REMOVAL AND INSTALLATION OF THE MOTOR AND THE RADIATOR

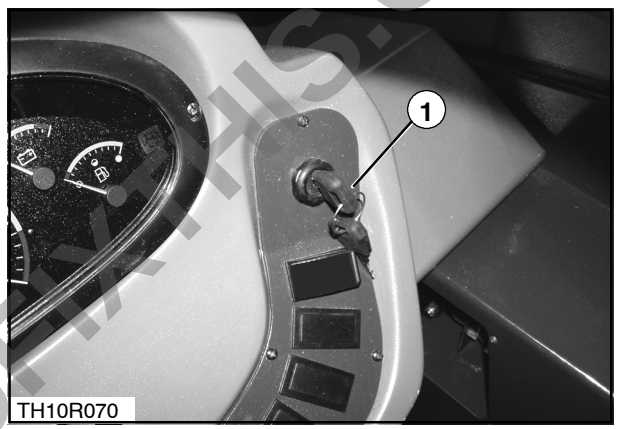
Preliminary operations

- Position the machine on a flat and compact surface.
- Engage the parking brake and block the wheels with a wedge.
- Use only the recommended tools.
- Do not insert your hands or unnecessary components between the parts.
- Disconnect the batteries prior to starting working.
- Remove the engine hood and under-hood.
- Disconnect the propeller shafts.

⚠ WARNING ⚠

Do not allow unauthorized persons to repair or maintain this machine. Read carefully the Operation and Manual prior to starting, maintaining or refueling and repairing the machine.

Turn the **STARTER SWITCH** (1) into **OFF** and place the "**DO NOT START**" notice.



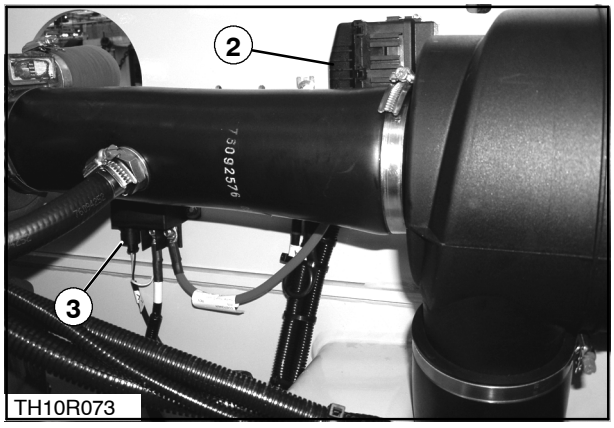
7

⚠ IMPORTANT ⚠

From this phase onward, identify all electrical connections and hydraulic pipes to facilitate the CONNECTIONS DURING THE INSTALLATION PHASE.

Removal part electrical

Remove, inside the engine compartment, fuse box (2) and cold starting device (3).



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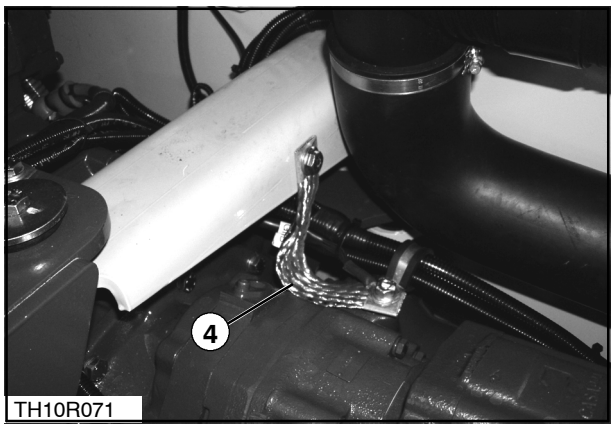
Disconnect ground braid (4).



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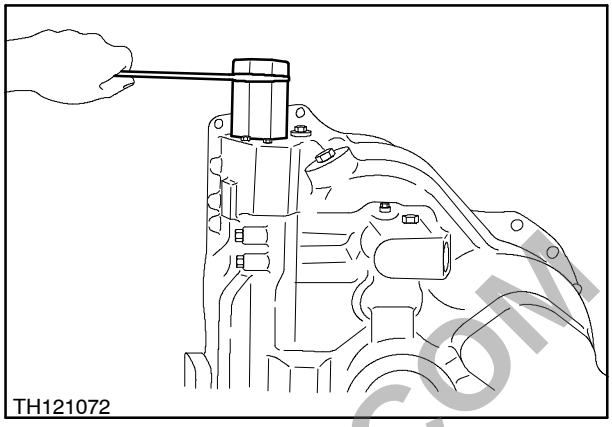
Modulation Valve Removal

Remove the modulation valve housing and O-ring.



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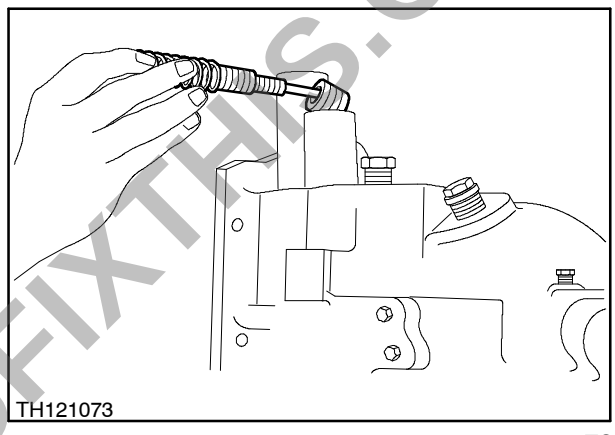
Remove the inner, middle and outer valve springs, the valve stop pin and the accumulator spool.



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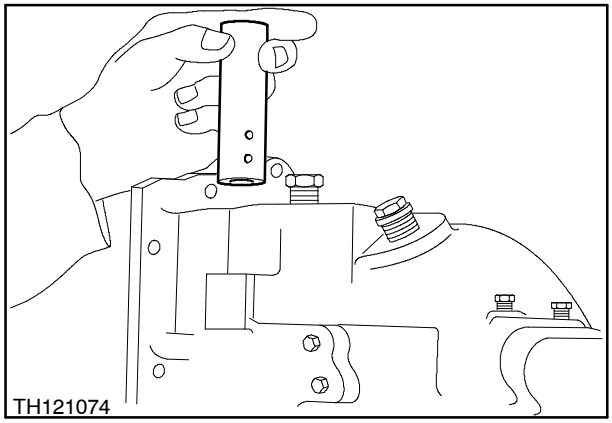
Remove the modulation housing sleeve and O-ring.



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To assist in removing the diverter, use a 5/16-24 threaded rod.

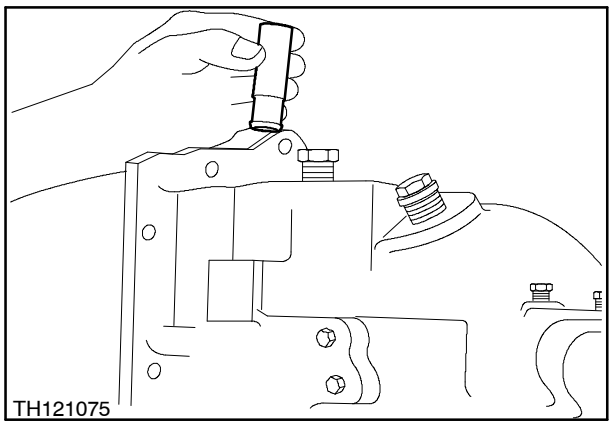

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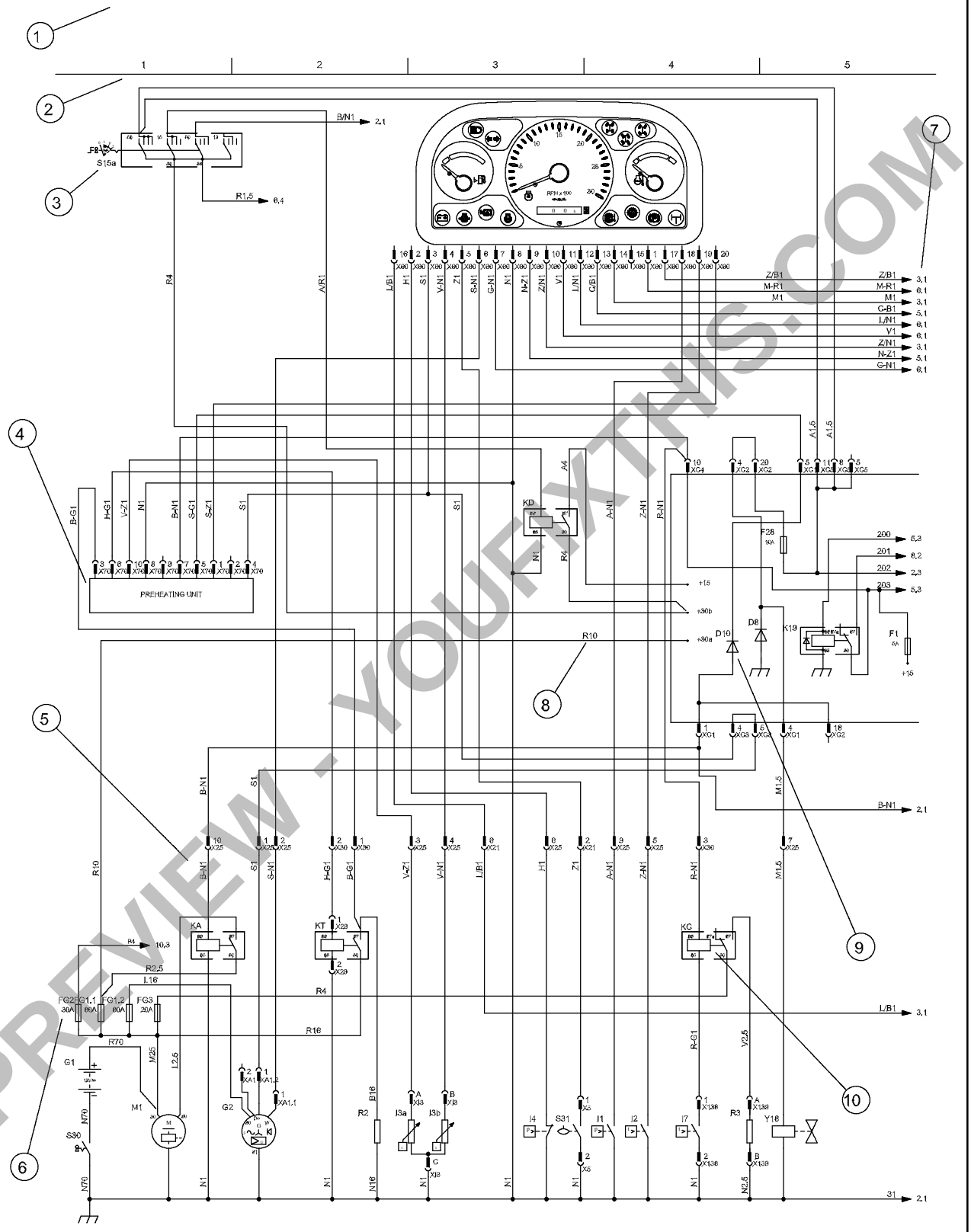
DIAGRAM 1 – STARTING/RECHARGE/WARNING LAMPS/INDICATORS



TH55R047

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TIGHTENING TORQUES

PART				TORQUE	
				Nm	(kgm)
Securing screws, cylinder head	1st phase	screws M12x1.75x70		50 ±5	(5 ±0.5)
		screws M12x1.75x140		40 ±5	(4 ±0.5)
		screws M12x1.75x180	♦	70 ±5	(7 ±0.5)
	2nd phase			90°	
	3rd phase	(solo per viti lunghezza 140 e 180)		90°	
Sec. screws, crankshaft journals	1st phase			50 ±6	(5 ±0.6)
	2ndt phase		♦	80 ±6	(8 ±0.6)
	3rd phase			90°	
Sec. screws, conrod journals	1st phase			50 ±6	(5 ±0.5)
	2nd phase		♦	80 ±6	(8 ±0.5)
	3rd phase			90°	
Sec. screws, flywheel	pre-tight.			30 ±5	(3 ±0.5)
	angle		♦	60° ±5°	
Injector securing				60 ±5	(5 ±0.5)
Fuel filter				contact + 3/4 turn	
Securing screw, injection pump gear cover				25 ±5	(2.5 ±0.5)
Securing screw, timing housing and cover				25 ±5	(2.5 ±0.5)
Securing screw, cold starter				25 ±5	(2.5 ±0.5)
Securing screw, intake manifold				25 ±5	(2.5 ±0.5)
Securing screw, fuel pump				25 ±5	(2.5 ±0.5)
Securing screw, exhaust manifold				53 ±5	(5.3 ±0.5)
Securing nut, rocker arm cover				25 ±5	(2.5 ±0.5)
Securing screw, rocker arm support				48 ±8	(4.8 ±0.8)
Securing nut, rocker arm adjustment				25 ±5	(2.5 ±0.5)
Securing screw, crankshaft pulley		pre-tightening		50 ±5	(5 ±0.5)
		angle		90°	
Securing screw, camshaft thrust plate				25 ±5	(2.5 ±0.5)
Securing screw, fan support				25 ±5	(2.5 ±0.5)
Securing screw, injection pump				12 ±5	(1.2 ±0.5)
Securing screw, fan pulley				45 ±5	(4.5 ±0.5)
Securing screw, turbocharger				25 ±5	(2,5 ±0.5)
Heat exchanger				25 ±5	(2,5 ±0.5)
Securing screw, oil pump and front cover				25 ±5	(2.5 ±0.5)
Securing screw, starter motor				55 ±5	(5.5 ±0.5)
Securing screw, alternator				45 ±5	(4.5 ±0.5)
Securing screw, water pump				25 ±5	(2.5 ±0.5)
Fuel filter				contact + 3/4 turn	
Securing screw, belt tensioner				45 ±5	(4.5 ±0.5)

♦ Lubricate with oil.

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TROBLESHOOTING

Main operational engine troubles:

1 - The engine fails to start.
2 - The engine overheats.
3 - The engine lacks power and operates irregularly.
4 - The engine smokes black or dark grey.
5 - The engines smokes grey (tending to white).
6 - The engine smokes light blue.
7 - The engine has abnormal knocks.
8 - The engine dies.
9 - The engine over-speeds.
10 - Excessive or insufficient oil pressure.
11 - Excessive fuel consumption.
12 - The engine fails to stop.

1	THE ENGINE FAILS TO START

Battery terminal connections inefficient	- NO →	Clean, check, tighten terminal nuts or replace them.
YES ↓		
Batteries efficient	- NO →	Perform inspections described in Repair Manual “Electrical system”.
YES ↓		
Starter motor efficient	- NO →	Perform inspections described in Repair Manual “Electrical system”.
YES ↓		
Cold starter efficient	- NO →	Replace.
YES ↓		
Injection pump timing correct	- NO →	Check correct timing as described by the relevant chapter.

(cont.ed)

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Workshop Manual
LM1340 TURBO - LM1343 TURBO - LM1345 TURBO
LM1443 TURBO - LM1445 TURBO
LM1745 TURBO
TELESCOPIC HANDLERS

GENERAL LIST OF CONTENTS

SECTION 00 - GENERAL

Description	Page
General instructions	1
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Environmental considerations	9
Maintenance techniques	10

SECTION 10 - ENGINE

Description	Page
Main specifications of engine	3
General engine specification	4
Generalities engine F4GE9484J*J600	6
Removal and installation of the motor and the radiator	11
Troubleshooting	23
Tightening torques	36

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HYDRAULIC SYSTEM

Gear pump	Hydraulic and steering system
Hydraulic system pressure:	
Main system pressure	250 bar
Steering system pressure	175 bar

TORQUES

	Nm
Wheel nuts	540
Cab securing screws	380

RADIATOR COOLANT

The antifreeze must be changed every 1000 hours or every 24 months

NOTE: *To reduce deposits and limit corrosion, the water used in the cooling system must not exceed the following limits:*

Total hardness	*Chloride*	*Sulphates*
300 ppm	*100 ppm*	*100 ppm*

TYRE COMBINATION FOR 4-WHEEL DRIVE VEHICLES

The tyres mounted on 4-wheel drive machines are selected so that they are compatible with the transmission and axle gears. When damaged or worn tyres are replaced, always mount tyres of brand, model and dimension equal to the previous ones. The installation of combined tyres can result in an excessive wear, loss of available power or serious damage to the transmission components. If in doubt, consult your Dealer.

MACHINE WEIGHT

Weight

13 metre = 10,480 kg

14 metre = 10,780 kg

17 metre = 11,760 kg

TH100028

5

IMPORTANT: *The data listed here above and below are general data provided as a guide to evaluate the weight of the machine and do not necessarily consider the tyres installed, the level of fluids or the presence of additional equipment. To establish precisely the weight of your machine, it is necessary to place it on an official weight bridge.*

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Knocking in cylinder head – NO → Check valve clearance; injection pump timing; timing. Adjustment.

YES ↓

Knocking in timing – NO → Check and replace gears as required and that there are no broken springs, there is no excessive clearance between stems and guides, tappets and guides; adjust valve clearance.

YES ↓

Knocking in injectors – NO → Check and calibrate as described in S.I. 1094 and replace them.

YES ↓

Knocking found in the engine flywheel. – NO → Replace loosen screws and replace all screws at the prescribed torque + angle.

YES ↓

Knocking found in fuel pipes – NO → Clean pipes and replace those with marked dents; if required, clean injection pump.

8	**THE ENGINE DIES**

Fuel tank filled – NO → Refuel and bleed as required.

YES ↓

Fuel filters efficient – NO → Replace.

(cont.ed)

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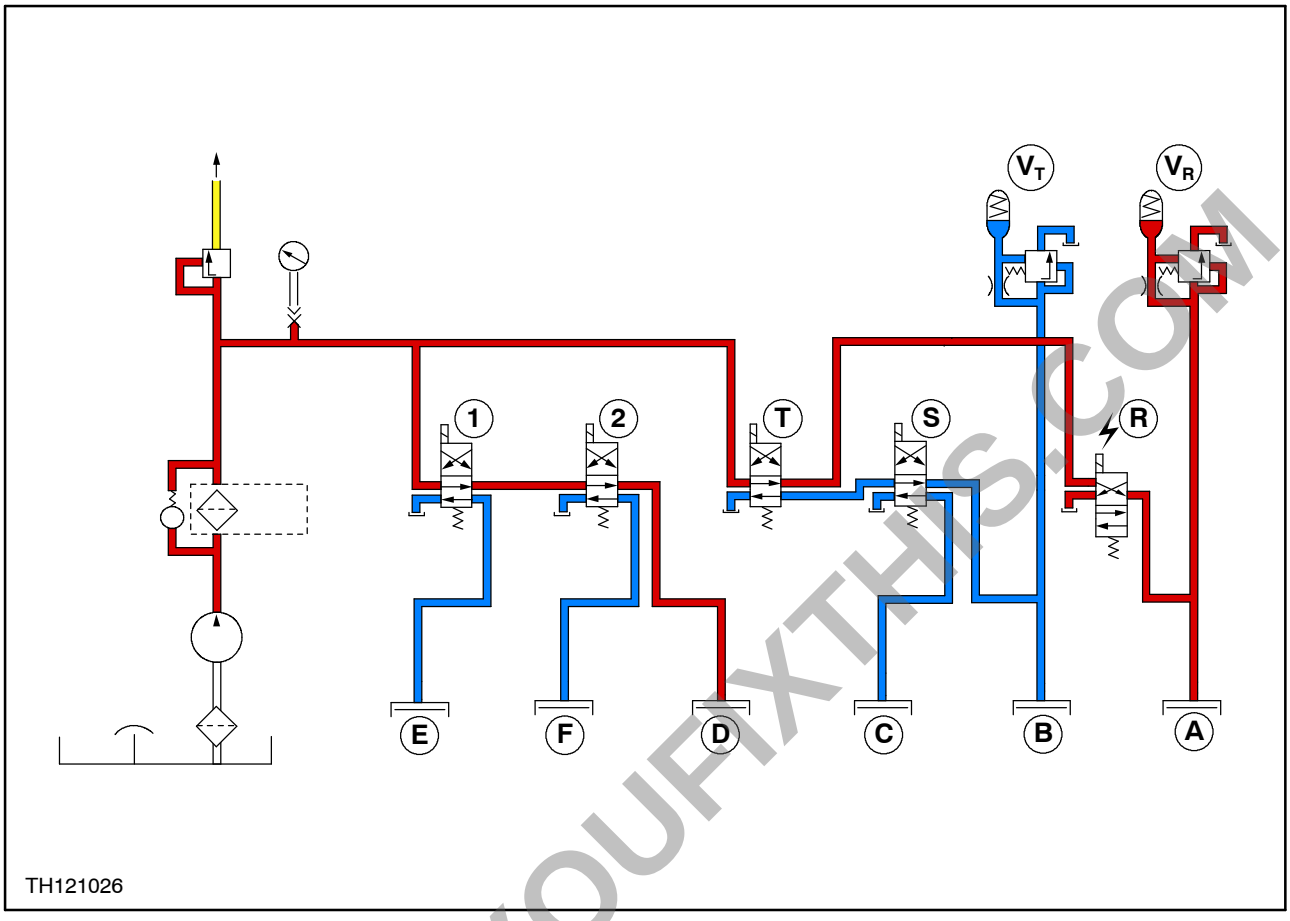

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Aspirated oil

High pressure oil (16.5 - 19.3 bar)

Torque converter and lubrication oil (2 - 7 bar)

Return to reservoir

V_T Forward modulation valve

V_R Revese modulation valve

Pressurised oil coming from the system regulation valve arrives at solenoid valve 1 and at the forward gear solenoid valve.

Solenoid valve 1 is not energised and it enables oil at system pressure to flow towards solenoid valve 2.

Solenoid valve 2 is not energised and hence oil flows towards clutch D.

The forward solenoid is not energised allowing oil to flow through the reverse solenoid which is then energised. Oil flows to the reverse clutch. Modulation is controlled by the modulation valve in the circuit.

Clutches B, C, E and F are open to the reservoir.

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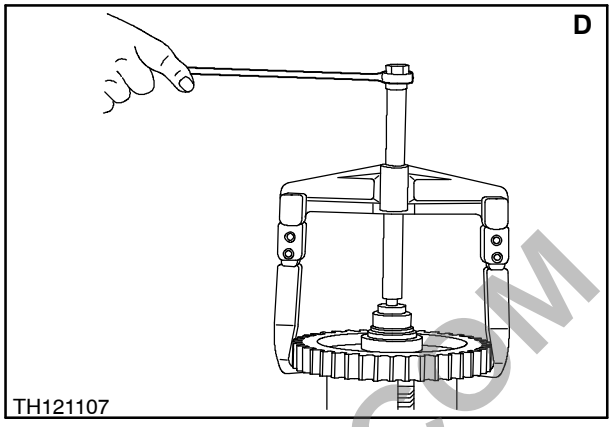
Disassembly of D clutch (3rd speed)

Use an extractor to remove the clutch pack gear.



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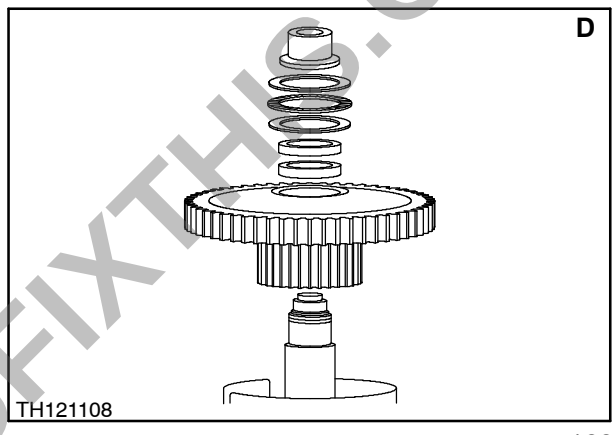
Remove also the shaft bearing inner race, the thrust bearing with its inner and outer washers and the two gear bearings.



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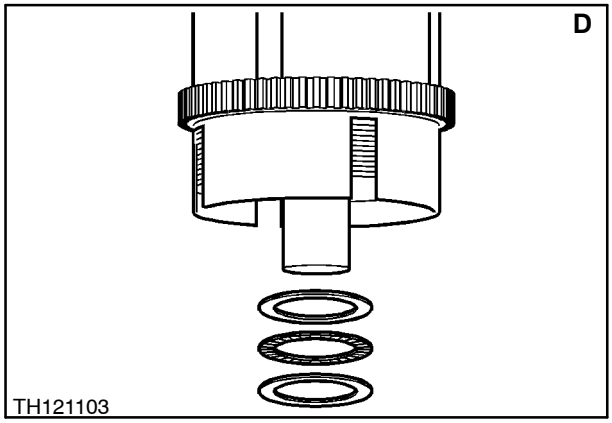
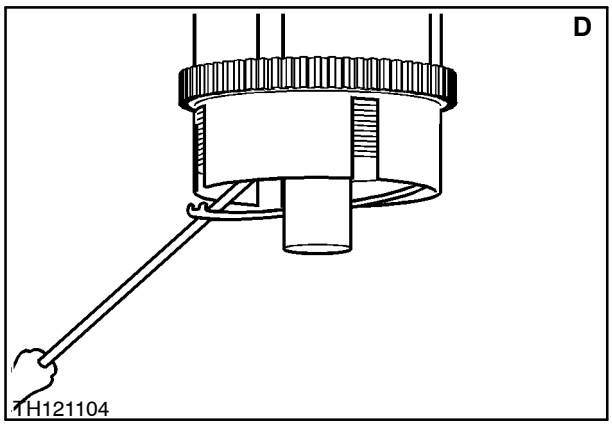
Remove the thrust washer retaining ring, then remove the outer thrust washer, thrust bearing and inner thrust washer.



123

Remove the end plate retaining ring.



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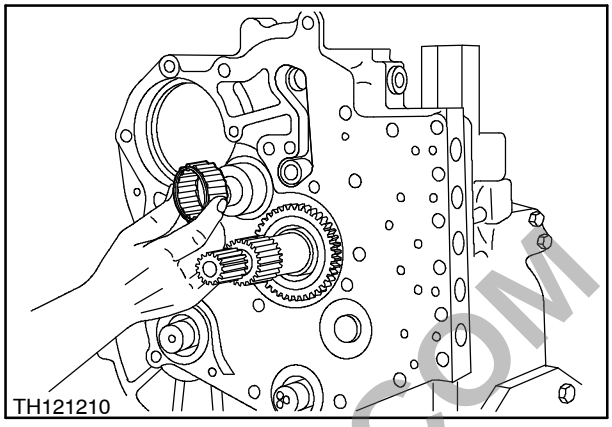
Install the pump idler gear bearing on idler shaft.



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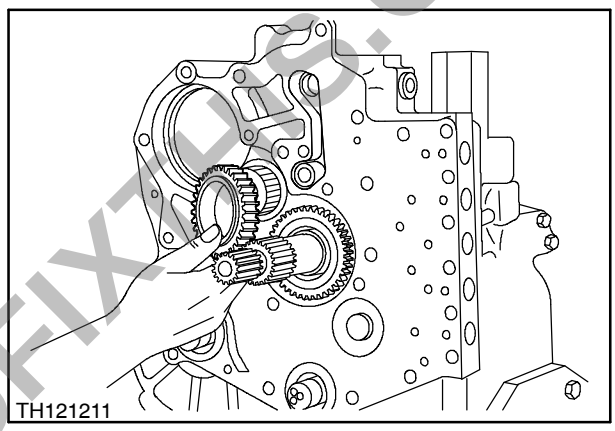
Install the pump idler gear on bearing.



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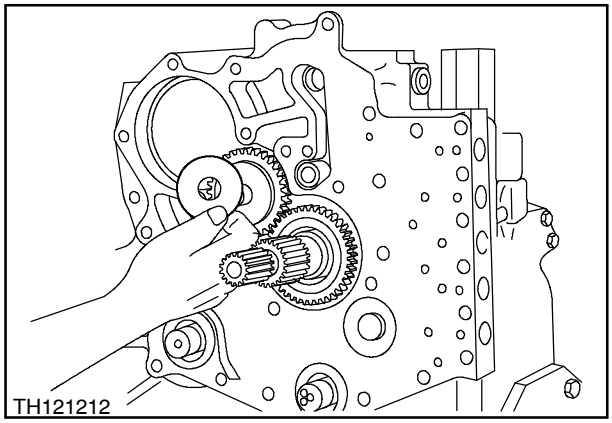
Install the idler gear thrust washer, aligning the hole with the roll pin.



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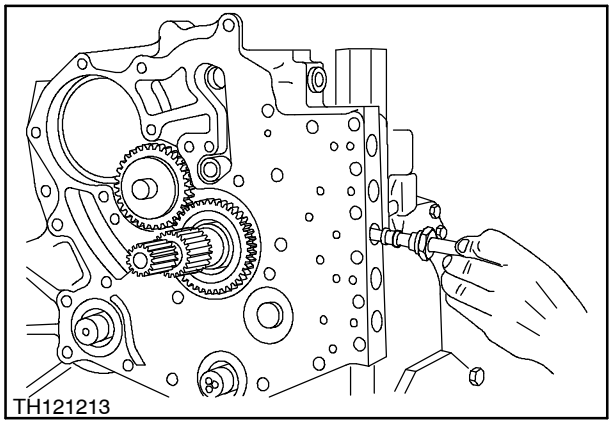
With the O-ring in position, install the solenoid cartridges.



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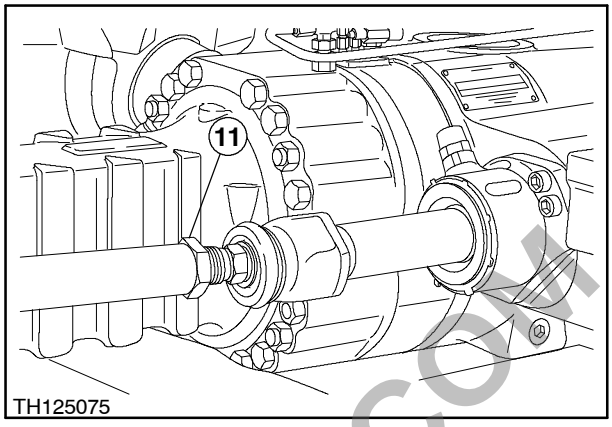
Loosen the nuts (11) and screw them onto the ball-and-socket joints.

Hold the steering knuckles still and rotate the ball-and-socket joints. Once the convergency has been adjusted, lock the nuts (11).

Torque wrench setting for nuts: 298 ÷ 328 Nm



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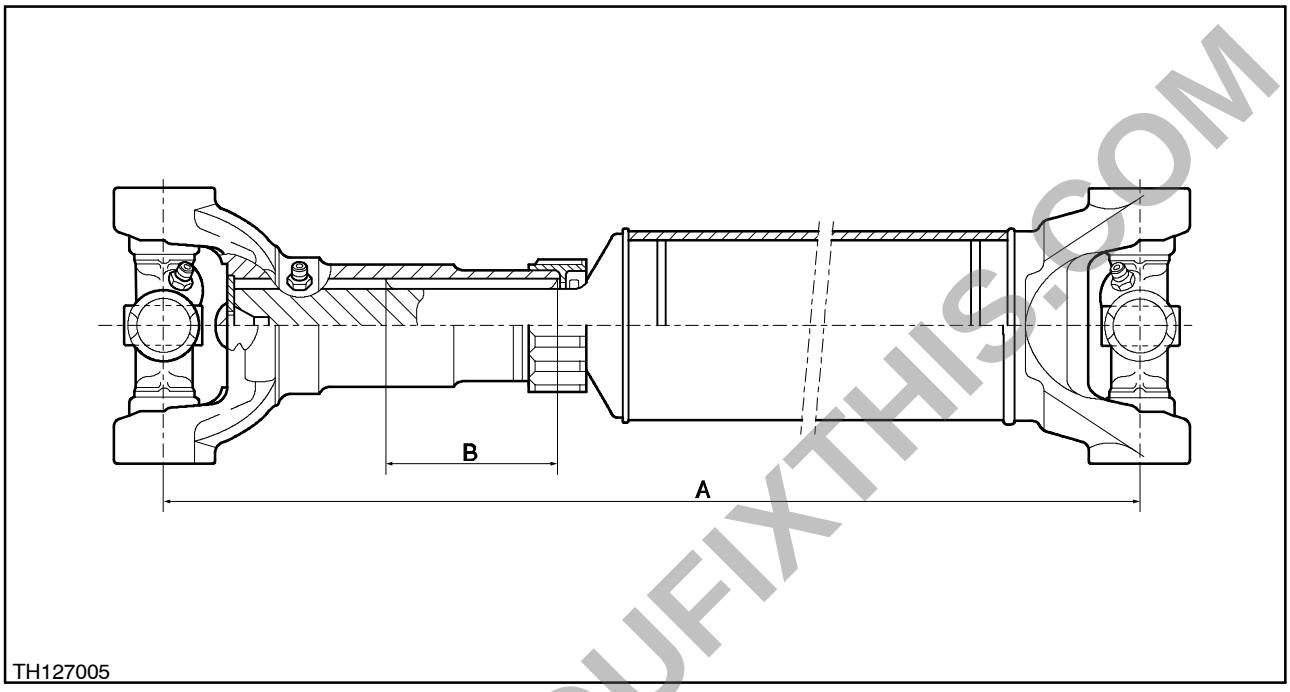
REAR DRIVE SHAFT

Specifications

Length (A) closed: . . . . . 1347 mm
Extension (B): . . . . . 72 mm



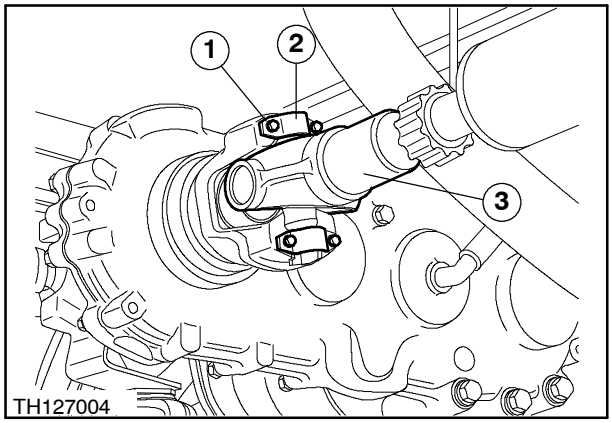
3

⚠ ATTENTION ⚠

Support the drive shaft with suitable instruments during removal.

Slacken the locking stud bolt (2) screws (1) to disconnect the drive shaft (3) front part. Make the same operation on the rear side and remove the drive shaft (3).

NOTE: *Refer to Section 25 "FRONT AXLE" for drive shaft spider removal.*



4

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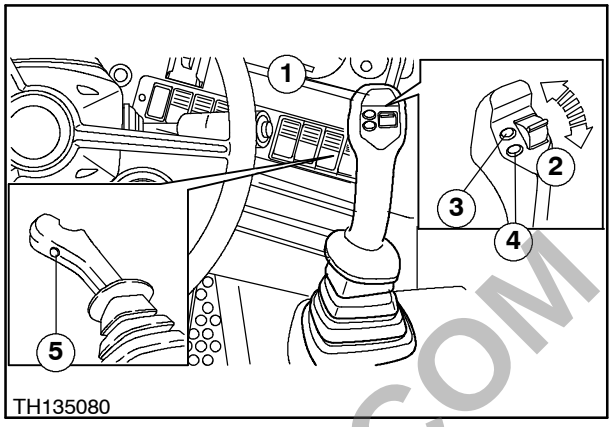
FRONT LOADER CONTROLS

To lift, lower, retract and tilt the parts, move the lever (1) as follows:
- forward, to lower the arm
- back, to lift the arm
- to the left, to retract the front loader/tool
- to the right, to tip the front loader/tool.



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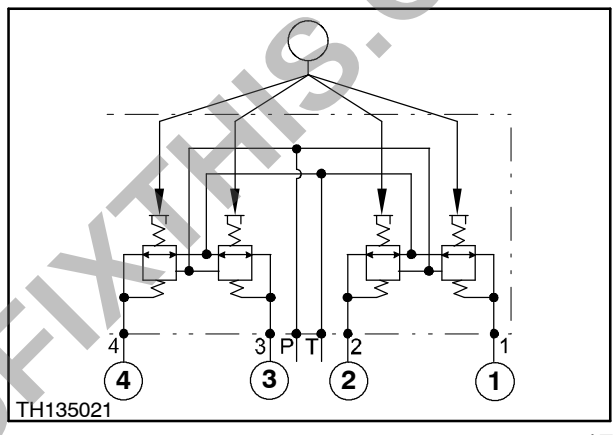
Upper control plate

This consists of an unstable cursor type three-position switch (2) and two buttons (3) and (4).
The cursor (2) makes it possible to pull out the telescopic boom (when pushed forward) or retract its (when pulled back).
The two buttons, buttons (3) and (4), are available for auxiliary functions.

Under the load handling lever there are two unstable buttons that have been assigned the following functions:

5. Transmission disengagement

Being unstable, button (5) keeps the transmission disengaged until it is released.



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Hydraulic scheme

1-2 Cylinder lifting lines
3-4 Front loader training lines
P - Supply line
T - Discharge line

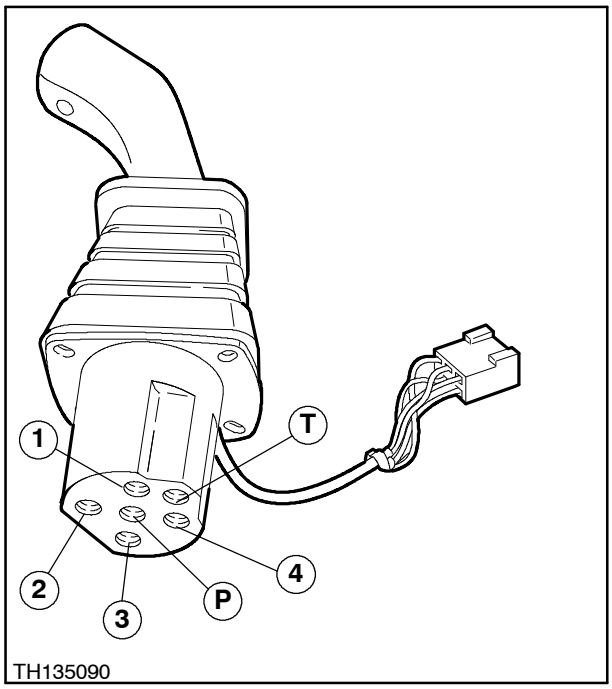
The bottom part of the power assisted control unit includes six hydraulic connections that go to the joystick as follows:

- Return to reservoir orifice (T)
- Four outlet holes (1-2-3 and 4) for proportional pressure, each of which is connected to each end of the slide valves of the lifting and tilting control distributor.
- An inlet orifice for the oil supply at a pressure of 35 bar (P).

Each of the four outlet holes is equipped with small pistons with plungers that make it possible to apply a pilot pressure proportional to the movement of the joystick at the end of a pin and hence to move it by the extent necessary to activate it.

The joystick is connected to a tilting plate; both the joystick and the plate are movable above the control unit body.

When the joystick is used, the tilting plate moves over one of the piston and plunger assemblies to transfer the oil to the hydraulic distributor spools.



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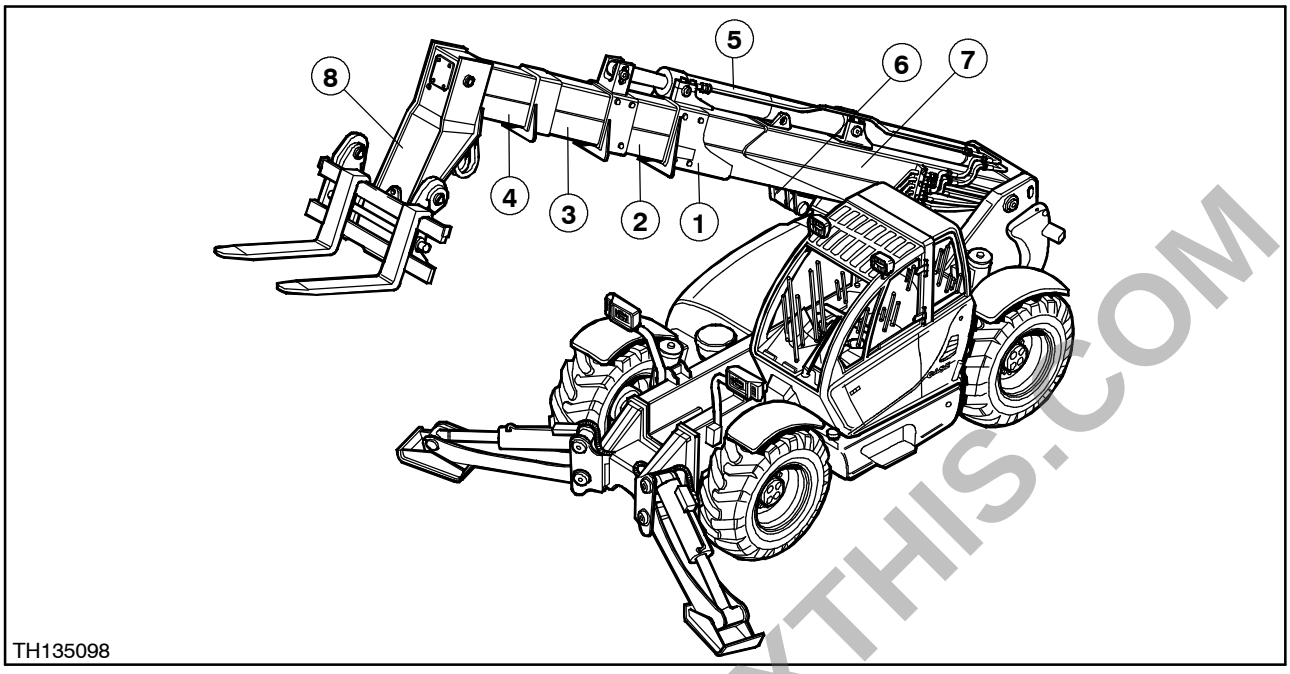
Boom disassembly description (17 m)



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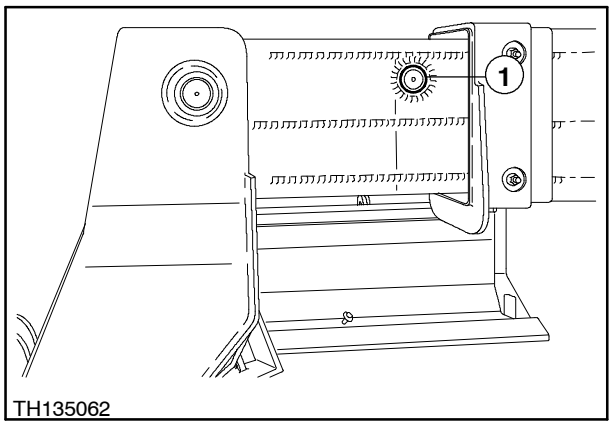
1. First boom
2. Second boom
3. Third boom
4. Fourth boom
5. Outer telescopic cylinder
6. Lifting + comp. cylinder
7. Inner telescopic cylinder
8. Tilt cylinder

ATTENTION

Do not allow unauthorised personnel to repair or to maintain this machine. Read and head carefully the Operation and Maintenance Instruction Manual prior to starting, operating, maintaining, refuelling or repairing this machine.

- Using tools **380001586** and **380001587** disconnect the two inner telescopic cylinder feeling and connect them to an external hydraulic unit sending pressurised oil to extract the boom about 500mm to make the removal of pivot pin (**1**) possible.
- Remove circlip (**2**) and extract pin (**1**).



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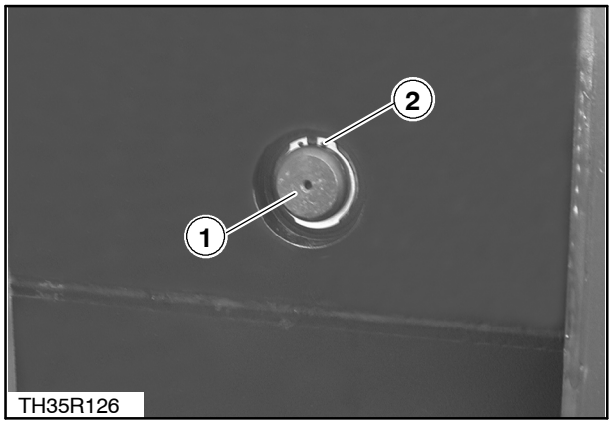
ATTENTION

Handle all parts with great care.
Do not place hands or fingers between pieces. Wear authorised protective clothing/devices such as glasses, gloves and safety shoes.



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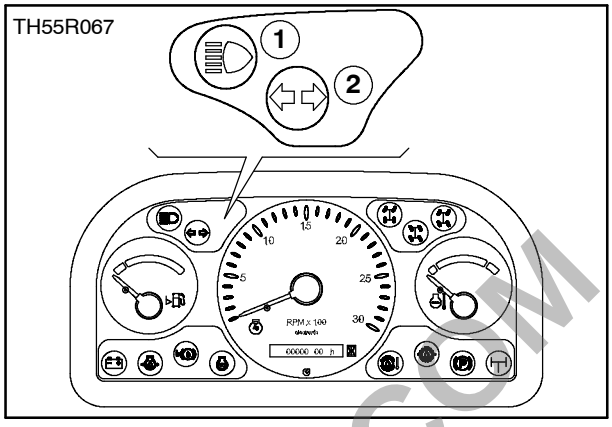
INDICATOR/WARNING LIGHTS – 1st Segment

1. Main beam headlight warning lamp
2. Direction indicator warning light



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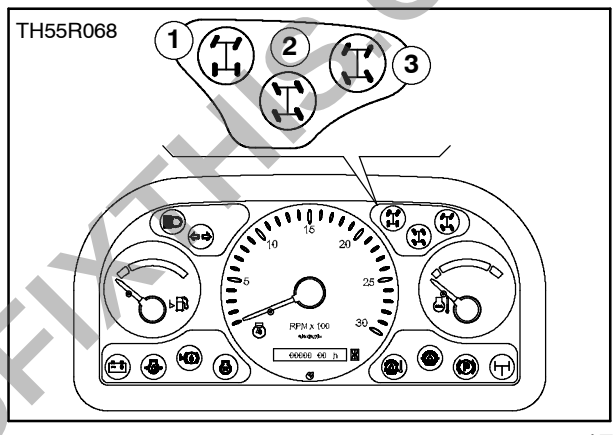
INDICATOR/WARNING LIGHTS – 2nd Segment

The show the selected steering mode:

1. 2 wheel steering (front)
2. Cross transfer (crab diagram)
3. 4 wheel steering



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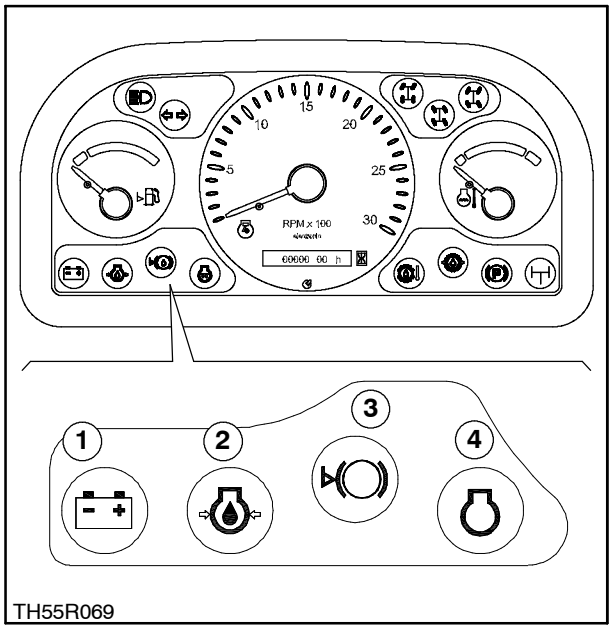
INDICATOR/WARNING LIGHTS – 3rd Segment

1. Alternator charge indicator light. The alternator charge warning light illuminates when the key start is turned on and will remain on until the engine is started. Once started the battery is being charged by the alternator and the light will be extinguished.
2. Engine oil pressure warning light with warning buzzer: Indicates low oil pressure and should extinguish immediately after the engine starts. Should the oil pressure drop below the predetermined level, the warning light will illuminate and an audible alarm will sound.
3. Brake reservoir oil level low indicator lamp
   This warning lamp illuminates when the oil level in the reservoir is at a LOW LEVEL. If the lamp illuminates at any time stop the machine immediately and investigate the cause, correct and or top up with new oil to the level specified. To test the warning light refer to the maintenance section of the manual.

⚠ ATTENTION ⚠

Corrective action must be taken immediately when this lamp illuminates. If not, failure of the brake system could occur, resulting in serious injury to yourself and others.



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IMPORTANT: *If the machine is left to run with the warning light 'on', engine performance and fuel consumption will suffer.*

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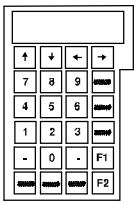
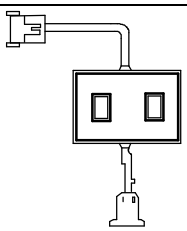
SPECIAL TOOLS

NUMBER	SKETCH	DESCRIPTION	HOW TO USE/MODEL
380001303		BB3 Diagnostic instrument	ALL
380001471		Cable with adapter for BB3	ALL

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