Electrical System

Battery

Note: *Before commencing work on the batteries you must read the following procedure in Health and Safety;* ⇒ *Battery (3-5)*.

Note: *If a battery requires replacement then both batteries must be replaced.*

Battery Isolator

T3-103

To disconnect the batteries from the machine electrics a battery isolator has been fitted.

Important: *DO NOT use the battery isolator when the engine is running, this may result in damage to the machine electrics.*

⚠ CAUTION

Before carrying out arc welding on the machine, disconnect the battery and alternator to protect the circuits and components. The battery must still be disconnected even if a battery isolator is fitted.

INT-3-1-13

At the end of a working cycle or if the machine is being left unattended or if carrying out maintenance, the battery must be isolated. Before attempting to start the engine or use the machine electrics the battery isolator key must be fitted and switched on.

Note: *If the batteries are isolated, the radio may loose its preset memories.*

1 Make the machine safe. Refer to ***Prepare the Machine for Maintenance***.

2 Locate the battery isolator in the battery bay.

3 To allow the engine ECU to shutdown correctly, you must wait 30 seconds (**X**) before you isolate the battery. The 30 second period starts when you switch OFF the machine ignition.

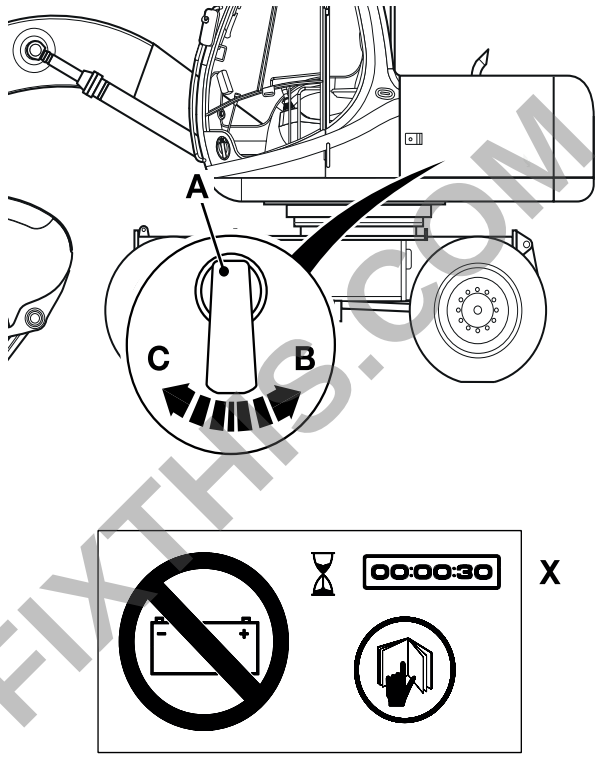


Fig 14.

4 Disconnect the batteries from the machine electrics.

a Turn the battery isolator key **A** in a counter-clockwise direction **B** and remove.

b Keep the key in a safe place and available for when the machine is next required.

To connect the batteries insert the key **A** and turn in a clockwise direction **C**.

Battery Disconnection/Connection

1 Prepare the machine. ⇒ *Prepare the Machine for Maintenance (3-25)*.

2 Gain access to the batteries. Remove the battery cover plate (if fitted).

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Hydraulic System

Introduction

⚠ WARNING

The temperature of the hydraulic oil will be high soon after stopping the engine. Wait until it cools (less than 40°C) before beginning maintenance.

8-3-4-10

⚠ WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses and gloves. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_3

⚠ WARNING

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before connecting or removing any hydraulic hose, residual hydraulic pressure trapped in the service hose line must be vented. Make sure the hose service line has been vented before connecting or removing hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11_2

⚠ CAUTION

Using incorrect fluid could damage the system. See Fluids, Capacities and Lubricants for the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.

2-3-5-1_2

⚠ CAUTION

Do not allow dirt to enter the system. Before disconnecting any part of the system, thoroughly clean around the connection. When a component has been disconnected, always fit protective caps and plugs to prevent dirt ingress.

Failure to follow these instructions will lead to dirt entering the system. Dirt in the system will seriously damage the systems components and could be expensive to repair.

INT-3-3-12

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Table 2. Torque Settings - UNF Grade 'S' Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
in.	mm	in.	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
1/4	6.3	7/16	11.2	1.1	8.3	10.0	1.0	7.4
5/16	7.9	1/2	22.3	2.3	16.4	20.0	2.0	14.7
3/8	9.5	9/16	40.0	4.1	29.5	36.0	3.7	26.5
7/16	11.1	5/8	64.0	6.5	47.2	57.0	5.8	42.0
1/2	12.7	3/4	98.00	10.0	72.3	88.0	9.0	64.9
9/16	14.3	13/16	140.0	14.3	103.2	126.0	12.8	92.9
5/8	15.9	15/16	196.0	20.0	144.6	177.0	18.0	130.5
3/4	19.0	1 1/8	343.0	35.0	253.0	309.0	31.5	227.9
7/8	22.2	1 15/16	547.0	55.8	403.4	492.0	50.2	362.9
1	25.4	1 1/2	814.0	83.0	600.4	732.0	74.6	539.9
1 1/8	31.7	1 7/8	1181.0	120.4	871.1	1063.0	108.4	784.0
1 1/4	38.1	2 1/4	1646.0	167.8	1214.0	1481.0	151.0	1092.3

Table 3. Torque Settings - Metric Grade 8.8 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	5.8	0.6	4.3	5.2	0.5	3.8
M6	6	10	9.9	1.0	7.3	9.0	0.9	6.6
M8	8	13	24.0	2.4	17.7	22.0	2.2	16.2
M10	10	17	47.0	4.8	34.7	43.0	4.4	31.7
M12	12	19	83.0	8.5	61.2	74.0	7.5	54.6
M16	16	24	205.0	20.9	151.2	184.0	18.8	135.7
M20	20	30	400.0	40.8	295.0	360.0	36.7	265.5
M24	24	36	690.0	70.4	508.9	621.0	63.3	458.0
M30	30	46	1372.0	139.9	1011.9	1235.0	125.9	910.9
M36	36	55	2399.0	244.6	1769.4	2159.0	220.0	1592.4

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Error Codes / Error Diagnosis (Automatic Temperature Control (ATC) System)

Table 1. Error Code 1 - High Pressure Lock Out

Effect	Description	Causes	Remedy
The unit cannot cool the cab The compressor disengages.	The high pressure switch operates twice In 1 minute.	The system is overcharged.	Check the continuity of switch (usually open switch).
			Check the gas in system and recharge, refer to table.
		There is no power to the high pressure switch.	Check for 24V at the switch.
			Check the continuity between ATC control module pin 33 and switch.
		There is a bad earth on the high pressure switch.	Check the earth wire between ATC control module pin 34 and switch.
		There is a defective switch.	Replace the switch.

Note: *If, an Error code shows after one minute this can show a system Error.*

Note: *If, an Error code shows instantly this can show a wiring Error.*

Table 2. Error Code 2 - Low Pressure Lock Out

Effect	Description	Causes	Remedy
The unit cannot cool the cab The compressor disengages.	The low pressure switch opens for longer than 1 minute.	The system is undercharged.	Check the continuity of switch (usually closed switch).
			Check the gas in system and recharge, refer to table.
		There is no power to the low pressure switch.	Check for 24V at the switch.
			Check the continuity between ATC control module pin 35 and switch.
		There is a bad earth on the low pressure switch.	Check the earth wire between ATC control module pin 36 and switch.
		There is a defective switch.	Replace the switch.

Note: *If an Error code shows after one minute this can show a system error.*

Note: *If an Error code shows instantly this can show a wiring error.*

Note: *Battery reset may be required to remove the error after repair.*

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Changing the Oil and Filter

⚠ CAUTION

Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.

2-3-3-2

1 Prepare the machine. Park the machine on level ground. Lower the bucket to the ground.

2 Stop the engine.

- **a** Remove the starter key.
- **b** Let the engine stand until it is warm. Do not check the oil straight after the engine has stopped, the oil level indicated will actually be lower than it is.

3 Drain the oil

- **a** Remove the belly plate
- **b** Place an oil collecting container of suitable size beneath the engine sump drain point.

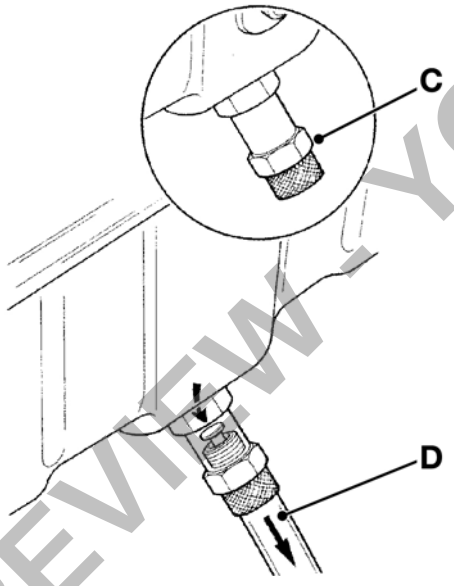


Fig 28.

- **c** Remove the self sealing drain plug outer cover **C**.
- **d** Fit the self sealing drain kit threaded union (with attached pipe) **D**. Drain sump oil into a suitable container.
- **e** Remove the self seal drain kit, clean and refit the outer cover. (Do not over tighten the cover).

4 Change the filter

- **a** Remove the remote filter **E**.

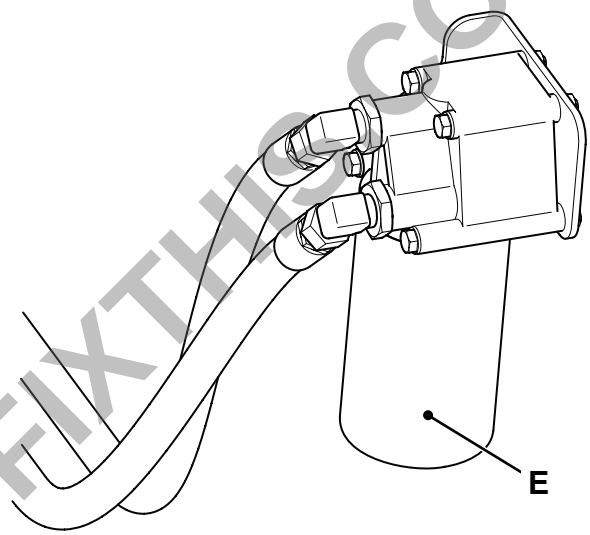


Fig 29.

- **b** Clean the filter head.
- **c** Smear the seal on the new filter **E** with oil.
- **d** Fill the filter with engine oil before fitting.
- **e** Tighten the filter until the seal bites onto the filter housing.
- **f** Tighten the filter a minimum of one more full turn.

5 Fill the system.

- **a** Fill the engine with new oil through filler **B** ⇒ *Fig 26. (3-48)*,⇒ *Fig 27. (3-48)*,⇒ *Fluids, Lubricants and Capacities (3-16)*
- **b** Wipe off any spilt oil.
- **c** Check for leaks.

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Service Schedules

Introduction

T3-036_3

⚠ WARNING

Maintenance must be done only by suitably qualified and competent persons.

Before doing any maintenance make sure the machine is safe, it should be correctly parked on level ground.

To prevent anyone starting the engine, remove the starter key. Disconnect the battery when you are not using electrical power. If you do not take these precautions you could be killed or injured.

8-3-1-1

A badly maintained machine is a danger to the operator and the people working around him. Make sure that the regular maintenance and lubrication jobs listed in the service schedules are done to keep the machine in a safe and efficient working condition.

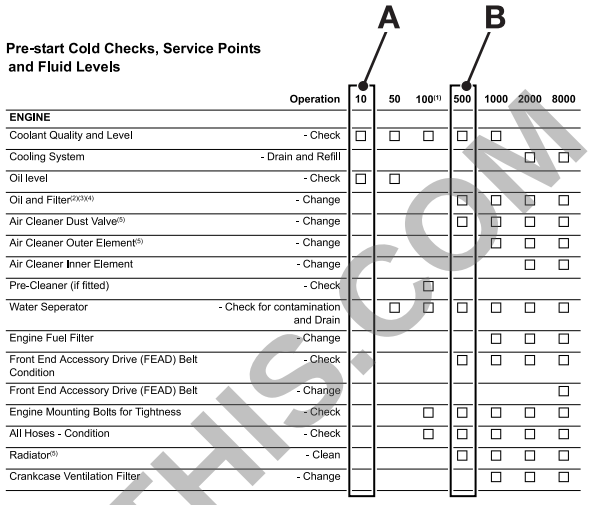
Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hourmeter readings to correctly gauge service intervals. When there is no hourmeter fitted, use the calendar equivalents to determine the service intervals. Refer to ***Calendar Equivalents***. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

How to Use the Service Schedules

T3-012_3

In the example shown, **A** shows all service requirements to be carried out every 10 hours and **B** shows the requirements to be carried out every 500 hours.

Important: *Services should be carried out at either the hourly interval or calendar interval, whichever occurs first. Refer to* ***Calendar Equivalents****.*



795390-1

Calendar Equivalents

Every 10 Hours	=	Daily
Every 50 Hours	=	Weekly
Every 250 Hours	=	Monthly
Every 500 Hours	=	Three Months
Every 1000 Hours	=	Six Months
Every 2000 Hours	=	1 Year
Every 4000 Hours	=	2 Years
Every 5000 Hours	=	2 Years Six Months

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Fuses

⚠ CAUTION

Fuses

Always replace fuses with ones of correct ampere rating to avoid electrical system damage.

8-3-3-5

The electrical circuits are protected by fuses. The fuse box is located in the rear stowage area. Remove the fuse box cover **A** to gain access to the fuses.

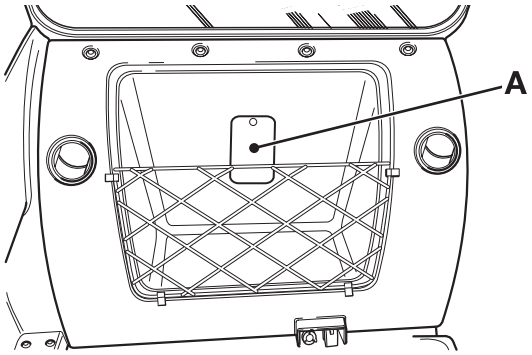


Fig 22. Machines Built Up To December 2011

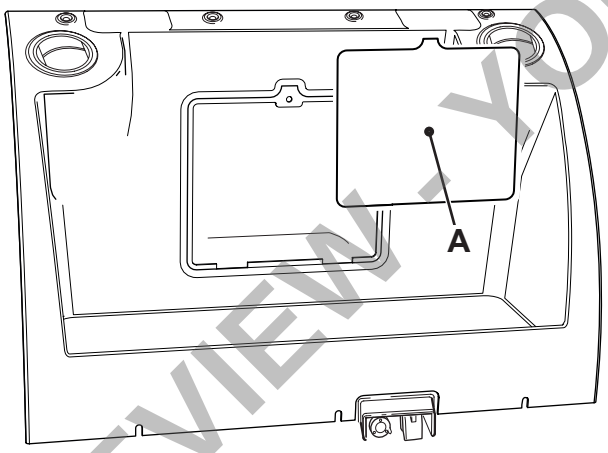


Fig 23. Machines Built After December 2011

If a fuse blows, find out why before fitting a new one.

Label **B** is fixed to rear of cover **A** for fuse identification.

Fuse Identification

Fuse	Circuit(s) Protected	Rating
1	Controller Outputs 1-6	15A
2	Controller Outputs 7-12	15A
3	Controller Outputs 13-16	15A
4	Auxiliary	15A
5	Controller Outputs 17-22	10A
6	ECU-STD, EMS, Fascia Ign Supply	10A
7	Controller Outputs 23-28	10A
8	Heater/Air Conditioner, Auto fan	20A
9	Refuel pump, Wiper, Heated Seat	20A
10	Work Lamps, Opt Hyd, Radio (Ign), Lighter	20A
11	Radio (Memory), Cab Interior Lamp Switch	10A
12	Key Switch	10A
13	ECU-STD, EMS Battery Supply	10A
14	Diagnostic	10A
15	Controller (W) Outputs 17-22	10A
16	Controller (W) Outputs 23-28	10A
17	ECU-W Ignition System	2A
18	Travel Mode (Align Switch)	5A
19	Fog Light	5A
20	Drive Isolate	5A
21	ECU-W Battery Supply	10A
22	Controller (W) Outputs 1-6	15A
23	Controller (W) Outputs 7-12	15A
24	Controller (W) Outputs 13-16	10A
25	Engine Fuel Lift Pump	15A
26	Refuel Pump (option)	10A

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Releasing Tank Pressure

⚠ WARNING

Do not remove the hydraulic tank filler cap or cover plate when the engine is running. The hydraulic system is under pressure. You or others could be injured. First stop the engine and then release the pressure.

8-3-4-4

1 Prepare the machine. Position the machine on level ground. Stop the engine. Remove the starter key.

2 Release tank pressure.

Depress rubber boot **A**, to release the pressure from the tank.

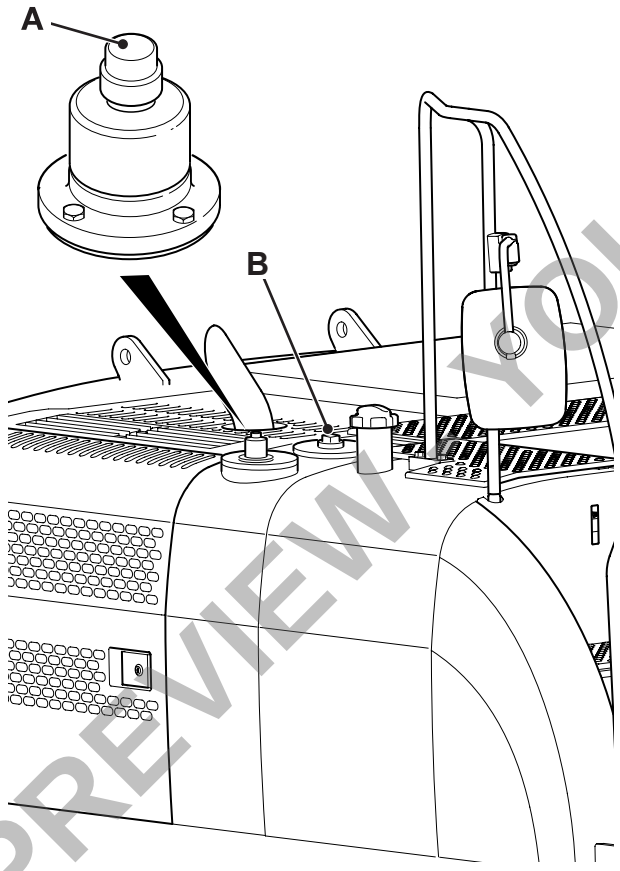


Fig 52.

Releasing the Hydraulic Pressure

Use the procedure below to release the hydraulic pressure. You must release the hydraulic pressure before carrying out maintenance on the machine for example.

1 Park the machine on hard, level ground and lower the attachment.

2 Stop the engine.

3 Turn the ignition to the 'ON' position.

4 Lower the control lock lever.

5 Operate the hand controllers in all directions to release pressure in the hydraulic system.

6 Turn the ignition to the 'OFF' position.

7 Remove the starter key.

8 Release the hydraulic oil tank pressure, refer to ***Maintenance, Releasing Tank Pressure***.

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Table 4. Metric Grade 10.9 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	8.1	0.8	6.0	7.3	0.7	5.4
M6	6	10	13.9	1.4	10.2	12.5	1.3	9.2
M8	8	13	34.0	3.5	25.0	30.0	3.0	22.1
M10	10	17	67.0	6.8	49.4	60.0	6.1	44.2
M12	12	19	116.0	11.8	85.5	104.0	10.6	76.7
M16	16	24	288.0	29.4	212.4	259.0	26.4	191.0
M20	20	30	562.0	57.3	414.5	506.0	51.6	373.2
M24	24	36	971.0	99.0	716.9	874.0	89.1	644.6
M30	30	46	1930.0	196.8	1423.5	1737.0	177.1	1281.1
M36	36	55	3374.0	344.0	2488.5	3036.0	309.6	2239.2

Table 5. Metric Grade 12.9 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	9.8	1.0	7.2	8.8	0.9	6.5
M6	6	10	16.6	1.7	12.2	15.0	1.5	11.1
M8	8	13	40.0	4.1	29.5	36.0	3.7	26.5
M10	10	17	80.0	8.1	59.0	72.0	7.3	53.1
M12	12	19	139.0	14.2	102.5	125.0	12.7	92.2
M16	16	24	345.0	35.2	254.4	311.0	31.7	229.4
M20	20	30	674.0	68.7	497.1	607.0	61.9	447.7
M24	24	36	1165.0	118.8	859.2	1048.0	106.9	773.0
M30	30	46	2316.0	236.2	1708.2	2084.0	212.5	1537.1
M36	36	55	4049.0	412.9	2986.4	3644.0	371.6	2687.7

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Table 3. Error Code 3 - Blower Potentiometer Error (User Interface / Control Panel)

Effect	Causes	Remedy
The Blower motor speed is irregular in Auto mode.The Blower motor speed is fixed or cannot be changed in manual mode.	Wiring Error (open or short-circuit).	Check for 24V at blower motor.
		Check the continuity from blower motor earth to Pin 7 on PWM.
	There is no blower speed signal from the user interface to the ATC Control Module.	Check the continuity from pin C15 on user interface to pin 28 on ATC control module. (Expected reading on Pin 28 0.5V to 3.0 V).
	There is no signal from the ATC control module to the PWM.	Check the continuity from Pin 5 on ATC control module to Pin 6 on PWM unit.
	Bad earth on blower motor / PWM.	Check for good earth as shown on schematic.
	Defective potentiometer.	Replace user interface / control panel.

Table 4. Error Code 4 - Water Valve Potentiometer Error (User Interface / Control Panel)

Effect	Causes	Remedy
The temperature shown on the display cycles between 22 degrees and error code 4.There is no temperature change There is no fan speed in Manual Mode.There is no temperature change / the fan speed operates correctly in Auto mode.	There is no temperature signal from the user interface to the ATC control module.	Check the continuity from Pin D1 on the user interface to pin 29 on ATC control Module. (Expected reading on Pin 29 - 0.5V to 3.0 V).
	There is no temperature signal from the ATC control module to the PWM.	Check the continuity from Pin 3 on ATC control module to Pin D on water valve.
		Check the continuity from Pin A on water valve to Pin 5 on PWM.
	There is a bad earth on water valve / PWM.	Check for good earth as shown on schematic.
	Defective potentiometer.	Replace user interface / control panel.

Table 5. Error Code 7 - Cab Air Sensor Error (Air Inlet Temperature Sensor)

Effect	Causes	Remedy
The unit cannot cool the cab. The compressor disengages.The Demist mode does not work / The Recirculation Mode is O.K.There is no temperature change / the fan speed operates correctly in Auto mode. The temperature changes on LCD display. The cab temperature does not correspond.	There is no temperature signal from the sensor to the ATC control module.	Check the continuity between pin1 on the cab temperature sensor to pin 21 on ATC control module.
	There is a bad earth on the cab air sensor.	Check for good earth as shown on schematic.
	There is a defective sensor.	Replace the cab air sensor.

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Changing The Coolant - 4JJ Engines (Non-Pressurized Expansion Bottle Type)

1 Park the machine on solid, level ground.

2 Turn the engine OFF and remove the ignition key.

3 Let the engine cool down.

⚠ WARNING

The cooling system is pressurised when the coolant is hot. When you remove the cap, hot coolant can spray out and burn you. Make sure that the engine is cool before you work on the cooling system.

9-3-3-1_2

4 Drain the system.

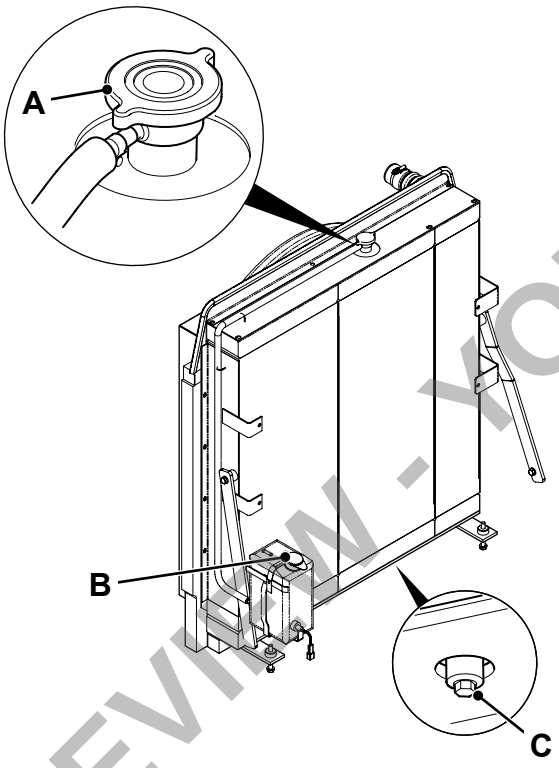


Fig 36.

a Carefully release the radiator cap **A** to release system pressure.

b Remove the radiator cap.

c Remove the expansion bottle cap **B**.

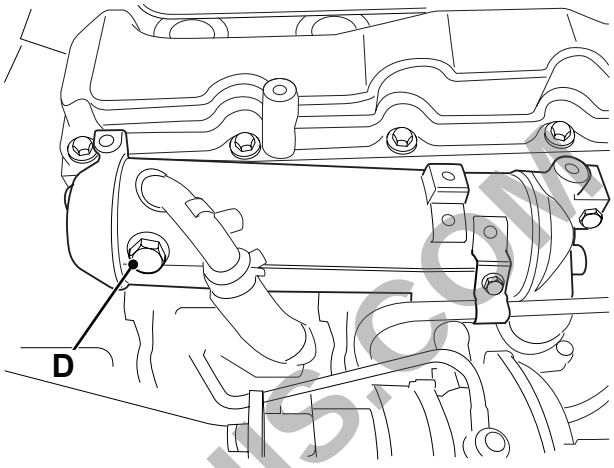


Fig 37. 4JJ Engine

d Remove the EGR cooler plug **D**.

e Open the radiator drain plug **C**, ⇒ *Fig 40. (3-61)*.

f Let the coolant drain out.

5 Flush the system if necessary. Use clean water.

6 Close the radiator drain plug **C**.

7 Fill the system with pre-mixed water/antifreeze. ⇒ *Coolant Mixtures (3-21)*.

a Switch the ignition ON and switch the cab heater onto hot and full blower speed.

b Slowly fill the radiator until coolant escapes out of the EGR plug **D**.

c Close the EGR cooler plug.

Note: *Torque tighten the EGR cooler plug to 25Nm.*

d Continue to fill the radiator to the of the filler neck.

Note: *Manipulate the top radiator hose to help bleed air from the system.*

e Fill the expansion bottle until the level in the bottle is at the FULL mark.

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Pre Start Cold Checks, Service Points and Fluid Levels

	Operation	10	50	250	500	1000	2000	4000	5000
ENGINE									
Oil level	- Check	☐	☐	☐	☐	☐	☐	☐	☐
Oil and Filter	- Sample/Change				☐	☐	☐	☐	☐
Pre Cleaner (if fitted)	- Clean			☐	☐	☐	☐	☐	☐
Air Cleaner Outer Element	- Change					☐	☐	☐	☐
Air Cleaner Inner Element	- Change						☐	☐	
Air Cleaner Dust Valve	- Check and Clean			☐	☐	☐	☐	☐	☐
Fuel Level	- Check	☐	☐	☐	☐	☐	☐	☐	☐
Fuel Filter Element	- Change				☐	☐	☐	☐	☐
Fuel Tank - Water and Sediment	- Drain		☐	☐	☐	☐	☐	☐	☐
Coolant Quality/Level	- Check	☐	☐	☐	☐	☐	☐	☐	☐
Coolant	- Change							☐	
Fuel Pump Filter Element[1]	- Change				☐	☐	☐	☐	☐
Primary Fuel Filter/Sedimenter	- Drain and Clean		☐	☐	☐	☐	☐	☐	☐
Primary Fuel Filter/Sedimenter-filter[1]	- Change				☐	☐	☐	☐	☐
Main Fuel Filter/Sedimenter	- Drain and Clean		☐	☐	☐	☐	☐	☐	☐
Main Fuel Filter/Sedimenter-filter[1]	- Change				☐	☐	☐	☐	☐
Fuel Filler Cap	- Check and Clean			☐	☐	☐	☐	☐	☐
Fuel Filler Cap (Dusty conditions)	- Check and Clean		☐	☐	☐	☐	☐	☐	☐
Fan Belt Tension/Condition	- Check			☐	☐	☐	☐	☐	☐
Valve Clearances	- Check and Adjust					☐	☐	☐	☐
Engine Mounting Bolts for Tightness	- Check				☐	☐	☐	☐	☐
Exhaust System Security	- Check				☐	☐	☐	☐	☐
Air Inlet System Security	- Check			☐	☐	☐	☐	☐	☐
Radiator	- Clean and Check			☐	☐	☐	☐	☐	☐

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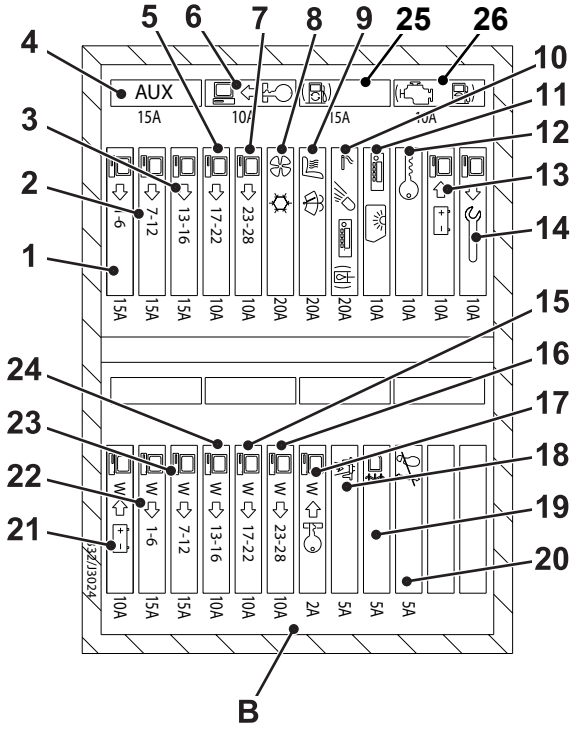


Fig 24.

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Changing the Fluid

1 Prepare the machine. Position the machine on level ground. Stop the engine. Remove the starter key.

2 Release tank pressure. ⇨ *Releasing Tank Pressure (3-74)*.

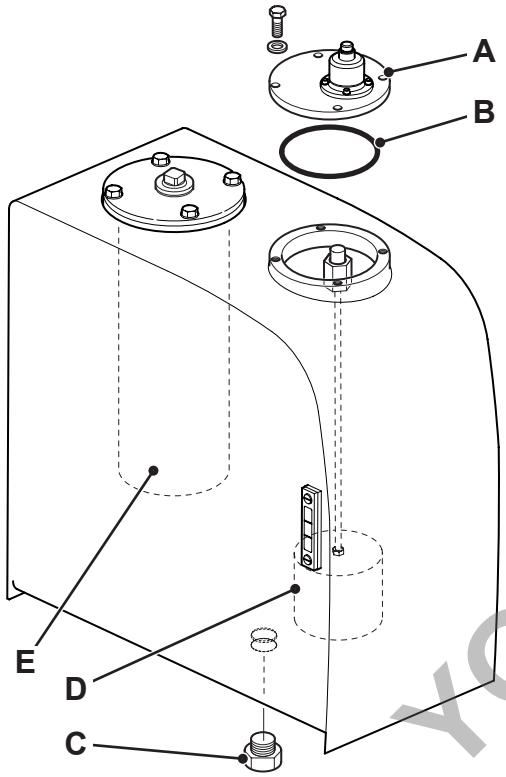


Fig 55.

3 Remove the oil.

a Remove cover **A** and 'O'-ring **B**.

b Use a pump and discharge the hydraulic oil into an empty container.

c Remove the drain plug **C** on the bottom of the tank and drain the remaining oil from the tank.

Note: *Have a drain pan ready.*

4 Renew the suction strainer **D** and return filter **E**. (⇨ *Cleaning/Changing the Suction Strainer (3-78)* and ⇨ *Changing the Return Filter (3-78)*).

5 Tighten the drain plug **C** securely.

6 Refill the tank with the specified oil to the specified level. (See Fluid and Lubricants).

7 Seal the System. Install the 'O'-ring **B** and filler port cover **A**.

Note: *If the 'O'-ring is damaged, replace it with a new one.*

8 Bleed air from the hydraulic components, ⇨ *Air Bleeding Procedures (3-83)*.

9 Start the engine and run it for 5 minutes without load. Slowly operate the rams several times and then put the machine in the hydraulic oil checking position.

10 Check that the hydraulic oil is within the proper range.

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Table 6. Torque Settings - Rivet Nut Bolts/Screws

Bolt Size				
ISO Metric Thread	mm	Nm	kgf m	lbf ft
M3	3	1.2	0.1	0.9
M4	4	3.0	0.3	2.0
M5	5	6.0	0.6	4.5
M6	6	10.0	1.0	7.5
M8	8	24.0	2.5	18.0
M10	10	48.0	4.9	35.5
M12	12	82.0	8.4	60.5

Table 7. Torque Settings - Internal Hexagon Headed Cap Screws (Zinc)

Bolt Size			
ISO Metric Thread	Nm	kgf m	lbf ft
M3	2.0	0.2	1.5
M4	6.0	0.6	4.5
M5	11.0	1.1	8.0
M6	19.0	1.9	14.0
M8	46.0	4.7	34.0
M10	91.0	9.3	67.0
M12	159.0	16.2	117.0
M16	395.0	40.0	292.0
M18	550.0	56.0	406.0
M20	770.0	79.0	568.0
M24	1332.0	136.0	983.0

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Table 6. Error Code 8 - Evaporator Temperature Sensor Error

Effect	Causes	Remedy
The unit cannot cool the cab The compressor disengages.	There is no temperature signal from the sensor to ATC control module.	Check the continuity between pin1 on the evaporator temperature sensor to pin 23 on ATC control module.
	There is a bad earth on the evaporator temperature sensor.	Check for good earth as shown on schematic.
	There is a defective sensor.	Make sure the sensor connections are correct. Replace the evaporator temperature sensor.

Table 7. Error Code 9 - Outlet Temperature Sensor Error

Effect	Causes	Remedy
The fan speed stays at maximum in AUTO mode. The manual mode blower operates as normal.	There is no temperature signal from the sensor to ATC control module.	Check the continuity between pin1 on the outlet temperature sensor to pin 22 on ATC control module.
	There is a bad earth on The outlet temperature sensor.	Check for good earth as shown on schematic.
	There is a defective sensor	Make sure the sensor connections are correct. Replace the outlet temperature sensor.

Table 8. Error Code E19 - No Communications Between User Interface / Control Panel and ATC Control Module.

Effect	Causes	Remedy
The unit cannot cool the cab / The compressor disengages.The ATC / Heater control does not operate.The fan speed stays at maximum in Auto mode / The fan speed operates as normal in Manual mode.	Wiring Error	Check power at pins on User Interface and ATC control module.
		Check Earth at pins on User Interface and ATC control module.
		Check the Continuity between the wires that connect the User Interface and the ATC control module.
	Connector Error	Check the connector plugs between User Interface and ATC control module are in good condition.
	Defective user interface / Control panel or ATC control unit	Replace the defective unit

Table 9. PWM Failure (No Fault Code Displayed)

Effect	Causes	Remedy
The unit cannot cool the cab / The compressor disengages.Fan speed unable to adjust in both auto and manual modes (fan speed defaults to max or min.) Temperature will be on maximum hot or maximum cold and unable to change.	Wiring Error	Check power and earths on PWM as shown on schematic.
		Expected readings for inputs to WM during normal operation.Pin 5 and Pin 6 Minimum 0.016 volts to maximum 11.18 volts

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Fan Belt

Checking the Fan Belt Tension

⚠ WARNING

Make sure the engine cannot be started. Disconnect the battery before doing this job.

2-3-3-5

1 Prepare the machine. Put the machine on level ground, lower the bucket to the ground.

2 Stop the engine. Remove the starter key.

3 Check the fan belt tension. There must be 6-8 mm (0.24-0.31 in) slack at **X**.

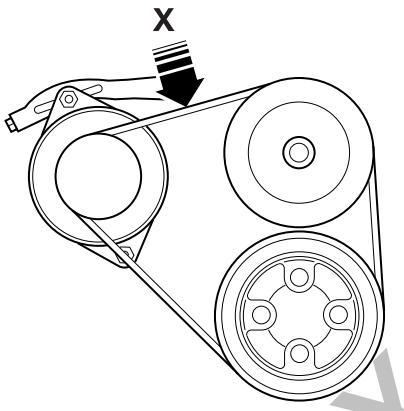


Fig 42.

4 Loosen the alternator. Slacken bolts **A** and **B**.

5 Adjust the fan belt.

a Use a lever to re-position the alternator so as to adjust the fan belt tension.

***Note:** If the fan belt is stretched so much that it cannot be adjusted correctly, fit a new belt.*

b While levering the alternator pinch the bolt **A** and check the tension on the belt.

c If it is not correctly tensioned complete steps 4 and 5.

d When correct tension is achieved fully tighten bolts **A** and **B**.

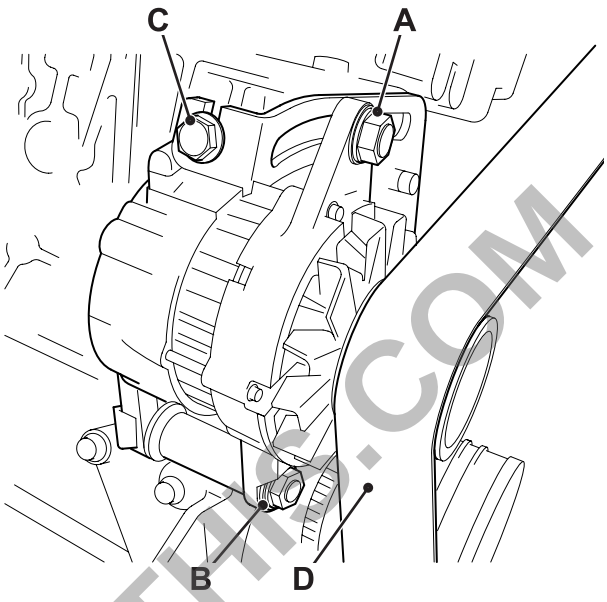


Fig 43.

Fitting a New Fan Belt

Complete steps 1 and 2.

1 Loosen the alternator. Slacken bolts **A, B** and adjust plate **C** so that the alternator is levered towards the engine, so that the fan belt **D** can be removed.

2 Fit a new fan belt. Remove the fan belt **D** and replace it with a new one, make sure the `V' profile locates in the pulleys correctly.

***Note:** It may be necessary to apply leverage to the new belt to get it over the pulleys.*

3 Adjust the fan belt. Carry out step 5, ⇨ ***Checking the Fan Belt Tension (3-63)***.

4 Re-check the fan belt tension. Check after running the machine for 5 minutes at low idle.

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Service Schedules

	Operation	10	50	250	500	1000	2000	4000	5000
GEARBOXES AND AXLES									
Security of Mounting Bolts and Nuts	- Check			☐	☐	☐	☐	☐	☐
Drive Gearbox Oil Level	- Check		☐	☐	☐	☐	☐	☐	☐
Slew Gearbox Oil Level	- Check			☐	☐	☐	☐	☐	☐
Slew Gearbox Oil[2]	- Change				☐	☐	☐	☐	☐
Drive Gearbox Oil	- Change					☐	☐	☐	☐
Slew Gearbox (if applicable)	- Grease				☐	☐	☐	☐	☐
Rear Axle Oil	- Change				☐	☐	☐	☐	☐
Front Hub Oil	- Change				☐	☐	☐	☐	☐
Front Differential Oil	- Check				☐	☐	☐	☐	☐
Front Differential Oil	- Change					☐	☐	☐	☐
Drive Shaft & Universal Joints	- Security/Grease			☐	☐	☐	☐	☐	☐
Steer Axle Pivot	- Grease			☐	☐	☐	☐	☐	☐
HYDRAULICS									
Oil Level	- Check	☐	☐	☐	☐	☐	☐	☐	☐
Oil (biodegradable and non-biodegradable)	- Sample				☐	☐	☐	☐	☐
Oil (biodegradable)	Change						☐	☐	
Oil (Non-biodegradable)	Change								☐
Servo Filter Element[3][2]	- Change				☐	☐	☐	☐	☐
Plexus Filter Element[3]	- Change						☐	☐	
Return Filter Element[3]	- Change				☐	☐	☐	☐	☐
Drain Filter Element[3]	- Change				☐	☐	☐	☐	☐
Suction Strainer	- Clean				☐	☐	☐	☐	☐
Suction Strainer	- Change						☐	☐	
Cushion Valve Filter (excluding 200W)	- Clean				☐	☐	☐	☐	☐
Cushion Valve Filter (excluding 200W)	- Change					☐	☐	☐	☐
Steering Filter	- Change					☐	☐	☐	
Oil Cooler	- Clean				☐	☐	☐	☐	☐
Tank - Water and Sediment	- Drain			☐	☐	☐	☐	☐	☐
Hydraulic Tank Air Breather	- Change					☐	☐	☐	☐
Pump Line Exit Hose	- Change							☐	

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Safety Notices

Important Information

T1-042

The Operator Manual

⚠ WARNING

You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator Manual. You must understand and follow the instructions in the Operator Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

INT-1-4-2

Do not operate the machine without an Operator Manual, or if there is anything on the machine you do not understand.

Treat the Operator Manual as part of the machine. Keep it clean and in good condition. Replace the Operator Manual immediately if it is lost, damaged or becomes unreadable.

Safety Warnings



This safety alert system identifies important safety messages in this manual. When you see this symbol, be alert, your safety is involved, carefuly read the message that follows, and inform other operators.

In this publication and on the machine, there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

⚠ DANGER

Denotes an extreme hazard exists. If proper precautions are not taken, it is highly probable that the operator (or others) could be killed or seriously injured.

INT-1-2-1

⚠ WARNING

Denotes a hazard exists. If proper precautions are not taken, the operator (or others) could be killed or seriously injured.

INT-1-2-2

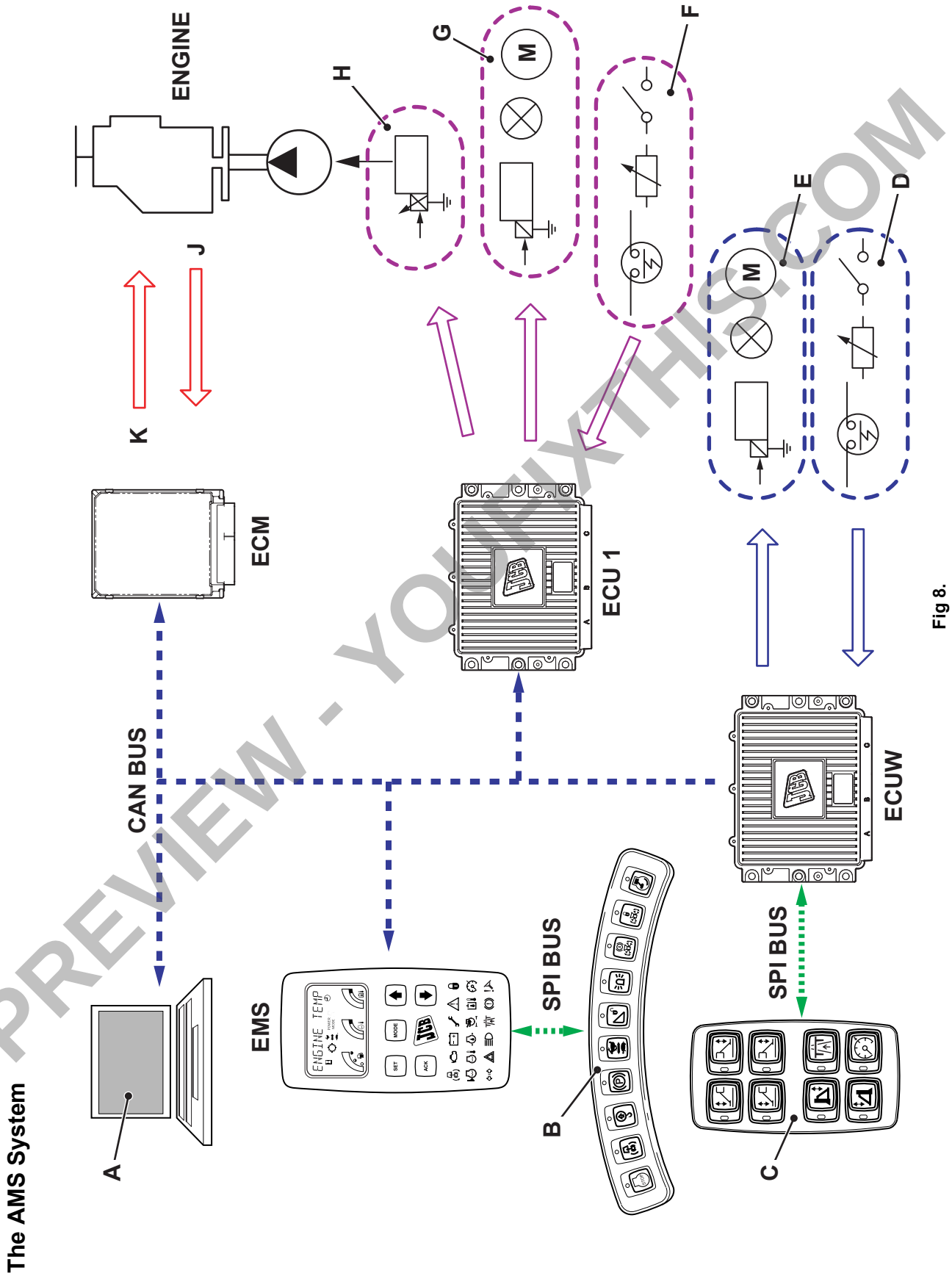
⚠ CAUTION

Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator (or others) and possible damage to the machine.

INT-1-2-3

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The AMS System

Fig 8.

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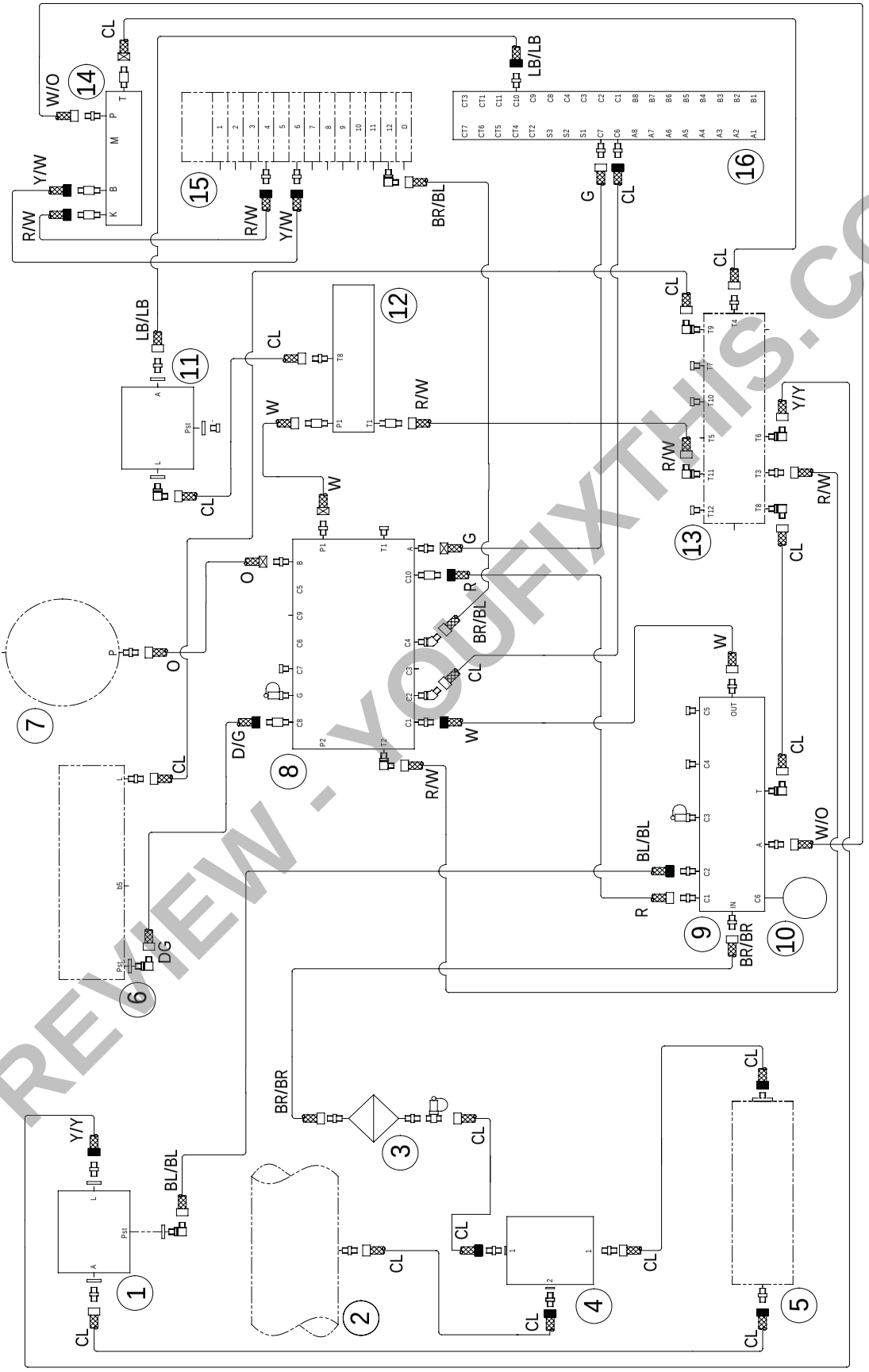


Fig 4. Pilot Pressure and Return Line Schematic 215/14571 - Issue 7

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Fig 127.

13 Ensure that the installation position and arrangement of sealing elements are correct

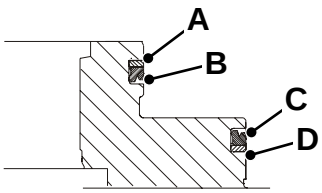


Fig 128.

Key

A	Support Ring
B	U Ring
C	U Ring
D	Support Ring

14 For new installation or if the cylindrical pins have been removed on dismantling, ensure that pins are fitted to the correct dimension **X**



Fig 129.

ZF Axle	Dimension X
MS-E 3050	18.00mm
MS-E 3060	16.00mm
MS-E 3070	16.00mm

15 Place the piston onto ring gear.



Fig 130.

16 Secure the piston using Spring sleeve, Inner and outer compression springs and a new hexagon screw.

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