Service Manual SM1531

Parker Motors

Effective: January 1, 1996

Low Speed High Torque Hydraulic Motors 700 Series

Definitions

WARNING: **A warning refers to procedures that must be followed for the safety of the equipment operator and the person inspecting or repairing the motor.**

CAUTION: **A CAUTION refers to a mandatory procedure which avoids damage to the motor or other system components.**

NOTE: **A NOTE provides key information to make a procedure easier or quicker to complete.**

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Introduction

Service Manual for Series 700 Two Speed High Torque Motor

This service manual has one purpose: to guide you in maintaining, troubleshooting, and servicing the 700 Two Speed High Torque Motor. These motors provide long life while operating with low radial side loads.

Read the trouble shooting information to eliminate non-hydraulic causes and hydraulic system problems. The check list identifies hydraulic system and possible motor component problems.

The 2 column format of the Disassembly and Inspection, and Assembly sections make it easier to conduct major work on the motor. Column 1 explains the procedure in detail. Column 2 illustrates this procedure with photographs. Read all material carefully and pay special attention to the notes, cautions, and warnings.

The component part names and item numbers assigned on the exploded assembly views corresponds with names and item numbers (in parentheses) used in the disassembly and assembly procedures. Refer to the exploded assembly view page as you follow the procedures for ease in identifying and locating components.

Service part number charts display exploded view item numbers and part numbers.

Obtain service parts from the Original Equipment Manufacturer or your local Parker distributor.

We welcome suggestions to make this manual clearer or more complete. If you are stuck, contact Parker Hannifin Corp. at the Hydraulic Pump/Motor Division. Don't second guess the manual. Following this safe and productive procedure results in restoring the reliable long-life operation engineered into the motor.

NOTE: **Before troubleshooting any system problem, check service literature published by the equipment and/or component manufacturers. Follow their instructions, if given, for checking any component other than the motor unit.**

Preparation

Make your troubleshooting easier by preparing as follows:

- Work in a clean, well lighted area.
- Have proper tools and materials nearby.
- Have an adequate supply of clean petroleum - based solvent.
- Prior to any motor disassembly, plug the open ports and case drain.
- Clean all dirt from the outside of the motor.
- Prior to assembly lightly oil all seals, rollers, rolls and the threaded bolt ends.

WARNING: **Since solvents are flammable, be extremely careful when using any solvent, even a small explosion or fire could cause injury or death.**

WARNING: **Wear eye protection and comply with OSHA and other maximum air pressure requirements.**

Preliminary Checks

Hydraulic systems are often trouble free. Therefore check the following easy to check items first, such as:

- Parts damaged from impact that were not properly repaired, or that should have been replaced.
- Improper replacement parts used in previous servicing.
- Mechanical linkage problems such as binding, broken parts or chain , loose parts, or slipping belts.

Hydraulic Components

If the motor has low speed or torque, look at the check list on the next page first. Since these motors maintain volumetric and torque efficiencies during their useful life, the problem is usually elsewhere in the hydraulic system.

However, there are hydraulic system problems which can drastically reduce the long life designed into these motors. Three key areas to check are:

- Temperature: Do not exceed 180°F.
- Fluid: Viscosity at the maximum temperature must exceed 50 ssu.
- Filtration: A Beta 25 ratio of at least 2.

Troubleshooting Checklist

Trouble	Cause	Remedy
Oil leakage	1. Hose fittings loose, worn, or damaged.	Check & replace damaged “O” Rings. Torque to manufacturers specifications.
	2. Motor section seal rings (7) deteriorated by excess heat.	Replace oil seal rings. Correct heat problem.
	3. Tie bolt loose.	If bolts are loose because of excessive pressures as indicated by most or all being loose replace bolts & advise customer to correct the pressure regulation.
	4. Broken tie bolts.	Replace bolts.
	5. Internal shaft seal worn or damaged	Replace seal.
	6. Worn shaft and internal seal.	Replace shaft and seal.
Significant loss of speed under load	1. Lack of sufficient oil supply.	(a) Check for faulty relief valve and adjust or replace as required. (b) Check for and repair worn pump. (c) Check for and use correct oil for temperature of operation. Check reservoir fluid level.
	2. High internal motor leakage.	Replace worn IGR™ set.
	3. Excessive heat.	Locate excessive heat source (usually a restriction or lack of an oil cooler) in the system and correct the condition.
Low mechanical efficiency or undue high pressure required to operate motor	1. Line blockage	Locate blockage source and repair or replace.
	2. Internal interference	Disassemble motor, identify and remedy cause.
	3. Excessive binding or loading in system external to motor unit.	Locate source and eliminate cause.
Lack of pressure	1. Low flow output of pump	Repair or replace worn pump.
	2. Relief valve set incorrectly or not closing completely.	Reset relief, look for contamination, or replace.

CAUTION: Seals in the system will shrink, harden or crack if fluid temperatures exceed 180°F (82.2°C), resulting in loss of ability to seal.

Tools and Materials Required to Service the 700 Series

- Clean, petroleum-based solvent
- Emery paper
- Vise with soft jaws
- Air pressure source
- Screwdriver
- Tape
- Breaker bar or impact wrench
- Torque wrench 50 ft. lbs
- Socket 1/2 inch
- 1/4 inch Allen wrench
- Adjustable crescent wrench or hose fitting wrenches

Item #	Qty	Part Number	Description
1	8	See Following Page	Bolts
2	1	M110C-6	4 Dowel End Cover (standard)
	1	M110C-23	Encoder End Cover
3	6	1046	O-Rings
4	1	See Following Page	IGR™ Set, Rear (2904-X)
5	2	1660	Clip
6	1	See Following Page	Shaft, Internal
7	2	3190	Commutator Plate
8	4	1021	Check Ball
9	1	See Following Page	Center Block
10	4	25060-09	Bolt
11	1	See Following Page	Shaft, Output
12	1	PA-2984-1	1.25" Shaft “A” Flange (with seals)
	1	PA-2984-2	1.25" Shaft “B” Flange (with seals)
	1	PA-2983-1	1.00" Shaft “A” Flange (with seals)
	1	PA-2983-2	1.00" Shaft “B” Flange (with seals)
13	1	1060-34	0-Ring, Flange
14	2	1026-2	Dowel
15	8	See Following Page	Bolt
16	1	See Following Page	Front Bearing Housing
17	1	See Following Page	IGR™ Set, Front (2917-X)
18	2	75013-10	Plug, Spool Port
19	1	1826	Sring
20	1	1825 or 2792	Valve-1825 Open Center, 2792 Closed Center
21	4	1320	Check Balls-Solenoid Block
22	5	032841	O-Rings-Solenoid Block
23	1	1823	Solenoid Block (Aluminum)
24	1	1824	Solenoid-With Manual Override
	1	2891	Solenoid-Without Manual Override
25	2	021442	Bolt
26	1	2271	1.25" Dia. Shaft Thrust Washer
27	1	2270	1.25" Dia. Shaft Thrust Bearing
28	1	2150	1.25" Dia. Shaft Seal, High Pressure
29	1	1435	1.25" Dia. Shaft Seal, Dust
30	1	1323	1" Dia. Shaft Thrust Washer
31	1	1585	1" Dia. Shaft Thrust Bearing (Pressed into flange)
32	1	2175	1" Dia. Shaft Seal, High Pressure
33	1	1325	1" Dia. Shaft Seal, Dust

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Motor Disp.	Item 6 Shaft	Item 17 IGR™ Set	Item 4 IGR™ Set	Item 1 Hex Bolt	Item 15 Allen Bolt
	Standard (encoder)				
12.9/25.8	2865-258 (2249)	2917-6	2904-6	021363	2992-258
10.6/21.2	2865-212 (2249)	2917-5	2904-5	021428	2992-212
8.8/17.6	2865-176 (2249)	2917-4	2904-4	021356	2992-176
7.1/14.2	2865-142 (2249)	2917-3	2904-3	021306	2992-142
5.4/10.8	2865-108 (2249)	2917-2	2904-2	021382	2992-108
3.6/7.2	2865-072 (2249)	2917-1	2904-1	021437	2992-072

Item 16 Brg. Hsng	Item 9 Center Block	Item 11 Shaft, Output
		1" Dia Shafts
	PA-2534 (7/8-14 O-Ring, Pilot Act.)	2970-0, 1" Key 2970-1, 6B Spline 2970-2, 25mm Key 2970-6, 7/8" 13T Spline
PA-2985-2 (1/4-19 BSPP)	PA-2535 (7/8-14 O-Ring Solenoid)	**1.25" Dia Shafts**
PA-2985-1 (7/16-20 O-Ring)	PA-3106 (BSPP Pilot Act.)	2928-3, 1.25" Key 2928-4, 1.25 Taper 2928-5, 1.25 14T Spline 2928-8, 32mm Key
	PA-3111 (BSPP Solenoid)	
	PA-2817 (Manifold, Pilot Act.)	

1" Output Shafts

Seal Kit-Complete: **3037**

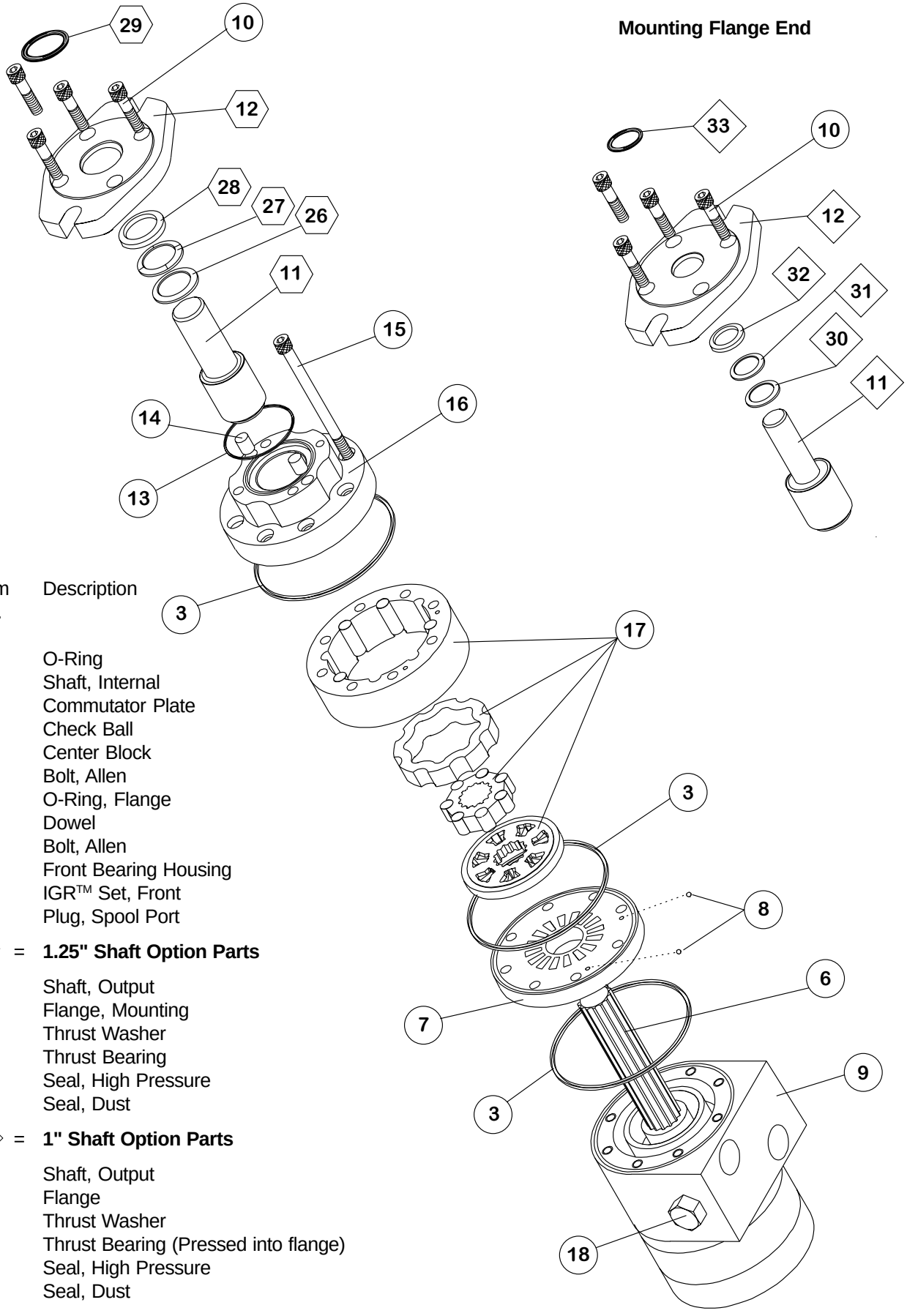
Includes; P/N	Qty	Description
1046	6	Body O-Rings
1060-34	1	Flange O-Ring, Item 13
1325	1	Dust Seal
2175	1	1.063" High Pressure Seal
032841	5	Solenoid Block O-Rings
1585	1	Thrust Bearing (presses in flange)

1.25" Output Shafts

Seal Kit-Complete; **3163**

Includes; P/N	Qty	Description
1046	6	Body O-Rings
1060-34	1	Flange O-Ring, Item 13
1435	1	Dust Seal
2150	1	1.311" DIA. High Pressure Seal
032841	5	Solenoid Block O-Rings

700 Series Exploded View - Typical



Item No.	Description
3	O-Ring
6	Shaft, Internal
7	Commutator Plate
8	Check Ball
9	Center Block
10	Bolt, Allen
13	O-Ring, Flange
14	Dowel
15	Bolt, Allen
16	Front Bearing Housing
17	IGR™ Set, Front
18	Plug, Spool Port
⬡ =	**1.25" Shaft Option Parts**
11	Shaft, Output
12	Flange, Mounting
26	Thrust Washer
27	Thrust Bearing
28	Seal, High Pressure
29	Seal, Dust
◇ =	**1" Shaft Option Parts**
11	Shaft, Output
12	Flange
30	Thrust Washer
31	Thrust Bearing (Pressed into flange)
32	Seal, High Pressure
33	Seal, Dust

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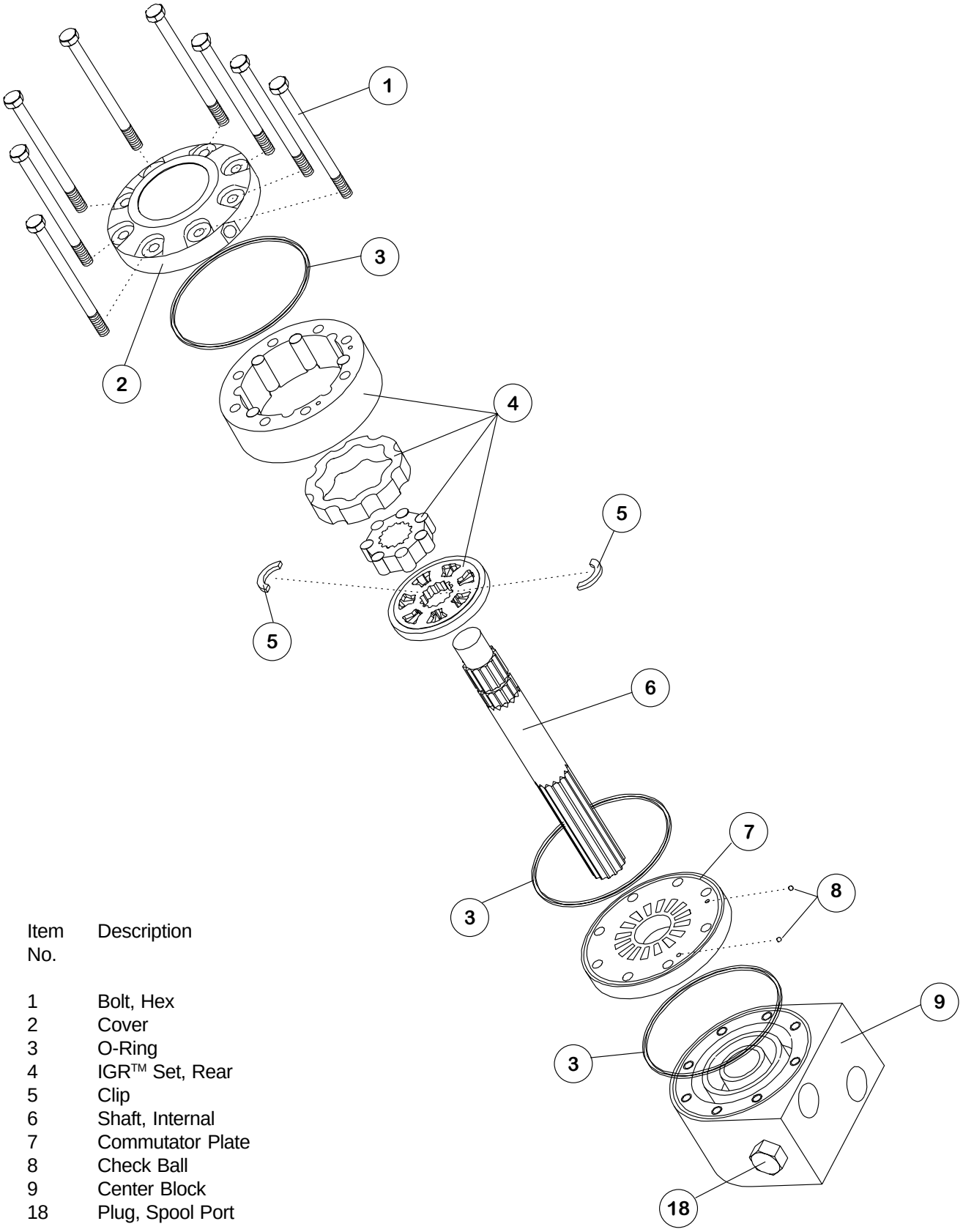
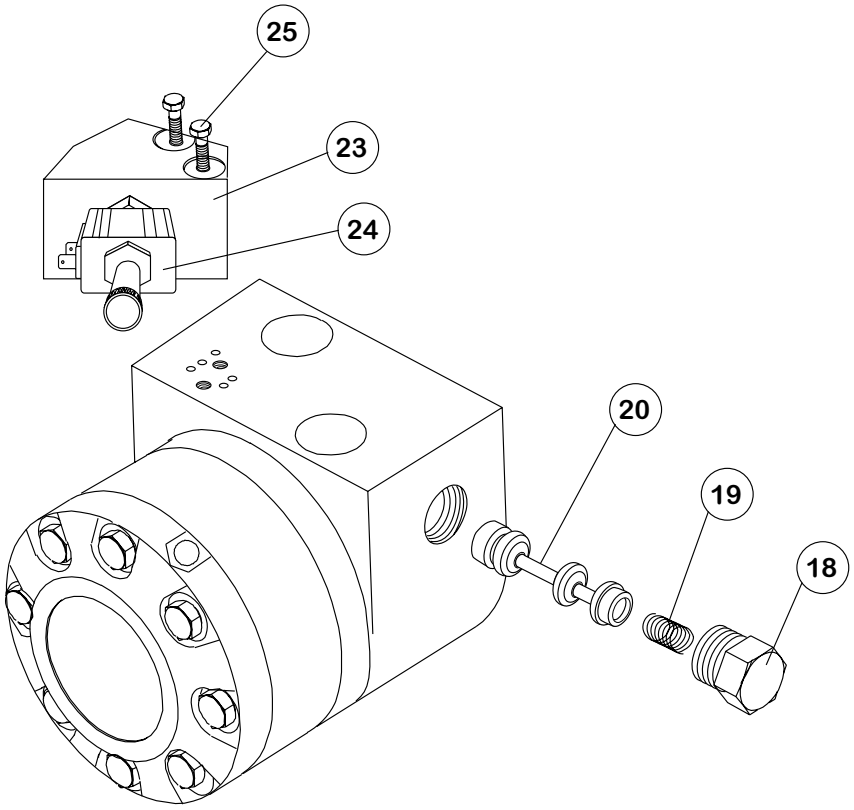
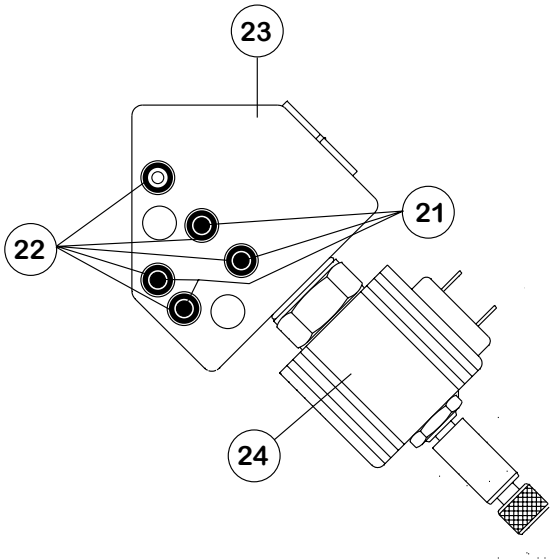
Cover End



Item No.	Description
1	Bolt, Hex
2	Cover
3	O-Ring
4	IGR™ Set, Rear
5	Clip
6	Shaft, Internal
7	Commutator Plate
8	Check Ball
9	Center Block
18	Plug, Spool Port

Optional Solenoid





Solenoid Block
Bottom View

Item No.	Description
18	Plug, Spool Port
19	Spring, Valve
20	Valve
21	Check Ball, Solenoid Block
22	O-Ring Solenoid
23	Solenoid Block
24	Solenoid
25	Hex Bolt

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(Preparation Before Disassembly)

- Before you disassemble the motor unit or any of its components read this entire manual. It provides important information on parts and procedures you will need to know to service the motor.
- Refer to page four for tools and other items required to service the motor and have them available.
- Thoroughly clean off all outside dirt, especially from around fittings and hose connections, before disconnecting and removing the motor. Remove rust or corrosion from coupling shaft.
- Remove coupling shaft connections and hose fittings and immediately plug port holes and fluid lines.
- Remove the motor from system, drain it of fluid and take it to a clean work surface.
- Clean and dry the motor before you start to disassemble the unit.
- As you disassemble the motor clean all parts, except seals, in clean petroleum based solvent, and blow them dry.

WARNING: **Since they are flammable, be extremely careful when using any solvent. Even a small explosion or fire could cause injury of death.**

WARNING: **Wear eye protection and be sure to comply with OHSA or other maximum air pressure requirements.**

CAUTION: **Never steam or high pressure wash hydraulic components. Do not force or abuse closely fitted parts.**

- Keep parts separate to avoid nicks and burrs.
- Discard all seals and seal rings, as they are removed from the motor. Replace all seals, seal rings and any damaged or worn parts with genuine Parker or OEM approved service parts.

(Reference Exploded Assembly View)

1. Mount the motor in a soft jawed vice, shaft up, clamping firmly on the cover assembly. Remove manifold port O-rings if applicable. SEE FIGURE D1

Figure D1

2. Remove the key or castle nut if present on the shaft.

3. Remove the 4 socket head cap screws (10) from the flange cover. Lift flange cover (12) by lightly tapping the flange up off the dowels with a soft hammer. Do not remove the dowel pins. SEE FIGURES D2, D3, D4.

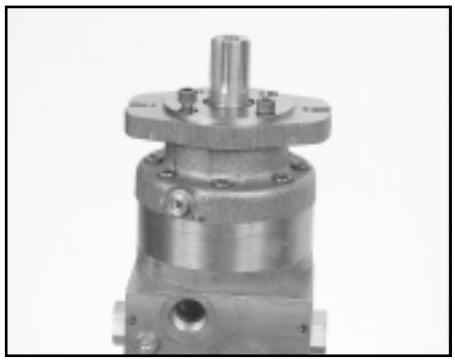

Figure D2

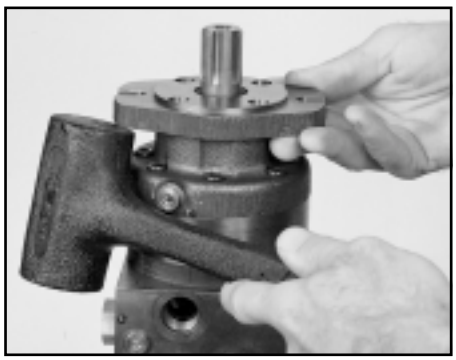

Figure D3

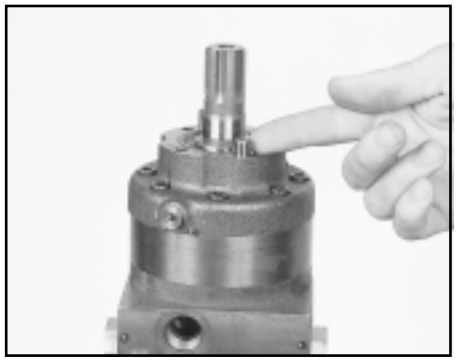

Figure D4

4. Remove thrust washers and the shaft. (2 washers used with the 1.25" dia. shaft, 1 washer used with the 1" dia. shaft) SEE FIGURE D5.

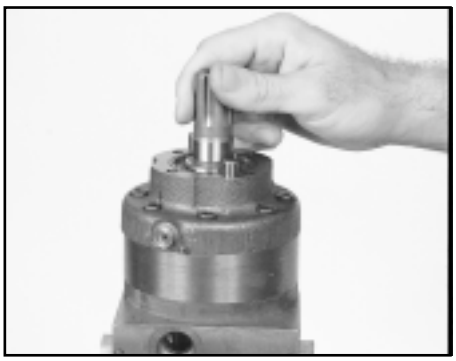

Figure D5

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5. Loosen and remove the 8 socket screws (15) to remove the front bearing housing (16) and the locating ring. Remove rollers and check balls. SEE FIGURES D6 & D7.

Caution: **The rollers & check balls will fall out so be ready to catch them to prevent damage and loss.**

Note: **The check balls may fall into the bolt holes or into the commutator ports.**

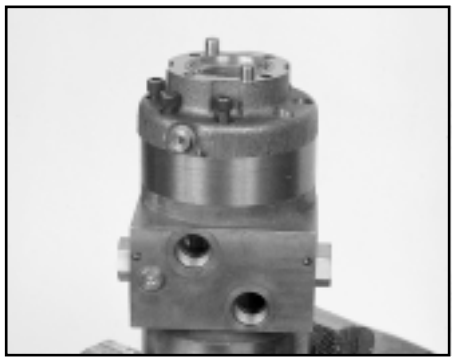

Figure D6

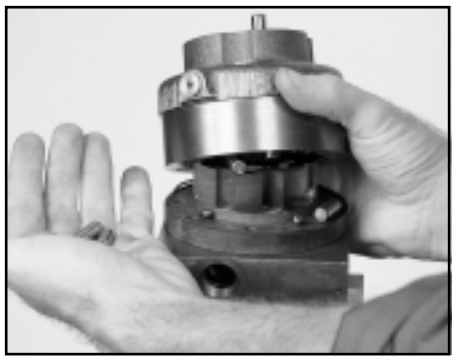

Figure D7

6. Separate the locating ring from the front bearing housing (16) by holding the locating ring in hand and tapping the housing with a soft nosed hammer.

Caution: **If placed in a vise, use minimal clamping force to prevent a permanent out of round condition.**

7. Remove the outer carefully to prevent rolls from falling or remove rolls with a magnet. SEE FIGURE D8.

Figure D8

8. Remove rolls, inner and valve plate. SEE FIGURES D9 & D10.

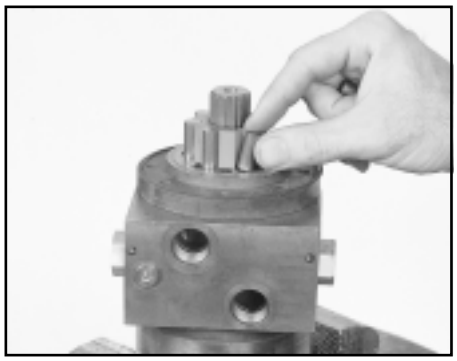

Figure D9

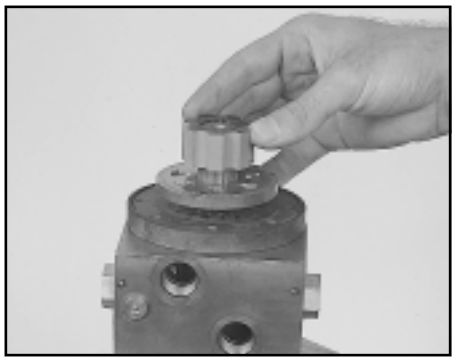

Figure D10

9. Remove commutator plate assembly (7) and seal (6). SEE FIGURE D11.

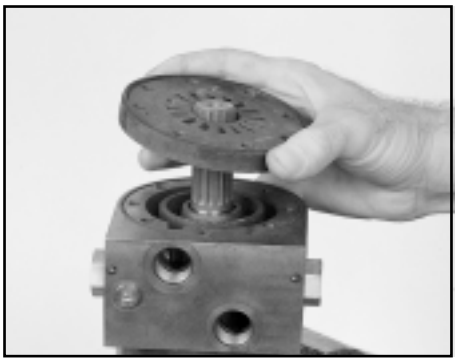

Figure D11

10. Turn motor assembly upside down and clamp center block (9) in vise. SEE FIGURE D12.

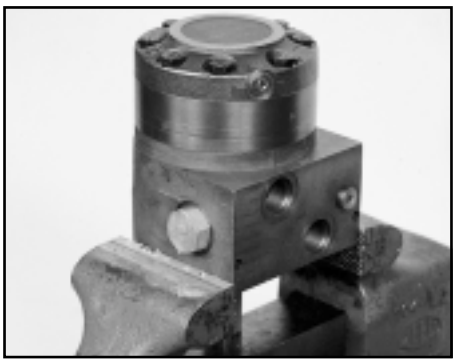

Figure D12

11. Loosen and remove the 8 5/16-24 bolts (1), remove the cover (2), locating ring, check valve balls (quantity 2) (8) and rollers. SEE FIGURES D13 & D14.

CAUTION: **The rollers will fall out so be ready to catch them to prevent damage and loss.**

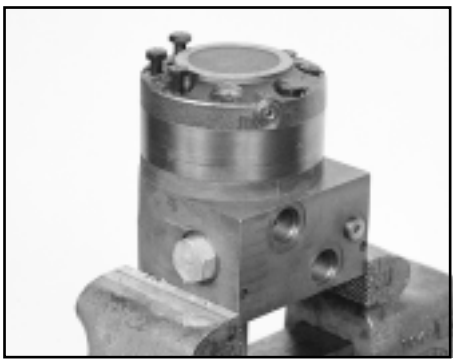

Figure D13

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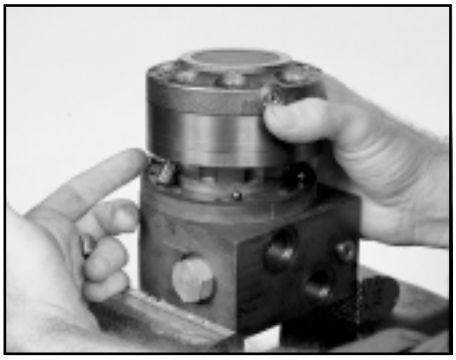

Figure D14

12. Remove the outer, rolls, inner and valve plate. SEE FIGURE D15.

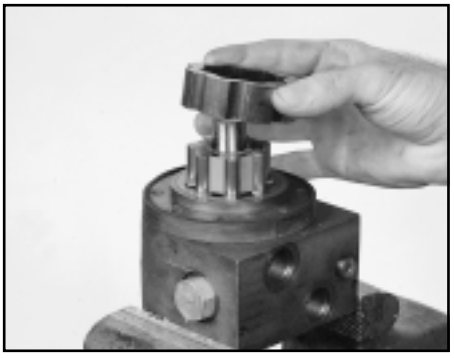

Figure D15

13. Lift shaft (6) up a short distance, push the valve plate down and remove the 2 snap ring pieces (5). SEE FIGURE D16.

Note: **With the snap ring removed the shaft will fall out of the motor unless, you maintain a grip on the it.**

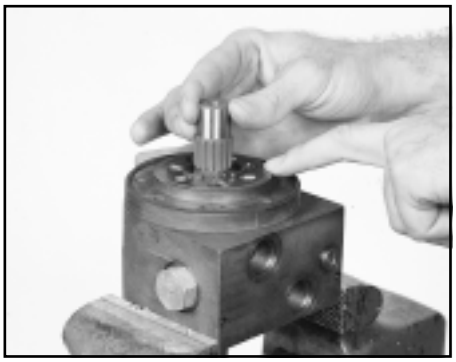

Figure D16

14. Remove valve plate, shaft (6) commutator plate (7) and seal (3). SEE FIGURE D17

Figure D17

Seal Removal

15. Remove dust seal by tapping on the seal with a blunt instrument and hammer with the flange(12) lying on a clean flat surface. SEE FIGURES D18.

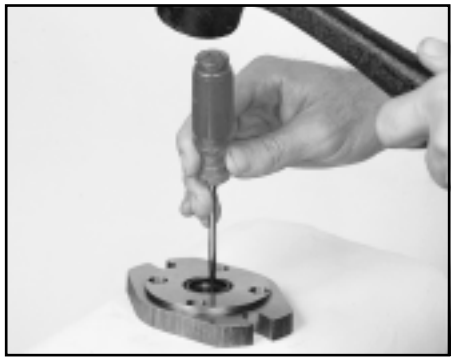

Figure D18

16. Pry lip seal out with a screwdriver. Be carefull not to scratch the flange seal area. Scratching the seal area would possibly create a leak path. SEE FIGURE D19.

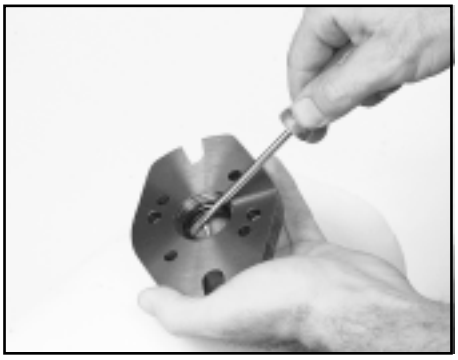

Figure D19

Pilot Option:

To change pilot operation from normally parallel to normally series or vice versa, reverse the spool direction. Also valid for solenoid shift motors.

1. Remove the plugs (18) on the center block. SEE FIGURE D20.

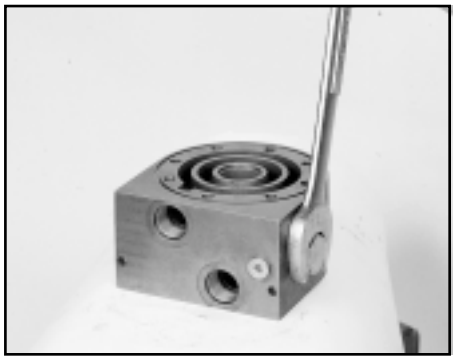

Figure D20

2. Remove the spool (20) and spring (19). SEE FIGURE D21.

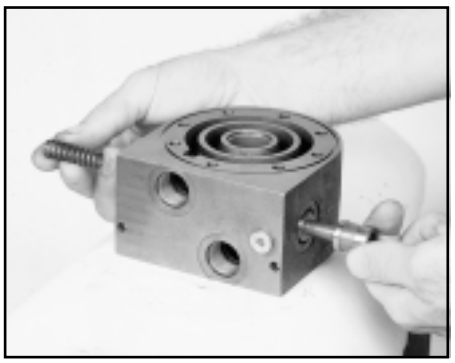

Figure D21

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3. Looking at the port surface, install the spool with ...

   A) the “double” or "wide" land nearest the “pilot port” for **normally parallel** operation. SEE FIGURE 22.

   B) the “double” or "wide" land opposite the “pilot port” for **normally series** operation. SEE FIGURE 23.

4. The spring is always located on the side, opposite the “pilot port”. SEE FIGURE 21.

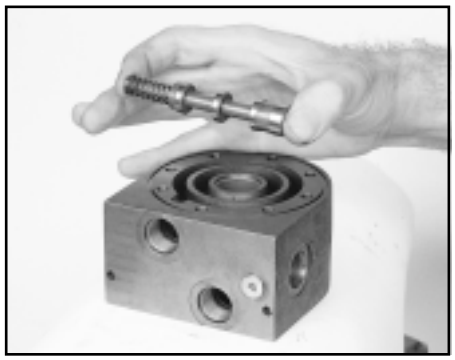

Figure D22

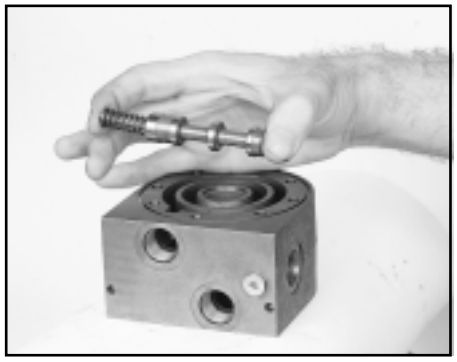

Figure D23

THE DISASSEMBLY OF THE MOTOR IS COMPLETED.

PARTS INSPECTION:

Inspect the shaft for a smooth polish in the bearing and seal areas.

If scratched, polish with fine emery paper in circumferential direction. If pitted, or if scratches are deep, replace shaft and check the rest of the motor for scratches, galling, or contamination damage. Replace parts as needed.

If your motor has a thru shaft option and the seals were leaking, the entire cover must be replaced. Thru covers contain no servicable parts.

Replace all seals and seal rings with new ones each time you reassemble the motor unit. Lubricate all seals and seal rings with oil or clean grease before assembly.

NOTE: Individual seals and seal rings as well as a complete seal kit are available. The parts should be available through most OEM parts distributors or Parker distributors. (Contact your local dealer for availability.)

NOTE: Unless otherwise indicated, do not oil or grease parts before assembly.

Wash all parts in clean petroleum-based solvents before assembly. Blow them dry with compressed air. Remove any paint chips from mating surfaces and from port and sealing areas.

WARNING: Since they are flammable, be extremely careful when using any solvent. Even a small explosion or fire could cause injury of death.

WARNING: Wear eye protection and be sure to comply with OHSA or other maximum air pressure requirements.

PROCEDURE:

1. Assemble the new dust seal flat edge facing in into the flange (12).
2. Assemble the new shaft seal, and place flat side facing out, over the shaft (11) to the shoulder. Insert shaft into flange. Tap shaft end with soft hammer to seat seal. SEE FIGURE A01.

NOTE: With 1" Dia. shafts (2970-X); thrust bearing must now be pressed into the flange with the *copper* side facing inward.

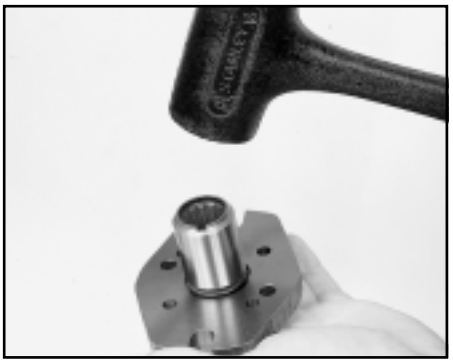

Figure A01

3. Position the center block (9) so the pilot port or solenoid ports are on your right and lock in the vise. SEE FIGURE A02.

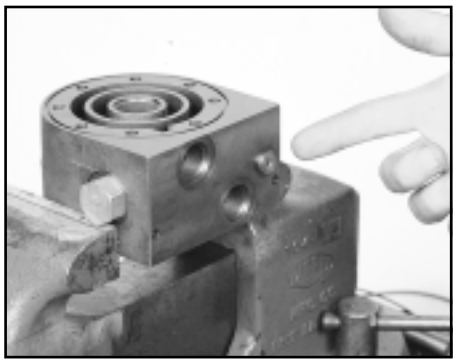

Figure A02

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4. Place the square cut seal (3) in center block seal gland. SEE FIGURE A03.

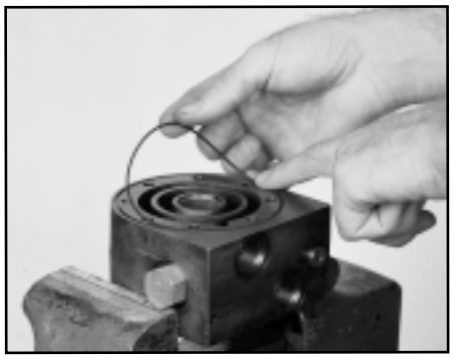

Figure A03

5. Place commutator plate (7) on the center block (9) with the square ring groove facing up. Align the 8 bolt holes in the plate with the 8 tapped holes in the body. (The holes will align in only 1 position). Note: Do not dislodge square ring seal (3) while positioning the commutator plate (7). SEE FIGURE A04

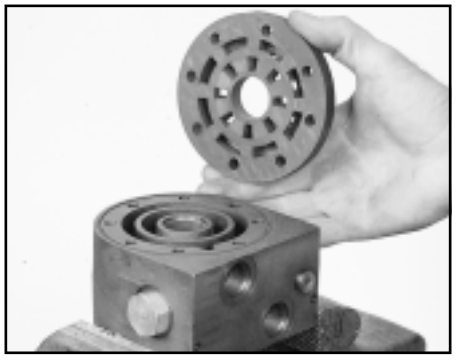

Figure A04

6. Insert the internal shaft through the commutator plate and center block with the spline snap ring groove “up”. Then place the counterbored (at the splines) valve plate on the shaft with the counterbore facing up to accept the snap ring halves (5) in the next step. SEE FIGURE A05

Figure A05

7. Next put both snap ring halves (5) into the snap ring groove on the shaft (6). Hold the snap rings in place with pliers while gently tapping the shaft down, seating the snap rings into the valve plate counterbore SEE FIGURES A06.

Figure A06

8. Place the square cut seal (3) in the commutator plate (7) seal gland. SEE FIGURE A07.

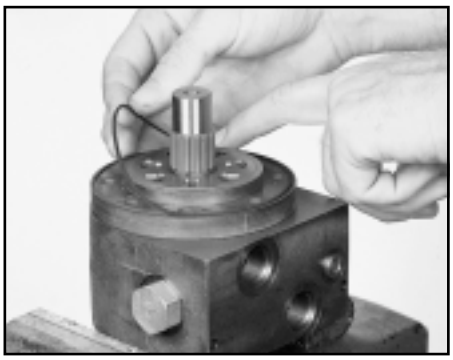

Figure A07

9. Place the inner counterbored side down on the splines so that the semicircular roll pockets are between the rotary valve port windows. Rotate the shaft and align one valve plate window perpendicular to the flat center block port face. Keep this valve/ shaft position to enable proper timing of the motor in step 17. A properly timed motor will help smooth out low speed operation (i.e. 180° out of phase). SEE FIGURE A08.

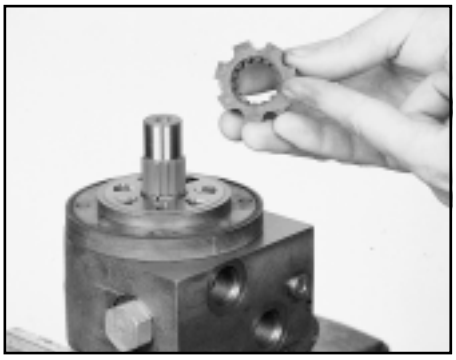

Figure A08

10. Place the outer over the inner and insert the rolls. The rolls should not block the ports in the valve plate. SEE FIGURE A09 Place the check balls (8) on their seats on the commutator plate. (Assembly grease can be used to keep the check balls in place during assembly). SEE FIGURE A10.

Figure A09

11. Place the locating ring over the inner with the square oil return groove up and the check ball counterbores over the check balls. Align the 8 bolt holes with the commutator holes. SEE FIGURE A10.

12. Alternate inserting long and short rollers between the outer and locating ring to match up with 4 dowels in the cover.

NOTE: The difference between rolls and rollers is that rolls have square ends and rollers have a radius on the ends.

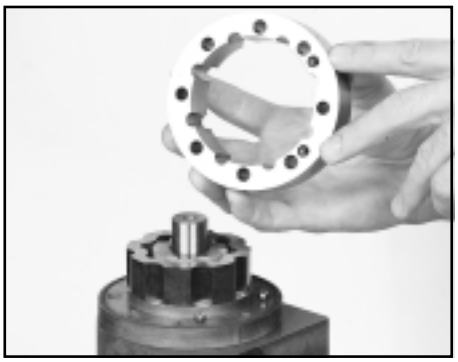

Figure A10

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13. Place o-ring (3) in cover (2) seal groove. (Assembly grease can be used to hold the o-ring in place during assembly). SEE FIGURE A11.

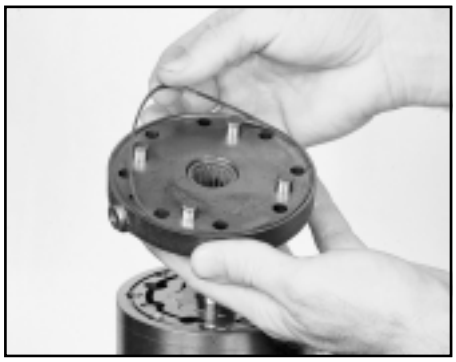

Figure A11

14. Place the cover (2) so the port markings (**IN**)-(**IN**) are lined up with the corresponding ports. Also check the o-ring (3) to verify that it hasn't dropped out. SEE FIGURE A12.

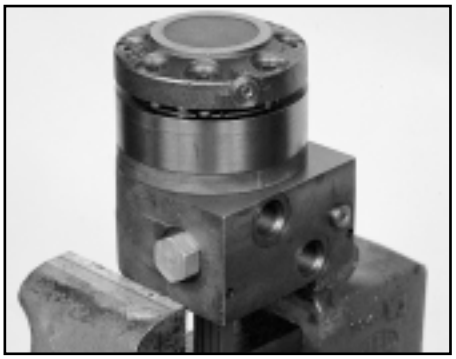

Figure A12

15. Install lubricated bolts (1) and torque diagonally to 15 ft lbs.

    A. Increase torque diagonally 5 foot lbs on each bolt.

    B. Rotate the shaft by hand through several rotations.

    C. Repeat steps A & B until torque is 28 foot lbs.

    SEE FIGURE A13

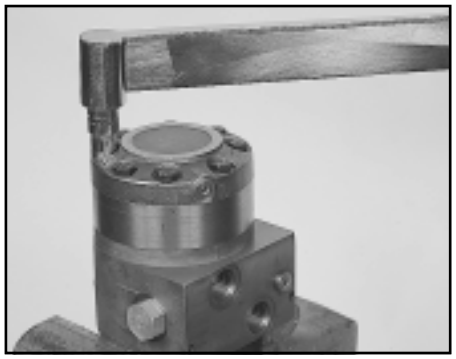

Figure A13

16. Turn motor right side up in the vice and install the o-ring (3) in the center block seal gland. SEE FIGURE A14.

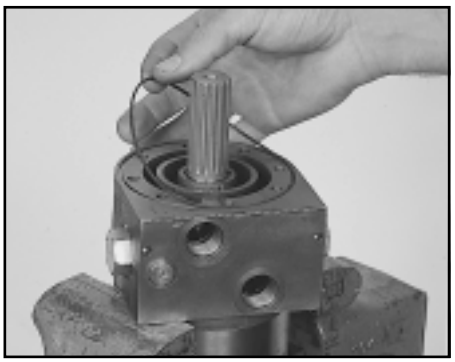

Figure A14

17. Place the commutator plate on the center block with the square ring groove facing up. Align the 8 bolt holes with the 8 tapped holes in the center block. SEE FIGURE A15

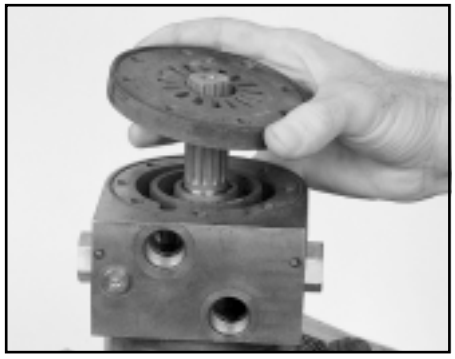

Figure A15

18. With the valve plate windows sharp edge facing the commutator plate, place the valve plate over the splines of the shaft. The plate should be positioned one tooth off the opposite end valve plate when viewing valve plate port timing with respect to the commutator plate. SEE FIGURE A16.

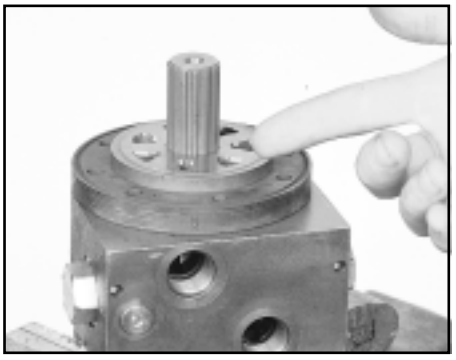

Figure A16

19. Install a o-ring into the grove in the commutator plate. SEE FIGURE A17

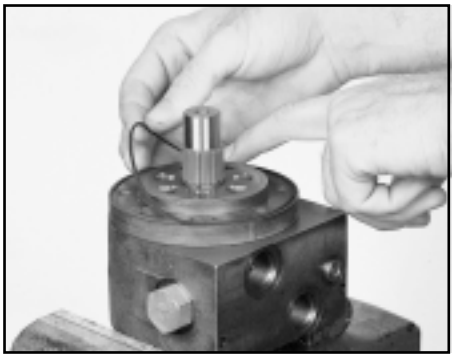

Figure A17

20. Place the inner over the splines of the shaft. Position the inner so the semi-circular roll pockets are between the rotary valve port windows. SEE FIGURE A18.

21. Place the outer over the inner and insert the rolls into the inner pockets.

NOTE: The difference between rolls and rollers is that rolls have square ends and rollers have a radius on the end.

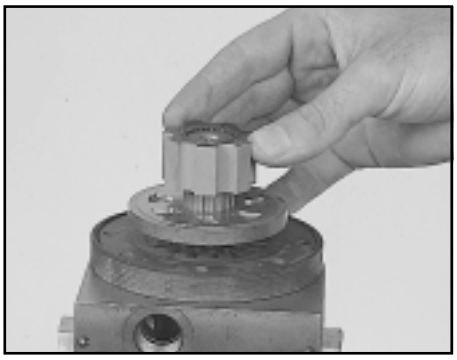

Figure A18

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WARNING: **Do not rotate the locating ring or check balls will drop into bolt holes.**

22. Place the check balls (8) on their seats on the commutator plate. Place the locating ring section onto the commutator plate with the check ball counterbored facing downward over the balls. Align the 8 bolt holes with the commutator holes. Place the rollers in position alternating long and short to match up with the 4 dowels in the front bearing housing (16). SEE FIGURE A19

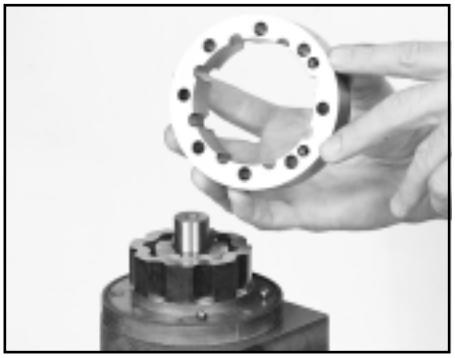

Figure A19

23. Install a o-ring (3) into the groove of the front bearing housing (16). Place the front bearing housing w/ o-ring over the shaft and onto the locating ring. Be sure to align the 4 dowels with the short dowels inside the locating ring and to align the bolt holes with the holes in the locating ring. (bolt hole pattern will only match one way.) SEE FIGURE A20

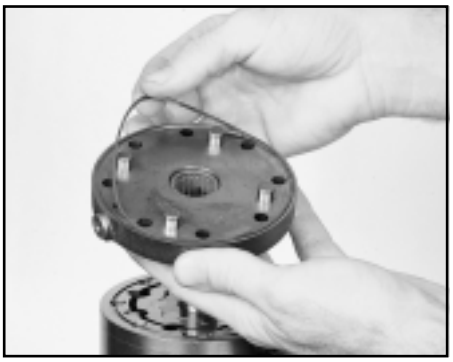

Figure A20

24. Insert o-ring seal (13) into the front bearing housing (16). SEE FIGURE A21.

Figure A21

25. Insert shaft (11). Gently tap in with a soft hammer, rotating the shaft if necessary to align the splines. SEE FIGURE A22

Figure A22

For the 1.25" dia. shaft;

Place the thrust washer (11A) on the shaft and place the thrust bearing (11A) on top of the thrust washer. the Grooves on the bearing washer must face towards the shaft seal. SEE FIGURE A23

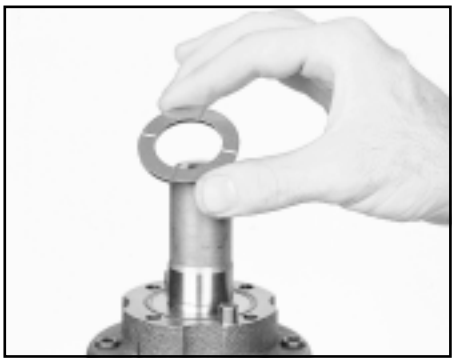

Figure A23

For the 1" dia. shaft;

There is only one thrust washer and it can be assembled either way. The thrust bearing is pressed in the front bearing housing.

26. Install the 8 lubricated bolts and torque diagonally to 15 ft lbs.

    A. Increase torque diagonally 5 foot lbs on each bolt.

    B. Rotate the shaft by hand through several rotations.

    C. Repeat steps A & B until torque is 30 foot lbs.

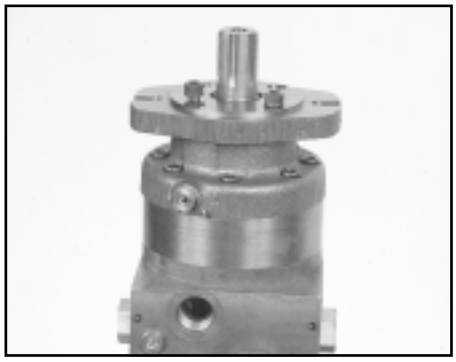

Figure A24

27. Place the flange ( ) with 2 dowels ( ) over the shaft and onto the front bearing housing, align the dowel pins as you install the flange. Lubricate and install the 4 socket head cap screws and torque to 25 lb ft. SEE FIGURE A24.

1. Place 4 check balls (21) on their seats on the center block (9) SEE FIGURE A25.

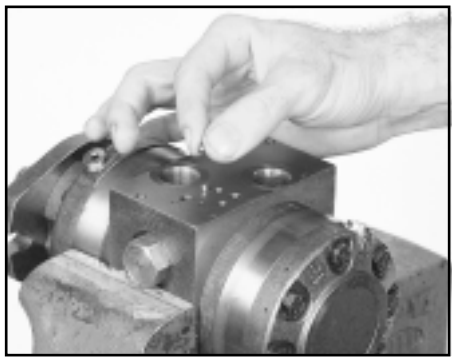

Figure A25

2. Place 5 O-rings (22) in the grooves on the solenoid block (23). SEE FIGURE A26.

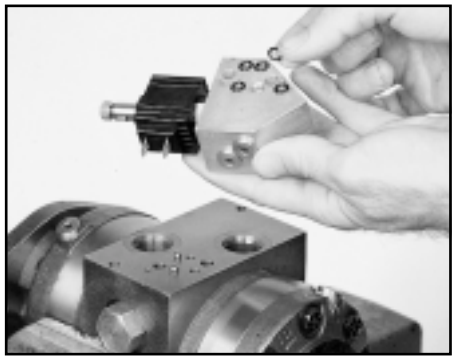

Figure A26

3. Place solenoid valve assembly (23) on the center block, insert bolts and torque to 15 ft lbs. SEE FIGURE A27.

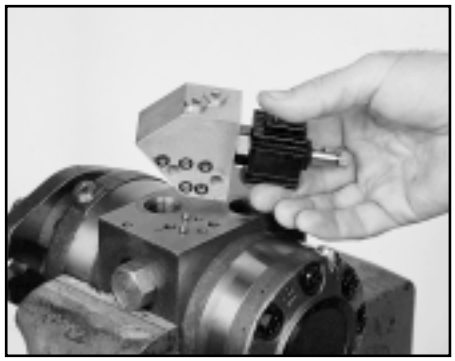

Figure A27

The motor assembly is now complete except for keys, nuts, etc. at the time of installation if applicable. See final checks.

Final Checks

- Pressurize the motor with 100 p.s.i. dry air or nitrogen and submerge in solvent to check for external leaks.
- Port with IN → cast adjacent to the port indicates shaft rotation.
- Check operation of the motor with a test stand.

Hydraulic Fluid

Keep the hydraulic system filled with one of the following:

- Hydraulic fluid as recommended by equipment manufacturer, with viscosity no less than 50 SSU.

CAUTION: **Do not mix oil types. Any mixture, or a non approved oil, could deteriorate the seals. Maintain the proper fluid level in the reservoir. When changing fluid, completely drain old oil from the system. It is suggested also that you flush the system with clean oil, especially if there was a major hydraulic component failure. In addition run the system with no load for a period of time to allow the filters to clean up the oil. Then change the filters before returning the machine to service.**

Filtration

- Recommended filtration: Beta 25 ratio of at least 2.

Oil Temperature

- Maximum operating temperature 180º

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- Adjust fluid level in reservoir as necessary.
- Encourage all operators to report any malfunction or accident that may have damaged the hydraulic system or component.
- Do not attempt to weld any broken motor component. Replace the component with original equipment only.
- Do not cold straighten, or bend any motor part.
- Prevent dirt or other foreign matter from entering the hydraulic system. Clean the area around the filler caps before checking oil level.
- Investigate and correct any external leak in the hydraulic system, no matter how minor.
- Comply with manufacturer's specifications for cleaning or replacing the filter.

CAUTION: Do not strike or drop the motor on the shaft end. This will cause internal damage.

CAUTION: Do not weld, braze, solder, or in any way alter any motor component.

CAUTION: Maximum operating pressure must not exceed recommended motor pressure capacity.

CAUTION: Always carefully inspect any system component that may have been struck or damaged during operation or in an accident. Replace any component that is damaged or that is questionable.

CAUTION: Do not force any coupling onto the motor coupling shaft as this could damage the unit internally.

Parker Hannifin Corp. extends close technical cooperation and assistance. If problems occur which you cannot solve, please contact our Parker Technical Service Representative or local Parker Distributor. See the back cover of this manual for our address, phone and fax numbers.