D150 - D150 LGP

CRAWLER DOZER

Workshop manual

Print No. 604.02.262 English

THIS ALERT SYMBOL SIGNALS IMPORTANT MESSAGES INVOLVING YOUR SAFETY.

Read and heed carefully the safety instructions listed and follow the precautions recommended to avoid potential risks and to safeguard your health and your safety.

You will find this symbol in the text of this Manual referred to the following key words:

***WARNING* - Cautions directed to avoid improper repair interventions involving potential consequences for the safety of the personnel performing the repairs.**

***DANGER* - These warnings qualify specifically potential dangers for the safety of the operator or other persons directly or indirectly involved.**

IMPORTANT NOTICE

All maintenance and repair interventions explained in this Manual **must be performed exclusively by the Service Organisation of the Manufacturer**, observing strictly the instructions explained using, whenever necessary, the recommended specific tools.
Whoever performs the operations reported without following exactly the precautions is responsible on his own, for the damages that may result.

Neither the Factory nor any Organisations in its Distribution Network, including but not limited to national, regional or local distributors, are responsible for any liability arising from any damage resulting from defects caused by parts and/or components not approved by the Factory for use in maintaining and/or repairing products manufactured or merchandised by the Factory.
In any case, no warranty of any kind is made or shall be imposed with respect to products manufactured or merchandised by the Factory, when failures are caused by the use of parts and/or components not approved by the Factory.

TOOLS

- Keep head, body, limbs, feet, fingers or hands away from bucket, blade or ripper when in raised position.

  Prior to any intervention, install all safety devices according to current rules and regulations.

- In case equipment on the machine must be operated by hydraulic systems, remember to proceed only after seating in the operator's compartment. Make sure that there are no persons in the operating area of the machine. Alert people before operating using the horn and by voice. Move the equipment very carefully.

- Do not use machine to transport loose objects, unless proper devices for this purpose are provided.

- Clutches and brakes of this machine and eventual auxiliary equipment and attachments (such as operating cylinder or winches control valves) must always be properly adjusted in accordance with the instructions provided by the Manuals of the Manufacturer.

- Never perform adjustments with engine running, except when called for by the above instructions.

  When changing work shift, check that wheel or rim securing screws and brackets are not loosen; if necessary, retighten to the prescribed torque.

WARNING

On machines having hydraulically, mechanically, and/or cable controlled equipment (such as shovels, loaders, dozers, excavators etc.) be certain the equipment is lowered to the ground before servicing, adjusting and/or repairing. If it is necessary to have the hydraulically, mechanically, and/or cable controlled equipment partially or fully raised to gain access to certain items, be sure the equipment is suitably supported by means other than the hydraulic lift cylinders, cable and/or mechanical devices used for controlling the equipment.

TABLES OF TECHNICAL DATA

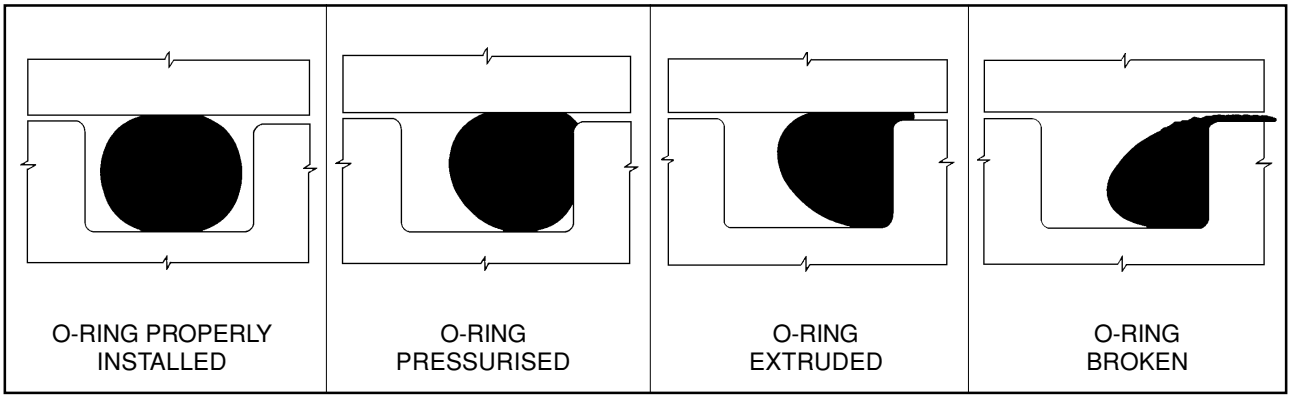
TRASMISSION SYSTEM	Steering and brakes system	The steering system is controlled by two levers located on the left side of the operator's seat. When the lever moves, a modulated pressure is sent through the electronic unit and the proportional solenoid valves to the steering control valve. The first pressure controls the disengagement of the steering clutches. The second pressure is equal to zero until the first pressure reaches 9 bar (127.8 psi) (50 % of the lever stroke) then it applies positively the steering brakes. The service brake system is controlled negatively by the brake pedal. Also, when pulling the two levers at the same time. When actuating the pedal, the counter pressure of the brake pedal is cut-off with a modulation and the springs apply the braking load.
	Steering clutches	Multiple discs, oil-bath, spring controlled, electro hydraulically provided.
	Number of clutch driven discs (sintered)	8 (per clutch)
	Number of clutch driving discs (steel)	9 (per clutch)
	Total area of each clutch	4678 cm^2 (725.09 in^2)
	Total area of each clutch	213 mm (8.38 in)
	Outer diameter of driven disc	286 mm (11.25 in)
	Brakes	**Oil-bath disc brakes** The single pedal actuates, at the same time, the brakes of both tracks, both as a service and emergency devices. The machine is not moving when the parking brakes are applied. A manual system allows the neutralisation of the brakes, when there is no hydraulic pressure, to tow the machine, in case of failures. **Parking brake:** automatically actuated by transmission safety lever engaged or engine inoperative.
	Number of brake driven discs (sintered)	5 per clutch
	Number of brake driving discs (steel)	4 per clutch
	Steering pump + torque converter oil scavenging	Dual, gear type
	Flow of steering section (@ 2100 rpm)	50 l/min (13.21 US gpm)
	Flow of torque conv. scavenger section(@2100 rpm)	22 l/min (5.81 US gpm)
	Steering system filters — Suction	Steel mesh and magnetic rod, filtering 100 micron, w/out by-pass
	Steering system filters — Delivery	Screwed on cartridge type, 30 micron, with by-pass valve.
	Final drive	Counter shaft double reduction
	Ratio	1 : 10.8
	Sprocket	7 bolt-on type segments
	Total number of teeth	28

O-RINGS - Field of application

DESIGNATION	BASE ELASTOMER	TEMPERATURE of OPERATION (*)	FIELD OF APPLICATION
NBR	NITRIL BUTADIENE	- 40 to 120° C (-40 to 248° F)	MINERAL OIL AND GREASE, COOLANTS, FUEL, WATER UP TO 70° C (158° F), AIR UP TO 100° C (212° F)
		- 30 to 125° C (-22 to 257° F)	SAME COMPATIBILITY OF NBR 60 to 75 IRHD, BETTER RESISTANCE TO EXTRUSION, USED ONLY AS STATIC SEAL
FPM	FLUOROCARBON (VITON)	- 40 to 200° C (-40 to 248° F)	GENERAL FUELS, NON FLAMMABLE FLUIDS, ACIDS, SOLVENTS, MINERAL OIL TO BE USED WITH TEMPERATURES > 100° C (212° F)
EPDM	ETHYLENE PROPYLENE	- 40 to 150° C (-40 to 302° F)	BRAKE FLUID (DOT 3), STEAM, HOT WATER, SILICON OIL AND GREASE. WARNING: NOT TO BE USED WITH MINERAL OIL AND GREASE
MVQ	SILICON	- 60 to 200° C (-60 to 392° F)	AIR, GAS, WATER, HIGH ANILINE POINT MINERAL OIL, STEAM USED AS STATIC SEAL ONLY

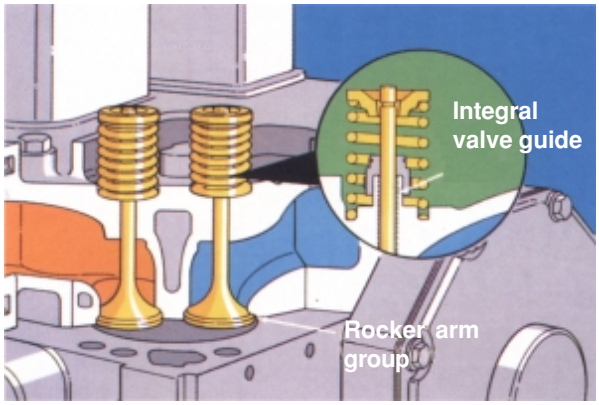
NOTE:

(*) Temperature indicated for static applications, provided as indication only.

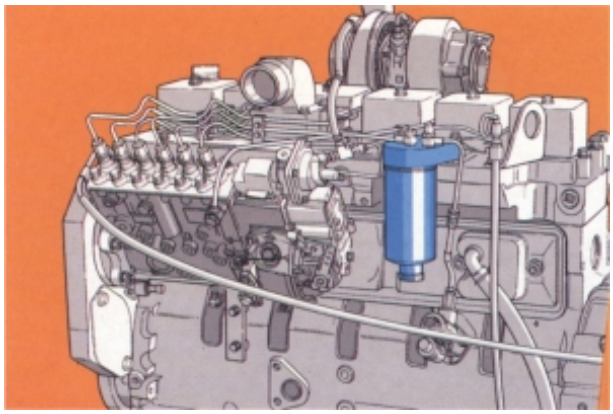


O-RING PROPERLY INSTALLED | O-RING PRESSURISED | O-RING EXTRUDED | O-RING BROKEN

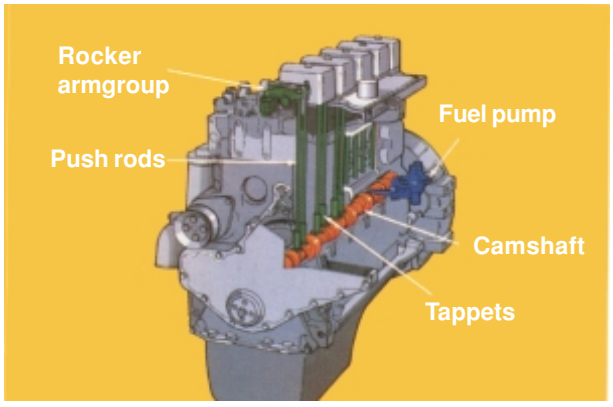
An additional design feature of the cylinder head includes cast integral valve guides and hardened valve seat surfaces. Service parts and procedures are available for grinding operations and installation for valve guides.



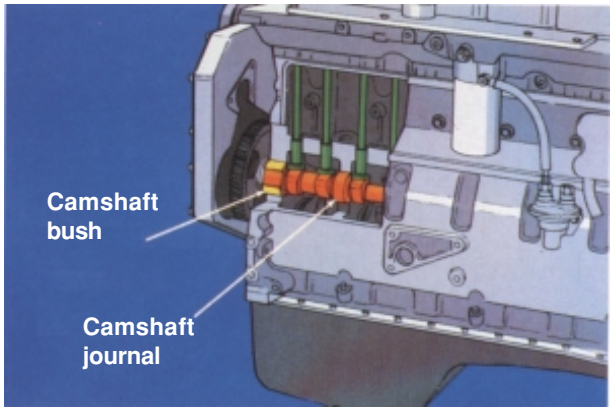
The length of the injection pump requires the repositioning of the fuel filter toward the rear of the engine. This is possible by using a distance filter support.



The timing is composed of a camshaft, tappets, push rods and rocker arm group. Besides the intake and exhaust valve cams, the camshaft has a special cam to power the fuel pump.



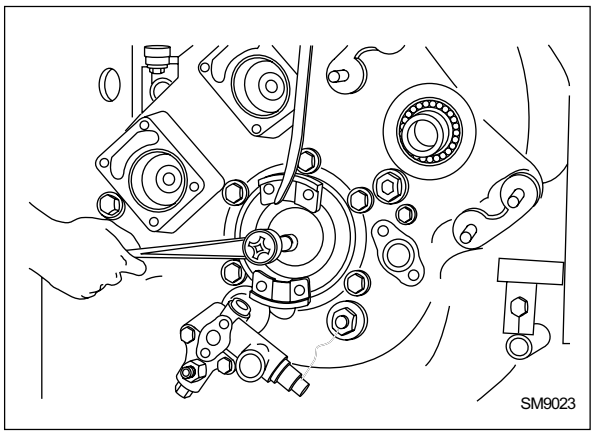
A single bush of the camshaft, located in the first shaft bore, is used to support the axial thrust of the accessory drives. The remaining journals turn in the camshaft bores in the cast iron block. Service bushes and the procedure to grind and install bushes for all journals of the camshaft are available.



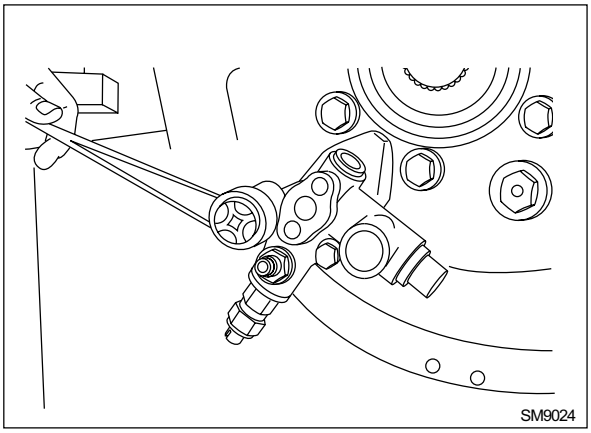
2.2 TROUBLESHOOTING

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

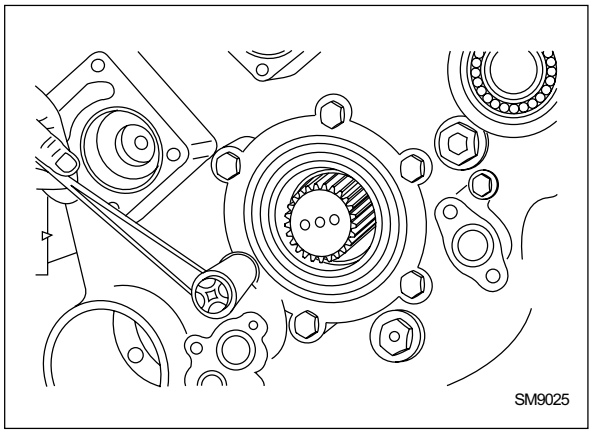
Loosen and remove the screws securing the retaining plate, then pull-out the plate, the O-Ring and the shaft flange.



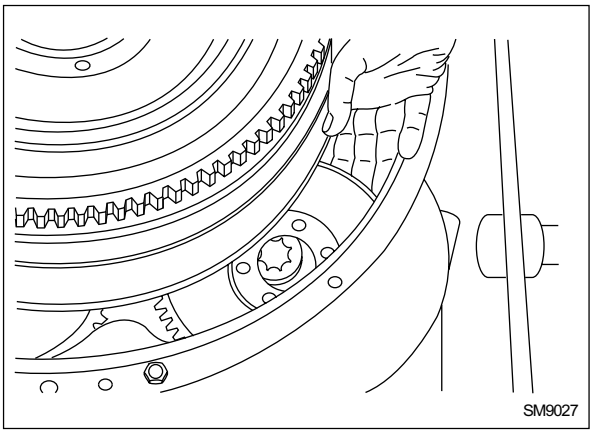
Remove the pressure relief valve assembly.



Loosen the support securing screws, then turn the torque converter with its bottom side upwards, so that the securing screws can me removed from the support.

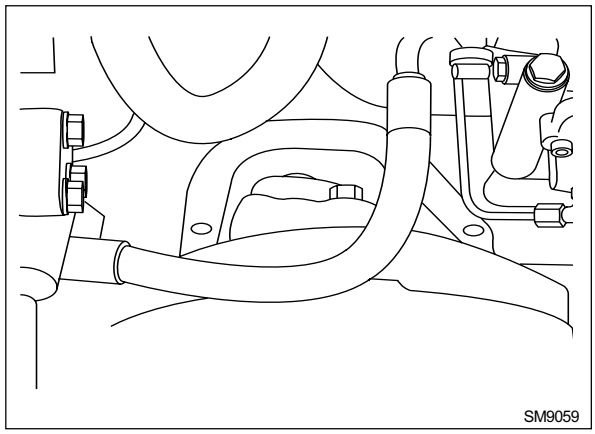


Remove the oil deflector.



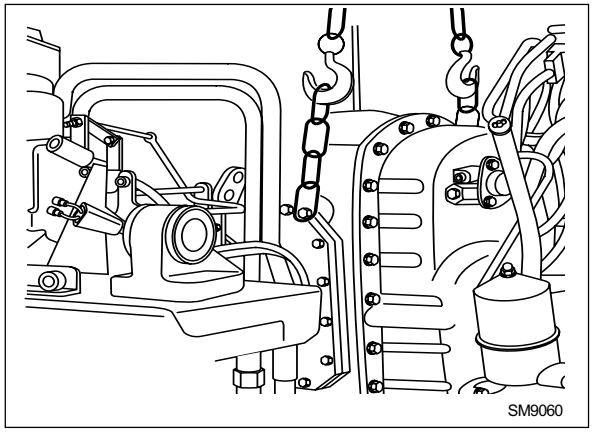
Remove the screws and nuts retaining the transmission housing.

NOTE: It could be necessary to disconnect the cylinder pipe on the hydraulic control valve to be able loosening the nuts on the right upper side of the transmission housing.


SM9059

Remove the transmission housing from the pinion support and lift it away from the machine.

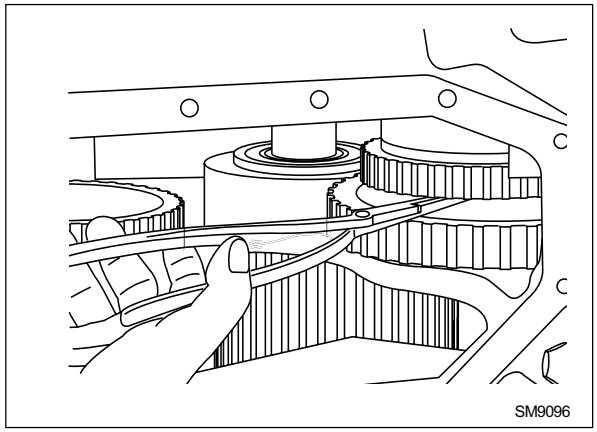
Lift and handle all heavy parts with a lifting device of appropriate capacity.
Make sure that the parts are secured by appropriate slings and hooks.


SM9060

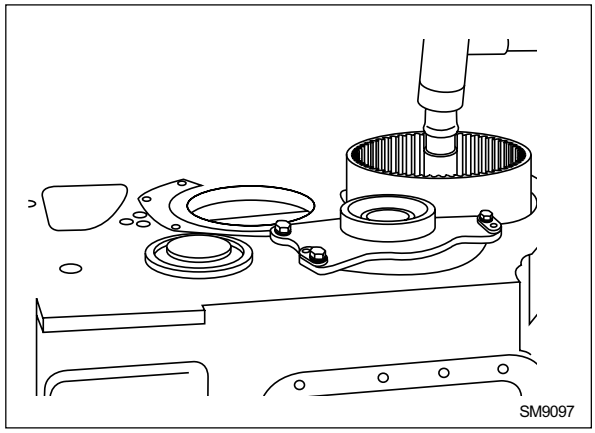
2.5.2 RE-INSTALLATION

The installation is done reversing the removal procedure.

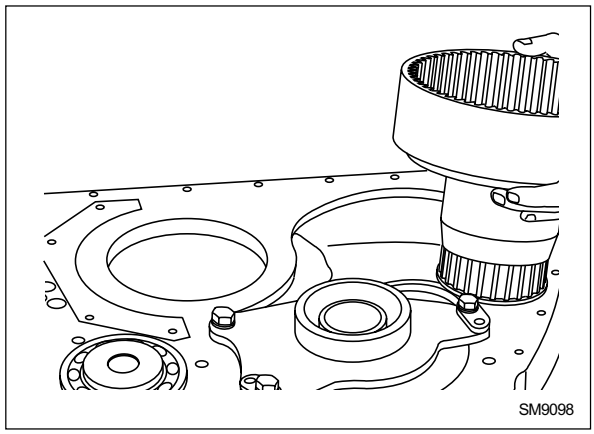
Remove the medium range clutch hub circlip.



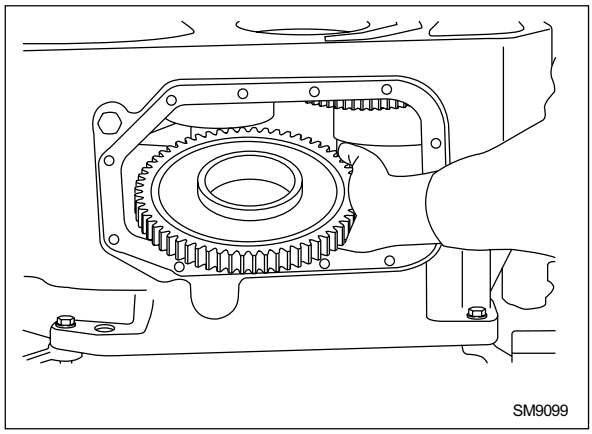
Remove the medium/high range clutch shaft.



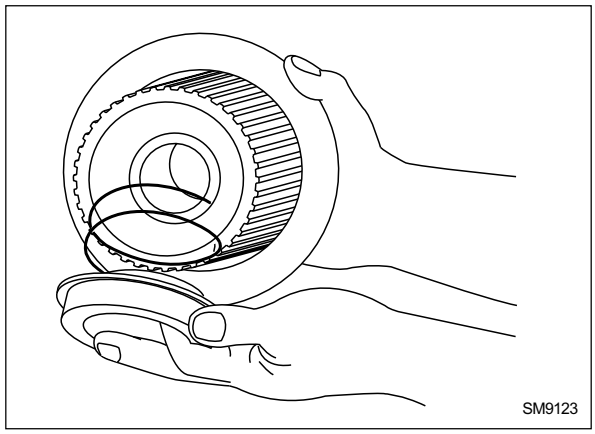
Remove the medium range clutch drum.



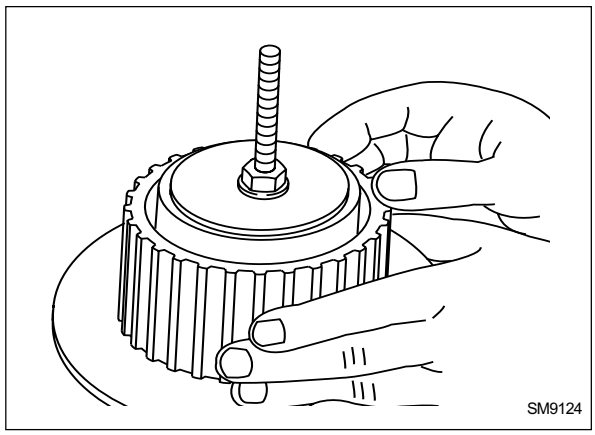
Remove the medium range clutch gear.



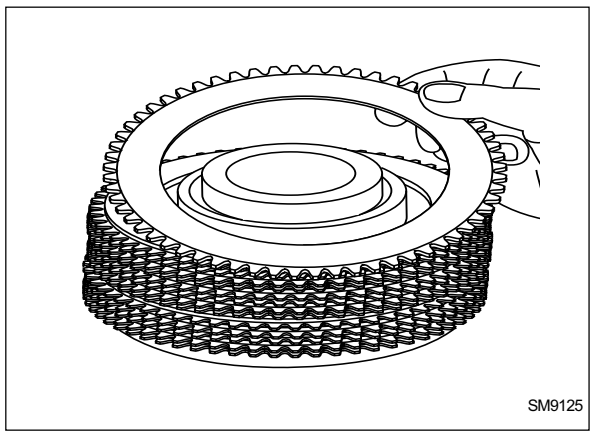
Remove the spring and the relevant cup from the hub; check that the spring complies with the prescribed requirements.



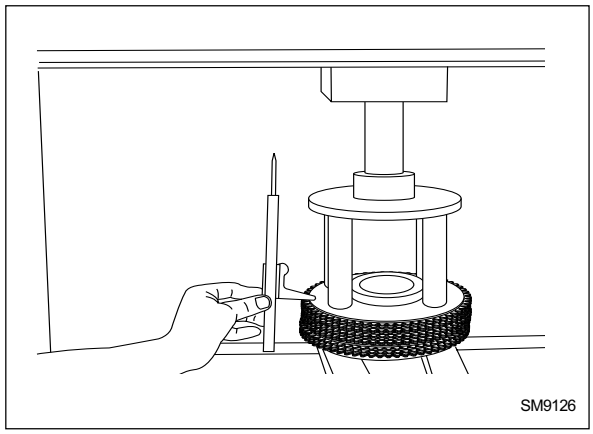
Insert the spring cup and the spring into the hub; press the spring and install the circlip.



Reinstall the friction discs, return springs and steel discs, alternatively on the hub.



To measure the height of the clutch pack, place the clutch assembly on a press and load it at 197 daNm (1452.88 ft lbs), measuring as illustrated.



2.6 SPECIFICATIONS AND DATA

2.6.1 GENERAL DATA

TORQUE CONVERTER

Make ..... TWIN-DISC
Model ..... PX-1615 - C MS335
Number of elements ..... 3 (pump, turbine, stator)
Torque ratio at stall 2.33:1

TORQUE CONVERTER AND TRANSMISSION PROPELLER SHAFT

Type ..... Tubular with universal joints at the ends
Technical description ..... Italcardano 148 - M70
Working angle ..... 10°
Lube fittings 2
Tightening torque of universal joint screws ..... 12.8-14.2 daNm (94.4 to 104.73 ft lbs)

TRANSMISSION HOUSING

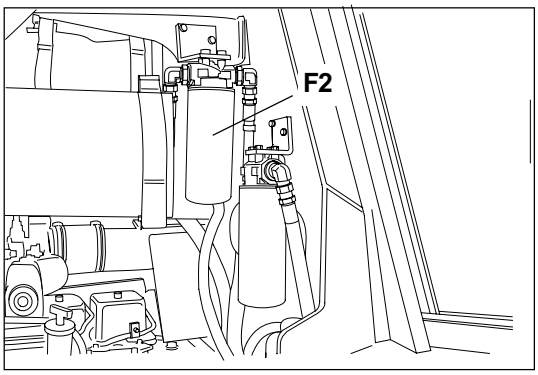
Type ..... Full Power Shift
No of speeds ..... 3 forward, 3 reverse
No of clutches 5

SPEED	POWER-SHIFT CLUTCHES ENGAGED	RATIO
1st Forward	Low - Forward	1:2.531
2nd Forward	Medium - Forward	1:1.484
3rd Forward	High - Forward	1:0.888
1st Reverse	Low - Reverse	1:2.016
2nd Reverse	Medium - Reverse	1:1.182
3rd Reverse	High - Reverse	1:0.707

	QUANTITY				
CLUTCH DISCS	Forward	3rd	2nd	1st	Reverse
Bimetal discs with outer toothing	10	6	8	8	8
Intermediate toothed steel discs	9	5	7	7	7
Shoulder toothed steel discs	1	1	1	1	1
Spacer springs	10	6	8	8	8

OIL FILTERS

Filter on the total flow transmission torque converter delivery with paper filtering element, replaceable every 500 hours work (25 µ - nominal tightening torque 4 daNm (29.5 ft lbs) and by-pass valve set at 2.5 bar 36.25 psi).



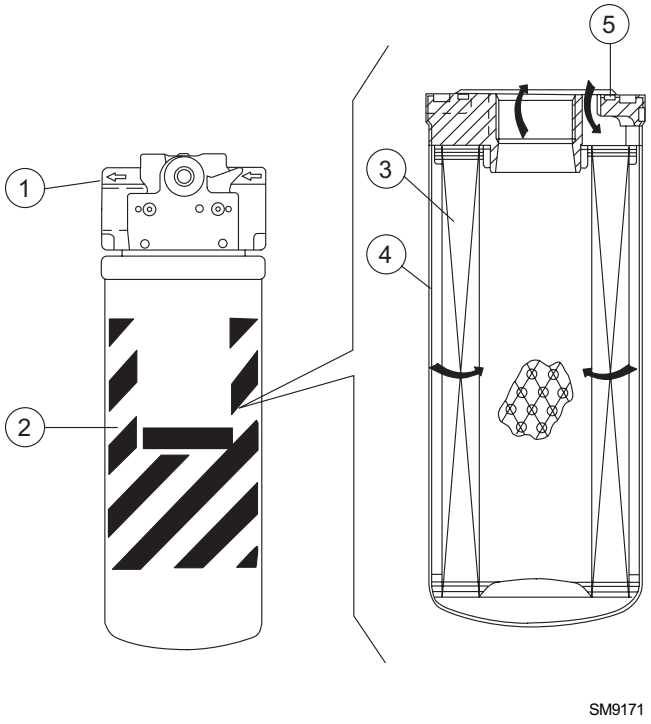


Fig. 17 - Oil filter on delivery line

1 - Filter support
2 - Filter cartridge
3 - Filtering element
4 - Cover
5 - O-Ring
F2 - Transmission/torque converter oil filter

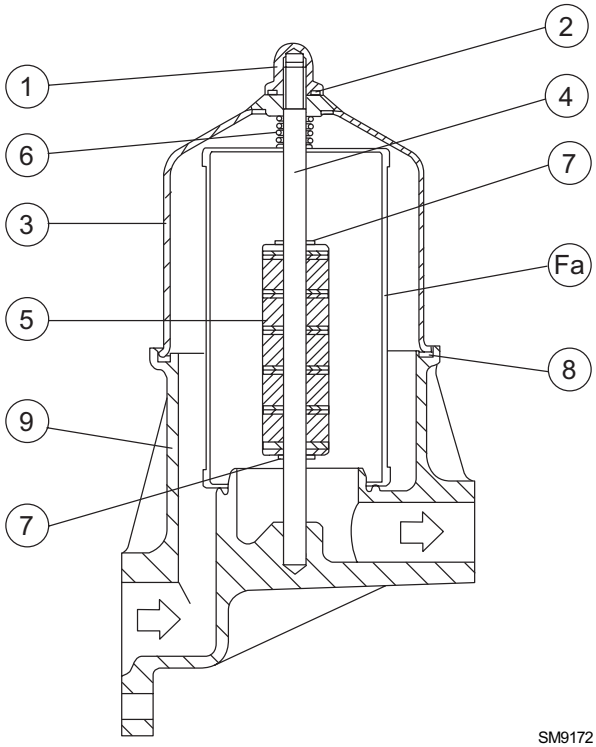


Fig. 18 - Oil filter on suction line

Total flow filter on torque converter-transmission pump suction line, with steel mesh filtering element (to be cleaned every 1000 hours work) and magnetic plug (100 µ nominal, without by-pass)

Fa - Steel mesh filtering element
1 - Cover locking nut
2 - O-Ring
3 - Cover
4 - Stud
5 - Magnetic rod
6 - Filtering element retaining spring
7 - Circlip
8 - Gasket
9 - Support

3.2.3 Driven gear

Bearing removal

Pull-out the bearing races from each end of the gear shaft, using puller (**E**), as illustrated in the figure.

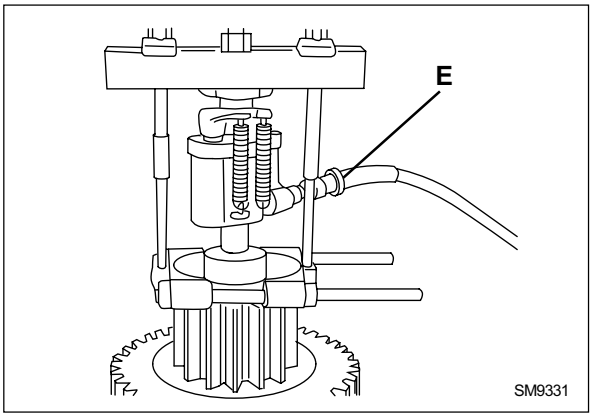


Fig. 19

Warm-up races **P** of the new bearings and install them on the shaft as illustrated.

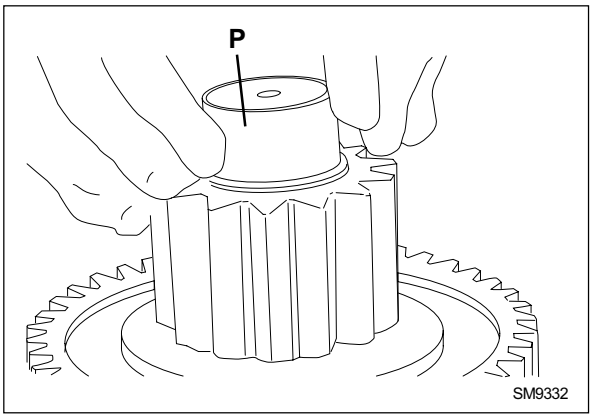


Fig. 20

3.2.4 Driving gear shaft

Bearing removal

Using an appropriate puller **E**, remove the bearing races from the driving gear shaft, as illustrated in the figure.

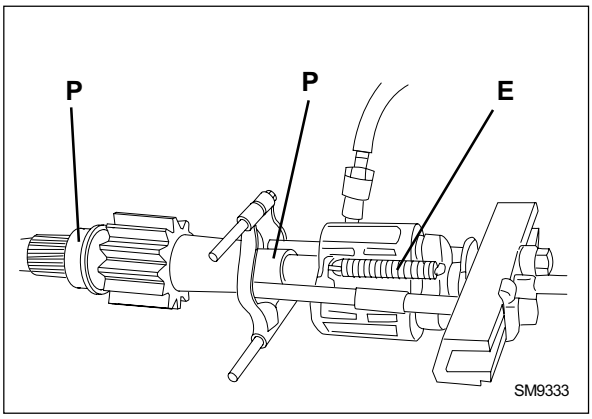


Fig. 21

Warm-up the races of the new bearings and install them on the shaft as illustrated.

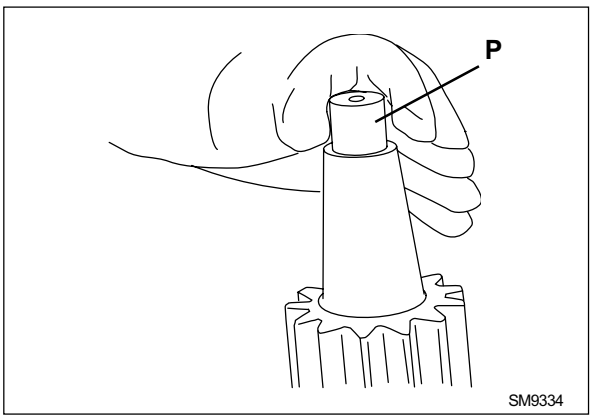


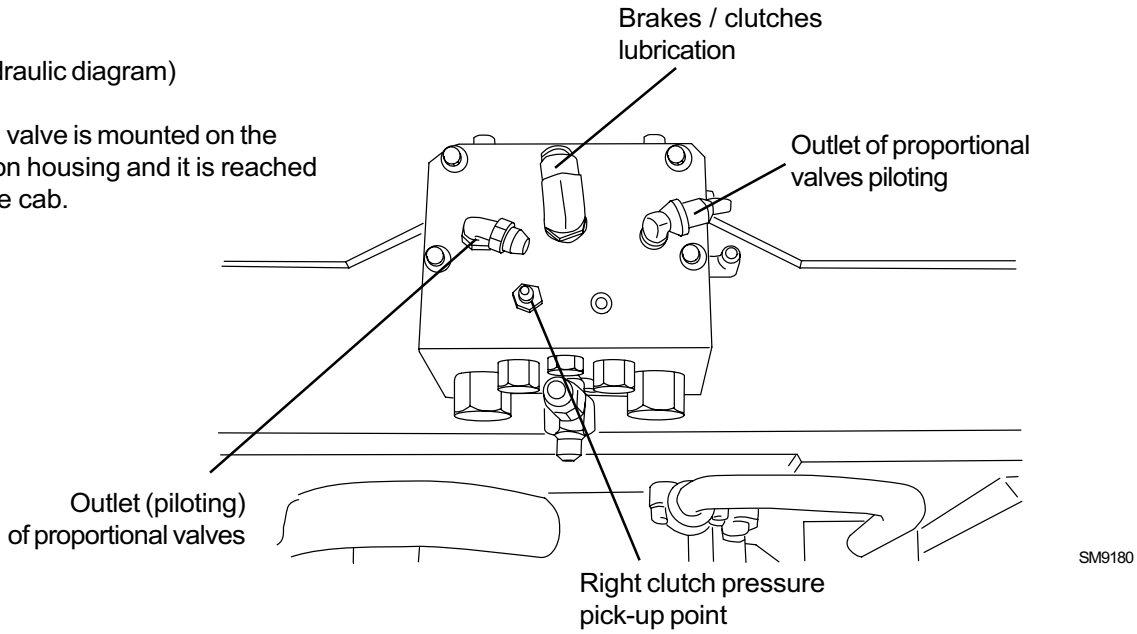
Fig. 22

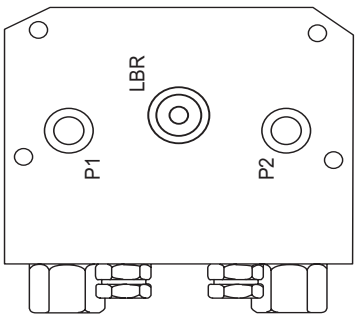
Note:

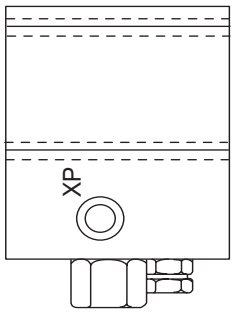
BRAKES AND CLUTCHES CONTROL VALVE

(Ref. **4**, hydraulic diagram)

The control valve is mounted on the transmission housing and it is reached by lifting the cab.

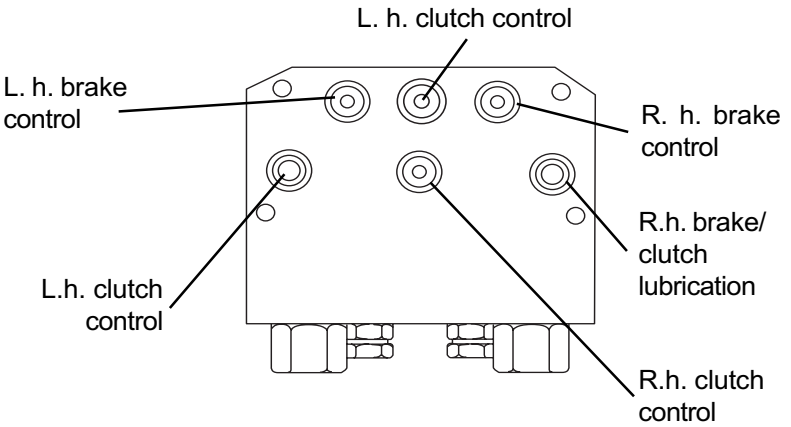




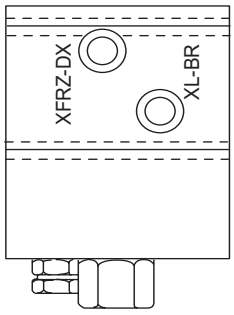


Left side view
XP - brake pressure pick-up point

P1 - P2 piloting of proportional solenoid valves
LBR - Brakes - clutches lubrication



Bottom view



SM9262

Right side view
XFRZ - right
XLBR - Lube pressure pick-up point

Proceeding with the test of the circuits, make sure that the single pressure gauges are adequate for the pressures to be measured.

WARNING

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

WARNING

Be sure exposed personnel in the area of operation are clear of the machine before moving it or its attachments. WALK COMPLETELY AROUND the machine before mounting. Sound the horn.

4.3 TESTS

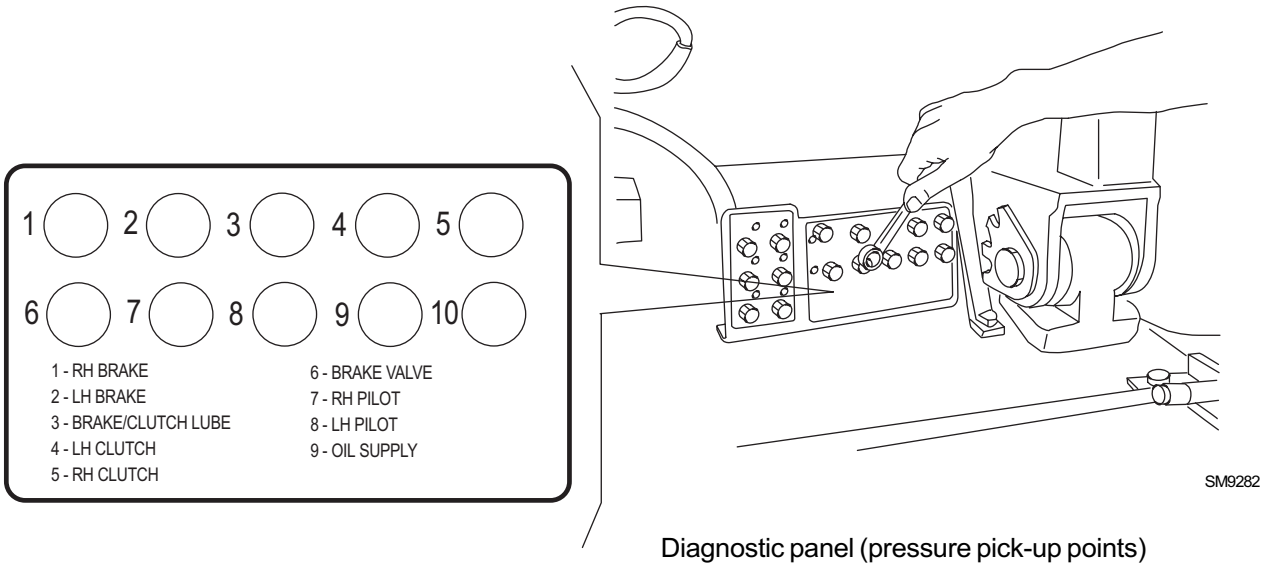
4.3.1 PRESSURE TEST OF THE BRAKES AND STEERING CLUTCHES CIRCUIT

Remove the plugs on the diagnostic panel.
Connect a pressure gauge, with engine inoperative (capacity 30 bar (435 psi)) to pressure pick-up points (3-4-5-7-8-9) indicated in the illustration.

Start the engine and operate the machine forward and reverse, actuating, at the same time, the steering clutches, to warm-up the oil.

Run the engine at maximum speed (2100 to 2200 rpm) and measure the relevant pressures which must coincide with the values listed in the nominal pressures table here below.

Table of nominal pressures	(bar)	(psi)
1. Right brake control	20 ± 2	290 ± 29
2. Left brake control	20 ± 2	290 ± 29
3. Brakes lubrication	3	43.5
4. Left steering clutch control	25 ± 2	362.5 ± 29
5. Right steering clutch control	25 ± 2	362.5 ± 29
6. Brake pedal valve	20 ± 2	290 ± 29
7. Right piloting	25 ± 2	362.5 ± 29
8. Left piloting	25 ± 2	362.5 ± 29
9. Feeding	25 ± 2	362.5 ± 29



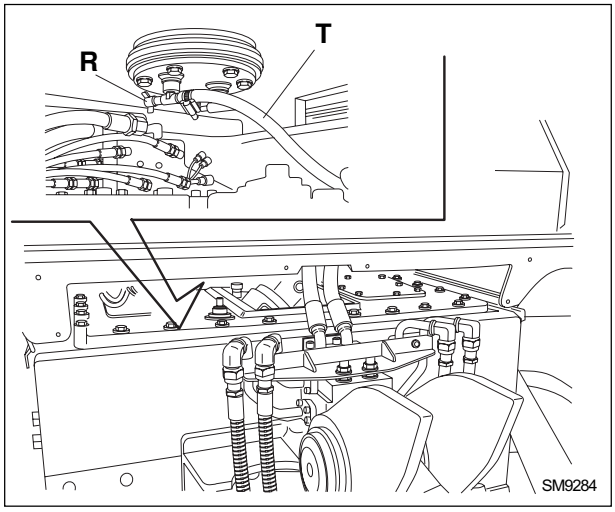
Diagnostic panel (pressure pick-up points)

4.4.3 BRAKES AND STEERING CLUTCHES

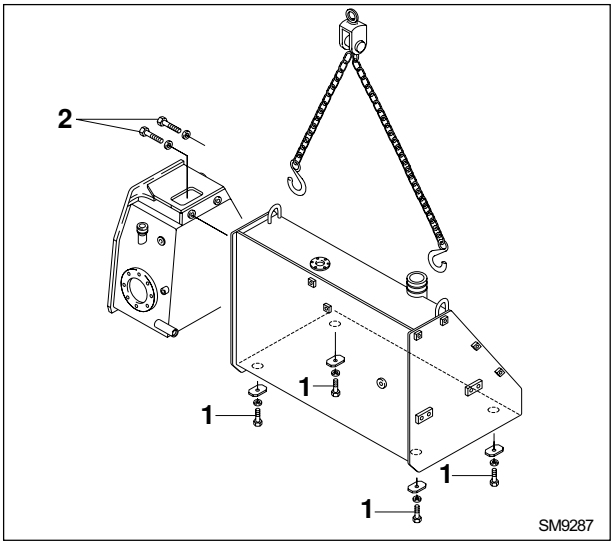
Disassembly of packs

WARNING

Make sure that the cables are properly secured and that the securing point is strong enough to lift the load. Keep all bystanders away from the lifting point, the cables or chains.



Drain the fuel from draining pipe **T** indicated, actuating valve **R**. Drain completely the fuel before removing it.
Capacity of full fuel reservoir: 270 litres (71.334 US gal).
Disconnect the fuel feeding pipe to the injection pump and remove the four securing screws (**1**) at the base of the reservoir.
Hold the reservoir with a crane equipped with a lifting hook, using the eyes indicated. Remove the two side securing screws (**2**) with the hydraulic oil reservoir, which is not necessary to be removed.



WARNING

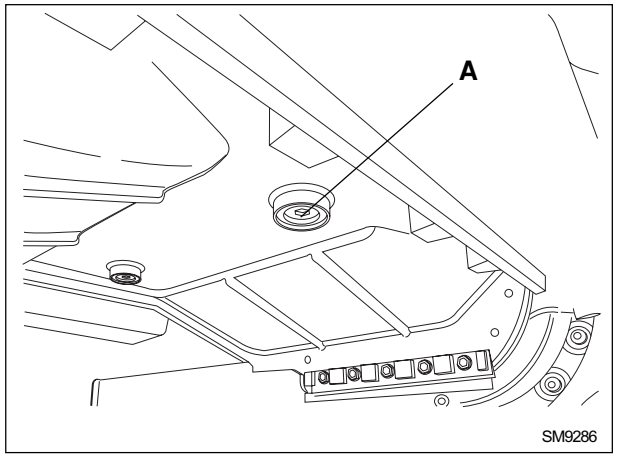
Avoid twisting chains or steel cables. Always wear heavy gloves when handling cables or chains.

Remove the fuel reservoir.
It is not necessary to remove the hydraulic oil reservoir to reach the inspection covers of the housing.

- Drain the oil from the transmission housing, removing plug **A** from the rear bottom of the machine and let it flow out completely (oil capacity of the housing: about 46 litres - 12.15 US gal).

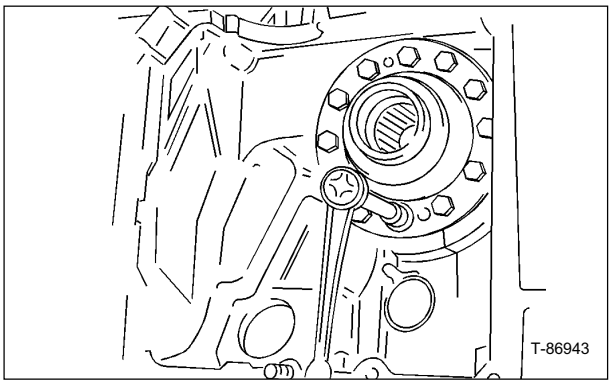
- Split the track chain as described in **SECTION 5 - UNDERCARRIAGE**.

- Remove the final drive as described in **SECTION 3 - FINAL DRIVES**.

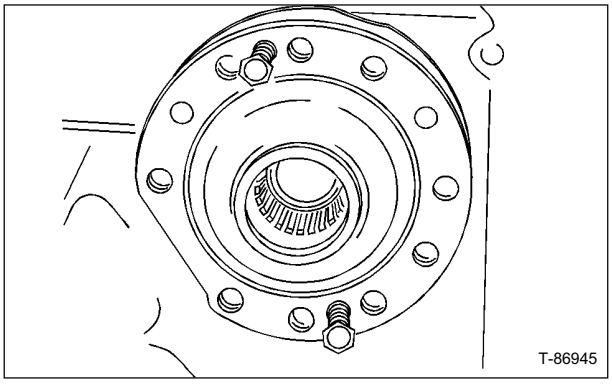


4.4.4.2 BEVEL PINION REMOVAL

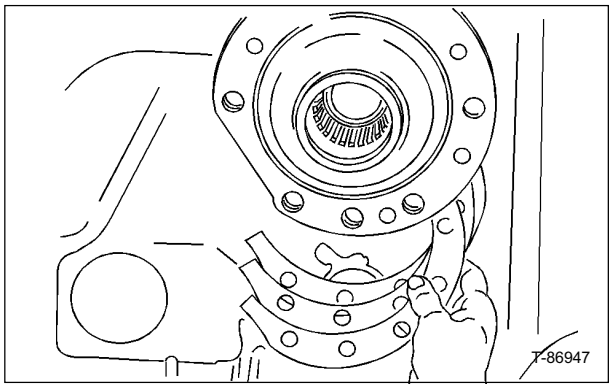
Remove the bevel pinion securing screws.



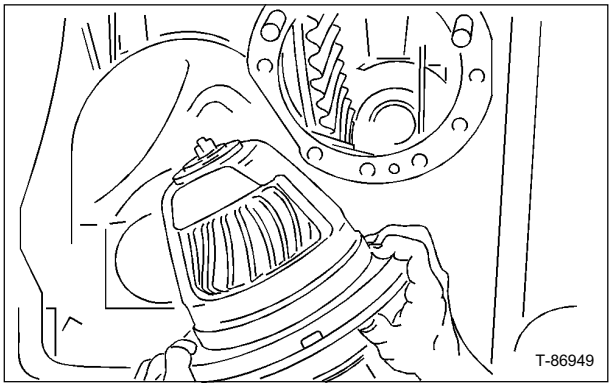
Install the guide pins and the manoeuvre screws.



Remove the adjustment shims and mark them.

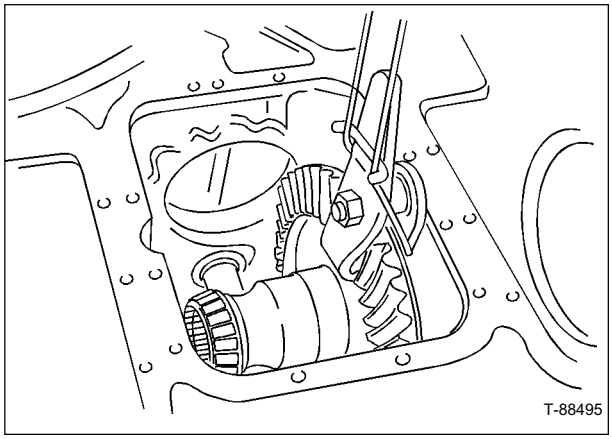


Pull-out the bevel pinion from the housing.



4.4.4.7 RE-INSTALLING THE BEVEL GEAR CROWN

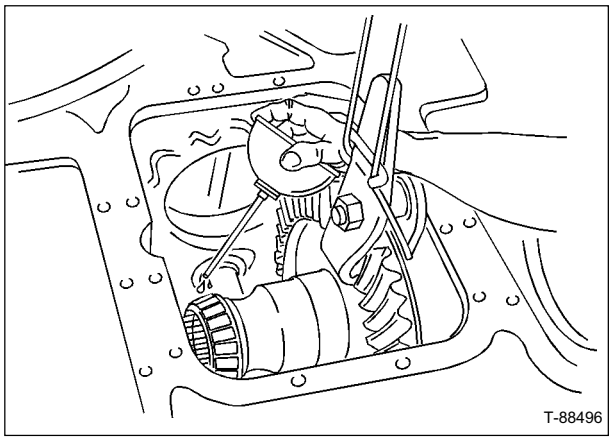
Install the lifting device (**75297792**) to the crown and arrange the latter into the bevel gear housing.



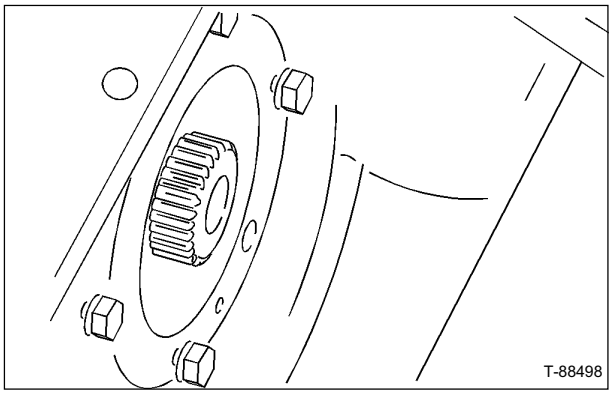
WARNING

Lift and handle all heavy items with lifting devices of appropriate capacity.
Make sure that appropriate slings and hooks secure the materials. Use lifting eyes when provided for these purposes.

Lubricate the bearings with engine oil.



Install the left half housing, without shims, using 4 screws only; tighten to a torque of 130 Nm (95.87 ft lbs).



Install the right half housing, without shims, with two securing screws, tightened by increments of 1 Nm (0.7375 ft lbs) up to a final value of 7 Nm (5.16 ft lbs). At the same time, turn manually the crown a few turns, to set the taper rollers into the relevant seats.

4.5.3 STEERING CLUTCHES

General data and dimensions

TYPE ..... multiple disc, oil bath
Number of discs per clutch
- Driven (with sintered facing) ..... Q.ty 8
- Driving (steel) ..... Q.ty 9

Specification of springs

Number of springs for each clutch 6
- Free length of spring ..... 38 mm (1.496 in)
- Diameter of wire ..... 2 ± 0.025 mm (0.079 ± 0.001 in)
- Outer diameter fully pressed ..... 14 ± 0.1 mm (0.551 ± 0.004 in)

Load with compression at: - 33.5 mm (1.319 in) ..... 4.7 ± 0.2 daNm (34.662 ± 1.475 ft lbs)
- 29.5 mm (1.161 in) ..... 8.9 ± 0.4 daNm (65.637 ± 2.95 ft lbs)

Matings and tolerances
Thickness of clutch disc pack ..... 56.5 to 58.5 mm (2.224 to 2.303 in)
(under a load of 300 to 400 kg) (661.5 to 882 lb)
Average travel of pressure plate ..... 5.5 mm (0.216 in)
Total travel ..... 5 mm (0.197 in)
Escursione totale ..... 10.5 mm (0.413 in)
Thickness of steel plates ..... 2.42 to 2.58 mm (0.095 to 0.101 in)
Thickness of sintered driven discs ..... 4.2 to 4.5 mm (0.165 to 0.177 in)

Clutch inner hub bearings
Inner diameter ..... Ø 40 mm (1.575 in)
Outer diameter ..... Ø 80 mm (3.150 in)

BRAKES

General data and dimensions

TYPE ..... multiple disc, oil bath
Number of discs per brake
- Driven (with sintered facing) 6
- Driving (steel) 5

Specification of springs
Number of springs for each brake 16
- Free length of spring ..... 83 mm (3.268 in)
- Diameter of wire ..... 5.5 ± 0.05 mm (0.216 ± 0.002 in)
- Outer diameter fully pressed ..... 30 ± 0.30 mm (1.181 ± 0.012 in)

Load with compression at:
66 mm (2.6 in) ..... 135 ± 7 daN (303.75 ± 15.75 lb)
61 mm (2.4 in) ..... 174 ± 9 daN (391.5 ± 20.25 lb)

Matings and tolerances
Thickness of clutch disc pack ..... 37.5 to 39.5 mm (1.48 to 1.95 in)
(under a load of 300 to 400 kg) (661.5 to 882 lb)
Average travel of pressure plate ..... 4.5 mm (0.18 in)
Average wear ..... 3.5 mm (0.14 in)
Total travel ..... 8 mm (0.31 in)
Thickness of steel plates ..... 2.42 to 2.58 mm (0.095 to 0.101 in)
Thickness of sintered driven discs ..... 4.2 to 4.5 mm (0.165 to 0.177 in)

Clutch inner hub bearings
Inner diameter ..... Ø 85 mm (3.35 in)
Outer diameter ..... Ø 130 mm (5.12 in)

5.3.2 SETTING OF THE TRACK TENSIONER PRESSURE RELIEF VALVE

Disassemble all parts of the valve and clean them from all traces of grease.
Reassemble the valve and proceed as follows:

- secure tool (**A**) **75291573** (Fig. 5) in a vice, screw valve (**Vs**) on the tool placing in between the relevant O-Ring;

- fill well (**P**) of the tool with gasoline or alcohol;

WARNING

Extinguish all smoking materials and free flames.

- actuate torque wrench (**B**) considering that the valve must stay closed, thus the level of the liquid inside well (**P**) must not change until value (V_1) = 6.41to 6.86 daNm (47.273 to 50.592 ft lbs).
  The valve should open and the well drain-out when a torque value (V_2) is applied, equivalent to a setting of 900 to 950 bar (13050 to 13775 psi).

Setting of the pressure relief valve:

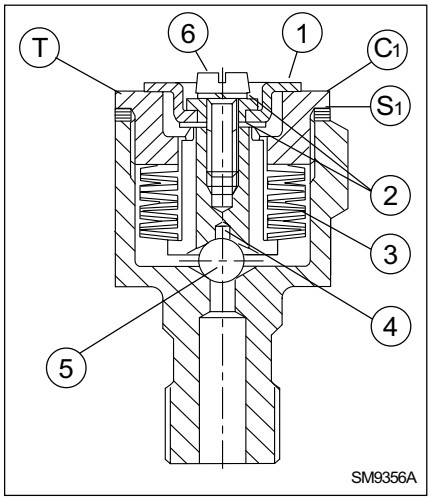
V_1 = 6.41 to 6.86 daNm (47.273 to 50.592 ft lbs)
V_2 = 6.86 to 7.35 daNm (50.592 to 54.206 ft lbs)

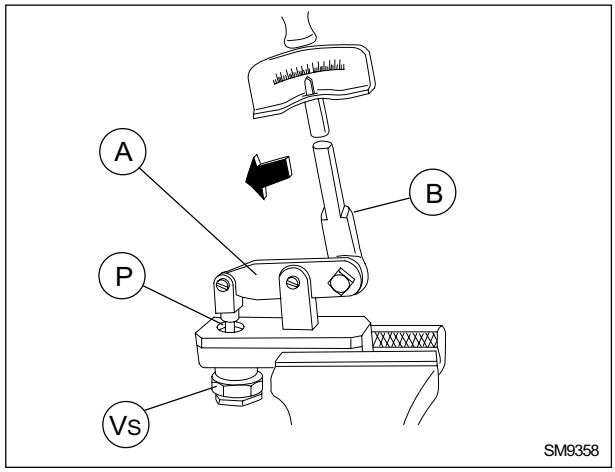
- to obtain the setting value required, change shims (**S_1** accordingly, or actuate threaded element (**1**);

- reassemble the valve and fill it with AMBRA GR9 grease;

- reinstall the valve on the cylinder and tighten it to the prescribed torque (see chapt. 5).

- Thickness of valve setting shims 0.1 - 0.2 - 0.5 mm (0.008 - 0.019 in).
  Setting 900 to 950 bar (13050 to 13775 psi)





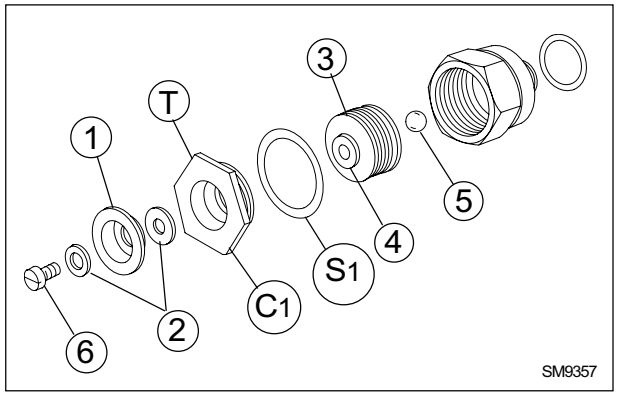


Fig. 5 - Sectional view, parts and check of the pressure setting of pressure relief valve (Vs) of the hydraulic adjusting cylinder

A. Test tool **75291573** - **B**. Torque wrench - **C1**. Valve cover - **P**. Gasoline or alcohol well - **S1**. Adjusting shims - **T**. Pressure setting marking - **1**. Rubber cap - **2**. Steel washers - **3**. Disc springs (Bauer type) - **4** and **5**. Plunger and ball valve - **6**. Cap (**1**) securing screw.

5.4.5 TRACK CHAIN BOTTOM ROLLERS (removal / installation / overhaul)

Removal

If the intervention is limited to one or few rollers, to remove them, it is sufficient to follow the procedure described here below.

1. Remove screws (**1, 2** and **3** fig. 33) and remove the bottom roller inner and outer guards. Salvage the spacers mounted coaxial with screws (**1**).

2. Split the chain (**see 5.4.1 TRACK CHAIN -Removal**).

3. Lift the machine using an hydraulic jack (**4** fig.34) of adequate capacity. Immediately support the machine using a strong wooden block (**5**) capable of supporting its weight (fig. 35).

4. Loosen screws (**6**) securing the rollers to the track frame.

5. Insert tool (**A**), remove the screws and remove the roller, as illustrated in fig. 35.

WARNING

Every time groups of the machine must be removed or installed, requiring to be supported by jacks, make sure that the contacts under the jack and between jack and machine are appropriate for the load to be supported. Immediately transfer the load to appropriate supports or stands. Do not work under or near a machine or its components which are supported only by jacks or other lifting devices, according to current national or local regulations.

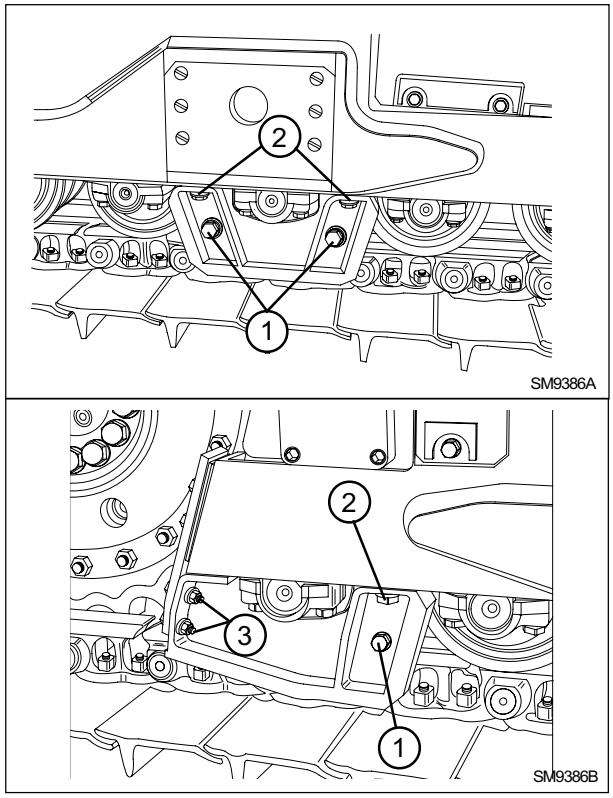


Fig. 33

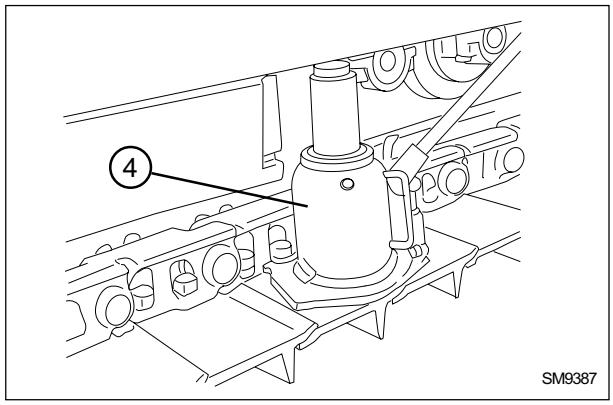


Fig. 34

Re-installation

1. Place the roller on tool (**A** fig. 35) and arrange it on the track frame. Install screws (**5**) and tighten to the prescribed torque (see 5.5.4 **SPECIFICATIONS AND DATA - bottom rollers**).

2. Re-install the roller guards, placing the spacer previously removed, and lower the machine to the ground.

3. Reassemble the track chain and set the correct tension (**see 5.4.1 TRACK CHAIN - Installation**).

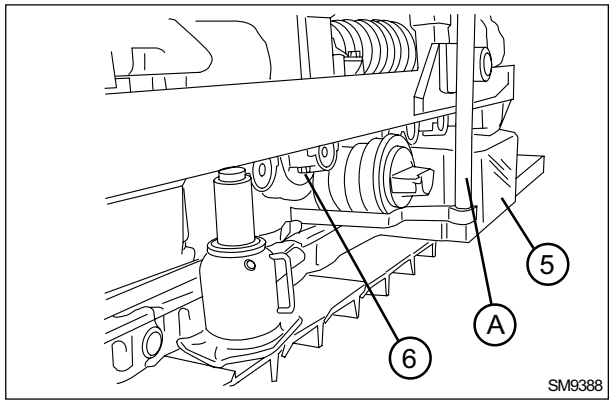


Fig. 35

FRONT CROSS-MEMBER PIVOTS

	Min. Max	Min. Max
A. Side pivot		
- Pin diameter	59.920 to 59.950 mm	2.359 to 2.360 in
- Ball joint inner diameter	60.000 to 60.300 mm	2.362 to 2.374 in
- Clearance	0.050 to 0.380 mm	0.002 to 0.149 in
A_1. Side pivot		
- Joint seat diameter	89.965 to 90.000 mm	3.542 to 3.543 in
- Joint outer diameter	89.960 to 89,985 mm	3.541 to 3.542 in
	0.025 clear. to 0.040 interf.	0.001 clean to 0.002 in
B. Central pivot		
- Pin diameter	59.954 to 60.000 mm	2.360 to 2.362 in
- Ball joint inner diameter(*)	60.450 to 60.550 mm	2.380 to 2.383 in
- Clearance	0.450 to 0.596 mm	0.017 to 0.023 in
B_1. Central pivot		
- Bush seat diameter	75.000 to 75.046 mm	2.952 to 2.954 in
- Phenolic bush outer diameter (*)	75.206 to 75.256 mm	2.961 to 2.963 in
- Interference	0.160 to 0.256 mm	0.006 to 0.010 in

(*) Dimension referred to prior press fitting into seat.

6.2 TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	TOOLS REQ.ED	TEST	SOLUTION
All cylinders operate slowly	Worn pump		Perform test flow	If the test proves a pressure drop of 15 % from no load through test load, replace the pump
	Main safety valve stuck open		Perform test flow	If the flow is very low and the pressure does not reach the prescribed values, re-set the main pressure relief valve
	Control linkage out of adjustment			Check and adjust the linkage for a precise spool stroke
A series of cylinders moves slowly	Control valve broken		Perform test flow	Negative test, replace the valve
	Control valve stuck in its seat		Move the spool manually	Replace the valve if spool stucks
	Safety valve stuck open		Perform test flow	Negative test, replace the valve
	Cylinder piston seal leaking		Perform test flow	Negative test of cylinder, replace seal
The hydraulic oil overheats	Insufficient oil level	Operation and Maintenance Manual		Refill equipment reservoir with oil of the prescribed type
	Suction filter clogged		Perform test flow	Suction is clogged, clean suction filter
	Pump suction leaking			Repair seal or tighten connections
	Main safety valve out of setting		Perform test flow	Re-set at prescribed value

6.4.3 HYDRAULIC CONTROL VALVE (removal/disassembly/overhaul)

The control valve is located inside the right side panel of the cab.

Removal

DANGER

Fluid under pressure. Always lower the hydraulic equipment to the ground. Cut-off the engine, move the control levers with no load a few times, then open and close the hydraulic system reservoir cap to relieve residual pressures, prior to disconnecting the connections of the hydraulic system.

To remove the control valve from the machine, it is necessary:

– to tilt the cab;
– to label and disconnect all hydraulic pipes, to remove the four screws (**C_1**) securing the control valve to the relevant support on the machine, sling the control valve appropriately with a cable and lift it and remove it with a hoist.

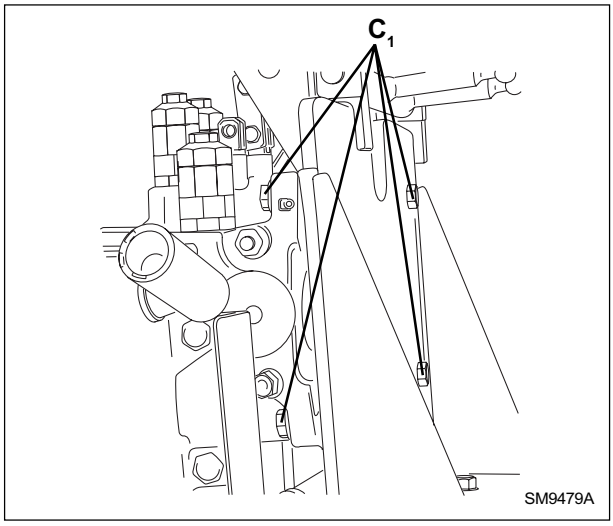


Fig. 14 - Hydraulic control valve

Disassembly and overhaul

Drain completely the oil from the control valve and place it on a work bench, proceeding wit a complete disassembly.
Loosen the control valve securing screws and proceed with the disassembly of the single spools.

6.5.9 RIPPER CYLINDER

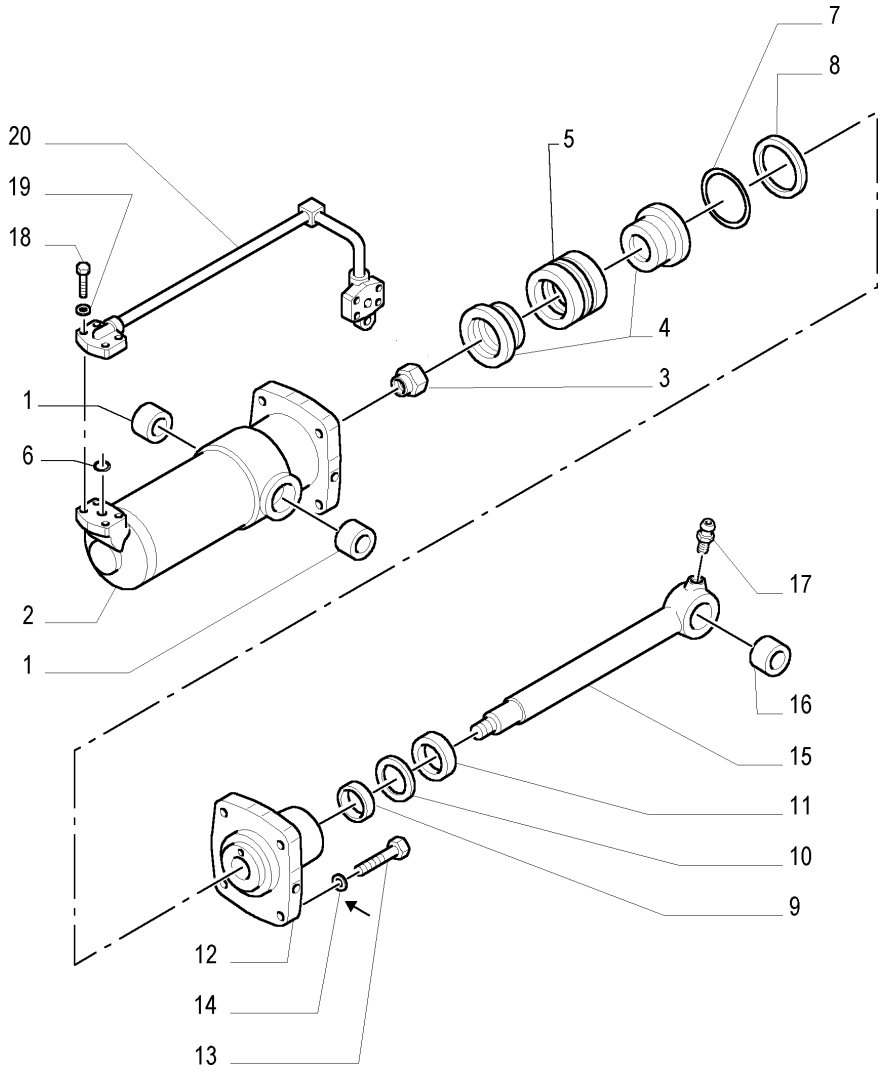


Fig. 25 - Ripper cylinder

Cylinder rod nominal diameter ..... 70 mm (2.76 in)
Piston nominal diameter ..... 125 mm (4.92 in)
Cylinder rod stroke ..... 380 mm (14.96 in)

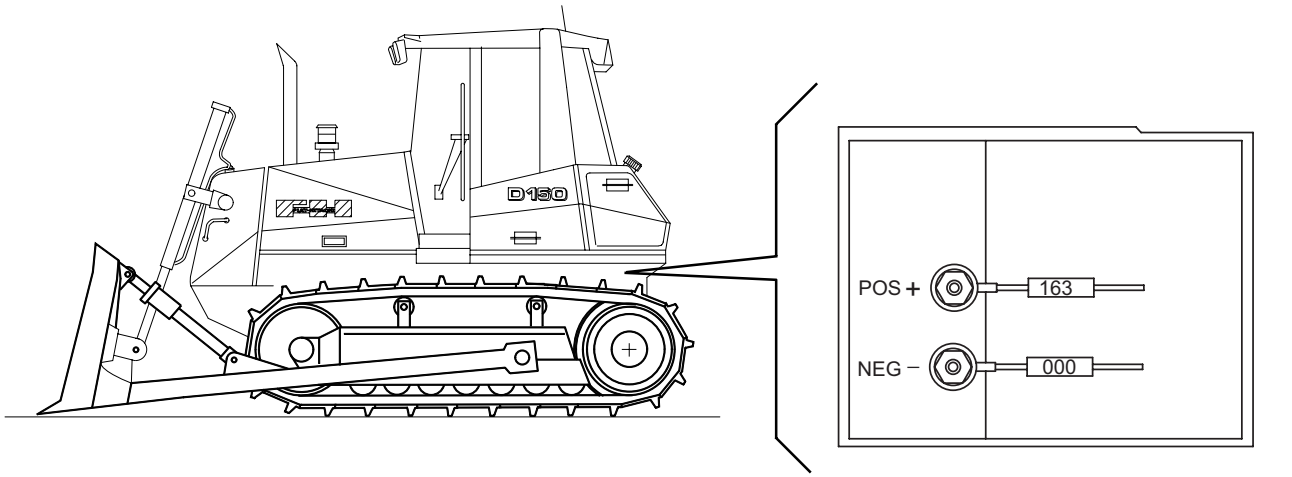
1.	Bush
2.	Cylinder
3.	Nut
4.	Piston
6.	Seal
7.	Seal
8.	Seal
9.	Seal
10.	Seal
11.	Seal
12.	Cover
13.	Screw 20x70
14.	Washer
15.	Rod
16.	Bush
17.	Grease fitting
18.	Screw
19.	Washer
20.	Steel piper

BACK-UP ALARM

WIRES

163 To electronic controller
000 To ground

LOCATION - Left side of machine under the fuel reservoir.



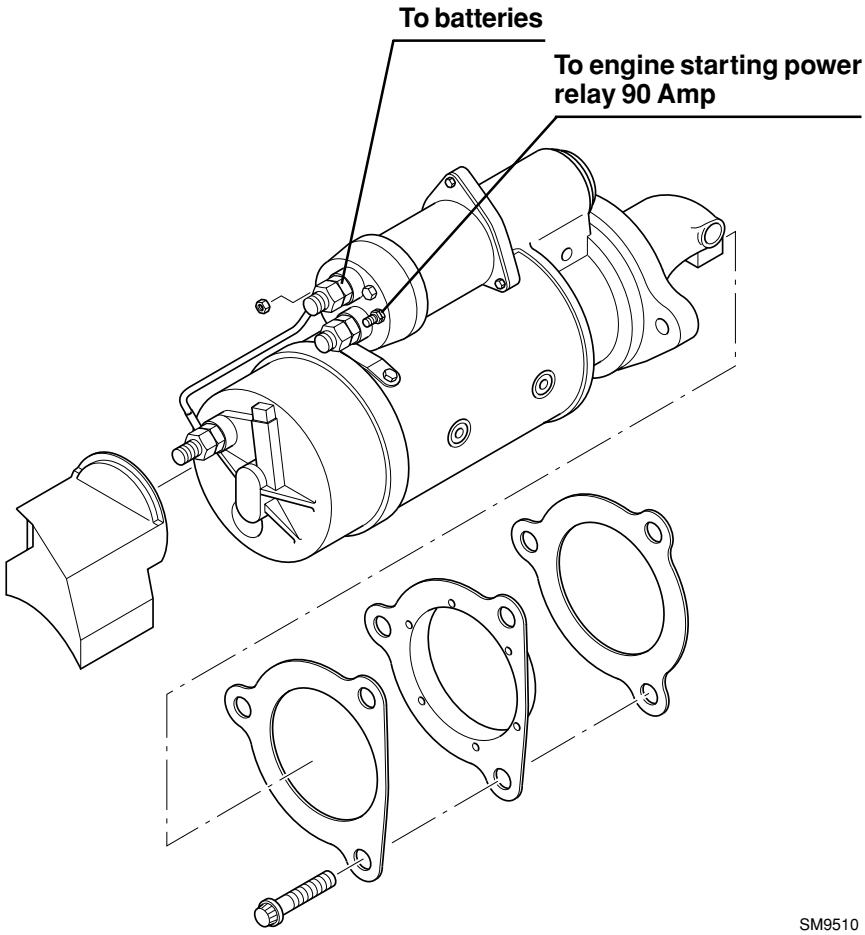
SM9509

STARTER MOTOR

Brand: DELCO - REMY

Type: 42 MT 7,8 kW

LOCATION: on engine.



SM9510