SERVICE MANUAL

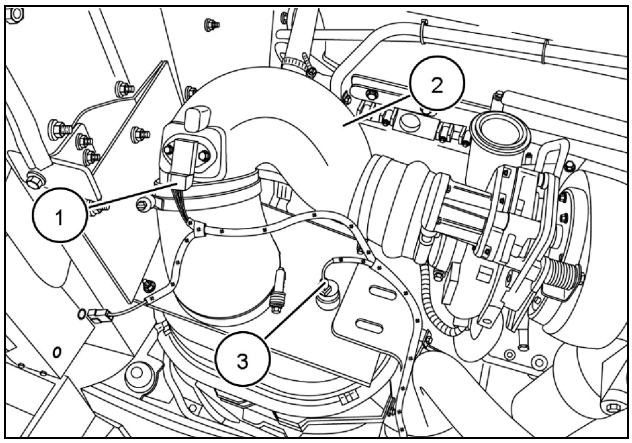
Wheel Loader
W270C
W300C

Print No. 84547255A

CONSTRUCTION

TABLE OF CONTENTS

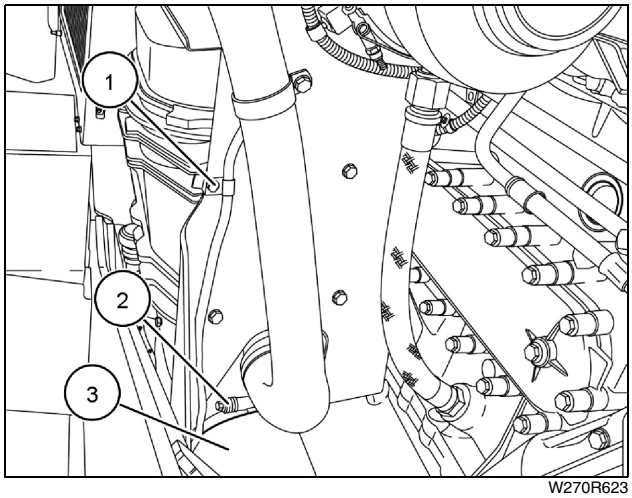
STEP 20



W270R622

Label and disconnect the humidity sensor electrical connector (1). Remove the turbo inlet tube (2).
Label and disconnect the air filter restriction sensor electrical connector (3).

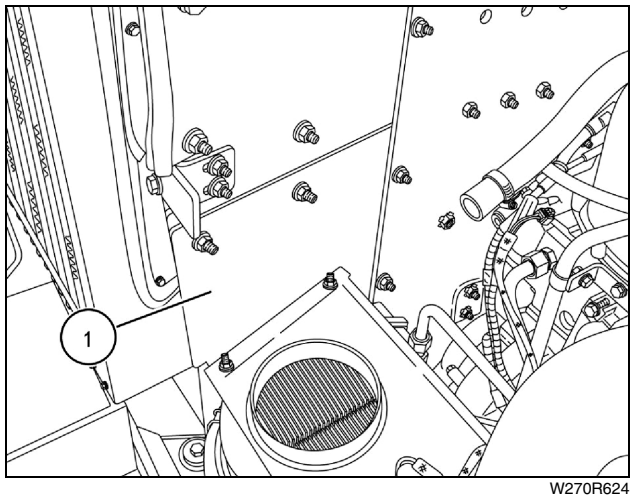
STEP 21



W270R623

Remove the wire harness P-clamp (1).
Loosen the hose clamp on the air box snorkel (2).
Disconnect the air box snorkel (3).

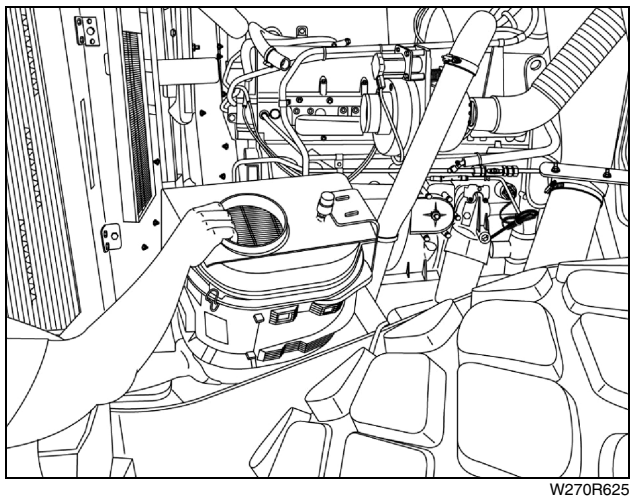
STEP 22



W270R624

Remove the lower, right panel (1) on the engine wall.

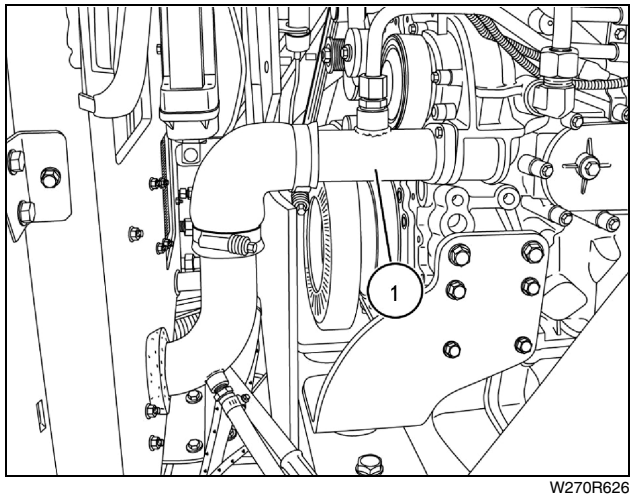
STEP 23



W270R625

Remove the air box assembly.

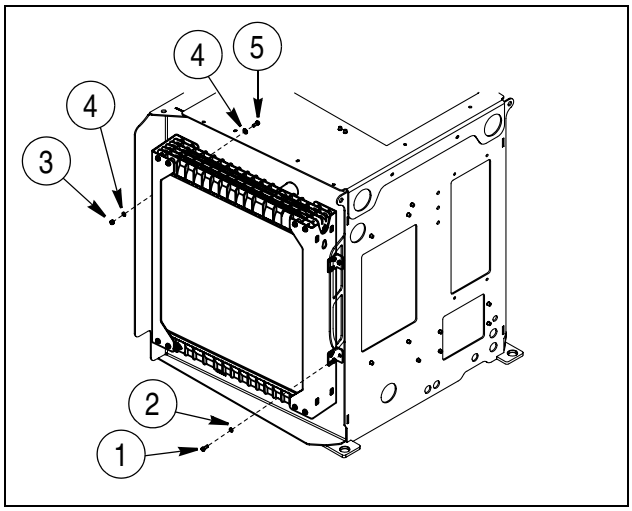
STEP 24



W270R626

Remove the lower radiator tube (1) .

STEP 7

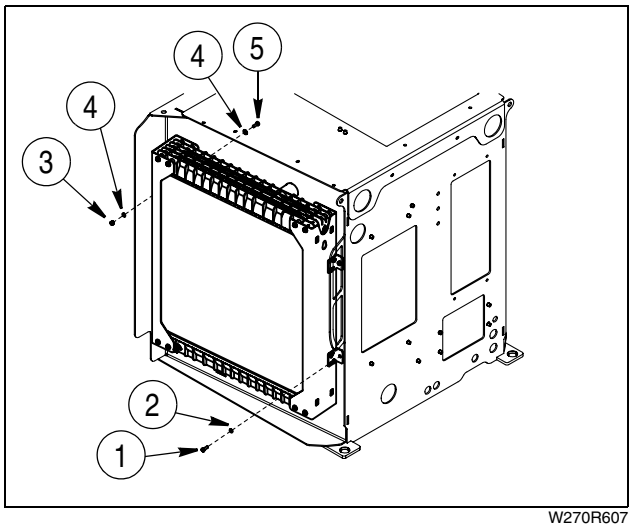


W270R607

Loosen and remove the bolt (1) and washer (2), the nut (3), washer (4) and bolt (5) that fasten the oil cooler to the cooling frame.
Remove radiator from machine.

Insallation

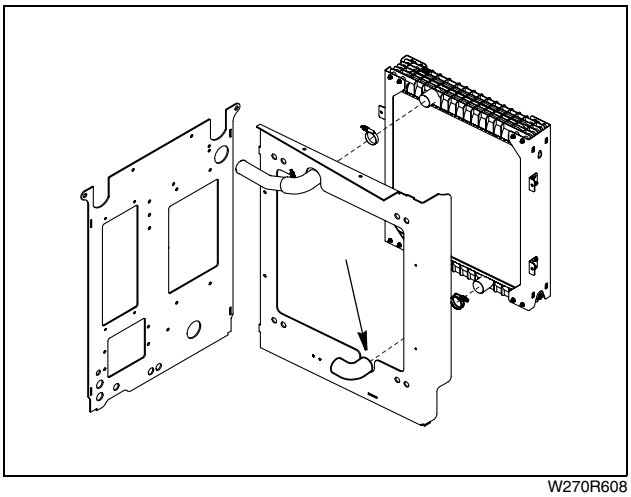
STEP 8



W270R607

Place the oil cooler in position in the cooling frame. Install and tighten the two mounting bolts (5), washer (4) and nuts (3), the washers (2) and bolts (1).

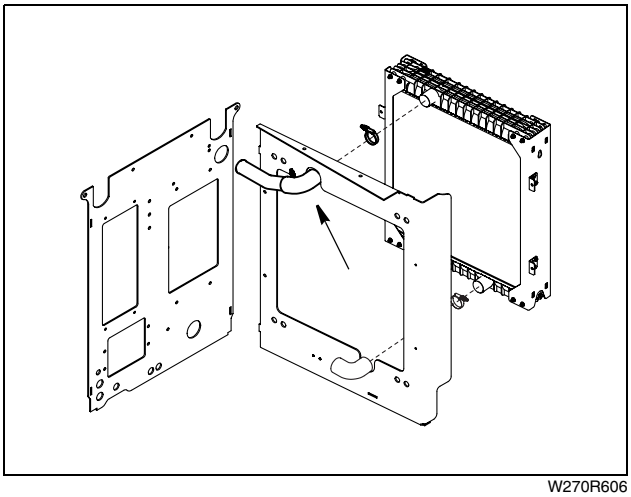
STEP 9



W270R608

Connect the lower hose to the oil cooler to cooling frame.

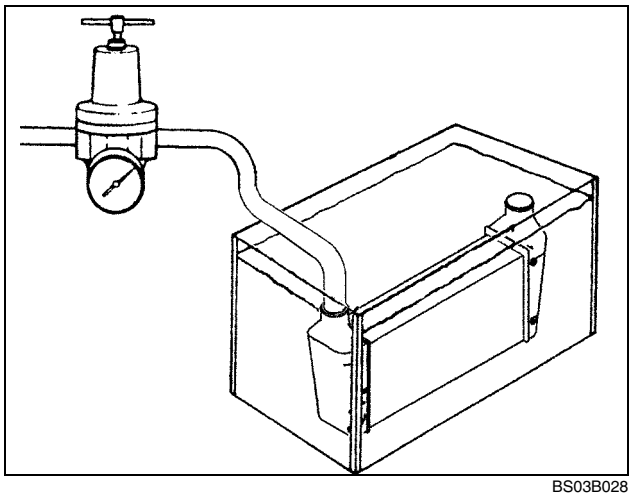
STEP 10



W270R606

Connect the hose to the top of the oil cooler.

Leak Test



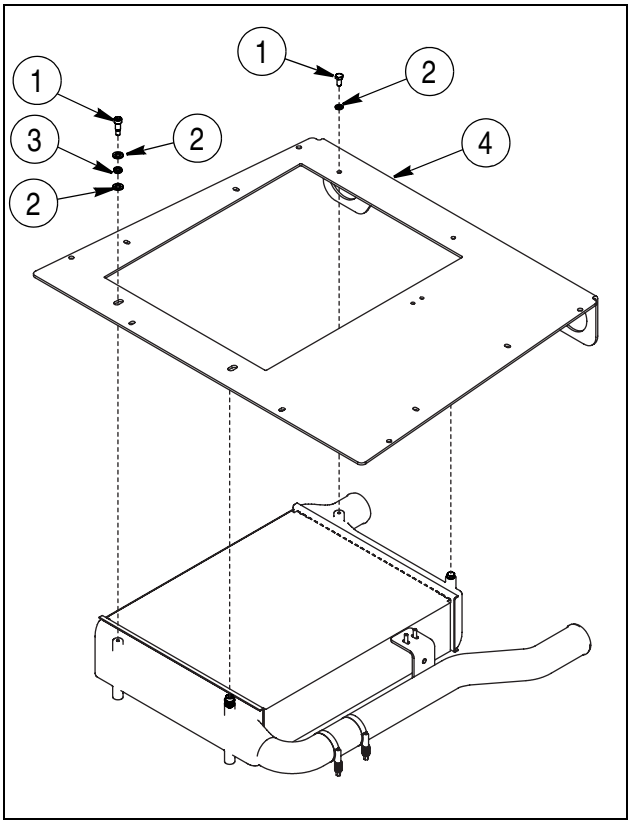
BS03B028

Check the core for leaks by closing off the outlet tube and attaching regulated air pressure 550kPa (80psi) to the inlet tube. Submerge the cooler in water and watch for air leakage.

NOTE: *If leakage is detected replace the after cooler.*

Installation

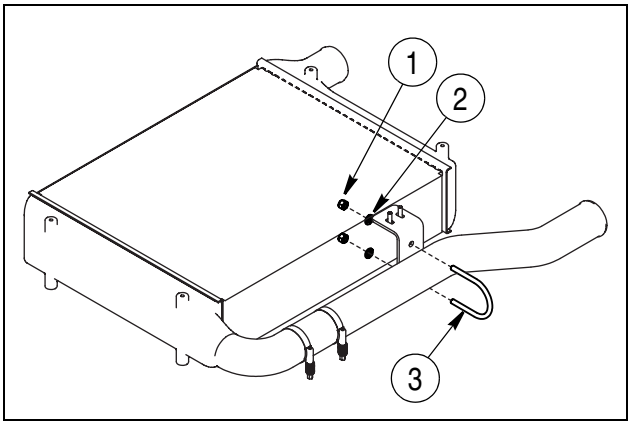
STEP 1



W270R605

Install after cooler in its frame (4). Install four mounting washers (2), springs (3) and bolts (1).

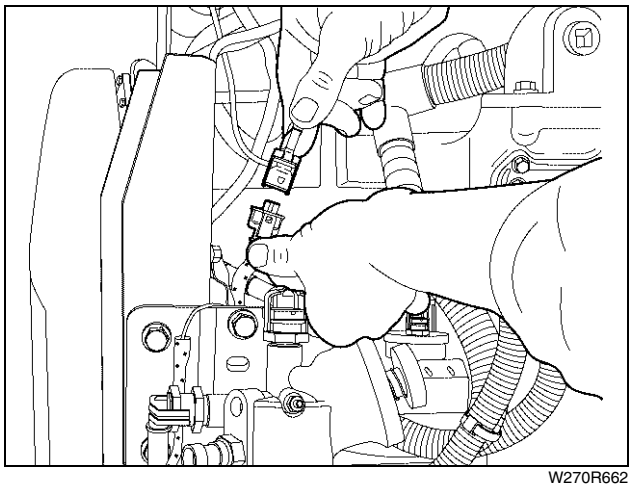
STEP 2



W270R604

Install U-bolt (3), washers (2) and nuts (1) of the plate of the after cooler mounting frame.

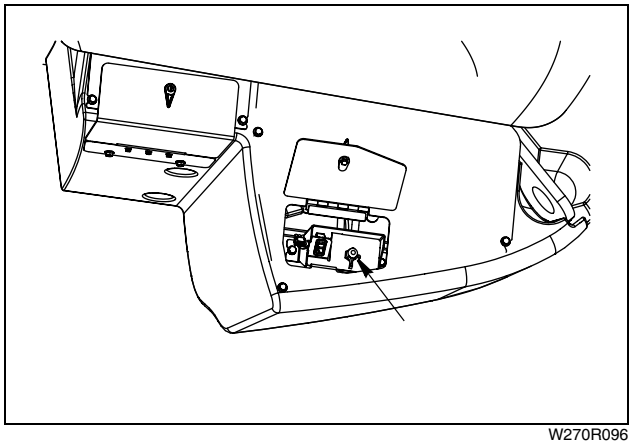
STEP 3



W270R662

Reconnect sensor to machine wiring harness.

STEP 4



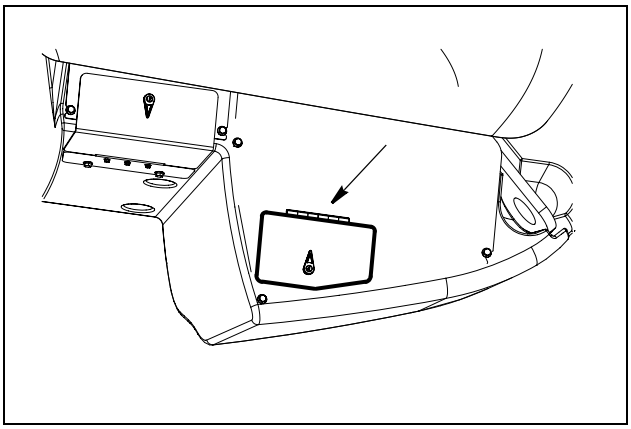
W270R096

Turn master electric switch to “on” position. Clear any fault code. Start engine and check to see if problem has been corrected.

NOx Sensor Removal

NOTE: *Emission sensor in the exhaust system and on the vehicle may be damaged by vibrations from use of impact wrenches or hammers during service work. Avoid using these tools servicing components close to the sensor. Remove the sensors with care if use of these tools cannot be avoided.*

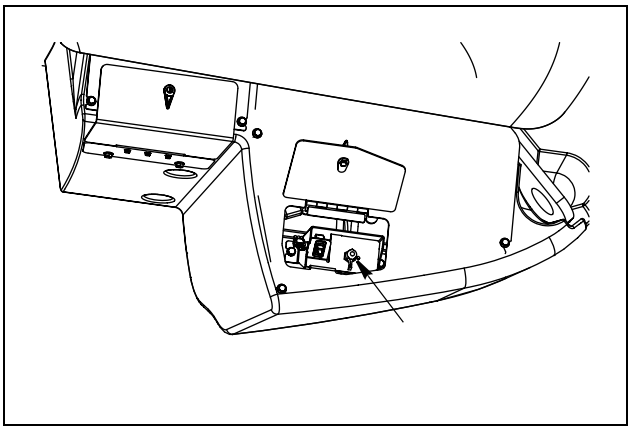
STEP 1



W270R095

Raise the hood using controls located behind the access cover.

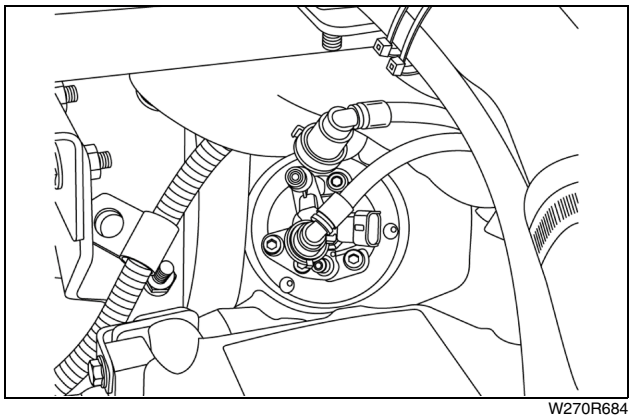
STEP 2



W270R096

Turn master electric switch to the “off” position.

STEP 3

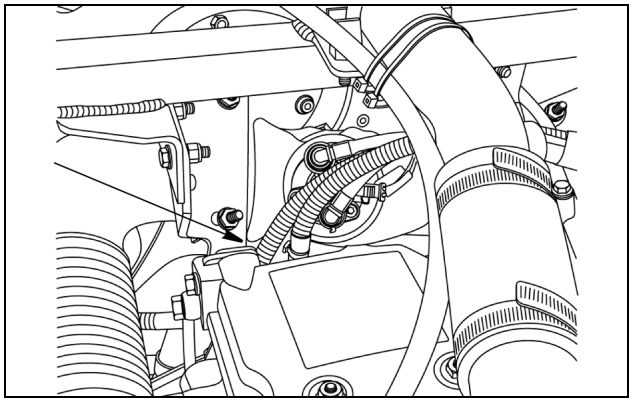


W270R684

Connect DEF/AdBlue supply and return lines and wiring harness to dosing injector.

NOTE: *Use marks made during disassembly to determine proper positioning.*

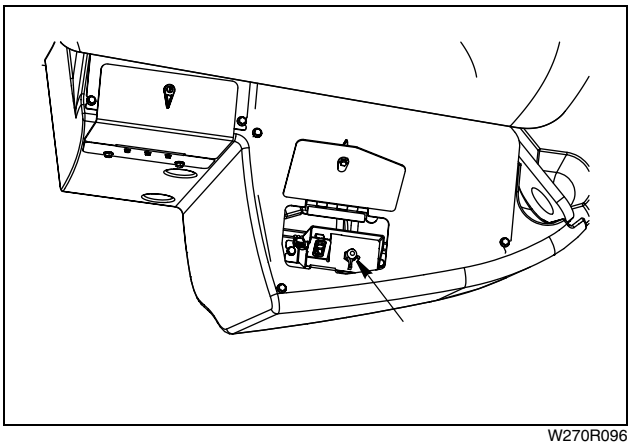
STEP 4



W270R685

Secure fuel pipe emissions.

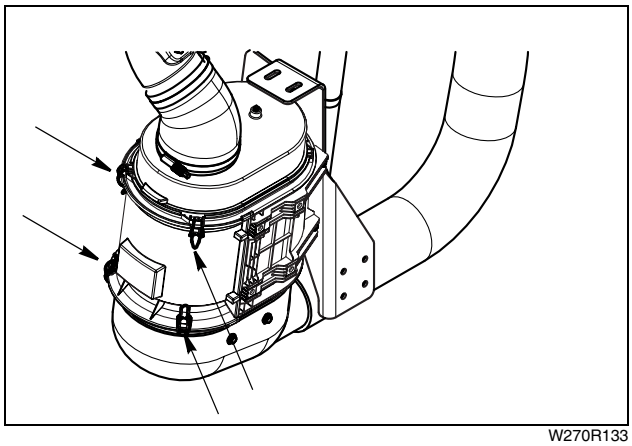
STEP 5



W270R096

Turn master electric switch to “on”. Clear any fault code. Start machine. Check for leaks at DEF/AdBlue, exhaust and intake system connections. Confirm problem has been corrected.

STEP 4

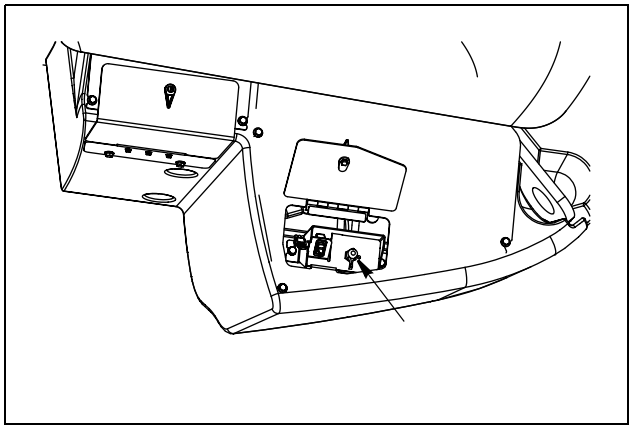


W270R133

Lock clips to secure filter housing cover.

NOTE: *If cover does not fit properly, recheck filter element installation. Cover will be difficult to install if filter elements are not properly installed.*

STEP 5



W270R096

Turn master electric power switch “on”. Clear any fault codes. Start machine and confirm problem has been corrected.

Wire Identification Codes

21C Bk - 1.0

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

Wire Color / Wire Name

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**
0 B12	Hood Down Relay Ground	Bk 1.0 GXL	SPL-HOOD-GRND, Hood Grnd 6 Pck	A	ECC, Elect Cntrc	C4
0 B13	Back Light Ground	Bk 1.0 GXL	SPL-BCK-LT-GD, Spl Bk Lght Grnd	A	SPL_WL1, ULTRASONIC	A
0 B14	Back Light Ground	Bk 0.8 GXL	SWL, Work Lights Switch	7	SPL-BCK-LT-GD, Spl Bk Lght Grnd	B
0 B15	Back Light Ground	Bk 0.8 GXL	SBE, Beacon Switch	7	SPL-BCK-LT-GD, Spl Bk Lght Grnd	C
0 B16	Hood Down Control Ground	Bk 1.0 GXL	SPL-HOOD-GRND, Hood Grnd 6 Pck	B	ECC, ELECT CNTR C	B4
0 B17	Back Light Ground	Bk 0.8 GXL	STA, Trans Auto Switch	7	SPL-BCK-LT-GD, Spl Bk Lght Grnd	E
0 B18	Back Light Ground	Bk 0.8 GXL	SDC, Declutch Switch	7	SPL-BCK-LT-GD, Spl Bk Lght Grnd	F
0 B19	Back Light Ground	Bk 0.8 GXL	SDR, Driving Lights Switch	7	SPL-BCK-LT-GD, Spl Bk Lght Grnd	G
0 B20	Back Light Ground	Bk 0.8 GXL	SRC, Ride Control Switch	7	SPL-BCK-LT-GD2, Spl Bk ghLt Grnd	J
0 B21	Back Light Ground	Bk 0.8 GXL	SBU, Backup Alarm Disc Sw	7	SPL-BCK-LT-GD, Spl Bk Lght Grnd	J
0 B22	Hood Up Relay Ground	Bk 1.0 GXL	SPL-HOOD-GRND, Hood Gnd 6 Pck	C	ECC, ELECT CNTR C	C2
0 B23	Back Light Ground	Bk 0.8 GXL	SRWP, Rear Wiper Switch	7	SPL-BCK-LT-GD, Spl Bk Lght Grnd	L
0 B24	Back Light Ground	Bk 0.8 GXL	SHZ, Hazard Switch	7	SPL-PED-BL-GD, Spl Bk Lght Grnd 6 Pck	C
0 B25	Hood Up Control Ground	Bk 1.0 GXL	SPL-HOOD-GRND, Hood Gnd 6 Pck	D	ECC, ELECT CNTR C	B2
0 B26	Buzzer/Switch Pad Ground	Bk 0.8 GXL	SPL-BUZ, Ultrasonic	A	GND_CAB2, Ground_A	1
0 B27	Buzzer Ground	Bk 0.8 GXL	SPL-BUZ, Ultrasonic	A	BUZ, AIC Buzzer	2
0 B28	Switch Pad Ground	Bk 0.8 TXL	SW-PD, Switch Pad	10	SPL-BUZ, Ultrasonic	A
0 B29	RTT/Float Ground	Bk 0.8 GXL	SPB, Parking Brake Switch	7	SPL-PED-BL-GD, Spl Bk Lgt Grnd 6 Pck	E
0_B31	SDA GND	BK 0.8 GXL	SPL_BCK_LT_GD2, SPL_Back LGT GRND	A	SDA, Diff lock switch	7
0_B32	Back light GND	BK 0.8 GXL	SRP, Work lights SW	7	SPL_BCK_LT_GD, SPL Back lght GD	M
0 BA	Pedestal Gnd Strap	Bk 5.0 SXL.	GND-PDST, Ground A	1	GND-PDST2, Ground A	1
0 BAC	EDC7 Ground	Bk 2.0 SXL	SPL-EDC1, Ultrasonic	A	GND-ENG2 Dedicated, WIF, EDC	1
0 BAE	EDC7 Sender Ground	Bk 1.0 GXL	RECT, Engine Coolant Temp	B	GND-ENG7Grnd Trans. Clnt	1
0 BAG	Hood Grounds (EURO)	Bk 1.0 SXL	GND-ENG4, Rear Lighting	1	E-HD, Trans Hood	C

Wire Identification Codes

21C Bk - 1.0

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 Name

Wire Identification			From Connector		To Connector	
Wire	**Circuit**	**Color, Size, and Material**	**Connector**	**Cavity**	**Connector**	**Cavity**
21G A	EDC7 Crank Control relay	W 0.8 TXL	ENG, Engine Cab 1	3	EDC7, Engine Controller	37
21H	Crank control relay LSD	W 0.8 GXL	CAB-E, Cab Engine	4	ECD, Elect Center D	A5
21H A	Crank control relay LSD	W 0.8 TXL	ENG, Engine Cab 1	4	EDC7, Engine Controller	17
21J	Restart Prevent	W 0.8 GXL	ECC, Elect Cntr C	D9	TEL, Telematics	S
21K	Ign Sw Start Signal	W 0.8 GXL	S-KEY, Ignition Switch	2	SPL-CRK, Ultrasonic	A
21K A	Ign Sw Start Signal	W 0.8 TXL	SPL-CRK, Ultrasonic	A	AIC-2, Adv Instrument Cluster 2	17
21K B	Ign Sw Start Signal	W 0.8 GXL	SPL-CRK, Ultrasonic	A	ECB, Elect Center B	B3
22A	Declutch SW	DU 0.8 TXL	SDC, Declutch Switch	3	TECM, Trans	21
22B	Pedal Sensor +5V	K 0.8 TXL	Cab_B, Cab BTM BULKHEAD	B	TECM, Trans	37
22C	Pedal Pos Signal	Y 0.8 TXL	TECM, Trans	38	Cab B, Cab BTM BULKHEAD	C
22D	Pedal Sensor Grnd	LU 0.8 TXL	Cab_B, Cab BTM BULKHEAD	A	TECM, Trans	24
22E	Pedal Sensor +5V	K 0.8 TXL	BTM_C, Cab Bottom BULKHD	B	BPP, Pedal Position	2
22F	Pedal Pos Signal	Y 0.8 GXL	BTM_C, Cab Bottom BULKHD	C	BPP, Pedal Position	3
22G	Pedal Sensor Grnd	LU 0.8 GXL	BTM_C, Cab Bottom BULKHD	A	BPP, Pedal Position	1
23A A	DNOX2 Module B+	N 0.8 TXL	NOXS, NOX Sensor	1	ENG2, ENG BULKHD 2	C
23B A	NOX Sensor B+	OR 0.8 GXL	CabE2, Cab to ENG2 BULKHD	F	ECD, Elec Cntr D	A8
23B B	NOX Sensor B+	N 0.8 GXL	CabE2, Cab to ENG2 BULKHD	C	ECD, Elec Cntr D	AA7
23B C	NOX Relay Gnd	BK 0.8 GXL	ECD, Elec Cntr D	A7	GND Cab_SPL, Cab Grnd Splice	E
23B D	NOX Relay, B+	OR 0.8 GXL	CabE2, Cab to ENG2 BULKHD	A	ECD, Elec cntr D	AA8
23B E	NOX Sensor B+	OR 1.0 GXL	SPL EDC2, Ultrasonic	A	ENG2, ENG BULKHD 2	F
23B F	NOX Relay B+	OR 1.0 SXL	SPL EDC4, Ultrasonic	A	ENG2, ENG BULKHD 2	A
23D D	NOX Sensor Gnd	BK 0.8 TXL	NOXS, NOX Sensor	2	GND ENG2 Dedicated, WIF, EDC	1
23J B	DNOX2 K-Line	W 0.8 GXL	Cab E, Cab-Engine	18	DIA 2, Diagnostic	E
23K A	Temp/Humd B+	K 0.8 TXL	HTS, HMDTY And AMB Temp	1	EDC7, Engine Controller	68
23K B	Temp/Humd Temp	Y 0.8 GXL	HTS, HMDTY And AMB Temp	2	EDC7, Engine Controller	26
23K C	Temp/Humd Humd	Y 0.8 GXL	HTS, HMDTY And AMB Temp	4	EDC7, Engine Controller	27
23K E	Temp/Humd Gnd	LU 0.8 GXL	EDC7, Engine Controller	28	HTS, HMDTY And Amb Temp	3
24B	Throttle Signal	W 0.8 TXL	ENG B, Cab Bottom	3	EDC7, Engine Controller	79
24B A	Throttle Signal	W 0.8 TXL	RTHP, Throttle Pedal	3	BTM E, Cab Bottom	3

Wire Identification Codes

21C Bk - 1.0

Wire Size (mm^2)

0.8 mm	1.0 mm	2.0 mm	5.0 mm

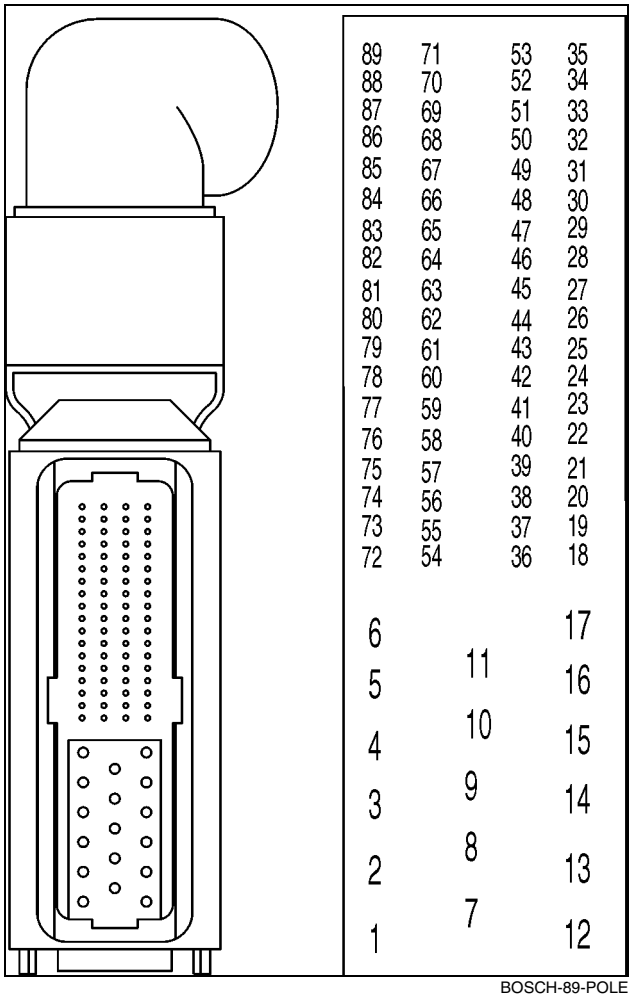
Wire Color

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 Name

Wire Identification			From Connector		To Connector	
Wire	**Circuit**	**Color, Size, and Material**	**Connector**	**Cavity**	**Connector**	**Cavity**
65R	Right Speaker	Or 0.8 GXL	RSPK, Right Speaker	A	SPK, Speaker	1
66A	RR Camera Pwr	OR 0.8 GXL	Mon, Camera/MOnitor	1	ECA, Elect Cntr A	C9
67A	Park Brake Signl	OR 0.8 GXL	TEL, Telematics	E	SPL PTM, Ultrasonic	A
67B	Start Lockout	OR 0.8 GXL	ECC, Elect Cntr C	87	SRP, Work Lights SW	8
68C	Rear Wiper Park Control	Or 1.0 GXL	CAB-RF, Cab to Roof Conn.	K	SRWP, Rear Wiper Switch	1
68C A	Rear Wiper Park Control	Or 1.0 GXL	ROOF, Roof to Cab Conn.	K	RWM, Rear Wiper Motor	D
68L	Rear Wiper Switch Power	Or 1.0 GXL	SRWP, Rear Wiper Switch	2	SPL-3, Ultrasonic	A
68L A	Rear Wiper Switch Power	Or 1.0 GXL	ROOF, Roof to Cab Conn.	L	RWM, Rear Wiper Motor	B
68L B	Rear Wiper Switch Power	Or 1.0 GXL	CAB-RF, Cab to Roof Conn.	L	SPL-3, Ultrasonic	A
68L C	Rear Wiper Switch Power	Or 1.0 GXL	140M, Diode Module	F	SPL-3, Ultrasonic	A
68W	Rear Washer Pump	W 0.8 GXL	CAB-E, Cab Engine	24	SRWP, Rear Wiper Switch	6
68W A	Rear Washer Pump	W 1.0 SXL	ENG, Engine Cab 1	24	RWW, Rear Washer	1
69F	Heated Mirror Signal	W 1.0 GXL	TRLY, Timer Relay	87	MHS, Trans Enable SW	3
69A	Heated Mirror Signal	W 1.0 GXL	SPL3, Ultrasonic	A	TRLY, Timer Relay	86
69B	Heated Mirror Signal	W 1.0 GXL	SPL3, Ultrasonic	A	MHS, Trans Enable SW	10
69D	Heated Mirror Signal	W 1.0 GXL	SPL3, Ultrasonic	A	MH-R, Mirror HTR	1
69E	Heated Mirror Signal	W 1.0 GXL	SPL3, Ultrasonic	A	MH-R, Mirror HTR	1
CAN1 H	CAN HI	Y 0.8 TXL TWIST	EDC7, Engine Controller	35	ENG, Engine-Cab1	14
CAN1 L	CAN LO	G 0.8 TXL TWIST	EDC7, Engine Controller	34	ENG, Engine-Cab1	13
CANS HA	CAN HI, CAN MOD2	Y 0.8 TXL TWIST	JSS Arm, JSS Armrest to Cab	1	CAN MOD 2, JSS CAN MOD	7
CANS HB	CAN HI, CAN MOD2	Y 0.8 TXL TWIST	Cab Arm FRM, Cab to Arm to FRM	12	Cab Arm, Cab to Armrest	1
CANS HD	CAN HI, CAN MOD3	Y 0.8 TXL TWIST	Cab Arm FRM, Cab to Arm to FRM	7	JSS CNT, JSS Controller	1
CANS LA	CAN LO, CAN MOD2	G 0.8 TXL TWIST	JSS Arm, JSS Armrest to Cab	12	CAN MOD 2, JSS CAN MOD	8
CANS LB	CAN LO, CAN MOD2	G 0.8 TXL TWIST	Cab Arm, Cab to Armrest	12	Cab Arm FRM, Cab to Arm to FRM	1
CANS LD	CAN HI, CAN MOD3	G 0.8 TXL TWIST	Cab Arm FRM, Cab to Arm to FRM	6	JSS CNT, JSS Controller	2

EDC7, ENGINE CONTROLLER



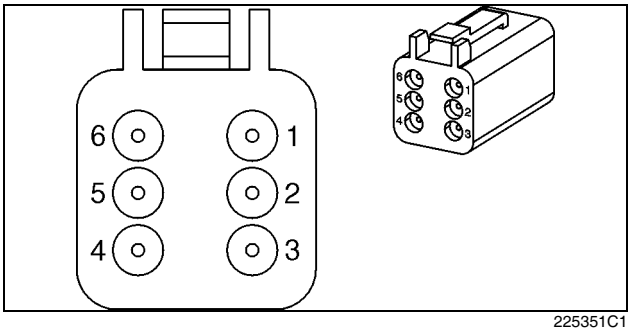
BOSCH-89-POLE

CAV	WIRE IDENT	CIRCUIT
2	18J-C	EDC7 FSD PWR
3	18J-B	EDC7 FSD PWR
5	0-BE	EDC7 GND
6	0-BF	EDC7 GND
8	18J-D	EDC7 FSD PWR
9	18J-E	EDC7 FSD PWR
10	0-BD	EDC7 GND
11	0-BC	EDC7 GND
12	28G	GRID HTR SOURCE DR
13	31	EDC RELAY CNTL
17	21H-A	CRANK CTRL RLY LSD
26	23K-B	TEMP/HUMD TEMP
27	23K-C	TEMP/HUMD HUMD
28	23K-E	TEMP/HUMD GND
29	21F-B	EDC7 DIGITAL GND
32	21E-A	KEY SWITCH CRANK
34	CAN-LJ	CAN LO, EDC
34	CAN1-L	CAN LO
35	CAN1-H	CAN HI
35	CAN-HK	CAN HI, EDC
36	28F	FUEL FLTR HTR RLY CTRL
37	21G-A	EDC7 CRANK CTRL RLY
40	13M-A	FUEL SHUTOFF FUSED PWR
42	35W	WIF INDICATOR
48	24L	LOW IDLE SWITCH
51	13A	EVGT RELAY
52	CAN-LS	CAN LO, NOX
52	CAN-L3	CAN2 LO, NOX
53	CAN-HS	CAN2 HI, NOX
53	CAN-H3	CAN2 HI, NOX
68	23K-A	TEMP/HUMD B+
75	0-BV	GRID HEATER CTRL GND
77	24S	THROT SUPPLY
78	24R	THROT GND
79	24B	THROT SIGNAL
89	20G-A	EDC7 ISO-K INTERFACE

ECA L1, B+ POWER

CAV	WIRE IDENT	CIRCUIT
cs01	J1	TRANS ECM PWR

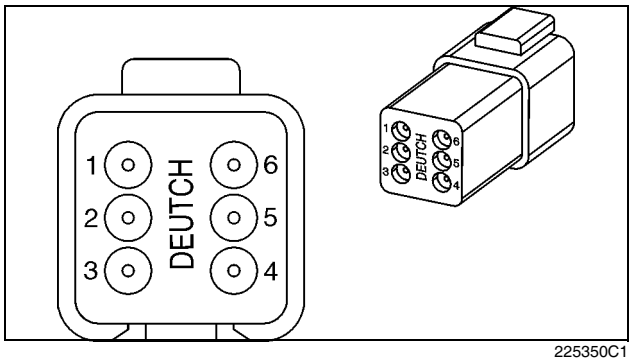
CONNECTOR EM - HEIGHT CONTROL RTD - RTT



225351C1

CAV	WIRE IDENT	CIRCUIT
1	55A-A	RTT/FLOAT SWITCHED POW.
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

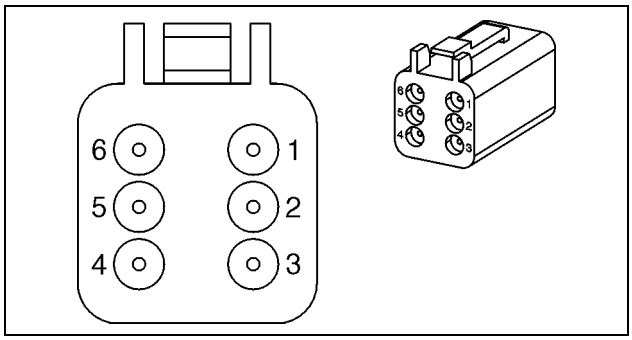
JSS 197F, MAIN CAB FNR



225350C1

CAV	WIRE IDENT	CIRCUIT
1	0-SS	GRND, JOYSTICK
2	26F-D	FNR FORWARD SIGNAL
3	26N-D	FNR NEUT SIGNAL
4	26R-D	FNR REVERSE SIGNAL
5	32J-G	TRANS ENABLE INDICTION
6	25Y-F	TRANS KICK DOWN SIGNAL

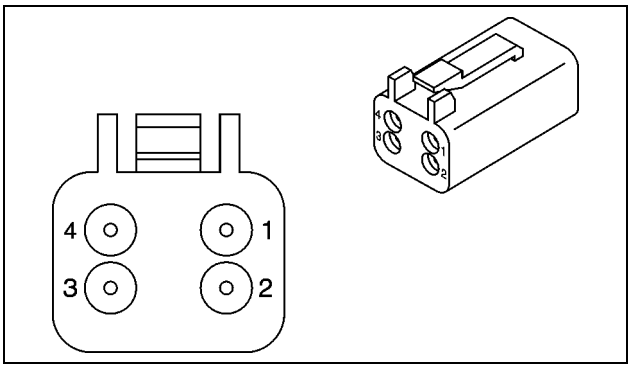
JSS 197M, FNR-MAIN CAB



225351C1

CAV	WIRE IDENT	CIRCUIT
1	19B-A	FNR SW FUSED PWR
2	26F-C	FNR FORWARD SIGNAL
3	26N-C	FNR NEUT SIGNAL
4	16R-C	FNR REVERSE SIGNAL
5	32J-F	TRANS ENABLE INDICTION
6	25Y-D	TRANS KICK DOWN SIGNAL

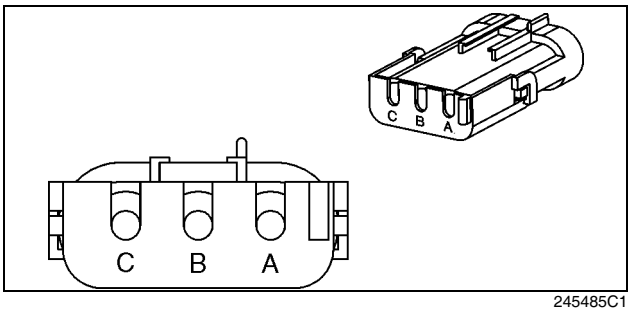
JSS VALVE, JSS HYD VALVE



239451A1

CAV	WIRE IDENT	CIRCUIT
1	51L	JOYSTICK SIGNAL
2	51J-C	JSS ALARM
3	0-AT	GRND, JSS VLV
4	51S-J	JSS OKAY PWR

KD DIODE, DIODE ASSY



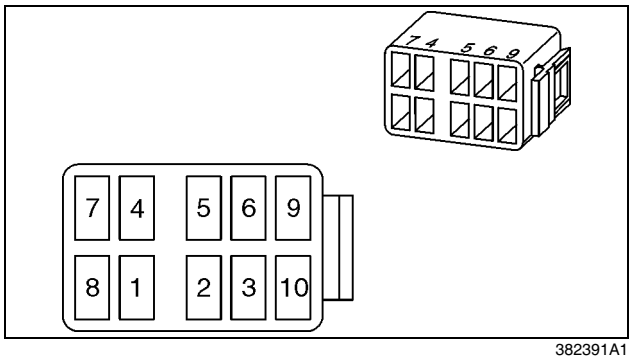
245485C1

CAV	WIRE IDENT	CIRCUIT
A	25Y-F	TRANS KICK DOWN SIGNAL
B	25Y-E	TRANS KICK DOWN SIGNAL
C	25Y-D	TRANS KICK DOWN SIGNAL

KWCO, WIPER CUT OUT

CAV	WIRE IDENT	CIRCUIT
30	63L-B	FNT WPR LS RLY OUT
85	63HC-A	WPR CUT OUT RLY CTRL
86	19J-G	WPR CUT OUT RLY FSD PWR
87A	63C3	FNT WPR PARK CTRL

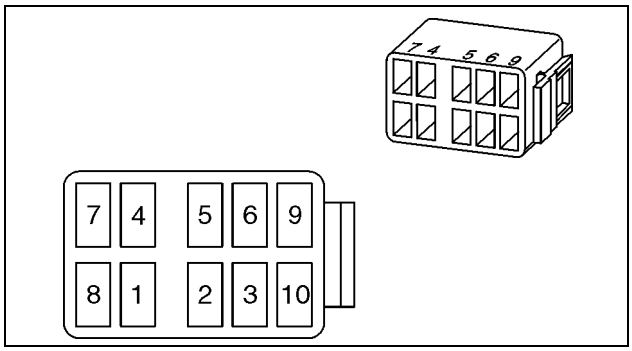
CONNECTOR SPC - PILOT CONTROL SWITCH



382391A1

CAV	WIRE IDENT	CIRCUIT
1		NOT USED
2	19C-F	PILOT CONTROL SW FUSED PWR
3	31L	PILOT CONTROL SW HIGH
4		NOT USED
5		NOT USED
6		NOT USED
7	0-B1	BACK LIGHT GROUND
8	49-N	BACK LIGHT POWER
9		NOT USED
10		NOT USED

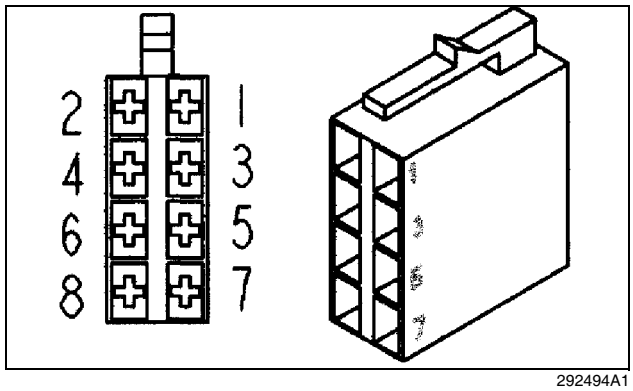
CONNECTOR SPE - PIN ENGAGE SWITCH



382391A1

CAV	WIRE IDENT	CIRCUIT
1	57-B	PIN ENGAGE SOL PWR
2	19P-A	PIN ENGAGE SW FUS PWR
3		NOT USED
4		NOT USED
5		NOT USED
6		NOT USED
7		NOT USED
8		NOT USED
9	0-B5	BACK LIGHT GROUND
10	49-F	BACK LIGHT POWER

CONNECTOR SPK - SPEAKER



292494A1

CAV	WIRE IDENT	CIRCUIT
1	65R	RIGHT SPEAKER
2	0-PB	RIGHT SPEAKER GROUND
3		NOT USED
4		NOT USED
5		NOT USED
6		NOT USED
7	65L	LEFT SPEAKER
8	0-PA	LEFT SPEAKER GROUND

SPL ACP, ULTRASONIC

CAV	WIRE IDENT	CIRCUIT
A	61A-C	AC SWITCH INPUT
A	61A-D	AC SWITCH INPUT
A	61A	AC PRESS SW INPUT

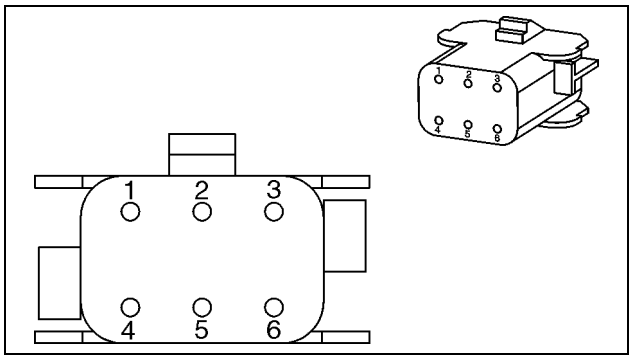
SPL ACS, ULTRASONIC

CAV	WIRE IDENT	CIRCUIT
A	61R-C	AC SWITCH OUTPUT
A	61R-D	AC SWITCH OUTPUT
A	61R	AC RELAY CONTROL

SPL AJ, ULTRASONIC

CAV	WIRE IDENT	CIRCUIT
A	19B-C	FNR SW FUSED PWR
A	19B-D	FNR SW FUSED PWR
A	19B-E	FNR SW FUSED PWR
A	19B-F	FNR SW FUSED PWR

CONNECTOR 108F - DIAGNOSTIC CONNECTOR



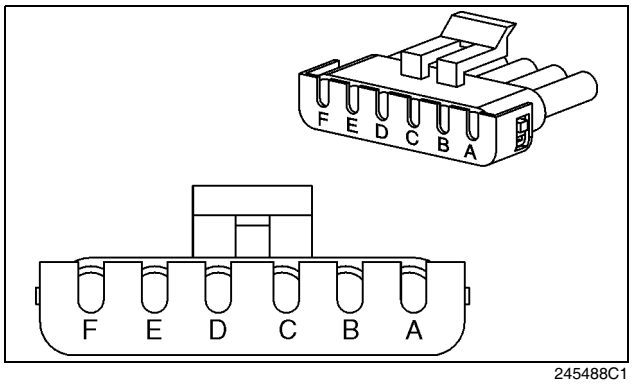
291663A1

CAV	WIRE IDENT	CIRCUIT
1	19A-W	DIAGN CONN. FUSED PWR
2	37D-A	DIAGNOSTIC SIGNAL
3	0-DAV	DIAGNOSTIC TECM GROUND
4	37E	DIAGNOSTIC SIGNAL SWITCHED
5		NOT USED
6		NOT USED

115, GRID HTR PWR

CAV	WIRE IDENT	CIRCUIT
1	1-BE	GRID HTR PWR

CONNECTOR 140M - DIODE MODULE



245488C1

CAV	WIRE IDENT	CIRCUIT
A	63H-C	FRONT WIPER HIGH RYL OUT
B	63L-C	FRONT WIPER LOW RYL OUT
C	0-EE	DIODE SUPPRESSION GNDS
D	58-D	RIDE CONTROL SOLENOID PWR
E		NOT USED
F	68L-C	REAR WIPER SWITCH PWR

193, STARTER RELAY

CAV	WIRE IDENT	CIRCUIT
1	1-BB	STRTR SOL PWR

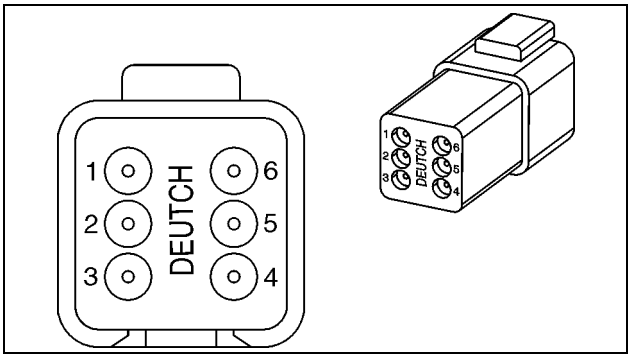
194, STARTER SIGNAL

CAV	WIRE IDENT	CIRCUIT
1	1-BB	STRTR SOL PWR

195, STARTER RELAY POWER

CAV	WIRE IDENT	CIRCUIT
1	1-Z	STRTR RLY BAT PWR

CONNECTOR 197F - MAIN CAB FNR



225350C1

CAV	WIRE IDENT	CIRCUIT
1	19A-C	FNR SWITCH FUSED POWER
2	26F-B	FNR FORWARD SIGNAL
3	26N-B	FNR NEUTRAL SIGNAL
4	26R-B	FNR REVERSE SIGNAL
5	32J-E	TRANS ENABLE INDIC LAMP
6	25Y-B	TRANS KICK DOWN SIGNAL

TABLE OF CONTENTS

(3) Us the UP or DOWN arrows and scroll to "SPECIAL", then press "ENTER".

(4) Highlight "RESET ERRORS" the press "ENTER" twice.

(5) Turn the ignition switch OFF and wait for 20 seconds.

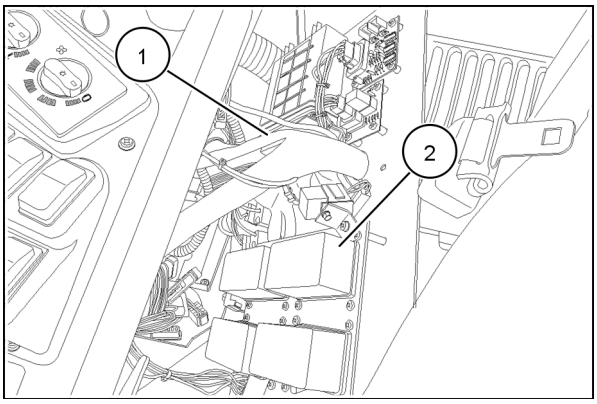
(6) The next time the machine is started the memory field will be empty.

(1) Measure the resistance across pin A and B on the Torque Converter Output Temperature Sender. The resistance should be approximately **3520 Ω** at **20 °C** (**68.0 °F**).

A. The resistance is not within the specifications. Temporarily replace sending unit and retest. Return to Step **1** to confirm elimination of fault.

B. The resistance is within the proper specifications. Go to Step **4**.

4. Check circuit 36R

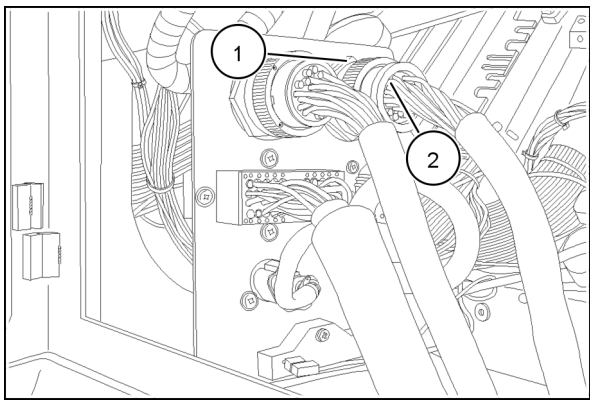


BD07E017 2

(1)	Connector TECM
(2)	Fuse and relay panels

(1) Check from pin 2 on Connector TCOT to pin 46 on Connector TECM.

(2) If circuit is open, check from pin 2 Connector TCOT to pin 12 Connector TRANS.



BD07E021-01 3

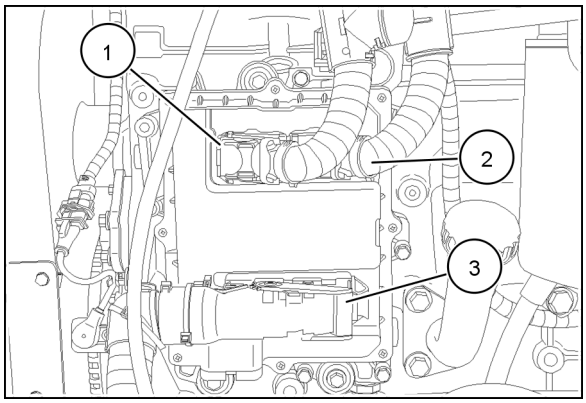
(1)	Connector CAB-T
(2)	Connector TRANS

(3) Check from pin 12 Connector CAB-T to pin 46 Connector TECM.

A. NOT OK – Determine the break between connector TCOT and TECM and repair. Return to Step **1** to confirm elimination of fault.

B. OK - Go to Step **5**.

5. Measure the resistance of the signal wire to chassis ground.



BD07D130-01 2

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

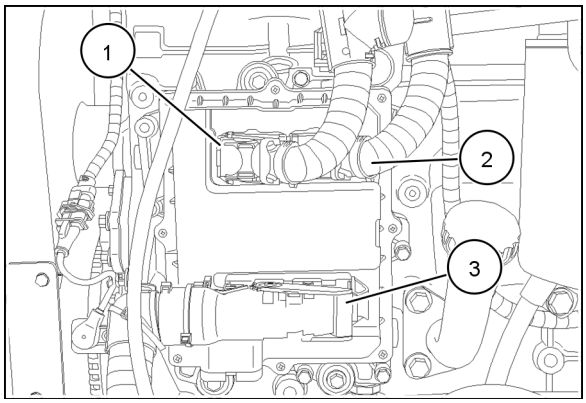
(1) If no voltage is present, disconnect connector C from engine controller.

(2) Check from 3 engine oil temp/pressure sending unit connector to pin 32 of connector C.

A. NOT OK – Determine the break between connectors and repair. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **4**.

4. Check input power.



BD07D130-01 3

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

(1) Turn ignition OFF. Disconnect Connector EDC7 from engine controller. Turn the ignition ON.

(2) Check pins 2, 3, 8, and 9 of Connector EDC7 to ground, a reading of **24 V** should be obtained.

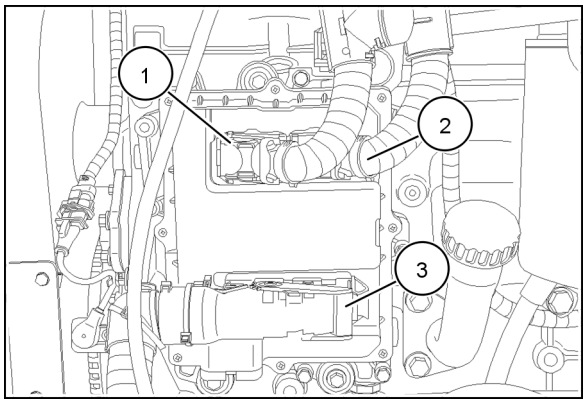
A. NOT OK – Check fuse PRM D-F2. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **5**.

5. Replace engine control module.

(1) Remove and replace control module.

A. Return to step **1** to confirm elimination of fault. If fault is recorded again, contact Technical Services Group for assistance.



BD07D130-01 2

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

(1) Disconnect connector C from engine controller and engine crankshaft speed sensor.

(2) Check from pin 1 engine crankshaft speed sensor to pin 19 of connector C.

(3) Check from pin 2 engine crankshaft speed sensor connector to pin 23 of connector C.

A. NOT OK – Determine the break between connectors and repair. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **4**.

4. Replace the engine control module.

(1) Remove and replace control module.

A. Return to Step **1** to confirm elimination of fault. If fault is recorded again contact Technical Services Group for assistance.

19019-Catalyst Temperature Sensor Circuit High - Before Catalyst

Context:
This is the first temperature sensor used upstream of the selective catalytic reduction (SCR) muffler to monitor muffler operating efficiency. This error will occur when the signal voltage is higher than **2.2 V** for more than **0.7 s**.

Cause:
There is an open circuit in the upstream temperature sensor circuit.

Possible failure modes:

1. Faulty sensor.
2. Faulty electrical wiring or connection.
3. Faulty denox module.

Solution:

1. Verify this error is still present, and in an active state.

   A. If the error is still present and active, continue with step **2**.

   B. If the error is no longer present or inactive, return unit to field operation..

2. Make sure the machine is fully cooled down to ambient temperature. Disconnect the wiring harness from the upstream temperature sensor at connector UTS. Measure the resistance on the sensor from pin 1 to pin 2. There should be approximately **175 - 250 Ω**.

   A. If the resistance is within **175 - 250 Ω**, continue with step **3**.

   B. If the resistance is infinite or **0.0 Ω** the sensor has failed. Replace the sensor.

3. Test the wiring harness end of the upstream temp sensor connector UTS to the denox module.

   Check the resistance between connector UTS pin 1 and pin 2. Expected reading is approximately **1000 - 1600 Ω**.

   A. If wiring harness test is good, contact ASIST for further information.

   B. If the resistance reading out of range, continue with step **4**.

4. Test the wiring harness end of the upstream temp sensor for good ground.

   Check the resistance between connector UTS pin 2 and ground. Expected reading is less than **1.0 Ω**.

   A. If wiring harness test is good, contact ASIST for further information.

   B. If the resistance is infinite, locate bad ground connection and repair..

Wiring harness - Electrical schematic frame 05

19074-Voltage supply 2 - tube heaters (UB2) electrical - Short circuit low

Context:
The denox module/supply module has sensed a fault with the voltage supply for the internal heaters, located in the denox module/supply module. Ensure all connectors are secured properly on the denox module/supply module and all lines are in operable condition. If the fault does not reset or reoccurs, replace the denox module/supply module.

19109-Reagent - tank temperature sensor (temperature of the Reagent - solution in the tank) - Short circuit high

Possible failure modes:

1. Faulty wiring
2. DEF/AdBlue® tank temperature sensor is faulty.

Solution:

1. Verify this error code is still present, and in an active state.

   A. If the error is still present and active, continue with step **2**.

   B. If the error is no longer present or is in an inactive state, return unit to field operation.

2. Check temperature sensor resistance. Disconnect connector DTLTS at top of DEF/AdBlue® tank. Use a multimeter to measure the resistance of the level sensor from pin 2 to pin 3. See expected resistance at given temperatures in table below.

-30 °C (**-22.0 °F**)	**12850 Ω**
-20 °C (**-4.0 °F**)	**7500 Ω**
0 °C (**32.0 °F**)	**2800 Ω**
20 °C (**68.0 °F**)	**1215 Ω**
30 °C (**86.0 °F**)	**825 Ω**
50 °C (**122.0 °F**)	**410 Ω**

   A. If resistance is correct continue with step **3**.

   B. If the resistance is not correct, replace the level sensor.

3. Check for a short to power between denox module/supply module and tank sensor. Disconnect connector DTLTS from tank sensor. Turn the ignition switch to the on position. Check for short to power between connector DTLTS pin 3 and ground.

   A. If reading shows short to power, repair or replace harness as required. Return unit to field operation.

   B. If the reading does not indicate a short , contact ASIST before replacing denox module/supply module.

Wiring harness - Electrical schematic frame 05

19182-Vent valve (Reverting Purge Control Valve) - Short circuit low

Context:
The dosing control unit (DCU) has detected a failure of the reverting valve, located inside the supply module. Ensure all connectors are secured properly on the DCU and all lines are in operable condition. If the fault does not reset or reoccurs, replace the supply module.
Wiring harness - Electrical schematic frame 05

19337-Defreezing Mode and Detection Errors (Back-flow Line Defreezing Failed)

Context:
The denox module/supply module has detected this failure when ambient temperature is below **17.0 °F** at system start up. The inlet and pressure line is detected open and pressure build up was OK. If DEF/AdBlue® pressure does not drop to **140 kPa** within **50 s** with the vent valve open to **100 %**, the back flow line is frozen. This failure is stored after 24 repetitions with **2.5 min** heating phases between the checks.

Cause:
The denox module/supply module has detected this error because of no DEF/AdBlue® back flow line is frozen.

Possible failure modes:

1. DEF/AdBlue® tank ventilation clogged
2. Back flow line clogged
3. Ventilation valve does not open
4. Back flow line frozen

Solution:

1. Verify this error code is still present and in an active state.

   A. If the error is still present and active, continue with step **2**.

   B. If the error is no longer present or is in an inactive state, continue with step **5**.

2. Actuate the pump. Use the electronic service tool (EST) to run the urea dosing system test (UDST) to start pump and stop it when DEF/AdBlue® pressure has reached **300 kPa**. Open the ventilation valve with the EST.

   A. If pressure does not drop down, continue with step **3**.

   B. If the pressure drops down to ambient pressure immediately, the line was frozen.

3. Check DEF/AdBlue® tank. Use the electronic service tool (EST) to run urea dosing system test (UDST) to start pump and stop it when DEF/AdBlue® pressure has reached **300 kPa**. Open the ventilation valve via EST.

   A. If pressure does not drop down, continue with step **4**.

   B. If pressure does drop, DEF/AdBlue® tank ventilation was clogged.

4. Check back flow line. Disconnect the back flow line from the box. Use the electronic service tool (EST) to run urea dosing system test (UDST) to start pump and stop it when DEF/AdBlue® pressure has reached **300 kPa**. Open the ventilation valve via EST.

   A. If DEF/AdBlue® flows, back flow line is clogged. Replace/repair the line.

   B. If DEF/AdBlue® does not flow, ventilation valve does not open. Replace the DEF/AdBlue® tank.

5. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while monitoring the Display.

   A. If damage is found or other than normal display readings are indicated, repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If no damage or other than normal display readings are indicated, erase the fault code and continue operation.

19559-Low Urea Level 1 - Too Low (Warning)

Context:
The denox module/supply module has detected low DEF/AdBlue® level. This error occurs when the DEF/AdBlue® fluid level is too low or level sensor has faults present. Ensure the heated level sensor is connected properly. Check DEF/AdBlue® tank level is full. If fluid level is low, fill tank to proper capacity. Check for any other errors that may be present. Correct those errors first, then recheck original error has been corrected. Ensure all connectors are secured properly on the denox module/supply module and all lines are in operable condition. If the fault does not reset or reoccurs, replace the denox module/supply module.

19649-Tank Level Sensor - Open Circuit

Cause:
There was an open circuit detected in the DEF/AdBlue® level sensor circuit.

Possible failure modes:

1. Faulty Sensor
2. Faulty electrical wiring or connection
3. Faulty DCU

Solution:

1. Verify this error code is still present, and in an active state.

   A. If the error is still present and active, continue with step **2**.

   B. If the error is no longer present or is in an inactive state, return unit to field operation.

2. Check level sensor resistance . Disconnect connector DTLTS at top of DEF/AdBlue® tank. Use a multi-meter to measure the resistance of the level sensor from pin 1 to pin 2. The resistance should be approximately **16000 Ω** when the tank is filled. The resistance should be approximately **100 Ω** when the tank is empty.

   A. If resistance is correct continue with step **3**.

   B. If the resistance is not correct, replace the level sensor.

3. Check for an open circuit between denox module/supply module and tank sensor. Disconnect connector DNOX2 from denox module/supply module and connector DTLTS from tank sensor. Check for continuity between connector DTLTS pin 1 and connector DNOX2 pin 18, and between connector DTLTS pin 2 and connector DNOX2 pin 19.

   A. If either reading shows no continuity, repair or replace harness as required. Return unit to field operation.

   B. If both readings show continuity/resistance of less than **1.0 Ω**, contact ASIST before replacing denox module/supply module.

19725-EEPROM/ Checksum Failures - Wrong EEPROM Size

Context:
The denox module/supply module has the incorrect EEPROM installed. This error would only occur during initial startup when the denox module/supply module has previously been replaced. Replace the denox module/supply module.

19805-Urea Tank Temperature -SCR High - Short Circuit High

Context:
The denox module/supply module has detected the urea tank temperature and denox module/supply module temperature are not in agreement.

Possible failure modes:

1. Extreme hot ambient conditions.
2. DEF/AdBlue® tank temperature sensor is faulty.

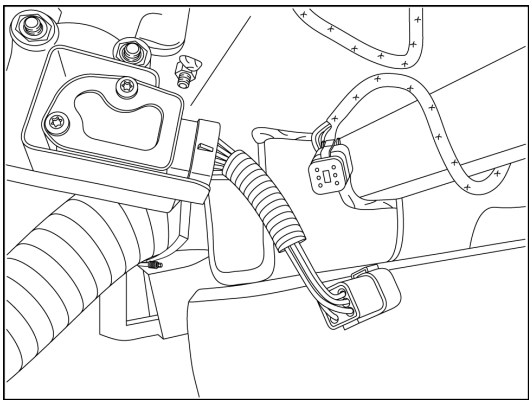
Solution:

1. Verify this error code is still present, and in an active state.
   A. If the error is still present and active, continue with step **2**.
   B. If the error is no longer present or is in an inactive state, return machine to the field.
2. Check to see if other DEF/AdBlue® temperature sensor fault codes are present.
   A. If no other errors are present, continue with step **3**.
   B. If errors are present, correct these errors first. Verify original error has been corrected.
3. Check temperature sensor resistance. Disconnect connector DTLTS at top of DEF/AdBlue® tank. Use a multimeter to measure the resistance of the level sensor from pin 2 to pin 3. See expected resistance at given temperatures in table below.

-30 °C (**-22.0 °F**)	**12850 Ω**
-20 °C (**-4.0 °F**)	**7500 Ω**
0 °C (**32.0 °F**)	**2800 Ω**
20 °C (**68.0 °F**)	**1215 Ω**
30 °C (**86.0 °F**)	**825 Ω**
50 °C (**122.0 °F**)	**410 Ω**

   A. If resistance is correct continue with step **4**.
   B. If the resistance is not correct, replace the level sensor.
4. If the tractor is operating in an extreme hot environment, shutdown for a period for cool down.
   A. If no other errors are present after restart return unit to field operation.
   B. If same fault code error is present, contact ASIST before replacing denox module/supply module.

Wiring harness - Electrical schematic frame 05



RCPH11WHL014AAL 3

(2) Turn the key switch ON.

(3) Measure the voltage between RTPH pin 5 and RTPH pin 4. The voltage should be approximately 5 volts.

A. The voltage is approximately 5 volt. Go to Step **5**.

B. The voltage is less than 5 volts. Go to Step **4**.

4. Measure the voltage at the EDC7 connector.

(1) Use a breakout tee to measure the voltage between the EDC7 connector pin 77 and pin 78. The voltage should be approximately 5 volts.

A. The voltage is approximately 5 volts at the EDC7 connector. There is a break in the harness between the EDC7 engine control and the throttle sensor. Repair or replace the harness as required. Go to Step **1** to confirm elimination of fault.

B. The voltage is not approximately 5 volts. There is a problem with the EDC7 engine control. Temporarily replace the EDC7 engine control and retest. Go to step **1** to confirm elimination of fault.

5. Measure the throttle signal.

(1) Fabricate a breakout tee and install it between the throttle sensor and RTHP connector.

3009-Coolant Temperature Sensor Circuit Open Or Sensor Disconnected

NOTE: *See engine repair manual for electrical schematic information. Check coolant level before proceeding.*

Cause:

1. Faulty reading from component.
2. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
3. Wiring or circuits open.
4. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting**. Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 3009 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Stop machine operations.

   (1) Run engine at 1500 r/min (rpm).

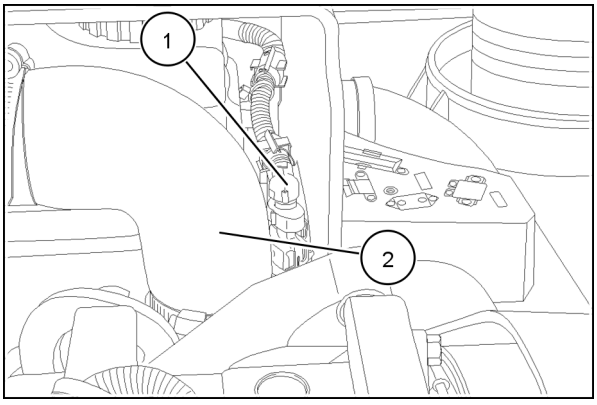
   (2) Check fan operation.

   (3) Check cooling core for clogs.

   A. NOT OK – Repair fan or clear clogs from radiator. Return to Step **1** to confirm elimination of fault.

   B. OK – Go to Step **3**.

3. Disconnect connector from engine temperature sending unit.



BD07D153-01 1

(1)	Connector engine temp sender
(2)	Upper radiator hose

(1) Inspect pins on temperature sending unit and connector. Clean connections.

(2) Take Ohm reading on sending unit, **2500 Ω** at **20 °C** (**68.0 °F**).

3024-Atmospheric Pressure Sensor - Signal Above Range Maximum

NOTE: *Atmospheric pressure sensor is inside the engine control module, replace ECU. (Not necessary if never running in high altitude and if turbocharger is without VGT).*

(1) Remove and replace engine control module.

A. Return to Step 1 to confirm elimination of fault. If fault is recorded again, contact Technical Services Group for assistance.

3051-Battery Voltage To Engine Controller - Voltage Too High

NOTICE: *When available use special tool 380040185 harness diagnostic/repair kit and 380040188 electro injector test fixture.*

Cause:

1. Battery voltage above a set range.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting**. Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

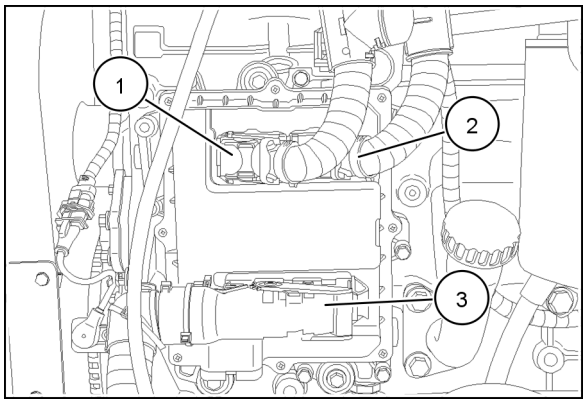
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. OK – Fault is not recorded again. OK for return to service.

   B. NOT OK – Fault code 3051 is recorded again. Go to Step **2**.

2. Check input power.



BD07D130-01 1

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

   (1) Turn ignition OFF. Disconnect Engine Controller connector, EDC7 from engine controller.

   (2) Inspect pins on connector EDC7 and controller. Clean connections.

   (3) Turn the ignition ON.

   (4) Check pins 2, 3, 8, and 9 of EDC7 to ground, a reading of 24 volts should be obtained.

   A. OK – Go to Step **3**.

   B. NOT OK – Check fuse PRM D-F2. Return to Step **1** to confirm elimination of fault.

3. Test alternator,

B. If there is no continuity, there is a short to ground condition in the Cylinder #5 injector circuit, between connector INJ5 and connector VC3. Locate and repair the grounded conductor.

5. Disconnect the engine injector harness from the injector cover at connector VC3 and use a multi-meter to check the resistance on the injector cover side of connector VC3 between pins 3 and 4. There should be **0.4 - 0.5 Ω**.

   A. If the resistance was within range, there is a short circuit condition in the engine injector harness between connector VC3 and ECU harness connector 3, locate and repair the short circuit.

   B. If the resistance was lower than range minimum, continue with step **6**.

6. Remove the injector (valve) cover and disconnect the injector harness from the Cylinder #5 injector at connector INJ5 terminal 1 (high side ring terminal) Use a multi-meter to check for continuity, on the Cylinder #5 injector, from terminal 1 to terminal 2. There should be **0.4 - 0.5 Ω**.

   A. If the resistance was within range, there is a short circuit condition in the injector harness, between connector INJ5 and connector VC3. Locate and repair the shorted conductors.

   B. If the resistance was lower than minimum range, the Cylinder #5 injector solenoid coil has failed. Replace the injector.

Remove ECU connector 3 and perform an injector resistance test. Use the spade style test leads from the from the Tier II (NEF) Diagnostic Repair Kit # **380040185** when probing the ECU harness side of connector 3. See test table below.

Test Type	From	To	Expected Results
1. Resistance	ECU harness connector 3, pin: 11	ECU harness connector 3, pin: 6	Approx. **0.4 - 0.5 ohms**

A. If resistance test was not successful, repair wiring harness between ECU harness connector 3 and connector VC1.

B. If resistance test was successful, proceed to step **5**.

4. Operation: Standalone Injector Resistance Test.
Vehicle Status: Key Off Engine Off.

Remove valve cover from the top of the head to allow access to the internal injector wiring harness. Remove the Cylinder #2 injector connector (two flying leads with ring terminals). Perform a resistance test on the terminals located on top of the solenoid portion of the injector. See test table below.

Test Type	From	To	Expected Results
1. Resistance	Cylinder #2 injector, connector INJ2 terminal #1	Cylinder #2 injector, connector INJ2 terminal #2	Approx. **0.4 - 0.5 ohms**

A. If resistance test was successful, repair the internal harness between the Cylinder #2 injector and the connector INJ2 .

B. If resistance test was not successful, replace the Cylinder #2 injector.

5. Operation: Check for ECU Voltages and Ground Continuity.
Vehicle Status (when removing ECU connector 1) Key Off Engine Off.
Vehicle Status (when performing test) Key On Engine Off.
Vehicle Status (when replacing ECU connector 1) Key Off Engine Off.

Remove connector 1 from the ECU and check for voltage and continuity at the appropriate pins defined in the test table below. Use the **0.43 mm** (**0.017 in**) diameter test probes from the Tier II (NEF) Diagnostic Repair Kit # **380040185** when connecting the DMM to the ECU connector 1.

Important Note: Check and verify that the Vehicle Status is correct for each operation. Potential ECU damage could result when removing and replacing main ECU connectors if this is not followed.

Test Type	From	To	Expected Results
1. Voltage	ECU connector 1, pin 2, 3, 8, 9, 40	Ground (engine block)	Approx. **24 volts** (DC)
2. Continuity	ECU connector 1, pin 5, 6, 10, 11	Ground (engine block)	Approx. **0.0 - 0.1 ohms**

A. If the voltages and ground paths are correct, proceed to step **6**.

B. If the voltages and ground paths are not correct, refer to product schematic and determine root cause of power and/or continuity problem(s).

6. Operation: Re-initialize the ECU.
Vehicle Status: Key On Engine Off.

Using the EST service tool, re-initialize the ECU and load the appropriate data-set for this engine type. Check to see if the fault code has cleared.

A. If the fault code did not clear, Replace the ECU.

B. If fault code cleared, continue with operation of machine.

3089-Crankshaft Sensor - Invalid Signal

NOTICE: *When available use special tool 380040185 harness diagnostic/repair kit and 380040188 electro injector test fixture.*

NOTE: *See engine repair manual for electrical schematic information.*

Context:
The Engine Control Unit (ECU) has reported an error with the monitoring of the Crankshaft speed sensor. If the engine has a defective Crankshaft speed sensor it can run off the Camshaft speed sensor.

Cause:
The ECU has determined that there are errors in the signal from the Crankshaft speed sensor.

Possible failure modes:

1. Faulty reading from component.
2. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
3. Wiring or circuits open.
4. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Troubleshooting**. Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

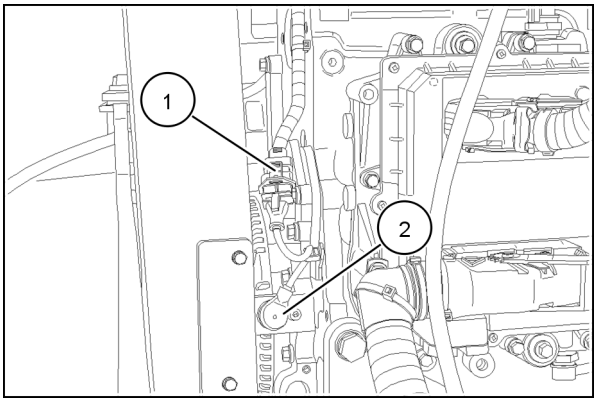
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 3089 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Disconnect connector from engine crankshaft speed sensor.



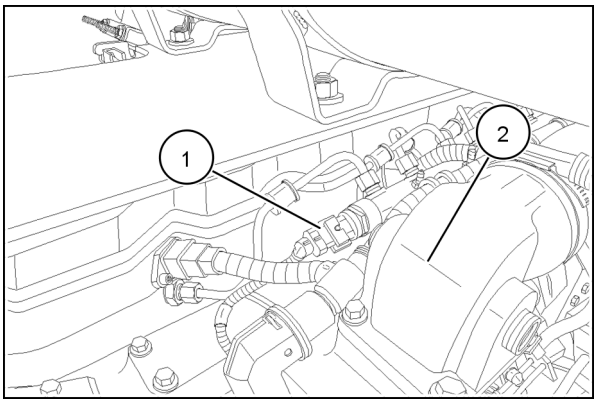
BD07D131-01 1

(1)	Connector engine crankshaft speed sensor
(2)	Crankshaft sensor

(1) Inspect pins on crankshaft speed sensor and connector. Clean connections.

(2) Take Ohm reading between pins 1 and 2 to sensor, a reading of **900 Ω** should be obtained.

A. NOT OK – Replace sensor. Return to Step **1** to confirm elimination of fault.



BD07D134-01 2

(1)	Rail pressure sensor
(2)	Intake manifold

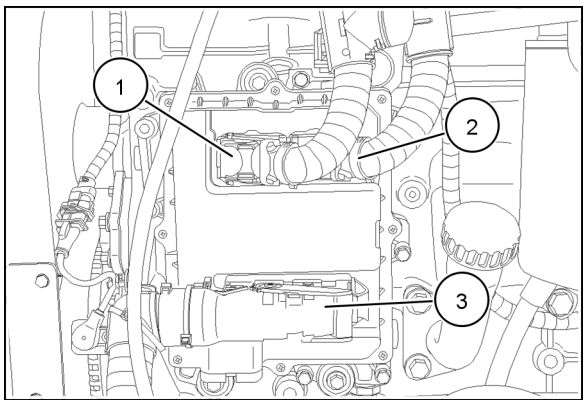
(1) Turn the ignition switch ON to power the system.

(2) Take voltage reading at pin 3 on connector, a reading of **5 V** should be obtained.

A. NOT OK – Replace sensor. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **4**.

4. Check circuit



BD07D130-01 3

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

(1) If no voltage is present, disconnect Connector C from engine controller.

(2) Inspect pins on Connector C and engine controller. Clean connections.

(3) Check from pin 3 rail pressure sensor connector to pin 13 of Connector C.

A. NOT OK – Determine the break between connectors and repair. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **5**.

5. Check input power.

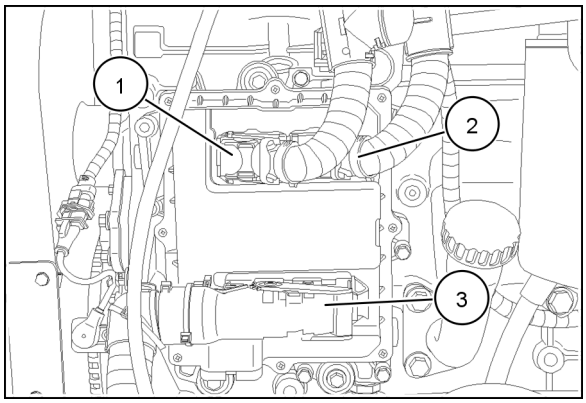
A. NOT OK – Check fuse PRM D-F2. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **3**.

3. Replace the engine control module.

(1) Remove and replace engine control module.

A. Return to Step 1 to confirm elimination of fault.



BD07D130-01 3

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

(1) Disconnect Connector EDC7 from engine controller and connector at grid heater relay.

(2) Inspect pins on Connector EDC7 and engine controller. Clean connections.

(3) Check from pin 12 to pin 75 at Connector EDC7, circuit should be open.

(4) Check from pin 1 grid heater relay connector to pin 12 of Connector EDC7.

(5) Check from pin 2 grid heater relay connector to pin 75 of Connector EDC7.

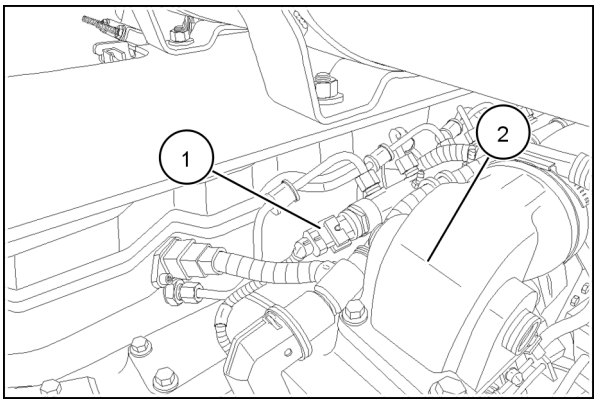
A. NOT OK – Determine the short circuit or the break between connectors and repair. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **5**.

5. Replace the engine control module.

(1) Remove and replace engine control module.

A. Return to Step **1** to confirm elimination of fault.



BD07D134-01 1

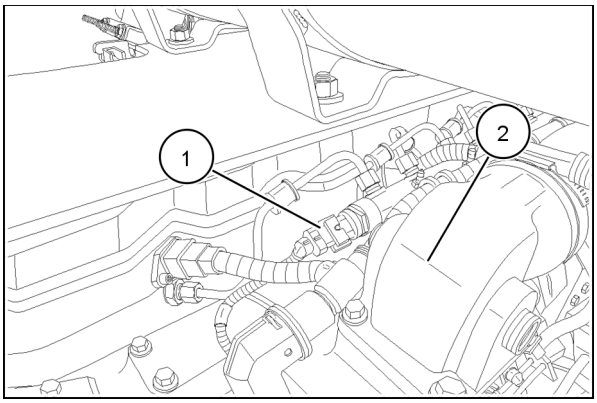
(1)	Rail pressure sender
(2)	Intake manifold

(1) Take Ohm reading between pins 1 and 2 on the sensor, a reading of **45k Ω** should be obtained.

A. NOT OK – Replace sensor. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **3**.

3. Disconnect connector from rail pressure sending unit.



BD07D134-01 2

(1)	Rail pressure sender
(2)	Intake manifold

(1) Turn the ignition switch on to power the system.

(2) Take voltage reading at pin 3 on connector, a reading of 5 volts should be obtained.

A. NOT OK – Go to Step **4**.

B. OK – Replace sensor. Return to Step **1** to confirm elimination of fault.

4. Check circuit

3180-Timeout of CAN Message VCM2EDC

NOTICE: *When available use special tool 380040185 harness diagnostic/repair kit.*

NOTE: *See engine repair manual for electrical schematic information.*

Cause:

1. CAN controller of the EDC reports a reception time-out for the VCM message VM2EDCIv over 100 ms.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Troubleshooting**. Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

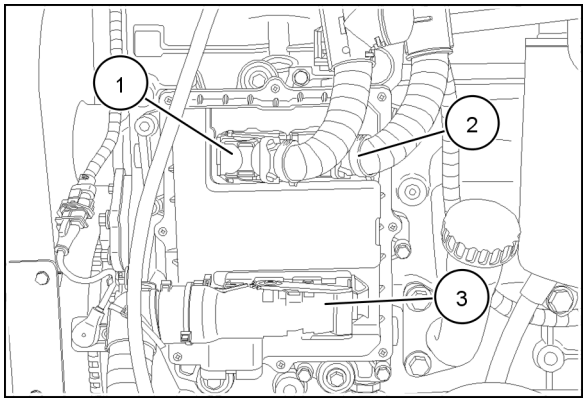
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 3180 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Check input power.



BD07D130-01 1

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

(1) Turn ignition OFF. Disconnect Engine Controller connector EDC7 from engine controller.

(2) Inspect pins on connector EDC7 and controller. Clean connections.

(3) Turn the ignition ON.

(4) Check pins 2, 3, 8, and 9 of EDC7 to ground, a reading of 24 volts should be obtained.

A. NOT OK – Check fuse PRM D-F2. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **3**.

3. Replace the engine control module.

5. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while monitoring the Display.

   A. If damage is found or other than normal display readings are indicated, repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If no damage or other than normal display readings are indicated, erase the fault code and continue operation.

(1) Disconnect leads from number 1 and 2 injector. NOTE: When installing leads on injectors, torque terminal nuts to general bolt torque specifications.

(2) Take an Ohm reading between terminals on number 1 and number 2 injectors, a reading of **0.5 - 1.0 Ω** at **20 °C** (**68.0 °F**) should be obtained across each injector.

(3) Disconnect leads from number 3 and 4 injector.

(4) Take an Ohm reading between terminals on number 3 and 4 injectors, a reading of **0.5 - 1.0 Ω** at **20 °C** (**68.0 °F**) should be obtained across each injector.

A. NOT OK— Replace injectors as needed. Return to Step **1** to confirm elimination of fault.

B. OK— Go to Step **6**.

6. Replace the engine control module.

(1) Remove and replace engine control module.

(2) Write symptom on failed engine control module.

A. Return to Step **1** to confirm elimination of fault.

(6) Take an Ohm reading between terminals on number 5 and number 6 injector, a reading of **0.5 - 1.0 Ω** on each injector at **20 °C** (**68.0 °F**) should be obtained.

A. NOT OK – Replace injectors as needed. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step **5**.

5. Replace the engine control module.

(1) Remove and replace engine control module.

A. Return to Step 1 to confirm elimination of fault.

3243-Engine Controller Recovery (Suppressed) - Recovery Occurred

Context:
The engine control unit (ECU) has detected, during system start up, a hardware or configuration problem. This triggers an ECU recovery (reset of the CPU - Central Processing Unit) that is not stored. During a fresh ECU start up different hardware tests are performed. If the error remains present even after reset, the software remains in the boot-block and the driving software is not processed. If three recoveries are triggered within 4 seconds an irreversible shut off of the system is carried out and the ECU is classified as permanently defective. In this case no error entry is possible. If, however, the error leading to recovery is not detected repeatedly and the system is allowed to start up, one of three recovery errors becomes active depending on the visibility of the recovery. This error can be the result of electronic disturbances, various hardware defects (ECU internal) or configuration problems. If this error occurs repeatedly, reprogram the ECU and if the error remains, replace the ECU.

3261-LS power stage hardware reports 'short circuit to battery' or 'excess temperature' longer than 100 ms.

NOTICE: *When available use special tool 380040185 harness diagnostic/repair kit.*

NOTE: *See engine repair manual for electrical schematic information.*

Cause:

1. LS power stage hardware reports 'short circuit to battery' or 'excess temperature' longer than 100 ms.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting**. Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

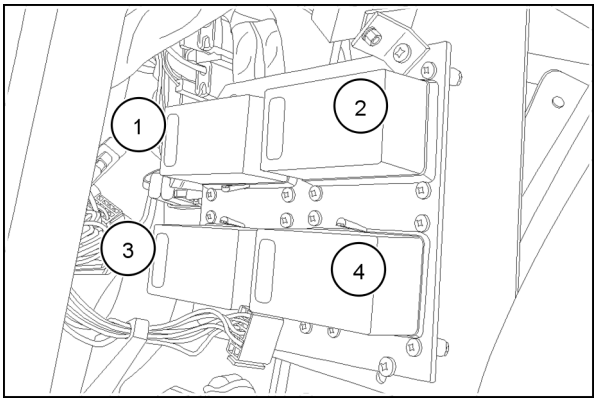
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 3261 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Remove crank control relay from Connector ECB (Electrical Center B).



BD07E018-01 1

(1)	Electrical center A
(2)	Electrical center C
(3)	Electrical center B
(4)	Electrical center D

(1) Inspect pins on crank control relay and relay panel. Clean connections.

(2) Disconnect Connector EDC7 from engine controller.

3284-Sensor Supply Voltage 2 - Low

NOTICE: *When available use special tool 380040185 harness diagnostic/repair kit and 380040188 electro injector test fixture.*

NOTE: *Check alternator output voltage, if below 24 volts refer to troubleshoot charging system before proceeding. See engine repair manual for electrical schematic information.*

Cause:

1. The hardware has detected the sensor voltage supply 2 to be below a lower limit over 100 ms.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Troubleshooting**. Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

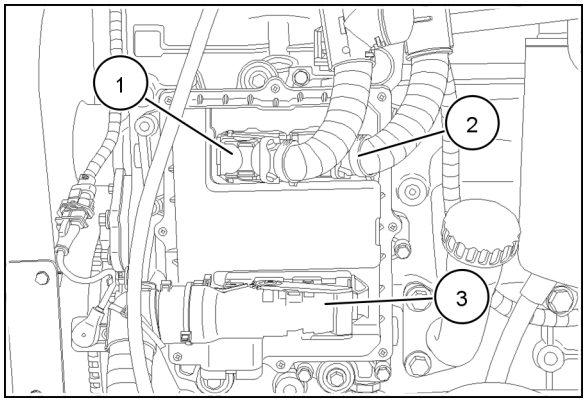
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 3284 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Check input power.



BD07D130-01 1

(1)	Connector C
(2)	Connector A
(3)	Connector EDC7

(1) Turn ignition OFF. Disconnect **EDC7** connector from the Engine Controller.

(2) Inspect pins on Engine Controller connector, **EDC7**.

(3) Turn the ignition ON.

(4) Check pins 2, 3, 8, and 9 on Engine Controller connector, **EDC7** to ground, a reading of 24 volts should be obtained.

A. NOT OK – Check fuse PRM D-F2. Return to Step **1** to confirm elimination of fault.

(1)	Connector TS1
(2)	Connector TS2

(1) Disconnect Connector TS1 and Connector TS2.

(2) Inspect all pins on Connector TS1 and Connector TS2. Clean connections.

(3) Take Ohm readings as listed below, continuity should be obtained.

(4) Place range selector in 1st gear, place FNR in F position. Pin A to pin B of Connector TS1, pin B and pin D of Connector TS2.

(5) Place range selector in 1st gear, place FNR in R position. Pin A to pin C of Connector TS1, pin B and pin D of Connector TS2.

(6) Place range selector in 2nd gear, place FNR in F position. Pin A to pin B of Connector TS1 and pin D of Connector TS2.

(7) Place range selector in 2nd gear, place FNR in R position. Pin A to pin C of Connector TS1, and pin D of Connector TS2.

(8) Place range selector in 3rd gear, place FNR switch F position. Pin A to pin B of Connector TS1, pin C and pin D of Connector TS2.

(9) Place range selector in 3rd gear, place FNR in R position. Pin A to pin C of Connector TS1, pin C and pin D of Connector TS2.

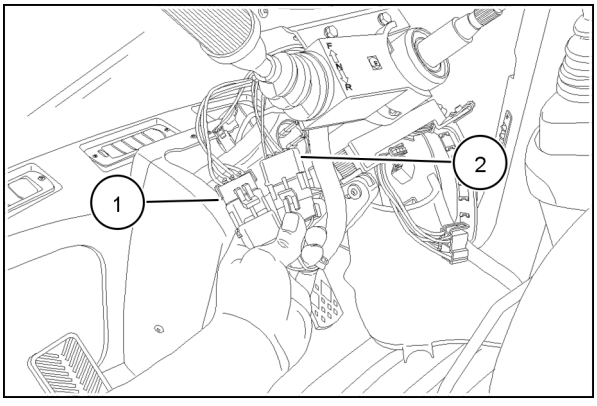
(10) Place range selector in 4th gear, place FNR in F position. Pin A to pin B of Connector TS1, pin B, pin C and pin D of Connector TS2.

(11) Place the range selector in any gear, place the FNR in N position. Pin A to pin D of Connector TS1.

A. OK — Go to step **5**.

B. NOT OK — Replace FNR switch. Return to step**1** to confirm elimination of fault.

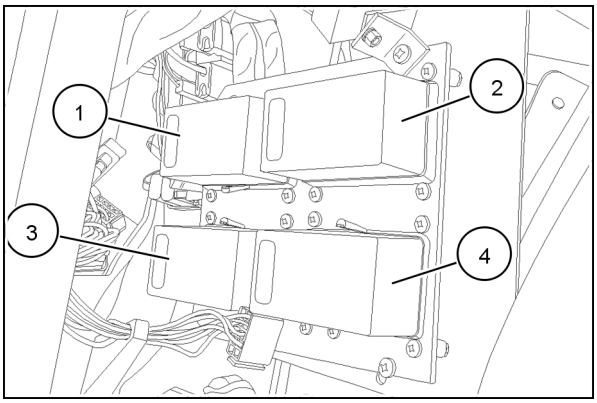
5. Check for open circuit between FNR switch and transmission control module.



BD07D168-01 5

(1)	Connector TS1
(2)	Connector TS2

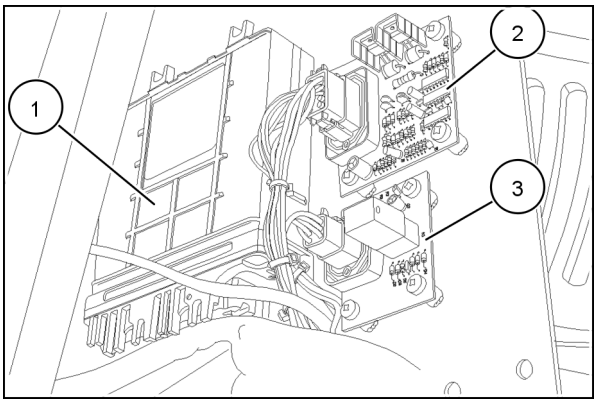
(1) Disconnect Connector TS1 and Connector TS2.



BD07E018-01 6

(1)	Electrical Center A
(2)	Electrical Center C
(3)	Electrical Center B
(4)	Electrical Center D

(1). Remove the relay from Connector ECD.



BD07E019-01 7

(1)	Transmission control module
(2)	Flasher module
(3)	Time delay module

(2). Disconnect Connector TECM from transmission control module.

(3). Inspect pins 8 and 57 on Connector TECM. Clean connections.

(4). Check circuit between pin D7 of Connector ECD and pin 8 of Connector TECM.

(5). Check circuit between pin B8 of Connector TS1 and pin 57 of Connector TECM.

A. NOT OK— Determine break between connectors and repair. Return to Step **1** to confirm elimination of fault.

B. OK— Go to Step **9**.

9. Check circuit between ride control relay and solenoid.

(6) From pin B of Connector PRBF to pin 21 of Connector FRONT.

(7) From pin B of Connector 202M to pin A of Connector 202M.

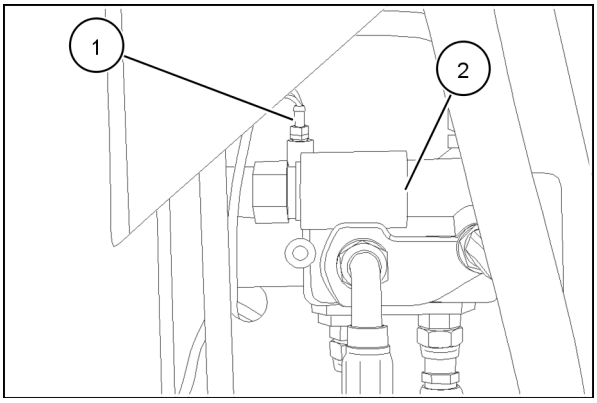
(8) If circuit is open at Connector 202M, replace jumper wire or rollback pressure switch if equipped.

(9) From pin 1 of Connector YRC to pin A of Connector PRBF.

A. NOT OK— Determine break between connectors and repair. Return to **1** to confirm elimination of fault.

B. OK— Go to **10**.

10. Check ground circuit of ride control solenoid.

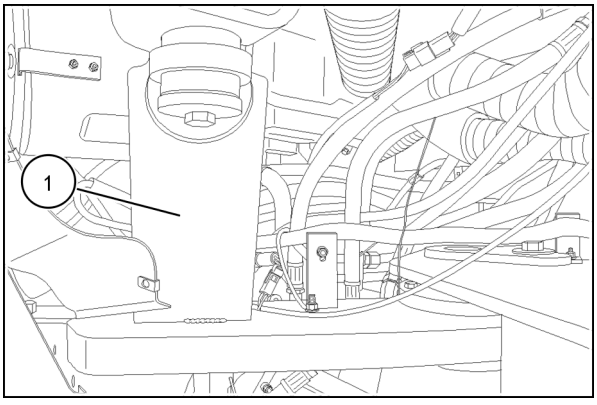


BD07F015-01 11

(1)	Connector YRC
(2)	Ride control valve

(1) Disconnect Connector YRC from ride control solenoid.

(2) Check circuit between pin 2 of Connector YRC and ground.



BD07F016-01 12

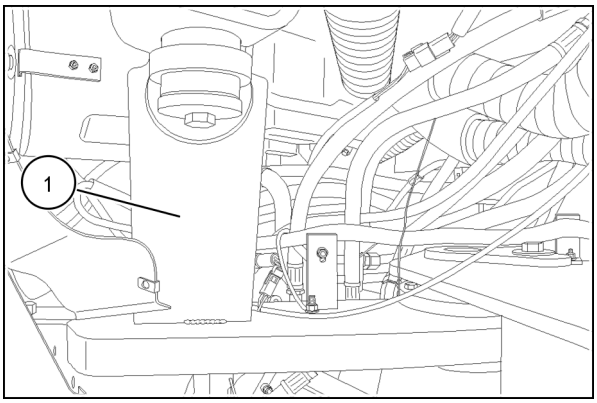
(1)	Ground GND-FC (Behind pedestal)

(3) If circuit is open check grounding stud connections at GND_FC.

A. NOT OK— Determine brake between connectors and repair. Return to Step **1** to confirm elimination of fault.

B. OK— Go to Step **11**.

11. Check ride control solenoid.



BD07F016-01 13

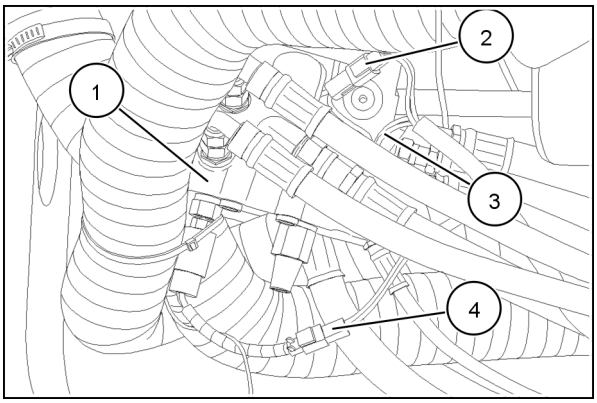
(1)	Ground GND-FC (Behind pedestal)

(3). If circuit is open check grounding stud connections at GND-FC.

A. NOT OK— Determine break between connectors and repair. Return to Step**1** to confirm elimination of fault.

B. OK— Go to Step **11**.

11. Check park brake solenoid.



BD07F014-01 14

(1)	Brake valve
(2)	Brake warning switch
(3)	Park brake solenoid
(4)	Brake light switch

(1). Disconnect Connector YPB from park brake solenoid.

(2) Take an Ohm reading on the solenoid, a reading of **40.3 Ω** at **20 °C** (**68.0 °F**) should be obtained.

A. NOT OK— Replace solenoid. Return to Step **1** to confirm elimination of fault.

B. OK— Go to Step **12**.

12. Replace the instrument cluster.

(1) Remove and replace instrument cluster.

A. Return to Step **1** to confirm elimination of fault.

Wiring harness - Electrical schematic frame 09

4150-Logical error at turbine speed input

NOTE: *This fault code is reset after power up of the TCM (transmission control module).*

Cause:

1. Failed turbine speed sensor.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Find out if the fault code is still active, refer to **0000 - Retrieving fault codes and Troubleshooting**.
   Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

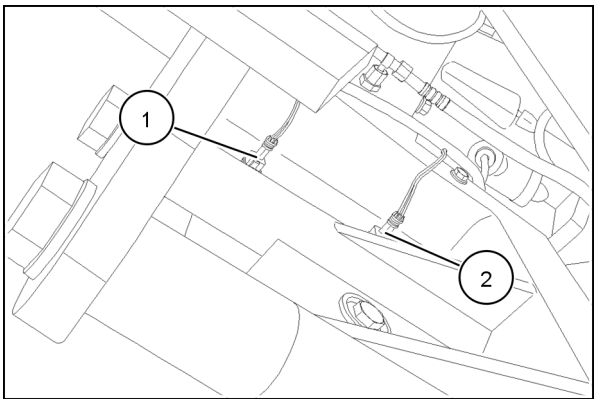
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 4150 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Check circuit.



BD07F019-01 1

(1)	Connector TSS
(2)	Connector ISS

(1) Disconnect Connector TSS at turbine speed sensor.

(2) Inspect pins on Connector TSS. Clean connections.

4155-Short circuit to ground at output speed input

NOTICE: *Check fuse ECA F1.*

Cause:

1. Output speed reading erratic.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting**.
   Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

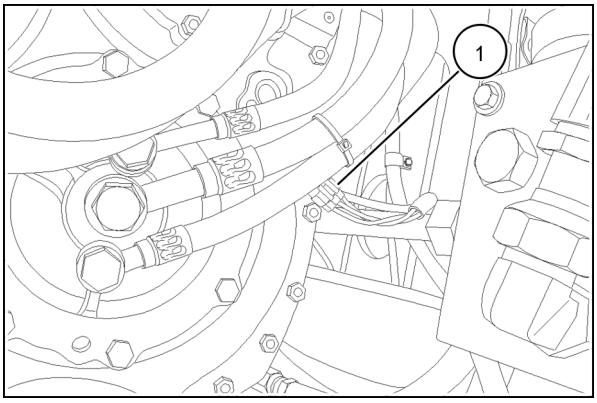
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 4155 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Check power to output speed sensor.



BD07F018-01 1

(1)	Connector OSS

(1) Disconnect Connector OSS at output speed sensor.

(2) Inspect pins on Connector OSS. Clean connections.

(3) Turn ignition switch ON.

(4) Take a voltage reading at pin 3 Connector OSS, a reading of **24 V** should be obtained.

A. NOT OK— Check fuse ECA F1. Return to Step **1** to confirm elimination of fault.

B. OK— Go to Step **3**.

3. Check power circuit

4209-Short circuit to battery voltage at clutch K1

Cause:

1. K1 clutch not functioning, transmission goes into limp home mode.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting.** Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

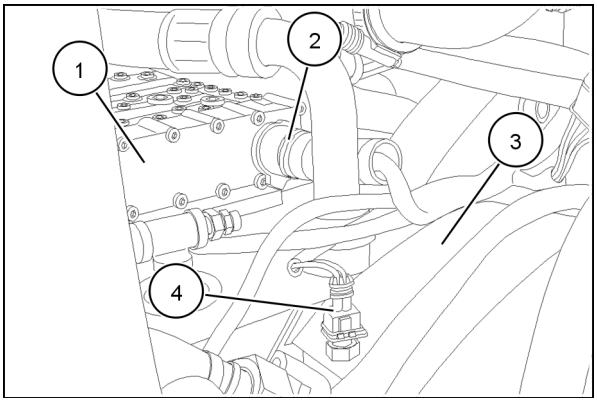
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 4209 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Disconnect connector at the valve body.



BD07F017-01 1

(1)	Valve body
(2)	Connector TRC
(3)	Bell housing
(4)	Connector TCOT

(1) Take Ohm reading at the valve body from pin 3 to pin 7, a reading of **19 Ω** at **27 °C** (**80.6 °F**) should be obtained.

A. NOT OK – Replace Y3 solenoid. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step .**3**.

3. Check circuit.

4217-Open circuit at clutch K3

Cause:

1. K3 clutch not functioning, transmission goes into limp home mode.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting.** Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

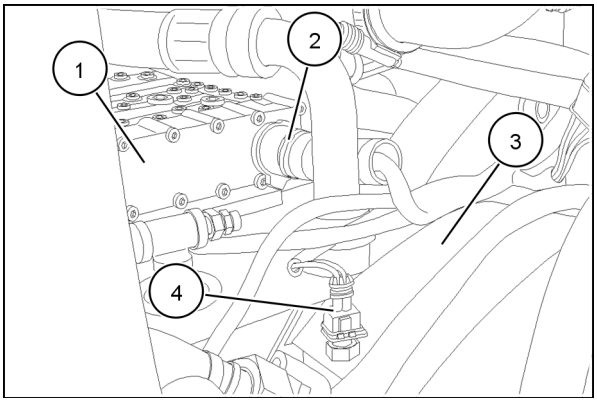
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 4217 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Disconnect connector at the valve body.



BD07F017-01 1

(1)	Valve body
(2)	Connector TRC
(3)	Bell housing
(4)	Connector TCOT

(1) Take an Ohm reading at the valve body from pin 4 to pin 7, a reading of **19 Ω** at **27 °C** (**80.6 °F**) should be obtained.

A. NOT OK – Replace Y4 solenoid. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step .**3**.

3. Check circuit.

4232-Short circuit to ground at clutch KR

Cause:

1. KR clutch not functioning, transmission goes into limp home mode.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting**.
   Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

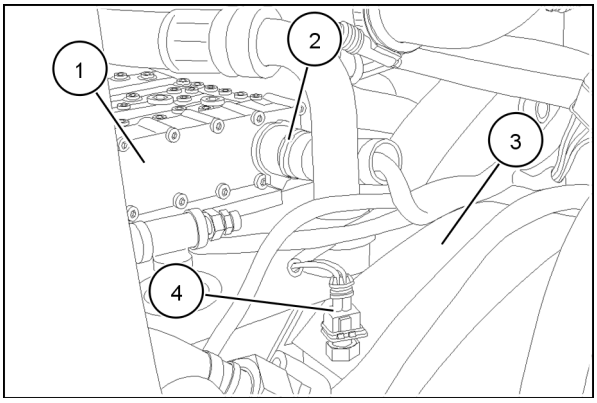
   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 4232 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Disconnect connector at the valve body.



BD07F017-01 1

(1)	Valve body
(2)	Connector TRC
(3)	Bell housing
(4)	Connector TCOT

(1) Take an Ohm reading at the valve body from pin 2 to pin 7, a reading of **19 Ω** at **27 °C** (**80.6 °F**) should be obtained.

A. NOT OK – Replace Y2 solenoid. Return to Step **1** to confirm elimination of fault.

B. OK – Go to Step .**3**.

3. Check circuit.

4276-Slippage at clutch K4

NOTICE: *Check clutch pressures*

Cause:

1. Failed speed sensor.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting.**
   Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 4276 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.
2. Refer to perform pressure checks
   and transmission troubleshooting.

   A. OK – No errors were found during troubleshooting. Go to Step **3**.

   B. NOT OK – Repair transmission as needed.
3. Refer to troubleshoot intermediate speed sensor. Do not replace the transmission control module at this time.

   A. OK – Go to Step.**4**.
4. Refer to troubleshoot output speed sensor.

   A. OK – Go to Step.**5**.
5. Replace the transmission control module.

   (1) Remove and replace control module.

   A. Return to Step **1** to confirm elimination of fault.

Wiring harness - Electrical schematic frame 08

4290-Transmission input torque overload

Cause:

1. TECM calculates a transmission input torque above the defined thresholds.
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting**.
   Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. OK – Fault is not recorded again. OK for return to service.

   B. NOT OK – Fault code 4290 is recorded again. Go to Step **2**.
2. Calibrate clutches.

   (1) Calibrate clutches accord to instructions.

   A. OK – Return to Step **1** to confirm the elimination of fault.

   B. NOT OK – Repair or replace transmission as needed.
3. Perform engine stall test.

   (1) Check engine stall speeds

   A. OK – Go to Step **4**.

   B. NOT OK – Repair or replace engine or transmission as needed.
4. Replace the transmission control module.

   (1). Remove and replace transmission control module.

   A. Return to Step **1** to confirm the elimination of fault.

Wiring harness - Electrical schematic frame 08

4305-Short circuit to battery voltage at power supply for sensors

NOTICE: *Check fuses ECA F1 and ECC F10, replace as needed.*

Cause:

1. Over voltage to TCM (Transmission Control Module).
2. Faulty reading from component.
3. Connectors not mated fully, pins not pushed into connector fully, bent pin or broken wire at rear of connector.
4. Wiring or circuits open.
5. Wiring or circuits shorted.

Solution:

1. Verify that the fault code is still active, refer to **0000 - Retrieving fault codes and Throubleshooting.** Prior to clearing fault codes write down all fault codes, number of occurrences, and engine hours at last occurrence.

   (1) Turn ignition switch to RUN position.

   (2) Clear all fault codes.

   (3) To check for fault code: Start and operate machine.

   A. NOT OK – Fault code 4305 is recorded again. Go to Step **2**.

   B. OK – Fault is not recorded again. OK for return to service.

2. Check equipment voltage.

   (1) Start and run engine at high idle.

   (2) Check output voltage of alternator.

   A. NOT OK – Repair electrical system as needed. Return to Step **1** to confirm elimination of fault.

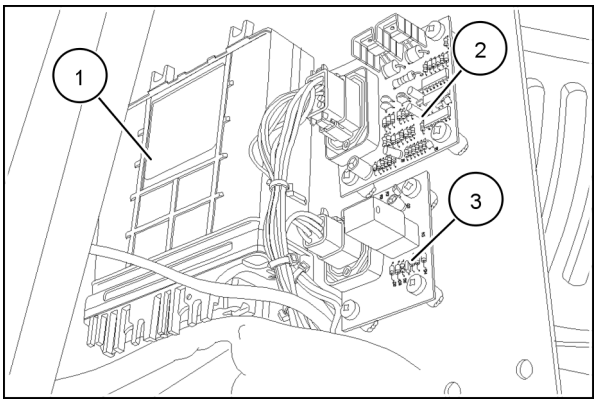
   B. OK – Go to Step .**3**.

3. Replace the transmission control module.

   (1) Remove and replace control module.

   A. Return to Step **1** to confirm elimination of fault.

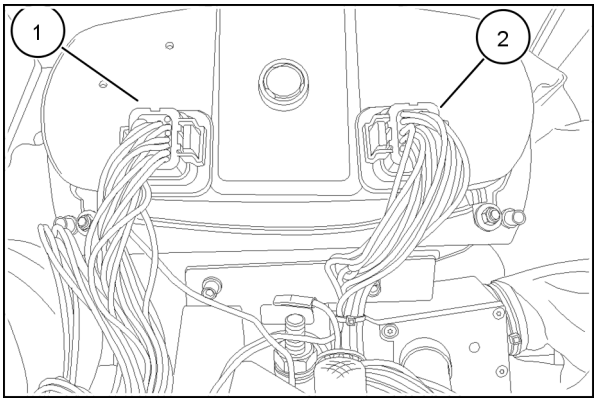
Wiring harness - Electrical schematic frame 08



BD07E019-01 2

(1)	Transmission control module
(2)	Flasher module
(3)	Time delay module

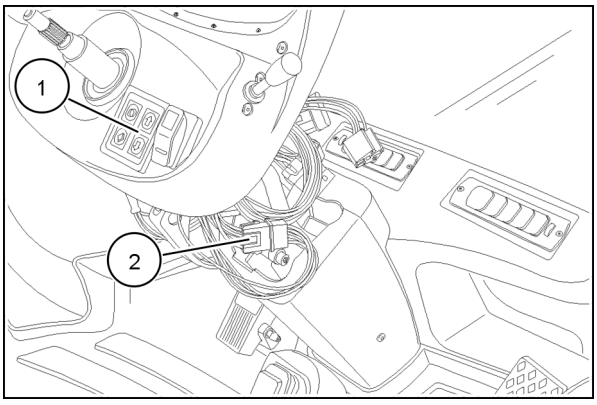
(3) Disconnect connector AIC-1.



BD07D128-01 3

(1)	Connector AIC-2
(2)	Connector AIC-1

(4) Disconnect connector SW-PD.



BD07E012-01 4

(1)	Switch pad
(2)	Connector SW-PD

(5) From pin C at the diagnostic connector, Connector DIA, take Ohm reading to pin 3 Connector AIC-1, take an Ohm reading to pin 46 Connector QSM11, take and Ohm reading to pin 25 Connector TECM, and take an Ohm reading to pin 7 Connector SW-PD.

84547255A

Issued 11-11 Printed in E.C.

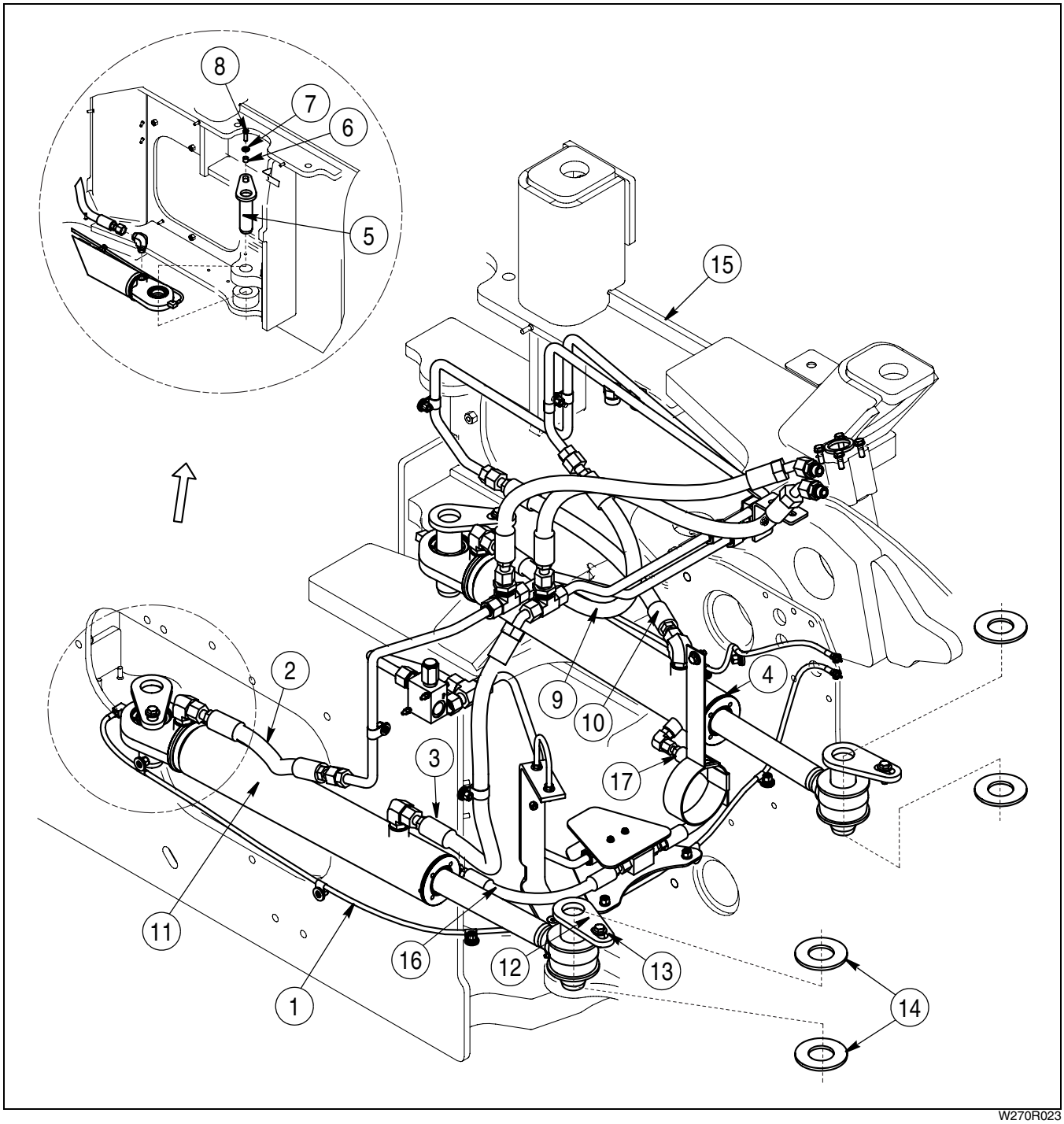
SECTION INDEX

STEERING

CNH Italia S.p.A.
Via Plava, 80
10135 Torino
Italia

84547255A

Issued November, 2011



W270R023

1. GREASE HOSE
2. HOSE ASSEMBLY
3. HOSE ASSEMBLY
4. STEERING CYLINDER
5. PIVOT PIN
6. SPACER
7. WASHER
8. CAP SCREW
9. HOSE ASSEMBLY
10. HOSE ASSEMBLY
11. STEERING CYLINDER
12. PIN
13. CAP SCREW
14. WASHER
15. REAR CHASSIS
16. HOSE ASSEMBLY
17. HOSE ASSEMBLY

STEERING CYLINDER ILLUSTRATION

SPECIFICATIONS

Torque for piston cap screw .....1600 to 1830 Nm (1180 to 1349.7 pound feet)
Torque for gland .....407 ± 68 Nm (300 ± 50 pound feet)

STEERING CYLINDER

Disassembly

1. Fasten tube (18) in a vise. Be careful not to damage the tube. See illustration on page 4.
2. Remove gland (1) from tube (18).
3. Pull piston rod (14) and piston (9) straight out of tube (18).
4. Fasten piston rod (14) yoke in vise and put a support below piston rod near piston (9). Put a shop cloth between support and piston rod to prevent damage to piston rod.
5. Loosen and remove bolt and washer (8) that hold piston (9).
6. Remove piston (9) from piston rod (14).
7. Remove and discard seal (13), loader ring (12), wear ring (11), cast iron ring (10) and seal (20) from piston (9).
8. Remove gland (1) from piston rod (14).
9. Remove and discard O-ring (7), backup ring (6), rod wiper (2), rod seal (3), buffer seal (4), and bearing (5) from gland (1).

Inspection

1. Clean all parts in cleaning solvent.
2. Check to be sure that piston rod (14) is straight. If piston rod is bent, install a new piston rod.
3. Inspect inside of tube (18) for deep grooves and other damage. If there is any damage to tube, a new tube must be used.
4. Remove small scratches on piston rod (14) or inside tube (18) with emery cloth of medium grit. Use emery cloth with a rotary motion.
5. Inspect bushing (17). If bushing requires replacement, remove grease fitting (15) and retaining rings (16) then press bushing from tube end.

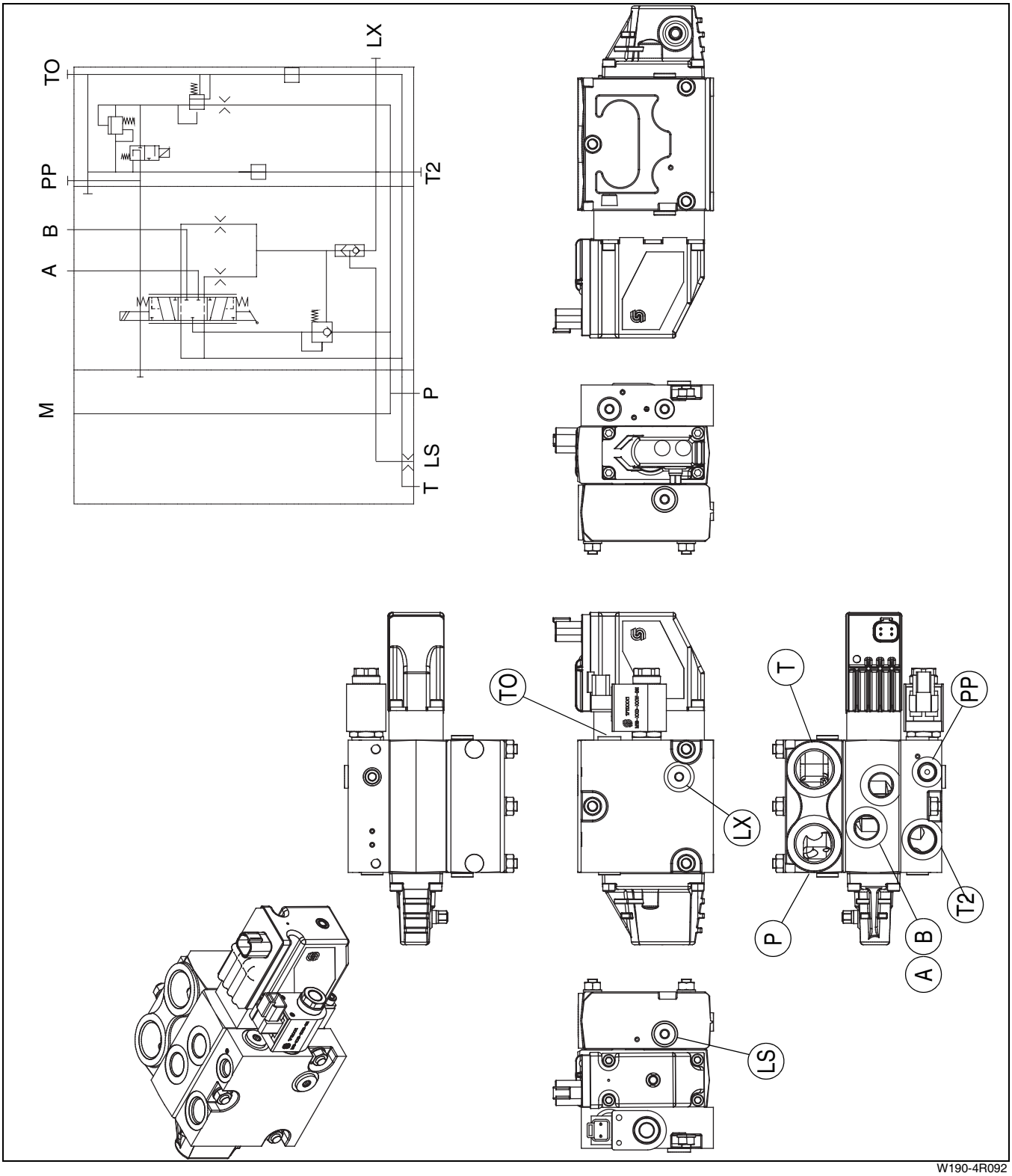
SPECIFICATIONS

Auxiliary steering motor

Maximum amperes	30 amperes
Minimum armature speed	6950 r/min (rpm)
Motor	24 volts

Auxiliary steering pump

Minimum flow	24.6 L/min at 104 bar at 315 amperes (6.5 U.S. gpm at 1500 psi at 315 amperes)



W190-4R092

Connections

ports A and B.	to the steering cylinder on the stem side and bottom side 350 bar, 100 l/min	port PP.	pilot pressure switch 8 bar
		port T.	outlet 25/40 bar
		port T2.	not used
LS port.	to port 3 of the valve PVFC	port TO, LX.	not used
port P.	to the steering priority valve 350 bar, 150-230 l/min		

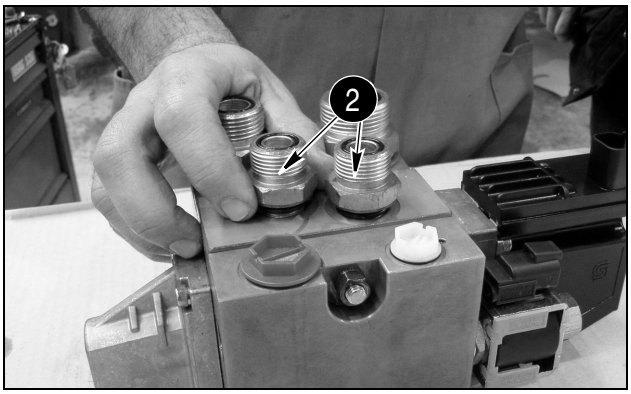
Illustration of the valve PVG32

STEP 15

W190-4R016

Unscrew the coupling (1) from the “LS” port of the steering valve PVG32.

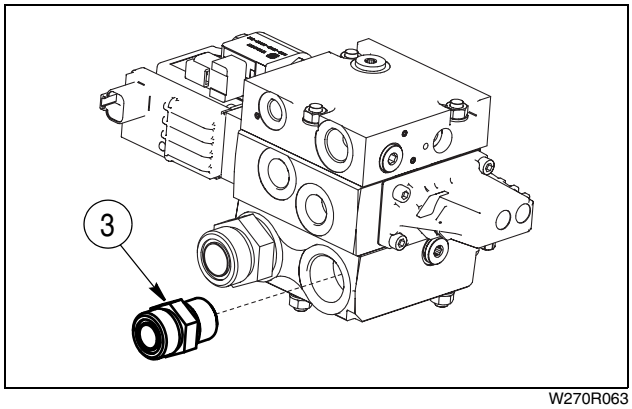
STEP 16



W190-4R017

Remove the two couplings (2) from the ports “A” and “B” supplying the steering cylinder line.

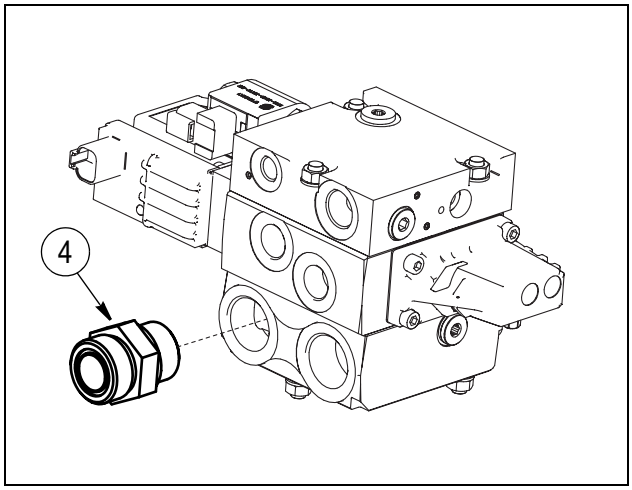
STEP 17



W270R063

Unscrew the coupling (3) from the port “P”.

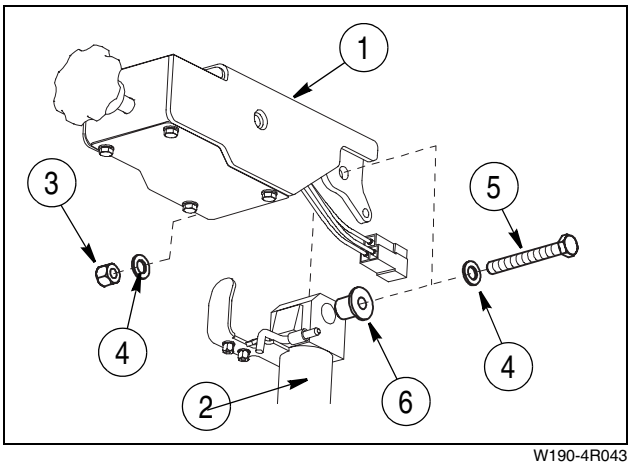
STEP 18



W270R064

Remove the coupling (4) from the port “T”.

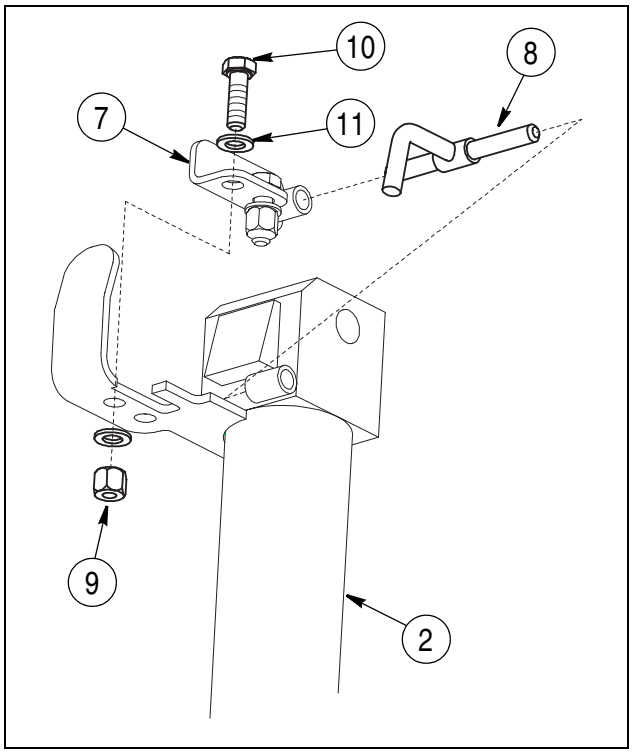
STEP 12



W190-4R043

With the armrest lowered remove the armrest height / angle adjustment device (2) from the support assembly (1) by removing the nut (3) and the washers (4), screws (5) and nylon bushings (6, qty. 2).

STEP 13



W190-4R104

Remove the locking bracket (7) of the pin (8) from the armrest height/angle adjustment device (2) by unscrewing the nuts (9, qty. 2), removing the screws (10) and the washers (11).
Remove the pin (8) from inside the seat of the bracket (7).

STEP 10

W190-4R116

After this operation the display will show a screen with the wording "**O. K.**". The display will automatically show the screen with the wording "**Joyst Full Right**" "**Release when WL starts moving**", the operator must then repeat **Step 9** twice.

STEP 11

W190-4R118

The display will show a screen with the wording "**Calibration Successful**" indicating the success of the calibration procedure.

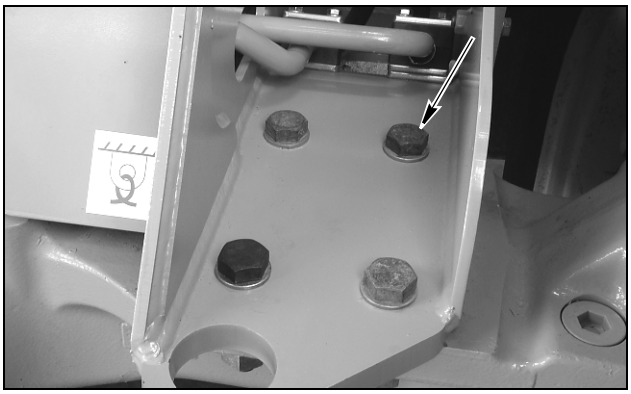
38. Remove the self-locking nuts (4), hardened washers (5), bolts (2), and washers (3), refer to illustration on page 14.
39. Loosen the nuts on the front ROPS cab or canopy mounting bolts and remove the rear mounting bolts. Raise the rear of the ROPS cab or canopy approximately 152 MM. (6 inches).
40. Install a block on each side.
41. Raise the engine and transmission, move the engine and transmission to the rear of the machine. Do this as required until the transmission is free of the ROPS cab or canopy.
42. Remove the engine and transmission from the machine. Put the engine and transmission on an acceptable support.
43. Remove the starter from the engine.
44. Fasten acceptable lifting equipment to the transmission.
45. Using the engine turning tool, turn the flywheel for access to the flex plate bolts (10).
46. Remove the twelve hardened washers (11) and bolts (10) from the flex plate.
47. Remove the cap screws (13) that hold the transmission to the flywheel housing.
48. Remove the transmission.

Installation

STEP 13

Carefully move front axle under machine and raise against mounting pads on machine.

STEP 14

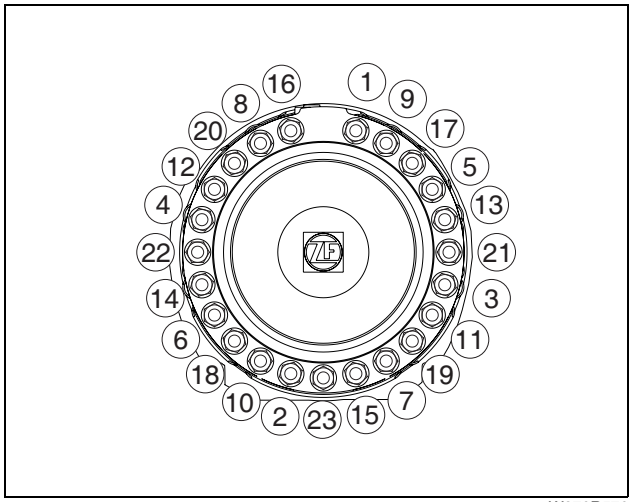


BD01F296

Apply one drop of engine oil to threads prior to assembly. Install eight washers, bolts, washers, and nuts to secure front axle to machine. Tighten bolts to a torque of 1520 to 1712 Nm (1121 to 1263 pound feet).

STEP 15

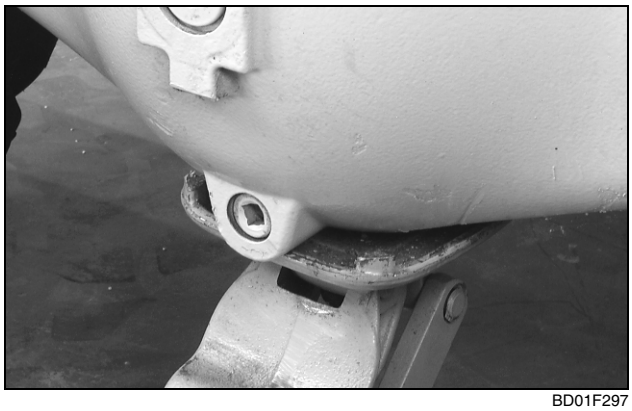
BD01F295



W270R576

Install both wheels on front axle and secure. Tighten bolts to a preliminary torque of 298 Nm (230 pound feet) in sequence indicated; then tighten to a torque of 640 to 720 Nm (475 to 530 pound feet) in same sequence.

STEP 16



BD01F297

Remove jack from front axle.

Transmission Sensor Data Collection

The Transmission ECM collects and uses information from four sensors to accurately shift the transmission and determine if any clutches are slipping. These sensors are:

Engine (Speed) Sensor - monitors engine speed to determine the load on the engine for shift points and sends the engine rpm to the Transmission ECM, which sends the information to the tachometer in the Information Center.

Turbine (Speed) Sensor - assists the engine speed sensor in determining the load going into the transmission and helps determine shift points.

Intermediate (Shaft Speed) Sensor - determines differential gear speed in the transmission to check for clutch slippage.

Output (Speed) Sensor - monitors transmission output shaft speed to help determine the load on the transmission and to assist in determining shift points. Sends output shaft speed to Transmission ECM which sends the information to the speedometer in the Information Center.

The transmission ECM also reviews voltage information from the shifter and transmission solenoids to determine if there are any short circuits or open circuits in the system.

Automatic Problem Modes

If the Transmission ECM detects an error condition in the transmission system, it will generate a service code in the Information Center and will enter one of three modes:

A. Clutch Modulation Substitute Mode

B. Limp-Home Mode

C. Transmission/Transmission ECM Shutdown Mode

Clutch Modulation Substitute Mode

In this mode, the transmission clutch modulation is time dependant rather than load dependant. The transmission will go into the Clutch Modulation Substitute Mode if any of the four speed sensors fail.

If the output speed sensor is working and the transmission is in gear, the shift points in Automatic mode will be speed dependant but the modulation will be a predetermined amount of time.

If the output speed sensor is not working and the transmission is in gear, the shift points will be load dependant but the modulation will still be a predetermined amount of time.

If the transmission is shifted from neutral into a direction in the Clutch Modulation Substitute Mode in automatic, the transmission will shift into 4th gear and shift down until it gets the correct output speed from the turbine.

Limp-Home Mode

In this mode, the transmission will go into second gear, forward or reverse, no matter what gear is selected. If second gear is not obtainable, the Transmission ECM selects a series of prioritized gears until an operable gear is found. The transmission will go into the Limp Home Mode if there is a fault on one clutch, a fault on one clutch valve, or a fault on more than one speed sensor.

Transmission/Transmission ECM Shutdown Mode

In this mode, the Transmission ECM has detected a severe failure that disables control of the transmission. The transmission will go into Shutdown Mode if there is a fault on more than one clutch, a fault on the solenoid power supply, or invalid voltage. In this mode, the Transmission ECM will shut off all solenoid valves and the power supply and the transmission shifts into and stays in neutral.

If the Transmission ECM generates a code, the wrench over the service manual icon will be displayed on the Information Center.

STEP 11

W270R147

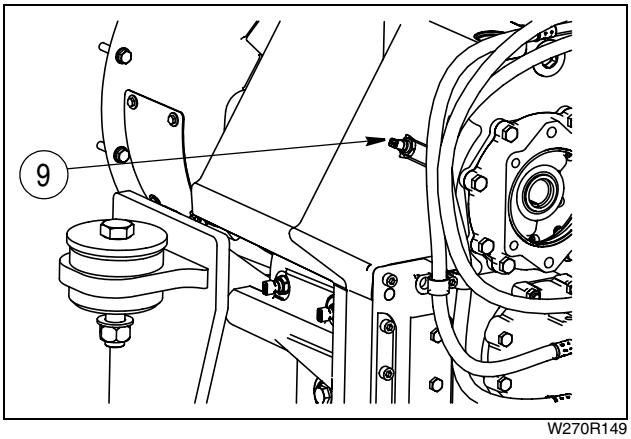
Press off the bearing inner ring from the spur gear.

STEP 12

W270R148

Remove the converter pressure back-up valve.

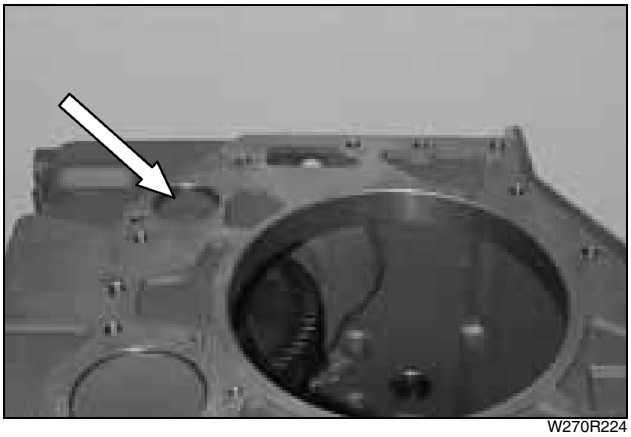
STEP 13



W270R149

Remove the inductive transmitter (9).

STEP 6



W270R224

Rotate the transmission housing by 180°.
Insert the sealing disc (arrow) with the concave side showing downwards into the housing bore until contact.

NOTE: *Wet contact face with Loctite (Type No. 262).*

ATTENTION: *Do not damage the centric orifice bore Ø 0.031 in (0.80 mm) when installing the sealing disc.*

STEP 46

W270R269

Heat the bearing inner ring 2.9 x 1.4 in (75 x 37 mm) and install it until contact.

ATTENTION: *Use safety gloves.*

STEP 47

W270R270

Assemble the spur gear until all inner clutch discs are located.

STEP 48

W270R271

Install the ring.

STEP 49

W270R272

Heat the bearing inner ring 2.9 x 1.6 in (75 x 41 mm) and locate it until contact.

ATTENTION: *Use safety gloves.*

STEP 50

W270R273

Heat the bearing inner ring (clutch bearing) and locate it until contact.

ATTENTION: *Use safety gloves.*

STEP 92

W270R318

Lift the disc carrier out of the clamping ring.
To ensure the exact locating of the single components, preload the bearing with 100 000 N (10 t).

ATTENTION: *Support on the lower as well as upper bearing inner ring. Use pressure pieces.*

STEP 93

W270R319

Lift the disc carrier into the clamping ring.
Rotate disc carrier by 90°. Install the slotted nut.

NOTE: *Observe installation position of the slotted nut. Collar Ø 2.3 in (Ø 60 mm) must show to the taper roller bearing, also see sketch/page 45.*
Oil the thread.

Tightening torque ... = 550 Nm (4867.9 pound inch)

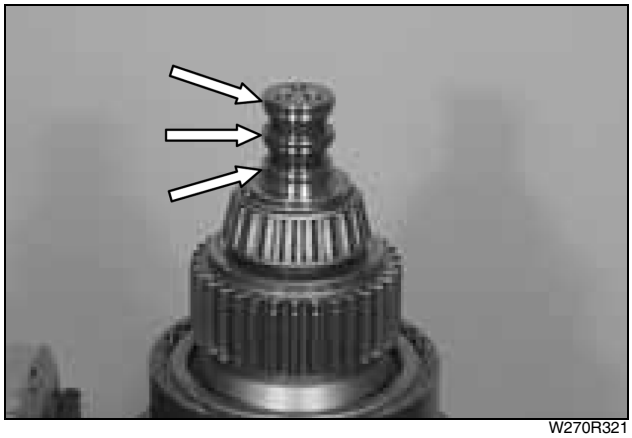
STEP 94

W270R320

Check function of the clutches KV and K1 by means of compressed air.

NOTE: *Closing or opening of the clutches is clearly audible when the single parts have been installed adequately.*

STEP 95

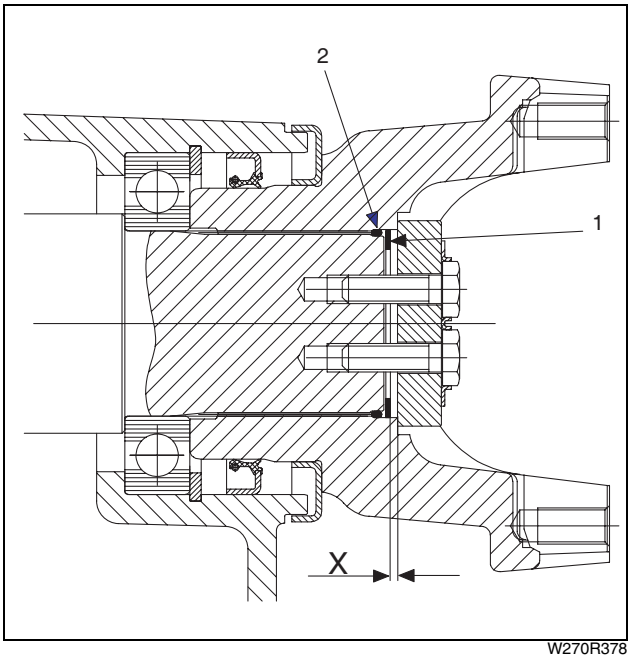


W270R321

Snap-in and lock the rectangular rings (see arrows).

Adjust gap size X = 0.011 ... 0.031 in (0.3 ... 0.8 mm) (Step 152 ... 155)

STEP 152



W270R378

X = Gap size
1 = Shim
2 = O-Ring

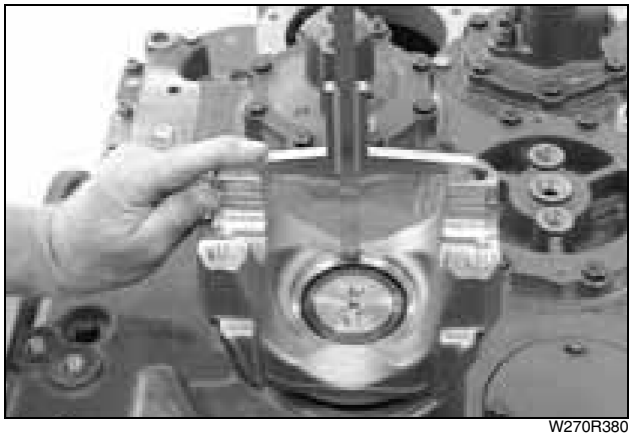
STEP 153

W270R379

Install the output flange until contact.
Measure Dim. I, from the plane face of the output flange to the end face of the output shaft.

Dim. I e.g. .....= 1.45 in (37.00 mm)

STEP 154



W270R380

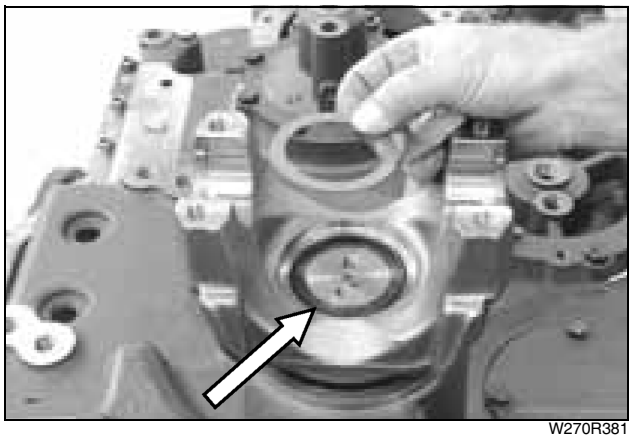
Measure Dim. II, from the plane face to the collar of the output flange.

Dim. II z.B. ..... = 1.41 in (36.00 mm)

Example:

Dim. I ..... 1.45 in (37.00 mm)
Dim. II ..... 1.41 in (36.00 mm)
Difference..... = 0.039 in (1.00 mm)
Gap size X 0.011 ... 0.031 in (0.3 ... 0.8 mm)
e.g. ..... - 0.019 in (0.50 mm)
Resulting shim.....s = 0.019 in (0.50 mm)

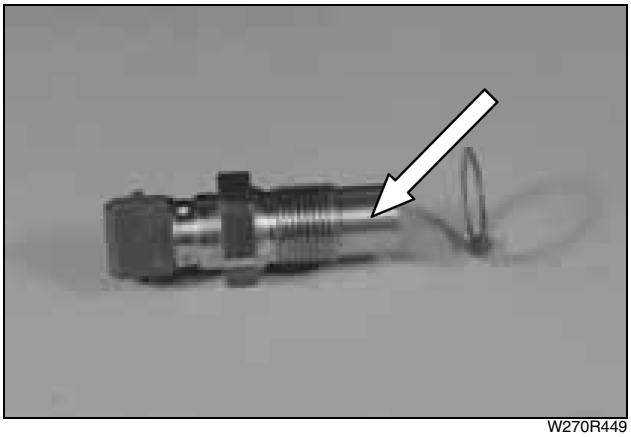
STEP 155



W270R381

Place the O-Ring (arrow) into the space between output flange and shaft (see also Step. 152) and put on the shim.

STEP 222



W270R449

Install the inductive transmitter n – Engine (9), see arrow.

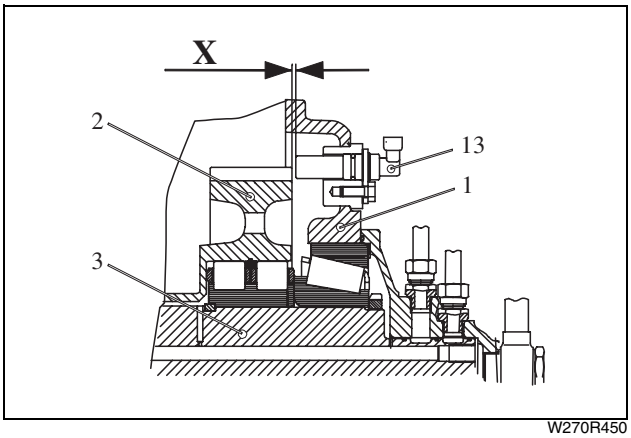
Tightening torque .....= 30 Nm (265.5 pound inch)

Set and install the inductive transmitter n – Turbine (14) and n-internal speed input (5) analogously.

NOTE: *Observe the different setting dimensions. Installation position of the single inductive transmitters, also see Step 215 and 216.*

Install speed transmitter n – Output/Speedo (13) (Step 223... 228)

STEP 223



W270R450

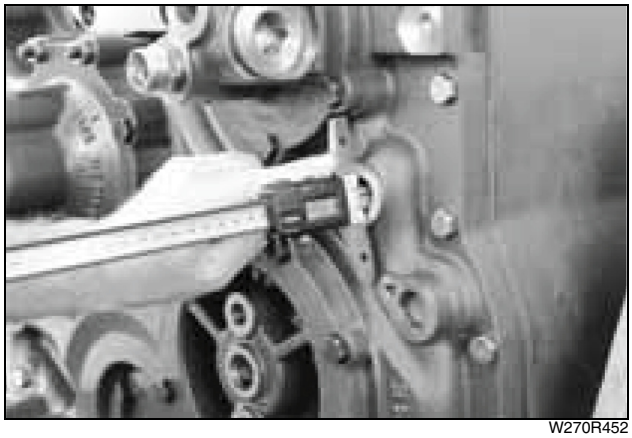
1 = Housing
2 = Spur gear K3
3 = Disc carrier
13 = Speed transmitter (Hall sensor)
X = Setting dimension “X” = 0.039 + 0.019 in (1.0 + 0.5 mm)

STEP 224

W270R451

Opposite figure shows the speed transmitter (Hall sensor).

STEP 225



W270R452

Determine Dim. I, from the housing face to spur gear K3.

Dim. I e.g..... = 1.56 in (39.70 mm)

STEP 226

W270R453

Measure Dim. II, from the contact face to the mounting face.

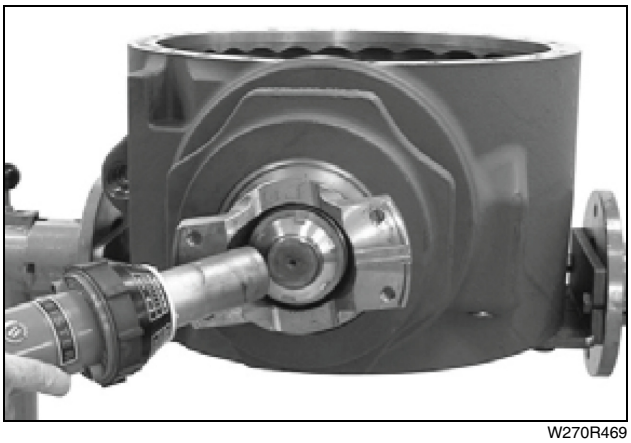
Dim. II e.g..... = 1.57 in (40.00 mm)

STEP 33

W270R468

Pull the bearing outer ring (see arrow) out of the bearing hole and remove the shim behind.

STEP 34

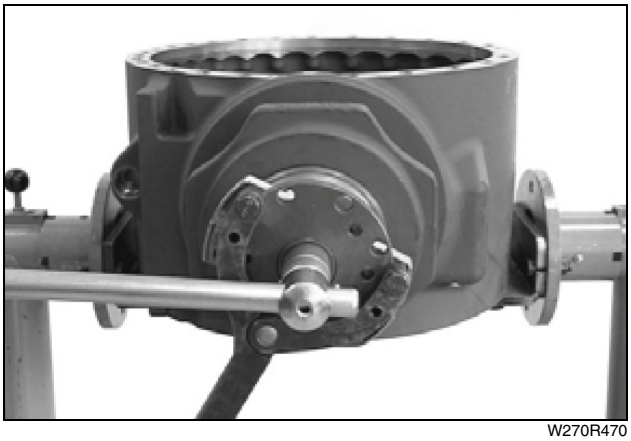


W270R469

Heat slotted nut by means of hot-air blower.

NOTE: *Slotted nut is secured with Loctite (Type no.: 262).*

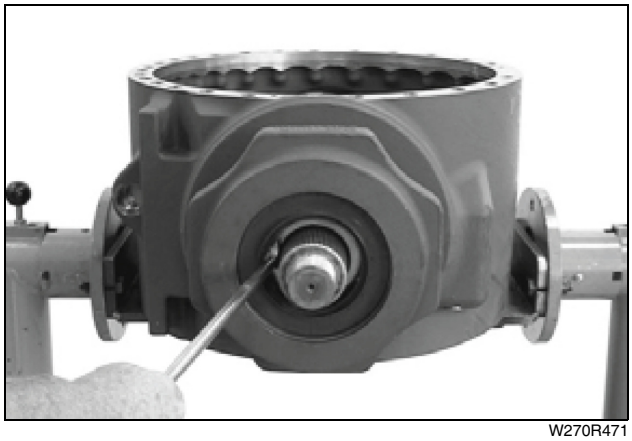
STEP 35



W270R470

Loosen the slotted nut and remove the shim behind.

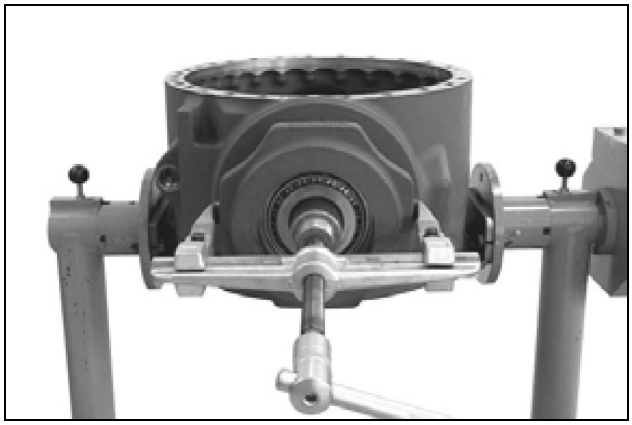
STEP 36



W270R471

Pull input flange from the input pinion and use a lever to lift the shaft seal ring behind out of the axle drive housing.

STEP 37



W270R472

Use a two-armed puller to press the input pinion out of the axle drive housing and remove the releasing tapered roller bearing.

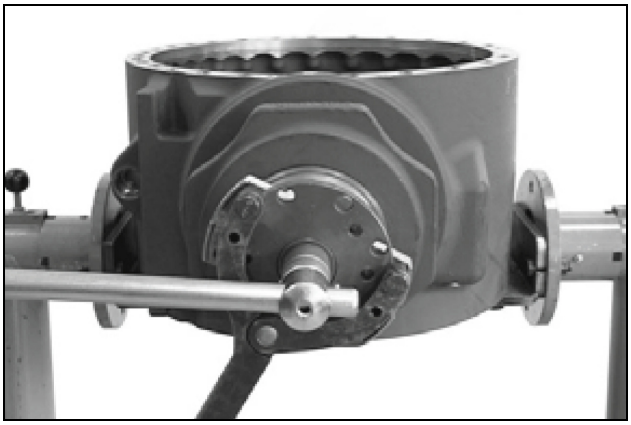
STEP 38

W270R473

Remove the spacer and pull the tapered roller bearing from the input pinion.

Reassembly of shaft seal ring (STEP 52 … 54)

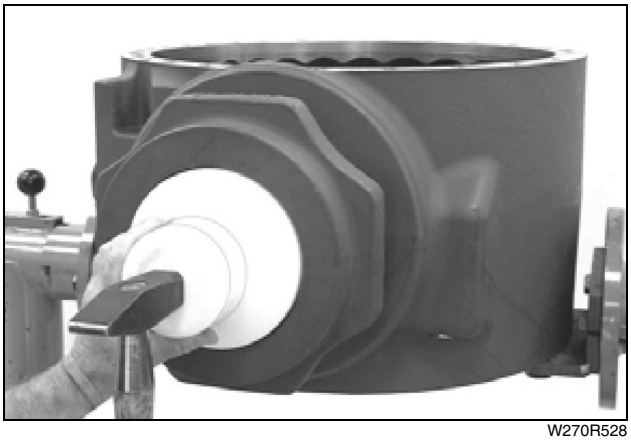
STEP 52



W270R470

Loosen slotted nut and pull the input flange from the input pinion.

STEP 53



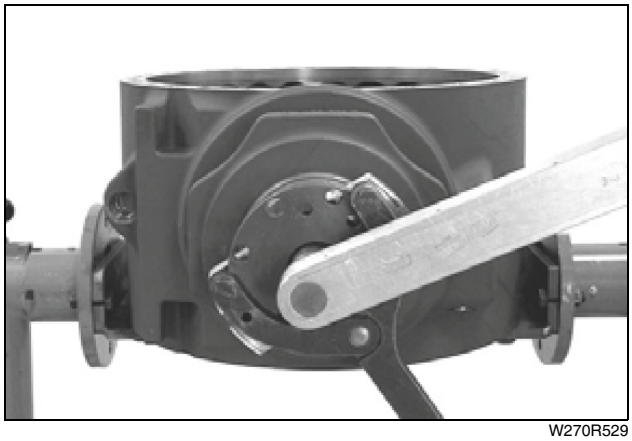
W270R528

Mount the shaft seal ring with the seal lip showing to the oil chamber.

NOTE: *The exact installation position of the shaft seal ring is obtained when using the specified driver tool.*

ATTENTION: *Wet the outer diameter of the shaft seal ring with spirit directly before installation and fill the space between seal and dust lip with grease.*

STEP 54



W270R529

Insert input flange and finally tighten by means of disk and slotted nut.

Tightening torque .....= 1200 Nm (885 pound feet)

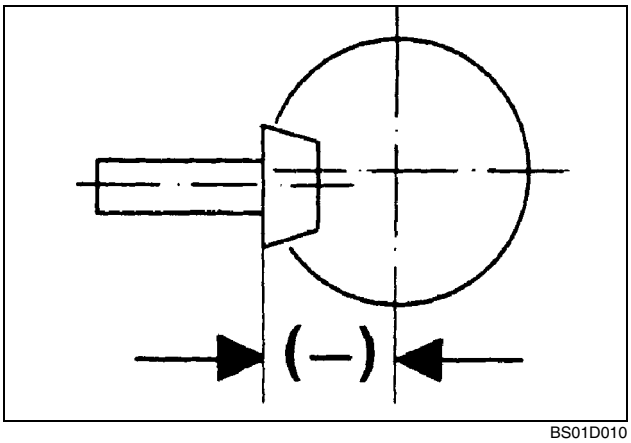
ATTENTION: *Cover the thread of the slotted nut with Loctite (Type no.: 262).*

STEP 55

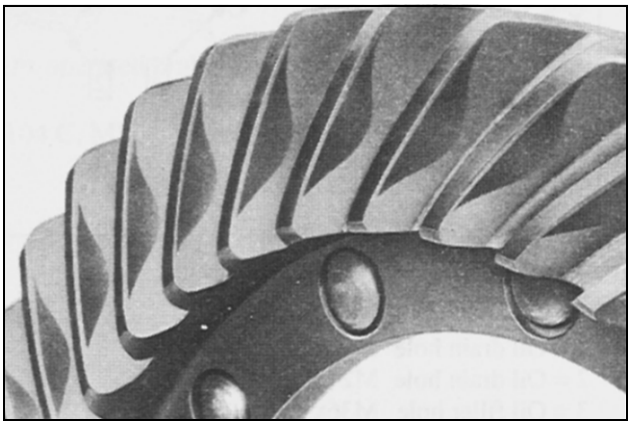
W270R530

Grease O-ring (see arrow) and insert it into the annular groove of the bearing housing.

Pinion Distance Must Be Decreased

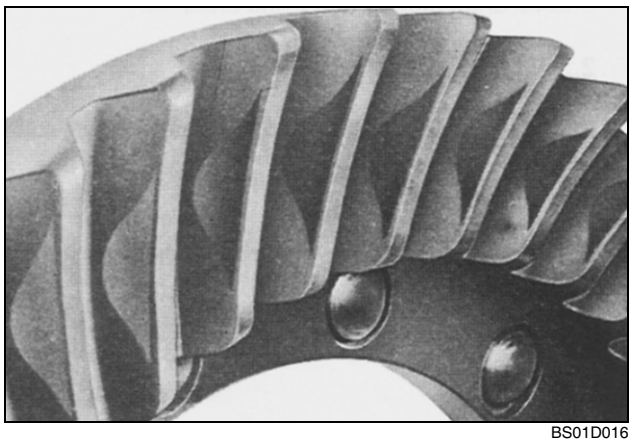


BS01D010



BS01D015

COAST SIDE (CONCAVE)



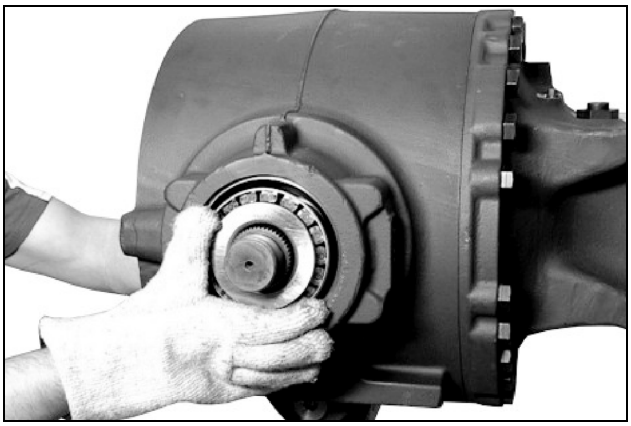
BS01D016

DRIVE SIDE (CONVEX)

STEP 64

WARNING: *Always wear heat protective gloves to prevent burning your hand when handling heated parts.*

SM121A

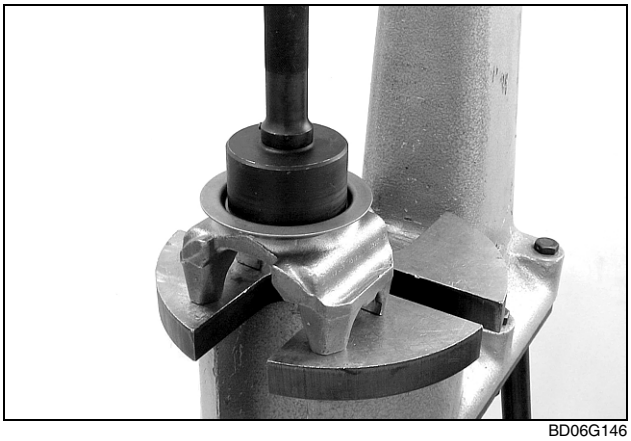


W230R576

Heat the pinion shaft outer bearing to 120° C (248° F) in a bearing oven. Wearing heat resistance gloves or mittens, install the bearing on the pinion shaft until contact.

NOTE: *Prior to mounting the input flange and tightening the nut, allow the bearing to cool to ambient temperature.*

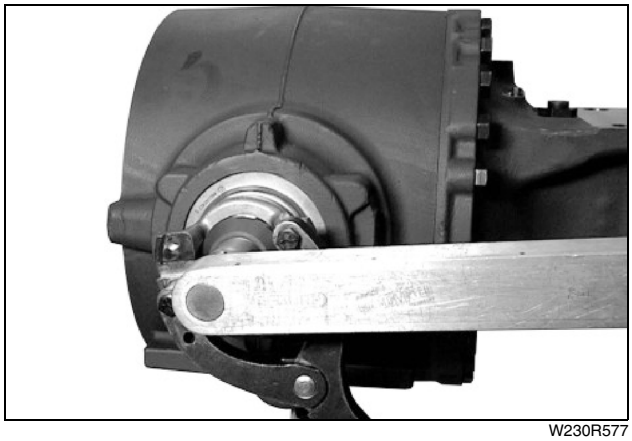
STEP 65



BD06G146

Press the dust shield on the input flange.

STEP 66



W230R577

Install the input flange on the pinion shaft.

STEP 67

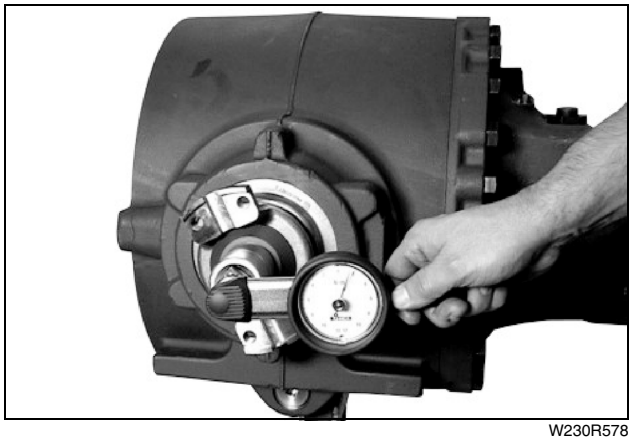
Put the washer in place on the pinion shaft.

STEP 68

Install holding wrench, 380001546, on input flange. Hold flange using holding tool and tighten nut to a torque of 1200 Nm (885 pound feet). Remove holding wrench.

NOTE: *When tightening rotate the pinion shaft in both directions several times.*

STEP 69



W230R578

Check the rolling torque of the drive pinion bearing. The rolling torque should be 1.5 to 4.0 Nm (13.3 to 35.4 lb-inch). If rolling torque is too low, install a thinner spacer (Step 63); if rolling torque is too high, install a thicker spacer (Step 63).

Section
6005

DRIVE SHAFTS, CENTER BEARING, AND UNIVERSAL JOINTS

6005

CNH Italia S.p.A.
Via Plava, 80
10135 Torino
Italia

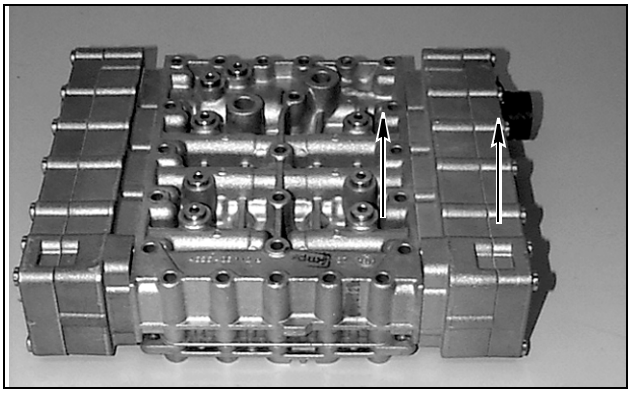
84547255A

Printed in E.C.
Issued November, 2011

CONTROL VALVE

Disassembly

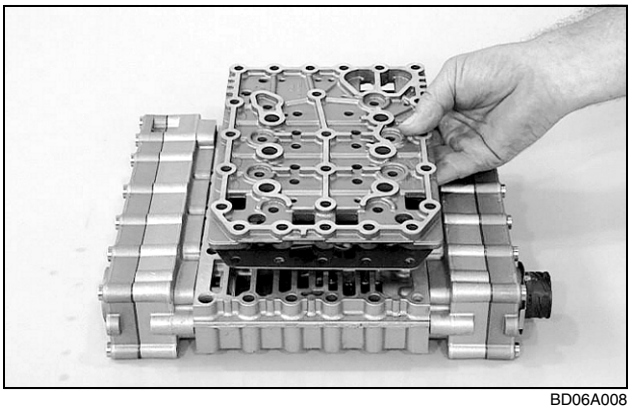
STEP 1



BD06A007

Mark the installation position of the wiring harness to the valve block.

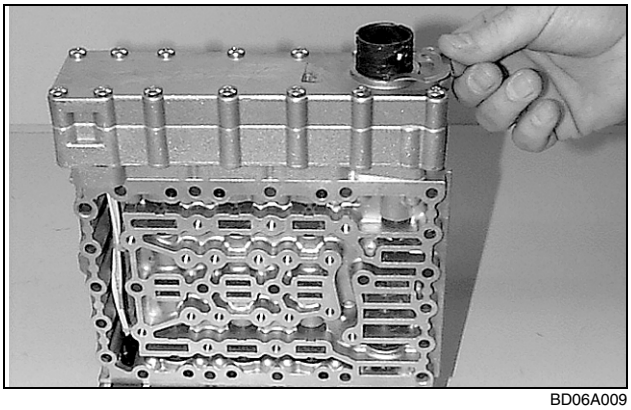
STEP 2



BD06A008

Loosen and remove the cap screws that secure the distribution plate and intermediate plate to the valve body, remove the intermediate plate and distribution plate.

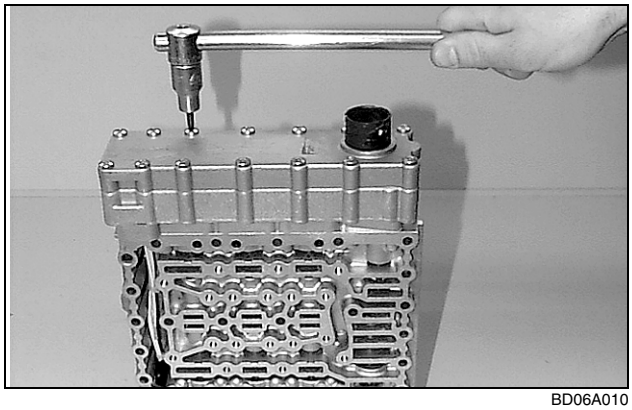
STEP 3



BD06A009

Remove the wiring harness retaining clamp.

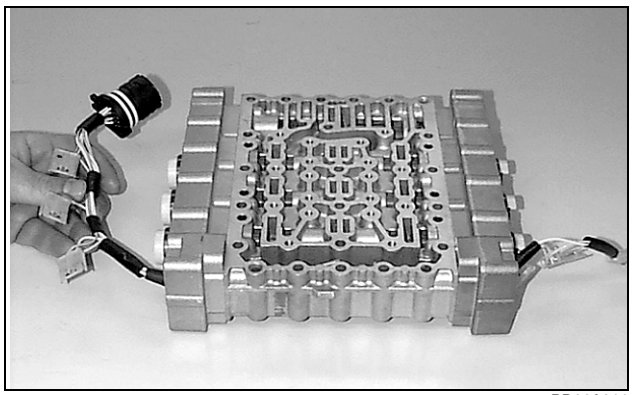
STEP 4



BD06A010

Loosen and remove the cap screws, remove the cover. Remove the opposite cover.

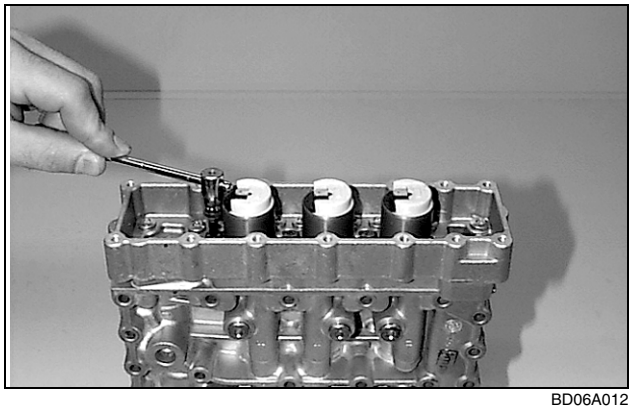
STEP 5



BD06A011

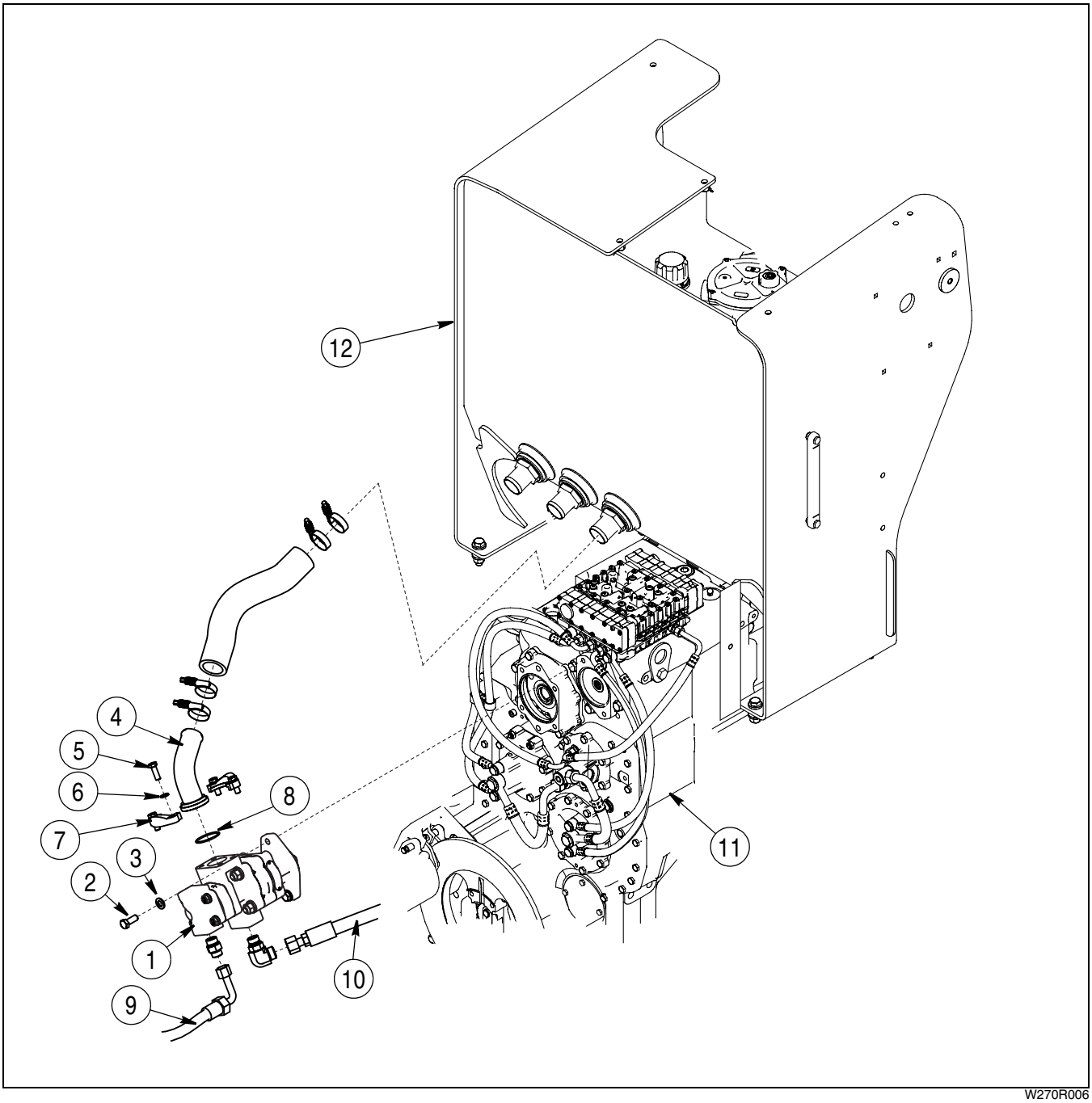
Remove the wiring harness.

STEP 6



BD06A012

Loosen and remove the retaining plate cap screws, remove the retaining plates and solenoids.



W270R006

1. BRAKE PUMP
2. MOUNTING BOLT
3. WASHER
4. SUCTION HOSE
5. BOLT
6. WASHER
7. FLANGE
8. O-RING
9. HOSE BRAKE PUMP TO BRAKE VALVE
10. PRESSURE HOSE
11. TRANSMISSION
12. HYDRAULIC TANK

BRAKE PUMP ILLUSTRATION

SPARE PARTS LIST

1. Seal kit
2. Complete pedal support
3. Dust rubber
4. Pedal rubber cover
5. Solenoid 24V Deutsch connector
6. Solenoid + Cartridge valve

PARKING BRAKE TEST PROCEDURE

STEP 20

While testing, the machine must be on a clear level surface with the bucket in the travel position.

WARNING: *Always know the location of all workers in your area. Warn them before you start working the machine. Always keep all other persons away from your area. Serious injury or death can result if you do not follow these instructions.*

SA015

STEP 21

Start the machine and run the engine at low idle in third gear neutral.

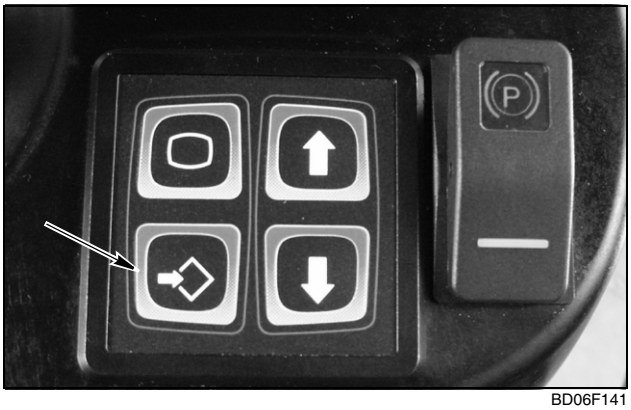
STEP 22

Place the Transmission-Auto switch to the manual position.

STEP 23

Place the Parking Brake switch to the ON position.

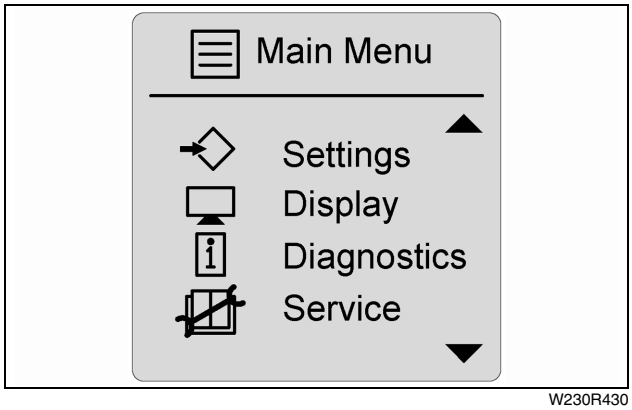
STEP 24



BD06F141

Press and hold the enter key for 2 to 3 seconds until the instrument cluster monitor display changes to the select screen.

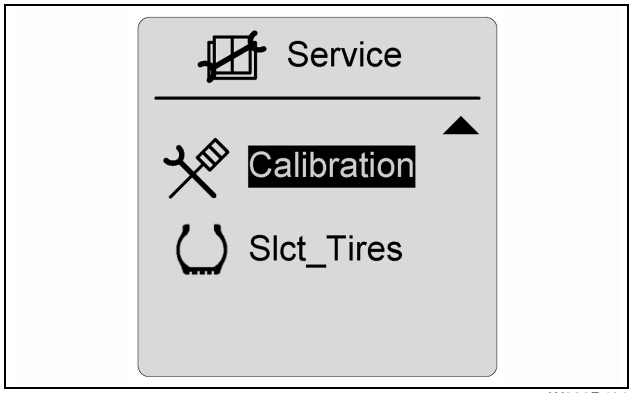
STEP 25



W230R430

Use up or down arrow and highlight Service, press the enter key to select the config menu.

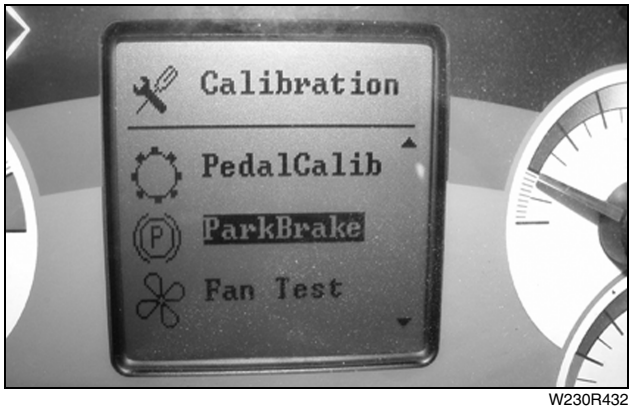
STEP 26



W230R431

Press the up or down arrow and high light Calibration, press the enter key.

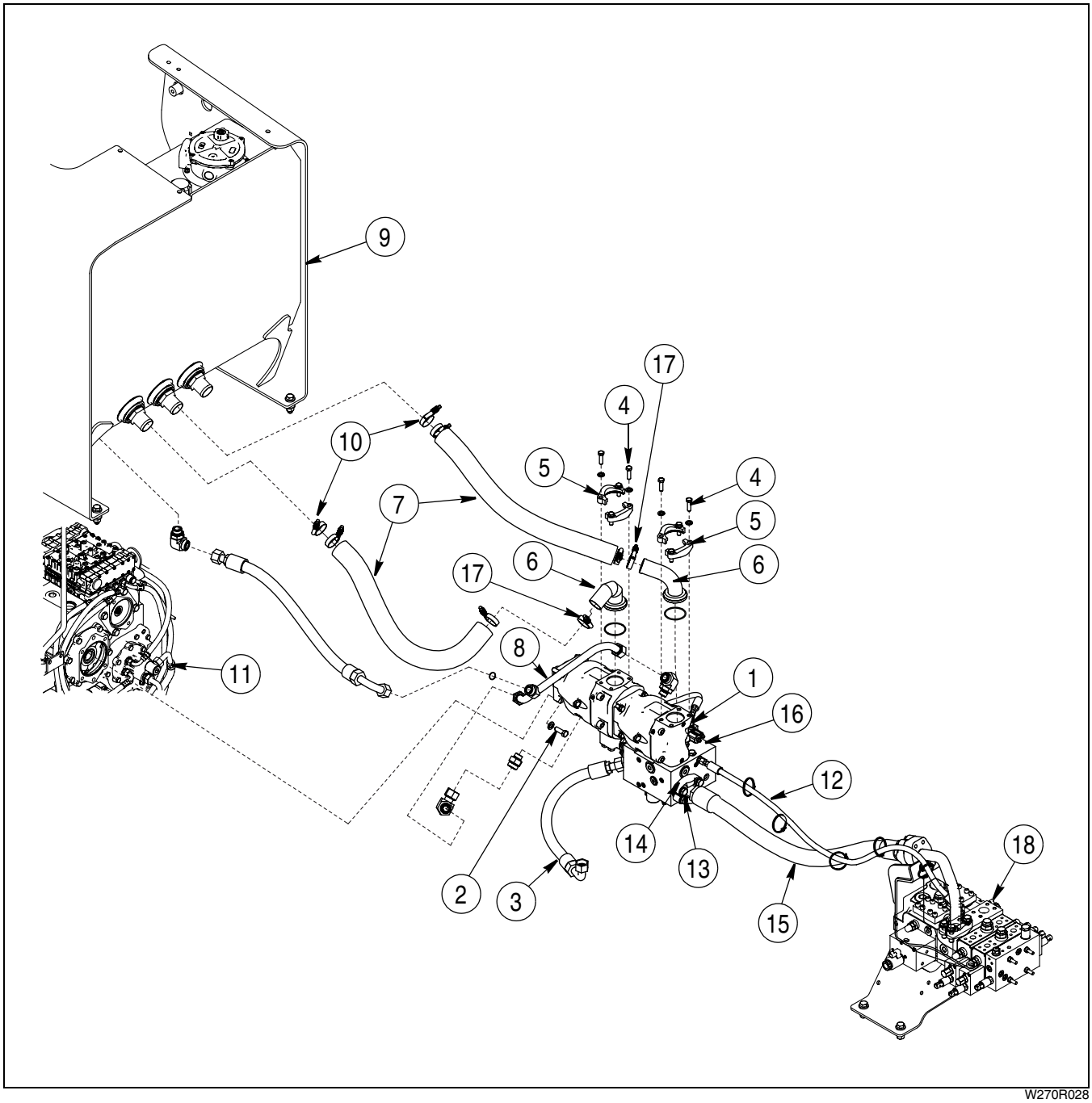
STEP 27



W230R432

Press the up or down arrow and high light Park Brake, press the enter key.

HYDRAULIC PUMP



W270R028

1. PUMP MAIN HYDRAULIC
2. MOUNT BOLTS
3. DRAIN HOSE
4. BOLT
5. SPLIT FLANGE
6. TUBE
7. HOSE SUCTION
8. HOSE CASE DRAIN
9. HYDRAULIC TANK
10. CLAMPS
11. TRANSMISSION
12. LOADER LOAD SENSE HOSE
13. BOLT
14. SPLIT FLANGE
15. LOADER HIGH PRESSURE
16. STEERING PRIORITY MANIFOLD
17. CLAMPS
18. LOADER VALVE

FAN REVERSING VALVE

Removal

STEP 183

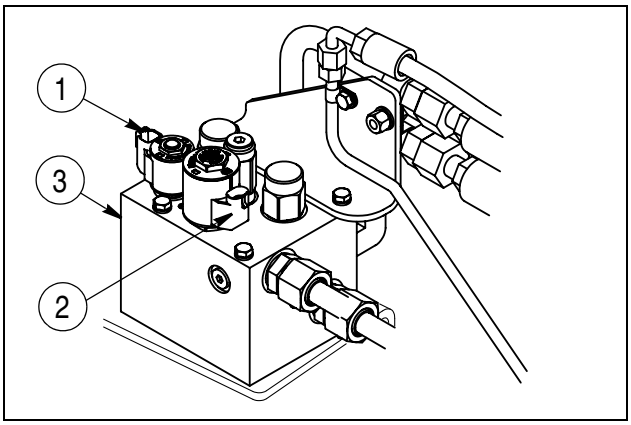
Park the machine on a level surface and lower the bucket to the ground. Stop the engine and apply the parking brake.

IMPORTANT: *With the engine NOT running, pump the brake repeatedly to be sure the brake accumulators have no hydraulic pressure, put the ignition switch in the ON position then move the loader control valve back and forth several times to release any hydraulic pressure in the pilot control circuit, turn ignition switch OFF.*

STEP 184

Loosen the filler cap on the hydraulic reservoir to release the air pressure in the reservoir. Connect a vacuum pump to the hydraulic reservoir, turn on the pump.

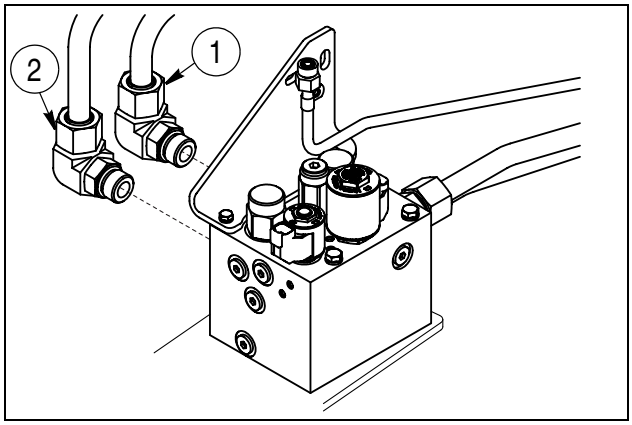
STEP 185



W270R037

Disconnect the electrical connector (1-2) for the fan reversing valve (3).

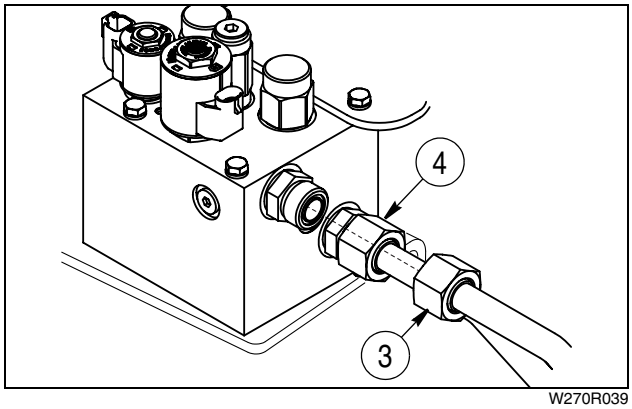
STEP 186



W270R038

Tag and disconnect the fan forward hose (1) from the fan reversing valve. Install a plug in the hose and a cap on the fitting. Tag and disconnect the fan reverse hose (2) from the fan reversing valve. Install a plug in the hose and a cap on the fitting.

STEP 187



W270R039

Tag and disconnect the fan valve return hose (3) from the fan reversing valve. Install a plug in the hose and a cap on the fitting. Tag and disconnect the fan valve supply hose (4) from the fan reversing valve. Install a plug in the hose and a cap on the fitting.

STEP 188

Loosen and remove the nuts, washers and bolts.

STEP 189

Remove the fan reversing valve from the machine.

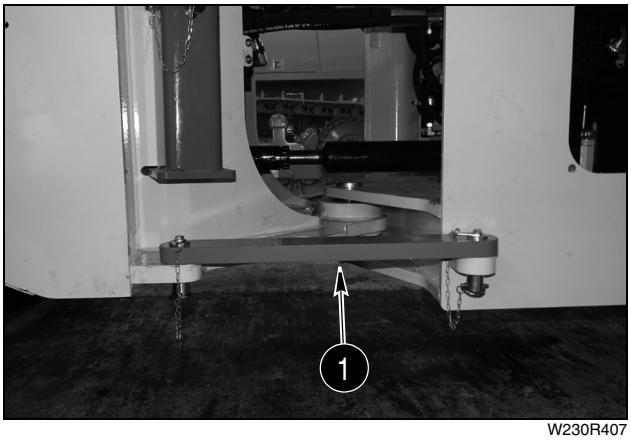
STEP 190

Remove and discard all O-rings from the fittings.

TESTING AND ADJUSTING THE STEERING LIMIT PRESSURE

Pressure Check

STEP 1

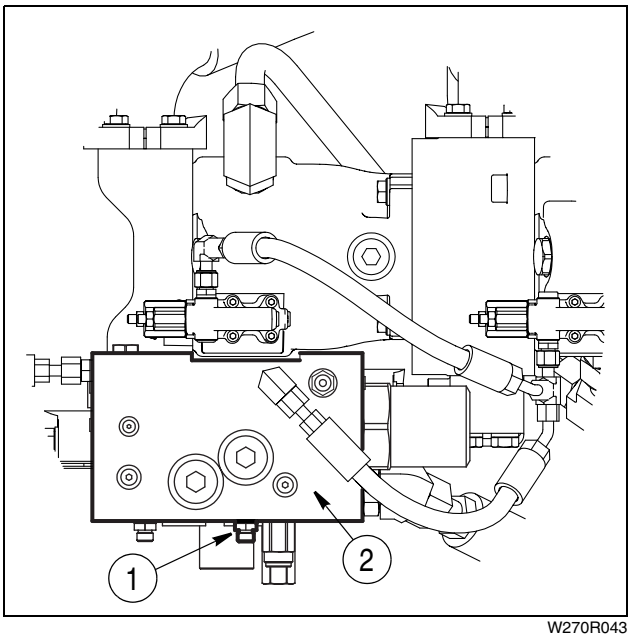


W230R407

1. ARTICULATION LOCK

Install articulation lock (1).

STEP 2



W270R043

1. TEST PORT **G1** (LOAD LIMIT)

Connect a 345 bar (5000 psi) test gauge to the test port **G1** (1), located on the priority valve (2).

STEP 3

Make sure that the temperature of the hydraulic oil is at least 54°C to 57°C (129°F to 135°F). The following is the procedure for heating the hydraulic oil.

A. Start the engine and run at full throttle.

B. Lower the loader bucket to the ground and hold the lift control lever in the FLOAT position.

C. Roll the bucket back against the stops and hold.

- To measure the oil temperature with the instrument cluster:

A. Press the up or down arrow key.

B. Stop at the info screen with the temperatures that need to be monitored are on.

After heating oil to operating temperature, lower bucket to the ground, turn off the engine, and relieve all pressure in the hydraulic system.

STEP 4

Start the engine and run at full throttle.

STEP 5

Steer hard in either direction over relief pressure.

STEP 6

Record the reading on the test gauge.

STEP 7

Reading should be 239 to 243 bar (3465 to 3525 psi).

STEP 8

If this reading is more or less than specified, it will be necessary to adjust the steering limit pressure.

FLUSHING WATER FROM THE HYDRAULIC SYSTEM

1. Start and run the engine at 1500 rpm (r/min).
2. Completely retract the cylinders of all attachments on the machine. Angle the blade to the right, the right cylinder will be fully retracted and the left will be fully extended. Stop the engine.

WARNING: *If retracting the cylinder rods causes the attachments to be raised, block the attachments in place before proceeding to the next step!*

39-4

NOTE: *Any attachment or part of an attachment that is raised must be supported with acceptable equipment to prevent the attachment from falling.*

3. Move each control lever in both directions to release pressure in the hydraulic circuits.
4. Loosen and remove the filler cap from the reservoir.
5. Drain the hydraulic oil from the reservoir.
   A. See Section 1002 for capacity specifications.
   B. Have available acceptable equipment to drain the hydraulic oil.
   C. Remove the drain plug from the bottom of the reservoir.
6. Remove the hydraulic filter elements from the machine.
7. Install new hydraulic filter elements on the machine.
8. Install the drain plug in the bottom of the reservoir.
9. Fill the hydraulic reservoir with hydraulic fluid. See Section 1002 for specifications.
10. Disconnect the line from the OPEN end and CLOSED end of each cylinder.
11. Be sure all control levers are in the NEUTRAL position.
12. Start and run the engine at low idle.

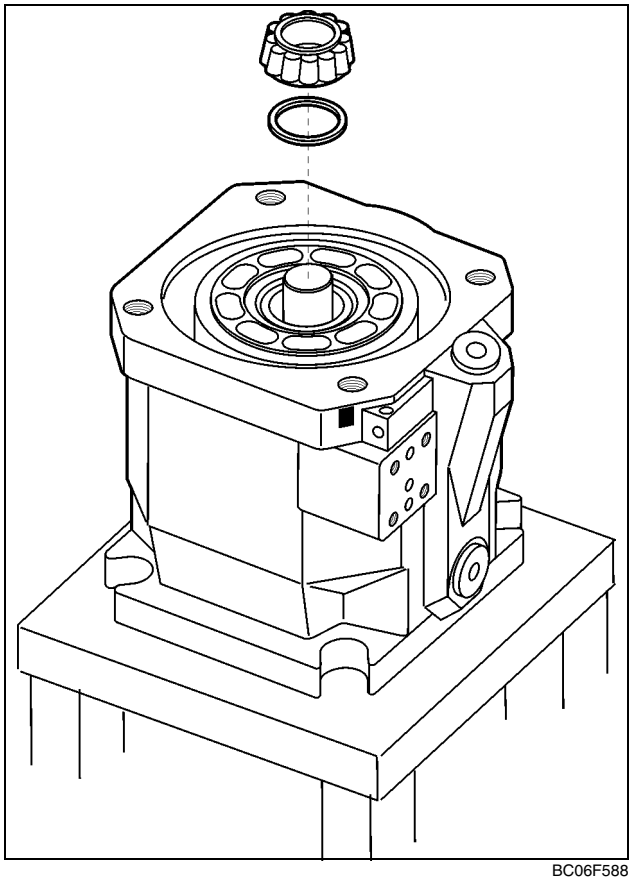
IMPORTANT: *Check the oil level in the hydraulic reservoir frequently while doing step 13. Have another person hold a container under the hydraulic lines while you do step 13.*

13. Slowly move each control lever in both directions until oil begins to flow from the open line. Hold the control lever in place until clean oil flows from the open line.
14. Stop the engine.
15. Connect the system line to the CLOSED end of each cylinder.
16. Connect a suitable drain line to the OPEN end of each cylinder and place the other end in an acceptable container for contaminated oil.
17. Start the engine and run the engine at low idle.
18. Slowly and completely extend all cylinders. As the piston rod comes in/out of the cylinder, oil will be pushed out of the OPEN end of the cylinders.

NOTE: *Any attachment or part of an attachment that is raised must be supported with acceptable equipment to prevent the attachment from falling.*

19. Support any attachments that will be in the RAISED position.
20. Stop the engine.
21. Disconnect the drain lines and connect the system lines to the cylinders.
22. Check the oil level in the hydraulic reservoir. Add oil as required. See Section 1002 for specifications.
23. Install the filler cap on the reservoir.
24. Remove the hydraulic filter elements from the machine.
25. Install new hydraulic filter elements on the machine.
26. Start and run the engine at 1500 rpm (r/min), operate each hydraulic circuit to completely extend and retract the cylinders.
27. Stop the engine and check for leaks. Check the oil level in the hydraulic reservoir. Add oil as required. See Section 1002 for specifications.

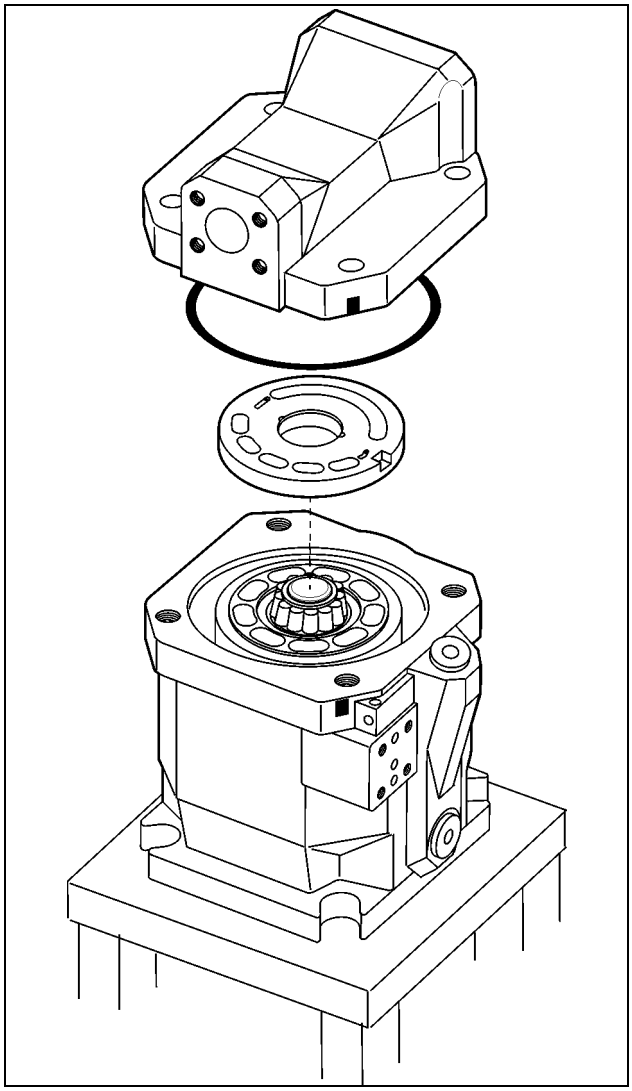
STEP 40



BC06F588

Use the shim that was required for the bearing pre load in step 30. Install the shim and bearing onto the shaft.

STEP 41



BC06F589

Install a new O-ring on the end cover, place the flow plate onto the rotating group with aligning notch up. Place the end cover onto the housing, make sure that the aligning pin in the end cover aligns with the slot in the flow plate.

STEP 14
Install and torque flow limit valve (20) to 20 to 25 Nm (177 to 221 pound inches).

STEP 15
Install the check valve (16). Torque locking screw to 100 Nm (73.7 pound feet).

STEP 16
Lubricate spools with hydraulic oil and push spools (31, 35 and 37) into housing (11).

IMPORTANT: *Do not force spools into housing.*

STEP 17
Install spring retainers (23), springs (24), covers (33 and 26), and bolts (32). Torque bolts to 8.3 Nm (73.4 pound inches).

STEP 18
Install spring retainers (23), spring (24 and 25), cover (28), and bolts (27). Torque bolts to 8.3 Nm (73.4 pound inches).

NOTE: *Prior to installation in the machine, circuit reliefs can be tested.*

STEP 19
Install valve in machine, see section 8001.

STEP 20
Check loader limit pressure, see section 8002.

Circuit Relief Pressure Test

STEP 1
Connect the hand pump to the port for anticavitation and circuit relief valves (19).

NOTE: *Repeat steps for machines that are configured with a 3 or 4 spool valve.*

STEP 2
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 3
Operate the handle of the hand pump and read the highest pressure. Repeat this step several times to be sure of the reading.

STEP 4
Compare the reading to the specifications on Page 3.

STEP 5
If the pressure is not correct, adjust the circuit relief valve.

Circuit Relief Adjustment

STEP 1
Loosen the lock nut. Turn the adjustment screw clockwise to increase the pressure or counterclockwise to decrease the pressure.

NOTE: *One turn of the adjusting screw will change the pressure approximately 138 bar (2000 psi).*

STEP 2
Check the pressure again. Repeat the adjustment as necessary.

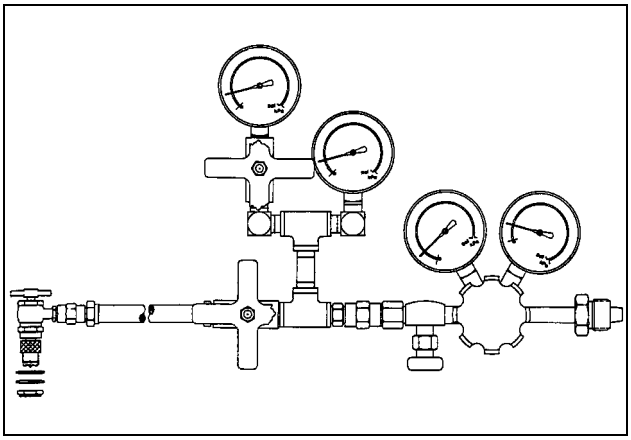
SPECIFICATIONS

Ride Control Accumulator Dry Nitrogen Pressure ..... See chart on page 7

Ride Control Accumulator Fluid Capacity ..... 3.78 liters (230 cu. inch)

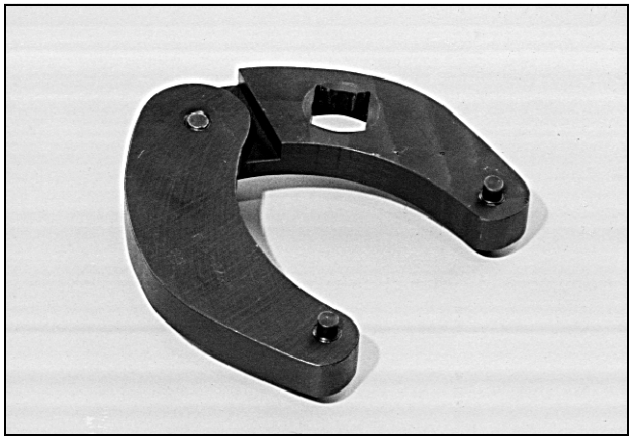
Ride Control Accumulator Maximum Operating Pressure .....280 bar (4061 psi)

SPECIAL TOOLS



94L95

380001737 NITROGEN ACCUMULATOR CHARGING KIT



B786441M

380001738 GLAND WRENCH

SAFETY PROCEDURES

THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH. M171B

ATTENTION: *Only authorized technicians certified by an approved training and certification organization may service or repair motor vehicle or mobile air conditioning systems. It is mandatory that all refrigerant must be RECOVERED and RECYCLED when removed from a system during servicing.*

Refrigerant HFC-134a is the most stable, and easiest to work with of the refrigerants now used in air conditioner systems. Refrigerant HFC-134a does not contain any chlorofluorocarbons (CFC's) which are harmful to the earth's ozone layer.

Safety procedures must be followed when working with Refrigerant HFC-134a to prevent possible personal injury.

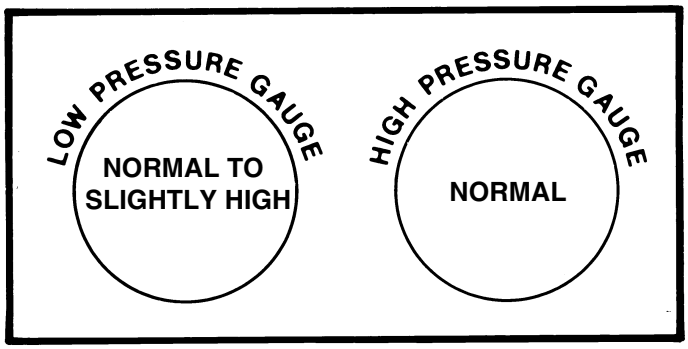
1. Always wear safety goggles when doing any service work near an air conditioner system. Liquid refrigerant getting into the eyes can cause serious injury. Do the following if you get refrigerant near or in your eyes:

   A. Flush your eyes with water for 15 minutes.

   B. See a physician immediately.

2. A drop of liquid refrigerant on your skin may cause frostbite. Open the fittings carefully and slowly when it is necessary to service the air conditioner system. Your skin must be treated for frostbite or a physician must be seen if you get refrigerant on your skin.
3. Keep refrigerant containers in the correct upright position. Always keep refrigerant containers away from heat and sunlight. The pressure in a container will increase with heat.
4. Always reclaim refrigerant from the system, if you are going to weld or steam clean near the air conditioner system.
5. Always check the temperature and pressure of the air conditioner system before reclaiming refrigerant and when you test the system.
6. Dangerous gas can form when refrigerant comes in contact with an open flame. Never permit fumes to be inhaled.
7. Never leak test with compressed air or flame testers. Tests have indicated that compressed mixtures of HFC-134a and air can form a combustible gas.
8. Always reclaim refrigerant from the system before removing any air conditioning component.

PROBLEM: NOT ENOUGH COOLING



476L7

SEE PRESSURE - TEMPERATURE CHART ON PAGE 14

Air in the System - Indications:

A. Suction line warm to your hand. B. Discharge air from heater/evaporator only a little cool.	→	1. Test system for leaks. See page 11. Possible leak has let air enter; check compressor seal carefully. 2. Discharge system of refrigerant. See Section 9003. 3. Repair system leak as necessary. 4. Replace receiver-drier. 5. Check compressor oil level. 6. Remove air and moisture from the system. See Section 9003. 7. Charge system with new refrigerant. See Section 9003.

STEP 18

A22114

Completely close the high and low pressure manifold valves.

ATTENTION: *Check the OEM equipment manual before performing Step 19 to avoid damaging the recovery unit. The pressure reading should be obtainable with valves closed. Damage may occur if the machine is started with the valves accidently open or if either or both valves are opened while the A/C system is operating.*

STEP 19

Start the engine and run at 1500 RPM. Operate the air conditioner system at maximum cooling setting and blower speed with the doors and windows open.

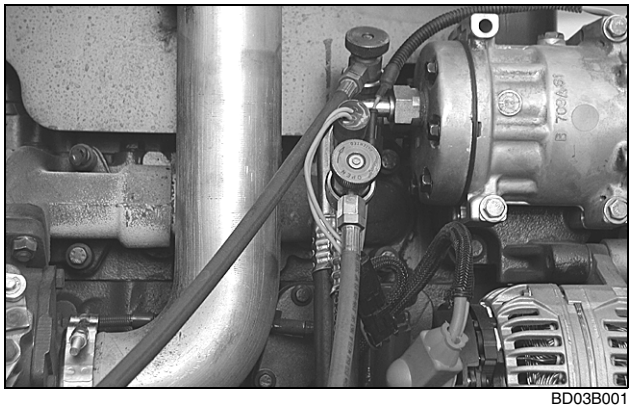
NOTE: *The compressor will not operate if the system pressure is too low or too high. The pressure indicator lamp will illuminate when the relay is actuated by a low or high pressure and the compressor clutch will disengage. To restart the compressor, the air conditioner control or blower switch must be turned to the OFF position and then to the ON position.*

STEP 20

A22117

Observe the pressure gauge readings to determine that the correct amount of refrigerant has entered the system. See chart on Page 9002-9 for temperature and pressure variations.

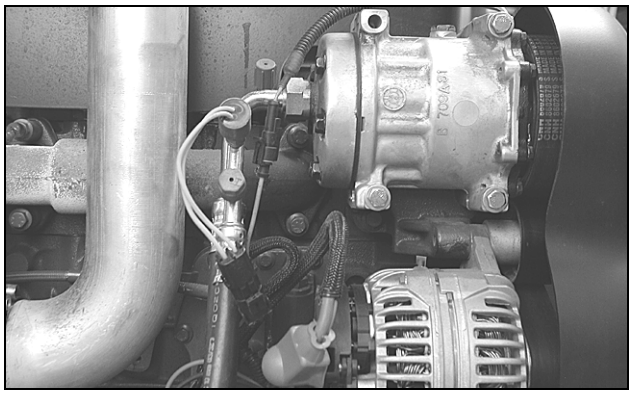
STEP 21



BD03B001

Stop the engine, close any open valves and carefully remove the manifold gauge hoses.

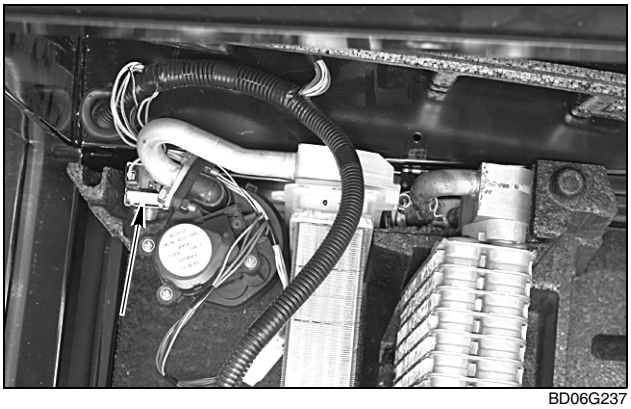
STEP 22



BD03B213

Install the caps on the service ports on the suction and discharge hoses.

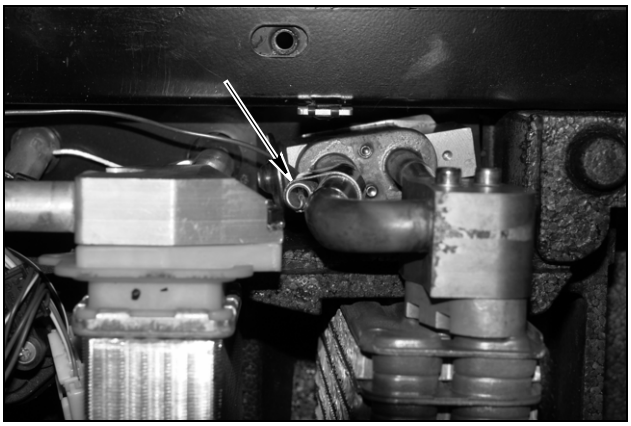
STEP 58



BD06G237

Connect the electrical connectors to the thermostat control.

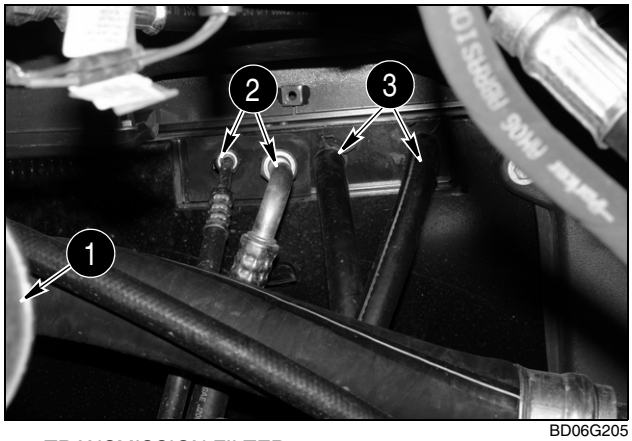
STEP 59



BD06G206

Install the thermostat probe coil and clamp to the evaporator core “cold” tube.

STEP 60



BD06G205

1. TRANSMISSION FILTER
2. AIR CONDITIONING HOSES
3. HEATER HOSES

Remove the plugs from the hoses and the caps from the fittings. Install new O-rings in the evaporator fittings, connect the heater and evaporator hoses. Remove and discard identification tags that were used during disassemble.

STEP 61

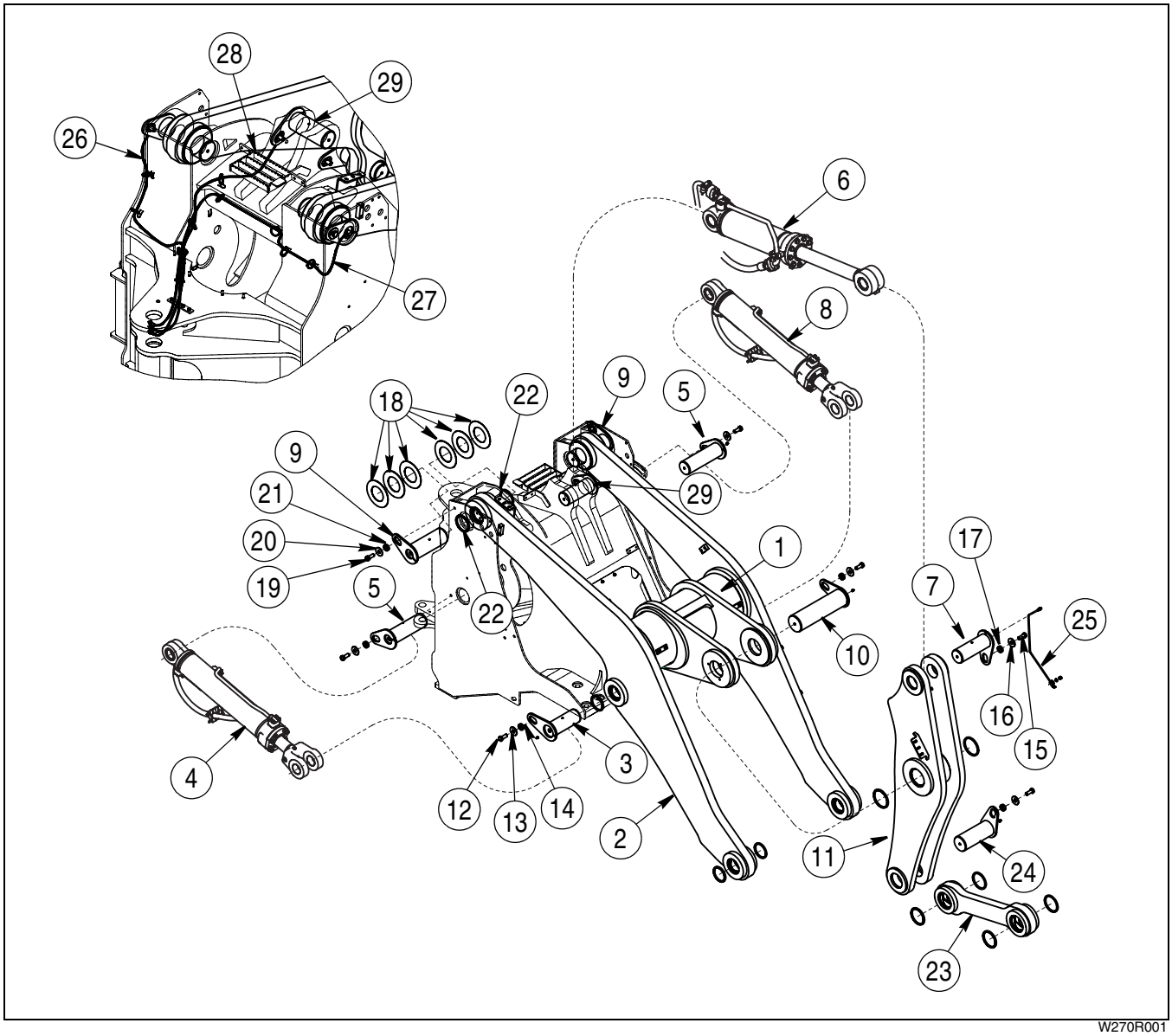
BD06G204

Install the right side cab skirt.

STEP 62

BD06G238

Install the upper PPE on the heater and air conditioning cores.



W270R001

1. CROSS MEMBER
2. LOADER FRAME
3. PIVOT PIN 10.8 in (276 mm)
4. LIFT CYLINDER
5. PIVOT PIN 13.5 in (343 mm)
6. BUCKET CYLINDER
7. PIVOT PIN 11.6 in (295 mm)
8. LIFT CYLINDER
9. PIVOT PIN 12.9 in (329 mm)
10. PIVOT PIN 18.5 in (472 mm)
11. BELL CRANK
12. BOLT
13. WASHER
14. SPACER
15. BOLT
16. WASHER
17. SPACER
18. WASHER
19. BOLT
20. WASHER
21. SPACER
22. WIPER
23. DUMP LINK
24. PIVOT PIN 11.6 in (295 mm)
25. TUBE GREASE
26. HOSE GREASE
27. HOSE GREASE
28. HOSE GREASE
29. PIVOT PIN 10.4 in (266 mm)

LOADER FRAME ILLUSTRATION