**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 toolholder is supported on a reference standard, while a BIG-PLUS toolholder is supported on the flange face, which brings remarkable improvement to rigidity.

<table>
<thead>
<tr>
<th></th>
<th>CONVENTIONAL</th>
<th>BIG-PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BT50</td>
<td>ø69.85</td>
<td>ø100</td>
</tr>
<tr>
<td>BT40</td>
<td>ø44.45</td>
<td>ø63</td>
</tr>
<tr>
<td>BT30</td>
<td>ø31.75</td>
<td>ø46</td>
</tr>
</tbody>
</table>

**Perfect Interchangeability**

BIG-PLUS toolholders can be used on existing standard machine spindles. Existing standard toolholders 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 toolholder fixture, as it is based on a conventional steep taper shank. Furthermore, it is not necessary to modify tool magazines and ATC devices of existing machines.

**SIMULTANEOUS TAPER & FLANGE FIT**

BIG-PLUS surpasses all other spindle concepts while offering interchangeability with existing machines and toolholders.

- 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
### Improvement of ATC Repeatability

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

![ATC REPEATABILITY](image)

### Minimized Deflection For Maximum Machining Accuracy & Superior Finish

With BIG-PLUS simultaneous contact, machining rigidity is greatly enhanced due to the larger contact diameter of the toolholder 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](image)

### Strict Gauge Control

BIG-PLUS spindles produced by the licensed machine or spindle builders are strictly controlled in dimensions by the BIG original master gauge. Only the BIG-PLUS trademarked toolholders can achieve the optimal performance fully and safely.

![BIG PLUS SPINDLE SYSTEM](image)

### Machine Builders

The BIG-PLUS Spindle System is offered by many of the world's leading manufacturers of machining centers. Some of the machine and spindle builders who have produced BIG-PLUS spindles are as follows:

- Advanced Machine
- ALEX-TECH
- AMS
- Aono Giken
- AREIS
- ASEA-Brown Boveri
- BCG-Technik
- Brother
- CHEVALIER
- CHUO-SEIKI
- CITIZEN
- COGAR
- Cross Hüller Ex-Cell-O
- D.S.TECHNOLOGIE
- DAH LEE
- Daiwa Seiki
- DAIKIN
- DMG
- DOOSAN
- DYNOMAX
- EGURO
- ENSHU
- FACOM
- FIRST
- FOREST-LINE
- FPT
- FRANZ KESSLER
- FUJI SEIKI
- Giddings & Lewis
- HARDinge
- HNK
- HOMMA
- HORKOS
- HOWA
- HWACHEON
- IBAG
- IBARIA MINNOVATEK
- IKEGAI
- INOUE KOSOKU KIKAI
- JOHNford
- JTEKT
- JUNGWOO M. S.
- KARATS
- KASHIFUJI
- KASWIN
- KENTURN
- KITAMURA
- KIWAI
- KMT
- KONDIA
- KOYO
- KURAKI
- KASWIN
- KASWIN
- KITACOMA
- KYOWA
- LAZZARI
- MAGNIX
- MAKINO
- MAKINO SEIKI
- MANDELLI
- MATSUURA
- MECLER
- MILLTRONICS
- MITSUBISHI
- MITSUBOSHI KOGYO
- MITSUI SEIKI
- MOKUHO
- N.S.S.
- NACHI
- NAKAMURA
- NEG
- Nicola Correa
- NIHON BEARING
- NISHUHAI
- NISSIN-mfg
- NOMURA
- Northland Tool
- NSK
- O.M
- OBTAKE
- OHTORI
- OKK
- OKUMA
- OMLAT
- PAMA
- PIETRO CARNAGHI
- PMC
- QUASER
- REIDEN
- ROKU ROKU
- ROYAL
- SAJO
- SEMPUCO
- SETCO
- SHAN RONG
- SHODA
- SHG
- SKODA
- SMEC
- SNK
- SODICK
- SORALUCE
- SPINNER
- STARRAG-LECHERT
- STUDER
- SUGINO
- Sunwoo
- TAJMAC-ZPS
- TAKAMAZ KIKAI
- KOGYO
- TAKASAWA
- TANABE
- THETA
- TOPPER
- TOSENDORF
- TSUGAMI
- TOYO SEIKI
- TSUSHIMA KIKAI
- UGAMIGE
- UTSONOMIYA
- VICTOR TAICHUNG
- WALDRICH COBURG
- WELE
- WIA
- YAMASAKI
- YAMASHINA
- YASDA
- YASUNAGA
- YCM
- YU HUNG
- ZAYER

[As of July, 2012]
**Premium Material Selection**

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

---

**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 provides finishing of this feature after heat treatment.

---

**Important Tool Retention Feature**

Internal clamping of HSK tools is defined by the location of highly concentrated forces from the machine tool. Accuracy and position of this form will affect the rigidity, repeatability, and precision of tool holders. BIG provides finish machining of this area after heat treatment.

---

**HSK Turning tools**

HSK-T63 / T100 (ISO 12164-3)

HSK form T
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.

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.

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.

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. This ideal nut design not only reduces whistling noise and splattering coolant, but also assures increased strength of the nut itself.

4 chuck types for different high speed machining requirements

To suit micro drills and end mills
Clamping range ø0.45 - ø20mm

To suit carbide drills, reamers and end mills
Clamping range ø0.25 - ø52mm

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.
High precision collet chuck system

**MEGA MICRO CHUCK**

0.1mm increments for higher precision

**Clamping Range:** ø0.45 - ø6.05

Extremely slim design of body and nut provides superior balance and concentricity and is ideal for reaching into confined areas.

**Nut diameter 10, 12 & 14mm**

Extremely slim design

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

**Three versions are available**

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

**High concentricity**

At nose: Within 1μm
At 4d: Within 3μm

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

**Collet concentricity**

- Max. runout:
  - At nose:
    - Within 1μm
  - At end of test bar:
    - Within 3μm

**0.1mm increments for higher precision**

Collet 124 models

Available in 0.1mm increments.

**Maximum performance!**

- Setup
- Cutting conditions
- Comparison of peck feed amount

Rigid taper design avoids chatter even with high peck feed milling leading to dramatically reduced machining time.
High precision collet, close to submicron

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

Collet concentricity

<table>
<thead>
<tr>
<th>Collet class</th>
<th>Max. runout At nose</th>
<th>Max. runout At end of test bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Within 1μm</td>
<td>Within 3μm</td>
</tr>
</tbody>
</table>

353 versions are available as standard (BBT, BDV, HSK)

Ideal length and diameter of holder is the key to precision machining. Select the optimum from the wide range.

If selection is limited; increased tool extension reduces performance.

Precision nut to optimize performance of collet

Thrust ball bearings to eliminate distortion of the collet during tightening. Patented design prevents ball bearings from moving at high speed. Threads are finished after heat treatment.

2 way coolant supply

Sealed collet nut

- Standard NBC Collet is used.
- High dust resistance

Unique sealed collet nut for coolant-through tools. The sealing performance increases with higher coolant pressure. Remove the sealing ring to supply coolant to the periphery of the cutting tool.

Coolant through tools

Thrust ball bearings to eliminate distortion of the collet during tightening. Patented design prevents ball bearings from moving at high speed. Threads are finished after heat treatment.
High precision collet chuck system

MEGA E CHUCK®
Clamping range: ø3.0 - ø12

Collet chuck designed exclusively for endmilling up to ø12mm with high concentricity & rigidity.

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.

- Clamping nut with thrust ball bearings

Eliminates distortion of the collet during tightening for higher gripping force and improved concentricity.

Ultimate performance in both chip volume and surface finish!

BTT40-MEGA6E-90 Other manufacturer
MEGA 6E ø6, L=90

<table>
<thead>
<tr>
<th>Cutter</th>
<th>Model</th>
<th>Radial DOC (mm)</th>
<th>Axial DOC (mm)</th>
<th>Removal (CC/min)</th>
<th>Power (kw)</th>
<th>Roughness (μm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø6</td>
<td>MEGA 6E</td>
<td>3.0</td>
<td>9</td>
<td>45.9</td>
<td>3.4</td>
<td>5.05</td>
</tr>
<tr>
<td></td>
<td>Other manufacturer</td>
<td>0.5</td>
<td>9</td>
<td>7.6</td>
<td>1.1</td>
<td>10.25</td>
</tr>
<tr>
<td>ø12</td>
<td>MEGA12E</td>
<td>12.0</td>
<td>18</td>
<td>91.8</td>
<td>3.0</td>
<td>3.49</td>
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<tr>
<td></td>
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<td>3.0</td>
<td>18</td>
<td>23.0</td>
<td>1.2</td>
<td>9.67</td>
</tr>
</tbody>
</table>

High concentricity

At nose Within 1μm Within 3μm
At 4d

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

- Collet concentricity

BBT Shank A6
BDV Shank B4
HSK Shank C7
CAPTO Shank E34

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.

- 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 of MEGA E CHUCK.

For Through Tools

Type D Type DS
High rigidity design for heavy cutting

MEGA DOUBLE POWER CHUCK®
Clamping range: ø16 - ø50

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

Stabilizing contact between flange & 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.

Secure coolant supply

Two types are individually designed for the most effective coolant supply.

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

Through tools
Jet through
Type D
Type DS

Coolant is reliably directed to cutting tool periphery from chuck nose.

- Straight Collets are available.

For JET Through PJC Collet
For Through Tools OCA Collet

Flange contacting nut together with BIG-PLUS

Stabilizing contact of nut to the flange provides exceptional rigidity in addition to the BIG-PLUS effect.

1.4 times increased rigidity
Comparison test proves increased stiffness compared to others.

BBT40-MEGA20D-75
1.4
BT40 from other manufacturer

High rigidity achieves higher level of stability

Cutting conditions
Coated carbide endmill ø32, 4-flutes
Workpiece: SS400 (JIS)

BBT50-MEGA32D-105
Radial d = 14mm
Power 15.2KW

Other manufacturer
Radial d = 80mm
Power 9.2KW

Coolant is reliably directed to cutting tool periphery from chuck nose.

Please choose suitable models according to the applications.
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.

**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, i.e., 100% check & re-check.

<table>
<thead>
<tr>
<th>Collet class</th>
<th>Max. runout</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Within 1μm</td>
</tr>
</tbody>
</table>

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

- Since the threads greatly influence 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**

Sealed collet nut

- **BABY PERFECT SEAL**
  - Standard NBC Collet is used.
  - High dust resistance

- Through Tools: Tools with holes
- Jet Through: Tools without holes
NEW Hi-POWER MILLING CHUCK combines the high accuracy with high torque capability and rigidity.

**High precision design for heavy cutting**

- **Slits to inner bore**
  - Large shrinkage capability is ensured.
- **Superior sealing**
  - The ingress of contamination by coolant or cutting particles is eliminated for extended tool holder life.
- **Roller bearings**
  - Rolling friction is minimised so that the clamping force is greatly increased.
- **Rigid design**
  - The substantial section (for 32mm chuck the section is 10mm) prevents chatter and achieves security of 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).

**NEW Hi-POWER MILLING CHUCK**

Clamping Range: ø16 - ø50.8

**Gripping power of NEW Hi-POWER MILLING CHUCK (HMC32)**

- **Axial adjustment screw**
  - Provides easy adjustment of cutter projection.
- **Rolling friction is minimised**
  - So that the clamping force is greatly increased.
- **Rigid design**
  - The substantial section (for 32mm chuck the section is 10mm) prevents chatter and achieves security of cutting.

**High gripping force**

<table>
<thead>
<tr>
<th>Grip (Nm)</th>
<th>Nut travel distance S (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>1000</td>
<td>2</td>
</tr>
<tr>
<td>1500</td>
<td>3</td>
</tr>
<tr>
<td>2000</td>
<td>4</td>
</tr>
<tr>
<td>2500</td>
<td>5</td>
</tr>
<tr>
<td>3000</td>
<td>6</td>
</tr>
</tbody>
</table>

**Slit and small hole**

Within 0.5mm
High rigidity body that increases the contact area of the collet

By increasing the contact length of the internal taper of chuck bodies, the undesired overhang of the collet is reduced. This modification of the standard improves 3 of the most important requirements for the collet chuck, rigidity, runout accuracy and clamping force. (Conventional DIN collets can also be used.)

2 way coolant supply

Sealed collet nut

Mega ER Perfect Seal

With "Through Tools", coolant is supplied from the coolant holes of the cutter (such as drills) and "Jet Through" directs the coolant around the cutter periphery (such as end mills). Both methods can be adapted with the same Perfect Seal nut according to the desired use.

The runout accuracy greatly affects the tool life

The runout accuracy has a great influence on the tool life. The tool life achieved with Mega ER Grip is about 3 times the tool life obtained with conventional collet chucks.
Runout accuracy less than 3μm

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

Easy clamping with 1 wrench

The cutting tool can be clamped or unclamped easily and securely with just 1 wrench.

Integral sleeve construction

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

Wide variety of clamping diameters (1mm increments) & projections

Slim design eliminates interference. Ideal for high precision 5 axis machining

Balanced for high speed machining

Pre-balanced to less than 15g·mm. Vibration free machining at high speed.

Precision drills & reamers  Ball endmills
Endmills  Diamond reamers  Grinding tools

FOR HIGH PRECISION MACHINING IN AUTOMOTIVE, AEROSPACE, MEDICAL AND DIE & MOLD
Compensates for synchronization errors during rigid tapping.
Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

48 body models and 182 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
Body and Tap Holder are fixed with a drive key in the rotation direction as well as the square of the tap.

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

M6 P1

V : 20m/min(1,060min⁻¹)

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

[Graph showing thrust load comparison]

- BIG 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 MEGA SYNCHRO compensates for synchronization errors and minimizes cutting load.

Fine surface finish of threads is achieved.

For small tap MGT3

Tapping Range

M1–M3  No.0–6

Eliminated synchronization errors and minimized dynamic runout at high speed provide stable thread quality and extended tool life.

Dynamic runout accuracy within 5μm even at 5,000min⁻¹

Plotted position of a test bar (at 18mm distance on 4mm diameter)
Wide range of compact and rigid heads
Suitable for all kinds of machining applications

**AGENT HED**

- Multiple operations on one setup
- Save time, speed production and guarantee accuracy.

**SPECIAL DESIGNS**
We are able to design and manufacture special Angle Heads such as special angle or long type models to answer to every machining condition.
**Reinforced gear driving system**

The planetary gears, which have been constantly up-graded since the development of our 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.

**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).

---

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

Comparison against previous model.
Ultra high-speed and precision

AIR TURBINE SPINDLE

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

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.

Minimal thermal displacement

Minimized spindle expansion!

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

Automatic Tool Change

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

Application examples

<table>
<thead>
<tr>
<th>Aluminum A2017</th>
<th>Stainless Steel SUS303</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutter</td>
<td>ø0.5mm Rib-endmill</td>
</tr>
<tr>
<td>Spindle speed</td>
<td>70,000min⁻¹</td>
</tr>
<tr>
<td>Feed</td>
<td>1,500mm/min</td>
</tr>
<tr>
<td>D.O.C</td>
<td>Ad=0.02mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RBX7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle speed</td>
</tr>
<tr>
<td>Feed</td>
</tr>
<tr>
<td>D.O.C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RBX5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle speed</td>
</tr>
<tr>
<td>Feed</td>
</tr>
<tr>
<td>Peck</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2 types of Air Turbine Spindle</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Optimum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drill</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø0.1-0.3mm</td>
</tr>
<tr>
<td>ø0.3-0.5mm</td>
</tr>
<tr>
<td>ø0.5-1.0mm</td>
</tr>
<tr>
<td>ø1.0-1.5mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Endmill</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø0.1-0.3mm</td>
</tr>
<tr>
<td>ø0.5-1.0mm</td>
</tr>
<tr>
<td>ø1.0-1.5mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jig grinding</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
</tr>
</tbody>
</table>

The table is just for reference. Machining range may change according to material, cutting conditions and cutting tools.
Non-contact seal design eliminates wear damage to body

Competitor Design

- Cutting particles in coolant, high speed operation and high pressure cause wear damage.

Hi-JET HOLDER

- Ideal mechanical sealing construction enables use under high speed and high pressure cutting conditions, preventing the main body from wear damage.

Hi-JET HOLDER SERIES

- NEW BABY CHUCK TYPE
- SIDE LOCK TYPE
- MILLING CHUCK TYPE

Suitable for small dia. cutters due to high speed and pressure

- Small diameter cutters require high spindle speeds to maintain high cutting speed and high coolant pressure due to their small dia. coolant holes.
- The Hi-JET HOLDER accepts even smaller diameter shanks, providing high spindle speeds (Max. 10,000 min⁻¹) and high coolant pressures (Max. 2MPa).

Easy maintenance by replacement of wear parts

- Easily replaceable Merit Sets consist of Merit Plates, Merit Rings and O-Rings.
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 & face contact body

Integral 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.

Strong cutting edge reduces edge chipping.

Cutting edge is located close to body dia.

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 manufacturers.

Cutting condition
- Machine: BBT40(BIG PLUS)
- Slot milling: 20mm
- Work material: C50(S50C)
- Spindle speed: 2,400min⁻¹
- Feed: 0.12mm/tooth

Heavy cut combined with excellent surface finish.

3.6 times higher cutting efficiency
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.

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

Higher rigidity with integral body with dual contact system.

A variety of shanks including simultaneous fit with integral body.

BBT and BDV type  HSK type

Cylindrical Shank type

For multi-functional cutting

Shoulder milling  Ramping  Helical milling  Peck-drilling

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

The indexable endmill that combines sharpness and rigidity has no match.

Evaluation of resistance to breakdown of cutting edge

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.

Work material: SUS304 stainless steel
Vertical M/C, #40 taper
Cutter dia: 25mm
f = 0.12mm/tooth

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

Nose radius 0.2mm

Finishing with indexable endmill - Why not?

Insufficient edge strength
Unstable insert life
No edge chipping
No edge chipping

BB

C

Other manufacturers

R"
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.

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 diameter : Ø80)

<table>
<thead>
<tr>
<th>Workpiece</th>
<th>Conditions</th>
<th>Surface roughness</th>
<th>Height difference</th>
<th>No. of workpiece</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crankcase ADC12</td>
<td>Cutting speed : 4,000m/min</td>
<td>Ra=0.08μm</td>
<td>Within 1μm</td>
<td>24,000</td>
<td>Rough &amp; finish processes are combined in a single operation.</td>
</tr>
<tr>
<td></td>
<td>Spindle speed : 15,900min⁻¹</td>
<td>Rz=0.55μm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Feed rate : 9,950mm/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depth of cut : 2.5mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Compact design with 4 inserts & small cutting diameter. High performance chamfer cutter to achieve ultra high feed rate by reducing the cutting diameter to the lowest limit.

**Triple effect**

**Effect 1**
Superb design. Ultra high feed by 4 inserts.

**Effect 2**
Increased Spindle speed by ultra compact diameter.

**Effect 3**
Latest coating [ACP200] increases the cutting speed.

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

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

**Work material:** C55(S55C)
Chamfering amount: 1mm x 45°
Feed per tooth: 0.1mm

<table>
<thead>
<tr>
<th>Tool</th>
<th>C-cutter mini</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ST12-C1116-45B-26)</td>
<td></td>
</tr>
</tbody>
</table>
Precision standard of BIG Daishowa Test Arbors

BIG Daishowa provides high quality test bars, produced under a strict quality control system.

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

Aluminium case

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

Calibration certificate and traceability system

BIG Daishowa can offer a Calibration Certificate with traceability on request as per ISO9000 requirements.

For machine tool maintenance

- Runout of spindle taper
- Parallelism to Z-axial movement