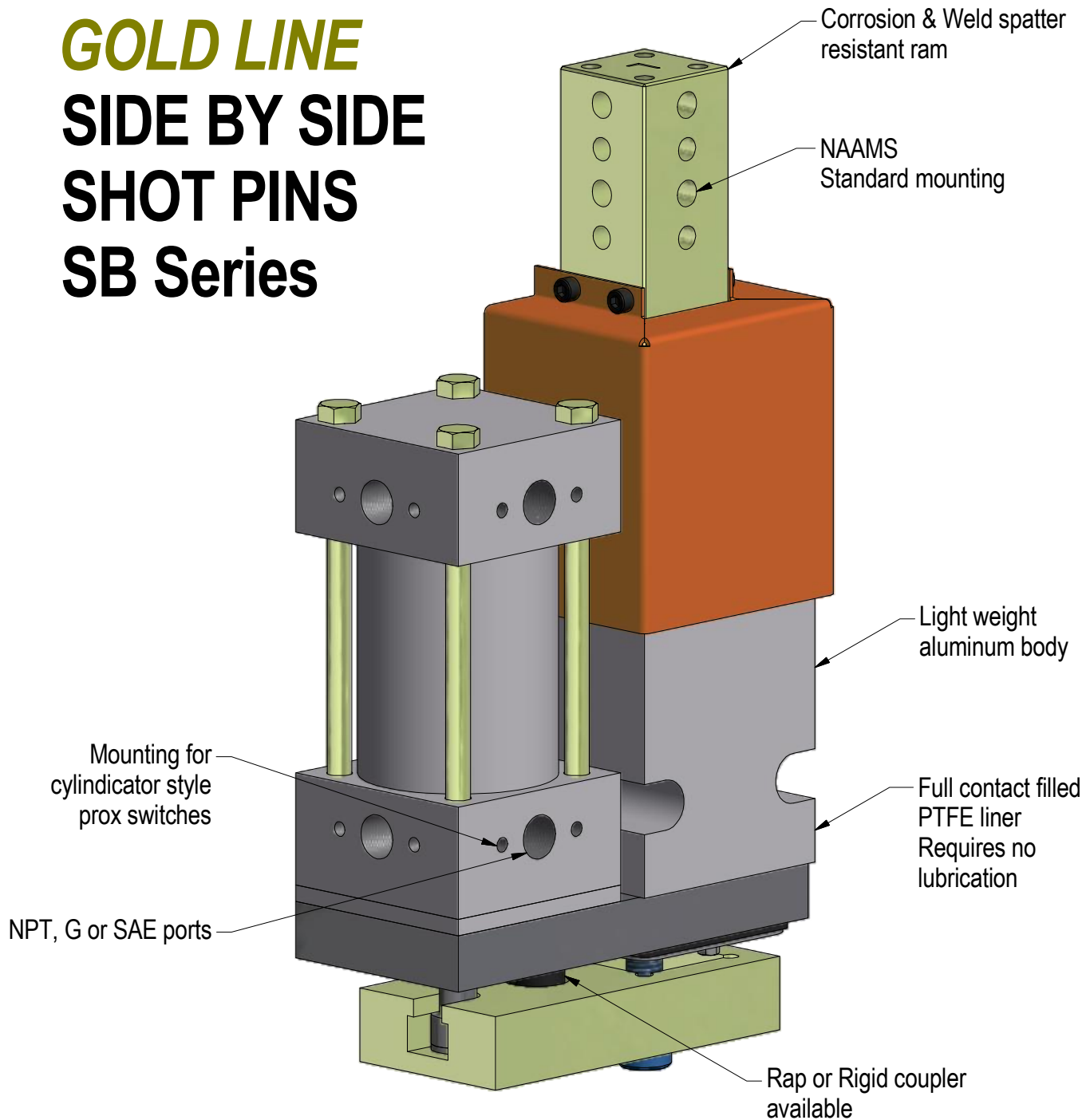


## **GOLD LINE** **SIDE BY SIDE** **SHOT PINS** **SB Series**



**Shot Pin Applications:** Retractable Locating Pints, Part Stops, Probe Slides, Wege Locks, Straight Clamps

# ORDERING INFORMATION

S B 2 N 0 2 5 A 0 1 0 D 0 0 1 A 0 0 0

**Series (Sheet 2)**  
SB

**Ram Size**

- 2 2 (24mm square)
- 4 4 (40mm square)
- 6 6 (60mm square)

**Stroke (Sheet 3)**

- 025 025, 050, 075, 100 (SB2 strokes)
- 025, 050, 075, 100, 125, 150, 175, 200 (SB4, SB6 strokes)

**Coupler**

- A Rap (shortens nominal cylinder stroke by 2mm-SB2, SB4)  
(shortens nominal cylinder stroke by 3mm-SB6)
- B Rigid

**Cylinder Options (Sheet 4)**

- 01 Pneumatic Single Rod (NPT Ports)
  - 02 Pneumatic Single Rod (G Ports)
  - 05 Hydraulic Single Rod (SAE Ports)
  - 06 Hydraulic Single Rod (G Ports)
- When ordering the hydraulic option, the shim code is to be "00".  
The hard stop is not available.

**Ram Style (Sheet 5)**

- D 4 Hole - Large
- L 4 Hole - Medium

(See supplemental ram sheet for other non-standard ram options)

**Switch Options**

- 00 See switch chart on page 6

**Shroud**

- 0 No Shroud
- 1 Shroud

**Cylinder Position (Sheet 4)**

- A C1 Prox at X1
- B C2 Prox at X1
- C C3 Prox at X1
- D C1 Prox at X2
- E C2 Prox at X2
- F C1 Prox at X3
- G C3 Prox at X3
- H C2 Prox at X4
- J C3 Prox at X4

**Ram Rotation (Sheet 5)**

- 0 No Rotation
- 9 90° Rotation (SB2N Only)

**Shim (See note)**

**Whole (mm)**

- 0 None
- 1 1mm
- 2 2mm
- 3 3mm
- 4 4mm
- 5 5mm

**Note:** Due to cylinder switch limitations, shimming past 5mm is not recommended.

When "00" is ordered, a 6mm shim set will be shipped loose with all pneumatic units.

**Shim (See note)**

**Quarter (mm)**

- 0 None
- A 0.25mm
- B 0.50mm
- C 0.75mm

**Standard Options-All other options may affect price and delivery**

(DO NOT SCALE DRAWING)

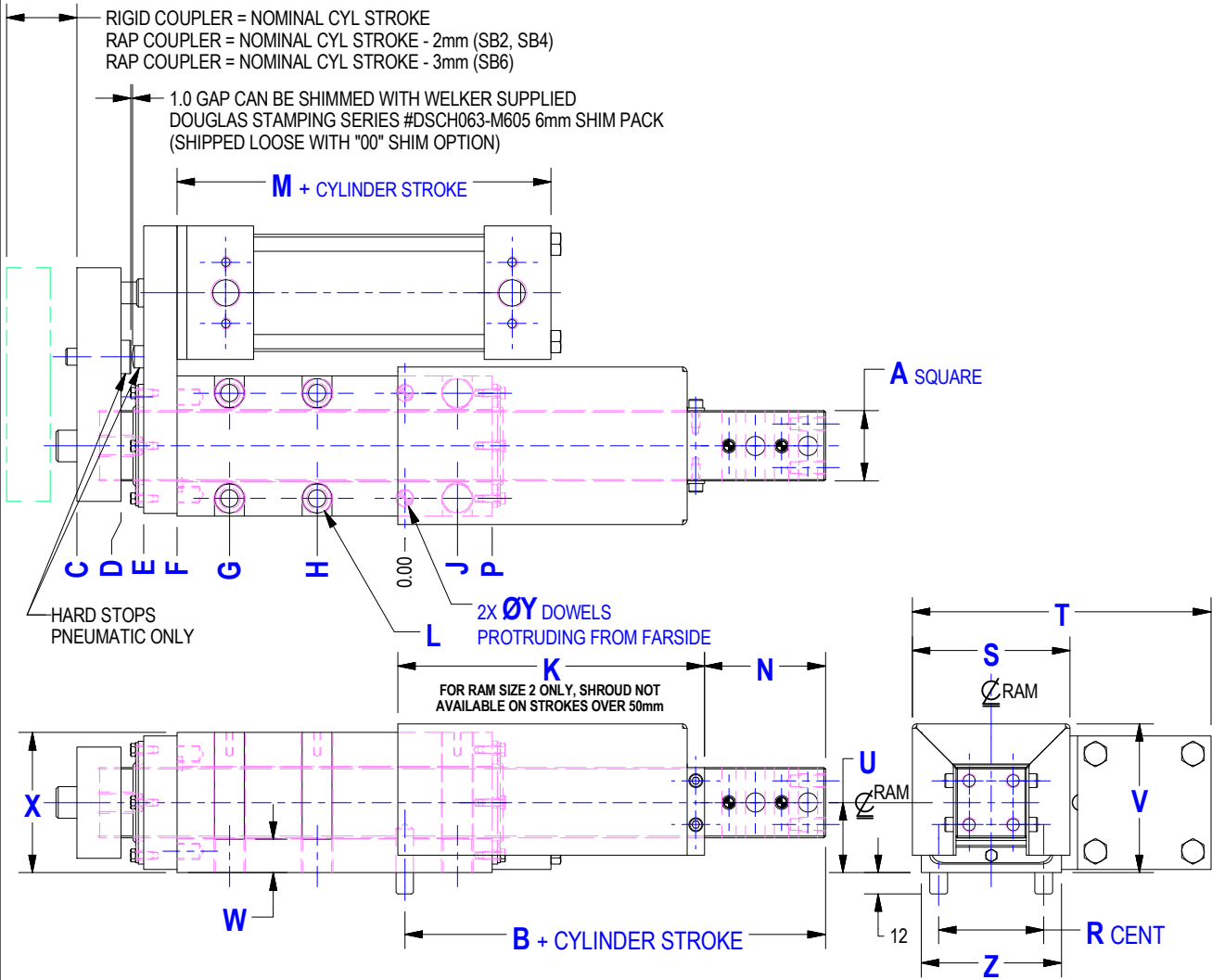


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# GENERAL DIMENSIONS

## SB2, SB4, SB6



Series	Strokes (25mm increments)	Nominal Ram	A	B	C	D	E	F	G	H	J	K	L
SB2*	25-100	24	23.937 23.926	127	152	127	116	100	75	25	25	78	6X M8 x 1.25 Tap from farside & drill & C Bore for M6 or 1/4" SHCS
SB4	25, 50	40	39.997 39.987	140	137	112	99	80	N/A	50	30	110	4X M12 x 1.75 Tap thru & Ø17.0 C Bore as shown for M10 or 3/8"
SB4	75, 100	40	39.997 39.987	140	187	162	149	130	100	50	30	175	6X M12 x 1.75 Tap thru & Ø17.0 C Bore as shown for M10 or 3/8"
SB4	125-200	40	39.997 39.987	140	287	262	249	230	150	50	30	230	6X M12 x 1.75 Tap thru & Ø17.0 C Bore as shown for M10 or 3/8"
SB6	25-200	60	60.000 59.987	200	303	265	249	230	180	60	60	280	6X M12 x 1.75 Tap thru & Ø17.0 C Bore as shown for M10 or 3/8"

	M	N	P	R	S	T	U	V	W	X	Y	Z
SB2*	118.5	67	48	40	60.5	117.6	28	56	44	52	8	54
SB4	113.6	69	50	60	90	170.4	40	85	19	80	10	80
SB6	**127.9	70	90	100	135	255.4	60	127	30	120	12	120

\*\*Hydraulic is 1/2" longer

### SHOT PIN UNIT WEIGHT PER STROKE

	25	50	75	100	125	150	175	200
SB2	11.1 lbs	11.9 lbs	12.2 lbs	12.9 lbs	X	X	X	X
SB4	23.9 lbs	25.1 lbs	27.7 lbs	30.6 lbs	37.3 lbs	38.8 lbs	40.0 lbs	41.2 lbs
SB6	100.6 lbs	103.3 lbs	106.0 lbs	108.9 lbs	112.8 lbs	115.5 lbs	118.0 lbs	120.7 lbs

\* THIS OPTION REQUIRES A MIN 5.5 BAR (80 PSI)

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# STROKE OPTIONS

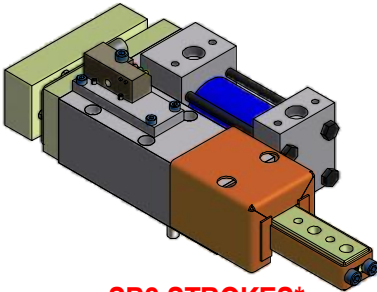
S B **2** N **0 2 5** A 0 1 0 0 D 0 0 1 A 0 0 0

**Ram Size**

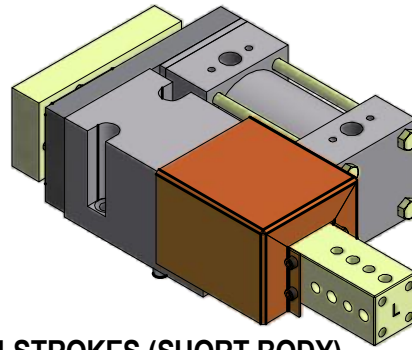
- 2** 2 (24mm square)
- 4** 4 (40mm square)
- 6** 6 (60mm square)

**Stroke**

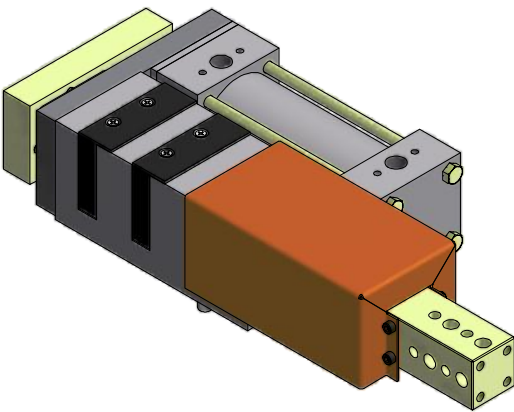
- 025** 025, 050, 075, 100 (SB2 Strokes)
- 025, 050, 075, 100, 125, 150, 175, 200 (SB4, SB6 Strokes)



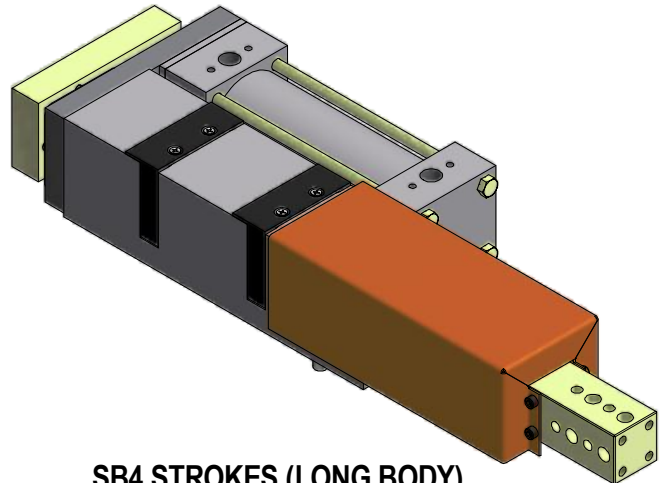
**SB2 STROKES\***  
025, 050, 075, 100



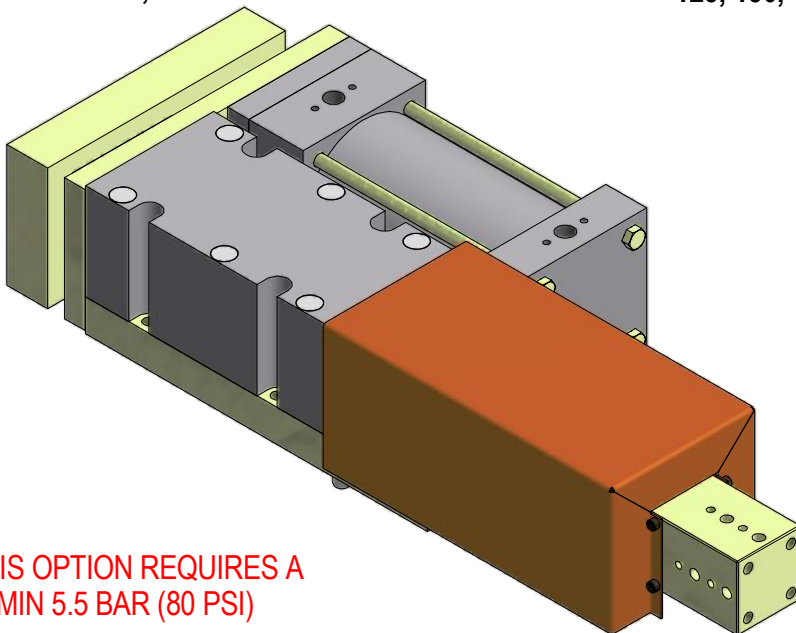
**SB4 STROKES (SHORT BODY)**  
025, 050



**SB4 STROKES (MEDIUM BODY)**  
075, 100



**SB4 STROKES (LONG BODY)**  
125, 150, 175, 200



**SB6 STROKES**  
025, 050, 075, 100,  
125, 150, 175, 200

\* THIS OPTION REQUIRES A  
MIN 5.5 BAR (80 PSI)

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# CYLINDER INFORMATION

S B **2** N 0 2 5 A **0 1** 0 D 0 0 1 **A** 0 0 0

**Ram Size**

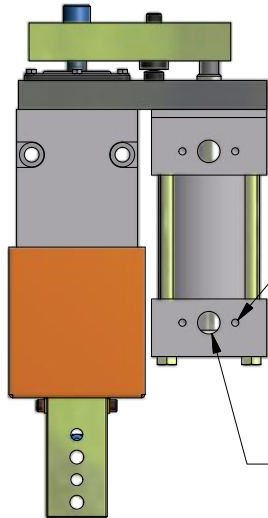
- 2 2 (24mm square)
- 4 4 (40mm square)
- 6 6 (60mm square)

**Cylinder Options**

- 01 Pneumatic Single Rod (NPT Ports)
- 02 Pneumatic Single Rod (G Ports)
- 05 Hydraulic Single Rod (SAE Ports)
- 06 Hydraulic Single Rod (G Ports)

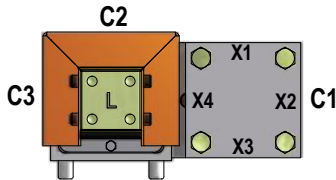
**Cylinder Position**

See Cylinder Position Chart "A" Below



**PROX MOUNT**  
SEE CHART "A" FOR  
LOCATIONAL OPTIONS

**PORTS**  
SEE CHARTS "A" & "B"  
& DIAGRAMS BELOW



SEE DIAGRAMS BELOW FOR EXAMPLES OF PROX/PORTS OF ALL CYLINDERS

**CHART "A"**

Code	Cylinder & Port/Prox Location
A	C1 & X1(SHN)
B	C2 & X1
C	C3 & X1
D	C1 & X2
E	C2 & X2
F	C1 & X3
G	C3 & X3
H	C2 & X4
J	C3 & X4

**For SB4 & SB6 (NPT or SAE Ports)**

Select the position of the cylinder (C1, C2 or C3)  
The X position for these cylinders is the PROX location, select this value (X1 thru X4).  
Find the preferred combination code in chart "A".

**For SB4 & SB6 (G Ports)**

Select the position of the cylinder (C1, C2 or C3)  
The X position for these cylinders is the AIR fitting location, select this value (X1 thru X4).  
Find the preferred combination code in chart "A".

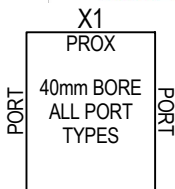
**For SB2 Cylinders**

Select the position of the cylinder (C1, C2 or C3)  
The X position for this cylinder is the PROX location, select this value (X1 thru X4).  
Find the preferred combination code in chart "A".

**CHART "B"**

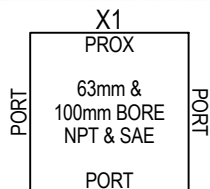
Series	Nominal Ram	Pneumatic Bore	Hydraulic Bore	Pneumatic Port Size	Hydraulic Port Size	Prox Port Read Depth	E	F	G
SB2*	24	40	**40	1/4" NPT OR G1/4	SAE #4 OR G1/4	26mm	51	63	1
SB4	40	63	***40	3/8" NPT OR G3/8	SAE #6 OR G3/8	26mm	76	76	2
SB6	60	100	***80	1/2" NPT OR G1/2	SAE #8 OR G1/2	32mm	114	114	3

\*THIS OPTION REQUIRES A MIN 5.5 BAR (80 psi) \*\*DO NOT OPERATE ABOVE 120 psi \*\*\*DO NOT OPERATE ABOVE 200 psi



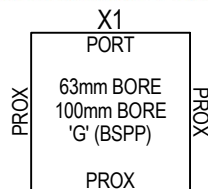
**"NPT, SAE & ALL 40mm BORE PORT TYPES"**

X1 OPTION DESIGNATES LOCATION OF THE PROX. TO ROTATE THE PROX LOCATION 90° CLOCKWISE, ORDER THE X2 OPTION, OTHER ROTATIONS AVAILABLE (SEE CHART A).



**"G" PORT CYLINDERS**

X1 OPTION DESIGNATES LOCATION OF THE PORT. TO ROTATE THE PORT LOCATION 90° CLOCKWISE, ORDER THE X2 OPTION, OTHER ROTATIONS AVAILABLE (SEE CHART A).



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# STANDARD RAM OPTIONS

(See supplemental ram sheet for non-standard options)

S B **2** N 0 2 5 A 0 1 0 **D** 0 0 1 A **0** 0 0

**Ram Size**

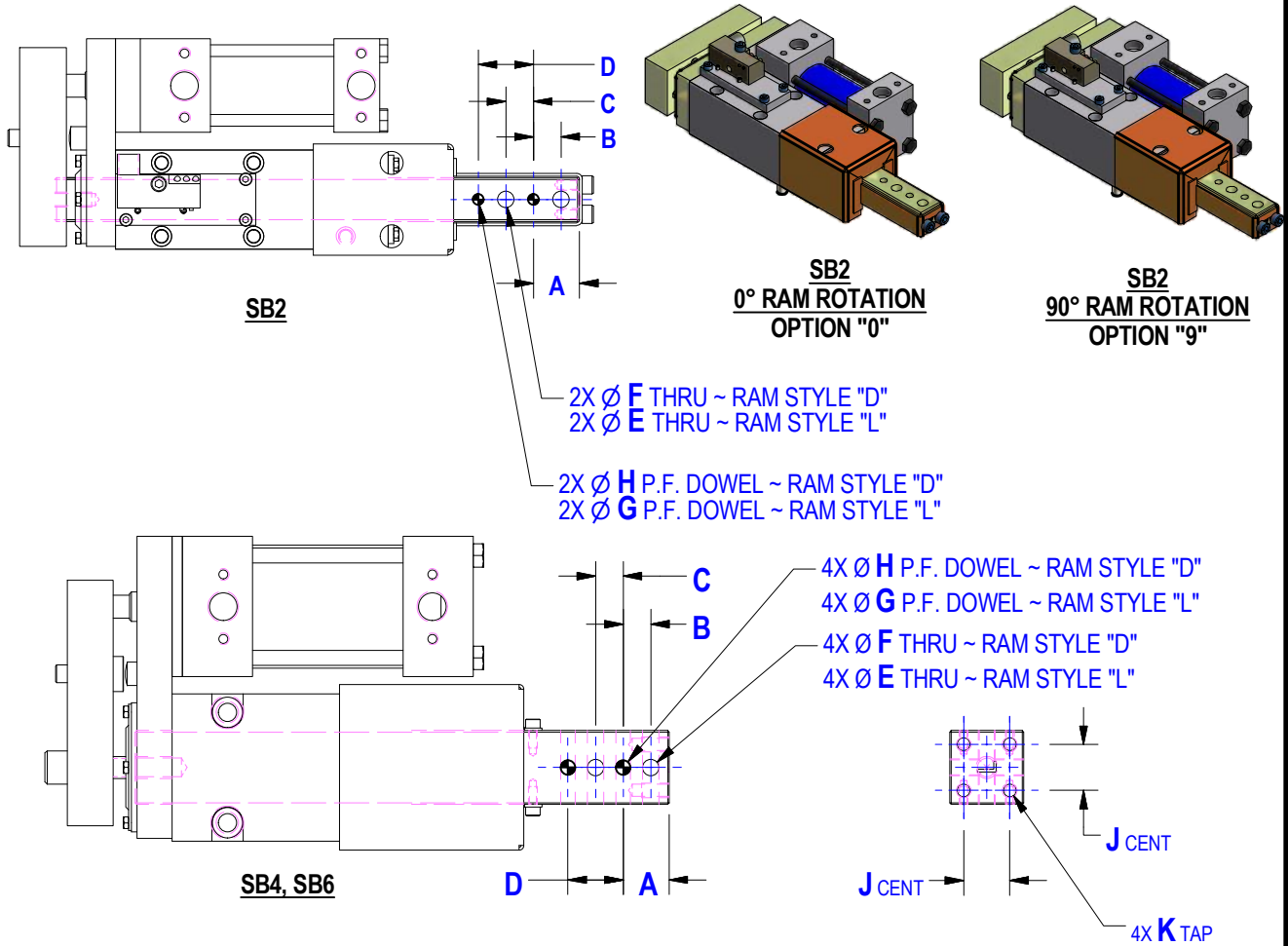
- 2** 2 (24mm square)
- 4** 4 (40mm square)
- 6** 6 (60mm square)

**Ram Style**

- D** 4 Hole - Large
- L** 4 Hole - Medium

**Ram Rotation**

- 0** No Rotation
- 9** 90° Rotation (SB2 Only)



Series	Nominal										
	Ram	A	B	C	D	ØE	ØF	ØG	ØH	J	K
<b>SB2*</b>	24	25	15	15	30	9.0	11.0	8.0 THRU	8.0 THRU	N/A	N/A
<b>SB4</b>	40	25	15	15	30	9.0	11.0	8.0 THRU	8.0 THRU	25	M8 X 1.25 - 15 DEEP
<b>SB6</b>	60	25	15	15	30	9.0	11.0	8.0 X 16 DEEP	8.0 THRU	40	M10 X 1.5 - 20 DEEP

**\* THIS OPTION REQUIRES A MIN 5.5 BAR (80 PSI)**

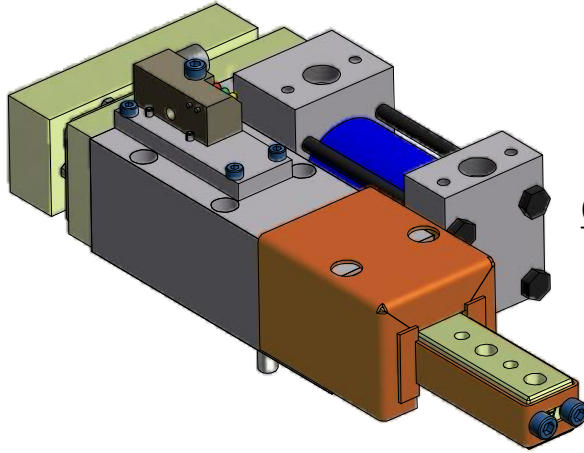
(DO NOT SCALE DRAWING)



# SWITCH OPTIONS

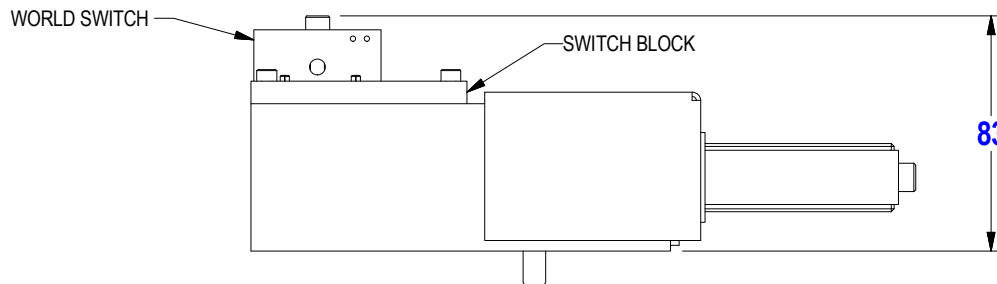
S B 2 N 0 2 5 A 0 1 0 D **DE** 1 A 0 0 0

Switch \_\_\_\_\_  
 00 See Chart Below



**NOTE: THE WORLD SWITCH CAN ONLY BE USED UP TO 50mm STROKE ON THE SB2N SERIES**  
**WORLD SWITCHES CANNOT BE USED ON SB4N SERIES**

	Order Number S01 (E)XTEND or S01 (R)ETRACT	Part Number	Manufacturer	Description
<b>World Switches</b>	00	NONE		
	99	Switch Ready		Customer Supplied Switch. Prepared for switches AE/AR - JE/JR only
	AE or AR	NI2-Q6.5-AP6-0.1-FS 4.4X3/S304	Turck	3-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect
	BE or BR	NI2-Q6.5-ADZ 32-0.1-FSB 5.4X4/S304	Turck	4-Wire, 5-Pin, AC/DC 1/2-20 (N.O.) Quick Disconnect
	CE or CR	NI2-Q6.5-AN6-0.1-FS 4.4X3/S304	Turck	3-Wire, 4-Pin, DC M12 X 1 (NPN) Quick Disconnect
	DE or DR	NBN2-F581-100S6-E8-V1	Pepperl & Fuchs	3-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect
	EE or ER	BES-Z02KR2-PSC20F-P100-S04-V	Balluff	3-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect
	FE or FR	871D-MW2GP100A-D4	Allen Bradley	4-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect
	HE or HR	NI2-Q6.5-0.1M-BDS-2AP6X3-H1141/S34	Turck	3-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect
	JE or JR	IN5374	Efector	4-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect



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# SUPPLEMENTAL RAM OPTIONS

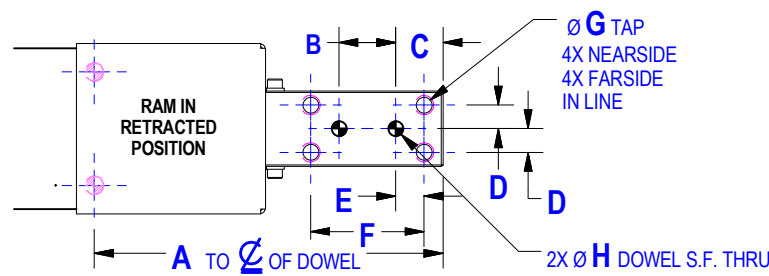
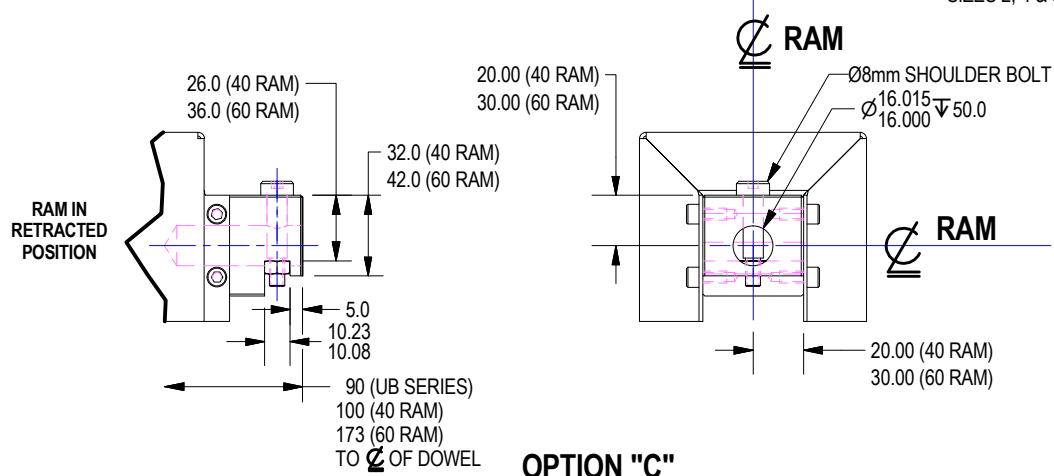
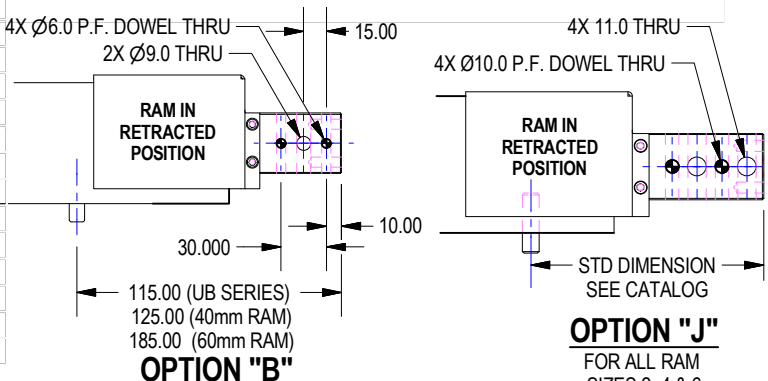
## SPECIAL ORDER ONLY - NOT SUBJECT TO STANDARD PRICE OR DELIVERY

S
B
4
N
0
2
5
A
0
1
0
D
0
0
1
A
0
0
0

- |  |                   |                       |                                 |
|--|-------------------|-----------------------|---------------------------------|
| <b>Series</b>                          | <b>Ram Size</b>   | <b>Ram Options</b>    | <b>Ram Rotation</b>             |
| EB Electric Side-By-Side               | 2 2 (24mm square) | See Ram Options Chart | 0 No Rotation                   |
| SB Pneumatic Side-By-Side              | where noted       |                       | 9 90° Rotation (Ram Option "H") |
| WP In Line                             | 4 4 (40mm square) |                       |                                 |
| UB In Line w/Integrated Cyl (40mm Ram) | 6 6 (60mm square) |                       |                                 |

**Ram Options**

- A** 4 Hole - 6mm Dwls and 9mm Holes
- B** 3 Hole
- C** End Hole
- D** 4 Hole - Large (See Ram Options Sheet)
- E** 4 Hole - M8 Taps - 6mm Dwls
- F** 3 Hole - M8 Taps - 6mm Dwls
- G** 4 Hole - M10 Taps - 8mm Dwls
- H** 6 Hole
- J** 4 Hole - 10mm Dwls and 11mm Holes
- K** 3 Hole - 10mm Dwls and 11mm Holes
- L** 4 Hole - Medium (See Ram Options Sheet)



Nominal Ram	A	B	C	D	E	F	ØG	ØH
40 (145 UB Series)	155	30	25	12.5	15.0	60.0	M10 X 1.5 X 20 DEEP or Clear for M8 Screw	8
60	290	95	30	17.5	15.0	125.0	M12 X 1.75 X 24 DEEP or Clear for M10 Screw	10

(DO NOT SCALE DRAWING)



## Welker Shot Pin Technical Information EB, SB, UB and WP Series

### Body Mounting (except UB - see UB catalog)

Square ram shot pin units have dual mounting capability. At all mounting locations, you have the option of mounting from the top using the counter-bored clearance holes or the same holes, tapped from the bottom. Using any four of the six holes, symmetrical about the centerline, is sufficient. Protruding mounting dowels are provided and are press fit into the body.

Square ram packages are high precision full contact plane bearing units and therefore must be mounted to a flat surface. **Mounting surfaces must be flat within .002" (0.95mm).**

### Ram Mounting

Square ram shot pin units use a standard NAAMS L-Block pattern with 15mm spacing. Spacing allows mounting of 3 and 4 hole pin retainers and L-blocks to the ram. Through holes can be tapped and fitted with standard thread inserts.

### Shrouds

Safety orange steel shrouds are available for additional protection. Shrouds prevent undesirable buildup of contamination from welding and machining applications. Welker specifically recommends shroud usage in mig, tig and arc welding applications. Shrouds should only be removed if clearance problems exist and conditions permit. Consult Welker.

### Wipers

The wiper is the only maintenance item on Welker pin units. It is a custom molded moly impregnated urethane wiper. Welker recommends changing the wiper yearly. Specific applications may require more or less frequent wiper service.

### Stroke

The stroke accuracy of shot pins is limited to that of the cylinder. Normal cylinder stroke accuracy is  $\pm .015"$  (0.38mm). For control of "end of stroke" repeatability, see extend and retract stop options for each series.

Rap couplings cause the unit to be less than the nominal stroke of the cylinder. The 24mm ram and 40mm ram units have a 2mm rap. The 60mm ram units have a 3mm rap. The rap allows the cylinder to begin moving before moving the ram. The impact of the coupler helps free tooling from a bound condition. Most applications using a pneumatic shot pin should have rap couplings while most hydraulic shot pin applications should use a rigid coupler.

Welker cylinders do not require lubrication. **WELKER DOES NOT MOUNT CUSTOMER SUPPLIED CYLINDERS TO SHOT PIN UNITS.** 24mm ram and 40mm ram tie rod cylinders use prox switch (cylindicator) ports with 1.025" read depth (probe length). 60mm ram tie rod cylinders have prox switch (cylindicator) ports with 1.250" read depth (probe length). Welker does not supply cylindicator switches. Shot pins ordered with compact cylinders are cylinder switch ready. Cylinder switches are available though Welker. World switches are available though Welker for shot pins offering world switch capability.

### Repeatability

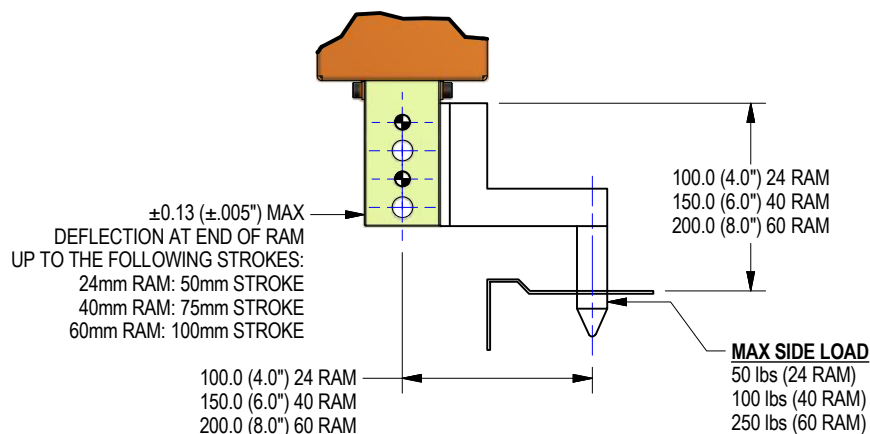
Shot pin units utilize a full contact bearing surface for high repeatability. Repeatability within  $\pm .002"$  (0.05mm) part to part is achievable.

### Wear

Wear equals variance in position under load over time. Shot pin tests indicate maximum wear of .002" wear at 3 million cycles.

### Loading and Deflection

Maximum deflection is  $\pm .005"$  and is measured at the **end of the ram** up to the specified strokes and up to the loads and distances as shown below. Longer extensions can be used at lower tolerances and loads. Pins mounted closer to the body exhibit less deflection. For applications with longer strokes and higher loads, consult Welker.



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