Illustration 1 g02317843

Removing sequence

(1) Air hose

(2) Air hose

(3) Air pipe

(4) Air inlet elbow

(5) Inlet manifold

(6) Exhaust manifold

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Crankshaft end play	0.100 to 0.204 mm (0.0039 to 0.0080 inch)	0.300 mm (0.0118 inch)

Removing main bearing cap

Note: When removing the main bearing cap, be careful do not damage the lower main bearing lower that are attached to the cap. Also be careful not to drop those parts, which may damage the crankshaft.

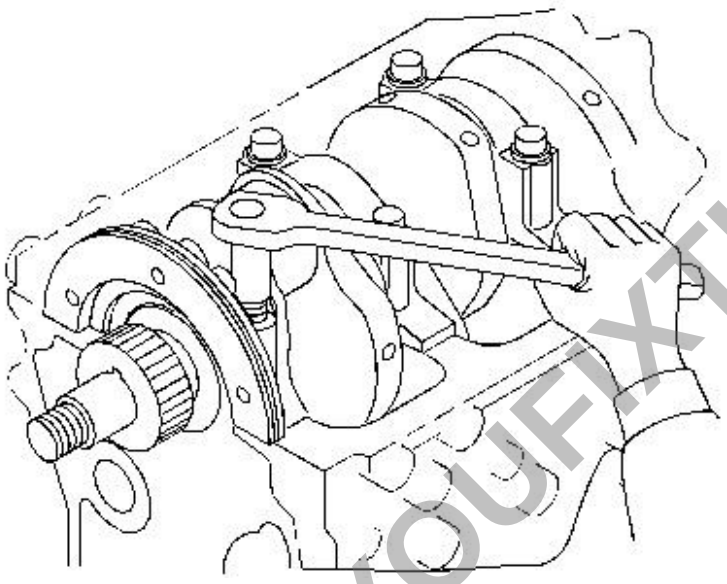


Illustration 11 g02210955

1. Unscrew the main bearing cap bolts. Inspect the main bearing cap bolts for damaged threads.
2. Unscrew the main bearing cap. Inspect the main bearing cap for cracks.

Inspect the main bearing cap (lower) (4) for scratches on inside and outside surfaces, corrosion, flaking, and seizing.

Note: Mark the bearings for the correct cylinder numbers.

Removing crankshaft

Note: Be careful not to damage bearings when removing the crankshaft.

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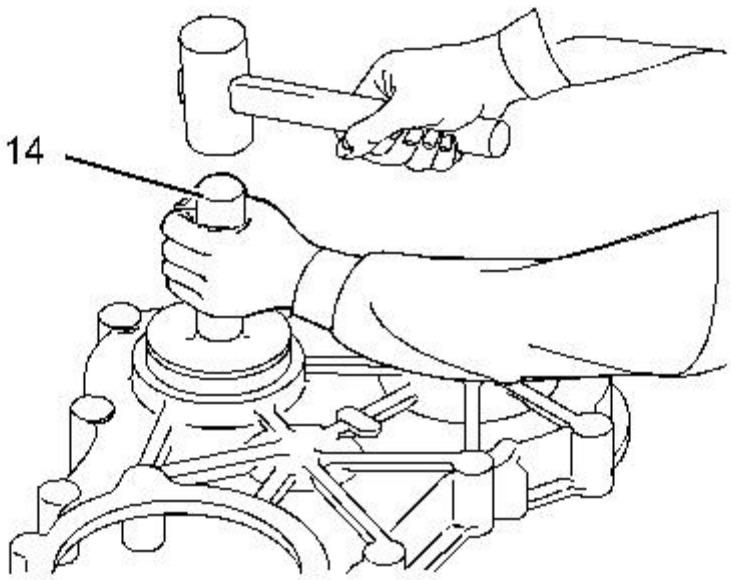


Illustration 10 g02237483

Install oil seal to the timing gear case using installer (14), and make sure that oil seal is flush with timing gear case.

Installing timing gear case

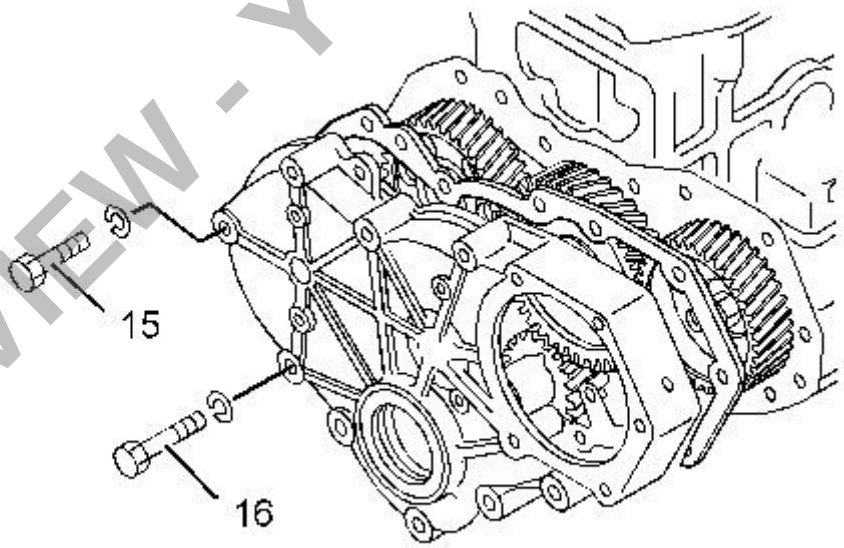


Illustration 11 g02237484

1. Install the baffle plate to the crankcase.
2. Install the gasket and the timing gear case to the crankcase aligning with the dowel pin located on the crankcase front side.

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(1) Water pump cover

(2) Gasket

(3) Water pump

Inspect the water pump cover (1) for crack, water leakage, and distortion. Replace both the gaskets (2) during assembly. Inspect the water pump (3) for crack, water leakage, damage, impeller, and shaft of rotation.

Inspecting water pump for smooth rotation

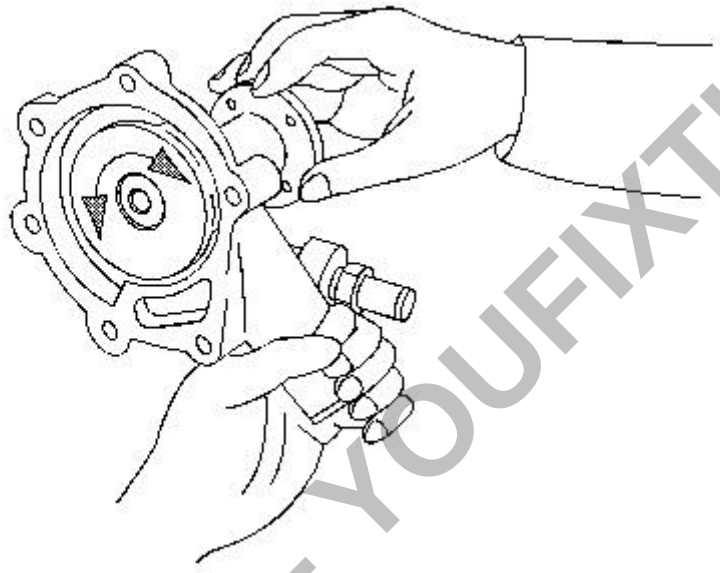


Illustration 2 g02239514

Check to make sure that the impeller and shaft of water pump rotate smoothly without noise and irregularities. If faulty, replace the water pump assembly.

Disassembling, inspecting, and reassembling thermostat

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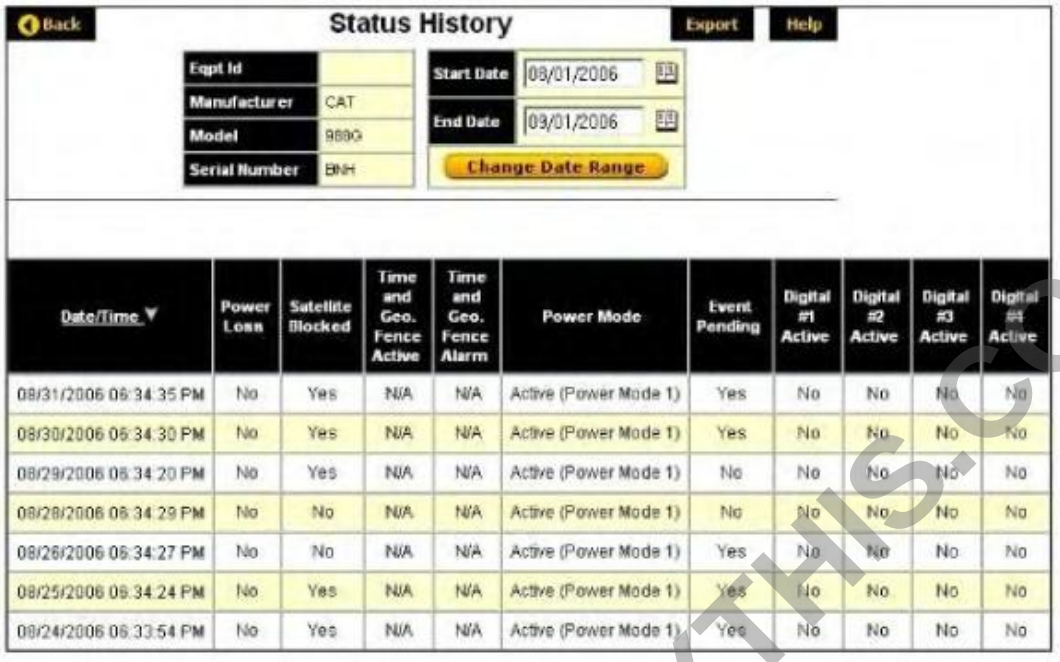


Illustration 4 g01390790

"Status History" screen

The "Status History" is a record of all the status reports that are sent by the PLM. The status report contains information about the status of the actual PLM.

In order to view the "Status History" of a PLM, click the "Status History" button that is on the "Equipment Registration Detail" screen.



Illustration 5 g01390794

Top of the "Status History" screen

In order to change the range of the date to reflect an appropriate time period for the status history, click the "Calendar" icon next to the "Start Date" and "End Date" boxes, respectively. Then, select a desired date from the applicable calendar.

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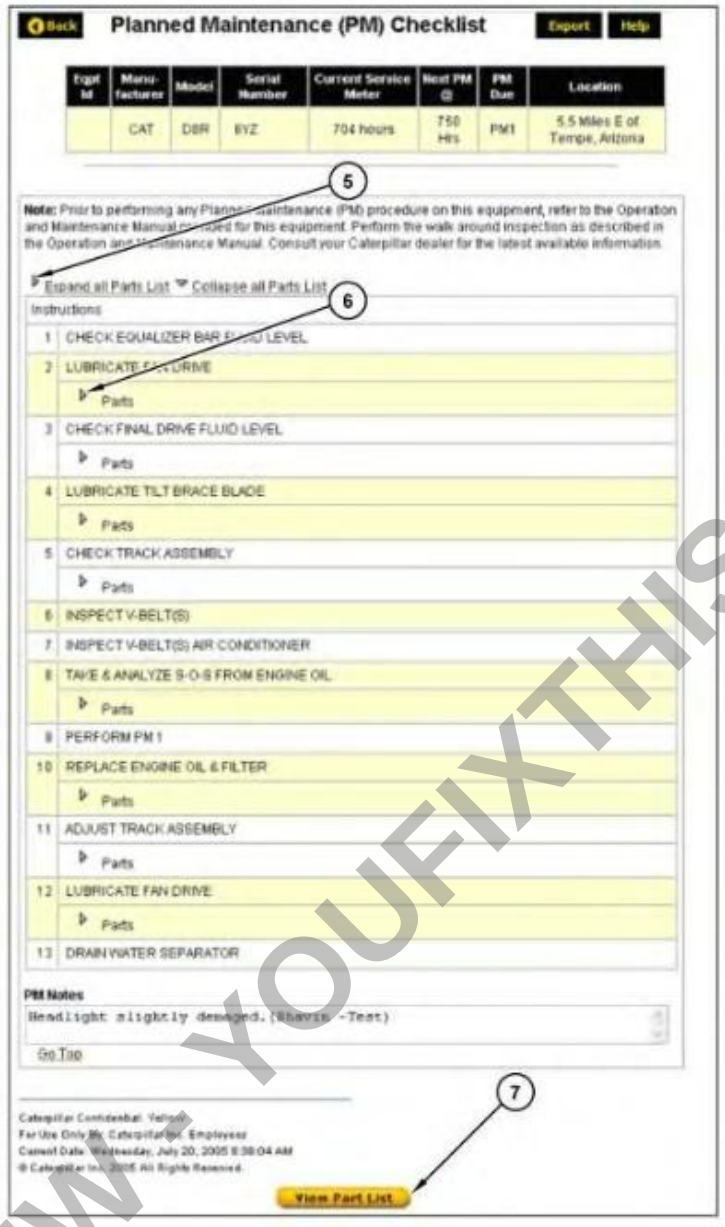


Illustration 5 g01716417

"PM Checklist"

(5) "Expand all Parts List" icon

(6) Icon of a triangle

(7) "View Part List" button

2. In order to view all of the parts list, click the "Expand all Parts List" icon (5) . This action will expand all of the parts lists for all of the steps.

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Date/Time ▼	Power Loss	Satellite Blocked	Time and Geo. Fence Active	Time and Geo. Fence Alarm	Power Mode	Event Pending	Digital #1 Active	Digital #2 Active	Digital #3 Active	Digital #4 Active
08/01/2006 10:09:01 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No
07/31/2006 10:09:01 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No
07/30/2006 10:09:01 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No
07/29/2006 10:28:38 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No
07/29/2006 10:09:00 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No
07/28/2006 10:09:01 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No
07/27/2006 10:09:00 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No
07/26/2006 10:09:02 PM	No	Yes	Yes	Yes	Active (Power Mode 1)	No	Yes	No	No	No

Illustration 6 g01390795

Bottom of the "Status History" screen

When you are done, click the "Change Date Range" button. The "Status History" table will again load the date in order to reflect the updated range of the date. Click the "Back" button in order to return to the "Equipment Registration Detail" screen.

Note: The "Change Date Range" function works similarly in many views or screens throughout the application.

Table 4 describes fields that are found on the "Status History" screen. Click the "Back" button in order to return to the "General Registry" screen.

Table 4

"Status History" Screen		
Field	**Description**	**Values**
"Date/Time"	Displays the date and time of the status report. If the PLM is set to send status once per day, these values should be approximately one day apart each time.	
"Power Loss" (Low Voltage)	Indicates that the PLM experienced a loss of power or low voltage sometime between this status report and the last status report.	Yes, No
"Satellite Blocked"	Indicates that the PLM was blocked from the satellite sometime between this status report and the last status report.	Yes, No
"PW Active"	Indicates that "Time and Geographic Fencing" is active.	Yes, No, N/A
"PW Alarms"		

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Illustration 6 g01252508

"PM Checklist" with an example of expanded parts

3. To expand the parts list for a single step, click the icon of a triangle (6) below the individual step of that part. The step will expand in order to display the parts that are required to complete the step.

"View Part List"

To assist the technician during a "planned maintenance", a list of all parts that are required for completing the PM can be displayed and exported for printing. In addition, this list of parts can be sent to the PartStore system for ordering.

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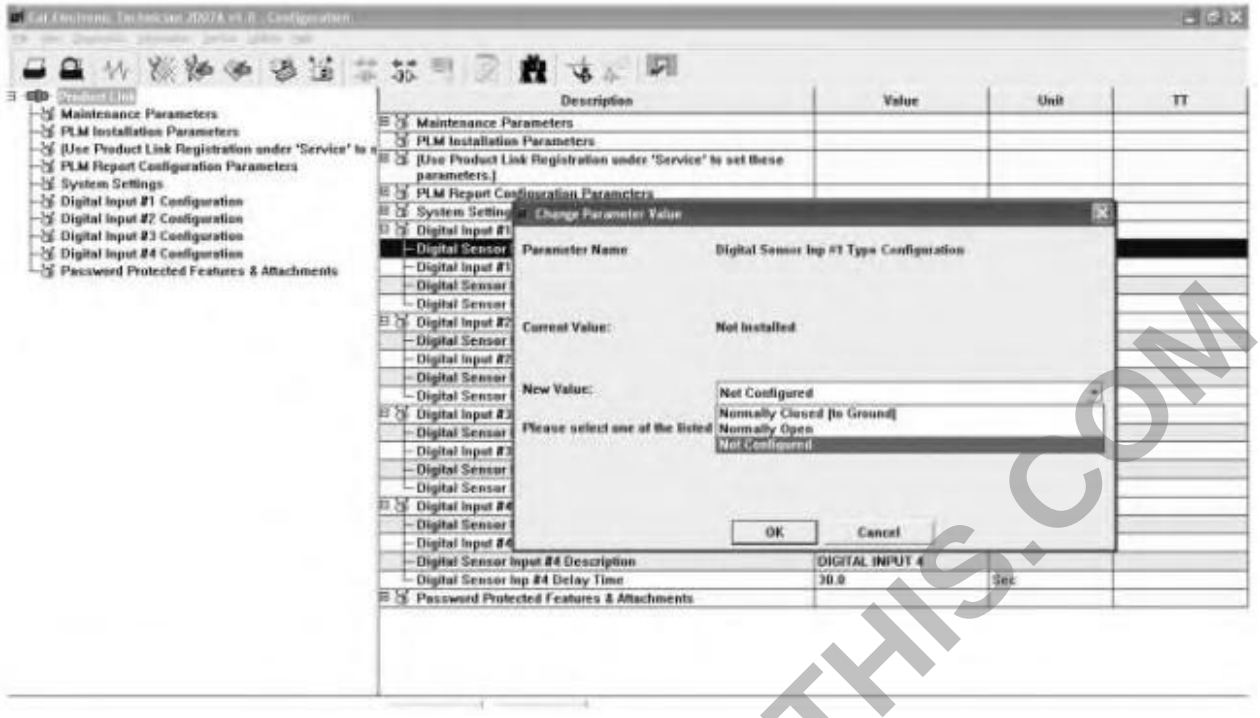


Illustration 2 g01361927

"Digital Input Type Configuration" Screen

The digital sensor type configuration informs the system of how to interpret the data from the attached sensor. Refer to Systems Operation, Troubleshooting, Testing and Adjusting, "Configuration" for the following information:

- Accessing parameters
- Changing parameters

Refer to Table 1 for further information about this parameter.

"Digital Sensor Input #x Monitoring Condition" Parameter

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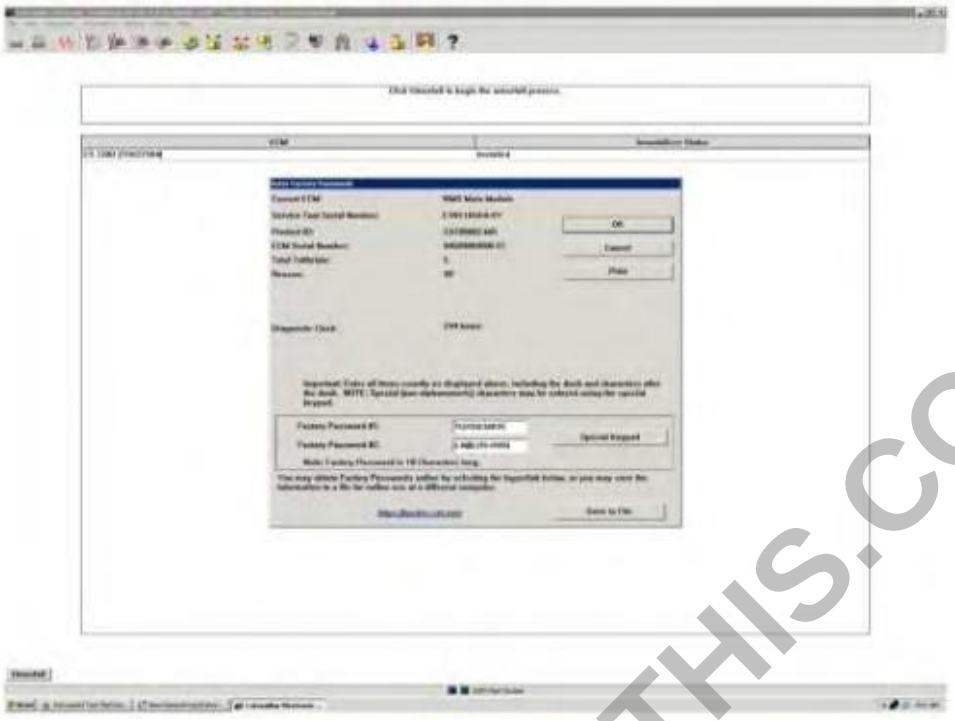


Illustration 25 g02646634

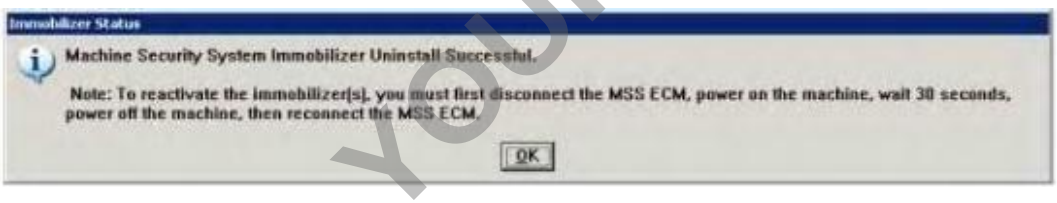


Illustration 26 g02646635

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Repair: Repair the alternator or replace the alternator.

STOP

Test Step 3. CHECK THE BATTERY VOLTAGE.

Turn the key start switch to the OFF position. Measure the battery voltage at the battery posts.

Expected Result:

The voltage should be 12 VDC to 15 VDC for a 12 VDC system. The voltage should be 24 VDC to 27 VDC for a 24 VDC system.

Results:

- **OK -** The voltage is between 12 VDC and 15 VDC or the voltage is between 24 VDC and 27 VDC.

  Repair: The Product Link could be faulty. Recheck the system before replacing the Product Link. The Product Link is seldom the cause of a diagnostic code. Refer to Systems Operation, Troubleshooting, Testing and Adjusting, "Electronic Control Module (ECM) - Replace". If the Product Link has been replaced, recheck the system and check the status of the diagnostic code.

  STOP

- **NOT OK -** The voltage is not between 12 VDC and 15 VDC or the voltage is not between 24 VDC and 27 VDC.

  Repair: See Special Instruction, REHS0354, "Charging System Troubleshooting". If conditions are not resolved, the Product Link could be faulty. Recheck the system before replacing the Product Link. The Product Link is seldom the cause of a diagnostic code. Refer to Systems Operation, Troubleshooting, Testing and Adjusting, "Electronic Control Module (ECM) - Replace". If the Product Link has been replaced, recheck the system and check the status of the diagnostic code.

  STOP

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		Exhaust	8.0 mm (0.31 inch)	7.920 to 7.940 mm (0.3118 to 0.3126 inch)	7.850 mm (0.3091 inch)	
	Clearance between valve stem and guide	Inlet		0.045 to 0.075 mm (0.0018 to 0.0030 inch)	0.130 mm (0.0051 inch)	
		Exhaust		0.060 to 0.095 mm (0.0024 to 0.0037 inch)	0.150 mm (0.0059 inch)	
	Height to top of valve guide		15.50 mm (0.610 inch)	15.10 to 15.60 mm (0.594 to 0.614 inch)		
Valve seat	Valve seat angle (B)		30 degrees			Refer Illustration 1
	Valve sinkage (D)		0.80 mm (0.031 inch)	0.70 to 0.90 mm (0.028 to 0.035 inch)	1.30 mm (0.051 inch)	
	Seat width (A)		1.180 mm (0.0465 inch)	1.040 to 1.320 mm (0.0409 to 0.0520 inch)	1.60 mm (0.063 inch)	
	Valve margin (C)		1.70 mm (0.067 inch)		Refacing permissible up to 1.20 mm (0.047 inch)	
Valve spring	Free length (G)			48.850 mm	47.600 mm	Refer Illustration 2

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Illustration 10 g01250172

15. Install Tooling (B) .
16. Apply approximately 345 kPa (50 psi) of shop air pressure in order to remove piston (27) .

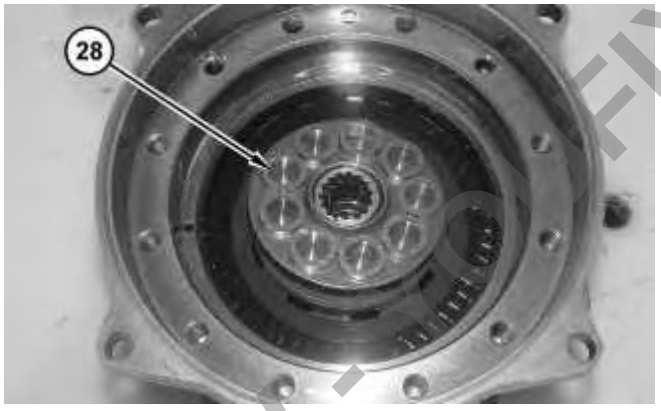


Illustration 11 g01250173

17. Remove rotating group (28) .

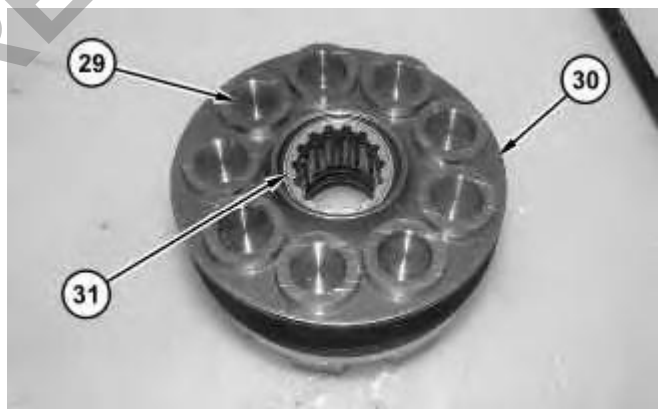


Illustration 12 g01250174

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Illustration 1 g01223493

1. Open access door (1) .

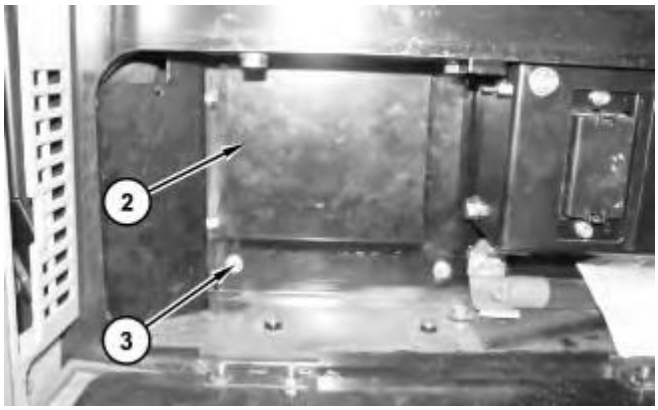


Illustration 2 g01223511

2. Remove bolts (3) and access panel (2) .

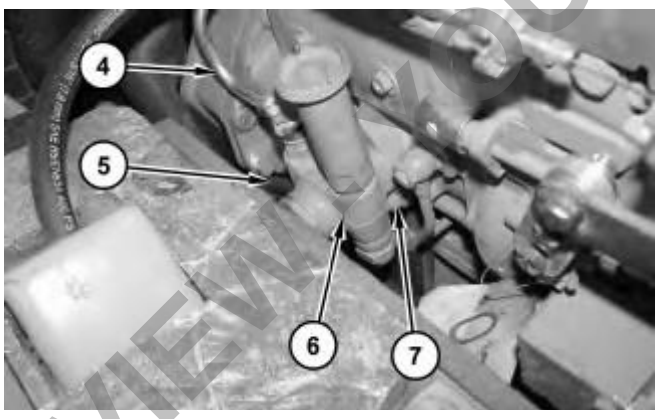


Illustration 3 g01223534

3. Disconnect hoses (4) and (5). Remove nuts (7) and the fuel transfer and priming pump (6) .

Installation Procedure

Note: Cleanliness is an important factor. Before assembly, all parts should be thoroughly cleaned in cleaning fluid. Allow the parts to air dry. Wiping cloths or rags should not be used to dry parts. Lint may be deposited on the parts which may cause later trouble. Inspect all parts. If any parts are worn or damaged, use new parts for replacement.

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i02378544

Hydraulic System Pressure - Release

SMCS - 4250-553-PX; 5050-553-PX

WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

1. Lower all implements to the ground.
2. Shut off the engine.
3. Turn the ignition to the ON position. Place the console in the DOWN position. Move the control levers through the full range of travel. This will relieve any pressure that may be present in the pilot system.
4. Slowly loosen the hydraulic tank air breather cap in order to release the pressure.
5. Tighten the hydraulic tank air breather cap.
6. The pressure in the hydraulic system has now been released.

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6. Move only the joysticks or the pedals of the hydraulic circuit that requires service to the FULL STROKE positions. This will release the high pressure only in that hydraulic circuit. This will also release any pressure that might be present in the pilot hydraulic circuit.

   Note: If the hydraulic circuit that requires service requires the activation of a switch for operation, activate the necessary switches for the operation of the hydraulic circuit.

7. Place the hydraulic activation control lever in the LOCKED position.

8. Start the engine.

9. Place the hydraulic activation control lever in the UNLOCKED position. **Do not move any joysticks or pedals from the NEUTRAL position during this step. Do not activate any switches during this Step.**

10. Return the hydraulic activation control lever to the LOCKED position.

11. Shut off the engine.

12. Repeat Steps 4 through 11 for each additional hydraulic circuit that requires service.

13. After releasing the hydraulic pressure in each of the desired hydraulic circuits, place the hydraulic activation control lever in the LOCKED position.

14. Turn the engine start switch to the OFF position.

15. Slowly loosen the filler cap on the hydraulic tank and release the pressure. Leave the filler cap loose for a minimum of 45 seconds. This will release the pressure that may be present in the return hydraulic circuit.

16. Tighten the filler cap on the hydraulic tank.

17. The pressure in the multiple hydraulic circuits that require service is now released and lines and components can be disconnected or removed from those hydraulic circuits.

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Illustration 14 g01244987

WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

14. Remove plug (19) and the O-ring seal.

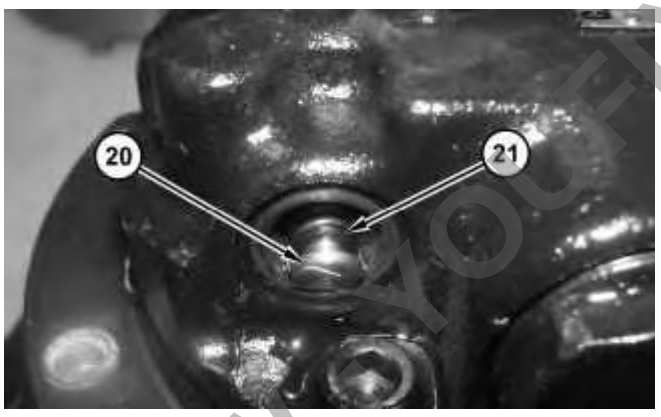
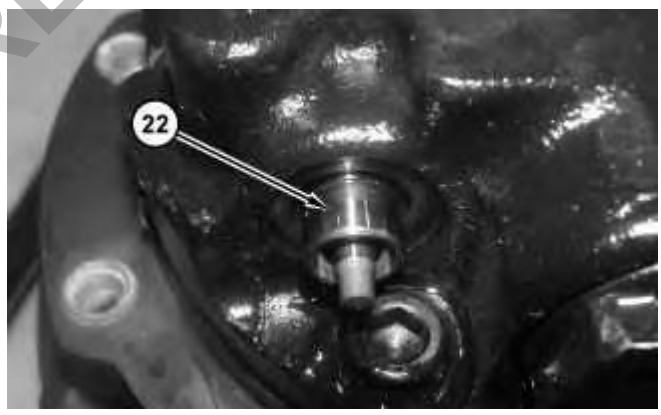


Illustration 15 g01244988

15. Remove retainer (20) and spring (21) .



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Illustration 4 g01247152

4. Install panel (17). Panel (17) is located in the cab.



Illustration 5 g01247150

5. Close access door (16). Access door (16) is located in the cab.

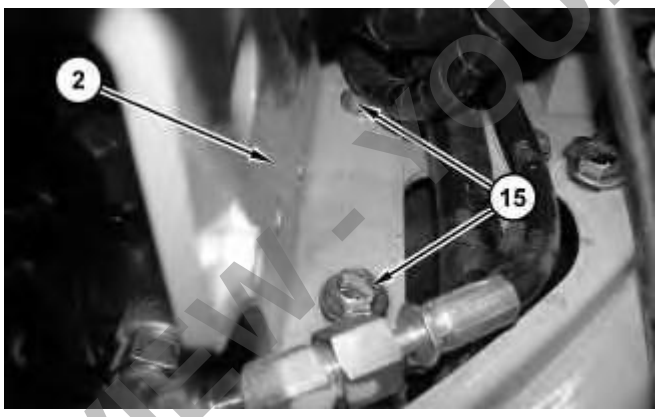


Illustration 6 g01247145

6. Install bolts (15) to hydraulic tank (2) .

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i02457443

Pilot Valve (Blade) - Install

SMCS - 5059-012

Installation Procedure

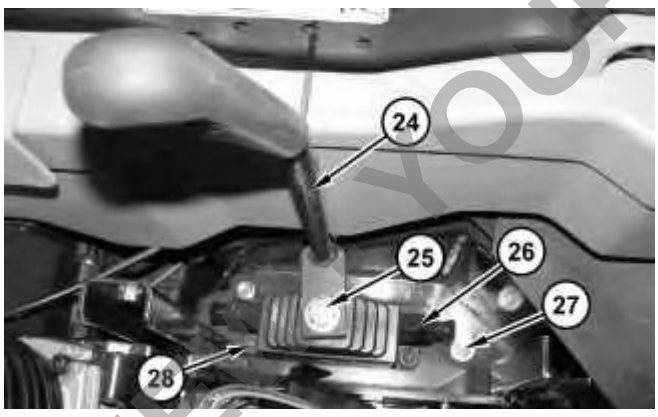


Illustration 1 g01225595

1. Install pilot valve (26). Install bolts (27) and (28). Install handle (24) and bolt (25).

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i03862991

Refrigerant System - Evacuate

SMCS - 1809-541

WARNING

Personal injury can result from contact with refrigerant.

This system is under pressure at all times, even if the engine is not running. Heat should never be applied to a charged system.

Contact with refrigerant can cause frost bite. Keep face and hands away to help prevent injury.

Protective goggles must always be worn when refrigerant lines are opened, even if the gauges indicate the system is empty of refrigerant.

Always use caution when a fitting is removed. Slowly loosen the fitting. If the system is still under pressure, evacuate the system recovering the refrigerant before removing the fitting.

Personal injury or death can result from inhaling refrigerant through a lit cigarette.

Inhaling air conditioner refrigerant gas through a lit cigarette or other smoking method or inhaling fumes released from a flame contacting air conditioner refrigerant gas, can cause bodily harm or death.

Do not smoke when servicing air conditioners or wherever refrigerant gas may be present.

Before any checks of the air conditioning and heating system are made, move the machine to a smooth horizontal surface. Lower all implements to the ground. Make sure the transmission is in neutral or park and that the parking brake is engaged. Keep all other personnel away from the machine or where they can be seen.

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7. If the pressure switch is removed, make sure that the wires on the new pressure switch are tie-wrapped. Securing the pressure switch prevents damage that may be caused by vibration.

Note: The multimeter may display OL if the contacts on the pressure switch are dirty. The contacts on the pressure switch can become dirty if the arc suppressor is no longer functioning.

Note: The multimeter will display OL if the pressure switch is not threaded into the air conditioning system.

149-6371 Low Pressure Switch (NORMALLY OPEN)

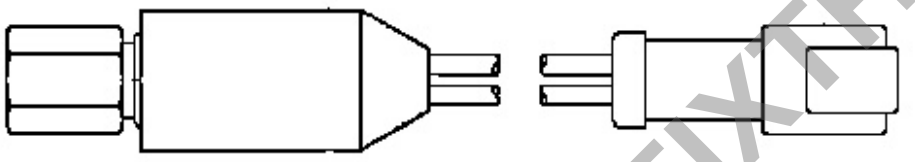


Illustration 4 g00651452

Table 4

Specifications for Pressure Switch	
Actuation Pressure [2]	103 ± 14 kPa (15 ± 2 psi)
Deactuation Pressure [3]	35 ± 7 kPa (5 ± 1 psi)

[2] Close when pressure increases.

[3] Open when pressure decreases.

Use the following procedures in order to test the pressure switch:

1. Disconnect the pressure switch from the machine harness.
2. Connect the **146-4080** Digital Multimeter to the two connector pins. Set the multimeter to the OHMS test mode.
3. Measure the resistance of the pressure switch.

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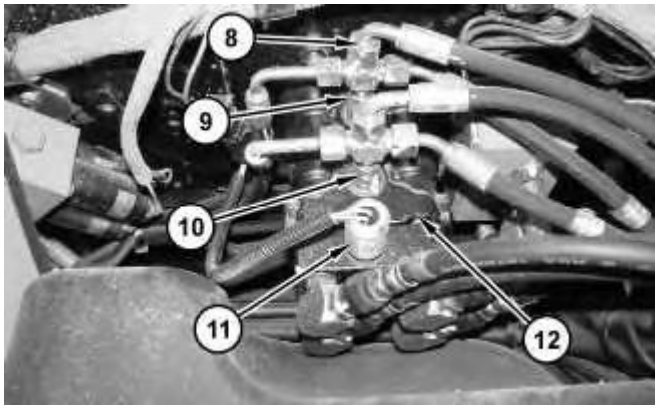


Illustration 5 g01225445

5. Disconnect hose assemblies (8). Remove fittings (9) and (10). Remove solenoid valve (11) from pilot valve (12) .

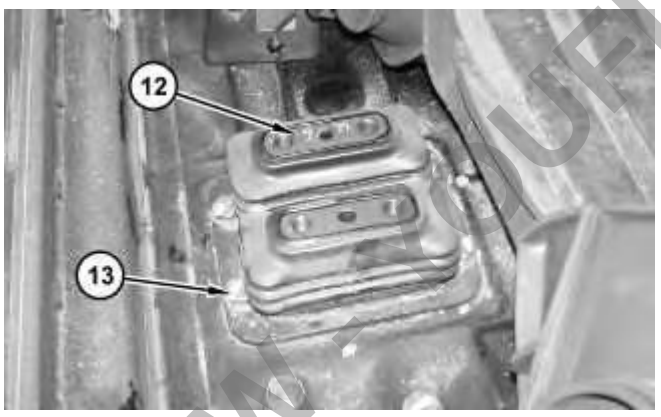


Illustration 6 g01225450

6. Remove bolts (13) and remove pilot valve (12) .

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WARNING

Personal injury can result from being struck by parts propelled by a released spring force.

Make sure to wear all necessary protective equipment.

Follow the recommended procedure and use all recommended tooling to release the spring force.

30. Remove pistons (46), balls (49), shaft (47), and bearing (48) .

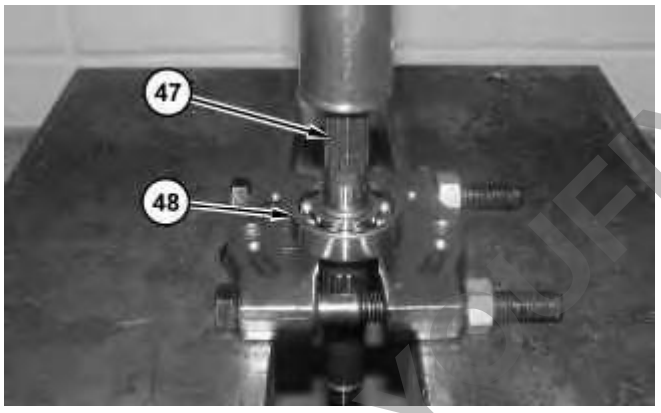


Illustration 29 g01245008

31. Use Tooling (C) in order to remove bearing (48) from shaft (47) .

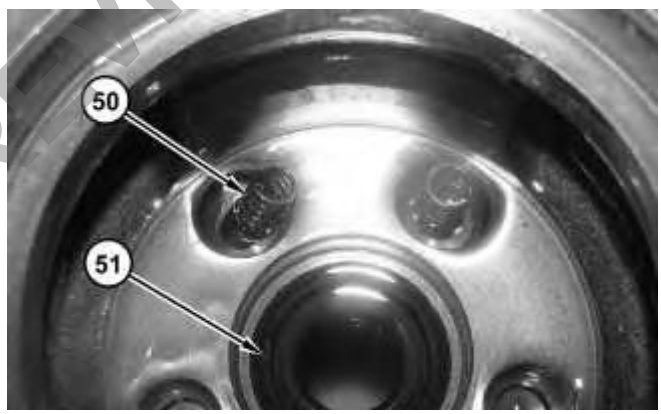


Illustration 30 g01245009

32. Remove springs (50) and seal (51) .

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Disassembly and Assembly
303.5C and 303C
Mini Hydraulic Excavators Machine Systems
Media Number -RENR9617-04 Publication Date -01/11/2008 Date Updated -07/01/2009

i02505420

Upper Frame and Undercarriage Frame - Separate

SMCS - 4150-076; 7051-076

Separate Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	189-0410	Shackle As	2
B	1U-9200	Lever Puller Hoist	2
C	140-7742	Sleeve	1
D	189-0412	Shackle As	1
E	138-7574	Link Bracket	3
F	6V-6146	Load Leveling Beam	1
G	1U-9204	Lever Puller Hoist	1
H	-	Guide Stud (M12 by1.75 by 95mm)	2

Start By:

A. Remove the bucket. Refer to Disassembly and Assembly, "Bucket - Remove".
B. Remove the boom cylinder. Refer to Disassembly and Assembly, "Boom Cylinder - Remove and Install".

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair

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