

# phd<sup>®</sup> START-UP & INFORMATION SHEET: SERIES BCS1-6 STRETCHING CYLINDERS

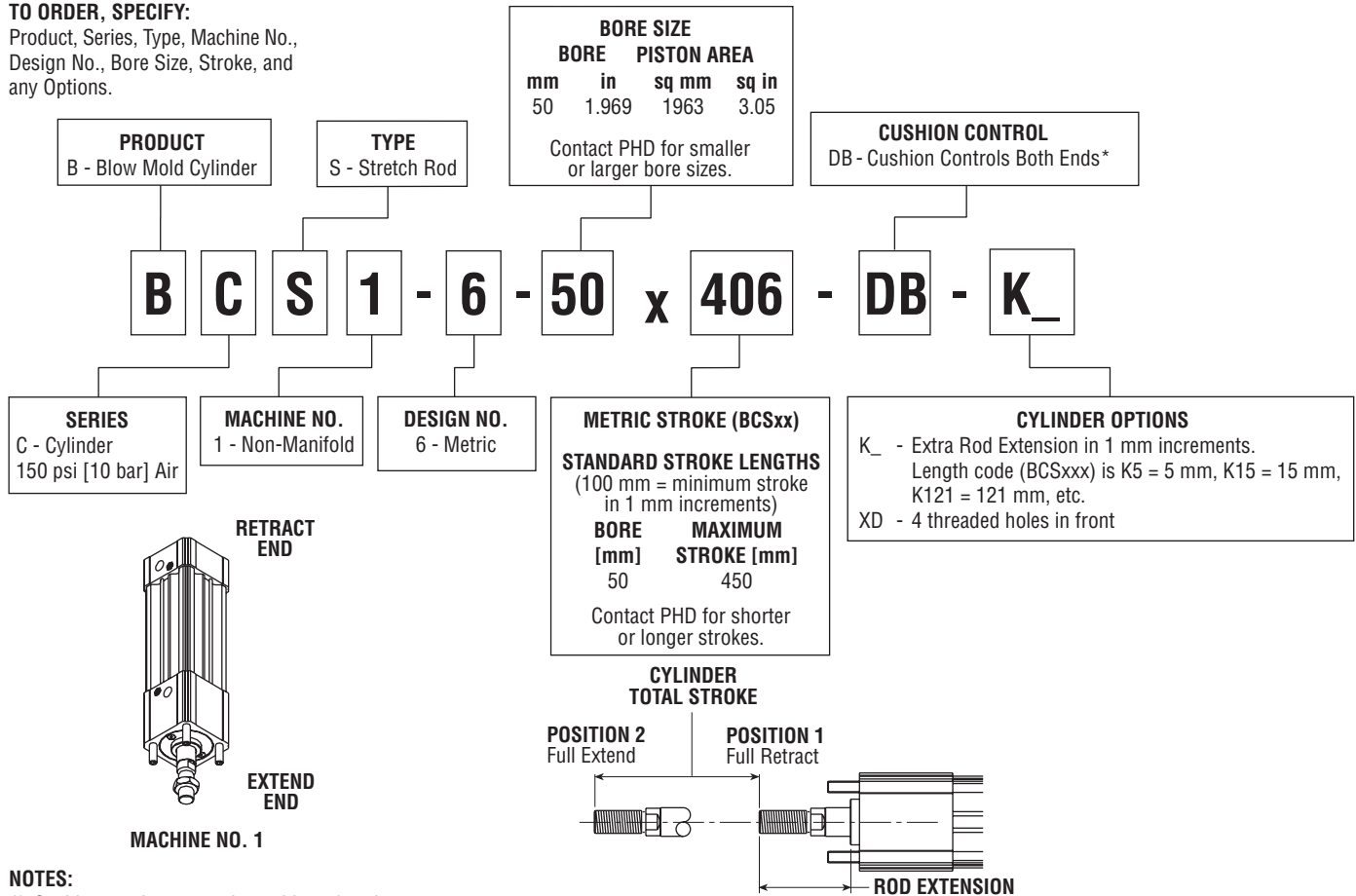
## IMPORTANT INFORMATION DO NOT DISCARD!

Use this information sheet to assist with cylinder installation and setup.  
File with maintenance or machine documentation.

### MODEL NUMBER DEFINITION

#### TO ORDER, SPECIFY:

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



#### NOTES:

- Cushions and ports are in positions 1 and 5.  
\* -DB Cushions in both directions is standard on Machine 1.
- Standard Series 1 Stretch Rod Cylinder ordering number is as follows:  
**BCS1-6-50x406-DB** (Stroke may vary)

For additional technical assistance, call or visit our website:

P.O. Box 9070, Fort Wayne, IN 46899  
**1-800-624-8511**  
**www.phdinc.com**

# phd<sup>®</sup> ENGINEERING DATA: SERIES BCS1-6 STRETCHING CYLINDERS

## TEMPERATURE LIMITS

Series BCS Stretch Rod Cylinders are designed for use in temperatures from -20° to 180°F [-29° to +82°C]. For temperatures outside this range, consult PHD.

## PRESSURE RATINGS

All Series BCS Cylinders have an operating pressure range of 7.5 psi minimum to 150 psi maximum [0.5 to 10 bar].

## LUBRICATION

Series BCS1 Stretching Cylinders are lubricated internally at the factory for the life of the cylinder using lubrication per FDA Regulation 21CFR 178.3570.

## CUSHIONS

Standard placement of the Cushions is in location 1 (full extend, head) and 5 (full retract, cap). Cushions control deceleration at the end of rod travel. The rate of deceleration can be adjusted by turning the cushion needle. Clockwise adjustment increases the cushion effect while counterclockwise adjustment decreases the cushion effect. (See Start-Up Procedures)

## UNIQUE SOLUTIONS™

A model number "ML-xxxxx" indicates the unit is a unique product. Contact your local distributor or PHD, Inc. for a complete cylinder description.

**NOTE:** Video tape #FM-CV1 is also available, covering repair procedures on Series CV Cylinders on which the Series BCS Cylinder design is based.

## START-UP PROCEDURES

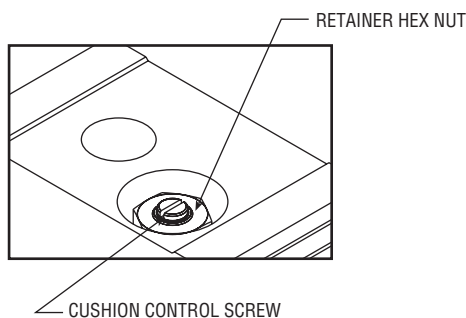
Units should be securely mounted with all fittings and external flow control devices attached prior to applying pressure to unit. Care should be taken to provide adequate space for the rod to extend from cylinder. Apply pressure slowly to the unit.

Cushion needles are adjusted at the factory during cylinder testing. Individual machine types, running speeds and set-up procedures may vary, refer to "Fine Tuning the Cushions" section for final cylinder cushion adjustment.

## CYLINDER ALIGNMENT PROCEDURES

To maximize the service life of stretching cylinders, careful installation is key. This guide is a suggestion of practices that machine operators and maintenance personnel routinely use to ensure satisfactory stretching cylinder performance.

1. Place the new cylinder in the proper location and loosely thread in the fasteners to ensure cylinder support but not interfere with locational adjustment.



2. Attach the rod eye to the cylinder and stretch housing.
3. Manually slide the stretch housing up and down to help center the cylinder.
4. Torque the cylinder mounting fasteners in an incremental diagonal pattern.
5. Verify that the stretch housing manually slides freely up and down and that the cylinder does not bind up at any point in travel.
6. Reconnect air and power to the cylinder.
7. Set stretching cam location per the machine builder's instructions.
8. Pneumatically cycle the cylinder to ensure proper function.

These general guidelines can assist in proper installation of the stretching cylinders to achieve maximum performance.

## FINE TUNING THE CUSHIONS

This should be accomplished by using the following guidelines. Varying loads and speeds will cause different internal pressures at the end of the cylinder travel with respect to the cushion needle adjustment, therefore, fine tuning should be done under pressure (about 1/4 of the final running pressure (i.e. 20 psi) at set-up) with the intended load the cylinder is to carry.

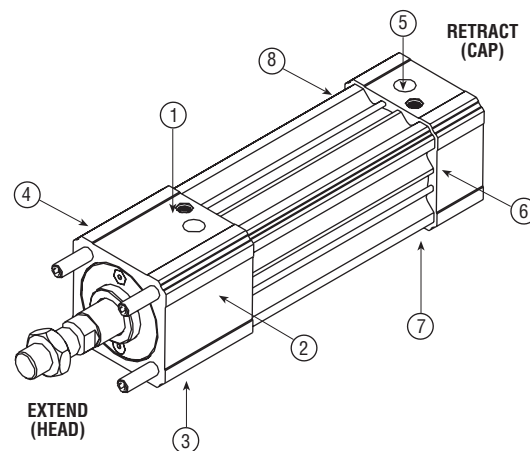
**CAUTION:** Only adjust the cushion by turning the cushion control screw. Do not loosen the retainer hex nut. This only retains the cushion control assembly. Adjusting the retainer hex nut will potentially cause failure in the performance of the cylinder.

If the cylinder is bouncing at end of travel, too much air is being compressed inside the cylinder:

1. Adjust the cushion needle by turning it in the counterclockwise direction (backing it out about a quarter turn at a time).
2. Cycle the cylinder.
3. Repeat until the bounce is eliminated.
4. Finish tuning the cushion by increasing the cylinder pressure to the final running pressure (i.e. 80 psi) of the unit and repeat steps 1 through 3.

If the cylinder is slamming at the end of travel, not enough air is being compressed inside the cylinder:

1. Adjust the cushion needle by turning it in a clockwise direction (turning it in about a quarter turn at a time).
2. Cycle the cylinder.
3. Repeat until the slamming is eliminated.
4. Finish tuning the cushion by increasing the pressure to the final running pressure (i.e. 80 psi) of the unit and repeat steps 1 through 3.



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# phd<sup>®</sup> PARTS LIST & REPAIR KITS: SERIES BCS1-6 STRETCHING 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	17424-099
11	Ball (4 per unit)	1976-004
12	Nut (1 per unit)	3204-003

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:** Universal repair kit and universal cushion kit are available. Please contact PHD, Inc. for more information.

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# phd EXPLODED VIEWS: SERIES BCS1-6 STRETCHING CYLINDERS

## BCS1-6-50

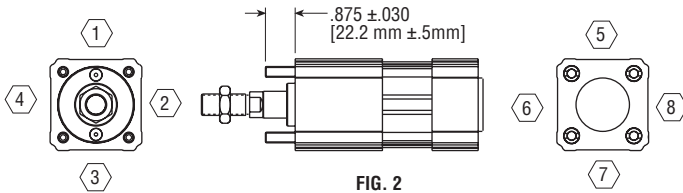
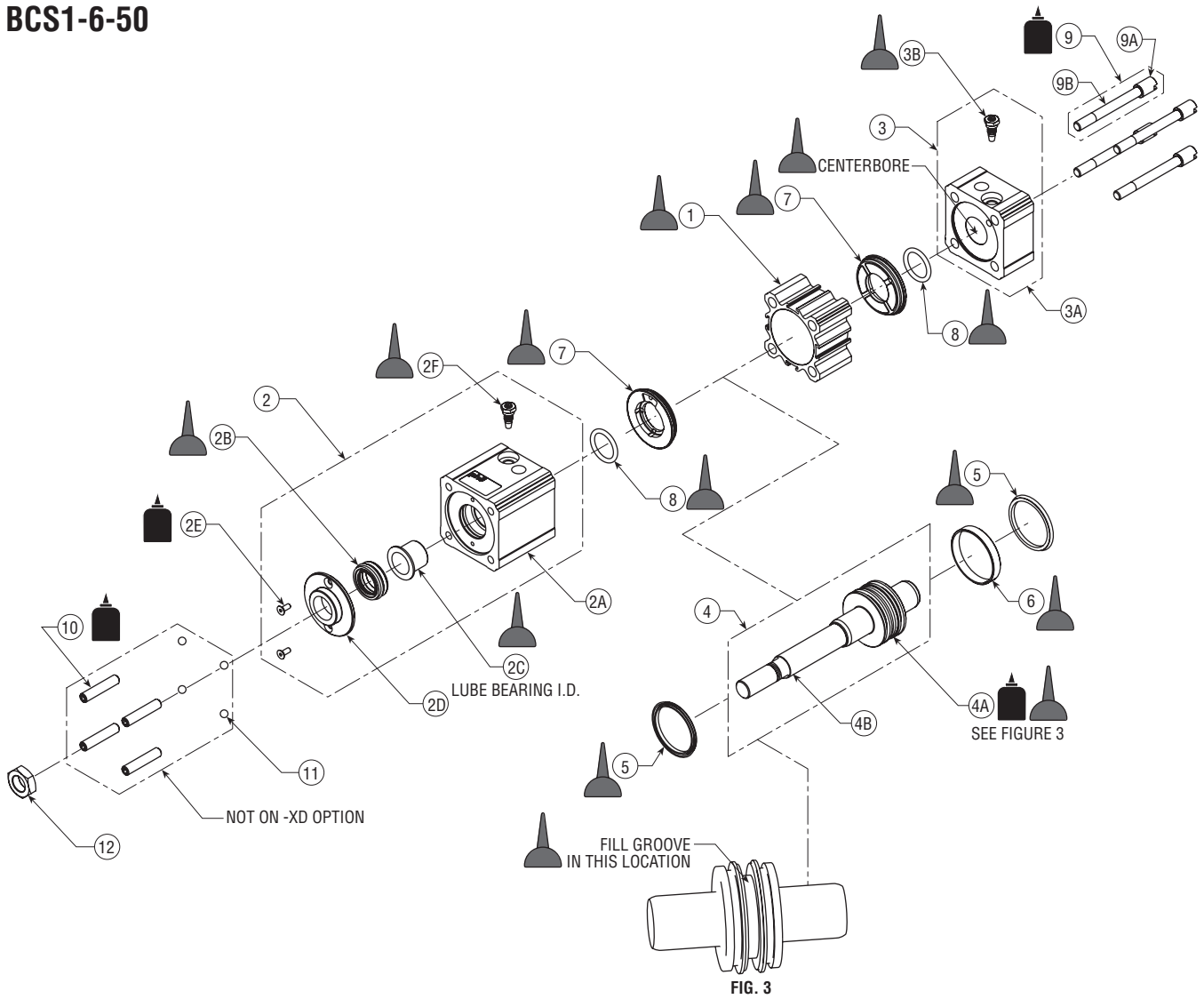


FIG. 2

ALIGN CUSHION ORIFICE IN HEAD OR CAP WITH CUSHION ORIFICE HOLE IN MULTI-FUNCTION SEAL WITHIN ±10°

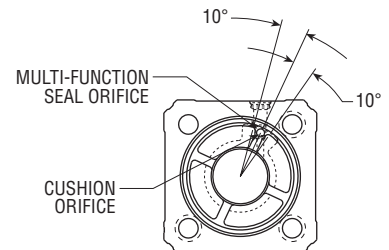


FIG. 1 CUSHION UNITS (-Dx)

- = LOCTITE 242 THREAD LOCKER
- = LUBRICANT PER FDA REGULATION 21CFR 178.3570

### 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]

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