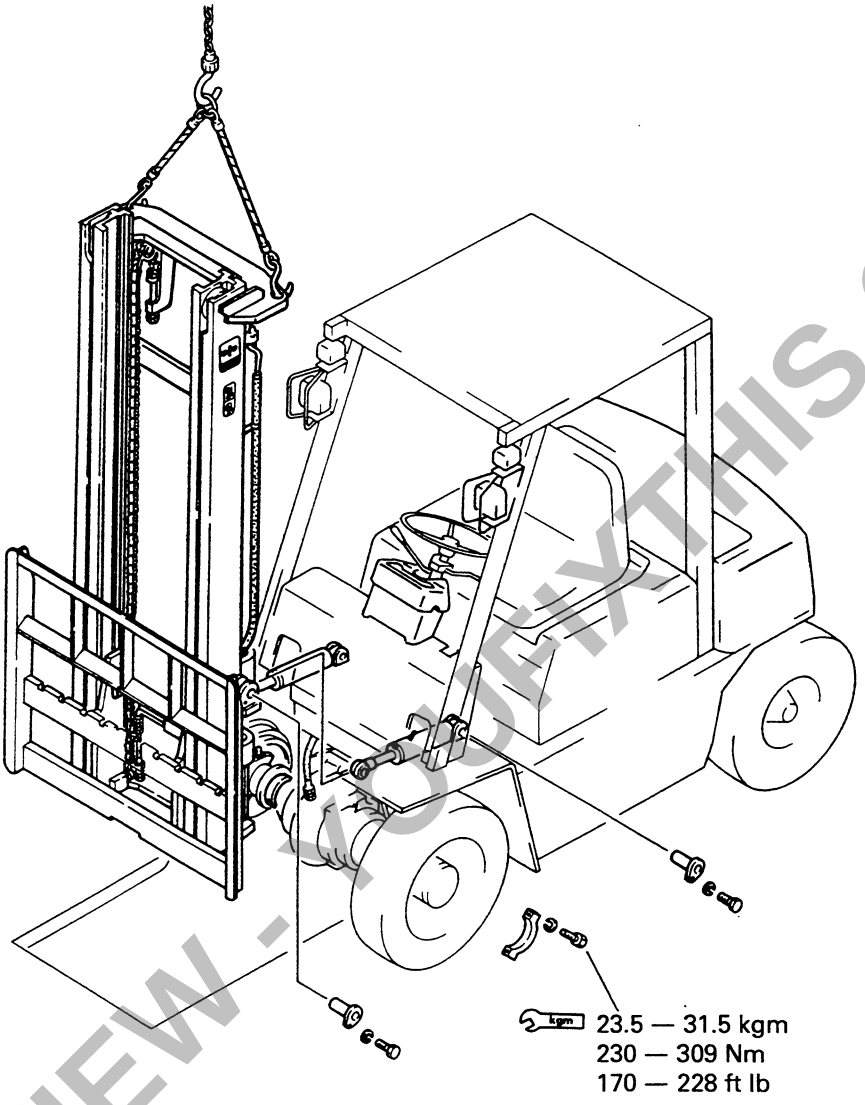
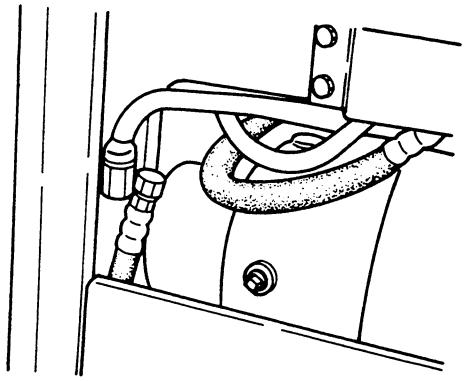


1. Piping

Raise the fork carriage to make it easy to remove the piping. Remove the piping and the return hose from the control valve.

★ Put blind plugs in the piping immediately after removing it. This prevents the hydraulic oil from flowing out and also prevents dust and dirt from getting in.

⚠ Insert blocks to prevent the fork carriage from coming down.



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STANDARD TIGHTENING TORQUE FOR BOLTS

TIGHTENING TORQUE when using torque wrench or spana shall be in accordance with Table. This torque shall be used when TIGHTENING TORQUE of especially narrow range is required.

1. In the case of using impact wrenches or spanners

Unit: kgm (Nm) [ft. lb]

Thread dia. mm (in)	Width across flats mm (in)		S43C, SMn34CH SMn40CH, SCM3H or superior ones	
	Conventional threads	ISO threads	Range	Target
6 (0.24)	10 (0.39)	10 (0.39)	0.9 — 1.5 (8.8 — 15) [6.5 — 11]	1.2 (12) [8.7]
8 (0.32)	14 (0.55)	13 (0.51)	1.5 — 3.5 (15 — 34) [11 — 25]	2.5 (25) [18]
10 (0.39)	17 (0.67)	17 (0.67)	3.5 — 7.5 (34 — 74) [25 — 54]	5.5 (54) [40]
12 (0.47)	19 (0.75)	19 (0.75)	5.5 — 12.5 (54 — 123) [40 — 90]	9.0 (88) [65]
14 (0.55)	21 (0.83)	22 (0.87)	8.5 — 20.0 (83 — 196) [61 — 145]	14.0 (137) [101]
16 (0.63)	23 (0.91)	24 (0.95)	15.0 — 31.5 (147 — 309) [109 — 228]	23.5 (231) [170]
18 (0.71)	26 (1.02)	27 (1.06)	20.5 — 43.5 (201 — 427) [148 — 315]	32.0 (314) [232]
20 (0.79)	29 (1.14)	30 (1.18)	32.5 — 62.0 (319 — 608) [235 — 448]	47.0 (461) [340]
22 (0.87)	32 (1.26)	32 (1.26)	48.0 — 84.5 (471 — 829) [347 — 611]	66.5 (652) [481]
24 (0.95)	35 (1.38)	36 (1.42)	60.0 — 105 (588 — 1030) [434 — 760]	82.5 (809) [597]
27 (1.06)	41 (1.61)	41 (1.61)	90.0 — 150 (883 — 1471) [651 — 1085]	120 (1177) [868]
30 (1.18)	46 (1.81)	46 (1.81)	115 — 195 (1128 — 1912) [832 — 1410]	155 (1520) [1121]
33 (1.30)	50 (1.97)	50 (1.97)	150 — 250 (1471 — 2452) [1085 — 1808]	200 (1961) [1447]
36 (1.42)	54 (2.13)	55 (2.17)	190 — 310 (1863 — 3040) [1374 — 2242]	250 (2452) [1808]
39 (1.54)	58 (2.28)	60 (2.36)	230 — 370 (2256 — 3628) [1664 — 2676]	300 (2942) [2170]

2. In the case of using torque wrenches

Unit: kgm (Nm) [ft. lb]

Thread dia. mm (in)	Width across flats mm (in)		S43C, SMn34CH SMn40CH, SCM3H or superior ones	
	Conventional threads	ISO threads	Range	Target
6 (0.24)	10 (0.39)	10 (0.39)	1.2 — 1.5 (12 — 15) [8.7 — 11]	1.35 (13.2) [9.87]
8 (0.32)	14 (0.55)	13 (0.51)	2.8 — 3.5 (28 — 34) [20 — 25]	3.2 (31) [23]
10 (0.39)	17 (0.67)	17 (0.67)	6 — 7.5 (59 — 74) [43 — 54]	6.7 (66) [49]
12 (0.47)	19 (0.75)	19 (0.75)	10 — 12.5 (98 — 123) [72 — 90]	11.5 (113) [83.2]
14 (0.55)	21 (0.83)	22 (0.87)	16 — 20.0 (157 — 196) [116 — 145]	18 (177) [130]
16 (0.63)	23 (0.91)	24 (0.95)	25 — 31.5 (245 — 309) [181 — 228]	28.5 (280) [206]
18 (0.71)	26 (1.02)	27 (1.06)	35 — 43.5 (343 — 427) [253 — 315]	39 (383) [282]
20 (0.79)	29 (1.14)	30 (1.18)	50 — 62.0 (490 — 608) [362 — 448]	56 (549) [405]
22 (0.87)	32 (1.26)	32 (1.26)	67.5 — 84.5 (662 — 829) [488 — 611]	76 (745) [550]
24 (0.95)	35 (1.38)	36 (1.42)	84 — 105 (824 — 1030) [608 — 760]	94.5 (927) [684]
27 (1.06)	41 (1.61)	41 (1.61)	120 — 150 (1177 — 1471) [868 — 1085]	135 (1324) [977]
30 (1.18)	46 (1.81)	46 (1.81)	155 — 195 (1520 — 1912) [1121 — 1410]	175 (1716) [1266]
33 (1.30)	50 (1.97)	50 (1.97)	200 — 250 (1961 — 2452) [1447 — 1808]	225 (2207) [1627]
36 (1.42)	54 (2.13)	55 (2.17)	250 — 310 (2452 — 3040) [1808 — 2242]	280 (2746) [2025]
39 (1.54)	58 (2.28)	60 (2.36)	295 — 370 (2893 — 3628) [2134 — 2676]	335 (3285) [2423]

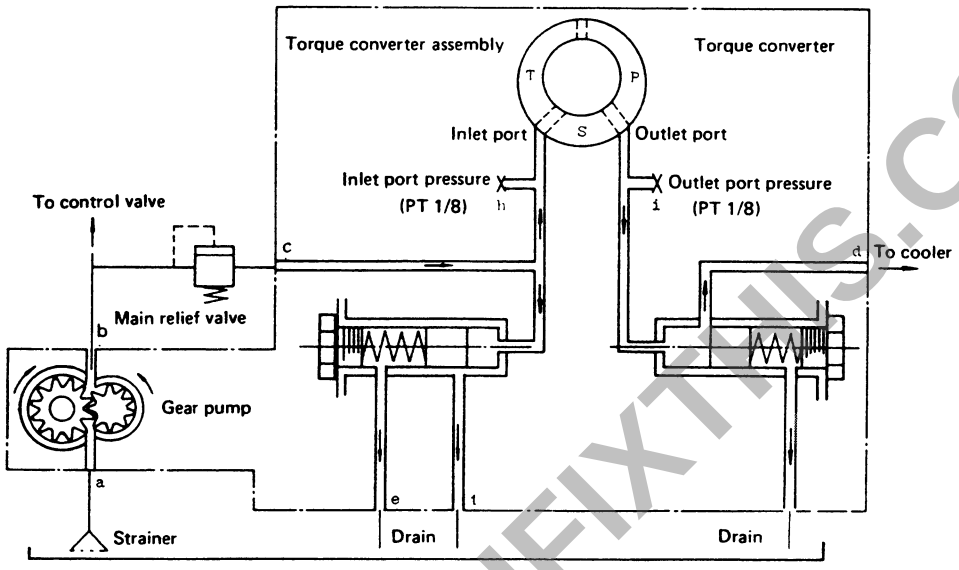
★ This table does not apply to the bolts with which nylon packings or other non-ferrous metal washers are to be used, or which require to tighten to otherwise specified torque.

Conventional screw threads

ISO screw threads

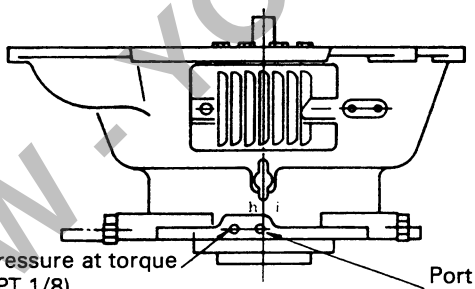
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TORQUE CONVERTER HYDRAULIC CIRCUIT



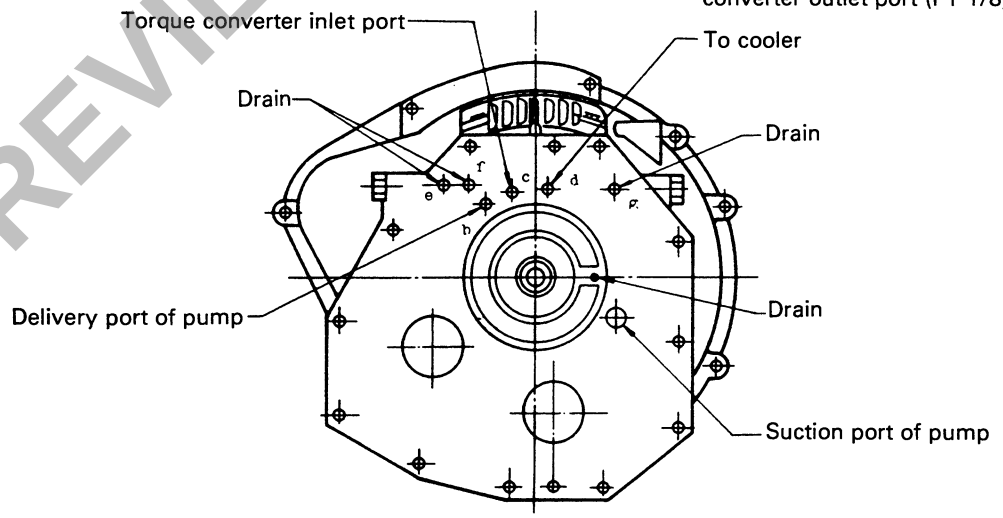
	kg/cm² (bar) [psi]
Inlet pressure	3 – 7.5 (3 – 7.4) [43 – 107]
Cracking pressure	5.0 (4.9) [71]

	kg/cm² (bar) [psi]
Outlet pressure	2 – 4.5 (2 – 4.4) [28 – 64]
Cracking pressure	2.0 (2.0) [28]



Port for measuring pressure at torque converter inlet port (PT 1/8)

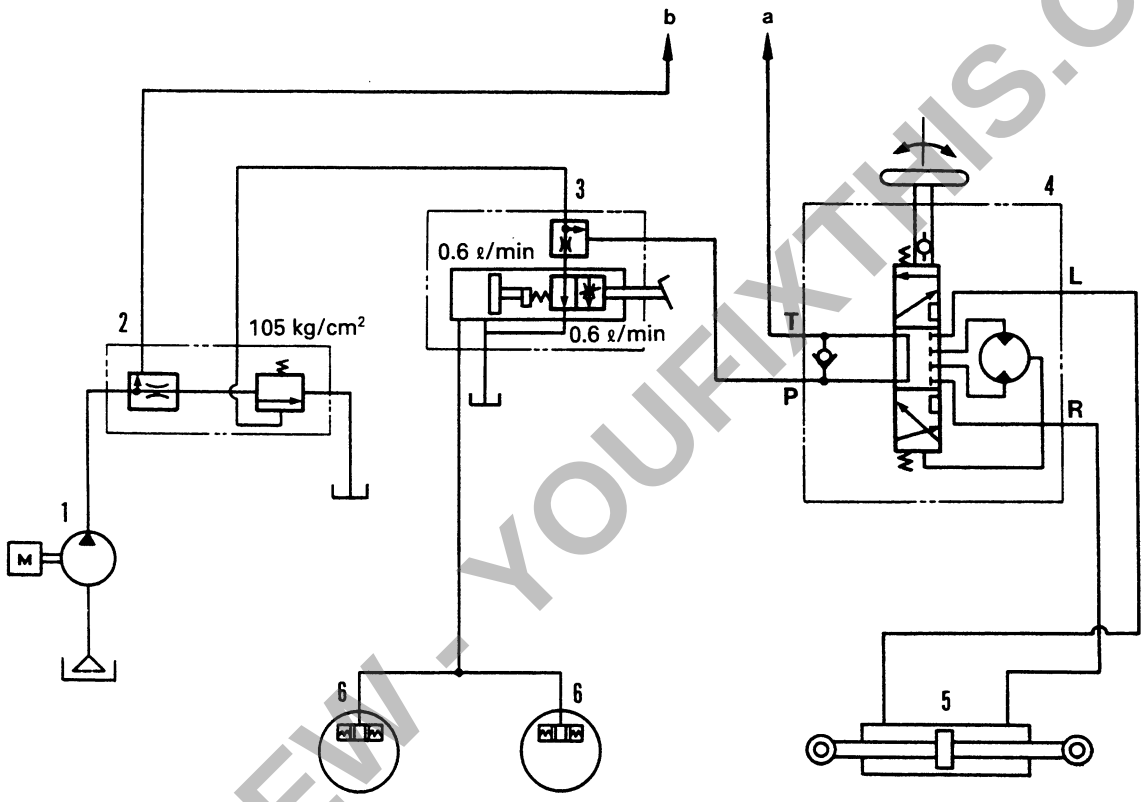
Port for measuring pressure at torque converter outlet port (PT 1/8)



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HYDRAULIC CIRCUIT DIAGRAM



1. Hydraulic pump
2. Flow divider
3. Brake valve
4. Steering valve
5. Power steering cylinder
6. Wheel cylinder

a. To tank
b. To hydraulic control valve

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TROUBLESHOOTING

Most steering problems can be corrected if the problem is properly defined. The entire steering system should be evaluated before removing any components. The steering control unit is generally not the cause of most steering problems. The following is a list of steering problems along with possible causes and suggested corrections.

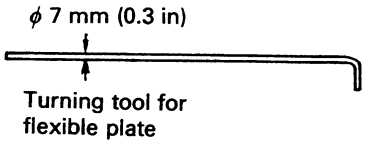
Problem	Possible Cause	Correction
1. Slow steering, hard steering, or loss of power assist.	Worn or malfunctioning pump.	Replace pump.
	Stuck flow divider piston.	Replace flow divider.
	Worn pump compensator allowing the sytem pressure to be less than specified.	Replace pump and compensator.
	Malfunctioning relief valve allowing the system pressure to be less than specified.	Replace the relief valve.
	Overloaded steer axle.	Reduce load.
	If load sensing system 1. Leaking of kinked load sensing signal axle. 2. Malfunctioning priority valve.	Correct Check spring and sticking spool. Check damping orifices in both ends of main bore for debris. Check system pressure at SCU inlet for proper system pressure. If not correct replace priority valve relief cartridge.
2. Wander — Tendency of vehicle path to deviate from course defined by operator input.	Air in the system due to low level of oil, cavitating pump, leaky fitting, pinched hose, etc.	Correct condition and add fluid.
	Worn mechanical linkage.	Repair or replace.
	Bending of linkage or cylinder rod.	Repair or replace.
	Loose cylinder piston.	Repair or replace.
	Leaky crossover relief or anti-cavitation valve in cylinder lines.	Repair or replace the accessory valve.
	Severe wear in steering control unit.	Replace the steering control unit.
3. Drift — Diviation of vehicle path, without operator input, from normally expected continuing course.	Single rod end cylinder slowly extends without turning the steering wheel.	A small rate of extension may be normal on a closed center system.
	Worn or damaged steering linkage.	Replace linkage and align front end.
4. Slip — A slow movement of steering wheel fails to cause any movement of steered wheels.	Leakage of clylinder piston seals or accessory valve between cylinder lines or ports.	Replace seals or accessory valve.
	Worn steering control unit meter.	Replace steering control unit.
5. Temporary hard steering or hang-up — A momentary increase in steering wheel torque during steering reversal or initial input.	Thermal Shock *	Check unit for proper operation and cause of thermal shock.

* Thermal shock definition bottom of page 20-83.

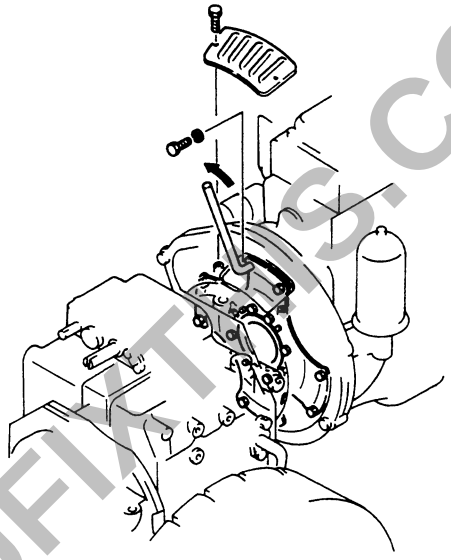
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6. **Control valve piping**
   Remove the hose because it is in the way when pulling the power train assembly out to the front. Fit blind plugs to prevent dust or dirt from entering.

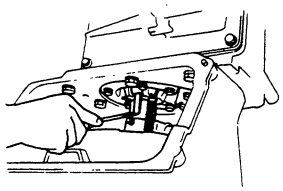
7. **Flexible plate (TORQFLOW trucks)**
   Remove the cover on the top face of the torque converter case, then remove the 12 mounting bolts installing to the engine flywheel. To rotate the flywheel, remove 1 mounting bolt, then insert a turning tool (pin diameter 7 mm) in the mounting hole. One man must turn the engine fan by hand while the other turns the flywheel.

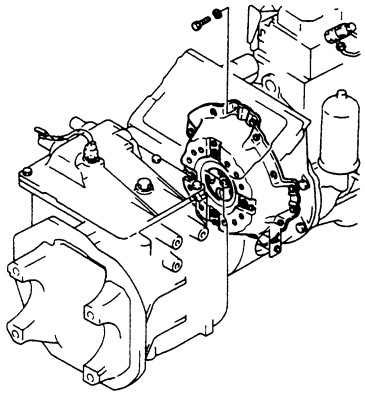


Turning tool for flexible plate



8. **Clutch disk (clutch type trucks)**
   - Open the clutch cover, and remove the rubber cover on top of the flange. Using a tool with an L shaped tip, open the snap ring holding the drive shaft, then pull out the pin.
   - Insert the tip of a screw driver in the groove of the drive shaft, and lever the drive shaft out to the transmission end.
   - Remove the 10 bolts mounting the cover of the pressure plate to the engine flywheel, then remove together with the clutch disk from the clutch case.
     When rotating the engine flywheel as with the TORQFLOW truck, it is easier if one man turns the engine fan by hand while the other turns the flywheel.





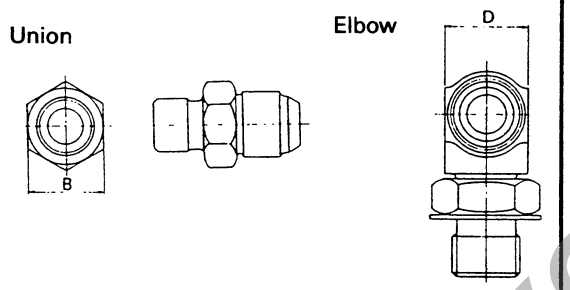
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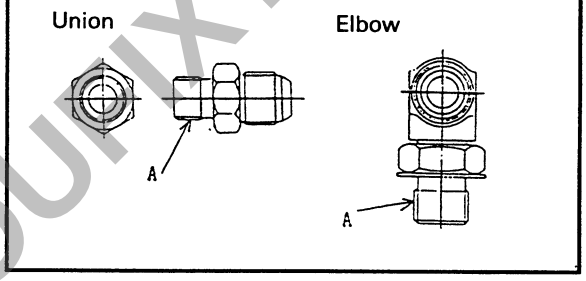
STANDARD TIGHTENING TORQUE FOR PIPE JOINTS

Elbows, nipples and unions

Width across flats B (mm)	22	30	36
Width D (mm)	19	22	30
Tightening torque (kgm)	3 — 4	8 — 10.5	12 — 16.5
Port size (inch)	3/4-16UNF	13/16-12UNF	15/16-12UNF
Tightening torque (kgm)	7 — 7.5	12 — 16.5	11 — 15

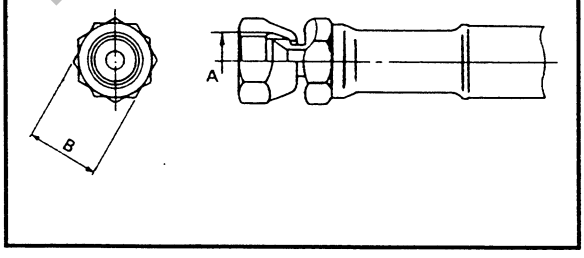


Thread size A (inch)	7/8-14 UNF	13/16-12 UNF	15/16-12 UNF
Tightening torque (kgm)	8 — 8.5	12 — 16.5	11 — 15

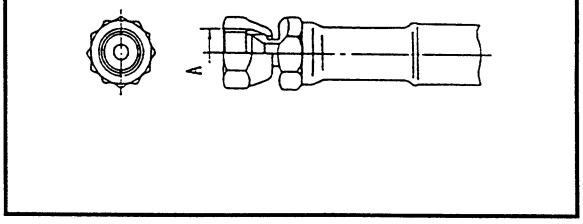


High-pressure rubber hoses, pipes and sleeve nuts

Width across flats B (mm)	19	24	27	32	36
Bore A (mm)	14	18	22	24	30
Tightening torque (kgm)	2 — 3	3 — 7	6 — 10	11 — 17	15 — 21



Thread size A (inch)	3/4-16 UNF	7/8-14 UNF	11/16-12 UNF
Tightening torque (kgm)	4.5 — 5.5	5.4 — 6.6	10.8 — 13.2

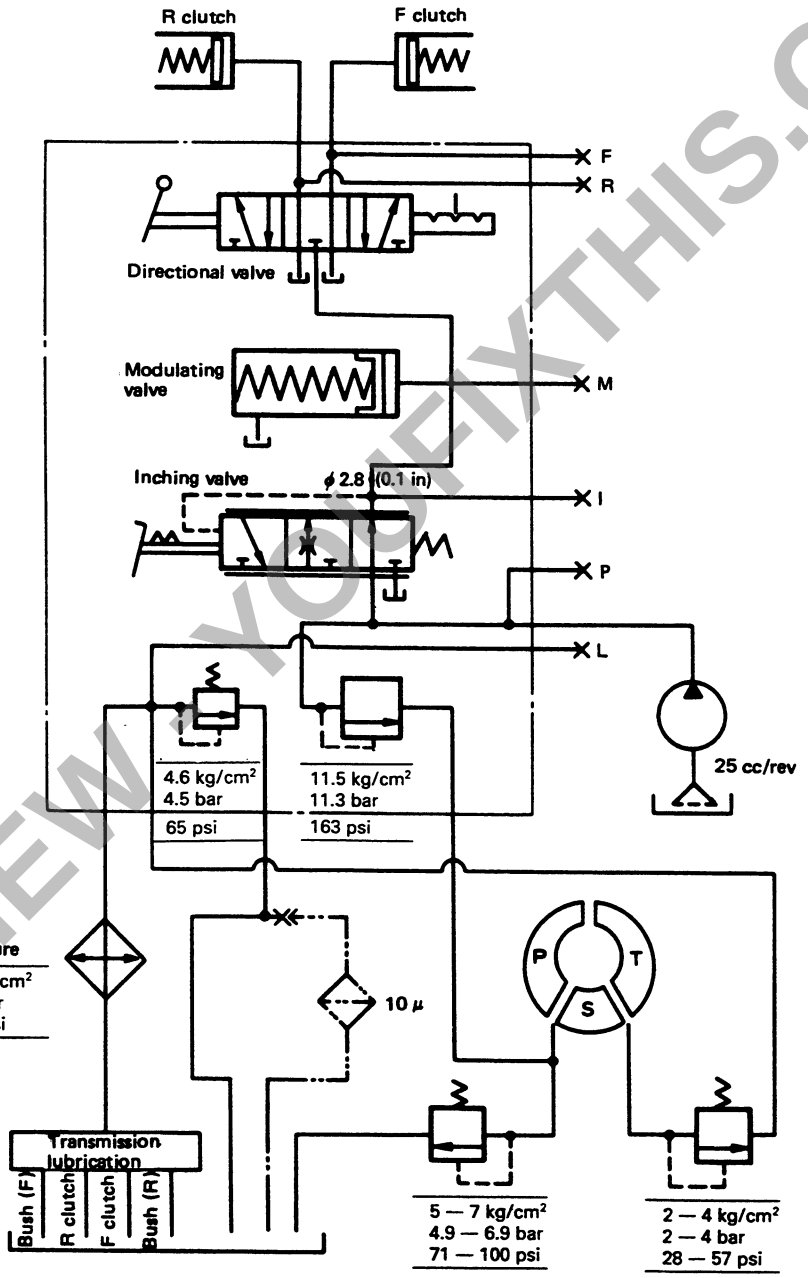


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HYDRAULIC CIRCUIT DIAGRAM

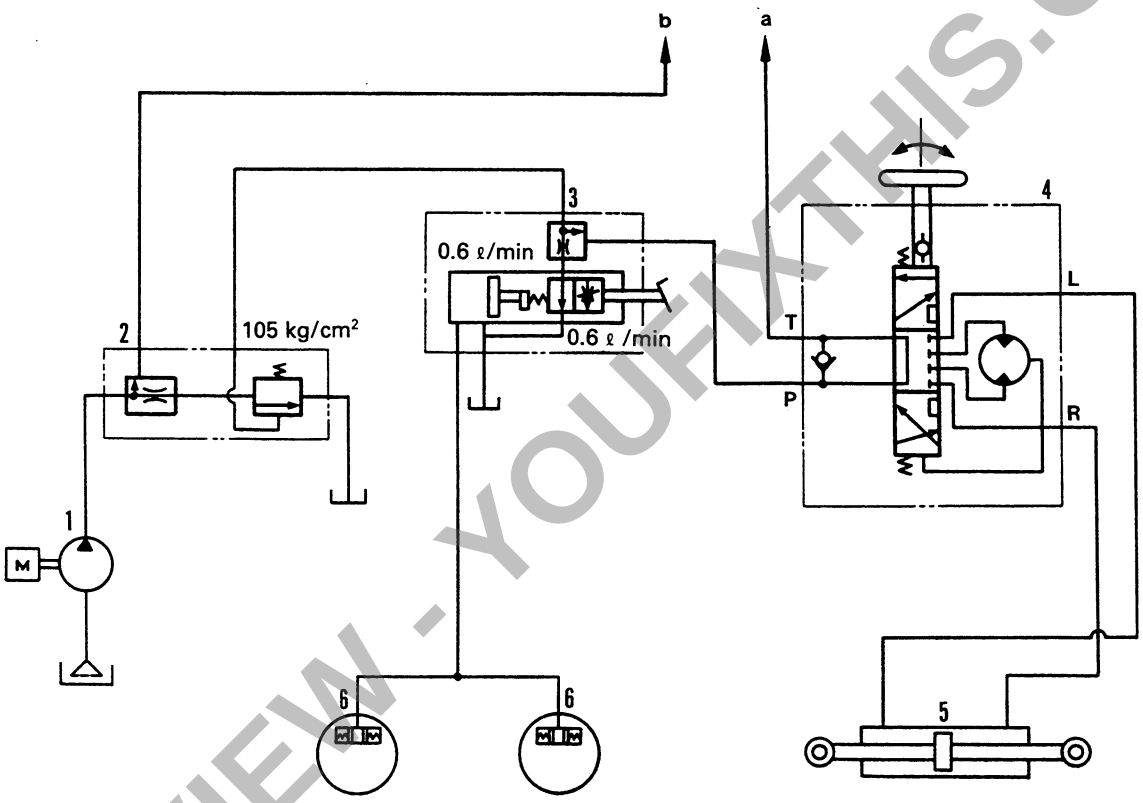
- **T1 TYPE**



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HYDRAULIC CIRCUIT DIAGRAM



1. Hydraulic pump
2. Flow divider
3. Brake valve
4. Steering valve
5. Power steering cylinder
6. Wheel cylinder

a. To tank
b. To hydraulic control valve

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ENGINE

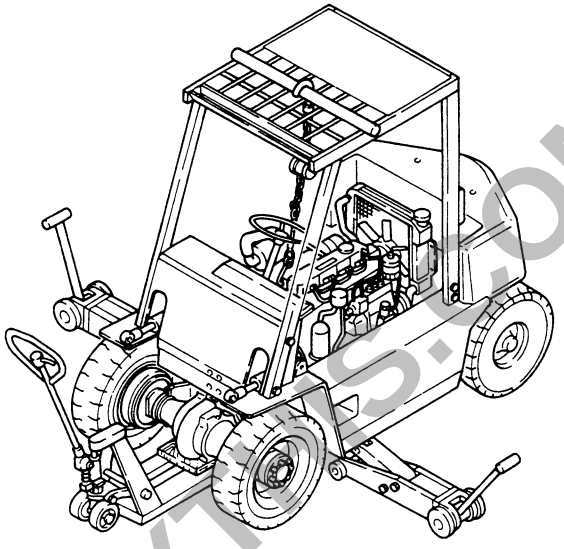
Trouble symptom	Probable cause	Remedy
Oil pressure caution lamp fails to go out.	• Low oil level in oil pan. • Oil filter element clogged. • Loose or worn oil pipe joint leaks oil.	• Add oil. • Replace element. • Check and repair
Radiator pressure valve spouts steam.	• Lack of cooling water or water leakage. • Loose fan belt. • Dust and scale accumulated in cooling system.	• Add water or repair. • Adjust belt. • Change water and clean the interior of cooling system.
Water temp. gauge indicates black range, on right.	• Radiator fin clogged or fin damaged. • Thermostat or water temp. gauge faulty. • Radiator filler cap loosening.	• Clean or repair. • Replace. • Retighten cap or replace packing.
Water temp. gauge indicates black range, on left.	• Thermostat faulty. • Water temperature gauge faulty.	• Replace • Replace
Engine fails to start.	• Lack of fuel. • Air mixed in fuel system. • Fuel injection pump or nozzle defective. • Starting motor rotates slowly. • Engine compression insufficient. • Valve clearance out of adjustment.	• Add fuel. • Repair. • Replace. • See "Electrical system." • Check and repair • Adjust clearance.
Engine emits whitish or bluish smoke.	• Excessive quantity of oil in oil pan. • Poor quality of fuel.	• Reduce oil quantity. • Replace with specified fuel.
Engine emits blackish smoke.	• Air cleaner element clogged.	• Clean or replace element.
Irregular fuel feeding sound heard.	• Fuel feed pump faulty.	• Replace pump.
Abnormal sound heard. (Fuel combustion or mechanical sound)	• Poor quality of fuel. • Overheating. • Muffler interior damaged. • Excessively large valve clearance.	• Replace with specified fuel. • See Symptom "Radiator pressure valve spouts steam". • Replace • Adjust clearance.

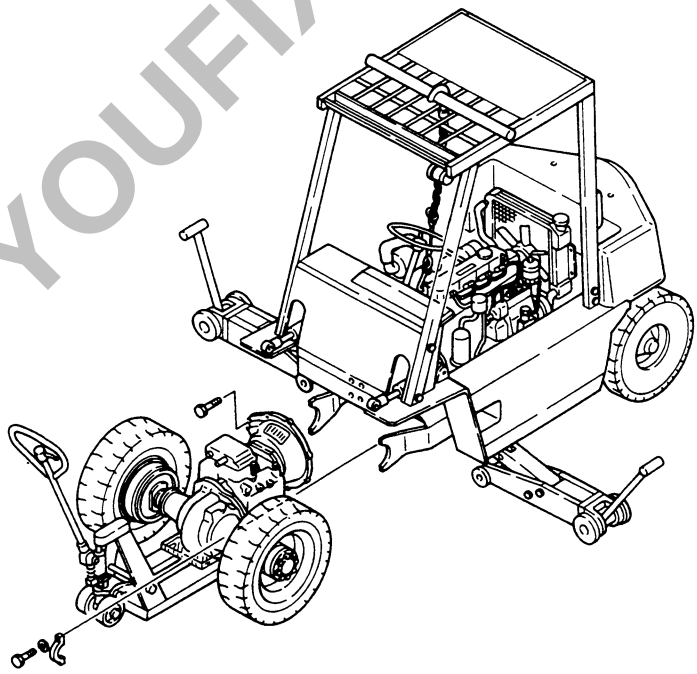
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9. Mounting bolts holding to flywheel housing

- Using a chain block, raise the engine to the overhead guard. Put jacks under the frame on both sides (or attach a crane to the tilt cylinder notches on the dashboard), and support the bottom of the transmission on a truck.
- Remove the drive axle caps and the mounting bolts installing to the engine flywheel. Insert a screwdriver in the join and disconnect.
  Operate the jacks on the left and right, raise the front of the frame and pull out slowly. When doing this, be careful not to catch the wiring harnesses, hoses and pipes.





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11. TIGHTENING TORQUE TABLE

System	Tightening	Tightening torque kgm (Nm) [ft.lb]	Page
Frame	Drive axle cap bolt	14 — 20 (137 — 196) [101 — 145]	10-13
	Pedal bracket bolt	5.5 — 7.5 (54 — 74) [40 — 54]	10-14
	Counterweight bolt	60 — 70 (588 — 687) [434 — 506]	10-28
Transmission	Transmission case and differential case bolts	16 — 20 (157 — 196) [116 — 145]	20-24
	Carrier cap	50 — 62 (490 — 608) [362 — 448]	20-20
	Pinion shaft bearing cage bolt	10 — 12.5 (98 — 123) [72 — 90]	20-19
	Pinion shaft nut	32 — 45 (314 — 441) [232 — 326]	20-16
	Transmission case and carrier case bolts	9 — 12.5 (88 — 123([65 — 90]	20-57
	(For clutch type)		
	F/R shaft stopper bolt	0.9 — 1.5 (9 — 15) [6.5 — 11]	20-23
	Drive shaft flange bolt	2.5 — 3.5 (25 — 34) [18 — 25]	20-23
	Transmission case and clutch case bolts	9 — 12.5 (88 — 123) [65 — 90]	20-23
	Gear shift lever nut	5.5 — 7.5 (54 — 74) [40 — 54]	10-14
	(For TORQFLOW type)		
	F/R, H/L shaft retainer bolt	2.5 — 3.5 (25 — 34) [18 — 25]	20-59
	Control valve bolt	2.8 — 3.5 (28 — 34) [20 — 25]	20-60
Differential	Differential gear case bolt	8 — 12.5 (79 — 123) [58 — 90]	20-62
	Differential gear case and bevel gear bolts	16 — 20 (157 — 196) [116 — 145]	20-62
Torque converter	Flexible plate bolt	5.5 — 7.5 (54 — 74) [40 — 54]	10-13
	Oil cooler pipe sleeve nut	3.5 — 4.5 (34 — 44) [26 — 33]	10-22
	Torque converter check valve plug	5 — 6.5 (49 — 64) [36 — 47]	20-27
	Gear pump case bolt (short)	2.5 — 3.2 (25 — 31) [18 — 23]	20-27
	Gear pump case bolt (long)	3.9 — 4.8 (38 — 47) [28 — 35]	20-27
	Drain plug	0.98 — 1.3 (9.6 — 13) [7 — 9.4]	20-27
	Pilot bolt	2.1 — 2.7 (21 — 27) [15 — 20]	20-27
Clutch	Pressure plate bolt	5.5 — 7.5 (54 — 74) [40 — 54]	10-13
Brake	Parking brake lever bracket bolt	2.5 — 3.5 (25 — 34) [18 — 25]	10-14
	Back up plate bolt (Compact wheel base chassis)	16 — 20 (157 — 196) [116 — 145]	10-24
	Back up plate bolt (Long wheel base chassis)	25 — 31 (245 — 304) [181 — 224]	10-24
	Brake drum nut	32.5 — 43.5 (319 — 427) [235 — 315]	40-14
	Pipe joint	0.8 — 1.0 (7.8 — 9.8) [5.8 — 7.2]	40-13
	Pipe sleeve nut	1.0 — 1.3 (9.8 — 12.8) [7.2 — 9.4]	40-13
Engine	Mounting bracket bolt (6D95L)	6.5 — 7.5 (64 — 74) [47 — 54]	10-17
	(P40) M10	6.5 — 7.5 (64 — 74) [47 — 54]	10-17
	M14	15 — 20 (147 — 196) [109 — 145]	10-17
	(TB42)	10 — 12.5 (98 — 123) [72 — 90]	10-17
	Flywheel housing and clutch case bolts	5.5 — 7.5 (54 — 74) [40 — 54]	10-18
	Flywheel housing and torque converter case bolts	5.5 — 7.5 (54 — 74) [40 — 54]	10-18
	Exhaust pipe nut	2.5 — 3.5 (25 — 34) [18 — 25]	10-19C
Drive axle (Front axle)	Front hub nut	30 — 50 (294 — 490) [217 — 362]	10-25
	Front hub bolt	32.5 — 43.5 (319 — 427) [235 — 315]	20-61

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