

T2[®] / T2-HP[™] / T3 HD[™]
Integrated Hydrostatic Transaxle
Service and Repair Manual

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FOREWORD

Headquartered in Sullivan, Illinois, Hydro-Gear® is a world leader in the design, manufacture, and service of quality hydrostatic transaxles for the lawn and garden industry. The mission of our company is to be recognized by our customers and the industry as a world-class supplier and the quality leader in everything we do.

This Service and Repair Manual is designed to provide information useful in servicing and troubleshooting the Hydro-Gear T2®, T2-HP™ and T3 HD™ Integrated Hydrostatic Transaxles.

Also included is a glossary of terms that are frequently used throughout the industry and in Hydro-Gear service publications. Understanding terminology is very important!

It is necessary, and a good shop practice, that your service area be equipped with the proper tools and the mechanics be supplied the latest information available. All repair procedures illustrated in this guide are suggested, but preferred methods of repair.

Internal repair procedures require that the transaxle unit be removed from the vehicle.

This is not a certification, test or study guide for a certification test. If a technician is interested in certification, they should contact an agent representing the EETC (Equipment and Engine Training Council) at (262) 367-6700 or their Hydro-Gear Central Service Distributor. Many distributors will be hosting certification testing. These study guides will cover most of the products and manufacturers in our industry.

For more information about Hydro-Gear or our products, please contact your Central Service Distributor, or visit our Customer Service Department website at www.hydro-gear.com.

DESCRIPTION AND OPERATION

INTRODUCTION

The purpose of this manual is to provide information useful in servicing the Hydro-Gear® T2®, T2-HP™ and T3 HD™ Integrated Hydrostatic Transaxle. This manual includes the T2, T2-HP and T3 HD's general description, hydraulic schematic, technical specifications, servicing and troubleshooting procedures.

The transaxle normally will not require servicing during the life of the vehicle in which it is installed. Should other servicing be required, the exterior of the transaxle will need to be thoroughly cleaned before beginning most procedures. Do not wash the transaxle while it is hot. Do not use a pressure washer to clean the unit.

GENERAL DESCRIPTION

The T2, T2-HP and T3 HD are self contained units designed for the transfer and control of power. They provide an infinitely variable speed range between zero and maximum in both forward and reverse modes of operation.

These transaxles uses a variable displacement pump with a maximum displacement of 8cc per revolution, and motor with a fixed displacement of 10.2cc for the T2 / T2-HP and 12cc for the T3 HD per revolution. The variable displacement pump features a trunnion mounted swashplate with a direct-proportional displacement control. Reversing the direction of the swashplate reverses the flow of oil from the pump and thus reverses the direction of the motor output rotation. The pump and motor are of the axial piston design and utilize spherical

nosed pistons which are held against a thrust race by internal compression springs.

The T2, T2-HP and T3 HD have a self contained fluid supply and an internal filter. The fluid is forced through the filter by a positive "head" on the fluid in the housing/expansion tank with an assist by the negative pressure created in the pump pistons as they operate.

The check valves in the center section are used to control the makeup flow of the fluid to the low pressure side of the loop.

A block lifting bypass is utilized in the T2, T2-HP and T3 HD to permit moving the vehicle for a short distance at a maximum of 2 m.p.h. (3.2 Km/h) without starting the engine. The T2, T2-HP and T3 HD utilize an in-line floating disc brake controlled by a "cam" style actuating arm.

DESCRIPTION AND OPERATION (CONTINUED)

HYDRAULIC SCHEMATIC

Figure 1 is a schematic of the hydraulic oil circuit. The oil supply for the hydraulic system of the T2®, T2-HP™ and T3 HD™ is also utilized for lubricating the components of the final drive assembly.

The input shaft and pump cylinder block are turned in one direction only by the engine/drive belt/pulley combination. Output of the oil flow is controlled by the direction and amount that the variable swashplate is angled. As the pump pistons compress they force the oil to flow through one of two passageways (forward or reverse) in the center section to the motor cylinder block and motor shaft. Since the motor has a fixed displacement angle it is forced to turn with the flow of oil. As the angle of the pump swashplate is increased the amount of oil being pumped will increase and cause a higher speed output of the

motor. Reversing the angle of the swashplate will reverse the direction of oil flow.

During the operation of the transaxle, fluid is “lost” from the hydraulic loop through leak paths designed into the product for lubrication purposes (around pistons, under the rotating cylinder blocks, etc.). This “lost” fluid returns to the transaxle housing, then is pulled back into one of the check valves depending on the direction of vehicle operation. All of this oil must pass through an internal filter.

The motor cylinder block mounts onto a splined motor shaft which drives the gear train.

The bypass feature in the T2, T2-HP and T3 HD has a mechanical lever which lifts the motor block off the center section running surface. This allows oil flow from the cylinder blocks to be discharged.

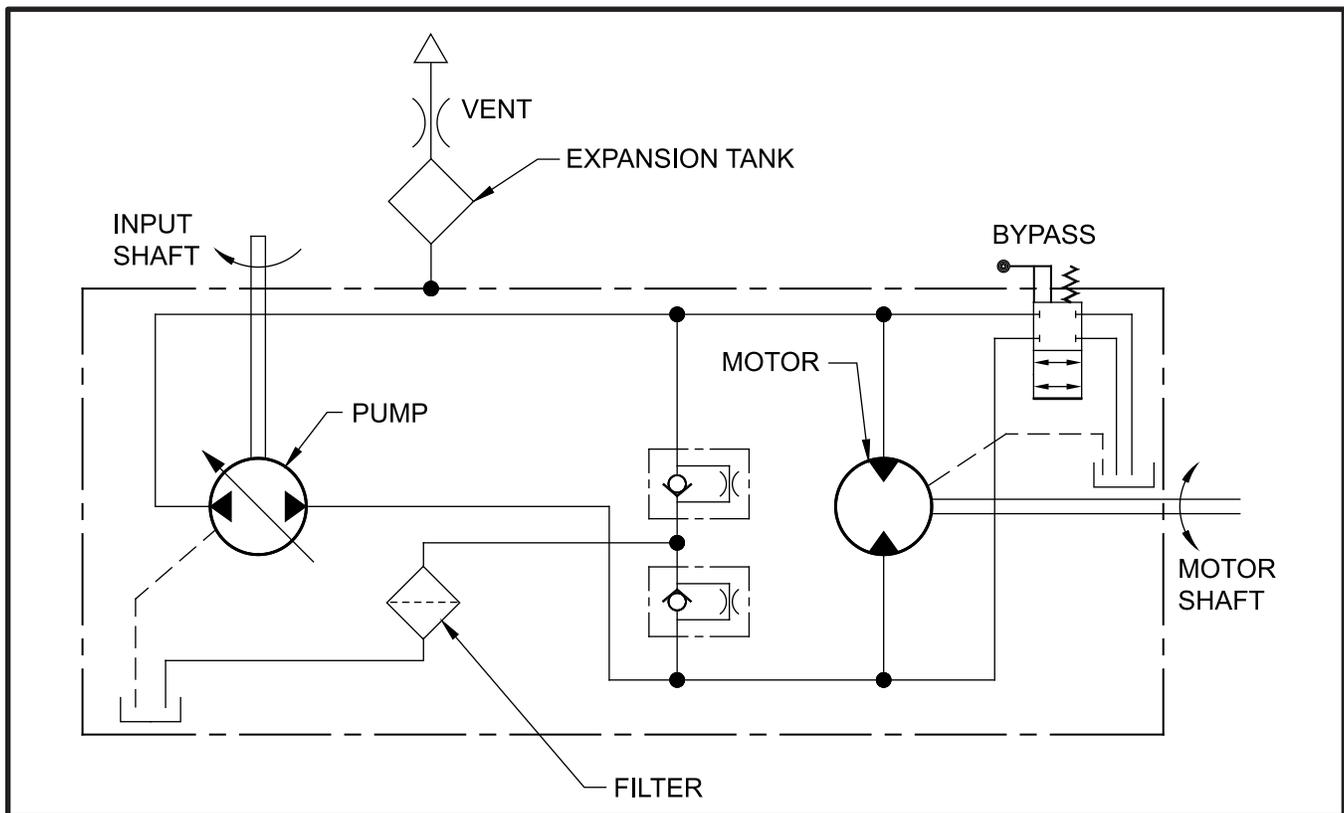
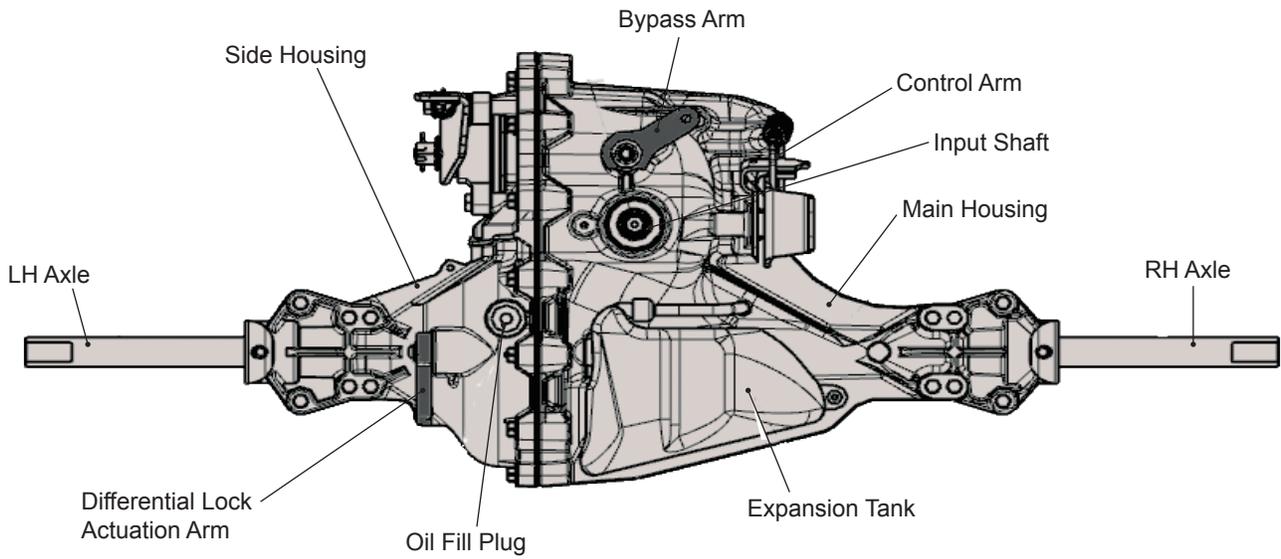
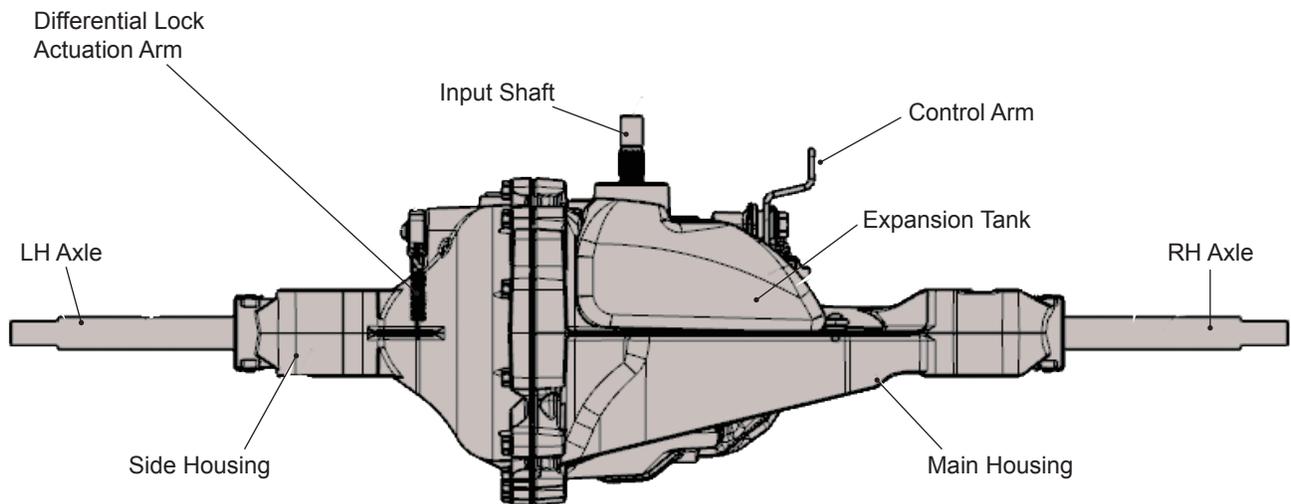


Figure 1, T2 Hydraulic Schematic

EXTERNAL FEATURES T2® / T2-HP™ / T3 HD™

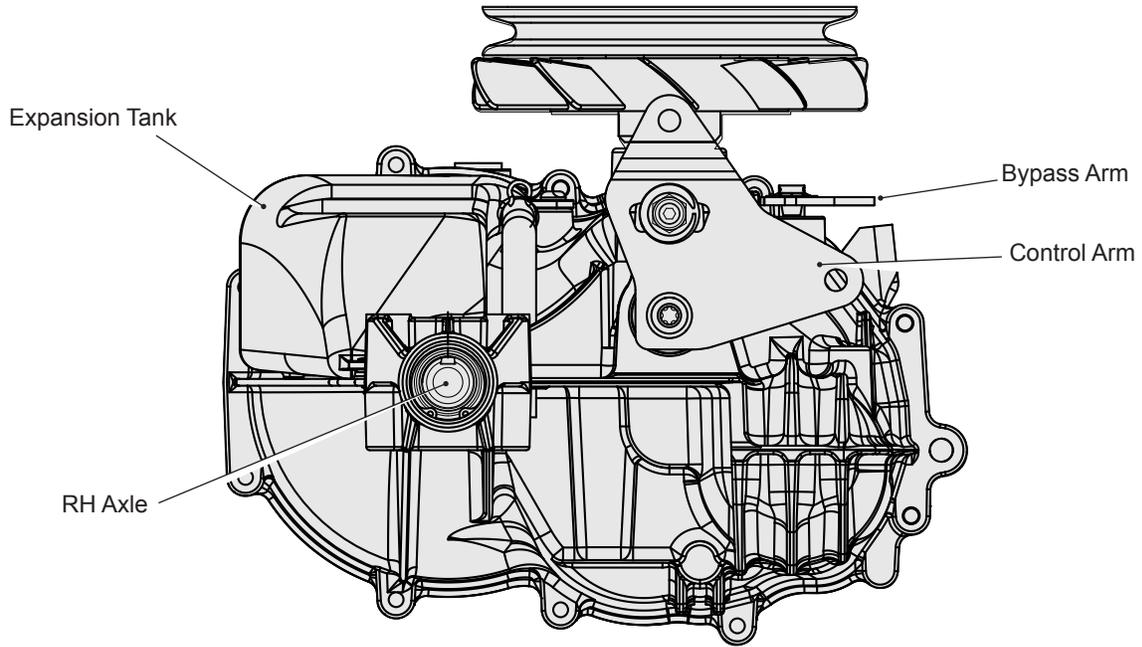


— Top View —

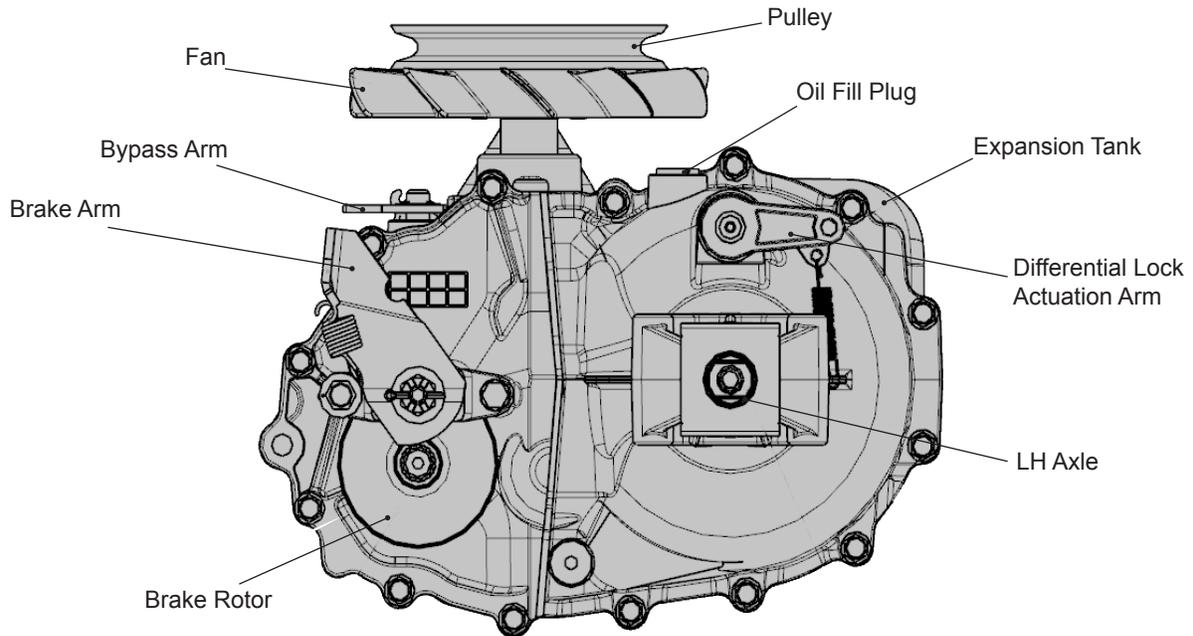


— Inboard View —

EXTERNAL FEATURES T2® / T2-HP™ / T3 HD™



— Outboard View—Left —



— Outboard View—Right —

TECHNICAL SPECIFICATIONS

| TECHNICAL SPECIFICATIONS | | | | | | |
|------------------------------------|--------------------|-----------|-----------|-----------|-----------|-----------|
| | T2® | | T2-HP™ | T3 HD™ | | |
| Overall Transaxle Reduction | 20.63:1 | 22.68:1 | 25.42:1 | 24.27:1 | 26.70:1 | 29.91:1 |
| Input Speeds | | | | | | |
| Maximum Hi-Idle (No Load) | 3000 rpm | | | 3200 rpm | | |
| Minimum | 1800 rpm | | | 1800 rpm | | |
| Output Torque | | | | | | |
| Intermittent lb-ft (Nm) | 195 (264) | 215 (291) | 285 (197) | 230 (311) | 290 (393) | 300 (406) |
| Continuous lb-ft (Nm) | 105 (142) | 115 (156) | 145 (196) | 140 (189) | 150 (203) | 160 (216) |
| Weight on Tires (per unit) | | | | | | |
| Maximum with 16" tires lb (kg) | 540 (245) | 540 (245) | 540 (245) | 600 (273) | — | — |
| Maximum with 18" tires lb (kg) | — | 500 (227) | 540 (245) | — | 630 (285) | — |
| Maximum with 20" tires lb (kg) | — | — | 540 (245) | — | — | 630 (285) |
| Axle Shaft Diameter in (mm) | .75 (19.05) | | | | | |
| Axle Shaft End Options | Keyed or Two Flats | | | | | |
| Parking Brake Type | External Disc | | | | | |
| Weight of Unit lb (kg) | 28 (12.7) | | | | | |

PRODUCT IDENTIFICATION

The model and configuration of the T2, T2-HP and T3 HD can be determined from the label shown below. T3 HD models equipped with the differential lock can be identified by the fourteenth character of the model number as either a D or E.

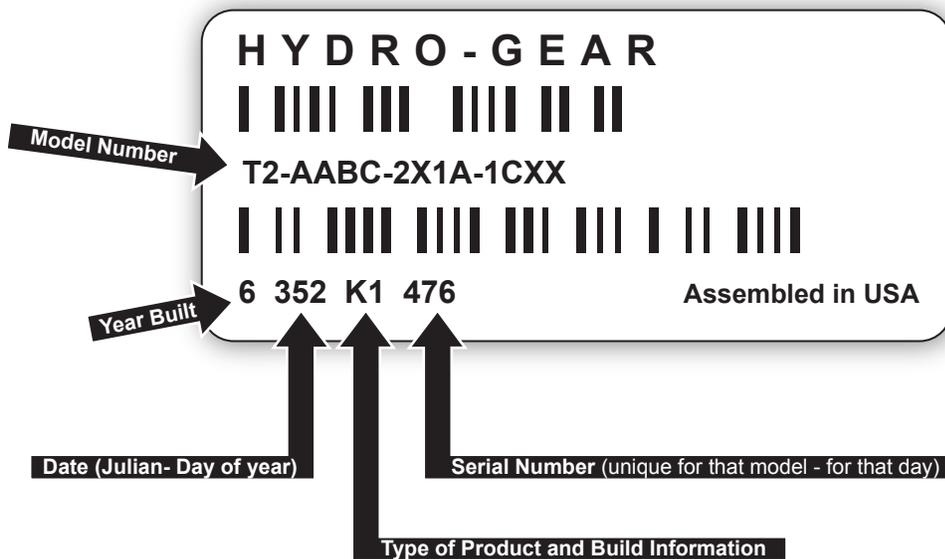


Figure 2, Configuration Label

SAFETY



This symbol points out important safety instructions which, if not followed, could endanger the personal safety and/or property of yourself and others. Read and follow all instructions in this manual before attempting maintenance on your transaxle. When you see this symbol - **HEED ITS WARNING.**



WARNING

POTENTIAL FOR SERIOUS INJURY

Inattention to proper safety, operation, or maintenance procedures could result in personal injury, or damage to the equipment. Before servicing or repairing the T2®, T2-HP™ or T3 HD™ transaxle, fully read and understand the safety precautions described in this section.

PERSONAL SAFETY

Certain safety precautions must be observed while servicing or repairing the T2, T2-HP or T3 HD. This section addresses some of these precautions but must not be considered an all-inclusive source on safety information. This section is to be used in conjunction with all other safety material which may apply, such as:

1. Other manuals pertaining to this machine,
2. Local and shop safety rules and codes,
3. Governmental safety laws and regulations.

Be sure that you know and understand the equipment and the hazards associated with it. Do not place speed above safety.

Notify your supervisor whenever you feel there is any hazard involving the equipment or the performance of your job.

Never allow untrained or unauthorized personnel to service or repair the equipment.

Wear appropriate clothing. Loose or hanging clothing or jewelry can be hazardous. Use the appropriate safety equipment, such as eye and hearing protection, and safety-toe and slip-proof shoes.

Never use compressed air to clean debris from yourself or your clothing.

TOOL SAFETY

Use the proper tools and equipment for the task.

Inspect each tool before use and replace any tool that may be damaged or defective.

WORK AREA SAFETY

Keep the work area neat and orderly. Be sure it is well lit, that extra tools are put away, trash and refuse are in the proper containers, and dirt or debris have been removed from the working areas of the machine.

The floor should be clean and dry, and all extension cords or similar trip hazards should be removed.

SERVICING SAFETY

Certain procedures may require the vehicle to be disabled in order to prevent possible injury to the servicing technician and/or bystanders.

The loss of hydrostatic drive line power may result in the loss of hydrostatic braking capability.

Some cleaning solvents are flammable. Use only approved cleaning materials. Do not use explosive or flammable liquids to clean the equipment.

To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.

“Discard used cleaning material in the appropriate containers according to local, state, and federal regulations.”

TROUBLESHOOTING



WARNING

Do not attempt any servicing or adjustments with the engine running. Use extreme caution while inspecting the drive belt assembly and all vehicle linkage!

Follow all safety procedures outlined in the vehicle owner's manual.

In many cases, problems with the T2®, T2-HP™ and T3 HD™ are not related to a defective transaxle, but are caused by slipping drive belts, partially engaged bypass valves, and loose or damaged control linkages. Be sure to perform all operational checks and adjustments outlined in Service and Maintenance, before assuming the transaxle is malfunctioning. The table below provides a troubleshooting checklist to help determine the cause of operational problems.

TROUBLESHOOTING CHECKLIST

| Possible Cause | Corrective Action |
|--|--|
| Unit Operates In One Direction Only | |
| Control linkage bent or out of adjustment | Repair or replace linkage, Page 9 |
| Drive belt slipping or pulley damaged | Repair or replace drive belt or pulley, Page 9 |
| Vehicle Does Not Drive/Track Straight | |
| Vehicle tires improperly inflated | Refer to vehicle manufacturer suggested pressure |
| Control linkage bent or out of adjustment | Repair or replace linkage, Pages 9 and 12 |
| Bypass assembly sticking | Repair or replace bypass, Page 29 |
| Brake Partially Engage | Disengage Brake, Replace Broken or Missing Brake Return Spring |
| Unit Is Noisy | |
| Oil level low or contaminated oil | Fill to proper level or change oil, Page 10 |
| Excessive loading | Reduce vehicle loading, Page 9 |
| Loose parts | Repair or replace loose parts |
| Bypass assembly sticking | Repair or replace linkage, Page 9 |
| Air trapped in hydraulic system | Purge hydraulic system, Page 11 |
| Brake Partially Engage | Disengage Brake, Replace Broken or Missing Brake Return Spring |
| Unit Has No/Low Power | |
| Engine speed low | Adjust to correct setting |
| Control linkage bent or out of adjustment | Repair or replace linkage, Page 9 |
| Drive belt slipping or pulley damaged | Repair or replace drive belt or pulley, Page 9 |
| Oil level low or contaminated oil | Fill to proper level or change oil, Page 10 |
| Excessive loading | Reduce vehicle loading, Page 9 |
| Bypass assembly sticking | Repair or replace linkage, Page 9 |
| Air trapped in hydraulic system | Purge hydraulic system, Page 11 |
| Brake Partially Engage | Disengage Brake, Replace Broken or Missing Brake Return Spring |
| Unit Is Operating Hot | |
| Debris buildup around transaxle | Clean off debris, Page 9 |
| Cooling fan damaged | Repair or replace cooling fan, Pages 17 |
| Oil level low or contaminated oil | Fill to proper level or change oil, Page 10 |
| Excessive loading | Reduce vehicle loading, Page 9 |
| Air trapped in hydraulic system | Purge hydraulic system, Page 11 |
| Brake Partially Engage | Disengage Brake, Replace Broken or Missing Brake Return Spring |
| Transaxle Leaks Oil | |
| Damaged seals, housing, or gaskets | Replace damaged components |
| Air trapped in hydraulic system | Purge hydraulic system, Page 11 |

SERVICE AND MAINTENANCE

NOTE: Any servicing dealer attempting a warranty repair must have prior approval before conducting maintenance of a Hydro-Gear® product unless the servicing dealer is a current Authorized Hydro-Gear Service Center.

EXTERNAL MAINTENANCE

Regular external maintenance of the T2®, T2-HP™ and T3 HD™ should include the following:

1. Check the vehicle operator’s manual for the recommended load ratings. Insure the current application does not exceed load rating.
2. Check oil level in accordance with Figure 3 Page 10.
3. Inspect the vehicle drive belt, idler pulley(s), and idler spring(s). Insure that no belt slippage can occur. Slippage can cause low input speed to the transaxle.
4. Inspect the transaxle cooling fan for broken or distorted blades and remove any obstructions (grass clippings, leaves, dirt, etc.).
5. Inspect the axle parking brake and vehicle linkage to insure proper actuation and adjustment of the parking brake.
6. Inspect the vehicle control linkage to the directional control arm on transaxle. Also, insure the control arm is securely fastened to the trunnion arm of the transaxle.
7. Inspect the bypass mechanism on the transaxle and vehicle linkage to insure it actuates and releases fully.

SERVICE AND MAINTENANCE PROCEDURES

All the service and maintenance procedures presented on the following pages can be performed while the T2, T2-HP or T3 HD is mounted on the vehicle. Any repair procedures as mentioned in the repair section of this manual must be performed after the unit has been removed from the vehicle.

FLUIDS

The fluids used in Hydro-Gear products have been carefully selected, and only equivalent, or better products should be substituted.

Typically, an engine oil with a minimum rating of 9.0 cSt (55 SUS) at 230°F (110° C) and an API classification of SL is recommended. A 20W-50 engine oil has been selected for use by the factory and is recommended for normal operating temperatures.

“All fluids should be handled and disposed of according to local, state, and federal regulations.”

FLUID VOLUME AND LEVEL

Fluid volume information is provided in the Table below.

Certain situations may require additional fluid to be added or even replaced. Refer to Page 10, Figure 3 and pages 4 and 5 for the proper fill port location.

Fill the T2, T2-HP or T3 HD to the bottom of the oil fill port threads.

Recheck the fluid level once the unit has been operated for approximately 1 minute.

Purging may be required. Refer to the purging procedures on page 11.

| Fluid Description |
|--|
| Type: 20W50 motor oil |
| Fluid Volume (per transaxle) |
| T2 - 10 Bolt Housing: 69.3 - 65.9 fl. oz. (2085 - 1985 ml) |
| T2 - 14 Bolt Housing: 68.1 - 64.8 fl. oz. (2015 - 1915 ml) |
| T3 - Without Differential Lock: 70.5 - 67 fl. oz. (2085 - 1985 ml) |
| T3 - With Differential Lock: 64.9 - 68.2 fl. oz. (2020 - 1920 ml) |

FLUID CHANGE PROCEDURE

This transaxle is factory filled, sealed and does not require oil maintenance. However, in the event of oil contamination or degradation, oil addition or change may alleviate certain performance problems.

1. Remove the transaxle from the vehicle.
2. Clean the expansion tank and oil fill port areas of any debris.
3. Remove the oil fill port fitting.
4. Position the transaxle so the oil will drain completely out of the housing.
5. After all the oil is drained from the transaxle, remove the expansion tank by removing the self tapping bolt (10-32 x 1/2) and ratchet fastener that holds the tank to the housing.
6. Remove the tank and drain the oil from the tank. DO NOT remove the vent cap from the tank. DO NOT remove the tank hose or o-ring unless a replacement is needed.
7. Install the tank by first inserting the hose into the opening in the expansion tank. Push the tank opening over the o-ring to ensure a proper seal.

8. Install the tank and self tapping bolt making sure not to cross thread the bolt. Torque the bolt to the lower value of the torque specification listed in the Table on page 15.
9. Fill the transaxle at the oil fill port according to Figure 3.
10. Install the oil fill port fitting.

EXPANSION TANK FUNCTION

The expansion tank allows the T2®, T2-HP™ and T3 HD™ to operate free of air entrainment and provides maximum lubrication to the mechanical and hydraulic components in the transaxle.

As the T2, T2-HP or T3 HD transaxle is operated, oil in the transaxle housing heats up which causes the oil to expand. The oil flows through an internal hose to the bottom of the vented expansion tank. As the oil cools, the oil in the transaxle housing contracts, causing the oil level to go down in the housing. This creates a negative pressure in the housing causing the oil to be drawn back into the case. This keeps the transaxle housing full of oil at specified operating temperatures.

| Fluid Description | |
|---------------------------------|--------------------------------------|
| Type: 20W50 motor oil | |
| Fluid Volume (per transaxle) | |
| T2 - 10 Bolt Housing: | 69.3 - 65.9 fl. oz. (2085 - 1985 ml) |
| T2 - 14 Bolt Housing: | 68.1 - 64.8 fl. oz. (2015 - 1915 ml) |
| T3 - Without Differential Lock: | 70.5 - 67 fl. oz. (2085 - 1985 ml) |
| T3 - With Differential Lock: | 64.9 - 68.2 fl. oz. (2020 - 1920 ml) |

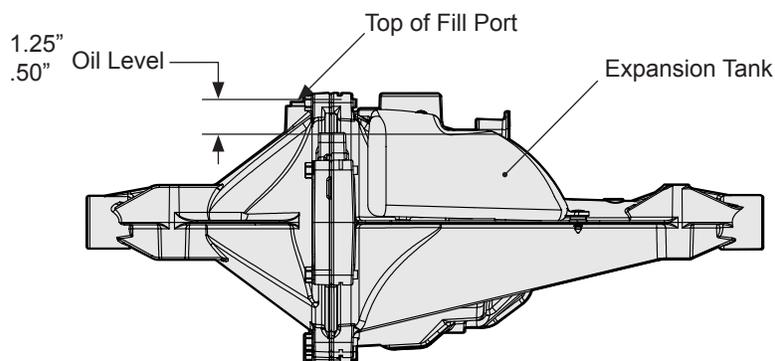


Figure 3, Expansion Tank

PURGING PROCEDURES

Due to the effects air has on efficiency in hydrostatic drive applications, it is critical that it be purged from the system.

These purge procedures should be implemented any time a hydrostatic system has been opened to facilitate maintenance or any additional oil has been added to the system.

Air creates inefficiency because its compression and expansion rate is higher than that of the oil approved for use in hydrostatic drive systems.

The resulting symptoms in hydrostatic systems may be:

1. Noisy operation.
2. Lack of power or drive after short term operation.
3. High operation temperature and excessive expansion of oil.

Before starting, make sure the transaxle/transmission is at the proper oil level. If it is not, fill to the specifications outlined on page 9.

The following procedures should be performed with the vehicle drive wheels off the ground, then repeated under normal operating conditions.

1. With the bypass valve open and the engine running at 3/4 to full throttle, slowly move the directional control in both forward and reverse directions (5 to 6 times), as air is purged from the unit, the oil level will drop.
2. With the bypass valve closed and the engine running, slowly move the directional control in both forward and reverse directions (5 to 6 times). Check the oil level, and add oil as required after stopping engine.
3. It may be necessary to repeat Steps 1 and 2 until all the air is completely purged from the system. When the transaxle moves forward and reverse at normal speed purging is complete.

RETURN TO NEUTRAL SETTING



WARNING

POTENTIAL FOR SERIOUS INJURY

Certain procedures require the vehicle engine to be operated and the vehicle to be raised off the ground. To prevent possible injury to the servicing technician and/or bystanders, insure the vehicle is properly secured.



WARNING

Do not attempt any adjustments with the engine running. Use extreme caution while inspecting all vehicle linkage!

Follow all safety procedures outlined in the vehicle owner's manual.

The return to neutral mechanism on the transaxle is designed to set the directional control into a neutral position when the operator removes their foot from the foot control. Follow the procedures below to properly adjust the return to neutral mechanism on the transaxle:

1. Confirm the transaxle is in the operating mode (bypass disengaged). Raise the vehicle's drive tires off the ground to allow free rotation.

NOTE: *It may be necessary to remove the drive tire from the axle hub to access the linkage control and the transaxle return arm.*

2. Remove the Original Equipment Manufacturer's (OEM's) control linkage at the control arm. Refer to Figure 4.

3. Start the engine and increase the throttle to full engine speed.
4. Check for axle rotation. If the axles do not rotate, go to Step 5. If the axles rotate, go to Step 6.
5. Stop the vehicle's engine. Reattach and adjust the OEM linkage according to the OEM manual. Recheck according to Step 3 and 4. Stop the vehicle engine. Refer to Figure 4.
6. Note the axle directional movement. Stop the vehicle engine. Loosen the lock down screw (168) until the control arm (160) can be rotated. Rotate the control arm in the same direction of the wheel rotation in small increments. Tighten the lock down screw. Recheck according to steps 3 and 4. Refer to Figure 4.

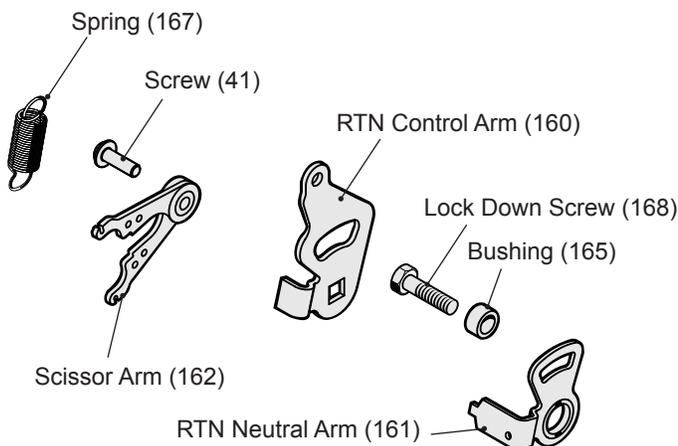


Figure 4, Return to Neutral

BRAKE MAINTENANCE

BRAKE SETTING

1. Remove the brake arm bias spring(134), and then the cotter pin (133) securing the brake castle nut (132).
2. Insert a 0.020" feeler gage between the brake rotor (121) and top brake puck, and then set the brake by finger tightening or loosening the castle nut.
3. Install a new cotter pin to secure the castle nut, and then install the brake arm bias spring.

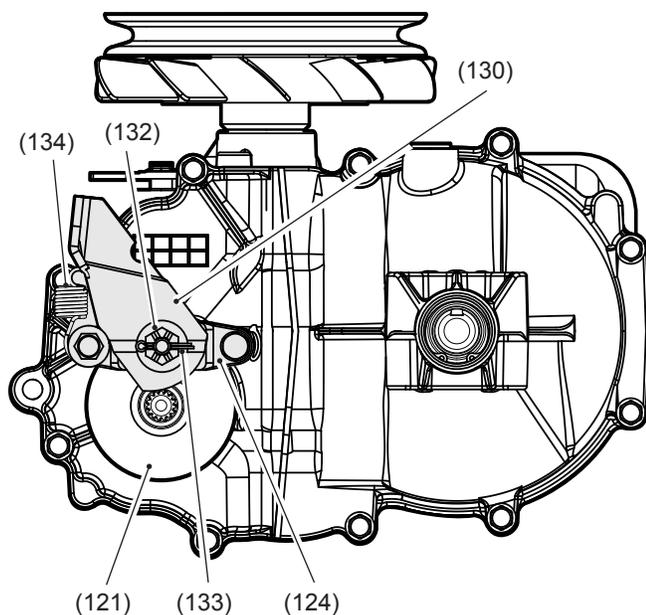


Figure 5, Brake Setting

FRICTION PACK ADJUSTMENT

The friction pack dampens or holds the operator control lever in its desired position.

Adjustment for the amount of drag or holding force can be made by turning the friction pack nut in or out.

Adjustments should be made in no more than 1/4 turn increments.

Over-tightening will result in difficulty or inability of the operator to move the control lever.

NOTE: The factory setting for the friction pack is tightening of the friction pack nut to 100 in-lbs (11 Nm) torque. The friction pack nut is then backed off per the vehicle manufacturer's specifications.

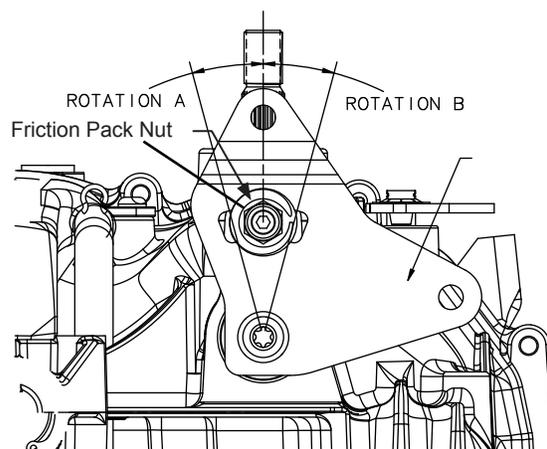


Figure 6, Friction Pack Adjustment

TEAR DOWN AND REASSEMBLY

HOW TO USE THIS MANUAL

Each subassembly illustrated in this section is illustrated by an exploded view showing the parts involved. **The item reference numbers in each illustration are for assembly instructions only.** See pages 39, 41 and 43 for part names and descriptions. A complete exploded view and item list of the transaxles is provided on pages 38 - 43.

Many of the parts and subassemblies of these transaxles can be removed and serviced independently of other components. Where some components and assemblies must be removed before a given assembly can be serviced, that information is given at the beginning of the disassembly instructions.

GENERAL INSTRUCTIONS

Cleanliness is a primary means of assuring satisfactory life on repaired units. Thoroughly clean all exposed surfaces prior to any type of maintenance. Cleaning of all parts by using a solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign material and chemicals.

Protect all exposed sealing surfaces and open cavities from damage and foreign material. The external surfaces should be cleaned before beginning any repairs.

Upon removal, it is recommended that all seals, O-rings, and gaskets be replaced. During installation lightly lubricate all seals, O-rings, gaskets with a clean petroleum jelly prior to assembly. Also protect the inner diameter of seals by covering the shaft with a cellophane (plastic wrap, etc.) material. Be sure all remnants of this covering are removed after servicing.

Parts requiring replacement must be replaced from the appropriate kits identified in the Items Listing, found on pages 38 - 43. Use only original Hydro-Gear® replacement parts found listed on Hydro-Gear service schematics at our website www.hydro-gear.com.

Note: “Any and all Hydro-Gear components removed and replaced during service are recyclable.”

IMPORTANT: When internal repair is performed on the T2®, T2-HP™ or T3 HD™ the filter assembly must be replaced.

TRANSAXLE REMOVAL

It is necessary to remove the T2, T2-HP or T3 HD from the vehicle before performing the repair procedures presented in this section.

LIMITED DISASSEMBLY

The following procedures are presented in the order in which they must be performed to completely disassemble the unit. Do not disassemble the unit any farther than is necessary to accomplish the required repairs. Each disassembly procedure is followed by a corresponding assembly procedure.

Reassembly is accomplished by performing the “Assembly” portions of the procedures. If the unit has been completely disassembled, a summary of the assembly procedures, in the order in which they should occur, is given on page 36.

TOOLS

| REQUIRED TOOLS | |
|---------------------------------|-------------------|
| Miscellaneous | Sockets |
| Flat Blade Screw Driver (2) | 1/2"-3/8" Adapter |
| Torque Wrench | 1/2" Deep |
| Air Impact Wrench | 7/16" Deep |
| Rubber or Neoprene Mallet | 3/4" Deep |
| Breaker Bar | 7/8" Deep |
| Side Cutters/Snips | 9/16" Deep |
| Needle Nose Pliers | T-40 Torx Head |
| Large External Snap Ring Pliers | 10 mm |
| Small Internal Snap Ring Pliers | T-25 Torx Head |

TORQUES

| REQUIRED TORQUE VALUES | | | |
|------------------------|--------------------------------|-------------------------------|-------------------------------|
| Item | Description | Torque | Operation |
| 8 | HFHCS 1/4-20 x 1.25 | 105-155 in-lbs [11.8-17.5 Nm] | Housing screw |
| 13 | Plug 9/16-18 (Metal) / Fitting | 110-150 in-lbs [12.4-16.9 Nm] | Fill plug / Fitting |
| 22 | Bolt, Hex Flange, 3/8-16, CS | 450-550 in-lbs [50.8-62.1 Nm] | Center section bolt |
| 24 | Check plug | 280-400 in-lbs [31.6-45.2 Nm] | Check plugs |
| 25 | Check plug | 280-400 in-lbs [31.6-45.2 Nm] | Check plugs |
| 41 | TWHCS 5/16-18 x 1 | 230-310 in-lbs [25.9-35.0 Nm] | Trunnion arm screw |
| 43 | Screw, set 5/16-24 x 2.50 | 135-155 in-lbs [15.2-17.5 Nm] | Control arm stud |
| 49 | Nut, hex 5/16-24 nylon insert | 85-120 in-lbs [9.6-13.5 Nm] | Friction Pack Nut |
| 127 | HFHCS 1/4-20 x 2.0 w/ patch | 80-120 in-lbs [9.0-13.5 Nm] | Brake yoke screw |
| 128 | HHCS 1/4-20 x 1 (patch) | 80-120 in-lbs [9.0-13.5 Nm] | Brake yoke screw |
| 140 | 5/16 SAE, 5/32 tube | 96-120 in-lbs [10.8-13.5 Nm] | Expansion tank fitting |
| 144 | Bolt, self-tapping 10-32 x 0.5 | 25-40 in-lbs [2.8-4.5 Nm] | Expansion tank screw |
| 152 | Nut, Patch Lock 1/2-20 | 540-660 in-lbs [61.1-74.6 Nm] | Fan Nut |
| 153 | HFHCS 1/4-20 x 0.75 | 50-80 in-lbs [5.7-9.0 Nm] | Fan Screws |
| 162 | Screw, Hex Flange Head | 85-120 in-lbs [9.6-13.5 Nm] | Neutral Assy Arm Screw |
| 181 | Bolt, self tapping 10-32 x 0.5 | 25-40 in-lbs [2.8-4.5 Nm] | Differential lock control arm |

As a general rule, use the low end of the torque spec on fasteners when reassembling the unit.

TRANSAXLE REMOVAL

NOTE: It is necessary to remove the T2®, T2-HP™ or T3 HD™ from the vehicle before performing the repair procedures presented in this section.

Before starting any disassembly, make certain that your work area is neat and clean. Clean the external parts of the transaxle.

The following procedures are presented in the order recommended for a

complete tear down of the transaxle.

Do not disassemble the unit any farther than necessary to accomplish the required repairs.

Reassembly is accomplished by performing the “Assembly” portions of the procedures. If the unit has been completely disassembled, a summary of the assembly procedures, in the order in which they should occur, is given on page 36.

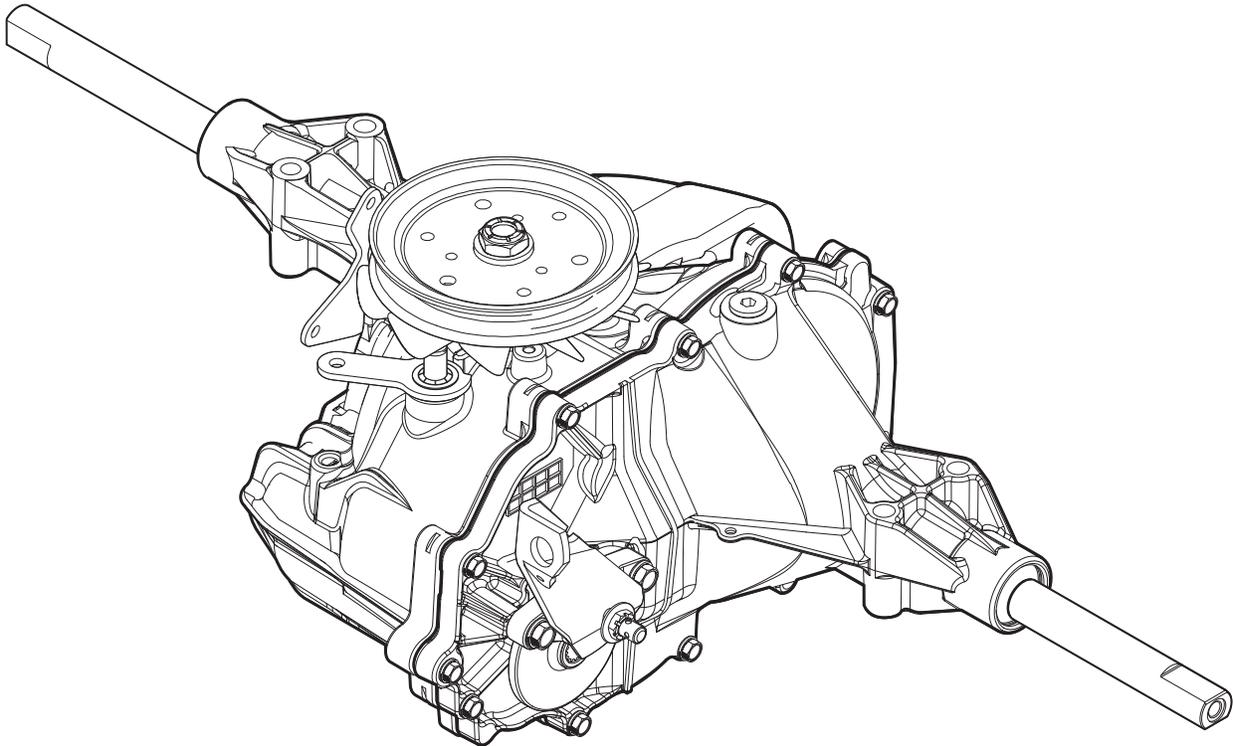


Figure 7, T2 Transaxle

FAN AND PULLEY

Refer to Figure 8

PULLEY AND FAN CONFIGURATION

1. Remove the locknut (152).
2. Remove the washer (153) if applicable.
3. If applicable separate the assembly by removing the screws (153), fan (150) and the pulley (151).

Inspection

1. Check all components for wear or damage. Replace if necessary.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. When tightening the fasteners, refer to the table on page 15 for the required torque values.

NOTE: As a general rule, use the low end of the torque specification on fasteners when reassembling the unit.

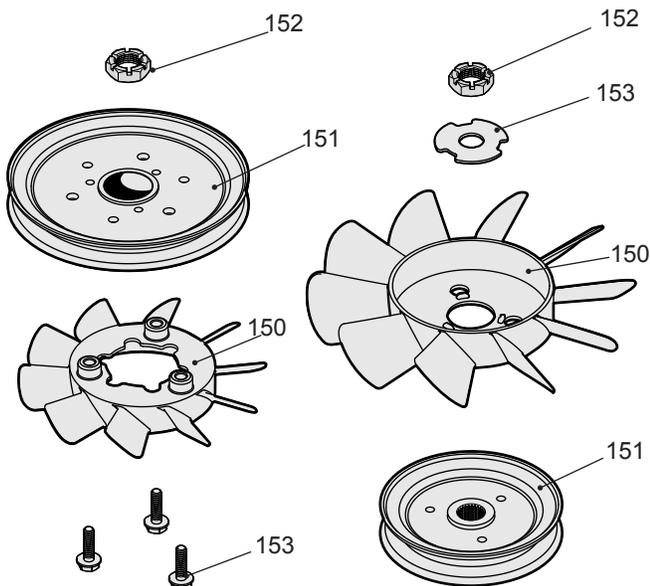


Figure 8, Fan and pulley configuration

Refer to Figure 9

HUB, FAN AND PULLEY CONFIGURATION

1. Remove the locknut (152).
2. Remove the washer (153) if applicable.
3. Remove the fan (150) and the pulley (151)
4. Remove the pulley hub (154).

Inspection

1. Check all components for wear or damage. Replace if necessary.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. When tightening the fasteners, refer to the table on page 15 for the required torque values.

NOTE: As a general rule, use the low end of the torque specification on fasteners when reassembling the unit.

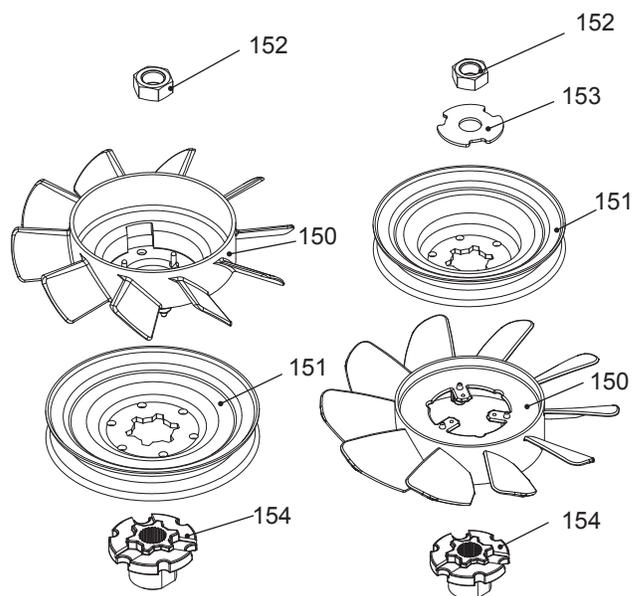


Figure 9, Hub, fan and pulley configuration

EXPANSION TANK

Refer to Figure 10

Disassembly

1. Remove all items previously discussed in their recommended order.
2. Detach the tube (145) from the tank fitting (146). The fitting (146) does not need to be removed – unless, replacing.
3. Remove the screw (144) from the expansion tank.
4. Remove the tank (143). Do not remove the hose (141) at this time.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. When tightening the fasteners, refer to the table on page 15 for the required torque values.

NOTE: As a general rule, use the low end of the torque specification on fasteners when reassembling the unit.

Inspection

1. Inspect all parts for wear or damage. Replace if necessary.

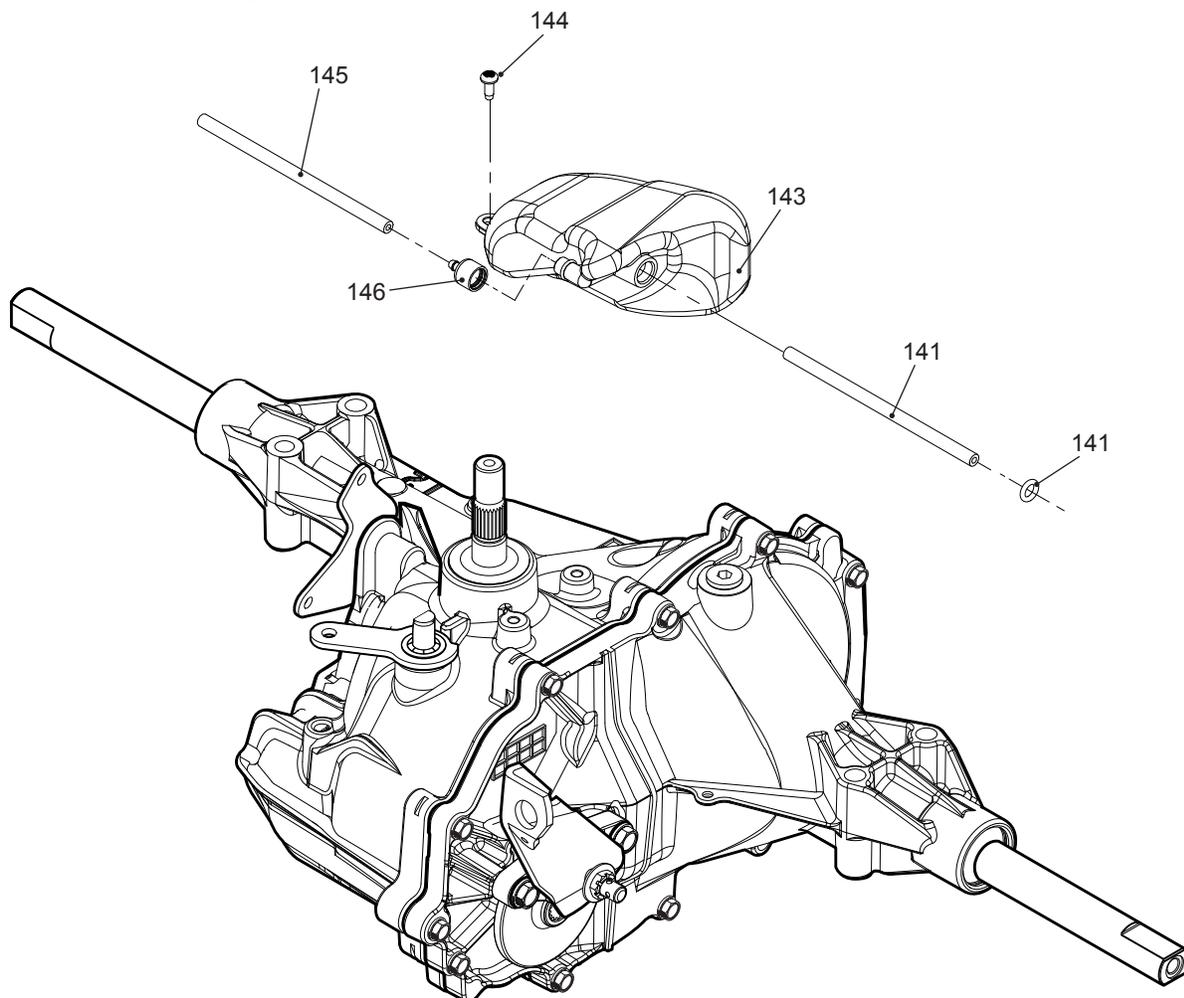


Figure 10, Expansion Tank

CONTROL ARM ASSEMBLY

Refer to Figure 11

Disassembly

1. Remove all items previously discussed in their recommended order.
2. If opening the housing or replacing seals, remove the oil port plug (13), then; drain oil from transaxle.
3. Remove the lock nut (49), the washer (46), the helical compression spring (48), the spacer (47), and the plastic washer (45).
4. Remove the Torx head screw (41) and discard.
5. Remove the control arm (42), the (second) washer (45), the belleville washer (44), and the set screw (43).

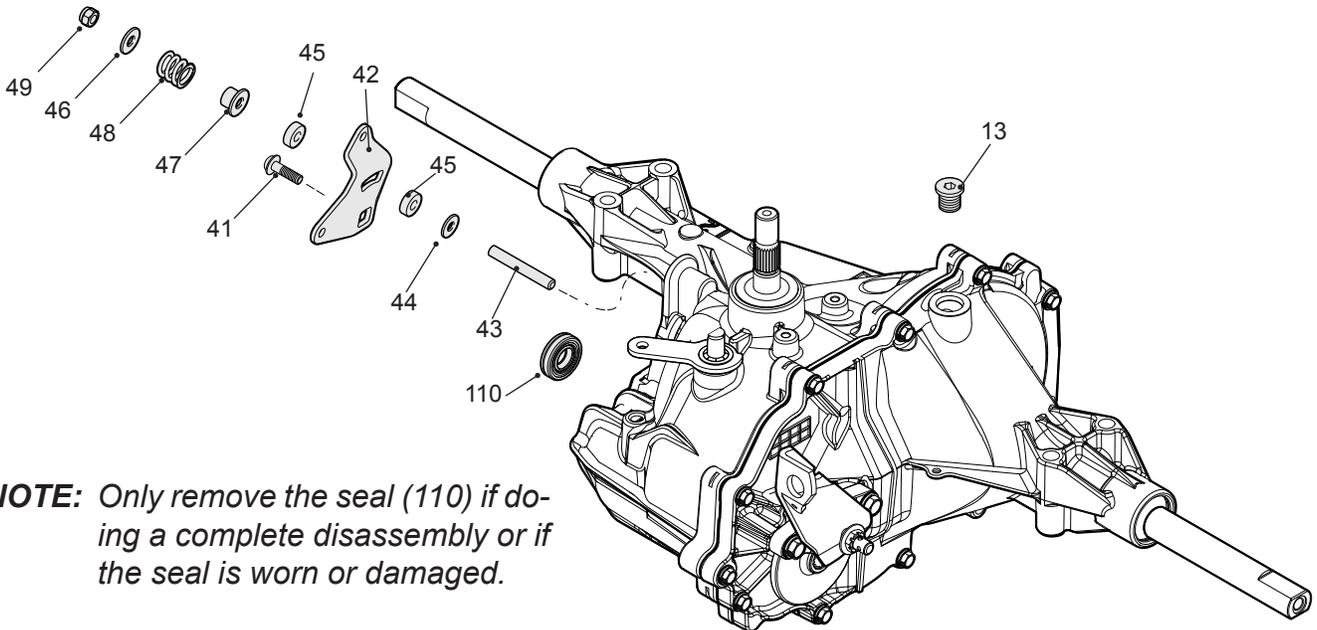
1. Reassemble all parts in the reverse order of disassembly.
2. When tightening the fasteners, refer to the table on page 15 for the required torque values.
3. Install new Torx head screw (41) and lip seal (110) from seal kit, if removed.

NOTE: As a general rule, use the low end of the torque specification on fasteners when reassembling the unit.

Inspection

1. Inspect all parts for wear or damage. Replace if necessary.

Assembly



NOTE: Only remove the seal (110) if doing a complete disassembly or if the seal is worn or damaged.

Figure 11, Control Arm

RETURN TO NEUTRAL ASSEMBLY OPTION

Refer to Figure 12

Disassembly

1. Remove all items previously discussed in their recommended order.
2. Remove the spring (167).
3. Remove the Torx head screw (41) and discard.
4. Remove the scissor arm (164), and the RTN control arm (161).
5. Remove the Hex flange head screw (162), the bushing (166) and the RTN neutral arm (165).

NOTE: Only remove the seal (110) if damaged or worn, or if doing a complete disassembly. Refer to “Seal Kit” in the Items List on page 39.

Inspection

1. Inspect all parts for wear or damage. Replace if necessary.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. When tightening the fasteners, refer to the table on page 15 for the required torque values.
3. Install new Torx head screw (41) and lip seal (110) from seal kit.

NOTE: As a general rule, use the low end of the torque specification on fasteners when reassembling the unit.

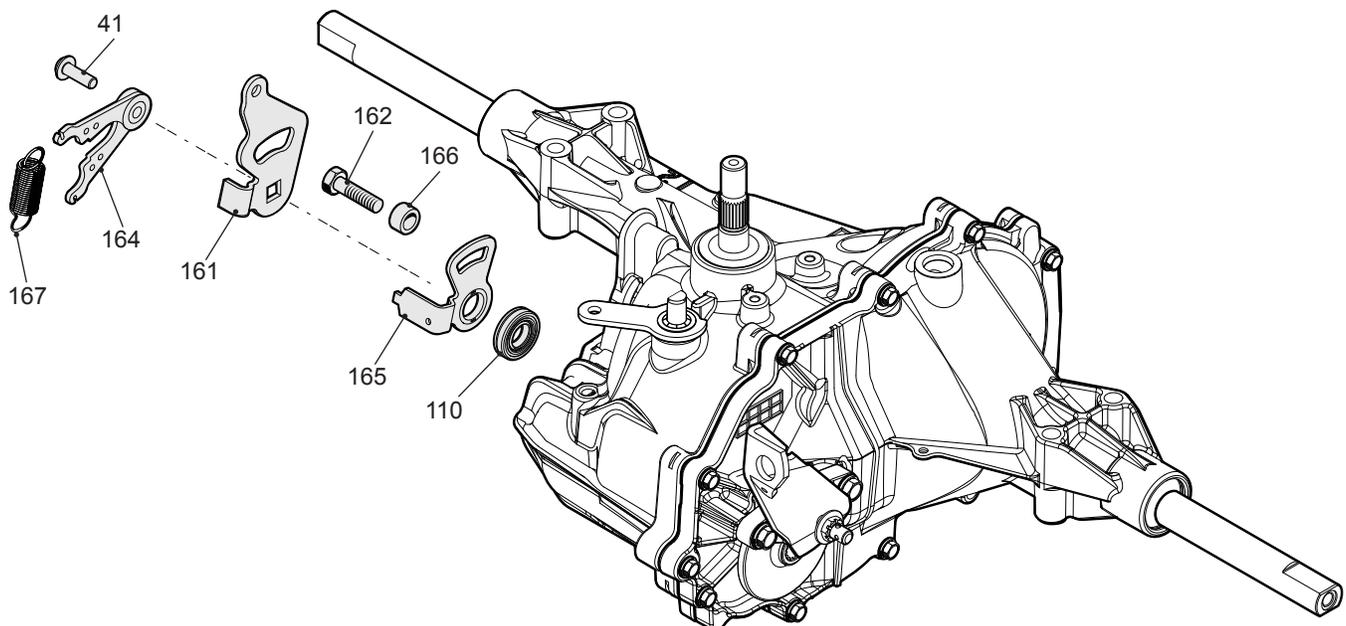


Figure 12, Return to Neutral Assembly

RETURN TO NEUTRAL/ROS ASSEMBLY OPTION

Refer to Figure 13

Disassembly

1. Remove all items previously discussed in their recommended order.
2. Remove the spring (167).
3. Remove the Torx head screw (41), discard, and the washer (163).
4. Remove the scissor arm (164), and the RTN control arm (160).
5. Remove the Hex flange head screw (162), the bushing (166) and the RTN neutral arm (165).

Inspection

1. Inspect all parts for wear or damage. Replace if necessary.

Assembly

1. Install the neutral arm (165).
2. Install the bushing (166) and the hex head screw (162).

3. Install the control arm (160).
4. Install the RTN scissor arm (164), washer (163) and Torx head screw (41). Refer to torque chart on page 15.
5. Install the switch retainer over the neutral arm tab. Place the rivet through the switch retainer and neutral arm.
6. Install the RTN spring (167).
7. Press down on the switch retainer tab to bias it. Ensure that the rivet is seated. Then set the rivet using a rivet gun.
8. Refer to page 12 for adjusting the RTN assembly.

NOTE: After installing the transaxle on the vehicle be sure the operator presence system and the reverse operation system (ROS) are working properly. Refer to the operations and maintenance sections in the vehicle owner's manual.

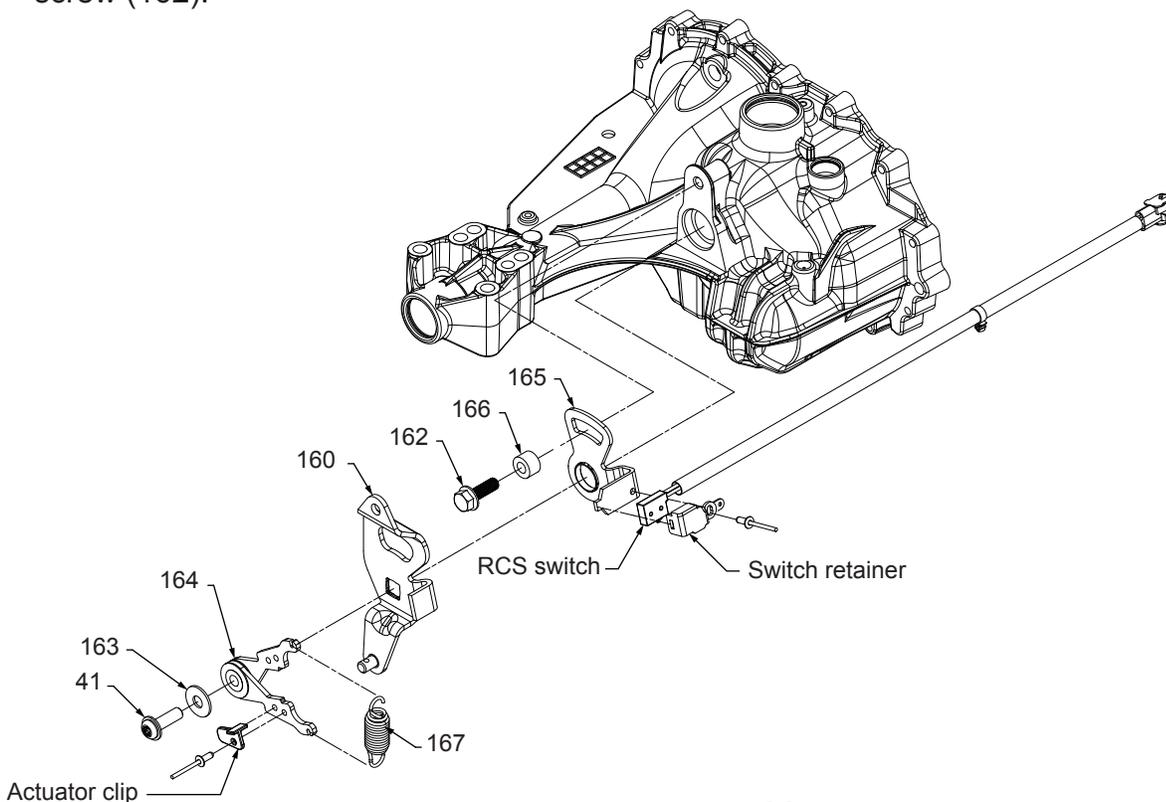


Figure 13, Return to Neutral/ROS Assembly

BRAKE ARM & BRAKE ASSEMBLY

Refer to Figure 14

Disassembly

1. Remove all items previously discussed in their recommended order.
2. Remove the cotter pin (133) and discard. Mark the orientation of the bias spring (134), and long screw (127). Remove the brake arm spring (134), the castle nut (132), and the washer (131).
3. Remove the brake arm (130), and the brake compression spring (129).
4. Remove the bolt (128), the bolt (127), and the spacer (126).
5. Remove the brake yoke (124), the puck plate (122), and the brake puck (120).
6. Remove the two brake pins (125) from the brake yoke (124).
7. Remove the brake rotor (121), the inner puck (120) and the seal (7) and discard.

NOTE: Only remove the seal (7) if damaged or worn, or if doing a complete disassembly. Refer to “Seal Kit” in the Items List on page 39.

Inspection

1. Inspect all parts for wear or damage. Replace if necessary.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. When tightening the fasteners, refer to the table on page 15 for the required torque values.
3. Install new cotter pin (133) and lip seal (7) from seal kit.

NOTE: As a general rule, use the low end of the torque specification on fasteners when reassembling the unit.

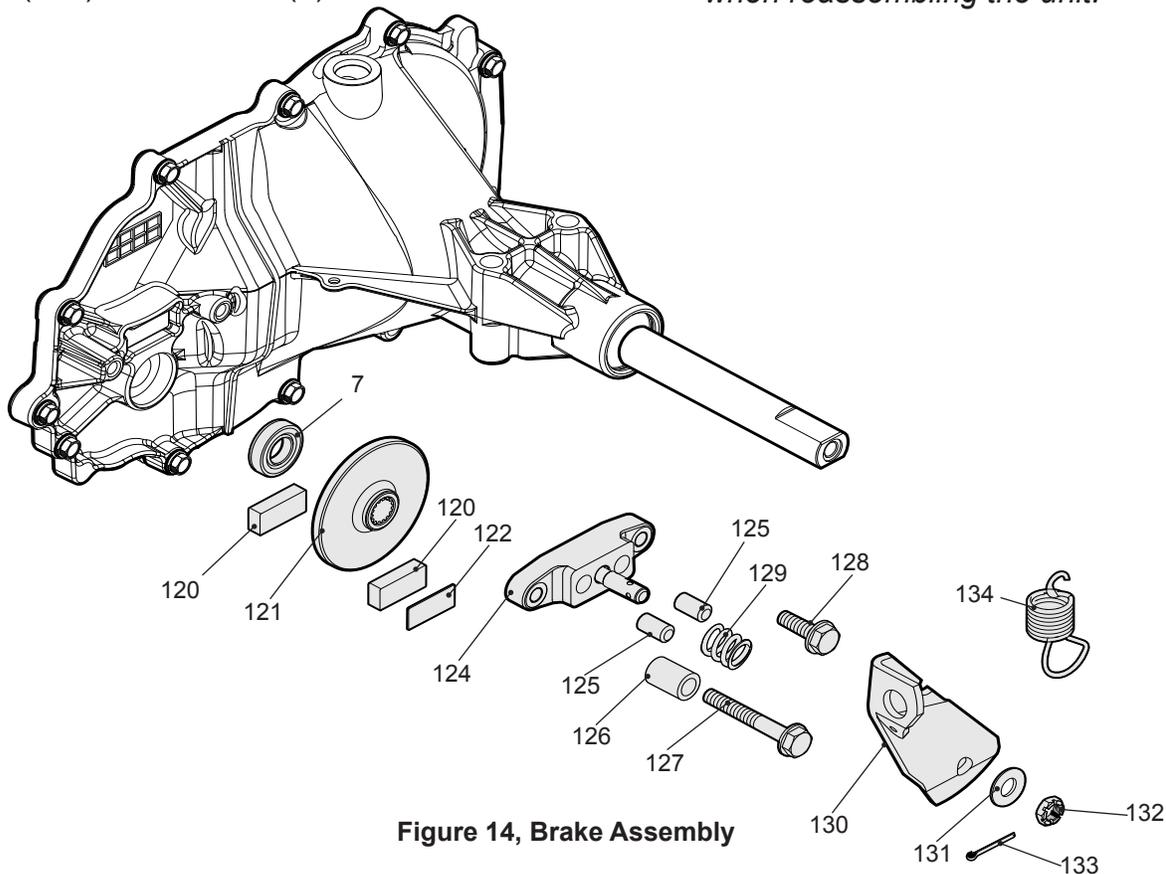


Figure 14, Brake Assembly

SIDE HOUSING

Refer to Figure 15

Disassembly

1. Remove all external items previously discussed in their recommended order.
2. Remove the screws (8), separate side housing (2) from main housing (1).

Inspection

1. Inspect the bearing and bushing areas in the side cover for wear or damage. Replace if necessary.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. Apply a bead of sealant around the perimeter of the main housing face. See “Sealant Application Diagram” on page 36.
3. Align the side housing (2) with the main housing (1). Use care not to smear the sealant bead.
4. Install the housing screws (8). Refer to the screw tightening pattern on page 37.
5. When tightening the fasteners, refer to the table on page 15 for the required torque values.

NOTE: For models that have differential lock reference page 24.

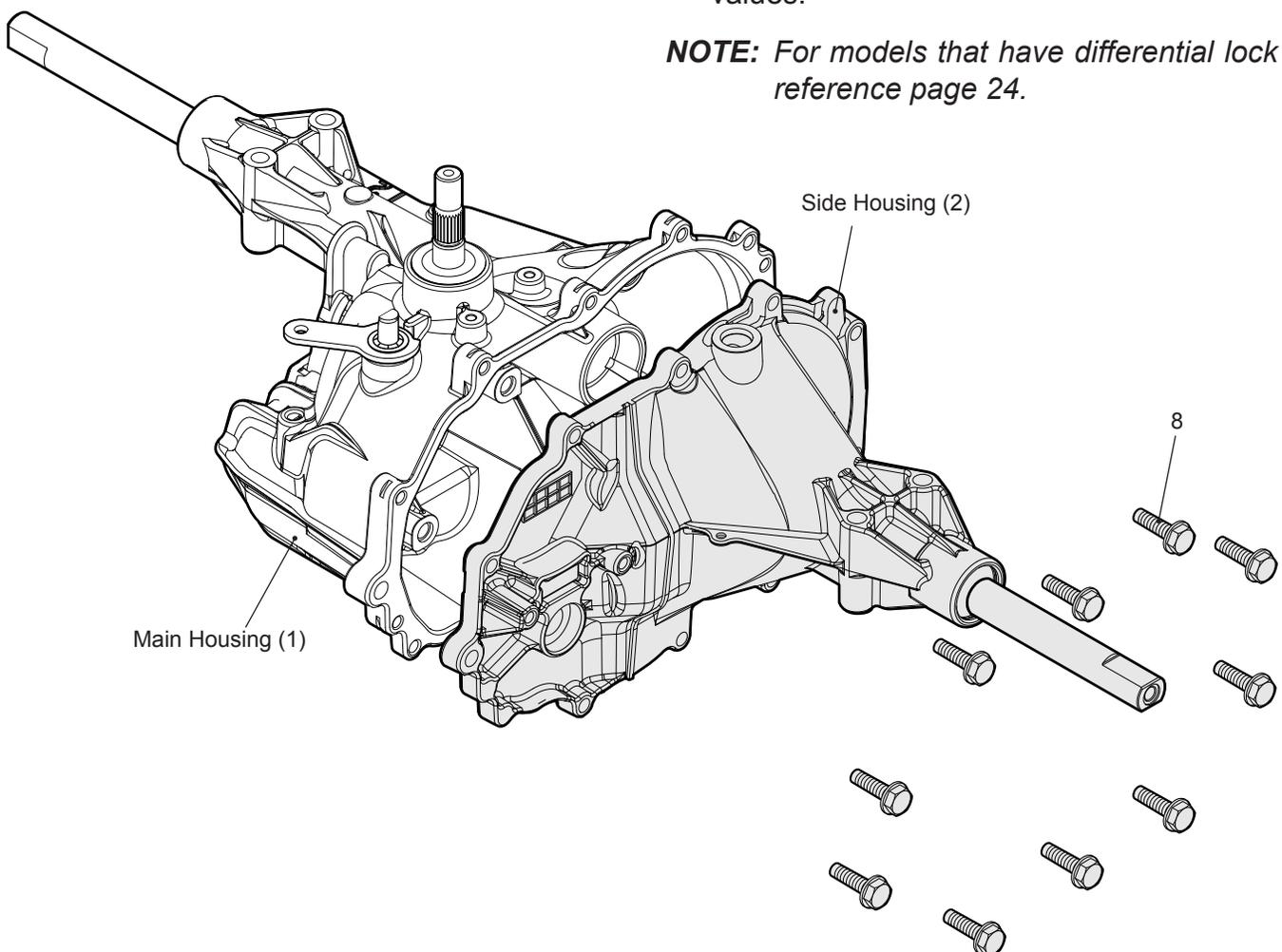


Figure 15, Side Housing Removal

DIFFERENTIAL LOCK

Refer to Figures 16 and 17.

NOTE: The following procedures only apply to T3 HD models with the letters D or E in the fourteenth character position of the model number. These procedures do not apply to any other models.

Disassembly

1. Remove self tapping bolt (181) using a 10-32 torque head wrench.
2. Remove flat washer (182), extension spring (183) and actuating arm (178).
3. Remove oil seal (172)
4. Remove the side housing (1). Reference disassembly step #2 on page 23.
5. Remove cupped washer (175) and rotating cam (177).
6. Remove the actuating cam (179).
7. Remove the bull gear (107). See figure 16.
8. Remove both miter gears (102) and both differential pins 108).
9. Remove both return springs (173) and both differential dogs (172).

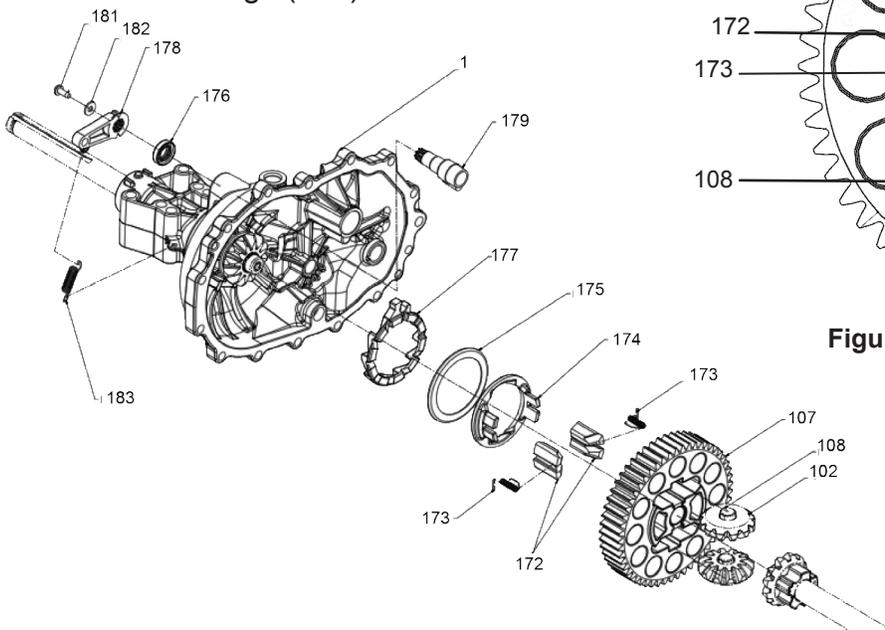


Figure 17, Differential Lock Assembly

Inspection

1. Inspect bearings and bushings in side housing for wear or damage. Replace if necessary.
2. Inspect differential lock components and ramps cast into side housing for damage and replace as necessary.

Assassembly

1. Assemble items in reverse order of disassembly.

NOTE: A special tool, cam clamp, is required to properly install the rotating cam. Reference figure 18 on page 25 for correct positioning of the cam clamp during assembly.

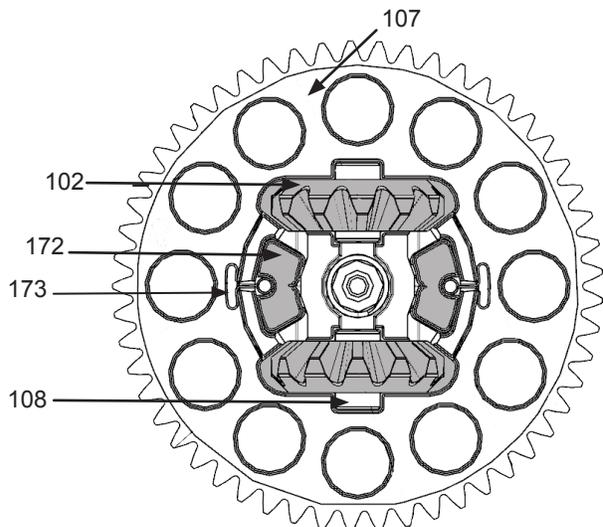


Figure 16, Differential Lock Bull Gear

CAM CLAMP

Refer to Figure 18.

The cam clamp (211) is a special tool that is required to properly assemble the differential lock.

To properly use the cam clamp to assist in assembly the followings steps should be followed:

1. Install the rotating cam (177) into the side housing and insure it is fully seated at the bottom of the ramps.
2. Insert the cam clamp (211) through the oil fill port hole with the flat end placed against the rotating cam.

3. Place the post of the opposite end into the nearest mounting hole in the housing.

4. Retain the position of the rotating cam (177) with the cam clamp (211) to continue assembly of the differential lock.

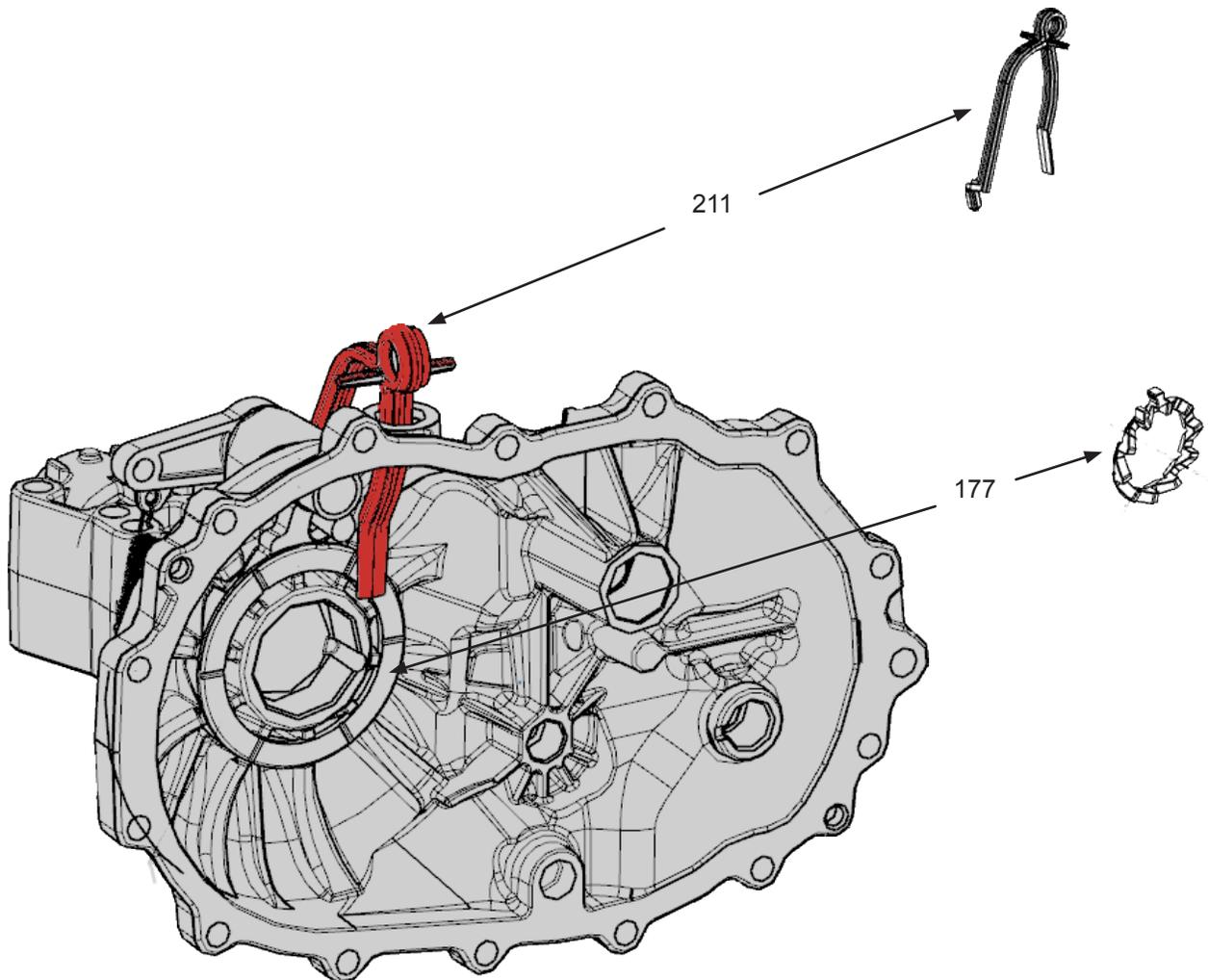


Figure 18, Differential Lock Cam Clamp

RH AXLE SHAFT

Refer to Figure 19

Disassembly

1. Remove all items previously discussed, in their recommended order.
2. Remove the lip seal (110) and discard.
3. Remove the outboard bushing (106).
4. Remove the axle shaft (103) in the direction of arrow.
5. Remove the inner bushing (105).

Inspection

1. Inspect the axle shaft for wear or damage. Replace if necessary.

Assembly

1. Assemble items in reverse order of disassembly.

NOTE: To protect the lip seal from possible damage when installing into the bore and over the axle shaft, apply a protective covering over the splines, sharp corners and/or keyway of the axle shaft (e.g., cellophane, tape, etc.). Remove protective covering after installation.

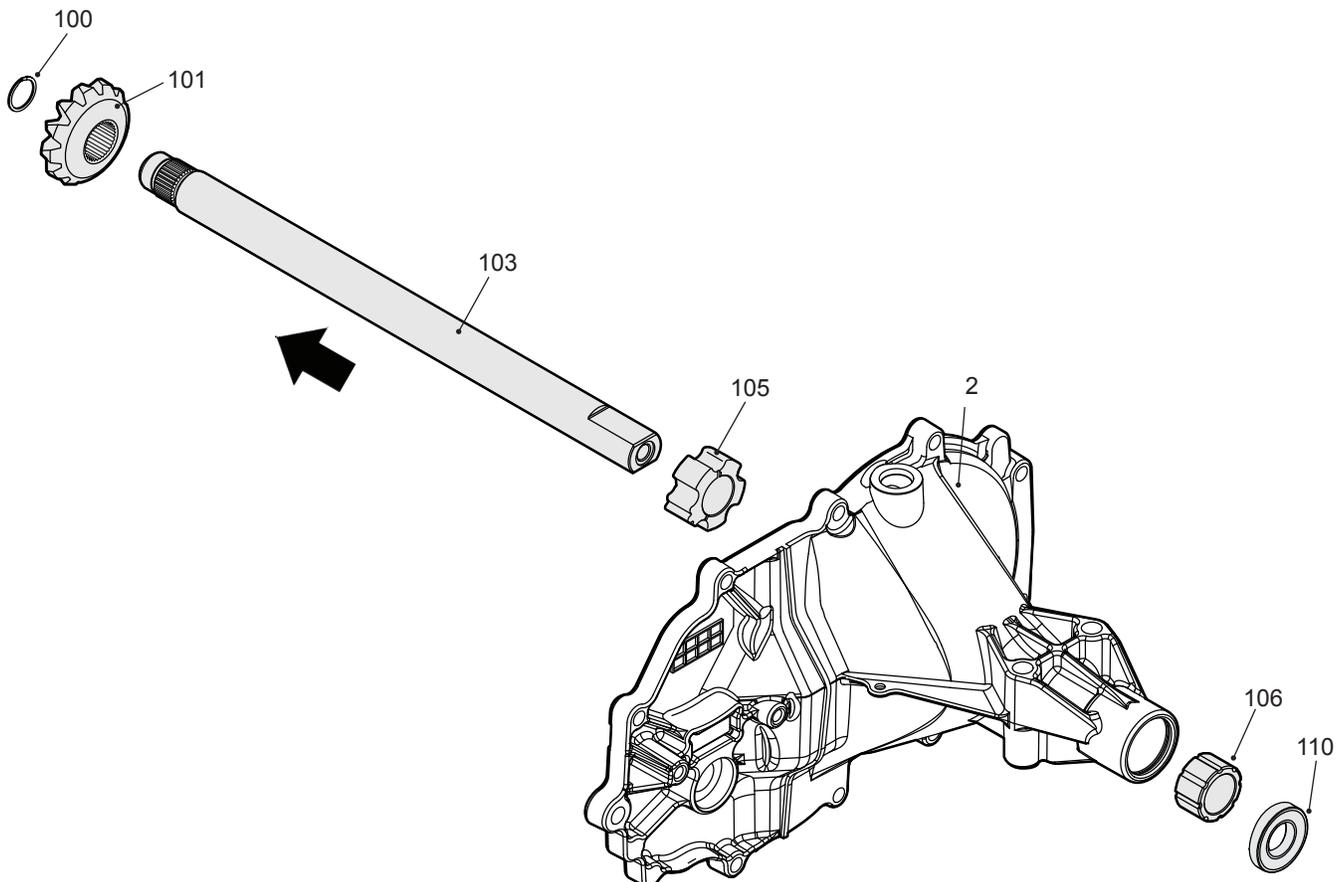


Figure 19, Axle Assembly

BULL GEAR SET

Refer to Figure 20

Disassembly

1. Remove all external items previously discussed in their recommended order.
2. Remove the bull gear set — two miter gears (102) with two differential pins (108), and bull gear (107).

Inspection

1. Inspect all items of the bull gear set for wear or damage.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. Install the bull gear (107).
3. Install the miter gears (102) with the differential pins (108).

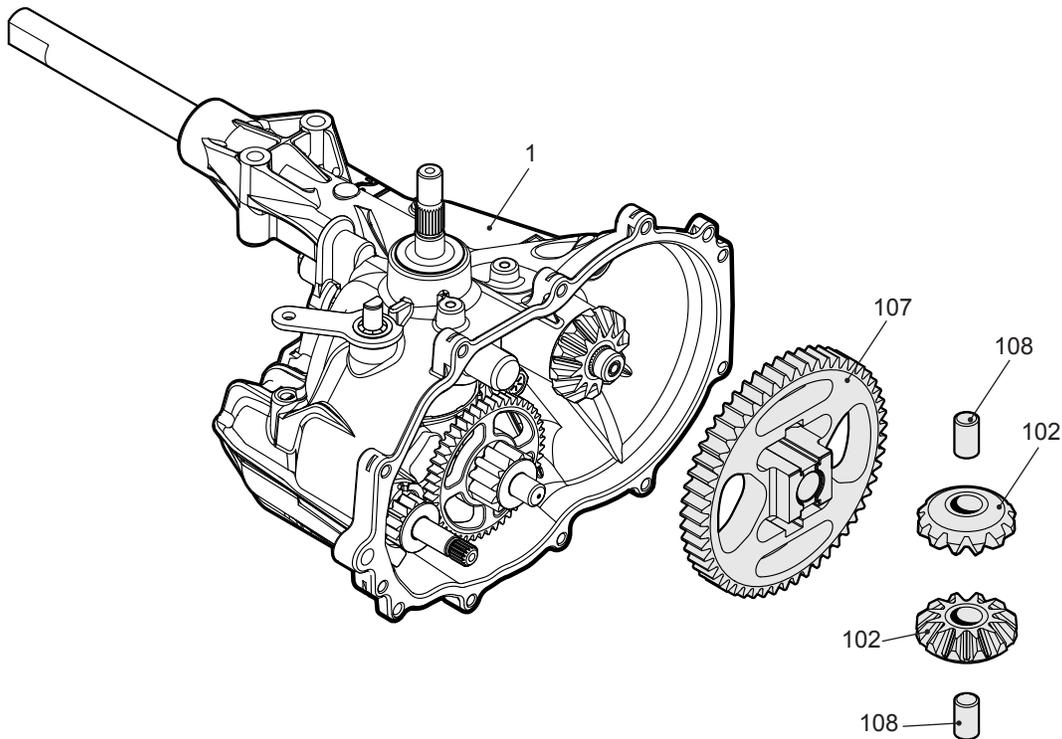


Figure 20, Bull Gear Set

REDUCTION GEAR SET

Refer to Figure 21

Disassembly

Reduction Gear Set:

1. Remove all external items previously discussed in their recommended order.
2. Remove the washer (93), jack shaft gear (91) and reduction gear (90).
3. Remove the jack shaft (92) and second washer (93).

Inspection

1. Inspect all items of the reduction gear set for wear or damage.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. Install the washer (93) and jack shaft (92).
3. Install the jack shaft gear (91) into the reduction gear (90). Insert onto the jack shaft (92).
4. Place the washer (93) onto the jack shaft (92).

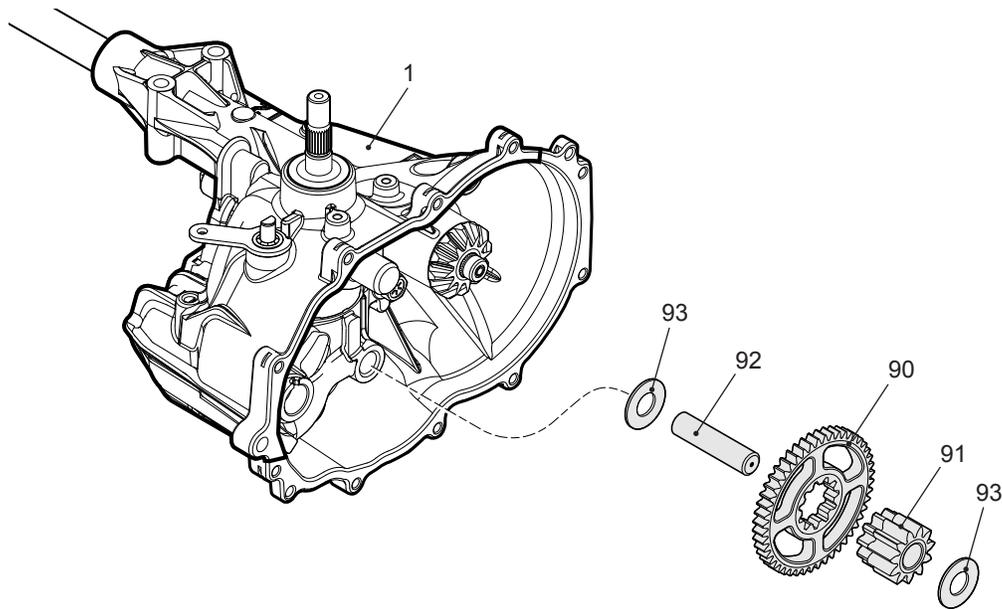


Figure 21, Reduction Gear Set

INPUT SHAFT

Refer to Figure 22

Disassembly

1. Remove all external items previously discussed in their recommended order.
2. Remove the retaining ring (66) and discard.
3. Remove the lip seal (65) and discard.
4. Remove the washer (64).
5. Remove the pump shaft (61) with pressed on bearing (62).

NOTE: Remove the bearing from pump shaft only if worn or damaged.

6. Remove the wire ring retainer (63) and discard. Remove the bearing (62) from the pump shaft (61).

Inspection

1. Inspect the bearing and input shaft for wear or damage. Inspect the splines on the shaft for possible damage. Replace if necessary.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. Install the bearing (62) and a new retaining wire (63).

NOTE: Apply a light coating of grease to new seal (65) before installing. Refer to "Seal Kit" in the Items List on page 39.

3. Install the input shaft assembly into the main housing.
4. Install the washer (64), seal (65) and retaining ring (66) into the main housing.

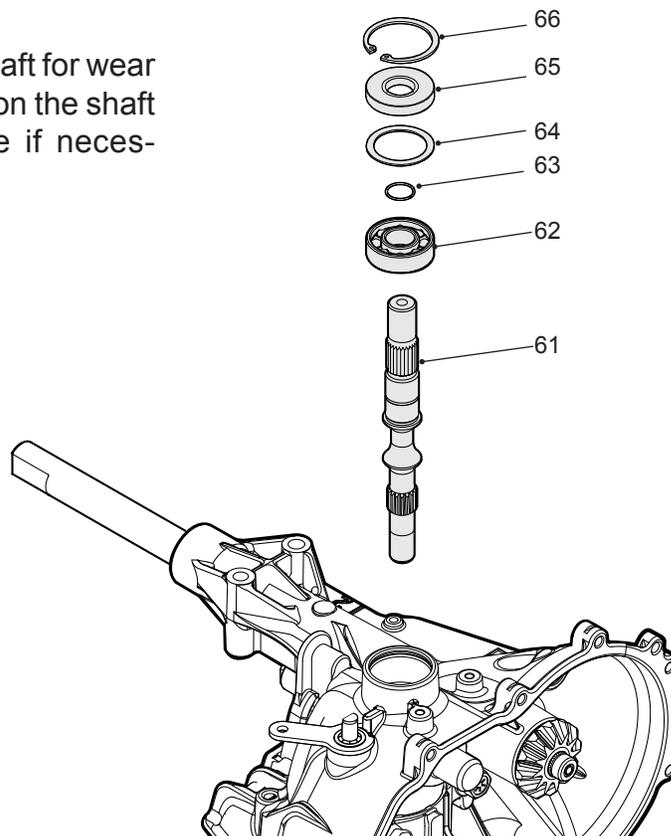


Figure 22, Input Shaft

SWASHPLATE

Refer to Figures 23-24

Disassembly

1. Requires removal of all items beginning on page 17.
2. Remove the swashplate (40) and pump cylinder block assembly (70) as a single item.

NOTE: Removal will be aided by applying a small amount of pressure on the trunnion mounted swashplate towards the center section. While **CAREFULLY** removing the swashplate and block assembly, keep the block face flush with the center section to minimize damage to the running surface.

3. Separate the pump cylinder block assembly (70) and the thrust bearing (74) from the swashplate (40) and set aside.

Inspection

1. Inspect the swashplate (40) and thrust bearing assembly (74) for wear or damage. Replace if necessary.
2. Inspect pump block per detail on page 33.

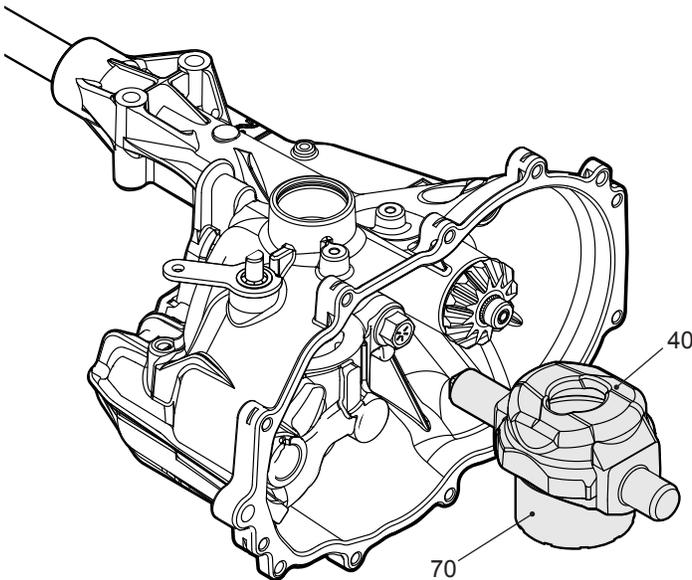


Figure 23, Swash Plate

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. Apply a light coating of oil to running surfaces on center section, swashplate bearing races, thrust bearing assembly and pump block assembly.
3. Place the thrust bearing assembly (74) into swashplate (40).
4. With the pistons facing the thrust bearing, place the pump block assembly (70) into the swashplate.
5. While pressing the pump block assembly (thrust bearing – pump cylinder block) and swashplate together, align to center section in main housing.

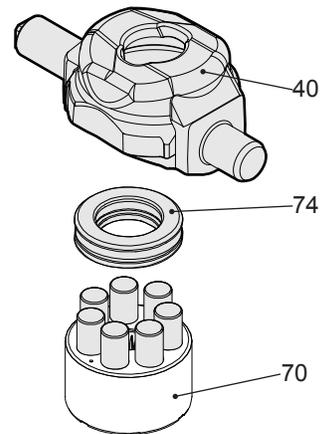


Figure 24, Hydraulic Pump Components

BYPASS ARM

Refer to Figure 25

Disassembly

1. Remove all external items previously discussed in their recommended order.
2. Remove the retaining ring (35) and discard. Remove the bypass arm (34).
3. Remove the retaining ring (33) and discard.
4. Remove the bypass rod (32) and the clip retaining ring (31) as a single item.

NOTE: It is not necessary to remove the clip retaining ring (31) from the bypass rod (32) unless it is damaged or worn.

5. Remove the lip seal (30) and discard.

Inspection

1. Inspect the bypass rod (32) for wear or damage. Replace if necessary.

NOTE: Take care to insure that the bypass rod is free of burrs that may cut the rubber lip seal.

2. Inspect the housing bore.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. Install a *new* lip seal (30).
3. Install the bypass rod (32) with *new* clip retaining ring (31), if removed.
4. Install the new retaining ring (33).
5. Install the bypass arm (34).
6. Install the retaining ring (35).

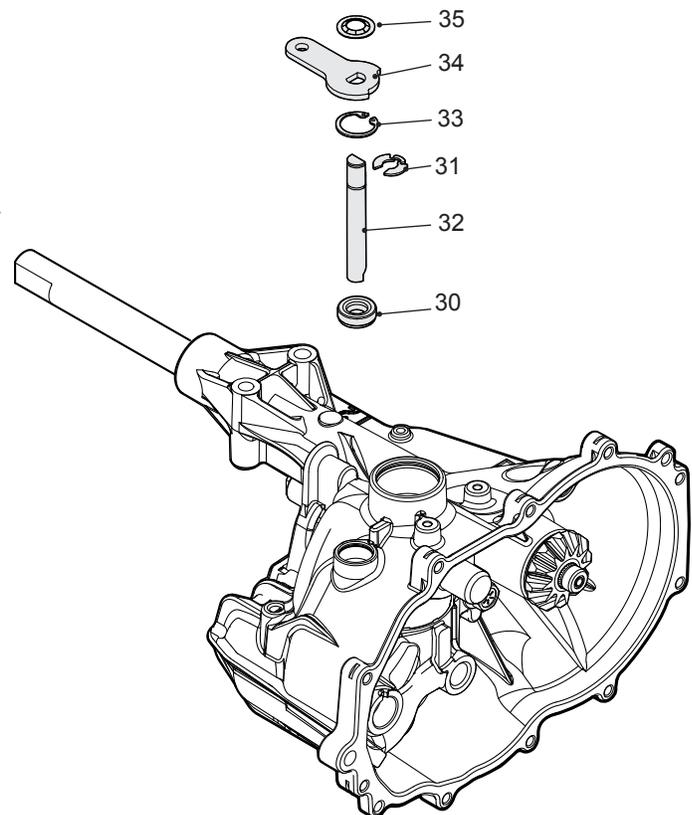


Figure 25, Bypass Arm and Rod

FILTER ASSEMBLY

Refer to Figure 27

Disassembly

1. Remove the magnet (28) and the filter (27). The filter can be removed without damaging the filter base (26).

2. Inspect the check plugs (24, 25). Remove if necessary.

NOTE: Mark plugs before removal.

3. Inspect the filter base (26). Remove/replace if necessary.

Inspection

1. Inspect all parts for wear or damage. Replace as necessary.

Assembly

1. Install the filter base, if removed.
2. Install the check plugs, if removed. Refer to torque chart on page 15.
3. Install a new filter (27) and the magnet (28).

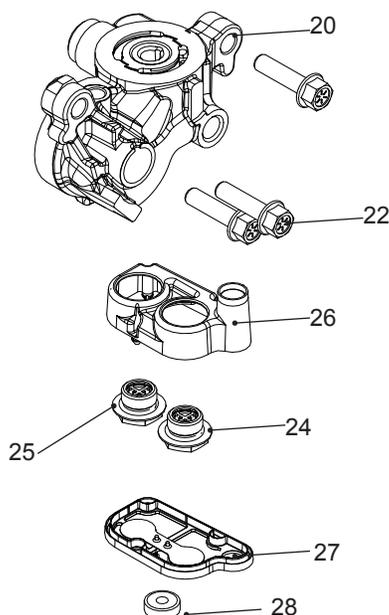


Figure 27, Filter Assembly

CYLINDER BLOCKS

Refer to Figure 28

Inspect each component of the cylinder block assemblies for wear or damage. Inspect the cylinder blocks' running surface for scratches. Replace if necessary.

NOTE: During separation of the cylinder blocks, take care not to damage the surfaces of the pistons and block.

Apply a thin coating of oil to all components of the cylinder block assemblies before reassembly.

After reassembling the cylinder block components, set aside until ready for installation of the center section and swashplate. Refer to pages 30 and 32.

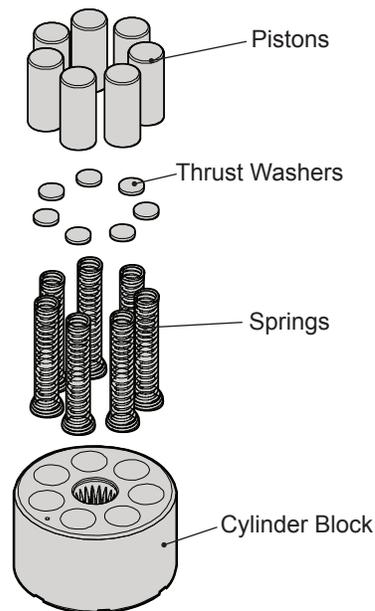


Figure 28, Pump/Motor Cylinder Block Assembly

LH AXLE SHAFT

Refer to Figure 29

Disassembly

1. Remove all items previously discussed, in their recommended order.
2. Remove the lip seal (110) and discard.
3. Remove the outboard bushing (106).
4. Remove the axle shaft (104) in the direction of arrow.
5. Remove the inner bushing (105).

Inspection

1. Inspect the axle shaft for wear or damage. Replace if necessary.

Assembly

1. Assemble items in reverse order of disassembly.

NOTE: To protect the lip seal from possible damage when installing into the bore and over the axle shaft, apply a protective covering over the splines, sharp corners and/or keyway of the axle shaft (e.g., cellophane, tape, etc.). Remove protective covering after installation.

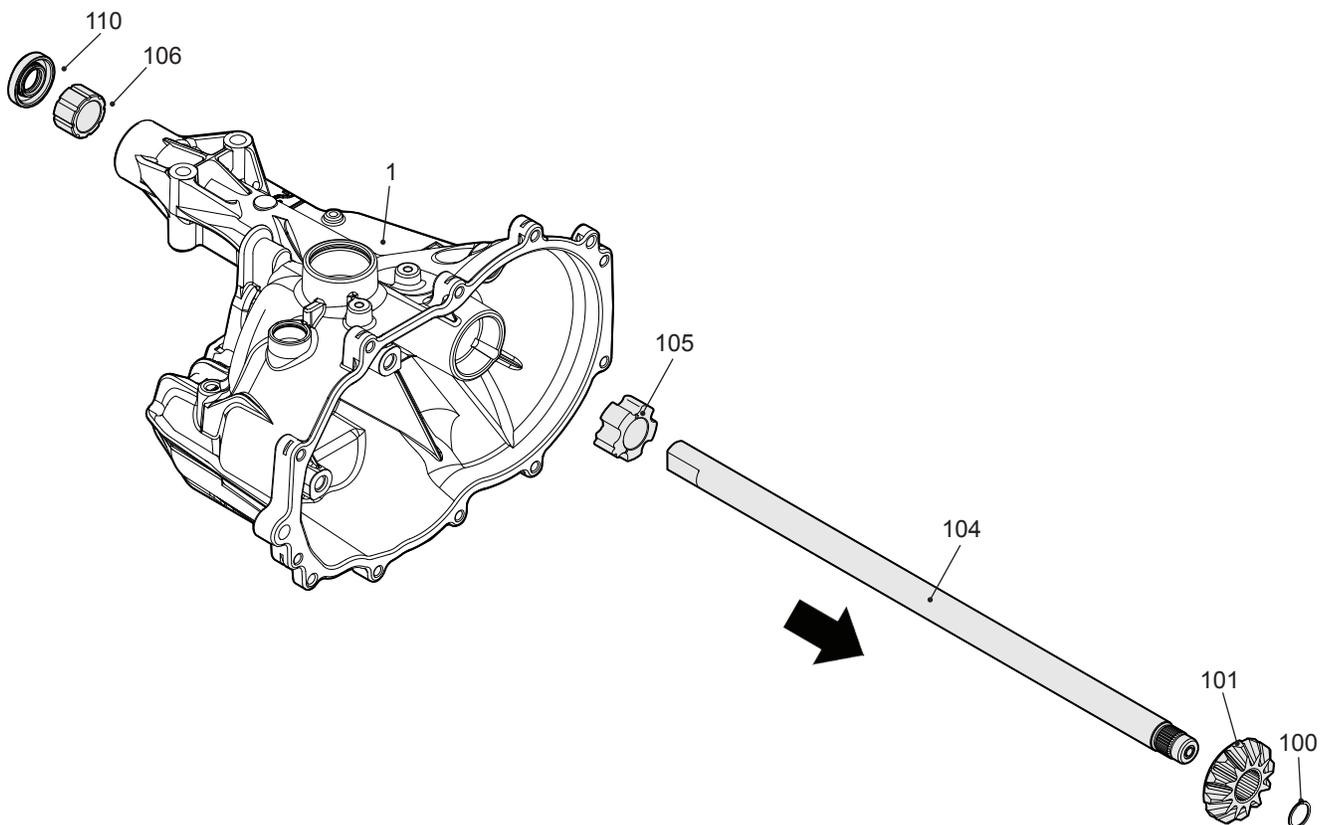


Figure 29, Axle Assembly

EXPANSION TANK HOSE AND FITTING

Refer to Figure 30

Disassembly

1. Remove the expansion tank hose (141).
2. Remove the O-ring (142) from the expansion tank fitting (140) and discard.
3. Remove the expansion tank fitting (140).

Inspection

1. Inspect the fitting for damage and replace if necessary.

Assembly

1. Install the fitting into the main housing. Refer to torque chart on page 15.
2. Install a new O-ring (142) onto the fitting.
3. Place the expansion tank hose (141) onto the fitting (140).

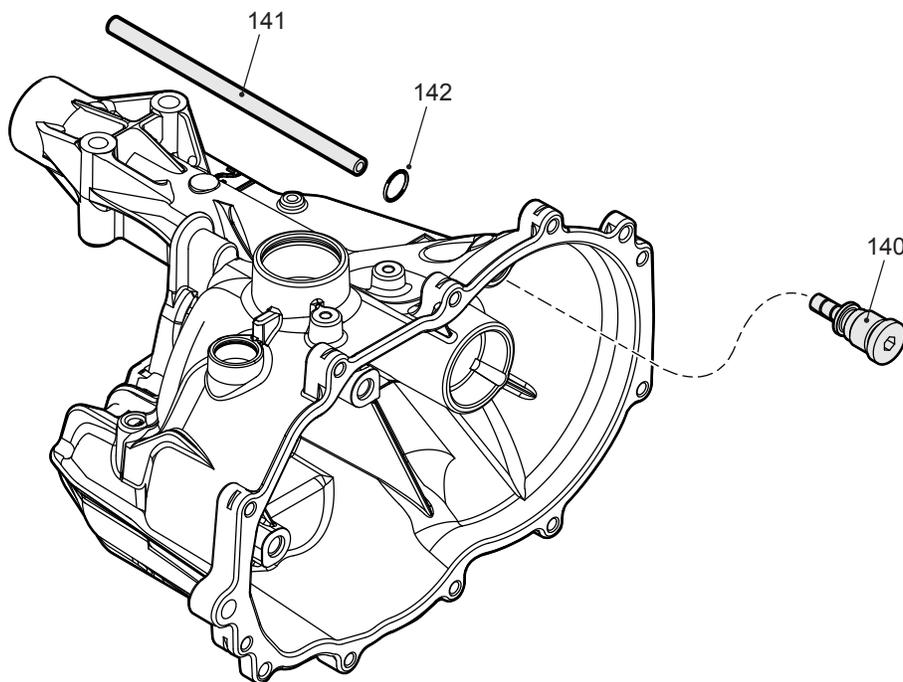


Figure 30, Expansion Tank Hose and Fitting

ASSEMBLY AFTER A COMPLETE TEAR DOWN

If the unit has been torn down completely, the following summary identifies the assembly procedures necessary to completely assemble the unit. Each assembly procedure is located by a page reference.

The part reference numbers provided in each assembly procedure are keyed to the individual procedure illustrations, and are also keyed to the complete unit exploded views on pages 38 - 42.

1. Install the expansion tank hose and fitting. See page 35.
2. Install the LH axle assembly. See page 34.
3. Install the filter assembly, cylinder block and motor shaft. See pages 32-33.
4. Install the bypass arm. See page 31.
5. Install the pump block and swash plate. See page 30.
6. Install the input shaft. See page 29.
7. Install the reduction gear set. See page 28.
8. Units with differential lock refer to pages 24 and 25.
9. Install the bull gear set. See page 27.
10. Install the RH axle assembly. See page 26.
11. Apply sealant to the main housing prior to assembly with the side housing. See below. Refer to page 37 for screw tightening sequence.

NOTE: *Prior to applying the new sealant, the old sealant must be removed from all surfaces.*

A small consistent bead (approx. 1/16 – 1/8 inch) of the sealant around the housing face will be sufficient. Use sparingly.

The illustration below indicates the correct sealant path.

11. Install the brake assembly. See page 22.
12. Install the control arm (RTN) assembly. See pages 19-21.
13. Install the expansion tank. See page 18.
14. Fill transaxle with clean oil.
15. Install the fan and pulley assembly. See page 17.
16. Install the transaxle into the vehicle.

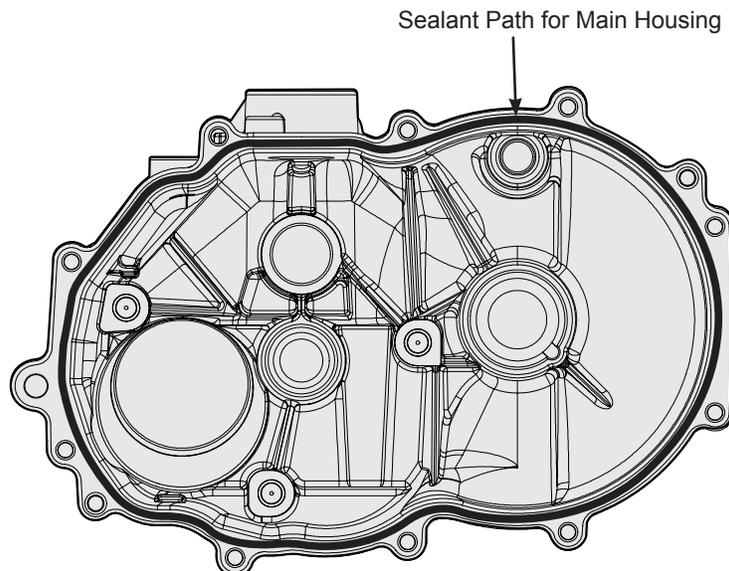


Figure 31, Sealant Application Diagram

SIDE HOUSING – SCREW TIGHTENING SEQUENCE

Starting with the number “1” screw location, tighten sequentially through to “10.”

Torque each screw to 105 – 155 lb-in (11.8 – 17.5 Nm).

NOTE: As a general rule, use the low end of the torque specification.

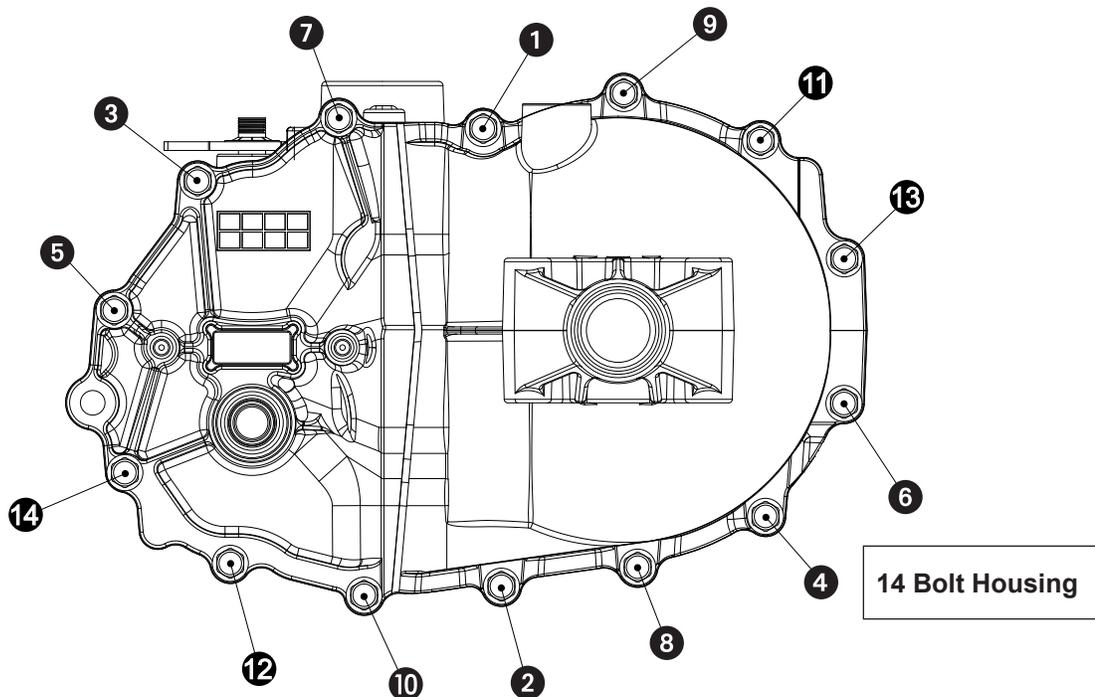
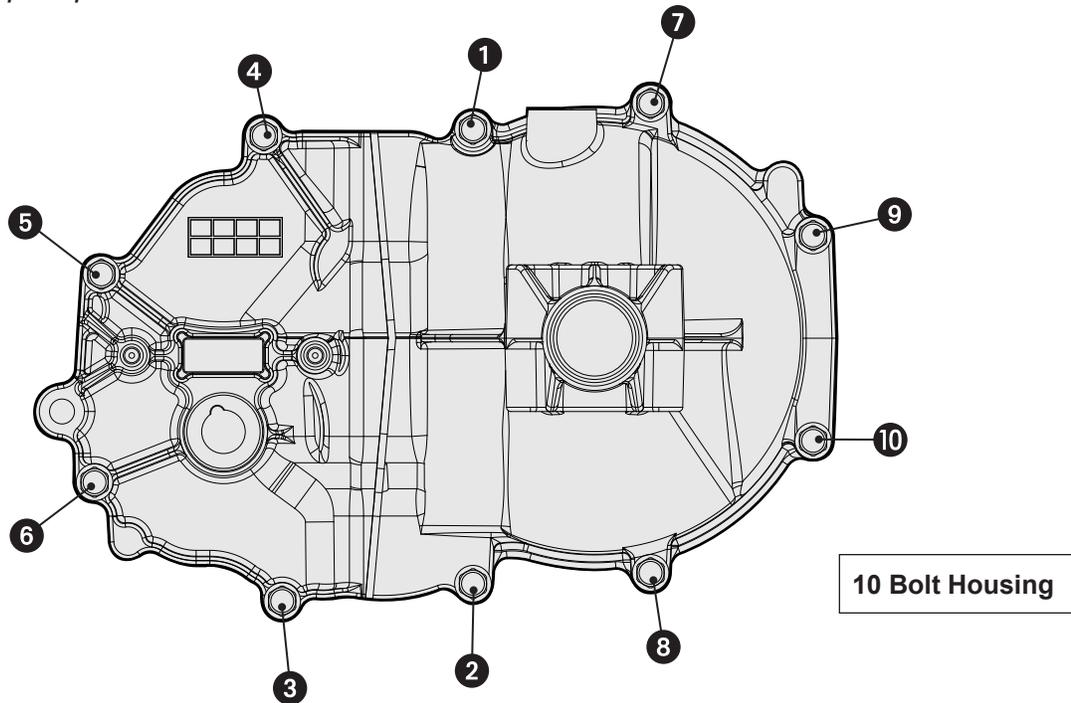
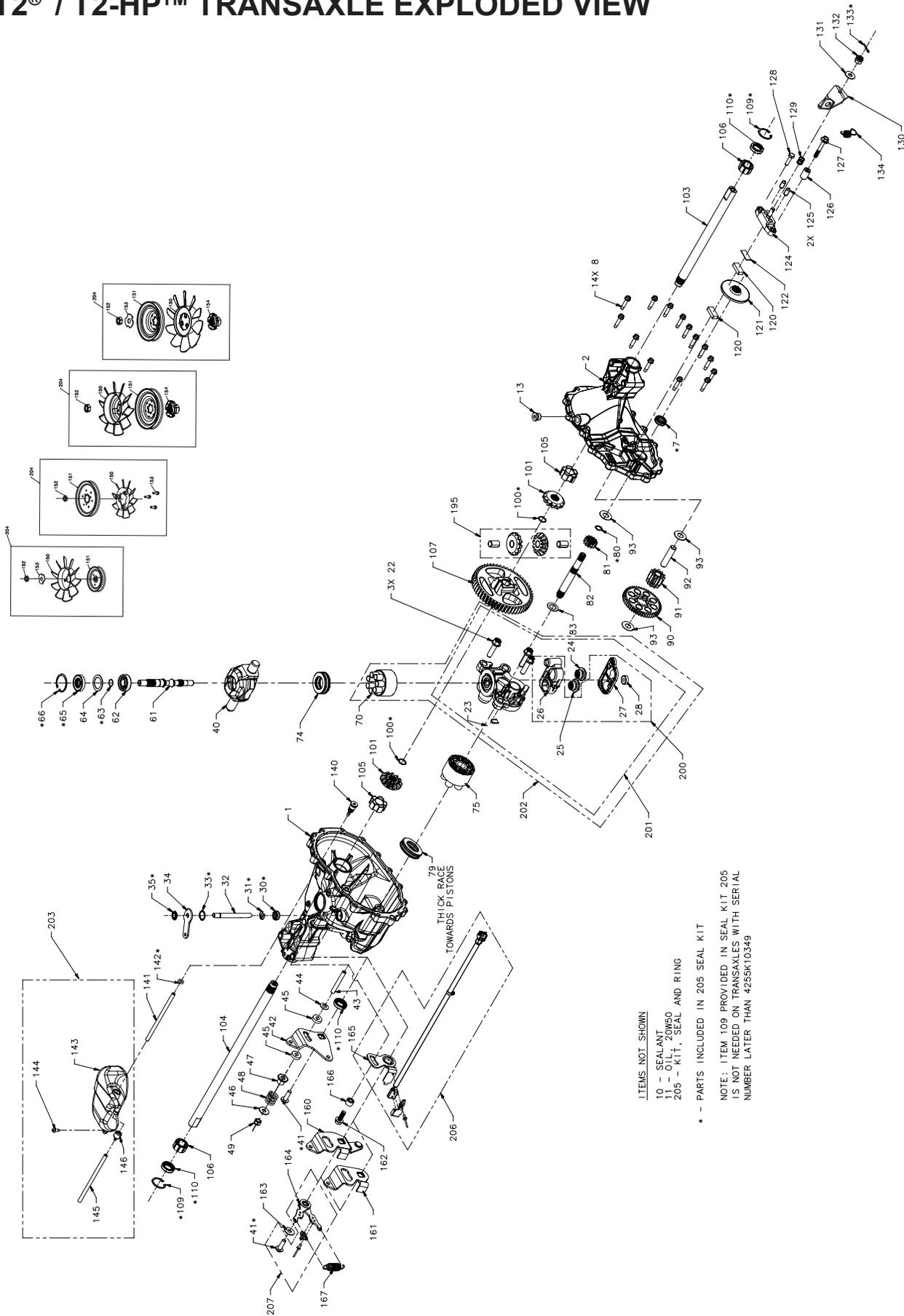


Figure 32, Screw tightening sequence

T2® / T2-HP™ TRANSAXLE EXPLODED VIEW



ITEMS NOT SHOWN

- 10 - SEAL ANT
- 11 - OIL
- 205 - KIT, SEAL AND RING

* - PARTS INCLUDED IN 205 SEAL KIT

NOTE: ITEM 109 PROVIDED IN SEAL KIT 205 IS NOT NEEDED ON TRANSAXLES WITH SERIAL NUMBER LATER THAN 4255K10349

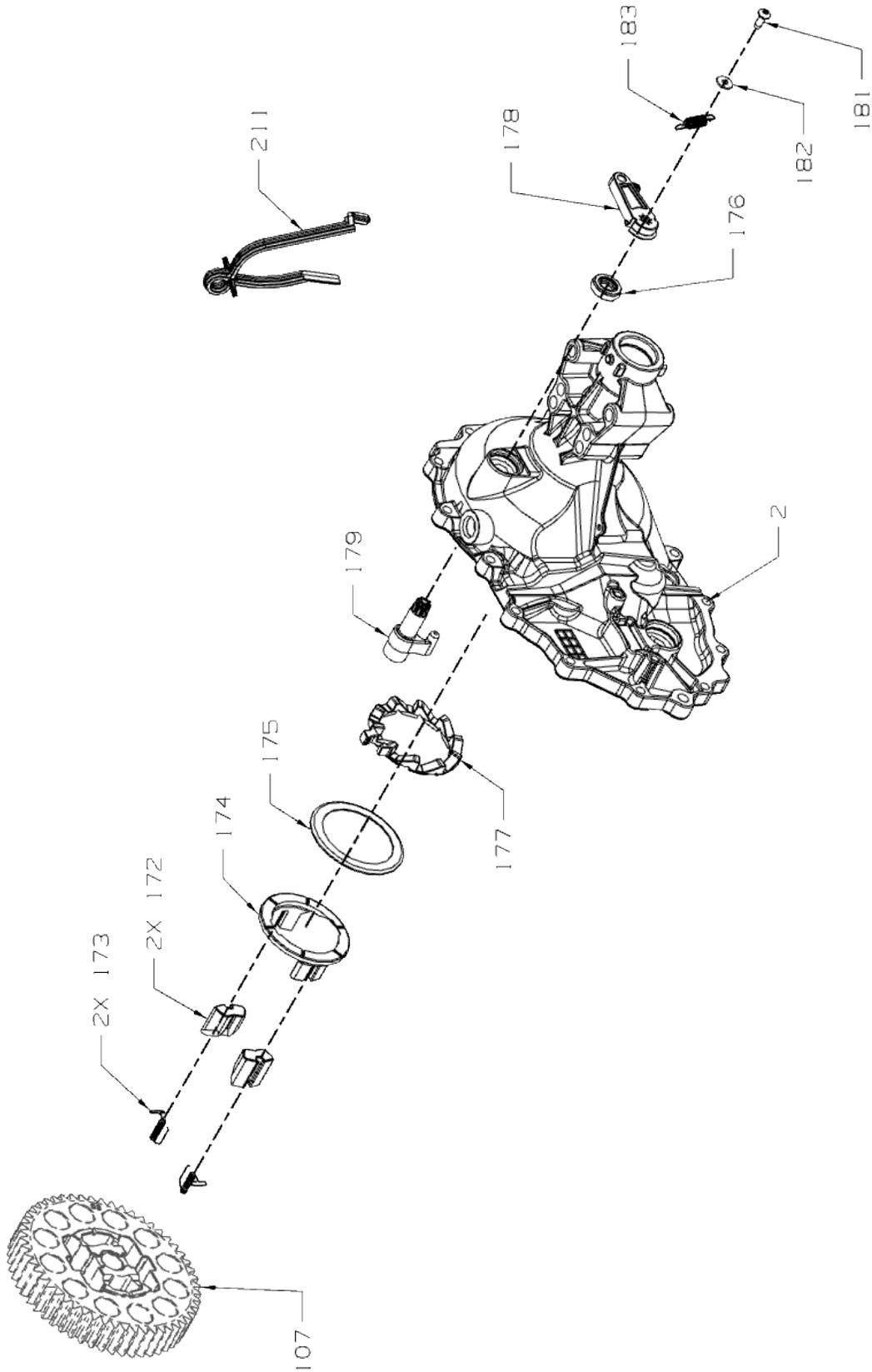
T2® / T2-HP™ TRANSAXLE PARTS LIST

| | | | |
|-----|--|-----|--|
| 1 | Housing, Main | 102 | Gear, Bevel .50 ID |
| 2 | Housing, Side | 103 | Axle .75 dia. RH |
| 7 | Seal, Lip (included in Center Section Kit 202) | 104 | Axle .75 dia. LH |
| 8 | HFHCS 1/4-20 x 1.25 | 105 | Bushing, Inboard |
| 10 | Sealant, Loctite 5900 | 106 | Bushing, Outboard |
| 11 | Oil, 20W50 | 107 | Gear Bull |
| 13 | Plug | 108 | Pin, Differential |
| 20 | Center Section | 110 | Seal, Lip .75 x 1.125 x .25 TC (part of 202) |
| 22 | Bolt, Hex Flange | 120 | Puck, Brake |
| 23 | Plate, Bypass | 121 | Rotor, Brake |
| 24 | Check Plug Assembly w/Washer | 122 | Plate, Puck |
| 25 | Check Plug/w Assembly w/Washer, .027, Spring | 124 | Yoke, Brake |
| 26 | Bottom, Filter | 125 | Pin, Brake |
| 27 | Cover, Filter | 126 | Spacer |
| 28 | Ring, Magnet | 127 | Screw 1/4-20 x 2.0 w/Patch |
| 30 | Seal, Lip (included in Center Section Kit 202) | 128 | Screw 1/4-20 x 1.0 w/Patch |
| 31 | Ring, Retaining (included in Center Section Kit 202) | 129 | Spring |
| 32 | Rod, Actuator | 130 | Arm, Brake |
| 33 | Ring, Retaining (included in Center Section Kit 202) | 131 | Washer |
| 34 | Arm, Bypass | 132 | Nut, Castle 5/16-24 PL |
| 35 | Ring, Retaining (included in Center Section Kit 202) | 133 | Pin, Cotter 3/32 x .75 |
| 40 | Trunnion, Swashplate | 134 | Spring, Brake arm |
| 41 | TWHCS 5/16-18 x 1.00 | 140 | 5/16 SAE, 5/32 Tube |
| 42 | Arm, Control | 141 | Hose |
| 43 | Screw, Set 5/16-24 x 2.50 | 142 | O-Ring .103 x .299 ID (part of 202) |
| 44 | Washer , Belleville | 143 | Tank, Expansion |
| 45 | Washer, Plastic .32 x .80 x .21 | 144 | Bolt, Self Tapping 10-32 x 1/2, patch |
| 46 | Washer .34 x .88 x .06 | 145 | Tube |
| 47 | Spacer .32 x .59 x .50 | 146 | Cap, Barbed Vent |
| 48 | Spring, Helical Comp | 150 | Fan |
| 49 | Nut, Hex 5/16-24 nylon insert | 151 | Pulley |
| 61 | Input Shaft | 152 | Nut |
| 62 | Bearing, Ball 15 x 35 x 11 | 153 | Washer |
| 63 | Ring, Retaining (included in Center Section Kit 202) | 153 | Screw 1/4-20 x 0.75 |
| 64 | Washer 1.23 x 1.56 x .04 | 154 | Hub, Pully |
| 65 | Seal, Lip (included in Center Section Kit 202) | 160 | Arm, Control RTN |
| 66 | Ring, Retaining (included in Center Section Kit 202) | 161 | Arm, Control RTN |
| 67 | Spring, Helical | 162 | Bolt, Hex Flange Head |
| 70 | Block, Cylinder 8cc | 163 | Bushing |
| 74 | Bearing, Thrust 27 x 47 x 14 | 164 | Assembly, RTN Bi-Directional |
| 75 | Block, Cylinder 10cc | 165 | Arm, Neutral Assembly |
| 79 | Bearing, Thrust Ball 30 x 52 x 13 | 166 | Bushing |
| 80 | Ring, Retaining .50 External Motor Shaft (part of 202) | 167 | Spring |
| 81 | Gear, Pinion | 200 | Kit, Filter |
| 82 | Shaft, Motor | 201 | Center Section w/Filter |
| 83 | Washer .60 x 1.00 x .03 | 202 | Center Section Kit |
| 90 | Gear | 205 | Seal Kit |
| 91 | Gear, Jack Shaft | 206 | Kit, T2® ROS |
| 92 | Jack Shaft (Pin) | 207 | Kit, T2® ROS |
| 93 | Washer .50 x 1.00 x .03 | | |
| 100 | Ring, Retainer (included in Center Section Kit 202) | | |
| 101 | Gear, Bevel Spline ID | | |

T3 HD™ TRANSAXLE PARTS LIST

| | | | |
|-----|--|-----|--------------------------------|
| 1 | Housing, Main | 104 | Axle .75 dia. LH |
| 2 | Housing, Side | 105 | Bushing, Inboard |
| 7 | Seal, Lip (included in Center Section Kit 202) | 106 | Bushing, Outboard |
| 8 | HFHCS 1/4-20 x 1.25 | 107 | Gear Bull |
| 10 | Sealant, Loctite 5900 | 108 | Pin, Differential |
| 11 | Oil, 20W50 | 110 | Seal, Lip .75 x 1.125 x .25 TC |
| 13 | Kit, Fitting | 120 | Puck, Brake |
| 30 | Seal, Lip (included in Center Section Kit 202) | 121 | Rotor, Brake |
| 31 | Ring, Retaining (included in Center Section Kit 202) | 122 | Plate, Puck |
| 32 | Rod, Actuator | 124 | Yoke, Brake |
| 33 | Ring, Retaining (included in Center Section Kit 202) | 125 | Pin, Brake |
| 34 | Arm, Bypass | 126 | Spacer |
| 35 | Ring, Retaining | 127 | Screw 1/4-20 x 2.0 w/Patch |
| 40 | Trunion, Swashplate | 128 | Screw 1/4-20 x 1.0 w/Patch |
| 41 | TWHCS 5/16-18 x 1.00 | 129 | Spring |
| 61 | Input Shaft | 130 | Arm, Brake |
| 64 | Washer 1.23 x 1.56 x .04 | 131 | Washer |
| 65 | Seal, Lip | 132 | Nut, Castle 5/16-24 PL |
| 66 | Ring, Retaining | 133 | Pin, Cotter 3/32 x .75 |
| 70 | Block, Cylinder 8cc | 134 | Spring, Brake arm |
| 74 | Bearing, Thrust 27 x 47 x 14 | 140 | 5/16 SAE, 5/32 Tube |
| 75 | Block, Cylinder 12cc | 161 | Arm, Control RTN |
| 79 | Bearing, Thrust Ball 30 x 52 x 13 | 162 | Bolt, Hex Flange Head |
| 80 | Ring, Retaining .50 External Motor Shaft | 163 | Bushing |
| 81 | Gear, Pinion | 164 | Assembly, RTN Bi-Directional |
| 82 | Shaft, Motor | 165 | Arm, Neutral Assembly |
| 83 | Washer .60 x 1.00 x .03 | 166 | Bushing |
| 90 | Gear | 167 | Spring |
| 91 | Gear, Jack Shaft | 180 | Spring Clip |
| 92 | Jack Shaft (Pin) | 185 | Plug |
| 93 | Washer .50 x 1.00 x .03 | 200 | Kit, Filter |
| 100 | Ring, Retainer | 201 | Center Section w/Filter |
| 101 | Gear, Bevel Spline ID | 204 | Fan / Pulley Kit |
| 102 | Gear, Bevel .50 ID | 205 | Seal Kit |
| 103 | Axle .75 dia. RH | | |

T3 HD™ TRANSAXLE WITH DIFFERENTIAL LOCK EXPLODED VIEW



T3 HD™ TRANSAXLE WITH DIFFERENTIAL LOCK PARTS LIST

| | |
|-----|--------------------------------------|
| 2 | Housing, Side Diff Lock W/Case Drain |
| 107 | Gear, Bull |
| 172 | Dog, Differential |
| 173 | Spring, Extension, .180 x .757 |
| 174 | Plate, Actuating |
| 175 | Washer, Cupped 2.15 x 2.80 x .035 |
| 177 | Cam, Rotating |
| 178 | Arm, Actuating |
| 179 | Cam, Actuating |
| 181 | Bolt, Self Tapping 10-32 x .50 Patch |
| 182 | Washer, .22 x .50 x .05 |
| 183 | Spring, Extension .322 x 1.758 |
| 211 | Clamp, Cam Part #55056 |

GLOSSARY OF TERMS

Axial Piston: Type of design for hydraulic motors and pumps in which the pistons are arranged parallel with the spindle (input or output shaft).

Bypass Valve: A valve whose primary function is to open a path for the fluid to bypass the motor or pump. Also referred to occasionally as the freewheel valve or dump valve.

Case Drain Line (Return Line): A line returning fluid from the component housing to the reservoir.

Cavitation: A concentrated gaseous condition within the fluid causing the rapid implosion of a gaseous bubble.

Center Section: A device which acts as the valve body and manifold of the transmission.

Charge Pump: A device which supplies replenishing fluid to the fluid power system (closed loop).

Charge Pressure: The pressure at which replenishing fluid is forced into a fluid power system.

Charge Relief Valve: A pressure control valve whose primary function is to limit pressure in the charge circuit.

Check Valve: A valve whose primary function is to restrict flow in one direction.

Closed Loop: A sealed and uninterrupted circulating path for fluid flow from the pump to the motor and back.

Decay Rate: The ratio of pressure decay over time.

Differential Lock: A locking mechanism designed to overcome the chief limitation of a standard open differential by essentially locking drive axles together as if on a common shaft thus forcing both axles to turn in unison.

End Cap: See “Center Section.”

Entrained Air: A mechanically generated mixture of air bubbles having a tendency to separate from the liquid phase.

Gerotor: A formed rotor set operating about an eccentric that provides a fixed displacement for pumps or motors.

Hydraulic Motor: A device which converts hydraulic fluid power into mechanical force and motion by transfer of flow under pressure.

Hydraulic Pump: A device which converts mechanical force and motion into hydraulic fluid power by producing flow.

Hydrostatic Pump: See “Hydraulic Pump.”

Hydrostatic Transaxle: A multi component assembly including a gear case and a hydrostatic transmission.

Hydrostatic Transmission: The combination of a hydraulic pump and motor in one housing to form a device for the control and transfer of power.

Inlet Line: A supply line to the pump.

Integrated Zero-Turn Transaxle: The combination of a hydrostatic transmission and gear case in one housing to form a complete transaxle.

Manifold: A conductor which provides multiple connection ports.

Neutral: Typically described as a condition in which fluid flow and system pressure is below that which is required to turn the output shaft of the motor.

Pressure Decay: A falling pressure.

Priming: The filling of the charge circuit and closed loop of the fluid power system during start up, frequently achieved by pressurizing the fluid in the inlet line.

Purging: The act of replacing air with fluid in a fluid power system by forcing fluid into all of the components and allowing the air a path of escape.

Rated Flow: The maximum flow that the power supply system is capable of maintaining at a specific operating pressure.

Scoring: Scratches in the direction of motion of mechanical parts caused by abrasive contaminants.

Swash Plate: A mechanical device used to control the displacement of the pump pistons in a fluid power system.

System Charge Check Valve: A valve controlling the replenishing flow of fluid from a charge circuit to the closed loop in a fluid power system.

System Pressure: The pressure which overcomes the total resistance in a system, including all efficiency losses.

Valve: A device which controls fluid flow direction, pressure, or flow rate.

Variable Displacement Pump: A pump in which the displacement per revolution can be varied.

Volumetric Displacement: The volume for one revolution.



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