NOTE: *If you have transmission shifting problems, see Section 6002 for complete troubleshooting information for Items 45 through 61.*
45 – Output Speed Sensor
46 – Transmission Solenoid Valve and Temperature Sensors
47 – Filter Maintenance Switch
48 – Torque Converter Output Temperature Sender
49 – Engine Speed Sensor
50 – Intermediate Speed Sensor
51 – Turbine Speed Sensor
52 – Transmission Shifter
53 – Transmission Electronic Control Module
54 – Transmission Enable Switch
55 – FNR Switch for Joystick Controls
56 – Transmission Kick-down Switch (Located In Hydraulic Controller for Joystick Option; Next to Hydraulic Levers for Single Axis Controls)
57 – FNR Switch for Single Axis Controls
58 – Transmission Auto Switch
59 – Brake Declutch Pressure Switch
60 – Declutch Switch
61 – Diagnostic Connector

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HOW TO READ SYMBOLS IN A HYDRAULIC SCHEMATIC

Introduction

A hydraulic schematic diagram is a line drawing composed of hydraulic symbols that indicate the types of the components the hydraulic circuit contains and how they are interconnected. Accurate diagrams of hydraulic circuits are essential to the service technician who must repair them. The schematic diagram is a valuable aid in diagnosing possible causes of a problem when troubleshooting machinery.

The purpose of this section is to show how to read and effectively use schematic circuit diagrams.

Circuit Diagrams

1. Cutaway Circuit Diagrams show the internal construction of the components, as well as the flow paths. By using colors, shades or various patterns in the lines and passages, they are able to show many different conditions of flow and pressure. Cutaway diagrams take considerably longer to produce because of their complexity.
2. Schematic Circuit Diagrams, the “shorthand” system of the industry, are usually preferred for troubleshooting. A schematic diagram is made up of simple geometric symbols for the components and their controls and connections.

Symbol Systems

There are several systems of symbols used when making schematic diagrams. They are as follows:

I.S.O. - International Standards Organization

A.N.S.I. - American National Standards Institute

A.S.A. - American Standards Association

J.I.C. - Joint Industry Conference

A combination of these symbols is shown in this section. There are differences between the symbols, but there is enough similarity so that if you understand the symbols in this section, you will be able to interpret other symbols as well.

Using Schematic Symbols

Reservoirs



VENTED RESERVOIR

PRESSURIZED RESERVOIR

BS07B620

A rectangle with the top removed represents a vented reservoir. A rectangle with the top in place represents a pressurized reservoir.



PRESSURIZED RESERVOIR

PRESSURIZED RESERVOIR

BS07B621

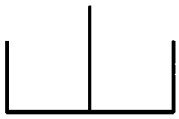
The are other schematic diagrams that show a slightly different version of a pressurized reservoir, but the symbols are similar and easily recognized. An oval with a short line on top or a rectangle with curved sides represents a reservoir that is pressurized.



RETURN LINE ABOVE THE OIL LEVEL

BS07B622

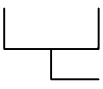
Lines connected to the reservoir usually are drawn from the top, regardless of where the actual connection is.



SUCTION LINE OR RETURN LINE BELOW THE OIL LEVEL

BS07B623

If the hydraulic line terminates below the fluid level, it is drawn all the way to the bottom of the symbol



BS07B624

RESERVOIR WITH SUCTION LINE ATTACHED AT THE BOTTOM

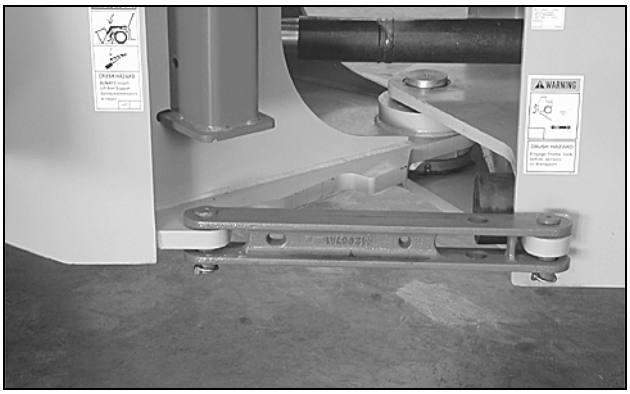
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ENGINE

Removal

STEP 1



BD03A040

Park machine on a level surface and lower bucket to ground. Put articulation lock in LOCKED position.

STEP 2

Stop engine. Actuate brake pedal several times to discharge brake accumulators. Put key switch in ON position and move loader control lever back and forth at least 30 times to release any pressure from hydraulic circuit. Put key switch in OFF position.

STEP 3

Slowly loosen the filler cap for hydraulic reservoir to release air pressure in hydraulic reservoir.

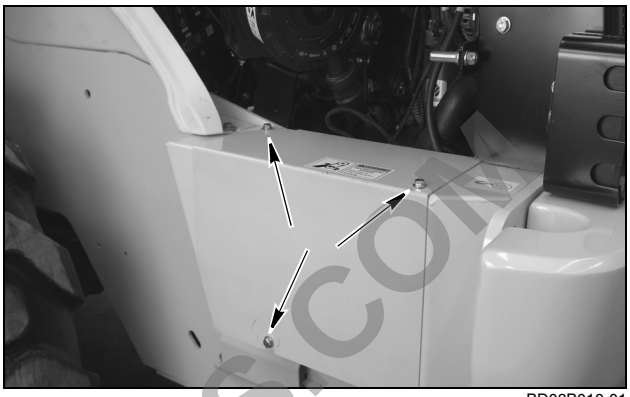
STEP 4



BD08B019-01

Put master disconnect switch in OFF position. Then remove the bolts holding it to the hood frame, and lay master disconnect to the side.

STEP 5



BD08B010-01

Remove the three bolts from the battery box cover from each side and disconnect batteries from the machine.

STEP 6

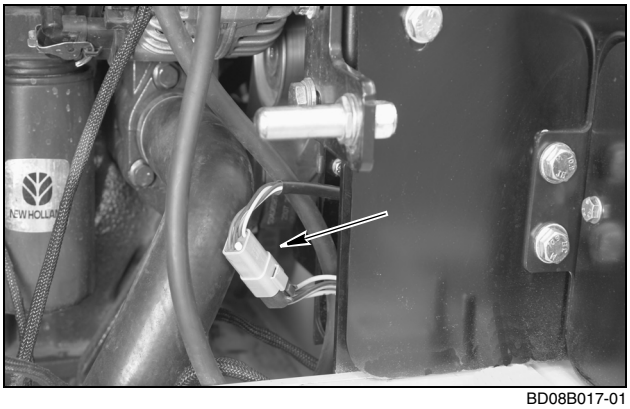


BD08B016-01

BACKUP ALARM FROM BACKSIDE

Remove the four bolts nuts and washers holding the backup alarm to the hood frame and lay the backup alarm to the side.

STEP 7



BD08B017-01

Disconnect the wire harness connector for the tail lights on each side.

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TORQUE SPECIFICATIONS - DECIMAL HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers dry, or when lubricated with engine oil. Not applicable if special graphities, Molydisulfide greases, or other extreme pressure lubricants are used.

Grade 5 Bolts, Nuts, and Studs



Size	Pound-Inches	Newton metres
1/4 inch	108 to 132	12 to 15
5/16 inch	204 to 252	23 to 28
3/8 inch	420 to 504	48 to 57
Size	Pound-Feet	Newton metres
7/16 inch	54 to 64	73 to 87
1/2 inch	80 to 96	109 to 130
9/16 inch	110 to 132	149 to 179
5/8 inch	150 to 180	203 to 244
3/4 inch	270 to 324	366 to 439
7/8 inch	400 to 480	542 to 651
1.0 inch	580 to 696	787 to 944
1-1/8 inch	800 to 880	1085 to 1193
1-1/4 inch	1120 to 1240	1519 to 1681
1-3/8 inch	1460 to 1680	1980 to 2278
1-1/2 inch	1940 to 2200	2631 to 2983

Grade 8 Bolts, Nuts, and Studs



Size	Pound-Inches	Newton metres
1/4 inch	144 to 180	16 to 20
5/16 inch	288 to 348	33 to 39
3/8 inch	540 to 648	61 to 73
Size	Pound-Feet	Newton metres
7/16 inch	70 to 84	95 to 114
1/2 inch	110 to 132	149 to 179
9/16 inch	160 to 192	217 to 260
5/8 inch	220 to 264	298 to 358
3/4 inch	380 to 456	515 to 618
7/8 inch	600 to 720	814 to 976
1.0 inch	900 to 1080	1220 to 1465
1-1/8 inch	1280 to 1440	1736 to 1953
1-1/4 inch	1820 to 2000	2468 to 2712
1-3/8 inch	2380 to 2720	3227 to 3688
1-1/2 inch	3160 to 3560	4285 to 4827

NOTE: *Use thick nuts with Grade 8 bolts.*

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22 – Water In Fuel Sensor

Located in the right side of the engine compartment on water separator housing, open engine compartment to gain access.

Check Points	Correct Reading	Possible Cause of Bad Reading
Terminal for wire 0-BP to ground	Continuity	Bad ground circuit.
NOTE: *Put the master disconnect switch and the ignition switch in the ON position.*		
Terminal for wire 18J-H to ground	24 volts	Check fuse ECD-F2, power relay module B (14), also check circuit 18J.
NOTE: *Remove sensor from filter and place probes in water.*		
Terminal for wire 35W to ground	24 volts	Bad water separator sensor.

23 – Throttle Potentiometer

Located below cab under throttle pedal.

Check Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Put the master disconnect switch in the ON position and the ignition switch in ON position.*		
Terminal for wire 24S to 24R	5 volts	Bad EDC7 (24). Also check wire 24S.
Terminal for wire 24R to ground	Continuity	Bad EDC7 (24). Also check wire 24R.
NOTE: *Throttle pedal in low idle position.*		
Terminal for wire 24B to 24R	0.4 ± 0.025 volts	Bad potentiometer.
NOTE: *Throttle pedal in high idle position.*		
Terminal for wire 24B to 24R	4.0 ± 0.1 volts	Bad potentiometer.
NOTE: *Put the ignition switch in OFF position and the master disconnect switch in the OFF position. Disconnect connector RTHP. Throttle pedal in low idle position.*		
Between pin 1 and 6 at pedal	Open	Bad potentiometer.
NOTE: *Throttle pedal in high idle position.*		
Between pin 1 and 6 at pedal	1000 ± 400 ohms at 20° C (68° F)	Bad potentiometer.
NOTE: *Throttle pedal in any position.*		
Between pin 4 and 5 at pedal	1200 ± 400 ohms at 20° C (68° F)	Bad potentiometer.

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1 – Starting Relay

Located in the right side of the engine compartment on cooling fan housing, open engine compartment to gain access.

Check Points	Correct Reading	Possible Cause of Bad Reading
Terminal for wire 0-GB to ground	Continuity	Bad ground circuit.
NOTE: *Put the master disconnect switch in the ON position.*		
Terminal for wire 1-Z to ground	24 volts	Check circuit to batteries.
NOTE: *Put the transmission in NEUTRAL. Have another person hold the ignition switch in the START position.*		
Terminal for wire 21D to ground	24 volts	Check crank control relay (4), also check circuit 21D.
Terminal for wire 1-BB to ground	24 volts	Bad starting relay.

2 – Resistor

Located in the cab access panel for fuses and relays.

NOTE: *Turn master disconnect switch off, disconnect terminals from resistor.*

Check Points	Correct Reading	Possible Cause of Bad Reading
Between terminals of resistor	75 ohms	Bad resistor.

3 – Alternator

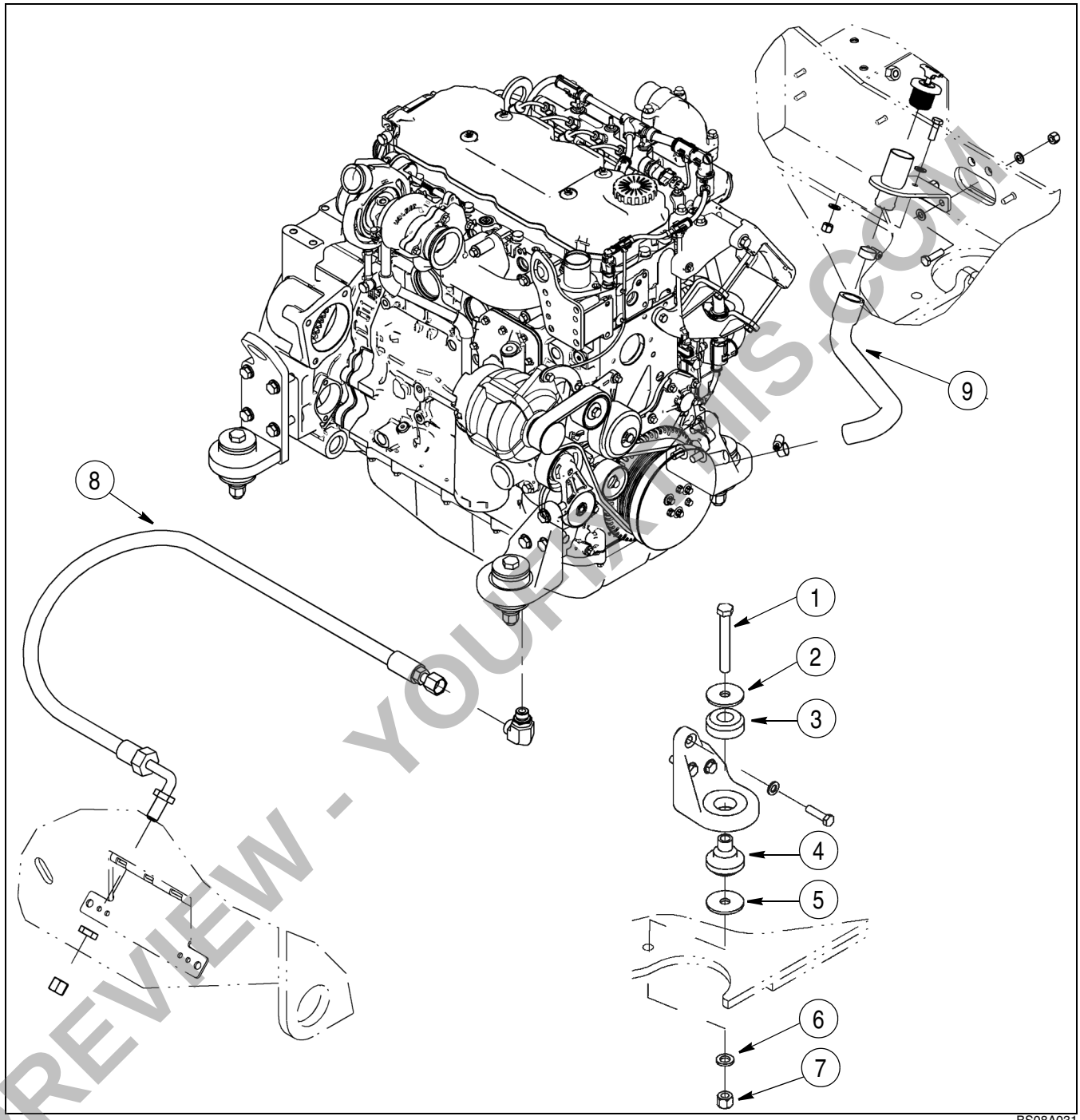
Located on left side of engine, open engine compartment to gain access.

Check Points	Correct Reading	Possible Cause of Bad Reading
Between housing of alternator and ground	Continuity	Bad ground connection.
NOTE: *Put the master disconnect switch in the ON position.*		
Between the B+ terminal of alternator and ground	24 volts	Check circuit to positive post of left battery. Bad master disconnect switch.
Between terminal for wire 1-BA and ground	24 volts	Bad wire 1-BA.
NOTE: *Put the ignition switch in the ON position.*		
Between the B+ terminal of alternator and ground	24 volts	Check circuit to positive post of left battery.
Terminal for wire 14 to ground	20 volts	Check circuit 14, 75 ohm resistor, and diode module. Bad fuse ECA-F4. Check power relay module A, and 105 ampere circuit breaker in engine compartment of machine.
NOTE: *If the readings are good, repair or replace the alternator.*		

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Installation



BS08A031

1. ENGINE MOUNT BOLT
2. WASHER
3. INSOLATOR UPPER
4. INSOLATOR LOWER
5. WASHER
6. WASHER
7. NUT
8. REMOTE OIL DRAIN HOSE
9. OIL FILL TUBE

STEP 43

If engine rubber isolators require replacement, remove and discard isolators (3 and 4). Install new rubber isolator (4), then rubber isolator (3).

If mounting brackets were removed from the engine, retorque the mounts to the engine to 118 to 133 Nm (87 to 98 pound-feet).

STEP 44

Slowly raise engine and move into position over rear chassis. Be sure all harness connections and hoses are out of the way then lower engine. Put washer (5) between front rubber isolator (4) and chassis. Install washer (2), bolt (1), washer (6), and nut (7) in engine isolators. Lower engine into position.

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W110B Wheel Loader
Service Manual 84249879
(Replaces 87728451)

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W110B Wheel Loader
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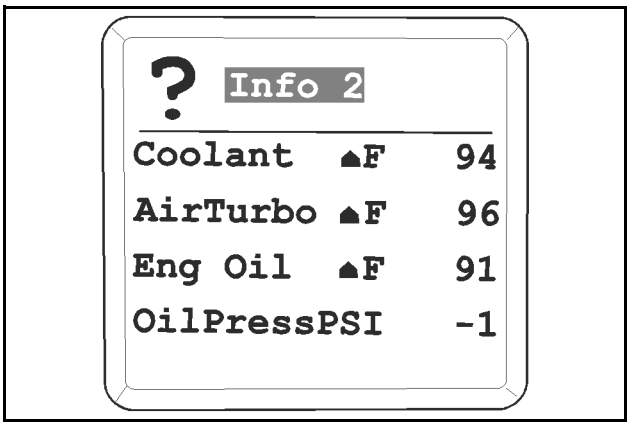
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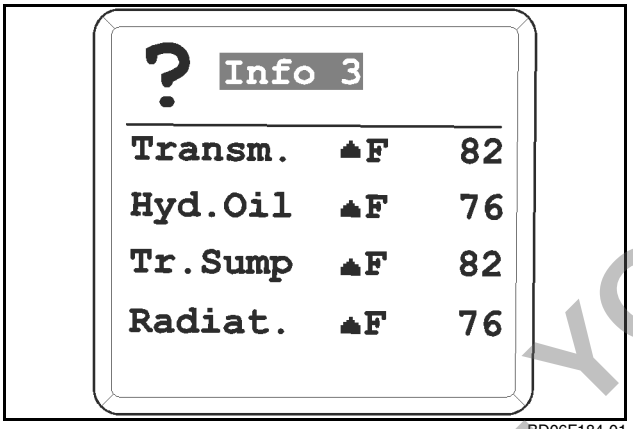
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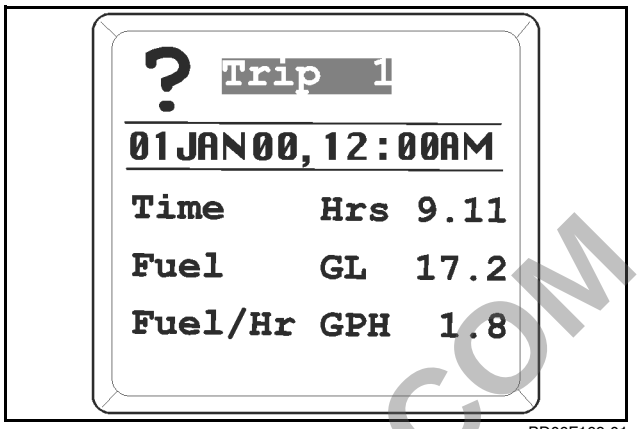
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4. **Info 2** will be displayed next. The Info 2 screen will display coolant temperature, turbocharger air temperature, engine oil temperature in either Fahrenheit or Celsius, as well as oil pressure PSI.



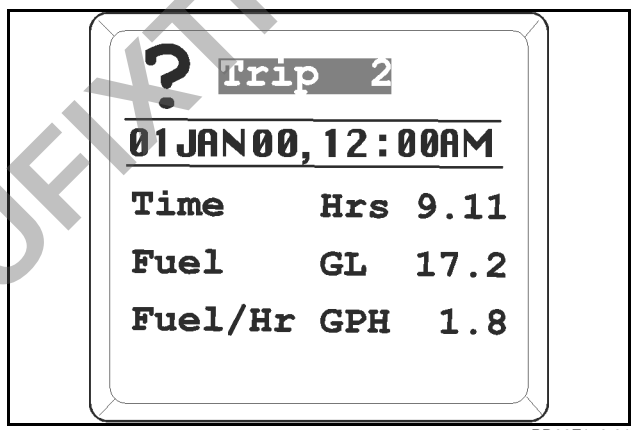
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5. Push the down button again and the Info 3 screen. This screen displays the temperature in Fahrenheit or Celsius of the transmission oil, hydraulic oil, sump oil, and radiator coolant temperature.



BD06F169-01

6. Press the down button again and the Trip 1 screen will display. The LCD provides two trip computers. These will display since last reset the total time in hours, the total fuel, and the average fuel consumption per hour.



BD06F170-01

7. By continuing to scroll down, the fifth screen will display the Trip 2 screen. Trip 1 and Trip 2 screens can be reset independently. The previous screen can be accessed by using the up arrow key.

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Wire Identification Codes

21C Bk - 1.0

- 21C — Wire Name
- Bk — Wire Color
- 1.0 — Wire Size (mm^2)

Wire Size (mm^2)	0.8 mm	1.0 mm	2.0 mm	5.0 mm

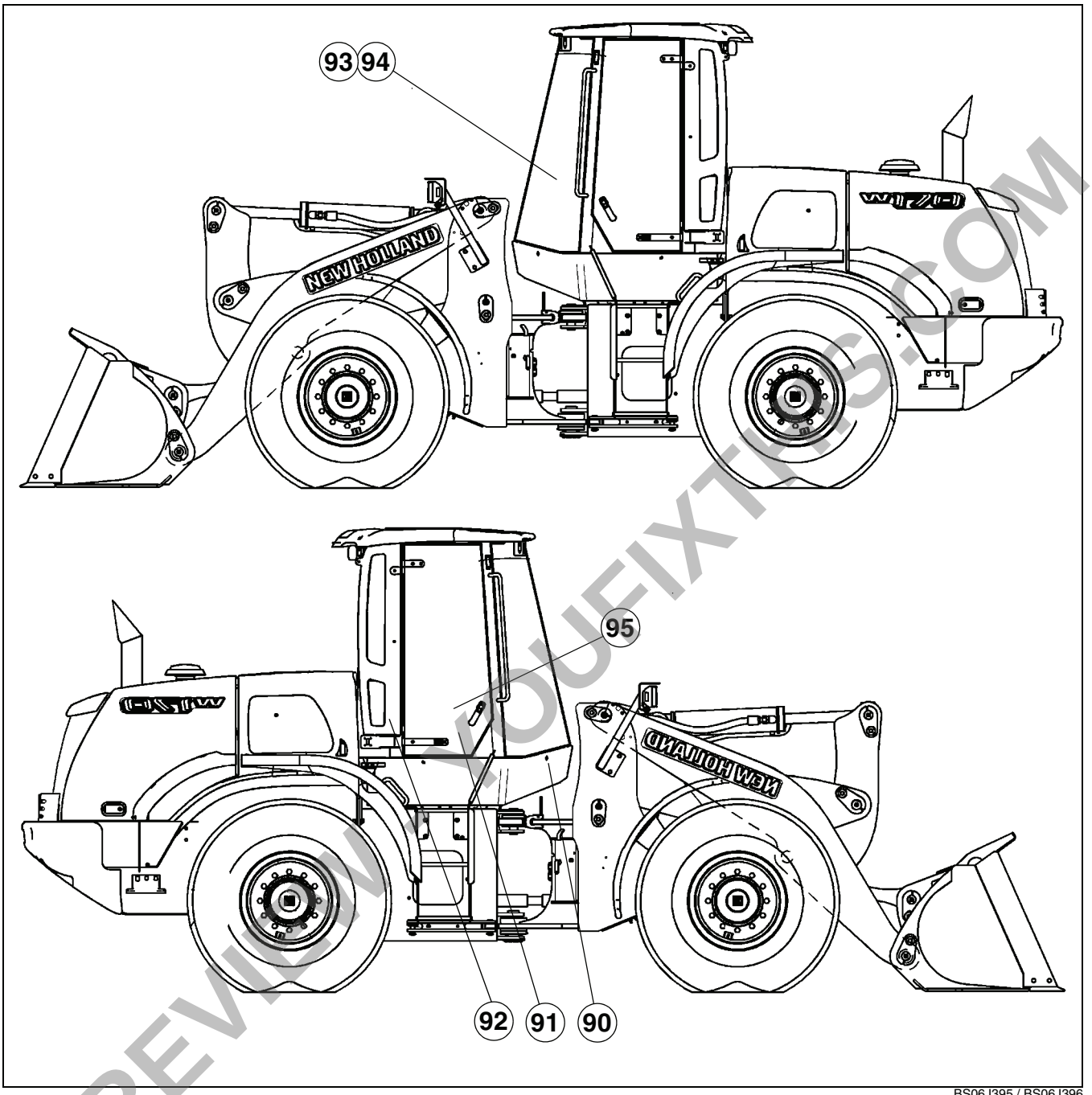
Wire Color				
Bk = Black	DU = Dark Blue	S = Gray	LG = Light Green	K = Pink
T = Tan	W = White	N = Brown	G = Green	U = Blue
LU = Light Blue	Or = Orange	R = Red	P = Purple	Y = Yellow

Wire Identification			From Connector		To Connector	
Wire	**Circuit**	**Color, Size, and Material**	**Connector**	**Cavity**	**Connector**	**Cavity**
41H D	High Beam Pwr	Or 0.8 TXL	SW-PD, Switch Pad	1	SPL-PK2, Splice 3-4 Way	M
41J	Driving Light Power	Or 1.0 GXL	SDR, Driving Lights Switch	6	SRHSTLK, RH Stalk Switch	56
41L A	Low Beam Power	Or 1.0 GXL	SRHSTLK, RH Stalk Switch	56b	SPL-LB, Ultrasonic	
41L B	Low Beam RH Power	Or 0.8 GXL	SPL-LB, Ultrasonic		ECB, Elect Center B	A6
41L C	Low Beam LH Power	Or 0.8 GXL	SPL-LB, Ultrasonic		ECB, Elect Center B	A5
41T	Position Lights Switched Pwr	K 1.0 GXL	SDR, Driving Lights Switch	3	SPL-PK2, Splice 3-4 Way	C
41T A	Position Lights RH Switched Pwr	K 1.0 GXL	SPL-PK2, Splice 3-4 Way	D	ECB, Elect Center B	A8
41T B	Position Lights LH Switched Pwr	K 1.0 GXL	SPL-PK2, Splice 3-4 Way	A	ECB, Elect Center B	A7
41T C	Position Lights Switched Pwr	K 1.0 GXL	D-OR, Diode OR	B	SPL-D, Ultrasonic	
41T D	Position Lights Switched Pwr	K 0.8 TXL	SW-PD, Switch Pad	2	SPL-D, Ultrasonic	
41T E	Position Lights Switched Pwr	K 1.0 SXL	SPL-PK2, Splice 3-4 Way	B	SPL-D, Ultrasonic	
42C A	Front Work Lights Fused Pwr	DU 1.0 GXL	CAB-RF, Cab to Roof Conn.	C	SPL-PK1, Splice 3-4 Way	A
42C C	Front Work Lights Fused Pwr	DU 1.0 GXL	SPL-PK1, Splice 3-4 Way	D	ECB, Elect Center B	AA1
42C D	Front Work Lights Fused Pwr	DU 1.0 GXL	SPL-PK1, Splice 3-4 Way	C	D-OR, Diode OR	A
42C E	Front Work Lights Fused Pwr	DU 0.8 TXL	SW-PD, Switch Pad	3	SPL-PK1, Splice 3-4 Way	B
42C F	Front Work Lights Fused Pwr	DU 1.0 GXL	ROOF, Roof to Cab Conn.	C	SPL-WRKF, Ultrasonic	A
42C G	RH Front Work Lights Fused Pwr	DU 1.0 SXL	SPL-WRKF, Ultrasonic	A	LRFW, RH Front Work Light	A
42C H	LH Front Work Lights Fused Pwr	DU 1.0 SXL	SPL-WRKF, Ultrasonic	A	LLFW, LH Front Work Light	A
42FS	Front Work Lights Switched Pwr	DU 1.0 GXL	SWL, Work Lights Switch	3	ECB, Elect Center B	A1
42RS	Rear Work Light Switched Pwr	DU 1.0 GXL	SWL, Work Lights Switch	6	ECB, Elect Center B	A2
42R C	Rear Work Lights Fused Pwr	DU 1.0 GXL	CAB-RF, Cab to Roof Conn.	B	ECB, Elect Center B	AA2
42R F	Rear Work Lights Fused Pwr	DU 1.0 GXL	ROOF, Roof to Cab Conn.	B	SPL-WRKR, Ultrasonic	A
42R G	RH Rear Work Lt Fused Pwr	DU 1.0 SXL	SPL-WRKR, Ultrasonic	A	LRRW, RH Rear Work Light	A
42R H	LH Rear Work Lt Fused Pwr	DU 1.0 SXL	SPL-WRKR, Ultrasonic	A	LLRW, LH Rear Work Light	A
42 A	Work Lights Fused Power	R 2.0 GXL	SWL, Work Lights Switch	2	SPL-WL, Ultrasonic	A
42 B	Work Lights Fused Power	R 2.0 GXL	SWL, Work Lights Switch	5	SPL-WL, Ultrasonic	A
43S A	Door Open Signal	W 0.8 GXL	CAB-RF, Cab to Roof Conn.	R	SPL-DS, Ultrasonic	A
43S B	Door Open Signal	W 0.8 GXL	ROOF, Roof to Cab Conn.	R	DS, Door Switch	B
43S C	Door Open Signal	W 0.8 TXL	SPL-DS, Ultrasonic	A	AIC-2, Adv Instrument Cluster 2	2
43S D	Time Delay Mod Door Sw Reset	W 0.8 TXL	TDM, Time Delay Module	4	SPL-DS, Ultrasonic	A
43 A	Dome Light Auto Mode	DU 0.8 TXL	CAB-RF, Cab to Roof Conn.	A	AIC-1, Adv Instrument Cluster 1	7

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LIGHTS - 02



BS06J395 / BS06J396

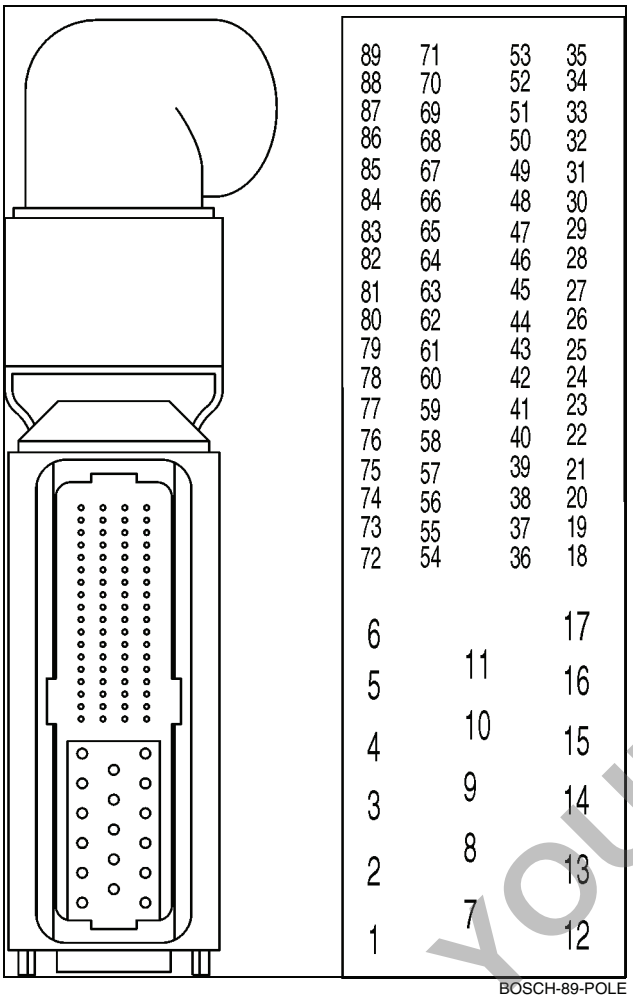
90. BRAKE LIGHTS SWITCH
91. BRAKE LIGHTS RELAY
92. FLASHER MODULE
93. HAZARD SWITCH
94. TURN SIGNAL, HIGH-LOW BEAM, AND HORN SWITCH
95. DRIVING LIGHTS SWITCH

NOTE: *The battery must be at full charge and all connections clean and tight before doing any testing of the electrical system. Use a Multimeter for the following tests.*

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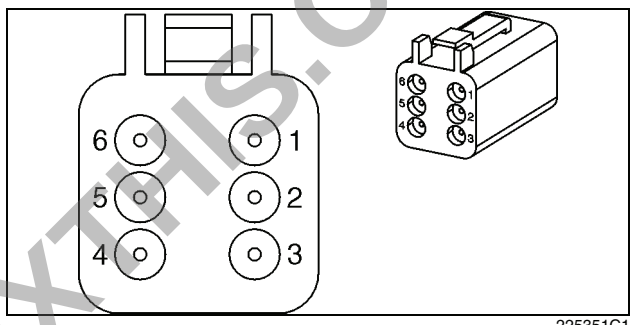
CONNECTOR EDC7 - ENGINE CONTROLLER



BOSCH-89-POLE

CAV	WIRE IDENT	CIRCUIT
2	18J-C	EDC7 Time Delay Fused Power
3	18J-B	EDC7 Time Delay Fused Power
5	0-BE	EDC7 Ground
6	0-BF	EDC7 Ground
8	18J-D	EDC7 Time Delay Fused Power
9	18J-E	EDC7 Time Delay Fused Power
10	0-BD	EDC7 Ground
11	0-BC	EDC7 Ground
12	28G	Grid Heater Source DR
13	0-BN	Filter Heater Control
17	21H-A	Crank Control Relay LSD
29	21F-B	EDC7 Digital Ground
32	21E-A	Key Switch Crank
34	CAN-L	CAN Low
35	CAN-H	CAN High
36	28F	Fuel Filter Heater Relay Control
37	21GA	EDC7 Crank Control Relay
40	13M-A	Fuel Shutoff Fused Power
42	35W	Water In Fuel Indicator
48	24L	Low Idle Switch
75	0-BV	Grid Heater Control Ground
77	24S	Throttle Supply
78	24R	Throttle Ground
79	24B	Throttle Signal
89	20G-A	EDC7 ISO-K Interface

CONNECTOR EM - HEIGHT CONTROL RTD - RTT



225351C1

CAV	WIRE IDENT	CIRCUIT
1	55A-A	RTT/Float Switched Power
2	54A	Height Control Switched Power
3	53A	RTD Switched Power
4	53B-B	RTD Control Signal
5	54B-B	HC-RTT Control Signal
6	55B	RTT Float Switch Control

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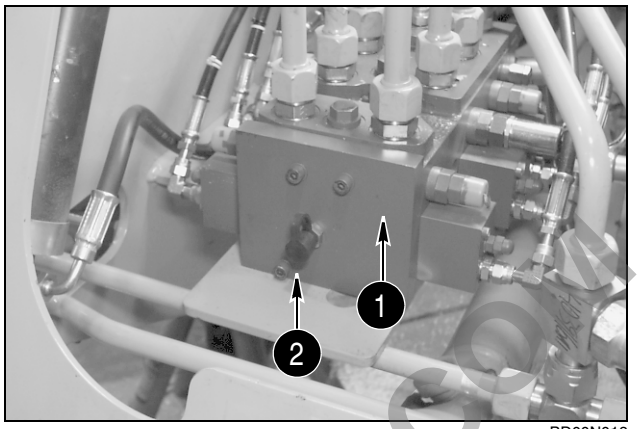
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6. Make sure that the temperature of the hydraulic oil is at least 52° C (125° F).
7. To measure the temperature of the oil using the instrument panel:
   A. Press the program switch (left side of the program/reset switch).
   B. Press the up count switch to function 008.
   C. Return the program switch to the **OFF** (center) position.
8. Apply the parking brake.
9. Start and run the engine at full throttle.
10. Hold the bucket control lever in the rollback position.
11. Hold the lift lever in the “FLOAT” position.
12. Continue holding until the specified temperature of the oil is reached.
13. Stop the engine.
14. Remove the cap on the hydraulic reservoir to release any pressure in the hydraulic system.



BD00N018

1. LOADER CONTROL VALVE
2. PUMP PRESSURE TEST PORT

15. Remove the dust cap from the test port (2).
16. Connect a 345 bar (5000 psi) pressure gauge to the test port (2) on the front of the loader control valve (1).

NOTE: *Make sure when you connect the pressure gauge that you do so in a manner that you can read the pressure gauge while sitting in the operators seat.*

17. Start the engine and operate the machine at full throttle.
18. With the articulation lock still in place, turn and hold the steering wheel for a hard right turn.
19. Continue holding the steering wheel, and read the pressure gauge.
20. The pressure gauge must indicate 239 to 243 bar (3465 to 3523 psi). If the pressure is not correct, adjust the steering relief valve.

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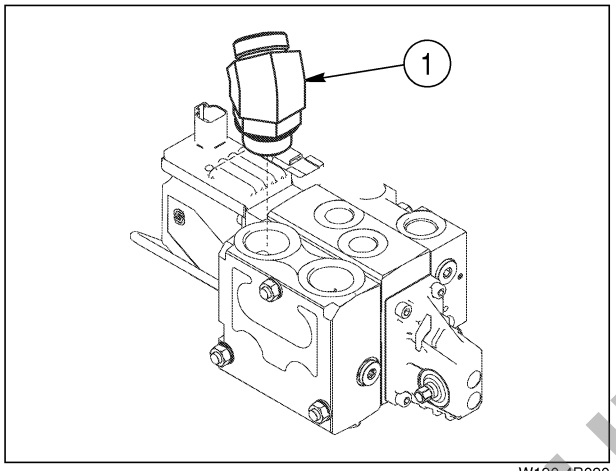
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Installation

Before reassembling the steering valves, clean all the disassembled parts thoroughly using solvent.

1. Inspect each part for dents, scoring or other defects.
2. Replace all damaged or deformed parts with new ones.

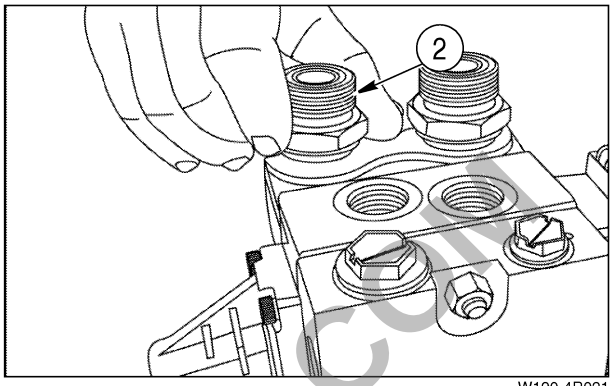
STEP 18



W190-4R020

Install the union (1) into port “T” of the steering valve PVG32. Torque to 310 Nm (228 pound feet).

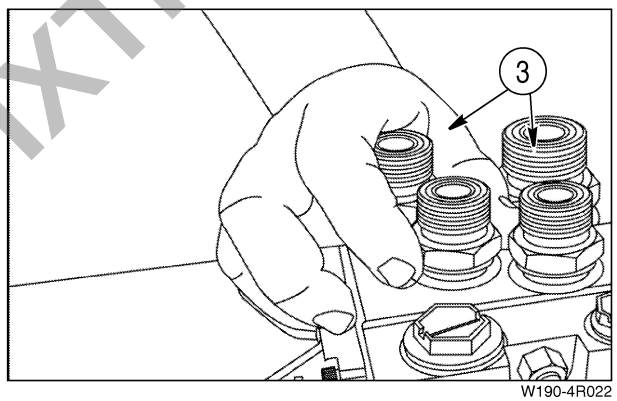
STEP 19



W190-4R021

Install the union (2) for connection with the suction hose of the steering priority valve on the port “P. Torque to 170 Nm (125 pound feet).

STEP 20



W190-4R022

Install the two joints (3) for connection with the steering cylinder line supply flexible hoses on the ports “A” and “B. Torque to 100 Nm (74 pound feet).

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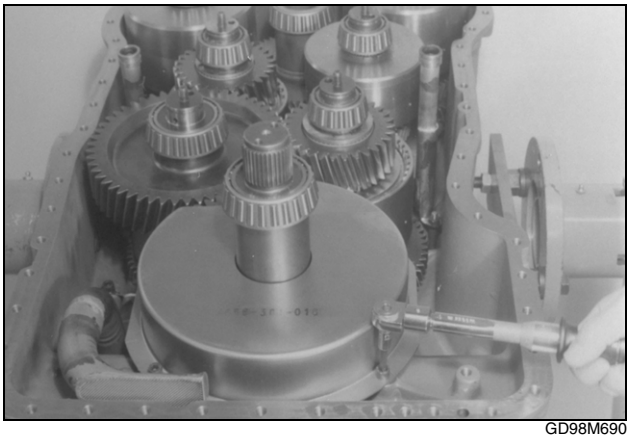
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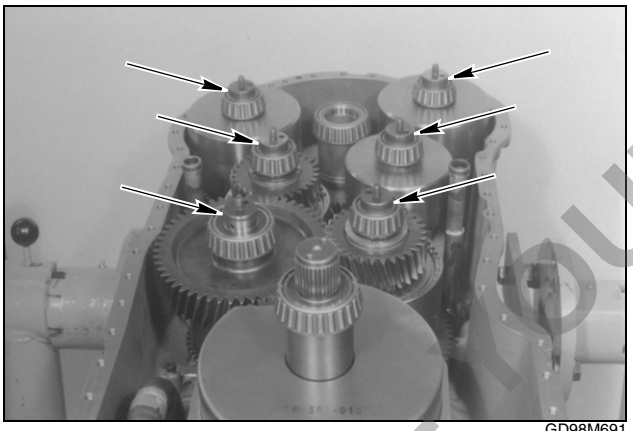
STEP 159



GD98M690

Apply Loctite 243 to the socket head screws and install the screws. Tighten the screws to a torque of 23 Nm (204 pound inches).

STEP 160



GD98M691

Install rectangular rings in grooves of clutch shafts. Apply grease to rings and align rings.

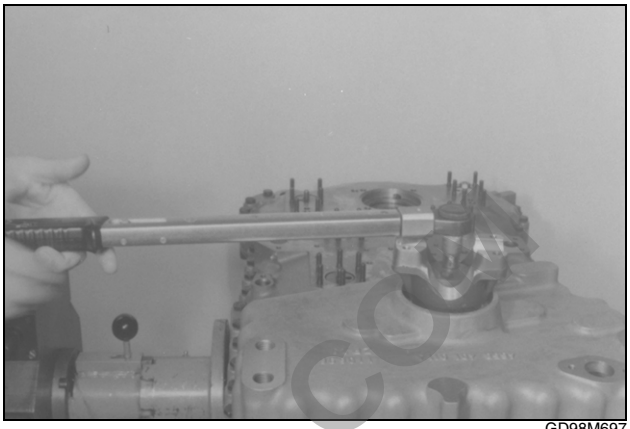
STEP 161



GD98M696

Position shaft seal with sealing lip facing oil chamber. Apply grease to sealing lip. Use CAS2869 transmission output shaft seal installation tool to install seal.

STEP 162



GD98M697

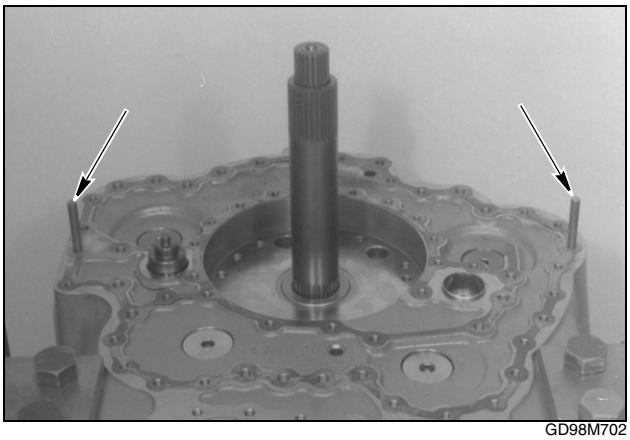
Heat the output flange to about 90° C (194° F). Apply Loctite 574 to the contact area and assemble the flange with the washers and hex head screws. Tighten the screws to a torque of 34 Nm (301 pound inches). Bend corner of lock plate over hex head screws.

STEP 163

Repeat Steps 161 and 162 to install shaft seal and output flange on converter side.

NOTE: *The following steps are for the assembly of the oil feed housing and transmission pump.*

STEP 164



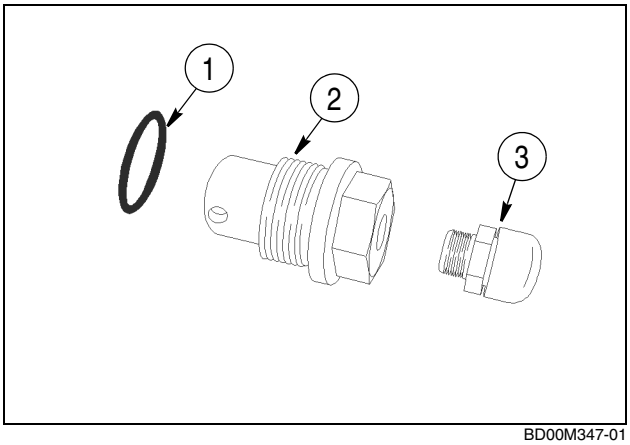
GD98M702

Install two alignment studs and install the gasket.

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STEP 182



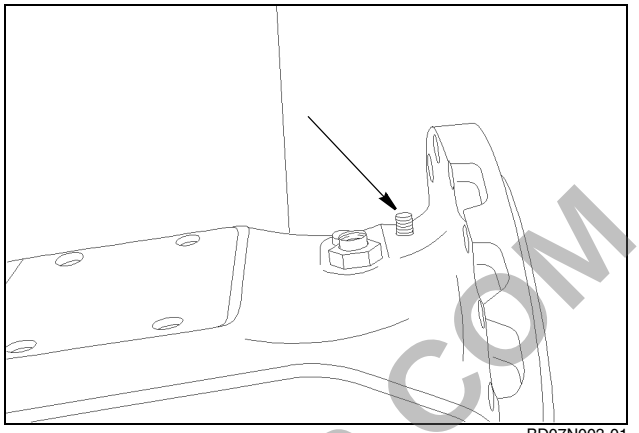
BD00M347-01

BREATHER VENT EXPLODED VIEW

1. O-RING 2. PLUG 3. BREATHER

Remove and discard O-ring (1) from plug (2) and install a new O-ring. Install breather (3) in plug.

STEP 183

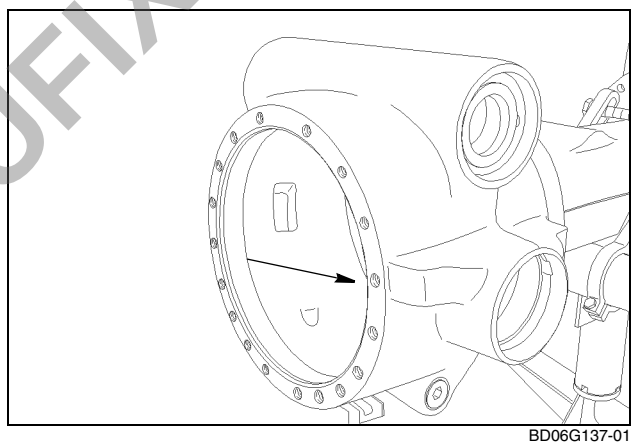


BD07N003-01

Install the plug in axle housing. Tighten plug to a torque of 50 Nm (36.9 pound feet). Tighten breather valve to standard torque specification.

Drive Pinion Installation

STEP 184



BD06G137-01

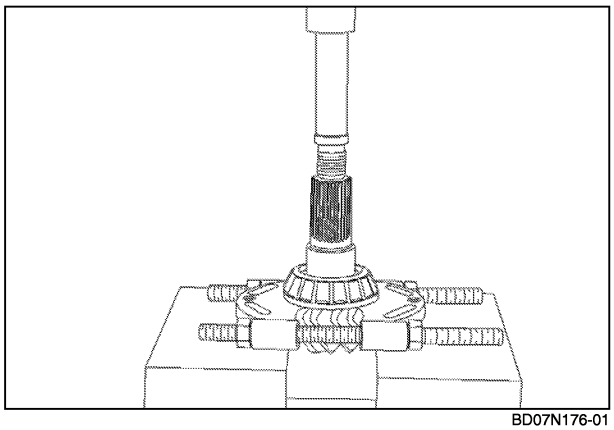
Find and record the housing dimension “X” located inside the differential housing where the pinion shaft is located.

Dimension X (Example).....205.30 (8.08 inch)

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STEP 173

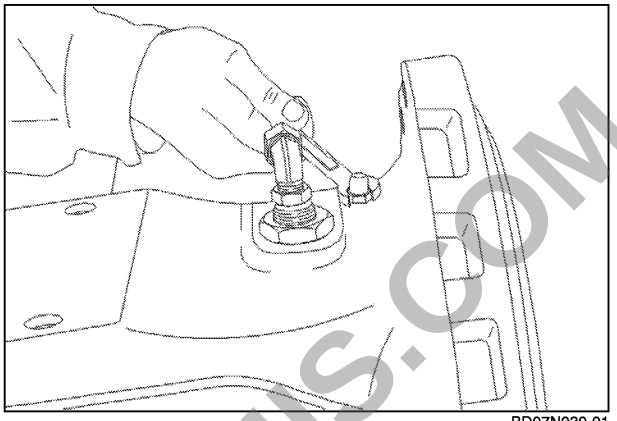


BD07N176-01

Remove inner bearing from the drive pinion using a suitable puller and a press.

Brake Tube Removal

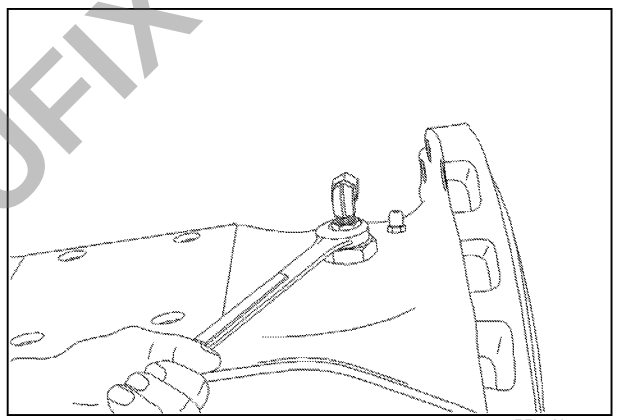
STEP 174



BD07N030-01

Remove the plug with the breather installed from the axle housing.

STEP 175



BD07N001-01

Remove fitting from the brake tube on the axle housing.

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TROUBLESHOOTING THE HYDRAULIC BRAKE SYSTEM

NOTE: *The hydraulic brake schematic is included in the hydraulic schematic. Refer to the rear pocket of this manual.*

1. Check the oil level in the hydraulic reservoir; add oil as necessary.
2. Push and release the brake pedal many times with the engine stopped to remove all hydraulic pressure from the brake system until there is no pressure on the pedal.
3. Install two 207 bar (3000 psi) pressure gauges to front and rear hydraulic brake accumulator test ports, refer to page 7 for the locations of the test ports.
4. Make sure that the pressure gauge hoses are long enough so the gauges can be read while sitting in the operators seat.

NOTE: *The gauges can not be connected to the test ports if hydraulic pressure remains in the system.*

5. Start the engine. Run the engine at low idle while reading the pressure gauges. The alarms (buzzer, master warning light and brake pressure warning light) should shut off when the accumulator with the lowest pressure reaches 117 to 141 bar (1697 to 2045 psi), approximately 40 seconds at any engine speed.
6. After the alarms stop, run the machine at high idle to finish charging the accumulators. The pressure must increase on both gauges until 190 to 196 bar (2757 to 2843 psi) is reached. This is the accumulator valve cut-out pressure. It is normal for the pressure to drop slightly once the cut-out pressure is reached.
7. With the engine running at high idle, push and release the brake pedal rapidly while reading the drop in pressure on the gauges. The pressure drops may not be equal, but as the lowest pressure reaches 157 to 167 bar (2280 to 2420 psi), the system pressure must start to increase. This is the valve cut in pressure.

NOTE: *The brake cut-in and cut-out pressures of the brake system charge valve are factory preset and are not adjustable.*

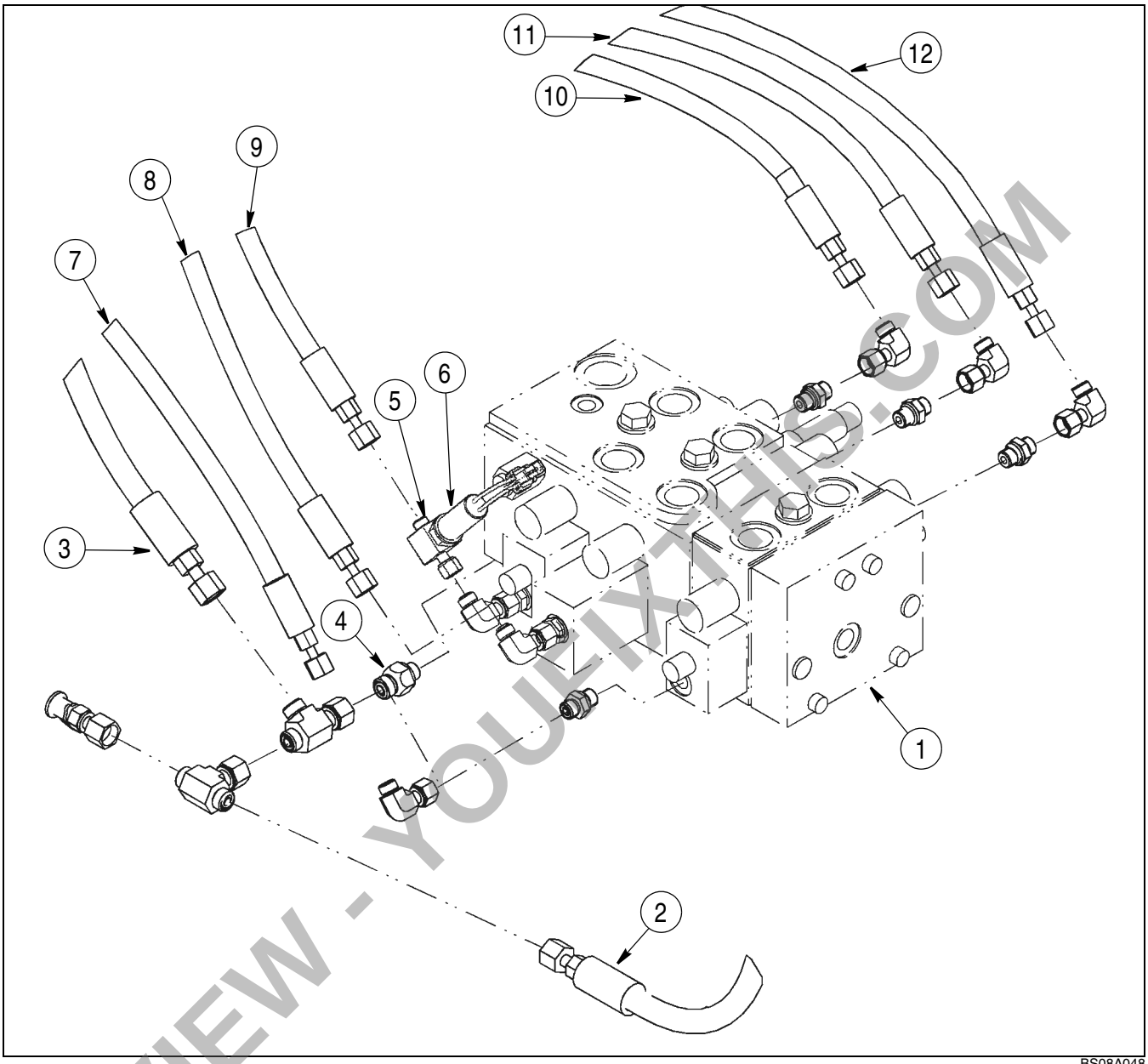
NOTE: *If the pressure on one of the pressure gauges is lower than specified, the problem can be a bad accumulator valve.*

8. Stop the engine. Turn the ignition switch to the ON position. Push and release the brake several times while reading the pressure on the gauges. Each push and release of the pedal will result in a slight drop in pressure, but not necessarily equal on the two gauges.
9. As the lowest pressure reaches 117 to 141 bar (1697 to 2045 psi) the brake warning lamp and alarm buzzer must actuate. If the warning lamp and alarm buzzer fail to work, test the low brake pressure warning switches and electrical circuit. If the warning lamp and alarm buzzer actuate at a higher or lower pressure than specified, test the low brake pressure warning switches and replace as needed.
10. After the low brake pressure light activates, press the brake pedal eight more times.
11. Record the readings on the pressure gauges. The pressure gauges should read at or above 48 to 59 bar (700 to 850 psi).
12. If the pressures are at or above 48 to 59 bar (700 to 850 psi), the test is complete.
13. If the pressures are not within the required specifications, then the brake system must be bled.
14. After bleeding the brake system, perform the brake system check again.
15. Continue to slowly push and release the brake pedal several times until the gauge pressure suddenly drops to zero. The last pressure reading before the drop to zero is the nitrogen charge pressure in the accumulator. Test the pressure in both accumulators. If the pressure is below 48 to 59 bar (700 to 850 psi), charge or replace the accumulator(s) (see section 7004).

NOTE: *Nominal temperature of 20° C (68° F), colder temperature will reduce pressure, hotter temperature will increase pressure.*

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BS08A048

1. LOADER CONTROL VALVE
2. PILOT ACCUMULATOR HOSE
3. PILOT PRESSURE HOSE
4. CHECK VALVE
5. SWITCH FITTING (XT WITH LOAD TRAVEL STABILIZATION ONLY)
6. SWITCH (XT WITH LOAD TRAVEL STABILIZATION ONLY)
7. PILOT 3 SPOOL RIGHT HOSE (RED AND WHITE)
8. PILOT LIFT RIGHT HOSE (YELLOW AND BLACK)
9. PILOT TILT RIGHT HOSE (ORANGE AND BLACK)
10. PILOT TILT LEFT HOSE (GREEN AND BLACK)
11. PILOT LIFT LEFT HOSE (RED AND BLACK)
12. PILOT 3 SPOOL LEFT HOSE (YELLOW AND WHITE)

3 SPOOL LINE REMOVAL AND INSTALLATION ILLUSTRATION

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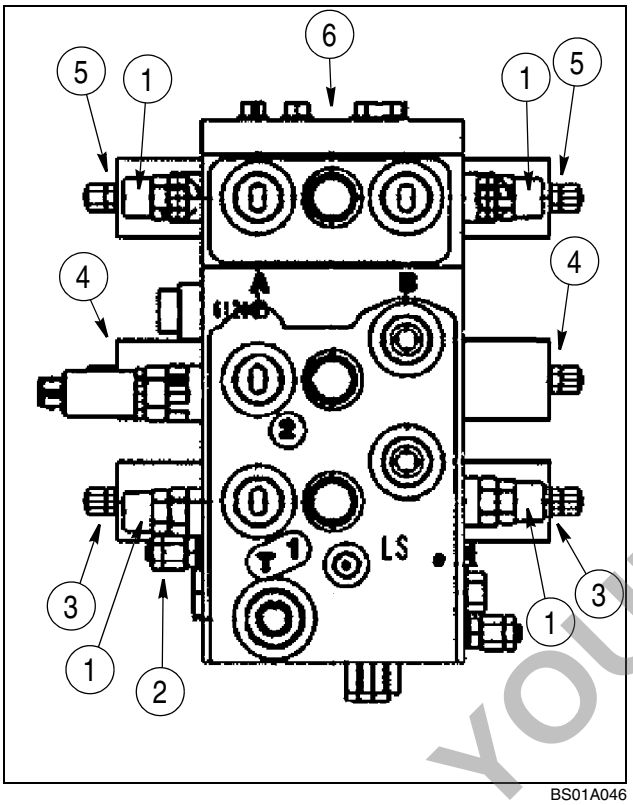
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TESTING AND ADJUSTING THE CIRCUIT RELIEF VALVES

Pressure Check

STEP 1

Circuit relief valves are located as shown below.



BS01A046

1. CIRCUIT RELIEF VALVE
2. MAIN RELIEF VALVE
3. BUCKET SPOOL
4. LIFT SPOOL
5. AUXILIARY SPOOL
6. LOADER CONTROL VALVE

Remove the cover at the front of the machine.

STEP 2

Lower the bucket to the floor. Shut off the engine. Find an easy place to disconnect the line for the circuit to be tested.

STEP 3

Connect the hand pump to the disconnected line that goes to the loader control valve.

STEP 4

Make sure that the hand pump is full of hydraulic oil and that the temperature of the oil is approximately 21°C (70°F).

STEP 5

Operate the handle of the hand pump and read the highest pressure. Repeat this step several times to be sure of the reading.

STEP 6

Compare the reading to the specifications on Page 3.

STEP 7

If the pressure is not correct, adjust the circuit relief valve.

Adjustment

STEP 1

Loosen the lock nut. Turn the adjustment screw clockwise to increase the pressure or counterclockwise to decrease the pressure.

STEP 2

Check the pressure again. Repeat the adjustment as necessary.

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Charging Accumulator With Nitrogen

IMPORTANT: *The four valves A, D, and E must be in the positions noted in the procedure before connecting the Nitrogen Accumulator Charging Kit to the machine or nitrogen, refer to illustration on page 5.*

1. Close the shutoff valve (D) by turning it all the way to the left (counterclockwise), refer to the illustration on page 5.
2. Close the gauge valve (E) by turning it all the way to the right (clockwise).
3. Connect the charging gauges to the nitrogen supply tank, open the supply tank valve.
4. Slowly turn valve (D) clockwise while watching the pressure gauge (B). Stop turning valve (D) when the needle on the gauge (B) reaches 10 bar (145 psi).

NOTE: *If the needle goes over the needed pressure, quickly open and close valve (E) and check the pressure again.*

The charging kit is now ready to be installed on the accumulator.

5. Remove the cap from the accumulator.
6. Loosen the sealing plug with an Allen wrench.

NOTE: *just loosen do not open to far so the gas leaks out*

7. Install adapter 380001168 (F).
8. Back off the needle valve (A) on the accumulator end of the charging hose by turning it counterclockwise to the maximum amount. This prevents nitrogen from escaping from the accumulator when the charging hose is attached to the accumulator gas charging valve.
9. Install the charging hose fitting onto the adapter.
10. Tighten the needle valve by turning it clockwise. Slowly open the gauge valve (E) and observe the reading on the gauge. This reading is the nitrogen pressure level inside the accumulator.
11. Fill the accumulator to pressure according to Temperature/Charge Pressure chart.

TEMPERATURE		CHARGE PRESSURE	
10° C	50° F	16.36 BAR	237 PSI
13° C	55° F	16.55 BAR	240 PSI
16° C	60° F	16.74 BAR	243 PSI
18° C	65° F	16.87 BAR	245 PSI
21° C	70° F	17.06 BAR	248 PSI
24° C	75° F	17.26 BAR	250 PSI
27° C	80° F	17.45 BAR	253 PSI
29° C	85° F	17.58 BAR	255 PSI
32° C	90° F	17.77 BAR	258 PSI
35° C	95° F	17.96 BAR	261 PSI
38° C	100° F	18.15 BAR	263 PSI

TEMPERATURE/CHARGE PRESSURE CHART

12. Close valve (E) by turning to the right (clockwise). After a few minutes open valve (E) and check the accumulator for leakage.
13. Back off the needle valve (A) on the accumulator end of the charging hose by turning it counterclockwise the maximum amount. This will prevent nitrogen from escaping from the accumulator as the hose is removed.
14. Close the valve on the nitrogen supply tank.
15. Adjust the regulator (D) to the minimum pressure setting by turning the knob counterclockwise.
16. Slowly remove the charging hose from the accumulator pressure valve.

NOTE: *A small amount of nitrogen will escape when disconnecting the hose.*

17. Snug the gas charging valve on the accumulator, remove the adapter from the accumulator.
18. Torque the gas charging valve to 20 to 25 Nm (14.8 to 18.4 pound feet)
19. Install the cap on the accumulator.
20. Remove the charging gauges from the nitrogen supply tank.

NOTE: *A small amount of nitrogen will escape when disconnecting the hose.*

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Removal

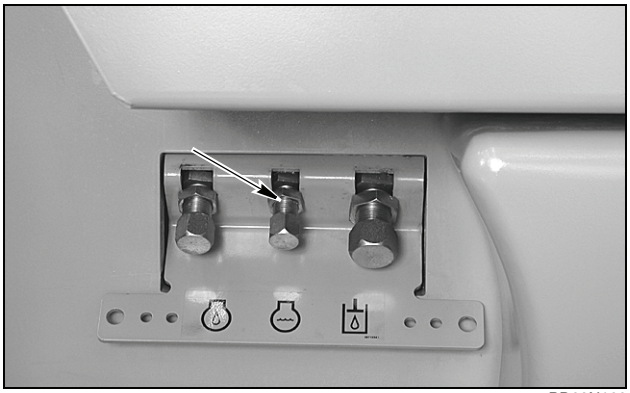
STEP 16

Park the machine on a level surface and lower the bucket to the floor.

STEP 17

If changing any air conditioning components, discharge the air conditioning system according to the instructions in Section 9003.

STEP 18



BD02N160

If changing the heater core, put a container capable of holding 22.7 liter (6 gallon) container below radiator drain. Remove radiator cap. Remove cap and drain coolant into container. Install cap after coolant has drained. Install radiator cap.

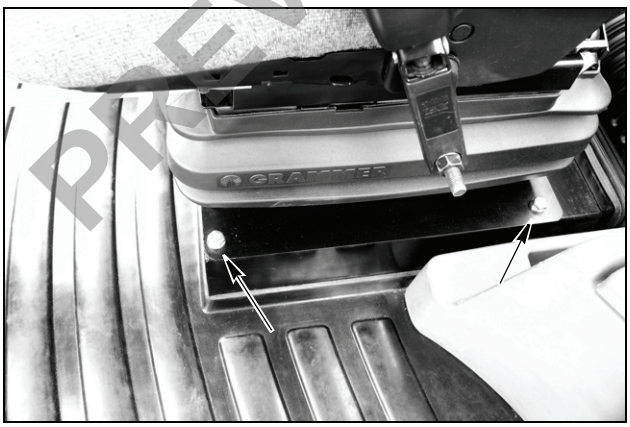
STEP 19

Place the master disconnect in the OFF position.

STEP 20

Disconnect the wiring harness from the operator's seat (if equipped with air seat option).

STEP 21



BD06G202

Remove the four bolts that fasten the operator's seat to the upper box, remove the seat from the machine.

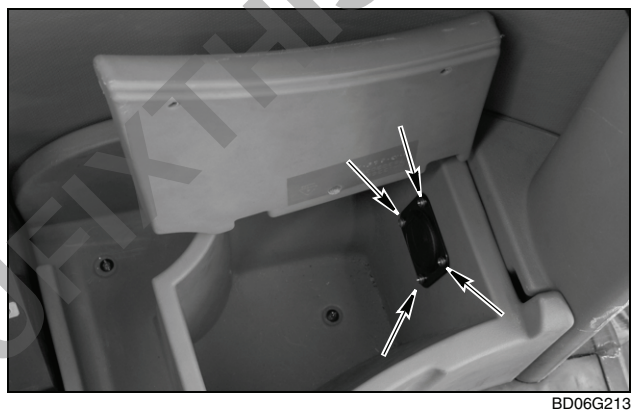
STEP 22



BD06G212

Open the cover on the cooler.

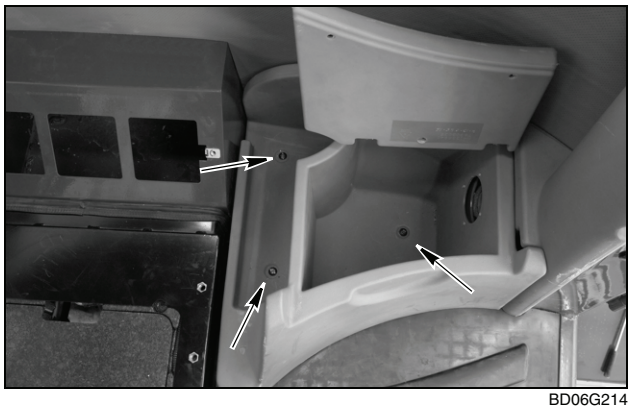
STEP 23



BD06G213

Remove the four screws securing the air vent, remove the vent cover.

STEP 24



BD06G214

Remove the three screws securing the cooler to the cab, remove the cooler.

STEP 25

Fold the rubber mat over to gain access to the upper box mounting bolts.

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