

phd[®] START-UP AND INFORMATION SHEET: SERIES BCZ2S NOZZLE CYLINDER

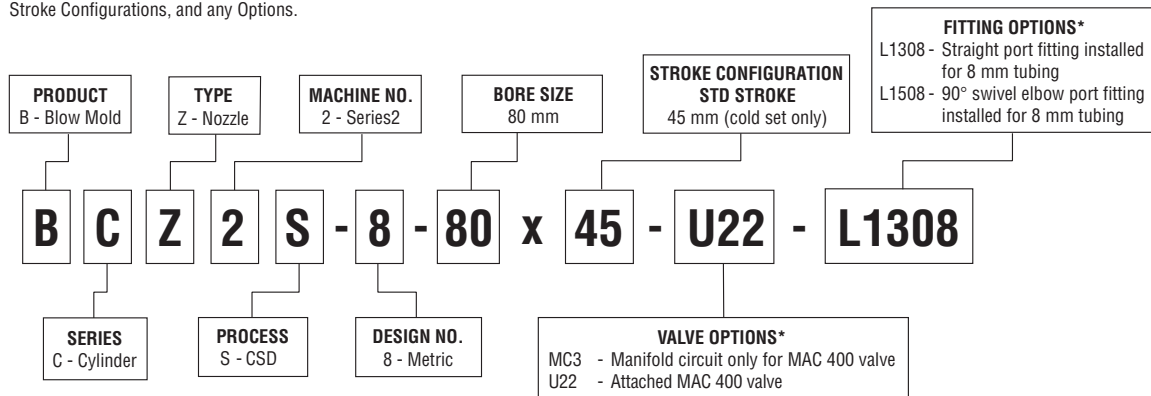
IMPORTANT INFORMATION DO NOT DISCARD!

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., Process, Design No., Bore Size, Stroke Configurations, and any Options.



NOTES:

- 1) Consult PHD for additional options such as magnetic piston, ISO/valve manifold combinations and alternative MAC 400 valve combinations.
- 2) *If no fittings or valves are required, leave blank.

LIFE EXPECTANCY

Series BCZ Cylinders have been designed for 15 million trouble-free cycles except for high pressure stretch rod seal.

CYCLE RATE

Series BCZ Nozzle Cylinders meet or exceed cycle rate of competitor's unit when using optional manifold/valve combinations.

MAINTENANCE

As with most PHD products, these cylinders are field repairable. Repair kits, tooling kits, and main structural components are available as needed for extended service. Optional rebuild service is available.

LUBRICATION

Series BCZ Nozzle Cylinders are designed and intended not to use lubrication on the high pressure (blow air) section. Only the control air section is designed and intended to be lubricated using lubrication per FDA Regulation 21CFR 178.3570.

As machine set-ups and conditions vary, PHD Inc. cannot guarantee the same extended life will be seen as that resulting from PHD's own lab testing of the stretch rod seal.

Recommended kits and tooling required for disassembly and assembly of unit:

- Flat blade screwdriver (Not included)
- Pick tool (Not included, see Figure 21)
- Side cutters or equivalent
- Tool 75682
- Tooling kit 75536 (Includes tools 75509, 75511, 75565, 75610 and tooling kit 80828)
- Tooling kit 80828 (Includes tools 80827 and 80826)

CYLINDER SPECIFICATIONS	IMPERIAL	METRIC
TYPE	Pneumatic	
SERIES	BCZ CSD Nozzle Cylinder	
CYLINDER BORE SIZE	3.149 in	80 mm
PISTON ROD DIAMETER	1.965 in	50 mm
CYLINDER - LOW PRESSURE		
BORE AREA - EXTEND	4.109 in ²	26.51 cm ²
BORE AREA - RETRACT	4.748 in ²	30.63 cm ²
THEORETICAL EXTEND OUTPUT	357 lb @ 87 psi	1588 N @ 6 bar
THEORETICAL RETRACT OUTPUT	413 lb @ 87 psi	1837 N @ 6 bar
OPERATION	Double Acting	
OPERATING PRESSURE RANGE	7.5 - 150 psi	0.5 - 10 bar
BLOW CYLINDER - HIGH PRESSURE		
BORE SIZE	2.165 in	55 mm
BORE AREA	3.094 in ²	19.96 cm ²
OPERATING PRESSURE	600 psi	41.4 bar
THEORETICAL CLAMP FORCE	1856 lb @ 600 psi	8256 N @ 41.4 bar
AMBIENT AND FLUID TEMPERATURE	-20° to 180° F	-29° to 82° C
STROKE TIME (TYPICAL)	Extend 93 ms, Retract 78 ms	
LUBRICATION	FDA Regulation 21CFR 178.3570	
PORT SIZE	G 1/8	
STROKE	1.772 in (+.079 / -.000)	45 mm (+2.0 / -1.0)

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phd[®] DISASSEMBLY PROCEDURES: SERIES BCZ2S NOZZLE CYLINDER

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DISASSEMBLY PROCEDURE

1) **WARNING: All air pressure in the unit must be exhausted prior to disassembly of nozzle cylinder.**

2) During disassembly, be careful to avoid scratching or damaging sealing surfaces. A non-metallic screwdriver (75682) is included with each repair kit to help prevent damage while removing low pressure piston and rod seals. A pick type tool is suggested for removal of blow air seals. See Figure 21 for tool example.

3) Remove nozzle and locking nut from piston rod.

4) Using 6mm hex wrench, remove all 8 SHCS from tube and cap. Notice that the tube screws are longer than the cap screws. (Figure 1)

5) Using 2 of the SHCS just removed, thread screws into the 2 threaded holes in the tube. Tightening these SHCS will separate tube from the body. (Figure 2)

6) Separate tube from body and remove piston rod from assembly. (Figure 3)

7) Remove cap from tube. (Figure 4)

8) Remove retaining ring from cap. (Figure 5)

9) Using a small flat blade screwdriver (not included), pry rod wiper out of the cap. (Figure 6)

10) Remove rod seal and cap seal from cap being careful not to scratch sealing surface and discard. (Figure 7)

11) Using small diameter of tool 75511 and arbor press, press bushing out of cap. (Figure 8)

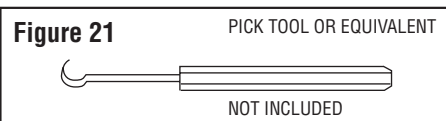
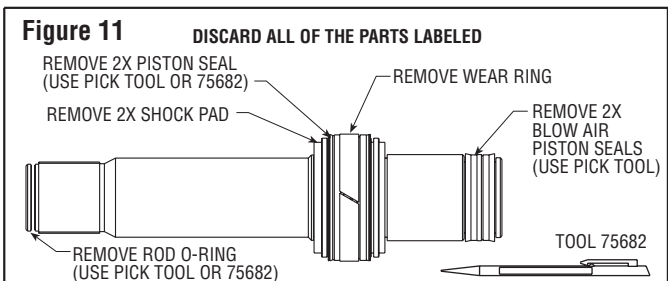
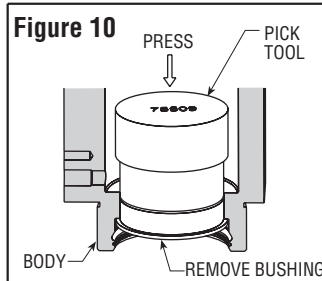
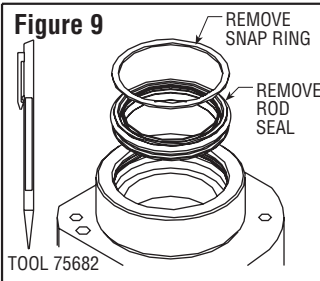
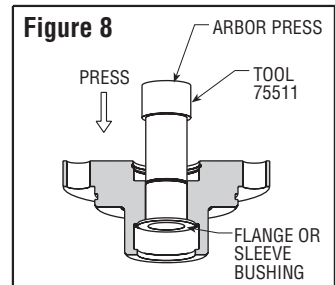
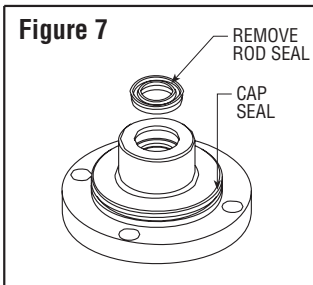
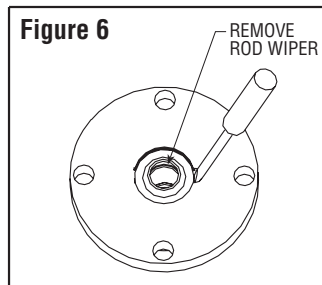
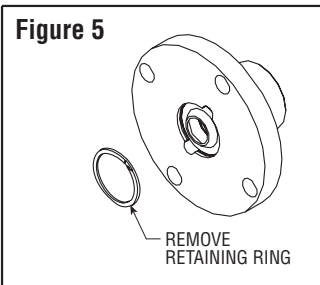
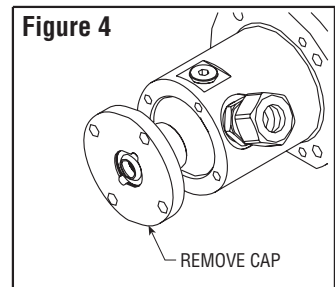
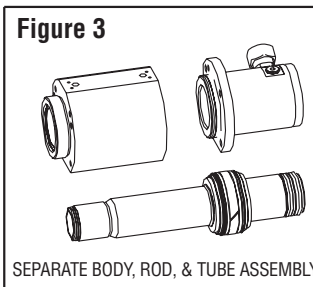
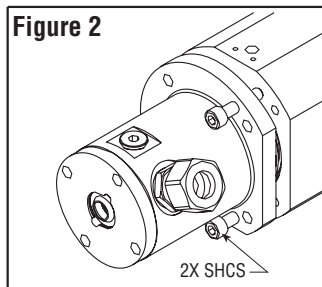
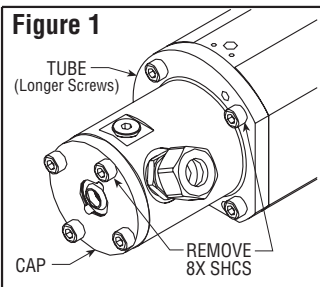
12) Pry large rod seal from body using tool 75682. (Figure 9)

13) Using small diameter of tool 75509 and arbor press, press bushing out of body. (Figure 10)

14) Remove wear ring, shock pads and piston seals from piston rod. (Figure 11)

15) To remove blow air piston seals, use pick tool (Figure 21, not included) to lift up under the seals and cut seals using a pair of side cutters. (Figure 11)

16) The repair kit provides new components for wear items to completely rebuild unit. Unless a fastener kit was also purchased, keep all SHCS to repair unit. Discard all old seals, shock pads and bushings and clean all remaining parts.



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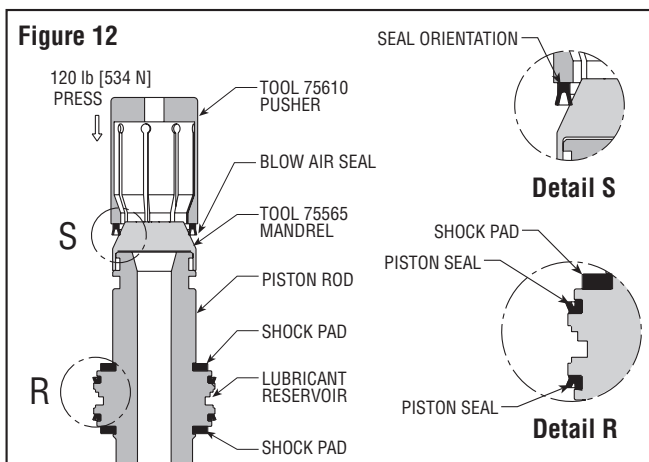
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ASSEMBLY PROCEDURE:

- 1) All seals and wear surfaces in the control air section are designed and intended to be lubricated using lubrication per FDA Regulation 21CFR 178.3570 prior to assembly (See page 4). Recommended lubricant is provided in repair kit.
- 2) PHD recommends using thread locker for all threaded fasteners.
- 3) Place piston seals onto piston rod. (Figure 12, Detail R)
- 4) Press shock pads onto piston rod. (Figure 12, Detail R)
- (Steps 5 and 6 are designed and intended not to use lubrication.)**
- 5) Place 75565 mandrel onto end of piston rod. Place a blow air seal with lip orientation shown in Figure 12, Detail S on 75565 mandrel. Using tool 75610 and an arbor press, provide a constant force of approximately 120 lb [534 N]. The seal should slide down the tool and into the second piston seal groove. **Warning: Do not use impact force such as a hammer to install piston seal.**

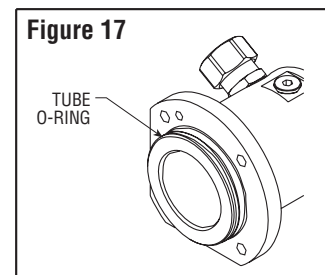
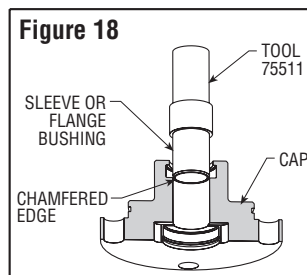
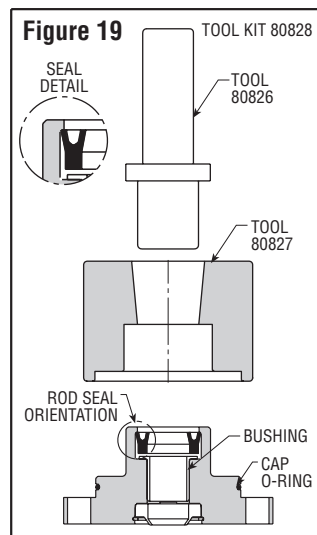
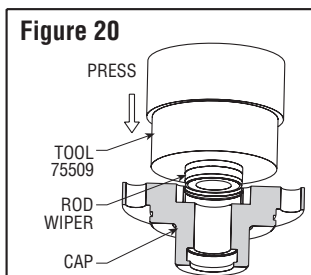
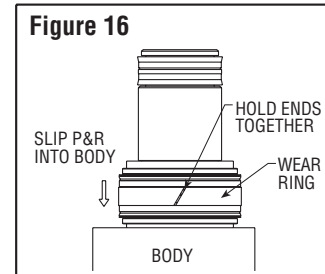
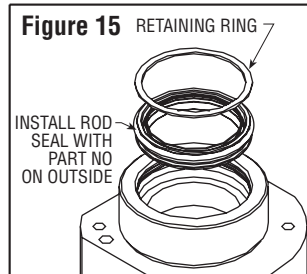
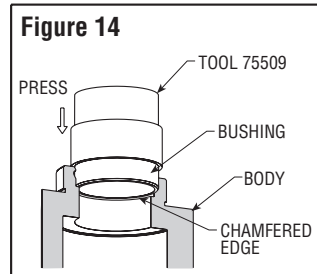
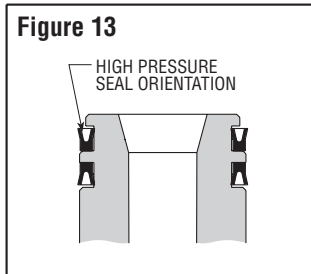


- 6) Place second blow air piston seal on piston rod with lip orientation as shown. (Figure 13)
- 7) Fill lubricant reservoir groove in the piston rod with lubricant. (Figure 12)
- 8) Install new rod o-ring onto piston rod end. (Figure 11)
- 9) Using large diameter of tool 75509 and arbor press, press bushing with chamfered side down into body. (Figure 14)
- 10) Install rod seal into body with part number of seal located on outside of body. (Figure 15)
- 11) Install retaining ring into body. (Figure 15)
- 12) Wrap wear ring around piston rod and while holding wear ring ends, slip piston rod into body. (Figure 16)
- 13) Place o-ring onto tube and lubricate tube bore. (Figure 17)
- 14) Work tube over blow air seals and seat tube fully against body aligning all flat sides. (Figure 1)

BLOW AIR SECTION:

The following steps are designed and intended not to use lubrication.

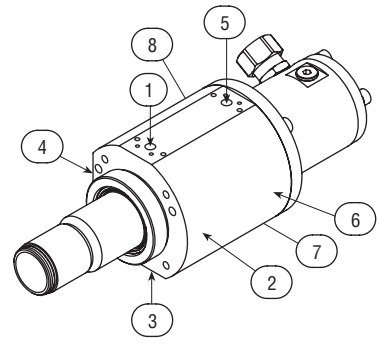
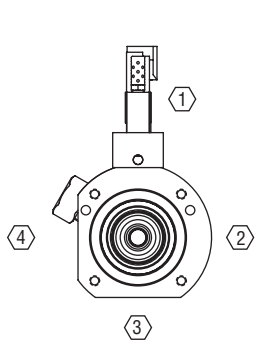
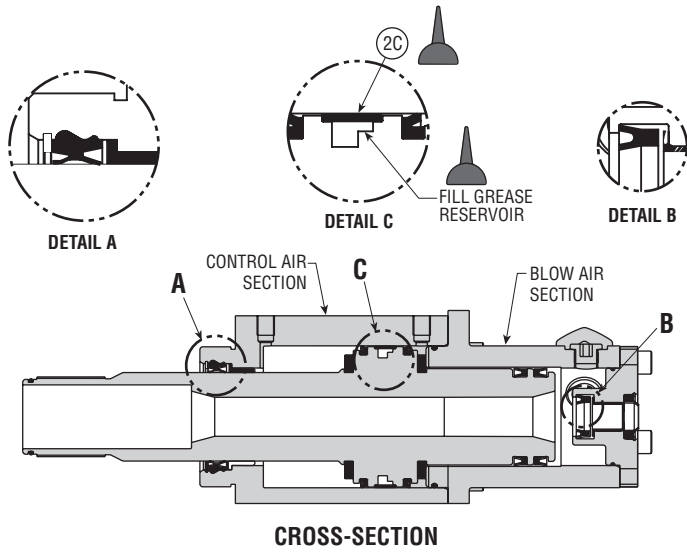
- 15) Using recommended thread locker, torque tube screws to 200 in-lb [23 Nm]. (Figure 1)
- 16) Using large diameter of tool 75511 and arbor press, install cap bushing until seated by tool depth. (Figure 18)
- 17) Install rod seal into cap using tooling 80826 and 80827 (Kit 80828) with orientation as shown. (Figure 19)
- 18) Place o-ring onto cap. (Figure 19)
- 19) Using tool 75509 and an arbor press, press rod wiper into cap until fully seated. (Figure 20)
- 20) Install retaining ring by separating coils and working retaining ring in a circle around groove. (Figure 5)
- 21) Work cap assembly onto tube until fully seated. (Figure 1)
- 22) Using recommended thread locker, torque cap screws to 200 in-lb [23 Nm]. (Figure 1)



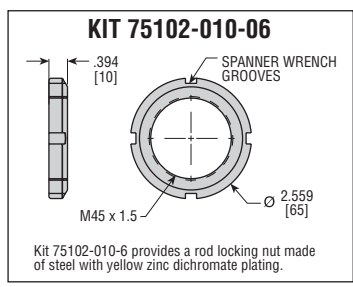
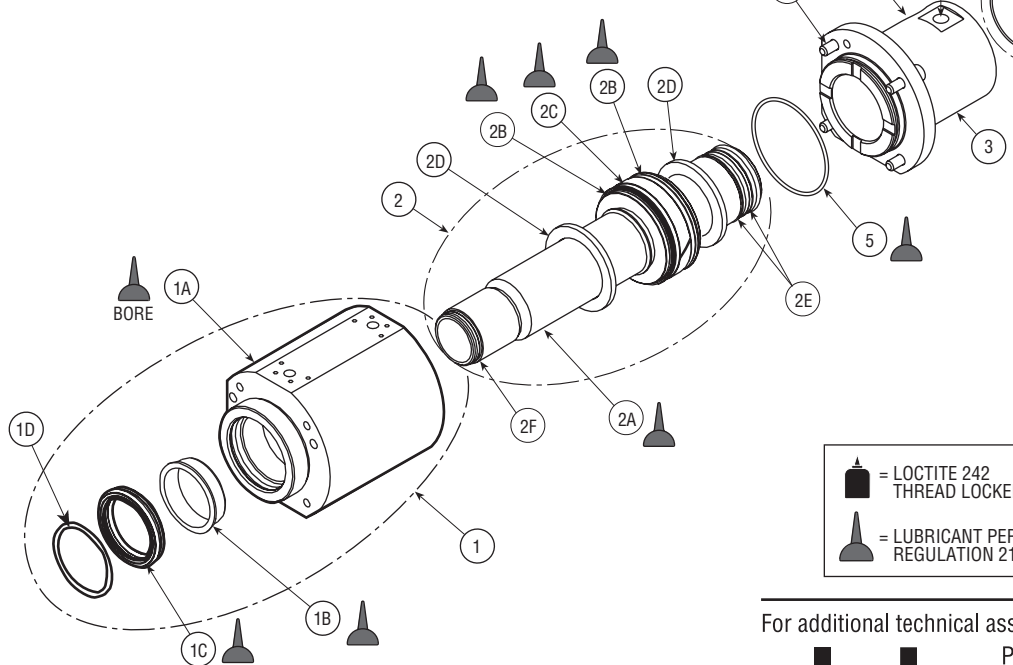
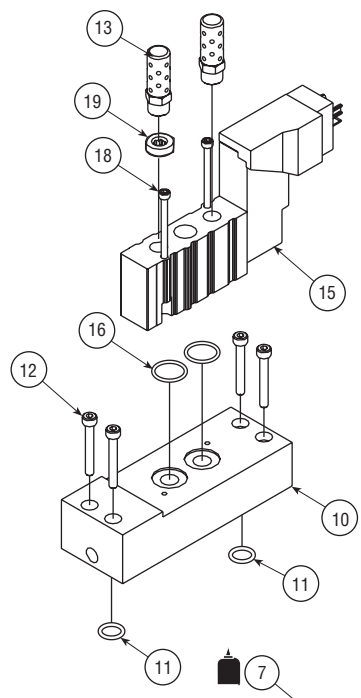
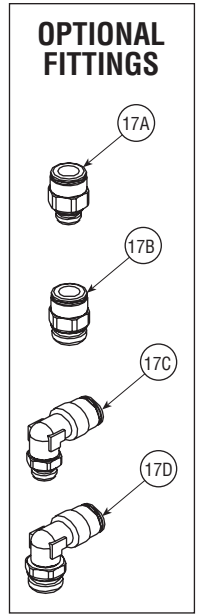
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phd[®] EXPLODED VIEW: SERIES BCZ2S NOZZLE CYLINDER



NOTES:
 1) NUMBERS INCLUDED IN A HEX INDICATE PORT POSITION
 2) NUMBERS INCLUDED IN AN OVAL INDICATE PORT LOCATION



- = LOCTITE 242 THREAD LOCKER
- = LOCTITE HYDRAULIC SEALANT
- = LUBRICANT PER FDA REGULATION 21CFR 178.3570
- = LOCTITE PRIMER 7090

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phd® PARTS LIST: SERIES BCZ2S NOZZLE CYLINDER

KEY	PART DESCRIPTION	BCZ2S-8-80x45
1	Body Assembly	Full unit description required followed by -H2400
1A	Body	75824-00
1B	Bushing	Sold as part of Repair Kit -H9010
1C	Rod Seal	Sold as part of Repair Kit -H9010
1D	Retaining Ring	Sold as part of Repair Kit -H9010
2	Piston and Rod Assembly	Full unit description required followed by -H1000
2A	Piston and Rod	75063
2B	Piston Seal	Sold as part of Repair Kit -H9010
2C	Wear Ring	Sold as part of Repair Kit -H9010
2D	Shock Pad	Sold as part of Repair Kit -H9010
2E	High Pressure Piston Seal	Sold as part of Repair Kit -H9010
2F	Rod O-Ring	Sold as part of Repair Kit -H9010
3	Tube	75065
4	Cap Assembly	Full unit description required followed by -H1200
4A	Cap	77169
4B	Bushing	Sold as part of Cap Repair Kit
4C	Rod Wiper	Sold as part of Cap Repair Kit
4D	Rod Seal ⁵	Sold as part of Cap Repair Kit
4E	Cap O-Ring	Sold as part of Cap Repair Kit
4F	Retaining Ring	Sold as part of Cap Repair Kit
5	Tube O-Ring	Sold as part of Repair Kit -H9010
6	Tube Standard Head Cap Screws	Sold as part of Fastener Kit -H9020
7	Cap Standard Head Cap Screws	Sold as part of Fastener Kit -H9020
8	High Pressure Fitting	12135-024
9	Plug	59144-002
10	Manifold Plate Assembly	75078
11	Manifold O-Ring	Sold As Part of Manifold Kit
12	Manifold SHCS	Sold As Part of Manifold Kit
13	Muffler	Sold As Part of Manifold Kit
15	Mac 400 Series Valve	MAC 411A-B0A-DM-DDAJ-1JM =4357
16	Valve Manifold O-Ring	Sold As Part of Manifold Kit
17A	Straight Port Fitting (-L1308)	62195-024
17B	Straight Port Fitting (-L1308-U22 OR -L1308-MC3)	61734-130
17C	90° Swivel Port Fitting (-L1508)	62195-007
17D	90° Swivel Port Fitting (-L1508-U22 OR -L1508-MC3)	61734-014
18	Valve SHCS	Sold As Part of Manifold Kit
19	Valve Orifice	Sold As Part of Orifice Kit or Manifold Kit

KIT DESCRIPTION	KIT NUMBER
Unit Repair Kit ¹	Full unit description required followed by -H9010
Cap Repair Kit ²	87121
Cap Seal Only Kit ³	87122
Tooling Kit ⁴	75536
Cap Seal Tooling Kit ⁵	80828
Rod Locking Nut	75102-010-06
Fastener Kit	Full unit description required followed by -H9020
Manifold Kit	75103
Orifice Kit	75677

NOTES:

- 1) Includes all parts to repair the full unit excluding cap parts.
- 2) Includes all hardware to completely repair cap.
- 3) Includes rod seal and grease to replace cap seal only.
- 4) Includes all specialized tools required to rebuild unit.
- 5) Includes tools to rebuild cap. Tools in this kit are also included in Kit #75536.

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