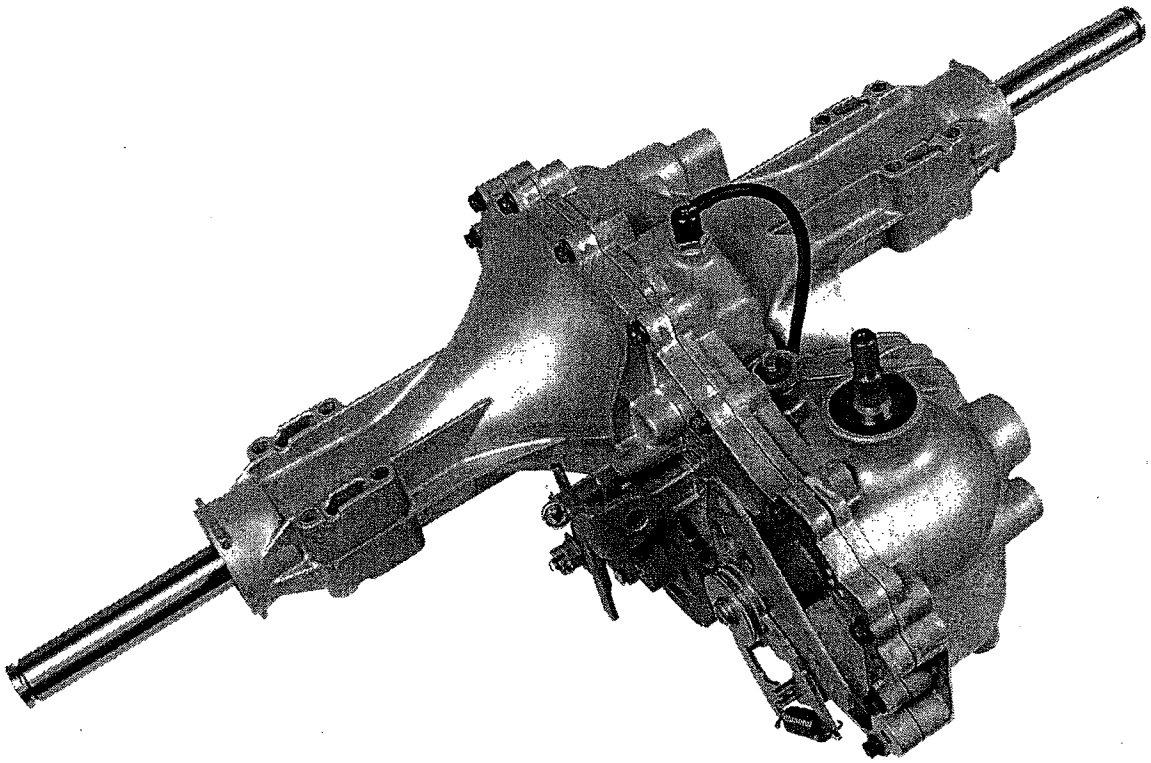
Hydro-Gear®

We set the wheels in motion.®



G730™
Integrated Hydrostatic Transaxle Service and Repair Manual

BLN-52864
March 2008

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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 G730™ Integrated Hydrostatic Transaxle.

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 OPEESA (Outdoor Power Equipment and Engine Service Association) at (860) 767-1770 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 call our Technical Service Department at (217) 728-2581.

DESCRIPTION AND OPERATION

Introduction

The purpose of this manual is to provide information useful in servicing the Hydro-Gear® G730™ Integrated Hydrostatic Transaxle. This manual includes the G730's general descriptions, hydraulic schematics, technical specifications, servicing and troubleshooting procedures.

Other than recommended oil changes, 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 G730 is a self contained unit designed for the transfer and control of power. It provides an infinitely variable speed range between zero and maximum in both forward and reverse modes of operation.

This transaxle uses a variable displacement pump with a maximum displacement of 10cc per revolution, and motor with a fixed displacement of 16cc 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 G730 transaxle has a self contained fluid supply and external filter. The external filter provides ease of access for oil maintenance of the drive system. The G730 is designed with a charged pressure circuit.

In this circuit, fluid is drawn from the case and through the filter and into a fixed displacement gerotor pump. Charge pump flow not used to feed the low pressure side of the system is passed over a charge relief valve and back into the transaxle case.

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

The G730 utilizes an in-line floating disc brake controlled by a "cam" style actuating arm.

A cam style, block lifting bypass is utilized in the G730 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 brake must be disengaged prior to actuating the bypass mechanism.

WARNING

Actuating the bypass will result in the loss of hydrostatic braking capacity. The machine must be stationary on a level surface and in neutral when actuating the bypass.

HYDRAULIC SCHEMATIC

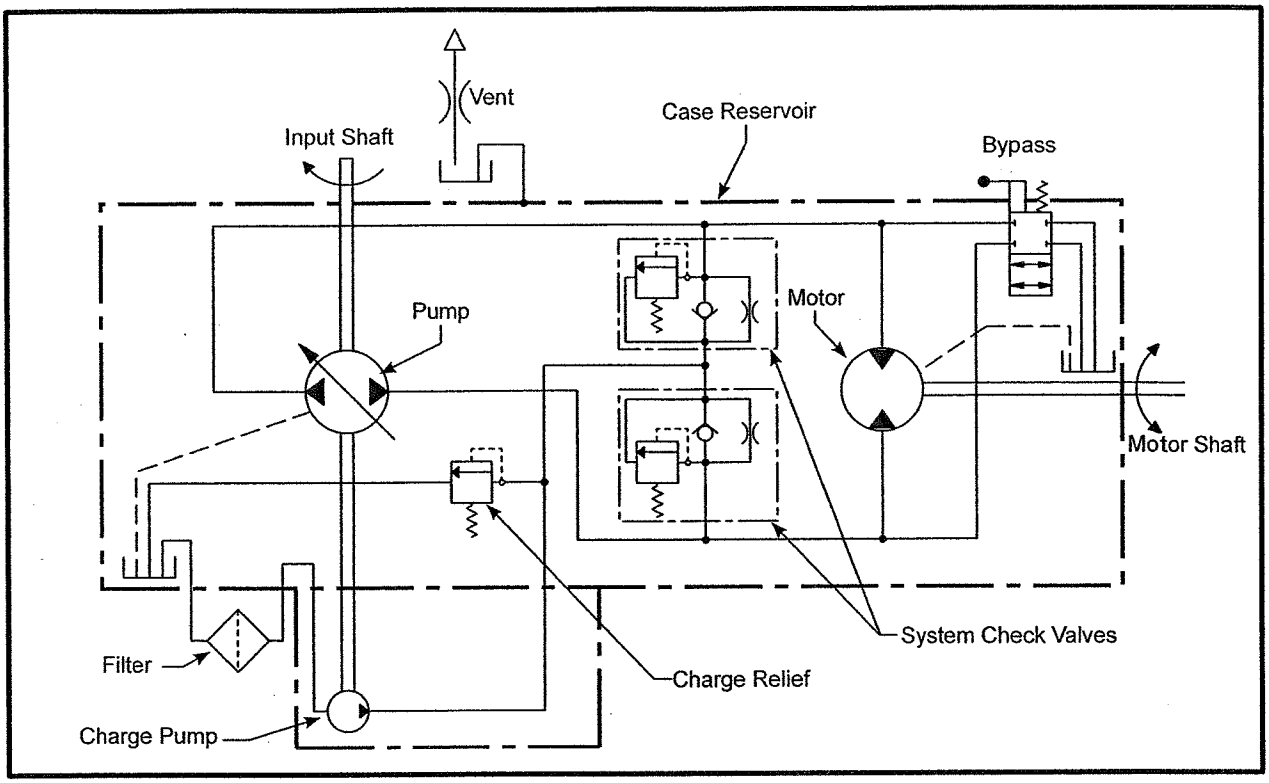
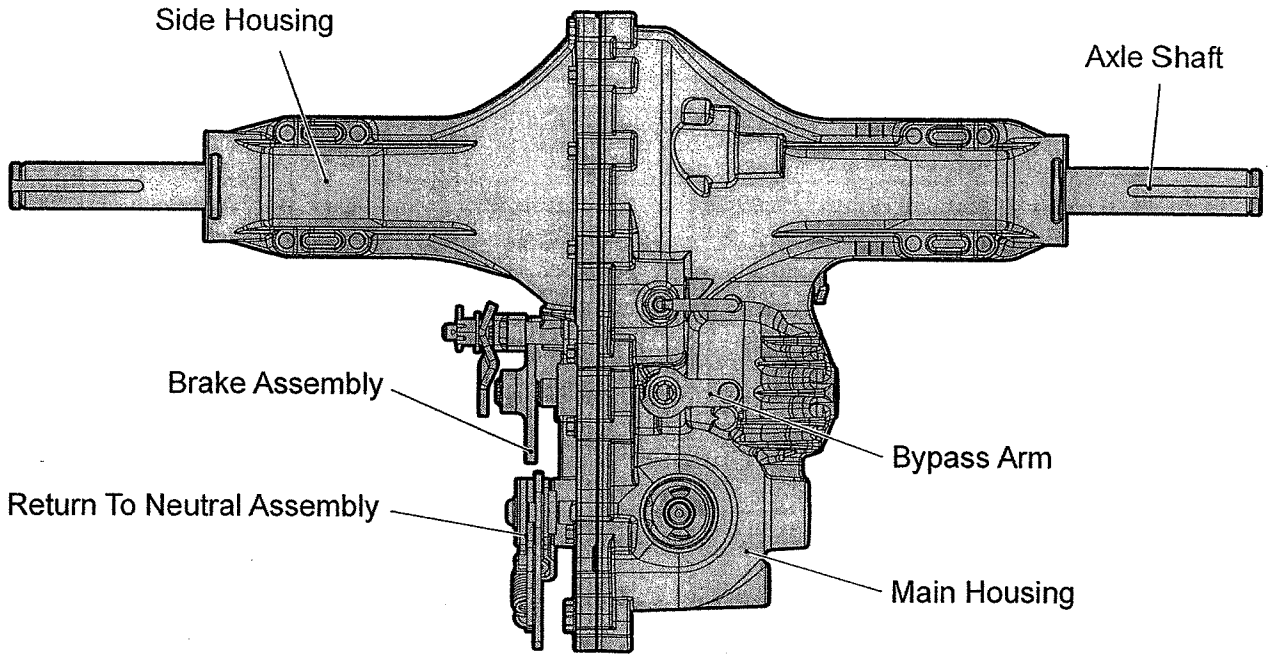
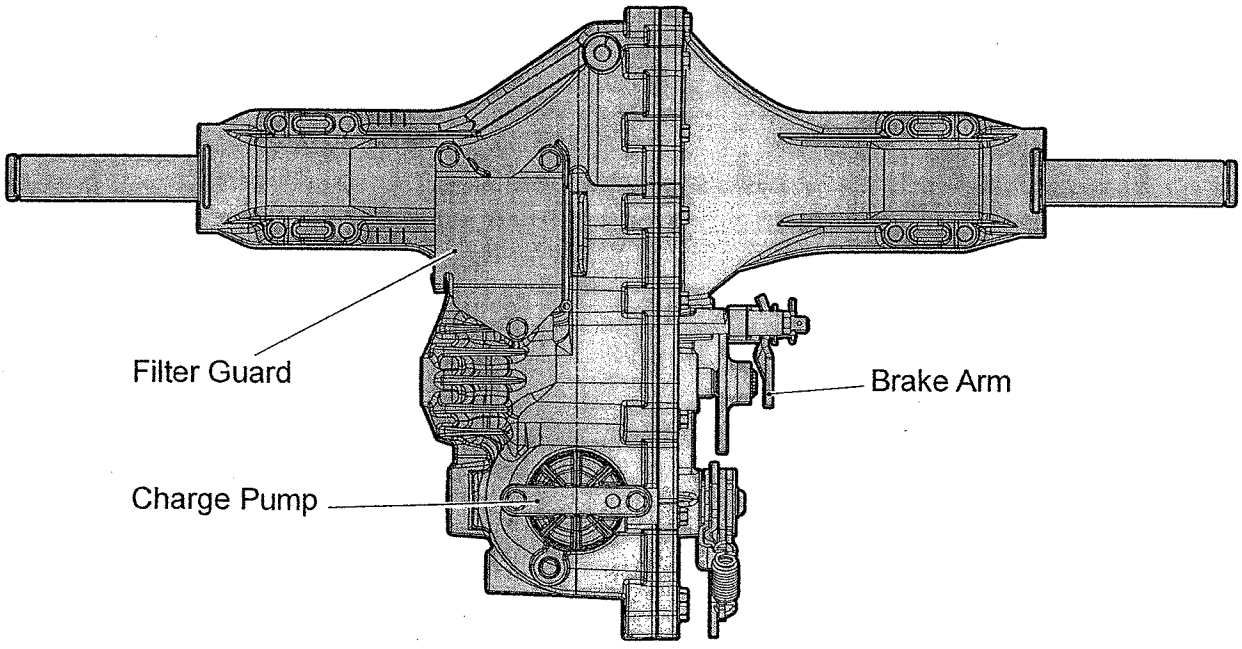


Figure 1, Hydraulic Schematic With Charge Pump

EXTERNAL FEATURES G730™

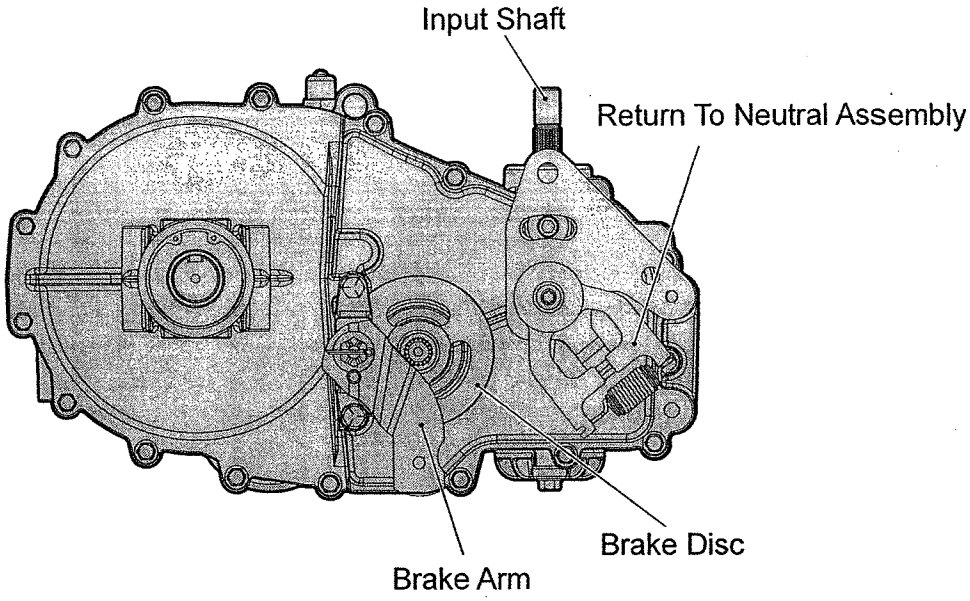


— Top View —

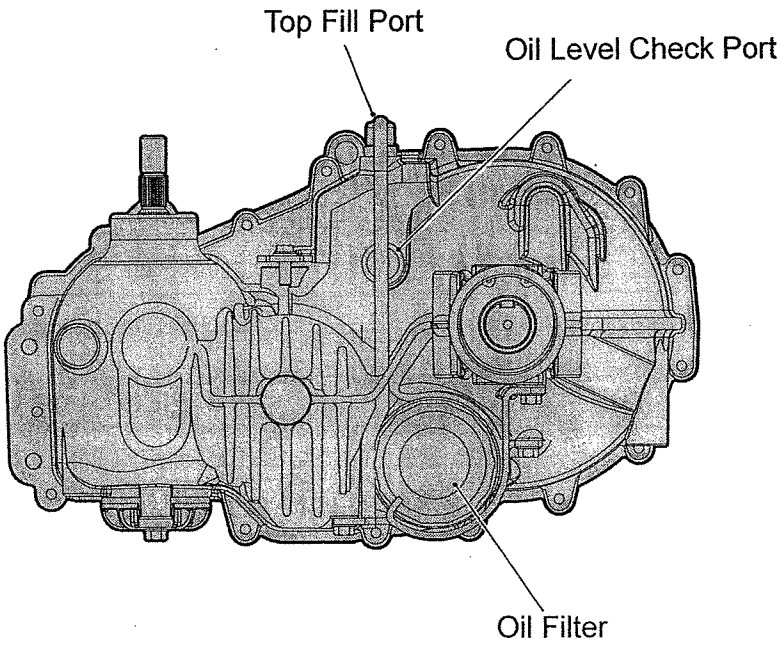


— Bottom View —

EXTERNAL FEATURES G730™



— Outboard View (Left) —



— Outboard View (Right) —

TECHNICAL SPECIFICATIONS

G730™ TECHNICAL SPECIFICATIONS	
Overall Transaxle Reduction	27.5:1
Input Speeds	
Maximum Hi-Idle (No Load)	3600 rpm
Minimum	1800 rpm
Output Torque	
Intermittent	445 lb-ft (603 N-m)
Continuous	230 lb-ft (312 N-m)
Maximum Tire Diameter	23 in (584 mm)
Weight on Tires (per unit)	
Maximum with 20" tires	770 lb (350 kg)
Maximum with 22" tires	700 lb (318 kg)
Maximum with 23" tires	665 lb (302 kg)
Axle Shaft Diameter	1.00 in (25.4 mm)
Axle Shaft End Options	Keyed; Two Flats
Parking Brake Type	Disc
Weight of Unit	42 lb (19 kg)

PRODUCT IDENTIFICATION

The model and configuration of the G730 can be determined from the label shown below.

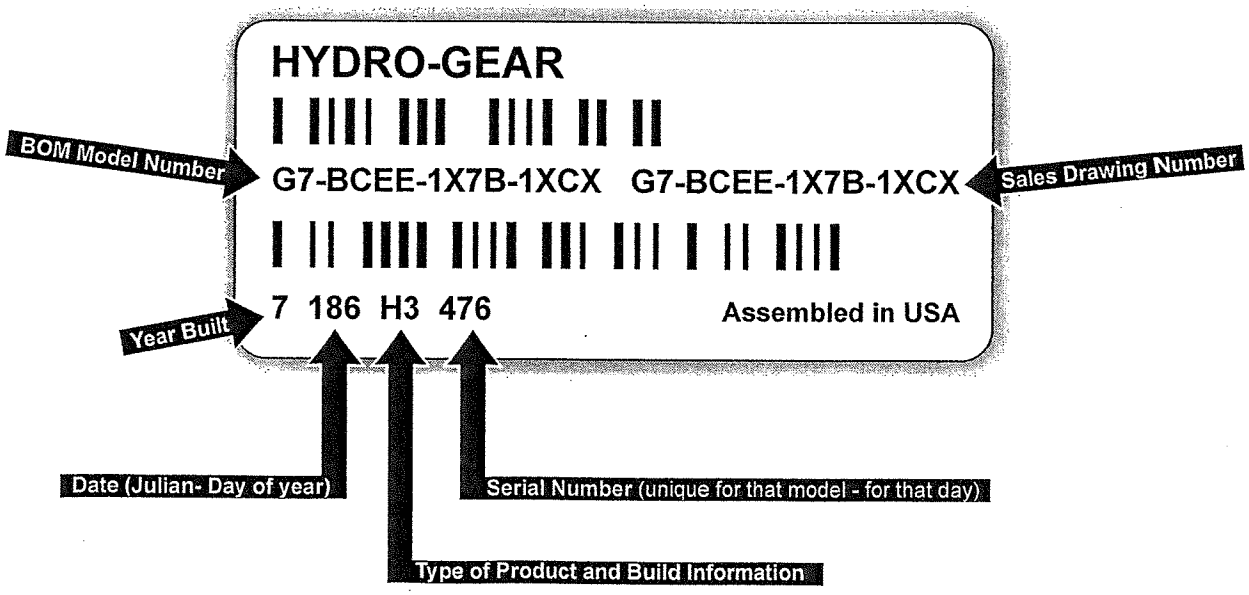


Figure 2, Configuration Label

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 G730™ 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 G730. 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.

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 G730™ 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 13
Bypass assembly sticking	Repair or replace bypass, Pages 9 and 26
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 11
Excessive loading	Reduce vehicle loading, Page 9
Loose parts	Repair or replace loose parts
Bypass assembly sticking	Repair or replace linkage, Pages 9 and 26
Air trapped in hydraulic system	Purge hydraulic system, Page 12
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 11
Excessive loading	Reduce vehicle loading, Page 9
Bypass assembly sticking	Repair or replace linkage, Pages 9 and 26
Air trapped in hydraulic system	Purge hydraulic system, Page 12
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
Oil level low or contaminated oil	Fill to proper level or change oil, Page 11
Excessive loading	Reduce vehicle loading, Page 9
Air trapped in hydraulic system	Purge hydraulic system, Page 12
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 12

SERVICE AND MAINTENANCE

External Maintenance

Regular external maintenance of the G730™ should include the following:

1. Check the vehicle operator's manual for the recommended load ratings. Insure that the current application does not exceed load rating.
2. Check oil level in accordance with "Fluid Change Procedure," step 9. Refer to page 11.
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 vehicle control linkage to the directional control arm on the transaxle. Also insure that the control arm is securely fastened to the trunnion arm of the transaxle.
5. Inspect the bypass mechanism on the transaxle and the vehicle linkage to insure that both actuate and release fully.

Service and Maintenance Procedures

Some of the service procedures presented on the following pages can be performed while the G730 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 55 SUS (9.0 cSt) at 212° F (100° C) and an API classification of SL is recommended. A 20W50 engine oil has been selected for use by the factory and is recommended for normal operating procedures.

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 11 and figure 4 for the proper fill port location.

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

Purging will be required if oil has been changed. Refer to the purging procedures on page 12.

Fluid Description
20W50 engine oil
Volume – per Transaxle
95.5 fl.oz. (2825 ml) to 93.8 fl.oz. (2775 ml)

FILTER AND FILTER GUARD

Refer to Figure 3

Disassembly

1. Remove the hex head screws (105), and filter guard (106).
2. Remove the filter (23) and discard.

NOTE: *Always replace the filter when preforming any internal maintenance to the transaxle.*

Inspection

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

Assembly

1. Reassemble all parts in the reverse order of disassembly. Refer to "Fluid Change Procedures," page 11, steps 3-5 for filter installation instructions.
2. When tightening the fasteners, refer to the table on page 19 for the required torque values.

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

3. Fill transaxle with oil.

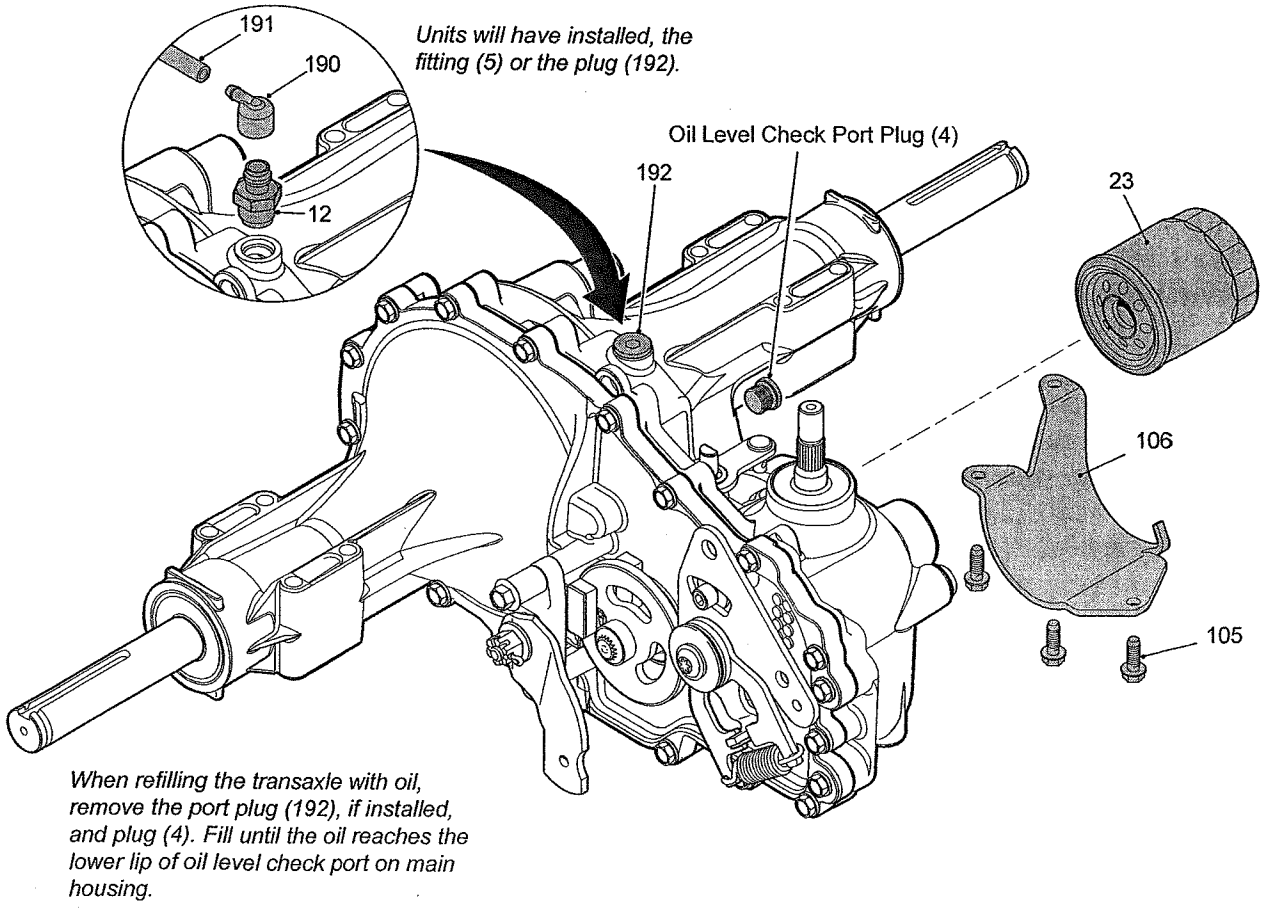


Figure 3, Filter and Guard

FLUID CHANGE PROCEDURE

This transaxle is designed with an external filter for ease of maintenance. To ensure constant fluid quality levels and longer life, an initial oil and filter change at 75-100 hours, then every 400 hours thereafter is recommended.

The following procedure can be performed with the transaxle installed in the vehicle, and the vehicle on level ground. Apply the bypass valve and lock the vehicle parking brake.

1. Remove the three 1/4" filter guard screws and filter guard. Clean any loose debris from around the perimeter of the filter. See figure 3.
2. Place an oil drain pan (12" or more diameter and 8 qt. capacity is optimal) beneath the oil filter. Remove the oil filter from the transaxle.
3. After the oil has drained, wipe the filter base surface off and apply a film of new oil to the gasket of the new replacement filter (Hydro-Gear part number 52114).
4. Install the new filter by hand, turn 3/4 to one full turn after the filter gasket contacts the filter base surface.
5. Re-install the filter guard with three 1/4" screws. Torque screws to 65 in. lbs. (7.35 Nm) each.
6. Drain old oil filters of all free flowing oil prior to disposal. Place used oil in appropriate containers and deliver to an approved recycling collection facility.
7. Remove the oil level check port plug (figure 4) from the transaxle prior to filling with oil. This will allow the transaxle to vent during oil fill.
8. Remove the top port plug from the transaxle.
9. Fill with 20W50 motor oil until oil just appears at the bottom of the oil level check port. Install the oil level check port plug into transaxle. Torque to 180 in. lbs. (20.34 Nm).
10. Install and torque the top port plug to 180 in. lbs.
11. Proceed to the purge procedure.

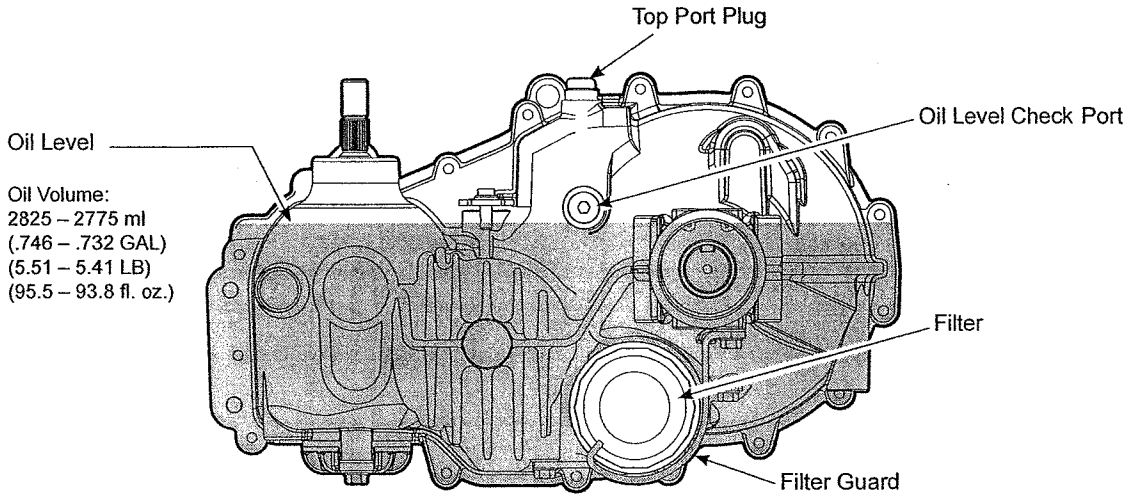


Figure 4, Filter Location

PURGING PROCEDURES

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

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

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 is at the proper oil level. If it is not, fill to the specifications outlined in this manual.

The following procedures are best performed with the vehicle drive wheels off the ground. Then repeated under normal operating conditions. If this is not possible, then the procedure should be performed in an open area free of any objects or bystanders.

1. Disengage the brake if activated.
2. With the bypass valve open and the engine running, slowly move the directional control in both forward and reverse directions (5 or 6 times).
3. 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 the engine.
4. It may be necessary to repeat Steps 2 and 3 until all the air is completely purged from the system. When the transaxle operates at normal noise levels and moves smoothly forward and reverse at normal speeds, then the transaxle is considered purged.

RETURN TO NEUTRAL SETTING

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 G730™ transaxle, fully read and understand the safety precautions described in this section.

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.

The return to neutral mechanism on the transaxle is designed to set the directional control into a neutral position when the operator releases the vehicle directional 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.
3. Start the engine and increase the throttle to full engine speed.
4. Check for axle rotation. If the axle does not rotate, go to Step 5. If the axle rotates, go to Step 6.
5. Stop the vehicle's engine. Reattach and adjust the vehicle's linkage according to the vehicle owner's manual.
6. Note the axle directional movement. Stop the vehicle engine. Loosen the RTN adjustment screw until the control arm can be rotated. Rotate the control arm in the same direction of the axle rotation in smal increments until the axle stops. Tighten the RTN adjustment screw to 175 in. lbs. (19.78 Nm). Recheck according to steps 3 and 4.

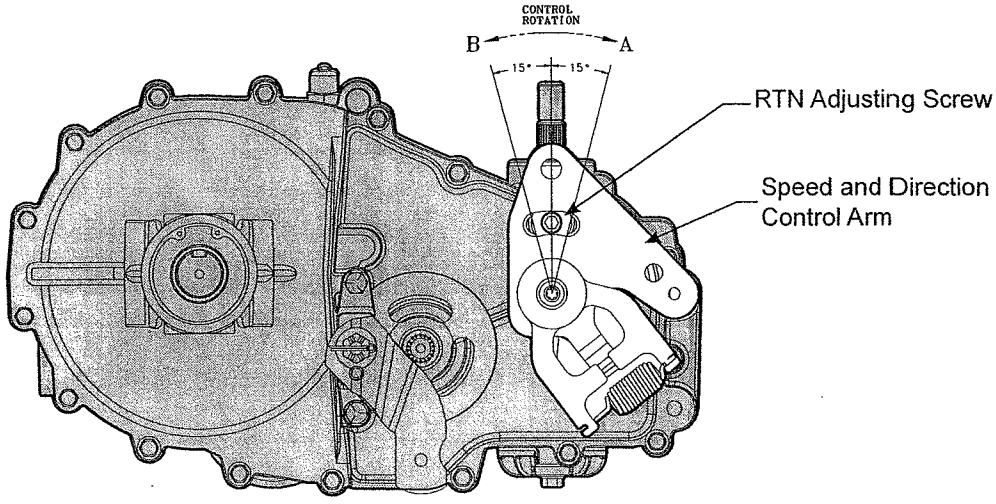


Figure 5, Return to Neutral Setting

RETURN TO NEUTRAL ASSEMBLY

Refer to Figure 6

Disassembly

1. Remove the RTN control arm kit by first removing the spring (147) and Torx head screw (46). The remaining members of the assembly can be removed as a single item – washer (146), unidirectional scissor arm kit (145), and the control arm (44).
2. Remove the Allen head screw (142), washer (45), neutral arm (141) and spacer (140).

NOTE: *Only remove the seal (41) if damaged or worn. The seal is not part of the RTN control arm kit. Refer to "Seal Kit" in the Items List on page 36.*

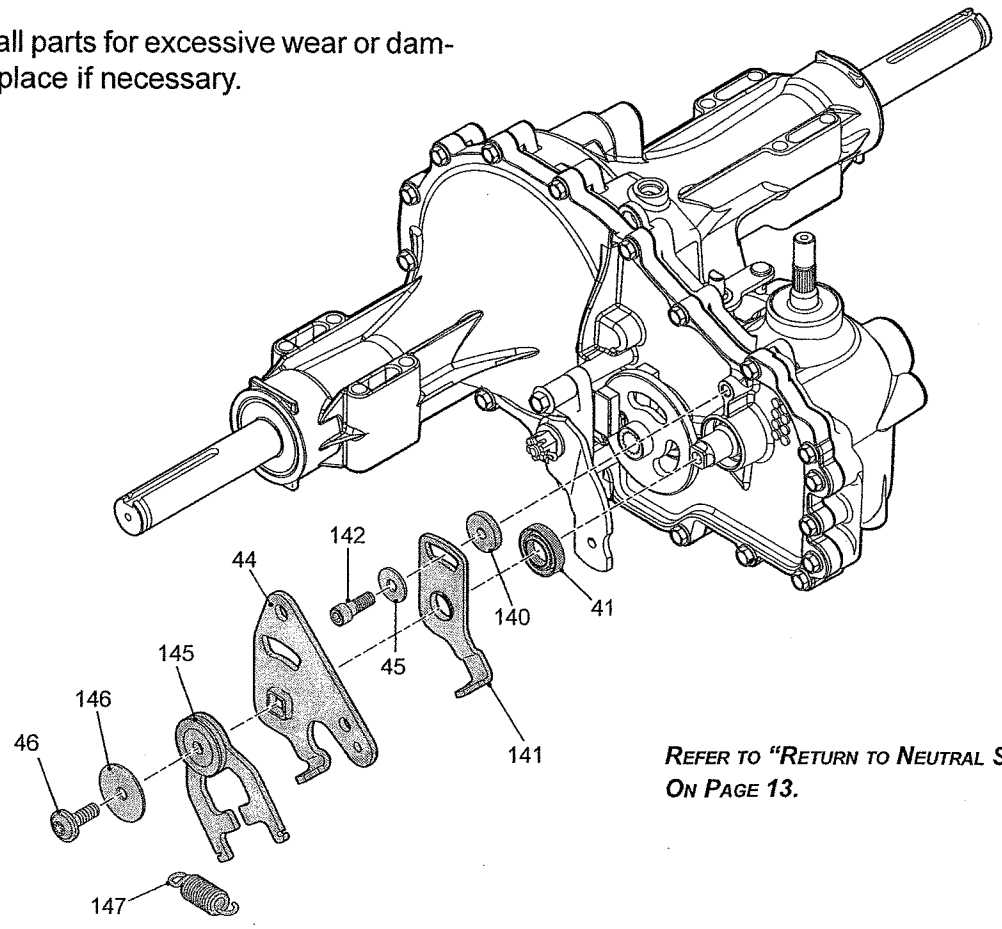
Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. When tightening the fasteners, refer to the table on page 19 for the required torque values.
3. Refer to the RTN adjustments on page 13.

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 excessive wear or damage. Replace if necessary.



REFER TO "RETURN TO NEUTRAL SETTING" ON PAGE 13.

Figure 6, Return to Neutral Assembly

CONTROL ARM ASSEMBLY

Refer to Figure 7

Disassembly

1. Remove the lock nut (47), the washer (45) and the Torx head screw (46).
2. Remove the control arm (44), the washers (48) and the stud (42).

NOTE: *Only remove the seal (41) if damaged or worn. The seal cannot be serviced separately. Refer to "Seal Kit" in the Items List on page 36.*

Inspection

1. Inspect all parts for excessive 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 19 for the required torque values.

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

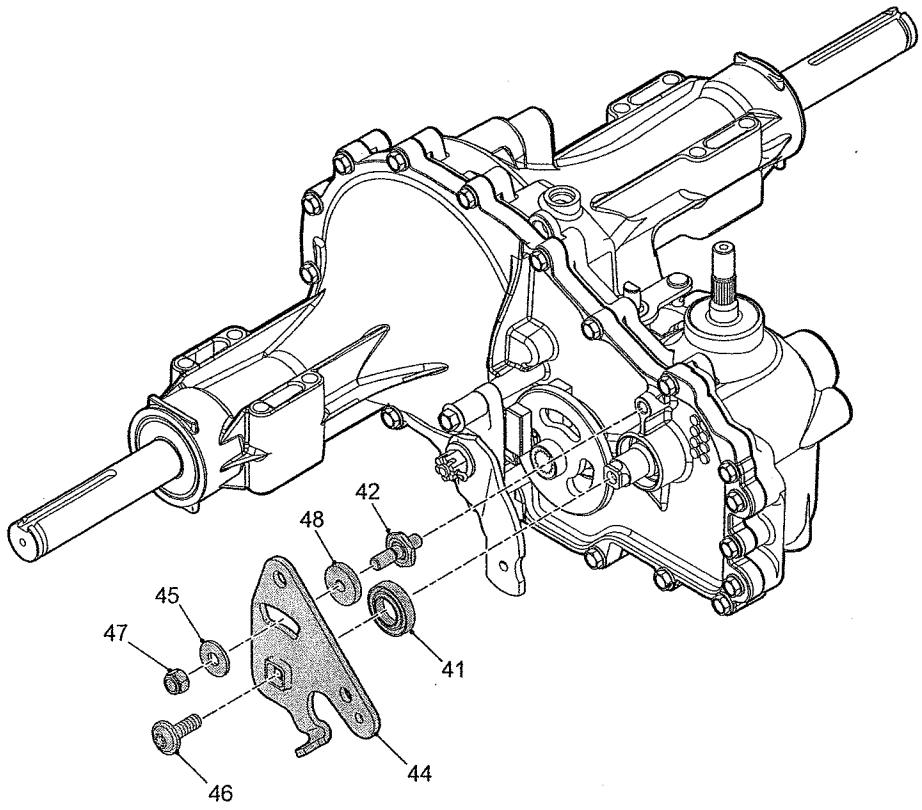


Figure 7, Control Arm Assembly

BRAKE ARM & BRAKE ASSEMBLY

Refer to Figure 8

Disassembly

1. Remove the cotter pin (182) and discard. Mark the orientation of the bias spring (185), and long screw (176). Remove the bias spring (185), the castle nut (181), and the washer (184).
2. Remove the brake arm (179), and the brake compression spring (178).
3. Remove the bolt (175), the bolt (176), and the spacer (183).
4. Remove the brake yoke (174), the puck plate (172), and the brake puck (170).
5. Remove the two brake pins (177) from the brake yoke (174).
6. Remove the brake rotor (171), the inner puck (170) and the seal (10) — discard the seal.

NOTE: *Only remove the seal (10) if damaged or worn, or if doing a complete disassembly. Refer to "Seal Kit" in the Items List on page 36.*

Inspection

1. Inspect all parts for excessive 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 19 for the required torque values.
3. Install new cotter pin (182) and lip seal (10) from seal kit.

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

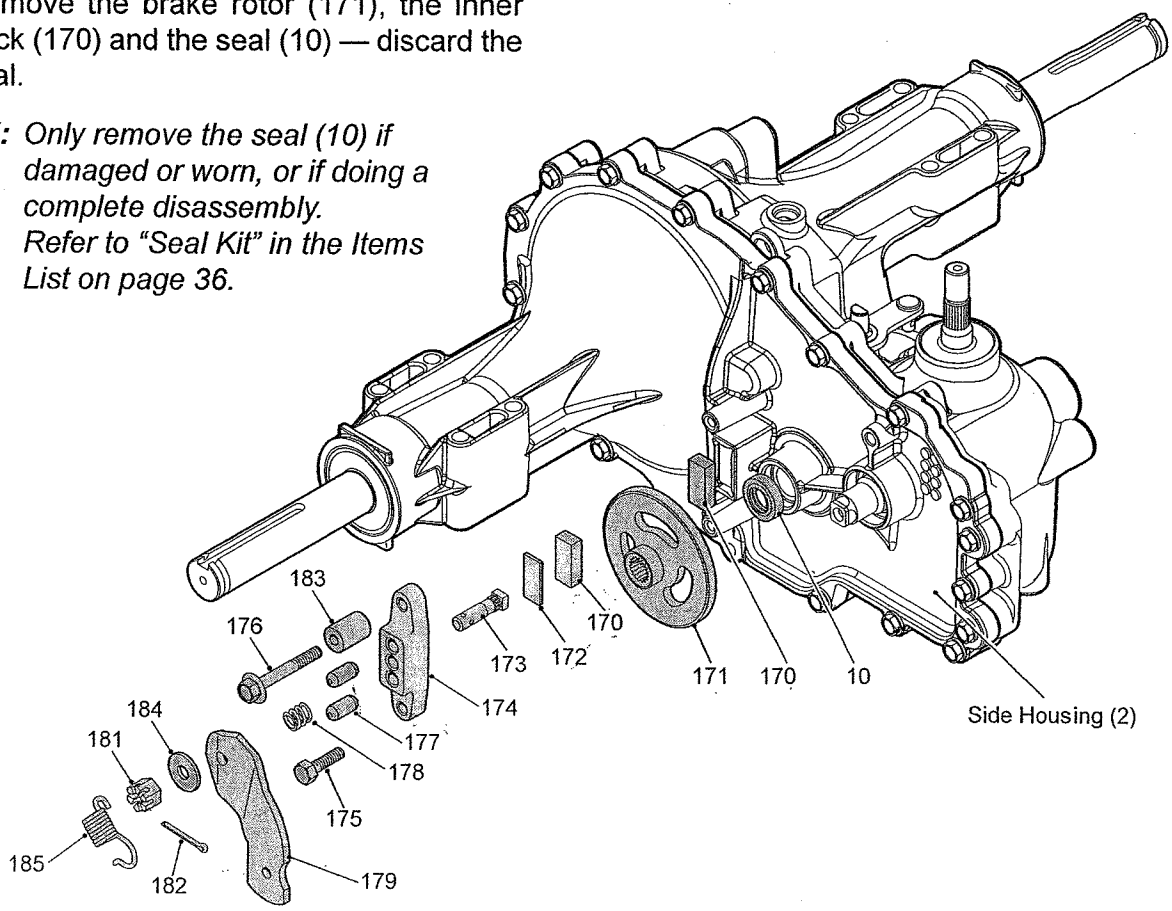


Figure 8, Brake Assembly

BRAKE MAINTENANCE

Refer to Figures 8 and 9

BRAKE SETTING

1. Remove the brake arm bias spring (185), the cotter pin (182) and loosen the brake castle nut (181). Refer to figure 8.
2. Insert a 0.015" feeler gage between the brake rotor (171) 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.

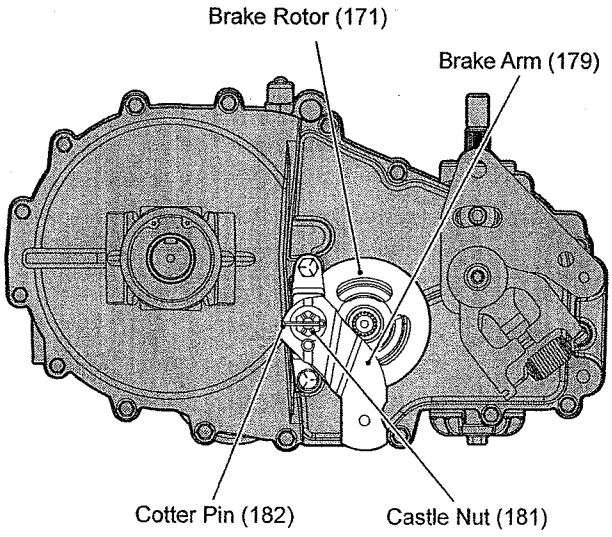


Figure 9, Brake Setting

Refer to Figure 10

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.*

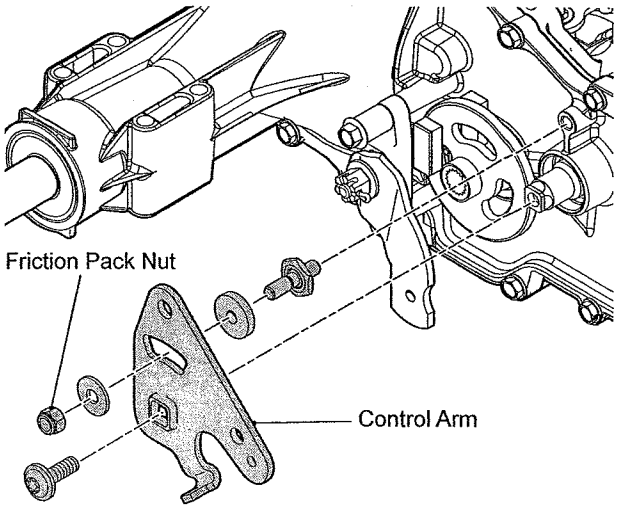


Figure 10, Friction Pack Adjustment

TEAR DOWN AND REASSEMBLY

How to Use This Manual

Each subassembly illustrated in this manual is illustrated with an exploded view showing the parts involved. The **item reference numbers in each illustration are for assembly instructions only.** See page 36 for part names and descriptions. A complete exploded view and item list of the transaxle is provided at the end of the repair section.

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. **Do not use a pressure washer to clean the transaxle.**

Upon removal, it is recommended that all seals, O-rings, and gaskets be replaced. During installation lightly lubricate all seals, O-rings and gaskets with a clean petroleum jelly prior to assembly. Also protect the inner diameter of seals during installation by covering the shaft with a cellophane or plastic wrap 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 at the end of this manual. Use only original Hydro-Gear replacement parts found in BLN-51427 (CD), at your Hydro-Gear Central Service Distributor or online at www.hydro-gear.com.

IMPORTANT: When internal repair is performed on the G730™ transaxle, the oil filter must be replaced.

TOOLS

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

TORQUES

REQUIRED TORQUE VALUES			
Item	**Description**	**Torque**	**Operation**
4	Plug 9/16-18 (Metal)	180 – 240 lb-in	Oil Level Port Plug
7	Screw, Hex head 1/4-20 x 1.25"	105 – 155 lb-in	Side Cover Screws
12	Fitting, Metal	180 – 240 lb-in	Breather Fitting
23	Filter	110 – 130 lb-in	Oil Filter
24	Check Plug or Shock Valve	280 – 400 lb-in	Center Section
25	Check Plug or Shock Valve	280 – 400 lb-in	Center Section
27	Screw, Hex Head 3/8-16 x1.5	525 – 700 lb-in	Center Section Screws
42	Stud, Short 5/16-24	50 – 120 lb-in	FR Control Arm
46	Torx Head Screw 5/16-24 x 1.00	230 – 310 lb-in	RTN/FR Control Arm
47	Nut, Hex Lock 5/16-24 UNF	85 – 120 lb-in	Friction Pack Nut
105	Screw, Hex Head 1/4-20 x .75	65 – 95 lb-in	Filter Guard Screws
122	Lock Nut, Hex 1/2-20 (Nylon Insert)	360 – 520 lb-in	Fan/Pulley Nut
123	Screw, 1/4-20 x .875	50 – 80 lb-in	Fan Screws
134	HFHCS 1/4-20 x .75	65 – 95 lb-in	Charge Plate Screws
142	SHCS 5/16-24 x 1 Patch	175 – 200 lb-in	Neutral Arm Screw
175	Bolt, Hex Head 1/4 x 20 x 1	80 – 120 lb-in	Brake Yoke Bolt
176	Bolt, Hex Head 1/4 x 20 x 2	80 – 120 lb-in	Brake Yoke Bolt
192	Plug, 9/16-18 (Metal)	180 – 240 lb-in	Fill Port Plug
193	Plug, 9/16-18 (Metal)	180 – 240 lb-in	Drain Plug
194	Plug, 9/16-18 (Plastic)	15 – 35 lb-in	Fill Plug
195	Plug, 9/16-18 (Metal)	180 – 240 lb-in	Plug
196	Fitting, Metal	15 – 35 lb-in	Breather Hose Fitting

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 G730™ 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 32.

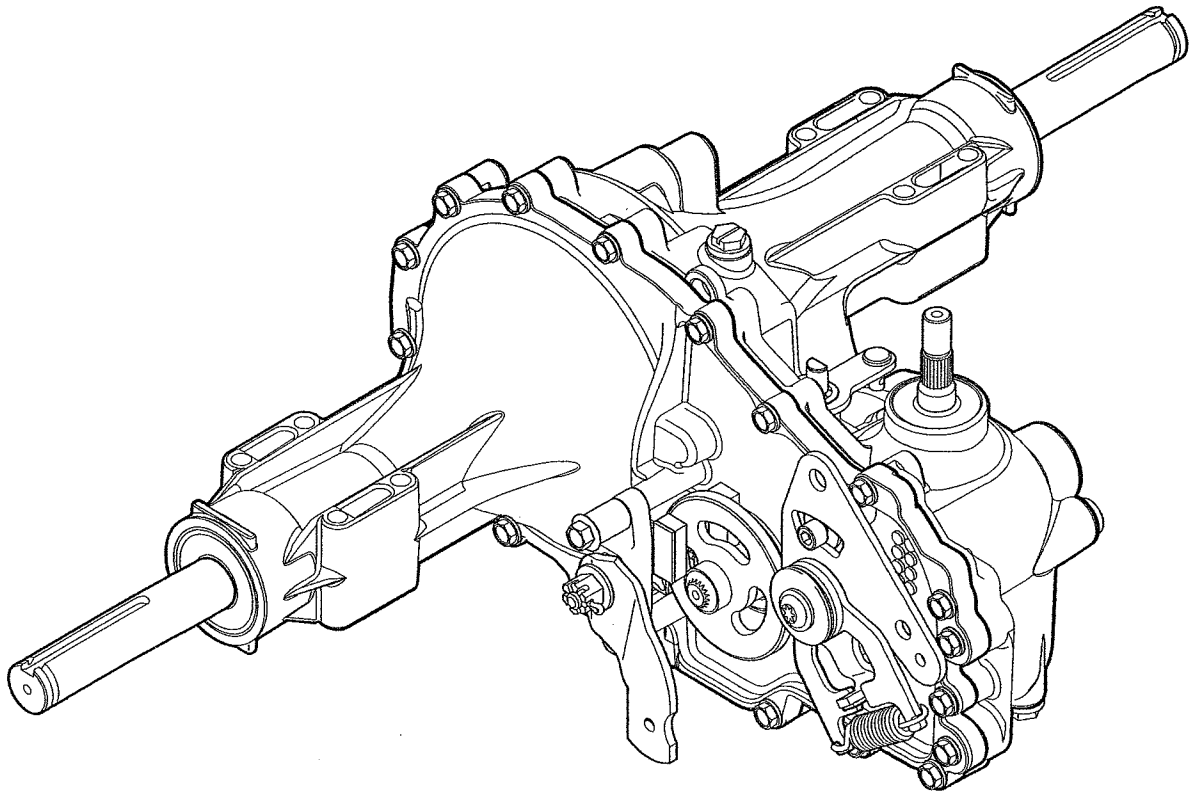


Figure 11, G730 Transaxle

SIDE HOUSING

Refer to Figure 12

Disassembly

1. Remove all external items previously discussed in their recommended order.
2. Remove filter (23) and discard. Drain oil from transaxle. Refer to page 11.
3. Remove the screws (7), separate side housing (2) from main housing (1), using "pry points" as required.
4. Clean off all the old sealant from the cover (2) and the main housing (1). Take care not to damage the sealing surfaces. A wire brush and solvent is effective.

IMPORTANT: *Before scraping the old sealant from the main housing, place a protective cover over the internal parts of the transaxle; avoiding any debris from entering the housing.*

Assembly

1. Apply a bead of sealant around the perimeter of the main housing face. See "Sealant Application Diagram" on page 33.
2. Install the locating pins (6), if not already installed.
3. Install the side housing (2). Use care not to smear the sealant bead.
4. Install the side housing screws (7). Refer to the screw tightening pattern on page 34.
5. When tightening the fasteners, refer to the table on page 19 for the required torque values.

Inspection

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

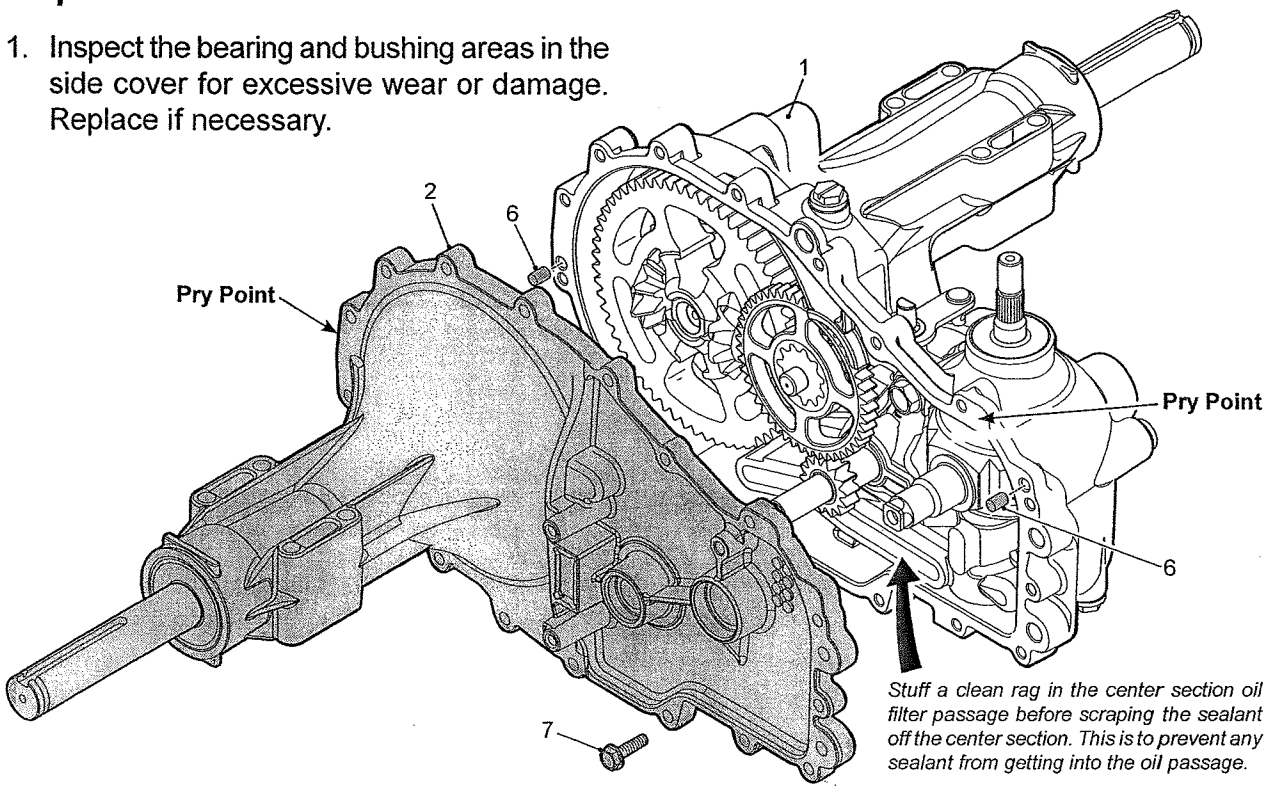


Figure 12, Side Housing

AXLE SHAFT (Side Housing)

Refer to Figure 13

Disassembly

1. Remove all items previously discussed, in their recommended order.
2. Remove the retaining ring (90) and discard.
3. Remove the lip seal (96) and discard.
4. Remove the axle shaft (94) in the direction of arrow.
5. Remove the bearing (95).

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

Inspection

1. Inspect the splines on the axle shaft for wear or damage. Replace if necessary.
2. Inspect the bearing (95) 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.).*

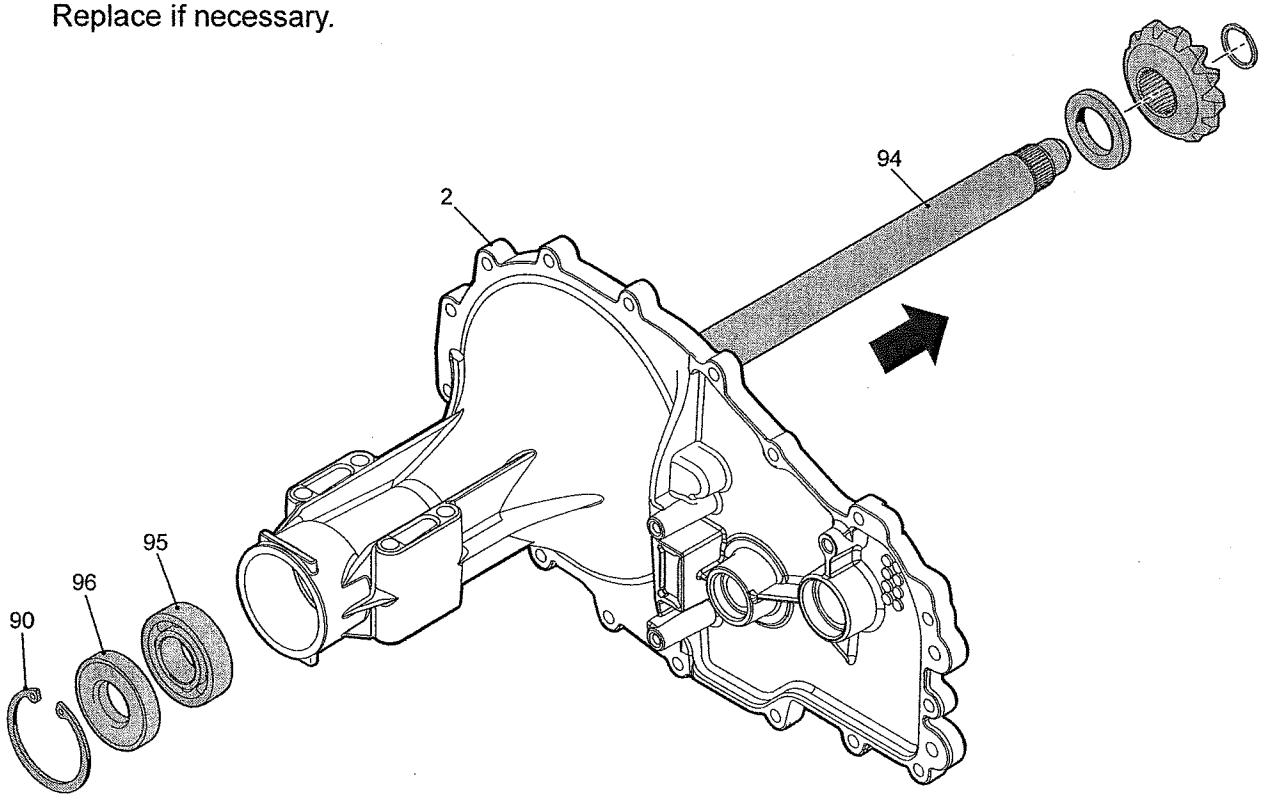


Figure 13, Axle Assembly

BULL, PINION AND REDUCTION GEARS

Refer to Figure 14

Disassembly

1. Remove all external items previously discussed in their recommended order.
2. Remove washer (80) and reduction gear set (81-82) as an assembly and set aside. Remove second washer (80) and jack shaft pin (83).
3. Remove the spacer (92), bevel gear (152) and retaining ring (155) from the side housing axle shaft.
4. Remove the bull gear set — two miter gears (153) with two differential pins (154), and bull gear (91).
5. From the axle shaft (main housing), remove the retaining ring 155, bevel gear (152) and the spacer (92).

Inspection

1. Inspect all gears for teeth and internal splines wear or damage.
2. Separate the reduction gears and inspect the gears and jack shaft pin for excessive wear or damage. Replace if necessary.

Assembly

1. Install the spacer (92), bevel gear (152) and the retaining ring (155) onto the axle shaft (94) in the main housing.
3. Install the bull gear (91), two miter gears (153) with two differential pins (154) onto the axle (94).
4. Install the retaining ring 155, bevel gear (152) and the spacer (92) onto the side housing axle shaft.
5. Install the jack shaft pin (83), washer (80), reduction gears (82) and (81).
6. Install washer (80).

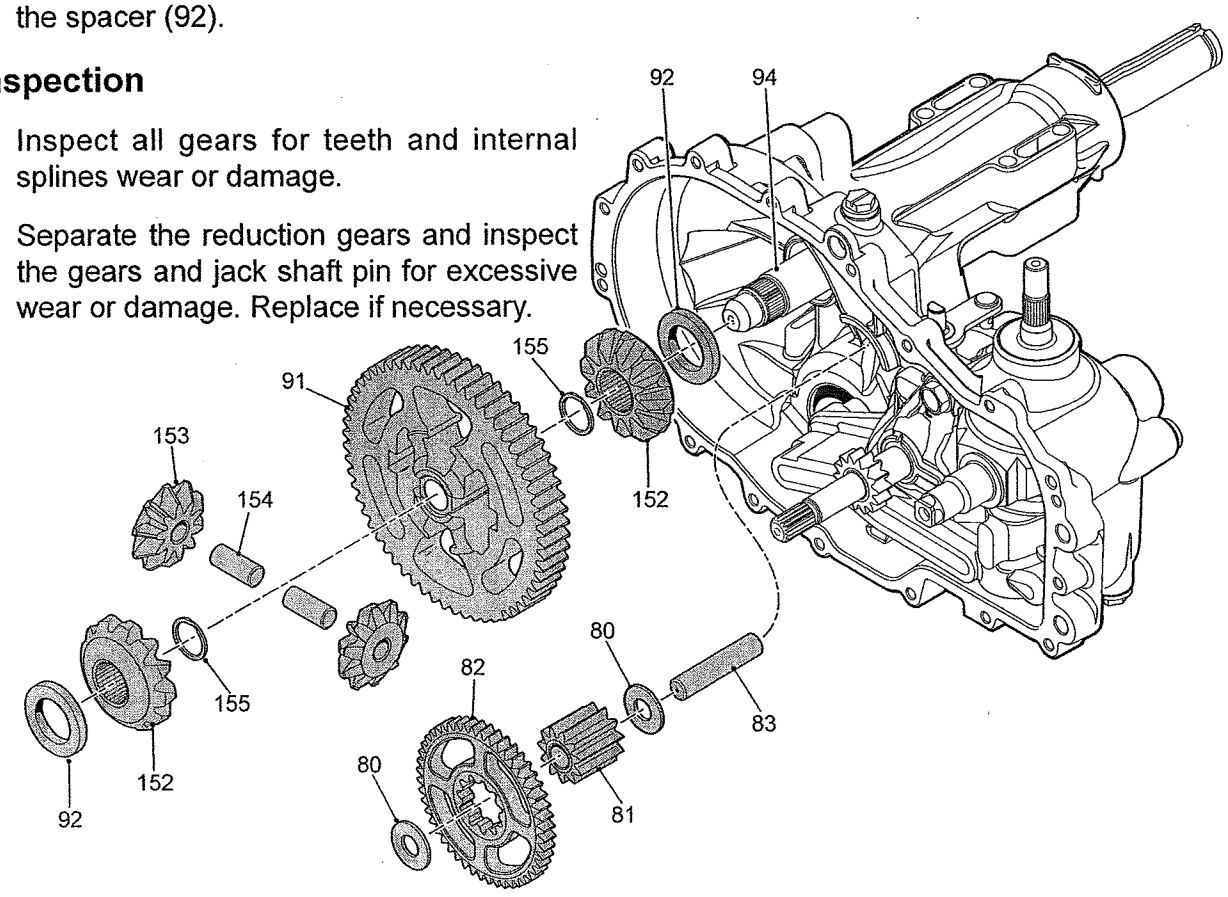


Figure 14, Bull, Reduction and Pinion Gear

CHARGE PUMP

Refer to Figures 15, 16

Disassembly

1. Mark the orientation of the charge pump cover relative to the main housing, prior to removal. Refer to figure 14.
2. Remove the hex head screws (134), charge pump cover, gerotor assembly, and the O-ring (132). Remove the connecting tubes (130) at this point – *only if the center section will be removed.* A pick type tool can be used to remove the connection tubes.

Inspection

1. Inspect the gerotor assembly for wear or damage.
   Replace if necessary.

Assembly

1. Reassemble all parts in the reverse order of disassembly.

NOTE: *When reinstalling the charge pump components, replace the O-ring (132) Also replace the connecting tubes (130), if they have been removed.*

2. Align the mark on the charge pump cover, from step 1, Disassembly, with the mark on the main housing.
3. When tightening the fasteners, refer to the table on page 19 for the required torque values.

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

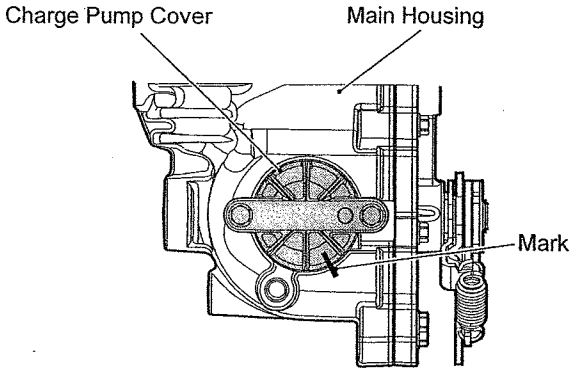


Figure 15, Charge Pump Cover Orientation

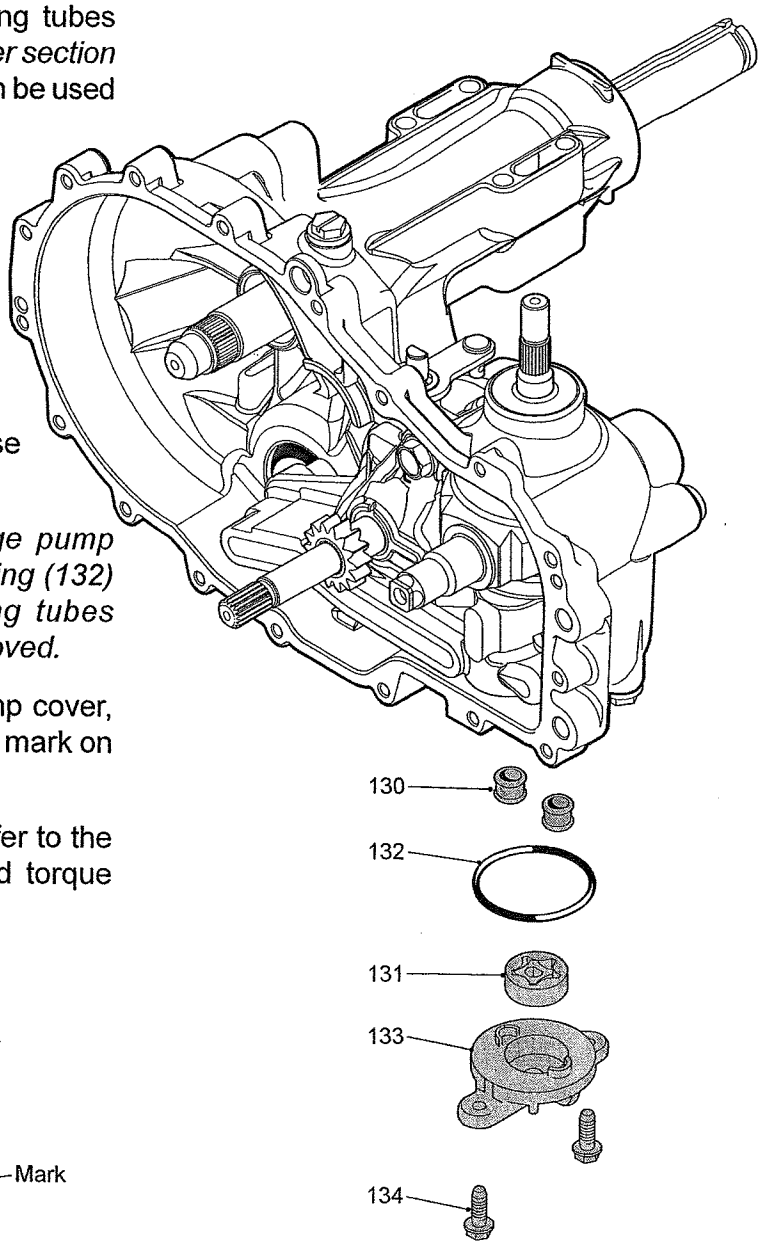


Figure 16, Charge Pump

INPUT SHAFT

Refer to Figure 17

Disassembly

1. Requires removal of all items beginning on page 21.
2. Remove the retaining ring (57).
3. Remove the lip seal (56) and discard.
4. Remove the washer (55) and the pump shaft assembly (52–53).

NOTE: *To assist in the removal of the pump shaft, lightly tap (using a neoprene head hammer) the shaft from the charge pump side of housing. Care should be taken not to damage the shaft or gerotor running surface.*

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

5. Remove the wire ring retainer (54) and the bearing (53) from the pump shaft (52).

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.

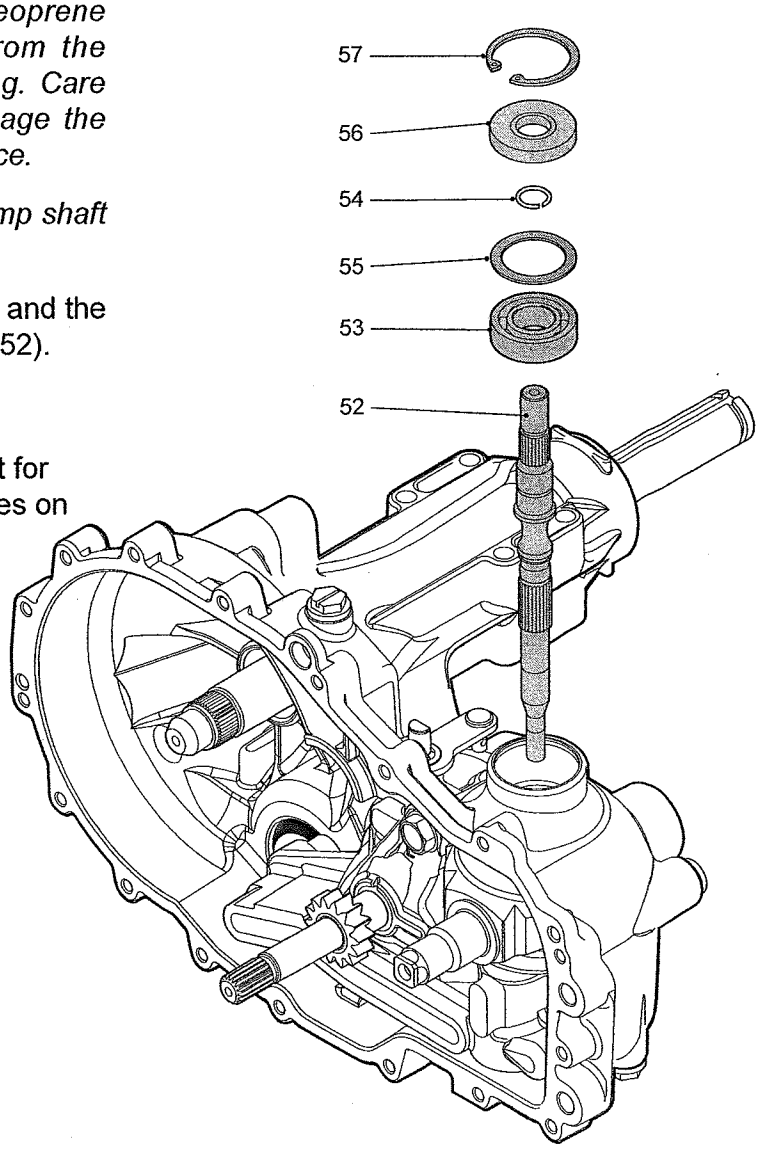


Figure 17, Input Shaft

BYPASS ARM

Refer to Figure 18

Disassembly

1. Requires removal of all items beginning on page 21.
2. Remove the push-on retaining ring (35) and discard. Remove the bypass arm (34).
3. Remove the retaining ring (33).
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.*

Assembly

1. Install a new lip seal (30).
2. Install the clip retaining ring (31) and bypass rod (32).
3. Install the retaining ring (33).
4. Install the bypass arm (34) and new push-on retaining ring (35).

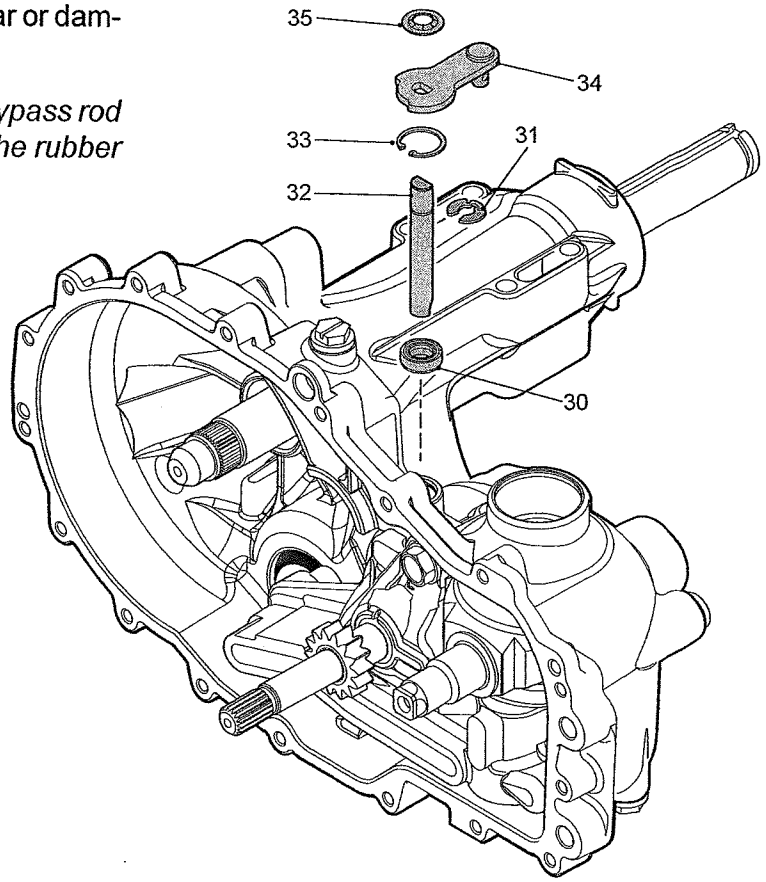


Figure 18, Bypass Arm

SWASHPLATE

Refer to Figures 19, 20

Disassembly

1. Requires removal of all items beginning on page 21.
2. Remove the swashplate (40) and pump cylinder block assembly (69) as a single item.
3. Separate the pump cylinder block assembly (69) and the thrust bearing (65) from the swashplate (40) and set aside.

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.*

Inspection

1. Inspect the swashplate (40) and thrust bearing assembly (65) for wear or damage. Replace if necessary.
2. Inspect pump block per detail page 31.

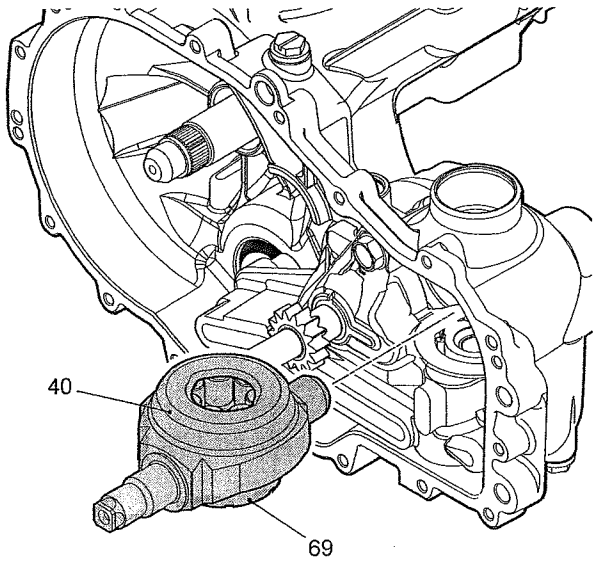


Figure 19, Swash Plate

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 (65) into swashplate (40) such that the thick race of the bearing assembly faces out.
4. With the piston facing the thrust bearing, place the pump block assembly (69) 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 and install.

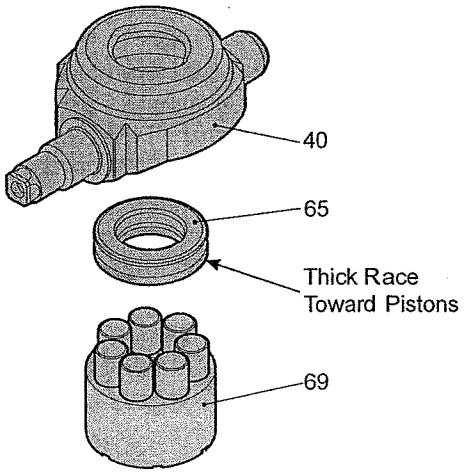


Figure 20, Hydraulic Pump Components

CENTER SECTION

Refer to Figure 21

Disassembly

1. Requires removal of all items beginning on page 21.
2. Remove the center section mounting screws (27).
3. Remove the center section, the motor shaft (73) and the motor cylinder block assembly (64) as a single item.
4. Remove the motor cylinder thrust bearing (60).
5. Remove the motor cylinder block assembly (64) from the motor shaft (73). Remove the motor shaft (73) from the center section.
6. Remove the washer (70) and the retaining ring (71) from the motor shaft (73).
7. Remove the reduction gear (72) and washer (74).

Inspection

1. Inspect the races of the thrust bearing (60) for wear or damage.
2. Inspect the motor shaft for wear or damage. Replace if necessary.
3. Inspect for scratches on the machined surfaces of the center section.
4. Inspect motor cylinder block assembly (64) per detail on page 31.
5. Inspect reduction gear (72) for wear or damage.

Assembly

1. Reassemble all parts in the reverse order of disassembly.
2. Apply a light coating of oil to all running surfaces on the center section.
3. Place the thrust bearing assembly (60) into the main housing (1).
4. Place the motor shaft (73) into the center section. With the pistons, of the motor cylinder (64), facing the thrust bearing (60), mount onto the motor shaft (73).
6. Align the assembled components (center section, the motor block and shaft) with the main housing and install.
7. Install the center section mounting screws (27) to the proper torque.

CENTER SECTION (Continued)

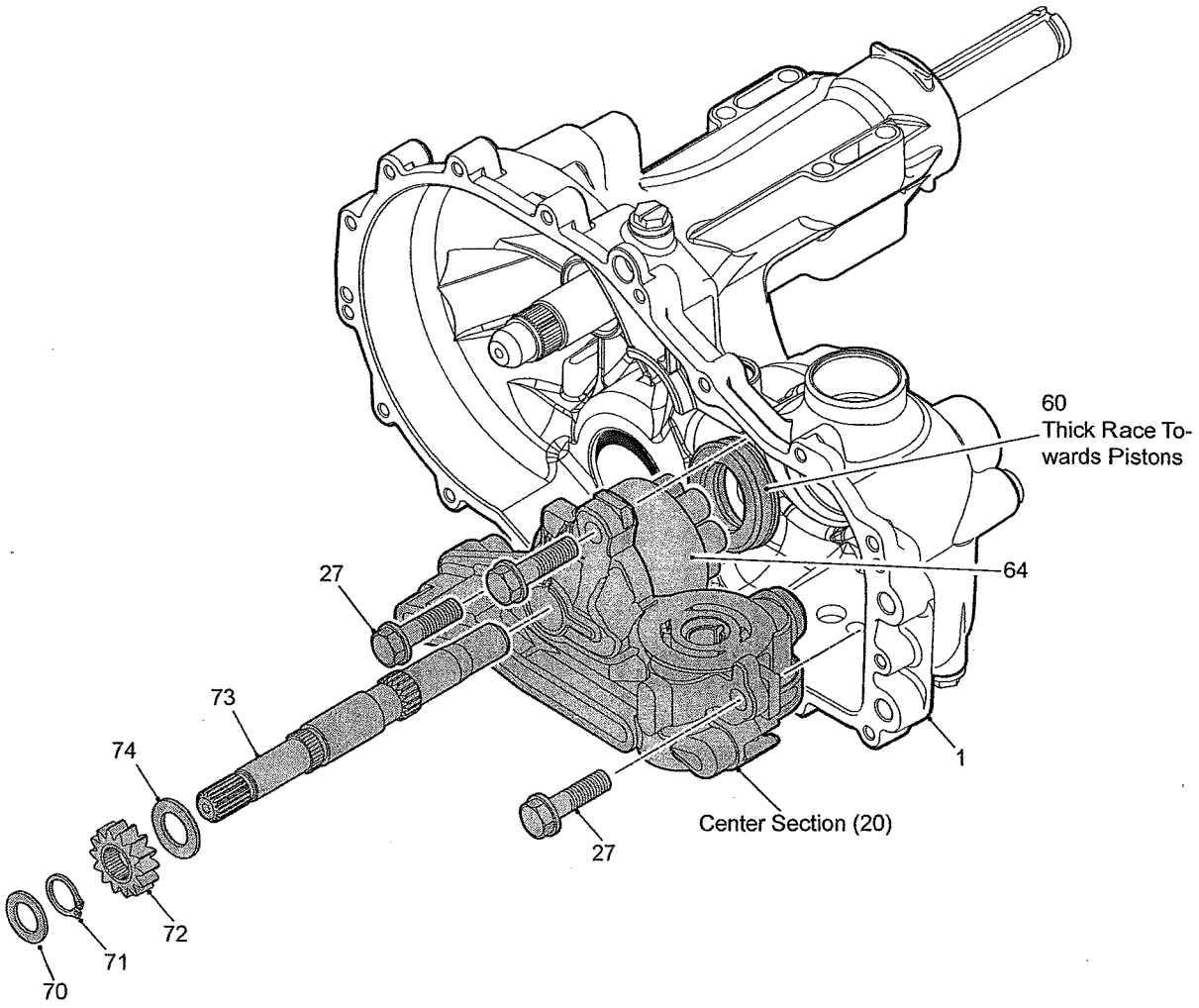


Figure 21, Center Section

CENTER SECTION KIT

Refer to Figure 22

Disassembly

1. Remove the bypass plate (22) from the center section.
2. Remove the plug seals (26) and discard. Refer to figure 22, on page 31.

IMPORTANT: *Before removing the check plugs, it is important to note their specific location, i.e., check plug (24) needs to be reinstalled in the same port it was removed from and the same for check plug (25). After removing the check plugs, inspect for debris or damage.*

3. Remove the check plugs (24) and (25) and inspect.

— Charge Relief Kit —

4. Remove the pin, spring and ball that make up the charge relief kit (202). Depressing the charge spring with the (clean) flat side of a slotted screw driver will allow the pin to slide out. Use caution when relieving spring force. Inspect the center section at the charge seat for wear or damage.

NOTE: *The check ball should seat properly in the check seat.*

Inspection

1. Inspect all components for unusual wear or damage. Pay particular attention to the center sections threaded ports and passages; there must be no lose particles or debris.

Assembly

1. Install the charge relief kit (202). Beginning with the ball, then the spring, followed by, the cross pin.
2. Install the new check plugs (24) and (25) in their proper ports.
3. Install the new plug seals (26).
4. Install the bypass plate (22). Applying a very small film of grease on the bypass plate, will help secure it in the center section.

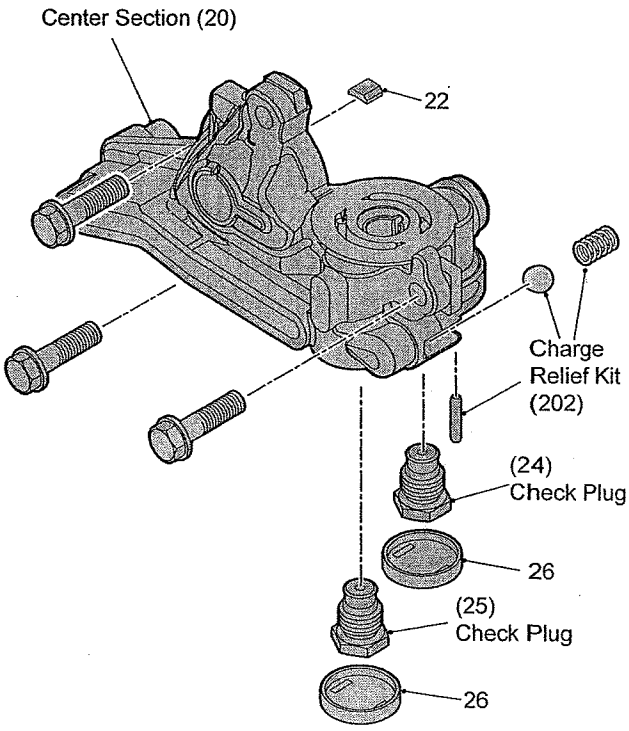


Figure 22, Center Section Kit (201)

CHECK PLUGS & SEALS

Refer to Figure 23

In order to gain access to the check plugs (24 & 25), it is necessary to remove the plug seals (26). This is accomplished by inserting a seal hook or puller into, and through, one of the insertion points *(rectangular recesses)* on the plug seal, refer to figure 21. After successfully removing the plug seals, discard and replace with new seals.

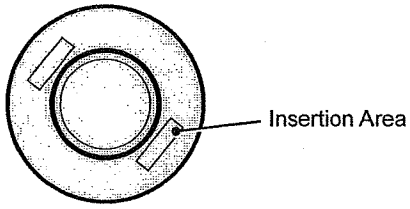


Figure 23, Plug Seal (26)

CYLINDER BLOCKS

Refer to Figure 24

Inspect each component of the cylinder block assemblies for wear or damage. Inspect the cylinder blocks' running surface for scratches or galling. 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 27 - 30.

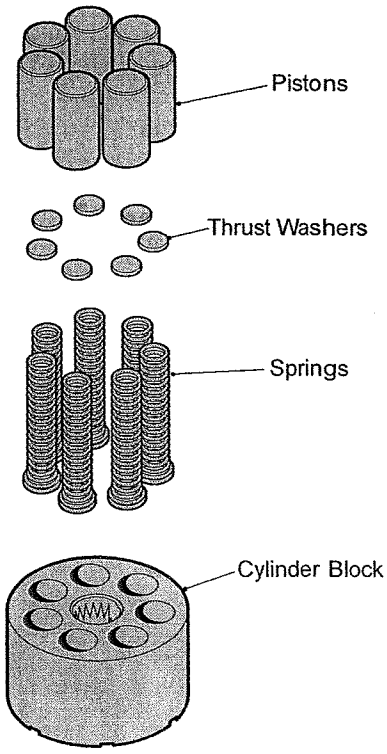


Figure 24, Pump/Motor Cylinder Block Assembly

AXLE SHAFT (Main Housing)

Refer to Figure 25

Disassembly

1. Remove all items previously discussed, in their recommended order.
2. Remove the retaining ring (90).
3. Remove and discard the lip seal (96).
4. Remove the axle shaft (94) in the direction of arrow.
5. Remove the bearing (95).

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

Inspection

1. Inspect the splines on the axle shaft for wear or damage. Replace if necessary.
2. Inspect the bearing (95) 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.).*

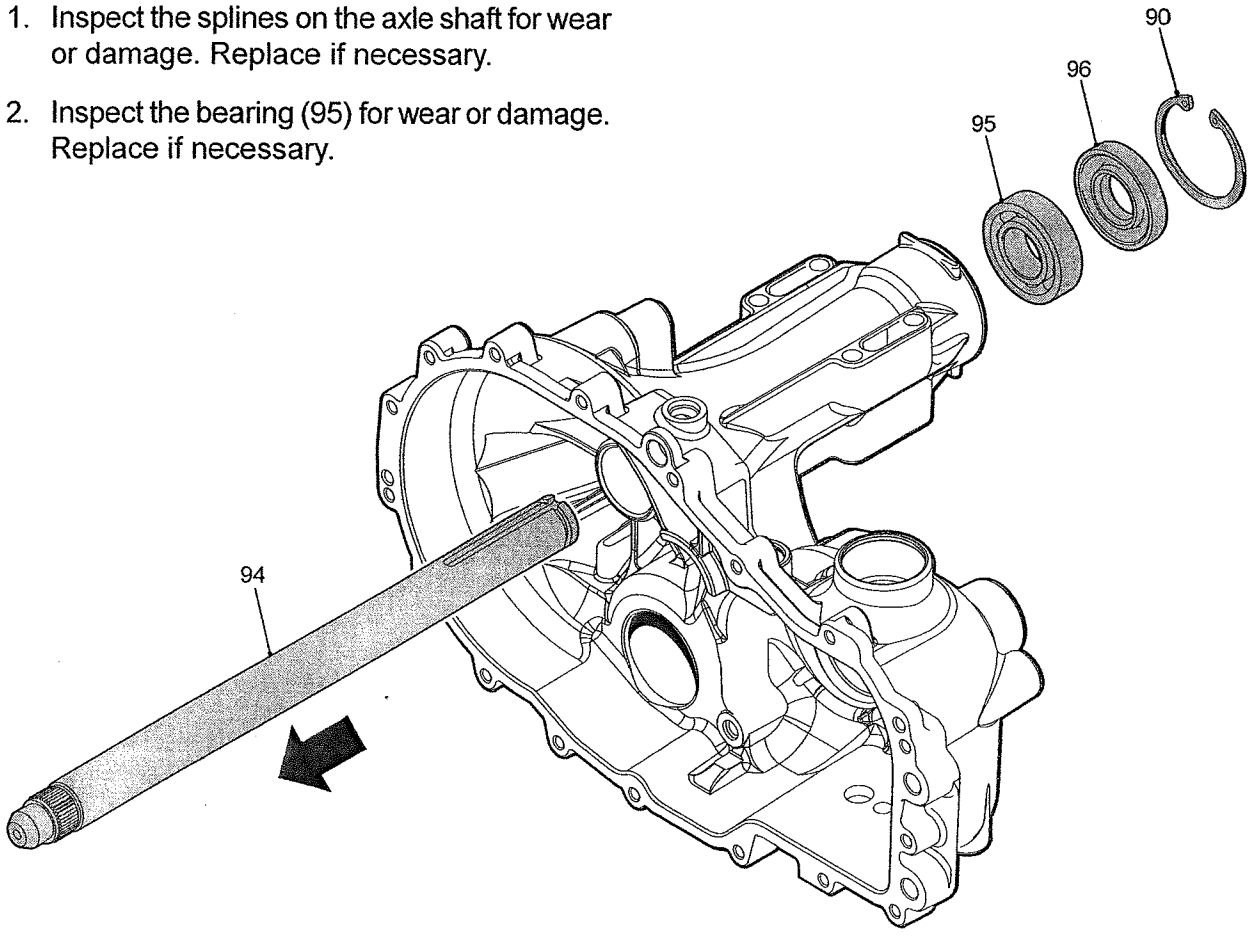


Figure 25, Axle Assembly

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 exploded views, and are also keyed to the complete unit exploded view on page 35.

1. Install the axle shaft (main housing). See page 32.
2. Install the hydraulic components. See pages 27-31.
3. Install the bypass rod and arm. See page 26
4. Install the input shaft. See page 25
5. Install the charge pump. See page 24
6. Install the reduction gears, pinion gear and bull gear. See page 23.
7. Install the axle shaft into side housing. See page 22.
8. Apply sealant to the main housing and center section prior to installing the side cover. See diagram below.

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.

9. Install side housing. See page 21.
10. Install brake assembly. See page 16.
11. Install new oil filter and fill the transaxle with new oil. See pages 10 and 11.
12. Install the control arm/RTN assembly. See pages 14 and 15.
13. Install the transaxle onto the vehicle.
14. Perform the purge procedures listed on page 12.

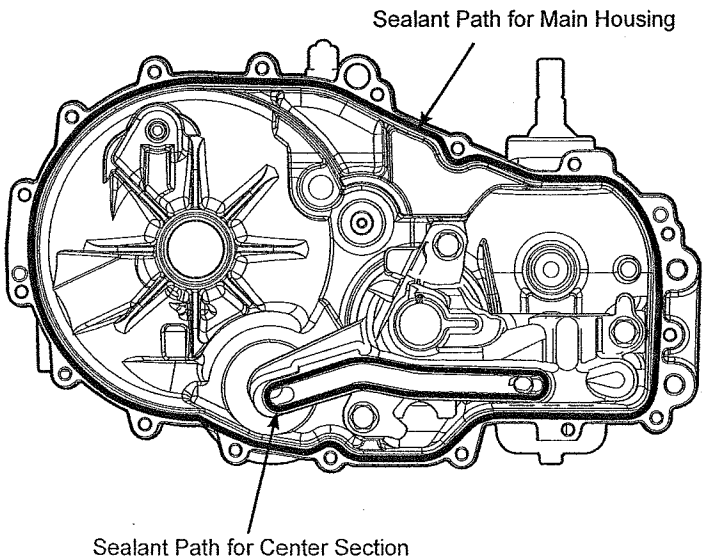


Figure 26, Sealant Application Diagram

SIDE HOUSING – SCREW TIGHTENING SEQUENCE

Starting with the number "1" screw location, tighten sequentially through to "17."

Torque each screw to 105 – 155 lb-in (11.87 – 17.52 Nm).

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

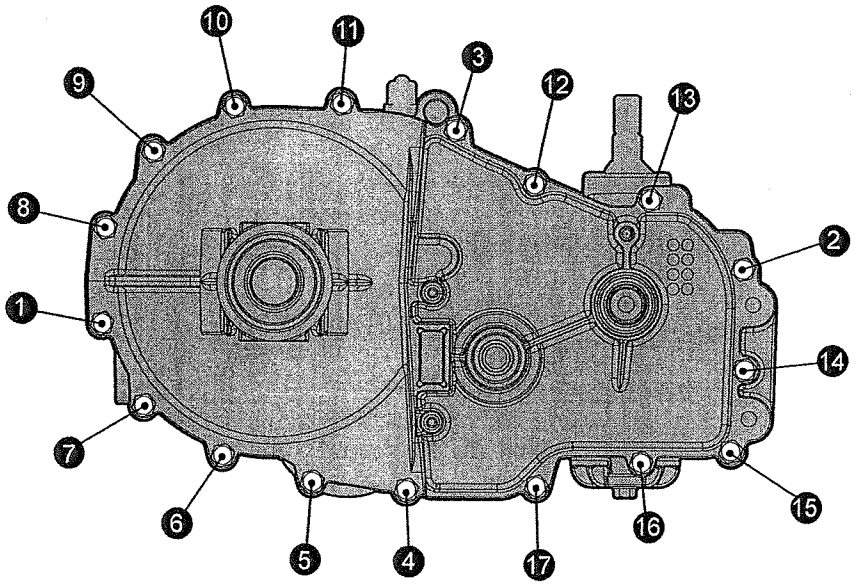
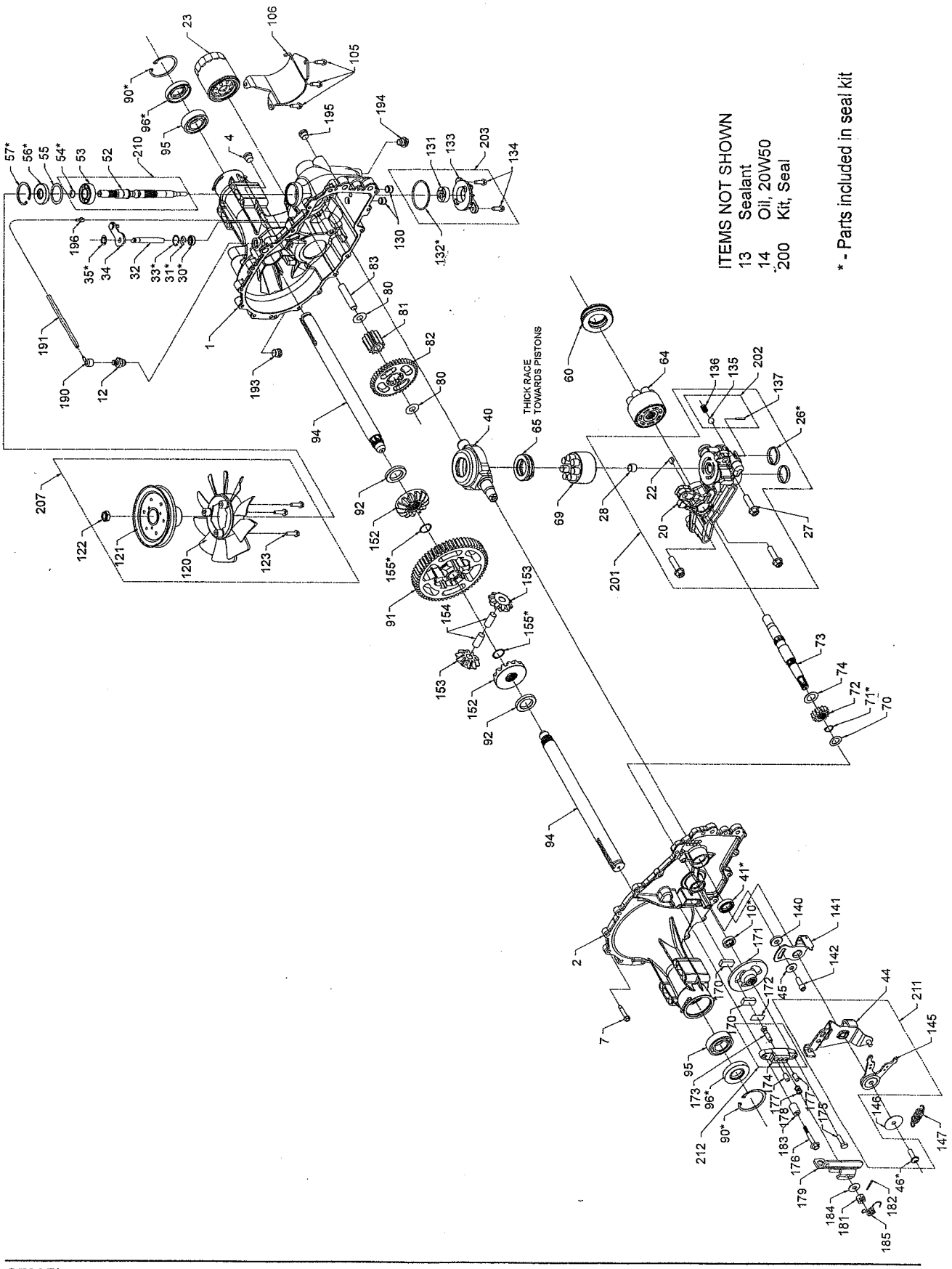


Figure 27, Screw tightening sequence diagram

G730™ TRANSAXLE EXPLODED VIEW



G730™ TRANSAXLE PARTS LIST

1	Housing, Main
2	Housing, Side
4	Plug 9/16-18 (metal)
7	HFHCS 1/4-20 x 1.25"
10	Seal, Lip .625 x 1.0
12	Fitting Assembly, Metal
20	Center Section
22	Plate, bypass
23	Filter, Oil
24	Check Plug or Shock Valve
25	Check Plug or Shock Valve
26	Seal, Plug 1.250 x .250
27	HFHCS 3/8-16 x 1.5 (Patch)
28	Bearing, Journal
30	Seal, Lip .375 x .75 x .25
31	Ring, Retaining .375 External
32	Rod, Bypass
33	Ring, Retaining .750 Internal
34	Arm, Bypass
35	Ring, Retaining .375 External
40	Trunnion, Swashplate
41	Seal, Lip 18 x 32 x 7
42	Stud, short 5/16-24
44	Arm, Control
45	Washer .34 x .88 x .06
46	TWHCS 5/16-24 x 1.00 (Patch)
52	Input Shaft
53	Bearing, Ball 17 x 40 x 12 Open 6203
54	Ring, Retaining Wire .561 I.D.
55	Washer 1.23 x 1.56 x .04
56	Seal, Lip 17 x 40 x 7
57	Ring, Retaining 2.06 Internal
60	Bearing, Thrust
64	Cylinder Block (Motor)
65	Bearing, Thrust Ball 30 x 52 x 13
69	Cylinder Block (Pump)
70	Washer .63 x 1.0 x .05
71	Ring, Retaining 62 External
72	Gear, Reduction 14T
73	Shaft, Motor
74	Washer .72 x 1.16 x .04
80	Washer .5 x 1.0 x .03
81	Gear, Reduction 45T
82	Gear, Reduction 11T
83	Pin, Jack Shaft
90	Ring, Retaining 2.06 Internal
91	Gear, Bull 60T
92	Spacer, 1.04 x 1.65 x .22
94	Shaft, Axle
95	Bearing, Ball 1.0 x 52 x 15 Open 6205M
96	Seal, Lip 25 x 52 x 10 TC (Gray)
105	Screw, Hex Flange Head 1/4-20 x .75
106	Guard, Filter
120	Fan
121	Pulley
122	Hex Lock Nut 1/2-20 (Nylon Insert)
123	Screw 1/4-20 x .875
130	Tube, Connecting
131	Gerotor Assembly (1.9 CC/rev)
132	O-Ring, -137, 0.103 x 2.050
133	Cover, Charge Pump
134	Screw, Hex Flange Head 1/4-20 x .75
135	Ball Steel 7/16"
136	Spring, Relief .42 x .75
137	Pin, Spring .125 x .875
140	Spacer .320 x 1.005 x .179
141	Arm, Neutral
142	SHCS 5/16-24 x 1 Patch
145	Assembly, RTN Bidirectional
146	Washer, .343 x 1.500 x .062
147	Spring, Extension .57 x 2"
152	Gear, Bevel 14T spline ID
153	Gear, Bevel 10T
154	Pin, .499 x 1.20
155	Ring, Spiral Retaining - 87
170	Puck, Brake
171	Rotor, Brake
172	Plate, Puck
173	RHCS 5/16-24 (special)
174	Yoke, Brake
175	Bolt, Hex Head 1/4-20 x 1 w / patch
176	Bolt, Hex Head 1/4-20 x 2 w / patch
177	Pin, Brake .31 x .73 Plated
178	Spring, Comp Brake Anti-Drag
179	Arm, Brake
181	Nut, Castle 5/16-24 PL
182	Pin, Cotter 3/32 x 3/4
183	Spacer .26 x .88 x .87
184	Washer .27 x .88 x .12
185	Spring, Brake Arm Bias
190	Barbed Cap
191	Hose
192	Plug 9/16-18 (Metal)
193	Plug 9/16-18 (Metal)
194	Plug 9/16-18 (Plastic)
195	Plug 9/16-18 (Metal)
196	Fitting, Barbed
200	Kit, Seal
201	Kit, Center Section
202	Kit, Charge Relief
203	Kit, Charge
207	Kit, Fan & Pulley
210	Kit, Input Shaft
211	Kit, RTN
212	Kit, Brake Yoke

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.

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.

NOTES

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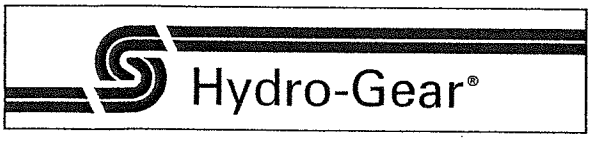

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