FIATALLIS®

FT110

EFF. S/N 3180001-UP

TRACTOR LOADER BACKHOE

TRACTOR SERVICE MANUAL

75128709
ISSUE 2
XII-1998

GROUP 00

GENERAL SPECIFICATIONS

GROUP 01

MAINTENANCE

SAFETY

PRECAUTIONARY STATEMENTS

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read and take the following precautions before operating the tractor. Equipment should be operated only by those who are responsible and instructed to do so.

THE TRACTOR

1. Read the operator's manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Ensure any attached equipment or accessories are correctly installed, are approved for use with the tractor, do not overload the tractor and are operated and maintained in accordance with the instructions issued by the equipment or accessory manufacturer.
3. Use an approved ROPS or safety cab and seat belt for safe operation. Overturning a tractor without a ROPS or safety cab can result in death or injury.
4. Always use the seat belt with the ROPS or safety cab.
5. Use the handholds and step plates when getting on and off the tractor to prevent falls. Keep the steps and platform clear of mud and debris.
6. Do not permit anyone but the operator to ride on the tractor; there is no safe place for extra riders.
7. Remember that your tractor, if abused or incorrectly used, can be dangerous and become a hazard both to the operator and bystanders. Do not overload or operate with attached equipment which is unsafe, not designed for the particular task, or is poorly maintained.
8. Replace all missing, illegible, or damaged safety decals.
9. Keep safety decals clean of dirt and grime.

SERVICING THE TRACTOR

1. The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always turn the cap slowly to the first stop and allow the pressure to escape before removing the cap entirely.
2. Do not smoke while refuelling the tractor. Keep any type of open flame away. Wait for the engine to cool before refuelling.
3. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.
4. To prevent fires or explosions, keep open flames away from battery or cold weather starting aids. To prevent sparks, which could cause explosion, use booster cables according to instructions in this manual.
5. Stop the engine, apply the hand brake and lower the loader and backhoe to the ground before performing any service on the tractor.
6. Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury.

   DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.

   Stop the engine and relieve pressure before connecting or disconnecting lines.

   Tighten all connections before starting the engine or pressurizing lines.

   If fluid is injected into the skin, obtain medical attention immediately or gangrene may result.

REPAIR MANUAL

FIATALLIS FT 110 FORD ENGINE

FORD GENESIS 5. OT.

Separating Engine From Transmission with Assembly Removed From the Vehicle

1. Place the engine/transmission assembly on a suitable splitting stand.

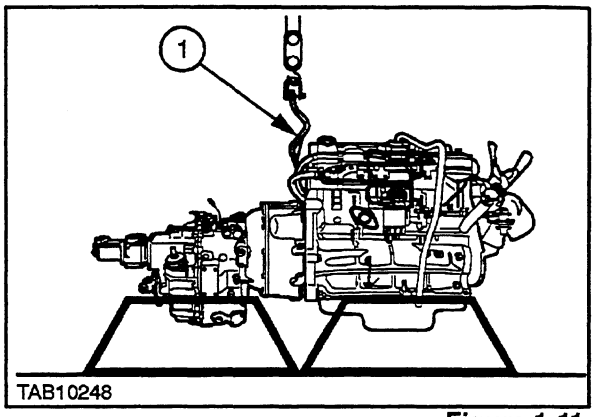


Figure 1-11

2. Remove the starter motor assembly.

3. Remove the torque converter attaching bolts accessed through the starter motor aperture, 1.

4. Remove the engine timing tab, 2.

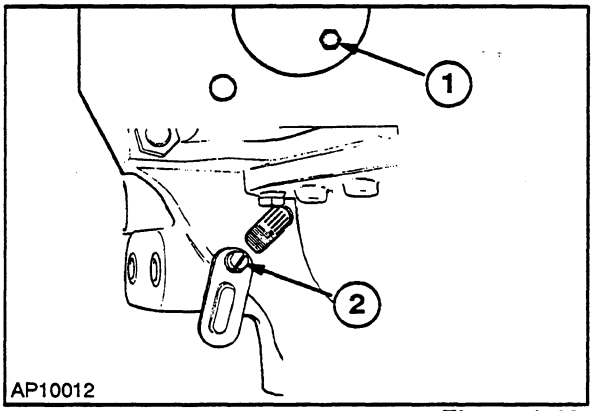


Figure 1-12

5. Remove the bell housing bolts.

6. Gently slide the transmission with the torque converter from the engine.

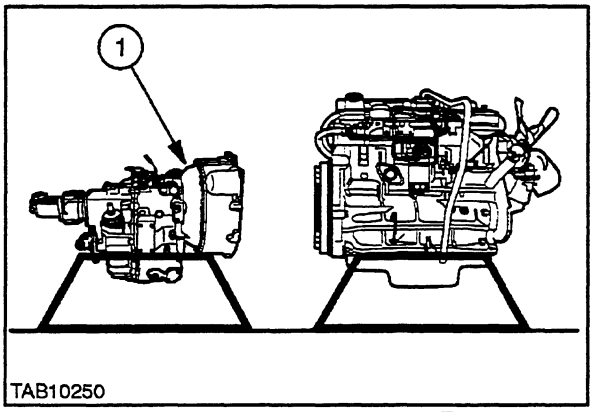


Figure 1-13

Engine Installation

Installation of the engine is the reversal of the removal procedure, noting the following points:

- Ensure all attaching hardware is tightened to the correct torque value as detailed in the specifications.

- Ensure after installation that all fluid levels are correct prior to start-up. Start and run the engine until correct operating temperature is achieved to purge air from cooling system. Stop engine, check for leaks, correct as required and recheck fluid levels.

Installation

1. Position piston No.1 at top dead center, install the spacer, key and camshaft gear, and tighten bolt, 4, to 51 ft. lbs. (69 N·m).

2. Install the camshaft idler gear to the block, aligning the timing marks to the crankshaft, 2, and camshaft gears, 1, and torque to 184 ft. lbs. (250 N·m).

3. With piston No. 1 at top dead center, assemble the pretimed fuel injection pump with a new O-ring, aligning the mark on the pump flange to the 0 degree timing mark on the front cover. Torque pump retaining bolts to 18 ft. lbs. (22 N·m). Install the pump gear over the pump shaft. Align timing marks to the idler gear, 3, and torque to pump shaft 58 ft. lbs. (79 N·m). Holding the idler gear, check the backlash between the pump and idler gear with a feeler gauge or dial indicator.

NOTE: Fuel injection pump dynamic internal timing is set at 10° before top dead center.

4. The front oil seal should be replaced every time the front plate is removed. Drive out the old seal using a punch, taking care not to damage the front plate.

5. Coat a new seal in a suitable lubricant, and drive the seal, 1, into the rear of the front plate

6. Ensure the front cover mating face and cylinder block face are thoroughly clean before reassembly. Apply a 0.078″ (2 mm) wide bead of sealer (Loctite® 5900/598 Ultra Black) along the center of each mating face. Position a new gasket on the front cover.

7. Install the front cover ensuring alignment with dowel pins and tighten the bolts in order of sequence:

5/16″–18 UNC bolts, tighten to 13–18 ft. lbs. (8–24 N·m).

3/8″–16 UNC bolts, tighten to 25–30 ft. lbs. (34–41 N·m).

8. Apply a 0.078″ (2 mm) wide bead of sealer (Loctite® 5900/598 Ultra Black) to clean oil pan face, install a new gasket and torque oil pan bolts to 28 ft. lbs. (38 N·m).

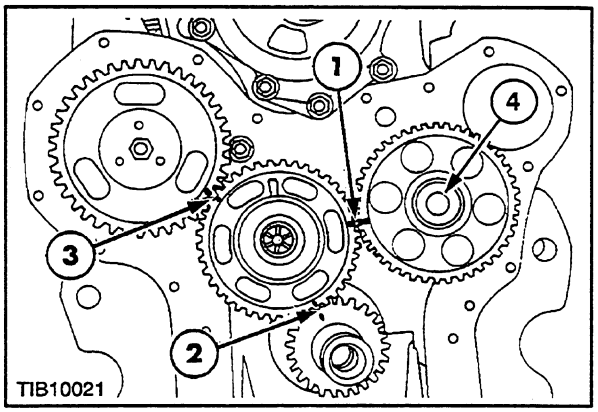


Figure 1-39

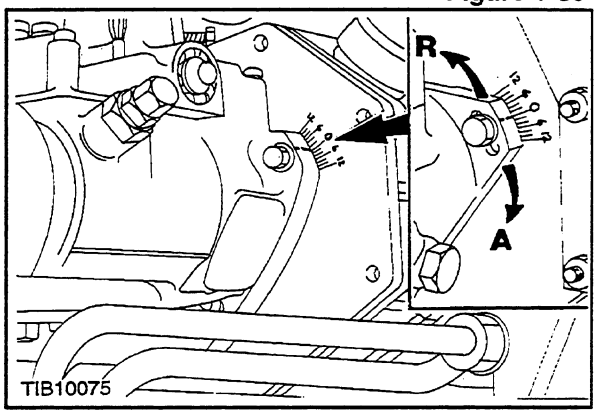


Figure 1-40

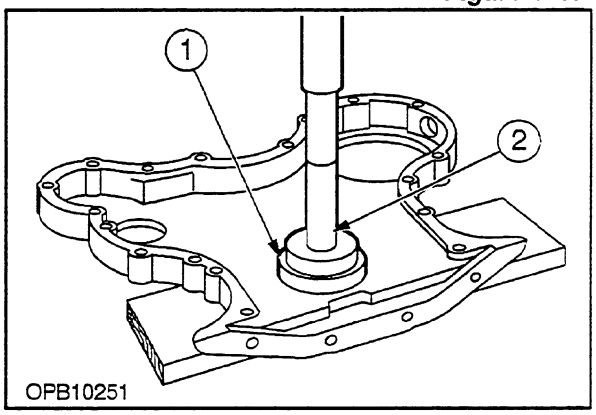


Figure 1-41

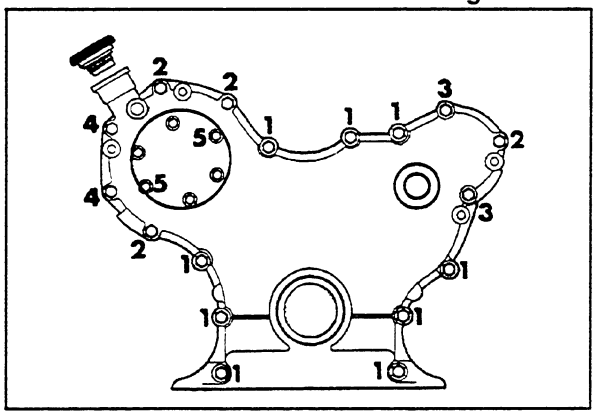


Figure 1-42

Piston Assembly — Installation Into Block

1. Select the correct bearing liners, as in the following crankshaft section, and install in the rod and cap. Carefully clean the back side of the liners and the rod and cap liner surfaces to remove any dirt which may prevent proper seating of the liner. Ensure the liner tang locates in the slots of the rod and cap.

2. Turn the crankshaft to position No. 1 crankpin at the bottom of the stroke. Lubricate all parts with new engine oil. Using a ring compressor and a soft drive, slide pistons into bores, ensuring grade letter on pistons is toward the front of the engine.

3. Ensure the connecting rod bearing liner seats on the crankpin with the bearing cap fitted to the connecting rod as a matched assembly. It is recommended that new bolts are fitted and lubricated with oil and tightened to a torque value of 110 ft. lbs. (149 N·m).

4. Using feeler gauges, check the side clearance of each connecting rod to crankshaft to specification 0.005–0.013″ (0.13–0.33 mm).

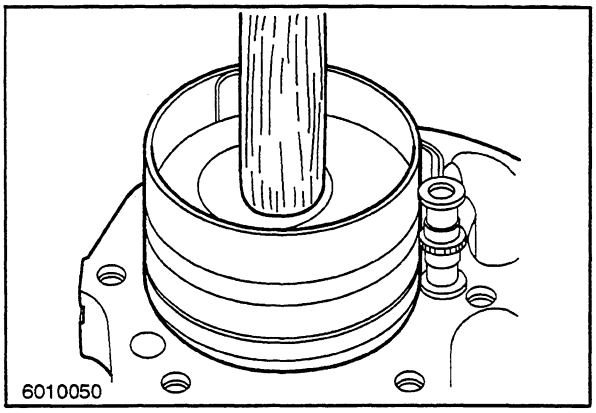


Figure 1-65

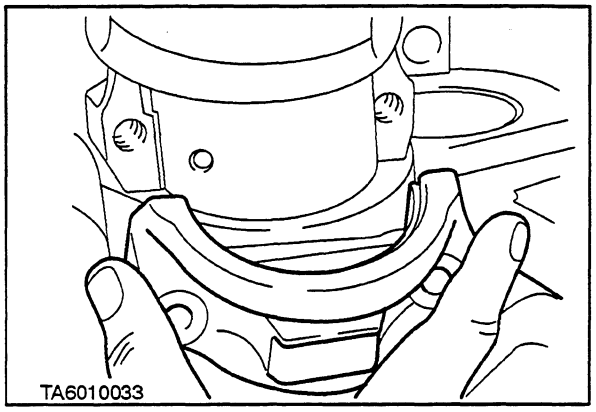


Figure 1-66

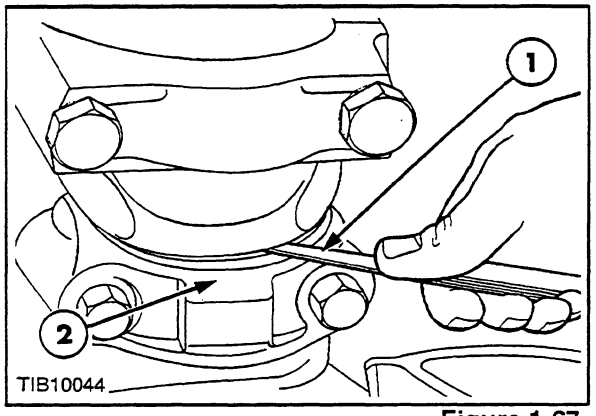


Figure 1-67

Balancer / Vibration Damper

Removal

1. Remove the oil pan to expose the balancer and, using a dial indicator gauge, check backlash between crankshaft gear and balancer drive gear. Position the dial plunger to the face of one of the drive gear teeth, then rock the gear to measure backlash. Readings should be taken at 90° intervals around the drive gear, to 0.002–0.012″ (0.05–0.30 mm). If the specification is exceeded, inspect the balancer shaft to bushing clearance. If within specification install new balancer gears.

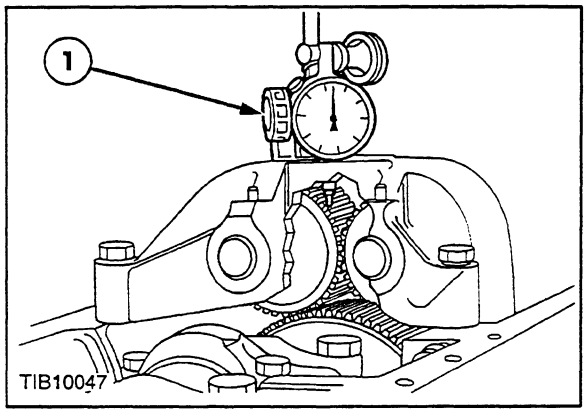


Figure 1-68

5. Tighten all bearing caps (except thrust bearing cap, leave finger tight) to a torque of 145 ft. lbs. (197 N·m).

6. Pry the crankshaft forward against thrust surface of bearing, hold crankshaft forward and pry bearing cap rearward taking care not to pry against flange of bearing liner. This will align thrust surfaces of both halves of bearing, hold forward pressure on crankshaft and tighten bearing cap bolts to a torque of 145 ft. lbs. (197 N·m).

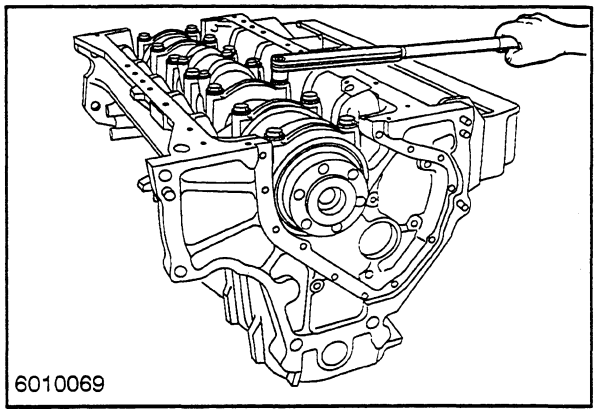


Figure 1-93

7. Check crankshaft end play with a dial indicator gauge, pry crankshaft toward front of engine and set dial indicator to zero. Pry crankshaft toward rear of engine and note reading on dial. If end play exceeds 0.004–0.008" (0.10–0.20 mm) install a new thrust bearing liner.

8. If the end play is less than specification check thrust bearing for burrs, scratches or dirt, and realign thrust bearing as described above.

9. Install rear crankshaft oil seal as previously described in back plate removal.

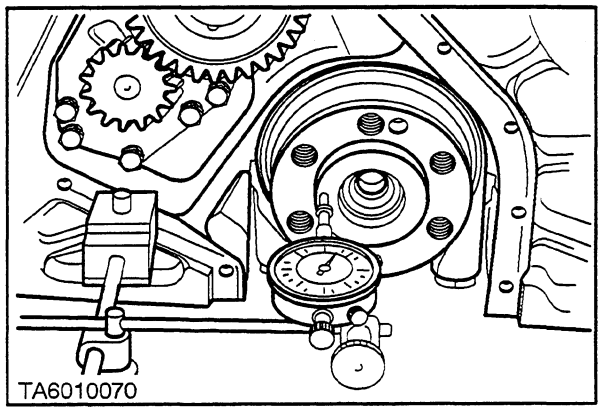


Figure 1-94

NOTE: Do not preinstall rear main seal into retainer. To ensure seal concentricity, it must be assembled with rear plate and installation tool when fitted to crankshaft.

Camshaft Removal

NOTE: The camshaft bearings and tappets can only be serviced with engine removed from the tractor.

1. Remove the engine front cover and cylinder head.

2. Check the camshaft end play, see Timing Gears Section, and remove gear, or remove the thrust plate bolts for removal of gear and camshaft as an assembly.

3. After removal of the flywheel and rear cover remove the camshaft oil pump drive gear.

4. Invert the engine on the stand, if camshaft bearings are to be replaced, and remove the oil pan.

5. Carefully withdraw the camshaft from the rear of engine.

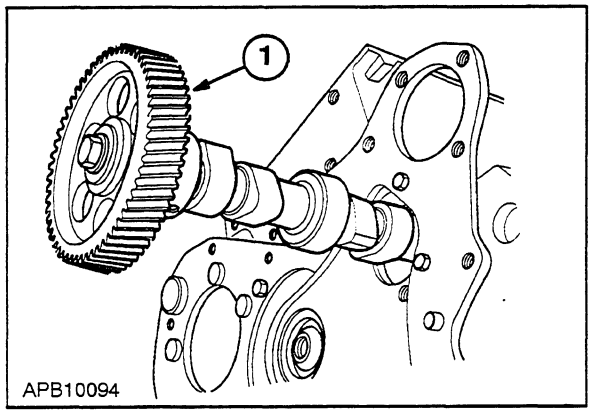


Figure 1-95

Rocker Arm

Inside Diameter	1.003–1.004″ (25.48–25.50 mm)

Tappets

Clearance-to-Bore	0.0006–0.0021″ (0.015–0.053 mm)
Tappet Diameter	0.9889–0.9894″ (25.118–25.130 mm)
Tappet Bore Diameter	0.9900–0.9910″ (25.15–25.17 mm)

Camshaft

Bearing Journal Diameter	2.3895–2.3905″ (60.693–60.719 mm)
Bearing Clearance	0.0010–0.0030″ (0.025–0.076 mm)
End Play	0.0020–0.0070″ (0.051–0.18 mm)

Connecting Rods

Small End Bushing (Internal Diameter)	
Naturally Aspirated	1.5005–1.5008″ (38.113–38.120 mm)
Turbocharged	1.6255–1.6258″ (41.288–41.259 mm)
Clearance Bushing to Piston Pin	0.0005–0.0010″ (0.013–0.025 mm)
Side Float	0.0050–0.0130″ (0.13–0.33 mm)
Maximum Twist	0.0120″ (0.30 mm)
Maximum Bend	0.0040″ (0.10 mm)

Piston Pin

Outside Diameter	
Naturally Aspirated	1.4998–1.5000″ (38.095–38.100 mm)
Turbocharged	1.6248–1.6250″ (41.270–41.275 mm)

Pistons

Skirt-to-Cylinder Clearance	
Naturally Aspirated and Turbocharged	
New, Unrun Engine	0.0055–0.0065″ (0.140–0.165 mm)
Run Engine	0.0055–0.011″ (0.140–0.28 mm)
Taper (Out-of-Round)	0.0025–0.0050″ (0.063–0.127 mm)
Grading Diameter (at Right Angles to Piston Pin)	4.3951–4.3991″ (111.64–111.74 mm) Increments of 0.0005″ (0.0127 mm)
Piston Pin Clearance	0.00012–0.00055″ (0.0030–0.0140 mm) at 70°F (21°C)

LUBRICATION

DESCRIPTION AND OPERATION

Lubrication System

Lubrication of the engine, Figure 1-98, is maintained by a rotor type oil pump mounted in the rear of the engine block, behind the flywheel. The oil pump is driven from the rear of the camshaft and draws oil from the engine oil pan through a tube and screen assembly.

A spring loaded relief valve is integral with the oil filter body mounted on the left-hand side of the engine block, and prevents overpressurization of the system.

A spin-on type oil filter is mounted externally to its support housing, on the left-hand side of the engine. Oil flows from the filter to the main oil gallery, which runs the length of the cylinder block, which also intersects the camshaft follower chamber.

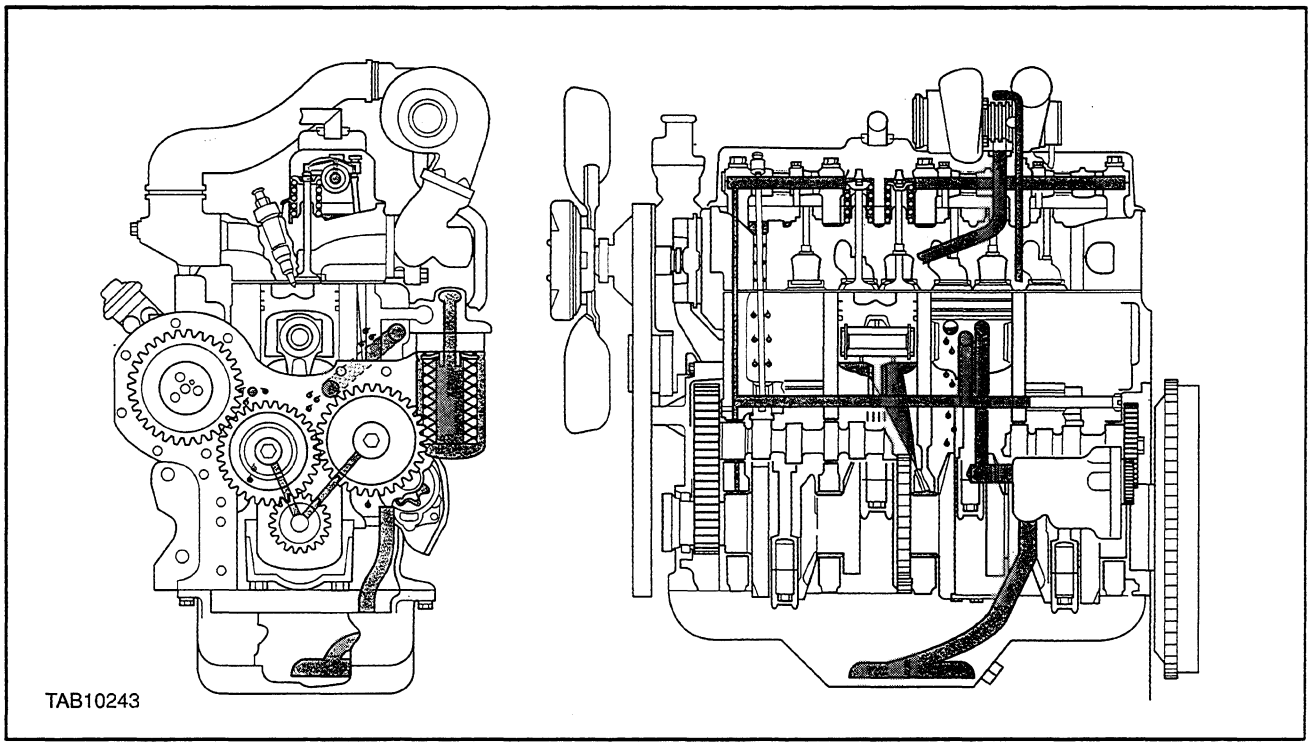
The main gallery also supplies oil to the crankshaft main bearings, connecting rods, big ends and small ends. The underside of the pistons and pins are lubricated by oil pressure jets mounted adjacent to each main journal housing.

The camshaft drive gear bushing is pressure lubricated through a drilled passage from the front main bearing. The gear has small oil passages machined on both sides allowing excess oil to escape.

Timing gears are lubricated by splashed oil from the cam follower chamber, and the pressure lubricated camshaft drive gear bushing.

An intermittent flow of oil is directed to the valve rocker arm shaft assembly via a drilled passage in the cylinder block. This is located vertically above No. 1 camshaft bearing, and aligns to a hole in the cylinder head. The rotation of the camshaft allows a controlled intermediate flow of lubrication.

The turbocharger, where fitted, is supplied with oil from the oil filter support housing, mounted on the left-hand side of the engine.



Engine Lubrication System With Turbocharger Installed **Figure 1-98**

Engine Oil Flow

Radiator Removal

Raise the loader to full height and secure with the loader arm support.

1. Remove the right- and left-hand engine side panels.

Disconnect the battery at the isolator switch.

WARNING: THE COOLING SYSTEM IS PRESSURIZED AND CARE SHOULD BE TAKEN WHEN REMOVING THE RADIATOR CAP OR ANY OTHER COOLING SYSTEM COVER WHEN THE ENGINE IS HOT.

2. Open the radiator petcock, 1, at the side of the transmission oil cooler (right side of the radiator) and drain the coolant off into a suitable clean container. Remove the expansion tank cap to speed draining.

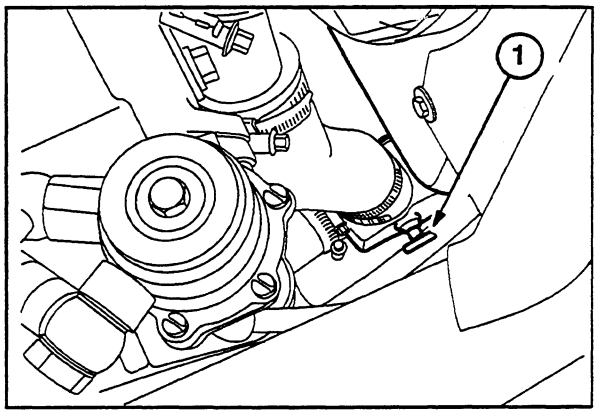


Figure 1-113

Remove:
Muffler stack pipe
Pre cleaner
Engine top hood
Front nose grill

3. Detach the hydraulic system oil cooler, 1, from the front of the radiator. The oil cooler must be moved forward to unhook it from the radiator. If necessary, loosen the brackets securing the cooler lines to the tractor frame at the side of the engine to allow the cooler to move forward.

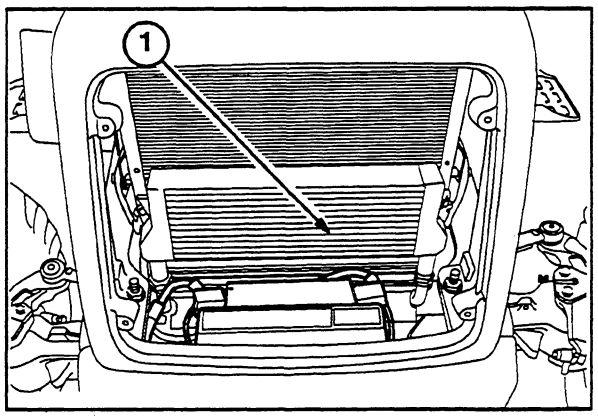


Figure 1-114

4. The air-conditioning condenser (when fitted) is mounted in front of the radiator.

5. Disconnect the lower radiator hose between the transmission oil cooler and radiator lower tank. Disconnect the upper radiator hose at the upper tank. Disconnect the coolant overflow hose from the upper tank.

6. Unfasten the fan shroud and lay it back over the fan.

7. Ensure all hoses are disconnected, wire looms are unclipped and away from the radiator assembly.

8. Remove the attaching bolts and lift the radiator up and clear of the vehicle.

AIR CLEANER

DESCRIPTION AND OPERATION

The tractors feature a dry element type air cleaner, 1, located beneath the engine top hood panel.

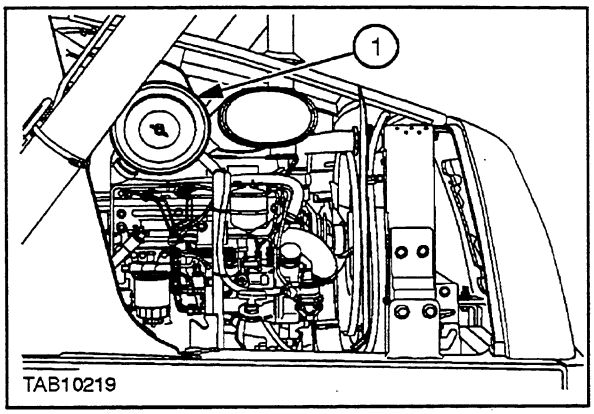


Figure 1-132

Air enters the cleaner in a circular direction and centrifugal force results in heavier particles being thrown to the outside of the container and collecting in the bottom of the cleaner. The lighter particles are collected on the outer (primary) element.

The inner (secondary) element is located within the outer element. The element protects the engine from the finer dust particles that may have passed through the outer element. This element also functions as a sefety element.

A vacuum indicator switch, 1, is mounted in the air cleaner outlet tube and illuminates a warning light on the instrument console when the air cleaner requires servicing.

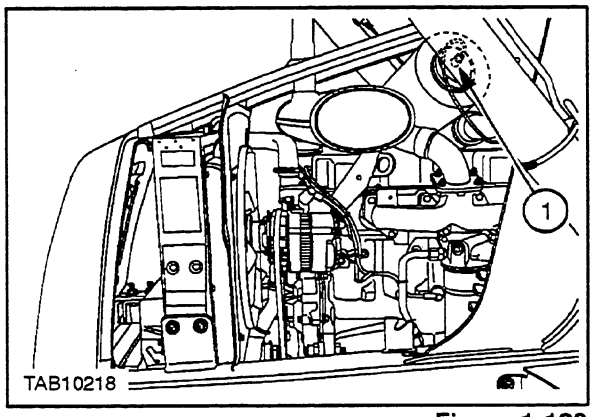


Figure 1-133

If the air cleaner restriction warning light, 1, illuminates when the engine is running, stop the engine and service the air cleaner.

IMPORTANT: The safety element must be replaced if damaged or clogged with dust, or if, after cleaning or installing a new outer element, the warning light remains on when the engine is running.

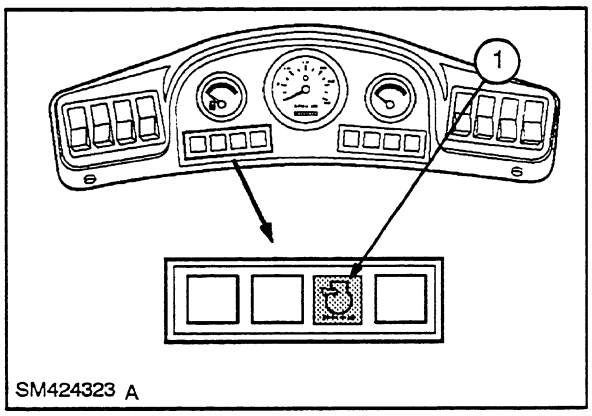


Figure 1-134

If the warning light remains on after installation of both inner and outer elements, check the switch for faulty operation by replacing with a switch known to function correctly.

NOTES:

A. Refer to Engine portion of Service Manual for servicing procedures.

B. With engine stopped, check air duct clamps for tightness.

WARNING: ALWAYS START THE ENGINE FROM THE TRACTOR SEAT. NEVER START THE ENGINE FROM THE GROUND.

C. With engine running at idle speed, lightly spray duct connections between the air cleaner and compressor inlet with starting fluid. Leaks at connections will be indicated by an increase in engine speed due to the starting fluid being drawn into the compressor and pumped into the engine combustion chambers.

D. With engine running at idle speed, check duct connections between the compressor outlet and intake manifold for leaks by applying lightweight oil or soapsuds to areas of possible leakage and looking for bubbles. Exhaust gas leakage between the cylinder head, exhaust manifold and the turbocharger inlet will also create a noise level change.

E. With engine running at idle speed, check for unusual noise and vibration. If either condition is noted, shut down the engine immediately to protect the turbocharger and engine from further damage. With the engine stopped, check the turbocharger shaft assembly for damage as outlined in Note I, below.

F. With engine running, a change in the noise level to a higher pitch can indicate air leakage between the air cleaner and the engine, or a gas leak between the engine block and the turbocharger inlet.

G. Exhaust gas leakage may be indicated by heat discoloration in the area of the leak.

H. With the engine running, noise level cycling from one level to another can indicate a plugged air cleaner, a restriction in the air cleaner- to-compressor duct, or a heavy buildup of dirt in the compressor housing or on the compressor wheel.

I. Internal inspection of the center housing can be accomplished by removing the oil drain line and looking through the oil drain opening. When a sludged or coked condition exists, a heavy sludge buildup will be seen on the shaft between the bearing journals and in the center housing from the oil drain opening back of the turbine end.

J. Thorough cleaning of the air induction system is essential following compressor wheel damage due to foreign object impact. In many cases, metal pieces from the wheel become imbedded in the air cleaner element. If the element is not changed in such cases, these metal pieces can be drawn into the replacement turbocharger and cause it to fail in the same manner as the original unit.

K. With the air inlet and exhaust gas ducting removed from the turbocharger, examine both the compressor and turbine wheels for blade damage. Examine the outer blade tip edges for evidence of rubbing on adjacent housing surfaces.

NOTE: A light is required for examining the turbine wheel blade tips, which are positioned inside the turbine housing. The surfaces requiring inspection can be viewed from the outlet end of the turbine housing.

Rotate the rotating assembly by hand and feel for smooth turning, dragging or binding. Push the rotating assembly sideways while rotating to feel for wheel rub. If there is any indication of rubbing, perform the bearing clearance inspection procedures outlined in this manual under Preventive Maintenance. If the rotating assembly rotates freely and there is not evidence of binding or rubbing, it can be assumed that the turbocharger is serviceable.

PROBLEM	POSSIBLE CAUSES
Seal leaks at compressor end of turbocharger	Dirty air cleaner Restricted duct between air cleaner and turbocharger Loose compressor-to-intake manifold duct connections Leaks at engine intake manifold Restricted turbocharger oil drain line Plugged engine crankcase breather Worn or damaged compressor wheel (worn bearings, bores or journals) Excessive piston blowby or high internal crankcase pressure
Seal leaks at turbine end of turbocharger	Excessive pre-oiling Plugged engine crankcase breather Restricted turbocharger oil drain line Sludged or coked center housing Worn turbocharger bearings, bearing bores, or shaft journals
Worn turbocharger bearings, bores or shaft journals	Inadequate pre-oiling following turbocharger installation or engine lube servicing Contaminated or improper grade of engine oil used in engine Insufficient oil supplied to turbocharger due to "oil lag" Restricted turbocharger oil feed line Plugged engine oil filter Abrasive wear due to flaking of "coked" particles from center housing interior surface Insufficient lube oil supplied to turbocharger due to engine oil pump malfunction

3 PRODUCT HARDWARE

Basically, two versions of the EGS are available : the GRIP TYPE and the STANDARD TYPE. Both have a number of common features but most EGS units have a customised control program, giving quite a range of functional differences.

Refer to the application specific EGS description for an explanation of customer specific features.

3.1 GRIP type EGS

The GRIP type EGS is a shift lever, intended for mounting on the left side of the steering column.

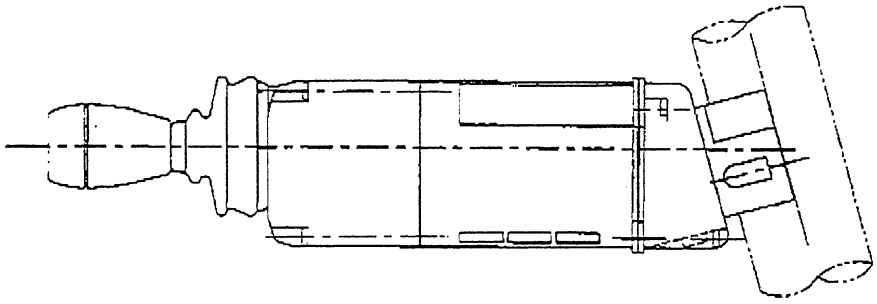


fig. 3.1 front view of a grip type EGS

3.2 STANDARD type EGS

The STANDARD type EGS is a shift lever intended to be mounted on the right side of the driver. Left side mounting is also possible (software modification).

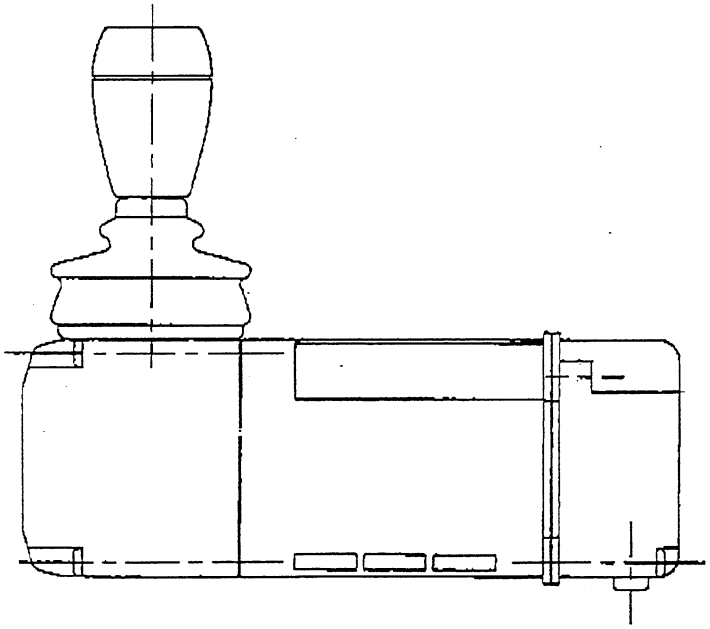


fig. 3.2 front view of a standard type EGS

Twisted pair cable is plain electrical cable (AWG20) which is twisted with at least 20 turns per meter.

fig.5.4. Connection of an induction speed sensor with twisted cable

While being less critical to install, noise rejection of a twisted pair cable is somewhat less than that of a shielded cable.

The sensor pins are connected to EGS pins 10 and 11 using the twisted pair cable. No polarity has to be observed.

5.2.2.2 Hall effect sensors

Sensor installation :

Hall effect sensors generate square wave voltages with a fixed amplitude determined by the EGS hardware regardless of gear speed.

The Hall effect sensor currently in use (p/n 247135) is pictured below and is mounted according to a transmission specific installation diagram.

fig.5.5 Hall effect gear tooth sensor

Sensor wiring :

The sensor has 3 wires, a **red** one for power supply plus, a **black** one for power supply ground and a **green** wire giving the speed information.

These three wires have to be connected with EGS pins 10,11 and 12 as follows :

EGS pin 10 to GREEN (sensor signal)
EGS pin 11 to BLACK (sensor ground)
EGS pin 12 to RED (sensor plus)

No sensor connector is available.

A good connection between sensor and EGS can be achieved in two ways :

use of shielded pair cable (2 central conductors + shield)
use of 3 twisted wires (of different color)

CLARK

SPECIFICATIONS AND SERVICE DATA—POWER SHIFT TRANSMISSION AND TORQUE CONVERTER

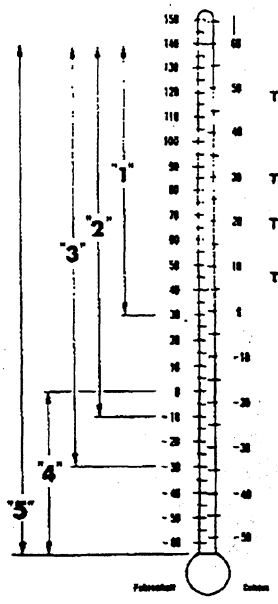
CONVERTER OUT PRESSURE	Converter outlet oil temp. 180° - 200° F. [82,3° - 93,3° C]. Transmission in **NEUTRAL**. Operating specifications: 25 P.S.I. [172,4 kPa] minimum pressure at 2000 R.P.M. engine speed **AND** a maximum of 70 P.S.I. [482,6 kPa] outlet pressure with engine operating at no-load governed speed.
CONTROLS	Forward and Reverse — Manual Speed Selection — Manual
CLUTCH TYPE	Multiple discs, hydraulically actuated, spring released, automatic wear compensation and no adjustment. All clutches oil cooled and lubricated.
CLUTCH INNER DISC	Friction.
CLUTCH OUTER DISC	Steel.
OIL FILTRATION	Full flow oil filter safety by-pass, also strainer screen in sump at bottom of transmission case.
CLUTCH PRESSURE	180-220 psi [1241,1 - 1516,8 kPa] — With parking brake set (see note) . oil temperature 180° - 200° F. [82,2° - 93,3° C], engine at idle (400 to 600 RPM). shift thru direction and speed clutches. All clutch pressure must be equal within 5 psi, [34,5 kPa]If ,clutch pressure varies in any one clutch more than 5 psi, [34,5 kPa] repair clutch. **NOTE: Never use service brakes while making clutch pressure checks. Units having brake actuated declutching in forward and/or reverse will not give a true reading.** **ALWAYS USE PARKING BRAKE WHEN MAKING CLUTCH PRESSURE CHECKS.**

LUBRICATION

TYPE OF OIL	See Lube Chart.
CAPACITY	Consult Operator's Manual on applicable machine model for system capacity. Torque Converter, Transmission and allied hydraulic system must be considered as a whole to determine capacity.
CHECK PERIOD	Check oil level DAILY with engine running at 500-600 RPM and oil at 180° to 200° F. [82, 2 - 93, 3° C]. Maintain oil level to FULL mark.
NORMAL * DRAIN PERIOD	Every 500 hours, change oil filter element. Every 1000 hours, drain and refill system as follows: Drain with oil at 150° to 200° F. [65, 6 - 93, 3° C]. **NOTE: It is recommended that filter elements be changed after 50 and 100 hours of operation on new and rebuilt or repaired units.** (a) Drain transmission and remove sump screen. Clean screen thoroughly and replace, using new gaskets. (b) Drain oil filters, remove and discard filter elements. Clean filter shells and install new elements. (c) Refill transmission to **LOW** mark. (d) Run engine at 500-600 RPM to prime converter and lines. (e) Recheck level with engine running at 500 - 600 RPM and add oil to bring level to LOW mark. When oil temperature is hot (180-200° F.) [82,2-93,3° C] make final oil level check. **BRING OIL LEVEL TO FULL MARK.**

RECOMMENDED LUBRICANTS FOR CLARK POWER SHIFTED TRANSMISSION AND TORQUE CONVERTERS

Prevailing Ambient Temperature



*Dexron is a registered trademark of General Motors Corporation.

Temperature Range	"1"	(a) C-2 Grade 30 (b) C-3 Grade 30 (c) Engine Oil:-Grade 30 API-CD/SE or CD/SF (d) MIL-L-2104C-Grade 30 (e) MIL-L-2104D-Grade 30
Temperature Range	"2"	(a) MIL-L-2104C-Grade 10 (b) MIL-L-2104D-Grade 10 (c) C-2 Grade 10 (d) C-3 Grade 10 (e) Engine Oil:-Grade 10 API-CD/SE or CD/SF (f) Quintolubric 822-220 (Non Phosphate Ester Fire Resistant Fluid)
Temperature Range	"3"	(a) *Dexron (b) *Dexron II D - **See Caution Below**
Temperature Range	"4"	(a) MIL-L-46167 (b) MIL-L-46167 A
Temperature Range	"5"	(a) Conoco Polor Start DN-600 Fluid

NOTES; Temperature ranges "2" and "3" may be used to lower ambient temperatures when sump preheaters are used. Temperature range "4" should be used only in ambient temperature range shown.

MODULATED SHIFT TRANSMISSIONS: H125, H200, H500, H600, 18000, 24000, 28000, 32000 & 34000 series transmissions with modulated shift use only C-3 or temperature range 3 items (a) & (b) *Dexron or *Dexron II D. **SEE CAUTION BELOW.** 3000, 4000, 5000, 6000, 8000 & 16000 series transmissions with modulated shift use only C-3 or temperature range 3 items (a) only *Dexron. Do NOT use *Dexron II D. **SEE CAUTION BELOW.**

CAUTION: *Dexron II D is not compatible with graphitic clutch plate friction material UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS. *Dexron II D cannot be used in the 3000, 4000, 5000, 6000, 8000 or 16000 series power shift transmissions, or the HR28000, HR32000 & HR34000 series having converter lock-up, or the C270 series converter having lock-up UNLESS IT MEETS THE APPROVED C-3 SPECIFICATIONS.

Any deviation from this chart must have written approval from the application department of the Clark Components International Engineering and Marketing Department.

***Normal drain periods and filter change intervals are for average environmental and duty-cycle conditions. Severe or sustained high operating temperatures or very dusty atmospheric conditions will cause accelerated deterioration and contamination. For extreme conditions judgment must be used to determine the required change intervals.**

LUBRICATION

- OIL FILLING

Use oil with specifications MIL -L - 2105 C and API GL 5 on differential and on final reduction gears.

e.g.: - with ambient air temperatures above 40°C, use:

ESSO GEAR OIL GX 85 W 140

- with ambient air temperatures between -10°C and 40°C, use:

ESSO GEAR OIL GX 80 W 90

- with ambient air temperatures below -10°C, use:

ESSO GEAR OIL GX 80 W

- QUANTITY

for differential - axle housing:	lts 7
for each reduction unit:	lts 1,3

CHECKING

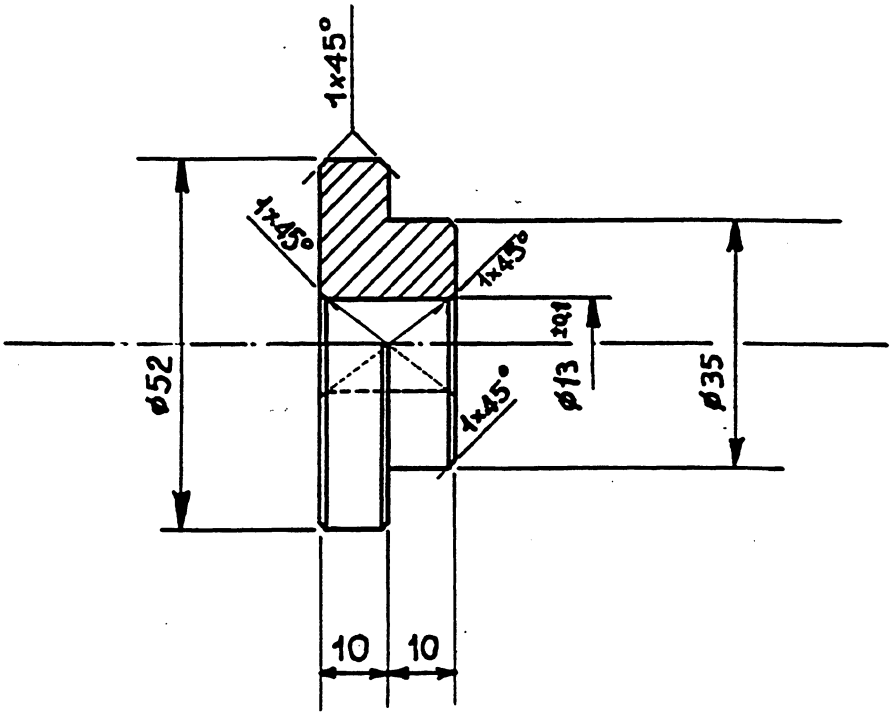
- Initial change at 150 hours.
- Subsequent changes every 1000 hours.
- Inspection of levels every 150 hours.

- ALL PRESSURE FITTINGS

- Use a good Nr. 2 lithium gun grease with molybdenum bisulphide.
- Applications:

- King pin:	every 50 hours
- Axle pivot:	every 50 hours
- Drive shafts:	every 50 hours or more frequently in relation to working conditions.

SUPERFICI LAVORATE CON UTENSILE DI TRUCIOLO	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8
SUPERFICI GREZZE: FUSE, FORGIATE, ATE, TRANCIATE, OSSITAGLIO, PARTICOLARI DI CARPENTERIA	± 0,2	± 0,3	± 1	± 1,2	± 2
ANGOLI SUPERFICI LAVORATE CONSIDERANDO IL LATO PIÙ CORTO	± 1°	± 30'	± 20'	± 10'	± 10'
ANGOLI SUPERFICI GREZZE CONSIDERANDO IL LATO PIÙ CORTO	± 2°	± 2°	± 1°30'	± 1°30'	± 1°



odifiche

CARRARO

CARRARO S.P.A. - VIA OLMO, 29
CAMPODARSEGO (PD) - ITALY

Macchina 710. - 709

Sottogruppo Bevel gear set

Denominazione DUMMY BEARINGS FOR BEVEL DISTANCE MEASUREMENT

Classifica mater.		Sost. il	Sost. dal
Scala FULL	Mat. SAE 1040 (C40)	Peso grezzo	Posizione Archivio
Data 11-11-86	Tratt. termico	Peso Finito	N. DISEGNO 119048
Firma F. Nicoletti	Tratt. superf.	Quantità 2	

DIFFERENTIAL SUPPORT AND BEVEL GEAR / PINION SET

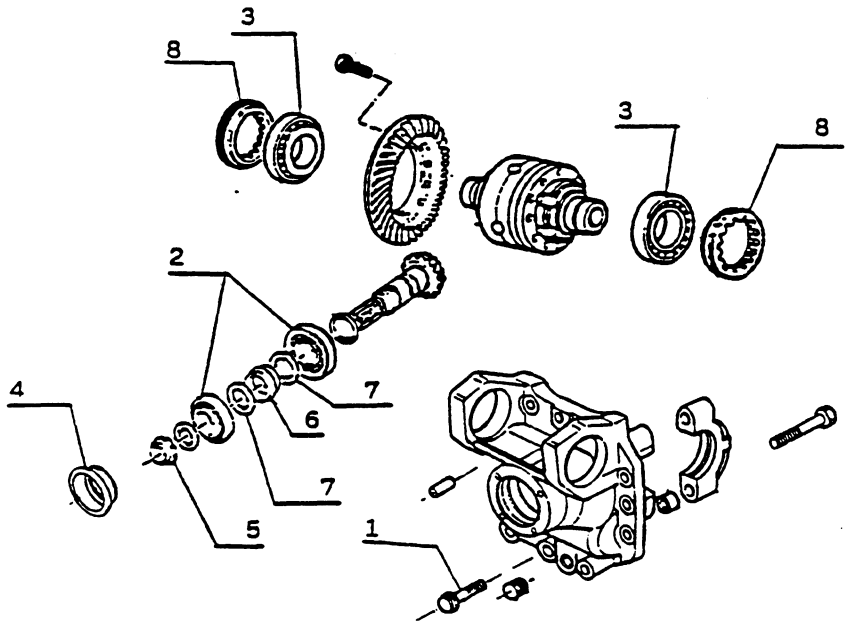


Fig. 9

- To remove the differential, unscrew the bolts (1) for on bench overhauling.
- Inspect the pinion bearings (2) and the differential side bearings (3) for wear or damage; in meantime inspect the lip seal (4) and, preferably, replace it.
- Inspect the bevel pinion splines and replace the ring nut (5), collapsible spacer (6) and washers (7).

The setting operation to do for this group are as follows:

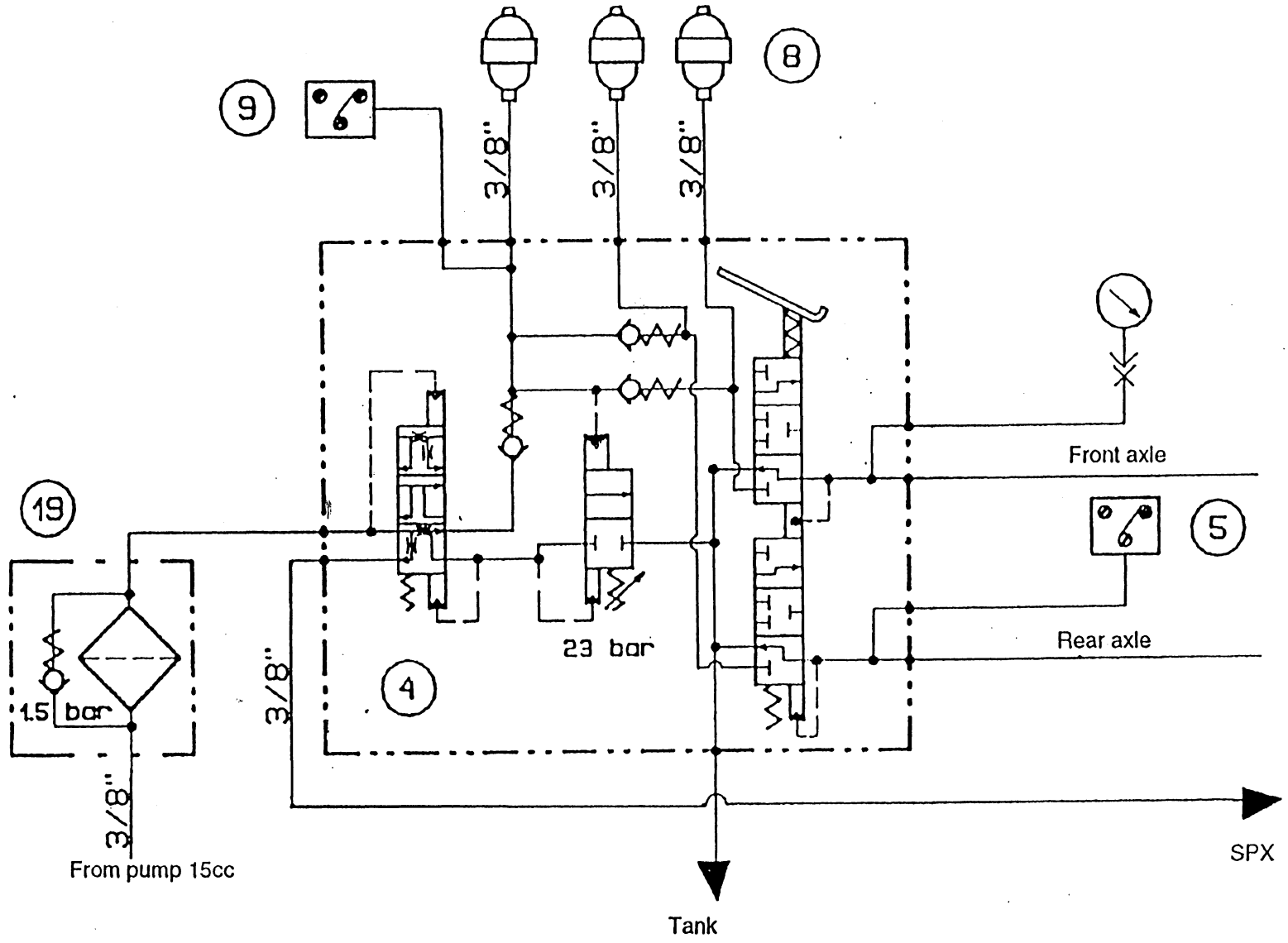
SETTING THE BEVEL DISTANCE
SETTING THE PRE - LOAD OF PINION BEARINGS
SETTING THE PINION / CROWN WHEEL BACK - LASH
SETTING THE DIFFERENTIAL BEARING PRELOAD

Described on following pages.

SPECIAL TOOLS:

- Wrench for pinion ring nut (5) : ref. 119044
- Wrench for differential ring nut (8) : ref. 119030

PLEASE NOTE THAT CROWN WHEEL CAN BE FITTED BOTH RH AND LH OF THE PINION. ALWAYS ENSURE CORRECT POSITION.



BRAKES

Serie 101160

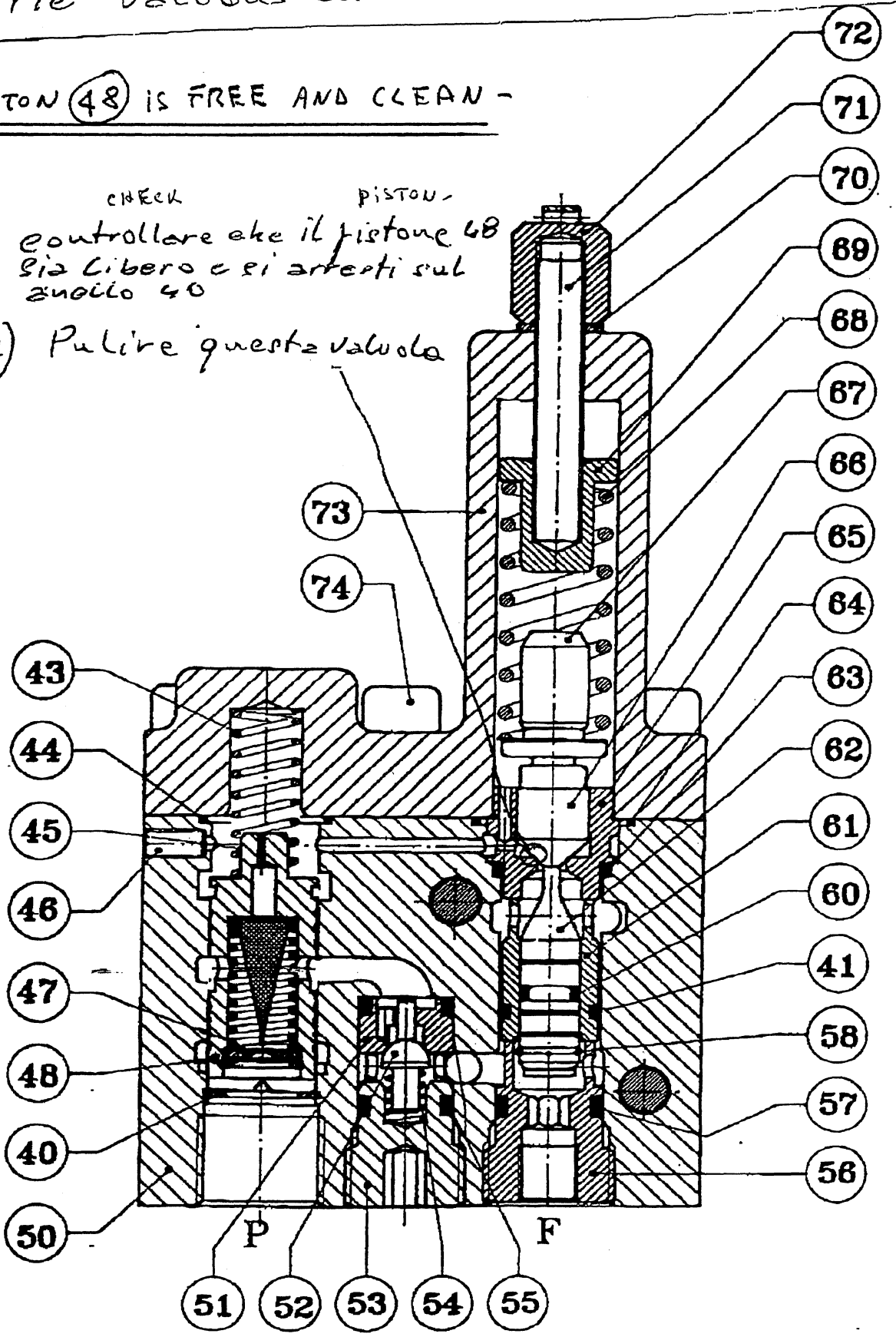
1° Serie Valvola di carica accumulatori

CHECK PISTON (48) IS FREE AND CLEAN -

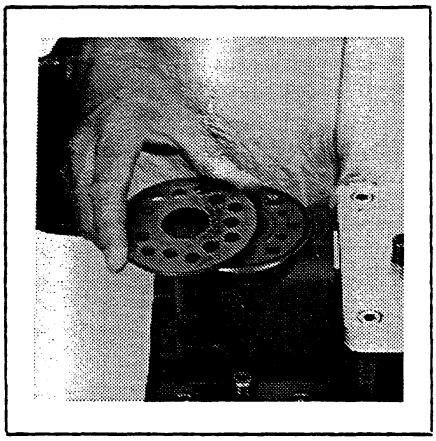
CHECK PISTON -

1) controllare che il pistone 48 sia libero e si arresti sul anello 40

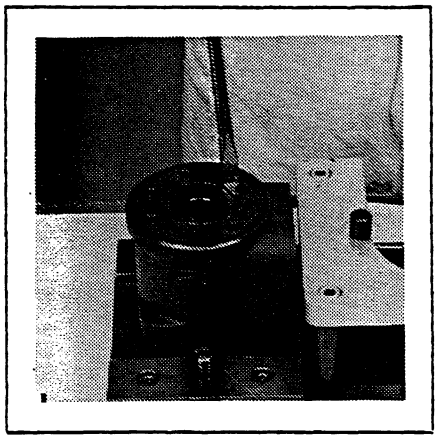
2) Pulire questa valvola



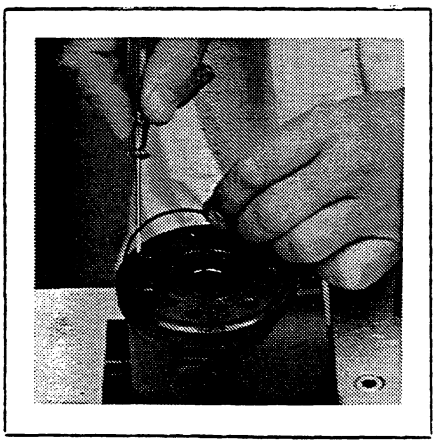
4 Remove cardan shaft.



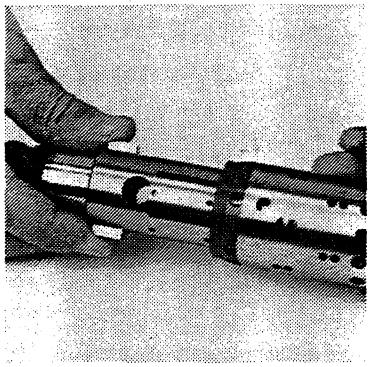
5 Remove distributor plate.



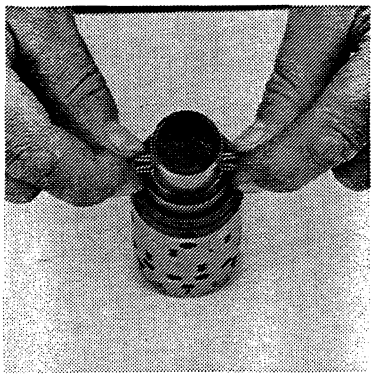
6 Screw out the threaded bush over the check valve.



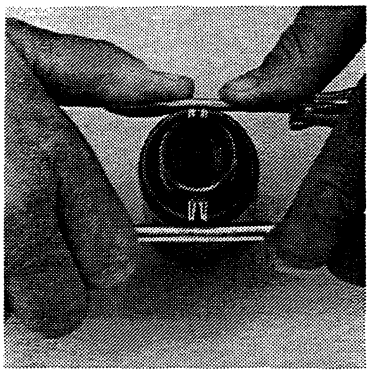
7 Remove o-ring.



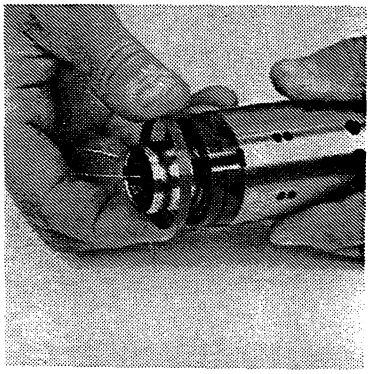
33 Guide the spool into the sleeve. Make sure that spool and sleeve for OSPB LS, OSPBX LS, OSPC LS and OSPC LSR are placed correctly in relation to each other (see page 14).



34 Press the springs togehter and push the neutral position springs into place in the sleeve.

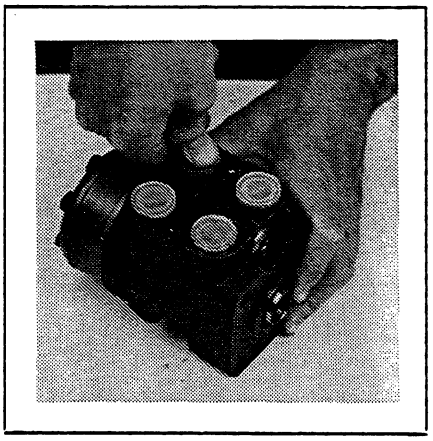


35 Line up the springs and centre them.



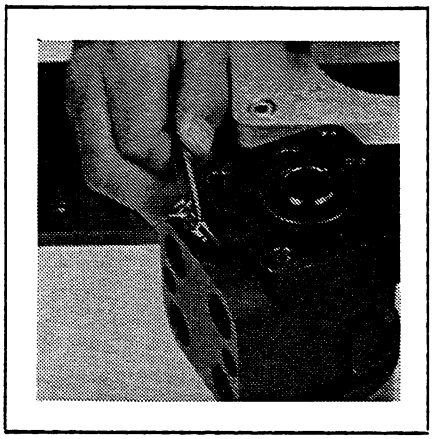
36 Guide the ring down over the sleeve.

Note: The ring should be able to rotate - free of the springs.



66 Press the plastic plugs into the connection ports. Do not use a hammer!

Assembly of the pressure relief valve for OSPC



67 Fit the piston.

68 Fit the spring.

Loader

Auxiliary Hydraulics
- Extend . . . . . 3335 psi (230 bar)
- Retract . . . . . 3335 psi (230 bar)

Bucket
- Extend* (piston) . . . . . 2320 psi (160 bar)
- Retract* (rod) . . . . . 3335 psi (230 bar)

Steering* . . . . . 3480 psi (240 bar)

* Anti-cavitation circuit relief valves

Brake System

Accumulator Setting . . . . . 1740-1885 psi (120-130 bar)
Brake Pad Pressure . . . . . 335 psi (23 bar)
Flow 8.7 GPM (33 L/min)
Filter bypass . . . . . 22 psi (1.5 bar)

Accumulators

Brake . . . . . 1740-1885 psi (120-130 bar)
Joystick . . . . . 190-215 psi (13-15 bar)

Test ports under left cab door:

1. Joystick . . . . . 580 psi (40 bar)
2. Brakes . . . . . 335 psi (23 bar)
3. Unload Valve . . . . . 2610 psi (180 bar)
4. Main System . . . . . 3046 psi (210 bar)

Test port on Auxullary Valve at left rear corner of frame.

1. Auxullary hydraulics . . . . . 3046 psi (210 bar)

MAIN CONTROL VALVE

HYDRAULIC DIAGRAM POS. 15 - SP.PTS CAT. TABLE 78 POS. 1

The control valve is made up of 8 spools in series. The control valve spools are servocontrolled by knobs through the group of solenoid valves A-B.
These solenoid valves are used to reverse knobs controls on the control valves whether if you are working with the backhoe or the front loader.

The reversal may occur through the sensor under the seat or with the switch on the side of left knob lever.

The control functions of control valve to the users (cylinders) should not be changed (therefore reversed ex. a digging cylinder with a lifting cylinder).

Beside the main valve (set at 210 bar) the control valve is equipped with antishock valves in the lifting section both for the bottom side (setting 230 bar) and head side of the cylinder (setting 275 bar).

The control valve free section is already equipped with antishock valves on the two deliveries, set at 230 bar.

On the digging cylinder spool there is only one antischock valve on the bottom side set to 275 bar.

The last section with antishock valves is the one for the control of front loader tilting cylinders. On this section there is a valve set at 230 bar, head side, and one at 160 bar bottom side.

Select two wheel steering mode, position #1. Restart the engine and test drive the machine. It should steer normally in all modes. If the wheels do not point straight ahead when the indicator lights are on, repeat the procedure.

NOTE: To maintain calibration and axle synchronization it is recommended that steering mode changes be made by turning the steering wheel slowly from full right to full left with the unit stopped and the engine at low to mid idle.

GROUP 07

ELECTRIC