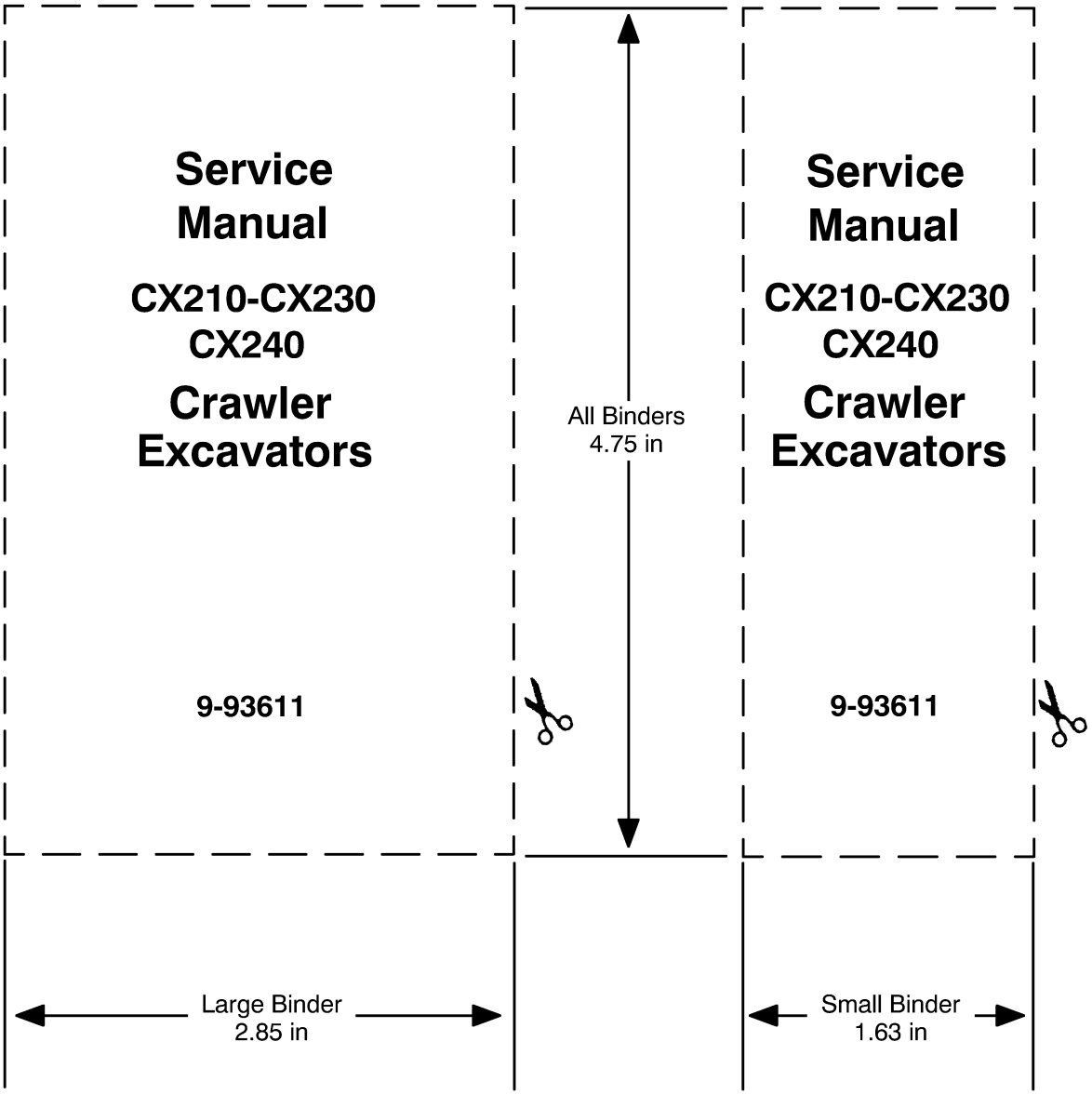

Service
Manual
CX210-CX230
CX240
Crawler
Excavators
9-93611
All Binders
4.75 in
Service
Manual
CX210-CX230
CX240
Crawler
Excavators
9-93611
Large Binder
2.85 in
Small Binder
1.63 in

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	[mm]	10	13	17	19	22	24	27	30
		[in.]	0.39	0.51	0.67	0.75	0.87	0.95	1.06	1.18
	Tightening torque	[Nm]	6.9	15.7	32.3	58.8	98.0	137.2	196.0	274.0
		[lb-ft]	5.1	11.6	23.9	43.4	72.3	101.2	144.6	202.4
Socket Head Cap Screw	Spanner	[mm]	5	6	8	10	12	14	14	17
		[in.]	0.20	0.24	0.32	0.39	0.47	0.55	0.55	0.67
	Tightening torque	[Nm]	8.8	21.6	42.1	78.4	117.6	176.4	245.0	343.0
		[lb-ft]	6.5	15.9	31.1	57.8	86.8	130.1	180.8	253.1

Control valve

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

Swing

	CX210/CX230	CX240
Fixed flow, axial piston motor.		
Automatic disc brake.		
Upperstructure swing speed	12 rpm	10,4 rpm
Displacement	151 cm^3	146 cm^3
Work output	155 l/min	182 l/min
Reduction ratio	16.757	22.097
Braking torque	≥ 739 Nm	≥ 806 Nm
Minimum brake pressure	29 bar	
Acceptable hydraulic motor leakage	xx l/min	xx l/min

Travel

	CX210	CX230	CX240
Two-speed, axial piston motor.			
Automatic disc brake.			
Slow speed	3.3 km/h	3,2 Km/h	3.4 km/h
Fast speed	5.7 km/h	5,3 Km/h	5.5 km/h

	CX210/CX230	CX240
Incline that can be overcome	70% (35°)	

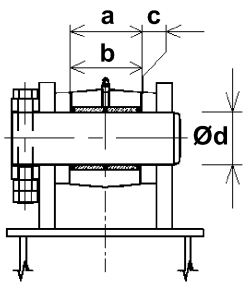
	CX210	CX230	CX240
Tractive force	18 340 daN	daN	19 100 daN

	CX210	CX230/CX240
Displacement	162.2/95 cm^3	168.9/100.3 cm^3
Work output	201 l/min	212 l/min
Reduction ratio	43.246	
Braking torque (including reducer)	20 900 Nm	
Number of turns at the sprockets (10 turns)		
Mode "S", fast speed	14.2±0.6 sec.	13±0.6 sec.
Mode "S", slow speed	23.4±0.7 sec.	21.4±0.7 sec.
Permitted deviation in travel over a distance of 20 m		
Mode "H", full speed	1 m	
Acceptable hydraulic motor leakage	xx l/mn	xx l/mn	xx l/mn

Undercarriage

	CX210	CX230	CX240
One-piece undercarriage with welded components.			
Lubricated rollers and idler wheels.			
Grease type track tension.			
Ground pressure			
with 550 mm track pads	0,54 Bar		
with 600 mm track pads	0.41 bar		0.47 bar
with 700 mm track pads	0.36 bar		0.42 bar
with 800 mm track pads	0.33 bar		0.37 bar
Track tension	280 to 300 mm		

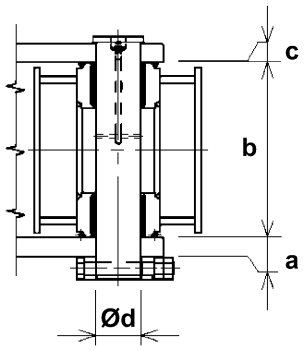
7. Bucket cylinder foot/Dipper



CS01B528

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	101	116
	Limit	107	122
b	Standard	100	105
	Limit	98	103
c (a - b)	Standard	0.5 to 3	0.5 to 3
	Limit	Shims	Shims
Ø d (pin)	Standard	75	80
	Limit	74	79
Ø d (ring)	Standard	75	80
	Limit	76.5	81.5

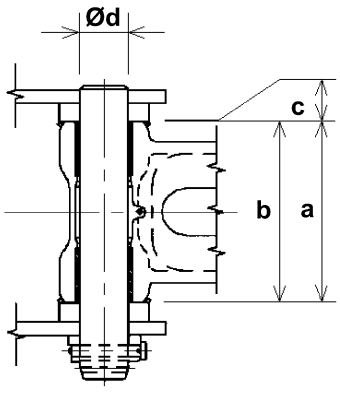
8. Connecting rod/Dipper



CS01B529

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	32	40
	Limit	30	38
b	Standard	296	316
	Limit	294	314
c (play)	Standard	1 to 1.5	1 to 1.5
	Limit	Shims	Shims
Ø d (pin)	Standard	75	80
	Limit	74	79
Ø d (ring)	Standard	75	80
	Limit	76.5	81.5

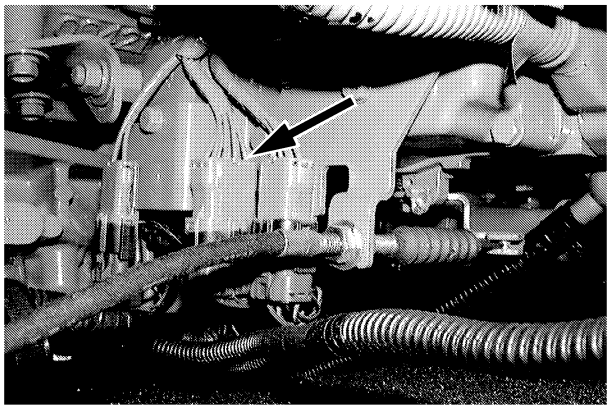
9. Compensator/Bucket



CS01B530

Marking		Dimension (mm)	
		CX210 CX230	CX240
a	Standard	307	317
	Limit	313	323
b	Standard	306	316
	Limit	304	314
c (play)	Standard	1 to 3.5	1 to 3.5
	Limit	Shims	Shims
Ø d (pin)	Standard	80	90
	Limit	79	89
Ø d (ring)	Standard	80	90
	Limit	81.5	91.5

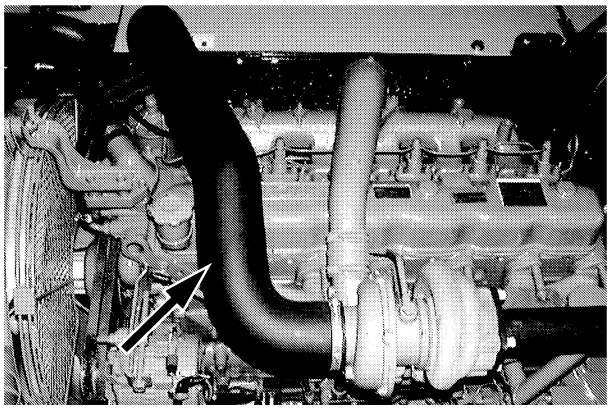
STEP 14



CD00J040

Label and disconnect the connectors to the electronic regulator and disconnect the fuel flow regulation resistance.

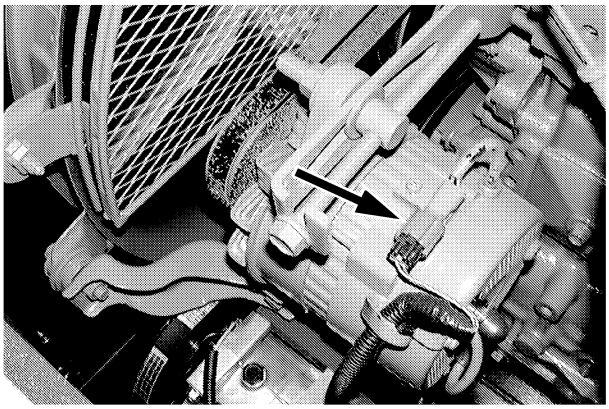
STEP 15



CD00J041

Remove the hose connecting the turbo-charger to the air filter.

STEP 16



CD00J042

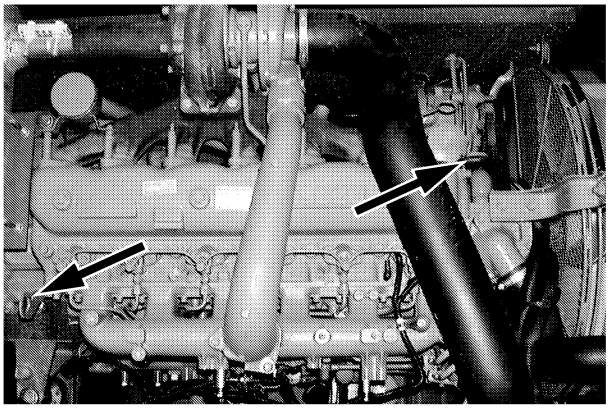
Label and disconnect the electrical connections to the alternator.

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

STEP 17

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

STEP 18



CD00J043

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

Section

3001

REMOVAL AND INSTALLATION OF THE FUEL RESERVOIR

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April 2001

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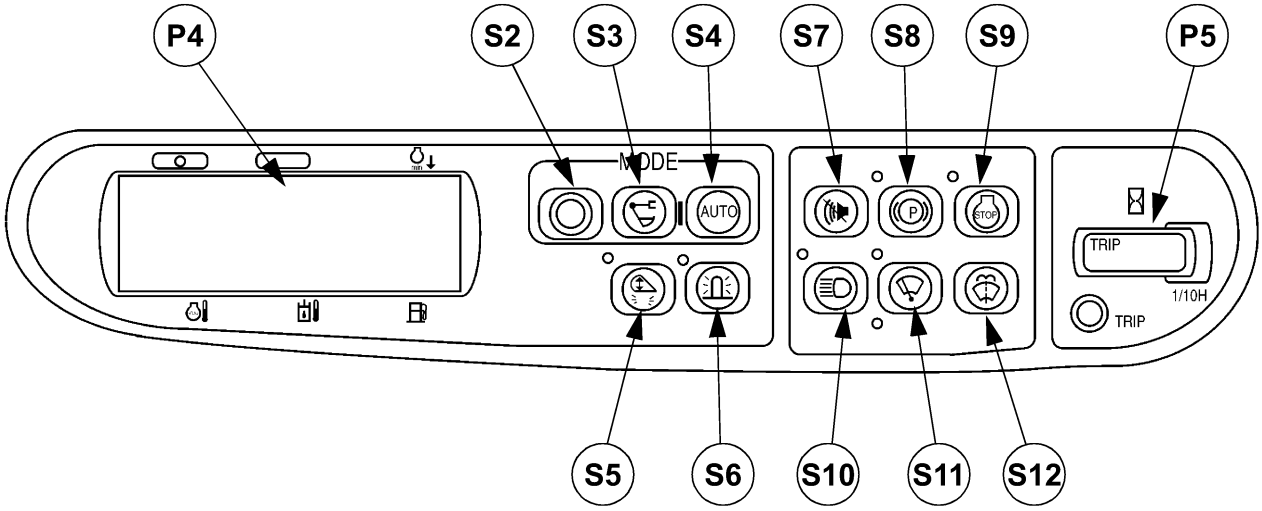
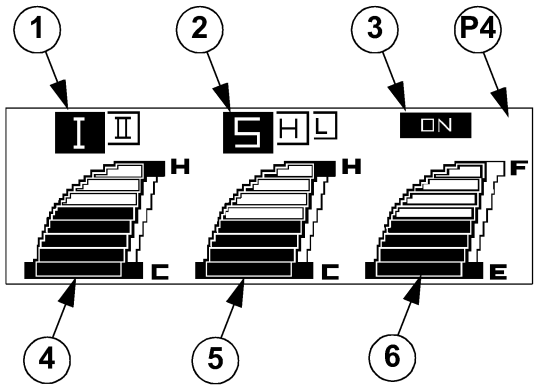
Instrument panel



CM00E001

P4 Monitor display
P5 Hourmeter
S2 Travel mode switch
S3 Work mode switch
S4 Auto mode switch
S5 Cushion control switch
S6 Rotary light switch
S7 Audible alarm cut out switch
S8 Swing brake switch
S9 Engine emergency stop switch
S10 Working light switch
S11 Wiper switch
S12 Washer switch

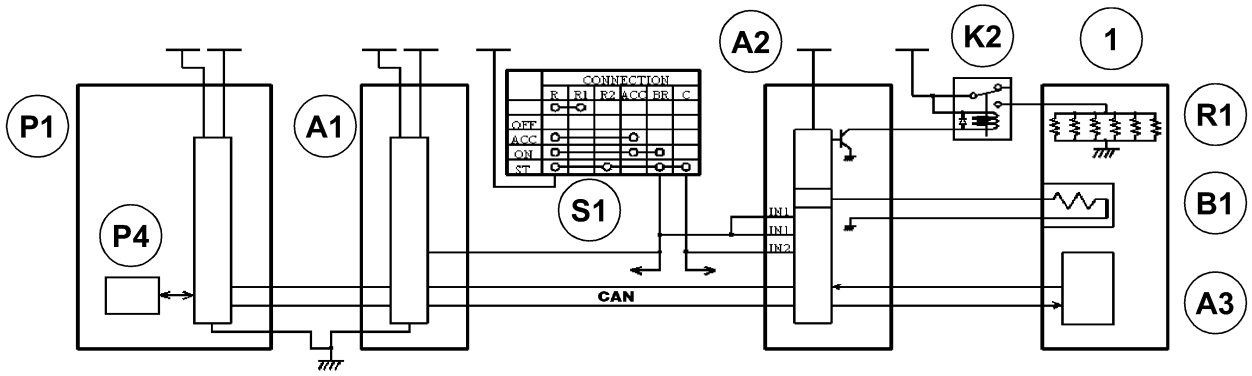


CS00F521

1 Travel speed indicator
2 Work mode indicator
3 Idle mode indicator
4 Coolant temperature indicator
5 Hydraulic oil temperature indicator
6 Fuel level indicator

Automatic engine preheat

1) Circuit configuration



CS01N574

1 Engine
A1 Computer
A2 Engine controller
A3 Electronic acceleration
B1 Coolant temperature sensor
K2 Relay-glow plug
P1 Instrument panel
P4 Monitor display
R1 Glow plug
S1 Key switch

2) Operation

1. Once the ignition is turned on (IN1 = ON), the computer (A1) calculates the preheat time (Tp) based on the coolant temperature (see graph).

2. The engine controller (A2) activates the preheat relay (K2) during the preheat time (Tp) previously calculated, and transmits a signal to the computer (A1).

3. After the preheat period (Tp), the preheat relay (K2) remains activated for 2 seconds.

4. When the ignition key (S1) is turned to "START" (ST, IN2 = ON), the engine controller (A2) reactivates the preheat relay (K2) but does not transmit a signal to the computer (A1).

5. The engine controller (A2) after preheat time (Ta) based on the coolant temperature (see graph).

6. After the ignition key (S1) returns from "START" to "RUN" (IN1 = ON; IN2 = OFF), the engine controller (A2) activates the preheat relay (K2) for the after-preheat time (Ta).

7. During the after-preheat time (Ta), the message "ENG. PRE HEAT" appears on the monitor display (P4).

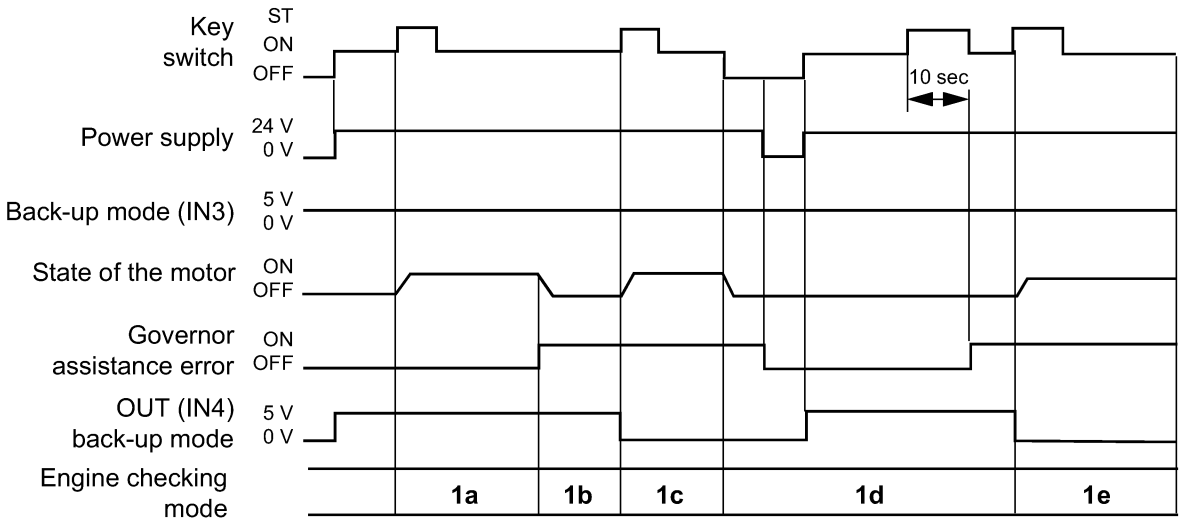
8. The checking system mentioned above starts immediately, once the ignition is turned on, the message "ENG. PRE HEAT" appears on the monitor display (P4) only if the preheat time is greater than 3 seconds (coolant temperature less than -5°C).

NOTE: *When the ignition is turned on, the "CASE" logo is displayed on the monitor display (P4) for 3 seconds.*

3) Back-up mode checking

1. The engine controller (A2) stops the engine by cutting off fuel injection, if an electronic acceleration (A3) governor assistance error is detected during the operation or starting of the engine (1).
2. After the engine (1) stops because of a governor assistance error, the engine can be restarted in back-up mode (IN3 = ON = GND).
3. When running in back-up mode, the engine controller (A2) checks only the position of the rack using the engine rpm obtained by the engine rpm sensor (B41). Thus the normal operation of the engine (1) cannot be obtained, but the back-mode has been activated.

4) Timing diagram



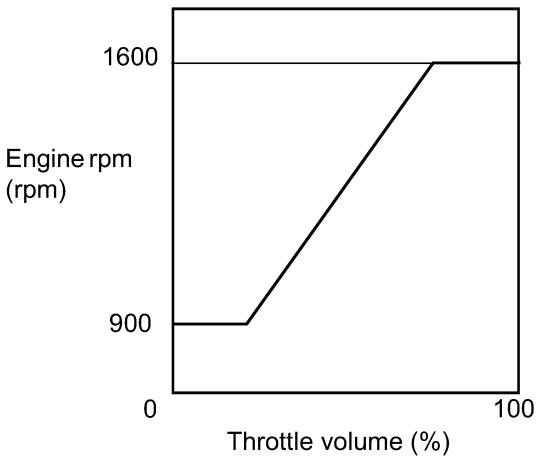
1a. Normal
1b. Stop
1c. Back-up mode
1d. Stop
1e. Back-up mode

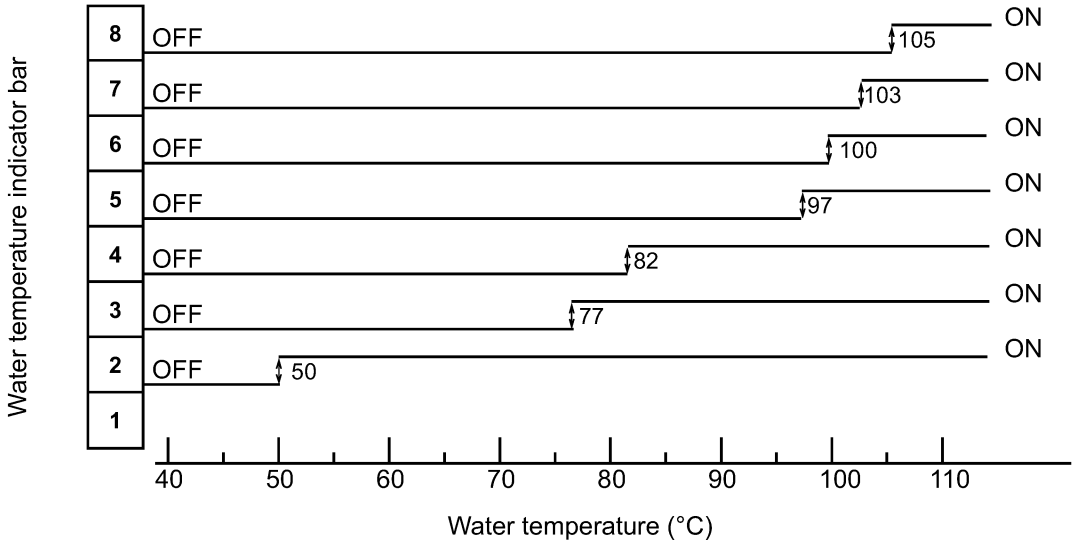
5) Checking the engine when the back-up mode is in operation

The engine controller (A2) determines the target engine rpm according to the position of the throttle volume (R3).

The engine controller (A2) checks the position of the electronic acceleration (A3) rack by analysing the difference between the actual engine rpm (1) obtained by a signal from the rpm sensor built into the electronic acceleration (A3) (or by the engine rpm sensor (B41) installed on the bowl of the motor) and the target rpm.

In back-up mode, the engine rpm (1) is checked only by the throttle volume (R3). Throttle volume (R3) checking is different from checking in normal conditions.





2) Operation

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

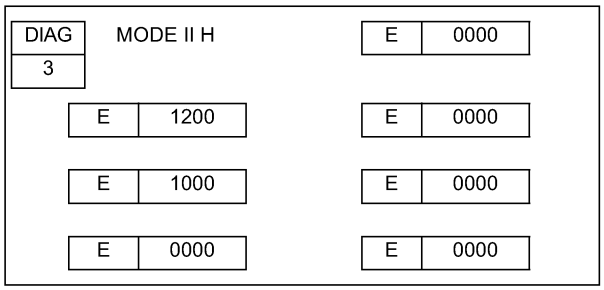
B. The engine controller (A2) sends the converted signal to the computer (A1) via the CAN connection (3).

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.



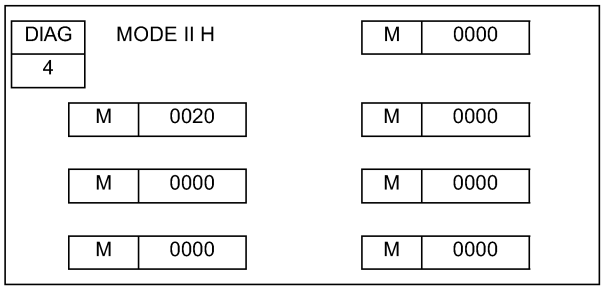
E: Failure code

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

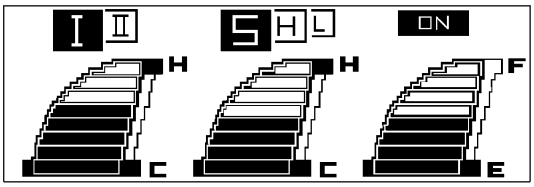
Example:

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:

CS00F533

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.

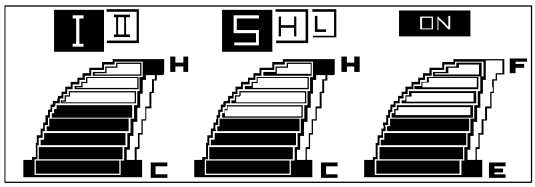
MACHINE : SH0120- 3	
TERRITORY : 3	LANGUAGE : 5
CONT. P / N	KHR2668
E. CONT. ERROR	

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

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.

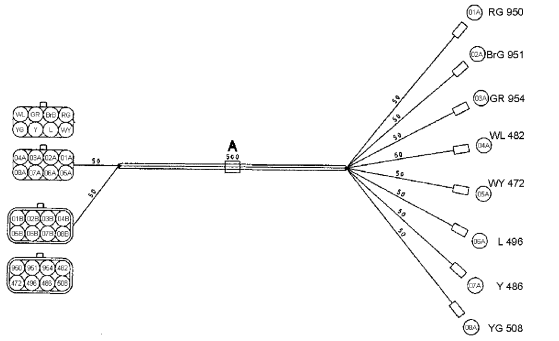
MACHINE : SH [?] - 3	
TERRITORY : ?	LANGUAGE : ?
CONT. P / N	KHR2668

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.

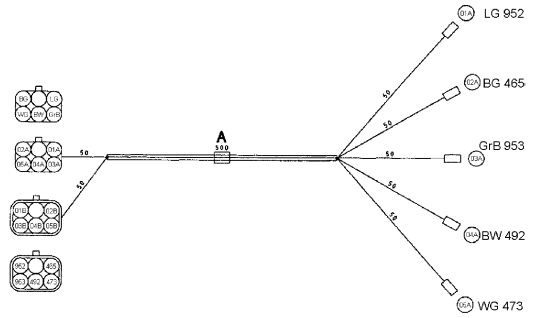
Overheating (continued)

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 (DIAG4) 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.		



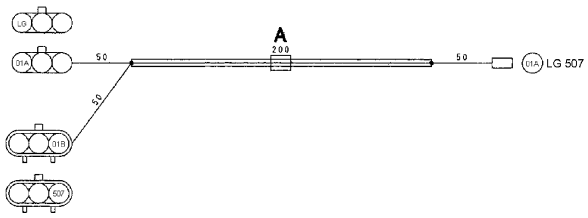
CS00J512

18. For electronic acceleration (RED4)



CS00J513

19. For electronic acceleration (RED4)

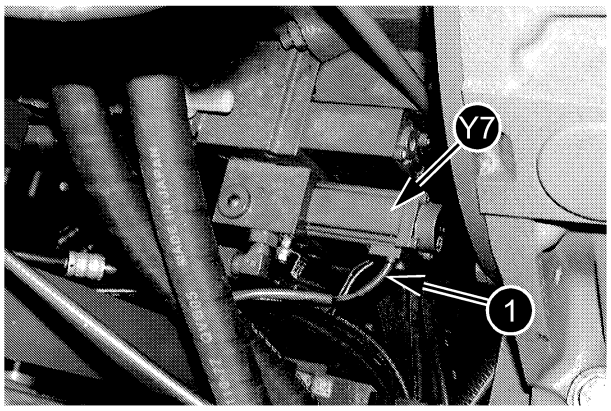


CS00J514

20. For electronic acceleration (RED4)

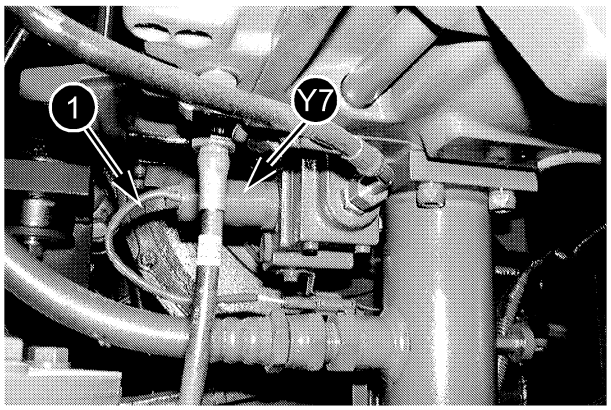
Proportional solenoid

CX130/CX160/CX180



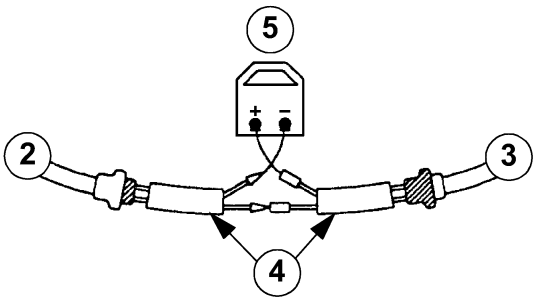
CD00F021

CX210/CX230/CX240



CD00F022

1. Disconnect connector (1) from the main pump proportional valve (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).

NOTE: *The + terminal of the meter should be connected to wire BrB (brown/black) on the service connector coming from the main harness and the - terminal to wire BrB (brown/black) on the service connector coming from the hydraulic pump.*

INSPECTING THE BATTERY

NOTE: *To carry out a correct inspection of the battery, carry out each step of the inspection; this will enable you to find out the real condition of the battery.*

Visual checks

- Check cable connections are clean and correctly tightened. Remove all foreign bodies from the top of the battery.
- Check there is no damage to the battery housing, terminals and cables.
- Check the electrolyte level, see page 4.
- If you have added water to the battery, charge the battery for 15 minutes at between 15 and 25 amps to allow the water to mix correctly with the electrolyte.

Checking the specific gravity

Use an acid hydrometer to check the specific gravity of the electrolyte. The specific gravity shows the charge level in each cell.

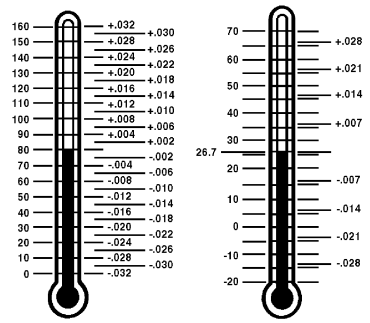
Acid hydrometers are designed to show the correct specific gravity when the electrolyte is at a temperature of 26.7°C.

Before checking the specific gravity, check the temperature of the electrolyte. If the hydrometer does not have a thermometer, use a thermometer to measure the temperature of the electrolyte. The thermometer must be graduated to at least 52°C.

1. Remove enough electrolyte from each cell to allow the float to move freely in the tube.

NOTE: *If it is not possible to check the specific gravity without first adding water to each cell, charge the battery for 15 minutes at between 15 and 25 amps 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 higher than 26.7°C, add specific gravity points to the reading to obtain the specific gravity. If the reading is lower than 26.7°C, subtract specific gravity points from the reading to obtain the specific gravity. See the illustration below and add or subtract specific gravity points as required.



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 minimum 0.050, charge the battery and check the specific gravity again. If, after charging, the difference is still minimum 0.050, install a new battery.

NOTE: *When the battery is changed, do not install a used battery with a new battery. That would reduce the life-time of the new battery.*

Section

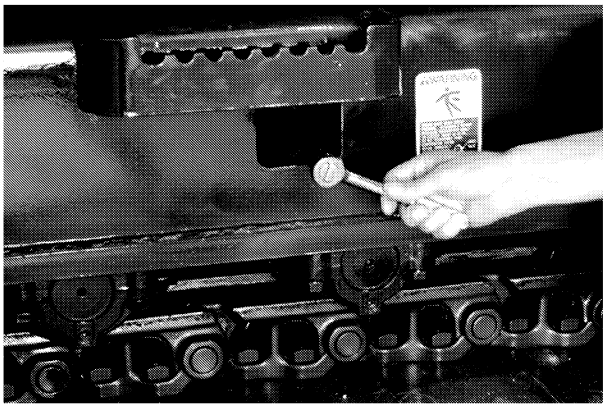
5001

REMOVAL AND INSTALLATION OF THE TRACKS SET

Printed in France
April 2001

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.

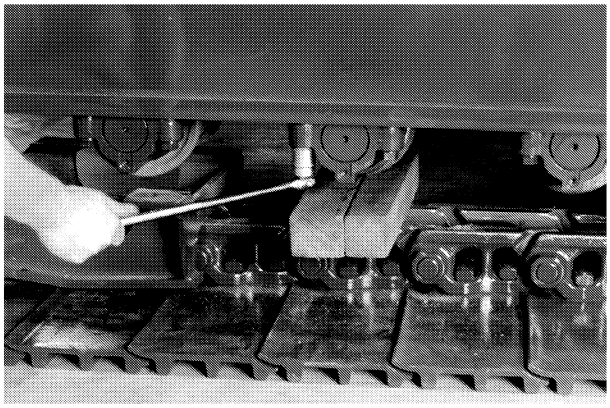
Installation

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 caps 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

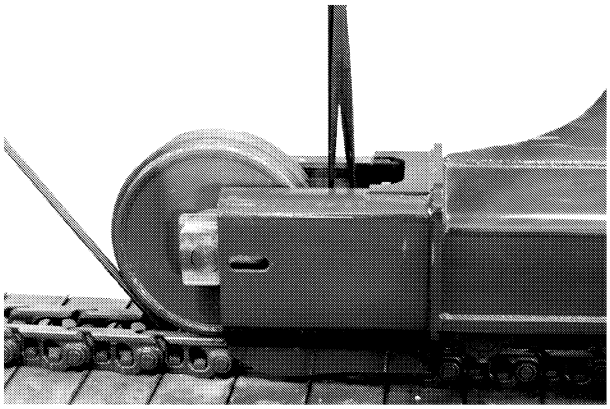
5004

Printed in France
April 2001

Case

Cre 7-27781GB

STEP 5



JD00365A

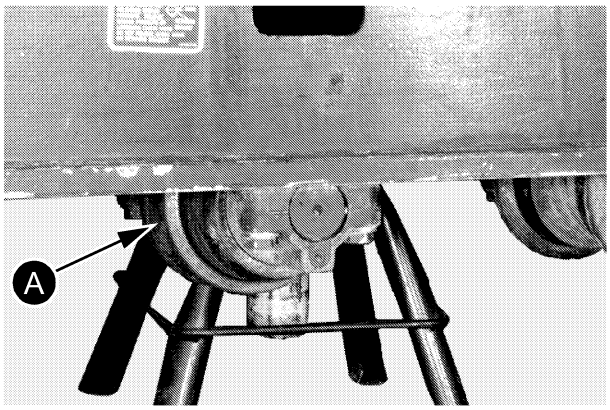
Raise the assembly and slide it into the undercarriage, with the help of a crowbar. Remove the lifting equipment.

STEP 6

See "Removing and installing a set of tracks", (section 5001), for installing the track.

Removal

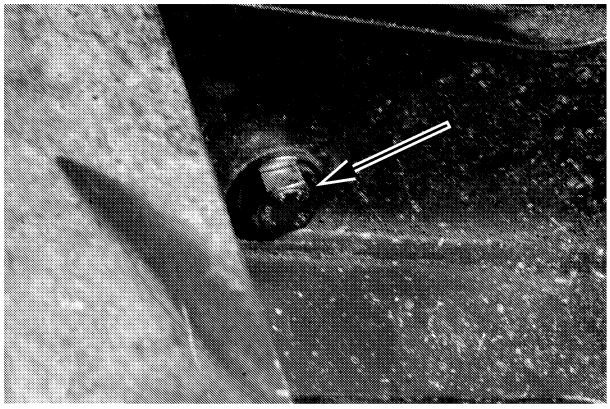
STEP 1



JD01080A

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

STEP 2

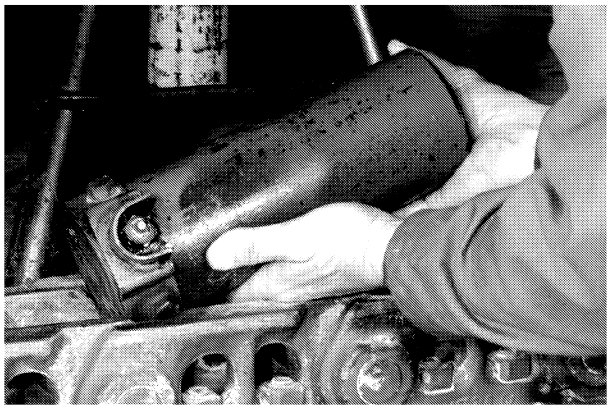


JD01081A

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).

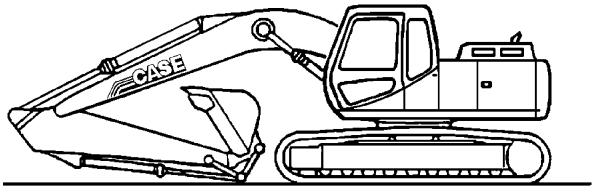
STEP 5

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).

DRIVE MOTOR AND FINAL DRIVE TRANSMISSION

Removal and installation

STEP 1



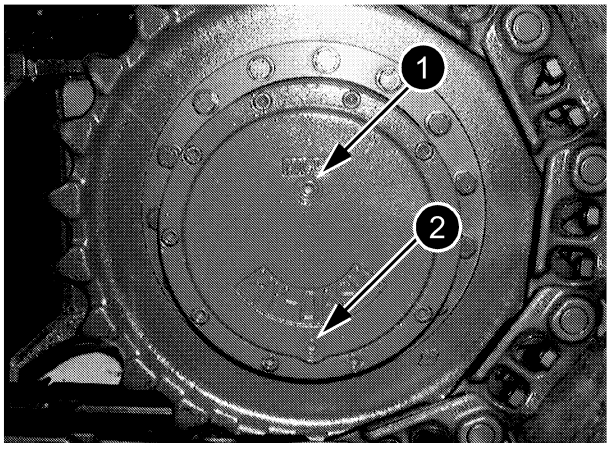
JS00163A

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 reservoir (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 5 to 11 Nm.*

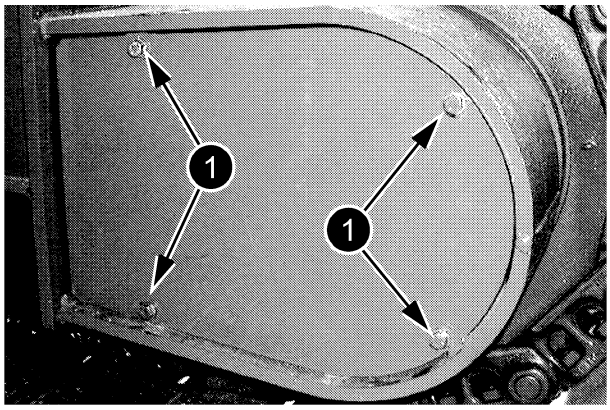
STEP 4

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 reservoir (see Section 8000).

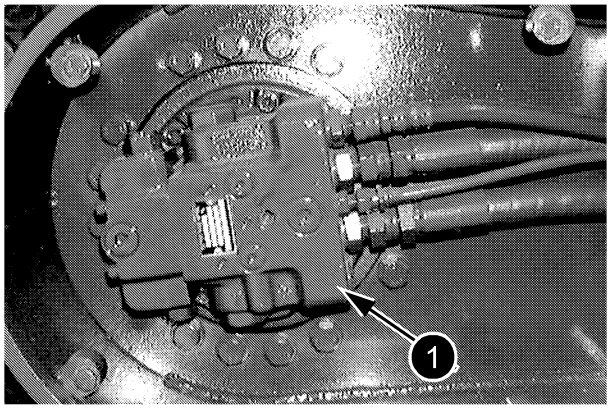
STEP 6



CD00F067

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

STEP 7



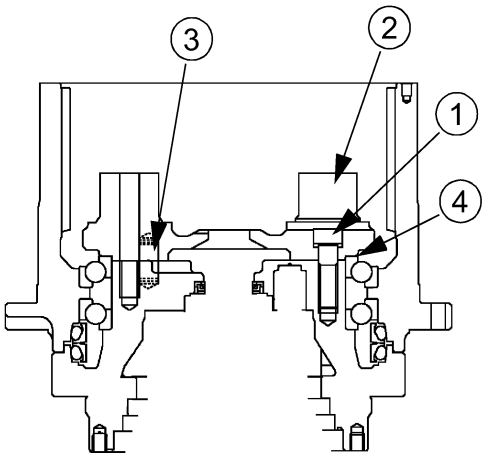
CD00F068

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

STEP 8

Start the vacuum pump.

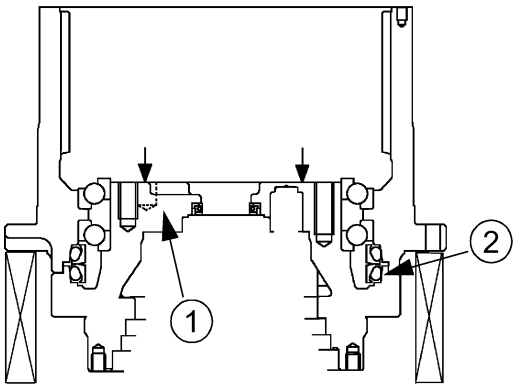
STEP 10



CI00G520

Disassemble the screws (1). Extract the planetary carrier (2). Remove the centring studs (3) and retain the shims (4).

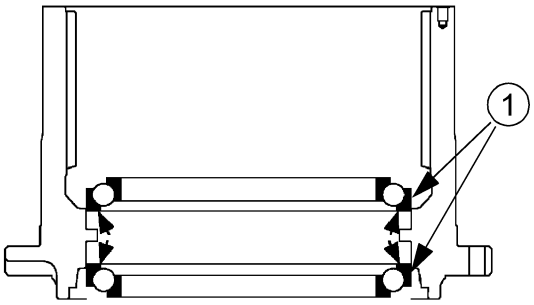
STEP 11



CI00G521

Install the housing under a press and on blocks so as to allow the body to be driven out (1). Drive out the body (1). Remove the face seal (2), taking care not to damage the steel contact faces.

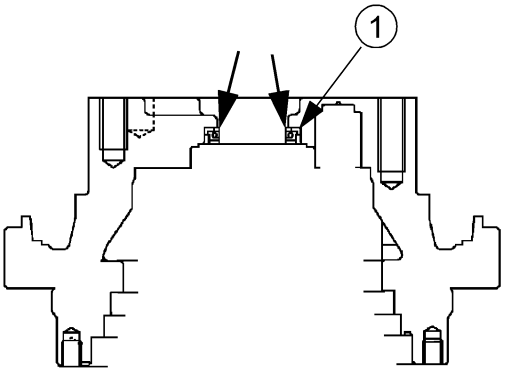
STEP 12



CIG00522

The following operation needs to be performed only if the bearings are changed: Remove the two bearings (1), driving them out using a bronze drift (arrow).

STEP 13



CI00G523

Disassemble and scrap the lip seal (1) (arrows).

SWING REDUCTION GEAR

Removal

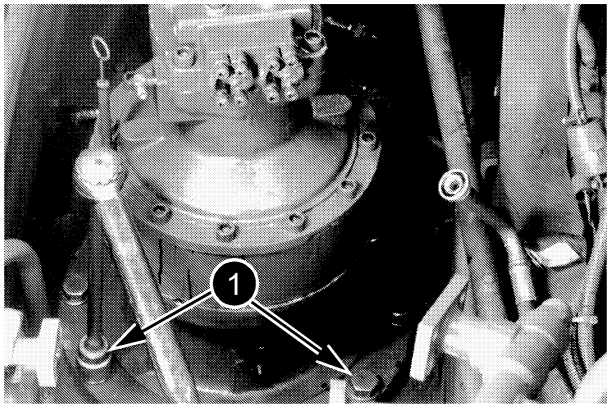
STEP 1

Carry out steps 1 to 11 of "Removing the swing motor" (see Section 8008).

STEP 2

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.

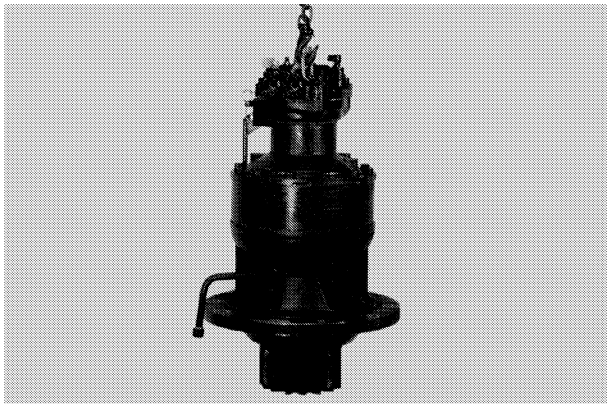
STEP 3



6003-110

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

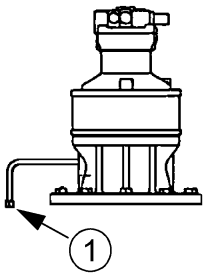
STEP 4



6003-084

Using a suitable lifting device, carefully raise the swing motor/reduction gear assembly from the upperstructure and move it away from the machine.

STEP 5



6003-014

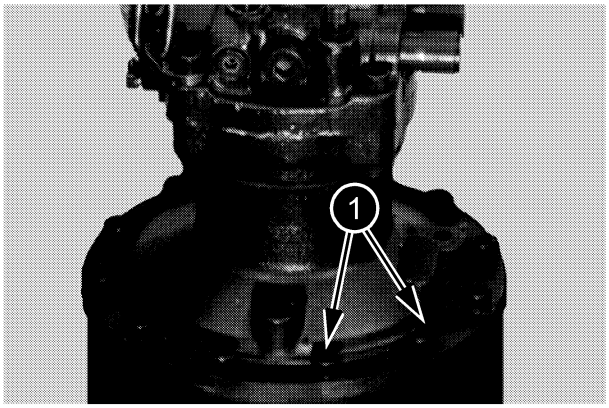
Place a receptacle of 7.5 litres capacity under the swing reduction gear drain plug (1). Remove the drain plug (1) and drain the oil. Install the drain plug.

STEP 6

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

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

STEP 7



6003-018

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

STEP 8

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

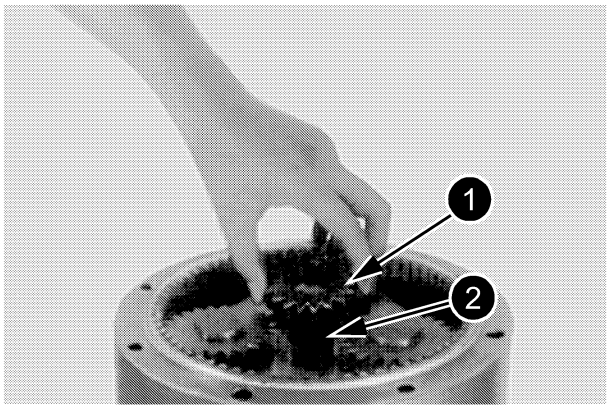
Disassembly

NOTE: *The swing reduction gear is extremely heavy. Use suitable lifting equipment to lift and move the components.*

STEP 1

Place the reduction gear in a clean working area.

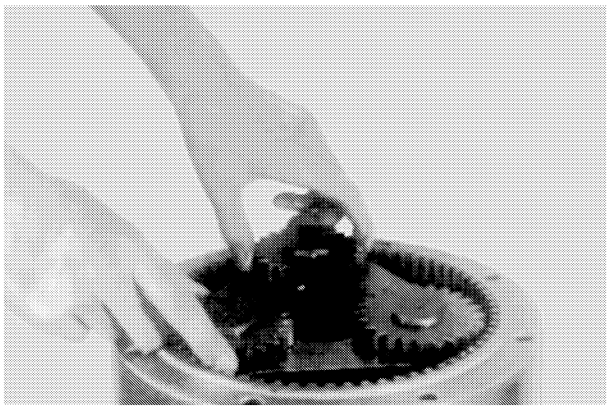
STEP 2



JD00450A

Remove the first stage sun gear (1) and the thrust ring (2).

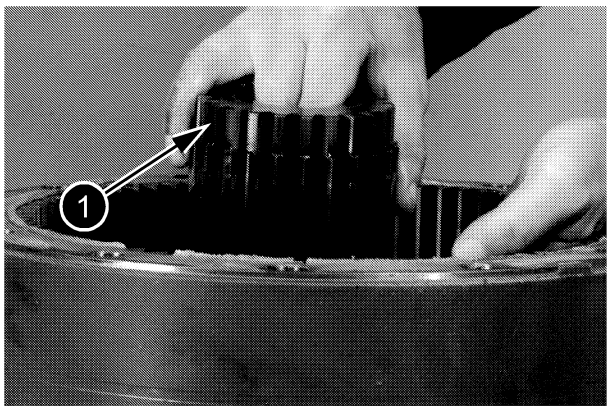
STEP 3



JD00451A

Remove the first stage planet wheel carrier (1). If first stage planetary gears are worn or have broken or missing teeth replace the complete assembly.

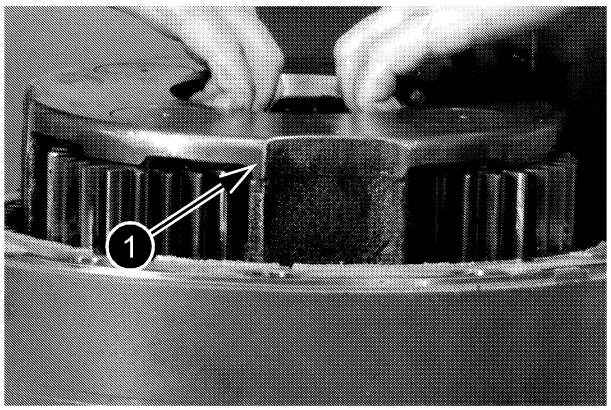
STEP 4



JD00452A

Remove the second stage sun gear.

STEP 5



JD00453A

Remove the second stage planet wheel carrier (1).

NOTE: *The planetary gear axles are assembled in two ways: A = assembly by hubbing the axle; B = assembly by blocking the axle (roll pin). Replace the whole planet wheel carrier or the spare parts separately.*

SPECIFICATIONS

See Section 1002

SPECIAL TORQUE SETTINGS

Motor retaining screw on the reduction gear ..... 294.3 $^{+50}_{-0}$ Nm

Section

8000

DEPRESSURISING AND DECONTAMINATING THE HYDRAULIC SYSTEM, USE OF THE VACUUM PUMP AND BLEEDING THE COMPONENTS

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May 2005

CNH

Cre 7-27952GB

Section

8001

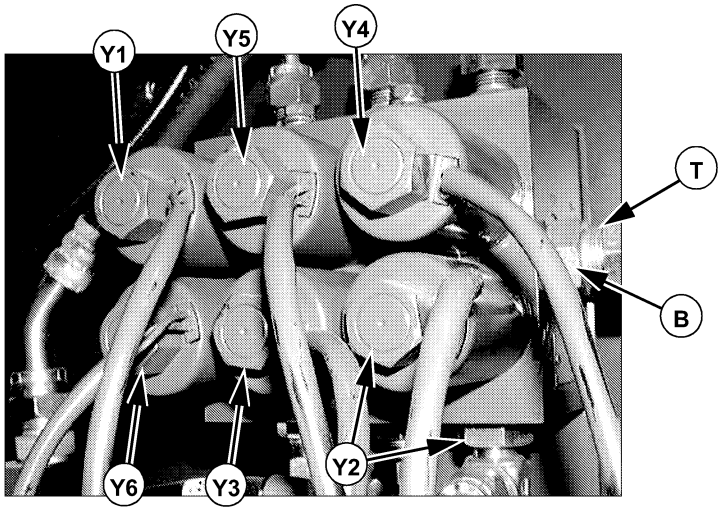
SPECIFICATIONS, TROUBLESHOOTING, CHECKS AND HYDRAULIC PRESSURE SETTINGS

Printed in France
May 2005

CNH

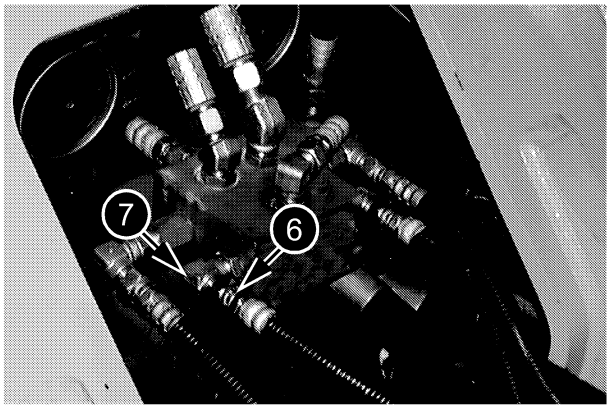
Cre 7-27704GB

6 solenoid valve manifold



CD00E143

Port	Description
B	Supply to pilot manifold
T	Return to reservoir
Y4	Select 2nd travel speed
Y3	Swing brake control
Y5	Higher pressure - 2-stage relief
Y6	Cancel pilot system shock absorbing
Y1	Cancel swing piloting
Y2	Pilot pressure cancellation control



CD01B007

Disconnect and plug the pilot hose (6) corresponding to the valve to be adjusted located behind the boom foot. Put the hose (6) in a receptacle in order to retrieve possible leaks. Plug the elbow union (7). Start the engine. Set the rotational velocity to 1000 rpm using the potentiometer on the instrument panel. Move the boom to half-height. Turn the boom lowering control and raise pressure settings of the valve (B+). Repeat the operation several times raising the pressure each time.

Machines	Pressure settings
CX130/CX160/CX180	383 to 388 bar
CX210/CX230/CX240	392 to 397 bar

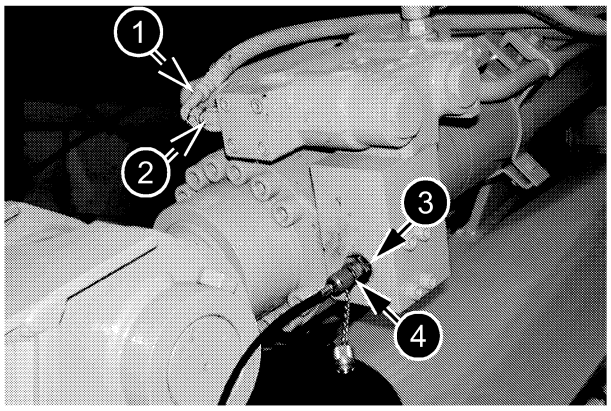
If the value is not correct, loosen the lock nut (8) and turn the screw (9) in order to adjust the pressure while turning the boom lowering control. Tighten to increase, loosen to decrease the pressure. Tighten again the lock nut (8). Shut down the engine. To decompress the large chamber cylinder, first reconnect the pilot hose (6). Start the engine in order to fill the accumulator. Shut down the engine. Decompress the hydraulic system. Remove the union plug (3). Débrancher le raccord d'accouplement (2). Reconnect the balancing hose (1).

Checking and setting the right-hand side

Carry out the same operations as those on the right-hand side. The difference between the two valves should be less than 5 bar.

Dipper secondary relief valve (D1)

Checking and setting



CD01B017

Disconnect and plug the pilot hose (1). Put a receptacle under the union (2) to collect possible leaks. Remove the plug (3) and install a pressure detector union (4) (location 21G). Connect the Multi-Handy tester or a 0-600 bar pressure gauge to the pressure detector (4). Start the engine. Set the rotational velocity to 1000 rpm using the potentiometer on the instrument panel. Lower the boom to half-height. Turn the dipper retracting control and raise the pressure settings of the valve. Repeat the operation several times while raising the pressure each time.

Machines	Pressure settings
CX130/CX160/CX180	383 to 388 bar
CX210/CX230/CX240	392 to 397 bar

No swing or slow swing

(No problems with other functions)

No.	Tests	Results	Repairs
1	Check the swing pressure	Pressure too low	Adjust or change the secondary relief valves
2	Disconnect the swing brake solenoid valve (pink connector) and operate the swing	No swing or slow swing	Reconnect the solenoid valve and check the swing brake release pressure at the output from the solenoid valve (No. 3)
		The swing operates normally	Check the solenoid valve supply electrical circuit
3	With the engine running and the swing brake deactivated, check the swing brake release pressure	Pressure below 30 bar	Check or change the swing brake solenoid valve
		Pressure greater than 30 bar	Check the swing motor for leaks (No. 5)
4	Disconnect the swing cancellation solenoid valve (green connector) and operate the swing	No swing or slow swing	Check or change the swing cancellation solenoid valve
		The swing operates normally	Check the solenoid valve supply electrical circuit
5	With the engine at full speed, and hydraulic oil at 50°C, check for leaks on the swing motor during the swing	Greater than the permitted value	Change or repair the swing motor
		Lower than the permitted value	Check the swing brake, repair or change

With the excavator on a slope, the swing brake does not hold

No.	Tests	Results	Repairs
1	Check the swing braking system	Abrasion	Incident on the brake, repair or change
2	Check the swing pressure	Pressure too low	Adjust or change the secondary relief valves
3	With the engine at full speed, and hydraulic oil at 50°C, check for leaks on the swing motor during the swing	Greater than the permitted value	Change or repair the swing motor
4	Check the swing brake pilot pressure at the solenoid valve output	Pressure greater than 1 bar (0.1 MPa)	Check electrical supply and the solenoid valve coil (No. 5 and 6)
5	Check the voltage at the electrical plug on the swing brake pilot solenoid valve	Voltage < 24 V	Check the electrical harness
6	Check the pilot solenoid valve coil	Infinite or 0 Ohm	Change the solenoid valve
		About 40 Ohm	Change the solenoid valve coil

Section

8003

8003

REMOVAL AND INSTALLATION OF THE MAIN HYDRAULIC PUMP AND THE PILOT PUMP

April 2001

Removal and installation

NOTE: *The numbers in brackets refer to the specification on page 10.*

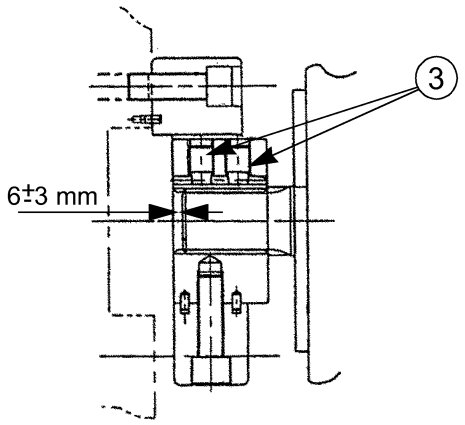
STEP 1

Refer to the removal of the hydraulic pump in this section and remove the hydraulic pump.

STEP 2

Remove the two locking screws (3), remove the splined sleeve (7) from the hydraulic pump shaft (4).

NOTE: *When installing, replace the splined sleeve if necessary. Install the splined sleeve on the pump shaft. The splined sleeve should be stopped against the pump shaft shoulder. The depth between the face of the end of shaft and the outer face of the splined sleeve should be 6±3 mm (see illustration below).*



CS00M510

Apply Loctite 262 on the threads and tighten the locking screws (3) of the splined sleeve to the torque specified on page 3.

STEP 3

Remove the elastic coupling (6), check visually the elastic coupling for wear, replace if necessary.

STEP 4

Remove the screws (1), then remove the dowel blocks (5). Visually check the state of the dowel blocks for wear, replace them if necessary.

NOTE: *If wear of the elastic coupling and dowel blocks requires them to be replaced, replace the splined sleeve as well. When installing, apply Loctite 262 on the threads of the dowel block retaining screws, position the dowel blocks correctly and tighten to the torque specified on page 3.*

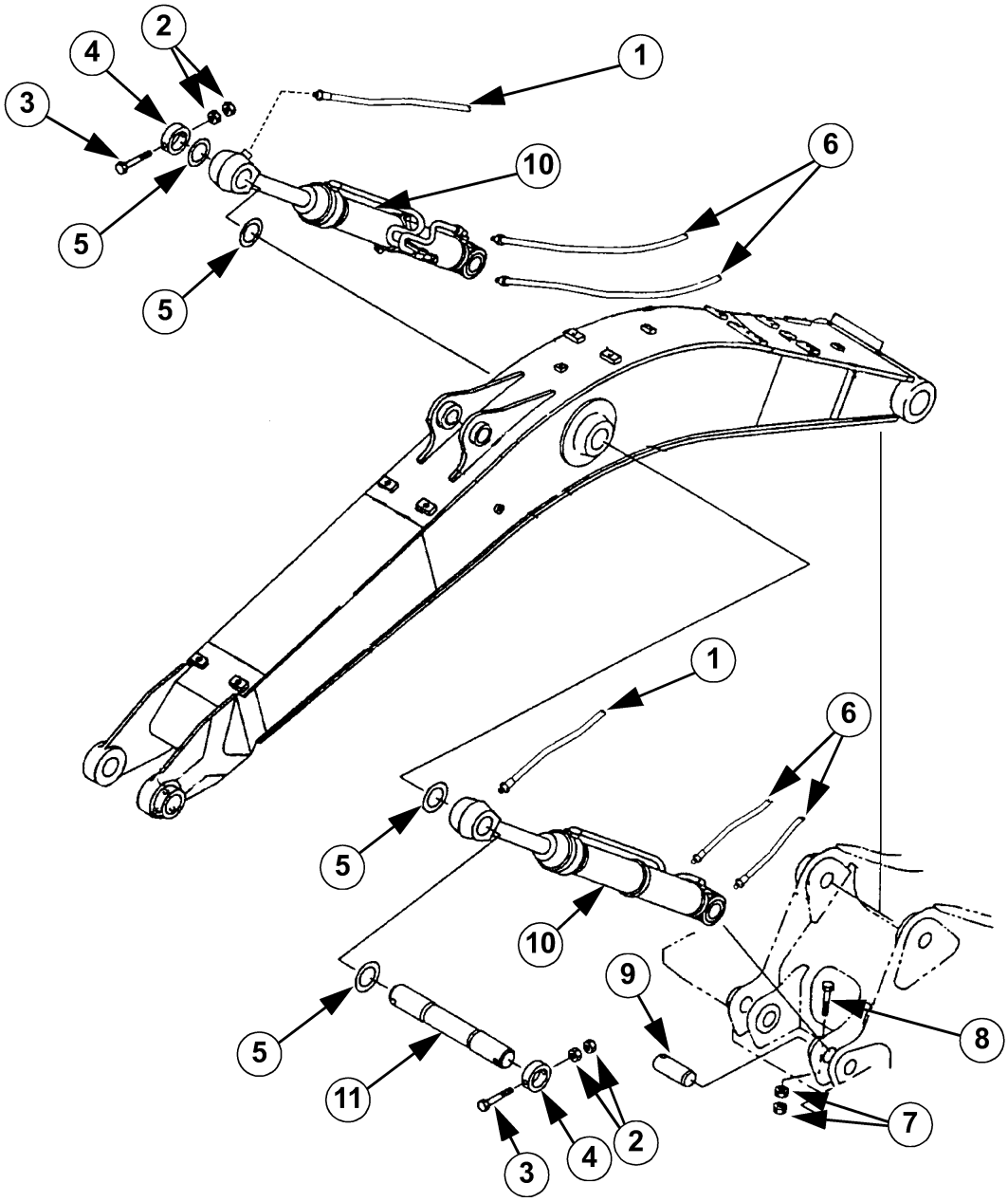
STEP 5

Remove the four roll pins from the engine hand-wheel, when installing, replace them if necessary.

NOTE: *When installing the hydraulic pump coupling, proceed in the reverse order to that of removal.*

BOOM CYLINDER

Description

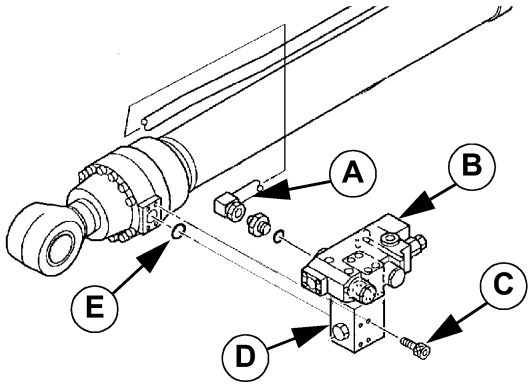


JS00593

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 safety valves)

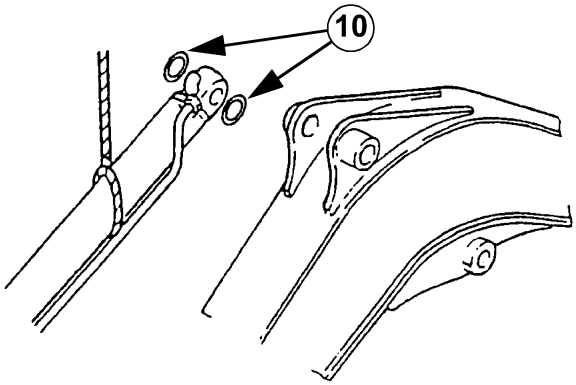


CS00G504

Install a new O-ring (E) on the dipper cylinder and install the cylinder safety valve (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.*

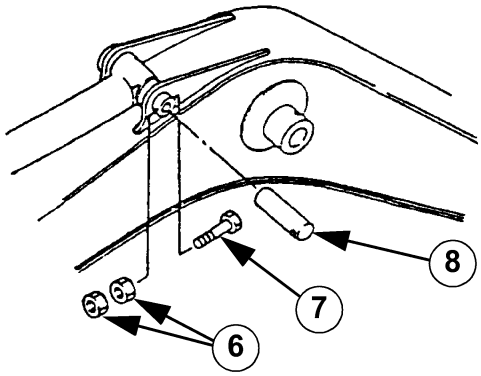
STEP 3



JS00602A

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

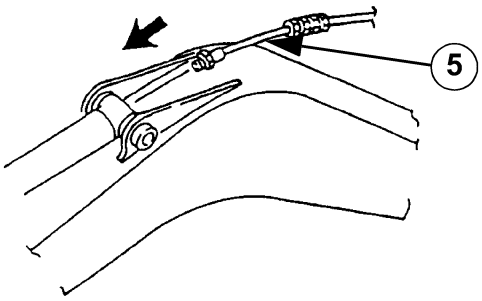
STEP 4



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 0.5 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



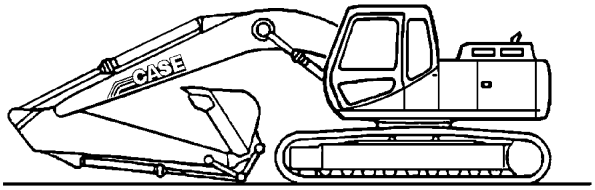
JS00604A

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

HYDRAULIC SWIVEL

Removal and installation

STEP 1



JS00163A

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 reservoir (see Section 8000).

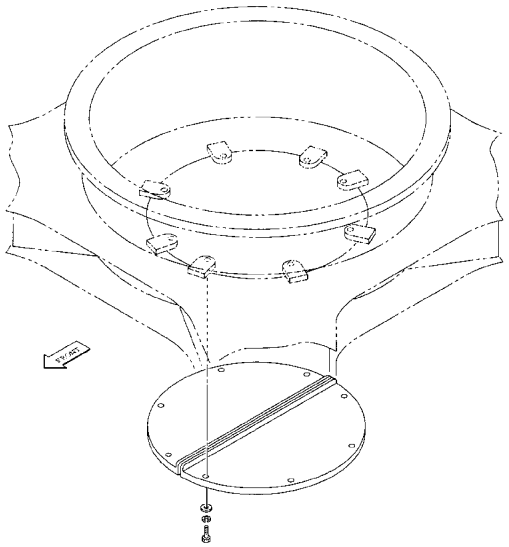
STEP 3

Disconnect the earth cable from the battery.

STEP 4

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

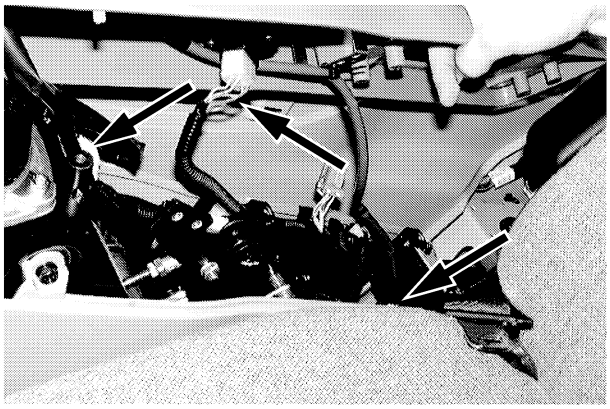
STEP 5



CI00F500

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

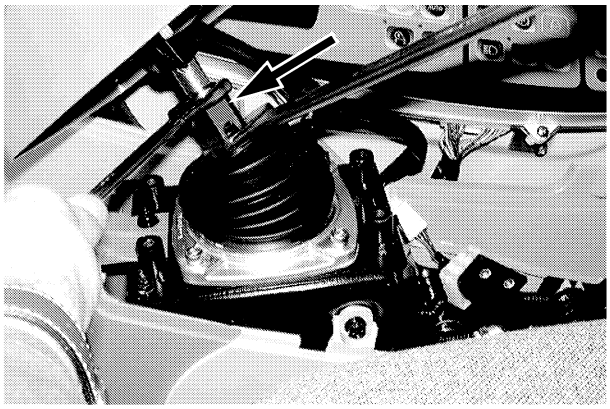
STEP 6



CD00G071

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

STEP 7

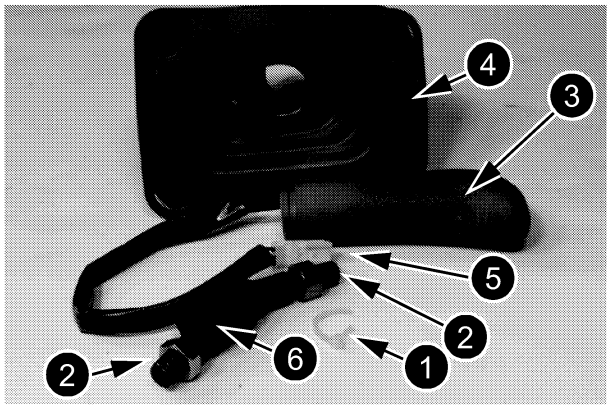


CD00G072

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 41 Nm.*

STEP 8



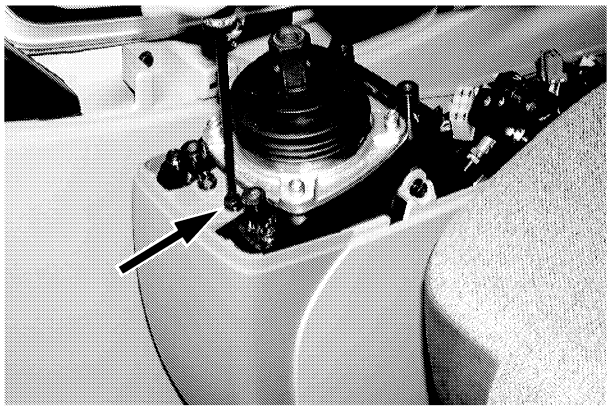
JD00764A

1 CLIP
2 NUT
3 HANDLE
4 GROMMET
5 CONNECTOR
6 LEVER

Cut the clip (1) and discard it. Loosen the nut (2). Unscrew and remove the handle (3) and the connector (5) from the lever (6). Remove the nut (2) to remove the grommet (4).

NOTE: *Replace the grommet if it is damaged. The grommet protects the unions from all types of contamination.*

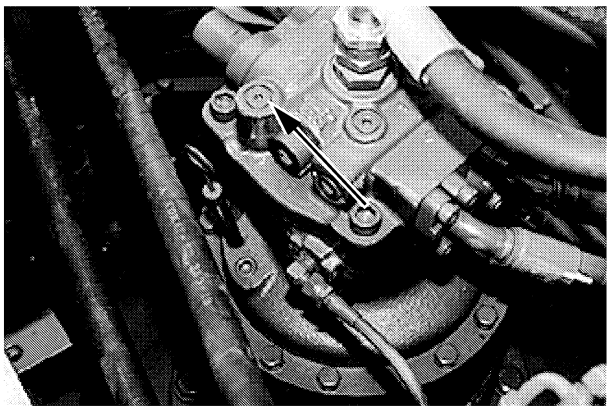
STEP 9



CD00G073

Loosen and remove the two upper retaining screws as well as the two lower retaining screws from the front portion of the control arm.

STEP 15



CP93A021

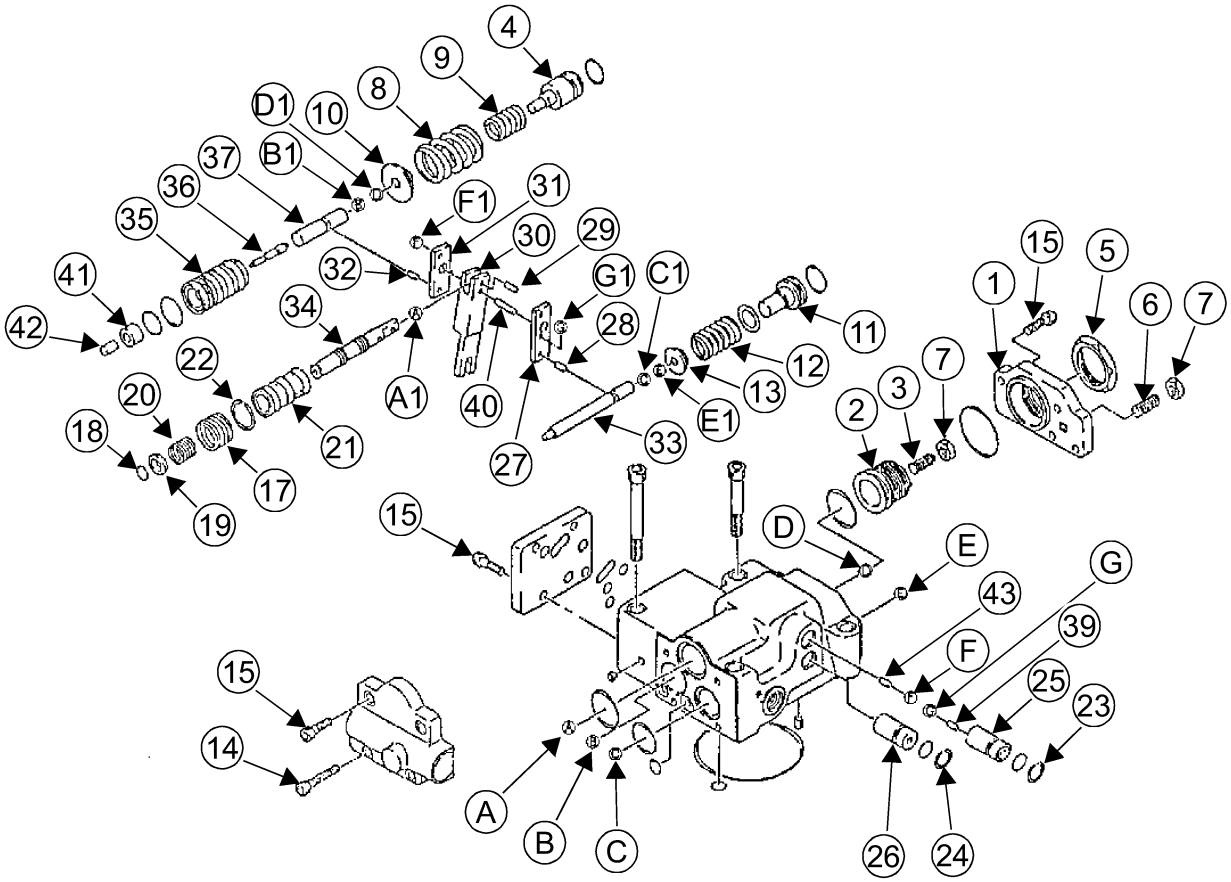
Remove the plug from the top of the swing motor. Fill the swing motor with hydraulic fluid via the plug orifice until the fluid starts to overflow. Then install the plug.

STEP 16

See Section 8001 and adjust the swing motor secondary relief valves.

NOTE: *Before operating the machine, start the engine, check the system for leaks and check the fluid level in the hydraulic reservoir, top up if necessary.*

STEP 13



CI01G560

Removing the regulator

In order to avoid changing the pump settings, the cover (1) is equipped with adjusting screws (2) and (3), a push-rod (4), a lock nut (5), an adjusting screw (6) and a nut (7).
Do not loosen these screws and nuts, failure to comply with this instruction will cause maladjustment of pressure and flow.

Compensation section

Remove the cover (1) by removing the screws (15). Remove the outer spring (8), the inner spring (9) and the spring seat (10).

Pilot section

Remove the spring guide (11), the spring (12) and the spring seat (13).
Remove the screws (14) and (15) and remove the cover (16) and the spring (17). Extract the snap ring (18), the spring seat (19), the spring (20) and the sleeve (21) and remove the outer snap ring (22) from the sleeve (21).

Extract the snap rings (23) and (24), the support plug (25) and the adjustment plug (26).

Remove the side lever (27) without removing the axle (28).

Remove the shaft (29) and remove the control lever (30).

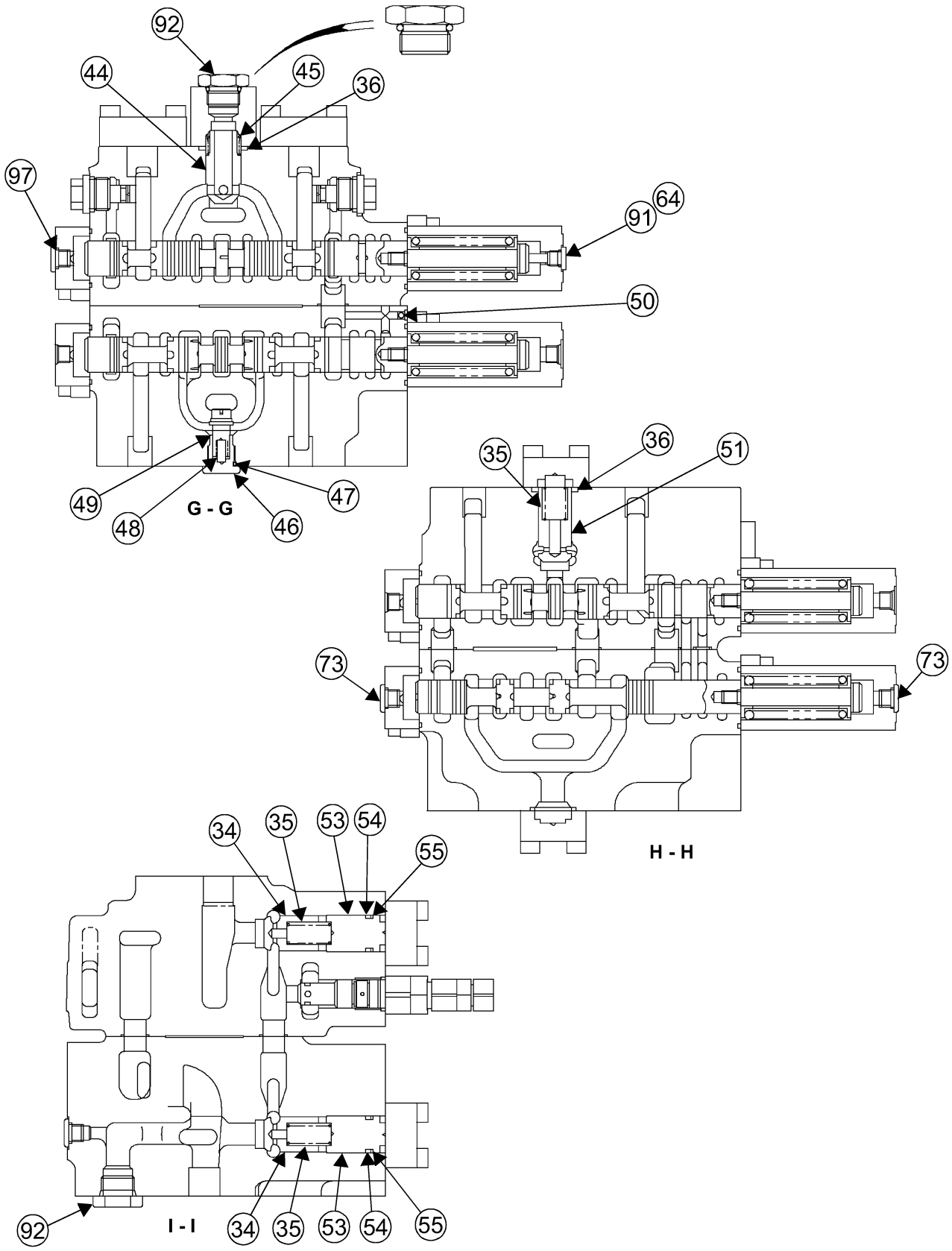
Remove the side lever (31) without removing the shaft (32).

Remove the pilot piston (33) and the spool (34).

Remove the sleeve (35) by pushing the compensating rod (37) to the opposite side.

Remove and discard the seals.

Replace all defective parts.


92
44
45
36
97
64
91
50
49
48
G - G
46
47
35
36
51
73
73
H - H
34
35
53
54
55
92
I - I
34
35
53
54
55

CI01K537

Dipper load holding valve decompression spool 1

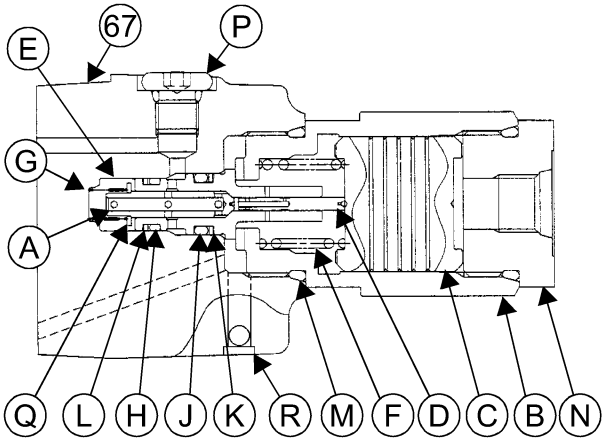
STEP 1

Apply Loctite 242 on the threaded portions of the spool (19) and install the spring seats (20), the spring (21) and the spool end (22).

STEP 2

Install the spool in a vice with protective jaws. Tighten the end of the spool to a torque of 19 to 22 Nm.

Load holding valve (67)



CS01K599

STEP 1

Install the O-rings (H) and (J) and the back up rings (K) and (L) on the peripheral grooves of the sleeve (E).

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

STEP 2

Install the check valve (A) and the spool (D) in the port of the sleeve (E).

STEP 3

Install the spring seat (Q) at the end of the check valve (A), install the spring (G). Insert the assembly into the load holding valve body (67).

NOTE: *Apply grease on the spring seats to make installation easier.*

STEP 4

Install the spring (F) and the piston (C) in the plug (B).

STEP 5

Install the plug (N) equipped with an O-ring on the plug (B). Tighten to a torque of 147 to 157 Nm.

STEP 6

Install the plug (B) equipped with a new O-ring (M) on the load holding valve body (67). Tighten to a torque of 147 to 157 Nm.

STEP 7

Install the plug (P) equipped with a new O-ring on the load holding valve body (67). Tighten to a torque of 14 to 18 Nm.

Valves

NOTE: *Do not act on the components of the safety valve, as this will affect the pressure.*

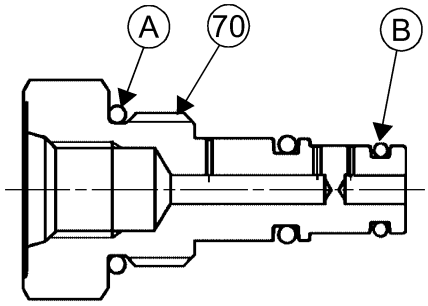
STEP 1

Install the relief valve (68). Tighten to a torque of 78 to 88 Nm.

STEP 2

Install the six safety valves (69). Tighten to a torque of 78 to 88 Nm.

STEP 3

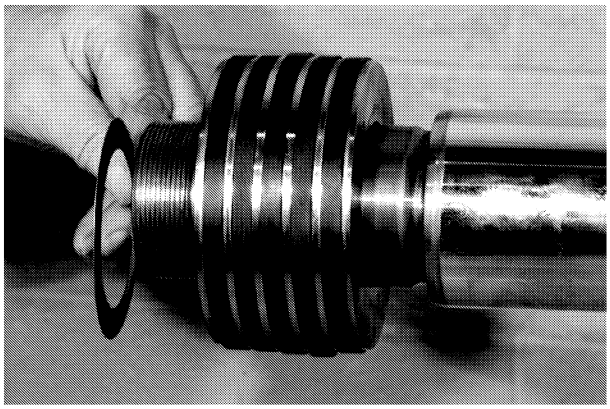


CS01K600

Install the two safety valves (70) equipped with an O-ring (A) and (B). Tighten to a torque of 103 to 113 Nm.

1 LUBRICATION FITTING
2 PLUG
3 O-RING
4 SCREW
5 HYDRAULIC PIPE
6 O-RING
7 SCREW
8 WASHER
9 PIPE CLAMP
10 HYDRAULIC PIPE
11 SCREW
12 LOCKING WASHER
13 RETAINING CLIP
14 SCREW
15 BEARING
16 SCREW
17 STEEL BALL
18 PISTON NUT
19 PISTON
20 SEAL RING
21 BACK UP RING
22 WEARING RING
23 WEARING RING
24 SHIM
25 NOT USED
26 NOT USED
27 NOT USED
28 NOT USED
29 O-RING
30 BACK UP RING
31 WEARING RING
32 BACK UP RING
33 SQUARE SEAL
34 U-RING
35 BACK UP RING
36 WIPER SEAL
37 STOPPING RING
38 BUSHING
39 SEAL RING
40 CUSHION BUSHING
41 WIPER SEAL
42 BUSHING
43 CYLINDER ROD
44 CYLINDER BARREL
45 O-RING

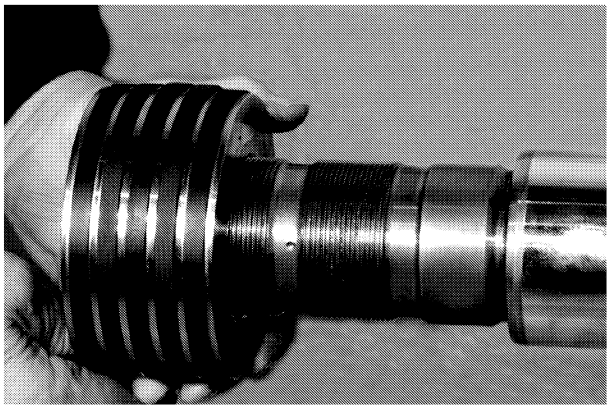
STEP 25



JD00641A

Remove the shim (24) from the rod.

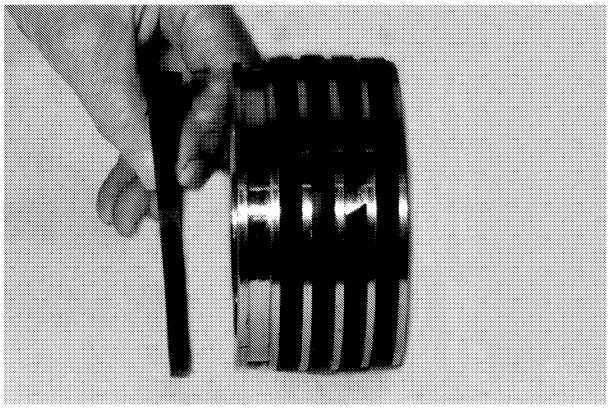
STEP 26



JD00642A

Remove the piston (19) then remove the bearing rod.

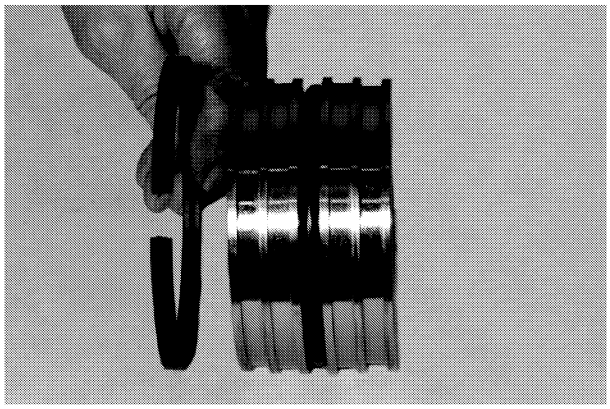
STEP 27



JD00643A

Remove the two outer wear rings (23) from the piston.

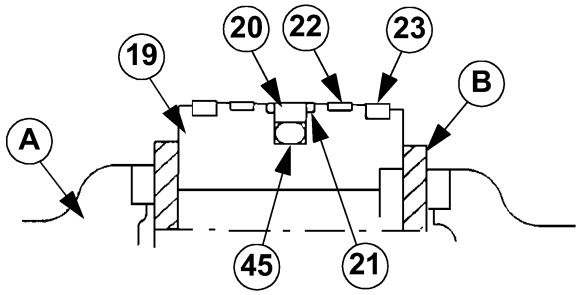
STEP 28



JD00644A

Remove the two inner wear rings (22) from the piston.

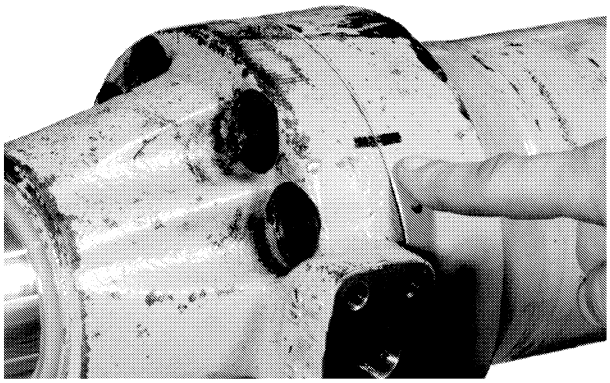
STEP 29



JS00645A

Install the piston (19) in a vice (A) with protective jaws (B). Using a suitable tool, cut or break the seal ring (20). Remove the seal ring and discard. Remove and discard the two back up rings (21). Remove the piston from the vice.

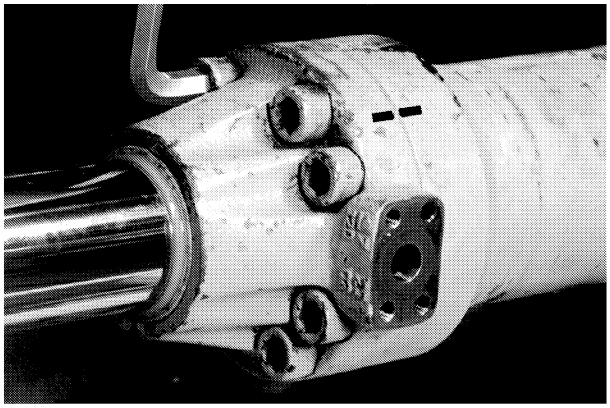
STEP 18



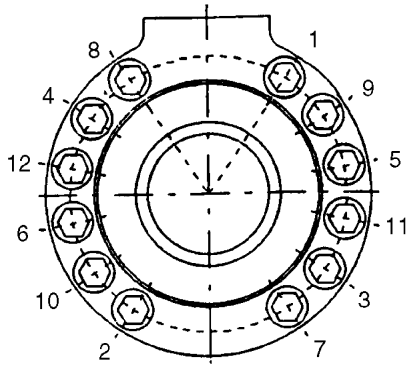
JD00662A

Using suitable means of lifting, install the tube on the repair stand in order to align the cylinder rod (43) and the bearing. Install the tube and the bearing (15) by aligning the markers.

STEP 19



JD00630A



JS00663A

Start the pump on the machine to bring the tube into contact with the bearing. Install 12 screws (14) and tighten the screws to torques (see "Specifications").

STEP 20

Attach a suitable lifting device to the cylinder. Remove the screws and chuck wings to free the cylinder from the repair stand.

STEP 21

Boom cylinder

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

1. Install the clamp (13) on the cylinder, the washer (12) and the screw (11). Tighten the screws to torque (see "Specifications").
2. Install the two hydraulic pipes (5) and (10), the clamp (9), the washer (8) and the screw (7). Tighten the screw to torque (see "Specifications").
3. Install two new O-rings (6) on the cylinder. Connect the hydraulic pipes (5) and (10) to the cylinders. Fasten the pipes using screws (4). Tighten the screws to torque (see "Specifications").
4. Install two new O-rings (3) on the pipes. Install two plugs (2) and tighten the plugs to torque (see "Specifications").
5. Install the lubrication fitting (1) in the cylinder.

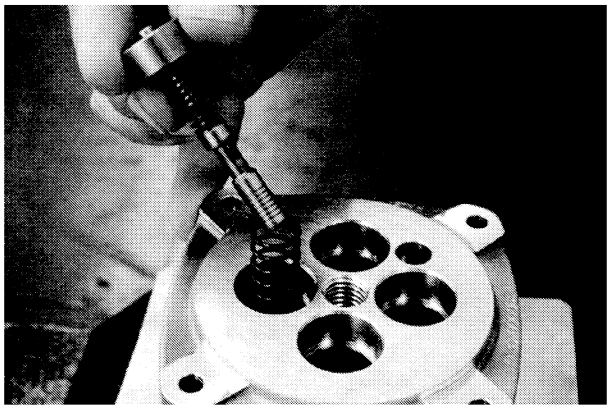
STEP 22

Dipper cylinder

NOTE: *The numbers in brackets in the following steps refer to the dipper cylinder schematic on page 8.*

1. Install the clamp (13), the screw (11) and the washer (12) on the cylinder. Tighten the screw to torque (see "Specifications").
2. Install the hydraulic pipe (5), the clamp (9), the washer (8) and the screw (7). Tighten the screw to torque (see "Specifications").
3. Install two new O-rings (6) on the cylinder. Connect the pipe (5) and the clamp to the cylinder with screws (4). Tighten the screws to torque (see "Specifications").
4. Install a new O-ring (3) on the pipe. Install the plug (2). Tighten the plug to torque (see "Specifications").
5. Install the lubrication fitting (1) in the cylinder.

STEP 6



CD00G106

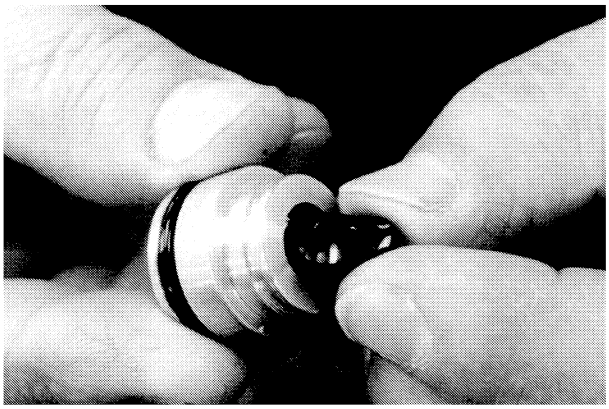
Turn the control lever the other way up in the vice. Install the return spring and the complete spool assembly in the body, respecting the positions noted during steps 5 to 7 (disassembly).

STEP 7

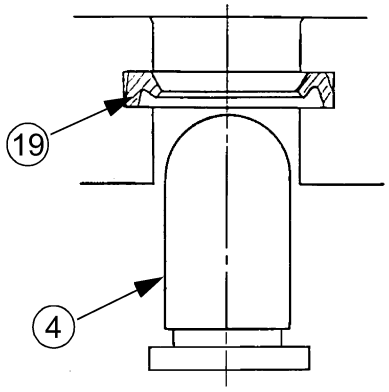
CD00G107

Install the O-ring on the plunger.

STEP 8



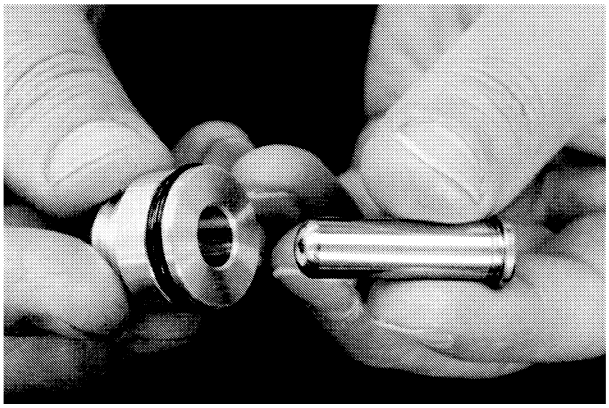
CD00G108



CI00G509

Install the lip seals (19) with their ends as shown above.

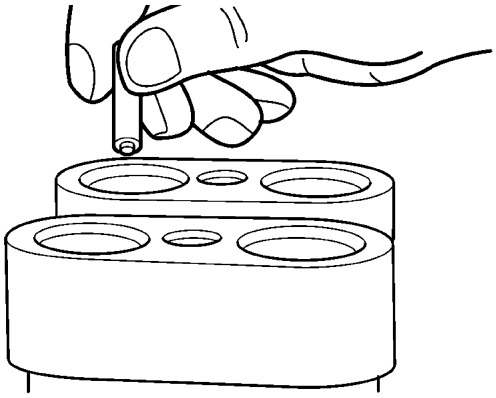
STEP 9



CD00G109

Coat the surfaces of the push-rod (4) with hydraulic fluid and install it in the plunger (6).

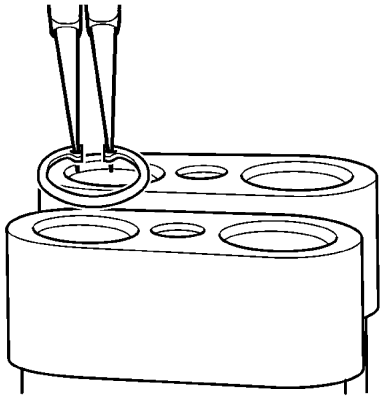
STEP 12



CI01B528

Mark the location of the balls and remove the four balls using a magnet.

STEP 13

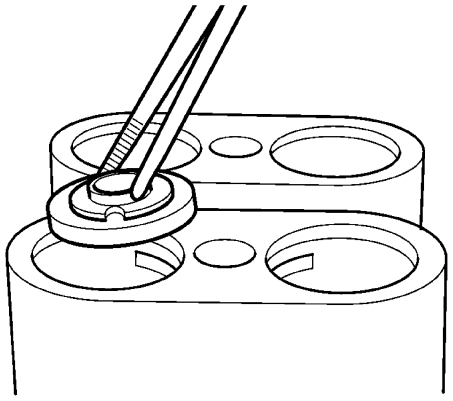


CI01B529

Remove the stopping ring using pliers.

NOTE: *Be careful not to scratch the inner part of the body. When installing, make sure that the stopping ring is put back in its original port.*

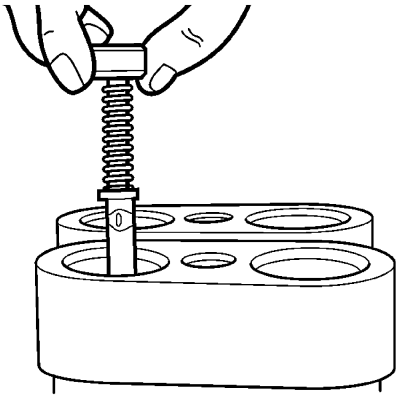
STEP 14



CI01B530

Mark and remove the ball seat.

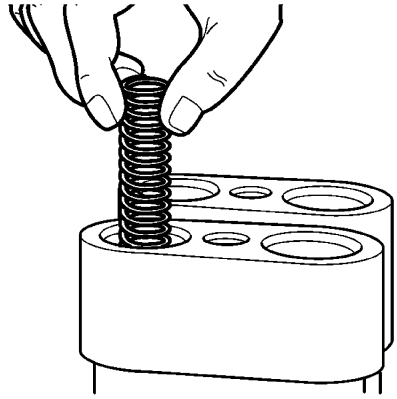
STEP 15



CI01B531

Mark and remove the spool assembly.

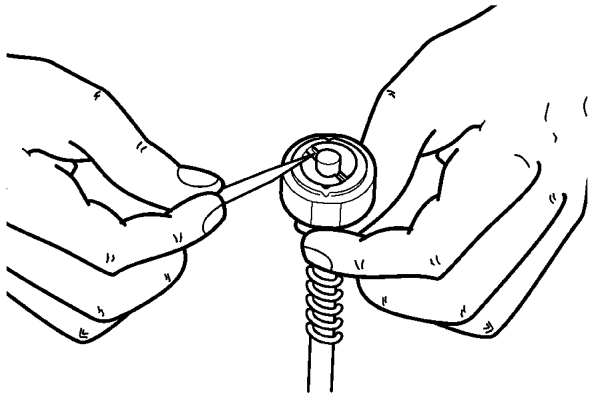
STEP 16



CI01B532

Mark and remove the spring.

STEP 17



CI01B535

Compress the spring with the seat so that the two locking half-washers can be removed.

NOTE: *Be careful not to damage the spool surface. Do not compress the spring by more than 4 mm.*

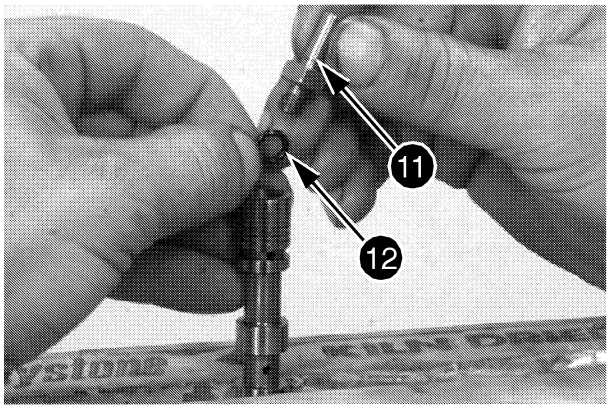
Section

8015

DISASSEMBLY AND ASSEMBLY OF THE SIX SOLENOID VALVES BLOCK

April 2003

STEP 6



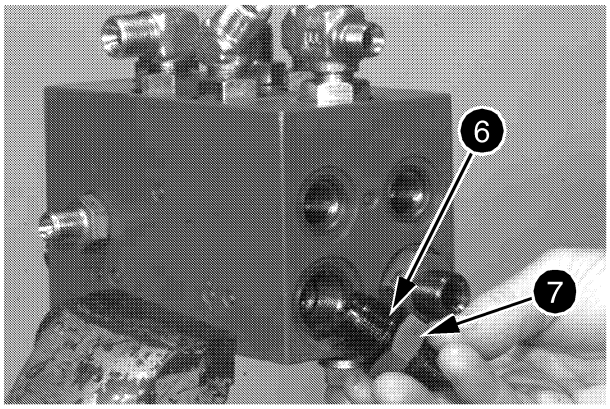
JD00554A

Remove the O-ring (12) from the spring guide (11). Scrap the O-ring.

STEP 7

Repeat steps 2 through 6 for the other spool.

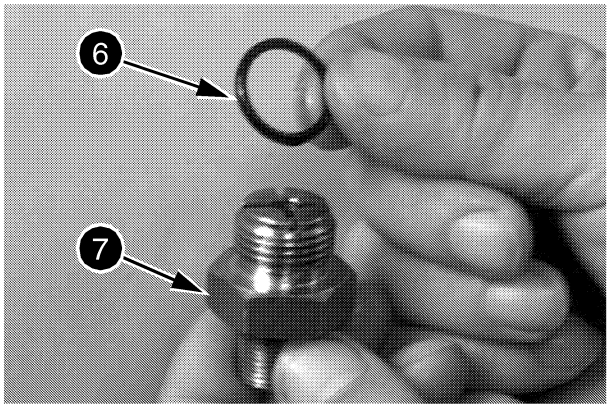
STEP 8



JD00555A

Remove the flow restriction adaptor (7) and the O-ring (6).

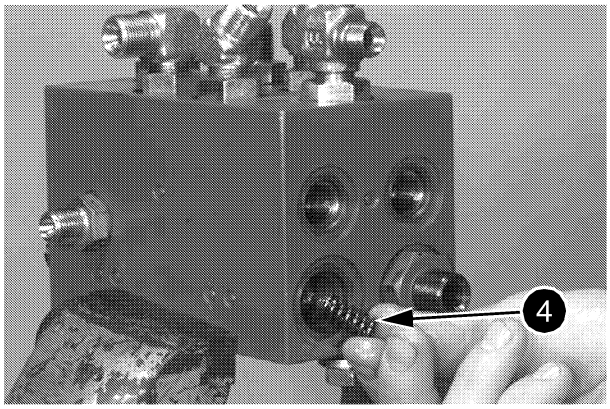
STEP 9



JD00556A

Remove and discard the O-ring (6) and the flow restriction adaptor (7).

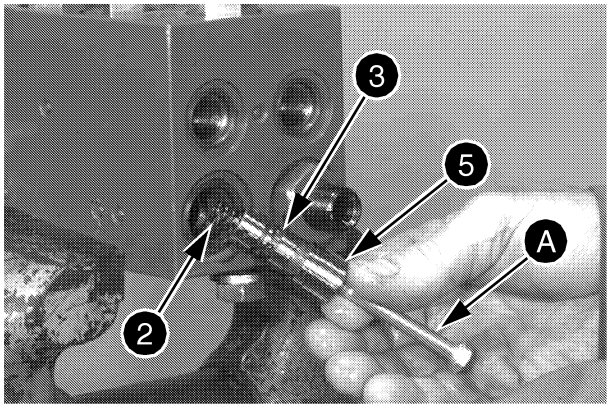
STEP 10



JD00557A

Remove the spring (4).

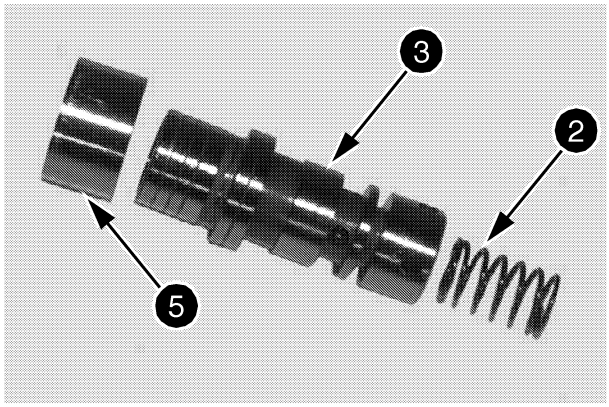
STEP 11



JD00558A

Install an M4 cap screw (A) in the tapped hole of the spool (3). Remove the spool (3) with the spacer (5) and the spring (2). Remove the M4 cap screw.

STEP 12

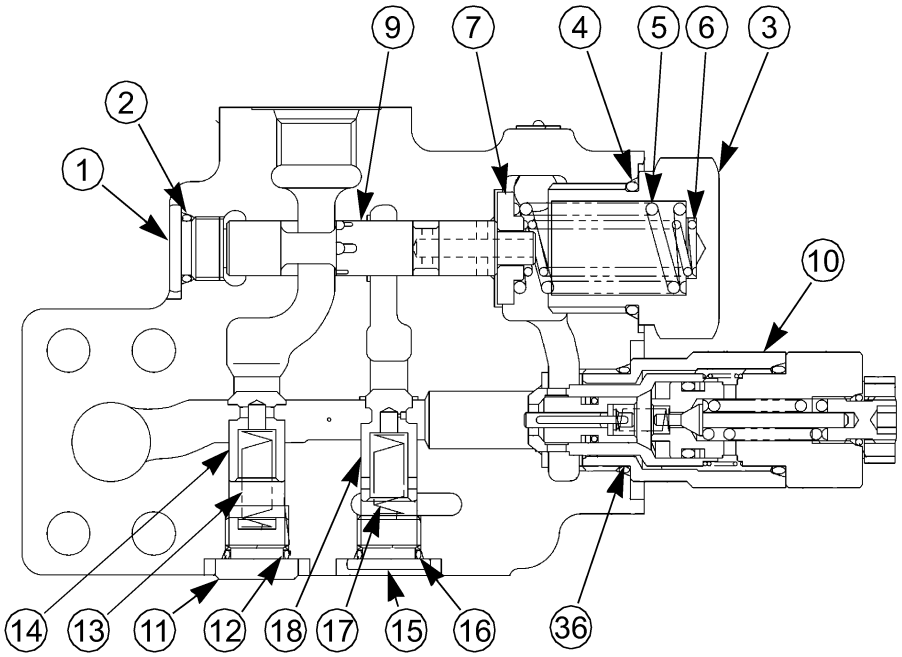


JD00559A

Remove the spring (2) and the spacer (5) from the spool (3).

STEP 13

Repeat steps 9 through 12 for the remaining three spools.



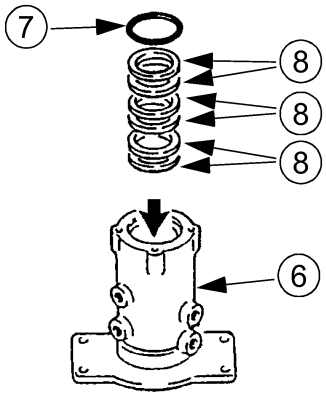
CI00K505

13. Install an O-ring (2) on the spool stop cap (1).
14. Install the cap (1) on the relief valve.
15. Oil and install the spool (9).
16. Install the springs (5) and (6).
17. Install an O-ring (4) on the spool cap (3).
18. Install the spool cap (3).
19. Install a joint (36) and install the valve (10).

NOTE: *Take care in respecting the position of each check valve assembly marked during removal.*

20. Install an O-ring (16) on the plug (15).
21. Oil and install the check valve (18) and the spring (17).
22. Install and tighten the plug (15).
23. Install an O-ring (12) on the plug (11).
24. Oil and install the check valve (14) and the spring (13).
25. Install and tighten the plug (11).

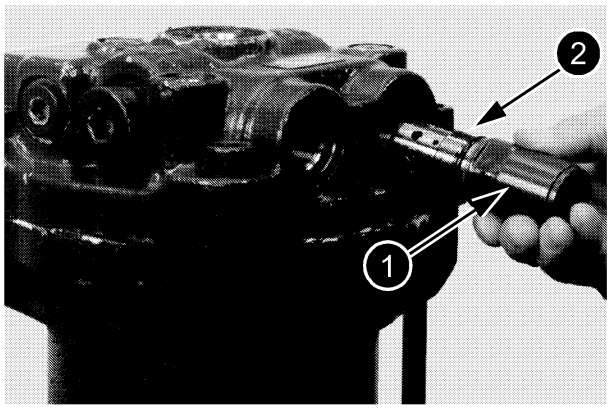
STEP 6



JS00030A

Remove the O-ring (7) and the sealing rings (8) from inside the outer component (6). Scrap the sealing rings and the O-ring.

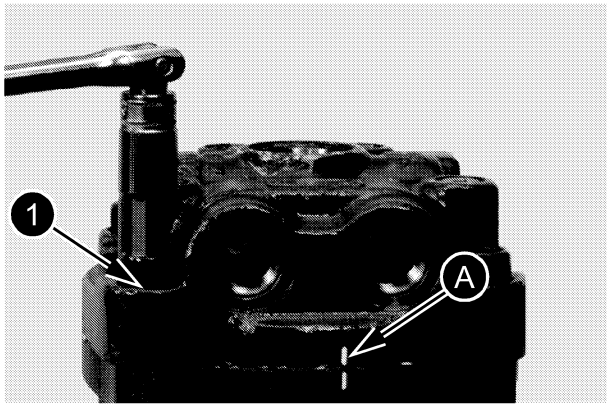
STEP 5



JD00392A

Remove relief valve assemblies (1) from swing motor. Remove and discard the O-rings (2).

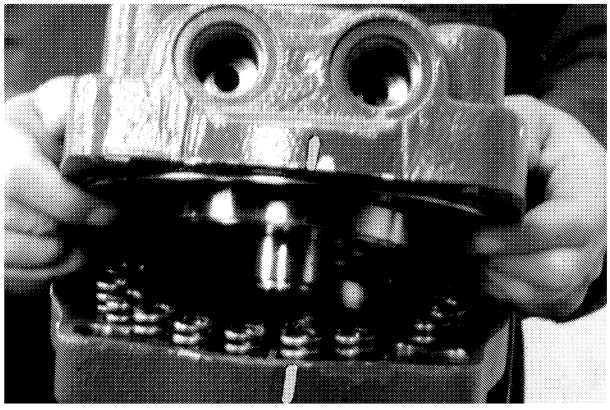
STEP 6



JD00393A

To aid assembly, put alignment marks (A) on the cover and motor housing. Remove the four cover retaining screws (1).

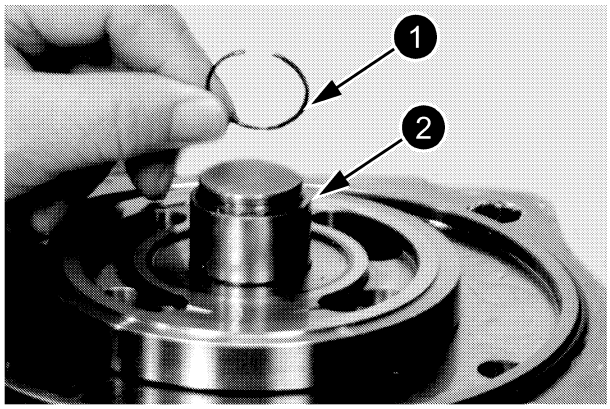
STEP 7



JD00394A

Remove the cover from the motor housing.

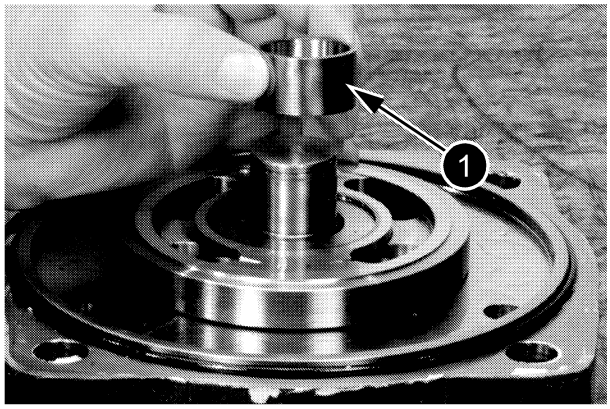
STEP 8



JD00395A

Place the cover with the shaft on top and remove the retaining ring (1) from the shaft (2).

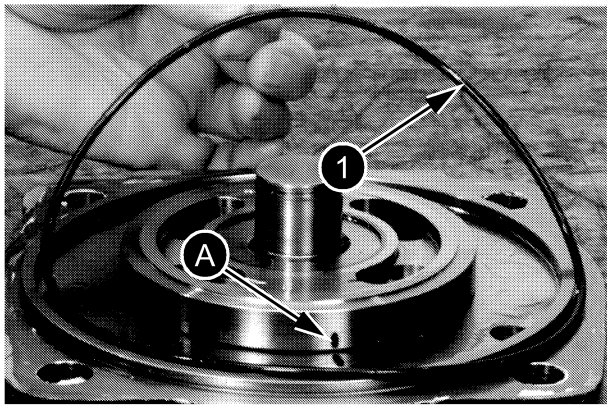
STEP 9



JD00396A

Remove the internal needle bearing ring (1).

STEP 10



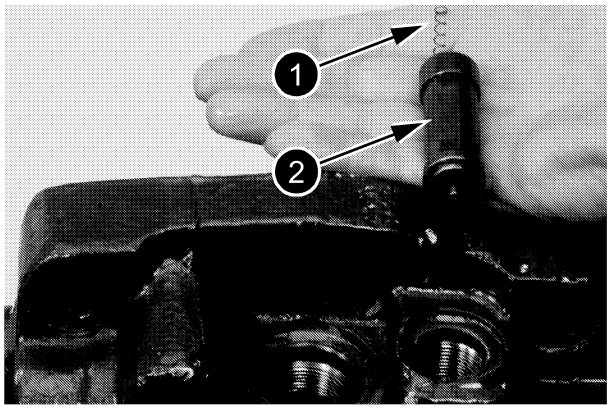
JD00397A

A ALIGNMENT MARK

Remove large O-ring (1) from cover. Discard the O-ring.

NOTE: *Mark the distribution plate and cover with an indelible ink felt tip pen prior to removal to ensure correct alignment when reassembling.*

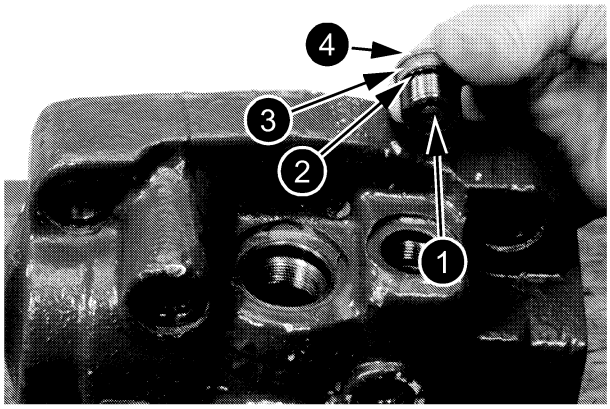
STEP 15



JD00408A

Reposition the cover and install the spring (1) and valve assembly (2) in bypass valve port of cover.

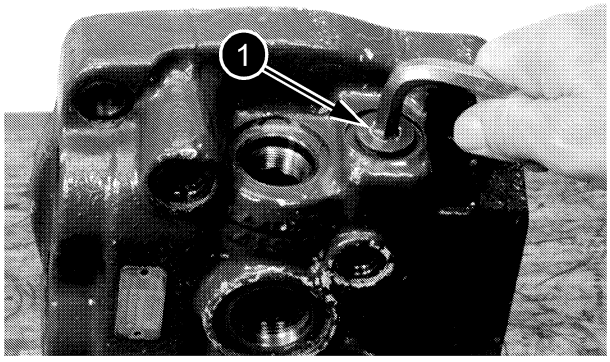
STEP 16



JD00407A

Install two new O-rings (1) and (2) and a new teflon back-up ring (3) on bypass valve plug (4).

STEP 17



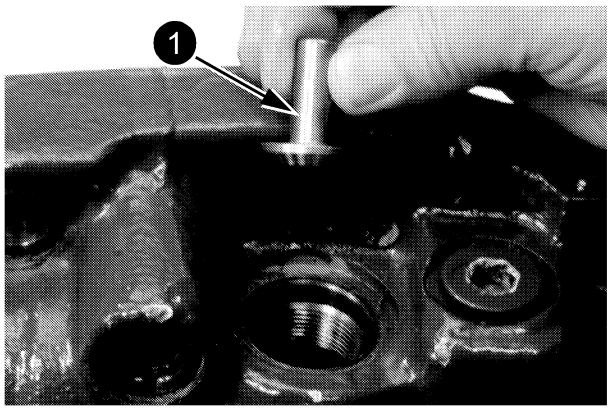
JD00406A

Install bypass valve plug (1) in cover. Tighten the plug to a torque of 23.8 Nm.

STEP 18

Repeat steps 15 through 17 to install second bypass valve on other side of cover.

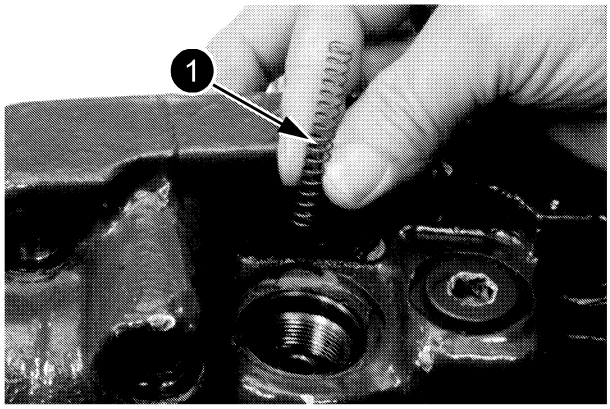
STEP 19



JD00405A

Install the check valve (1) in the cover.

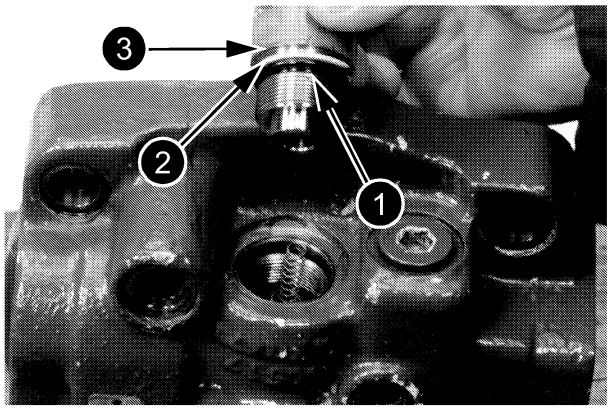
STEP 20



JD00404A

Install the spring (1) in the cover.

STEP 21

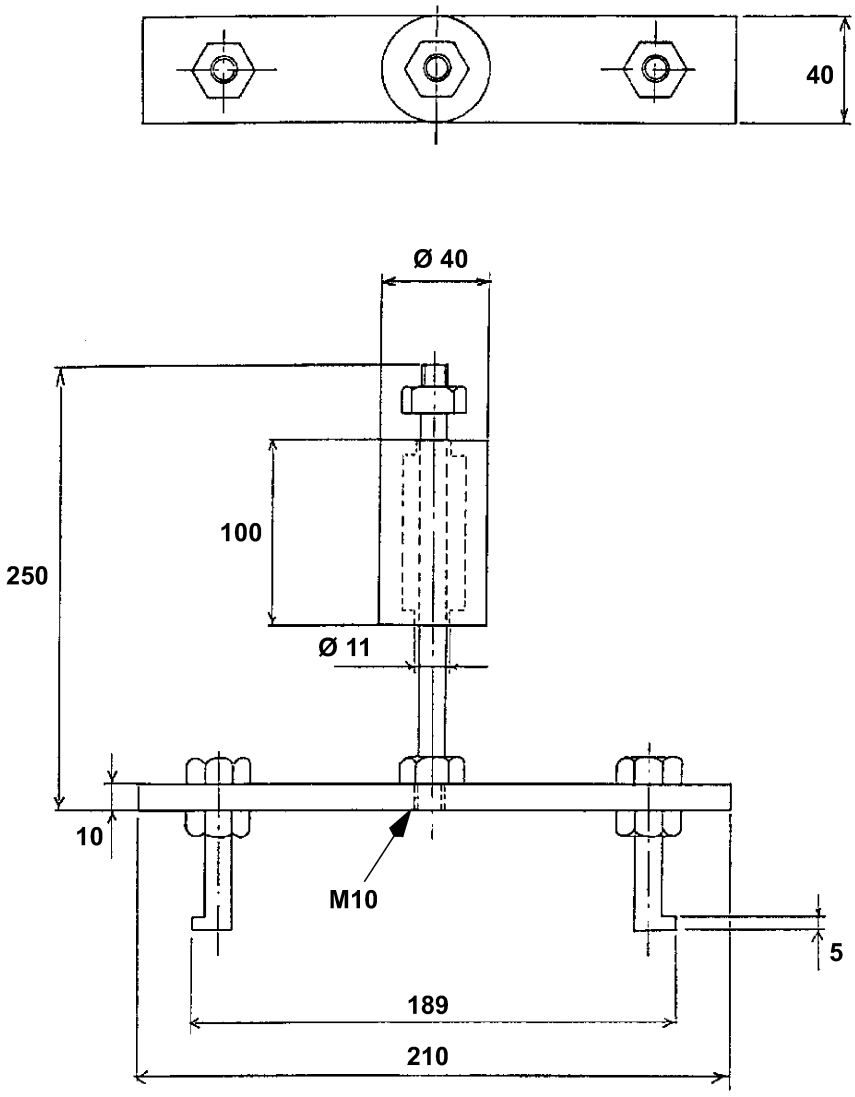


JD00403A

Install a new O-ring (1) and a new back-up ring (2) on the plug (3).

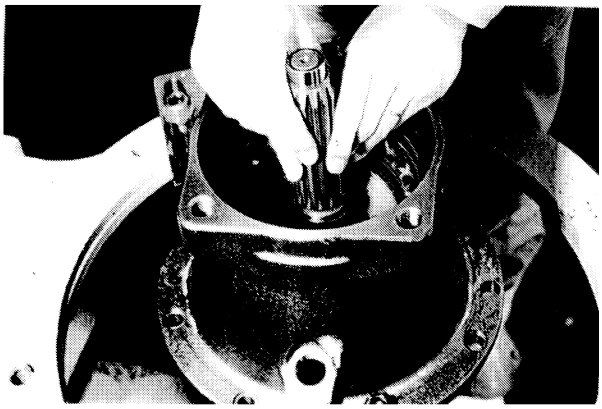
TOOL TO BE MANUFACTURED

For removal of the brake piston



CS01D501

STEP 6



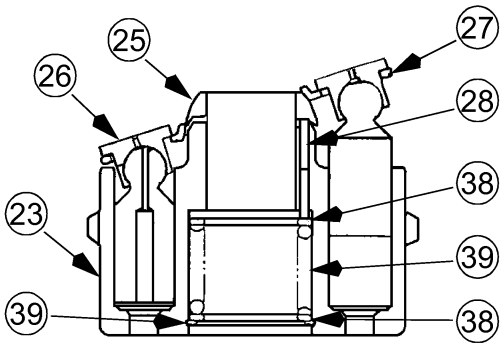
CD01D018

Protect the splines and install the shaft (31) in the housing (12) taking care not to damage the lip seal (35).

STEP 7

Apply a thin coat of grease on the plate (24) (chamfer side in contact with the housing) and install the plate in the housing (12).

STEP 8



CS01D506

Install a shim (38), the spring (39) and a shim (38) in the barrel (23). Install the retaining ring (37) on the barrel (23).

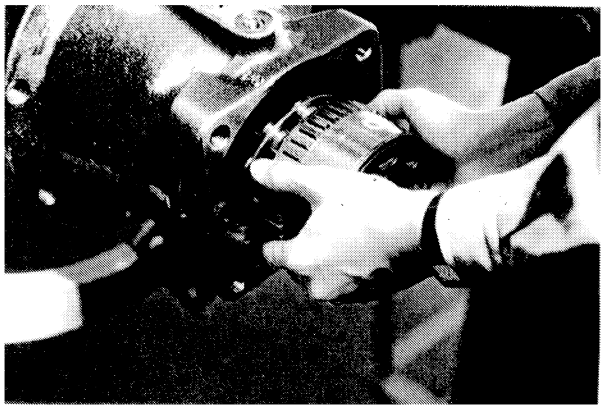
STEP 9

Install the connecting rods (28) and the spherical bearing (25) on the barrel (23).

STEP 10

Install the pistons (26) on the thrust pad (27). Apply clean hydraulic oil in the bores of the barrel (23) and install the plate/piston assembly in the barrel (23) respecting their original ports marked at the time of removal.

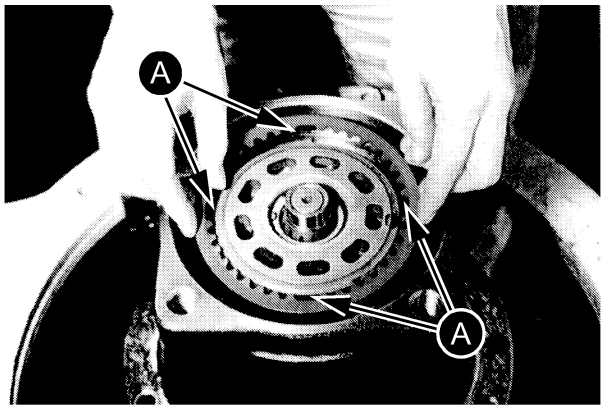
STEP 11



CD01D019

Install the equipped barrel (23) on the shaft (31).

STEP 12

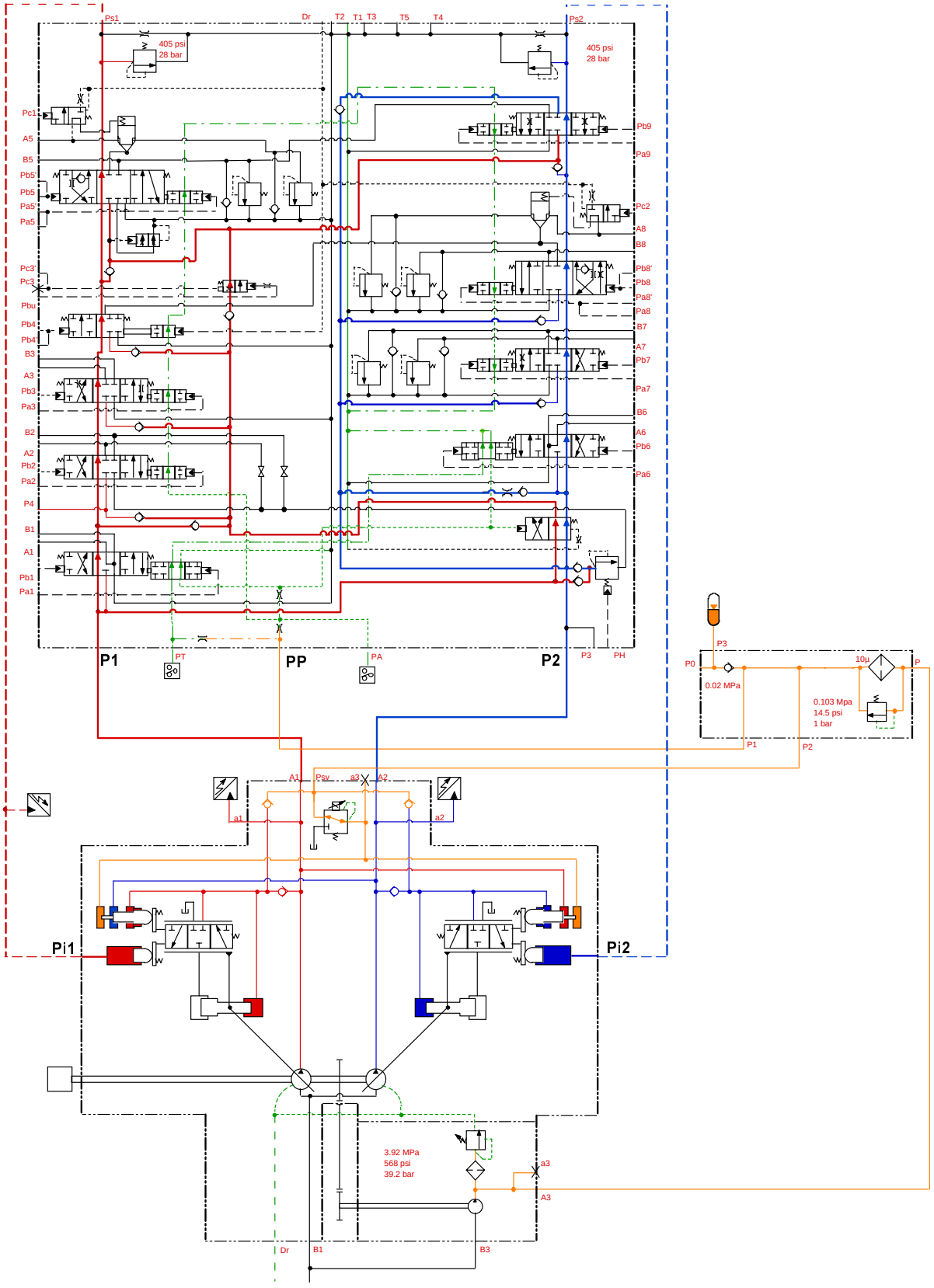


CD01D020

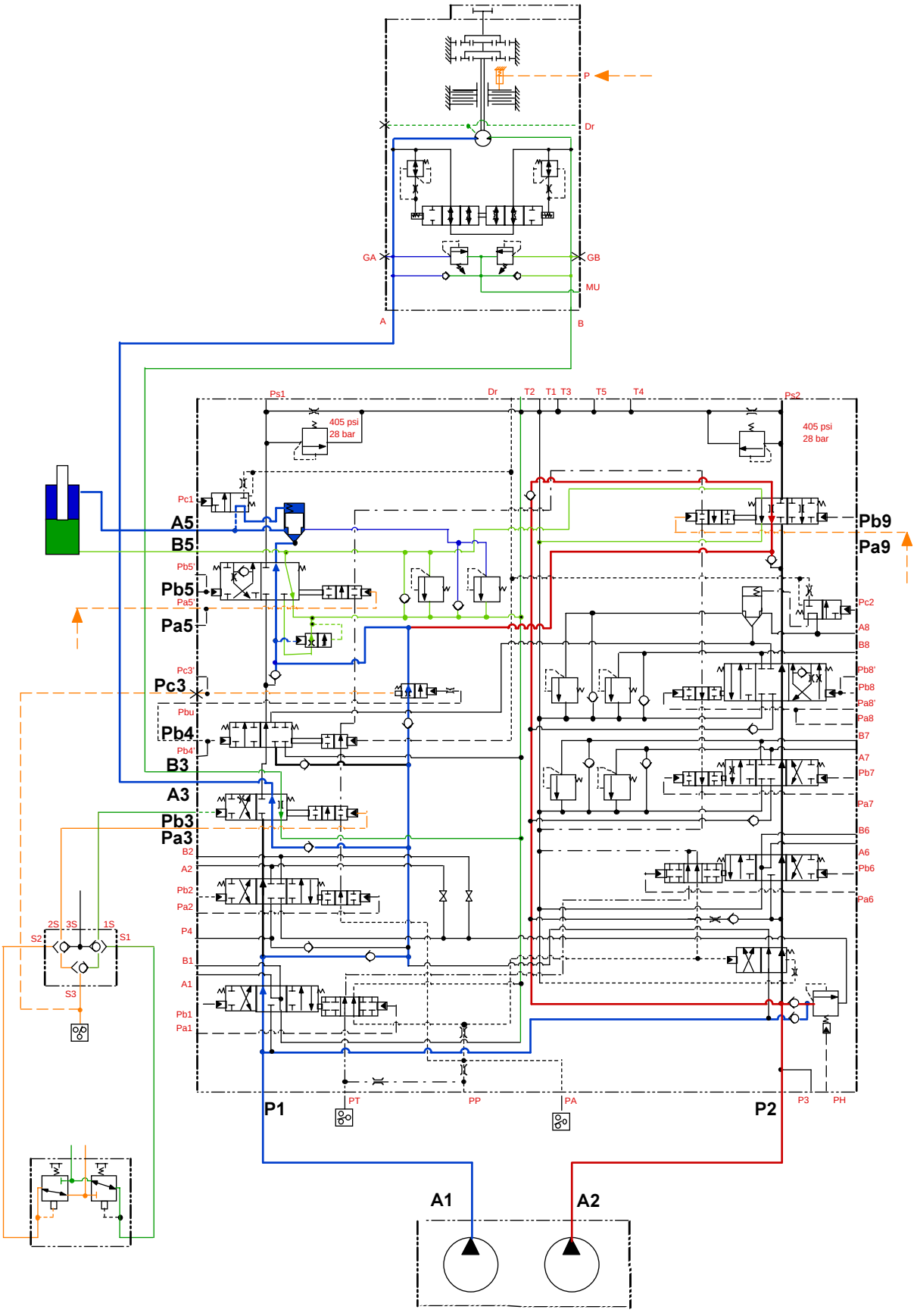
Apply clean hydraulic fluid to the two faces of the friction and disk plates. Install the disk brakes, start with a disk plate (30) then a friction plate (29) and so on. Take care in aligning the notches (A) of the friction plates.

STEP 13

Apply a thin coat of grease on the O-rings (21) and (22) and install the O-rings (21) and (22) in the housing (12).


Ps1
Dr
T2
T1
T3
T5
T4
Ps2
405 psi
28 bar
405 psi
28 bar
Pc1
A5
B5
Pb5'
Pb5
Pa5'
Pa5
Pc3
Pc3'
Pbu
Pb4'
Pb4
B3
A3
Pb3
Pa3
B2
A2
Pb2
Pa2
P4
B1
A1
Pb1
Pa1
Pb9
Pa9
Pc2
A8
B8
Pb8'
Pb8
Pa8'
Pa8
B7
A7
Pb7
Pa7
B6
A6
Pb6
Pa6
P1
PT
PP
PA
P2
P3
PH
P3
P0
0.02 MPa
10µ
P
0.103 Mpa
14.5 psi
1 bar
P1
P2
A1
Psv
a3
A2
a1
a2
Pi1
Pi2
3.92 MPa
568 psi
39.2 bar
a3
A3
Dr
B1
B3

CM00K026

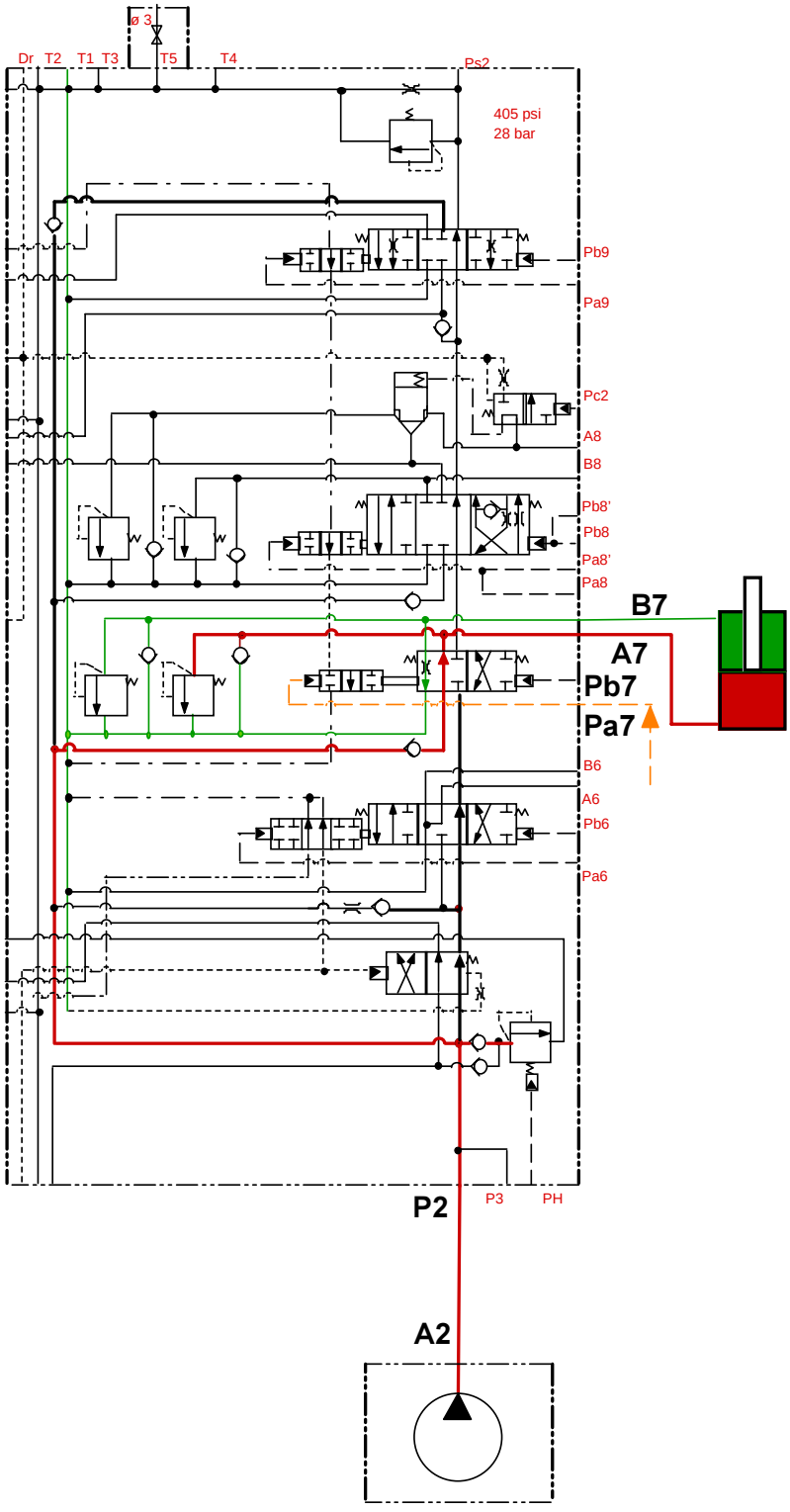

P
Dr
GA
GB
MU
A
B
Ps1
Dr
T2
T1
T3
T5
T4
Ps2
405 psi
28 bar
405 psi
28 bar
Pc1
A5
B5
Pb5'
Pb5
Pa5'
Pa5
Pc3'
Pc3
Pbu
Pb4
Pb4'
B3
A3
Pb3
Pa3
B2
A2
Pb2
Pa2
P4
B1
A1
Pb1
Pa1
Pb9
Pa9
Pc2
A8
B8
Pb8'
Pb8
Pa8'
Pa8
B7
A7
Pb7
Pa7
B6
A6
Pb6
Pa6
2S
3S
1S
S2
S1
S3
P1
PT
PP
PA
P3
PH
P2
A1
A2

CM00K017

Bucket Closing Circuit

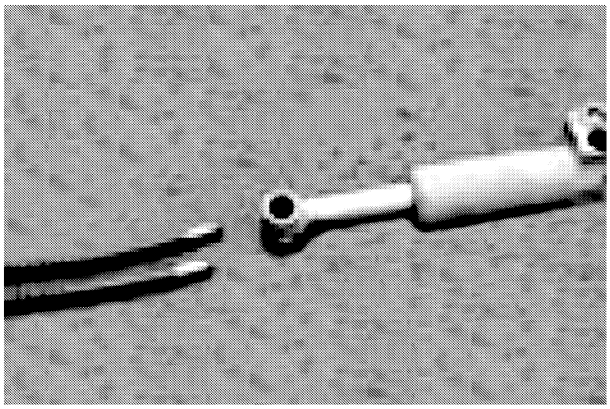
The bucket uses one supply flow which arrives from pump A2 via the parallel working passage.

Pa7/A7. Bucket opening
Pb7/B7. Bucket closing



CM00K023

STEP 9



CRPH05C006A

Remove hydraulic hoses from the cylinder.

Hook and cylinder removal

STEP 1

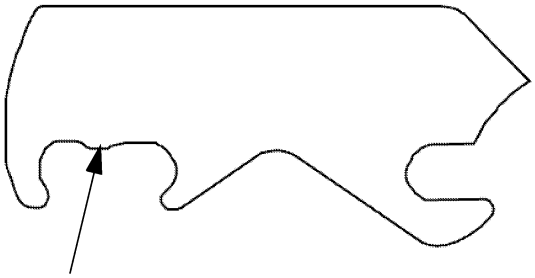
Remove the small cylinder pin (**BF6**).

NOTE: *On some quicks couplers the small cylinder pin (**BF6**) is inaccessible because of the quick coupler frame. To change this remove the long hook pin (**BF5**) and lift out the hook and cylinder as one assembly then remove the small cylinder pin.*

NOTE: *When installing the hydraulic cylinder, use the same procedure in the reverse order.*

Inspection

NOTE: *If the quick coupler frame becomes worn or damaged in the area of the side plate rear, then the following procedure must be followed for repair.*



CRPH05C007A

The maximun wear allowed around this area is 5mm. If the wear is more than this then repairs must be carried out.

STEP 1

Contact your CASE Dealer for a template for the coupler quoting serial number and *quick* coupler type.

STEP 2

The area affected should be prepared with use of a grinder before been built up with weld to match the appropriate shape. Mig welding is recommended for these repairs. Alternatively, welding with low hydrogen electrodes (E7018 or equivalent) can be used. All welds should be blended in and smooth to avoid stress areas.

STEP 3

Once fully welded the repaired areas must be allowed to cool slowly

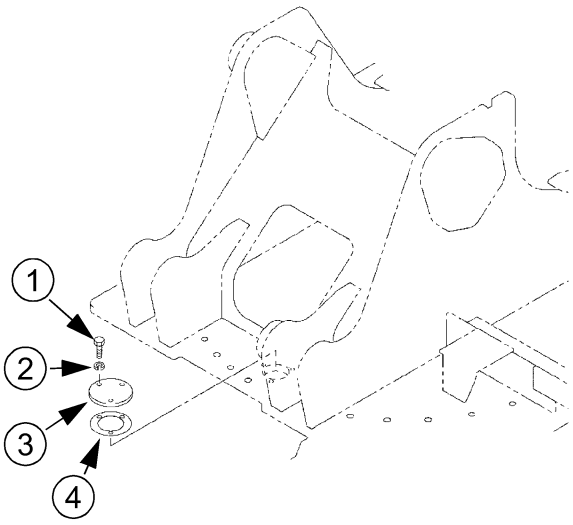
STEP 4

Fully dress the welded areas by grinding and check to ensure that they do not interfere with the movement of the hook or other parts of the coupler. Check that the dressed areas match that of the template provided.

STEP 5

Clean off all sharp edges and repaint the coupler. Carry out a maintenance check (Refer to Operator's Manual) before refitting the *quick* coupler to the machine.

STEP 16



CI00F509

Remove the three screws (1) and the locking washers (2) which fasten the access panel (3) to the upperstructure. Remove the access panel (3). Scrap the seal (4).

STEP 17

Apply grease by hand to the ring gear.

STEP 18

Start the engine and swing the upperstructure an eighth of a turn. Stop the engine.

STEP 19

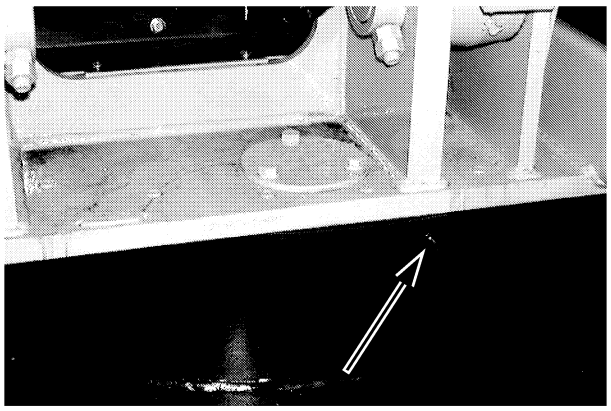
Apply grease by hand to the ring gear again.

STEP 20

Repeat the operation until all the teeth of the ring gear are perfectly greased.

NOTE: *Refer to specifications on page 2 for the quantity of grease to be applied.*

STEP 21



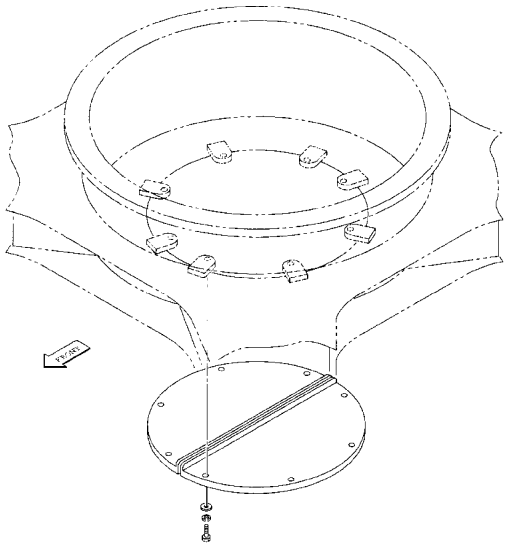
CD00G043

Apply grease to the three grease fittings on the turntable. Install a new seal.

STEP 22

Install the access panel with its seal, on the machine. Fasten it in position with the three screws and the locking washers.

STEP 23



CI00F500

Install the lower housing under the machine, using screws and washers.

STEP 6

Attach a suitable lifting device to the yoke (4) and place the yoke in position on the dipper. Install the bucket cylinder rod on the yoke (4) and the connecting rods (15), see Section 8005. Install the grease fittings (10).

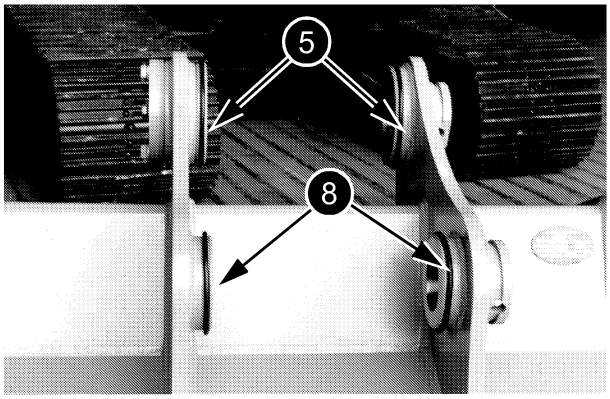
STEP 7

Install new dust seals (9) on the yoke (4).

STEP 8

Install new dust seals (20) on the dipper.

STEP 9



B9240128

Install new linkage seals (5) and (8) on the bucket bosses.

STEP 10

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

STEP 11

Install the pin (2) through the bucket and the dipper. Install the locking pin (1).

STEP 12

Align the orifices of the yoke with the orifices in the bucket and install the pin (7) through the bucket and the yoke. Install the locking pin (6).

STEP 13

Using a set of feeler gauges, check that the clearance between the yoke and the bucket is 1 to 3.5 mm. If necessary remove the locking pin (6) and the pin (7) and add or more shims (19) as required to arrive at the correct clearance. Install the pin (7) and the locking pin (6).

STEP 14

Push the linkage seals (5) and (8) into their housings.

STEP 15

Grease the linkages.

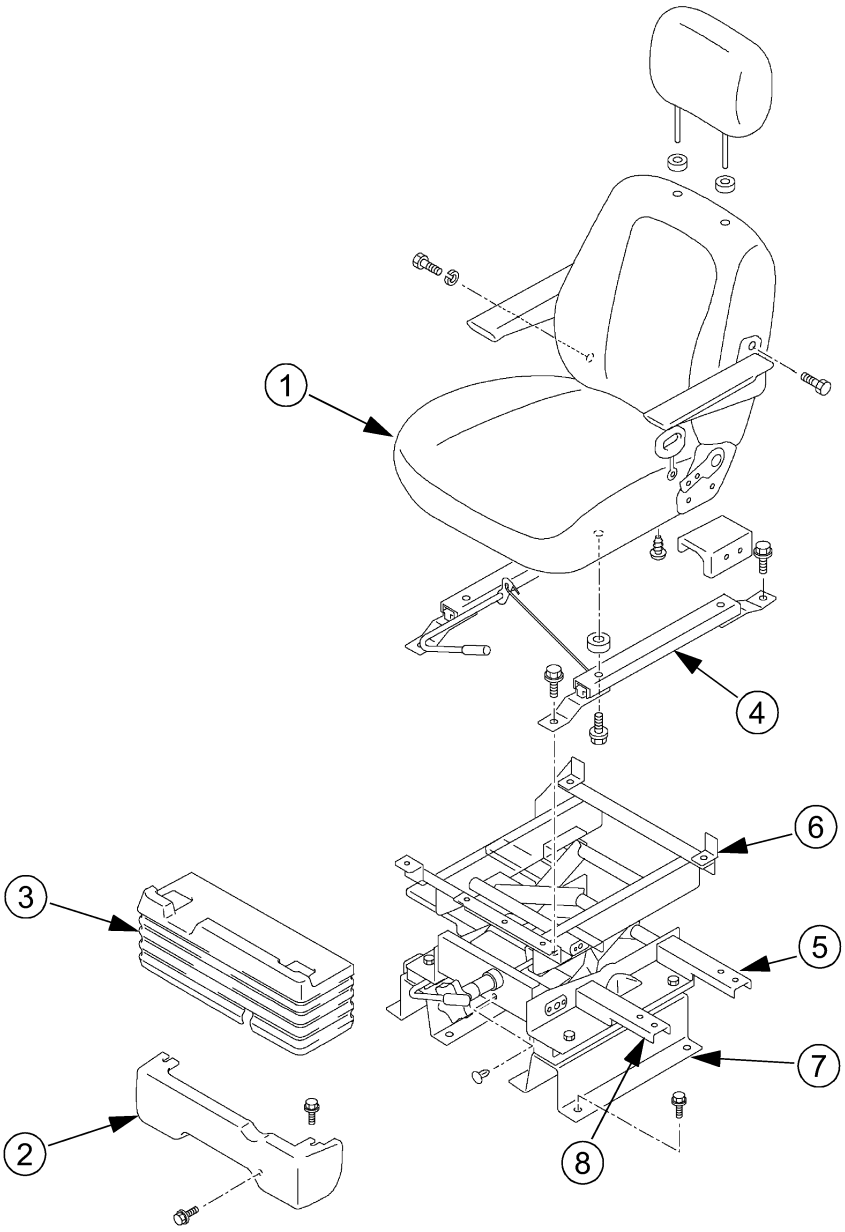
NOTE: *Perform step 16 only on* ***CX160, CX180, CX210, CX230, CX240*** *machines.*

STEP 16

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

OPERATOR'S SEAT

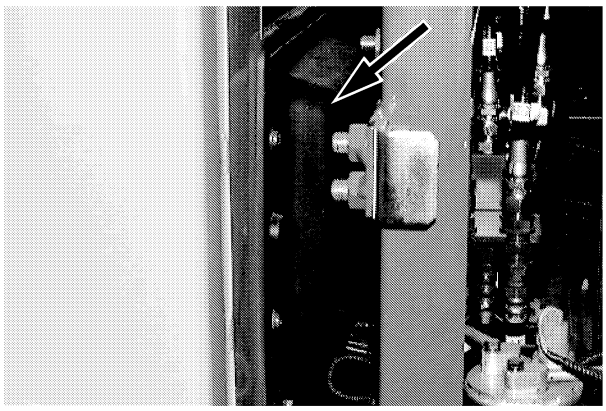
Description



CI00G507

1 OPERATOR'S SEAT
2 MASK
3 GROMMET
4 RAIL
5 REAR CONTROL ARM BRACKET
6 SHOCK ABSORBER
7 BRACKET
8 FRONT CONTROL ARM BRACKET

STEP 17



CD00G007

Remove the pollen filter guard, remove the pollen filter and remove the pollen filter conduit.

STEP 18

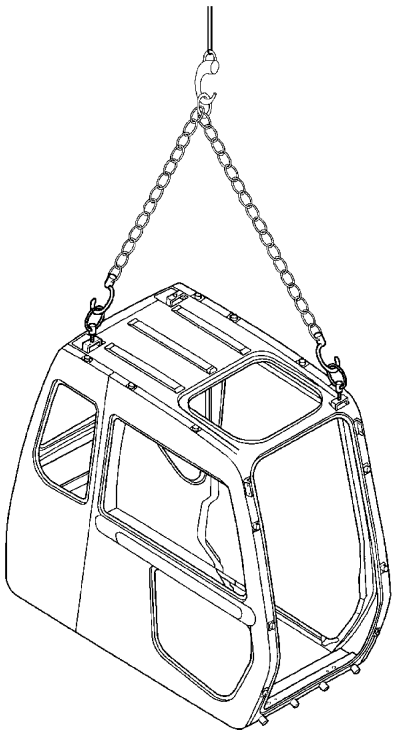
Remove the working light from the top of the cab. Retract the radio aerial. Install suitable lifting rings on the top of the cab. Install lifting equipment.

STEP 19

Remove the screws and washers which fasten the cab to the upperstructure frame.

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 254 kg.*

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 9

CD00G133

Remove the upper right-hand trim.

STEP 10

CD00G134

Remove the lower front trim inside the cab, by the screw(s) (A).

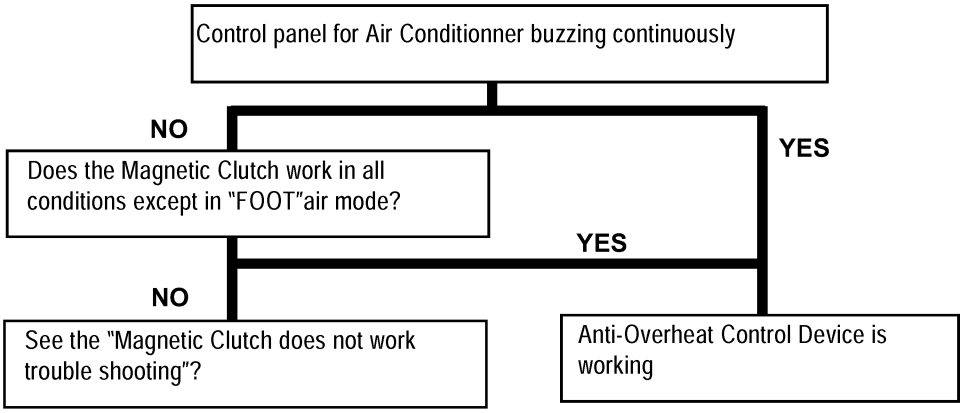
STEP 11

Disconnect the electrical harness (10) from the windshield wiper motor (4).

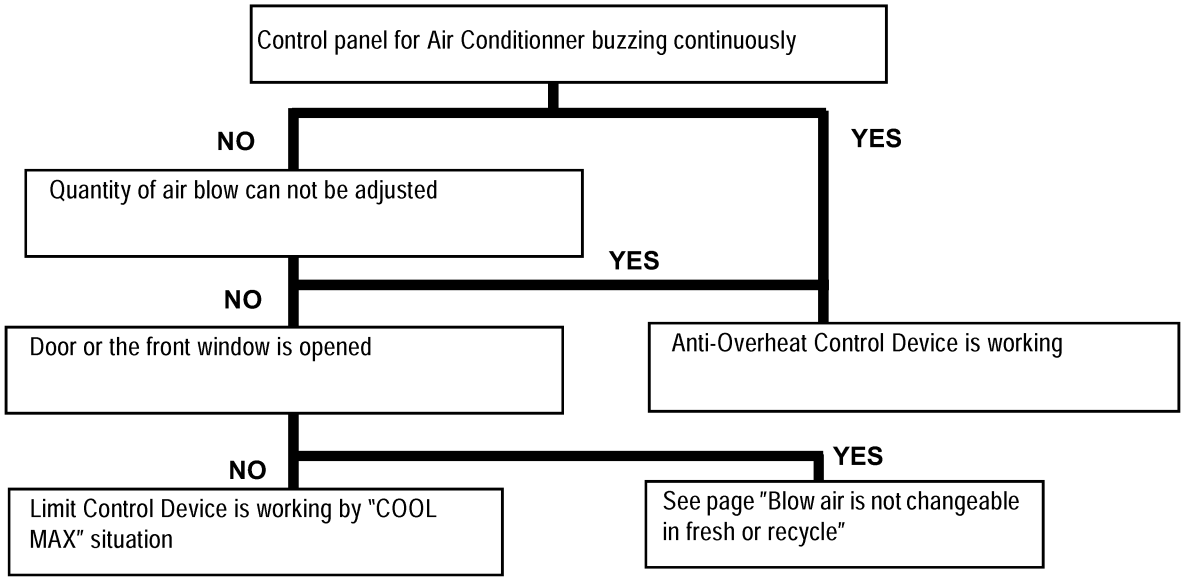
STEP 12

Remove the screws (9) and (11) from the windshield wiper motor. Remove the windshield wiper motor.

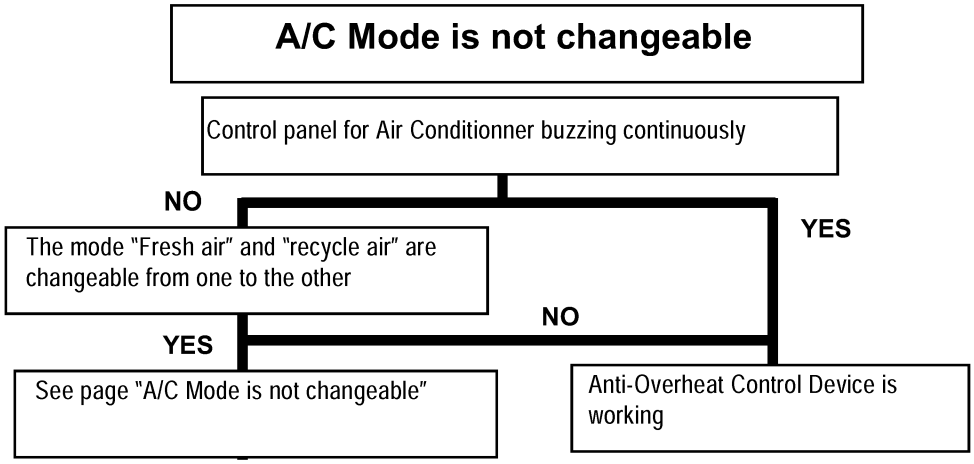
Magnetic Clutch does not work



Blow air is not changeable in fresh or recycle



A/C Mode is not changeable



SPECIFICATIONS

Articulation cylinder

Inner diameter of the cylinder barrel	150 mm
Outer diameter of the cylinder barrel	180 mm
Rod diameter	100 mm
Stroke	1090 ± 3.15 mm
Weight	251 kg
Safety valve setting (rod extension)	37.8 MPa
Safety valve setting (rod retraction)	39.7 MPa
Rod extension speed (in mode S)	5.11 s
Rod retraction speed (in mode S)	2.84 s

Articulated boom

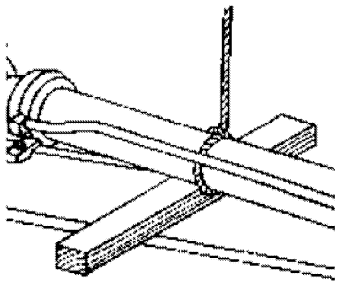
Weight	1895 kg

SPECIAL TORQUE SETTINGS

Articulation cylinder

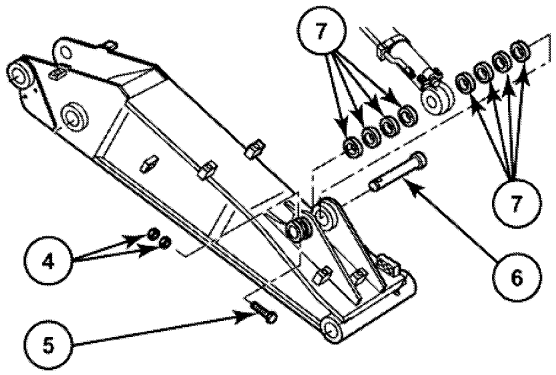
Piston nut	9900 Nm
Bearing retaining screw	520 Nm
Piston nut screw	56.9 ± 10.7 Nm

11. Attach a lifting device to the cylinder. Use the total movement to get sufficient support during removal of the cylinder.



CRIL05G045A

12. Remove the nuts (4) and the screw (5) from the pin (6) and carefully remove the pin (6). Carefully lift the articulation cylinder and place it on the ground. Recover the shims (7). Remove the sling that holds the cylinder rod to the cylinder barrel.



CRIL05G046A01

Installation

NOTE: *The numbers in brackets in the following steps refer to the removal chapter.*

1. Attach a suitable sling to hold the cylinder rod to the cylinder barrel

2. Attach a lifting device to the articulation cylinder, lift the cylinder and bring it in position. Align the cylinder foot port with the boom brackets and install the shims (7).

3. Install the pin (6). Using a set of spacer rings, check that the play between the boom and the articulation cylinder is 0.6 to 2 mm. If required, remove the pin (6) and add one or more shims (7) according to the requirement in order to get the correct play. Install the pin (6). Install the screw (5), the first nut (4) and tighten the nut until it touches the boss on the boom. Loosen a quarter of a turn and use two wrenches to tighten the second nut (4) on the first.

4. Start the vacuum pump. Remove the plugs and connect the articulation cylinder supply hoses (A). If the safety valve is installed, connect the hoses (B) and clamp them to the articulation cylinder. Stop the vacuum pump.

5. Remove the sling that holds the cylinder rod to the cylinder barrel.

6. Start the engine and align the cylinder head port with the boom brackets and install the shims. Stop the engine.

7. Install the pin (3). Using a set of spacer rings, check that the play between the boom and the articulation cylinder is 0.6 to 2 mm. If required, remove the pin (3) and add one or more shims according to the requirement in order to get the correct play. Install the pin (3). Install the screw (2), the first nut (1) and tighten the nut until it touches the boss on the boom. Loosen a quarter of a turn and use two wrenches to tighten the second nut (1) on the first.

8. Remove the vacuum pump and bleed the air from the articulation cylinder.

9. Install the lubrication hoses on the rod and barrel side of the articulation cylinder and lubricate the linkages.