Service Manual

JZ 70

From machine no.834000

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General Information 1
Care & Safety 2
Routine Maintenance 3
Attachments A
Body & Framework B
Electrics C
Controls D
Hydraulics E
Transmission F
Brakes G
Engine K

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Contents

	Page No.
Bolt and Nut Torque Specifications	1 - 1
General Torque Settings	1 - 2
Service Tools	
Section B - Body and Framework	3 - 1
Section C - Electrics	4 - 1
Section E - Hydraulics	5 - 1
Sealing and Retaining Compounds	9 - 1

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All construction and agricultural equipment can be hazardous. When a JCB Excavator is correctly operated and properly maintained, it is a safe machine to work with. But when it is carelessly operated or poorly maintained it can become a danger to you (the operator) and others.

Do not work with the machine until you are sure that you can control it.

Do not start any job until you are sure that you and those around you will be safe.

If you are unsure of anything, about the machine or the job, ask someone who knows. Do not assume anything.

Remember

BE CAREFUL
BE ALERT
BE SAFE

GEN-1-6

As well as the warnings in the following pages, specific warnings are given throughout the book. This section is designed to give a safety code for use of the machine generally and for operation and maintenance practices.

Note: This section includes a certain amount of operating safety information. But remember that whenever you drive the machine or operate its controls, you are in effect a machine operator. Therefore you should read and understand the information given in the Operator Handbook before driving the machine or operating its controls.

General Safety

WARNING

Lifting Equipment

You can be injured if you use faulty lifting equipment. Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job.

INT-1-3-7

WARNING

Clothing

You can be injured if you do not wear the proper clothing. Loose clothing can get caught in the machinery. Wear protective clothing to suit the job. Examples of protective clothing are: a hard hat, safety shoes, safety glasses, a well fitting overall, ear-protectors and industrial gloves. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained.

INT-1-3-6

WARNING

Care and Alertness

All the time you are working with or on the machine, take care and stay alert. Always be careful. Always be alert for hazards.

INT-1-3-5

WARNING

Raised Equipment

Raised equipment can fall and injure you. Do not walk or work under raised equipment unless safely supported.

13-1-1-6

DANGER

Before removing the boom from the machine, ensure that the counterweight is adequately supported as in certain ground conditions the machine could tip backwards. Never travel or transport the machine with the boom removed.

BF6-3

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The following circuit diagrams are taken from the main electrical schematic, but are reduced to

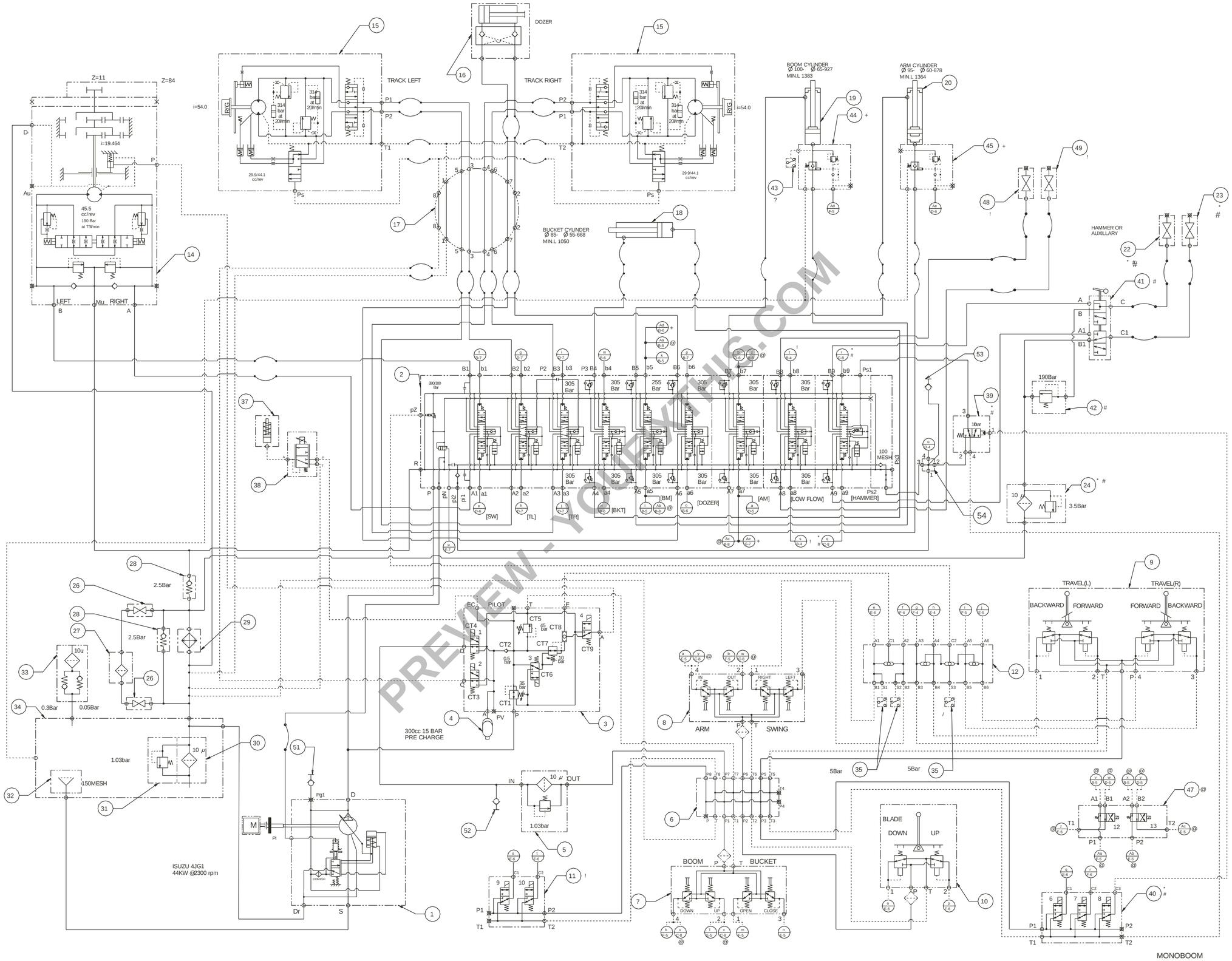
	Circuit description	**Page**
1.	Alternator charging and battery relay	5-6
2.	Engine throttle control	5-7
3.	Engine auto idle and one touch idle	5-8
4.	Engine start / stop	5-9
5.	Engine pre-heat	5-10
6.	Lever lock and isolator	5-11
7.	Wiper	5-12
8.	Washer	5-13
9.	Horn	5-14
10.	Travel alarm	5-15
11.	Swing brake	5-16
12	Swing lock	5-17
13.	2 speed travel	5-18
14.	Work lamps	5-19
15.	Fuel sensor	5-20
16.	Engine temperature	5-21
17.	Hydraulic temperature	5-22
18.	Quickhitch	5-23
19.	Beacon	5-24
20.	Low flow (grab rotate/weedcutter)	5-25
21.	Hammer	5-26
22.	Warning indicator lamps	5-27
23.	Heater	5-28
24.	Air conditioning	5-29
25.	Refueling pump	5-30
26.	Radio	5-31
27.	Cigar lighter	5-32
28.	Cab interior (room) lamp	5-32
29	Swing/offset	5-33
30	EMS/power supply and network	5-34
31	Diagnostic socket	5-35

Wire colour coding

Code	Colour
R	Red
Y	Yellow
U	Blue
G	Green
N	Brown
B	Black
S	Grey
W	White
O	Orange
K	Pink
P	Purple
LG	Light green

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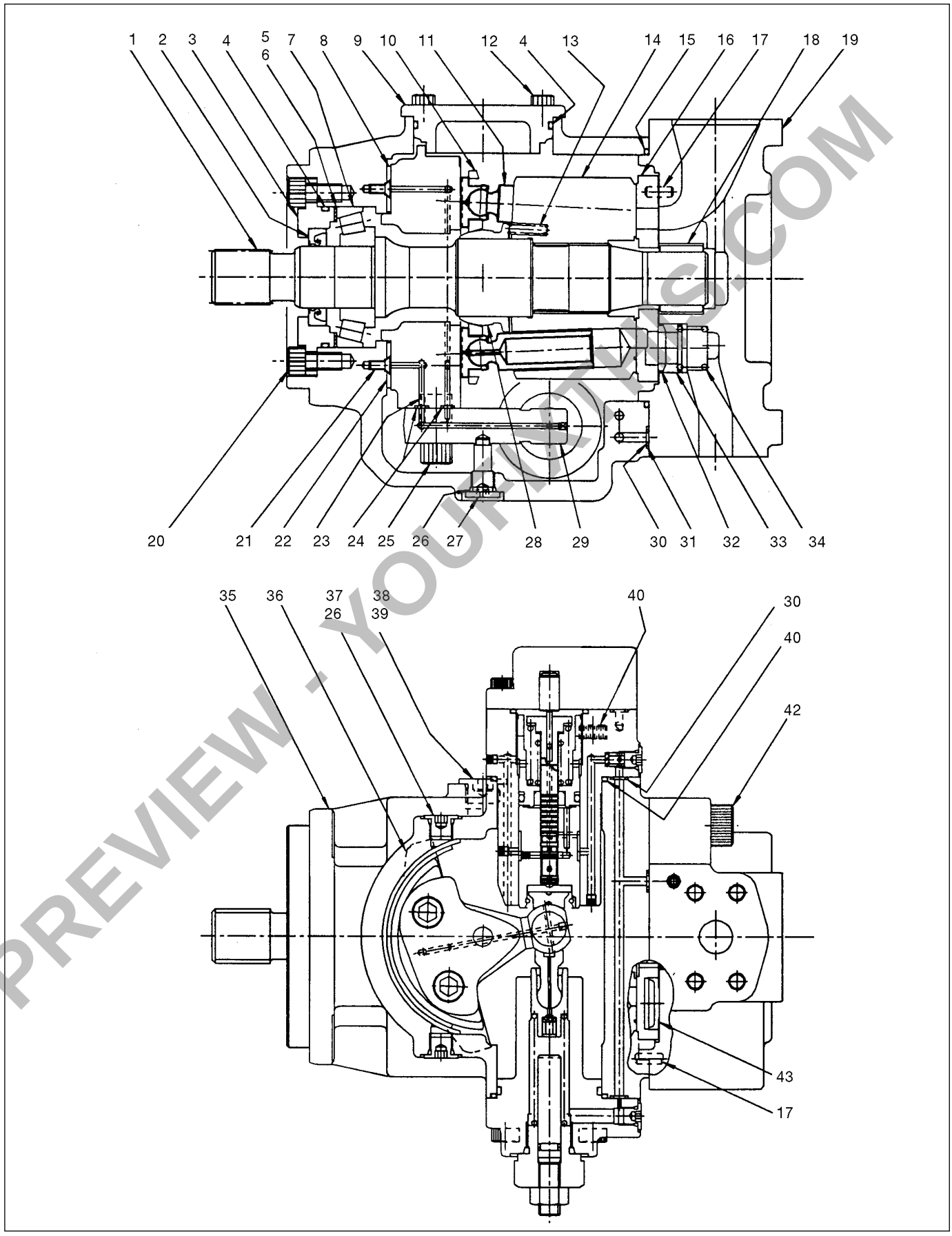
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Hydraulic Pump



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Bolt and Nut Torque Specifications

Tighten the bolts and nuts according to the table. Before and after daily work, check the bolts and nuts for looseness and for those missing. Tighten if loose and renew if missing.

Tighten the bolts and nuts after the first 50 hours of the running-in stage and every 250 hours thereafter.

Torque Tightening Table

No	Tightening Point	Bolt Diameter	Wrench	Tightening Torque		
			mm	Nm	kgf m	lbf ft
1†	Travel Motor	M16	24	268~312	27.2~31.8	197~230
2†	Drive Sprocket	M14	22	173~202	17.6~20.6	128~149
3†	Idler Wheel	M10	17	63~73	6.9~7.4	46~54
4†	Upper (Carrier) Roller	M16	24	267~312	27.2~31.8	197~230
5†	Lower (Track) Roller	M12	19	109~127	11~13	80~94
6†	Grease Cylinder	M12	19	109~127	11~13	80~94
7†	Track Guard	M12	19	109~127	11~13	80~94
8	Shoe Bolt	U1/2 - 38	19	196~235	20~24	145~173
9†	Counterweight	M24	36	660~770	67.3~78.5	487~568
10†	Turntable Bearing (Undercarriage)	M16	24	252~283	25.7~28.9	186~209
11†	Turntable Bearing (Slew Frame)	M16	24	252~283	25.7~28.9	186~209
12†	Slew Equipment	M16	24	273~318	27.8~32.4	201~235
13†	Engine (Engine Mount)	M16	24	167~216	17~22	123~159
14†	Engine Bracket	M10/M16	17/24	65~75/167~216	6.6~7.7/17~22	48~55/123~159
15	Radiator	M10	17	30~35	3.1~3.6	22~26
16†	Hydraulic Pump	M10/M12	17/19	63~73/109~127	6.4~7.4/11~13	46~54/80~94
17†	Hydraulic Oil Tank	M16	24	160~172	16.3~17.5	118~127
18†	Fuel Tank	M16	24	160~172	16.3~17.5	118~127
19†	Control Valve	M12	19	53~65	5.4~6.6	39~48
20†	Rotary Coupling	M10	17	63~73	6.4~7.4	46~54
21	Cab	M16	24	79~88	8~9	58~65
22	Battery	M10	17	20~30	2~3	15~22

Note: Use JCB Threadlocker and Sealer (High Strength) on those marked † and tighten to the torque listed in the above table.

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Some problems which may occur in the hydraulic system are listed below, either for the system as a whole or for individual components

Symptom	Possible Cause	Action
1 Hydraulic System		
a The hydraulic system is defective or does not operate at all.	1 The pump is defective.	Check pump pressure and renew if defective.
	2 Dirt is clogging the inside of the relief valve.	Dismantle and clean the relief valve.
	3 The relief valve is defective.	Strip and check the relief valve.
	4 A ram is worn.	Repair or renew the ram.
	5 Negative pressure is low.	Check circuit pressure.
	6 A valve is cracked.	Renew the valve.
	7 A spool is not operating over its full stroke.	Check the movement of the spool or the operational linkage.
	8 The oil level in the tank is too low.	Replenish the oil.
	9 Circuit filters are clogged.	Clean or renew filters.
	10 The circuit pipes are restricted.	Check the piping.
2 Hydraulic Pump		
a Oil is not discharged from the pump.	1 The tank strainer or intake pipe is blocked.	Clean the strainer and clean the intake pipe.
	2 The end of the inlet pipe is above the tank oil level.	Replenish the oil tank.
	3 One or more of the pump major components is damaged or the input shaft or coupling are defective.	Dismantle and inspect pump. Renew damaged components and reassemble the pump. Renew shaft or coupling.
b Pump output is low. Hydraulic pressure does not increase.	1 The pressure does not increase because of problems with the hydraulic pump or control valve.	Check hydraulic pump and control valve. Renew as required.
	2 Internal leakage within the hydraulic pump with excessive fluid drain from pump drain port.	Strip and inspect the hydraulic pump, paying particular attention to sliding surfaces. Repair or renew as necessary. Reassemble the pump.
	3 Air is being drawn into the pump from the inlet side.	Check tank oil level and strainer for clogging. Correct as necessary. If OK, check tightness of pump inlet connection.
	4 Inlet resistance causing cavitation.	Check correct oil . Check pump low pressure inlet pipe for collapse. Renew as required.
c The pump makes an abnormal noise.	1 Oil level is low and the pump is drawing in air.	Check and replenish oil level. Run the pump under no load to bleed air from the hydraulic system.

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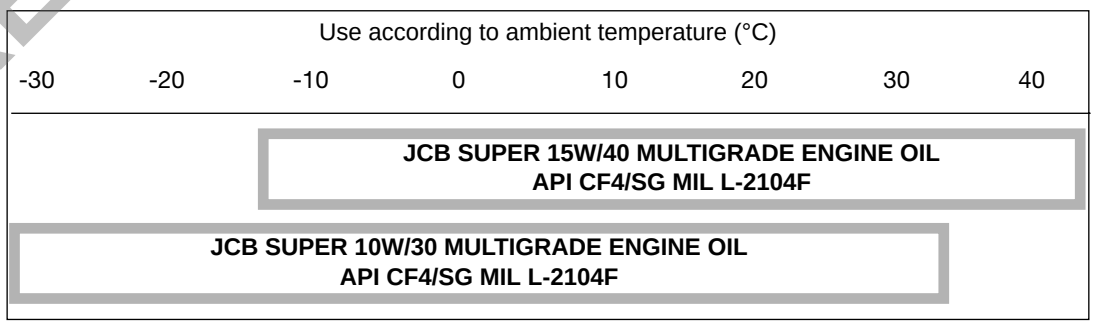
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CAPACITIES AND SPECIFICATIONS

Note: *New engines DO NOT require a running-in period. The engine should be used in a normal work cycle immediately; glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently run-in. Under no circumstances should the engine be allowed to idle for extended periods (e.g. warming-up without load).*

Item	Fluid/Lubricant	International Specification	Capacity
ENGINE	See separate chart	-	6.8 litres (1.49 UK gal) (1.79 US gal)
TRACK GEARBOXES	JCB Gear Oil HD90	API-GL-5, MIL-L-2105C	2 x 1.7 litres (0.37 UK gal) (0.44 US gal)
TRACK ROLLERS AND IDLER WHEEL	Engine Oil (see separate chart)	-	-
HYDRAULIC SYSTEM	JCB Special Hydraulic Fluid HP46	Vickers 35VQ25/V104C: Sundstrand, Denison and FZG Approval Tests	92 litres (20.26 UK gal) (24.33 US gal)
SLEW RING - BEARINGS - GEAR TEETH	 JCB HP Grease JCB HP Grease	 Lithium Complex (NLGI 2) inc. extreme measure additives	 - 3.2 kg (7.14 lb)
ALL OTHER GREASE POINTS	JCB HP Grease	Lithium Complex (NLGI 2) inc. extreme measure additives	
COOLING SYSTEM	See ***Coolant Mixtures***	ASTM D3306-74	10.1 litres (2.22 UK gal) (2.66 US gal)
FUEL TANK	See ***Fuel System***, ***Types of Fuel***	ASTM D975-66T Nos 1D, 2D	140 litres (30.8 UK gal) (37.0 US gal)

Engine Lubrication Chart



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Every 10 Operating Hours or Daily
Whichever occurs first

1 Clean
- **a** Machine generally.

2 Grease
(If operating in very wet or severe conditions)
- **a** Bucket/dipper pivot points.

3 Check (Engine Stopped)
- **a** Generally for damage.
- **b** For oil and coolant leakage.
- **c** Security of bolts and nuts ††.
- **d** For disconnected or shorted wiring, loose terminals.
- **e** Hydraulic fluid level.
- **f** Engine oil level.
- **g** Track tension.
- **h** Windscreen washer fluid level.
- **j** Fuel system for leaks.
- **k** Fuel level.
- **l** The auxiliary circuit hydraulic oil filter visual indicator (if using a rockbreaker)

†† Tapping with a hammer will identify any loose nuts and bolts which should then be tightened to the specified torque.

4 Check (Engine Running)
- **a** Operation of warning lights and audible alarm.
- **b** Operation of other electrical equipment.
- **c** Exhaust for excessive smoke.
- **d** Excavator operation.
- **e** Transmission operation.
- **f** Operation of track and slew brakes.
- **g** Operation of hour meter.

Every 50 Operating Hours or Weekly
Whichever occurs first

1 Do the daily jobs plus:

2 Clean
- **a** Drain water and sediment from fuel tank.
- **b** Drain fuel water separator.

3 Grease
- **a** All pivot pins.

Every 100 Operating Hours or 2-Weekly
Whichever occurs first

1 Do a 50 hour service plus:

2 Clean
- **a** Battery terminals.
- **b** Fuel lift pump strainer†.

3 Change
- **a** Engine oil main filter element †.
- **b** Engine oil †.
- **c** Servo oil filter element †.
- **d** Engine oil filter by-pass element †.
- **e** Return filter element†.
- **f** Drain filter element †.
- **g** Track gearbox oil†.
- **h** Fuel filter element†.

4 Check (Engine Stopped)
- **a** Hoses and pipework for chafing or damage.
- **b** Condition of ram piston.
- **c** Bucket pivot pin grease seals†.
- **d** Track plate condition.
- **e** Track and running gear.
- **f** Top and bottom track rollers for oil leaks †.
- **g** Track idler wheels for oil leaks †.
- **h** Security of major unit mounting bolts and nuts†. If loose, tighten to specified torque.
- **i** Wiring for chafing.
- **j** Fan belt adjustment†.
- **k** Accumulator operation.
- **l** Radiator for damage.
- **m** Oil cooler for damage.
- **n** Battery electrolyte level†.
- **p** Exhaust system security†.
- **r** Teeth and sidecutters†.

5 Check (Engine Running)
- **a** Operation of throttle system†.
- **b** Operation of overload warning†.
- **c** Operation of stop control†.

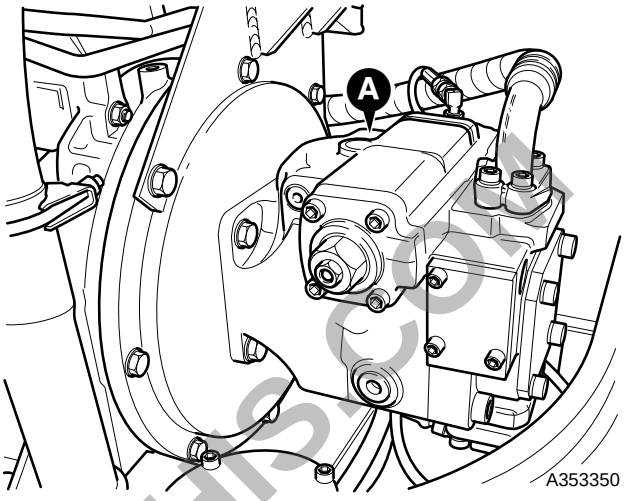
† These procedures are only to be carried out after the first 100 hours use of a new machine. Thereafter they are to be carried out as detailed in the following periodic checks.

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Air Bleeding Procedures

After replacing the hydraulic oil or repairing or replacing hydraulic components or removing hydraulic pipes, bleed air from the hydraulic circuit.



Bleeding Air from the Hydraulic Pump

If the air is not completely bled, the life of the pump will be reduced or serious trouble can occur.

1 Prepare the Machine

Position the machine on level ground. Stop the engine.

Remove the starter key.

2 Locate the Hydraulic Pump

Refer to **Component Locations** at the end of this section.

3 Temporarily loosen air bleeding plug **A**.

4 If oil comes out, re-tighten the plug. If oil does not come out, remove the air bleeding plug **A** and prime the pump by pouring hydraulic oil into the pump case through the air bleeding port.

5 Temporarily tighten air bleeding plug **A**. Start the engine and idle at low speed. Slightly loosen air bleeding plug **A** and continue to run the engine until oil exudes from the air bleeding port.

6 Tighten the air bleeding plug firmly.

7 Stop the engine and allow any bubbles in the system to make their way through the hydraulic tank.

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Checking the Track Shoes

1 Prepare the Machine

Position the machine on level ground and switch off the engine.

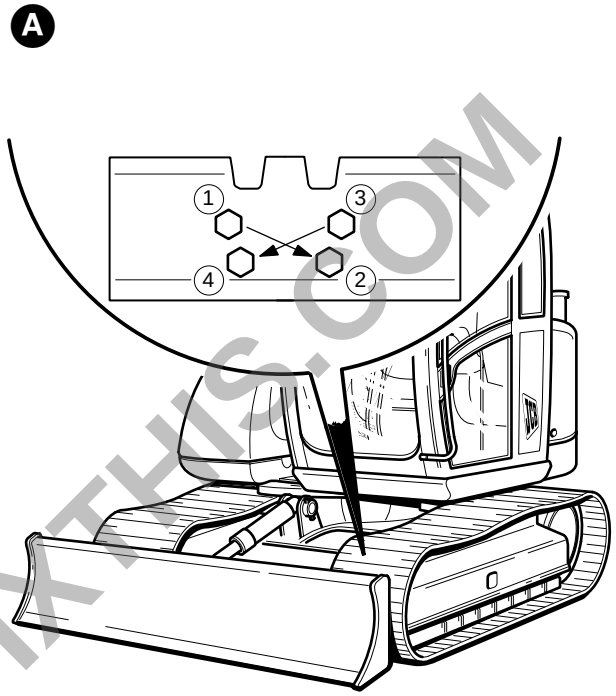
2 Inspect the Track Shoes

Check the shoes for wear and for loose mounting bolts.

3 Carry out Repairs or Maintenance

a Replace any damaged or broken shoes.

b Tighten or re-tighten the shoe-mounting bolts in the sequence shown at **A** to a torque of 197 - 236 Nm (145 - 174 lbf ft).



Checking the Rollers and Idler Wheels for Oil Leaks

1 Prepare the Machine

See **Clean the Tracks**, steps 1 to 3.

Block the undercarriage.

2 Look for Oil Leaks

Check the top and bottom rollers and the idler wheels for oil leaks. If leaks are found contact your JCB Distributor for service.

⚠ CAUTION

Do not run the machine if you discover oil leaks in the top or bottom rollers or idler wheels. Failure to rectify such leaks could cause damage to the machine.

8-3-4-6

3 Lower the Track

Remove the blocks from beneath the undercarriege.

See **Clean the Tracks**, step 5.

4 Repeat for the Opposite Track

Swing the boom to the other side and repeat steps 1 to 3 above.

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Monitor Panel

1 Display Panel
The EMS instrument panel is located at the front of the cab in the line of sight from the operator's seat. It provides the interface with the machine's system. The LCD has 20 segment bar graph gauges for fuel, hydraulic and water temperatures, a clock, gear, power, mode and hours run meter. The panel also has an eleven character message area.

2 Mode Switch
Press to select working mode. The machine will be in **S** mode when started. Each press cycles through the modes as follows:
S ➔ L ➔ S
Select the appropriate work mode suitable for the work to be carried out:

S - STANDARD MODE
Mode for general digging and loading work.

L - LIGHT MODE
for precise or light duty work (3/4 Throttle)

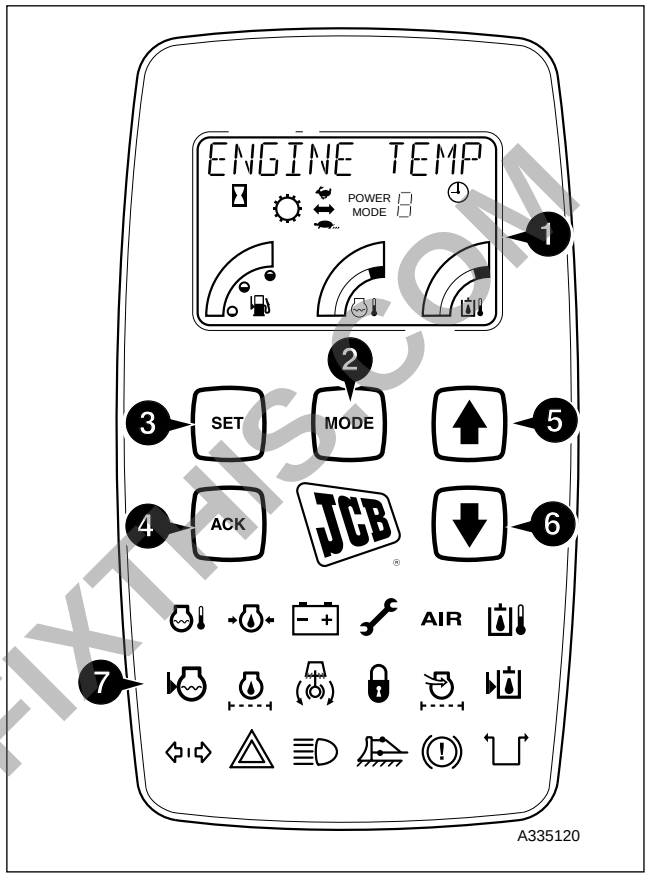
3 Set Switch
Press the SET switch to access the monitor menu. The menu can be scrolled through using the Scroll Up and Scroll Down switches.

4 ACK Switch
Press to acknowledge warnings shown on the display. This will clear the message but will not put out the warning lamps.

5 Scroll Up Switch

6 Scroll Down Switch

7 Warning lamps
Eighteen tell tale warning light indicators are included on the monitor, (not all the warning lights are used)



Indicates that machine hours are displayed top right of the display.

Indicates that time is displayed top left of the display.

Indicates that transmission information is displayed top left of the display.

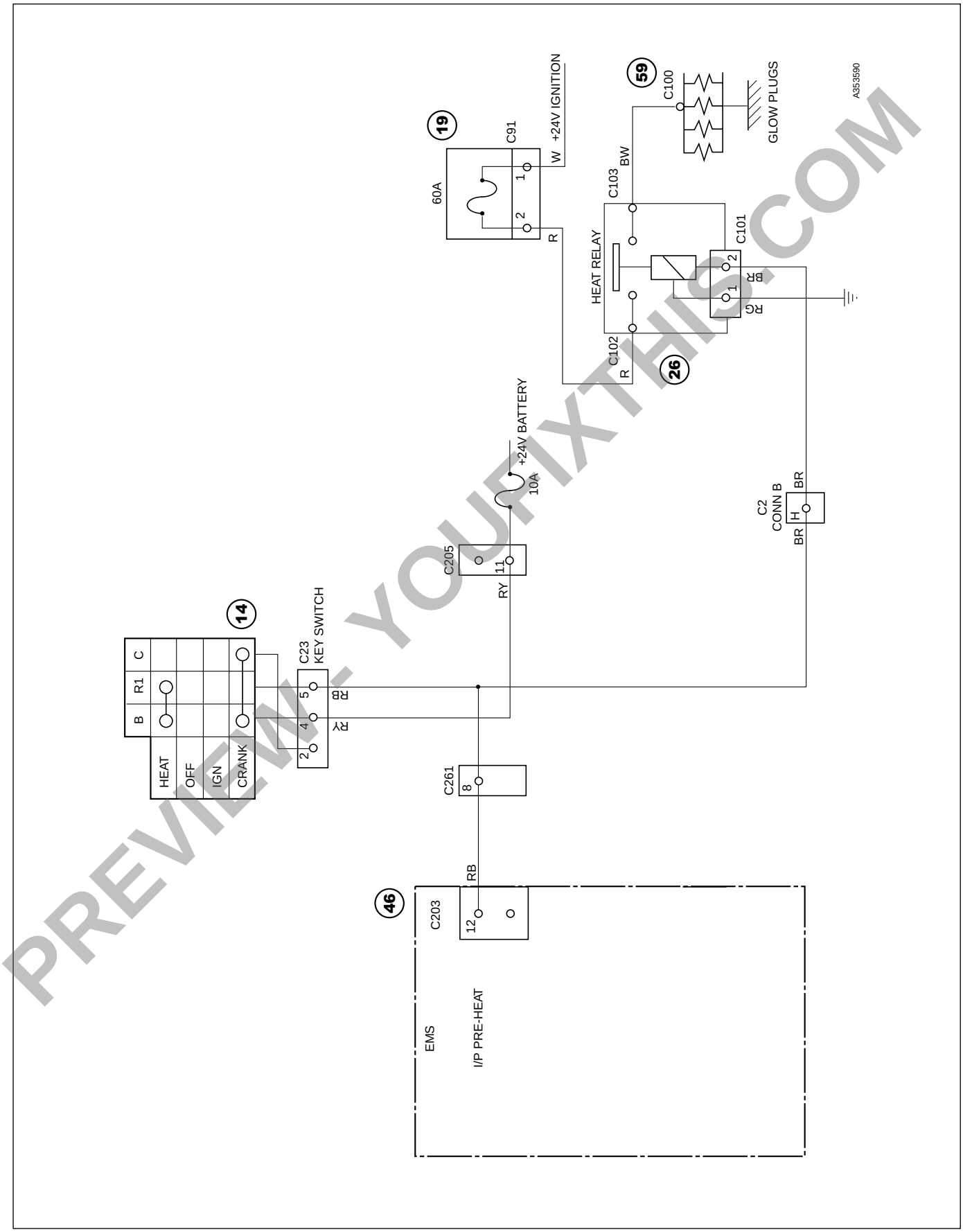
⚠ CAUTION

All the warning lights should go out when the engine is started. Rectify any faults immediately.
4-2-1-4

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5. Engine Pre-heat



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50% Swing brake

Key

A Pump pressure
B Servo pressure (40 bar)
C Return pressure/tank
D Servo pressure (10 bar)

a 50% swing brake is achievable by having the swing brake solenoid energised and the swing lock solenoid de-energised.

b Servo pressure (40 bar) in the pilot supply valve will pass through the energised swing brake solenoid and via the 10 bar pressure reduction valve. The 10 bar pressure will move the shuttle and travel to the swing motor brake.

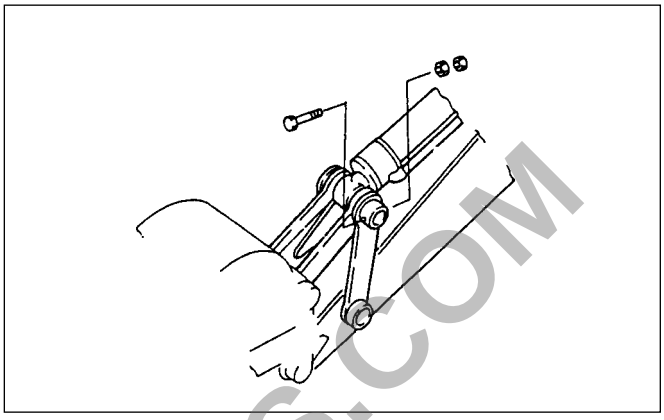
c The 10 bar at the swing brake gives 50% swing brake.

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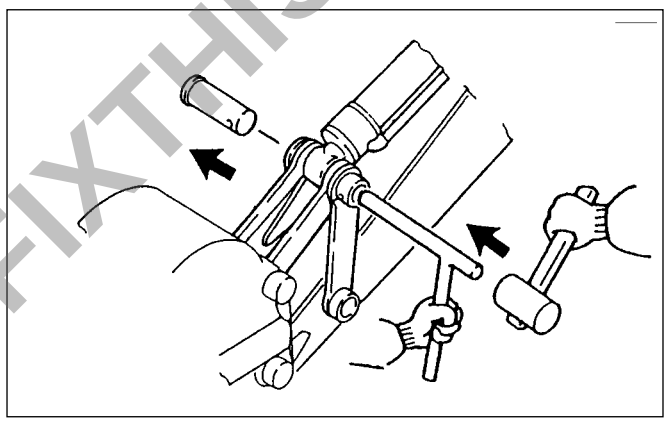
Bucket Ram - Removal (cont'd)

4 Remove the nuts and bolts from the rod end of the ram.

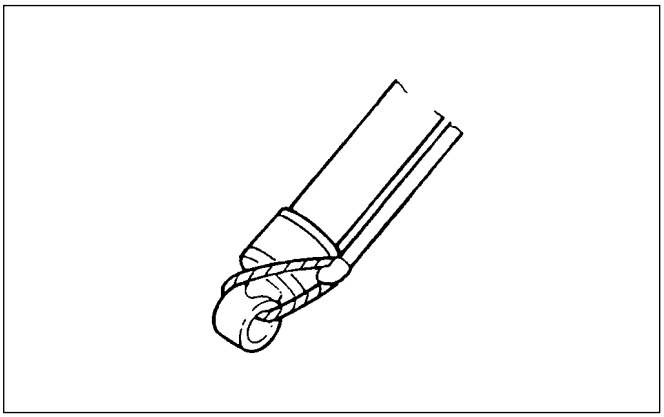


5 Push the pin out using a bar and hammer.

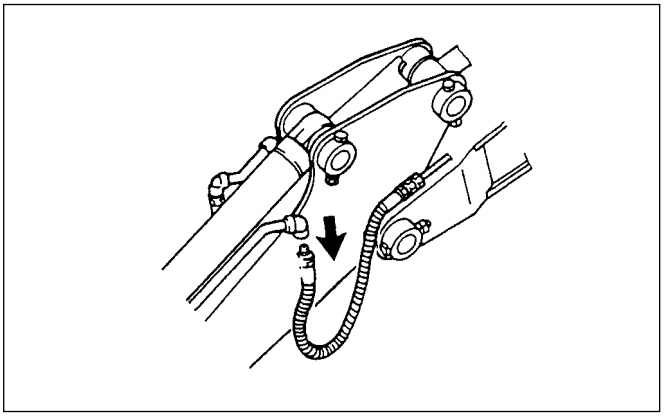
WARNING
Metal Splinters
You can be injured by flying metal splinters when driving metal pins in or out. Use a soft faced hammer or drift to remove and fit metal pins. Always wear safety glasses.
INT-3-1-3



6 Restrain the eye end of the ram piston rod to the ram cylinder to prevent the piston rod from extending.



7 Remove the ram hoses and install plugs or caps to prevent contamination.



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Fault Finding

Table 1.

Symptom	Cause	External Inspection	Countermeasure	Repair
Motor does not run	Internal damage to the motor.	Measure the oil drain volume.	High possibility of damage to the sliding surfaces if the supply volume is approximately equal to the drain volume. Dismantle and inspect.	Refer to Table 2.
	Internal damage to the motor.	Open the motor inlet and outlet ports and apply 39 bar (40 kgf/cm^2) (569lbf/in^2) pilot pressure to the brake release port. Try to rotate the shaft with a torque of approx. 24.40 Nm (18 lbf ft).	High possibility of internal damage to the motor if the supply shaft does not rotate smoothly when this torque is applied. Dismantle and inspect.	Renew damaged parts or renew the motor assembly.
	Relief valve in circuit not set correctly.	Measure pressure.	Reset to the prescribed setting.	
Excessive slip	Wear or damage to the motor sliding surfaces or to the high-pressure seal.	Measure the oil drain volume.	Leakage is too high if the oil drain volume exceeds 5 l/min (1.1 gal/min). Dismantle and inspect.	Refer to table 2.
	Oil hot and excessive leakage in the motor.	Measure the oil temperature.	Reduce the oil temperature.	Refer to table 2.
Abnormal heating	Seizure of motor sliding parts or circuit.	Check for any metallic matter deposited in motor drain oil or drain filter. Apply a 39 bar (40 kgf/cm^2) (569 lbf/in^2) pilot pressure to the brake release port and try to rotate the shaft with a torque of approx. 24.40 Nm (18 lbf ft).	If metallic matter is discovered or the supply shaft does not rotate smoothly when torque is applied, there is a high possibility of internal damage to the motor. Dismantle and inspect.	Repair or renew the damaged parts. Renew the motor assembly.
Leakage from oil seals	Damage or wear to oil seal lip.			Renew the oil seals.
	Damage or wear of the shaft seal.			Repair the problem or renew the motor assembly.

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