

SETCO

**3 Year
Limited
Warranty**

SETCO PRECISION SPINDLES • PATENTED AIRSHIELD TECHNOLOGY

Patented AirShield™ Technology

Sentry™ Belt-Driven Spindles

- ***C017 Cartridge Spindle***
- ***B035, B040, B050, B070 & B090 Block Spindles***

SETCO™

Sentry Precision Spindles

Value-Priced Sentry Precision Belt-Driven Spindles

The Sentry line is our standard building block spindle and is offered as a low-cost solution for many applications that call for a precision, high performance, standard design. Sentry spindles are built tough to deliver years of trouble-free performance. They feature a 100% inch design, permanent grease lubrication, class 7 extra precision steel ball bearings, and can be applied at any attitude: horizontal, vertical, angular, ceiling, and side-mounted attitudes and rotational need.

The Sentry line includes 6 models – 1 cartridge and 5 block configurations:

- **C017 Cartridge Spindle**
- **B035 Block Spindle**
- **B040 Block Spindle**
- **B050 Block Spindle**
- **B070 Block Spindle**
- **B090 Block Spindle**



**Sentry C017
Cartridge Spindle**

The C017 and B035 are the smallest Sentry spindles. These spindles are equipped with labyrinth seals. The Sentry C017 is our newest cartridge spindle, a drop-in replacement for the Gilman 1875.

The C017 is available in two basic configurations and offered with three spindle nose options and two spindle mounting brackets. Built to stock, these configurations are offered with 1-2 week shipment and a standard one year warranty.

The Sentry B035 is our smallest block spindle. Its compact size makes it ideal for small work that may require precision boring, drilling, and milling. The B035 is offered with a variety of motor drive packages – up to 3 hp and 9,000 rpm and features 4-6 week shipment. The B035 is a drop-in replacement for the Gilman 2750.



Sentry B035 Block Spindle

Models B040, B050, B070, and B090 represent the high end of the Sentry precision spindle line. These spindles are equipped with the patented SETCO AirShield™ and feature a standard 3-year warranty and 6-8 week shipment with standard options. All Sentry block-style spindles are equipped with a cross keyway and jackscrew holes, and can be configured with a variety of options such as triplex and quad front bearing arrangements, a wide assortment of motor drive packages, manual drawbar, and arrangement for through-spindle coolant. Like the B035, these spindles can be equipped with a variety of motor drive packages – up to 10 hp and 13,500 rpm.



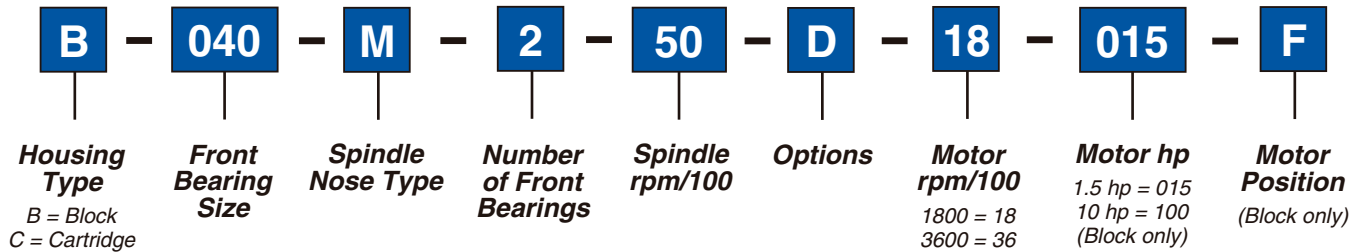
**Sentry B035 Spindle with
Optional Motor Drive Package
in Motor-front Position**

Note: Due to continual improvements, specifications are subject to change without notice. For current specifications, request a certified print when placing your order.

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How to Order Sentry Spindles

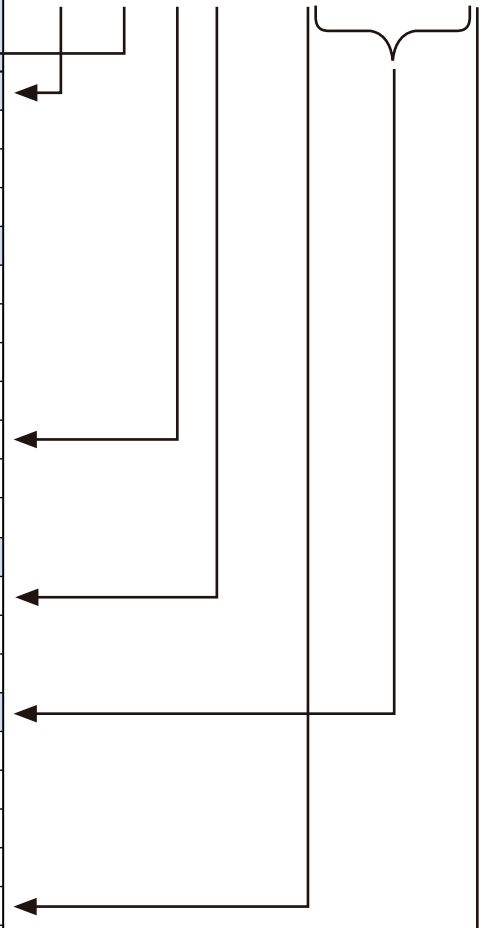
The following example identifies the Sentry spindle model code. When ordering a spindle, refer to this chart to specify the desired spindle and option package. The chart below is a matrix of options for the complete Sentry spindle line.



Sentry Spindle Model						Features / Options
017	035	040	050	070	090	
C	B	B	B	B	B	Housing Style/Seal Type
X	N/A	N/A	N/A	N/A	N/A	Cartridge with Labyrinth Seal
N/A	X	N/A	N/A	N/A	N/A	Block with Labyrinth Seal
N/A	N/A	X	X	X	X	Block with AirShield
						Spindle Nose
X	N/A	N/A	N/A	N/A	N/A	Arbor (AR)
X	N/A	N/A	N/A	N/A	N/A	Collet (CT)
X	N/A	N/A	N/A	N/A	N/A	Straight Bore (ST)
N/A	X	X	X	X	X	Boring (B)
N/A	X	X	N/A	N/A	N/A	#30 NMTB Milling (M)
N/A	N/A	N/A	X	X	N/A	#40 NMTB Milling (M)
N/A	N/A	N/A	N/A	N/A	X	#50 NMTB Milling (M)
						Front Bearing Arrangement
X	X	X	X	X	X	Duplex (2)
N/A	X	X	X	X	X	Triplex (3)
N/A	X	X	X	X	X	Quad (4)
						Brackets, Spindle and Drive Options
						017 Options
X	N/A	N/A	N/A	N/A	N/A	Clamp S-Type Cartridge Bracket (P)
X	N/A	N/A	N/A	N/A	N/A	Positioning Nut Cartridge Bracket (N)
						035 -090 Options
N/A	X	X	X	X	X	Manual Drawbar for Milling Nose (D)
N/A	X	X	X	X	X	Rotating Coolant Union Arrangement (C)
X	X	X	X	X	X	No Option (N)
N/A	N/A	N/A	N/A	X	X	Type A – Motor Forward Drive Package (AF)
N/A	X	X	X	X	X	Type B – Motor Forward Drive Package (F)
N/A	X	X	X	X	X	Type B – Motor Rearward Drive Package (R)

Example:

B - 040 - M - 2 - 50 - D - 18 - 015 - F



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Patented AirShield™ Technology

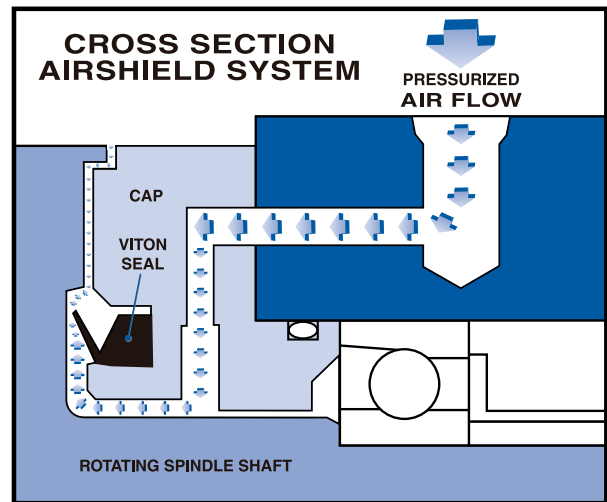
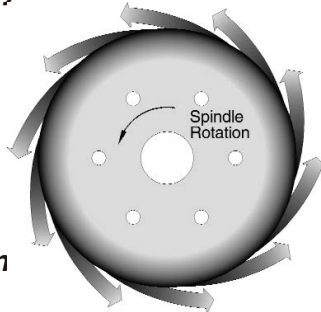
SETCO's Exclusive Patented AirShield™ Provides the Industry's Best Spindle Sealing System!

3-Year Warranty!

With over 2000 AirShield-equipped spindles in the field, over 4 years of runtime **without a failure**, the SETCO AirShield sealing system is the most reliable spindle seal in the industry!

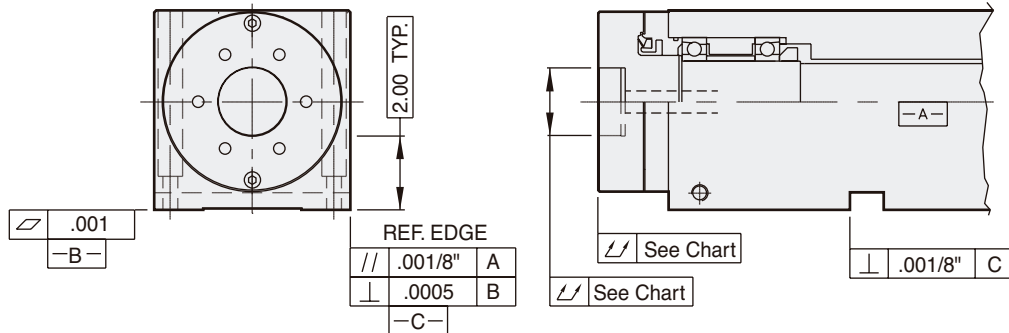
As standard, an AirShield-equipped SETCO spindle delivers:

- **3-year limited warranty on standard speed spindles**
- **Increased spindle reliability**
- **Reduced maintenance**
- **Increased runtime**
- **Increased production**
- **Protection from coolant ingress in dynamic and static modes**
- **Corrosion-resistant design**



U.S. Patent No. 5,727,095, 5,980,115 and 6,217,219

Standard Precision Run-Outs

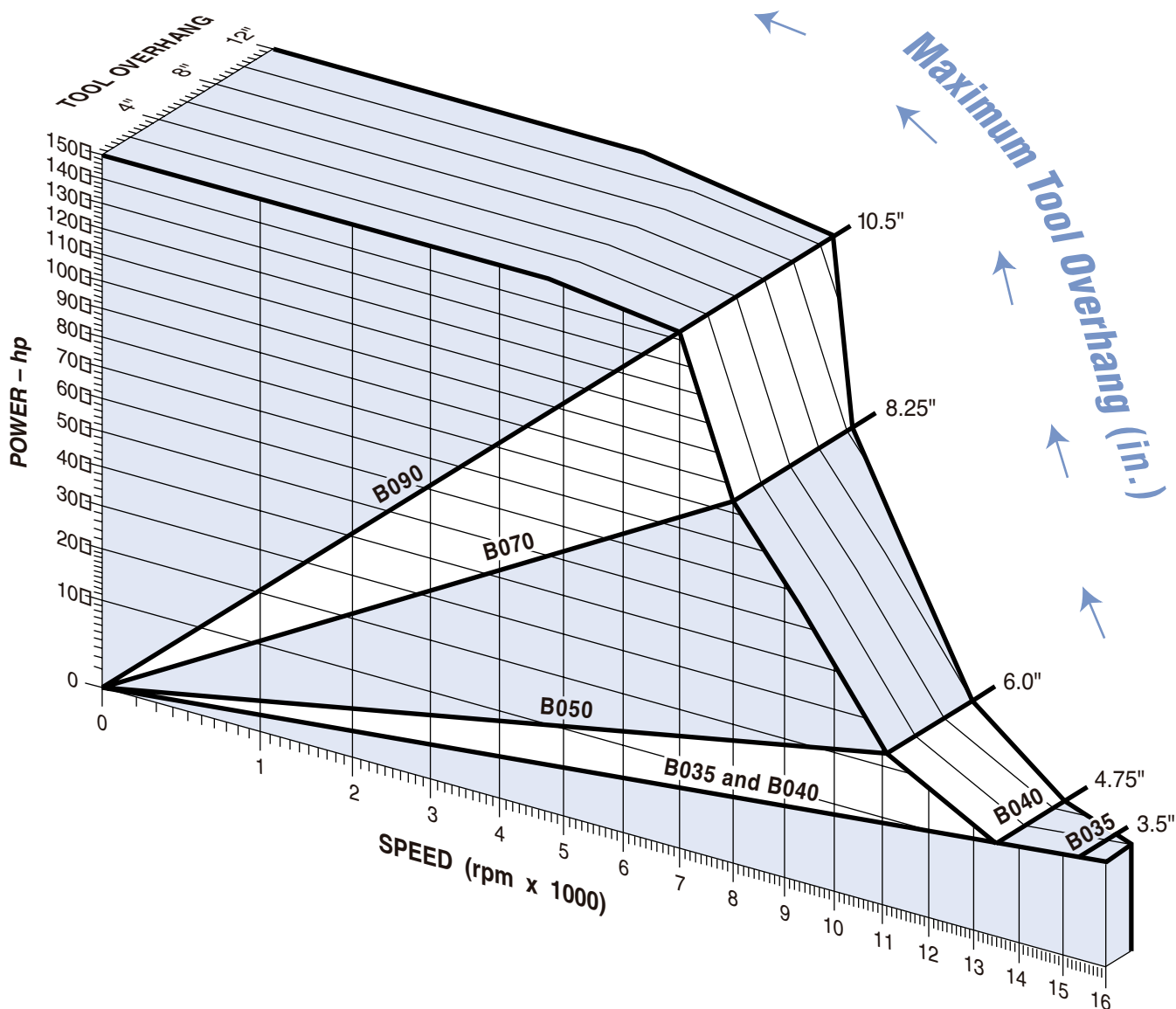


Spindle Size	RUNOUT TOLERANCES (INCHES)				
	BORING PILOT		MILLING PILOT		
	Pilot Diameter	Spindle Mounting Face	Internal Taper	Pilot Diameter	Spindle Mounting Face
B035	0.0001	0.0001	0.0001	0.0002	0.0002
B040	0.0001	0.0001	0.0001	0.0002	0.0002
B050	0.0001	0.0001	0.0001	0.0002	0.0002
B070	0.0001	0.0001	0.0001	0.0002	0.0002
B090	0.0002	0.0002	0.0002	0.0003	0.0003

How to Size Your Spindle to the Application

Spindle Selection Procedure

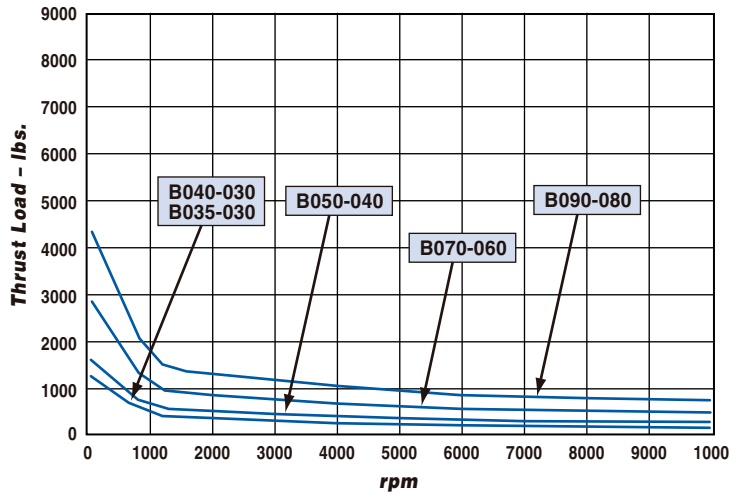
1. Determine the Power and Speed requirements for the application. Refer to the cutting data found in tool catalogs. For assistance, consult the SETCO Application Group.
2. Locate the Spindle Speed (rpm) on the chart and follow the line up until it intersects with the required Power (hp).
3. Continue up until it crosses the Spindle Size (model) line. This line is the minimum spindle size.
4. Verify that the Tool Overhang, measured from the spindle nose, falls within the maximum for the spindle.
5. For finish bore applications, verify the front spindle bearing is as large as the bore to be machined.



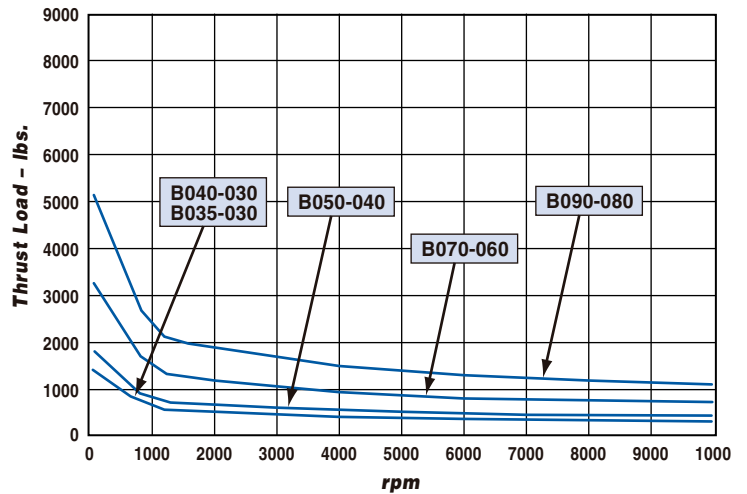
Note: The maximum rpm noted is based upon grease lubrication and light preload bearing.

Sentry Spindle Thrust Load vs. RPM

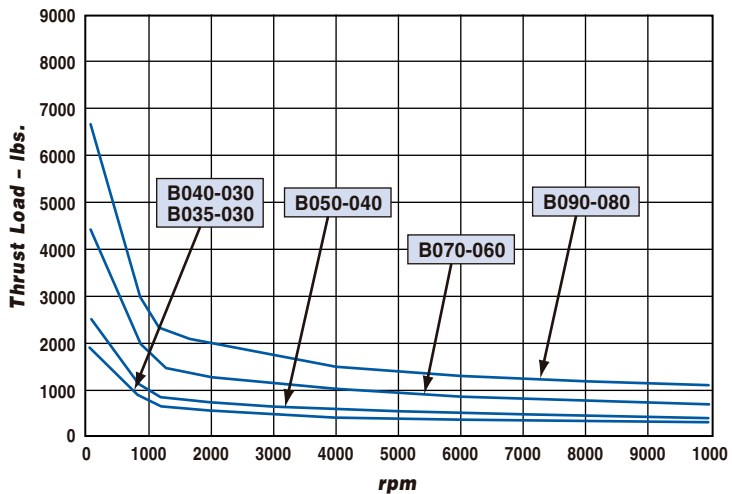
**Thrust Load vs RPM
Duplex Bearing - 15 Degree**



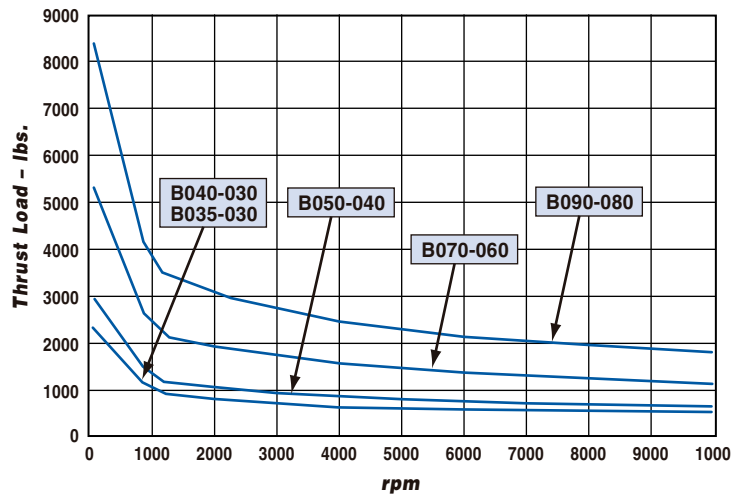
**Thrust Load vs RPM
Duplex Bearing - 25 Degree**



**Thrust Load vs RPM
Triplex Bearing - 15 Degree**



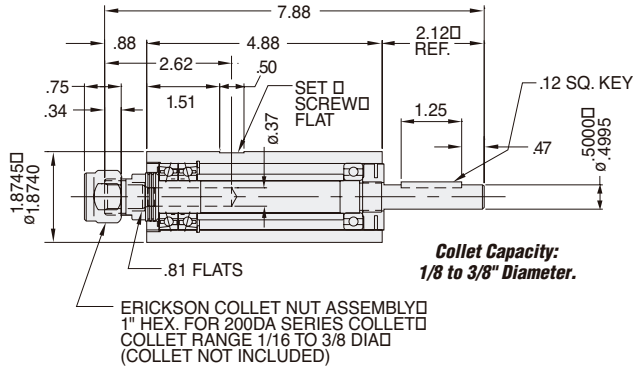
**Thrust Load vs RPM
Triplex Bearing - 25 Degree**



C017 Cartridge Spindle

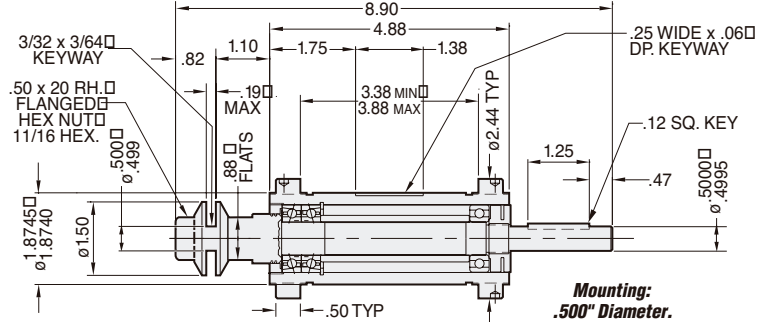
Plain Cartridge

Shown with Collet Nose

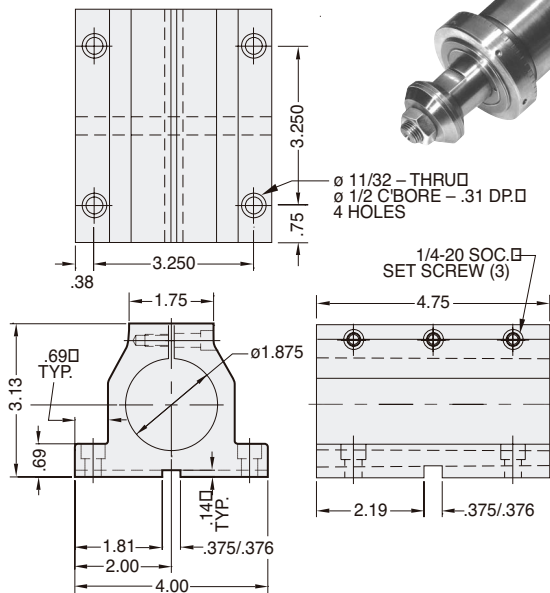


Positioning Nut Cartridge

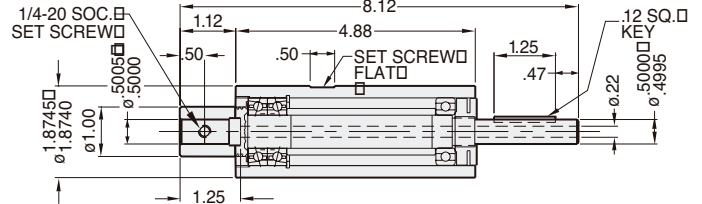
Shown with .500" Arbor Nose



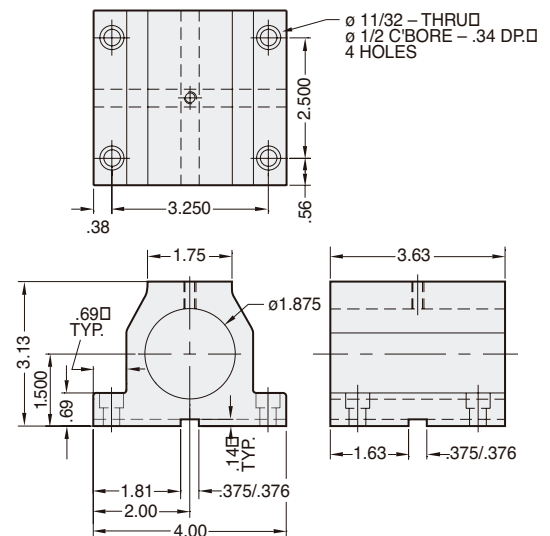
Clamp-Style Bracket



Straight Bore Nose

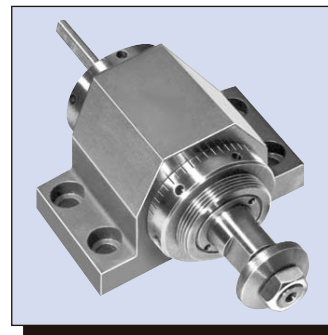


Positioning Nut Bracket



Sentry 017 Specifications

Speed	34,000 rpm Maximum
Torque	35 in-lb
Power/Revolution	1/1800 hp/rev
Spindle Nose Options	Arbor, Straight Bore, and Collet (1/8" to 3/8")
Front Bearing Configuration	Duplex Class 7, "DB" 17 x 35 mm Ball
Rear Bearing Configuration	Single Class 7, 17 x 35 mm Ball
Static Axial Stiffness	140,000 lb/in
Static Radial Stiffness	40,600 lb/in
Seal Type	Labyrinth Seal System
Lubrication	Permanent Grease Pack
Motor Drive Package	Not Available
Weight (Approx.)	
Spindle Cartridge	4.0 lb
Cartridge and Bracket	7.5 lb
Warranty	1 year



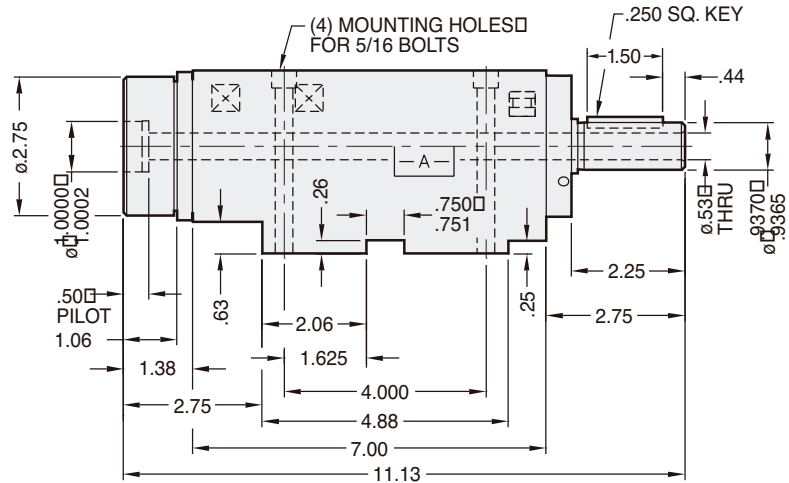
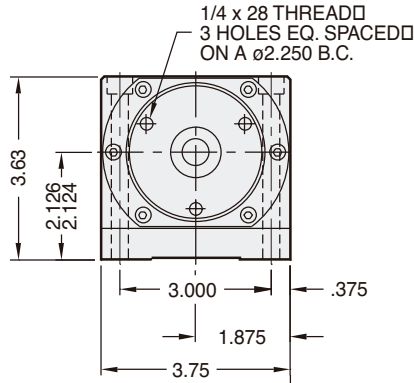
C017 Spindle
shown with
positioning nut
cartridge and
positioning nut
bracket

B035 Block Spindle

Sentry Belt-Driven Spindle

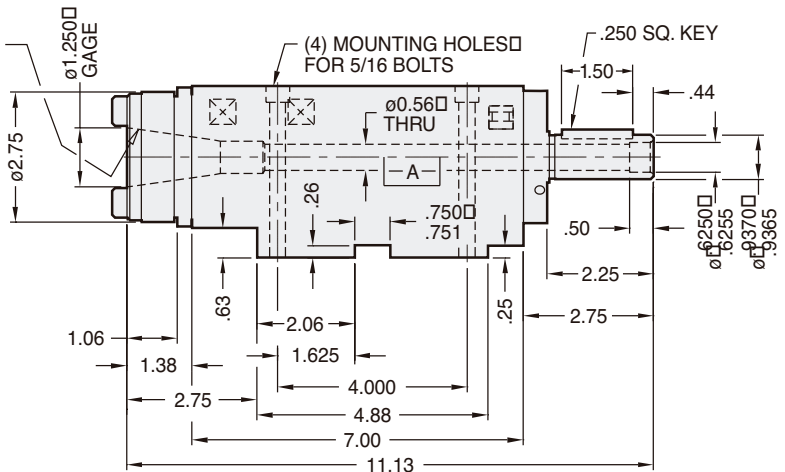
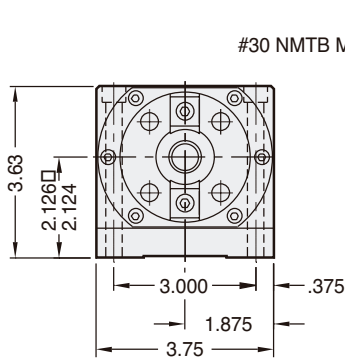
B035B

Keyed Block Style



B035M

Keyed Block Style



Note: See page 4 for Standard Precision Run-Outs.

Note: Erickson 075 collet nose also available.

035 TECHNICAL DATA

Torque Rating Max.	Power/ Revolution Max.	Spindle Weight Max.	Seal Type	Warranty	rpm Max. (Grease)*	Spindle Inertia wk ²	Static Radial Stiffness	Static Axial Stiffness**
60 in-lb	1/1000 hp/rev	25 lb	Labyrinth	1 year	15,300	12.0 lb-in ²	2.46 x 10 ⁵ lb/in	2.45 x 10 ⁵ lb/in

*All data is based upon light preload, duplex bearing setup.

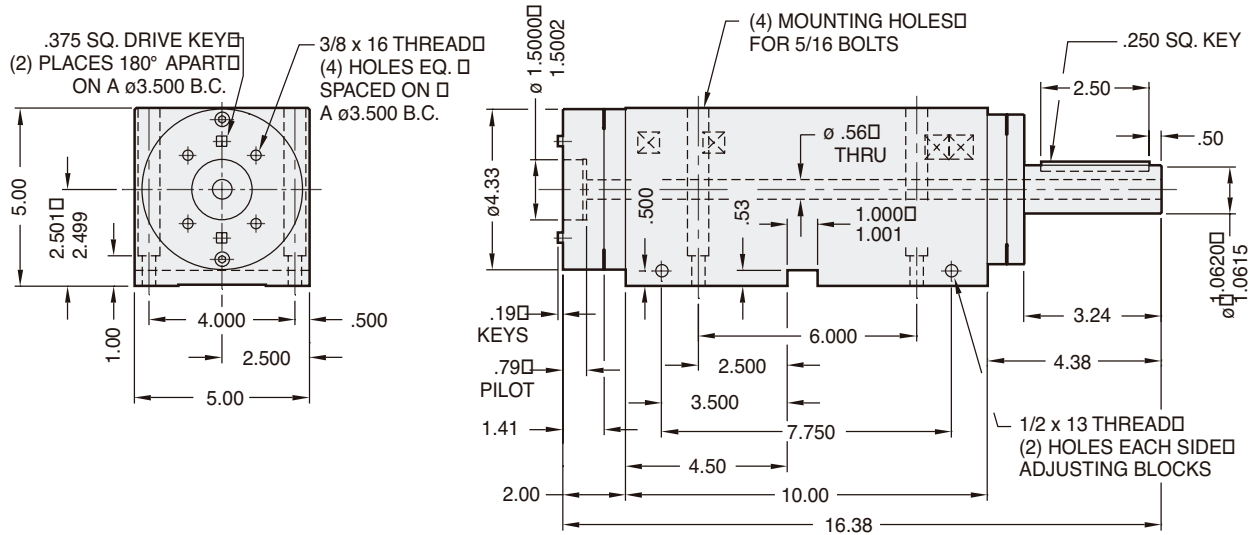
**Spindle stiffness calculated using 100 lb radial load applied at the spindle nose.

B040 Block Spindle

Sentry Belt-Driven Spindle

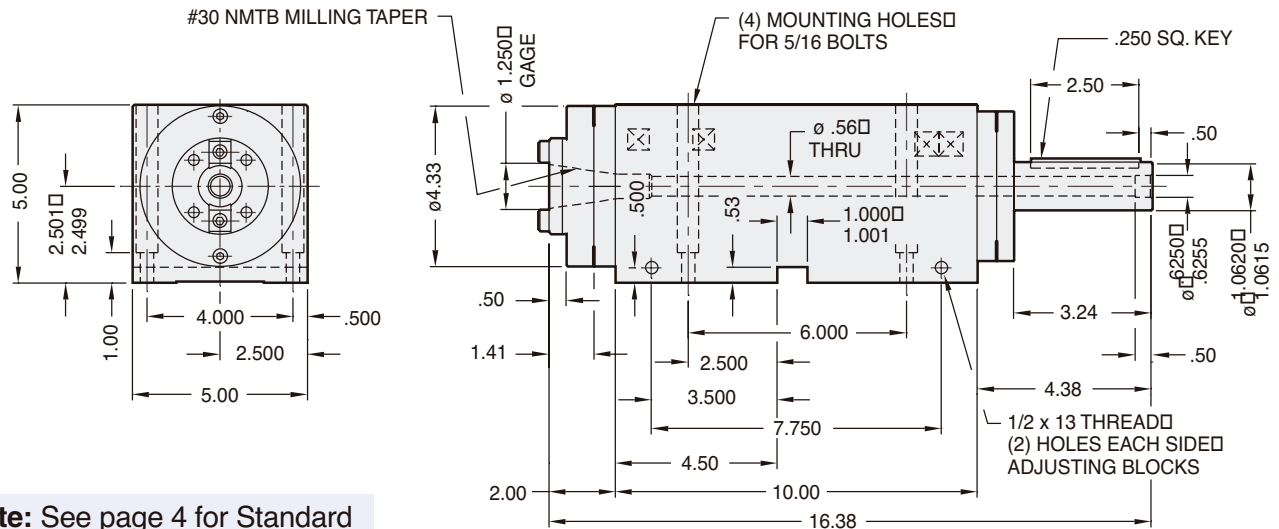
B040B

Keyed Block Style



B040M

Keyed Block Style



Note: See page 4 for Standard Precision Run-Outs.

040 TECHNICAL DATA

Torque Rating Max.	Power/ Revolution Max.	Spindle Weight Max.	Seal Type	Warranty	rpm Max. (Grease)*	Spindle Inertia wk ²	Static Radial Stiffness	Static Axial Stiffness**
66 in-lb	1/900 hp/rev	71 lb	AirShield	3 year	13,500	17.0 lb-in ²	2.11 x 10 ⁵ lb/in	2.57 x 10 ⁵ lb/in

*All data is based upon light preload, duplex bearing setup.

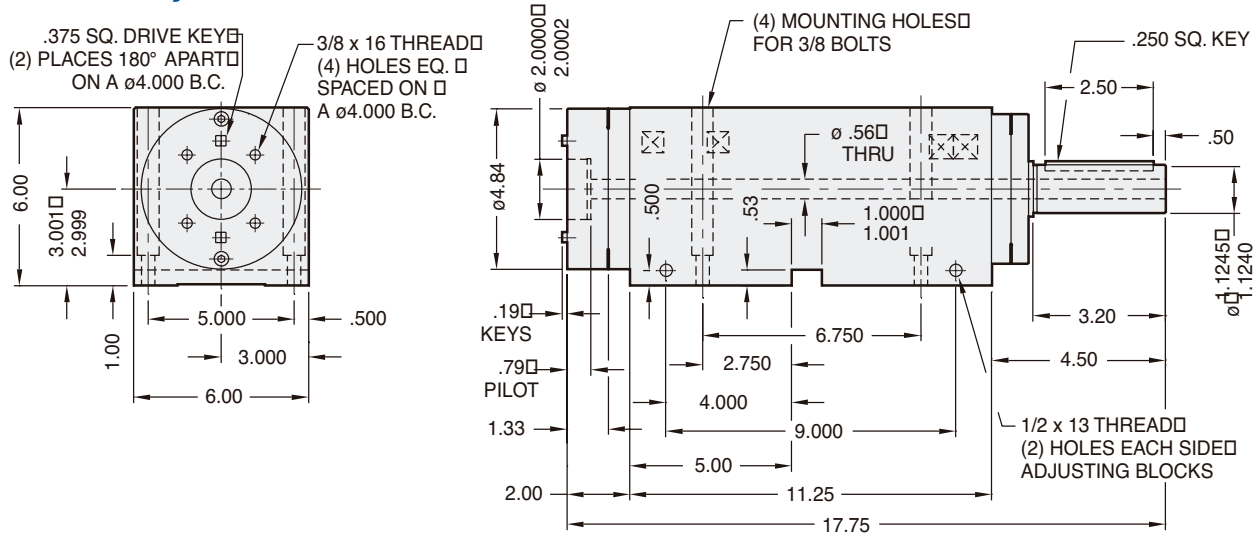
**Spindle stiffness calculated using 100 lb radial load applied at the spindle nose.

B050 Block Spindle

Sentry Belt-Driven Spindle

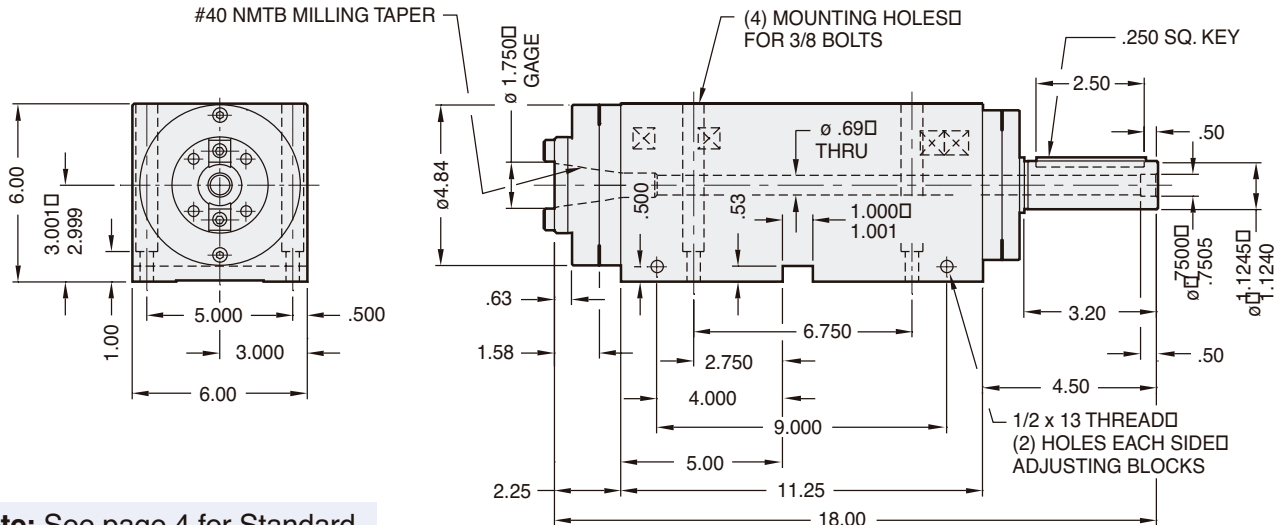
B050B

Keyed Block Style



B050M

Keyed Block Style



Note: See page 4 for Standard Precision Run-Outs.

050 TECHNICAL DATA

Torque Rating Max.	Power/ Revolution Max.	Spindle Weight Max.	Seal Type	Warranty	rpm Max. (Grease)*	Spindle Inertia wk ²	Static Radial Stiffness	Static Axial Stiffness**
180 in-lb	1/350 hp/rev	113 lb	AirShield	3 year	11,100	30.0 lb-in ²	3.31 x 10 ⁵ lb/in	3.20 x 10 ⁵ lb/in

*All data is based upon light preload, duplex bearing setup.

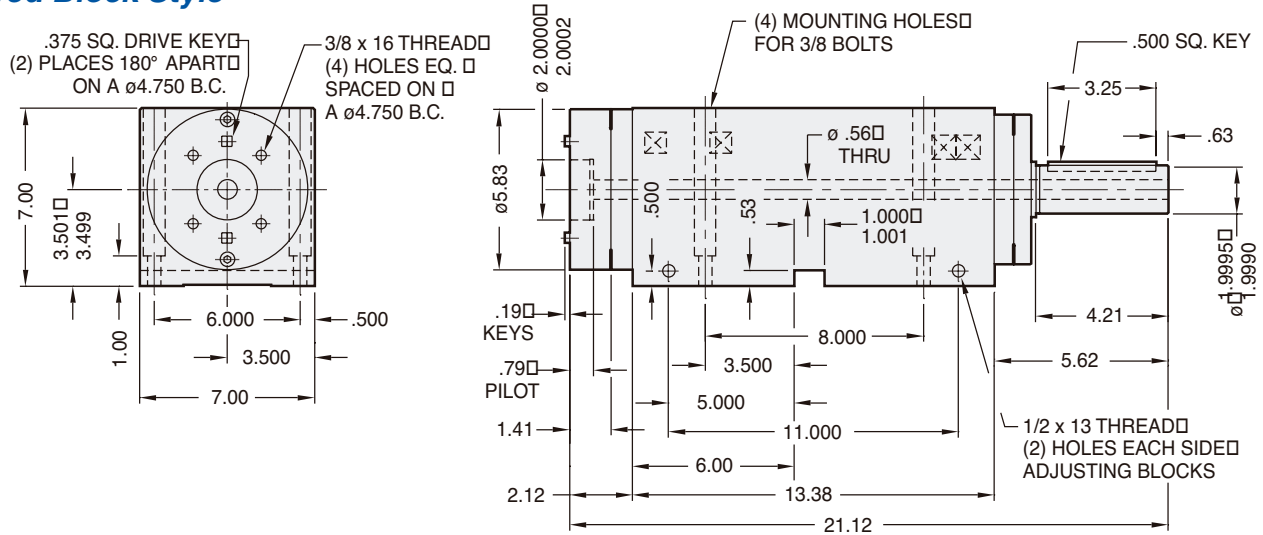
**Spindle stiffness calculated using 100 lb radial load applied at the spindle nose.

B070 Block Spindle

Sentry Belt-Driven Spindle

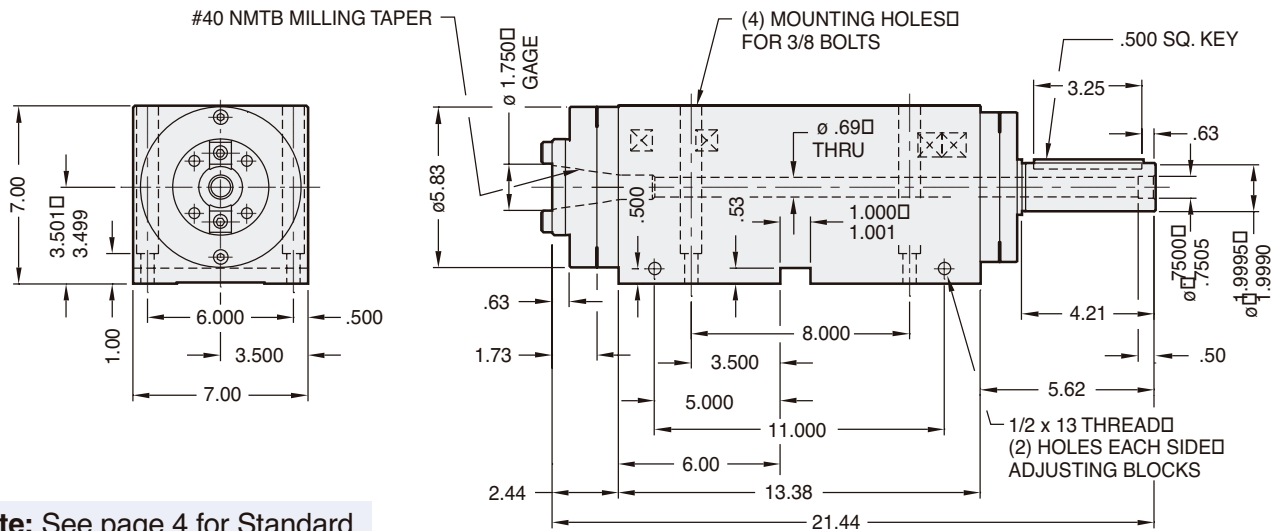
B070B

Keyed Block Style



B070M

Keyed Block Style



Note: See page 4 for Standard Precision Run-Outs.

070 TECHNICAL DATA

Torque Rating Max.	Power/ Revolution Max.	Spindle Weight Max.	Seal Type	Warranty	rpm Max. (Grease)*	Spindle Inertia wk ²	Static Radial Stiffness	Static Axial Stiffness**
974 in-lb	1/60 hp/rev	187 lb	AirShield	3 year	8,000	87.0 lb-in ²	7.08 x 10 ⁵ lb/in	4.80 x 10 ⁵ lb/in

*All data is based upon light preload, duplex bearing setup.

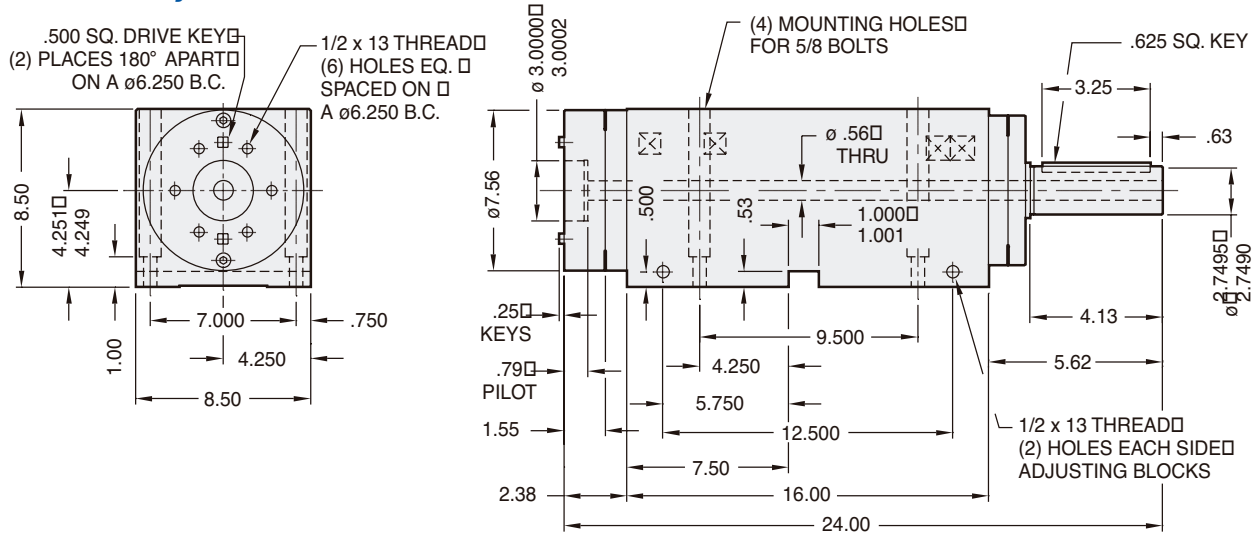
**Spindle stiffness calculated using 200 lb radial load applied at the spindle nose.

B090 Block Spindle

Sentry Belt-Driven Spindle

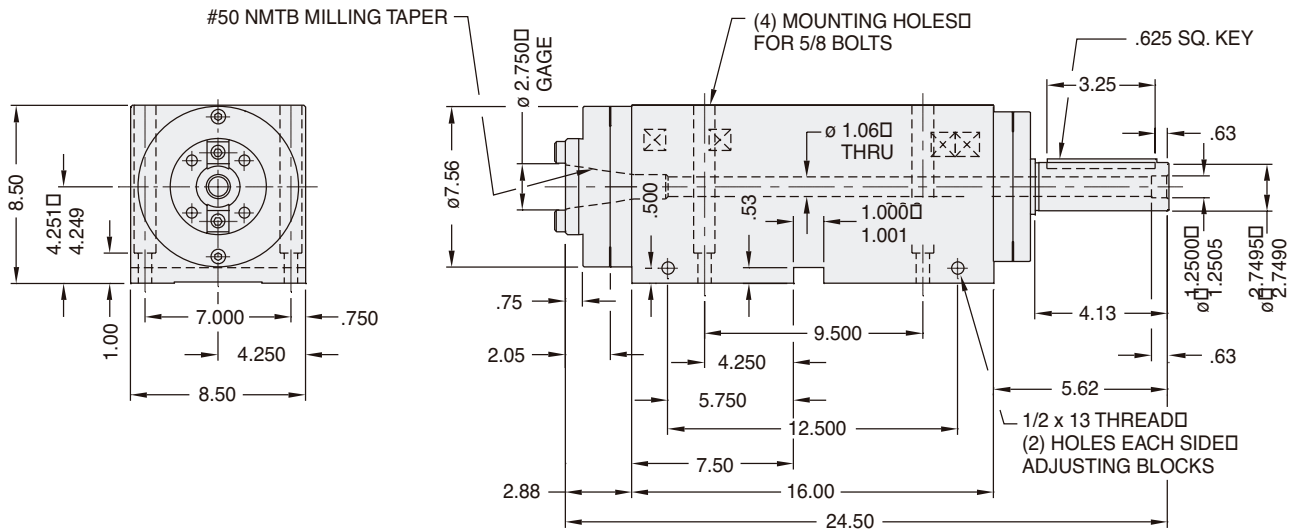
B090B

Keyed Block Style



B090M

Keyed Block Style



Note: See page 4 for Standard Precision Run-Outs.

090 TECHNICAL DATA

Torque Rating Max.	Power/ Revolution Max.	Spindle Weight Max.	Seal Type	Warranty	rpm Max. (Grease)*	Spindle Inertia wk ²	Static Radial Stiffness	Static Axial Stiffness**
2600 in-lb	1/25 hp/rev	330 lb	AirShield	3 year	6,200	273.0 lb-in ²	9.65 x 10 ⁵ lb/in	6.05 x 10 ⁵ lb/in

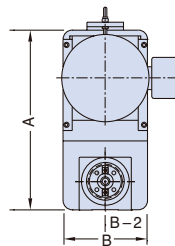
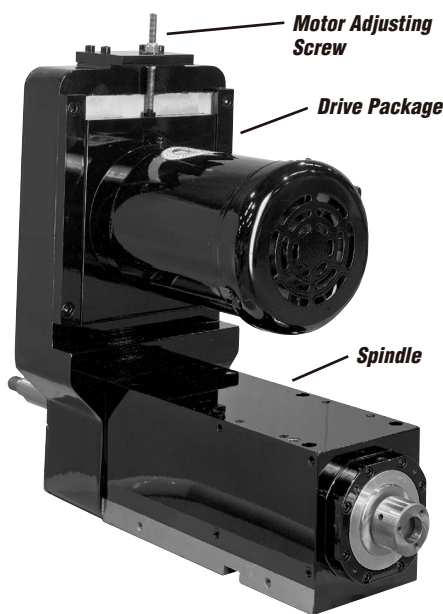
*All data is based upon light preload, duplex bearing setup.

**Spindle stiffness calculated using 200 lb radial load applied at the spindle nose.

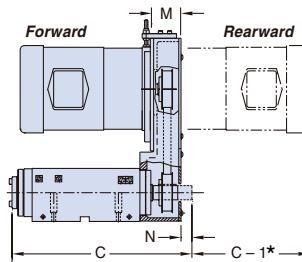
Accessories: Motor Drive

Type 'B' Belt Drive Package

The Type 'B' Belt Drive Packages provide a complete drive system for the Sentry series precision spindles. Mounted on the rear of the spindle housing is an integral belt guard/mounting bracket with motor mounting plate having screw type belt adjustment. Belt guard/mounting bracket allows for mounting of the motor toward or away from the spindle nose. Belt and pulleys are included to provide a wide range of incremental operating speeds for the application. The motor plate accommodates 'C' - face mounted motors.



Note: Specify motor mounting position when ordering.



*Non-NEMA Standard—Vendor Dependent
C = Arbor Length

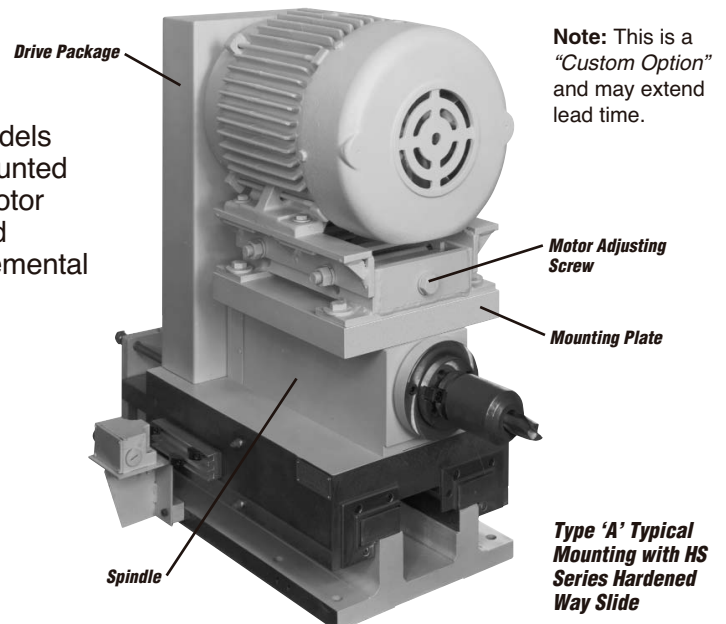
hp	Base Speed	Frame Size	C-1
1	3600	56C	9.69
	1800	143TC	10.31
	1200	145TC	11.62
1.5	3600	143TC	10.31
	1800	145TC	10.50
	1200	182TC	13.44
2	3600	145TC	11.62
	1800	145TC	11.62
	1200	184TC	14.44
3	3600	145TC	12.00
	1800	182TC	13.31
	1200	213TC	16.31
5	3600	184TC	14.44
	1800	184TC	14.44
	1200	215TC	17.44
7.5	3600	213TC	16.31
	1800	213TC	16.31
10	3600	215TC	16.31
	1800	215TC	17.44

Size	Motor Frame Size (max.)	Spindle Size	A	B	B-2	M	N
675	145TC	B035	17.38	6.75	3.38	2.12	0.12
850	145TC	B040	20.65	8.50	4.25	2.88	
		B050					
1025	215TC	B070	22.65	10.25	5.12	3.88	
		B090					
1075	215TC	B070	24.91	10.75	5.38	3.88	
		B090					

Type 'A' Belt Drive Package

The Type 'A' Belt Drive Packages are offered on models B070 and B090 for motors of 15, 20, and 25 hp. Mounted on the top of the spindle housing is an adjustable motor mounting plate that controls belt tensioning. Belt and pulleys are included to provide a wide range of incremental operating speeds for the application. Motor plate accommodates foot-mounted motors.

Spindle Size	hp	Base Speed	Frame Size	Belt Drive Ratio (Max.)
B070	15	1800	254T	2 to 1
	15	3600		
B090	15	1800		
	15	3600		
	20	1800	256T	
	20	3600		
	25	1800	284T	
	25	3600	284TS	



Accessories: Standard Sentry Drive Packages

Model	Motor hp	Motor rpm (Nominal)	Spindle Speed (rpm)	Speed Ratio
035	1.5	1200	800	1.5 to 1
			960	1.25 to 1
			1200	1 to 1
			1500	1 to 1.25
			1800	1 to 1
	2	1800	2250	1 to 1.25
			2700	1 to 1.5
			3168	1 to 1.76
			3600	1 to 1
			4032	1 to 1.12
	3	3600	4500	1 to 1.25
			4986	1 to 1.385
			5400	1 to 1.5
			5890	1 to 1.636
			6336	1 to 1.76
			6750	1 to 1.875
			7200	1 to 2
			7499	1 to 2.083
			8100	1 to 2.25
			8510	1 to 2.364
			9000	1 to 2.5

Model	Motor hp	Motor rpm (Nominal)	Spindle Speed (rpm)	Speed Ratio
040	1.5	1200	600	2 to 1
			902	1.333 to 1
			1200	1.5 to 1
	2	1800	1500	1.2 to 1
			1800	1 to 1
			2138	1 to 1.188
	3	3600	2400	1.5 to 1
			2707	1.333 to 1
			3000	1.2 to 1
			3374	1.067 to 1
			3600	1 to 1
			4000	1 to 1.111
			4320	1 to 1.2
			4561	1 to 1.267
			4799	1 to 1.333
			5263	1 to 1.462
			5760	1 to 1.6
			6232	1 to 1.731
			6646	1 to 1.846
			6923	1 to 1.923
			7200	1 to 2

Model	Motor hp	Motor rpm (Nominal)	Spindle Speed (rpm)	Speed Ratio
050	1.5	1200	600	2 to 1
			902	1.333 to 1
			1200	1.5 to 1
	2	1200	600	2 to 1
			900	1.333 to 1
			1200	1.5 to 1
		1800	1500	1.2 to 1
			1800	1 to 1
			2138	1 to 1.188
	3	3600	2400	1.5 to 1
			2707	1.333 to 1
			3000	1.2 to 1
			3374	1.067 to 1
			3600	1 to 1
			4000	1 to 1.111
			4320	1 to 1.2
			4561	1 to 1.267
			4799	1 to 1.333
			5263	1 to 1.462
			5760	1 to 1.6
			6232	1 to 1.731
			6646	1 to 1.846
			6923	1 to 1.923
			7200	1 to 2
	5	1800	1200	1.5 to 1
			1500	1.2 to 1
			1800	1 to 1
			2138	1 to 1.188
			2400	1.5 to 1
			2701	1.333 to 1
			3000	1.2 to 1
			3374	1.067 to 1
			3600	1 to 1
			4000	1 to 1.111
			4320	1 to 1.2
			4561	1 to 1.267
	5	3600	4799	1 to 1.333
			5263	1 to 1.462
			5760	1 to 1.6
			6232	1 to 1.731
			6646	1 to 1.846
			6923	1 to 1.923
			7200	1 to 2

Model	Motor hp	Motor rpm (Nominal)	Spindle Speed (rpm)	Speed Ratio
070	1.5	1200	600	2 to 1
			900	1.333 to 1
			1200	1.5 to 1
	2	1200	600	2 to 1
			900	1.333 to 1
			1200	1.5 to 1
		1800	1500	1.2 to 1
			1800	1 to 1
			2100	1.714 to 1
	3	3600	2400	1.5 to 1
			2701	1.333 to 1
			3000	1.2 to 1
			3374	1.067 to 1
			3600	1 to 1
			4000	1 to 1.111
			4500	1 to 1.25
			5040	1 to 1.4
			5400	1 to 1.5
			6001	1 to 1.667
			6750	1 to 1.875
	5	1200	600	2 to 1
			900	1.333 to 1
			1200	1.5 to 1
		1800	1500	1.2 to 1
			1800	1 to 1
			2100	1.714 to 1
		3600	2400	1.5 to 1
			2701	1.333 to 1
			3000	1.2 to 1
			3374	1.067 to 1
			3600	1 to 1
			4000	1 to 1.111
	10	1800	4500	1 to 1.25
			5040	1 to 1.4
			5400	1 to 1.5
		3600	6001	1 to 1.667
			6750	1 to 1.875
			1200	1.5 to 1
			1500	1.2 to 1
			1800	1 to 1
			2100	1.714 to 1
			2400	1.5 to 1
			2701	1.333 to 1
			3000	1.2 to 1
			3374	1.067 to 1
			3600	1 to 1
			4000	1 to 1.111
			4500	1 to 1.25
			5040	1 to 1.4
			5400	1 to 1.5
			6001	1 to 1.667
			6750	1 to 1.875

Model	Motor hp	Motor rpm (Nominal)	Spindle Speed (rpm)	Speed Ratio
090	1.5	1200	600	2 to 1
			923	1.3 to 1
			1200	1.5 to 1
	2	1200	600	2 to 1
			923	1.3 to 1
			1177	1.529 to 1
		1800	1523	1.182 to 1
			1800	1 to 1
			2077	1 to 1.154
	3	3600	2493	1.444 to 1
			2769	1.3 to 1
			3046	1.182 to 1
			3324	1.083 to 1
			3600	1 to 1
			3877	1 to 1.077
			4500	1 to 1.25
			4820	1 to 1.339
			5191	1 to 1.442
			5400	1 to 1.5
	5	1200	600	2 to 1
			923	1.3 to 1
			1177	1.529 to 1
		1800	1523	1.182 to 1
			1800	1 to 1
			2077	1 to 1.154
		3600	2493	1.444 to 1
			2769	1.3 to 1
			3046	1.182 to 1
			3324	1.083 to 1
			3600	1 to 1
			3877	1 to 1.077
	10	1800	4500	1 to 1.25
			4820	1 to 1.339
			5191	1 to 1.442
		3600	5400	1 to 1.5
			1177	1.529 to 1
			1523	1.182 to 1
			1800	1 to 1
			2077	1 to 1.154
			2493	1.444 to 1
			2769	1.3 to 1
			3046	1.182 to 1
			3324	1.083 to 1
			3600	1 to 1
			3877	1 to 1.077
			4500	1 to 1.25
			4820	1 to 1.339
			5191	1 to 1.442
			5400	1 to 1.5

Note: Standard Type 'B' drive packages. For Type 'A' packages consult factory. Speed based on no-load motor rpm. Specifications subject to change without notice. Custom drive packages are available as a "Custom Option." Consult factory.

Accessories: Coolant Union & Drawbar

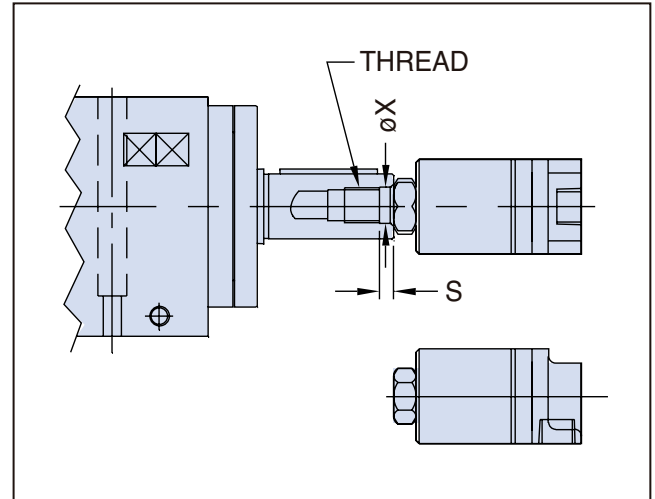
Accessories

Rotating Coolant Union Arrangement

Available on all Sentry series super precision spindles. Rotating coolant unions allow the coolant to enter by way of the rear of the spindle shaft and flow through the spindle to the tooling. Requires hole through and machining of spindle shaft to accommodate mounting of union (standard is customer-supplied, or SETCO can provide).

Available as straight through or 90° union. Specify left-hand or right-hand thread.

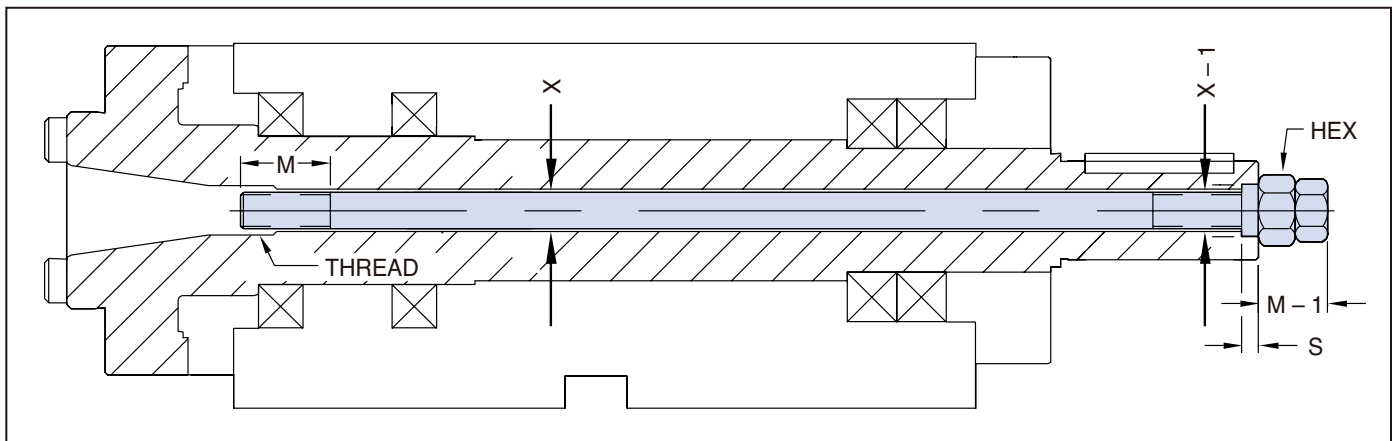
THREAD	X	S
5/8 X 18	$\frac{.6556}{.6560}$.28



Note: Specify direction of spindle rotation viewing rear of spindle.
Other makes and styles of unions are available upon request.

Manual Drawbar

Commonly used for manual retention of milling taper adapters per ANSI B5.18.



SIZE	THREAD	M	X	X-1	S	M-1	HEX
30	.50-13	1.25	.50	.625	.38	1.56	.88
40	.62-11	1.50	.62	.750	.38	1.81	1.06
50	1.00-8	2.00	1.00	1.250	.50	2.50	1.62

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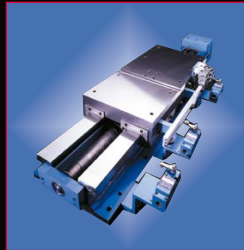
PRODUCTS



Dovetail Slides



Linear Recirculating
Bearing Slides



Hardened Steel
Way Slides



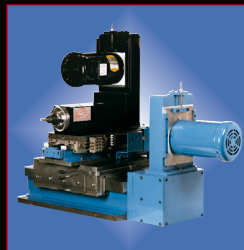
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and Accessories



Boring and Milling
Spindles



Sentry Belt-Driven
Spindles



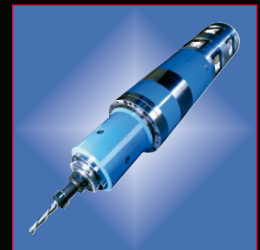
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