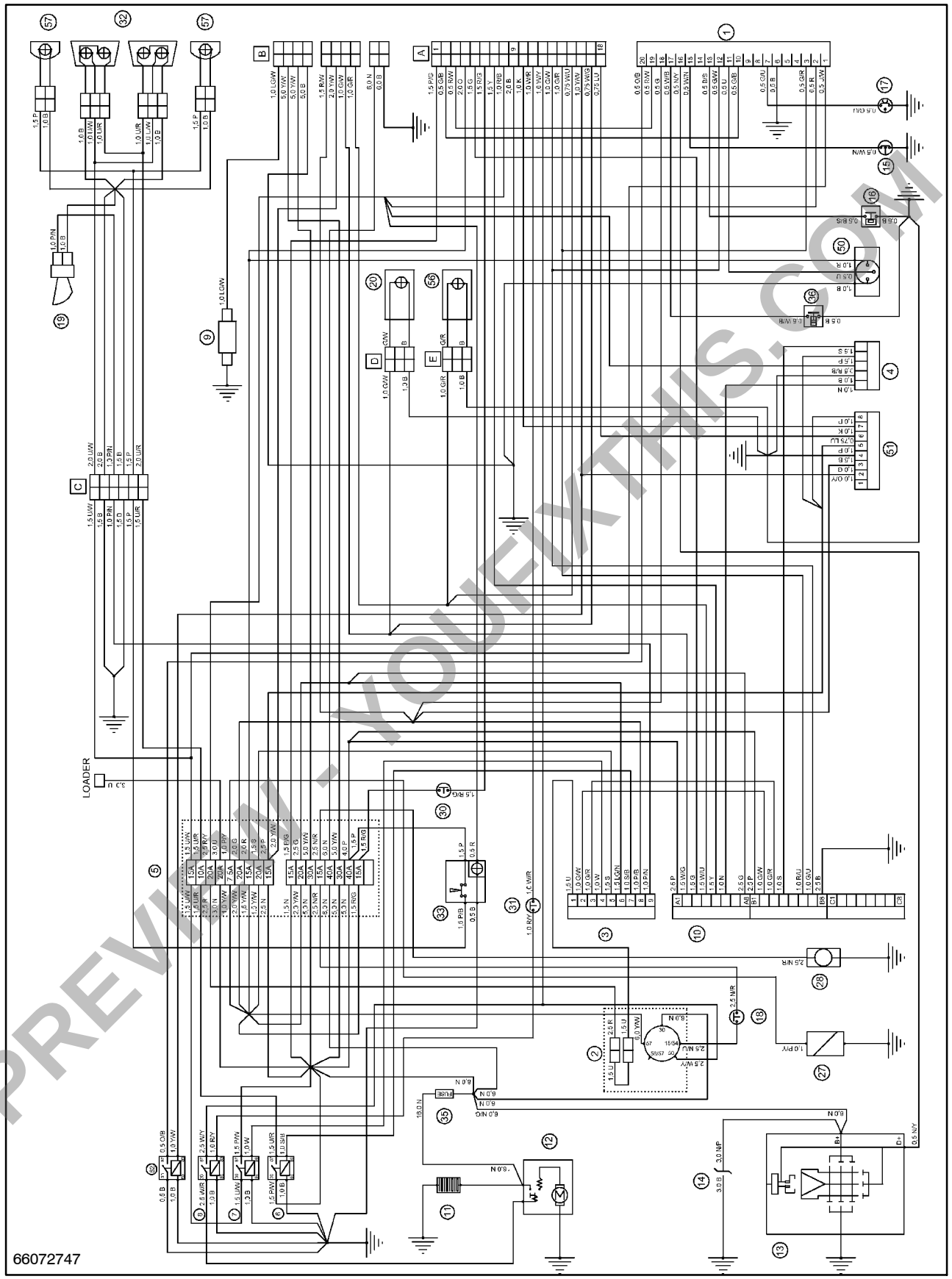


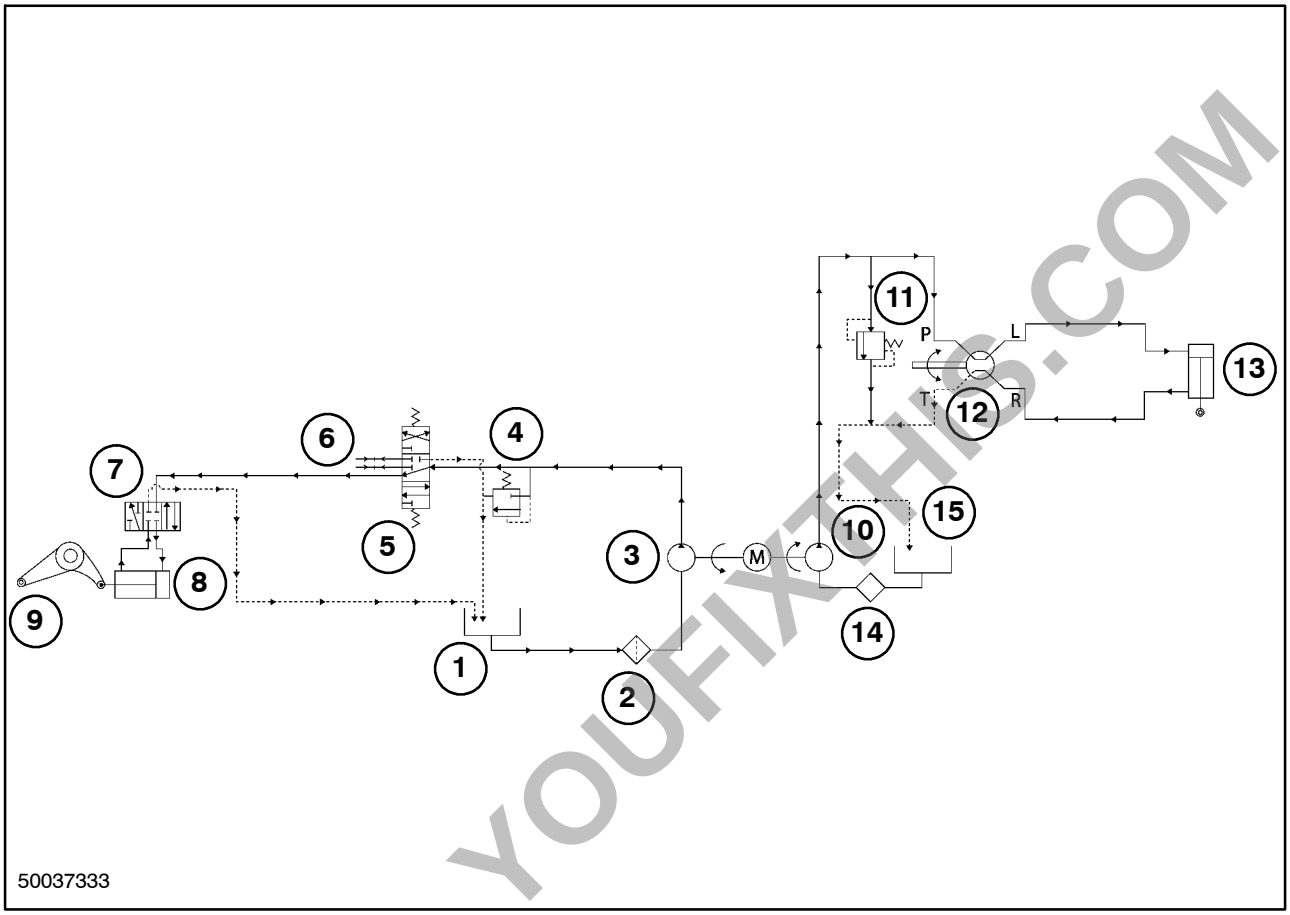
GENERAL DIAGRAM - CENTER (WITH CAB)

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HYDRAULIC SYSTEM DIAGRAMS

HYDRAULIC DIAGRAM ON JX60, JX70, JX80, JX90 AND JX95 BASE MODELS



5

1. Rear Axle Casing (high-pressure system reservoir)
2. Filter Assembly (high-pressure)
3. High-Pressure (Lift) Pump 13.6 g/m (51.7 L/m)
4. Pressure Relief Valve (rated 186 - 191 bar [2697 - 2770 psi])
5. Rear Remote Control Valve with Automatic Detent Release (4th remote valve - optional)
6. Quick-Release Connectors
7. Lift Control Valve
8. Lift Cylinder
9. Lift Arms
10. Steering Pump 8.1 g/m (30.8 L/m)
11. Pressure Relief Valve (2WD - 100 bar [1450 psi]) (MFD - 125 bar [1813 psi])
12. Hydrostatic Steering Control Valve
13. Steering Cylinder
14. Steering Filter Assembly (internal to reservoir)
15. Self-Contained Steering System Reservoir

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MINIMUM HARDWARE TIGHTENING TORQUES

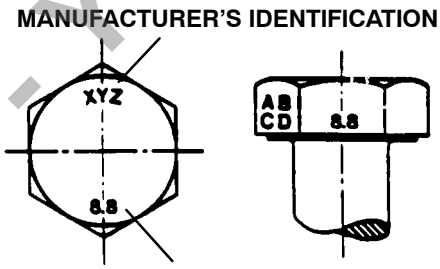
IN NEWTON-METERS (FOOT POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS

METRIC NON-FLANGED HARDWARE AND LOCKNUTS

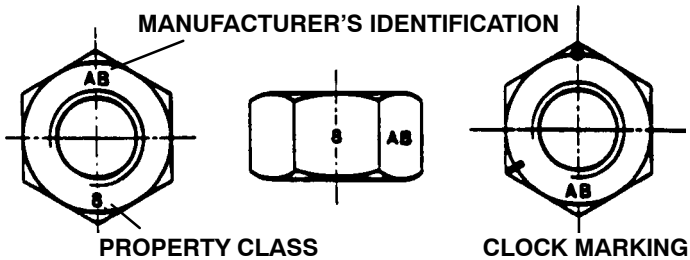
NOMINAL SIZE	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCKNUT CL.8 W/CL8.8 BOLT
	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	UNPLATED	PLATED W/ZnCr	
M4	1.7 (15)*	2.2 (19)*	2.6 (23)*	3.4 (30)*	3.7 (33)*	4.8 (42)*	2.3 (20)*
M6	5.8 (51)*	7.6 (67)*	8.9 (79)*	12 (102)*	13 (115)*	17 (150)*	7.8 (69)*
M8	14 (124)*	18 (159)*	22 (195)*	28 (248)*	31 (274)*	40 (354)*	19 (169)*
M10	28 (21)	36 (27)	43 (32)	56 (41)	61 (45)	79 (58)	38 (28)
M12	49 (36)	63 (46)	75 (55)	97 (72)	107 (79)	138 (102)	66 (49)
M16	121 (89)	158 (117)	186 (137)	240 (177)	266 (196)	344 (254)	164 (121)
M20	237 (175)	307 (226)	375 (277)	485 (358)	519 (383)	671 (495)	330 (243)
M24	411 (303)	531 (392)	648 (478)	839 (619)	897 (662)	1160 (855)	572 (422)

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



86529681 REV F 5.1

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OVERHAUL

ENGINE

Removal

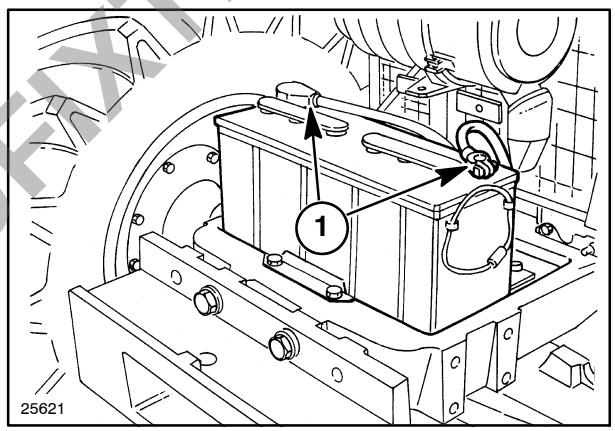
DANGER

Lift and handle all heavy parts using suitable lifting equipment.
Make sure that the load is 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

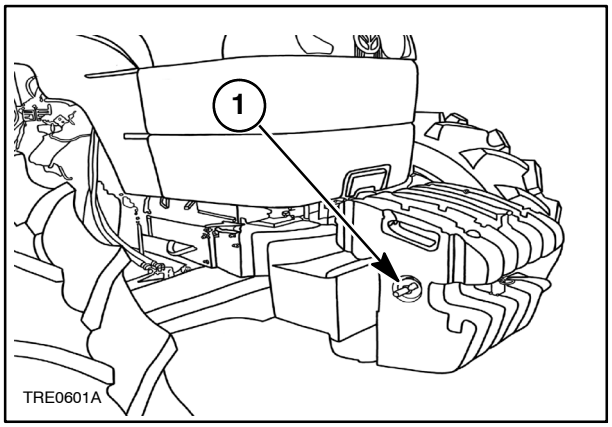
Always use suitable tools to align holes in parts.
NEVER USE YOUR FINGERS OR HANDS.

1. Disconnect the battery negative (ground) and positive cables (1).
2. Drain oil from the transmission/gearbox.
3. Drain the cooling system.



11

4. Unscrew the nut (1) from the front ballast retaining pin.



12

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TROUBLESHOOTING

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

(continued)

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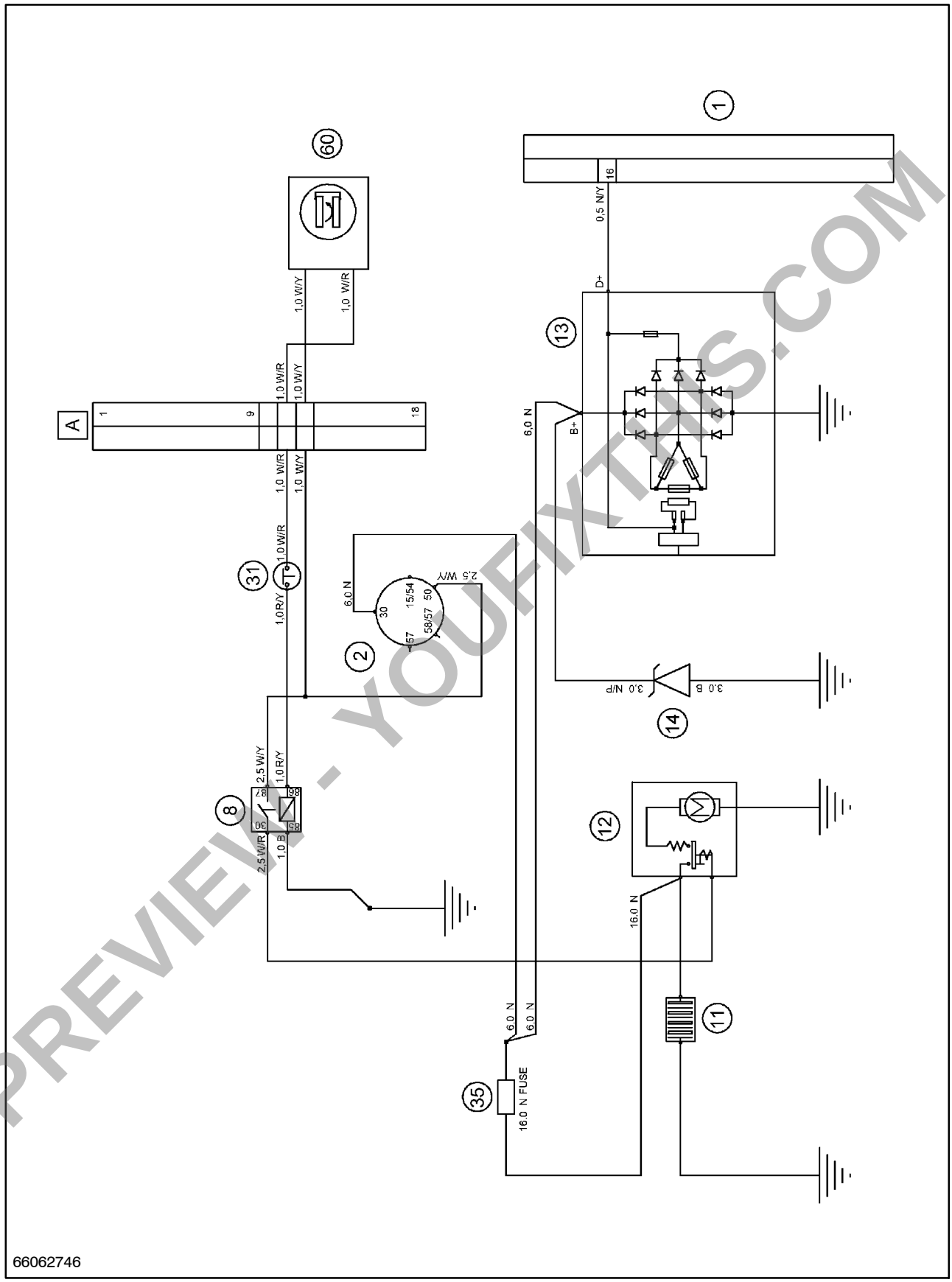
SPECIFICATIONS

GENERAL SPECIFICATIONS	3-cylinder	4-cylinder
Engine type:		
- JX60 (BOSCH pump; naturally aspirated)	179 cu. in (2.9 L)	-
- JX70 (BOSCH pump; turbocharged)	179 cu. in (2.9 L)	-
- JX80 (BOSCH pump; naturally aspirated)	-	238 cu. in (3.0 L)
- JX90 (BOSCH pump; turbocharged)	-	238 cu. in (3.0 L)
- JX95 (BOSCH pump; turbocharged)	-	238 cu. in (3.0 L)
Cycle	Diesel, 4-stroke	
Fuel injection	Direct	
No. of in-line cylinders	3	4
Cylinder liners	dry force-fitted in cylinder block	
Piston diameter		
- JX60	100 mm (3.937 in.)	-
- JX70	104 mm (4.094 in.)	-
- JX80	-	100 mm (3.937 in.)
- JX90	-	104 mm (4.094 in.)
- JX95	-	104 mm (4.094 in.)
Piston stroke	115 mm	
Total displacement:		
- JX60	2710 cm^3 (165 in^3)	-
- JX70	2931 cm^3 (175 in^3)	-
- JX80	-	3613 cm^3 (220 in^3)
- JX90	-	3908 cm^3 (238 in^3)
- JX95	-	3908 cm^3 (238 in^3)
Compression ratio	17 to 1 naturally aspirated 16.5 to 1 turbocharged	
Maximum power:		
- JX60	40.4 kW (JX60)	-
- JX70	44,1 kW (JX70)	-
- JX80	-	51,5 kW (JX80)
- JX90	-	58,8 kW (JX90)
- JX95	-	70 kW (JX95)
Fast idling speed	2500 rev/min	
Maximum torque (daNm) at 1500 rpm:		
- JX60	20.7 (153 ft-lb)	-
- JX70	25.0 (184 ft-lb)	-
- JX80	-	27.9 (206 ft-lb)
- JX90	-	32.0 (236 ft-lb)
- JX95	-	33.7 (249 ft-lb)
Number of main bearings	4	5
Sump pan	Structural, cast iron	

Rev counter/hourmeter	incorporated in control panel
Operating system	from gear on camshaft
Hour counter calibrated for engine speed of	1800 rpm

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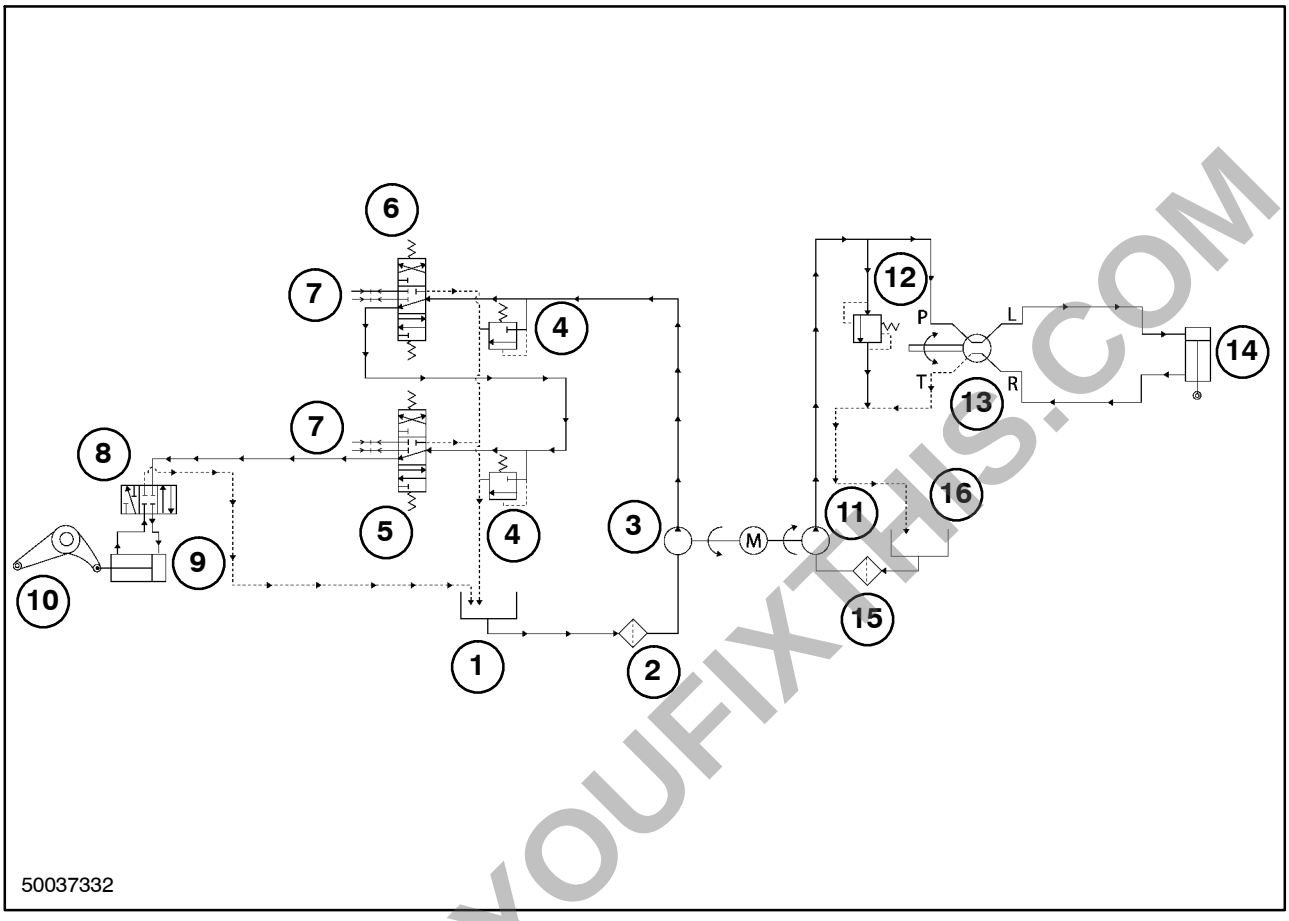


STARTER CIRCUIT

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HYDRAULIC DIAGRAM ON JX95 HIGH CLEARANCE MODELS



6

1. Rear Axle Casing (high-pressure system reservoir)
2. Filter Assembly (high-pressure)
3. High-Pressure (Lift) Pump 13.6 g/m (51.7 L/m)
4. Pressure Relief Valve
5. Rear Remote Control Valve with Automatic Detent Release
6. Rear Remote Control Valve with Automatic Detent Release and Float Function (4th remote valve - optional)
7. Quick-Release Couplers
8. Lift Control Valve
9. Lift Cylinder
10. Lift Arms
11. Steering Pump 8.1 g/m (30.8 L/m)
12. Pressure Relief Valve (2WD - 100 bar [1450 psi]) (MFD - 125 bar [1813 psi])
13. Hydrostatic Steering Control Valve
14. Steering Cylinder
15. Steering Filter Assembly (internal to reservoir)
16. Self-Contained Steering System Reservoir

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MINIMUM HARDWARE TIGHTENING TORQUES

IN NEWTON-METERS (FOOT POUNDS) FOR NORMAL ASSEMBLY APPLICATIONS

INCH NON-FLANGED HARDWARE AND LOCKNUTS

NOMINAL SIZE	SAE GRADE 2		SAE GRADE 5		SAE GRADE 8		LOCKNUTS		NOMINAL SIZE
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	GR.B w/GR5 BOLT	GR.C w/GR8 BOLT	
1/4	6.2 (55)*	8.1 (72)*	9.7 (86)*	13 (112)*	14 (121)*	18 (157)*	8.5 (75)*	12.2 (109)*	1/4
5/16	13 (115)*	17 (149)*	20 (178)*	26 (229)*	28 (250)*	37 (324)*	17.5 (155)*	25 (220)*	5/16
3/8	23 (17)	30 (22)	35 (26)	46 (34)	50 (37)	65 (48)	31 (23)	44 (33)	3/8
7/16	37 (27)	47 (35)	57 (42)	73 (54)	80 (59)	104 (77)	50 (37)	71 (53)	7/16
1/2	57 (42)	73 (54)	87 (64)	113 (83)	123 (91)	159 (117)	76 (56)	108 (80)	1/2
9/16	81 (60)	104 (77)	125 (92)	163 (120)	176 (130)	229 (169)	111 (82)	156 (115)	9/16
5/8	112 (83)	145 (107)	174 (128)	224 (165)	244 (180)	316 (233)	153 (113)	215 (159)	5/8
3/4	198 (146)	256 (189)	306 (226)	397 (293)	432 (319)	560 (413)	271 (200)	383 (282)	3/4
7/8	193 (142)	248 (183)	495 (365)	641 (473)	698 (515)	904 (667)	437 (323)	617 (455)	7/8
1	289 (213)	373 (275)	742 (547)	960 (708)	1048 (773)	1356 (1000)	654 (483)	924 (681)	1

NOTE: Torque values shown with * are inch pounds.

IDENTIFICATION
CAP SCREWS AND CARRIAGE BOLTS



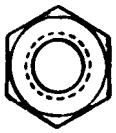
SAE GRADE 2



SAE GRADE 5



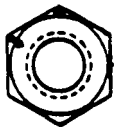
SAE GRADE 8



REGULAR NUTS



SAE GRADE 5 HEX NUTS



SAE GRADE 8 HEX NUTS

LOCKNUTS



GRADE IDENTIFICATION

GRADE A NO NOTCHES

GRADE B ONE CIRCUMFERENTIAL NOTCH

GRADE C TWO CIRCUMFERENTIAL NOTCHES



GRADE IDENTIFICATION

GRADE A NO MARKS

GRADE B THREE MARKS

GRADE C SIX MARKS

MARKS NEED NOT BE LOCATED AT CORNERS



GRADE A NO MARK
GRADE B LETTER B
GRADE C LETTER C

GRADE IDENTIFICATION

86529681 REV F 5.2

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Installation

To install the engine, proceed as follows:

1. Attach the three hooks of an adjustable lifting chain to three eye bolts on the engine. Raise the engine from the platform and position it in front of the front axle support. Join the two units using the four securing bolts.
2. Move the mobile stand from under the front axle differential housing to under the engine sump, inserting a suitably shaped block of wood between the stand and the sump pan.
3. Attach the top radiator hose to the thermostat housing and secure with an adjustable hose clamp.
4. Connect the bottom radiator hose to the coolant pump and secure at both ends with adjustable hose clamps.
5. Install the lift pump.
6. Detach the lifting chain from the engine.
7. Connect the rigid pipe from the air cleaner to the inlet manifold and secure with the relative clamp.
8. Reconnect all electrical leads: thermostart glow plug, coolant temperature sensor, 'air filter blocked' sensor, horn, front axle support ground, engine stop on injection pump, leads to the alternator and relay, oil pressure sensor, starter motor, fuel dryer filter. Secure all leads with plastic ties.
9. Install the clutch to the engine flywheel using the six retaining bolts.
10. Connect the oil delivery pipe to the DT control valve. Tighten the pipe union on the anti-cavitation accumulator; install the bracket on the left-hand side near the engine oil filter.
11. Clean the distance collar and the mating surfaces of the overdrive clutch housing; scrape away all traces of old sealing compound.
12. Apply silicone sealing compound to the mating surfaces of engine and distance collar. Install the distance ring on the engine studs.
13. Apply silicone sealing compound to the mating surfaces of the overdrive clutch housing.
14. Remove the fixed stand from under the front weight support. Remove the wooden wedges from under the front wheels.
15. Attach the adjustable lifting chain to the eyebolts on the engine.
16. Place wooden wedges under the rear wheels, check that the handbrake is fully on and that the fixed and moveable stands are firmly in place.
17. Detach the lifting chain from the engine. Attach the two cables still attached to the cab handrail to the hook of the hoist. Raise the front part of the cab about 6 cm. (2.36 in.)
18. Replace and tighten all the bolts securing the engine to the overdrive clutch housing.
19. Bolt on the brake pipe support bracket on the right-hand side of the engine. Lower the hoist and detach the cables from the cab handrail.
20. Lower the stands under the engine sump and the clutch housing. Remove tool **380000236** and the stand from under the drawbar support.
21. Fix the cab in place with the two front securing bolts.
22. Connect the injector leak-off pipe. Connect the pipes to the glowplug and to the fuel dryer filter.
23. Install the fuel filter mounting to the engine. Connect the two semirigid pipes to the mounting.
24. Connect the oil suction pipes to the pumps; secure the rubber hoses with hose clamps.
25. Connect the lift control valve supply pipe to the lift pump with a new O-ring.
26. Secure the three pipes with the adjustable hose clamp.
27. Attach all the electrical leads to the connectors on the vertical support bracket.
28. Install the cab heater pipe union on the engine/ clutch distance collar. Connect the rubber heater hoses to the union.

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TROUBLESHOOTING

Problem	Possible Cause	Remedy
Engine overheats.	Coolant pump malfunction.	Overhaul pump or replace.
	Thermostat faulty.	Replace thermostat.
	Radiator inefficient.	Remove internal deposits by flushing. Check for leaks and repair.
	Deposits in cylinder head and crankcase coolant passages.	Flush out coolant system.
	Coolant pump and fan drive belt slack.	Check and adjust belt tension.
	Coolant level low.	Top up expansion tank with specified coolant mixture.
	Incorrect timing.	Check and adjust.
	Injection pump calibration incorrect – delivering too much or too little fuel.	Calibrate pump on test bench to values specified in Chapter 4, this section.
	Air filter clogged.	Clean filter unit and replace filter element if necessary.
Engine lacks power and runs unevenly.	Injection pump timing incorrect.	Adjust pump timing.
	Auto advance regulator in injection pump damaged.	Overhaul injection pump and adjust on test bench to values specified in Chapter 4, this section.
	Distributor journal worn.	Overhaul injection pump and adjust on test bench to values specified in Chapter 4, this section.
	Injection pump delivery irregular.	Overhaul injection pump and adjust on test bench to values specified in Chapter 4, this section.
	All-speed governor damaged.	Overhaul injection pump and adjust on test bench to values specified in Chapter 4, this section.
	Injectors partially obstructed or damaged.	Clean, overhaul and calibrate injectors.
	Impurities or water in fuel lines.	Disconnect fuel lines from injection pump and clean thoroughly. If necessary clean and dry the fuel tank.

(continued)

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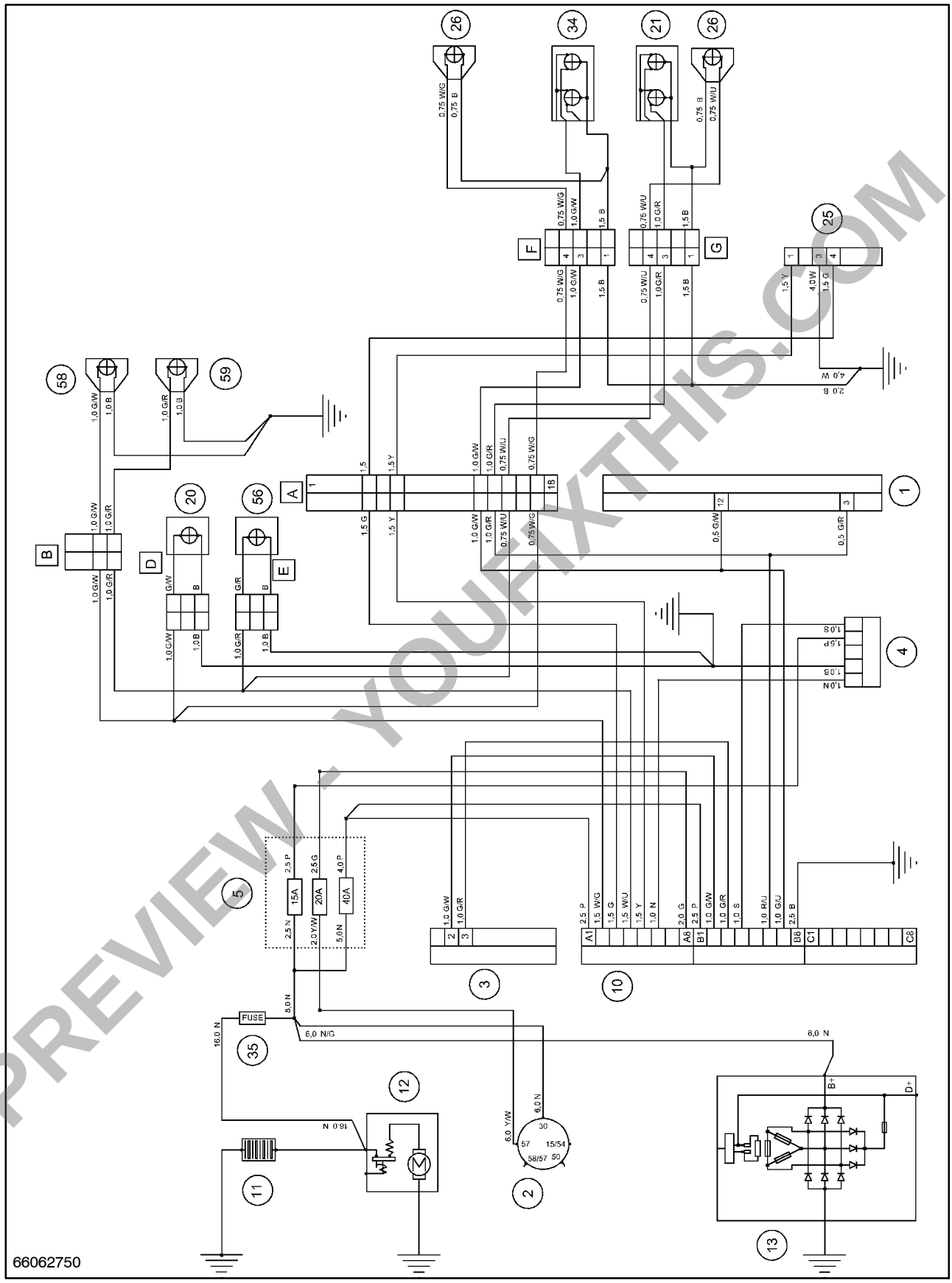
Timing System	overhead valves operated camshaft located in engine block through tappets, pushrods and rockers; camshaft is driven by the crankshaft through helical gears
Intake:	
- start: before TDC	12°
- end: after BDC	31°
Exhaust:	
- start: before BDC	50°
- end: after TDC	16°
Valve clearance for timing check	0.45 mm (0.0177 in.)
Valve clearance for normal running (engine cold):	
- intake	0.30 ± 0.05 mm (0.01 ± 0.002 inches)
- exhaust	0.30 ± 0.05 mm (0.01 ± 0.002 inches)

CRANKCASE/CYLINDER BLOCK DATA	**mm (in)**
Cylinder block	cast-iron monobloc with parent-bore cylinders, incorporating seatings for crankshaft bearings, camshaft and pushrod/tappet assemblies
Internal diameter of cylinders	104.000 to 104.024 (4.094 - 4.095)
Maximum permissible cylinders ovality or taper due to wear ([1])	0.12 (0.004)
Diameter of main shell bearing seats	84.200 to 84.230 (3.314 - 3.316)
Diameter of camshaft bearing seats:	
- front	54.780 to 54.805 (2.156 - 2.157)
- center	54.280 to 54.305 (2.137 - 2.138)
- rear	53.780 to 53.805 (2.117 - 2.118)
Diameter of standard tappet bores in crankcase	15.000 to15.018 (0.590 -0 .591)
Tappet oversizes	0.1 - 0.2 - 0.3 (0.004 - 0.007 - 0.011)

([1]) Measure in the area swept by piston rings, both parallel and perpendicular to the crankshaft axis.

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DIRECTION INDICATOR AND HAZARD WARNING LIGHT CIRCUIT

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TIGHTENING TORQUES

ANGULAR TORQUE DATA

PART (Refer to Figure 7)	Thread size	Preliminary torque		Angle
		Nm	ft-lb	
Cylinder head bolts (1)	M 12 x 1.25	70	51	90° + 90°
Main bearing cap bolts (2)	M 14 x 1.5	80	59	90°
Big-end cap bolts (3)	M 11 x 1.5	40	29	60°
Flywheel mounting bolts (4)	M 12 x 1.25	40	29	60°
Rocker shaft pedestal bolts (5)	M 8	25	18	
Crankshaft hub retaining nut (6)	M 30 x 1.5	294	216	
Fan and alternator pulley bolts (7)	M 10 x 1.25	55	40	
Additional counterweight retaining bolts	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	40	
Coolant pump retaining bolts	M 10 x 1.25	55	40	
Rocker cover nuts	M 8	15	11	
Rocker shaft pedestal bolts	M 8	25	18	
Oil pump and pump cover retaining bolts	M 8	25	18	
Timing gear case and cover bolts	M 8	25	18	
Intermediate flanged journal bolts	M 10 x 1.25	55	40	
Camshaft thrust plate retaining bolts	M 8	35	26	
Rear crankcase cover bolts	M 8	25	18	
Tappet adjuster screw locknuts	M 8	22	16	
Nuts for injector mounting studs	M 8	25	18	
Exhaust manifold retaining bolts	M 8	25	18	
Injection pump mounting bolts	M 8	25	18	
Sump pan retaining bolts to – inner rear timing cover and gear case – cylinder block and flywheel case • JX60, JX70, JX80 and JX90 Models • JX95 Models	 M 10 X 1.25 M 10 X 1.25 M 10 X 1.25	 39 – 49 49 – 59 49 – 69	 28 – 36 36 – 43 36 – 51	

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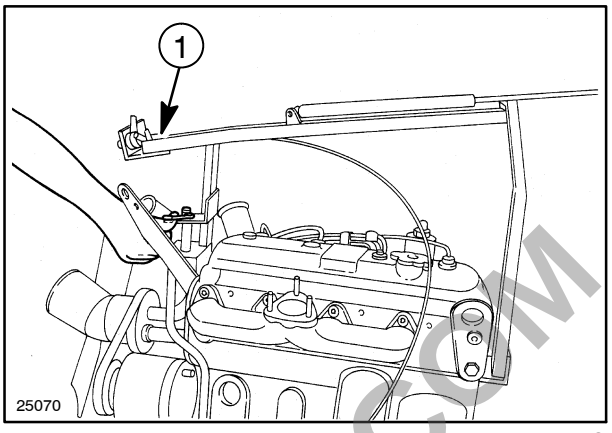
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Disassembly

CAUTION

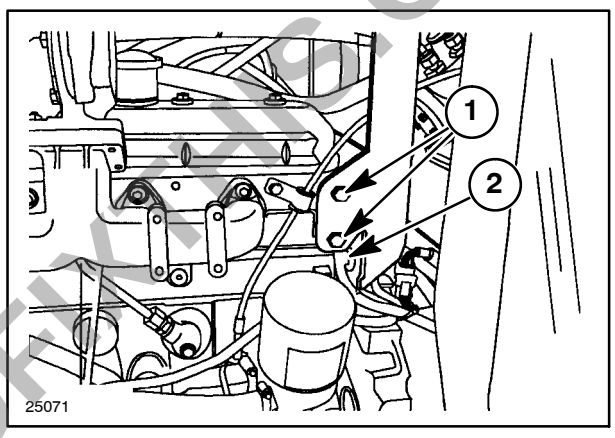
Handle all parts carefully. Do not put your hands or fingers between parts.
Wear suitable safety clothing – safety goggles, gloves and shoes.

1. Remove the front and rear retaining screws from the hood stay bracket (1).



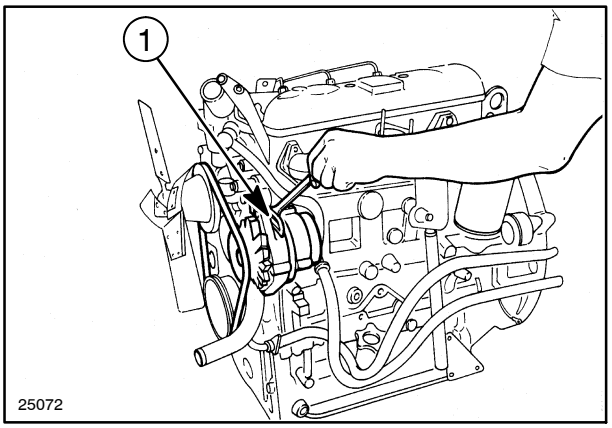
53

2. Remove the hood catch support side retaining bolts (1) and rear retaining bolts (2). Remove the hood catch and stay bracket.



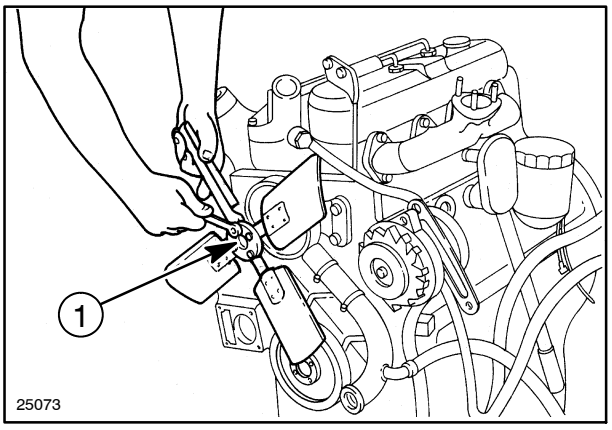
54

3. Loosen the alternator pivot bolt.
4. Loosen the belt tension adjustment bolt (1).
5. Release the belt tension adjustment arm by unscrewing the retaining nut.
6. Remove the alternator and coolant pump drive belt.



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7. Unscrew the bolts securing the fan (1) and pulley to the coolant pump. Remove the fan and pulley.



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TROUBLESHOOTING

Problem	Possible Cause	Remedy
Engine lacks power and runs unevenly. (continued)	Fuel supply pump damaged.	Replace fuel supply pump.
	Incorrect valve clearances.	Adjust valve clearances.
	Cylinder compression low.	Test compression and overhaul engine if necessary.
	Air filter clogged.	Clean air filter unit and replace element if necessary.
	Tierod in linkage between accelerator and injection pump incorrectly adjusted.	Adjust to correct length.
	Maximum speed screw on injection pump incorrectly adjusted.	Adjust max. speed screw.
Engine produces abnormal knocking noises.	Injectors partially obstructed or damaged.	Clean, overhaul and calibrate injectors.
	Impurities accumulating in fuel lines.	Clean fuel lines and replace severely dented pipes. Clean injection pump if necessary.
	Incorrect injection pump timing.	Adjust injection pump timing.
	Crankshaft knocking due to excessive play in one or more main or big-end bearings or excessive endfloat.	Regrind crankshaft journals and crankpins. Install oversize shell bearings and thrust washers.
	Crankshaft unbalanced.	Check crankshaft alignment and balance; replace if necessary.
	Flywheel bolts loose.	Replace any bolts that have worked loose and tighten all bolts to the specified preliminary and angular torque values.
	Connecting rod axes not parallel.	Straighten connecting rods, check axes parallelism; replace connecting rods if necessary.
	Piston knock due to excessive wear.	Rebore cylinders and install oversize pistons.
	Noise caused by excessive play of gudgeon pins in small-end and piston bushings, or loose fit of small-end bushing.	Install oversize gudgeon pin, rebore piston seats and small-end bushings. Replace bushings.
	Excessive tappet / valve noise.	Check for broken springs or excessive play between valve stems and guides, cam followers and bores. Adjust valve clearances.

(continued)

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CRANKSHAFT AND BEARINGS DATA	mm (in)
Crankshaft	balanced with integral counterweights
Standard journal diameter	79.791 to 79.810 ([1]) (3.141 - 3.142) ([1])
Journal undersizes	0.254 - 0.508 - 0.762 - 1.016 (0.01 - 0.02 - 0.03 - 0.04)
Standard main bearing shell thickness	2.168 to 2.178 (0.085 - 0.086)
Main bearing shell undersizes (internal diameter)	0.254 - 0.508 - 0.762 - 1.016 (0.01 - 0.02 - 0.03 - 0.04)
Bearing shell to journal clearance	0.034 to 0.103 (0.001 - 0.004)
Maximum permitted wear clearance	0.180 (0.007)
Standard crankpin diameter	63.725 to 63.744 ([1]) (2.508 - 2.510) ([1])
Crankpin undersizes	0.254 - 0.508 - 0.762 - 1.016 (0.01 - 0.02 - 0.03 - 0.04)
Standard big-end bearing shell thickness	1.805 to 1.815 (0.0710 - 0.0714)
Big-end bearing shell undersizes (internal diameter)	0.254 - 0.508 - 0.762 - 1.016 (0.01 - 0.02 - 0.03 - 0.04)
Big-end bearing shell to crankpin clearance	0.033 to 0.087 (0.001 - 0.003)
Wear limit endfloat	0.180 (0.007)
Standard crankshaft thrust washer thickness	3.378 to 3.429 (0.132 -0 .135)
Thrust washer oversizes (thickness)	0.127 - 0.254 - 0.381 - 0.508 (0.005 - 0.01 - 0.015 - 0.02)
Width of main bearing including thrust washers	31.766 to 31.918 (1.250 - 1.256)
Width of corresponding crankshaft journal	32.000 to 32.100 (1.259 - 1.263)
Crankshaft assembly endfloat	0.082 to 0.334 (0.003 - 0.013)
Maximum permitted wear endfloat	0.40 (0.015)
Maximum ovality or taper of worn journals and crankpin after regrinding	0.01 (0.0004)
Maximum ovality or taper of journals and crankpin	0.05 (0.002)
Maximum tolerance for alignment of crankshaft journals with crankshaft supported on the two outer journals	0.10 (0.004)
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 (0.010)
Maximum tolerance for runout between the outer surfaces of the crankshaft journals and the crankshaft centerline	± 0.10 (0.004)

(continued)

([1]) Crankshafts with 0.1 mm (0.004 in) undersize journals, crankpins and, consequently, undersize bearing shells may be installed in factory production.

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SECTION 10 – ENGINE

BOOK 1 - 87649367

Chapter 2 – Cooling System

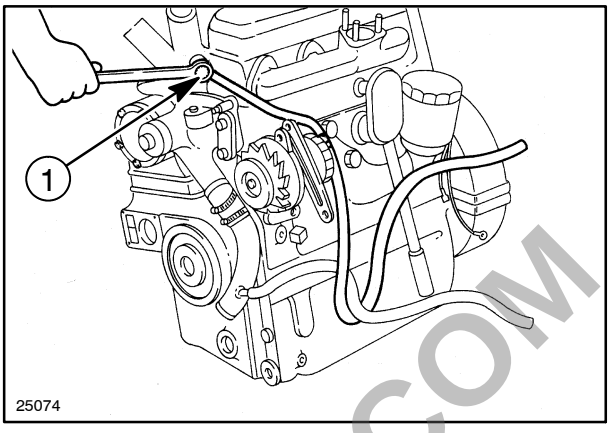
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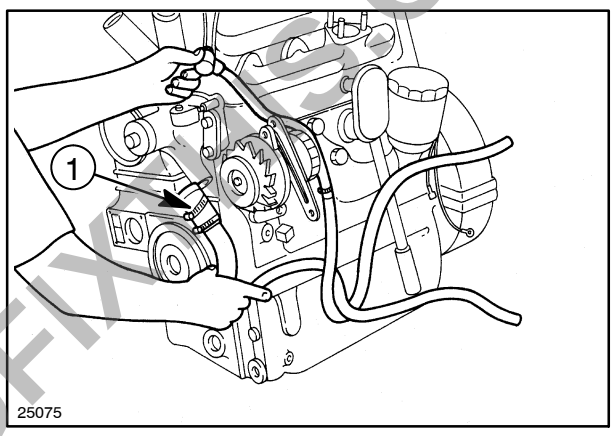
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8. Unscrew the union (1) from the water supply pipe to the cab heater.



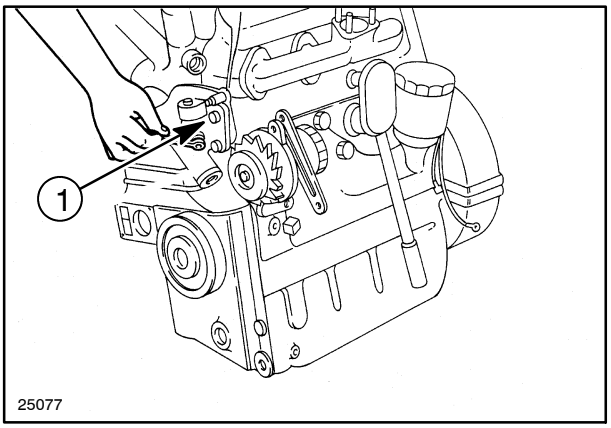
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9. Loosen the hose clamp (1) and detach the hose from the coolant pump. Remove the curved hose and flexible cab heater hoses.



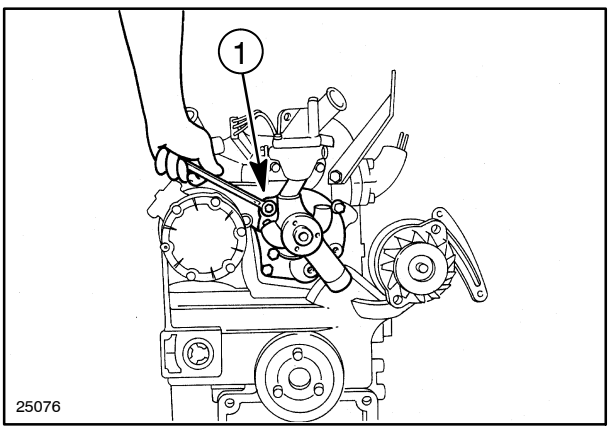
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10. Remove the union (1) in order to gain access to the pump retaining bolt.



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11. Unscrew the coolant pump retaining bolts (1) and remove the pump.



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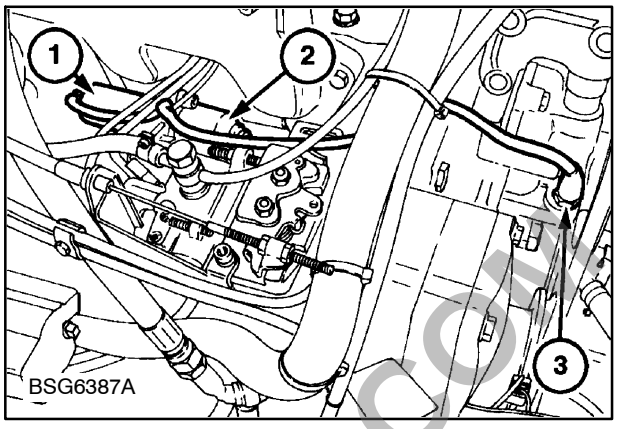
Function

The temperature switch, located on the right side of the water pump, 3, receives a supply of 12 volts DC from the fuel pump shutoff solenoid. The shutoff solenoid receives power with the key/start switch in the ON position. The temperature switch normally remains OPEN. The temperature switch differs from the naturally aspirated and turbocharged models.

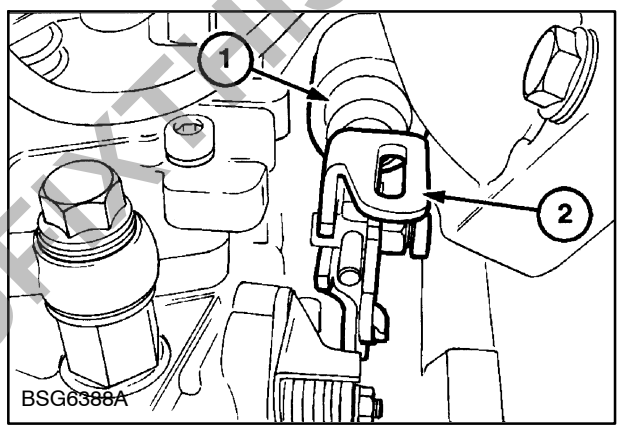
On turbocharged equipped engines, the temperature switch consists of a black wire connector, and the switch closes at 30°C (86°F). On naturally aspirated (NA) engines, the switch consists of a blue wire connector, and the switch closes at 55°C (131°F). The NA engine temperature switch allows the 6 degree cold-start advance timing to run a longer period of time.

A wax element, 1, transmits motion through linkage, 2, to rotate the roller ring, thereby advancing pump timing 5° to 6° for engine cold starting.

After starting the engine, the temperature switch closes when coolant temperature within the water pump reaches the prescribed temperature. The temperature sender now supplies power to the KSB heating element. When the wax element heats, the wax expands, and moves the linkage to return the pump timing to the normal setting.



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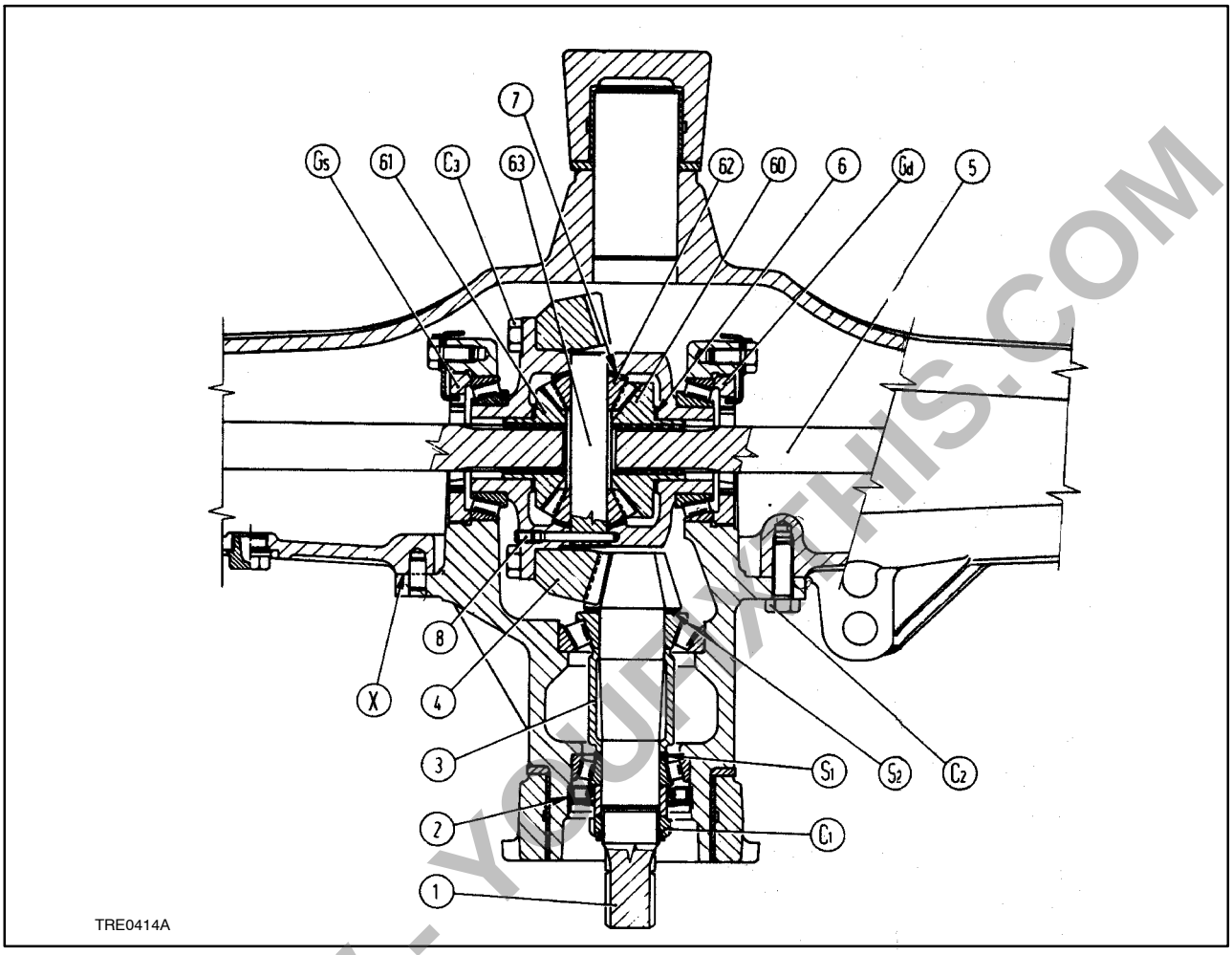
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DESCRIPTION OF OPERATION

SECTIONAL VIEWS



2

Cross-sectional view of front axle differential

X = 0.5–1 mm (0.019 - 0.039 ins)
S1 = Pinion bearing shim
S2 = Pinion position shim

C1 = Pinion bearing lockring.
C2 = Differential carrier capscrew.
C3 = Ring gear capscrew.

Gd, Gs= R.H. and L.H. Differential bearing lock-ring.

1. Pinion
2. Seal
3. Pinion bearing spacer
4. Ring gear
5. Axle shaft with universal joint
6. Side gear washers
7. Differential pinion washers
8. Differential pinion journal capscrew
60. Side gear
61. Side gear
62. Differential pinion
63. Differential pinion journal

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(continued)

		JX60 and JX70	JX80, JX90, and JX95
Ground speed PTO. Rear wheel speed with PTO shaft rotating at 540/750 rev/min (30 and 40 km/h versions)	wheel speed rev/min	as for single-speed PTO	
Ground speed PTO. Rear wheel speed with PTO shaft rotating at 1000 rev/min (30 km/h version)	wheel speed rev/min	14.1	15.2
Ground speed PTO. Rear wheel speed with PTO shaft rotating at 1000 rev/min (40 km/h MFD version)	wheel speed rev/min	11.51	12.4
Diameter of PTO shaft at splined end:			
- 540/750 rpm	rev/min	1-3/8 in. (6-spline)	
- 1000 rpm	rev/min	1-3/8 in. (21-spline)	
External diameter of driven gear support bushings	mm (in)	49.925 - 49.950 (1.9655-1.9665)	
Internal diameter of driven gears	mm (in)	50.050 - 50.089 (1.9705-1.9720)	
Clearance between driven gears	mm (in)	0.100 - 0.164 (0.0039-0.0065)	
Diameter of driven shaft at front and center bushings	mm (in)	39.166 - 39.191 (1.5420-1.5429)	
Diameter of driven shaft at rear bushing	mm (in)	34.984 - 35.000 (1.3773-1.3780)	
Internal diameter of front and center bushing	mm (in)	39.200 - 39.239(1.5433-1.5448)	
Internal diameter of rear bushing	mm (in)	35.009 - 35.048 (1.3783-1.3798)	
Clearance between shaft and front and center bushings	mm (in)	0.009 - 0.073 (0.0004-0.0029)	
Clearance between shaft and rear bushing	mm (in)	0.009 - 0.064 (0.0004-0.0029)	

SPECIAL TOOLS

Important - The operations described in this section must be performed solely with the **ESSENTIAL** tools marked below with **(X)**.
To work in complete safety and to ensure optimal technical results with a minimum of time and effort, they must however be supplemented with the specific tools recommended below and with those to be specially constructed by you and for which the construction diagrams are given in this manual.

380000227 Hook for lifting PTO

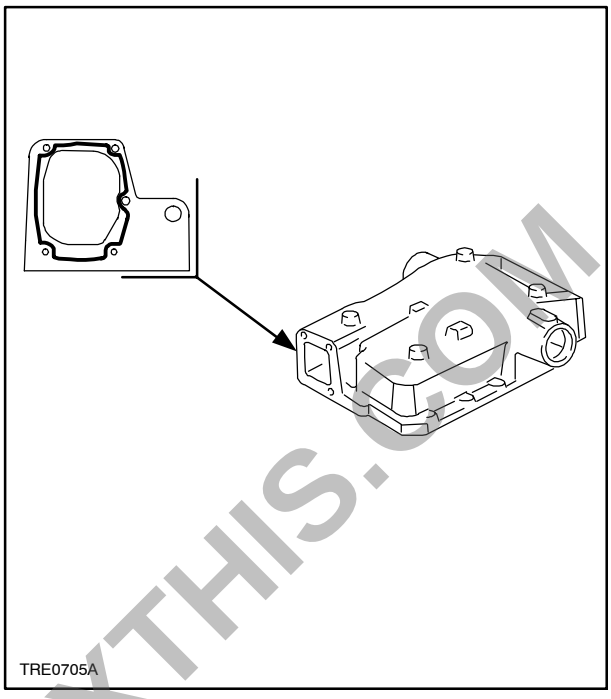
380001597 Guide pins for PTO unit

380000223 Installer for PTO driving shaft bearings

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6. Install the internal linkages and the corresponding eccentric pin. Fasten the eccentric pin by tightening the securing bolts.
7. Install the control levers, friction discs, snap rings, and stud bolts.
8. Install the spring and the bracket which secures the lever unit.
9. Install the internal position control lever.
10. Install the internal linkages and the Fast Raise/ Lower control device.
11. Install the cylinder with piston. Tighten the bolts.
12. Install the internal linkages and connect to the cylinder.
13. Clean the mating surfaces thoroughly and apply a 2 mm (0.0787 in.) diameter strip of sealing compound to the lift box, as shown in fig. 40.
14. Install the hydraulic control valve block on the lift housing and tighten the bolts. Make the following adjustments.
15. Proceed with Mechanically Operated Hydraulic Lift Adjustments.

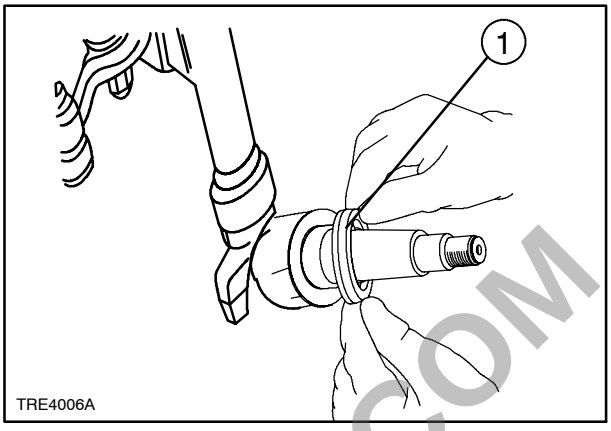


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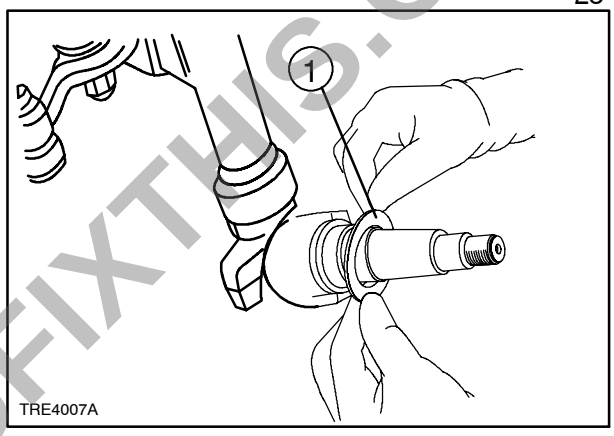
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13. Remove black (Twin lip) wheel bearing seal (1).



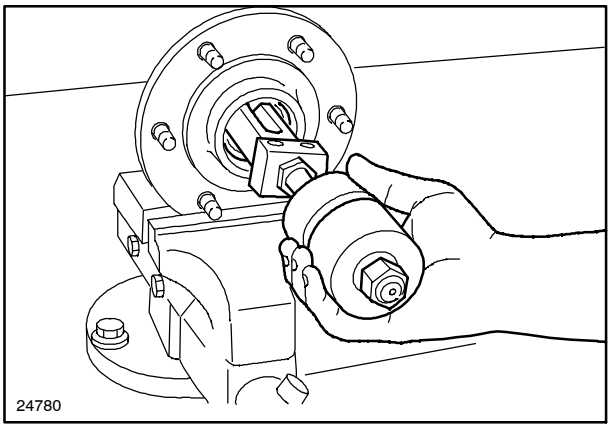
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14. Remove white back up ring (1).



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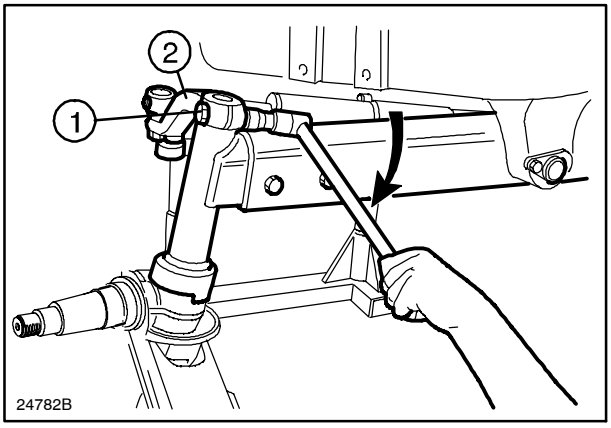
15. Replace worn bearings and seals, using suitable extractors and punches.



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Installation

1. Place a hydraulic jack beneath the stub axle and unscrew the bolt (1) fixing the control lever (2) to the stub axle pin.

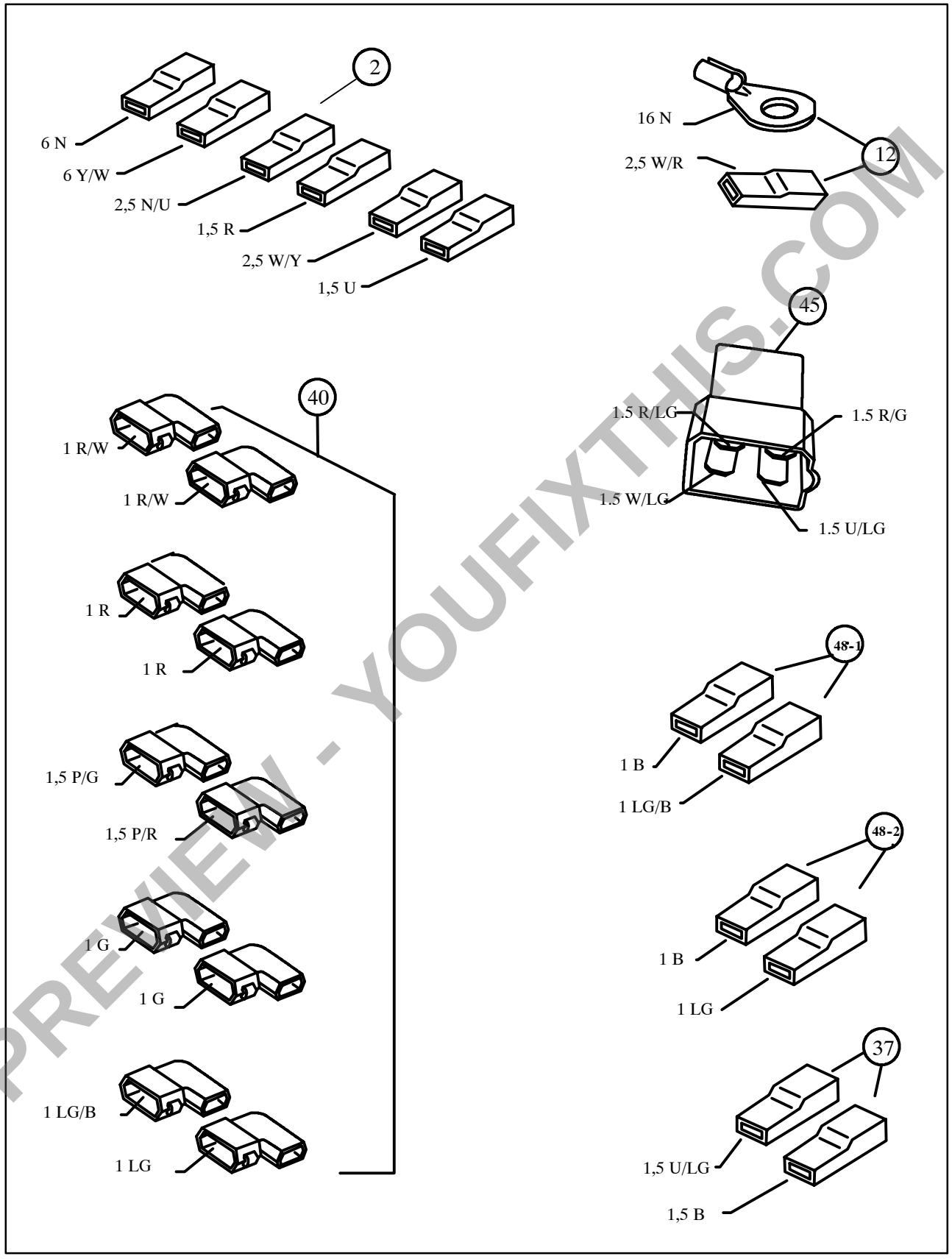


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Connector Overview



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