6-4 COMPRESSOR VALVES

6-4.1 GENERAL. Each stage has a valve assembly whose main components are a suction reed, discharge reed and a valve seat. A bad valve, either suction or discharge, in the 2nd stage will usually be indicated by higher pressures than normal on the 1st stage. A bad suction or discharge valve in the 1st stage will cause a loss of flow. Severe usage over long periods of time may result in worn or broken valves which may be destructive if the unit is allowed to operate with them in this condition. Worn or broken valves can be evidenced by clacking noises in the cylinder head. Remove, disassemble, inspect and service the valves every 4000 hours of operation. This may readily be accomplished by removing the cylinder heads.

6-4.2 REMOVAL AND INSTALLATION OF 1ST STAGE VALVE ASSEMBLIES (Figure 7-2)

6-4.2.1 REMOVAL OF SUCTION AND DISCHARGE VALVES.

a. Remove inlet and discharge piping from the head.

b. Remove the nuts which hold down the 1st stage head and drop the head off. Make sure the cylinder does not come out of the crankcase with the head. It may be necessary to lean back the compressor in order to remove head.

c. Remove the suction reed and inspect.

d. Remove the valve seat. Remove the discharge reed. Discard pitted, cracked or broken valves. A scratched or pitted valve seat may need to be lapped

e. Inspect and repair as necessary.

6-4.2.2 INSTALLATION OF SUCTION AND DISCHARGE VALVES.

a. Once the valve reeds have been examined or replaced and the seat has been examined, lapped or replaced, reassemble in reverse order of disassembly.

b. Install discharge reeds and O-ring. A light coating of oxygen compatible grease (RIX P/N 45-1006) should be used on the O-ring.

c. Install the valve seat. Push down to engage O-ring properly.

d. Put the suction valve on the valve seat. Install head assembly and torque bolts to 15 ft-lbs.

6-4.3 REMOVAL AND INSTALLATION OF 2ND STAGE VALVE ASSEMBLY. (Figure 7-4 ~~7-3~~)

6-4.3.1 REMOVAL OF THE 2ND STAGE VALVE.

a. Remove the inlet and discharge lines on the 2nd stage head. Remove the four nuts.

b. Lift off head. Remove O-ring, valve stop, suction valve, locating pin and second O-ring. Discard all O-rings.

c. Remove the valve seat from the cylinder head. Removal can be assisted by removing the plug in the head and using an object such as a bolt with a blunt end and putting it through the discharge port in the top of the head and tapping lightly on the seat. Care must be taken not to damage the valve seat.

d. Remove the O-ring, discharge reed and second locating pin.

6-4.3.2 INSTALLATION OF 2ND STAGE VALVES.

CAUTION

When reinstalling valves with O-ring seals, care must be taken to avoid damaging the O-rings. Lubricate the O-ring with oxygen compatible grease. Avoid tilting the valve when installing into the head and apply even finger pressure about the circumference until the valve is completely installed.

a. Apply a light film of oxygen compatible O-ring grease to the new O-rings.

b. Set the discharge valve over the pin in the head and place the first new O-ring in the valve pocket. Refer to Figure 7-4 for proper orientation of the valve.

NOTE: If discharge or suction valves are installed in inverted position, the valve will not be able to open properly.

c. Insert valve seat into head with the pin hole in the discharge side of the seat aligned with the pin in the head. Look through the suction port in the head to check that the locating pin has engaged the hole in the seat and the seat is inserted all the way to the bottom of the head. Be sure valve seat is not inverted (See Figure 7-4).

d. Install O-ring and new pin on suction side of valve seat. Install suction valve, referring to Figure 7-4 for proper orientation.

e. Install valve stop in head and O-ring on valve stop.

f. Reinstall the head using the four nuts and torque to 15 ft-lbs. Reconnect the inlet and discharge lines.

6-4.4 VALVE INSPECTION AND REPAIR. The valve disassembly, inspection and repair instructions here cover all the compressor valve assemblies. Figures ~~7-3~~ 7-2 and 7-4 should be used as guides for assembly.

a. Inspect the reed valves for cracking or pitting. Remove any deposits from the reeds. A thin impression of a circle should be evident where the reed seals over the valve seat ports. Any radial lines or streaks extending outward from these circles indicate valve leakage.

b. Examine the valve seat carefully for cracks or pits and for leakage past the seat. Streaked marks on the seat also indicate leakage. Replace or repair parts as required.

c. Lap the valve seat on a lapping plate or regrind the valve seat, using a very fine valve grinding compound. When lapping or grinding, remove a minimum of material to just clean up the surface. When the trepans or grooves between sealing surfaces on the valve are reduced to less than .100 inches deep, the seat should be replaced (1st stage only).

d. Carefully clean the valve parts to remove the compression residue and valve grinding compound from the seat.

e. Reassemble the valve in the reverse order of disassembly.

6-5 CYLINDERS.

6-5.1 GENERAL. The compression cylinders must be removed to service the rings and pistons. The 2nd stage has a removable liner. There is no scheduled maintenance required on the cylinders or liner.

6-5.2 REMOVE AND INSTALL 1ST AND 2ND STAGE COMPRESSION CYLINDERS. (Figures 7-1)

a. Remove the cylinder head in accordance with Paragraph 6-3.2.

b. Turn the flywheel by hand to position the piston at bottom dead center (1st stage only).

c. Remove retaining nuts.

d. Use caution to prevent side stress on the piston and rod assembly, slide the cylinder off the piston. It may be necessary to lean back the compressor. Remove and discard the used O-rings.

e. Be careful not to damage the shims.

f. Remove 2nd stage guide cylinder and liner.

NOTE: The 2nd stage piston may remain in the liner when liner is removed. See Paragraph 6-7.

g. Reinstall the compression cylinder and liner in the reverse sequence of removal, using new O-rings.

6-6 CRANKCASE

6-6.1 GENERAL. There is no scheduled maintenance on the crankcase. For crankshaft and main bearing removal, see Paragraph 6-9 and 6-10.

6-7 PISTON RINGS AND SEALS

6-7.1 GENERAL. The compressor is single acting, meaning that in a single crankshaft revolution, suction and compression occur once in each cylinder. In order to accomplish sealing and to deliver oil-less gas, high pressure, non-lubed and seals rings are used. A viton expander is used under the compression rings. In addition to the compression rings, rider rings are used on the 1st stage piston to keep the piston centered in the cylinder, preventing metal to metal contact with the cylinder wall. The rings should be inspected for wear and replaced as necessary. See Paragraph 4-8. Rings not meeting the tolerances specified in Table 6-6 should be replaced.

1ST STAGE ONLY

6-7.2 REPLACE PISTON RINGS . (Figure 7-1; see also Figure. 7-3)

a. Remove the cylinder head in accordance with Paragraph 6-3.2.

b. Turn the flywheel by hand to position the piston at bottom dead center.

c. Remove the 1st stage cylinder. (See Paragraph 6-5)

d. Remove and discard the used rings and expanders.

e. Clean the ring grooves, replace expanders and, by hand, carefully spread a new ring and install in the ring groove. Repeat for each ring, being certain the ends of the spiral fit completely into the groove to insure proper sealing.

f. Discard old rider rings.

g. Install new rider rings on pistons and on piston rod (big end) and follower.

h. Clean and inspect the cylinder liner for wear or damage. Wear must be within the tolerance specified in Table 6-6.

i. Reinstall the cylinder head in accordance with Paragraph 6-3.3.

j. Rotate the flywheel by hand several times to be certain that the parts are free. See Section 6-15 for piston clearance adjustment.

2ND STAGE ONLY

6-7.3 REPLACE PISTON SEAL. (Figure 7-1; see also Figure 7-5)

a. Remove the cylinder head in accordance with Paragraph 6-3.2.

b. Turn the flywheel by hand to position the piston at bottom dead center.

c. Remove the 2nd stage compression cylinder assembly. (See paragraph 6-5)

d. Slide the top of the compression cylinder assembly out of the bottom piece, along with the seal.

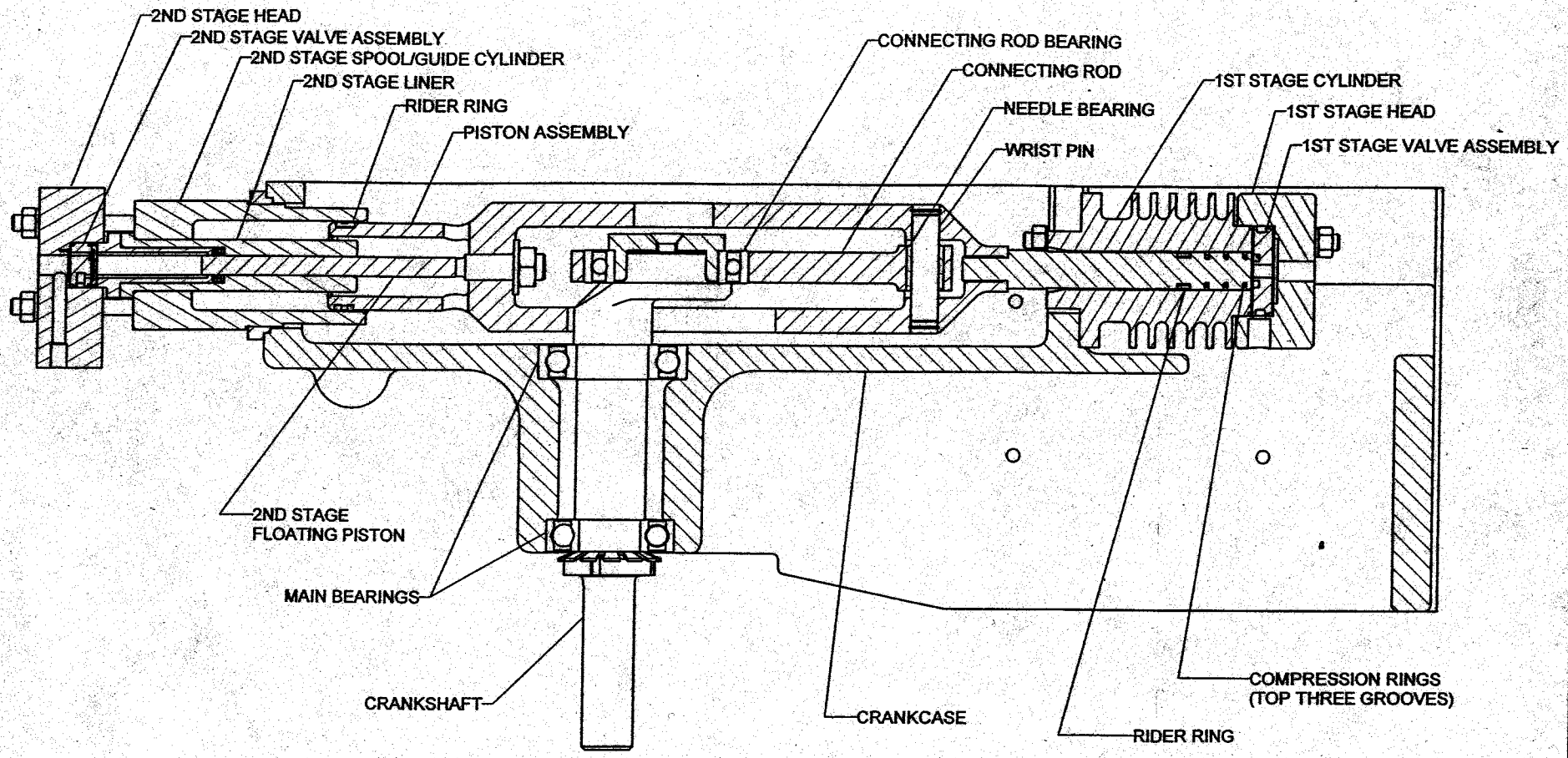
e. Discard the old seal.

f. Install a new seal into the top cylinder, using the included tool to compress the seal.

g. Clean and inspect the cylinder liner for wear or damage. Wear must be within the tolerance specified in Table 6-6.

h. Reinstall the cylinder head in accordance with Paragraph 6-3.3.

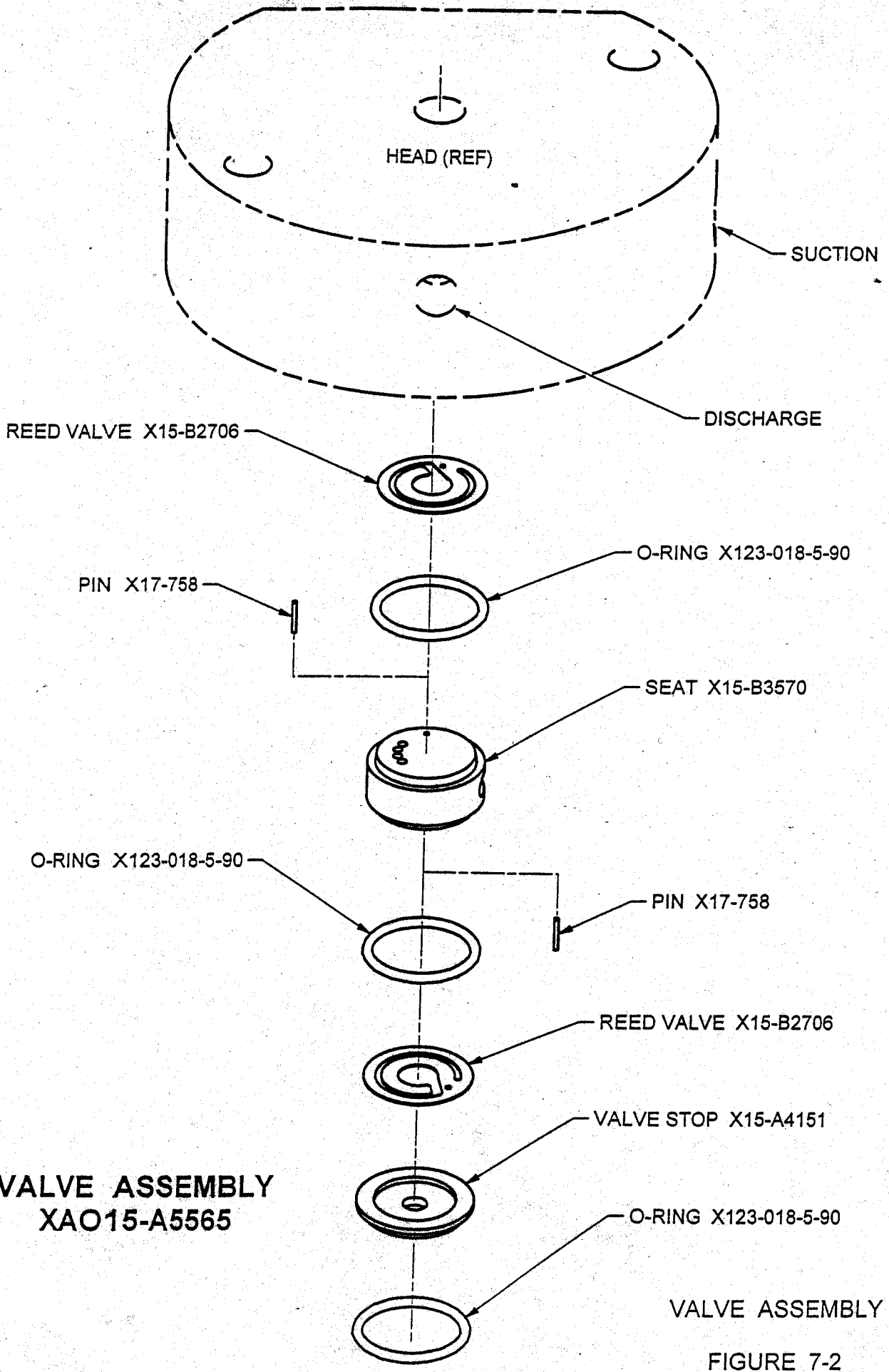
i. Rotate the flywheel by hand several times to be certain that the parts are free. See section 6-15 for piston clearance adjustment.



COMPRESSOR ASSEMBLY
2PS-6000

FIGURE 3-1
PAGE 3-2

B8594

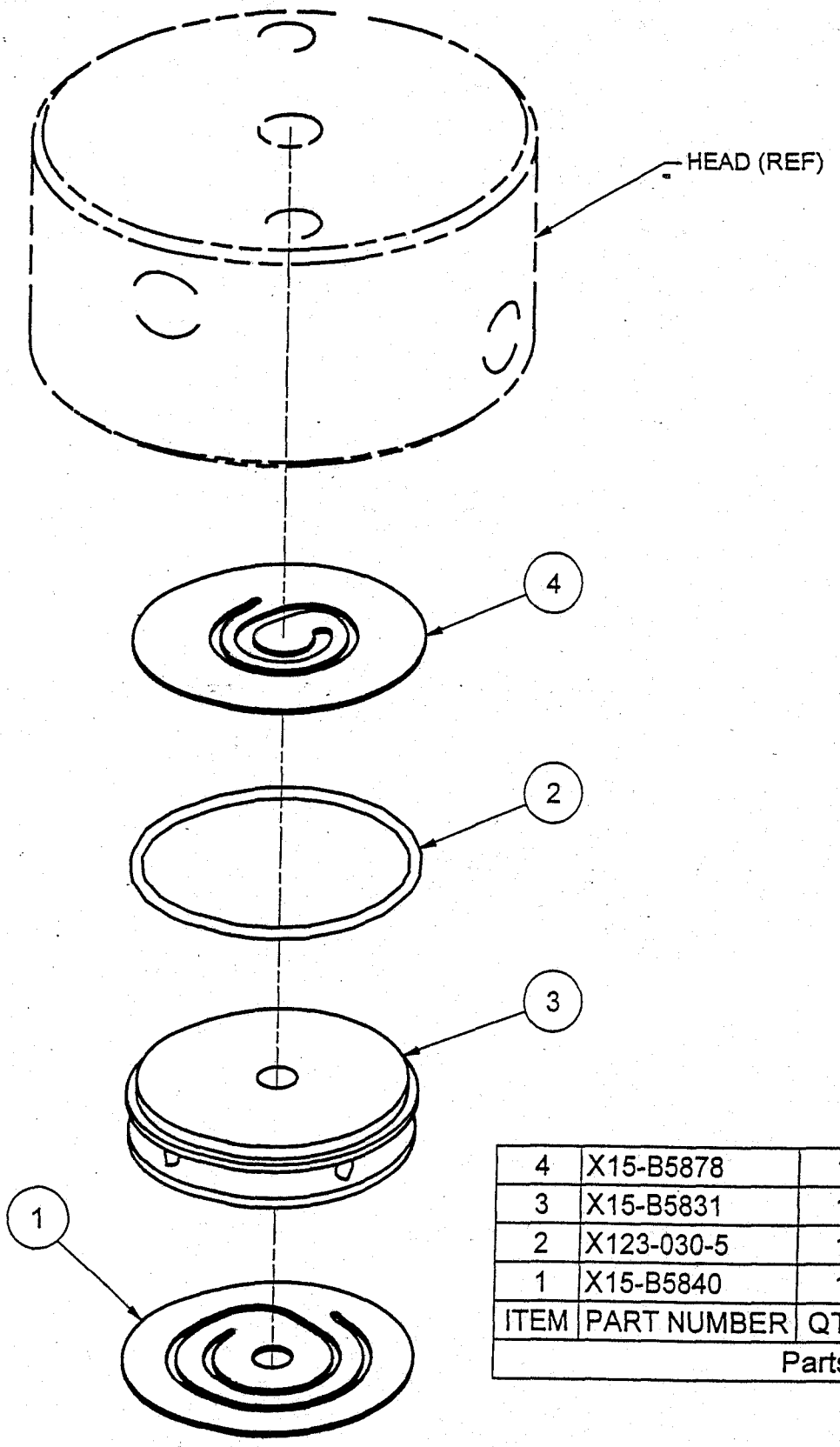


VALVE ASSEMBLY
XAO15-A5565

VALVE ASSEMBLY

A5565A

A	Item 2 was 123-130-5	7/21/93	DM
B	Added "X" to Part Numbers	1/16/03	DCB/JAC



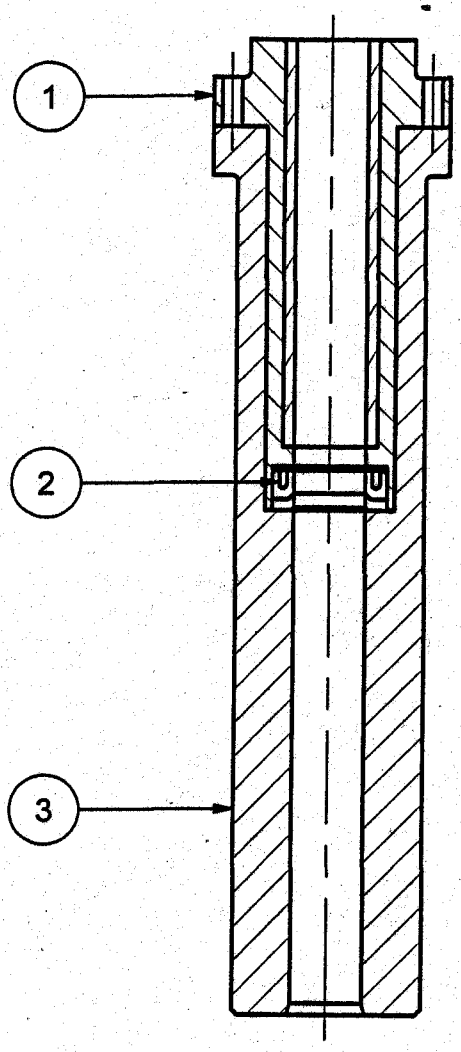
ITEM	PART NUMBER	QTY	DESCRIPTION
4	X15-B5878	1	REED VALVE - DISCH.
3	X15-B5831	1	VALVE SEAT
2	X123-030-5	1	O-RING
1	X15-B5840	1	REED VALVE - SUCT.

Parts List

Assembly Part Number XA15-A7798

1ST STAGE VALVE ASSEMBLY

FIGURE 7-4



Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1-B7824	CYLINDER, TOP
2	1	125-5902	SEAL, PISTON
3	1	1-B7622	CYLINDER, BOTTOM

CYLINDER ASSEMBLY
3/8" DIA., 2ND STAGE

FIGURE 7-5
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