



# Profit Maker Tools

**BIG DAISHOWA SEIKI CO LTD**

CATALOG No. **EXi 302-1**

## HIGHER PERFORMANCE GUARANTEED

- ANGLE HEAD . . . . . PG1 - 20
- AIR POWER . . . . . PG21 - 26  
SPINDLE
- HIGH SPINDLE . . . . . PG27 - 30
- Hi-JET HOLDER . . . . . PG31 - 38

Patented; USA, Canada, Germany, UK,  
France, Italy and South Korea



US Patent No. 5,352,073



# ANGLE HEAD

PAT.

AG90/AGU SERIES



Patented: USA, Canada, Germany, UK,  
France, Italy and South Korea

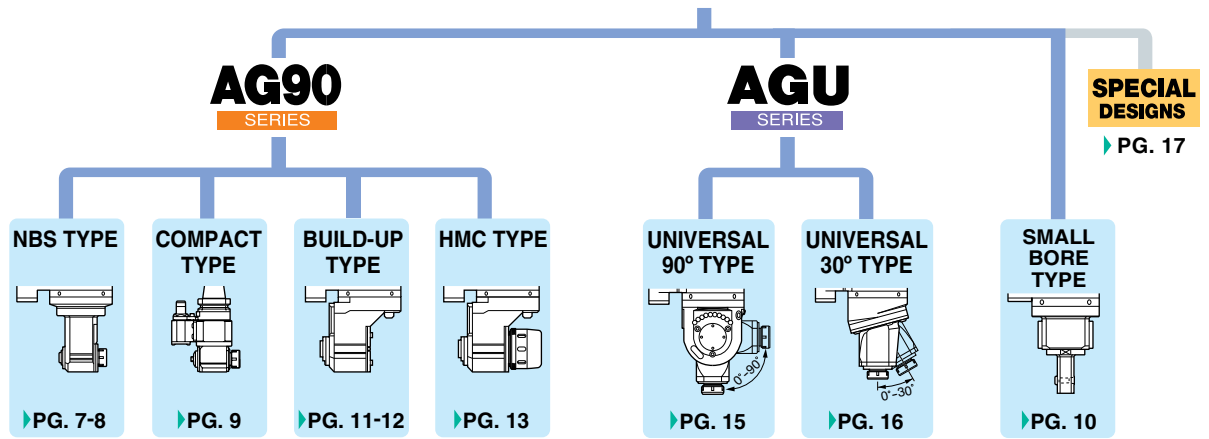
**BIG-PLUS**  
SPINDLE SYSTEM PAT.  
DUAL CONTACT  
US Patent No. 5352073

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



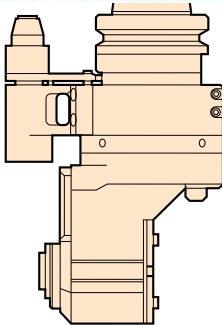
**WIDE RANGE OF COMPACT AND RIGID HEADS, FROM MILLING CHUCK TYPES TO UNIVERSAL TYPES, SUITABLE FOR ALL KINDS OF MACHINING APPLICATIONS.**

**BIG** **ANGLE HEAD** SERIES  
BIG DAISHOWA



BUILD-UP TYPE / HMC TYPE

**Compact design assures rigidity**



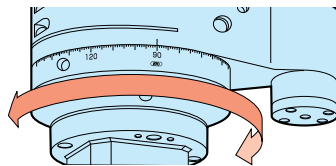
Overhang is minimized for added rigidity and strength. As a result, the projection length with the cutting tool is shorter, which reduces the overall load on the Angle Head and thus improves the unit's cutting capabilities. Further, the minimized overhang helps eliminate interference with the ATC (automatic tool changer) and connecting storage pockets in the tool magazine.

High Riddity S-Type, which has a steel housing and a stronger locating pin assembly, is also available.

※ ATC may not be utilized for some machining centers.

**Cutter head adjustable 360°**

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



**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 bearings.

**Innovative sealing method**



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

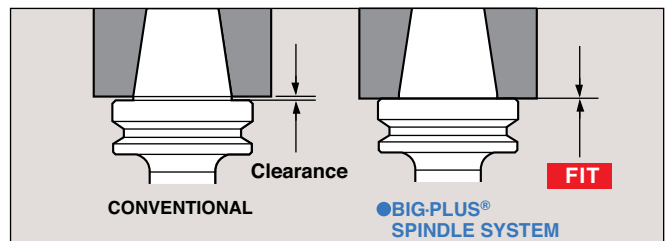
**Unique coolant jacket**



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

**BIG-PLUS® is standard on all BT & CV taper versions PAT.**

Simultaneous taper and flange contact between the machine spindle and tool holder provides improved rigidity and ATC repeatability. Interchangeability with conventional spindles ensures suitability for your existing machines.



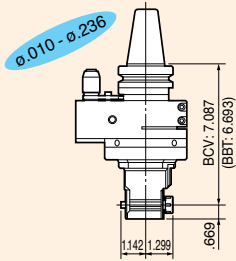
**BIG-PLUS®**  
SPINDLE SYSTEM PAT.  
DUAL CONTACT  
US Patent No. 5352073

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

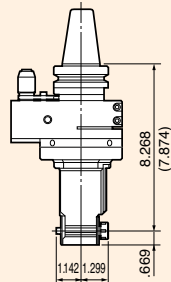
**AG90** SERIES  
(SPINDLE ANGLE: 90°)

**NBS TYPE** ▶ PG. 7-8

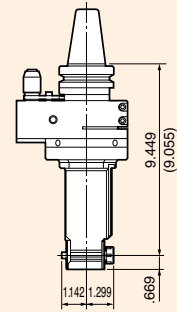
**BCV40 (BBT40) MAX. 6,000 RPM** (Except for NBS20 models)



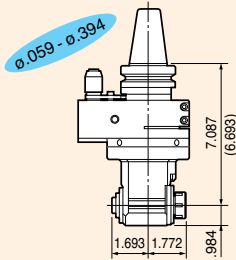
**BCV40-AG90/NBS6-180**  
**BBT40-AG90/NBS6-170**



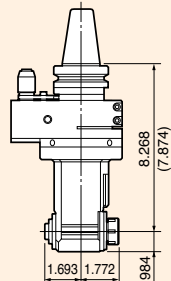
**BCV40-AG90/NBS6-210**  
**BBT40-AG90/NBS6-200**



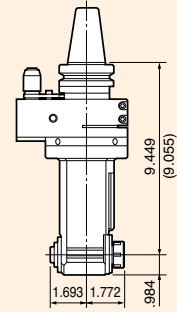
**BCV40-AG90/NBS6-240**  
**BBT40-AG90/NBS6-230**



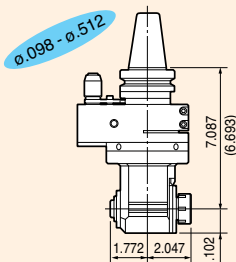
**BCV40-AG90/NBS10-180**  
**BBT40-AG90/NBS10-170**



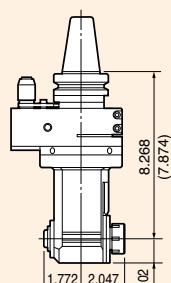
**BCV40-AG90/NBS10-210**  
**BBT40-AG90/NBS10-200**



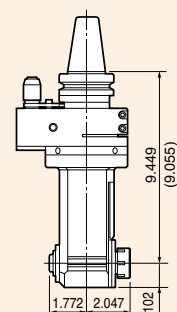
**BCV40-AG90/NBS10-240**  
**BBT40-AG90/NBS10-230**



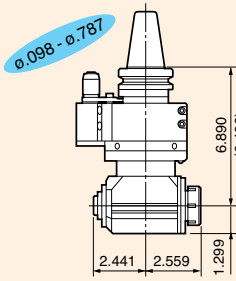
**BCV40-AG90/NBS13-180**  
**BBT40-AG90/NBS13-170**



**BCV40-AG90/NBS13-210**  
**BBT40-AG90/NBS13-200**



**BCV40-AG90/NBS13-240**  
**BBT40-AG90/NBS13-230**



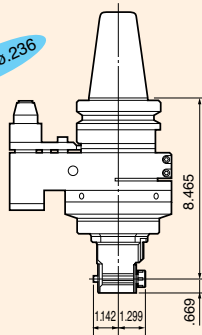
**BCV40-AG90/NBS20S-175S**  
**BBT40-AG90/NBS20S-165S**  
MAX. 3,000 RPM

Automatic tool change may not be utilized for some machining centers.

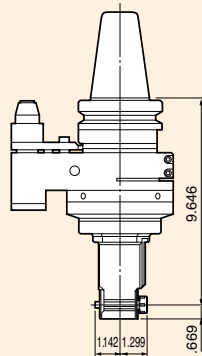
# BCV50 (BBT50)

MAX. 6,000 RPM (Except for NBS20 models)

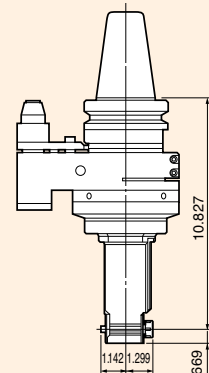
ø.010 - ø.236



**BCV50-AG90/NBS6-215**  
**BBT50-AG90/NBS6-215**

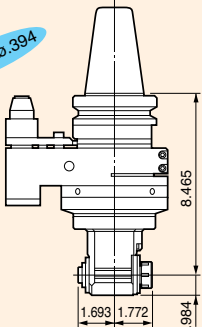


**BCV50-AG90/NBS6-245**  
**BBT50-AG90/NBS6-245**

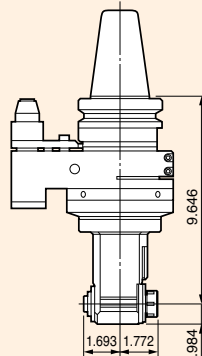


**BCV50-AG90/NBS6-275**  
**BBT50-AG90/NBS6-275**

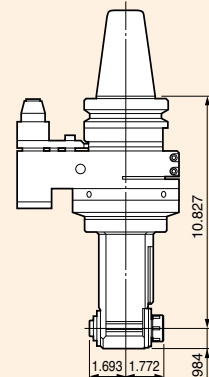
ø.059 - ø.394



**BCV50-AG90/NBS10-215**  
**BBT50-AG90/NBS10-215**

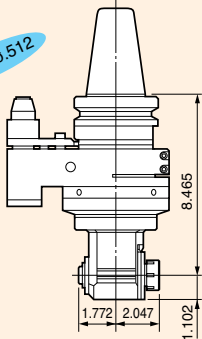


**BCV50-AG90/NBS10-245**  
**BBT50-AG90/NBS10-245**

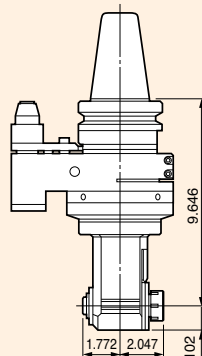


**BCV50-AG90/NBS10-275**  
**BBT50-AG90/NBS10-275**

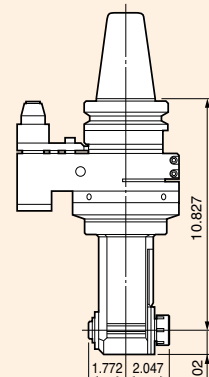
ø.098 - ø.512



**BCV50-AG90/NBS13-215**  
**BBT50-AG90/NBS13-215**

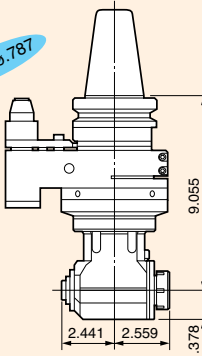


**BCV50-AG90/NBS13-245**  
**BBT50-AG90/NBS13-245**



**BCV50-AG90/NBS13-275**  
**BBT50-AG90/NBS13-275**

ø.098 - ø.787



**BCV50-AG90/NBS20-230**  
**BBT50-AG90/NBS20-230**  
MAX. 3,000 RPM

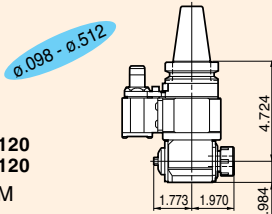
Automatic tool change may not be utilized for some machining centers.

**AG90** SERIES  
(SPINDLE ANGLE: 90°)

**COMPACT TYPE** ▶ PG. 9

**BCV40 (BBT40)**

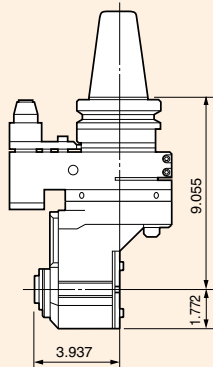
BCV40-AG90-13-120  
BBT40-AG90-13-120  
MAX. 5,000 RPM



**BUILD-UP TYPE** ▶ PG. 11-12

**BCV50 (BBT50)**

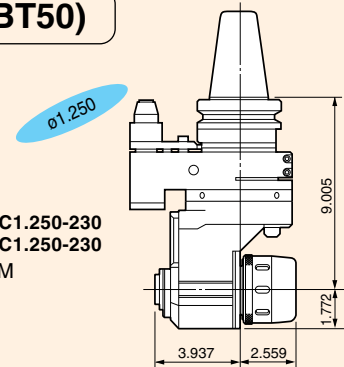
BCV50-AG90/AGH35-230  
BBT50-AG90/AGH35-230  
MAX. 3,000 RPM  
(QUICK CHANGE ADAPTERS)



**HMC TYPE** ▶ PG. 13

**BCV50 (BBT50)**

BCV50-AG90/HMC1.250-230  
BBT50-AG90/HMC1.250-230  
MAX. 3,000 RPM



Automatic tool change may not be utilized for some machining centers.

# AGU SERIES

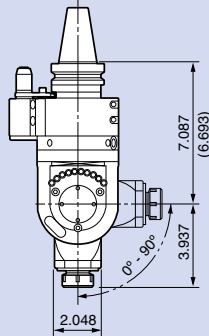
## UNIVERSAL TYPE ▶ PG. 15

(SPINDLE ANGLE: 0° - 90°)

### BCV40 (BBT40)

$\phi 0.098 - \phi 512$

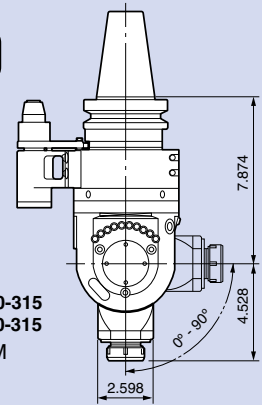
BCV40-AGU/NBS13-280  
BBT40-AGU/NBS13-270  
MAX. 6,000 RPM



### BCV50 (BBT50)

$\phi 0.098 - \phi 787$

BCV50-AGU/NBS20-315  
BBT50-AGU/NBS20-315  
MAX. 4,000 RPM



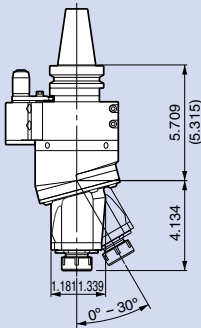
## UNIVERSAL 30 TYPE ▶ PG. 16

(SPINDLE ANGLE: 0° - 30°)

### BCV40 (BBT40)

$\phi 0.098 - \phi 512$

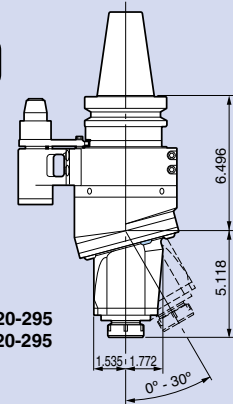
BCV40-AGU30/NBS13-250  
BBT40-AGU30/NBS13-240  
MAX. 6,000 RPM



### BCV50 (BBT50)

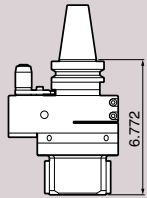
$\phi 0.098 - \phi 787$

BCV50-AGU30/NBS20-295  
BBT50-AGU30/NBS20-295  
MAX. 4,000 RPM



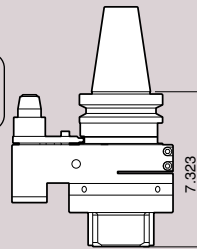
## SMALL BORE TYPE ▶ PG. 10

**BCV40**  
MAX. 2,000 RPM



BCV40-AGB-172

**BCV50**  
MAX. 2,000 RPM



BCV50-AGB-186

$\phi 3, 3.5, 4\text{mm}$



AG90-CA4SGM-64



AG90-CA4SGM-96



AG90-CA4SGM-128

$\phi 3, 4, 5, 6\text{mm}$



AG90-CA6SGM-45



AG90-CA6SGM-89



AG90-CA6SGM-133

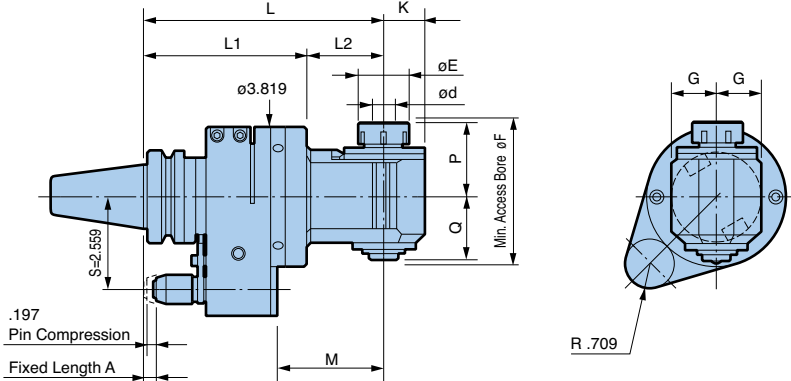
Automatic tool change may not be utilized for some machining centers.

# AG90 SERIES (SPINDLE ANGLE: 90°)

# NBS TYPE

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

## 40 TAPER



- Model Description
- BCV40** - **AG90** / **NBS** **6** - **180**
- BIG-PLUS® Shank No.
- AG90 Series
- New Baby Chuck Type
- L= Projection Length (mm)
- Max. Capacity (mm)

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

• The rotation of the cutting tool is in reverse direction of the machine spindle. (Speed Ratio 1:1)



Stop Block is required. PG. 19

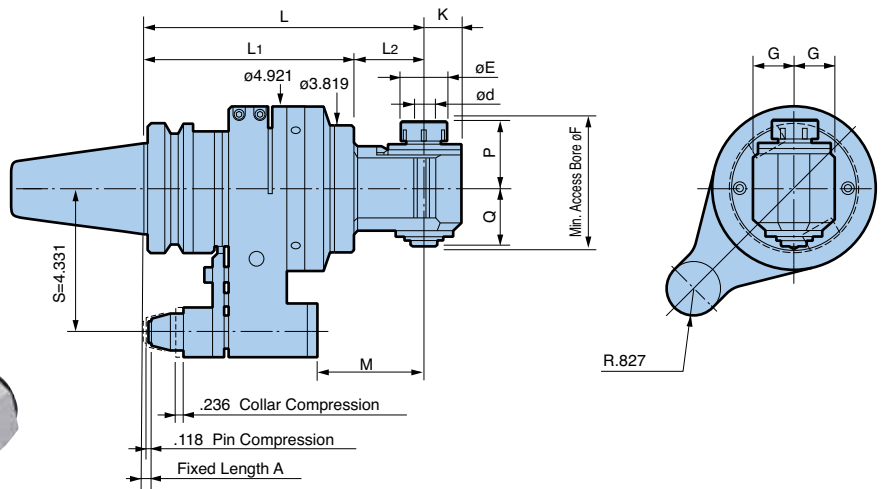
Shank	Model	ød	øE	G	K	L	L1	L2	M	P	Q	øF	Collet	Max. RPM	Weight (lbs)										
BCV	<b>BCV40-AG90/NBS6-180</b>	.010 - .236	.787	.827	.669	7.087	4.921	2.165	3.031	1.299	1.142	2.638	NBC 6	6,000	11.2										
	<b>-210</b>					8.268		3.346	4.213						11.7										
	<b>-240</b>					9.449		4.528	5.394						12.1										
	<b>-AG90/NBS10-180</b>					.059 - .394		1.181	1.181						.984	7.087	4.921	2.165	3.031	1.772	1.693	3.583	NBC10	6,000	12.1
	<b>-210</b>															8.268		3.346	4.213						13.0
	<b>-240</b>															9.449		4.528	5.394						13.7
	<b>-AG90/NBS13-180</b>					.098 - .512		1.378	1.220						1.102	7.087	4.921	2.165	3.031	2.047	1.772	3.976	NBC13	6,000	12.3
	<b>-210</b>															8.268		3.346	4.213						13.2
<b>-240</b>	9.449	4.528	5.394	13.9																					
<b>-AG90/NBS20S-175S</b>	.098 - .787	1.811	1.378	1.299	6.890	4.803	2.087	2.835	2.559	2.441	5.197	NBC20	3,000	17.6											
BBT	<b>BBT40-AG90/NBS6-170</b>	.010 - .236	.787	.827	.669	6.693	4.528	2.165	3.031	1.299	1.142	2.638	NBC 6	6,000	11.2										
	<b>-200</b>					7.874		3.346	4.213						11.7										
	<b>-230</b>					9.055		4.528	5.394						12.1										
	<b>-260</b>					10.236		5.709	6.575						12.5										
	<b>-AG90/NBS10-170</b>					.059 - .394		1.181	1.181						.984	6.693	4.528	2.165	3.031	1.772	1.693	3.583	NBC10	6,000	12.1
	<b>-200</b>															7.874		3.346	4.213						13.0
	<b>-230</b>															9.055		4.528	5.394						13.7
	<b>-AG90/NBS13-170</b>					.098 - .512		1.378	1.220						1.102	6.693	4.528	2.165	3.031	2.047	1.772	3.976	NBC13	6,000	12.3
	<b>-200</b>															7.874		3.346	4.213						13.2
	<b>-230</b>															9.055		4.528	5.394						13.9
	<b>-AG90/NBS20S-165S</b>					.098 - .787		1.811	1.378						1.299	6.496	4.409	2.087	2.835	2.559	2.441	5.197	NBC20	3,000	17.6

1. The standard fixed length A is .315. Other lengths are available upon request.
2. The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.
3. Nut and wrench are included. Collet must be ordered separately.
4. For greater rigidity, High Rigidity S-Type with a steel housing and a stronger locating pin assembly is also available. Please add "S" after each model number when ordering High Rigidity Type.

For NEW BABY COLLET PG. 38

For WRENCH PG. 14

**50 TAPER**



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

• The rotation of the cutting tool is in reverse direction of the machine spindle. (Speed Ratio 1:1)



Stop Block is required. PG. 19

Shank	Model	ød	øE	G	K	L	L1	L2	M	P	Q	øF	Collet	Max. RPM	Weight (lbs)													
BCV	<b>BCV50-AG90/NBS6-215</b>	.101 -.236	.787	.827	.669	8.465	6.299	2.165	3.228	1.299	1.142	2.638	NBC 6	6,000	27.8													
	-245					9.646		3.346	4.409						28.2													
	-275					10.827		4.528	5.591						28.7													
	BCV	<b>-AG90/NBS10-215</b>	.059 -.394	1.181	1.181	.984	8.465	6.299	2.165	3.228	1.772	1.693	3.583	NBC10	6,000	28.7												
		-245					9.646		3.346	4.409						29.5												
		-275					10.827		4.528	5.591						30.2												
		BCV	<b>-AG90/NBS13-215</b>	.098 -.512	1.378	1.220	1.102	8.465	6.299	2.165	3.228	2.047	1.772	3.976	NBC13	6,000	28.9											
			-245					9.646		3.346	4.409						29.8											
			-275					10.827		4.528	5.591						30.4											
BCV			<b>-AG90/NBS20-230</b>	.098 -.787	1.811	1.378	1.378	9.055	6.299	2.756	3.819	2.559	2.441	5.197	NBC20	3,000	31.3											
			BBT					<b>BBT50-AG90/NBS6-215</b>		.101 -.236	.787						.827	.669	8.465	6.299	2.165	3.228	1.299	1.142	2.638	NBC 6	6,000	27.8
								-245											9.646		3.346	4.409						28.2
	-275			10.827	4.528	5.591	28.7																					
	BBT			<b>-305</b>	.059 -.394	1.181	1.181	.984	12.008	6.299	5.709	6.772	1.772	1.693	3.583	NBC10	6,000	29.0										
				<b>-AG90/NBS10-215</b>					8.465		2.165	3.228						28.7										
		-245		9.646					3.346		4.409	29.5																
		BBT		<b>-275</b>	.059 -.394	1.181	1.181	.984	10.827	6.299	4.528	5.591	1.772	1.693	3.583	NBC10	6,000	30.2										
				<b>-AG90/NBS13-215</b>					8.465		2.165	3.228						28.9										
-245				9.646					3.346		4.409	29.8																
BBT			<b>-275</b>	.098 -.512	1.378	1.220	1.102	10.827	6.299	4.528	5.591	2.047	1.772	3.976	NBC13	6,000	30.4											
			<b>-AG90/NBS20-230</b>					9.055		2.756	3.819						2.559	2.441	5.197	NBC20	3,000	31.3						
			-245					9.646		3.346	4.409						2.047	1.772	3.976	NBC13	6,000	29.8						
	BBT		<b>-275</b>	.098 -.787	1.811	1.378	1.378	10.827	6.299	4.528	5.591	2.559	2.441	5.197	NBC20	3,000	30.4											

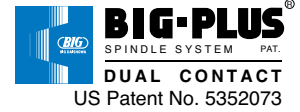
1. The standard fixed length A is .315. Other lengths are available upon request.
2. The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.
3. Nut and wrench are included. Collet must be ordered separately.
4. For greater rigidity, High Rigidity S-Type with a stronger locating pin assembly is also available. Please add "S" after each model number when ordering High Rigidity Type.

For NEW BABY COLLET PG. 38

For WRENCH PG. 14

**AG90** SERIES  
(SPINDLE ANGLE: 90°)

**COMPACT TYPE**



Compact and lightweight design combined with the accuracy required for drilling.  
Ideal size for small machining centers.

**For Drilling**

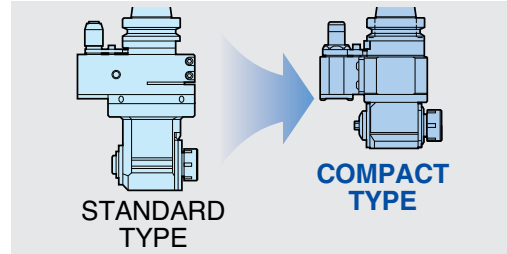
High quality components

- High precision New Baby Collet
- Spiral bevel gears and angular contact bearings
- Advanced non-contact sealing structure

■ Case & head sizes are substantially reduced.



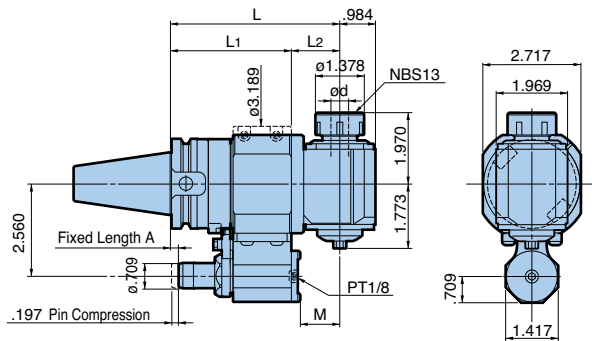
**MAX  
5,000  
RPM**



• Model Description

**BCV40** - **AG90** - **13** - **120**

- L= Projection Length (mm)
- Max. Capacity (mm)
- AG90 Series
- BIG-PLUS® Shank No.



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

- The rotation of the cutting tool is in reverse direction of the machine spindle. (Speed Ratio 1:1)



Stop Block is required. PG. 19

Shank	Model	ød	L	L1	L2	M	Collet	Speed Ratio	Max. RPM	Weight (lbs)
BCV	BCV40-AG90-13-120	.098 - .512	4.724	3.386	1.339	1.096	NBC13	1:1	5,000	10
BBT	BBT40-AG90-13-120	.098 - .512	4.724	3.386	1.339	1.096	NBC13	1:1	5,000	10

1. Nut and wrench are included. Collet must be ordered separately.
2. End mill collet cannot be used.
3. Stop Block is necessary to mount the Angle Head on the machine. Please order separately.
4. ATC may not be utilized on some CV machining centers. Consult engineering for specifications.

For NBC COLLET PG. 38

For WRENCH PG. 14

**Application Example**

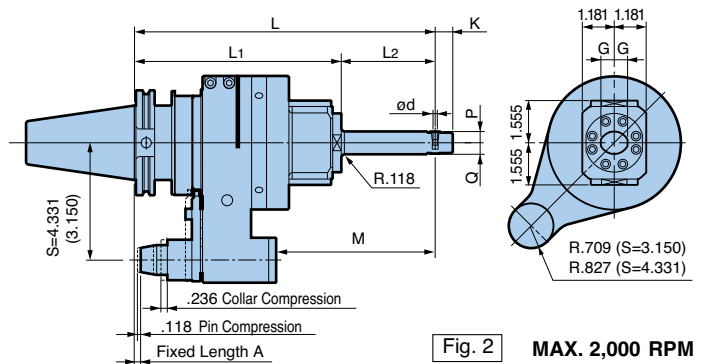
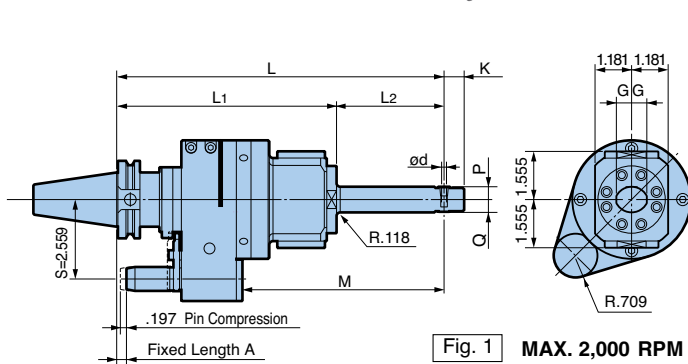
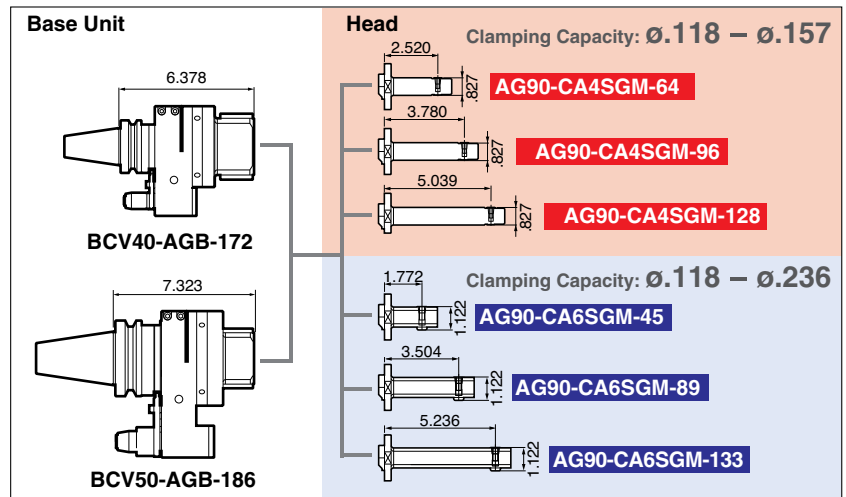


Stable machining is obtained due to high rigidity and good runout.

	Drilling
Cutter	ø.472" (12mm) carbide drill
Workpiece	1050 Steel
Cutting Speed	230 SFM
Cutting Feed	14.6 IPM .008 IPR
Spindle Speed	1,860 RPM

# SMALL BORE TYPE

Angular operations within a  $\phi 1.181$  inch bore is possible. Modular heads enhance versatility and the head is aligned with the spindle center for easy programming.



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

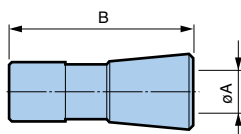
- The cutter rotates in the same direction of the machine spindle.



Shank	Set Model	Base	Head	Fig.	$\phi d$	G	K	L	L1	L2	M	P	Q	Speed Ratio	Weight (lbs)		
															S=2.559	S=3.150	S=4.331
BCV	BCV40-AG90-CA4SGM-236	BCV40-AGB-172	AG90-CA4SGM-64	1	.118 - .157	.492	.650	9.291	7.087	2.205	5.236	.413	.413	1:1.06 (Increase)	12.6	-	-
	-268		10.551					3.465		6.496	12.8				-	-	
	-300		11.811					4.724		7.756	13.0				-	-	
	-CA6SGM-217		AG90-CA6SGM-45	1	.118 - .236	.591	.787	8.543	7.087	1.457	4.488	.492	.630	1:0.77 (Decrease)	12.8	-	-
	-261		10.276					3.189		6.220	13.2				-	-	
	-305		12.008					4.921		7.953	13.7				-	-	
	BCV50-AG90-CA4SGM-250	BBT50-AGB-186	AG90-CA4SGM-64	2	.118 - .157	.492	.650	10.236	8.031	2.205	4.606	.413	.413	1:1.06 (Increase)	27.6	26.3	-
	-282		11.496					3.465		5.866	27.8				26.5	-	
	-314		12.756					4.724		7.126	28.0				26.7	-	
	-CA6SGM-231		AG90-CA6SGM-45	2	.118 - .236	.591	.787	9.488	8.031	1.457	3.858	.492	.630	1:0.77 (Decrease)	27.8	26.5	-
	-275		11.220					3.189		5.591	28.3				26.9	-	
	-319		12.953					4.921		7.323	28.7				27.4	-	

- The standard fixed length A: 40 taper=.315, 50 taper=.236. Other lengths are available upon request.
- The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.
- Coolant cannot be supplied through the Locating Pin.
- Exclusive collets should be ordered separately.
- S= 3.150 type is available for #50 taper models upon request.

## EXCLUSIVE COLLET



Model	$\phi A$	B	Model	$\phi A$	B
CA4-3	.118	.650	CA6-3	.118	.866
-3.5	.138		-4	.157	
-4	.157		-5	.197	
		-6	.236		

- Use only a cutting tool shank with exactly the same diameter as the collet bore diameter.
- Tolerance of the cutting tool shank must be within h7.

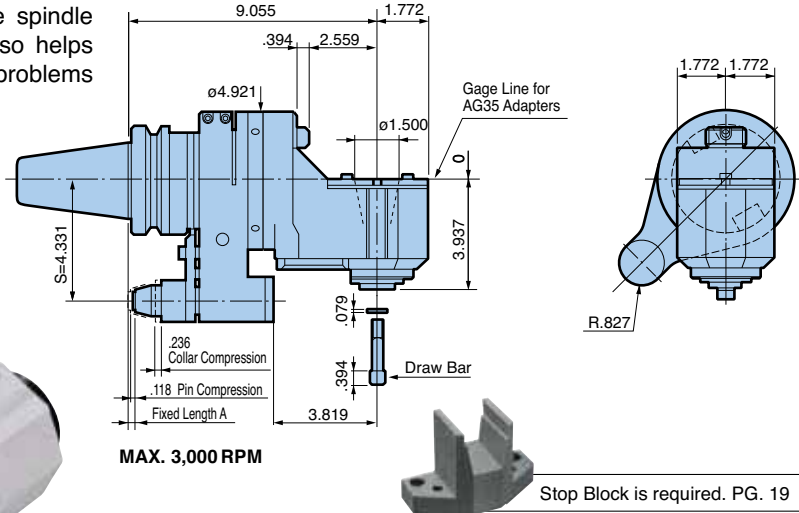
# AG90 SERIES (SPINDLE ANGLE: 90°)

# BUILD-UP TYPE

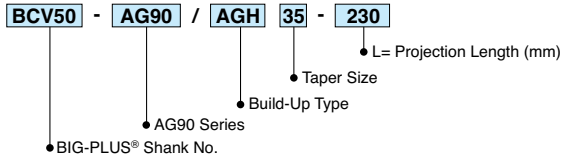
Spindle head is equipped with a short taper for quick changing of various adapters.

## STANDARD 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.



• Model Description



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

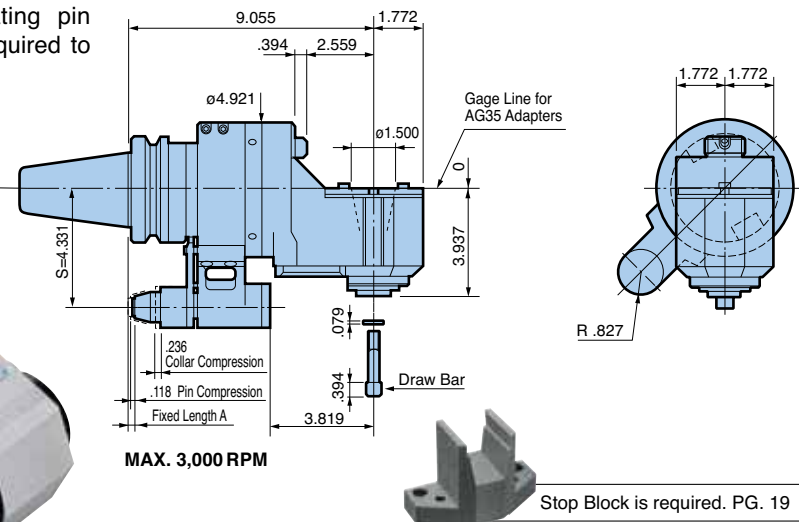
- The cutter rotates in the same direction of the machine spindle.

Shank	Model	Weight (lbs)
BCV	BCV50-AG90/AGH35-230	33.1
BBT	BBT50-AG90/AGH35-230	33.1

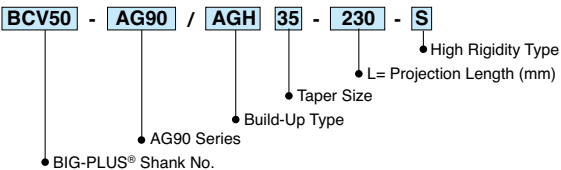
1. The standard fixed length A is .236. Other lengths are available upon request.
2. The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.

## HIGH RIGIDITY TYPE

Provided with a steel housing and reinforced locating pin assembly for applications where increased rigidity is required to perform various types of heavier machining.



• Model Description



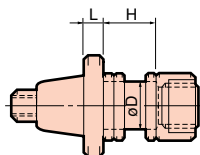
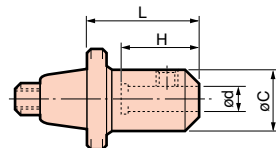
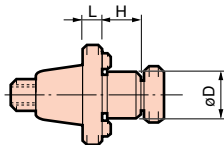
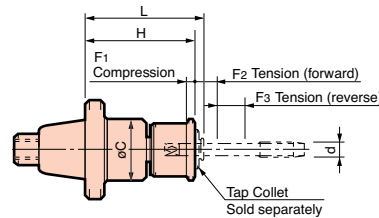
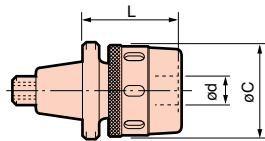
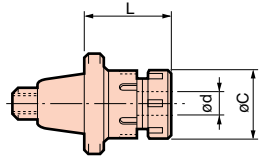
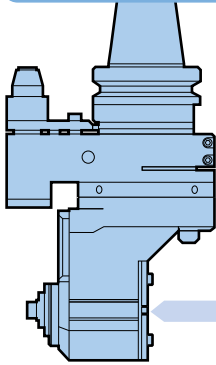
**BIG-PLUS® tools can be used in machining centers with conventional spindles.**

- The cutter rotates in the same direction of the machine spindle.

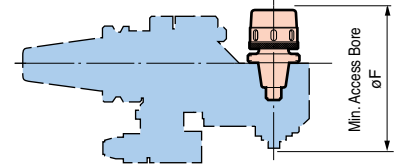
Shank	Model	Weight (lbs)
BCV	BCV50-AG90/AGH35-230S	35.9
BBT	BBT50-AG90/AGH35-230S	35.9

1. The standard fixed length A is .236. Other lengths are available upon request.
2. The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.

**BUILD-UP TYPE AG35 ADAPTER SERIES**



øF= Minimum bore size that an AG35 adapter can fit into, excluding the cutting tool.



**NEW BABY CHUCK**

Model	ød	L	øC	øF	Weight (lbs)
<b>AG35-NBS10</b>	.059-.394	1.850	1.181	6.378	1.3
<b>-NBS13</b>	.098-.512	2.126	1.378	6.614	1.5
<b>-NBS16</b>	.098-.630		1.654	6.693	1.8
<b>-NBS20</b>	.098-.787		1.811	6.693	2.0

☞ For NEW BABY COLLET PG.38 ☞ For WRENCH PG.14

**HI-POWER MILLING CHUCK**

Model	ød	L	øC	øF	Weight (lbs)
<b>AG35-HMC.750</b>	.750	2.362	2.079	7.008	3.3

Wrench is included (FK52-55)

☞ For STRAIGHT COLLET PG.14

**AUTO TAPPER TYPE B**

Model	d	L	øC	H	F1	F2	F3	Weight (lbs)
<b>AG35-ATB12E</b>	No.6-U1/2	3.150	1.594	2.835	.020	.197	.157	2.2
<b>-ATB20E</b>	U3/8-U3/4	4.528	2.264	4.035		.256	.197	3.7

Tap collets with torque control or positive drive available upon request.

**SHELL MILL ARBOR**

Model	øD	L	H	Weight (lbs)
<b>AG35-SM1.000-20</b>	1.000	.787	.689	2.2

**END MILL ADAPTER**

Model	ød	L	øC	H	øF	Weight (lbs)
<b>AG35-EM.750</b>	.750	3.248	1.750	3.880	7.756	3.0

**STUB ARBOR**

Model	øD	L	H	Weight (lbs)
<b>AG35-SA1.000</b>	1.000	.394	1.181	2.8

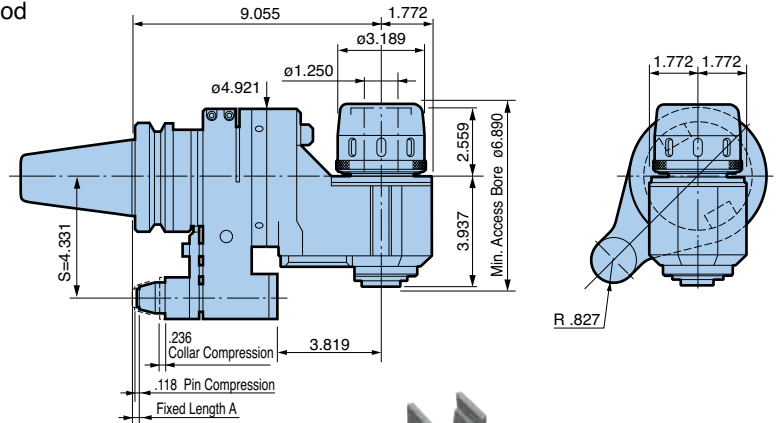
**AG90 SERIES**  
(SPINDLE ANGLE: 90°)

**HMC TYPE**

Greater versatility is obtainable with Milling Chuck capacity of  $\phi 1.250"$  by utilizing Straight Reduction Collets and other accessories.

**STANDARD TYPE**

Hi-Power Milling Chuck Type with powerful clamping and good rigidity for the most popular straight shank cutting tools.

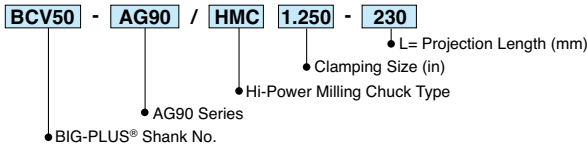


MAX. 3,000 RPM



Stop Block is required. PG. 19

• Model Description



**BIG-PLUS<sup>®</sup> tools can be used in machining centers with conventional spindles.**

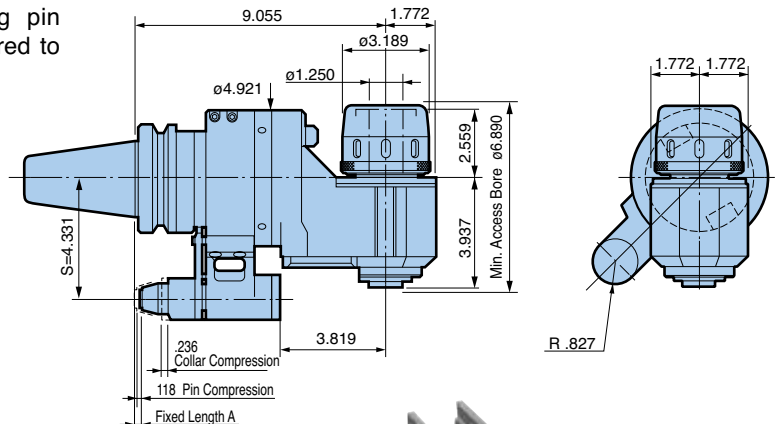
- The cutter rotates in the same direction of the machine spindle.

Shank	Model	Weight (lbs)
BCV	BCV50-AG90/HMC1.250-230	37.0
BBT	BBT50-AG90/HMC1.250-230	37.0

1. The standard fixed length A is .236. Other lengths are available upon request.
2. The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.

**HIGH RIGIDITY TYPE**

Provided with a steel housing and reinforced locating pin assembly for applications where increased rigidity is required to perform various types of heavier machining.

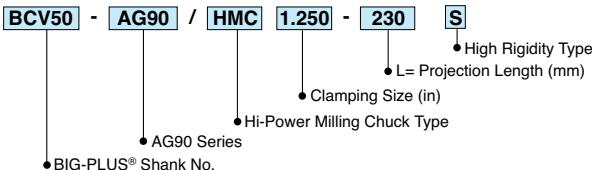


MAX. 3,000 RPM



Stop Block is required. PG. 19

• Model Description



**BIG-PLUS<sup>®</sup> tools can be used in machining centers with conventional spindles.**

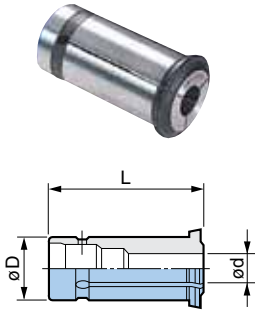
- The cutter rotates in the same direction of the machine spindle.

Shank	Model	Weight (lbs)
BCV	BCV50-AG90/HMC1.250-230S	39.9
BBT	BBT50-AG90/HMC1.250-230S	39.9

1. The standard fixed length A is .236. Other lengths are available upon request.
2. The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.

# ACCESSORIES for Angle Head

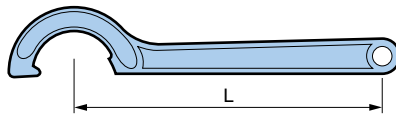
## • STRAIGHT COLLET for Milling Chuck



Model	ød	øD	L
<b>C.750-1/4</b>	.250	.750	2.36
<b>-5/16</b>	.312		
<b>-3/8</b>	.375		
<b>-7/16</b>	.437		
<b>-1/2</b>	.500		
<b>-9/16</b>	.562		
<b>-5/8</b>	.625		

Model	ød	øD	L
<b>C1.25-1/4</b>	.250	1.250	2.91
<b>-5/16</b>	.312		
<b>-3/8</b>	.375		
<b>-7/16</b>	.437		
<b>-1/2</b>	.500		
<b>-9/16</b>	.562		
<b>-5/8</b>	.625		
<b>-11/16</b>	.687		
<b>-3/4</b>	.750		
<b>-13/16</b>	.812		
<b>-7/8</b>	.875		
<b>-15/16</b>	.937		
<b>-1</b>	1.000		

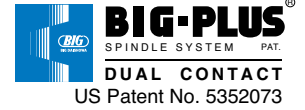
## • WRENCH for Angle Head



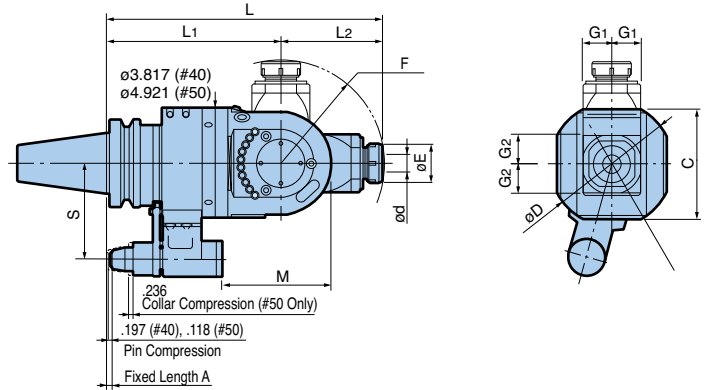
Model	L	Collet
<b>NBK6</b>	2.559	NBC6
<b>NBK10</b>	4.094	NBC10
<b>NBK13</b>	4.449	NBC13
<b>NBK16</b>	4.803	NBC16
<b>NBK20</b>	5.157	NBC20

**AGU SERIES**  
(SPINDLE ANGLE: 0° to 90°)

**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.



Stop Block is required. PG. 19

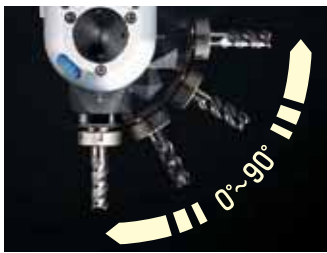
**BIG-PLUS® tools can be used in machining centers with conventional spindles.**

- The cutter rotates in the same direction of the machine spindle.

Shank	Model	$\phi d$	$\phi E$	$\phi D$	C	G1	G2	L	L1	L2	M	F	S	Collet	Max. RPM	Weight (lbs)
BCV	BCV40-AGU/NBS13-280	.098 - .512	1.378	4.528	3.819	1.024	1.014	11.024	7.087	3.937	4.882	4.016	2.559	NBC13	6,000	21.4
	BCV50-AGU/NBS20-315	.098 - .787	1.811	5.512	4.921	1.299	1.280	12.402	7.874	4.528	4.921	4.646	4.331	NBC20	4,000	44.1
BBT	BBT40-AGU/NBS13-270	.098 - .512	1.378	4.528	3.819	1.024	1.014	10.630	6.693	3.937	4.882	4.016	2.559	NBC13	6,000	21.4
	BBT50-AGU/NBS20-315	.098 - .787	1.811	5.512	4.921	1.299	1.280	12.402	7.874	4.528	4.921	4.646	4.331	NBC20	4,000	44.1

- The standard fixed length A: 40 taper= .315, 50 taper= .236. Other lengths are available upon request.
- The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.
- Clamping nut & wrench included. Collet must be ordered separately.

**For NEW BABY COLLET PG. 38**



**EASILY ADJUSTABLE SPINDLE ANGLE FROM 0° to 90°.**



**PRECISE ANGLE ADJUSTMENT**

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

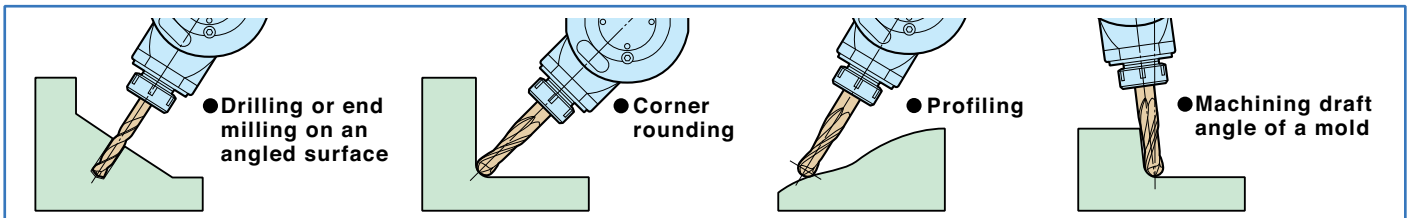


**EXCLUSIVE CLAMPING BOLTS AND NUTS**

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

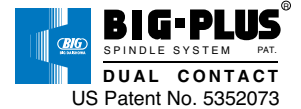
**APPLICATION EXAMPLES**

Adjustable AGU Universal Series expands Angle Head capabilities to accomplish various angular machining applications.

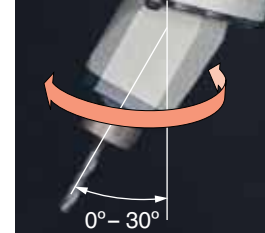


# AGU SERIES (SPINDLE ANGLE: 0° to 30°)

# AGU30 TYPE

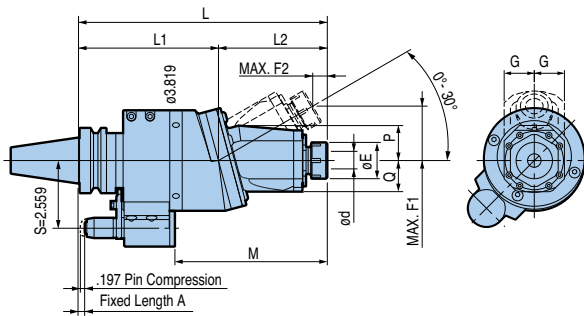


Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.

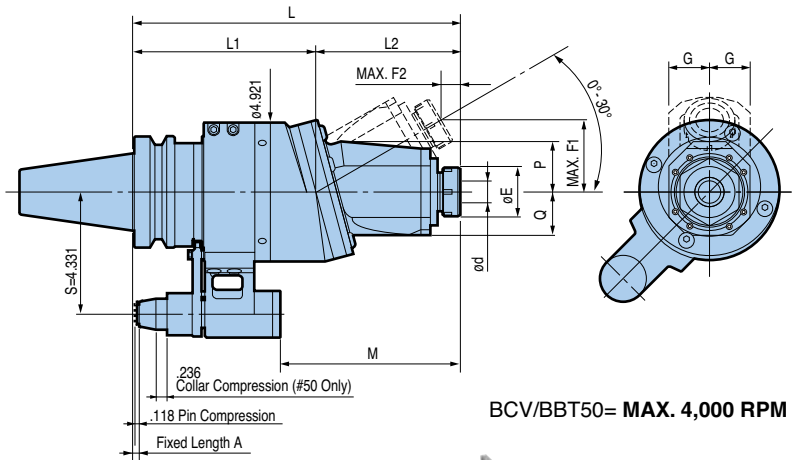


### Angle adjustment by aligning divisions

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



BCV/BBT40= MAX. 6,000 RPM



BCV/BBT50= MAX. 4,000 RPM

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

- The cutter rotates in the same direction of the machine spindle.



Stop Block is required. PG. 19

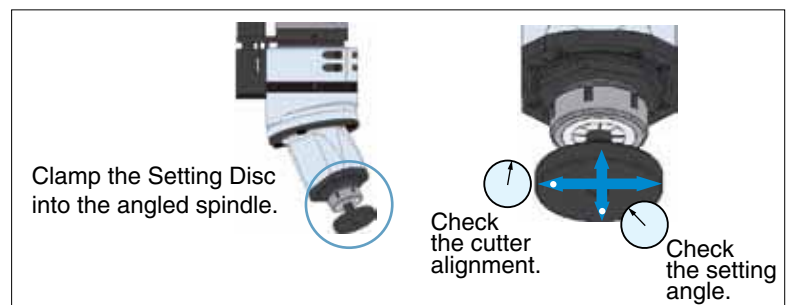
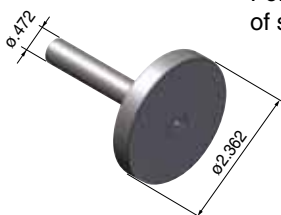
Shank	Model	ød	øE	G	L	L1	L2	M	P	Q	F1	F2	Collet	Speed Ratio	Weight (lbs)
BCV	BCV40-AGU30/NBS13-250	.098-.512	1.378	1.142	9.842	5.71	4.13	5.79	1.34	1.18	2.07	.55	NBC13	1 : 1	15.23
	BCV50-AGU30/NBS20-295	.098-.787	1.811	1.437	11.614	6.50	5.12	6.38	1.77	1.54	2.56	.67	NBC20	1 : 1	35.54
BBT	BBT40-AGU30/NBS13-240	.098-.512	1.378	1.142	9.449	5.315	4.134	5.787	1.339	1.181	2.067	.551	NBC13	1 : 1	15.33
	BBT50-AGU30/NBS20-295	.098-.787	1.811	1.437	11.614	6.496	5.118	6.378	1.772	1.535	2.559	.669	NBC20	1 : 1	35.78

- The standard fixed length A: 40 taper= .315, 50 taper= .236. Other lengths are available upon request.
- Clamping nut and wrench are included. Collet must be ordered separately.
- The angles of positioning pin to drive key groove and direction of cutting edge are adjustable from 0° to 360°.

For NEW BABY COLLET PG. 38

- SETTING DISC** PAT.P (Included accessory)

For the precise adjustment of spindle angle or direction.



## SPECIAL DESIGNS

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

### SPECIAL CUTTER HEAD



Twin Head



For Shell Mill



For Slot Milling Cutter

### ULTRA SMALL HEAD



For Small Cutter

### SPECIAL ANGLE



35 Degree  
New Baby Collet NBS20



115 Degree  
New Baby Collet NBS13



180 Degree  
New Baby Collet NBS20

### EXTRA LONG



New Baby Collet NBS20

### FLANGE MOUNT



Milling Chuck 1.250"



Shell Mill Adapter 1.500"



New Baby Collet NBS20

### OIL FEEDER



HSK Shank  
New Baby Collet NBS13

# APPLICATION EXAMPLES

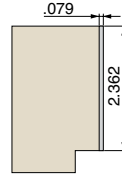


## • AG90 SERIES (Build-Up Type)

**STANDARD**

**BBT50-AG90/AGH35-230** (with AG35-SM1.000)

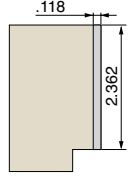
**Workpiece:** Carbon Steel 1055 (ANSI)  
**Cutter:** 3.150 shell mill  
**Cutting Depth:** .079  
**Spindle Speed:** 600 RPM  
**Cutting Speed:** 492 SFM  
**Cutting Feed:** 14.173 IPM



**HIGH RIGIDITY**

**BBT50-AG90/AGH35-230S** (with AG35-SM1.000)

**Workpiece:** Carbon Steel 1055 (ANSI)  
**Cutter:** 3.150 shell mill  
**Cutting Depth:** .118  
**Spindle Speed:** 600 RPM  
**Cutting Speed:** 492 SFM  
**Cutting Feed:** 14.173 IPM

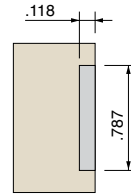


## • AG90 SERIES (HMC Type)

**STANDARD**

**BBT50-AG90/HMC1.250-230**

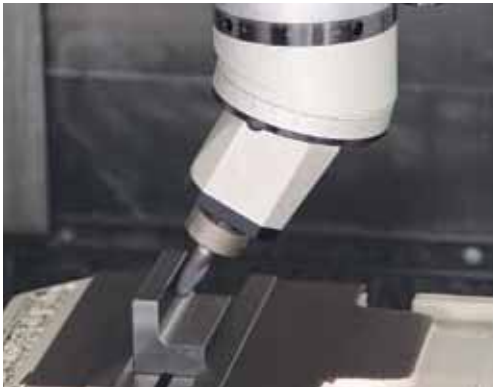
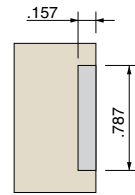
**Workpiece:** Carbon Steel 1055 (ANSI)  
**Cutter:** .787 2-flute H.S.S. end mill  
**Cutting Depth:** .118  
**Spindle Speed:** 400 RPM  
**Cutting Speed:** 82 SFM  
**Cutting Feed:** 2.835 IPM



**HIGH RIGIDITY**

**BBT50-AG90/HMC1.250-230S**

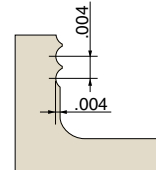
**Workpiece:** Carbon Steel 1055 (ANSI)  
**Cutter:** .787 2-flute H.S.S. end mill  
**Cutting Depth:** .157  
**Spindle Speed:** 400 RPM  
**Cutting Speed:** 82 SFM  
**Cutting Feed:** 2.835 IPM



## • AGU SERIES (AGU30 Type)

**BBT40-AGU30/NBS13-240**

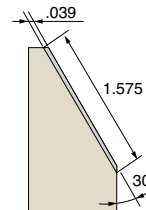
**Workpiece:** Pre-hardened Steel (HRC40)  
**Cutter:** R.197 2-flute carbide ball nose end mill  
**Spindle Speed:** 6,000 RPM  
**Cutting Speed:** 623 SFM  
**Cutting Feed:** 35.433 IPM  
**Cutting Depth:** .004  
**Peck Feed:** .004



## • AGU SERIES (Universal Type)

**BBT50-AGU/NBS20-315**

**Workpiece:** Carbon Steel 1055 (ANSI)  
**Cutter:** .787 2-flute H.S.S. end mill  
**Cutting Depth:** .039  
**Cutting Width:** 1.575  
**Spindle Speed:** 400 RPM  
**Cutting Speed:** 82 SFM  
**Cutting Feed:** 3.937 IPM



All new applications are subject to review by engineering in order to confirm the Angle Head will operate within its capacity.

※ Results will vary depending on workpiece, cutting tool, machine model, and other conditions.

## SET UP INFORMATION FOR ANGLE HEAD



### • 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 **BIG** Angle Head.

Please contact a BIG Kaiser agent if using an existing Stop Block.

### 1. Standard Setup of the Locating Pin

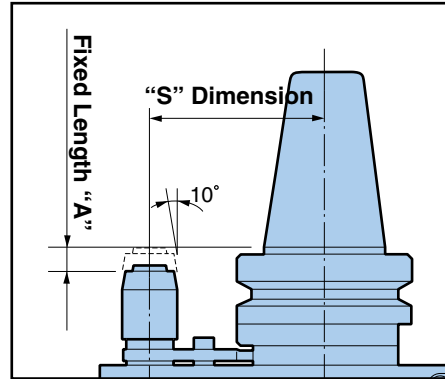
Please note that the “S” dimension and Fixed Length “A” are not adjustable by the user. If the standard dimensional values shown below are not suitable for your machine, please contact a BIG Kaiser agent.

#### 《 ”S” Dimension 》

The distance from the centerline of the Angle Head spindle to the centerline of the Locating Pin.

#### 《 Fixed Length “A” 》

The axial distance from the gage line to the top of the Locating Pin, when the Locating Pin is properly engaged in the Stop Block.

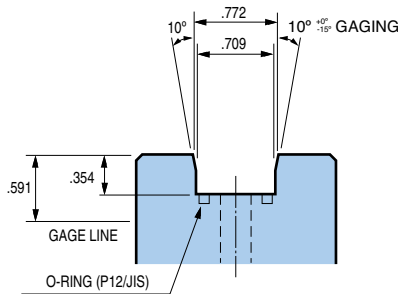


	“S” Dimension	Fixed Length “A”
BCV/BBT40	2.559	.315
BCV/BBT50	4.331	.236

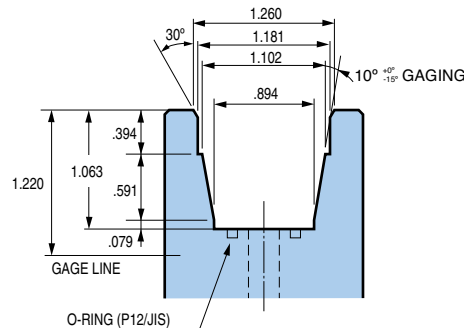
### 2. Stop Block Dimensions



Please order a Stop Block from the machine tool builder. Refer to the following diagrams for the proper Stop Block groove dimensions and configurations for use with a **BIG** Angle Head.



**For #40 (S=2.559)**



**For #50 (S=4.331)**

**Note:** For a BCV50/BBT50 unit with an 3.150 “S” dimension, please use the Stop Block dimensions for BCV40/BBT40, as the Locating Pin dimension differs from that of a standard unit with a 4.331 ”S” dimension.

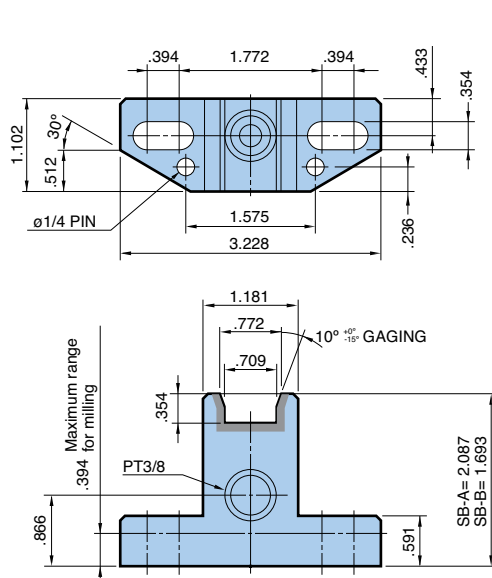
### 3. Semi-Finished Stop Block

A semi-finished Stop Block has the proper groove form for use with **BIG** Air Power Spindle, High Spindle and Hi-Jet Holder, as well as additional material to allow the customer to machine the block to the correct height.  
(NOTE: Stop Block SB-F is not height-adjustable.)

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 the semi-finished Stop Block.

#### For #40 (S=2.559)

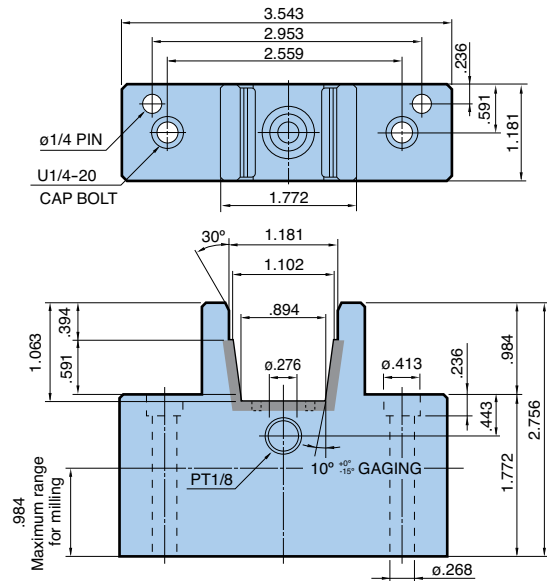
- MODEL: SB-A/SB-B



1. Adjustment to the required height by milling the base.
2. Fix the stop block by inserting two dowel pins ( $\phi 1/4$ ).

#### For #50 (S=4.331)

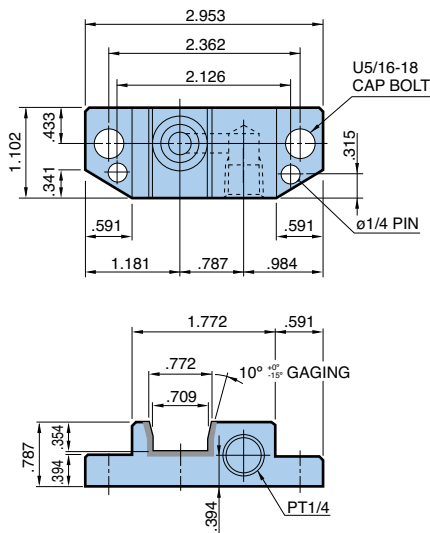
- MODEL: SB-G/E



1. Adjustment to the required height by milling the base.
2. Fix the stop block by inserting two dowel pins ( $\phi 1/4$ ).

#### For #40 (S=2.559)

- MODEL: SB-F

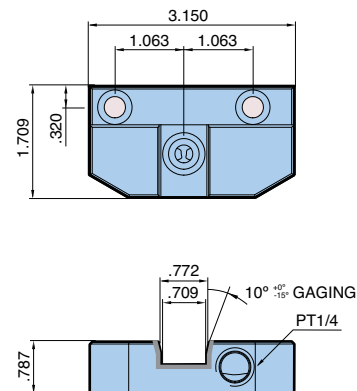


1. Fix the stop block by inserting two dowel pins ( $\phi 1/4$ ).

#### For #40 (S=2.559)

- MODEL: SB-H40

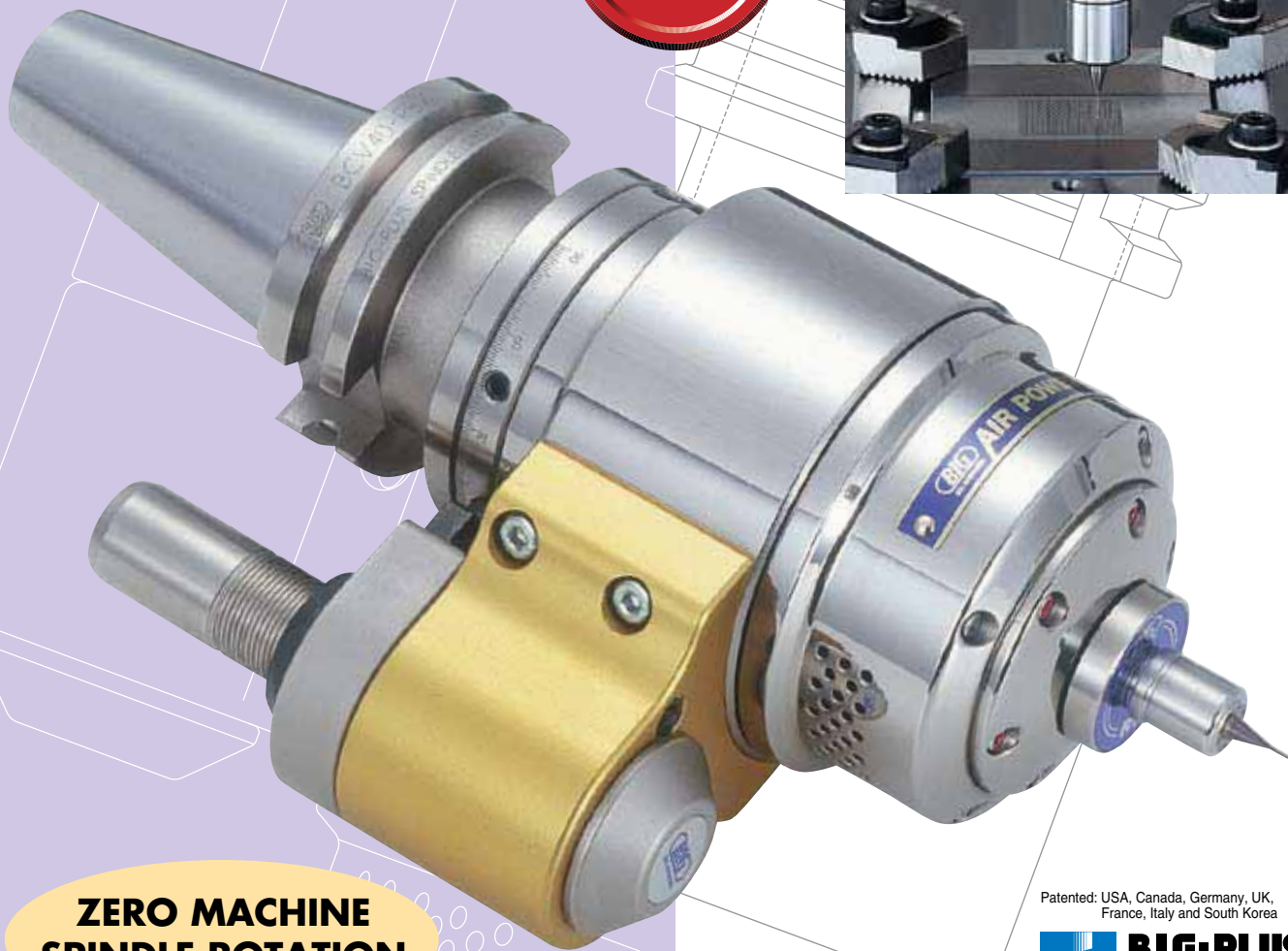
For use with most Haas 40 taper machines.



**Note:**  on the sketch indicates heat treatment (HRC45-50), all other surfaces can be milled.

# AIR POWER SPINDLE

MAX  
80,000  
RPM

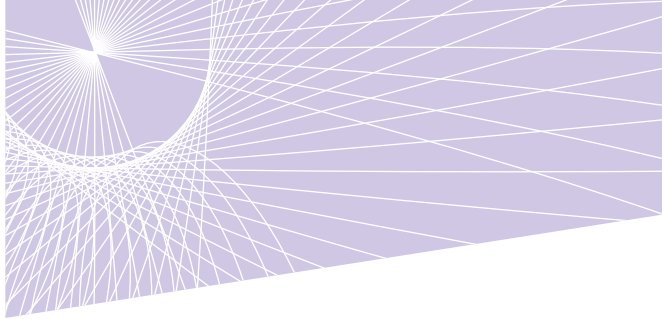


**ZERO MACHINE  
SPINDLE ROTATION**

Patented: USA, Canada, Germany, UK,  
France, Italy and South Korea

**BIG-PLUS**  
SPINDLE SYSTEM PAT.  
DUAL CONTACT  
US Patent No. 5352073

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

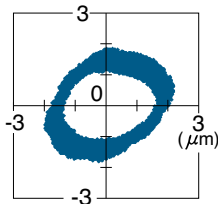


**Using Air Power Spindle for super high spindle speed, an expensive high-speed machine is no longer required.**

### 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.

**Plotted position of a test bar at the max. spindle speed. (reference value)**



**RBX**

(80,000 RPM)

Improved machining accuracy

Extended tool life

Superior surface finish

### Ultra low vibration design

Perfect dynamic balance is obtained for ultra low vibration. A notch-free nut eliminates unbalance at high speed rotation.

Cutting tool is clamped with an exclusive wrench.



### Environmental measures

#### Saving power consumption

Compared with power consumption of a machine spindle, Air Power Spindle minimizes the loss of energy.

**Air pressure: 90 PSI, Air consumption: 7 CFM**  
(e.g.: Power output of a compressor: 5 HP 8.8 CFM)

#### Low noise design (Within 65 dB)

Air channels and turbine are optimized for low noise. Cutting noise of micro tools can be heard.

### Automatic Tool Change

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



### 2 types of Air Power Spindle

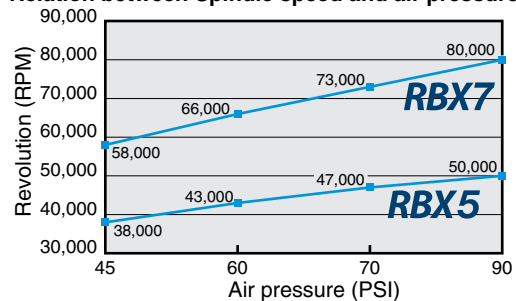
⊙ ... Optimum      △ ... Dependent upon cutting conditions  
○ ... Acceptable      × ... Not recommended for use

		RBX7	RBX5
Drill	ø0.1 - 0.3mm	○	○
	ø0.3 - 0.5mm	⊙	○
	ø0.5 - 1.0mm	○	⊙
	ø1.0 - 1.5mm	×	△
End mill	ø0.1 - 1.0mm	⊙	⊙
	ø1.0 - 1.5mm	△	⊙
Jig grinding		⊙	⊙

The table is just for reference. Machining range may change according to material, cutting conditions and cutting tools.

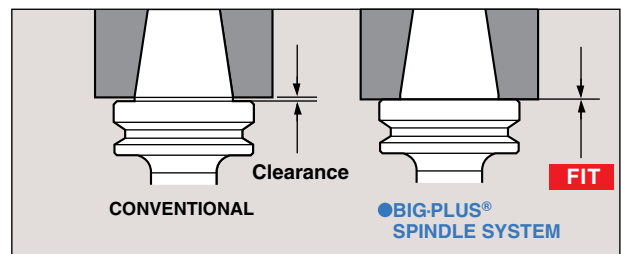
	RBX7	RBX5
Practical spindle speed (RPM)	60,000 - 80,000	40,000 - 50,000
Clamping range	ø0.45 - ø4.05mm (.018"-.159")	
T.I.R. at nose	Less than 1 μm (.00004")	
Air pressure	Less than 0.6 MPa (90 PSI)	
Air flow	200L/min [ANR] (7 CFM)	

### Relation between Spindle speed and air pressure (Reference)



### BIG-PLUS® is standard on all BT & CV taper versions PAT.

Simultaneous taper and flange contact between the machine spindle and tool holder provides improved rigidity and ATC repeatability. Interchangeability with conventional spindles ensures suitability for your existing machines.

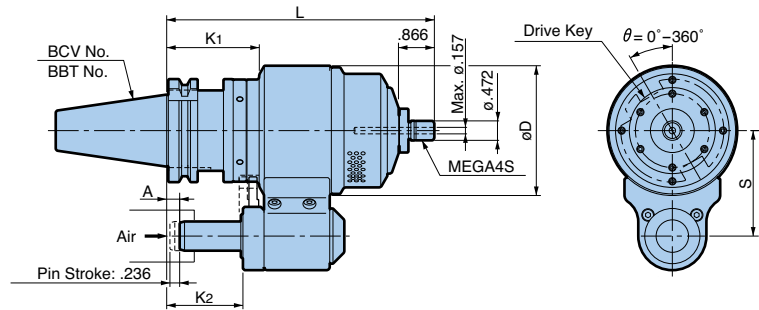
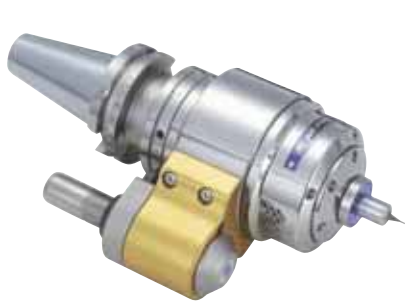
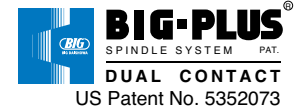


**BIG-PLUS®**  
SPINDLE SYSTEM PAT.  
DUAL CONTACT  
US Patent No. 5352073

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

### For automatic tool change

The compressed air is supplied through the stop block which also enables automatic tool change.



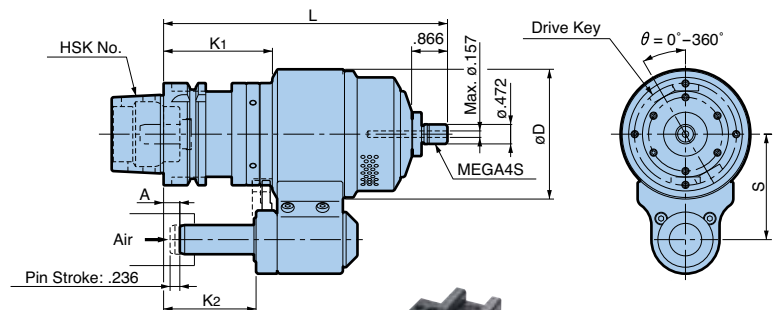
Stop Block is required. PG. 35

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

Shank	Model	Practical Spindle Speed (RPM)	L	øD	K1	K2	S	A	Weight (lbs)
BCV	BCV40-RBX7-4S-165-65	60,000 - 80,000	6.496	3.150	2.244	1.850	2.559	-.394 - 1.378	8.82
	-RBX5-4S-165-65	40,000 - 50,000		3.780					11.02
	BCV50-RBX7-4S-170-80	60,000 - 80,000	6.693	3.937	2.441	2.047	3.150	-.197 - 1.575	19.18
	-RBX5-4S-170-80	40,000 - 50,000		21.38					
BBT	BBT30-RBX7-4S-152-55	60,000 - 80,000	5.984	3.150	1.102	1.299	2.165	-.394 .866	5.95
	BBT40-RBX7-4S-151-65	60,000 - 80,000	5.945	3.150	1.693	1.299	2.559	-.945 .827	8.82
	-RBX5-4S-151-65	40,000 - 50,000		3.780					11.02
	BBT50-RBX7-4S-166-80	60,000 - 80,000	6.535	3.937	2.283	1.890	3.150	-.354 - 1.417	19.18
	-RBX5-4S-166-80	40,000 - 50,000		21.38					

1. Nut and wrench are included. Collet must be ordered separately.

**For MICRO COLLET PG. 26**



Stop Block is required. PG. 35

Shank	Model	Practical Spindle Speed (RPM)	L	øD	K1	K2	S	A	Weight (lbs)
HSK-A	HSK-A63-RBX7-4S-175-65	60,000 - 80,000	6.890	3.150	2.638	2.244	2.560	0 - 1.772	8.38
	-RBX5-4S-175-65	40,000 - 50,000		3.780					10.58
	HSK-A100-RBX7-4S-180-80	60,000 - 80,000	7.087	3.937	2.835	2.441	3.150	.197 - 1.969	18.52
	-RBX5-4S-180-80	40,000 - 50,000		20.72					

1. Nut and wrench are included. Collet must be ordered separately.

**For MICRO COLLET PG. 26**

### [For manual tool change]

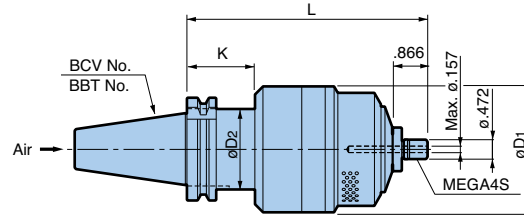
Easily mounted on machines without a stop block.



When ordering, please exchange the end of model number H.

Order Example  
BCV40-RBX7-4S-165-65  
↓  
BCV40-RBX7-4S-165H

For compressed air through the machine spindle.



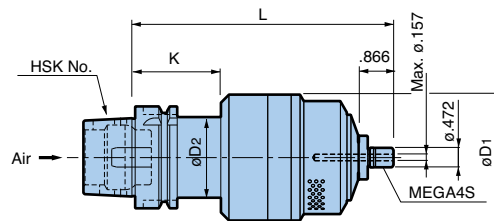
**BIG-PLUS® tools can be used in machining centers with conventional spindles.**

Shank	Model	Practical Spindle Speed (RPM)	L	øD1	øD2	K	Weight (lbs)
BCV	BCV40-RBX7C-4S-150	60,000 - 80,000	5.906	3.071	1.953	1.693	6.83
	-RBX5C-4S-150	40,000 - 50,000		3.780			9.04
	BCV50-RBX7C-4S-145	60,000 - 80,000	5.709	3.071	2.677	1.496	12.79
	-RBX5C-4S-145	40,000 - 50,000		3.780			14.99
BBT	BBT40-RBX7C-4S-150	60,000 - 80,000	5.906	3.071	1.969	1.693	6.83
	-RBX5C-4S-150	40,000 - 50,000		3.780			9.04
	BBT50-RBX7C-4S-160	60,000 - 80,000	6.299	3.071	2.677	2.087	13.89
	-RBX5C-4S-160	40,000 - 50,000		3.780			16.09

1. Nut and wrench are included. Collet must be ordered separately.

For MICRO COLLET PG. 26

**Caution** Compressed air to drive the Air Power Spindle must be clean. Coolant should not be supplied through the spindle on the machine that uses the Air Power Spindle.



Shank	Model	Practical Spindle Speed (RPM)	L	øD1	øD2	K	Weight (lbs)
HSK-A	HSK-A63-RBX7C-4S-160	60,000 - 80,000	6.299	3.071	1.969	2.087	6.39
	-RBX5C-4S-160	40,000 - 50,000		3.780			8.60
	HSK-A100-RBX7C-4S-165	60,000 - 80,000	6.496	3.071	2.677	2.283	10.80
	-RBX5C-4S-165	40,000 - 50,000		3.780			13.00

1. Nut and wrench are included. Collet must be ordered separately.

For MICRO COLLET PG. 26

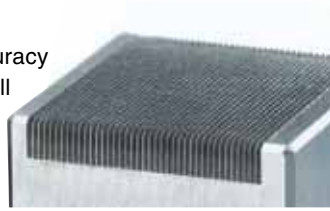
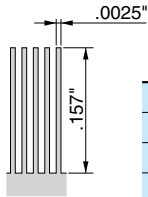
**Caution** Compressed air to drive the Air Power Spindle must be clean. Coolant should not be supplied through the spindle on the machine that uses the Air Power Spindle.

## APPLICATION EXAMPLES

### RBX7

#### Aluminum

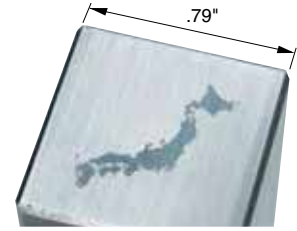
Outstanding runout accuracy permits super thin wall cutting.



Cutter	ø.020" Rib end mill
Spindle Speed	70,000 RPM
Feed	59 IPM
D.O.C.	Ad= .0008"

#### Prehardened Steel HRC40

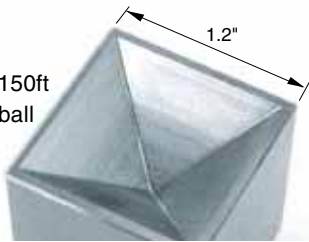
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of .0002" clearly visible.



Cutter	R .004" Ball nose end mill
Spindle Speed	80,000 RPM
Feed	15.75 IPM
D.O.C.	Ad= .0004"

#### Prehardened Steel HRC40

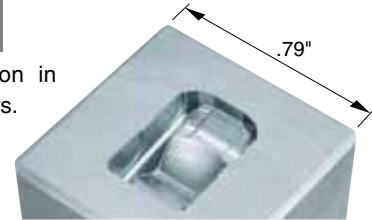
Overall cutting length of 2,150ft can be achieved with one ball nose endmill. Drastically extended tool life.



Cutter	R .020" Ball nose end mill
Spindle Speed	65,000 RPM
Feed	1.63 IPM
D.O.C.	Ad= .0008" Rd= .002"

#### Prehardened Steel HRC40

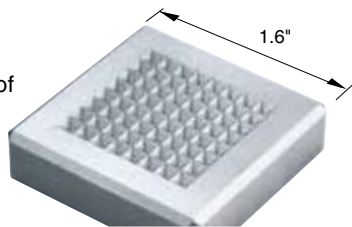
Original 5hour operation in MC is reduced to 2 hours.



Cutter	R .008" Ball nose end mill
Spindle Speed	70,000 RPM
Feed	39.4 IPM
D.O.C.	Ad= .0004"

#### Prehardened Steel HRC40

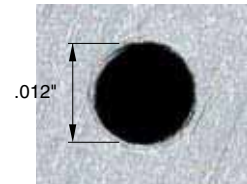
No thermal expansion of spindle results in finely detailed surface finish!



Cutter	R .020" Ball nose end mill
Spindle Speed	75,000 RPM
Feed	15.75 IPM
D.O.C.	Ad= .0008"

#### Aluminum

High-precision drilling is possible without center drill operation. Even after 3,500 holes, no problems can be found on cutting edge.



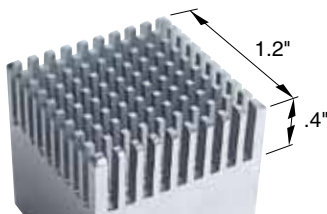
depth= .06"

Cutter	ø.012" Drill
Spindle Speed	75,000 RPM
Feed	7.87 IPM
Peck	.012"

### RBX5

#### Prehardened Steel HRC40

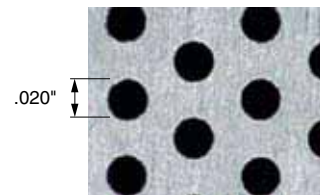
Even a taper endmill that has high cutting forces can achieve stable cutting.



Cutter	ø.060" Rib end mill
Spindle Speed	40,000 RPM
Feed	39.4 IPM
D.O.C.	Ad= .002"

#### Stainless Steel SUS303

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



depth= .067"

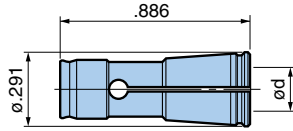
Cutter	ø.020" Drill
Spindle Speed	40,000 RPM
Feed	787 IPM
Peck	.0004"

# ACCESSORIES for Air Power Spindle

## • MICRO COLLET



Clamping range from  $\phi.018"$  to  $\phi.159"$  with  $.004"$  increments.  
Slim body and outstanding clamping force are ideal for micro-machining.  
Collet class AA, max. runout 1 micron at collet nose.



Collet Class	Max. T.I.R.	
	At nose	At end of test bar
AA	<b>.00004"</b>	<b>.00012"</b>

**.00004" .00012"**

## MEGA4S

Model	Clamping Range $\phi d$
<b>NBC4S-0.5AA</b>	.018 - .022
<b>-0.6AA</b>	.022 - .026
<b>-0.7AA</b>	.026 - .030
<b>-0.8AA</b>	.030 - .033
<b>-0.9AA</b>	.033 - .037

Model	Clamping Range $\phi d$
<b>NBC4S-1.0AA</b>	.037 - .041
<b>-1.1AA</b>	.041 - .045
<b>-1.2AA</b>	.045 - .049
<b>-1.3AA</b>	.049 - .053
<b>-1.4AA</b>	.053 - .057
<b>-1.5AA</b>	.057 - .061
<b>-1.6AA</b>	.061 - .065
<b>-1.7AA</b>	.065 - .069
<b>-1.8AA</b>	.069 - .073
<b>-1.9AA</b>	.073 - .077

Model	Clamping Range $\phi d$
<b>NBC4S-2.0AA</b>	.077 - .081
<b>-2.1AA</b>	.081 - .085
<b>-2.2AA</b>	.085 - .089
<b>-2.3AA</b>	.089 - .093
<b>-2.4AA</b>	.093 - .096
<b>-2.5AA</b>	.096 - .100
<b>-2.6AA</b>	.100 - .104
<b>-2.7AA</b>	.104 - .108
<b>-2.8AA</b>	.108 - .112
<b>-2.9AA</b>	.112 - .116

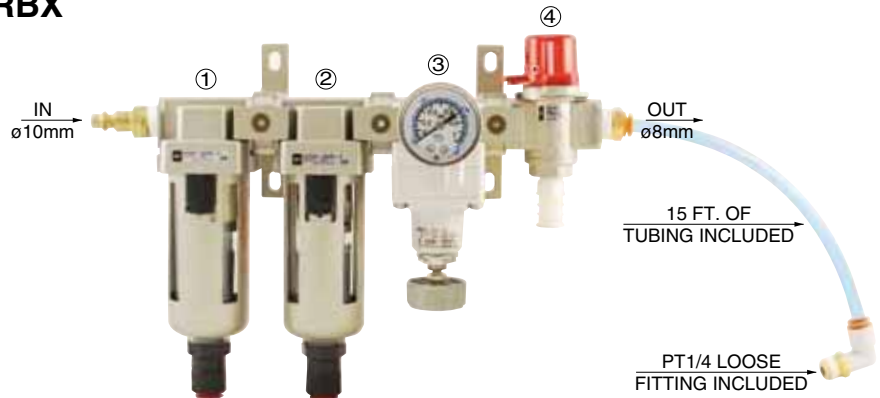
Model	Clamping Range $\phi d$
<b>NBC4S-3.0AA</b>	.116 - .120
<b>-3.1AA</b>	.120 - .124
<b>-3.175AA</b>	.123 - .127
<b>-3.2AA</b>	.124 - .128
<b>-3.3AA</b>	.128 - .132
<b>-3.4AA</b>	.132 - .136
<b>-3.5AA</b>	.136 - .140
<b>-3.6AA</b>	.140 - .144
<b>-3.7AA</b>	.144 - .148
<b>-3.8AA</b>	.148 - .152
<b>-3.9AA</b>	.152 - .156
<b>-4.0AA</b>	.156 - .159

## • AIR FILTER REGULATOR for RBX

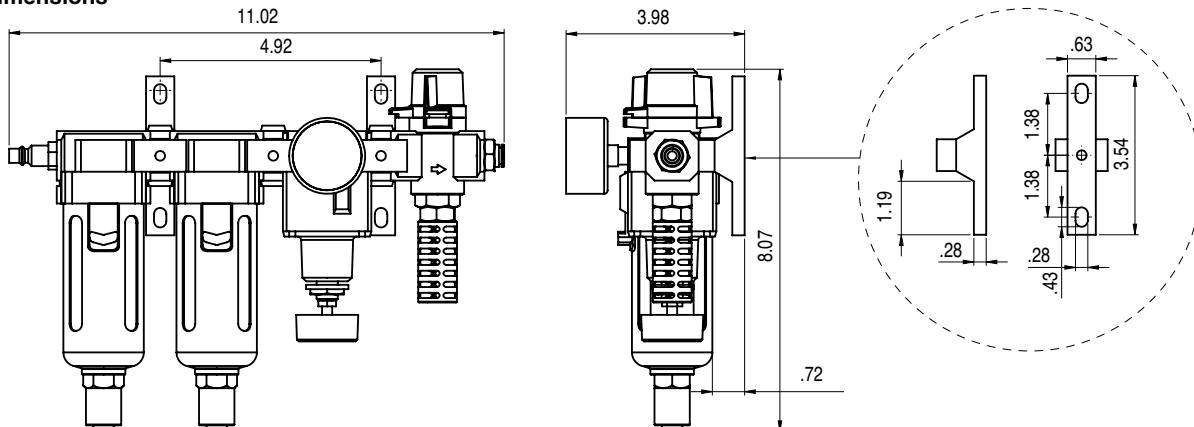
Air filtering for turbine drive.

Model	XF1-NPT
-------	---------

- ① Mist separator (filtration:  $.012"$ )
- ② Micro mist separator (filtration:  $.0004"$ )
- ③ Precision regulator
- ④ Three port valves for extracting pressurization (non-grease type)



## • Dimensions



Speed Increaser

# HIGH SPINDLE

PAT.

MAX  
20,000  
RPM



Patented: USA, Canada, Germany, UK,  
France, Italy and South Korea



**BIG-PLUS**  
SPINDLE SYSTEM PAT.

**DUAL CONTACT**  
US Patent No. 5352073

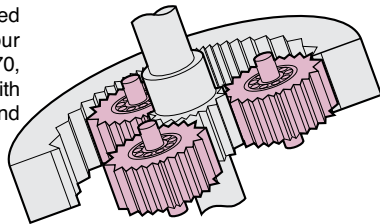
**High Spindle improves drilling and end milling performance on existing machines by multiplying the spindle speed 4, 5 or 6 times.**



## HIGH SPEED MACHINING INCREASES PRODUCTIVITY WITH GREATER ACCURACY AND SUPERIOR FINISH

### Reinforced gear driving system

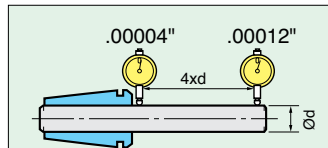
The planetary gears, which have been constantly upgraded since the development of our first "High Spindle" back in 1970, achieves smooth operation with minimal heat generation and high torque transmission.



### High precision collet chuck system



**.00004" at nose**  
**[New Baby Collet]**



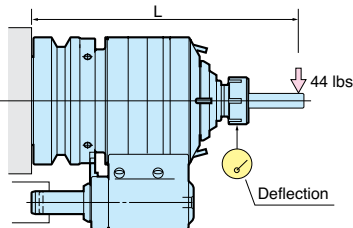
Collet Class	Max. Runout	
	At nose	At 4xd
AA	.00004"	.00012"

The BIG New Baby Collet is world renowned for its unmatched accuracy and precision. It offers concentricity close to sub-micron.

Runout at spindle nose in GTG4, 5, & 6 models guaranteed to be within .0002". Runout at 4x the distance of the cutter dia. in GTG4, 5 & 6 models guaranteed to be within .0004".

### Rigidity increased 1.7 times

Larger diameter body and spindle with double angular contact bearings and reinforced locating pin assembly greatly increases rigidity.



Model	L	Deflection	Comparison Against Previous Model
BBT40-GTG5-10-140-65	7.874	.0014	58% less
BBT50-GTG6-10-158-80	8.661	.0010	78% less
BBT50-GTG4-16-177-80	9.449	.0004	93% less

### Obtain optimum cutting tool performance

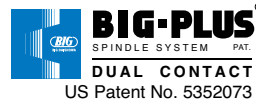
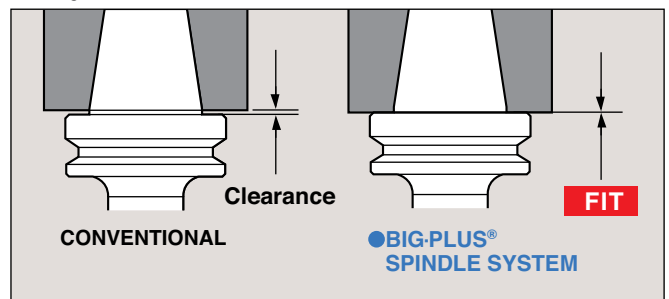
High efficiency cutting tools have been developed for advanced high speed machining. High Spindle maximizes the performance of these cutting tools by increasing the spindle speeds up to higher required levels.

### Reduce load to machine spindle

Continuous use at high revolutions results in shorter life span of the machine spindle due to excessive load to its motor and bearings. High Spindle reduces this load and greatly extends the life of the expensive machine spindle.

### BIG-PLUS® is standard on all BT & CV taper versions PAT.

Simultaneous taper and flange contact between the machine spindle and tool holder provides improved rigidity and ATC repeatability. Interchangeability with conventional spindles ensures suitability for your existing machines.



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

### Higher durability (Advanced sealing method)

The advanced non-contact sealing method provides improved protection against coolant and particle contamination more than any other seals.

### Multi-directional coolant supply

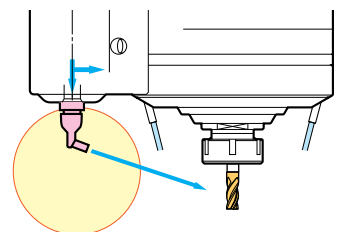
Universal coolant nozzles are capable of being adjusted to suit the length of cutting tool. Thus, the maximum coolant delivery to the cutting edge is assured.



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

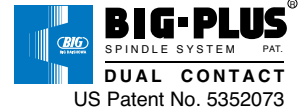
### Pinpoint coolant jet for shorter cutting tools

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 (BCV/BBT taper models only).

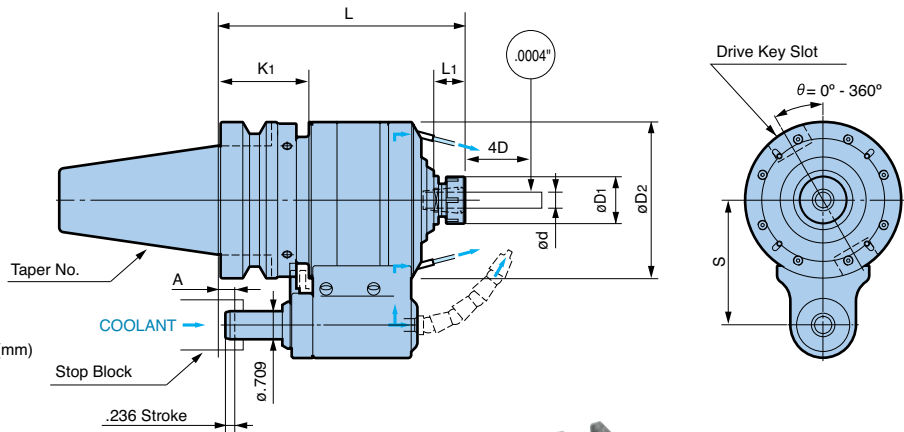


## For Machining Centers

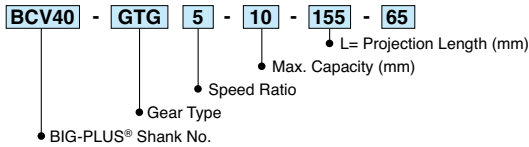
Higher spindle speeds are available without excessive load on the machine spindle.



MAX  
20,000 RPM



• Model Description



Stop Block is required. PG. 35

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

Shank	Model	ød	L	L1	øD1	øD2	K1	S	A	Speed Ratio	Max. RPM	Weight (lbs)
BCV	BCV40-GTG5-10-155-65	.059 - .394	6.102	.787	1.181	3.150	2.283	2.559	-.354 +.236	4.67	20,000	11.0
	BCV50-GTG6-10-163-80	.059 - .394	6.417	.787	1.181	3.937	2.480	3.150	-.157 +.433	5.67	20,000	19.8
	BCV50-GTG4-16-182-80	.098 - .630	7.165	1.004	1.654	4.331	2.480	3.150	-.157 +.433	3.80	15,000	23.8
BBT	BBT40-GTG5-10-140-65	.059 - .394	5.512	.787	1.181	3.150	1.693	2.559	-.354 +.236	4.67	20,000	10.6
	BBT50-GTG6-10-158-80	.059 - .394	6.220	.787	1.181	3.937	2.283	3.150	-.354 +.236	5.67	20,000	19.4
	BBT50-GTG4-16-177-80	.098 - .630	6.969	1.004	1.654	4.331	2.283	3.150	-.354 +.236	3.80	15,000	23.4

1. 1 pc. of maximum size collet is included as standard accessory. (GTG5, 6= NBC10-10AA, GTG4= NBC16-16AA)  
 2. θ (angle of locating pin to drive key groove) is adjustable to any degree from 0° - 360°.  
 3. Special air purge oil mist lubrication style is available upon request for machining graphite, ceramic, tungsten and other composite materials.  
 4. Please be aware of the risk of fire when using an oil based coolant.

For NEW BABY COLLET PG. 38

For POSITIONING PINS PG. 35

## For Conventional Machines

Higher spindle speeds increase the productivity on conventional machines.

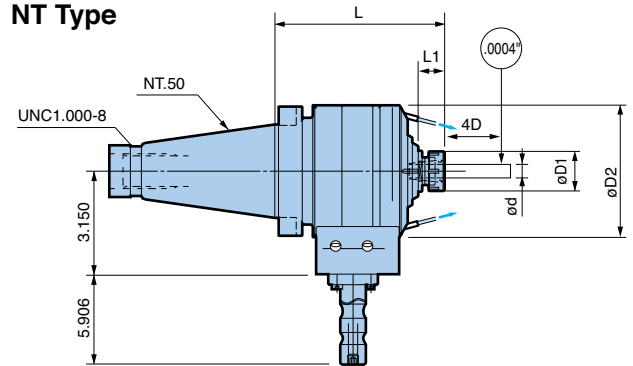


• Model Description

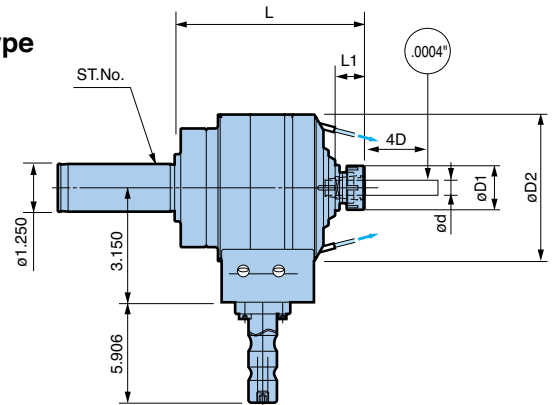
**NT50U** - **GTG** **4** - **16** - **150**

- Shank No.
- Gear Type
- Speed Ratio
- Max. Capacity (mm)
- L = Projection Length (mm)

### NT Type



### ST Type



Model	Shank	ød	L	L1	øD1	øD2	Speed Ratio	Max. RPM	Weight (lbs)
<b>NT50U-GTG4-16-150</b>	50 taper	.098-.630	5.906	1.004	1.654	4.331	3.80	15,000	20.5
<b>ST1.250-GTG4-16-155</b>	1-1/4" cylindrical	.098-.630	6.102	1.004	1.654	4.331	3.80	15,000	15.9

1. 5 pcs of NBC collets are included. (NBC16-6, 8, 10, 12 & 16AA)
2. Please be aware of the risk of fire when using an oil based coolant.

For NEW BABY COLLET PG. 38

## APPLICATION EXAMPLES

MODEL	<b>BBT40-GTG5-10-140</b>	<b>BBT50-GTG6-10-158</b>	<b>BBT50-GTG6-10-158</b>	<b>BBT50-GTG4-16-177</b>
CUTTER	Solid carbide end mill ø.315" / 2 flutes	Solid carbide end mill ø.236" / 2 flutes	Solid carbide drill ø.079"	Solid carbide end mill ø.630"
MATERIAL	Duralumin (A-2017)	1055	Duralumin (A-2017)	Duralumin (A-2017)
REVOLUTION	20,000 RPM	16,000 RPM	20,000 RPM	15,000 RPM
FEED RATE	118.1 IPM	137.8 IPM	78.7 IPM	39.4 IPM
RESULT	High metal removal rate 5.5 cu.in./min.	High metal removal rate 2.1 cu.in./min.	Extended tool life 1,200 holes by 1 drill	Surface roughness RMS max. .00008"

※ Results will vary depending on workpiece, cutting tool, machine model, and other conditions.

※ The rigidity and concentricity are often affected by the projection length of a cutting tool. It is recommended to keep the projection as short as possible.

# Coolant Feed **Hi-JET HOLDER**

for water-soluble coolant only

PAT.

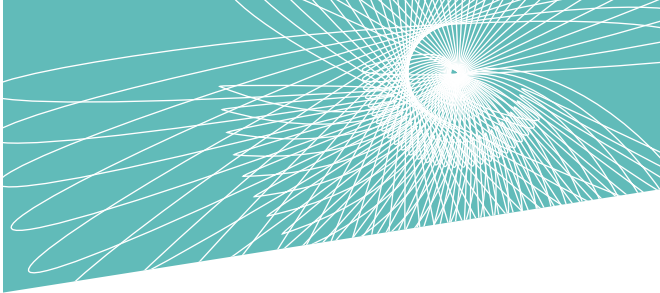


Spindle speeds up to  
**10,000 RPM**  
for 40 tapers and 8,000 RPM for 50 tapers

Patented: USA, Canada, Germany, UK,  
France, Italy and South Korea

**BIG-PLUS**  
SPINDLE SYSTEM PAT.  
DUAL CONTACT  
US Patent No. 5352073

## **Bearings in a separate housing from the coolant for extended life.**



## Non-contact seal design eliminates wear damage to body

With the Hi-Jet Holder, coolant runs through a separate sealing section called the Merit Set. In the Merit Set, the sealing ring that stays stationary when the body rotates does not come in contact with the body. Only the sealing plate, which rotates with the body, has actual contact with the body wear. As a result, there is no friction from any seals which can cause body wear. The only wear will be to the Merit Set seals, which are easily replaceable parts. Coolant contamination and high speed operations are no longer limiting factors to the service life of the Coolant Feed Holders.

## ENSURING COOLANT DELIVERY TO THE CUTTING EDGE REQUIRED FOR HIGH SPEED CUTTING.

### High speed available

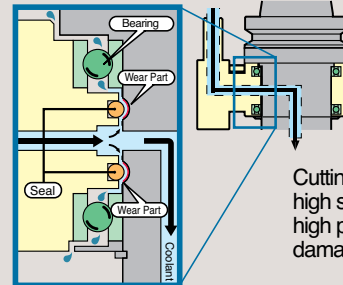
Spindle speeds up to **10,000 RPM**  
40 tapers

Spindle speeds up to **8,000 RPM**  
50 tapers

To meet the increasing demand for high-speed operations due to use of carbide cutters, Hi-Jet Coolant Feed Holder models are available that run at speeds up to 10,000 RPM for 40 taper and 8,000 RPM for 50 tapers. Their compact design and 360 adjustability assures compatibility with automatic tool changers of machining centers.



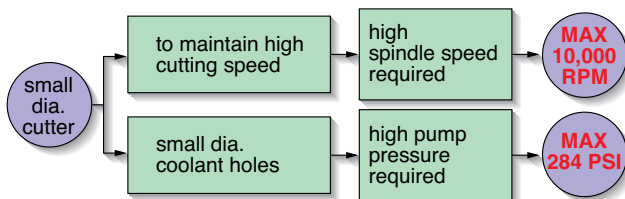
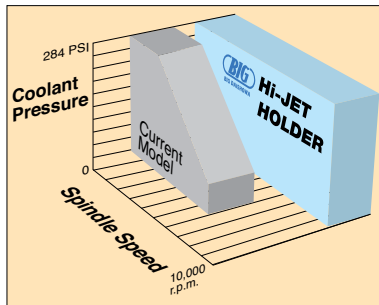
### Competitor Design



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

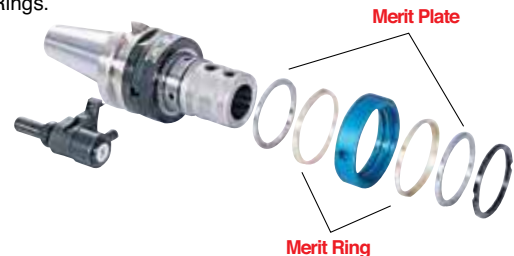
### Suitable for small dia. cutters due to high speed and pressure

Small diameter cutters require high spindle speeds to maintain high cutting speed and high coolant pressure due to their small dia. coolant holes. The BIG Hi-Jet Holder accepts even smaller diameter shanks, providing high spindle speeds (Max. 10,000 RPM) and high coolant pressure (Max. 284 PSI)



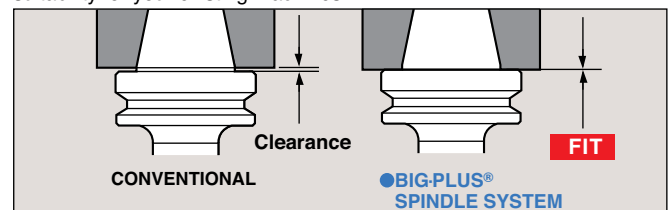
### Easy maintenance by replacement of worn parts

Easily replaceable Merit Sets consist of Merit Plates, Merit Rings and O-Rings.



### BIG-PLUS® is standard on all BT & CV taper versions PAT.

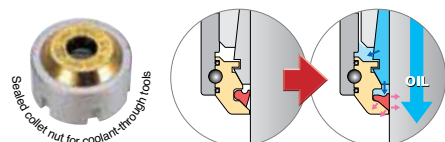
Simultaneous taper and flange contact between the machine spindle and tool holder provides improved rigidity and ATC repeatability. Interchangeability with conventional spindles ensures suitability for your existing machines.



### For New Baby Chuck type (ONBS) coolant sealed nut

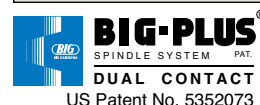
#### BABY PERFECT SEAL PAT.

US Patent No. 5975817



#### Perfect sealing by utilizing coolant pressure!

- For high speed cutting
- Prevents the ingress of particles to the collet and body
- Special collets no longer necessary

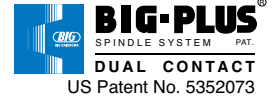


BIG-PLUS® tools can be used in machining centers with conventional spindles.

## NEW BABY CHUCK TYPE



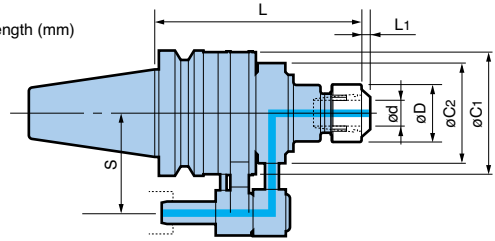
Suitable for small diameter drills, gun drills and end mills due to high precision New Baby Collet.



• Model Description

**CV40** - **ONBS** **13** **N** - **165**

- Shank No.
- Oil Hole New Baby Chuck
- Max. Capacity (mm)
- Hi-Jet Type
- L= Projection Length (mm)



Stop Block is required. PG. 35

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

Shank	Model	ød	øD	L	øC1	øC2	S	Max. RPM	Merit Set 2 pcs. of Merit Ring and 2 pcs. of Merit Plate	Weight (lbs)
CV	CV40-ONBS13N-165	.118 - .512	1.378	6.614	3.213	2.874	2.559	10,000	MES-40	8.8
	-ONBS20N-165	.118 - .787	1.811			3.150		8,000	MES-50	9.5
	CV50-ONBS13N-165	.118 - .512	1.378	6.614	3.921	3.150	3.150	8,000	MES-50	16.1
	-ONBS20N-165	.118 - .787	1.811			3.150		8,000	MES-50	16.5
BBT	BBT40-ONBS13N-165	.118 - .512	1.378	6.614	3.213	2.874	2.559	10,000	MES-40	8.8
	-ONBS20N-165	.118 - .787	1.811			3.150		8,000	MES-50	9.5
	BBT50-ONBS13N-165	.118 - .512	1.378	6.614	3.921	3.150	3.150	8,000	MES-50	16.1
	-ONBS20N-165	.118 - .787	1.811			3.150		8,000	MES-50	16.5

1. Collet, adjusting screw and wrench are optional items.
2. Max. coolant pressure is 284 PSI.
3. Clamping nut is sold separately. Please order Baby Perfect Seal (BPS) for your application.

For NEW BABY COLLET PG. 38

For POSITIONING PINS PG. 35

For BABY PERFECT SEAL PG. 37

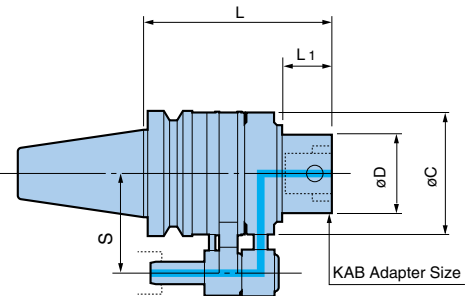
## KAISER SHANK TYPE



• Model Description

**BBT50** - **OCK** **6** **N** - **139**

- Shank No.
- Kaiser Shank
- KAB Adapter Size
- Hi-Jet Type
- L= Projection Length (mm)



Stop Block is required. PG. 35

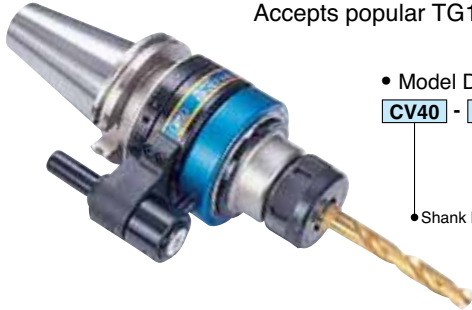
BIG-PLUS® tools can be used in machining centers with conventional spindles.

Shank	Model	Adapter Size	D	L	L1	C	S	Max. RPM	Merit Set 2 pcs. of Merit Ring and 2 pcs. of Merit Plate	Weight (lbs)
CV	CV40-OCK6N-144	KAB6	2.520	5.669	1.102	3.921	2.559	5,000	MES-65	13.4
	CV50-OCK6N-142	KAB6	2.520	5.591	1.063	3.921	3.150	5,000	MES-65	15.9
	-OCK7N-165	KAB7	3.543	6.496	1.358	5.102	3.150	4,000	MES-90	27.0
BBT	BBT40-OCK6N-149	KAB6	2.520	5.866	1.102	3.921	2.559	5,000	MES-65	13.4
	BBT50-OCK6N-139	KAB6	2.520	5.472	1.063	3.921	3.150	5,000	MES-65	15.9
	-OCK7N-165	KAB7	3.543	6.496	1.358	5.102	3.150	4,000	MES-90	27.0

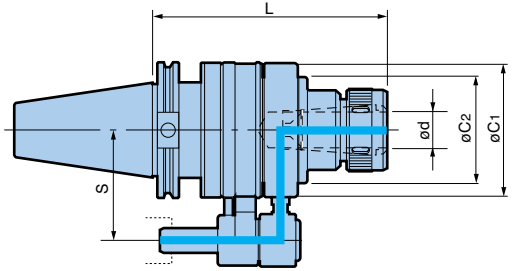
1. Max. coolant pressure is 284 PSI.

## COLLET CHUCK TYPE

Accepts popular TG100 single angle style collets.



- Model Description
- CV40** - **OHC** **1.000** **N** - **175**
- Shank No.
- Oil Hole Collet Chuck
- Max. Capacity (in)
- Hi-Jet Type
- L= Projection Length (mm)



Stop Block is required. PG. 35

Shank	Model	ød	Collet Series	L	øC1	øC2	S	Max. RPM	Merit Set 2 pcs. of Merit Ring and 2 pcs. of Merit Plate	Weight (lbs)
CV	CV40-OHC1.000N-175	.093 - 1.000	TG100	6.890	3.213	3.150	2.559	8,000	MES-50	11.1
	CV50-OHC1.000N-172			6.772	3.921	3.858	3.150	6,000	MES-65	16.5
BT	BT40-OHC1.000N-175			6.890	3.213	3.150	2.559	8,000	MES-50	11.1

1. Max. coolant pressure is 284 PSI.
2. Collet and clamping nut are optional items.

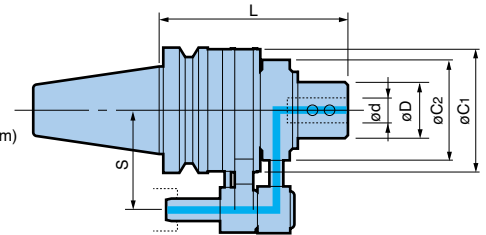
For POSITIONING PINS PG. 35

## SIDE LOCK TYPE

Suitable for popular straight shanks with flat.



- Model Description
- CV40** - **OSL** **1.000** **N** - **165**
- Shank No.
- Oil Hole Side Lock Holder
- Max. Capacity (in)
- Hi-Jet Type
- L= Projection Length (mm)



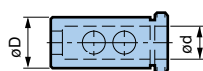
Stop Block is required. PG. 35

Shank	Model	ød	øD	L	øC1	øC2	S	Max. RPM	Merit Set 2 pcs. of Merit Ring and 2 pcs. of Merit Plate	Weight (lbs)
CV	CV40-OSL1.000N-165	1.000	1.890	6.496	3.213	3.150	2.559	8,000	MES-50	9.7
	-OSL1.250N-160	1.250	2.283	6.299				6,000	MES-65	12.6
	CV50-OSL.750N-150	.750	1.890	5.906	3.921	3.150	3.150	8,000	MES-50	16.3
	-OSL1.000N-165	1.000						6,000	MES-65	17.4
	-OSL1.250N-165	1.250	2.283	6.496	3.858	6,000	MES-65	17.6		
	-OSL1.500N-165	1.500	2.500	7.087	5.079	4.764	4,000	MES-90	26.2	
	-OSL2.000N-180	2.000	3.307	7.087	5.079	4.764	4,000	MES-90	26.2	
BT	BT40-OSL1.000N-165	1.000	1.890	6.496	3.213	3.150	2.559	8,000	MES-50	9.7
	-OSL1.250N-165	1.250	2.283					6,000	MES-65	12.6
	BT50-OSL.750N-150	.750	1.890	5.906	3.921	3.150	3.150	8,000	MES-50	16.3
	-OSL1.000N-165	1.000						6,000	MES-65	17.4
	-OSL1.250N-165	1.250	2.283	6.496	3.858	6,000	MES-65	17.4		
	-OSL1.500N-165	1.500	2.500	7.087	5.079	4.764	4,000	MES-90	26.2	

1. Max. coolant pressure is 284 PSI.

For POSITIONING PINS PG. 35

## OSL REDUCTION COLLET



Model	ød	øD
OSL1 <sup>1</sup> / <sub>4</sub> - <sup>3</sup> / <sub>4</sub>	.750	1.250
-1	1.000	
1 <sup>1</sup> / <sub>2</sub> -1	1.000	1.500
-1 <sup>1</sup> / <sub>4</sub>	1.250	

# SET UP INFORMATION FOR AIR POWER SPINDLE, HIGH SPINDLE & Hi-JET HOLDER



## • Preparing the Locating Pin and Stop Block

The Air Power Spindle, High Spindle and Hi-Jet Holder utilize a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle. Please refer to the following instructions to select/adjust the Locating Pin, and to prepare it for the Stop Block.

### 1. Standard Setup of the Locating Pin

#### 《"S" Dimension》

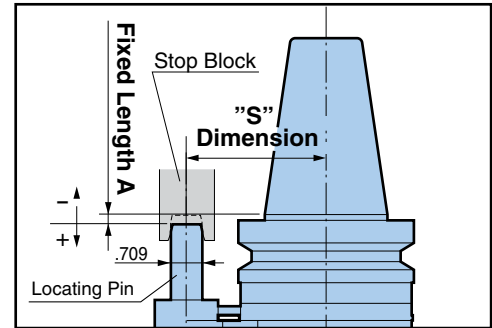
The distance from the centerline of the holder to the centerline of the Locating Pin. Please note that this dimension is not adjustable by the user.

	"S" Dimension
BCV/CV/BBT40	2.559
BCV/CV/BBT50	3.150

#### 《Fixed Length "A"》

The axial distance from the gage line of the spindle to the bottom of the groove on the Stop Block. This dimension is adjustable by the user.

Three (3) Locating Pin models are available: LP-A, LP-B, and LP-C. Each Locating Pin is adjustable to provide a different range of Fixed Length "A", as shown in the tables below. Please specify the required Fixed Length "A" when ordering. Otherwise, it will be delivered set at the **BIG** standard, .236.



### HIGH SPINDLE/AIR POWER SPINDLE

	BCV40	BCV50	BBT40	BBT50
LP-A	-.354 / +.236	-.157 / +.433	-.945 / -.354	-.354 / +.236
LP-B	+.236 / +.827	+.433 / +1.024	-.354 / +.236	+.236 / +.827
LP-C	+.827 / +1.417	+1.024 / +1.614	+.236 / +.827	+.827 / +1.417

**Note:**  indicates adjustable range of the **BIG** standard setup.

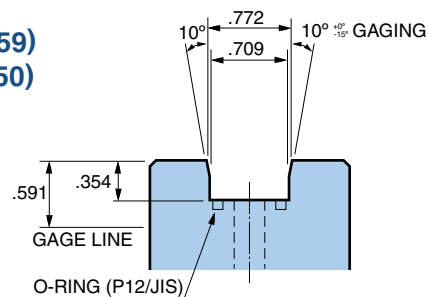
### Hi-JET HOLDER

	CV/BT40	CV/BT50	CV40 - OSL1.250	CV50 - OSL2.000	BT50 - OSL2.000
LP-A	-.236 / +.354	-.354 / +.236	-.197 / +.394	-.079 / +.512	+.118 / +.709
LP-B	+.354 / +.945	+.236 / +.827	+.394 / +.984	+.512 / +1.102	+.709 / +1.299
LP-C	+.945 / +1.535	+.827 / +1.417	+.984 / +1.575	+.1.102 / +1.535	+.1.299 / +1.535

### 2. Stop Block Dimensions

The diagram on the right shows the proper groove dimensions for a suitable Stop Block for use with **BIG** Air Power Spindle, High Spindle and Hi-Jet Holder. When ordering a Stop Block from a machine tool builder, please reference these dimensions.

**FOR #40 (S=2.559)  
#50 (S=3.150)**

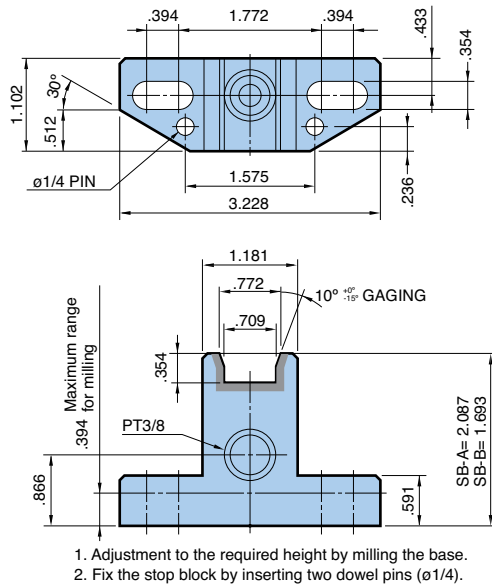


### 3. Semi-Finished Stop Block

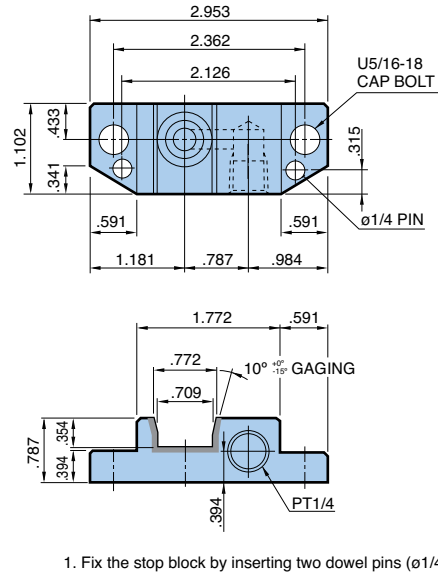
A semi-finished Stop Block has the proper groove form for use with **BIG** Air Power Spindle, High Spindle and Hi-Jet Holder, as well as additional material to allow the customer to machine the block to the correct height.  
(NOTE: Stop Block SB-F is not height-adjustable.)

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 the semi-finished Stop Block.

• MODEL: SB-A/SB-B

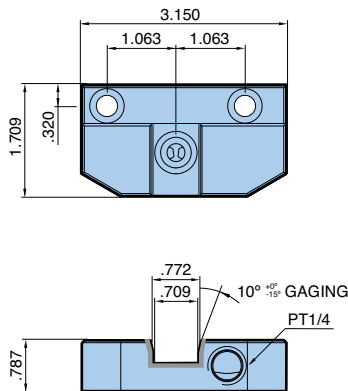


• MODEL: SB-F



• MODEL: SB-H40

For use with most Haas 40 taper machines.



**Note:** [shaded area] on the sketch indicates heat treatment (HRC45–50), all other surfaces can be milled.



## • BABY PERFECT SEAL PAT.

Sealed collet nut for coolant-through tools (order separately) US Patent No. 5975817



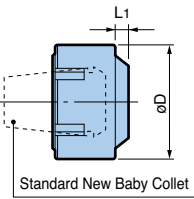
### • Model Description

**BPS** | **13** - **03035**

• Tool Shank Dia. Clamping Range:  $\varnothing 3 - \varnothing 3.5\text{mm}$  ( $\varnothing .118" - \varnothing .138"$ )

• Main Body Size

• Baby Perfect Seal



### ONBS13

Model	Cutter Shank Dia.	øD	L <sub>1</sub>	Collet Model
<b>BPS13-03035</b>	.118 - .138	1.378	.169	NBC13-3-4
<b>-0304</b>	.118 - .157			-3-4.5
<b>-04045</b>	.157 - .177			-4-5
<b>-0405</b>	.157 - .197			-4-5.5
<b>-05055</b>	.197 - .217			-5-6
<b>-0506</b>	.197 - .236		-5-6.5	
<b>-06065</b>	.236 - .256		-6-7	
<b>-0607</b>	.236 - .276		-6-7.5	
<b>-07075</b>	.276 - .295		-7-8	
<b>-0708</b>	.276 - .315		-7-8.5	
<b>-08085</b>	.315 - .335		-8-9	
<b>-0809</b>	.315 - .354		-8-9.5	
<b>-09095</b>	.354 - .374		-9-10	
<b>-0910</b>	.354 - .394		-9-10.5	
<b>-10105</b>	.394 - .413		-10-11	
<b>-1011</b>	.394 - .433	-10-11.5		
<b>-11115</b>	.433 - .453	-11-12		
<b>-1112</b>	.433 - .472	-11-12.5		
<b>-12125</b>	.472 - .492	-12-13		
<b>-1213</b>	.472 - .512	-12-13		

### ONBS20

Model	Cutter Shank Dia.	øD	L <sub>1</sub>	Collet Model
<b>BPS20-03035</b>	.118 - .138	1.811	.157	NBC20-3-4
<b>-0304</b>	.118 - .157			-3-4.5
<b>-04045</b>	.157 - .177			-4-5
<b>-0405</b>	.157 - .197			-4-5.5
<b>-05055</b>	.197 - .217			-5-6
<b>-0506</b>	.197 - .236		-5-6.5	
<b>-06065</b>	.236 - .256		-6-7	
<b>-0607</b>	.236 - .276		-6-7.5	
<b>-07075</b>	.276 - .295		-7-8	
<b>-0708</b>	.276 - .315		-7-8.5	
<b>-08085</b>	.315 - .335		-8-9	
<b>-0809</b>	.315 - .354		-8-9.5	
<b>-09095</b>	.354 - .374		-9-10	
<b>-0910</b>	.354 - .394		-9-10.5	
<b>-10105</b>	.394 - .413		-10-11	
<b>-1011</b>	.394 - .433	-10-11.5		
<b>-11115</b>	.433 - .453	-11-12		
<b>-1112</b>	.433 - .472	-11-12.5		
<b>-12125</b>	.472 - .492	-12-13		
<b>-1213</b>	.472 - .512	-12-13.5		
<b>-1314</b>	.512 - .551	-13-14.5		
<b>-1415</b>	.551 - .591	-14-15.5		
<b>-1516</b>	.591 - .630	-15-16.5		
<b>-1617</b>	.630 - .669	-16-17.5		
<b>-1718</b>	.669 - .709	-17-18.5		
<b>-1819</b>	.709 - .748	-18-19.5		
<b>-1920</b>	.748 - .787	-19-20		

## • PS RING

Spare seal for Baby Perfect Seal

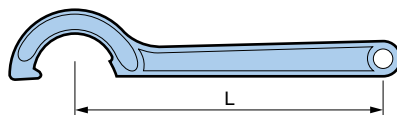


1 package contains 5 pcs. (1 size)

Model	Corresponding BPS Model	Model	Corresponding BPS Model	Model	Corresponding BPS Model
<b>PS-0304</b>	BPS□-03035, 0304	<b>PS-0809</b>	BPS□-08085, 0809	<b>PS-1314</b>	BPS□-1314
<b>0405</b>	-04045, 0405	<b>0910</b>	-09095, 0910	<b>1415</b>	-1415
<b>0506</b>	-05055, 0506	<b>1011</b>	-10105, 1011	<b>1516</b>	-1516
<b>0607</b>	-06065, 0607	<b>1112</b>	-11115, 1112	<b>1617</b>	-1617
<b>0708</b>	-07075, 0708	<b>1213</b>	-12125, 1213	<b>1718</b>	-1718
				<b>1819</b>	-1819
				<b>1920</b>	-1920

( Replacement of PS Ring is recommended when coolant leaks due to damage of the PS Ring. )

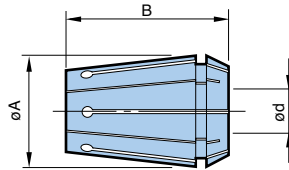
## • WRENCH



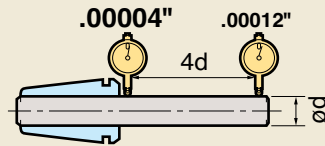
Model	L	Body Type	
		HIGH SPINDLE	Hi-JET HOLDER
<b>NBK10</b>	4.09	GTG□-10	—
<b>NBK13</b>	4.45	—	ONBS13-BPS13
<b>NBK16</b>	4.80	GTG□-16	—
<b>NBK20</b>	5.16	—	ONBS20-BPS20

# NEW BABY COLLET

New Baby Collet "AA" class guarantees T.I.R. of .00004" at the nose.

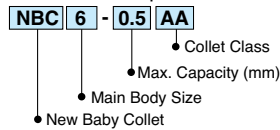


### T.I.R. of collet



Collet Class	T.I.R.	
	At nose	At end of test bar
AA	.00004"	.00012"

### Model Description



1. Collapsibility is .010" for NBC6 and .020" for NBC8 to NBC20.
2. For best performance, cutting tool shanks should be cylindrical without flats and be as long as the clamping section of the collet bore.

NBS6	
Model	Clamping Range od
NBC6-0.5AA	.010 - .020
-0.75AA	.020 - .030
-1AA	.030 - .039
-1.25AA	.039 - .049
-1.5AA	.049 - .059
-1.75AA	.059 - .069
-2AA	.069 - .079
-2.25AA	.079 - .089
-2.5AA	.089 - .098
-2.75AA	.098 - .108
-3AA	.108 - .118
-3.175AA	.115 - .125
-3.25AA	.118 - .128
-3.5AA	.128 - .138
-3.75AA	.138 - .148
-4AA	.148 - .157
-4.25AA	.157 - .167
-4.5AA	.167 - .177
-4.75AA	.177 - .187
-5AA	.187 - .197
-5.25AA	.197 - .207
-5.5AA	.207 - .217
-5.75AA	.217 - .226
-6AA	.226 - .236

øA= .374 B= .551

NBS16	
Model	Clamping Range od
NBC16-3AA	.098 - .118
-3.5AA	.118 - .138
-4AA	.138 - .157
-4.5AA	.157 - .177
-5AA	.177 - .197
-5.5AA	.197 - .217
-6AA	.217 - .236
-6.5AA	.236 - .256
-7AA	.256 - .276
-7.5AA	.276 - .295
-8AA	.295 - .315
-8.5AA	.315 - .335
-9AA	.335 - .354
-9.5AA	.354 - .375
-10AA	.376 - .394
-10.5AA	.394 - .413
-11AA	.413 - .433
-11.5AA	.433 - .453
-12AA	.453 - .472
-12.5AA	.472 - .492
-13AA	.492 - .512
-13.5AA	.512 - .531
-14AA	.531 - .551
-14.5AA	.551 - .571
-15AA	.571 - .591
-15.5AA	.591 - .610
-16AA	.610 - .630

øA= 1.004 B= 1.378

NBS10	
Model	Clamping Range od
NBC10-1.75AA	.059 - .069
-2AA	.069 - .079
-2.25AA	.079 - .089
-2.5AA	.089 - .098
-2.75AA	.098 - .108
-3AA	.108 - .118
-3.175AA	.115 - .125
-3.5AA	.118 - .138
-4AA	.138 - .157
-4.5AA	.157 - .177
-5AA	.177 - .197
-5.5AA	.197 - .217
-6AA	.217 - .236
-6.5AA	.236 - .256
-7AA	.256 - .276
-7.5AA	.276 - .295
-8AA	.295 - .315
-8.5AA	.315 - .335
-9AA	.335 - .354
-9.5AA	.354 - .375
-10AA	.376 - .394

øA= .650 B= 1.063

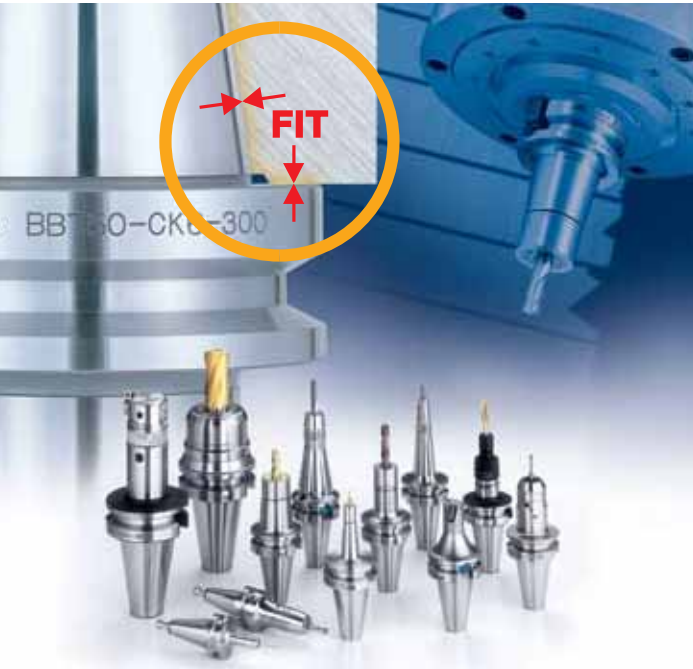
NBS20	
Model	Clamping Range od
NBC20-3AA	.098 - .118
-3.5AA	.118 - .138
-4AA	.138 - .157
-4.5AA	.157 - .177
-5AA	.177 - .197
-5.5AA	.197 - .217
-6AA	.217 - .236
-6.5AA	.236 - .256
-7AA	.256 - .276
-7.5AA	.276 - .295
-8AA	.295 - .315
-8.5AA	.315 - .335
-9AA	.335 - .354
-9.5AA	.354 - .375
-10AA	.376 - .394
-10.5AA	.394 - .413
-11AA	.413 - .433
-11.5AA	.433 - .453
-12AA	.453 - .472
-12.5AA	.472 - .492
-13AA	.492 - .512
-13.5AA	.512 - .531
-14AA	.531 - .551
-14.5AA	.551 - .571
-15AA	.571 - .591
-15.5AA	.591 - .610
-16AA	.610 - .630
-16.5AA	.630 - .650
-17AA	.650 - .669
-17.5AA	.669 - .689
-18AA	.689 - .709
-18.5AA	.709 - .728
-19AA	.728 - .750
-19.5AA	.751 - .768
-20AA	.768 - .787

øA= 1.122 B= 1.496

NBS13	
Model	Clamping Range od
NBC13-3AA	.098 - .118
-3.175AA	.115 - .125
-3.5AA	.118 - .138
-4AA	.138 - .157
-4.5AA	.157 - .177
-5AA	.177 - .197
-5.5AA	.197 - .217
-6AA	.217 - .236
-6.5AA	.236 - .256
-7AA	.256 - .276
-7.5AA	.276 - .295
-8AA	.295 - .315
-8.5AA	.315 - .335
-9AA	.335 - .354
-9.5AA	.354 - .375
-10AA	.376 - .394
-10.5AA	.394 - .413
-11AA	.413 - .433
-11.5AA	.433 - .453
-12AA	.453 - .472
-12.5AA	.472 - .492
-13AA	.492 - .512

øA= .807 B= 1.220

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