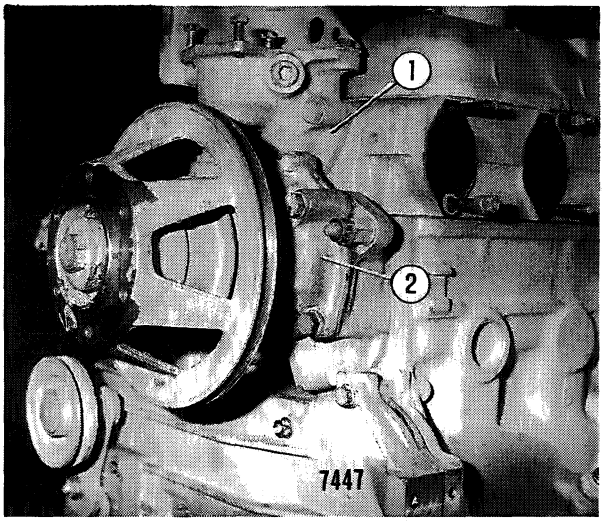
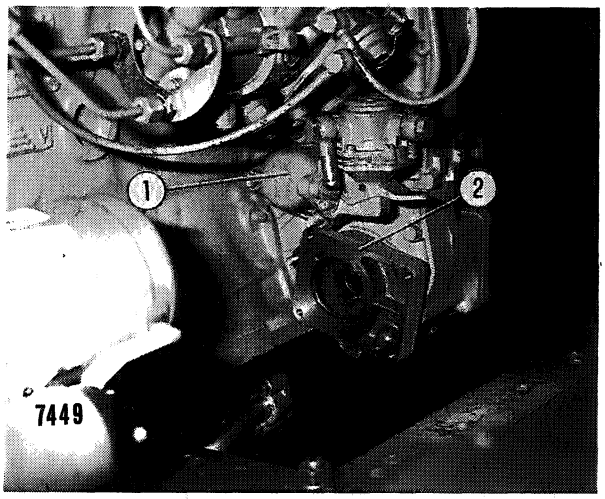
FIATALLIS®

ENGINE | 8045.25...

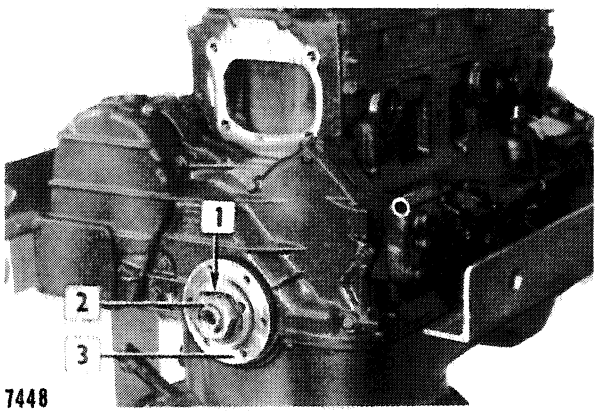
Service manual



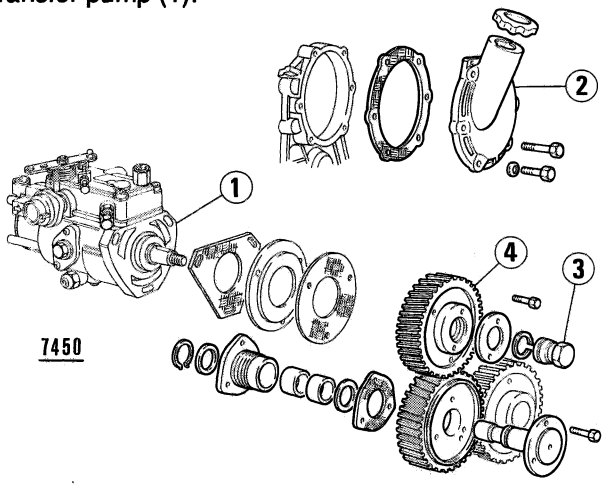
Remove thermostat support (1) and water pump (2).



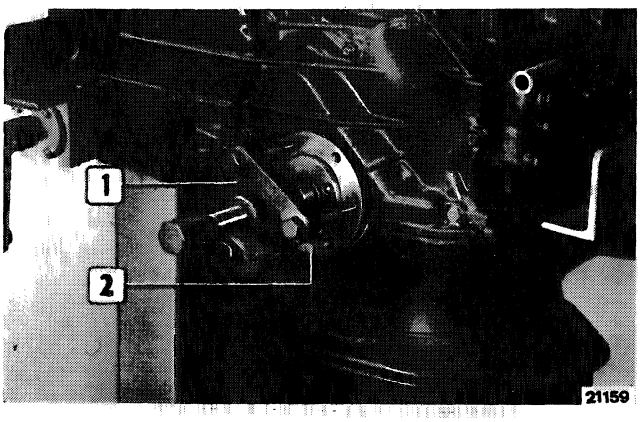
Remove hydraulic pump from support, followed by transfer pump (1).



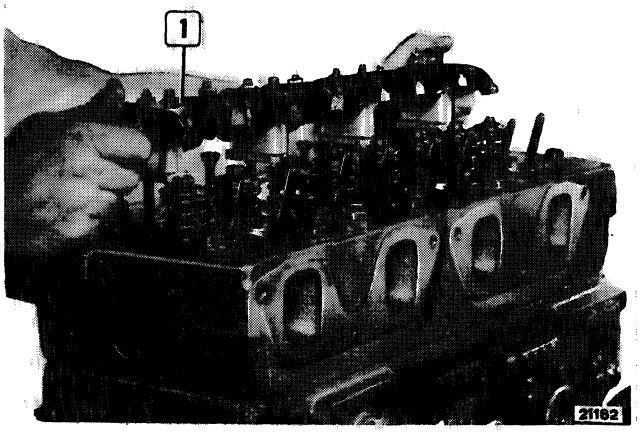
Take off the drive pulley on crankshaft. Lock flywheel in position using special retaining fixture 993600352. Lift the tab of lock plate (1) and with a suitable wrench slacken nut (2) securing the alternator/water pump drive pulley hub (3).



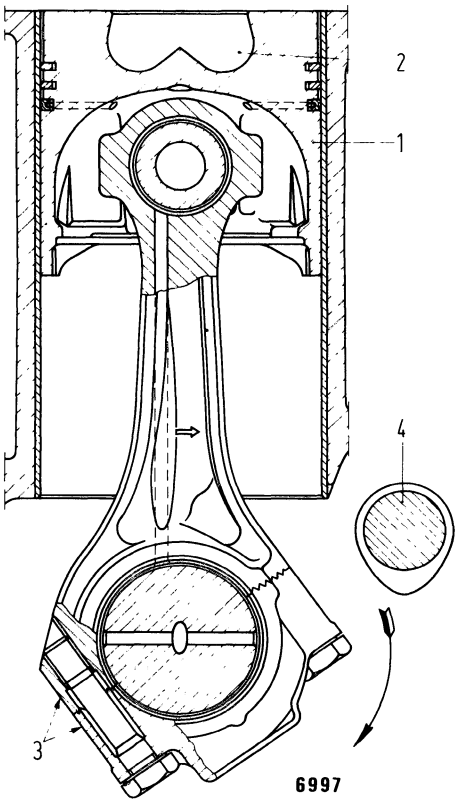
First remove cover (2), backout nut (3) then take down the fuel injection pump (1). The nut serves as puller for drive gear (4).



Apply fixture 99340033 (1) and pull out hub (2).



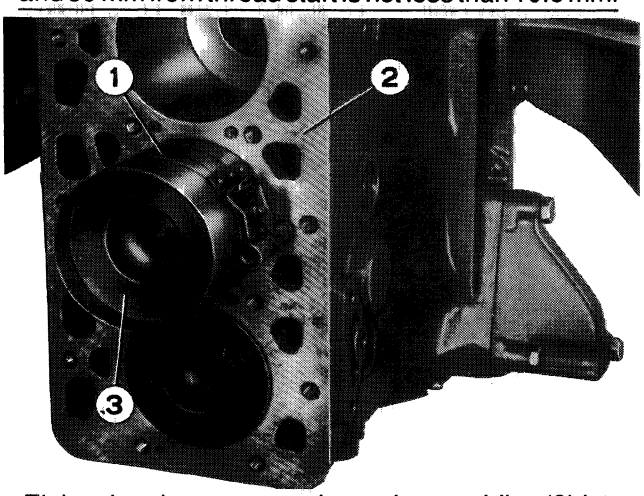
Remove the complete rocker shaft (1).



PISTON AND CONNECTING ROD SET ASSEMBLY DATA

1. Piston - 2. Combustion chamber - 3. Corresponding cylinder number stamping area - 4. Camshaft

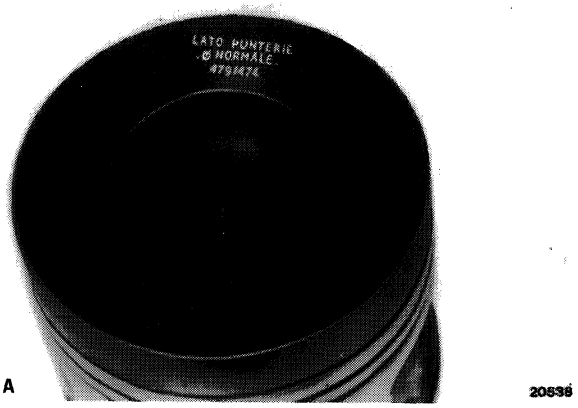
NOTE - The con rod cap screws may be re-used as long as their thread diameter measured between 19 and 35 mm from thread start is not less than 10.5 mm.



Fitting the piston/connecting rod assemblies (3) into cylinders using special ring compressor 99360605 (1).

When installing piston/con rod sets into their associated cylinder check that:

☐ Connecting rod number is same as the number of the cylinder in which it is fitted.

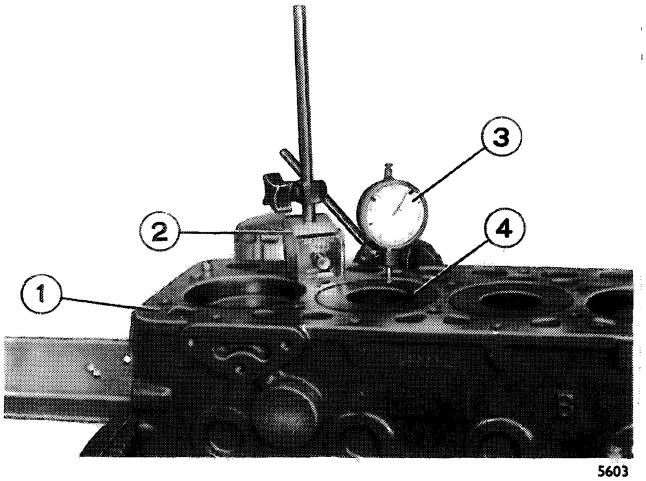


☐ Wording "LATO PUNTERIE" (tappet side) on piston top faces the camshaft.

☐ Numbers stamped on connecting rods are located on side opposite the camshaft.

☐ Piston ring gaps are positioned offset and 120 apart.

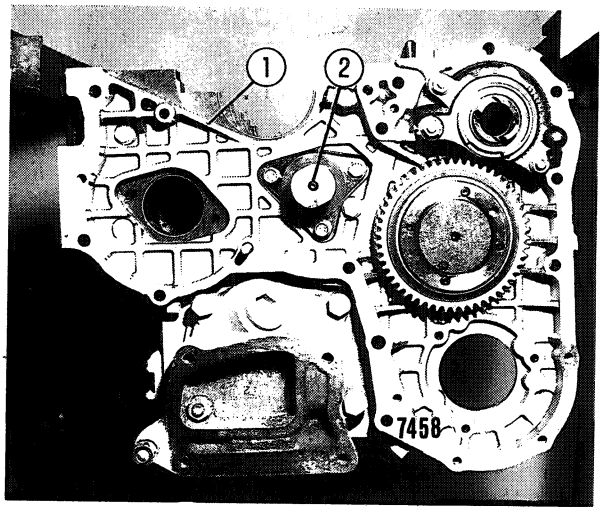
Before insertion, lubricate the pistons, rings and liner bores.



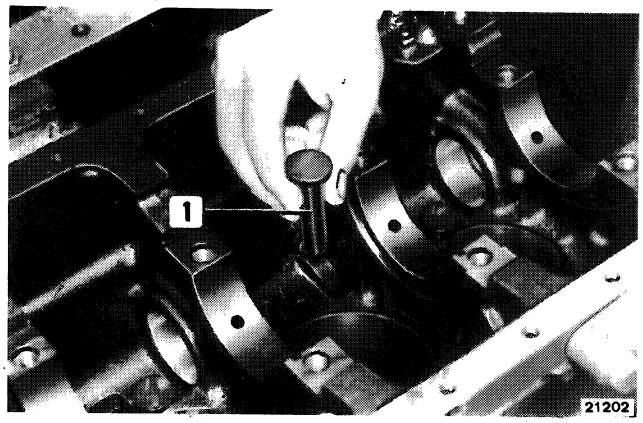
At end of assembly check the TDC position of pistons (4) relative to engine block top face using a magnetic base dial gauge (3).

Piston top standout over face (1) shall be 0.46 to 0.79 mm max.

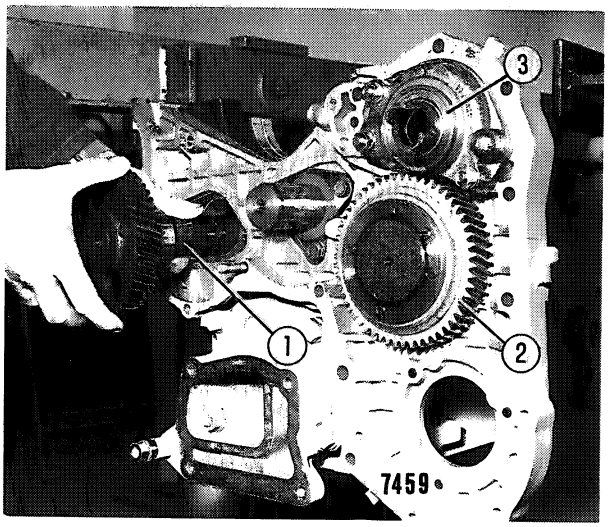
ENGINE ASSEMBLY



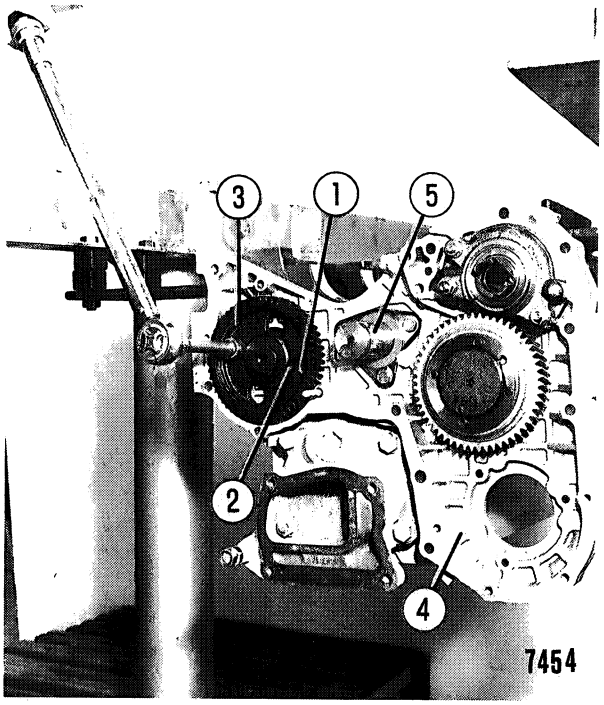
Using brackets 99361033 secure cylinder block on service revolving stand 99322205.
Fit the camshaft bushings...
Fix the timing gear cover (1) and fit the intermediate gear shaft (2).



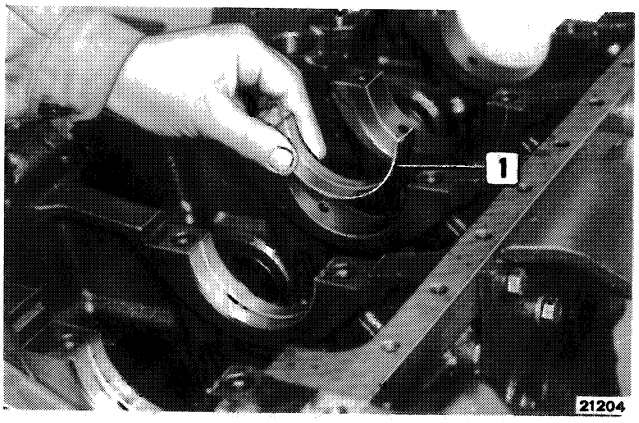
Oil the tappets (1) and introduce in their respective housings in cylinder block.



Install camshaft gear (3) intermediate gear (2) lubricate the journals of camshaft (1) and insert in block.



Through openings (2) in gear (3) tighten screws (1) securing the camshaft-to-cylinder block retaining plate.



Fit main bearing halves (1) on supports in crankcase; next, using hoist and sling, raise crankshaft and lower down gently onto the main bearings.

FAULT	CAUSE	REMEDY
Engine runs unevenly	Injector operation defective.	Check that needle does not bind or seize in its housing in nozzle and that calibration meets specifications.
	Fuel lines clogged.	Disconnect line: clean accurately and replace any found to be excessively dented or distorted.
	Injection pump setting to engine incorrect.	Re-adjust to ensure fuel release in conformity with the specified advance angles.
	Crankshaft knocking caused by excessive play in one or more main/ connecting rod bearings or high end float.	Re-grind journals and crankpins and fit undersize bearings. Replace thrust rings with oversize rings.
	Crankshaft out of balance.	Check alignment; if necessary, correct as required and check balance.
	Flywheel screws slackened.	Replace the slack screws and tighten the others to the specified torque.
	Connecting rods misaligned.	Straighten connecting rods on the hydraulic press and check the parallelism of axes.
	Piston thumping due to slap.	Ream out the cylinder liners and fit oversize pistons.
	Piston pin noise caused by excessive clearance in skirt bosses and small end bushings.	Replace piston pin or, if necessary, also the piston.
	Con rod bushings loose.	Replace bushings as required.
	Valve train noisy (tapping).	Re-adjust valve to rocker clearance and check for broken springs, excessive valve stem-to-guides and/or tappets-to-housing clearances.

SAFETY RULES

GENERAL

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

Read and heed all machine-mounted safety signs before starting, operating, maintaining, fueling or servicing machine.

Machine-mounted safety signs have been color coded yellow with black border and lettering for WARNING and red with white border and lettering for DANGER points.

Never attempt to operate the machine or its tools from any position other than seated in the operator's seat. Keep head, body, limbs, hands and feet inside operator's compartment at all times to reduce exposure to hazards outside the operator's compartment.

Do not allow unauthorized personnel to operate, service or maintain this machine.

Always check work area for dangerous features. The following are examples of dangerous work areas: slopes, overhangs, timber, demolitions, fire, high walls, dropoff, backfills, rough terrain, ditches, ridges, excavations, heavy traffic, crowded parking, crowded maintenance and closed areas. Use extreme care when in areas such as these.

An operator must know the machine's capabilities. When working on slopes or near dropoffs be alert to avoid loose or soft conditions that could cause sudden tipping or loss of control.

Do not jump on or off machine. Keep two hands and one foot, or two feet and one hand, in contact with steps, grab rails and handles at all times.

Do not use controls or hoses as handholds when climbing on or off machine. Hoses and controls are movable and do not provide a solid support. Controls also may be inadvertently moved causing accidental machine or equipment movement.

Keep operator's compartment, stepping points, grab-rails and handles clear of foreign objects, oil, grease, mud or snow accumulation to minimize the danger of slipping or stumbling. Clean mud or grease from shoes before attempting to mount or operate the machine.

Be careful of slippery conditions on stepping points, hand rails, and on the ground. Wear safety boots or shoes that have a high slip resistant sole material.

For your personal protection, do not attempt to climb on or off machine while machine is in motion.

Never leave the machine unattended with the engine running.

Always lock up machine when leaving it unattended. Return keys to authorized security. Heed all shutdown procedures of the Operation and Maintenance Instruction Manual. Always set the parking brake when leaving the machine for any reason.

Do not wear rings, wrist watches, jewelry, loose or hanging apparel, such as ties, torn clothing, scarves, unbuttoned, or unzipped jackets that can catch on moving parts. Wear proper safety equipment as authorized for the job. Examples: hard hats, safety shoes, heavy gloves, ear protectors, safety glasses or goggles, reflector vests, or respirators. Consult your employer for specific safety equipment requirements.

Do not carry loose objects in pockets that might fall unnoticed into open compartments.

Do not use machine to carry loose objects by means other than attachments for carrying such objects.

DO NOT CARRY RIDERS unless the machine is equipped for carrying people to reduce personal exposure to being thrown off.

Do not operate machinery in a condition of extreme fatigue or illness. Be especially careful towards the end of the shift.

Roll Over Protective Structures are required on wheel loaders, dozer tractors, track type loaders, graders and scrapers by local or national requirements. DO NOT operate this machine without a Roll over Protective Structure.

Do not operate a machine without a falling object protective structure (FOPS).

Do not operate this machine without a rear canopy screen when machine is equipped with rear mounted towing winch.

Seat belts are required to be provided with roll over protective structures or roll protection cabs by local or national regulations. Keep the safety belt fastened around you during operation.

Where noise exposure exceeds 90 dBA for 8 hours, wear authorized ear protective equipment per local or national requirements that apply.

Keep clutches and brakes on machine and attachments such as power control units, winches and master clutches adjusted according to Operation and Maintenance Instruction Manuals of the manufacturers at all times. DO NOT adjust machine with engine running except as specified.

Do not operate a machine with brakes out of adjustment. See the Operation and Maintenance Instruction Manual.

Move carefully when under, in or near machine or implements. Wear required protective equipment, such as hard hat, safety glasses , safety shoes, ear protectors.

To move a disabled machine, use a trailer or low boy truck if available. If towing is necessary, provide warning signals as required by local rules and regulations and follow Operation and Maintenance Instruction Manual recommendations. Load and unload on a level area that gives full support to the trailer wheels. Use ramps of adequate strength, low angle and proper height. Keep trailer bed clean of clay, oil and all materials that become slippery. Tie machine down securely to truck or trailer bed and block tracks (or wheels) as required by the carrier.

To prevent entrapment in cabs or mounted enclosures, observe and know the mechanics of alternate exit routes.

On machines equipped with suction radiator fans, be sure to periodically check all engine exhaust parts for leaks as exhaust gases are dangerous to the operator. Keep a vent open to outside air at all times when operating within a closed cab.

STARTING FLUID IS FLAMMABLE. Follow the recommendations as outlined in the Operation and Maintenance Instruction Manual and as marked on the containers. Store containers in cool, well-ventilated place secure from unauthorized personnel. DO NOT PUNCTURE OR BURN CONTAINERS. Follow the recommendations of the manufacturer for storage and disposal.

Wire rope develops steel slivers. Use authorized protective equipment such as heavy gloves, safety glasses when handling.

CAPSCREW AND TORQUE VALUES

Capscrew Head Markings	SAE Grade Number	Capscrew Size									
Manufacturer's marks may vary		1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
		Threads per inch									
		20	18	16	14	13	12	11	10	9	8
		28	24	24	20	20	18	18	16	14	14
		Torque Ft-Lb									
	1 or 2	5	11	18	28	39	51	83	105	160	235
		6	13	20	30	41	55	95	115	175	250
	5	8	17	31	49	75	110	150	270	395	590
		10	19	35	55	85	120	170	295	435	660
	6 or 7	10	19	34	55	85	120	167	280	440	660
		12	21	38	61	95	130	187	300	480	730
 	8	12	24	44	70	105	155	210	375	605	910
		14	27	49	78	120	170	240	420	675	990

Notes:

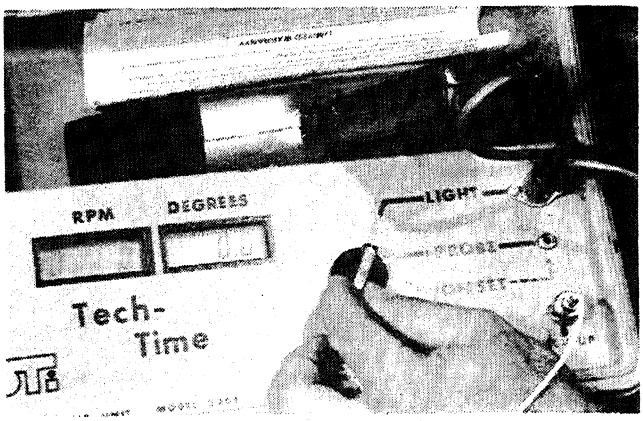
1. Always use the torque values listed above when specific torque values are not available.
2. Do not use above values in place of those specified in other sections of this manual; special attention should be observed.
3. The above is based on use of clean, dry threads.
4. Reduce torque by 10% when engine oil is used as a lubricant.
5. Reduce torque by 20% if new plated capscrews are used.
6. Capscrews threaded into aluminum may require reductions in torque of 30% of more of Grade 5 capscrews torque and must attain two capscrew diameters of thread engagement.

CAUTION:
If replacement capscrews are of a higher grade than originally supplied, adhere to torque specifications for that replacement.

SYMPTOM	PROBABLE CAUSE	TOOLS REQUIRED	TEST	SOLUTION
Starter will not crank engine(Continued)	Starter brush springs weak			Check spring tension and replace if necessary
	Starter commutator dirty or worn			Polish and/or machine commutator and under-cut mica if necessary
	Starter armature shaft bushings worn (armature drags on fields)			Replace worn bushings and related parts
	Starter armature burned out			Replace armature
Starter pinion will not engage with flywheel ring gear	Grease or dirt in starter drive mechanism			Disassemble and clean the drive assembly
	Broken or excessively worn parts			Replace broken or worn parts
FUEL SYSTEM				
Insufficient fuel supply to fuel injection nozzles	No fuel in fuel tank		Observe dipstick reading	Fill fuel tank with specified fuel. Vent fuel system
	Inoperative fuel transfer pump	Vacuum gauge	Install gauge between tank and pump and run engine tests	If vacuum is below specification, repair or replace transfer pump
	Fuel injection nozzle valve binding in valve body	Nozzle tester	Pop nozzles for pressure, pattern and sound	Replace valve assembly in nozzle holder body
	Fuel lines, filter, sediment bowl clogged	Engine diagnostic kit	Visual, run engine performance test and compare results	Clean fuel system components. Replace fuel filter
	Fuel injection pump malfunctioning	Engine diagnostic kit	Run engine performance test and compare results	Repair or replace fuel injection pump
	Fuel injection nozzles improperly adjusted	Nozzle tester	Pop nozzles for pressure, pattern and sound	Adjust fuel injection nozzles
Air in fuel system	Loose fuel line fitting or leak in fuel line on suction side of fuel transfer pump		Visual	Tighten loose fittings or replace damaged fuel lines
	Damaged gasket on fuel filter		Visual	Replace gasket

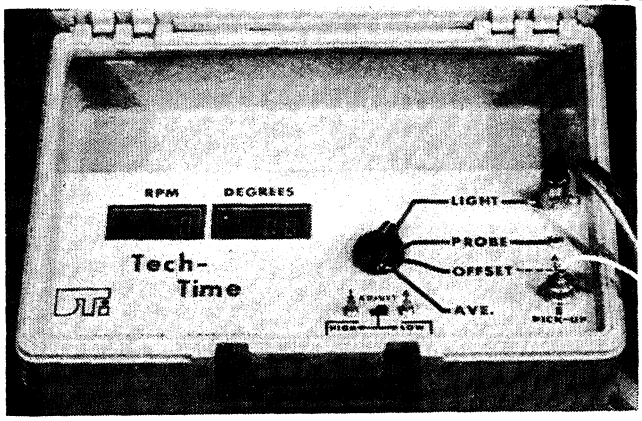
1.3.3.10
Turn the function switch to the *"light"* position.

T-91352



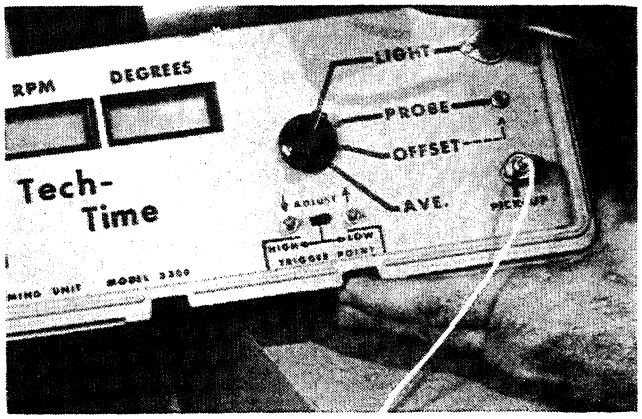
1.3.3.11
The digital display will show rpm indicating *"zero"* and the degrees display will read *"zero-point-zero"*.

T-91386



1.3.3.12
Place the *"trigger"* switch in the *"low"* position.

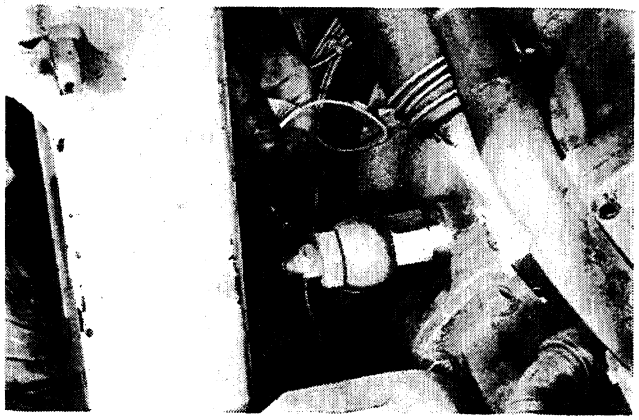
T-91353



1.3.3.13
If the battery voltage falls below 7 volts as the tractor is started, the unit may *"lock-up"*. If this should happen, momentarily disconnect the positive battery clip. This will re-set the microprocessor in the unit.

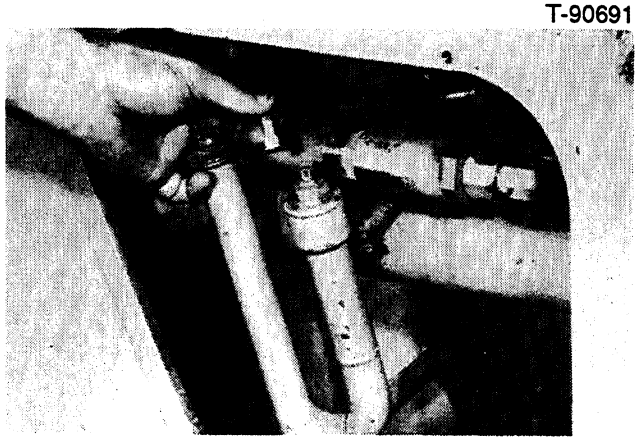
1.4.1.3.9
Disconnect and tag two wires to upper and lower transmission oil cooler sensors.(Upper shown)

T-90690



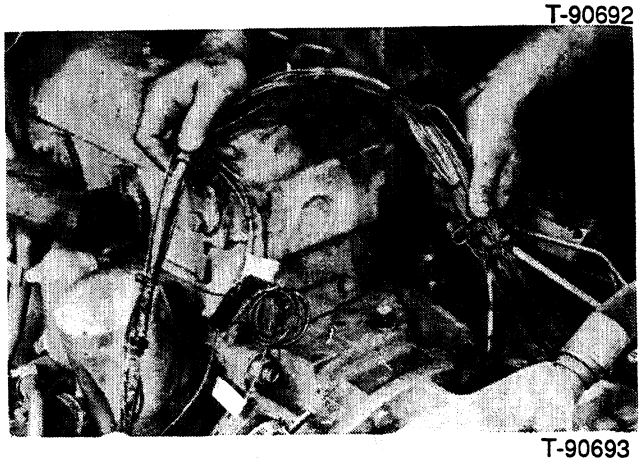
1.4.1.3.10
Disconnect and tag wire to transmission oil level sensor at dipstick.

T-90691



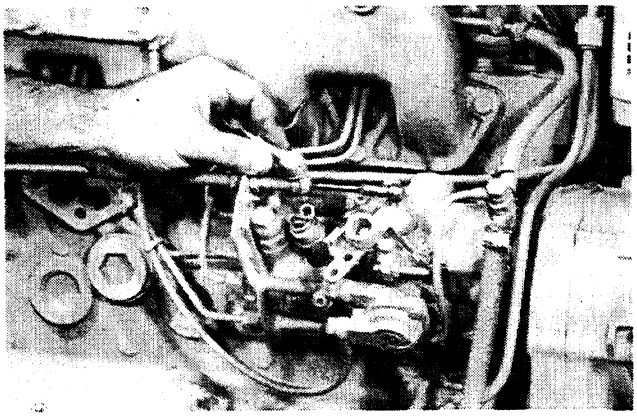
1.4.1.3.11
Remove three clamps attaching wiring harness to top of converter housing.

T-90692



1.4.1.3.12
Disconnect and tag wire from injection pump.

T-90693



1.4.2 DISASSEMBLY AND ASSEMBLY

1.4.2.1

Refer to **TRANSMISSION** (section 2) for repair procedures for the Transmission assembly.

1.4.2.2

Refer to **8045 ENGINE** service manual for repair procedures for the Engine assembly.

1.4.3 INSTALLATION

1.4.3.1

Follow reverse procedures as outlined in **REMOVAL.**

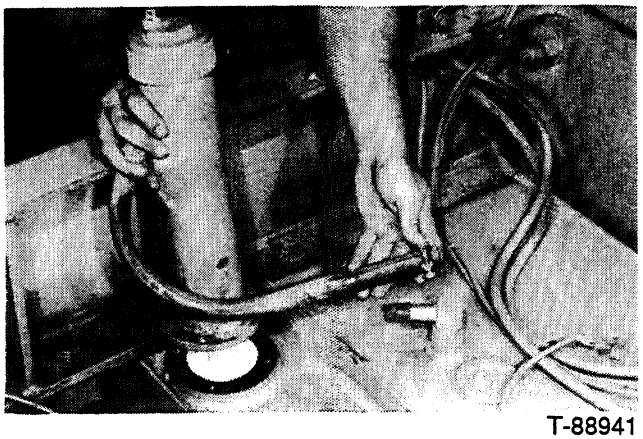
⚠ WARNING

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

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

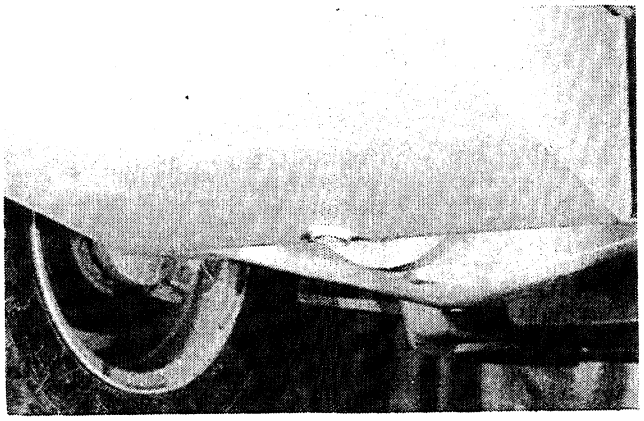
1.4.8.2.4
Install fuel filler tube and tighten four capscrews securely.

T-90801



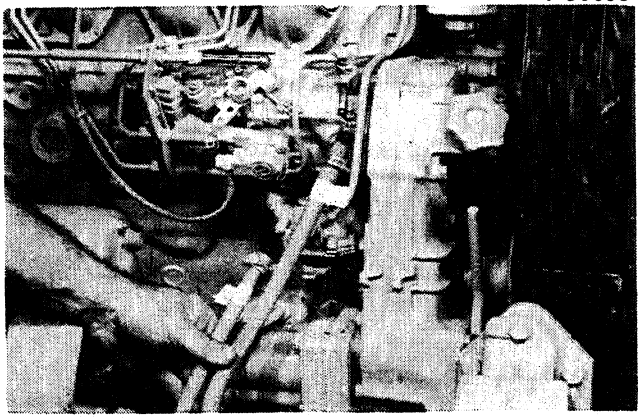
1.4.8.2.5
Install fuel tank drain plug.

T-88941



1.4.8.2.6
Install two hoses to fuel pump.

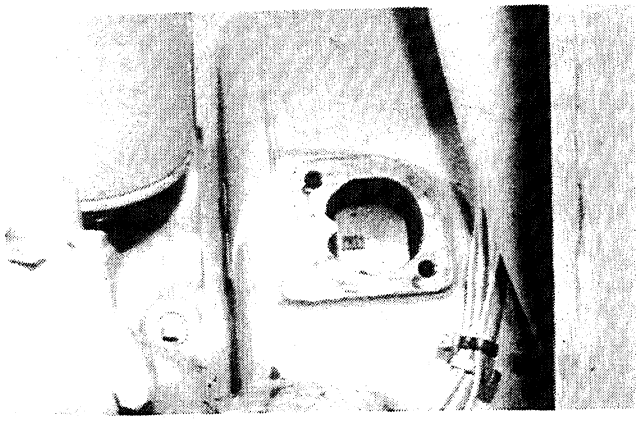
T-90695



1.4.11.2 INSTALLATION

1.4.11.2.1

Make sure the engine positioned with the number one cylinder on its compression stroke with the timing marks properly align.



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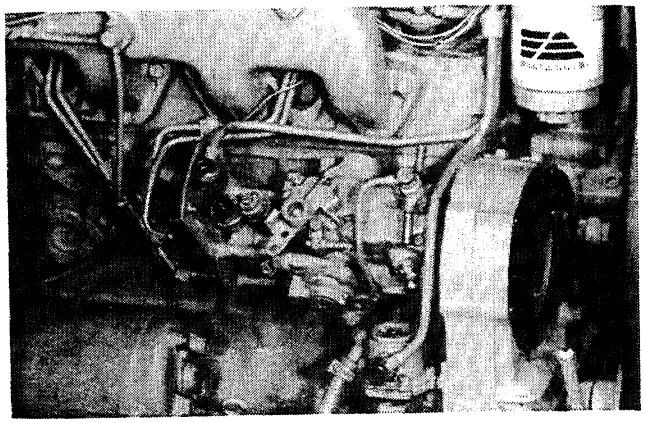
1.4.11.2.2

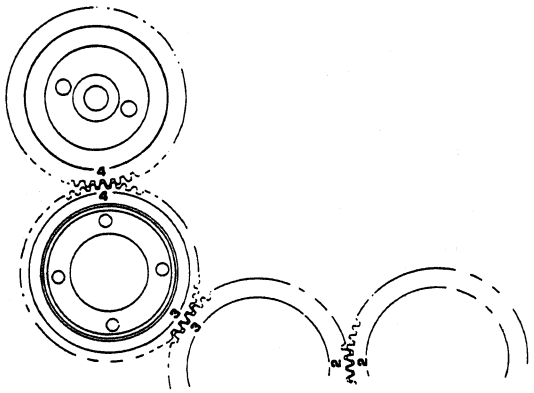
Reposition the pump against the drive housing and replace the mounting capscrews. Lightly snug the capscrews "finger tight".



T-91380

1.4.11.2.3

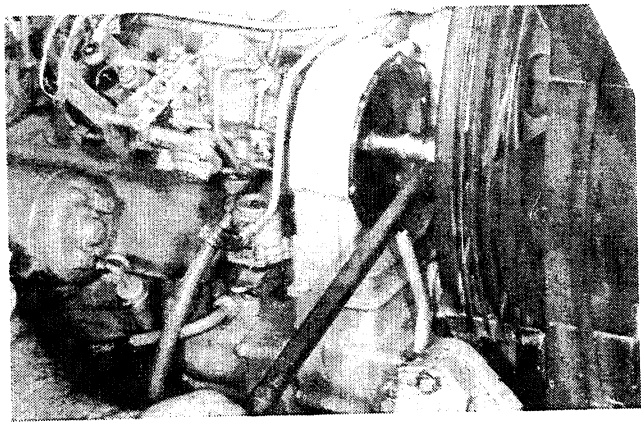
Located on the fuel pump drive gear, near the gear teeth is a timing mark. This timing mark must be aligned with the timing mark on the other drive gear. Install the drive gear onto the shaft of the pump, being careful that you have align the timing marks.



T-100051

1.4.11.2.4

Tighten the drive gear puller nut to specified torque. Now you can attach the fuel pump drive housing cover and tighten the retaining capscrews.



T-91381

Fig. 2-3 illustrates engagement of 1st forward speed.

Drive is transmitted as follows:

- Flexible coupling (13), connected to the flywheel, moves torque converter impeller wheel (U) which transmits drive to turbine wheel (V) splined to the transmission input shaft (16).

- Spool (4) directs oil pressure to forward clutch (A) positively connecting shaft (15) to shaft (16).

- Spool(5) directs oil pressure to clutch(1), thus con- necting shaft (16) to shaft (18) through the two first speed gears. Shaft(18) in turn drives shaft (24) and transmission output shaft (23).

The complete gear engagement pattern is as follows:

SPEED	SHAFTS ENGAGED	
FORWARD	1st	15-16-18-24-23
	2nd	15-16-17-18-24-23
	3rd	15-16-17-19-24-23
REVERSE	1st	15-14-17-16-18-24-23
	2nd	15-14-17-18-24-23
	3rd	15-14-17-19-24-23

2.1.4.3 Modulation Valves
Two modulation valves are provided, one for forward and one for reverse.

Detail (a), Fig.2-3, illustrates the modulating stage of 1st forward clutch engagement. Modulation valve (6) opens oil return port (20) to prevent pressure rise in the forward speed clutch(A) apply gallery. Oil gradually fills the accumulator chamber (7) through trimmer orifice (21). Accumulator piston moves to compress spring (22) resulting in a gradual increase in apply circuit pressure.

When accumulator piston reaches end of stroke, modulation valve (6) closes return port (20) and apply circuit pressure reaches its maximum value.

Oil pressure on spring (22) return plunger (7) to its initial position immediately after reverse is engaged.

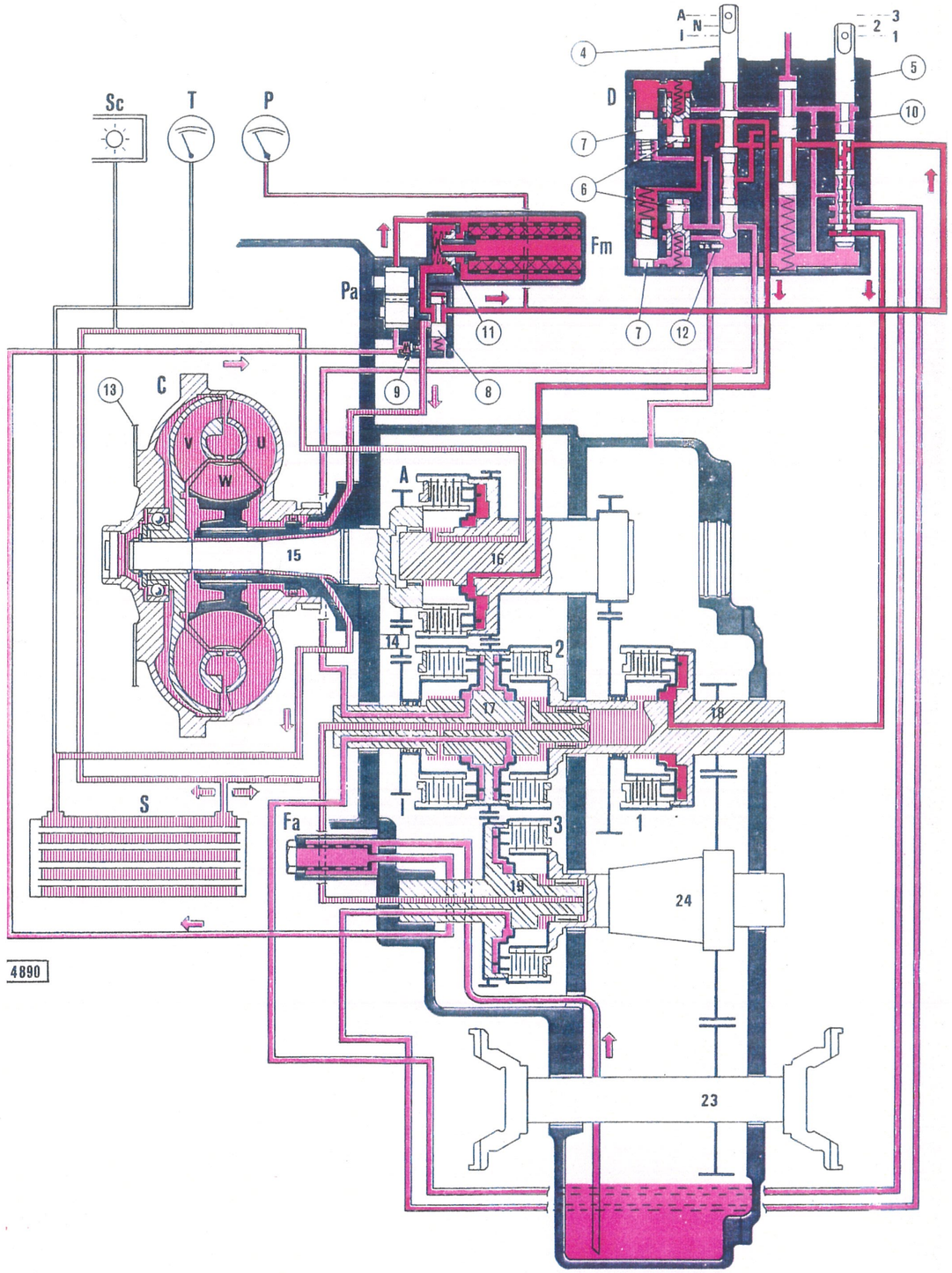
2.1.4.4 Trans. Disengagement with Brake Applied
When the brake pedal is actuated, a piston hydraulic pump, connected in parallel to the brake pump sends oil in (3) to move spool (10).

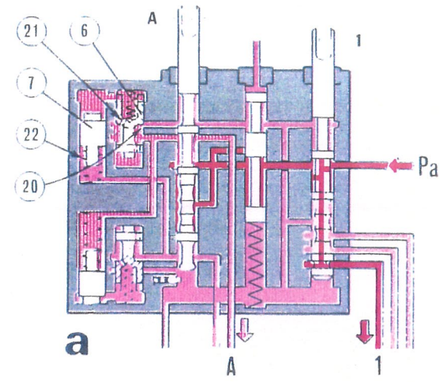
The spool, pushed downward closes the pressure oil inlet, and discharges the oil from the gear clutch engaged before.

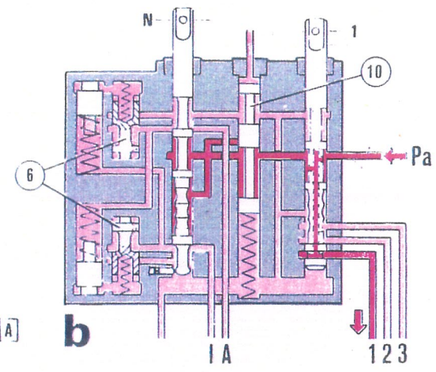
Detail "C" in Fig.2-3 shows the operation of spool (10) with valve block positioned in 2nd reverse gear.

⚠ WARNING

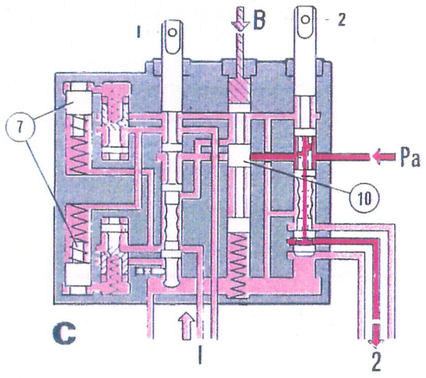
The hydraulic portion of the brake system requires a solid column of brake fluid, free of air bubbles, if it is to function properly. If air is present in the hydraulic fluid, compression of the air bubbles may nullify effective stroking of the brake actuating piston and will make the brakes ineffective. Possible personal injury or property damage could result.







4890 A



Olio in pressione - Main oil pressure

Olio a pressione intermedia - Intermediate oil pressure

Olio aspirazione o scarico - Intake or exhaust oil

Olio in lubrificazione - Lubricating oil

Olio in pressione in arrivo dalla pompa collegata al pedale freni
Oil from the pump connected to the brake pedal

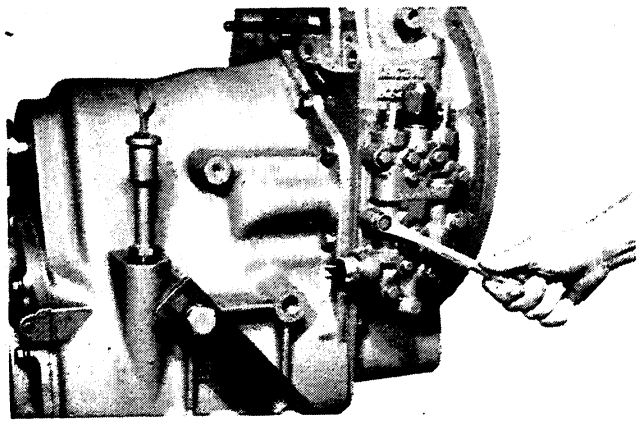
Fig. 2-3 Schema idraulico trasmissione

a. Distributore in fase di moderazione nell'innesto della prima marcia avanti - **b**. Distributore in neutro - **c**. Distributore in seconda marcia indietro nella fase di disinnesto cambio in frenatura - **A**. Marcia avanti - **B**. Dalla pompa collegata al pedale freni - **C**. Convertitore - **D**. Distributore - **Fa**. Filtro sull'aspirazione - **Fm**. Filtro sulla mandata - **I**. Marcia indietro - **N**. Neutro - **P**. Manometro pressione olio commando cambio - **Pa**. Pompa alimentazione convertitore-cambio - **S**. Scambiatore di calore - **Sc**. Segnalatore bassa pressione olio di lubrificazione - **T**. Termometro olio - **U**. Pompa convertitore - **V**. Turbina convertitore - **W**. Statore - **1**. Prima velocità - **2**. Seconda velocità - **3**. Terza velocità - **4**. Asta distributrice comando marce avanti e indietro - **5**. Asta distributrice comando prima, seconda e terza velocità - **6**. Valvole moderatrici - **7**. Accumulatori valvole moderatrici - **8**. Valvola di regolazione pressione olio cambio - **9**. Valvola di sicurezza convertitore - **10**. Asta disinnesto cambio - **11**. Valvola di sicurezza filtro (**Fm**) - **12**. Dispositivo sicurezza avviamento - **13**. Giunto - **14**. Albero di rinvio retromarcia - **15**. Albero ingresso cambio - **16**. Albero marcia avanti - **17**. Albero marcia indietro e seconda velocità - **18**. Albero prima velocità - **19**. Albero terza velocità - **20**. Scarico valvola moderatrice - **21**. Strozzatura - **22**. Molla - **23**. Albero uscita cambio - **24**. Albero rinvio uscita cambio

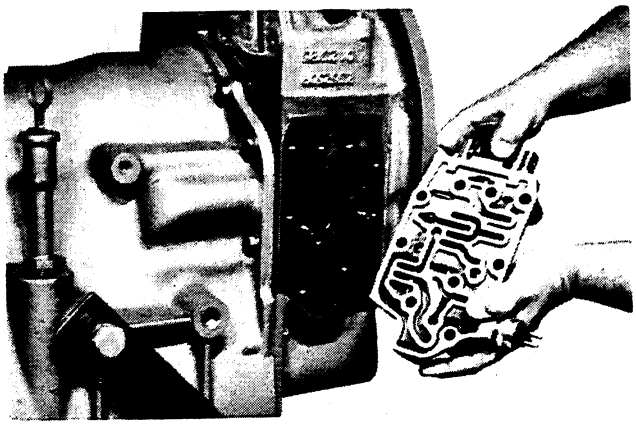
Fig. 2-3 Converter-transmission hydraulic system

a. Valve block in 1st forward apply retard phase - **b**. Valve block in neutral - **c**. Valve block in 2nd reverse gear during transmission clutch disengagement with brakes applied - **A**. Forward speed - **B**. From the pump connected to the brake pedal - **C**. Converter - **D**. Valve block - **Fa**. Filter on suction line - **Fm**. Filter on delivery line - **I**. Reverse speed - **N**. Neutral - **P**. Transmission oil pressure gauge - **Pa**. Transmission-converter charging pump - **S**. Oil cooler - **Sc**. Low lube oil pressure indicator - **T**. Oil temperature gauge - **U**. Impeller wheel - **V**. Converter turbine wheel - **W**. Stator wheel - **1**. 1st speed - **2**. 2nd speed - **3**. 3rd speed - **4**. Forward and reverse spool - **5**. 1st,2nd and 3rd speed spool - **6**. Retarder valves - **7**. Retarder valve accumulators - **8**. Transmission oil pressure regulator valve - **9**. Converter safety valve - **10**. Transmission cut-off speed - **11**. Filter by-pass valve (**Fm**) - **12**. Neutral start devise - **13**. Coupling - **14**. Reverse idler shaft - **15**. Transmission input shaft - **16**. Forward speed shaft - **17**. Reverse and 2nd speed shaft - **18**. 1st speed shaft - **19**. 3rd speed shaft - **20**. Retarder valve oil return port - **21**. Trimmer orifice - **22**. Spring - **23**. Transmission output shaft - **24**. Transmission idler output shaft

2.4.4.13
Remove control valve bolts and lockwashers.



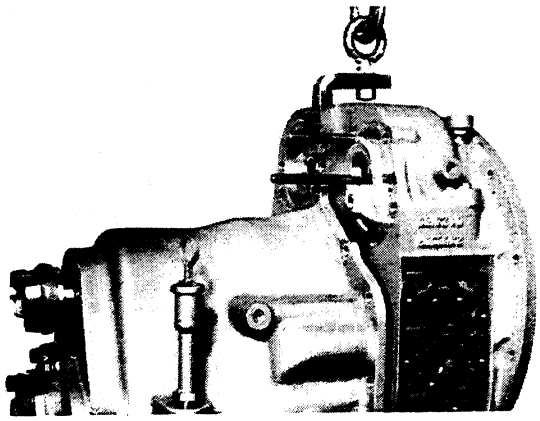
2.4.4.14
Remove control valve assembly. Use caution not to lose detent springs and balls.



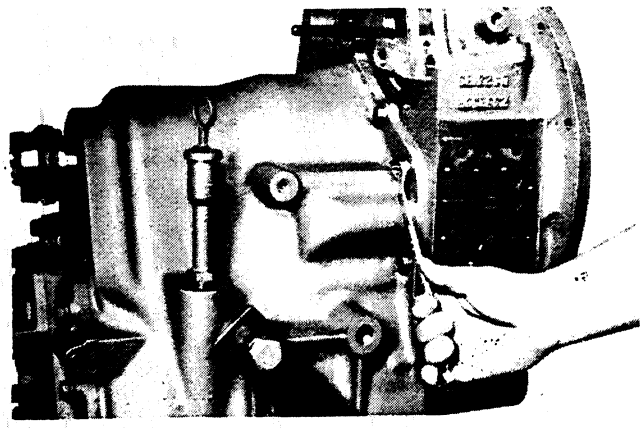
2.4.4.15
Support converter housing with a chain hoist.

⚠ WARNING

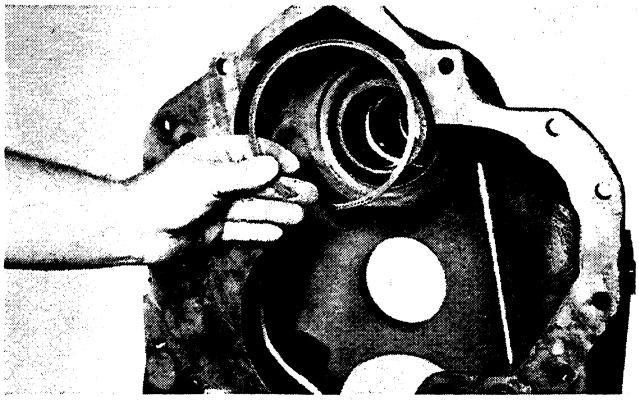
Lift and handle all heavy parts with a lifting device or proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch out for people in the vicinity.



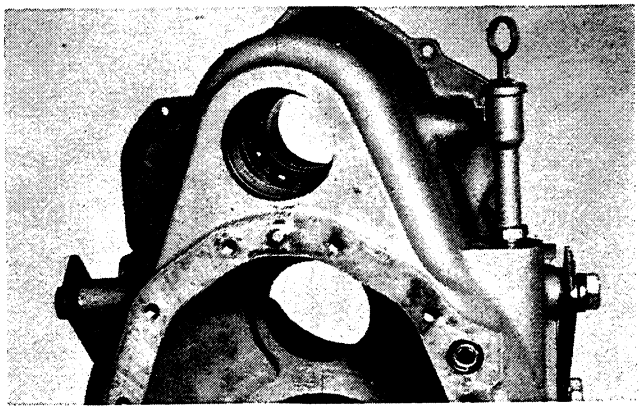
2.4.4.16
Remove all bolts securing transmission to converter housing.



2.4.4.53
Remove forward clutch piston ring sleeve retainer ring.



2.4.4.54
If piston ring sleeve or forward clutch rear bearing is to be replaced, tap bearing from rear of housing.



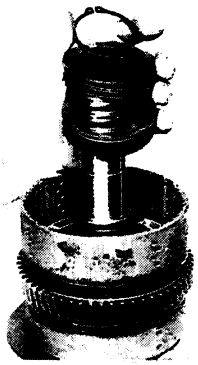
⚠ WARNING

It is unsafe to strike hardened steel parts with anything other than a soft iron or non-ferrous hammer. When installing or removing such parts wear safety glasses with side shields and heavy gloves, etc., to reduce the possibility of injury.

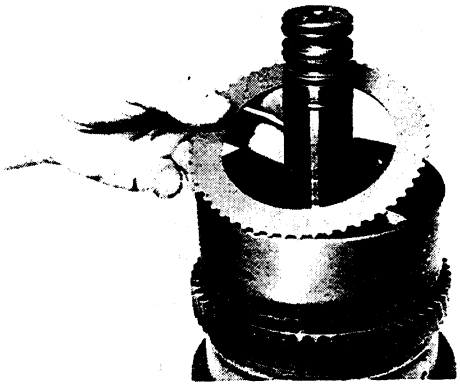
2.4.8 FORWARD, REVERSE AND 2ND CLUTCH ASSEMBLY

2.4.8.1
Install inner and outer clutch piston seal rings. Size rings as previously explained. Position piston in clutch drum.

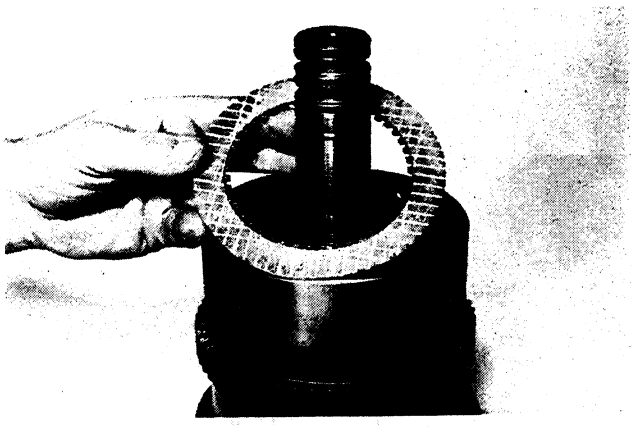
2.4.8.2
Install piston return spring spacer, Belleville spring washers and retainer ring.



2.4.8.3
Install 1st steel disc.

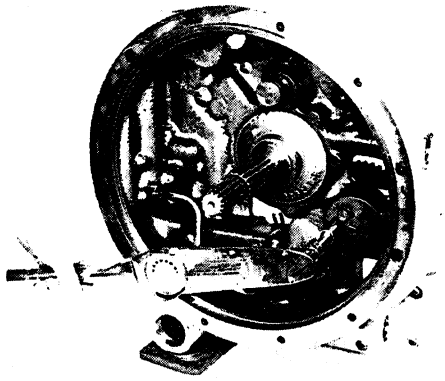


2.4.8.4
Install one friction disc.

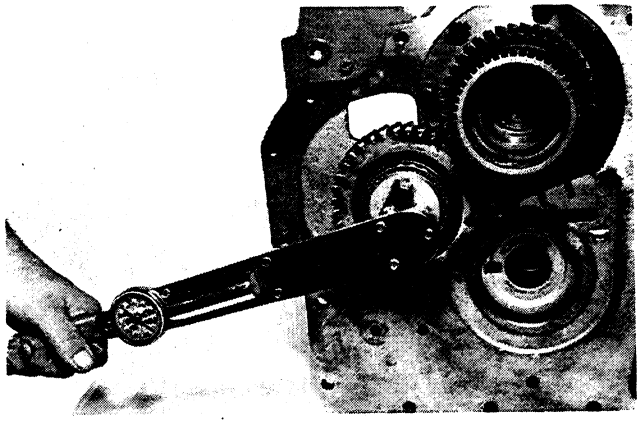


2.4.11.9
Position reverse idler and bearing assembly into converter housing.
NOTE: Long hub gear out.

2.4.11.10
Install reverse idler shaft capscrews and lockwashers. Tighten capscrews 7.86 - 8.68 daNm (58 - 64 lbs.ft).



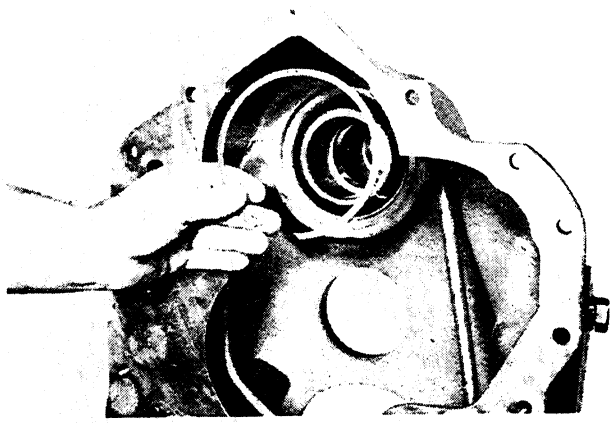
2.4.11.11
Install bearing retainer plate, lock plate and idler gear capscrews. Tighten capscrews 7.86 - 8.68 daNm (58 - 64 lbs.ft). Bend lock plate tabs over capscrew heads to prevent loosening.



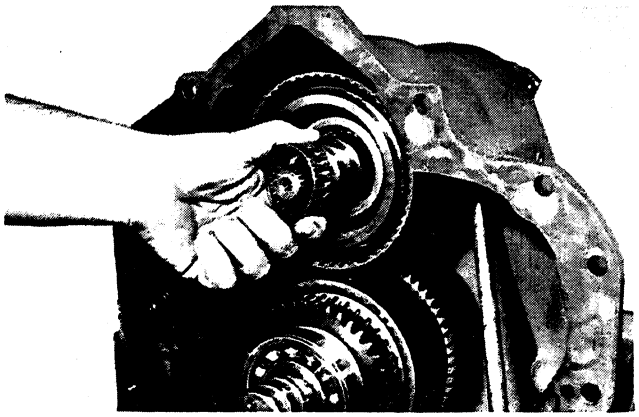
2.4.11.12
Tap forward clutch shaft rear bearing into bearing bore with bearing snap ring toward front of housing. Align roll pin in forward clutch shaft piston ring sleeve with groove in housing. Tap sleeve into position and secure with sleeve retainer ring.

⚠ WARNING

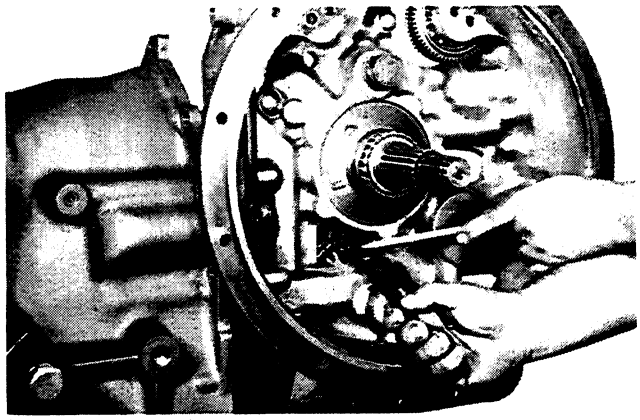
It is unsafe to strike hardened steel parts with anything other than a soft iron or non-ferrous hammer. When installing or removing such parts wear safety glasses with side shields and heavy gloves, etc., to reduce the possibility of injury.



2.4.11.48
Install forward clutch pilot bearing.



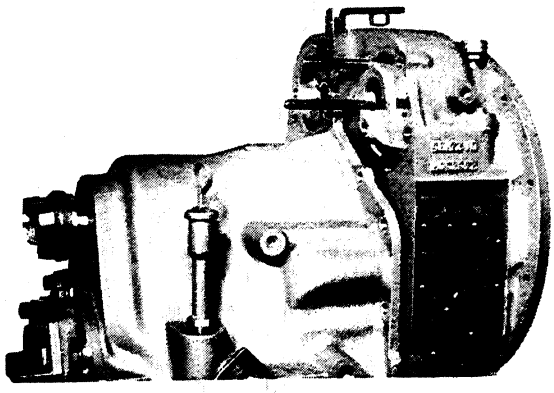
2.4.11.49
Position new gasket on front of transmission housing. A thin coat of chassis grease will hold gasket in place. Spread ears on the reverse clutch front bearing locating ring. Lock pliers open to hold snap ring open.



2.4.11.50
Position converter housing assembly on transmission case. Use caution not to disturb housing O-rings or gasket.

⚠ WARNING

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

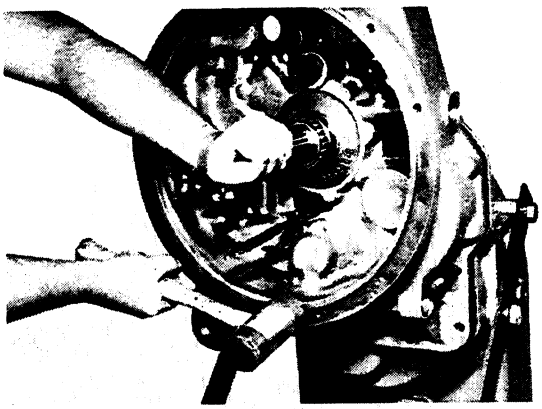


2.4.11.51
Tap converter housing into place. Use caution as not to damage reverse clutch front piston ring. Note aligning stud.

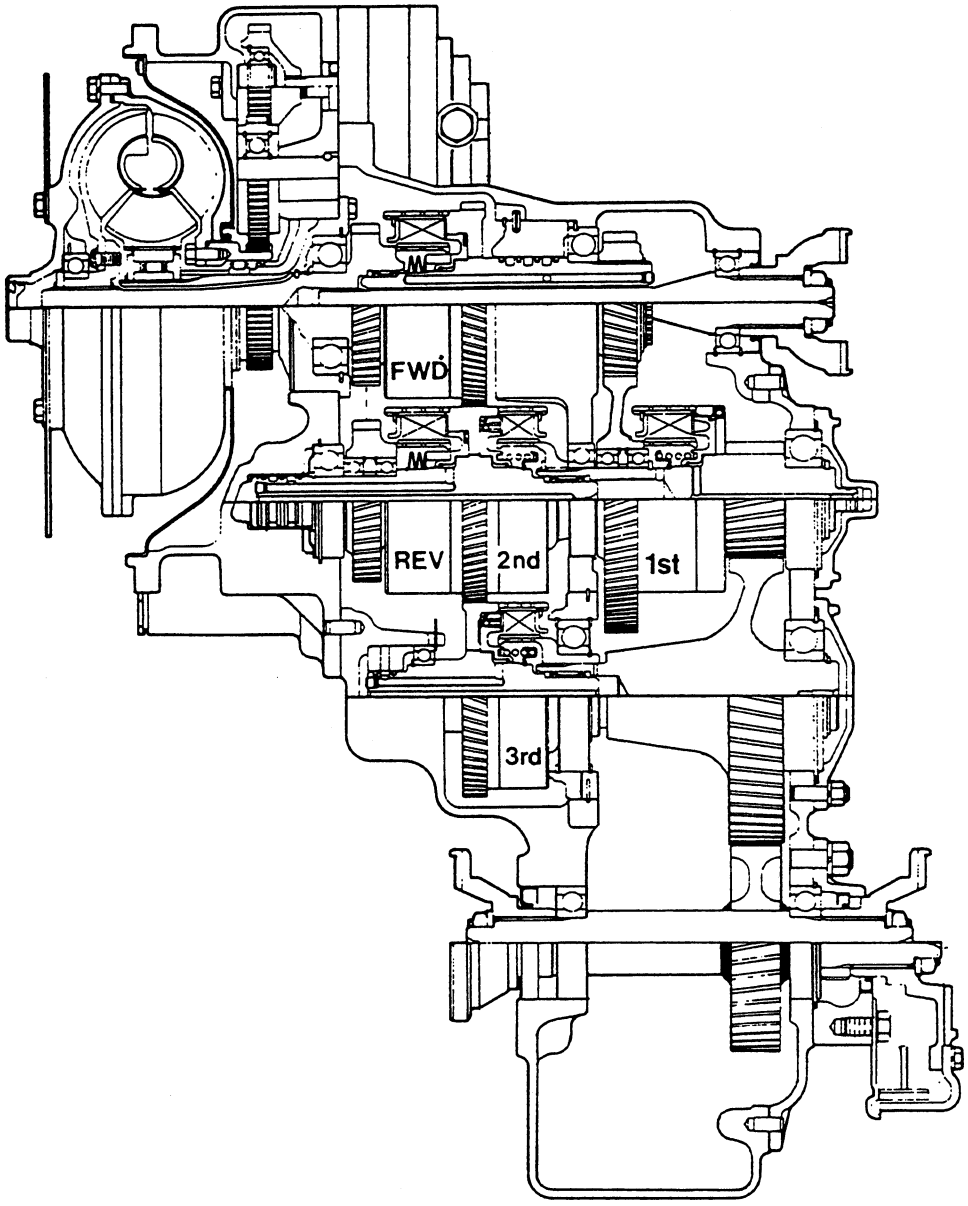
⚠ WARNING

It is unsafe to strike hardened steel parts with anything other than a soft iron or non-ferrous hammer. When installing or removing such parts wear safety glasses with side shields and heavy gloves, etc., to reduce the possibility of injury.

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



2.4.13 REFERENCE DRAWINGS



T-85457

FIG. 2-9 BASIC DESIGN

2.4.13 REFERENCE DRAWINGS

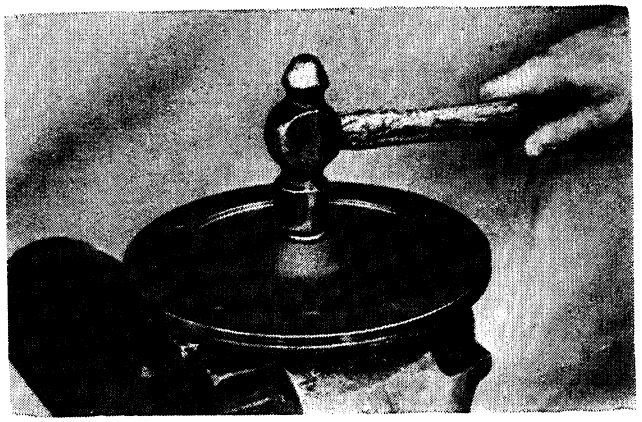
Legend for Fig. 2-14

1. *Actuator assembly*
2. *O-ring*
3. *Spring*
4. *Retainer pin*
5. *Piston seal*
6. *Piston*
7. *Seal ring*
8. *Speed selector spool*
9. *Plug*
10. *Oil seal*
11. *Plug*
12. *Housing*
13. *Detent ball*
14. *Spring*
15. *Gasket*
16. *Spool stop*
17. *Switch actuating pin*
18. *Neutral switch*
19. *Spool stop*
20. *Oil seal*
21. *Forward & reverse spool*
22. *Declutch spool*
23. *Spring*
24. *Modulator housing*
25. *Accumulator spring (inner)*
26. *Accumulator spring (outer)*
27. *Accumulator valve*
28. *O-ring*
29. *Plug*
30. *Regulator spring*
31. *Regulator spool*
32. *Gasket*

SYMPTOM	PROBABLE CAUSE	TOOLS REQUIRED	TEST	SOLUTION
Noise	Incorrect lubricant or level too low	Operator's Manual	Compare oil specifications	Check level, fill with correct lubricant
	Improperly adjusted wheel bearings		Examination	Adjust bearings
	Damage to planetary gears		Examination	Replace gears
	Pinion to ring gear backlash is too low	Micrometer	Check backlash	Adjust backlash to specifications
	Poor pattern between pinion and ring gear		Examination	Correct pattern
Lubricant Loss	Lubricant leaks at planetary cover		Examination	Tighten capscrews or reseal cover and capscrews
	Lubrication level too high		If oil blows from breather, check oil level	Fill differential to proper level
	Excessive foaming of lubricant		Examination	Drain and fill with correct lubricant
	Breather plugged		Examination	Clean breather
	Damaged seals		Examination	Replace
	Worn yoke		If oil leaks from yoke may be seals or yoke	Replace seal or yoke
Overheating	Incorrect lubricant or level incorrect		Examination	Check level, fill with correct lubricant
	Excessive gear wear		Examination	Replace gears
	Pinion gear assembly adjusted too tight in the differential		Examination	Correct to proper adjustment

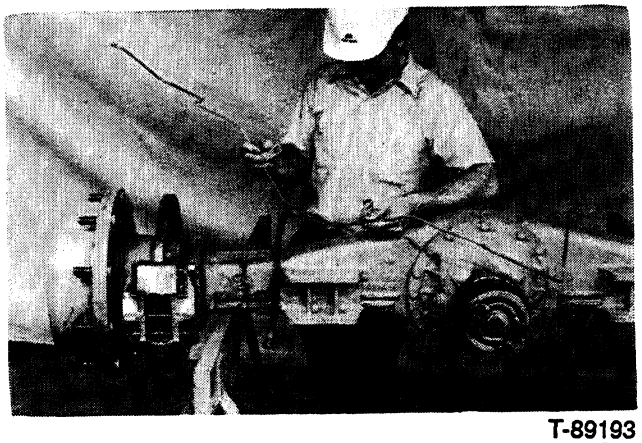
3.4.2.13
Remove axle thrust button.

T-89318



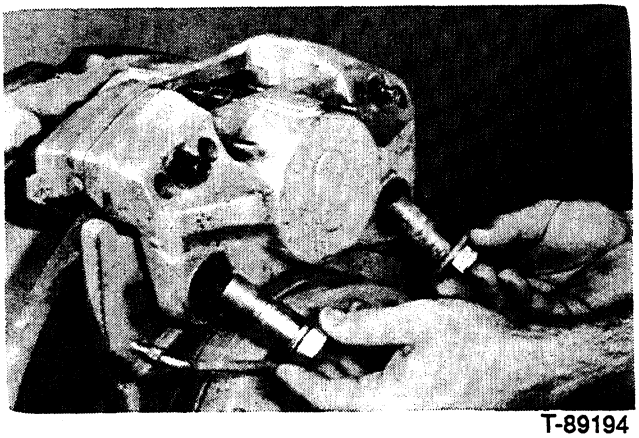
3.4.2.14
Disconnect hydraulic brake line.

T-89217



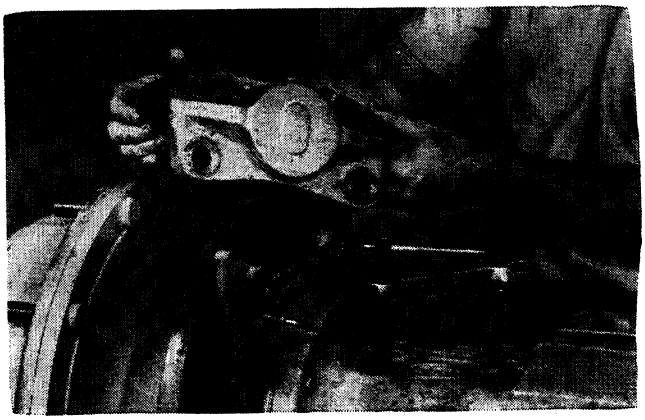
3.4.2.15
Remove brake caliper capscrews. Note location of each capscrew as they are different .

T-89193



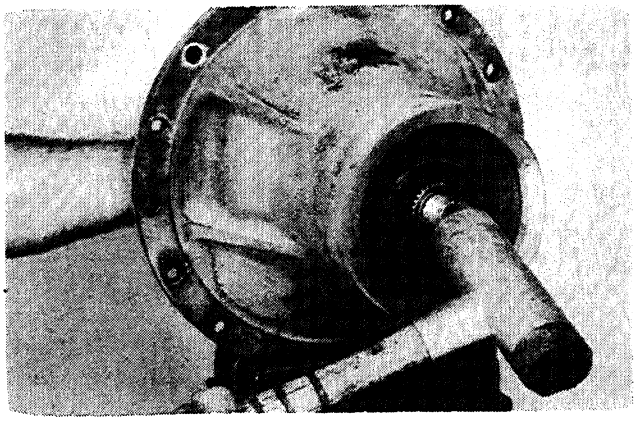
3.4.2.16
Remove brake caliper.

T-89194



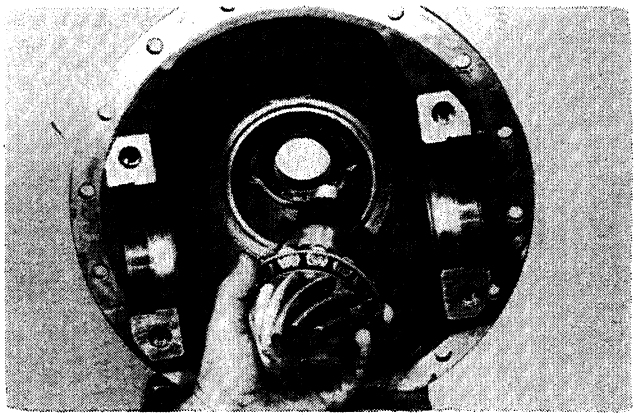
3.4.2.53
Tap the end of the pinion to loosen it.

T-91110



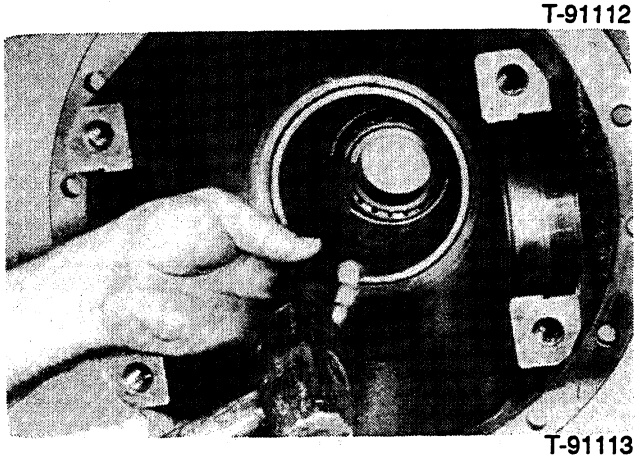
3.4.2.54
Remove the pinion, inner bearing, spacer and shims.

T-91111



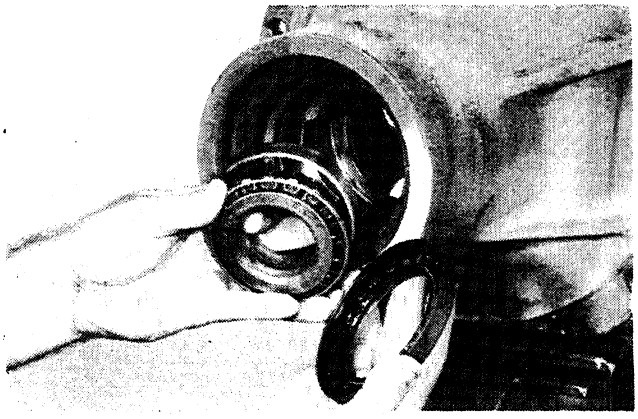
3.4.2.55
Tap out the outer bearing and seal.

T-91112



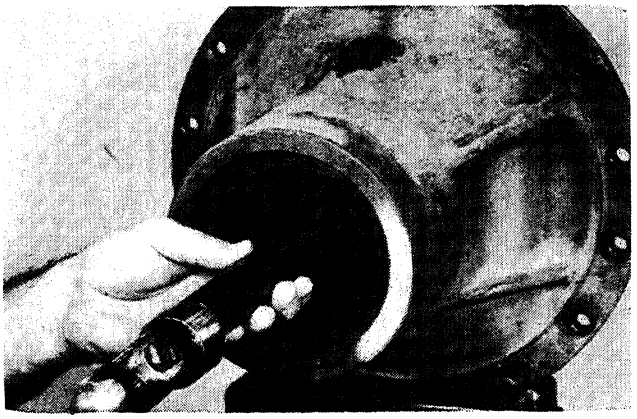
3.4.2.56
Remove the outer bearing, race and seal.

T-91113



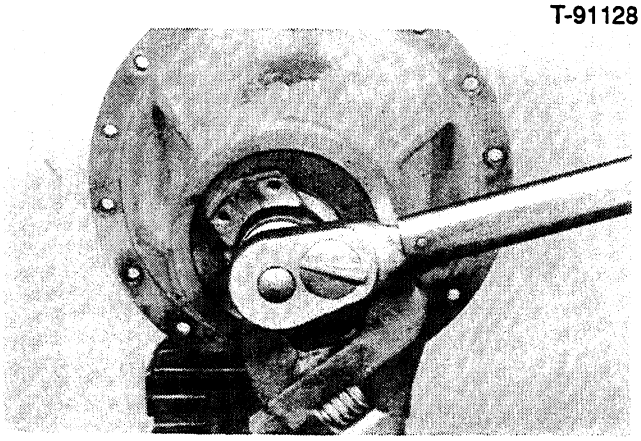
3.4.3.25
Install the seal.

T-91135



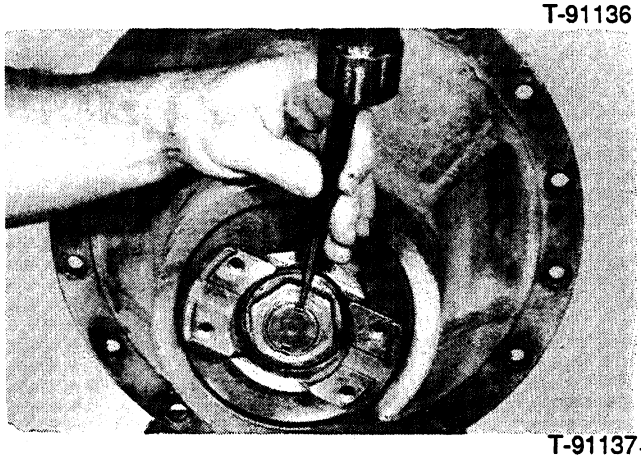
3.4.3.26
Install the flange, washer, and nut. Tighten the nut to specified torque.

T-91128



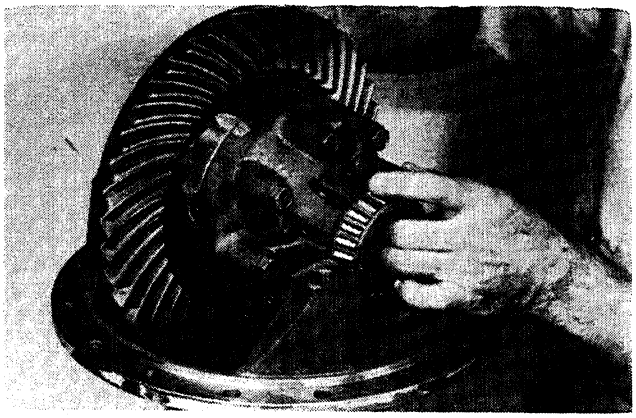
3.4.3.27
Stake the nut in two places.

T-91136



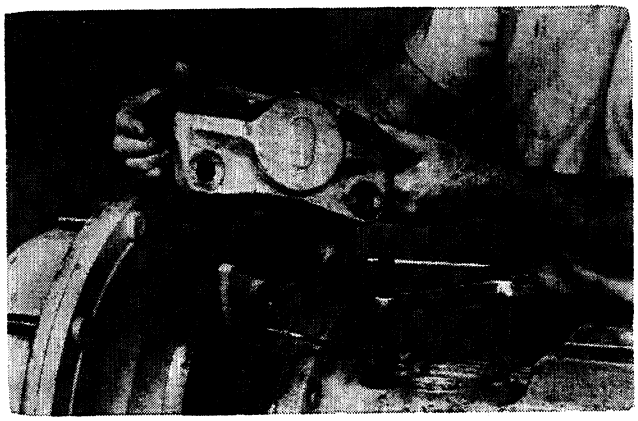
ASSEMBLE DIFFERENTIAL CASE TO CARRIER
3.4.3.28
Place the differential on the carrier and place bearing races on bearings.

T-91137



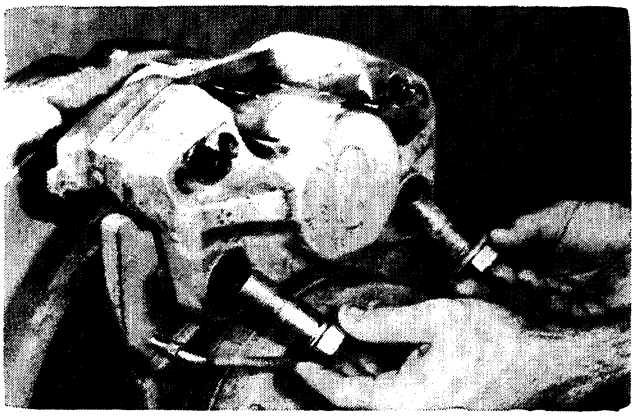
3.4.3.64
Install brake caliper assembly.

T-89194



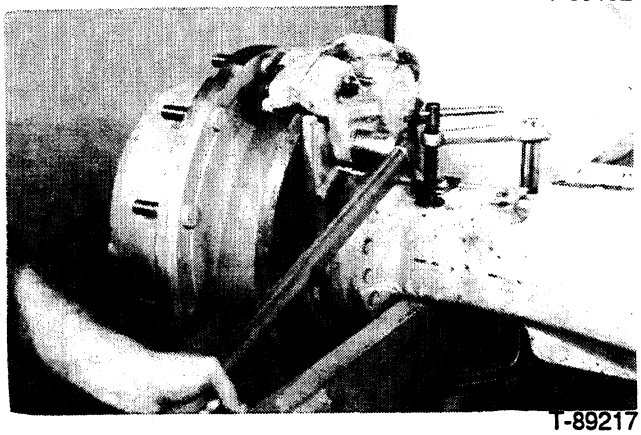
3.4.3.65
Coat capscrews with thread lock P/N 75000776 (Loctite 262). Shoulder capscrew goes into the larger hole(top on front axle, bottom on rear axle).

T-89193



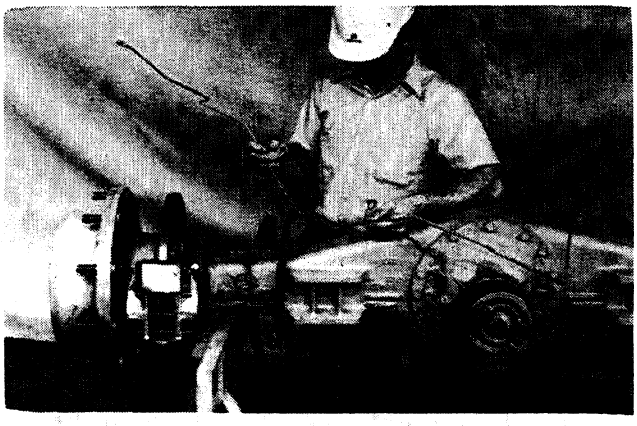
3.4.3.66
Tighten capscrews to specified torque.

T-89192



3.4.3.67
Install brake line to axle assembly.

T-89217

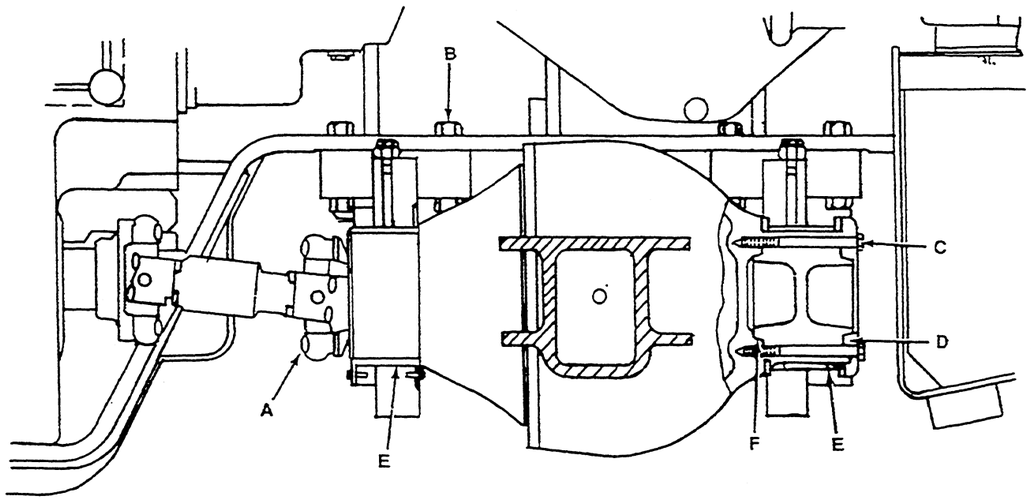


3.6 SPECIFICATIONS

3.6.3 AXLE MOUNTING

ITEM	STEP #	NAME	TORQUE daNm	TORQUE FT·LBS
A	3.4.4.5	U-joint capscrews	5.3-5.9	39-43
B	3.4.4.3	Rear axle support capscrews	60	445
		Front axle attaching capscrews	4.25	315
C	3.4.3.79	Axle support cover capscrews	22	145
		Midship bearing support capscrews	16.7-18.6	123-137

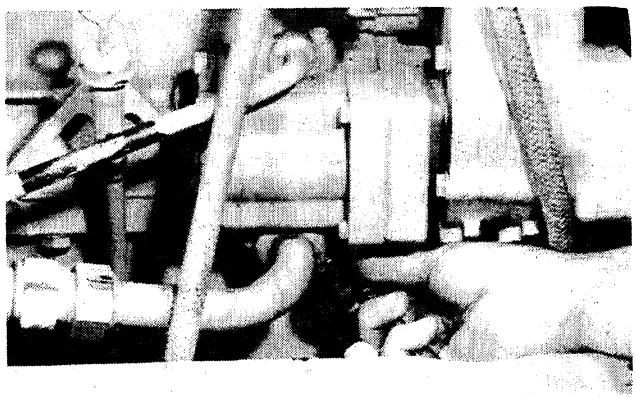
ITEM	STEP #	NAME	DIMENSIONS mm	DIMENSIONS in.
		End play		
D	3.4.3.77	Oscillating axle end play	0.3 - 0.7	0.012 - 0.027
		Shim thickness available	0.5, 1.0	0.020, 0.039
E		Support I. D.	175.0-175.04	6.890 - 6.891
		Bushing O. D.	175.108 - 175.128	6.8940-6.8948
		Bushing I. D. (installed)	160.0 - 160.08	6.299 - 6.302
		Pivot hub O. D.	159.82 - 159.915	6.293 - 6.296
F		Axle housing bore	105.0 - 105.05	4.134 - 4.136
		Pivot hub O. D.	105.013 - 105.048	4.1343 - 4.1357



T-85383

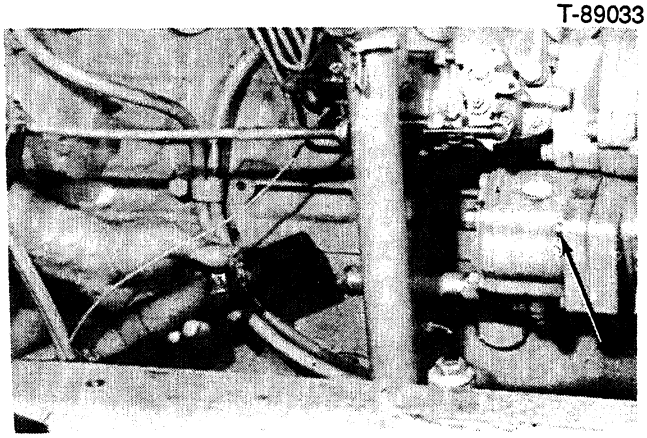
4.4.1.5
Disconnect tube attached to bottom of brake pump.

T-91306



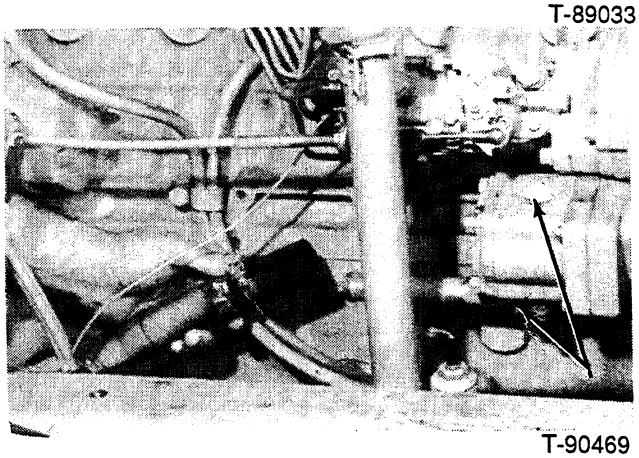
4.4.1.6
Remove the four capscrews holding the pump to the engine.

T-89033



4.4.1.7
When installing the brake pump onto the engine, be sure that the pump's small outlet is on top. Tighten the attaching capscrews to specified torque. Install new O-rings on the pump inlet and outlet lines.

T-89033

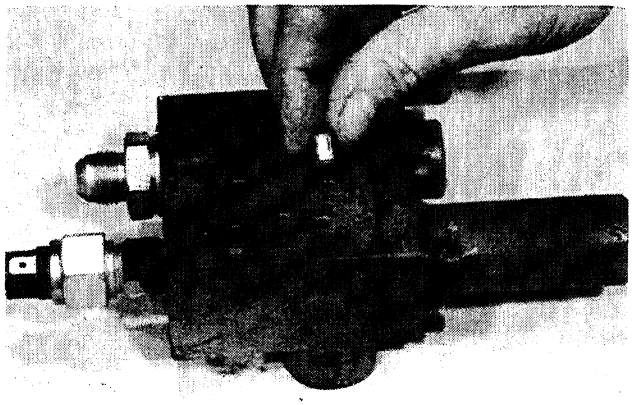


4.4.1.8
Fill the implement tank with oil as specified on the lubrication chart decal.

T-90469

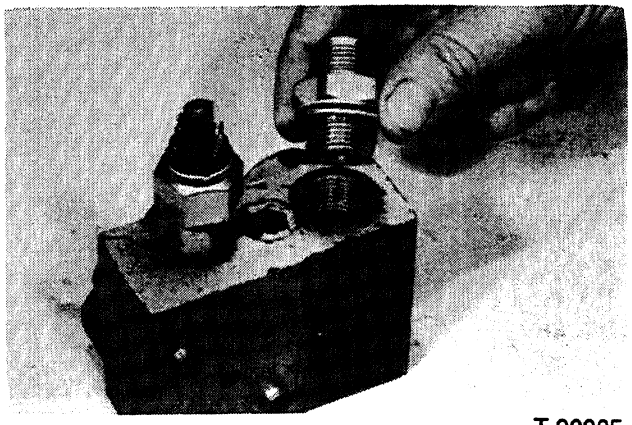
4.4.2.2.21
Remove two (2) alignment dowel sleeves from pressure control body.

T-90998



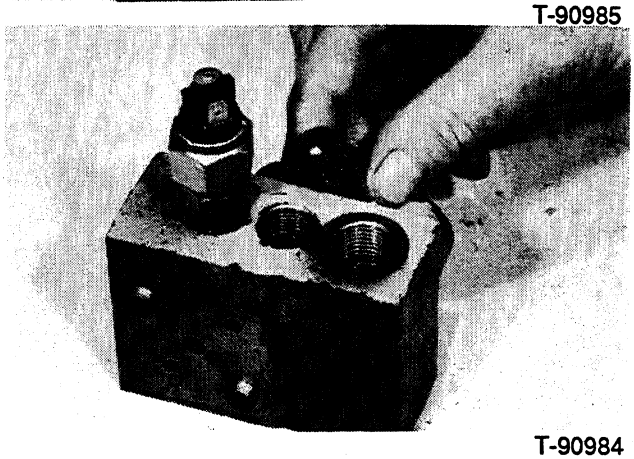
4.4.2.2.22
Remove pump inlet fitting.

T-90987



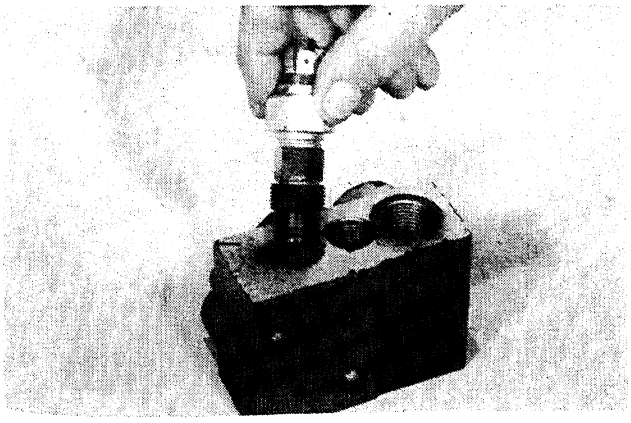
4.4.2.2.23
Remove inlet check valve.

T-90985



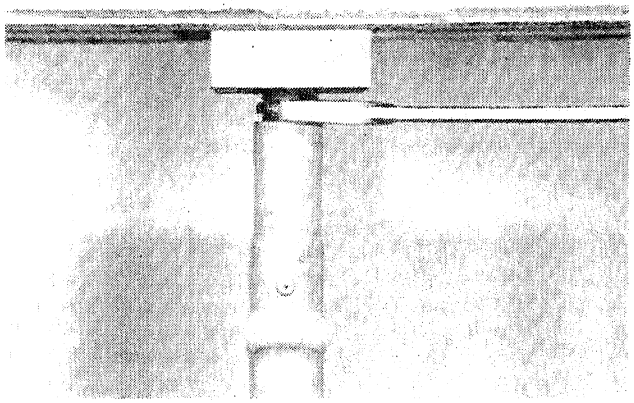
4.4.2.2.24
Remove low brake fluid pressure switch.

T-90984



4.4.3.3.5
Thread spring retaining cap into cylinder until it seats. Place cylinder in a vise and tighten retaining cap.

T-90953

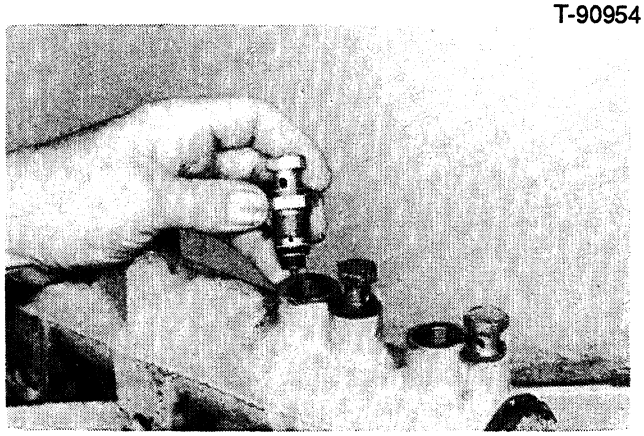


⚠ WARNING

Brake valves have a heavy spring compressed inside them. Always follow recommended procedures when assembling or disassembling these valves.

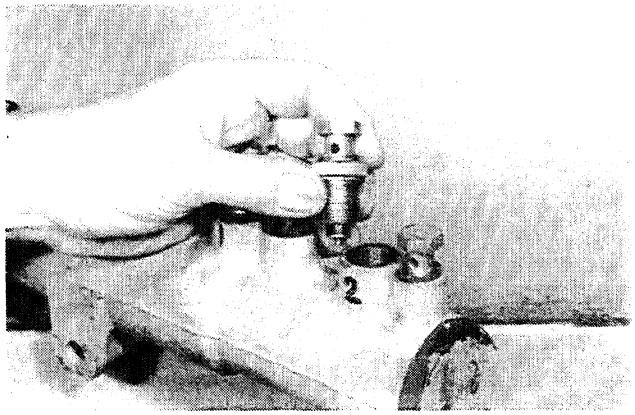
4.4.3.3.6
Install rear axle brake fluid supply tip check valve and tighten.

T-90954



4.4.3.3.7
Install front axle brake fluid supply tip check valve and tighten.

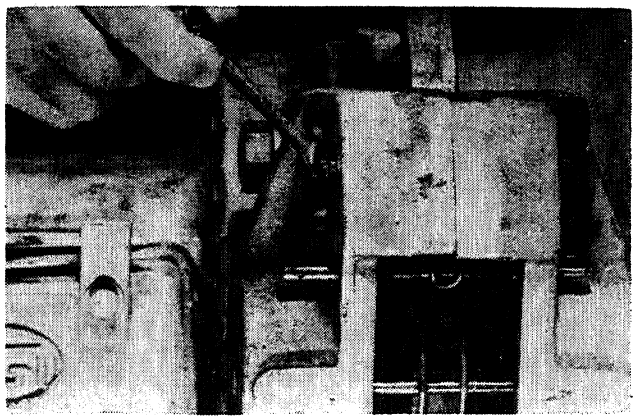
T-90958



4.4.5.3

With the pedal depressed loosen the brake bleeder fitting located on the brake caliper. (Wheel and tire removed for picture clarity.) Tighten the fitting before the assistant lifts his foot from the pedal. Repeat the steps until a solid column of fluid flows from the fitting.

T-89168



⚠ WARNING

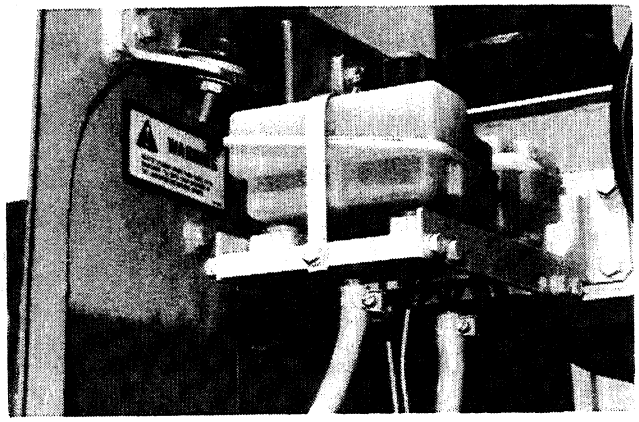
The hydraulic portion of the brake system requires a solid column of brake fluid, free of air bubbles, if it is to function properly. If air is present in the hydraulic fluid, compression of the air bubbles may nullify effective stroking of the brake actuating piston and will make the brakes ineffective. Possible personal injury or property damage could result.

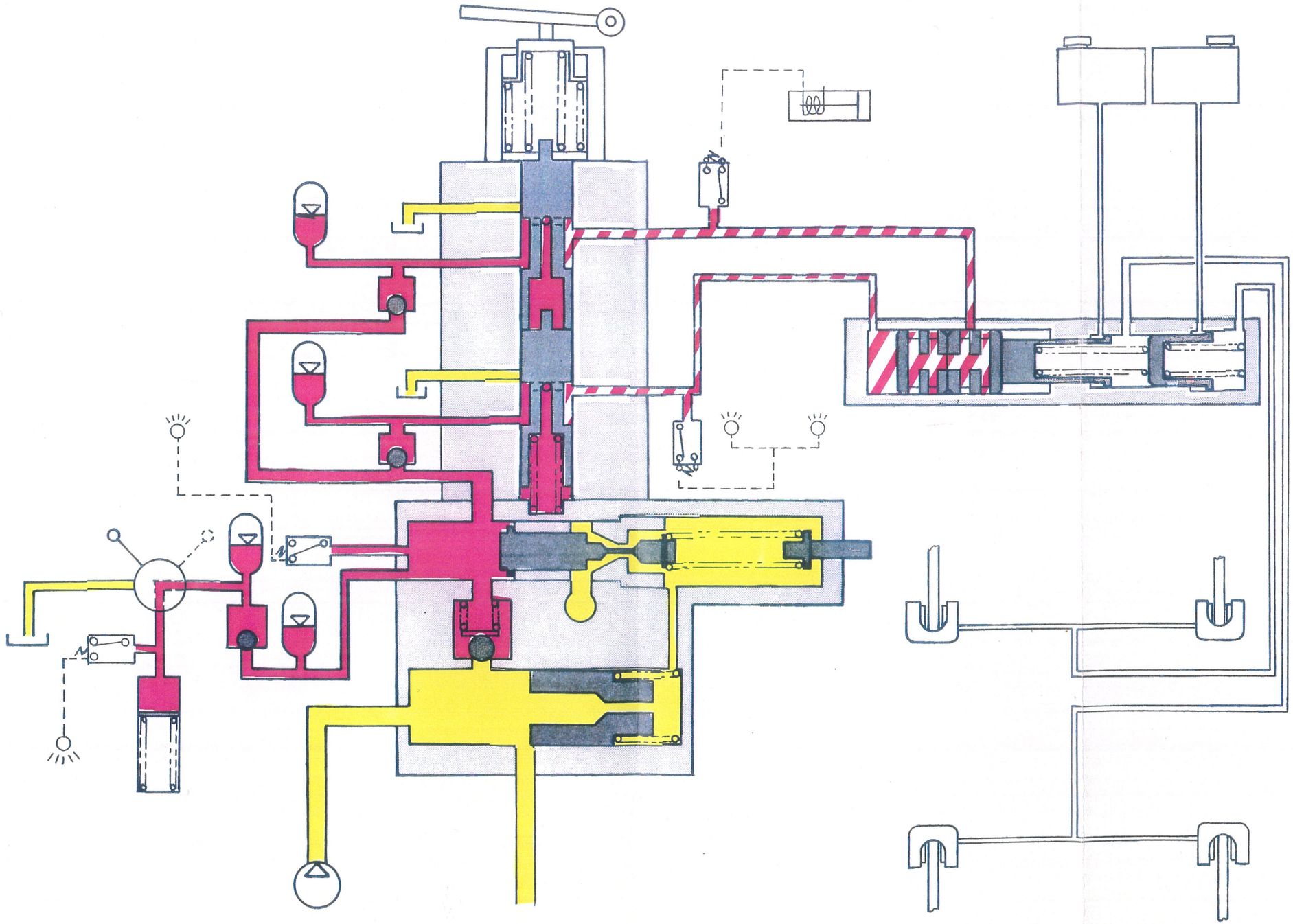
Brake fluid reservoirs must be filled with fluid to the proper level. Fill with specified fluid.

4.4.5.6

Be sure to keep the master cylinder reservoirs full of fluid during the bleeding process. Repeat the procedure for all other brakes.

T-90498





SYMPTOM	PROBABLE CAUSE	TOOLS REQUIRED	TEST	SOLUTION
Lack of Hydraulic Power	Low hydraulic oil level		Observe oil level gauge with bucket flat on ground	If low, fill to proper level
	Clogged suction screen			Clean suction screen
	Foaming oil caused by air in suction line		Shut down machine and check the oil tank for foam in oil	Tighten all fittings or replace faulty hoses
	Foaming oil caused by improper oil	Operator manual	Compare specifications to those of oil	Fill implement oil tank with specified fluid
	Leaking piston packing			Replace packing
	Main relief valve set too low	Pressure gauge	See Sec 5.3	Adjust pressure
	Dirt holding relief valve open	Pressure gauge	See Sec 5.3	Loosen the adjusting screw two turns and operate the machine, then reset pressure setting
	Hydraulic Pump defective	Flow meter	Conduct flow test of pump	If pump test low, rebuild or replace pump
System Oil Overheating	Hydraulic level too low or overfilled		Observe the oil level with the bucket flat upon the ground	If incorrect, add or drain oil
	Restricted suction line	Flow meter	Pump flow test See Sec 5.3	Clean line
	Improper oil	Operator manual	Compare specifications to those of oil	Fill implement oil tank with specified fluid
	Main relief valve open	Pressure gauge	Check main relief opening pressure	Clean the valve and reset pressure

5.3.2.4.3
Warm the machine's implement oil system to normal working conditions.

⚠ WARNING

Observe all start up and shut down procedures and **'WARNINGS'** listed in the operation and maintenance instruction manual.

Do not run the engine or this machine in closed areas without proper ventilation to remove deadly exhaust gases.

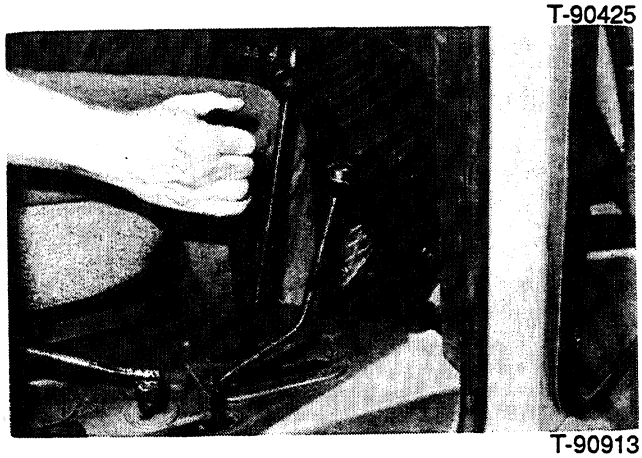
The machine and it's attachments are to be operated only by qualified operator seated in the operator's seat.

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

Replace seat belts every two years on open canopy units and every three years on machinery with cabs or at change of ownership.

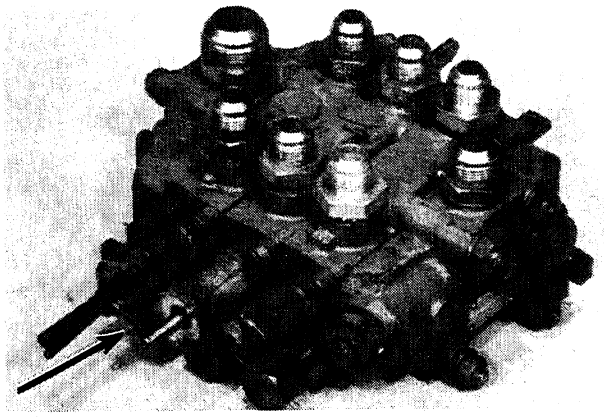
5.3.2.4.4
Operate the machine at low idle. Place the implement in the tip back position. Allow the bucket to remain in that position. Raise the boom. Dump the bucket quickly and note the pressure on the gauge.

T-90425



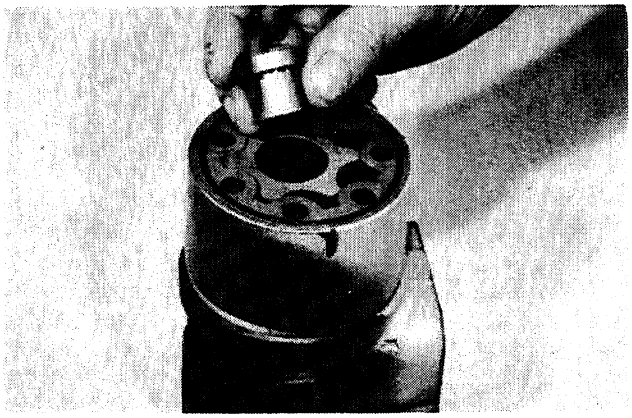
T-90913

5.3.2.4.5
Compare the results of the test with the specifications for the boom lift relief valve. If the test pressure does not fall within specifications, adjust the boom lift circuit relief valve opening pressure. The circuit relief valve must be removed from the valve body and adjusted. Turning the screw in raises pressure while turning the screw out reduces pressure.



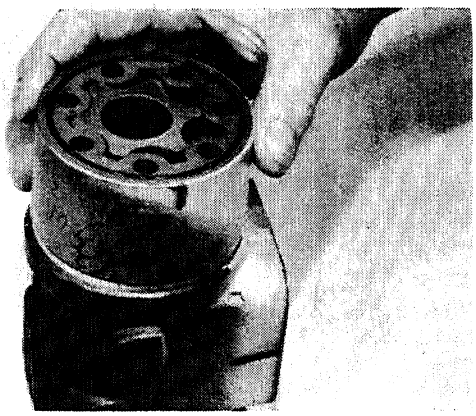
5.4.2.2.15
Remove center spacer.

T-91055



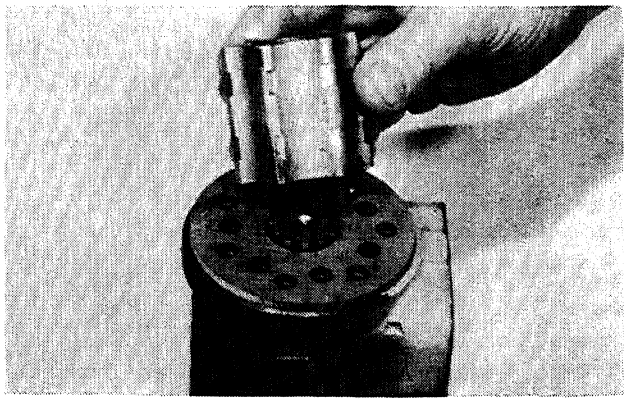
5.4.2.2.16
Remove gerotor meter housing.

T-91054



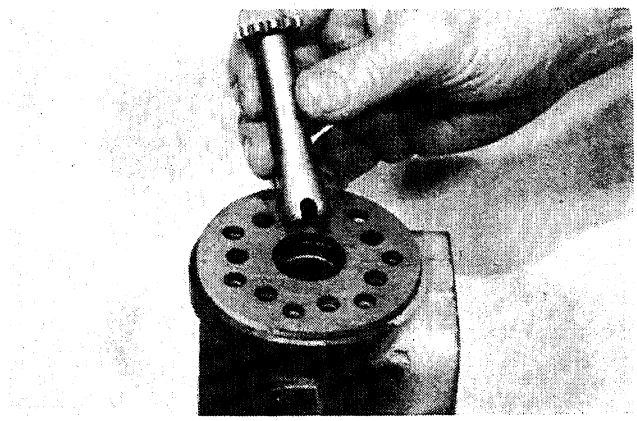
5.4.2.2.17
Remove gerotor inner gear.

T-91053



5.4.2.2.18
Remove the drive.

T-91052



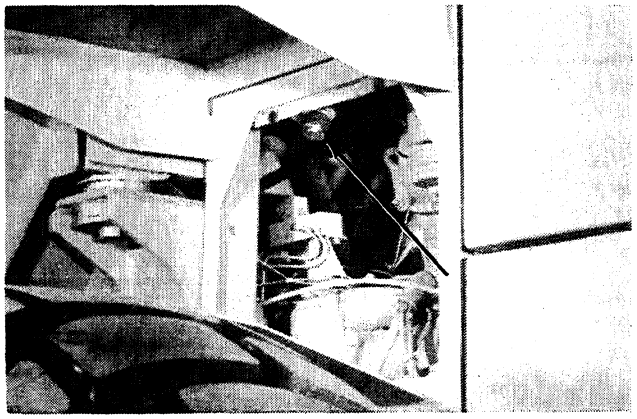
5.4.3 STEERING CYLINDER

5.4.3.1
Drain Implement oil tank

⚠ DANGER

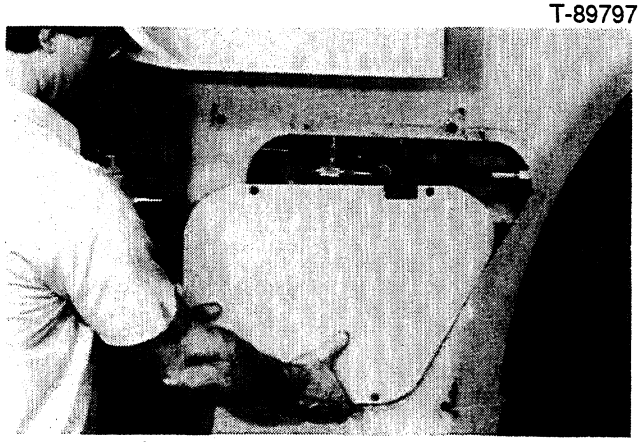
Fluid under pressure - turn cap or cover slowly to relieve pressure before removing.

T-88929



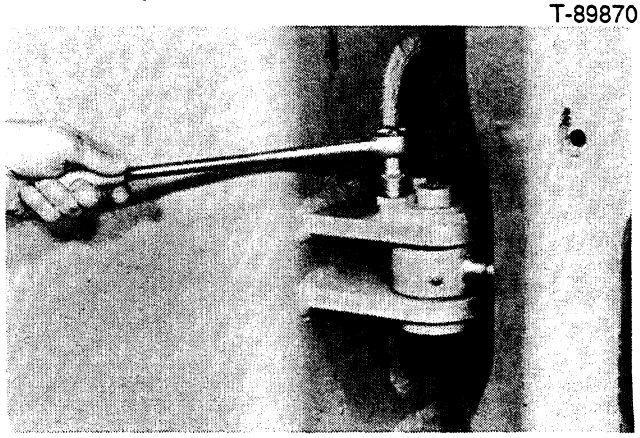
5.4.3.2
Remove access cover from the loader frame.

T-89797



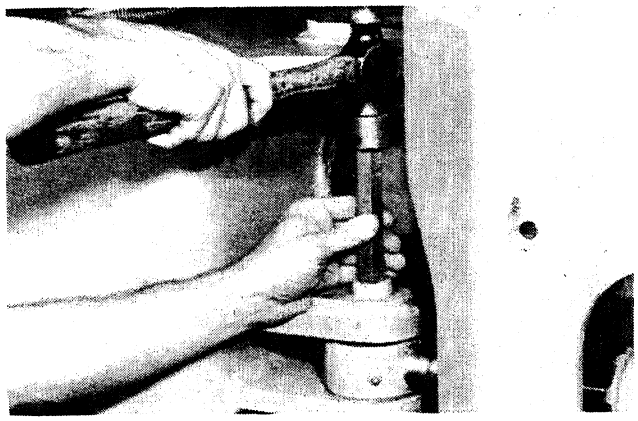
5.4.3.3
Remove the capscrews and lock plate holding the steering cylinders front and rear pins in position.

T-89870



5.4.3.4
Remove the front and rear pin by driving the pin from the boss and rod.

T-89873

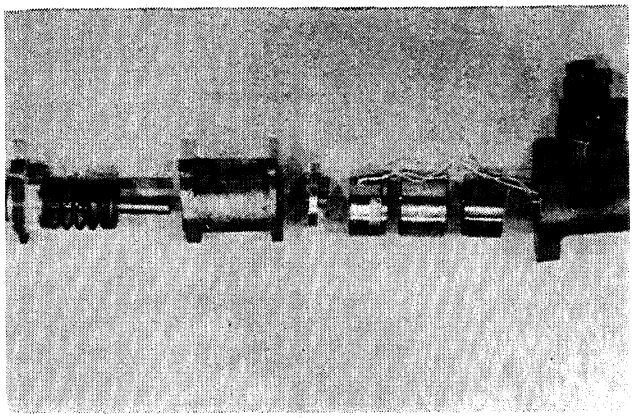


⚠ WARNING

It is unsafe to strike hardened steel parts with anything other than a soft iron or non-ferrous hammer. When installing or removing such parts wear safety glasses with side shields and heavy gloves, etc., to reduce the possibility of injury.

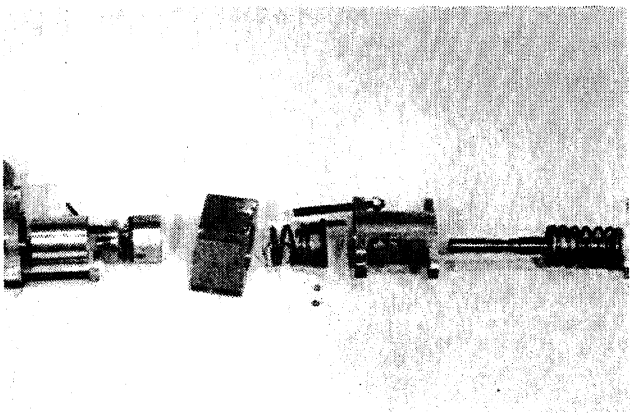
5.4.5.2.5
The bucket spool detent's parts will appear in this order: end cap, spacer, guide, solenoid, capscrews and washers, housings with detent balls and spool.

T-90890



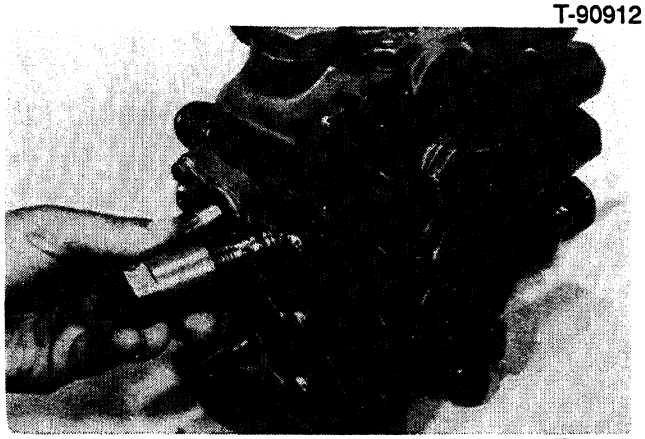
5.4.5.2.6
The boom spool detent is comprised of basically the same parts but in a different order. The order is: end cap,guide, capscrews and washers, solenoid, adapter, spring, detent balls, housing and spool.

T-90891



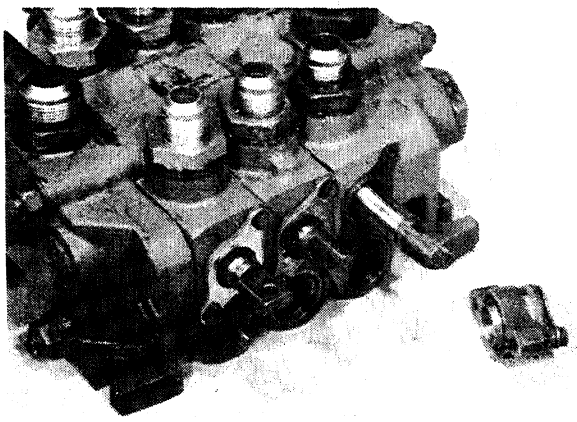
5.4.5.2.7
Mark each of the valve cartridges and their position on the valve stack. Remove the cartridges.

T-90912

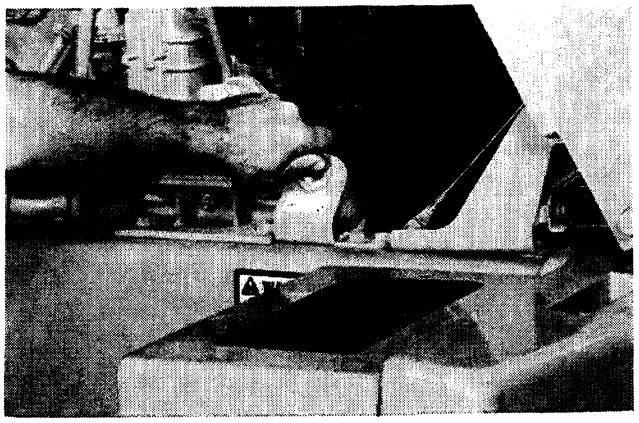


5.4.5.2.8
Remove the spool seal retainers from the eye end of the spools.

T-90911



Turn on the master switch. Test the system for leaks and proper operation.



⚠ WARNING

Do not run the engine of this machine in closed areas without proper ventilation to remove deadly exhaust gasses.

Observe all start up and shut down procedures and "WARNINGS" listed in the operation and maintenance instruction manual.

This machine and its attachments are to be operated only by qualified operator seated in the operator's seat.

Before starting machine, check, adjust and lock the operator's seat for maximum comfort and control of the machine.

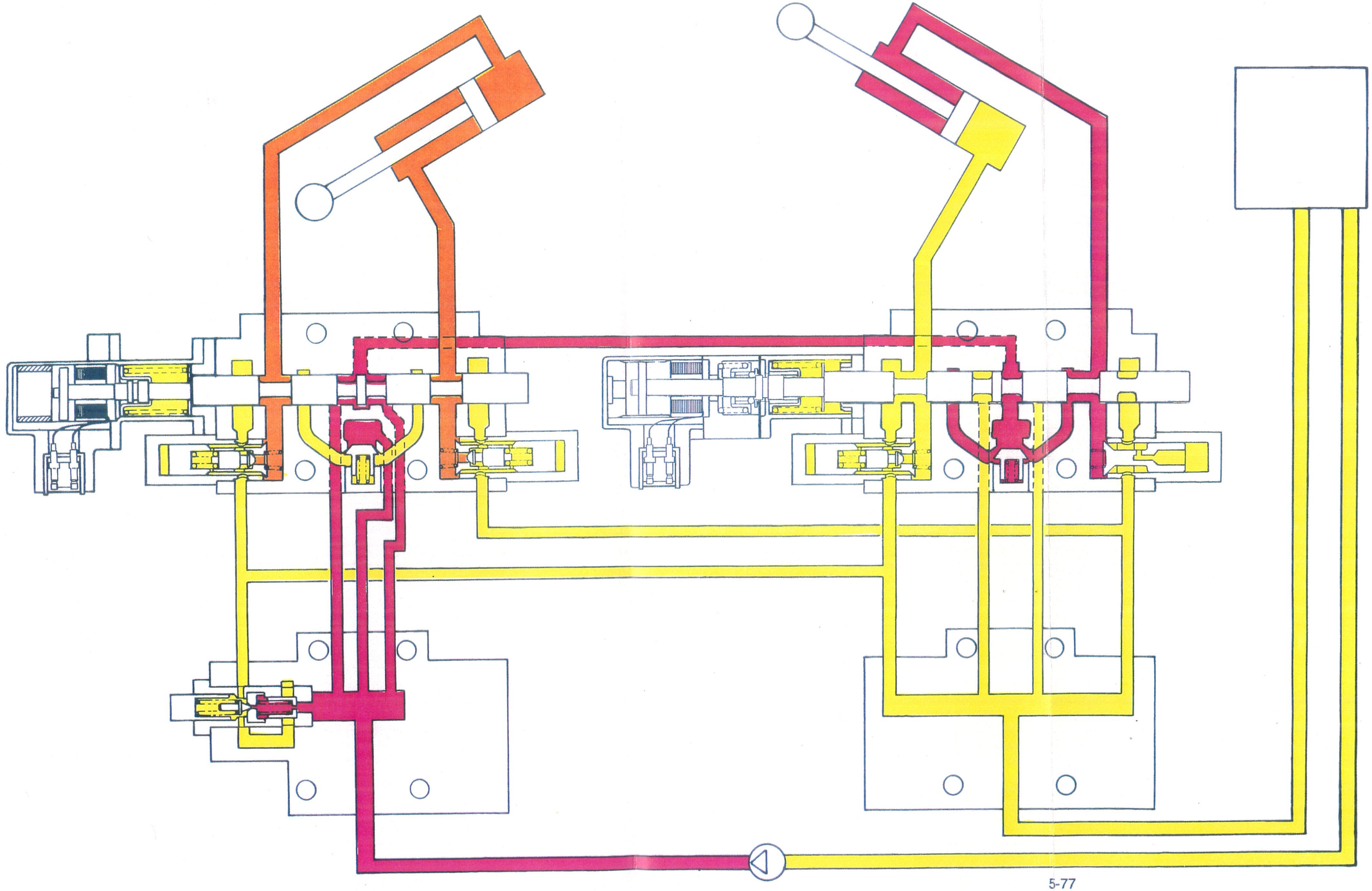
Replace seat belts every two years on open canopy units and every three years on machinery with cabs or at change of ownership.

5.5 TOOLS

Service tools required to perform the repair operations in this manual are listed below. Order tools from your *FIATALLIS*® dealer unless otherwise noted.

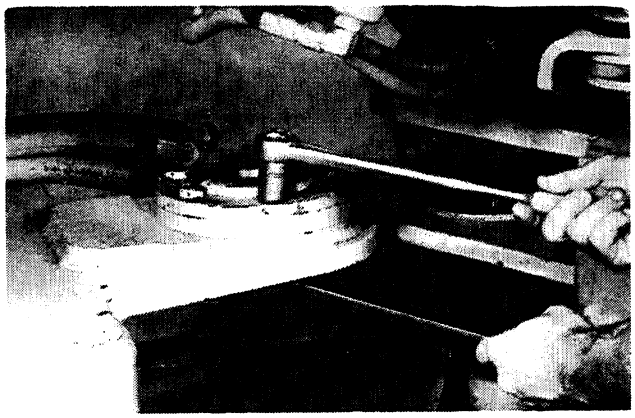
All other tools are considered to standard tools which can be ordered from local tool suppliers.

Topic No.	Tool Description	Part No.
5.3	Flow meter 200 gpm	75300836
5.3	Multi-gauge 150-600-5000 psi	75300110
5.4.6.4	Wrench	75300478
5.4.7.4	Wrench	75300478
5.4.8.2	Wrench	75300478



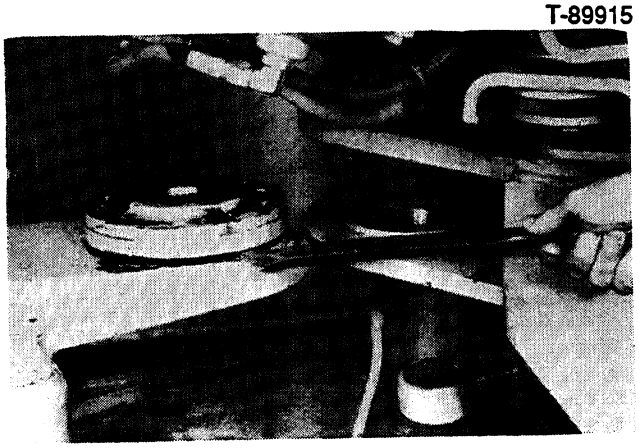
6.1.2.21
Remove the capscrews holding the bushing retainer to the hitch.

T-89914



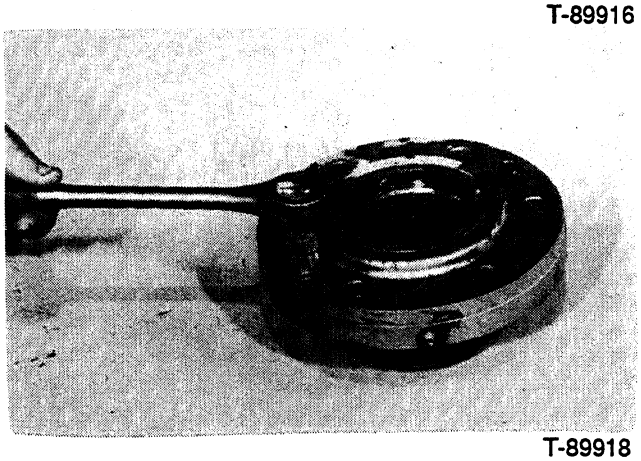
6.1.2.22
Pry the bushing retainer from the hitch.

T-89915



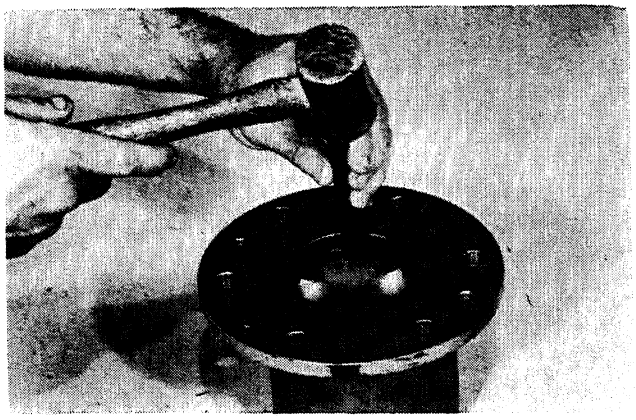
6.1.2.23
Place the retainer on a clean work surface and remove the two capscrews holding the seal retainer to the bushing retainer.

T-89916



6.1.2.24
Remove the seal from the retainer.

T-89918

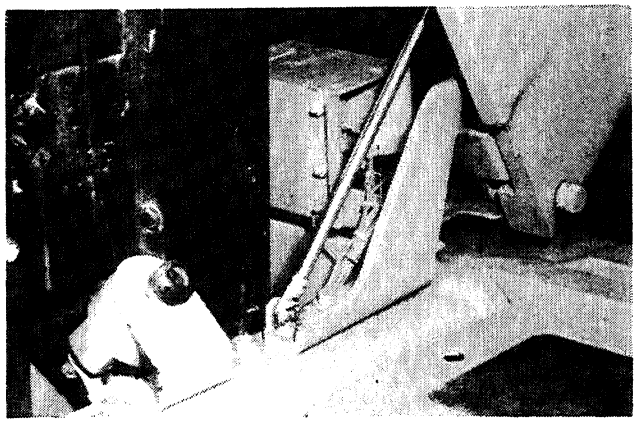


⚠ WARNING

It is unsafe to strike hardened steel parts with anything other than a soft iron or non-ferrous hammer. When installing or removing such parts wear safety glasses with side shields and heavy gloves, etc., to reduce the possibility of injury.

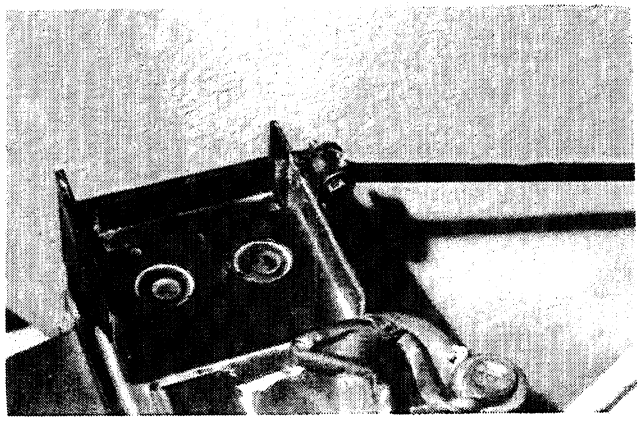
6.2.1.5
Remove four capscrews, washers and nut attaching hood to frame.

T-90312



6.2.1.6
Remove capscrew and locknut attaching spring supports to top of radiator and remove hood.

T-91320



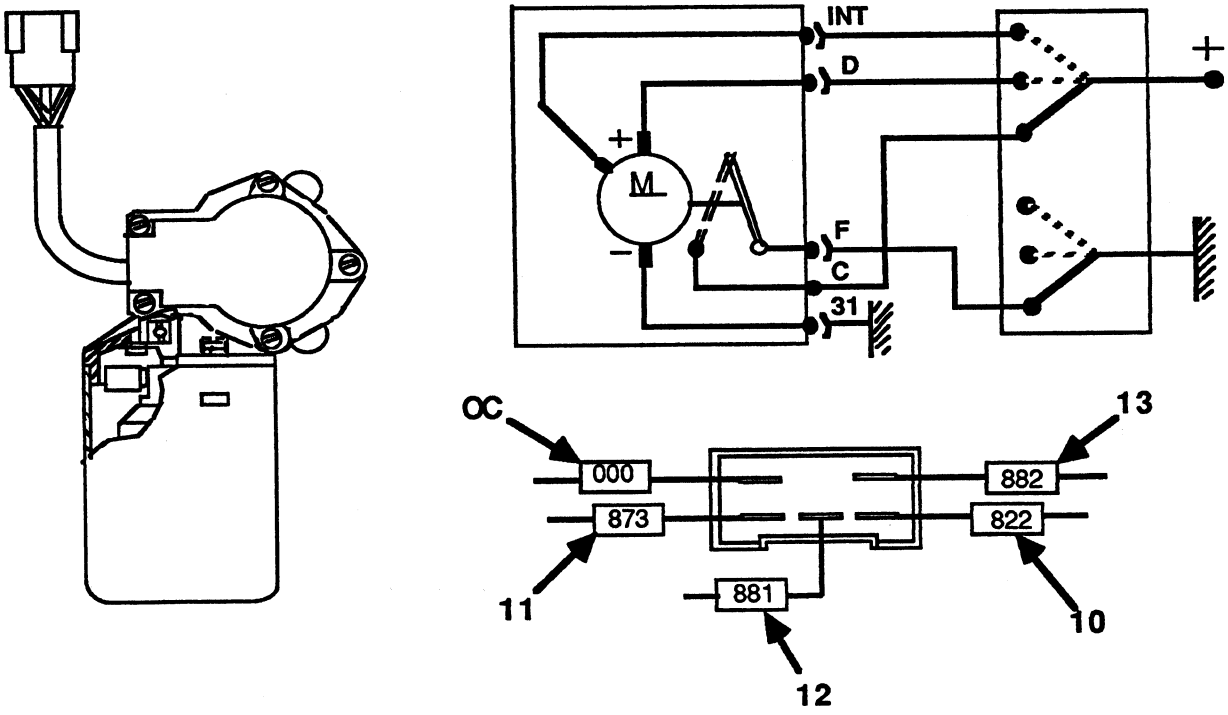
CAB GROUP

A. Connector to Flasher Unit
   Optional 79083348
   Varianti or standard
B. Connector to Clutch Cut-off Relay
C. Connector to Front Wiper Motor
D. Connector to Timer Motor
E. Connector to Buzzer Unit
F. Connector to Electronic Data Monitor (Connection "B")
G. Connector to Electronic Data Monitor (Connection "A")
H. Connectors to Turn Signal Switch
   Optional 79083348
   Varianti or standard
I. Connectors to Light Switch
J. Connector to Front Wiper Switch
K. Connector to Rear Wiper Switch
L. Connector to Emergency Flasher Switch
   Optional 79083348
   Varianti or standard
M. Connectors to Rear Flood Light Switch
N. Connector to Key Switch
O. Connectors to Cold Weather Starting Aid Switch
   Optional 79082673
   Varianti
P. Connector to Key Switch
Q. Connector to Clutch Cut-off Switch
R. Connectors to Cab Flood Light Switch
S. Connectors to Rotating Beacon Switch
   Optional 79085677
   Varianti
T. Connector to right hand side of Cab (Dome Lights, Cab Flood Lights & Beacon)
U. Connectors to Cigarette Lighter
V. Connector to Hour Meter
W. Connector to Tachometer
   Optional 79083655
   Varianti
X. Connector to Indicator Light Panel
Y. Connector to Indicator Light Panel
Z. Connector to Rear Wiper Motor

AA. Connector to Air Conditioner Switch
   Optional
   Varianti
BB. Connector to Cab Heater Blower Switch
   Optional 79084143
   Varianti
CC. Connector to Boom Kick-out Relay
DD. Connector to Bucket Kick-out Relay
   Optional 79081216
   Varianti
EE. Connector to Fuse BLock
FF. Connectors to Starter Relay Switch
GG. Cab Flood Lights
HH. Cab Dome Light

CAB GROUP

FRONT WIPER MOTOR 'C'

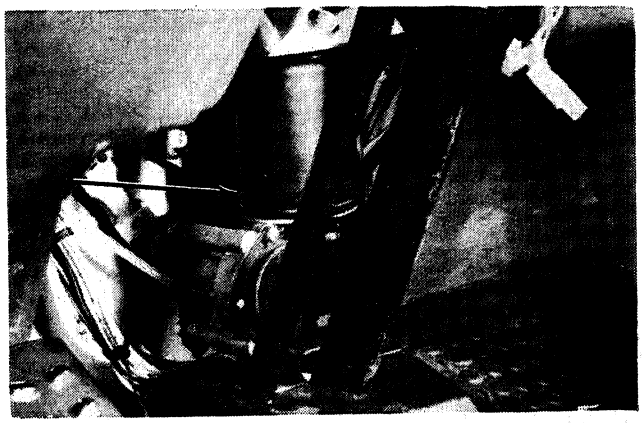


T-85978

ITEM #	WIRE #	
0C	000	To Front Wiper Switch "J", Wiper Switch "J" to Rear Wiper Switch "K"
10	822	To Front Wiper Switch "J"
11	873	To Front Wiper Switch "J"
12	881	To Front Wiper Switch "J"
13	882	To Front Wiper Switch "J"

NOTE: Connector will index to Wiper Motor

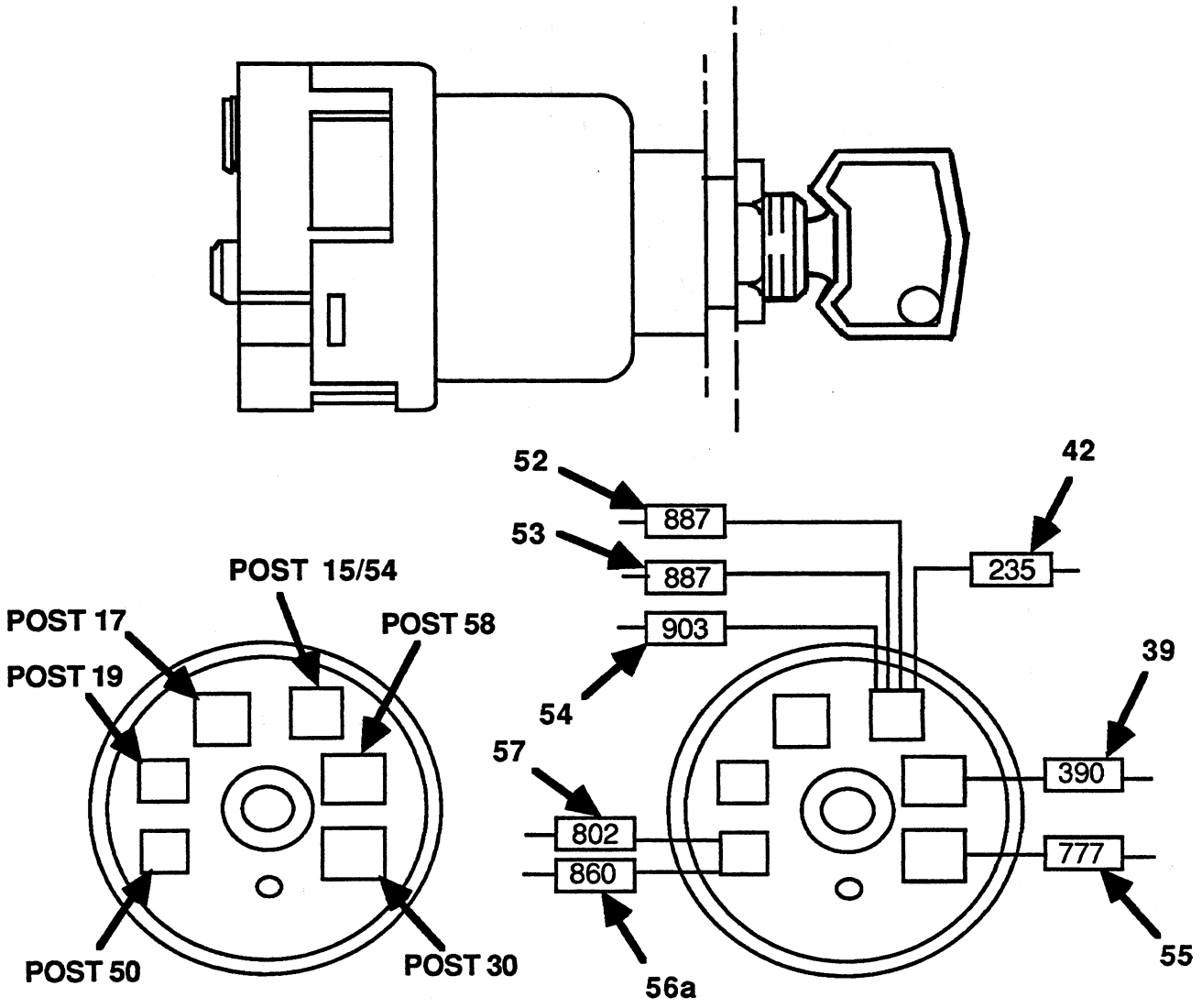
LOCATION: Below Front Windshield



T-89666

CAB GROUP

KEY SWITCH "N" & "P"



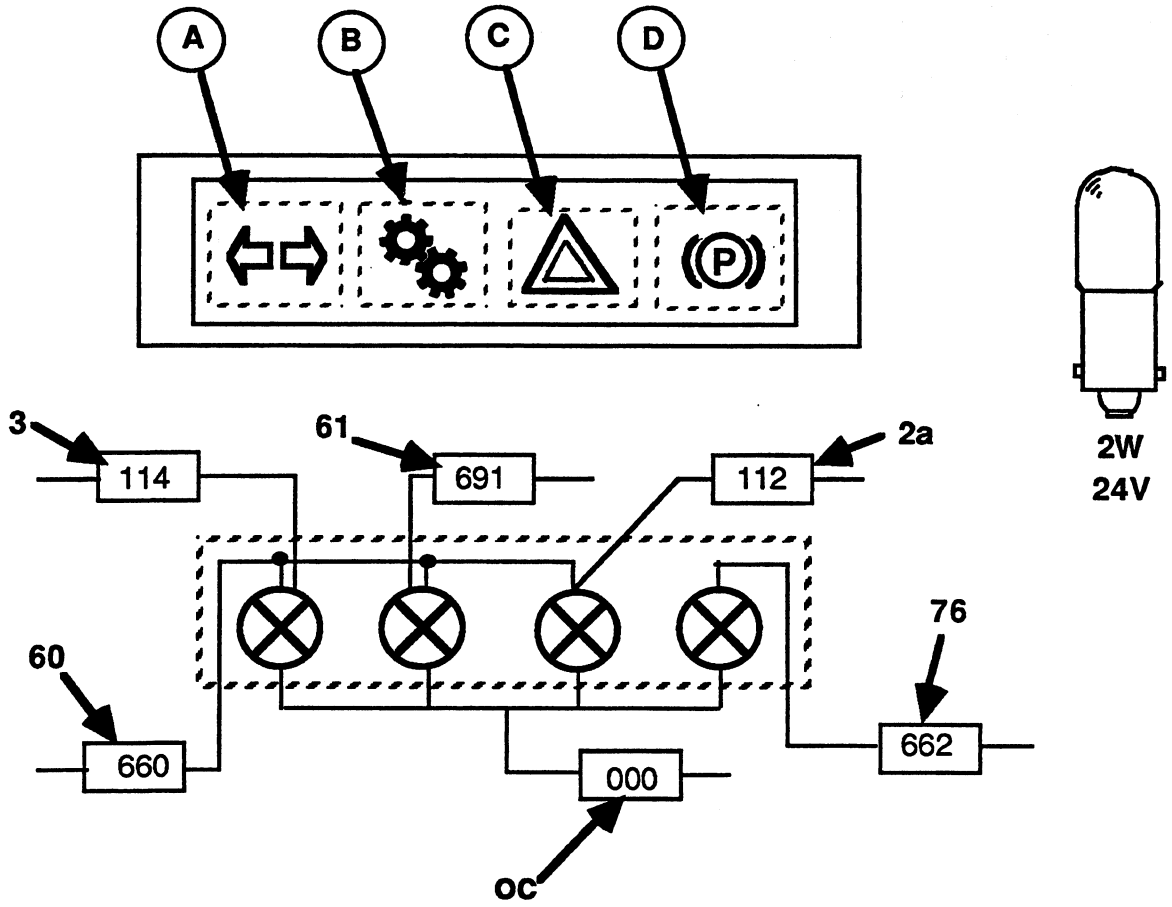
T-85997

ITEM #	WIRE #	
39	390	To Light Switch "I" (Post 58/57)
42	235	To Light Switch "I" (Post 15)
52	887	To Fuse Block "EE"
53	887	To Fuse Block "EE"
54	903	To Cab to Rear Frame Group (Connector "B", Item #15, Page 86)
56a	860	To Cold Weather Starting Aid Switch "O"
57	802	To Starter Relay Switch "GG"

NOTE: Connector "N" will index to Switch

LOCATION: Right hand Instrument Panel

CAB GROUP
INDICATOR LIGHT PANEL "Y"



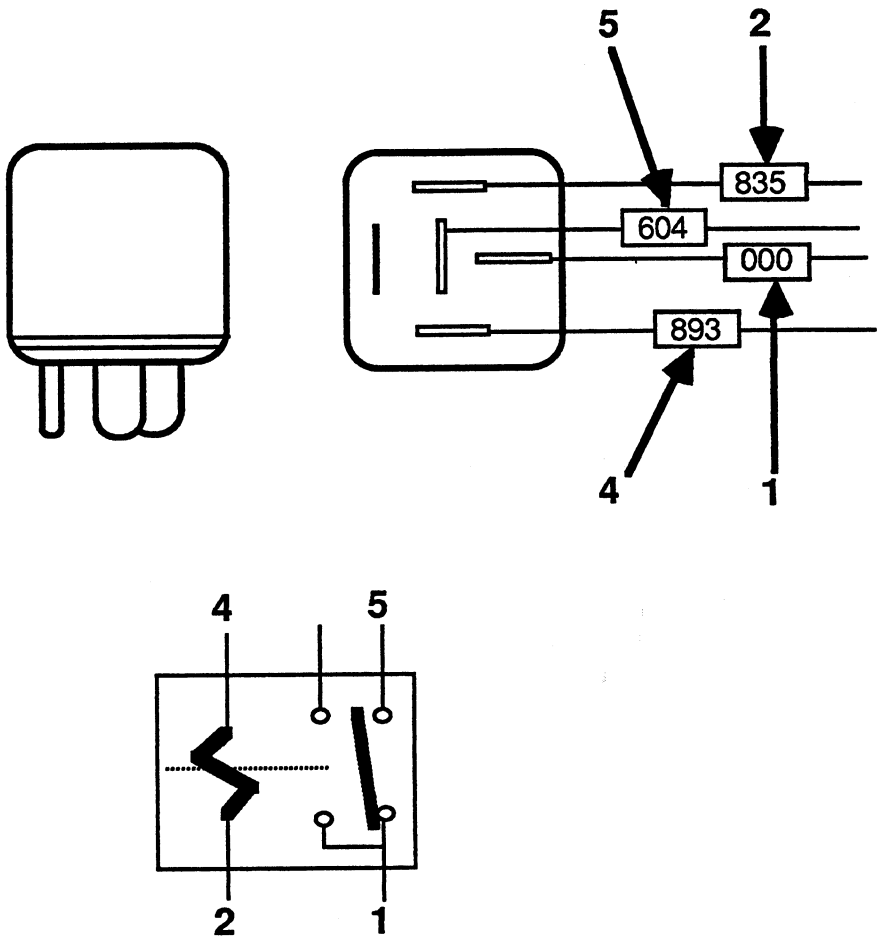
T-85969

A. Turn Signals
B. Clutch Cut-off
C. Emergency Flashers
D. Parking Brake

ITEM #	WIRE#	
0C	000	To Indicator Light Panel "X" and Cab Ground
2a	112	To Emergency Flasher Switch "L"
3	114	To Flasher Unit "A"
60	660	To Clutch Cut-off Switch "Q"
61	691	To Clutch Cut-off Switch "Q"
76	662	To Cab to Front Frame Group (Connector "B", Item #13, Page 54)

LOCATION: Right hand Instrument Panel

EMERGENCY STEERING PUMP PRESSURE SWITCH RELAY "B"



T-85975

ITEM # WIRE #

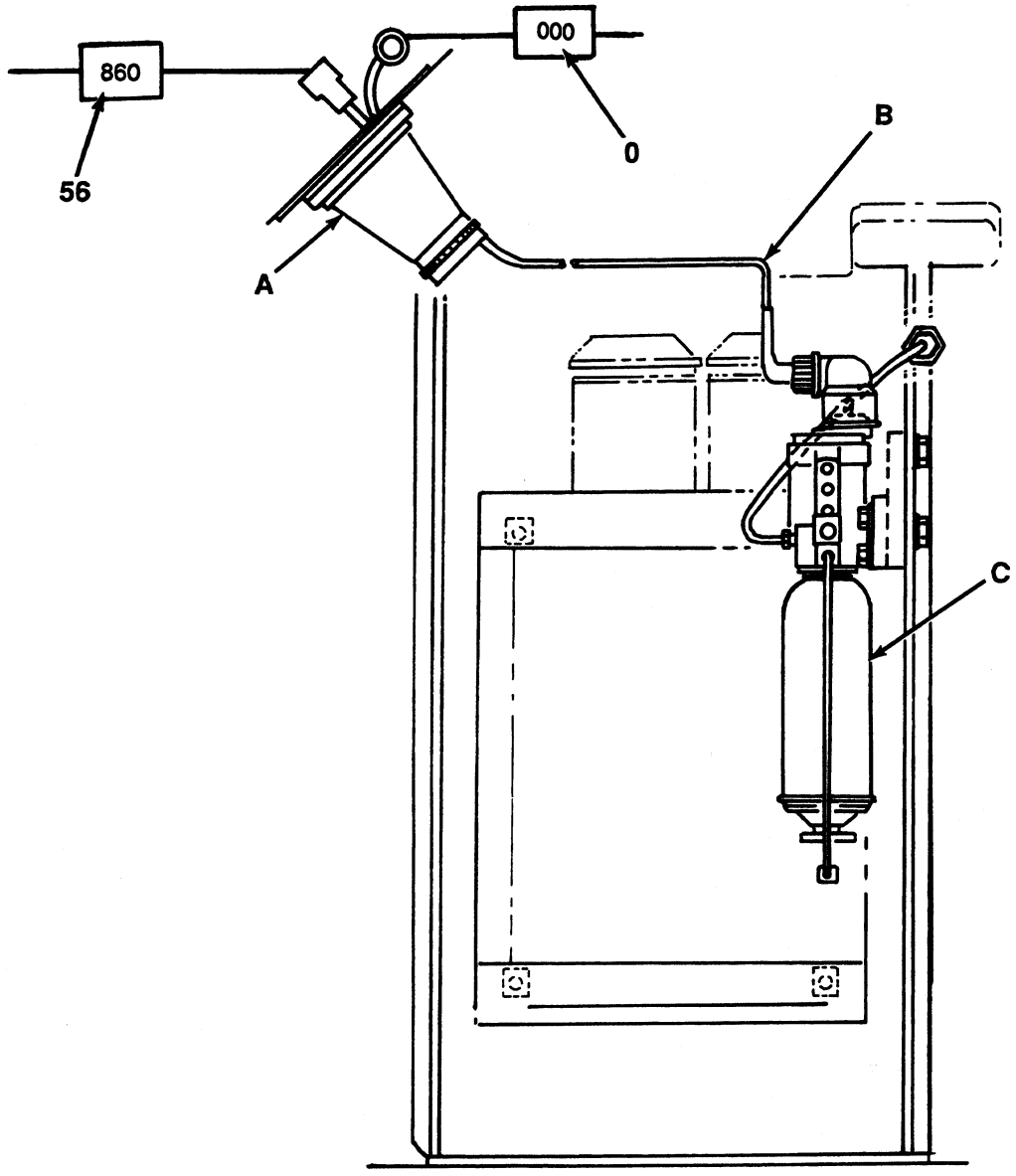
1. 000 To Emergency Steering Buzzer Relay "A" and Emergency Steering Flow Valve Pressure Switch Relay "C".
2. 835 To Emergency Steering Buzzer Relay "A" and Front Frame Connector "F" (Steering Pump Pressure Switch).
4. 893 To Emergency Steering Buzzer Relay "A" and Emergency Steering Flow Valve Pressure Switch Relay "C".
5. 604 To Emergency Steering Flow Valve Pressure Switch Relay "C" and Indicator Light Panel "E".

NOTE: Connector will index to Relay

LOCATION: Left hand side of Seat in bottom of Console Panel, See Page 8

Optional
Varianti

CAB GROUP
COLD WEATHER STARTING AID GROUP



T-100012

A. Boot
B. Harness
C. Cold Weather Starting Aid

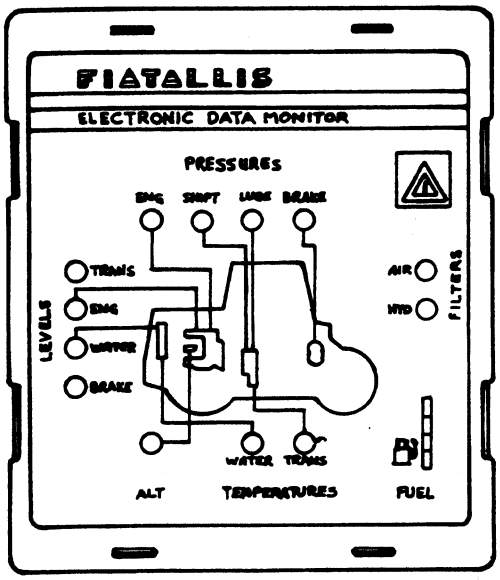
ITEM #	WIRE #	
0.	000	To Ground in Cab
56.	860	To Cab wire 860 (Cab Group, Item #56)

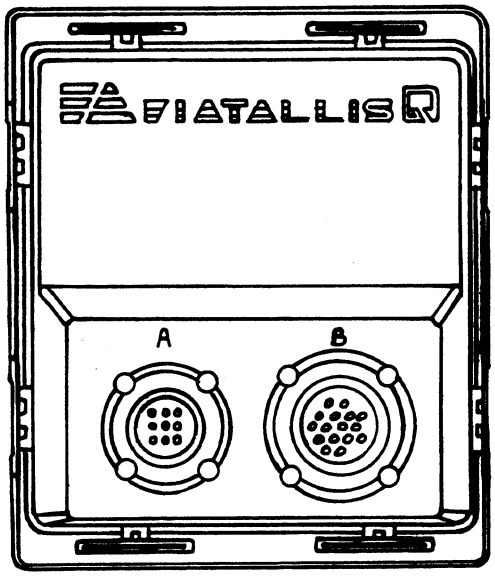
NOTE: Connectors will index.

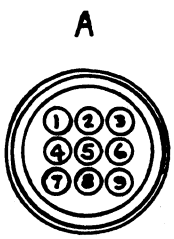
LOCATION: Left hand side of Hydraulic Tank Assembly.

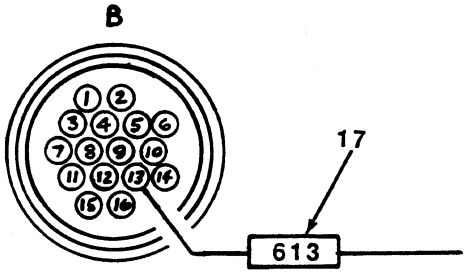
Optional 79082673
Varianti

CAB TO FRONT FRAME GROUP
ELECTRONIC DATA MONITOR 'I'









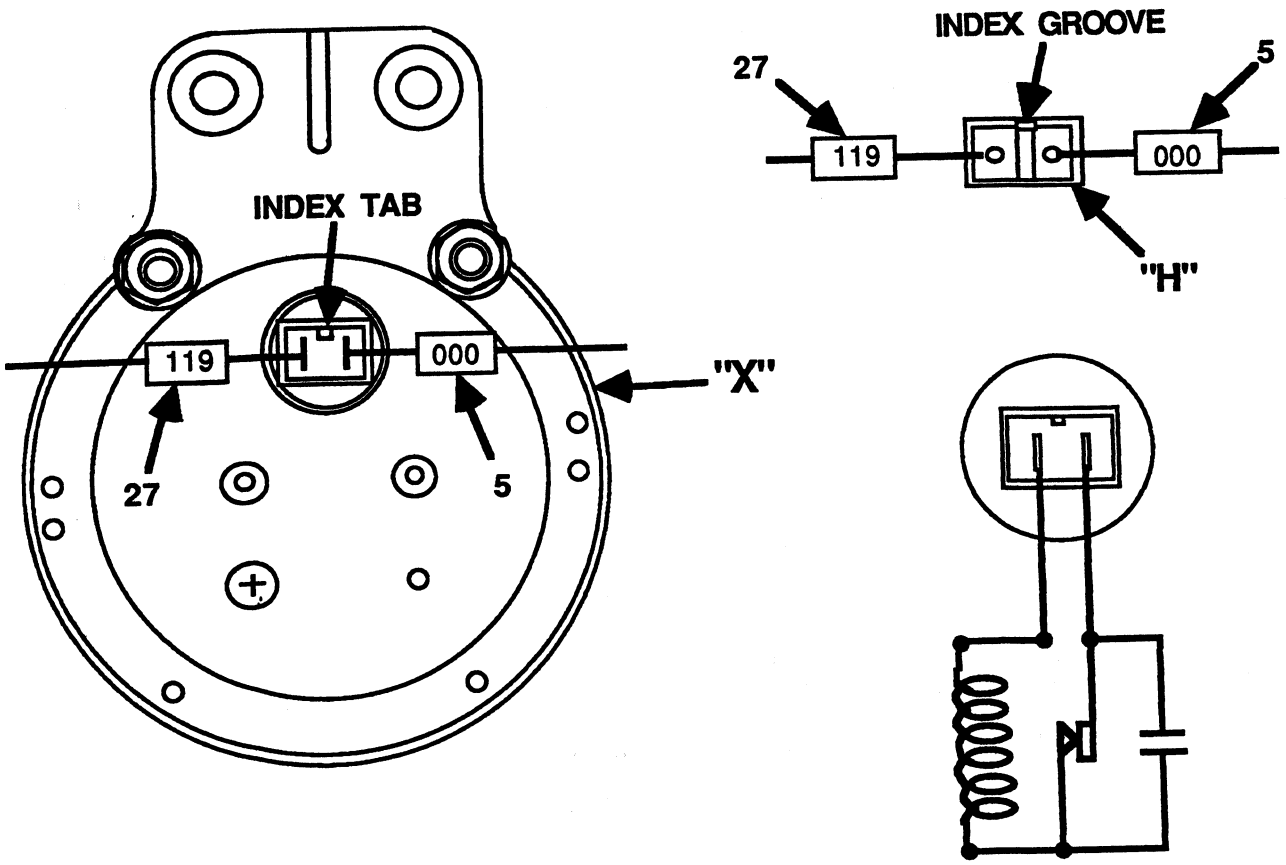
T-85993

ITEM #	WIRE #	
17	613	To Connector "B"

LOCATION: Left hand Instrument Panel

FRONT FRAME GROUP

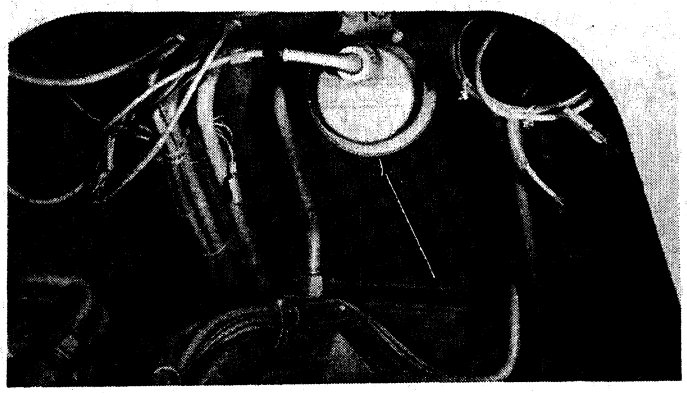
CONNECTOR 'H' TO HORN 'X'



T-100006

ITEM #	WIRE #	
5.	000	To ground in Cab
27.	119	To Connector "D"

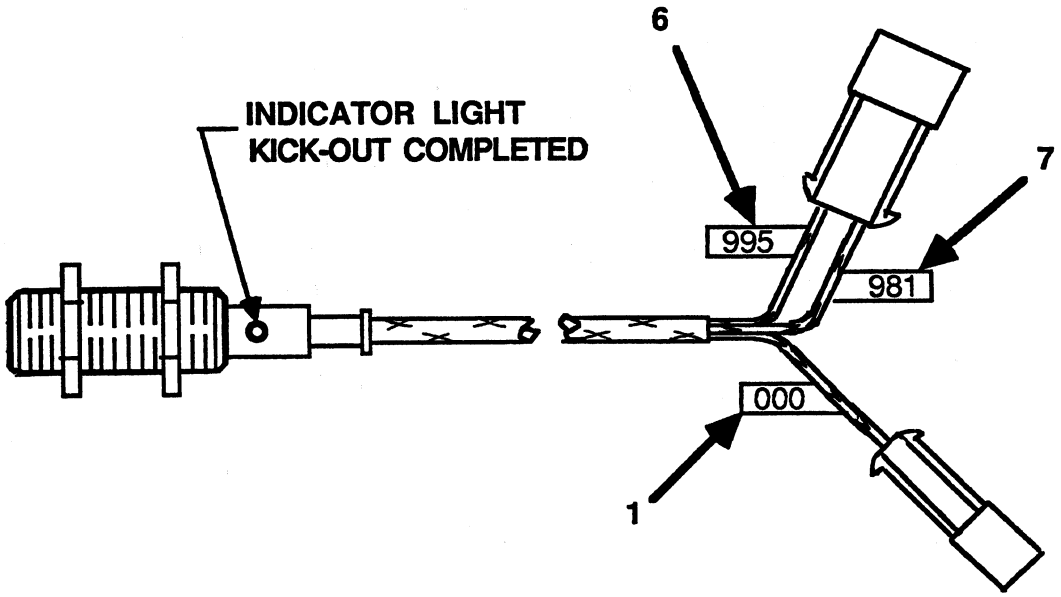
Location: Front Frame



T-90637

FRONT FRAME GROUP

BUCKET KICK-OUT PICKUP SWITCH 'U'



T-100010

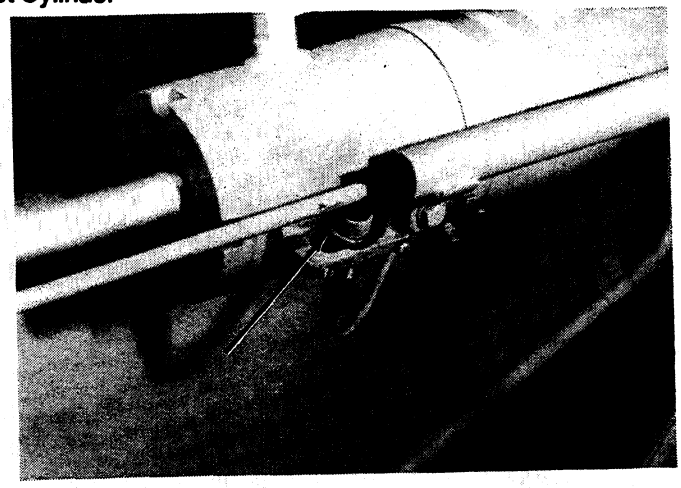
ITEM # WIRE #

1.	000	To ground in Cab
6.	995	To Connector "A" (positive)
7.	981	To Connector "A" (output)

NOTE: Post "A" must index to Post "A"
Post "B" must index to Post "B"

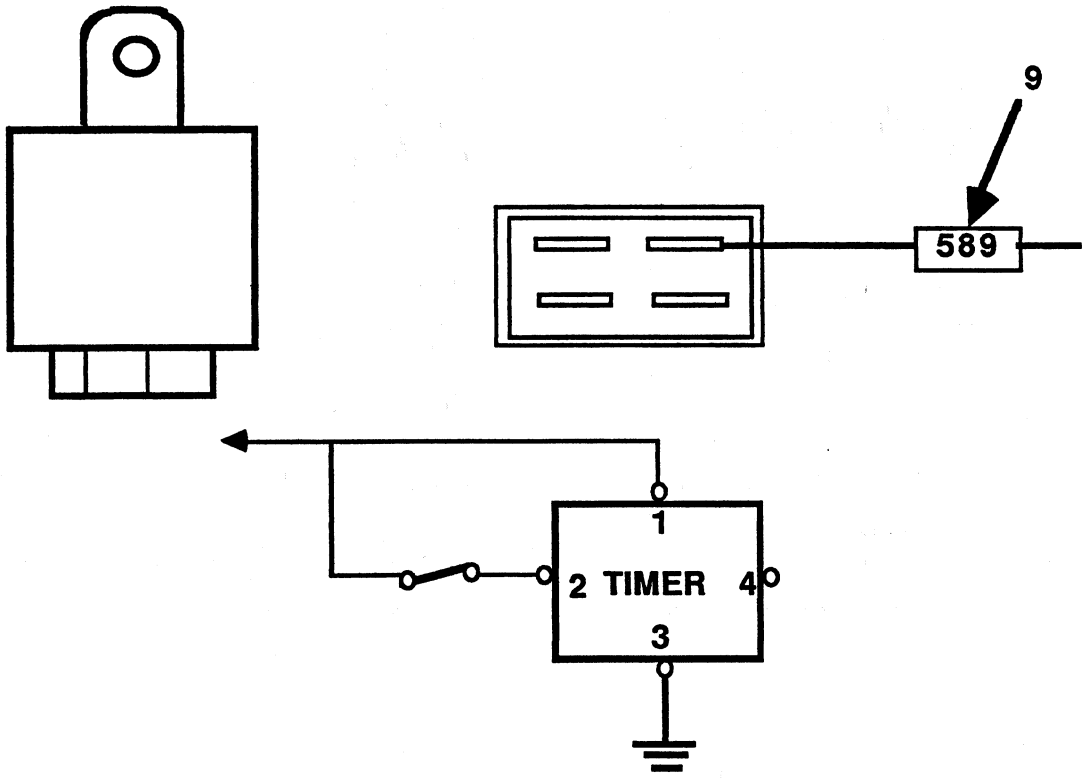
Maximum operating distance: 5mm (0.20in)

LOCATION: Right hand Bucket Cylinder
Optional 79081216
Varianti or standard



T-90639

CAB TO REAR FRAME GROUP
TIMER RELAY "I"



T-85992

ITEM #	WIRE #	
9	589	To Connector "A"

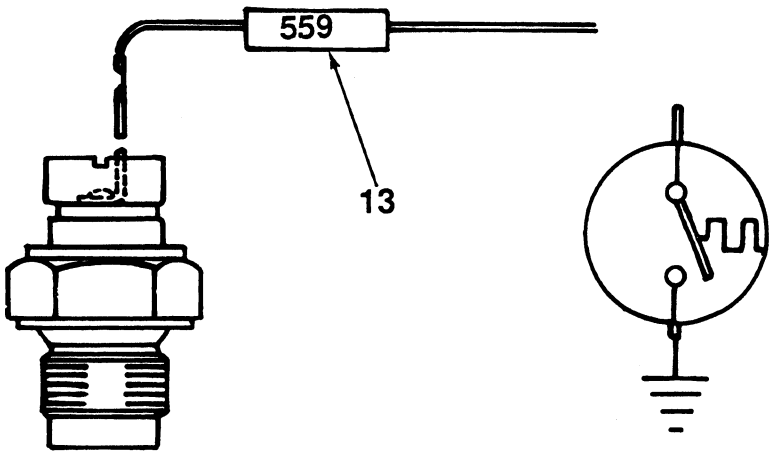
NOTE: Connector will index to Timer Relay

LOCATION: Left hand side of Seat in bottom of Console Panel. See Page 8.

REAR FRAME GROUP

ITEM #	WIRE #	
1.	777	Starter Relay Switch in Cab to Starter "I"
2.	777	Alternator "Y" to Starter "I"
3.	000	Cab ground to Clutch Cut-off Valve "J" & Rear Flood Light Connectors "E"
4.	000	Rear Frame ground to Neutral Start Switch "H" & Transmission Oil Pressure Switch "K"
5.	000	Rear Frame ground to Water Level Sending Unit "N" (Post B) and Air Filter Restriction Indicator Switch "O" and Brake Fluid Level Sending Units "P" & "Q"
6.	000	Rear Frame ground to Engine Oil Pressure Switch "W (Post B) and Brake Lights "AA" & "BB"
7.	000	Lamp, Number Plate "Z" to ground on Rear Frame
8.	693	Connector "A" to Transmission Lube, Oil Pressure Switch "S"
9.	589	Connector "A" to Transmission Oil level Sending Unit "U"
10.	503	Connector "A" to Engine Oil Pressure Switch "W" (Post A)
11.	637	Connector "A" to Alternator "Y"
12.	580	Connector "A" to Hydraulic Tank Oil filter Restriction Indicator Switch "T"
13.	559	Connector "A" to Transmission Oil Temperature Sending Unit "R"
14.	569	Connector "A" to Engine Oil Level Sending Unit "X"
15.	903	Connector "B" to Fuel Shut-off Solenoid "M"
16.	907	Connector "B" to Neutral Start Switch "H"
17.	888	Connector "B" to Starter "I"
18.	224	Connector "B" to Connector "E" for Rear Flood Lights "CC"
19.	175	Connector "B" to Rear Brake Lights "AA" & "BB"
20.	975	Connector "B" to Clutch Cut-off Valve "J"
21.	976	Connector "B" --- (pig tail) ----
22.	557	Connector "C" to Fuel Level Sending Unit "V"
23.	528	Connector "C" to Water Temperature Sending Unit "L"
24.	663	Connector "C" to Air filter Restriction Indicator Switch "O"
25.	661	Connector "C" to Brake Fluid Level Sending Unit "P" & "Q"
26.	555	Connector "C" to Fuel Level Sending Unit
27.	520	Connector "C" to Water Level Send Unit "N"
28.	581	Connector "C" to Transmission Oil Pressure Switch "K"
29.	109	Connector "D" to Connector "F" for Rear Brake, Tail & Turn Signal Light "EE"
30.	103	Connector "D" to Connector "G" for Rear Brake, Tail & Turn Signal Light "DD"
31.	330	Connector "D" to Connector "F" for Rear Brake, Tail & Turn Signal Light "EE"
32.	337	Connector "D" to Lamp, Number Plate
33.	339	Connector "D" to Connector "G" for Rear Brake, Tail & Turn Signal Light "DD"
34.	175	Connector "D" to Connectors "F" & "G" for Rear Brake, Tail & Turn Signal Lights "DD" & "EE"

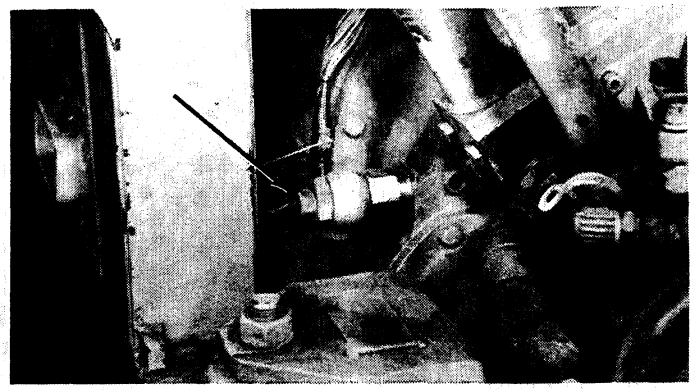
TRANSMISSION OIL TEMPERATURE SENDING UNIT "R"



T-100014

ITEM #	WIRE #	
13	559	To Connector "A"

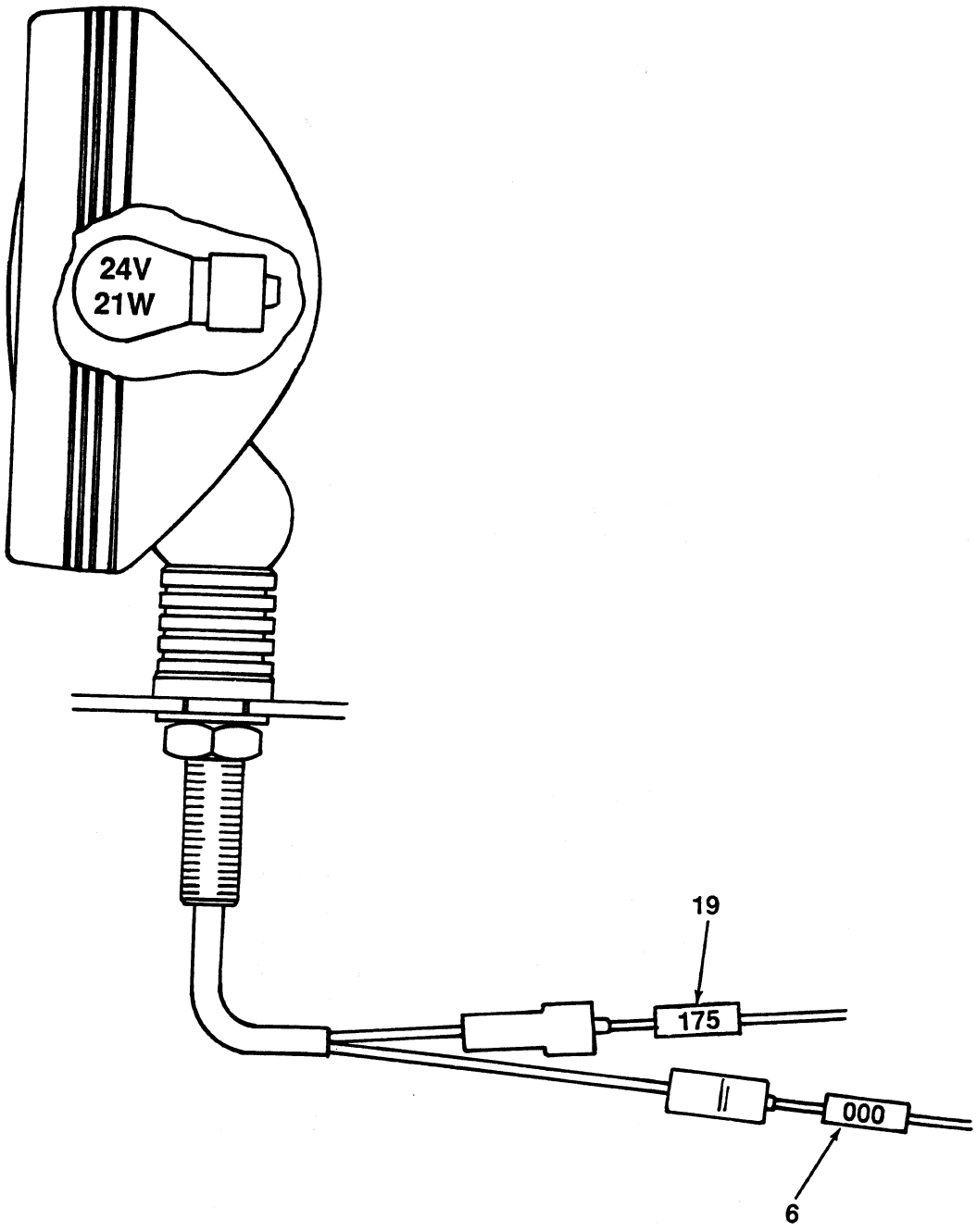
LOCATION: Right hand side of the Transmission Housing



T-90636

REAR FRAME GROUP

REAR BRAKE LIGHT GROUP ("AA" & "BB")



T-100018

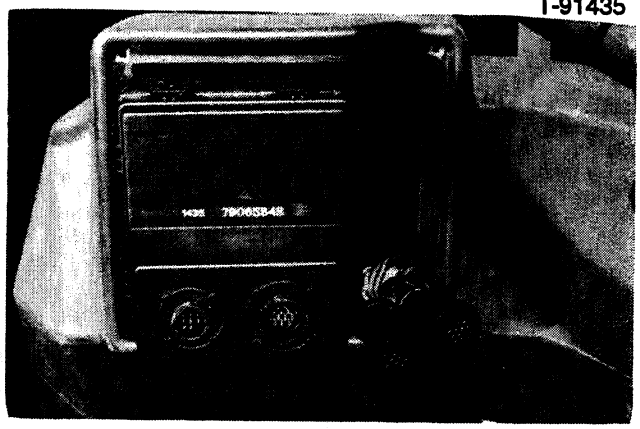
STANDARD EQUIPMENT

ITEM #	WIRE #	
6	000	To Rear Frame ground
19	175	To Connector "B"

ELECTRONIC DATA MONITOR

TESTING

T-91435



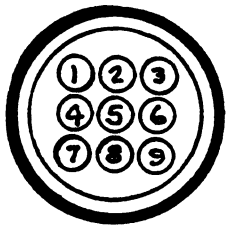
7.2.1

When identifying problems within a particular circuit, it is best to know how the circuit operates. The Electronic Data Monitor has two cables that come out the back. The cable's wires connect to the power source as well as level and pressure switches. It is best to identify cable contact positions and where the cable leads. Knowing where the wires connect will aid if the wires are suspected of having an open or short circuit.

T-85993

7.2.2

Cable "A" leads go from the monitor and to the following locations:

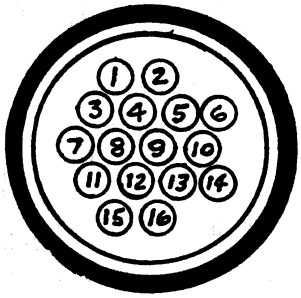


Position	Wire#	
1	581	To Transmission Shift Pressure Switch
2	589	To Transmission Oil Level Sending Unit
3	693	To Transmission Lubrication Pressure Switch
4	569	To Engine Oil Level Sending Unit
5	520	To Coolant Level Sending Unit
6	888	To Starter Relay Switch
7	555	To Fuel Level Sending Unit
8	557	To Fuel Level Sending Unit

T-85993

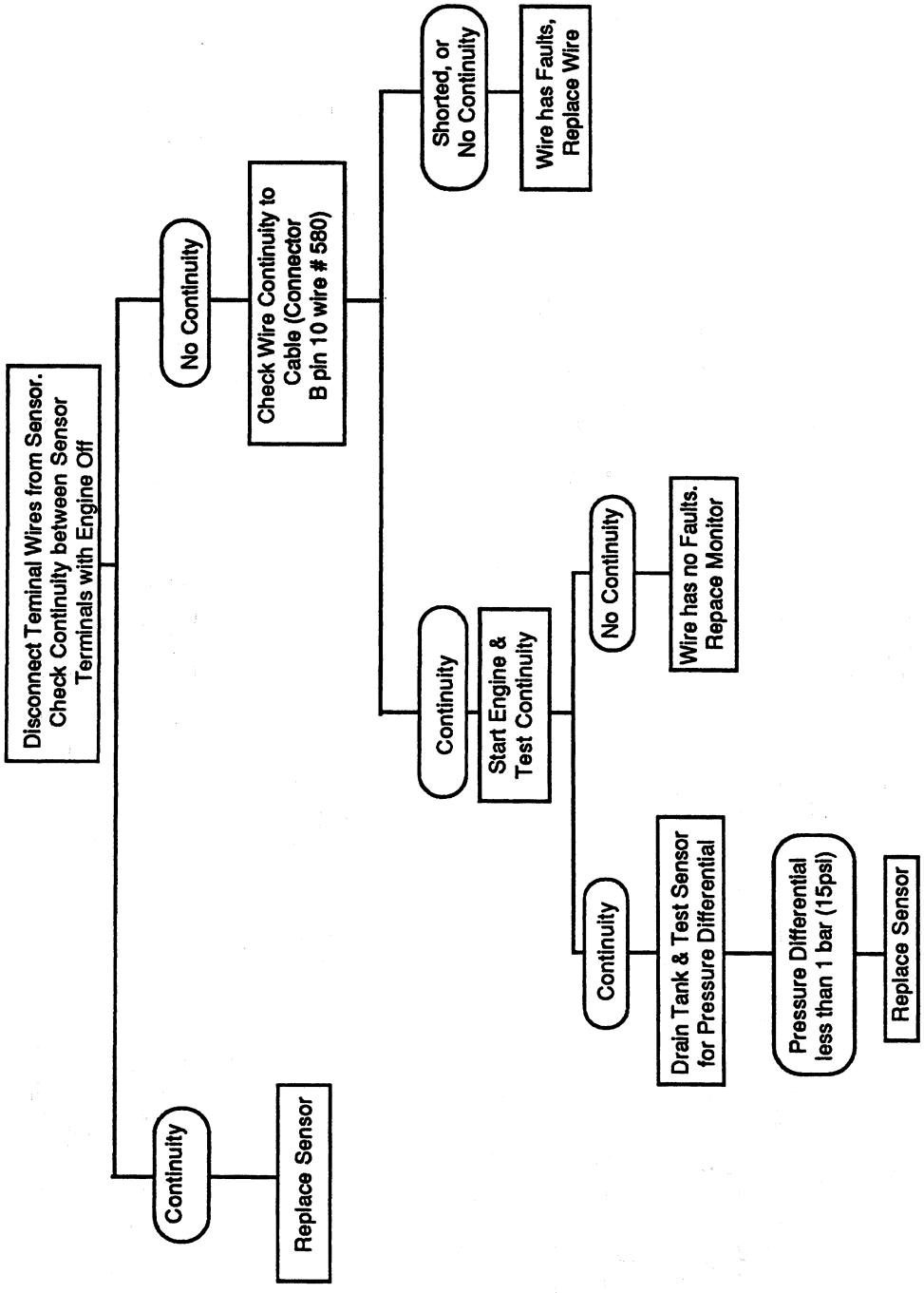
7.2.3

Cable "B" leads go from the monitor and to the following locations:



Position	Wire#	
1	887	To Fuse Block
2	000	To Cab Ground
3	104	To Buzzer Unit
4	559	To Transmission Oil Temperature Sending Unit
5	661	To Brake Fluid Level Sending Unit
6	105	To Buzzer Unit
7	528	To Water Temperature Sending Unit
8	637	To Alternator
9	503	To Engine Oil Pressure Switch
10	580	To Implement Oil Filter Restriction Switch
11	871	To Fuse Block
12	663	To Air Filter Restriction Switch
13	613	To Low Brake System Pressure Switch
14		Not Used
15		Not Used
16		Not Used

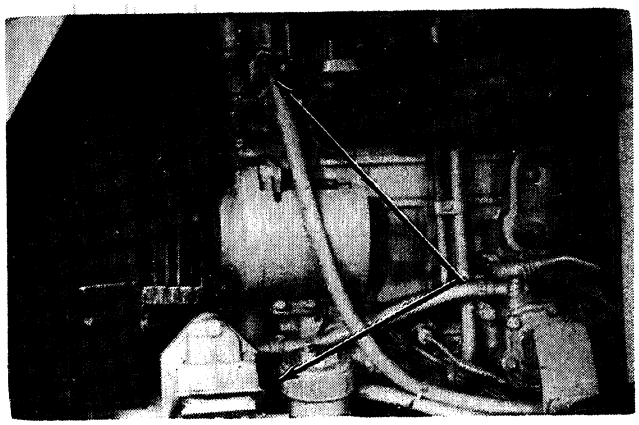
IMPLEMENT FILTER RESTRICTION LIGHT STAYS ON AFTER INSTALLING NEW FILTER ELEMENTS



SYMPTOM	PROBABLE CAUSE	TOOLS REQUIRED	TEST	SOLUTION
No heat (Heater)	1. Heater control valve malfunctioning			1a. Check control linkage 1b. Repair or replace valve
	2. Blower motor malfunctioning			2a. Check fuse 2b. Repair or replace blower motor
	3. Heater core clogged or leaking			3. Repair or replace heater core
	4. Heater hoses or shut-off valves clogged			4a. Turn shut-off valves "OPEN" 4b. Disconnect hoses from heater core and flush hoses to remove restriction
	5. No hot water from engine			5. Correct engine problem

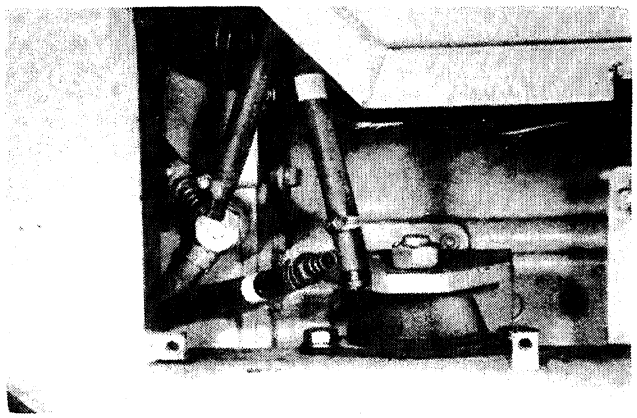
8.3.1.33
Shut off valves supplying fluid to heater.

T-90560



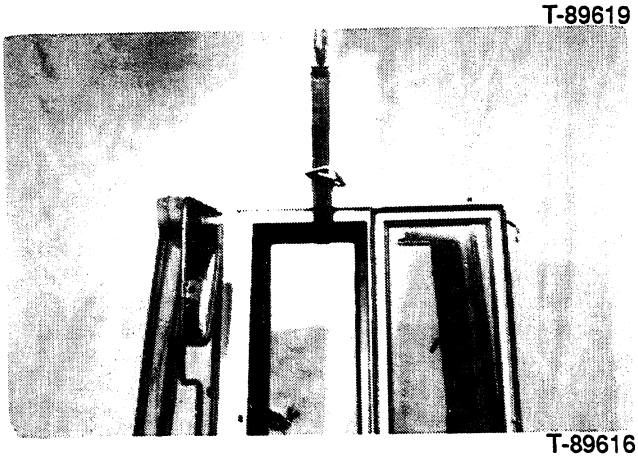
8.3.1.34
Disconnect two heater hoses located at right rear of cab.

T-90559



8.3.1.35
Position lifting device of proper capacity above cab and attach a strap through the cab door and out the side window. **(May want to install 4 lifting eyes to the four holes at top of cab.)**

T-89619

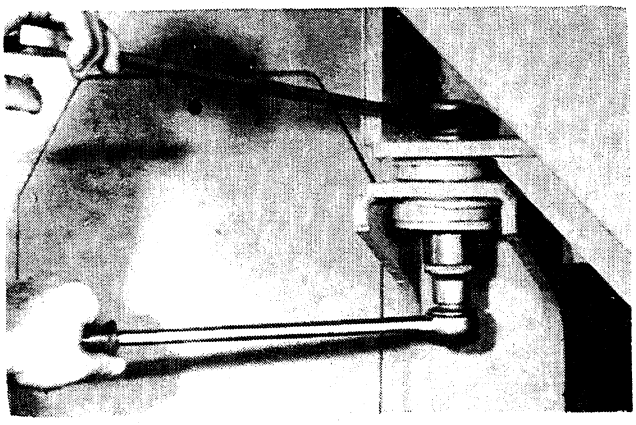


⚠ WARNING

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

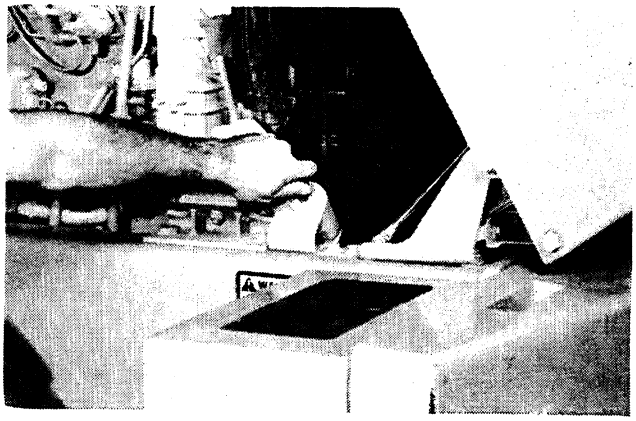
8.3.1.36
Disconnect and remove the four mounting capscrews and lock nuts attaching the cab to the frame.

T-89616



T-90538

8.3.2.33
Turn on master electrical switch.



⚠ WARNING

Study the operation and maintenance instruction manual through before starting, operating, main- taining, fueling or servicing this machine.

This machine and its attachments are to be operated only by a qualified operator seated in the operator's seat.

Machine-mounted safety signs have been color coded yellow with black border and lettering for warning, and red with white border and lettering for danger points.

This symbol is your safety alert sign. It means "ATTENTION!" "BECOME ALERT!" "YOUR SAFETY IS INVOLVED".

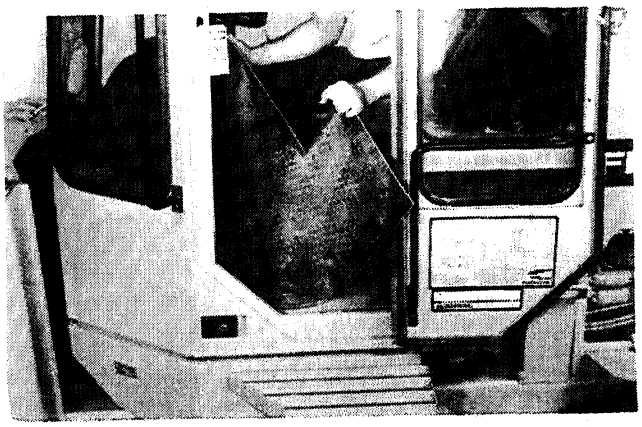
Read and heed all safety instructions carrying the signal words "WARNING" and "DANGER".

8.3.3.6 HEATER & BLOWER FAN

8.3.3.6.1 Heater Removal

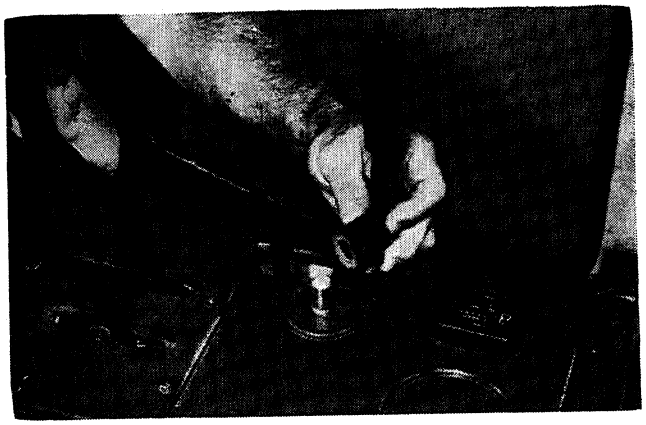
8.3.3.6.1.1
Remove floor mat.

T-88026



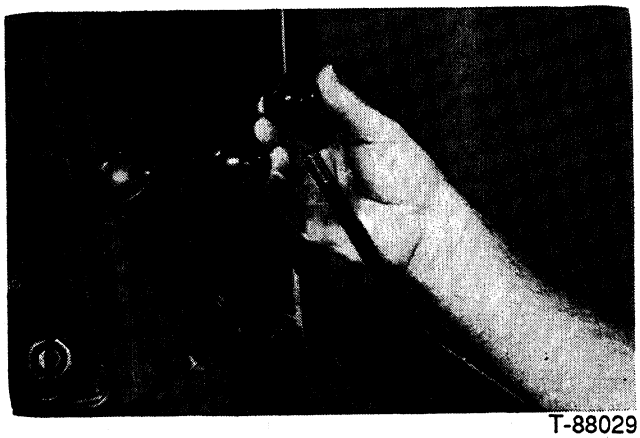
8.3.3.6.1.2
Loosen setscrew on hydraulic controls lock lever and remove lever.

T-90569



8.3.3.6.1.3
Unscrew knobs on hydraulic control levers.

T-90570



8.3.3.6.1.4
Remove right front cab corner panel.

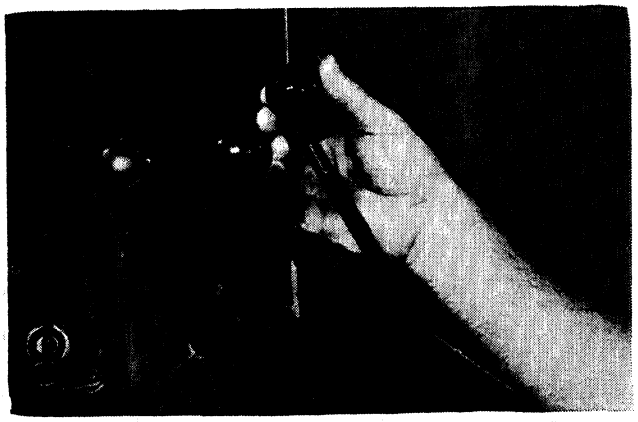
T-88029

8.3.3.6.5.10
Install right front cab corner panel.

T-88029

8.3.3.6.5.11
Install boot and knobs to hydraulic control levers.

T-90570



8.3.3.6.5.12
Install hydraulic controls lock lever and tighten set-screw.

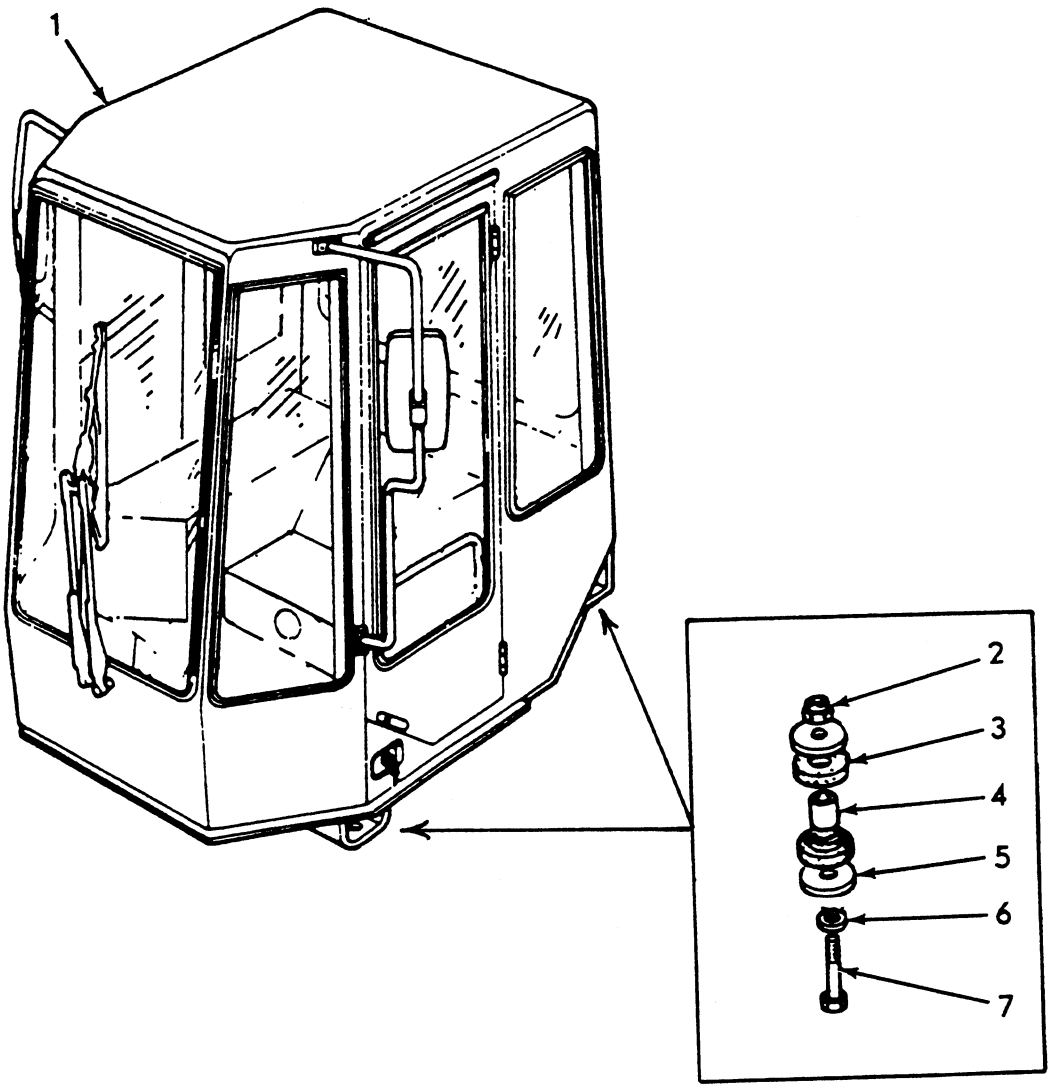
T-90569

8.3.3.6.5.13
Install floor mat.

T-88026

8.3.3 CAB DISASSEMBLY & ASSEMBLY

8.3.3.10 REFERENCE DRAWINGS



T-85641

FIG. 8-1 CAB ASSEMBLY

1. *CAB ASSEMBLY*
2. *NUT*
3. *BUSHING*
4. *SPACER*
5. *WASHER*
6. *WASHER*
7. *CAPSCREW*

8.4 TOOL SECTION

Service tools required to perform the repair operations in this manual are listed below. Order tools from your *FIATALLIS*® dealer unless otherwise noted.

All other tools are considered to be standard tools which can be ordered from local tool suppliers.

DESCRIPTION	PART NO.
Glass and seal removal and installation tool	_____
Wire cutters	_____
Torque wrench	75300810
Putty knife	_____
Silicone sealant	70935406

III MACHINE LUBRICANT/VISCOSITY SPECIFICATION TABLE

Find lubricant to use and viscosity as follows: Example – 2 (4)
1st Number, Lubricant Reference Code: Refer to page 7
2nd Number, (in parenthesis), Viscosity Chart Code: Refer to page 8

* Preferred

CRAWLER TRACTORS	Trans & Conv	St. Clutch Bevel Gear	Track Rollers	Carrier Rollers & Idlers	Final Drive Sides	Impl Hyd	Track Release Housing
FD5	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-
FD7	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-
FD9	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-
10C	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-
FD14E	*1 (-) 5 (4)	2 (4)	2 (4)	2 (4)	11 (12)	*2 (4) 4 (4) 7 (4)	-
FD30B	*4 (4) 5 (4) 6 (4)	3 (9) 4 (9) 2 (9)	2 (10)	2 (9)	11 (12) *12 (-)	2 (7) 4 (7) 7 (7)	8 (11)
FD40B	*4 (4) 5 (4) 6 (4)	3 (9) 4 (9) 2 (9)	2 (10)	2 (9)	11 (12) *12 (-)	2 (7) 4 (7) 7 (7)	8 (11)
FD50	*4 (4) 5 (4) 6 (4)	3 (9) 4 (9) 2 (9)	2 (10)	2 (9)	11 (12) *12 (-)	2 (7) 4 (7) 7 (7)	8 (11)
FL5B	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-
FL7B	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-
FL10E	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-
FL14E	*1 (-) 5 (4)	6 (4)	6 (10)	6 (10)	12 (-)	6 (5)	-
FL20	*1 (-) 5 (4)	2 (4)	2 (10)	2 (10)	11 (12) *12 (-)	*2 (4) 4 (4) 7 (4)	-

FD9 CRAWLER DOZER S/N 030114, 030202 - UP

ENGINE		IVECO 8065.25.095		
Bore & stroke		104 x 115 mm		
Displacement		5.9L		
Firing order		1-5-3-6-2-4		
Low idle, (high idle)	rpm	800-850 (2200-2300)		
Converter stall	rpm	1960-2030		
Hydraulic stall	rpm	2140-2240		
Full stall (converter & implement)	rpm	1640-1740		
Valve clearnance, Cold Intake (Exhaust)	inch	0.010 (0.014)	mm	0.25 (0.35)
Oil pressure, Min. @low idle (high idle)	PSI	10 (43)	bar	0.7 (2.96)
Cylinder compression, minimum @ cranking speed	PSI	304	bar	21
Nozzle pressure	PSI	3335-3451	bar	230-238
Intake manifold pressure @ converter stall	In. Hg.	27	cm Hg	68.6
Exhaust manifold temp., Max. @ converter stall	°F	1130	°C	610
Air Cleaner restriction, Max. @ converter stall	In. H_2O	25	cm. H_2O	63.5
TRANSMISSION/TORQUE CONVERTER				
Main pressure @ high idle, neutral	PSI	206-213	bar	14.2-14.6
Lube pressure high idle, neutral	PSI	28	bar	1.9
Converter relief @ high idle, neutral	PSI	95-118	bar	6.5-8.1
Trimmer valve poppet pressure	PSI	18-23	bar	1.25-1.55
Pump flow @2100 rpm	GPM	17.7	L/min	67
Scavenging pump flow @ 2100 rpm	GPM	18.3	L/min	71
STEERING/BRAKES				
Steering pressure @ high idle	PSI	333-340	bar	23-24
Brake pressure @ high idle	PSI	391-449	bar	27-31
Pump flow @ high idle @ steering pressure	GPM	9.5 (8 min.)	L/min	36 (30)
IMPLEMENT HYDRAULICS				
Main pressure @ high idle	PSI	2140	bar	148
Pump flow @ high idle @ 1500 psi	GPM	30 (25 min.)	L/min	114 (94)

CAPACITIES, refill (approximate)	**GALS**	**TYPE**	**LITER**
Engine cooling system	6	COOLANT	23
Engine crankcase	3.7	EO	14
Transmission/converter	6.5	TF	24.5
Steering clutch, bevel gear	4.2	EO	15.5
Final drives (each)	3.5	MGO	13
Implement hydraulic system	13	HO	49
Fuel tank	52	Diesel	198
Track idler & rollers	2	EO	7.5

FD40B CRAWLER DOZER S/N 89A 35110 - UP

ENGINE		Cummins KT19C		
Bore & stroke		159 X 159 mm		
Displacement		19 L		
Firing order		1-5-3-6-2-4		
Low idle, (high idle)	rpm	750-800 (2200-2400)		
Converter stall	rpm	1720-1780		
Hydraulic stall	rpm	N/A		
Full stall (converter & implement)	rpm	N/A		
Valve clearance, Cold Intake (Exhaust)	inch	*	mm	*
Oil pressure, Min. @low idle (high idle)	PSI	*	bar	*
Cylinder compression, minimum @ cranking speed	PSI	*	bar	*
Nozzle pressure	PSI	*	bar	*
Intake manifold pressure @ converter stall	In. Hg.	*	mm Hg.	*
Exhaust manifold temp., Max. @ converter stall	°F	*	°C	*
Air Cleaner restriction, Max. @ converter stall	In. H_2O	25	cm H_2O	63.5

*Contact Cummins distributor

TRANSMISSION/TORQUE CONVERTER				
Main pressure @ high idle neutral	PSI	175-229	bar	12-15.1
Clutch apply pressure @ high idle	PSI	175-200	bar	12-13.8
Lube pressure @ high idle	PSI	70-80	bar	4.8-5.5
Converter out @ hgih idle, neutral	PSI		bar	
Converter 3rd forward	PSI	100-110	bar	6.8-7.5
Inhibit pump neutral	PSI	80-120	bar	5.5-8.3
Inhibit pump pressure differential	PSI	80-120	bar	5.5-8.3
Pump flow @ 1450 rpm, neutral	GPM	47 (43 min)	L/min	178 (168)
Lube flow, high idle	GPM	38 (36 min)	L/min	143 (136)
Clutch flow all ranges	GPM	4 (3min)	L/min	15 (11)
Converter in @ high idle, neutral	GPM	37 (31 min)	L/min	140 (119)
Converter out@ high idle, neutral	GPM	35 (29 min)	L/min	132 (112)

STEERING/BRAKES				
Pump flow @ high idle @ steering pressure (section)	GPM	11.5 (9.5 min)	L/min	43 (36)
Brake pressure @ low idle, neutral	PSI	apply 10 release 55	bar	0.7—3.8
Steering pressure @ low idle PTO & no brakes (St. levers 1/2 travel (trans signal press 180 psi)	PSI	490	bar	33

IMPLEMENT HYDRAULICS				
Main relief @ high idle, ripper (tilt)	PSI	2000 (2000)	bar	138 (138)
Power assist	PSI	240-285	bar	16.5-19.6
Circuit relief ripper (tilt)	PSI	2600 (2600)	bar	179 (179)
Circuit relief ripper pitch	PSI	2850-3150	bar	197-217
Power assist pump @ high idle & 0 pressure	GPM	14.4 (12 min)	L/min	54 (45)
Main pump @ high idle & 1500 pressure				
1st section	GPM	77 (65 min)	L/min	291 (246)
2nd section	GPM	34 (12 min)	L/min	128 (109)

CAPACITIES	GAL	TYPE	LITER
Engine cooling system	28	Coolant	106
Engine crankcase	15	EO	57
Transmission/converter	16	TF	61
Steering clutch/bevel gear	50.5	TF	191
Final drives, each	15	MGO	56
Implement hydraulic system	30	TF	113
Implement hydraulic system with ripper	39	TF	148
Fuel tank	235	DIESEL	890

FR7B WHEEL LOADER S/N 630101 - UP

ENGINE		IVECO 8045.05.395		
Bore & stroke		104 X 115 mm		
Displacement		3.9 L		
Firing order		1-3-4-2		
Low idle, (high idle)	rpm	820-870 (2690-2740)		
Converter stall	rpm	2470-2570		
Hydraulic stall	rpm	2500-2600		
Full stall (converter & implement)	rpm	1850-2000		
Valve clearnance, Cold Intake (Exhaust)	inch	0.010 (0.014)	mm	0.25 (0.35)
Oil pressure, Min. @low idle (high idle)	PSI	10 (43)	bar	0.7 (2.96)
Cylinder compression, minimum @ cranking speed	PSI	304	bar	21
Nozzle pressure	PSI	3335-3451	bar	230-238
Intake manifold pressure @ converter stall	In. Hg.	N/A	mm Hg.	N/A
Exhaust manifold temp., Max. @ converter stall	°F	1148	°C	620
Air Cleaner restriction, Max. @ converter stall	In. H_2O	25	cm H_2O	63.5
TRANSMISSION/TORQUE CONVERTER				
Main pressure @ high idle, neutral	PSI	180-220	bar	12.4-15.1
Lube pressure high idle, neutral	PSI	15-25	bar	1.1-1.7
Converter out @ high idle, neutral	PSI	70 max	bar	4.8
Converter out @ 2000 rpm	PSI	25 min	bar	1.7
Pump @ 2500 rpm	GPM	19.8	L/min	75
STEERING/BRAKES				
Steering pressure @ high idle, neutral	PSI	1975-2088	bar	136-144
Steering crossover relief	PSI	2855-2940	bar	197-203
Pump flow @ 2500 rpm @ 100 psi	GPM	17	L/min	65
Brake air pressure	PSI	N/A	bar	N/A
Brake pump pressure @ high idle, neutral	PSI	N/A	bar	N/A
Brake pump flow	GPM	N/A	L/min	N/A
IMPLEMENT HYDRAULICS				
Main pressure @ high idle	PSI	2685-2825	bar	185-195
Circuit relief valve, raise	PSI	3290-3375	bar	227-233
Circuit relief valve, dump	PSI	1710-1770	bar	118-122
Circuit relief valve, retract	PSI	3000-3090	bar	207-213
Pump flow @2500 rpm @ 100 psi	GPM	25	L/min	95
Pilot pressure @high idle, neutral	PSI	N/A	bar	N/A
Pilot pressure @ low idle, neutral	PSI	N/A	bar	N/A
Pilot reducer pressure (engine off, bucket at 6' 8")	PSI	N/A	bar	N/A
Pilot pump flow @	GPM	N/A	L/min	N/A
Cycle times @ high idle, neutral				
Full raise	sec	6-7		
Retract @ full raise	sec	0.7-1.0		

CAPACITIES, refill (approximate)	**GALS**	**TYPE**	**LITER**
Engine cooling system	5	COOLANT	19
Engine crankcase	2.4	EO	9
Transmission/converter	5	TF	19
Transmission transfer case	N/A	N/A	N/A
Axle (1) including differential & planetaries	5.4	MGO	20.5
Implement hydraulic system	8	HO	30
Brake system	0.1	EO	0.4
Fuel tank	34	DIESEL	130

FR11 WHEEL LOADER S/N 530101 - UP

ENGINE		IVECO 8065.SI.25 (ALL 004)		
Bore & stroke		104 X 115 mm		
Displacement		5.9 L		
Firing order		1-5-3-6-2-4		
Low idle, (high idle)	rpm	760-810 (2600-2650)		
Converter stall	rpm	2360-2460		
Hydraulic stall	rpm	2440-2540		
Full stall (converter & implement)	rpm	1840-1980		
Valve clearnance, Cold Intake (Exhaust)	inch	0.010 (0.014)	mm	0.25 (0.35)
Oil pressure, Min. @low idle (high idle)	PSI	10 (43)	bar	0.7 (2.96)
Cylinder compression, minimum @ cranking speed	PSI	304	bar	21
Nozzle pressure	PSI	3335-3451	bar	230-238
Intake manifold pressure @ converter stall	In. Hg.	27	mm Hg.	686
Exhaust manifold temp., Max. @ converter stall	°F	1130	°C	610
Air Cleaner restriction, Max. @ converter stall	In. H_2O	25	cm H_2O	63.5
TRANSMISSION/TORQUE CONVERTER				
Main pressure @ high idle, neutral	PSI	217-247	bar	15-17
Lube pressure high idle, neutral	PSI	N/A	bar	N/A
Converter out @ high idle, neutral	PSI	72 max	bar	5 max
Converter out @ converter stall	PSI	36 min	bar	2.5 min
Pump @ 2400 rpm	GPM	17.75	L/min	67.2
STEERING/BRAKES				
Steering pressure @ high idle, neutral	PSI	2044-2160	bar	141-149
Steering crossover relief	PSI	2900-3200	bar	200-220
Pump flow @ 2400 RPM @ 100 psi	GPM	35	L/min	132
Brake air pressure	PSI	105-120	bar	7.2-8.3
Brake pump pressure @ high idle, neutral	PSI	N/A	bar	N/A
Brake pump flow	GPM	N/A	L/min	N/A
IMPLEMENT HYDRAULICS				
Main pressure @ high idle, neutral	PSI	2465-2610	bar	170-180
Circuit relief valve, raise	PSI	N/A	bar	N/A
Circuit relief valve, dump	PSI	1340-1440	bar	92.4-99.3
Circuit relief valve, retract	PSI	2800-3200	bar	193-221
Total Pump flow @2400 rpm @ 100 psi	GPM	52	L/min	196
Pilot pressure @high idle, neutral	PSI	N/A	bar	N/A
Pilot pressure @ low idle, neutral	PSI	N/A	bar	N/A
Pilot reducer pressure (engine off, bucket at 6' 8")	PSI	N/A	bar	N/A
Pilot pump flow @	GPM	N/A	L/min	N/A
Cycle times @ high idle, neutral				
Full raise	sec	6-7		
Retract @ full raise	sec	3-4		

CAPACITIES, refill (approximate)	**GALS**	**TYPE**	**LITER**
Engine cooling system	8.5	COOLANT	32
Engine crankcase	3.8	EO	14.5
Transmission/converter	4.5	TF	17
Transmission transfer case	N/A	N/A	N/A
Axle (1) including differential & planetaries	15.8	MGO	60
Implement hydraulic system	17.2	HO	65
Brake system	0.5	BF	2
Fuel tank	50	DIESEL	189

FR160 WHEEL LOADER S/N 580101-UP

ENGINE		IVECO 8365.25.584		
Bore & stroke		115 X 130 mm		
Displacement		8.1 L		
Firing order		1-5-3-6-2-4		
Low idle, (high idle)	rpm	870-920 (2360-2420)		
Converter stall	rpm	2210-2350		
Hydraulic stall	rpm	2230-2370		
Full stall (converter & implement)	rpm	1680-1880		
Valve clearance, Cold Intake (Exhaust)	inch	0.012 (0.020)	mm	0.30 (0.50)
Oil pressure, Min. @low idle (high idle)	PSI	20 (43)	bar	1.4 (3.0)
Cylinder compression, minimum @ cranking speed	PSI	341	bar	23.5
Nozzle pressure	PSI	3335-3450	bar	230-238
Intake manifold pressure @ converter stall	In. Hg.	25	mmHg	620
Exhaust manifold temp., Max. @ converter stall	°F	1075	°C	580
Air Cleaner restriction, Max. @ converter stall	In. H_2O	25	cmH2O	62.5
Pump timing to engine	B.T.D.C	22-24°		
TRANSMISSION/TORQUE CONVERTER	4WG200			
Main pressure @ high idle, neutral	PSI	230-260	bar	16-18
Converter out @ high idle, neutral	PSI	36	bar	2.5
Converter out @ converter stall	PSI	na	bar	na
Pump @ 2100 rpm min.	GPM	25	L/min	97
STEERING/BRAKES				
Steering pressure @ high idle, neutral	PSI	2680-2750	bar	185-190
Steering crossover relief	PSI	3700-3840	bar	255-265
Pump flow @ 2100 RPM @ 100 psi	GPM	44	L/min	170
Brake pressure (at accumulator)	PSI	1800-2175	bar	1-25-150
Brake pressure (at booster inlet)	PSI	1260-1300	bar	86-90
Brake pump flow @ 1000 RPM & 100 psi	GPM	5.2	L/min	20.1
IMPLEMENT HYDRAULICS				
Main pressure @ high idle, neutral	PSI	2830-2970	bar	195-205
Circuit relief valve, raise,	PSI	3265-3405	bar	225-235
Circuit relief valve, dump	PSI	3265-3405	bar	225-235
Circuit relief valve, retract	PSI	3265-3405	bar	225-235
Total Pump flow @2100 rpm @ 100 psi	GPM	64	L/min	246
Pilot pressure	PSI	441	bar	30
Cycle times @ high idle, neutral				
Full raise	sec	6.6		
Retract @ full raise	sec	2		

CAPACITIES, refill (approximate)	**GALS**	**TYPE**	**LITER**
Engine cooling system	10	COOLANT	37.5
Engine crankca	3.9	EO	14.5
Transmission/converter	4.8	TF	18
Axle (1) including differential & planetaries	8.8	MGO*	33
Implement hydraulic system	30	HO	112
Brake system	0.4	BF	1.5
Fuel tank	79	DIESEL	286

* Super Max Trac requires lubricant with LS additive

FG65C MOTOR GRADER S/N 85S005001-UP

ENGINE			IVECO/Ford New Holland - 444		
Bore & Stroke		cu.in.	4.4 x 4.4	cu.mm	111.8 x 111.8
Displacement		CID	268	L	4.4
Firing Order			1-3-4-2		
Low-idle		rpm	800-900		
High-idle		rpm	2400-2500		
Convertor Stall		rpm	2040-2140		
Horse Power - Gross			80	Kw	59.7
	- Net		72.6	Kw	54.1
Valve Clearance - intake			0.14-.018	mm	0.36-0.46
(Cold)	- exhaust		.017-.021	mm	0.43-0.53
Cylinder Compression @ 200 RPM		PSI	375	bar	25.85
Injection Nozzle Pressure		PSI	3480-3596	bar	240-248
Engine Oil Pressure - lo idle		PSI	10	bar	0.7
(Operating Temp.) - hi idle		PSI	30	bar	2.7

TRANSMISSION / TORQUE CONVERTER					
Model/Type	Torque Conv.		ZF Model F&S 280		
	Trans.		ZF 6WG 100		
Trans. Clutch Apply Pressure		PSI	232-261	bar	16-18
Trans. Lube Pressure		PSI	4.5-14.5	bar	0.3-1.0r
Torque Convertor Charging Pressure		PSI	29-35	bar	2.0-2.4
Charging Pump Flow @ 2000 Engine RPM		GPM	13.2	L/min	50.0

HYDRAULIC SYSTEM					
Hydraulic Pump Flow	- Implement	GPM	11.4	L/min	43.2
(Dual Section)	- Steering	GPM	6.7	L/min	25.6
Relief Pressure	- Implement	PSI	2000	bar	137.9
@ Engine High Idle	- Steering	PSI	1350	bar	93.1
Tire Pressure		PSI	25	bar	1.7

CAPACITIES (REFILL)	**Type**		
Engine Crankcase	SAE 15W40	3.0 Gal	11.4 L
Cooling System	50/50 water/ethylene Glycol	5.0 Gal	18.9 L
Hydraulic System	SAE 10W	16.0 Gal	60.6 L
Trans./Convertor	SAE 15W40 or ZFTE-MLD3	3.5 Gal	13.2 L
Circle Turn Gear Box	SAE 80/90W(EP)	.6 QT	0.57 L
Brake System	SAE 10W	1.2 QT	1.13 L
Rear Axle	SAE 15W40	5.5 Gal	20.8 L
Tandem Case (Each)	SAE 80/90	3.0 Gal	11.4 L
Fuel Tank	No.2 Diesel	34.0 Gal	128.7 L

161 TRACTOR SCRAPER

Tr. S/N 13S 00101 - UP
Sc. S/N 18A 00101 - UP

ENGINE		CUMMINS: V-903-C265		
Firing order		1-5-4-8-6-3-7-2		
Low idle, (high idle)	rpm	600-650 (2375-2420)		
Converter Stall	rpm	2010-2070		
Valve clearnance, Cold Intake (Exhaust)	inch	*		
Oil pressure, Min. @ high idle, hot	PSI	*		
Cylinder compression pressure	PSI	*		
Diff. between cyls. (max.)	PSI			
Nozzle pressure	PSI	*		
Intake manifold press. @ conv. stall	in.hg	*		
Exhaust manifold temp. @ conv. stall	°F	*		
Oil or coolant temp. differential across heat exchangers	°F	10 (min.)	°C	-12
Air Cleaner restriction, Max. @ stall	in. H_2O	30	cm H_2O	76
*See Cummins distributor for complete engine information				
TRANSMISSION/TORQUE CONVERTER				
Main press. @ high idle, neutral	PSI	195-215	bar	13.4-14.8
Trans. clutch apply pressure @ high idle	PSI	195-215	bar	13.4-14.8
Lube press. high idle, neutral	PSI	20-30	bar	1.4-2
Converter out, high idle, neutral	PSI	36-38	bar	2.5-2.6
Converter out, @ 1000 rpm, neutral	PSI	60-65	bar	4.1-4.5
Converter lock-up, @ high idle, neutral and 2nd thru 6th	PSI	195-215	bar	13.4-14.8
Pilot press., high idle, neutral	PSI	36-38	bar	2.5-2.6
Pump flow @ high idle	gpm	36 (29 min.)	L/min	136 (109)
Shift solenoids min. voltage	V	16		
STEERING/BRAKES				
Steering pressure @ high idle	PSI	1975-2025	bar	136-140
Steering pump @ high idle	gpm	41(34 min.)	L/min	155 (128)
Steering crossover relief	PSI	2550-2650	bar	176-183
Brake air pressure	PSI	85-105	bar	5.9-7.3
IMPLEMENT HYDRAULICS				
Scraper syst. pressure @ high idle	PSI	2375-2425	bar	164-167
Pump flow @ high idle @ 1500 psi scraper/elevator system	gpm	28 (23 min.)	L/min	106 (87)
Elevator motor system	gpm	86 (73 min.)	L/min	325 (276)
Ejector system	gpm	34 (28 min.)	L/min	128 (106)

CAPACITIES, refill (approximate)	**GALS**	**TYPE**	**LITER**
Engine cooling system	17	COOLANT	64
Engine crankcase, incl. filters	9	EO	34
Transmission/converter	16	TF	60
Planetaries and axle (total)	11	MGO	41
Brake reservoir, each	.35	BF	1.3
Impl. hydraulic system	60	HO	227
Fuel tank	122	Diesel	461
Elevator gear box	2	MGO	7.6

FE40 EXCAVATOR

ENGINE		IVECO 8215.22.523		
Bore & stroke		137 X 156 mm		
Displacement		13.8 L		
Firing order		1-5-3-6-2-4		
Low idle, (high idle)	rpm	800-850 (2200±50)		
Valve clearnance, Cold Intake (Exhaust)	inch	0.012 (0.016)	mm	0.3 (0.4)
Oil pressure, Min. @low idle (high idle)	PSI	42-57	bar	2.9-3.9
Cylinder compression, minimum @ cranking speed	PSI	313	bar	21.6
Nozzle pressure	PSI	3625-3740	bar	250-258
Intake manifold pressure @ hydraulic stall	In. Hg.		mm Hg.	
Exhaust manifold temp., Max. @ hydraulic stall	°F		°C	
Air Cleaner restriction, Max. @ hydraulic stall	In. H_2O		cm H_2O	
HYDRAULIC SYSTEM				
Pump flow @ 4061 + 4061 + 8122 psi @ 2100 eng. rpm (after regualtor cut-in)	GPM		L/min	
Pump flow @ 2100 eng. rpm (before regualtor cut-in)	GPM		L/min	
Main pressure @ high idle	PSI	4040-4080	bar	278-281
Pump regulator cut-in pressure	PSI		bar	
Power assist reducing pressure	PSI		bar	
Swing motor crossover pressure	PSI		bar	
Ch. Valve (to accumulator, from pumps)	PSI		bar	
Pilot relief pressure	PSI	435 (bench test)	bar	30
Overload valve pressure (6)	PSI	5050-5100	bar	348-351

CAPACITIES, refill (approximate)	**GALS**	**TYPE**	**LITER**
Engine cooling system	13	COOLANT	50
Engine crankcase	7.6	EO	29
Swing reduction unit	4	MGO	15
Travel reduction unit	2.6	MGO	10
Implement hydraulic system	132	HO	500
Fuel tank	132	DIESEL	500

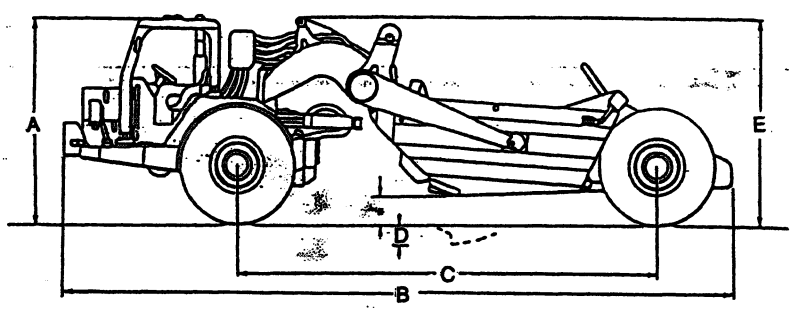
FE40 with Modified Hydraulic System

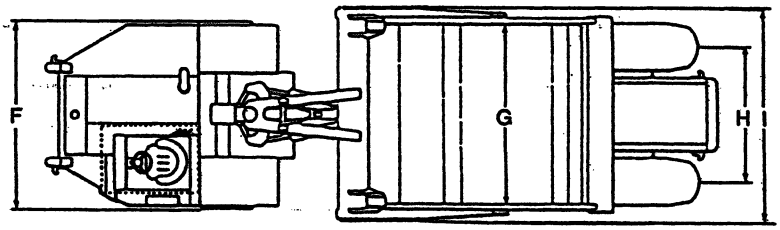
High idle	RPM	2300 ± 50		
Hydraulic stall with 2 circuits	RPM	2050-2100		
Main relief	PSI	4150 4175	bar	286-288
Swing pressure - old style	PSI	4640	bar	320
Swing pressure - new style	PSI	4930	bar	340
Governor Cut-in pressure	PSI	4350 combined	bar	300

CRAWLER LOADERS

Model	Power kw/Hp DIN6270	Operating weight ton	bucket standard m^3	breakout force ton	Tipping load Kg	Shoe mm	Dump height mm
FL5B	52/71	803	1.0	5.7	5371	360	2470
FL7B	63/86	9.6	1.15	7.9	6693	360	2580
FL9	68/93	11.2	1.24	9.0	7100	360	2680
FL10E	94/127	13.6	1.53	11.1	9120	380	2800
FL14E	125/170	17.7	2.1	15.7	12550	425	3000
FL20	173/235	26.3 27.3	2.67 3.1	21.6	17240	500	3280

FIATALLIS MOTORSCRAPERS							
Models	Power Hp (SAE)	Scraper type	Wheel drive n°	Heaped capacity m^3	Rated load ton	Weight empty ton	Tires standard
260B	342	Conventional	2	16.1	22.8	26.5	29.5x29
261B	342	Elevating	2	17.6	24.0	28.5	29.5x29
161	229	Elevating	2	11.5	17.0	20.3	26.5x25





	A	B	C	D	E	F	G	H	I	*
260B	3250	11785	7165	280	3455	3150	3050	2285	3630	460
261B	3250	11785	7340	240	3555	3150	3000	2285	3660	430
161	3035	10695	6885	300	3125	2745	2670	2085	3050	440