TECHNICAL BULLETIN
SB2 LEGACY STATUS

EFFECTIVE 1/1/21: SB2 IS LEGACY STATUS, ONLY AVAILABLE AS SERVICE PARTS. AVAILABILITY, PRICING & DELIVERY LEAD TIMES ARE NOT GUARANTEED.

UB2
RECOMMENDED REPLACEMENT FOR SB2

LEGACY SHOT PIN

SB2
SB2 SERIES GOLD LINE
SIDE-BY-SIDE SHOT PIN

- Corrosion & Weld Spatter Resistant RAM
- NAAMS Standard Mounting
- Lightweight Aluminum Body with Full Contact PTFE Liner: Requires No Lubrication
- World Switch Available with 25 & 50mm Stroke Units
- NPT or G Ports
- Mounting for Cylindicator Style Prox Switches
- Rap or Rigid Coupler Available

SHOT PIN APPLICATIONS:
- Retractable Locating Pins
- Part Stops
- Probe Slides
- Wedge Locks
- Straight Clamps

REVISED: 6/18/19
**ORDERING INFORMATION**

*Note: All boxes must be filled in for a complete part number*

- **Series**: SB
- **Ram Size**: 2
  - 24mm square
- **Stroke (Sheet 3)**: 025
  - 025, 050, 075, 100
- **Coupler**
  - A: Rap (shortens ram retract stroke by 2mm)
  - B: Rigid
- **Cylinder Options (Sheet 4)**
  - 01: Pneumatic Single Rod (NPT Ports)
  - 02: Pneumatic Single Rod (G Ports)
- **Ram Style (Sheet 5)**
  - D: 4 Hole - Large
  - L: 4 Hole - Medium
- **Switch Options (Sheet 6)**
  - 00: See switch chart
- **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**
  - 0: No Rotation
  - 9: 90° Rotation
- **Shim Whole (mm):**
  - See note
  - 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 Quarter (mm):**
  - See note
  - 0: None
  - A: 0.25mm
  - B: 0.50mm
  - C: 0.75mm

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

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**Engineered Products**

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(Do not scale drawing)
GENERAL DIMENSIONS

ON SB SERIES SHOT PINS THE DIMENSION FOR RAM EXTEND POSITION IS THE SAME FOR RAP OR RIGID OPTION.

REMOVAL OF RIGID COUPLER CONVERTS UNIT TO RAP OPTION. SEE WEBSITE FOR DATA SHEET AND VIDEO www.welkerproducts.com

SB2 RAP OPTION SHORTENS RAM RETRACT BY 2mm.

RIGID COUPLER = NOMINAL CYLINDER STROKE
RAP COUPLER = NOMINAL CYLINDER STROKE - 2mm

SHIMMABLE HARD STOP
IF SHIMMING, WELKER RECOMMENDS 3mm, 5mm MAX.

118.5 + CYLINDER STROKE

23.937
23.926
SQUARE

6X M8 x 1.25 TAP FROM FARSIDE
& DRILL & C'BORE FOR M6 OR 1/4" SHCS

2X Ø8 DOWELS
PROTRUDING FROM FARSIDE

SHROUD NOT AVAILABLE
ON STROKES OVER
50mm

127 + CYLINDER STROKE
(SAME FOR RAP & RIGID OPTION IN RAM EXTEND POSITION, SHOWN)

REQUIRES A MIN 5.5 BAR (80 PSI)

<table>
<thead>
<tr>
<th>SHOT PIN WEIGHT BY STROKE</th>
<th>25mm</th>
<th>50mm</th>
<th>75mm</th>
<th>100mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>25mm</td>
<td>11.1 lbs</td>
<td>11.9 lbs</td>
<td>12.2 lbs</td>
<td>12.9 lbs</td>
</tr>
</tbody>
</table>

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CYLINDER INFORMATION

Ram Size
2 24mm square

Cylinder Options
01 Pneumatic Single Rod (NPT Ports)
02 Pneumatic Single Rod (G Ports)

Cylinder Position
See Cylinder Position Chart A Below

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

CHART A

<table>
<thead>
<tr>
<th>Code</th>
<th>Cylinder &amp; Port/Prox Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>C1 &amp; X1 (shown)</td>
</tr>
<tr>
<td>B</td>
<td>C2 &amp; X1</td>
</tr>
<tr>
<td>C</td>
<td>C3 &amp; X1</td>
</tr>
<tr>
<td>D</td>
<td>C1 &amp; X2</td>
</tr>
<tr>
<td>E</td>
<td>C2 &amp; X2</td>
</tr>
<tr>
<td>F</td>
<td>C1 &amp; X3</td>
</tr>
<tr>
<td>G</td>
<td>C3 &amp; X3</td>
</tr>
<tr>
<td>H</td>
<td>C2 &amp; X4</td>
</tr>
<tr>
<td>J</td>
<td>C3 &amp; X4</td>
</tr>
</tbody>
</table>

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).
If ordering with world switch option, cylinder position C2 is not available.
Find the preferred combination code in Chart A.

CHART B

<table>
<thead>
<tr>
<th>Nominal Ram</th>
<th>Pneumatic Bore</th>
<th>Pneumatic Port Size</th>
<th>Prox Port Reed Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>&quot;40&quot;</td>
<td>1/4&quot; NPT or G1/4</td>
<td>26mm</td>
</tr>
</tbody>
</table>

* REQUIRES A MINIMUM OF 5.5 BAR (80 PSI)
FLOW CONTROLS NOT REQUIRED

"NPT & 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).

(DO NOT SCALE DRAWING)

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RAM OPTIONS

Ram Size
2 24mm square

Ram Style
See chart

Ram Rotation
0 No Rotation
9 90° Rotation

2X P.F. DOWEL
2X HOLES

RAM STYLE | DOWELS | HOLES
---|---|---
D | 8.0mm THRU | 11.0mm THRU
L | 8.0mm THRU | 9.0mm THRU

0° RAM ROTATION
OPTION "0"

90° RAM ROTATION
OPTION "9"
## SWITCH OPTIONS

Switch 00 See Chart Below

### NOTES:

The World Switch can only be used with 25mm & 50mm strokes.

Cylinder Position C2 is not available with switch

### WORLD SWITCH OPTIONS

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Part Number</th>
<th>Manufacturer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>99</td>
<td>Switch Ready</td>
<td></td>
<td>Customer Supplied Switch. Prepared for switches below:</td>
</tr>
<tr>
<td>AE or AR</td>
<td>Ni2-Q6.5-AP6-0.1-FS 4.4X3/S304</td>
<td>Turck</td>
<td>4-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect</td>
</tr>
<tr>
<td>BE or BR</td>
<td>Ni2-Q6.5-ADZ32-0.1-FSB 5.4X4/S304</td>
<td>Turck</td>
<td>4-Wire, 5-Pin, AC/DC 1/2-20 (N.O.) Quick Disconnect</td>
</tr>
<tr>
<td>DE or DR</td>
<td>NBN2-F581-100S6-EB-V1</td>
<td>Pepperl &amp; Fuchs</td>
<td>4-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect</td>
</tr>
<tr>
<td>JE or JR</td>
<td>IN5374</td>
<td>Efector</td>
<td>3-Wire, 4-Pin, DC M12 X 1 (PNP) Quick Disconnect</td>
</tr>
</tbody>
</table>

Standard Switch Option - All other options may affect price and delivery

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World Switches Note: Available with 25mm and 50mm stroke

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Diagram of World Switch with dimensions:

- WORLD SWITCH
- SWITCH BLOCK
- 88 [3.45]
WELKER SB2 SHOT PIN TECHNICAL INFORMATION

Body Mounting: 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 ± .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 units have a 2mm 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. Rap coupler not available on hydraulic units.

Welker cylinders do not require lubrication.

Switch: 24mm ram tie rod cylinders use prox switch (cylinder indicator) ports with 1.025" read depth (probe length). World switches are available.

Repeatability: Shot pin units utilize a full contact bearing surface for high repeatability. Repeatability within ±.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 ± .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.

![Diagram of Welker SB2 Shot Pin](image)

MOUNTED TOOLING MUST BE WITHIN APPROVED APPLICATION RADIUS FROM END OF RAM:
50 lbf @ R = 100.0mm (4.0") 24 RAM

±0.13 (±.005") MAX
DEFLECTION AT END OF RAM UP TO THE FOLLOWING STROKES:
24mm RAM: 50mm STROKE

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