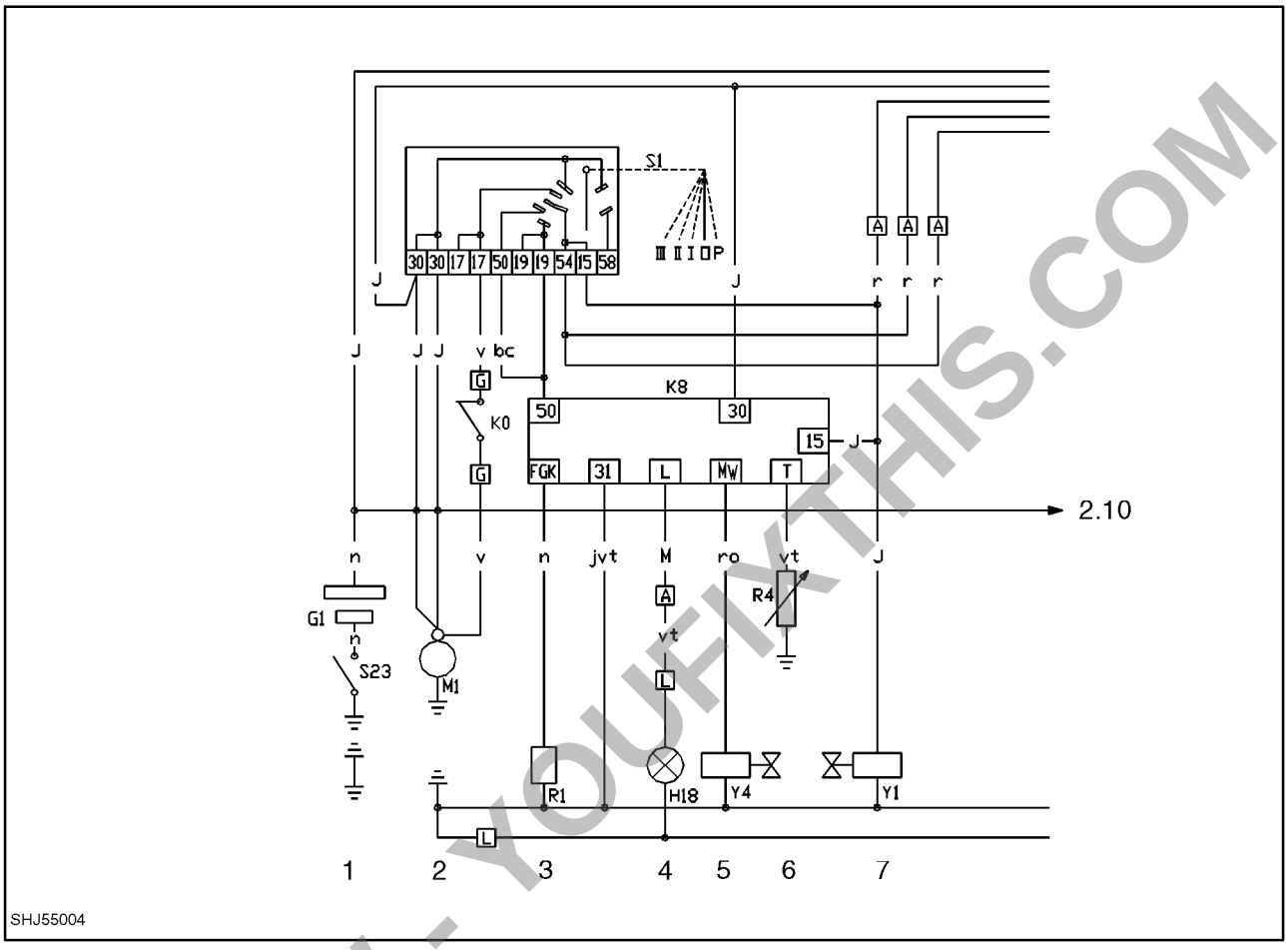
Starting

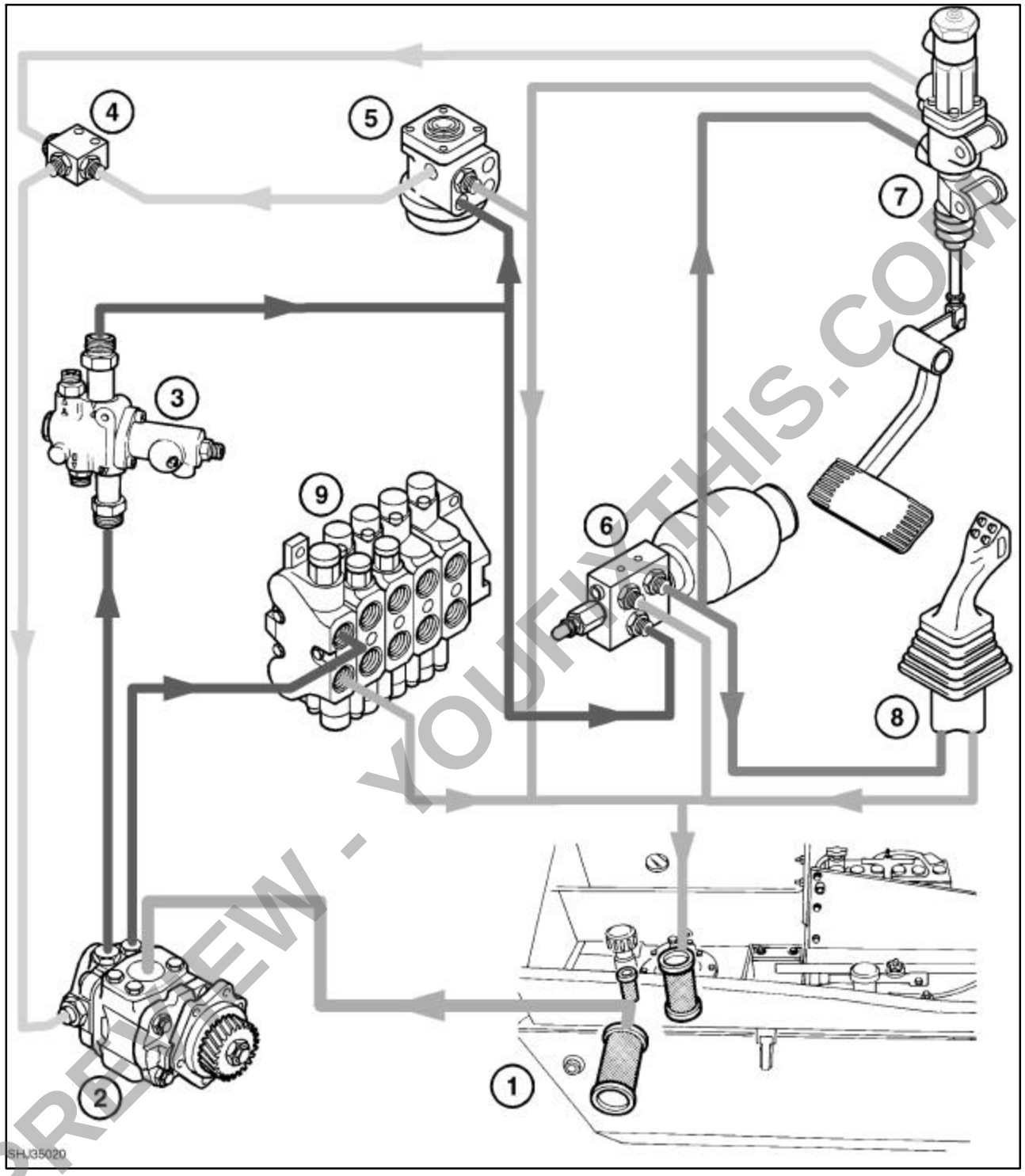


Wire Colors

Bc:	White	N:	Black
Bl:	Blue	O:	Orange
G:	Grey	R:	Red
J:	Yellow	Ro:	Pink
Jvt:	Yellow/green	Vt:	Green
M:	Brown	V:	Violet

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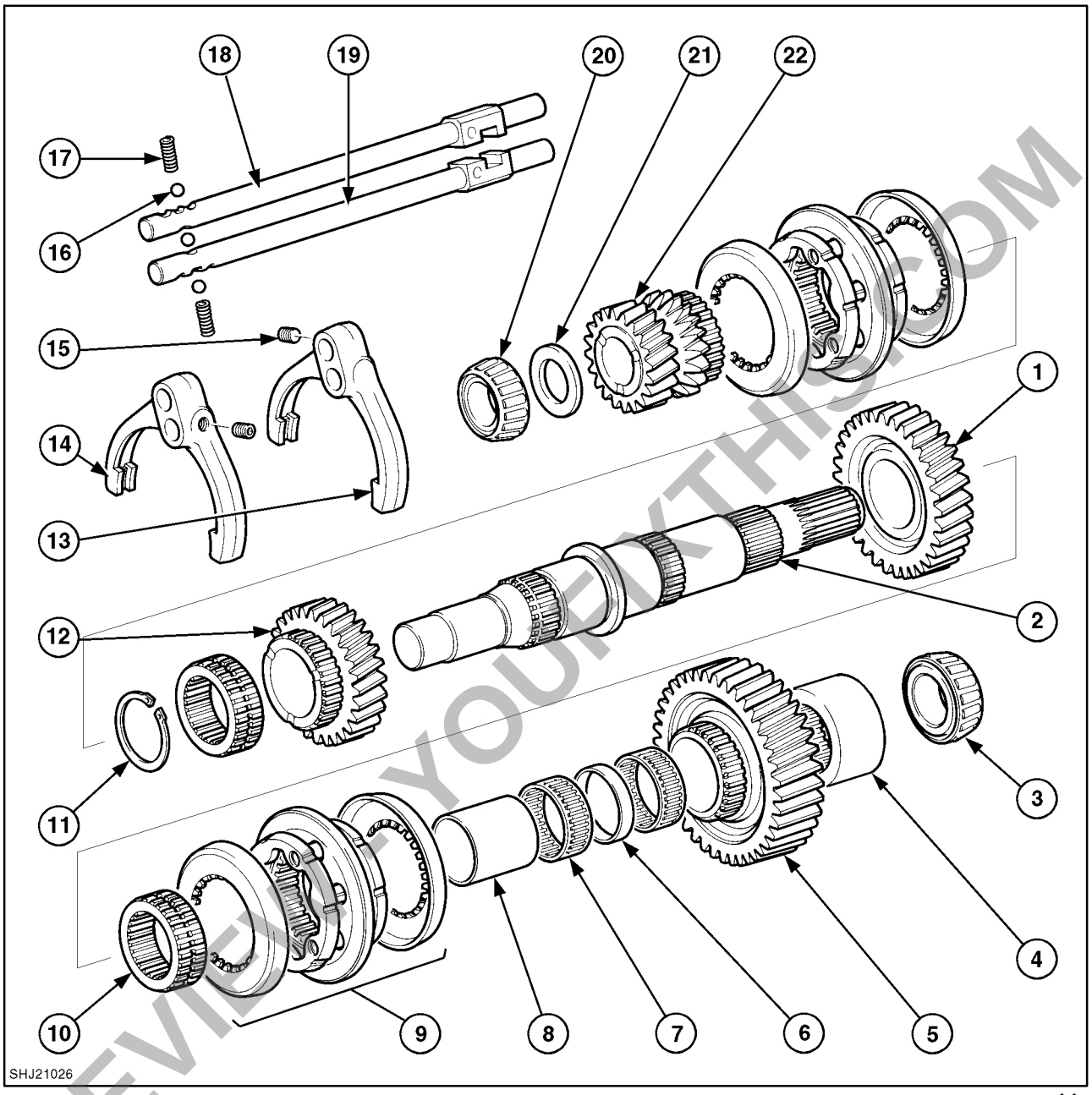
Hydraulic Circuit Schematic

	System Pressure		Suction Oil
	Reduced Pressure @ 40 bar (580 PSI)		Return to Reservoir
	Load Sense Line		

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OUTPUT SHAFT - DISASSEMBLY



OUTPUT SHAFT 44

1. 2nd GEAR
2. Output Shaft
3. Bearing
4. Spacer
5. 1st GEAR
6. Spacer
7. Bearing 2 places
8. Sleeve
9. Bulk Pin Synchronizer 2 places
10. Synchronizer Hub 2 places
11. Circlip
12. 3rd GEAR
13. Gear Selection Fork ‘Lower’
14. Gear Selection Fork ‘Upper’
15. Fork Locking Allen Key
16. Detent Ball
17. Detent Spring
18. Gear Selection Rail
19. Gear Selection Rail
20. Bearing
21. Thrust Washer
22. 4th GEAR

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MINIMUM HARDWARE TIGHTENING TORQUES

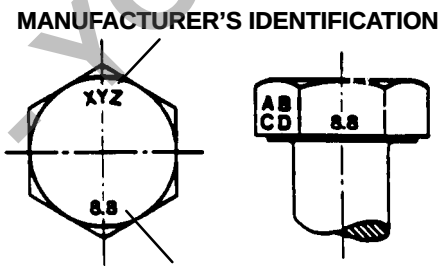
IN FOOT POUNDS - FT. LB. (NEWTON-METERS - N·m) FOR NORMAL ASSEMBLY APPLICATIONS

METRIC HARDWARE AND LOCKNUTS

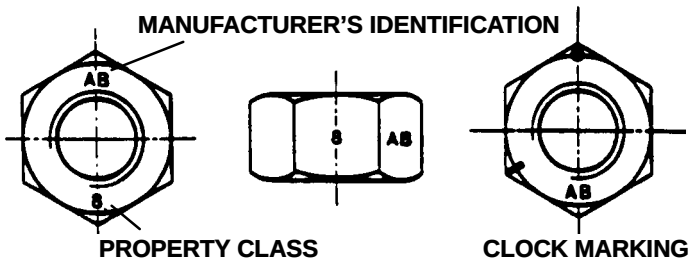
NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	15* (1.7)	19* (2.2)	23* (2.6)	30* (3.4)	33* (3.7)	42* (4.8)	16* (1.8)
M6	51* (5.8)	67* (7.6)	79* (8.9)	102* (12)	115* (13)	150* (17)	56* (6.3)
M8	124* (14)	159* (18)	195* (22)	248* (28)	274* (31)	354* (40)	133* (15)
M10	21 (28)	27 (36)	32 (43)	41 (56)	45 (61)	58 (79)	22 (30)
M12	36 (49)	46 (63)	55 (75)	72 (97)	79 (107)	102 (138)	39 (53)
M16	89 (121)	117 (158)	137 (186)	177 (240)	196 (266)	254 (344)	97 (131)
M20	175 (237)	226 (307)	277 (375)	358 (485)	383 (519)	495 (671)	195 (265)
M24	303 (411)	392 (531)	478 (648)	619 (839)	662 (897)	855 (1160)	338 (458)

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
HEX CAP SCREW AND CARRIAGE BOLTS
CLASSES 5.6 AND UP



HEX NUTS AND LOCKNUTS
CLASSES 05 AND UP



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ENGINE TROUBLESHOOTING

Problem	Possible cause	Remedy
Engine does not start.	**1.** Battery partially discharged.	Check and recharge battery. Replace if necessary.
	2. Battery terminal connections corroded or loose.	Clean, inspect and tighten terminal nuts. Replace terminals and nuts if excessively corroded.
	3. Injection pump timing incorrect.	Adjust injection pump timing.
	4. Impurities or water in fuel lines.	Disconnect fuel lines from injection pump and clean thoroughly. If necessary clean and dry the fuel tank.
	5. No fuel in tank.	Fill tank.
	6. Fuel supply pump malfunction.	Check and replace pump if necessary.
	7. Air in fuel system.	Check fuel lines, unions, supply pump, filters and injection pump for air, then bleed system.
	8. Starter motor faulty.	Repair or replace starter motor.
	9. Thermostarter faulty.	Check and replace thermostarter if necessary.
Engine stalls.	**1.** Idle speed too low.	Adjust idle speed.
	2. Irregular delivery from injection pump.	Check injection pump delivery on test bench.
	3. Impurities or water in fuel lines.	Disconnect fuel lines from injection pump and clean thoroughly. If necessary clean and dry the fuel tank.
	4. Fuel filters clogged.	Renew filter cartridges.
	5. Incorrect valve clearances.	Adjust valve clearances.
	6. Burnt or cracked valves	Replace valves.
	7. Air in fuel system.	Check fuel lines, unions, supply pump, filters and injection pump for air, then bleed system.
	8. Injection pump drive mechanism damaged.	Replace damaged parts.

(continued)

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Chapter 2 - Data and Tooling

The following data is for general guidance. Where specific data or dimensions are required and not quoted in this section, refer to the section in the Repair Manual relating to the component under repair.

ENGINE DATA - IVECO 75 hp & 106 hp

Type		Diesel
No. of cylinders		4
Bore	mm	104
	(in)	4.094
Stroke	mm	115
	(in)	4.528
Displacement	(cm^3)	3908
	in^3	238
Compression Ratio		18:1
Firing Order		1.3.4.2
Idle Speed	rev/min	625 - 675
Maximum 'No-Load' Speed	rev/min	2350 - 2400
Rated Speed	rev/min	2300
Maximum Torque		275 / 376

Tappet Clearance (cold)

Intake	0.36 - 0.46mm (0.014 - 0.018 in)
Exhaust	0.43 - 0.53mm (0.017 - 0.021 in)

COOLING SYSTEM

Type	Pressurized Full Flow By-pass with Expansion Chamber
Fan	7 Blade
Fan Belt Deflection:	
Naturally Aspirated	13 - 19 mm (0.50 in. - 0.75 in)
Turbocharged	10 - 16 mm (0.38 - 0.62 in)
Drive Belt Deflection Air Conditioning Compressor	
Naturally Aspirated	13 - 19 mm (0.50 in. - 0.75 in)
Turbocharged	10 - 16 mm (0.38 - 0.62 in)
Thermostat:	
Start to Open at	79°C (174°F)
Radiator Cap	0.50 bar (7.2 lb in^2)

FUEL SYSTEM

Injection Pump	
Type	Rotary
Cold Start Device	Thermostart
Excess Fuel Device	Automatic Governor
Fuel Shut Off	Solenoid
Lift Pump	Mechanical

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MODEL 75 hp - CALIBRATION DATA FOR BOSCH INJECTION PUMP TYPE VE 4/11 F 1150 L 704 - 99441589

Pump timing on engine: delivery start $9^{o} \pm 0.5^{o}$ before TDC of cylinder 1 compression stroke.
Plunger pre-lift for timing on engine: 1 mm from BDC (with tools **291754** - **291755**).
Cylinder No.1 delivery line union on pump: marked with the letter A.

ASSEMBLY DIMENSIONS

SYMBOL	K	KF	MS	ya	yb
mm	3.2÷3.4	-	1.1÷1.5	36.4÷40.4	44.0÷49.4

CALIBRATION TEST CONDITIONS

Test bench conforming to ISO 4008/1 .../2
Injectors conforming to ISO 7440-A61 - (1.688.901.027 with pad (∅ 0.5 mm).
Injector pressure setting 250 - 253 bar (255 - 258 kg/cm^2).
Supply pressure:
0.35 ± 0.05 bar (kg/cm^2).
Delivery pipes (conforming to ISO 4093.2): mm 6 x 2 x 450.
Graduate drain time . . . . . : 30".
Test liquid: ISO 4113 at a temperature of $44^{o} \pm 4^{o}$C.

1. START OF DELIVERY

Plunger pre-lift from TDC: mm 0	Pump rotation (viewed from drive side): counter-clockwise	Injection order: 1-3-4-2

2. ADVANCE REGULATOR STROKE

rev/min: 1200	Advance stroke: 0.5 - 0.9 mm

3. FUEL SUPPLY PUMP PRESSURE

rev/min: 1200	Internal pressure: 8.6 - 9.2 bar

4. FULL-LOAD DELIVERY

rev/min: 800	Delivery per 1000 shots: cm^3 71.5 - 72.5	Spread: cm^3 - 3.5 (4.0)

5. SPREAD GOVERNOR AT IDLE SPEED

rev/min: 325	Delivery per 1000 shots: cm^3 6-10	Spread: $cm^3 \leq 3.5$ (4.0)

6. SPREAD GOVERNOR AT MAXIMUM SPEED

rev/min: 1250	Delivery per 1000 shots: cm^3 17.4 ÷ 25.4	Spread:-

7. DELIVERY AT STARTING

rev/min: 100	Delivery per 1000 shots: cm^3 95 - 145

8. INJECTION ADVANCE PROGRESSION

rev/min		1200	1300
Advance stroke	mm	0.5 - 0.9 (0.2 - 1.2)	1.2 - 2.0 (1.2 - 2.0)

9. TRANSFER PRESSURE PROGRESSION

rev/min		1200	800	400
Internal supply pressure	bar	8.6 - 9.2	6.5 - 7.1	4.6 - 5.2

10. BACKFLOW

rev/min		400	1125
Backflow	cm^3	49.6 - 82.8 (34.6 - 97.8)	58 - 113.1 (43 - 128.1)

(continued overleaf)

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

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CRANKSHAFT AND BEARINGS DATA	SPECIFICATIONS
Standard journal diameter	79.791 - 79.810 mm ([1]) (3.143 - 3.144 in)
Journal undersizes	0.254 - 0.508 - 0.762 - 1.016 mm (0.010 - 0.020 - 0.030 - 0.040 in)
Standard main bearing shell thickness	2.168 - 2.178 mm (0.0854 - 0.0858 in)
Main bearing shell undersizes (internal diameter)	0.254 - 0.508 - 0.762 - 1.016 mm (0.010 - 0.020 - 0.030 - 0.040 in)
Bearing shell to journal clearance	0.034 - 0.103 mm (0.00134 - 0.004 in)
Maximum permitted wear clearance	0.180 mm (0.007092 in)
Standard crankpin diameter	63.725 - 63.744 mm ([1]) (2.510 - 2.5115 in)
Crankpin undersizes	0.254 - 0.508 - 0.762 - 1.016 mm (0.010 - 0.020 - 0.030 - 0.040 in)
Standard big-end bearing shell thickness	1.805 - 1.815 mm (0.0711 - 0.0715 in)
Big-end bearing shell undersizes (internal diameter)	0.254 - 0.508 - 0.762 - 1.016 mm (0.010 - 0.020 - 0.030 - 0.040 in)
Big-end bearing shell to crankpin clearance	0.033 - 0.087 mm (0.001300 - 0.00342 in)
Maximum permitted wear clearance	0.180 mm (0.007092 in)
Standard crankshaft thrust washer thickness	3.378 - 3.429 mm (0.133-0.135 in)
Thrust washer oversizes (thickness)	0.127 - 0.254 - 0.381 - 0.508 mm (0.005 - 0.010 - 0.015 - 0.0200 in)
Width of main bearing including thrust washers	31.766 - 31.918 mm (1.25-1.257 in)
Width of corresponding crankshaft journal	32.000 - 32.100 mm (1.26-1.264 in)
Crankshaft assembly endfloat	0.082 - 0.334 mm (0.0032-0.013 in)
Max. permitted wear endfloat	0.40 mm (0.01576 in)
Maximum ovality or taper of journals and crankpin after regrinding	0.01 mm (0.000394 in)
Maximum ovality or taper of worn journals and crankpin	0.05 mm 0.00197 in)
Maximum tolerance for alignment of crankshaft journals with crankshaft supported on the two outer journals	0.10 mm (3.94 in)
Maximum tolerance for alignment, in both directions, of crankpins (3-cylinder engines) or each pair of crankpins (4-cylinder engines) relative to crankshaft journals	0.25 mm (0.00985 in)
Maximum tolerance for run-out between the outer surfaces of the crankshaft journals and the crankshaft centerline	± 0.10 mm (0.00394 in)

(1) Crankshafts with 0.1 mm (0.00394 in) undersize journals and crankpins and consequently undersize bearing shells may be fitted in factory production.

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SECTION 1 – MAINTENANCE

Chapter 1 – General Instructions

IMPORTANT NOTICE

All maintenance and repair operations described in this manual should be carried out exclusively by NEW HOLLAND authorized workshops. All instructions detailed should be carefully observed and special equipment indicated should be used if necessary.
Everyone who carries out service operations described without carefully observing these prescriptions will be directly responsible of deriving damages.

SHIMMING

At each adjustment, select adjusting shims, measure them individually using a micrometer and then sum up recorded values. Do not rely on measuring the whole shimming set, which may be incorrect, or on rated value indicated for each shim.

ROTATING SHAFT SEALS

To correctly install rotating shaft seals, observe the following instructions:

- Let the seal soak into the same oil as it will seal for at least half an hour before mounting;
- Thoroughly clean the shaft and ensure that the shaft working surface is not damaged;
- Place the sealing lip towards the fluid. In case of a hydrodynamic lip, consider the shaft rotation direction and orient grooves in order that they deviate the fluid towards the inner side of the seal;
- Coat the sealing lip with a thin layer of lubricant (oil rather than grease) and fill with grease the gap between the sealing lip and the dust lip of double lip seals;
- Insert the seal into its seat and press it down using a suitable tool. Do no tap the seal with a hammer or a drift;
- Take care to insert the seal perpendicularly to its seat while you are pressing it. Once the seal is settled, ensure that it contacts the thrust element if required.;
- To prevent damaging the sealing lip against the shaft, place a suitable protection during installation.

O RINGS

Lubricate the O rings before inserting them into their seats. This will prevent the O rings from rolling over during mounting which will jeopardize sealing.

SEALERS

Apply NEW HOLLAND FLEXIBLE GASKET SEALANT or a suitable equivalent, over the mating surfaces marked with an X.
Before applying the sealer, prepare the surface as follows:

- remove possible scales using a metal brush;
- thoroughly degrease the surfaces using NEW HOLLAND DEGREASER or a suitable equivalent.

BEARINGS

It is advisable to heat the bearings to 80 - 90°C before mounting them on their shafts and cool them down before inserting them into their seats with external tapping.

SPRING PINS

When mounting split socket spring pins, ensure that the pin notch is oriented in the direction of the effort to stress the pin.
Spiral spring pins should not be oriented during installation.

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CONTROLS AND INSTRUMENTS

POWERSHUTTLE HAND AND FOOT OPERATING CONTROLS

Shown in Figure 8, is the cabin layout of a typical machine with a Powershuttle Transmission and Mechanical Controls for the Telescopic Arm.

NOTE: *The layout of controls in the diagram may vary between machines dependant upon options fitted to meet Legislation in different Countries.*

1. Steering Control:

   IMPORTANT: *Prior to driving the vehicle always turn the steering wheel side to side at engine start up, to circulate the hydraulic oil.*

2. Wheel Alignment Indicator Switch

3. Instrument Console and Switches

4. Direction Indicator and Road Lights

5. Vehicle Hazard Lighting Switches

6. Load Handling Monitor Indicator

7. Optional Automatic Load Handling Hydraulic Lock

8. Switch Panel for miscellaneous services

9. Storage Bin (optional Radio Placement)

10. Auxiliary Hydraulic Movement (Bucket Clam etc.)

11. Telescopic Extend / Retract Lever

12. Auxiliary Hydraulic Equipment Lever (Pickup Hitch / Trailer Tipping)

13. Loader Lever which controls:
    - Loader Boom Lift and Drop,
    - Attachment Curl In and Out
    - Transmission Disconnect

14. Heater Control Knob

15. Gear Lever With Transmission Disconnect Button

16. Foot Throttle

17. Safety Lockout for the Axle Steering Control Lever (Fitted Subject to Local Legislation)

18. Axle Steering Control Lever Two Wheel Steer, Four Wheel Steer and Crab Steer:

    Select fully all steering modes at least once a day to ensure correct operation.

19. Overcenter Parkbrake

20. Windscreen Washer Reservoir

21. Foot Brake Pedal / Transmission Cut Off Pedal

22. Key Start

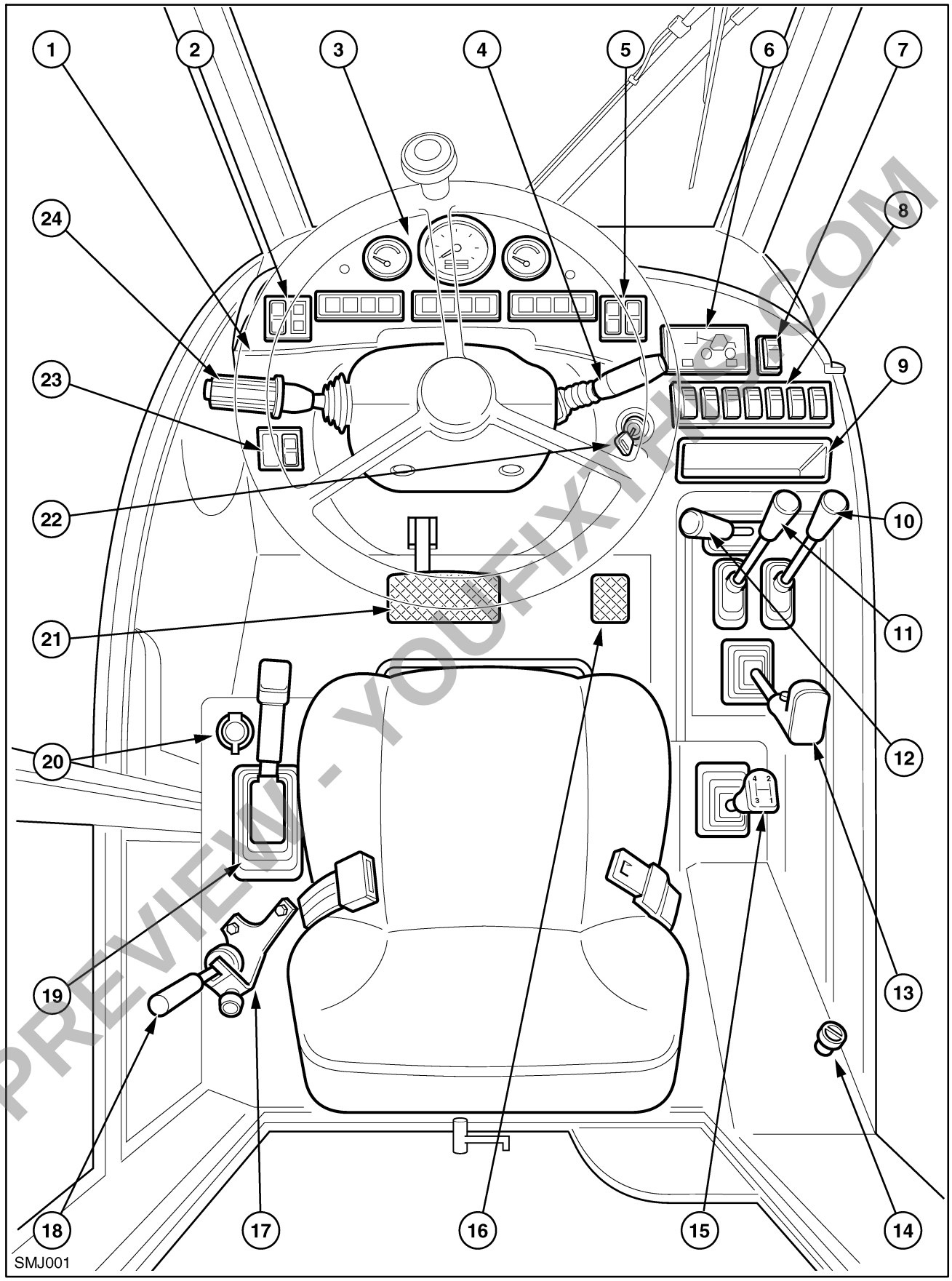
23. Loader Lever Isolator switch (when fitted) is used when the vehicle is driven public roads to stop accidental movement of the loader.

    Plus an optional Switch Plate

24. Transmission Direction Lever (Power Shuttle)

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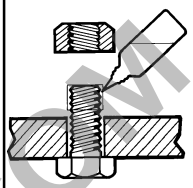
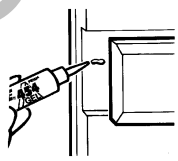
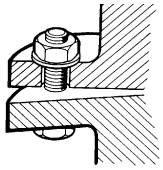
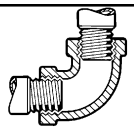
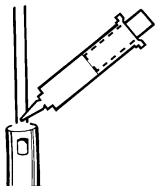
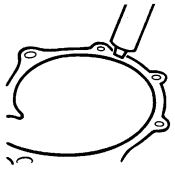
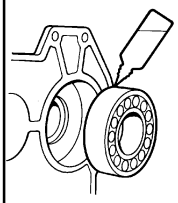
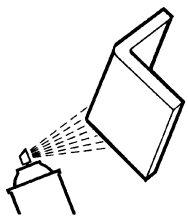
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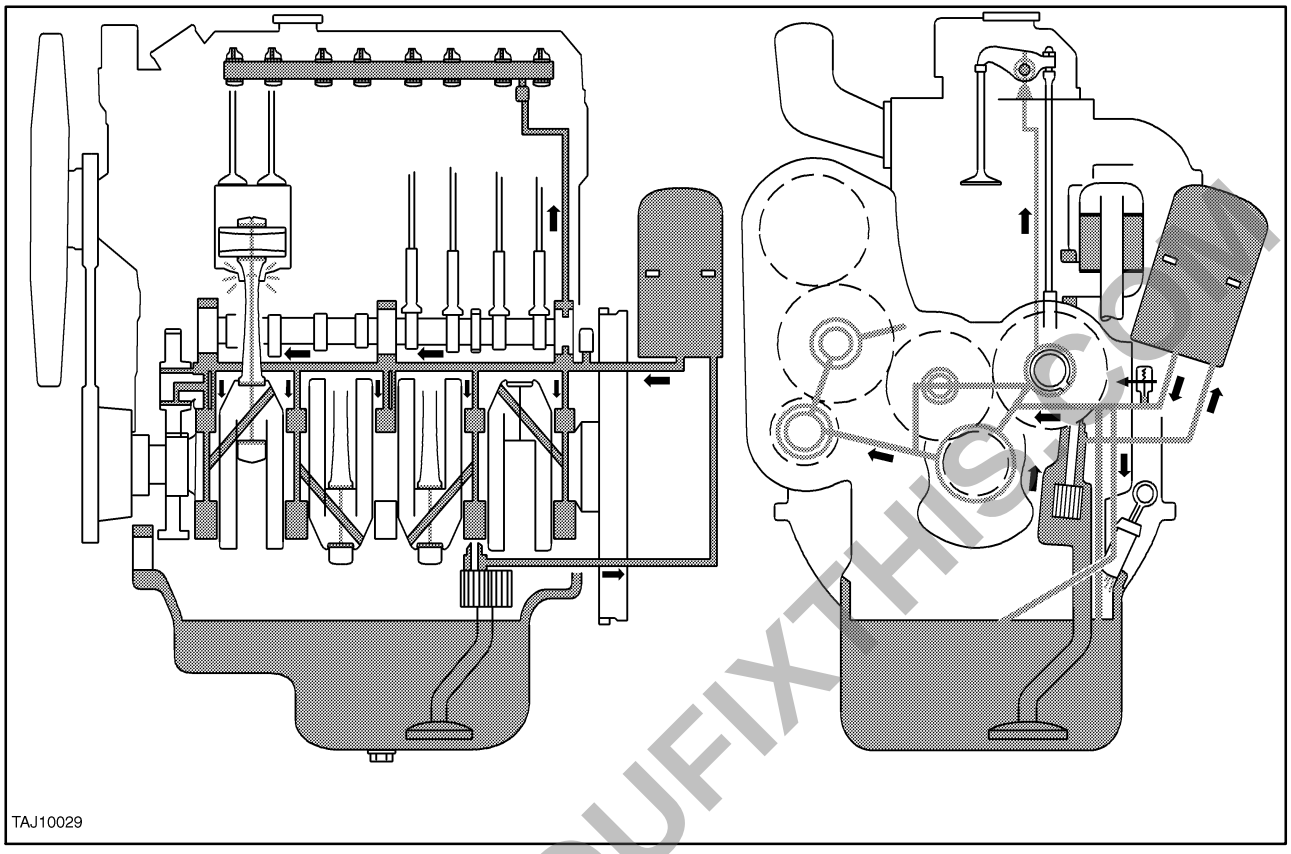
SEALANTS

Description	Part No. NH	Typical Applications	
THREAD LOCK & SEAL 24ml	82995773	• General locking and sealing of metallic threads-medium strength • Oil tolerant • Resists vibration, seals against corrosion and leakage • Can be dismantled with standard tools	
SUPER GLUE GEL 20gm	82995778	• General purpose instant non drip gel adhesive Ideal for repair of cab trim, mats, external trim, etc. • Bonds most materials including wood, rubber, metals, most plastics • Not absorbed by porous materials	
FLEXIBLE GASKET SEALANT 50ml 300ml	82995770 82995771	• Replaces pre cut gasket materials • Use on hydraulic lift cover joint, transmission to axle joint and all rigid machined faces • Anaerobic sealant cures on assembly • Will not cure and block oil ways, etc.	
THREAD SEAL 50ml	82995768	• General purpose metallic thread and pipe sealant • Use on fuel system, hydraulics, air lines etc. • Replaces pastes, hemp, pipe tape, etc.	
CLEAR ADHESIVE AND SEALANT 50ml 310ml	82995775 82995776	• Clear, flexible adhesive and sealant • Suitable for glass, metal, wood etc., seals and bonds gaps to 6 mm • Use to seal glazing and windscreens, vehicle lamps, electrical boxes, sump joints, etc.	
GASKET DRESSING 60ml	82995774	• Non hardening sealant-enhances sealing of all types of pre cut gaskets • Holds gasket in place-assists assembly • Dries slowly, sets to pliable film for easy dismantling	
STUD & BEARING LOCK 24ml	82995772	• General high strength metallic locking and sealing of all threaded fasteners and studs • Retains cylindrical parts, e.g. bushes, bearings, gears to shafts etc. • Resists severe vibration loosening. Seals against corrosion	
SOLVENT CLEANER & DEGREASER 400ml	82995779	• All purpose cleaner & degreaser • Specially designed for parts to be lubricated, bonded or sealed leaving no film or residue • Removes grease, oil and dirt from electrical parts, tools etc. FLAMMABLE. Do not smoke, use only in well ventilated areas	

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LUBRICATION CIRCUIT



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DESCRIPTION AND OPERATION

Lubrication of the engine, is maintained by rotor type oil pumps mounted in the engine sump. The oil pump is driven from the camshaft 75 hp model or crankshaft on the 106 hp model and draws oil from the engine oil pan through a tube and screen assembly.

A spring loaded relief valve is integral with the oil pump body and prevents over pressurization of the system.

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

The main gallery also supplies oil to the crankshaft main bearings, connecting rods, big ends, small ends.

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

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

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

The turbocharger where fitted, is supplied with oil from the left hand side of the engine.

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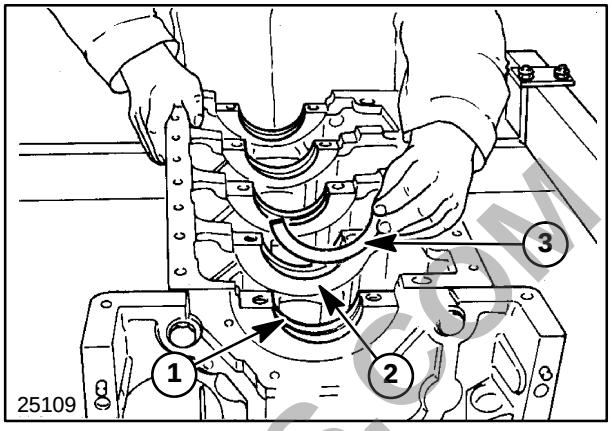
RE-ASSEMBLING THE ENGINE

Proceed as follows:

— Install the tappets in their crankcase bores.

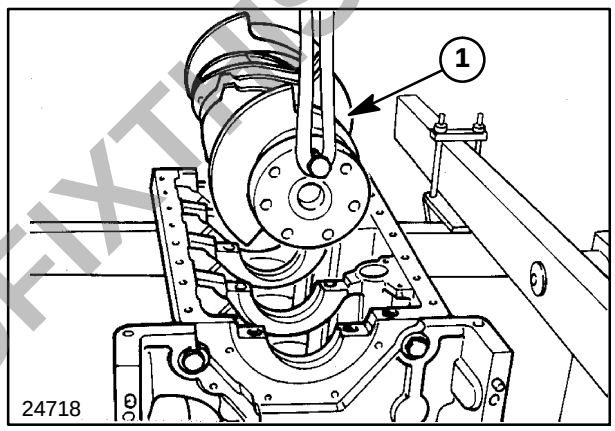
— Lubricate the main bearing seats with engine oil and install the half shell bearings (3).

— Stick the semi-circular thrust washers to both sides of the penultimate main bearing with grease.



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— Lubricate the upper surfaces of the main bearing shells with engine oil and lower the crankshaft (1) into position taking care not to dislodge the semi-circular thrust washers installed previously.

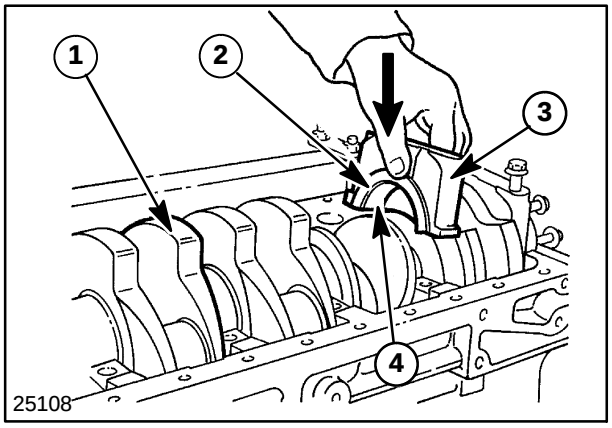


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— Lubricate the crankshaft journals with engine oil and fit the main bearing caps (3) with the half-shells (4), fitting the top semi-circular thrust washers (2) to the penultimate bearing cap.

— Rotate the crankshaft (1) a few times to allow the parts to settle into position.

— Insert the main bearing cap bolts and screw in until the head of the bolt is up against the cap.



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SAFETY RULES

PAY ATTENTION TO THIS SYMBOL



WARNING: The word "WARNING" denotes a potential or hidden hazard which has a potential for serious injury. it is used to warn operators and others to exercise every appropriate means to avoid a surprise involvement with machinery.

DANGER: The word "DANGER" denotes a forbidden practice in connection with a serious hazard.



TO PREVENT ACCIDENTS

Most accidents and personal injuries taking place in workshops are due from non-observance of some simple and essential prudential rule and safety precautions. For this reason, IN MOST CASES THEY CAN BE AVOIDED. It suffices to foresee possible causes and act consequently with necessary caution and care.

The possibility that an accident might occur with any type of machines should not be disregarded, no matter how well the machine in question was designed and built.

A wise and careful service technician is the best precautions against accidents.

Careful observance of this only basic precaution would be enough to avoid many severe accidents.

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

SAFETY RULES

GENERALITIES

◊ Carefully follow specified repair and maintenance procedures.

◊ Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get hold into moving parts. We advise to use approved safety clothing such as anti-slipping footwear, gloves, safety goggles, helmets, etc.

◊ Never carry out any repair on the machine if someone is sitting on the operator's seat, except if they are certified operators to assist in the operation to be carried out.

◊ Never operate the machine or use attachments from a place other than sitting at the operator's seat.

◊ Never carry out any operation on the machine when the engine is running, except when specifically indicated.

◊ Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.

◊ All repair and maintenance operations should be carried out with the greatest care and attention.

◊ Service stairs and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.

◊ Disconnect the batteries and label all controls to warn that the Vehicle is being serviced. Block the machine and all equipment which should be raised.

◊ Never check or fill fuel tanks and accumulator batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.

◊ Brakes are inoperative when they are manually released for maintenance purposes. In such cases, the machine should be kept constantly under control using blocks or similar devices.

◊ The fuel filling gun should remain always in contact with the filler neck. Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity buildup.

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FOUR WHEEL DRIVE TIRE COMBINATIONS

The tires fitted to machines with four wheel drive have been carefully selected to match the gearing of the transmission and axles. When renewing worn or damaged tires, always install tires of the same make, model and size as those removed. The installation of other tire combinations may result in excessive tire wear, loss of usable power or severe damage to drive line components. If in doubt, consult your Dealer.

TIRE PRESSURES

The tables are for guidance only. For exact information regarding inflation pressures and loads for your particular tires, consult your Dealer.

MODEL	TIRE SIZE	FRONT REAR	PRESSURE	AXLE WEIGHT (Unladen Static)	AXLE WEIGHT (Rated Dynamic)
LM 410	400/70-20 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	2840 kg (6261 lb)	7810 kg (17218 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	3410 kg (7518 lb)	1240 kg (2734 lb)
	400/80-20 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	2840 kg (6261 lb)	7810 kg (17218 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	3410 kg (7518 lb)	1240 kg (2734 lb)
	15.5-24 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	2840 kg (6261 lb)	7810 kg (17218 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	3410 kg (7518 lb)	1240 kg (2734 lb)
	17.5 X 24 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	2840 kg (6261 lb)	7810 kg (17218 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	3410 kg (7518 lb)	1240 kg (2734 lb)
	15.5-25 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	2840 kg (6261 lb)	7810 kg (17218 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	3410 kg (7518 lb)	1240 kg (2734 lb)
LM 420	400/70-20 10 ply	FRONT	3.0 bar (44 ft. lb. in^2)	2705 kg (5963 lb)	8335 kg (18375 lb)
		REAR	3.0 bar (44 ft. lb. in^2)	3935 kg (8675 lb)	1505 kg (3318 lb)
	400/80-20 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	2705 kg (5963 lb)	8335 kg (18375 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	3935 kg (8675 lb)	1505 kg (3318 lb)
	15.5-24 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	2705 kg (5963 lb)	8335 kg (18375 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	3935 kg (8675 lb)	1505 kg (3318 lb)
	17.5 X 24 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	2705 kg (5963 lb)	8335 kg (18375 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	3935 kg (8675 lb)	1505 kg (3318 lb)
	15.5-25 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	2705 kg (5963 lb)	8335 kg (18375 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	3935 kg (8675 lb)	1505 kg (3318 lb)
LM 430 (P. Shuttle)	400/70-20 10 ply	FRONT	3.0 bar (44 ft. lb. in^2)	2830 kg (6239 lb)	7800 kg (17196 lb)
		REAR	3.0 bar (44 ft. lb. in^2)	4020 kg (8862 lb)	1850 kg (4079 lb)
	400/80-20 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	2830 kg (6239 lb)	7800 kg (17196 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	4020 kg (8862 lb)	1850 kg (4079 lb)
	15.5-24 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	2830 kg (6239 lb)	7800 kg (17196 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	4020 kg (8862 lb)	1850 kg (4079 lb)
	17.5 X 24 10 ply	FRONT	3.2 bar (46 ft. lb. in^2)	2830 kg (6239 lb)	7800 kg (17196 lb)
		REAR	3.2 bar (46 ft. lb. in^2)	4020 kg (8862 lb)	4020 kg (8863 lb)
	15.5-25 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	2830 kg (6239 lb)	7800 kg (17196 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	4020 kg (8862 lb)	4020 kg (8863 lb)
LM 430 (P. Shift)	400/70-20 10 ply	FRONT	3.0 bar (44 ft. lb. in^2)	2945 kg (6493 lb)	8395 kg (18508 lb)
		REAR	3.0 bar (44 ft. lb. in^2)	3745 kg (8256 lb)	1095 kg (2414 lb)
	400/80-20 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	2945 kg (6493 lb)	8395 kg (18508 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	3745 kg (8256 lb)	1095 kg (2414 lb)
	15.5-24 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	2945 kg (6493 lb)	8395 kg (18508 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	3745 kg (8256 lb)	1095 kg (2414 lb)
LM 640	400/70-20 10 ply	FRONT	3.5 bar (51 ft. lb. in^2)	3285 kg (7242 lb)	8780 kg (19356 lb)
		REAR	3.5 bar (51 ft. lb. in^2)	3875 kg (8543 lb)	1380 kg (2601 lb)
	400/80-20 10 ply	FRONT	2.75 bar (40 ft. lb. in^2)	3285 kg (7242 lb)	8780 kg (19356 lb)
		REAR	2.75 bar (40 ft. lb. in^2)	3875 kg (8543 lb)	1380 kg (2601 lb)
	15.5-24 12 ply	FRONT	2.7 bar (39 ft. lb. in^2)	3285 kg (7242 lb)	8780 kg (19356 lb)
		REAR	2.7 bar (39 ft. lb. in^2)	3875 kg (8543 lb)	1380 kg (2601 lb)

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◊ Use exclusively specified towing points for towing the Vehicle. Connect parts carefully. Ensure that foreseen pins and/or locks are steadily fixed before applying traction. Do not stop near towing bars, cables or chains working under load.

◊ To transfer a failed Vehicle, use a trailer or a low loading platform trolley if available.

◊ To load and unload the machine from the transportation mean, select a flat area providing a firm support to the trailer or truck wheels. Firmly tie the machine to the truck or trailer platform and block wheels as required by the forwarder.

◊ For electrical heaters, battery-chargers and similar equipment use exclusive auxiliary power supplies with a efficient ground to avoid electrical shock hazard.

◊ Always use lifting equipment and similar of appropriate capacity to lift or move heavy components.

◊ Pay special attention to bystanders.

◊ Never pour gasoline or diesel oil into open, wide and low containers.

◊ Never use gasoline, diesel oil or other flammable liquids as cleaning agents. Use non-flammable non-toxic proprietary solvents.

◊ Wear protection goggles with side guards when cleaning parts using compressed air.

◊ Do not exceed a pressure of 2.1 bar, in accordance with local regulations.

◊ Do not run the engine in a closed building without proper ventilation.

◊ Do not smoke, use open flames, cause sparks in the nearby area when filling fuel or handling highly flammable liquids.

◊ Do not use flames as light sources when working on a machine or checking for leaks.

◊ Move with caution when working under a Vehicle, and also on or near a Vehicle. Wear proper safety accessories: helmets, goggles and special footwear.

◊ During checks which should be carried out with the engine running, ask an assistant to seat at the operator's seat and keep the service technician under visual control at any moment.

◊ In case of operations outside the workshop, drive the Vehicle to a flat area and block it. If working on an incline cannot be avoided, first block the Vehicle carefully. Move it to a flat area as soon as possible with a certain extent of safety.

◊ Ruined or plied cables and chains are unreliable. Do not use them for lifting or trailing. Always handle them wearing gloves of proper thickness.

◊ Chains should always be safely fastened. Ensure that fastening device is strong enough to hold the load foreseen. No persons should stop near the fastening point, trailing chains or cables.

◊ The working area should be always kept CLEAN and DRY. Immediately clean any spillage of water or oil.

◊ Do not pile up grease or oil soaked rags, as they constitute a great fire hazard. Always place them into a metal container.

Before starting the Vehicle or its attachments, check, adjust and block the operator's seat. Also ensure that there are no persons within the Vehicle or attachment operating range.

◊ Do not keep into your pockets any object which might fall unobserved into the Vehicle's inner compartments.

◊ Whenever there is the possibility of being reached by ejected metal parts or similar, use protection eye mask or goggles with side guards, helmets, special footwear and heavy gloves.

◊ Wear suitable protection such as tinted eye protection, helmets, special clothing, gloves and footwear whenever it is necessary to carry out welding procedures. All persons standing in the vicinity of the welding process should wear tinted eye protection. NEVER LOOK AT THE WELDING ARC IF YOUR EYES ARE NOT SUITABLY PROTECTED.

◊ Metal cables with the use get frayed. Always wear adequate protections (heavy gloves, eye protection, etc.)

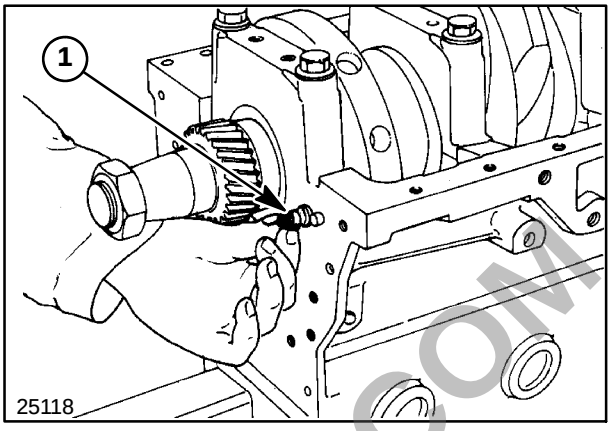
◊ Handle all parts with the greatest caution. Keep your hands and fingers far from gaps, moving gears and similar. Always use approved protective equipment, such as eye protection, heavy gloves and protective footwear.

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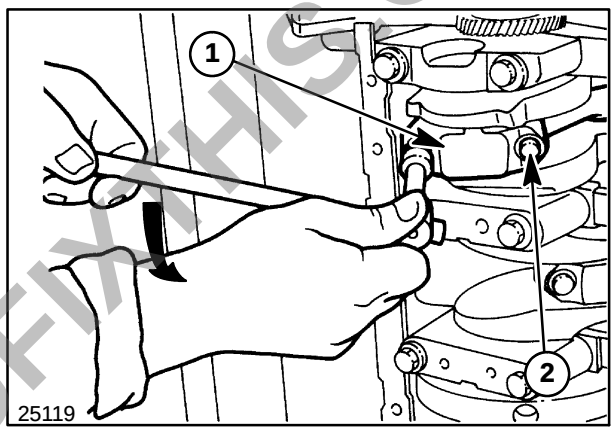
39. Renew the O ring seal (1) installed in the lift pump drive shaft lubrication line (where applicable).

40. Remove the crankcase - timing gear case gasket.



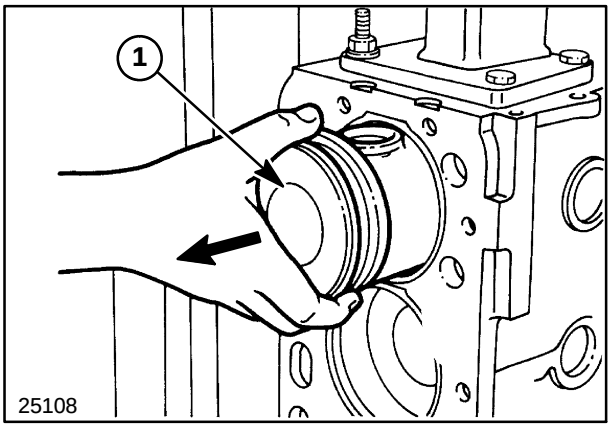
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41. Rotate the engine on the stand through 90_. Unscrew the big-end cap bolts (2) and recover the big-end caps with their half shell bearings.



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42. Slide the pistons (1), complete with rings, gudgeon pins and connecting rods, out of the cylinder liners.



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TROUBLE SHOOTING

IMPORTANT: *When effecting a repair the cause of the problem must be investigated and corrected to avoid repeat failures.*

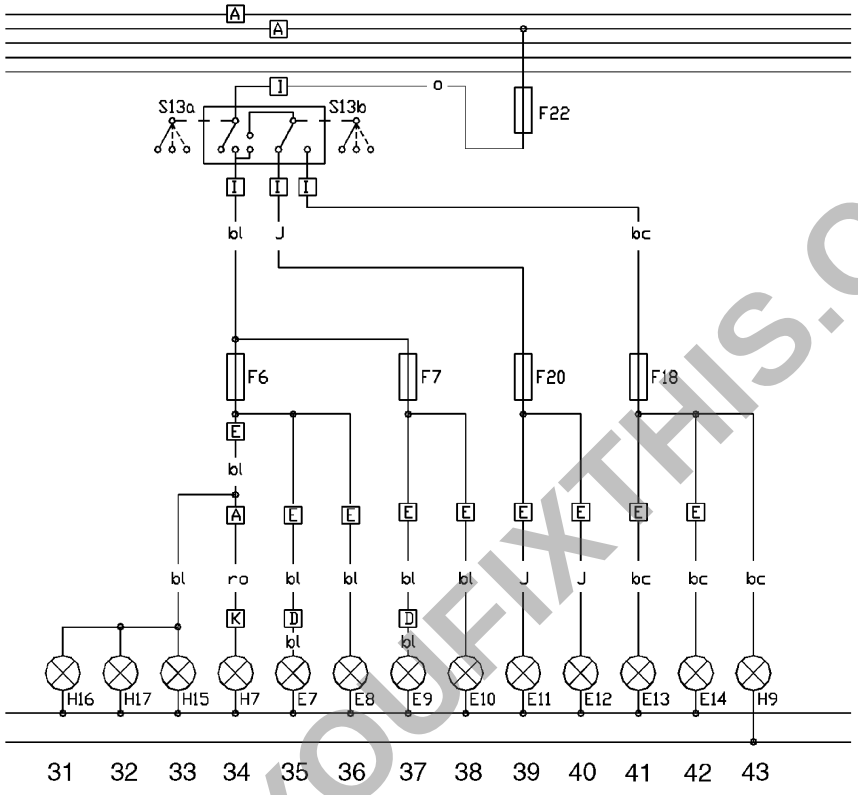
The following table lists problems and their possible causes with recommended remedial action.

PROBLEM	POSSIBLE CAUSES	REMEDY
Engine overheats	1. Hose connection leaking or collapsed	1. Tighten hose connection, renew hose if damaged
	2. Radiator cap defective or not sealing	2. Renew radiator cap
	3. Radiator leakage	3. Repair/renew radiator
	4. Improper fan belt adjustment	4. Re-adjust fan belt
	5. Radiator fins restricted	5. Clean with compressed air
	6. Faulty thermostat	6. Renew thermostat
	7. Internal engine leakage	7. Check for source of leakage, renew gasket or defective parts
	8. Water pump faulty	8. Overhaul water pump
	9. Exhaust gas leakage into cooling system	9. Renew cylinder head gasket, check head for damage or distortion
	10. Coolant aeration	10. Tighten all connections and check coolant level is correct. Ensure cylinder head gasket has not blown
	11. Cylinder head gasket improperly installed	11. Renew cylinder head gasket
	12. Hot spot due to rust and scale or clogged water jackets	12. Reverse flush entire cooling system
	13. Obstruction to radiator air flow	13. Remove the obstruction
	14. Extended engine idling	14. Do not allow engine to idle for long periods
	15. Oil cooler tube blocked	15.Clean
	16. Radiator core tubes blocked	16. Check free flow

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Lighting



Wire Colors

Bc:	White	N:	Black
Bl:	Blue	O:	Orange
G:	Grey	R:	Red
J:	Yellow	Ro:	Pink
Jvt:	Yellow/green	Vt:	Green
M:	Brown	V:	Violet

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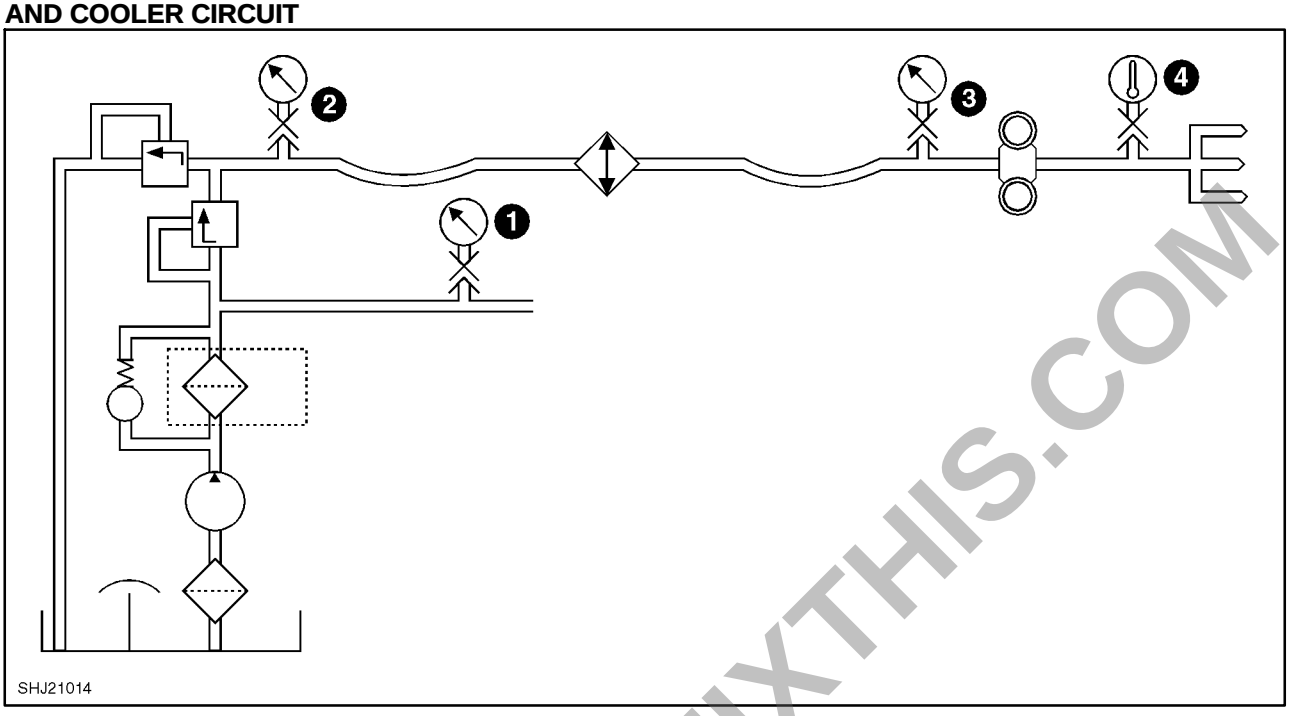
FAULT FINDING

PROBLEM	POSSIBLE CAUSES	CORRECTION
Gear selection - Hard shifting	1. Worn or bent shift rods	1. Dismantle and renew
	2. Worn or chipped dog teeth on drive gears	2. Dismantle and renew
	3. Worn synchronizer cones or cups	3. Dismantle and renew
	4. Broken or missing detent spring or ball	4. Dismantle and renew
	5. Residual clutch pressure (clutch supply fault)	5. Dismantle and renew
	6. Corrosion at stud lever (boot damaged)	6. Dismantle and renew
	7. Clutch plates distorted	7. Replace
Gear jump out	1. Worn detent notches on shift rail	1. Dismantle and renew
	2. Worn or broken synchronizer cones or cups	2. Dismantle and renew
	3. Worn or loose shift forks	3. Dismantle and renew
Main vehicle pump no power	1. Main pump Failure	1. Dismantle and renew
	2. Fractured transmission drive rod	2. Dismantle and renew
	3. Failed splines on converter, drive rod or pump	3. Dismantle and renew
Erratic or noisy response from main pump	1. Main pump Failure	1. Dismantle and renew
	2. Out of balance transmission drive rod	2. Dismantle and renew
	3. Worn drive rod support bush	3. Dismantle and renew

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PRESSURE TESTING TORQUE CONVERTER AND COOLER CIRCUIT



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All pressure and flow testing should be measured with an oil temperature of 82 - 93 degrees Celsius (180 - 200_ F). For operating speed refer to each test.

Port 1 System pressure

Engine set to 2000 revs/min.

Minimum pressure 13 bar (lb/in2).

Desired pressure 16.5 - 19.5 bar (- lb/in2).

Port 2 Oil cooler in

Engine set to 2000 revs/min.

Pressure range 2 - 7 bar (- lb/in2).

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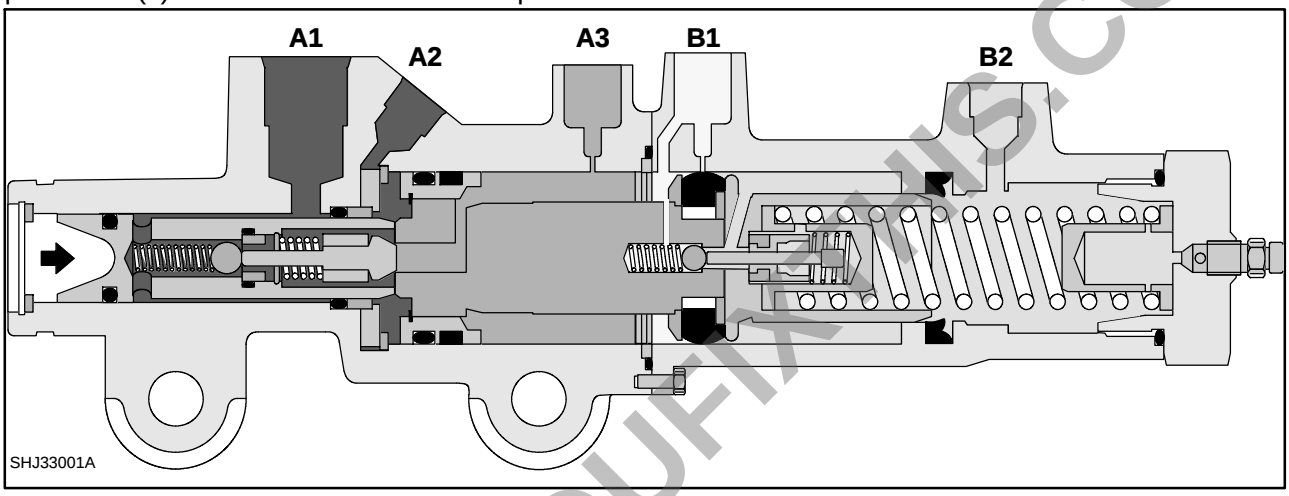
Servo-brake Assistance Brake Partially Applied

As the brake pedal is depressed the push rod (2) moves to the right and the conical valve (4) blocks the drilling through the piston. This prevents load sensing oil returning to tank, allowing pressure to build up in the load sensing line. As the brake pedal is depressed further the check valve (3) is lifted off its seat allowing pressure oil from the accumulator system line A1 to apply pressure to the primary piston (5). The primary piston and the slide valve assembly (10) will move to the right and the brake piston seal (7) blocks the brake oil reservoir port B1.

The brake piston seal then compresses the brake oil in chamber Y & Z. Slightly applying the brakes via port B2.

During this initial braking phase the brake piston seal is compressing the brake fluid in the larger diameter of the secondary body (13), therefore at this stage a greater volume of brake oil is displaced at low brake fluid pressure.

This takes up the free play between all the brake discs in the front and rear axle and slightly applies the brakes.



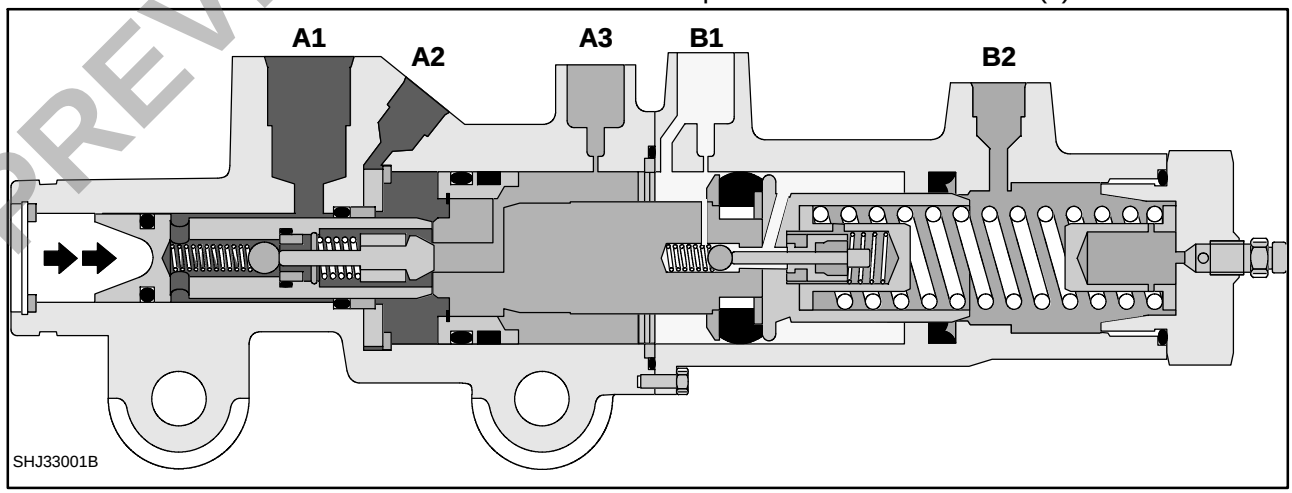
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Servo-brake Assistance Brakes Fully Applied.

As the pressure on the brake pedal increases the push rod (2), primary piston (5), brake piston seal (7) and the slide valve (10) all move further to the right, increasing brake system pressure. When the slide valve (10) passes seal (11) and the pressure reaches 16 bar (232 PSI) it acts on Pin (8) and opens the relief valve (6) allowing the brake oil in chamber Y to return to reservoir B1. As the brake piston seal and the slide valve move further to the right pressure in chamber Z is increased by the force of the small diameter of the slide valve.

During this braking phase the brake fluid pressure is multiplied as the same exerting force is acting on a smaller area therefore giving maximum braking force after the initial brake disc freeplay has been taken up.

Should there be air or a leakage in the brake pipe network and the pressure at B2 does not reach 16 bar then rather than the oil flowing from chamber Y to the reservoir, it will unseat the equalizer valve (9) and increase the flow at B2 to fill up the void in the system quickly. Only when the pressure at B2 reaches 16 bar (232 PSI) will it revert to normal operation and the relief valve (6) will be unseated.



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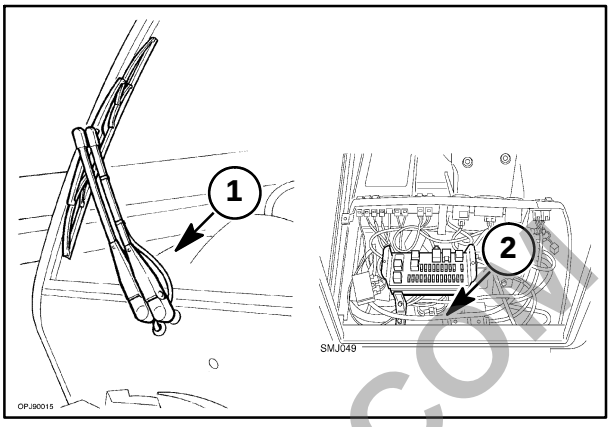
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WINDSCREEN WIPERS

The front windscreen wiper motor is accessible from the front instrument console. To remove the unit the following will have to disassembled.

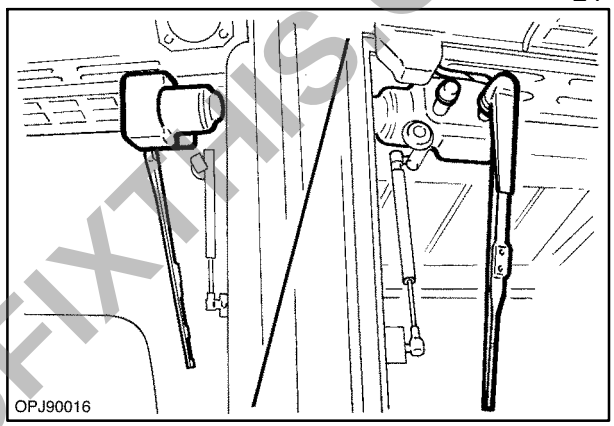
1. Wiper Arms (1)
2. Upper Instrument Console
3. Electrical Connections
4. Motor (2) Attaching Hardware



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The rear windscreen wiper motor is accessible from the inside of the cab. To remove the unit the following will have to disassembled.

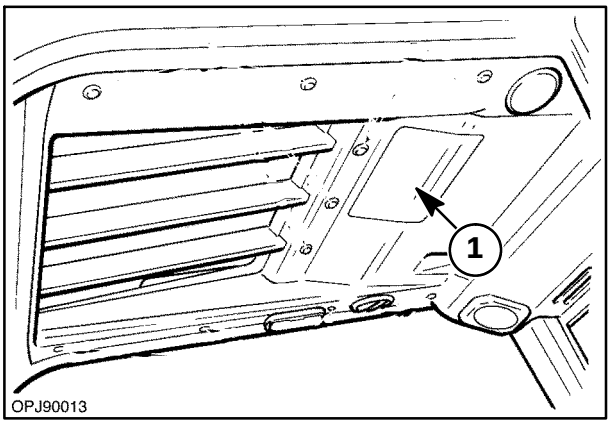
1. Wiper Arm
2. Electrical Connections
3. Motor Attaching Hardware



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The roof windscreen wiper motor (when fitted) is accessible from the inside of the cab roof panel (1). To remove the unit the following will have to disassembled.

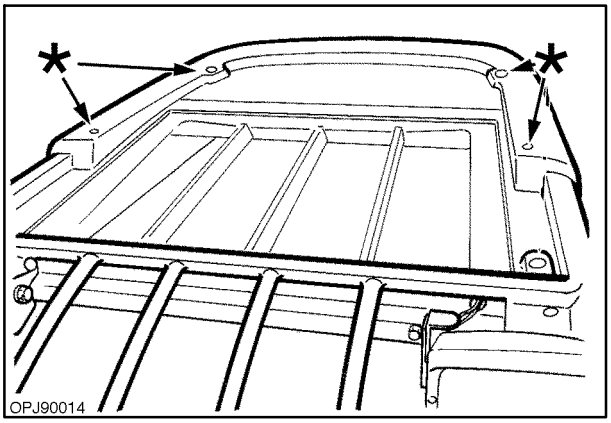
1. Wiper Arm
2. Electrical Connections
3. Motor Attaching Hardware



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ROOF PANEL

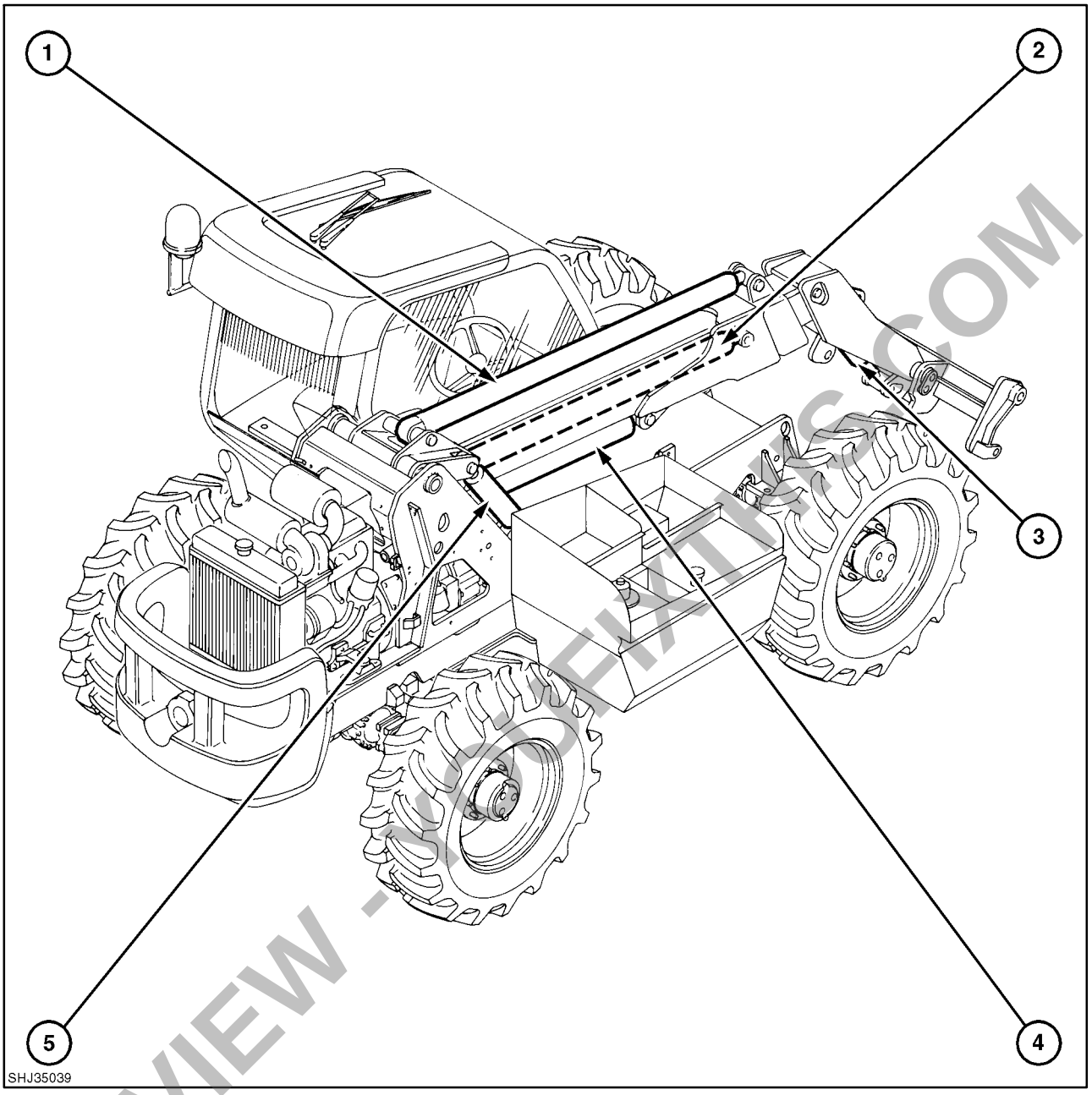
The outer roof panel is a moulded one piece unit that is easily removed by removal of the attaching hardware.



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Hydraulic Cylinders

1. Telescopic Cylinder with Double Counterbalance Valve (Double Telescopic Boom Section only)
2. Telescopic Cylinder
3. Tilt Cylinder with Counterbalance Valve
4. Lift Cylinder with Counterbalance Valve
5. Compensation Cylinder

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