

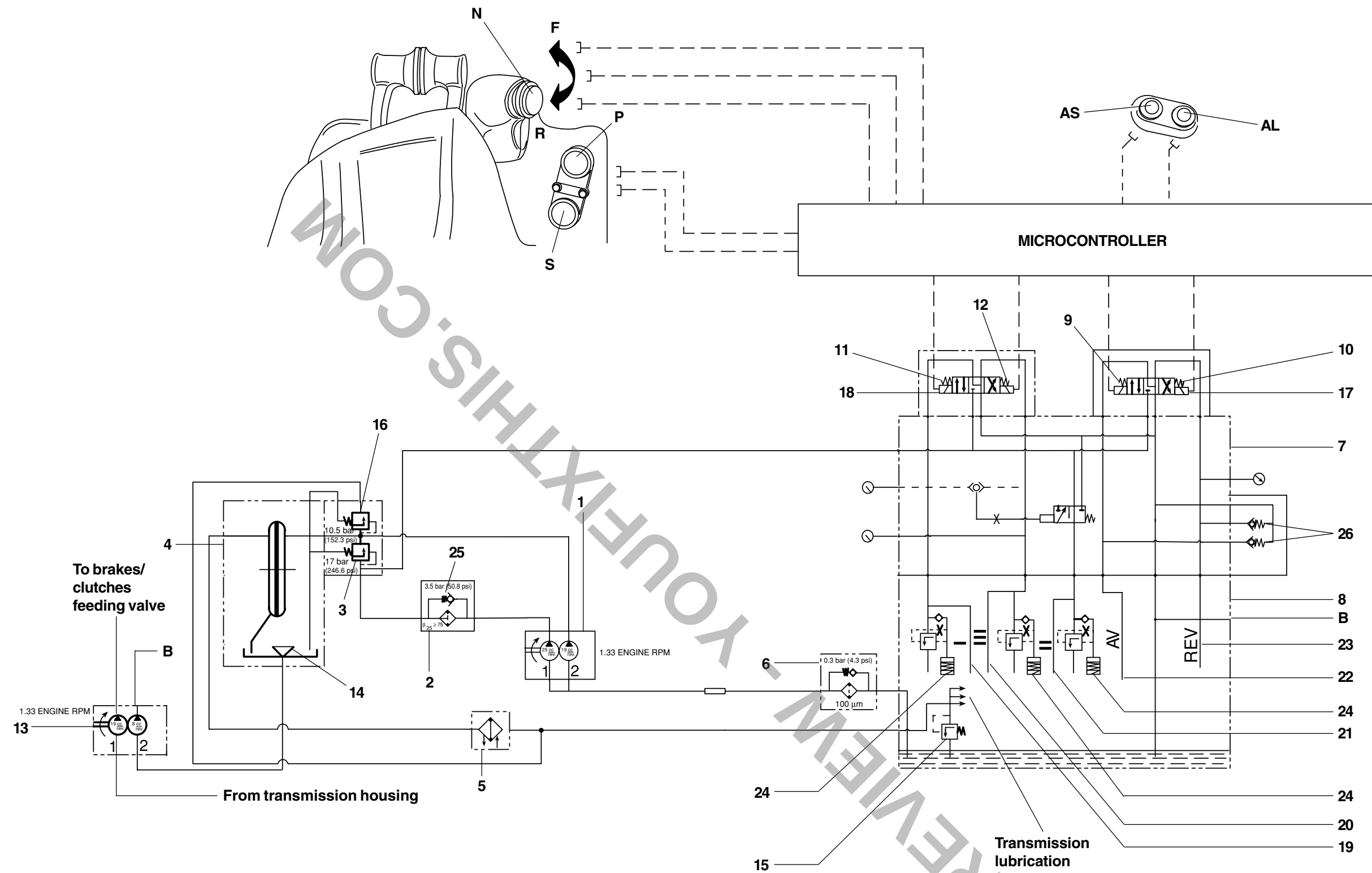


Fig. 2-1 Torque converter hydraulic diagram

1. Transmission/torque converter pump - **2.** Oil filter (delivery) - **3.** Pressure relief valve (17 bar, 246.6 psi) - **4.** TWIN-DISC torque converter - **5.** Heat exchanger - **6.** Oil filter (suction) - **7.** Control valve - **8.** Transmission housing - **9.** FORWARD speed solenoid - **10.** REVERSE speed solenoid - **11.** 1st speed solenoid - **12.** 3rd speed solenoid - **13.** Brake/scavenge pump - **14.** Mesh filter - **15.** Lube oil pressure relief valve (3 bar, 43.5 psi) - **16.** Torque converter safety valve (10.5 bar, 152.3 psi) - **17.** FORWARD/REVERSE control valve spool - **18.** 1st - 3rd control valve spool - **19.** To 1st speed clutch pack - **20.** To 3rd speed clutches pack - **21.** 2nd speed clutch pack - **22.** To FOR speed clutch pack - **23.** To REV speed clutch pack - **24.** 1st - 2nd - 3rd speed modulating valves - **25.** Filter clogging valve - **26.** FOR/REV modulating valves - **B.** To transmission housing - **F.** Forward speed - **R.** Reverse speed - **P.** Upshifting - **S.** Downshifting - **N.** Neutral - **AS.** Auto-shift function - **AL.** Auto kick-down function.

3.1.1 FINAL DRIVES

(final drive exploded view and section)

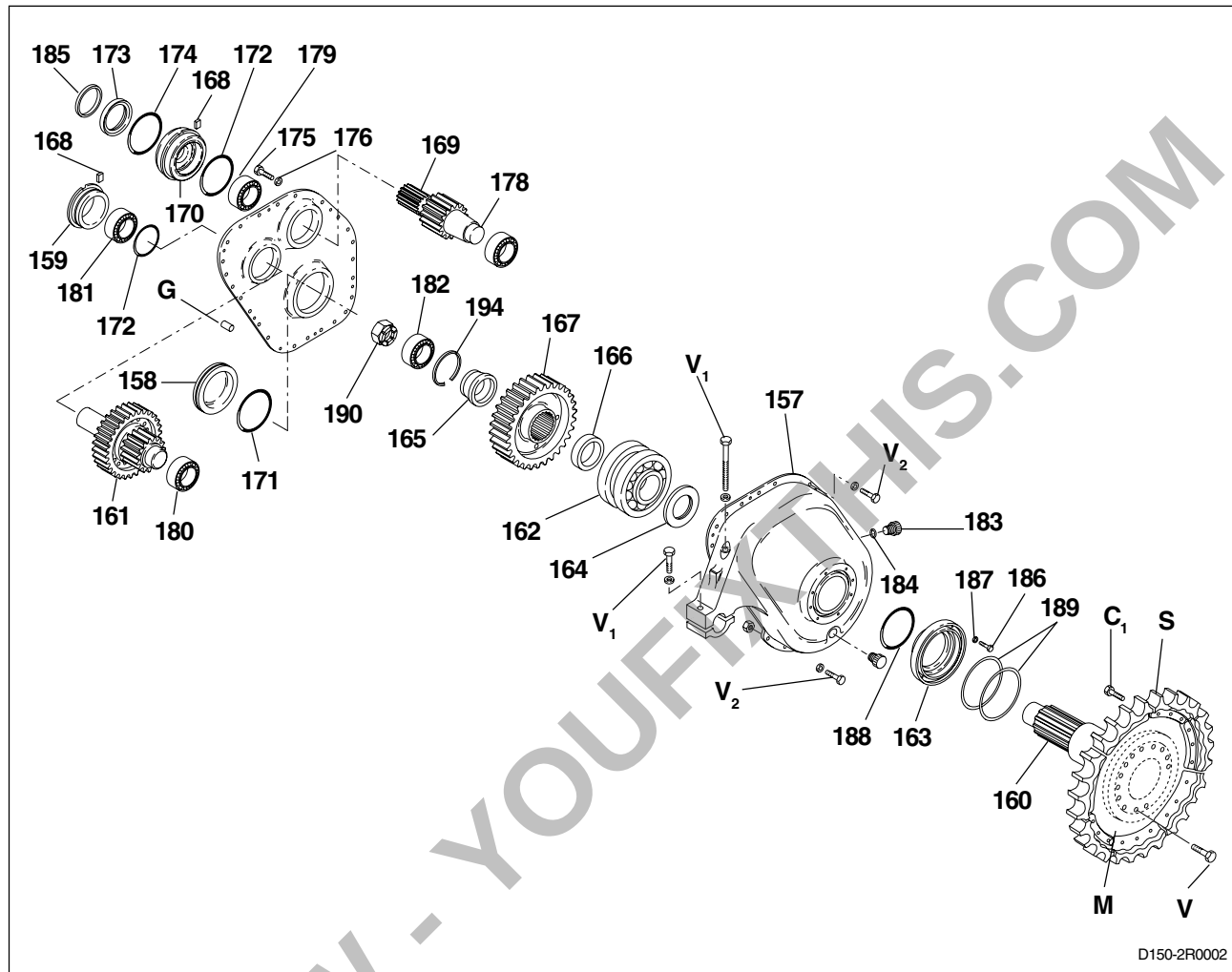


Fig. 3.2 Final drive exploded view

C. Final drive cover - **G.** Dowel - **V.** Sprocket hub securing screw (M20x1.5) - **V₁**. Final drive securing screw to PIVOT SHAFT (M24x2x260) (M24x2x130) - **V₂**. Final drive securing screw to transm. housing (M16x1.5) - **C₁**. Segment securing screws (M22x1.5) - **S.** Sprocket segments - **M.** Sprocket hub - **157.** Housing - **158.** Cover - **159.** Bearing housing - **160.** Sprocket shaft - **161.** Driven or idle gear - **162.** Bearing - **163.** Housing - **164.** Spacer - **165.** Spacer - **166.** Spacer - **167.** Sprocket gear - **168.** Plate - **169.** Driving gear - **170.** Bearing housing - **171.** O-Ring 3.53 x 171 - **172.** O-Ring 3.53 x 142.50 - **173.** O-Ring 3.53 x 183.7 - **174.** O-Ring 3.53 x 190.1 - **175.** Screw TE M16x1.5x65 - **176.** Washer 16x30x3 - **178.** Roller bearing 40x90x33 - **179.** Roller bearing 70x150x35 - **180.** Roller bearing 70x150x51 - **181.** Roller bearing 55x120x43 - **182.** Bearing - **183.** Plug M27x2x16 - **184.** O-Ring 3x24 - **185.** Seal - **186.** Screw TE M12x50 - **187.** Washer 12x24 - **188.** O-Ring 3.53 x 215.5 - **189.** Front seal - **190.** Beaded ringnut - **194.** Circlip 170.

TABLE OF TIGHTENING TORQUES

When the tightening torque of bolts and nuts is not indicated in the single sections, this can be obtained from the table here below:

NUTS (ZNT)					SCREWS (ZNT / DEIDR)		
Class of strength: 10 (R 80)					Class of strength: 10.9 (R 100)		
Diameter and pitch mm	normal daNm (lb.ft.)	low type daNm (lb.ft.)	with polyamide ring		Diameter and pitch mm	normal ZNT daNm (lb.ft.)	autoblocc. ZNT daNm (lb.ft.)
			normal daNm (lb.ft.)	low type daNm (lb.ft.)			
M6 x 1	1.3 (9.6)	1.2 (8.8)	-	-	M6 x 1	1.3 (9.6)	-
M8 x 1.25	3.2 (23.6)	2.6 (19.2)	3.9 (28.7)	3.2 (23.6)	M8 x 1.25	1.3 (9.6)	3.5 (25.8)
M10 x 1.25	7.2 (53)	5.2 (38.8)	8.2 (60.4)	6.2 (45.7)	M10 x 1.25	7.1 (52.3)	7.9 (58.2)
M10 x 1.5	6.5 (47.9)	5 (36.8)	7.7 (56.8)	6 (44.2)	M10 x 1.5	6.5 (47.9)	7 (51.6)
M12 x 1.25	13 (95.8)	8.7 (64.1)	14.5 (106.9)	10.2 (75.2)	M12 x 1.25	12.7 (93.6)	13.9 (102.5)
M12 x 1.75	11 (81.1)	8.1 (59.7)	12.9 (95.1)	9.6 (70.8)	M12 x 1.75	11 (81.1)	12 (88.5)
M14 x 1.5	19.5 (143.8)	13 (95.8)	21.6 (159.2)	15 (110.6)	M14 x 1.5	20 (147.5)	22 (162.2)
M14 x 2	18 (132.7)	12.5 (92.2)	20 (147.5)	14.6 (107.6)	M14 x 2	18 (132.7)	19 (140.1)
M16 x 1.5	30 (221.2)	17 (125.3)	34 (250.7)	20 (147.5)	M16 x 1.5	30 (221.2)	33 (243.3)
M16 x 2	-	-	-	-	M16 x 2	-	-
M18 x 1.5	45 (331.8)	25 (184.3)	50 (368.6)	29 (213.8)	M18 x 1.5	45 (331.8)	48 (353.9)
M18 x 2.5	-	-	-	-	M18 x 2.5	-	-
M20 x 1.5	60 (442.3)	30.5 (224.9)	64.5 (475.5)	35 (258)	M20 x 1.5	60 (442.3)	65 (479.2)
M20 x 2.5	-	-	-	-	M20 x 2.5	-	-
M22 x 1.5	80 (589.8)	41 (302.2)	-	-	M22 x 1.5	80 (589.8)	90 (663)
M22 x 2.5	-	-	-	-	M22 x 2.5	-	-
M24 x 2	100 (737.3)	47 (346.5)	108 (796.2)	52.5 (387)	M24 x 2	100 (737.3)	110 (811)
M24 x 3	-	-	-	-	M24 x 3	-	-
M27 x 2	95 (700.4)	40.1 (295.6)	-	-	M27 x 2	100 (737.3)	-
M30 x 2	130 (958.4)	49.9 (368)	-	-	M30 x 2	140 (1032)	-
M33 x 2	170 (1253.4)	-	-	-	M33 x 2	190 (1400.9)	-
M36 x 3	220 (1622.1)	-	-	-	M36 x 3	240 (1769.5)	-

4.2 TROUBLESHOOTING

4.2.1 DIAGNOSIS ON DISPLAY

The display has 5 text fields to signal the following messages:

A. Work hourmeter signal

The engine hours are signalled by the lighting for about 1 second when the instrument board carries out the general test. To re-visualise the engine hours, it is necessary to switch off and switch on again with the starter key. The engine hours stay ON as far as the engine is inoperative.

or

B. Gear engaged + failure code

- The first field indicated the gear engaged.
- The second field indicates, in the event of failure, digit E.
- The 3rd 4th 5th fields indicate the failure type coded that are distinguished by two types.

Failure code of a single component of the brakes/clutches and transmission control system
(see table 1)

Failure codes for more than one component
(see table 2)

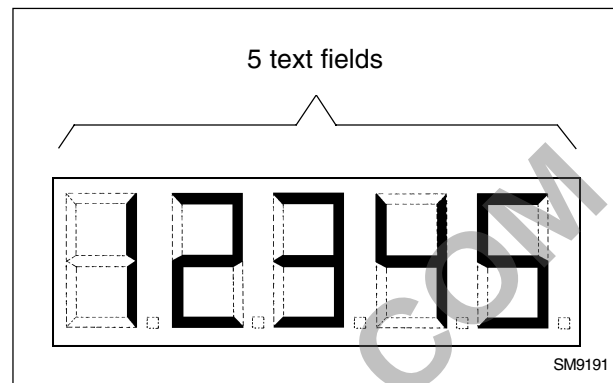


Fig. 4-17

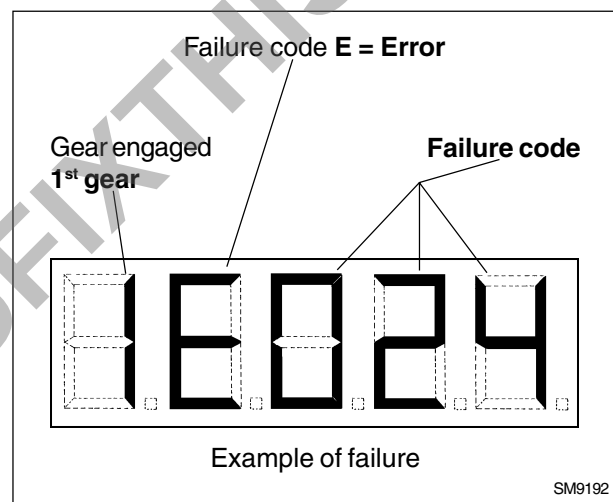


Fig. 4-18

In the event the display shows one of the following failure code, identify the failed component from table 1.

TABLE 1	
Failed component	Failure code
Solenoid, left proportional valve	001
Solenoid, right proportional valve	002
Solenoid, Forward "F" gear	004
Solenoid, Reverse "R" gear	008
Solenoid, 1 st gear	016
Solenoid, 3 rd gear	032
Solenoid, left steering lever	064
Solenoid, right steering lever	128

2.4 PROCEDURES FOR THE REPAIR OF THE TORQUE CONVERTER

2.4.1 REMOVAL

Turn the main switch into position "OFF". Place a "*DO NOT OPERATE*" warning signal on the machine. Please refer to the Section "CAB" of this Manual to tilt the cab.

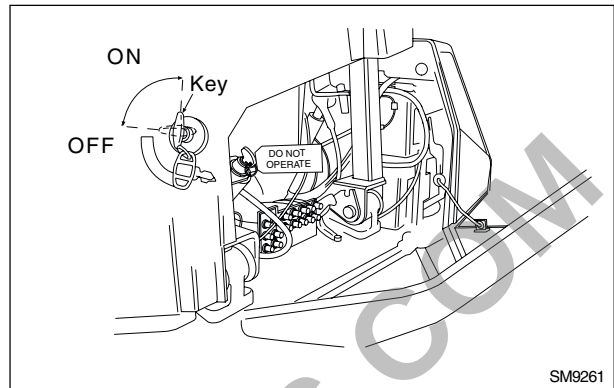


Fig. 2-8

Remove the central lower guard.

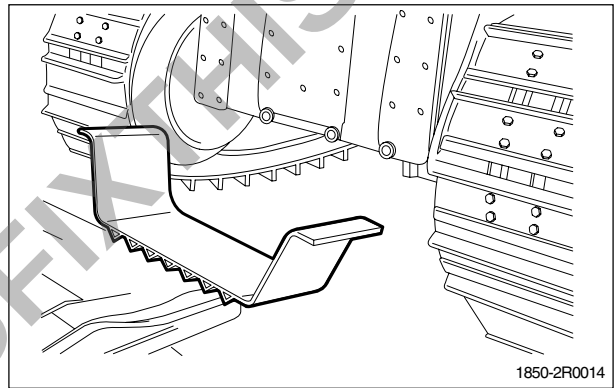


Fig. 2-9

Drain the transmission oil through the draining plug.

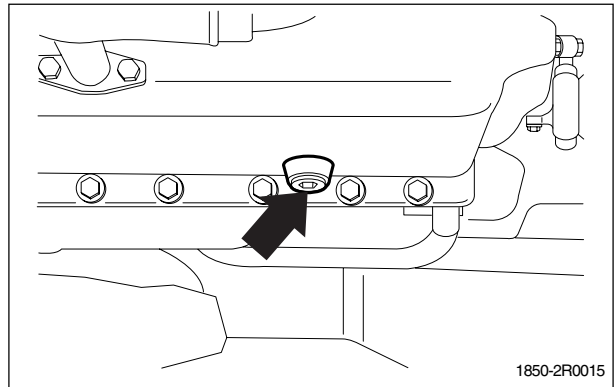


Fig. 2-10

Drain the oil from the torque converter housing through the draining plug.

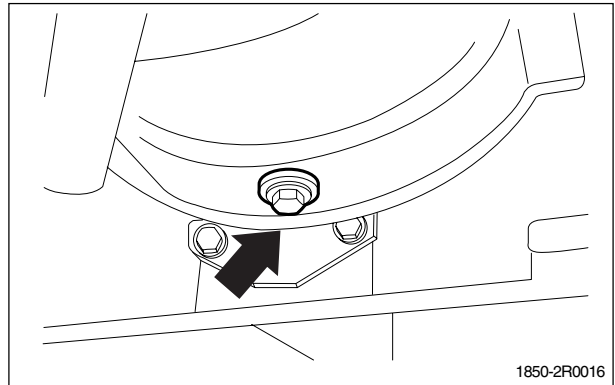


Fig. 2-11

2.2 TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	TOOLS REQUIRED	TEST	SOLUTION
Lube oil low pressure. The indicator light comes ON when the engine is in operation.	Transmission oil level low.	Instruction Manual.	Pull-out the dipstick and check the level.	Top-up oil up to prescribed level.
	Torque converter pump suction filter clogged.			Clean the filter.
	Outer crack allowing the seeping of air into the pump.		If the oil is foaming, check if a crack is present.	Eliminate the crack.
	Hose defective.		Suction pipe clogged.	Change or clean the pipe.
	Oil of a wrong type.	Instruction Manual.	Check oil specifications with data provided by Manufacturer.	Drain the oil and change it with oil of the prescribed type.

TABLES OF TECHNICAL DATA

DIMENSIONS	Total length (basic tractor)		mm (in)	3890 (153)
	Total length (with HS blade)		mm (in)	4750 (187)
	Total length (with semi-U HSU blade)		mm (in)	5025 (198)
	Total length ("LT PAT" version)		mm (in)	4950 (195)
	Total length ("XLT PAT" version)		mm (in)	5315 (209)
	Total length ("LGP PAT" w/ 800 mm, 32 in shoes version)		mm (in)	5315 (209)
	Total length (basic tractor w/500 mm shoes)		mm (in)	2450 (96)
	Total length (with HS blade)		mm (in)	3180 (125)
	Total length (with semi-U HSU blade)		mm (in)	3180 (125)
	Total length ("LT PAT" version)		mm (in)	3200 (126)
	Total length ("XLT PAT" version)		mm (in)	3200 (126)
	Total length ("LGP PAT" w/ 800 mm, 32 in shoes version)		mm (in)	4000 (157)
	Total height (BD, LT PAT)		mm (in)	3060 (120)
	Total height (with ROPS canopy)		mm (in)	3080 (121)
	Track gauge (BD, LT PAT)		mm (in)	1900 (75)
	Track gauge (XLT PAT, LGP PAT)		mm (in)	2140 (84)
	Minimum ground clearance (SAE J1234)		mm (in)	370 (15)
	Track chain length bearing on ground (BD, LT PAT)		mm (in)	2550 (100)
	Track chain length bearing on ground (XLT PAT, LGP PAT)		mm (in)	2985 (117)
	Width of track shoe (standard)		mm (in)	500 (20)
MASS	Weight in shipping order (including ROPS, 500 mm, 20 in shoes, lubricants, engine coolant, 10 % fuel)		kg (lb)	12865 (28362)
	Weight in work order (w/ PAT blade, ROPS cab, 500 mm, 20 in shoes, lubricants, engine coolant, 10 % fuel and operator)		kg (lb)	14915 (32882)
PERFORMANCES	SPEEDS / PULL	1 st forward	Km/h / daN (mph/lbf)	4.3 / 21300 (2.7 / 47884)
		2 nd forward	Km/h / daN (mph/lbf)	7.0 / 12100 (4.3 / 27202)
		3 rd forward	Km/h / daN (mph/lbf)	11.0 / 6800 (6.8 / 15287)
		1 st forward	Km/h / daN (mph/lbf)	5.4 / 16770 (3.3 / 37700)
		2 nd forward	Km/h / daN (mph/lbf)	8.7 / 9420 (5.4 / 21177)
		3 rd forward	Km/h / daN (mph/lbf)	13.0 / 5230 (8.1 / 11757)
	PRESSURE ON GROUND	(Standard shoes 500 mm, 20 in wide)		
	CLIMBING CAPACITY	w/ blade "PAT" and ROPS cab		Kpa (psi) 57.4 (8.3)
		60%	(1 st forward)	Km/h (mph) 3.0 (1.9)
		30%	(2 nd forward)	Km/h (mph) 5.0 (3.1)
		10%	(3 rd forward)	Km/h (mph) 9.0 (5.6)

7.3.1 ELECTRIC DIAGRAM OF INSTRUMENT/MONITOR PANEL

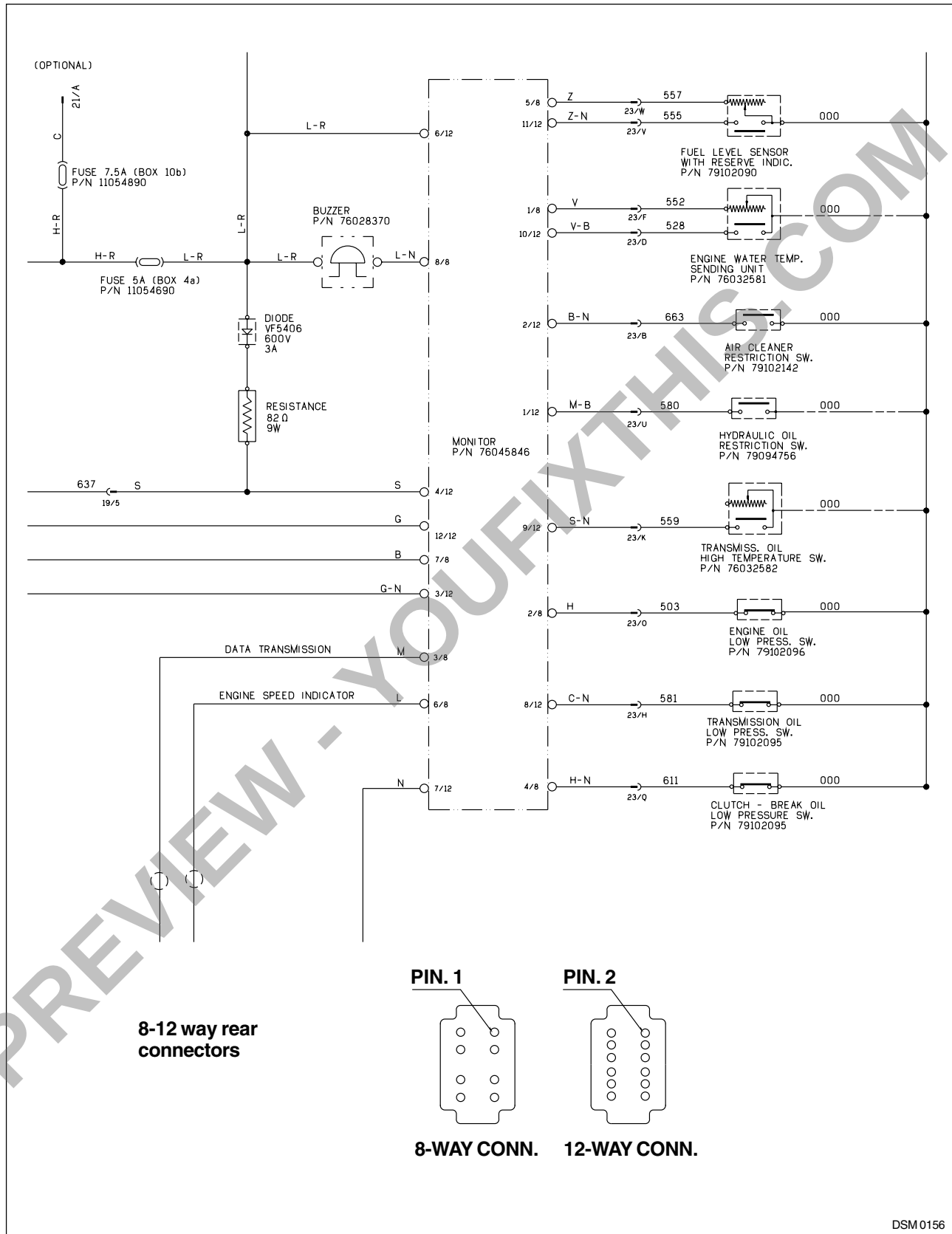


Fig. 7-19

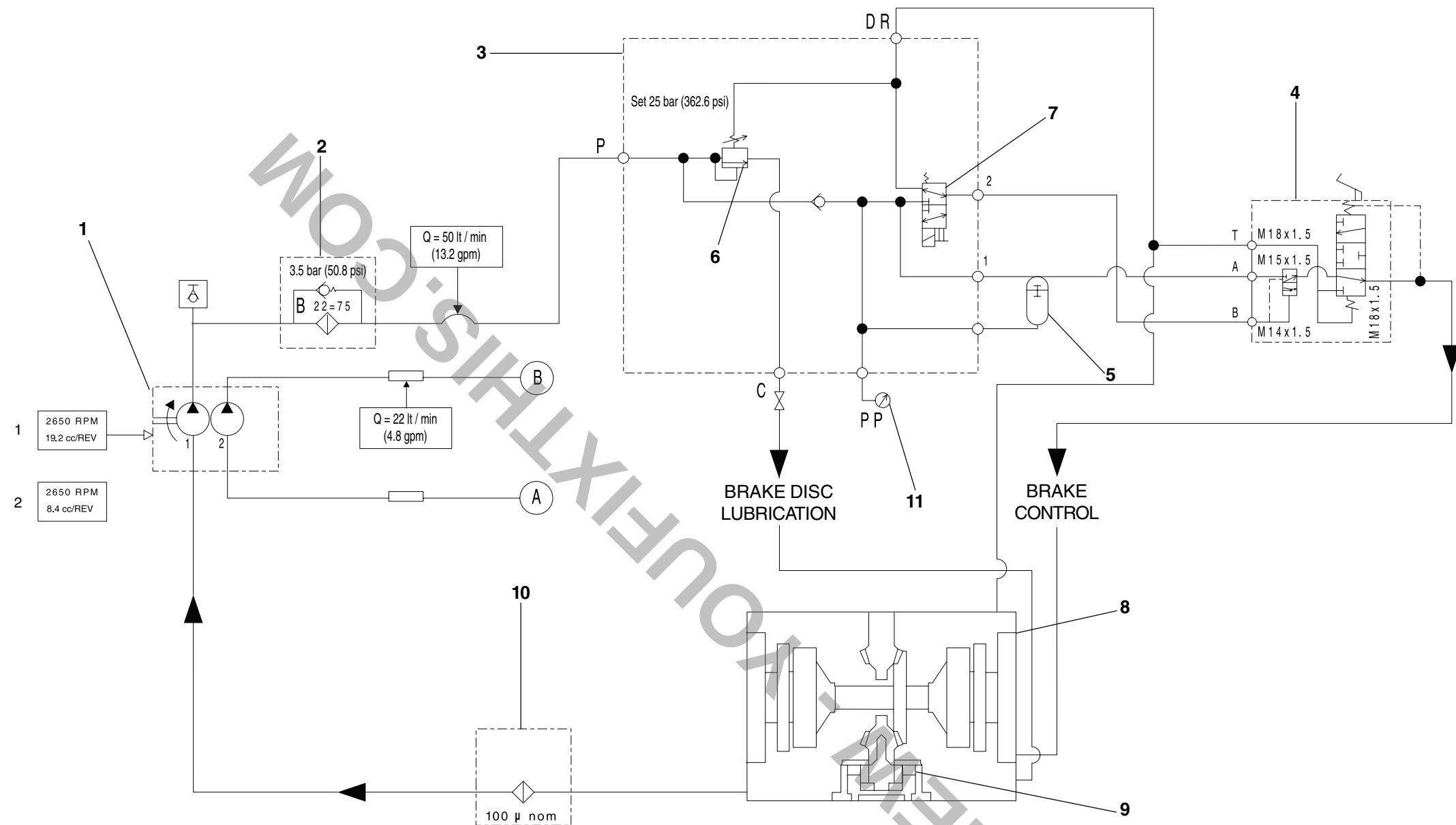
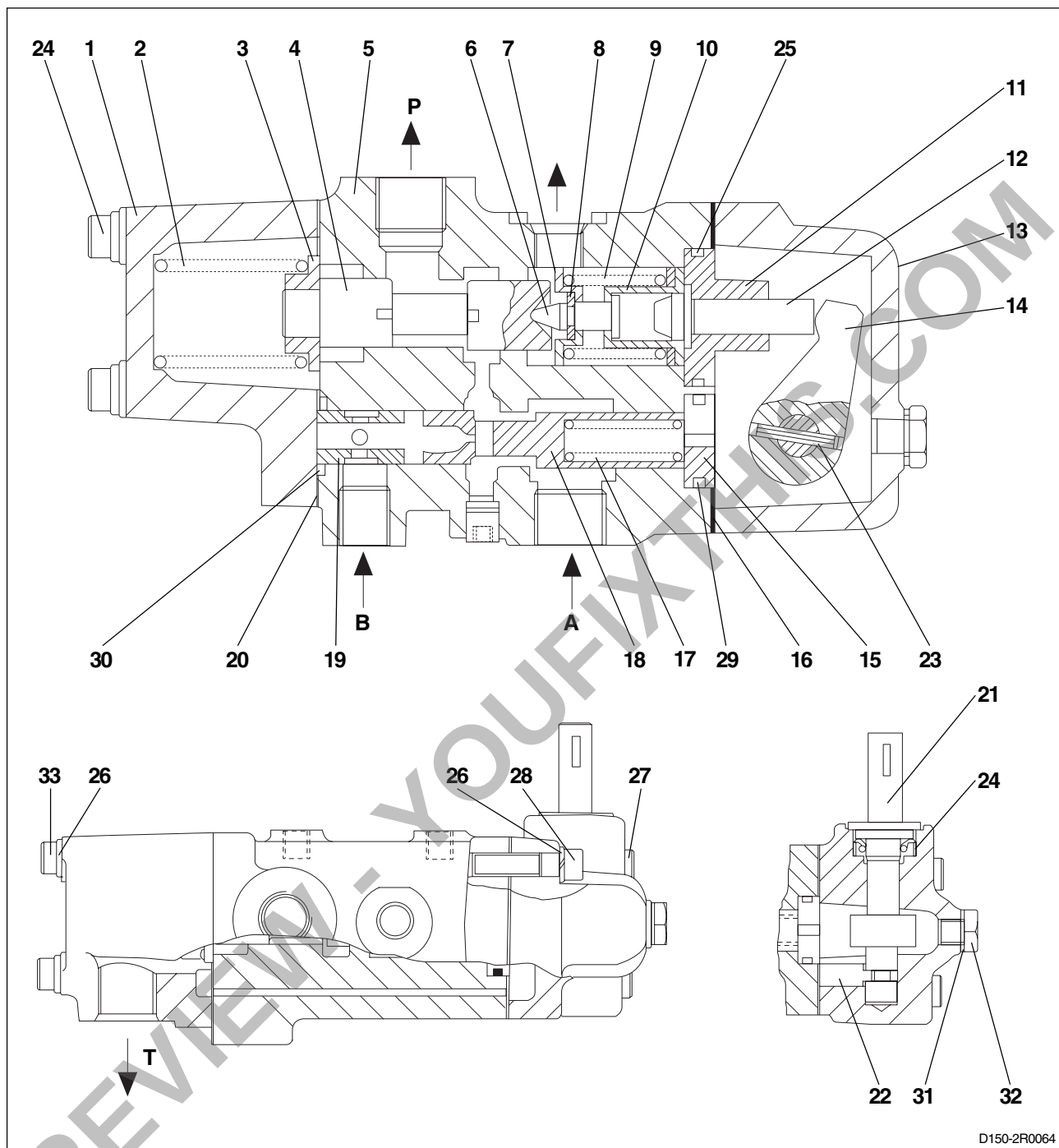


Fig. 4-1 Brakes hydraulic diagram

1. Power double pump - 2. Oil filter (delivery) - 3. Power valve block - 4. Brake pedal valve - 5. Accumulator - 6. Pressure relief valve - 7. Directional solenoid valve - 8. Transmission housing - 9. Brake discs - 10. Oil filter (suction) - 11. Pressure pick-up point - A. From converter - B. To transmission housing.



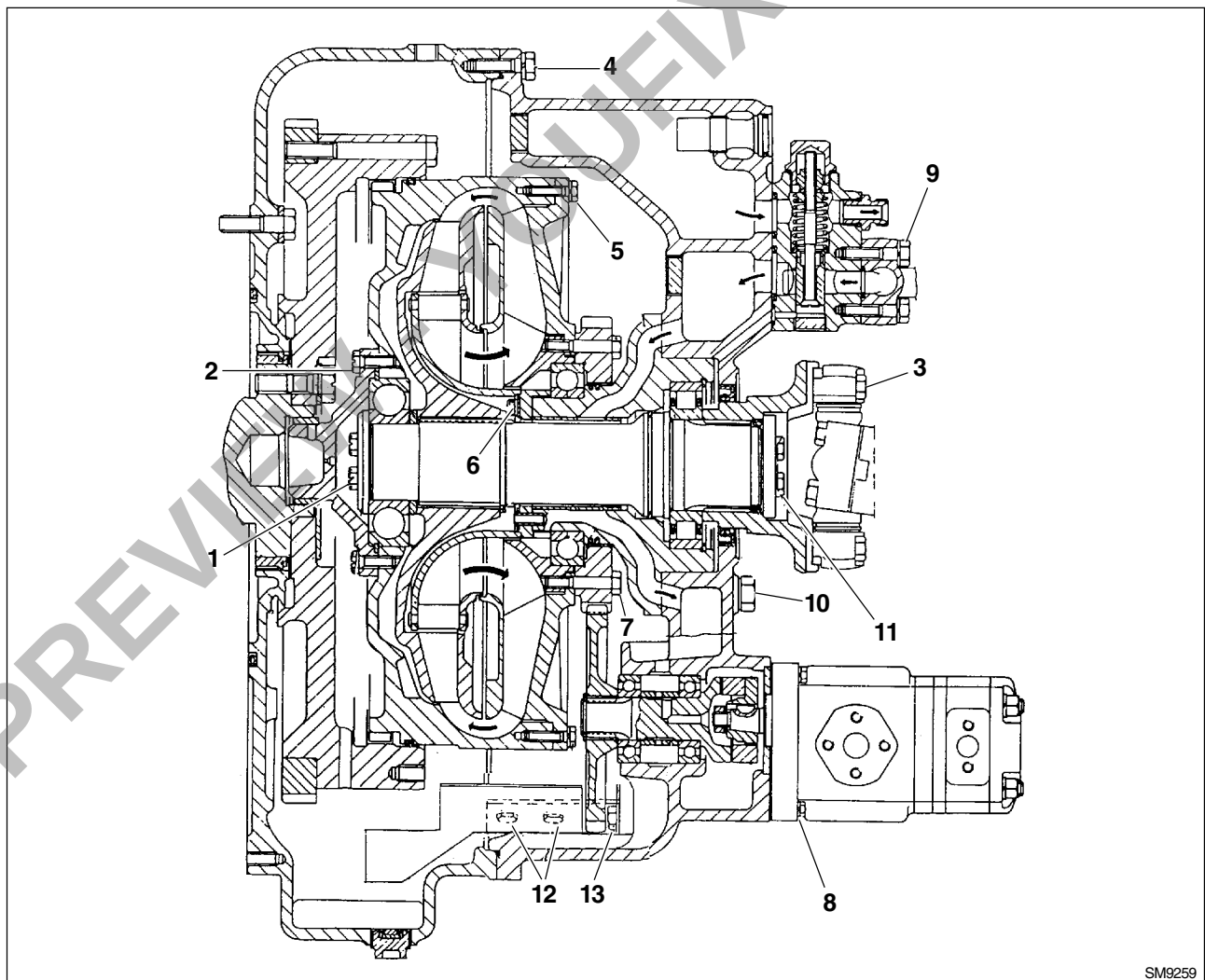
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Fig. 4-8 Brake pedal valve section

1. Cover - 2. Spring - 3. Washer - 4. Piston - 5. Body assembly - 6. Push rod - 7. Inner cup - 8. Washer - 9. Spring - 10. Outer cup - 11. Guide - 12. Pusher pin - 13. Pusher pin - 14. Cam - 15. Washer - 16. Gasket - 17. Piston spring - 18. Piston - 19. Spacer - 20. Gasket - 21. Pin - 22. Dowel - 23. Spring pin - 24. Seal - 25. O-Ring 2.62x34.59 - 26. Spring washer - 27. Screw M8x55 - 28. Screw M8x35 - 29. O-Ring 2.62x20.29 - 30. O-Ring 2.62x18.72 - 31. Gasket - 32. Plug M10x1.25 - 33. Screw M8x75.

2.6.2 TIGHTENING TORQUES - Torque converter

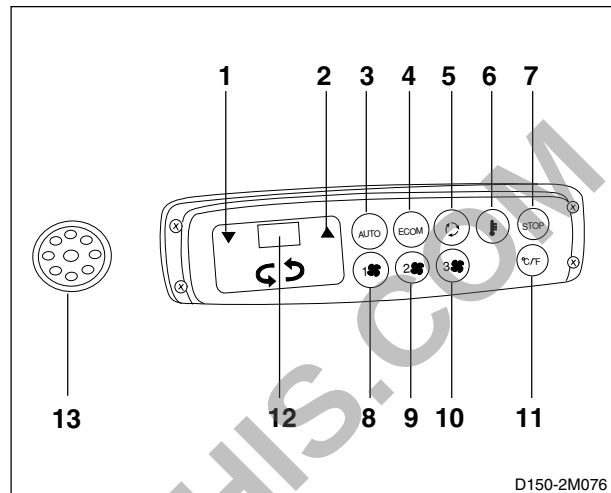
	DESCRIPTION	daNm (*)	ft lb
1.	Securing screws, front bearing stop	4.1 to 4.9	30.24 to 36.14
2.	Securing screws, shaft hub stop	4.1 to 4.9	30.24 to 36.14
3.	Securing screws, drive shaft	10.8 to 11.7	79.65 to 86.29
4.	Securing screws, torque conv. housing	6.8 to 7.4	50.15 to 54.57
5.	Securing screws, rear wheel	2.3 to 2.8	16.96 to 20.65
6.	Securing screws, stator	3.4 to 3.9	25.07 to 28.76
7.	Securing screws, pump drive gear	4.1 to 4.9	30.24 to 36.14
8.	Securing screws, steering-brakes pump	1.2 to 1.4	8.85 to 10.32
9.	Securing screws, pressure relief valve	6.8 to 7.4	50.15 to 54.58
10.	Securing screws, rear bearing support	8.0 to 8.8	59 to 64.9
11.	Secur. screws, rear output flange stop	4.1 to 4.9	30.24 to 36.14
12.	Securing screws, oil deflector	3.0 to 3.3	22.13 to 24.34
13.	Securing screws, oil deflector support	6.8 to 7.4	50.15 to 54.57
	Screws, equipm. pump driven gear	7.5 to 8.3	55.31 to 61.21
	Sec. screws, trans./torque conv. pump	6.8 to 7.4	50.15 to 54.57
	Nut, pump drive hub	2.1 to 2.3	15.49 to 16.96
	Secur. screws, hydraulic pump		



SM9259

Fig. 2-168 Section view of torque converter housing

8.1.3 CAB CLIMATE CONDITIONER AND ERROR CODES



1. Decrement of internal temperature - 2. Increment of internal temperature - 3. Automatic function - 4. Compressor cut-off - 5. Re-circulation - 6. Outer temperature - 7. Cut-off - 8. Fan 1st speed - 9. Fan 2nd speed - 10. Fan 3rd speed - 11. °C/°F conversion - 12. Display reading of temperature setting - 13. Cab inside temperature sensor.

ERROR CODES TABLE

ERROR	ERROR DESCRIPTION
E1	OUTSIDE TEMPERATURE FEELER (TE) OPEN
E2	OUTSIDE TEMPERATURE FEELER (TE) IN SHORT CIRCUIT
E3	INSIDE TEMPERATURE FEELER (TI) OPEN
E4	INSIDE TEMPERATURE FEELER (TI) IN SHORT CIRCUIT
E5	MIXED AIR TEMPERATURE FEELER (TIM) OPEN
E6	MIXED AIR TEMPERATURE FEELER (TM) IN SHORT CIRCUIT

2.5 PROCEDURES FOR THE REPAIR OF THE TRANSMISSION

2.5.1 REMOVAL

Turn the main switch into position "OFF". Place a "*DO NOT START*" warning signal on the machine. Please refer to the Section "CAB" of this Manual to tilt the cab.

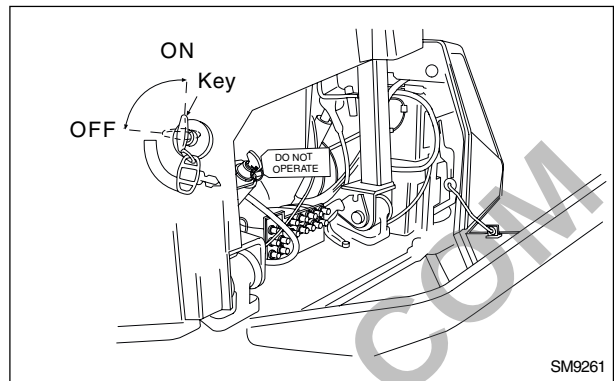


Fig. 2-49

Drain the transmission oil through the draining plug.
Remove the central lower guards.
Drain the oil from the torque converter housing through the draining plug.
Remove the propeller shaft between torque converter and transmission housing.

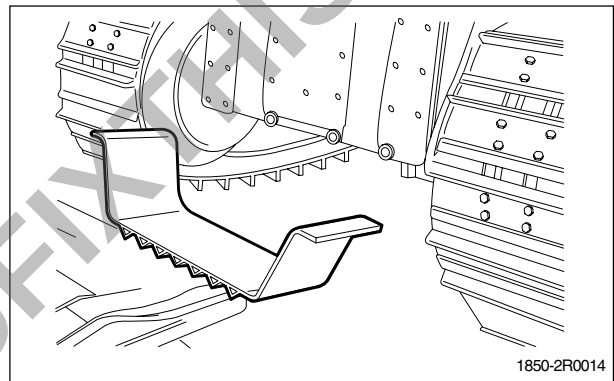


Fig. 2-50

Disconnect the hydraulic pump pipes (delivery and return) to the distributor.

Disconnect the forward and 2nd speed pressure test pipes between transmission and test panel.

Disconnect and label the three pipes between the upper part of the control valve and the pilot valve.

Disconnect and label the 4 pipes on the rear side of the transmission control valve: 2 run to the test panel, one runs to the manual pilot valve and one runs to the brake unlocking valve.

Hold the transmission housing with an appropriate winch: its mass is about 450 kg (992.25 lb).

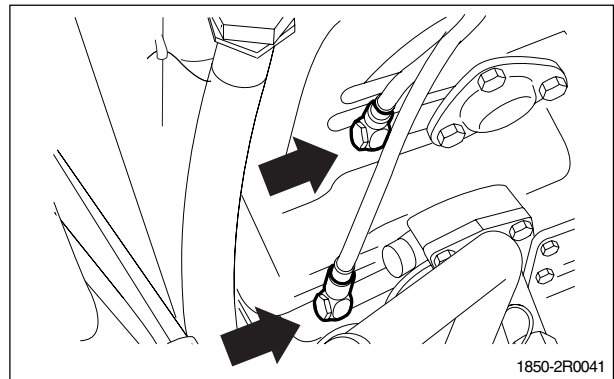


Fig. 2-51

Troubleshooting chart**(a) Fan motor does not operate**

Possible cause	Inspection	Remedy
1. Blown fuse	Inspect the air conditioner fuse.	Replace.
2. Broken wiring or bad connection	Check the fan motor earth and connectors.	Repair the wiring or connect correctly.
3. Fan motor malfunction	Check the two lead wires from the motor with a circuit tester. If there is no conductance, the motor is malfunctioning.	Replace.
4. Broken resistor wiring	Check resistor conductance using a circuit tester. If there is no conductance, the wiring is broken.	Replace.
5. Fan motor switch failure	Operate the fan switches in sequence and check whether the fan operates.	Replace.

(b) Fan motor operates normally, but air flow is insufficient

Possible cause	Inspection	Remedy
1. Evaporator inlet obstruction	Check the inlet.	Remove the obstruction and clean.
2. Air leak	Check the cooling unit case fittings.	Repair or adjust.
3. Detective thermo switch	Check whether the evaporator is frozen. Check the switch using a circuit tester.	Replace.

(c) Insufficient cooling although air flow and compressor operation are normal

Possible cause	Inspection	Remedy
1. Insufficient refrigerant	There will be little temperature difference between the low- and high-pressure sides. Air bubbles or a "cloudy" flow will be visible in the sightglass.	Repair any leaks and recharge the refrigerant to the correct level.
2. Excessive refrigerant	The high-pressure side pressure will be high and even if the condenser is cooled using water, air bubbles will not appear in the sightglass.	Drain small quantity of refrigerant until air bubbles appear periodically through the window.

ENGINE	Model	CUMMINS 6BTAA 5.9
	Type	4-stroke, in-line vertical, direct injection turbocharged, after-cooled, low emission
	Bore and stroke	102 x 120 mm (4 x 4.7 in)
	Total displacement	5.9 litres (360 in ³)
	Number of cylinders	6
	Net power at flywheel (SAE J1349)	140 HP / 104 kW (at 2200 rpm)
	Net power at flywheel (DIN 6270)	142 HP / 106 kW (at 2200 rpm)
	Net power at flywheel (ISO 9249)	142 HP / 105 kW (at 2200 rpm)
	Net power at flywheel (EEC 80/1269)	142 HP / 106 kW (at 2200 rpm)
	Maximum torque	650 Nm (146.1 lbf) (at 1300 rpm)
	Maximum power speed	2000 (rpm)
	Maximum idle speed	2460 (rpm)
	Low idle speed	850 (rpm)
	Fuel consumption (at max. power)	25 kg/h (55 lbs/h)
	Starter motor	24 Volt - 6.8 kW (9.1 HP)
	Alternator	24 Volt - 70 Amp
	Batteries - std oversized	2 x 12 Volt - 100 Amph 2 x 12 Volt - 160 Amph
	Radiator	Air - water with tubes and in line core
	Dimensions of radiator core	930 x 453 x 114 mm (36.6 x 17.8 x 4.5 in)
	Pressure of radiator cap	1.0 bar (14.5 psi)
TRANSMISSION/ TORQUE CONVERTER	Water pump flow (at engine 2200 rpm)	157 lt/min (34.5 gpm)
	Fan	Blower, 6-blade, diam 711.2 mm (28 in)
	Air cleaner	DONALDSON - Dry, 2-stage twith safety element and centrifugal separator, clogging indicator
	Exhaust silencer	Horizontal, dimensions 655 x diam 228 mm (25.8 x diam 9 in)
	Torque converter	Single stage, single phase, diam. 13" Stall ratio 2.33 : 1 The propeller shaft actuates through a gear train: – equipment pump – transm. pump + converter pump – oil scavenger pump + brake pump
	Transmission	"Power shift" transmission, 3 forward and 3 reverse speeds with FINGERTIP CONTROL type electric control. Neutral button allowing disengaging directly the speed engaged shifting the transmission into neutral. AL function button and As function button. Modulating valves on For and REV, speed engaging modulating valve.

STEERING HYDRAULIC DIAGRAM

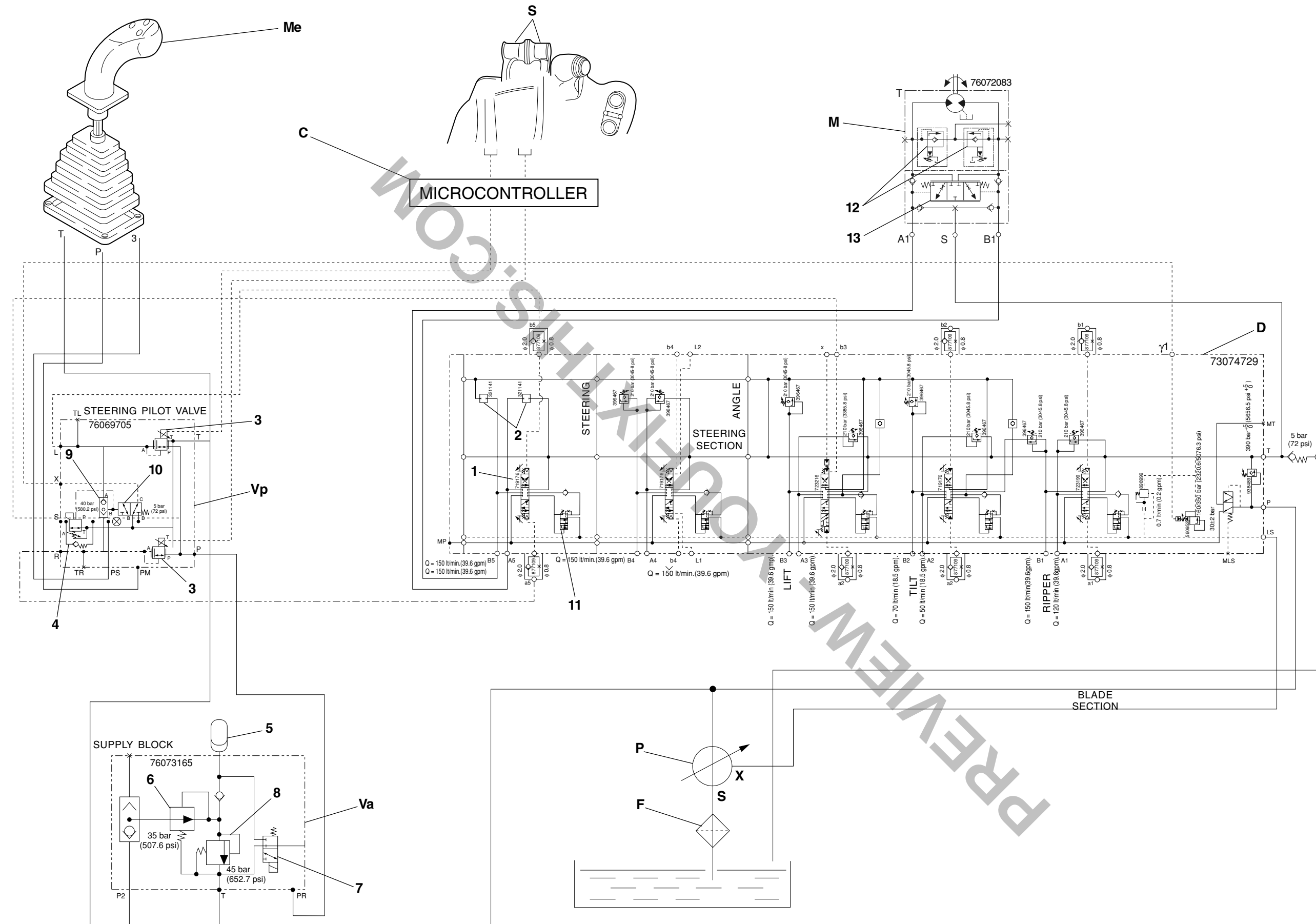


Fig. 4-12 Steering hydraulic diagram

C. Microcontroller - F. Oil suction filter - M. Steering hydraulic motor - D. Equipment/steering control valve - P. Variable displacement piston pump - Ma. Blade control pilot valve - Ls. Steering levers - Va. Supply block - Vp. Steering pilot valve - 1. Steering control spool - 2. Plugs - 3. Electro proportional valves - 4. Priority valve (40 bar, 580.2 psi) - 5. Accumulators - 6. Reduction valve (35 bar, 507.6 psi) - 7. Power block solenoid valve - 8. Supply block pressure relief valve (45 bar, 652.7 psi) - 9. Selector valve - 10. Piloting valve - 11. Pressure compensator - 12. Steering motor safety valves - 13. Hydraulic breaking valve.

On the opposite side, remove guide (11) pushpin (12) and O-Ring (25), then remove pusher assembly (6). Press spring (9) and extract pusher retaining washer

(8), remove the spacer, spring (9) and cup (10). Extract washer (15) and O-Ring (29), extract spring (17) and large and small plungers (18 and 19).

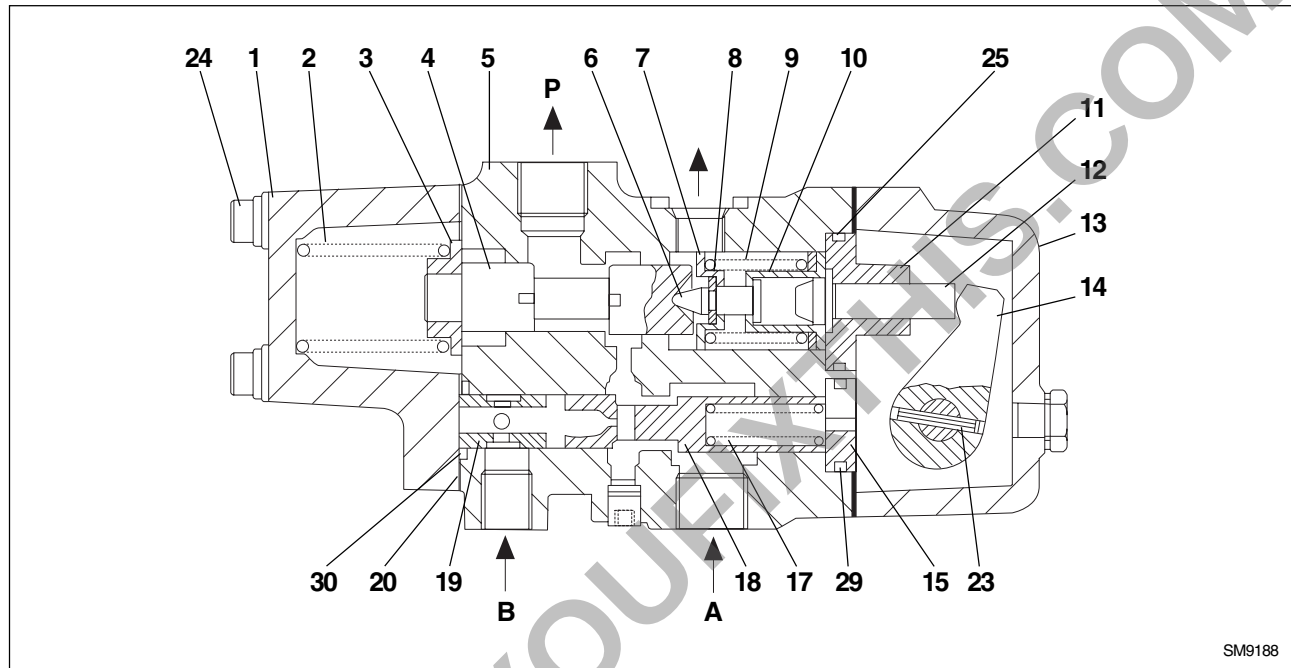


Fig. 4-29 Section view of brakes control valve

1. Cover - 2. Spring - 3. Washer - 4. Piston - 5. Body assembly - 6. Push rod - 7. Inner cup - 8. Washer - 9. Spring - 10. Outer cup - 11. Guide - 12. Pusher pin - 13. Cover - 14. Cam - 15. Washer - 16. Gasket - 17. Piston spring - 18. Piston - 19. Spacer - 20. Gasket - 23. Spring pin - 24. Cover securing screw M8x75 - 25. O-Ring 2.62x34.59 - 29. O-Ring 2.62x20.29 - 30. O-Ring 2.62x18.72.

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