

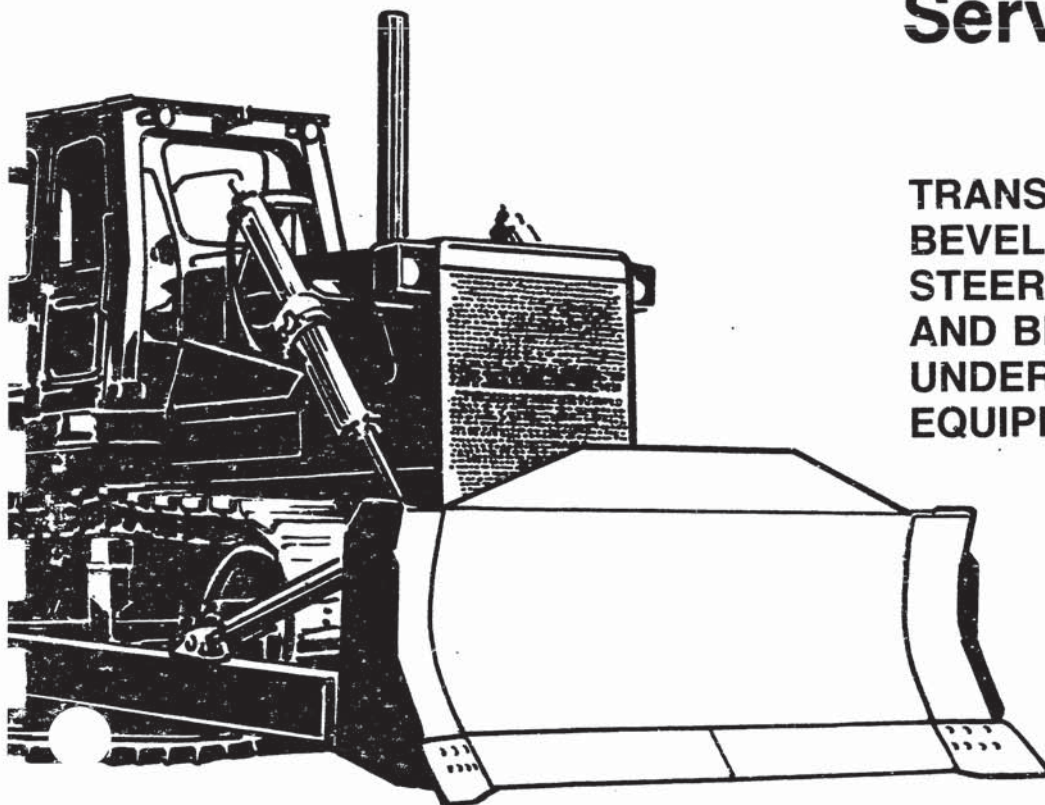


14-C

crawler dozer

Service manual

TRANSMISSION
BEVEL GEAR
STEERING CLUTCHES
AND BRAKES FINAL DRIVE
UNDERCARRIAGE
EQUIPMENT



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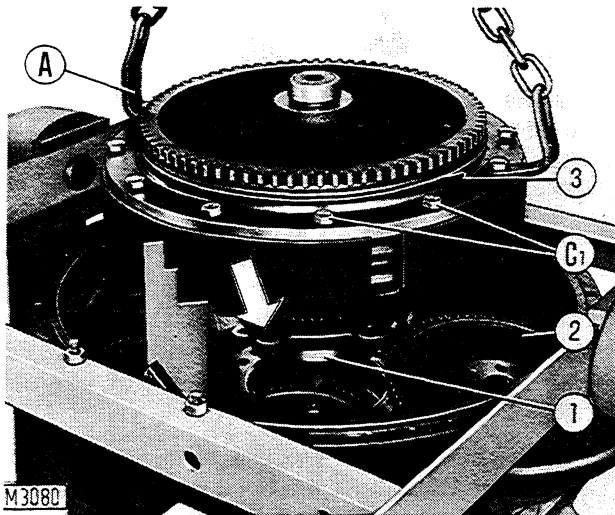


Fig. 5 - Disassembling or assembling clutch assembly using lifting chains 75291517 (A).

NOTE: Arrow shows correct lug position.

C₁. Backplate capscrews - 1. Bearing carrier - 2. Equipment pump driven gear - 3. O-ring.

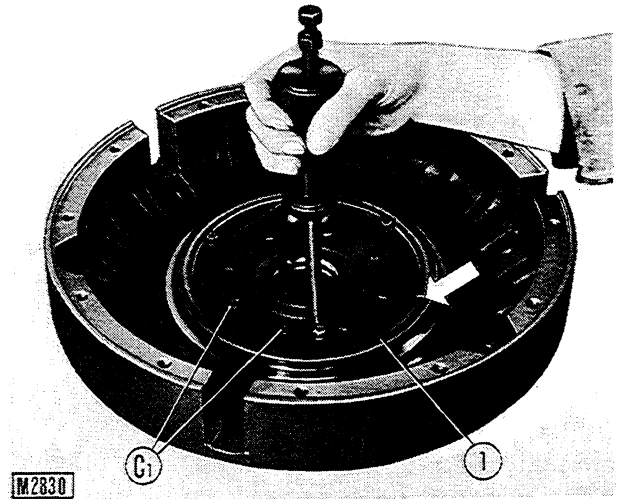


Fig. 6 - Removing annular piston (1) using slide hammer puller 75291523.

NOTE: Arrow indicates pressure plate locating dowel seat.

C₁. Self-locking hydraulic pump drive gear capscrews.

- Slacken capscrews (C₁, Fig. 5), attach lifting chain 75291517 (A) and secure to hoist. Position the bearing carrier (1) so that the lug arrowed does not interfere with the gears and remove the complete clutch assembly.

WARNING

Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorized protective equipment such as safety glasses, heavy gloves, safety shoes.

- Compress external (1, Fig. 12) and internal (2) return springs using compressor 75291519 (P).
- Withdraw split cones (5).
- Remove annular piston (1, Fig. 6) using slide hammer puller 75291523.
- Remove self-locking capscrews (C₁) and withdraw complete bearing carrier assembly (Fig. 7).
- Remove retaining ring (3) and withdraw rear bearing (8, Fig. 8) together with spacer (2) using a suitable puller.
- Remove pump driven gears, then remove oil catcher (3, Fig. 9).

- Using a punch on rear end of clutch shaft, withdraw shaft complete with hub (1, Fig. 11). Ensure that shaft splines do not clash with spacer (2, Fig. 8) to permit shaft withdrawal.
- Remove backplate (5).

DANGER

Springs are assembled into machine with high compressive load. Follow recommended procedures when assembling or disassembling these parts.

1.3 APPLY MECHANISM INSPECTION

Inspect driven plates (1, Fig. 8), checking that:

- Maximum taper on surface of sintered material does not exceed 0.05 mm (0.002 in).

2. TRANSMISSION

Transmission overhaul is the only operation covered in the following section. The associated hydraulic circuit is dealt with together with the clutch circuit in the section headed "Clutch/transmission Hydraulic system".



WARNING

Do not work under or near unlocked or unsupported linkage, parts or machine.

2.1 REMOVAL

NOTE: Transmission may be removed from either above or below tractor. A pit is required for the latter operation.

Proceed as follows:

- Remove transmission lower rear and center covers, front and rear footboards, operator's seat complete with scuttle, batteries and associated tray.
- Drain oil from master clutch/transmission assembly and equipment oil tank as described in the Operation and Maintenance Instruction Manual.



DANGER

Fluid under pressure. Always lower hydraulic equipment to ground. Shut off engine, move control levers to each position several times and loosen and retighten hydraulic tank filler cap to relieve trapped pressure before loosening hydraulic connections.

- To remove crossmember complete with pedals, first remove the steering clutch linkage (1, Fig. 1), dashboard center guard and lift cylinder lines (6).
- Separate the crossmember from LH and RH brake actuator rods (3), lines and fasteners.
- Remove the following from the bottom of the master clutch/transmission assembly.
- Transmission oil line (2, Fig. 2), clutch/transmission pump inlet filter (Fa), complete with line (1), steering clutch/brake pump (Pf). Raise inlet pipe (3) to prevent loss of oil from rear transmission housing.
- Remove the following from the top of the master clutch/transmission assembly.
- Oil filler pipe (7, Fig. 1), master clutch oil inlet line, equipment pump (P, Fig. 2) lines connecting clutch/transmission assembly to oil cooler, transmission/master clutch propeller shaft, control valve assembly and divider valve.
- Detach relay linkage from transmission control valve and remove front cover from rear transmission housing.



WARNING

Lift and handle all heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.



WARNING

Guard against kinking chain or cables. Do not lift or pull through a kinked chain or cable. Always wear heavy gloves when handling chain or cable.

- Apply tools **75293320 (A, Fig. 30)** and **75291621 (B)**, and position nut (**C₁**) on clutch pack. Compress clutch pack as shown in figure until nut (**C₁**) can be threaded onto shaft.
- Tighten nut (**C₁**) and stake.

Assemble forward and low speed clutches with associated shaft as follows:

- Assemble forward clutch drum (**8, Fig. 17**), position driven gear (**2, Fig. 19**) from inside and secure with retaining ring (**1**).
- Place transmission housing horizontal with the rear end facing upward.
- Install first thrust ring (**43, Fig. 18**) and idler gear (**42**).
- From above, insert shaft (**34**), second thrust ring (**43**) and complete housing (**30**), together with complete drum (**31**) and housing gasket.
- Install low speed (a, Fig. 23) and forward (b) clutch packs as shown in figure.



WARNING

Springs are installed into machine with high compressive load. Follow recommended procedures when assembling or disassembling these parts.

- Mate outer steel plate (**3, Fig. 31**) to drum spline, tighten nut (**C₁**) as described for high speed clutch installation, and tighten nut to 20 daNm (148 lb. ft.). Tighten forward clutch nut to the specified torque, check tightening torque of low speed clutch and stake.
- Support oil bowl (**5, Fig. 17**) connect lines (**3** and **4**) inserting rear ends in the associated seats (**S, Fig. 31**) and secure the oil bowl by inserting the edge into the line grooves.

Assemble transmission housing covers as follows:

- Assemble complete rear cover (**1, Fig. 14**) and low speed clutch housing cover (**2**), together with associated seals.
- Assemble tubes (**1** and **2, Fig. 17**) and attach lifting hook **75291526 (A, Fig. 16)** to front cover. Assemble front cover using guide pins **75291525 (B)** on housing. Use a drive punch to install the low speed clutch lines in seats on cover.
- Assemble LH and RH side covers (**2, Fig. 15**), inspection cover (**4**) and lubricating oil manifold cover (**3**) after installing associated seals. Make sure that cover (**3**) is complete with O-rings.

- Insert control valve spools (**26, Fig. 32**), bearing in mind the instructions given for reverse control valve spool installation.
- Smear seal with grease and install caps (**3, Fig. 14**) and (**5** and **6, Fig. 15**).

2.4 INSTALLATION



WARNING

Lift and handle all heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.



WARNING

Guard against kinking chain or cables. Do not lift or pull through a kinked chain or cable. Always wear heavy gloves when handling chain or cable.



WARNING

Be sure cables are anchored and the anchor point is strong enough to handle the expected load. Keep exposed personnel clear of the anchor point and cables or chain.

Install transmission assembly, keeping in mind the points below.



DANGER

Adhesives are extremely flammable. Follow the manufacturer's instructions when applying.

- Clean and degrease transmission housing and rear transmission mating surfaces and apply one of the following jointing compounds: LOCTITE PLASTIC GASKET - VIT C type C - OMNI FIT 150H - RHODOSIL CAF 1.
- Install transmission to rear transmission housing, reversing operations described in para. 2.1 of this section.

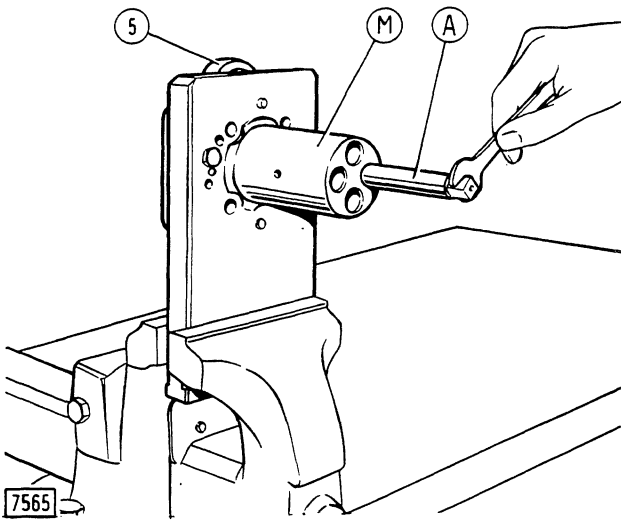


Fig. 36 - Reaming hydraulic pump shaft bushing bores (4 and 5, Fig. 34).

A. Reamer 75291372 - M. Jig 75291370 - 5. Charging pump front cover.

Use FIAT AP 51 (SAE 20W) oil supplied with tester and perform the output tests at the specified temperature and pressure (Fig. 37).

Output readings resulting from several tests performed at pressure and temperature conditions specified shall be compared with the chart in Fig. 37, bearing in mind that:

- Output readings for new or overhauled pumps should not be significantly lower than the dotted line.

NOTE: While testing charging pump, it is not necessary to supply the scavenging pump. Ensure, however, that the oil seeping through the bushings lubricates the gears adequately.

3.3 MASTER CLUTCH/TRANSMISSION OIL FILTERS



DANGER
Fluid under pressure: turn cap or cover slowly to relieve pressure before removing.

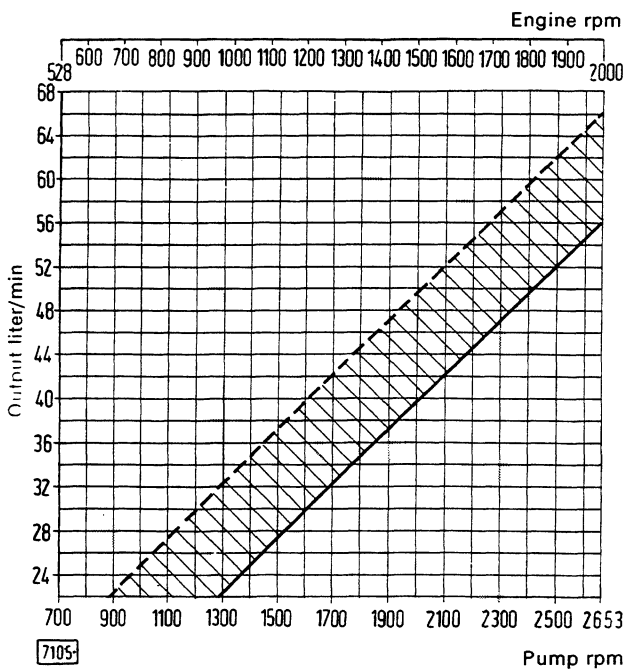


Fig. 37 - Master clutch/transmission charging pump output - speed chart.

Test pressure: 15 bar (218 psi) - Oil temperature: 55 to 65°C (131 to 140°F) - Pump drive ratio: 1.326 to 1.

NOTE: For new or overhauled pumps, output should not be much less than dotted line, for used pumps, output is acceptable if contained within the shaded area. If output is near or below the solid line, pump should be overhauled or replaced.

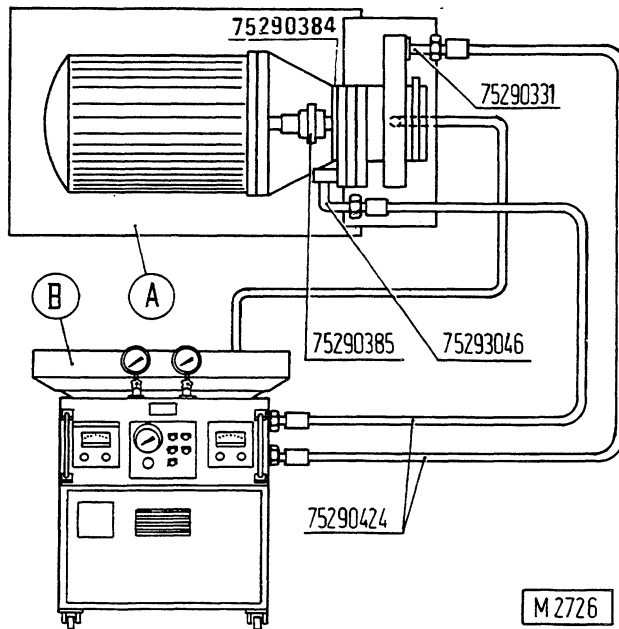


Fig. 38 - Transmission/master clutch charging pump output test set-up.

A. Electric motor with trolley 75291235 - B. Output tester 75295501.

FAULT	CAUSE	REMEDY
<p>10. Normal transmission oil pressure reading on dashboard gauge; machine does not pull in certain gears and the oil heats up.</p> <p>11. Transmission oil pressure gauge shows a pressure drop when engaging a certain gear.</p> <p>12. Transmission oil level drops, clutch housing and oil pan level rises.</p> <p>13. Transmission does not shift from low to high speed.</p> <p>14. Transmission does not shift from low to high speed or vice versa, and engine lugs.</p>	<p>Worn or warped discs in corresponding speed clutch.</p> <p>a. Interlock valve (11) stuck open because of foreign matter.</p> <p>b. Oil leaks in associated clutch, oil lines broken or debonded. Oil outlet lines, defective seals, broken or worn sealing rings, etc.</p> <p>a. Scavenging pump inlet filter (Fr) clogged.</p> <p>b. Defective scavenging pump.</p> <p>Low/high speed control valve (14, Fig. 33) stuck in low position.</p> <p>Low/high speed servo valve (15, Fig. 33) stuck in high or low position.</p>	<p>Replace.</p> <p>Clean valve ports and check filters.</p> <p>Overhaul transmission and replace defective parts as necessary.</p> <p>Inspect.</p> <p>Overhaul and replace if necessary.</p> <p>Free by removing foreign matter and check filters.</p> <p>Free by removing foreign matter and check filters.</p>

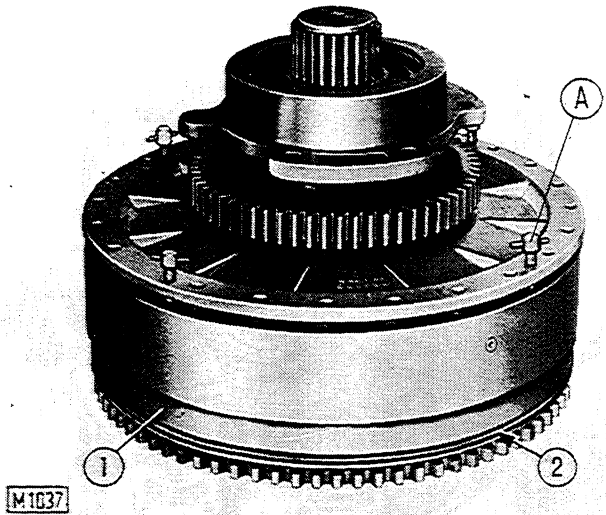


Fig. 8 - Disassembling the converter using forcing screws.
A. Puller screws 75295473 - 1. Converter housing - 2. O-ring.

! WARNING

Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorised protective equipment such as safety glasses, heavy gloves and safety shoes.

- Apply lift chain **75291517** (A, Fig. 7), position the bearing carrier (6, Fig. 9) so that it does not foul the gears during removal and lift the converter clear as shown in Fig. 7.
- Take off the capscrews (C₁, Fig. 9) and use puller screws **75295473** (A, Fig. 8) to separate the turbine assembly from converter housing.
- Withdraw thrust plate (7, Fig. 9) and turbine wheel (5) from converter housing.
- Remove retaining ring (9) and using an inch socket wrench back off screws (C₄) and retrieve stator (8).
- Separate the impeller from the hydraulic pump drive gear (11) by removing screws (C₂).
- Remove ring (13) retaining bearing (18) and separate converter shaft assembly from bearing carrier (6).
- Prior to separating bearing (18) from shaft be sure to remove ring (24) from the shaft.

- Remove pump driven gears (3 and 4, Fig. 4) from converter support housing.

1.3 ASSEMBLY

Proceed as follows:

- Install hydraulic pump driven gears on converter support housing.
- Place rear bearing (18, Fig. 9) on converter shaft, and insert sealing ring (24) in its seat on the shaft.
- Introduce the shaft assembly in the bearing carrier (6, Fig. 9) and secure the rear bearing (18) with the retaining ring (13).
- Install the two sealing rings (17) on bearing carrier (6), then install gear (11) complete with screws (C₂).
- Fit intermediate bearing (12) and couple the pump impeller (10) with gear (11) using screws (C₂).
- Position the stator as shown in Fig. 11, and tighten capscrews (C₄, Fig. 9).
- Insert retaining ring (9) on converter shaft, install turbine wheel (5) as shown in Fig. 9 and then insert the thrust plate (7) on the shaft.
- Secure the converter housing to the impeller, tightening screws (C₁) gradually in a diagonal sequence.

! WARNING

Be sure cables are anchored and the anchor point is strong enough to handle the expected load. Keep exposed personnel clear of anchor point, cables or chains.

! WARNING

Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorised protective equipment such as safety glasses, heavy gloves, safety shoes.

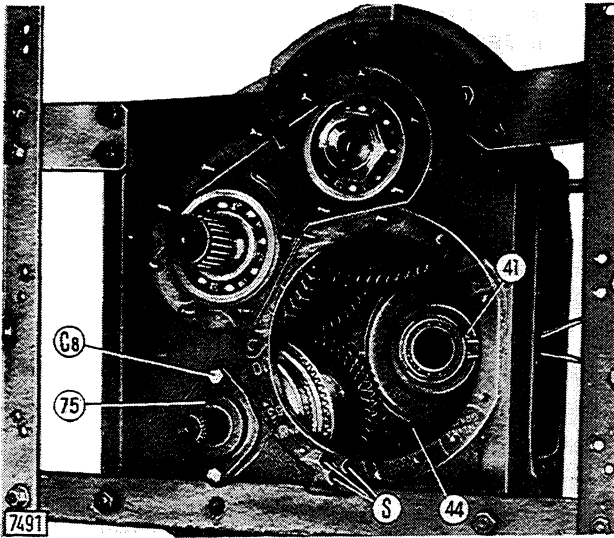


Fig. 16 - Disassembling forward speed driven gear retaining ring (41).

C₆. Cover capscrews - S. High/low speed hydraulic and lubrication oil rear ports - 75. Seal cover.

- Remove drum (45, Fig. 14) and forward speed driven gear (44, Fig. 16), first removing the retaining ring (41).

To remove high/intermediate speed clutches and associated shaft:

- Retain high speed clutch with clamps 75291531 as shown in Fig. 17, back off nut (C₁₄, Fig. 14) and remove the intermediate speed clutch pack.

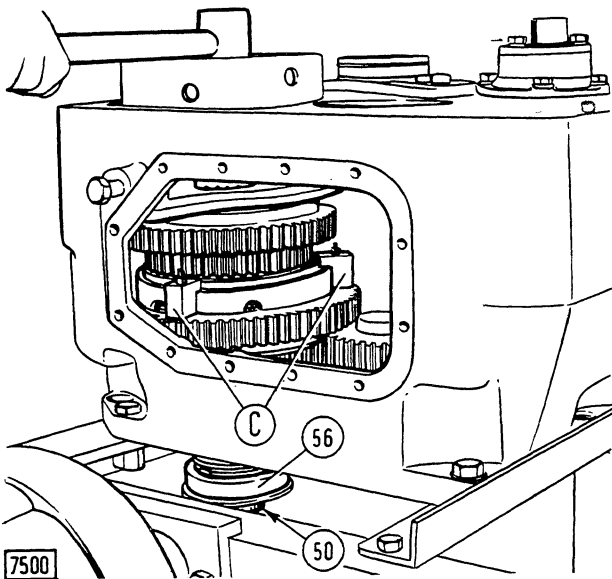


Fig. 17 - Disassembling high/intermediate speed clutch shaft (50).

C. Set of high speed clutch clamps 75291531 - 56. Rear ball bearing.

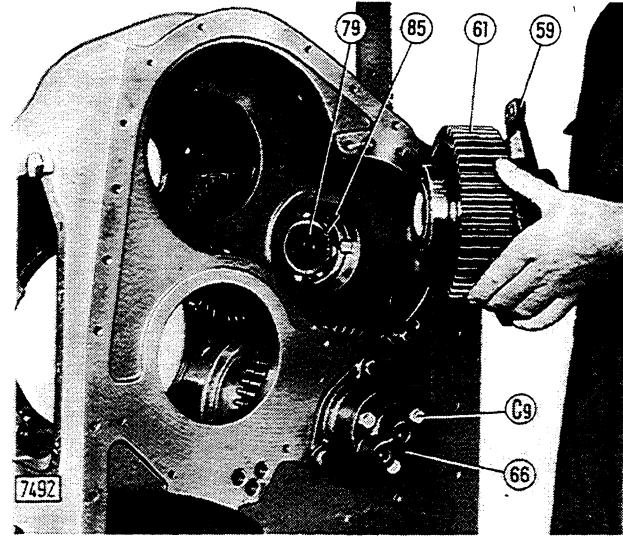


Fig. 18 - Disassembling bracket (59) with attached drive gear (61).

C₉. Cap capscrews - 66. Reverse speed clutch control valve spool cap - 79. Output shaft - 85. Retaining ring.

- Place transmission case horizontal with the front end facing upwards and withdraw high/intermediate speed clutch shaft (50, Fig. 17) complete with bearing (56) from the lower end.
- Raise intermediate speed drum, remove thrust ring (49, Fig. 31), withdraw retaining ring (65, Fig. 28) and then remove the complete drum.
- Take out the high speed clutch unit from case.

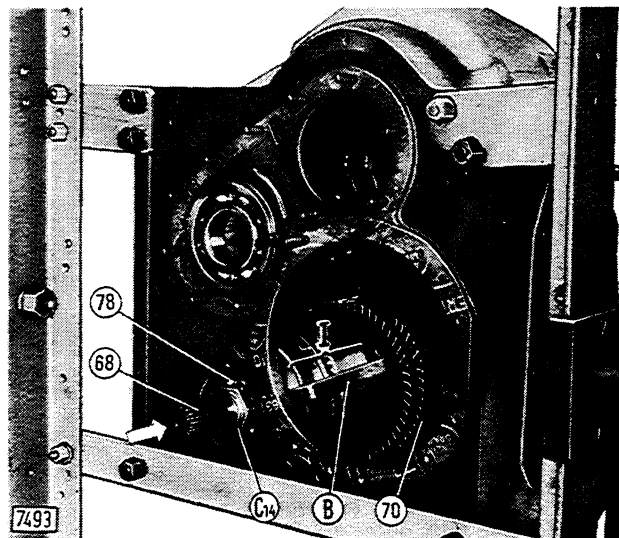


Fig. 19 - Disassembling reverse speed clutch unit.

NOTE: The arrow indicates direction of shaft withdrawal.

B. Brackets 75291520 - C₁₄. Reverse speed shaft retaining nut - 68. Reverse speed clutch shaft - 70. Reverse speed driven gear - 78. Rear ball bearing.

Moving piston smaller I.D. (forward/reverse/intermediate/low speed clutch)	mm in	60.000 to 60.046 2.362 to 2.364	
Moving piston O.D. (high speed clutch - 96, Fig. 20).....	mm in	194.870 to 194.910 7.672 to 7.674	
High speed clutch piston housing bore diameter in low speed driven gear	mm in	195.000 to 195.072 7.677 to 7.679	
Moving piston I.D. (high speed clutch)	mm in	80.036 to 80.066 3.151 to 3.152	
High speed clutch piston journal diameter on intermediate/low/high speed drive gear hub	mm in	79.940 to 79.970 3.147 to 3.148	
Piston working clearance: - Forward/low/intermediate/reverse speed clutch	mm in mm in	Small dia.	Larger dia.
		0.030 to 0.122 0.0012 to 0.0048	0.043 to 0.169 0.0017 to 0.0066
		0.066 to 0.126 0.0026 to 0.0049	0.090 to 0.202 0.0035 to 0.0079
Clutch control valve spool (8, Fig. 20) diameter	mm in	19.770 to 19.800 0.778 to 0.779	
Valve spool bushing fitted I.D.	mm in	19.950 to 20.030 0.785 to 0.788	
Spool to bushing fitted clearance	mm in	0.150 to 0.260 0.006 to 0.010	
Valve spool bushing (60) O.D.	mm in	24.987 to 25.000 0.983 to 0.984	
Bushing housing diameter in clutch shafts	mm in	24.939 to 24.972 0.981 to 0.983	
Housing to bushing interference fit in clutch shafts	mm in	0.015 to 0.061 0.0006 to 0.0024	

Power take-off

Direction of rotation of splined shaft (seen from rear of machine)	Clockwise	
Splined shaft speed (at full load engine speed)	0 to 2147 rpm	
Transmission P.T.O. shaft dimensions (1, Fig. 32):		
- Nominal diameter	mm 35	in 1.38
- Number of splines	21	
- Module	mm 1.587	in 0.062
- Pressure angle	30°	
Transmission P.T.O. shaft dimensions (optional - 3, Fig. 32):		
- Nominal diameter	mm 38	in 1.49
- Number of teeth	13	
- Module	mm 2.75	in 0.108
- Pressure angle	30°	

3.2.1 Output test

Position the pump on trolley-mounted electric motor **75291235 (A, Fig. 36)** using bracket **75290384** and drive coupling **75290385**.

Install output tester **75295501 (B, Fig. 36)** and connect to charging pump. Use oliofiat AP 51 (SAE 20 W) supplied with the output tester and test at the specified temperature and pressure readings shown in Fig. 37 and 38.

Output readings resulting from several tests should be compared with the charts of Fig. 37 and 38, noting the following points:

- Output readings of new or reconditioned pumps should not fall too short of the dash line.

NOTE: During the test there is no need to supply the pumps (transmission/converter or converter only). Simply make sure that leakage past the bushings is sufficient for lubrication of the gears of the section not being tested.

3.3 OIL FILTERS

Transmission hydraulic system oil filtering is through the following:

- Full flow filter (**Fa, Fig. 39**) with replaceable element of tin plated steel cloth on charging pump inlet (**Pa, Fig. 35**).
- Full flow filter (**Fm, Fig. 40**) with replaceable element of tin plated steel cloth of finer mesh, placed on charging pump outlet (**Pa, Fig. 35**). In case of clogging, by-pass valve (**5**) admits unfiltered oil to the hydraulic system, cutting off the filtering element almost completely.
- One steel mesh gauze filter (**Fr, Fig. 35**) on scavenge pump inlet (**Pr**).

Every 500 working hours, clean filters (**Fa** and **Fm, Fig. 35**) as follows:



WARNING

Never use gasoline, solvents or other flammable fluid for cleaning parts. Use authorized commercial, non-flammable and non-toxic solvents.

- Clean outer surfaces of covers and cases.
- Remove nut (**1, Fig. 39**), and capscrew (**6, Fig. 40**) to withdraw cartridges and magnetic rod (**5, Fig. 39**).
- Clean all parts and cases.
- Renew any damaged seals and reassemble the filters as shown in Figs. 39 and 40.

3.4 TRANSMISSION CONTROL AND MODULATING VALVES

Valve block (Fig. 42) houses the spool valves controlling transmission clutches. The valve block also incorporates two forward and reverse modulating valves (**Va** and **Vi**). For valve block disassembly proceed as follows:

- Take off cover from valve block with attached valve (**5**); separate the valve from the cover by removing hinge pin (**24**).
- Back off plugs (**26** and **27**) and withdraw pin (**25**) to release linkage and cams from cover.

Valves (**3, 4** and **5**) are matched to the valve block and are only available together with the block.

NOTE: Mark the relative positions of the valves and valve block to ensure correct reassembly.

FAULT	CAUSE	REMEDY
<p>6. High transmission oil temperature (needle of gauge T, Fig. 35 over red sector).</p>	<ol style="list-style-type: none"> 1. Insufficient transmission oil level. 2. Safety valve (3) stuck open. 3. Safety valve (3) stuck open owing to cooler and line obstruction. 4. Charging pump inlet pipe leakage. 5. Clogged charging pump inlet filter (Fa). 6. Inefficient charging pump. 7. Low operating pressure and clutch slippage (see fault no. 2). 8. Distorted clutch plate binding when clutches are released. 	<ol style="list-style-type: none"> 1. Top up. 2. Remove foreign matter and inspect filters. 3. Inspect and free cooler and lines. 4. Check and tighten connections and clips. 5. Inspect and wash filter. 6. Overhaul and renew as necessary. 7. See remedies under fault no. 2. 8. Renew.
<p>7. Normal transmission oil pressure (gauge P, Fig. 35) but machine starts at high revs only.</p>	<ol style="list-style-type: none"> 1. Insufficient oil output at low speed. 	<ol style="list-style-type: none"> 1. Inspect filters, check for leakage and inspect charging pump
<p>8. Machine creeps forward in neutral; machine stops in reverse and overloads engine.</p>	<ol style="list-style-type: none"> 1. Forward speed control valve (9, Fig. 35) stuck open. 	<ol style="list-style-type: none"> 1. Eliminate foreign matter and inspect filters.
<p>9. Machine creeps back in neutral; machine stops in forward and overloads engine.</p>	<ol style="list-style-type: none"> 1. Reverse speed control valve (10, Fig. 35) stuck open. 	<ol style="list-style-type: none"> 1. Eliminate foreign matter and inspect filters.
<p>10. Normal transmission oil pressure (P, Fig. 35), low power output in some gears and oil overheating.</p>	<ol style="list-style-type: none"> 1. Worn or distorted clutch plates. 	<ol style="list-style-type: none"> 1. Renew.
<p>11. Low transmission oil pressure on gauge (P, Fig. 35) upon selection of a specific gear.</p>	<ol style="list-style-type: none"> 1. Leakage to be traced in lines of clutch for gear in question, failed or debonded supply lines, defective seals, broken or worn sealing rings, etc. 	<ol style="list-style-type: none"> 1. Overhaul transmission and renew defective parts.
<p>12. Gear lever does not hold selected position.</p>	<ol style="list-style-type: none"> 1. Transmission actuating linkage out of adjustment. 	<ol style="list-style-type: none"> 1. Adjust links.
<p>13. Converter oil and engine pan oil level increases with diminishing transmission oil level.</p>	<ol style="list-style-type: none"> 1. Clogged scavenge pump inlet filter (Fr, Fig. 35). 2. Faulty scavenge pump. 	<ol style="list-style-type: none"> 1. Inspect. 2. Overhaul and renew if necessary.

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1. CENTRAL REDUCTION UNIT BEVEL GEAR

1.1 REMOVAL

⚠ WARNING

Lift and handle all heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.

⚠ WARNING

Handle all parts with extreme care. Keep hands and fingers from between parts. Wear authorized protective equipment such as safety glasses, heavy gloves, safety shoes.

Preliminary operations:

- remove fuel hydraulic oil tank;
- remove entire gerabox assembly;
- drain oil from rear transmission housing;
- take off complete brakes and steering clutches assembly.

Then proceed as follows:

- take off central transmission housing cover (7, fig. 1), along with inside pipes interfering with removal;

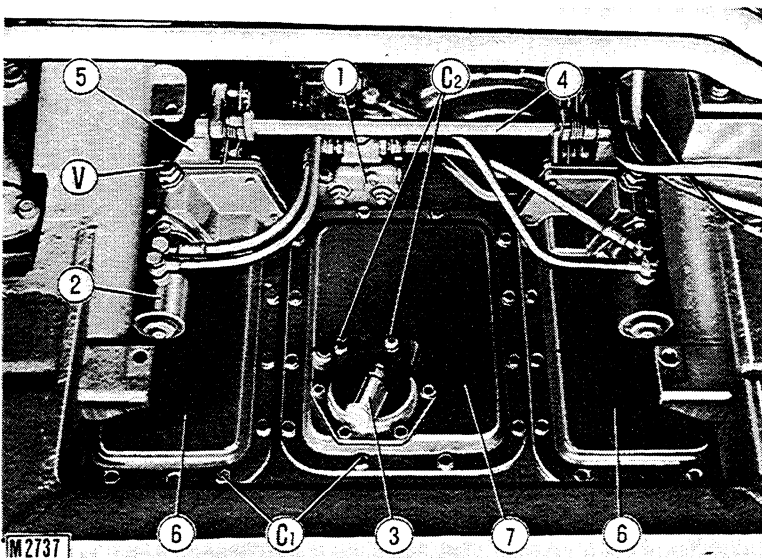


Fig. 1 - Rear transmission housing covers.

V. Brake bands clearance adjustment screw. - C₁. Covers (6, 7) retaining screws. - C₂. Inner line flange retaining screws. - 1. Steering clutches and brakes control valve. - 2. Power brake. - 3. Return oil filter cover. - 4. Parking brake crossrod. - 5. Steering clutches and brakes front cover. - 6. Steering clutches and brakes rear covers. - 7. Bevel gear cover.

⚠ WARNING

Guard against kinking chain or cables. Always wear heavy gloves when handling chain or cable.

- attach a lifting hook **75291533** on the ring gear as in fig. 4, and attach it to the tackle;
- pull off carrier covers (1 and 2, fig. 6) by means of the two screws **75291585**;
- take off cover (5), remove the bevel pinion carrier by means of the two withdrawal screws **75291585** (fig. 2). Be sure to shift the ring gear fully to the right (fig. 7), and recover the shims (S, fig. 6);
- grip bracket **75291581** in a vice and lock the complete bevel pinion carrier (fig. 3) in it by means of the two clamps (R), straighten the tab of the lock washer, and unscrew ring nut (C₁) with spanner **75292224** (C), and torque multiplier **75291285** (B);

FL 14-C, 14-C

2. BRAKES AND STEERING CLUTCHES

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On completion of the adjustment operation, lock the tie rods (6) with the nuts (7).

2.8 ADJUSTMENT OF 14-C BRAKES AND STEERING CLUTCHES

Adjust the tie rods (7, fig. 26) of the power brake as follows:

- rest the pedal on stop (6);
- use the threaded adjusting screw to bring tie rod (7) as far back as possible;

Adjust the steering clutch tie rods as follows:

- pull steering clutch control levers (1) into the engaged position;
- check that jointed lever (2) is resting on buffer (3);
- adjust tie rods (4 & 5) so that distance X is 90 mm (3.54");
- adjust tie rod (8) so that there is a clearance of about 0.5 mm (0.019") (Y) between the outer control levers (9) and their stops on the control valve body.

On completion of the adjustment operation, lock the tie rods with the appropriate nuts.

2.9 SPECIFICATIONS AND DATA

BRAKES	
Service brakes	
Type	full-wrapround in oil bath
How applied	hydraulic power control actuated by second part of steering clutch and central pedal locking both tracks on the FL 14-C; by the two side pedals on the 14-C.

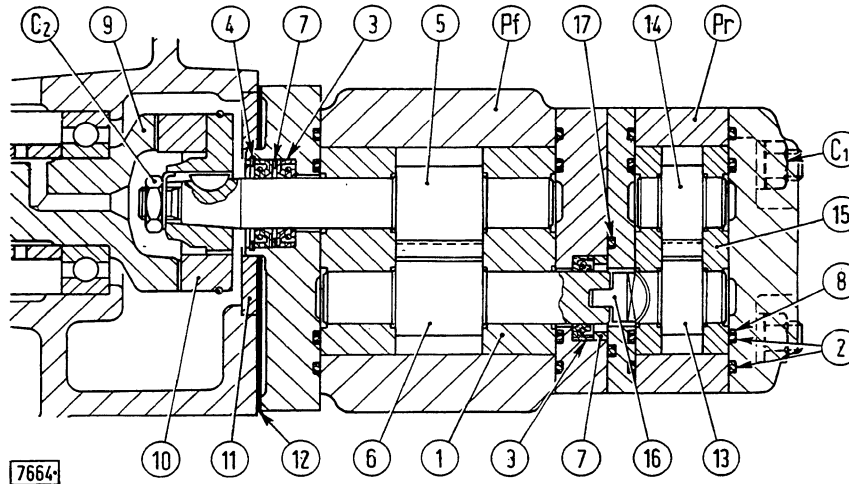


Fig. 33 - Longitudinal section of hydraulic pump for steering clutches (Pf) and converter recovery (Pr) (Model 14-C converter).

C₁, Pump retaining screw nuts. - C₂, Coupling retaining nut. - 1, Shaft support bushes. - 2, O-rings for pump covers. - 3, Seals for shafts. - 4, Circlip. - 5, Pump drive gear (Pf). - 6, Pump driven gear (Pf). - 7, Spacers. - 8, Retainer rings for inside O-rings (2). - 9, Drive shaft. - 10, Drive coupling. - 11, Centring ring. - 12, Seal washer (0.5 mm - 0.019"). - 13, Pump (Pr) drive gear. - 14, Pump (Pr) driven gear. - 15, Support bushes for gears 13 & 14 Pump (Pr) entrainment keyway. - 17, O-ring.

3.3.1 Flow rate test

NOTE

Flow rate test procedures and tools have not yet been established. Details will be given in a subsequent update.

During overhauls, or whenever the clogged filter tell-tale on the dashboard comes on, replace the cartridge on the return circuit as follows:

- clean the outside of the cover;
- replace any damaged seals reassemble according to fig. 34.

3.4 STEERING CLUTCH AND BRAKE FILTERS

Oil in the steering clutch and brake hydraulic system is kept clean by:

- a full-flow filter (fig. 34) with a replaceable tin-plated steel wool element branched off the pump suction port;
- a filter (fig. 35) with a replaceable paper cartridge branched off the oil to transmission housing return circuit; if this cartridge gets clogged, valve (5) bypasses it so that lubrication continues with unfiltered oil.

During overhauls, or after every 500 hours of operation, the pump inlet filter should be cleaned as follows:

- clean the outside of the cover and filter housing;
- take off nut (1, fig. 34) to remove the filter cartridge (Fa) and magnetic rod (5);
- wash the filter parts and housing with kerosene, making sure that nothing is burning nearby, and that there is no danger from naked flames or sparks;

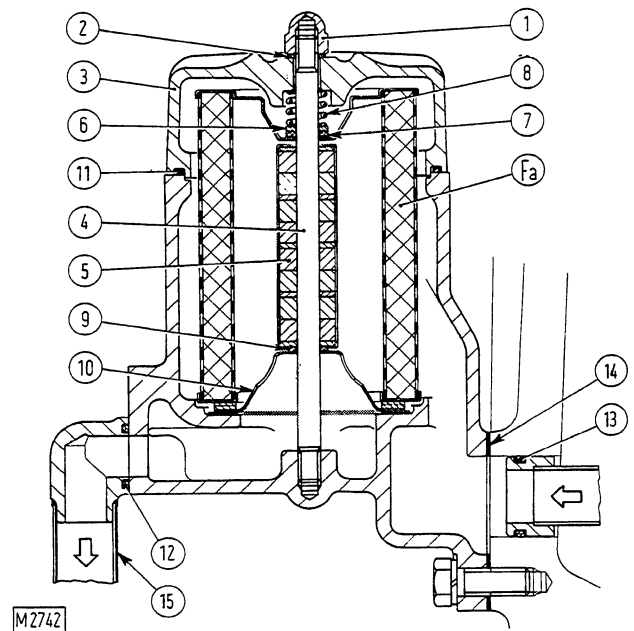


Fig. 34 - Cross-section through pump inlet filter.

Fa, Steel wool filter cartridge. - 1, Cover lock nut. - 2, Copper gasket. - 3, Cover. - 4, Stud. - 5, Magnetic rod. - 6, Steel washer. - 7, Rubber gasket. - 8, Check spring. - 9, Circlip. - 10, Cap 11, 12, 13 O-rings. - 14, Seal. - 15, Pump suction pipe.

4. FINAL DRIVES AND SPROCKETS

4.1 REMOVAL

Remove each track as explained in "UNDERCARRIAGE" section of manual 604.06.291 (mod. FL 14-C) and 604.06.290 (mod. 14-C).

WARNING

Use linkage safety support provided whenever it is necessary to put linkage in the raised position for any reason. Implement must be empty when using safety supports. Remove support and secure immediately after use for operation and transporting according to the Operation and Maintenance Instruction Manual. Do not substitute any other device for these supports. Lock up linkage with an external support capable of holding up the linkage when work is required under the linkage, according to local or national requirements.

WARNING

Lift and handle all heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.

WARNING

Use proper tools to bring holes into alignment. DO NOT USE FINGERS OR HANDS.

Remove the final drives as follows:

- drain the lube oil as explained in the Operation and Maintenance Instruction Manual;
- undo guard (35, fig. 62) retaining screws and take off guard;

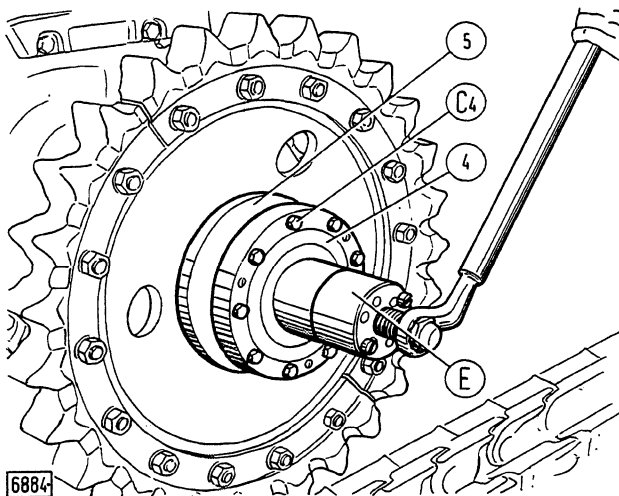


Fig. 41 - Withdrawal of rear suspension shaft inner bearing (4) together with bearing cage (5)

C₄. Outboard bearing cage retaining screw. - E. Puller 75291374.

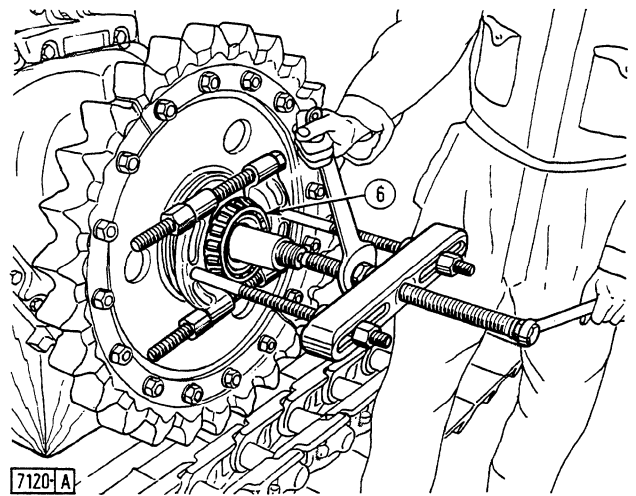


Fig. 42 - Disassembly of inner of outboard taper roller bearing (6) with special puller.

4.6 SPECIFICATIONS AND DATA

FINAL DRIVES	
Type	Double-reduction with straight toothing
Reduction ratio (final drives)	1 : 12.286
Overall reduction (bevel gear and final drives)	1 : 39.696
Backlash between drive gears and idler	0.25-0.35 mm (0.010-0.014")
Backlash between idler and drive gear	0.30-0.40 mm (0.012-0.015")
Diameter of suspension shafts inboard hub	114.980-115.000 mm (4.5267-4.5275")
Thickness of outboard bearing bush.	3.44-3.56 mm (0.1355-0.1402")
Diameter of bush seat on gearing	122.2-122.25 mm (4.811-4.813")
Clearance between hub and bush	0.080-0.390 mm (0.0031-0.0153")
Adjustment of taper roller bearings (6 & 19, fig. 62)	by shims between inboard bearing and bearing cage
Shim (S) thicknesses	0.3-0.8-1-1.2-1.4-1.5 mm (0.0188-0.0314-0.04 0.005-0.06")
SPROCKETS	
Type	27
– number of ring gear teeth.	824 mm (32.44")
– pitch diameter of ring gear	80 mm (3.15")
– width of ring gear	22 mm (0.866")
– thickness of side rim	14 mm (0.551")
– wear allowance	

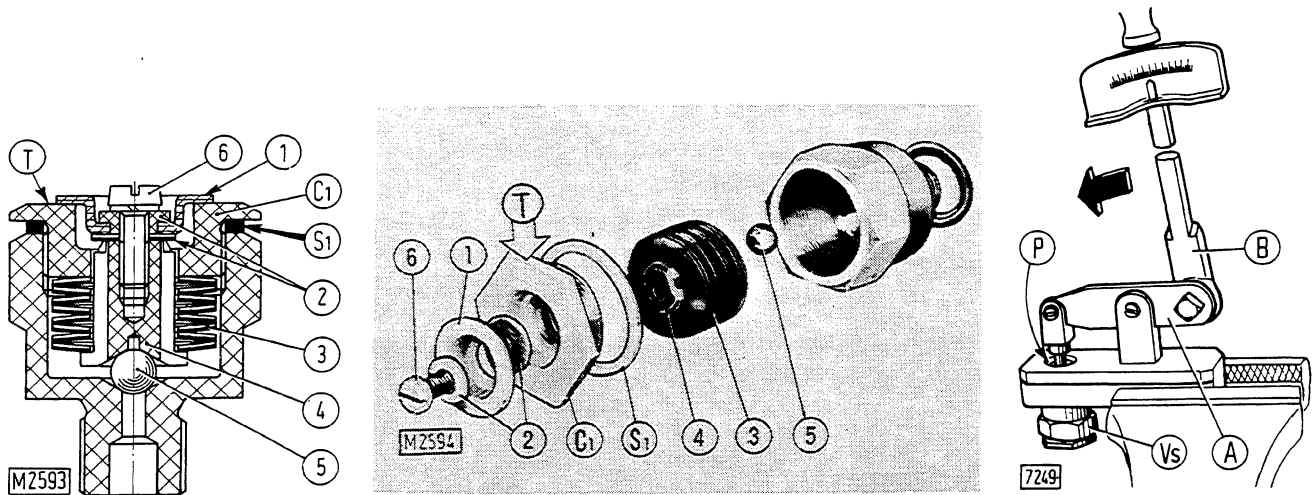


Fig. 9 - Track release hydraulic cylinder relief valve (Vs) components pressure adjustment and cross section.

A. Test tool 75291573 - B. Torque wrench - C₁ Threaded valve cover - P. Fuel tank for gasoline or alcohol - S₁ Valve adjustment shims - T. Punchmark of pressure setting: 784 bar (11,150 psi) - 1. Rubber protection - 2. Steel washers - 3. Disc spring (BAUER type) - 4. Restrictor - 5. Ball - 6. Protection (1) retaining screw.

NOTE - During adjustments of the track release mechanism, whether new or reconditioned, proceed to bleed air as follows:

- Back out drain plug partly (1, Fig. 10).

- Inject grease through valve (Vr) until it squirts out of drain plug (1).
- Tighten the plug and proceed with the adjustment following the instructions provided in the Operator's Manual.

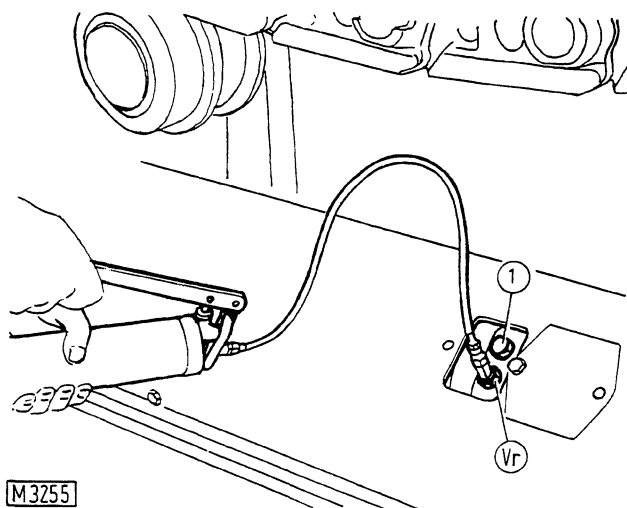


Fig. 10 - Track tension adjustment.
Vr. Adjustment valve - 1. Drain plug.

1.3 TRACK IDLER WHEELS

WARNING

Lift and handle all heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.

NOTE - Machines from no. 018826 are fitted with idler wheels having bushing carrier as shown in detail (b), Fig. 14. Given in the following paragraphs are the servicing procedures for both types of idlers, bearing in mind that the removal and installation operations are the same in either case and are hence described once only.

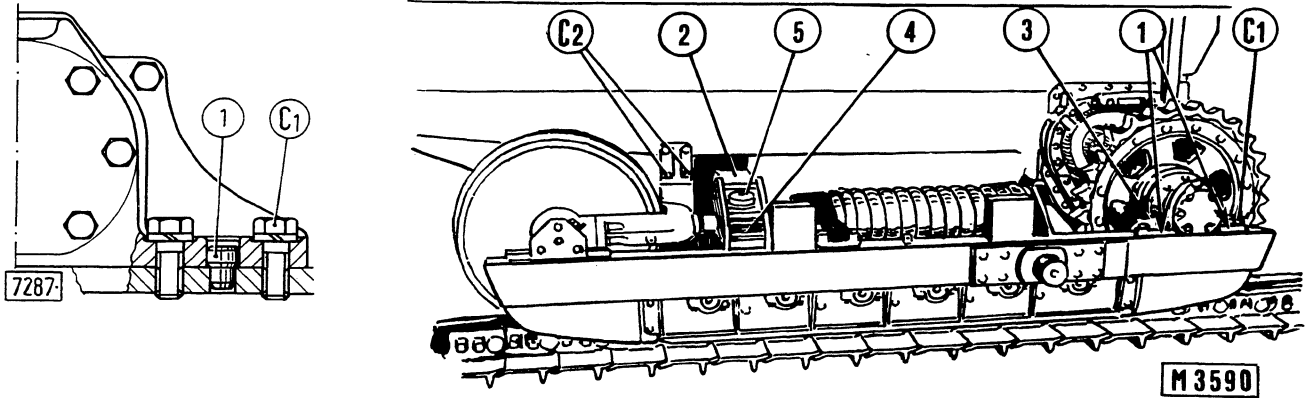


Fig. 27 - LH track frame.

C₁. Rear suspension beam outer support capscrews - C₂. Track frame connecting plate self-locking screws - 1. Track frame rear dowels - 2. Front suspension beam - 3. Rear suspension bar outer support - 4. Suspension beam bump pads - 5. Suspension beam retaining pin.

Disconnect from machine the dozer blade complete with pusher frame or arms as described under DOZER EQUIPMENT then proceed to remove the track frames as follows:

- Pull out the track coupling master pin and stretch out the track on ground.
- Remove the two carrier rollers and both suspension beam retaining pins (5, Fig. 27).
- Remove connecting plate (3, Fig. 31), cap (6, Fig. 33) and screws (C₁, Fig. 27).
- Lift the machine sufficiently high to permit removal of track frames and support adequately on stands or wooden blocks under the drive case and engine sump guard.

NOTE - The machine must be lifted level or first at rear end and then at front end without inclining it transversally.

Should this not be possible owing to lack of adequate hoisting equipment or cranes, first disconnect tie plates (3, Fig. 31) to prevent damages.

- Disconnect the complete frame as shown in Fig. 28.

1.7.1 TRACK FRAME CHECKS

Only in very exceptional cases can the track frames undergo distortions that impose accurate inspections and checks. In such events, it will be possible to check each frame by referring to Fig. 29 and to the instructions provided below.

Track roller mounting surfaces

The coplanarity tolerance between surfaces A on the two side rails is 1 mm (0.04 in).

Idler wheel slide bar mounting surfaces

The coplanarity tolerance between surfaces B on the two side rails is 1 mm while the plane formed by the same surfaces shall be parallel with respect to the planes formed by surfaces A within 1 mm (0.04 in).

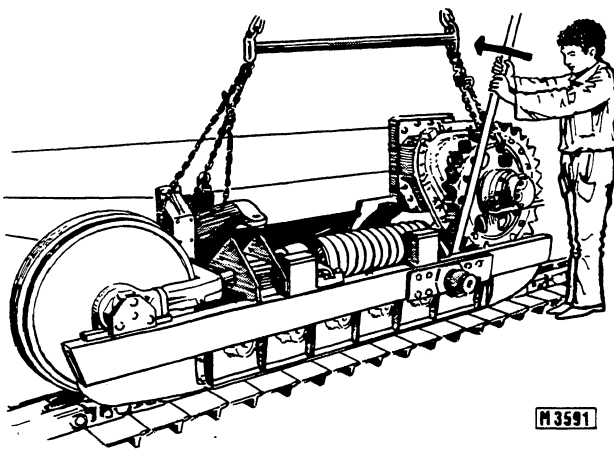


Fig. 28 - Removal of a track frame from the machine.

SPECIFICATIONS (cont'd)

	mm	in
Bushing O.D.:		
– Early	75.075 to 75.105	2.955 to 2.956
– Late	74.970 to 75.000	2.951 to 2.952
Bushing seat bore diameter:		
in idler body (Early)	75.000 to 75.030	2.952 to 2.953
in bushing carrier (2) (Late)	74.911 to 74.957	2.949 to 2.951
Bushing to seat interference		
– Early	0.045 to 0.105	0.0017 to 0.0041
– Late	0.013 to 0.089	0.0005 to 0.0035
Bushing carrier (2) O.D. (late type only)	114.067 to 114.102	4.490 to 4.492
Bushing carrier seat bore in wheel (late type only)	114.000 to 114.035	4.488 to 4.489
Bushing carrier to seat bore interference	0.032 to 0.102	0.0012 to 0.0040
Shaft (3) centre shoulder thickness (late type only)	17.750 to 17.800	0.698 to 0.700
Bushing flange thickness:		
– Early	4.950 to 5.000	0.194 to 0.197
– Late	4.750 to 4.800	0.187 to 0.189
Idler end float	0.30 to 0.75	0.012 to 0.029
Maximum wear tolerance:		
– Early	1.3 to 1.5	0.0511 to 0.0590
– Late	1.2	0.047
Shim thickness (S_1) for adjusting clearance between side plates and upper slide bars	0.5	0.019
Shim thickness (S_2) for adjusting clearance between idler bracket slide bars and track frame slide bars	0.5	0.019
FRONT SUSPENSION	Pivot mounted oscillating beam with track frame rubber pad support	
Oscillating beam pivot pin (1, Fig. 35) O.D.	69.954 to 70.000	2.754 to 2.755
Oscillating beam bushing (2) I.D., installed	70.210 to 70.280	2.764 to 2.766
Bushing to pin clearance	0.210 to 0.326	0.008 to 0.012
Tractor frame (3) pin bore	70.010 to 70.040	2.756 to 2.757
Frame to pin clearance	0.010 to 0.086	0.0004 to 0.0033
Bushing (2) O.D.	85.090 to 85.125	3.349 to 3.351
Oscillating beam bushing bore	85.000 to 85.054	3.3464 to 3.3485
Bushing press fit	0.036 to 0.125	0.0014 to 0.0049
Track frame guide adjusting shims (S_1 and S_2 , Fig. 31) thickness	0.5-1-1.5	0.019-0.039-0.059

5. BULLDOZER

With respect to the power tilt angledozer the hydraulic system of the bulldozer is deprived of the check valve (V, Fig. 38) and is provided with only one blade tilt cylinder (T, Fig. 39). The ripper control section of the hydraulic system is unchanged.

2.2 HYDRAULIC CONTROL SYSTEM OIL TANK AND FILTER

NOTE - For routine servicing operations such as oil drainage and refills, cleaning of tank and of suction filter (Fa, Fig. 40), or replacement of return filter (Fr) refer to the instructions in the Operation and Maintenance Manual provided with each machine. Remember that the servicing operations specified must be performed also every time the oil return filter restriction indicator turns ON.

WARNING

Study the Operation and Maintenance Instruction Manual before starting, operating, maintaining, fueling, or servicing this machine.

WARNING

DO NOT USE HANDS to search for pressure leaks. Fluid escaping under pressure can penetrate the skin.

2.2.1 FILTERS

The attachment hydraulic control system oil decontamination is ensured by two separate

filter units located inside the full-flow tank, namely:

- One filter (Fa, Fig. 40) on pump intake with magnetic rod (5) and metal filtering element;
- One filter (Fr), on pump return fitted with replaceable paper cartridge: by-pass valve (for unit exclusion in case of total restriction) and sender for the dashboard restriction indicator.

Both filters are accessible for servicing by removing their respective covers on oil tank.

2.2.2 TANK REMOVAL

WARNING

To minimize dangers of fire and explosion, it is recommended that before any welding is done on a fuel tank, the tank be completely drained of fuel, fuel lines disconnected and the ends closed to protect them, and the tank steam cleaned. All traces of fuel must be removed before welding is started. Flood the tank with carbon dioxide (CO₂) before and during welding. Caps must be removed and vents and other openings left open during welding.

Proceed as described below:

- Remove battery compartment/main control valve side protection covers;
- Drain oil and fuel from respective tanks through the specially provided plugs, as instructed in the Operation and Maintenance Instruction Manual.

DANGER

Fluid under pressure - turn cap or cover slowly to relieve pressure before removing. Study the Operation and Maintenance Instruction Manual.

- Remove the Operator's seat and the battery ground cable;
- Disconnect control valve oil delivery and return lines and the fuel supply line;

Increase the pressure by actuating the proper test bench control building it up to 65-75 bar (924-1066 psi). Collect any fluid leaking from connection **75295587** in a graduated burette (E): check that it does not exceed 150 cc/min.

NOTE – Should the machine be equipped with ripper or blade hydraulic tilt perform the above check also on the relevant spools, shifting each time connection **75295588** to the respective oil supply ducts. Also, consider that checking at "lift" control lines only (while keeping the "lower" control lines blanked with plates **75290535**) will be adequate .

In this way, the test is run in the most unfavorable conditions, that is, those under which the leakages through control valve spools would cause the accidental lowering of the blade.

d. Safety valve check and setting on bench

Prepare the setup shown in Figure 52. Lock the valve in housing **75290459** and proceed as follows:

- Run the test with the drive motor at the highest possible speed and with oil at a temperature of 65 to 75°C (176 to 194°F).
- Increase pressure gradually and check that the valves open at the specified pressure quoted in the table and marked on the blanking plug of each valve (see also Fig. 47).

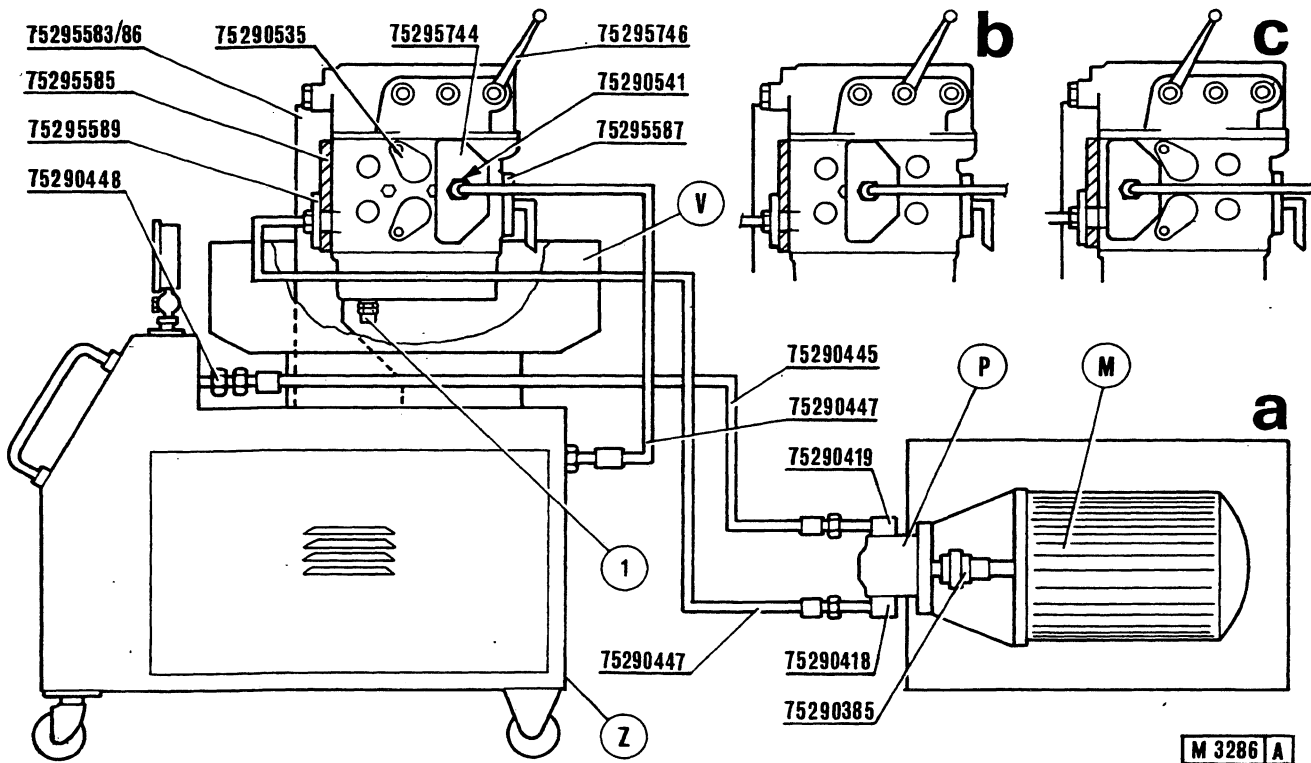


Fig. 50 - Schematic set-up for main control valve fluid test on bench.

a. Set-up for testing pressure relief valve setting and valve ripper spool sliding freedom - b. Set-up for testing pressure relief valve setting and valve blade spool sliding freedom c. Set-up for testing pressure relief valve setting and valve blade tilt spool (bulldozers and angledozers with hydraulic tilt control only) - M. Electric drive motor (7.3 kW) with truck **75291235** - P. Pump (Plessey A42X) - V. Oil collecting tank **75293005** - Z. Flow rate test bench **75295420** - 1. Relief valve opening pressure setting adjustment screw.

NOTE - For the description of items shown by part number only, see para. 2.12 SPECIAL PURPOSE TOOLS.

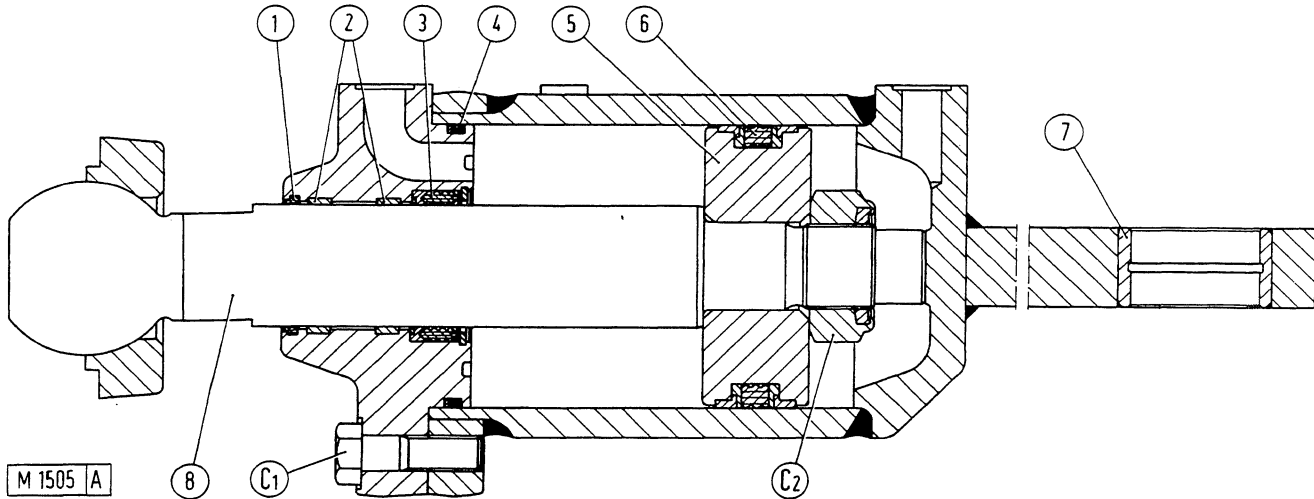


Fig. 62 - Tilt cylinder section (Bulldozer).

C₁. Cylinder cover screw - C₂. Piston lock nut - 1. Wiper seal - 2. Rod guide rings - 3. Rod packing - 4. O-rings - 5. Piston - 6. Piston packing - 7. Bushing - 8. Piston rod.

At reassembly, consider the following:

- Clean orifice (6) eliminating any possible restrictions.
- Locate plungers (3) properly by referring to

the figure and respecting the marks made at disassembly.

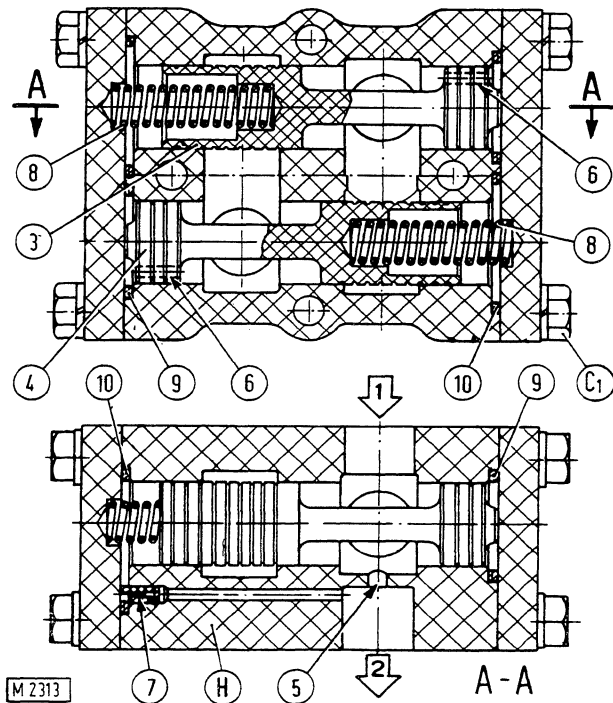
- The valve body is supplied as spare matched with said plungers and calibrated passages (7).

WARNING

Wear safety glasses with side shields or goggles when using compressed air for cleaning to reduce the danger of personal injury from flying particles. Limit the pressure to 2 bar (30 psi) according to local or national requirements.

Fig. 63 - Flow reduction valve section.

C₁. Valve cover screws - H. Valve body - 1. From control valve - 2. To tilt cylinder (dozer) or check valve (angle dozer with hydraulic tilt) - 3. Flow reduction valve spool - piston side - 4. Flow reduction valve spool - 5. Spool (3) control restricted passage - 6. Pressure side from pump on spools (3 and 4) - 7. Calibrated passage to control oil pressure increase on spools (3 and 4) - 8. Spool spring - 9 and 10. O-rings.



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