Service Manual

JCB 8085

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Section 2 - Care & Safety

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Section C - Electrics

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Zinc Plated Fasteners and Dacromet Fasteners

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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Fluids, Lubricants and Capacities

Table 6.

Item	Capacity Litres (UK Gal)	Fluid / Lubricant	International Specification
Fuel Tank	103 (22.7)	See Fuel System, Types of Fuel	⇨ *Types of Fuel (🗋 3-33)*
Engine (Oil)	6.8 (1.49)	JCB Extreme Performance 15W/40	ACEA E5:B3:A3, API CH4/SJ
		-15ºC to +50ºC(14ºF to 122ºF)	
Engine Coolant	14.2 (3.1)	JCB High Performance Antifreeze and Inhibitor/Water ⇨ *Coolant Mixtures (🗋 3-12)*	ASTM D3306-74
Track Gearbox (each)	2 x 1.7 (0.37)	JCB SAE 30 Engine Oil (Not Multigrade)	API CD/SF, MIL-L-46152, MIL-L-2104D
Track Idler Wheels	-	Engine Oil (See Above)	-
Track Roller (top)	-	Engine Oil (See Above)	-
Track Rollers (bottom)	-	Engine Oil (See Above)	-
Hydraulic System	105 (23)	JCB Special Hydraulic Fluid HP46	Vickers 35VQ25/V104C: Sundstrand, Denison and FZG Approval Tests
Slew Ring Bearings		JCB HP Grease	Lithium Complex (NLGI) inc. extreme measure additives
Slew Ring Gear Teeth	3.2kg (7.14lb)	JCB HP Grease	Lithium Complex (NLGI) inc. extreme measure additives
All Other Grease		JCB HP Grease	Lithium Complex (NLGI) inc. extreme measure additives

⚠ WARNING

Slew Pinion Grease

JCB Slew Pinion Grease is harmful as it contains bitumen compounds 2811. Excessive contact may lead to dermatitis or skin cancer. Always use a barrier cream or wear gloves; wash contaminated skin thoroughly with soap and water. In the event of eye contact, immediately wash with plenty of water and seek medical advice.

8-1-1-7

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Service Schedules

Introduction

A poorly maintained machine is a hazard. Doing the regular maintenance and lubrication jobs listed in these schedules will help keep the machine in safe running order.

⚠ 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

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hour meter reading. Do not use a machine which is due for a regular service. Rectify any defects found during regular maintenance before clearing the machine for use.

Calendar equivalents:

Every 10 Hours	=	Daily
Every 50 Hours	=	Weekly
Every 500 Hours	=	Six Months
Every 1000 Hours	=	1 Year
Every 2000 Hours	=	2 Year

Note: *Services should be carried out at either the hourly interval or calendar interval, whichever occurs first.*

Table 1.

Description	Symbol
No fault found job complete	✓
Fault found and corrected (Detail on report)	☐
Follow up required (Detail on report)	✘

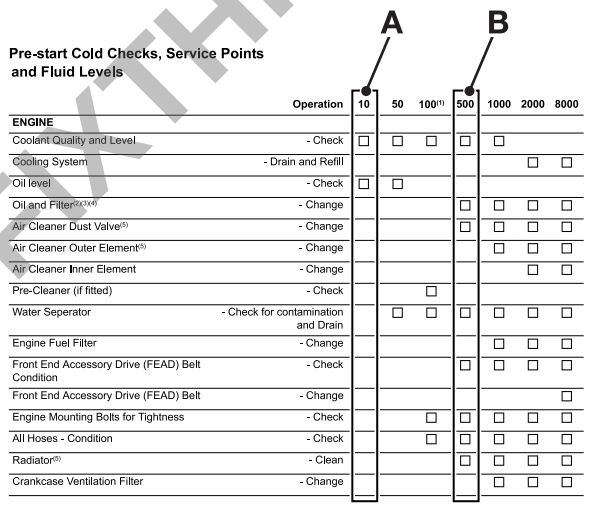
How to Use the Service Schedules

T3-012_4

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****.*

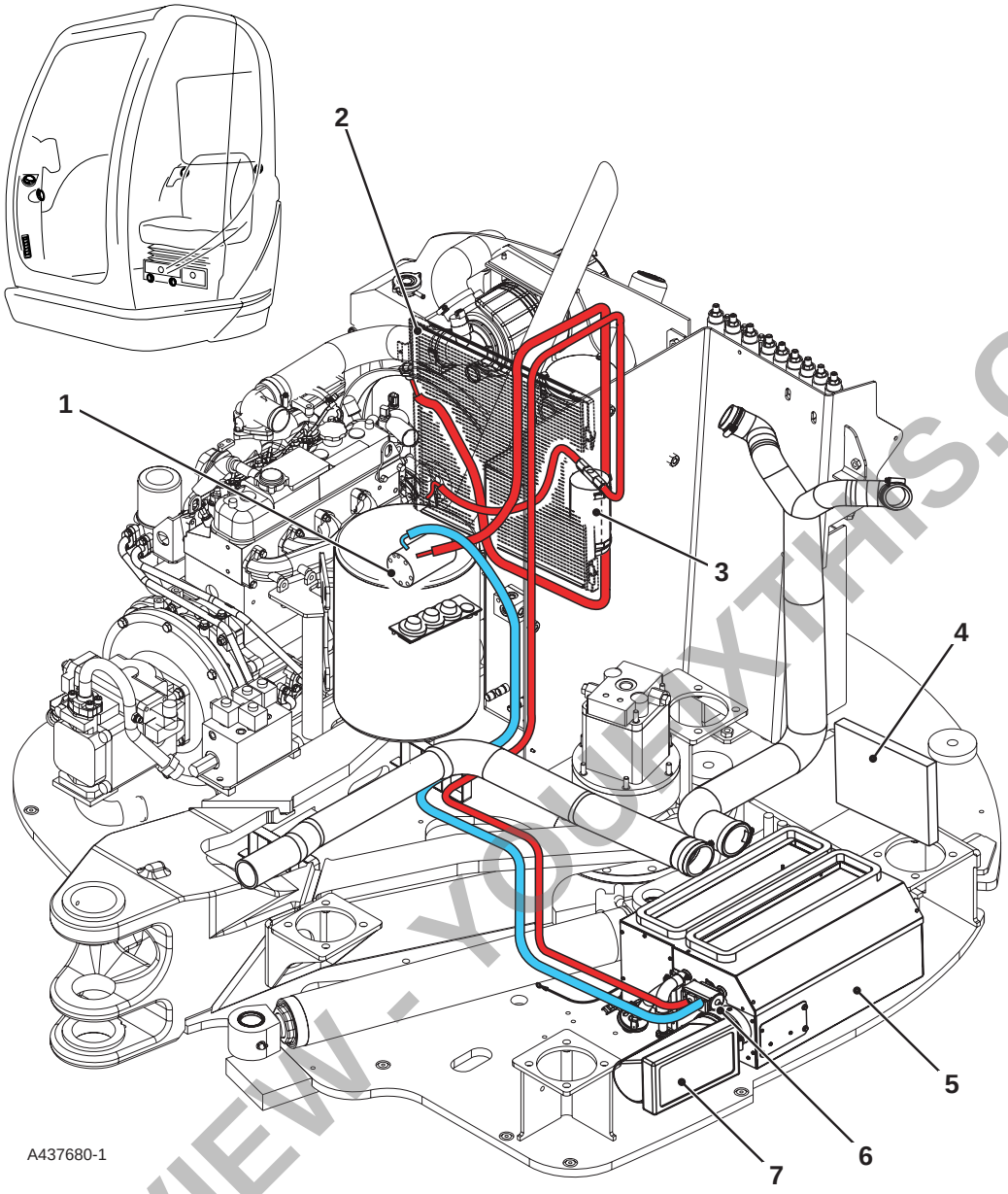
Important: *The intervals given in the schedules must not be exceeded. If the machine is operated under severe conditions (high temperature, dust, water, etc.), shorten the intervals.*



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Fig 1.

1 Compressor
2 Condenser
3 Receiver/Drier
4 Air Filter
5 Evaporator Coil
6 Evaporator Valve
7 Air Filter

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Circuit Diagrams

Introduction to Hydraulic Schematic Symbols

TE-001

General (Basic and Functional Symbols)

Complex hydraulic components and circuits can be described to the engineer by using graphical symbols. The following pages illustrate and give a brief description for some of the more common symbols used.

There are many symbols in use and it would be impossible to include them all here. However it should be noted that most are only variations or refinements on the basic principles explained here. If more detailed information is required you are recommended to obtain a copy of BS2917 or IS01219.

Once familiar with the symbols, the engineer can use hydraulic circuit diagrams as an aid to fault finding. It will be possible to see the complete hydraulic circuit and decipher the relationship between hydraulic components.

Table 1. General

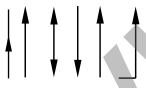
	Spring
	Flow restriction affected by viscosity
	Direction of flow
	Indication of rotation
	Indication of direction and paths of flow
	Variable control

Table 2. Rams

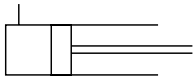
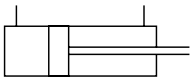
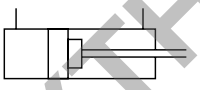
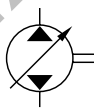
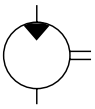
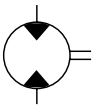
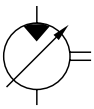
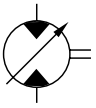
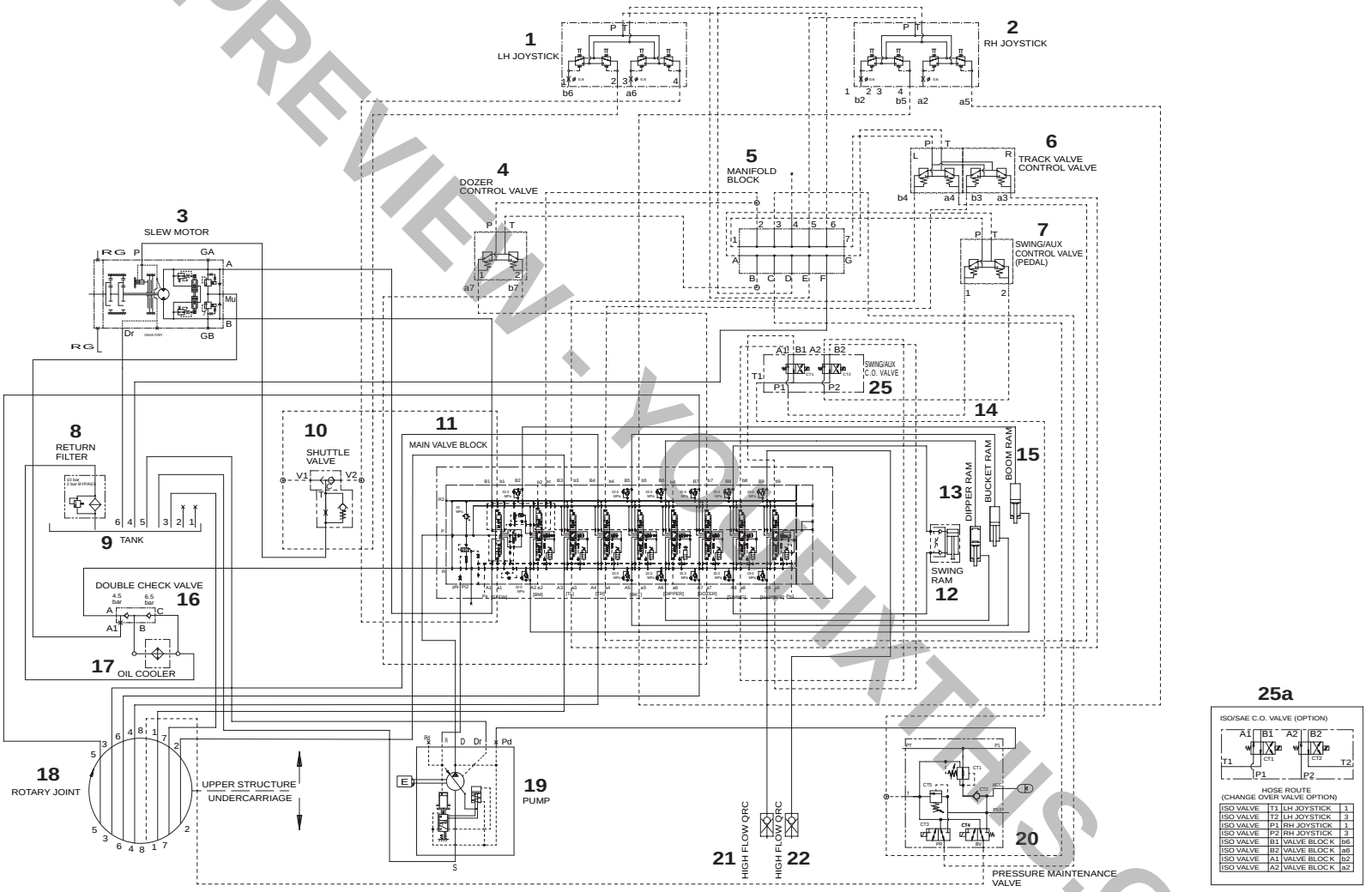
	Single acting
	Double acting
	Double ended
	Double acting with damping at rod area end

Table 3. Pumps and Motors

	Variable capacity pump two directions of flow
	Fixed capacity motor one direction of flow
	Fixed capacity motor two directions of flow
	Variable capacity motor one direction of flow
	Variable capacity motor two directions of flow

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25a

ISO/SAE C.O. VALVE (OPTION)

HOSE ROUTE
(CHANGE OVER VALVE OPTION)

ISO VALVE	T1	LH JOYSTICK	1
ISO VALVE	T2	LH JOYSTICK	3
ISO VALVE	P1	RH JOYSTICK	1
ISO VALVE	P2	RH JOYSTICK	3
ISO VALVE	B1	VALVE BLOCK K	b6
ISO VALVE	B2	VALVE BLOCK K	a6
ISO VALVE	A1	VALVE BLOCK K	b2
ISO VALVE	A2	VALVE BLOCK K	a2

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Fig 8. Nine Spool Standard Machine

Component Key ⇒ ***Key - Main Components (Upper Structure) (🗋 E-14)***

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Error Codes

The following table shows the error codes for this system. If an error code is active the message will be display right away and a log will be entered by the ECU-MIDI. If the error is removed the message will also clear.

If the "ACK" button is pressed to acknowledge the error then the message will become a repetitive message. If more then one error is active then the error messages should be entered into their own repetitive message queue until they are acknowledged.

Errors associated with optional features are disabled if the feature is not selected for the vehicle.

The errors are organised according to the type of error. Open circuit errors are given 1XX numbers. Short circuit errors are given 2XX numbers. System errors are given 3XX numbers. The XX number will depend on the function with the error.

Example: The Horn error number is 15. Therefore if the horn is open circuit the error number will be 115 and if the horn is short circuit the error number will be 215.

Table 12.

Message	Err#	Description
101 CRANK	1	A crank signal was not seen by the ECU-MIDI.
102 ALT ERR	2	The alternator is reading high when the engine is off and is therefore open circuit.
103 OIL SW	3	The oil pressure switch is open circuit.
112 SERVO	12	The servo solenoid output is open circuit.
113 WIPER	13	The wiper output is open circuit.
114 WASHER	14	The washer output is open circuit.
115 HORN	15	The horn output is open circuit.
116 TRVL AL	16	The travel alarm output is open circuit.
119 2 SPEED	19	The travel speed output is open circuit.
124 LH LT	24	The LH work lamps output is open circuit.
125 RH LT	25	The RH work lamps output is open circuit.
126 BOOM	26	The boom work lamps output is open circuit.
127 REAR LT	27	The rear work lamps output is open circuit.
128 FUEL	28	The fuel level is reading more than 200 Ohms and is therefore open circuit.
129 EN TEMP	29	The engine temperature input is open circuit.
130 HYD TMP	30	The hydraulic temperature input is open circuit.
132 Q HITCH	32	The quick hitch output is open circuit.
133 REFUEL	33	The refuelling pump output is open circuit.
136 T OPEN	36	The throttle actuator windings/feedback circuit is open circuit.
137 T DUTY	37	Loss of PWM signal from throttle actuator.
211 ESOS	11	The ESOS output is short circuit.
212 SERVO	12	The servo solenoid output is short circuit.
213 WIPER	13	The wiper output is short circuit.
214 WASHER	14	The washer output is short circuit.
215 HORN	15	The horn output is short circuit.
216 TRVL AL	16	The travel alarm output is short circuit.
219 2 SPEED	19	The travel speed output is short circuit.
224 LH LT	24	The LH work lamps output is short circuit.
225 RH LT	25	The RH work lamps output is short circuit.
226 BOOM	26	The boom work lamps output is short circuit.
227 REAR LT	27	The rear work lamps output is short circuit.
229 EN TEMP	29	The engine temperature input is short circuit.
230 HYD TMP	30	The engine temperature input is short circuit.

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Fault Finding

To extend the service life and improve the operation of the machine, daily inspection and lubrication are necessary as well as immediately isolating any problem found and dealing with it. If the machine is operated with the problem uncorrected, it may lead to larger trouble and possibly to a big accident. If trouble occurs, search for the cause in the items below and make adjustments, repairs, etc. as necessary. If the cause cannot be isolated, contact your JCB distributor.* Indicates jobs which should be done by a specialist. Refer to Engine Service Manual.

Engine and Related Area

Problem	Cause	Remedy
Engine does not start	– Defective starter switch (Starter does not run)	– Connect, repair connection
	– Detective rotation of starter (Starter rotates slowly	– Discharged battery, starter problems, contaminated or loose wiring connection
	– Improper viscosity of engine oil	– Inspect and replace as necessary
	– Excessive cooling of engine (Cold weather)	– Preheat with air heater, Warm up the coolant (add hot water)
	– Possible seizure in engine	– *Repair
	– Incomplete air bleeding of fuel system	– Completely bleed air
	– No fuel in fuel tank	– Refill
	– Fuel quality unsuitable	– Inspect and replace as necessary
	– Fuel filter clogged	– Clean or replace
	– Low compression	– *Repair
	– Defective fuel injection pump	– *Repair
Engine stops during operation	– No fuel in fuel tank	– Refill
	– Fuel filter clogged	– Clean and replace
	– Air is mixed in the fuel system	– Re-tighten fuel pipe connections and bleed system
Low oil pressure	– Low oil	– Refill
	– Defective oil pressure switch	– *Replace
	– Oil filter clogged	– Replace element
	– Low oil viscosity	– Replace with oil of viscosity matching temperature
	– Improper operation of oil pump	– *Replace parts
	– Oil leakage at connections	– Tighten connections
Exhaust gas from engine is white or blue	– Excessive oil consumption	– *Disassemble and repair, replace parts
	– Excessively low oil viscosity	– Replace with correct oil
	– Excessive cooling by radiator	– Adjust
	– Improper fuel injection timing	– *Adjust or replace if necessary
	– Low compression	– *Disassemble and repair, replace parts

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Cab

Direct Glazing

Direct Glazing

TB-002_6

The following procedures explain how to correctly remove and install panes of glass that are directly bonded to the cab frame apertures. When carrying out the procedures, relevant safety precautions must be taken.

1 Always wear safety glasses during both removal and replacement.

2 Use protective gloves - heavy duty leather gauntlet type gloves when cutting out the broken glass; 'non-slip' type gloves when handling/moving panes of glass; surgical type gloves when using the polyurethane adhesives.

3 Wear protective overalls.

4 Do not smoke - the activators and primers used in the procedures are highly flammable.

5 Do not attempt to handle or move panes of glass unless you are using glass lifters.

Several special tools are required to successfully complete the removal and replacement procedures. Reference is made to the tools in the text. The majority of these tools can be obtained locally and the remainder from JCB Service (see ***Service Tools***).

The work must only be carried out in a dry, frost free environment. A protective canopy may be required or the machine/frame must be moved to a sheltered area. In damp or wet conditions, hinged doors and window frames can be removed from the machine and taken to a more suitable (dry) environment.

Glass should not be replaced at temperatures below 5°C (41°F).

⚠ WARNING

Laminated glass must be handled with extra care to prevent breakage. Wherever possible, store and handle it in a vertical attitude. When placing or lifting the glass in a horizontal attitude it must be supported over its whole area, not just at the edges.

BF-1-8_1

Removing the Broken Glass and Old Sealant

⚠ WARNING

Always wear safety glasses when removing or installing screen glass. Never use a power operated knife when removing the sealant around a toughened glass screen. The action of the knife could cause particles of glass to be thrown with sufficient force to cause serious injury, even when safety glasses are being worn. Use only hand operated tools when working with toughened glass.

BF-2-3_1

1 Position the machine on level ground and apply the park brake. Stop the engine. Put protective covers over the cab seat and control pedestals.

2 If a laminated pane breaks it will stay in one piece even though the glass is cracked. A toughened pane will shatter and fall apart. The method of removal of the glass depends upon which type it is.

a Laminated glass - leave installed until the old sealant has been cut away, after which it will be possible to lift the broken screen away from its frame housing in one piece.

b Toughened glass - remove as much of the shattered glass as possible prior to cutting out the old sealant.

3 Cut out the old sealant, leaving approximately 1 to 2 mm on the cab frame. There are several tools and techniques for doing this:

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Technical Data

General Data

System Type	12V negative earth
Battery	
Type	Std. JCB round pole
Voltage	12V
Specific Gravity (fully charged)	Between 1.285 and 1.310 at 15 ºC (59 ºF)
Starter Motor	
Direction of Rotation (viewed from pinion side)	Clockwise
Alternator	
Direction of Rotation (viewed from pulley)	Clockwise
Nominal Output	12 volt 80 amp
Polarity	Negative earth

Tightening Torques - Alternator	**Nm**	**kgf m**	**lbf ft**
Mounting Bolt	20.4 - 27.2	2.1 - 2.8	15.0 - 20.0
Adjusting Bolt	10.9 - 13.5	1.1 - 1.4	8.0 - 10.0
Shaft Nut	70 - 90	7.1 - 8.2	51.6 - 66.4

Bulbs

Function	**Rating**
Cab Lights, Interior	10W
Working Lights, Boom and Cab Roof	55W
All Panel Warning Lamps	LED’s
All Switch Illuminations	LED’s

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Engine

Checking the Oil Level

1 Park the machine on level ground. Lower the excavator and dozer to the ground.

2 Stop the engine and remove the starter key.

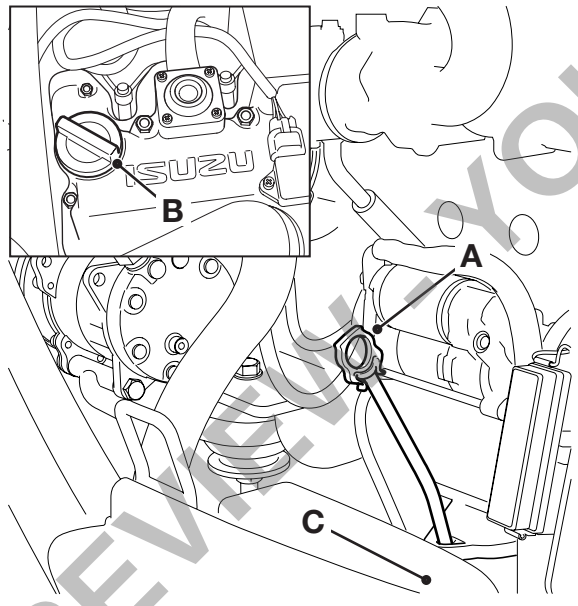
3 Open the engine cover.

4 Wait for the oil to drain into the engine sump before an oil level check is done. If the check is done quickly, an incorrect low level of oil is shown on the dipstick, which can cause too much oil to be added.

5 Remove and clean the dipstick **A**.

6 Put the dipstick back, then remove it to check the oil level.

7 The correct level will show the oil at the top of the hatched area on the dipstick **A**.



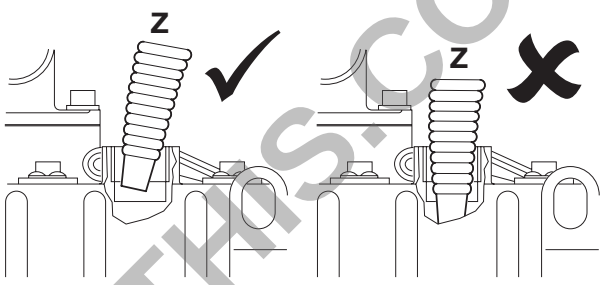
T049090

Fig 8.

8 To add oil to the engine, if necessary:

Remove the oil filler cap **B**.

Carefully add the oil slowly through the oil filler. Use only the recommended oil. ⇒ ***Fluids, Lubricants and Capacities (3-11)***.



804240-B1

Fig 9.

Do not put the neck of the container **Z** fully into the filler hole.

Let the oil flow from the filler to the crankcase.

Replace the oil filler cap tightly.

⚠ CAUTION

The engine has a closed ventilation system, (a hose connects the ventilation system and the inlet manifold). When oil is added through the oil filler it is important that the oil is added slowly. If the oil is added too rapidly it will enter the cylinders through the hose and intake manifold and cause serious engine damage.

8-3-5-10

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Auxiliary Controls

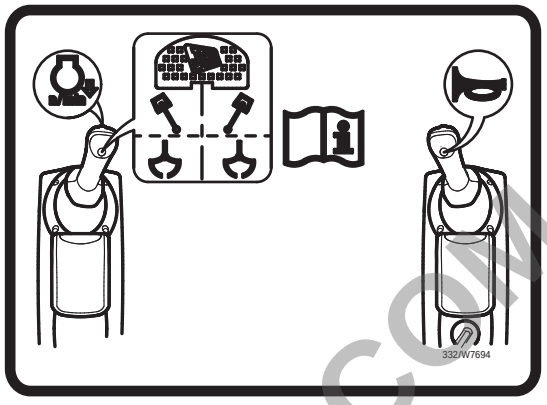
Standard Machine (No options)

Operating the switch **C** changes the function of the swing control pedal to operate the auxiliary circuit.

Press either the left **A** or the right **B** of the pedal as appropriate to operate an auxiliary attachment.

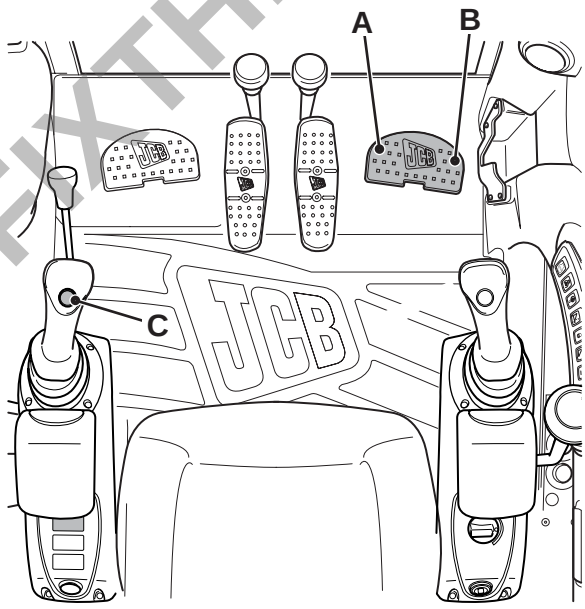
Note: *'Forward' and `reverse' directions will be determined by the hydraulic connections to the attachment.*

When the machine is switched off, the swing/auxiliary change over will remain in the last selected state and the mode will be displayed on the EMS unit.



332-W7694

Fig 6. Standard machine decal - no options



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Fig 7.

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One Touch Idle

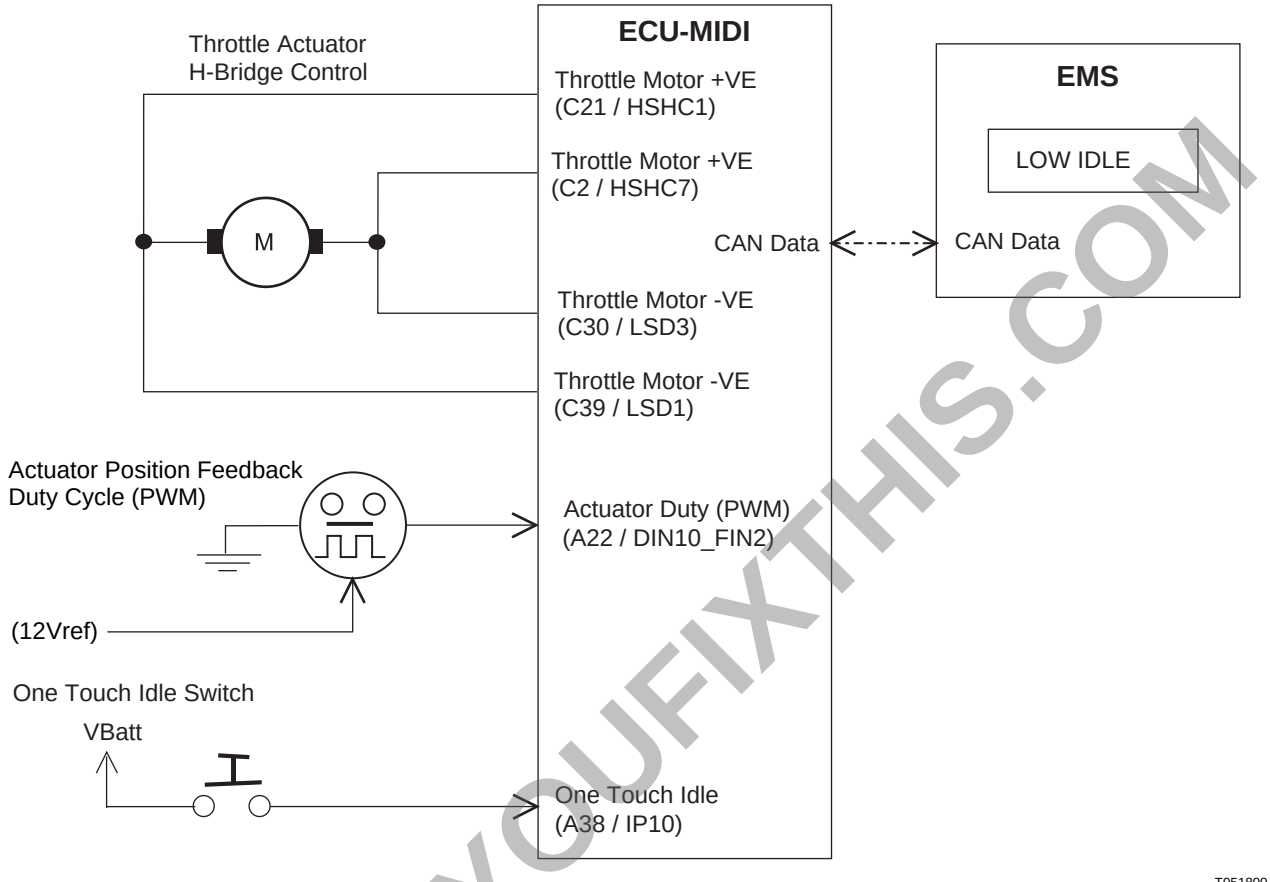


Fig 19.

Operation

The one touch idle switch is located in the left hand joystick.

The one touch idle switch is a momentary button that will give a grounded +Vbatt input when it is pressed and an open input when it is not pressed. When operated the engine revs drop automatically to idle speed.

When activated this feature allows the engine to run at the low idle setting regardless of any other input (including the throttle dial). When the one touch idle switch is activated the EMS will display the "LOW IDLE" message to verify operation and the engine speed will drop to the low idle setting. A second press of this switch will disable the function and the engine speed will return to the previous value as defined by the throttle set pot. The EMS display returns to normal status.

If one touch idle is selected and the ignition is turned off, when the vehicle is started again the one touch idle is automatically activated.

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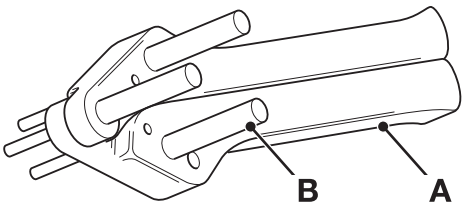
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JCB Ram Sealing Procedure

TE-005_2

1 Fit new rod seals.

Use seal fitting tool **11-A** to fit rod seals, the size (diameter) and position of pins **11-B** is determined by the diameter and radial width of the rod seal being fitted.

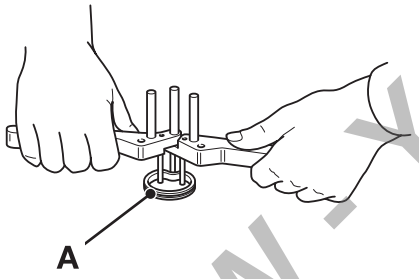


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Fig 11. Seal Fitting Tool

The pins are screwed into threaded holes in the tool body, the spacing of the holes is designed to suit small or large diameter rod seals.

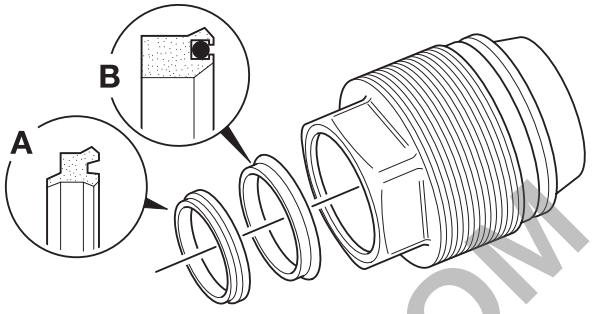
a Open the tool and insert the new rod seal **12-A**. The seal must be fitted behind the two front pins but in front of the rear pin as shown.



S161750 X-1

Fig 12.

Note: *Later ram end caps and piston heads are metric threads. The seals are also different, make sure the correct seals are fitted. On metric threaded rams make sure the seals are fitted the correct way round, as shown at **13-A** and **13-B**.*



153212-1

Fig 13.

b Close the tool. ⇨ *Fig 14. (E-79)*. The seal must form a reniform (kidney shape).



S161750 Y-1

Fig 14.

c Before fitting the rod seals check the seal grooves are free of contamination and sharp edges.

d Locate the seal in the end cap groove. ⇨ *Fig 15. (E-79)*. When the seal is in position, open the tool to release the seal. Make sure the seal is correctly installed in its grooved and remove the tool.



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Fig 15.

e Fit rod wiper seal **13-A** into seal groove. Make sure the seal is correctly installed as shown.

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