SPECIFICATIONS

Engine

Make ..... Isuzu
Model 6SD1XQB

Type: Four stroke, water cooled with overhead valves, direct injection in-line cylinder (electronic control) with turbo-

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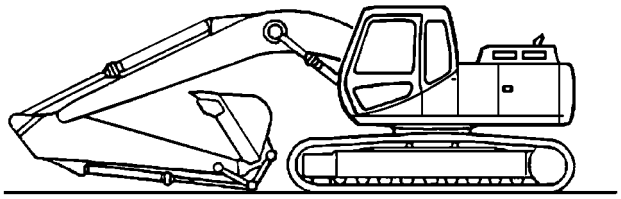
ENGINE

Removal and installation

STEP 1



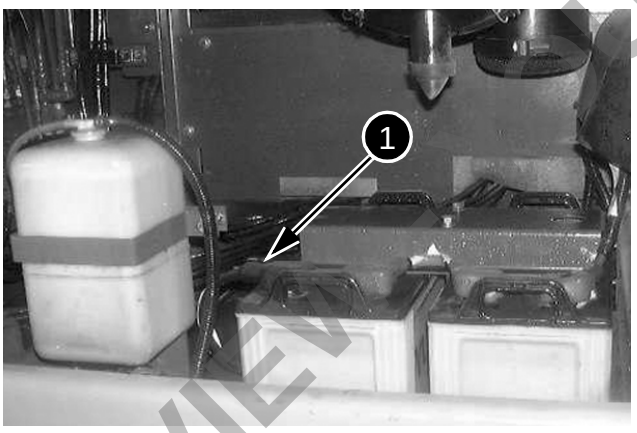
JS00163A

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



CD02H003

Disconnect the battery ground (-) cable (1) from the battery.

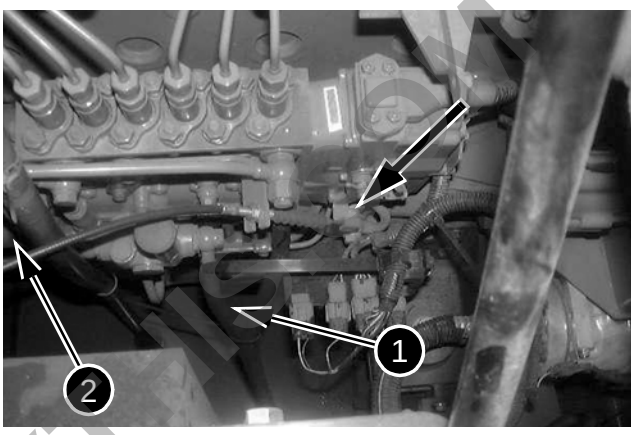
STEP 4

Refer to Section 8003 and remove the hydraulic pump.

STEP 5

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

STEP 6

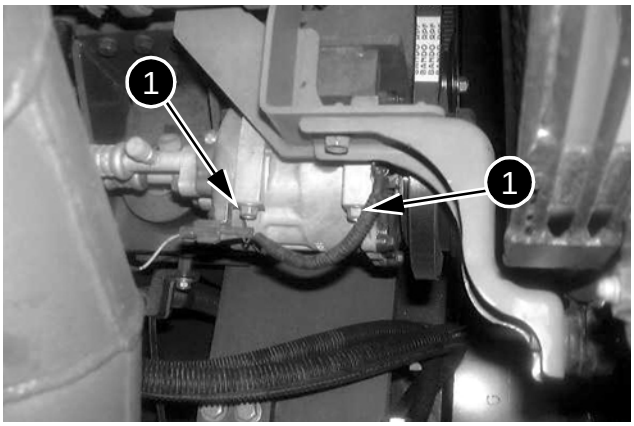


CD02K003

Remove the engine shutdown control (arrow).

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

STEP 7



CD02K004

Remove the screws (1) from the compressor and put it away from the engine.

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SPECIAL TORQUE SETTINGS

No.	Component	Screw (Ø)	Wrench (mm)	Torque setting (lb-ft)
1 *	Travel motor and reduction gear assembly	M24	36	664-774
2 *	Sprocket	M24	36	664-774
3 *	Idler wheel	M16	24	197-230

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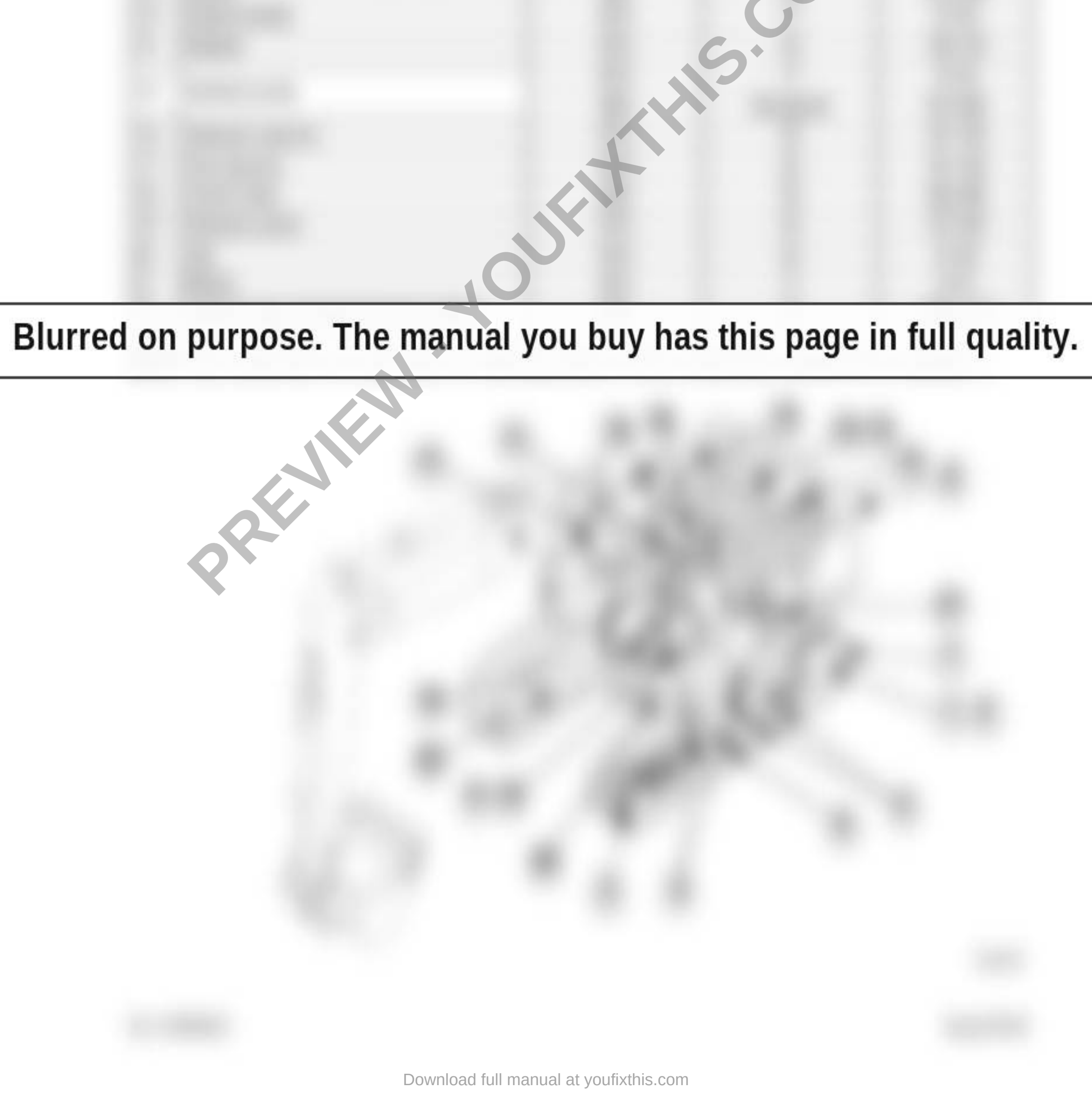

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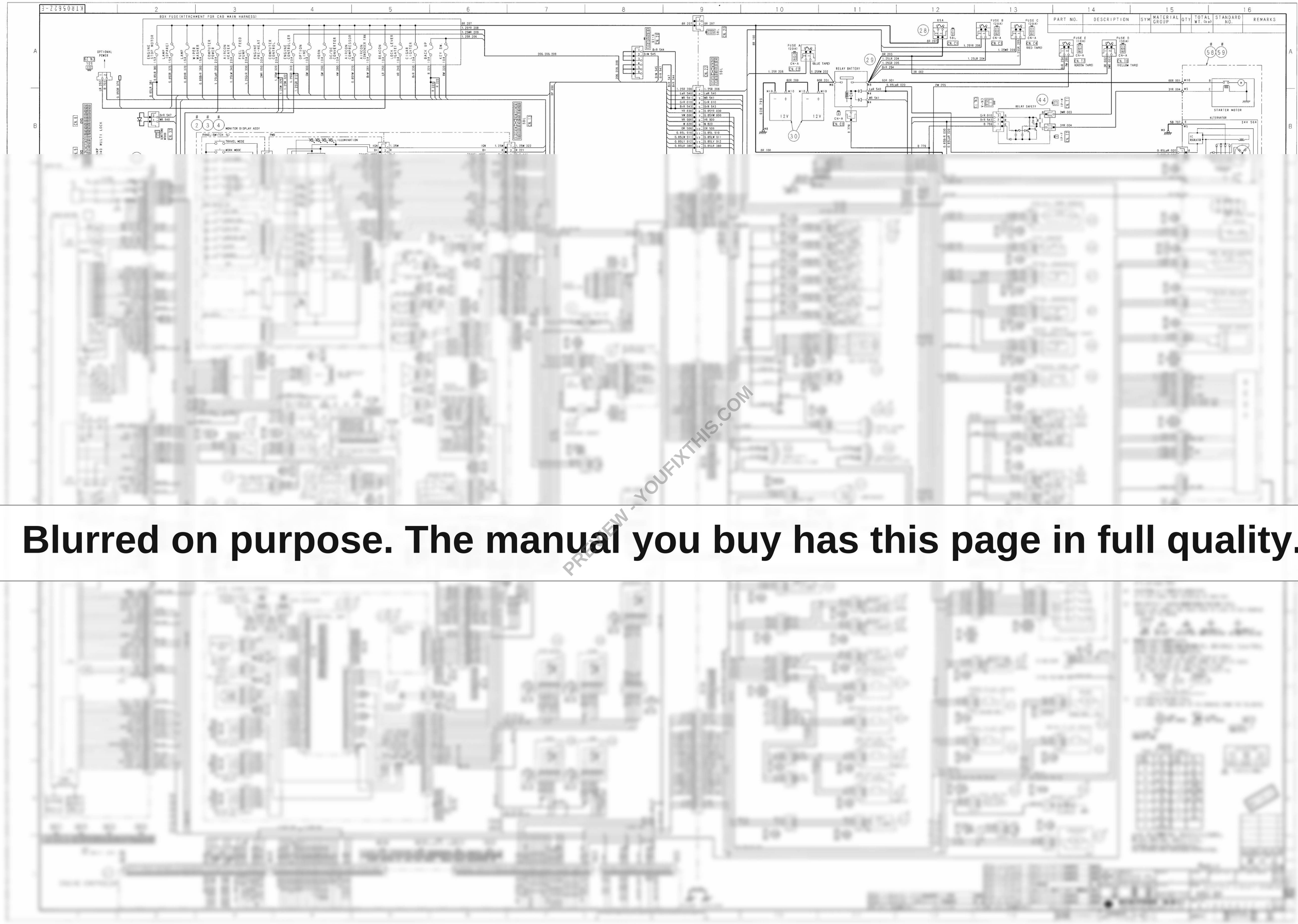

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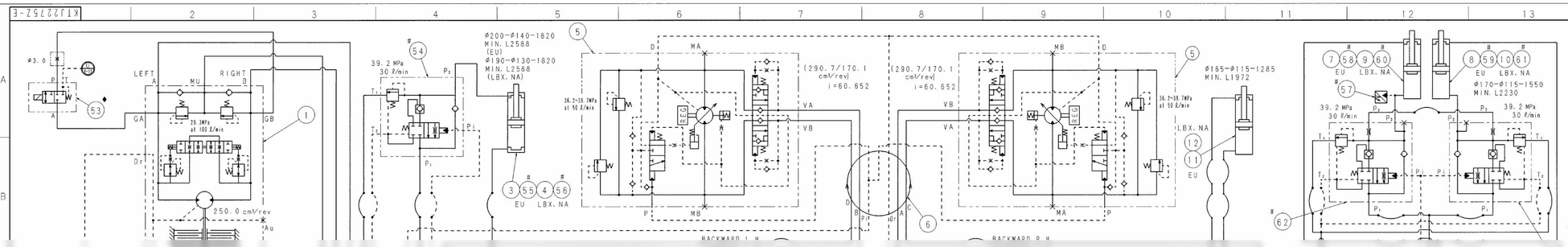

PART NO.	DESCRIPTION	SYM	MATERIAL GROUP	QTY	TOTAL WT. (kg)	STANDARD NO.	REMARKS
KTC0171X-B	MOTOR:SWING モータ:旋回	1		1			TOSHIBA 東芝電機
KTC0148Z-C	SWING REDUCTION GEARS 減速機(旋回)	2		1			ASANO GEAR 浅野歯車
KTV1250X-B	CYLINDER:ARM シリンダ:アーム(HD) EMS	3		1			KAYABA カヤバ工業
KTV1409X-B	CYLINDER:ARM シリンダ:アーム(標準) 電機	4		1			KAYABA カヤバ工業
KTA1070X-A	MOTOR:TRACTION UNIT モータ:走行 ユニット	5		2			NABCO ナブコ
KSA1136Z-D	JOINT:CENTER ジョイント:センタ 電気	6		1			TAIHEIYO 太平洋機器
KTV1248X-B	CYLINDER:BOOM(L) シリンダ:ブーム (左 EMS)	7		1			KAYABA カヤバ工業
KTV1247X-B	CYLINDER:BOOM(R) シリンダ:ブーム (右 EMS)	8		1			KAYABA カヤバ工業
KTV1408X-B	CYLINDER:BOOM(L) シリンダ:ブーム (左 電機)	9		1			KAYABA カヤバ工業
KTV1407X-B	CYLINDER:BOOM(R) シリンダ:ブーム (右 電機)	10		1			KAYABA カヤバ工業
KTV1264X-B	CYLINDER:BUCKET シリンダ:バケット (左 EMS)	11		1			KAYABA カヤバ工業
KTV1410X-B	CYLINDER:BUCKET シリンダ:バケット (電機)	12		1			KAYABA カヤバ工業
KHJ0982X-A	VALVE:CHECK バルブ:チェック(3x)	13		1			YAMASHIN 山田工業
KTJ2185X-B	MANIFOLD マニホールド リターン	14		1			HIROSE 廣瀬製作所
~~KTJ2471X-B~~ KTJ1007O-B	VALVE:CONTROL バルブ:コントロール	15		1			KAYABA カヤバ工業
KTJ2034X-B	VALVE:REMOTE CONTROL バルブ:リモコン(走行)	16		1			KAWASAKI 川崎重工

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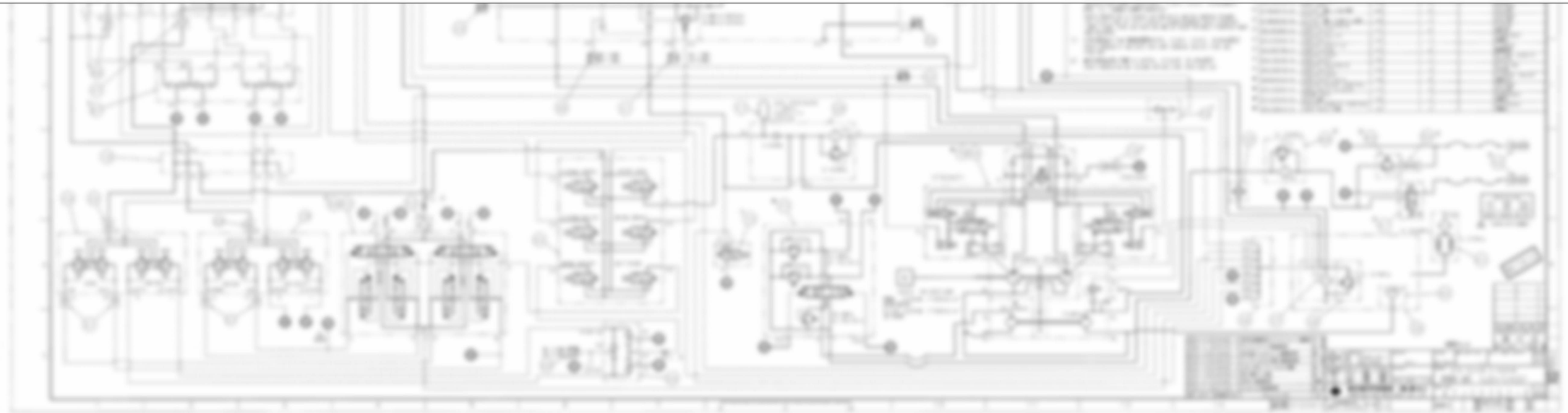

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TROUBLESHOOTING

Prior inspections

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

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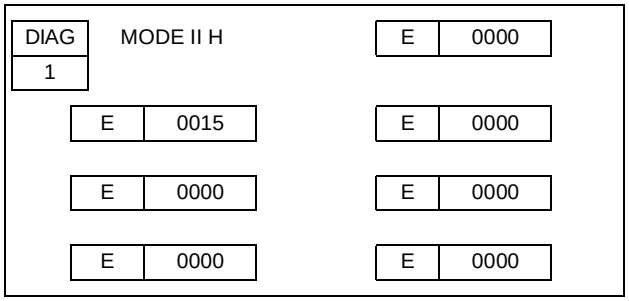
Diagnostic code

1. Detection of engine failures DIAG1



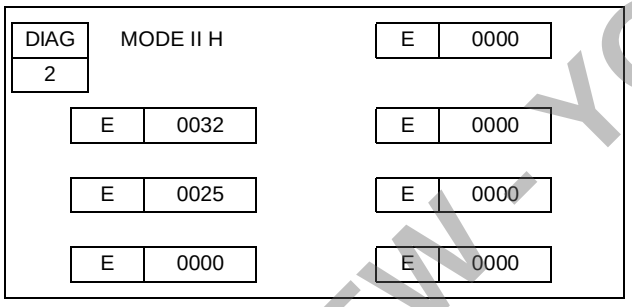
E: Failure code

Failure code

E0000: No defect
E0015: Coolant temperature sensor
E0025: Fuel flow adjustment resistor
E0031: Linear motor control circuit in electronic regulator
E0032: Electronic regulator rack position detector
E0041: Electronic regulator engine rpm receiver
E0042: Engine rpm sensor

Example: In the screen above, there is a defect in the coolant temperature sensor.

2. Previous failures in the engine DIAG2



E: Failure code

Example: The screen above shows that there is a defect in the electronic regulator rack position detector (0032) and in the fuel flow adjustment resistor (0025).

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460LX Crawler Excavators
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	Disassembly and assembly of the engine	*	
3	**FUEL SYSTEM**		
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	Main hydraulic control valve, disassembly and assembly	8011	9-54310LX
	Attachment cylinders, disassembly and assembly	8012	9-53690LX
	Hand control levers, disassembly and assembly	8013	9-54000LX
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Seat and seat belt	9004	9-40960LX
Cab and cab equipment	9005	9-53410LX
Air conditioning troubleshooting	9006	[redacted]
Air conditioning unit disassembly and assembly	9007	[redacted]
Air conditioning servicing	9008	[redacted]
Air conditioning components	9009	[redacted]
Large format hydraulic and electrical schematics	Pocket	9-43170

* *Consult the Engine Service Manual*

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

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

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

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SPECIFICATION 2

TORQUE SETTING 2

ENGINE 3
Removal and installation 3

SPECIFICATION

Weight of engine ..... See Section 1002

TORQUE SETTING

Retaining screw for the engine ..... 231 ± 18 lb-ft

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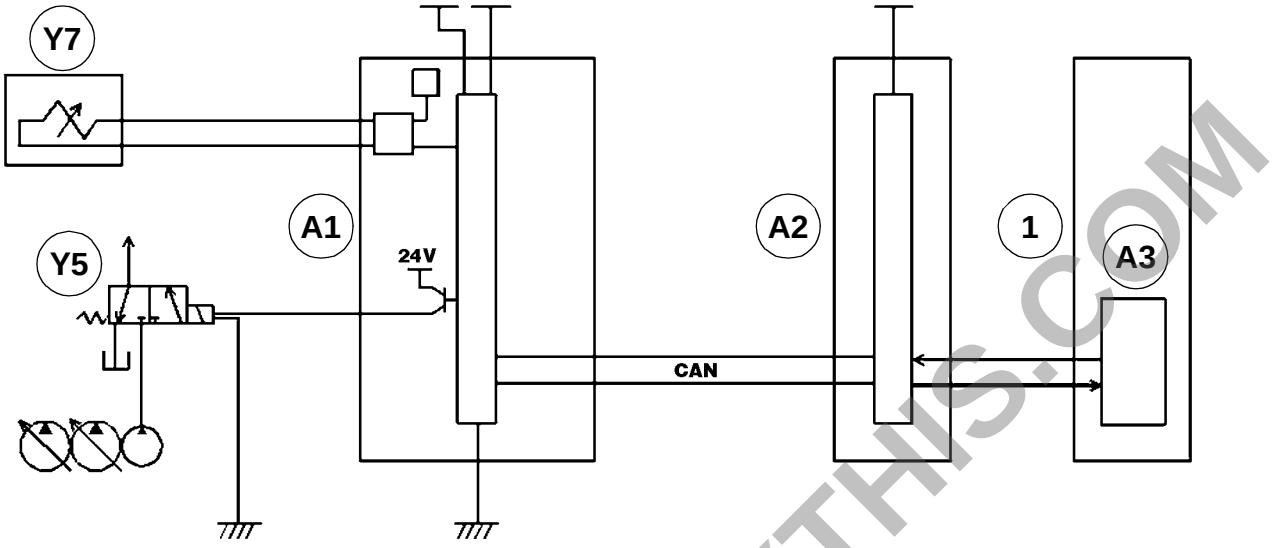
H/S/L mode checking

1) Circuit configuration



CS00F509

1 Engine
A1 Main computer (yellow band)
A2 Engine controller
A3 Electronic acceleration
Y5 Power-up solenoid valve (yellow band)
Y7 Main pump proportional solenoid

2) Fixed values for each model

					Hydraulic power boost
H mode	Engine rpm (Max)		rpm	2000 ± 10	Automatic checking
	Current (variable current)	(Max)	mA	515	
		(Min)	mA	405	
S mode	Engine rpm (Max -200)		rpm	1800 ± 10	Automatic checking
	Fixed current intensity (90% torque)		mA	405	
L mode	Engine rpm (Max -300)		rpm	1700 ± 10	Constant
	Fixed current intensity (70% torque)		mA	< 50	
Idle	Engine rpm		rpm	900	-----
Automatic idle	Engine rpm		rpm	1200	-----
Engine rpm at maximum torque			rpm	1600	-----

NOTE: *The values listed above are those in normal conditions, the following are exceptions:*

1. If the target engine rpm is less than the maximum torque rpm, the pump is controlled by the "L" mode current value (same in H/S modes).
2. In "L" mode, if only travel is selected, the pump is controlled by the "S" mode current value.
3. In "L" mode, if the hydraulic breaker or the grab is used, the pump is controlled by the "S" mode current value.
4. If the engine coolant temperature is too low, or if the voltage coming in to the engine controller (A2) is too low, the idle rpm increases to avoid over-cooling of the engine or discharging of the battery.

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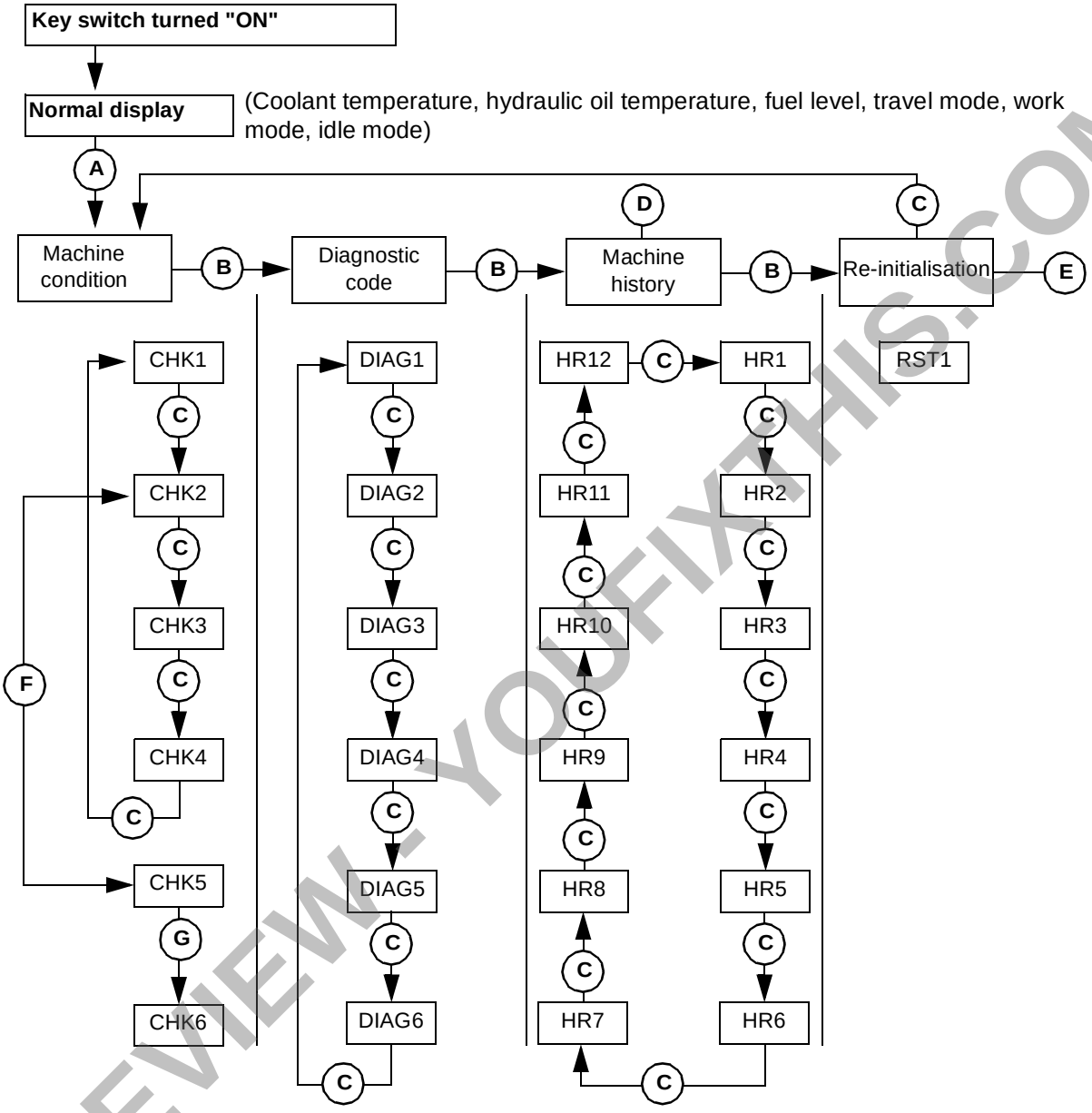
ACCESS AND CONTENTS OF MONITOR DISPLAYS (Diagnostic mode)

Access to monitor displays



A. Press the travel mode and work mode switches simultaneously for a minimum of 3 seconds.

B. Press the auto work mode switch.

C. Press the audible alarm cut out switch.

D. To erase the data, press the work mode switch for a minimum of 10 seconds and the audible warning device sounds.

E. To re-initialise the system, press the audible alarm cut out switch.
To programme the system, press the travel mode switch.
To erase the data, press the work mode switch for a minimum of 10 seconds and the audible warning device sounds.

F. To initialise the automatic overload detection on the electrical circuit, press the travel mode switch.

G. To initialise the automatic detection of short-circuits, press the travel mode switch for a minimum of 10 seconds and the audible warning device sounds.

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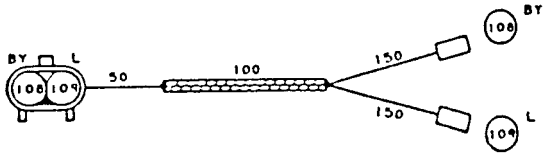
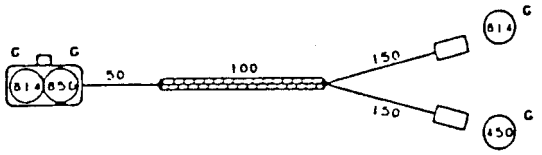


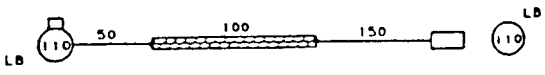
BS98F229

9. For harness end of pressure switch



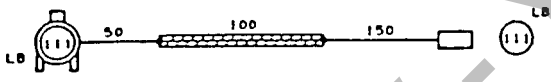
BS98F230

10. For air conditioning compressor clutch switch (2P)



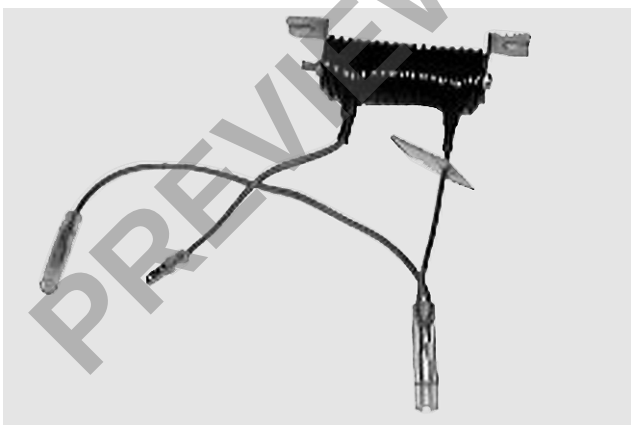
BS98F231

11. Not used



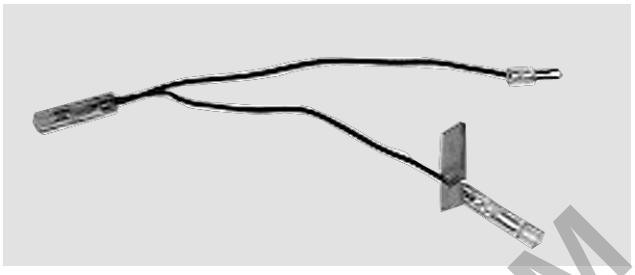
BS98F232

12. Not used



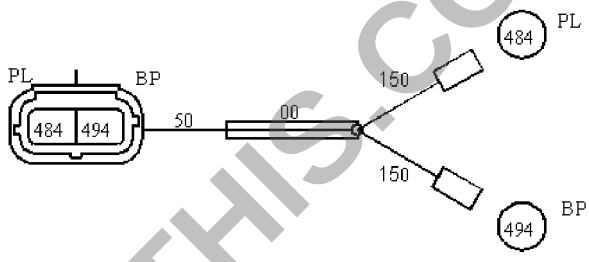
CD00N018

13. Not used



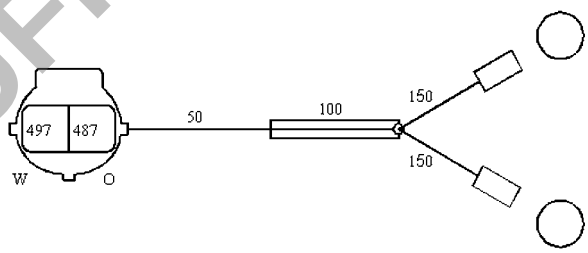
CD00N019

14. Not used



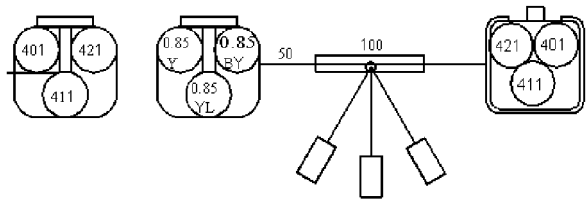
CS00E531

15. For hydraulic oil and coolant solution temperature sensor



CS00E530

16. For engine rpm sensor



CS00E532

17. For pressure sensor

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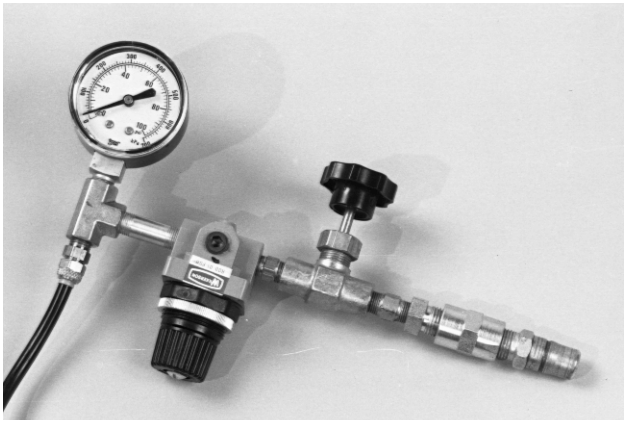
SPECIFICATIONS

See Section 1002.

SPECIAL TORQUE SETTINGS

See Section 1002.

SPECIAL TOOLS



B407320M

Use CAS 1450 and CAS 1682 for the leak checks shown below.

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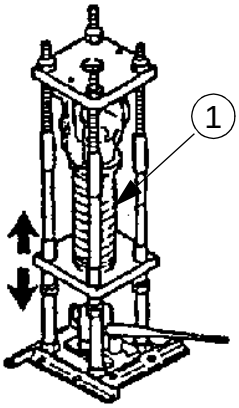
Disassembly

STEP 1

Clean the shock absorber - spring assembly.

> **WARNING:** *The shock absorber spring is highly compressed.*

STEP 2



CS02E656

Place the shock absorber spring in a hydraulic press. Use the press to compress the shock absorber spring (1).

STEP 3

Drive out the retainer pin (2) from the slotted nut (3). Remove the slotted nut from the spring guide (5).

STEP 4

Operate the hydraulic press so as to very slowly release tension in the shock absorber spring (1).

STEP 5

Remove the compensator (4) and the shock absorber spring (1) from the spring guide (5).

Assembly

STEP 1

Fix the spring guide (5) in a hydraulic press.

STEP 2

Place the shock absorber spring (1) and the compensator (4) in the hydraulic press on the spring guide (5).

STEP 3

Operate the hydraulic press to compress the shock absorber spring (see specifications for the value).

STEP 4

Install the slotted nut (3) and install a new retainer pin (2) in the slotted nut and the spring guide shaft (5).

STEP 5

Remove the shock absorber spring from the hydraulic press.

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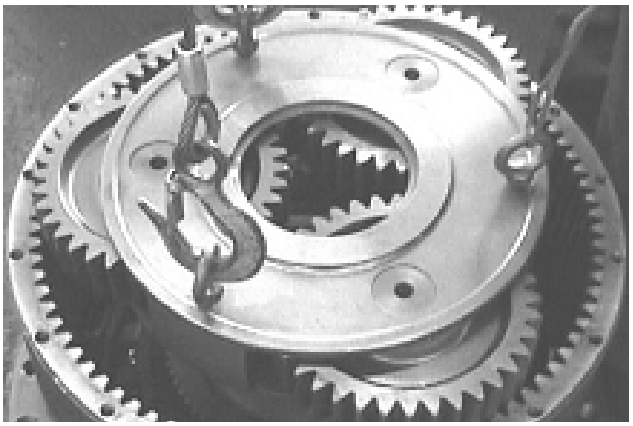
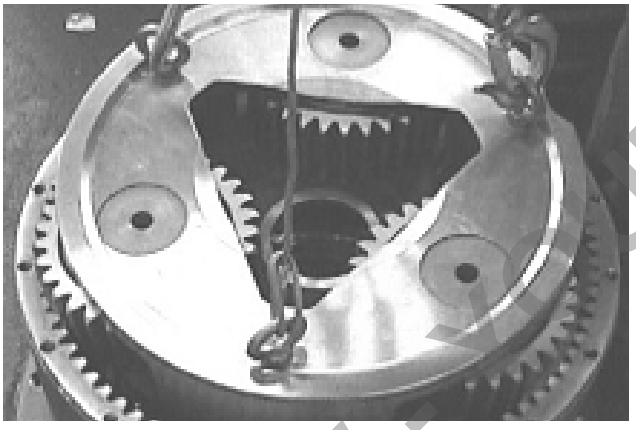
STEP 4



CD02B009

Remove the thrust plate (8).
Remove the planetary (9).
Place three lifting eyes on the satellite carrier (2) and remove assemblies (3), (4), (5), (6) and (7).

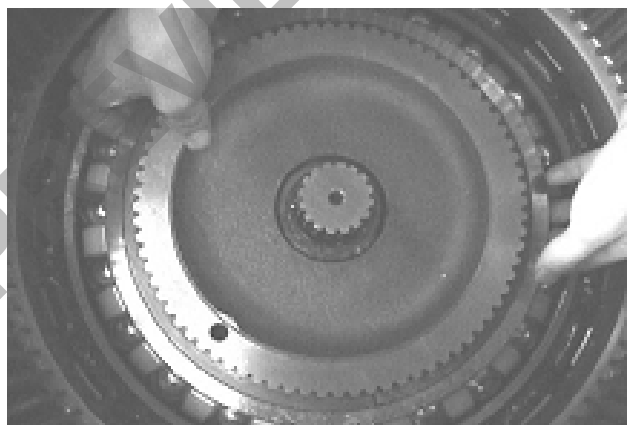
STEP 5



CD02B010

Remove the planetary (10).
Place three lifting eyes on the housing (11) and remove assemblies (12), (13), (14), (15) and (16).

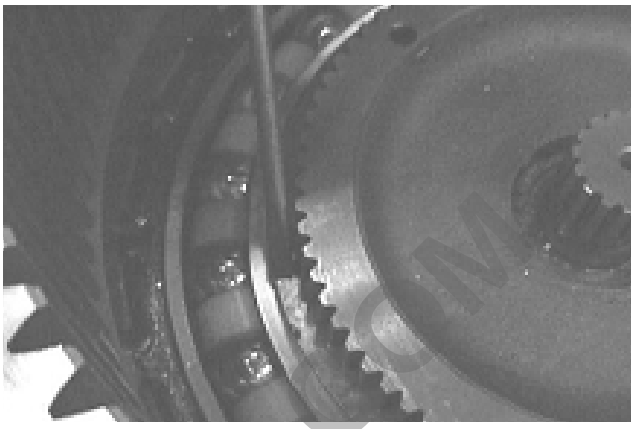
STEP 6



CD02B011

Remove the support ring (22).

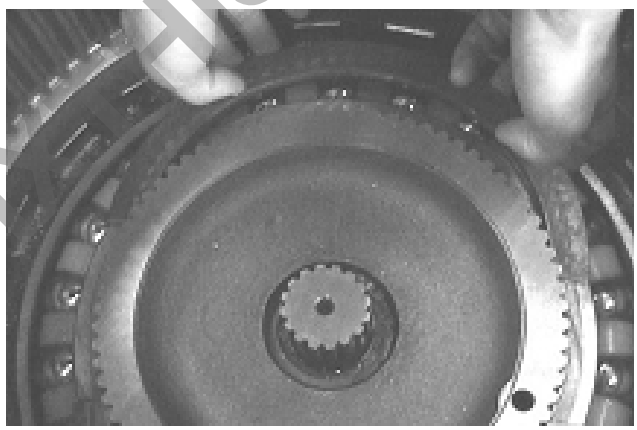
STEP 7



CD02B012

Remove the lock washer (21).

STEP 8



CD02B013

Place lifting eyes in three holes in the ring gear (17) and remove the assembly (ring gear (17), pivot (18), bearing (19) and face seal (23)), lifting them uniformly.

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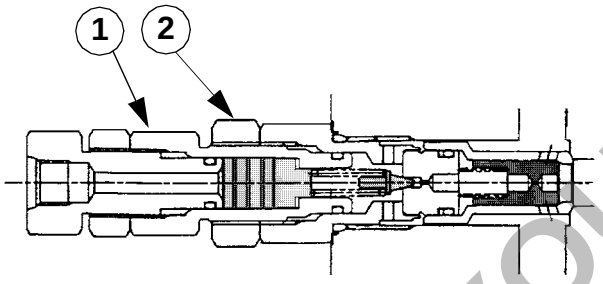
Attachment control valve secondary reliefs (B, C, D, E, F and G)

NOTE: *If the excavator is equipped with safety valves on the boom and the dipper, secondary reliefs (B) and (D) are not fitted or are overset. In this case it is necessary to set the pressures on the reliefs (B1-B2 and D1) mounted on the safety valves.*

NOTE: *The attachment main reliefs are set to a higher pressure than the main relief valve. To check or set the attachment main reliefs, the main relief must be overset.*

NOTE: *Since the pressure of the boom lowering valve is lower than the main relief, there is no need the overset the main relief (Steps 1 to 4 and 15 to 19).*

Checking and setting the pressure

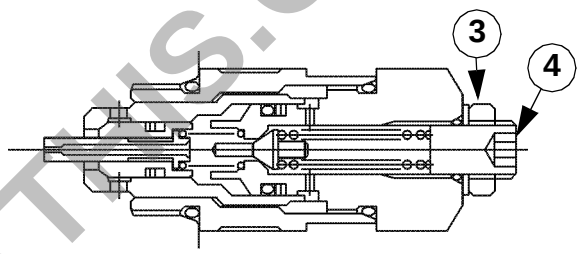


CS00E550

1. Disconnect and plug the power boost pilot hose on the main relief.
2. Using a wrench, hold the adjusting screw (1) in position and loosen the lock nut (2).
3. Tighten the adjusting screw (1) 180°.
4. Using a wrench, hold the adjusting screw (1) in position and tighten the lock nut (2).
5. Start the engine and run it at maximum speed, select mode "S".
6. Display the "CHK1" monitor display.
7. Operate and hold in position the corresponding attachment control (against the cylinder stops).
8. Read the pressure on the monitor display, the pressure should be:

Boom raising	**P1-P2**	**5265±72 psi**
Boom lowering	**P2**	**3553±72 psi**
Dipper in	**P1-P2**	**5265±72 psi**
Dipper out	**P1-P2**	**5265±72 psi**
Bucket opening	**P2**	**5265±72 psi**
Bucket closing	**P2**	**5265±72 psi**

9. Carry out Steps 10 to 14 only if one of the attachment secondary reliefs has to have its pressure set. Otherwise go on to Step 15.



CS01K554

10. Using a wrench, hold the adjusting screw (4) of the secondary relief concerned in position and loosen the lock nut (3).
11. Operate and hold in position the corresponding attachment control (against the cylinder stops).
12. Turn the adjusting screw (4) of the secondary relief concerned until the correct pressure is obtained.
13. Using a wrench, hold the adjusting screw (4) in position and tighten the lock nut (3).
14. Check the pressure again. If the desired value is not obtained, repeat steps 10 to 14.
15. Using a wrench, hold the adjusting screw (1) of the main relief concerned in position and loosen the lock nut (2).
16. Operate and hold in position the dipper retracting control (against cylinder stops).
17. Turn the adjusting screw (1) until the correct standard pressure of the main relief concerned is obtained.

NOTE: *Tighten the screw (1) to increase the pressure. Loosen the screw (1) to reduce the pressure.*

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SPECIFICATIONS

See Section 1002.

PREPARATION BEFORE REMOVAL/INSTALLATION

- Park the machine on hard, flat ground.
- Completely retract the bucket and dipper cylinder rods and lower the attachment to the ground.
- Release pressure in the hydraulic circuit and install a vacuum pump on the hydraulic reservoir (see Section 8000).

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Cushion control valve

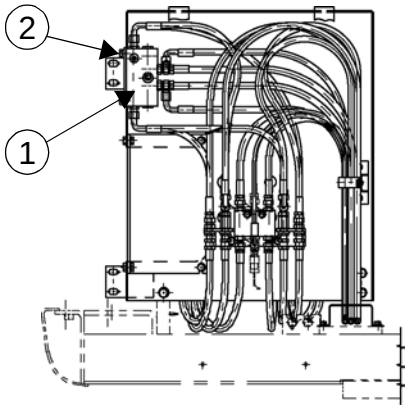
Removal and installation

NOTE: *Refer to page 3 and carry out Steps 1 to 4.*

STEP 1

Open the left-hand side doors.

STEP 2



CI01N512

To aid installation, put identification tags on the hydraulic hoses.

STEP 3

Start the vacuum pump.

STEP 4

Disconnect the hydraulic hoses from the cushion control valve (1). Plug the hydraulic hoses and the ports of the cushion control valve (1).

STEP 5

Stop the vacuum pump.

STEP 6

Remove the screws (2) from the bracket and from the cushion control valve. Remove the cushion control valve.

NOTE: *When installing, proceed in the reverse order to that of removal. Start the engine, operate the control levers, stop the engine, check the circuit for leaks and the hydraulic oil level in the reservoir, top up if necessary.*

Servo control and return manifold block

Removal and installation

NOTE: *Refer to page 3 and carry out Steps 1 to 4.*

STEP 1

To aid installation, put identification tags on all the hydraulic hoses.

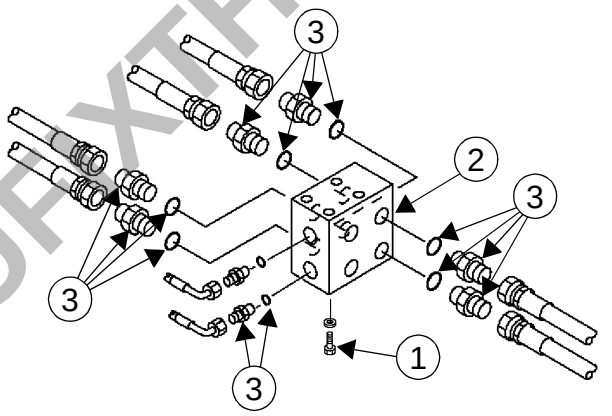
STEP 2

Start the vacuum pump.

STEP 3

Provide for a container to recover any possible hydraulic fluid leaks.

STEP 4



CS01N583

Remove and seal the hydraulic hoses.

STEP 5

Stop the vacuum pump.

STEP 6

Remove the screws (1) then remove the block (2). Remove the junction unions (3), discard the O-rings, put plugs on the ports of the block.

NOTE: *When installing, replace all O-rings with new O-rings.*

NOTE: *When installing, proceed in the reverse order to that of removal. Start the engine, operate the control levers, stop the engine, check the circuit for leaks and the hydraulic oil level in the reservoir, top up if necessary.*

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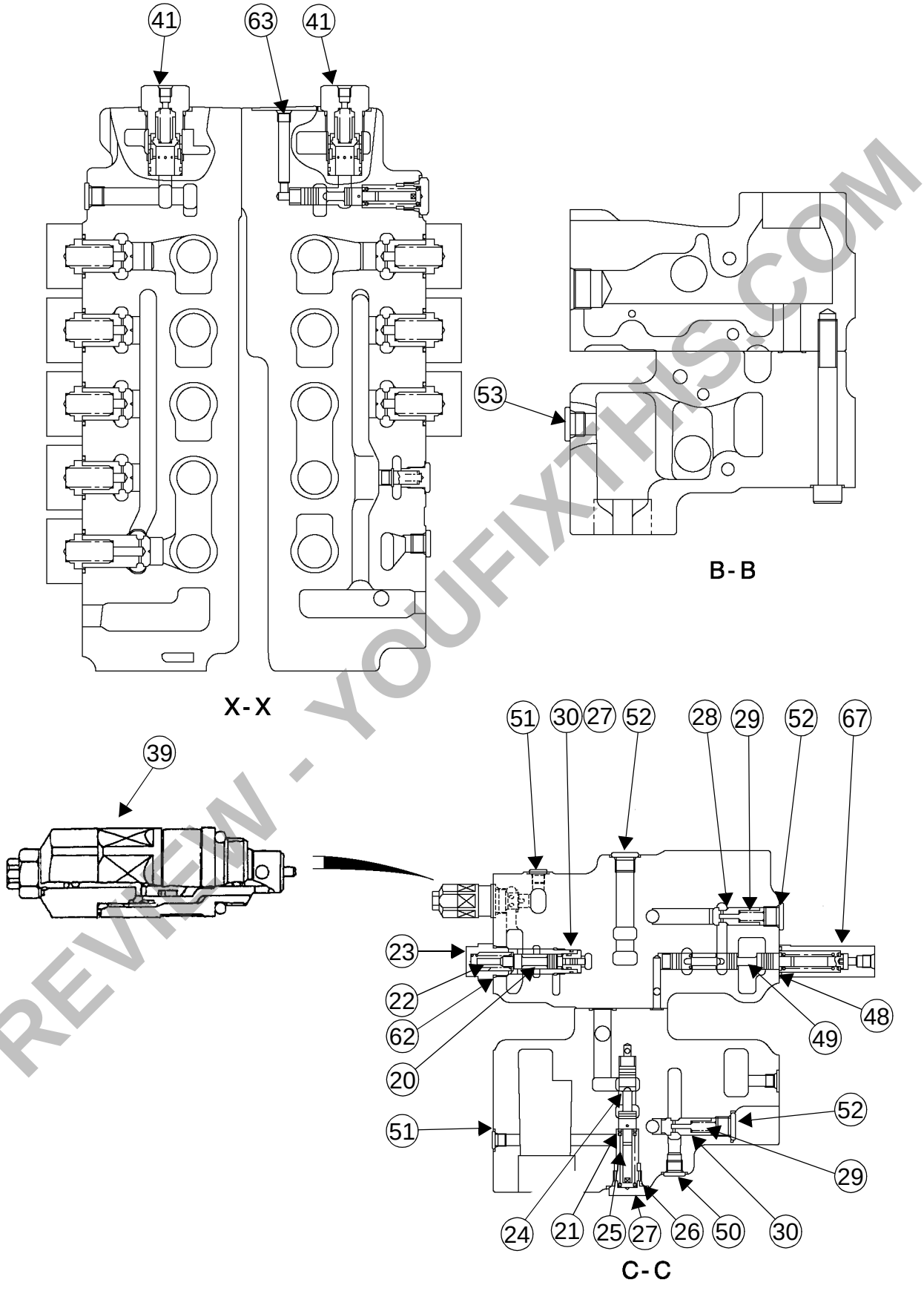

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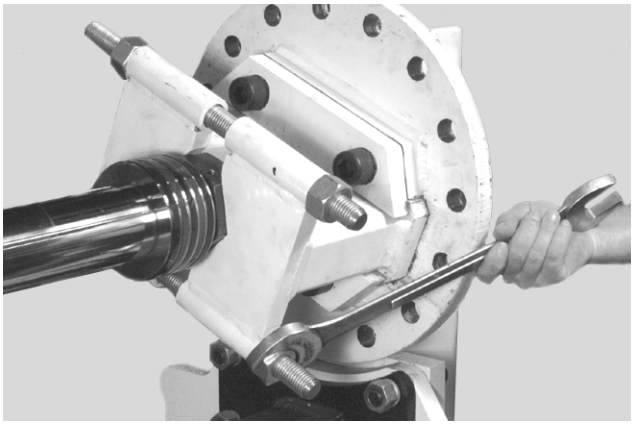
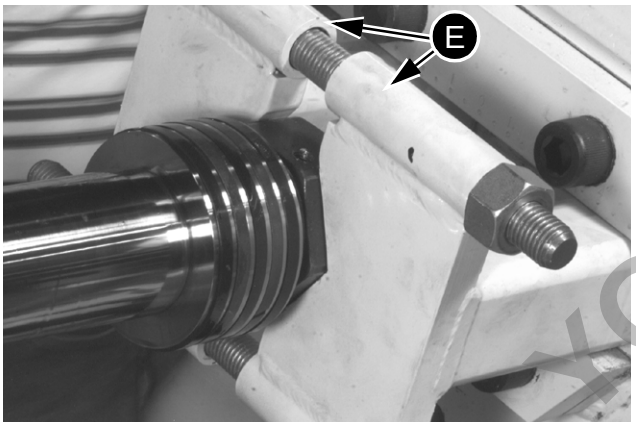
STEP 11

Carry out Steps 4 to 12 of disassembly to install the cylinder rod in the repair stand.

STEP 12



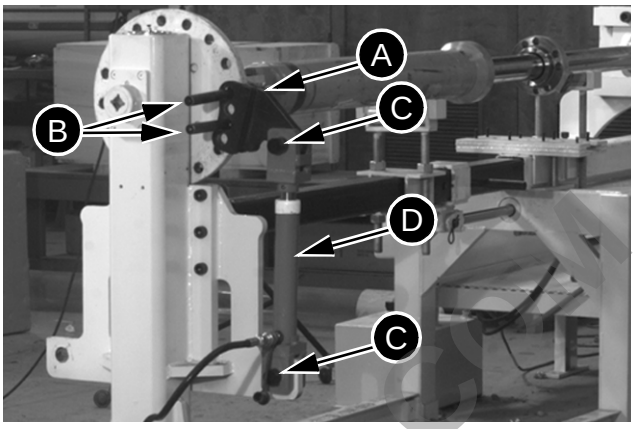
JD00637A



JD00636A

Carry out Steps 19 to 21 of disassembly to install wrench (E) on the piston nut (22).

STEP 13



JD00660A

Remove the toggle assembly (A) and the cylinder (D) on the RH side of the repair stand, by removing the stop bars (B) and the pins (C). Install the toggle assembly and cylinder (D) on the left side of the repair stand. Operate the hydraulic pump by depressing the foot pedal to extend the rod end of the hydraulic cylinder to rotate the circular plate clockwise to tighten the piston nut. At the end of the stroke, remove the two stop bars; if necessary, depress the rear of the pedal to retract the cylinder rod just enough to enable removal of the stop bars. Depress the rear of the pedal to retract the cylinder rod to lower the toggle assembly as far as possible then install the stop bars. Repeat this step as required to tighten the piston nut to torque (see "Specifications").

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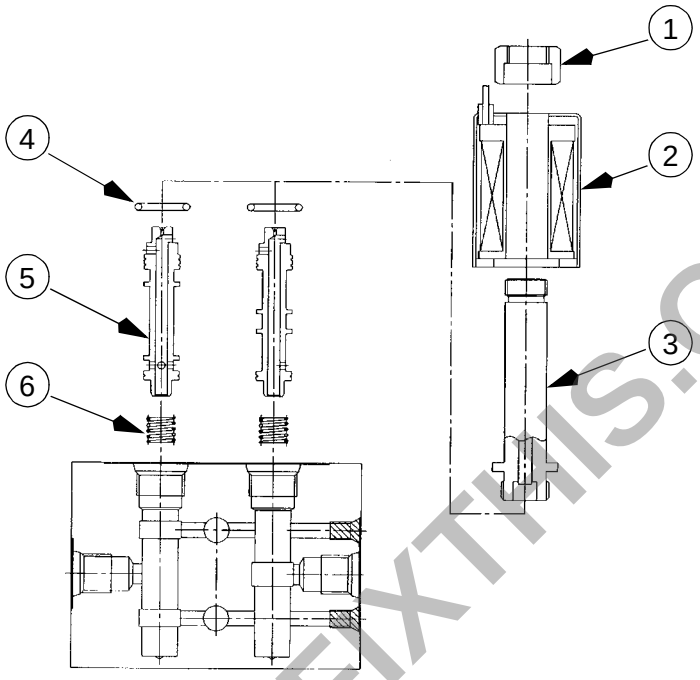
Disassembly and assembly



CS01C522

NOTE: *During disassembly, identify each part of every component to facilitate reassembly. The spool on solenoid valve Y1 is different from spools Y2, Y3, Y4, Y5 and Y6.*

STEP 1

Remove the connections from the solenoid valve block.

STEP 2

Remove the retaining nut (1) from the coil (2) and remove the coil from the core (3).

NOTE: *When reassembling, tighten the nut (1) to torque (see torque settings on page 2).*

STEP 3

Remove the core (3) from the solenoid valve housing. Scrap the O-ring (4).

NOTE: *When reassembling, install a new O-ring (4) on the core (3), tighten the core (3) to torque (see torque settings on page 2).*

STEP 4

Remove the spool (5) from the solenoid valve block housing.

STEP 5

Remove the spring (6) from the solenoid valve block housing.

STEP 6

Repeat Steps 2 to 5 for disassembly of the other solenoid valves.

STEP 7

Carry out inspection of the components.

NOTE: *During assembly, proceed in the reverse order to that of disassembly.*

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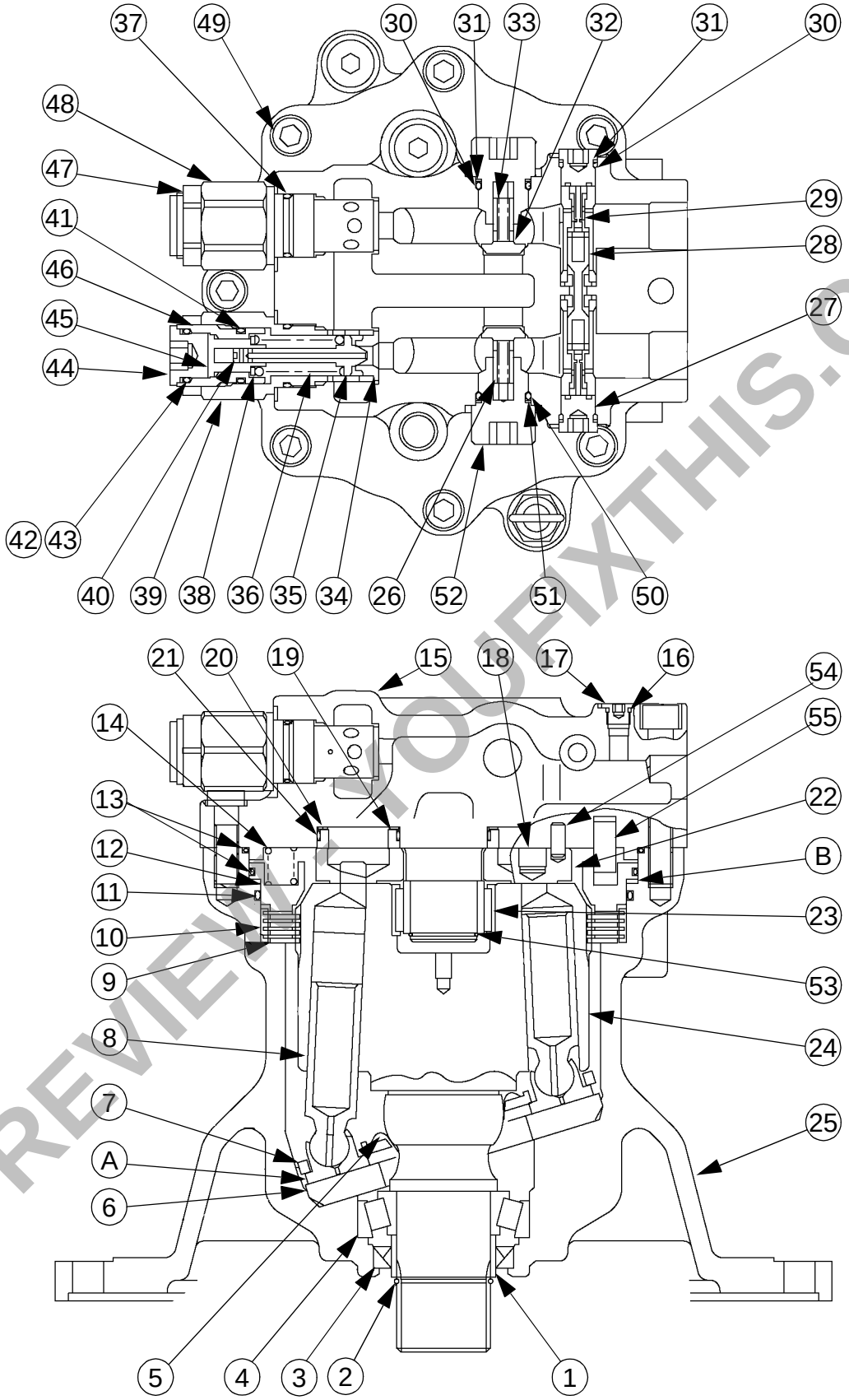

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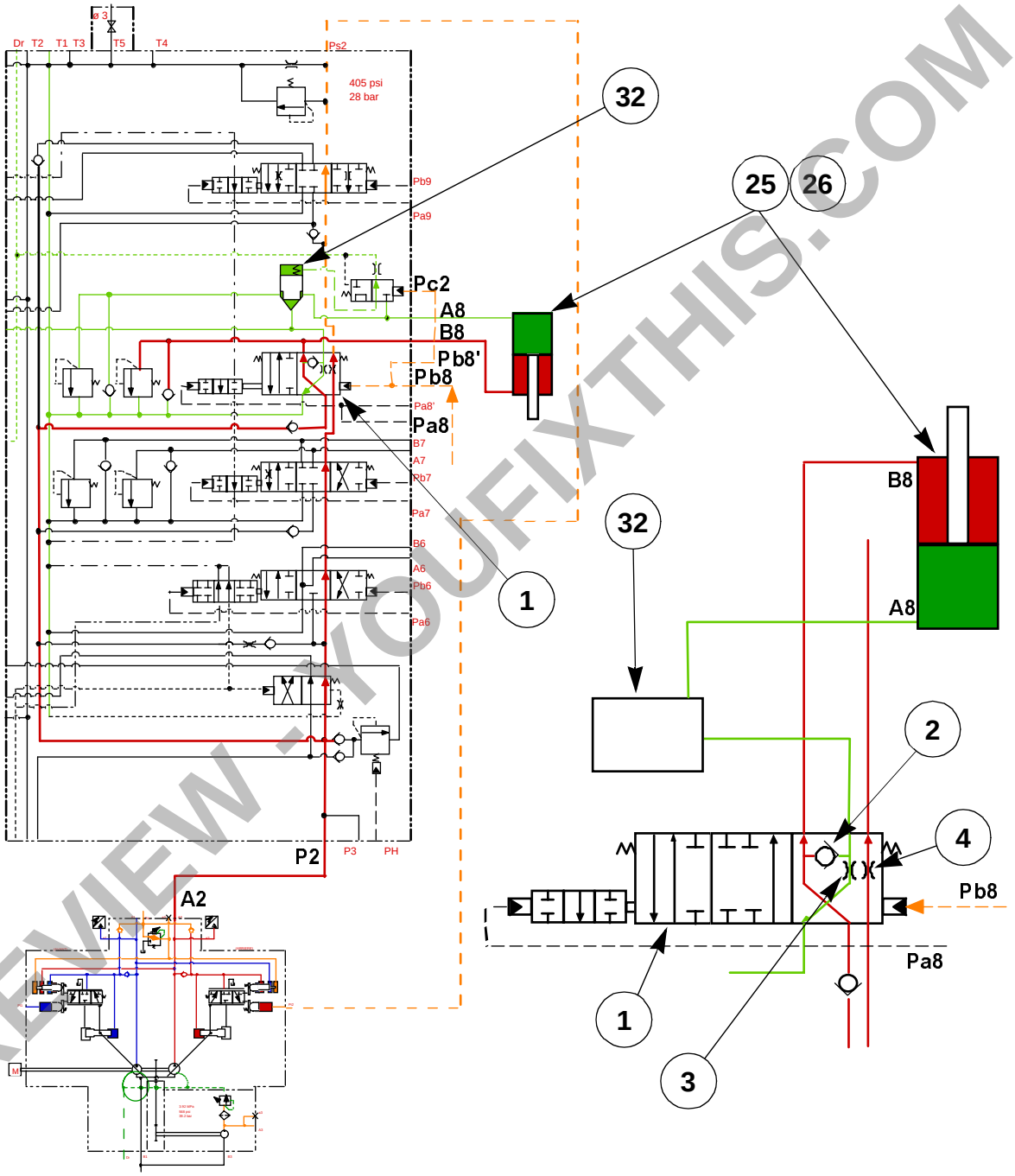
CS02J563



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CM00K019

Removal

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

STEP 1

Attach a suitable lifting device to the lifting rings of the counterweight (1). Use the total movement of the lifting device.

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

STEP 2

Remove the four screws (2) and the flat washers (3) that fasten the counterweight (1) to the undercarriage.

STEP 3

Raise the counterweight (1) and remove it from the machine. Place it on flat ground. Remove the lifting equipment.

STEP 4

Remove the shims (4) from the undercarriage anchorage points.

NOTE: *Count the number of shims (4), remove them from each anchorage point. Keep each set of shims (5) to facilitate reassembly.*

STEP 5

Check the state of the insulating material (5) installed on the counterweight. Change the insulating material if it is damaged.

Installation

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

STEP 1

Attach a suitable lifting device to the lifting rings of the counterweight (1).

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

STEP 2

Install the same number of shims (4) as those removed in step 4 of removal, at each anchorage point of the counterweight on the undercarriage.

STEP 3

Move the counterweight (1) into position on the undercarriage. Align the ports of the counterweight with those on the undercarriage.

STEP 4

Install the four screws (2) as well as the flat washers (3) to attach the counterweight (1). Tighten to the torques specified on page 2.

STEP 5

Remove the lifting device from the lifting rings of the counterweight (1).

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