SERVICE MANUAL

BACKHOE LOADER
1CX, 1CXT

EN - 9813/6050 - ISSUE 2 - 07/2018

This manual contains original instructions, verified by the manufacturer (or their authorized representative).

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Foreword

The Operator's Manual

⚠

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

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

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

Contents

01 - Machine

03 - Attachments, Couplings and Load Handling

06 - Body and Framework

09 - Operator Station

12 - Heating, Ventilating and Air-Conditioning (HVAC)

15 - Engine

18 - Fuel and Exhaust System

21 - Cooling System

24 - Brake System

27 - Driveline

30 - Hydraulic System

33 - Electrical System

72 - Fasteners and Fixings

75 - Consumable Products

78 - After Sales

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01 - Machine

Contents **Page No.**

Acronyms Glossary 01-2

01-03 Safety
- 01-03-03 Safety - Yours and Others 01-3
- 01-03-06 Safety Warnings 01-4
- 01-03-09 General Safety 01-5
- 01-03-12 Maintenance Safety 01-6
- 01-03-18 Operating Safety 01-8
- 01-03-21 Worksite Safety 01-11
- 01-03-24 Risk Assessment 01-12
- 01-03-27 Maintenance Positions 01-13

01-06 About this Manual
- 01-06-03 Model and Serial Number 01-17
- 01-06-06 Using the Manual 01-18

01-33 Cleaning
- 01-33-00 General 01-21

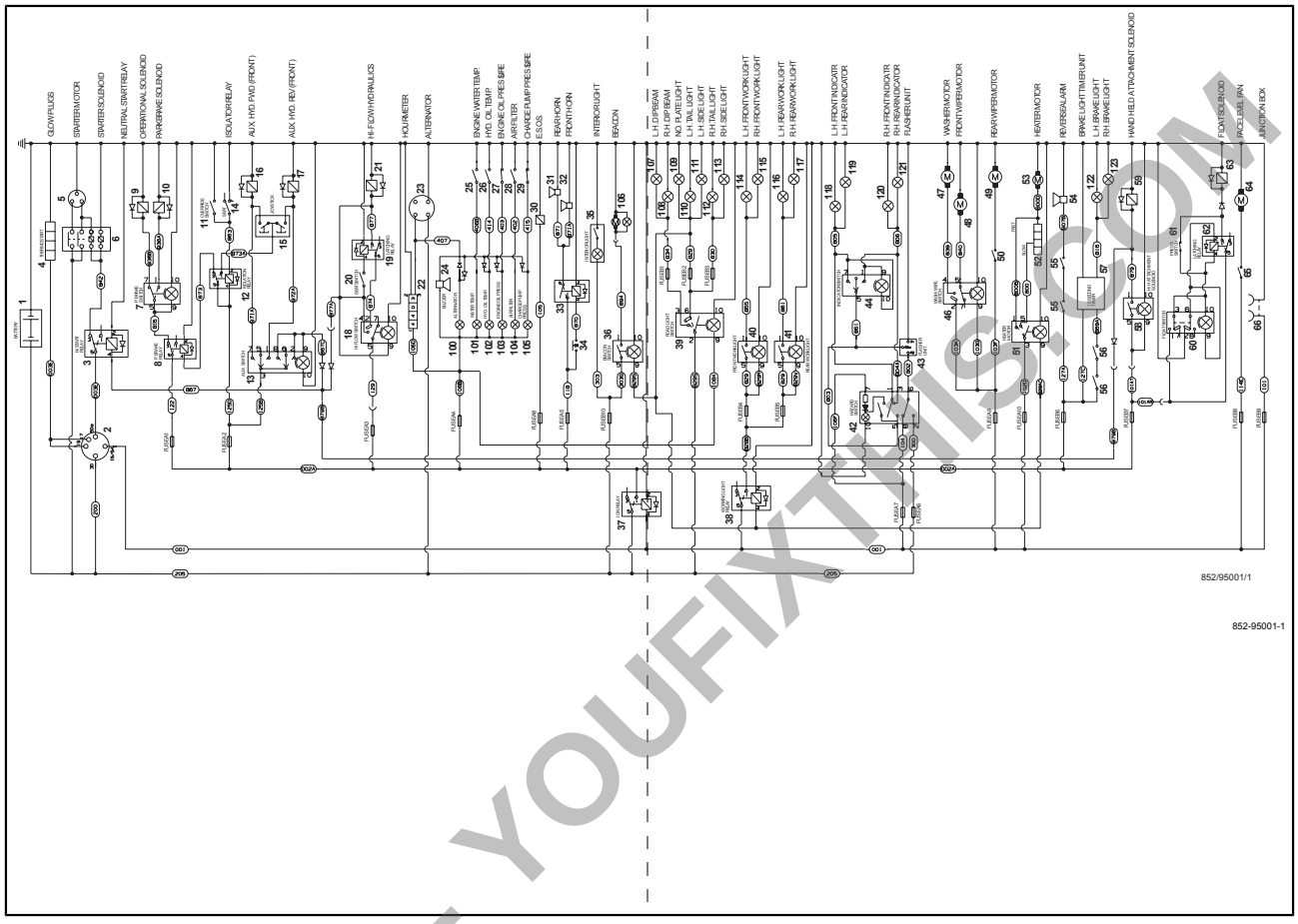
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Page 33-12

Figure 490. From Machine No. (751600 to 752370)

Page 33-13



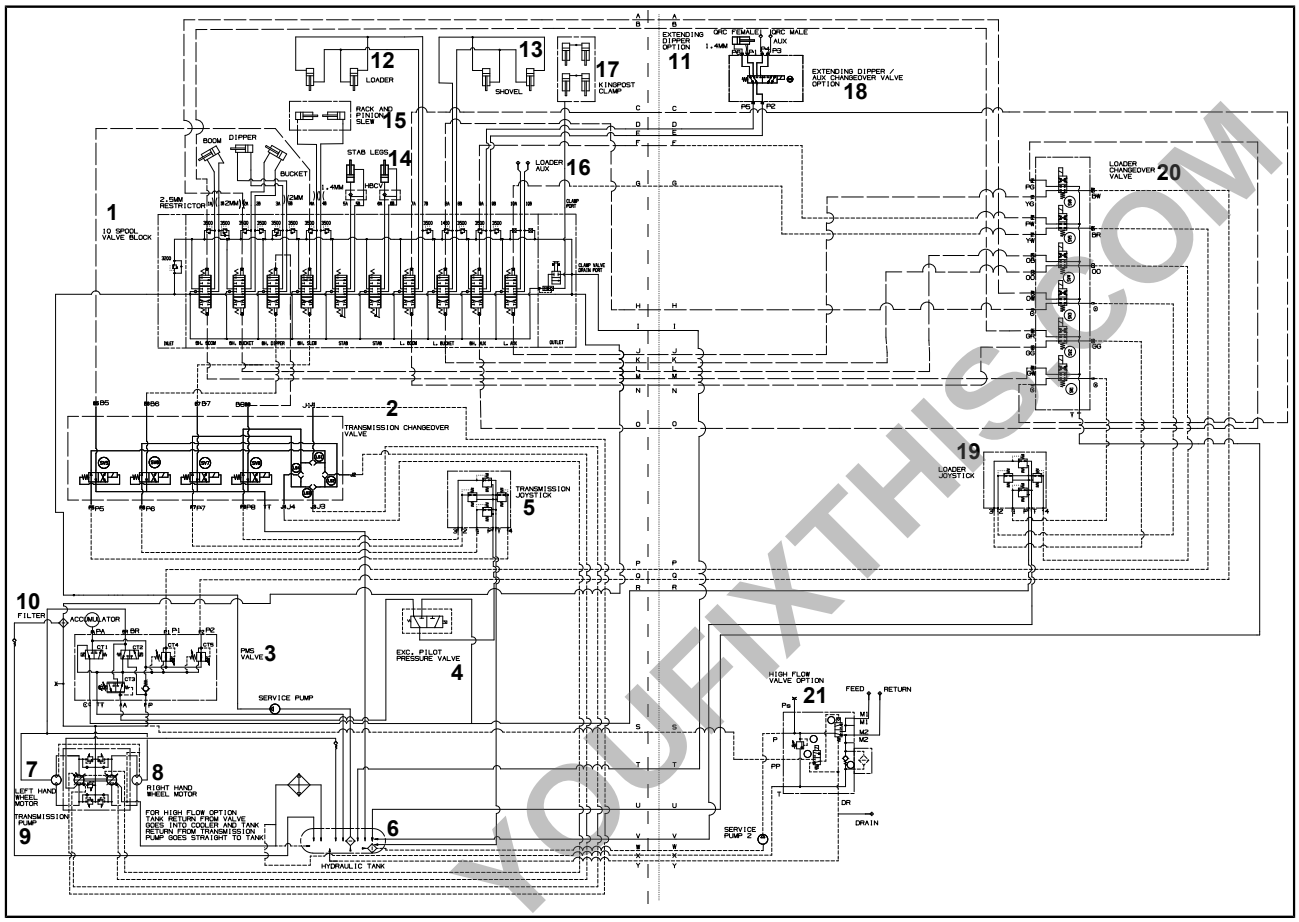
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Page 30-22

Figure 393. ISO Machines - 333-R1564

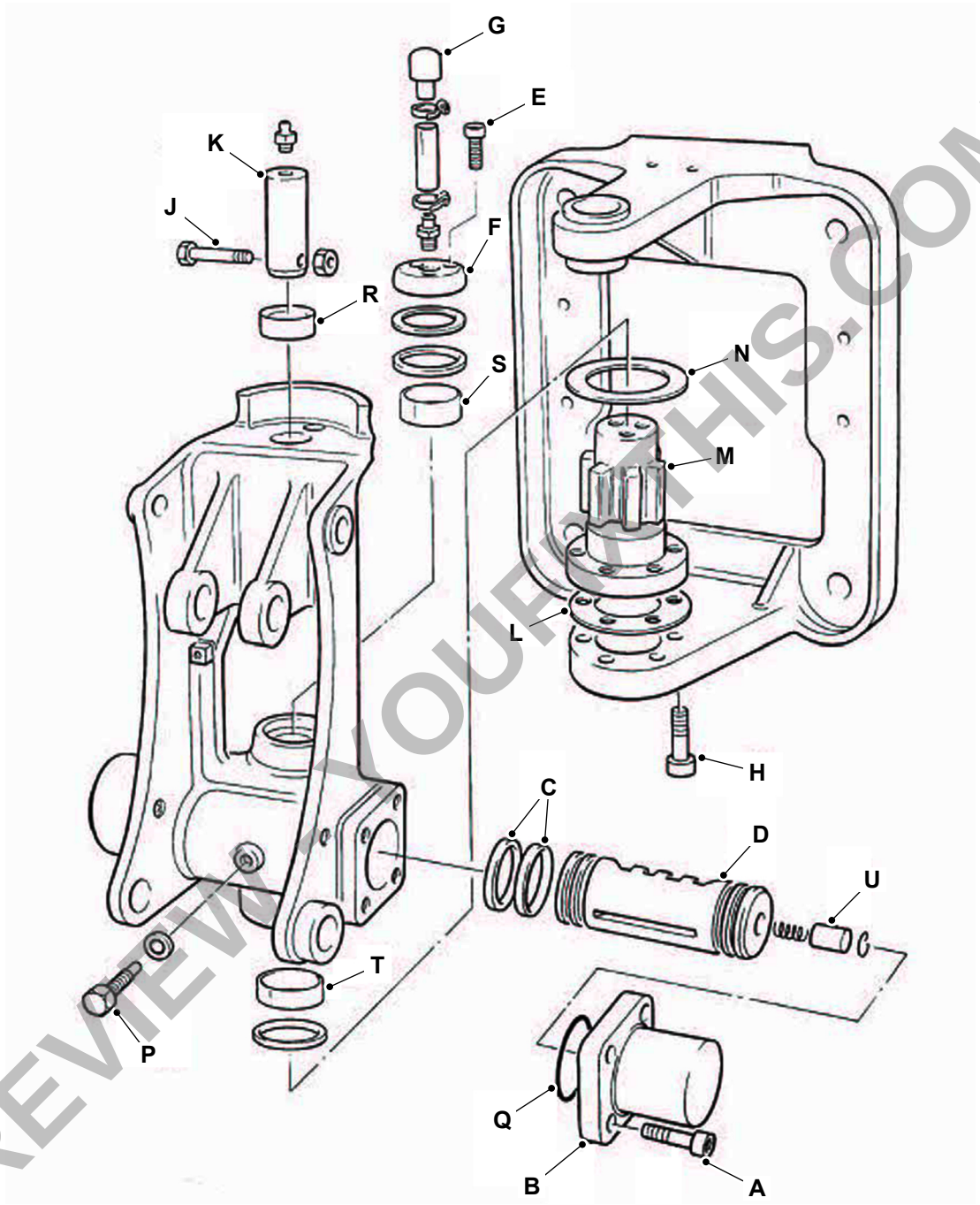
Page 30-23



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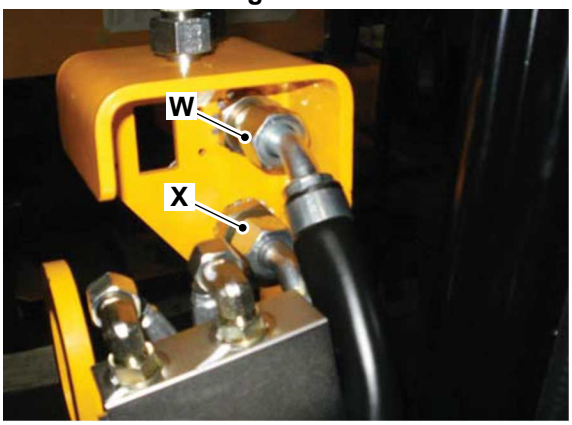
Figure 63.



A Capscrew 1
B Swing cylinder ram
C Rack seal
D Rack
E Capscrew 2
F Thrust cap
G Filler tube assembly
H Capscrews 3
J Bolt
K Pivot pin
L Shim
M Pinion
N Thrust washer
P Anti-roll pin
Q O-ring
R Bush 1
S Bush 2
T Bush 3
U Plungers

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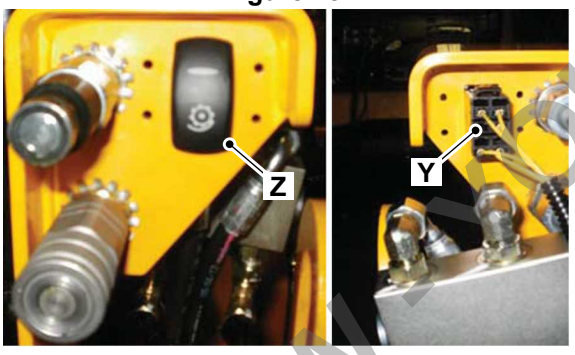
Figure 27.



W F-marked hose
X M-marked hose

39. Install the electrical harness.
40. Install the cable ties.
41. Install the switch to the bracket 2. Make sure that the switch faces downwards.

Figure 28.



Y Electrical harness
Z Switch top

42. Install the switch top.
43. Install the switch cover.

Figure 29.



AG Switch cover

Remove

1. The removal procedure is the opposite of the installation procedure.

Table 3. Torque Values

Item	Nm
D	89
E	135
F	135
G	89
H	89
J	135
K	69
U	81
V	81
W	69
X	69

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90 - Fault Codes

Technical Data

This machine has no diagnostic capability and therefore there are no fault codes.

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27 - Maintenance Positions

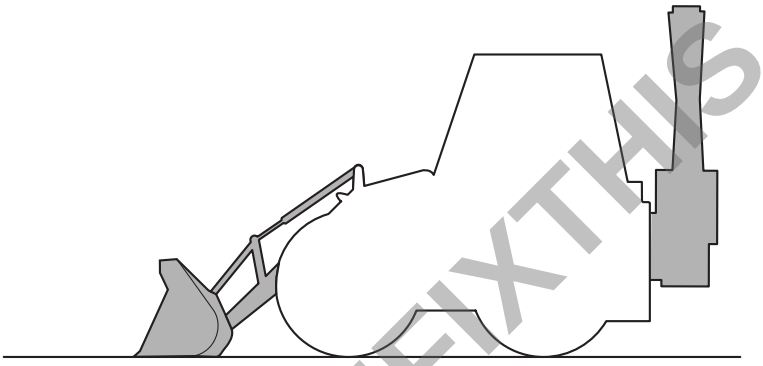
Introduction 01-13
Health and Safety 01-15

Introduction

Make the machine safe before you start a maintenance procedure. You can complete most of the maintenance procedures with the lift arm lowered. Unless a maintenance procedure instructs you differently, you must lower the lift arm.

Lift Arm Lowered

Figure 2.

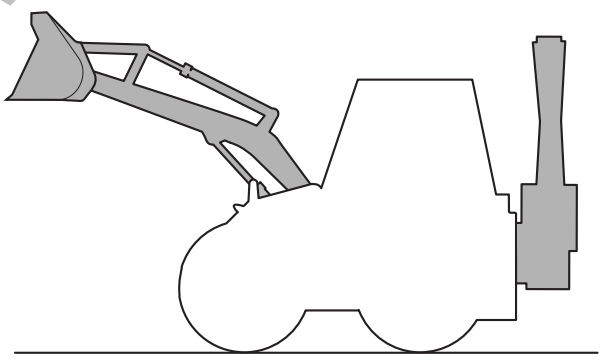


1. Park the machine on level, solid ground.
2. Lower the lift arm.
3. Put the attachment flat on the ground.
4. Stop the engine and remove the ignition key.
5. Disconnect the battery to prevent accidental operation of the engine.
6. If necessary, put chocks against the two sides of the wheels before you get below the machine.

Lift Arm Raised

If you raise the lift arm to get access for maintenance, you must install the maintenance strut on the lift arm.

Figure 3.



Installing the Lift Arm Safety Strut

Install the lift arm safety strut before you work underneath the raised lift arms.

1. Empty the shovel and raise the lift arms fully.
2. Stop the engine and remove the ignition key.
3. Release the strut.
   - 3.1. Release the fastener.
   - 3.2. Remove the strut from the stowage bracket.
4. Install the strut.
   - 4.1. Push the strut over the ram piston rod.

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Fault-Finding

Fault		
Warning YELLOW light turn on	Table 13.	Page 15-12
The engine does not start	Table 14.	Page 15-12
Engine starts but stops	Table 15.	Page 15-12
RPM (Revolutions Per Minute) instability at idle speed	Table 16.	Page 15-12
Low idle speed	Table 17.	Page 15-12
Blue smoke	Table 18.	Page 15-13
Excessive fuel consumption	Table 19.	Page 15-13
Inadequate performance	Table 20.	Page 15-13
Slow acceleration	Table 21.	Page 15-13
Engine jerking	Table 22.	Page 15-13
Engine overheats	Table 23.	Page 15-13

Table 13. Warning YELLOW light turn on

Cause	Remedy
ECM (Engine Control Module)has detected malfunctions	Contact JCB Service

Table 14. The engine does not start

Cause	Remedy
Sulphated/corroded battery terminals	Clean the battery terminals
Battery voltage too low	Recharge or replace the battery
Low fuel level	Refuel
Frozen fuel	Contact JCB Service
Clogged fuel filter	Replace the filter
Air suction in fuel system	Contact JCB Service
Clogged air filter	Replace the filter
Clogged pipes	Contact JCB Service
Open fuse	Replace with a new fuse, if the problem persists, contact JCB Service
Intake or exhaust system clogged	Contact JCB Service

Table 15. Engine starts but stops

Cause	Remedy
Inefficient electrical connections	Clean the electrical contacts, if the problem persists, contact JCB Service
Sulphated battery terminals	Clean the battery terminals
Clogged fuel filter	Replace the filter and clean the tank
Clogged fuel pipes	Contact JCB Service

Table 16. RPM (Revolutions Per Minute) instability at idle speed

Cause	Remedy
Clogged fuel pipes	Contact JCB Service

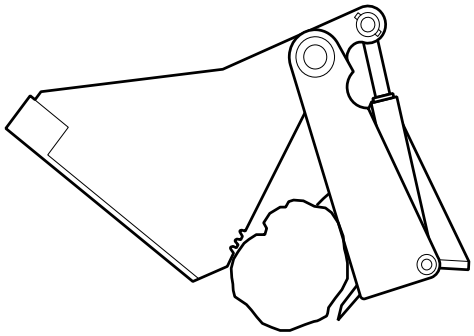
Table 17. Low idle speed

Cause	Remedy
Clogged fuel pipes	Contact JCB Service
Poor quality fuel	Clean the tank and refuel with quality fuel

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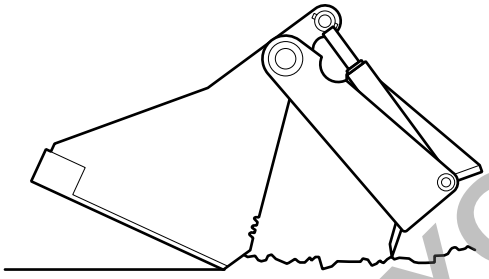
Figure 37.



Grading

To grade, open the clam and drag the shovel backwards. When the shovel is full, roll it back and close the clam. Refer to Figure 38.

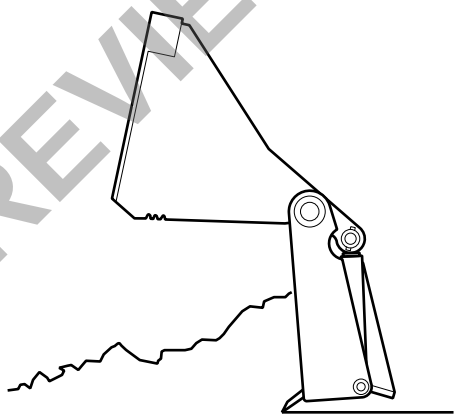
Figure 38.



Dozing

To doze, open the clam and drive the machine forward. Refer to Figure 39.

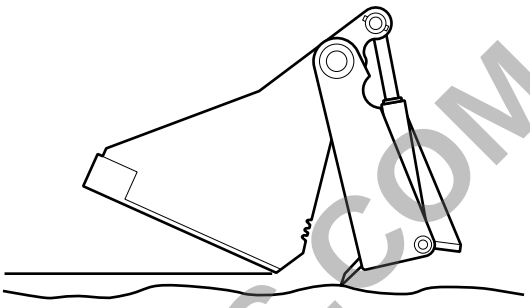
Figure 39.



Spreading

Load the shovel with the material to be spread. Set the clam opening to suit the size of material and rate of flow. Drag the shovel backwards, allowing it to discharge an even layer of material as it goes. Refer to Figure 40.

Figure 40.



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06 - Pre-start Cold Checks, Service Points and Fluid Levels

Technical Data

Table 273.

Component	Task	10	50	100[1]	500	1000	2000
Engine							
Engine and pump mount security	Check				☐	☐	
Oil and filter[1]	Drain and refill				☐	☐	☐
Coolant level and Antifreeze strength	Check	☐	☐	☐	☐	☐	☐
Coolant	Replace						☐
Air cleaner dust valve	Clean				☐	☐	☐
Air cleaner outer element[2]	Replace				☐	☐	☐
Air cleaner inner element	Replace					☐	☐
Cylinder head nuts	Replace					☐	☐
Valve clearance	Check and adjust					☐	☐
Fan belt condition and tension	Check	☐	☐	☐	☐	☐	☐
Fan belt	Replace					☐	☐
Fuel sediment	Drain			☐	☐	☐	☐
Fuel filter	Replace			☐	☐	☐	☐
Radiator hose	Clean			☐	☐	☐	☐
Air cleaner hose security	Check			☐	☐	☐	☐
Fuel system for leaks and contamination	Check			☐	☐	☐	☐
External oil leaks	Check			☐	☐	☐	☐
Clean radiator matrix	Inspect			☐	☐	☐	☐
Transmission							
Motor mounting bolt tightness	Check			☐	☐	☐	☐
Wheel nut security	Check			☐	☐	☐	☐
Hub mounting bolt security	Check			☐	☐	☐	☐
Tyre pressures	Check (Condition)	☐	☐	☐	☐	☐	☐
Drive chain case oil level	Check				☐	☐	☐
Drive chain case oil	Replace						☐
Drive chain tension	Check and Adjust					☐	☐
Hydraulics							
Oil	Sample/Replace						☐
Oil level	Check	☐	☐	☐	☐	☐	☐
Oil filter	Sample/Change				☐	☐	☐
Ram piston rods for Damage/Leaks	Change			☐	☐	☐	☐

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Technical Data

⚠ **CAUTION** Waxoyl contains turpentine substitute which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

JCB recommend that you use the JCB lubricants shown as they have been verified by JCB for use on JCB machines. However, you could use other lubricants that are equivalent to the JCB standards and quality or offer the same machine component protection.

No warranty liability will be accepted for engine failures where unacceptable fuel grades (or their equivalent) have been used at any stage.

Table 250.

Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size[1]	Specification
Fuel tank	45 L	Diesel oil			
Engine (oil) 1CXWS[2]	10.5 L	JCB engine oil EP 5W/40 20 °C (68.0 °F) to 50 °C (121.9 °F)	4001/2705	20 L	API CH-4/CG-4, CF-4,CF,SJ. ACEA, E2, B3, A3
		JCB engine oil EP 15W/40 -10 °C (14.0 °F) to 50 °C (121.9 °F)	4001/1805		API CH-4/SJ, ACEA E5, E3, B3, A3
Engine (oil) 1CXT[2]	9.3 L	JCB engine oil EP 5W/40 20 °C (68.0 °F) to 50 °C (121.9 °F)	4001/2705	20 L	API CH-4/CG-4, CF-4,CF,SJ. ACEA, E2, B3, A3
		JCB engine oil EP 15W/40 -10 °C (14.0 °F) to 50 °C (121.9 °F)	4001/1805		API CH-4/SJ, ACEA E5, E3, B3, A3
Engine (coolant)[3]	11 L	JCB antifreeze HP coolant/ water	4006/1120	20 L	ASTM D3306, ASTM D4985, ASTM D6210, SAE (Society of Automotive Engineers) J1034, BS6580 (1992), AFNOR NF R15-601
Hydraulic system 1CXWS	80 L	JCB Optimum Performance Hydraulic Oil	4002/2805	20 L	
Hydraulic system 1CXT	80 L	JCB Ultra Performance Hydraulic Oil	4002/2805	20 L	
Grease points		JCB special HP grease	4003/2017	0.4 kg	
		JCB special MPL-EP grease[4]	4003/1501	0.4 kg	
Extending dipper		JCB waxoyl	4004/0502	5 L	

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Notes:

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00 - General

Introduction 03-59
Health and Safety 03-60

Introduction

A hydraulic rockbreaker (also called hammer, breaker, pecker, hoe ram or hoe rammer) is a powerful attachment installed to the excavator for demolishing concrete structures or rocks. It is powered by the auxiliary hydraulic system from the excavator, which is installed with a valve for this purpose.

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00 - General

Remove and Install

Consumables

Description	Part No.	Size
Special HP Grease	4003/2020	0.5 kg
	4003/2017	0.4 kg
	4003/2006	12.5 kg
	4003/2005	50 kg

Remove

1. Make the machine safe with the lift arm lowered. Refer to (PIL 01-03).
2. Remove the hinge pin from the upper and lower hinge.
3. Lift the door off its hinges and move to a safe place.
4. If worn, replace the bushes.
5. If necessary, replace the hinge pins.

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00 - General

Introduction 15-49
Technical Data 15-50
Component Identification 15-51
Operation 15-52
Check (Condition) 15-53
Remove and Install 15-54
Disassemble and Assemble 15-56

Introduction

The relationship between the rotation of the camshaft and the rotation of the crankshaft is of critical importance.

Since the valves control the flow of the air/fuel mixture intake and exhaust gases, they must be opened and closed at the appropriate time during the stroke of the piston.

For this reason, the camshaft is connected to the crankshaft through a gear mechanism.

When the engine runs the crankshaft drives the camshaft through the gears. The camshaft opens and closes the inlet and exhaust valves through the push rods in time with the four stroke cycle.

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21 - Tappet

Introduction 15-135
Technical Data 15-136
Component Identification 15-136
Remove and Install 15-137

Introduction

Mechanical Tappet

The tappets are also known as cam followers or lifters. The tappets run on the camshaft and are made to move vertically by the action of the rotating cam. In an overhead valve engine, the tappet is installed low down in the crankcase. From there it drives the push rod up to the top of the engine, above the cylinder head. Here the rockers, arranged on a rocker shaft beneath the rocker cover, reverse the direction of the valve movement to press the valves downwards to open them.

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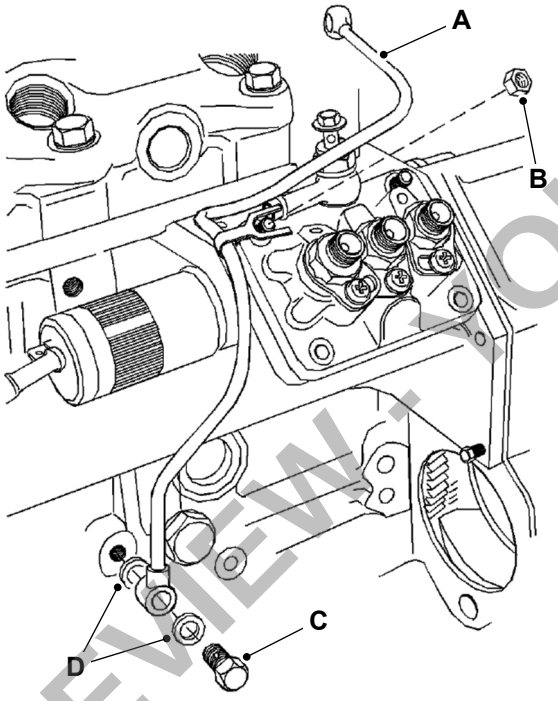
00 - General

Remove and Install

Remove

1. Make the machine safe.
   Refer to: PIL 01-03-27.
2. Make sure that the engine is safe to work on. If the engine has been running, let it cool before you start the service work.
3. Loosen the nut that attaches the clip on the oil line to the fuel injection pump.
4. Remove the banjo bolt 1 and remove the washers1 from the crankcase.

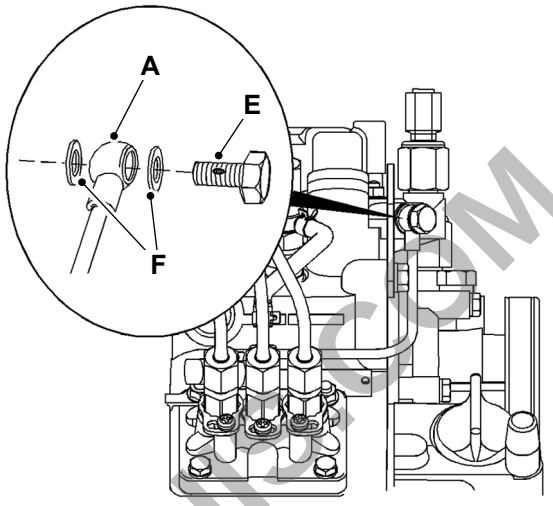
Figure 253.



A Oil line
B Nut
C Banjo bolt 1
D Washers 1

5. Remove the banjo bolt 2 and remove the washers 2 from the crankcase.

Figure 254.



A Oil line
E Banjo bolt 2
F Washers 2

6. Remove the oil line from the engine.

Install

1. Installation is the opposite of the removal procedure. Additionally do the following steps.
2. Before installation, make sure that all the components are clean and free from damage.
3. Tighten the banjo bolts and the nut to the correct torque value.

Table 82. Torque Values

Item	Description	Nm
B	Nut	15
C	Banjo bolt 1	12
E	Banjo bolt 2	12

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21 - Cooling System

Contents **Page No.**

Acronyms Glossary 21-2

21-00 Cooling System
21-00-00 General 21-3
21-03 Cooling Pack
21-03-03 Radiator 21-13
21-06 Expansion Tank
21-06-00 General 21-15
21-09 Pump
21-09-00 General 21-17
21-12 Thermostat
21-12-00 General 21-23
21-12-03 Housing 21-27
21-93 Hose
21-93-00 General 21-29

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32 - Wheel Drive Motor

Contents **Page No.**

27-32-00 General 27-41

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Technical Data

For: Series 2 ..... Page 30-5
For: Series 1 ..... Page 30-6

(For: Series 2)

Table 142. Auxiliary Pump - Standard

Description	Data
Type	Gear type
Flowrate	48 L/min at 3000 RPM (Revolutions Per Minute)
Maximum working pressure	185 –192 bar (2,681.1 – 2,782.6 psi)
Maximum speed	3200 RPM
Maximum input torque	121 N·m

Table 143. Auxiliary Pump - High Flow

Description	Data
Type	Tandem Gear type
Flowrate - Front section	90 L/min at 3600 RPM
Flowrate - Rear section	57 L/min at 3600 RPM
Maximum working pressure	185 –192 bar (2,681.1 – 2,782.6 psi)
Maximum speed	3600 RPM
Maximum input torque	121 N·m

Table 144. Main Pump - 2 off

Description	Data
Type	Tandem axial piston Series 42 M28
Displacement	28 cm³/rev
Control	Servo non-feedback proportional, 15 bar (217.4 psi) to give maximum pump displacement.
Maximum working pressure	350 bar (5,072.4 psi)
Maximum speed	3900 RPM
Charge pressure (Oil temperature at 50 °C (121.9 °F))	11.5 bar (166.7 psi) at engine idle
	23.5 –24 bar (340.6 – 347.8 psi) at 3000 RPM

Table 145. Servo Joysticks

Description	Data
Output Characteristics - Single Lever Drive Control	
Transmission forward/reverse (spools 2 & 4)	3.5 bar (50.7 psi) at 15 % stroke
Transmission left/right (spools 1 & 3)	5.5 bar (79.7 psi) at 15 % stroke
Loader	3.5 bar (50.7 psi) at 15 % stroke
Output Characteristics- Dual Lever Drive Control	
Transmission control spools	5.5 bar (79.7 psi) at 15 % stroke
Loader control spools	3.5 bar (50.7 psi) at 15 % stroke

Table 146. Hydraulic Motors

Description	Data
Type	MCR03
Displacement	328 cm³/rev
Maximum working pressure	414 bar (6,000.0 psi) continuous
Maximum speed	237 RPM continuous
Maximum flow	84 L/min continuous

Table 147. Relief Valve Operating Pressures

Description	Operating Pressure
MRV (Main Relief Valve) at 1500 RPM	207 bar (3,000.0 psi)
ARV (Auxiliary Relief Valve) - Loader	
Shovel crowd	235 bar (3,405.8 psi)
Shovel dump	100 –103 bar (1,449.3 – 1,492.7 psi)
Lift ram raise	241 bar (3,492.7 psi)
ARV - Excavator	
Slew ram	241 bar (3,492.7 psi)
Boom raise	241 bar (3,492.7 psi)
Boom lower	241 bar (3,492.7 psi)
Dipper in	241 bar (3,492.7 psi)
Dipper out	241 bar (3,492.7 psi)
Bucket crowd	241 bar (3,492.7 psi)
Bucket dump	241 bar (3,492.7 psi)
Auxiliary spool (optional) - Both ports[1]	241 bar (3,492.7 psi)
Optional hand tool circuit	138 bar (2,000.0 psi)

(1) The return line ARV must be set to zero when a Rockbreaker is installed. The ARV must return to the correct setting when the Rockbreaker is removed.

Table 148. Solenoid Brake Valve

Description	Data
Type	3 position, 4 way directional control
Electrics	12 V

Table 149. Hydraulic filter

Description	Data
Type	HP (High Pressure) Spin On - 5 micron
Suction strainer	125 micron

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00 - General

Introduction 30-91
Health and Safety 30-92
Technical Data 30-93
Disassemble and Assemble 30-94

Introduction

A hydraulic cylinder ram is a mechanical actuator that is used to give a single directional force through a single action stroke. It is used in many applications, the cylinder gets the power from pressurised hydraulic oil. The hydraulic cylinder consists of a cylinder barrel, in which a piston connected to a piston rod moves back and forth.

The barrel is closed on one end by the cylinder cap and the other end by the cylinder head where the piston rod comes out of the cylinder. The piston has sliding rings and seals. The piston divides the inside of the cylinder into two chambers, the bottom chamber (cap end) and the piston rod side chamber (rod end / head end).

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Remove and Install

Remove

1. Make the machine safe with the lift arm lowered. Refer to (PIL 01-03).
2. Remove the floor mat. Refer to (PIL 09-48).
3. Remove the floor plate. Refer to (PIL 09-78).
4. Disconnect all the hoses.
5. Disconnect the electrical connectors.
6. Put a label on the hoses and electrical connectors to help installation.
7. Plug all the open ports and hoses to prevent contamination.
8. Support the PMS (Power Management System) combination valve.
9. Remove the bolts.
10. Remove the PMS combination valve from the machine.

Install

1. The installation procedure is the opposite of the removal procedure.

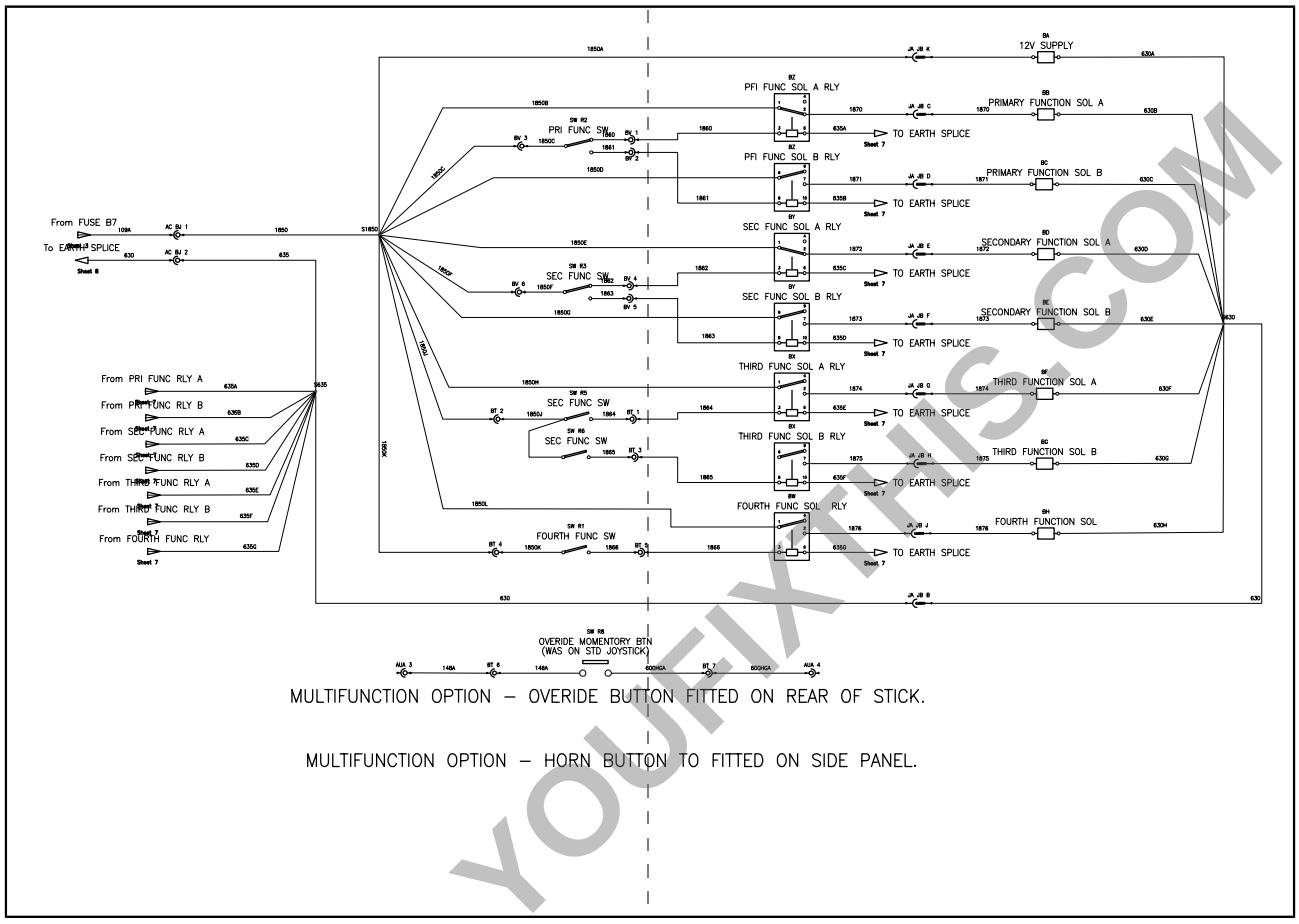
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Page 33-50

Figure 499.

Page 33-51



MULTIFUNCTION OPTION – OVERIDE BUTTON FITTED ON REAR OF STICK.

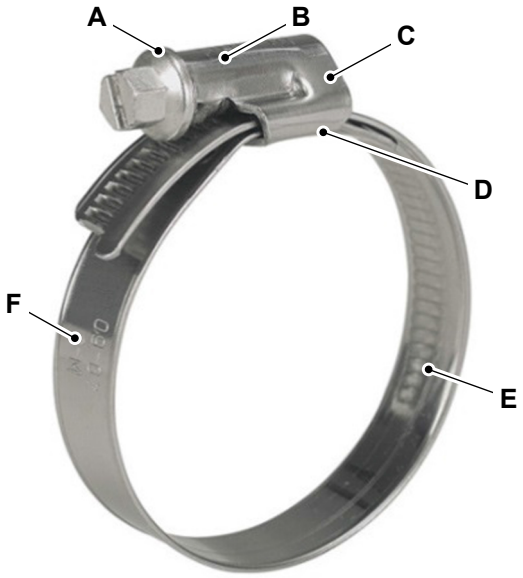
MULTIFUNCTION OPTION – HORN BUTTON TO FITTED ON SIDE PANEL.

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Component Identification

Figure 549. Standard Worm Drive Clip



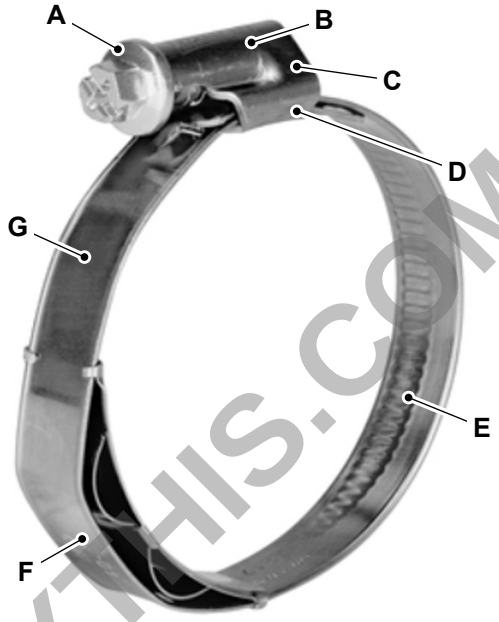
A Screw support flange
B Asymmetric housing
C Asymmetric extension
D Short housing saddle
E Stamped inside
F Identification of material/clamping range

Figure 550. Heavy Duty Worm Drive Clip



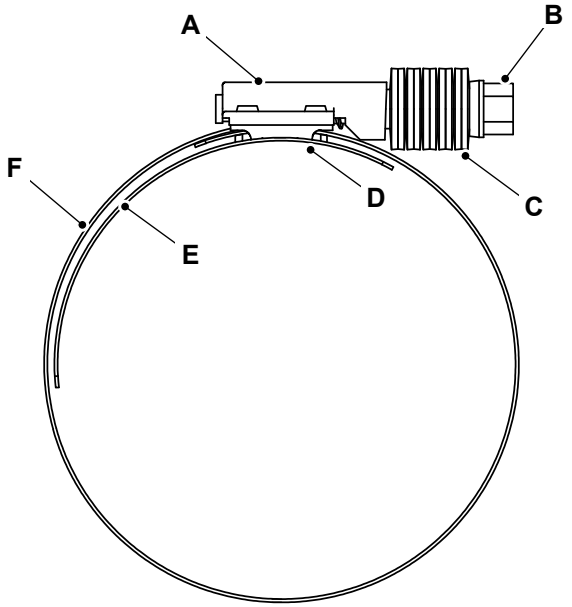
A Extended bridge
B Band width (16 mm)
C Identification of clamping range

Figure 551. Spring Assisted Worm Drive Clip



A Screw support flange
B Asymmetric housing
C Asymmetric extension
D Short housing saddle
E Stamped inside
F Spring insert
G Identification of material/clamping range

Figure 552. Constant Torque Worm Drive Clips



A Housing
B Screw
C Belleville spring
D Saddle
E Liner
F Band

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