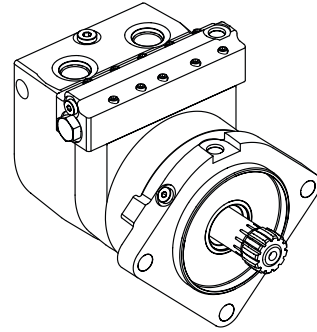
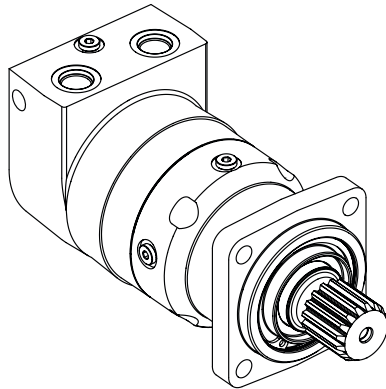


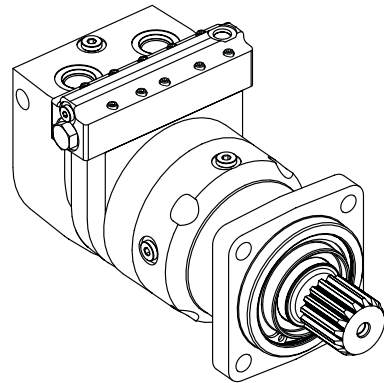
189-XXXX-003
(Single Speed Bearingless Motor)



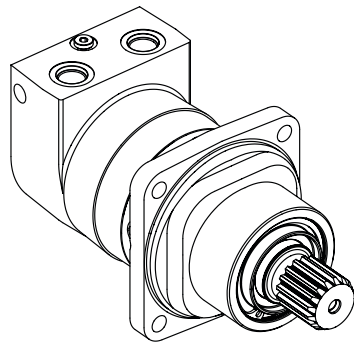
192-XXXX-003
(Two Speed Bearingless Motor)



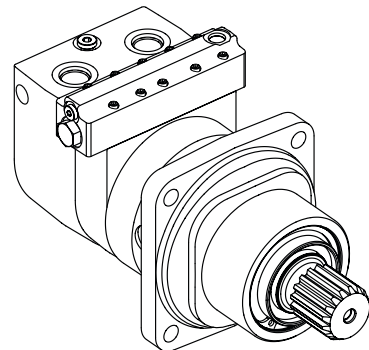
187-XXXX-003
(Single Speed Standard Mount Motor)



190-XXXX-003
(Two Speed Standard Mount Motor)



188-XXXX-003
(Single Speed Wheel Mount Motor)



191-XXXX-003
(Two Speed Wheel Mount Motor)

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Bearingless motors

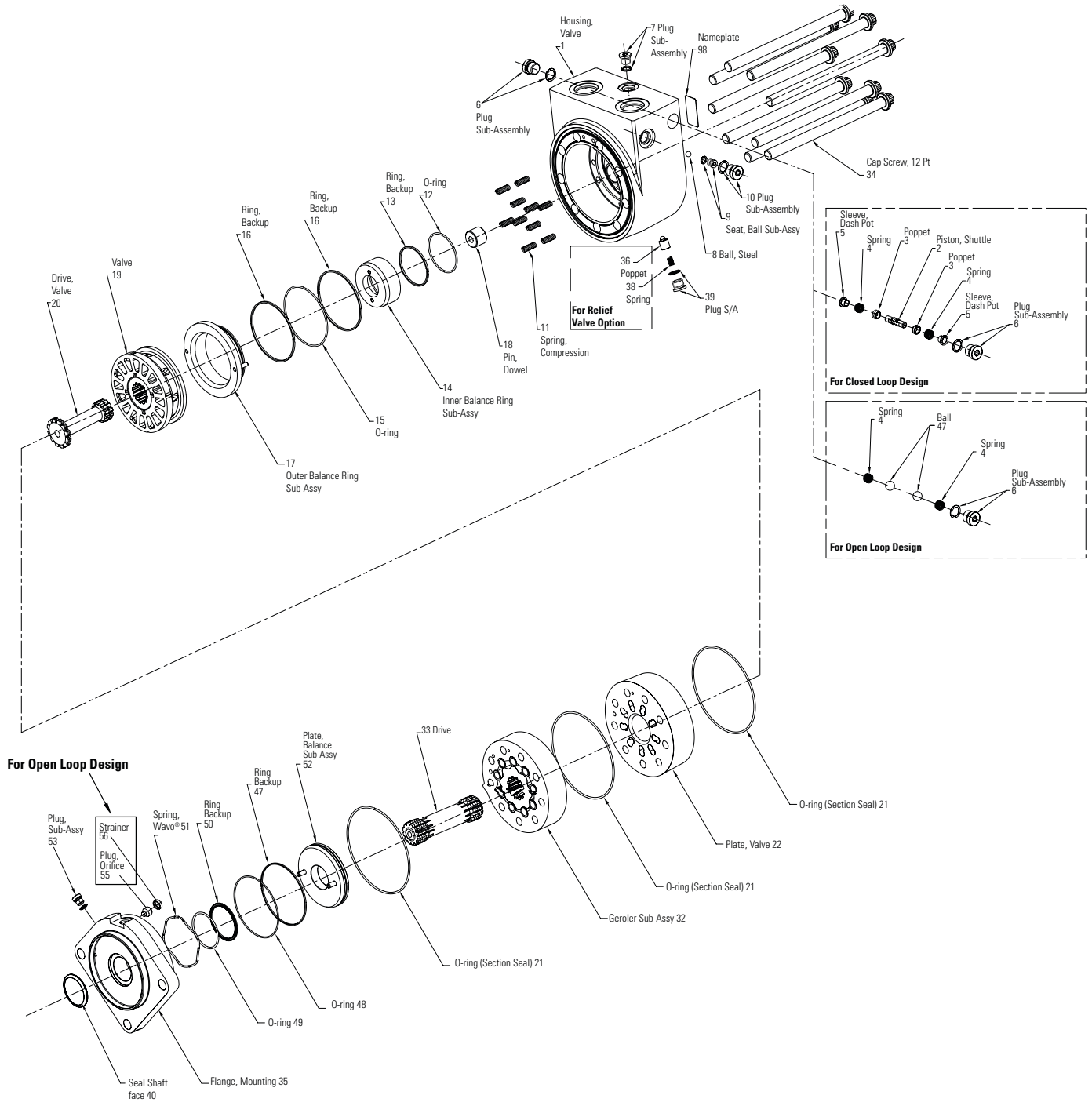
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Standard and wheel motor

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Exploded View

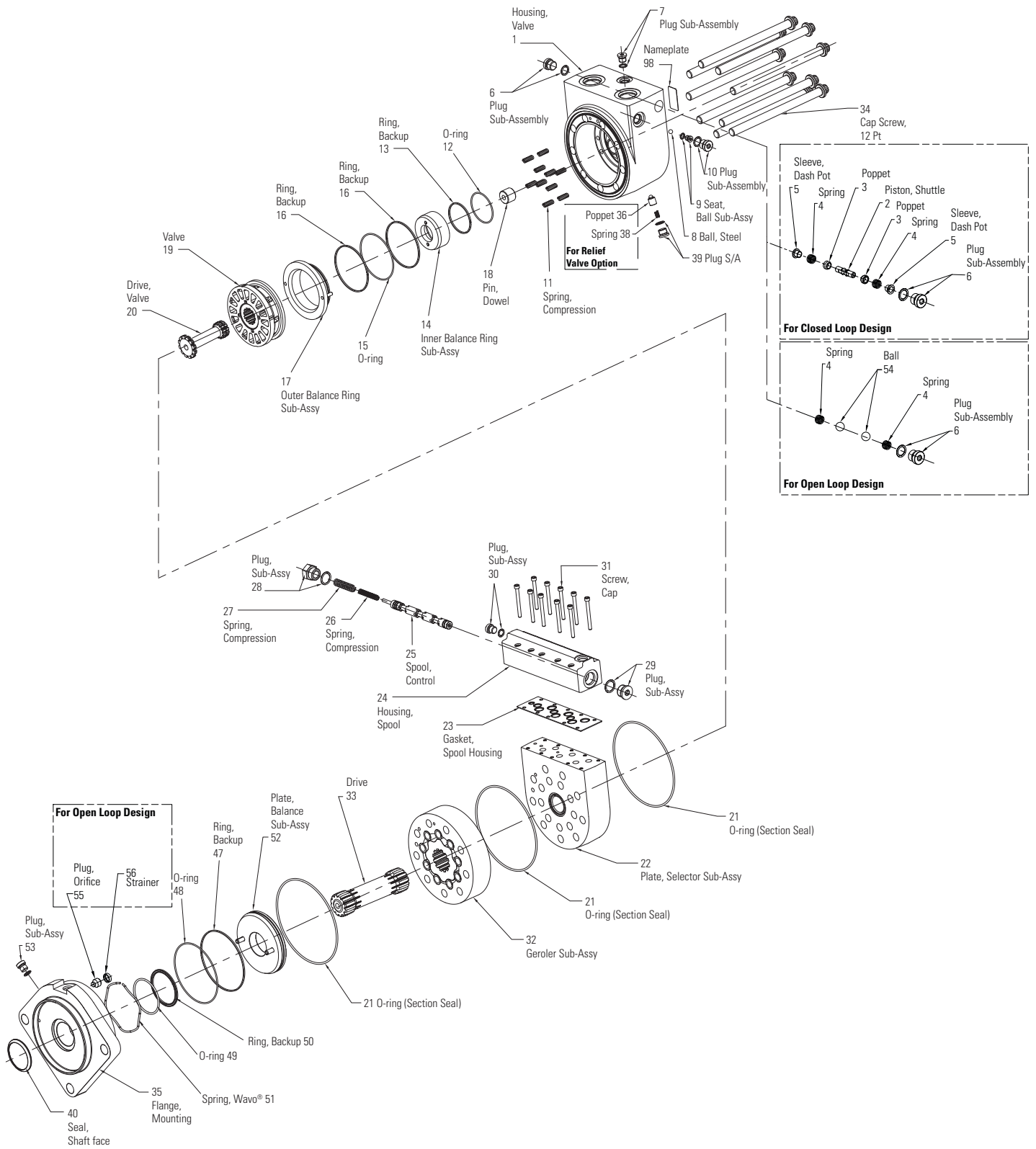
(Single Speed - Bearingless Motor)



Wavo® is a registered trademark of Smalley Steel Ring Company

Exploded View

(Two Speed - Bearingless Motor)



Part List

(Single Speed - Bearingless Motor)

Item Description

Ref No.	Part No.	Description	Quantity
1	6033992-001	Housing, Valve 1.0625-12 UN-2B SAE O-Ring Ports (2)	1
	6033992-002	Housing, Valve 1.3125-12 UN-2B SAE O-Ring Ports (2)	1
	6033992-003	Housing, Valve G 1 BSP Straight Thread Ports	1
2	201494-002	Piston, Shuttle	1
3	8567-000	Poppet	2
4	230079-000	Spring	2
5	112126-001	Sleeve, Dash Pot	2
6	9266-006	Plug Sub-Assembly	2
X	250003-906	O-ring	2
7	9266-006	Plug Sub-Assembly	1
X	250003-906	O-ring	1
8	18026-000	Ball, Steel	1
9	5992342-001	Seat, Ball Sub-Assy	1
X	250003-902	O-ring	1
10	9266-006	Plug Sub-Assembly	1
X	250003-906	O-ring	1
11	6203-000	Spring, Compression	10
X 12	14502-032	O-ring	1
X 13	5989483-001	Ring, Backup	1
14	5991782-001	Inner Balance Ring Sub-Assy	1
	268009-005	Pin, Roll	2
X 15	14502-040	O-ring	1
X 16	5989483-002	Ring, Backup	2
17	5991783-001	Outer Balance Ring Sub-Assy	1
	268009-005	Pin, Roll	2
18	5987800-001	Pin, Dowel	1
19	6030354-001	Valve	1
20	6030970-001	Drive, Valve	1
X 21	250002-161	O-ring (Section Seal)	3
22	5989335-001	Plate, Valve	1
32	*	Geroler Sub-Assy	1
33	*	Drive, Main	1
34	*	Cap Screw, 12 PT	9
35	6033986-001	Flange, Mounting Shuttle Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Mounting Flange	1
	6033986-002	Flange, Mounting Check Valve With Orifice Plug, 5625-18 UNF-2B SAE O-Ring Case drain Port In Valve Housing	1
36	113538-001	Poppet (for relief valve unit only)	1
38	113186-001	Spring (for relief valve unit only)	1
39	9072-004	Plug Sub-Assembly	1
	250003-905	O-ring	1
X 40	9080-001	Seal, Shaft Face	1
X 47	5989483-004	Ring, backup	1
X 48	112530-044	O-ring	1
X 49	112530-139	O-ring	1

Part List

(Single Speed - Bearingless Motor)

Item Description

Ref No.	Part No.	Description	Quantity
X 50	14649-004	Ring, backup	1
	51	Spring, Wavo®	1
	52	6035183-001 5993989-005 16026-609	1 1 2
	53	9072-004 250003-905	1 1
X	54	285020-140	2
X 55	9289-001 9289-004	Plug, Orifice (For Open Loop Design Only) Plug, W/O Orifice (For Close Loop Design Only)	1 1
X 56	31500-452 9901191-000	Strainer (For Open Loop Design Only) Seal Kit - Contains Parts Indicated by X	1
	59	6039391-001	1

* = See Chart

A/R = As Required

Part List

(Single Speed - Bearingless Motor)

Displacement	Ref. No. 32	Width	Ref. No. 33	Length	Ref. No. 34	Length
cm ³ /r [in ³ /r]	Geroler	mm [inch]	Drive	mm [inch]	Cap Screw	mm [inch]
343.8 [20.98]	6033989-001	32,1 [1.26]	5992182-001	130,4 [5.13]	114154-016	177,0 [6.97]
400.0 [24.40]	6033989-002	37,3 [1.47]	5992182-002	135,7 [5.34]	114154-021	182,6 [7.19]
434.2 [26.50]	6033989-006	40,6 [1.60]	5992182-006	138,9 [5.47]	114154-025	185,2 [7.29]
479.5 [29.26]	6033989-003	44,7 [1.76]	5992182-003	143,1 [5.63]	114154-026	190,5 [7.50]
677.3 [41.33]	6033989-007	63,2 [2.49]	5992182-008	161,2 [6.35]	114154-032	208,5 [8.21]

Part List

(Two Speed - Bearingless Motor)

Item description

Ref No.	Part No.	Description	Quantity
1	6033992-001	Housing, Valve 1.0625-12 UN-2B SAE O-Ring Ports (2)	1
	6033992-002	Housing, Valve 1.3125-12 UN-2B SAE O-Ring Ports (2)	1
	6033992-003	Housing, Valve G 1 BSP Straight Thread Ports	1
2	201494-002	Piston, Shuttle	1
3	8567-000	Poppet	2
4	230079-000	Spring	2
5	112126-001	Sleeve, Dash Pot	2
6	9266-006	Plug Sub-Assembly	2
X	250003-906	O-ring	2
7	9266-006	Plug Sub-Assembly	1
X	250003-906	O-ring	1
8	18026-000	Ball, Steel	1
9	5992342-001	Seat, Ball Sub-Assy	1
X	250003-902	O-ring	1
10	9266-006	Plug Sub-Assembly	1
X	250003-906	O-ring	1
11	6203-000	Spring, Compression	10
X	14502-032	O-ring	1
X	5989483-001	Ring, Backup	1
14	5991782-001	Inner Balance Ring Sub-Assy	1
	268009-005	Pin, Roll	2
X	14502-040	O-ring	1
X	5989483-002	Ring, Backup	2
17	5991783-001	Outer Balance Ring Sub-Assy	1
	268009-005	Pin, Roll	2
18	5987800-001	Pin, Dowel	1
19	6030354-001	Valve	1
20	6030970-001	Drive, Valve	1
X	250002-161	O-ring (Section Seal)	3
22	5991781-001	Plate, Selector Sub-Assy	1
	5989384-001	Insert, Sleeve	1
X	6028001-002	Gasket, Spool Housing	1
24	5989326-002	Housing, Spool	1
25	112850-002	Spool, Control	1
26	112211-001	Spring, Compression	1
27	114587-001	Spring, Compression	1
28	9151-002	Plug Sub-Assembly	1
X	250003-908	O-ring	1
29	9072-006	Plug Sub-Assembly	1
X	250003-908	O-ring	1
30	9266-003	Plug Sub-Assembly	1
X	250003-904	O-ring	1
31	16148-320	Screw, Cap	10
32	*	Geroler Sub-Assy	1
33	*	Drive, Main	1
34	*	Cap Screw, 12 PT	9

Part List

(Two Speed - Bearingless Motor)

Item description

Ref No.	Part No.	Description	Quantity	
35	6033986-001	Flange, Mounting Shuttle Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Mounting Flange	1	
	6033986-002	Flange, Mounting Check Valve With Orifice Plug, .5625-18 UNF-2B SAE O-Ring Case drain Port In Valve Housing	1	
36	113538-001	Poppet (for relief valve unit only)	1	
38	113186-001	Spring (for relief valve unit only)	1	
39	9072-004	Plug Sub-Assembly	1	
X	250003-905	O-ring	1	
X	40	9080-001	Seal, Shaft Face	1
X	47	5989483-004	Ring, Backup	1
X	48	112530-044	O-ring	1
X	49	112530-139	O-ring	1
X	50	14649-004	Ring, Backup	1
51	6023120-001	Spring, Wavo®	1	
52	6035183-001	Plate, balance sub-assy	1	
	5993989-005	Balance plate	1	
	16026-609	Pin, roll	2	
53	9072-004	Plug Sub-Assembly	1	
X	250003-905	O-ring	1	
54	285020-140	Ball (for open loop design only)	2	
X	9289-001	Plug, Orifice (For Open Loop Design Only)	1	
	9289-004	Plug, W/O Orifice (For Close Loop Design Only)		
X	56	31500-452	Strainer (for open loop design only)	1
	9901148-000	Seal Kit Contains Parts Indicated by X		
59	6039391-001	Extreme duty seal (For Seal Option - Extreme Duty Seal Guard Only)	1	

* = See Chart

A/R = As Required

Displacement	Ref. No. 32	Width	Ref. No. 33	Length	Ref. No. 34	Length
cm ³ /r [in ³ /r]	Geroler	mm [inch]	Drive	mm [inch]	Cap Screw	mm [inch]
343.8 [20.98]	6033989-001	32,1 [1.26]	5992182-001	130,4 [5.13]	114154-016	177,0 [6.97]
400.0 [24.40]	6033989-002	37,3 [1.47]	5992182-002	135,7 [5.34]	114154-021	182,6 [7.19]
434.2 [26.50]	6033989-006	40,6 [1.60]	5992182-006	138,9 [5.47]	114154-025	185,2 [7.29]
479.5 [29.26]	6033989-003	44,7 [1.76]	5992182-003	143,1 [5.63]	114154-026	190,5 [7.50]
677.3 [41.33]	6033989-007	63,2 [2.49]	5992182-008	161,2 [6.35]	114154-032	208,5 [8.21]

Disassembly

(Single and Two speed Bearingless Motor)

Tools required

- 7/32 inch Hex Key (Relief Valve Plug)
- 1/4 inch Hex Key (Shuttle Valve Plug)
- 5/16 inch Hex Key (Spool Housing Plug)
- 5/32 inch Hex Key (Spool Housing Screw, Cap)
- 7/8 Socket
- 9/16 Socket (12 Point Drive)
- Torque wrench - 142 Nm [1260 lb-in] capacity

3.0 Disassembly

- 3.0.1 Cleanliness is extremely important when repairing hydraulic motors. Work in a clean area. Before disconnecting the hydraulic motor thoroughly clean the exterior. Remove motor from application and drain the oil from the motor before disassembly.
- 3.0.2 Remove the 9 cap screws and disassemble the motor in the vertical position as shown in Figure 1A & 1B.
- 3.0.3 Remove shuttle valve (and relief valve if applicable) from Valve Housing.
- 3.0.4 Check all mating surfaces. To reduce the chance of leakage, replace any parts that have scratches or burrs. Wash all metal parts in clean solvent. Blow them dry with pressurized air. Do not wipe parts dry with paper towels or cloth as lint in a hydraulic system will cause damage.

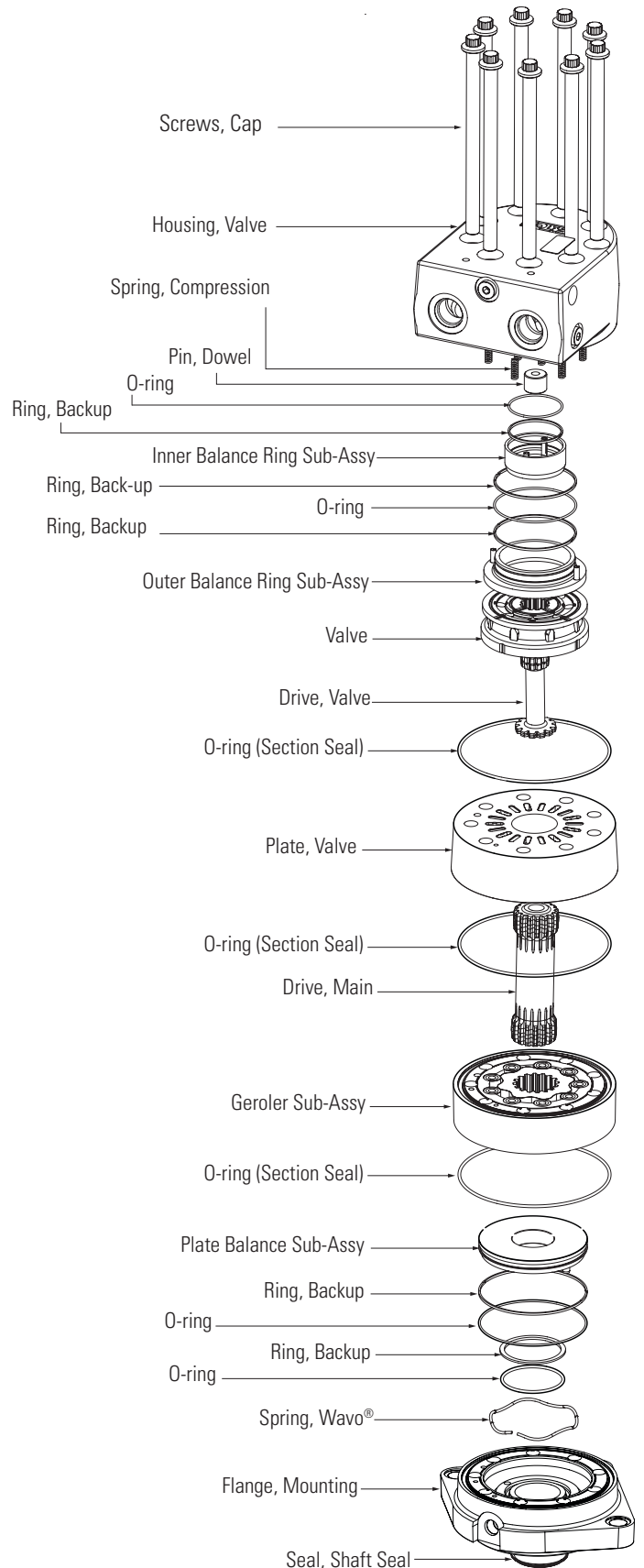


Figure 1A
(Single Bearingless Motor)

Disassembly

(Single and Two Speed Bearingless Motor)

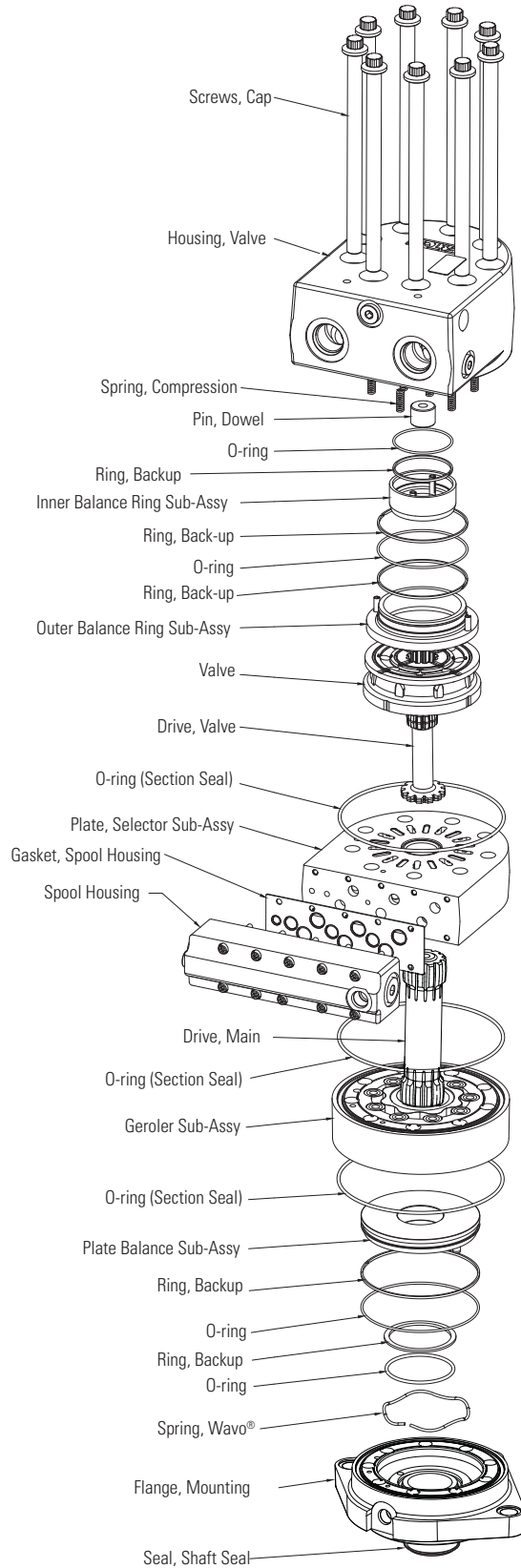


Figure 1B
(Two Speed Bearingless Motor)

Reassembly

(Single and Two Speed Bearingless Motor)

Note: Always use new seals when reassembling hydraulic motors. Refer to parts list for seal kit number and replacement parts.

Important: During reassembly, lubricate the new seals with a petroleum jelly such as Vaseline®. Also lubricate machined surfaces with clean hydraulic fluid.

4.0 Valve housing assembly

- 4.0.1 Install one poppet, spring, dash pot and threaded internal hex plug with O-ring into shuttle valve bore from one end of Valve Housing.
- 4.0.2 Install shuttle piston from opposite end of shuttle valve cavity.
- 4.0.3 Install one shuttle valve poppet, spring, dash pot onto piston and threaded internal hex plug with O-ring from opposite end of shuttle valve cavity.
- 4.0.4 Shuttle plug threads may have light coat of oil or

preservative. Torque both plugs to 360 +/- 36 lbf-in.

- 4.0.5 For a motor with open loop design, Install Ball, Spring and threaded internal hex plug with O-ring form one end of cavity. And then install another Ball, Spring and threaded internal hex plug with O-ring from opposite end of cavity. Torque both plugs to 360 +/- 36 lbf-in. Plugs may have light coat of oil or preservative.
- 4.0.6 For a motor with low pressure relief valve, install poppet, spring and plug. Plug threads may have light coat of oil or preservative. Torque plug to 180 +/- 18 lb-in.
- 4.0.7 For a motor without low-pressure relief valve, Install and torque plug to 180 ± 18 lbf-in. Plug may have light coat of oil or preservative.
- 4.0.8 Install ball and seat ball sub-assembly. Torque seat to 60 +/- 6 lbf-in. Install plug sub-assembly and torque to 360 +/- 36 lbf-in.

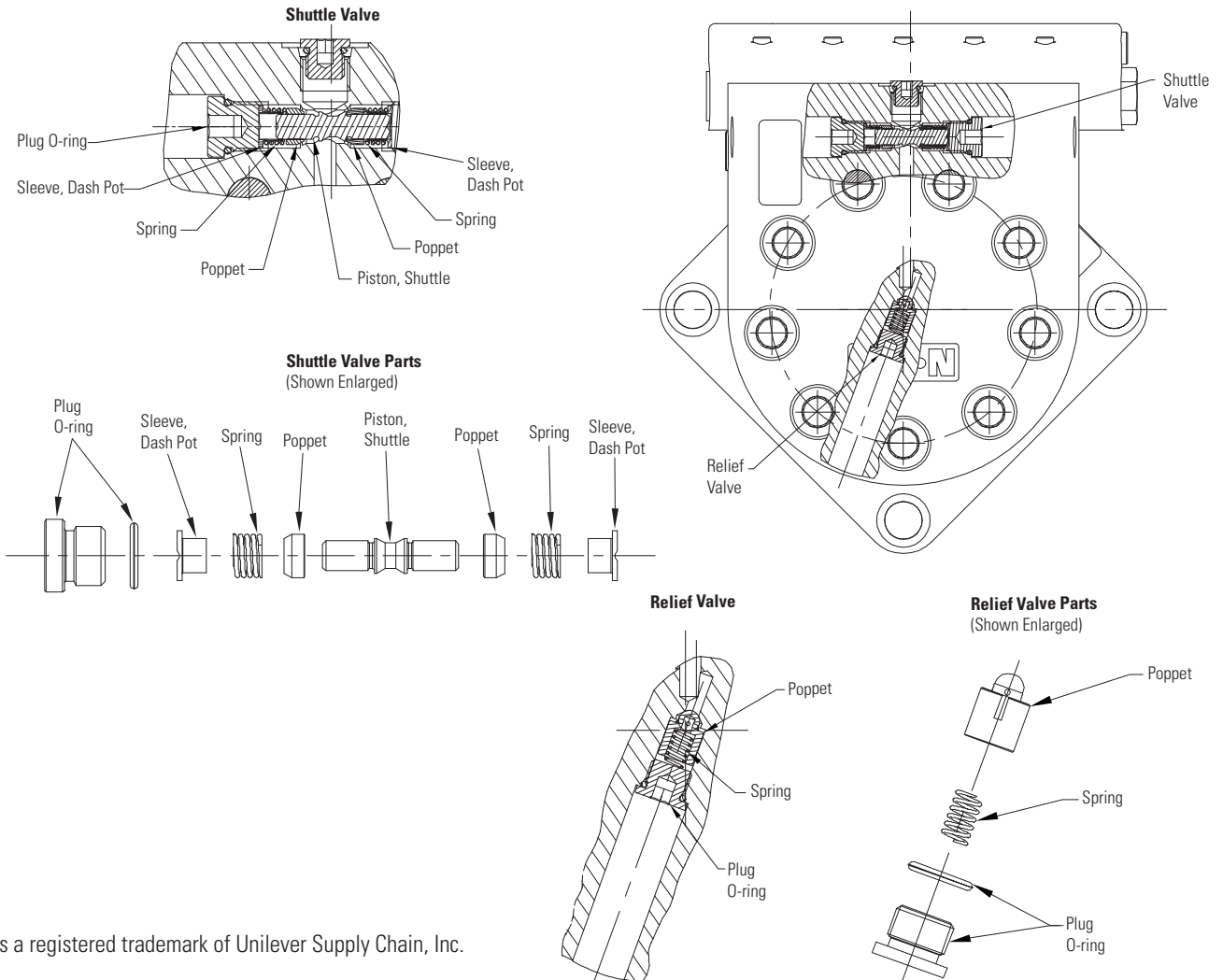


Figure 2

Vaseline® is a registered trademark of Unilever Supply Chain, Inc.

Reassembly

(Single and Two Speed Bearingless Motor)

4.1 Outer balance ring assembly

- 4.1.1 Install one backup ring (75,1 [2.96] OD), then one O-ring (72,7 [2.86] ID) followed by one backup ring (75,1 [2.96] OD) into the O-ring groove in the outer balance ring. Seals and backups are to be greased. Ensure splits in backup rings are mated correctly. Location of splits in backup rings should not be aligned, a minimum of 90 degrees of separation is recommended.
- 4.1.2 Install one O-ring (47,3 [1.86] ID) then one backup ring (48,6 [1.91] OD) into the inner balance ring groove, located in the valve housing. Seal and backup are to be greased. Ensure split in backup ring is mated correctly.
- 4.1.3 Grease dowel pin and install in valve housing.
- 4.1.4 Install 10 balance ring springs in valve housing.
- 4.1.5 Install inner and outer balance ring sub-assemblies into valve housing. Ensure O-rings seals are seated.
- 4.1.6 Install greased O-ring section seal (139,4 [5.49] ID) in valve housing O-ring groove.

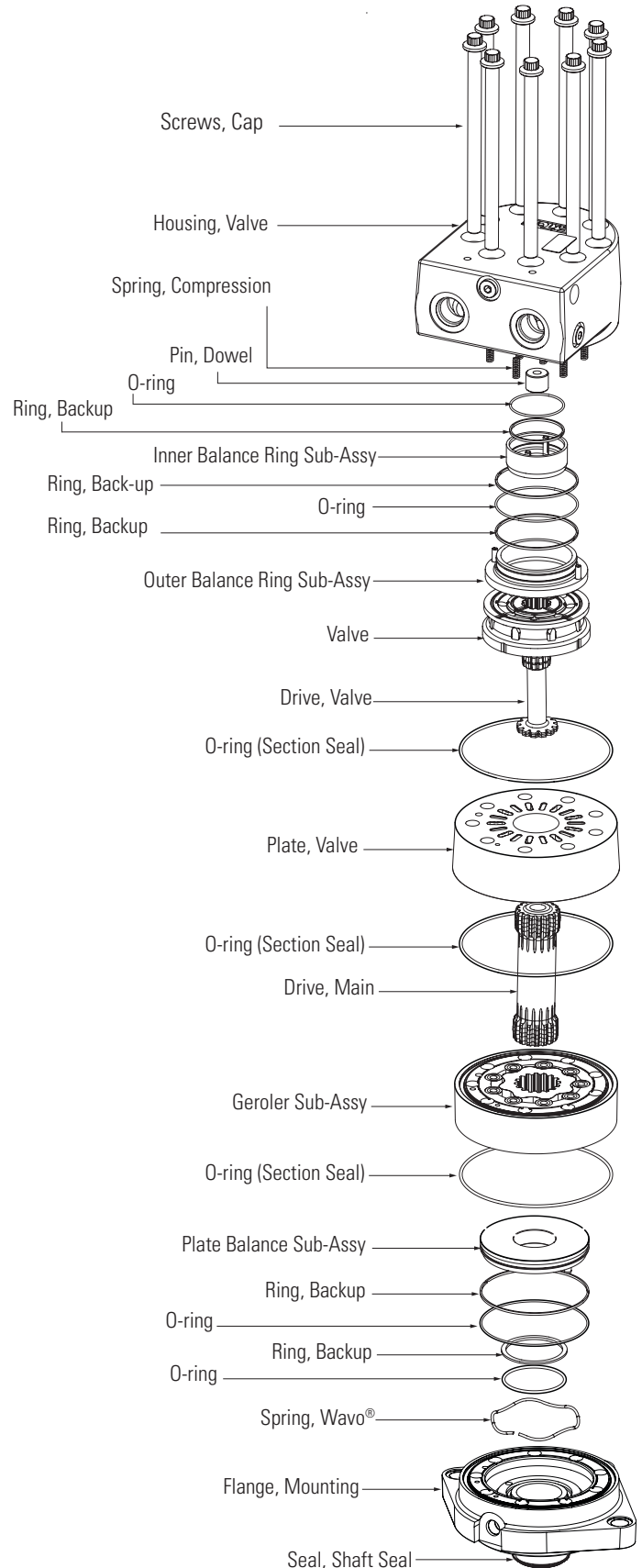


Figure 3A
(Single Speed Bearingless Motor)

Reassembly

(Single and Two Speed Bearingless Motor)

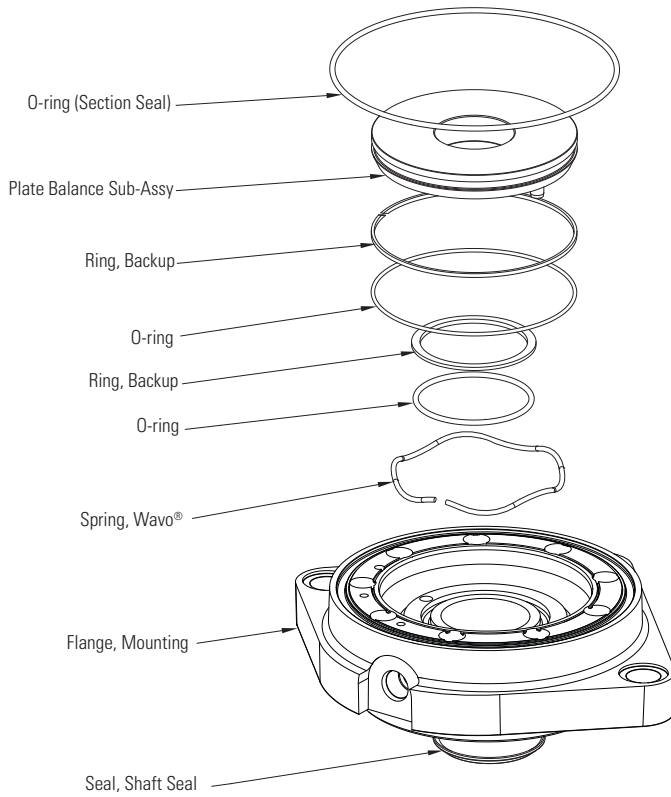


Figure 4
(Bearingless Motor Flange Assembly)

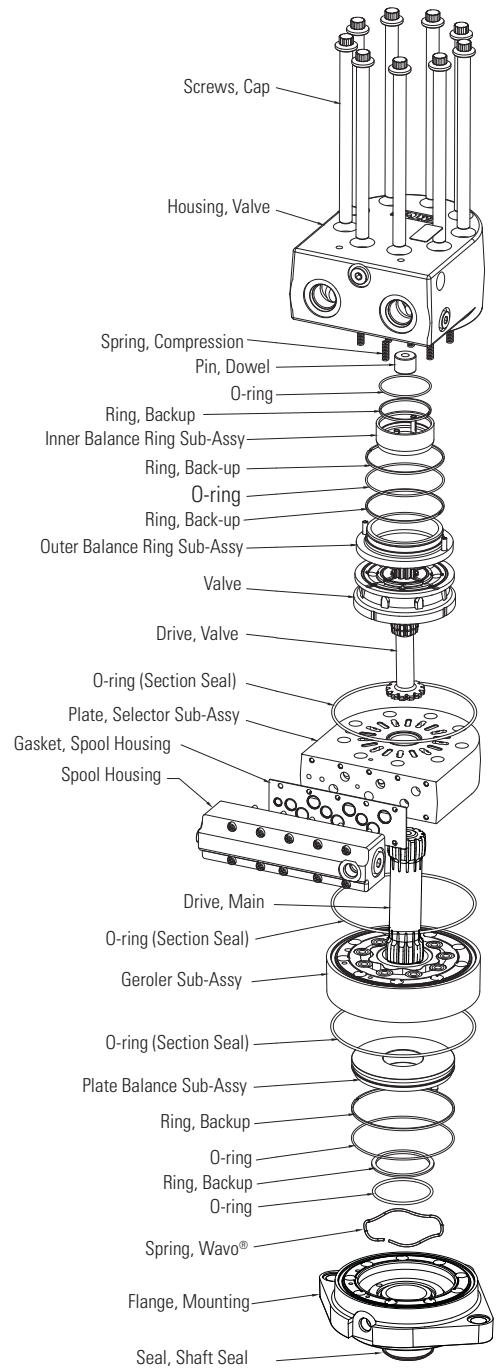


Figure 3B
(Two Speed Bearingless Motor)

Reassembly

(Single and Two Speed Bearingless Motor)

4.2 Flange assembly (For single speed bearingless motor)

- 4.2.1 Position flange on workbench with the O-ring grooves face down and install face seal (54,1 [2.13] OD).
- 4.2.2 With mounting flange O-ring grooves up (see Figure 4), install O-ring section seal (139,4 [5.49] ID) into flange. Install back-up ring (62,1 [2.45] OD) over O-ring (55,2 [2.18] ID) with flat side up. Back-up ring and O-rings may be greased to assist in retaining parts.
- 4.2.3 Install spring in groove in mounting flange.
- 4.2.4 Install back-up ring (99,7 [3.93] OD) in grooves of balance plate sub assembly and then install O-ring (95,0 [3.74] ID) over back-up ring from tapered side.
- 4.2.5 Install balance plate sub assembly in mounting flange with tapered side down.
- 4.2.6 Install the Plug, Orifice and then Strainer as shown in Fig 5 for Open Loop Configuration only

4.3 Final assembly (For single speed bearingless motor)

- 4.3.1 Place drive in build fixture. Place mounting flange (seal grooves up) over drive.
- 4.3.2 Place Geroler assembly (seal groove up) over mounting flange. Install greased O-ring section seal (139,4 [5.49] ID) in seal groove of Geroler assembly. Align shuttle flow hole of Geroler with shuttle flow hole of mounting flange.
- 4.3.3 Mark drive teeth that align (See Figure A) with dykem pen. Install valve drive into internal star spline (See Figure B or C for motor timing).
- 4.3.4 Install valve plate onto Geroler sub-assembly (valve plate valve slots up). Align shuttle flow hole of valve plate with shuttle flow hole of Geroler sub-assembly.
- 4.3.5 Install valve onto valve drive and selector plate assembly. Ensure long leakage groove is aligned with marked tooth on valve drive (see Figure D).
- 4.3.6 Carefully invert valve housing and place onto valve plate. Make sure that shuttle flow holes are aligned.
- 4.3.7 Install nine cap screws lubricated with DTE-26. Pre-torque each in a crisscross pattern (see Figure 7) to 80+/-10 lb-ft. Finally, in a crisscross pattern, tighten screws to 105+/-5 lb-ft.

4.4 Flange assembly (For two speed bearingless motor)

- 4.4.1 Position flange on workbench with the O-ring grooves face down and install face seal (54,1[2.13] OD).

- 4.4.2 With mounting flange O-ring grooves up (see Figure 4), install O-ring section seal (139,4 [5.49] ID) into flange. Install back-up ring (62,1 [2.45] OD) over O-ring (55,2 [2.18] ID) with flat side up. Back-up ring and O-rings may be greased to assist in retaining parts.
- 4.4.3 Install spring in groove in mounting flange.
- 4.4.4 Install back-up ring (99,7 [3.93] OD) in grooves of balance plate sub assembly and then install O-ring (95,0 [3.74] ID) over back-up ring from tapered side.
- 4.4.5 Install balance plate sub assembly in mounting flange with tapered side down.
- 4.4.6 Install the Plug, Orifice and then Strainer as shown in Fig 5 for Open Loop Configuration only

4.5 Spool housing assembly (For two speed bearingless motor)

- 4.5.1 Install control spool into spool housing by first lubricating control spool with DTE26. Install control spool into spool bore, verifying that the control spool moves freely in bore.
- 4.5.2 Install nested springs and counter bored plug into end of spool housing spool bore. Plug may have light coat of oil or preservative. Torque plug to 46 +/-2 lbf-ft.
- 4.5.3 Install plug in opposite end of spool bore. Plug may have light coat of oil or preservative. Torque plug to 46 +/-2 lbf-ft.
- 4.5.4 Install plug into spool housing port and torque to 192 +/- 19 lbf-in.

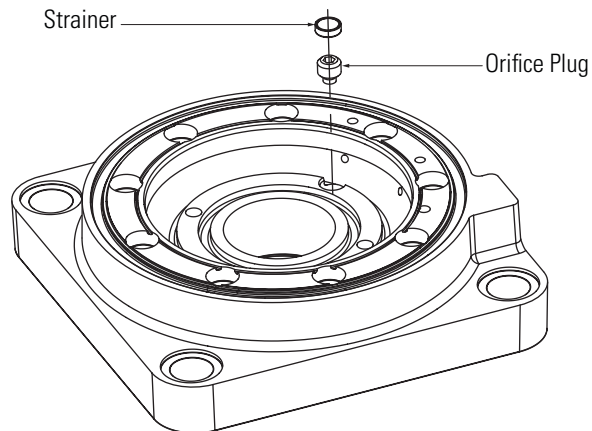


Figure 5

Reassembly

(Single and Two Speed Bearingless Motor)

4.6 Selector plate assembly (For two speed bearingless motor)

4.6.1 Apply 1 drop of Loctite® 290 in all 10 screw holes in the selector plate while ensuring that no air is trapped underneath the droplet. Install the gasket onto the selector plate. Place the spool housing assembly onto the gasket. Install and torque each of the 10 screws starting in the middle working outwards using the sequence in Figure 6. Torque each screw to 70 +/- 8 lbf-in.

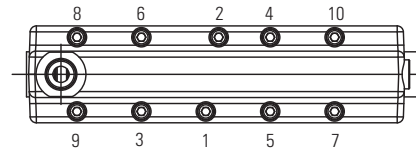


Figure 6

4.7 Final assembly (For two speed bearingless motor)

- 4.7.1 Place drive in build fixture. Place mounting flange (seal grooves up) over drive.
- 4.7.2 Place Geroler assembly (seal groove up) over mounting flange. Install greased O-ring section seal (139,4 [5.49] ID) in seal groove of Geroler assembly. Align shuttle flow hole of Geroler with shuttle flow hole of mounting flange.
- 4.7.3 Mark drive teeth that align (See Figure A) with dykem pen. Install valve drive into internal star spline (See Figure B or C for motor timing).
- 4.7.4 Install selector plate onto Geroler sub-assembly (selector plate valve slots up). Align shuttle flow hole of selector plate with shuttle flow hole of Geroler sub-assembly.
- 4.7.5 Install valve onto valve drive and selector plate assembly. Ensure long leakage groove is aligned with marked tooth on valve drive (see Figure D).
- 4.7.6 Carefully invert valve housing and place onto selector plate. Make sure that shuttle flow holes are aligned.
- 4.7.7 Install nine cap screws lubricated with DTE-26. Pre-torque each in a crisscross pattern (see Figure 7) to 80 +/- 10 lb-ft. Finally, in a crisscross pattern, tighten screws to 105 +/- 5 lb-ft.

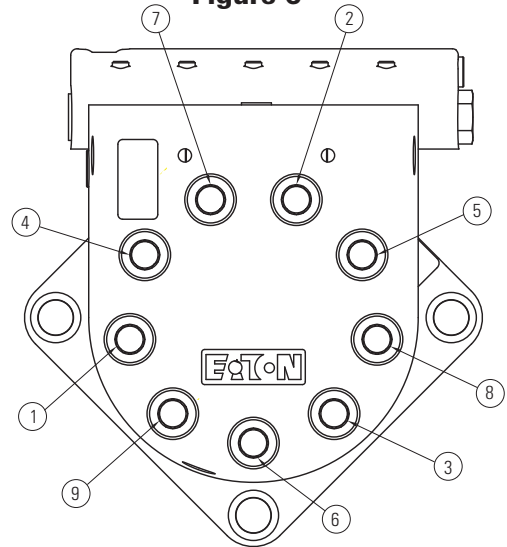


Figure 7

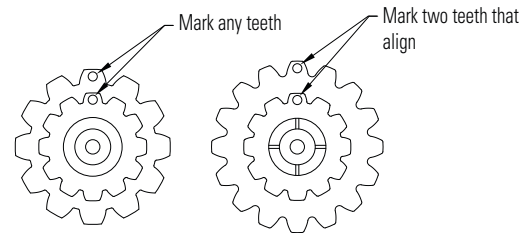


Figure A (Mark aligning teeth)

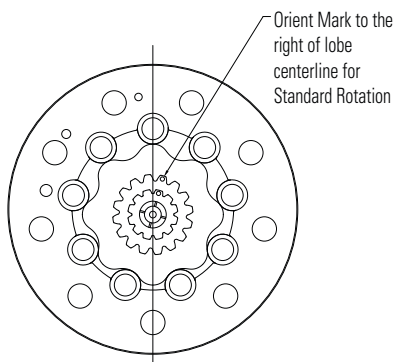


Figure B (Timing - Standard Rotation)

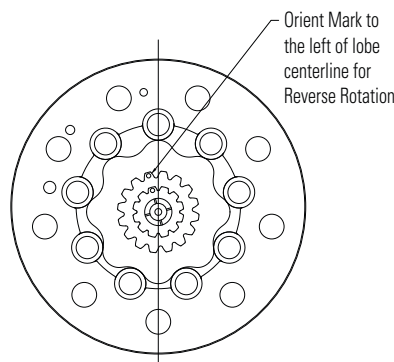


Figure C (Timing - Reverse Rotation)

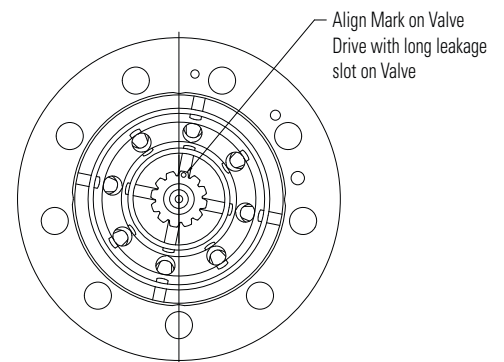


Figure D (Valve Orientation)

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How to order replacement parts

(Single and Two Speed Bearingless Motor)

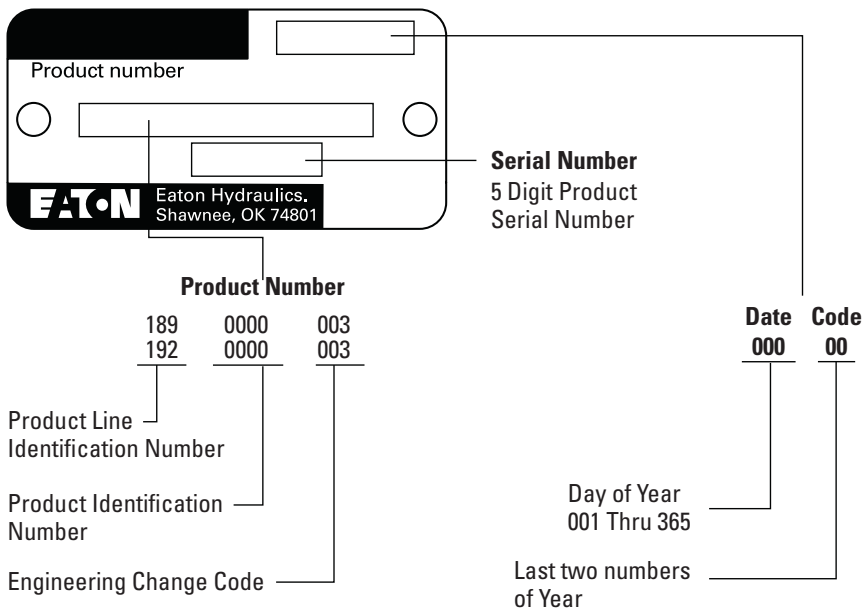
Each order must include the following:

- Product Number
- Date Code
- Part Name
- Part Number
- Quantity of Parts

For more detailed information,
please contact:

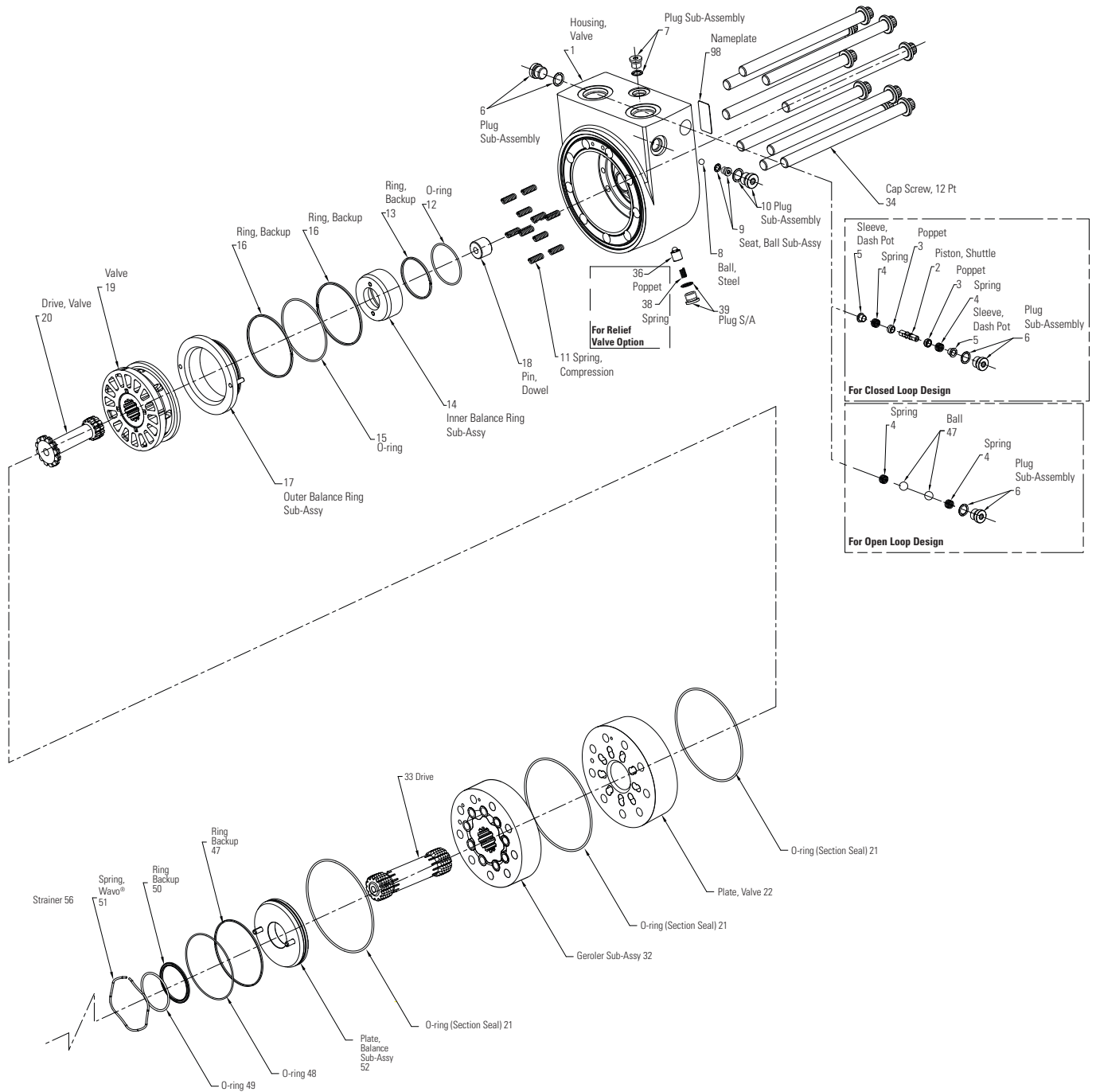
Eaton's Hydraulics Operations
14615 Lone Oak Road
Eden Prairie, MN 55344

For Specification and Performance data,
refer to catalog C-MOLO-TM012-E2



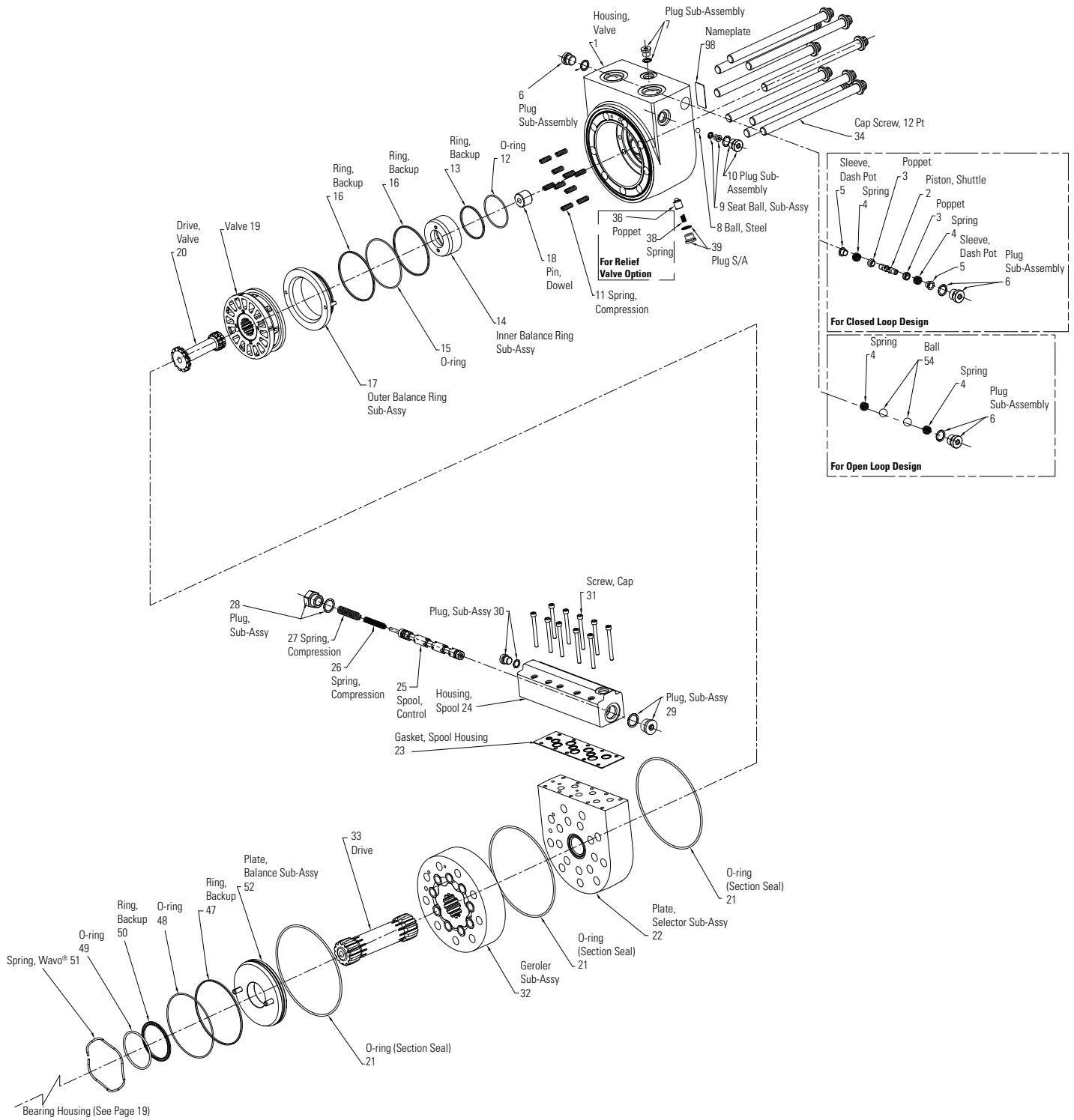
Exploded view

(Single Speed Standard and Wheel Motor)



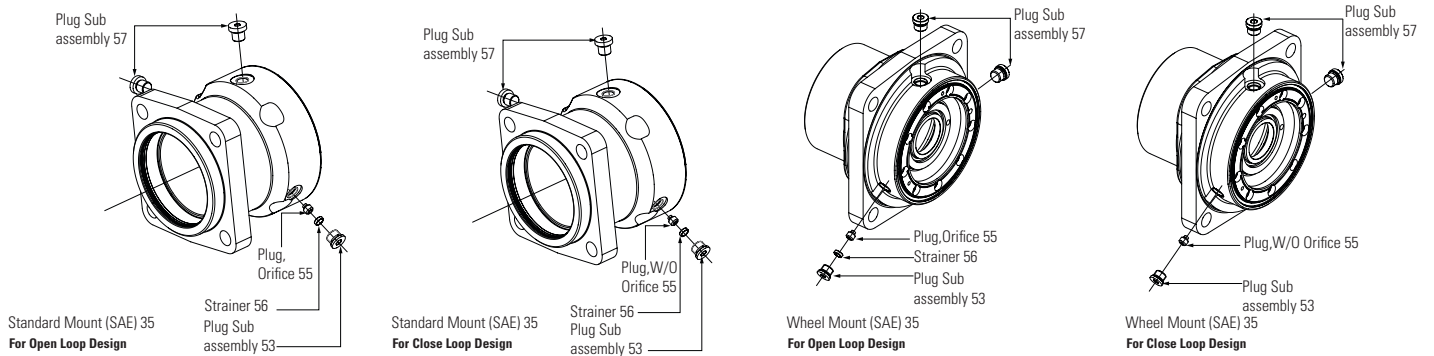
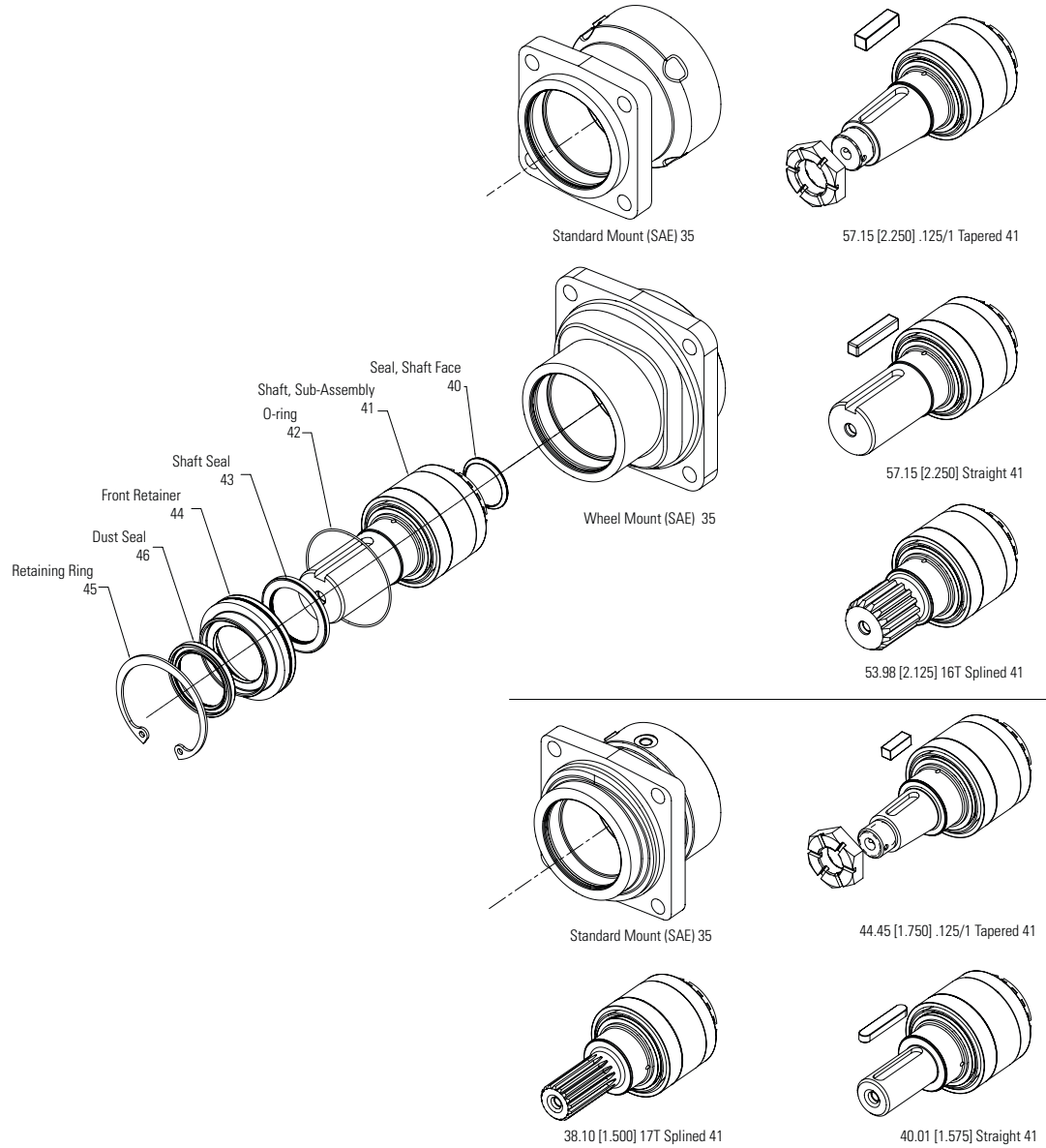
Exploded view

(Two Speed Standard and Wheel Motor)



Exploded view

(Single and Two Speed Standard and Wheel Motor)



Part list

(Single Speed Standard and Wheel Motor)

Item description

Ref No.	Part No.	Description	Quantity
1	6033992-001	Housing, Valve 1.0625-12 UN-2B SAE O-Ring Ports (2)	1
	6033992-002	Housing, Valve 1.3125-12 UN-2B SAE O-Ring Ports (2)	1
	6033992-003	Housing, Valve G 1 BSP Straight Thread Ports	1
2	201494-002	Piston, Shuttle	1
3	8567-000	Poppet	2
4	230079-000	Spring	2
5	112126-001	Sleeve, Dash Pot	2
6	9266-006	Plug Sub-Assembly	2
X	250003-906	O-ring	2
7	9266-006	Plug Sub-Assembly	1
X	250003-906	O-ring	1
8	18026-000	Ball, Steel	1
9	5992342-001	Seat, Ball Sub-Assy	1
X	250003-902	O-ring	1
10	9266-006	Plug Sub-Assembly	1
X	250003-906	O-ring	1
11	6203-000	Spring, Compression	10
X	14502-032	O-ring	1
X	5989483-001	Ring, Backup	1
14	5991782-001	Inner Balance Ring Sub-Assy	1
	268009-005	Pin, Roll	2
X	14502-040	O-ring	1
X	5989483-002	Ring, Backup	2
17	5991783-001	Outer Balance Ring Sub-Assy	1
	268009-005	Pin, Roll	2
18	5987800-001	Pin, Dowel	1
19	6030354-001	Valve	1
20	6030970-001	Drive, Valve	1
X	250002-161	O-ring (Section Seal)	3
22	5989335-001	Plate, Valve	1
32	*	Geroler Sub-Assy	1
33	*	Drive, Main	1
34	*	Cap Screw, 12 PT	9
35	6033984-001	Bearing Housing (Standard) Shuttle Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Mounting Flange	1
	6033984-002	Bearing Housing (Standard) Shuttle Valve With G 1/4 BSP Straight Thread Case Drain Port In Mounting Flange	1
	6033985-001	Bearing Housing (Wheel) Shuttle Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Mounting Flange	1
	6033985-002	Bearing Housing (Wheel) Shuttle Valve With G 1/4 BSP Straight Thread Case Drain Port In Mounting Flange	1
	6033984-001	Bearing Housing (Standard) Check Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Valve Housing	1
	6033984-002	Bearing Housing (Standard) Check Valve With G 1/4 BSP Straight Thread Case Drain Port In Valve Housing	1
	6033985-001	Bearing Housing (Wheel) Check Valve With .5625-18 UNF-2B SAE O-Ring	1

Part list

(Single Speed Standard and Wheel Motor)

Item description

Ref No.	Part No.	Description	Quantity
36	113538-001	Poppet (for relief valve unit only)	1
38	113186-001	Spring (for relief valve unit only)	1
X 39	9072-004 250003-905	Plug Sub-Assembly O-ring	1
X 40	9080-001	Seal, Shaft Face	1
41	6041082-003	Shaft, Sub-Assy(57.15mm .125/1 Tapered)	1
	6041082-003	Shaft, Sub-Assy(57.15mm Straight)	1
	6041082-001	Shaft, Sub-Assy(53.98mm 16 Tooth Splined)	1
	6041082-007	Shaft, Sub-Assy(40.01mm Straight)	1
	6041082-008	Shaft, Sub-Assy(38.10mm 17 Tooth Splined)	1
X 42	112530-045	O-ring	1
X 43	14878-001	Shaft Seal	1
44	5991645-002	Front Retainer	1
X 45	16077-066	Retaining Ring	1
X 46	14850-001	Dust Seal	1
X 47	5989483-004	Ring, backup	1
X 48	112530-044	O-ring	1
X 49	112530-139	O-ring	1
X 50	14649-004	Ring, backup	1
51	6023120-001	Spring, Wavo®	1
52	6035183-001	Plate, balance sub-assy	1
	5993989-005	Balance plate	1
	16026-609	Pin, roll	2
53	9072-004 250003-905	Plug Sub-Assembly O-ring	1 1
X 54	285020-140	Ball (for open loop design only)	2
X 55	9289-001 9289-004	Plug, Orifice (For Open Loop Design Only) Plug, W/O Orifice (For Close Loop Design Only)	1 1
X 56	31500-452	Strainer (For Open Loop Design Only)	1
57	9266-006	Plug Sub-Assembly	2
X	250003-906 9901186-000	O-ring Seal Kit - Contains Parts Indicated by X	2
59	6039391-001	Extreme duty seal (For Seal Option - Extreme Duty Seal Guard Only)	1

* = See Chart

A/R = As Required

Displacement	Ref. No. 32	Width	Ref. No. 33	Length	Ref. No. 34	Length
cm ³ /r [in ³ /r]	Geroler	mm [inch]	Drive	mm [inch]	Cap Screw	mm [inch]
343.8 [20.98]	6033989-001	32,1 [1.26]	5992182-001	130,4 [5.13]	114154-016	177,0 [6.97]
400.0 [24.40]	6033989-002	37,3 [1.47]	5992182-002	135,7 [5.34]	114154-021	182,6 [7.19]
434.2 [26.50]	6033989-006	40,6 [1.60]	5992182-006	138,9 [5.47]	114154-025	185,2 [7.29]
479.5 [29.26]	6033989-003	44,7 [1.76]	5992182-003	143,1 [5.63]	114154-026	190,5 [7.50]
677.3 [41.33]	6033989-007	63,2 [2.49]	5992182-008	161,2 [6.35]	114154-032	208,5 [8.21]

Part list

(Two Speed Standard and Wheel Motor)

Item description

Ref No.	Part No.	Description	Quantity	
1	6033992-001	Housing, Valve 1.0625-12 UN-2B SAE O-Ring Ports (2)	1	
	6033992-002	Housing, Valve 1.3125-12 UN-2B SAE O-Ring Ports (2)	1	
	6033992-003	Housing, Valve G 1 BSP Straight Thread Ports	1	
2	201494-002	Piston, Shuttle	1	
3	8567-000	Poppet	2	
4	230079-000	Spring	2	
5	112126-001	Sleeve, Dash Pot	2	
6	9266-006	Plug Sub-Assembly	2	
X	250003-906	O-ring	2	
7	9266-006	Plug Sub-Assembly	1	
X	250003-906	O-ring	1	
8	18026-000	Ball, Steel	1	
9	5992342-001	Seat, Ball Sub-Assy	1	
X	250003-902	O-ring	1	
10	9266-006	Plug Sub-Assembly	1	
X	250003-906	O-ring	1	
11	6203-000	Spring, Compression	10	
X	14502-032	O-ring	1	
X	5989483-001	Ring, Backup	1	
14	5991782-001	Inner Balance Ring Sub-Assy	1	
	268009-005	Pin, Roll	2	
X	15	14502-040	O-ring	1
X	16	5989483-002	Ring, Backup	2
17	5991783-001	Outer Balance Ring Sub-Assy	1	
	268009-005	Pin, Roll	2	
18	5987800-001	Pin, Dowel	1	
19	6030354-001	Valve	1	
20	6030970-001	Drive, Valve	1	
X	21	250002-161	O-ring (Section Seal)	3
22	5991781-001	Plate, Selector Sub-Assy	1	
	5989384-001	Insert, Sleeve	1	
X	23	6028001-002	Gasket, Spool Housing	1
24	5989326-002	Housing, Spool	1	
25	112850-002	Spool, Control	1	
26	112211-001	Spring, Compression	1	
27	114587-001	Spring, Compression	1	
28	9151-002	Plug Sub-Assembly	1	
X	250003-908	O-ring	1	
29	9072-006	Plug Sub-Assembly	1	
X	250003-908	O-ring	1	
30	9266-003	Plug Sub-Assembly	1	
X	250003-904	O-ring	1	
31	16148-320	Screw, Cap	10	
32	*	Geroler Sub-Assy	1	
33	*	Drive, Main	1	
34	*	Cap Screw, 12 PT	9	

Part list

(Two Speed Standard and Wheel Motor)

Item description

Ref No.	Part No.	Description	Quantity
35	6033984-001	Bearing Housing (Standard) Shuttle Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Mounting Flange	1
	6033984-002	Bearing Housing (Standard) Shuttle Valve With G 1/4 BSP Straight Thread Case Drain Port In Mounting Flange	1
	6033985-001	Bearing Housing (Wheel) Shuttle Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Mounting Flange	1
	6033985-002	Bearing Housing (Wheel) Shuttle Valve With G 1/4 BSP Straight Thread Case Drain Port In Mounting Flange	1
	6033984-001	Bearing Housing (Standard) Check Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Valve Housing	1
	6033984-002	Bearing Housing (Standard) Check Valve With G 1/4 BSP Straight Thread Case Drain Port In Valve Housing	1
	6033985-001	Bearing Housing (Wheel) Check Valve With .5625-18 UNF-2B SAE O-Ring Case Drain Port In Valve Housing	1
	6033985-002	Bearing Housing (Wheel) Check Valve With G 1/4 BSP Straight Thread Case Drain Port In Valve Housing	1
36	113538-001	Poppet (for relief valve unit only)	1
38	113186-001	Spring (for relief valve unit only)	1
X 39	9072-004	Plug Sub-Assembly	1
	250003-905	O-ring	1
X 40	9080-001	Seal, Shaft Face	1
41	6041082-003	Shaft, Sub-Assy(57.15mm .125/1 Tapered)	1
	6041082-002	Shaft, Sub-Assy(57.15mm Straight)	1
	6041082-001	Shaft, Sub-Assy(53.98mm 16 Tooth Splined)	1
	6041082-015	Shaft, Sub-Assy(44.45mm .125/1 Tapered)	1
	6041082-007	Shaft, Sub-Assy(40.01mm Straight)	1
	6041082-008	Shaft, Sub-Assy(38.10mm 17 Tooth Splined)	1
42	112530-045	O-ring	1
43	14878-001	Shaft Seal	1
44	5991645-002	Front Retainer	1
45	16077-066	Retaining Ring	1
46	14850-001	Dust Seal	1
X 47	5989483-004	Ring, Backup	1
X 48	112530-044	O-ring	1
X 49	112530-139	O-ring	1
X 50	14649-004	Ring, Backup	1
51	6023120-001	Spring, Wavo®	1
52	6035183-001	Plate, Balance Sub-Assy	1
	5993989-005	Balance plate	1
	16026-609	Pin, roll	2
X 53	9072-004	Plug Sub-Assembly	1
	250003-905	O-ring	1
54	285020-140	Ball (for open loop design only)	2
X 55	9289-001	Plug, Orifice (For Open Loop Design Only)	1
	9289-004	Plug, W/O Orifice (For Close Loop Design Only)	1

Part list

(Two Speed Standard and Wheel Motor)

Item description

	Ref No.	Part No.	Description	Quantity
X	56	31500-452	Strainer (For Open Loop Design Only)	1
	57	9266-006	Plug Sub-Assembly	2
X		250003-906	O-ring	2
		9901192-000	Seal Kit - Contains Parts Indicated by X	
	59	6039391-001	Extreme duty seal (For Seal Option - Extreme Duty Seal Guard Only)	1

* = See Chart

A/R = As Required

Displacement	Ref. No. 32	Width	Ref. No. 33	Length	Ref. No. 34	Length
cm³/r [in³/r]	Geroler	mm [inch]	Drive	mm [inch]	Cap Screw	mm [inch]
343.8 [20.98]	6033989-001	32,1 [1.26]	5992182-001	130,4 [5.13]	114154-016	177,0 [6.97]
400.0 [24.40]	6033989-002	37,3 [1.47]	5992182-002	135,7 [5.34]	114154-021	182,6 [7.19]
434.2 [26.50]	6033989-006	40,6 [1.60]	5992182-006	138,9 [5.47]	114154-025	185,2 [7.29]
479.5 [29.26]	6033989-003	44,7 [1.76]	5992182-003	143,1 [5.63]	114154-026	190,5 [7.50]
677.3 [41.33]	6033989-007	63,2 [2.49]	5992182-008	161,2 [6.35]	114154-032	208,5 [8.21]

Disassembly

(Single and Two Speed Standard and Wheel Motor)

Tools required

- 7/32 inch Hex Key (Relief Valve Plug)
- 1/4 inch Hex Key (Shuttle Valve Plug)
- 5/16 inch Hex Key (Spool Housing Plug)
- 5/32 inch Hex Key (Spool Housing Screw, Cap)
- 7/8 Socket
- 9/16 Socket (12 Point Drive)
- Torque wrench - 142 Nm [1260 lb-in] capacity

8.0 Disassembly

- 8.0.1 Cleanliness is extremely important when repairing hydraulic motors. Work in a clean area. Before disconnecting the hydraulic motor thoroughly clean the exterior. Remove motor from application and drain the oil from the motor before disassembly.
- 8.0.2 Remove the 9 cap screws and disassemble the motor in the vertical position as shown in Figure 8A and 8B.
- 8.0.3 Remove shuttle valve (and relief valve if applicable) from Valve Housing.
- 8.0.4 Check all mating surfaces. To reduce the chance of leakage, replace any parts that have scratches or burrs. Wash all metal parts in clean solvent. Blow them dry with pressurized air. Do not wipe parts dry with paper towels or cloth as lint in a hydraulic system will cause damage.

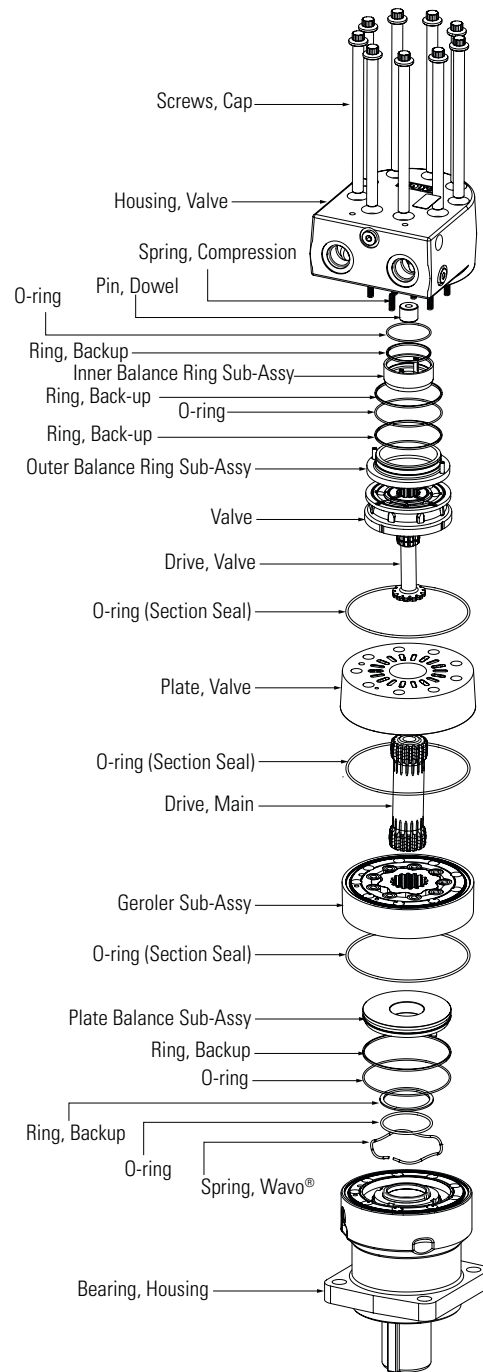


Figure 8A
(Single Speed standard and Wheel Motor)

Disassembly

(Single and Two Speed Standard and Wheel Motor)

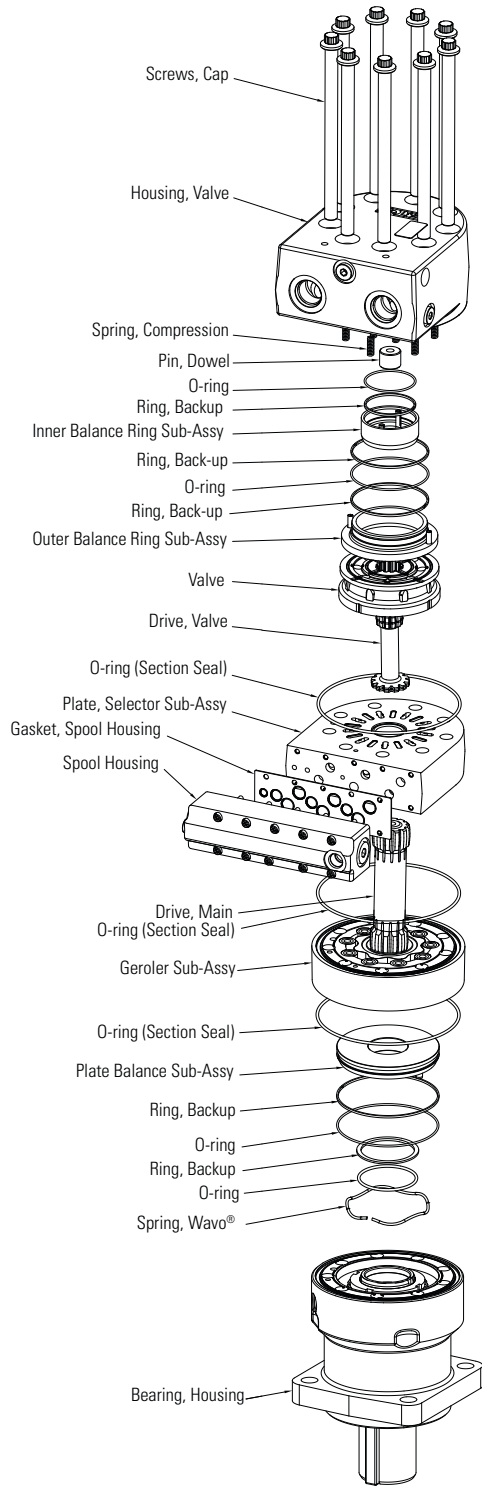


Figure 8B
(Two Speed standard and Wheel Motor)

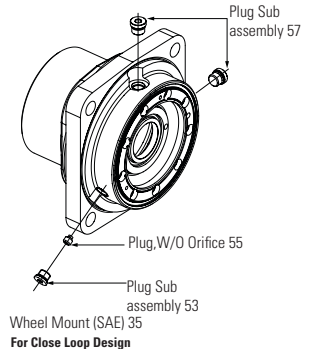
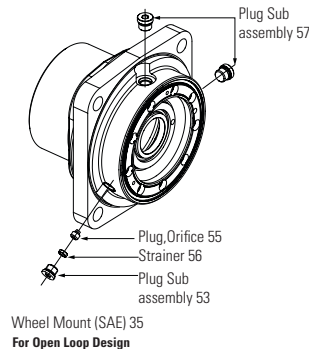
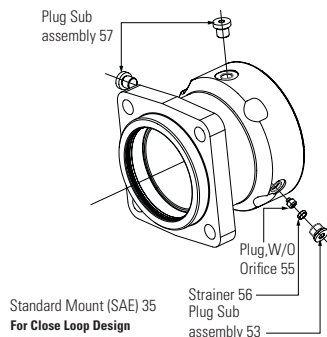
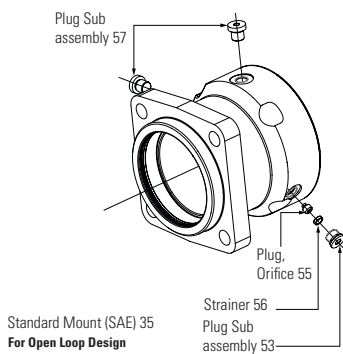
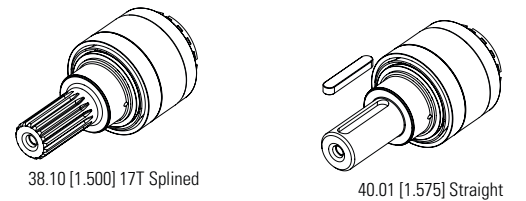
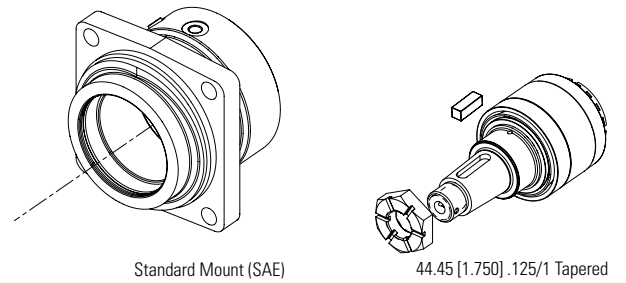
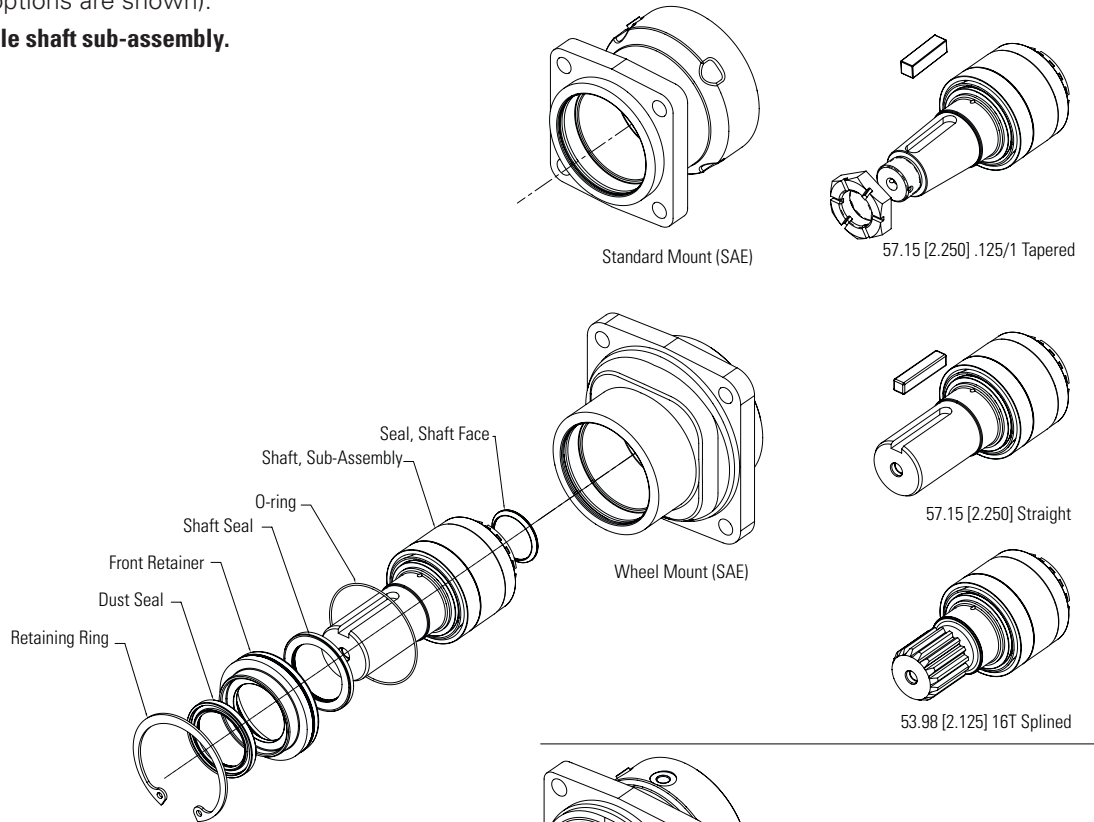
Disassembly

(Single and Two Speed Standard and Wheel Motor)

8.5 Disassembly Geroler Motors

8.5.1 Disassemble bearing housing (3 bearing housings, and 6 shaft sub-assembly options are shown).

Note: Do NOT disassemble shaft sub-assembly.



Reassembly

(Single and Two Speed Standard and Wheel Motor)

Note: Always use new seals when reassembling hydraulic motors. Refer to parts list for seal kit number and replacement parts.

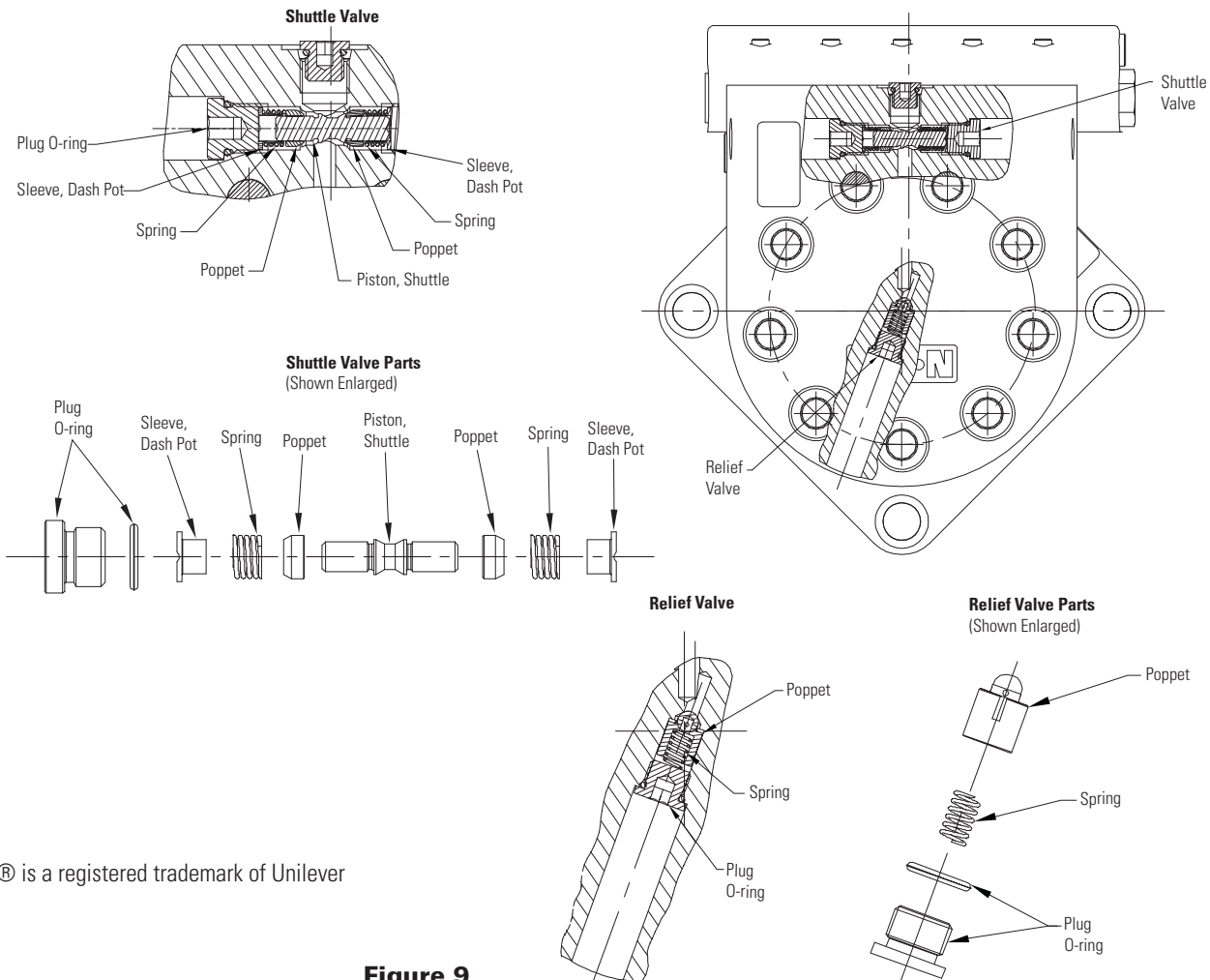
Important: During reassembly, lubricate the new seals with a petroleum jelly such as Vaseline®. Also lubricate machined surfaces with clean hydraulic fluid.

9.0 Valve housing assembly

- 9.0.1 Install one poppet, spring, dash pot and threaded internal hex plug with O-ring into shuttle valve bore from one end of Valve Housing.
- 9.0.2 Install shuttle piston from opposite end of shuttle valve cavity.
- 9.0.3 Install one shuttle valve poppet, spring, dash pot onto piston and threaded internal hex plug with O-ring from opposite end of shuttle valve cavity.
- 9.0.4 Shuttle plug threads may have light coat of oil or preservative. Torque both plugs to 360 +/- 36 lbf-in.
- 9.0.5 For a motor with open loop design, Install Ball, Spring and threaded internal hex plug with O-ring

form one end of cavity. And then install another Ball, Spring and threaded internal hex plug with O-ring from opposite end of cavity. Torque both plugs to 360 +/- 36 lbf-in. Plugs may have light coat of oil or preservative.

- 9.0.6 For a motor with low pressure relief valve, install poppet, spring and plug. Plug threads may have light coat of oil or preservative. Torque plug to 180 +/- 18 lb-in.
- 9.0.7 For a motor without low-pressure relief valve, Install and torque plug to 180 ± 18 lbf-in. Plug may have light coat of oil or preservative.
- 9.0.8 Install ball and seat ball sub-assembly. Torque seat to 60 +/- 6 lbf-in. Install plug sub-assembly and torque to 360 +/- 36 lbf-in.



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Figure 9

Reassembly

(Single and Two Speed Standard and Wheel Motor)

9.1 Outer balance ring assembly

- 9.1.1 Install one backup ring (75,1 [2.96] OD), then one O-ring (72,7 [2.86] ID) followed by one backup ring (75,1 [2.96] OD) into the O-ring groove in the outer balance ring. Seals and backups are to be greased. Ensure splits in backup rings are mated correctly. Location of splits in backup rings should not be aligned, a minimum of 90 degrees of separation is recommended.
- 9.1.2 Install one O-ring (47,3 [1.86] ID) then one backup ring (48,6 [1.91] OD) into the inner balance ring groove, located in the valve housing. Seal and backup are to be greased. Ensure split in backup ring is mated correctly.
- 9.1.3 Grease dowel pin and install in valve housing.
- 9.1.4 Install 10 balance ring springs in valve housing.
- 9.1.5 Install inner and outer balance ring sub-assemblies into valve housing. Ensure O-rings seals are seated.
- 9.1.6 Install greased O-ring section seal (139,4 [5.49] ID) in valve housing O-ring groove.

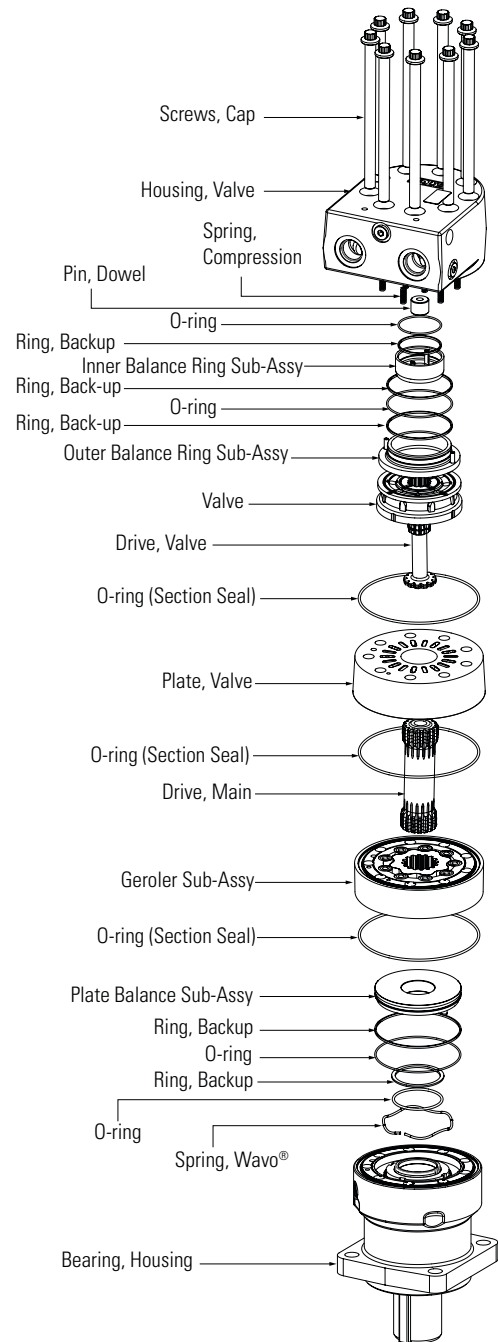


Figure 10A
(Single Speed standard and Wheel Motor)

Reassembly

(Single and Two Speed Standard and Wheel Motor)

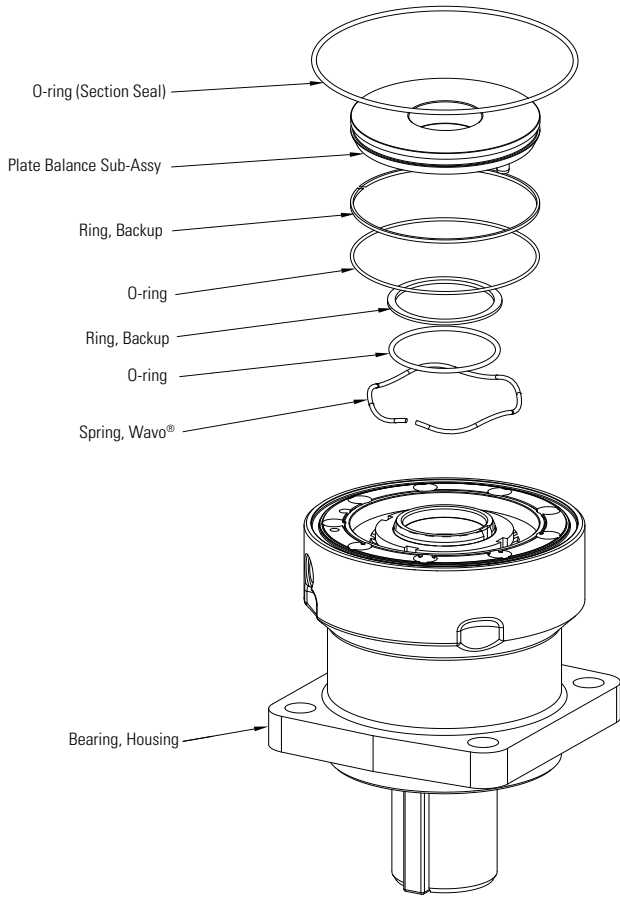


Figure 11

Standard And Wheel Motor Flange Assembly

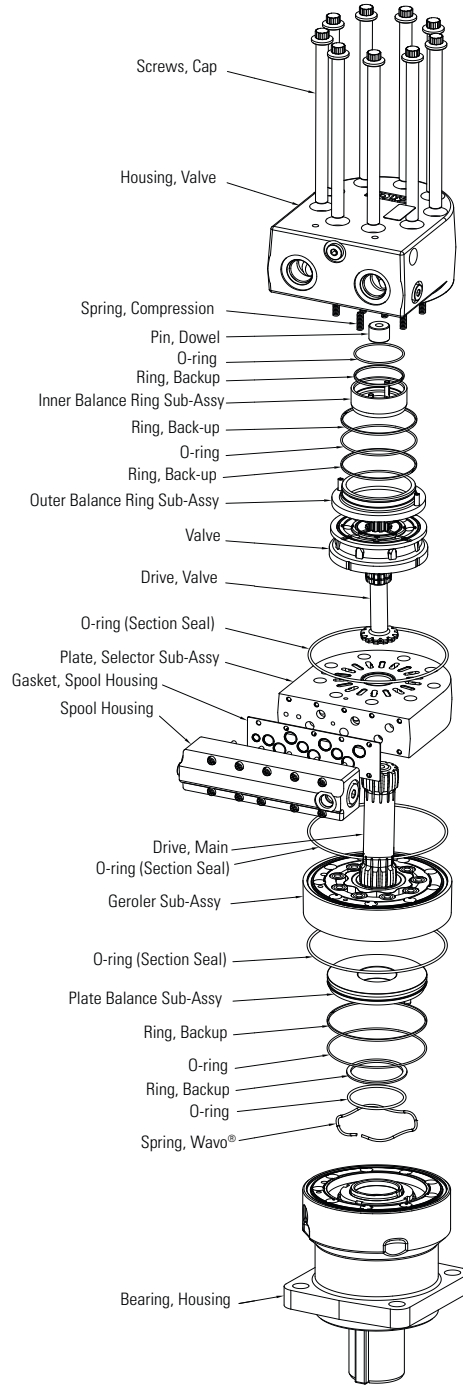


Figure 10B

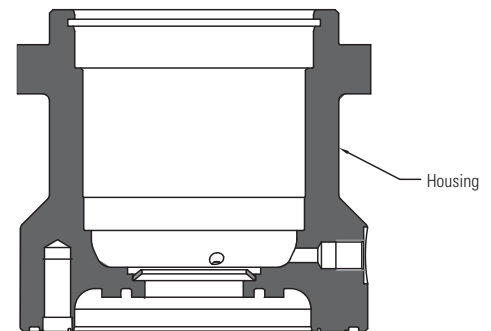
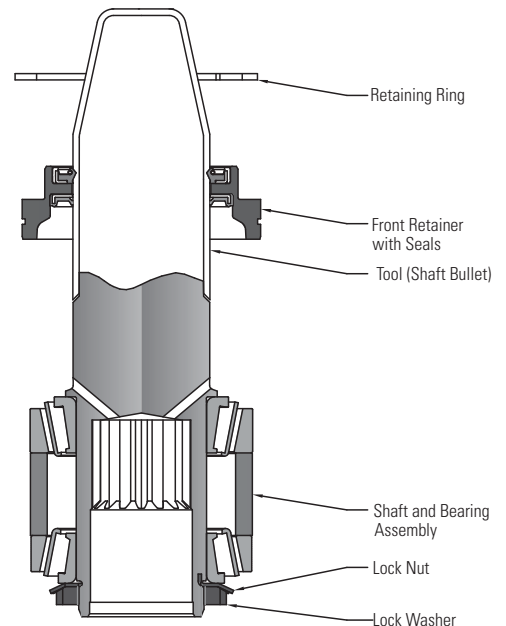
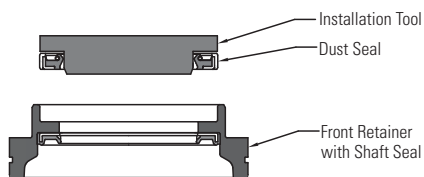
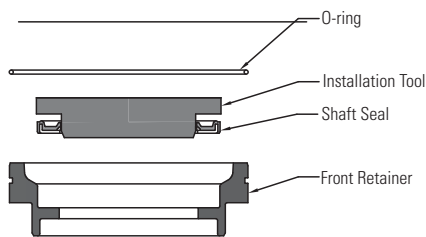
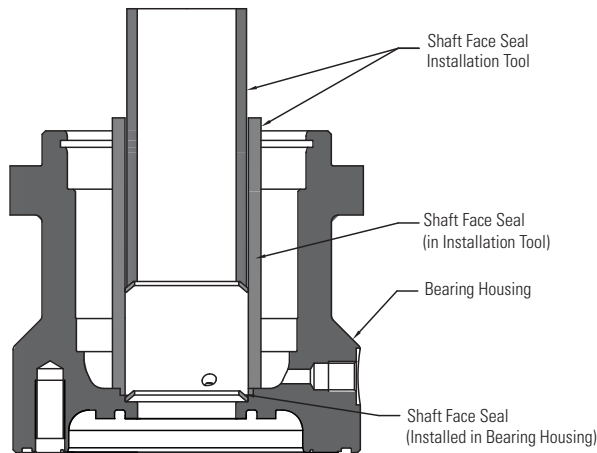
(Two Speed standard and Wheel Motor)

Reassembly

(Single and Two Speed Standard and Wheel Motor)

Note: Always use new seals when reassembling hydraulic motors. Refer to parts list for seal kit number, replacement parts, and ordering information.

Important: During reassembly, lubricate the new seals with a petroleum jelly such as Vaseline®. Also lubricate machined surfaces with clean hydraulic fluid.



- 9.1.7 Install Teflon shaft face seal into bearing housing. Use an installation tool as shown, lubricate seal with Mobilith EP-111 grease or petroleum jelly (e.g. Vaseline®) and compress seal into place.
- 9.1.8 Lightly lubricate seal with Mobilith EP-111 grease or petroleum jelly (e.g. Vaseline®). Install in groove on front retainer.
- 9.1.9 Lightly Lubricate seal Shaft seal and dust seal lips with Mobilith EP-111 grease or petroleum jelly (e.g. Vaseline®). Place seal on assembly tool, and press into bore of front retainer. Press until seal makes positive stop with front retainer shoulder. Protect inside diameter shaft seal area from damage.
- 9.1.10 Invert the front retainer, place dust seal on assembly tool, and press into bore of front retainer. Press until seal makes positive stop with front retainer shoulder. Protect inside diameter dust seal area from damage.
- 9.1.11 Install shaft/bearing sub-assembly into housing with press force of 3300 +/- 200 Lbf.
- 9.1.12 Before installing retainer, place a protective sleeve of bullet over shaft. Grease inside diameter of shaft seal. To prevent damage to seal, install front retainer over shaft with a twisting motion. Do not cut or distort shaft seal. Damage to shaft seal will cause external leakage. After installing front retainer into bearing housing secure it with snap ring.

Reassembly

(Single and Two Speed Standard and Wheel Motor)

9.2 Bearing housing assembly (For single speed standard and wheel motor)

- 9.2.1 With Bearing Housing O-ring grooves up (see Figure 11), install O-ring section seal (139,4 [5.49] ID) Bearing Housing. Install back-up ring (62,1 [2.45] OD) over O-ring (55,2 [2.18] ID) with flat side up. Back-up ring and O-rings may be greased to assist in retaining parts.
- 9.2.2 Install Spring, Wavo® in groove in Bearing Housing.
- 9.2.3 Install back-up ring (99,7 [3.93] OD) in grooves of balance plate sub assembly and then install O-ring (95,0 [3.74] ID) over back-up ring from tapered side.
- 9.2.4 Install balance plate sub assembly in Bearing Housing with tapered side down.
- 9.2.5 Install the Plug W/O Orifice Plug as shown in Fig 12a for Close Loop Configuration
- 9.2.6 Install the Strainer and then Plug, Orifice Plug as shown in Fig 12b for Open Loop Configuration

9.3 Final assembly (For single speed standard and wheel motor)

- 9.3.1 Install main drive with longest spline length (if asymmetric) into output shaft spline.
- 9.3.2 Place Geroler assembly (seal groove up) over Bearing Housing. Install greased O-ring section seal (139,4 [5.49] ID) in seal groove of Geroler assembly. Align shuttle flow hole of Geroler with shuttle flow hole of Bearing Housing.
- 9.3.3 Mark drive teeth that align (See Figure E) with dykem pen. Install valve drive into internal star spline (See Figure F or G for motor timing).
- 9.3.4 Install valve plate onto Geroler sub-assembly (valve plate valve slots up). Align shuttle flow hole of valve plate with shuttle flow hole of Geroler sub-assembly.
- 9.3.5 Install valve onto valve drive and selector plate assembly. Ensure long leakage groove is aligned with marked tooth on valve drive (see Figure H).
- 9.3.6 Carefully invert valve housing and place onto valve plate. Make sure that shuttle flow holes are aligned.
- 9.3.7 Install nine cap screws lubricated with DTE-26. Pre-torque each in a crisscross pattern (see Figure 14) to 80+/-10 lb-ft. Finally, in a crisscross pattern, tighten screws to 105+/-5 lb-ft.
- 9.3.8 Install two cap plugs in main ports (Optional).
- 9.3.9 Install key and hex nut into shaft if required.

9.4 Bearing housing assembly (For two speed standard and wheel motor)

- 9.4.1 With Bearing Housing O-ring grooves up (see Figure 11), install O-ring section seal (139,4 [5.49] ID) Bearing Housing. Install back-up ring (62,1 [2.45] OD) over O-ring (55,2 [2.18] ID) with flat side up. Back-up ring and O-rings may be greased to assist in retaining parts.
- 9.4.2 Install Spring, Wavo® in groove in Bearing Housing.
- 9.4.3 Install back-up ring (99,7 [3.93] OD) in grooves of balance plate sub assembly and then install O-ring (95,0 [3.74] ID) over back-up ring from tapered side.
- 9.4.4 Install balance plate sub assembly in Bearing Housing with tapered side down.
- 9.4.5 Install the Plug W/O Orifice Plug as shown in Fig 12a for Close Loop Configuration then Install a Plug
- 9.4.6 Install the Strainer and then Plug, Orifice Plug as shown in Fig 12b for Open Loop Configuration

9.5 Spool housing assembly (For two speed bearingless motor)

- 9.5.1 Install control spool into spool housing by first lubricating control spool with DTE26. Install control spool into spool bore, verifying that the control spool moves freely in bore.
- 9.5.2 Install nested springs and counter bored plug into end of spool housing spool bore. Plug may have light coat of oil or preservative. Torque plug to 46 +/-2 lbf-ft.
- 9.5.3 Install plug in opposite end of spool bore. Plug may have light coat of oil or preservative. Torque plug to 46 +/-2 lbf-ft.
- 9.5.4 Install plug into spool housing port and torque to 192 +/- 19 lbf-in.

Reassembly

(Single and Two Speed Standard and Wheel Motor)

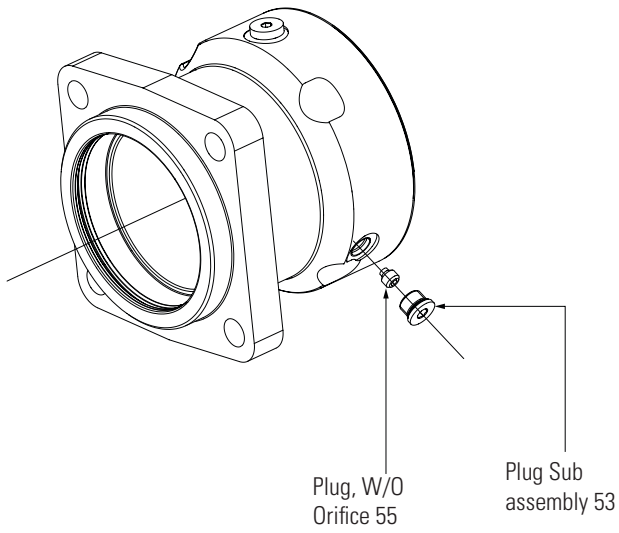


Figure 12A

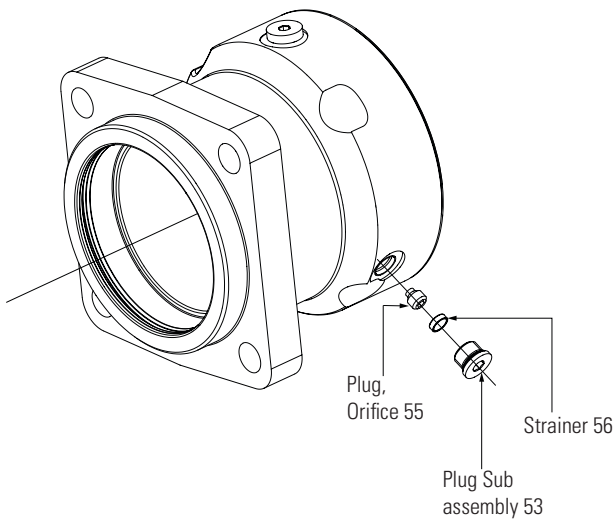


Figure 12 B

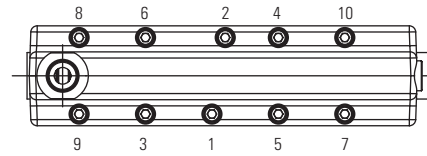


Figure 13

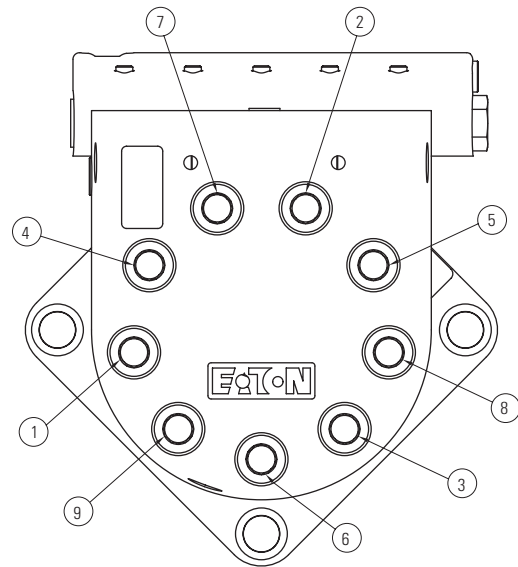


Figure 14