HY13-1524-002-M1/US

Parker HTG Series

Integrated Hydrostatic Transmission

Effective: August, 2021

HTG Series

Service Procedure

⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This product can expose you to chemicals including lead and DEHP, which are known to the State of California to cause cancer, and birth defects or other reproductive harm. For more information go to www.p65warnings.ca.gov

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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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Parker Hannifin Corporation
Hydraulic Pump/Motor Division
Greeneville, Tennessee USA

Disclaimer

This Service Manual has been prepared by Parker Hannifin for reference and use by individuals who have been trained to repair and service hydraulic motors and systems on commercial and non-commercial equipment applications. Parker Hannifin has exercised reasonable care and diligence to present accurate, clear and complete information and instructions regarding the techniques and tools required for maintaining, repairing and servicing the complete line of Parker Integrated Hydrostatic Transmission Units. However, despite the care and effort taken in preparing this general Service Manual, Parker makes no warranties that (a) the Service Manual or any explanations, illustrations, information, techniques or tools described herein are either accurate, complete or correct as applied to a specific Transmission unit, or (b) any repairs or service of a particular Transmission unit will result in a properly functioning Transmission unit.

If inspection or testing reveals evidence of abnormal wear or damage to the unit or if you encounter circumstances not covered in the Manual, STOP – CONSULT THE EQUIPMENT MANUFACTURER'S SERVICE MANUAL AND WARRANTY. DO NOT TRY TO REPAIR OR SERVICE A UNIT WHICH HAS BEEN DAMAGED OR INCLUDES ANY PART THAT SHOWS EXCESSIVE WEAR UNLESS THE DAMAGED AND WORN PARTS ARE REPLACED WITH ORIGINAL PARKER REPLACEMENT AND SERVICE PARTS AND THE UNIT IS RESTORED TO PARKER SPECIFICATIONS FOR THE UNIT.

It is the responsibility of the individual performing the maintenance, repairs or service on a particular Transmission unit to (a) inspect the unit for abnormal wear and damage, (b) choose a repair procedure which will not endanger his/her safety, the safety of others, the equipment, or the safe operation of the Transmission, and (c) fully inspect and test the unit and the hydraulic system to insure that the repair or service of the unit has been properly performed and that the Transmission will function properly.

Introduction

The three-column format used in this Service Manual will help make it easy for you to service a HTG Series Integrated Hydrostatic Transmission. Column one illustrates the procedure, column two gives a brief key for each step, and column three explains in detail the procedure you should follow. Pay special attention to the notes, cautions and warnings.

This manual contains troubleshooting information and checklists. With them you can potentially diagnose a hydraulic system problem without removing the HTG Transmission, the checklists will help you to determine where the problem may be.

Item numbers on the exploded view correspond with item numbers used throughout the Service Manual. As you gain experience in servicing HTG Transmission, you may find that some information in this Service Manual could be clearer and more complete. If so, please contact your local dealer or OEM manufacturer's technical service department. Don't try to second-guess the Service Manual; if problems occur that you cannot solve, please contact your local dealer or OEM manufacturer's technical service department.

Design Features

HTG Transmission

- High efficiency results in a cooler running system
- Top housing is sturdy, lightweight aluminum, excellent at dispersing heat, resulting in an overall cooler system
- High capacity thrust bearing provides longer transmission life

Torqmotor

- Roller vane to reduce friction and internal leakage and to maintain efficiency
- A patented orbiting commutator system for less wear and longer life
- A unique high-pressure shaft seal
- Manifold designed to improve operating efficiency
- Roller vane and sealed commutation assure high volumetric efficiency and smooth low speed operation

Conversions

INCHES	mm	INCHES	mm
.020	.511	1.060	26.92
.021	.531	1.295	32.89
.029	741	1.297	32.94
.030	.760	1.396	35.46
.111	2.81	1.398	35.51
.119	3.02	1.620	41.15
.152	3.86	1.622	41.20
.160	4.06	1.983	50.37
.296	7.52	1.985	50.42
.304	7.72	2.120	53.85
.460	11.68	2.122	53.90
.470	11.94	2.233	56.72
.500	12.70	2.235	56.77
.585	14.86	2.483	63.07
.595	15.11	2.485	63.12
.660	16.76	2.500	63.5
.675	17.15	2.88	73.2
1.058	26.87		

Troubleshooting Guide

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 HTG Transmission.

Preparation

Make your troubleshooting easier by preparing as follows:

- work in a clean, well-lighted place;
- have proper tools and materials nearby;
- have an air pressure source

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 BE SURE TO COMPLY WITH OSHA AND OTHER MAXIMUM AIR PRESSURE REQUIREMENTS. KEEP HANDS CLEAR OF FAN AND MOVING PARTS CAN CAUSE PERSONAL INJURY. SHUT OFF ENGINE AND LET ENTIRE SYSTEM COOL BEFORE REMOVING ANY COMPONENT.

Preliminary Checks

Hydraulic systems are often trouble-free. Hence, the problem an operator complains of could be caused by something other than the hydraulic components. Thus, once you have determined that a problem exists, start with the easy-to-check items, 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, or loose parts or slipping belts

Hydraulic Components

If you think the problem is caused by a hydraulic component, start by checking the easy-to-reach items. Check all belts for cracks, hardening, or other signs of wear. Check all pulleys, fans and bolts to make sure they are tightened to specified torque value. Look for leaks, especially at the coupling shaft and plugs.

Visually check other components to see if they are loosely mounted, show signs of leaks, or other damage or wear.

Suspect Faulty Transmission

Before the HTG Transmission is disassembled for repair, make sure all control arm adjustments and engine speed requirements are per OEM specification. Also make sure the parking brake is releasing fully on both sides.

If there is a defect in the HTG Transmission, a right to left side performance difference should be noticeable. To test for this condition, run the vehicle at full forward throttle and control levers. The vehicle should track nearly straight both on flat ground and on uphill grades.

Troubleshooting Checklist (page 1 of 3)

General Cautions

Caution: Do not pressure wash the transmission to remove debris. Use a power blower to remove built up debris.

Caution: Use of Foam/ Liquid filled tires is not recommended. Filling the tires will void the transmission warranty.

Problem/ Symptom	What to Check/ Look For/ Look At	Potential Repair Fix	Dealer Fix	If In Warranty Replace Transmission
Fluid Leakage	Expansion tank overfilled	***Refer to OEM owners manual***- Remove fluid and adjust to proper level	X	
NOTE: Identify fluid leak location	Expansion tank overflowing (tank completely filled when transmission is run)	Check for broken fan blades, debris build up, contaminated oil/ milky oil	X	
NOTE: Refer to owners manual for proper transmission fluid and fill volume.	Shaft seal leaking (Trunnion, Input, Motor Output Seal)	Replace shaft seal	X	
	Filter cap- Check proper torque, inspect for seal damage, inspect for cap damage	If loose, torque to proper torque specification, if seal damage replace filter assembly, if cap cracked replace filter assembly	X	
	Static seals leaking (Side/ bottom cover)	Remove covers, install new seal, re-torque to proper torque spec	X	
	Motor static seals leaking (motor section seals, motor top housing interface seals)	Dis-assemble transmission, remove pump section from motor, replace seals as necessary		X
	Drain plug is leaking	Torque to proper spec. If leak continues, remove drain plug, install new plug and washer, torque to proper spec, refill oil	X	
	SAE plug/ hose barb	Check torque of fitting, if leak continues replace fitting assembly	X	
No Power	Proper fluid level	***Refer to OEM owners manual***- Check transmission fluid level, adjust as necessary	X	
NOTE: Verify Engine is running / operating properly	Bypass lever position	Ensure lever is in the proper operating position	X	
NOTE: Refer to owners manual for proper transmission fluid and fill volume.	Drive belt broken or lack of proper tension	Inspect belt and tensioner pulley and spring, repair as necessary	X	
	Trunnion lever/ control linkage disconnected/ damaged	Inspect linkage and repair as necessary	X	
	Internal components of transmission are damaged	Remove transmission, dis-assemble, repair/ replace as necessary		X

Troubleshooting Checklist (page 2 of 3)

Problem/ Symptom	What to Check/ Look For/ Look At	Potential Repair Fix	Dealer Fix	If In Warranty Replace Transmission
Low Power	Excessive load	Verify mower use conditions, reduce weight of load or towing amount	**X**	
NOTE: Verify operating conditions (BELOW)	Low fluid level	***Refer to OEM owners manual***- check and fill as necessary	**X**	
- Mowing? Heavy grass/ normal grass conditions	Belt tension	***Refer to OEM owners manual***- adjust belt tension to proper specification	**X**	
- Towing? ***NOT Recommended*** *Trailer/ logs/ field maintenance equipment*	Transmissions over heat	Check fan for broken blades, check for debris wrapped around pulley shaft	**X**	
NOTE: Refer to owners manual for proper transmission fluid and fill volume.	Engine speed low	***Refer to OEM owners manual***- Check RPM of engine to ensure proper operation	**X**	
	Control lever doesn't have full range of motion	Check linkage for interference or damage	**X**	
	Contaminated fluid/ filter clog	Drain fluid, remove transmission, dis-assemble and inspect components for damage, re-assemble, install new filter, re-fill oil	**X**	
	Brake Drag	***Refer to OEM owners manual***- for proper specified brake adjustment	**X**	
	Pulley Loose- can spin on shaft	Verify proper nut torque for fan/ pulley, tighten as necessary	**X**	
	Pulley Alignment (transmission to engine)	Verify pulley alignment with clutch/ engine, transmission pulley installed correctly	**X**	
	Worn internal components	Remove transmission, dis-assemble, repair/ replace as necessary		**X**

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Troubleshooting Checklist (page 3 of 3)

Problem/ Symptom	What to Check/ Look For/ Look At	Potential Repair Fix	Dealer Fix	If In Warranty Replace Transmission
Lack of control/jerky control	Proper tire pressure	***Refer to OEM owners manual***- Verify proper tire inflation, adjust as necessary	X	
NOTE: Refer to owners manual for proper transmission fluid and fill volume.	Inspect control linkage dampeners	Inspect dampener for smooth and proper range of motion, replace as necessary	X	
	Loose control lever/ linkage	Verify linkage connections, repair as necessary	X	
	RTN function	Verify RTN bolt torque, RTN adjustment, repair as necessary	X	
	Belt tension	***Refer to OEM owners manual***- verify proper tension, adjust as necessary	X	
	Proper engine governor speed control (fluctuating RPM)	***Refer to OEM owners manual***- verify RPM, adjust as necessary	X	
	Brake Drag	***Refer to OEM owners manual***- for proper specified brake adjustment	X	
	Loose lug nuts	***Refer to OEM owners manual***- for proper torque specification	X	
	Output axle shaft castle nut is loose	Inspect shaft, threads, and hub for damage, repair as necessary, and re-torque to proper torque specification	X	
	Internal components of transmission are damaged	Remove transmission, dis-assemble, repair/ replace as necessary		X
Noisy Unit	Low fluid level	***Refer to OEM owners manual***- Check and fill as necessary	X	
NOTE: Verify location of the noise- engine/ deck/ transmission	Contaminated fluid/ filter clog	Drain fluid, remove transmission, dis-assemble and inspect components for damage, re-assemble, install new filter, re-fill oil	X	
NOTE: Refer to owners manual for proper transmission fluid and fill volume.	Internal components of transmission are damaged	Remove transmission, dis-assemble, repair/ replace as necessary		X
Miscellaneous	Lack of brake holding power	***Refer to OEM owners manual***- for proper specified brake adjustment	X	

Tools and Materials Required for Servicing

- Clean, petroleum-based solvent
- Emery paper
- Vise with soft jaws
- Air pressure source
- Arbor press
- Flat screw driver
- Grease pen
- Small gear puller
- Torque wrenches
- Sockets: 3/8 inch, 5/16 inch 12 pt., 1/2 inch, 9/16 inch, 5/16 Hex head bit, 15/16
- inch, 1 1/2 inch
- Vise grip™ pliers
- Internal snap ring pliers
- Clean corrosion resistant grease. Recommended grease is Mobil Mobilith SHC® 460

CAUTION

Mixing greases that have different bases can be detrimental to bearing life.

- Break-in oil change 300 hours
- To insure maximum HTG Transmission performance and life, use Parker-1000™ oil. HTG transmissions come factory filled with Parker HT-1000™ oil. Oil change intervals depend on the type of oil used. Follow OEM manufacturers recommended oil change interval. Always change the filter when changing the oil.

Approved Oil	Packaging	P/N
Parker HT-1000™	Hydraulic Transmission Oil Service Kit	SK000448
	1 U.S. Gallon (3.8L)	406030
	1 U.S. Quart (0.79L)	406032

Expansion tank and hose

The HTG transmission requires an expansion tank and hose for proper operation. This allows for fluid expansion and contraction when the fluid heats up and cools down during normal use. The specific hoses, tanks, and related parts that came installed on your machine need to be used/maintained in the manner described in the chassis owner's manual. The expansion tank and hose parts will vary in size and may require more, or less fluid, depending on your installation. Please refer to the chassis owner's manual for the specific hydraulic fluid filing procedure and the estimated amount of oil required.

System Maintenance Tips

- Adjust fluid level in reservoir /expansion tank 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 HTG Transmission component. Replace any component with original Parker parts.
- Do not cold straighten, hot straighten, or bend any HTG Transmission 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 the leak.
- Comply with Parker specifications for cleaning or replacing the filter.

CAUTION

Do not weld, braze, solder or alter any HTG Transmission component.

CAUTION

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 questionable.

CAUTION

Do not mix oil types. Any mixture or unapproved oil could deteriorate the seals. When changing fluid, completely drain old oil from the system and refill with HT-1000™.

If problems occur which you cannot solve, please contact your local dealer or OEM manufacturer's technical service department.

HTG Transmission Assembly Rebuild Bolt Torques

Component	ft-lbs	in-lbs
End Block to Housing	22.5-25	270-300
Charge Cover Bolts	7.5-9.5	90-110
Shock/ Check Valves	21-24	252-288
Motor Bolts	45-55	
Oil Filter	9.6-11.3	115-135
Fan Nut	55-70	
Control Arm Bolt	12.5-15	150-180
Brake Assembly	25-28	
Castle Nut / Patch Lock Nut	200- 300 plus rotation to align Cotter Pin	
Self locking nut (for brake drum)	200 - 300 min.	
Hose Barb/ Expansion Fitting	16.6-20	200-240
Fill Plug (Vent Plug)	8.3-10	100-120
Bottom Cover/ Side Cover Bolts (Initial Assembly)	8.3-10	100-120
Bottom Cover (Repair/ Rebuild)	6-8	72-96
Side Cover (Repair/ Rebuild)		48-72
Return To Neutral Bolts	22-24	
Drain Plug (Aluminum Washer PN: 029130)	38-42	

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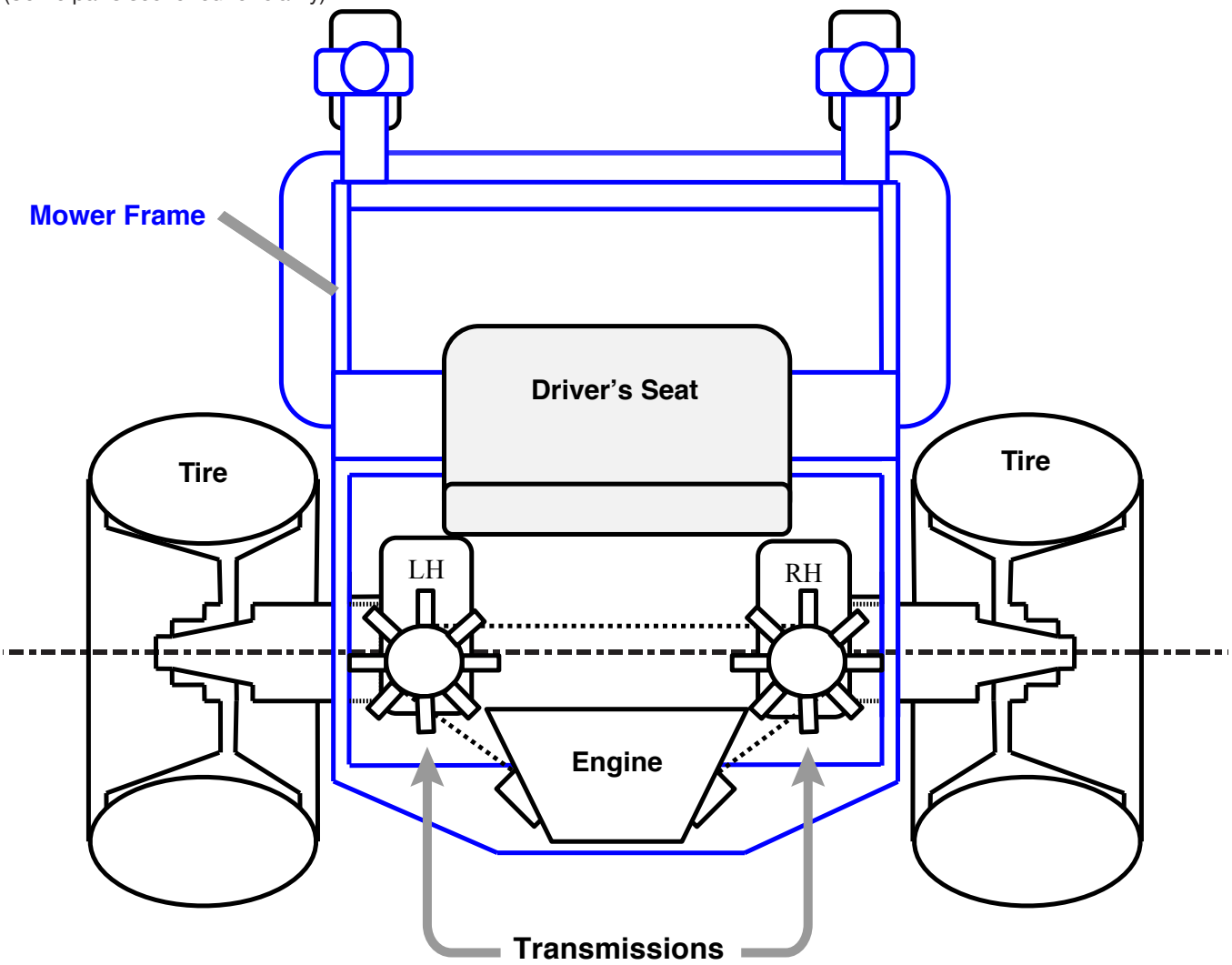
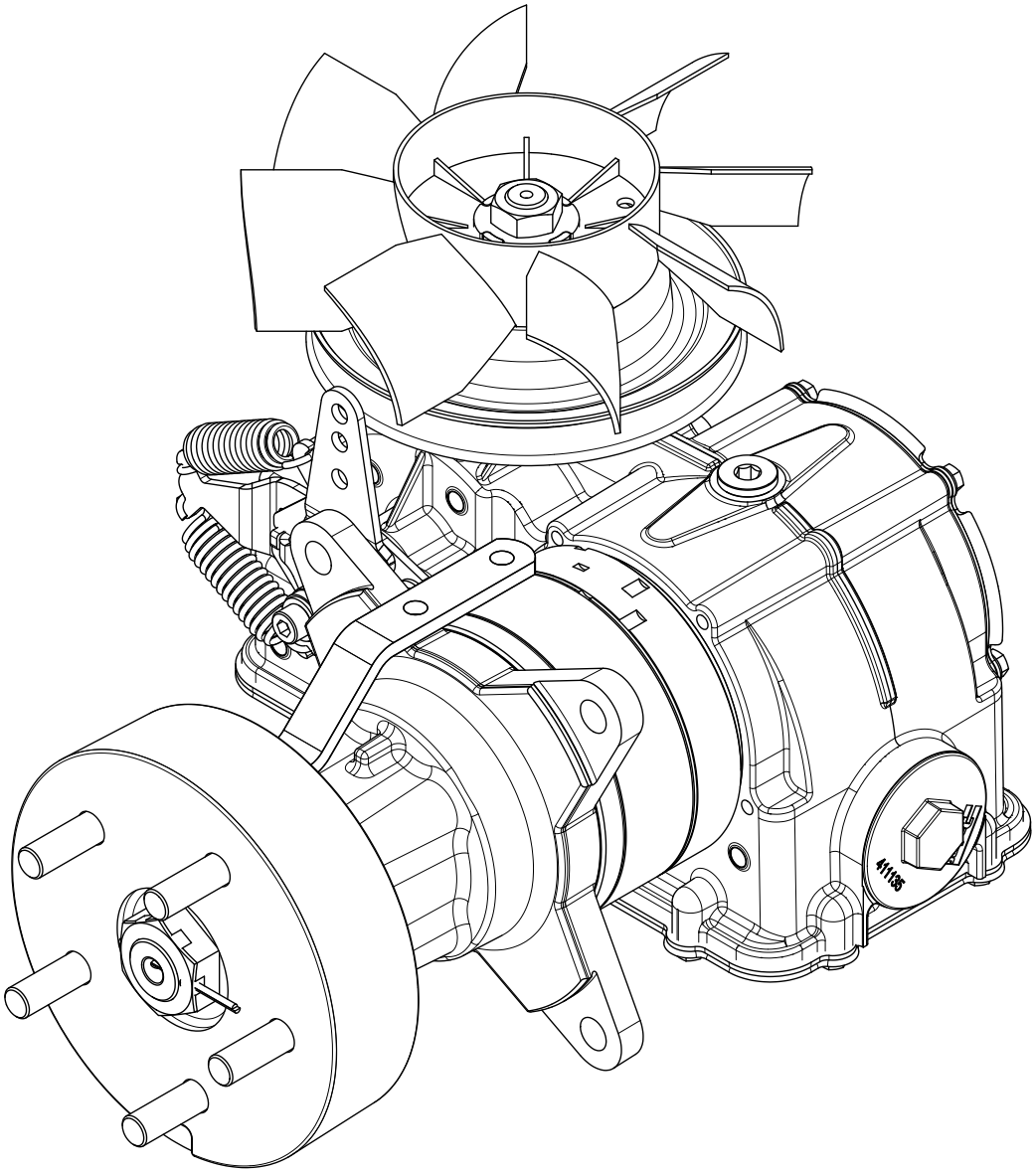
Top View of Mower

(Some parts sectioned for clarity)



Exploded Diagram and Parts List



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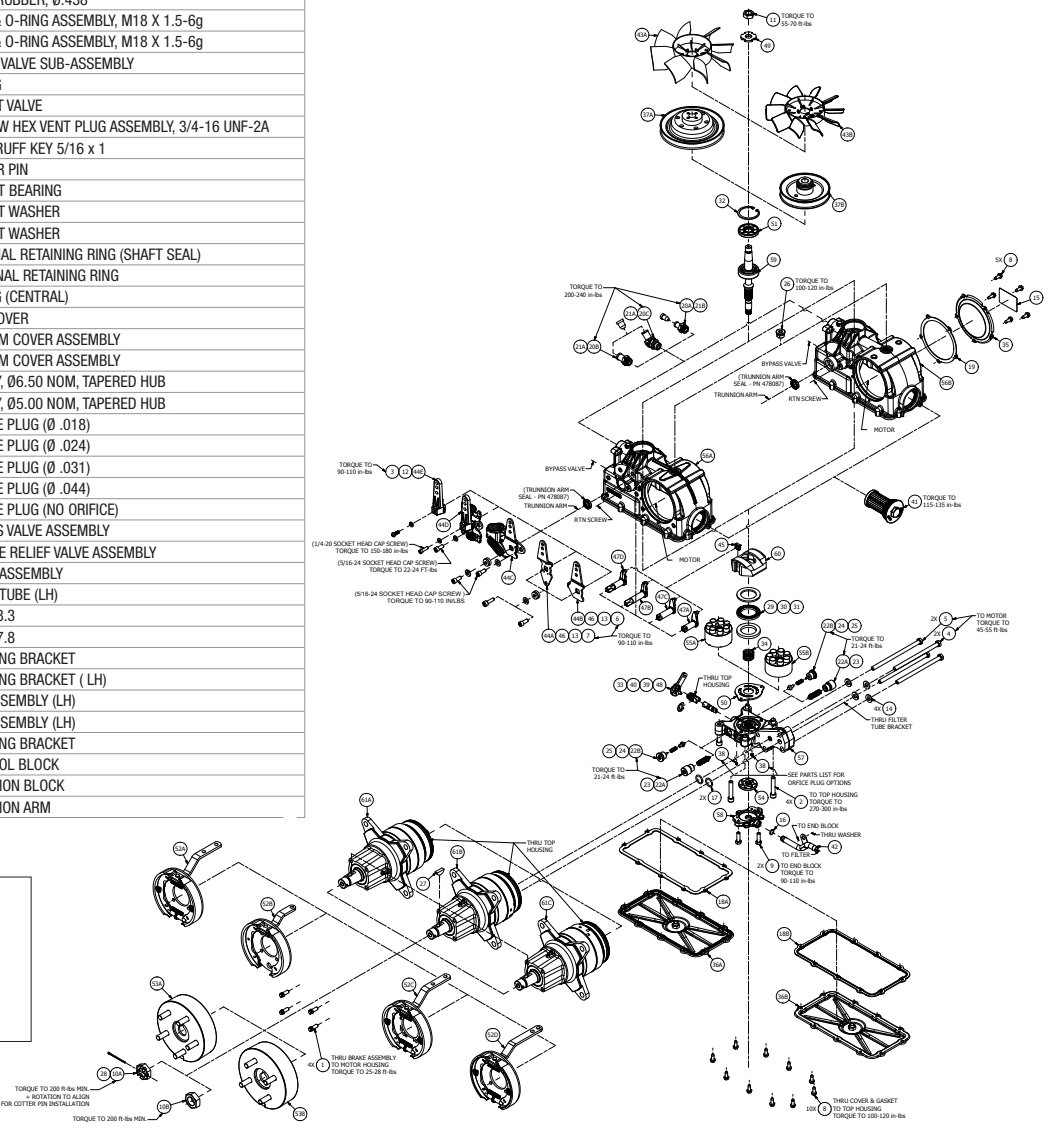
Left-hand Unit Exploded View & Parts List (page 1 of 4)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	020207	FLANGE HEAD CAP SCREW, 5/16-18 UNC-3A X 0.75
2	4	020297	SOCKET HEAD CAP SCREW, 3/8-16 UNRC-3A X 1.5
3	1	020310	BUTTON HEAD CAP SCREW, 1/4-20 X 0.75
4	2	021415	SPECIAL BOLT, 3/8-24 UNF-2A X 6.125
5	2	021393	SPECIAL BOLT, 3/8-24 UNF-2A X 6.625
6	1	021485	SOCKET HEAD CAP SCREW, 5/16-24 UNF-3A x 0.735
7	1	022006	SOCKET HEAD CAP SCREW, M8 X 1.25 X 25mm
8	15	023002	THREAD FORMING SCREW 1/4-20 X .625
9	2	100000031-105	HEX HEAD SCREW 1/4-28 UNRF-2A X 2.25
10A	1	025113	NUT 1-20 UNEF-2B
10B	1	025126	NUT 1-20 UNEF-2B
11	1	025164	NUT 5/8-18 UNF-2B
12	1	028022	WASHER, FLAT, Ø.259 ID X Ø.500 OD X .062
13	1	028025	WASHER, FLAT, Ø8.74mm ID X Ø17.50mm OD X 1.664mm
14	4	028996	WASHER, FLAT, Ø.406 ID X Ø827 OD X .098
15	1	100000068	LABEL
16	1	032202-013	PREFORMED O-RING SEAL
17	2	032202-116	PREFORMED O-RING SEAL
18A	1	034008	GASKET, BOTTOM COVER, FE
18B	1	034007	GASKET, BOTTOM COVER, COMPOSITE
19	1	034009	GASKET, SIDE COVER, FE
20A	1	035007	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20B	1	035008	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20C	1	035009	FITTING, 45° BEADED HOSE BARB, SAE STR THD 3/4-16
21A	1	036321	PLUG, RUBBER, Ø.594
21B	1	036326	PLUG, RUBBER, Ø.438
22A	2	036038	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
22B	2	409035	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
23	2	410113	RELIEF VALVE SUB-ASSEMBLY
24	2	401143	SPRING
25	2	409041	POPPET VALVE
26	1	036044	HOLLOW HEX VENT PLUG ASSEMBLY, 3/4-16 UNF-2A
27	1	038016	WOODRUFF KEY 5/16 x 1
28	1	040204	COTTER PIN
29	1	063048	THRUST BEARING
30	1	069010	THRUST WASHER
31	1	069011	THRUST WASHER
32	1	401114	INTERNAL RETAINING RING (SHAFT SEAL)
33	1	401145	EXTERNAL RETAINING RING
34	1	401302	SPRING (CENTRAL)
35	1	402132	SIDE COVER
36A	1	402136	BOTTOM COVER ASSEMBLY
36B	1	402139	BOTTOM COVER ASSEMBLY
37A	1	403855	PULLEY, Ø6.50 NOM, TAPERED HUB
37B	1	403856	PULLEY, Ø5.00 NOM, TAPERED HUB
38A	2	409353	ORIFICE PLUG (Ø .018)
38B	2	409354	ORIFICE PLUG (Ø .024)
38C	2	409355	ORIFICE PLUG (Ø .031)
38D	2	409356	ORIFICE PLUG (Ø .044)
38E	2	409357	ORIFICE PLUG (NO ORIFICE)
39	1	410123	BYPASS VALVE ASSEMBLY
40	1	410124	CHARGE RELIEF VALVE ASSEMBLY
41	1	411135	FILTER ASSEMBLY
42	1	411136	FILTER TUBE (LH)
43A	1	420067	FAN, Ø8.3
43B	1	420142	FAN, Ø7.8
44A	1	420068	ROTATING BRACKET
44B	1	420072	ROTATING BRACKET (LH)
44C	1	420077	RTN ASSEMBLY (LH)
44D	1	420122	RTN ASSEMBLY (LH)
44E	1	452028	ROTATING BRACKET
45	1	452011	CONTROL BLOCK
46	1	452020	TRUNNION BLOCK
47A	1	452005	TRUNNION ARM
47B	1	452016	TRUNNION ARM
47C	1	452019	TRUNNION ARM
47D	1	452027	TRUNNION ARM
48	1	452018	BYPASS LEVER
49	1	477370	FAN SPACER
50	1	477369	PORT PLATE
51	1	478086	SHAFT SEAL
52A	1	490164	BRAKE ASSEMBLY
52B	1	490169	BRAKE ASSEMBLY
52C	1	490225	BRAKE ASSEMBLY
52D	1	490242	BRAKE ASSEMBLY
53A	1	490216	BRAKE DRUM, 5 BOLT
53B	1	490218	BRAKE DRUM, 4 BOLT
54	1	H1A014000	ROTOR SET ASSEMBLY
55A	1	H1A147000	PISTON & BARREL ASSEMBLY, 14 cc/REV
55B	1	H1A167000	PISTON & BARREL ASSEMBLY, 16cc/REV
56A	1	HD012001L-A1	TOP HOUSING ASSEMBLY (LH)
56B	1	HD012001L-A2	TOP HOUSING ASSEMBLY (LH)
57	1	HD016000L-A1	END BLOCK ASSEMBLY (LH)
58	1	HD018000	CHARGE PUMP COVER
59	1	HD019000-A1	SHAFT ASSEMBLY
60	1	HP2013000-A1	SWASH BLOCK ASSEMBLY
61A	1	TG0240SD080HTAA	MOTOR ASSEMBLY, 240cc/REV
61B	1	TG0280SD080HTAA	MOTOR ASSEMBLY, 280cc/REV
61C	1	TG0310SD080HTAA	MOTOR ASSEMBLY, 310cc/REV
62	0.72gal	045642	PARKER HT-1000, HYDRAULIC TRANSMISSION OIL



NOTE

Full view.
See additional pages for scaled-up views and part listings

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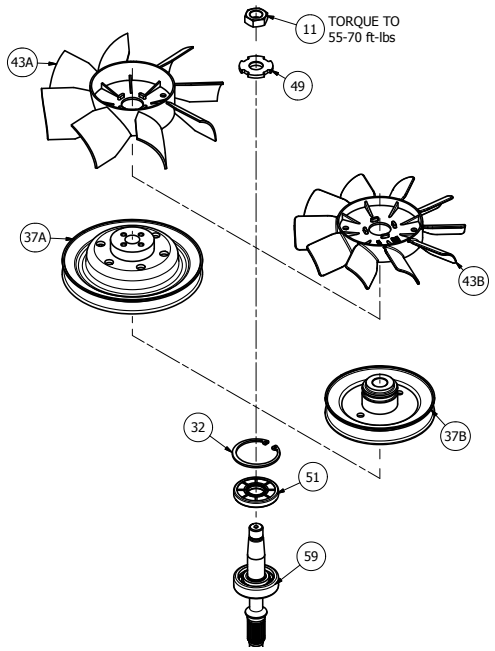
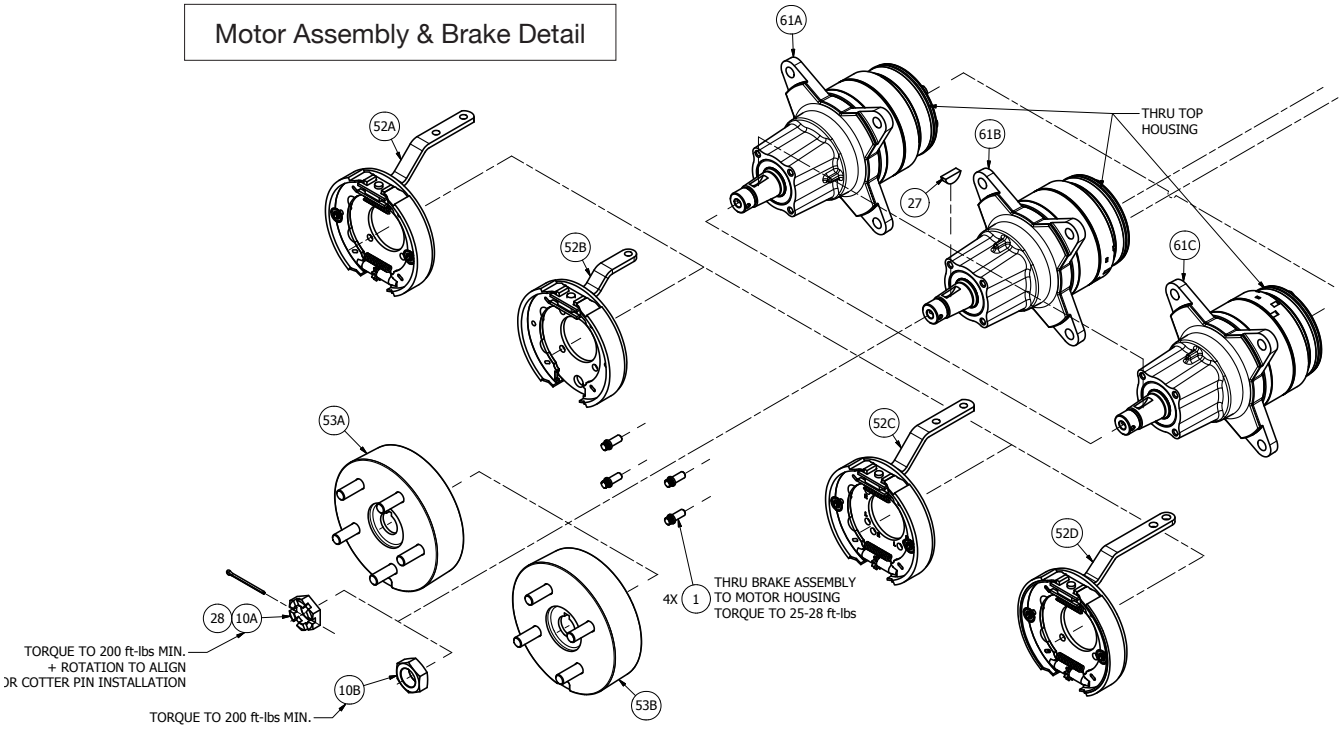
Left-hand Unit Exploded View & Parts List (page 2 of 4)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	020207	FLANGE HEAD CAP SCREW, 5/16-18 UNC-3A X 0.75
10A	1	025113	NUT 1-20 UNEF-2B
10B	1	025126	NUT 1-20 UNEF-2B
11	1	025164	NUT 5/8-18 UNF-2B
27	1	038016	WOODRUFF KEY 5/16 x 1
28	1	040204	COTTER PIN
32	1	401114	INTERNAL RETAINING RING (SHAFT SEAL)
37A	1	403855	PULLEY, Ø6.50 NOM, TAPERED HUB
37B	1	403856	PULLEY, Ø5.00 NOM, TAPERED HUB
43A	1	420067	FAN, Ø8.3
43B	1	420142	FAN, Ø7.8
49	1	477370	FAN SPACER
51	1	478086	SHAFT SEAL
52A	1	490164	BRAKE ASSEMBLY
52B	1	490169	BRAKE ASSEMBLY
52C	1	490225	BRAKE ASSEMBLY
52D	1	490242	BRAKE ASSEMBLY
53A	1	490216	BRAKE DRUM, 5 BOLT
53B	1	490218	BRAKE DRUM, 4 BOLT
59	1	HD019000-A1	SHAFT ASSEMBLY
61A	1	TG0240SD080HTAA	MOTOR ASSEMBLY, 240cc/REV
61B	1	TG0280SD080HTAA	MOTOR ASSEMBLY, 280cc/REV
61C	1	TG0310SD080HTAA	MOTOR ASSEMBLY, 310cc/REV

Fan & Pulley Detail



Motor Assembly & Brake Detail



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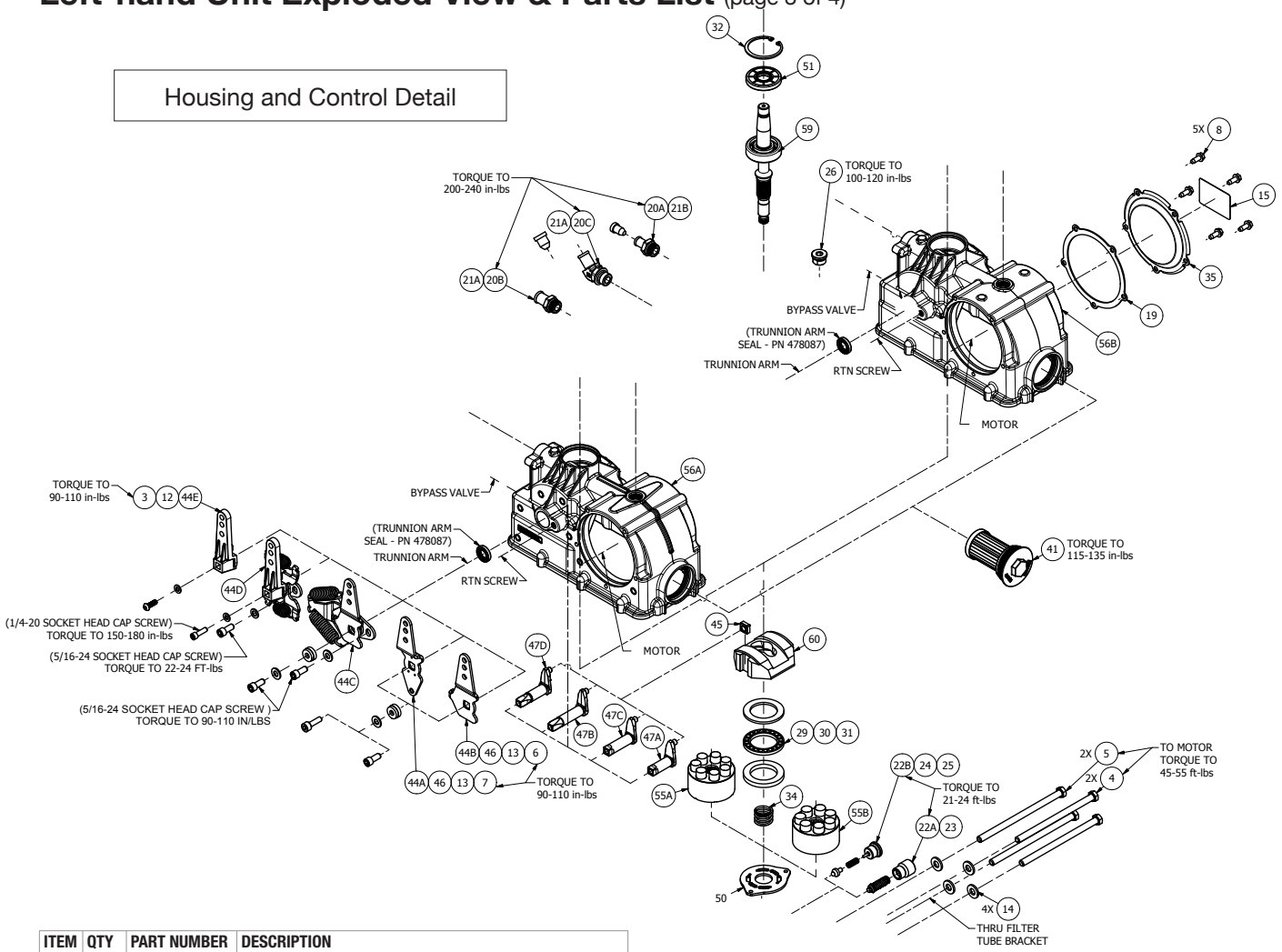
Left-hand Unit Exploded View & Parts List (page 3 of 4)

Housing and Control Detail

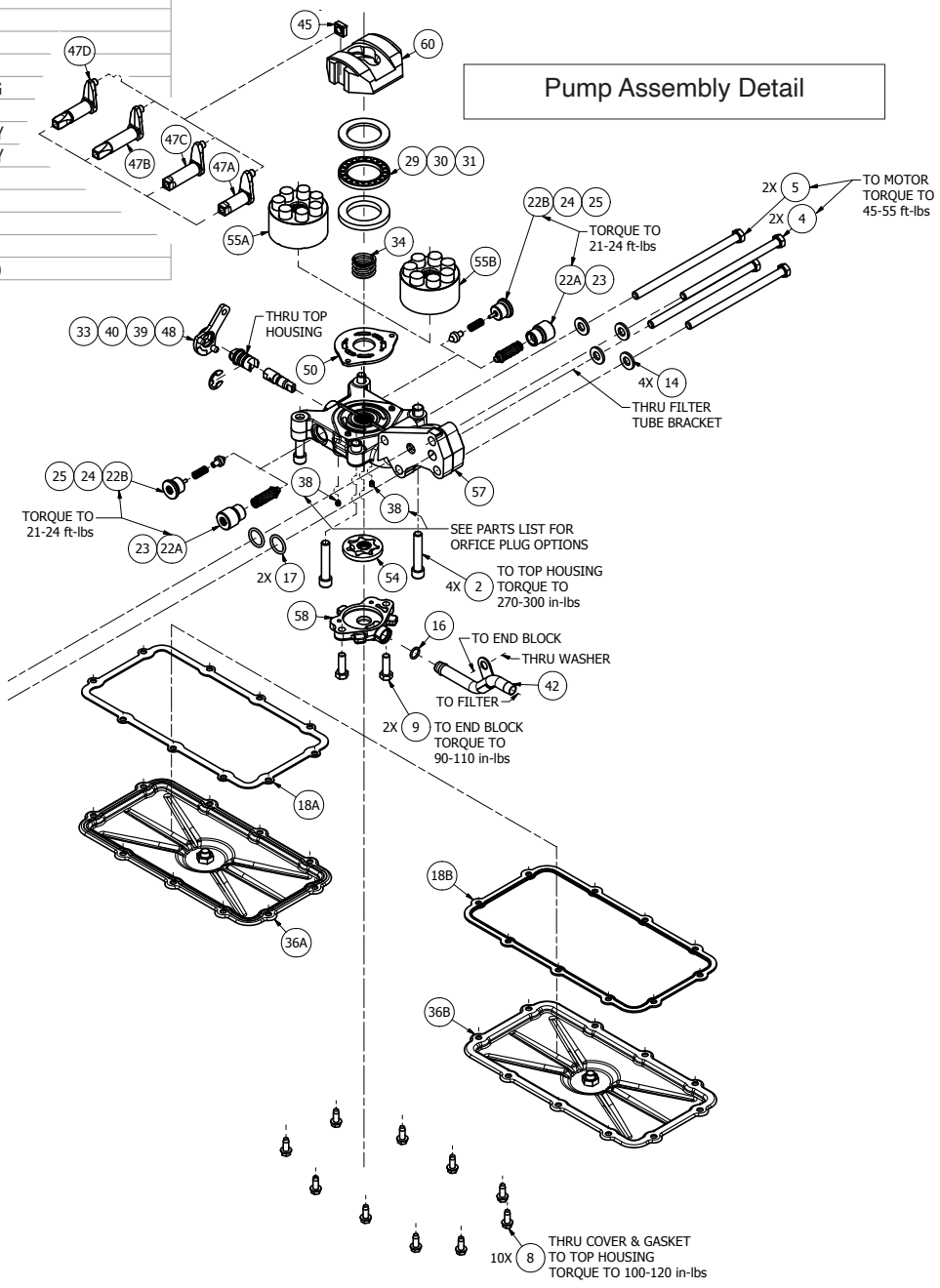


ITEM	QTY	PART NUMBER	DESCRIPTION
2	4	020297	SOCKET HEAD CAP SCREW, 3/8-16 UNRC-3A X 1.5
3	1	020310	BUTTON HEAD CAP SCREW, 1/4-20 X 0.75
4	2	021415	SPECIAL BOLT, 3/8-24 UNF-2A X 6.125
5	2	021393	SPECIAL BOLT, 3/8-24 UNF-2A X 6.625
6	1	021485	SOCKET HEAD CAP SCREW, 5/16-24 UNF-3A x 0.735
7	1	022006	SOCKET HEAD CAP SCREW, M8 X 1.25 X 25mm
8	15	023002	THREAD FORMING SCREW 1/4-20 X .625
12	1	028022	WASHER, FLAT, Ø.259 ID X Ø.500 OD X .062
13	1	028025	WASHER, FLAT, Ø8.74mm ID X Ø17.50mm OD X 1.664mm
14	4	028996	WASHER, FLAT, Ø.406 ID X Ø827 OD X .098
15	1	100000068	LABEL
19	1	034009	GASKET, SIDE COVER, FE
20A	1	035007	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20B	1	035008	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20C	1	035009	FITTING, 45° BEADED HOSE BARB, SAE STR THD 3/4-16
21A	1	036321	PLUG, RUBBER, Ø.594
21B	1	036326	PLUG, RUBBER, Ø.438
22A	2	036038	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
22B	2	409035	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
23	2	410113	RELIEF VALVE SUB-ASSEMBLY
24	2	401143	SPRING
25	2	409041	POPPET VALVE
26	1	036044	HOLLOW HEX VENT PLUG ASSEMBLY, 3/4-16 UNF-2A
29	1	063048	THRUST BEARING
30	1	069010	THRUST WASHER
31	1	069011	THRUST WASHER
32	1	401114	INTERNAL RETAINING RING (SHAFT SEAL)

34	1	401302	SPRING (CENTRAL)
35	1	402132	SIDE COVER
41	1	411135	FILTER ASSEMBLY
42	1	411136	FILTER TUBE (LH)
43A	1	420067	FAN, Ø8.3
43B	1	420142	FAN, Ø7.8
44A	1	420068	ROTATING BRACKET
44B	1	420072	ROTATING BRACKET (LH)
44C	1	420077	RTN ASSEMBLY (LH)
44D	1	420122	RTN ASSEMBLY (LH)
44E	1	452028	ROTATING BRACKET
45	1	452011	CONTROL BLOCK
46	1	452020	TRUNNION BLOCK
47A	1	452005	TRUNNION ARM
47B	1	452016	TRUNNION ARM
47C	1	452019	TRUNNION ARM
47D	1	452027	TRUNNION ARM
50	1	477369	PORT PLATE
51	1	478086	SHAFT SEAL
55A	1	H1A147000	PISTON & BARREL ASSEMBLY, 14 cc/REV
55B	1	H1A167000	PISTON & BARREL ASSEMBLY, 16cc/REV
56A	1	HD012001L-A1	TOP HOUSING ASSEMBLY (LH)
56B	1	HD012001L-A2	TOP HOUSING ASSEMBLY (LH)
57	1	HD016000L-A1	END BLOCK ASSEMBLY (LH)
58	1	HD018000	CHARGE PUMP COVER
59	1	HD019000-A1	SHAFT ASSEMBLY
60	1	HP2013000-A1	SWASH BLOCK ASSEMBLY

Left-hand Unit Exploded View & Parts List (page 4 of 4)

ITEM	QTY	PART NUMBER	DESCRIPTION
2	4	020297	SOCKET HEAD CAP SCREW, 3/8-16 UNRC-3A X 1.5
4	2	021415	SPECIAL BOLT, 3/8-24 UNF-2A X 6.125
5	2	021393	SPECIAL BOLT, 3/8-24 UNF-2A X 6.625
8	15	023002	THREAD FORMING SCREW 1/4-20 X .625
9	2	100000031-105	HEX HEAD SCREW 1/4-28 UNRF-2A X 2.25
14	4	028996	WASHER, FLAT, Ø.406 ID X Ø827 OD X .098
16	1	032202-013	PREFORMED O-RING SEAL
17	2	032202-116	PREFORMED O-RING SEAL
18A	1	034008	GASKET, BOTTOM COVER, FE
18B	1	034007	GASKET, BOTTOM COVER, COMPOSITE
22A	2	036038	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
22B	2	409035	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
23	2	410113	RELIEF VALVE SUB-ASSEMBLY
24	2	401143	SPRING
25	2	409041	POPPET VALVE
29	1	063048	THRUST BEARING
30	1	069010	THRUST WASHER
31	1	069011	THRUST WASHER
33	1	401145	EXTERNAL RETAINING RING
34	1	401302	SPRING (CENTRAL)
36A	1	402136	BOTTOM COVER ASSEMBLY
36B	1	402139	BOTTOM COVER ASSEMBLY
38A	2	409353	ORIFICE PLUG (Ø .018)
38B	2	409354	ORIFICE PLUG (Ø .024)
38C	2	409355	ORIFICE PLUG (Ø .031)
38D	2	409356	ORIFICE PLUG (Ø .044)
38E	2	409357	ORIFICE PLUG (NO ORIFICE)
39	1	410123	BYPASS VALVE ASSEMBLY
40	1	410124	CHARGE RELIEF VALVE ASSEMBLY
42	1	411136	FILTER TUBE (LH)
45	1	452011	CONTROL BLOCK
47A	1	452005	TRUNNION ARM
47B	1	452016	TRUNNION ARM
47C	1	452019	TRUNNION ARM
47D	1	452027	TRUNNION ARM
48	1	452018	BYPASS LEVER
50	1	477369	PORT PLATE
54	1	H1A014000	ROTOR SET ASSEMBLY
58	1	HD018000	CHARGE PUMP COVER
59	1	HD019000-A1	SHAFT ASSEMBLY
60	1	HP2013000-A1	SWASH BLOCK ASSEMBLY



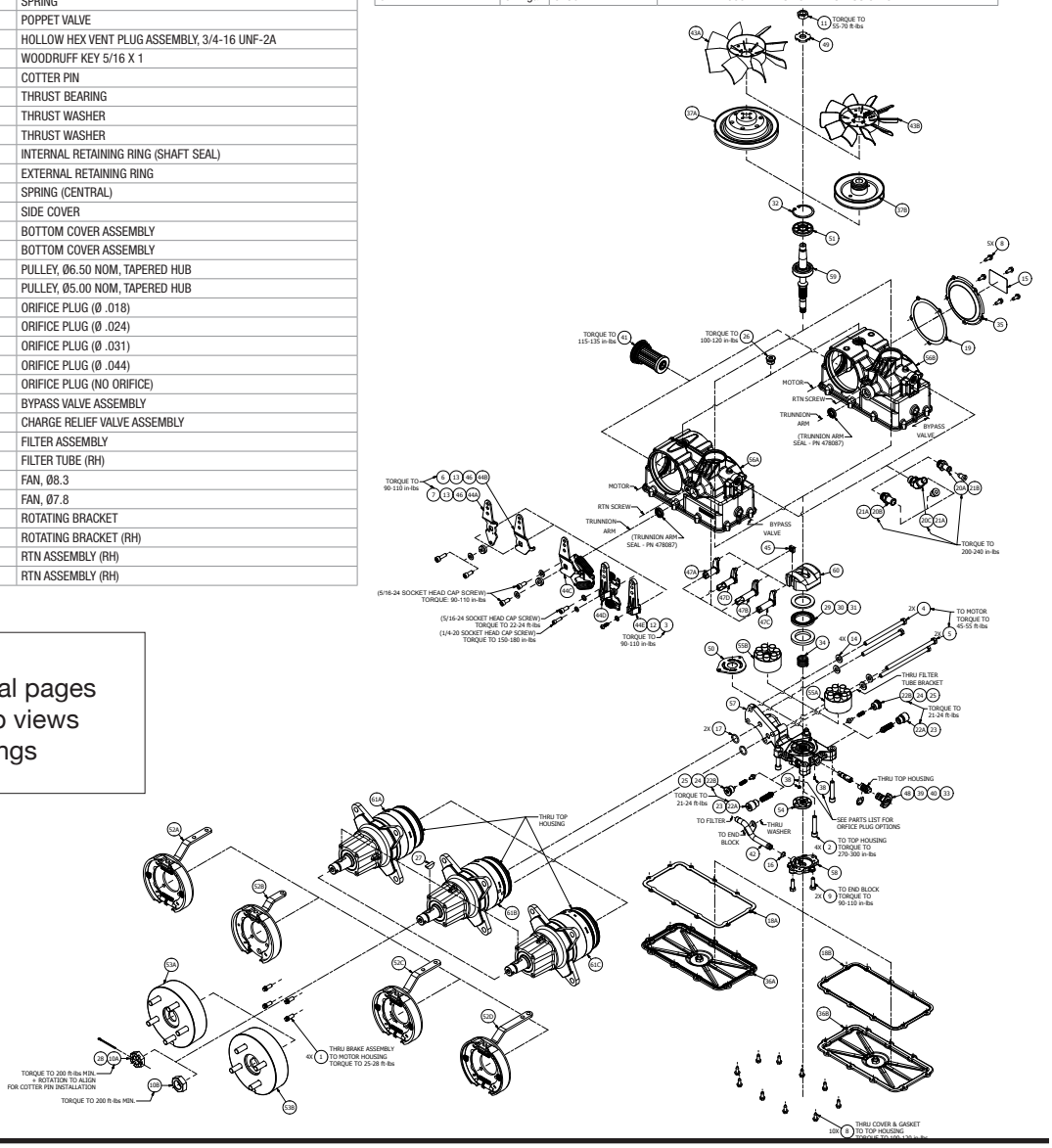
Parker Hannifin Corporation
Hydraulic Pump/Motor Division
Greeneville, Tennessee USA

Right-hand Unit Exploded View & Parts List (page 1 of 4)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	020207	FLANGE HEAD CAP SCREW, 5/16-18 UNC-3A X .75
2	4	020297	SOCKET HEAD CAP SCREW, 3/8-16 UNRC-3A X 1.5
3	1	020310	BUTTON HEAD CAP SCREW, 1/4-20 X .75
4	2	021291	SPECIAL BOLT, 3/8-24 UNF-2A X 5.375
5	2	021393	SPECIAL BOLT, 3/8-24 UNF-2A X 6.625
6	1	021485	SOCKET HEAD CAP SCREW 5/16-24 UNF-3A X .735
7	1	022006	SOCKET HEAD CAP SCREW, M8 X 1.25 X 25mm
8	15	023002	THREAD FORMING SCREW, 1/4-20 X .625
9	2	100000031-105	HEX HEAD SCREW, 1/4-28 UNRF-2A X 2.25
10A	1	025113	NUT 1-20 UNEF-2B
10B	1	025126	NUT 1-20 UNEF-2B
11	1	025164	NUT 5/8-18 UNF-2B
12	1	028022	WASHER, FLAT, Ø.259 ID X Ø.500 OD X .062
13	1	028025	WASHER, FLAT, Ø8.74mm ID X Ø17.50mm OD X 1.664mm
14	4	028996	WASHER, FLAT, Ø.406 ID X Ø.827 OD X .098
15	1	030049	LABEL
16	1	032202-013	PREFORMED O-RING SEAL
17	2	032202-116	PREFORMED O-RING SEAL
18A	1	034008	GASKET, BOTTOM COVER, FE
18B	1	034007	GASKET, BOTTOM COVER, COMPOSITE
19	1	034009	GASKET, SIDE COVER, FE
20A	1	035007	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20B	1	035008	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20C	1	035009	FITTING, 45° BEADED HOSE BARB, SAE STR THD 3/4-16
21A	1	036321	PLUG,RUBBER, Ø.594 NOM
21B	1	036326	PLUG, RUBBER, Ø.438 NOM
22A	2	036038	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
22B	2	409035	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
23	2	410113	RELIEF VALVE SUB-ASSEMBLY
24	2	401143	SPRING
25	2	409041	POPPET VALVE
26	1	036044	HOLLOW HEX VENT PLUG ASSEMBLY, 3/4-16 UNF-2A
27	1	038016	WOODRUFF KEY 5/16 X 1
28	1	040204	COTTER PIN
29	1	063048	THRUST BEARING
30	1	069010	THRUST WASHER
31	1	069011	THRUST WASHER
32	1	401114	INTERNAL RETAINING RING (SHAFT SEAL)
33	1	401145	EXTERNAL RETAINING RING
34	1	401302	SPRING (CENTRAL)
35	1	402132	SIDE COVER
36A	1	402136	BOTTOM COVER ASSEMBLY
36B	1	402139	BOTTOM COVER ASSEMBLY
37A	1	403855	PULLEY, Ø6.50 NOM, TAPERED HUB
37B	1	403856	PULLEY, Ø5.00 NOM, TAPERED HUB
38A	2	409353	ORIFICE PLUG (Ø .018)
38B	2	409354	ORIFICE PLUG (Ø .024)
38C	2	409355	ORIFICE PLUG (Ø .031)
38D	2	409356	ORIFICE PLUG (Ø .044)
38E	2	409357	ORIFICE PLUG (NO ORIFICE)
39	1	410123	BYPASS VALVE ASSEMBLY
40	1	410124	CHARGE RELIEF VALVE ASSEMBLY
41	1	411135	FILTER ASSEMBLY
42	1	411137	FILTER TUBE (RH)
43A	1	420067	FAN, Ø8.3
43B	1	420142	FAN, Ø7.8
44A	1	420068	ROTATING BRACKET
44B	1	420073	ROTATING BRACKET (RH)
44C	1	420078	RTN ASSEMBLY (RH)
44D	1	420123	RTN ASSEMBLY (RH)
44E	1	452028	ROTATING BRACKET
45	1	452011	CONTROL BLOCK
46	1	452020	TRUNNION BLOCK
47A	1	452005	TRUNNION ARM
47B	1	452016	TRUNNION ARM
47C	1	452019	TRUNNION ARM
47D	1	452027	TRUNNION ARM
48	1	452018	BYPASS LEVER
49	1	477370	FAN SPACER
50	1	477369	PORT PLATE
51	1	478086	SHAFT SEAL
52A	1	490164	BRAKE ASSEMBLY
52B	1	490169	BRAKE ASSEMBLY
52C	1	490225	BRAKE ASSEMBLY
52D	1	490242	BRAKE ASSEMBLY
53A	1	490216	BRAKE DRUM, 5 BOLT
53B	1	490218	BRAKE DRUM, 4 BOLT
54	1	H1A014000	ROTOR SET ASSEMBLY
55A	1	H1A147000	PISTON & BARREL ASSEMBLY, 14cc/REV
55B	1	H1A167000	PISTON & BARREL ASSEMBLY, 16cc/REV
56A	1	HD012001R-A1	TOP HOUSING ASSEMBLY (RH)
56B	1	HD012001R-A2	TOP HOUSING ASSEMBLY (RH)
57	1	HD016000R-A1	END BLOCK ASSEMBLY (RH)
58	1	HD018000	CHARGE PUMP COVER
59	1	HD019000-A1	SHAFT ASSEMBLY
60	1	HP2013000-A1	SWASH BLOCK ASSEMBLY
61A	1	TG0240SD081HTAA	MOTOR ASSEMBLY, 240cc/REV
61B	1	TG0280SD081HTAA	MOTOR ASSEMBLY, 280cc/REV
61C	1	TG0310SD081HTAA	MOTOR ASSEMBLY, 310cc/REV
62	0.72gal	045642	PARKER HT-1000 HYDRAULIC TRANSMISSION OIL

NOTE

Full view.
See additional pages for scaled-up views and part listings

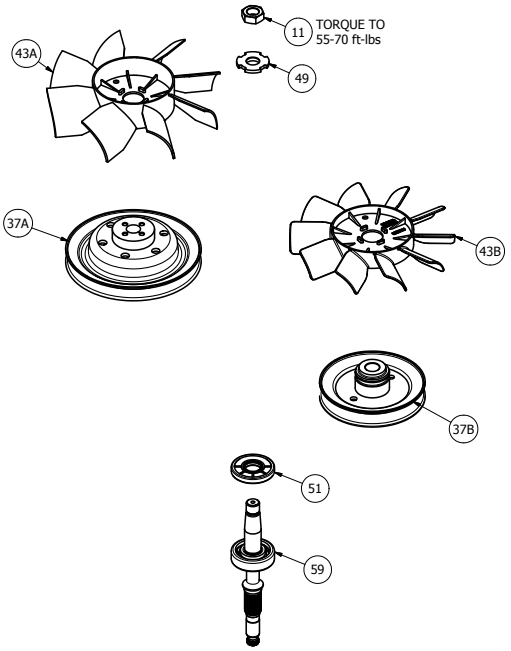


Parker Hannifin Corporation
Hydraulic Pump/Motor Division
Greeneville, Tennessee USA

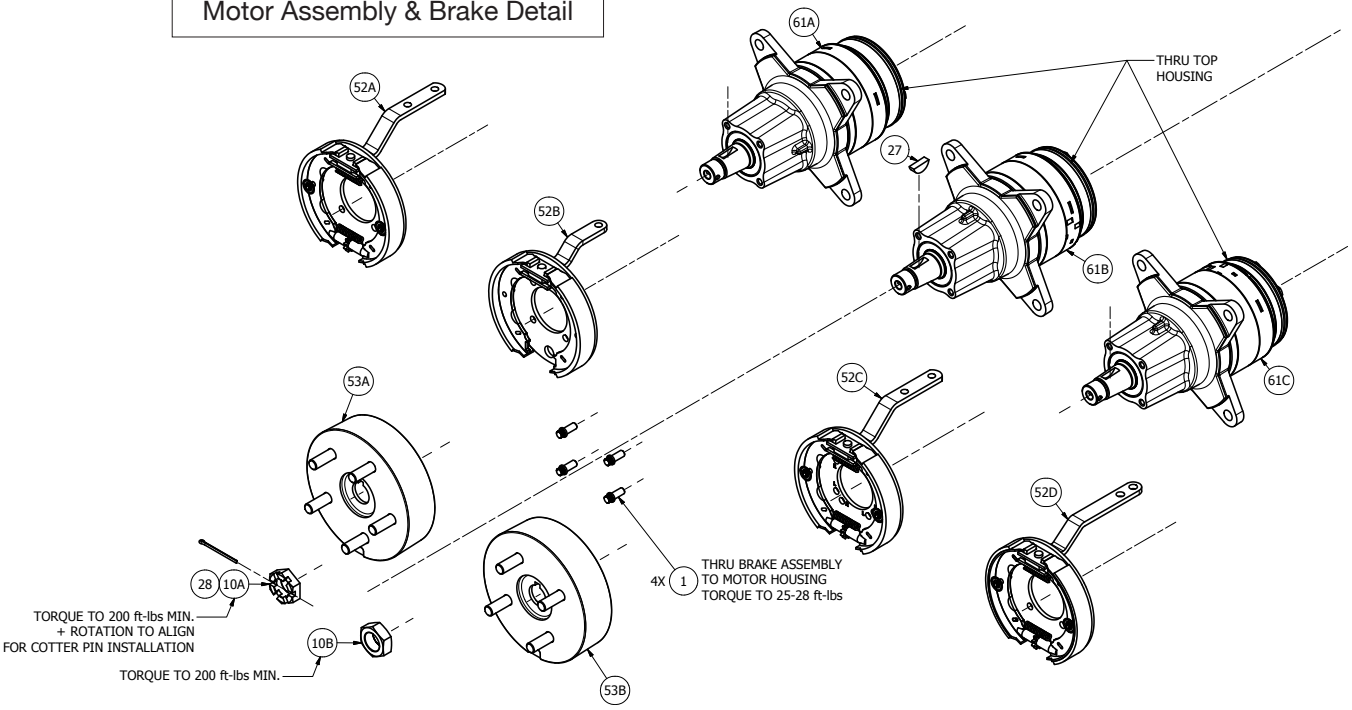
Right-hand Unit Exploded View & Parts List (page 2 of 4)

ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	020207	FLANGE HEAD CAP SCREW, 5/16-18 UNC-3A X .75
10A	1	025113	NUT 1-20 UNEF-2B
10B	1	025126	NUT 1-20 UNEF-2B
11	1	025164	NUT 5/8-18 UNF-2B
27	1	038016	WOODRUFF KEY 5/16 X 1
28	1	040204	COTTER PIN
32	1	401114	INTERNAL RETAINING RING (SHAFT SEAL)
37A	1	403855	PULLEY, Ø6.50 NOM, TAPERED HUB
37B	1	403856	PULLEY, Ø5.00 NOM, TAPERED HUB
43A	1	420067	FAN, Ø8.3
43B	1	420142	FAN, Ø7.8
49	1	477370	FAN SPACER
51	1	478086	SHAFT SEAL
52A	1	490164	BRAKE ASSEMBLY
52B	1	490169	BRAKE ASSEMBLY
52C	1	490225	BRAKE ASSEMBLY
52D	1	490242	BRAKE ASSEMBLY
53A	1	490216	BRAKE DRUM, 5 BOLT
53B	1	490218	BRAKE DRUM, 4 BOLT
59	1	HD019000-A1	SHAFT ASSEMBLY
61A	1	TG0240SD081HTAA	MOTOR ASSEMBLY, 240cc/REV
61B	1	TG0280SD081HTAA	MOTOR ASSEMBLY, 280cc/REV
61C	1	TG0310SD081HTAA	MOTOR ASSEMBLY, 310cc/REV

Fan & Pulley Detail



Motor Assembly & Brake Detail



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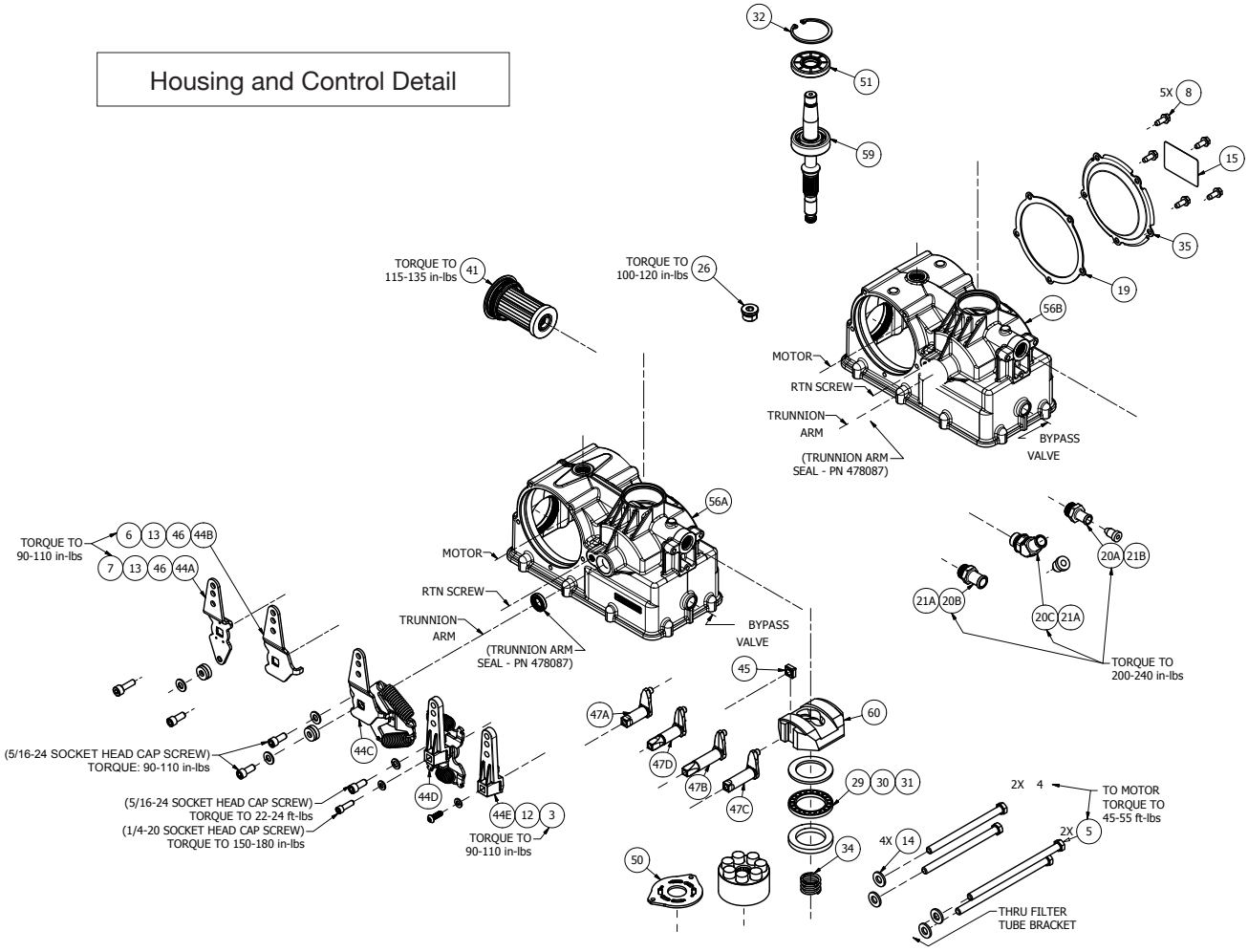
Hydraulic Pump/Motor Division
Greeneville, Tennessee USA

Right-hand Unit Exploded View & Parts List (page 3 of 4)

Housing and Control Detail



ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	020310	BUTTON HEAD CAP SCREW, 1/4-20 X .75
5	2	021393	SPECIAL BOLT, 3/8-24 UNF-2A X 6.625
6	1	021485	SOCKET HEAD CAP SCREW 5/16-24 UNF-3A X .735
7	1	022006	SOCKET HEAD CAP SCREW, M8 X 1.25 X 25mm
8	15	023002	THREAD FORMING SCREW, 1/4-20 X .625
12	1	028022	WASHER, FLAT, Ø.259 ID X Ø.500 OD X .062
13	1	028025	WASHER, FLAT, Ø8.74mm ID X Ø17.50mm OD X 1.664mm
14	4	028996	WASHER, FLAT, Ø.406 ID X Ø.827 OD X .098
15	1	030049	LABEL
19	1	034009	GASKET, SIDE COVER, FE
20A	1	035007	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20B	1	035008	FITTING, BEADED HOSE BARB, SAE STR THD 3/4-16
20C	1	035009	FITTING, 45° BEADED HOSE BARB, SAE STR THD 3/4-16
21A	1	036321	PLUG,RUBBER, Ø.594 NOM
21B	1	036326	PLUG, RUBBER, Ø.438 NOM
26	1	036044	HOLLOW HEX VENT PLUG ASSEMBLY, 3/4-16 UNF-2A
29	1	063048	THRUST BEARING
30	1	069010	THRUST WASHER
31	1	069011	THRUST WASHER
32	1	401114	INTERNAL RETAINING RING (SHAFT SEAL)
34	1	401302	SPRING (CENTRAL)
35	1	402132	SIDE COVER
41	1	411135	FILTER ASSEMBLY
44A	1	420068	ROTATING BRACKET
44B	1	420073	ROTATING BRACKET (RH)
44C	1	420078	RTN ASSEMBLY (RH)
44D	1	420123	RTN ASSEMBLY (RH)
44E	1	452028	ROTATING BRACKET
45	1	452011	CONTROL BLOCK
46	1	452020	TRUNNION BLOCK
47A	1	452005	TRUNNION ARM
47B	1	452016	TRUNNION ARM
47C	1	452019	TRUNNION ARM
47D	1	452027	TRUNNION ARM
50	1	477369	PORT PLATE
51	1	478086	SHAFT SEAL
56A	1	HD012001R-A1	TOP HOUSING ASSEMBLY (RH)
56B	1	HD012001R-A2	TOP HOUSING ASSEMBLY (RH)
59	1	HD019000-A1	SHAFT ASSEMBLY
60	1	HP2013000-A1	SWASH BLOCK ASSEMBLY

Parker Hannifin Corporation
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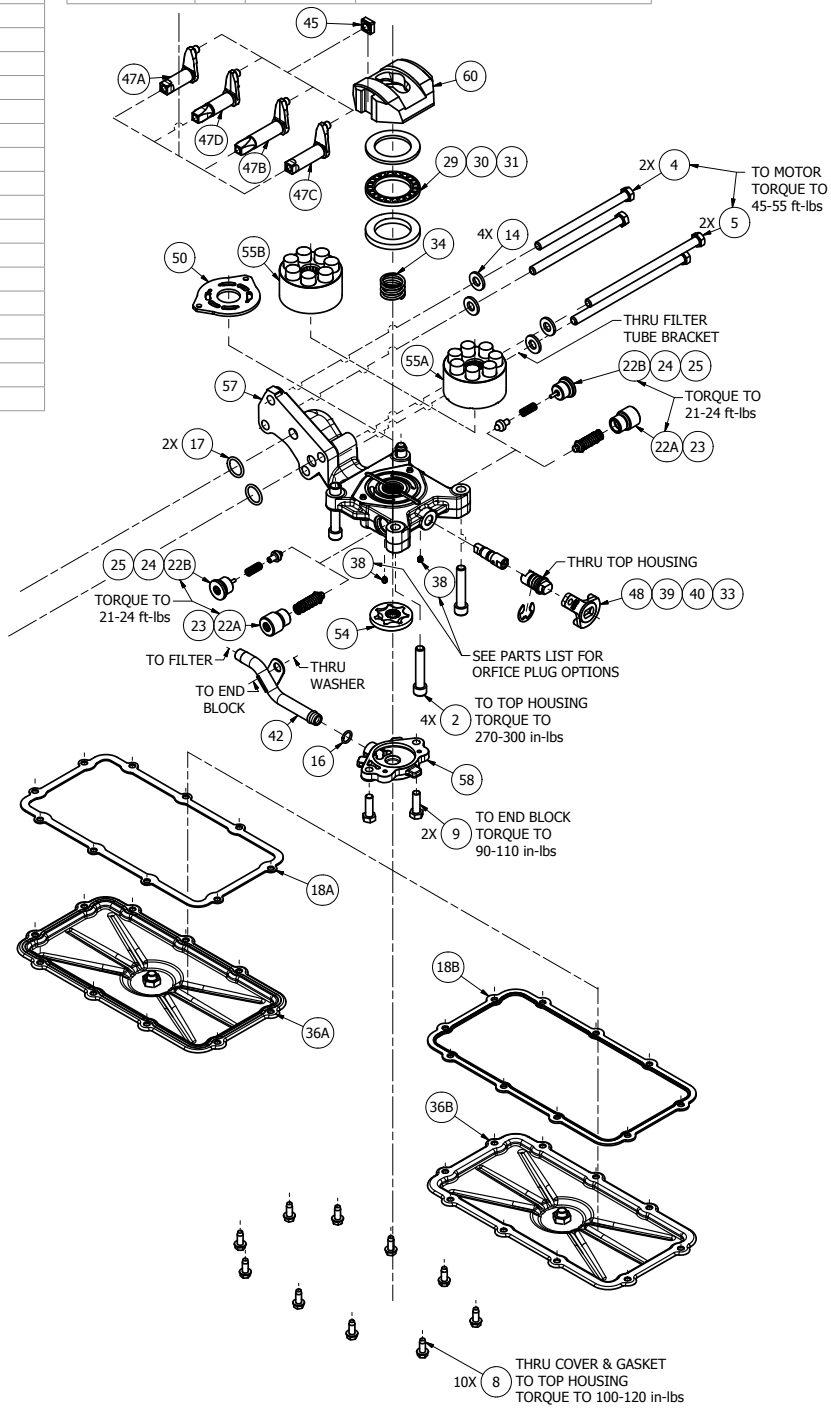
Right-hand Unit Exploded View & Parts List (page 4 of 4)

ITEM	QTY	PART NUMBER	DESCRIPTION
5	2	021393	SPECIAL BOLT, 3/8-24 UNF-2A X 6.625
8	15	023002	THREAD FORMING SCREW, 1/4-20 X .625
9	2	100000031-105	HEX HEAD SCREW, 1/4-28 UNRF-2A X 2.25
14	4	028996	WASHER, FLAT, Ø.406 ID X Ø.827 OD X .098
16	1	032202-013	PREFORMED O-RING SEAL
17	2	032202-116	PREFORMED O-RING SEAL
18A	1	034008	GASKET, BOTTOM COVER, FE
18B	1	034007	GASKET, BOTTOM COVER, COMPOSITE
22A	2	036038	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
22B	2	409035	PLUG & O-RING ASSEMBLY, M18 X 1.5-6g
23	2	410113	RELIEF VALVE SUB-ASSEMBLY
24	2	401143	SPRING
25	2	409041	POPPET VALVE
29	1	063048	THRUST BEARING
30	1	069010	THRUST WASHER
31	1	069011	THRUST WASHER
33	1	401145	EXTERNAL RETAINING RING
34	1	401302	SPRING (CENTRAL)
36A	1	402136	BOTTOM COVER ASSEMBLY
36B	1	402139	BOTTOM COVER ASSEMBLY
38A	2	409353	ORIFICE PLUG (Ø .018)
38B	2	409354	ORIFICE PLUG (Ø .024)
38C	2	409355	ORIFICE PLUG (Ø .031)
38D	2	409356	ORIFICE PLUG (Ø .044)
38E	2	409357	ORIFICE PLUG (NO ORIFICE)
39	1	410123	BYPASS VALVE ASSEMBLY
40	1	410124	CHARGE RELIEF VALVE ASSEMBLY
42	1	411137	FILTER TUBE (RH)
45	1	452011	CONTROL BLOCK
46	1	452020	TRUNNION BLOCK
47A	1	452005	TRUNNION ARM
47B	1	452016	TRUNNION ARM
47C	1	452019	TRUNNION ARM
47D	1	452027	TRUNNION ARM
48	1	452018	BYPASS LEVER
50	1	477369	PORT PLATE
54	1	H1A014000	ROTOR SET ASSEMBLY
57	1	HD016000R-A1	END BLOCK ASSEMBLY (RH)
58	1	HD018000	CHARGE PUMP COVER
59	1	HD019000-A1	SHAFT ASSEMBLY
60	1	HP2013000-A1	SWASH BLOCK ASSEMBLY

Pump Assembly Detail



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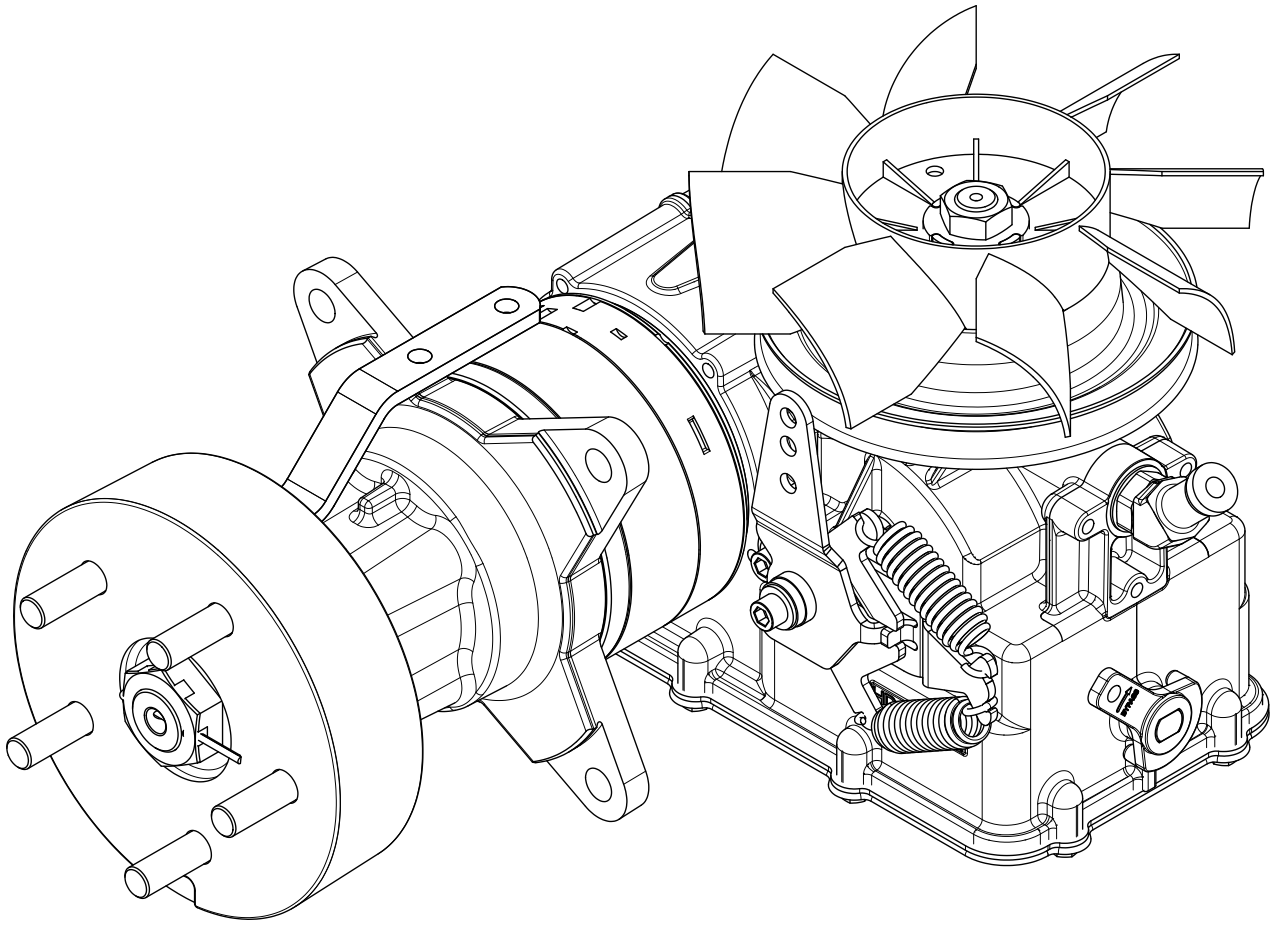
Greeneville, Tennessee USA

Service Kit Information



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Hydraulic Pump/Motor Division
Greeneville, Tennessee USA

Service Kit Information (page 1 of 3)

SK000275	HTG SERVICE KIT, FAN (8.3" Fan)		
Item	QTY	Part Number	Description
1	1	25164	Nut
2	1	477370	Fan Spacer
3	1	420067	Fan (8.3")
	1	SK000275 Sheet 3	Service Bulletin

SK000276	HTG SERVICE KIT, MOTOR (240cc- Right Hand Side)		
Item	QTY	Part Number	Description
1	1	TG0240SD081HTAA	SA, Motor
2	2	032202-116	Packing, Preformed, O-Ring Seal
3	1	034009	Gasket, Side Cover
4	1	SK000276	Service Bulletin

SK000277	HTG SERVICE KIT, MOTOR (280cc- Right hand Side)		
Item	QTY	Part Number	Description
1	1	TG0280SD081HTAA	SA, Motor
2	2	032202-116	Packing, Preformed, O-Ring Seal
3	1	034009	Gasket, Side Cover
4	1	SK000277 Sheet 3	Service Bulletin

SK000278	HTG SERVICE KIT, MOTOR (310cc- Right hand Side)		
Item	QTY	Part Number	Description
1	1	TG0310SD081HTAA	SA, Motor
2	2	032202-116	Packing, Preformed, O-Ring Seal
3	1	034009	Gasket, Side Cover
4	1	SK000278 Sheet 3	Service Bulletin

SK000279	HTG SERVICE KIT, MOTOR (240cc- Left hand Side)		
Item	QTY	Part Number	Description
1	1	TG0240SD080HTAA	SA, Motor
2	2	032202-116	Packing, Preformed, O-Ring Seal
3	1	034009	Gasket, Side Cover
4	1	SK000279 Sheet 3	Service Bulletin

SK000280	HTG SERVICE KIT, MOTOR (280cc- Left hand Side)		
Item	QTY	Part Number	Description
1	1	TG0280SD080HTAA	SA, Motor
2	2	032202-116	Packing, Preformed, O-Ring Seal
3	1	034009	Gasket, Side Cover
4	1	SK000280 Sheet 3	Service Bulletin

SK000281	HTG SERVICE KIT, MOTOR (310cc- Left hand Side)		
Item	QTY	Part Number	Description
1	1	TG0310SD080HTAA	SA, Motor
2	2	032202-116	Packing, Preformed, O-Ring Seal
3	1	034009	Gasket, Side Cover
4	1	SK000281 Sheet 3	Service Bulletin

Service Kit Information (page 2 of 3)

SK000282	HTG SERVICE KIT, BRAKE (5 Bolt Drum)		
Item	QTY	Part Number	Description
1	1	040204	Cotter Pin
2	1	490164	Brake Assembly
4	1	490216	Drum Assembly
3	4	020207	Flange Head Screw
4	1	025113	Castle Nut
5	1	SK000281 Sheet 3	Service Bulletin

SK000283	HTG SERVICE KIT, BRAKE (4 Bolt Drum)		
Item	QTY	Part Number	Description
1	1	040204	Cotter Pin
2	1	490164	Brake Assembly
4	1	490218	Drum Assembly
3	4	020207	Flange Head Screw
4	1	025113	Castle Nut
5	1	SK000283 Sheet 3	Service Bulletin

SK000284	HTG SERVICE KIT, BRAKE (5 Bolt Drum)		
Item	QTY	Part Number	Description
1	1	040204	Cotter Pin
2	1	490169	Brake Assembly
4	1	490216	Drum Assembly
3	4	020207	Flange Head Screw
4	1	025113	Castle Nut
5	1	SK000284 Sheet 3	Service Bulletin

SK000285	HTG SERVICE KIT, BRAKE (4 Bolt Drum)		
Item	QTY	Part Number	Description
1	1	040204	Cotter Pin
2	1	490169	Brake Assembly
4	1	490218	Drum Assembly
3	4	020207	Flange Head Screw
4	1	025113	Castle Nut
5	1	SK000285 Sheet 3	Service Bulletin

SK000287	HTG SERVICE KIT, SEAL TOP HOUSING (Gasket Kit inc. rubber & composite pan gaskets)		
Item	QTY	Part Number	Description
1	1	401114	Retaining Ring
2	1	478086	Shaft Seal
3	1	478087	Seal Trunnion Arm
4	2	032202-116	Packing Preformed O-Ring Seal
5	1	032202-244	Packing Preformed O-Ring Seal
6	1	034007	Bottom Cover Composite Gasket
7	1	034009	Side Cover FE Gasket
8	1	034008	Bottom Cover FE Gasket
9	2	032203-114	Packing Preformed O-Ring Seal
10	1	032202-013	Packing Preformed O-Ring Seal
11	1	SK000287 Sheet 3	Service Bulletin

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Service Kit Information (page 3 of 3)

SK000288	TG SERVICE KIT, MOTOR SERVICE (Motor Seal Kit)		
Item	QTY	Part Number	Description
1	1	478035	Dirt & Water Seal
2	1	028515	Backup Ring
3	1	029118	Backup Washer
4	1	032818	Shaft Seal
5	3	032820	Viton Section O-Ring
6	2	032862	Section O-Ring
7	1	032861	Seal Ring
8	1	032202-244	O.D. End Cover O-Ring Seal
9	2	032202-116	Motor to Endblock O-Ring Seal
10	1	034009	Gasket Side Cover
11	1	SK000288 Sheet 3,4,5	Service Bulletin

SK000345	HTG SERVICE KIT, FAN (HTG 7.8")		
Item	QTY	Part Number	Description
1	1	025164	Fan Nut
2	1	477370	Fan Spacer
3	1	420142	Fan 7.8”
4	1	SK000345 Sheet 3	Service Bulletin

SK000448	HTG HYDRAULIC TRANSMISSION OIL/ FILTER KIT- 2 GAL		
Item	QTY	Part Number	Description
1	2	022078	Hex Head Screw
2	2	029130	Washer
3	2	406030	HT-1000 Oil (Gal)
4	2	411135S	Filter (Service)
5	1	SK000448 Sheet 3,4,5,6	Service Bulletin
SK000456	HTG SERVICE KIT SEAL TOP HOUSING- FE Top Housing Gasket		
Item	QTY	Part Number	Description
1	1	401114	Retaining Ring
2	1	478086	Shaft Seal
3	1	032202-244	Packing Preformed O-Ring Seal
4	1	032202-116	Packing Preformed O-Ring Seal
5	2	034009	Side Cover Gasket
6	1	034008	Bottom Cover FE Gasket
7	1	032203-114	Packing Preformed O-Ring Seal
8	2	032202-013	Packing Preformed O-Ring Seal
9	1	478087	Seal Trunnion Arm
10	1	SK000456 Sheet 3,4	Service Bulletin

Warning Data

Before disassembly of the HTG Transmission 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 HTG Transmission unit. Be sure that you know and understand the equipment and any hazards associated with performing these procedures.

Thoroughly clean off all outside dirt and grass, especially from around fittings and hose connections before disconnecting and removing the HTG Transmission. Remove belt connections and immediately plug port holes and any fluid lines.

Depending on how the HTG is mounted to vehicle, the nut, brake hub and/or brake back plate may need to be removed prior to removing the HTG for inspection and/or repair. Refer to exploded view illustrations for removal and replacement of the brake assembly and torque specifications.

Remove the HTG Transmission from the chassis, drain it of fluid and take it to a clean work surface. Clean and dry the exterior surfaces of the HTG Transmission before you start to disassemble it.

As you disassemble the HTG Transmission, clean all parts, except seals, in a clean container/tank, using a clean OSHA approved solvent and use low pressure air to blow them dry.

WARNING

Be extremely careful when using any solvent. Even a small explosion or fire could cause injury or death.

WARNING

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

WARNING

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

WARNING

Do not tow, push, or pull faster than 5 mph. Towing may cause hydraulic transmission further damage. If equipment needs to be moved, make sure both transmission bypass valves are open and push by hand.

Keep parts separate to avoid nicks and burrs.

Replace all seal rings and any damaged or worn parts with genuine Parker or OEM approved service parts.

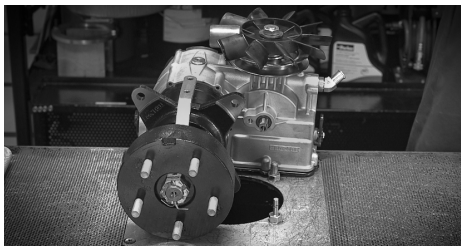
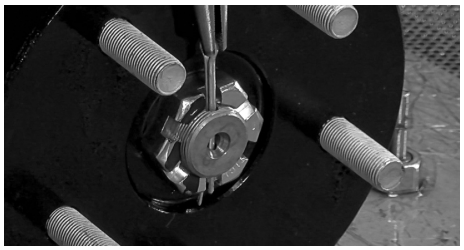
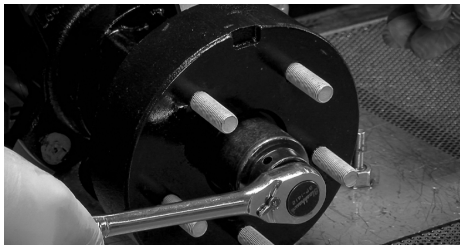
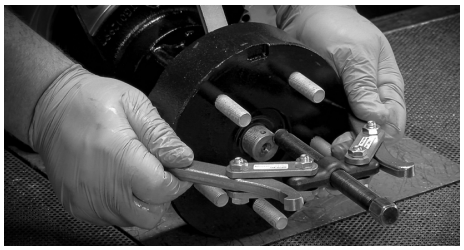
Illustration	Step	Instruction
	**Begin HTG Disassembly** Remove HTG Transmission unit from vehicle	1. Thoroughly clean unit free of grass and other debris. Let dry and place on a clean work table. 2. Place a pan for oil collection under the unit.
	Remove brake hub	1. Remove the cotter pin using needle nose pliers. 2. Straighten bent pins.
		3. Pull out pin
	Remove castle nut from brake hub.	1. Using a 1 ½" socket wrench, loosen the castle nut.
		2. Remove nut.
	Remove brake hub	1. Using a 2-jaw, 3-jaw puller or similar, loosen brake hub. 2. You may leave the nut threaded on the last few threads of the shaft for protection. **NOTE**: The brake drum will "pop" off the coupling shaft when the correct force is reached.

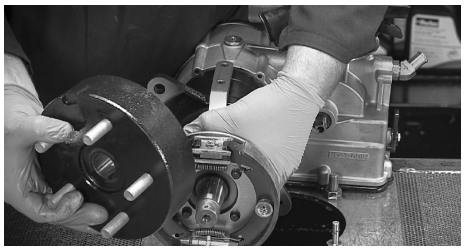
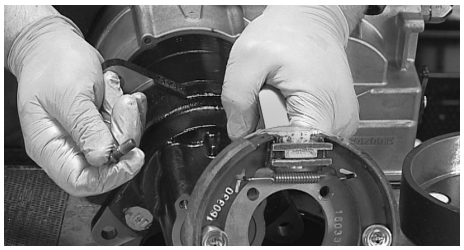
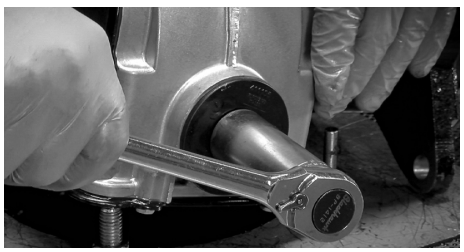
Illustration	Step	Instruction
		3. Pull brake hub off brake assembly.
	Remove brake assembly.	1. Loosen and remove the 4 bolts from the brake assembly using a ratchet and a 5/16” 12 pt socket. 2. Inspect bolts for damage.
		3. Pull off brake assembly
	Remove vent plug	1. Using a 5/16” hex head socket, loosen the vent plug.
		2. Remove the vent plug from the top of the housing.
	Remove filter	1. Using a ratchet and a 15/16” socket, loosen the filter.

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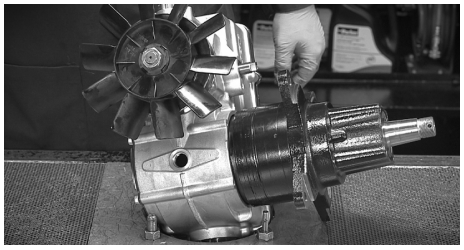
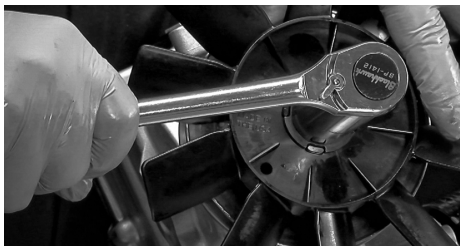
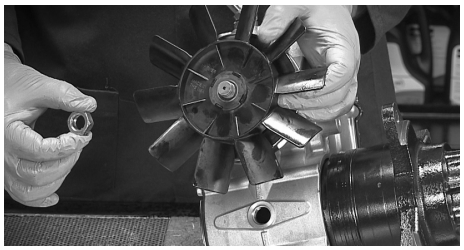
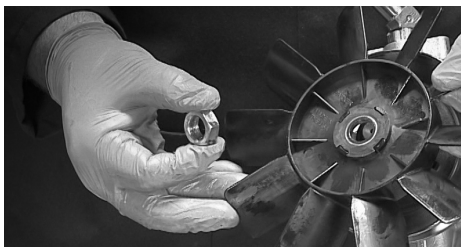
Illustration	Step	Instruction
		2. Gently pull out filter by hand.
	Drain oil from unit.	
	Remove the fan nut.	1. With a ratchet and a 15/16” socket, loosen and remove the fan/pulley nut. 2. Use a strap wrench or similar tool to hold the pulley while loosening the nut.
	Inspect for damage.	Inspect nut for any damage to the threads. If none exists, the nut can be reused.
	Remove fan.	1. Lift off fan. 2. Check for any damage that could make the fan inefficient (broken fan blades or chips, etc). If none exists, the fan can be reused.

Go to Next Step

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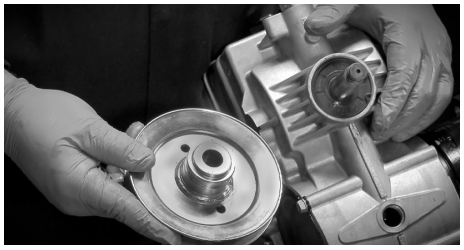
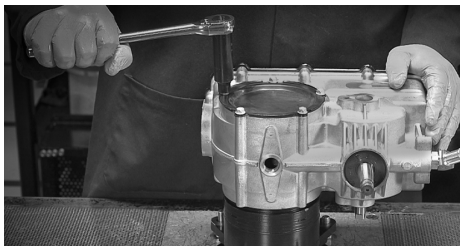
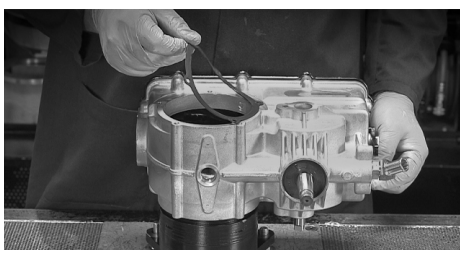
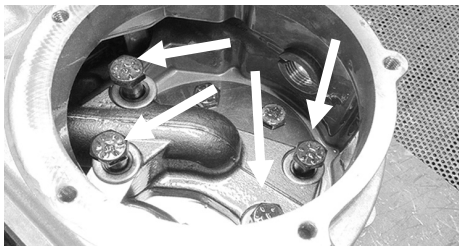
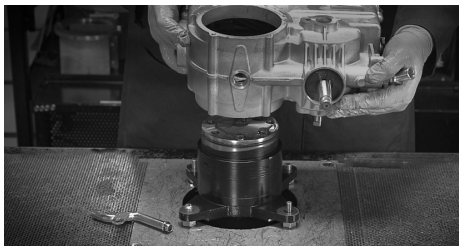
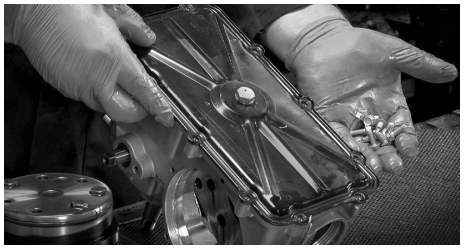
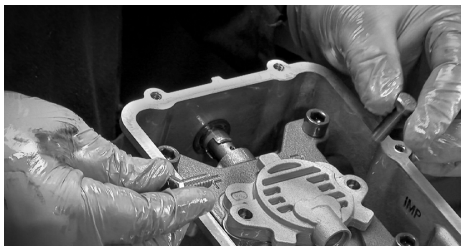
Illustration	Step	Instruction
	Remove pulley.	1. Use an OEM pulley puller or equivalent standard 2-jaw or 3-jaw puller to remove the pulley.
		2. Replace pulley if damaged or bent during removal.
	Remove side cover.	1. Loosen the five screws from the side plate using a ratchet and a 3/8” socket .
		2. Remove five side cover screws.
		3. Remove the side cover plate.
	Remove side cover gasket.	1. The gasket may either still be attached to the inside of the side cover or sitting on top of the housing. 2. Inspect gasket for any damage (splits or tears). Replace if needed.

Illustration	Step	Instruction
	Remove four bolts from inside pump	1. Loosen and remove four bolts from inside the pump using a ratchet and a 9/16” socket.
		2. Inspect bolts for damage.
	Remove filter tube.	
		
	Separate pump section from the motor.	

Go to Next Step

Illustration	Step	Instruction
	Remove bottom cover	1. Using ratchet and a 3/8” socket , loosen the 10 screws from the bottom cover.
		2. Remove screws and inspect for damage.
	Remove gasket from bottom of cover	Discard Gasket and replace with new.
	Remove two (2) charge pump cover bolts	1. Using ratchet and a ½” socket , loosen charge pump cover bolts.
		2. Remove and inspect for damage.

Go to Next Step

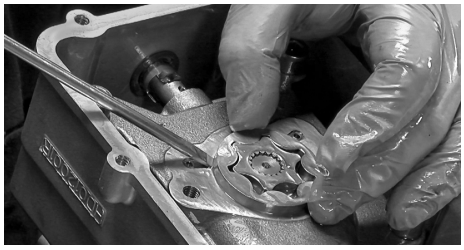
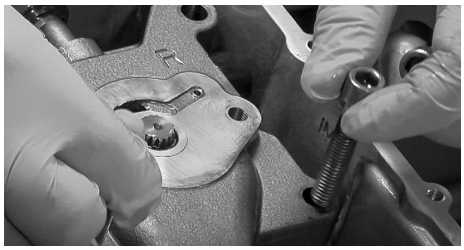
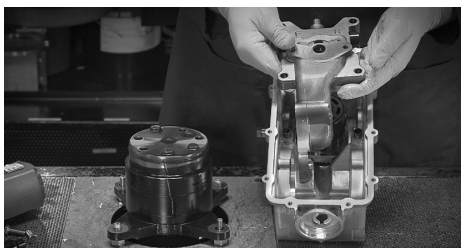
Illustration	Step	Instruction
	Remove charge pump cover	1. Inspect inside of charge pump cover for any scoring. 2. Replace if necessary.
	Remove gerotor set	1. Remove both the charge pump rotor and stator. 2. May need to use a flathead screwdriver to assist in prying.
		3. Inspect for any damage either on the tips of rotor or stator lobes. Replace if necessary.
	Remove four endblock screws	1. Using 5/16” hex head, loosen the endblock screws.
		2. Inspect the threads on each bolt for damage.
	Remove endblock	1. Lift out the entire endblock. 2. The port plate and endblock face may stick together and need some gentle prying.

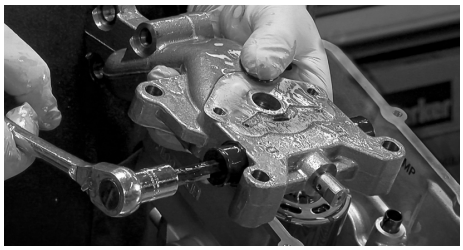
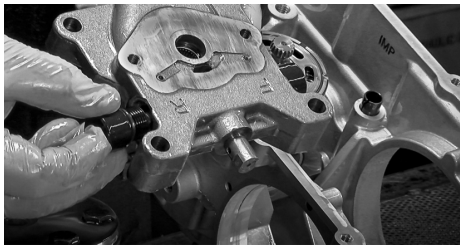
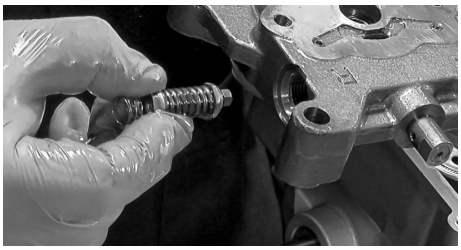
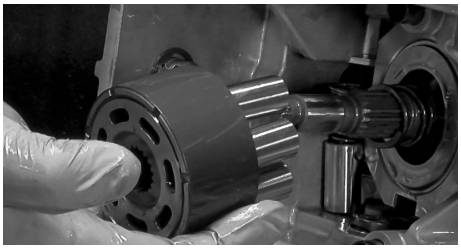
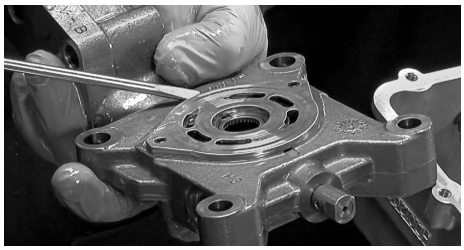
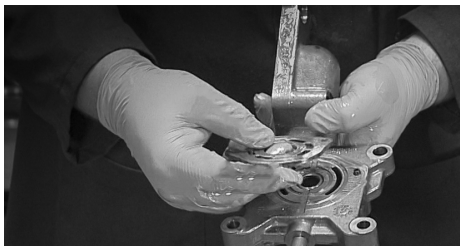
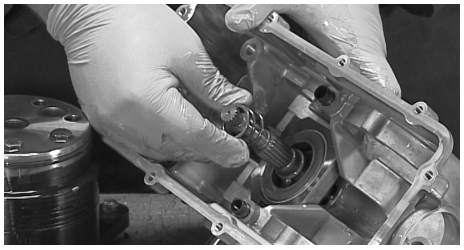
Illustration	Step	Instruction
	Remove shock valve caps	1. There are two caps, one on each side of the endblock. 2. Remove each cap using a ratchet and a 5/16” hex head socket.
	Remove spring and shock valve from each side	Turn endblock to side and remove spring and shock valve.
		
	Remove rotating group with pistons	1. Tilt top housing to 90 degrees, slowly pull barrel off shaft making sure pistons do not fall off barrel.
		2. Ensure pistons stay in original location of the barrel.
	Remove port plate	1. You may need to use a flat blade screw-driver or similar tool to separate the port plate from the endblock. **Be careful not to scratch the port plate running surface (barrel interface).**

Illustration	Step	Instruction
	Inspect port plate	1. Inspect port plate for any damage. 2. If the brass side of the port plate has heavy scoring, replace with a new port plate.
	Remove central spring	
	Remove swash block	Inspect top and bottom of swash block surfaces for excessive wear.
	Remove top washer (0.25” thick)	1. Lift out top washer from the swash block. 2. Inspect for any signs of pitting or galling to either side of the top washer.
	Remove thrust bearing	1. Lift thrust bearing from off the swash block. 2. Inspect bearing rollers for any signs of pit-ting or galling.

Go to Next Step

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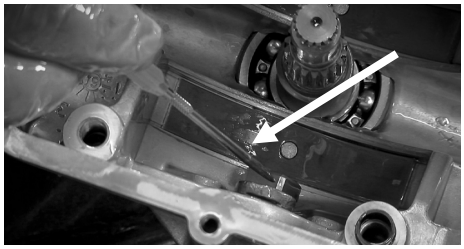
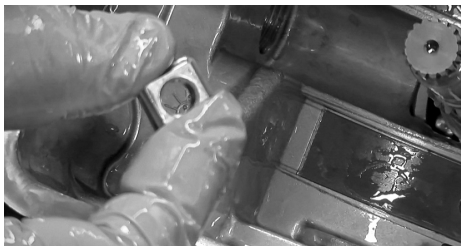
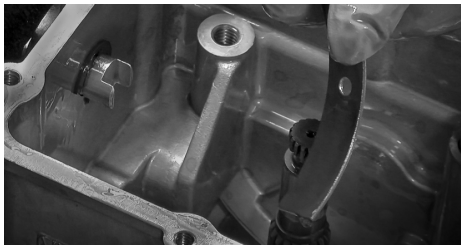
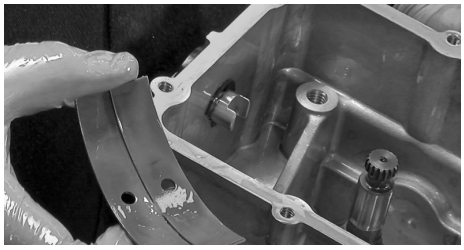
Illustration	Step	Instruction
	Remove control block	The control block should slide off the trunnion shaft. However, you may need to use a flat head screwdriver to gently loosen it.
		
	Remove the two cradle bushings	1. May need to use a magnet to lift out bushings.
		2. Inspect for excessive wear, pitting or scoring.
	Remove shaft seal snap ring	Using snap ring pliers, remove snap ring.

Go to Next Step

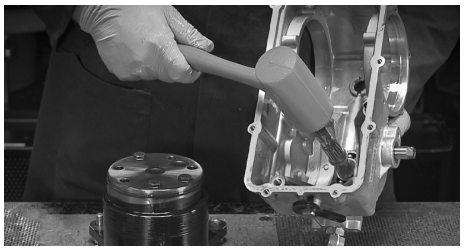
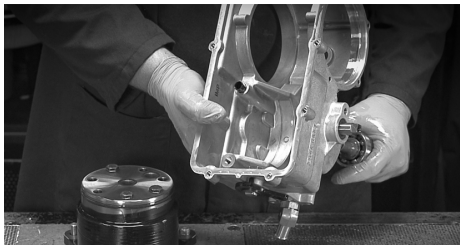
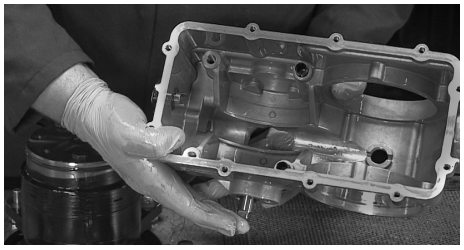
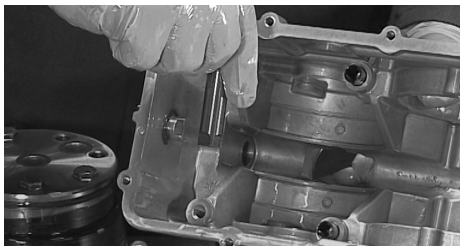
Illustration	Step	Instruction
	Remove pump shaft and bearing assembly	1. Tap top of shaft with a rubber mallet to loosen.
		2. Pull pump shaft out of top of pump housing 3. Keep assembly level, HT-1000™ to avoid damaging shaft and housing.
	Remove shaft and bearing	Once shaft is free from the housing assembly, remove the shaft seal.
	Remove trunnion arm	1. Gently push trunnion arm with hand.
		2. Pull trunnion arm out from inside of pump.
	Remove trunnion arm seal	Position the flat edge of a screwdriver under the lip of seal and lift outward. **Be careful not to score the edges of housing while removing trunnion arm seal.**

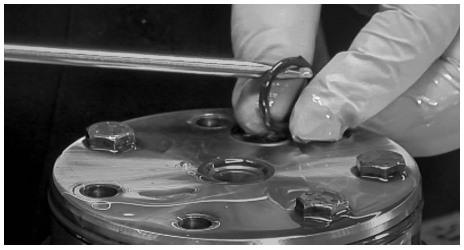
Illustration	Step	Instruction
	Disassemble the Motor	Mark the motor in a V-pattern before disassembly to ensure the parts are put back in the correct order.
	Remove two (2) end cover O-rings.	Using a screwdriver or a pick, slide the two O-rings out from cover grooves. **Be careful not to scratch the end cover O-ring sealing surfaces.**
		
	Remove three end cover bolts	1. Loosen bolts with a 9/16” socket.
		2. Inspect bolts for damage.
	Separate the end cover from the commutator ring.	

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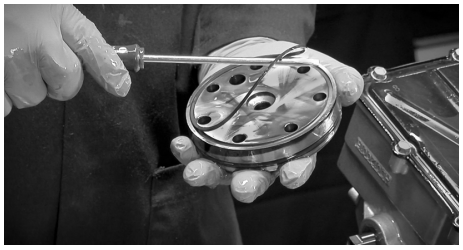
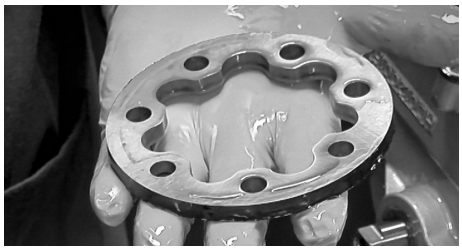
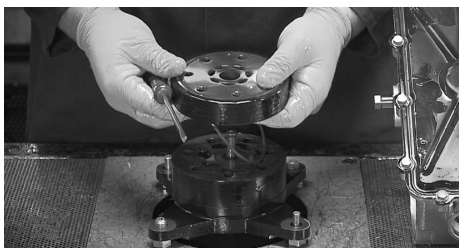
Illustration	Step	Instruction
	Remove end cover O-ring seal.	**NOTE:** May need to use a flat head screwdriver to pry O-ring out from the end cover.
	Remove the section seal from the end cover.	**NOTE:** May need to use a flat head screwdriver to pry section seal from the end cover.
	Remove the commutator ring.	
	Remove the commutator.	It may be necessary to use a flat-head screwdriver to lift and separate the commutator from the motor surface. **Be careful not to scratch or damage the motor parts.**
	Remove the commutator seal from the commutator.	It may be necessary to use compressed air to loosen and lift the seal from its groove. **NOTE:** Use an OSHA approved compressed air gun and direct a jet of air at the seal groove. **CAUTION** **Use all safety precautions when working with compressed air**
	Remove the manifold.	

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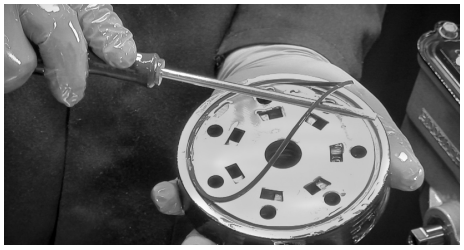
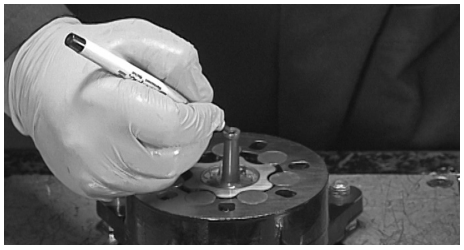
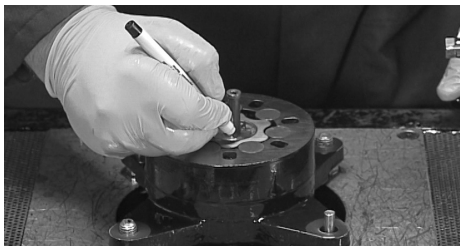
Illustration	Step	Instruction
	Remove section seal from both sides of the manifold.	It may be necessary to use a flat head screwdriver to lift out the two section seals. **Be careful not to scratch or damage the motor parts.**
		
	Remove the thrust washer.	Remove the thrust washer from the top of drive link.
	Add alignment marks on drive link and rotor.	1. Make sure the surface is clean and free of debris so marks will adhere. 2. Mark tip of drive link.
		3. Mark the same location on the rotor for alignment on re-assembly.
		

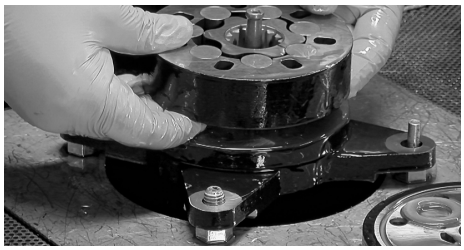
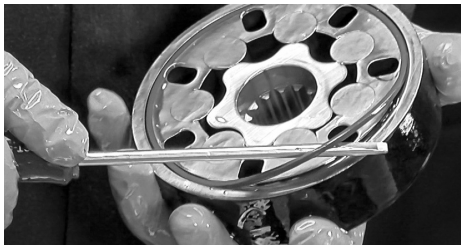
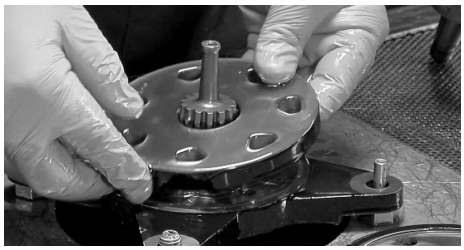
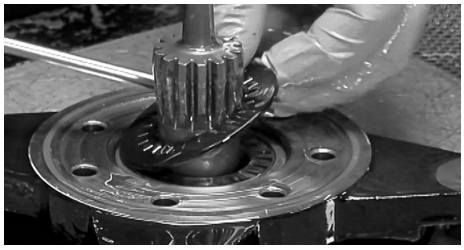
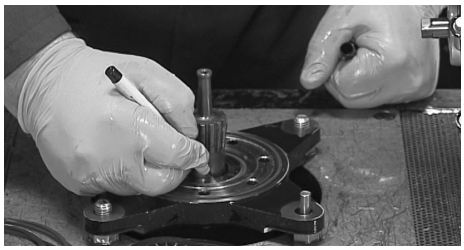
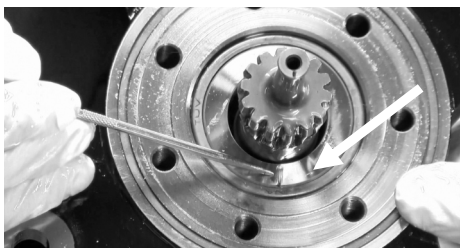
Illustration	Step	Instruction
	Remove the rotor set.	
	Remove section seal from bottom of rotor set.	1. Rotate rotor set over. 2. Remove the section seal from the bottom of the rotor set.
	Remove the wear plate.	
	Remove the thrust bearing from the motor housing.	It may be necessary to use a flat head screwdriver in order to lift out the thrust bearing.
	Add coupling shaft alignment mark.	1. The surface must be clean of all oil so the marks will adhere to the housing body. 2. Make marks on the coupling shaft in line with mark on drive link for alignment on reassembly.
		

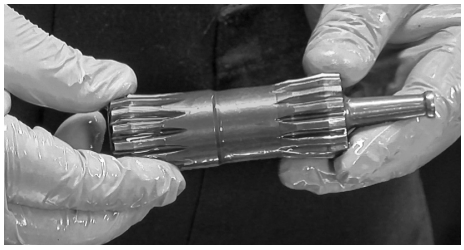
Illustration	Step	Instruction
	Remove drive link.	1. While motor housing is in vise, use hands to gently rotate the drive link out of the shaft.
		2. Inspect drive link for damage and wear.
	Remove the Woodruff key.	1. Gently turn the motor housing over.
		2. Using a flathead screwdriver, pry off the Woodruff key.
	Remove coupling shaft.	1. Turn motor housing back over so coupling shaft is facing down. 2. Push firmly down on the motor housing to remove coupling shaft.
		3. Lift coupling shaft out through the bottom of motor housing.

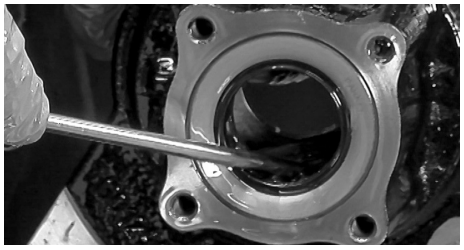
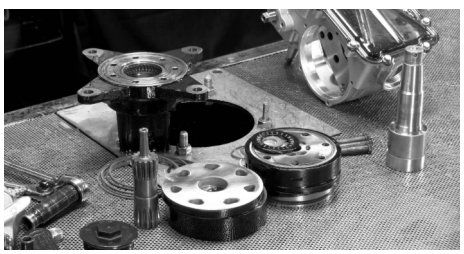
Illustration	Step	Instruction
	Remove the shaft seal	1. Hold the motor on its side. 2. Using fingers, move thrust package on its side, vertical to the motor.
		3. Use a screwdriver to pry shaft seal loose from housing groove on the front side of the motor. **Be careful not to scratch or damage the seal groove or motor parts.**
		4. From the back side of the motor, remove the shaft seal.
		5. Remove the backup washer.
		6. Remove the backup ring.
	**HTG Disassembly Complete**	

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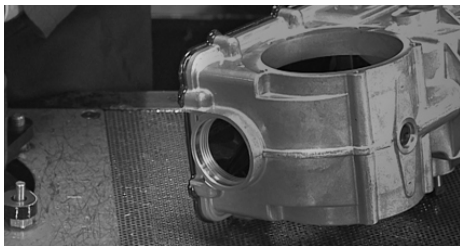
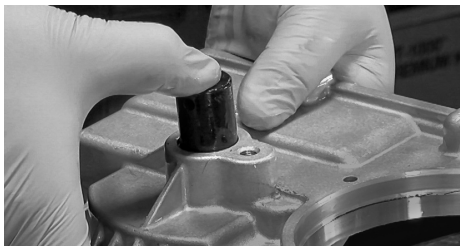
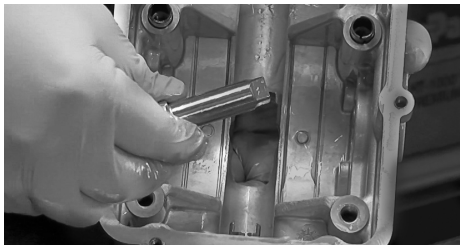
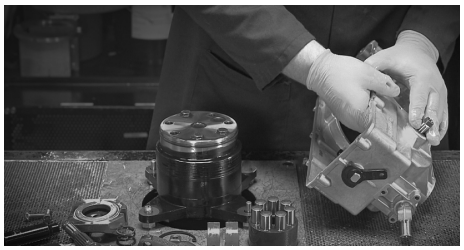
Illustration	Step	Instruction
	Begin Reassembly of HTG Motor Start with reassembly of the pump section.	Starting with the top housing, clean all parts before reassembly.
	Install trunnion arm seal.	Using finger pressure, push seal into place.
	Seat trunnion arm seal.	With a 5/8” socket, gently press on socket until seal is seated in housing.
	Install trunnion arm.	1. Lightly oil trunnion arm with HT-1000™ oil. 2. Insert from the inside of the pump housing.
		3. Push the trunnion flush to inner top housing.

Go to Next Step

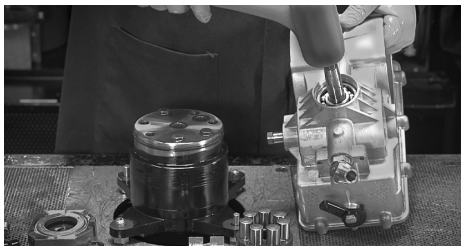
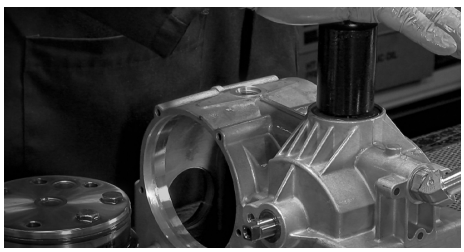
Illustration	Step	Instruction
	Install pump shaft and bearing assembly.	1. Install pump shaft and bearing assembly into top housing 2. Place extended shaft through housing.
		3. With the shaft properly aligned to the top housing, lightly tap the bearing assembly with a rubber mallet.
	Seat shaft bearing.	Push shaft and bearing assembly to the bottom of the top housing.
	Install pump seal.	1. Lubricate bearing bore and shaft with HT-1000™. 2. Place seal over output shaft while avoiding any sharp edges.
	Press seal in place.	1. Place socket on top of charge pump seal and press firmly until seal is in place. 2. Lightly tap socket with a rubber mallet until seal is below the snap ring groove.
	Install snap ring.	Using internal snap ring pliers, insert snap ring into groove of top housing.

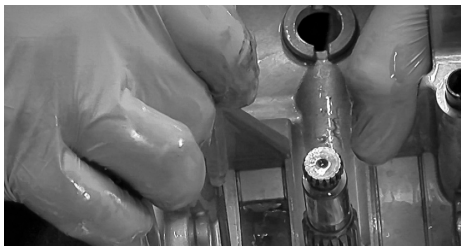
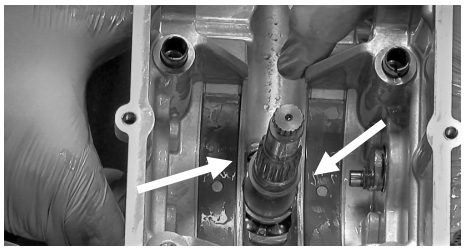
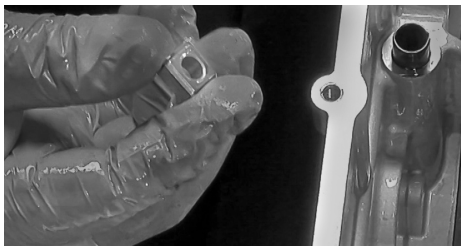
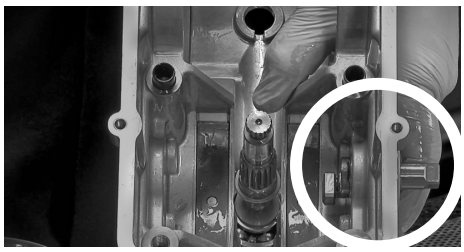
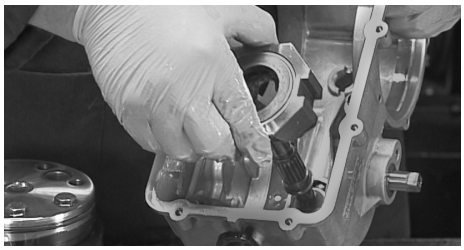
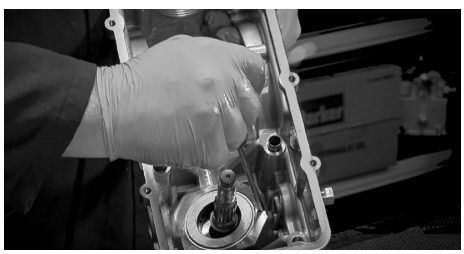
Illustration	Step	Instruction
	Install cradle bushings.	1. Align cradle bushing pin hole to pin location in top housing. 2. Do not stake pins. 3. Apply HT-1000™ oil on top of each cradle bushing.
		4. Make sure bushings are set in place.
	Install control block.	Install control block onto trunnion arm inside of top housing
		
	Install swash block.	1. Apply HT-1000™ oil onto washers in swash block. 2. Assemble swash block – thin washer, thrust bearing and thick, top washer – with the swash block. 3. Slide the swash block onto cradle bearings in top housing.
		4. Align swash block with control block using a small flathead screwdriver. 5. Verify the swash block moves freely back and forth on bushing without binding or dragging.

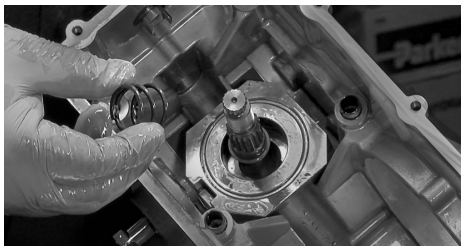
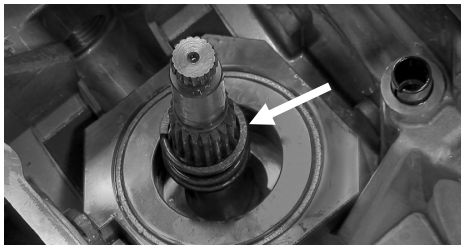
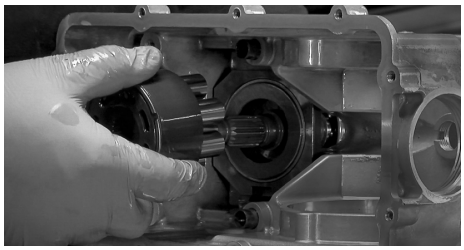
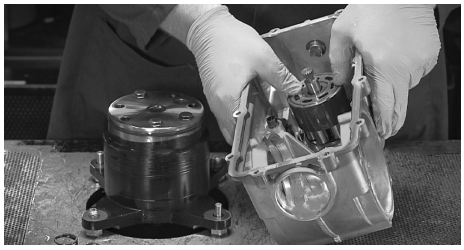
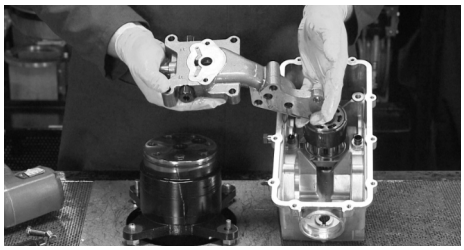
Illustration	Step	Instruction
	Install central spring.	Place central spring onto pump shaft.
		
	Install rotating group assembly.	1. Turn assembly onto side while holding pistons in place. 2. Slide the assembly, rotating slightly, over the charge pump shaft.
		3. Press lightly on rotating group assembly to ensure pistons are working and in place.
	Prepare endblock for assembly.	Inspect face of endblock for scratches between kidney ports and dowel pins.
	Install two shock valves and springs on each side of endblock.	Turn endblock to one side to insert shock valves, nose first with the springs on the back side of shock valve.

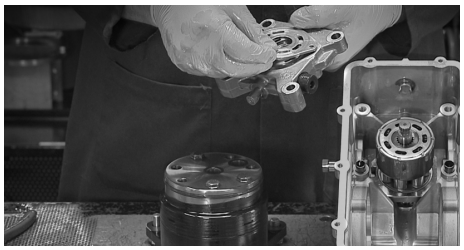
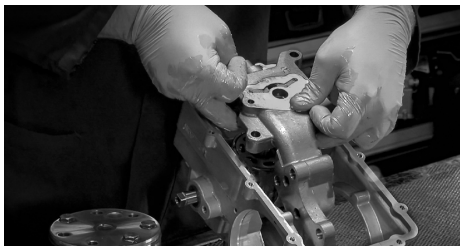
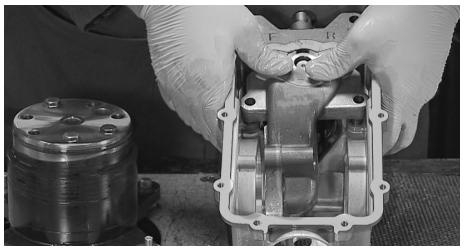
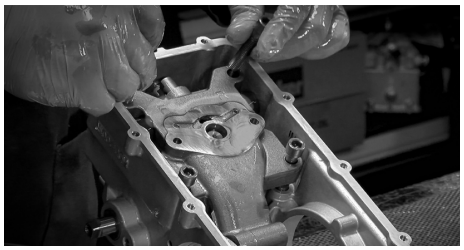
Illustration	Step	Instruction
	Install valve cap.	1. Capture springs into valve caps. 2. Hand tighten valve caps. 3. Repeat shock valve, springs and valve cap installation on other side.
	Torque valve caps.	Torque both caps to 21-24 ft-lbs.
	Install port plate.	1. Make sure endblock is free of debris and Apply HT-1000™ oil on the face of endblock which will provide some suction and keep the port plate in place during reassembly. 2. Place port plate onto endblock with the bronze side facing up. 3. Align the port plate to both dowel pins.
	Place endblock into top housing.	While holding the port plate in place, put endblock assembly into the top housing.
	Install endblock.	1. Align the endblock to the bolt holes and push the endblock down. 2. The endblock should spring back, confirming that the rotating group pistons and springs are still in place. 3. Make sure the port plate stays in place while aligning and installing the endblock.
	Insert endblock bolts.	Insert and tighten bolts in a cross pattern.

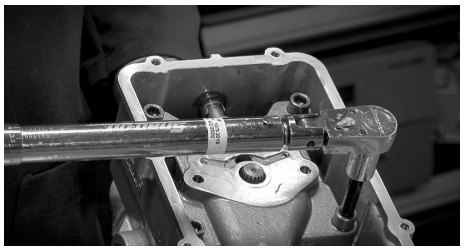
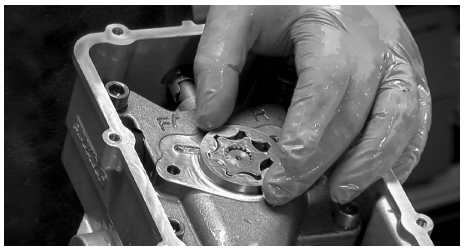
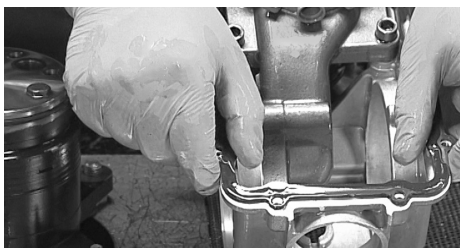
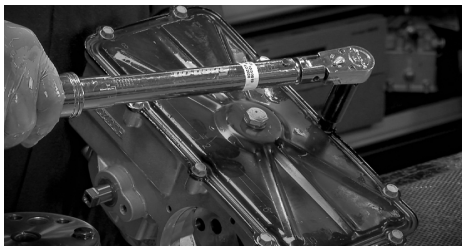
Illustration	Step	Instruction
	Torque endblock bolts.	1. Torque each bolt in a cross-pattern to 270-300 in-lbs (22.5-25.0 ft-lbs). 2. Apply small amount of HT-1000™ oil to the face of the bottom face of the endblock.
	Install charge pump.	1. Place the charge pump rotor onto pump shaft splines.
		2. Place and align the stator over the rotor and onto the face of the endblock.
	Install charge pump cover.	Place charge pump cover over the rotor and stator, aligning with the holes on the endblock.
	Install two pump cover bolts and torque.	1. Hand start the two bolts of the charge pump cover to endblock 2. Torque bolts to 90-110 in-lbs.
	Install bottom gasket.	Align bottom gasket according to bolt pattern on bottom side of housing.

Illustration	Step	Instruction
	Install bottom cover.	1. Place the bottom cover over gasket. 2. If installing a standard rubber gasket, insert screws into all holes to keep gasket in place while tightening.
	Insert self-tapping screws.	1. Start hand-tightening all of the self-tapping screws half-way down (**NOTE**: Bottom cover is marked in order of with how each screw should be torqued.). 2. Starting at the number one screw, torque to 50-60 in-lbs. 3. Following the number order, torque all remaining screws to 50-60 in-lbs.
	Finish applying final torque to bottom screws.	1. Starting again at the number one screw, torque to 72-96 in-lbs (6-8 ft-lbs). 2. Repeat by following the marked number on the bottom cover until all screws have been properly torqued to 72-96 in-lbs (6-8 ft-lbs).
	Install charge pump pick-up tube.	1. Place O-ring onto the end of charge pump pick up tube. 2. Lightly oil the O-ring with HT-1000™ oil. 3. Push the charge pump tube inside of charge pump cover.
		4. Ensure tube is in the correct position (metal clamp tab will be bolted to motor assembly later in the assembly process).

Go to Next Step

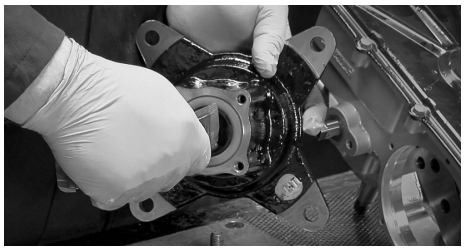
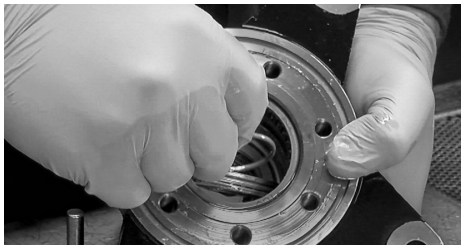
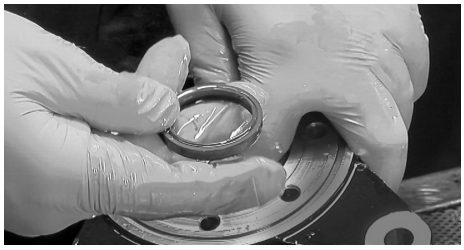
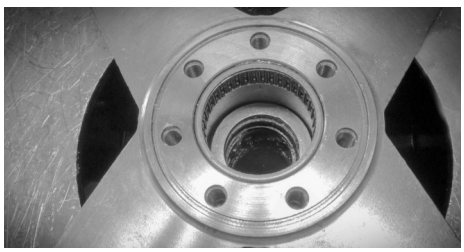
Illustration	Step	Instruction
	Begin Motor Assembly	1. Place motor housing in a soft jawed vice with nose pointed down. 2. Using grease provided in seal kit, apply a layer into front radial bearing.
	Replace back up ring.	1. Holding motor and thrust package at 90 degrees, slide backup ring inside housing past the bearing package. 2. The back up ring will lay flat into the groove of housing seal cavity.
	Replace back up washer.	Slide thin flat washer (with either side down) past the thrust package and onto the backup ring.
	Install shaft seal.	1. Lubricate both sides of the shaft seal.
		2. Insert seal, with lip facing out or towards the motor sections. 3. Use fingers to press shaft seal firmly into housing seal groove until it makes contact with back up washer.
	Install thrust-out bearing.	Make sure the thrust bearing stays in between the two washers.

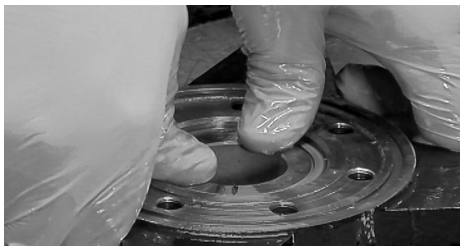
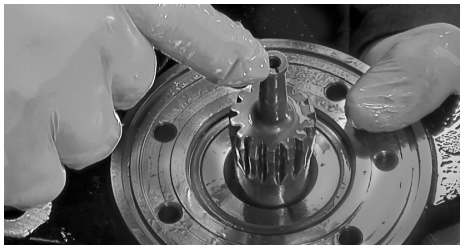
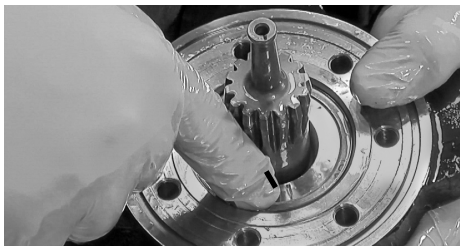
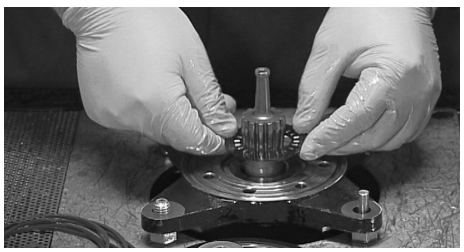
Illustration	Step	Instruction
	Oil shaft.	Apply HT-1000™ oil to help shaft pass through the lip of shaft seal package.
	Insert shaft into housing.	1. Slightly rotate shaft while pushing down so that it passes through the seal package and bottoms on top of the thrust washer.
		2. The top of the shaft should be flush (even) with the radial bearing face.
	Install drive link.	1. Install drive link into the coupling shaft.
		2. Align marks on coupling shaft and drive link. **NOTE:** Refer to picture for orientation.
	Install thrust bearing.	Install thrust bearing over the drive link onto the end of coupling shaft

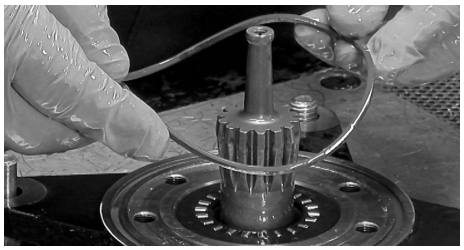
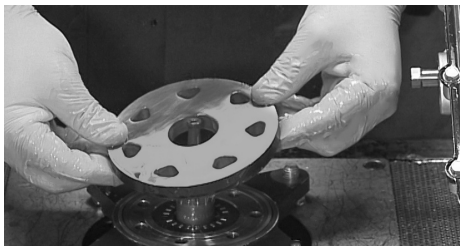
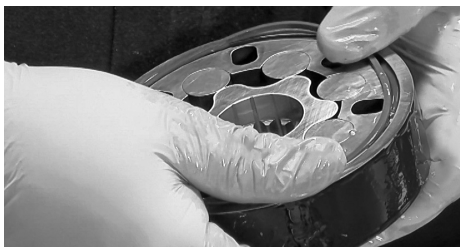
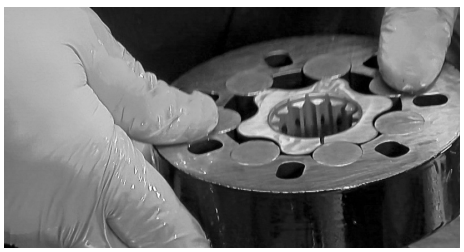
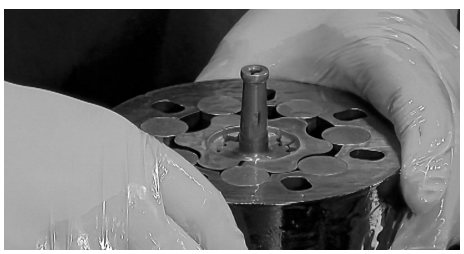
Illustration	Step	Instruction
	Install housing face section seal.	1. Apply small amount of clean grease to a new section seal. 2. Assemble seal into the seal ring groove of the housing face.
		
	Install wear plate.	1. Place wear plate over drive link 2. Align wear plate bolt holes to the motor housing bolt holes, referencing the V-pattern previously drawn on the wear plate.
	Install section seal.	1. Apply small amount of clean grease to a new section seal. 2. Install seal into the seal ring groove of the rotor set.
	Install the assembled rotor set.	1. Install the assembled rotor set with seal side facing down onto wear plate and drive link thrust washer counter bore facing up (refer to picture). 2. Verify rotor and drive link alignment marks are aligned.
	Alignment of rotor set to housing bolt holes.	Turn the assembly so the stator bolt holes line up with the bolt holes of the motor housing and the V-pattern marks.

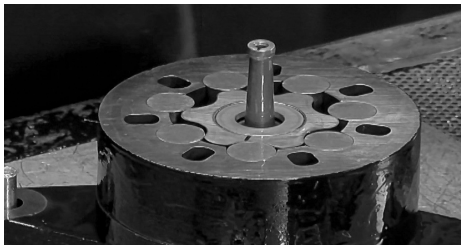
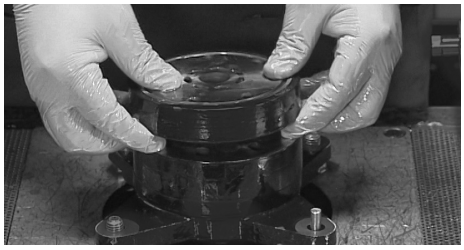
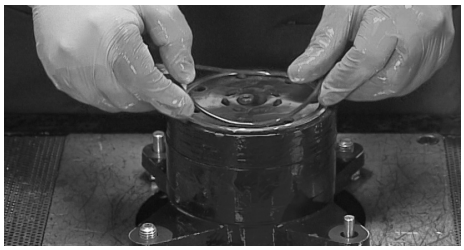
Illustration	Step	Instruction
	Install rotor thrust washer.	1. Place thrust washer over the tip of the drive link and into the rotor counter bore.
		2. Washer should fit flush with top of rotor.
	Install section seal ring into manifold.	Apply clean grease to a new section seal and install in the seal ring groove on the manifold face with trapezoid-shaped flow holes.
	Install manifold.	1. Place manifold over the drive link and onto the rotor set (seal facing rotor set). 2. Reference V-pattern previously marked on manifold and align bolt holes.
	Install section seal.	Apply clean grease to a new section seal and install it in the seal ring groove of manifold.
	Assemble seal and commutator.	Assemble new commutator seal, flat side up, into commutator groove.

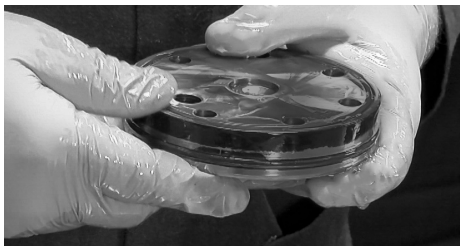
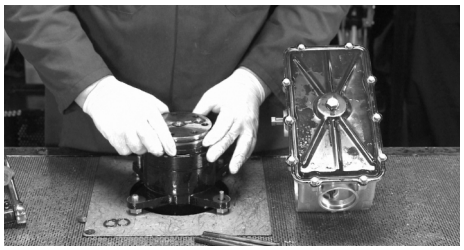
Illustration	Step	Instruction
	Install commutator.	Place commutator over the end of drive link onto manifold with seal ring face side up
	Install commutator ring.	Place commutator ring on top of manifold and align the holes up with the bot holes of housing. **NOTE:** Reference the V-Pattern previously marked on commutator ring.
	Install section seal in end cover.	Apply clean grease to a new section seal and install it into the seal ring groove of the end cover.
	Install end cover O-ring.	Place O-ring over the end cover and into groove.
	Install end cover on top of motor.	Align bolt holes.
	Install two end cover flow port O-rings.	1. Apply clean lubricant to both O-rings and place them in the end cover grooves.

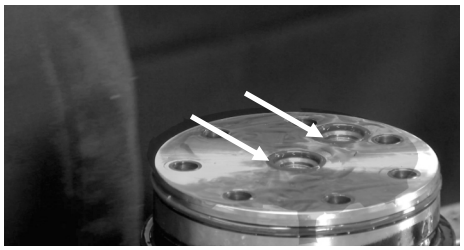
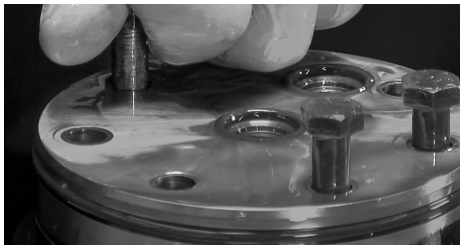
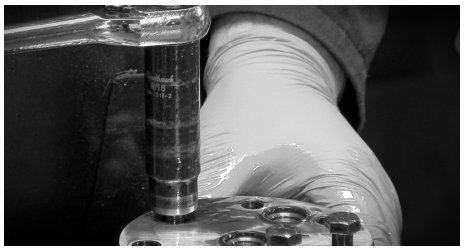
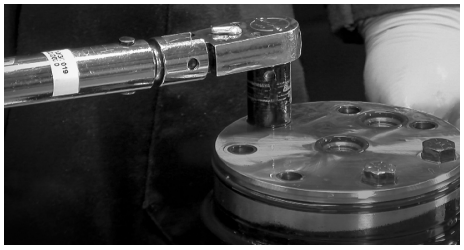
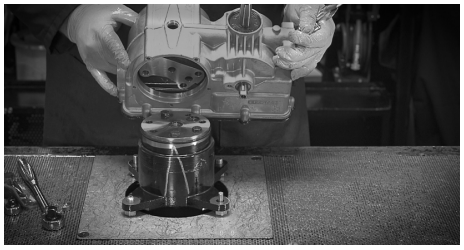
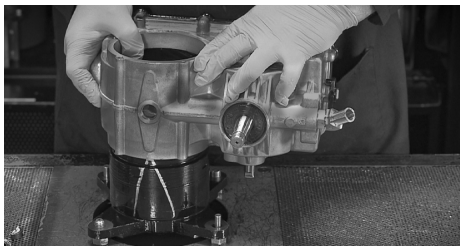
Illustration	Step	Instruction
		2. Use hand pressure to seat O-rings into grooves.
	Install three short bolts into end cover.	1. Begin hand-tightening in the correct location as shown. **NOTE:** Reference alignment marks on end cover face for correct location.
		2. Tighten with ratchet and a 9/16” socket.
		3. Torque to 45-55 ft-lbs.
	Install top housing.	1. Before installing, lubricate O-ring seal with HT-1000™. 2. With motor still in vise, place top housing assembly over the end cover of the motor.
	Align two components together, pressing down on the top housing.	Push top housing down while transferring pressure side to side, seating the O-ring into the correct position. **NOTE:** Endblock should be touching motor end cover.

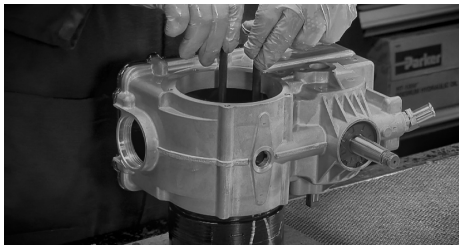
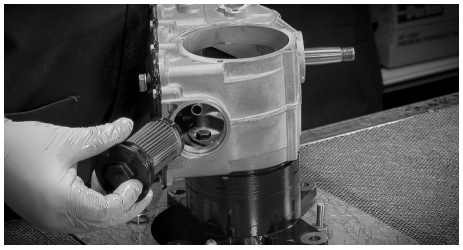
Illustration	Step	Instruction
	Install endblock motor bolts.	1. Starting with two longest bolts, insert one into the first tall location on the endblock where the filter tube hanger is located. 2. Insert the other into the second tall location in the endblock.
		3. Place the shorter endblock bolts into the short endblock hole locations. 4. Tighten all four bolts.
	Torque bolts.	Torque each bolt with torque wrench and a 9/16” socket to 45-55 ft-lbs in a cross pattern.
	Install filter.	1. Insert filter into the top housing and twist until hand tight.
		2. Tighten with 15/16” wrench. 3. Torque filter to 115-135 in-lbs. **Be careful not to over torque**
	Install side cover gasket.	Place the side cover gasket on top housing.

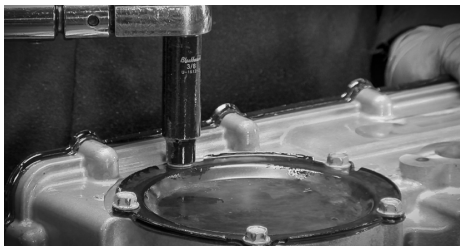
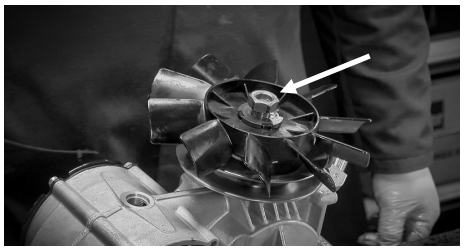
Illustration	Step	Instruction
	Install side cover.	Place side cover on top of gasket and align the screw holes.
	Install side cover screws.	Place self-tapping screws in all five locations and hand tighten.
	Torque side cover screws.	1. Starting at position one, torque to 24-36 in-lbs. 2. Repeat process following numbers on side cover plate. 3. Torque all to 48-72 in-lbs.
	Install pulley.	Place pulley onto pump shaft.
	Install fan.	Place the fan with the tabs pointing up onto the pump shaft.
	Install nut.	1. Install nut 2. Apply thread locker to the threads on the nut. (Type 243)

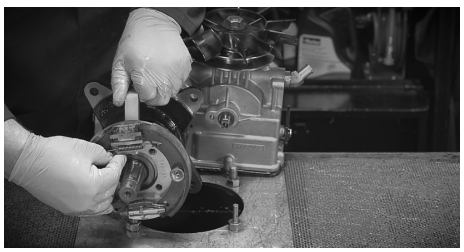
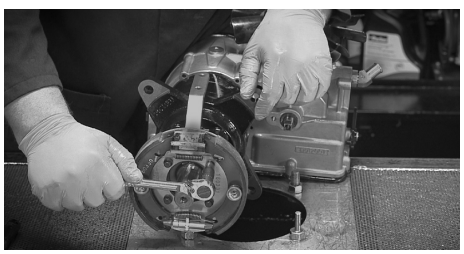
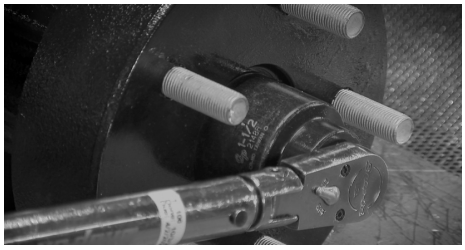
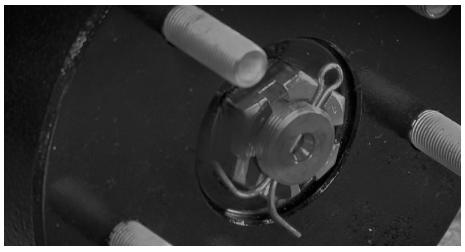
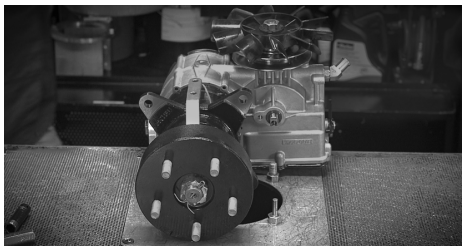
Illustration	Step	Instruction
	Torque nut	1. Using a strap wrench or similar, hold pulling while torquing nut. 2. Torque nut to 55-70 ft-lbs.
	Fill with HT-1000™ oil.	Fill transmission to the expansion tank fitting with approximately three (3) quarts of HT-1000™ oil.
	Replace vent plug.	1. Hand start hollow hex plug. 2. Tighten with a 5/16” hex wrench 3. Torque to 100-120 in-lbs.
	Install Woodruff Key.	May need to use brass hammer to seat the Woodruff Key into shaft.
	Install brake assembly.	Place assembly over shaft, aligning with four bolt holes on motor housing.
	Install four brake assembly bolts.	1. Tighten by hand

Illustration	Step	Instruction
		2. Torque brake assembly bolts to 25-28 ft-lbs.
	Install brake drum.	Slide brake drum onto brake assembly, piloting the Woodruff Key into the matching slot. **Be careful not to scrape the shaft or dislodge the Woodruff Key while installing the brake drum.**
	Install brake drum nut.	1. Place nut onto end of coupling shaft and hand tighten.
		2. Torque to 200-300 ft-lbs, minimum, plus more to align slot on castellated nuts.
	Install new cotter pin (if using a castellated nut).	1. Using needle nose pliers, push cotter pin through the hole in the coupling shaft. 2. Bend ends of cotter pin to lock nut in place
	**HTG Assembly Complete**	

Parker Hannifin Corporation
Hydraulic Pump/Motor Division
Greeneville, Tennessee USA

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PARKER-HANNIFIN CORPORATION
OFFER OF SALE

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14. Cancellations and Changes. Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order for any reason except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

15. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

16. Force Majeure. Seller is not liable for delay or failure to perform any of its obligations by reason of events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, delays or failures in delivery from carriers or suppliers, shortages of materials, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by force majeure shall be tolled for the duration of such force majeure and rescheduled for mutually agreed dates as soon as practicable after the force majeure condition ceases to exist. Force majeure shall not include financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or sub-contractors.

17. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidation of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

18. Termination. Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

19. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

20. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by Seller to Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

21. Governing Law. These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

22. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

23. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Laws.

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