

# BCS

**SERIES BCS**  
**STRETCH ROD CYLINDERS**  
*for the Plastic Bottle Blowing Industry*



**DIRECT REPLACEMENT FOR SIDEL® MODEL SBO,  
ISBM SERIES1 AND SERIES2 MACHINES**



**MODEL BCS2  
(SERIES2)**



**MODEL BCS1  
(SERIES1)**



**-X27 ADAPTOR BLOCK  
WITH PHD IN-LINE  
CHECK VALVE ATTACHED  
TO MANIFOLD**

**ISO-9001  
CERTIFIED**

Quality Management  
System Certified

BCS05C



PHD is a member of the  
MAC Distributor Network

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SOLUTIONS FOR INDUSTRIAL AUTOMATION

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# ORDERING DATA: SERIES BCS STRETCH ROD CYLINDERS

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FOR SERIES1 MACHINES SB01, SB02, SB04 CONSULT FACTORY

### TO ORDER, SPECIFY:

Product, Series, Type, Machine No.,  
Design No., Bore Size, Stroke, any  
Options.

**PRODUCT**  
B - Blow Mold

**TYPE**  
S - Stretch Rod

**BORE SIZE**

BORE	mm	in	mm <sup>2</sup>	in <sup>2</sup>
50	1.969	1963	3.05	

Contact PHD for smaller  
or larger bore sizes.

**MANDATORY CUSHION CONTROL**

DB - Cushion Controls Both Ends Series1 only\*\*  
DR - Cushion Control Retract Only Series2 only\*\*  
No other cushion option can be  
Specified See notes 1, 2 & 3.

**B C S 1 - 6 - 50 X 406 - DB - U19**

**SERIES**  
C - Cylinder  
150 psi [10 bar] Air

**MACHINE NO.**  
1 - Series1 Machine  
(without Manifold)  
2 - Series2 Machine  
(with Manifold)

**DESIGN NO.**  
6 - Metric

**METRIC STROKE (BCSxx)**

**STANDARD STROKE LENGTHS**  
(100 mm = minimum stroke  
in 1 mm increments)

BORE	MAXIMUM	STROKE [mm]
50	450	

Contact PHD for shorter or longer strokes.

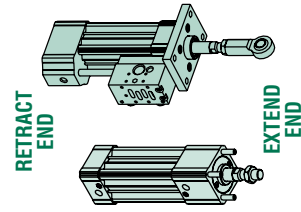
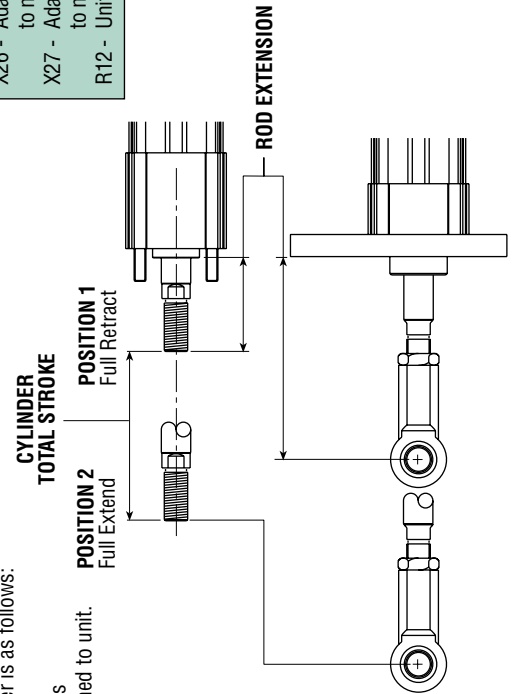
**CYLINDER OPTIONS**

K\_ - Extra Rod Extension in 1 mm increments.  
Length code (BCSxxx) is K5 = 5 mm, K17 = 17 mm,  
K121 = 121 mm, etc.

U19 - MAC ISO 2 Series Valve with DIN connection  
LR6 - 6 mm orifice on retract for 2 m/sec retraction  
(4 mm orifice standard)  
L12 - 1/2 BSPP to 14 mm Elbow Fitting  
(Replaces Male Run Tee - BCS2 only)  
XD - 4 Threaded holes front (BCS1 only)  
X25 - Adaptor block only attached to manifold  
X26 - Adaptor block with in-line check valve attached  
to manifold  
X27 - Adaptor block with PHD in-line check valve attached  
to manifold  
R12 - Unit without spherical bearing rod end (BCS2 only)

### NOTES:

- Cushions and ports are in positions 1 and 5.  
\* -DB Cushions in both directions is required on Series1 units only. (BCS1)  
\*\* -DR Cushion on retract only is required on Series2 units only. (BCS2)
- Standard Series1 Stretch Rod Cylinder ordering number is as follows:  
**BCS1-6-50x406-DB** (Stroke may vary)
- Standard Series2 Stretch Rod Cylinder ordering number is as follows:  
**BCS2-6-50x400-DR** (-U19) For GSD machines  
**BCS2-6-50x400-DR** (-U19) -LR6 For heat set machines  
-U19 option needs to be specified for valve to be attached to unit.
- Options not available on Series1 units: (BCS1)  
-U19, -LR6, -L12, -X25, -X26, -X27 and -R12.



MACHINE NO. 1  
DESIGN 6

MACHINE NO. 2  
DESIGN 6



- **Direct Replacement**
- **Provides Significantly Longer Life**
- **Reduces Maintenance and Downtime**

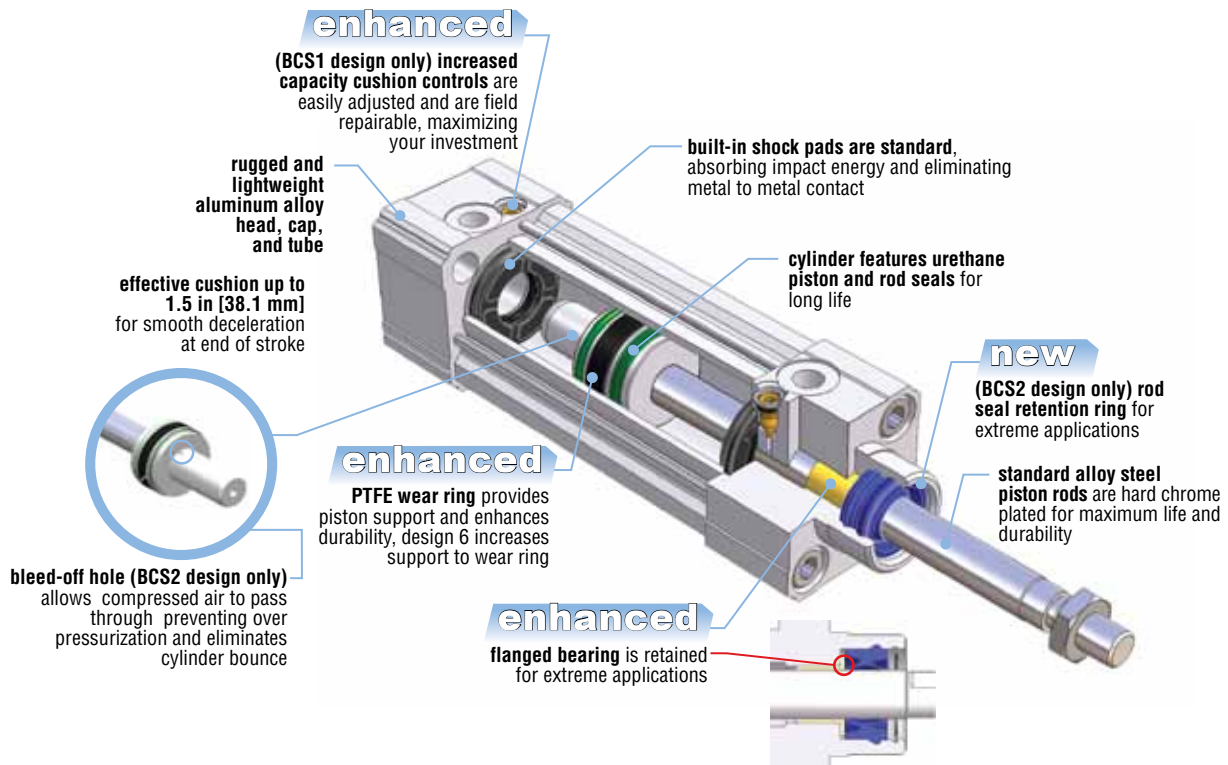


## MODEL BCS1 CYLINDER

■ Direct replacement for Sidel® Model, SBO ISBM Series1 Machines.

## MODEL BCS2 CYLINDER

■ Direct replacement for Sidel® Model, SBO ISBM Series2 Machines.



### Common Benefits

- PHD Cylinder mounts into the same space and bolt patterns.
- Provides significantly longer life and reduces maintenance and downtime.
- Mounting options provide ease of design into application.
- Internal shock pads are standard, eliminating metal to metal contact.
- Cushion controls are available for end of stroke deceleration.
- Cylinders are easily field repairable, maximizing your investment.

### Industry Uses

- Plastic Packaging - Stretch Blow Molding

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# ENGINEERING DATA: SERIES BCS1 STRETCH ROD CYLINDERS

SPECIFICATIONS	IMPERIAL	METRIC
TYPE	Pneumatic Cylinder	
SERIES	BCS Stretch Rod Cylinder	
BORE SIZE	1.969 in	50 mm
BORE AREA - EXTEND	3.04 in <sup>2</sup>	1963 mm <sup>2</sup>
BORE AREA - RETRACT	2.56 in <sup>2</sup>	1649 mm <sup>2</sup>
THEORETICAL OUTPUT	264.5 lb @ 87 psi	1176.6 N @ 6 bar
OPERATION	Double Acting	
OPERATING PRESSURE RANGE	7.5 - 150 psi	0.5 - 10 bar
AMBIENT TEMPERATURE	-20° to 180° F	-29° to 82° C
MAX. OPERATING PISTON SPEED	80 in/sec	2.03 m/sec
ADJUSTABLE CUSHION	Standard	
LUBRICATION	FDA Regulation 21 CFR 1789.3570	
PORT SIZE	1/4 BSPP	
MAXIMUM STROKE	17.72 in	450 mm
STROKE TOLERANCE	+ .079/- .000 in	+2.0/-0.0 mm
BASE WEIGHT	4.28 lb	1.94 kg
STROKE ADDER WEIGHT PER 1 in (25 mm)	0.38 lb	0.17 kg
ALLOWABLE KINETIC ENERGY WITH CUSHION	60.5 in-lb	6.84 Nm
SHOCK PAD	Thermoplastic Polyester Elastomer (TPE)	
HEADS & CAPS	Anodized Aluminum	
CYLINDER TUBE	Anodized Aluminum	
PISTON ROD	Hard Chrome Plated Steel	
ROD BEARING	Internally Lubricated Polymer	
PISTON & ROD SEALS	Urethane	

## ACTUATOR SPEEDS

Cylinder speed is up to 80 in/sec [2.03 m/sec].

## MAXIMUM ALLOWABLE KINETIC ENERGY

Series BCS1 is provided with cushions on both extend and retract. Its maximum kinetic energy rating is 60.5 in-lb [6.84 Nm].

## LIFE EXPECTANCY

Series BCS1 Cylinders have been lab tested over 20 million trouble-free cycles.

## LUBRICATION

Series BCS1 Cylinders are lubricated internally at the factory for the life of the cylinder. PHD uses FDA food grade lubrication per regulation 21 CFR 1789.3570. Any other lubrication to the cylinder may decrease the life expectancy.

## MAINTENANCE

As with most PHD products, these cylinders are field repairable. Repair kits, piston and rod assemblies, cushion control cartridge assemblies, and main structural components are available as needed for extended service.

# ENGINEERING DATA: SERIES BCS2 STRETCH ROD CYLINDERS

SPECIFICATIONS	IMPERIAL	METRIC
TYPE	Pneumatic Cylinder	
SERIES	BCS Stretch Rod Cylinder	
BORE SIZE	1.969 in	50 mm
BORE AREA - EXTEND	3.04 in <sup>2</sup>	1963 mm <sup>2</sup>
BORE AREA - RETRACT	2.56 in <sup>2</sup>	1649 mm <sup>2</sup>
THEORETICAL OUTPUT	264.5 lb @ 87 psi	1176.6 N @ 6 bar
OPERATION	Double Acting	
OPERATING PRESSURE RANGE	7.5 - 150 psi	0.5 - 10 bar
AMBIENT TEMPERATURE	-20° to 180° F	-29° to 82° C
MAX. OPERATING PISTON SPEED	80 in/sec	2.03 m/sec
ADJUSTABLE CUSHION - RETRACT	Standard	
LUBRICATION; FOOD GRADE	FDA Regulation 21 CFR 1789.3570	
MAXIMUM STROKE	17.72 in	450 mm
STROKE TOLERANCE	+ .079/- .000 in	+2.0/-0.0 mm
WEIGHT	15.1 lb	5.6 kg
ALLOWABLE KINETIC ENERGY		
RETRACT	181.5 in-lb	20.5 Nm
EXTEND	8.7 in-lb	0.98 Nm
SHOCK PAD	Thermoplastic Polyester Elastomer (TPE)	
HEADS & CAPS	Anodized Aluminum	
CYLINDER TUBE	Anodized Aluminum	
PISTON ROD	Hard Chrome Plated Steel	
ROD BEARING	Internally Lubricated Polymer	
PISTON & ROD SEALS	Urethane	

## VALVE SPECIFICATIONS

SERIES	ISO 2 (ISO 5599/1)
FUNCTION	5/2
OPERATOR	Single
PILOT	Internal
SPOOL RETURN	Spring
SOLENOID	24 Vdc (5.4 W)
VOLTAGE RANGE	-15% to +10% from Nominal
ELECTRICAL CONNECTOR	DIN 43650, Form A
MANUAL OPERATOR	Non-locking Recessed
PILOT EXHAUST	Muffled
FLOW	3.0 Cv
LUBRICATION	FDA Regulation 21 CFR 1789.3570
FILTRATION	40 Micron
OPERATING PRESSURE RANGE	20 to 150 psi [1.37 to 10 bar]
AMBIENT FLUID TEMPERATURE	0° to 120° F [-18° to 50° C]

## ACTUATOR SPEEDS

Typical extension cylinder speed is 80 in/sec [2.03 m/sec] but is controlled by the blow mold mechanical cam to provide 63.04 in/sec [1.6 m/sec]. Retract speed has been restricted to provide 39.4 in/sec [1.0 m/sec]. An optional orifice (LR6) can be ordered to provide a velocity of 78.7 in/sec [2.0 m/sec].

## MAXIMUM ALLOWABLE KINETIC ENERGY

The Series BCS2 is provided with a cushion on retract. Its maximum kinetic energy rating is 181.5 in-lb [20.5 Nm].

The BCS2 maximum kinetic energy capacity on extend is 8.7 in-lb [0.98 Nm] which is provided by the bumper only.

**Note:** Cushions are adjustable for 1 m/sec operation.

External shock absorbers are required with cushions adjusted for 2 m/sec operation.

## LIFE EXPECTANCY

Series BCS2 Cylinders have been lab tested over 20 million trouble-free cycles.

## LUBRICATION

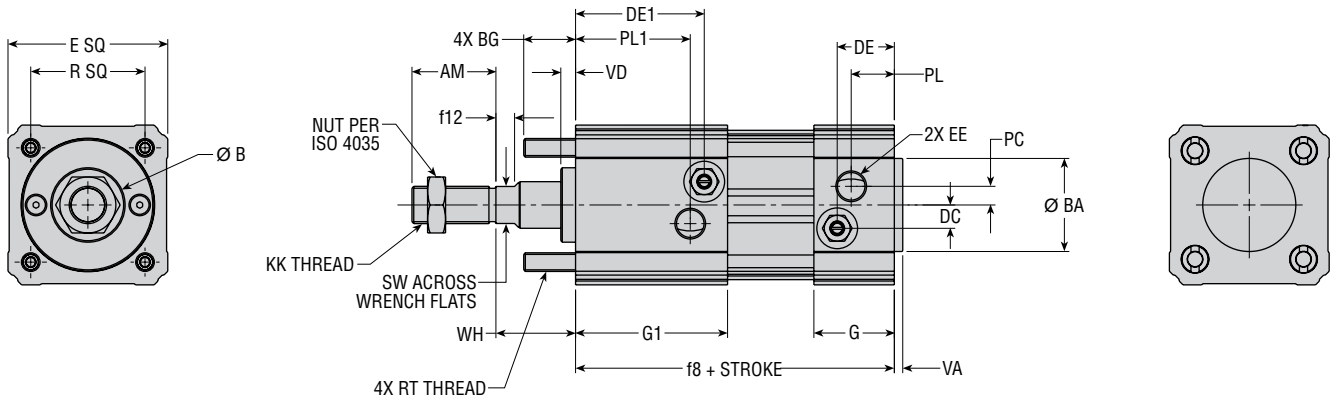
Series BCS2 Cylinders are lubricated internally at the factory for the life of the cylinder. PHD uses FDA food grade lubrication per regulation 21 CFR 1789.3570. Any other lubrication to the cylinder may decrease the life expectancy.

## MAINTENANCE

As with most PHD products, these cylinders are field repairable. Repair kits, piston and rod assemblies, cushion control cartridge assemblies, and main structural components are available as needed for extended service.

# DIMENSIONS: SERIES BCS1 STRETCH ROD CYLINDERS

## BCS1-6-50 (NON-MANIFOLD UNIT - SERIES1)



### NOTES:

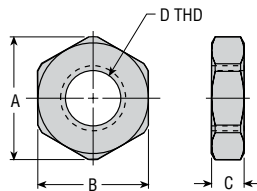
- 1) DIMENSIONS SHOWN IN [ ] ARE IN mm.
- 2) DESIGNATED CENTERLINE IS CENTERLINE OF CYLINDER.
- 3) UNLESS OTHERWISE DIMENSIONED, MOUNTING HOLE PATTERNS ARE CENTERED ON DESIGNATED CYLINDER CENTERLINE.

BORE SIZE [mm]	B	B ±TOL	RT	WH	R	BG	VD	VA MAX.	G	G1	f8	E	f12
50	1.2565 [31.92]	.0025 [0.06]	M8 x 1.25	1.340 [34.0]	1.929 [49.0]	.875 [22.2]	.249 [6.3]	.157 [4.0]	1.358 [34.5]	2.566 [65.2]	5.381 [136.7]	2.697 [68.5]	.315 [8.0]

BORE SIZE [mm]	SW (WRENCH FLAT)	BA	KK	AM	EE PORT	EE PORT DEPTH	PL	PL1	PC	DE	DE1	DC
50	.630 [16.0]	1.5709 [39.9]	M16 x 1.5	1.417 [36.0]	G 1/4	.354 [9.0]	.728 [18.5]	1.936 [49.2]	.315 [8.0]	.965 [24.5]	2.173 [55.2]	.394 [10.0]

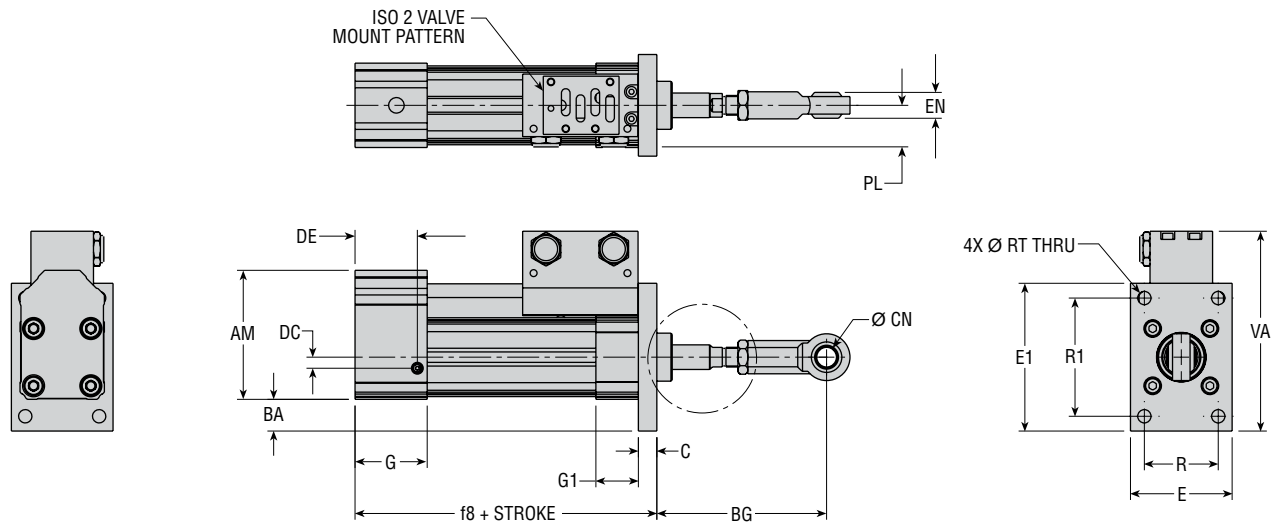
### HEX NUT DIMENSIONS PER ISO 4035 (DIN 4398)

BORE SIZE [mm]	A MIN	B	C	D THD	PHD PART NUMBER	PHD PART NUMBER (-Z1)
50	1.053 [26.75]	.945 [24.0]	.315 [8.0]	M16 x 1.5	3204-003-01	19735-003



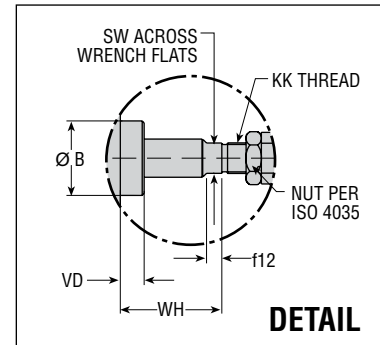
# DIMENSIONS: SERIES BCS2 STRETCH ROD CYLINDERS

## BCS2-6-50 (MANIFOLD UNIT - SERIES2)



### NOTES:

- 1) DIMENSIONS SHOWN IN [ ] ARE IN mm.
- 2) DESIGNATED CENTERLINE IS CENTERLINE OF CYLINDER.
- 3) UNLESS OTHERWISE DIMENSIONED, MOUNTING HOLE PATTERNS ARE CENTERED ON DESIGNATED CYLINDER CENTERLINE.
- 4) 100 mm MINIMUM STROKE REQUIRED FOR STANDARD, CONSULT PHD FOR OTHER LENGTHS.
- 5) FOR ILLUSTRATION PURPOSES, UNIT SHOWN IS AT 100 mm OF STROKE, BUT CHARTED DIMENSION f8 IS AT 0 mm STROKE.

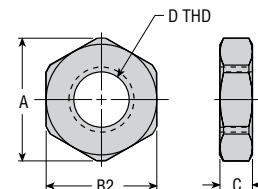


BORE SIZE [mm]	B	B ±TOL	C	RT	WH	R	R1	BG	VD	VA	G	G1	f8
50	1.5350 [38.99]	.0050 [0.13]	.591 [15.0]	.425 [10.8]	2.091 [53.1]	2.362 [60.0]	3.780 [96.0]	5.427 [137.8]	.491 [12.5]	6.388 [162.3]	2.307 [58.6]	1.358 [34.5]	5.713 [145.1]

BORE SIZE [mm]	E	E1	f12	SW (WRENCH FLAT)	BA	KK	AM	PL	DE	DC	CN H9 TOL.	EN h12 TOL.
50	3.250 [82.6]	4.724 [120.0]	.315 [8.0]	.630 [16.0]	1.014 [25.8]	M16 x 1.5	4.125 [104.8]	1.330 [33.8]	1.992 [50.6]	.354 [9.0]	.630 [16.0]	.827 [21.0]

### HEX NUT DIMENSIONS PER ISO 4035 (DIN 4398)

BORE SIZE [mm]	A MIN	B2	C	D THD	PHD PART NUMBER	PHD PART NUMBER (-Z1)
50	1.053 [26.75]	.945 [24.0]	.315 [8.0]	M16 x 1.5	3204-003-01	19735-003



All dimensions are reference only unless specifically tolerated.

# OPTIONS: SERIES BCS STRETCH ROD CYLINDERS

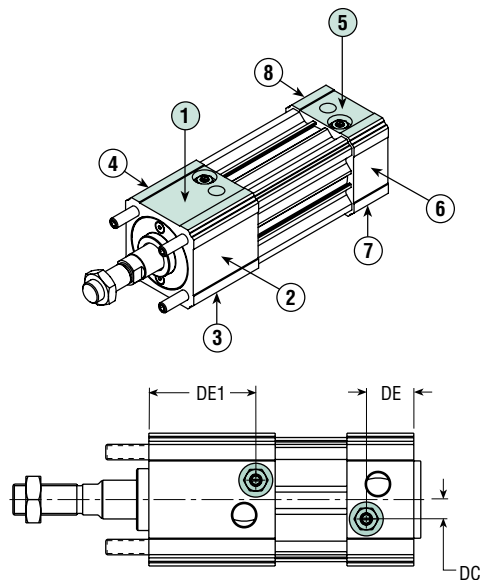
**DB** CUSHION CONTROL  
IN BOTH DIRECTIONS (BCS1 ONLY)  
(standard location 1 & 5)

**DR** CUSHION CONTROL  
ON RETRACT ONLY (BCS2 ONLY)  
(standard location 8)

PHD cushions are designed for smooth deceleration at the end of stroke. When the cushion is activated, the remaining volume in the cylinder must exhaust past an adjustable needle which controls the amount of deceleration. The effective cushion lengths for each bore size are shown in the table below.

## - DB CUSHION CONTROLS

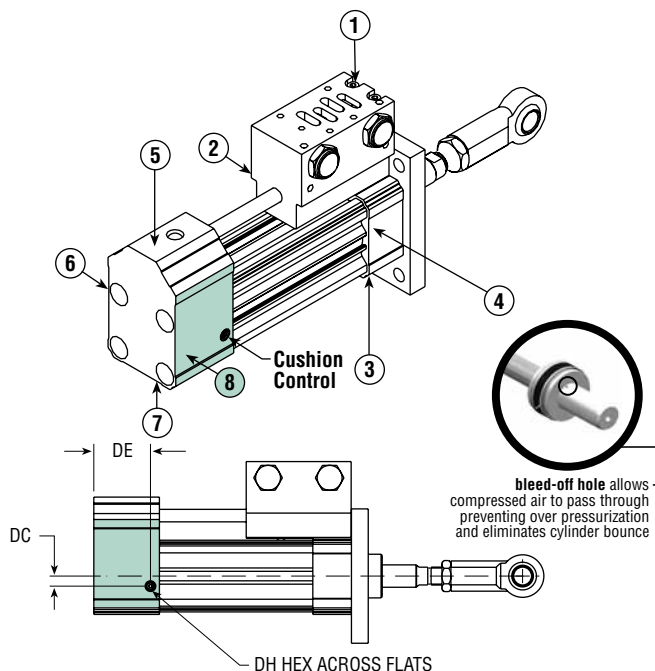
**Note:** Cushion controls are standard in locations 1 and 5 only.



BORE SIZE [mm]	DE1	DC	DE	EFFECTIVE CUSHION LENGTH
50	2.173 [55.2]	.394 [10.0]	.965 [24.5]	.930 [23.6]

## - DR CUSHION CONTROL

**Note:** Cushion control is standard in location 8 only.



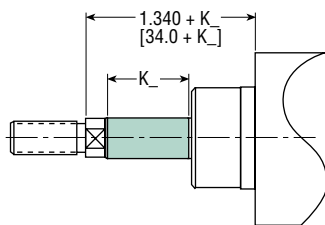
BORE SIZE [mm]	DE	DC	DH	EFFECTIVE CUSHION LENGTH
50	1.992 [50.6]	.354 [9.0]	— [2.5]	1.496 [29.2]

**K<sub>-</sub>** EXTRA ROD EXTENSION

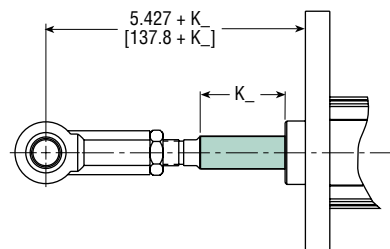
Extra rod extension can be achieved by specifying the option -K followed by the length code. Rod extension is available in 1 mm increments. Contact PHD for other combinations.

**NOTE:** -K<sub>-</sub> = Extra rod extension in 1 mm increment lengths  
code examples: -K5 = 5 mm extension  
-K15 = 15 mm extension

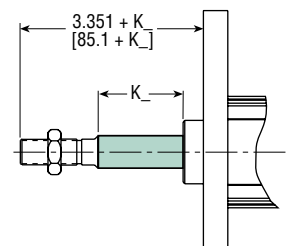
### SERIES BCS1



### SERIES BCS2



### SERIES BCS2 with -R12 Option





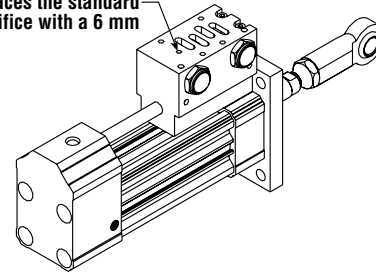
# OPTIONS: SERIES BCS STRETCH ROD CYLINDERS

## LR6

### 6 mm ORIFICE ON RETRACT (BCS2 ONLY)

The LR6 option is required on all BCS2 heat set units and replaces the standard 4 mm orifice which provides 39.4 in/sec [1.0 m/sec] retract velocity with a 6 mm orifice that increases retract velocity to 78.7 in/sec [2.0 m/sec]. (Required for heat set applications).

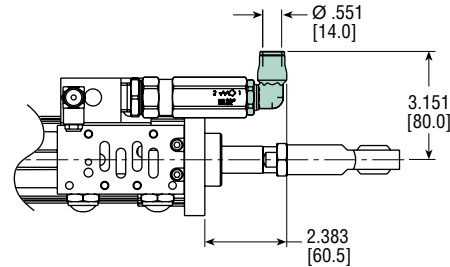
-LR6 option replaces the standard 4 mm orifice with a 6 mm



## L12

### 1/2 BSPP TO 14 mm ELBOW FITTING (BCS2 ONLY)

The L12 option is required on all BCS2 heat set units and replaces the standard 1/2 BSPP male run tee pressure inlet fitting with a 1/2 BSPP to 14 mm elbow fitting. **NOTE:** The L12 option is only available if combined with the X26 option. See the X26 option for more information. (Required for heat set applications).

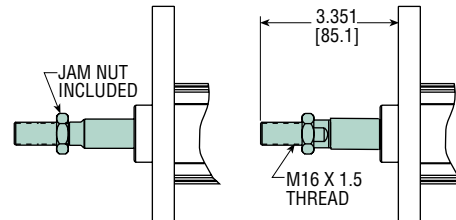


-L12 option with -X26 option

## R12

### UNIT WITHOUT SPHERICAL ROD END (BCS2 ONLY)

The unit is not supplied with a spherical bearing rod end. It is shipped without one.

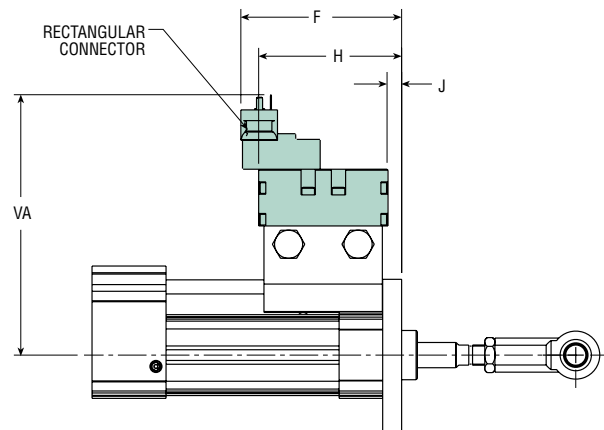
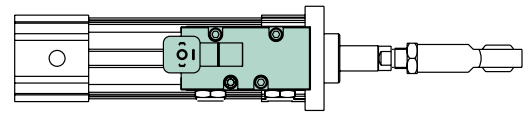
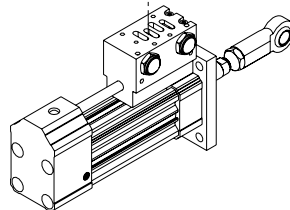
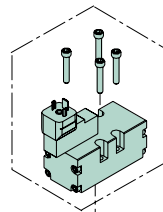


## U19

### MAC ISO 2 SERIES VALVE DIN CONNECTION (BCS2 ONLY)

A MAC ISO 2 Series valve is optionally pre-assembled to the unit by specifying the -U19 option. The valve is equipped with a DIN 43650, shape A connector, and is lubricated with FDA Regulation 21 CFR 1789.3570 food grade lubrication.

Reference valve specification chart page 5.

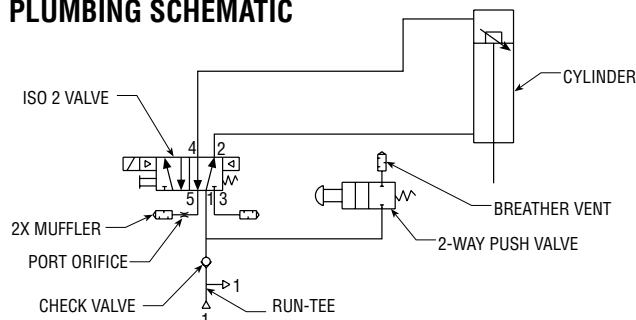


BORE SIZE [mm]	F	H	J	VA
50	5.011 [127.3]	4.456 [113.2]	.424 [10.8]	8.135 [206.6]

#### NOTES:

- 1) DIMENSIONS SHOWN IN [ ] ARE IN mm.
- 2) DESIGNATED CENTERLINE IS CENTERLINE OF CYLINDER.
- 3) UNLESS OTHERWISE DIMENSIONED, MOUNTING HOLE PATTERNS ARE CENTERED ON DESIGNATED CYLINDER CENTERLINE.

### PLUMBING SCHEMATIC

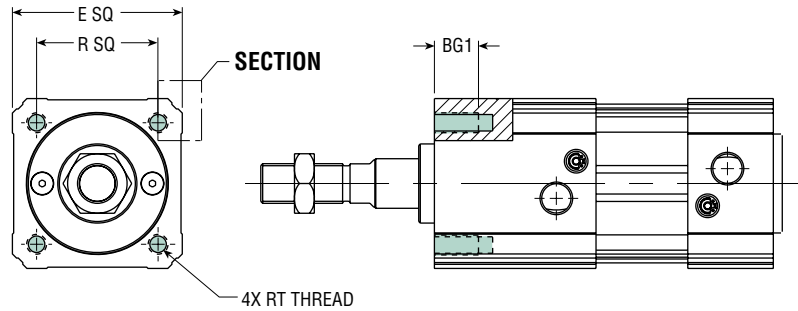


All dimensions are reference only unless specifically tolerated.

# OPTIONS: SERIES BCS STRETCH ROD CYLINDERS

## XD 4 THREADED HOLES FRONT (BCS1 ONLY)

BORE SIZE [mm]	RT	R	BG1 MIN.	E
50	M8 x 1.25	1.929 [49.0]	.875 [22.2]	2.697 [68.5]



**NOTES:**

- 1) DIMENSIONS SHOWN IN [ ] ARE IN mm.
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- 3) UNLESS OTHERWISE DIMENSIONED, MOUNTING HOLE PATTERNS ARE CENTERED ON DESIGNATED CYLINDER CENTERLINE.

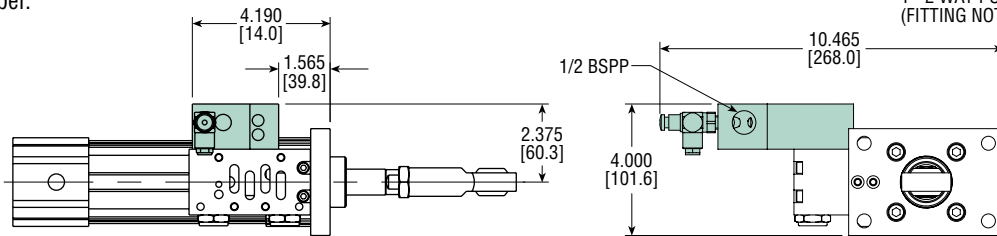
## X25 ADAPTOR BLOCK ONLY ATTACHED TO MANIFOLD

This option omits the check valve completely allowing the customer to provide the check valve of choice. See the drawing for thread and port sizing required. This option is assembled at the factory, or a kit is available for quick and easy field retrofit. See kit ordering number.

UNIT	INLET ADAPTOR KIT#
BCS2650	76066

**NOTE:**

- KIT INCLUDES -
- 1 - INLET ADAPTOR ASSEMBLY
  - 1 - 1/8 NPT O-RING SEAL
  - 1 - 1/2 NPT O-RING SEAL
  - 4 - INLET ADAPTOR TO MANIFOLD SHCS
  - 1 - 1/8 NPT BREATHER VENT
  - 1 - 2 WAY PUSH BUTTON VALVE (FITTING NOT INCLUDED)



## X26 ADAPTOR BLOCK WITH IN-LINE CHECK VALVE ATTACHED TO MANIFOLD

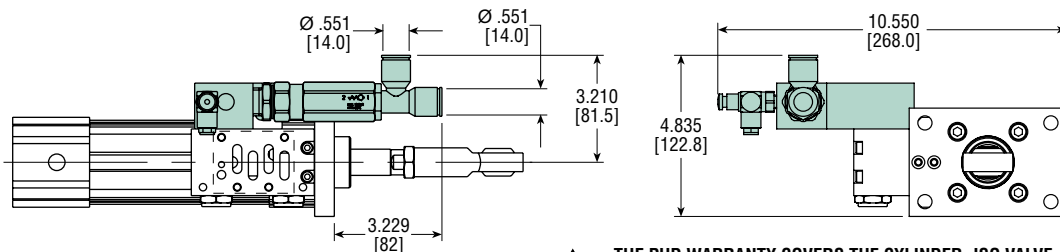
The inline check valve with adaptor block assembly is provided with an inline poppet style check valve to keep incoming air from exhausting through the inlet pressure supply tube during maintenance and keeps the stretch rod from dropping. This option

is assembled at the factory, or a kit is available for quick and easy field retrofit. See kit ordering number. **NOTE:** Comes standard from factory with male run tee. Option -L12 replaces the male run tee with elbow fitting.

UNIT	IN-LINE CHECK VALVE KIT#
BCS2650	80138

**NOTE:**

- KIT INCLUDES -
- 1 - IN-LINE CHECK VALVE
  - 1 - BSPP MALE TO NPT MALE NIPPLE
  - 1 - SEALING RING (FITTING NOT INCLUDED)



THE PHD WARRANTY COVERS THE CYLINDER, ISO VALVE, MANIFOLD AND ALL OTHER COMPONENTS ON THE CYLINDER WITH THE EXCEPTION OF THE CHECK VALVE. THE CHECK VALVE IS PROVIDED AS A SERVICE TO THE CUSTOMER, BUT DOES NOT CARRY THE PHD WARRANTY.

# OPTIONS: SERIES BCS STRETCH ROD CYLINDERS

## X27 ADAPTOR BLOCK WITH PHD IN-LINE CHECK VALVE ATTACHED TO MANIFOLD

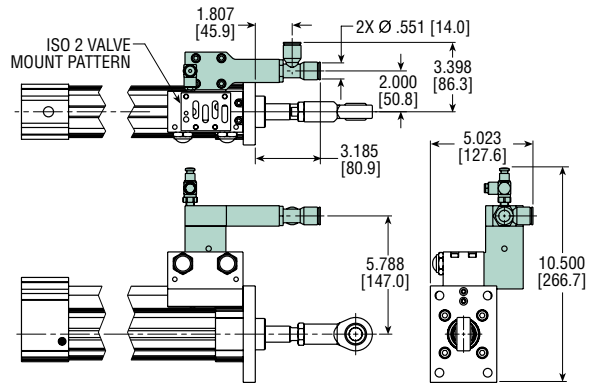
The PHD inline check valve with adaptor block assembly is provided with an inline check seal to keep incoming air from exhausting through the inlet pressure supply tube during maintenance and keeps the stretch rod from dropping. This option is assembled at the factory, or a kit is available for quick and easy field retrofit. See kit ordering number. **NOTE:** Comes standard from factory with male run tee. Option -L12 replaces the male run tee with elbow fitting.

**NOTE: OPTION INCLUDES -**

- 1 - INLET ADAPTOR ASSEMBLY
- 1 - 1/8 NPT O-RING SEAL
- 1 - 1/2 NPT O-RING SEAL
- 4 - INLET ADAPTOR TO MANIFOLD SHCS
- 1 - 1/8 NPT BREATHER VENT
- 1 - 2 WAY PUSH BUTTON VALVE
- 1 - INLET CAP ADAPTOR
- 4 - INLET CAP ADAPTOR MTG SHCS
- 2 - INLET CAP O-RING SEALS
- 1 - QUICK EXHAUST SEAL

UNIT	INLINE CHECK VALVE KIT#
BCS2650	83551

KIT DOES NOT INCLUDE THE FOLLOWING ITEMS-  
MALE RUN TEE FITTING,  
2 WAY PUSH BUTTON VALVE,  
1/8 NPT BREATHER VENT

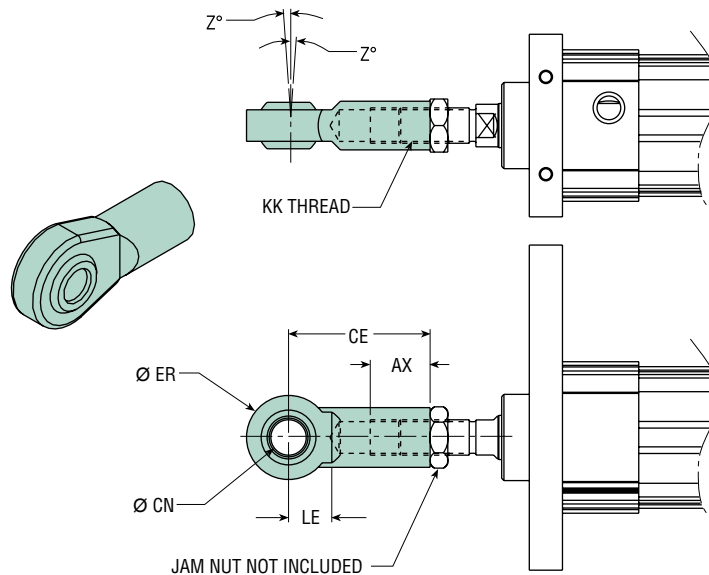


**NOTES:**

- 1) DIMENSIONS SHOWN IN [ ] ARE mm
- 2) DESIGNATED CENTERLINE IS CENTERLINE OF CYLINDER
- 3) UNLESS OTHERWISE DIMENSIONED, MOUNTING HOLE PATTERNS ARE CENTERED ON DESIGNATED CYLINDER CENTERLINE
- 4) 100 mm MINIMUM STROKE REQUIRED FOR STANDARD UNITS, CONSULT PHD FOR OTHER LENGTHS

# ACCESSORIES: SERIES BCS STRETCH ROD CYLINDERS

## ROD EYE MOUNTING WITH SPHERICAL BEARING (DIN 8139)

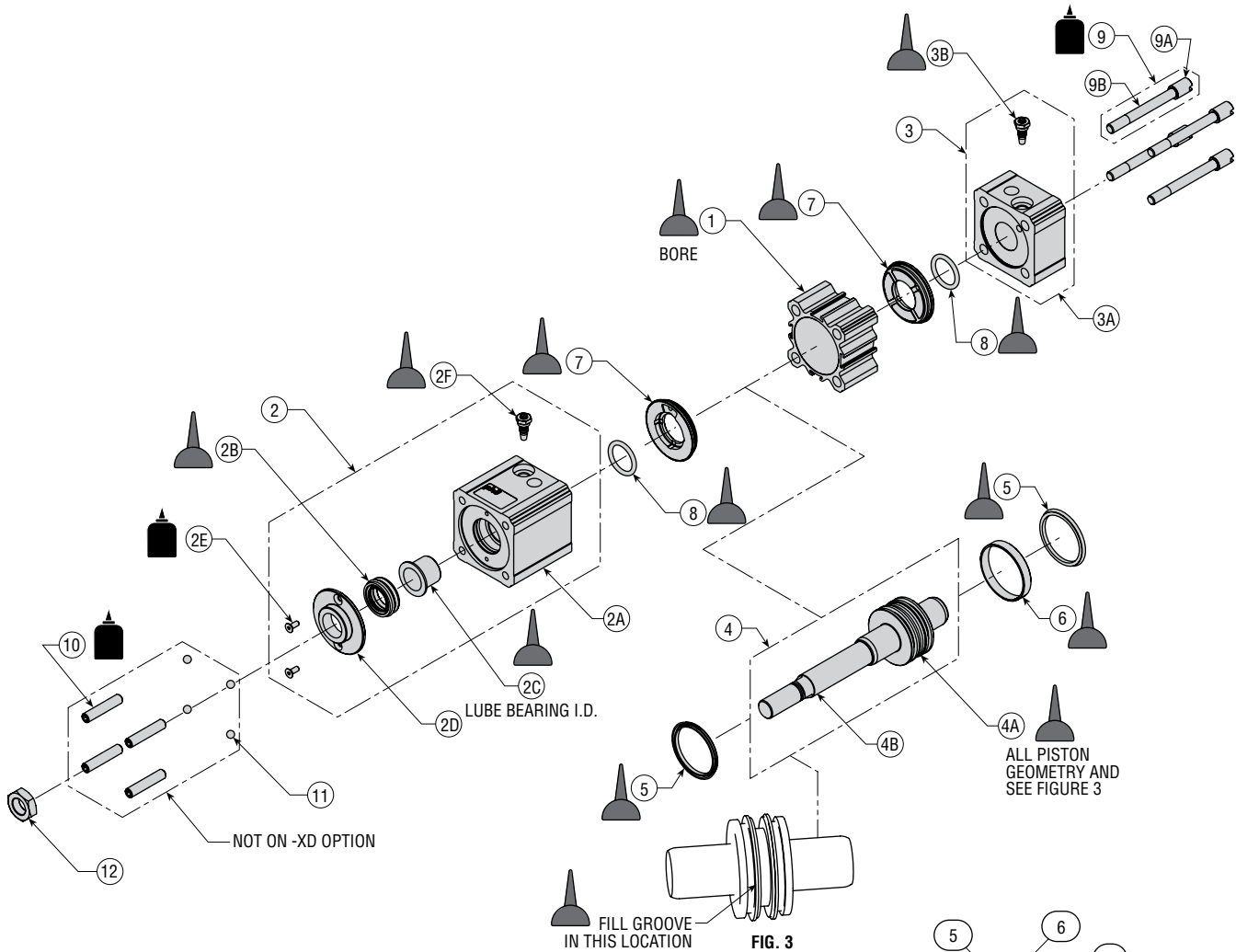


BORE SIZE [mm]	KK	AX MIN.	CN H9	EN h12	CE	LE MIN.	ER MAX.	Z°	*KIT
50	M16 x 1.5	1.102 [28.0]	.630 [16.0]	.827 [21.0]	2.520 [64.0]	.866 [22.0]	.827 [21.0]	4°	52493-03-1

**NOTE:** \* KIT DOES NOT INCLUDE JAM NUT.

All dimensions are reference only unless specifically toleranced.

# EXPLODED VIEW: SERIES BCS1 CYLINDERS



ALIGN CUSHION ORIFICE IN HEAD OR CAP WITH CUSHION ORIFICE HOLE IN MULTI-FUNCTION SEAL SO THAT CUSHION ORIFICE HOLE IS NOT BLOCKED MUST BE FREE FLOW THRU ORIFICE

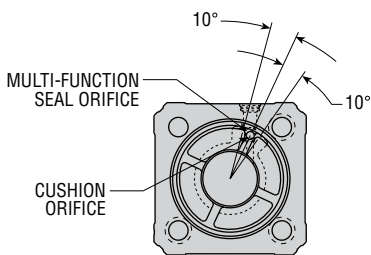


FIG. 1  
CUSHION UNITS (-DB)

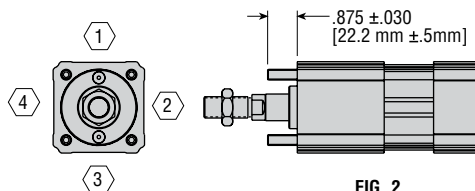
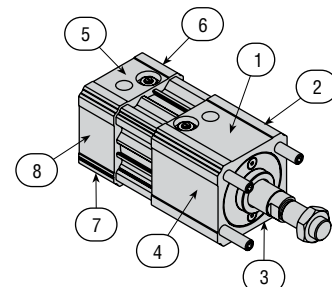
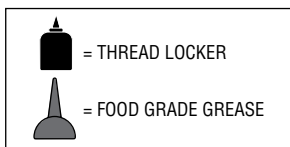


FIG. 2  
Not on -XD option  
(No thread extension)



PORT LOCATION DEFINITION  
See Note 2

- NOTES:
- 1) NUMBERS ENCLOSED BY A HEX REPRESENT PORT POSITIONS
  - 2) LOCATION DEFINITION OF PORTS, CUSHION CONTROLS, AND PORT CONTROLS



## TORQUE CHART 1

PART DESCRIPTION	TORQUE in-lb [Nm]
TIEROD AND NUT ASSEMBLIES	110 [12.4]
FLAT HEAD CAP SCREWS (LOCATOR TO HEAD)	20 [2.3]

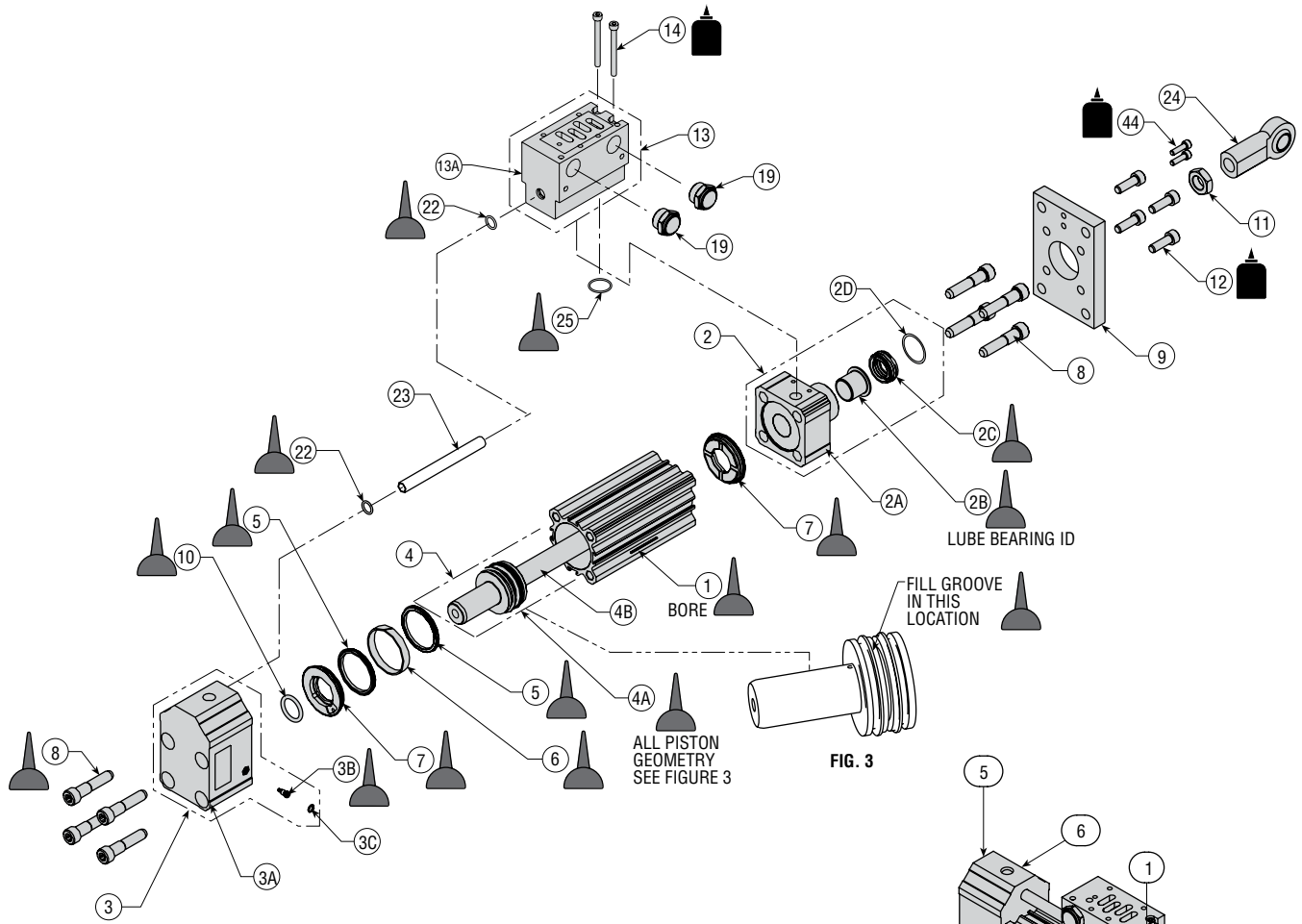
# PARTS LIST AND REPAIR KITS: SERIES BCS1 CYLINDERS

KEY	PART DESCRIPTION	BCS1-6-50
1	Tube	Full unit description required followed by -H1300
2	Head Assembly (Extend End)	Full unit description required followed by -H1100
2A	Head	Full unit description required followed by -H1105
2B	Rod Seal	Sold as part of Seal and Repair Kit
2C	Flange Bearing	Sold as part of Repair Kit (Full unit description -H9010)
2D	Locator	73624
2E	SFHCS	Sold as part of Repair Kit (Full unit description -H9010)
2F	Needle Assembly	Sold as part of Cushion Kit (Full unit description -H6530)
3	Cap Assembly	Full unit description required followed by -H1200
3A	Cap	Full unit description required followed by -H1205
3B	Needle Assembly	Sold as part of Cushion Kit (Full unit description -H6530)
4	Piston and Rod Assembly	Full unit description required followed by -H1000
4A	Piston	—
4B	Rod	—
5	Piston Seal	Sold as part of Seal and Repair Kit
6	Wear Ring	Sold as part of Repair Kit (Full unit description -H9010)
7	Multi-Function Impact Seal	Sold as part of Seal and Repair Kit
8	Cushion O-Ring Seal	Sold as part of Seal and Repair Kit
9	Tierod and Nut Assembly	Full unit description required followed by -H1400
9A	Tierod Nut	—
9B	Tierod	—
10	Socket Set Screw	82323
11	Ball (4 per unit)	1976-004
12	Nut (1 per unit)	3204-003-01

KIT DESCRIPTION	KIT NUMBER
Seal Kit	Full unit description required followed by -H9000
Repair Kit	Full unit description required followed by -H9010
Cushion Kit	Full unit description required followed by -H6530

**NOTE:** General repair, seal and cushion kits are available for BCS1-5-50 (old design units). Contact PHD for more information.

# EXPLODED VIEW: SERIES BCS2 CYLINDERS



ALIGN CUSHION ORIFICE IN HEAD OR CAP WITH CUSHION ORIFICE HOLE IN MULTI-FUNCTION SEAL SO THAT CUSHION ORIFICE HOLE IS NOT BLOCKED MUST BE FREE FLOW THRU ORIFICE

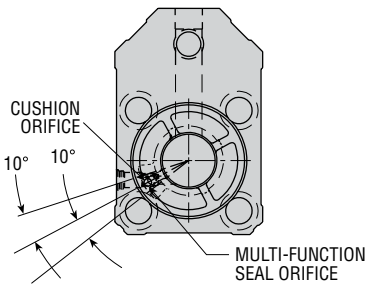


FIG. 1 CUSHION UNITS (-DR)

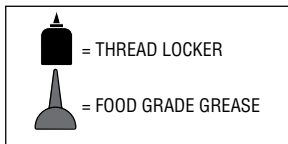


FIG. 3

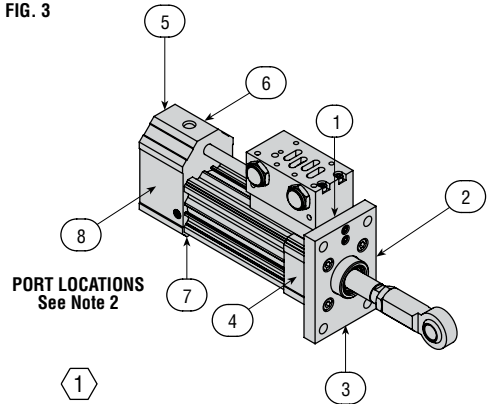


FIG. 2

- NOTES:  
 1) NUMBERS ENCLOSED BY A HEX REPRESENT PORT POSITIONS  
 2) LOCATION DEFINITION OF PORTS, CUSHION CONTROLS, AND PORT CONTROLS

## TORQUE CHART 1

KEY	PART DESCRIPTION	TORQUE in-lb [Nm]
12	FLANGE TO HEAD SHCS	200 [22.6]
44	FLANGE TO MANIFOLD SHCS	80 [9.0]
8	SHOULDER BOLT	250 [28.2]
29A	-U19 OPTION VALVE ASSEMBLY	100 [11.3]
4A & 4B	PISTON TO ROD	325 [36.7]
14	MANIFOLD SHCS	80 [9.0]
19	MUFFLER TO MANIFOLD ASSEMBLY	HAND TIGHTEN PLUS 1/4 TURN
33	INLET ADAPTOR TO MANIFOLD SHCS	50 [5.6]
50	CAP MOUNTING (SHCS)	125 [14.1]

# PARTS LIST AND REPAIR KITS: SERIES BCS2 CYLINDERS

KEY	PART DESCRIPTION	BCS2-6-50
1	Finished Tube	Full unit description required followed by -H1300
2	Head Assembly	Full unit description required followed by -H1100
2A	Head	Sold as part of Head Assembly
2B	Rod Bearing	Sold as part of Head Assembly, Sold as part of Repair Kit (-H9010*)
2C	Rod Seal	Sold as part of Head Assembly, Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
2D	Retaining Ring	Sold as part of Head Assembly, Sold as part of Repair Kit (-H9010*)
3	Cap Assembly	Full unit description required followed by -H1200
3A	Cap	Sold as part of Cap Assembly
3B	Cushion Needle Assembly	Sold as part of Cap Assembly, Sold as part of Cushion Kit (-H6530*)
3C	Retaining Ring	Sold as part of Cap Assembly, Sold as part of Cushion Kit (-H6530*)
4	Piston & Rod Assembly	Full unit description required followed by -H1000
4A	Piston	Sold as part of Piston & Rod Assembly
4B	Rod	Sold as part of Piston & Rod Assembly
5	Piston Seal	Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
6	Wear Ring	Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
7	Multi-Function Impact Seal	Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
8	Shoulder Bolt w/Female Thread	Sold as part of Repair Kit (-H9010*)
9	Flange	Full unit description required followed by -H2005
10	Cushion O-Ring Seal	Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
11	Jam Nut	Full unit description required followed by -H2001
12	Flange to Head Cap Screw	Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
13	Manifold Block Assembly	Full unit description required followed by -H9090
13A	Manifold Block	Sold as part of Manifold Block Assembly
14	Manifold to Head Cap Screw	Sold as part of Repair Kit (-H9010*) or Manifold Assembly Kit (-H9090*)
16	Fitting Adaptor	See Chart #1
17	Check Valve	See Chart #1
18	Male Run Tee Fitting	See Chart #1
20	2 Way Push Button Valve	See Chart #1
21	Breather Vent	See Chart #1
22	Steel Tubing O-Ring Seal	Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
23	Steel Tube	Full unit description required followed by -H1310
24	Rod Eye	63429-003-01
25	Manifold to Head O-Ring Seal	Sold as part of Seal Kit (-H9000*) and Repair Kit (-H9010*)
30	Inlet Adaptor Assembly	Sold as part of Inlet Adaptor Kit (-H9150*)
31	1/8 NPT O-Ring Seal	Sold as part of Inlet Adaptor Kit (-H9150*), Sold as part of Seal Kit (-H9000*)
32	1/2 NPT O-Ring Seal	Sold as part of Inlet Adaptor Kit (-H9150*), Sold as part of Seal Kit (-H9000*)
33	Inlet Adaptor to Manifold Cap Screw	Sold as part of Inlet Adaptor Kit (-H9150*), Sold as part of Repair Kit (-H9010*)
39	Sealing Ring	See Chart #1
44	Flange to Manifold Cap Screw	Sold as part of Repair Kit (-H9010*)

NOTE: \*Full unit description required (followed by -Hxxxx)

KIT DESCRIPTION	KIT NUMBER
Seal Kit	-H9000*
Repair Kit	-H9010*
Cushion Kit	-H6530*
Inlet Adaptor Assembly Kit	-H9150*
Manifold Assembly Kit	-H9090*
Inline Check Valve -X23 to -X26 Conversion Kit	-H9160*
Inline Check Valve -X26 Kit	-H9165*
Inline Check Valve -X27 Kit	-H9166*

NOTE: \*Full unit description required (followed by -Hxxxx)

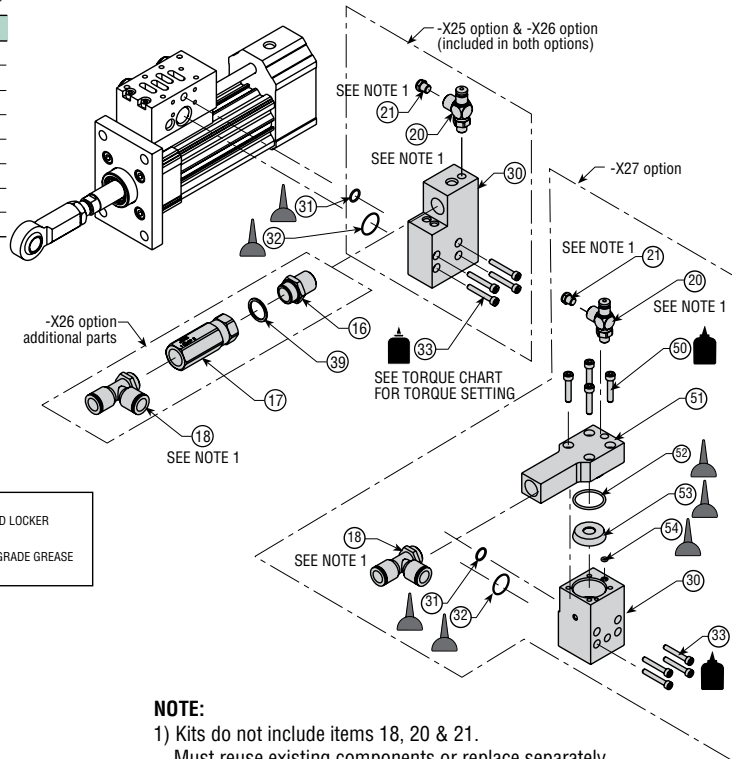
## CHART 1

KEY	OPTION CODE		
	-X25	-X26	-X27
16	-	77235	-
17	-	80010	-
18	-	See Chart #2	See Chart #2
20	73660	73660	73660
21	2804-23	2804-23	2804-23
39	-	77629-004	-
50	-	-	14308-025
51	-	-	80104
52	-	-	*
53	-	-	*
54	-	-	*

NOTE: \*Sold as part of inlet adaptor kit (-H9150\*)  
Sold as part of seal kit (-H9000\*)

## CHART 2 - Item #18

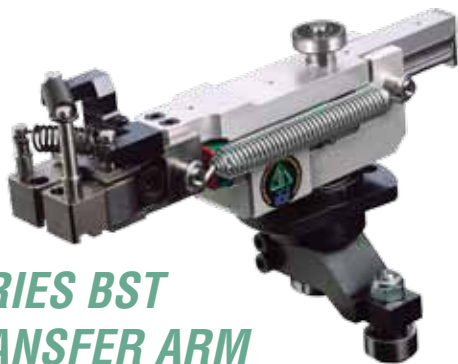
OPTION	OPTION CODE	
	-X26	-X27
STANDARD	61734-040	61734-040
-L12	61734-070	61734-070



### NOTE:

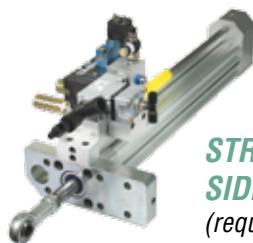
1) Kits do not include items 18, 20 & 21.  
Must reuse existing components or replace separately.

# OTHER PLASTIC PACKAGING SOLUTIONS



## SERIES BST TRANSFER ARM

This unit can be used as a replacement for Sidel® Series1 SB02 through SB040 Machines.  
(request the current Series BST catalog)



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**STRETCH ROD CYLINDERS FOR  
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- Packaging & Palletizing
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