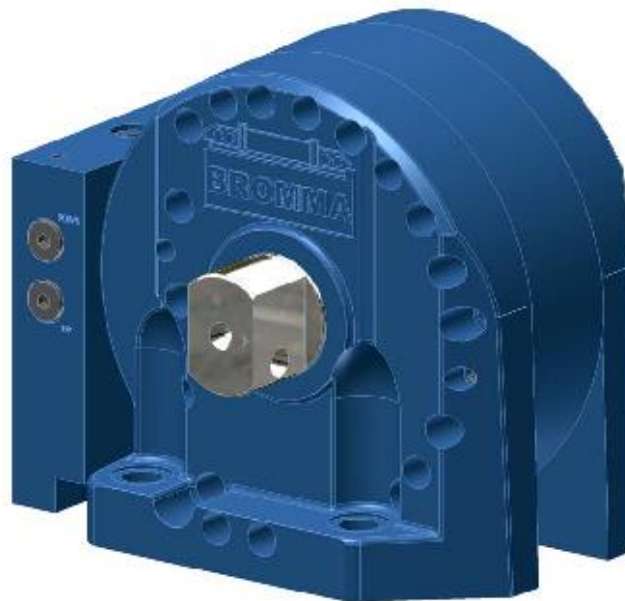


OVERHAUL INSTRUCTIONS

Rotac[®] Model SB-18-1V

Bills of Material – 26-10-7707 & 26-10-7712
Outline Drawings- 26-10-7707 & 26-10-7712 SHTS 1
Part lists- 26-10-7707 & 26-10-7712 SHTS 2



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REVISION HISTORY

REV.	DATE	DESCRIPTION	BY
A	11DEC20	REVISED / ADDED INSTRUCTIONS REGARDING ECO 11815 & 11864; 1/2 - 13 TORQUE WAS 126 FT-LBS, NOW 93 FT-LBS	STINSON
B	02SEP21	REVISED/ADDED NEW ASSEMBLY TOOL KIT REGARDING ECO 12151; TOOL KIT PART NUMBER IS 26-97-0348 AND 26-97-0349; TOOL NUMBER SK-4133 IS NOW REPLACED BY SK-5238-02	LUTHMAN
C	10SEP21	REVISED ASSEMBLY TOOL KIT BY ADDING TWO A010152 DOWEL PINS TO THE BOM	LUTHMAN
D	11FEB22	REMOVE SEALS A010263, A010264, AND 26-09-0714; THEY NEED REPLACED WITH 26-09-2813 SHAFT SEAL AND 26-09-0539 O-RING REGARDING ECO 12368	LUTHMAN

ACTUATOR DISASSEMBLY, INSPECTION AND ASSEMBLY

INTRODUCTION

These instructions provide an overhaul procedure and parts lists for the SB-18-1V-DE-FLATS-FT and SB-18-1V-DE-KEY-FT Rotac[®] Rotary Actuators.

Actuator overhaul should not be attempted without having a seal kit on hand. See table 4 for seal kit numbers. The exploded & section views on pages 8 and 9, should be used for reference in following the overhaul instructions.

DISASSEMBLY

Read the special instructions below before proceeding. Reference exploded view drawings, on sheets 8 and 9, for relative part location(s).

1. Clean exterior of unit as much as possible. This will help ensure that any material found in the unit is a result of wear, system contamination or damage. A more accurate evaluation of the unit and operating system will be obtained.
2. Remove all burrs from the shaft (4) around key-seats, end chamfers etc.
3. Before disassembly, the body (1) heads (2,3) and shaft (4) should be marked in order to return parts to their relative positions during assembly.
4. After removing assembly screws from both heads (2,3), insert ½-13 screws in tapped holes provided. Alternately tighten these screws to separate heads from body (1). **Alternate:** strike head of shaft with plastic mallet or non-marring hammer and allow the shaft to push the end off. **DO NOT PRY HEADS OFF!!!** Damage will occur to body or heads if you attempt to pry heads off.
5. Pull the shaft out, with a straight even pull, being careful that the shaft (4) does not fall and nick the body (1).

IMPORTANT: DO NOT allow the shaft (4) to cock/tilt during removal as this may break the sharp edges on the body, causing internal leakage during operation.

6. Remove all seals and inspect for cuts, nicks, or any other unusual conditions of the seal. (Compare to the new seal kit).

INSPECTION/EVALUATION

1. Examine oil residue inside actuator. This may give a clue as to why any damage has occurred.
 - ❖ Contaminated oil will cause scoring of internal surfaces.
 - ❖ Varnish on internal parts can be a sign of hydraulic system running too hot.
 - ❖ Metallic particles may originate from valve spools, actuator internal parts and other metal components in the system.

The appearance of any of the above will require flushing and cleaning of the hydraulic system.

2. Wash all parts thoroughly and examine for defects.

A. Shaft (Figure 1)

1. Examine the vane for cracks on "A" diameter, keyways, and any other areas where stress may be applied.

- a. Spot check by Magnaflux can be used to check for cracks.

Three different materials are needed, and **MUST** be applied in order:

SKC-S Cleaner

SKL-HF/SKL-S Penetrant

SKD-S Developer

FOLLOW DIRECTIONS

ON BACK OF THE CANS CAREFULLY

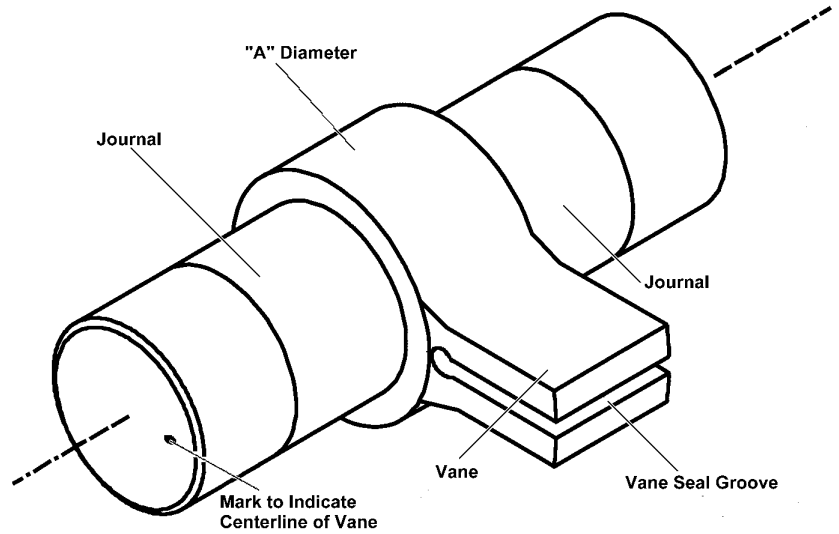


Figure 1 – Shaft Definitions

- b. Key-seats that are widened will allow key to move, damaging mating coupling and ultimately cause failure of the shaft and/or mating part.
- c. Scoring on "A" (major) diameter. See figure 1.
Any scratch .010 or more deep requires replacement of the part.
- d. Scoring or galling on shaft journal. See figure 1.
This problem can be repaired with hard chrome; however, critical dimensions & finishes **MUST** be held - this type of repair should be performed by actuator factory.
- e. Scoring or galling on end of "A" (major) diameter. See figure 1.
This is another problem that can be repaired; however, it is recommended that this type repair be performed by actuator factory.

B. Body

1. Any light scoring can be polished out with 400-grit emery cloth or equivalent. Scoring of .010 or more deep indicates replacement of this part is necessary. When pressurized, the body will expand and contract. For this reason, plating is not recommended by the factory for repair.
2. Cracks may be found across the dowel holes, screw holes or ports. This indicates replacement is needed.
3. Dowel holes may be elongated or out of round. This indicates replacement is necessary.

C. Heads - See figure 2.

1. Scoring on face of head **MUST** be repaired. Possible causes are:
 - a. Dirty oil
 - b. Axial load on shaft.
2. Minor scoring can be polished out with emery cloth.
3. Cracks in head are usually around screw or dowel holes. Replacement of the part is necessary.

D. Seals - It is recommended that all seals be replaced.

1. Cutting or shaving of seals usually occurs during assembly.
This can occur in several different ways. Refer to assembly instructions for proper procedure.

SEAL REPLACEMENT AND ASSEMBLY

The assembly area should be clean to prevent contamination of parts assembly. A plastic or metal covered workbench is the best. Parts should be re-cleaned if necessary. A small pliable brush should be used to clean seal grooves, dowel holes, screw holes and other hard-to-get-at areas. Remove all burrs that may be on any part. **DO NOT** break corners on shaft "A" diameter or heads of the body I.D. These sharp corners are important to the operation and function of the actuator. They should be sharp but also burr free.

Tools

During the assembly of the unit, the seals need to be protected. Assembly tools are required to install seal kits. The tools are; a dummy head - to hold the shoe seal during installation, a shoe seal protector, a vane seal protector, and a shaft seal protector (reference fig 3 & table 3). Use a lubricant on all seals and internal parts that is compatible with the driving fluid used. DS-ES Lubriplate by Fiske Brothers is used at the factory. Petroleum jelly is also compatible in most hydraulic systems.

Assembly- reference Pages 8 & 9.

- A. Place body (1) on a flat surface. Put two $\frac{3}{4}$ " X 1" long dowels into the body for the dummy head. Attach the dummy head with two $\frac{1}{2}$ -13 X 1.50 long SHCS so that it is properly seated. Turn the body and dummy head over so that the dummy head is on the flat surface.
- B. Install the shoe seal cushion (6) and shoe seal cap (5) into the body (1).
- C. Lubricate the shoe seal cap (5) and the ID of the body (1)
- D. Insert the vane seal cushion (8) and "C" shaped shaft vane seal cap (7) in the vane seal groove. Lubricate to hold the seals in position. Lubricate the "A" diameter of the shaft (see figure 1). Use care to avoid nicking or cutting the vane seal. All seal corners **MUST** remain sharp.
- E. Place the vane seal protector on the body and assure that it is properly seated. Place the shoe seal protector over the shaft and place this assembly into the dummy end. Rotate the shaft approximately 90° from the shoe position. Slide the shaft into the body until the vane is fully installed. Remove the vane and shoe seal protectors.
- F. Install spacer (23) inside groove and be sure it is against the inside surface of the head, then install O-ring (24) into same groove and shaft seal (22) over the O-ring into that groove of head (3). (Reference section views on pages 8 &9)
Smooth out ripples or wrinkles in the installed shaft seal (22).

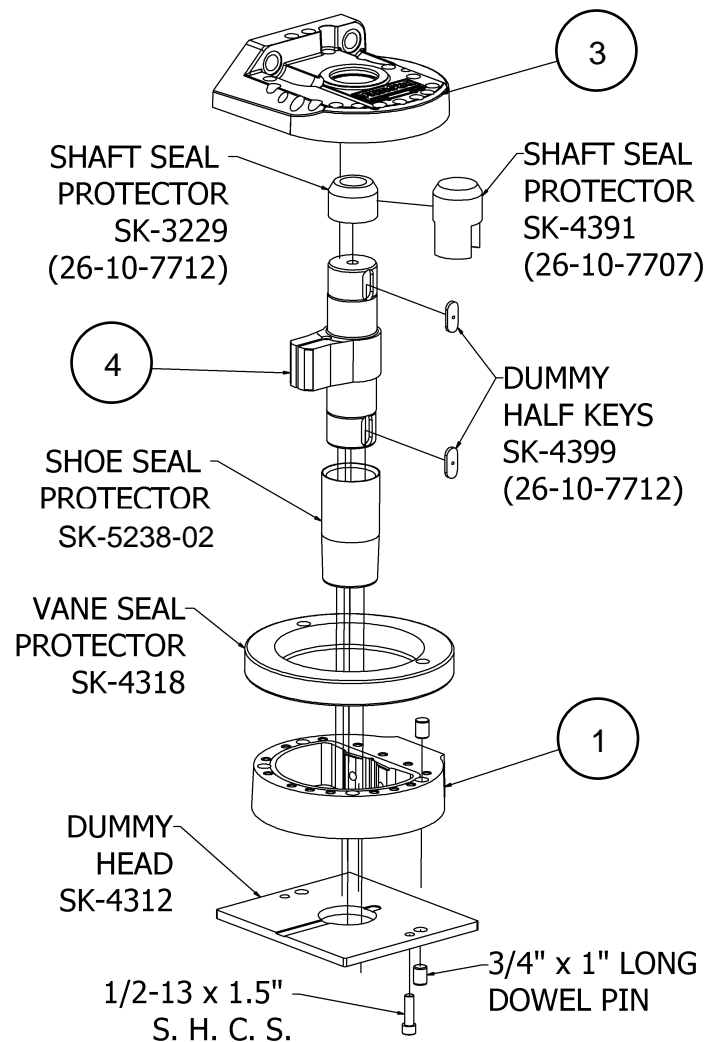


Figure 3 Assembly Tools

- G. Place two wavy springs (20), hub seal ring (19), and hub seal (18) into the head (3). Ensure that hub seal (18) is free to move axially. **NOTE:** Movement of this seal is essential to the proper performance of the actuator. Seal should be a slip fit on the O.D. of the seal counterbore. Be sure top edge of counterbore is sharp- but burr free.
- H. Place head seal (O-ring) (10) into the groove in the head (3).
- I. Lubricate all seals and internal parts with grease, sufficient to maintain the seals in position when the head is inverted and installed on the body (1)
- J. (Unit 26-10-7707) Install the shaft seal protector onto the head of shaft (4). (See figure 3). Invert the head (3) and carefully slide it down over the shaft. **DO NOT** hammer on the head or allow the hub seal to become dislodged from its cavity as the head is mated to the body. Precisely align the dowel holes in head (3) and body (1). Install two screws (15) 180° apart and tighten the screws to pull the head (3) onto the body (1).
(Unit 26-10-7712) Install the shaft seal protector into the bearing bore of head (3). (See figure 3). Install two dummy keys in shaft (4) keyways. Invert the head (3) and carefully slide it down over the shaft. **DO NOT** hammer on the head or allow the hub seal to become dislodged from its cavity, as the head is mated to the body. Precisely align the dowel holes in head (3) and body (1). Install two screws (15) 180° apart and tighten the screws to pull the head (3) onto the body (1).
- K. Turn the assembly over and remove the dummy head, screws, and dowel pins.
- L. Repeat steps F thru J for the second head.
- M. Freeze four dowel pins (21) to -67°C and install through complete assembly.
- N. Install remaining twenty-four screws (15) and torque all per table 1.

Factory built actuators are then tested for internal by-pass leakage and breakaway pressure. See chart in table 2. Actuator should be cycled 10-20 times before beginning the tests.

TABLE 1 – TORQUE CHART

MODEL	SCREW SIZE	TORQUE
SB-18	½-13	93 Ft. Lbs/ 126 Nm – ungreased

*use Permalok # HM128 for all screws

TABLE 2 – BREAKAWAY & LEAKAGE CHART

MODEL	BREAKAWAY PRESSURE	INTERNAL BY-PASS LEAKAGE–per minute
SB-18	100 PSI / 7 bar	10cu.in. @ 3000 PSI / 164cc @ 207 bar

INTERNAL BY-PASS LEAKAGE: Leakage checks to be made at pressure listed. The fluid is measured out the exhaust port of the actuator. Pressure to be maintained listed for one (1) full minute before check is started. The unit is tested in both directions.

BREAKAWAY PRESSURE: an operating pressure, as listed, **MUST** rotate actuator shaft through the full stroke. The unit is tested in both directions.

EXTERNAL LEAKAGE: there should be no external leakage from the unit.

TABLE 3 – Assembly Tools

TOOL NUMBER	TOOL
SK-4312	DUMMY HEAD
SK-4318	VANE SEAL PROTECTOR
SK-5238-02	SHOE SEAL PROTECTOR
SK-4391	SHAFT SEAL PROTECTOR
SK-3229	SHAFT SEAL PROTECTOR
SK-4399	DUMMY KEY
26-97-0348 & 26-97-0349	ASSEMBLY TOOL KITS

TABLE 4 – Seal Kit

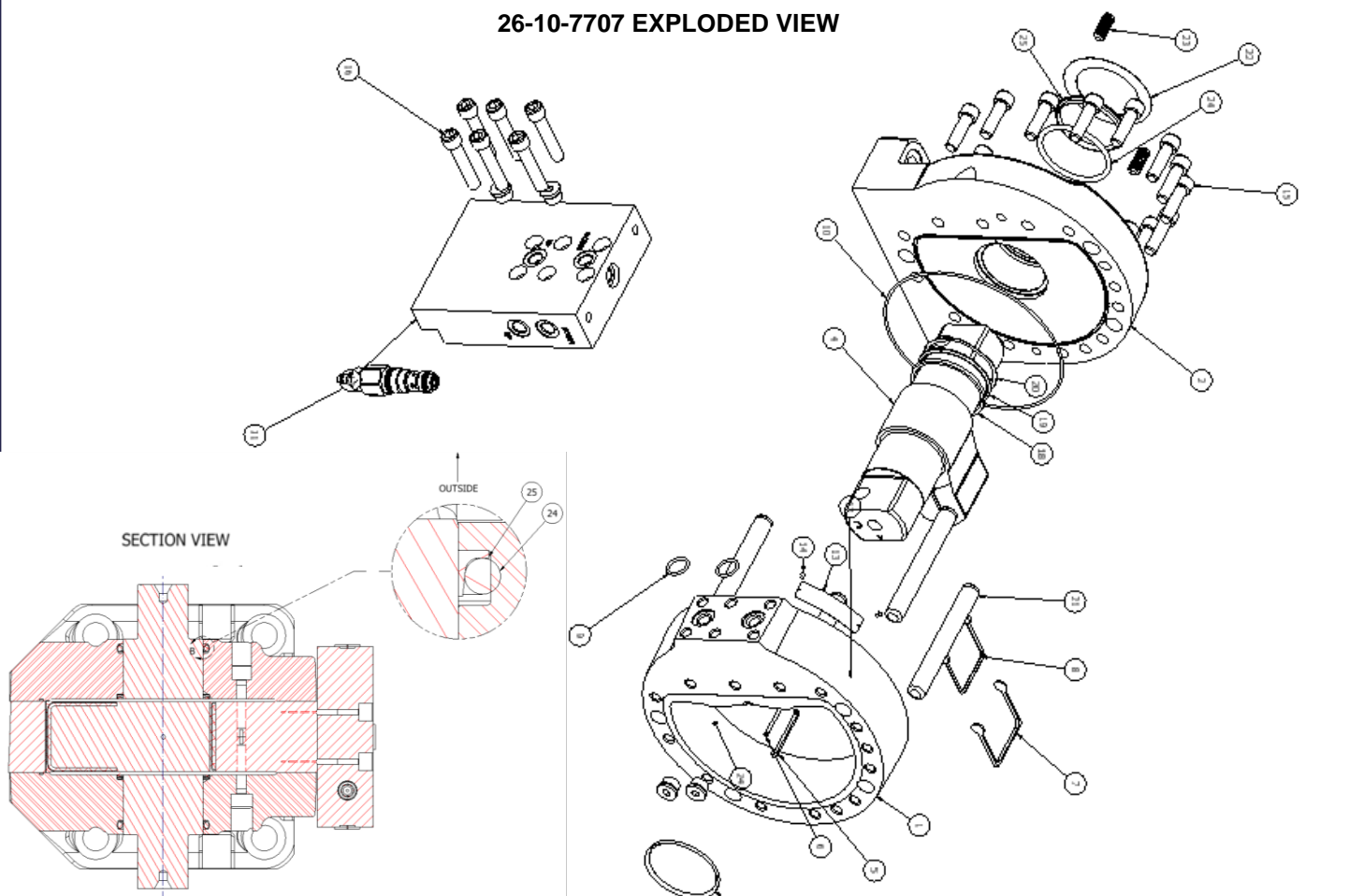
MODEL	SEAL KIT NUMBER
SB-18	26-90-7707

TABLE 5

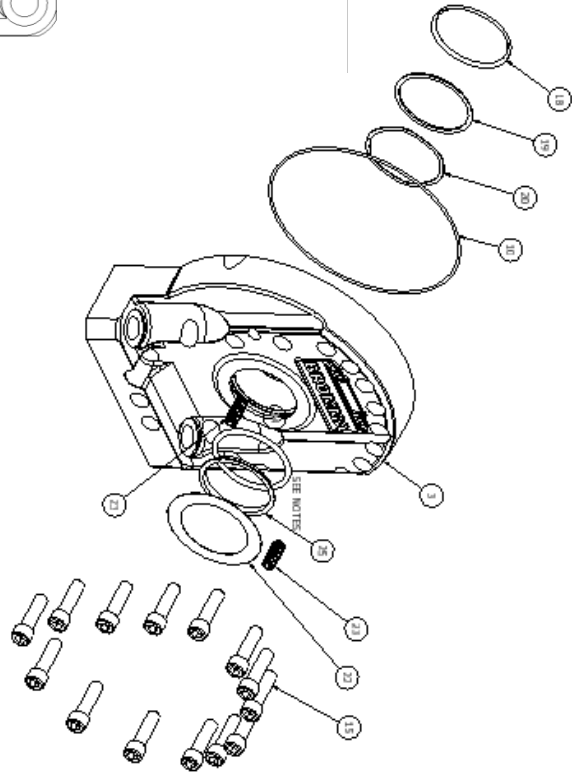
Trouble Shooting Guide

TROUBLE	PROBABLE CAUSE	REMEDY
External Leakage at Shaft	Defective shaft seal(s) (22) or cushions (O-ring)(s) (24).	Replace defective parts.
	Shaft (4) scored or worn. Bearing area in head(s) (2 or 3) worn or scored.	Repair shaft or replace defective part.
External Leakage at Joint Between Head (2,3) and Body (1)	Defective O-rings (10), or damaged sealing surface on head (2 or 3) or body (1). Improper torque on the head screws(15).	Replace defective O-ring. Repair or replace damaged parts.
Excessive Internal Leakage	Defective shoe seal (5), shoe seal cushion (6) vane seal cushion(8) and/or vane seal (7)	Replace defective parts.
	Defective hub seal (18), hub seal ring (19), or hub seal springs (20).	Replace defective parts.
	Hub seal (18) stuck down	Remove burr (leave corner sharp!) at top corner of seal cavity, polish seal for slip fit to O.D.
	Worn or scratched head faces on head (2 or 3) or in body (1).	Repair or replace.
	Worn or scratched ID of body (1).	Repair or replace.
	Head screws (15) not tightened sufficiently.	Tighten to recommended torque.
	"C" style vane seal (7) not seated properly (applicable to units immediately after overhaul only).	Operate through full cycles for a few minutes to attempt to seat seals.

26-10-7707 EXPLODED VIEW



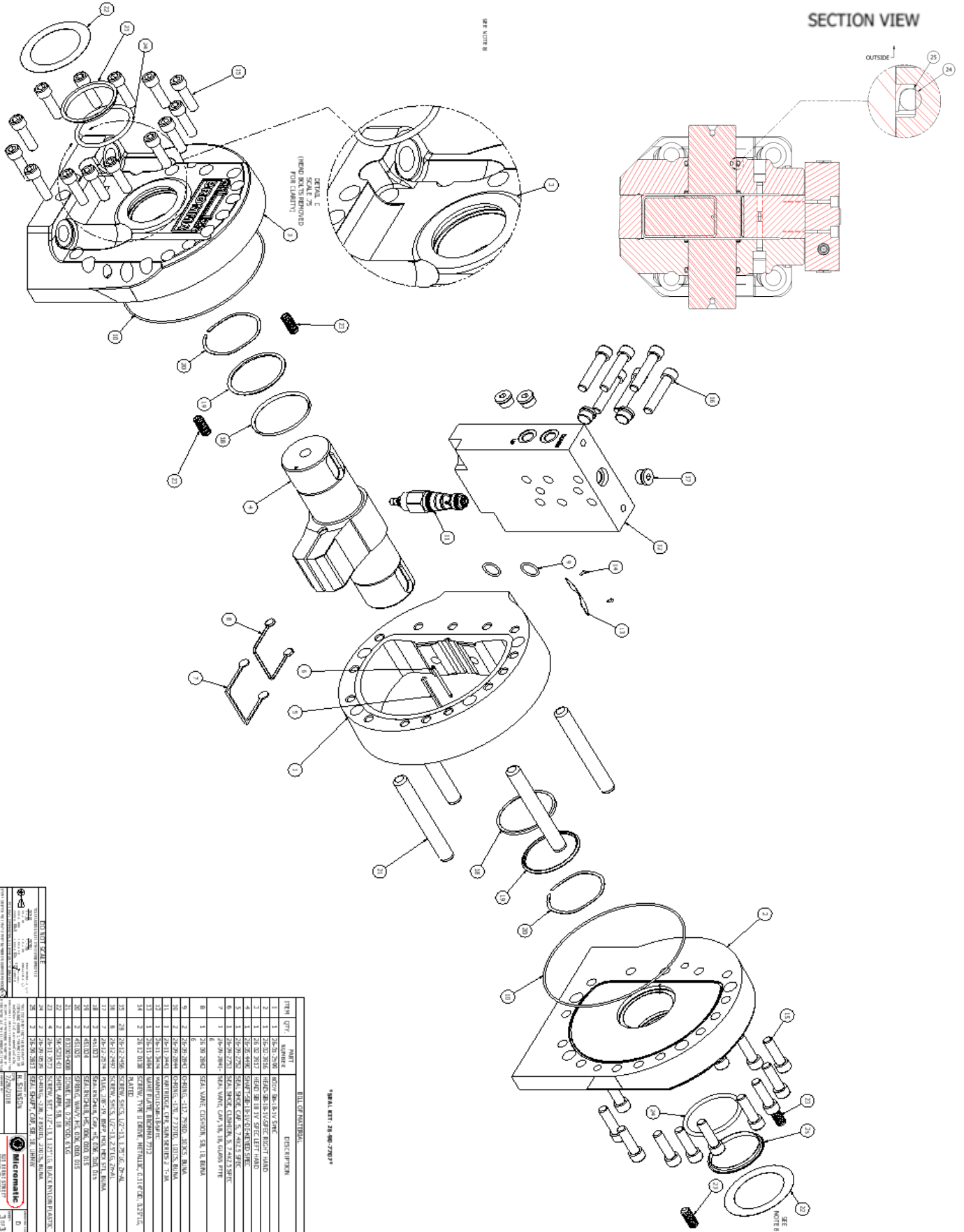
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ITEM	QTY.	PART NUMBER	DESCRIPTION
1	1	36-01-2699	BODY 5/8 IN. I.D. SPC
2	1	36-02-2916	HEAD 5/8 IN. I.D. SPC RIGHT HAND
3	1	36-02-3017	HEAD 5/8 IN. I.D. SPC LEFT HAND
4	1	36-02-4020	SEAL 5/8 IN. I.D. SPC CLASS 5 SPC
5	1	36-02-2792	SEAL SHOT. CAP. 3/4 7.4023 SPC
6	1	36-02-2793	SEAL SHOT. CRUSHING 5.74473 SPC
7	1	36-02-2814-6	SEAL VALVE CAP. 5/8 IN. I.D. SPC
8	1	36-02-2814-6	SEAL VALVE CRUSHING 5/8 IN. I.D. SPC
9	2	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
10	2	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
11	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
12	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
13	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
14	2	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
15	2	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
16	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
17	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
18	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
19	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
20	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
21	1	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
22	4	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
23	4	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
24	2	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC
25	2	36-02-2814-3	O-RING 1.1717 IN. I.D. 1.00 IN. I.D. SPC

SEAL KIT 26-10-7707

26-10-7712 EXPLODED VIEW



ITEM QTY UNIT	PART NUMBER	DESCRIPTION
1	26-10-7712	ASSEMBLY
2	26-10-7713	COVER
3	26-10-7714	SEAL
4	26-10-7715	SEAL
5	26-10-7716	SEAL
6	26-10-7717	SEAL
7	26-10-7718	SEAL
8	26-10-7719	SEAL
9	26-10-7720	SEAL
10	26-10-7721	SEAL
11	26-10-7722	SEAL
12	26-10-7723	SEAL
13	26-10-7724	SEAL
14	26-10-7725	SEAL
15	26-10-7726	SEAL
16	26-10-7727	SEAL
17	26-10-7728	SEAL
18	26-10-7729	SEAL
19	26-10-7730	SEAL
20	26-10-7731	SEAL
21	26-10-7732	SEAL
22	26-10-7733	SEAL
23	26-10-7734	SEAL
24	26-10-7735	SEAL
25	26-10-7736	SEAL
26	26-10-7737	SEAL