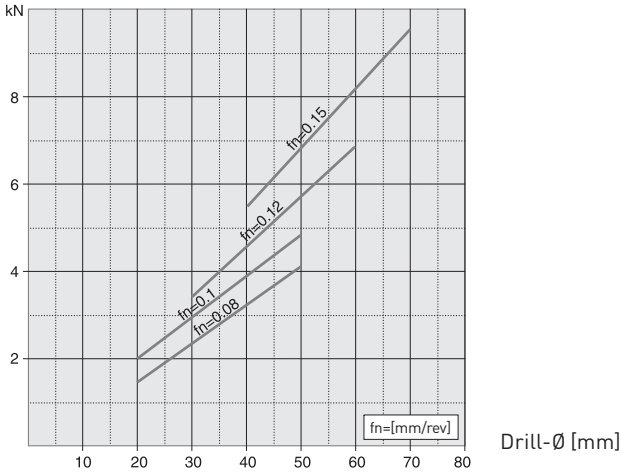
kc 1 = 2 110 N/mm²



Feed force

Material St 60

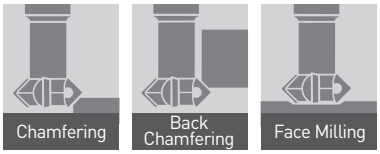
kc 1 = 2 110 N/mm²



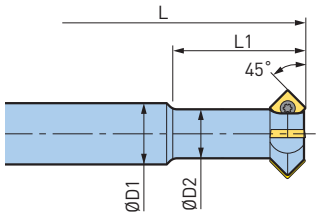
C.2

C-Cutter Mini, Multi Insert Type

Front & Back Chamfering







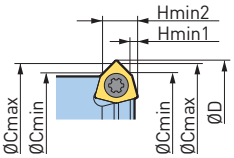


Fig. 1

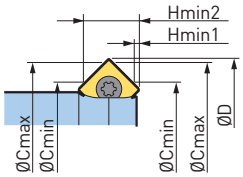


Fig. 2

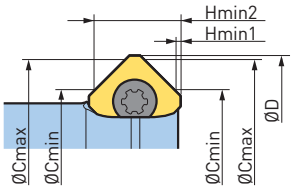


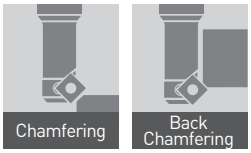
Fig. 3

Model	Order No.	Face Milling	Fig.	ØD	ØD1	ØD2	L	L1	ØCmin.	ØCmax.	Hmin1	Hmin2	Insert Model	No. of Insert
ST12 -C1012 -45B - 20	**966.461**	-	1	12.7	12	9	93	20	10	12	1.0	3.7	CM04	3
- 35	**966.462**						108	35						
-C1116 -45B - 25	**966.433**	-	2	17.1	12	9.6	98	25	11	16	0.4	6.2	CM05	4
- 40	**966.463**						113	40						
ST16 -C1520 -45B - 50	**966.464**	-	2	20.7	16	13.2	123	50	15	20	0.6	6.3	CM05	4
ST20 -C1924 -45B - 60	**966.465**	-	2	24.7	20	17.2	143	60	19	24	0.6	6.3	CM05	4
-C2232 -45B - 50	**966.434**	✓	3	32.7	20	19.2	130	50	22	32	0.4	12.4	CM10	
- 80	**966.466**						160	80						
ST32 -C3242 -45B - 65	**966.435**	✓	3	42.7	32	30.6	175	65	32	42	0.4	12.4	CM10	4
-100	**966.467**						211	100						

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.
3. In case of chamfering with 4 insert type, chatter may occur due to increased cutting resistance when plunge cutting. Please try the different types with less inserts, 1 or 2.

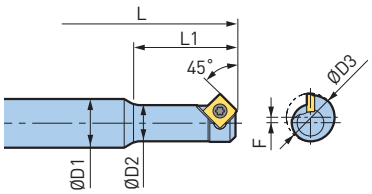
For Insert ▸ 480
For Cutting Condition ▸ 480

C-Cutter Mini, Single Insert Type



Front & Back Chamfering





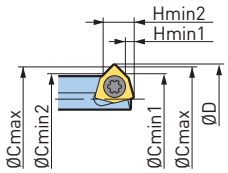


Fig. 1

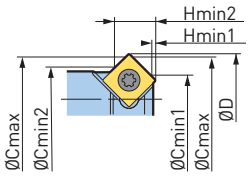


Fig. 2

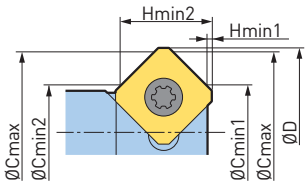


Fig. 3

Model	Order No.	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	ØC min1	ØC min2	ØC max.	H min1	H min2	Offset F	Insert Model
ST10 -C0608 -45B - 16	**966.468**	1	8.8	10	5.7	5.7	78	16	6	6	8	1.0	3.8	1.55	CM04
ST10 -C0409 -45B - 20	**966.469**	2	9.8	10	5.4	7.7	86	20	4	6	9	0.5	5.4	1.1	CM05
ST10 -C0611 -45B - 20	**966.432**	2	12.0	10	7.4	9.8	81	20	6	8	11	0.4	5.5	1.1	CM05
- 35	**966.470**						96	35							
ST16 -C1222 -45B - 40	**966.471**	3	22.6	16	11.0	16.9	117	40	12	12	22	0.3	12.4	2.9	CM10

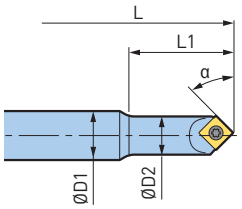
1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

For Insert ▸ 480
For Cutting Condition ▸ 480

Front Chamfering







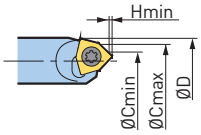


Fig. 1

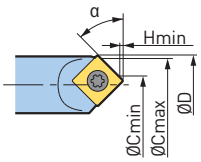


Fig. 2

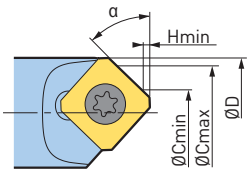


Fig. 3

Model	Order No.	Fig.	α	ØD	ØD1	ØD2	L	L1	ØC min.	ØC max.	H min.	Insert Model
ST10 -C0204 -45 - 15	**966.486**	1	45°	6.3	10	6	78	15	2	4	0.4	CM04
- 25	**966.487**						88	25				
ST10 -C0207 -45 - 20	**966.431**	2	45°	8.1	10	7.8	81	20	2	7	0.4	CM05
- 35	**966.488**						96	35				
ST16 -C0515 -45 - 50	**966.489**	3	45°	15.8	16	15.2	122	50	5	15	0.4	CM10
ST16 -C0214 -30 - 40	**966.436**	3	30°	15.9	16	15.4	105	40	2	14	0.2	CM10
ST16 -C0916 -60 - 40	**966.437**	3	60°	16.5	16	15.6	105	40	9	16	0.8	CM10

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set. Centering is not possible.

For Insert ▸ 480
For Cutting Condition ▸ 480

C-Cutter Mini, Bolt Hole & Tap Starting Hole



Front & Back Chamfering



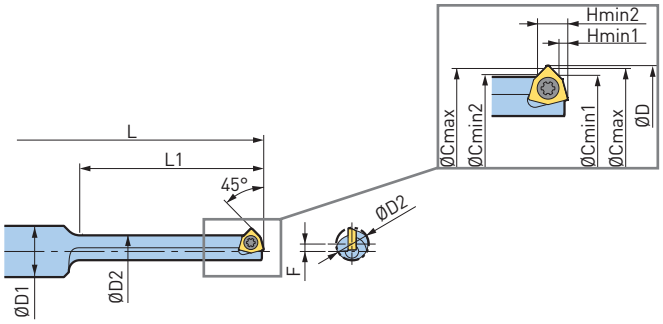


Fig. 1

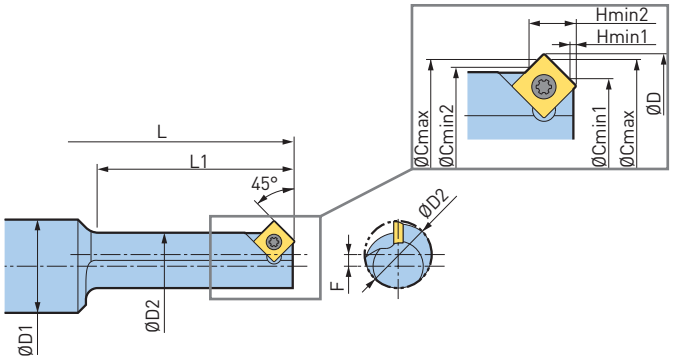


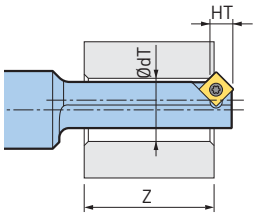
Fig. 2

Model	Order No.	Fig.	ØD	ØD1	ØD2	L	L1	ØC min1	ØC min2	ØC max.	H min1	H min2	Offset F	Insert Model
ST10 -CM08 -45B - 19	966.472	1	9.2	10	6.3	81	19	6.4	6.6	8.4	1.0	3.7	1.45	CM04
- 35 *	966.473					97	35							
ST12 -CM10 -45B - 25	966.474	2	11.3	12	8.0	99	25	5.5	8.3	10.5	0.5	5.0	1.65	CM05
- 45 *	966.475					119	45							
ST12 -CM12 -45B - 29	966.476	2	13.4	12	9.7	102	29	7.6	10.0	12.6	0.5	5.2	1.85	
- 53 *	966.477					126	53							
ST16 -CM14 -45B - 33	966.478	2	15.5	16	11.5	107	33	9.7	11.8	14.7	0.5	5.3	2.00	
- 61 *	966.479					135	61							
ST16 -CM16 -45B - 37	966.480	2	17.6	16	13.5	110	37	11.8	13.8	16.8	0.5	5.4	2.05	
- 69 *	966.481					142	69							
ST20 -CM18 -45B - 42	966.482	2	19.7	20	14.9	126	42	13.9	15.2	18.9	0.5	5.7	2.40	
- 78 *	966.483					162	78							
ST20 -CM20 -45B - 46	966.484	2	21.8	20	16.9	129	46	16.0	17.2	21.0	0.5	5.8	2.45	
- 86 *	966.485					169	86							

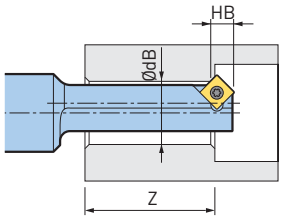
1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.
3. For * long type, standard insert is recommended rather than "SE" sharp edge insert to avoid chipping.

For Insert ▸ 480
For Cutting Condition ▸ 480

Tap starting hole

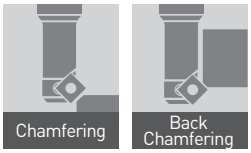


Bolt hole



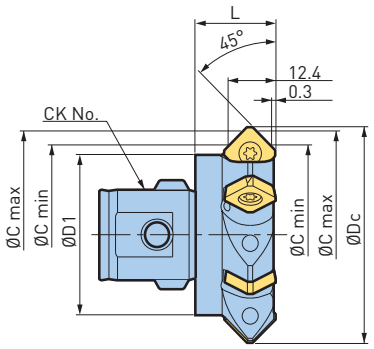
Cutter Type	Tap Starting Hole		Bolt Hole		Z	
	ØdT	HT	ØdB	HB	Standard Type	Long Type
CM08	6.8 (M8)	3.6	6.6 (M6)	3.7	13	29
CM10	8.5 (M10)	4.9	9 (M8)	4.6	17	37
CM12	10.3 (M12)	5.0	11 (M10)	4.7	21	45
CM14	12.0 (M14)	5.2	-	-	25	53
CM16	14.0 (M16)	5.3	14 (M12)	5.3	29	61
CM18	15.5 (M18)	5.6	16 (M14)	5.3	33	69
CM20	17.5 (M20)	5.6	18 (M16)	5.4	37	77

C-Cutter Mini CKB Type



The C-Cutter mini is a high performance tool for chamfering, back chamfering and face milling. The large number of cutting edges (4 -6) combined with the small tool diameter permit extremely high feed rates.



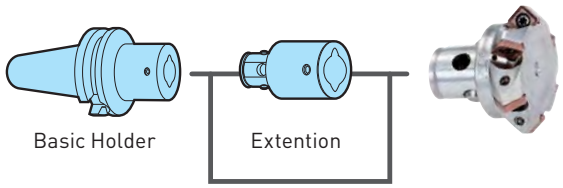


Model	Order No.	Chamfer		CK No.	ØDc	ØD1	L	No. of Inserts	Insert Model
		ØC min	ØC max.						
CKB1-C2232-45B-20	**335.070**	22	32	CKB1	32.7	19	20	4	CM10
CKB3-C3242-45B-20	**335.071**	32	42	CKB3	42.7	31	20	4	CM10
-C5262-45B-20	**335.072**	52	62		62.7	31		6	
CKB4-C4252-45B-20	**335.073**	42	52	CKB4	52.7	39	20	6	CM10
CKB5-C5262-45B-20	**335.074**	52	62	CKB5	62.7	51	20	6	CM10

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. Can be used with through coolant.

For Insert ▶ 480
For Cutting Condition ▶ 480

BIG KAISER Moduler Tooling System



Indexable Inserts for C-Cutter Mini

Indexable Inserts



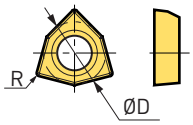


Fig. 1

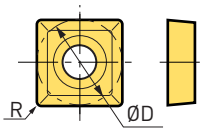


Fig. 2

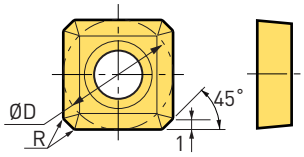


Fig. 3

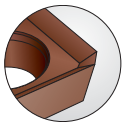
The suffix SE designates a sharp cutting edge version.

Model	Fig.	ØD	Nose R	P	M	K	N	Clamping Screw Set	
				ACP300	ACP200		DS20	Model	Order No.
CM0402	1	3.97	0.2	966.440	-		-	S2SS-T6	966.448
CM0502	2	5	0.2	-	966.441		966.442	S2TS-T6	966.449
CM0502SE				800.950	966.443		-		
CM10C1	3	10	0.2	-	966.445		966.446	S4S-T15	966.450
CM10C1SE				-	966.447		-		

1. Inserts are available in packets of 10 pcs.
2. It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

Sharp cutting edge insert for „SE" type

Sharp cutting edge minimises the generation of burrs. This is especially beneficial when cutting stainless and mild steel materials.



Recommended Cutting Condition

A (Standard conditions)

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/tooth)		Coolant
			Chamfering	Face Milling (CM10 insert only)	
General Steel, Alloy Steel, High-Alloy Steel	ACP200 ACP300	100 - 350	0.05 - 0.4	0.05 - 0.2	Dry
Prehardened Steel (Less than HRC40)		60 - 100	0.05 - 0.1	0.05 - 0.1	Wet
Stainless Steel		100 - 250	0.08 - 0.3	0.08 - 0.2	Dry / Wet
Cast Iron		100 - 350	0.1 - 0.5	0.05 - 0.25	Dry
Aluminium, Non-Ferrous	DS20, ACP300	100 - 800	0.1 - 0.5	0.05 - 0.3	Dry / Wet

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is recommended to obtain the good surface quality.
3. In case built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

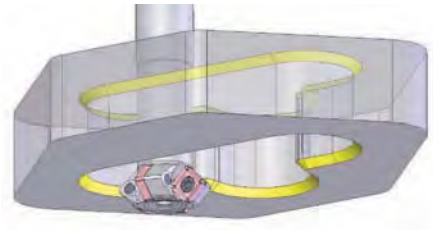
B (For long models of „bolt hole and starting hole for tapping type")

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/tooth)	Coolant
General Steel, Alloy Steel, High-Alloy Steel	ACP200 ACP300	20 - 100	0.03 - 0.12	Wet
Cast Iron		50 - 160	0.05 - 0.20	Dry
Aluminium, Non-Ferrous		30 - 100	0.03 - 0.12	Wet

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. For stainless steel and hardened steel, shorter models are recommended.

Application Examples C-Cutter Mini

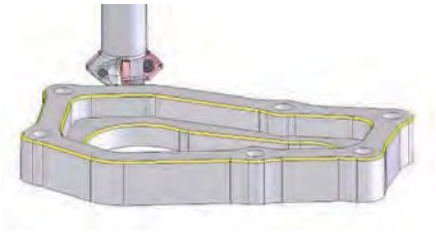
Front & Back chamfering for stainless steel



	Competitor's Tool (with TiAlN Coated Carbide Insert)	C-Cutter Mini (ST20-C2232-45B-50)
Chamfering Dia.	Ø 30	Ø 28
Number of Teeth	1	4
Cutting Speed (m/min)	140	180
Spindle Speed (min-1)	1 490	2 050
Feed (mm/min)	149	819
Result	5 times better cutting efficiency	

Material: X5CrNi18-9
Chamfer: 3 mm x 45°
Feed: 0.1 mm/tooth

Chamfering for aluminium



	Competitor's Tool	C-Cutter Mini (ST12-C1116-45B-25)
Chamfering Dia.	Ø 40	Ø 12
Number of Teeth	3	4
Cutting Speed (m/min)	200	600
Spindle Speed (min-1)	1 590	15 920
Feed (mm/min)	477	6 370
Result	13 times better cutting efficiency	

Material: Al-Si7Mg(Fe)
Chamfer: 0.5 mm x 45°
Feed: 0.1 mm/tooth

Front & Back chamfering of starting holes for M8 tapping

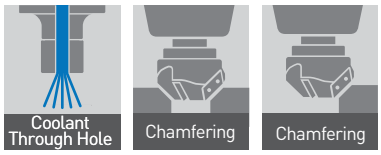


	Competitor's Tool (with Non-Coated Carbide Insert)	C-Cutter Mini (ST10-CM08-45B-19)
Cutting Speed (m/min)	30	150
Spindle Speed (min-1)	1 140	5 680
Feed per Tooth (mm/rev)	0.05	0.1
Feed (mm/min)	57	568

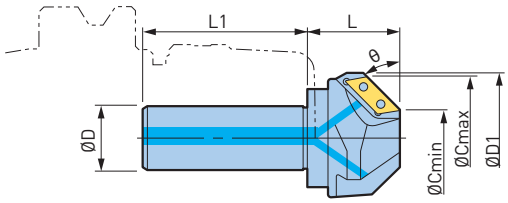
Material: FC250
Tapped hole: Ø 6.6
Chamfering dia.: Ø 8.4

C-Cutter Standard Type

One C-Cutter to cover a wide chamfering range. Ø 5 - Ø 25, Ø 10 - Ø 40, Ø 30 - Ø 60, Ø 50 - Ø 100







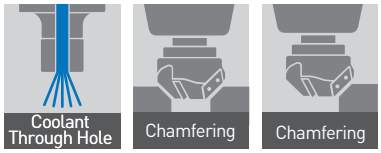
Model	Order No.	Chamfering Angle θ	Chamfer		ØD	ØD1	L	L1	No. of Inserts	Insert Model	Screw Set	
			ØC min	ØC max							Model	Order No.
ST32 -C1652C -30	**978.336**	30°	16	52	32	68	48	80	2	CW19	S3S	**801.696**
ST42 -C5085C -30	**802.251**		50	85	42	96	52	80	3			
ST20 -C0525C	**966.401**	45°	5	25	20	33	25	60	1	CW12	S2S-B	**978.284**
ST25 -C1040C	**966.406**		10	40	25	45	35	70	2	CW19	S3S	**801.696**
ST32 -C3060C	**802.224**		30	60	32	65	45	80	3			
ST42 -C50100C	**966.404**		50	100	42	106	70	80	3	CW31	S5S	**801.699**
ST25 -C1434C -60	**966.405**	60°	14	34	25	38	37	70	2	CW19	S3S	**801.696**
ST32 -C3050C -60	**978.338**		30	50	32	54	45	80	3			
ST32 -C4565C -60	**978.339**		45	65	32	69	50	80	3			

1. Wrench and screws are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

For Insert ▶ 484

C-Cutter Universal Type

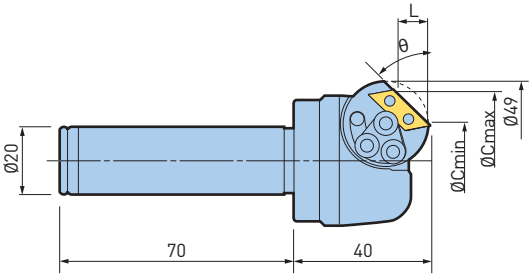
Chamfering angle adjustment from 5° to 85° with a hex key.



Model	Order No.
ST20-C5/85A-40	**966.407**

Insert Model: CW12





C.2

Easy angle adjustment with a hex key.





Chamfering range

Angle θ	Chamfer		L
	ØC min	ØC max	
5°	5.5	33.5	1.2
10°	7.3	34.7	2.4
15°	9.0	36.2	3.6
20°	11.2	37.4	4.7
25°	13.0	38.6	5.9
30°	15.2	39.6	7.0
35°	17.4	40.5	8.0
40°	19.6	41.2	9.0
45°	21.8	41.8	10.0

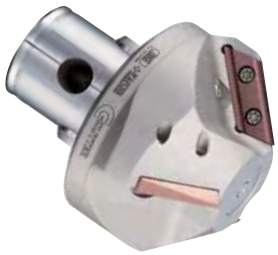
Angle θ	Chamfer		L
	ØC min	ØC max	
50°	24.0	42.2	10.8
55°	26.4	42.4	11.4
60°	28.5	42.5	12.1
65°	30.7	42.4	12.5
70°	32.9	42.1	12.6
75°	34.9	41.7	12.7
80°	36.9	41.1	11.9
85°	38.8	40.3	8.6

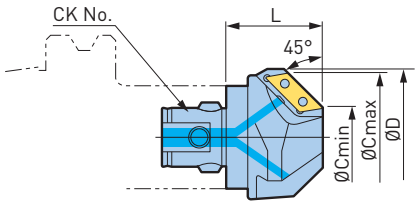
For Insert ▶ 484

C-Cutter CKB type

Chamfering mill with indexable inserts for efficient and vibration-free 45° chamfering. The long cutting edge provides a wide chamfering range which reduces the number of tools, tool changes, and magazine pots.





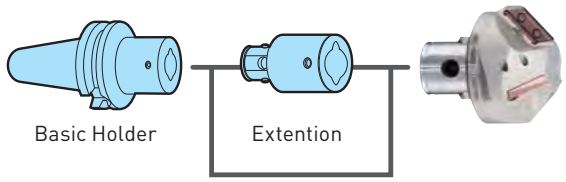


Model	Order No.	Chamfer		CK No.	ØD	L	No. of Inserts	Insert Model	Screw Set	
		ØC min	ØC max						Model	Order No.
CKB2 -C0525C	**335.021**	5	25	CKB2	28.5	25	1	CW12	S2S-B	**978.284**
CKB4 -C1040C	**335.022**	10	40	CKB4	45	35	2	CW19	S3S	**801.696**
CKB5 -C3060C	**335.023**	30	60	CKB5	65	40	3			
CKB6 -C50100C	**335.024**	50	100	CKB6	106	65	3	CW31	S5S	**801.699**

1. A wrench and a screw are included. Inserts must be ordered separately.
2. Can be used with through coolant.

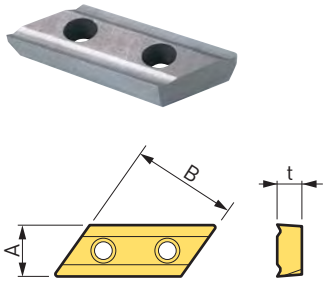
For Insert ▶ 484

BIG KAISER Moduler Tooling System



Indexable Inserts for C-Cutter

Indexable Inserts

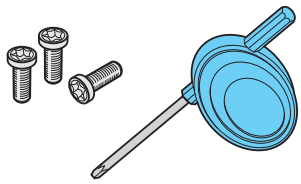


ZX = TiCN+TiAlN multilayer coating

Model	A	B	t	P30	P20	N20
				Non-Coat	ZX	DLC
CW1206A	6.35	12.7	2.7	978.283	800.951	801.753
SCW1206A				802.134	978.918	-
CW1909A	9.525	19.05	4.5	978.817	800.952	801.754
SCW1909A				802.135	802.136	-
CW3115A	15.875	31.75	7.0	978.826	800.953	801.755
SCW3115A				802.137	802.138	-

1. SCW contains 10 pcs of CW inserts in a package (same insert).
2. DLC coated insert is available with 1 pce.

Insert Clamping Screw Set



Insert	Set Model	Order No.
CW1206A	S2S-B	978.284
CW1909A	S3S	801.696
CW3115A	S5S	801.699

1. The set contains 10 screws and 1 wrench.
   ※ Wrenches are also available separately.

C-Cutter

Recommended Cutting Condition

Cutter Type	Max. Chamfer	Chamfering	General Steel Alloy Steel		Stainless Steel		Cast Iron		Aluminium	
			Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
ST20-C5/85A-40	2 mm *	Plunge Cutting	50	0.1	30	0.08	40	0.1	80	0.1
		Side Cutting	80	0.15	60	0.1	50	0.15	100	0.2
C0525C	C2	Plunge Cutting	50	0.1	30	0.08	40	0.1	80	0.1
		Side Cutting	80	0.15	60	0.1	50	0.15	100	0.15
C1040C	C3	Plunge Cutting	90	0.15	40	0.12	60	0.15	100	0.2
C1434C-60 C1652C-30	3 mm *	Side Cutting	120	0.3	60	0.2	90	0.3	150	0.3
C3060C / C3060	C4	Plunge Cutting	120	0.3	60	0.18	90	0.25	150	0.3
C3050C-60 C4565C-60 C5085C-30	4 mm *	Side Cutting	150	0.45	60	0.3	120	0.6	200	0.6
C50100C	C4	Plunge Cutting	150	0.4	80	0.25	120	0.35	180	0.4
		Side Cutting	150	0.45	60	0.36	120	0.6	240	0.6

Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

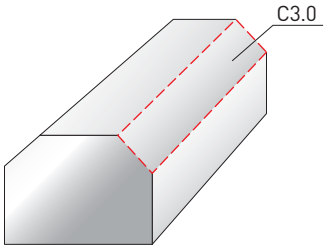
1. Cutting condition is the same for both non-coated and coated inserts. Coated inserts will achieve better surface finish and extended insert life.
2. Peck feed is necessary in case cutting chips are too long.
3. Reduce cutting speed if a larger chamfer than the max. amount shown in the table is required.
4. A high rigidity toolholder is recommended, such as BIG KAISER HMC or MEGA D Chuck.
5. Max. chamfering amount with * in 30, 60 degree type and Universal type indicates the chamfering length of the longer side.

Application Example

C3 traverse chamfering. Workmaterial: C55 (S55C)

High cutting parameter was achieved without chattering

C-Cutter	ST25-C1040
Insert Model	CW1909A
Spindle speed	3 000 min-1
Feed	1 800 mm/min



Chamfer Rings for Boring Heads

Chamfering rings for single- and rough-cutter boring bars for 30° or 45° chamfering immediately after boring without tool change.



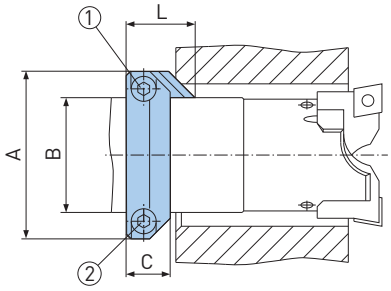


Fig. 1

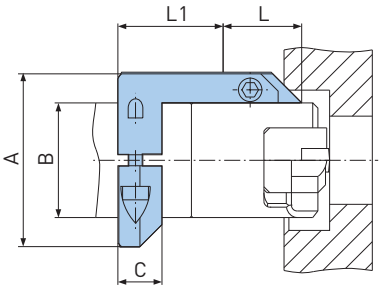


Fig. 2

Bore Ø	Model	Order No.	Fig.	CK No.	A	B	C	L1	Inserts
20 - 35	CR20	**663.110**	1	CK1	35	19	13	-	CRP 20-45 CRP 20-30
25 - 40	CR25	**663.120**	1	CK2	42	24	15	-	
	CR25S	**663.121**	2					27	
32 - 47	CR32	**663.130**	1	CK3	49	31	15	-	
	CR32S	**663.131**	2		51			31.5	
41 - 55	CR41	**663.140**	1	CK4	57	39	15	-	
	CR41S	**663.141**	2					38.5	
53 - 90	CR53	**663.150**	1	CK5	85	50	25	-	CRP 53-45 CRP 53-30
	CR53S	**663.151**	2		90			39	
68 - 104	CR68	**663.160**	1	CK6	100	64	25	-	
	CR68S	**663.161**	2		104			53	
90 - 130	CR93-125	**663.170**	1	CK6	130	64	25	-	

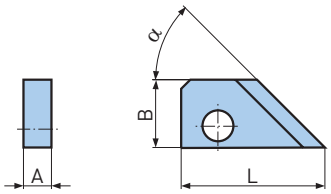
1. Dimension "L" is defined according to the Insert. Please refer to the chart below.

Assembly instructions:

- Mount both ring parts on tool shank and adjust them in length.
- Assemble cutting insert or insert holder between the ring parts and fasten screw ① tightly.
- Fasten clamp screw ②.

Inserts 45°and 30°

Carbide inserts with ground chip breaker for machining of cast iron and steel.



α	Model	Order No.	Range Ø	A	B	L
45°	CRP20-45	**663.191**	20 - 55	4	9	23.5
	CRP53-45	**663.195**	53 - 130	8	20	43
30°	CRP20-30	**663.181**	20 - 55	4	9	27.5
	CRP53-30	**663.185**	53 - 100	8	20	52

Insert Holder for Indexable Type

For different work piece materials and a quick change of the insert.



Fig. 1



Fig. 2

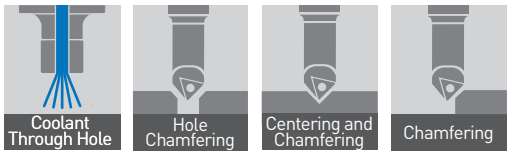
α	Model	Order No.	Fig.	Ring Type	Range Ø	Insert
45°	CB2-45CW12A	**805.811**	1	CR53	55 - 75	CW1206A
				CR68	69 - 89	
				CR93-125	95 - 115	
	CB2-45CW12B	**805.812**	2	CR53	70 - 90	
				CR68	84 - 105	
				CR93-125	110 - 130	

1. A wrench and screw are included. Inserts to be ordered separately.

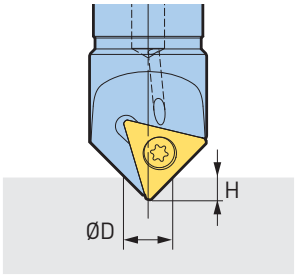
For Insert ▶ 484

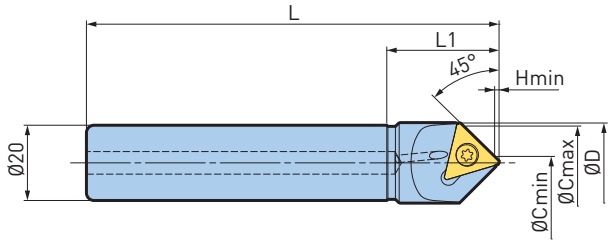
C-Centering Cutter

A multifunction cutter capable of both spot drilling and chamfering.







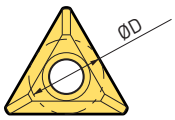


H = D/2 - 0.7 mm

Model	Order No.	ØD	L	L1	ØC min.	ØC max.	H min.	Insert
ST20-CN0220-45-110	**806.622**	22	110	30	2	20	0.3	CN0906

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. As the insert has a nose radius, spot drilled tip is not acute.
3. Use with hand feed is not recommended.

Inserts for C-Centering Cutter



Model	Order No.	ØD	Screw Set	
CN0906 ACZ150	**806.623**	9.525	S4S-15IP	**806.624**

1. Insert grade coated carbide P15C.
2. Inserts are available in a packet of 10 pcs.
3. The insert clamping screw set contains 10 screws and 1 wrench.

Recommended Cutting Condition

Workpiece Material	Cutting Speed Vc (m/min)	Feed (mmv/rev)	
		Spot Drilling	Traverse Chamfering
Carbon Steel, Alloy Steel	50 - 150	0.02 - 0.08	0.05 - 0.2
Cast Iron	70 - 200		
Aluminium	100 - 300		

1. The table is just a reference to determine cutting conditions.
   It should be adjusted according to the condition of the machine tool and workpiece.

R-Cutter



Front & back R-chamfering are available. 4 inserts multiply feed rate.

Front & Back R Chamfering



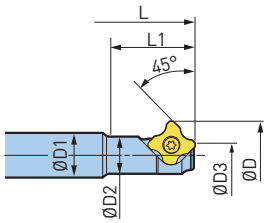


Fig. 1

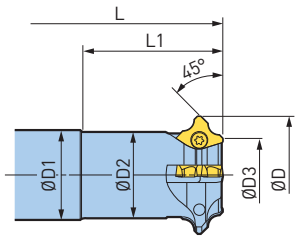
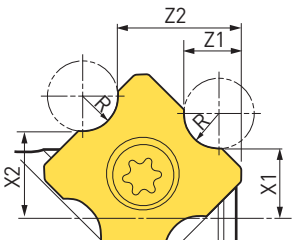


Fig. 2



R-dimensions

Model	Order No.	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	No. of Inserts	R	X1	Z1	X2	Z2	Insert Model
ST10 -RC061B - 15	**966.501**	1	12.3	10	6.6	4.4	78	15	1	0.5	3.61	1.93	4.30	5.78	RC06
										1	3.35	2.18	4.04	5.53	
										1.5	3.09	2.43	3.78	5.28	
										2	2.83	2.68	3.52	5.03	
ST16 -RC121B - 30	**966.502**	1	24.4	16	13.3	8.6	103	30	1	1	7.17	3.79	8.56	11.63	RC12
										2	6.65	4.29	8.03	11.13	
										3	6.13	4.79	7.51	10.63	
										4	5.60	5.29	6.99	10.13	
ST16 -RC064B - 30	**966.503**	2	21	16	15.2	13.2	101	30	4	0.5	7.89	1.93	8.59	5.78	RC06
										1	7.64	2.18	8.34	5.53	
										1.5	7.39	2.43	8.09	5.28	
										2	7.13	2.68	7.84	5.03	
ST32 -RC124B - 50	**966.504**	2	42	32	30.8	26.3	141	50	4	1	15.85	3.79	17.26	11.63	RC12
										2	15.33	4.29	16.75	11.13	
										3	14.83	4.79	16.24	10.63	
										4	14.31	5.29	15.73	10.13	

1. Wrench and screw are included. Inserts are to be ordered separately.

For Insert ▶ 491

R Chamfering

Front R Chamfering



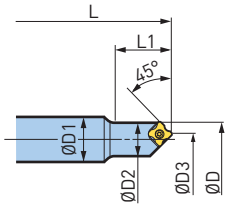


Fig. 1

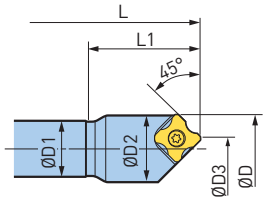
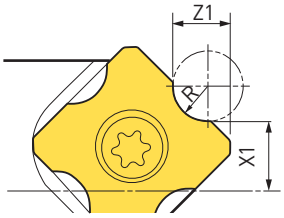


Fig. 2



R-dimensions

Model	Order No.	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	No. of Inserts	R	X1	Z1	Insert Model
ST16 -RC061 - 20	**966.505**	1	12.3	16	11.9	4.5	94	20	1	0.5	3.61	1.93	RC06
										1	3.35	2.18	
										1.5	3.09	2.43	
										2	2.83	2.68	
ST20 -RC121 - 40	**966.506**	2	24.4	20	23.8	8.9	121	40	1	1	7.17	3.79	RC12
										2	6.65	4.29	
										3	6.13	4.79	
										4	5.60	5.29	

1. Wrench and screw are included. Inserts are to be ordered separately.

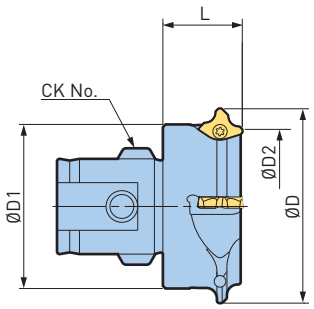
For Insert ▶ 491

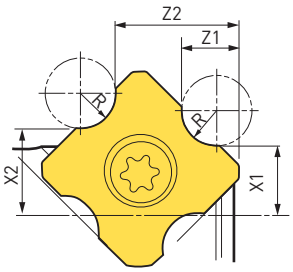
R-Cutter CKB Type



The C-Cutter mini is a high performance tool for chamfering, back chamfering and face milling. The large number of cutting edges (4 -6). Combined with the small tool diameter permit extremely high feed rates.







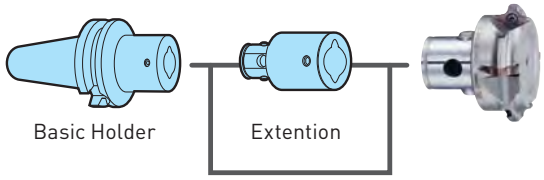
R-Dimensions

Model	Order No.	CKB No.	ØD	ØD1	ØD2	L	R	X1	Z1	X2	Z2	No. of Insert	Insert Model
CKB3-RC064B-15	**806.439**	CKB3	37	31	29.2	15	0.5	15.9	1.9	16.6	5.8	4	RC06
							1.0	15.6	2.2	16.3	5.5		
							1.5	154	2.4	16.1	5.3		
							2.0	15.1	2.7	15.8	5		
CKB5-RC124B-25	**806.440**	CKB5	62	50	46.3	25	1	25.8	3.8	27.2	11.6	4	RC12
							2	25.3	4.3	26.7	11.1		
							3	24.8	4.8	26.2	10.6		
							4	24.3	5.3	25.7	10.1		

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. Can be used with through coolant.

For Insert ▶ 491

BIG KAISER Moduler Tooling System



Indexable Inserts for R-Cutter

Indexable Inserts



Type	Insert Model	Order No.	Radius	Insert Clamping Screw Set	
				Model	Order No.
RC06	RC06050 ACP300	**966.530**	R0.5	S2TS-T6	**966.449**
	RC06100 ACP300	**966.531**	R1.0		
	RC06150 ACP300	**966.532**	R1.5		
	RC06200 ACP300	**966.533**	R2.0		
RC12	RC12100 ACP300	**966.534**	R1.0	S4S-T15	**966.450**
	RC12200 ACP300	**966.535**	R2.0		
	RC12300 ACP300	**966.536**	R3.0		
	RC12400 ACP300	**966.537**	R4.0		

1. Inserts are available in packet of 10 pcs.
2. Material is coated carbide.
3. 10 screws and 1 wrench are included in insert clamping screw set.

Recommended Cutting Condition

Workpiece Material	Cutting Speed (m/min)	Feed Rate (mm/tooth)	Coolant
Structural, Carbon or Alloy Steel	100 - 350	0.05 - 0.2	Dry
Prehardened Steel (less than HRC40)	60 - 80	0.05 - 0.1	Wet
Stainless Steel	100 - 250	0.08 - 0.2	Dry / Wet
Cast Iron	100 - 350	0.05 - 0.25	Dry
Aluminium	100 - 800	0.05 - 0.25	Dry / Wet

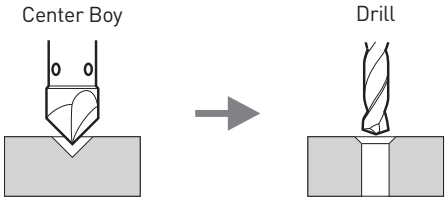
1. The table is a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is generally recommended to obtain good surface quality.
3. In case of built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

Center Boy

Accurate centering and chamfering can be obtained in a single operation.







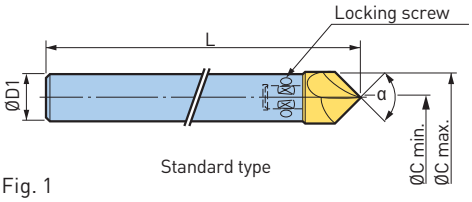


Fig. 1

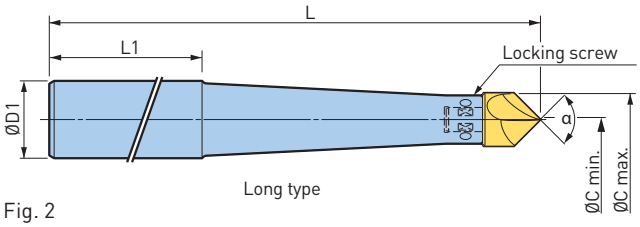


Fig. 2

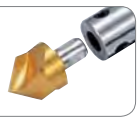
Model	Order No.	Fig.	Chamfering Angle α	Chamfer		ØD1	L	L1	Bit Model	Spare Locking Screw
				ØC min	ØC max					
ST10 -CBY09010	**966.415**	1	90°	0.9	10	10	150	-	CBY09010	H0403-5P
ST12 -CBY09013	**966.416**	1	90°	0.9	13	12	150	-	CBY09013	H0403-5P
ST16 -CBY09016	**966.417**	1	90°	1.0	16	16	180	-	CBY09016	H0504-5P
ST20 -CBY09022	**966.418**	1	90°	1.5	22	20	180	-	CBY09022	H0505-5P
ST20 -CBY09013 -220	**966.411**	2	90°	0.9	13	20	220	120	CBY09013	H0403-5P
-260	**966.412**						260			
ST32 -CBY09022 -260	**966.413**	2	90°	1.5	22	32	260	120	CBY09022	H0505-5P
-300	**966.414**						300			
ST12 -CBY12013	**802.756**	1	120°	0.9	13	12	150	-	CBY12013	H0403-5P

1. 2 pcs of inserts and 2 pcs of locking screws are included as standard accessories.
2. Spare locking screws are available in a packet of 5 pcs.

Indexable Bit for Center Boy



Highly accurate
Replaceable bit



Bit Model	Chamfering Angle α	Order No.
CBY09010	90°	**966.422**
CBY09013		**966.423**
CBY09016		**966.424**
CBY09022		**966.425**
CBY12013	120°	**800.945**

1. Bits are available in packages of 5 pcs.
2. Bit grade is HSS with TiN coating.

Locking Screw Model	Order No.
H0403-5P	**978.256**
H0504-5P	**801.046**
H0505-5P	**801.047**

C.2

Recommended Cutting Condition

Workpiece Material	Cutter Type	Chamfering		Centering	
		Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
General Steel Alloy Steel	Standard	20 - 35	0.10	25 - 50	0.08
	long	20 - 35	0.08	20 - 50	0.08
Stainless Steel	Standard	15 - 30	0.08	20 - 40	0.08
	long	15 - 30	0.06	15 - 30	0.06
Cast Iron	Standard	20 - 40	0.12	30 - 45	0.10
	long	20 - 40	0.10	30 - 45	0.10
Aluminium	Standard	45 - 60	0.15	50 - 65	0.15
	long	40 - 60	0.12	40 - 60	0.12

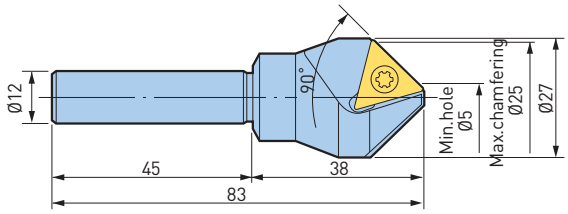
1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. In case vibration occurs, reduce cutting speed V.
3. Projection length should be as short as possible.

Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

C-Cutter Boy

For bench drill machine only. Smooth guide with carbide support pad. Never get irregular chamfering. Long tool life with carbide insert. Economical with its 3 cutting edges.



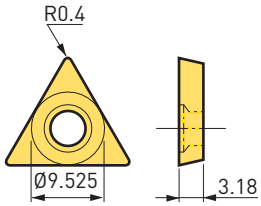


Model	Order No.
ST12B-C0525	**966.408**

1. Including 1 pce. of insert.

Indexable Insert for C-Cutter Boy

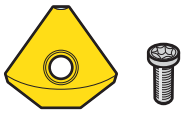




Model	Order No.
C1603B	**966.409**

1. Inserts are available in packages of 10 pcs.

Guide Pad Set



Set Model	Order No.	Carbide Guide	Thread Size
CG0525S	**978.908**	CG0525	M4 x 7

1. 1 pce. of carbide set and clamping screw are included.

Insert Clamping Screw Set



Set Model	Order No.	Thread Size
S4S	**806.148**	M4 x 8

1. 10 pce. of clamping screw and 1 pce. of wrench are included.

Recommended Cutting Condition

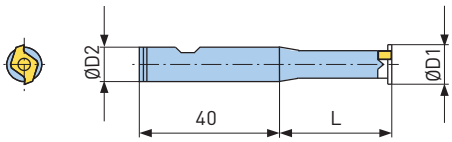
Hole Dia. Ø	Spindle Speed (min^{-1})		
	Steel	Cast Iron	Aluminium
5	600	800	1 000
10	500	600	800
15	400	500	600
20	300	400	500

Slot Milling Cutter

Slot milling cutter with indexable inserts for circlip grooves as per DIN472.

Cylindrical Shank Type

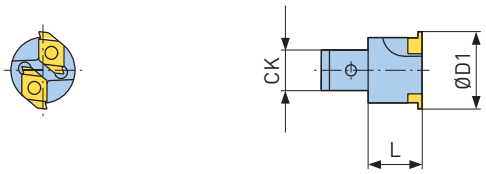




Model	Order No.	Range	ØD1	ØD2	L	Cutting Edges	Insert
DNF12-22XW10	**958.008**	**12 - 24**	11.5	10	32	2	Type 0

CK Shank Type

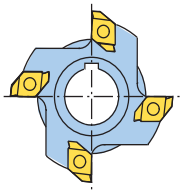


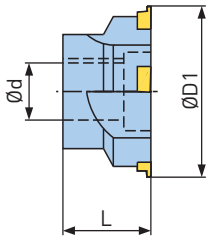


Model	Order No.	Range	CK	ØD1	L	No. of Inserts	Insert
DNF22-34XCK1	**958.010**	**22 - 34**	CK1	21	15	2	Type 1
DNF34-50XCK2	**958.021**	**34 - 50**	CK2	33	20	3	

Arbor Type



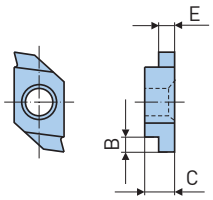




Model	Order No.	Range	Ød	ØD1	L	No. of Inserts	Insert
DNF50-85XF16	**958.031**	**50 - 85**	16	48	26	4	Type 1
DNF85-210XF27	**958.041**	**85 - 210**	27	83	32	6	Type 2

Inserts for Slot Milling Cutter





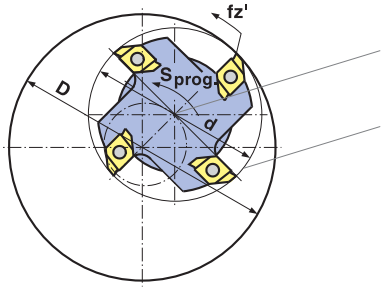
Insert	E	B	C	P20 Steel	K20 Cast Iron	N10 Aluminium
Type 0	1.15	0.9	4	958.051	958.052	958.053
	1.35	1.3		958.055	958.056	958.057
	Blank			958.314	958.313	
Type 1	1.15	1.1	4	958.061	958.062	958.063
	1.35	1.5		958.065	958.066	958.067
	1.65	1.6		958.071	958.072	958.073
	1.9	2		958.075	958.076	958.077
	2.2	2.2		958.081	958.082	958.083
	2.7	2.6		958.085	958.086	958.087
	Blank			958.158	958.157	
Type 2	3.2	3	6	958.091	958.092	958.093
	4.2	3.5		958.095	958.096	958.097
	Blank			958.156	958.155	

1. Insert type is corresponding to P494.

Recommended Cutting Condition

These values relate to the milling cutter circumference and apply under normal working conditions. Climb-cut milling is recommended with helical or tangential plunging to groove depth assuming a continuous program cycle without feed interruption.

Work Piece Material	Cutting Speed Vc [m/min]	Feed per Tooth fz [mm]
Cast Iron	80 - 130	0.12 - 0.25
Steel	120 - 200	0.10 - 0.20
Aluminium	200 - 400	0.15 - 0.30



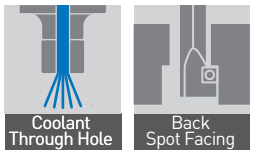
D Circular slot diameter
d Slot cutter circumference
Vf Feed rate at the circumference of the milling cutter
Vf1 Feed rate at the center of the milling cutter

In all circular milling operations the programmed feed rate [Vf1] applies to the centre of the milling cutter. This may be computed as follows:

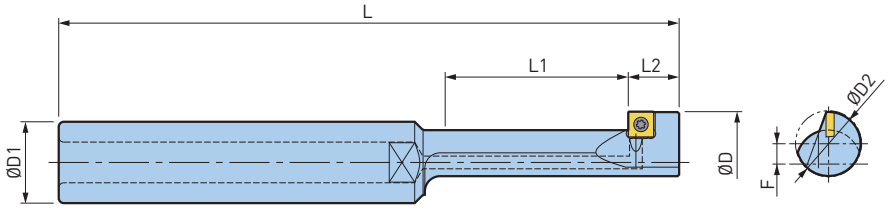
$$Vf1 = Vf - \frac{D - d}{D}$$

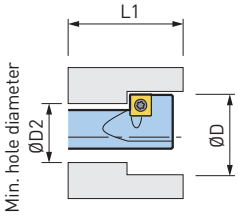
BF-Cutter

Selected spot facing diameters suitable for cap screws.







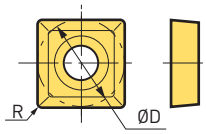


Model	Order No.	ØD	ØD1	ØD2	L	L1	L2	Offset F	Insert Model
ST16 -BFM6/11 - 12	**802.752**	11	16	6.5	102	12	9	2.40	CM0502
-BFM8/14 - 20	**802.753**	14	16	8.5	108	20	9	2.90	
-BFM10/17.5 - 25	**802.750**	17.5	16	10.5	112	25	10	3.65	
-BFM12/20 - 36	**802.751**	20	16	13	122	36	10	3.65	
ST20 -BFM14/23 - 49	**802.754**	23	20	15	136	49	10	4.15	CM0502
-BFM16/26 - 56	**802.755**	26	20	17	142	56	10	4.65	

1. Wrench and screw are included. Inserts are to be ordered separately (10/pkg).
2. 10 screws and 1 wrench are included in insert clamping screw set.

Indexable Inserts for BF-Cutter





Model	ØD	Nose R	P	N
			ACP200	DS20
CM0502	Ø5	0.2	**966.441**	**966.442**

1. Inserts are available in a packet of 10 pcs.

Spare Parts

Cutting Type	Insert Clamping Screw Set	Order No.
BFM6/11	S2SS-T6	**966.448**
BFM8/14		
BFM10/17.5	S2TS-T6	**966.449**
BFM12/20		
BFM14/23		
BFM16/26		

C.2

Recommended Cutting Condition

Workpiece Material	Insert Grade	Cutting Speed (m/min)	Feed Rate (mm/rev)
General Steel, High-Alloy Steel	ACP200	30	0.03
Cast Iron		30	0.03
Aluminium, Non-Ferrous	DS20	30 - 50	0.03

Insert grade

ACP200	DS20
General steel	Aluminium & non-ferrous
High wear-resistant PVD coating on carbide substrate with ultra multi-layer TiAlN and AlCrN in micron order.	Ultra smooth and low friction DLC coating on carbide substrate having excellent anti-adhesive property.

Measuring Instruments

Point Master Series	498 - 500
Base Master Series	501 - 502
Tool Master	503
Accu Center	503
Alignment Tool for ATC Arm	504
Dyna Force	505
Dyna Contact	506
Level Master	507
Centering Tool for Lathe	508

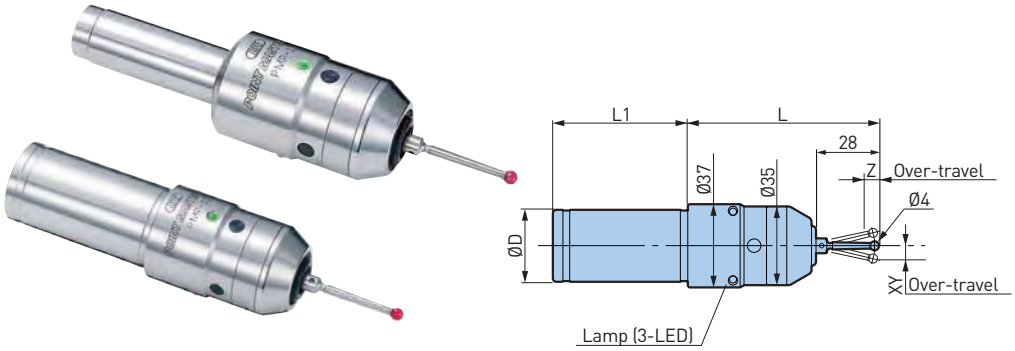
D.1

Point Master Pro Series

Point Master Pro Series is a precision 3-D touch sensor operating in non-conductive as well as conductive applications, resin, ceramic or coated workpieces, machines with ceramic spindle taper or bearings can all be accommodated.

- LED lamp
- Repeatability ± 1 µm
- For all materials

Cylindrical Type



Model	Order No.	ØD (h7)	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
					XY	Z	XY	Z			
PMP -10	**978.976**	10	75	49	± 12	5	0.4	1.5	Panasonic Lithium BR435x1	ST28-4R	0.4
-20	**961.237**	20	90	50					LR1x2		0.5

1. PMP-10 has one LED only.
2. Above table indicates the specification when using stylus ST28-4R.
3. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
4. Battery is not included.

For Stylus ▶ 500

BBT Type

JIS B 6339 (BIG-PLUS)



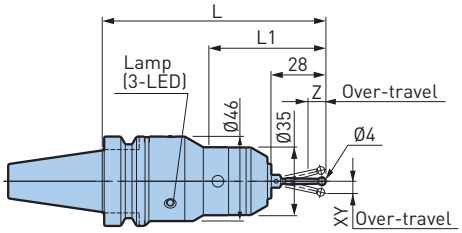


Fig. 1

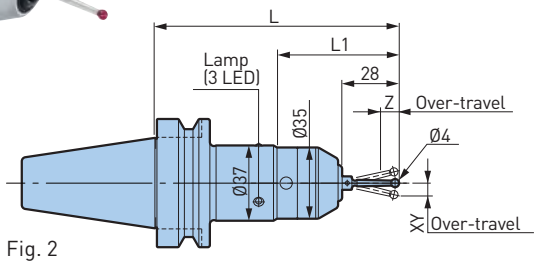


Fig. 2

D.1

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Fig.	BBT No.	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
						XY	Z	XY	Z			
BBT30-PMP-115	**802.313**	1	30	115	63	± 12	5	0.4	1.5	CR2x1	ST28-4R	0.8
BBT40-PMP-120	**804.649**	2	40	120	60					LR1x2		1.3

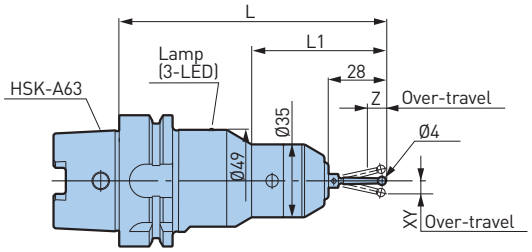
1. Above table indicates the specification when using stylus ST28-4R.
2. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
3. Battery is not included.

For Stylus ▶ 500

HSK Type

ISO 12164(DIN 69893-1) & DIN 69893-5





Model	Order No.	Fig.	HSK No.	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
						XY	Z	XY	Z			
HSK-A63-PMP-130	**804.656**	1	HSK-A63	130	65	± 12	5	0.4	1.5	CR2x1	ST28-4R	1.3

1. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
2. Above table indicates the specification when using stylus ST28-4R.
3. Battery is not included.

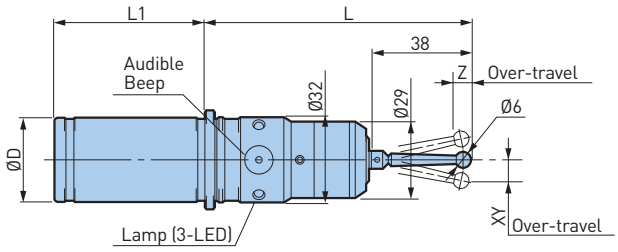
For Stylus ▶ 500

Point Master PMC Series

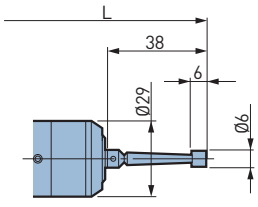
Point Master PMC series is ideal touch sensor for electric conductive materials. LED lamp illuminates when the stylus touches the workpiece. Stroke of stylus provides sufficient over-travel for safety.

- LED lamp + beep sound
- Repeatability ± 1 µm
- For electric conductive materials

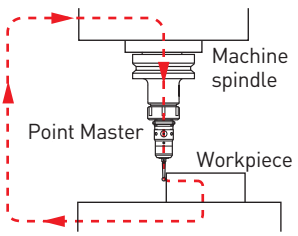




With stylus ST38-6P



With stylus ST38-6x6



Model	Order No.	ØD h7	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
					XY	Z	XY	Z			
PMC-20	**961.238**	20	110	50	± 12	5	0.6	2.7	LR1x2	ST38-6P	0.4
PMC-20S	**804.658**									ST38-6x6	0.4

1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMC utilizes conductivity from the machine, toolholder, Point Master through workpiece.
3. Battery is not included.

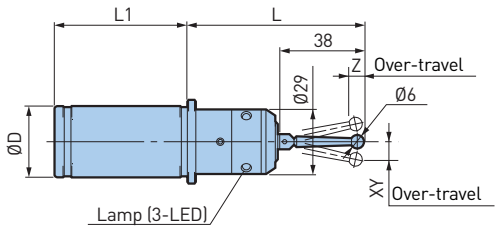
For Stylus ▶ 500

Point Master PMG Series

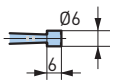
LED lamp illuminates when the stylus touches the workpiece.

- LED lamp
- Repeatability ± 1 µm
- For electric conductive materials

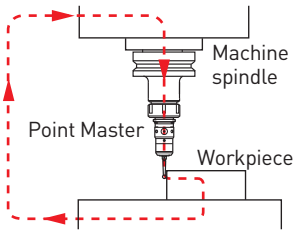




With stylus ST38-6P



With stylus ST38-6x6



Model	Order No.	ØD h7	L	L1	Over-travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
					XY	Z	XY	Z			
PMG-10	**961.200**	10	75	50	± 12	5	0.6	2.7	Panasonic Lythium BR435x1	ST38-6P	0.2
PMG-10S	**804.662**									ST38-6x6	0.2
PMG-20	**961.205**	20	90	50	± 12	5	0.6	2.7	LR1x2	ST38-6P	0.3
PMG-20S	**961.206**									ST38-6x6	0.3

1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMG utilizes conductivity from the machine, tool holder, point master through workpiece.
3. Battery is not included.

Alternative Stylus

The stylus (M3 thread) is replaceable. Please replace when different model of stylus required or if damaged.



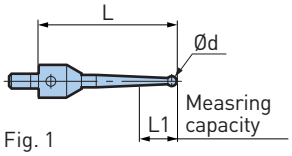


Fig. 1

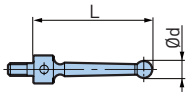


Fig. 2

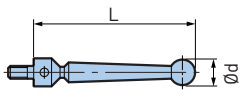


Fig. 3

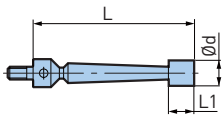
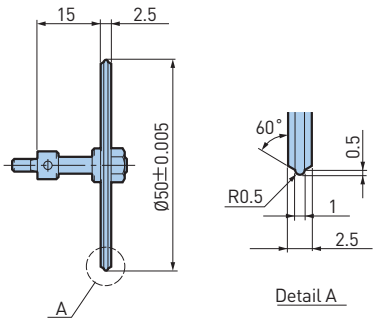


Fig. 4



Model	Order No.	Fig.	L	L1	Ød	Material	Series
ST28 -1P	**802.222**	1	28	2	1	Carbide	PMC·PMP PMG
-2P	**802.223**			8	2		
-3P	**972.309**	2		-	3		
-4P	**972.311**				4		
ST38 -6P	**972.304**	3	38	-	6	Steel (SUS)	PMC, PMG
ST38 -6x6	**972.306**	4		6	6		PMC PMG
ST28 -4R	**972.310**	2	28	-	4	Ruby	PMP

1. Stylus model ST38-6x6 is exclusive for PMC-20S and PMG-20S. Runout accuracy may worsen when used on other models.

Model	Order No.
ST15-50K	**804.842**

1. Ideal for peculiarly shaped workpiece or tapered portion of plastic mold.
2. PMC-series only.

Base Master Series

Base Master Series is a precision touch sensor to determine workpiece offsets and tool length. Mounted on workpiece surface or machine table, LED lamp illuminates immediately when the cutting edge touches the sensor plate and the position is detected.



Base Master

The most popular Base Master model with 1µm accuracy. Operates when a conductive circuit is completed.

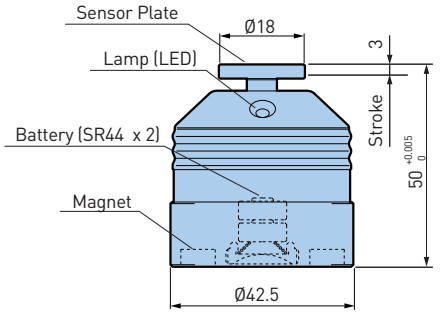
- LED lamp
- For use with conductive cutting tools, workpieces, and machine tools.

Model	Order No.
BM-50	961.201



Height Accuracy	$50^{+0.005}_{0}$ mm
Measureable Pressure	3N
Repeatability Accurary	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 1 mm
Battery Life	10 hours (continuous use)
Weight	0.23 kg

1. Battery is not included.



Base Master Gold

Suitable for various tools and workpieces, including non-conductive materials such as ceramics.

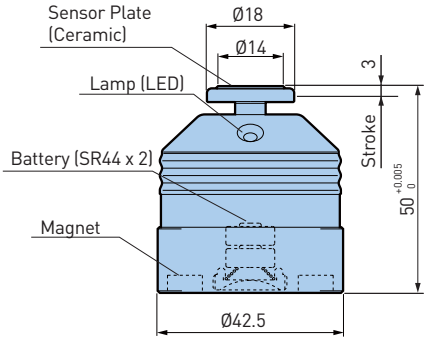
- LED lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools

Model	Order No.
BM-50G	961.211



Height Accuracy	$50^{+0.005}_{0}$ mm
Measureable Pressure	2N
Repeatability Accurary	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 1 mm
Battery Life	10 hours (continuous use)
Weight	0.24 kg

1. Battery is not included.



Base Master Micro

Specifically designed for micro cutting tools. Low measuring pressure protects the cutting edge.

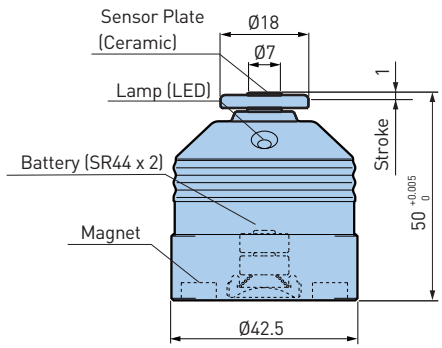
- LED lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools

Model	Order No.
BM-50M	961.212



Height Accuracy	$50^{+0.005}_{0}$ mm
Measureable Pressure	0.3N
Repeatability Accurary	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 0.05 mm
Battery Life	10 hours (continuous use)
Weight	0.24 kg

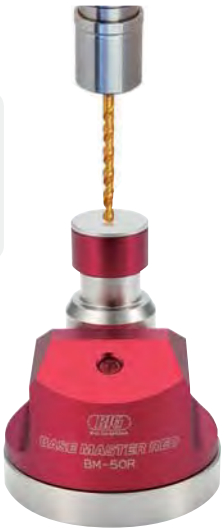
1. Battery is not included.

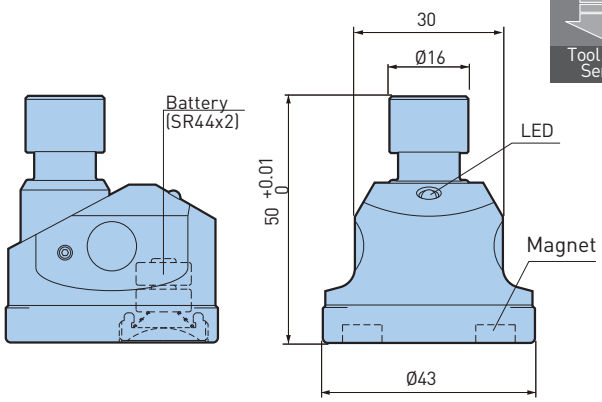


Base Master Series

Base Master Red

- LED lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools
- Replaceable sensor plate, BM-MEG, is available as individual part





Tool Offset Sensor

Body Set

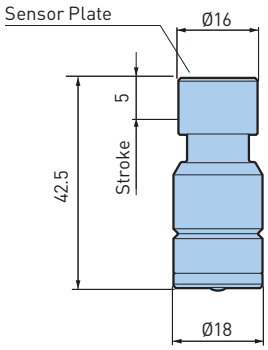
Model	Order No.
BM-50R	805.675

1. BM-MEG is included.

Sensor Part

Model	Order No.
BM-MEG	805.674





Height Accuracy	$50^{+0.01}_{0}$ mm
Repeatability Accuracy	± 1 µm (2 σ)
Min. Measureable Tool Diameter	Ø 1 mm
Measureable Pressure	2 N
Sensor Stroke	5 mm
Signal	LED (red)
Battery	SR44 x 2
Weight	0.2 kg

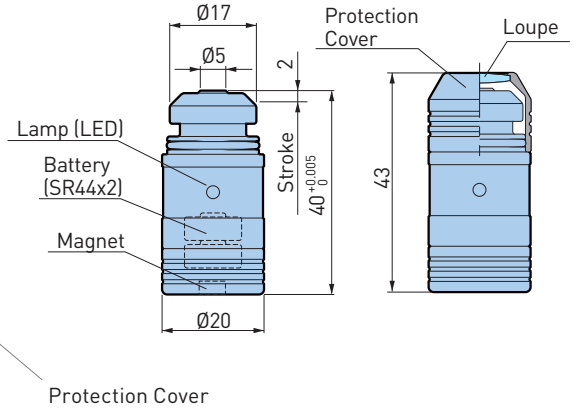
1. Battery is not included.

Base Master Mini

- LED Lamp
- For all materials, including non-conductive cutting tools,workpieces, and machine tools
- World smallest 20 mm body diameter







Model	Order No.
BMM-20	961.213

1. Protection cover is included.

Height Accuracy	$40^{+0.005}_{0}$ mm
Measureable Pressure	1.8 N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measureable Tool Diameter	Ø 0.1 mm
Battery	SR44 x 2
Battery Life	10 hours (continuous use)
Weight	55 g

1. Battery is not included.

Tool Master

Tool Master is a precision touch sensor with a large dial gauge. LED lamp and sound pre-indicate approach to 100 mm height to ease the detecting operation.

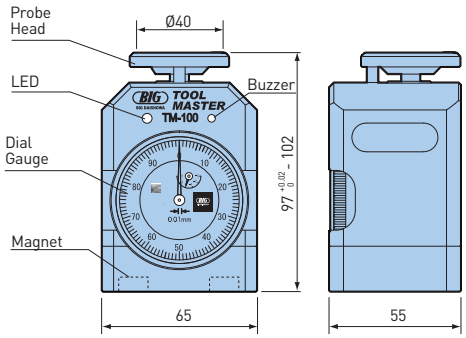


- LED lamp
- Visible dial indicator

Model	Order No.
TM-100	961.347



Height Accuracy		$100\ ^{+0.02}_{0}$ mm
Stroke		5 mm
Stroke Range		97 - 102 mm
Measureable Pressure		6N (100 mm)
Battery		SR44x2
Weight		1.2 kg
Dial Guage	Graduation	0.01 mm
	Indication Tolerance	12 µm
	Repeatability	3 µm
	Return Tolerance	3 µm



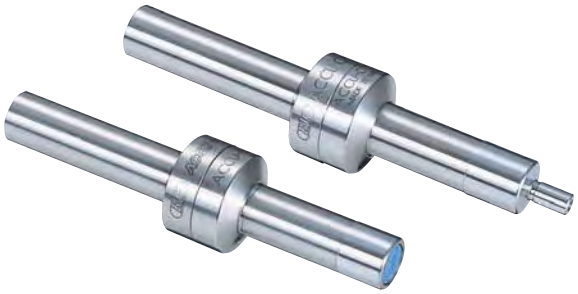
1. Dial gauge accuracy in accordance with JISB7503:2011.
2. Battery is not included.

Accu Center

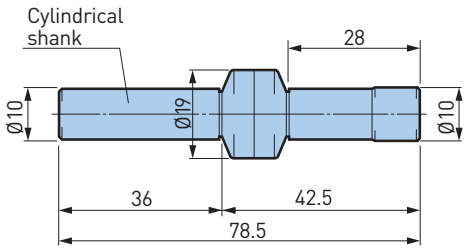
Accu Center is a simple and precise edge finder offering repeatability within 3 µm.
Hard chrome plated stylus offers extended life.



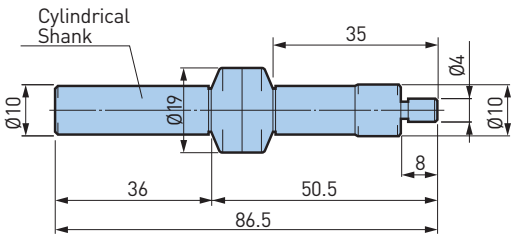
- For all material
- Not for use with horizontal machine tools



Model	Order No.
ACCU-C10	800.483



Model	Order No.
ACCU-C104	800.484



Alignment Tool for ATC arm

For maintenance of machine tool spindle. Measuring equipment of misalignment between the ATC arm and machine tool spindle or magazine pot center.

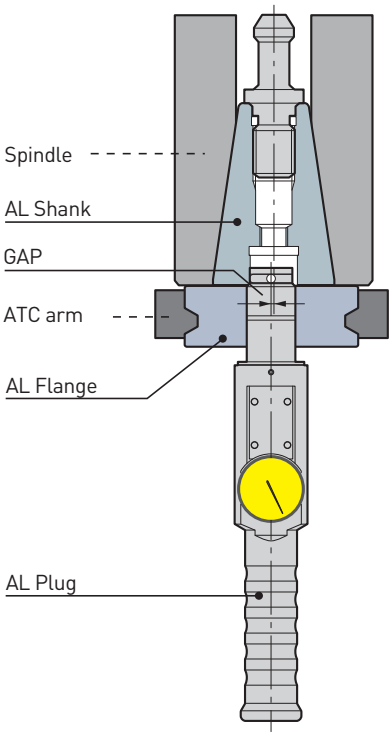
How to use

- Load the AL Shank in the machine spindle and mount the AL Flange on the ATC arm.
- Insert the AL Plug into the AL Flange.
- Rotate the AL Plug and read the highest and lowest values of the dial indicator. This direction is the eccentric direction. Half of the gap of the values is the eccentric amount.
- Adjust the position of the ATC arm so that the front end of the AL Plug will be inserted into the AL Flange fully.





Exclusive storage case



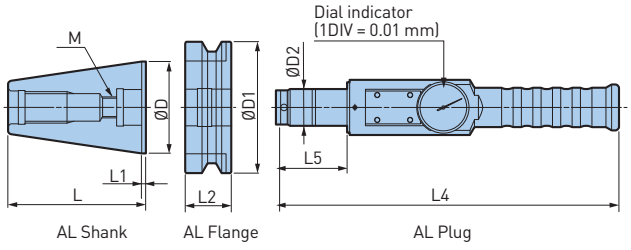


Fig. 1

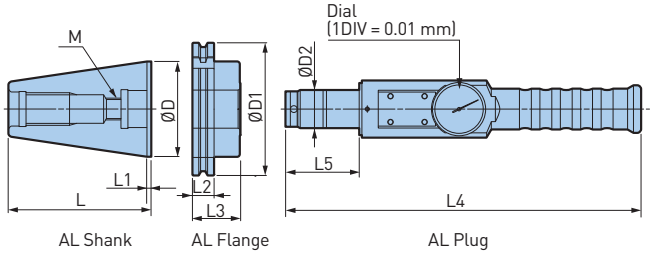


Fig. 2

Model	Order No.	Fig.	ØD	D1	D2	L	L1	L2	L3	L4	L5	M
BT30-ATC18	**978.238**	1	31.75	46.00	18	50.40	2.0	20.0	-	251	44	12
BT40-ATC20	**978.237**		44.45	63.00	20	67.40	2.0	25.0	-	251	44	12
BT50-ATC28	**978.236**		69.85	100.00	28	104.80	3.0	35.0	-	261	54	16
DV40-ATC20	**801.042**	2	44.45	63.55	20	71.60	3.2	15.9	24.3	251	44	12
DV50-ATC28	**801.043**		69.85	97.50	28	104.95	3.2	15.9	35.3	261	54	16

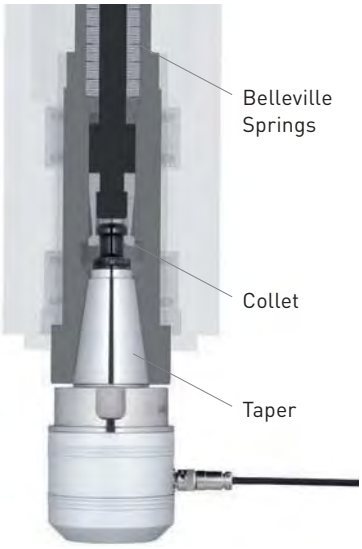
1. For HSK is also available upon request. Please contact BIG KAISER agency.

Dyna Force

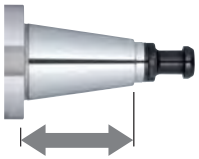
Measuring device for pulling force of machine tool spindle.

- Periodical measurement avoids reduced rigidity leading to vibrations, loss of machining quality, shortened tool life

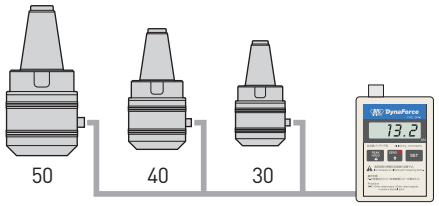




Longer taper shank to enhance reliability
Long taper supports itself in long span and stabilizes the value of measurement.



Only one display for all taper sizes
One common display can be used for all taper sizes.



Specification

Corresponding JIS, DIN, ANSI

Measuring device

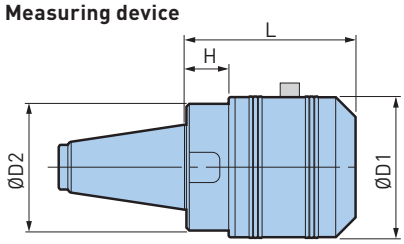


Fig. 1

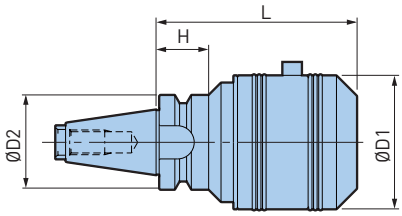


Fig. 2

Display



Cable



Case



Set Model	Order No.	Contents of Set				Taper Size	Rated Capacity	ØD1	ØD2	L	H	Weight (kg)
		Measuring Device	Fig.	Display	Cable							
SNT30 -DF10	**805.845**	NT30 -DF10	1	DFA-1 (AA batteryx2)	DFC-1 (2 m)	30	10kN (980 kgf)	65	58	80	20	1.5
SBT30 -DF10	**805.442**	BT30 -DF10	2						46	98	26	1.6
SNT40 -DF30	**804.949**	NT40 -DF30	1			40	30kN (2 940 kgf)	73	66	90	24	2.5
SNT50 -DF50	**805.423**	NT50 -DF50	1			50	50kN (4 900 kgf)	96	90	110	33	6.0
-DF30 *	**805.846**	-DF30	1				30kN (2 940 kgf)	73	70	86	20	3.9

1. Each component is also available separately. Please contact BIG KAISER agent if individual component is required.
2. SBT30-DF10 is designed exclusively for machines not capable of manual tool change.
3. SBT30-DF10 is suitable for BT/BBT30 machines only.
4. Pull stud bolt is to be ordered separately. For DIN, ISO, ANSI & CAT standard machines, exclusive pull stud bolt for dyna force is required.
5. SNT50-DF30 marked with * is a light-weight model.

Exclusive pull stud bolts for Dyna Force

An exclusive pull stud bolt is needed for a machine spindle in DIN, ANSI or CAT standard.
Pull stud bolts in MAS and JIS standards can be used. These pull stud bolts are not suitable for the SBT30-DF10.



Standard No.		Shank No. 30		Shank No. 40		Shank No. 50	
		Model	Order No.	Model	Order No.	Model	Order No.
DIN69872		DF-PDV30	**804.683**	DF-PDV40A	**804.685**	DF-PDV50A	**804.686**
ISO7388	Type A	-					
	Type B	-		DF-PAV40	**804.681**	DF-PAV50	**804.682**
ANSI B5.50		DF-PAV30	**804.680**				
ASME B5.50		DF-PCV30	**804.684**	DF-PCV40	**804.687**	DF-PCV50	**804.688**

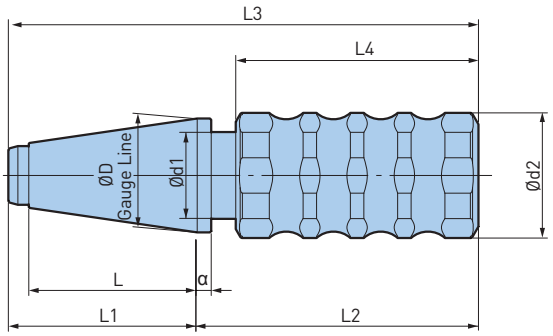
Dyna Contact

A ceramic taper gauge allowing inspection of machine spindle tapers at a glance.

- Made of ceramic
- Clearly shows up Prussian blue



Taper Angle: 8° 17' 50" ±1"



Model	Order No.	Taper No.	ØD	Ød1	Ød2	L	L1	L2	L3	L4	α	Weight (Kg)
DC -30P	**806.806**	30	31.75	23	36	48.4	56.4	106.6	163	93.6	6	0.52
-40P	**806.807**	40	44.45	34	49	65.4	73.4	110.6	184	95	6	1.22
-50P	**806.808**	50	69.85	49	49	101.8	111.8	113.2	225	95	8	2.62

1. It can be used for BBT (BT=JISB6339), BDV (DV=DIN69871) and BCV (CV = ANSI)

Supplied in Aluminium Case



Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously.
LED and buzzer indication when leveling is completed.

Wireless

Standart Type



Model	Order No.
LVM-01	801.673

Wireless Type



Body



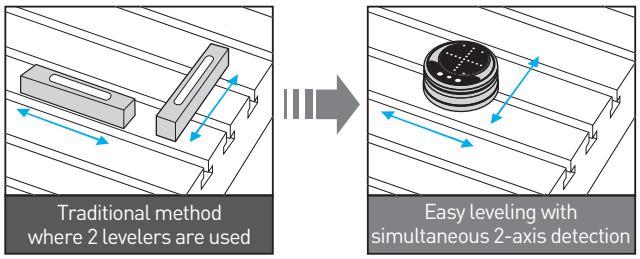
Receiver



Model	Order No.
LVM-WL	806.805

1. Body and receiver are available only as a set.

Simultaneous 2-axis detection



LED & buzzer indicate leveling completion

High Mode

when the required level condition is within 0.01mm/1m

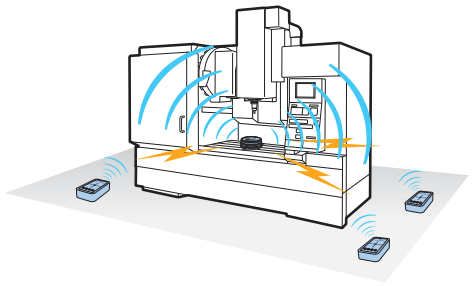
Low Mode

when the required level condition is within 0.1mm/1m

LED (blue) & buzzer are simultaneously activated

Remote Work solution Wireless Type

Easy and quick leveling with a single operator.



Supplied in Aluminium Case



	LVM-01	LVM-WL	
		Body	Receiver
Minimum Read Value	0.01 mm Inclination/m	0.01 mm / 1 m	
Power Source	Alkaline batteries (AAA x 4 pcs)	Alkaline batteries (AAA x 4 pcs)	
Auto Power Off	30 minutes after power is turned on	30 minutes after power is turned on	
Operational Temperature	0-40°C (Recommended 20°C ± 5°)	0-40°C (Recommended 20°C ± 5°)	
Battery Life	50 hours	50 hours	
Dimensions	Ø 109 mm x H46 mm	Ø 109 mm x H43 mm	H141 x W81 x D43 mm
Weight	0.99 Kg	0.99 Kg	0.28 Kg

1. Batteries are not included.

Note: In the case of high precision leveling, we recommend to check the Level Master in advance on a reference level, such as a level block.

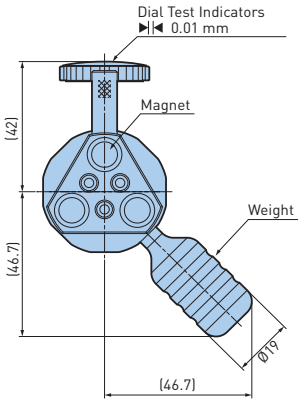
Centering Tool for Lathes

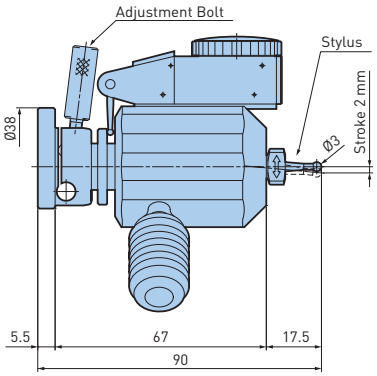
Easy Centering with Static Dial Gauge

- Centering the tool holder while watching the dial gauge made possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 2mm)
- Magnet base allows for flexible mounting positions







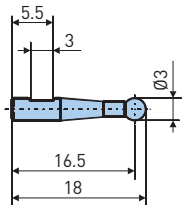


Model	Order No.	Min. Scale	Max. Spindle Speed	Weight (kg)	Stylus
CTL-90	**806.436**	0.01 mm	100 U/min	0.4 kg	ST3-CT90

1. Stylus is included.

Stylus for CTL-90





Model	Order No.	Material
ST3-CT90	**806.437**	Ruby

1. Longer stylus is also available upon request. Please contact BIG KAISER agency.

Order No.	Page	Weight (kg)
112.080	429	0.02
112.097A	331	2.150
112.107	313	1.370
112.108	313	1.100
112.110	312	1.300
112.121	313	1.770
112.122	313	1.890
112.123	313	1.710
112.126	312	1.700
112.205	333	0.260
112.206	333	0.265
112.207	333	0.310
112.271	340	0.025
112.272	340	0.035
112.301A	333	0.540
112.303A	333	0.880
112.304A	333	0.540
112.310	332	0.400
112.353	334	0.048
112.385	334	0.096
112.503	346	0.030
112.504	346	0.030
112.505	344	0.130
112.506	344	0.150
112.507	345	-
112.508	346	0.030
112.806	328	0.160
112.837	331	2.570
112.837A	331	2.570
112.837B	331	2.570
112.837C	331	2.570
112.837E	331	-
188.133	345	0.190
188.134	345	0.190
195.001	429	-
195.007	429	-
309.201	360	0.120
309.301	360	0.220
309.401	360	0.400
309.501	360	0.850
309.601	360	1.850
310.020	361	0.033
310.030	361	0.050
310.101	351	0.075
310.201	351	0.130
310.301	351	0.210
310.305A	358	0.220
310.401	351	0.400
310.405A	358	0.410
310.501	351	0.825
310.505A	358	0.810
310.601	351	1.650
310.602	351	2.400
310.605A	358	1.700
310.606A	358	1.730
310.607A	358	1.250
310.608A	358	1.750
310.701	351	3.850
310.705A	358	1.700
310.706A	358	1.830
310.708	351	5.360
310.840	349	0.400
310.850	349	0.780
310.860	349	1.650
310.865	349	1.650
310.870	349	4.000
315.101	306	0.050
315.201	306	0.100
315.301	306	0.165
315.401	306	0.340
315.501	306	0.635
315.601	306	1.290
315.602	306	1.850
315.701	306	3.100
317.102A	383	1.800
317.105	383	1.890
317.202	381	2.750
317.205	381	0.090
317.206	381	2.750
317.222	381	3.450
317.223	381	4.900
317.224	381	6.200
317.225	381	7.700
317.226	381	9.100
317.227	381	10.600
317.231	437	27
317.232	437	29
317.233	437	30
317.234	437	32
317.235	437	33
317.236	437	35
317.237	437	36
317.238	437	37
317.252	437	1.24
317.254	437	2.26
317.255	437	2.96
317.256	437	3.27
317.257	437	3.8
317.261	437	1.145
317.285	372	0.846
317.286	437	0.009
317.287	382	0.012
317.289	381	2.200
318.101	369	0.820
318.104	369	0.800
318.105	369	0.840
318.107	369	0.830
318.201	368	2.750
318.201N	368	2.800
318.202	368	2.730
318.202N	368	2.730
318.205	368	1.830
318.205N	368	1.830
318.206	368	2.320
318.206N	368	2.320
318.222	368	1.500
318.223	368	2.040
318.224	368	2.620
318.225	368	3.210
318.226	368	3.900
318.227	368	4.400
318.240	368	1.100
318.261	372	1.210
318.421	375	14.660
318.422	375	21.450
318.423	375	33.000
318.424	375	55.000
318.425	375	90.000
318.431	375	2.110
318.432	375	2.900
318.433	375	3.000
318.434	375	3.400
318.435	375	4.000
318.441	375	1.280
318.442	375	1.500
318.443	375	1.500
318.444	375	1.500
319.101	297	0.050
319.201	297	0.110
319.301	297	0.190
319.401	297	0.360
319.501	297	0.660
319.601	297	1.180
319.601N	297	1.180
319.602	297	1.900
319.602N	297	1.900
319.603	297	2.520
319.603N	297	2.520
319.604N	298	0.545
319.605N	298	0.850
319.607N	298	1.300
319.650	421	0.005
319.701	297	3.100
319.701N	297	3.100
319.702	297	4.500
319.702N	297	4.500
319.703	297	5.600
319.703N	297	5.600
319.705N	298	1.600
319.706N	298	1.920
319.707N	298	2.300
319.750	421	0.005
321.451	204	1.000
321.462	204	1.090
322.563	204	1.800
323.563	204	2.060
323.701	115	0.380
323.703	115	0.350
323.705	76	0.390
323.707	76	0.350
323.721	115	1.130
323.722	115	2.060
323.726N	115	1.120
323.728	115	0.820
323.730	76	1.200
323.731	76	1.320
323.735N	76	1.300
323.736N	76	1.300
323.738	76	0.965
323.760	115	3.400
323.761	115	4.600
323.765N	115	3.450
323.766N	115	4.750
323.767N	115	4.850
323.768N	115	7.200
323.769N	115	13.700
323.770	76	4.000
323.771	76	5.000
323.775N	76	3.900
323.776N	76	4.950
323.777	76	5.400
323.780	204	3.000

Order No.	Page	Weight (kg)
323.781	204	3.850
323.821N	113	1.100
323.825	113	0.920
323.826	113	1.150
323.831N	74	1.300
323.832N	74	0.990
323.860N	113	3.350
323.861N	113	4.450
323.862	113	7.000
323.864N	113	4.920
323.865N	113	7.000
323.866N	113	13.200
323.868	113	3.250
323.871N	74	4.900
323.874N	74	3.950
323.875	74	7.370
324.111F	168	0.220
324.112F	150	0.220
324.121F	168	0.200
324.131F	168	0.265
324.132F	150	0.255
324.141F	168	0.364
324.142F	150	0.340
324.231F	168	0.465
324.232F	150	0.440
324.241F	168	0.520
324.242F	150	0.500
324.251F	168	0.710
324.252F	150	0.665
324.312F	150	0.730
324.322F	150	0.830
324.331	150	0.850
324.331F	150	0.850
324.332	150	1.120
324.341	150	1.150
324.341F	150	1.150
324.342	150	1.305
324.352	150	0.960
324.352F	150	0.960
324.353	150	1.320
324.354	150	1.940
324.361	150	1.250
324.361F	150	1.250
324.361N	150	1.250
324.362	150	1.820
324.367N	150	3.230
324.461	150	1.950
324.531	150	2.450
324.541	150	2.870
324.551	150	2.905
324.552	150	3.770
324.561	150	2.900
324.561N	150	2.800
324.563	150	3.450
324.563N	150	3.350
324.566N	150	6.000
324.571	150	4.050
324.571N	150	4.100
324.572	150	5.800
324.572N	150	5.750
324.575N	150	11.930
325.933	115	3.750
325.942	115	3.650
325.944	115	4.250
325.952	115	3.800
325.954	115	4.700
325.955	115	4.550
325.964	115	4.700
325.965	115	5.500
326.005	115	0.600
326.011	115	1.200
326.021	115	1.200
326.031	115	1.300
326.041	115	1.300
326.050	115	0.920
326.054	115	2.550
326.057	115	1.100
326.064	115	2.750
326.141	76	1.180
326.153	76	1.850
326.160	76	0.990
328.032N	192	3.100
328.033N	192	1.350
328.034	192	0.970
328.035	192	0.940
328.036	192	0.880
328.037N	192	0.850
328.053N	192	2.420
328.086	192	3.700
328.151F	168	0.220
328.162	192	3.800
328.210	192	3.800
328.211	192	3.740
328.213	377	7.500
328.214	377	7.500
328.215	377	7.500
328.216	377	2.600
328.217N	377	4.740
328.218F	168	0.400
328.223	192	0.590
328.224	192	0.600
328.226	192	0.600
328.228	75	7.500
328.230	75	12.100
328.233	114	7.500
328.235	114	12.100
328.238	151	6.800
328.240	151	11.400
328.249F	168	0.050
328.257F	168	0.155
328.260	74	0.550
328.261	74	0.750
328.262	74	0.700
328.272	74	0.640
328.273	192	0.600
328.277F	150	0.215
328.278F	150	0.200
328.279F	150	0.180
328.280F	168	0.140
328.281F	168	0.075
328.289	74	0.890
328.308	74	0.480
328.321	192	0.850
328.322	192	0.940
329.866	76	0.480
331.110	197	0.050
331.111	197	0.070
331.220	197	0.100
331.221	197	0.150
331.330	197	0.160
331.331	197	0.250
331.440	197	0.350
331.445	197	0.470
331.550	197	0.850
331.555	197	1.210
331.660	197	1.360
331.660N	197	1.360
331.665	197	2.200
331.665N	197	2.200
331.775	197	4.400
331.775N	197	4.400
331.776	197	7.250
331.776N	197	7.250
331.860N	198	0.550
331.861N	198	0.800
331.864N	198	0.450
331.865N	198	0.950
331.867N	198	0.520
331.868N	198	0.820
331.870N	198	1.410
331.871N	198	2.190
331.874N	198	0.950
331.875N	198	2.000
331.876N	198	3.100
331.877N	198	1.530
331.878N	198	3.000
331.879N	198	2.250
332.210	196	0.090
332.310	196	0.150
332.320	196	0.160
332.410	196	0.230
332.420	196	0.250
332.430	196	0.300
332.510	196	0.440
332.511	196	0.440
332.520	196	0.550
332.521	196	0.420
332.530	196	0.670
332.531	196	0.435
332.541	196	0.540
332.545	196	0.700
332.610	196	0.910
332.611	196	0.790
332.620	196	0.800
332.621	196	0.700
332.630	196	0.960
332.631	196	0.750
332.632	196	1.200
332.641	196	0.820
332.642	196	1.450
332.645	196	1.050
332.651	196	0.840
332.652	196	1.950
332.655	196	1.230
332.741	196	1.500
332.745	196	1.730
332.750	196	2.460
332.751	196	1.650
332.755	196	2.010
332.765	196	2.250
332.765N	196	2.250
332.766	196	2.900

Order No.	Page	Weight (kg)
332.870N	198	1.110
332.875N	198	1.660
332.875N	198	1.66
335.021	483	0.085
335.022	483	0.255
335.023	483	0.710
335.024	483	2.680
335.035	441	0.006
335.036	441	0.015
335.037	441	0.03
335.042	201	1.350
335.044	201	1.520
335.066	201	1.980
335.070	479	0.081
335.071	479	0.181
335.072	479	0.311
335.073	479	0.281
335.074	479	0.450
335.077	201	4.750
335.130	202	0.130
335.131	202	0.230
335.132	202	0.235
335.140	202	0.590
335.142	202	0.740
335.164	202	1.150
335.165	202	1.700
335.230	200	0.280
335.231	200	0.300
335.232	200	0.390
335.233	200	0.550
335.234	200	0.410
335.235	200	0.425
335.236	200	0.535
335.237	200	0.670
335.238	200	0.690
335.239	200	0.790
335.240	200	0.610
335.241	200	0.630
335.242	200	0.690
335.243	200	0.820
335.244	200	0.840
335.245	200	0.900
335.246	200	0.920
335.247	200	1.050
335.248	200	1.660
335.249	200	0.800
335.250	200	2.900
335.251	200	3.400
335.320	362	0.470
335.321	362	0.740
335.322	362	0.950
335.323	362	0.860
335.324	362	1.100
335.325	362	1.750
335.326	362	1.810
335.327	362	3.650
335.328	362	3.690
335.329	362	5.400
335.330	362	7.150
335.331	362	2.500
335.380	362	0.570
335.381	362	0.810
335.382	362	1.005
335.383	362	0.700
335.384	362	0.970
335.385	362	1.300
335.386	362	1.050
335.387	362	1.530
335.388	362	2.050
335.389	362	1.230
335.390	362	1.770
335.391	362	2.400
335.420	200	0.265
335.421	200	0.350
335.423	200	0.420
335.424	200	0.510
335.425	200	0.640
335.430	200	0.700
335.430N	200	0.700
335.431	200	0.770
335.431N	200	0.770
335.432	200	0.930
335.433	200	1.300
335.433N	200	1.300
335.434	200	1.750
335.434N	200	1.700
335.435	200	2.100
335.436	200	2.500
335.437N	200	1.850
335.438N	200	2.350
335.531	203	0.440
335.532	203	0.560
335.541	203	0.820
335.542	203	0.940
335.551	203	1.700
335.552	203	1.850
335.561	203	3.300
335.562	203	4.050
335.563	203	5.800
335.571	203	9.500
335.625	285	-
335.762	203	0.870
335.763	203	1.550
335.764	203	0.500
335.768	203	0.780
335.769	203	1.000
335.902	357	2.750
335.903	357	2.100
335.904	357	1.750
335.905	357	1.450
335.906	357	2.700
335.912	357	0.850
335.913	357	0.400
335.915	357	0.200
336.171	473	0.410
336.172	473	0.485
336.173	473	0.580
336.174	473	0.690
336.175	473	0.845
336.301	474	1.160
336.302	474	1.070
336.303	474	3.330
336.304	474	3.850
336.309	474	1.195
336.310	474	2.900
336.569	473	3.300
336.631	473	0.930
336.632	473	0.920
336.633	473	1.000
336.634	473	0.980
336.635	473	0.960
336.636	473	1.030
336.637	473	1.150
336.638	473	1.140
336.639	473	1.160
336.640	473	1.160
336.641	473	1.190
336.642	473	1.220
336.643	473	1.330
336.644	473	1.350
336.645	473	1.400
336.647	473	1.460
336.649	473	1.590
336.651	473	1.750
336.653	473	1.770
336.655	473	2.150
336.657	473	2.000
336.659	473	2.090
336.661	473	2.270
336.665	473	4.100
336.674	473	5.000
336.731	473	0.990
336.732	473	1.010
336.733	473	1.040
336.734	473	1.100
336.735	473	1.190
336.736	473	1.240
336.737	473	1.250
336.738	473	1.270
336.739	473	1.400
336.740	473	1.370
336.741	473	1.380
336.742	473	1.600
336.743	473	1.520
336.744	473	1.560
336.745	473	1.600
336.747	473	1.750
336.749	473	1.920
336.751	473	2.000
336.753	473	2.400
336.755	473	2.430
336.757	473	2.600
336.759	473	2.950
336.761	473	2.840
336.905	441	0.02
337.316	472	0.740
337.317	472	0.750
337.318	472	0.760
337.319	472	0.765
337.320	472	0.785
337.321	472	0.785
337.322	472	0.795
337.323	472	0.820
337.324	472	0.840
337.325	472	0.855
337.326	472	0.885
337.327	472	0.920
337.328	472	0.935
337.329	472	0.960
337.330	472	0.990
337.416	472	0.750
337.417	472	0.750

Order No.	Page	Weight (kg)
337.418	472	0.780
337.419	472	0.790
337.420	472	0.800
337.421	472	0.805
337.422	472	0.830
337.423	472	0.855
337.424	472	0.875
337.425	472	0.905
337.426	472	0.960
337.427	472	0.995
337.428	472	1.020
337.429	472	1.055
337.430	472	1.095
389.221	437	0.140
389.365	197	1.250
389.366	197	2.550
389.367	197	5.180
389.395	350	2.350
389.396	350	5.000
389.397	350	8.520
389.405	299	2.400
389.406	299	5.000
389.407	299	8.600
470.103	332	0.900
470.108	313	1.800
470.109	320	1.800
470.301	352	0.295
470.401	352	0.585
470.501	352	1.125
470.601	352	2.190
470.602	352	2.890
470.606	359	2.200
470.609	359	1.380
470.721	205	0.300
470.723	205	0.300
470.731	205	0.300
470.733	205	0.300
470.742	205	0.300
470.744	205	0.300
470.752	205	0.300
470.754	205	0.300
470.801	352	5.200
472.051	296	0.260
472.052	296	0.005
472.061	296	0.280
472.062	296	0.007
490.106	109	0.880
490.108	109	0.905
490.110	109	0.980
490.112	109	1.070
490.114	109	1.085
490.116	109	1.270
490.118	109	1.285
490.120	109	1.315
490.125	109	2.410
490.132	109	2.600
490.206	109	2.670
490.208	109	2.710
490.210	109	2.810
490.212	109	2.940
490.214	109	2.975
490.216	109	3.040
490.218	109	3.050
490.220	109	3.110
490.225	109	3.850
490.232	109	4.500
490.240	109	5.500
490.506	107	0.990
490.508	107	0.985
490.510	107	1.050
490.512	107	1.035
490.514	107	1.085
490.516	107	1.065
490.518	107	1.250
490.520	107	1.175
490.556	107	1.150
490.558	107	1.145
490.560	107	1.290
490.562	107	1.250
490.566	107	1.310
490.570	107	1.560
490.606	107	2.725
490.608	107	2.715
490.610	107	2.780
490.612	107	2.770
490.614	107	2.820
490.616	107	2.800
490.618	107	2.940
490.620	107	2.915
490.625	107	3.500
490.656	107	3.500
490.658	107	3.500
490.660	107	3.500
490.662	107	3.500
490.664	107	3.600
490.666	107	3.600
490.668	107	3.900
490.670	107	3.900
490.675	107	4.710
611.115	414	0.003
611.116	414	0.004
611.117	414	0.004
611.152	414	0.002
611.153	414	0.003
611.154	414	0.003
611.155	315	0.003
611.156	315	0.004
611.157	414	0.004
611.212	414	0.015
611.213	414	0.020
611.214	414	0.025
611.215	414	0.040
611.252	414	0.015
611.253	414	0.020
611.254	414	0.025
611.255	414	0.040
612.110	414	0.002
612.111	414	0.002
612.112	414	0.002
612.113	414	0.003
612.114	414	0.003
612.116	414	0.004
612.117	414	0.004
612.213	414	0.020
612.215	414	0.040
612.253	414	0.020
612.254	414	0.025
612.255	414	0.040
613.202	340	0.012
613.203	340	0.011
613.204	340	0.012
613.205	340	0.010
613.206	340	0.009
613.207	340	0.007
613.208	340	0.005
613.304	334	0.020
613.305	334	0.020
613.306	334	0.019
613.307	334	0.019
613.308	334	0.015
613.309	336	0.019
613.310	336	0.008
613.323	334	0.065
613.324	334	0.065
613.325	334	0.060
613.326	334	0.060
613.327	334	0.060
613.404	314	0.050
613.405	314	0.050
613.406	314	0.045
613.407	314	0.045
613.408	314	0.040
613.409	314	0.040
613.410	314	0.035
613.411	316	0.029
613.412	318	0.025
613.413	316	0.018
613.414	318	0.015
613.422	314	0.125
613.423	314	0.120
613.424	314	0.130
613.425	314	0.130
613.426	314	0.120
613.427	314	0.120
613.428	314	0.150
613.429	314	0.120
613.430	314	0.130
615.080	315	0.010
615.081	315	0.010
615.082	315	0.020
615.083	315	0.020
615.084	315	0.030
615.085	315	0.030
615.086	315	0.030
615.087	321	0.050
615.089	430	0.050
615.201	315	0.020
615.202	315	0.040
615.203	315	0.008
615.203A	315	0.008
615.204	315	0.015
615.204A	315	0.016
615.205	315	0.020
615.206	315	0.115
615.207	315	0.045
615.208	315	0.085
615.209	319	0.160
615.210	319	0.235
615.211	315	0.016
615.212	315	0.045
615.213	315	0.035
615.214	315	0.025

Order No.	Page	Weight (kg)
615.215	315	0.070
615.216	343	0.025
615.217	343	0.040
615.218	319	0.060
615.219	319	0.140
615.220	327	0.015
615.221	319	0.300
615.223	315	0.100
615.224	319	0.200
615.225	319	0.140
615.226	319	0.125
615.227	319	0.260
615.228	327	0.035
615.229	319	0.400
615.230	327	0.030
615.231	327	0.035
615.232	319	0.093
615.233	319	0.250
615.234	339	0.065
615.239	339	0.170
615.240	339	0.215
615.243	339	0.135
615.250	319	0.140
615.251	319	0.250
615.252	317	0.300
615.253	317	0.450
615.257	326	0.370
615.258	326	0.520
615.262	317	0.140
615.264	326	0.240
615.265	317	0.210
615.266	317	0.370
615.267	326	0.290
615.268	319	0.220
615.269	319	0.350
615.271	315	0.010
615.272	315	0.012
615.273	319	0.015
615.280	319	0.015
615.281	319	0.019
615.282	319	0.025
615.283	319	0.030
615.284	319	0.035
615.285	319	0.040
615.286	319	0.040
615.287	319	0.050
615.288	319	0.030
615.289	319	0.030
615.290	319	0.030
615.291	319	0.030
615.292	319	0.035
615.300	317	0.016
615.301	317	0.015
615.302	317	0.018
615.303	317	0.020
615.304	326	0.055
615.305	326	0.060
615.306	326	0.080
615.365	317	0.005
615.366	317	0.010
615.367	317	0.015
615.369	317	0.105
615.371	317	0.170
615.373	317	0.260
615.374	317	0.070
615.375	317	0.100
615.376	317	0.130
615.377	317	0.170
615.378	317	0.220
615.387B	326	0.140
615.388	329	0.040
615.390	330	0.340
615.392	328	0.012
615.394	326	0.050
615.395	326	0.050
615.401	327	0.015
615.402	327	0.015
615.403	327	0.015
615.404	327	0.015
615.405	327	0.015
615.406	327	0.015
615.407	327	0.015
615.408	327	0.015
615.409	327	0.015
615.420	326	0.015
615.421	326	0.015
615.422	326	0.015
615.423	326	0.015
615.424	326	0.020
615.425	326	0.020
615.426	326	0.020
615.427	326	0.020
615.428	326	0.020
615.429	326	0.020
615.501	344	0.022
615.502	344	0.021
615.503	344	0.021
615.504	344	0.021
615.505	344	0.020
615.506	344	0.022
615.507	344	0.023
615.508	344	0.023
615.509	344	0.024
615.511	344	0.030
615.522	344	0.020
615.524	344	0.020
615.525	344	0.020
615.530	344	0.020
615.531	344	0.030
615.541	346	0.003
615.542	346	0.003
615.543	346	0.003
615.544	346	0.003
615.545	346	0.003
615.546	346	0.004
615.547	346	0.004
615.551	346	0.003
615.552	346	0.003
615.553	346	0.003
615.554	346	0.003
615.555	346	0.003
615.561	346	0.003
615.562	346	0.003
615.563	346	0.003
615.564	346	0.003
615.565	346	0.003
615.566	346	0.003
615.571	346	0.003
615.572	346	0.003
615.573	346	0.003
615.574	346	0.004
615.575	346	0.004
615.590	345	0.003
625.020	361	0.007
626.111	353	0.007
626.112	353	0.007
626.113	353	0.008
626.121	353	0.007
626.122	353	0.008
626.123	353	0.009
626.131	353	0.009
626.132	353	0.010
626.133	353	0.010
626.141	353	0.013
626.142	353	0.015
626.143	353	0.018
626.151	353	0.020
626.152	353	0.025
626.153	353	0.030
626.161	353	0.045
626.162	353	0.070
626.163	353	0.080
626.231	432	0.008
626.241	432	0.014
626.251	432	0.022
626.261	432	0.035
626.271	369	0.040
626.272	369	0.050
626.273	369	0.060
626.322	354	0.008
626.323	354	0.009
626.331	354	0.014
626.332	354	0.011
626.333	354	0.013
626.341	354	0.010
626.342	354	0.015
626.343	354	0.020
626.351	354	0.020
626.352	354	0.030
626.353	354	0.035
626.361	354	0.030
626.362	354	0.060
626.363	354	0.090
626.371	369	0.045
626.372	369	0.062
626.422	355	0.005
626.423	355	0.011
626.432	355	0.014
626.433	355	0.013
626.442	355	0.012
626.443	355	0.019
626.452	355	0.025
626.453	355	0.025
626.462	355	0.052
626.463	355	0.040
626.472	369	0.045
626.473	369	0.055
626.901	354	0.005
626.902	354	0.008
626.903	354	0.013
626.904	354	0.027
626.905	354	0.042

Order No.	Page	Weight (kg)
626.906	354	0.130
626.907	328	0.025
626.908	328	0.055
626.909	328	0.090
626.910	328	0.110
626.916	354	0.244
626.917	369	0.187
626.935	356	0.060
626.936	356	0.110
626.937	356	0.130
626.938	356	0.090
626.945	356	0.060
626.946	356	0.110
626.947	356	0.130
626.948	439	0.150
627.121	433	0.020
627.131	433	0.050
627.141	433	0.050
627.151	433	0.050
627.161	433	0.050
637.421	427	0.028
637.422	427	0.025
637.431	427	0.040
637.432	427	0.060
637.441	427	0.080
637.442	427	0.090
637.451	427	0.150
637.452	427	0.170
637.461	427	0.300
637.462	427	0.350
637.463	427	0.450
637.464	427	0.550
637.561	427	0.300
637.562	427	0.350
637.563	427	0.450
637.564	427	0.550
637.811	437	0.800
637.813	437	0.750
637.814	381	0.850
637.830	381	0.853
637.833	437	0.725
637.834	381	0.850
637.842	437	0.750
637.845	437	0.720
637.846	381	0.860
637.940	368	0.710
637.941	368	0.710
637.942	368	0.747
637.943	368	0.700
637.951	368	0.750
637.953	368	0.750
637.959	373	0.385
637.961	373	0.591
638.104	442	0.070
638.105	442	0.125
638.106	442	0.195
638.107	442	0.315
638.108	442	0.425
638.111	425	0.015
638.121	425	0.022
638.131	425	0.053
638.132	425	0.074
638.141	425	0.100
638.142	425	0.140
638.151	425	0.190
638.152	425	0.270
638.161	425	0.340
638.162	425	0.470
638.171	425	0.580
638.172	425	0.830
638.241	425	0.110
638.251	425	0.200
638.252	425	0.225
638.261	425	0.350
638.262	425	0.450
638.271	425	0.605
638.272	425	0.805
638.411	306	0.014
638.412	306	0.018
638.421	306	0.022
638.422	306	0.028
638.431	306	0.050
638.432	306	0.070
638.441	306	0.095
638.442	306	0.130
638.451	306	0.175
638.452	306	0.250
638.461	306	0.325
638.462	306	0.450
638.471	306	0.560
638.472	306	0.780
638.561	424	0.320
638.562	424	0.450
639.104	303	0.100
639.105	303	0.185
639.106	303	0.385
639.107	303	0.110
639.108	303	0.775
639.109	303	1.050
639.110	303	1.150
639.113	301	0.020
639.123	301	0.020
639.133	301	0.060
639.137	301	0.080
639.143	301	0.090
639.147	301	0.120
639.153	301	0.200
639.157	301	0.260
639.163	301	0.430
639.167	301	0.550
639.173	301	0.810
639.177	301	1.100
639.183	301	1.100
639.187	301	1.320
639.191	423	0.100
639.192	423	0.150
639.193	423	0.200
639.194	423	0.300
639.195	423	0.350
639.196	423	0.400
639.197	423	0.450
639.243	302	0.110
639.253	302	0.240
639.255	422	0.120
639.257	302	0.240
639.263	302	0.450
639.267	302	0.550
639.273	302	0.850
639.277	302	1.080
639.283	302	1.160
639.287	302	1.300
639.403	304	0.120
639.404	304	0.840
639.405	304	0.170
639.406	304	0.380
639.407	304	0.660
639.408	304	0.770
639.409	304	1.040
639.410	304	1.155
639.413	300	0.020
639.417	300	0.040
639.423	300	0.040
639.427	300	0.040
639.433	300	0.060
639.437	300	0.060
639.443	300	0.060
639.447	300	0.060
639.453	300	0.190
639.457	300	0.190
639.463	300	0.400
639.467	300	0.400
639.473	300	0.820
639.477	300	0.820
639.483	300	1.100
639.487	300	1.300
639.490	423	0.200
639.491	423	0.300
639.492	423	0.400
639.493	423	0.500
639.494	423	0.600
639.495	423	0.600
639.496	423	0.800
639.497	423	0.800
639.563	300	0.400
639.567	300	0.500
639.573	300	0.770
639.577	300	0.930
639.583	300	1.090
639.587	300	1.290
639.653	305	0.330
639.654	305	0.220
639.663	305	0.610
639.664	305	0.440
639.667	305	0.550
639.668	305	0.770
639.673	305	0.805
639.674	305	0.805
639.677	305	1.360
639.678	305	0.950
639.683	305	1.460
639.684	305	1.210
639.687	305	1.740
639.688	305	1.350
639.913	423	0.050
639.914	423	0.080
639.915	423	0.100
639.916	423	0.150
639.917	423	0.260
639.918	423	0.400
651.623	389	0.001
651.632	389	0.001
651.702	389	0.001

Order No.	Page	Weight (kg)
651.713	389	0.001
651.723	389	0.001
651.725	389	0.001
651.734	389	0.001
651.735	389	0.001
651.736	389	0.001
651.737	389	0.001
651.738	389	0.001
651.802	389	0.001
651.813	389	0.001
651.823	389	0.001
651.824	389	0.001
651.825	389	0.001
651.833	389	0.001
651.834	389	0.001
651.835	389	0.001
651.837	389	0.001
651.838	389	0.002
651.839	389	0.002
654.128	397	0.002
654.150	397	0.001
654.152	397	0.001
654.158	397	0.002
654.168	397	0.001
654.183	397	0.002
654.240	398	0.004
654.250	398	0.004
654.251	398	0.003
654.259	398	0.004
654.277	398	0.004
654.287	398	0.004
654.340	399	0.008
654.350	399	0.008
654.351	399	0.008
654.354	399	0.008
654.387	399	0.008
654.650	432	0.006
654.837	393	0.001
654.840A	393	0.001
654.846	393	0.001
654.847	393	0.001
654.850A	393	0.001
654.851A	393	0.001
654.852	393	0.001
654.853	393	0.001
654.856	393	0.001
654.858	393	0.001
654.877	393	0.001
654.879	393	0.001
654.888	393	0.001
654.889	393	0.001
654.930A	394	0.004
654.935	394	0.004
654.937	394	0.004
654.940A	394	0.004
654.941	394	0.001
654.942	394	0.004
654.945	394	0.004
654.947	394	0.004
654.949	394	0.004
654.950	394	0.003
654.952	394	0.004
654.955	394	0.003
654.957	394	0.003
654.959	394	0.003
654.964	395	0.004
654.965	395	0.004
654.968	395	0.004
654.969	395	0.004
654.977	394	0.004
654.978	395	0.003
654.979	395	0.003
654.980	395	0.008
654.983	396	0.016
654.986	396	0.015
654.987	394	0.004
654.988	395	0.007
654.989	395	0.009
654.990A	395	0.009
654.991	395	0.009
654.992	395	0.009
654.993A	395	0.009
654.995	395	0.003
654.996	396	0.016
654.997	396	0.016
654.998	396	0.016
655.301A	390	0.001
655.301B	390	0.001
655.302A	390	0.001
655.302B	390	0.001
655.303A	390	0.002
655.303B	390	0.002
655.305	390	0.001
655.306	390	0.001
655.310	392	0.002
655.311A	390	0.001
655.313	391	0.001
655.314	391	0.001
655.315	392	0.001
655.316	390	0.001
655.317	392	0.001
655.318	391	0.001
655.319	391	0.001
655.320	391	0.001
655.321A	390	0.001
655.322	390	0.001
655.324	390	0.001
655.326	390	0.003
655.327	391	-
655.328	391	-
655.331A	390	0.001
655.332	390	0.001
655.334	390	0.001
655.354	390	0.001
655.363	391	0.001
655.364	390	0.001
655.369	391	0.001
655.370	391	0.001
655.371	391	0.001
655.372	391	0.001
655.373	391	0.001
655.374	392	0.002
655.375	391	0.001
655.378	391	0.001
655.379	391	0.002
655.380	391	0.001
655.381	391	0.001
655.383	391	0.001
655.384	392	0.002
655.385	391	0.001
655.386	391	0.001
655.387	391	0.001
655.388	391	0.001
655.389	391	0.001
655.390	391	0.001
655.393	391	0.001
655.395	391	0.001
655.397	391	0.002
655.398	391	0.001
655.399	391	0.001
655.600	388	0.001
655.601	388	0.001
655.602	388	0.001
655.603	388	0.001
655.604	388	0.001
655.605	388	0.001
655.606	388	0.001
655.620	403	0.001
655.621	403	0.001
655.622	403	0.001
655.630	403	0.001
655.631	403	0.001
655.632	403	0.001
655.640	404	0.002
655.641	404	0.002
655.642	404	0.002
655.644	404	0.002
655.650	404	0.004
655.651	404	0.004
655.652	404	0.004
655.654	404	0.004
655.660	405	0.009
655.661	405	0.009
655.662	405	0.010
655.664	405	0.009
655.670	406	0.016
655.671	406	0.017
655.910	401	0.002
655.911	401	0.002
655.912	401	0.002
655.913	401	0.002
655.920	401	0.002
655.921	401	0.002
655.922	401	0.002
655.923	401	0.002
655.930	402	0.003
655.931	402	0.003
655.932	402	0.003
655.933	402	0.003
655.940	296	0.001
655.941	296	0.001
655.942	296	0.001
658.049	441	-
662.600	418	13.300
663.110	486	0.045
663.120	486	0.070
663.121	486	0.140
663.130	486	0.090
663.131	486	0.180
663.140	486	0.100
663.141	486	0.210
663.150	486	0.500

Order No.	Page	Weight (kg)
663.151	486	0.950
663.160	486	0.640
663.161	486	1.250
663.170	486	0.600
663.181	486	0.010
663.185	486	0.040
663.191	486	0.005
663.195	486	0.030
688.599	400	0.002
688.619	400	0.002
689.001	355	0.020
689.007	355	0.050
689.189	369	0.030
689.197	355	0.020
689.198	355	0.020
689.290	345	-
690.101	421	0.002
690.102	428	0.004
690.103	428	0.004
690.104	428	0.005
690.105	421	0.025
690.106	421	0.030
690.107	431	0.005
690.108	421	0.005
690.113	431	0.004
690.115	433	0.003
690.121	434	0.053
690.124	434	0.005
690.126	419	0.030
690.127	419	0.055
690.128	419	0.100
690.129	419	0.095
690.130	419	0.240
690.131	420	0.010
690.132	435	0.010
690.135	432	0.001
690.136	432	0.001
690.137	432	0.003
690.138	432	0.004
690.139	432	0.002
690.140	432	0.004
690.141	432	0.007
690.150	431	0.005
690.156	331	0.005
690.157	421	0.005
690.159	426	0.100
690.163	421	0.020
690.167	419	0.105
690.168	419	0.250
690.172	420	0.019
690.173	421	0.007
690.176	433	0.005
690.177	433	0.005
690.178	433	0.005
690.179	433	0.001
690.180	433	0.003
690.182	433	0.003
690.183	431	0.020
690.184	421	0.007
690.186	405	0.008
690.188	421	0.014
690.189	421	0.010
690.191	421	0.005
690.192	421	0.007
690.193	421	0.009
690.194	421	0.010
690.195	421	0.014
690.196	421	0.017
690.197	421	0.020
690.208	429	0.001
690.320	429	0.009
690.323	431	0.070
690.324	431	0.070
690.410	432	0.001
690.413	426	0.020
690.414	433	0.001
690.416	433	0.001
690.417	429	0.001
690.418	420	0.001
690.419	420	0.001
690.421	429	0.001
690.425	427	0.001
690.431	418	0.001
690.432	418	0.001
690.433	418	0.002
690.434	418	0.003
690.435	418	0.003
690.436	418	0.010
690.437	418	0.050
690.440	429	0.001
690.449	429	0.002
690.451	420	0.001
690.452	420	0.005
690.457	429	0.003
690.459	430	0.001
690.460	420	0.002
690.462	427	0.001
690.464	427	0.002
690.465	427	0.002
690.466	427	0.001
690.467	427	0.001
690.469	420	0.005
690.477	440	0.002
690.478	440	0.003
690.479	440	0.006
690.480	440	0.010
690.481	440	0.017
690.482	440	0.020
690.483	440	0.035
690.484	420	0.045
690.486	430	0.001
690.487A	430	0.008
690.488	430	0.007
690.489	429	0.001
690.510	440	0.010
690.512	440	0.002
690.513	440	0.003
690.514	440	0.004
690.515	440	0.008
690.529	424	0.001
690.538	424	0.001
690.541	424	0.010
690.549	432	0.001
690.550	432	0.001
690.551	432	0.001
690.552	432	0.004
690.553	432	0.005
690.573	421	0.001
690.576	420	0.008
690.577	432	0.010
690.578	432	0.010
690.579	432	0.014
690.580	432	0.020
690.582	429	0.007
690.583	424	0.002
690.585	424	0.004
690.586	424	0.003
690.591	433	0.005
690.594	418	0.004
690.595	429	0.003
690.596	436	0.020
690.603	427	0.003
690.604	427	0.007
690.605	427	0.010
690.606	427	0.025
690.607	427	0.040
690.611	429	0.001
690.614	429	0.001
690.654	419	0.010
690.655	419	0.030
690.656	419	0.035
690.657	419	0.080
690.658	433	0.005
690.666	419	0.005
690.667	419	0.030
690.668	426	0.040
690.703	440	0.020
690.704	440	0.045
690.705	440	0.080
690.706	440	0.140
690.707	440	0.240
690.716	438	0.019
690.800	424	0.001
690.801	418	0.001
690.802	418	0.001
690.803	418	0.005
690.804	331	0.010
690.805	418	0.018
690.806	331	0.030
690.807	421	0.060
690.808	418	0.160
690.809	440	0.170
690.810	419	0.100
690.811	421	0.014
690.812	421	0.015
690.813	421	0.016
690.814	421	0.020
690.816	331	0.050
690.817	440	0.045
690.819	421	0.050
690.832	435	0.001
690.833	427	0.001
690.834	413	0.002
690.836	429	0.004
690.837	413	0.010
690.838	413	0.010
690.843	429	0.010
690.845	436	0.040
690.847	419	0.125
690.848	419	0.170
690.849	419	0.220
690.850	419	0.300

Order No.	Page	Weight (kg)
690.851	419	0.110
690.852	419	0.200
690.853	419	0.325
690.854	419	0.680
690.855	419	0.250
690.861	435	0.800
690.899	423	0.005
690.900	424	0.001
690.901	424	0.001
690.902	424	0.002
690.903	424	0.002
690.904	424	0.003
690.905	424	0.003
690.906	424	0.003
690.907	424	0.003
690.908	426	0.004
690.925	429	0.004
690.940	433	0.001
690.943	433	0.005
690.947	429	0.005
690.953	433	0.005
690.954	433	0.005
690.964	431	0.003
690.965	431	0.001
690.970	421	0.003
690.978	429	0.001
690.981	429	0.003
690.984	435	0.050
690.987	435	0.030
690.989	435	0.020
690.990	435	0.010
690.991	435	0.010
690.994	429	0.040
690.995	429	0.003
690.996	429	0.010
690.997	432	0.010
691.315	440	0.001
691.316	440	0.001
691.318	440	0.001
691.369	427	0.001
691.370	427	0.001
691.371	427	0.001
691.372	427	0.001
691.373	436	0.005
691.390	434	0.002
691.501	418	0.001
691.502	418	0.002
691.503	418	0.006
691.504	418	0.011
691.505	418	0.021
691.506	418	0.050
691.507	418	0.110
691.600	440	0.001
691.601	440	0.004
691.602	440	0.005
691.603	440	0.010
691.604	440	0.006
691.605	440	0.015
691.606	440	0.022
691.607	440	0.045
691.608	440	0.075
691.609	440	0.075
691.637	420	0.088
691.755	423	0.015
691.756	423	0.015
691.757	423	0.015
692.270	418	0.050
692.271	418	0.050
692.272	418	0.050
692.286	418	0.050
692.295	434	0.005
692.296	429	0.005
692.298	435	0.001
692.381	429	0.010
692.404A	442	0.370
692.406	421	0.003
692.409	421	0.002
692.415	369	0.010
693.131	428	0.001
693.175	421	0.001
693.176	421	0.001
693.177	421	0.001
693.178	421	0.001
693.179	421	0.001
693.180	424	0.001
693.181	424	0.003
693.182	424	0.004
693.183	424	0.017
693.184	424	0.024
693.185	424	0.004
693.186	426	0.001
693.187	421	0.001
693.289	433	0.001
693.304	418	0.325
693.305	418	0.325
693.306	418	0.325
694.101	388	0.005
694.102	389	0.005
694.103	389	0.005
694.105	426	0.005
694.110	403	0.005
694.120	433	0.005
694.121	397	0.005
694.122	391	0.005
694.123	401	0.005
694.124	403	0.005
694.125	431	0.005
694.130	401	0.005
694.131	404	0.005
694.136	402	0.005
694.137	404	0.005
694.138	423	0.005
694.141	394	0.005
694.142	399	0.005
694.143	405	0.005
694.144	399	0.005
694.145	423	0.005
694.150	395	0.005
694.160	441	0.090
694.161	441	0.090
694.162	441	0.090
694.163	441	0.090
694.164	441	0.090
694.165	441	0.090
694.166	441	0.090
694.167	441	0.017
694.168	441	0.017
694.169	441	0.017
694.170	441	0.017
694.171	441	0.017
694.172	441	0.017
694.173	441	0.017
694.174	441	0.017
694.175	441	0.017
694.176	441	0.017
694.177	441	0.017
694.178	441	0.017
694.179	441	0.017
694.180	441	0.017
694.181	441	0.105
694.182	441	0.105
694.183	441	0.105
694.184	441	0.105
694.185	441	0.105
694.186	441	0.105
694.187	441	0.105
694.188	441	0.105
694.189	441	0.105
694.190	441	0.105
694.191	441	0.105
694.192	441	0.105
694.193	441	0.105
694.194	441	0.105
694.806	426	0.002
694.807	331	0.004
694.808	429	0.004
694.809	421	0.004
694.810	421	0.009
694.815	421	0.009
694.820	421	0.010
695.101	423	0.020
695.102	423	0.020
800.001	63	4.060
800.002	63	4.040
800.008	63	4.340
800.015	63	4.260
800.023	63	3.860
800.027	63	3.920
800.029	56	1.250
800.031	56	0.563
800.045	193	0.600
800.046	452	0.010
800.047	452	0.010
800.048	452	0.002
800.049	452	0.010
800.050	452	0.005
800.051	452	0.005
800.052	452	0.005
800.053	452	-
800.054	93	3.580
800.058	47	0.457
800.063	64	0.526
800.065	93	2.800
800.066	72	1.110
800.074	72	1.820
800.075	72	1.720
800.079	72	1.750
800.080	72	2.000
800.081	72	2.776
800.085	63	1.500
800.088	63	1.180
800.093	63	1.520

Order No.	Page	Weight (kg)
800.096	63	1.340
800.111	63	1.380
800.112	63	1.680
800.115	63	1.420
800.116	63	1.600
800.128	63	1.480
800.131	63	1.180
800.144	58	1.820
800.146	58	2.780
800.147	58	2.260
800.148	58	3.200
800.158	70	1.280
800.159	70	1.420
800.160	70	1.660
800.163	64	1.160
800.164	65	1.784
800.165	65	2.065
800.168	64	1.030
800.175	69	1.700
800.177	69	1.640
800.179	69	1.550
800.184	93	5.200
800.185	463	4.380
800.186	463	4.340
800.187	463	4.480
800.188	463	4.640
800.204	72	4.080
800.205	72	4.420
800.206	72	4.800
800.207	72	3.740
800.221	72	6.320
800.224	72	6.020
800.235	72	7.100
800.236	72	9.240
800.237	72	3.840
800.249	58	9.960
800.256	72	19.000
800.264	63	3.880
800.268	63	3.900
800.272	63	4.000
800.278	58	4.160
800.279	58	4.500
800.280	58	4.930
800.281	58	5.600
800.282	58	4.320
800.283	58	4.800
800.284	58	5.300
800.285	58	5.940
800.287	58	4.600
800.288	58	5.160
800.289	58	5.840
800.290	58	6.800
800.291	58	4.640
800.292	58	5.440
800.293	58	6.380
800.294	58	7.440
800.323	67	7.080
800.325	70	3.870
800.329	70	3.900
800.330	70	4.020
800.335	70	3.490
800.336	70	4.410
800.341	70	3.460
800.347	70	3.580
800.350	65	4.020
800.351	65	4.060
800.352	65	4.400
800.354	65	3.780
800.355	65	3.900
800.369	69	4.140
800.374	69	4.100
800.375	69	4.180
800.380	69	4.720
800.385	69	4.680
800.403	262	0.054
800.404	262	-
800.405	262	0.054
800.406	262	0.054
800.407	262	0.054
800.408	262	0.052
800.409	262	0.052
800.410	262	-
800.411	262	-
800.412	262	-
800.413	262	-
800.414	262	0.083
800.415	262	0.083
800.416	262	0.083
800.417	262	0.080
800.418	262	-
800.419	262	0.080
800.420	263	0.115
800.421	263	-
800.422	263	-
800.423	263	0.115
800.424	263	-
800.425	263	0.117
800.426	263	-
800.427	263	-
800.428	263	-
800.429	263	0.117
800.430	263	0.133
800.431	263	0.133
800.432	263	-
800.433	263	0.133
800.434	263	-
800.435	263	-
800.436	263	-
800.437	263	0.135
800.438	263	-
800.439	263	0.135
800.450	288	0.028
800.463	288	0.086
800.464	288	0.071
800.468	289	0.226
800.472	289	0.200
800.483	503	0.053
800.484	503	0.056
800.488	452	-
800.557	178	1.400
800.587	459	0.002
800.597	56	0.787
800.664	274	0.028
800.665	274	0.615
800.666	274	0.604
800.668	274	0.596
800.670	274	0.574
800.671	274	0.502
800.672	274	0.550
800.673	274	0.375
800.674	274	0.575
800.675	274	0.588
800.678	182	0.568
800.679	183	0.717
800.681	183	0.690
800.687	188	0.654
800.688	188	0.657
800.689	188	0.800
800.695	190	1.200
800.698	190	1.600
800.703	186	0.875
800.708	186	0.870
800.712	186	1.100
800.717	186	1.200
800.722	186	1.020
800.723	186	1.700
800.726	186	0.843
800.731	186	0.861
800.734	185	0.773
800.735	185	1.400
800.746	178	0.643
800.765	187	0.830
800.766	187	1.380
800.767	187	0.754
800.775	188	1.500
800.776	234	2.470
800.777	234	-
800.778	234	-
800.779	234	2.600
800.783	190	2.460
800.787	190	2.800
800.788	190	1.800
800.789	190	2.100
800.790	190	2.300
800.795	186	1.156
800.799	186	1.440
800.802	186	1.180
800.806	186	1.900
800.812	186	2.000
800.815	186	2.000
800.816	186	2.000
800.819	186	2.100
800.822	186	1.320
800.823	186	2.380
800.825	186	1.740
800.826	186	2.440
800.831	186	1.120
800.838	186	1.140
800.842	185	1.140
800.843	185	1.720
800.844	185	2.500
800.845	185	1.380
800.846	185	2.060
800.847	185	3.100
800.848	185	1.520
800.849	185	2.200
800.850	185	2.870
800.851	185	1.920
800.887	189	1.780
800.888	189	2.200
800.889	234	-
800.903	190	3.450

Order No.	Page	Weight (kg)
800.904	190	4.400
800.910	190	5.100
800.911	190	6.800
800.933	187	2.080
800.934	187	2.480
800.935	187	2.020
800.940	189	2.840
800.942	189	3.280
800.945	492	0.056
800.949	203	6.800
800.950	480	0.003
800.951	484	0.002
800.952	484	0.009
800.953	484	0.040
800.972	104	1.960
800.973	104	2.000
800.974	104	2.010
800.975	104	1.820
800.976	104	2.105
800.977	104	2.780
801.013	267	-
801.014	223	-
801.015	223	-
801.037	275	0.190
801.038	275	0.290
801.039	275	0.365
801.040	121	3.100
801.042	504	-
801.043	504	-
801.046	492	0.002
801.047	492	0.003
801.071	175	0.020
801.073	174	8.710
801.092	148	3.880
801.093	148	4.840
801.094	148	5.920
801.102	148	3.500
801.103	148	3.590
801.105	148	3.300
801.106	148	4.360
801.118	148	3.700
801.119	148	5.280
801.124	148	6.670
801.125	148	4.900
801.126	143	2.550
801.129	143	2.580
801.133	143	2.840
801.136	143	2.940
801.139	143	3.520
801.143	143	2.550
801.146	132	2.380
801.147	132	2.460
801.164	147	7.950
801.169	174	4.900
801.179	130	0.795
801.188	148	2.380
801.189	148	1.190
801.196	143	1.020
801.201	143	1.060
801.205	143	1.320
801.208	143	1.500
801.215	143	1.160
801.217	143	1.180
801.219	143	2.140
801.221	143	1.380
801.222	143	0.970
801.252	145	1.200
801.253	144	0.916
801.254	144	1.200
801.255	145	1.300
801.256	144	1.000
801.257	144	1.200
801.258	145	1.220
801.259	145	1.900
801.260	145	1.040
801.262	145	0.900
801.263	145	1.100
801.264	144	0.900
801.265	144	0.951
801.266	145	1.120
801.267	144	0.873
801.268	144	1.020
801.280	175	0.016
801.283	171	1.080
801.287	171	0.770
801.289	225	3.180
801.290	225	3.180
801.294	224	-
801.296	224	3.160
801.297	224	3.860
801.298	226	0.839
801.299	222	3.120
801.300	222	4.080
801.301	222	1.200
801.302	220	1.760
801.303	220	-
801.313	264	0.038
801.314	264	0.032
801.315	264	0.051
801.316	264	0.058
801.317	264	-
801.318	270	0.153
801.405	278	0.343
801.406	278	0.459
801.407	278	-
801.408	278	0.271
801.409	278	0.334
801.410	278	0.570
801.411	278	0.265
801.412	278	-
801.413	278	0.464
801.414	278	0.581
801.415	278	0.275
801.416	278	0.344
801.417	278	0.463
801.418	278	-
801.419	278	0.274
801.420	280	0.001
801.421	278	-
801.422	278	-
801.423	278	-
801.424	278	0.179
801.425	278	0.274
801.426	278	0.336
801.427	278	0.455
801.428	278	0.572
801.429	278	0.175
801.430	278	0.267
801.431	279	0.958
801.432	279	1.140
801.433	279	0.527
801.434	279	-
801.435	279	0.935
801.436	279	1.120
801.437	279	0.516
801.438	279	-
801.439	279	0.914
801.440	279	1.100
801.441	279	0.502
801.442	279	0.760
801.443	279	-
801.444	279	1.080
801.445	279	0.492
801.446	279	0.751
801.447	279	0.876
801.448	279	1.040
801.449	279	0.481
801.450	279	0.728
801.451	280	0.001
801.452	279	0.932
801.453	279	1.120
801.454	279	0.512
801.455	279	0.775
801.456	279	-
801.457	279	1.080
801.458	279	0.495
801.459	279	0.753
801.460	279	0.526
801.461	279	-
801.462	279	0.508
801.463	279	-
801.464	281	-
801.465	279	0.490
801.466	279	1.220
801.467	279	1.340
801.468	279	1.396
801.469	279	1.560
801.470	280	-
801.471	279	-
801.472	279	-
801.473	279	-
801.474	280	-
801.475	281	-
801.476	281	-
801.477	281	-
801.478	280	-
801.479	278	0.221
801.480	278	-
801.481	278	0.174
801.482	278	0.217
801.483	278	0.293
801.484	278	0.111
801.485	278	0.172
801.486	278	0.211
801.487	278	-
801.488	278	0.360
801.489	278	0.109
801.490	278	0.167
801.491	278	0.212
801.492	278	0.283
801.493	278	0.359
801.494	278	0.108

Order No.	Page	Weight (kg)
801.495	278	0.167
801.496	278	0.211
801.497	278	0.284
801.498	278	-
801.499	278	0.108
801.500	278	0.167
801.501	280	0.001
801.507	288	0.065
801.509	289	0.223
801.517	289	0.195
801.524	260	0.069
801.525	260	0.070
801.526	260	0.070
801.527	260	0.070
801.528	260	0.068
801.529	260	0.102
801.530	260	0.102
801.531	260	0.102
801.532	260	-
801.533	260	0.102
801.534	260	0.099
801.535	261	0.145
801.536	261	0.155
801.537	261	0.155
801.538	261	0.146
801.539	261	-
801.540	261	0.147
801.541	261	-
801.542	261	-
801.543	261	-
801.544	261	0.147
801.545	261	0.168
801.546	261	0.168
801.547	261	0.168
801.548	261	-
801.549	261	0.010
801.550	261	0.170
801.551	261	0.010
801.552	261	-
801.651	250	0.023
801.652	250	0.022
801.653	234	-
801.654	253	0.025
801.655	250	0.022
801.656	250	0.022
801.657	232	0.492
801.658	253	0.026
801.659	250	0.023
801.660	250	0.022
801.662	253	0.026
801.663	235	2.580
801.664	234	4.100
801.665	234	-
801.666	183	4.500
801.671	251	0.005
801.672	251	0.040
801.673	507	1.044
801.674	253	0.048
801.675	251	0.005
801.676	251	0.041
801.677	171	0.858
801.678	253	0.049
801.679	251	0.041
801.680	251	0.040
801.681	123	4.000
801.682	253	0.049
801.684	468	2.100
801.685	272	0.125
801.688	136	1.000
801.690	175	0.018
801.694	251	-
801.695	251	0.074
801.696	484	0.005
801.697	251	0.073
801.698	251	0.073
801.699	484	0.028
801.700	251	0.074
801.701	251	0.073
801.702	248	0.011
801.703	248	0.010
801.704	248	0.008
801.705	271	0.097
801.709	248	0.004
801.711	53	1.480
801.712	54	1.480
801.713	54	2.320
801.714	241	0.097
801.718	252	0.097
801.719	252	0.098
801.720	46	1.080
801.721	253	0.116
801.722	252	0.098
801.723	252	0.097
801.724	128	0.858
801.725	253	0.116
801.726	252	0.099
801.727	252	0.099
801.729	253	0.116
801.730	53	2.100
801.731	53	1.640
801.733	253	0.116
801.734	135	1.400
801.737	135	1.420
801.738	250	0.004
801.740	136	1.940
801.742	248	0.012
801.743	248	0.004
801.744	250	0.009
801.746	248	0.010
801.747	273	0.215
801.748	273	0.210
801.750	250	-
801.751	250	-
801.752	273	0.189
801.753	484	0.003
801.754	484	0.011
801.755	484	0.052
801.759	93	-
801.760	93	-
801.761	93	-
801.762	93	-
801.763	93	5.520
801.764	273	0.660
801.765	273	0.660
801.767	273	0.640
801.768	273	0.617
801.769	273	0.600
801.770	273	0.480
801.771	273	0.463
801.772	273	0.360
801.773	273	0.340
801.774	273	0.665
801.775	273	0.660
801.785	288	0.028
801.787	288	0.029
801.807	288	0.074
801.808	288	0.070
801.810	288	0.070
801.812	288	0.069
801.813	288	0.070
801.814	288	0.072
801.831	288	0.074
801.832	288	0.070
801.833	288	0.070
801.834	288	-
801.860	289	0.246
801.861	289	0.261
801.867	289	-
801.868	289	-
801.873	289	0.258
801.883	289	-
801.885	289	0.258
801.889	289	0.257
801.898	289	0.278
801.925	289	0.246
801.927	289	0.259
801.929	289	0.260
801.930	289	-
801.931	289	-
801.938	289	0.244
801.942	289	0.275
801.944	289	0.257
801.948	289	0.257
801.982	272	0.592
801.983	272	0.556
801.984	272	0.481
801.985	272	0.353
802.001	288	0.028
802.023	288	0.073
802.046	289	0.258
802.063	273	0.280
802.064	273	0.250
802.065	273	0.242
802.066	273	0.226
802.067	273	0.215
802.112	288	0.051
802.120	289	0.194
802.129	221	-
802.130	221	-
802.131	227	-
802.133	227	-
802.134	484	0.010
802.135	484	0.080
802.136	484	0.100
802.137	484	-
802.138	484	-
802.152	239	0.118
802.153	239	-
802.154	239	0.068
802.155	239	0.112
802.156	239	0.073
802.157	239	-

Order No.	Page	Weight (kg)
802.158	239	0.109
802.159	239	0.178
802.160	239	0.186
802.161	239	0.254
802.162	239	0.101
802.163	239	0.169
802.164	239	-
802.165	239	0.175
802.166	239	0.382
802.167	239	0.274
802.168	239	0.391
802.169	239	0.284
802.170	239	0.504
802.171	239	0.395
802.172	239	-
802.173	239	-
802.174	239	-
802.175	239	0.270
802.176	239	0.564
802.177	239	0.816
802.178	239	0.538
802.179	239	0.788
802.180	239	0.505
802.181	239	0.758
802.183	256	0.640
802.184	256	1.115
802.185	256	2.320
802.187	256	0.310
802.188	256	0.003
802.189	212	0.068
802.190	212	0.073
802.191	458	0.163
802.192	458	0.400
802.193	458	0.290
802.194	213	0.250
802.195	213	0.337
802.196	213	0.426
802.197	212	0.200
802.198	212	0.350
802.199	212	0.400
802.200	212	0.227
802.201	212	0.318
802.202	212	0.410
802.205	212	0.241
802.209	212	0.205
802.210	212	0.281
802.211	212	0.300
802.212	212	0.372
802.213	212	0.400
802.214	213	0.250
802.215	213	0.350
802.216	213	0.388
802.217	212	0.250
802.218	212	0.300
802.219	212	0.400
802.220	458	0.582
802.221	458	0.519
802.222	500	0.003
802.223	500	0.003
802.224	482	1.040
802.225	458	1.110
802.226	458	1.040
802.232	213	0.500
802.233	213	0.750
802.234	213	1.199
802.238	213	0.550
802.239	213	0.759
802.240	213	1.200
802.241	213	1.238
802.245	213	0.579
802.246	213	0.850
802.247	213	1.274
802.248	213	0.588
802.249	213	0.850
802.250	213	1.300
802.251	482	2.680
802.307	283	6.670
802.308	283	-
802.313	498	-
802.314	175	0.051
802.315	175	0.101
802.316	175	0.187
802.318	85	22.800
802.329	291	1.590
802.337	282	0.017
802.350	191	1.005
802.351	175	0.058
802.355	128	0.330
802.356	128	0.349
802.357	128	0.363
802.383	282	-
802.384	282	-
802.385	282	-
802.386	282	-
802.387	282	-
802.389	282	-
802.390	282	-
802.391	282	-
802.393	282	-
802.394	282	-
802.395	89	3.350
802.396	90	2.700
802.398	89	5.000
802.399	90	5.500
802.403	88	4.100
802.404	89	4.370
802.405	90	4.000
802.409	88	3.100
802.411	89	9.700
802.412	90	5.000
802.415	88	7.300
802.416	89	8.700
802.417	90	8.700
802.420	88	3.100
802.421	123	9.700
802.422	121	6.800
802.423	123	8.700
802.424	121	5.800
802.425	161	9.400
802.426	162	9.400
802.427	160	5.900
802.428	161	8.400
802.429	162	8.400
802.430	160	4.900
802.431	161	4.800
802.432	162	4.800
802.433	161	3.800
802.434	162	3.800
802.435	81	0.876
802.436	81	1.000
802.442	84	-
802.449	78	5.500
802.451	78	5.300
802.453	78	5.500
802.455	78	5.500
802.457	78	5.900
802.459	78	6.300
802.462	78	6.200
802.463	78	5.100
802.465	78	5.300
802.467	78	5.500
802.469	78	5.700
802.473	84	5.600
802.474	84	5.700
802.475	84	5.800
802.476	84	5.700
802.477	84	5.900
802.478	84	6.100
802.480	85	9.700
802.481	86	6.900
802.482	83	6.000
802.489	80	17.400
802.490	80	17.100
802.492	82	17.800
802.493	82	19.000
802.494	78	13.000
802.497	78	13.400
802.500	78	13.700
802.503	78	13.100
802.506	78	13.500
802.509	78	13.800
802.512	78	14.660
802.515	78	12.600
802.518	78	12.800
802.521	78	13.000
802.524	78	13.200
802.529	84	12.500
802.531	84	12.600
802.533	84	12.700
802.535	84	12.600
802.537	84	12.800
802.539	84	13.000
802.544	86	16.100
802.545	83	9.2
802.546	116	5.500
802.547	116	5.900
802.548	116	6.200
802.549	116	5.800
802.550	116	6.000
802.551	116	6.300
802.552	116	8.000
802.553	116	5.100
802.554	116	5.300
802.555	116	5.500
802.556	116	5.700
802.557	120	9.700
802.558	117	-
802.559	117	-
802.560	119	16.800
802.561	119	18.100
802.562	116	13.000
802.563	116	13.400

Order No.	Page	Weight (kg)
802.564	116	13.570
802.565	116	13.100
802.566	116	13.500
802.567	116	13.800
802.568	116	14.200
802.569	116	5.100
802.570	116	5.300
802.571	116	5.500
802.572	116	5.700
802.573	120	20.800
802.639	153	14.200
802.640	153	15.500
802.642	157	16.000
802.645	152	12.200
802.648	152	12.600
802.651	152	12.900
802.654	152	12.300
802.657	152	12.700
802.660	152	13.000
802.663	152	13.400
802.666	152	11.800
802.669	152	12.000
802.672	152	12.200
802.675	152	12.400
802.680	156	11.700
802.682	156	11.800
802.684	156	11.900
802.686	156	11.800
802.688	156	12.000
802.690	156	12.200
802.695	158	20.000
802.696	159	15.300
802.697	155	5.900
802.702	152	5.400
802.704	152	5.800
802.706	152	6.100
802.708	152	5.500
802.710	152	5.900
802.712	152	6.200
802.716	152	7.900
802.717	152	5.000
802.719	152	5.200
802.721	152	5.400
802.723	152	5.600
802.727	156	5.500
802.728	156	5.600
802.729	156	5.700
802.730	156	5.600
802.731	156	5.800
802.732	156	6.000
802.734	158	9.600
802.735	159	6.800
802.736	155	8.400
802.740	81	0.780
802.741	81	0.780
802.742	81	1.200
802.750	496	0.100
802.751	496	0.114
802.752	496	0.092
802.753	496	-
802.754	496	0.198
802.755	496	0.220
802.756	492	0.129
802.757	282	-
802.758	282	-
802.759	282	-
802.760	282	-
802.761	282	-
802.762	282	-
802.767	282	-
802.768	282	-
802.769	282	-
802.781	286	0.015
802.782	286	0.027
802.783	286	-
802.785	285	1.550
802.787	285	-
802.788	287	-
802.789	287	-
802.790	287	-
802.791	287	-
802.792	287	-
802.793	287	0.070
802.794	287	-
802.795	287	-
802.796	287	-
802.797	287	-
802.798	287	-
802.799	287	-
802.800	287	-
802.801	287	-
802.802	287	-
802.803	287	-
802.805	286	-
802.807	286	-
802.808	286	-
802.809	286	-
802.810	286	-
802.811	286	-
802.812	286	-
802.814	465	-
802.815	465	-
802.816	465	1.086
802.817	465	-
802.818	465	-
802.819	465	-
802.820	465	-
802.821	465	-
802.822	465	-
802.823	465	-
802.824	175	-
802.825	175	-
802.827	175	0.034
802.828	175	0.038
802.831	174	2.000
802.832	174	4.100
802.834	126	7.000
802.836	266	-
802.837	266	-
802.838	266	-
802.839	266	-
802.840	266	0.006
802.841	266	-
802.842	266	-
802.843	266	-
802.844	266	-
802.845	266	0.008
802.846	266	0.008
802.847	266	0.008
802.848	266	-
802.942	284	2.268
802.943	284	1.328
802.944	284	-
802.945	284	-
802.946	284	-
802.947	284	-
802.948	284	-
802.949	284	-
802.950	284	-
802.963	450	1.080
802.964	92	4.000
802.968	92	11.110
802.970	92	9.350
802.975	125	5.000
802.976	125	-
802.977	125	9.000
803.041	185	1.700
803.043	185	1.200
803.051	60	0.666
803.052	60	0.682
803.053	60	0.480
803.054	60	0.620
803.055	60	0.641
803.056	60	1.320
803.057	60	1.640
803.058	60	1.360
803.059	60	1.700
803.060	60	1.050
803.061	60	1.140
803.062	60	1.240
803.063	60	1.540
803.064	60	1.280
803.065	60	1.600
803.066	60	4.160
803.067	60	4.220
803.068	60	4.020
803.069	60	4.100
803.070	141	1.170
803.071	141	1.160
803.072	141	0.907
803.073	141	1.060
803.074	141	1.100
803.075	100	1.640
803.076	100	2.100
803.077	100	2.080
803.078	100	2.120
803.080	135	2.020
803.081	136	2.040
803.082	173	2.040
803.083	173	2.030
803.085	135	1.000
803.088	136	0.971
803.089	136	1.240
803.090	136	1.440
803.092	173	1.200
803.093	173	1.400
803.095	173	1.240
803.096	173	1.800
803.101	135	1.840
803.102	136	1.840
803.103	173	1.840
803.104	173	2.000

Order No.	Page	Weight (kg)
803.105	135	0.691
803.106	136	0.750
803.108	184	1.100
803.110	183	4.200
803.112	184	2.520
803.113	184	2.000
803.114	184	1.640
803.116	53	2.060
803.117	54	2.620
803.118	54	2.060
803.119	54	1.640
803.120	183	3.400
803.121	184	3.400
803.123	183	1.700
803.125	184	1.700
803.126	183	2.240
803.127	183	2.010
803.128	184	2.240
803.129	184	2.020
803.131	53	2.360
803.132	54	2.630
803.133	54	2.360
803.135	53	3.050
803.136	54	3.200
803.137	54	3.060
803.141	184	0.800
803.144	184	1.300
803.145	184	1.280
803.147	184	1.320
803.148	53	1.450
803.149	54	1.100
803.150	54	1.480
803.161	54	3.220
803.162	54	2.600
803.163	54	3.740
803.164	183	5.000
803.166	184	3.000
803.167	184	2.900
803.177	184	1.940
803.179	184	1.700
803.182	183	1.420
803.183	184	1.340
803.184	184	1.990
803.185	184	1.420
803.187	54	4.500
803.189	54	3.920
803.194	183	2.940
803.195	184	2.400
803.198	53	2.320
803.199	53	2.060
803.200	54	3.180
803.201	54	2.340
803.202	54	2.060
803.206	184	1.680
803.213	172	1.600
803.214	172	0.771
803.216	172	1.900
803.218	172	0.800
803.220	134	1.100
803.222	134	0.646
803.226	169	0.450
803.554	241	-
803.555	241	-
803.556	241	-
803.557	241	-
803.558	241	-
803.559	241	-
803.560	241	-
803.561	241	-
803.562	241	-
803.563	241	-
803.564	241	-
803.565	241	-
803.566	241	-
803.567	241	0.301
803.568	241	0.195
803.569	241	-
803.570	241	0.269
803.571	240	-
803.572	240	-
803.573	240	-
803.574	240	-
803.575	240	-
803.576	240	-
803.577	240	-
803.578	240	-
803.579	240	0.680
803.580	240	-
803.581	268	-
803.582	268	0.050
803.583	268	-
803.584	268	0.110
803.585	268	0.150
803.589	170	0.675
803.591	170	0.710
803.592	170	0.800
803.593	242	-
803.594	242	-
803.595	242	0.095
803.596	208	0.192
803.597	46	1.200
803.598	46	0.585
803.599	47	1.050
803.600	129	0.900
803.601	46	1.200
803.602	242	0.164
803.603	128	0.980
803.604	163	0.200
803.608	47	0.530
803.619	130	1.260
803.620	130	1.040
803.622	130	0.860
803.623	130	0.938
803.624	130	1.360
803.629	130	0.770
803.730	445	2.650
803.731	445	5.070
803.736	191	4.000
803.737	191	0.500
803.738	191	2.050
803.739	191	0.800
803.740	191	3.600
803.742	282	-
803.743	282	-
803.745	282	-
803.746	282	-
803.747	282	-
803.748	282	-
803.749	282	-
803.750	282	-
803.751	282	-
803.752	282	-
803.754	282	-
803.755	282	-
803.757	282	-
803.759	282	-
803.760	282	-
803.761	282	-
803.762	282	-
803.763	282	-
804.108	249	-
804.109	249	-
804.110	249	-
804.111	249	-
804.112	249	-
804.113	249	-
804.114	249	-
804.115	242	-
804.117	271	-
804.119	271	-
804.121	271	-
804.128	279	-
804.129	279	-
804.130	279	-
804.131	279	-
804.132	248	0.012
804.134	248	0.012
804.135	248	0.012
804.136	248	0.012
804.137	248	0.012
804.138	248	0.012
804.139	248	0.012
804.140	248	0.012
804.141	248	0.012
804.142	248	0.012
804.143	248	0.012
804.144	248	0.012
804.145	248	0.012
804.146	248	0.012
804.147	248	0.012
804.148	248	-
804.149	248	0.011
804.150	248	0.011
804.151	248	0.011
804.152	248	0.011
804.153	248	0.011
804.154	248	0.011
804.155	248	0.011
804.156	248	0.011
804.157	248	0.011
804.158	248	0.011
804.159	248	0.011
804.160	248	0.010
804.161	248	0.010
804.162	248	0.010
804.163	248	0.010
804.164	248	0.010
804.165	248	0.010
804.166	248	0.009
804.167	248	0.010
804.168	248	0.009
804.169	248	0.009

Order No.	Page	Weight (kg)
804.170	248	0.009
804.171	248	-
804.172	248	-
804.173	248	-
804.174	248	-
804.175	248	-
804.176	248	-
804.177	248	-
804.266	84	-
804.267	239	-
804.268	239	-
804.269	239	0.142
804.270	239	0.219
804.271	239	-
804.272	239	-
804.273	239	-
804.274	239	0.217
804.275	239	-
804.276	239	0.283
804.277	239	-
804.278	239	0.293
804.279	239	-
804.280	239	0.404
804.281	239	-
804.282	239	-
804.283	239	-
804.284	239	-
804.285	238	0.256
804.286	238	0.446
804.287	238	-
804.288	238	0.436
804.289	238	0.601
804.290	238	-
804.291	238	0.412
804.292	238	-
804.293	238	-
804.294	238	0.758
804.295	238	0.902
804.296	238	-
804.297	238	0.693
804.298	238	0.976
804.644	469	-
804.645	469	-
804.646	469	-
804.649	498	1.330
804.656	499	1.180
804.658	499	-
804.662	500	-
804.666	84	0.003
804.667	84	-
804.668	84	-
804.669	84	0.007
804.670	84	0.007
804.671	84	0.006
804.672	84	0.005
804.678	69	0.660
804.679	69	0.600
804.680	505	-
804.681	505	-
804.682	505	-
804.683	505	-
804.684	505	-
804.685	505	-
804.686	505	0.225
804.687	505	-
804.688	505	-
804.749	64	1.260
804.750	64	1.400
804.751	64	1.300
804.752	64	1.300
804.753	64	4.140
804.754	64	4.300
804.755	64	4.100
804.756	64	4.200
804.757	71	4.700
804.758	71	5.100
804.759	71	5.740
804.760	71	1.960
804.761	71	2.360
804.762	71	2.300
804.763	71	5.100
804.764	71	5.700
804.765	71	6.580
804.771	275	0.530
804.772	274	-
804.773	274	0.040
804.796	468	0.002
804.821	227	-
804.827	273	0.090
804.828	273	0.076
804.829	273	0.348
804.830	273	0.340
804.831	273	0.340
804.832	273	0.323
804.833	273	0.310
804.834	272	-
804.835	272	0.074
804.842	500	-
804.844	259	-
804.845	259	-
804.846	259	-
804.847	259	-
804.848	259	-
804.849	259	-
804.850	259	-
804.851	259	-
804.852	259	-
804.853	259	-
804.854	259	-
804.855	259	-
804.856	259	-
804.857	259	-
804.858	259	-
804.860	259	-
804.883	89	1.700
804.885	89	3.000
804.886	90	1.700
804.887	90	2.700
804.890	88	0.700
804.891	88	1.300
804.904	183	1.640
804.917	139	3.820
804.945	287	-
804.949	505	2.500
804.962	171	0.935
804.969	73	0.450
804.970	73	6.300
804.971	73	4.500
804.972	73	4.880
804.973	73	6.880
804.974	73	7.800
804.975	73	4.100
804.976	149	4.400
804.977	149	5.580
804.978	149	5.000
804.979	149	6.500
804.995	104	4.130
805.002	108	8.500
805.016	96	0.405
805.035	79	18.900
805.036	79	19.100
805.037	79	19.300
805.038	79	19.500
805.039	79	23.300
805.040	79	23.500
805.041	79	23.700
805.042	79	23.900
805.043	79	27.700
805.044	79	27.900
805.045	79	28.100
805.046	79	28.300
805.047	79	19.300
805.048	79	19.700
805.049	79	20.000
805.050	79	23.700
805.051	79	24.100
805.052	79	24.400
805.053	79	28.100
805.054	79	28.500
805.055	79	28.800
805.057	79	19.400
805.058	79	19.800
805.060	79	20.100
805.061	79	23.800
805.062	79	24.200
805.063	79	24.500
805.064	79	28.200
805.065	79	28.600
805.066	79	28.900
805.067	79	20.500
805.069	79	24.900
805.070	79	29.300
805.077	61	0.505
805.078	61	0.655
805.079	61	0.670
805.080	61	0.699
805.081	61	0.718
805.082	61	1.180
805.083	61	1.150
805.084	61	1.450
805.085	61	1.200
805.086	61	1.500
805.087	61	1.200
805.088	61	1.540
805.089	61	1.240
805.090	61	1.600
805.091	61	3.940
805.092	61	3.960
805.093	61	4.000
805.094	61	4.100
805.096	142	1.120
805.097	142	1.140

Order No.	Page	Weight (kg)
805.098	142	1.180
805.099	142	1.300
805.100	139	1.398
805.101	139	1.020
805.102	139	1.780
805.103	139	2.420
805.104	139	2.560
805.105	139	1.398
805.106	139	1.398
805.107	139	1.398
805.108	139	4.020
805.110	139	3.240
805.111	139	4.660
805.112	139	3.700
805.113	139	4.160
805.114	139	5.140
805.115	139	6.160
805.117	139	1.398
805.156	273	0.069
805.157	273	0.064
805.158	273	0.053
805.159	273	0.039
805.172	277	1.040
805.173	277	0.478
805.174	129	0.180
805.194	178	0.289
805.238	277	0.110
805.239	277	0.110
805.240	277	0.110
805.241	277	0.110
805.242	277	0.110
805.243	69	1.340
805.244	273	0.164
805.245	273	0.127
805.246	96	0.480
805.247	97	0.580
805.250	129	0.488
805.251	128	0.576
805.252	130	0.530
805.253	130	0.610
805.254	130	0.655
805.255	130	0.724
805.256	130	0.650
805.257	129	0.800
805.258	129	0.821
805.259	128	0.791
805.260	128	0.826
805.261	128	0.917
805.262	131	0.865
805.263	131	0.916
805.264	131	1.090
805.265	131	0.980
805.266	131	1.200
805.267	131	1.040
805.268	131	1.320
805.269	131	1.140
805.270	131	1.220
805.271	131	1.710
805.283	468	5.120
805.284	468	3.240
805.290	133	4.700
805.296	112	4.900
805.298	112	6.200
805.299	112	7.300
805.305	225	7.500
805.306	225	7.400
805.356	273	0.280
805.412	208	0.430
805.413	273	0.198
805.423	505	7.660
805.424	104	4.040
805.430	104	3.790
805.431	104	4.780
805.433	104	4.720
805.435	104	5.960
805.436	104	5.980
805.438	104	6.020
805.442	505	1.500
805.449	55	4.600
805.450	55	5.720
805.451	55	5.100
805.452	55	6.900
805.453	55	5.400
805.454	55	7.640
805.455	55	5.600
805.456	55	8.420
805.457	137	3.980
805.458	137	4.220
805.459	137	4.760
805.460	271	0.162
805.461	451	1.820
805.462	60	0.624
805.463	60	1.180
805.464	60	1.400
805.465	141	0.943
805.466	141	1.060
805.471	167	0.181
805.472	167	0.181
805.473	167	0.187
805.474	167	0.288
805.475	167	0.286
805.476	167	0.292
805.477	142	0.905
805.478	142	1.360
805.479	142	1.400
805.480	61	0.822
805.481	61	0.920
805.482	61	1.340
805.483	61	1.760
805.484	61	1.340
805.485	61	1.840
805.486	61	4.240
805.487	61	4.320
805.489	283	2.900
805.492	55	0.019
805.493	55	0.019
805.494	55	0.019
805.495	55	0.019
805.496	55	0.019
805.497	55	0.019
805.498	55	0.019
805.499	55	0.019
805.527	141	0.320
805.530	230	2.100
805.535	225	9.300
805.536	225	9.950
805.537	224	6.560
805.538	226	3.450
805.539	226	3.900
805.540	226	5.070
805.542	147	1.000
805.544	289	0.307
805.548	141	0.800
805.549	61	1.440
805.550	62	1.020
805.551	62	0.977
805.553	271	0.242
805.560	210	0.976
805.569	72	0.860
805.570	83	1.900
805.571	83	1.980
805.573	148	1.340
805.574	148	1.590
805.575	208	0.244
805.576	170	0.700
805.584	111	1.200
805.585	111	1.780
805.586	111	1.500
805.590	148	5.100
805.591	148	4.800
805.592	148	17.100
805.593	148	0.090
805.595	210	0.915
805.596	100	2.100
805.597	100	2.100
805.598	100	2.100
805.600	100	2.100
805.601	100	2.100
805.604	111	1.240
805.605	111	1.240
805.606	111	1.240
805.608	111	1.240
805.609	111	1.240
805.610	111	1.240
805.611	111	1.240
805.623	111	3.720
805.624	111	1.240
805.626	111	1.240
805.627	111	1.240
805.628	111	1.240
805.629	111	1.240
805.630	111	1.240
805.631	111	1.240
805.632	111	1.240
805.633	111	1.240
805.635	111	1.240
805.636	111	1.240
805.637	111	1.240
805.638	111	1.240
805.639	111	1.240
805.640	111	1.240
805.641	111	1.240
805.642	111	1.240
805.643	111	4.540
805.644	111	1.240
805.645	111	1.240
805.646	148	1.240
805.655	146	4.100
805.656	146	4.700
805.657	147	10.100
805.658	136	6.400
805.659	136	7.600

Order No.	Page	Weight (kg)
805.660	136	6.840
805.661	136	8.820
805.662	136	7.600
805.663	268	1.000
805.664	268	1.000
805.665	268	1.000
805.666	268	1.000
805.668	258	0.090
805.669	258	0.090
805.670	258	0.090
805.671	258	0.090
805.672	258	0.090
805.673	258	0.090
805.674	502	0.052
805.675	502	0.200
805.677	61	1.720
805.678	61	2.100
805.679	61	4.900
805.680	61	5.000
805.684	175	0.096
805.723	67	1.080
805.724	221	1.635
805.728	282	0.130
805.733	282	0.019
805.734	282	0.112
805.735	282	0.097
805.736	282	0.057
805.737	282	0.019
805.738	282	0.019
805.739	282	0.358
805.740	282	0.294
805.741	465	1.100
805.747	90	-
805.748	161	3.000
805.749	160	1.600
805.750	136	7.440
805.753	100	4.900
805.758	111	1.240
805.781	227	0.017
805.802	249	0.230
805.808	101	5.100
805.809	101	5.400
805.810	101	5.900
805.811	486	0.210
805.812	486	0.210
805.814	59	0.555
805.815	59	1.320
805.816	59	1.560
805.817	59	3.950
805.818	59	4.280
805.819	59	4.600
805.820	60	0.510
805.821	60	0.620
805.822	60	4.520
805.823	60	4.640
805.824	60	4.760
805.825	60	4.860
805.826	63	1.760
805.827	286	-
805.828	128	0.520
805.829	140	1.060
805.830	140	1.400
805.831	142	2.100
805.832	142	2.300
805.833	148	0.800
805.834	148	1.000
805.835	210	0.414
805.836	210	0.434
805.837	210	0.485
805.838	210	0.517
805.839	210	0.570
805.840	210	1.220
805.841	210	1.280
805.842	211	0.643
805.843	211	0.850
805.844	211	1.080
805.845	505	1.500
805.846	505	1.600
805.847	468	1.300
805.848	468	1.900
805.849	458	0.200
805.850	458	0.325
805.851	458	0.258
805.852	458	0.700
805.853	458	0.600
805.854	458	1.100
805.855	458	1.000
805.856	446	-
805.857	446	-
805.858	449	0.500
805.859	449	0.600
805.860	449	0.500
805.861	449	0.600
805.862	449	0.600
805.863	449	0.700
805.864	449	0.788
805.865	449	0.600
805.866	449	1.000
805.867	449	0.700
805.868	449	1.000
805.869	452	0.001
805.870	452	0.001
805.871	452	0.001
805.872	452	0.001
805.873	452	0.001
805.874	220	1.400
805.875	220	1.840
805.876	220	3.700
805.877	220	4.000
805.878	222	4.200
805.879	222	6.100
805.880	226	2.700
805.881	226	3.200
805.882	272	0.029
805.883	272	0.024
805.884	272	-
805.885	288	0.070
805.886	289	0.557
805.887	289	-
805.888	289	-
805.889	289	-
805.890	467	0.900
805.894	284	-
806.148	484	-
806.197	274	-
806.198	274	0.089
806.243	226	1.760
806.244	226	2.282
806.245	226	1.270
806.246	224	2.200
806.247	225	7.500
806.248	225	7.500
806.249	225	3.100
806.250	225	9.700
806.252	225	3.010
806.253	235	3.010
806.254	235	3.010
806.255	225	3.010
806.256	235	-
806.257	452	0.001
806.258	452	0.001
806.284	74	1.600
806.347	106	1.160
806.348	106	1.160
806.349	106	1.200
806.350	106	1.220
806.351	106	1.240
806.352	106	1.300
806.353	106	1.300
806.354	106	1.300
806.355	106	1.300
806.356	106	1.300
806.357	106	1.300
806.358	106	1.380
806.359	106	1.380
806.360	106	3.140
806.361	106	3.300
806.362	55	1.700
806.363	55	2.100
806.364	137	1.600
806.365	137	2.100
806.370	130	1.300
806.371	131	1.800
806.372	131	2.200
806.373	132	3.800
806.374	132	1.300
806.375	97	1.800
806.376	97	2.300
806.377	98	4.000
806.378	98	4.600
806.379	48	0.950
806.380	49	1.600
806.381	49	1.900
806.382	49	2.200
806.383	49	2.500
806.384	51	4.300
806.385	51	4.900
806.386	51	5.800
806.387	51	6.240
806.388	258	-
806.389	258	-
806.390	252	-
806.391	252	0.196
806.392	252	0.194
806.393	252	0.191
806.394	252	0.188
806.395	252	0.184
806.396	252	0.180
806.397	252	0.177
806.398	252	-
806.399	252	0.167
806.400	252	0.164

Order No.	Page	Weight (kg)
806.401	252	0.159
806.402	252	-
806.403	252	0.149
806.404	252	0.144
806.405	252	0.139
806.406	252	0.134
806.407	252	0.129
806.408	252	-
806.409	252	0.117
806.412	255	-
806.413	255	-
806.414	255	-
806.415	255	-
806.416	255	-
806.417	255	-
806.418	255	-
806.419	255	-
806.420	255	-
806.421	255	-
806.422	237	2.300
806.423	237	4.460
806.424	237	0.104
806.425	237	0.104
806.426	237	0.097
806.427	237	0.169
806.428	237	0.166
806.429	237	0.157
806.430	167	0.090
806.431	167	0.090
806.436	243	0.395
806.437	243	-
806.439	490	-
806.440	490	-
806.441	106	-
806.442	273	0.143
806.443	273	0.090
806.444	143	1.700
806.462	275	0.190
806.465	274	0.140
806.466	274	0.050
806.467	274	0.044
806.468	274	0.035
806.476	274	0.090
806.477	274	0.113
806.478	274	0.139
806.541	482	0.255
806.575	133	5.200
806.579	73	6.880
806.580	73	6.880
806.581	73	6.880
806.582	73	6.880
806.585	148	4.000
806.586	148	4.800
806.587	148	5.400
806.588	148	6.700
806.589	148	5.100
806.595	139	1.500
806.601	71	0.442
806.602	71	0.443
806.603	71	0.408
806.604	71	1.080
806.605	71	1.100
806.606	71	1.120
806.607	110	1.000
806.608	110	1.000
806.609	110	1.100
806.622	487	0.222
806.623	487	0.003
806.627	137	6.800
806.628	137	7.200
806.629	137	7.900
806.630	149	6.900
806.631	149	8.000
806.656	256	-
806.657	256	-
806.671	204	0.340
806.680	74	1.200
806.681	74	1.500
806.682	74	2.100
806.683	74	4.300
806.684	74	5.900
806.685	74	7.000
806.686	74	8.200
806.687	74	9.700
806.688	74	9.900
806.689	74	12.700
806.690	75	5.500
806.692	75	6.100
806.693	75	8.100
806.694	75	9.500
806.695	75	10.300
806.696	75	12.900
806.697	75	15.200
806.698	192	0.400
806.699	192	0.400
806.700	192	0.500
806.701	192	0.500
806.702	192	0.500
806.703	192	2.400
806.704	192	3.000
806.705	192	2.700
806.706	192	3.800
806.707	192	4.800
806.708	192	5.600
806.709	58	5.200
806.710	162	2.700
806.712	204	0.460
806.713	204	0.560
806.714	204	0.740
806.715	204	0.650
806.716	204	0.780
806.717	204	0.860
806.718	204	0.970
806.719	204	1.100
806.720	204	1.600
806.721	204	2.200
806.722	204	2.400
806.723	204	2.500
806.724	204	5.100
806.725	214	0.700
806.726	214	0.800
806.727	214	0.900
806.728	214	1.000
806.729	214	1.000
806.730	214	1.100
806.731	214	1.200
806.732	214	1.300
806.733	214	1.800
806.734	167	0.110
806.737	284	8.000
806.738	284	8.000
806.739	255	-
806.742	350	2.300
806.743	350	4.400
806.744	350	8.300
806.747	96	1.000
806.800	130	0.230
806.802	237	0.104
806.803	237	0.104
806.804	128	0.170
806.805	507	1.270
806.806	506	0.600
806.807	506	1.300
806.808	506	2.700
806.810	105	1.400
806.811	105	1.600
806.812	105	3.500
806.813	105	3.800
869.002	74	4.000
869.011	74	4.000
869.015	74	4.900
869.017	74	1.100
869.018	75	12.000
869.024	150	4.900
869.025	150	7.500
938.834	409	0.001
938.835	410	0.004
938.837	408	0.001
938.840	408	0.001
938.841	409	0.001
938.862	410	0.008
938.866	410	0.001
938.867	410	0.001
938.868	410	0.004
938.869	410	0.004
938.870	410	0.008
938.871	410	0.008
938.876	409	0.002
938.878	409	0.002
938.879	408	0.001
938.880	408	0.001
938.883	407	0.001
938.884	407	0.001
938.885	407	0.001
948.101	407	0.001
948.201	408	0.001
948.202	408	-
948.203	408	-
948.210	408	0.010
948.211	408	0.010
948.230	408	0.010
948.231	408	0.010
948.251A	408	0.001
948.252	408	0.001
948.253	408	0.001
948.270	408	0.001
948.271	408	0.001
948.301	409	0.010
948.302	409	0.001
948.310	409	0.001
948.311	409	0.001
948.312	409	0.001

Order No.	Page	Weight (kg)
948.330	409	0.001
948.331	409	0.001
948.332	409	0.001
948.350A	409	0.001
948.351A	409	0.001
948.352A	409	0.001
948.370	409	0.001
948.371	409	0.001
948.372	409	0.001
948.373	409	-
948.374	409	-
951.108	420	0.430
951.128	420	-
951.149	420	0.310
958.008	494	0.045
958.010	494	0.035
958.021	494	0.080
958.031	494	0.110
958.041	494	0.500
958.051	495	0.002
958.052	495	0.002
958.053	495	0.002
958.055	495	0.002
958.056	495	0.002
958.057	495	0.002
958.061	495	0.002
958.062	495	0.002
958.063	495	0.002
958.065	495	0.002
958.066	495	0.002
958.067	495	0.002
958.071	495	0.002
958.072	495	0.002
958.073	495	0.002
958.075	495	0.002
958.076	495	0.002
958.077	495	0.002
958.081	495	0.002
958.082	495	0.002
958.083	495	0.002
958.085	495	0.002
958.086	495	0.002
958.087	495	0.002
958.091	495	0.010
958.092	495	0.010
958.093	495	0.010
958.095	495	0.010
958.096	495	0.010
958.097	495	0.010
958.155	495	0.012
958.156	495	0.013
958.157	495	0.002
958.158	495	0.003
958.313	495	0.002
958.314	495	0.002
958.425	356	0.004
958.430	356	0.004
958.433	356	0.004
958.435	356	0.004
958.440	356	0.004
958.475	356	0.004
958.480	356	0.004
958.483	356	0.004
958.485	356	0.004
958.490	356	0.004
958.501	329	0.001
958.502	329	0.001
958.503	329	0.001
958.601	305	0.021
958.602	305	0.021
958.603	305	0.022
958.604	305	0.023
958.611	305	0.020
958.612	305	0.021
958.613	305	0.022
958.614	305	0.023
961.120	250	0.023
961.127	251	0.041
961.146	253	0.002
961.147	253	0.040
961.148	253	0.004
961.149	253	0.004
961.150	253	0.004
961.151	253	0.002
961.152	253	0.009
961.153	253	0.010
961.154	253	0.008
961.155	253	0.008
961.156	253	0.004
961.160	253	0.024
961.161	253	0.020
961.165	253	0.047
961.166	253	0.044
961.167	253	0.032
961.168	253	0.087
961.169	253	0.085
961.170	253	0.085
961.171	253	0.085
961.172	253	0.085
961.173	253	0.080
961.174	253	0.070
961.175	253	0.064
961.176	253	0.050
961.180	253	0.117
961.182	253	0.113
961.183	253	0.105
961.184	253	0.091
961.185	253	0.086
961.186	253	0.050
961.200	500	-
961.201	501	0.200
961.205	500	0.265
961.206	500	-
961.211	501	0.200
961.212	501	-
961.213	502	-
961.237	498	0.440
961.238	499	0.400
961.252	285	-
961.253	285	0.380
961.254	285	-
961.255	285	-
961.256	285	-
961.257	285	9.500
961.264	93	7.500
961.269	126	9.140
961.270	283	2.900
961.271	283	2.370
961.272	283	2.900
961.273	283	2.900
961.276	287	0.015
961.277	287	0.015
961.278	286	0.003
961.279	286	0.005
961.280	286	0.005
961.281	286	0.005
961.282	286	0.005
961.283	286	0.009
961.284	286	0.009
961.285	286	0.005
961.286	286	0.005
961.287	286	0.005
961.288	286	0.010
961.289	286	0.010
961.290	286	0.005
961.291	283	0.724
961.292	283	0.880
961.293	283	1.100
961.294	283	1.500
961.295	283	2.040
961.296	283	3.380
961.297	283	-
961.331	289	0.271
961.332	289	0.260
961.333	289	0.243
961.336	289	0.244
961.338	283	2.600
961.339	283	2.900
961.342	283	2.950
961.346	283	2.600
961.347	503	1.200
961.362	68	1.360
961.363	68	1.480
961.364	68	1.550
961.365	68	2.160
961.366	68	1.370
961.367	68	4.080
961.368	68	4.160
961.369	68	4.860
961.371	72	6.180
961.372	72	8.040
961.394	68	0.493
961.395	68	0.521
961.396	68	0.610
961.397	68	0.704
961.401	260	0.028
961.402	260	0.028
961.403	260	0.028
961.404	260	0.047
961.405	260	0.045
961.406	260	0.047
961.407	260	0.045
961.408	260	0.046
961.409	262	0.020
961.410	262	0.020
961.411	262	0.020
961.412	262	0.035
961.413	262	0.035
961.414	262	0.037
961.415	262	0.035
961.416	262	0.035
961.417	260	0.102

Order No.	Page	Weight (kg)
961.418	260	0.102
961.420	260	0.099
961.462	247	0.003
961.464	247	0.003
961.466	247	0.003
961.468	247	0.003
961.470	247	0.002
961.472	247	0.003
961.474	247	0.002
961.477	248	0.005
961.479	248	0.005
961.481	248	0.005
961.483	248	0.005
961.485	248	0.005
961.487	248	0.005
961.489	248	0.005
961.491	248	0.005
961.493	248	0.004
961.495	248	0.004
961.497	248	0.003
961.498	249	0.305
961.500	250	0.005
961.501	250	0.004
961.502	250	0.005
961.503	250	0.005
961.504	250	0.004
961.505	250	0.005
961.506	250	0.005
961.507	250	0.004
961.508	250	0.005
961.509	250	0.003
961.510	250	0.004
961.511	250	0.003
961.512	250	0.004
961.513	250	0.003
961.514	250	0.004
961.515	250	0.003
961.516	250	0.003
961.517	250	0.003
961.518	250	0.003
961.519	250	0.003
961.520	250	0.003
961.521	250	0.003
961.522	250	0.003
961.524	256	0.220
961.525	271	0.018
961.526	259	0.013
961.527	258	0.003
961.531	250	0.009
961.532	250	0.009
961.533	250	0.010
961.534	250	0.010
961.535	250	0.010
961.536	250	0.009
961.537	250	0.009
961.538	250	0.009
961.539	250	0.010
961.540	250	0.009
961.541	250	0.008
961.542	250	0.007
961.543	250	0.004
961.544	250	0.006
961.545	250	0.005
961.547	256	0.230
961.548	271	0.038
961.549	259	0.025
961.550	258	0.001
961.551	250	0.022
961.552	250	0.023
961.553	250	0.023
961.554	250	0.023
961.555	250	0.023
961.556	250	0.023
961.557	250	0.022
961.558	250	0.023
961.559	250	0.022
961.560	250	0.021
961.561	250	0.021
961.562	250	0.020
961.563	250	0.020
961.564	250	0.019
961.565	250	0.018
961.566	250	0.017
961.567	250	0.013
961.569	256	0.360
961.570	271	0.045
961.571	259	0.042
961.572	258	0.007
961.573	251	0.042
961.574	251	0.041
961.575	251	0.041
961.576	251	0.040
961.577	251	0.041
961.578	251	0.041
961.579	251	0.041
961.580	251	0.040
961.581	251	0.040
961.582	251	0.039
961.583	251	0.039
961.584	251	0.038
961.585	251	0.036
961.586	251	0.034
961.587	251	0.036
961.588	251	0.035
961.589	251	0.033
961.590	251	0.031
961.591	251	0.030
961.592	251	0.027
961.593	251	0.026
961.595	256	0.350
961.596	271	0.085
961.597	259	0.055
961.598	258	0.016
961.599	250	0.022
961.601	251	0.074
961.602	251	0.075
961.603	251	0.070
961.604	251	0.074
961.605	251	0.074
961.606	251	0.073
961.607	251	0.074
961.608	251	0.075
961.609	251	0.074
961.610	251	0.074
961.611	251	0.070
961.612	251	0.073
961.613	251	0.073
961.614	251	0.072
961.615	251	0.071
961.616	251	0.065
961.617	251	0.068
961.618	251	0.067
961.619	251	0.064
961.620	251	0.064
961.621	251	0.063
961.622	251	0.061
961.623	251	0.060
961.624	251	0.057
961.625	251	0.055
961.626	251	0.052
961.627	251	0.049
961.629	256	0.730
961.630	271	0.080
961.631	259	0.075
961.632	258	0.005
961.641	252	0.098
961.642	252	0.097
961.643	252	0.098
961.644	252	0.097
961.645	252	0.099
961.646	252	0.099
961.647	252	0.101
961.648	252	0.100
961.649	252	0.099
961.650	252	0.100
961.651	252	0.100
961.652	252	0.102
961.653	252	0.100
961.654	252	0.100
961.655	252	0.099
961.656	252	0.098
961.657	252	0.096
961.658	252	0.096
961.659	252	0.093
961.660	252	0.092
961.661	252	0.091
961.662	252	0.089
961.663	252	0.087
961.664	252	0.085
961.665	252	0.083
961.666	252	0.081
961.667	252	0.082
961.668	252	0.077
961.669	252	0.074
961.670	252	0.071
961.671	252	0.068
961.672	252	0.064
961.673	252	0.056
961.674	252	0.055
961.675	252	0.050
961.676	256	3.960
961.677	256	0.920
961.678	271	0.100
961.679	259	0.085
961.680	258	0.006
961.681	259	-
961.683	259	-
961.684	259	-
961.685	259	-
961.701	209	0.230
961.702	209	0.326
961.703	209	0.519

Order No.	Page	Weight (kg)
961.706	209	0.252
961.707	209	0.346
961.708	209	0.537
961.711	209	0.273
961.712	209	0.365
961.713	209	0.551
961.714	209	0.921
961.721	209	0.522
961.722	209	0.670
961.723	209	0.530
961.726	209	0.540
961.727	209	0.691
961.728	209	0.845
961.731	209	0.580
961.732	209	0.728
961.733	209	0.879
961.741	209	0.797
961.746	209	0.825
961.747	209	1.080
961.748	209	1.550
961.749	209	2.200
961.751	209	0.850
961.752	209	1.120
961.753	209	1.358
961.754	209	1.624
961.756	209	0.900
961.757	209	1.140
961.758	209	1.633
961.761	209	0.898
961.762	209	1.120
961.763	209	1.618
961.773	208	0.095
961.774	208	0.144
961.775	208	0.390
961.776	208	0.430
961.777	208	0.059
961.778	208	0.117
961.779	208	0.180
961.831	102	1.010
961.833	102	1.000
961.835	102	1.120
961.839	102	1.370
961.876	103	3.200
961.889	103	3.450
961.902	56	0.468
961.908	56	0.555
961.915	56	0.560
961.916	56	0.915
961.917	56	0.443
961.918	56	0.485
961.919	56	0.474
961.920	56	0.570
961.921	56	0.510
961.922	56	0.646
961.923	56	0.522
961.924	56	0.718
961.925	56	0.540
961.926	56	0.830
961.932	56	1.060
961.933	56	1.130
961.935	56	1.150
961.936	56	1.270
961.938	56	1.200
961.939	56	1.390
961.941	56	1.270
961.942	56	1.550
961.944	56	1.360
961.945	56	1.810
961.946	56	1.100
961.947	56	1.440
961.948	56	1.975
961.959	56	2.310
961.962	57	3.680
961.963	57	3.740
961.964	57	3.820
961.966	57	3.740
961.967	57	3.880
961.970	57	3.840
961.971	57	4.060
961.972	57	4.220
961.975	57	3.800
961.976	57	3.960
961.977	57	4.240
961.978	57	4.450
961.983	57	4.120
961.984	57	4.500
961.985	57	5.200
961.988	57	3.920
961.989	57	4.200
961.990	57	4.660
961.991	57	5.030
961.992	57	5.980
962.121S	104	1.480
962.124S	104	1.900
962.205	274	0.064
962.248	274	0.253
962.249	274	0.219
962.250	274	0.190
962.260	274	0.091
962.262	274	0.087
962.263	274	0.087
962.264	274	0.078
962.265	274	0.068
962.266	274	0.054
962.271	274	0.165
962.272	274	0.161
962.273	274	0.160
962.274	274	0.152
962.276	274	0.130
962.278	274	0.090
962.281	274	0.294
962.282	274	0.290
962.283	274	0.296
962.284	274	0.288
962.285	274	0.274
962.286	274	0.270
962.287	274	0.264
962.288	274	0.242
962.289	274	0.175
962.291	275	0.210
962.292	275	0.380
962.293	275	0.400
962.294	275	0.170
962.311	274	0.023
962.312	274	0.023
962.313	274	-
962.401	273	0.118
962.402	273	0.112
962.403	273	0.101
962.404	273	0.089
962.405	273	0.052
962.406	273	0.150
962.407	273	0.097
962.408	273	0.374
962.409	273	0.372
962.410	273	0.366
962.411	273	0.362
962.412	273	0.358
962.413	273	0.351
962.414	273	0.343
962.415	273	0.332
962.416	273	0.293
962.417	273	0.284
962.418	273	0.272
962.419	273	0.262
962.420	273	0.350
962.421	273	0.239
962.422	273	0.226
962.423	273	0.202
962.424	273	0.192
962.437	273	0.120
962.438	273	0.118
962.439	273	0.117
962.440	273	0.120
962.441	273	-
962.442	273	0.115
962.443	273	0.111
962.444	273	0.106
962.445	273	-
962.446	273	0.099
962.447	273	0.085
962.448	273	0.067
962.457	273	0.348
962.458	273	0.344
962.459	273	0.342
962.460	273	0.332
962.461	273	0.313
962.462	273	0.306
962.463	273	0.292
962.464	273	0.267
962.465	273	0.194
962.468	272	0.066
962.469	272	0.059
962.470	272	0.054
962.471	272	0.043
962.472	272	0.105
962.473	272	0.108
962.474	272	0.106
962.475	272	0.110
962.476	272	0.109
962.477	272	0.106
962.478	272	0.103
962.479	272	0.098
962.480	272	0.093
962.481	272	0.092
962.483	272	0.063
962.484	272	0.184
962.485	272	0.180
962.486	272	0.173
962.487	272	0.166
962.488	272	0.082
962.489	272	0.141

Order No.	Page	Weight (kg)
962.491	272	0.102
962.492	272	0.327
962.493	272	0.320
962.494	272	0.321
962.495	272	0.310
962.496	272	0.290
962.497	272	0.286
962.499	272	0.250
962.500	272	0.186
962.571	291	0.370
962.572	291	0.310
962.574	291	0.170
962.581	69	-
962.582	69	-
962.586	69	0.320
962.596	69	0.155
962.597	69	0.118
962.598	69	0.290
962.599	69	0.200
962.642	121	4.100
962.649	123	5.000
962.661	90	1.920
962.667	122	4.000
962.668	122	4.850
962.669	122	8.700
962.670	122	9.700
962.785	81	0.600
962.786	81	0.700
962.793	81	0.530
962.794	81	0.700
962.795	81	0.750
962.796	81	0.750
963.399	278	0.452
963.400	278	0.112
963.401	108	1.280
963.402	108	1.320
963.403	108	1.815
963.404	108	3.420
963.405	108	3.480
963.406	108	4.060
963.432	280	0.011
963.601	215	0.510
963.602	215	0.750
963.603	215	1.476
963.611	276	0.110
963.612	276	0.175
963.613	276	0.220
963.614	276	0.300
963.615	276	0.112
963.616	276	0.175
963.617	276	0.220
963.618	276	0.300
963.619	276	0.110
963.620	276	0.170
963.621	276	0.215
963.622	276	0.295
963.623	276	0.110
963.624	276	0.170
963.625	276	0.215
963.626	276	0.295
963.627	276	0.107
963.628	276	0.167
963.629	276	0.215
963.630	276	0.285
963.631	276	0.360
963.632	276	0.105
963.633	276	0.165
963.634	276	0.210
963.635	276	0.284
963.636	276	0.360
963.637	276	0.180
963.638	276	0.275
963.639	276	0.345
963.640	276	0.465
963.641	276	0.850
963.642	276	0.180
963.643	276	0.275
963.644	276	0.345
963.645	276	0.465
963.646	276	0.580
963.647	276	0.177
963.648	276	0.272
963.649	276	0.345
963.650	276	0.460
963.651	276	0.580
963.652	276	0.170
963.653	276	0.265
963.654	276	0.336
963.655	276	0.455
963.656	276	0.570
963.657	276	0.170
963.658	276	0.265
963.659	276	0.335
963.660	276	0.450
963.661	276	0.570
963.662	277	0.524
963.663	277	0.795
963.664	277	0.950
963.665	277	1.150
963.666	277	0.517
963.667	277	0.779
963.668	277	0.940
963.669	277	1.120
963.670	277	0.510
963.671	277	0.780
963.672	277	0.930
963.673	277	1.110
963.674	277	0.509
963.675	277	0.800
963.676	277	0.950
963.677	277	1.150
963.678	277	0.509
963.679	277	0.800
963.680	277	0.928
963.681	277	1.100
963.682	277	0.500
963.683	277	0.760
963.684	277	0.910
963.685	277	1.090
963.686	277	0.493
963.687	277	0.750
963.688	277	0.900
963.689	277	1.090
963.690	277	0.500
963.691	277	0.750
963.692	277	0.900
963.693	277	1.080
963.700	280	0.015
963.702	280	0.021
963.703	280	0.140
963.711	280	0.011
963.713	280	0.023
963.721	280	0.005
963.722	280	0.010
963.723	280	0.020
964.101S	58	0.730
964.102S	58	0.885
964.103S	58	1.040
964.190S	58	1.320
964.191S	58	1.400
964.192S	58	1.540
964.194S	58	1.840
964.195S	58	2.140
964.196S	58	2.070
965.400	67	0.460
965.401	66	0.665
965.402	66	0.710
965.403	66	1.430
965.404	66	1.230
965.405	66	1.300
965.406	66	1.740
965.407	66	3.820
965.408	66	3.920
965.409	66	4.300
965.505	160	3.500
965.506	160	3.900
965.511S	139	1.400
965.523	148	3.190
965.601	146	0.532
965.602	146	0.700
965.603	146	0.800
965.604	146	0.822
965.606	146	1.000
965.607	146	1.080
965.608	146	1.660
965.609	146	2.410
965.610	146	2.506
965.611	146	3.100
966.081	445	0.520
966.082	445	0.620
966.083	445	0.620
966.084	445	0.710
966.085	445	1.300
966.086	445	1.320
966.087	445	1.400
966.088	445	1.500
966.089	445	1.440
966.090	445	1.580
966.091	445	1.700
966.092	445	1.740
966.093	448	0.900
966.094	448	1.000
966.095	448	1.000
966.096	448	1.200
966.097	448	1.100
966.098	448	1.130
966.099	448	1.300
966.100	448	1.000
966.101	447	0.317
966.102	447	0.336
966.103	447	0.400
966.104	447	0.385

Order No.	Page	Weight (kg)
966.105	447	0.600
966.106	447	0.583
966.107	447	0.600
966.108	447	0.600
966.109	447	0.600
966.110	447	0.700
966.111	447	0.722
966.112	447	1.000
966.115	448	0.269
966.120	444	0.643
966.121	444	1.260
966.122	444	1.360
966.123	444	1.700
966.124	444	1.280
966.125	444	1.400
966.126	444	1.750
966.127	444	1.420
966.128	444	1.540
966.129	444	1.900
966.130	444	1.520
966.131	444	1.680
966.132	444	2.100
966.133	444	1.790
966.134	444	2.000
966.135	444	2.400
966.136	444	2.140
966.137	444	2.400
966.138	444	2.940
966.141	447	0.800
966.142	447	1.100
966.143	447	1.300
966.144	447	1.000
966.145	447	1.200
966.146	447	1.400
966.147	447	1.100
966.148	447	1.230
966.149	447	1.500
966.150	447	1.220
966.151	447	1.220
966.152	447	1.700
966.153	447	1.300
966.154	447	1.650
966.155	447	1.860
966.156	447	1.840
966.157	447	2.040
966.158	447	2.800
966.161	446	1.300
966.162	446	1.400
966.163	446	1.100
966.164	446	1.300
966.165	446	1.200
966.166	446	1.600
966.167	446	1.500
966.168	446	1.700
966.169	446	1.700
966.170	446	2.000
966.171	446	2.200
966.172	446	2.400
966.173	448	1.300
966.174	448	0.161
966.181	450	0.164
966.182	450	0.250
966.183	450	0.290
966.184	450	0.600
966.185	450	0.524
966.186	450	1.220
966.187	450	1.000
966.206	446	1.200
966.207	446	1.250
966.208	446	1.330
966.209	446	1.300
966.210	446	1.360
966.211	446	1.400
966.212	451	0.320
966.213	451	0.499
966.214	451	1.120
966.216	444	0.550
966.217	444	0.481
966.218	444	0.518
966.219	444	0.563
966.220	444	0.540
966.221	444	1.220
966.222	444	1.160
966.223	444	1.200
966.224	444	1.260
966.225	444	1.460
966.226	444	1.400
966.231	447	0.900
966.232	447	0.888
966.233	447	0.929
966.234	447	1.000
966.235	447	1.100
966.236	447	1.160
966.237	450	0.113
966.238	450	0.118
966.239	450	0.117
966.240	450	0.227
966.241	450	0.405
966.242	450	0.697
966.243	450	0.797
966.244	450	0.965
966.245	452	0.001
966.246	452	0.002
966.248	452	0.002
966.249	452	0.002
966.250	452	0.001
966.251	452	0.002
966.253	452	0.002
966.254	452	0.003
966.255	452	0.001
966.256	452	0.002
966.258	452	0.002
966.259	452	0.003
966.260	452	0.001
966.261	452	0.005
966.263	452	0.005
966.264	452	0.005
966.265	452	0.005
966.266	452	0.005
966.268	452	0.005
966.269	452	0.005
966.270	452	0.005
966.271	466	-
966.272	466	0.040
966.273	227	0.047
966.274	466	0.040
966.275	466	0.041
966.280	452	0.005
966.281	452	0.002
966.283	452	0.005
966.284	452	0.005
966.285	452	0.005
966.286	452	0.005
966.288	452	0.002
966.289	452	0.002
966.341	68	0.985
966.401	482	0.214
966.404	482	3.200
966.405	482	0.400
966.406	482	0.426
966.407	482	0.390
966.408	493	0.134
966.409	493	0.004
966.411	492	0.418
966.412	492	0.475
966.413	492	1.120
966.414	492	1.280
966.415	492	0.089
966.416	492	0.127
966.417	492	0.269
966.418	492	0.418
966.422	492	0.027
966.423	492	0.050
966.424	492	0.090
966.425	492	0.250
966.431	477	0.042
966.432	477	0.044
966.433	476	0.077
966.434	476	0.304
966.435	476	1.040
966.436	477	0.147
966.437	477	0.148
966.440	480	0.001
966.441	480	0.001
966.442	480	0.001
966.443	480	0.001
966.445	480	0.001
966.446	480	0.001
966.447	480	0.002
966.448	480	0.018
966.449	480	0.007
966.450	480	0.047
966.461	476	0.072
966.462	476	0.080
966.463	476	0.086
966.464	476	0.165
966.465	476	0.308
966.466	476	0.370
966.467	476	1.240
966.468	477	0.038
966.469	477	0.042
966.470	477	0.048
966.471	477	0.145
966.472	478	0.040
966.473	478	0.043
966.474	478	0.069
966.475	478	0.074
966.476	478	0.074
966.477	478	0.085
966.478	478	0.132
966.479	478	0.150
966.480	478	0.143

Order No.	Page	Weight (kg)
966.481	478	0.172
966.482	478	-
966.483	478	0.283
966.484	478	0.264
966.485	478	0.321
966.486	477	0.040
966.487	477	0.042
966.488	477	0.048
966.489	477	0.183
966.501	488	0.040
966.502	488	0.136
966.503	488	0.160
966.504	488	0.813
966.505	489	0.125
966.506	489	0.290
966.530	491	0.001
966.531	491	0.001
966.532	491	0.001
966.533	491	0.001
966.534	491	0.001
966.535	491	0.001
966.536	491	0.001
966.537	491	0.001
966.601	456	1.100
966.602	456	1.500
966.603	456	1.600
966.604	456	0.950
966.605	456	1.300
966.606	456	1.700
966.607	456	1.100
966.608	456	1.320
966.609	456	1.800
966.610	456	1.220
966.611	456	1.452
966.612	456	1.610
966.616	455	1.220
966.617	455	1.420
966.618	455	1.600
966.619	455	1.160
966.620	455	1.530
966.621	455	1.600
966.622	455	1.200
966.623	455	1.480
966.624	455	1.800
966.625	455	1.260
966.626	455	1.500
966.627	455	1.900
966.631	457	0.870
966.632	457	1.080
966.633	457	-
966.634	457	0.900
966.635	457	-
966.636	457	1.200
966.637	457	0.925
966.638	457	1.120
966.639	457	-
966.640	457	-
966.641	457	1.280
966.642	457	-
966.651	459	0.001
966.652	459	0.001
966.653	459	0.003
966.656	459	0.003
966.658	459	0.001
966.661	459	0.001
966.662	459	0.001
966.663	459	0.001
966.666	459	0.001
966.667	459	0.001
966.668	459	0.001
966.669	459	0.005
966.671	457	-
966.672	457	-
966.673	457	0.600
966.674	457	-
966.675	457	0.823
966.676	457	1.000
966.677	457	-
966.678	457	0.991
966.679	457	-
966.680	457	1.060
966.681	457	1.260
966.682	457	1.315
966.683	455	0.512
966.684	455	-
966.685	455	0.520
966.686	455	0.578
966.687	455	0.515
966.688	455	0.640
966.689	455	0.553
966.690	455	-
966.691	455	1.200
966.692	455	1.320
966.693	455	1.300
966.694	455	1.475
966.695	455	1.440
966.696	455	1.580
966.697	455	1.670
966.698	455	1.785
966.701	462	-
966.702	462	0.065
966.703	462	0.060
966.704	462	0.126
966.705	462	0.119
966.706	462	0.252
966.707	462	0.233
966.708	462	-
966.709	462	-
966.710	462	0.100
966.711	462	-
966.712	462	-
966.713	462	0.280
966.714	462	0.228
966.721	463	-
966.722	463	-
966.723	463	-
966.724	463	-
966.725	463	-
966.726	463	0.588
966.727	463	-
966.728	463	0.576
966.731	463	-
966.732	463	-
966.733	463	-
966.734	463	1.000
966.735	463	1.150
966.736	463	1.200
966.737	463	-
966.738	463	1.160
966.739	463	-
966.740	463	-
966.741	463	1.330
966.742	463	1.460
966.746	463	-
966.747	463	4.500
966.748	463	4.940
966.749	463	4.950
966.751	464	-
966.752	464	-
966.753	464	-
966.754	464	1.900
966.755	464	-
966.756	464	-
966.757	464	-
966.758	464	-
966.759	464	1.115
967.501	266	0.026
967.502	266	-
967.503	266	-
967.504	266	-
967.505	266	-
967.506	266	-
967.507	266	-
967.508	266	-
967.509	266	-
967.510	266	-
967.511	266	0.023
967.512	266	-
967.513	266	-
967.514	266	-
967.515	266	0.023
967.516	266	-
967.517	266	-
967.518	266	-
967.519	266	0.023
967.520	266	-
967.521	266	-
967.522	266	-
967.523	266	0.022
967.524	266	-
967.525	266	0.021
967.526	266	-
967.527	266	0.020
967.528	266	-
967.529	266	0.018
967.530	266	-
967.531	266	0.015
967.532	266	-
967.533	266	-
967.534	266	-
967.535	266	-
967.536	266	-
967.537	266	-
967.538	266	-
967.539	266	-
967.540	266	-
967.541	266	-
967.542	266	-
967.543	266	-
967.544	266	-
967.545	266	-
967.546	266	-

Order No.	Page	Weight (kg)
967.547	266	-
967.548	266	-
967.549	266	-
967.550	266	-
967.551	266	-
967.552	266	-
967.553	266	-
967.554	266	-
967.555	266	-
967.556	266	-
967.557	266	-
967.558	266	-
967.559	267	-
967.560	267	-
967.561	267	-
967.562	267	-
967.563	267	0.074
967.564	267	-
967.565	267	-
967.566	267	-
967.567	267	0.050
967.568	267	-
967.569	267	-
967.570	267	-
967.571	267	0.073
967.572	267	-
967.573	267	0.074
967.574	267	-
967.575	267	0.073
967.576	267	-
967.577	267	0.072
967.578	267	-
967.579	267	0.070
967.580	267	-
967.581	267	0.067
967.582	267	-
967.583	267	0.065
967.584	267	-
967.585	267	0.059
967.586	267	-
967.587	267	-
967.588	267	-
967.589	267	0.051
967.590	267	-
967.591	267	0.048
967.592	267	0.140
967.593	267	-
967.594	267	-
967.595	267	-
967.596	267	0.135
967.597	267	-
967.598	267	-
967.599	267	-
967.600	267	0.143
967.601	267	-
967.602	267	0.142
967.603	267	-
967.604	267	0.145
967.605	267	0.144
967.606	267	0.145
967.607	267	-
967.608	267	0.145
967.609	267	-
967.610	267	0.145
967.611	267	-
967.612	267	0.143
967.613	267	-
967.614	267	0.142
967.615	267	-
967.616	267	0.140
967.617	267	-
967.618	267	0.137
967.619	267	0.135
967.620	267	0.134
967.621	267	-
967.622	267	0.130
967.623	267	-
967.624	267	0.126
967.625	267	-
967.627	267	-
967.628	267	0.110
967.629	267	-
967.630	267	0.108
967.631	267	-
967.632	267	0.100
967.801	268	0.068
967.802	268	-
967.803	268	0.135
967.804	268	0.135
967.810	286	0.005
967.811	286	0.011
967.812	286	0.014
967.813	286	0.020
967.814	286	0.029
967.850	269	0.077
967.851	269	0.077
967.852	269	0.077
967.853	269	-
967.854	269	-
967.855	269	-
967.856	269	0.077
967.857	269	-
967.858	269	-
967.859	269	-
967.861	269	0.076
967.862	269	-
967.863	269	-
967.864	269	-
967.865	269	-
967.866	269	-
967.867	269	-
967.868	269	-
967.869	269	-
967.870	269	0.112
967.871	269	-
967.872	269	-
967.873	269	-
967.874	269	0.114
967.875	269	-
967.876	269	-
967.877	269	0.113
967.878	269	-
967.879	269	0.109
967.880	269	-
967.881	269	-
967.882	269	-
967.883	269	-
967.884	269	-
967.885	270	-
967.886	270	-
967.887	270	-
967.888	270	-
967.889	270	-
967.890	270	-
967.891	270	0.150
967.892	270	-
967.893	270	-
967.894	270	-
967.895	270	0.150
967.896	270	-
967.897	270	-
967.898	270	-
967.899	270	0.150
967.900	270	-
967.901	270	-
967.902	270	0.159
967.903	270	0.155
967.904	270	0.154
967.905	270	-
967.906	270	0.150
967.908	270	0.219
967.909	270	-
967.910	270	-
967.911	270	-
967.912	270	-
967.913	270	-
967.914	270	-
967.915	270	-
967.916	270	-
967.917	270	-
967.918	270	-
967.919	270	-
967.920	270	-
967.921	270	-
967.922	270	-
967.923	270	-
967.924	270	-
967.925	270	0.224
967.926	270	-
967.927	270	0.218
967.928	270	-
967.929	270	-
967.930	270	-
967.931	270	-
967.932	270	-
967.933	270	-
967.934	270	0.217
968.033	53	7.460
968.037	53	8.300
968.038	53	9.560
968.059	100	5.020
968.060	100	5.120
968.061	100	4.500
968.076	54	5.160
968.077	54	5.700
968.080	54	6.770
968.083	54	7.480
968.086	54	4.800
968.087	54	8.320
968.088	54	9.580
968.105	135	3.970
968.108	135	3.900

Order No.	Page	Weight (kg)
968.111	135	4.760
968.112	135	5.800
968.121	136	3.980
968.122	136	4.880
968.123	136	5.780
968.124	136	4.240
968.125	136	5.360
968.127	136	4.780
968.128	136	5.540
968.129	136	6.840
968.130	136	5.500
968.131	136	3.280
968.136S	139	1.720
968.137S	139	2.000
968.142	99	1.114
968.144	99	1.200
968.145	99	1.300
968.147	99	1.300
968.148	99	1.400
968.150	99	1.100
968.151	99	1.700
968.152	99	1.910
968.154	99	3.300
968.156	99	3.340
968.159	99	3.600
968.161	99	3.600
968.162	99	3.800
968.163	99	4.400
968.167	52	0.580
968.170	52	0.495
968.171	52	0.620
968.174	52	0.525
968.175	52	0.800
968.178	52	0.560
968.179	52	0.590
968.180	52	0.965
968.181	52	1.120
968.183	52	1.080
968.185	52	1.200
968.188	52	1.560
968.191	52	1.120
968.193	52	1.300
968.196	52	1.730
968.199	52	1.140
968.201	52	1.400
968.204	52	1.940
968.207	52	1.200
968.208	52	1.380
968.209	52	1.568
968.210	52	1.780
968.211	52	2.020
968.212	52	2.280
968.213	52	2.740
968.214	52	3.700
968.217	52	3.920
968.221	52	4.040
968.225	52	4.160
968.228	52	4.020
968.229	52	4.410
968.230	52	5.230
968.235	134	0.350
968.238	134	0.407
968.241	134	0.473
968.242	134	0.670
968.243	134	0.543
968.247	134	0.800
968.248	134	0.975
968.249	134	1.100
968.252	134	0.896
968.253	134	1.050
968.254	134	1.180
968.257	134	1.000
968.258	134	1.140
968.259	134	1.290
968.260	134	1.480
968.262	134	1.150
968.263	134	1.320
968.264	134	1.480
968.265	134	1.670
968.266	134	1.830
968.287	134	2.760
968.288	134	3.000
968.289	134	3.360
968.290	134	3.420
968.291	134	4.000
968.301	247	0.002
968.302	247	0.002
968.303	247	0.002
968.304	247	0.002
968.305	247	0.002
968.306	247	0.002
968.307	247	0.002
968.308	247	0.002
968.309	247	0.002
968.310	247	0.002
968.311	247	0.002
968.312	247	0.002
968.313	247	0.002
968.314	247	0.002
968.315	247	0.002
968.316	247	0.002
968.317	247	0.002
968.318	247	0.002
968.319	247	0.002
968.320	247	0.002
968.321	247	0.002
968.322	247	0.002
968.323	247	0.002
968.324	247	0.001
968.325	247	0.001
968.326	247	0.002
968.327	247	0.001
968.328	247	0.002
968.329	247	0.005
968.330	249	0.111
968.334	247	0.003
968.335	247	0.003
968.336	247	0.003
968.337	247	0.003
968.338	247	0.003
968.339	247	0.003
968.340	247	0.002
968.341	247	0.003
968.342	247	0.003
968.343	247	0.003
968.344	247	0.003
968.345	247	0.003
968.346	247	0.003
968.347	247	0.003
968.348	247	0.003
968.349	247	0.003
968.350	247	0.003
968.351	247	0.003
968.352	247	0.002
968.353	247	0.003
968.354	247	0.003
968.355	247	0.002
968.356	247	0.003
968.357	247	0.002
968.358	247	0.002
968.359	247	0.002
968.360	247	0.002
968.361	247	0.003
968.362	247	0.002
968.363	247	0.003
968.364	249	0.115
968.369	248	0.004
968.370	248	0.004
968.371	248	0.004
968.372	248	0.005
968.373	248	0.005
968.374	248	0.004
968.375	248	0.004
968.376	248	0.004
968.377	248	0.004
968.378	248	0.004
968.379	248	0.005
968.380	248	0.005
968.381	248	0.005
968.382	248	0.005
968.383	248	0.005
968.384	248	0.005
968.385	248	0.005
968.386	248	0.005
968.387	248	0.005
968.388	248	0.005
968.389	248	0.005
968.390	248	0.005
968.391	248	0.005
968.392	248	0.005
968.393	248	0.005
968.394	248	0.005
968.395	248	0.005
968.396	248	0.004
968.397	248	0.004
968.398	248	0.004
968.399	248	0.005
968.400	248	0.005
968.401	248	0.004
968.402	248	0.004
968.403	248	0.004
968.404	248	0.004
968.405	248	0.004
968.406	248	0.004
968.408	248	0.004
968.409	248	0.004
968.410	248	0.004
968.411	248	0.004
968.412	248	0.004
968.413	248	0.004
968.414	248	0.003
968.415	248	0.004

Order No.	Page	Weight (kg)
968.421	264	0.014
968.423	264	0.013
968.424	264	0.012
968.425	264	0.010
968.427	264	0.020
968.429	264	0.025
968.430	264	0.023
968.431	264	0.020
968.433	264	0.018
968.434	264	0.043
968.436	264	0.043
968.437	264	0.042
968.438	264	0.041
968.440	264	0.036
968.442	264	0.028
968.443	264	0.067
968.445	264	0.067
968.446	264	0.068
968.447	264	0.066
968.448	264	0.060
968.449	264	0.062
968.451	264	0.056
968.453	264	0.046
968.461	264	0.044
968.462	264	0.066
968.463	264	1.070
968.464	264	0.150
968.468	265	0.048
968.469	265	0.048
968.470	265	0.048
968.471	265	0.049
968.472	265	0.074
968.473	265	0.074
968.474	265	0.074
968.475	265	0.074
968.476	265	-
968.477	265	0.073
968.478	265	0.096
968.479	265	0.096
968.480	265	-
968.481	265	0.096
968.482	265	-
968.483	265	0.097
968.484	265	0.096
968.485	265	0.096
968.486	265	0.150
968.487	265	0.150
968.488	265	0.150
968.489	265	0.151
968.490	265	0.151
968.491	265	0.152
968.492	265	0.152
968.493	265	0.153
968.494	265	0.151
968.495	265	0.151
968.572	138	2.500
968.573	138	2.600
968.575	138	2.600
968.578	138	2.660
968.580	138	2.610
968.581	138	2.840
968.583	138	2.720
968.584	138	3.020
968.587	138	2.890
968.588	138	3.320
968.593	138	3.000
968.594	138	3.800
968.604	56	1.340
968.610	56	1.660
968.613	56	1.770
968.708	54	4.600
968.709	54	5.030
968.710	54	5.920
968.711	54	5.360
968.712	54	6.500
968.713	54	5.460
968.714	54	6.890
968.716	164	0.216
968.717	165	0.250
968.718	165	0.303
968.719	165	0.292
968.720	165	0.356
968.721	165	0.349
968.722	165	0.487
968.723	165	0.474
968.728	166	0.489
968.729	166	0.496
968.730	166	0.600
968.731	166	0.540
968.733	166	0.623
968.734	166	0.746
968.736	166	0.878
968.738	130	0.567
968.742	130	1.010
968.745	130	0.659
968.752	165	0.089
968.753	165	0.120
968.754	165	0.180
968.757	164	0.231
968.760	164	0.460
968.764	166	0.772
968.771	138	0.900
968.772	138	0.900
968.773	138	0.956
968.775	138	0.865
968.776	138	0.975
968.777	138	1.080
968.779	138	0.905
968.780	138	1.050
968.781	138	1.200
968.783	138	0.943
968.784	138	1.133
968.785	138	1.310
968.787	138	1.100
968.788	138	1.290
968.789	138	1.580
968.790	138	1.850
968.791	138	2.200
968.792	138	1.070
968.793	138	1.380
968.794	138	1.650
968.795	138	2.300
968.796	138	2.470
968.803	129	0.787
968.811	131	0.870
968.812	131	0.895
968.813	131	0.940
968.814	131	0.885
968.815	131	0.869
968.816	131	0.945
968.818	131	1.150
968.819	131	0.910
968.820	131	1.050
968.822	131	1.350
968.823	131	0.960
968.824	131	1.120
968.826	131	1.540
968.827	131	1.020
968.828	131	1.280
968.829	131	1.576
968.830	131	1.860
968.831	131	2.400
968.832	131	1.060
968.833	131	1.380
968.835	131	2.040
968.836	131	2.500
968.841	132	2.440
968.842	132	2.400
968.843	132	2.520
968.844	132	2.400
968.845	132	2.500
968.846	132	2.700
968.847	132	2.590
968.848	132	2.600
968.849	132	2.840
968.850	132	2.540
968.851	132	2.720
968.852	132	2.990
968.853	132	3.280
968.854	132	2.620
968.855	132	2.900
968.856	132	3.320
968.857	132	3.680
968.858	132	2.700
968.859	132	3.000
968.860	132	3.500
968.861	132	3.920
968.868	164	0.064
968.869	164	0.079
968.870	163	0.155
968.871	163	0.077
968.874	163	0.070
968.875	163	0.090
968.876	164	0.136
968.877	164	0.150
968.878	164	0.138
968.879	164	0.153
968.880	163	0.136
968.881	163	0.155
968.882	163	0.139
968.883	163	0.160
968.884	165	0.160
968.885	165	0.192
968.886	165	0.197
968.890	163	0.230
968.891	163	0.260
968.892	163	0.240
968.893	163	0.270
968.894	163	0.312
968.895	165	0.272
968.896	165	0.335
968.897	165	0.399

Order No.	Page	Weight (kg)
968.899	165	0.418
968.900	165	0.417
968.901	165	0.566
968.905	165	0.543
968.907	163	0.460
968.910	166	1.146
968.911	166	1.020
968.914	164	0.131
968.915	164	0.221
968.917	163	0.148
968.919	163	0.315
968.920	163	0.247
968.925	128	0.256
968.926	128	0.282
968.927	128	0.310
968.929	129	0.253
968.930	129	0.280
968.931	129	0.249
968.932	129	0.260
968.933	129	0.240
968.934	128	0.255
968.936	128	0.260
968.937	128	0.290
968.940	130	0.283
968.941	130	0.340
968.942	130	0.346
968.943	130	0.314
968.945	130	0.413
968.946	130	0.350
968.948	130	0.494
968.949	130	0.458
968.950	130	0.460
968.951	130	0.517
968.952	130	0.780
968.953	130	0.696
968.961	128	0.771
968.963	128	0.858
968.965	129	0.780
968.966	128	0.818
968.970	128	0.774
968.971	128	0.795
968.973	128	0.860
968.975	128	0.980
968.981	131	0.905
968.982	131	1.000
968.983	131	1.120
968.984	131	1.240
968.985	131	1.040
968.986	131	1.500
968.989	132	2.460
968.990	132	2.700
968.991	132	2.520
968.992	132	2.700
968.993	132	2.620
968.994	132	2.820
968.995	132	2.760
968.996	132	3.040
968.997	132	2.860
968.998	132	3.300
969.023	100	3.340
969.025	100	4.580
969.032	102	1.070
969.034	102	1.030
969.036	102	1.260
969.037	102	1.040
969.038	102	1.170
969.040	102	0.900
969.041	102	1.230
969.042	102	1.500
969.043	102	1.040
969.044	102	1.360
969.045	102	1.670
969.046	102	1.015
969.047	102	1.340
969.048	102	1.870
969.059	102	2.300
969.060	102	2.400
969.062	103	2.720
969.063	103	3.100
969.066	103	3.200
969.067	103	3.000
969.069	103	2.800
969.070	103	3.105
969.071	103	3.300
969.075	103	4.200
969.077	103	3.500
969.082	103	3.000
969.083	103	3.415
969.084	103	4.300
969.085	103	4.000
969.087	103	2.980
969.088	103	3.200
969.090	103	4.000
969.091	103	4.340
969.208	96	1.100
969.209	46	0.385
969.210	46	0.405
969.211	46	0.480
969.214	46	0.435
969.215	46	0.470
969.218	46	0.395
969.220	46	0.470
969.221	46	0.505
969.222	46	0.585
969.224	97	0.990
969.225	97	1.080
969.229	97	1.060
969.230	97	1.330
969.234	97	1.250
969.235	97	1.340
969.239	97	1.200
969.240	97	1.480
969.241	97	1.660
969.244	97	1.317
969.245	97	1.800
969.246	97	2.010
969.248	97	1.100
969.249	97	1.365
969.250	97	1.900
969.251	97	2.400
969.252	97	0.350
969.253	98	3.000
969.254	98	3.800
969.255	98	1.310
969.261	98	3.200
969.262	98	3.160
969.263	98	3.360
969.267	98	3.200
969.268	98	3.400
969.269	98	3.700
969.274	98	3.230
969.275	98	3.458
969.276	98	3.840
969.277	98	4.400
969.280	98	3.280
969.281	98	3.580
969.282	98	4.040
969.283	98	4.600
969.302	96	1.000
969.305	96	0.928
969.307	96	0.900
969.308	96	0.970
969.309	96	1.070
969.319	46	0.440
969.322	46	0.985
969.323	46	1.080
969.324	46	0.980
969.326	46	1.000
969.328	46	1.115
969.330	46	0.989
969.331	46	1.000
969.332	46	1.030
969.333	46	1.060
969.334	46	1.120
969.335	46	1.200
969.341	48	0.480
969.342	48	0.540
969.343	48	0.550
969.344	48	0.527
969.345	48	0.622
969.346	48	0.668
969.347	48	0.570
969.348	48	0.725
969.349	48	0.631
969.350	48	0.815
969.351	48	0.700
969.352	48	1.000
969.353	48	0.720
969.354	48	1.080
969.361	49	1.050
969.362	49	1.100
969.363	49	1.140
969.364	49	1.080
969.365	49	1.180
969.366	49	1.210
969.367	49	1.160
969.368	49	1.280
969.369	49	1.350
969.370	49	1.200
969.371	49	1.380
969.372	49	1.460
969.373	49	1.250
969.374	49	1.520
969.375	49	1.680
969.376	49	1.270
969.377	49	1.600
969.378	49	1.780
969.446	271	0.094
969.447	271	0.239
969.448	271	0.533
969.449	271	0.068
969.450	271	0.860

Order No.	Page	Weight (kg)
969.451	271	0.178
969.452	271	0.091
969.453	271	0.184
969.454	271	0.117
969.455	271	0.203
969.456	271	0.180
969.457	271	0.300
969.458	271	0.250
969.459	271	0.396
969.460	271	0.312
969.460L	271	0.200
969.461	271	0.563
969.462	271	0.358
969.462L	271	0.570
969.463	271	0.520
969.464L	271	0.784
969.465	271	0.368
969.465L	275	0.640
969.466	271	0.790
969.468L	271	0.963
969.469L	275	0.979
969.470L	275	1.040
969.471L	275	1.300
969.472L	275	1.700
969.475	175	0.029
969.480	249	0.004
969.481	249	0.006
969.482	249	0.075
969.483	258	0.025
969.484	258	0.040
969.485	258	0.060
969.486	258	0.090
969.487	258	0.120
969.488	258	0.140
969.491	257	0.019
969.492	257	0.050
969.493	257	0.030
969.494	257	0.036
969.495	257	0.100
969.496	257	0.028
969.497	257	0.029
969.498	257	0.036
969.499	257	0.037
969.504	47	0.430
969.506	47	0.975
969.508	47	1.000
969.509	48	0.450
969.510	48	0.510
969.511	48	0.460
969.512	48	0.531
969.513	48	0.515
969.514	49	1.220
969.516	48	0.515
969.517	48	0.735
969.518	48	0.930
969.519	48	0.565
969.520	48	0.850
969.521	48	0.600
969.522	48	0.900
969.523	49	1.030
969.524	49	1.070
969.525	49	1.150
969.526	49	1.230
969.527	49	1.320
969.528	49	1.060
969.529	49	1.140
969.530	49	1.260
969.531	49	1.380
969.532	49	1.500
969.533	49	1.080
969.534	48	0.655
969.535	49	1.420
969.536	49	1.560
969.537	49	1.720
969.538	49	1.100
969.539	49	1.280
969.540	49	1.560
969.541	49	1.760
969.542	49	1.960
969.543	49	1.100
969.544	49	1.400
969.545	49	1.810
969.546	49	2.100
969.547	49	2.427
969.548	49	1.100
969.549	49	1.460
969.550	49	1.940
969.551	49	2.290
969.552	49	2.690
969.553	50	3.640
969.554	50	3.700
969.555	50	3.800
969.556	50	3.870
969.557	50	3.680
969.558	50	3.790
969.559	50	3.940
969.560	50	4.040
969.561	50	3.750
969.562	50	3.880
969.563	50	4.100
969.564	50	4.260
969.565	50	4.500
969.566	50	4.720
969.567	50	3.840
969.568	50	4.000
969.569	50	4.270
969.570	50	4.480
969.571	50	4.780
969.572	50	5.080
969.573	51	3.770
969.574	51	3.920
969.575	51	4.160
969.576	51	4.520
969.577	51	4.850
969.578	51	5.240
969.579	51	3.800
969.580	51	3.950
969.581	51	4.260
969.582	51	4.680
969.583	51	5.060
969.584	51	5.560
969.593	53	5.060
969.595	53	5.360
969.596	53	6.490
969.597	53	5.460
969.601	254	0.004
969.602	254	0.003
969.603	254	0.003
969.604	254	0.003
969.605	254	0.004
969.606	254	0.003
969.607	254	0.003
969.608	254	0.003
969.609	254	0.003
969.610	254	0.003
969.611	254	0.003
969.612	254	0.003
969.613	254	0.003
969.615	254	0.010
969.616	254	0.009
969.617	254	0.009
969.618	254	0.008
969.619	254	0.008
969.620	254	0.008
969.621	254	0.008
969.622	254	-
969.623	254	0.007
969.624	254	-
969.625	254	0.006
969.627	254	0.026
969.628	254	0.026
969.629	254	0.027
969.630	254	0.025
969.631	254	0.025
969.632	254	0.024
969.633	254	0.022
969.634	254	0.025
969.635	254	0.021
969.636	254	0.021
969.637	254	0.020
969.638	254	0.020
969.639	254	0.018
969.640	254	0.016
969.641	254	0.016
969.643	254	0.045
969.644	254	0.047
969.645	254	0.047
969.646	254	0.045
969.647	254	0.044
969.648	254	0.044
969.649	254	0.043
969.650	254	0.043
969.651	254	0.042
969.652	254	0.010
969.653	254	0.041
969.654	254	0.038
969.655	254	0.038
969.656	254	0.037
969.657	254	0.036
969.658	254	0.034
969.659	254	0.033
969.660	254	0.032
969.661	254	0.030
969.662	254	0.028
969.663	254	0.026
969.669	255	0.082
969.670	255	0.082
969.671	255	0.082
969.672	255	0.082
969.673	255	0.079
969.674	255	-
969.675	255	0.078

Order No.	Page	Weight (kg)
969.676	255	-
969.677	255	0.078
969.678	255	-
969.679	255	0.075
969.680	255	0.073
969.681	255	0.072
969.682	255	-
969.683	255	0.067
969.684	255	-
969.685	255	0.063
969.686	255	-
969.687	255	0.059
969.688	255	-
969.689	255	0.055
969.690	255	-
969.691	255	0.049
969.697	255	0.117
969.698	255	0.116
969.699	255	0.116
969.700	255	0.115
969.701	255	0.112
969.702	255	0.113
969.703	255	0.112
969.704	255	0.112
969.705	255	0.110
969.706	255	0.108
969.707	255	0.108
969.708	255	0.105
969.709	255	0.104
969.710	255	0.101
969.711	255	0.100
969.712	255	0.098
969.713	255	0.094
969.714	255	0.093
969.715	255	0.091
969.716	255	0.088
969.717	255	0.085
969.718	255	0.083
969.719	255	0.080
969.720	255	0.077
969.721	255	0.074
969.722	255	0.071
969.723	255	0.680
969.724	255	0.063
969.725	255	0.060
969.726	255	0.056
969.727	255	0.051
969.861	260	0.028
969.862	260	0.028
969.863	260	0.028
969.864	260	0.047
969.865	260	0.047
969.866	260	0.047
969.867	260	0.045
969.868	260	0.045
969.869	260	0.070
969.870	260	0.070
969.871	260	0.070
969.872	260	0.070
969.873	260	0.070
969.874	260	0.070
969.875	260	0.069
969.876	260	0.102
969.877	260	0.101
969.878	260	0.102
969.879	260	0.102
969.880	260	0.102
969.881	260	0.102
969.882	260	0.102
969.883	260	0.100
969.884	260	0.099
969.885	260	0.099
969.886	261	0.145
969.887	261	0.145
969.888	261	0.145
969.889	261	0.150
969.890	261	0.147
969.891	261	0.148
969.892	261	0.148
969.893	261	0.150
969.894	261	0.147
969.895	261	0.147
969.896	261	0.143
969.897	261	0.143
969.898	261	0.142
969.899	261	0.167
969.900	261	0.168
969.901	261	0.168
969.902	261	0.168
969.903	261	0.168
969.904	261	0.170
969.905	261	0.170
969.906	261	0.170
969.907	261	0.170
969.908	261	0.170
969.909	261	0.168
969.910	261	0.169
969.911	261	0.169
969.912	261	0.163
969.913	261	0.164
969.914	261	0.164
969.915	261	0.163
969.921	262	0.020
969.922	262	0.020
969.923	262	0.020
969.924	262	0.036
969.925	262	0.036
969.926	262	0.037
969.927	262	0.035
969.928	262	0.035
969.929	262	0.054
969.930	262	0.054
969.931	262	0.054
969.932	262	0.054
969.933	262	0.054
969.934	262	0.052
969.935	262	0.052
969.936	262	-
969.937	262	0.080
969.938	262	0.083
969.939	262	0.083
969.940	262	0.083
969.941	262	0.083
969.942	262	0.083
969.943	262	0.080
969.944	262	0.080
969.945	262	0.080
969.946	263	0.115
969.947	263	0.115
969.948	263	0.116
969.949	263	0.116
969.950	263	0.116
969.951	263	0.117
969.952	263	0.117
969.953	263	0.320
969.954	263	0.117
969.955	263	0.116
969.956	263	0.111
969.957	263	0.112
969.958	263	0.112
969.959	263	0.132
969.960	263	0.133
969.961	263	0.133
969.962	263	0.133
969.963	263	0.133
969.964	263	0.135
969.965	263	0.135
969.966	263	0.135
969.967	263	0.134
969.968	263	0.136
969.969	263	0.135
969.970	263	0.133
969.971	263	0.133
969.972	263	0.129
969.973	263	0.128
969.974	263	0.128
969.975	263	0.129
969.981	261	0.002
969.982	261	0.002
969.983	261	0.002
969.984	261	0.005
969.985	261	0.004
969.986	261	0.005
969.987	261	0.004
969.988	261	0.010
969.989	261	0.006
969.990	261	0.005
969.991	261	0.001
969.992	261	0.010
969.993	261	0.010
969.994	261	0.002
969.995	261	0.002
969.996	261	0.002
969.997	261	0.010
972.304	500	0.005
972.306	500	0.005
972.309	500	0.003
972.310	500	0.003
972.311	500	0.003
972.321	274	-
972.322	274	0.029
972.331	284	0.950
973.001	230	0.550
973.002	230	0.761
973.003	230	1.060
973.006	230	1.480
973.007	230	1.920
973.011	230	1.350
973.013	230	-
973.014	221	0.470
973.015	221	0.491
973.016	221	1.352

Order No.	Page	Weight (kg)
973.017	221	0.465
973.018	221	0.464
973.019	221	0.740
973.020	221	0.740
973.021	221	1.352
973.022	221	0.684
973.023	221	0.683
973.024	221	0.440
973.025	221	1.635
973.026	234	1.140
973.027	234	-
973.028	234	1.270
973.030	234	-
973.031	234	6.620
973.032	235	-
973.033	235	1.600
973.034	235	3.100
973.035	235	3.100
973.038	235	-
973.039	235	5.940
973.040	235	-
973.041	235	2.560
973.045	235	-
973.046	235	-
973.047	235	-
973.052	232	0.850
973.053	232	1.380
973.054	232	-
973.055	232	0.950
973.056	232	1.998
973.057	232	-
973.058	232	3.320
973.059	232	4.280
973.060	232	-
973.061	232	3.720
973.062	232	4.750
973.063	232	5.700
973.064	232	0.240
973.065	232	0.700
973.066	232	-
973.067	232	-
973.068	232	-
973.069	232	-
973.070	232	0.210
973.071	232	0.210
973.072	232	-
973.073	232	-
973.076	223	0.338
973.077	223	0.700
973.078	223	-
973.079	223	-
973.080	223	0.330
973.081	223	0.700
973.082	223	0.380
973.083	223	0.700
973.084	223	0.406
973.085	223	0.700
973.086	223	0.258
973.087	223	0.276
973.088	236	0.646
973.089	236	0.644
973.090	236	0.647
973.091	236	0.786
973.092	236	0.974
973.093	236	1.280
973.094	236	1.540
973.095	236	2.040
973.096	236	-
973.097	236	-
973.098	236	0.952
973.099	236	0.960
973.100	236	1.100
973.101	236	1.280
973.102	236	1.580
973.103	236	1.840
973.104	236	2.350
973.105	236	3.720
973.110	236	-
973.111	236	-
973.112	236	2.820
973.113	236	3.320
973.114	236	1.820
973.115	188	0.880
973.116	188	0.840
973.117	188	0.935
973.119	188	1.700
973.120	188	1.260
973.121	188	1.180
973.122	188	1.580
973.123	188	1.780
973.124	188	3.100
973.125	188	0.820
973.126	188	3.000
973.127	188	1.380
973.128	188	3.500
973.181	227	-
973.182	227	1.635
973.183	227	-
973.184	227	-
973.185	227	0.011
973.186	227	0.017
973.187	227	0.013
973.188	227	0.017
973.194	287	0.007
973.195	287	0.015
973.196	287	0.011
973.197	287	0.015
973.198	287	0.020
973.203	178	0.580
973.204	178	0.892
973.205	178	0.940
973.206	178	0.961
973.209	178	0.468
973.210	178	0.782
973.211	178	0.801
973.212	178	0.800
973.213	179	0.497
973.214	179	0.400
973.215	179	0.560
973.218	179	0.534
973.219	179	0.500
973.220	179	0.630
973.223	179	0.550
973.224	179	0.645
973.225	179	0.715
973.229	179	0.579
973.230	179	0.707
973.231	179	0.799
973.235	179	0.700
973.236	179	0.802
973.237	179	0.932
973.241	179	0.710
973.242	179	0.800
973.243	179	1.000
973.247	180	0.822
973.248	180	0.857
973.249	180	0.888
973.250	180	1.300
973.251	180	0.946
973.252	180	1.200
973.253	180	1.070
973.254	180	0.854
973.255	180	1.300
973.256	180	0.965
973.257	180	1.000
973.258	180	1.060
973.259	180	1.100
973.260	180	1.200
973.261	180	0.893
973.262	180	1.400
973.263	180	1.040
973.264	180	1.110
973.265	180	1.180
973.266	180	1.248
973.267	180	1.380
973.269	180	0.930
973.270	180	1.050
973.271	180	1.120
973.272	180	0.900
973.273	180	1.300
973.274	180	1.400
973.275	180	1.580
973.277	180	1.040
973.278	180	1.120
973.279	180	1.260
973.280	180	1.400
973.281	180	1.520
973.282	180	1.650
973.283	180	2.400
973.285	180	1.140
973.286	180	1.180
973.287	180	1.340
973.288	180	1.500
973.289	180	1.640
973.290	180	2.300
973.291	180	2.600
973.292	180	2.900
973.293	181	1.860
973.295	181	1.900
973.297	181	2.020
973.298	181	2.600
973.300	181	2.700
973.302	181	2.200
973.304	181	2.010
973.306	181	2.140
973.308	181	2.380
973.311	181	2.040
973.313	181	2.220
973.315	181	3.200
973.316	181	2.720
973.318	181	2.160
973.320	181	2.420

Order No.	Page	Weight (kg)
973.322	181	2.800
973.325	181	2.220
973.327	181	2.520
973.329	181	3.040
973.330	181	3.410
973.347	182	0.756
973.348	182	0.900
973.349	182	1.080
973.354	182	0.951
973.355	182	1.040
973.356	182	1.140
973.357	182	1.280
973.361	182	1.020
973.362	182	1.140
973.363	182	1.280
973.364	182	1.800
973.368	182	1.500
973.369	182	1.250
973.370	182	1.800
973.371	182	2.000
973.374	182	1.120
973.376	182	1.440
973.377	182	1.660
973.378	182	1.900
973.379	182	2.600
973.380	182	2.800
973.382	182	2.600
973.385	182	2.300
973.388	182	2.700
973.391	182	3.200
973.394	182	2.150
973.396	182	3.200
973.397	182	2.680
973.400	182	2.300
973.402	182	2.750
973.403	182	3.400
973.404	182	4.300
973.427	183	2.180
973.428	183	2.800
973.431	183	2.585
973.432	183	4.200
973.433	183	4.380
973.435	183	2.705
973.436	183	3.340
973.438	183	6.400
973.440	183	4.800
973.441	183	5.250
973.465	184	2.180
973.466	184	2.920
973.469	184	2.570
973.471	184	3.000
973.473	184	2.700
973.475	184	4.740
973.476	184	5.780
973.477	184	3.350
973.478	184	3.940
973.480	184	6.500
973.572	189	0.660
973.573	189	0.900
973.574	189	1.200
973.575	189	0.990
973.576	189	1.150
973.577	189	0.990
973.578	189	2.600
973.579	189	2.800
973.580	189	2.420
973.598	191	1.000
973.600	191	1.200
973.601	191	1.700
973.602	191	3.600
973.603	191	3.600
973.604	191	3.500
973.605	191	3.620
973.609	449	1.017
973.680	185	2.500
973.682	185	4.700
973.684	185	3.500
973.686	185	3.650
973.688	185	3.550
973.690	185	4.780
973.718	190	1.000
973.720	190	1.180
973.721	190	1.110
973.722	190	1.800
973.723	190	2.200
973.724	190	1.800
973.725	190	2.100
973.726	190	2.300
973.727	190	2.900
973.728	190	3.500
973.729	190	4.100
973.730	190	3.200
973.731	190	3.450
973.732	190	5.200
973.737	193	2.800
973.738	193	3.770
973.740	193	7.000
973.753	235	-
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974.057	222	2.400
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974.102	226	1.540
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978.003	65	0.479
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978.007	64	0.550
978.010	134	0.790
978.011	135	0.962
978.017	68	5.020
978.018	68	6.450
978.025	62	0.735
978.027	63	1.340
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978.029	72	8.180
978.030	54	0.723
978.031	130	0.586
978.032	189	1.090
978.033	189	3.000
978.034	62	0.645
978.035	72	2.380
978.038	62	0.805
978.042	189	1.440
978.046	63	1.160
978.047	171	1.040
978.054	189	1.820
978.056	65	1.020
978.057	65	1.060
978.058	65	1.132
978.059	65	1.150
978.060	65	1.170
978.061	65	1.252
978.071	62	0.580
978.073	62	0.781
978.075	62	0.578
978.076	62	0.652
978.078	62	0.810
978.080	62	0.566
978.081	62	0.764
978.083	62	0.876
978.085	62	0.620
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978.088	62	0.940
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978.194	63	1.420
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978.197	179	0.524
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978.204	179	0.526
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978.215	171	1.000
978.219	72	1.420
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978.238	504	-
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978.255	70	2.050
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978.284	484	0.006
978.286	278	0.180
978.287	278	0.179
978.288	278	0.177
978.289	278	0.172
978.290	93	7.150
978.291	65	0.990
978.294	68	6.450
978.295	145	0.900
978.296	145	1.000
978.297	145	0.918
978.298	145	0.933
978.299	145	0.966
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978.315	69	0.930
978.317	69	2.320
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978.326	72	0.513
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978.331	279	0.180
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978.339	482	-
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978.908	493	0.013
978.909	175	0.006
978.910	175	0.026
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979.202	143	1.200
979.203	143	1.260
979.204	143	1.280
979.206	143	1.480
979.986	260	0.070
979.987	260	0.068
979.995	287	-
979.996	287	-
979.997	287	-
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