MODEL	**330LX**
SERIES	**LX Series**
BOOK NO.	**1060**
SERIAL NO.	

MACHINE SERIAL NUMBER

The machine serial number is stamped on the serial number plate which is located at the front of the machine on the right side of the operator's cab platform. 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. The number is stamped just below the boom and between 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-element control valve for dipper, boom acceleration, swing, option and right travel.
Four-element control valve for dipper, bucket, boom acceleration and left travel.
Load holding relief valve for boom and dipper.

Swing

Fixed flow engine with axial pistons.
Automatic disk brakes.

Upperstructure frame swing speed	9.6 rpm
Swing torque	
Tail swing	
Displacement	10.98 cu in
Work flow	75 gpm
Reduction ratio	27.143
Brake torque	≥ 683.7 lb-ft
Minimum brake release pressure	421 psi
Permissible motor leak	4.2 gpm

Travel

Two-speed motor with axial pistons.
Automatic disk brakes.

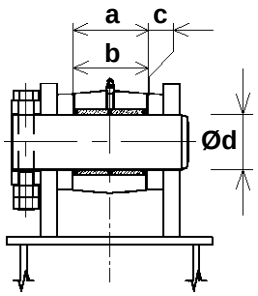
Low speed	1.9 mph
High speed	3.4 mph
Gradeability	70% (35°)
Tractive effort	61597 lbf
Displacement	17.73/10.38 cu in
Work flow	75 gpm
Reduction ratio	40.4675
Braking torque (reduction gear excluded)	≥ 665 lb-ft
Number of sprocket turns (10 turns)	
Mode "S", high speed	16.6 ± 0.6 sec.
Mode "S", low speed	27.8 ± 0.6 sec.
Permissible deviation in travel over a distance of 65 ft 7 in	
Mode "H", full speed	39.36 in
Permissible motor leak	3.7 gpm

Undercarriage

Monobloc frame with fabricated elements.
Lubricated rollers and idler wheels.
Grease track tension.

Weight load on track	
with 23.6 in track pads	9.28 psi
with 27.5 in track pads	7.97 psi
with 31.4 in track pads	7.10 psi
with 35.4 in track pads	6.38 psi
Track tension	13.3 to 14.1 in

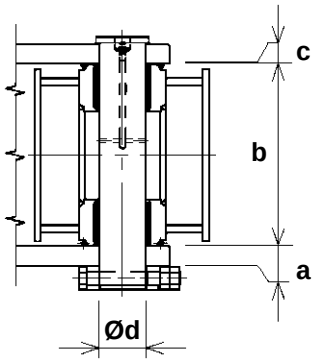
7. Bucket cylinder foot/Dipper



CS01B528

Mark		Dimension (in)
a	Standard	5.74
	Limit	5.98
b	Standard	5.70
	Limit	5.62
c (a - b)	Standard	0.039 to 0.13
	Limit	Shims
Ø d (shaft)	Standard	3.74
	Limit	3.70
Ø d (bushing)	Standard	3.74
	Limit	3.79

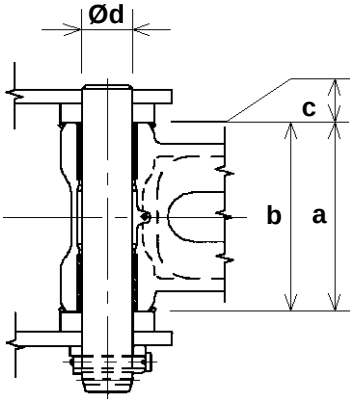
8. Connecting rod/Dipper



CS01B529

Mark		Dimension (in)
a	Standard	1.96
	Limit	1.85
b	Standard	14.7
	Limit	14.6
c (play)	Standard	0.039 to 0.078
	Limit	Shims
Ø d (shaft)	Standard	3.34
	Limit	3.30
Ø d (bushing)	Standard	3.34
	Limit	3.40

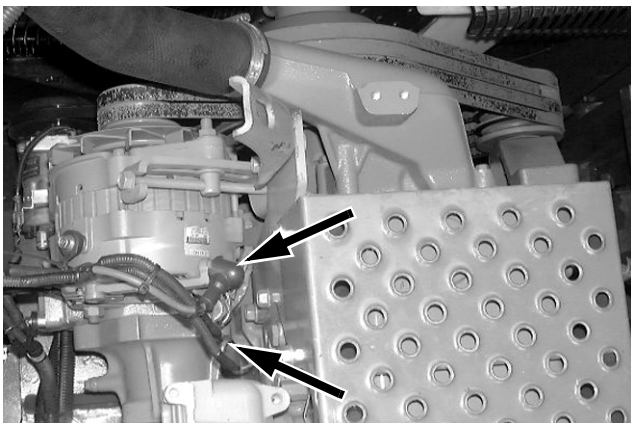
9. Compensator/Bucket



CS01B530

Mark		Dimension (in)
a	Standard	1.96
	Limit	1.85
b	Standard	14.7
	Limit	14.6
c (play)	Standard	0.039 to 0.078
	Limit	Shims
Ø d (shaft)	Standard	3.34
	Limit	3.30
Ø d (bushing)	Standard	3.34
	Limit	3.40

STEP 14



CD01M004

Label and disconnect the electrical connections to the alternator (arrows).

STEP 15

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

STEP 16

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

STEP 17

Remove the engine retaining hardware.

NOTE: *When installing, make a visual inspection of the condition of the rubber flexible mountings and change them if necessary. Respect the colours, light blue on the fan side, light green on the hand-wheel side. Tighten the engine retaining screws to a torque of 231 ± 18 lb-ft.*

STEP 18

When there is nothing interfering with the removal of the engine, raise the engine carefully and install it on a suitable repair bench.

NOTE: *When installing the engine in the machine, proceed in the reverse order from removal.*

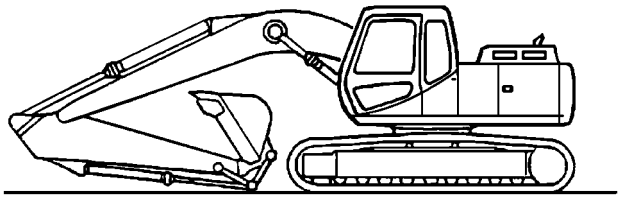
Before operating the machine, carry out the following operations:

- Bleed and prime the fuel system (see Operator's Manual).
- Fill and bleed the engine cooling system (see Operator's Manual).
- Check the hydraulic, fuel and cooling systems for leaks.
- Check the oil level in the hydraulic reservoir. Top up if necessary.

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 within brackets refer to the figures on pages 5 and 6.*

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

STEP 6

Open the filling plug (2) of the tank (1). Bleed the remaining fuel using the valve (3) then remove the latter. Remove the filter (19) and the fuel gauge (20).

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 reservoir (1).

STEP 10

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

STEP 11

Remove the two screws that hold the fuel oil filter. Attach labels on the two hoses. Remove the fuel oil filter by removing the two hoses and the retaining clips.

STEP 12

Shift the plastic protection (13) from the fuel sensor (14). Remove the retaining screws (15) then the fuel sensor (14) as well as the seal (16).

STEP 13

Remove the six screws (17) from the fuel tank (1), and the shims (18).

STEP 14

Remove the fuel tank (1) using a hoist.

STEP 15

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

52 6 solenoid valve bank
A3 Electronic acceleration
B1 Coolant temperature sensor
B2 Hydraulic oil temperature sensor
B21 Engine oil pressure switch
B22 Swing pilot pressure switch
B26 Upper pilot pressure switch
B27 Travel pilot pressure switch
B41 Engine rpm sensor
B42 Pump pressure sensor P1
B43 Pressure sensor (nega-cont)
B44 Pump pressure sensor P2 (yellow band)
B45 Overload indicator pressure switch
B81 Horn
E1 Working light (upperstructure)
E2 Working light (attachment)
E3 Working light (cab)
F22 Fuse 20 A; main fuse for F11 and F12 circuits
F23 Fuse 65 A; main fuse for F3 to F10 and F13 to F20 circuits
F24 Fuse 20 A; main fuse for F2 circuit
F25 Fuse 20 A; main fuse for F1 circuit
F27 Fuse 50 A; relay safety
G1 Batteries
G2 Alternator
H2 Travel alarm
K7 Relay battery
K8 Relay safety
M1 Starter motor
M2 Engine emergency stop motor
M4 Washer motor
M9 Air conditioner condenser fan motor
R1 Glow plugs
R2 Fuel flow adjustment resistor
R5 Fuel sensor
S52 Air conditioning compressor clutch switch
S55 Reserve tank LSW
X1 Fuel filler pump connector
X2 Rotary light connector
Y7 Main pump proportional solenoid
Y8 Air conditioner magnet clutch
Y18 Free swing solenoid valve

3) Mode selection switch

a) When the ignition switch is turned on, the "S" mode is selected by default (except if auto mode was selected at the time of turning off the ignition switch).

b) Each time the work mode switch (S3) is pressed, the mode changes:
S → H → L → S → H

c) If the auto mode switch (S4) is activated, the mode changes to auto mode. If the auto mode switch (S4) is pressed once again, the mode changes to "S" mode.

d) When auto mode is activated, if the work mode switch (S3) is pressed, the work mode does not change.

e) After turning off the ignition switch in auto mode, when the ignition switch is turned on again, the mode remains automatic.

4) Operation

1. The work mode (S3) and auto mode (S4) switches signal is managed by the computer (A1) that changes the mode according to the input signal.

2. The computer (A1) transmits the selected mode to the monitor display (P4) via series communication (2). The monitor display (P4) displays the selected mode.

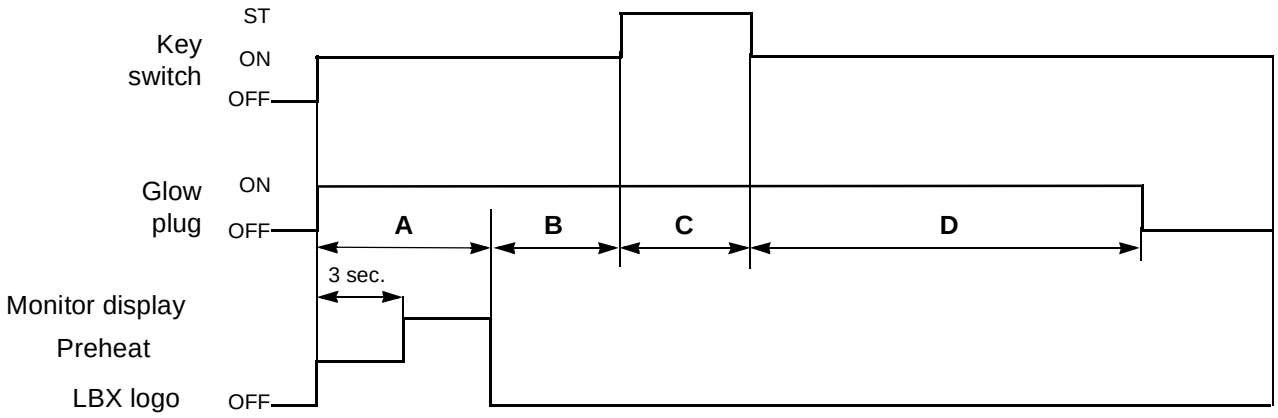
3. The computer (A1) transmits the selected mode to the engine controller (A2) via CAN communications that control the electronic acceleration (A3).
The engine controller (A2) transmits the mode and the data concerning the rpm to the computer (A1) via CAN communications.

4. The computer (A1) calculates the main pump proportional solenoid (Y7) current based on the selected mode and the data on the actual rpm and the target rpm of the engine.

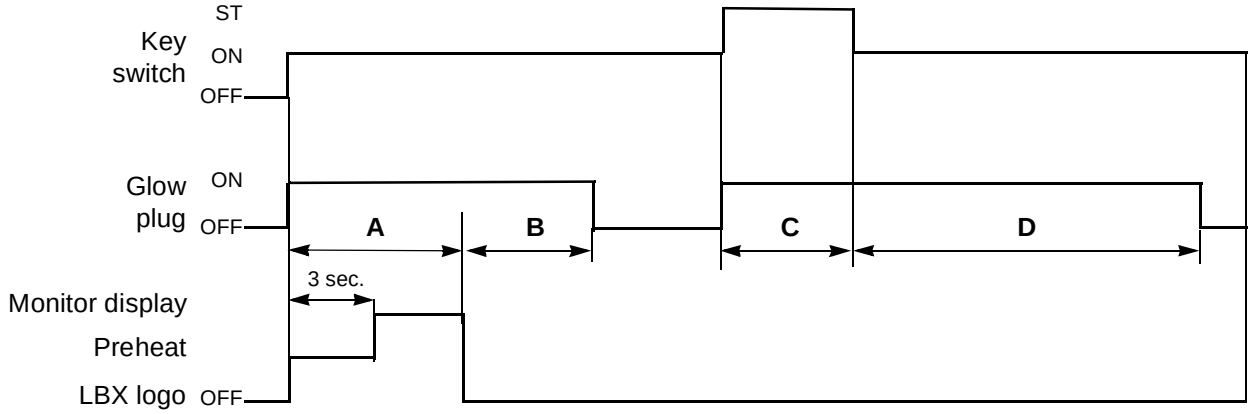
5. The computer (A1) transmits the new data to the monitor display (P4) via series communications.

5) Timing diagram

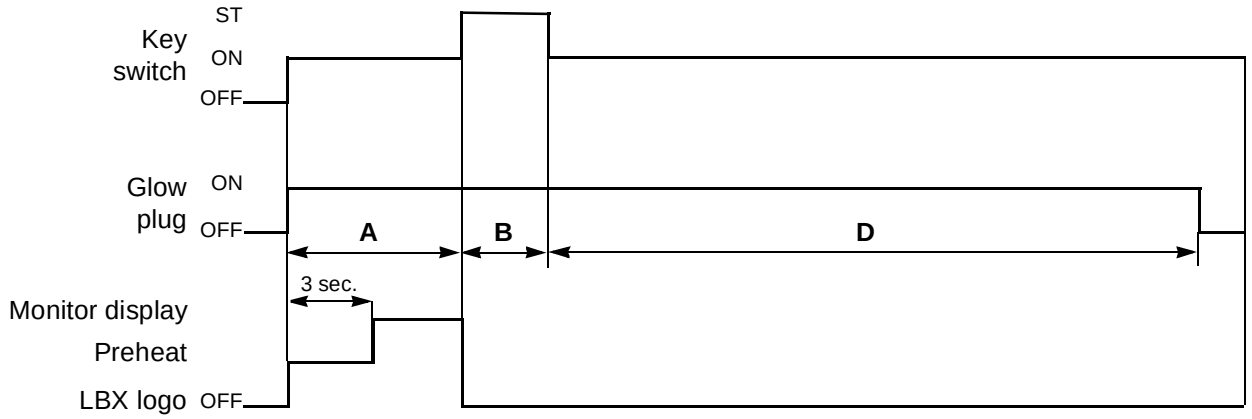
a) If the engine starts within 2 seconds following the display "ENG. PRE HEAT"



a) If the engine starts within 2 seconds following the display "ENG. PRE HEAT"



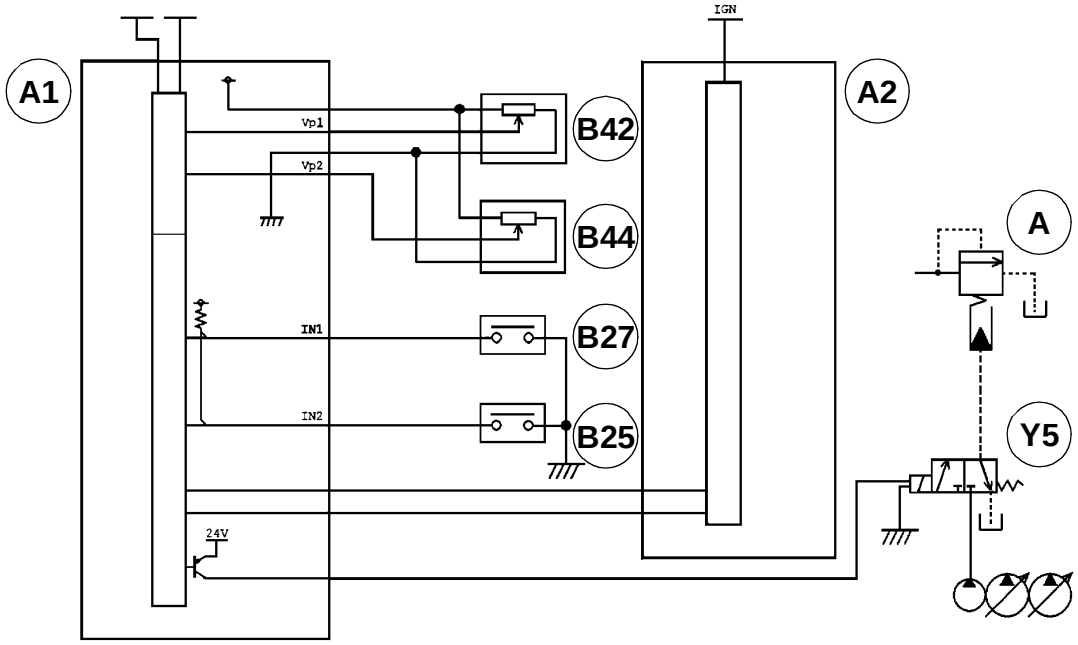
c) If the engine starts during the "ENG. PRE HEAT"



A. Preheat time Tp
B. 2 seconds additional preheat
C. Preheat time for engine start
D. Time after preheat Ta

Power boost

1) Circuit configuration



CS00F502

A Main relief (standard)
A1 Computer
A2 Engine controller
B25 Breaker pilot pressure switch
B27 Travel pilot pressure switch
B42 Pump pressure sensor (P1)
B44 Pump pressure sensor (P2) (yellow band)
Y5 Power-up solenoid valve (yellow band)

2) Increasing the pressure in each work mode

H mode (Pressure)	Automatic power boost (*) (4975 ↔ 5410 psi)
S mode (Pressure)	Automatic power boost (*) (4975 ↔ 5410 psi)
L mode (Pressure)	Constant power boost (*) (5410 psi)

* When the travel pilot pressure switch (B27) or the optional breaker pilot pressure switch (B25) is activated, power boost is deactivated.

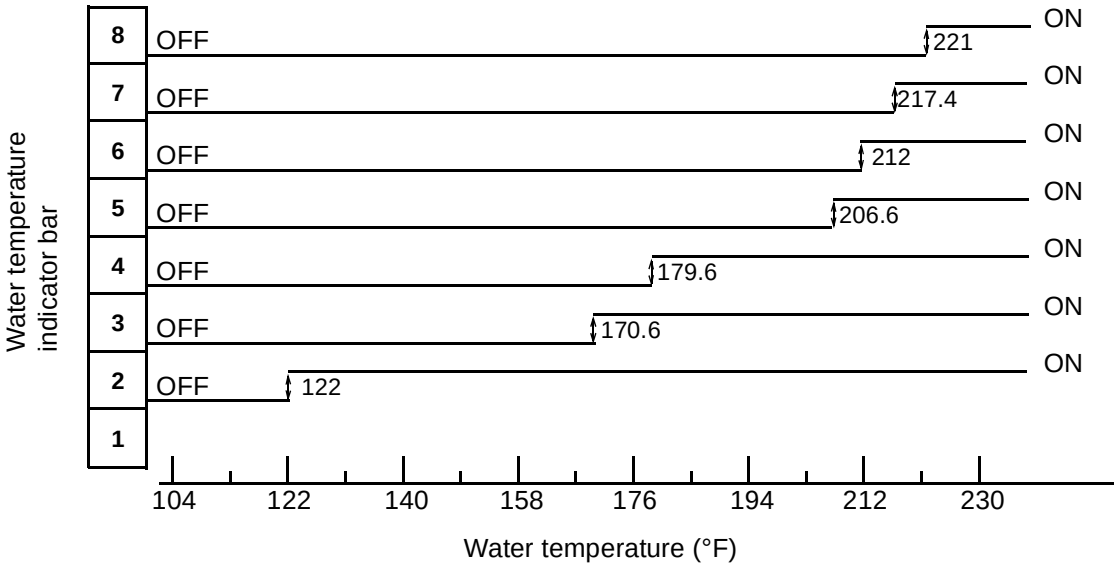
3) Operation

When operating in H or S mode, the computer (A1) records the ratio between:

- The engine load transmitted by the engine controller (A2).
- The hydraulic circuit load transmitted by the pump pressure sensors (P1) (B42) and (P2) (B44).

If the pump pressure (P1) or (P2) is greater than 4351 psi and the load ratio is within a range of ± 5% for 2 seconds, the computer (1) activates the power-up solenoid valve (yellow band) (Y5) for 8 seconds, which increases the main pressure.

When the travel pilot pressure switch (B27) or the optional breaker pilot pressure switch (B25) is activated, the computer (A1) deactivates the power-up solenoid valve (yellow band) (Y5).



2) Operation

A. The coolant temperature sensor (B1) sends a signal to the engine controller (A2).

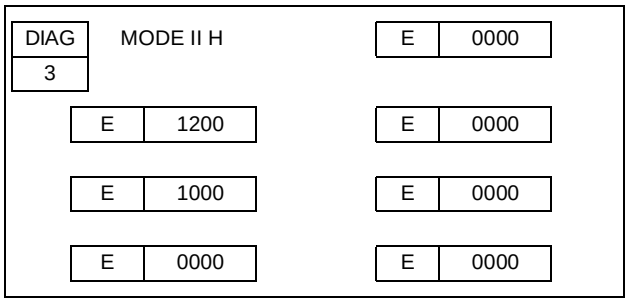
B. The engine controller (A2) sends the converted signal to the computer (A1) via the CAN connection (3).

C. The computer (A1) calculates the number of bars to display and transmits the information to the coolant temperature indicator (1) of the monitor display (P4) via the series connection (2).

D. When the 8th bar on the coolant temperature indicator (1) is displayed, the message "OVER HEAT" appears on the monitor display (P4) of the instrument panel (P1) and the audible warning device sounds.

3. Previous failures in the engine DIAG3

This screen is connected to the previous screen (DIAG2) as concerns failures involving the hourmeter.



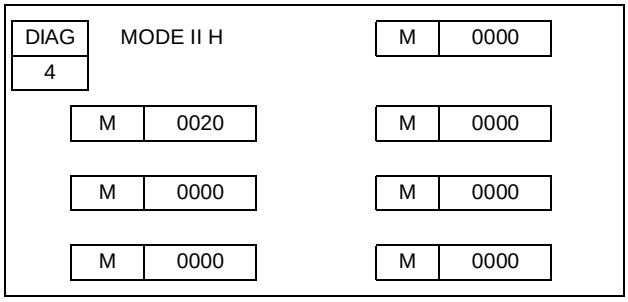
E: Failure code

Example:

The screen above shows that the failure code 0032 (electronic regulator rack position detector) occurred at 1200 H and that failure code 0025 (fuel flow adjustment resistor) occurred at 1000 H.

A. The numbers of hours shown indicate the time at which the failure occurred for the first time since the data was reinitialised.
B. If you wish 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 DIAG2 and DIAG3, it is recorded in the electronic control box memory (this data is only visible using an external computer).

4. Excavator failure detection DIAG4



M: Failure code

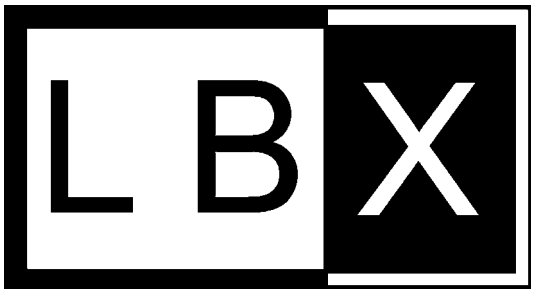
Failure code

M0000: No defect
M0010: Transistor output short-circuit
M0020: Hydraulic oil temperature sensor
M0030: Fuel sensor
M0040: Pump pressure sensor (P1)
M0050: Pump pressure sensor (P2)
M0060: Pressure sensor (nega-cont)
M0070: Key switch
M0080: Upper or travel pilot pressure switch
M0090: CAN communication circuit
M00A0: Computer reinitialisation
M00B0: Engine controller
M00C0: Boom cylinder pressure

Example:

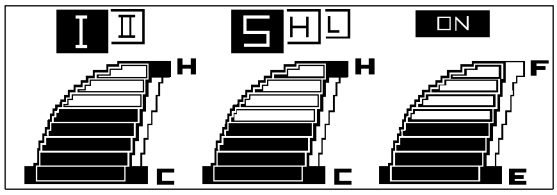
The screen above shows a failure in the hydraulic oil temperature sensor (0020).

7. After selecting the machine code, the destination code and the language code, press the auto mode switch and the screen below will appear:



CS00J508

Then the work screen is displayed:



CS00F521

8. If the machine code does not correspond to the engine controller installed, the error code: "E. CONT. ERROR" appears on the screen and the audible warning device sounds.

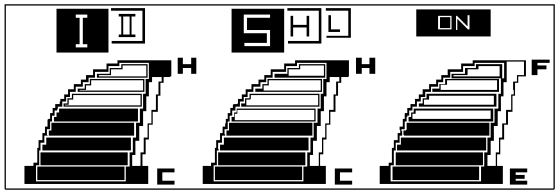
MACHINE : SH0300- 3	
TERRITORY : 3 LANGUAGE : 5	
CONT. P / N	KHR2669
E. CONT. ERROR	

9. Check that the machine code corresponds to the engine controller installed on the excavator.
- If the machine code is wrong, start the procedure again from the beginning.
- If the engine controller installed is not correct, change it.

10. To confirm the excavator model selection, press the auto work mode switch for 10 seconds:
The screen below will appear:

MACHINE : SH0300- 3	
TERRITORY : 3 LANGUAGE : 5	
CONT. P / N	KHR2669

11. Press the auto work mode switch again and the work screen will appear:



CS00F521

12. Re-initialising the data
In the excavator model selection screen, if the auto mode switch is pressed for 10 seconds, all the data will be erased and the audible warning device will sound.
If the key switch is turned OFF and then ON, the screen below will appear and the procedure starts again from the beginning.

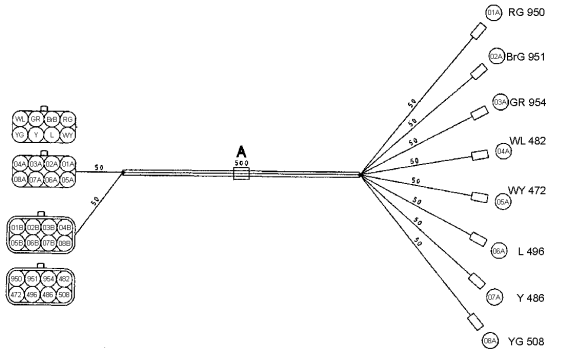
MACHINE : SH [?] - 3	
TERRITORY : ? LANGUAGE : ?	
CONT. P / N	KHR2669

Changing the language code

Display the excavator model confirmation screen (press the auto mode switch for 10 seconds).
To change the language code, press the travel mode switch to display the required code.
To confirm the language code, press the work mode switch and the audible warning device sounds.
Turn the key switch to OFF.

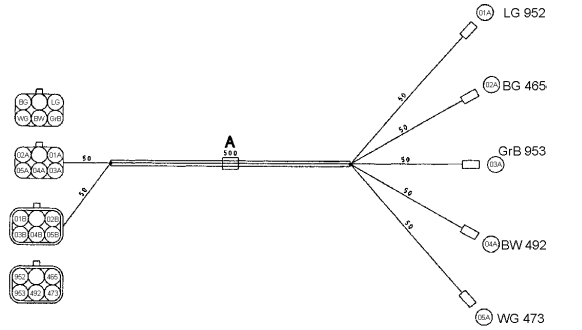
Overheating (continued)

Troubleshooting	Cause	Action
2. The hydraulic temperature bar-graph displays 8 bars. Key switch ON The hydraulic oil temperature sensor (B2) temperature is abnormal compared to maintenance assistance CHK1 (comparison between the actual temperature and that indicated). See hydraulic oil temperature in CHK1 OT. Measure the actual temperature YES See problem code M0020 for the oil temperature sensor (B2) using maintenance diagnostic (DIAG 4) YES Disconnect the hydraulic oil temperature sensor connector (B2) to measure the resistance. (Refer to the table below for the resistances). NO	Defective hydraulic oil temperature sensor (B2)	Replace the hydraulic oil temperature sensor (B2)
YES Disconnect the CN24 connector to measure the resistance between the male terminals OL and BO. (Refer to the table below for the resistances). NO	Bad connection on the hydraulic oil temperature sensor connector (B2)	Clean the hydraulic oil temperature sensor connecting terminal (B2)
YES Disconnect connector CN1 to measure the resistance between the female terminals OL and BO. (Refer to the table below for the resistances). NO	Bad connections on CN24	Clean the connecting terminal on CN24
YES	Defective computer (A1) or bad connection on CN1	Replace the computer (A1) or clean the connecting terminals on CN1
Note: In the event of a short-circuit, the bar-graph goes off completely.		



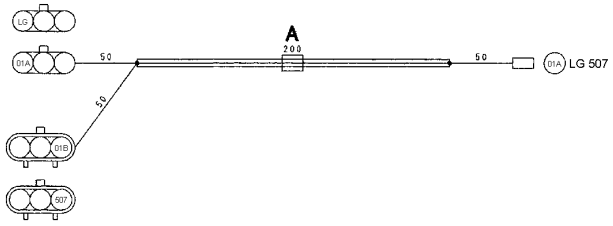
CS00J512

18. For electronic acceleration (RED4)



CS00J513

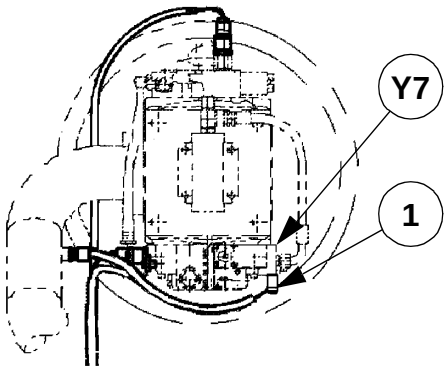
19. For electronic acceleration (RED4)



CS00J514

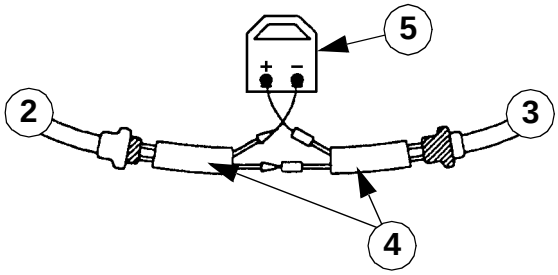
20. For electronic acceleration (RED4)

Proportional solenoid



CS01M541

1. Disconnect connector (1) from the main pump proportional solenoid (Y7).



CS00E534

2. Connect the appropriate service connector (2P) (4) between the connector at the pump end (2) and the connector at the main harness end (3) and install the meter (5).

INSPECTING THE BATTERY

NOTE: *For a proper inspection of the battery, carry out each part of the inspection until the actual state of the battery is known.*

Visual inspection

- Check that the cable connections are clean and tightened properly. Remove all foreign bodies from the top of the battery.
- Check the box, the terminals and the battery cables for damage.
- Check the electrolyte level, see page 4.
- If you have added water to the battery, charge the battery for 15 minutes at 15 to 25 amperes to allow the water to mix correctly with the electrolyte.

Check the specific gravity

Use a battery hydrometer to check the specific gravity of the electrolyte. The specific gravity indicates the charge level in each cell.

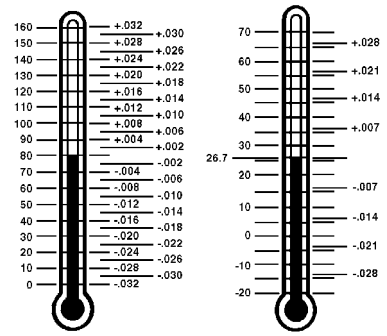
Battery hydrometers are designed to indicate the correct specific gravity when the electrolyte is at a temperature of 80°F.

Before checking the specific gravity, check the electrolyte temperature. If the hydrometer is not equipped with a thermometer, use a thermometer to measure the electrolyte temperature. The thermometer has to be calibrated at least up to 80°F.

1. Remove sufficient electrolyte from a cell so that the float moves freely in the tube.

NOTE: *If it is not possible to check the specific gravity without first adding water to the cell, charge the battery for 15 minutes at 15 to 25 amperes to allow the water to mix correctly with the electrolyte. Then, check the specific gravity.*

2. Read the float.
3. Read the thermometer, if the reading is greater than 80°F, add specific gravity points to the reading to get the specific gravity. If the reading is less than 80°F, deduct specific gravity points from the reading to get the specific gravity. See the illustration below and add or deduct specific gravity points depending on the situation.



1. Temperature in °F. 2. Temperature in °C.

JS00532A

4. Record the corrected specific gravity for each cell.
5. If the difference between the high and low readings is 0.0019 minimum, charge the battery and check the specific gravity again. If after charging the difference is still 0.0019 minimum, install a new battery.

NOTE: *When the battery is replaced, do not use a used battery with a new one. The life of the new battery will be reduced.*

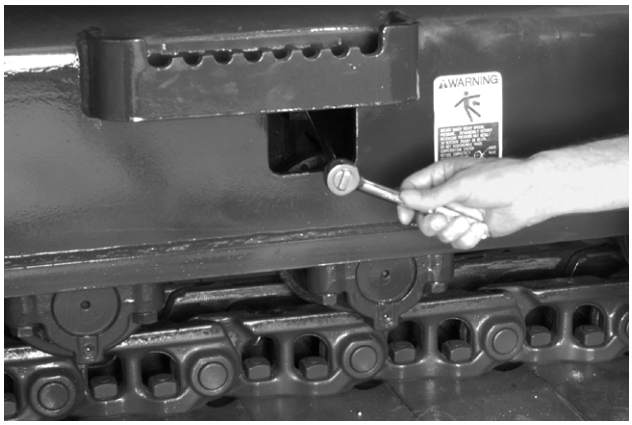
Section

5001

REMOVAL AND INSTALLATION OF THE TRACKS SET

STEP 5

Do the following procedure to decrease the track tension:



JD00273A

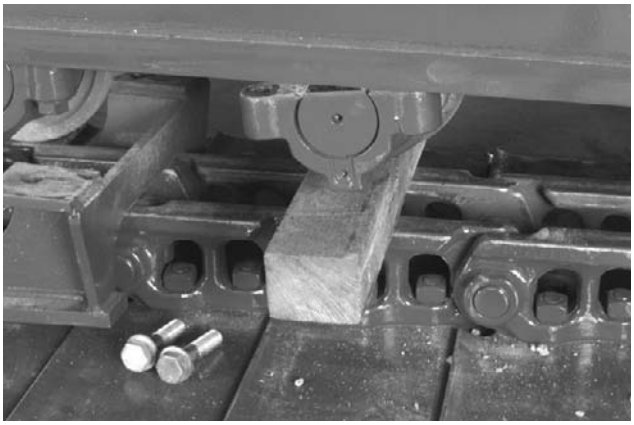
1. Do not remove the non-return check valve. Grease in the track tension cylinder is under high pressure. Release the track by gradually loosening the non-return check valve by about two turns, the grease escapes from a port in the check valve thread.

> ⚠ **WARNING:** *Grease is under havy 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 retaining bracket.*

2. When the track tension is correct, tighten the check valve.
3. Clean the grease from the check valve.

Installation

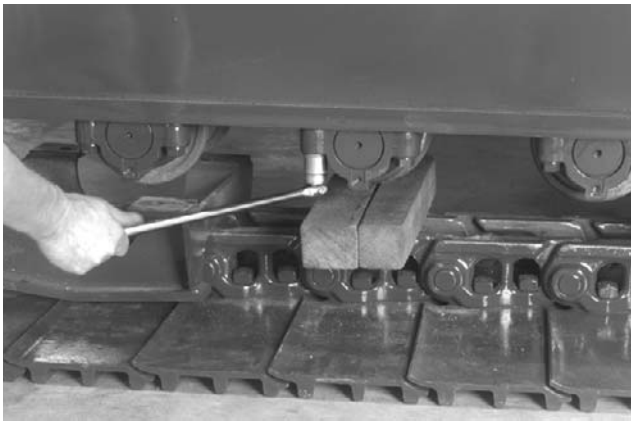
STEP 1



JD00316A

Align the lower roller in position under the lower undercarriage.

STEP 2



JD00299A

Apply Loctite 262 to the threads of the four screws. Assemble the four hardened washers and the screws.

STEP 3

Tighten the four retaining screws of the lower roller end bearings to the torque (see specifications). Remove the wood blocks.

STEP 4

At each end of the track, remove the wood blocks from beneath the track. Remove the two supports from beneath the machine.

STEP 5

Refer to "Adjusting track tension", see section 5001.

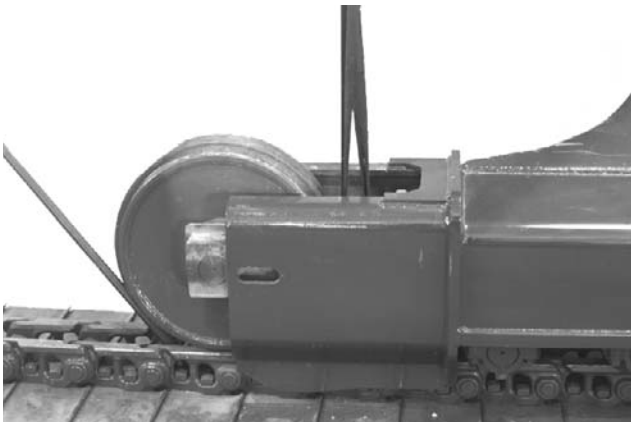
Section

5004

SPROCKET

5004

STEP 5



JD00365A

Raise the assembly and slide it into the undercarriage, with the help of a crowbar. Remove the lifting equipment.

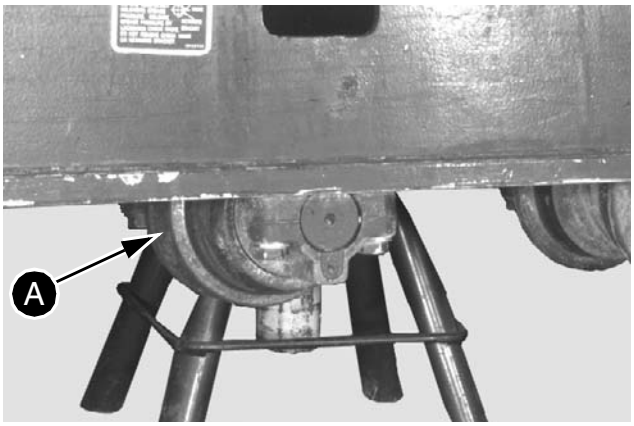
STEP 6

See "Removing and installing the tracks" (Section 5001), for installing the track.

Removal

NOTE: *The photos below do not correspond to the machine model, but the procedure is the same.*

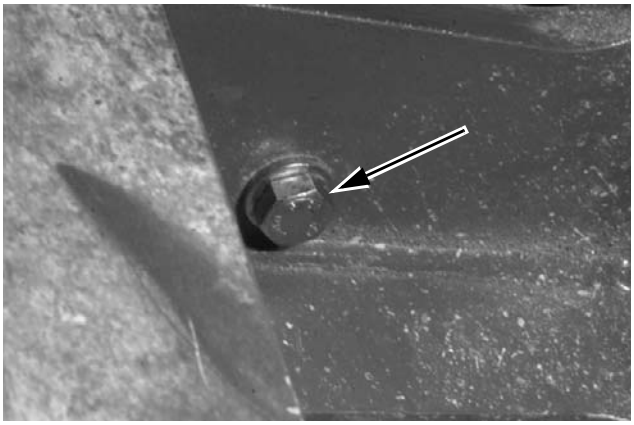
STEP 1



JD01080A

See Section 5003 "Removing the lower roller" and remove the roller (A) located under the track tension cylinder.

STEP 2



JD01081A

NOTE: *Do not allow any part of your body to pass under the tension cylinder. You could be seriously injured by the tension cylinder falling, when the screws are removed which fasten it to the machine.*

Loosen the tension cylinder non-return check valve. Place wooden blocks under the tension cylinder to prevent it falling off the machine when the two screws which attach it to the machine are removed. Remove the two screws and the flat washers (2).

STEP 3

JD01082A

Using a crowbar, push the track tension cylinder piston rod into the cylinder barrel. The grease will flow out of the non-return check valve. Remove the track tension cylinder from the machine.

Disassembly

STEP 1

Using a suitable cleaning solvent and clean cloths, remove impurities and grease from the outside of the track tension cylinder.

STEP 2

Remove the two screws (3) and the locking washers (4). Remove the bracket (5).

STEP 3

Remove the grease fitting (6) from the non-return check valve.

STEP 4

Remove the non-return check valve from the cylinder barrel (15).

STEP 5

If necessary, disassemble the non-return check valve by removing the poppet (7), spring (8) and the ball (9) from the non-return check valve (10).

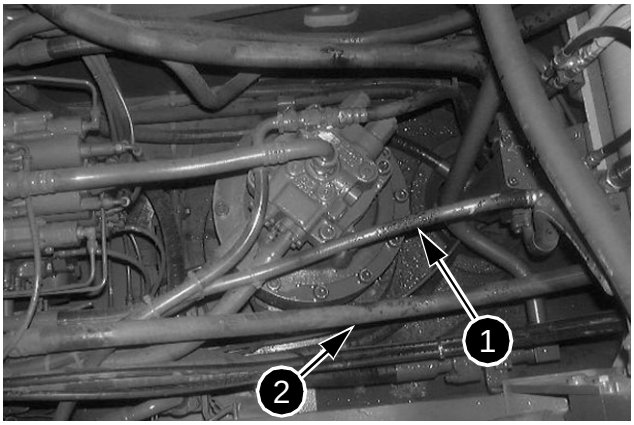
SWING REDUCTION GEAR

Removal

STEP 1

Carry out steps 1 to 10 of "Removing the swing motor" (see Section 8008).

STEP 2



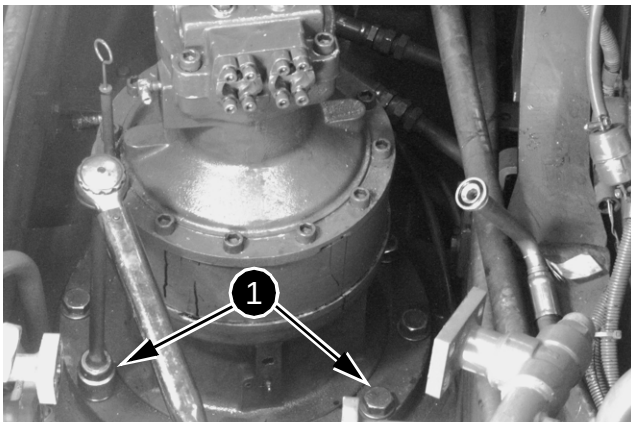
CD02B034

Attach an identification tag to the hoses (1) and (2), disconnect them and plug the ports.

STEP 3

Mark the position of the swing reduction gear on the upperstructure frame by making alignment marks on the swing reduction gear and the upperstructure frame.

STEP 4



JD00449A

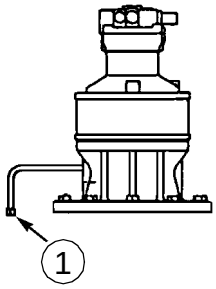
Remove the twelve swing reduction gear retaining screws (1) and the centring pin.

STEP 5

JD00437A

Carefully lift the upperstructure swing motor and reduction gear assembly, move it away from the machine.

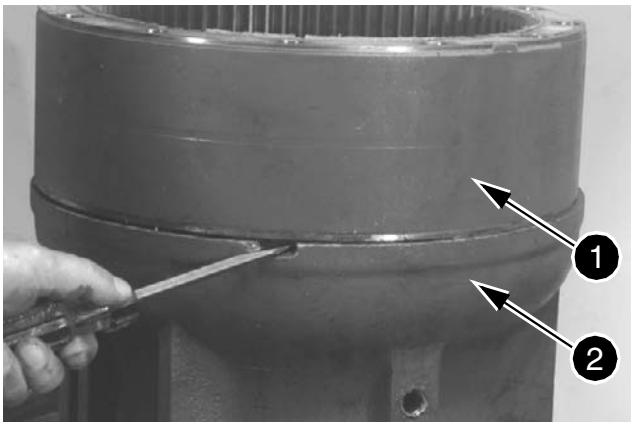
STEP 6



JS00379A

Place a container of 1.5 gallon capacity under the swing reduction gear drain plug. Remove the drain plug (1) and drain the oil. Install the drain plug.

STEP 6

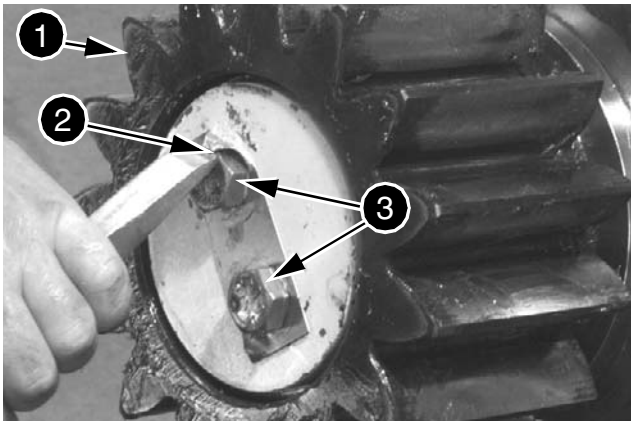


6003-090

Remove the ring gear (1) from the reduction gear housing (2) using the notch in the housing for leverage.

NOTE: *The planetary gear axles are assembled in two ways: A = assembly by hubbing the axle; B = assembly by blocking the axle (roll pin). According to the type of assembly, replace the entire planet wheel carrier or individual spare parts.*

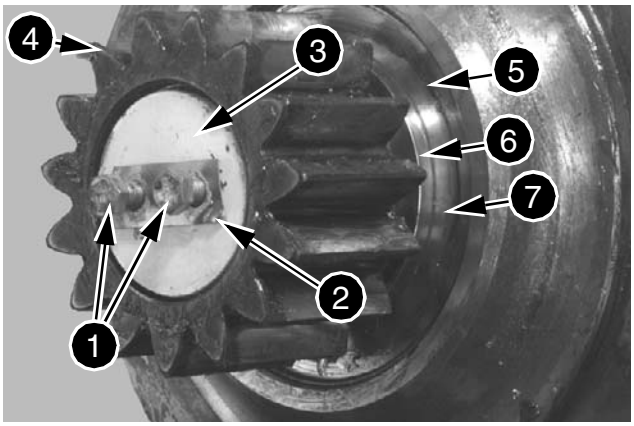
STEP 7



JD01464A

Turn the swing reduction gear upside down to be able to access the pinion (1). Straighten up the corners of the brake plate (2) to free the screws (3).

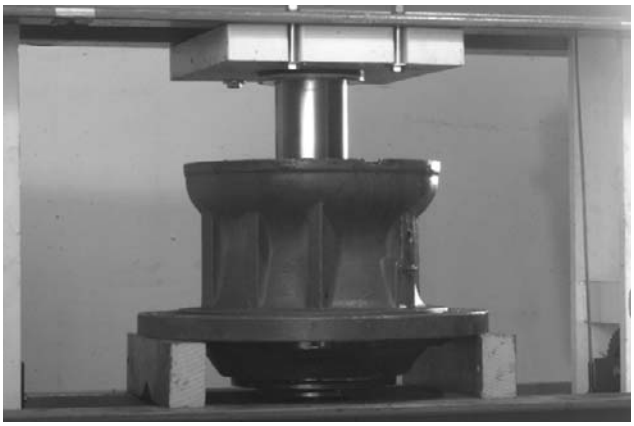
STEP 8



JD01465A

Remove the two screws (1), the brake plate (2), the end plate (3) and the pinion (4). Remove the snap ring (5), the stop (6) and the plate (7).

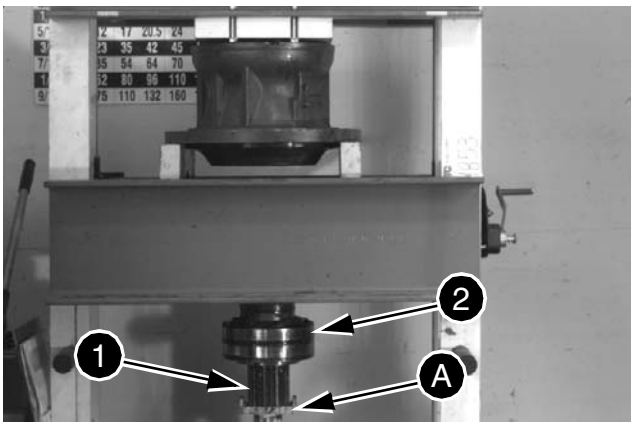
STEP 9



6003-096

Install the swing reduction gear in a suitable press. Place shims under the flange on the housing to hold the shaft upright.

STEP 10

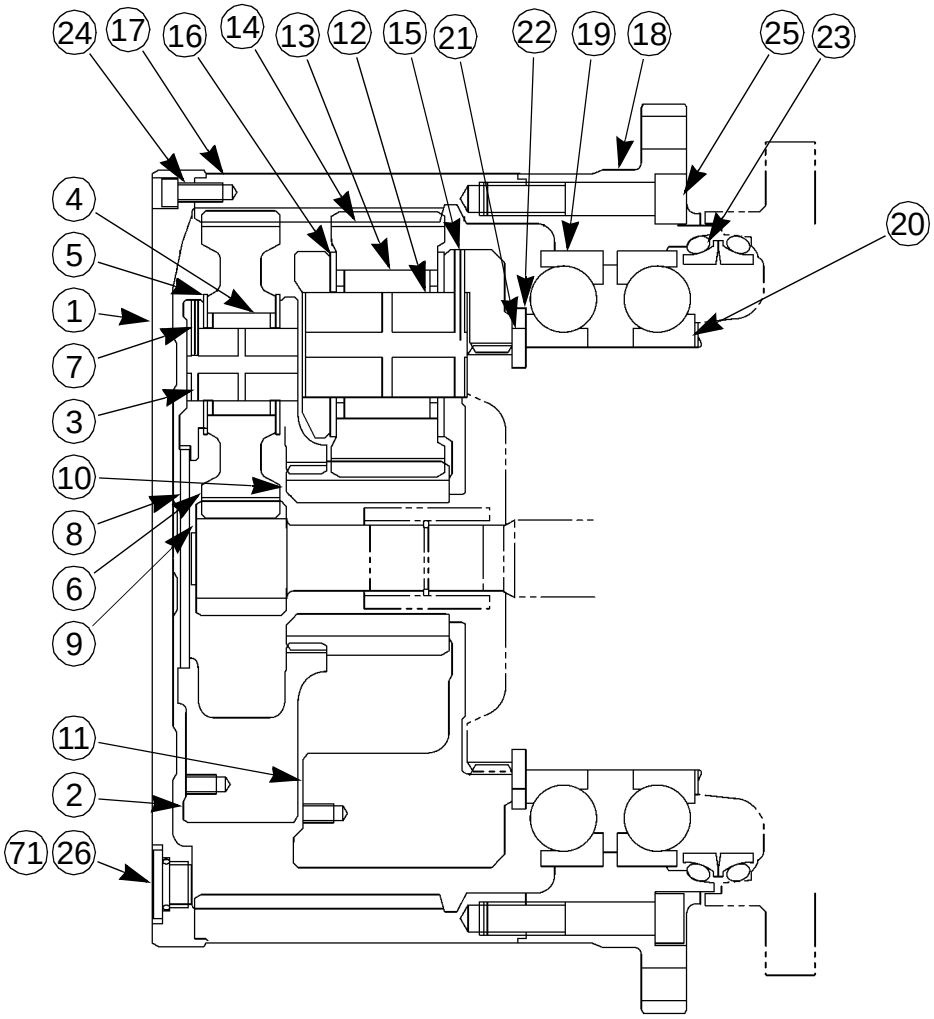


6003-097

Place a jack (A) under the shaft (1) and the bearing (2) under the press to hold and support the shaft when it has been pressed out of the housing. Press the shaft from the housing. Remove the shaft and the bearings from the press.

REDUCTION GEAR

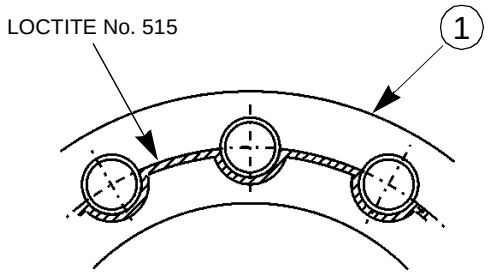
Description



CS02B540

1 COVER
2 CARRIER
3 CARRIER PIN
4 NEEDLE BEARING
5 THRUST WASHER
6 PLANETARY GEAR
7 SPRING PIN
8 THRUST PLATE
9 SUN GEAR
10 SUN GEAR
11 CARRIER
12 CARRIER PIN
13 NEEDLE BEARING
14 PLANETARY GEAR
15 SPRING PIN
16 THRUST WASHER
17 RING GEAR
18 HOUSING
19 ANGULAR BEARING
20 SHIM
21 LOCK WASHER
22 SUPPORT RING
23 FLOATING SEAL
24 SCREW
25 SCREW
26 PLUG
71 O-RING

STEP 20



CS02B549

Apply Loctite No. 515 to the mating surfaces of cover (1) and ring gear (17), and install the cover (1) onto the ring gear (17).

STEP 21

CD02B027

Apply Loctite No. 242 to hexagonal socket head cap screws (24) and fasten them with tightening torque of 50.5 lb-ft.

STEP 14

Install the portable filter on the upperstructure in such a manner that the machine can be operated. Attach the portable filter firmly to the machine.

STEP 15

Connect the electric cable from the portable filter to the batteries. Make sure that the electric cable is away from all moving parts.

STEP 16

Start the portable filter running.

STEP 17

Start the engine, run it at half the maximum speed for 10 minutes. During those ten minutes, stir the hydraulic fluid in the hydraulic reservoir with the long pipe.

STEP 18

Run the engine at maximum speed and bring the hydraulic fluid to its operating temperature by proceeding as follows:

1. Operate the bucket and dipper controls in one direction (cylinders against the stops) for 30 seconds.
2. Operate the bucket and dipper controls in the other direction (cylinders against the stops) for 30 seconds.
3. Repeat steps 1 and 2 until the hydraulic fluid temperature reaches 113-131°F. (Third bar on the hydraulic oil temperature indicator of the monitor display on the illuminated instrument panel).

STEP 19

With the engine running at full speed, cycle each cylinder (in, out) twice, one after the other for 45 minutes.

STEP 20

With the engine running at full speed, operate the swing control several times by 180 degrees to the left and then to the right.

STEP 21

With the engine running at full speed, position the attachment at right angles to the frame. Use the attachment to raise the track off the ground. Operate the travel pedal, in one direction for 2 minutes and then in the other direction for 2 minutes. Repeat this cycle for 10 minutes.

STEP 22

Repeat step 21 for the other track.

STEP 23

Bring back the engine to idle mode.

STEP 24

Stir the hydraulic fluid in the hydraulic reservoir for 10 minutes with the long pipe.

STEP 25

Shut down the portable filter and the engine.

STEP 26

Close the valve under the hydraulic reservoir.

STEP 27

Remove the inlet pipe of the valve under the hydraulic reservoir.

STEP 28

Remove the long pipe from the hydraulic reservoir.

STEP 29

Disconnect the electric cable of the portable filter from the batteries and remove the portable filter from the machine.

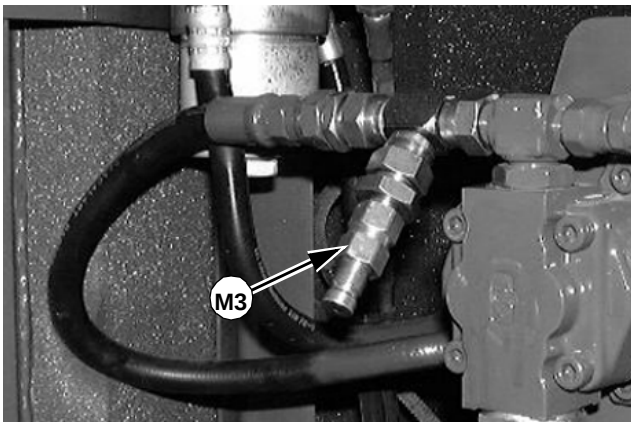
STEP 30

Install a vacuum pump on the hydraulic reservoir, see page 6.

STEP 31

Start the vacuum pump.

Installing the pilot pressure test point

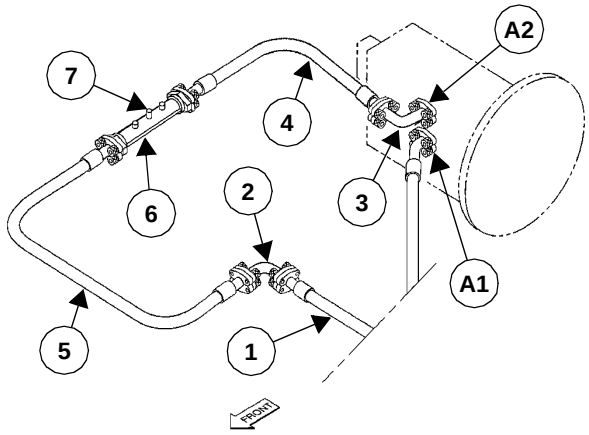


CD01M20

Install a pressure test point (M3) on the pilot circuit, using the T-pieces and the quick union supplied in the K1P0003 kit.

Installing the flowmeter

(Checking hydraulic pump flows)

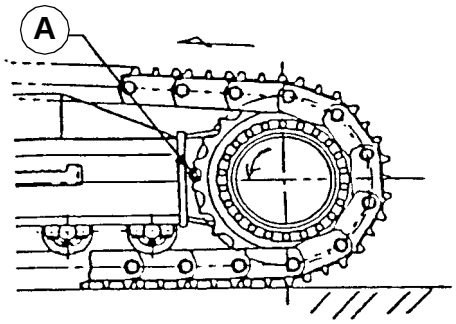


CI01M520

1. Disassemble hose (1) from port (A2) of the pump being checked.
2. Install the elbow union (2) (supplied in the kit K1P0003) on the hose (1).
3. Connect the elbow union (3) (supplied in the kit K1P0003) to port (A2) of the pump.
4. Install the hose (4) (K1P0011) on the elbow union (3).
5. Install the flowmeter (6) on the hoses (4).
6. Install the hose (5) (K1P0011) on the flowmeter (6) and on the elbow union (2).
7. Connect the multi-handy 2051 connecting cable to the plug on the flowmeter (6) detector (7).
8. Proceed in the same manner to check the other stage of the pump (A1).

Checking and adjustment

1. Overset the secondary relief. Attachment main relief chapter).
2. Start the engine.

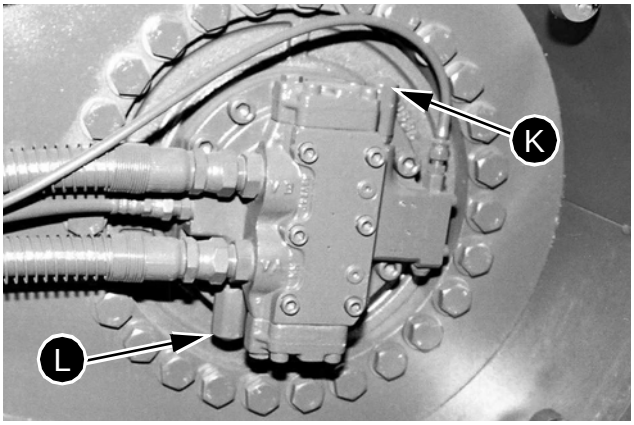


CS99B580

3. Carefully lock the travel on the side to be checked by positioning the locking pin (A) between the sprocket and the undercarriage as shown above.
4. With the engine at full speed, select mode "S".
5. Display the "CHK1" monitor display.
6. Operate and maintain the corresponding travel control (locking the sprocket).
7. Read the pressure on the monitor display, the pressure should be: Pressure setting 5511±72 psi .

Note the pressures if they are not correct to determine the number of shims needed for adjustment. **One 0.0039 in shim corresponds to 145 psi pressure**.

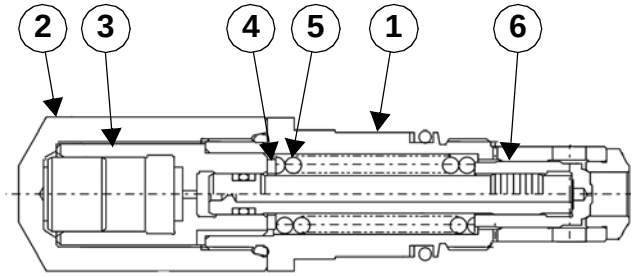
8. Go on to step 9 if one of the secondary reliefs has to have its pressure set. Otherwise, reset the pressure on the main relief.



CD01M019

K. Reverse secondary relief
L. Forward travel secondary relief

9. Remove the swing motor secondary relief concerned. If the two secondary reliefs have to be removed, mark them to ensure they are replaced in their original position.



CI01M519

10. Tighten the body of the secondary relief (1) in a vice and remove the plug (2), the guide (3), the shims (4), the spring (5) and the check valve (6).

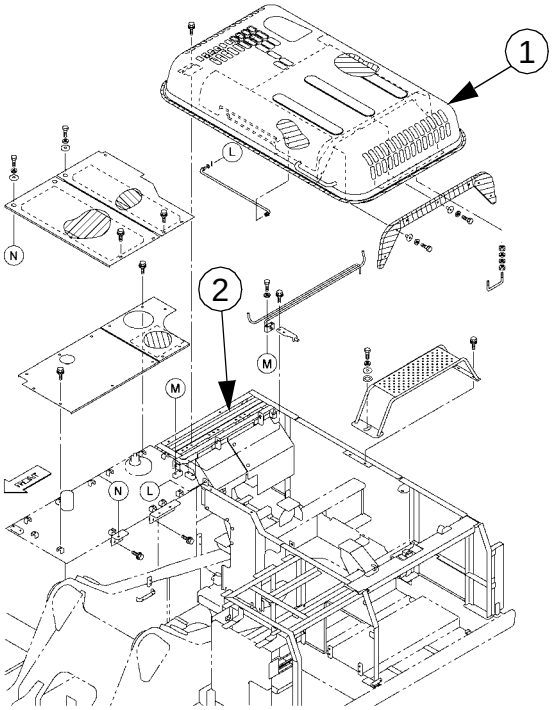
Section

8002

REMOVAL AND INSTALLATION OF THE HYDRAULIC RESERVOIR

june 2002

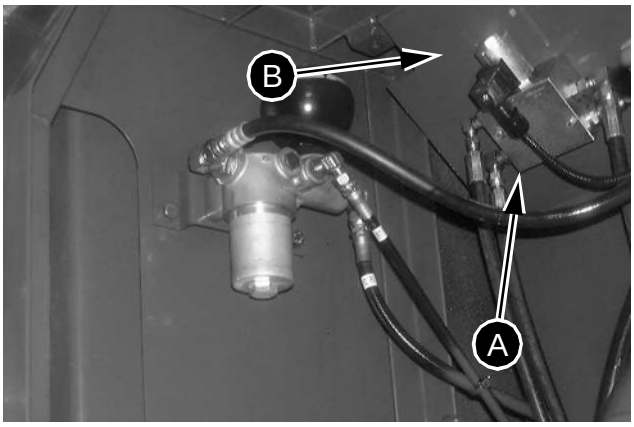
STEP 6



CS02B556

Remove the engine hood (1) then the protective grille (2).

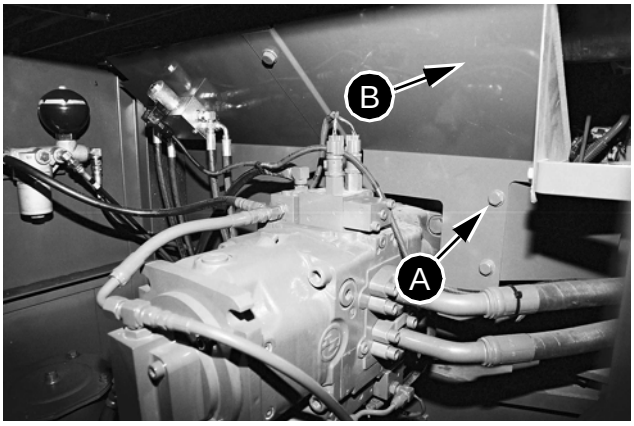
STEP 7



CD02C147

Disconnect all hoses of the block (A). Remove the block (A) from the panel (B).

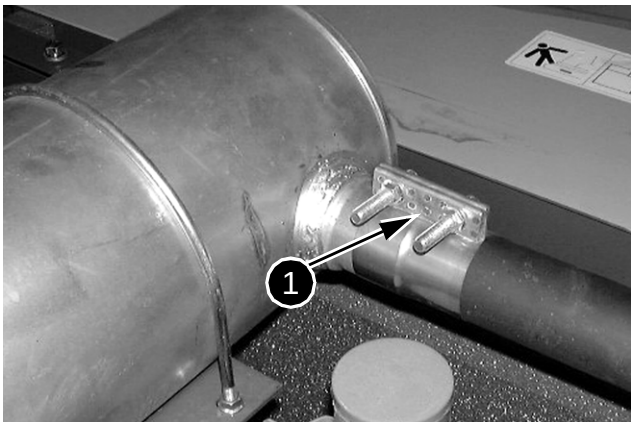
STEP 8



CD02C148

Remove all the retaining screws (A) from the panel (B), then remove the panel (B).

STEP 9

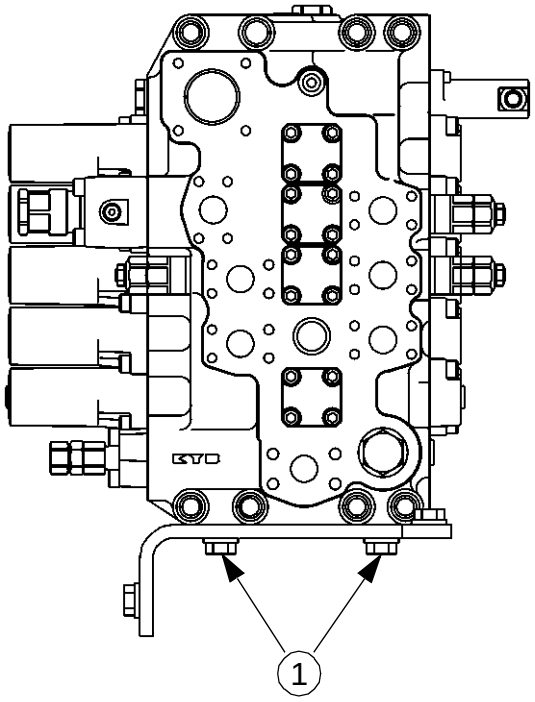


CD00F108

Remove the circlip (1) fastening the silencer pipe to the turbocompressor.

NOTE: *Let the engine and the exhaust system cool before trying to remove the silencer.*

STEP 11



CI02B519

Remove the retaining screws (1) and washers from the control valve.

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

STEP 12

Carefully raise and guide the control valve out of the upperstructure frame. Move all the hoses and pipes out of the way. Remove the control valve from the machine and place it on suitable stands.

NOTE: *The following step is to be performed only if the control valve has to be changed.*

STEP 13

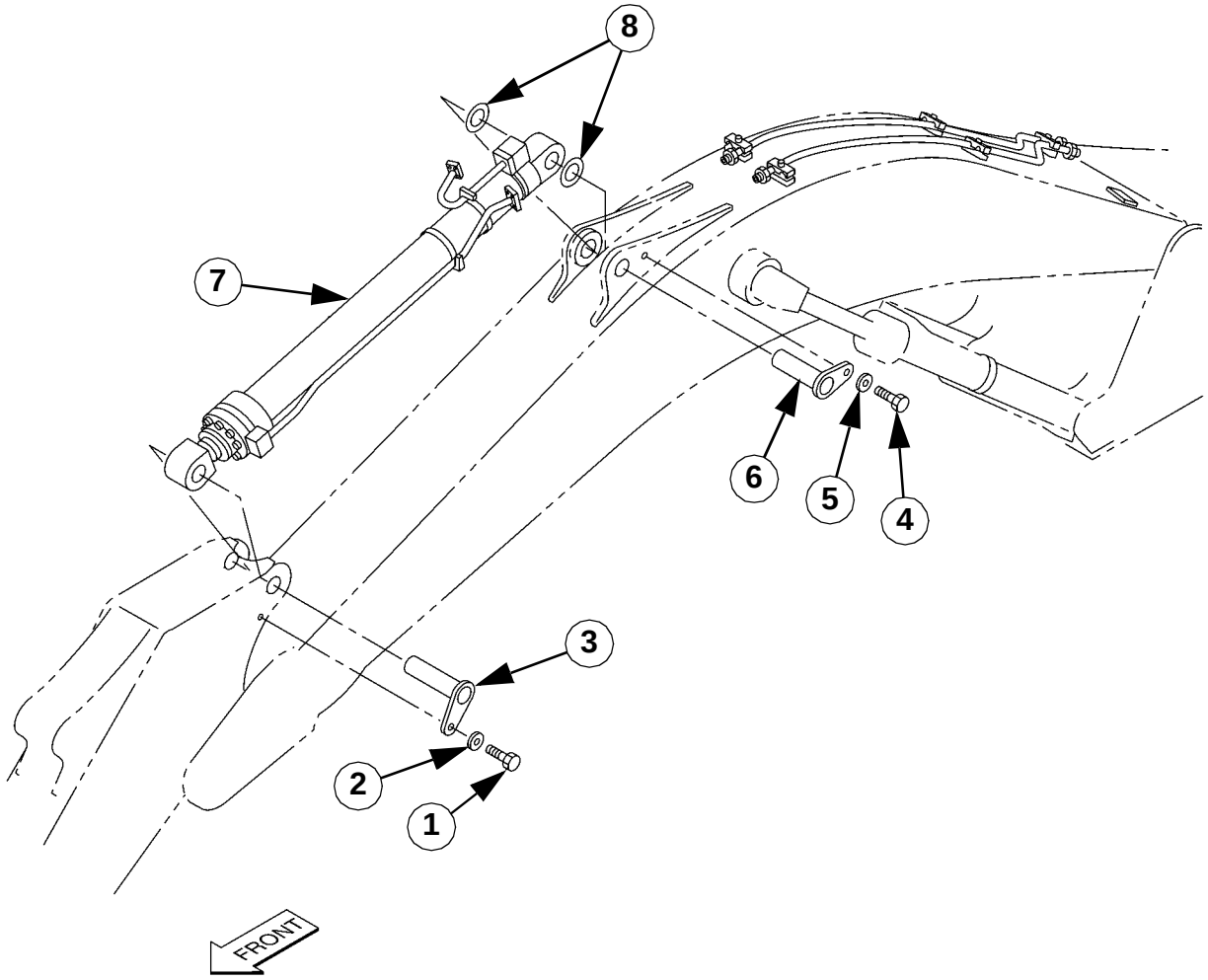
Remove the unions and manifolds from the control valve which has just been removed and mount them on the new control valve. Remove and install the unions and manifolds one after another to make sure that they are correctly installed on the new control valve.

NOTE: *When installing, follow the same procedure in the reverse order. Replace all seals with new seals.*

NOTE: *Before carrying out any work with the machine, operate the swing, travel and the attachment for five minutes with the engine at idle speed. Check that there are no leaks in the system, check the level of oil in the hydraulic reservoir, top up if necessary. Adjust the valves in the control valve (see Section 8001).*

DIPPER CYLINDER

Description



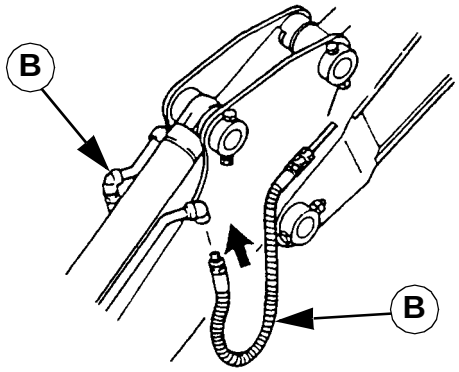
CS02B564

1 SCREW
2 WASHER
3 PIN
4 SCREW
5 WASHER
6 PIN
7 DIPPER CYLINDER
8 SHIM

STEP 3

With the cylinder and the shims in position, install the shaft (9), the screw (7) and the washer (8). Using a set of spacer rings, check that there is a clearance of 0.019 to 0.11 in between the mounting bracket and the mounting ring of the cylinder barrel. If necessary, remove the screw, the shaft and add or remove one or more shim(s) (10) as required in order to get the correct clearance. Install the pin and the screw.

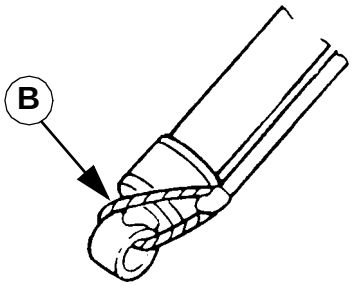
STEP 4



JS00617A

Start the vacuum pump. Remove the plugs from the hydraulic hoses (B) and the caps from the unions. Connect the hydraulic hoses to the unions of the bucket cylinder. Stop the vacuum pump.

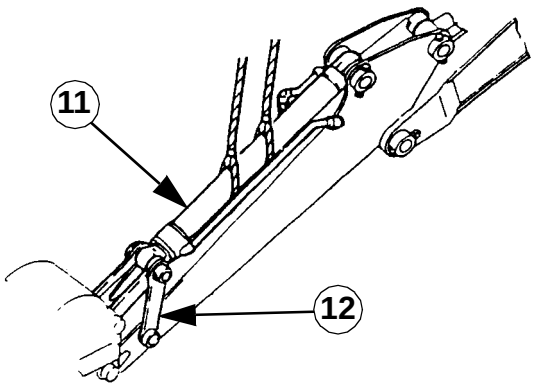
STEP 5



JS00586A

Remove the sling (B) that holds the cylinder rod to the cylinder barrel.

STEP 6



JS00618A

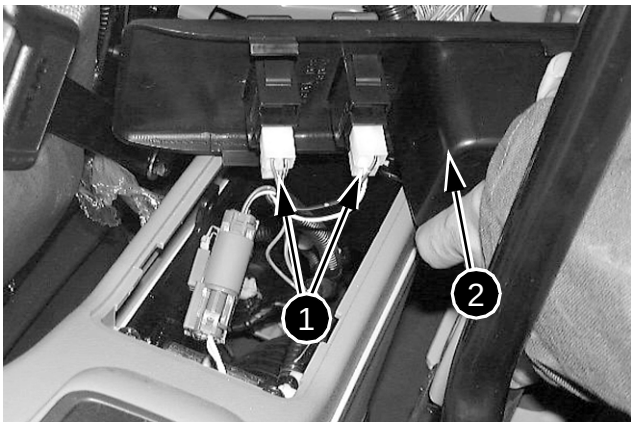
Lift the bucket cylinder (11) to align the cylinder rod and the compensators (12). Install the shims (4).

STEP 3

CD00G050

Loosen and remove the three retaining screws from the inner cab access bar, then remove the access bar.

STEP 4



CD00G051

Label and disconnect the electrical connections (1), remove the compartment control casing assembly (2).

STEP 5

CD00G052

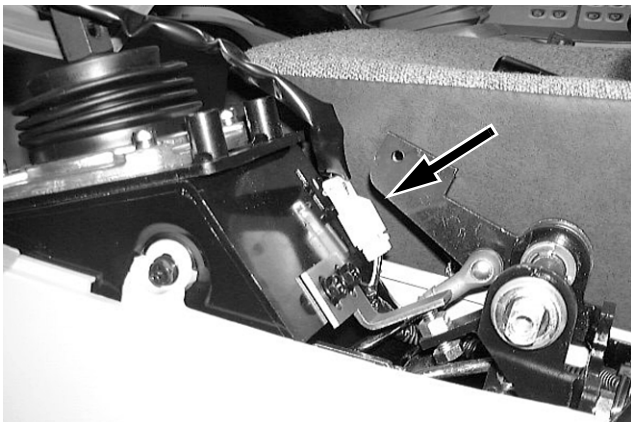
Loosen and remove the four retaining screws from the rear upper portion of the control arm.

STEP 6

CD00G053

Loosen and remove the two retaining screws from the arm angle adjustment and function cancellation lever, then remove the lever.

STEP 7



CD00G054

Lift the upper portion of the control arm, label and disconnect the electrical connections.

STEP 8

CD00G055

Loosen the locknut, unscrew the control lever and remove the upper portion of the control arm.

NOTE: *When installing, tighten the locknut to a torque of 30 lb-ft.*

Section

8008

REMOVAL AND INSTALLATION OF THE SWING MOTOR

Section

8010

DISASSEMBLY AND REASSEMBLY OF THE HYDRAULIC PUMP (KAWASAKI)

Install the pilot spool (33) at (C) in the housing (38).

Install the lever (27), engaging the shaft (43) in the groove on the spool (33).

Install the plug (25) complete with the shaft (39) in the housing (38). Position the lever (27) correctly so that the shaft (39) is engaged in the orifice on the lever (27), then install the snap ring (23).

Install the plug (26) and the snap ring (24).

Install the spring (20), the spring seat (19) on the spool (34) and install the snap ring (18).

Install the spring (17).

Install the compensating piston (36), the sleeve (35), the spacer (41) and the piston (42) at orifice (B).

Install the cover (16) and tighten the screws (14).

Install the spring seat (13), the spring (12) and the spring guide (11) in the housing at (E) (see disassembly).

Install the spring seat (10), the inner spring (9), the outer spring (8) in the housing at (D) (see disassembly).

Install the cover (1) complete with adjusting screws (2), (3) and (6), the push-rod (4), the lock nuts (5) and (7).

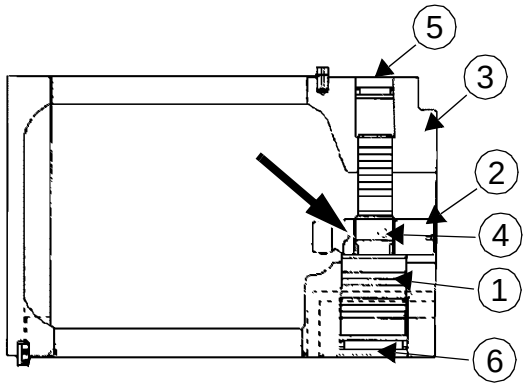
Install and tighten the retaining screws (15).

Pump assembly instructions

Assembly is done in the reverse order of disassembly, however, the following instructions need to be followed:

- Respect the reference marks made during disassembly.
- Lubricate the seals and the sliding parts.
- Do not mix the parts of the front and rear pumps.
- Use light Loctite when installing the control pivot.

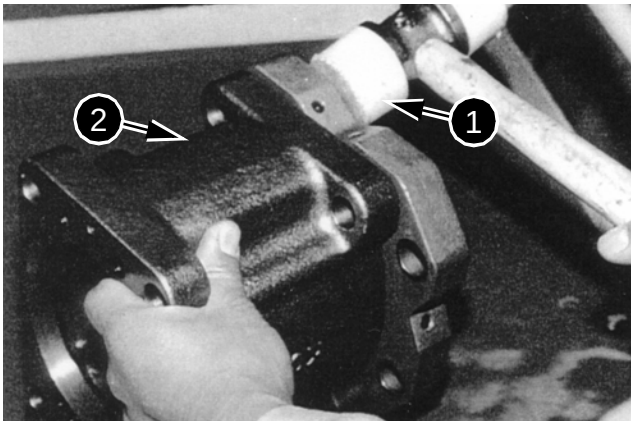
STEP 2



CI01G502

Install the control piston (1) and the control pivot (2) in the housing (3), coat with light Loctite that part of the control piston that is in contact with the control pivot (arrow). Position the pivot in such a way that the locking pin (4) is installed, wipe off excess Loctite. Lubricate the control piston (1) and its housing, fit new seals on the seal plates (5), (6) and install them in the housing (3).

STEP 3



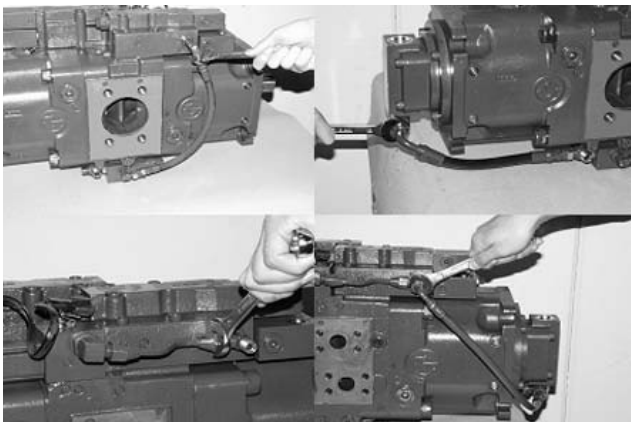
CD01G113

Fit a new O-ring on the flange (1). Install the flange (1) on the housing (2), respecting the reference marks made during disassembly.

REMOVAL

NOTE: *Always keep the components from different pumps separate from one another. During disassembly of the pump, place the components on a rubber mat. Handle the components carefully. Always mark the position of the parts.*

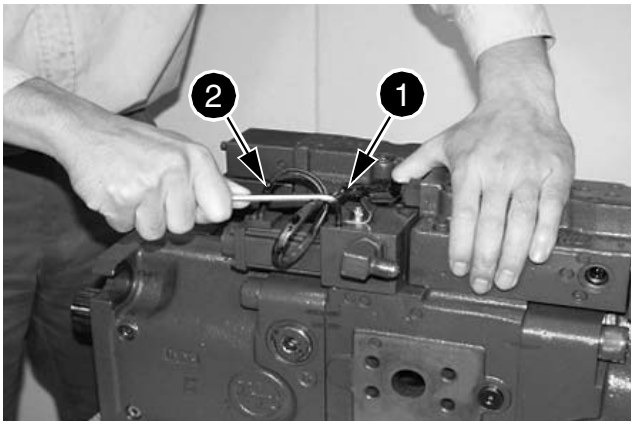
STEP 1



CD02B059

Remove the different hoses and connecting tube.

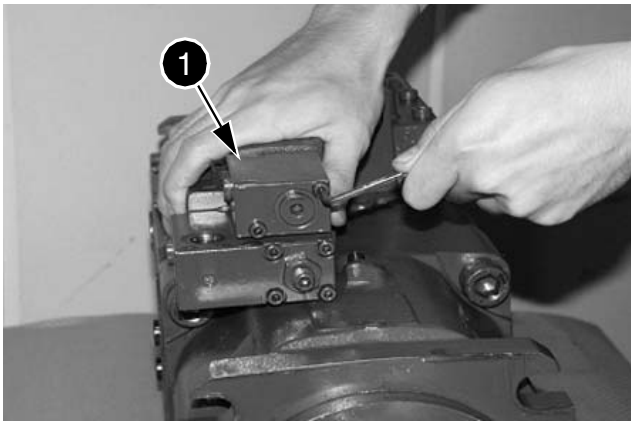
STEP 2



CD02B060

Remove the block (1) DRE4 K. Remove the electromagnetic proportional valve block (2).

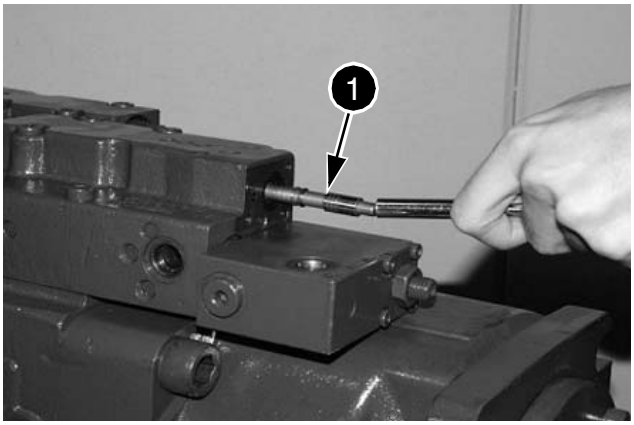
STEP 3



CD02B061

Remove the cover (1).

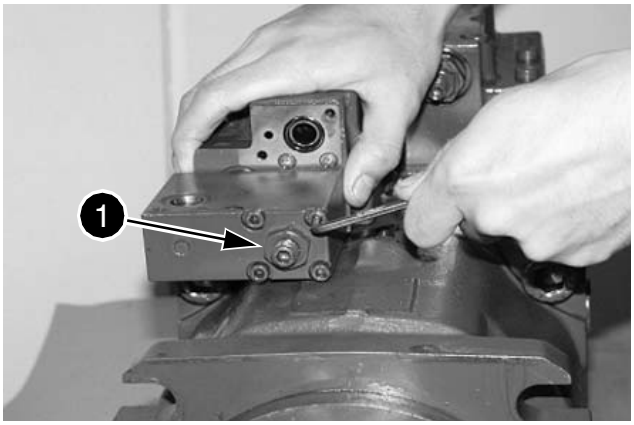
STEP 4



CD02B062

Extract the spool (1) using a magnet or nosed pliers and remove the link rod at the end of the spool (1).

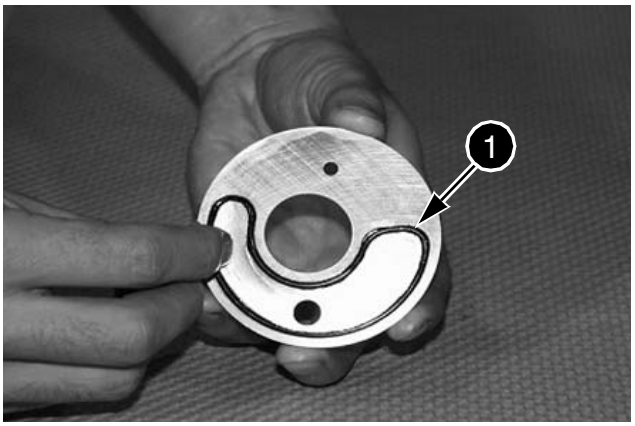
STEP 5



CD02B063

Remove the negative pressure control block and discard the seal without removing the pressure setting screw (1).

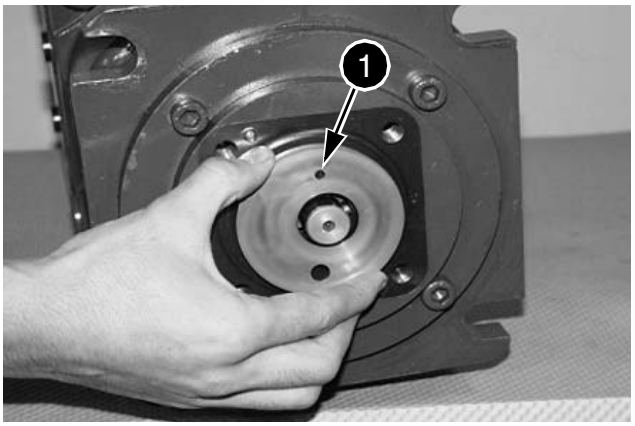
STEP 17



CD02B094

Install the O-ring (1) in the plate housing. Use adhesive to hold it in place.

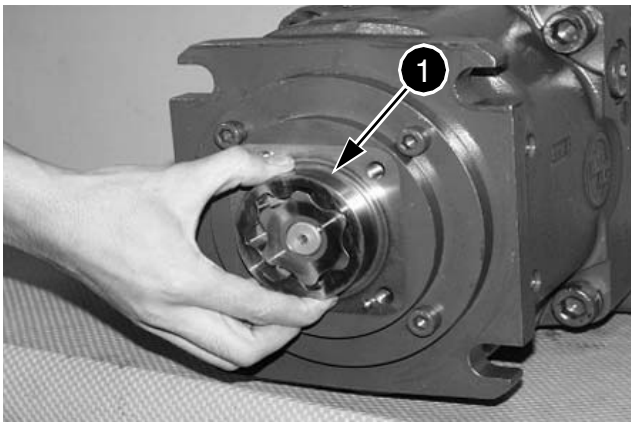
STEP 18



CD02B073

Install the pump plate (1) by positioning the port on the dowel pin.

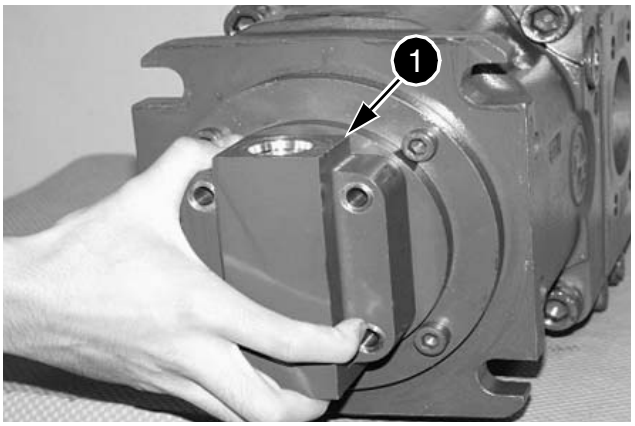
STEP 19



CD02B072

Install the rotor (1) on the pump body.

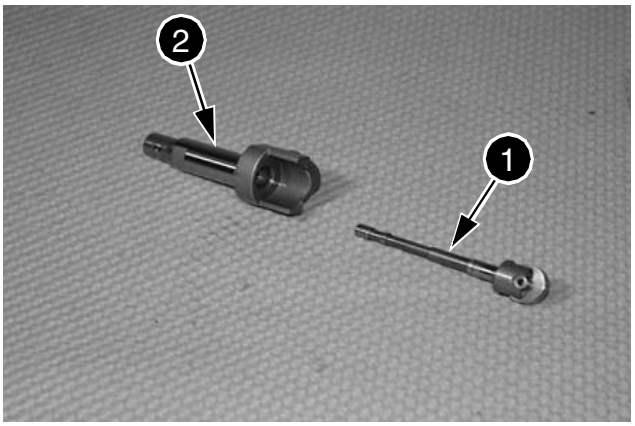
STEP 20



CD02B095

Install the pump cover (1) while respecting the reference marks made during removal. Install and tighten the screws to a torque of 40.5 to 50.8 lb-ft.

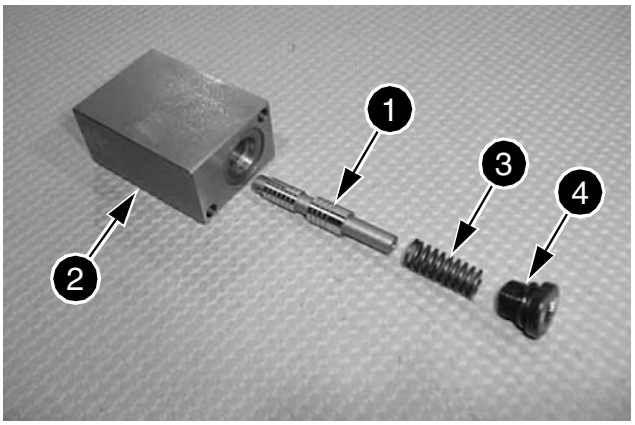
STEP 21



CD02B069

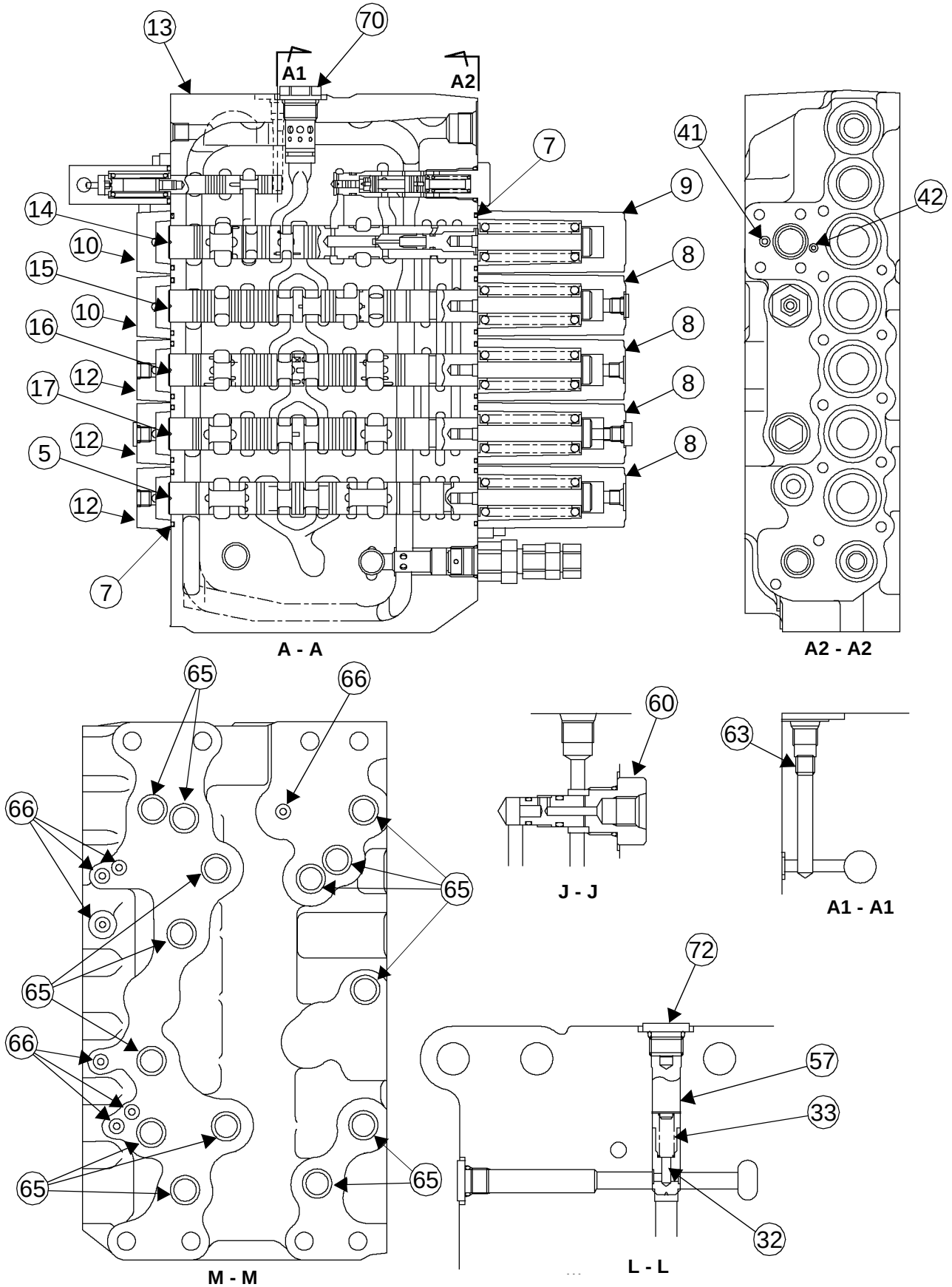
Oil and install the spool (1) in the guide (2).

STEP 22



CD02B068

Oil and install the piston (1) in the cover (2). Install the spring (3), install and tighten the plug (4) to a torque of 22.8 to 30.2 lb-ft.


13
70
A1
A2
7
41
9
42
14
10
8
15
10
8
16
12
8
17
12
8
5
12
7
A - A
A2 - A2
65
66
66
65
65
66
65
65
M - M
60
J - J
63
A1 - A1
72
57
33
32
L - L

CI01K539

STEP 7

Install the check valve (34) and the spring (35) (see section I-I), install the spacer (53) complete with an O-ring (54) and a back up ring (55).

NOTE: *Respect the positions of the O-rings and back up rings. Any wrong installation will cause lacerations to the O-rings and will encourage the cylinder to drift.*

STEP 8

Install the cap (52) using screws (75) and tighten to a torque of 29 to 32 lb-ft.

STEP 9

Install the O-ring in the option section (see section G-G), install the check valve (44) and the spring (45). Install the cap (43) and fasten it using screws (96). Tighten to a torque of 43 to 47 lb-ft.

STEP 10

Install the plug assembly (92) equipped with an O-ring. Tighten to a torque of 151 to 167 lb-ft.

STEP 11

Install the check valve (49) and the spring (48) on the travel portion (see section G-G). Install the plug (46) equipped with an O-ring (47). Tighten to a torque of 79 to 86 lb-ft.

STEP 12

Install the check valve (32) and the spring (33) on the dipper portion 1 (see section C-C). Install the plug (72) equipped with an O-ring. Tighten to a torque of 54 to 58 lb-ft.

STEP 13

Install the check valve (32), the spring (33) and the spacer (57) on the dipper portion 2 (see section L-L). Install the plug (72) equipped with an O-ring. Tighten to a torque of 54 to 58 lb-ft.

Load holding valve

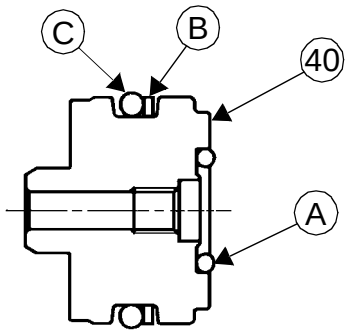
STEP 1

Install the O-rings (41) and (42) on the dipper control valve body 1 (see sections D-D and A2-A2) and boom 1 (see sections E-E and B1-B1).

STEP 2

Install the check valve (38) and the spring (39).

STEP 3



CS01K598

Install an O-ring (A) on the spacer (40), install the O-ring (C) and the back up ring (B).

NOTE: *Respect the positions of the O-rings and back up rings. Any wrong installation will cause lacerations and external leaks.*

STEP 4

Install the spacer assembly (40).

STEP 5

Install the load holding valve (67) and fasten it using screws (76). Tighten to a torque of 29 to 32 lb-ft.

Auxiliary assembly

STEP 1

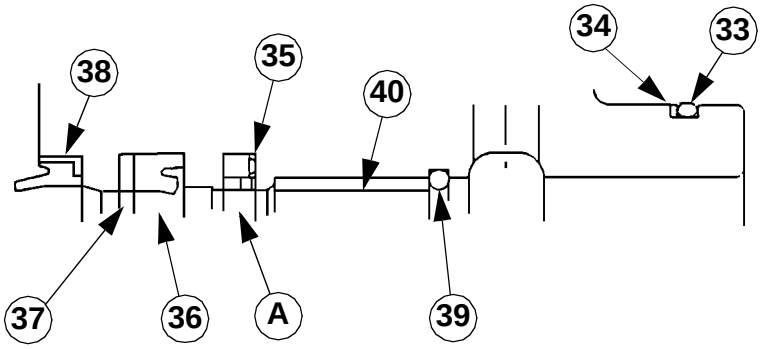
Install the caps (88) equipped with an O-ring (89) and fasten them using the screws (75). Tighten to a torque of 43 to 47 lb-ft.

STEP 2

Install the plugs (87) complete with an O-ring and a back up ring. Tighten to a torque of 57.5 to 65 lb-ft.

1 GREASE GUN
2 PLUG
3 O-RING
4 SCREW
5 SCREW
6 WASHER
7 PIPE CLAMP
8 HYDRAULIC PIPE
9 O-RING
10 HYDRAULIC PIPE
11 O-RING
12 SCREW
13 HYDRAULIC CLAMP
14 O-RING
15 SCREW
16 LOCKING WASHER
17 RETAINING CLIP
18 SCREW
19 BEARING
20 SCREW
21 STEEL BALL
22 PISTON NUT
23 PISTON
24 SEAL
25 BACK-UP RING
26 SEALING RING
27 SEALING RING
28 SHIM
29 RING
30 SNAP RING
31 CUSHION BUSHING
32 CUSHION SEAL
33 O-RING
34 BACK-UP RING
35 RING
36 SEAL
37 BACK-UP RING
38 WIPER SEAL
39 RETAINING RING
40 BUSHING
41 SEAL
42 CUSHION BUSHING
43 WIPER SEAL
44 BUSHING
45 CYLINDER ROD
46 CYLINDER BARREL
47 O-RING

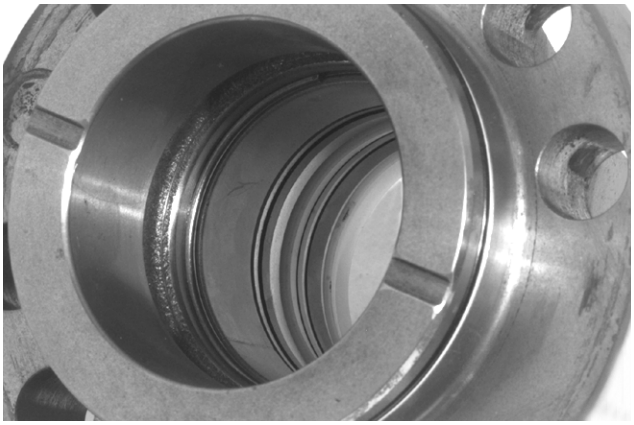
STEP 32



JS00649A

JD00650A

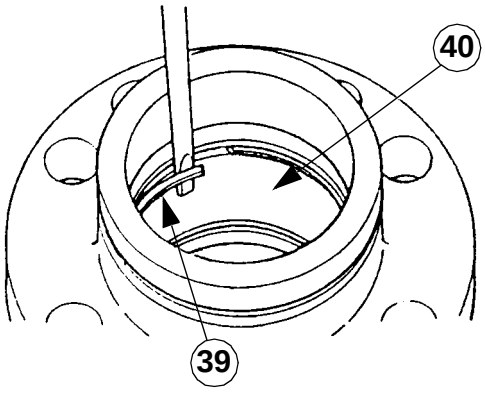
JD00651A



JD00652A

Remove and discard the O-ring (33) and back up ring (34). Remove and discard the back up ring (37) and the seal (36). Remove and discard the buffer ring (A) consisting of a ring (35). Remove and discard the wiper ring (38).

STEP 33



JS00653A

With a suitable tool, remove the retaining ring (39) from the bearing. Place the bearing on a press and with a suitable drift, force the ring (40) out of the bearing.

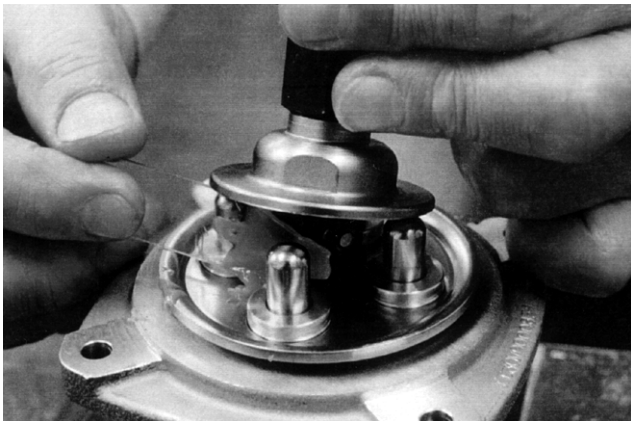
Section

8013

DISASSEMBLY AND ASSEMBLY
OF THE CONTROL LEVERS

June 2002

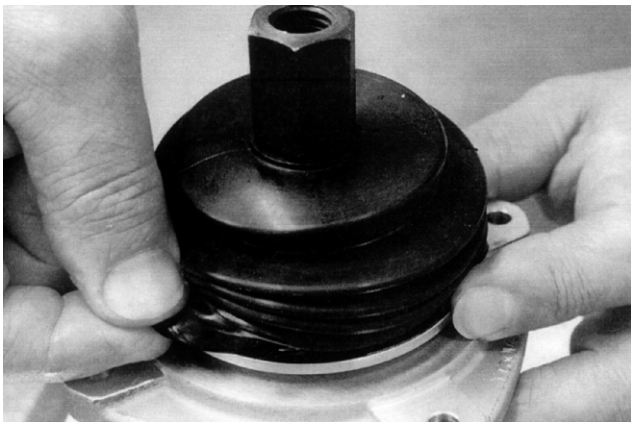
STEP 16



CD00G115

Place a few spots of grease on the push-rods.

STEP 17

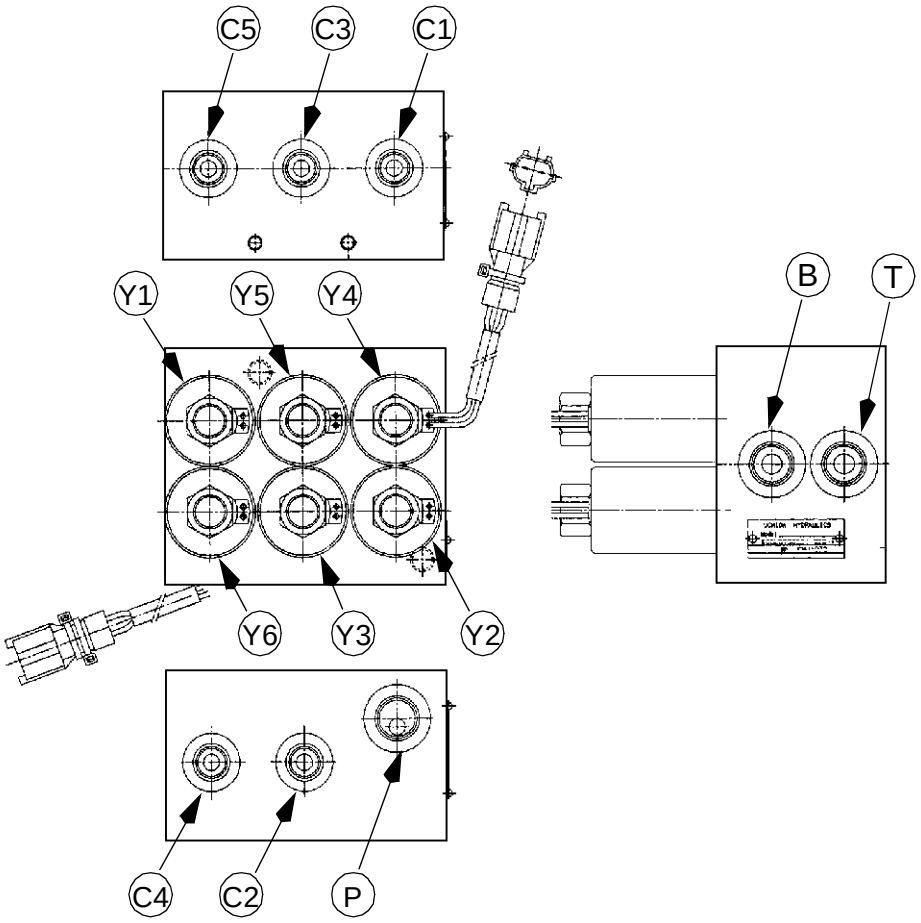


CD00G116

Install the protective boot (2) on the control lever.

SIX SOLENOID VALVES BLOCK

Identifying the ports and the solenoid valves

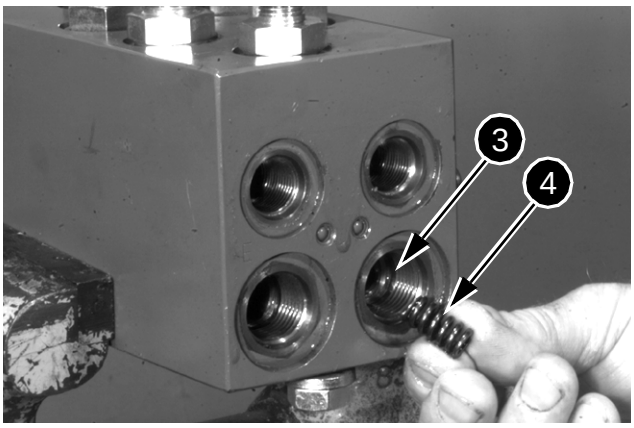


CS01C519

C1 HIGH SPEED CONTROL
C2 SWING BRAKE CONTROL
C3 POWER BOOST CONTROL
C4 CUSHION CANCELLATION CONTROL
C5 SWING CANCELLATION CONTROL
P SIX SOLENOID VALVES BLOCK POWER SUPPLY
B MACHINE CONTROL POWER SUPPLY
T RETURN TO THE RESERVOIR

Y1 SWING CANCELLATION SOLENOID VALVE (GREEN RING)
Y2 PILOT PRESSURE SOLENOID VALVE
Y3 SWING BRAKE SOLENOID VALVE (PINK RING)
Y4 HIGH SPEED TRAVEL SOLENOID VALVE (RED RING)
Y5 POWER BOOST SOLENOID VALVE (YELLOW RING)
Y6 CUSHION CANCELLATION SOLENOID VALVE (LIGHT GREEN RING)

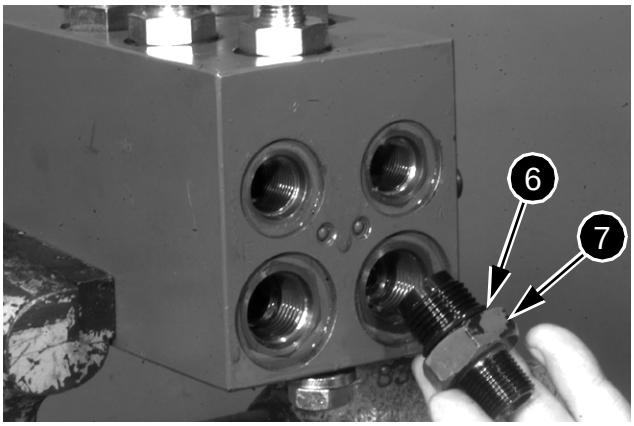
STEP 3



JD00561A

Install the spring (4) in the spool (3).

STEP 4



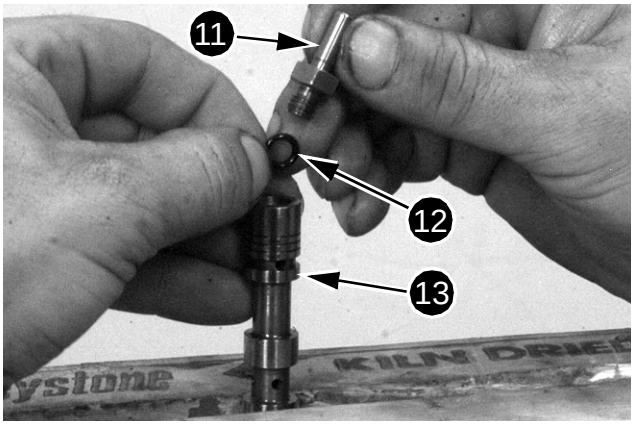
JD00562A

Install a new O-ring (6) on the flow restriction adaptor (7). Install the flow restriction adaptor in the control valve housing.

STEP 5

Repeat steps 1 through 4 for remaining three spools.

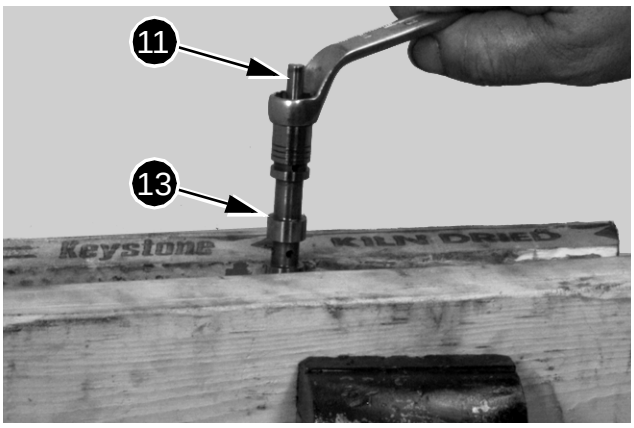
STEP 6



JD00554A

Install the spring guide (11) using a new O-ring (12) on the spool (13).

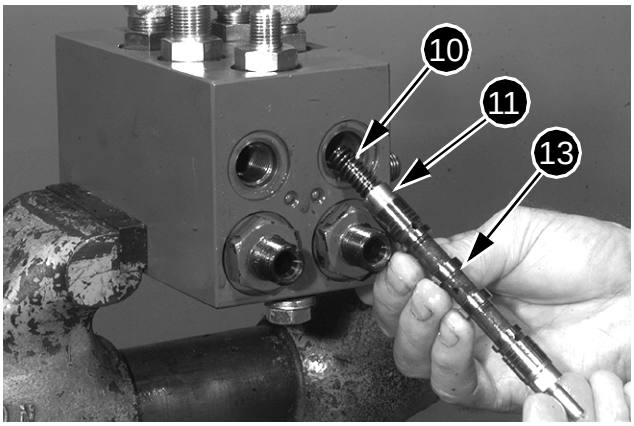
STEP 7



JD00563A

Place the spool (13) in a vice using wooden shims to protect it and tighten the spring guide (11).

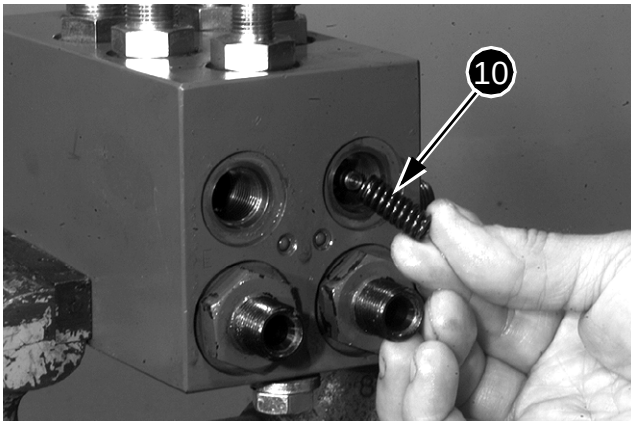
STEP 8



JD00564A

Install the spring (10), the spring guide (11) and the spool (13) in the groove of the control valve housing.

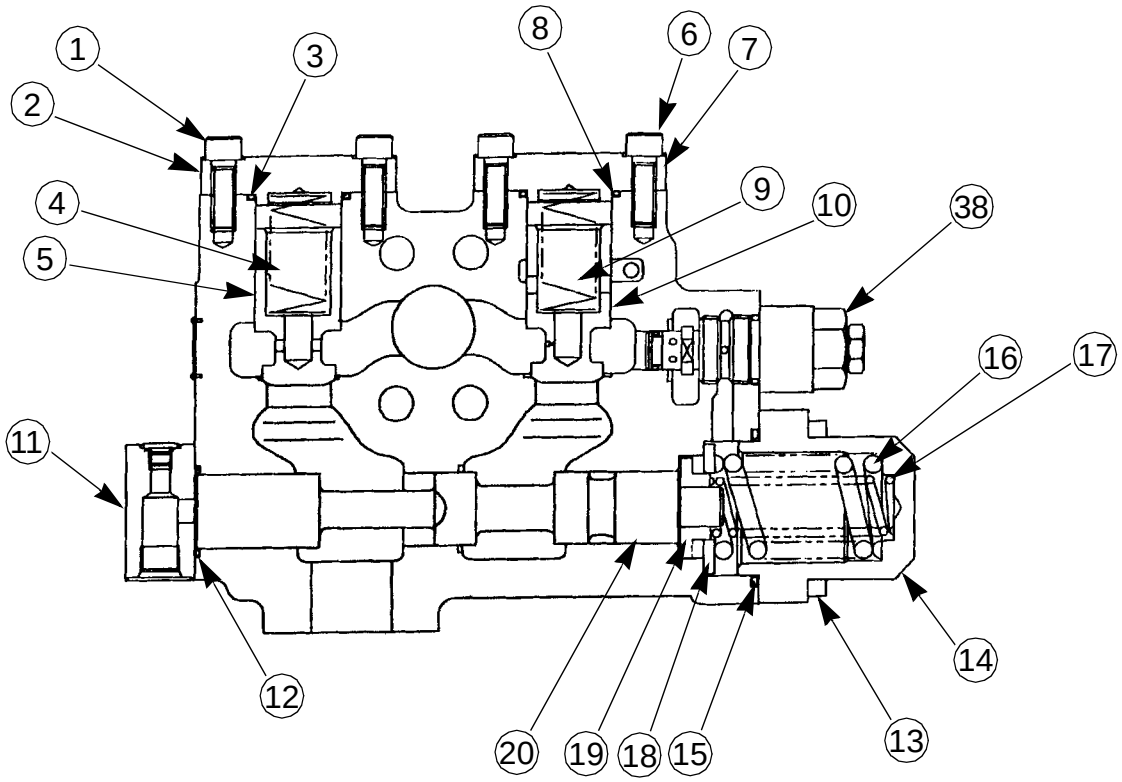
STEP 9



JD00565A

Install the spring (10).

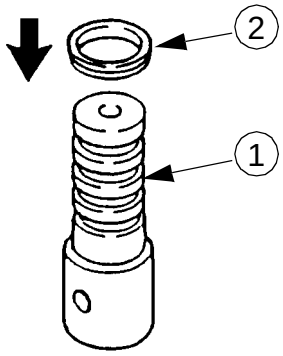
Disassembly



CS02C502

1. Remove the screws (1) and the cover (2), discard the seal (3).
2. Remove the spring (4) and the check valve (5) after marking their positions.
3. Remove the screws (6) and the cover (7), discard the seal (8).
4. Remove the spring (9) and the check valve (10) after marking their positions.
5. Remove the retaining screws from the spool stop cap (11), remove it and discard the joint (12).
6. Remove the screws (13) and remove the cover (14), discard the seal (15).
7. Remove the springs (16) and (17).
8. Remove the seats from the spring (18) and (19).
9. Remove the spool (20).
10. Remove the valve (38).

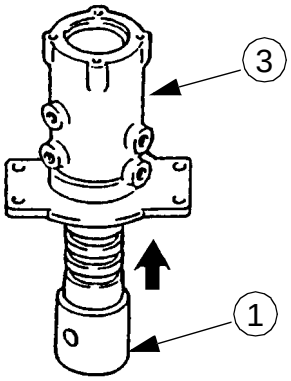
STEP 4



CS00G519

Install a new "V" seal (2) on the pivot (inner component) (1) and coat it with clean hydraulic oil.

STEP 5

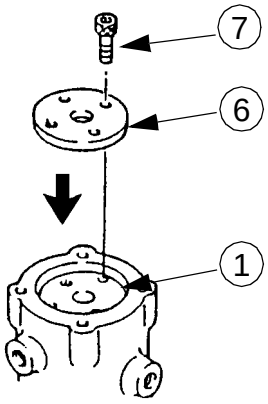


JS00037A

Insert the pivot (inner component) (1) in the bushing (outer component) (3).

NOTE: *Do not cut through the "V" seal, or graze it.*

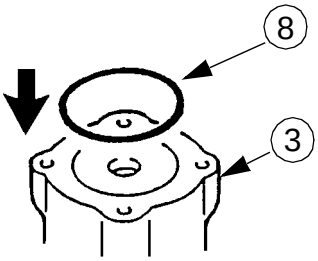
STEP 6



JS00038A

Install the thrust plate (6) and the screws (7).

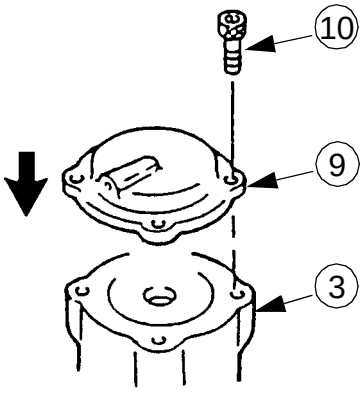
STEP 7



JS00039A

Install the O-ring (8).

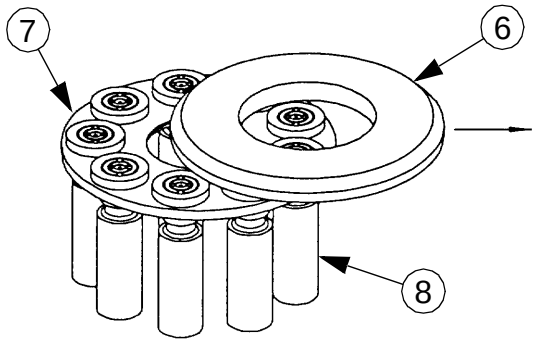
STEP 8



JS00040A

Install the cover (9) and the screws (10). Tighten the screws to torque (see page 2).

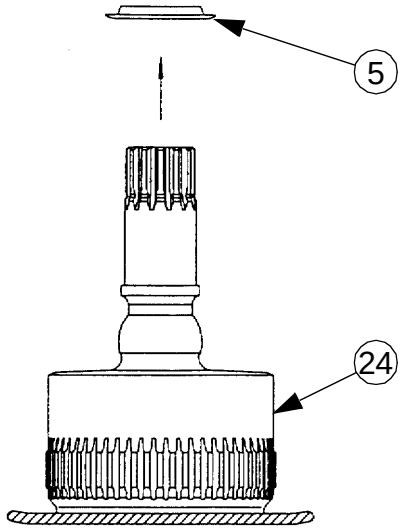
STEP 14



CS02C530

Slip the piston plate (6) out of the sliding surfaces of the piston assemblies (8), while ensuring that it does not get damaged. Remove the pistons from the base plate (7).

STEP 15



CS02C531

Remove the backup washer (5) from the fluted shaft.

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 0.017 in , 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

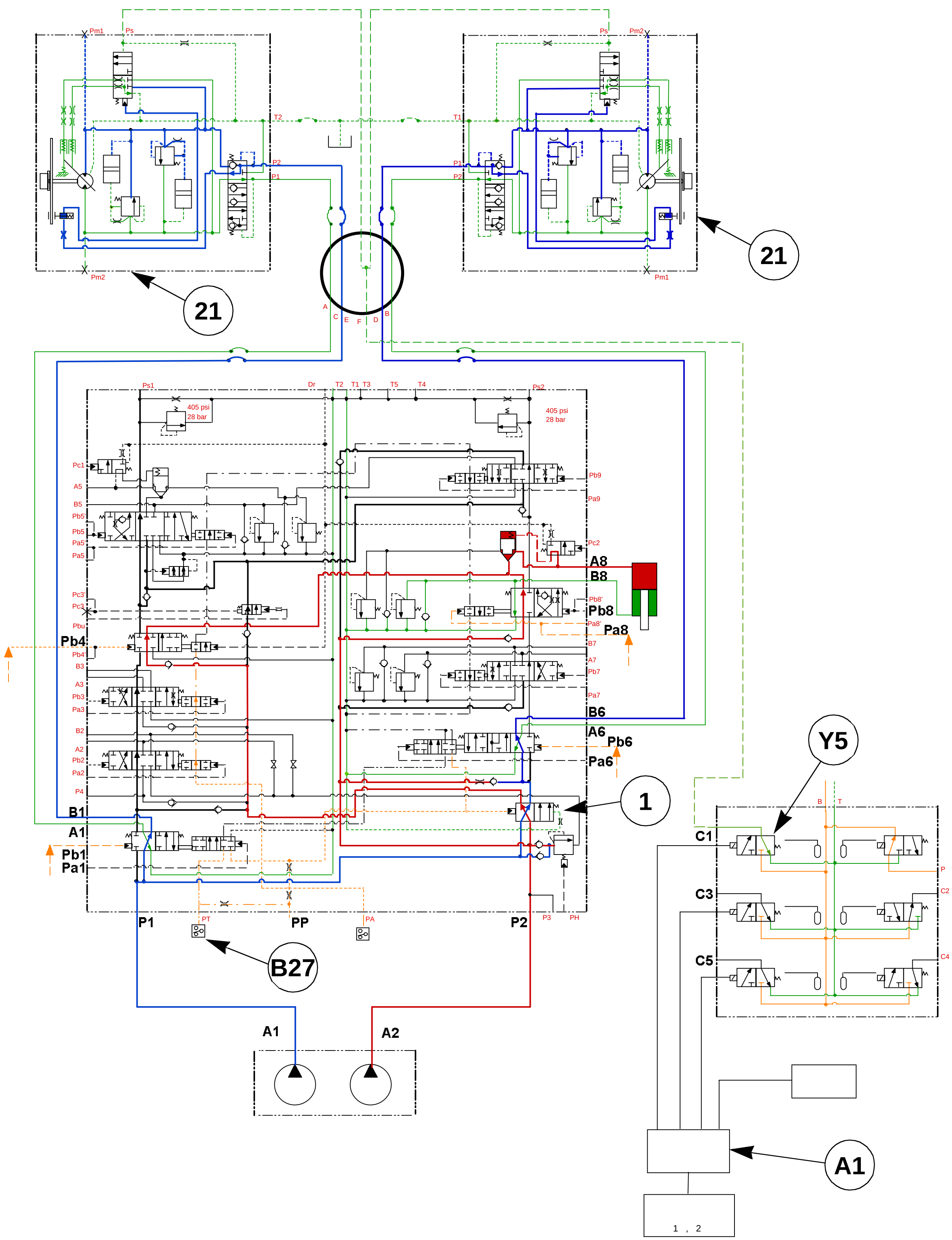
Check for signs of seizing, wear or damage on the cylinder piston bores. The motor should be replaced if there is evidence of seizing or if the piston bores are damaged.

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.

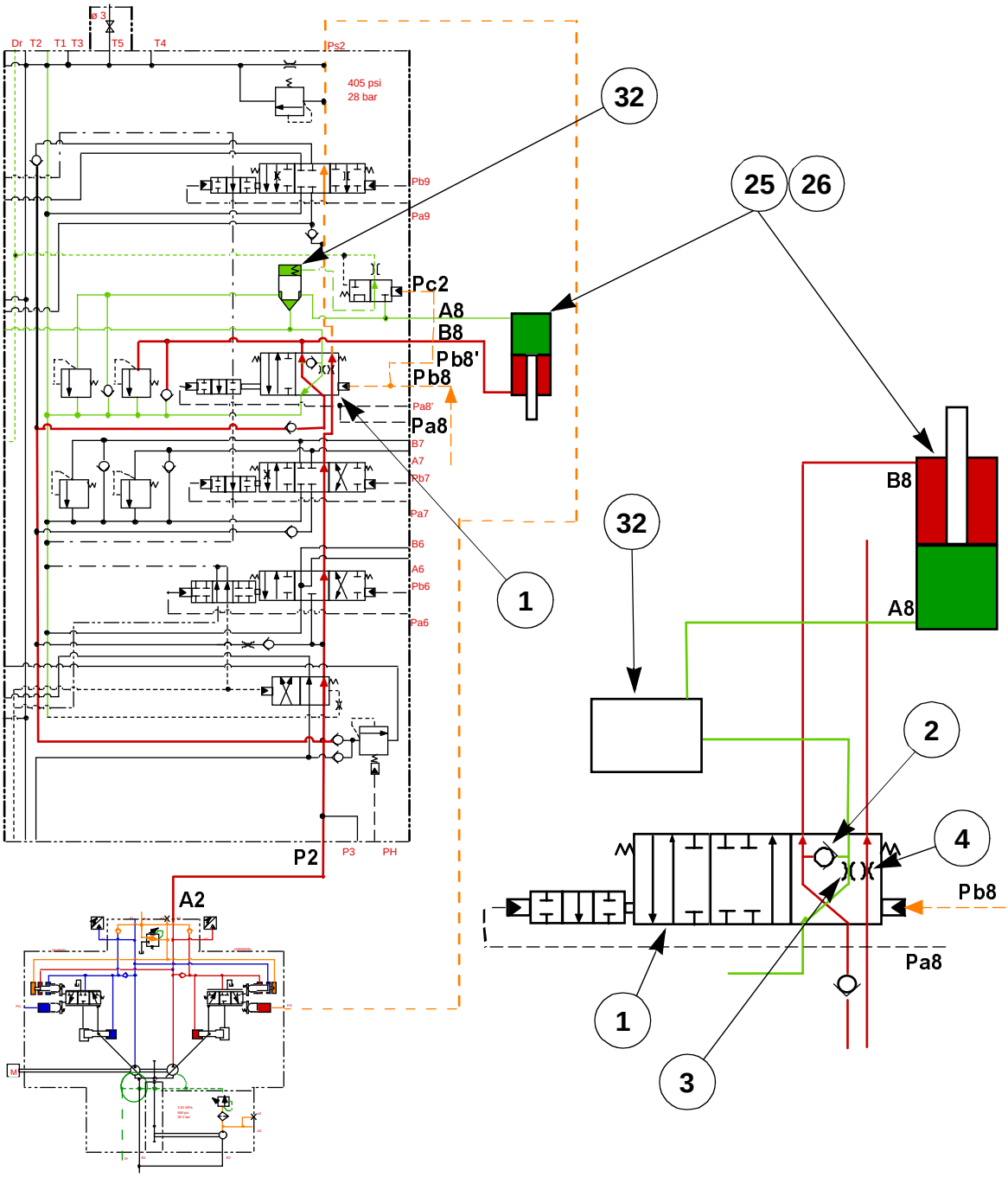
HYDRAULIC FUNCTIONS

List of functions

Functions	Description	Pages
Travel		
High speed	High speed is obtained by changing the motors from large displacement to small displacement. When the pressure increases too much, the motors automatically change to low speed. When the pressure is lowered, the motors automatically change back to high speed. The machine changes to 1st speed when the travel pressure is below 566 psi to prevent shaking when swinging in 2nd speed.	**Page 8**
Low speed	Low speed is obtained when the travel motors are changed to high displacement.	**Page 10**
Straight-line travel	If you want to use the attachment or the swing during travel, the machine will continue in a straight line without zig-zagging.	**Page 12**
Swing		
Braking	When the swing control is in the neutral position, the motor and reduction gear assembly is braked. When the swing is operated, the motor and reduction gear assembly brake is released. When the swing control is in the neutral position and the boom, dipper or bucket is used, the motor and reduction gear assembly brake is released. The swing is braked 5 seconds after putting the control in the neutral position or when the attachment is no longer operated. When the swing lock is engaged, the motor and reduction gear assembly is braked.	**Page 14**
Priority	The swing torque is maintained by the priority valve which is incorporated in the control valve. When working in a trench, the swing variable priority valve is actuated to provide sufficient flow to the dipper.	**Page 16**
Free swing operation	An orifice leak is opened between the A and B ports of the swing motor. This will provide smoother starts and stops of the swing during hoisting operation	**Page 18**
Anti-rebound	This function reduces the number of rebounds when the swing is stopped. A protective valve is mounted on the swing motor.	
Attachment		
Boom raising	An internal spool is used to provide two flows when raising the boom.	**Page 20**
Lowering the boom, load holding	Lowering the boom is made possible by unlocking the load holding system which is included in the control valve.	**Page 22**
Lowering the boom, additional supply	The continuous connection between the supply and the return, the acceleration and the flow reduction pressure information are controlled via the additional supply in the boom spool.	**Page 22**
Boom lowering, prevention of vibration	The pressure points are controlled by the circuit which keeps part of the supply flow for the free passage. This is used to reduce vibration.	**Page 22**
Extending the dipper	An internal spool provides two flows for the dipper.	**Page 24**


21
21
1
Y5
B27
A1
A1
A2
P1
PP
P2
B1
A1
Pb1
Pa1
Pb4
A8
B8
Pb8
Pa8
B6
A6
Pb6
Pa6
C1
C3
C5
405 psi
28 bar
1 , 2

CM00K015


Dr T2 T1 T3 T5 T4
Ø 3
Ps2
405 psi
28 bar
Pb9
Pa9
Pc2
A8
B8
Pb8'
Pb8
Pa8'
Pa8
B7
A7
Pb7
Pa7
B6
A6
Pb6
Pa6
P2
P3
PH
A2
32
25
26
1
B8
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32
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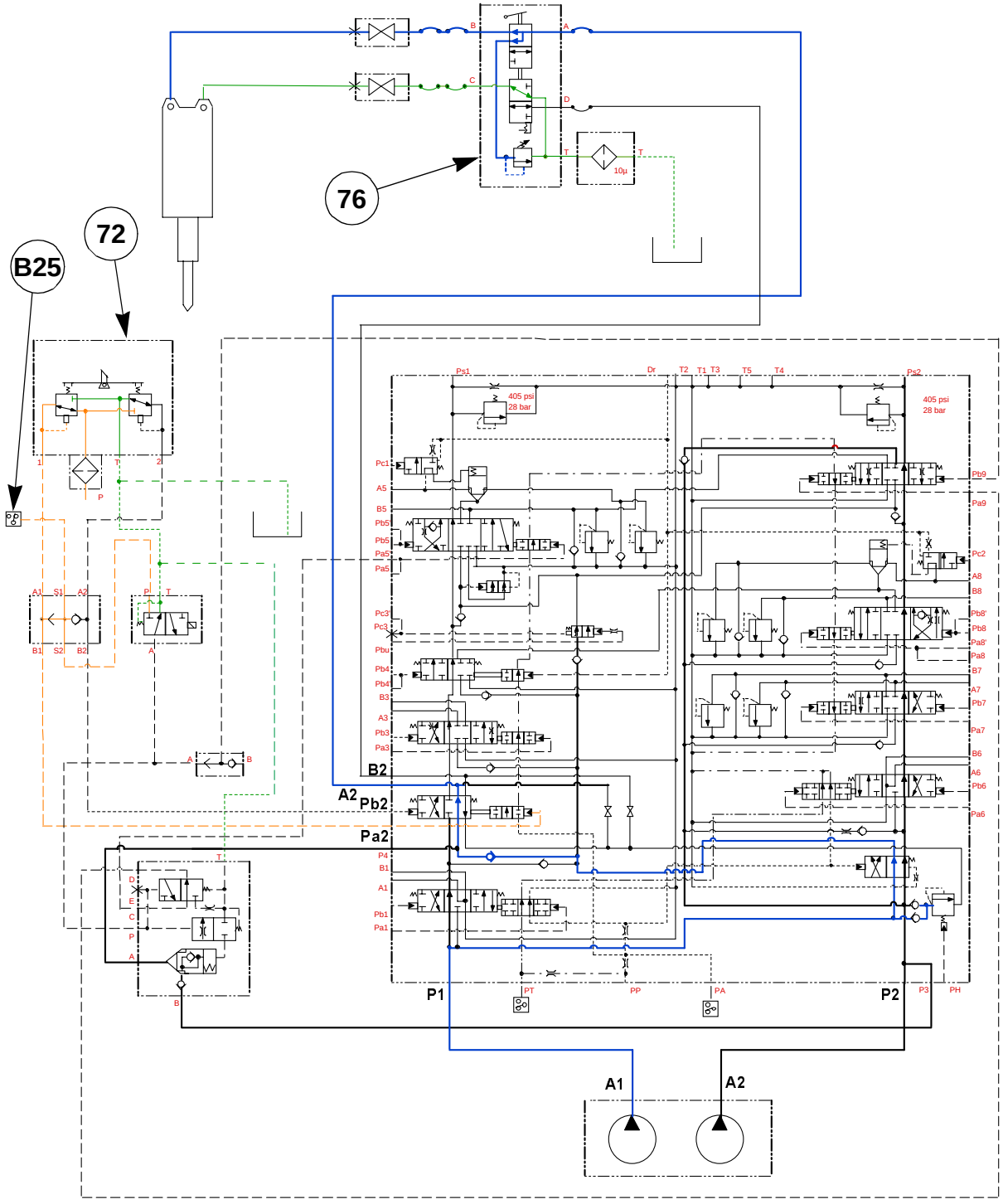
4
Pb8
Pa8
1
3

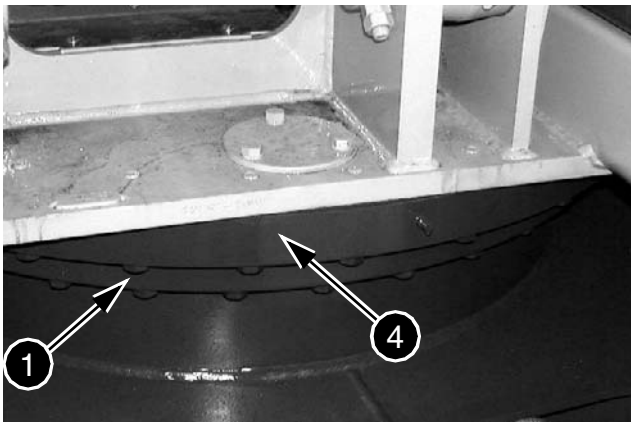
CM00K019



CM00K025

<table>
<tr><th>Items to measure and methods of measurement</th><th colspan="4">Criterion and remedy</th></tr>
<tr><td rowspan="2">4. Negative braking force
When the assembling is complete, measure the torque at start of rotation by placing a torque wrench at the end of the output shaft.</td><td>Table 6. Items and what to be inspected</td><td>Standard values</td><td>Allowable values</td><td>Remedy</td></tr>
<tr><td>Brake torque</td><td>665 lb-ft</td><td>600 lb-ft</td><td>Separator plate
Friction plate
Spring
Replace all of the above</td></tr>
<tr><td>5. Shaft
Use a roughness gauge and measure the extent of wear on the seal of the shaft.
6. Bearing
Replace bearings.</td><td colspan="4">Usable up to 0.0019 in of wear with steps.
Attention! Replace the oil seal (26) also when replacing the shaft.
Attention! The thickness of the shim (33) needs to be adjusted when replacing the shaft.
The bearings (30 and 31) need to be replaced before the hour meter records 10,000 hours of operation.
Attention! Replace the inner and the outer race also when replacing the bearings.
Attention! The thickness of the shim (33) needs to be adjusted when replacing the bearings.</td></tr>
<tr><td>7. Spline
Replace parts when the wear of the spline exceeds the allowable limit.</td><td colspan="4">The spline is reusable up to the 0.011 in of wear with steps at the contact surface.</td></tr>
<tr><td>8. Overload relief valve section
The pressure check and the adjustment of the overload relief section cannot be done unless the applicable test bench is available.</td><td colspan="4">Replace as a subassembly every 10,000 hours according to the main machine’s hour meter.</td></tr>
</table>

STEP 4



CD00G043

Coat the screw threads (3) with Loctite 262. Install the screws (3) to attach the turntable (4) to the undercarriage. Tighten the screws (3) to the torques specified on page 2.

STEP 5

Connect a suitable lifting device to the lifting rings located in front of the upperstructure, on top of the boom brackets, as well as to the rings installed on the upper frame behind the upperstructure.

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

NOTE: *When the upperstructure is lowered and touches the turntable and the crown wheel, make sure that the swing reduction gear pinion engages perfectly with the teeth on the upperstructure crown wheel.*

STEP 6

Carefully install the upperstructure in position on the turntable. Align the marks on the upperstructure and on the turntable. Check that the mounting ports of the upperstructure are aligned with those of the turntable.

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

STEP 7

Coat the screw threads (1) with Loctite 262. Install the screws (1) with flat washers (2) in the turntable and the upperstructure to fasten the upperstructure en position. Tighten the screws (1) to the torques specified on page 2.

STEP 8

Remove the lifting device then remove the lifting rings.

STEP 9

Refer to Section 8006 and reassemble the hydraulic swivel.

STEP 10

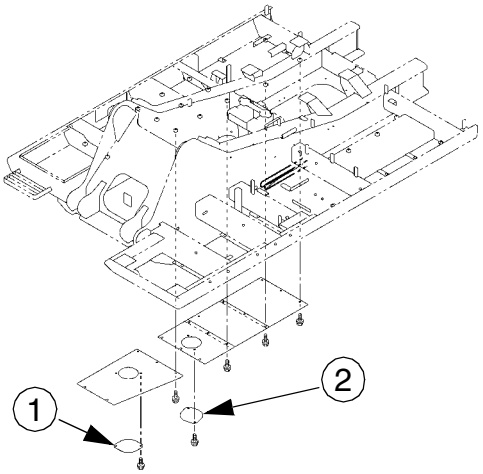
Refer to Section 9003 and reassemble the boom, the dipper and the bucket on the machine.

STEP 11

Make sure that the drain valve of the hydraulic reservoir is closed. For filling the reservoir refer to the chapter "Filling the reservoir" in the operator's manual.

NOTE: *See Section 1002 for the capacity of the hydraulic reservoir and the capacity of entire system.*

STEP 12



CS02C508

1 FUEL TANK LOWER ACCESS PANEL
2 HYDRAULIC RESERVOIR LOWER ACCESS PANEL

Install the access door (2) under the hydraulic reservoir, as well as the access door (1) under the fuel reservoir.

STEP 13

Make sure that the drain valves of the fuel and hydraulic reservoirs are closed, fill the reservoirs (see the operator's manual).

NOTE: *See Section 1002 for the capacity of the fuel reservoir and the hydraulic reservoir.*

STEP 6

Attach a suitable lifting device to the connecting rod (5) and position the connecting rod on the dipper. Install the bucket cylinder rod on the connecting rod (5) and the yokes (15), see Section 8005. Install the grease fittings (10).

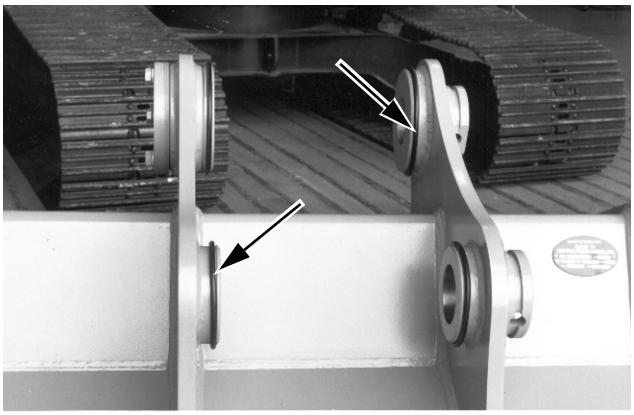
STEP 7

Install new dust seals (9) on the connecting rod (5).

STEP 8

Install new dust seals (20) on the dipper.

STEP 9



B9240128

Install new coupling shafts on the boss of the bucket.

STEP 10

Start the engine and align the dipper ports with the ports in the bucket.

STEP 11

Install the pin (3) through the bucket and the dipper. Install the screw (2).

STEP 12

align the ports of the connecting rod with the ports of the bucket and install the pin (8) through the bucket and the compensator. Install the screw (7).

STEP 13

Using a set of spacer rings, check that the play between the compensator and the bucket is 0.039 in to 0.13 in. If required, remove the screw (7) and the pin (8) and add one or more shims according to the requirement in order to get the correct play. Install the pin (8) and the screw (7).

STEP 14

Install the first nut (6) on the screw and tighten until the nut touches the boss on the connecting rod. Loosen a quarter of a turn and use two wrenches to tighten the second nut on the first. Do the same for the nuts (1) and the screw (2).

STEP 15

Push the coupling shafts back in their positions.

STEP 16

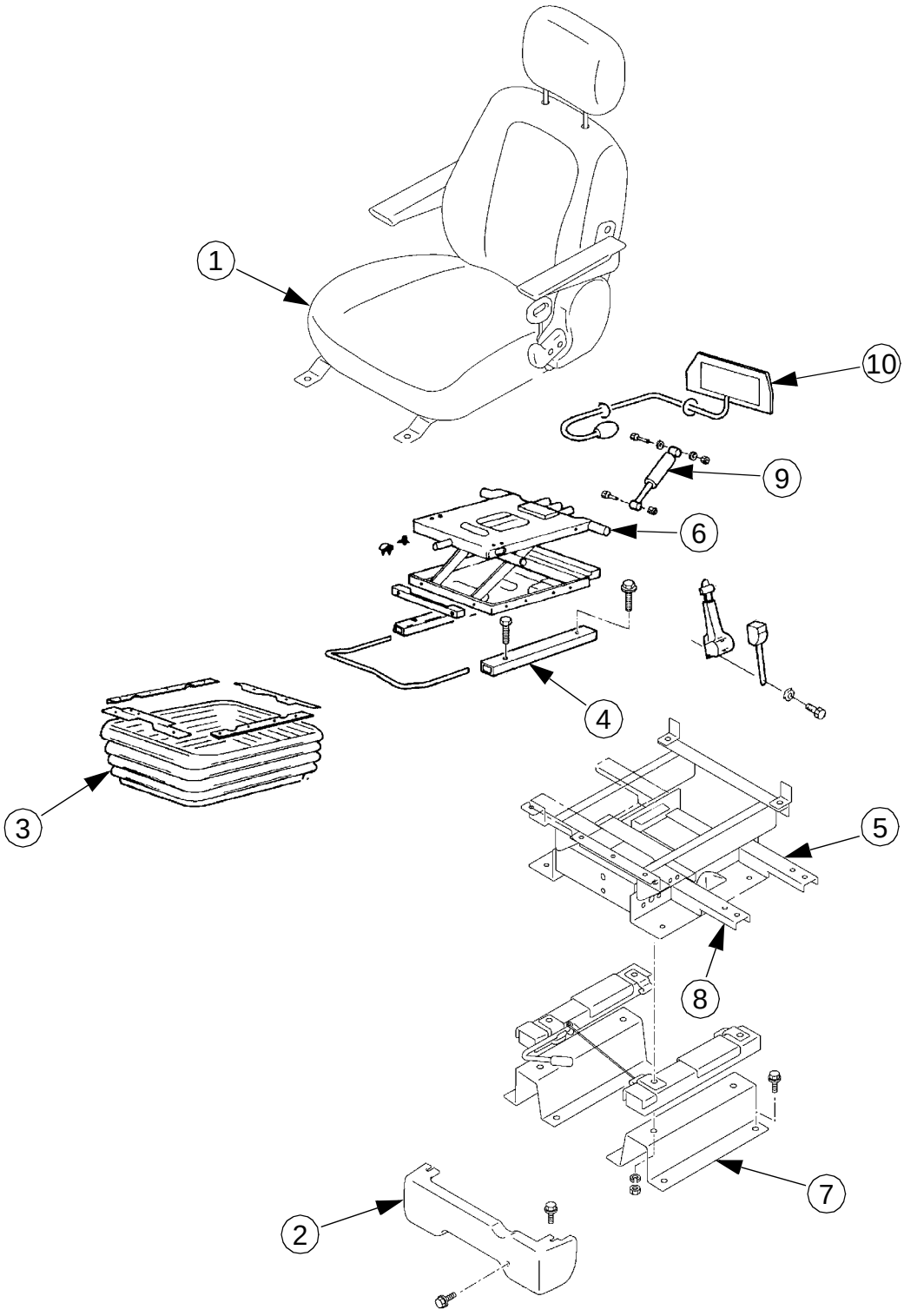
Grease the linkages.

STEP 17

Carry out the shimming of the bucket, see page 6.

OPERATOR'S SEAT

Description

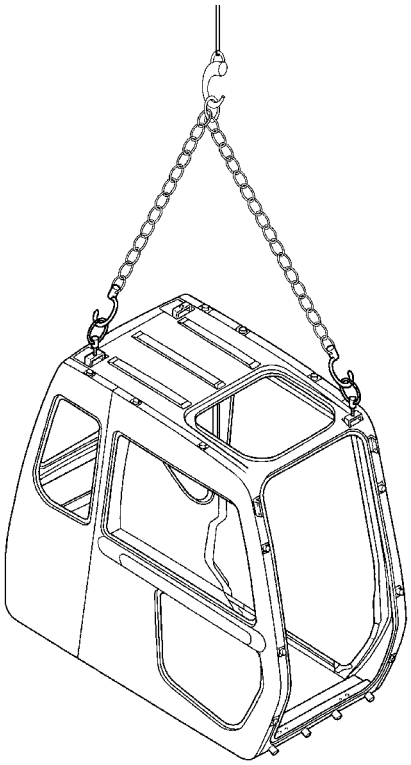


CS02A504

1 OPERATOR'S SEAT
2 MASK
3 BOOT
4 RAIL
5 REAR CONTROL ARM BRACKET
6 SHOCK ABSORBER
7 BRACKET
8 FRONT CONTROL ARM BRACKET
9 CYLINDER
10 BULB

NOTE: *Keep away from the cab while it is being lowered. Make sure that the cab is not damaged during lifting or lowering. Room for manoeuvre is very limited at the rear, on the sides and inside the cab.*

STEP 20



CI99G501

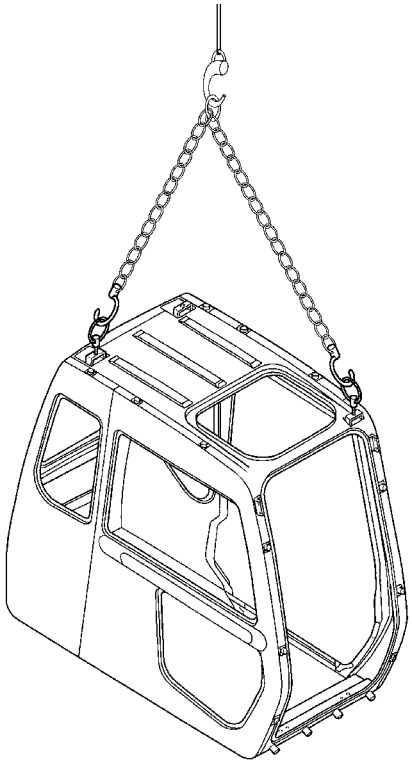
Using the lifting equipment, carefully raise the cab until it is completely away from the machine, then lower it to the ground.

NOTE: *The cab weighs 560 lbs.*

Installation

NOTE: *Keep away from the cab while it is being lowered. Make sure that the cab is not damaged during lifting or lowering. Room for manoeuvre is very limited at the rear, on the sides and inside the cab.*

STEP 1



CI99G501

Install suitable lifting rings on the top of the cab. Using suitable lifting equipment, raise the cab. Guide the cab so that it is correctly aligned with the mounting studs and orifices in the upperstructure frame.

NOTE: *The cab weighs 560 lbs.*

STEP 2

Install the screws and washers which fasten the cab to the upperstructure frame. Tighten them to a torque of 57 to 59 lb-ft.

STEP 3

Install the working light on the top of the cab.

STEP 4

Install the windshield wiper motor, see page 13 in this Section.