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CAPACITIES AND LUBRICANTS

Engine Oil
- Capacity with filter replacement ..... 10.7 litres
- Type of oil ..... refer to “Engine oil recommendations”

Engine cooling system
- Capacity ..... 16.5 litres
- Type of collant solution ..... refer to “Fluids and lubricants”

Fuel tank
- Capacity ..... 120 litres
- Type of fuel ..... refer to “Fluids and lubricants"

Hydraulic system
- Total hydraulic system capacity ..... 90 litres
- Hydraulic reservoir filling capacity with filter replacement ..... 45 litres
- Hydraulic reservoir filling capacity without filter replacement ..... 43 litres
- Type of fluid ..... refer to “Fluids and lubricants”

Transmission
- Total system ..... 19 litres
- Filling with or without filter replacement ..... 15 litres
- Type of oil ..... API cd/se grade 10W30

Front and real Axle
- Axle center housing ..... 8 litres
- Axle hubs (each) ..... 4.5 litres
- Type of oil ..... API GL5 grade EP 85 w 140

Brake fluid
- Fluid type ..... LHM brake fluid

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RADIATOR REMOVAL

Put identification tags on all disconnected hoses and wires. Close disconnected hoses and fittings with caps and plugs.

STEP 1

Park the machine on a level surface. Raise the loader and install the support strut to hold the loader.

STEP 2

Open the hood.

STEP 3

Remove the bolts, washers, and nuts from the pivot point on the hood.

STEP 4

Have another person help with the following procedure :

A. Remove the retainers from the hood struts and disconnect the hood struts from the stud.

B. Remove the hood from the machine.

STEP 5

Slowly remove the radiator cap.

> **WARNING :** *Do not remove the cap when the engine is hot. The circuit is still under pressure and you could be scalded.*

NOTE : *During installation, fill the radiator and coolant reservoir completely. See Section 1002 for coolant specifications. Start and run the engine until the coolant is at operating temperature. Stop the engine and check for leakage. When the coolant is cold, check the coolant reservoir level. Add coolant as required. Never remove the radiator cap to check the coolant level in the radiator.*

STEP 6

Depressurize the hydraulic system as follows see section 8002.

STEP 7

Disconnect the hoses from the hydraulic filter.

STEP 8

Remove and fit blaks to the expansion reservoir hoses.

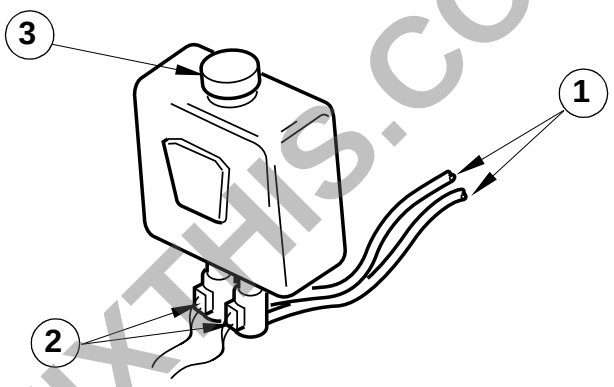
STEP 9

Tag and disconnect the wires on the audible warning device.

STEP 10

Tag and disconnect the wires on the hydraulic filter obstruction indicator.

STEP 11



789M250A

Release the fluid pipes (1) and electrical connections (2) to the screen wash bottle (3) and tie back to the chassis.

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595SLE AND 595LS MACHINES (Engine in the Perkins manual)

Specifications

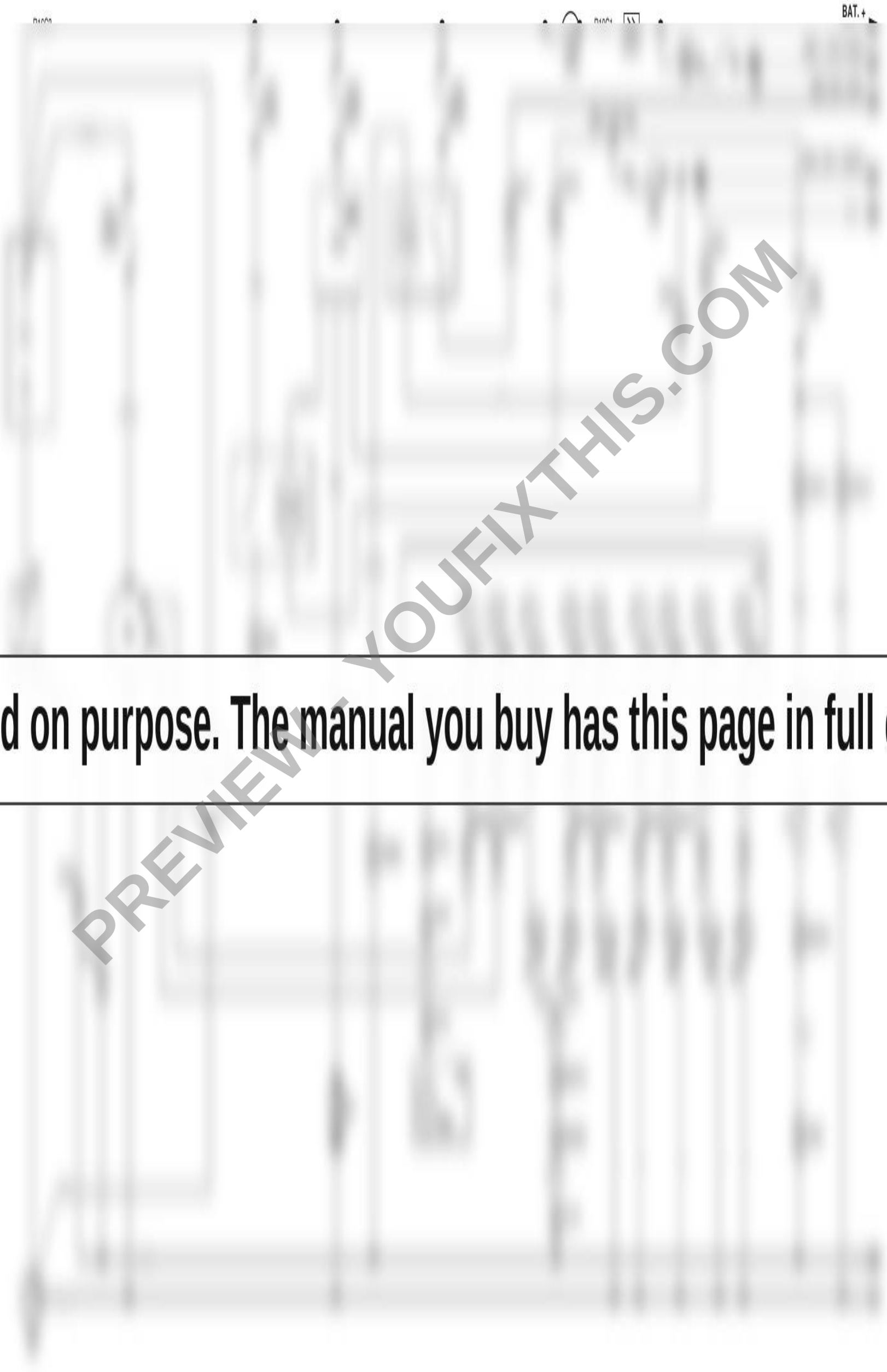
Engine model No	1004 - 40T
Bore	100 mm
Stroke	127 mm

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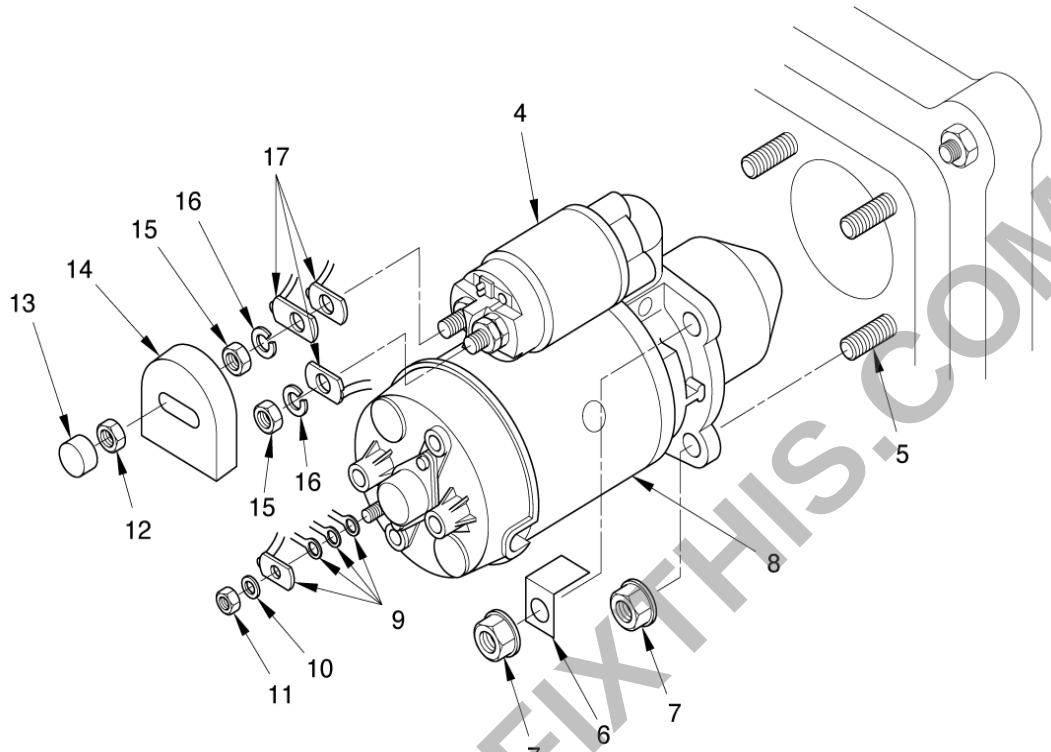
BATTERY MASTER SWITCH	ALTERNATOR	STARTER MOTOR	START RELAY	KEY SWITCH THERMOSTART	BATTERY RELAY IGNITION ENGINE FAULT LAMP	ENGINE TACHOMETER	ALTERNATOR CHARGING	FUEL LEVEL	AIR FILTER PRESSURE	ENGINE COOLANT MAXI T°	ENGINE COOLANT T°	ENGINE OIL PRESSURE	TRANSMISSION OIL TEMPERATURE	HYDRAULIC OIL FILTER RESTRICTION	ENGINE STOP SOLENOID	ENRICHMENT SOLENOID



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CALIBRATION

Mode type calibration

1. Park the machine on a level surface.
2. Make sure that the area around and above the machine is free from obstructions and personnel.
3. With the engine running, press the red emergency stop button to isolate the hydraulic management unit.
4. Plug the diagnostic terminal into test socket on the side instrument panel.
5. Twist the emergency stop button to reset the system.
6. The terminal display will show :

Waiting for HMU

7. The terminal display will show :

FERMEC P100 DBD V - X.X.X HMU V - X.X.X

8. The terminal display will show :

ENGLISH “Y” or “N”

NOTE : *If N is selected, the calibration procedure can be displayed in French, German, Spanish, Italian or Danish.*

Once the required language has been selected.

9. The terminal display will show :

Calibrate ? “Y” or “N”

NOTE : *If N is selected, the diagnostic terminal will go to monitor steering, see page 9.*

Press Y on the diagnostic terminal.

10. The terminal display will show :

Machine Type is Fermec 965 “Y” or “N”

NOTE : *Three different model configurations are available. Fermec 960, Case 595LSP or Case 595SLE models.*

Press Y or N on the diagnostic terminal to choose the correct machine.

11. The terminal display will show :

Waiting for HMU

12. The terminal display will show :

Checking HMU is set to correct machine

If the machine type is correct, the diagnostic terminal will go to Calibrate steering, see page 4.

If the machine type is incorrect, the diagnostic terminal will return to Calibrate, see step 9

NOTE : *H.M.U. automatically retains the language which was last used and also the machine type (model).*

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TROUBLESHOOTING PROCEDURES

Check the machine for oil leaks and damaged or missing parts. Repair as required.

Is the oil in the hydraulic reservoir at the correct level ?
- NO → Fill the hydraulic reservoir with the oil specified in Section 1002.
- YES ↓

Are the hydraulic hoses connected correctly ?
- NO → Connect the hoses in accordance with the hydraulic schematic.
- YES ↓

With the oil at operating temperature and the engine running at low idle, is the steering wheel difficult to turn ?
- NO → Troubleshooting procedure complete.
- YES ↓

Has the emergency stop button been reset ?
- NO → Twist the emergency stop button to reset the hydrauic system.
- YES ↓

Has the hydraulics enable switch been set on ?
- NO → Set the hydraulics enable switch to on.
- YES ↓

Did the green light in the hydrauics enable switch come on ?
- NO → Replace the bulb in the hydraulics enable switch.
- YES ↓

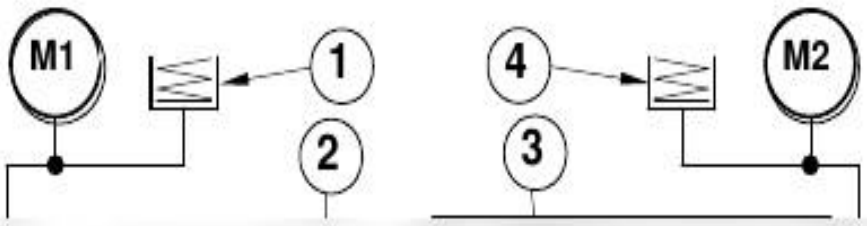
Is the green light in the hydraulics enable switch flashing twice per second ?
- NO → Continue with the procedure.
- YES ↓

Is the driver sat in the seat ?
- NO → The warning is given if the driver is not seated.
- YES ↓

Has the light stopped flashing ?
- NO → Replace the seat pressure switch.
- YES ↓

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HYDRAULIC SCHEMATIC



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595SLE/595LSP LOADER BACKHOE SERVICE MANUAL

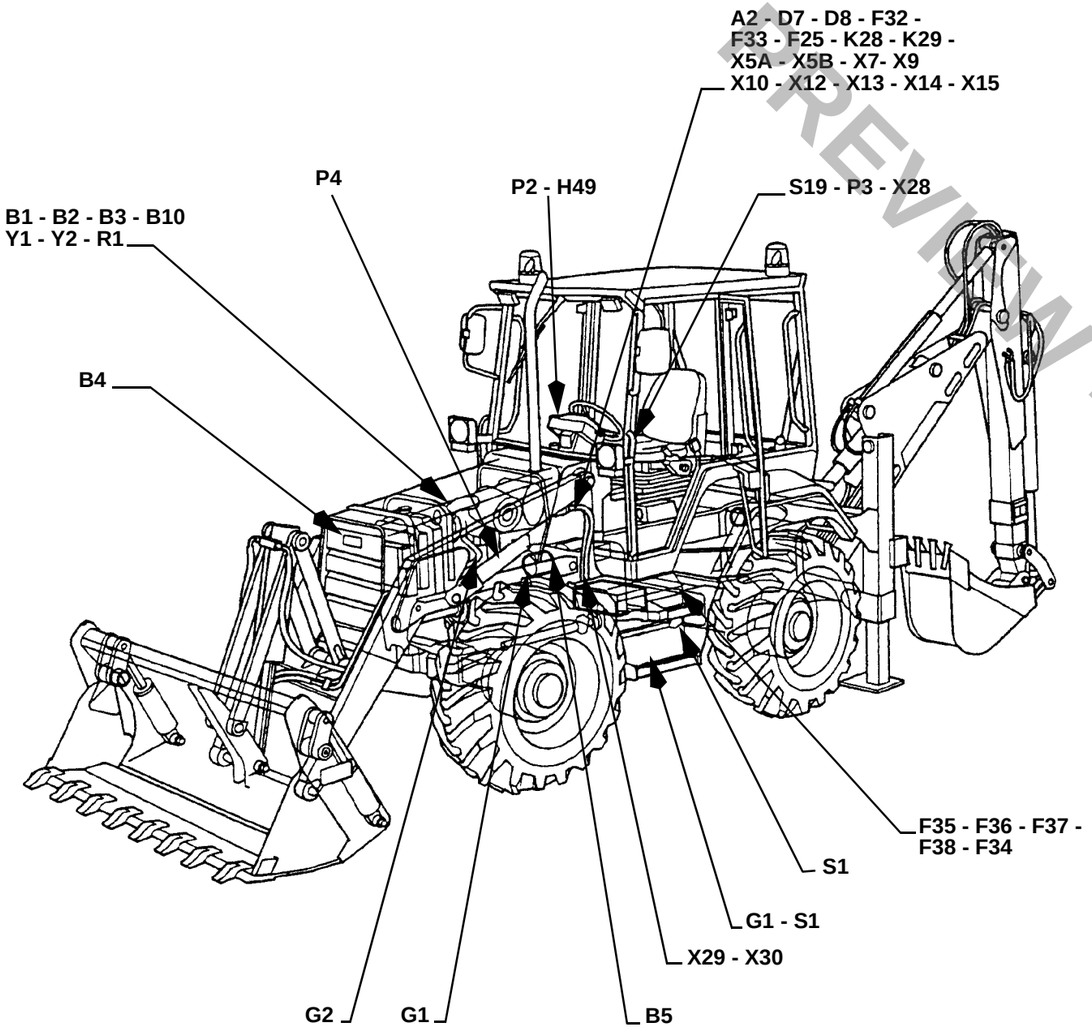
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	Fluids and lubricants	1002	7-22480GB
2	**ENGINE**		
	Engine and radiator removal and installation	2000	7-21290GB
	Specifications details	2401	7-26610GB
3	**FUEL SYSTEM**		
4	**ELECTRICAL**		
	Electrical schematic	4001	7-26620GB
	Battery	4003	7-21330GB
	Starter motor	4004	7-21340GB
	Removal and installation of electrical components	4005	7-21350GB
	Alternator	4007	7-23790GB
	Steering, loader and backhoe calibration	4008	7-26530GB
5	**STEERING**		
	Removal and installation of steering components	5000	7-23810GB
	Steering specifications, pressure checks and troubleshooting	5001	7-21900GB
	Steering control valve	5002	7-21390GB
	Steering cylinder	5003	7-21400GB
	Front axle, four wheel drive machine/four wheel steer machine	5007	7-21890GB
6	**POWER TRAIN**		
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	Transmission specifications, pressure checks and troubleshooting	6002	7-21430GB
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	Gear box	6007	7-22560GB
	Rear axle-four whell steer	6008	7-21600GB
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	Disassembly and assembly of brake components	7003	7-23190GB
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9	**MOUNTED/EQUIPMENT**		
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	Removal and installation of components	9011	7-23850GB

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WIRING DIAGRAM (PLATE A)



CS99F501

ENGINE

B1 Engine air filter pressure switch
B2 Engine water temperature switch
B3 Engine oil pressure switch
B10 Engine water maxi temperature switch
G2 Alternator
M1 Starter motor
R1 Thermostart
Y1 Engine stop solenoid
Y2 Enrichment solenoid

CHASSIS

B4 Hydraulic oil filter pressure switch
B5 Transmission oil temperature switch
F34 125A, Fuse
F35 80A, Fuse
F36 80A, Fuse
F37 40A, Fuse
F38 20A, Fuse
G1 Battery
P4 Fuel sender
S1 Battery master switch

CAB

A2 Relay fuse board
K28 Battery relay (ignition)
K29 Start relay
H49 Engine fault warning lamp
P2 Front control panel
P3 Side console panel
S19 Key switch

RELAY FUSE BOARD

F25 7.5A, Fuse
F32 5A, Fuse
F33 5A, Fuse
V7 Diode
V8 Diode

CONNECTOR

X5A Connector relay fuse board
X5B Connector relay fuse board
X7 Connector relay fuse board
X9 Connector relay fuse board
X10 Connector relay fuse board
X12 Connector relay fuse board
X13 Connector relay fuse board
X14 Connector relay fuse board
X15 Connector relay fuse board
X28 Connector side control panel
X29 Connector engine harness
X30 Connector engine harness

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Testing the starter motor terminal voltage under load

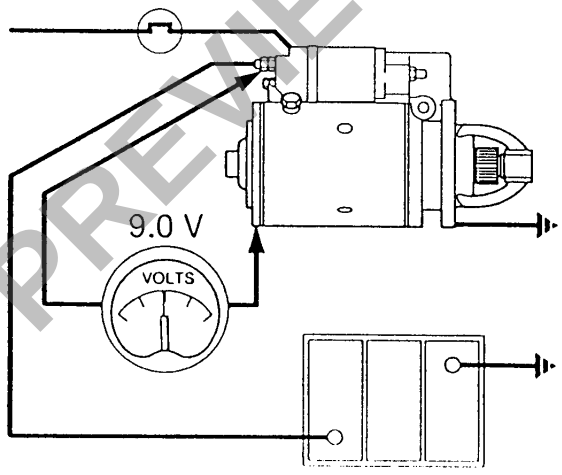
Test equipment

0 to 20 V dc voltmeter

NOTE : *This test can be made with the starter motor still installed on the machine.*

Do the starter motor terminal voltage under load test as follows:

1. Open the hood.
2. Remove the protective cover (13), the nut (12) and the cover (14), refer to page 4.
3. Disconnect the wire from the fuel injection pump, to prevent the engine from starting.
4. Connect the voltmeter between the starter input terminal and earth (end bracket). Crank the engine with the fuel cut off. The voltmeter reading should not be more than 0.5 V lower than in the battery voltage under load test, refer to page 7.
5. A low reading (more than 0.5 V difference between tests 1 and 2) indicates high resistance in cables or contacts.
6. High readings indicate high resistance in the starter motor itself.
7. Reconnect the wire to fuel injection pump if no further tests are required.
8. Install the cover (14), the nut (12) and the protective cover (13), refer to page 4.
9. Close the hood.



789M053A

Testing the voltage drop on the insulated line

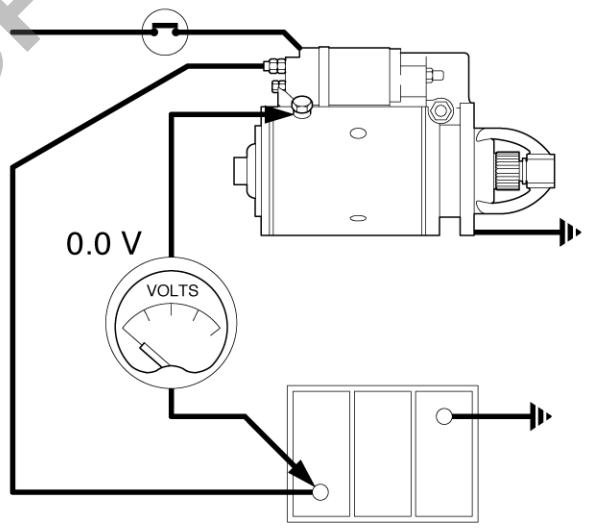
Test equipment

0 to 20 V dc voltmeter

NOTE : *This test can be made with the starter motor still installed on the machine.*

Do the voltage drop on the insulated line as follows:

1. Open the hood.
2. Connect the voltmeter between the starter terminal and the battery terminal.
3. When the starter switch is open, the voltmeter should register battery voltage. When the starter switch is closed, the voltmeter should read practically zero.
4. A high voltmeter reading indicates a high resistance in the starter circuit. Check all the insulated connections.
5. Do the voltage drop across the solenoid contacts test, refer to page 9.



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Monitor joystick diagnosis

7. The terminal display will show :

Monitor Left joystick “Y” or “N”

NOTE : *If N is selected, the diagnostic terminal will go to Monitor right joystick diagnosis, see Step 9.*

Press Y on the diagnostic terminal.

8. The terminal display will show :

L-ST 5OFE>L* X 512 Y 512 # Z 512

NOTE : *Change these values, using the joystick and check that the data displayed corresponds to the values given in note 3 on page 12.*
If this not the case, repair or replace the defective component(s) in the circuit concerned.

Key :

>	Seat forw’d	^	Seat up
L	Seat down	*	Override
<	Seat backw’d	#	Neutral switch active

Press button O⟶ to go to Monitor right joystick diagnosis.

9. The monitor display will show :

Monitor Right joystick “Y” or “N”

NOTE : *If N is selected, the diagnostic terminal will go to Calibrate, see page 3.*

Press Y on the diagnostic terminal.

10. The terminal display will show :

R-ST OOFE(*) X 512# Y 512 Z 512

NOTE : *Change these values, using the right joystick and check that the data displayed corresponds to the values given in note 3 on page 12.*
If this is not the case, repair or replace the defective comonent(s) in the circuit concerned.

Key :

(*)	T X Dump	#	Neutral switch active

Press button O⟶ , to terminate the diagnosis.

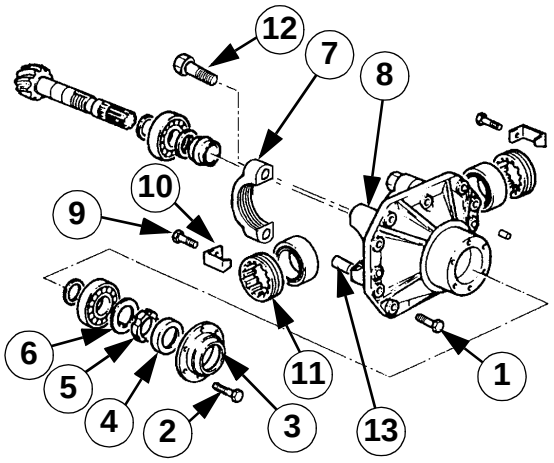
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Disassembly

STEP 1

Remove the final drive hubs and the final drive shaft (see page 5).

STEP 2



CI98M509

Remove the ten bolts (1) from the differential carrier (8).

STEP 3

Install two screws in the threaded holes in the differential carrier (8) and jack the carrier from the dowels (13).

NOTE : *The combination of the dowels and the silicone rubber sealant makes removal of the differential carrier from the axle difficult unless this jacking procedure is used.*

STEP 4

Remove the screws (2) from the pinion shaft end-cover (3).

STEP 5

Use a soft-faced mallet to separate the cover, complete with oil seal (4), from the carrier housing.

NOTE : *The seal is held in place with a silicone rubber gasket material.*

STEP 6

Prise open the staked lip on the ring nut (5) and unscrew it with wrench FS17 ≠ 2. The ring nut is tight, so a soft metal wedge must be used to prevent the pinion shaft turning. Remove the tab washer (6).

STEP 7

Mark the bearing caps (7) and carrier (8), for correct assembly.

STEP 8

Remove the bolt (9) and lock-plate (10) from each bearing cap.

STEP 9

Unscrew the ring nuts (11) from either side of the carrier.

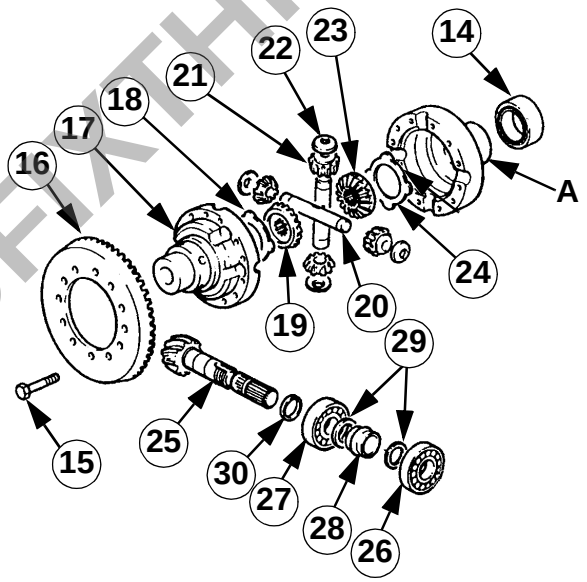
STEP 10

Remove bolts (12) and both bearing caps. Use a soft mallet to disengage the caps from the dowels (13).

STEP 11

Lift the differential and the crown wheel unit out of the carrier (8).

STEP 12



CI98M510

Pull the bearings races (14) off the differential case.

STEP 13

Mark both halves of the differential case to ensure correct assembly.

STEP 14

Remove the bolts (15) which fasten the crownwheel and differential case halves together.

STEP 15

Stand the differential case on the bearing spigot “A” with the crown wheel side uppermost (shown horizontal for clarity).

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Inspection

STEP 1

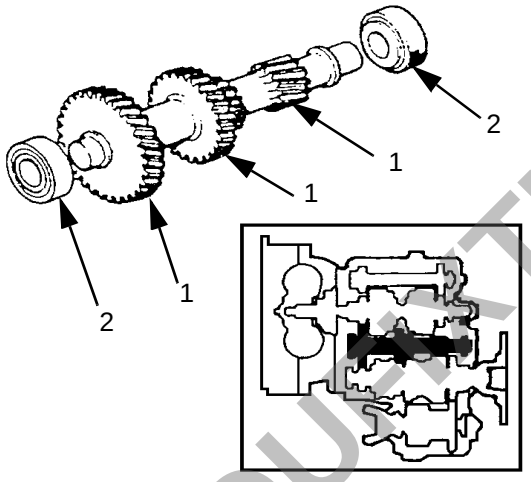
Check the teeth (1) on the gears for wear and damage. If a tooth is badly damaged, be sure to inspect the gear or spline that is in mesh with the damaged gear.

STEP 2

Check the bearings (2) for flat areas, pitting, and other damage. Replace as necessary.

STEP 3

Check the splines on the main shaft for wear and damage.



CI98G512

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Disassembly

STEP 1

Thoroughly clean the outside of the pump and the work area before starting work.

STEP 2

Remove the screws that attach the unloader valve to the pump, and remove the unloader valve.

STEP 3

Mark the end cover (19), the outer pump body (15), the inner pump body (12) and mounting flange (4) as an aid to assembling.

STEP 4

Remove the screw (20) and the washers (21).

STEP 5

Remove the end cover (19) from the outer pump body (15). It may be necessary to use a soft faced mallet to separate the components.

STEP 6

Remove and discard the O-ring seal (5) from the end cover (19).

STEP 7

Note the position of the gears (17) and (18) and the bearing plates (7) and (8) as an aid to assembling.

STEP 8

Remove the ring (6), the back-up ring (7) and the bearing plate (8) from the outer pump body (15).

STEP 9

Remove the drive gear (18) and the driven gear (17) from the outer pump body (15).

STEP 10

Remove the bearing plate (8), the back-up ring (7) and the ring (6) from the outer pump body (15). Remove the outer pump body (15) from the inner pump body (12). It may be necessary to use a soft faced mallet to separate the components.

STEP 11

Remove the spindle coupling (13) from the outer pump body (15).

STEP 12

Remove and discard the O-ring seals (14) from the outer pump body (15).

STEP 13

Remove the mounting flange (4) from the inner pump body (12). It may be necessary to use a soft faced mallet to separate the components.

STEP 14

Remove and discard the O-ring seal (5) from the mounting flange (4).

STEP 15

Remove the snap ring (3) and the shaft seal (2) from the mounting flange (4). Discard the shaft seal (2).

STEP 16

Note the position of the gears (11) and (10) and the bearing plates (8) as an aid to assembling.

STEP 17

Remove the ring (6), the back-up ring (7) and the bearing plate (8) from the inner pump body (12).

STEP 18

Remove the driven gear (11) and the drive gear (10) from the inner pump body (12).

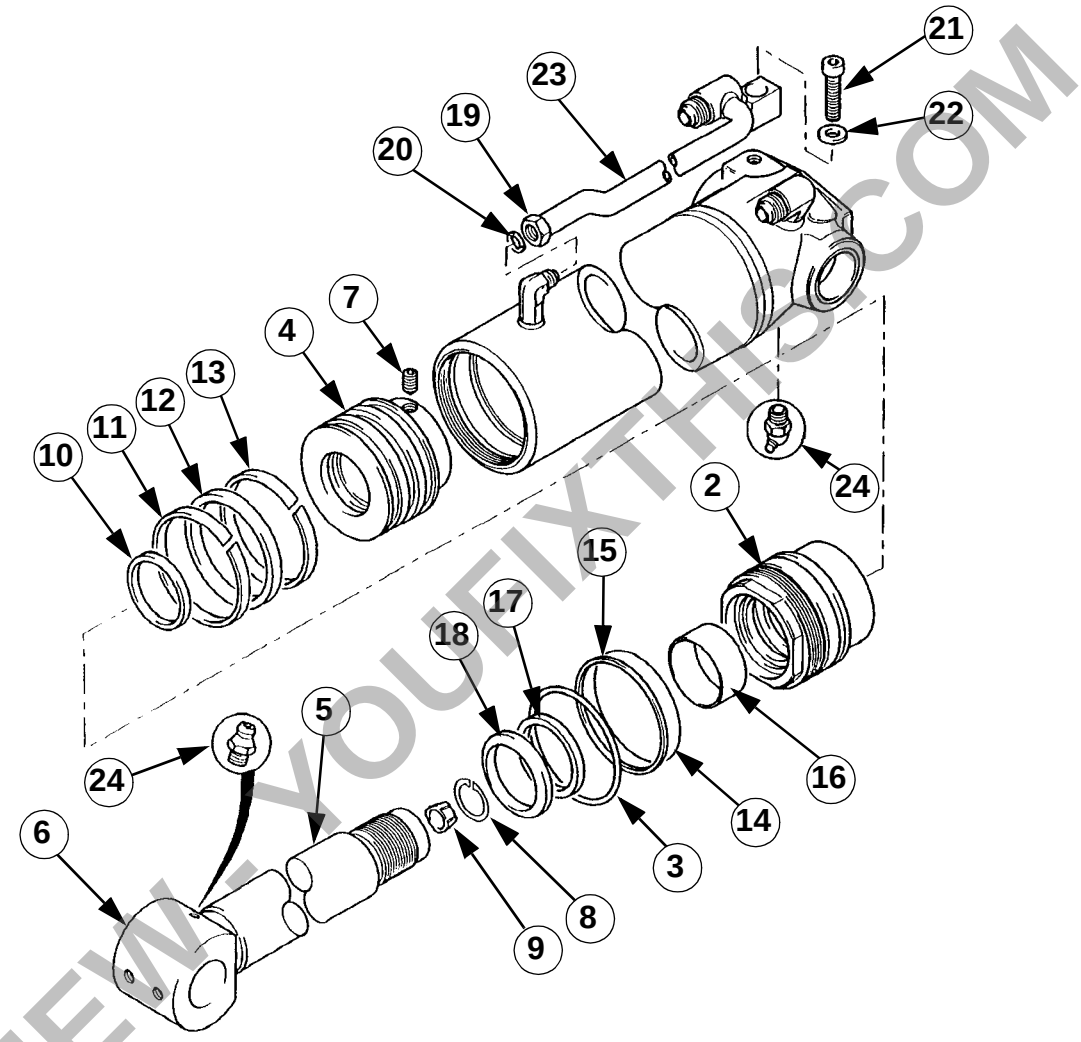
STEP 19

Remove the bearing plate (8), the back-up ring (7) and the ring (6) from the inner pump body (12).

STEP 20

Remove all sealant from the inner pump body (12), the mounting flange (4), the outer pump boby (15) and the end cover (19).

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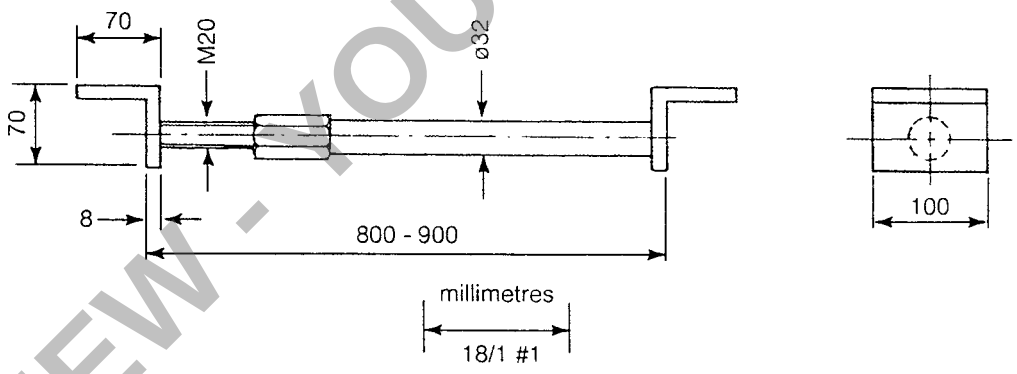
CI98K521

1. Tube
2. Gland
3. Ring
4. Piston
5. Piston rod
6. Piston rod eye
7. Stop screw
8. Snap ring
9. Dash-pot bushing
10. O-ring
11. Carrier ring
12. Seal
13. Carrier ring
14. O-ring
15. Back-up ring
16. Bushing
17. Wide seal
18. Wiper
19. Nut
20. Ring
21. Bolt
22. Washer
23. Pipe
24. Grease fitting

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SPECIAL TOOLS

- Hand press
- Multi-purpose grease
- Torque wrench 0 to 250 Nm
- Torque wrench 0 to 2500 Nm
- Rope
- Cylinder clamp
- Suitable jacks and packing
- Blanks
- Identifying tags
- “C” spanners
- Loctite 648
- Loctite 242
- Ring compressor
- Suitable lifting equipment
- Drainage container
- Lifting equipment with 100 kg capacity



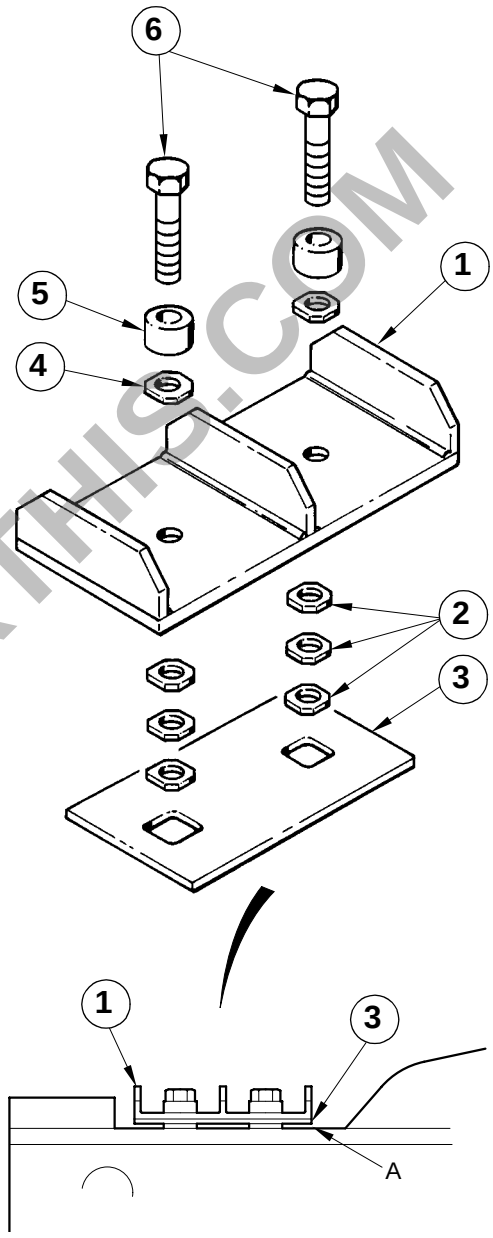
CS98M584

- Loader beam expander

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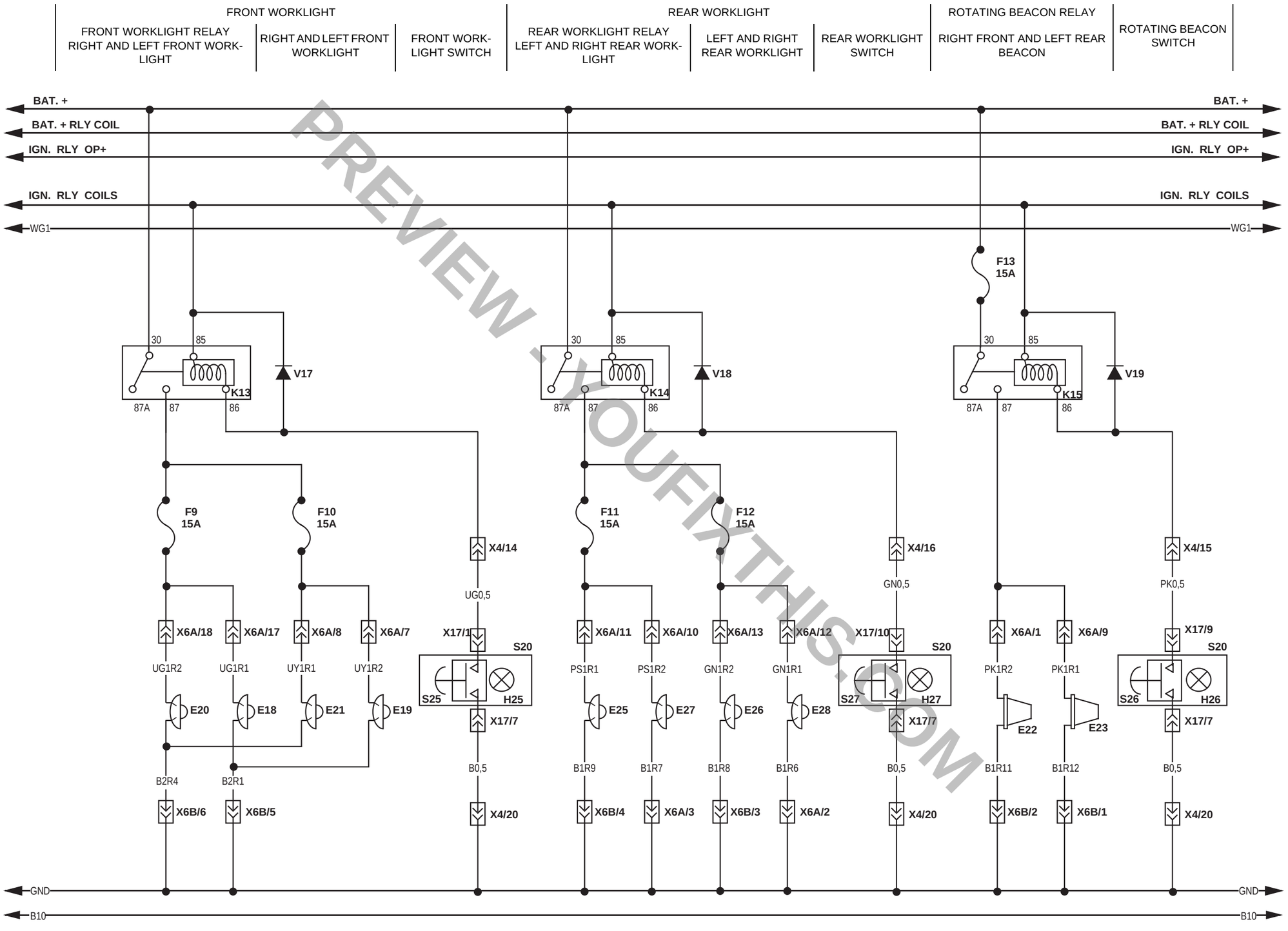
CHECKING AND ADJUSTING THE UPPER WEAR PAD

1. Position the digger to full reach and 3/4 extension of the extending dipperstick, but with the bucket 50 mm off the ground. Any wear will show as a gap between the outer wear pad (3) and the dipperstick. A maximum gap of 1 mm is permitted at A.
2. If adjustment is necessary, release both bolts (6) and remove the spacers (5) and the spare shims (4).
3. Remove the cover plate (1) and the second set of shims (2) which must be equally reduced in thickness to compensate for the measured wear. Use the spare shims removed at step 2 to obtain the correct shim thickness.
4. Install the cover plate (1) the spare shims (4), the spacers (5) and the bolts (6). Torque tighten the bolts (6) to 670 Nm.



789M395A

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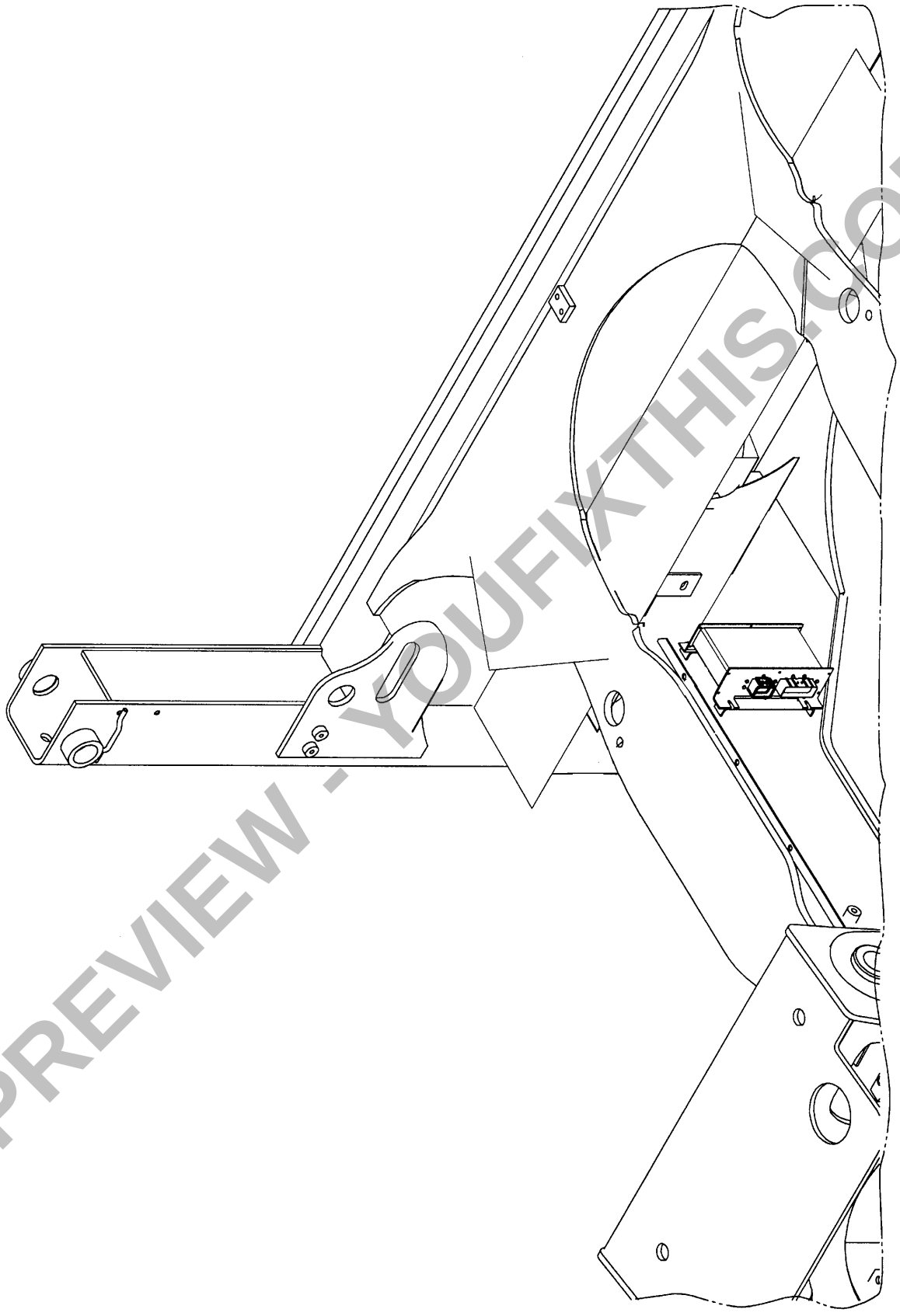
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CM99F044

Powershuttle Transmission

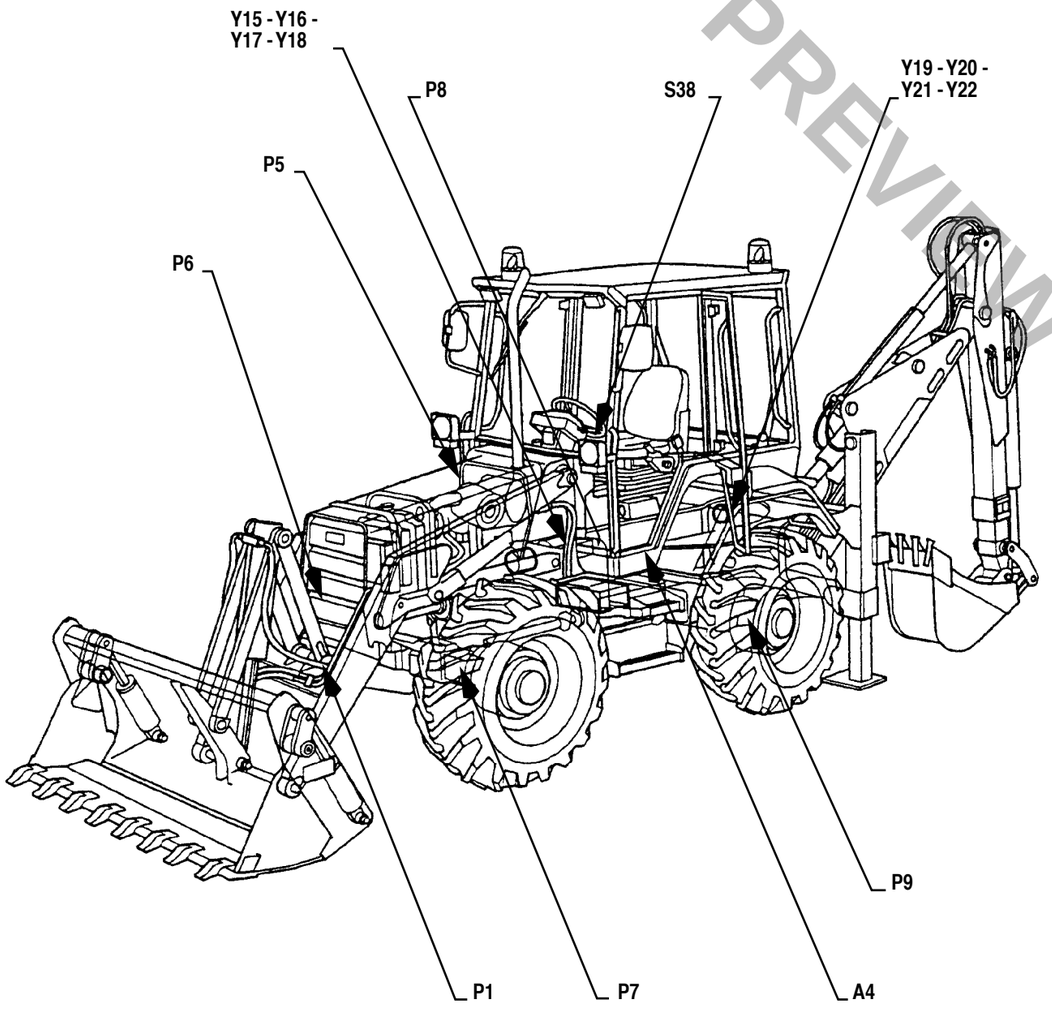
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WIRING DIAGRAM (PLATE L)

CAB

S38 Emergency stop switch

LOADER

P1 Return to dig-potentiometer
P5 Loader arms potentiometer

CHASSIS

A4 HMU
P6 Right front wheel potentiometer
P7 Left front wheel potentiometer
P8 Right rear wheel potentiometer
P9 Left rear wheel potentiometer
Y15 Steer mode solenoid
Y16 Clam solenoid
Y17 Loader beam solenoid
Y18 Loader bucket solenoid
Y19 Slew solenoid (595LSP)
Y20 Boom solenoid (595LSP)
Y21 Dipper solenoid (595LSP)
Y22 Bucket solenoid (595LSP)

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