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HYDRAULIC CYLINDER MAINTENANCE AND REPAIR MANUAL

33QC-SNC
THROTTLE CYLINDER
INTERSTOP PART # 135259



REV. 0 / FEBRUARY 2002

Manual Revision Log

Various Customers 33 QC-SNC/ Hydraulic Cylinder Repair Manua

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2/1/2002	Create Rev. 0 / February 2002 Hydraulic Cylinder Maintenance and Repair Manual 33QC-SNC Throttle Cylinder Part #135259	02-94	DC	ACF	3/12/2002	Russ Borrowdale	5	2

INTERSTOP

FLOW CONTROL SYSTEMS

!W A R N I N G!

*Read this manual in its entirety
before performing any operation.
Any errors during operation could result
in personal injury and/or damage to the equipment.*

If you have any questions or concerns, contact:

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Cincinnati, Ohio 45227

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TOLL FREE: 1-866-556-STOP



Cylinder Description: 4" Bore x 4-15/16" stroke with a rated operating pressure of 3,000 PSIG

Refer to drawing 135259C for construction and component part numbers in Section 6.

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DWG: 135259c

1. TOOLS

1.1 Assemble required tools (See Figure 1):

- A. Assorted o-ring picks
- B. Socket wrench, 1/2" drive
- C. Piston ring compressor for 4" bore
- D. 5/16" allen wrench adapter for 1/2" drive
- E. Hone for 4" bore, 240 grit silicon carbide
- F. 3/16" allen wrench
- G. Ring removal pliers
- H. Torque wrench, 1/2" drive, for 50 ft.-lbs.
 - Hydraulic fluid for seal lube (same as operating fluid)

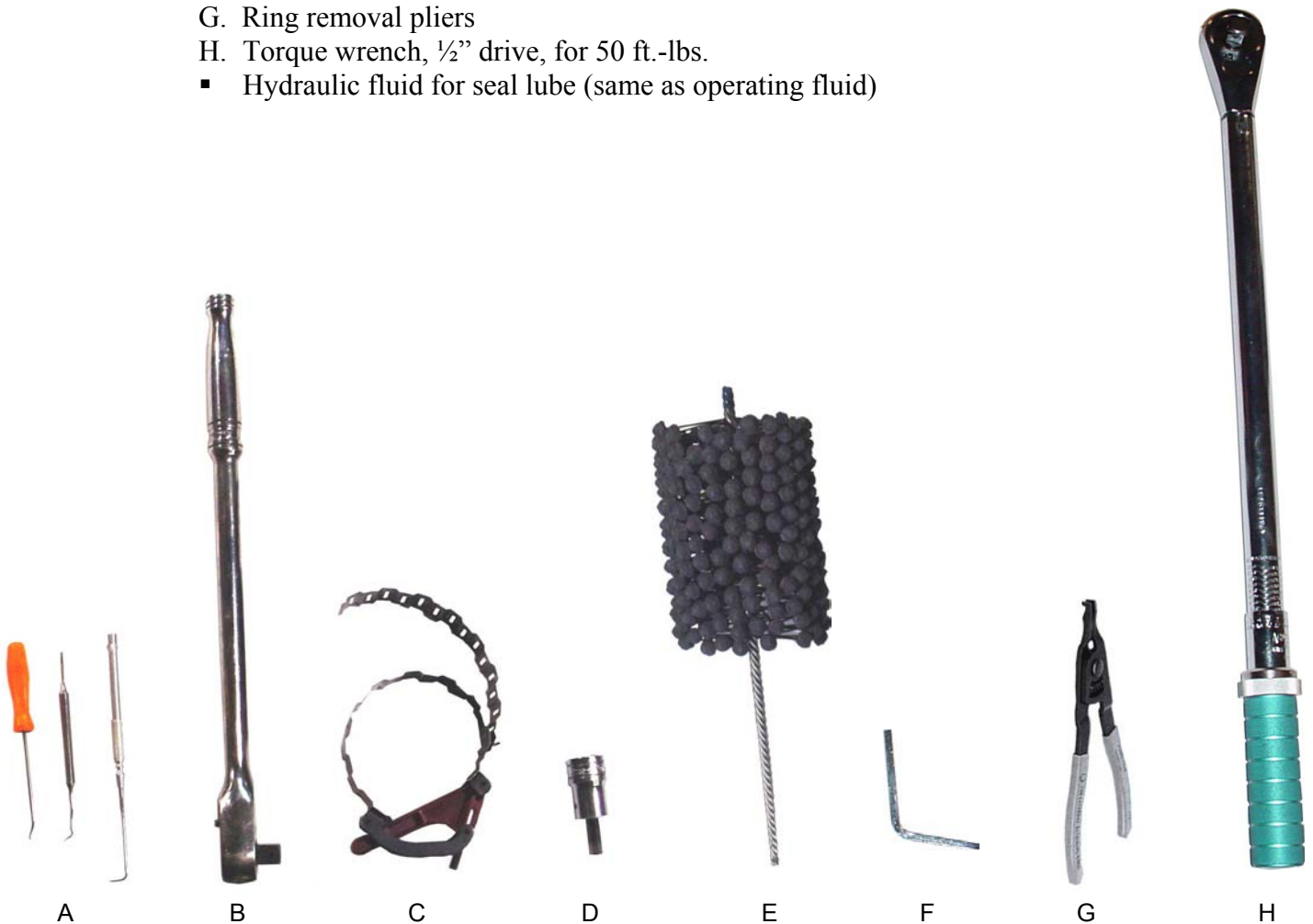
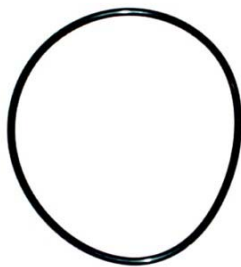


FIGURE 1

2. SEALS



ITEM 9A
TUBE SEAL O-RING



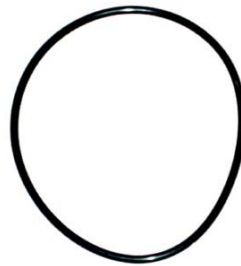
ITEM 9B
ROD WIPER



ITEM 9C
ROD SCRAPER



ITEM 9D
ROD SEAL



ITEM 9E
TUBE SEAL BACK-UP



ITEM 9F
SPACER SEAL



ITEM 9G
MAGNET RETAINER

FIGURE 2
SEAL KIT 135287

3. COMPLETE CYLINDER DISASSEMBLY

3.1 Cylinder Prior to Disassembly

Secure the cylinder in a vise. See Figure 3 for view of cylinder prior to disassembly.



FIGURE 3
CYLINDER PRIOR TO DISASSEMBLY

3.2 Removal of the Flange Retaining Screws

Extend the piston rod (Item 3) several inches and inspect the rod end for burrs and sharp edges. Remove any if present. Use a socket wrench with a 1/2" drive and a 5/16" allen wrench adapter to remove the (8) flange retaining screws (Item 5). See Figure 4.

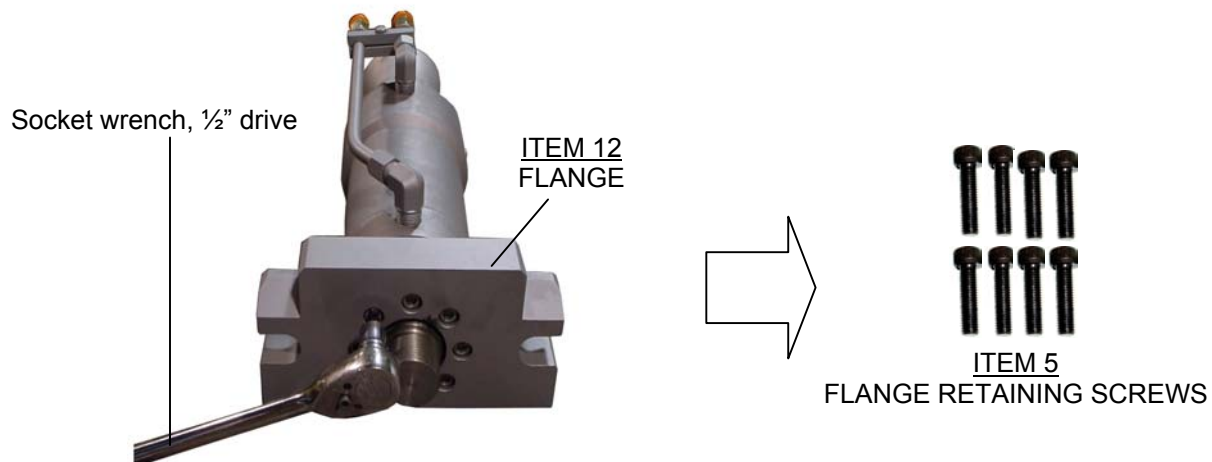


FIGURE 4
REMOVAL OF THE FLANGE RETAINING SCREWS

3.3 Removal of the Flange

After removing the (8) flange retaining screws, carefully slide the flange (Item 12) off the rod. See Figure 5.

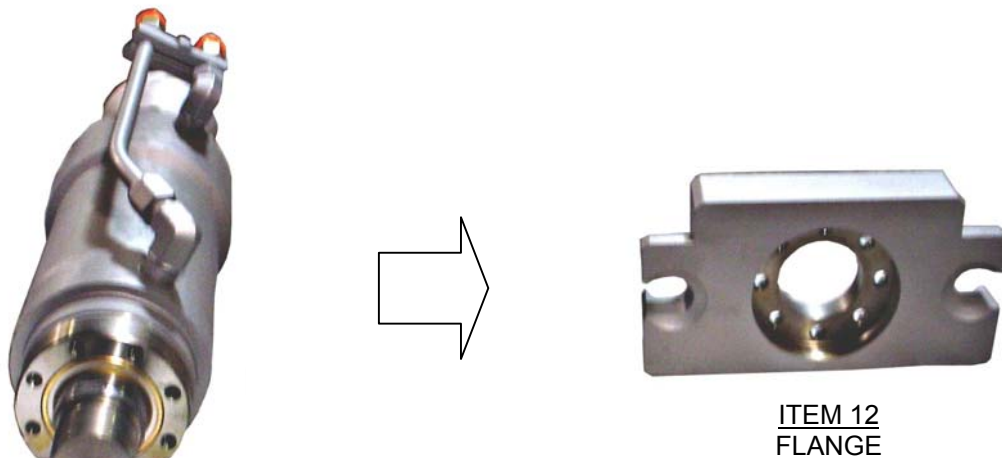


FIGURE 5
REMOVAL OF THE FLANGE

3.4 Removal of the Bushing Cartridge

After removing the flange, extend the piston rod several more inches. Carefully slide the bushing cartridge (Item 10) off the rod. See Figure 6.

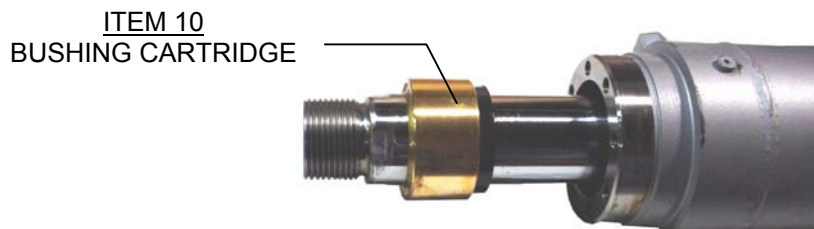


FIGURE 6
REMOVAL OF BUSHING

3.4.1 Removal of the Rod Seal, Wiper and Scraper

After removing the bushing cartridge it is now possible to remove the rod seal (Item 9D), the wiper (Item 9B) and the scraper (Item 9C) from the bushing cartridge. Be careful not to scratch the seal cavities. Use a small, rounded-edge screwdriver to aid in seal removal. See Figure 7.

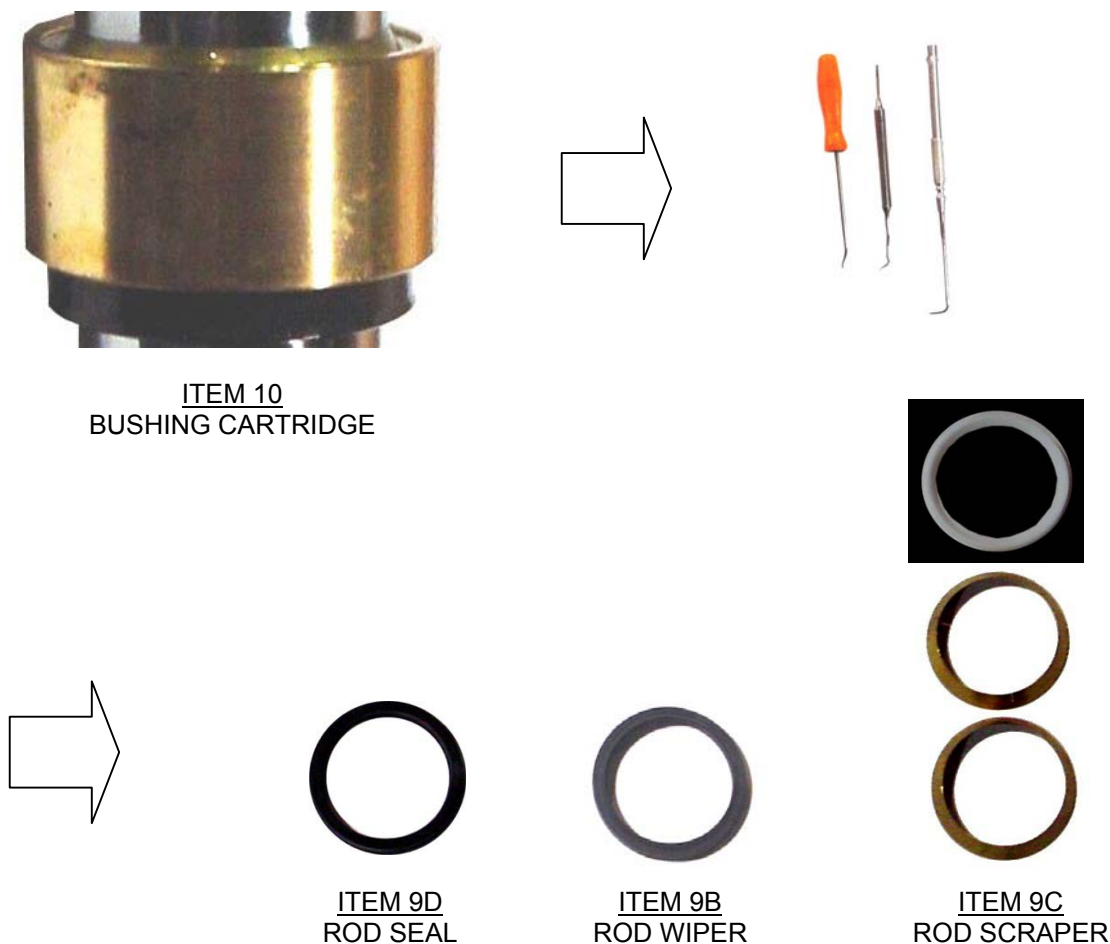


FIGURE 7
REMOVAL OF THE ROD SEAL, WIPER AND SCRAPER

3.5 Removal of the Transducer Cover

After the flange is removed, use a 3/16" allen wrench to remove the (3) transducer cover mounting screws (Item 16). Now, remove the transducer cover (Item 15). See Figure 8.



FIGURE 8
REMOVAL OF TRANSDUCER COVER

3.6 Removal of the Cap Retaining Screws

After the transducer cover is removed, use a socket wrench with a 1/2" drive and a 5/16" allen wrench adapter to remove the (8) cap retaining screws (Item 6). See Figure 9.

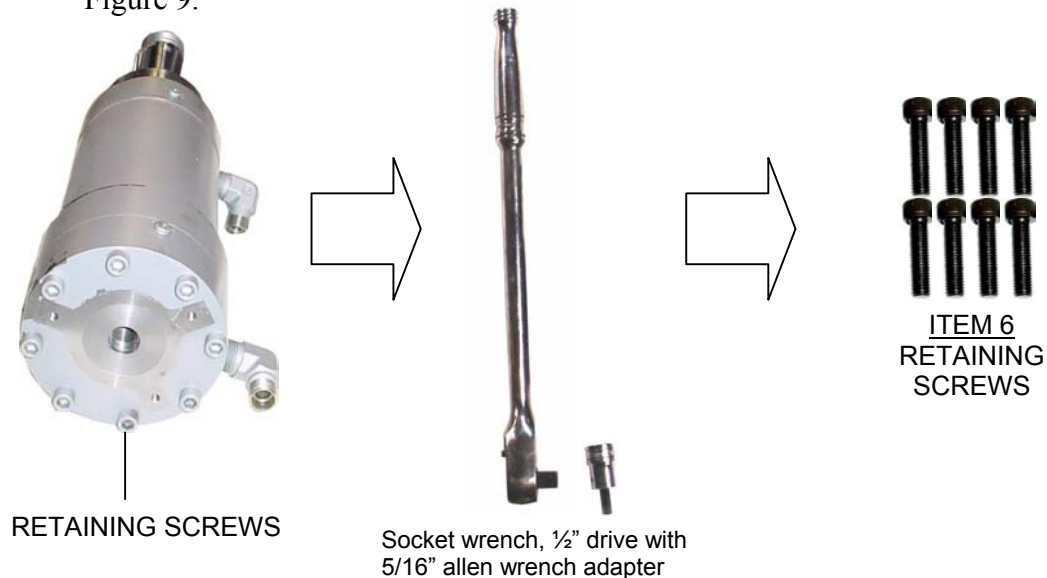


FIGURE 9
REMOVAL OF THE CAP RETAINING SCREWS

3.7 Removal of the Cap

After removing the (8) cap retaining screws, carefully remove the cap (Item 2). See Figure 10.

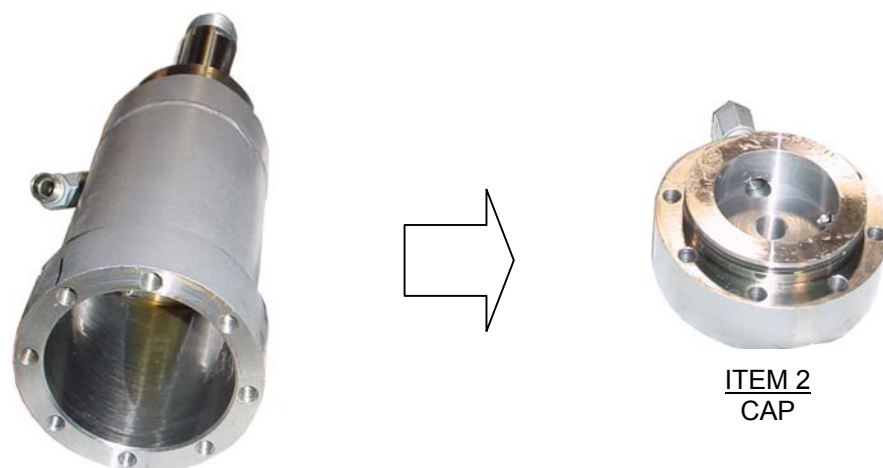


FIGURE 10
REMOVAL OF THE CAP

3.7.1 Removing the Tube Seal O-ring and the Tube Seal Back-Up

It is now possible to remove the tube seal o-ring (Item 9A) and the tube seal back-up (Item 9E) from the cap (Item 2). Be careful not to scratch the seal cavities. Use a small, rounded-edge screwdriver to aid in the o-ring removal. See Figure 11.

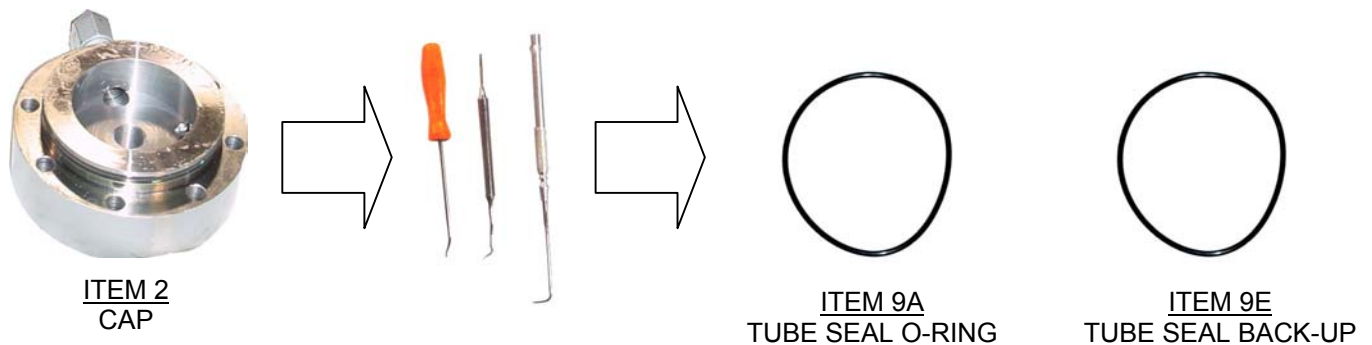


FIGURE 11
REMOVING THE TUBE SEAL O-RING AND TUBE SEAL BACK-UP

3.8 Removal of the Piston/Rod Assembly

Place the cylinder in a vertical rod-up position. Pull the piston/rod assembly (Item 3) out of the head/tube assembly (Item 1). Do not allow the piston rod surface to contact the head/tube assembly during removal. See Figure 12.

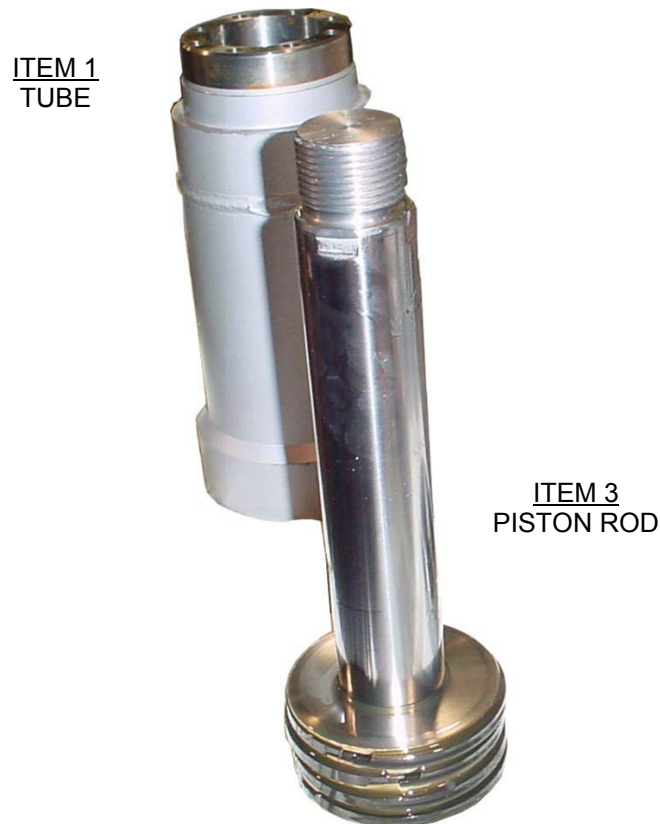


FIGURE 12
REMOVAL OF THE PISTON/ROD ASSEMBLY

3.9 Removal of the Piston Rings

To remove the (4) piston rings (Item 8) use ring removal pliers. Inspect the piston and smooth any scratched surface using fine grit emery cloth. See Figure 13.

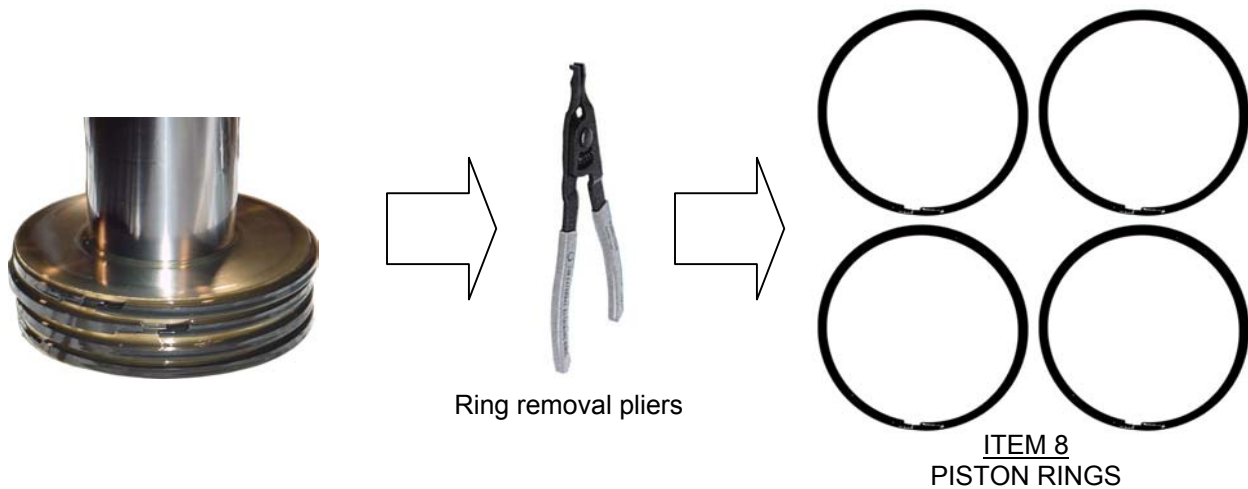


FIGURE 13
REMOVAL OF THE PISTON RINGS

3.10 Cleaning the Head/Tube Assembly

Clean the inside of the head/tube assembly (Item 1) and inspect for deep gouges and scratches. Light scratches and score marks can be removed with honing or fine grit emery cloth. A heavily scored surface requires a new head/tube assembly. See Figure 14.



FIGURE 14
CLEANING THE HEAD/TUBE ASSEMBLY

4. CYLINDER REASSEMBLY

4.1 Installing the Piston Rings

To install the (4) new piston rings (Item 8) fill the two center grooves on the piston first. Make sure splits are opposed. See Figure 15.

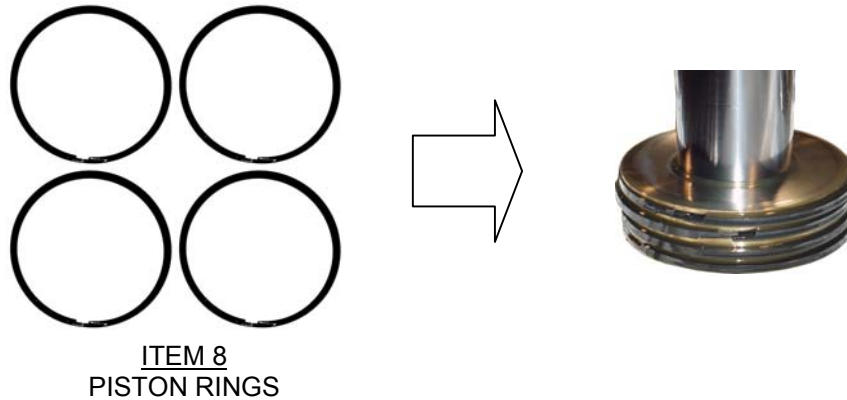


FIGURE 15
INSTALLING THE PISTON RINGS

4.2 Reinstalling the Piston/Rod Assembly

After the (4) piston rings have been installed, place the head/tube assembly in the vertical position. Lubricate the rings and piston with system hydraulic fluid. Using a ring compressing tool, push the piston into the tube. See Figure 16.

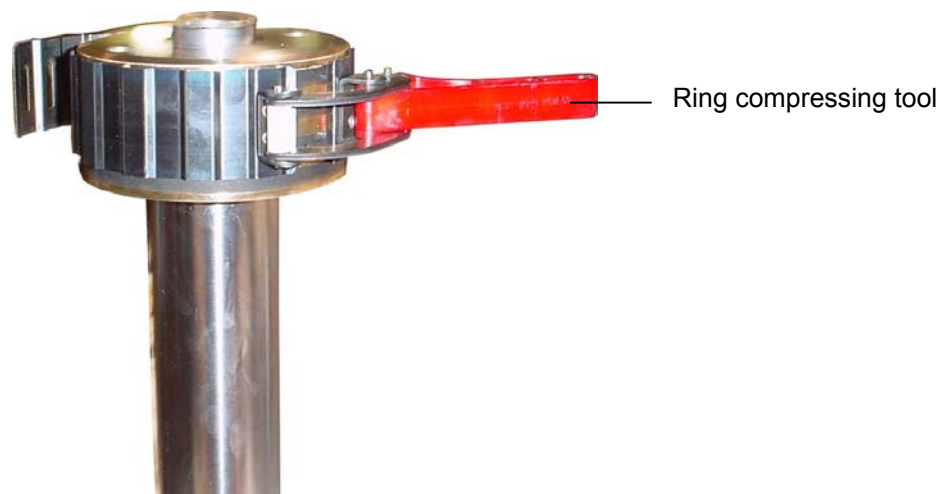


FIGURE 16
REINSTALLING THE PISTON/ROD ASSEMBLY

4.3 Reinstalling the Tube Seal O-ring and Tube Seal Back-Up

Clean all the tube seal o-ring (Item 9A) and tube seal back-up (Item 9E) cavities in the cap. Lubricate the tube seal and back-up with clean system hydraulic fluid before installing it into the cap. Use a small, rounded-edge screwdriver to aid in reinstallation. See Figure 17.

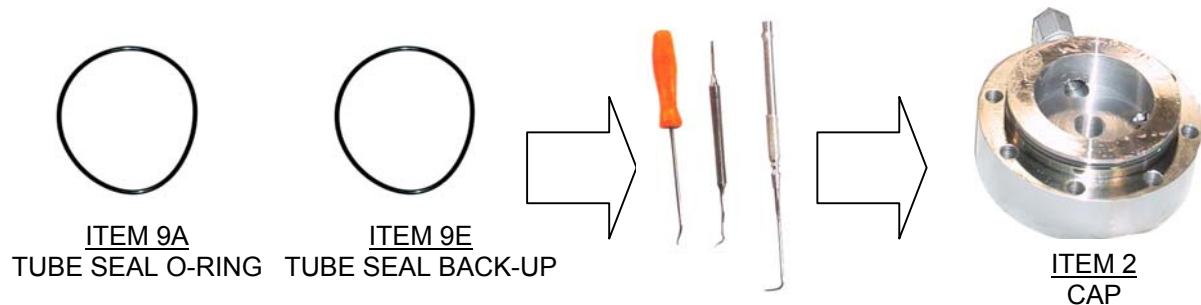


FIGURE 17
REINSTALLING THE TUBE SEAL O-RING AND TUBE SEAL BACK -UP

4.4 Reinstalling the Cap

After the tube seal o-ring and the tube seal back-up are installed in the cap, carefully place the cap (Item 2) onto the tube (Item 1) and tighten the (8) cap retaining screws (Item 6) to 50ft. lbs using a torque wrench with a 1/2" drive and a 5/16" allen wrench adapter. Always tighten screws across from each other, rather than adjacent, to allow a more uniform pressure on the tube seal o-ring. See Figure 18.

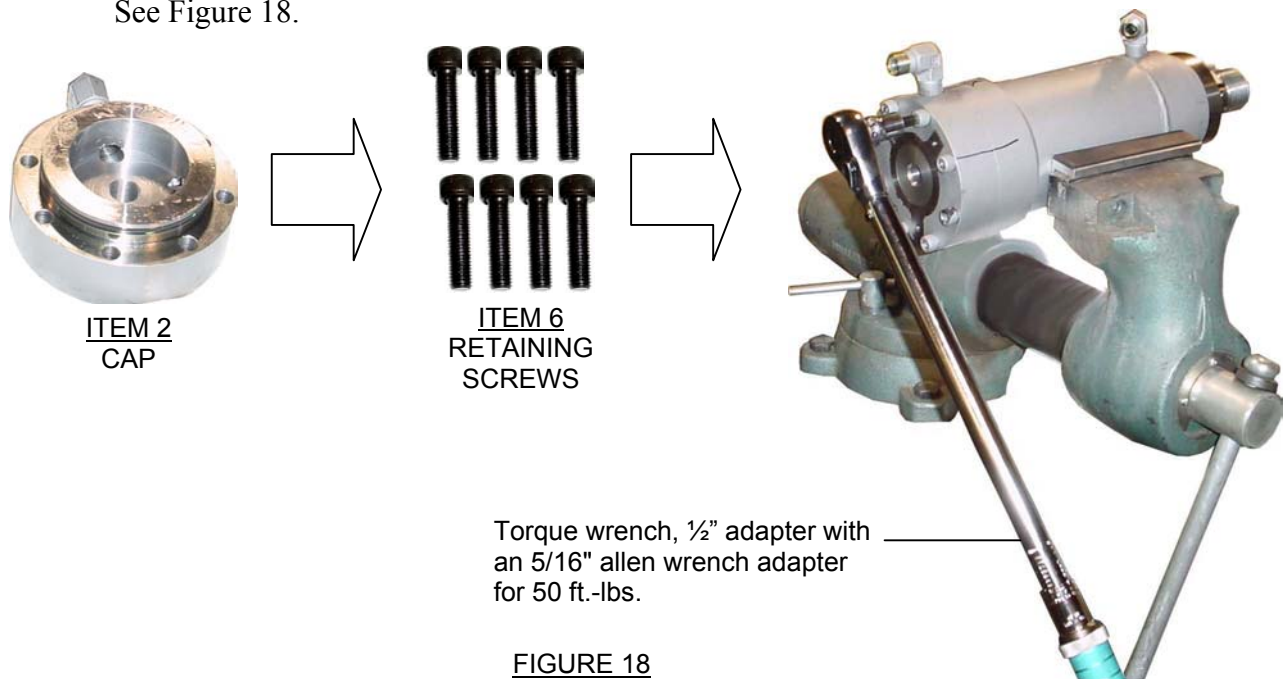


FIGURE 18
REINSTALLING THE CAP

4.5 Reinstalling the Transducer Cover

After the cap (Item 2) is reinstalled, place the head/tube assembly in the vertical position. Gently set the transducer cover (Item 15) onto the head/tube assembly. Using a 3/16" allen wrench, tighten the (3) transducer cover mounting screws (Item 16). See Figure 19.



ITEM 15
TRANSDUCER
COVER



ITEM 16
TRANSDUCER
COVER MOUNTING
SCREW



3/16" allen wrench



FIGURE 19
REINSTALLING THE TRANSDUCER COVER

4.6 Reinstalling the Rod Seal, Wiper and Scraper

Before reinstalling the bushing cartridge onto the piston rod, reinstall the rod seal (Item 9D), the wiper (Item 9B) and the scraper (Item 9C) into the bushing cartridge (Item 10). Lubricate the seals and seal cavities with clean system hydraulic fluid. Use a small, rounded-edge screwdriver to aid in seal installation. Be careful not to scratch the seal cavities. See Figure 20.



FIGURE 20
REINSTALLING THE ROD SEAL, WIPER AND SCRAPER

4.7 Reinstalling the Bushing Cartridge

After the rod seal, wiper and scraper have been installed into the bushing cartridge (Item 10), lubricate the bushing cartridge with clean system hydraulic fluid and carefully slide the bushing onto the piston rod. See Figure 21.

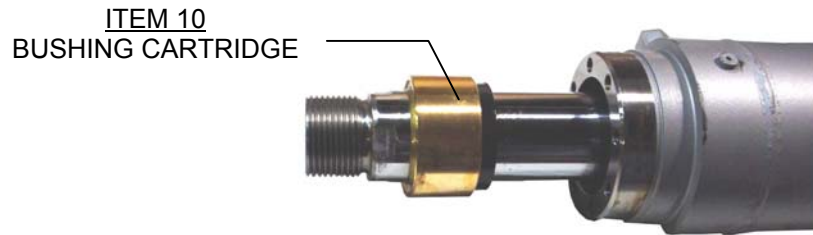
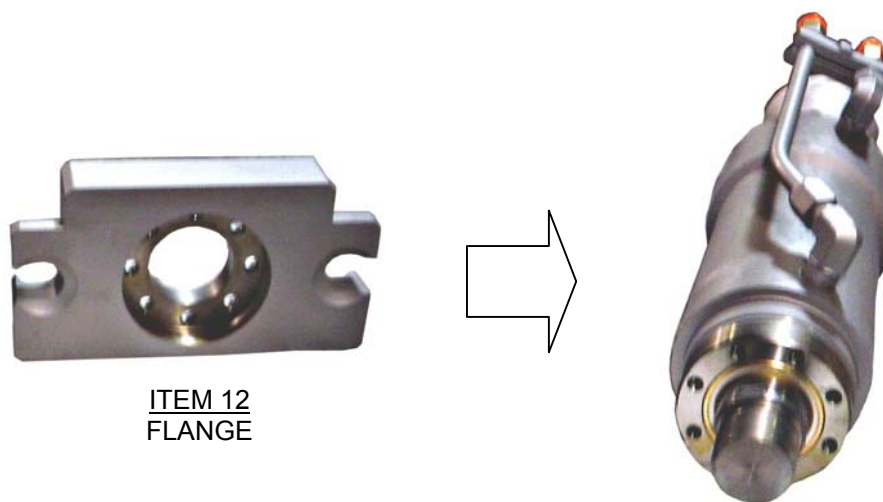


FIGURE 21
REINSTALLING THE BUSHING CARTRIDGE

4.8 Reinstalling the Flange

After the bushing cartridge has been installed, gently slide the flange (Item 12) onto the piston rod. Tighten the (8) flange retaining screws (Item 5) using a socket wrench with a 1/2" drive and a 5/16" allen wrench adapter. Always tighten screws across from each other, rather than adjacent. See Figure 22.



ITEM 12
FLANGE

FIGURE 22
REINSTALLING THE FLANGE



4.9 Testing of the Reassembled Cylinder

Test assembled cylinder to 3,000 PSI minimum to check for external leaks. To test for leakage past the piston rings, extend the cylinder to its full extended stroke. Turn off the hydraulic system and release pressure.

Disconnect front port hose at supply end (leave connected to cylinder). End of hose must be open to atmosphere (no quick coupler or quick coupler with internal check). Place open end of hose in a container to catch possible hydraulic fluid. Pressurize rear port so cylinder is at full extension. Dead head at full pressure, check for fluid bypassing rings.



5. TROUBLE SHOOTING AND FREQUENCY OF REPAIR

5.1 External leakage at the rod seal may indicate more than just worn seals. Check the rod surface for scratches, nicks and scoring.

5.2 Excessive internal leakage past the piston ring is usually noticed by loss of cylinder efficiency, that is, the rod movement is not responsive to system pressure.

Note: Other components in the hydraulic system, such as control valves, may give the same indication.

5.3 External leakage at the tube seal located at cap end of the cylinder tube usually means the retaining screws are not properly torqued or the hydraulic system pressure experienced high shock pressures. Check the screw torque against the values given on the cylinder assembly drawing.

5.4 To test for internal leakage past the piston rings, extend the cylinder to its full extended stroke. Turn off hydraulic system, release pressure. Disconnect front port hose at supply end (leave connected to cylinder). End of hose must be open to atmosphere (not quick coupler or quick coupler with internal check). Place open end of hose in a container to catch possible hydraulic fluid. Pressurize rear port so cylinder is at full extension. Dead head at full pressure. Check amount of fluid bypassing rings. When using split cast iron rings a small amount of fluid may bypass the rings even when they are new. Test should be conducted at the same pressure as during normal operation.

5.5 Suggested frequency of repair:

- Front Seals –Every 3 months
- Complete Service –Every 12 months

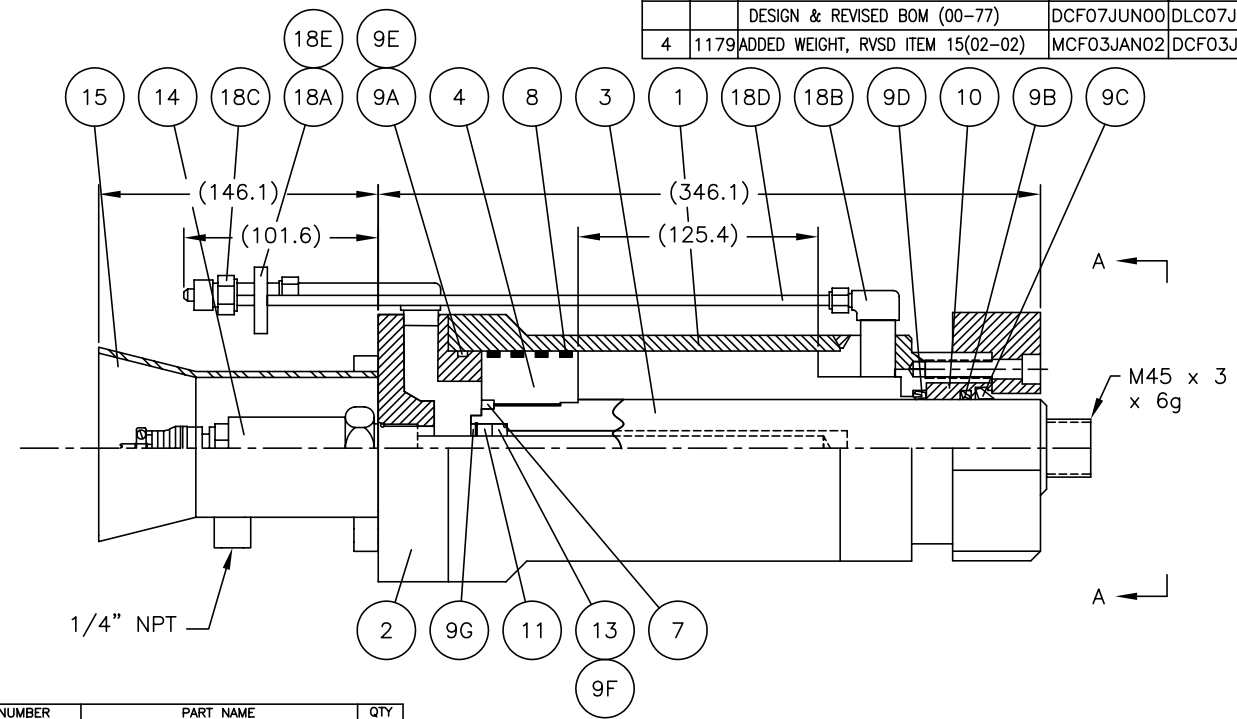
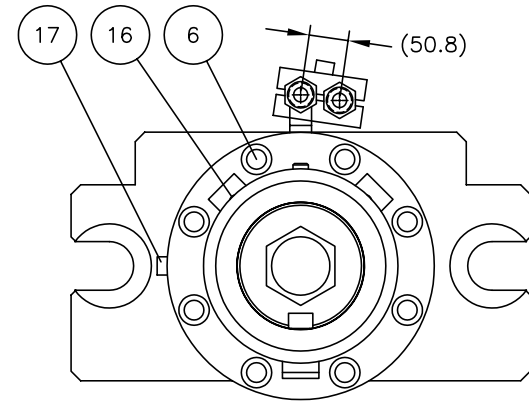
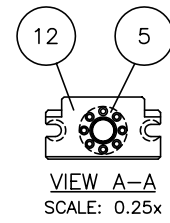


6. PARTS DRAWING AND PARTS LIST

6.1 DWG: 135259c

SIZE B DRAWING NO. 135259c SH 1 REV 4

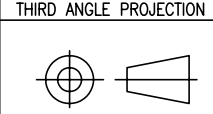
REVISIONS				
REV	ECN	DESCRIPTION	BY/DATE	APPROVED
1	406	215.4 WAS 136.5 (ENG98-90)	DCF03AUG98	DLC03AUG98
2	183	REVISED PARTS LIST (ENG97-118)	DCF28SEP98	DLC28SEP98
3	819	SHOWED NEW TRANSDUCER COVER		
		DESIGN & REVISED BOM (00-77)	DCF07JUN00	DLC07JUN00
4	1179	ADDED WEIGHT, RVSD ITEM 15(02-02)	MCF03JAN02	DCF03JAN02



ITEM	PART NUMBER	PART NAME	QTY	ITEM	PART NUMBER	PART NAME	QTY
1		HEAD / TUBE ASSEMBLY	1	9G		RETAINER, MAGNET	1
2		CAP	1	10		BUSHING, CARTRIDGE	1
3		ROD, PISTON	1	11		MAGNET	1
4		PISTON	1	12		FLANGE, FRONT	1
5		RETAINING SCREW - FLG	8	13		SPACER, MAGNET	1
6		RETAINING SCREW CAP	8	14		TRANSDUCER	1
7		PISTON DOWEL SCREW	1	15	140141	COVER, TRANSDUCER	1
8	135288	RING, (SET OF 4) PISTON	1	16		SCREW, TRANSDUCER COVER MOUNTING	3
9	135287	KIT, SEAL	1	17		PLUG, AIR BLEED	2
9A		SEAL, TUBE	1	18	135451	ASSEMBLY, PIPING	1
9B		WIPER, ROD	1	18A		CLAMP, TUBE	1
9C		SCRAPER, ROD	1	18B		ELBOW, MALE	2
9D		PACKING, ROD	1	18C		ADAPTER, UNION 1/2" TUBE 37" FLARE	2
9E		BU, TUBE SEAL	1	18D		TUBING, 1/2" HYDRAULIC	2
9F		SEAL, SPACER	1	18E		SCREW, TUBE CLAMP	1


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CHECKED D. CARL 31MAR98
MATERIAL
SEE BOM
MODEL NO.
REF. DWG. 4SH-A174

**INTERSTOP**
FLOW CONTROL TECHNOLOGY
8361 Broadwell Rd. Cincinnati, OH 45244

TITLE
CYLINDER, THROTTLING
SPARE PARTS PRINT
33QC/SNC

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SCALE 1:2.5	PROJ. NO. ENG98-33	ECN NO. 322	SHEET 1 OF 1