SPECIFICATIONS

Engine

Make ..... Isuzu
Model BB-4BG1T

Type: Four stroke, water-cooled, overhead valve, direct injection (electronically controlled), in-line engine with

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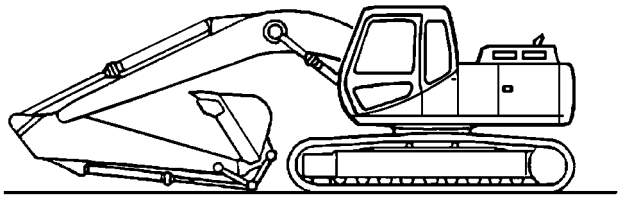
ENGINE

Removal and installation

STEP 1



JS00163A1

Park the machine on hard, flat ground. Lower the attachment to the ground.

STEP 2

Release pressure in the hydraulic system and in the hydraulic sump tank (see Section 8000).

STEP 3



JD00375A

Remove the battery cover (1) and disconnect the ground cable (-) (2) from the battery.

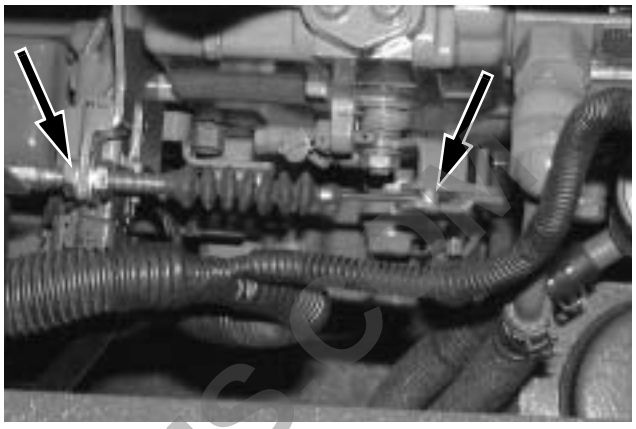
STEP 4

Refer to Section 8003 and remove the hydraulic pump.

STEP 5

Refer to Section 2001 and remove the radiator and oil-cleaner assembly.

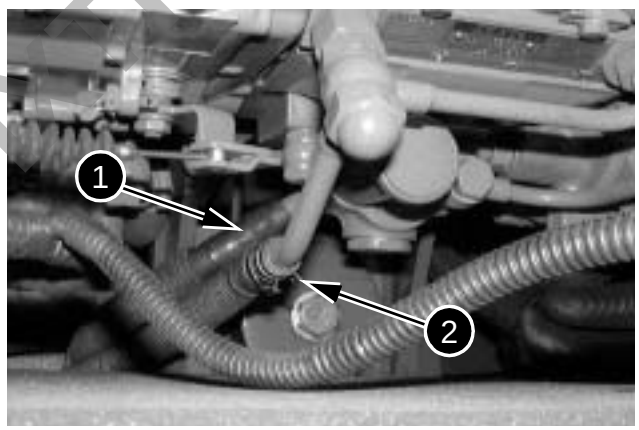
STEP 6



CD00J024

Remove the engine throttle control.

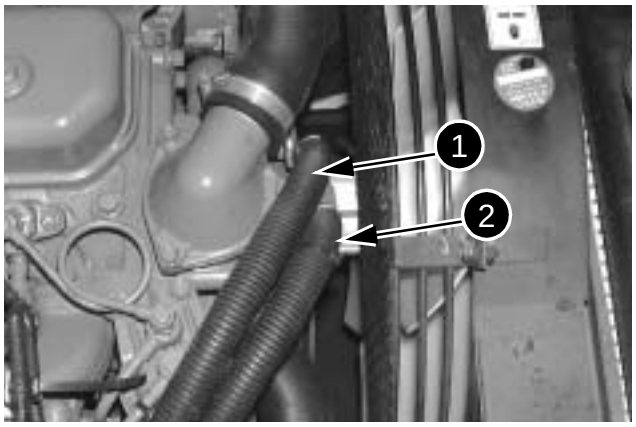
STEP 7



CD00J025

Disconnect the fuel supply pipe (1) and the fuel return pipe (2) and plug them.

STEP 8



CD00J026

Remove the hoses (1) and (2) from the heater system and plug them.

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TROUBLESHOOTING

Prior Inspections

Item	Value	Action
POINTS TO BE CHECKED WHEN STARTING		
Lubricants - Coolants		
1. Check the quantity of fuel	---	Add fuel
2. Check that fuel is not contaminated	---	Clean, drain
3. Check the quantity of hydraulic fluid	---	Fill with fluid
4. Inspect the hydraulic fluid filter	---	Drain, clean
5. Check the quantity of oil in each reduction gear	---	Fill with oil
6. Check the quantity of engine oil	---	Fill with oil
7. Check the quantity of coolant	---	Fill with water
8. Check the filter restriction indicator (dust)	---	Clean or change
Electrical equipment		
9. Check the battery terminals and wiring for tightness and corrosion	---	Tighten or change
10. Check the alternator terminals and wiring for tightness and corrosion	---	Tighten or change
11. Check the starter motor terminals and wiring for tightness and corrosion	---	Tighten or change
OTHER POINTS TO CHECK		
Hydraulic system - Mechanical equipment		
12. Abnormal noise or smell	---	Repair
13. Check for oil leaks	---	Repair
14. Air in the system	---	Bleed the air
Electrical system - Electrical equipment		
15. Check the battery voltage (with engine shut down)	23-26 V	Change
16. Check the quantity of fluid in the battery	---	Add or change
17. Make sure that the cables are not discolored, burnt or stripped	---	Change
18. Check for missing or loose cable retaining clips	---	Repair
19. Check for dampness on cables (especially on connectors and terminals)	---	Disconnect and dry if damp
20. Check fuses for condition and corrosion	---	Change
21. Check the alternator voltage (with engine speed above the throttle control mid-point) (when battery charge is insufficient, there can be 25 V only at start up)	27.5-29.5 V	Change
22. Noise from battery relay (with starter motor ON or OFF)	---	Change

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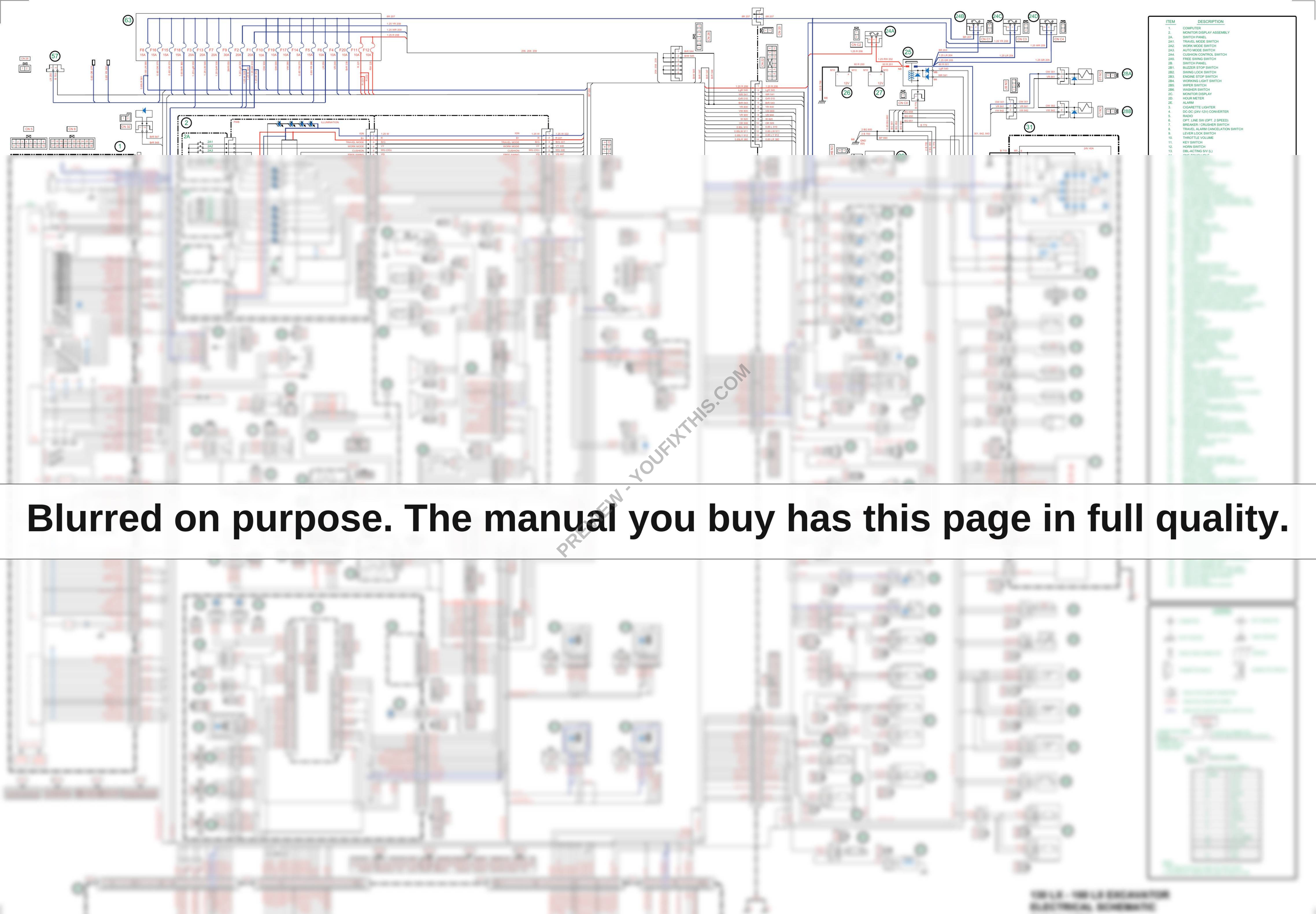

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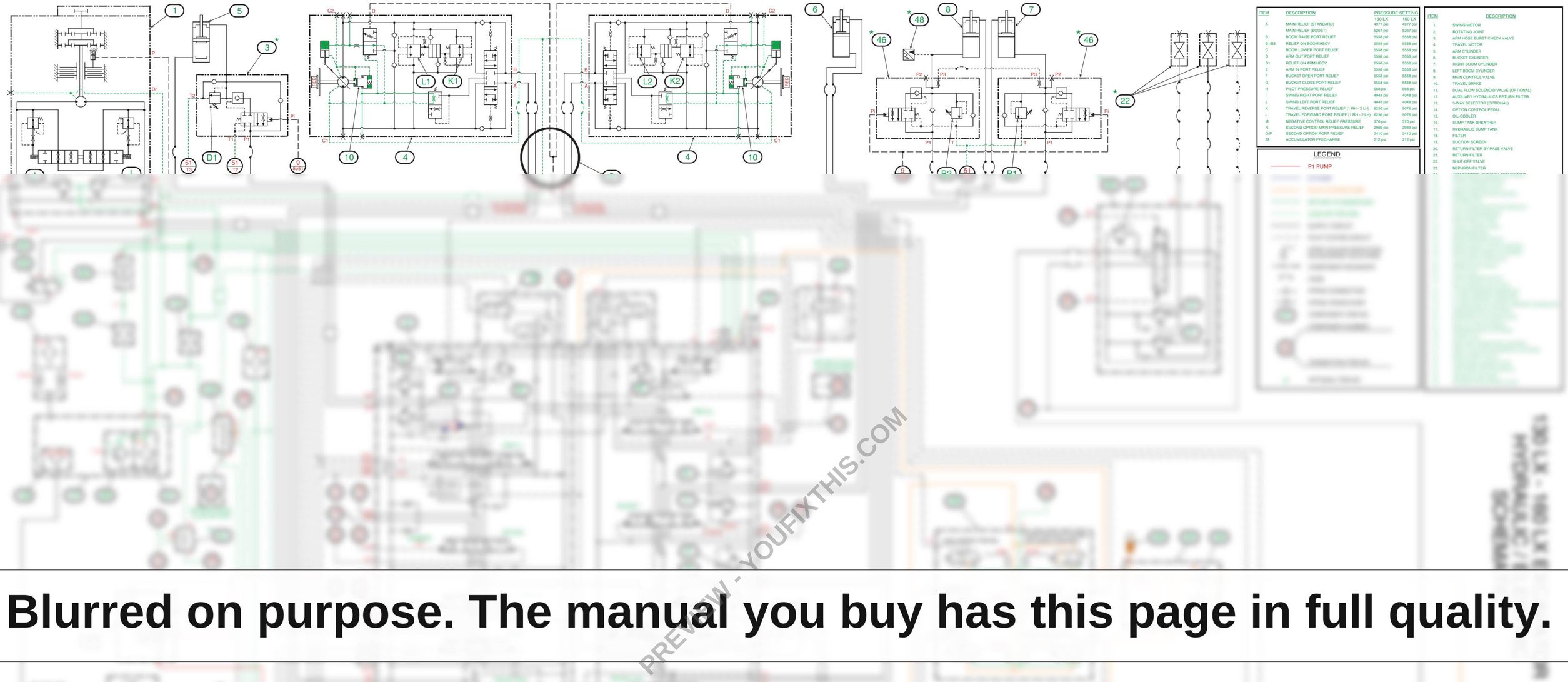

ITEM	DESCRIPTION	PRESSURE SETTING 130 LX	160 LX
A	MAIN RELIEF (STANDARD)	4977 psi	4977 psi
	MAIN RELIEF (BOOST)	5267 psi	5267 psi
B	BOOM RAISE PORT RELIEF	5558 psi	5558 psi
B1/B2	RELIEF ON BOOM HBCV	5558 psi	5558 psi
C	BOOM LOWER PORT RELIEF	5558 psi	5558 psi
D	ARM OUT PORT RELIEF	5558 psi	5558 psi
D1	RELIEF ON ARM HBCV	5558 psi	5558 psi
E	ARM IN PORT RELIEF	5558 psi	5558 psi
F	BUCKET OPEN PORT RELIEF	5558 psi	5558 psi
G	BUCKET CLOSE PORT RELIEF	5558 psi	5558 psi
H	PILOT PRESSURE RELIEF	568 psi	568 psi
I	SWING RIGHT PORT RELIEF	4048 psi	4048 psi
J	SWING LEFT PORT RELIEF	4048 psi	4048 psi
K	TRAVEL REVERSE PORT RELIEF (1 RH - 2 LH)	6236 psi	5076 psi
L	TRAVEL FORWARD PORT RELIEF (1 RH - 2 LH)	6236 psi	5076 psi
M	NEGATIVE CONTROL RELIEF PRESSURE	370 psi	370 psi
N	SECOND OPTION MAIN PRESSURE RELIEF	2989 psi	2989 psi
O/P	SECOND OPTION PORT RELIEF	3410 psi	3410 psi
28	ACCUMULATOR PRECHARGE	212 psi	212 psi

LEGEND

P1 PUMP

ITEM	DESCRIPTION
1.	SWING MOTOR
2.	ROTATING JOINT
3.	ARM HOSE BURST CHECK VALVE
4.	TRAVEL MOTOR
5.	ARM CYLINDER
6.	BUCKET CYLINDER
7.	RIGHT BOOM CYLINDER
8.	LEFT BOOM CYLINDER
9.	MAIN CONTROL VALVE
10.	TRAVEL BRAKE
11.	DUAL FLOW SOLENOID VALVE (OPTIONAL)
12.	AUXILIARY HYDRAULICS RETURN FILTER
13.	3-WAY SELECTOR (OPTIONAL)
14.	OPTION CONTROL PEDAL
15.	OIL-COOLER
16.	SUMP TANK BREATHER
17.	HYDRAULIC SUMP TANK
18.	FILTER
19.	SUCTION SCREEN
20.	RETURN FILTER BY PASS VALVE
21.	RETURN FILTER
22.	SHUT-OFF VALVE
23.	NEPHRON FILTER

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130LX Crawler Excavators
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November 2001

SAFETY

This symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED. The message that follows the symbol contains important information about safety. Carefully read the message. Make sure you fully understand the causes of possible injury or death.

To prevent injury always follow the Warning, Caution and Danger notes in this section and throughout the manual.

Place a “Do not operate“ tag on the starter switch key before carrying out any service or repair work on the machine.

.

WARNING: *Read the operator’s manual to familiarize yourself with the correct control functions.*

WARNING: *Operate the machine and equipment controls from the seat position only. Any other method could result in serious injury.*

WARNING: *This is a one man machine, no riders allowed.*

WARNING: *Before starting engine, study Operator’s Manual safety messages. Read all safety signs on machine. Clear the area of other persons. Learn and practice safe use of controls before operating.*
It is your responsibility to understand and follow manufacturers instructions on machine operation, service and to observe pertinent laws and regulations. Operator’s and Service Manuals may be obtained from your Link-Belt dealer.

WARNING: *If you wear clothing that is too loose or do not use the correct safety equipment for your job, you can be injured. Always wear clothing that will not catch on objects. Extra safety equipment that can be required includes hard hat, safety shoes, ear protection, eye or face protection, heavy gloves and reflector clothing.*

WARNING: *When working in the area of the fan belt with the engine running, avoid loose clothing if possible, and use extreme caution.*

WARNING: *When doing checks and tests on the equipment hydraulics, follow the procedures as they are written. DO NOT change the procedure.*

WARNING: *When putting the hydraulic cylinders on this machine through the necessary cycles to check operation or to remove air from a circuit, make sure all people are out of the way.*

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	Air conditioning components	9009	[redacted]
	Large format hydraulic and electrical schematics	Pocket	7-28501

* *Consult the Engine Service Manual*

[redacted] *Sections to be distributed at a later date*

NOTE: Link-Belt Company reserves the right to make changes in the specification and design of the machine without prior notice and without incurring any obligation to modify units previously sold.

The description of the models shown in this manual has been made in accordance with the technical specifications known as of the date of design of this document.

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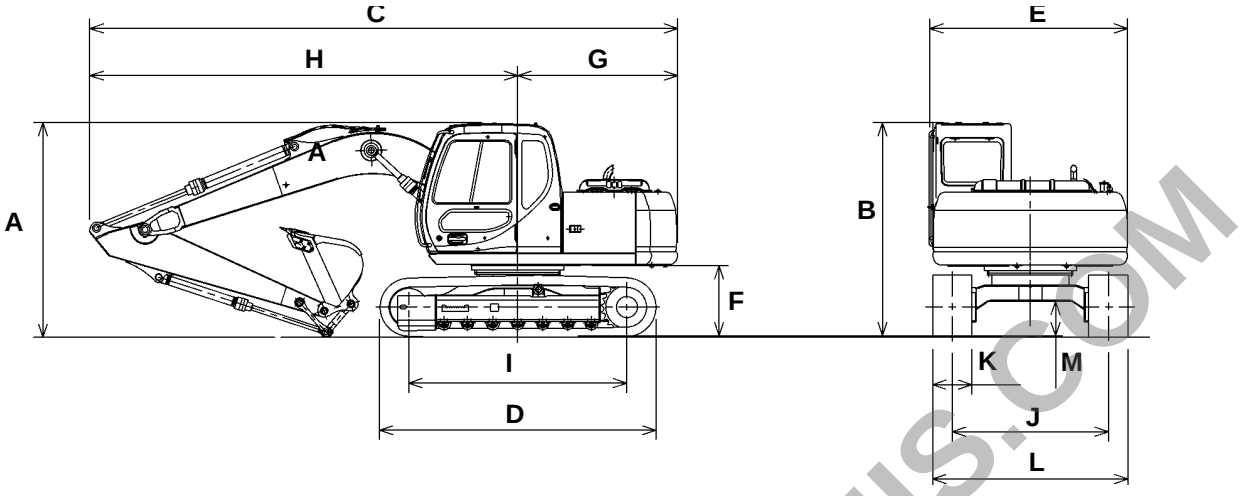
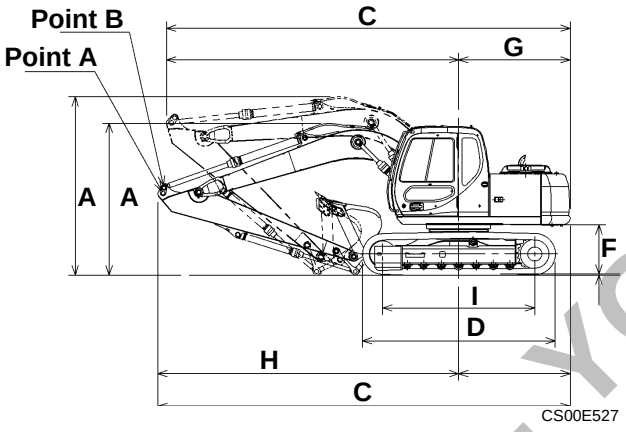
MACHINE OVERALL DIMENSIONS



CS00E526

Only on machines with 10 ft arm



CS00E527

Point A: Working position
Point B: Transport position

IMPORTANT: *For the transport of machines with 10 ft arm, it is imperative that the arm cylinder head/arm linkage is positioned at point B.*

NOTE: *Never work with the pin in this position.*

WARNING: *When the arm cylinder is placed in position B (transport), take care not to damage the cab, there can be interference between the bucket and the cab.*

	Arm		
	8 ft 2 in	10 ft 0 in Point (A)	10 ft 0 in (Point B)
A	9 ft 0 in	10 ft 8 in	9 ft 1 in
B (with vandal guard)	9 ft 3 in	9 ft 3 in	9 ft 3 in
C	24 ft 10 in	24 ft 5 in	25 ft 0 in
D	11 ft 6 in	11 ft 6 in	11 ft 6 in
E	8 ft 5 in	8 ft 5 in	8 ft 5 in
F	2 ft 11 in	2 ft 11 in	2 ft 11 in
G	6 ft 11 in	6 ft 11 in	6 ft 11 in
H	17 ft 11 in	17 ft 6 in	18 ft 5 in
I	9 ft 2 in	9 ft 2 in	9 ft 2 in
J	6 ft 6 in	6 ft 6 in	6 ft 6 in
K	1 ft 8 in	1 ft 8 in	1 ft 8 in
L (with 19.68 in track shoes)	8 ft 2 in	8 ft 2 in	8 ft 2 in
L (with 23.6 in track shoes)	8 ft 6 in	8 ft 6 in	8 ft 6 in
L (with 27.56 in track shoes)	8 ft 10 in	8 ft 10 in	8 ft 10 in
L (with 31.5 in track shoes)	-	-	-
M	1 ft 5 in	1 ft 5 in	1 ft 5 in

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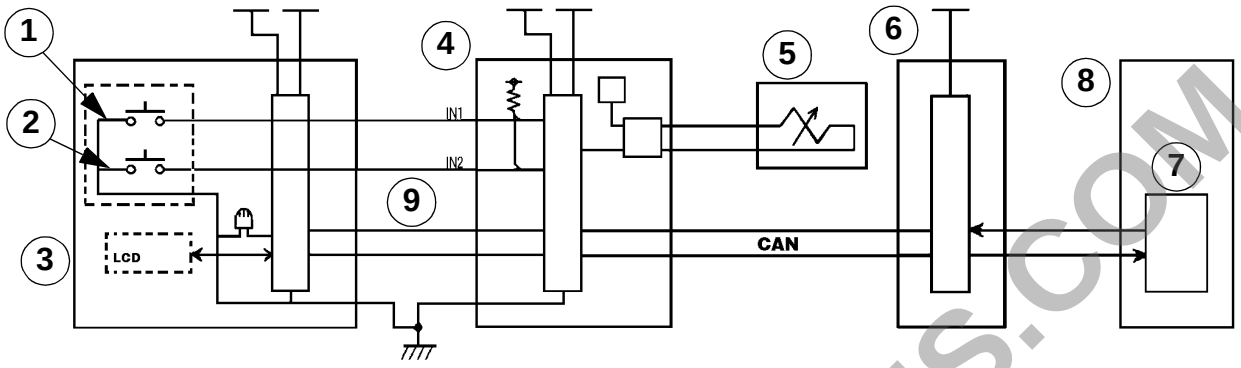
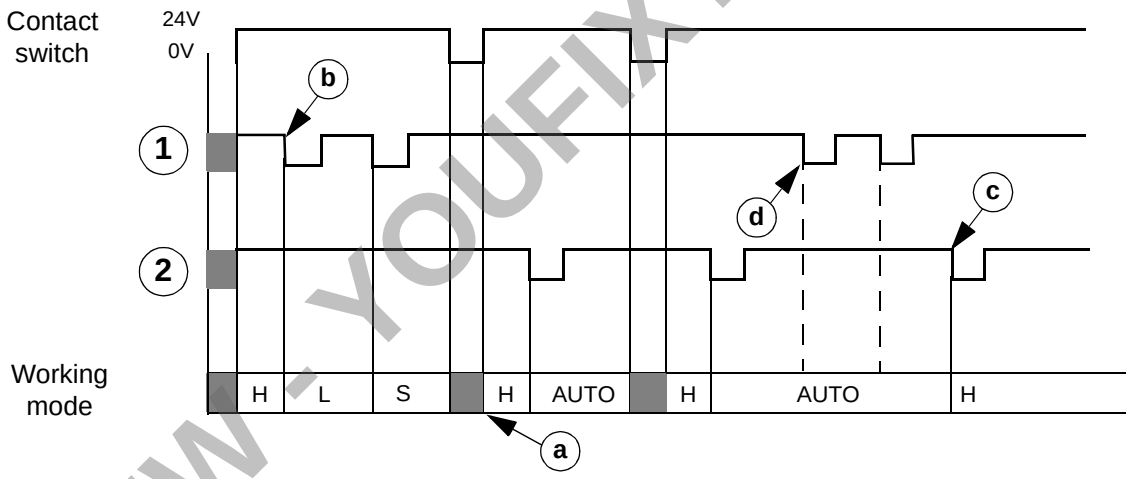
Working Mode Selection

1) Circuit configuration



CS00F505

2) Timing diagram



1. Working mode switch
2. Automatic mode switch
3. Instrument panel
4. Main electronic control box
5. Proportioning valve
6. Engine electronic control box
7. Electronic acceleration
8. Engine
9. SERIES communication

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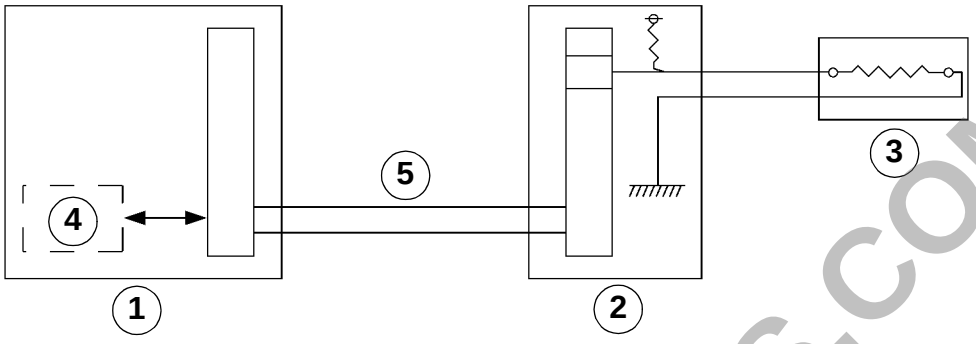
Fuel Level

1) Circuit configuration



CM00F009

Remaining fuel (gal)	Fuel level sender resistor (Ω)	Input voltage (V)	Bars displayed
50.5 -	10.0 - 18.1	0.455 - 0.766	8
42.2 - 50.5	18.1 - 23.9	0.766 - 0.964	7
33.9 - 42.2	23.9 - 29.6	0.964 - 1.142	6
25.6 - 33.9	29.6 - 36.5	1.142 - 1.337	5
17.3 - 25.6	36.5 - 46.3	1.337 - 1.582	4
9.0 - 17.3	46.3 - 60.8	1.582 - 1.891	3
4.1 - 9.0	60.8 - 74.7	1.891 - 2.138	2
- 4.1	74.7 - 80.0	2.138 - 2.222	1

1. Instrument panel
2. Main electronic control box
3. Fuel level sending unit
4. Fuel level indicator
5. Series connection

2) Operation

A. The fuel level sender (3) sends a signal to the main electronic control box (2).

B. The main electronic control box (2) calculates the number of bars to be displayed and sends the information to the fuel level gauge (4) via the Series connection (5).

C. When only one bar is displayed on the fuel level gauge (4), the message “LOW FUEL” appears on the instrument panel control screen (1) and the audible warning device sounds.

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Troubleshooting	Cause	Action
Troubleshooting using the diagnostic system Starting motor switch ON Failure code displayed in DIAG 1 — NO → To DIAG4 YES → Display E0031 — YES	Defective circuit in the regulator	Check the electronic regulator
NO → Display E0032 — YES	Problem with rack detector signal in regulator	Same as above
NO → Display E0041 — YES	Problem with TDC detector signal	Same as above
Failure code displayed in DIAG 4 YES → M00B0 — YES	Faulty engine electronic control box	Change the engine electronic control box
NO → M0010 — Check that the transistor output is not short circuited YES → To CHK2"		
Self-detection finds the short circuit YES → The failure code disappears after disconnecting the solenoid valve connector — YES	Defective solenoid valve	Change the solenoid valve
NO → The failure code disappears after disconnecting connector CN22 — YES	Short circuit on wire between CN22 and the solenoid valve	Repair the wiring
NO → The failure code disappears after disconnecting connector CN23 — YES	Short circuit on wire between CN23 and the solenoid valve	Repair the wiring
NO → The failure code disappears after disconnecting connector CN6 — YES	Short circuit on wire between CN23 and CN6	Repair the wiring
NO → The failure code disappears after disconnecting connector CN5 — YES	Short circuit on wire between CN22 and CN5	Repair the wiring
NO	Electronic control box defective	Change the electronic control box

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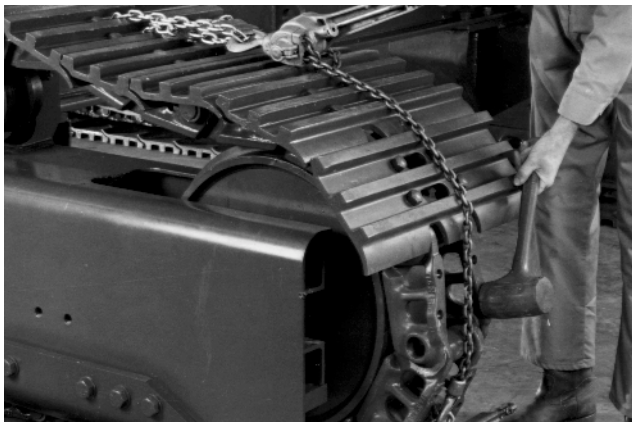
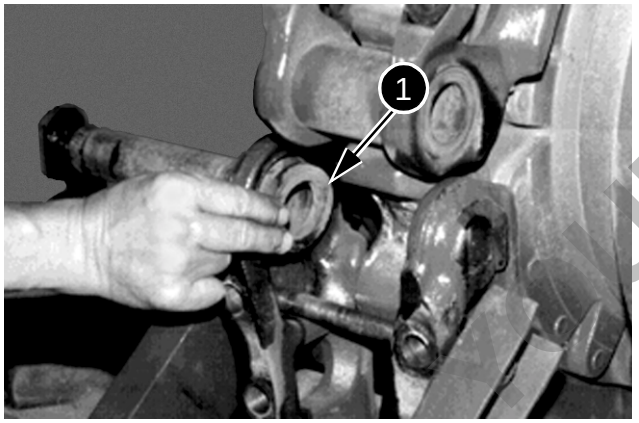
STEP 6



B5573689M

Connect suitable pulling equipment to both ends of the track chain. Operate the pulling equipment to pull both ends of the track chain together.

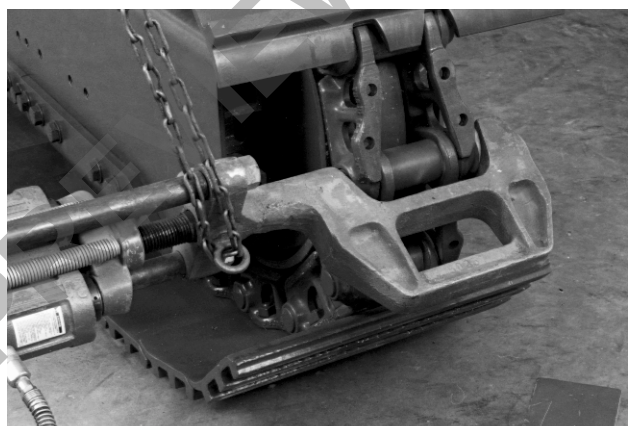
STEP 7



JD00278A

Install two spacers (1) in the two half links where the end of chain axle is assembled.

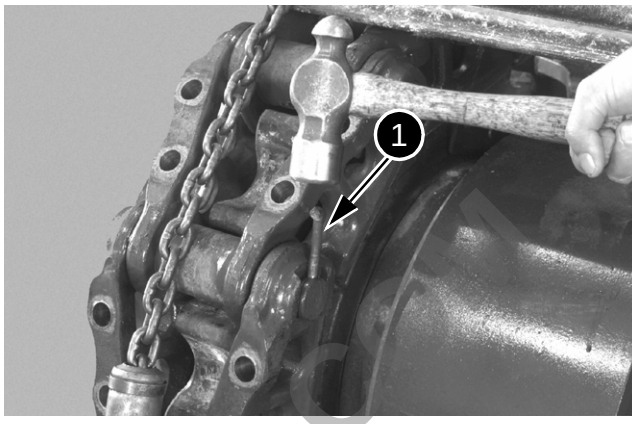
STEP 8



B5491989M

Install the end of chain axle with the portable hydraulic press K1P0013.

STEP 9



JD00284A

Remove the portable hydraulic press. Install a new pin (1) in the end of chain axle. Bend the ends of the pins to brake the end of chain axle.

STEP 10

Install the two track pads, the screws and the nuts.

STEP 11



B5171389M

Tighten the track pad screws to a torque (see the specifications).

STEP 12

See "Track tension adjustment" in this section and adjust the track tension.

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Section

5005

IDLER WHEEL AND TENSION SHOCK ABSORBER

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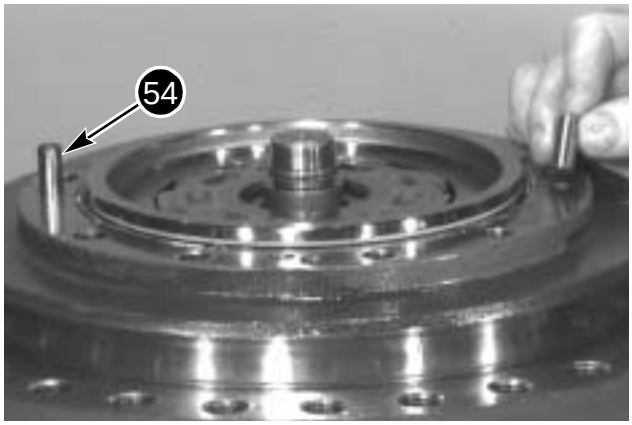
STEP 29

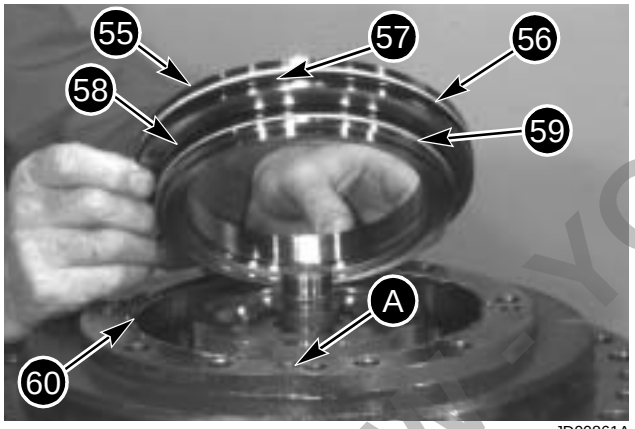


JD00860A

Remove the two dowel pins (54).

STEP 30

NOTE : *If compressed air is used to remove the piston (55), place a cloth covering over the piston and restrain the piston to prevent it from flying out of the spindle.*

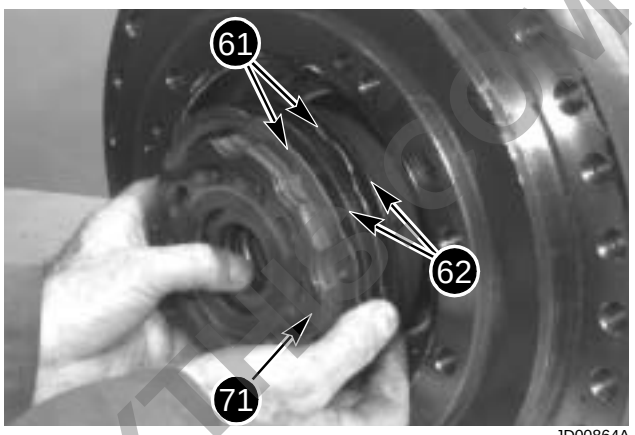


JD00861A

Remove the piston (55). Remove and discard the two O-rings (57 and 58) and two back-up rings (56 and 59) from the piston. Remove and discard the O-ring (60) from the spindle. If difficulty is encountered in removing the piston, apply 42 psi (3 bar) compressed air to the parking brake passage port (A) in the spindle.

STEP 31

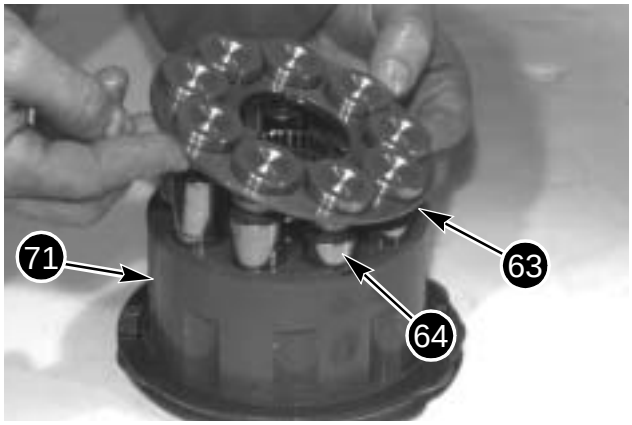
NOTE : *In this step, hold the cylinder block (71) with both hands and rotate it back and forth several times so that the shoes of the pistons (64) will separate from the thrust plate (73). If the piston shoes stick to the thrust plate, the parts (*63 *through* 65*) mounted on the cylinder block will fall into the spindle.*



JD00864A

Reposition the spindle on its side over a container to catch hydraulic oil that will drain from the spindle. Remove the cylinder block (71) with the two separator plates (61) and two friction plates (62) installed from the spindle.

STEP 32



JD00865A

Remove the retainer plate (63) and pistons (64) from the cylinder block (71).

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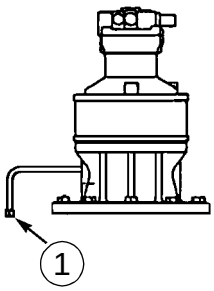
STEP 6



JS00379A

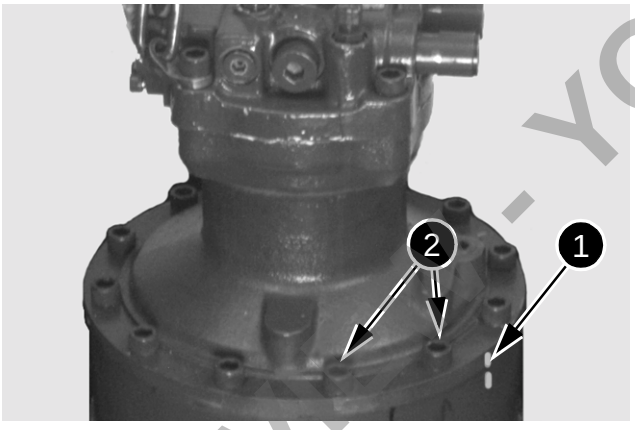
Place a receptacle of 1.98 gal (7.5 litres) capacity under the swing reduction gear drain plug. Remove the drain plug (1) and drain the oil. Install the drain plug.

STEP 7

Lower the swing motor/reduction gear assembly to the ground and place it on suitable stands.

NOTE: *The stands must be high enough to prevent the pinion touching the ground.*

STEP 8



JD00386A

To facilitate reassembly, make an alignment mark (1) on the swing motor and on the reduction gear. Remove the eight swing motor retaining screws (2).

STEP 9

Carefully raise the swing motor and move it away from the swing reduction gear. Place it in a clean area.

Installation

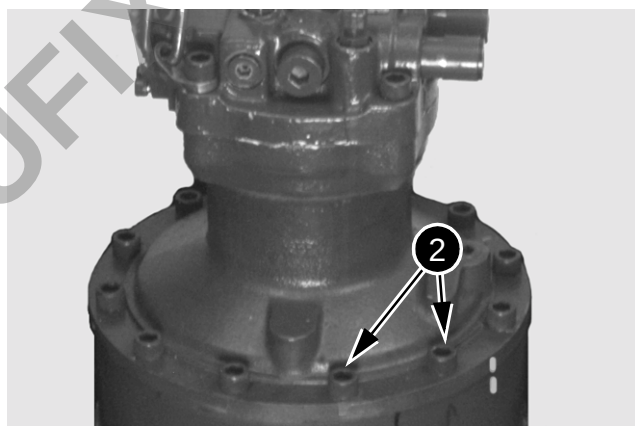
STEP 1



JD00446A

Connect a suitable lifting device to the swing motor and move it into position above the reduction gear. Carefully lower the swing motor onto the reduction gear.

STEP 2



JD00386A

Assemble the eight swing motor retaining screws (1).

NOTE: *Tighten the screws to a torque of 78 lb-ft (103 Nm).*

STEP 3

Clean the upperstructure mating surface.

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PREPARATION BEFORE INSPECTION

WARNING: *Hydraulic fluid output under pressure can penetrate the skin. Hydraulic fluid can also cause or infect a slight skin cut. In the event of being injured by hydraulic fluid under pressure, consult a doctor immediately. Any delay in obtaining treatment for an injury can cause a serious infection or reaction. Before pressurizing the circuits, make sure that all the outlets are correctly tightened and that the hoses and pipes are in good condition. Release pressure in the circuits completely before disconnecting pipes or carrying out any operation on the hydraulic system. Always use a small piece of cardboard or wood to detect leaks of fluid under pressure. Never use your hands.*

WARNING: *Any incorrect use or maintenance of a construction machine can cause accidents. Only persons who have read, understood and who observe the instructions in the operator's manual are authorized to use or maintain this machine.*

WARNING: *The accumulator of this machine is charged with nitrogen under pressure. In the event of incorrect operation of the circuit, change the accumulator. Never try to repair it. Non-observance of these instructions and the procedure shown below can cause serious or fatal injury.*

Releasing Pressure In the Hydraulic System

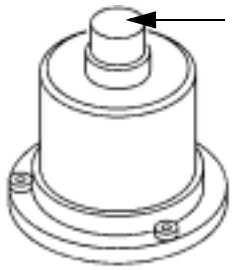
To be carried out before conducting any service work on the hydraulic circuit.

1. Position the machine on hard, flat ground.
2. Open the bucket until the cylinder rod is completely retracted.
3. Extend the arm until the cylinder rod is completely retracted. Lower the boom so that the end of the arm is resting on the ground. Lower the tool to the ground.
4. Check in "S" mode on the diagnostic screen that the following values are respected.

CHK	MODE II S		ENG	1950	rpm
1					
	P1	4350 psi	I	0450	mA
	P2	4350 psi	WT	0176	°F
	No.	435 psi	OT	0131	°F

Engine speed	1950 ± 10 rpm
Amperage	450 mA

5. Lower the engine speed to idle for 30 seconds, then shut down the engine.
6. Turn the starter key switch to "ON", without starting the engine.
7. Lower the pilot control cancellation lever.
8. Operate each control 10 times in both directions to release pressure in the circuits.



CS00E544

9. Press the button located on the hydraulic sump tank breather to release pressure in the reservoir.

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PILOT PUMP

Removal and installation

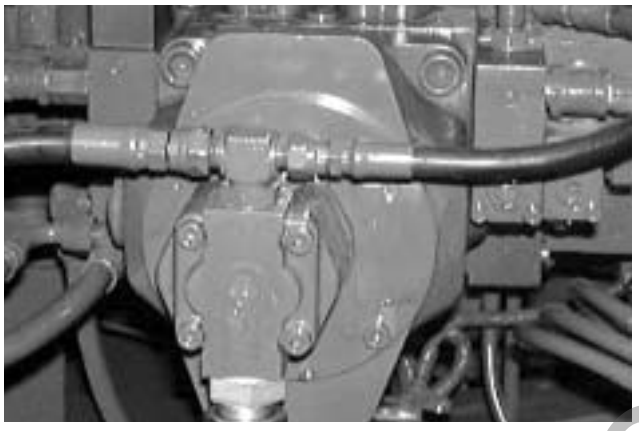
STEP 1

Refer to "Removing the hydraulic pump" in this section and carry out steps 1 to 3.

STEP 2

To prevent any hydraulic fluid leaks when disconnecting hydraulic lines, connect a vacuum pump to the hydraulic sump tank (see section 8000). Start the vacuum pump.

STEP 3



CD00F080

Place an appropriate container under the pilot pump to recover the hydraulic fluid that could escape from one of the disconnected hoses or from the hydraulic pump when the pilot pump has been removed. Disconnect the hoses from the upper union of the pilot pump. Seal the union and the hoses.

STEP 4



CD00F081

Disconnect the hose from the lower union of the pilot pump. Seal the union and the hose.

STEP 5

Remove the two fastening screws (and the flat washers) from the pilot pump, then remove the pilot pump.

STEP 6

Shut off the vacuum pump.

NOTE: *When installing, proceed in the reverse order to that of removal. Replace the O-rings with new O-rings.*

NOTE: *Before working with the machine, operate the swing, travel and attachment for five minutes with the engine at idle. Check that there are no leaks in the system, check the level of oil in the hydraulic sump tank, add oil if necessary. See section 8001 for checking pump.*

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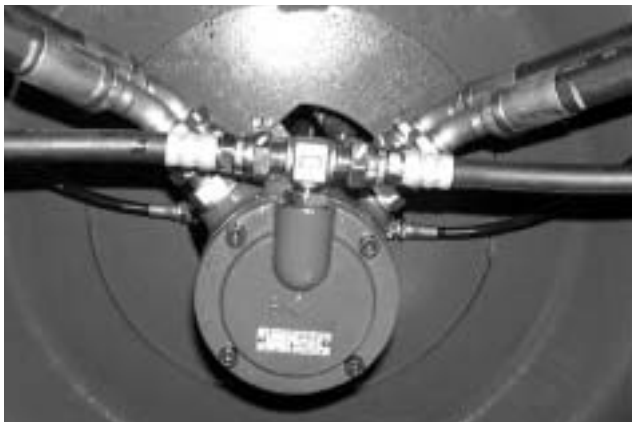
STEP 6



CD00F058



CD00F059

To facilitate installation, attach identification labels to all the rotating joint hoses (outer and inner).

STEP 7

Start the vacuum pump.

STEP 8

Disconnect the hoses from the rotating joint. Plug the rotating joint hoses and orifices.

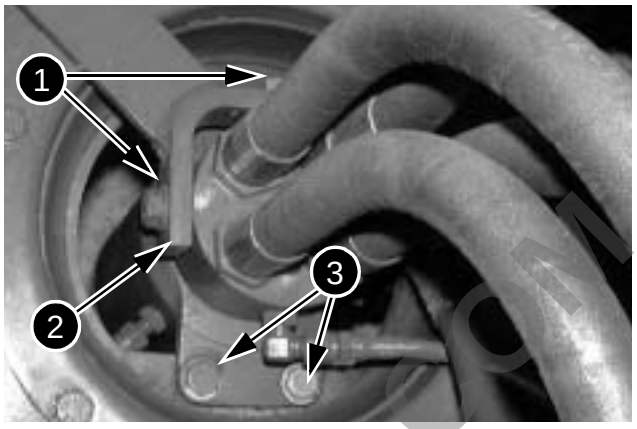
STEP 9

Stop the vacuum pump.

STEP 10

Connect suitable lifting equipment to the rotating joint. Do not leave any slack since the rotating joint has to be supported once the retaining screws are removed.

STEP 11



CD00F060

Remove the retaining hardware (1), the locking bar (2) and the retaining hardware (3) from the rotating joint outer component.

NOTE: *When installing, tighten to the torque specified in Section 1002.*

STEP 12

Raise the rotating joint sufficiently to free it from its bracket, so that it can be pivoted 90°. Place the rotating joint on the ground.

NOTE: *When installing, use the same procedure in the reverse order. Replace all O-rings with new O-rings. Before operating the machine, operate the travel, stop the engine and check that there are no leaks. If there is a leak, tighten the hose connections, check the level of hydraulic oil in the hydraulic sump tank and top up if necessary.*

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Assembly

STEP 1

Install and tighten the plug (p) complete with a new O-ring (q) on the arm semi-parallel valve block.

STEP 2

Install and tighten the plug (n) complete with a new O-ring (o) on the arm semi-parallel valve block.

STEP 3

Install the spring (m) on the arm semi-parallel valve block then install the spool (l).

STEP 4

Install a new O-ring (k) on the plug (j). Install the plug (j) on the semi-parallel valve block. Tighten to a torque of 44 lb-ft (60 Nm).

STEP 5

Install the spool (i) and the spring (h) on the arm semi-parallel valve block.

STEP 6

Install a new O-ring (g) on the plug (f). Install the plug on the semi-parallel valve block. Tighten to a torque of 44 lb-ft (60 Nm).

STEP 7

Install the piston (e) on the plug (a).

STEP 8

Install new O-rings (b) and (c) and back-up ring (d) on the plug (a). Install the plug (a) on the semi-parallel valve block. Tighten to a torque of 37 lb-ft (50 Nm).

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Section

8013

DISASSEMBLY AND ASSEMBLY
OF THE HAND JOYSTICK CONTROL

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November 2001

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TORQUE SETTINGS

Boom relief valve

Spool cap (3)	181 lb-ft +/- 10% (245.2 Nm +/- 10%)
Spool stop cap (1)	7.2 lb-ft +/- 10% (9.8 Nm +/- 10%)
Plug (11)	36 lb-ft +/- 10% (49 Nm +/- 10%)
Plug (15)	7.2 lb-ft +/- 10% (9.8 Nm +/- 10%)
Safety valve (10)	43.3 lb-ft +/- 10% (58.8 Nm +/- 10%)

Arm relief valve

Plug (1) and (5)	159 lb-ft +/- 10% (215.8 Nm +/- 10%)
Spool cap (9) and (11) retaining screws	29 lb-ft +/- 10% (39.2 Nm +/- 10%)
Safety valve (18)	43.3 lb-ft +/- 10% (58.8 Nm +/- 10%)

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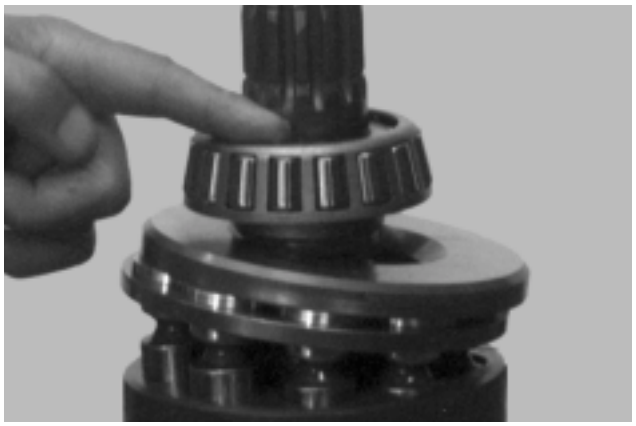
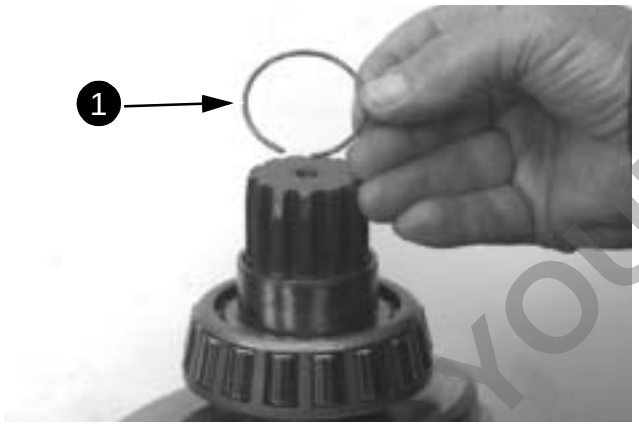
STEP 5



JD00430A

Apply a thin coat of Loctite 515 or 518 where the sleeve is installed on the cylinder shaft. Press the sleeve on the shaft.

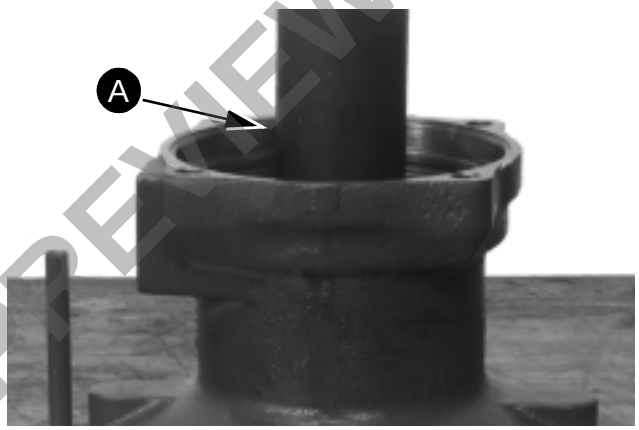
STEP 6



JD00420A

Install the retaining ring (1).

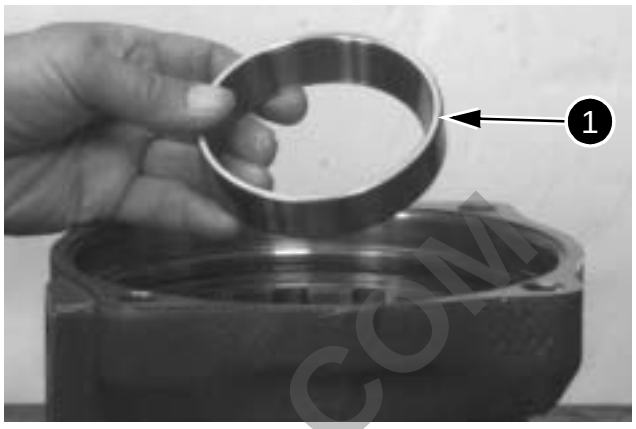
STEP 7



JD00431A

Before removal, apply grease to the lip of the lip seal. Position housing in a press. Apply Loctite 504 to the periphery of the lip seal. Install and centre the lip seal in the housing bore. With a suitable sleeve (A), press the lip seal in the bore of the housing.

STEP 8



JD00418A

Install the new external roller ring (1) in the motor housing.

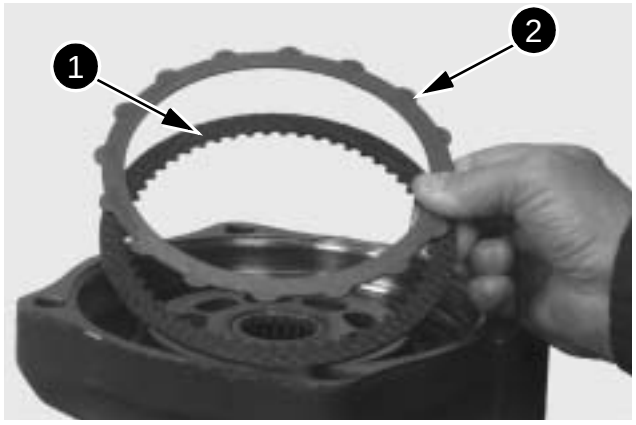
STEP 9



JD00417A

Carefully install the cylinder assembly in the housing. Be careful when installing the cylinder assembly not to damage the splines on the shaft.

STEP 10



JD00416A

Apply clean hydraulic fluid to both faces of the friction plates (1) and the disc plates (2). Install a disc plate first, then a friction plate, then a disc plate, then a friction plate, then the last disc plate, then the last friction plate.

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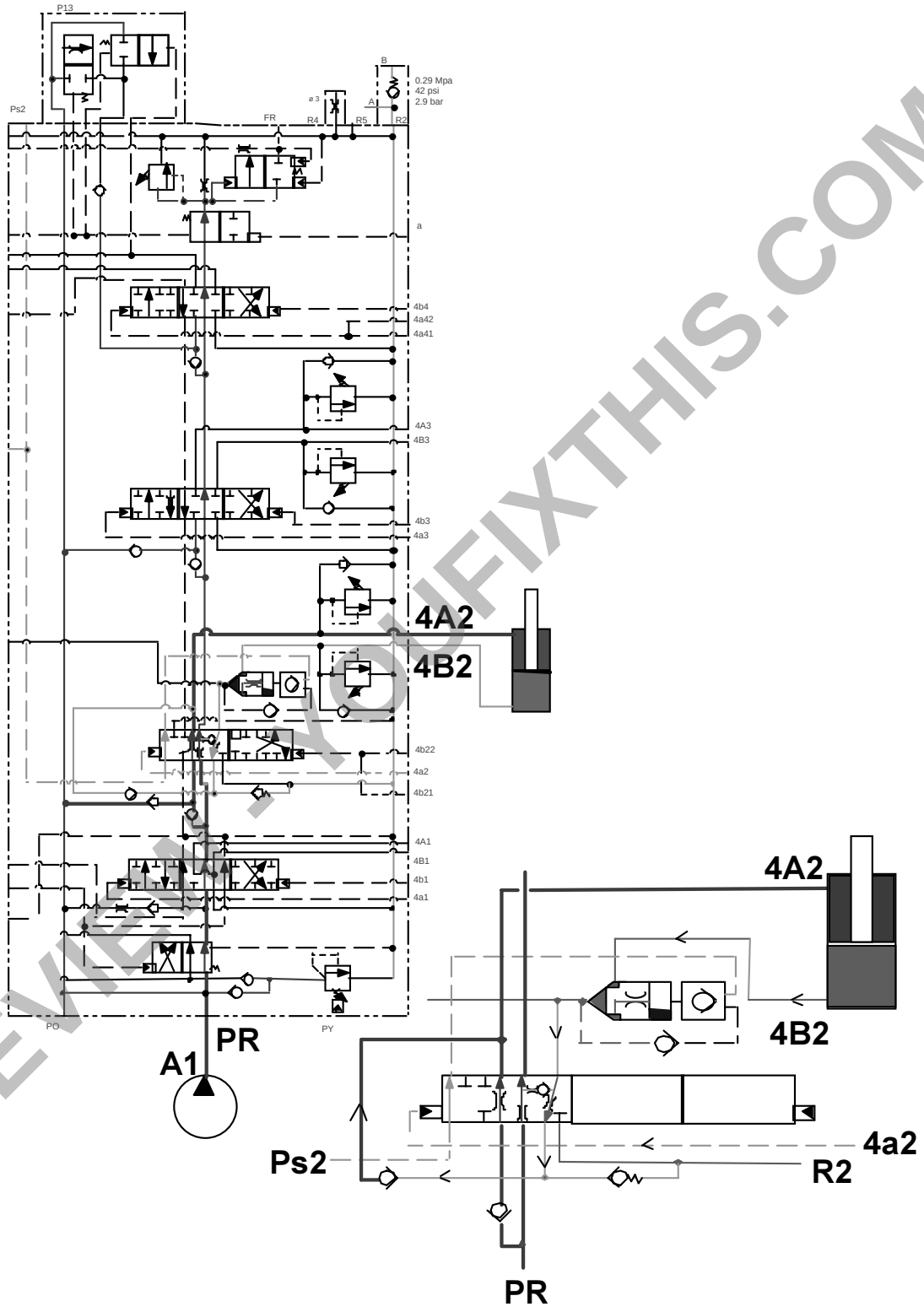

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CM00K010

Removal

STEP 1

Remove the bucket, the guide link and the bucket link, see page 4.

STEP 2

Start the engine, retract the arm cylinder rod and lower the attachment to the ground. Shut down the engine.

STEP 3

Remove the bucket cylinder and disconnect the arm cylinder rod from the arm, see Section 8005. Attach the arm cylinder rod to the boom.

NOTE: *The numbers in the following steps refer to the arm drawing on page 7.*

STEP 4

Attach a suitable lifting device to the arm. Take up any slack on the lifting slings, since the arm has to be supported before lifting.

STEP 5

Remove the nuts (1), the screw (2) and remove the pin (3).

STEP 6

Start the engine, move the machine backwards to separate the arm from the boom. Lower the boom to the ground and shut down the engine.

STEP 7

Lower the arm to the ground and remove the lifting equipment from the arm.

STEP 8

Remove and discard the dust seals (6).

NOTE: *Perform step 9 only if the bushings (8), (9), (10) or (11) have to be changed, see Specifications.*

STEP 9

Remove the bushings (8), (9), (10) or (11) from the arm or from the boom, using a hammer and a suitable drift on the outer diameter of the bushing.

Installation

NOTE: *Perform step 1 only if the bushings (8), (9), (10) or (11) have been removed.*

STEP 1

Using a suitable sleeve, install the bushings (8), (9), (10) or (11).

STEP 2

Install new dust seals (6) on the arm.

STEP 3

Attach a suitable lifting device to the arm. Move the arm into position near the machine.

STEP 4

Start the engine and move the machine forwards so that the boom is aligned with the arm. Check the alignment of the pin bores on the boom and the arm. Shut down the engine.

STEP 5

Install the pin (3).

STEP 6

Using a set of feeler gauges, check that the play between the boom and the arm is 0.019 to 0.043 inch (0.5 to 1.1 mm) . If necessary, remove the pin (3) and add one or more shims as required to arrive at the correct clearance. Install the pin (3).

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