

Ingersoll

HYDRAULIC MOTOR
COMPACT TRACTOR
Service Manual No. 9-99642



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SERVICING HYDRAULIC MOTORS

Part Numbers C 13047 and C 13498

INTRODUCTION

a. Make certain the pump and control valve have been checked for proper flow and pressure before attributing a "loss of power" problem to the hydraulic motor.

b. Individual components of these hydraulic motors are repairable according to the parts catalog listing. Replacement of the complete assembly is not necessary or authorized under Warranty unless the combined cost of the worn, damaged or defective components and applicable labor equals or exceeds the cost of the assembly.

c. If "loss of power" is traced to the hydraulic motor on a tractor having limited hours of use, first check the torque on the spacer plate (14) and end cap (19) cap screws. This can be done without removing the hydraulic motor from the tractor. Be sure to mark a line across the geroler housing and spacer plate and keep the geroler assembly intact to insure proper assembly. If any of these cap screws were loose, it should not be necessary to further disassemble the motor. Use new "O" rings (15) and end cap washers (20) when re-assembling.

d. Before disassembling the hydraulic motor, try manually turning the spool and

geroler using the transmission input shaft. If the geroler clearances are tight, the shaft will be difficult to turn or may not turn at all under manual force. If the shaft turns freely, there is indication of excessive clearance and slippage in the geroler (22) or the drive coupling (11) is broken. Disassemble the motor and install a new geroler kit or coupling and seal kit.

e. If oil is transferring from the hydraulic motor into the transmission, complete disassembly of the hydraulic motor is not required. Renew seals (4), (5) and (6) on the motor flange and renew the input shaft seals. Carefully install the input shaft and reassemble motor to transmission in accordance with the instructions provided in "Servicing the two - speed transmission", Form No. 9-99582.

NOTE: Inspect the bore in the flange and spool for nicks, scratches or roughness and polish out with fine emery cloth. Also break any sharp edges on the flange and spool bores to facilitate insertion of the input shaft "O" ring. Also top roll pins on flange flush with face before bolting back on housing.

DISASSEMBLY

Important - Before removing the hydraulic motor, thoroughly clean it and the attached parts to prevent the entry of foreign material. Also make sure the disassembly area is clean.

1. Mark a line across the geroler housing (21), spacer plate (14) and main housing (8). Also make a mark on the housing port side of the mounting flange (2) and dye mark a line across the front end of the spool bore and the mounting flange bore.
2. Remove the seven cap screws (18) and remove the end cap (19), "O" ring (15) and coupling spacer (12).
3. Carefully remove the geroler and housing assembly (21) so it remains intact. Remove "O" ring (15).

4. Remove the seven cap screws (3) from the spacer plate (14) and remove the plate (14), "O" ring (13) and drive coupling (11).
5. Remove the four cap screws (3) from the mounting flange (2) and tap off the flange with a lead or leather mallet.
6. Remove back-up washer (4), quad ring (5), "O" ring (6) and thrust washer (7) from the flange.
7. Remove the plug (9) from the main housing (8) by inserting a small pin or screwdriver through holes in the opposite end of the housing. Remove the "O" ring (10) from the plug.

INSPECTION

Discard all original seals and washers which are included in the C 14826 kit and the thrust washer (7).

Clean all parts in solvent and air dry before inspection being careful not to damage any machined surfaces or to remove the scribe and dye marks.

Inspect all parts for scratches, scoring and excessive wear giving particular attention to the spool and housing and geroler assemblies. The components of these assem-

blies should fit snugly and be free of wear spots. Also refer to paragraph "d" under introduction. A polished pattern on the spacer plate and end cap due to geroler action is normal but they should not be grooved. Check the housing, geroler and roller thickness with a micrometer. If the geroler and roller thickness is more than .002" less than the thickness of the housing, install a new geroler kit.

Use all new seals from the C14826 kit plus a new thrust washer (7) during assembly.

ASSEMBLY

1. Install the plug (9) with a new "O" ring (10). The "O" ring end of the plug is toward the outside.
2. Install a new thrust washer (7), back up washer (4), quad ring (5), and "O" ring (6) in the mounting flange (2) in that order. Position the mounting flange on the main housing so the side marked is on the same side as the motor parts. Roll pins (17) must be drawn back through mounting flange (2) until they are flush with the inner side.
3. Position the mounting flange on the main housing so the side marked is on the same side as the motor ports. Tap the mounting flange (2) onto the main housing with a lead or leather mallet and secure with four cap screws (3). Torque cap screws evenly to 215 inch pounds. Make certain the roll pins (17) do not protrude beyond the face of the mounting flange.
4. Slide the spool into the housing (8) until it bottoms on the thrust washer (7) in the flange. Align the dye marks on the spool (8) and mounting flange (2).
5. Place new "O" rings (13) and (15) on the spacer plate (14). Align the scribe marks on the spacer plate (14) and main housing (8) and secure the plate with "O" ring (13) toward housing with seven cap screws (3). Torque the cap screws evenly to 175 inch pounds.

NOTE: If for any reason the alignment marks were not made or were removed while handling or cleaning, continue these assembly procedures and install the motor. Refer to the "Important" paragraph at the end of this instruction if it is necessary to correct alignment to obtain proper direction of tractor travel.

6. Slide the drive coupling (11), longer splined end first, through the spacer plate and into the spool.
7. Recheck the alignment of the dye marks on the spool and flange and install the geroler assembly with the scribe marks in alignment and with the splined end of the geroler toward the end cap (19). Be careful not to allow the geroler and rollers to fall out of the housing.

NOTE: It may be necessary to wobble the drive coupling to align the mounting holes between the geroler assembly and spacer plate (14). This can be facilitated by inserting a finger through the flange bore and moving the coupling slightly back.

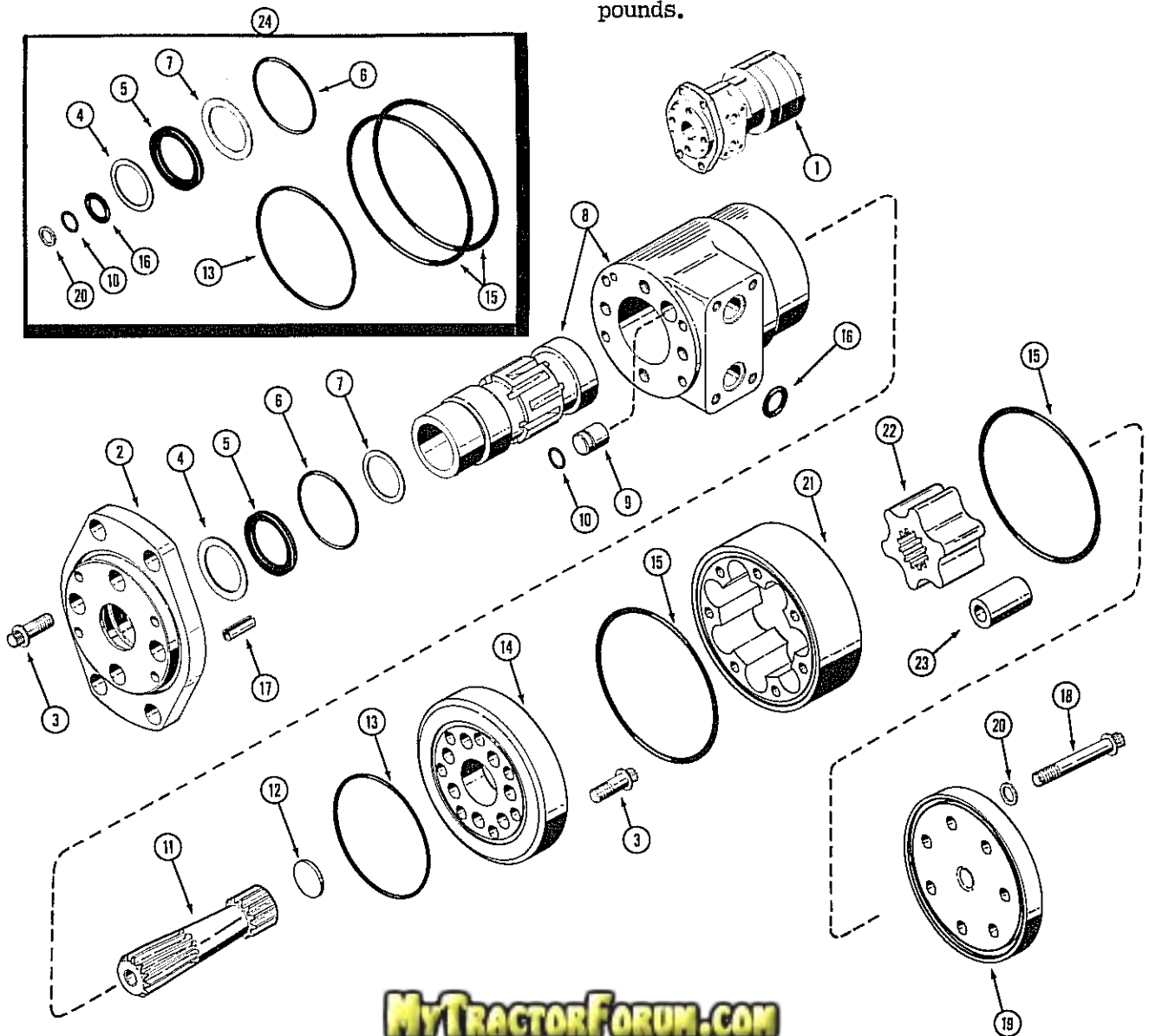
8. With the geroler assembly properly aligned, stand the motor on its mounting flange and install the end cap (19) with seven new washers (20) and original cap screws. Torque the cap screw evenly to 175 inch pounds.

NOTE: Refer to Win. Form No. 9-99581 for instructions covering removal and assembly of the hydraulic motor to the transmission and the transmission to the tractor. Be especially careful and thorough when performing steps 2, 3 and 4 according to that instruction.

IMPORTANT: With the hydraulic motor installed, check for proper geroler alignment by placing the transmission in gear. When in forward, the tractor should drive forward and when in reverse, it should drive in reverse. If the results of these operations are opposite, the geroler as-

sembly is not properly aligned. To correct this condition, proceed as follows:

- a. Remove the end cap (19) and coupling spacer (12) without removing the hydraulic motor from the transmission.
- b. Scribe mark the geroler housing (21) to the spacer plate (14) and ink mark the geroler (22) to one of the splines on the drive coupling (11).
- c. Slide the geroler assembly off the drive coupling. Move it one tooth in either direction and slide it back on the drive coupling.
- d. Install the end cap (19) using new washers (20) and original cap screws (18). Torque cap screws evenly to 175 inch pounds.



SERVICING HYDRAULIC MOTORS

Part Numbers C 14655 and C 16697

INTRODUCTION

IMPORTANT a. The hydraulic motors are not to be repaired on tractors in Warranty. The Warranty is automatically void if the hydraulic motor is disassembled. Service parts are available to repair hydraulic motors out of Warranty according to the Parts catalog listing.

b. Make certain the pump and the control valve have been checked for proper efficiency and pressure before attributing a "loss of power" problem to the hydraulic motor.

c. Before disassembling the hydraulic motor, try manually turning the shaft (7). If the rotor (10) clearances are tight, the shaft will be difficult to turn or may not turn at all with manual force. If the shaft turns freely, there is an indication of excessive clearance and slippage in the rotor or the drive link (8) is broken.

d. If oil is transferring from the hydraulic motor into the transmission, complete disassembly of the hydraulic motor is not required. Renew the spacer (2) and seal (3) in the housing (4) in accordance with paragraph 12 under Assembly.

DISASSEMBLY

IMPORTANT: Before removing the hydraulic motor, thoroughly clean the motor and the attached parts to prevent the entry of foreign material. Also make sure the disassembly area is clean (a piece of clean wrapping paper makes an excellent and disposable work bench top).

CAUTION: Use care in handling close-fitting parts as nicks and dents result in serious damage. Do not force or abuse these precision parts. Avoid wiping parts with a cloth because lint and foreign particles may adhere to the working parts of the motor.

1. Remove retaining ring (1).
2. If only shaft seal (3) and spacer (2) are required, complete disassembly of the hydraulic motor is not necessary.
 - a. With retaining ring (1) removed, set the motor, shaft downward in a suitable clean can.
 - b. Plug motor "in" port and connect "out" port to 120 psi air hose or use a piston type hydraulic hand pump. Charge the motor with air or oil pressure to remove the shaft and seal spacer.

NOTE: The air connection should have provisions for quick shut-off after the seal spacer (2) and seal (3) have been ejected.

c. Repack the seal spacer (2) with Aero-Shell #14 grease or E.P. equivalent each time the shaft seal (3) is replaced.

NOTE: If the hydraulic motor is being completely disassembled, the seal can be removed without air or oil pressure after the shaft is removed.

3. Clamp the motor housing port boss in a padded jaw vise with the shaft pointing downward.
4. Using a 15" wrench with a 12 point 9/16" socket, remove the seven cap screws (16).
5. Pry off the end cap (5) using two large screw drivers 180° apart. Discard the "O" ring (6).
6. Remove the commutator and commutator ring (13) and place them flat on the end cap (5).
7. Pry the sleeve (15) off the housing (4) using two screw drivers 180° apart. Discard the "O" ring (6).

8. Remove manifolds (11) and (12) by lifting them off the rotor section (10) and place them on top of the commutator assembly (13).
9. Remove the drive link (8) by lifting straight up with the wear plate (9) and rotor assembly (10), then place all three parts carefully on the work bench.

NOTE: Be careful when handling the rotor assembly (10) to keep the rollers and rotor intact with the housing.

10. Push the coupling shaft (7) up and out of the bearing housing (4).
11. Remove retainer ring (1), spacer (2) and oil seal (3).

NOTE: Since factory tooling and gauges are required to properly install the thrust and needle bearings in the housing (4), these items are not serviced.

INSPECTION

Wash all parts thoroughly in clean petroleum base solvent and blow dry with clean, dry air. Do not use cloth to wipe off parts as lint and foreign material may cause binding and sticking of closely fitted components.

Inspect the bearing housing (4) for nicks at the O.D. "O" ring (6) sealing surface. Check the rotor assembly (10) for finish.

The rotor and vanes (rollers) must be smooth and not show signs of galling or have nicks. Check the wear plate (9) for excessive wear, or poor sealing surface for the rotor. Check the wearing surfaces of the manifolds (11) and (12) for wear. Inspect the commutator (13) at the sealing areas for excess wear. Check the "O" ring (6) sealing areas of the sleeve (15) closely for smoothness.

ASSEMBLY

1. Carefully clamp the housing (4) in a padded vise with the seven tapped holes upward.
2. Insert the shaft (7) and drive link (8).
3. Lubricate the "O" ring (6) and slide into the groove on the housing.
4. If the rotor assembly was disassembled place the stator on the wear plate (9) and carefully insert the rotor and rollers.
5. Place the rotor assembly (10) and wear plate (9) over the drive link (8) and onto the housing, with the rotor counter bore facing upward.

NOTE: Two cap screws, 3/8" x 4-1/2", with heads removed, can be used to align the seven holes in the housing with the holes in the wear plate (9), rotor assembly (10), manifolds (11) and (12) and the commutator (13).

6. Install the manifold plate (11) with the slots toward the rotor.
7. Install the manifold (12) over the plate (11) with the swirl grooves toward the rotor and the diamond shaped holes upward.
8. Place the commutator and commutator ring (13) onto the manifold with the bronze ring groove facing upward. Place the bronze ring (14) into the groove with the rubber side downward.
9. Place the sleeve (15) over the assembled components and carefully force down over the lubricated "O" ring (6) with arbor press or similar tool. Observe the "O" ring closely while the sleeve is being pressed over to make certain it is not nicked or rolled.
10. Lubricate the new "O" ring (6) and slide into the groove on the end cap (16). Carefully force the end cap into the sleeve with an arbor press or similar tool. Observe the "O" ring closely while pressing in the end cap to make certain it is not nicked or rolled.

11. Remove the line up bolts and insert the seven cap screws (16). Using a tightening sequence similar to the cylinder head on an internal combustion engine, torque the seven cap screws to 50 foot pounds.

12. Remove the motor from the vise and place it on the bench shaft end up. Lubricate the seal (3) and spacer (2) with Aero-Shell #14 grease and place onto the shaft. Seat the spacer and seal squarely into the housing using a tubular tool having an I.D. slightly larger than the shaft and O.D. slightly smaller than the housing bore. Install the retainer ring (1).

13. Lubricate the motor by introducing oil into the ports and turn the shaft several revolutions. Plug the ports to keep out foreign material unless motor is being connected back to the tractor immediately.

14. Install a new "O" ring on the motor flange before installing to the trans-axle. Operate the motor under load in both forward and reverse for several minutes and check the end cap and housing closely for leakage.

