

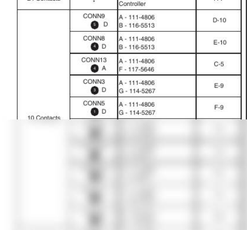
Harness Connector Location

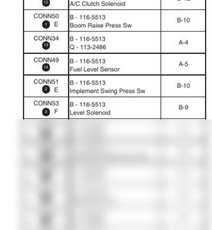
Connector	Machine Location	Harness And/Or Components	Schematic Location
40 Contacts	CONN1 -	A - 111-4806 Controller	B-7
24 Contacts	CONN2 -	A - 111-4806 Controller	A-7
	CONN9 D	A - 111-4806 B - 116-5513	D-10
	CONN8 D	A - 111-4806 B - 116-5513	E-10
	CONN13 A	A - 111-4806 F - 117-5646	C-5
	CONN3 D	A - 111-4806 Q - 114-5267	E-9
10 Contacts	CONN5 D	A - 111-4806 Q - 114-5267	F-9

Connector	Machine Location	Harness And/Or Components	Schematic Location
	CONN23 K	A - 111-4806 K - 7Y-3868	F-3
	CONN40 M	C - 5I-8268 A/C Clutch Solenoid	C-12
	CONN50 E	B - 116-5513 Boom Raise Press Sw	B-10
	CONN34 Q	B - 116-5513 Q - 113-2486	A-4
	CONN49 F	B - 116-5513 Fuel Level Sensor	A-5
	CONN51 E	B - 116-5513 Implement Swing Press Sw	B-10
	CONN53 F	B - 116-5513 Level Solenoid	B-9







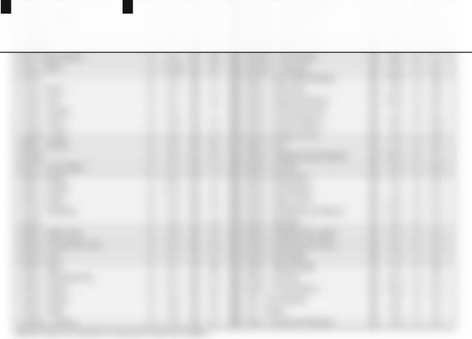
















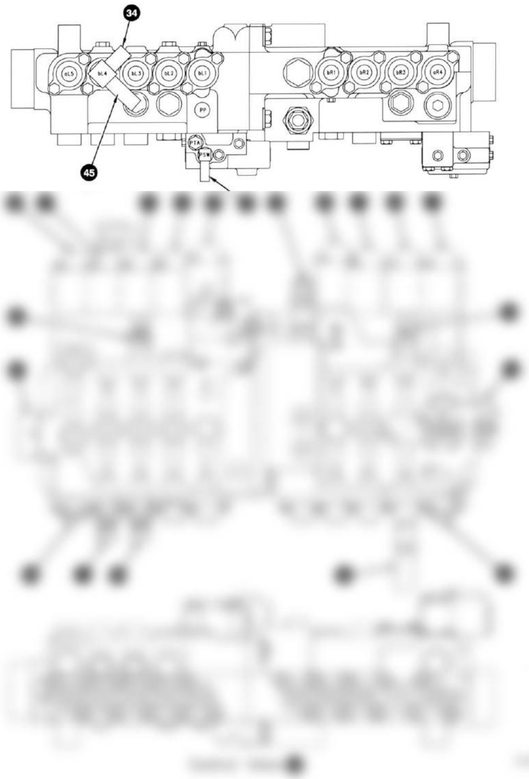




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Schematic

320L, 320 L, 320 N and 320 S Excavators Hydraulic System

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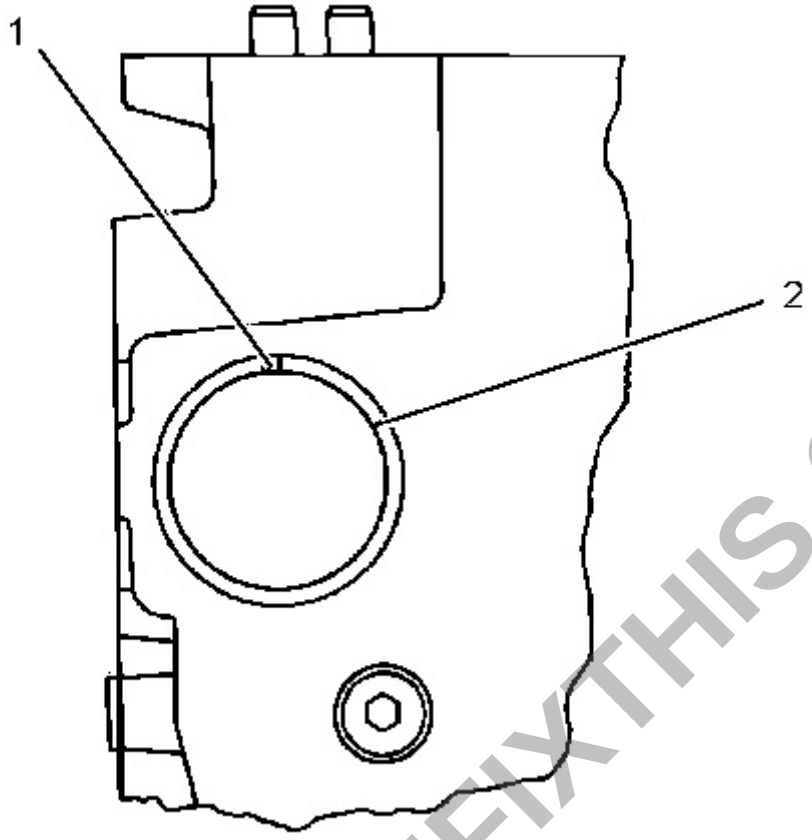


Illustration 1 g01104577

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When the boom control lever is returned to the NEUTRAL position, there is no oil supply to port (12). Stem (41) is shifted to the left (neutral position) by spring (48). Passage (42) closes, blocking oil flow from passage (43). Check valve (17) is now closed by the force of spring (36) and valve (35) is moved to the right by the force of spring (32).

Negative Flow Control Circuit

When the boom control lever is moved to the full BOOM LOWER position upper pump oil in center bypass passage (15) goes through partially open passage (31) and passage (39) to center bypass passage (18). Return oil from the head end enters boom I control valve (16) through passage (43). The return oil then goes through fully open passage (42) to passage (40). Part of the oil in passage (40) goes through passages (38) and (39) to center bypass passage (18), and combines with the upper pump oil.

The combined oil in center bypass passage (18) goes through line (23), developing a negative flow control signal pressure. The negative flow control pressure acts on the upper pump regulator, causing the upper pump to destroke. Now less oil is required for the cylinder rod end due to the function of the regeneration circuit.

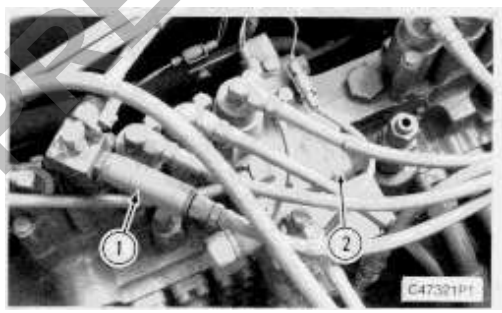
When the boom control lever is partially moved to BOOM LOWER position with stem (41) slightly shifted to the right, passages (29) and (42) are partially open, and passage (44) is closed. Return oil in passage (43) goes through passages (42) and (40) to return check valve (46). Return check valve (46) is opened allowing oil flow through passage (45) to return passage (21).

Upper pump oil in center bypass passage (15) goes through partially open passage (31). [The opening of passage (31), at this time, is larger than when the boom control lever is moved to FULL BOOM LOWER position.] The oil then goes through passage (39) to center bypass passage (18). The return oil in passage (43) goes through partially open passage (42), passages (40), (38) and (39) to center bypass passage (18), and combines with the upper pump oil.

With the appropriate opening of passage (31), optimum amount of combined oil flows through center bypass passage (18). Now the negative flow control pressure destrokes the pump for proper cylinder operation.

Components In Cylinder Circuits

Shock Reducing Valve (For Boom)



Main Control Valve Compartment
(1) Shock reducing valve (boom lower). (2) Main control valve.

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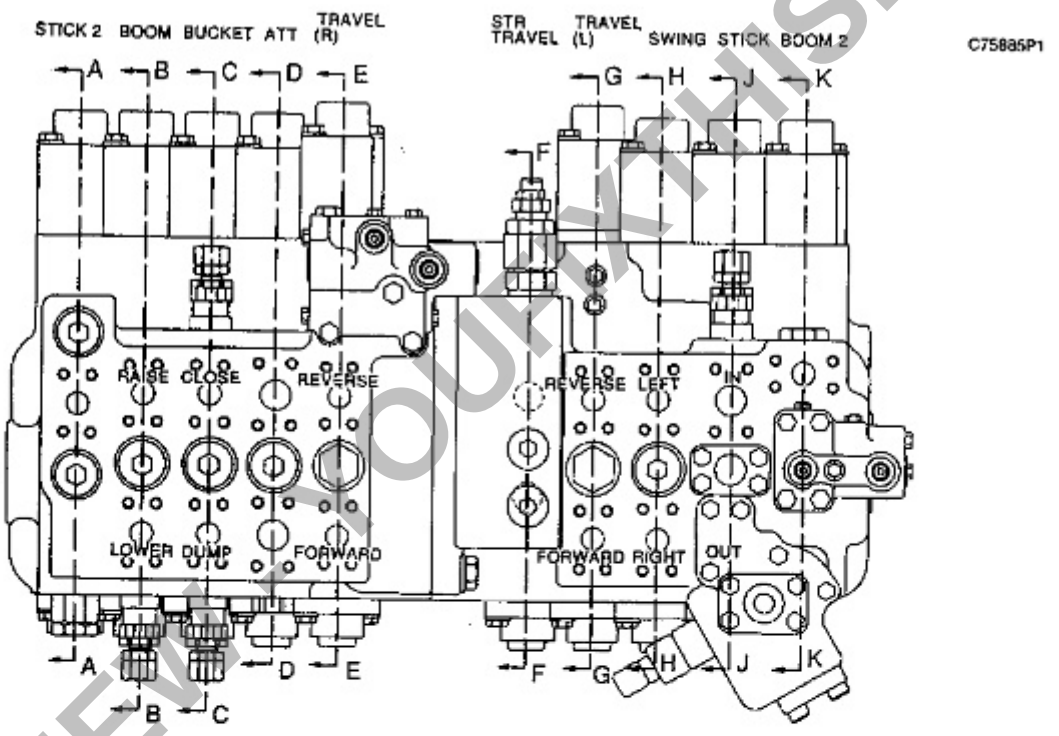
Specifications

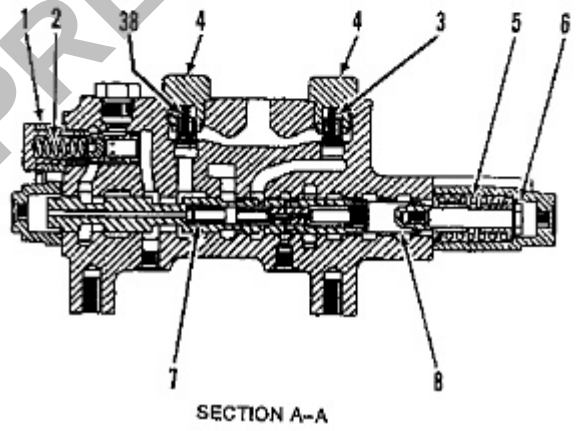
320, 320L, 320N AND 320S EXCAVATOR HYDRAULIC SYSTEM

Media Number -SENR5453-03 **Publication Date -01/01/2000** **Date Updated -11/10/2001**

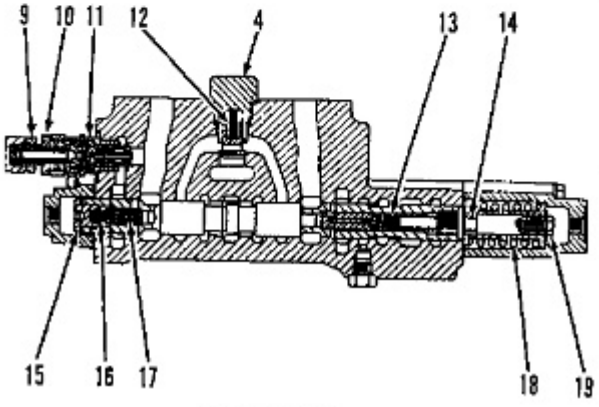
Main Control Valves

SMCS - 4351-010; 4351-017





SECTION A-A



SECTION B-B

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(4) 90° expansion valve

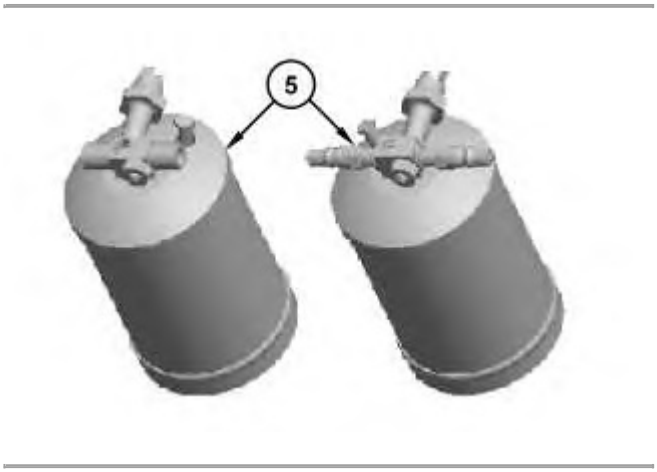


Illustration 4 g01507435

(5) Receiver-dryers

The following components are the five components of the expansion valve system:

- Compressor
- Condenser coil
- Receiver-dryer
- Expansion valve
- Evaporator coil

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Tools Needed		A	B
1U8842	Seal Installer	1	
8S2328	Dial Indicator Group		1

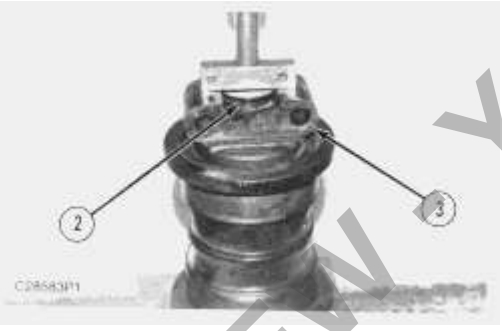
Start By:

a. remove track roller

1. Thoroughly clean the outside of the track roller prior to disassembly.



2. Drive plug (1) into the stopper in the end of the track roller, and drain the oil from the track roller into a suitable container for disposal. The capacity of the track roller is **350 ± 15 ml (11.9 ± .51 oz.).**



3. Put the track roller in a press as shown. The weight of the track roller is **36 kg (80 lb).** Press down on end collar (3), and remove snap ring (2). Release the pressure on the end collar. Remove end collar (3).

4. Remove plug (1) from inside the track roller.



5. Remove Duo-Cone seal (4) from end collar (3).

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BASIC ENGINE

Systems Operation

3114 , 3116 and 3126 Engines for Caterpillar Built Machines - SENR3583

- Basic Engine

Testing and Adjusting

3114 , 3116 and 3126 Engines for Caterpillar Built Machines - SENR3583

- Finding Top Center Position for No. 1 Piston
- Gear Group (Front) - Time
- Engine Crankcase Pressure (Blowby) - Test
- Compression - Test
- Engine Valve Lash - Inspect/Adjust
- Excessive Bearing Wear - Inspect
- Piston Ring Groove - Inspect
- Connecting Rod Bearings - Inspect
- Main Bearings - Inspect
- Cylinder Block - Inspect
- Flywheel - Inspect
- Flywheel Housing - Inspect
- Vibration Damper - Check

Specifications / Disassembly and Assembly

ADAPTER GP-ENGINE TO XMSN - Specifications

3114, 3116 and 3126 Engines for Caterpillar Built Machines - SENR3582

- Engine to Transmission Adapter

AIR COMPRESSOR GP - Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders - SENR3611

- Air Compressor - Remove and Install
- Air Compressor Drive Gear - Remove and Install

BALANCER GP - Specifications

3114, 3116 and 3126 Engines for Caterpillar Built Machines - SENR3582

- Balancer Group - 3114 Engine Only

BALANCER GP - Disassembly and Assembly

446 and 446B Backhoe Loaders, Lexion 450 Combine, 3114 and 3116 Engines, IT18F Integrated Toolcarrier, D6M Track-Type Tractor and 928F, 950F and 950G Wheel Loaders - SENR3611

- Engine Balancer Shaft - Remove and Install

BELT TIGHTENER GP - Specifications

3114, 3116 and 3126 Engines for Caterpillar Built Machines - SENR3582

- Belt Tension Chart

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End By: Install the flywheel. Refer to Disassembly and Assembly, "Flywheel - Install".

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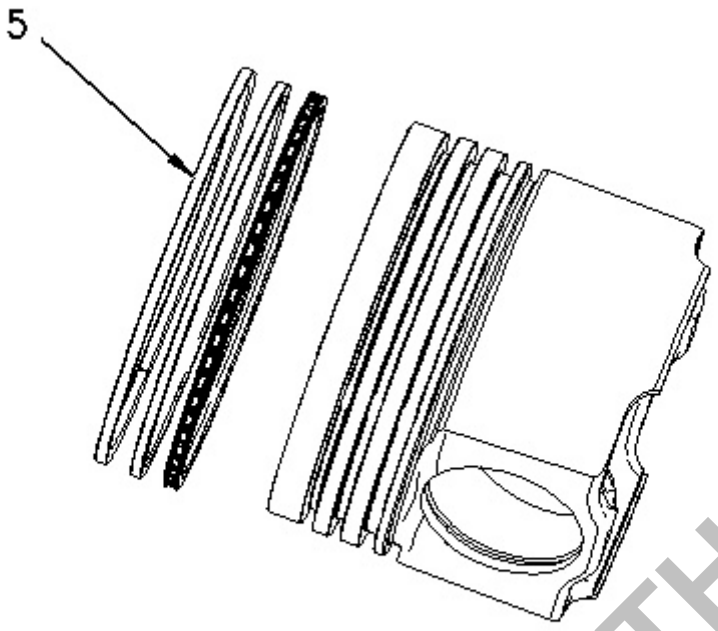


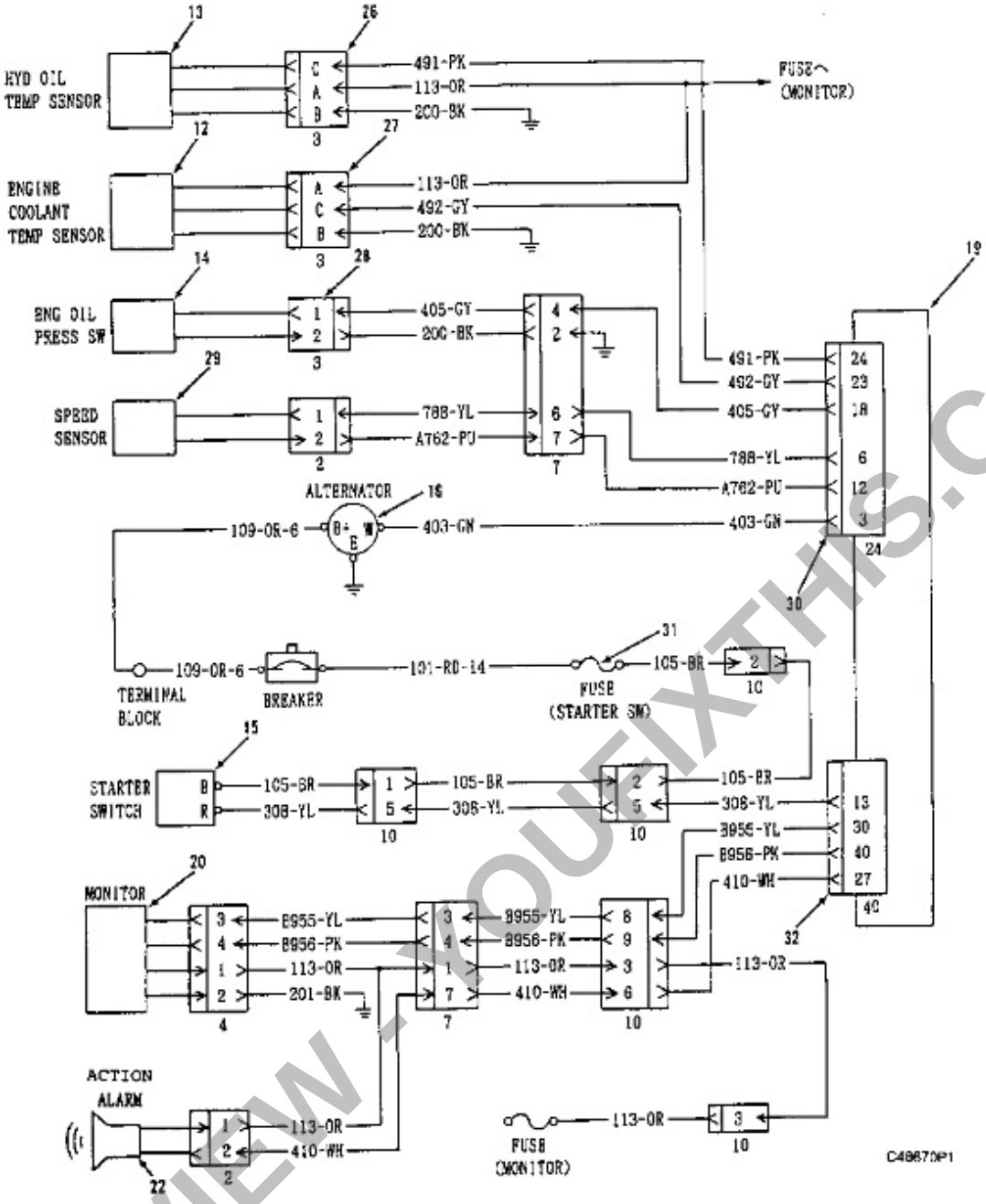
Illustration 2 g00988681

2. Use Tooling (A) to remove piston rings (5) .

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325 Action Alarm Circuit

(12) Engine Coolant Temperature Sensor. (13) Hydraulic Oil Temperature Sensor. (14) Engine Oil Pressure Switch. (15) Key Start Switch. (16) Alternator. (19) Controller. (20) Monitor. (22) Action Alarm. (26) Connector. (27) Connector. (28) Connector. (29) Speed Sensor. (30) Controller 24 Contact Connector. (31) Fuse. (32) Controller 40 contact Connector.

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i03947896

Planned Maintenance

SMCS - 7600; 7606

In order to access the "Planned Maintenance" screen, use the following procedure:

1. Search for equipment and view results on the "Event Summary" screen.
2. Select the "Planned Maintenance" option from the "View:" drop-down menu.

   The "Planned Maintenance" screen will then appear.

PM History

By using Maintenance Watch, you can view a record of all previous procedures for the PM that were performed on the equipment and the procedures that were entered through EquipmentManager. In order to view the PM history, use the following procedure:

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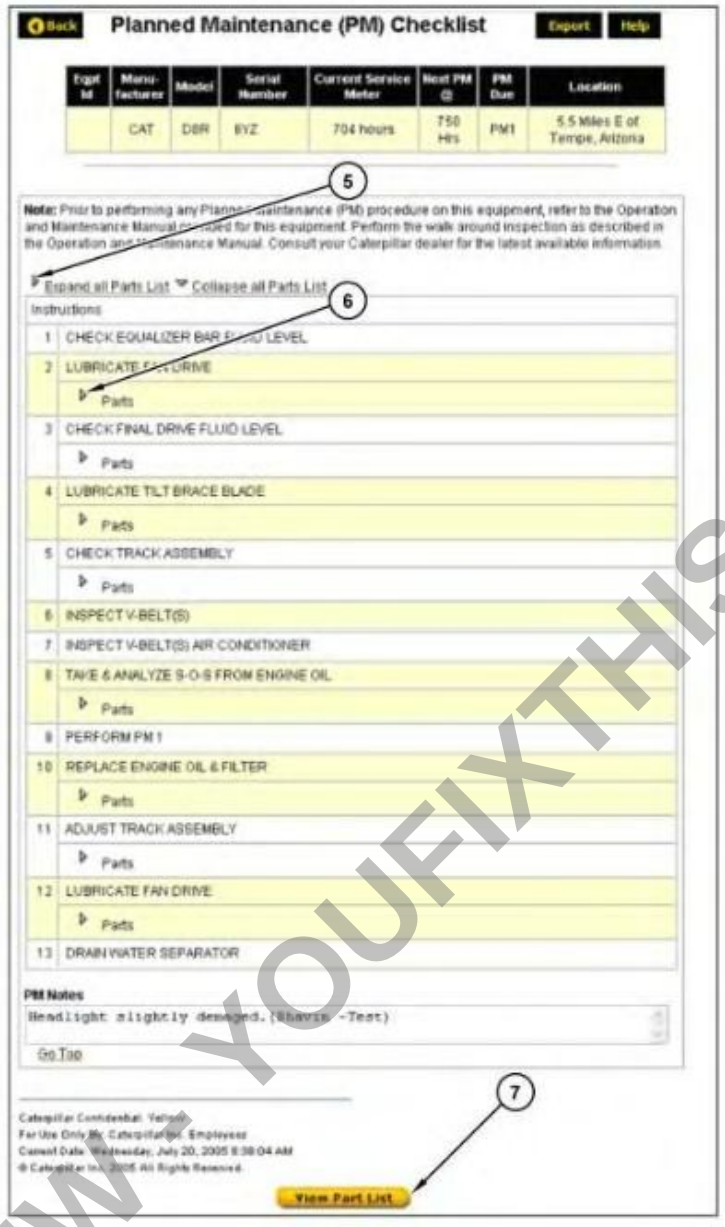


Illustration 5 g01716417

"PM Checklist"

(5) "Expand all Parts List" icon

(6) Icon of a triangle

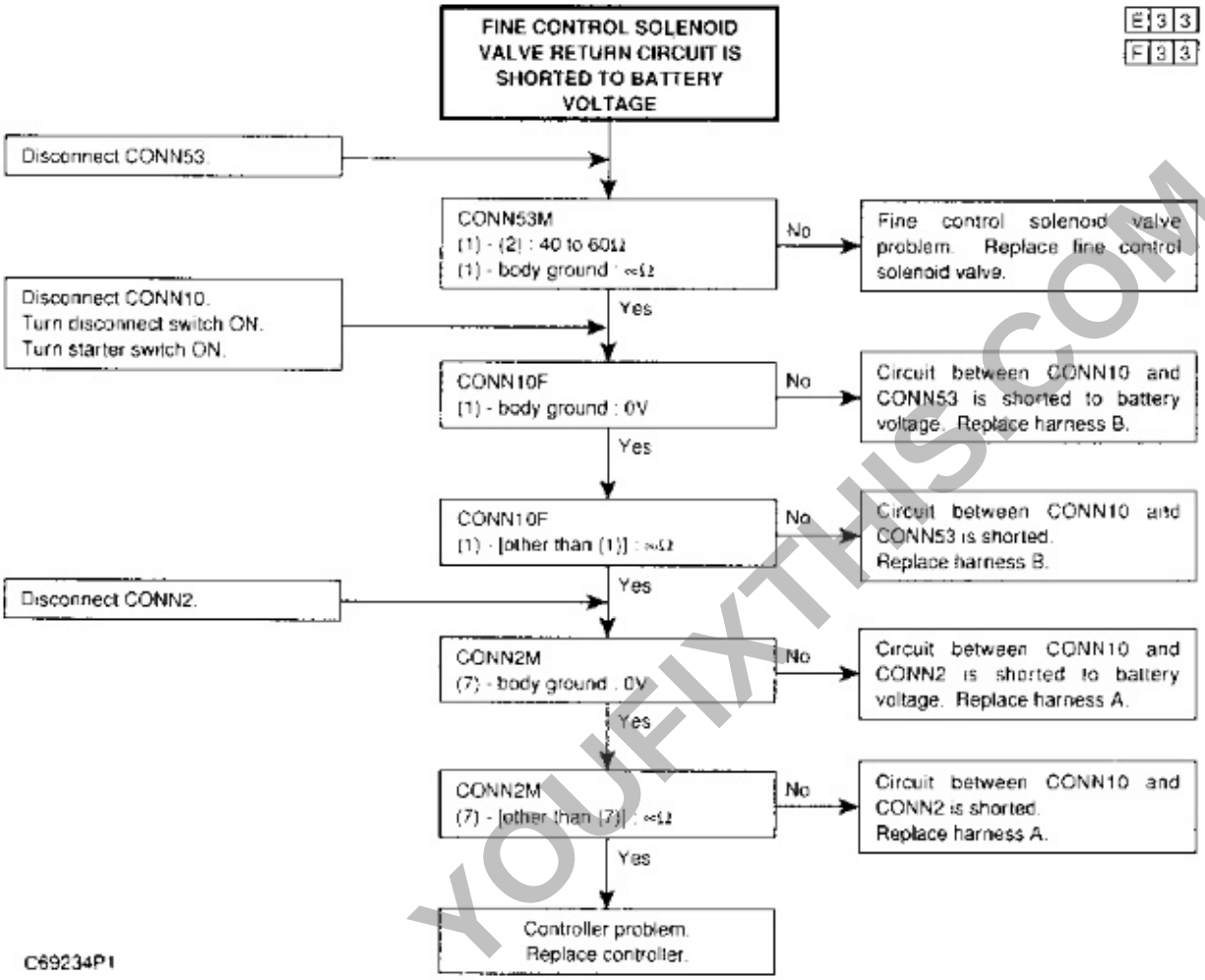
(7) "View Part List" button

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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Check to ensure that CONN53, 10, and 2 are properly connected. If the problem still exists even with the correct connections, troubleshoot according to the following checking procedure chart.



[Elec #8-2] Battery Voltage Cable Of Fine Control Solenoid Valve Circuit Is Shorted To Body Ground

Problem:

Battery voltage cable of fine control solenoid valve circuit is shorted to body ground.

Solution:

Check to ensure that CONN53, 10, 4, and 2 are properly connected. If the problem still exists even with the correct connections, troubleshoot according to the following checking procedure chart.

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i01510734

Engine Does Not Crank with Starting Motor On and Pinion Engaging Ring Gear

SMCS - 1453-035

System Operation Description:

The possible causes of this failure are listed below:

- The battery is discharged or the battery is faulty.
- The cables to the starter have failed.
- The ignition switch has failed.
- The engine is locked.
- The starting motor solenoid has failed.
- The starting motor has an internal problem.

The following tables will be referenced in troubleshooting the starting motor.

Table 1

TYPICAL SYSTEM VOLTAGE DURING CRANKING AT VARIOUS AMBIENT TEMPERATURES		
Temperature	**12 Volt System**	**24 Volt System**
-23 °C (-9.4 °F) to -7 °C (19.4 °F)	6 to 8 Volts	12 to 16 Volts
-7 °C (19.4 °F) to 10 °C (50 °F)	7 to 9 Volts	14 to 18 Volts
10 °C (50 °F) to 27 °C (80 °F)	8 to 10 Volts	16 to 20 Volts

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Note: The mark on each orifice indicates the direction of spray. The mark on the front orifice must point to the front of the engine. The mark on the rear orifice must point to the rear of the engine. The direction is very important in order to avoid spraying ether on the air inlet heater element.

(4) Air inlet heater

(5) Air inlet elbow

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i01513318

Governor (Types I, II, and Some III) - Adjust

SMCS - 1264-025

Table 1

Required Tools		
Part Number	**Part Description**	**Qty**
1U-6672	Rack Adjusting Wrench	1
1U-6673	Wrench	1
1U-5548	Combination Wrench	1
1U-7316	Calibration Pin Group	1
6V-6106	Dial Indicator	1
1U-8815	Indicator Contact Point	1
1U-8869	Dial Indicator	1
6V-2030	Extension	1

The following procedures are used in order to adjust Type I, Type II, and some Type III governors after the governors have been assembled. There are certain governor adjustments that must be made during governor assembly. Refer to the Testing and Adjusting, "Governor (Type) - Assemble" section in this manual.

1. Install the governor on the **1U-7326** Governor Calibration Bench. Refer to the Testing and Adjusting, "Installation Of Governor On **1U-7326** Governor Calibration Bench " section in this manual.

   Note: If the governor is equipped with a fuel ratio control, a regulated air supply of 140 to 210 kPa (20 to 30 psi) must be connected to the fuel ratio control during the adjusting procedure.

2. Remove the plug from the access hole. To remove this plug, use a hammer and a punch to pierce the center of the plug. Then use a suitable tool to remove the plug from the bore.

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

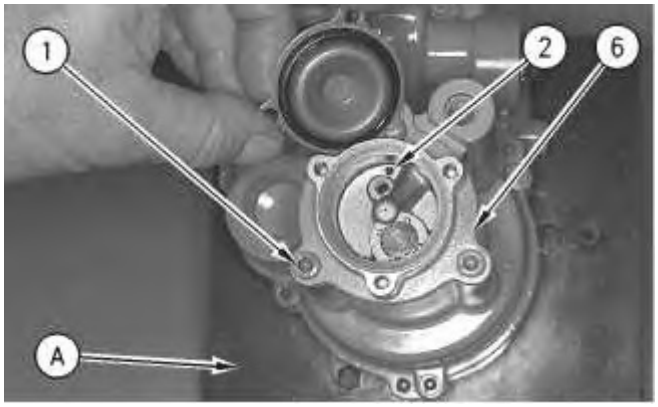


Illustration 51 g00521801

51. Put cover assembly (6) in position on the governor. Install three bolts (1) and evenly tighten the bolts.

52. Ensure that orifice (2) for the dashpot is not plugged. Also ensure that orifice (2) is tight in the casting.



Illustration 52 g00521800

53. Install O-ring seal (3) onto cover (5) .

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(97) Wire retaining clip

(98) Solenoid

(99) Bolt

62. Remove wire retaining clip (97) and remove solenoid (98) from the dual horsepower mechanism.

63. Remove three bolts (99) that hold the Type VI dual horsepower mechanism in position on the governor.

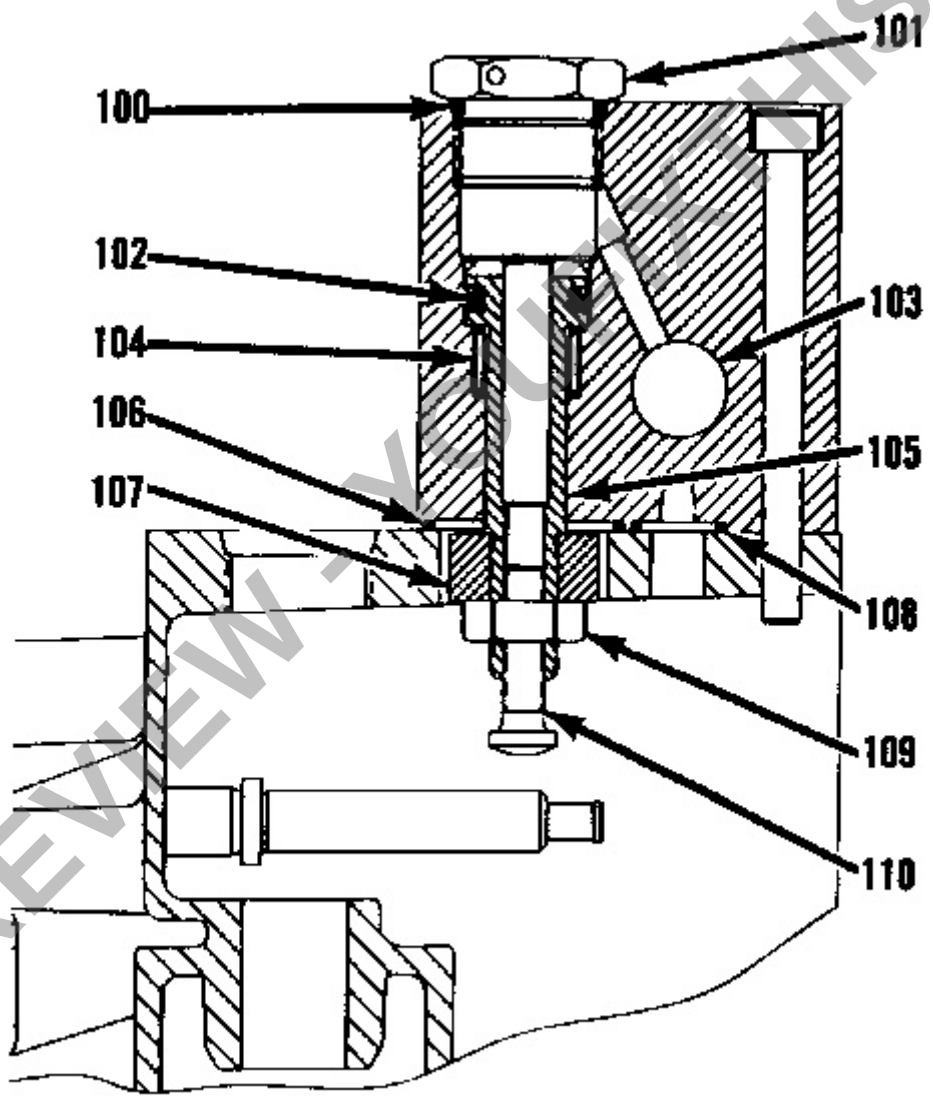


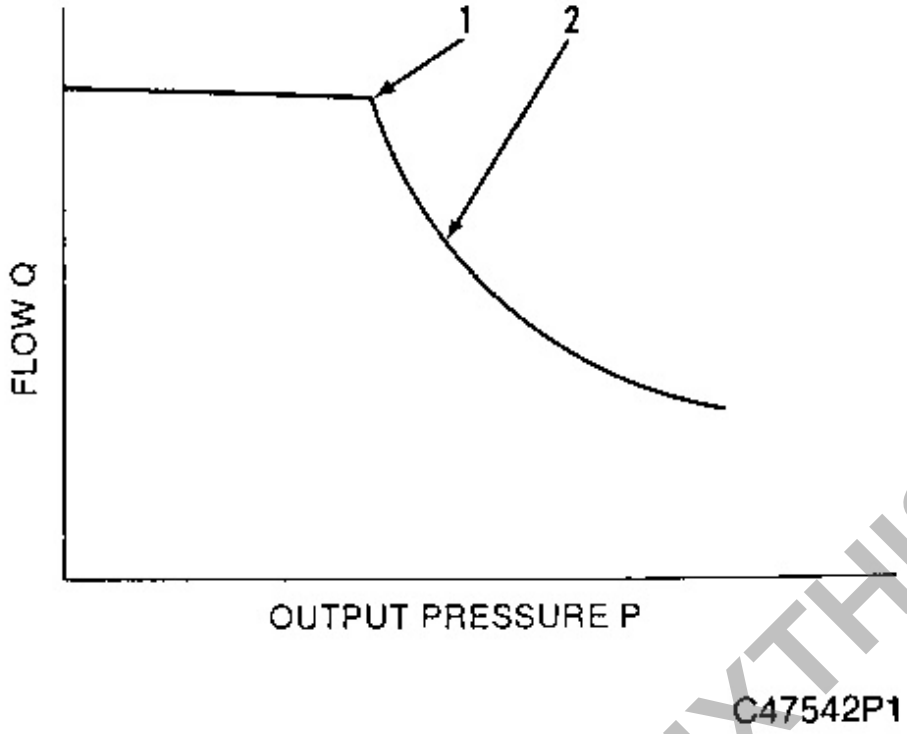
Illustration 60 g00621391

(100) O-ring seal

(101) Access plug

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P-Q Characteristic Curves
(1) Point (start of pump destroke). (2) Horsepower characteristics.

The output characteristics of each pump depends on two pressures:

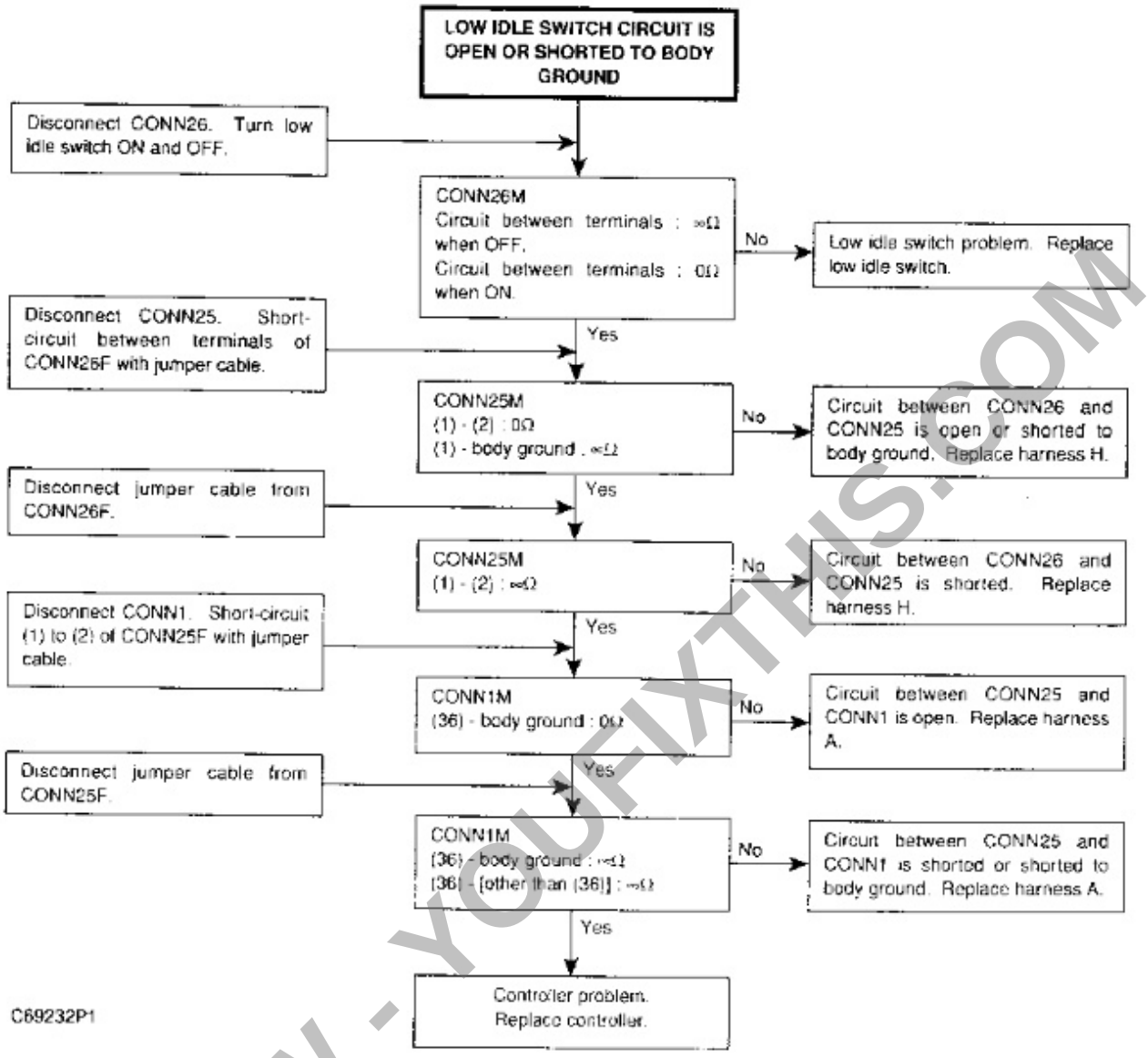
1. Pump output circuit pressure.
2. Power shift pressure.

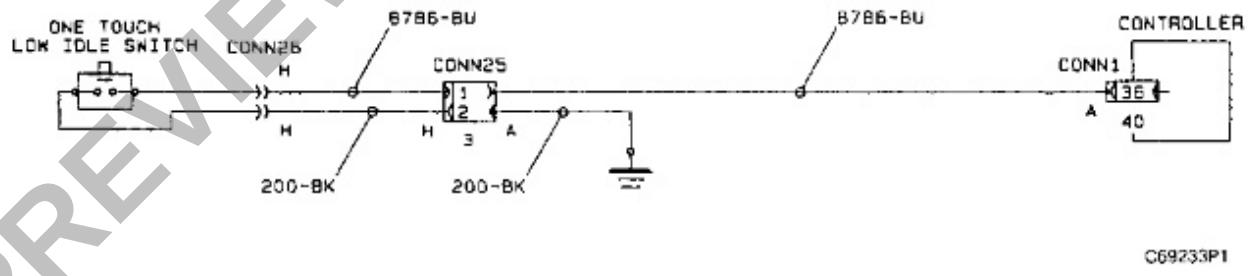
After a pump starts to operate, each pump has a set of pressure/flow (P-Q) characteristic curves. The P-Q curve represents a set of flow rates for different pump circuit pressures. Each point on curve (2) represents the respective flow rate and pressure to maintain pump output horsepower constant.

Hydraulic Schematic Of Main Control Valves

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[Elec #8-1] Fine Solenoid Valve Return Circuit Is Shorted To Battery Voltage

Problem:

Fine solenoid valve return circuit is shorted to battery voltage.

Solution:

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(2) Torque to ... 95 ± 9 N· (70 ± 7 lb ft)

(3) Torque nut to ... 61 ± 6 N· (45 ± 4 lb ft)

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Tools Needed		
5P8578	Manifold Gauge Set	1
1U9691	Adaptor-Straight Or	1
1U9692	Adaptor- 90°	1

A performance check of the air conditioning system must be made with a manifold gauge set connected to the service valves on the compressor.

See Safety Requirements before service work is performed on the air conditioning system.

NOTE: Current compressors use a 7/16-20 threaded low side fitting. The high side fitting is a 3/8-24 thread. Adaptor fittings 1U9691 or 1U9692 are required to install the manifold gauge set.

1. Connect the manifold gauge set to the discharge (high pressure) and suction (low pressure) service valves on the compressor. The fitting adaptors from the test kit are needed to connect the hoses to the service valves. Connect the hoses to the adaptor. Then connect the adaptor to the service valves. Hand tighten only.

NOTE: To connect a valve adapter to a service valve, first start the fitting on the valve and push the adapter onto the valve, then tighten the fitting. To disconnect a valve adapter, first push on the adapter and loosen the fitting. Then quickly pull the adapter off the valve. This method prevents refrigerant loss.

2. Make sure both hand valves on the manifold gauge set are closed (turned clockwise). Connect the blue hose from the left gauge to the service valve on the suction side of the compressor. Connect the red hose from the right gauge to the service valve on the discharge side of the compressor.

3. Put a clean rag over the yellow charging hose fitting on the open end, this will prevent compressor oil spray. Open the left (suction side) hand valve about 1/2 of a turn for 2 or 3 seconds to release the air from the blue hose and the gauge set. Close the hand valve. Do this again for the right (discharge side) hand valve to release the air from the red hose.

4. Start the engine and run it at approximately 1000 rpm. Move the temperature control knob to the MAX cool position. Put the fan switch in the HI position on the A/C side. Operate for a minimum of TEN minutes to stabilize the system. Then adjust the engine speed to approximately 1300 to 1400 rpm.

During normal operation of the air conditioning system, the discharge pressure will be 965 to 1207 kPa (140 to 175 psi). The suction pressure will be 103 to 207 kPa (15 to 30 psi). (See Illustration A). The outside (ambient) temperature will have an effect on the pressures (the higher the temperature, the higher the pressure). On very hot days the suction and discharge pressures will both be high. On cooler days the suction pressure will be normal to low. The discharge pressure will be low.

If suction and discharge pressures are not within the normal operating range, see Problem Solving in Testing And Adjusting of Air Conditioning And Heating, Form No. SENR3334. See the following illustrations for some examples of pressures that are not within the Specifications.

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15. Turn on the remote 12/24 volt power supply.

16. Obtain a third wire. Short pin (2) of rotational actuator (5) to ground. Next, short pin (2) of rotational actuator (5) to the battery. The actuator should move fully to the clockwise position. Next, the actuator should move completely to a counterclockwise position. The movement of the actuator is dependent on the voltage that is going to pin (2) of rotational actuator (5) .

    Note: When the actuator and signal pin (2) is in an open circuit condition, it is normal for the actuator to default travel to an end of travel position. This condition is similar if pin (2) for the control signal is shorted to ground. This condition is normal operation for the type of actuator. Refer to **279-0850** Actuator .

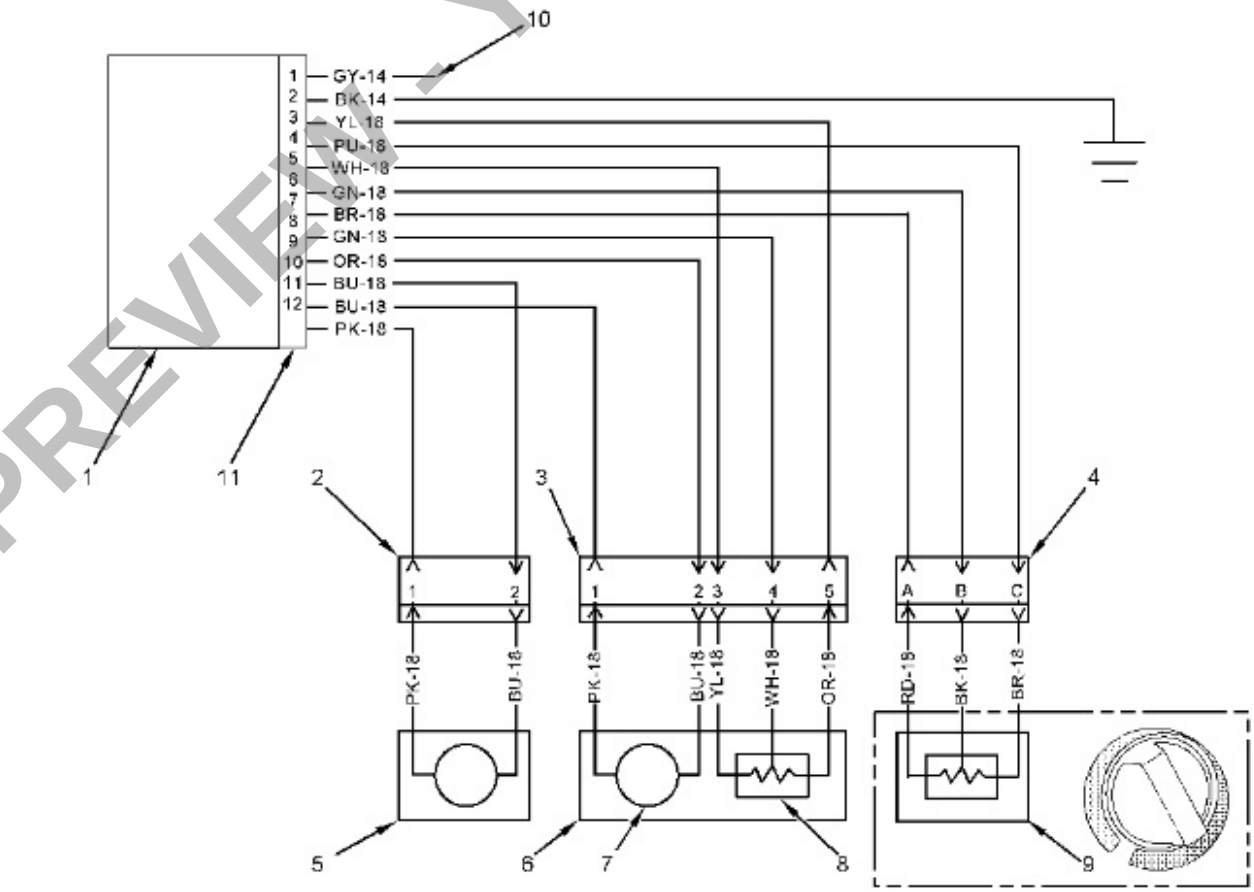
17. Disconnect all of the test equipment and reconnect Deutsch connector (4) .

Type 2 - Electronic Heat Control Circuit for Water Valve and Blend Door HVAC System using External Control Assembly

Electronic heat controls that have a blend door actuator and an electronic water valve are classified as a type 2 electronic heat control.

Table 6

Required Tools		
Part Number	**Description**	**Quantity**
146-4080	Digital Multimeter (RS-232)	1



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1. Put a load "P" of 4000 kg (8820 lb) on bearing (4).

2. Rotate housing (10) to seat the bearing.

3. Reduce load "P" to 1000 ± 100 kg (2200 ± 220 lb).

4. Measure dimension B.

5. Measure dimension (C) of gear (8).

6. Use a maximum of two shims (9), to obtain a total shim thickness of ... (A - B) ± 0.05 mm (.002 in).

Shim (9) thickness:

0961773 ... 0.15 mm (.006 in)

0961774 ... 0.30 mm (.012 in)

0961775 ... 0.40 mm (.016 in)

0961776 ... 0.50 mm (.020 in)

0961777 ... 0.60 mm (.024 in)

0961778 ... 0.70 mm (.028 in)

0961779 ... 0.80 mm (.031 in)

0961780 ... 1.00 mm (.039 in)

0961781 ... 1.60 mm (.063 in)

7. If two shims are used, the thinner one should be placed next to gear (8).

(5) O-rings of floating seal and all surfaces in contact with them must be clean and dry at assembly. Put a thin layer of oil on the surfaces that make contact on the metal seals just before installation.

(6) Make stake marks near opening of each pin hole after installation, as indicated in VIEW A.

(7) Torque for bolts ... 270 ± 39 N·m (200 ± 29 lb ft)

Quantity ... 16

Apply 9S3263 Thread Lock on threads.

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