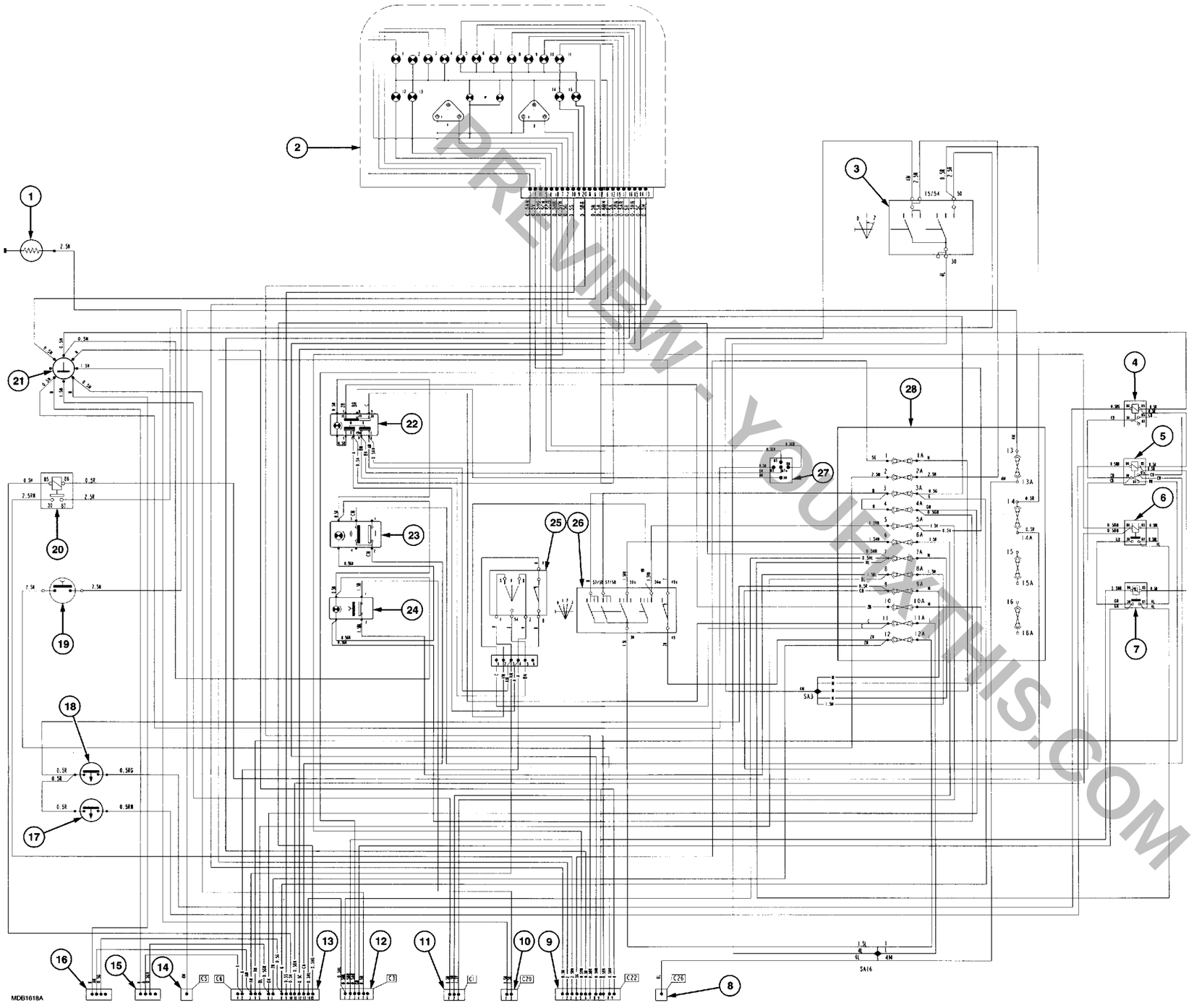
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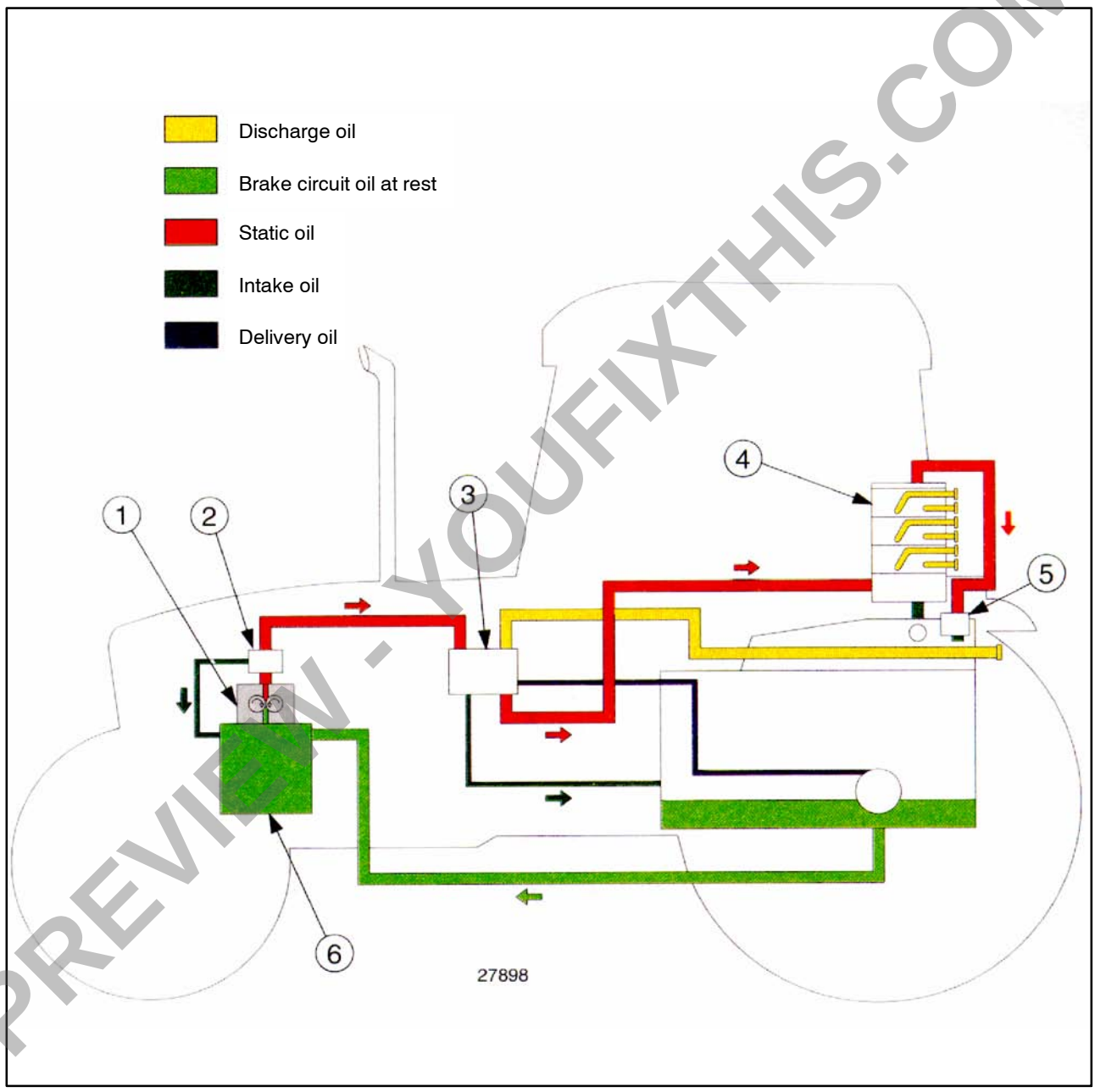
DESCRIPTION AND OPERATION

The mechanical lift can operate with controlled position and draft, and with mixed control.

The lift is controlled by two special levers located on the operator's right-hand side. It also features the Lift-O-Matic device which raises and lowers the implement without having to use.

Draft control is performed by the flex bar, positioned in the seat mounted in the rear transmission housing the position and draft control levers.

The lower lift arms and corresponding control rods are connected to the flex bar.



10

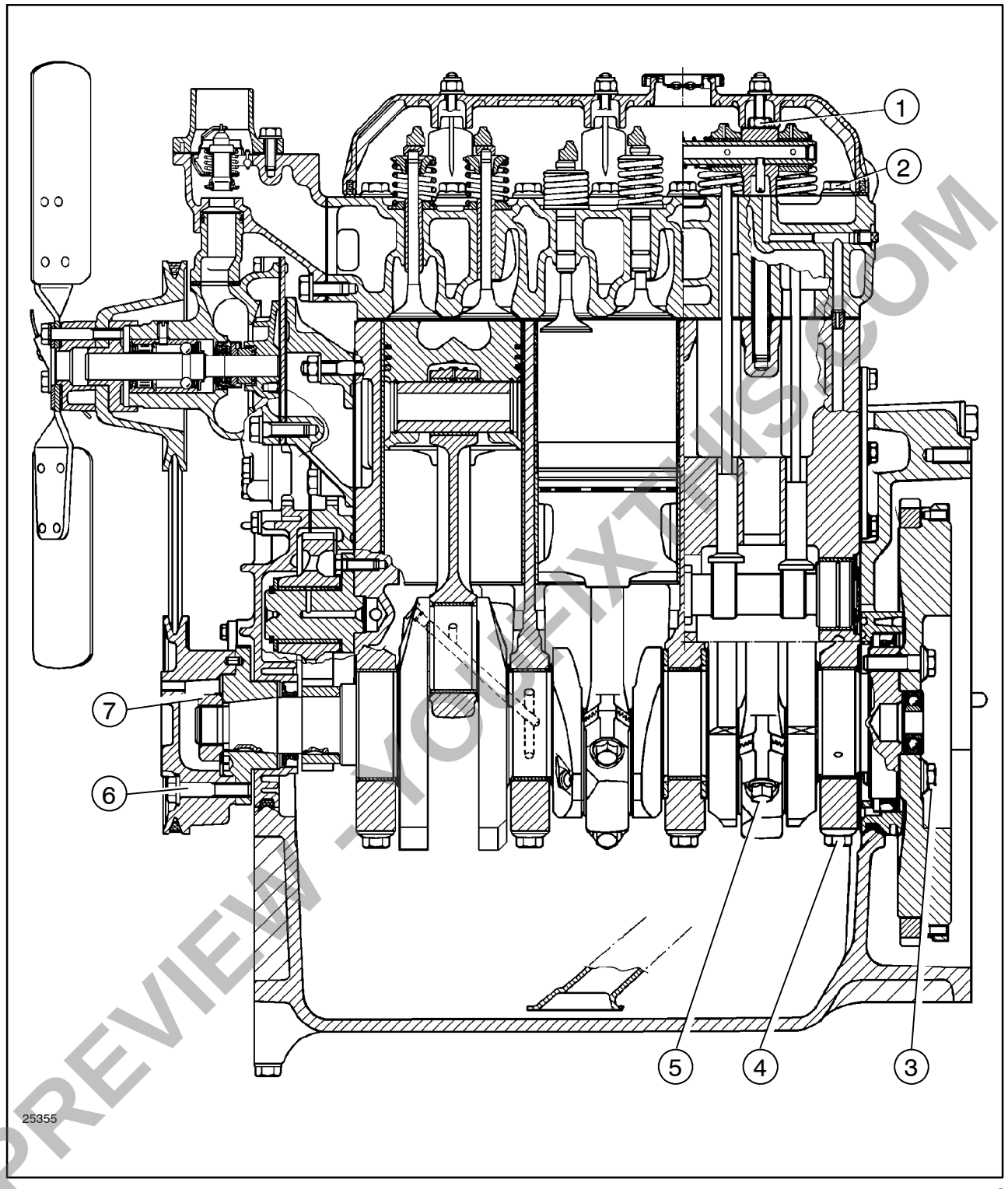
HYDRAULIC LIFT CIRCUIT

1. Hydraulic pump.
2. Pressure relief valve.
3. Trailer brake valve.
4. Rear auxiliary control valves.
5. Lift hydraulic control valve.
6. Filter.

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3

Longitudinal section of engine (modelsTN 55 and TN 65).

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TORQUE SETTINGS WITH ANGLE

PART	Thread	Torque setting		Angle
		Nm	ft-lbs	
Cylinder head bolts (2, page 23)	M 12 x 1.25	70	52	90° + 90°
Main bearing cap bolts (4)	M 14 x 1.5	80	59	90°
Big-end cap bolts (5)	M 11 x 1.5	40	30	60°
Flywheel mounting bolts (3)	M 12 x 1.25	40	30	60°

TIGHTENING TORQUE DATA

PART	Thread	Tightening torque	
		Nm	ft-lbs
Rocker shaft pedestal bolts (1, page 23)	M 8	25	18
Crankshaft hub retaining nut (7)	M 30 x 1.5	294	217
Fan and alternator pulley bolts (6)	M 10 x 1.25	55	41
Additional counterweight retaining bolts (1, page 24)	M 12 x 1.25	110	81
Inlet manifold retaining bolts	M 8	25	18
Alternator and belt tension adjustment nut	M 10 x 1.25	55	41
Coolant pump retaining bolts	M10x1.25	55	41
Tappet cover nuts (1, fig, 48)	M 8	15	11
Rocker shaft pedestal bolts (2, fig. 49)	M 8	25	18
Oil pump and pump cover retaining bolts (1, fig. 57)	M 8	25	18
Timing gear case and cover bolts (1, fig. 61)	M 8	25	18
Intermediate flanged journal bolts (1, fig. 64)	M 10 x 1.25	55	41
Camshaft thrust plate retaining bolts (2, fig. 65)	M 8	35	26
Rear crankcase cover bolts (2, fig. 85)	M 8	25	18
Tappet adjuster locknuts (1, fig. 104)	M 8	22	16
Nuts for injector mounting studs (1, fig. 105)	M 8	25 **(*)**	18 **(*)**
Exhaust manifold retaining bolts	M 8	25	18
Injection pump mounting bolts	M 8	25	18
Sump pan retaining bolts	M 10 x 1.25	69	51
- timing gear seal, cover and casing	M 10 x 1.25	39 to 49	29 to 36
- flywheel housing crankcase and casing:			
models TN 55 and TN 65	M 10 x 1.25	49 to 59	36 to 44
models TN 70 and TN 75	M 10 x 1.25	49 to 69	36 to 51

(*) Tighten nuts in two stages: see operations described in fig. 105.

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POWER SHUTTLE FAULT CODE PRIORITY

CODES	FAULT	PRIORITY	CORRECTION	EFFECT
11	CPDL_POT_LO_DISABLING_ERR	14	SL	Dis
11	CPDL_POT_LO_ERR	75	Fixed	Lim
12	CPDL_POT_HI_DISABLING_ERR	15	SL	Dis
12	CPDL_POT_HI_ERR	74	Fixed	Lim
13	UD_SW_ON_ERR	67	Auto	None
14	C1_SW_HI_DIS_ERR	22	CP/SL	Dis
14	C1_SW_HI_ERR	83	Fixed	Model
15	C1_SW_LO_DIS_ERR	23	CP/SL	Dis
15	C1_SW_LO_ERR	84	Fixed	Model
16	G1_SW_HI_DIS_ERR	24	CP/SL	Dis
16	G1_SW_HI_ERR	85	Fixed	Model
17	G1_SW_LO_DIS_ERR	25	CP/SL	Dis
17	G1_SW_LO_ERR	86	Fixed	Model
18	CREEPER_ENG_SW_HI_ERR	47	Fixed	Model
19	CREEPER_ENG_SW_LO_ERR	48	Fixed	Model
21	CH_HARN_ERR	1	Fixed	Crit.Dis
22	SOL_A_SHORT_DIS_ERR	39	CP/SL	Dis
22	SOL_A_SHORT_ERR	97	Fixed	Lim
23	SOL_B_SHORT_DIS_ERR	37	CP/SL	Dis
23	SOL_B_SHORT_ERR	95	Fixed	Lim
24	CL_UNCAL_ERR	100	Fixed	Model
26	ERPM_HI_ERR	65	Fixed	Model
27	ERPM_LO_ERR	66	Fixed	Model
28	B_CL_UNCAL_ERR	101	Fixed	Model
29	A_CL_UNCAL_ERR	102	Fixed	Model
31	SOL_SHTL_SHORT_DIS_ERR	31	CP/SL	Dis
31	SOL_SHTL_SHORT_ERR	90	Fixed	Lim
32	SOL_HL_SHORT_DIS_ERR	33	CP/SL	Dis
32	SOL_HL_SHORT_ERR	92	Fixed	Lim
33	SOL_DUMP_SHORT_DIS_ERR	35	CP/SL	Dis
33	SOL_DUMP_SHORT_ERR	98	Fixed	Lim
35	SOL_DUMP_SHORT_12V_ERR	8	Fixed	Crit.Dis
36	SOL_DUMP_OPEN_OR_GND_DIS_ERR	34	CP/SL	Dis
36	SOL_DUMP_OPEN_OR_GND_ERR	99	Fixed	Lim
37	CL_SW_OC_ERR	13	CP/SL	Dis
38	SOL_B_SHORT_12V_ERR	9	Fixed	Crit.Dis

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Op. 10 001 10
ENGINE Removal-Installation

DANGER

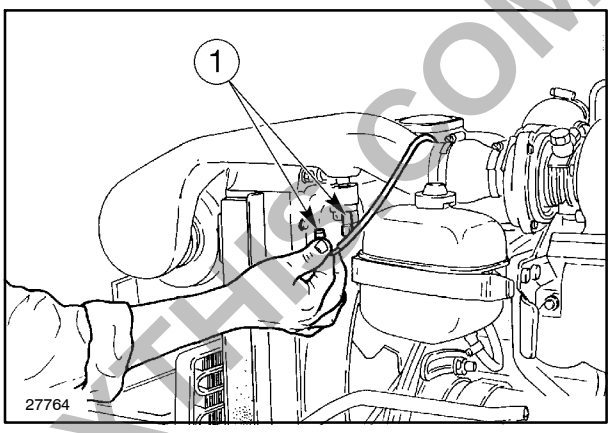
Lift and handle all heavy parts using suitable lifting equipment.
Make sure that assemblies or parts are supported by means of suitable slings and hooks. Make sure that no-one is standing in the vicinity of the load to be lifted.

WARNING

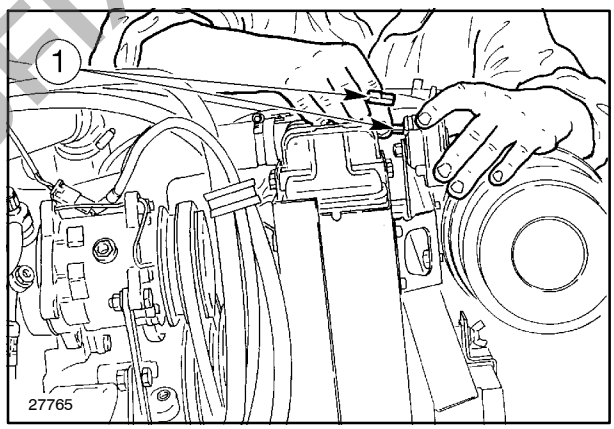
Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

Proceed as follows.

1. Carry out Clutch operation **18 110 10**, only removal (see sect. 18).
2. Remove the clogged air filter sensor connection (1).
3. Disconnect the horn connection (1).

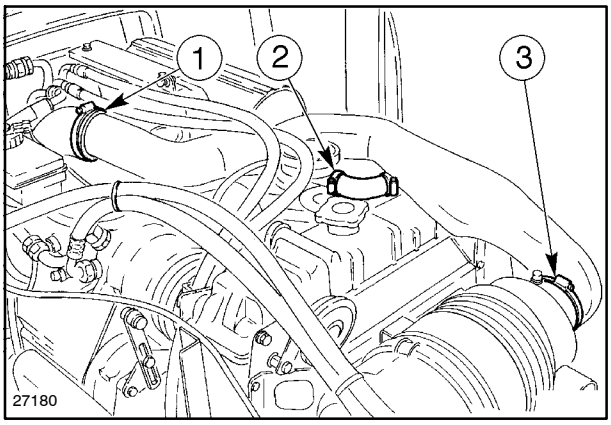


7



8

4. Loosen the clamps (1, 2 and 3) and remove the inlet manifold.

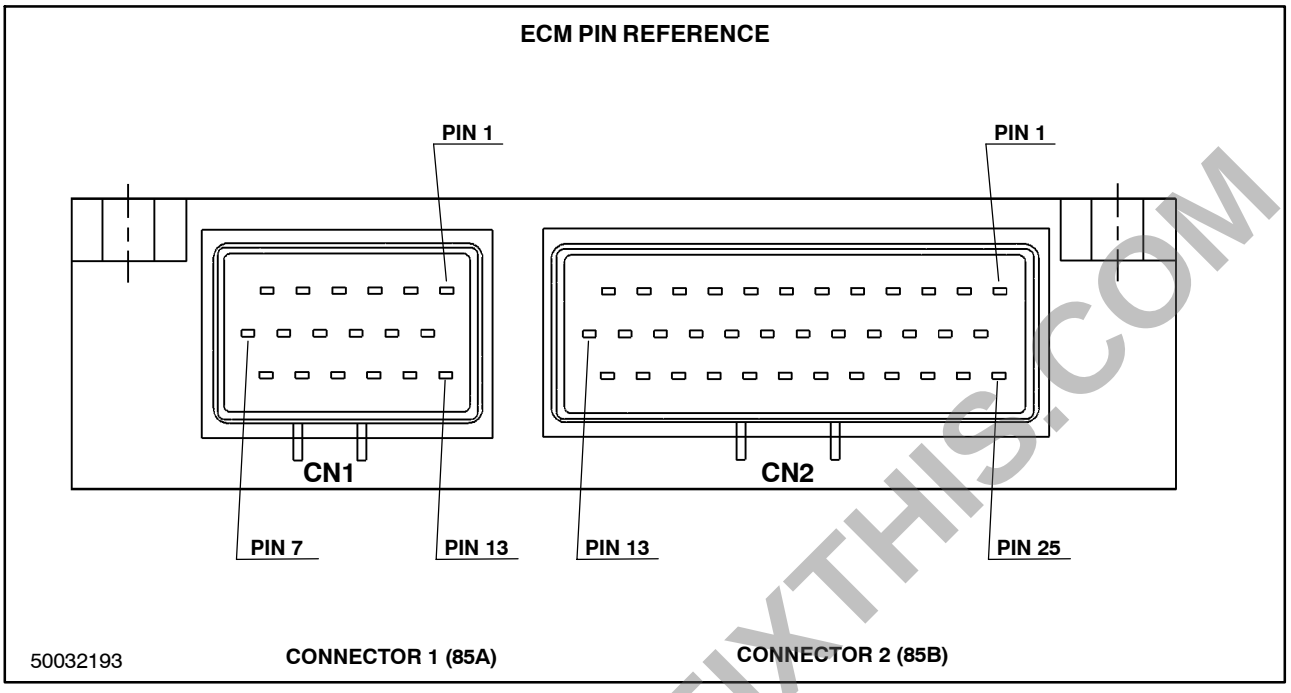


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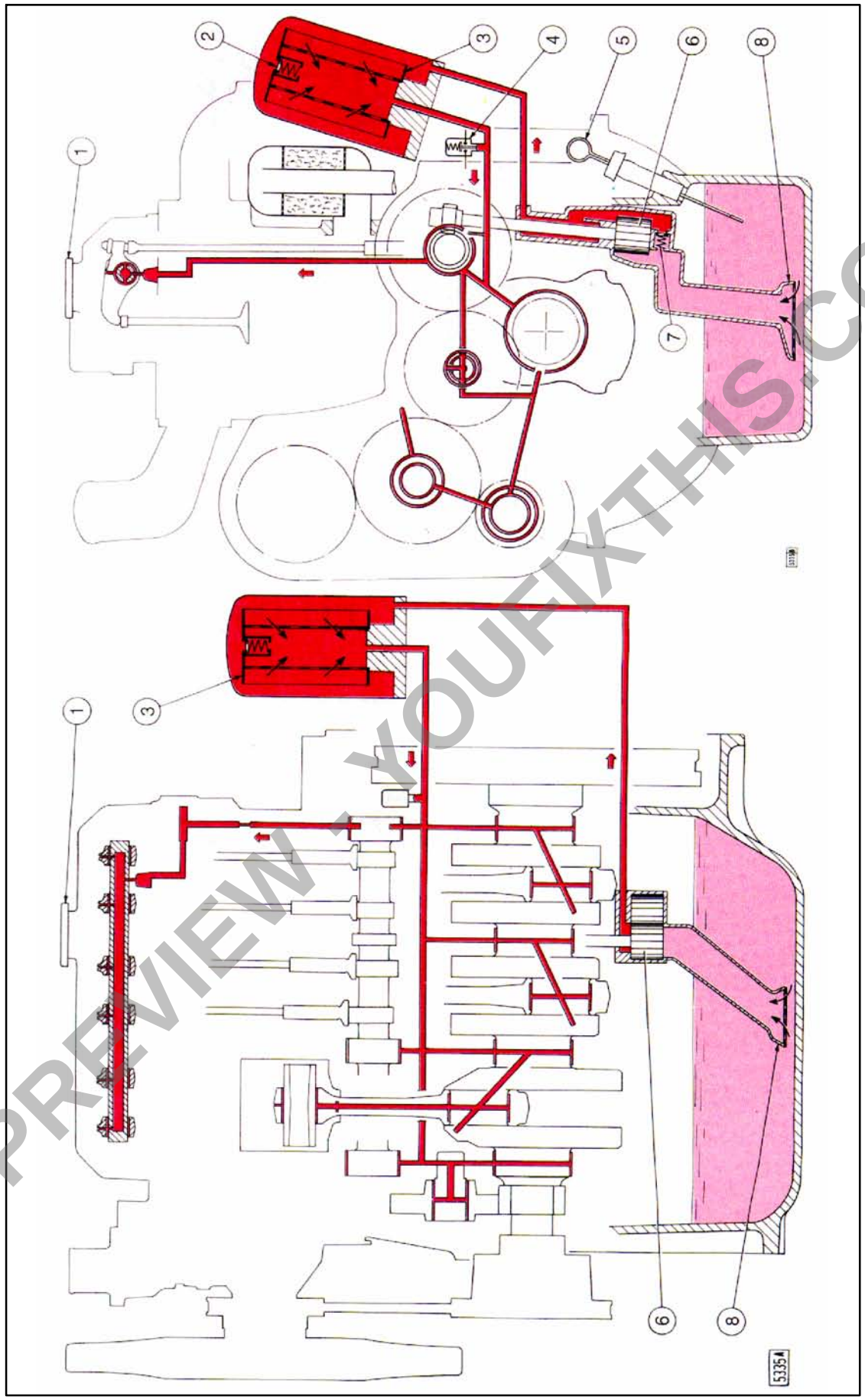
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Art Shown As If Sitting In Operator's Seat

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5

Engine lubrication system

1. Oil filler cap - 2. Filter safety valve (opens when oil pressure at filter inlet exceeds the pressure at the outlet by 1.5-1.7 bar/cm2) - 3. Filter - 4. Switch for low engine oil pressure warning (on dashboard) - 5. Dipstick - 6. Pump - 7. Oil pressure limiting valve - 8. Screen filter on pick-up pipe

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TOOLS

Warning - The operations described in this section can only be carried out with **ESSENTIAL** tools indicated by an **(X)**.
To work safely and efficiently and obtain the best results, it is also necessary to use the recommended specific tools listed below and certain other tools which are to be made according to the drawings included in this manual.

List of specific tools required for the various operations described in this section.

290740	Engine lifting hook.
290090	Revolving engine service stand.
293860	Set of engine mounting brackets for revolving stand **290090**.
X 291309	Compression test kit.
292870	Engine oil pressure test kit.
293240	Check set, turbo charger (for 90 hp TN 70 and TN 75).
X 291160	Piston ring pliers.
X 291048	Piston ring clamp.
X 292248	Protractor for angular torque measurement.
X 291504	Puller for crankshaft pulley hub.
X 291883	Wrench for valve clearance adjustment.
X 291046	Drift for valve guide extraction / installation.
X 294027	Twist bit for enlarging valve guide bore.
X 294028	8^{o} tapered grinder for swaging exhaust valve guides.
X 293231	Bush for intake/exhaust valve guide installation (with **291046**).
X 291177	Valve guide reamer.
X 291050	Valve spring compressor.
X 293270	Set of grinding tools for regrinding injector seat.
X 291182	Extractor for coolant pump impeller.
X 293280	Drift for installation of coolant pump impeller seal.
293814	Charger impeller reaction block (for 90 hp TN 70 and TN 75).
293786	Wrench for injection pump delivery line unions.
293671	Injector cleaning kit.
X 293761	Wrench set for injector dismantling (with **295008**).
290284	Hand pump for injector calibration test.

Injection pump bench test

291754	Dial gauge (1/100 mm, 5 mm stroke, ∅ 40 mm with **291755**).
291755	Device for BOSCH injection pump timing on engine (with **291754**).
X 295042	Extractor for injection pump drive gear.
X	Test Cylinder Compression (dummy injector) Order a complete injector assembly (500307714) from parts. Remove the internal guts. Use the hollowed injector to screw into engine and the other end for the gage.

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GENERAL SPECIFICATIONS	
Engine type:	
- Hp TN 55 - type 8035.05B.529	See data page 6-7
- Hp TN 65 - type 8035.05R.539	See data page 8-9
- Hp TN 70 - type 8035.25R.520	See data page 97
- Hp TN 75 - type 8035.25.529	See data page 10-11
Cycle	diesel, 4-stroke
Fuel injection	direct
No. of in-line cylinders	3
Cylinder liners	dry force-fitted in cylinder block
Piston diameter:	
- Hp TN 55	104 mm (4.09 inches)
- Hp TN 65	104 mm (4.09 inches)
- Hp TN 70	104 mm (4.09 inches)
- Hp TN 75	104 mm (4.09 inches)
Piston stroke	115 mm (4.53 inches)
Total displacement:	
- Hp TN 55	2931 cm^3 (0.77 gallons)
- Hp TN 65	2931 cm^3 (0.77 gallons)
- Hp TN 70	2931 cm^3 (0.77 gallons)
- Hp TN 75	2931 cm^3 (0.77 gallons)
Compression ratio, models TN 55 and TN 65	17:1 normal intake
Compression ratio, model TN 70 and TN 75	16.5:1 turbocharged
Maximum power:	
- Hp TN 55	37 kW (50 HP)
- Hp TN 65	44 kW (60 HP)
- Hp TN 70	51 kW (70 HP)
- Hp TN 75	53 kW (72 HP)
Max. power speed	2300 rpm
Max. torque speed: model TN 55	1400 rpm
Max. torque speed: model TN 65	1400 rpm
Max. torque speed: model TN 70	1400 rpm
Max. torque speed: model TN 75	1400 rpm
Number of main bearings	4
Sump pan	structural, cast iron

(continued)

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MODEL TN 55 - CALIBRATION DATA FOR BOSCH INJECTION PUMP TYPE VE 3/11 F 1150 L 767 - VE 3/11 F 1150 L 767-1

ASSEMBLY DATA

Pump timing on engine: delivery start 9° ± 0.5° before TDC of cylinder 1 compression stroke.
Plunger pre-lift for timing on engine: mm 1 from P.M.I. (with tools **291754** - **291755**).
Cylinder No.1 delivery line union on pump: marked with letter A.

ASSEMBLY DIMENSIONS

SYMBOL	K	MS	ya	yb
mm (in.)	-	-	38.5 to 40.5 (1.52 to 1.59)	42.8 to 48.0 (1.69 to 1.89)

CALIBRATION TEST CONDITIONS

Test bench conforming to ISO 4008/1 .../2
Injectors conforming to ISO 7440-A61 - (1.688.901.027 and pad with calibrated hole ∅ 0.5 mm; 0.02 in.).
Injector pressure setting 250 to 253 bar (3626.1 to 5120.1 psi).
Supply pressure:
. . . . . 0.35 ± 0.05 bar (5.1 ± 0.7 psi).
Delivery pipes (conforming to ISO 4093.2):
. . . . . 6 x 2 x 450 mm (0.24 x 0.08 x 17.72 in.)
Graduate drain time: . . . . . : 30".
Test liquid: ISO 4113 at a temperature of 45° ± 1°C (113° ± 33.8° F).

1. START OF DELIVERY

Plunger pre-lift from TDC: mm -	Pump rotation (viewed from drive side): counter-clockwise	Injection order: 1-2-3

2. ADVANCE REGULATOR STROKE

Rpm: 1200	Advance stroke: mm 0.7 to 1.1 (inches 0.03 to 0.04)

3. FUEL SUPPLY PUMP PRESSURE

Rpm: 1200	Internal pressure: bar 8.1 to 8.7 (psi 117.5 to 126.2)

4. FULL LOAD DELIVERY

Rpm: 700	Delivery per 1000 shots: cm^3 59.5 to 60.5 (gal.0.0157 to 0.0159)	Spread: cm^3 - 3.5 (gal. -0.000925)

5. SPREAD GOVERNOR AT IDLE SPEED

Rpm: 325	Delivery per 1000 shots: cm^3 8.4 to 12.4 (gal. 0.0022 to 0.0032)	Spread: cm^3 (gal.)

6. SPREAD GOVERNOR AT MAXIMUM SPEED

Rpm: 1220	Delivery per 1000 shots: cm^3 27 to 33 (gal. 0.007 to 0.008)	Spread: -

7. DELIVERY AT STARTING

Rpm: 100	Delivery per 1000 shots: cm^3 60 to 100 (gal. 0.016 to 0.026)

8. INJECTION ADVANCE PROGRESSION

Rpm		1200	1250
Advance stroke	mm (in.)	0.7 to 1.1 (0.03 to 0.04)	1.4 to 1.8 (0.06 to 0.07)

9. TRANSFER PRESSURE PROGRESSION

Rpm		1200	400	700
Internal pressure supply	bar (psi)	8.1to 8.7 (117.5 to 126.2)	3.2 to 3.8 (46.4 to 55.1)	4.7 to 6.1 (68.1 to 88.5)

10. BACKFLOW

Rpm		400	1150
Backflow	l/h (gal./h)	13 to 33 (3.43 to 8.72)	25 to 37 (6.60 to 9.77)

(continued overleaf)

Note: the values shown above in brackets must be used for checking purposes only.

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FUEL SUPPLY PUMP DATA	mm (inches)
Eccentricity of drive shaft	3 (0.1181)
Diameter of drive shaft at bushings	31.975 to 32.000 (1.2588 to 1.2598)
Internal diameter of installed and reamed bushings	32.050 to 32.075 (1.2618 to 1.2628)
Interference between bushings and seats	0.063 to 0.140 (0.0025 to 0.0055)
Assembly clearance between shaft and bushings	0.050 to 0.100 (0.0020 to 0.0039)
Thickness of internal washer	1.45 to 1.50 (0.0571 to 0.0496)
Thickness of external washer	2.93 to 3.00 (0.1154 to 0.1181)

CRANKCASE/CYLINDER BLOCK DATA	mm (inches)
Cylinder block	cast-iron monobloc with replaceable dry-fitted cylinder liners, incorporating seatings for crankshaft bearings, camshaft and pushrod/tappet assemblies
Internal diameter of cylinder liners	104.000 to 104.024 (4.0945 to 4.0954) (1)
External diameter of cylinder liners	107.020 to 107.050 (4.2134 to 4.2146)
Diameter of cylinder bores	106.850 to 106.900 (4.2067 to 4.2087)
Interference fit between cylinder liners and bores	0.120 to 0.200 (0.0047 to 0.0079)
Liner internal diameter oversizes	0.4 to 0.8 (0.0157 to 0.0315)
Liner external diameter oversizes	0.2 (0.0079)
Maximum permissible liner ovality or taper due to wear (2)	0.12 (0.0047)
Diameter of main shell bearing seats	84.200 to 84.230 (3.3150 to 3.3161)
Diameter of camshaft bearing seats:	
- front	54.780 to 54.805 (2.1567 to 2.1577)
- centre	54.280 to 54.305 (2.1370 to 2.1380)
- rear	53.780 to 53.805 (2.1173 to 2.1183)
Diameter of standard tappet bores in crankcase	15.000 to 15.018 (0.5906 to 0.5913)
Tappet oversizes	0.1 - 0.2 - 0.3 (0.0039 - 0.0079 - 0.0118)

(1) Measured after press-fitting and reaming.
(2) Measure in the area swept by piston rings, both parallel and perpendicular to the crankshaft axis.

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BATTERY CHECKING AND MAINTENANCE

RELATIVE DENSITY

The relative density of the battery electrolyte shows the charge level of the battery. When the battery is fully charged, the relative density of the electrolyte is at least 1.280 at 25°C (77°F).

Alternatively, the approximate charge status can be measured by using a digital voltmeter (± 0.01V), as follows:

Less than 10.5 V Battery is unusable*
Less than 11.8 V Battery flat
Less than 12.3 V Battery half-charged
More than 12.6 V Battery fully charged

* See the notes under the heading "TESTS" for instructions on how to recover a slightly sulphured battery.

The battery voltage must be measured on a flat battery, considering the following:

P. the battery must have been flat for at least four hours;

Q. if the vehicle has been used recently, switch the headlamps on for two minutes.

When a battery is flat, the sulphuric acid in the electrolyte combines chemically with the plates, thereby decreasing the relative density of the solution.

A battery densimeter will determine the relative density of the electrolyte in an element, and the quantity of sulphuric acid not used in the solution indicates the degree of charge of that element.

Low temperatures require a higher battery charge to operate. For example, a battery with a relative density of 1.225 at 27°C (80°F) can activate the starter motor at ambient temperatures, but will fail to do so if the temperature drops as a result of poor battery performance levels.

Table 1 shows the effects of temperature on battery performance.

Table 1

Temperature	Fully charged battery performance
25.0°C (77°F)	100%
-4.5°C (-40°F)	82%
-24.0°C (-75°F)	64%
-27.5°C (-81.5°F)	58%
-31.0°C (-88°F)	50%
-34.5°C (-94°F)	40%
-37.5°C (-99.5°F)	33%

Maximum battery life can be achieved by taking care of and regularly checking the battery. The energy capacity output must not be exceeded by a constant/excessive overload and charging requirements must be respected.

BATTERY MAINTENANCE

WARNING

Batteries contain sulphuric acid and generate a highly explosive hydrogen and oxygen mix during charging.

- *Never use devices that produce flames or sparks whilst checking the electrolyte level.*
- *Always protect hands and eyes before removing the battery caps.*

During battery maintenance, observe the steps noted below:

1. Keep the electrolyte at the recommended level of 17 mm (0.6693 in.) over the plates. If this level is not respected, the acid concentration will increase, which could cause damage to the separators and diminish plate performance.
2. Only use distilled or demineralized water, never overfill or use tap/rain water or other sources of water.
3. Keep the battery 75% charged (at least) to avoid plate sulphurisation, performance loss and possible freezing at low temperatures.
4. Avoid overcharging the battery, as excessive charge will generate high internal heat, causing grid deterioration water leaks.
5. During rapid recharging, make sure that the battery temperature does not exceed 50°C (122°F).
6. Do not add sulphuric acid to an element unless electrolyte has been spilled. Before topping up, make sure that the solution has the correct relative density. Slow recharging is the only way to fully recharge the battery. Use a high amperage battery charger to charge the battery with high current intensity for short periods of time, but this must be followed by a slow charge to achieve full capacity battery performance.

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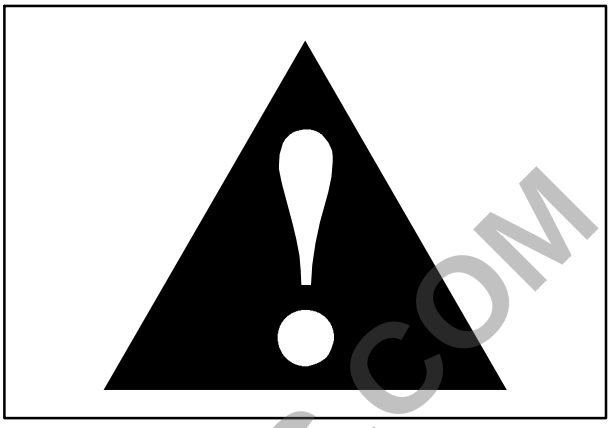
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SAFETY REGULATIONS

WARNING AND DANGER SYMBOL

This warning symbol points out important messages concerning your safety.
Carefully read the following safety regulations and observe advised precautions in order to avoid potential hazards and safeguard your health and safety.
In this manual the symbol is accompanied by the following key-words:

***WARNING** - Warnings concerning unsuitable repair operations that may jeopardise the safety of Repair personnel.*
***DANGER** - Specific warnings concerning potential hazards for operator safety or for other persons directly or indirectly involved.*



2

ACCIDENT PREVENTION

Most accidents or injuries that occur in workshops are the result of non-observance of simple and fundamental safety regulations. For this reason, IN MOST CASES THESE ACCIDENTS CAN BE AVOIDED by foreseeing possible causes and consequently acting with the necessary caution and care.

Accidents may occur with all types of machine, regardless of how well the machine in question was designed and built.

A careful and judicious service technician is the best guarantee against accidents.

Precise observance of the most basic safety rule is normally sufficient to avoid many serious accidents.

DANGER. Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

SAFETY REGULATIONS

GENERAL GUIDELINES

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewellery, unbuttoned or loose articles of clothing such as: ties, torn clothing, scarves, open jackets or shirts with open zips that may remain entangled in moving parts. It is advised to wear approved safety clothing, e.g.: non-slip footwear, gloves, safety goggles, helmets, etc.
- Do not carry out repair operations with someone sitting in the driver's seat, unless the person is a trained technician who is assisting with the operation in question.
- Do not operate the machine or use any of the implements from different positions, other than the driver's seat.
- Do not carry out operations on the machine with the engine running, unless specifically indicated.
- Stop the engine and check that the hydraulic circuits are pressure-free before removing caps, covers, valves, etc.
- All repair and maintenance operations must be carried out using extreme care and attention.
- Service steps and platforms used in the workshop or elsewhere should be built according to standard accident prevention regulations.
- Disconnect the batteries and label all controls to indicate that the tractor is being serviced. Any parts that are to be raises must be locked in position.
- Do not check or fill fuel tanks, accumulator batteries, nor use starting liquid when smoking or near naked flames, as these fluids are inflammable.
- Brakes are inoperative when manually released for repair or maintenance purposes. Use blocks or similar devices to control the machine in these conditions.
- The fuel nozzle should always be in contact with the filling aperture. Maintain this position until filling operations are completed in order to avoid possible sparks caused by the accumulation of static electricity.

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SECTION 10 - ENGINE

Chapter 1 - Engine

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10 402 30	Thermostat, Removal-Installation	95
10 406 10	Radiator, Removal-Installation	97

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- Only use specified towing points for towing the tractor. Connect parts carefully. Make sure that all pins and/or locks are secured in position before applying traction. Never remain near the towing bars, cables or chains that are operating under load.
- Transport tractors that cannot be driven using a trailer or a low-loading platform trolley, if available.
- When loading or unloading the tractor from the trailer (or other means of transport), select a flat area capable of sustaining the trailer or truck wheels. Firmly secure the tractor to the truck or trailer and lock the wheels in the position used by the carrier.
- Electric heaters, battery-chargers and similar equipment must only be powered by auxiliary power supplies with efficient ground insulation to avoid electrical shock hazards.
- Always use suitable hoisting or lifting devices when raising or moving heavy parts.
- Take extra care if bystanders are present.
- Never pour gasoline or diesel oil into open, wide or low containers.
- Never use gasoline, diesel oil or other inflammable liquids as cleaning agents. Use non-inflammable, non toxic commercially available solvents.
- Wear safety goggles with side guards when cleaning parts with compressed air.
- Limit the air pressure to a maximum of 2.1 bar (31 PSI), according to local regulations.
- Do not run the engine in confined spaces without suitable ventilation.
- Do not smoke, use naked flames, or cause sparks in the area when fuel filling or handling highly inflammable liquids.
- Never use naked flames for lighting when working on the machine or checking for leaks.
- All movements must be carried out carefully when working under, on or near the tractor. Wear protective equipment: helmets, goggles and special footwear.
- When carrying out checks with the engine running, request the assistance of an operator in the driver's seat. The operator must maintain visual contact with the service technician at all times.
- If operating outside the workshop, position the tractor on a flat surface and lock in position. If working on a slope, lock the tractor in position. Move to a flat area as soon as is safely possible.
- Damaged or bent chains or cables are unreliable. Do not use them for lifting or towing. Always use suitable protective gloves when handling chains or cables.
- Chains should always be safely secured. Make sure that the hitch-up point is capable of sustaining the load in question. Keep the area near the hitch-up point, chains or cables free of all bystanders.
- Maintenance and repair operations must be carried out in a CLEAN and DRY area. Eliminate any water or oil spillage immediately.
- Do not create piles of oil or grease-soaked rags as they represent a serious fire hazard. Always store rags in a closed metal container.
  Before starting the tractor or implements, make sure that the driver's seat is locked in position. Also check that there are no persons within the tractor or implement range of action.
- Empty pockets of all objects that may fall unobserved into the tractor parts.
- In the presence of protruding metal parts, use protective goggles or goggles with side guards, helmets, special footwear and gloves.
- When welding, use protective safety devices: tinted safety goggles, helmets, special overalls, gloves and footwear. All persons present in the area where welding is taking place must wear tinted goggles. NEVER LOOK DIRECTLY AT THE WELDING ARC WITHOUT SUITABLE EYE PROTECTION.
- Metal cables tend to fray with repeated use. Always use suitable protective devices (gloves, goggles, etc.) when handling cables.
- Handle all parts carefully. Do not put your hands or fingers between moving parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

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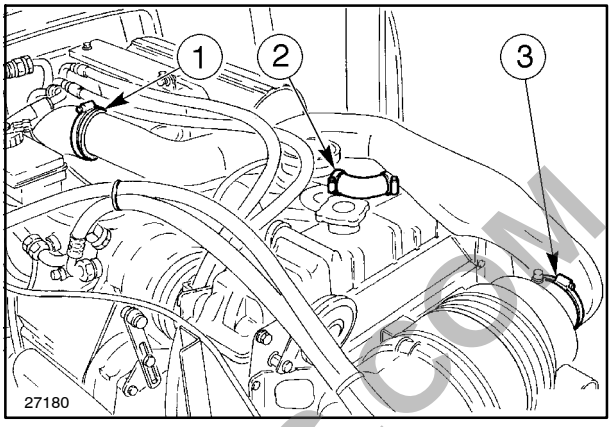
Op. 10 218 30
FUEL INJECTORS Removal-Installation

WARNING

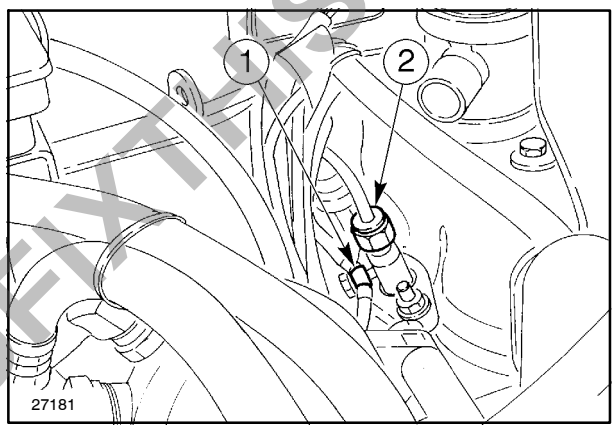
Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

Proceed as follows:

1. Carry out operation **90 100 22**: Bonnet opening, only removal (see sect. 90).
2. Loosen the clamps (1, 2 and 3) and remove the inlet manifold.
3. Unscrew the return lines connecting union (1) and the injector fuel supply lines (2).

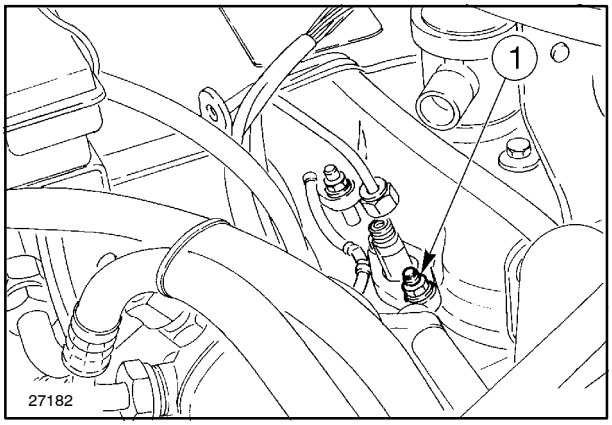


137



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4. Loosen the injector retaining bolts (1).



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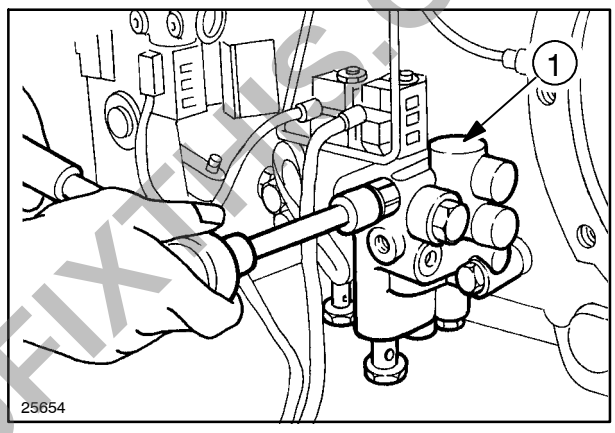
Op. 21 118 85
TRANSMISSION-GEARBOX
Disassembly-Assembly

WARNING

Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.

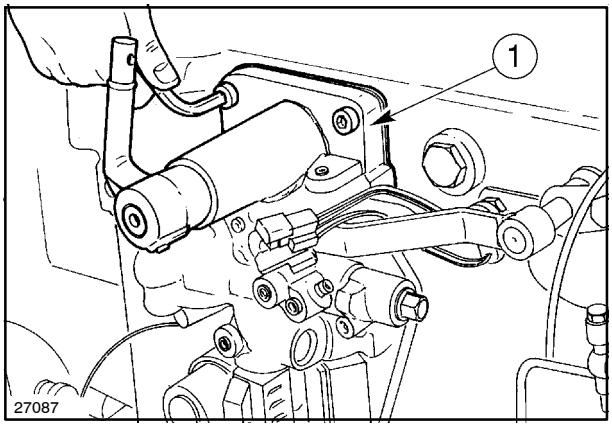
Proceed as follows:

1. Carry out operation **21 118 10**: Rear transmission-gearbox casing, only removal (see Chapter 1).
2. Unscrew the retaining bolts and recover the services control valve (1).



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3. Unscrew the retaining bolts and detach the Power Shuttle (1) control valve.
4. Attach the transmission-gearbox casing on the rotating stand **290090** using brackets **50160** (see pages 5 and 6).



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Turn the starter key to the OFF position.
Remove the rear left-hand wheel.
Is connection (76) and the sensor wiring connected?

NO → Connect the connection and/or wiring.

YES

Disconnect sensor connection (76).
Using a digital tester, measure the sensor electrical resistance.
Is the resistance ~ 700 Ω?

NO → Replace the sensor if interrupted.

YES

Raise the engine hood.
Is there electrical continuity between connection (76) (HB) on the sensor and pin (B3) (HB) on connection (69)?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

Is there electrical continuity between connection (76) (VN) on the sensor and pin (A4) (VN) on connection (69)?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

Disconnect the control panel and the connections (85) on the ECM.
Is there electrical continuity between pin (B3) (HB) on connection (69) and pin CN2-36 (HB) on connections (85)?

NO → Check the wiring and eliminate the cause of the open circuit.

YES

Is there electrical continuity between pin (A4) (VN) on connection (69) and pin CN2-29 (VN) on connections (85)?

NO → Check the wiring and eliminate the cause of the open circuit.

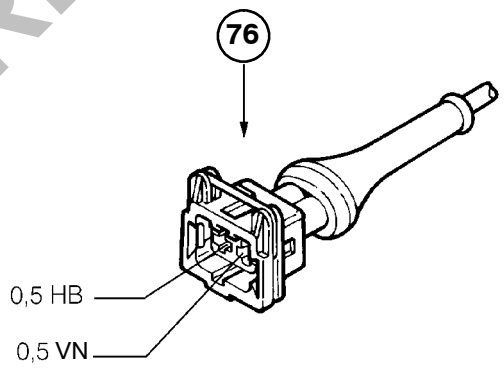
YES

Turn the starter key to the ON position.
Is there a reading of +12V between pin CN2-29 (VN) (wiring side) on connections (85) and ground?

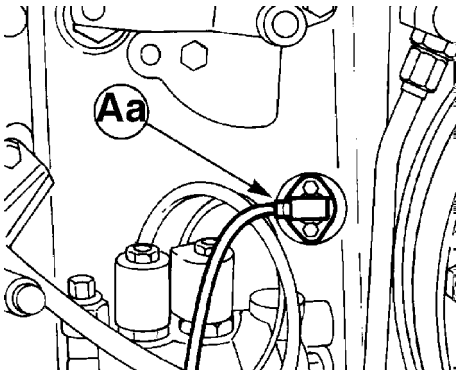
NO → Replace the ECM.

YES

Check the wiring and eliminate the cause of the short to +12V.



(Speed sensor Aa)

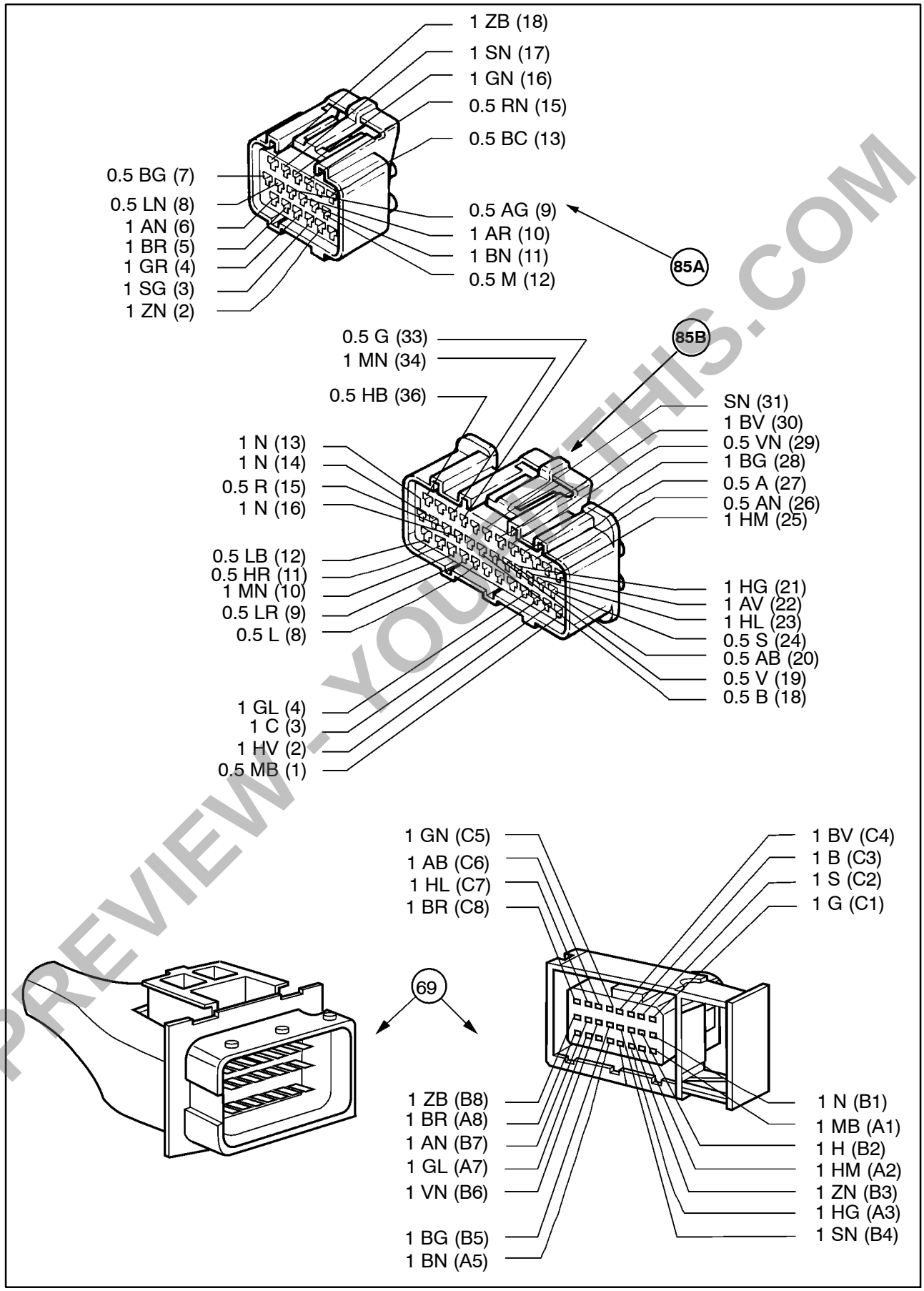


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FAULT CODE 82



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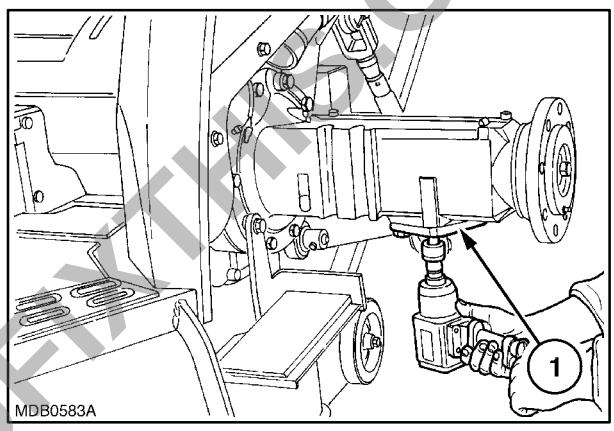
Op. 27 120 10 - 27 120 20
RH OR LH LATERAL FINAL DRIVE HOUSING ASSEMBLY
Removal-Installation

DANGER

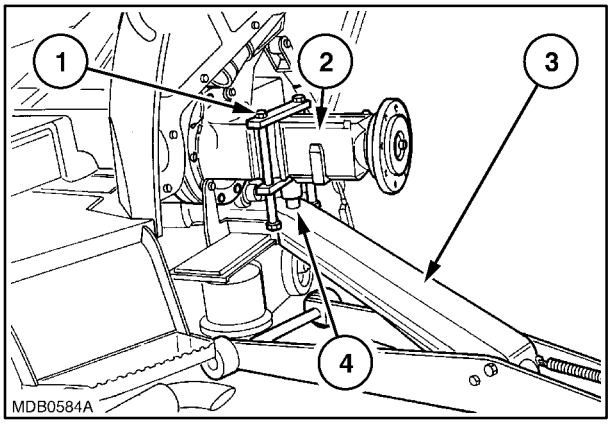
Lift and handle all heavy parts using suitable lifting equipment.
Make sure that assemblies or parts are supported by means of suitable slings and hooks. Make sure that no-one is standing in the vicinity of the load to be lifted.

Proceed as follows:

1. Lock the front wheels using chocks.
2. Carry out operation **90 114 26**: Rear roll bar, only removal (see Section 90, Chapter 1).
3. To remove the LH final drive housing, carry out operation **10 216 10**: Fuel tank, only removal (see Section 10, Chapter 1).
4. Unscrew the retaining bolts holding the lateral stabiliser strut.
5. Fit tool **50091** (1) and adapter **50114** (2) to the final drive housing (3), then position a hydraulic jack (4) under the tool.

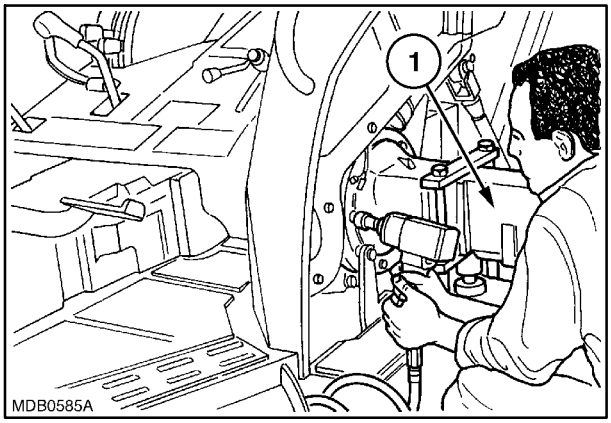


40



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6. Unscrew the retaining bolts and, using the hydraulic jack, remove the final drive housing (1) and the axle shafts.
7. To refit the lateral final drive housing, proceed as follows.



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WARNING

Always use appropriate tools to align fixing holes. NEVER USE YOUR FINGERS OR HANDS.

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SYSTEM TESTING

Starting system test on tractor

To troubleshoot the starting system simply and rapidly with conclusive results, use a battery/starter tester (high discharge rate tester) with incorporated 0 to 20 V voltmeter and 0 to 500 A ammeter.

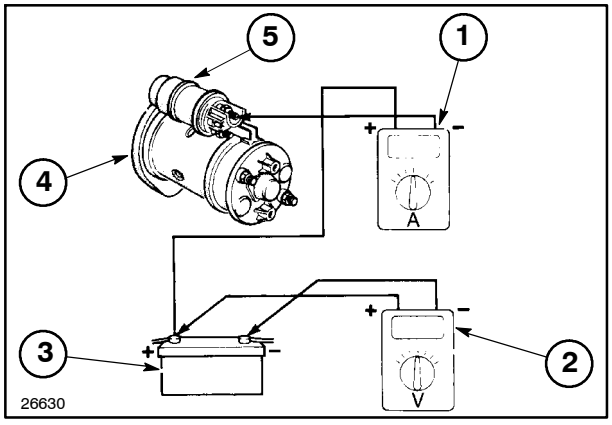
When using testing devices, follow the test procedures recommended by the manufacturer. If testing devices are not available, carry out the following procedure using a standard 0 to 20 V voltmeter and a 0 to 500 A ammeter to check correct starter motor operation, without removing it from the engine.

Before the test:

- check that the battery is fully charged;
- check the condition of all the starting system wiring (no damaged or frayed wires, no loose connections);
- check that the engine is not seized.

Current absorbed on the starter motor circuit (Fig. 1)

1. Disconnect the battery (3) ground cable (negative).
2. Disconnect the positive battery cable from the starter electromagnet (5). Connect the positive lead of an ammeter (1) to the positive battery terminal and the negative lead to the electromagnet input terminal (5).
3. Reconnect the ground wire (negative) to the battery negative terminal (3).
4. Connect the positive lead on the voltmeter (2) to the battery positive terminal and the negative lead to the battery negative terminal.



1

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OPERATOR SAFETY CIRCUIT (Mechanical Shuttle Version)
(Diagram C/1)

2 Instrument Panel

- 2 Power take-off (PTO)
- 10 Handbrake ON

28 Fusebox

- F7 PTO safety circuit + instrument cluster power supply, operator presence (keyed 12V)
- F12 8A power socket, + 12V operator's presence system

66 Transmission connection (18 pin)

81 Operator safety circuit buzzer timer

- PIN 1 - Power
- PIN 2 - Handbrake switch
- PIN 3 - Operators presence switch
- PIN 4 - Not used
- PIN 5 - Ground
- PIN 6 - Starter switch
- PIN 7 - PTO switch
  PTO indicator light
- PIN 8 - Not used

82 Buzzer diode protection

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