



SM1513-M1/USA

Parker Motors

Revised: January 2006



110A Series Low Speed High Torque Hydraulic Motor Service Bulletin

WARNING

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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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Introduction

The 110A series Low Speed High Torque (LSHT) hydraulic orbit motor is designed to provide long life while operating with limited radial loads. Refer to catalog radial load limits. However, should maintenance be required, the instructions below should be used for disassembly, replacement of parts, cleaning and assembly.

Important Notes:

Prior to any motor disassembly, plug the open ports and case drain. Clean all dirt from the outside of the motor.

If the thru shaft seal is to be replaced, the entire rear cover assembly, P/N SK000190, must be purchased.

Prior to assembly lightly oil all seals, the rollers and the threaded bolt ends.

If the endcoder thru shaft seal is to be replaced, the entire rear cover assembly, P/N SK000191, must be purchased

Parts List

| <i>Item No.</i> | <i>Description</i> | <i>Qty./per Motor</i> | <i>Part Number</i> | <i>Where Used</i> |
|--|---|-----------------------|---------------------|---------------------|
| 1 | Seal, Dust | 1 | 2183 | ALL MODELS |
| 2 | Back Up Ring | | 1 | 2177 ALL MODELS |
| 3 | Seal, Lip | 1 | 2175 | ALL MODELS |
| 21 | Snap Ring (.05 thick) | 1 | 2180 | ALL MODELS |
| 5 | Check Valve Ball (.25 dia.) | 2 | 1021 | ALL MODELS |
| 6 | IGR Assy Code 036 w/Valve Plate | 1 | SM003607005A1 | 11XA-036-XX-X |
| | IGR Assy Code 054 w/Valve Plate | 1 | SM005407005A1 | 11XA-054-XX-X |
| | IGR Assy Code 071 w/Valve Plate | 1 | SM007107005A1 | 11XA-071-XX-X |
| | IGR Assy Code 088 w/Valve Plate | 1 | SM008807005A1 | 11XA-088-XX-X |
| | IGR Assy Code 106 w/Valve Plate | 1 | SM010607005A1 | 11XA-106-XX-X |
| | IGR Assy Code 129 w/Valve Plate | 1 | SM012907005A1 | 11XA-129-XX-X |
| | IGR Assy Code 164 w/Valve Plate | 1 | SM016407005A1 | 11XA-164-XX-X |
| | IGR Assy Code 189 w/Valve Plate | 1 | SM018907005A1 | 11XA-189-XX-X |
| | IGR Assy Code 241 w/Valve Plate | 1 | SM024107005A1 | 11XA-241-XX-X |
| | IGR Assy Code 036 w/Valve Plate | 1 | SM003607003A1 | 11XA-036-XX-E or TV |
| | IGR Assy Code 054 w/Valve Plate | 1 | SM005407003A1 | 11XA-054-XX-E or TV |
| | IGR Assy Code 071 w/Valve Plate | 1 | SM007107003A1 | 11XA-071-XX-E or TV |
| | IGR Assy Code 088 w/Valve Plate | 1 | SM008807003A1 | 11XA-088-XX-E or TV |
| | IGR Assy Code 106 w/Valve Plate | 1 | SM001067003A1 | 11XA-106-XX-E or TV |
| | IGR Assy Code 129 w/Valve Plate | 1 | SM012907003A1 | 11XA-129-XX-E or TV |
| | IGR Assy Code 164 w/Valve Plate | 1 | SM016407003A1 | 11XA-164-XX-E or TV |
| | IGR Assy Code 189 w/Valve Plate | 1 | SM018907003A1 | 11XA-189-XX-E or TV |
| | IGR Assy Code 241 w/Valve Plate | 1 | SM024107003A1 | 11XA-241-XX-E or TV |
| Note: IGR Assembly sold only as a complete set. | | | | |
| 7 | Snap Ring, Shaft, .042 thick, (Thru-Shaft) ³ | 1 | 1135 | 11XA-XXX-XX-1 |
| | Snap Ring, .109 thick, (Extra Heavy Duty) | 1 | 1296 | 11XA-XXX-XX-0 |
| 8 | Square Ring Seal 7/16" | 3 | 1046 | ALL MODELS |
| 14 | Snap Ring Valve (Thru Shaft) ³ | 1 | 1157 | 11XA-XXX-XX-1 |
| 10 | Bolts, Hex 5/16-24 | 8 | 021363 | 11XA-036-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021428 | 11XA-054-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021356 | 11XA-071-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021306 | 11XA-088-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021382 | 11XA-106-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021437 | 11XA-129-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021438 | 11XA-164-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021435 | 11XA-189-XX-X |
| | Bolts, Hex 5/16-24 | 8 | 021383 | 11XA-241-XX-X |
| 11 | Key, Woodruff 1.0 x .25" | 1 | 1655 | 110A-XXX-XX-X |
| | Key, Straight .3125 x .3125 x 1.125 LG | 1 | 1020-3 | 113A-XXX-XX-X |
| | Key, Woodruff 1.25 DIA. x .25" | 1 | 1756 | 114A-XXX-XX-X |
| 12 | Shaft 1" Keyed (Woodruff) | 1 | 2109-X ⁴ | 110A-XXX-XX-0 |
| | Shaft 1" SAE 6B Spline | 1 | 1887-X ⁴ | 111A-XXX-XX-0 |
| | Shaft 25mm Keyed | 1 | 2225-X ⁴ | 112A-XXX-XX-0 |
| | Shaft 1.25" Keyed (Straight) | 1 | 2123-X ⁴ | 113A-XXX-XX-0 |
| | Shaft 1.25" J501 Taper | 1 | 2135-X ⁴ | 114A-XXX-XX-0 |
| | Shaft 1.25" 14 Tooth Spline | 1 | 2265-X ⁴ | 115A-XXX-XX-0 |
| | Shaft 7/8" 13 Tooth Spline | 1 | 1896-X ⁴ | 116A-XXX-XX-0 |
| | Shaft 32mm Keyed | 1 | 2504-X ⁴ | 118A-XXX-XX-0 |

Parts List

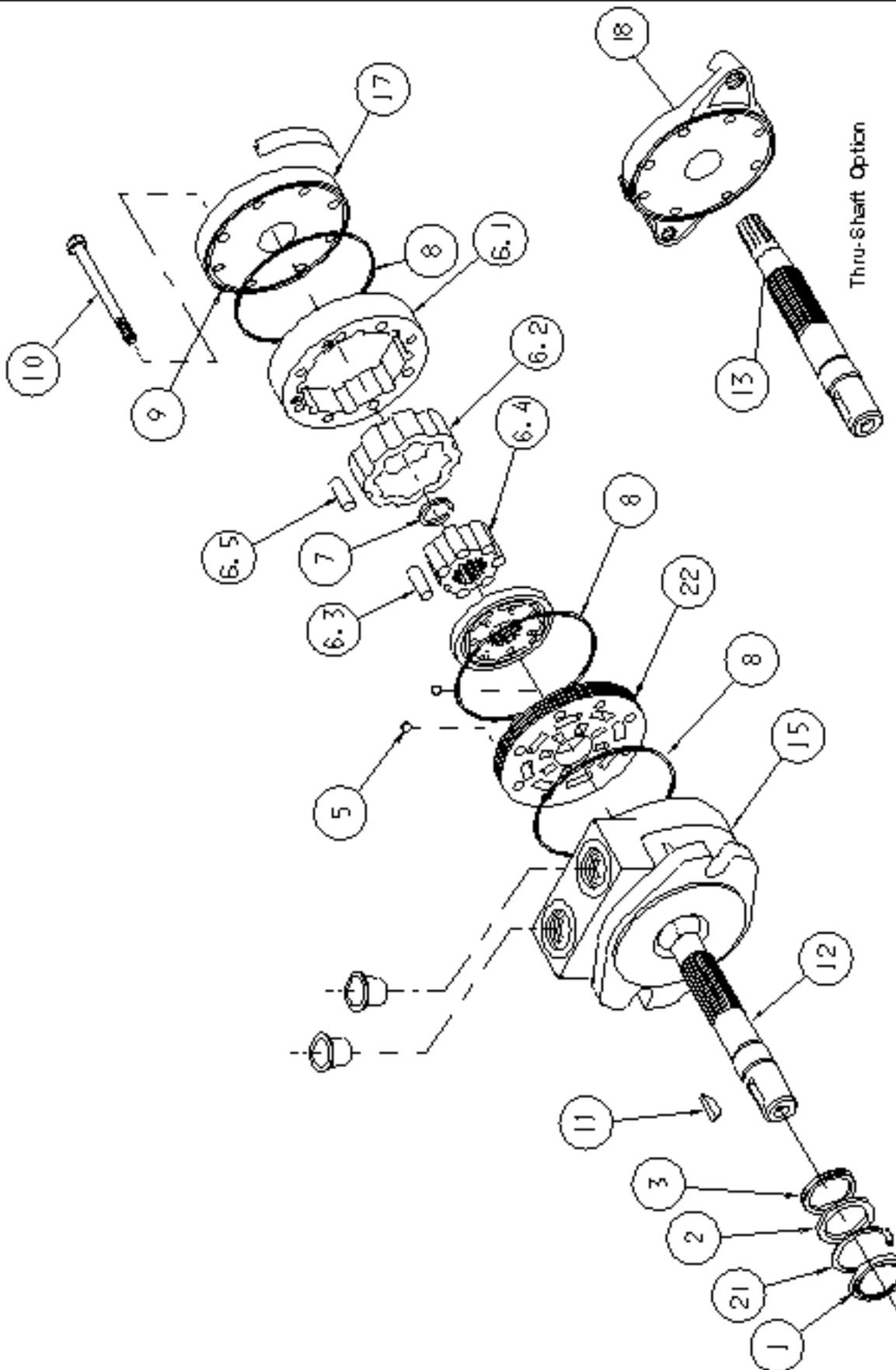
| Item No. | Description | Qty./per Motor | Part Number | Where Used |
|---|--|---------------------|---------------------|-----------------|
| 13 | Shaft 1" Keyed Thru (Woodruff) ³ | 1 | 2110-X ⁴ | 110A-XXX-XX-1 |
| | Shaft 1" SAE 6B Spline Thru ³ | 1 | 2169-X ⁴ | 111A-XXX-XX-1 |
| | Shaft 25mm Keyed Thru ³ | 1 | 2129-X ⁴ | 112A-XXX-XX-1 |
| | Shaft 1.25" Key Thru | 1 | 2128-X ⁴ | 113A-XXX-XX-1 |
| | Shaft 1.25" Taper Thru | 1 | 2505-X ⁴ | 114A-XXX-XX-1 |
| | Shaft 1.25" 14T Thru | 1 | 2127-X ⁴ | 115A-XXX-XX-1 |
| | Shaft 7/8" 13 Tooth Spline Thru ³ | 1 | 2170-X ⁴ | 116A-XXX-XX-1 |
| | Shaft 32mm | 1 | 3061-X ⁴ | 118A-XXX-XX-1 |
| | Shaft 1" Keyed (Str) Encoder ³ | 1 | 2367-X ⁴ | 110A-XXX-XX-E |
| | Shaft 6B Spline Encoder ³ | 1 | 2366-X ⁴ | 111A-XXX-XX-E |
| | Shaft 25mm Dia. Key Encoder ³ | 1 | 2281-X ⁴ | 112A-XXX-XX-E |
| | Shaft 1.25" Key Encoder ³ | 1 | 2363-X ⁴ | 113A-XXX-XX-E |
| | Shaft 1.25" Taper Encoder ³ | 1 | 2537-X ⁴ | 114A-XXX-XX-E |
| | Shaft 1.25" 14T Encoder ³ | 1 | 2365-X ⁴ | 115A-XXX-XX-E |
| | Shaft 7/8" 13T Encoder ³ | 1 | 2364-X ⁴ | 116A-XXX-XX-E |
| | Shaft 1" Dia. Stainless Steel | 1 | 2416-X ⁴ | 110A-XXX-XX-0-S |
| | Shaft 6B Spline Stainless Steel | 1 | 2551-X ⁴ | 111A-XXX-XX-0-S |
| | Shaft 25mm Dia. Stainless Steel | 1 | 2625-X ⁴ | 112A-XXX-XX-0-S |
| | Shaft 1.25" Key Stainless Steel | 1 | 2433-X ⁴ | 113A-XXX-XX-0-S |
| | Shaft 1.25" Taper Stainless Steel | 1 | SA019000-XXX | 114A-XXX-XX-0-S |
| | Shaft 1.25" 14T Stainless Steel | 1 | 3053-X ⁴ | 115A-XXX-XX-0-S |
| | Shaft 7/8" 13T Stainless Steel | 1 | SA019004-XXX | 116A-XXX-XX-0-S |
| | Shaft 1" Dia. Thru Stainless Steel | 1 | 2525-X ⁴ | 110A-XXX-XX-1-S |
| | Shaft 6B Spline Thru Stainless Steel | 1 | 3162-X ⁴ | 111A-XXX-XX-1-S |
| | Shaft 25mm Dia. Key Thru Stainless Steel | 1 | 2650-X ⁴ | 112A-XXX-XX-1-S |
| | Shaft 1.25" Key Thru Stainless Steel | 1 | 2523-X ⁴ | 113A-XXX-XX-1-S |
| | Shaft 7/8" 13T Thru Stainless Steel | 1 | 3150-X ⁴ | 116A-XXX-XX-1-S |
| | Shaft 1" Dia. Encoder Stainless Steel | 1 | 2511-X ⁴ | 110A-XXX-XX-E-S |
| Shaft 6B Spline Encoder Stainless Steel | 1 | 3002-X ⁴ | 111A-XXX-XX-E-S | |
| Shaft 25mm Dia. Encoder Stainless Steel | 1 | 3094-X ⁴ | 112A-XXX-XX-E-S | |
| Shaft 1.25" Key Encoder Stainless Steel | 1 | 2608-X ⁴ | 113A-XXX-XX-E-S | |
| Shaft 1.25" Taper Encoder Stainless Steel | 1 | SA019002-XXX | 114A-XXX-XX-E-S | |
| 22 | Commutator Plate | 1 | SM015995 | ALL MODELS |
| 15 | Body/Bearing Assy | | | |
| | SAE "A" 2 Bolt O-ring | 1 | PA-2328-2 | 11XA-XXX-AS-X |
| | SAE "A" 2 Bolt Manifold | 1 | PA-2328-3 | 11XA-XXX-AM-X |
| | SAE "A" 2 Bolt NPTF | 1 | PA-2328-4 | 11XA-XXX-AP-X |
| | SAE "A" 2 Bolt BSPP | 1 | PA-2328-1 | 11XA-XXX-AT-X |
| | SAE "B" 2 Bolt O-ring | 1 | PA-2328-5 | 11XA-XXX-BS-X |
| | SAE "B" 2 Bolt Manifold | 1 | PA-2328-6 | 11XA-XXX-BM-X |
| | SAE "B" 2 Bolt NPTF | 1 | PA-2328-8 | 11XA-XXX-BP-X |
| | SAE B 2 Bolt BSPP | 1 | PA-2328-7 | 11XA-XXX-BT-X |
| 17 | Cover/Bearing Assy | 1 | M110C-1 | 11XA-XXX-XX-0 |
| | Cover/Bearing Assy DU or Stainless Steel | 1 | M110C-3 | 11XA-XXX-XX-0-D |

Parts List

| <i>Item No.</i> | <i>Description</i> | <i>Qty./per Motor</i> | <i>Part Number</i> | <i>Where Used</i> |
|-----------------|---|-----------------------|--------------------|-------------------|
| 18 | Cover/Bearing Assy Thru ³ | 1 | M110C-2 | 11XA-XXX-XX-1 |
| | Thru, DU or S.S. ³ | 1 | M110C-10 | 11XA-XXX-XX-1-D |
| | Thru, Encoder ³ | 1 | SM016005A1 | 11XA-XXX-XX-E |
| 9 | Case Drain Plug w/O-ring 7/16-20 | 1 | 036297 | ALL MODELS |
| 19 | Seal,Lip .875" ³ | 1 | 2332 | 11XA-XXX-XX-1 |
| 20 | Seal, Dust .875" ³ | 1 | 1141 | 11XA-XXX-XX-1 |
| | Seal Kit, Body | 1 | SK000183 | ALL MODELS |
| | Seal Kit, Viton Body | 1 | SK000185 | ALL MODELS |
| | Seal Kit, Cover (Thru) ³ . complete cover only | 1 | SK000190 | Thru-Shaft Models |

NOTES:

1. Before ordering parts listed above confirm that all options in the model number match the identification tag on the motor. The "X" in a model number indicates an option.
2. Body assemblies [items #15 & #16] and cover/bearing assemblies [items #17 & #18] include bearings.
3. Indicates parts used only in thru-shaft motors. See Figure 3.
4. The X in this p/n indicates the displacement of the motor. Replace the X with one of the following **bold** numbers when ordering these shafts; 036=1, 054=2, 071=3, 088=4, 106=5, 129=6, 164=7, 189=189, 241=241



Disassembly & Assembly Procedures

Section I

Motor Disassembly

1. Mount the motor in a vise or other holding device with the shaft (12) facing down.
2. Remove the eight 5/16-24 bolts (10). If motor has bolt washers, remove and discard them.
3. Remove the cover/bearing assembly (17) and square ring seal (8). **Note:** For thru-shaft option remove cover/bearing assembly (18).
4. Remove the IGR™ set components (6) starting with the outer locating ring (6.1) and rollers (6.5). Note that the inner most IGR™ component (6.4) and rotary valve (4) are retained on the shaft by a snap ring (7).
5. Remove the two check valve balls (5). **Note:** The check balls may fall into the bolt holes or into the body valve ports during disassembly. Be sure that both check balls are removed and accounted for.
6. Remove and discard the square ring seal (8) from the body/bearing assembly.
7. Remove the snap ring (7), the inner (6.4), the rotary valve (4), the commutator plate (22) and pull the shaft (12) out from the front of the motor. For thru shaft see figure 3.
8. Inspect the IGR™ inner component (6.4), the rotary valve (4), and the shaft (12) for wear or other damage. The shaft should have smooth polished surfaces in the bearing and seal areas. If any of these components are damaged, the snap ring (7) must be removed and discarded and the appropriate components replaced.
9. Pry out the dust seal (1) to expose the snap ring (21). The lip seal (3) and back-up ring (2) can be removed after the snap ring is removed using snap ring pliers. Remove the back up and pry the seal out using a blunt object. Do not use a sharp object that might scratch the bore and cause a leak.

Section II

Motor Assembly

A. Assembly of Complete Motor

1. Prior to assembly, all parts must be cleaned with a suitable solvent and be free of nicks and burrs.
2. Install a new lip seal (3) by pressing it into the bore from the outside of the body with the lip pointed towards the inside of the body. Insure the seal is seated on the shoulder of the body.
3. Next place the back-up ring on the seal and insert the snap ring in its groove. The flat side (or sharp edge) of both items should face away from the motor.
4. Install the dust seal (1) from the front of the body/bearing assembly. Seat the back side (flat side) of the dust seal against the snap ring.
5. Lubricate the inside of the lip seal and dust seal with oil.
6. Mount the body (15) in a vise bolt side up. Place a square ring seal in the body groove. Assemble the commutator plate (2) on the body with the 16 equally spaced slots facing upwards.
7. Check the output shaft end for burrs and scratches, de-burr if necessary. The shaft must be smooth so it will not cut the lip seal when installed through the seal. Lubricate the shaft and lip seal and install the shaft from the outside of the body through the seal. While holding the shaft from under the motor, install the valve plate and inner (6.4) as shown in Fig 1. Using snap ring pliers, install snap ring (7). Be sure the snap ring is tight on the shaft. For thru shaft see figure 3.
8. Place the outer rotor (6.2) of the IGR™ over the inner and insert the seven rolls (6.3) into the inner pockets. (The difference between rolls and rollers is distinguishable by eye. Rolls have square ends and rollers have radiused ends.)
9. Lightly oil the square ring seal (8) and place it in the commutator plate (22) o-ring groove.

10. Place the check balls (5) over the two 1/8 inch diameter holes on the commutator plate (22). Be sure the check balls do not fall into the (bolt) holes.
11. Place the locating ring (6.1) onto the body/bearing assembly with the check ball holes facing downward over the balls. Align the eight bolt holes in the locating ring with the eight holes in the body (15). (The bolt holes will align in only one position). **Note:** Be sure not to dislodge the body/bearing assembly (15) square ring seal (8) while positioning the locating ring (6.1).
12. Install the eight locating ring rollers (6.5) into their pockets and oil lightly.
13. Place the other lightly oiled square ring seal (8) into the groove in the cover and place the cover over the shaft end and align the bolt holes. If the motor is equipped with the optional thru-shaft, oil the seal in the cover and the shaft and install the cover gently while rotating it.
14. Install the eight bolts with lightly oiled thread ends into the bolt holes.
 - A. Tighten the bolts in a diagonal pattern to 15 lb ft.
 - B. Turn the shaft by hand through several rotations.
 - C. Increase the torque of each bolt by 5 lb ft in a diagonal pattern. Turn the shaft by hand through several rotations.
 - D. Repeat this procedure until the torque of each bolt has reached 27 ± 1 lb ft.

Section III**INSTALLATION REQUIREMENTS**

1. The motor may be mounted in any secure position.
2. If the system minimum downstream pressure exceeds 1000 PSI on a continuous basis, the external case drain should be vented to tank.
3. The standard motor seals are suitable for use with petroleum base oils. Consult the factory for use with other fluids.
4. A minimum of 25 micro filtration with a β ratio of 2 is recommended.
5. For maximum system pressure refer to catalog.
6. Shaft may not turn freely after assembly. A short running period may be required.

Date Coding & Detail Figures

Section IV

Date Coding

Prior to December 31, 1988 the serial number stamped into the identification tag provided the month and year of manufacture and a sequentially assigned number.

Sample serial number: **H6 - 1234**

H = The month of manufacture

6 = The year of manufacture (this the last digit of the year number i.e. 1986)

Month code:

- | | | |
|--------------|------------|---------------|
| A = January | E = May | J = September |
| B = February | F = June | K = October |
| C = March | G = July | L = November |
| D = April | H = August | M = December |

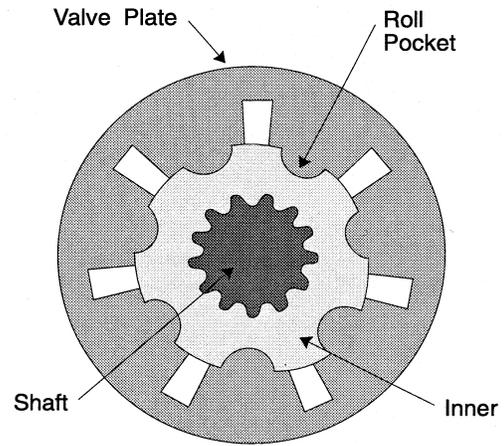


Fig. 1
Correct Valve Plate / Inner Orientation
(Not to Scale)

Note: Assemble with inner counterbore facing away from the valve plate.

Motors manufactured after January 1, 1989, have the Julian Date Code and year of manufacture stamped into the identification tag. i.e. **025-90**. The three digits indicate the day of the year the motor was manufactured. The last two digits indicate the year of manufacture.

The example (025-90) was manufactured during the 25th day of 1990.

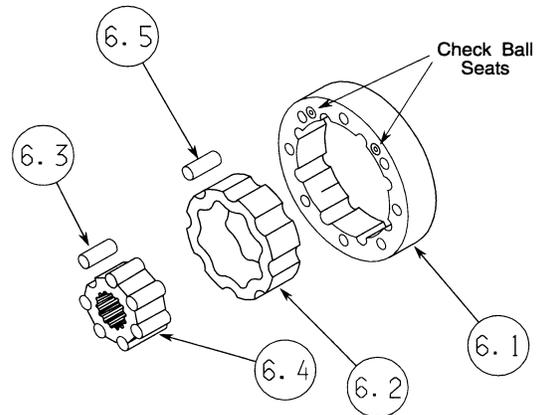


Fig. 2
Exploded IGR™

Figure 3

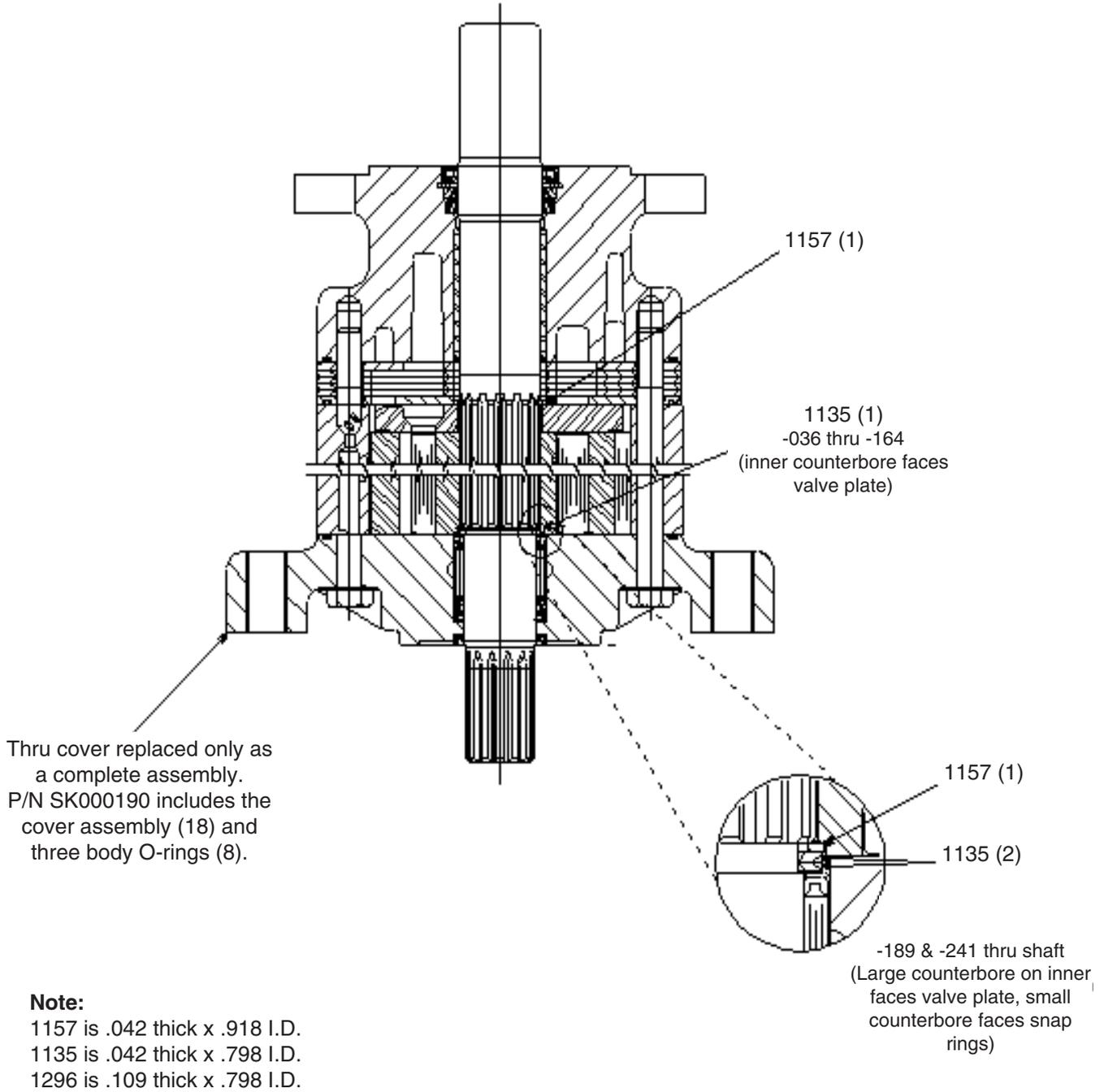


Fig. 3
Thru Shaft Option
Snap Ring Replacement



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