MODEL	**130LX**
SERIES	**LX Series**
BOOK NO.	**1030**
SERIAL NO.	

MACHINE SERIAL NUMBER

The machine serial number is stamped on the serial number plate which is located inside the operator's cab. The serial number should always be furnished when ordering parts for the machine or when corresponding with the distributor or factory concerning the machine. Providing the serial number is the only way of ensuring the correct parts and/or information can be furnished.

In the event the serial plate is not readable, a number is stamped on the upper revolving frame which can be used to identify the machine. On hydraulic excavators the number is stamped just below the boom hoist cylinder mounting lugs.

Torque Table

Tighten cap screws and nuts according to the table below if there are no other special instructions.

Cap Screw Name Size (Size)			**M6**	**M8**	**M10**	**M12**	**M14**	**M16**	**M18**	**M20**
Cap Screw	Spanner	[in.]	0.39	0.51	0.67	0.75	0.87	0.95	1.06	1.18
		[mm]	10	13	17	19	22	24	27	30
	Tightening torque	[lb-ft]	5.1	14.5	29.0	43.4	72.5	116.0	144.6	202.4
		[Nm]	6.9	19.6	39.2	58.8	98.1	157.2	196.0	274.0
Socket Head Cap Screw	Spanner	[in.]	0.20	0.24	0.32	0.39	0.47	0.55	0.55	0.67
		[mm]	5	6	8	10	12	14	14	17
	Tightening torque	[lb-ft]	6.5	15.9	31.1	57.8	86.8	130.1	180.8	253.1
		[Nm]	8.8	21.6	42.1	78.4	117.6	176.4	245.0	343.0

Control valve

Five section main control valve for arm, boom acceleration, swing, option and RH travel.
Four section main control valve for arm acceleration, bucket, boom and LH travel.
Load holding valve for boom and arm.

Swing

Fixed flow, axial piston motor.
Automatic disc brake.

Upperstructure swing speed	13.4 rpm
Swing torque	24340 ft.lbs
Tail swing	6 ft 9 in
Displacement	3.97 cu in
Work output	26.4 gpm
Reduction ratio	17.03
Braking torque	≥ 216 lb-ft
Minimum brake release pressure	420 psi

Travel

Two-speed, axial piston motor.
Automatic disc brake.

Slow speed	2.2 mph
Fast speed	3.4 mph
Gradeability	70% (35°)
Tractive force	25 400 lbs
Displacement	3.2/2.1 cu in
Work output	32 gpm
Reduction ratio	72
Braking torque (excluding reducer)	107 lb-ft
Number of turns at the sprockets (10 turns)	
Mode "S", fast speed	13.4±0.6 sec.
Mode "S", slow speed	20.6±0.7 sec.
Permitted deviation in travel over a distance of 20 m	
Mode "H", full speed	39.4 in

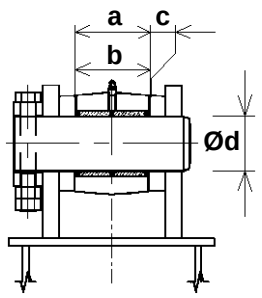
Undercarriage

One-piece undercarriage with welded components.
Lubricated rollers and idler wheels.
Grease type track tension.

Ground pressure

with 19.68 in track pads	5.66 psi
with 23.6 in track pads	4.79 psi
with 27.6 in track pads	4.21 psi
Tracks tension	9.45 to 10.24 in

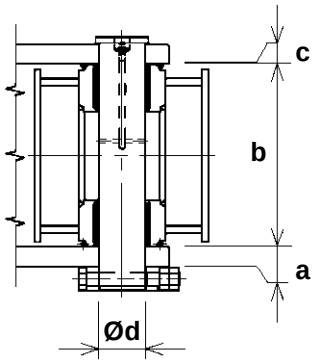
7. Bucket cylinder foot/Arm



CS01B528

Marking		Dimension (in)
a	Standard	3.46
	Limit	3.7
b	Standard	3.42
	Limit	3.35
c (a - b)	Standard	0.02 to 0.2
	Limit	Shims
Ø d (pin)	Standard	2.56
	Limit	2.52
Ø d (ring)	Standard	2.56
	Limit	2.62

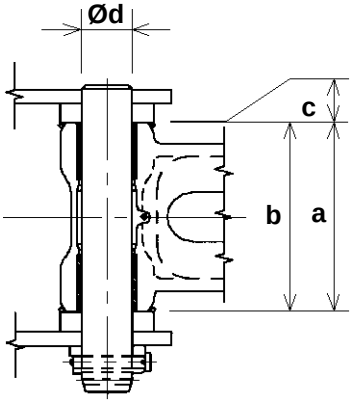
8. Connecting rod/Arm



CS01B529

Marking		Dimension (in)
a	Standard	1.26
	Limit	1.18
b	Standard	10
	Limit	9.92
c (play)	Standard	0.04 to 0.06
	Limit	Shims
Ø d (pin)	Standard	2.56
	Limit	2.52
Ø d (ring)	Standard	2.56
	Limit	2.62

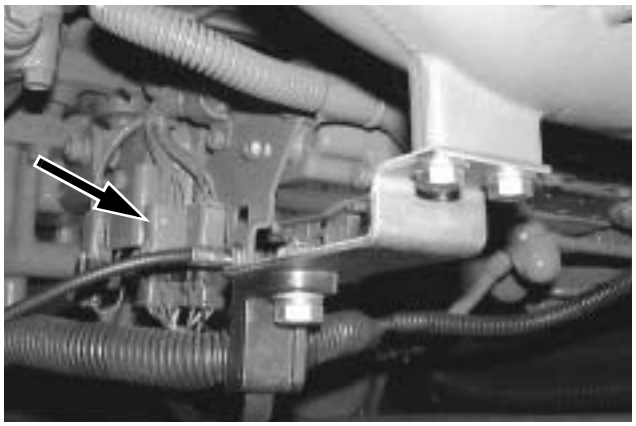
9. Compensator/Bucket



CS01B530

Marking		Dimension (in)
a	Standard	10.04
	Limit	10.27
b	Standard	10
	Limit	9.92
c (play)	Standard	0.04 to 0.14
	Limit	Shims
Ø d (pin)	Standard	2.56
	Limit	2.52
Ø d (ring)	Standard	2.56
	Limit	2.62

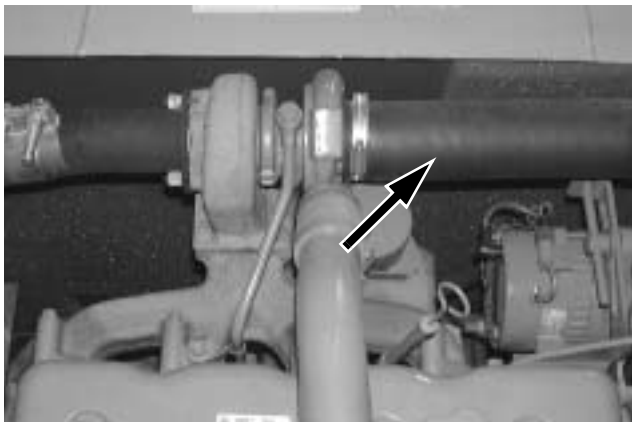
STEP 14



CD00J032

Label and disconnect the connectors for the electronic regulator and disconnect the fuel flow regulating resistance.

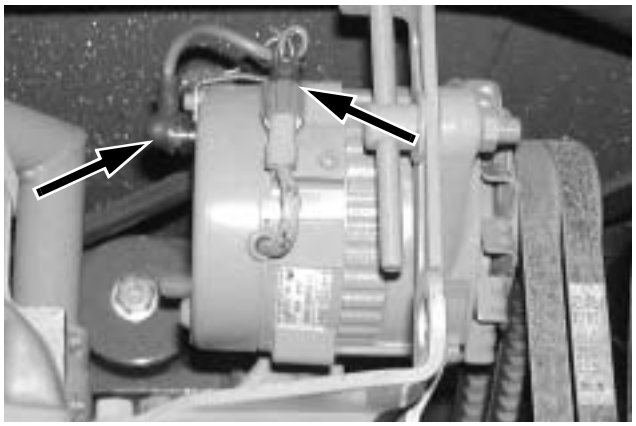
STEP 15



CD00J033

Remove the hose which connects the turbo-charger to the air filter.

STEP 16



CD00J035

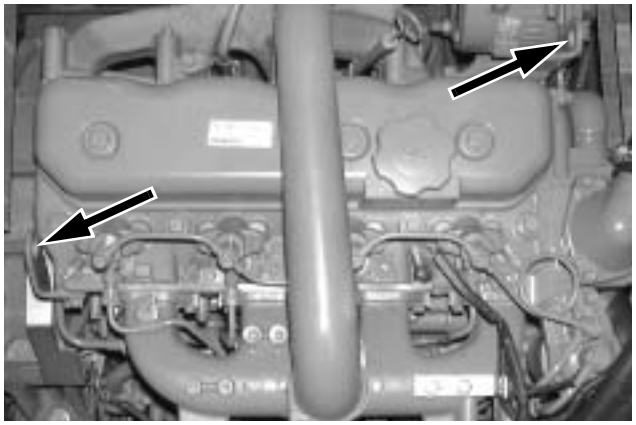
Label and disconnect the alternator electrical connections.

NOTE: *If the machine is equipped with air conditioning, remove the compressor retaining hardware and move the compressor away from the engine.*

STEP 17

Remove all the clips, etc. which attach the electrical harnesses to the engine and move them out of the way.

STEP 18



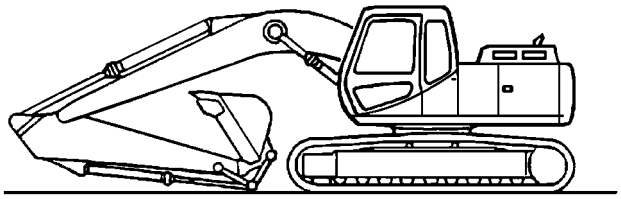
CD00J036

Install a suitable lifting device on the engine lifting eyes (for the weight of the engine, see Section 1002).

FUEL TANK

Removal

STEP 1



JS00163A1

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

STEP 2

Reduce the engine speed to idle for 30 seconds, then shut down the engine.

STEP 3

Turn the ignition key to "ON" without starting the engine.

STEP 4

Attach a "DO NOT OPERATE" tag to the ignition key in the cab.

STEP 5

NOTE: *The numbers in brackets refer to the figures on pages 5 and 6.*

Remove the access panel under the fuel tank (1).

STEP 6

Open the filling plug of the tank (2). Empty the tank using the valve (3) then remove the latter.

STEP 7

Lift the hood of the front boot. Remove the retaining screw (4) of the access ramp (5). Remove the access ramp (5).

STEP 8

Remove the screws (6) on top and then inside the front boot, then remove the protective housing (7).

STEP 9

Remove the screws (8) and the protective plate (9) from on top of the fuel tank (1).

STEP 10

Loosen the two screws (10) located underneath the machine. Open the side portion of the machine and remove the two screws (11) located on the RH side of the fuel tank (1). Remove the protective plate of the tank (12).

STEP 11

Remove the two screws (13) that hold the fuel oil filter (14). Attach tags to the two hoses (15) and (16). Remove the fuel oil filter (14) by removing the two hoses (15) and (16) and the circlips (17) and (18).

STEP 12

Shift the plastic protection (19) from the fuel probe (20). Remove the retaining screws (21) then the fuel probe (20) as well as the seal (22).

STEP 13

Remove the four screws (23) from the fuel tank (1), as well as the shims (24).

STEP 14

Remove the fuel tank (1) using a hoist.

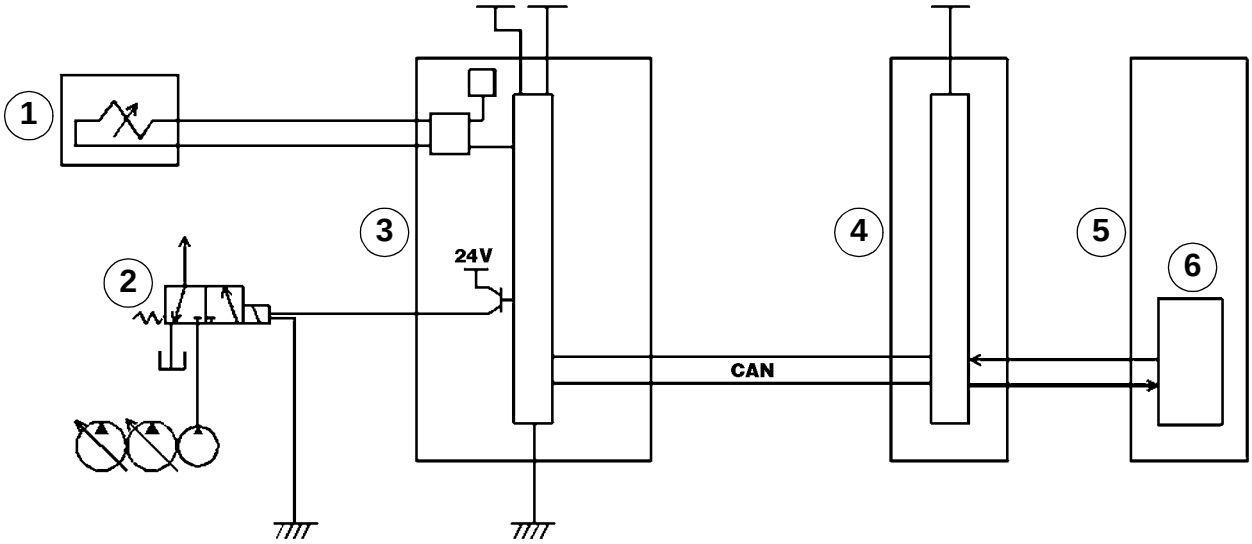
STEP 15

See the operator’s manual for removing the fuel filter.

1. Free swing valve solenoid
2. Alarm travel
3. Attachment working light
4. Swing pilot pressure switch
5. Horn
6. Horn
7. Pilot pressure switch (yellow ring)
8. Working light (upperstructure)
9. Windshield washer motor
10. Fuel filler pump connector (not used)
11. Fuel level sending unit
12. Travel pilot pressure switch
13. Engine speed sending unit
14. Engine oil pressure
15. Proportioning valve
16. Engine emergency stop motor
17. 6 solenoid valve block
18. Negative pressure detector (N)
19. P2 pressure transducer (yellow ring)
20. P1 pressure transducer
21. Hydraulic oil temperature sending unit
22. Starter motor
23. Electronic regulator
24. Fuel flow regulating resistor
25. Pre-heater plugs
26. Air conditioning compressor magnetic clutch
27. Alternator
28. Engine water temperature sending unit
29. Fuel temperature sending unit
30. Battery relay
31. Main protective fuse for circuits F11 and F12
32. Main protective fuse for circuits F3 to F10 and F13 to F20
33. Main protective fuse for circuit F2
34. Main protective fuse for circuit F1
35. Batteries
36. Coolant sending unit level
37. Air conditioning compressor magnetic clutch contact switch

H/S/L Mode Control

1) Circuit configuration



CS00F509

1. Proportioning valve
2. Power up solenoid valve
3. Main electronic control box
4. Engine electronic control box
5. Engine
6. Electronic acceleration

2) Values set for each mode

					Hydraulic power up
Mode H	Number of engine revolutions (Maxi)		rpm	2150 ± 10	Automatic control
	Current (variable amperage)	(Max)	mA	600	
		(Min)	mA	450	
Mode S	Number of engine revolutions (Max -200)		rpm	1950 ± 10	Automatic control
	Fixed current amperage (90% of torque)		mA	450	
Mode L	Number of engine revolutions (Max -300)		rpm	1850 ± 10	Constant
	Fixed current amperage (70% of torque)		mA	<100	
Idle	Number of engine revolutions		rpm	1000 ± 10	-----
Number of engine revolutions at maximum torque			rpm	1600	-----

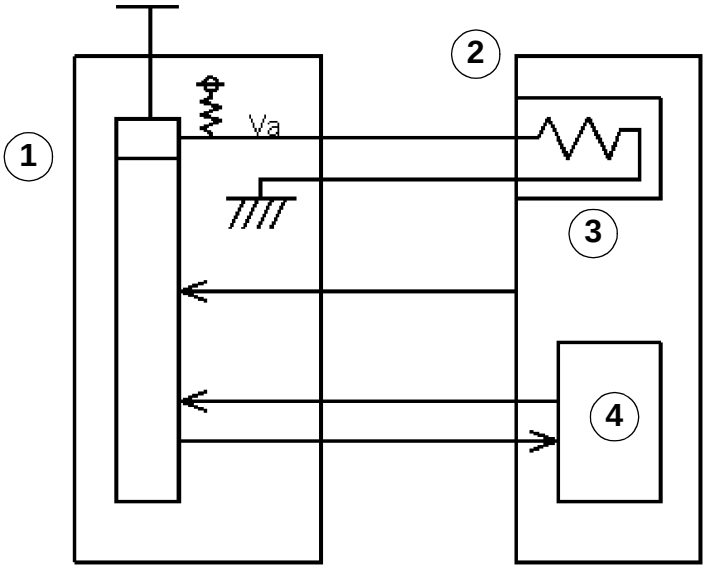
NOTE: *The shown above are for normal conditions; the following are exceptions:*

1. If the target number of engine revolutions is less than the maximum torque number of revolutions, the pump is controlled by the value of "L" mode current (even in H/S modes).
2. In "L" mode, if travel operation only is actuated, the pump is controlled by the value of "S" mode current.
3. In "L" mode, if a hydraulic hammer is used, the pump is controlled by the value of "S" mode current.
4. If the engine coolant solution temperature is too low, or the voltage arriving at the engine electronic control box is too low, the idle speed increases to prevent the engine becoming too cool or the battery being discharged.

Idle Control by Battery Voltage and Coolant Temperature

The purpose of this function is to prevent the battery from becoming discharged or the coolant solution temperature becoming too low.

1) Circuit configuration



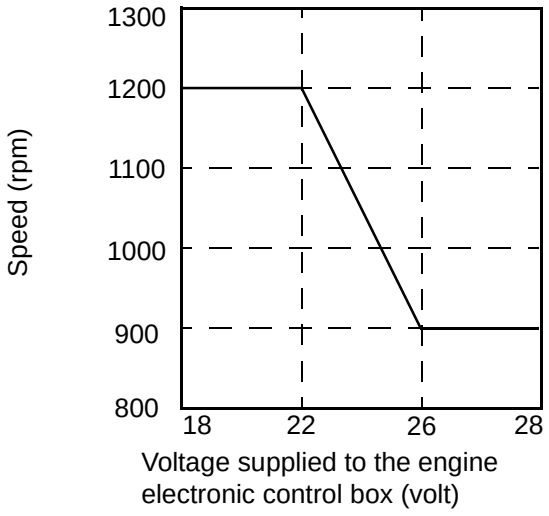
CS00F516

1. Engine electronic control box
2. Engine
3. Engine coolant temperature sending unit
4. Electronic acceleration

2) Operation

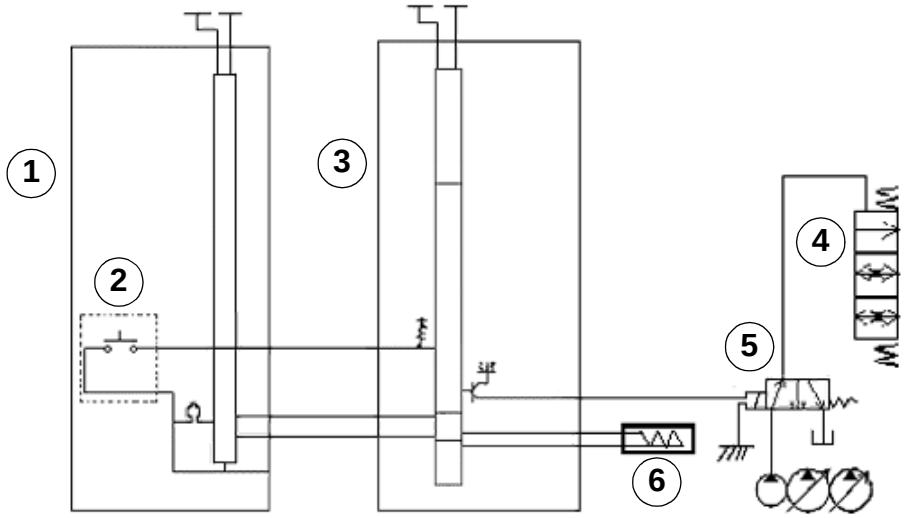
When the idle time is too long and the voltage supplied to the engine electronic control box (1) drops or the coolant temperature (3) is low, the idle speed automatically increases (see figure below).

Adjusting the speed in accordance with battery voltage



Cushion (On/Off)

1) Circuit configuration



CS01G511

1. Instrument panel
2. Cushion switch
3. Main electronic control box
4. Cushion valve
5. Cushion solenoid valve
6. RPM sensor

2) Operation

1. Controls the pilot oil of the boom and arm spools.
2. This feature can be turned off by the operator.
3. Each time the machine is started, it will be in cushion ON.

NOTE: *The main electronic control box needs a RPM signal for cushion OFF.*

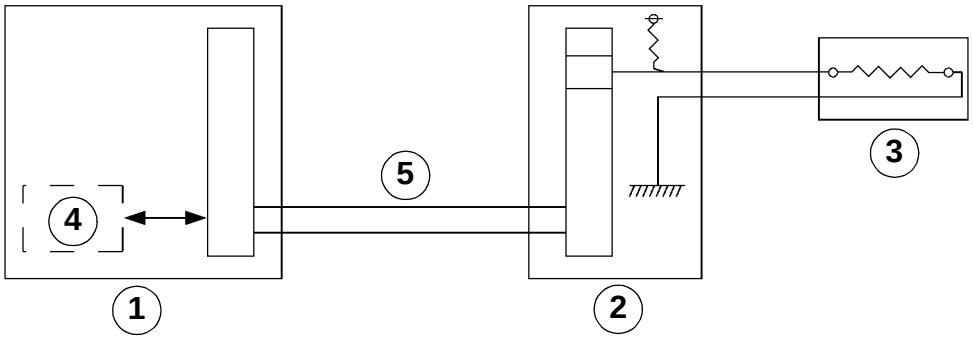
Output to the cushion solenoid valve is OFF when the key switch is ON. This is cushioned status.

To turn the cushion feature OFF the cushion switch is pressed. The main electronic control box will sent 24V to the cushion solenoid valve.

The solenoid valve shifts and sends pressure to the cushion valve and shifts the valve to the non-cushion position.

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

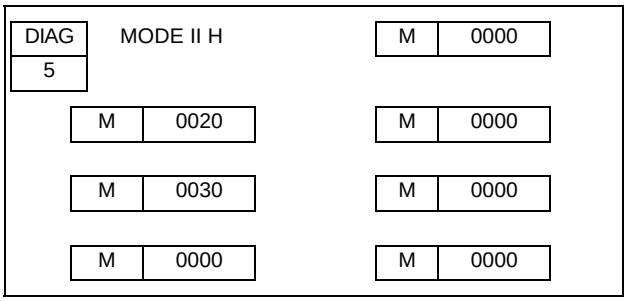
2) Operation

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.

5. Previous failures on the excavator DIAG5



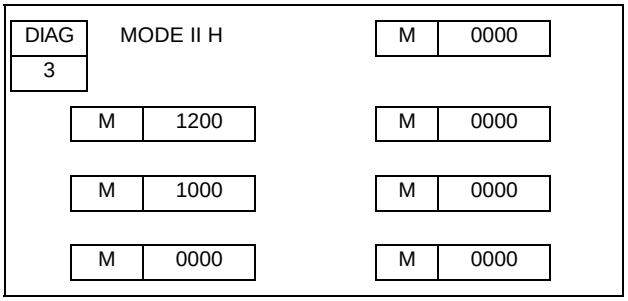
M: Failure code

Example:

The screen above shows that there is a failure in the hydraulic oil temperature sending unit and in the fuel level sending unit.

6. Previous failures on the excavator DIAG6

This screen is connected to the previous screen (DIAG5) as regards failures involving the hourmeter.



M: Failure code

Example:

The screen above shows that failure code 0020 (hydraulic oil temperature sending unit) occurred at 1200 H and that failure code 0030 occurred at 1000 H.

A. The numbers of hours shown indicate the time at which the failures occurred for the first time since the data was re-initialized.
B. To erase the failure codes and the number of hours, press the work mode switch for 10 seconds.
C. When data is erased from screens DIAG5 and DIAG6, it is recorded in the electronic control box memory (this data is only visible using an external computer).

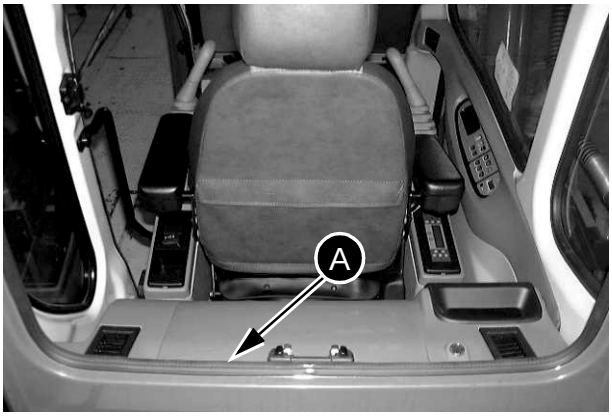
MACHINE : SH0120- 3	
TERRITORY : 1	LANGUAGE : 5
CONT. P / N	KHR2668

Example:

In the screen opposite, the language code has changed from 1 (English) to 5 (French).

ACTIVATING THE ANTI-THEFT SYSTEM

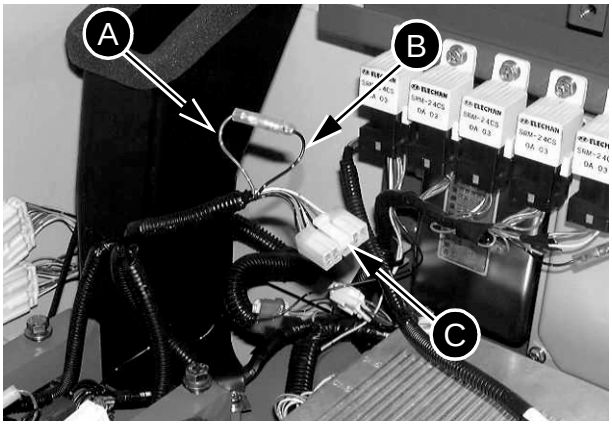
1. Remove the hood (A) located behind the operator's seat.



CD00F011

A. Hood

2. Disconnect the two wires (A) (B) covering the anti-theft system.



CD00F012

A. Violet wire marked 469 female plug
B. Black wire marked 621 male plug
C. Radio connector

3. Turn the starter key switch to ON and then OFF.

4. Reconnect the two wires (A) (B) covering the anti-theft system (see paragraph 2).

5. To save the new access code, consult the anti-theft protection section in the operator's manual.

Detector resistances

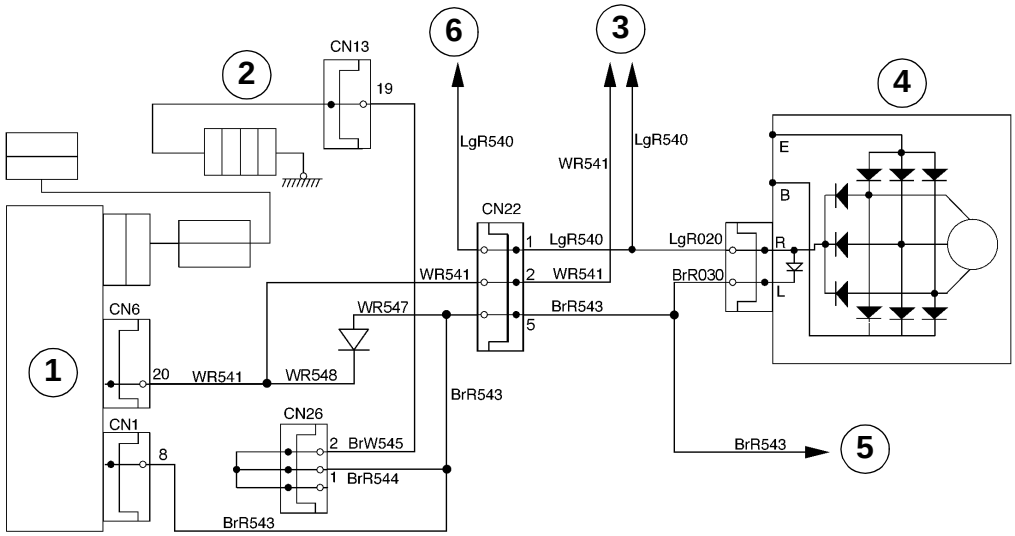
NOTE: *The resistance varies with the temperature.*

Coolant or oil temperature	Coolant temperature detector	Oil temperature detector
68°F	6.08 kΩ	2.45 kΩ
86°F	4.24 kΩ	1.66 kΩ
104°F	3.02 kΩ	1.15 kΩ
122°F	2.18 kΩ	0.81 kΩ
140°F	1.61 kΩ	0.58 kΩ
158°F	1.20 kΩ	0.43 kΩ
176°F	0.91 kΩ	0.32 kΩ

Battery Charge Circuit Defective

Description of problem No. 5

- The message is still displayed.



CM00F005

1. Main electronic control box
2. Hourmeter
3. Battery relay
4. Alternator
5. Starter motor
6. Starter motor switch

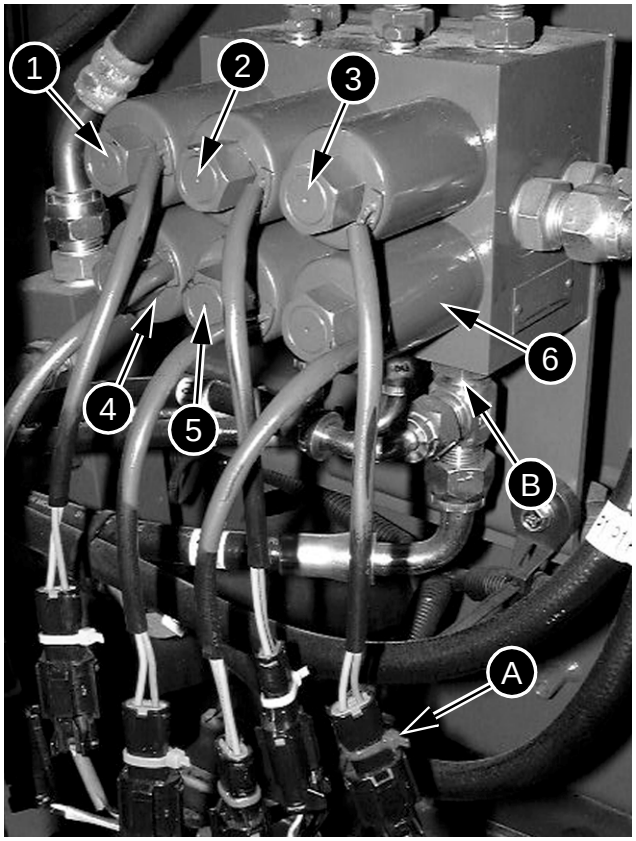
3. Make sure that wire LR (blue/red) on the service connector is connected to wire LR on the main harness and install the meter.

NOTE: *The + terminal on the meter must be connected to wire LR (blue/red) on the service connector and the - terminal to the machine earth.*

4. Turn the starter switch key to "ON", the meter reading should be 24 V.

Block of 6 Solenoid Valves

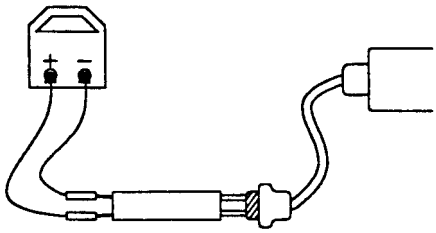
1. Disconnect connector (A) from one of the solenoids on the 6 solenoid valve block (B)



CD00F023

Marking	Function	Ring color
1	Swing pilot cancellation	Green
2	Power up	Yellow
3	2nd travel speed	Red
4	Attachment cushion	Light green
5	Swing brake	Pink
6	Pilot pressure	Blue

2. Connect the appropriate service connector (2P) to the connector on the disconnected solenoid only and install the meter.



CS99A843

3. When the connection has been made, the solenoid resistance reading should be 45 Ω at 68°F.

NOTE: *The resistance value varies with temperature.*

3. Apply a charge of 15 amps to the battery for 15 seconds. Wait at least 3 minutes before continuing the test.

4. Measure and note the temperature of the electrolyte.

5. Refer to specifications for the correct charge for this test.

6. The correct charge corresponds to half the value of the cold start current 0°F (-17°C).

7. Turn the charge control knob until the ammeter shows the current required. Maintain the charge for 15 seconds and read the voltmeter. Turn the charge control knob to OFF.

8. Compare the reading and the electrolyte temperature with the values shown below.

Electrolyte temperature	Minimum voltage
70°F (21°C) minimum	9.6
60°F (16°C)	9.5
50°F (10°C)	9.4
40°F (4°C)	9.3
30°F (-1°C)	9.1
20°F (-7°C)	8.9
10°F (-12°C)	8.7
0°F (-18°C)	8.5

A. If the result of the test is higher than or equal to the voltage shown, the battery is in good condition.

B. If the result of the test is less than the voltage shown, replace the battery with a new battery.

CHARGING THE BATTERY

WARNING: *Never try to charge a battery which has frozen electrolyte.*

Before charging the battery, check the electrolyte level.

It is difficult to state an exact charging rate since the following conditions are variable: (1) temperature of the electrolyte, (2) charge level, and (3) condition of the battery. Refer to the Charging Guide for correct charging time.

Refer to Specifications on page 3 for the reserve battery charge of this machine.

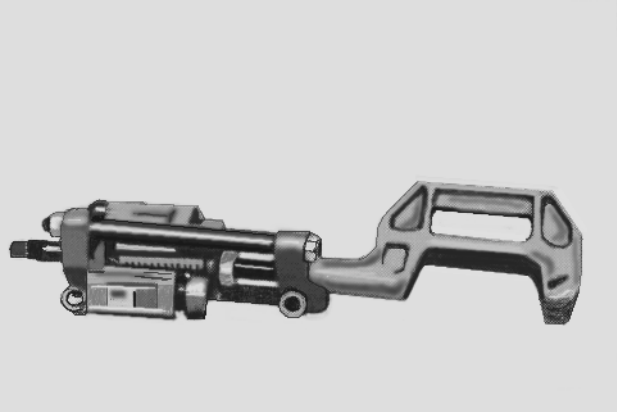
Reduce the rate of charge if:

1. The electrolyte spills out of the cells since they are producing too much gas.

2. The temperature of the electrolyte exceeds 125°F (52°C).

NOTE: *For optimum charging, select slow charging rates. The battery is fully charged when, after slow charging for 3 hours, no cell is producing too much gas and the specific gravity remains unchanged.*

SPECIAL TOOLS



926407

1. Track removal hydraulic press K1P0013
2. Loctite 262
3. Hammer
4. Lifting jib
5. Impact wrench
6. Torque spanner
7. Supports 10 T
8. Roller pump
9. Angle wrench K1P0014

Section

5002

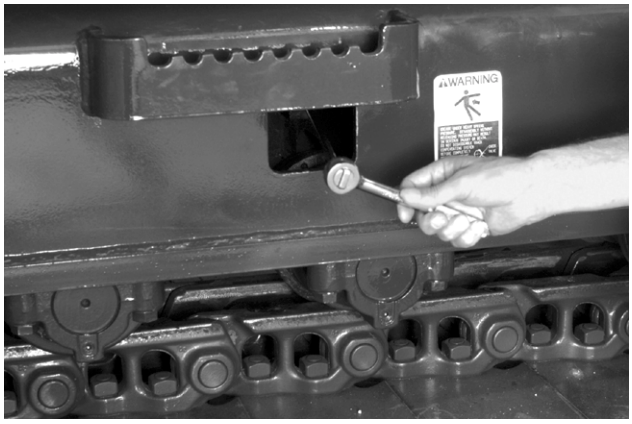
REMOVAL AND INSTALLATION OF A SET OF RUBBER TRACKS

Removal

STEP 1

Park the machine on hard, flat ground. Rotate the upperstructure of the machine so that the cab is over the lower rollers to be removed.

STEP 2



JD00273A

Do not remove the non-return check valve. The grease in the track adjustment cylinder is under high pressure. Slacken the tracks by slowly loosening the non-return check valve by about two turns, the grease will escape from a port in the thread of the check valve.

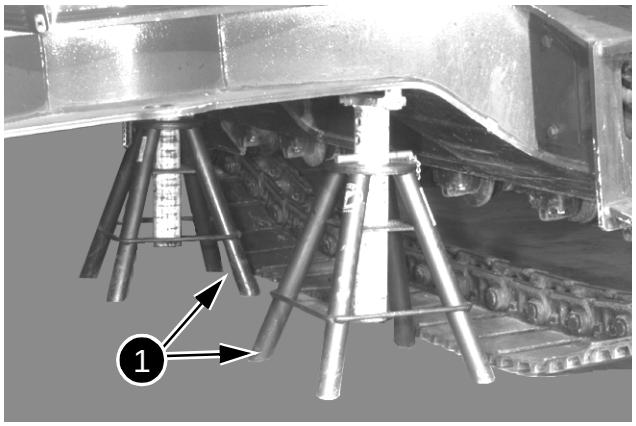
> **WARNING:** *Grease is under heavy spring pressure. Disassembly without releasing pressure may result in serious injury or death. Do not disassemble the track compensating system before completely releasing the grease pressure. Release grease pressure by loosening check valve. Do not remove the non-return check valve or the retaining bracket.*

STEP 3

Lower the attachment to lift the machine until a sufficient gap between the track frame and the trackis obtained so that the lower roller can be removed.

KHP1040

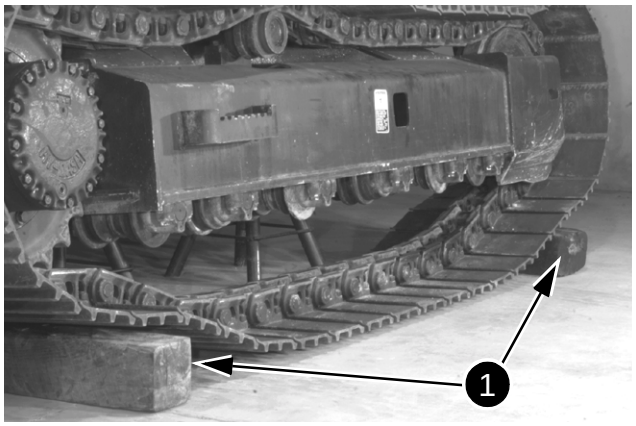
STEP 4



JD01075A

Install the supports (1) of suitable capacity under the machine.

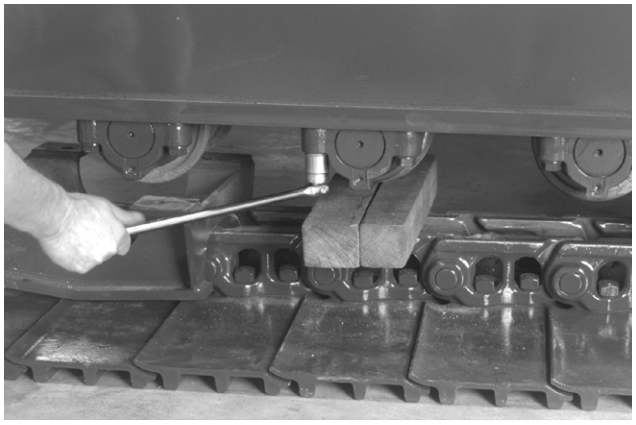
STEP 5



JD01076A

At each end of the track, install wood blocks (1) under the track.

STEP 6

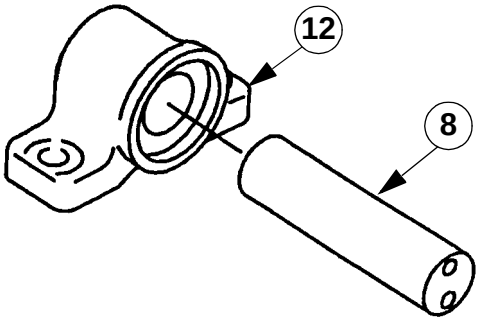


JD00299A

Install a wood block under the lower roller to support it. Remove the four screws and the retaining washers and remove the lower roller.

Assembly

STEP 1



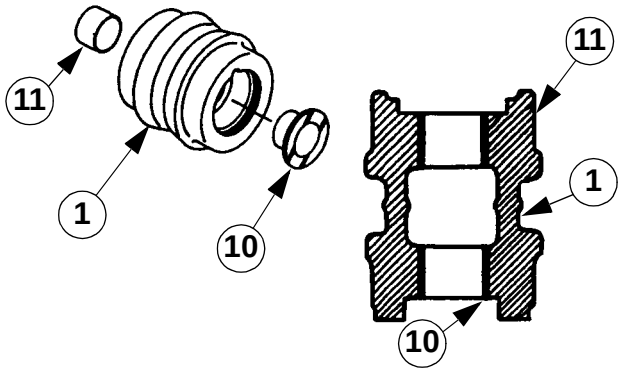
JS00331A

If the shaft (8) has been removed from the bracket (12), install the shaft in the bracket using a press. Be careful not to damage the seal bore in the bracket.

NOTE: *The retaining ports of the thrust plate (7) should be perpendicular to the retaining plane of the bracket (12).*

NOTE: *Respect the recess dimension of the shaft in the bracket, see page 10.*

STEP 2

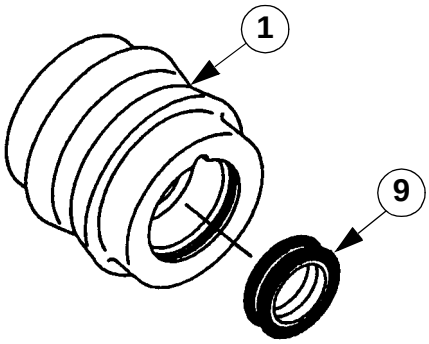


JS00332A

Install the bushings (11) and (10) in the upper roller (1).

NOTE: *The grooves of the bushings should be rotated by 90°*

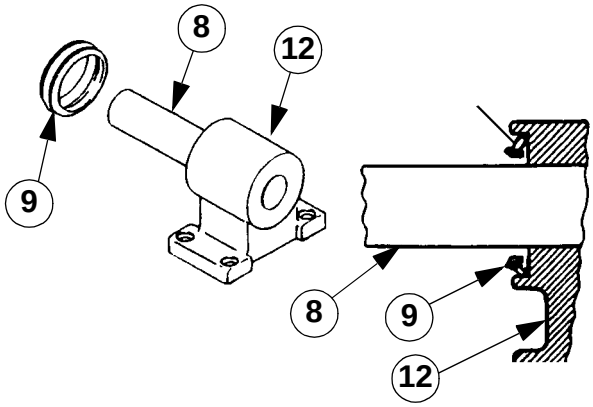
STEP 3



JS00333A

Install an O-ring and a face seal (9) metal bushing in the seal bore of the upper roller (1). Liberally apply clean oil on the edge of the face seal.

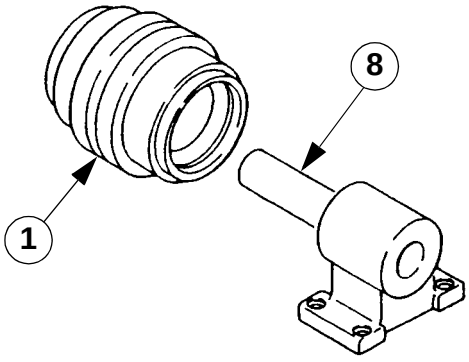
STEP 4



JS00334A

Install the O-ring and the remaining face seal (9) metal bushing in the seal bore of the bracket (12). Apply clean oil copiously to the face seal.

STEP 5



JS00335A

Apply clean grease on the surface of the shaft (8) and install the shaft in the upper roller (1).

SPECIFICATIONS

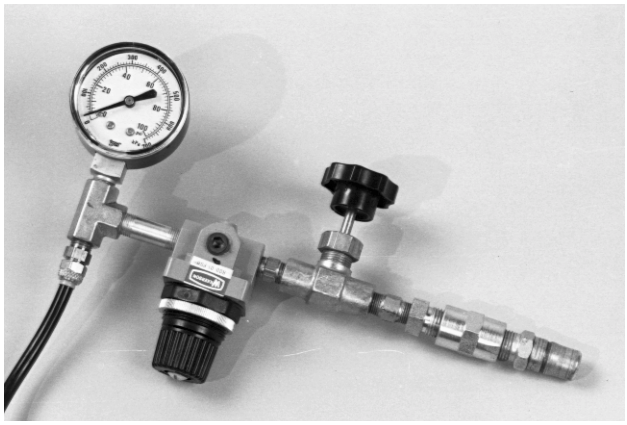
Idler wheel ..... See section 1002

SPECIAL TORQUE SETTINGS

Shock absorber spring yoke screw* ..... 197 to 230 lb-ft (267 to 312 Nm)
Tension cylinder screw* ..... 197 to 230 lb-ft (267 to 312 Nm)
Tension cylinder non-return valve ..... 43 lb-ft (59 Nm)

* Apply Loctite 262 to the threads

SPECIAL TOOLS

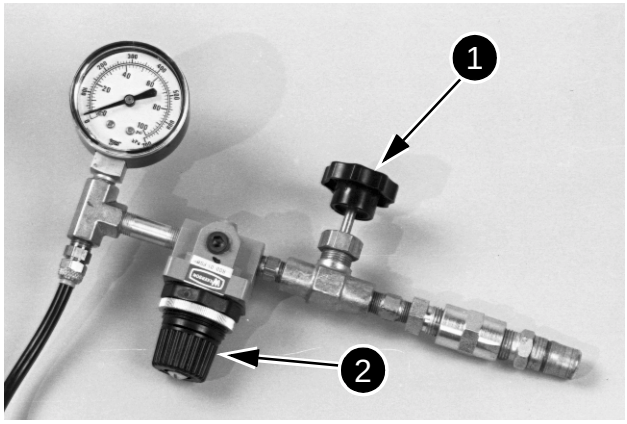


B407320M

Use K1P0015 and K1P0016 to check for leaks as below

Leakage test

Use K1P0015 and K1P0016 for the leak checks shown below.



B407320M

STEP 1

Connect the shut-off valve (1) to the pressure regulator (2). Connect a union for the air supply hose to the shut-off valve.

STEP 2

Install the adaptor and a quick coupler to the oil filler orifice. Install a seal with the adaptor.

STEP 3

Turn the knob anti-clockwise to close the pressure regulator (2).

STEP 4

Connect the pressure gauge pipe to the quick coupler.

STEP 5

Make sure that the shut-off valve (1) is open.

STEP 6

Open the pressure regulator (2) until the pressure gauge shows 27.5 psi (1.9 bar).

STEP 7

The shaft being checked should now be rotated four times.

STEP 8

Close the regulator until the pressure gauge shows 14.5 psi (1bar).

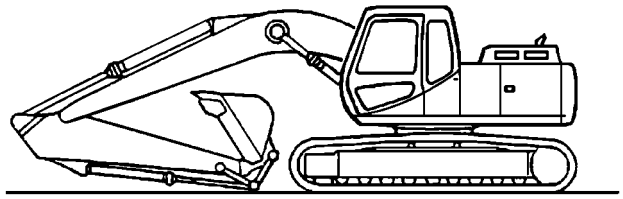
STEP 9

Close the shut-off valve. Maintain the air pressure of step 8 for 10 seconds. A reduction in air pressure during this period shows a defective component or incorrect assembling.

DRIVE MOTOR AND FINAL DRIVE TRANSMISSION

Removal and installation

STEP 1



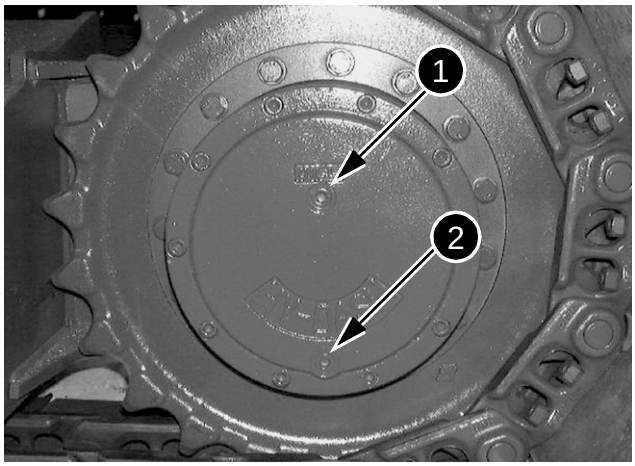
JS00163A1

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



CD00F069

Remove the oil fill plug and oil lever plug (1) and oil drain plug (2) and drain the oil.

NOTE: *When installing, refer to Section 1002 for the correct type and quantity of oil to use. Tighten the plugs to a torque of 3.6 to 8 lb-ft (5 to 11 Nm).*

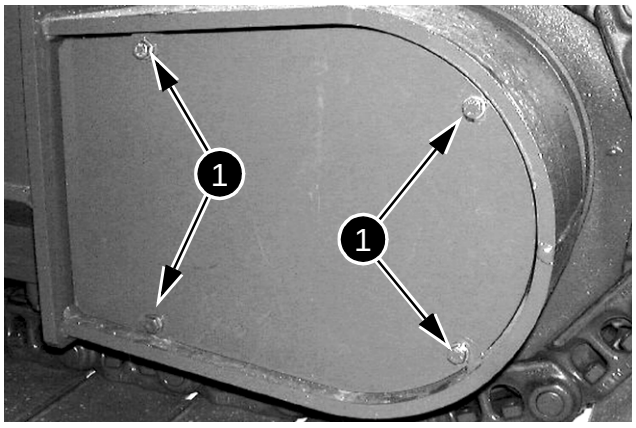
STEP 4

Wrap Teflon tape on the oil drain plug and install it. Install the fill plug.

STEP 5

To prevent fluid loss when disconnecting hydraulic lines, connect a vacuum pump to the hydraulic sump tank(see Section 8000).

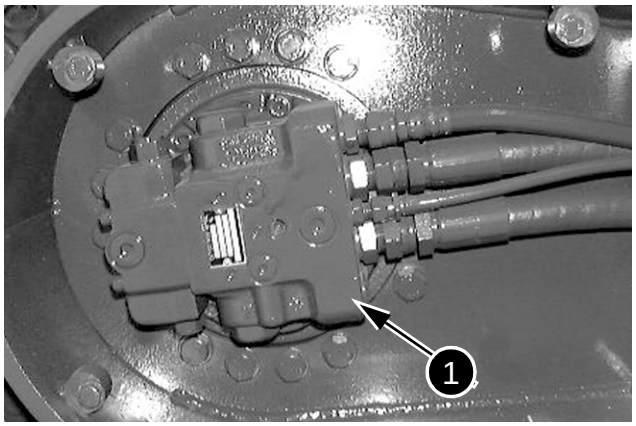
STEP 6



CD00F067

Remove the four cap screws and washers (1) holding the access cover to the drive motor.

STEP 7



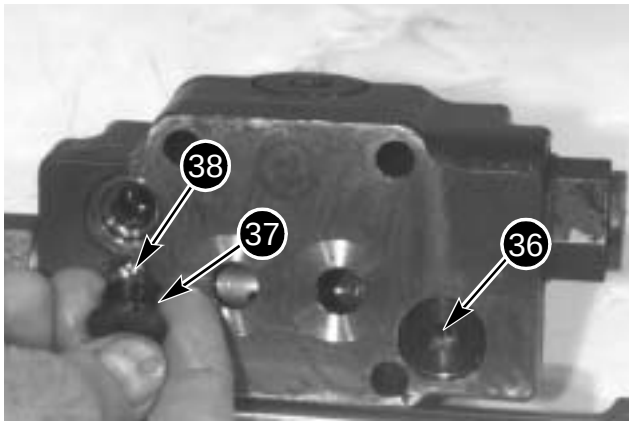
CD00F068

Install indentification tags on the hoses connected to the drive motor to aid in installation.

STEP 8

Start the vacuum pump.

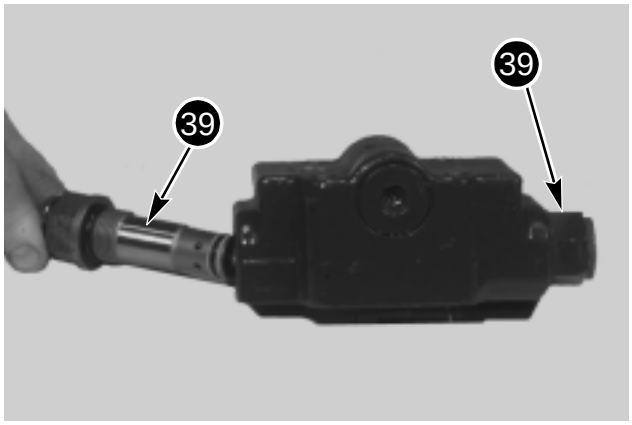
STEP 22



JD00855A

Remove the two plugs (36). Turn the relief valve assembly (3) over and let the balls (38) fall into your hand. Remove and discard the O-ring (37) from each plug.

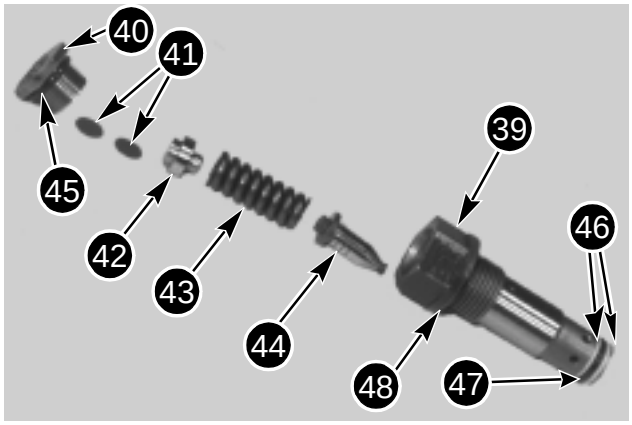
STEP 23



JD00856A

Remove the relief valve (39) from the valve housing port.

STEP 24



JD00857A

Remove the cap (40), two shims (41), sleeve (42), spring (43), and valve (44). Remove and discard the O-ring (45) from the cap. Remove and discard the two back-up rings (46) and the two O-rings (47 and 48).

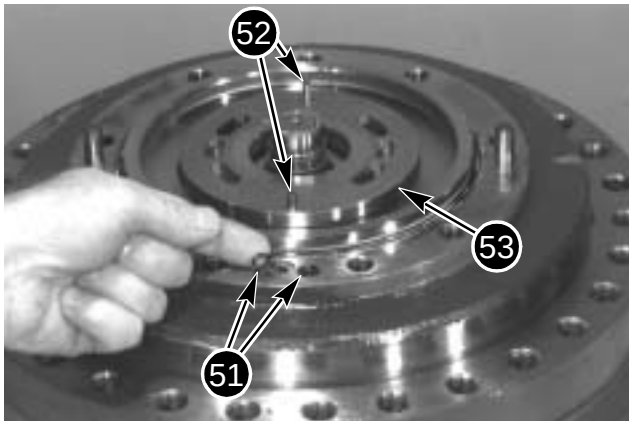
STEP 25

Using a suitable tool, reach inside the valve bore from which the relief valve was removed and remove two back-up rings (49) and O-ring (50).

STEP 26

Repeat steps 23 through 25 to remove the remaining relief valve (39).

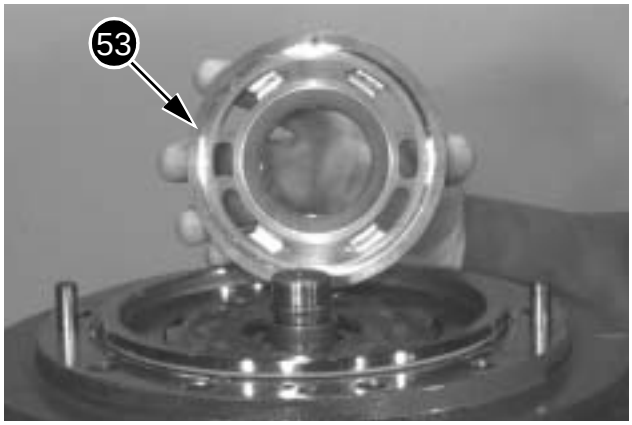
STEP 27



JD00858A

Remove and discard the two O-rings (51). Remove the two dowel pins (52) from the timing plate (53).

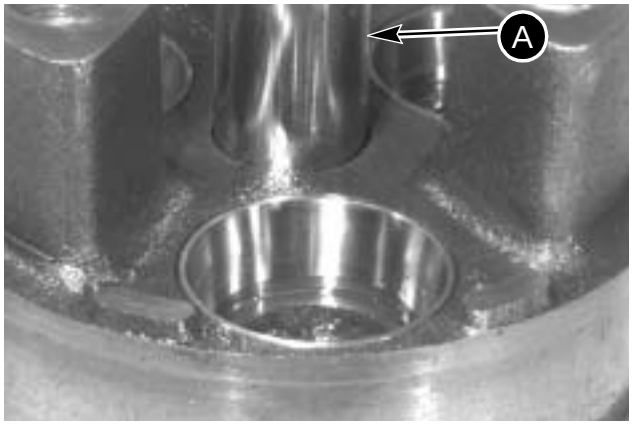
STEP 28



JD00859A

Remove the timing plate (53).

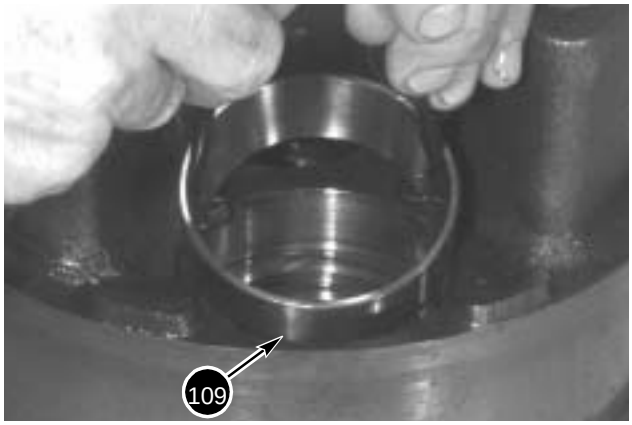
STEP 68



JD01125A

Using a proper diameter sleeve (A), press the oil seal (108) from the spindle (110). Discard the oil seal.

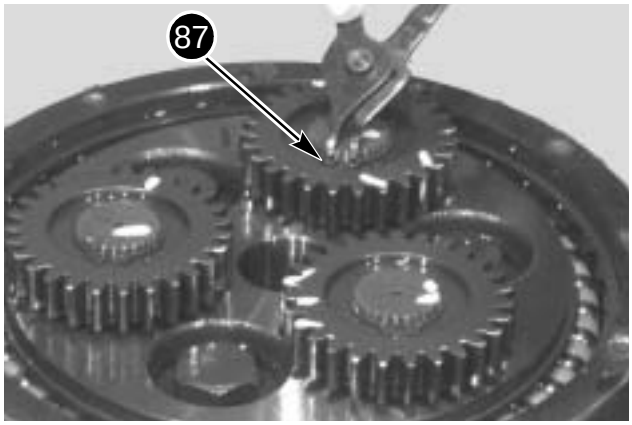
STEP 69



JD01126A

Remove the bearings (109) outer races from the spindle (110).

STEP 18



JD01102A

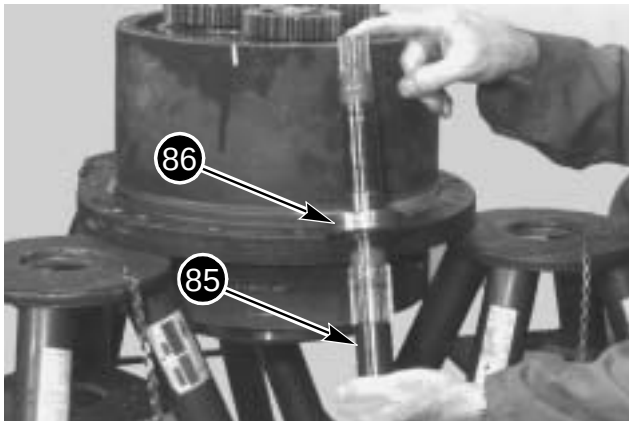
Install the three retaining rings (87).

STEP 19

> **WARNING:** *Use insulated gloves or mittens when working with hot parts.*

If the bearing (86) was removed from the shaft (85), heat the bearing to 194 to 230 degrees F (90 to 110 degrees C). Using proper size sleeve, press the bearing on the shaft until seated against the shoulder on the shaft.

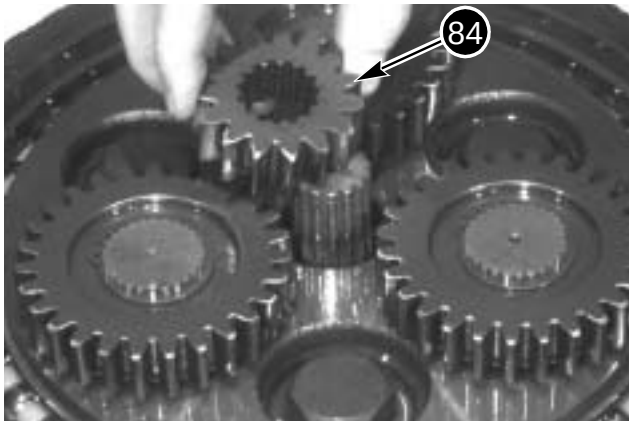
STEP 20



JD01100A

Position the hub (106) and spindle (110) on supports. Install the assembled bearing (86) and shaft (85) in the spindle. Place supports under the shaft.

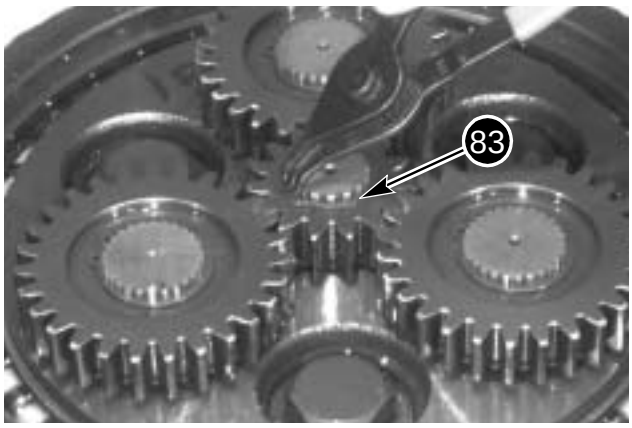
STEP 21



JD01099A

Install the sun gear (84) on the shaft (85).

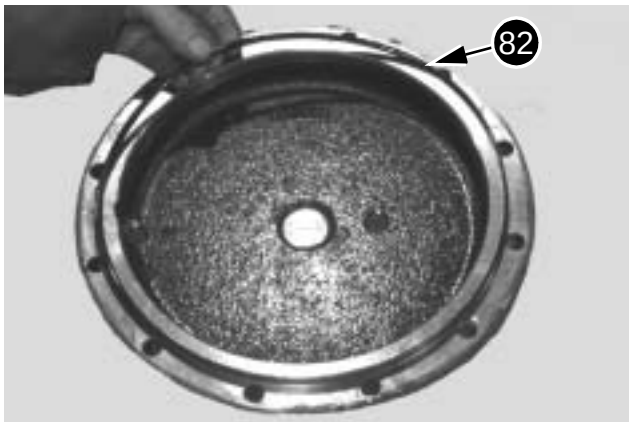
STEP 22



JD01098A

Install the retaining ring (83) to secure the sun gear (84).

STEP 23



JD01096A

Apply lithium grease to a new O-ring (82). Install the O-ring on the cover (81).

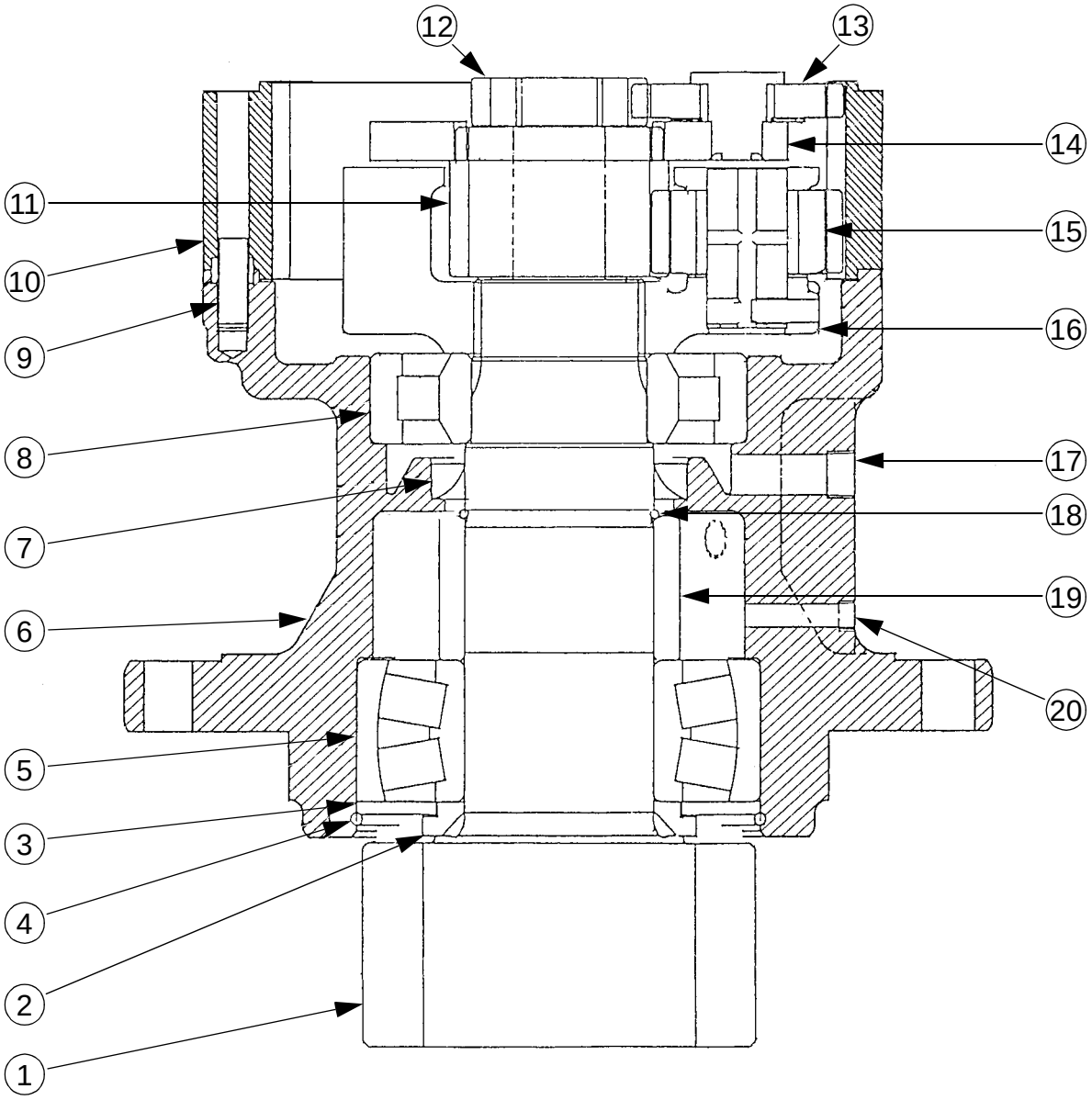
Section

6003

REMOVAL AND INSTALLATION
OF THE SWING REDUCTION GEAR

SWING REDUCTION GEAR

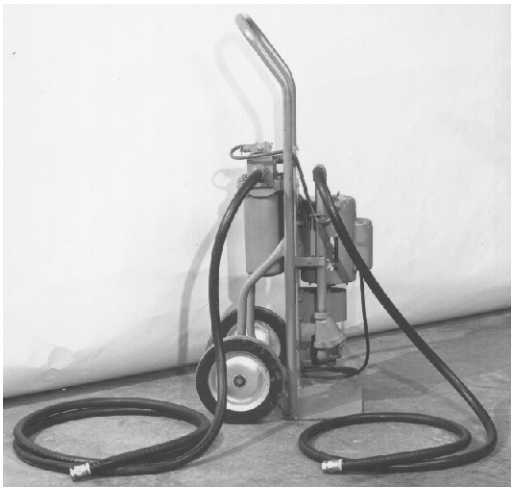
Description



CS00G512

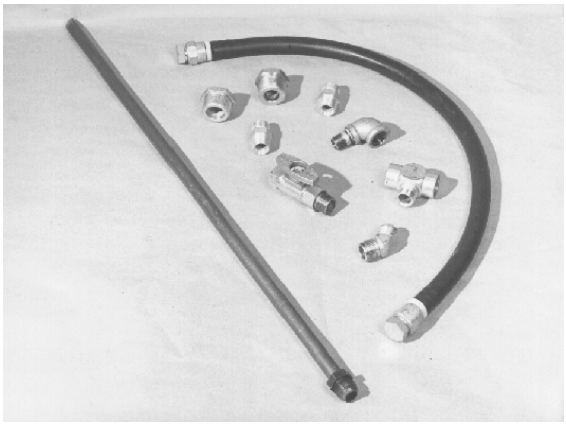
1 PINION SHAFT
2 STOP
3 PLATE
4 RETAINING RING
5 BEARING
6 HOUSING
7 LIP-SEAL
8 BEARING
9 DOWEL PIN
10 RING GEAR
11 SUN GEAR
12 SUN GEAR
13 PLANETARY GEAR
14 PLANET WHEEL CARRIER
15 PLANETARY GEAR
16 PLANET WHEEL CARRIER
17 PLUNGER ASSEMBLY
18 RETAINING RING
19 SPACER
20 PLUNGER ASSEMBLY

SPECIAL TOOLS



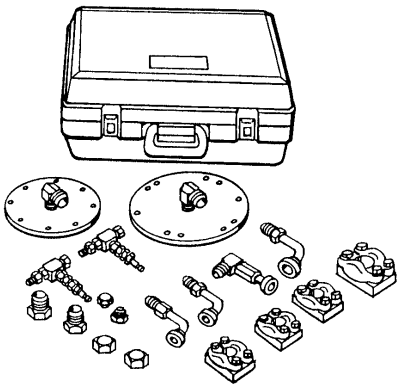
806127

K1P0001 - Portable filter



806128

K1P0002 - Kit for unions



CS99B532

K1P0003 - Set of hydraulic flow and pressure test unions

M1325

K1P0004 - Kit for vacuum pump

Item	Description	Approximately pressure with 1/4 turn of the screw (or with one shim*)
A	Main relief valve (standard pressure)	---
	Main relief valve (higher pressure - 2-stage relief)	---
B	Boom raising secondary relief valve	710 psi
C	Boom lowering secondary relief valve	710 psi
D	Arm extending secondary relief valve	710 psi
E	Arm retracting secondary relief valve	710 psi
F	Bucket opening secondary relief valve	710 psi
G	Bucket closing secondary relief valve	710 psi
H	Pilot circuit secondary relief valve	56 psi
I	RH swing secondary relief valve	70 psi *
J	LH swing secondary relief valve	70 psi *
K	Reverse travel secondary relief valve	145 psi *
L	Forward travel secondary relief valve	145 psi *

Pilot System Secondary Relief Valve (H)

Test

1. Connect a 0-1500 psi pressure gauge to pressure test point P3. (See page 11)
2. With the engine at full speed, select "S" mode.
3. Move the pilot cancellation lever to its low position.
4. With the swing and travel attachment controls in neutral, read the value on the pressure gauge: **The value should be 565 ± 15 psi**.

Adjustment

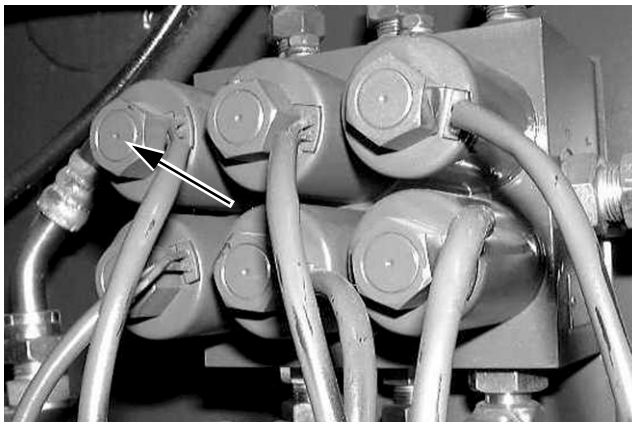
1. Loosen the lock nut and turn the valve adjusting screw (H) until 565 ± 15 psi is reached.
2. Tighten the lock nut while holding the adjusting screw in position.
3. When the adjusting screw has been tightened, check the pressure again and make sure there are no leaks.

Checking the Pilot Accumulator

1. Raise the boom completely and extend the arm.
2. Shut down the engine, with the starter key switch on "ON".
3. Operate the boom lowering or arm retracting control several times consecutively.
4. The pressure in the accumulator should enable the boom lowering or arm retracting function to be performed about six times.

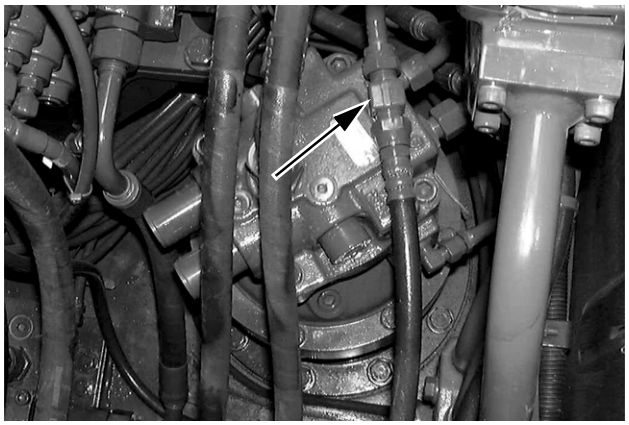
Checking for leaks

(With the hydraulic oil between 113 and 131°F)



CD00E143

1. Disconnect the swing solenoid valve connector (green).
2. Display the CHK1 diagnostic screen.
3. Start the engine and select the "S" mode.
4. Make sure the free swing function is not operational.
5. Switch on the swing brake control on the instrument panel (indicator lamp ON).
6. Slowly operate the swing control lever and gradually increase the engine speed to full speed to ensure that the swing is locked.
7. Shut down the engine.
8. Press the breather to release pressure in the hydraulic sump tank.



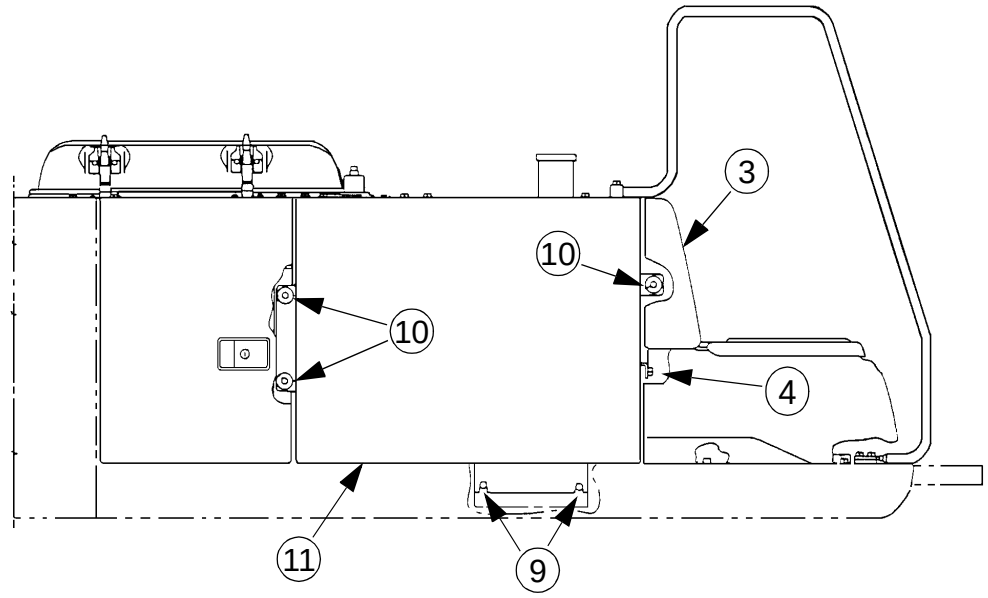
CD00E192

9. Disconnect the hydraulic motor drain hose and plug it.
10. Use a hose to connect the drain port to the receptacle.
11. Start and run the engine at full speed in "S" mode. Operate the swing control to right or left and measure the quantity of oil which flows out of the drain hole during 1 min.
12. Since the quantity of oil can vary depending on the test point used, repeat the measurement (Step 10) with the upperstructure at 90°, then at 180°.

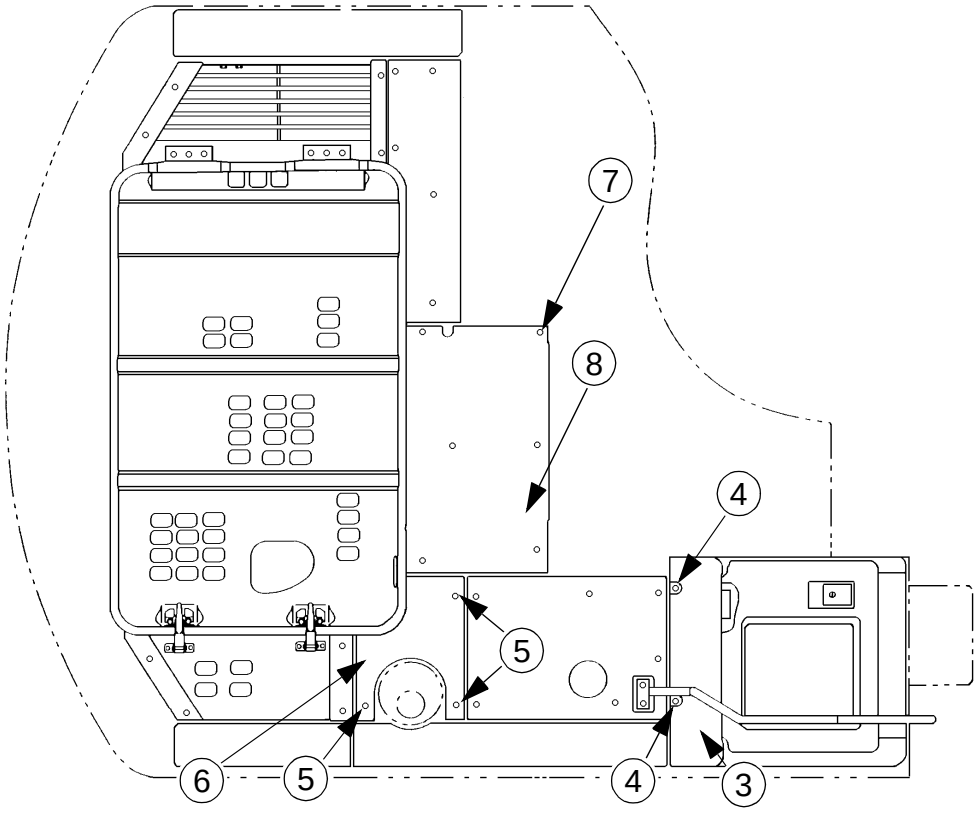
NOTE: *The maximum permitted is about 1.05 gpm.*

Description

Location



CS00F539

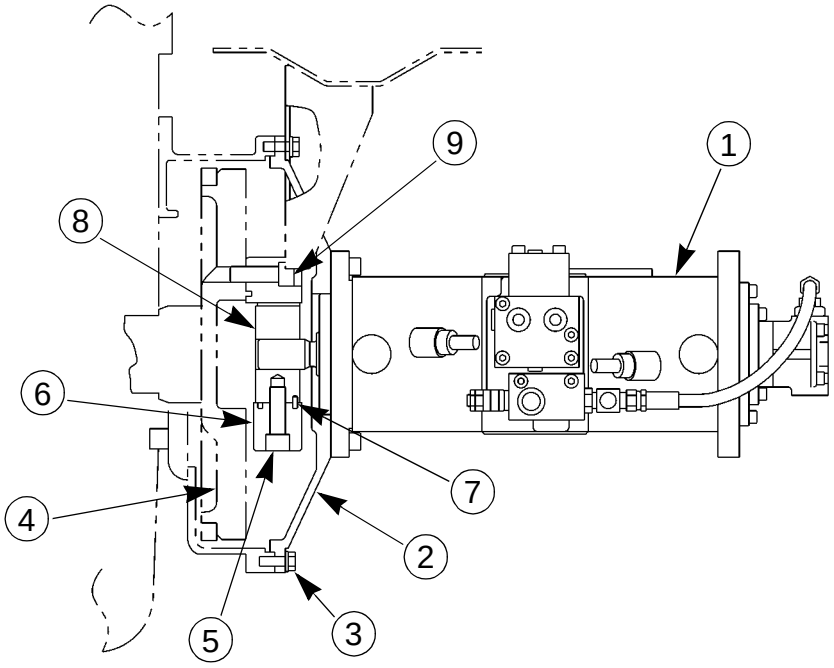


CS00F540

3 PROTECTIVE HOUSING
4 SCREW
5 SCREW
6 HYDRAULIC SUMP TANK PROTECTIVE PLATE
7 SCREW
8 CONTROL VALVE PROTECTIVE PLATE
9 SCREW
10 SCREW
11 HYDRAULIC SUMP TANK PROTECTIVE PLATE

HYDRAULIC PUMP COUPLING

Section

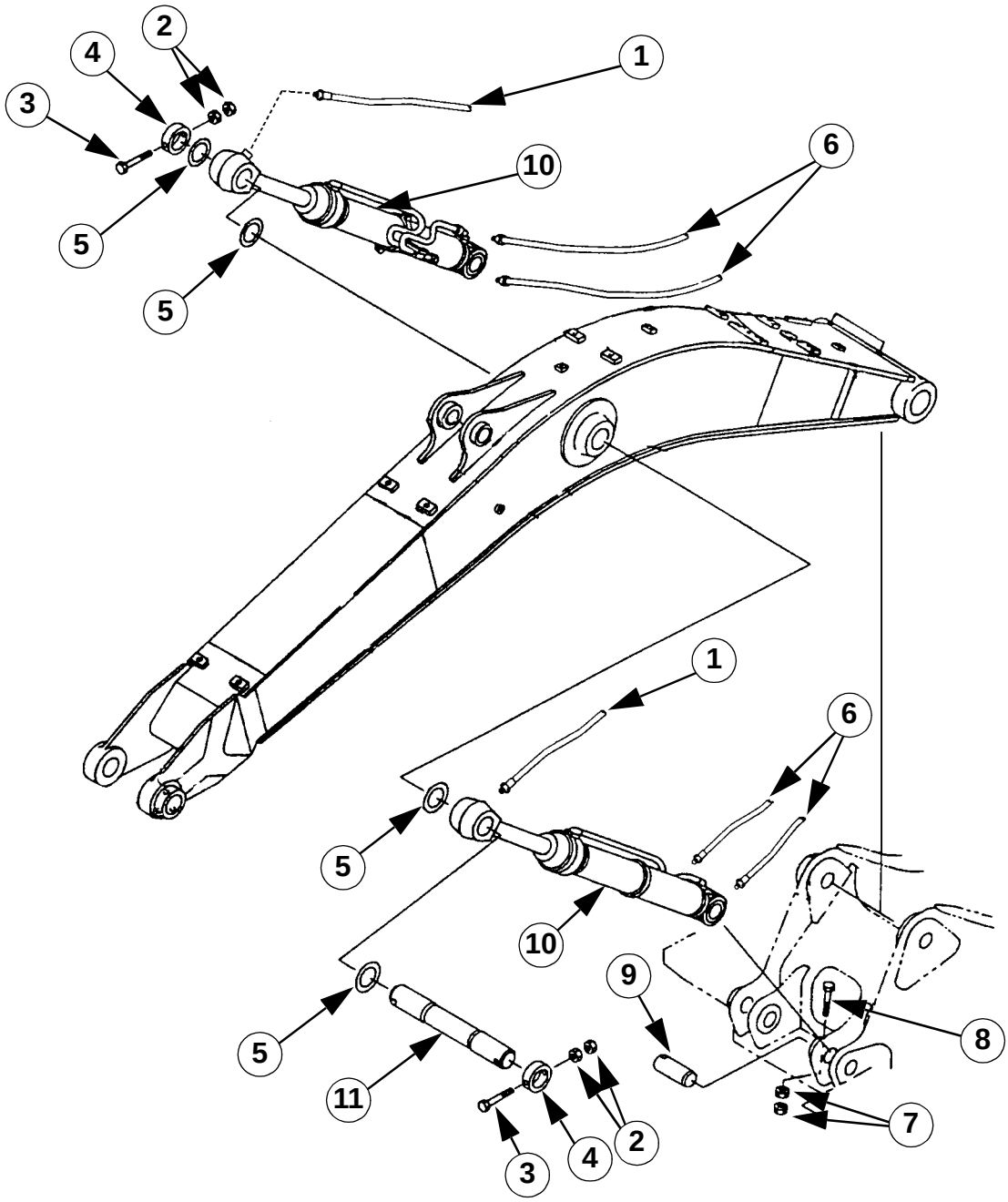


CS00M502

1 HYDRAULIC PUMP
2 COUPLING FLANGE
3 SCREW
4 ENGINE HAND-WHEEL
5 SCREW FOR FIXING THE COUPLING ASSEMBLY ON THE GROOVED SPACER
6 COUPLING ASSEMBLY
7 ROLL PIN
8 GROOVED SPACER
9 SCREW FOR FIXING THE COUPLING ASSEMBLY ON THE ENGINE HAND-WHEEL

BOOM CYLINDER

Description

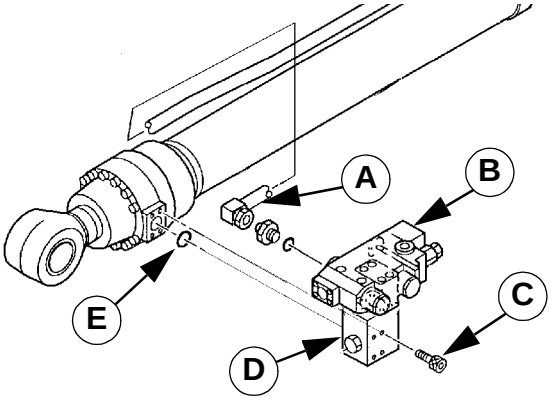


JS00593

1 LUBRICATING HOSE
2 NUT
3 SCREW
4 LOCKING BUSHING
5 SHIM
6 HYDRAULIC HOSE
7 NUT
8 SCREW
9 PIN
10 BOOM CYLINDER
11 PIN

STEP 2

(Only if the machine is equipped with cylinder hose burst check valves)

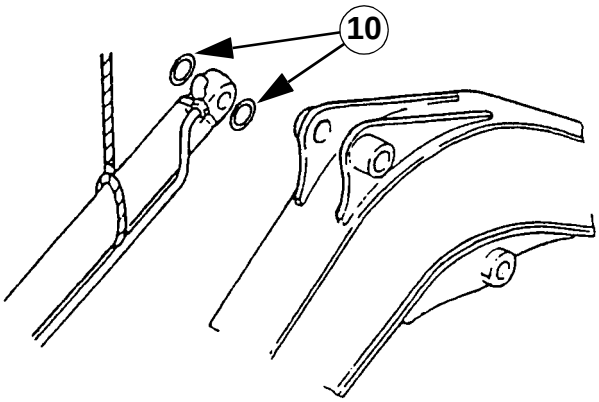


CS00G504

Install a new O-ring (E) on the arm cylinder and install the cylinder hose burst check valves (B) and the base (D) with the screws (C). Connect the pipe (A).

NOTE: *Carefully raise the cylinder. The cylinder is heavy and the weight must be carefully distributed over the slings when lifting.*

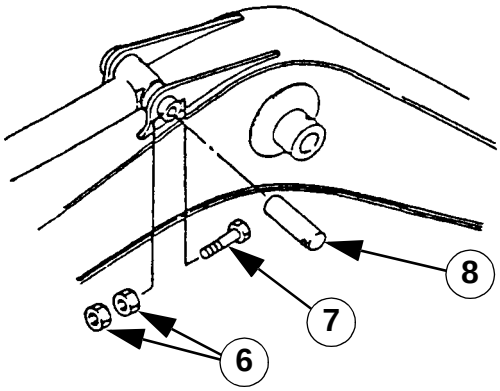
STEP 3



JS00602A

Attach a suitable lifting device to the arm cylinder, lift the arm cylinder and bring it into position. Align the arm cylinder mounting orifices with the boom brackets and install the shims (10).

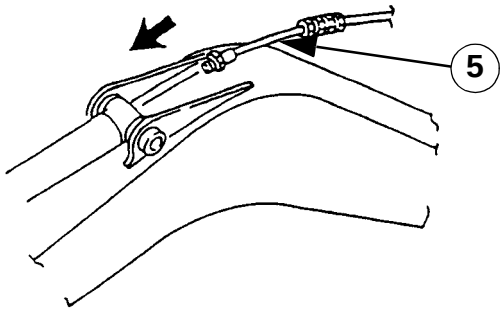
STEP 4



JS00601A

Install the pin (8) and fasten the pin with the screw (7). Using a set of feeler gauges, check that there is a clearance of 0.019 to 0.118 inch (0.5 to 3 mm) between the mounting bracket and the cylinder barrel mounting eye. If necessary, remove the screw and the pin and add or remove one or more shims (10) as required to obtain the correct clearance. Install the pin and the screw. Install the first nut (6) on the screw and tighten until the nut touches the bracket boss. Loosen the nut a quarter of a turn and, using two wrenches, install the second nut (6) to lock the first nut in position.

STEP 5



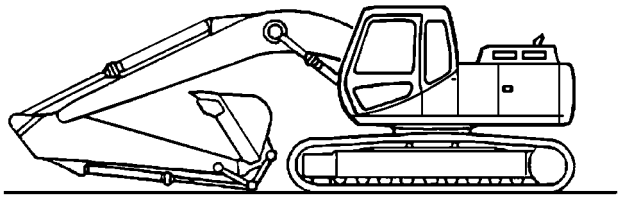
JS00604A

Connect the lubrication hose (5) to the arm cylinder.

ROTATING JOINT

Removal and installation

STEP 1



JS00163A1

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

STEP 2

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

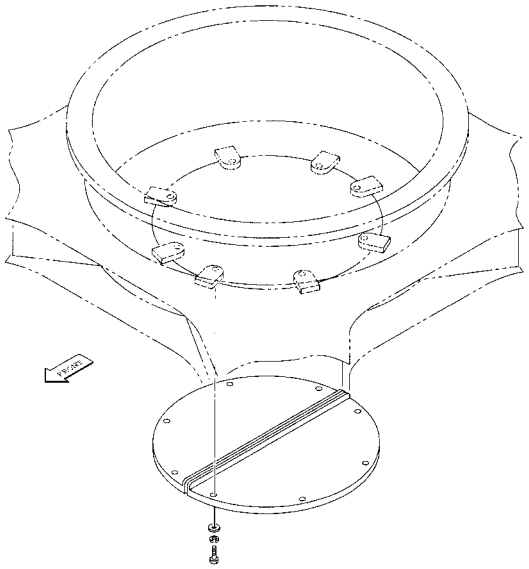
STEP 3

Disconnect the ground cable from the battery.

STEP 4

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

STEP 5



CI00F500

Remove the retaining hardware (1) from the lower plates (2) then remove the plates.

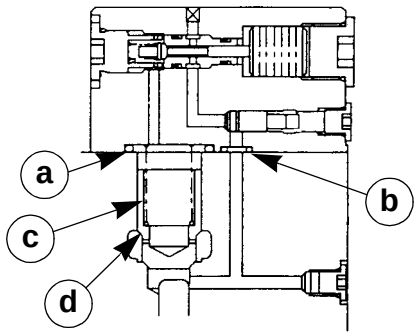
Removing the section for arm 2, bucket, boom 1, LH travel

The numbers in brackets refer to the drawing on page 6.

Removing the boom load holding block (4)

STEP 1

Loosen and then remove the four screws. Remove the boom load holding block. Discard the O-rings (a) and (b).



CI00H517

STEP 2

Remove the spring (c) and then the check valve (d) from the main control valve.

Removing the non-return check valves (18), (19) (20), (21)

STEP 1

Remove the arm 2 non-return check valve from the main control valve.

STEP 2

Remove the bucket non-return check valve from the main control valve.

STEP 3

Remove the boom 1 non-return check valve from the main control valve.

STEP 4

Remove the LH travel non-return check valve from the main control valve.

Removing the free passage locking (26)

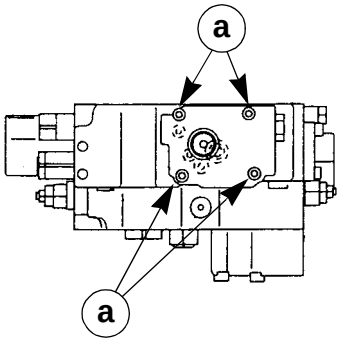
Remove the adaptor from the main control valve. Remove the spool and then the spring.

Removing the plugs (34)

Remove the plugs from the main control valve, discard the O-rings and the back-up rings.

Removing the arm semi-parallel valve block (12)

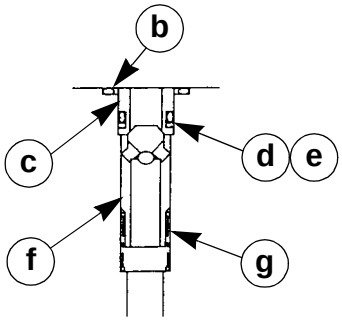
STEP 1



CI00H520

Loosen and then remove the screws (a) holding the arm semi-parallel valve block. Remove the block from the main control valve.

STEP 2



CI00H508

Discard the O-rings (b), remove the seat (c), discard the O-ring (d) and the back-up ring (e). Remove the check valve (f) and then the spring (g).

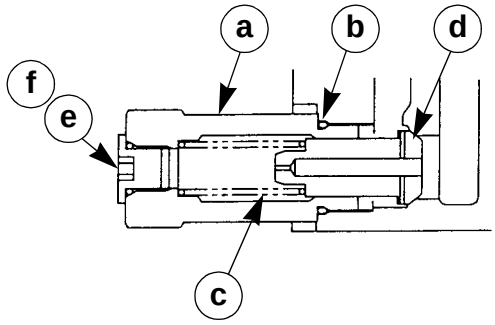
Removing the cancellation valve (24)

Remove the pump cancellation valve from the main control valve.

Boom pressure non-return check valve (29)

Disassembly

STEP 1



CI00H512

Remove the non-return check valve block (a) and discard the O-ring (b).

STEP 2

Remove the check valve (d) and the spring (c).

STEP 3

Place the non-return check valve block (a) in a soft-jawed vice, unscrew the plug (e) and discard the O-ring (f).

Inspection

See "Inspection" chapter page 31.

Assembly

STEP 1

Install a new O-ring (f) on the plug (e). Install the non-return check valve block (a) in a soft-jawed vice and then install and tighten the plug (e) on the non-return check valve block (a).

STEP 2

Install the spring (c) and the check valve (d) on the main control valve.

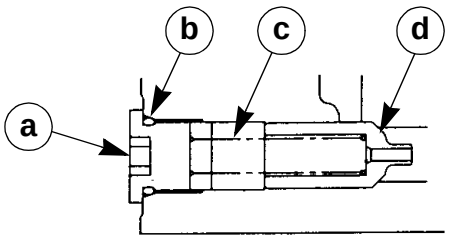
STEP 3

Install a new O-ring (b) on the non-return check valve block (a). Install the non-return check valve block (a) on the main control valve. Tighten to a torque of 44 lb-ft (60 Nm).

Arm recyclable flow non-return check valve (28)

Disassembly

STEP 1



CI00H511

Remove the plug (a), discard the O-ring (b).

STEP 2

Remove the spring (c) and remove the non-return check valve (d).

Inspection

See "Inspection" chapter page 31.

Assembly

STEP 1

Install the non-return check valve (d) and the spring (c) on the main control valve.

STEP 2

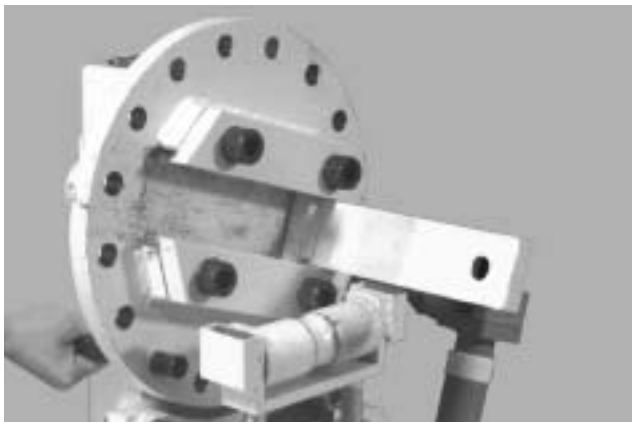
Install a new O-ring (b) on the plug (a). Install the plug (a) on the main control valve. Tighten to a torque of 37 lb-ft (50 Nm).

Section

8012

DISASSEMBLY AND ASSEMBLY OF THE ATTACHMENT CYLINDERS

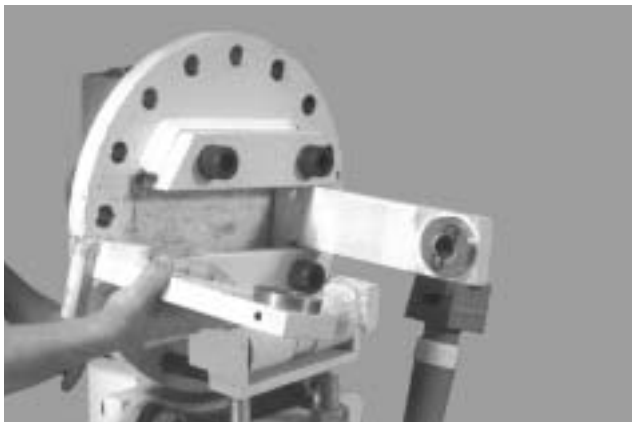
STEP 6



JD00623A

Install the stop pins on the boom tail stock.

STEP 7



JD00624A

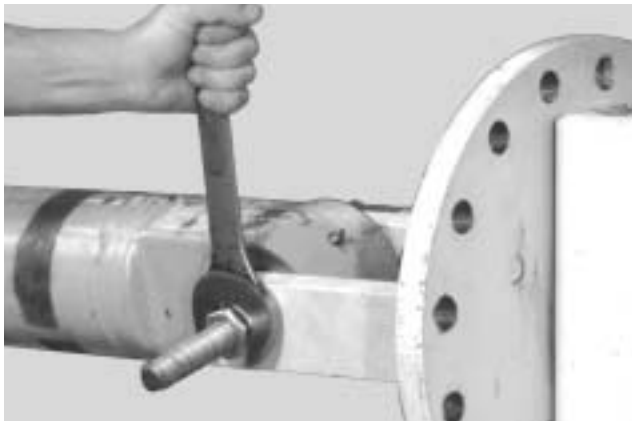
Install suitable bushings on the cylinder tail stock chuck wings. Tighten the retaining screws. Install the chuck wings on the cylinder tail chuck. Tighten the locking screws. Use the scale on the face of the chuck to aid in centering the chuck wings.

STEP 8

JD00625A

Connect lifting equipment, if necessary, to the cylinder. Position the cylinder in the repair stand with the rod end of the cylinder at the head stock chuck. Loosen the retaining screws of the tail stock chuck wings. When positioning the cylinder rod end on the head stock chuck wing, be sure that the chuck wing bushings are centred in the rod bushing. Install the screw and nuts to secure the cylinder rod end to the repair stand.

STEP 9

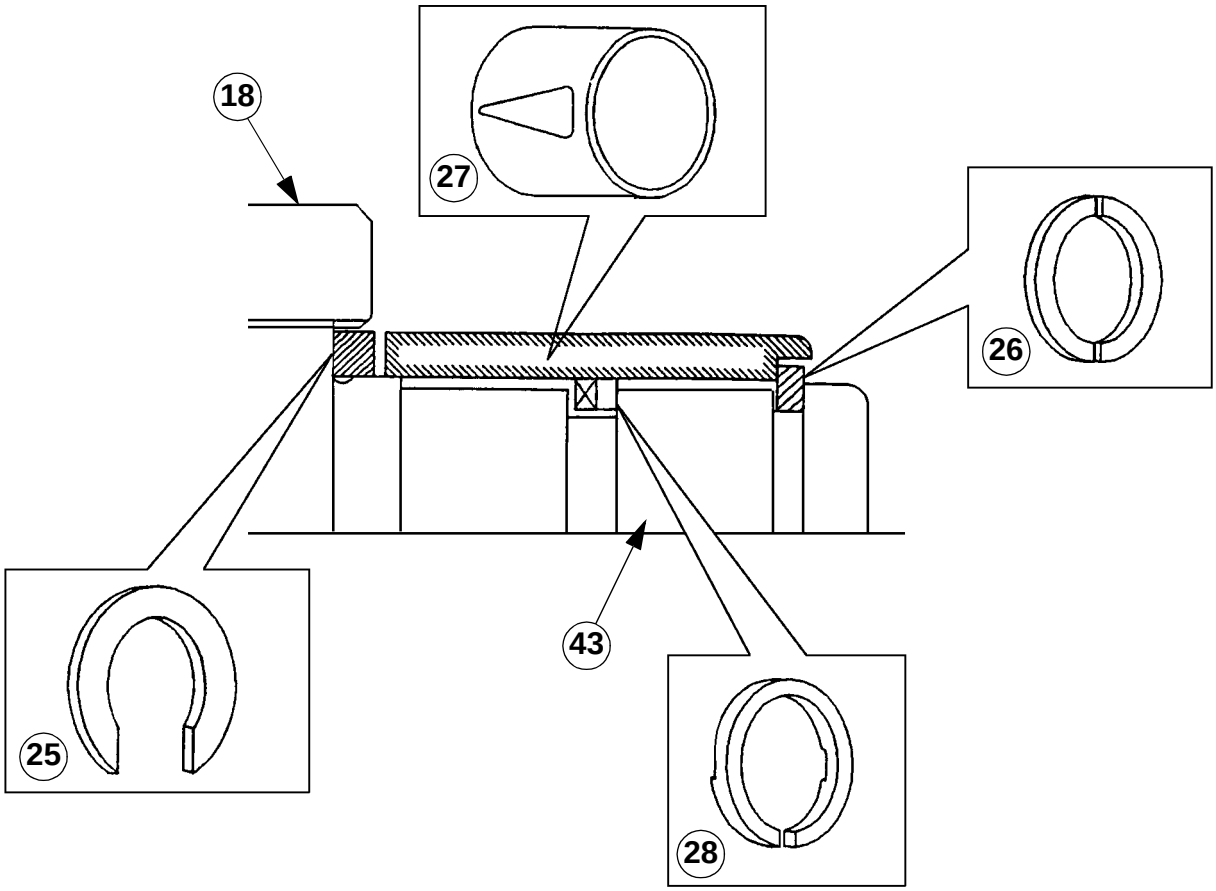


JD00626A

On the cylinder repair stand, loosen the retaining screws of the tail stock chuck wings. When positioning the cylinder barrel end on the head stock chuck wing, be sure that the bushings are centred in the cylinder barrel bushing. Install the screw and nuts to secure the cylinder barrel end to the repair stand.

NOTE: *Step 6 applies only to the arm cylinder.*

STEP 6



JS00648A

18 PISTON NUT
25 RING
26 STOPPER
27 CUSHION BUSHING
28 CUSHION RING
43 CYLINDER ROD

Install a new cushion ring (28) on the cylinder rod (43). Install the stopper (26) in the groove of the cylinder rod (43). Install the cushion bushing (27) on the cylinder rod (43) and install the ring (25) to hold the cushion bushing (27).

STEP 5

CD00G091

Remove the plate.

NOTE: *Mark the components removed in the following steps to facilitate their insertion in the correct bore during assembly.*

STEP 6

CD00G092

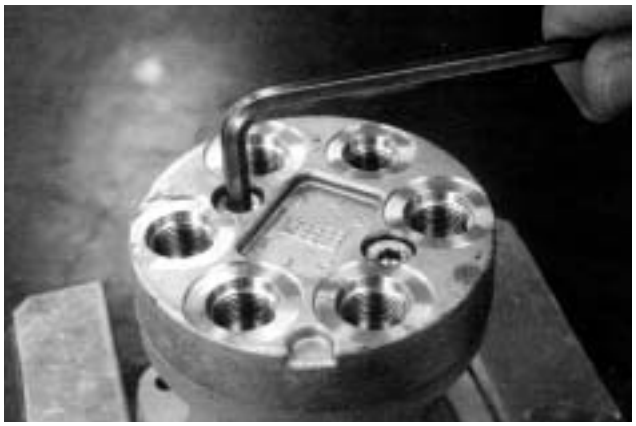
Depending on the condition of the return springs, the friction of the O-rings can keep the plunger assemblies in place in the body. In this case, use a flat screwdriver to remove the plunger assemblies. Slide the screwdriver into the external groove of the plunger assembly, taking care not to damage the plunger assembly. This must be done carefully, since the plunger assembly can be thrown out suddenly, due to the action of the return springs.

STEP 7

CD00G093

Remove the spool assembly from the joystick control.

STEP 8



CD00G094

Turn the control valve the other way up in the vice. Unscrew and remove the six screws and the sealing washers.

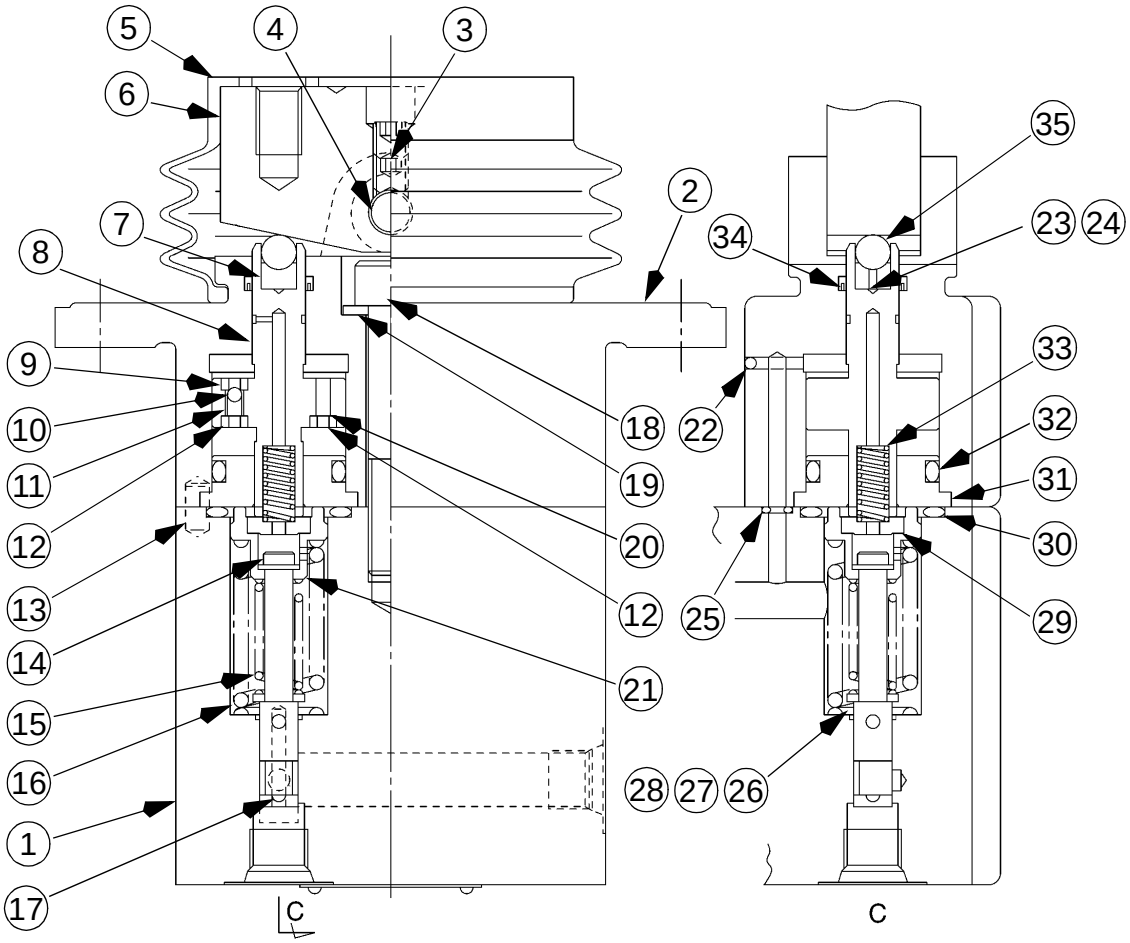
STEP 9

CD00G095

Remove the orifice plates and the O-ring from the body. Discard the O-ring.

TRAVEL PEDAL CONTROL

Description



CI00K507

1 BODY
2 COVER
3 LOCKING SCREW
4 CAM SHAFT
5 GROMMET
6 CAM
7 BRACKET
8 PISTON ASSEMBLY
9 BUSHING
10 BALL
11 SPRING
12 BUSHING
13 ROLL PIN
14 FLANGE SCREW
15 SPRING
16 SPRING
17 SPOOL
18 SCREW
19 WASHER
20 SHIM
21 GUIDE
22 BALL
23 SHIM
24 SHIM
25 O-RING
26 SHIM
27 SHIM
28 SPRING SEAT
29 THRUST WASHER
30 O-RING
31 GUIDE
32 O-RING
33 SPRING
34 U-SHAPED SEAL
35 BALL

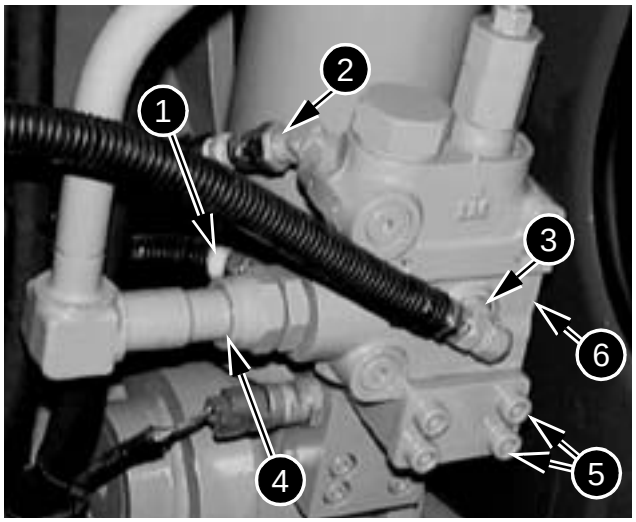
Section

8016

DISASSEMBLY AND ASSEMBLY OF THE CUSHION CONTROL

BOOM RELIEF VALVE

Marking the ports



CD00K000

1 PILOT SPOOL
2 LEAK RETURN
3 HIGH PRESSURE CIRCUIT BYPASS TOWARDS THE OTHER VALVE
4 VALVE POWER SUPPLY

Removal

NOTE: *Before performing any operation on the machine, carry out the following operations in the order shown.*
- Park the machine on hard, flat ground.
- Lower the attachment to the ground.
- Shut down the engine.
- Depressurise the hydraulic circuit (see Section 8000).

1. Remove the hoses (1), (2) and (3) and seal the unions and the hoses.
2. Remove the tube (4) and seal the ports.
3. Remove the screws (5) and remove the relief valve (6).
4. Seal the cylinder port.

Installation

When installing, use the same procedure in the reverse order of removal by assembling new seal rings.

For valve adjustment, refer to section 8001.

Section

8018

DISASSEMBLY AND ASSEMBLY
OF THE ROTATING JOINT

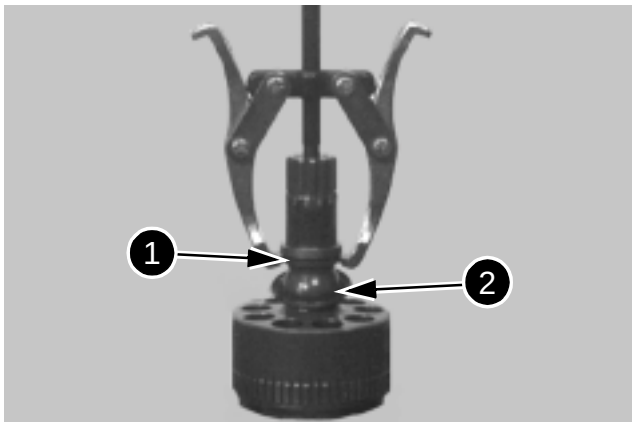
SPECIFICATIONS

See Section 1002

TORQUE SETTINGS

Cover plug	17.5 lb-ft (23.8 Nm)
Bypass valve plug	17.5 lb-ft (23.8 Nm)
Non return check valve plug	17.5 lb-ft (23.8 Nm)
Cover screw	115 lb-ft (157 Nm)
Safety valve	57 lb-ft (78 Nm)

STEP 35



JD00425A

Using an extractor, remove the spacer (1) from the fluted shaft. Remove the spring (2) from the cylinder.

Inspection

STEP 1

Check the distribution plate sliding surfaces for signs of seizing or wear. If there is evidence of seizing or wear, the plate should be replaced.

STEP 2

Check for wear of the pistons. Replace the motor if the depth of any shoe sliding surface is less than 0.0177 inch (0.45 mm), if the shoe surfaces are seriously damaged or if a piston assembly shows any sign of seizing. There should be no wear of the external surfaces of the piston assemblies.

STEP 3

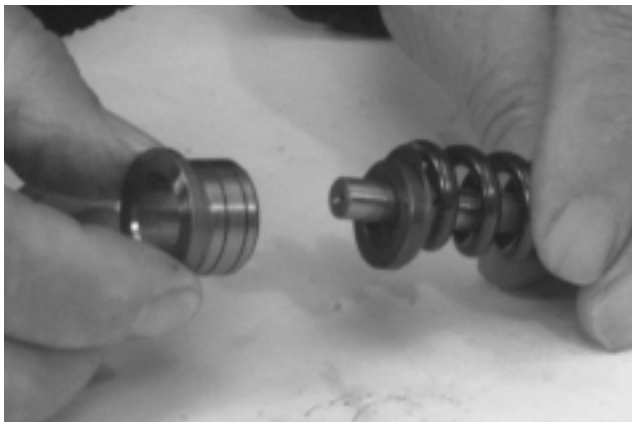
Check for signs of seizing or wear on the piston plate sliding surface. The plate should be replaced if there is evidence of seizing or wear.

STEP 4

Check for signs of seizing, wear or damage on the cylinder piston bores. The motor should be replaced if there is evidence of seizing or if the piston bores are damaged.

Inspect the needle bearing and tapered roller bearing for damage. The bearings should be replaced if any damage is found, or after 3000 hours of operation.

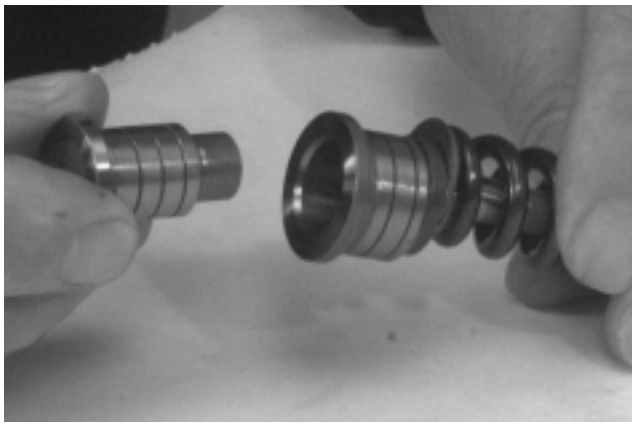
STEP 3



JD00443A

Install the sleeve on the poppet.

STEP 4



JD00442A

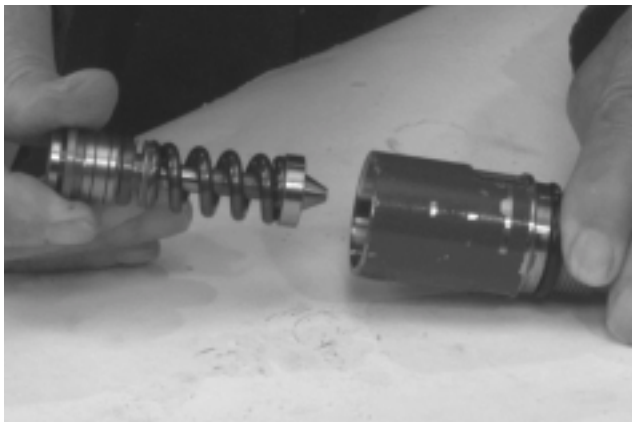
Install the piston on the poppet.

STEP 5

JD00435A

Install new O-ring on the housing.

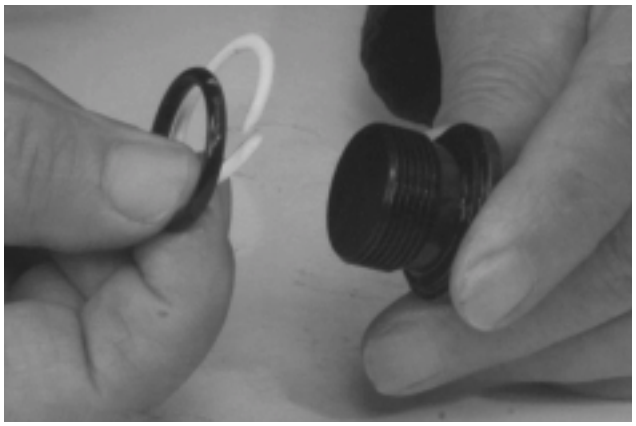
STEP 6



JD00441A

Install relief valve assembly in housing.

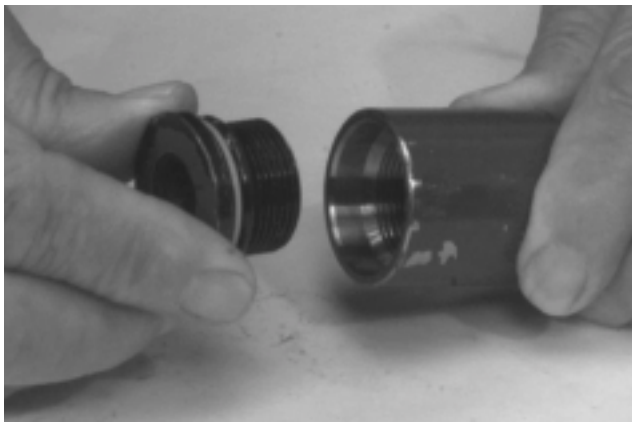
STEP 7



JD00440A

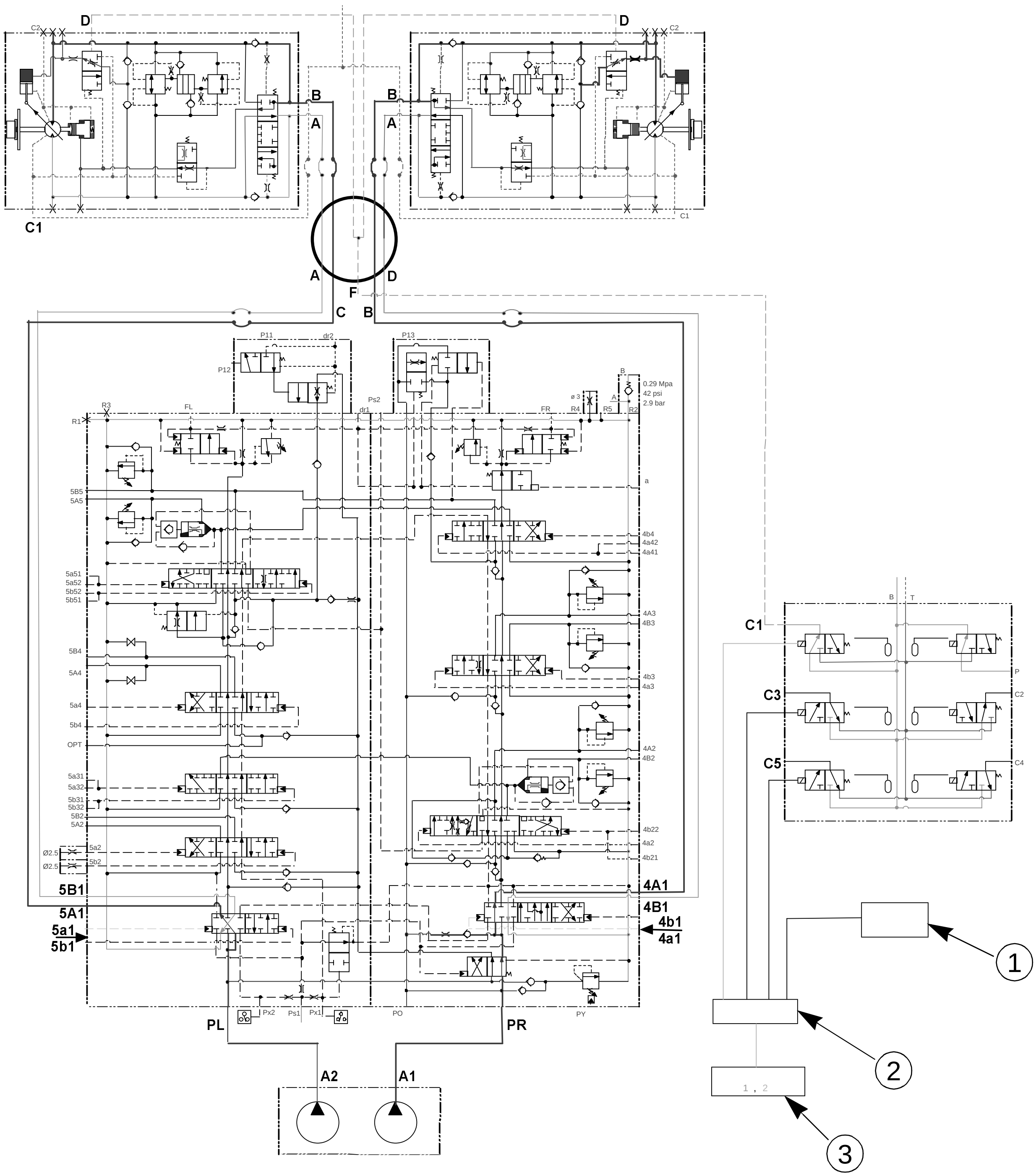
Install O-ring and back-up ring on plug if removed.

STEP 8



JD00439A

Assemble and tighten the plug in the relief valve housing.


D
C2
C1
B
A
F
C
P11
dr2
P12
P13
Ps2
dr1
R1
R3
FL
FR
R4
R5
R2
0.29 Mpa
42 psi
2.9 bar
5B5
5A5
5a51
5a52
5b52
5b51
5B4
5A4
5a4
5b4
OPT
5a31
5a32
5b31
5b32
5B2
5A2
Ø2.5
5a2
5b2
5B1
5A1
5a1
5b1
4b4
4a42
4a41
4A3
4B3
4b3
4a3
4A2
4B2
4b22
4a2
4b21
4A1
4B1
4b1
4a1
Px2
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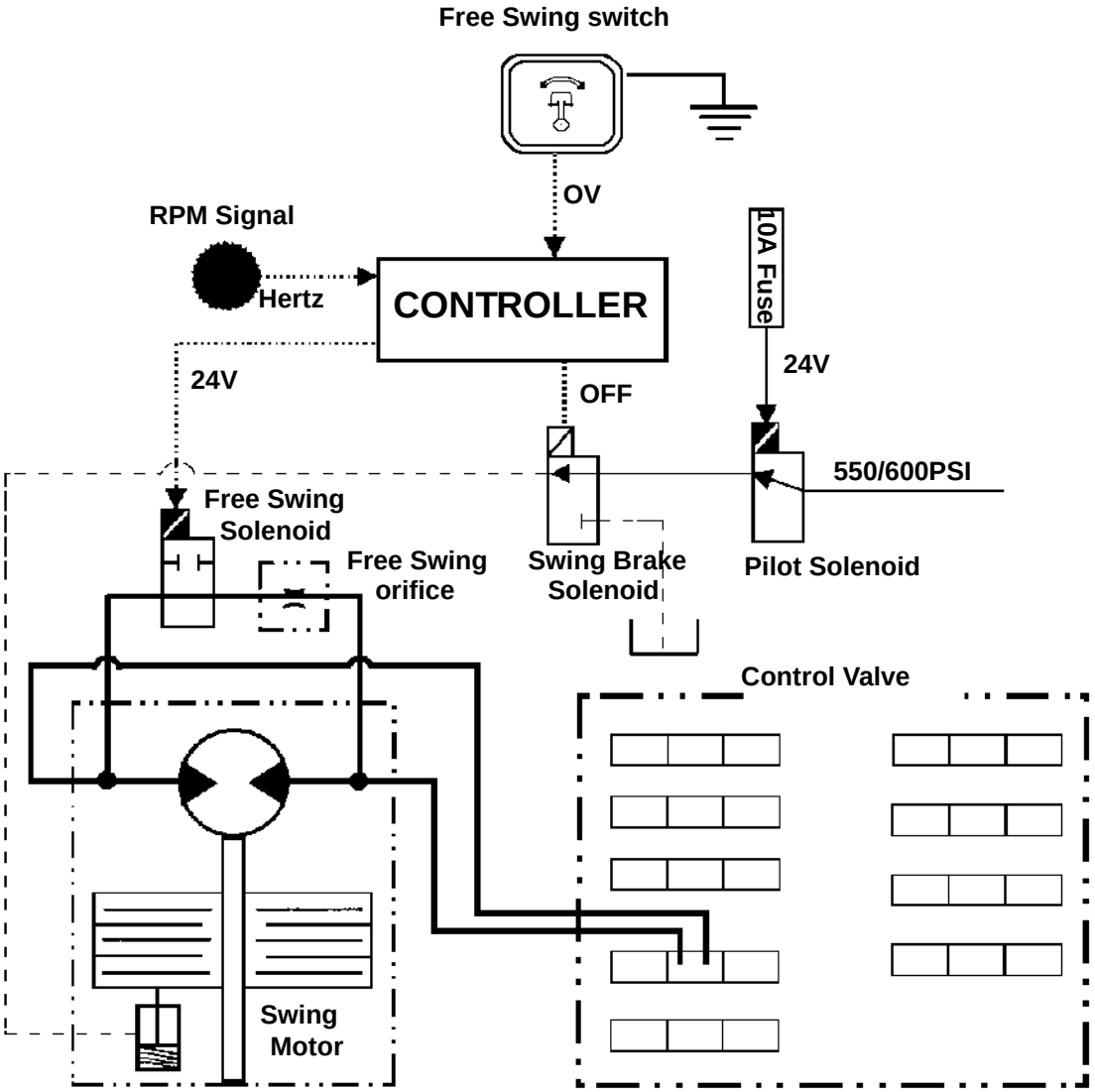
C3
C5
C4
P
1
2
3

CM00K004

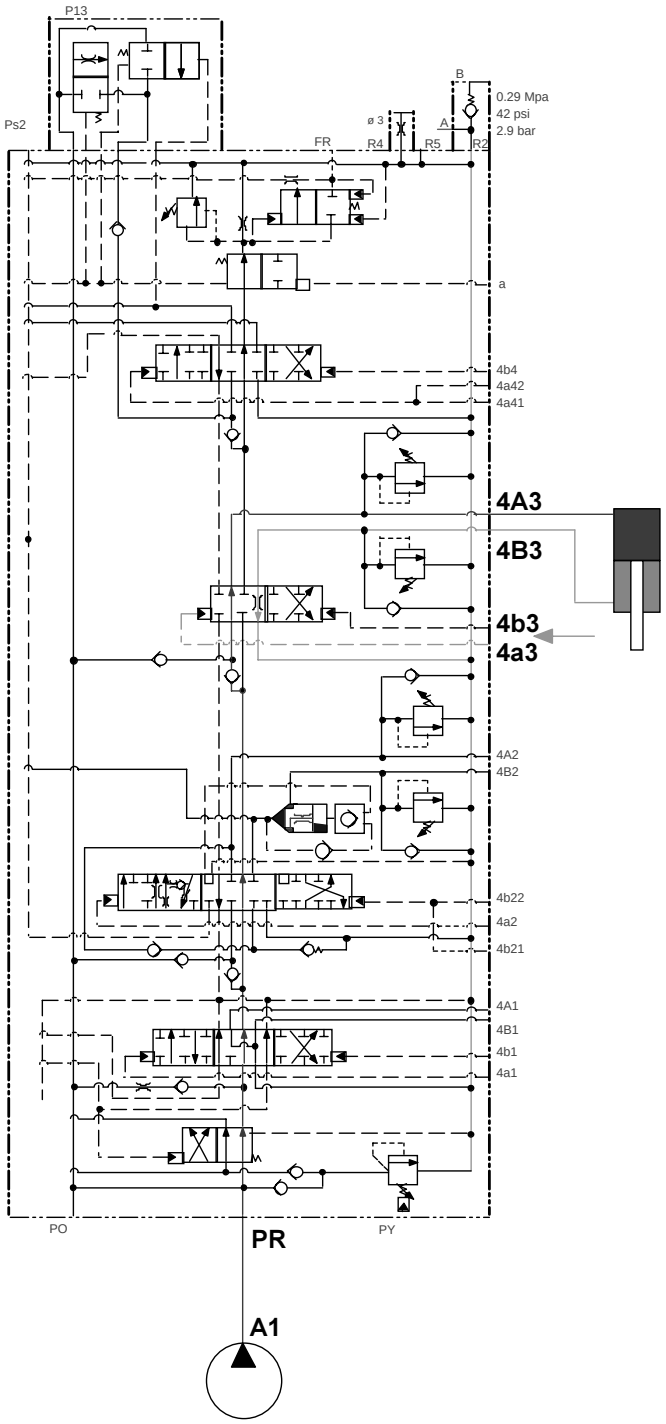

Free Swing switch
OV
RPM Signal
Hertz
CONTROLLER
10A Fuse
24V
24V
OFF
550/600PSI
Free Swing
Solenoid
Free Swing
orifice
Swing Brake
Solenoid
Pilot Solenoid
Control Valve
Swing
Motor

CM00K008

Bucket Closing Circuit

The bucket uses one supply flow which arrives from pump A1 via the parallel working passage.

4a3/4A3. Bucket closing
4b3/4B3. Bucket opening



CM00K028

NOTE: *See Section 1002 for the fuel tank capacity.*

STEP 5

Remove the lower access panel from the hydraulic sump tank (2). Place a receptacle under the hydraulic sump tank drain valve. Open the drain valve and drain the hydraulic fluid into the receptacle.

NOTE: *See Section 1002 for the capacity of the hydraulic sump tank and of the total system.*

STEP 6

Refer to Section 8006 and remove the rotating joint.

STEP 7

Refer to Section 9003 and remove the bucket, the arm and the boom.

STEP 8

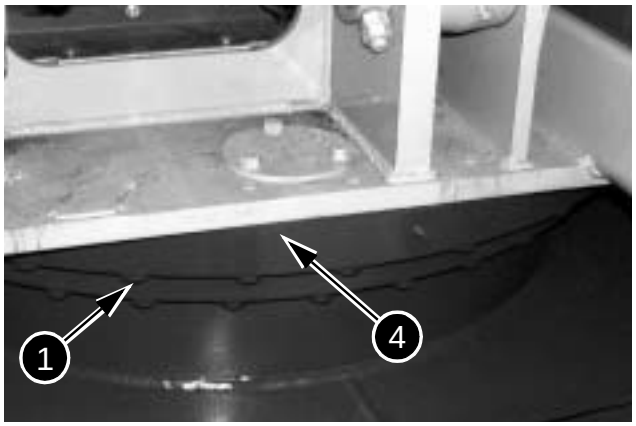
Refer to the page 10 in this section and remove the counterweight.

STEP 9

Install lifting eyes at the rear of the upperstructure. Connect a suitable lifting device to these lifting eyes and to the lifting eyes located at the front of the upperstructure, above the boom brackets. Take up any slack in the lifting equipment, to ensure the upperstructure is fully supported before lifting starts.

NOTE: *Refer to specifications on page 2 for the weight of the upperstructure. Make sure that the lifting device has sufficient lifting and support capacity for the upperstructure.*

STEP 10



CD00G043

Using paint or another marking product, make marks on the upperstructure, turntable bearing (4) and the undercarriage, to facilitate re-assembly of the upperstructure and the turntable bearing.

NOTE: *The numbers in brackets in the following steps refer to the illustration on page 6.*

STEP 11

Remove the cap screws (1) which fasten the upperstructure to the turntable bearing (4).

STEP 12

Carefully lift the upperstructure while disengaging it from the undercarriage. Place the upperstructure on suitable stands to protect the swing pinion against any damage.

STEP 13

Install lifting eyes on the turntable bearing (4). Connect a suitable lifting device to the lifting eyes. Take up any slack in the lifting equipment, to ensure that the turntable bearing is fully supported before lifting starts.

NOTE: *Refer to specifications on page 2 for the weight of the turntable bearing.*

STEP 14

Remove the cap screws (2) and the flat washers (3) which fasten the turntable bearing to the undercarriage. Carefully lift the turntable bearing while disengaging it from the undercarriage. Place the turntable bearing on suitable stands to protect the surfaces of the turntable bearing against any damage. Remove the lifting equipment from the lifting eyes and disassemble the lifting eyes from the turntable bearing.

Section

9003

BOOM, ARM AND BUCKET

Removal

STEP 1

Remove the arm, see page 8.

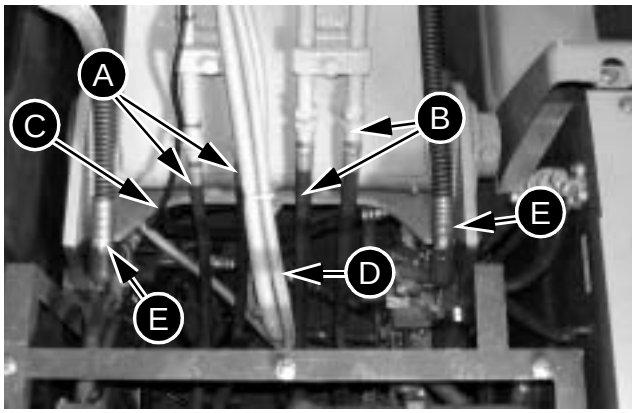
STEP 2

Start the engine and lower the boom to the ground. Shut down the engine.

STEP 3

Remove the arm cylinder, see Section 8005. Do not remove the vacuum pump from the hydraulic sump tank.

STEP 4



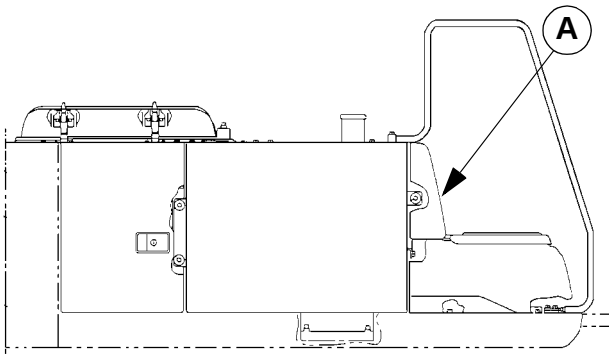
CD00F117

Start the vacuum pump. Label and disconnect the bucket (A) and arm (B) supply hoses at the bottom of the boom. If equipped, disconnect the option hoses (E). Plug the hoses. Stop the vacuum pump. If equipped, disconnect and move the arm cylinder safety valve pilot hoses (D) away from the boom. Disconnect the boom working light electrical harness (C).

STEP 5

Disconnect the boom cylinder rods from the boom, see Section 8005.

STEP 6



CS00F539

Remove the lid (A) on the front of the fuel tank.

NOTE: *The numbers in brackets in the following steps refer to the drawing on page 10.*

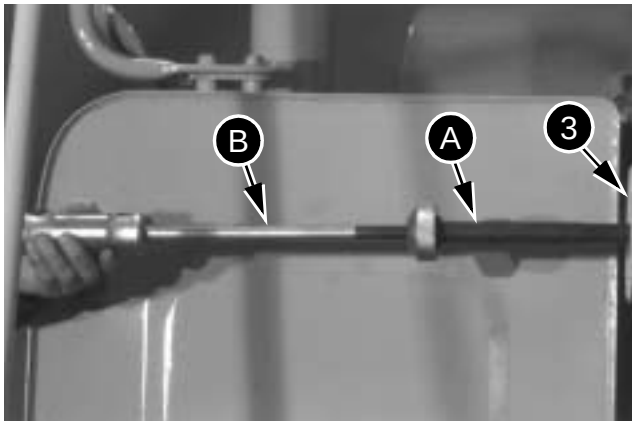
STEP 7

Remove the nuts (1) and the screw (2).

STEP 8

Attach a suitable lifting device to the boom, take up all the slack on the lifting device.

STEP 9



CD00F118

Install a screw (A) in the pin threaded orifice (3). Install a sliding hammer (B) on the screw and remove the pin (3).

STEP 10

Raise the boom and retain the shims (5). Lower the boom to the ground and remove the lifting device.

Section

9005

CAB AND CAB EQUIPMENT

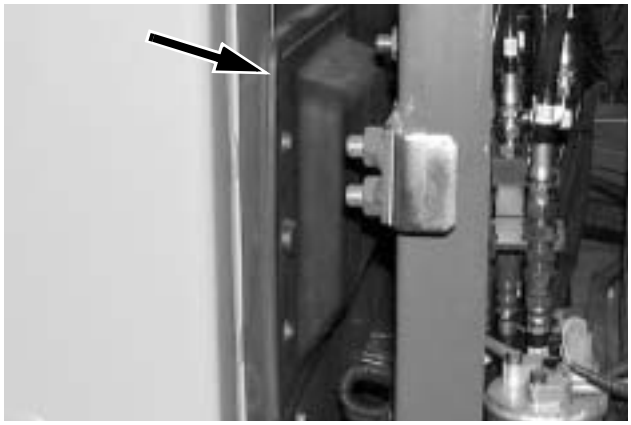
Installation

NOTE: *The numbers in brackets refer to the illustration on page 8.*

STEP 1

Install the heating or air-conditioning block in the cab using screws (6), brake washers and flat washers.

STEP 2



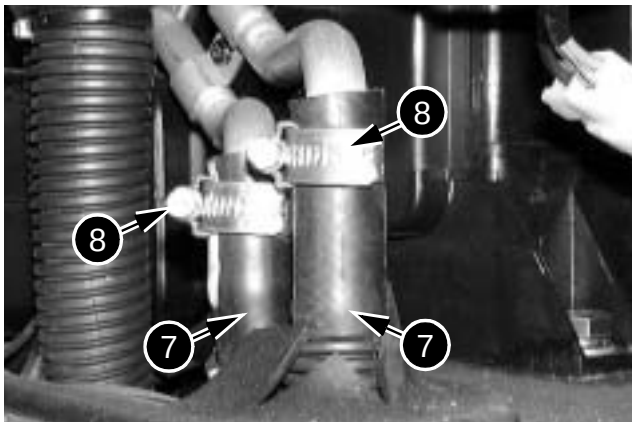
CD00G007

Install the conduit (5), the pollen filter (4) and the pollen filter guard.

STEP 3

Install the heater ventilation conduits (1), (2) and (3).

STEP 4

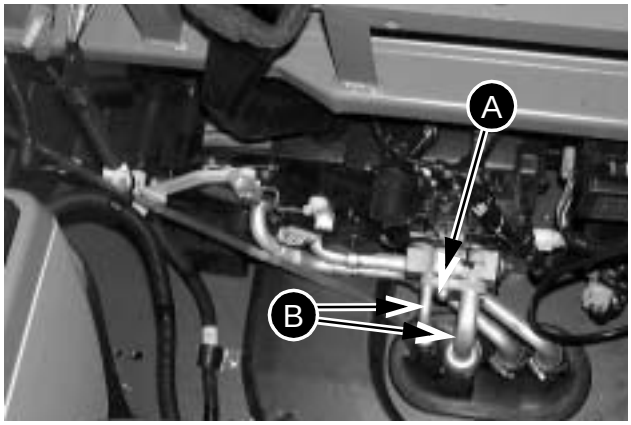


CD00G044

Install the heater hoses (7) and tighten the retaining clips (8).

NOTE: *Carry out Steps 5 and 6 only on air-conditioned machines.*

STEP 5



CD00G006

Remove the plugs from the air-conditioner and the hoses (B), install new O-rings on the hoses (B) and install the hoses (B) on the air-conditioner, tighten the screw (A) to a torque of 7.8 to 11.8 Nm.

STEP 6

Fill the air-conditioning circuit, contact an authorized engineer.

Type of coolant: HFC (R) 134a
Capacity of the circuit: 1 kg +/- 0.05

STEP 7

Connect the blower supply electrical harness.

STEP 8

CD00G003

Install the trim at the rear of the cab, taking care to reconnect the connector for the cigarette lighter and the solar radiation detector (only on air-conditioned models).