COLOR ABBREVIATION

NUMBER	COLOR	NUMBER	COLOR
0	--- BLACK	5	--- GREEN
1	--- BROWN	6	--- BLUE
2	--- RED	7	--- VIOLET (PURPLE)
3	--- ORANGE	8	--- GRAY
4	--- YELLOW	9	--- WHITE

CIRCUIT LABEL IDENTIFICATION

0.8-29--123

"0.8" WIRE GAUGE IN mm2 (SAE) (18 GAUGE)

"29" COLOR; 1st DIGIT= BASE COLOR, 2nd DIGIT = TRACER (RED WITH WHITE STRIPE)

"123" CIRCUIT ID NUMBER

CAN BUSS CABLES DO NOT HAVE ID NUMBERS.
C=CABLE, ??=A CABLE NUMBER, G,B,Y&R=COLOR.

NOTES:

1 FOR ELECTRICAL SYSTEM INSTRUCTION SEE ES-A7384.

2 DIAGRAM SHOWN WITH VEHICLE OFF & IN PARK

3 (X--X)= GOTO (SH#-SECTION#) OR PAGE#

4 [XXX]=WIRE ID OF WIRE NOT SHOWN.

5 RELAYS WITH 2 PAGE#s, 1st=COIL LOC. PAGE & 2nd=CONTACT LOC. PAGE

6 FLYBACK DIODE ARE ALWAYS REVERSED BIAS. THIS MEANS ANODE TO GROUND.

7 GS--X IS A RING TERMINALS WITH MULITPLE WIRES

SYMBOLS

- WIRE(S) SPLICED TOGETHER
- WIRE CROSSING NO CONNECTIONS
- FEMALE TERMINAL (SOCKETS)
- MALE TERMINAL (PINS)
- BULKHEAD CONNECTOR WITH POSITION VALUE
- CHASSIS GROUND
- RELAY CONTACTS NORMALLY OPEN
- RELAY CONTACTS NORMALLY CLOSED

CIRCUIT DISCRIPTION

CIRCUIT DISCRIPTION TABLE	PAGE
LEGEND	01
PAGE TABLE	02
FUSE TABLES	03
RELAY TABLES	04
PART LOCATOR LIST	05
BULKHEAD LOCATIONS	06
BATTERYS	07
STARTER / ALTERNATOR	08
SUPPLY CIRCUITS FP1	09
SUPPLY CIRCUITS FP2	10
INGITION / BRAKE	11
PARK BRAKE / BACKUP ALARM	12
ICU2 DISPLAY	13
FUEL / WIF/ CAB PSI	14
WIPERS	15
HEADLIGHT/HAZ / BACKLIGHTING	16
HEADLIGHTS / ROOF WKLTS	17
WKLTS ROTARY SW	18
F WKLTS / MID BOOM LTS	19
TURN SIGNAL POD	20
STOP/TAIL/FLASHER LTS	21
DOME LTS / RADIO	22
ELEC MIRROR/ APOST PORTS	23
SEAT / PWR PORTS	24
AIR CONDITIONER	25
HYD. OIL SENSORS / RADAR	26
HYDROSTAT HANDLE	27
RH BOOM FUNCTIONS	28
LH BOOM FUNCTIONS	29
BOOM HEIGHT /AXLE	30
FOAM MARKER	31
SPARGE / PUMP / PSI SWITCHES	32
BOOM SECT. PWR/ FLOWMETER	33
BOOM SECTION 1-3	34
BOOM SECTION 4-6	35
BOOM SECTION 7 / FENCEROWS	36
REMOTE BOX	37
PSI GAUGES / HYD GND SPLICES	38
NEUTRAL/REVERSE/SHUNT	39
POWER TRAIN CONTROL MODULE	40
TPS / CRUISE / ENGINE KILL	41
ENGINE POWER / AC CNTRLS	42
VEHICLE CAN BUSS	43

CIRCUIT DISCRIPTION

CIRCUIT DISCRIPTION TABLE	PAGE
CONTROLLER, SPEED NODE	46
CONTROLLER, OPTIONS	47
ENGINE ECU	48
AIM COMMAND SWITCHES	49
ENGINE ECU	50
AUTO FOLD	51
AUTO LEVEL	52
ATC UNIT	53
CCM UNIT	54

FUSE

NUM	CIRCUIT DESCRIPTION	SIZE	SH--PG
1	INGITION	10	11
2	RADIO/DOME	10	22
3	BOOM LTS	20	19
4	PWR PORT#1	20	24
5	HORN	10	20
6	ELECTRONIC FLASHERS	20	20
7	HEADLIGHTS	30	16
8	SERVICE TOOL/GPS	5	43
9	ICU POWER	10	13
10	BRAKE LTS	10	21
11	CNTRL BAT PWR	10	45/46
12	R--PORT	10	24
13	ACC PORT	15	23
14	S_PORT	20	24
15	WKLTS F ROOF	15	17
16	WKLTS R ROOF	15	17
17	WKLTS INTERLOCK	20	18
18	KEYED POWER	10	39
19	SEAT POWER	15	47
20	BOOM CNTRLS	15	29
21	AXLE ADJUST	7.5	30
22	ECU KEYED PWR	20	41
23	REVERSE / P B	15	12
24	S_PORT	20	24
25	F/C CONV	5	25
26	MODULE ATC	30	25
27	HVAC MICRO B+	5	25
28	AC CNTRL	10	25
CB1	MAIN	150	07
CB2	GRID HEATER	150	42

FUSE

NUM	CIRCUIT DESCRIPTION	SIZE	SH--PG
29	FRONT WIPER	10	15
30	CIGAR LIGHTER	20	24
31	LOAD SHARE	10	39
32	CAB PRESSURIZATION	15	14
33	PWR PORT#2	20	24
34	ELECT MIRRORS	15	22
35	SEAT HEATER	10	24
36	CHASSIS POWER	10	26
37	REX--CNTRL PWR	10	40
38	UNUSED		
39	ACC PORT	15	23
40	BACKLIGHTS	10	16
41	AIM CMD	10	33
42	BOOM SECTION SW	15	33
43	ICU POWER	5	13
44	R_PORT	10	24
45	AUX PORT	10	23
46	RH HIGH BEAM	15	17
47	LH HIGH BEAM	15	17
48	RH LOW BEAM	15	17
49	LH LOW BEAM	15	17
50	FRONT WKLTS	15	19
51	LH FRONT WKLTS	25	19
52	PROPEL CNTRL	10	12
53	HEAD/TAIL/PDS HAZ	10	21
54	PROPEL CNTRL	5	44
55	MARKER LTS	15	19
56	B+ HEADLIGHTS	30	16

FUSE	FUSE TABLE EXTERNAL	SIZE	PAGE
PB17	ENGINE HARNESS	30	42
F101	SECT 1--3 BOOM MAST	20	33
F100	SECT 4--6 BOOM MAST	20	33
F100	AIM CMD MAIN	30	
F101	AIM CMD SLAVE	30	
F400	AIM CMD SLAVE	30	30

TABLE OF RELAYS

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
RP1A	WKLT INERLOCK	16/18
RP1B	MARKER	16/19
RP1C	R ROOF WKLTS	18/17
RP1D	F ROOF WKLTS	18/17
RP1E		
RP1F	NEUTRAL SAFTY	12/11

TABLE OF RELAYS

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
RP2A		
RP2B	REVERSE	39/12
RP2C	PB BRAKE	12
RP2D	PB ON	12
RP2E	REAR WKLTS	18/19
RP2F	HEADLIGHTS	16/10

TABLE OF RELAYS

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
RP3A	CAB PRESSSURIZATION	14
RP3B	REVERSE ENABLE	40
RP3C	BRAKE LTS	11/21
RP3D	PB CNTRL	12
RP3E	BACKLIGHTS	16
RP3F	TAILLIGHTS	16/21

TABLE OF RELAYS

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
PR1	KEY PWR RELAY	11/09
PR2	ACC2 PWR RELAY	11/10
PR3	ACC1 PWR RELAY	11/10
PR4	ACC3 PWR RELAY	11/09
PR5	WKLTS	18

TABLE OF RELAYS

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
RP4A	HI/LO BEAM	20/16
RP4B	HORN	20
RP4C	CONTROL PWR CNTRL	
RP4D		
RP4E		
RP4F		

TABLE OF RELAYS

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
RP5A	SPREAD/HOLD	27/33
RP5B	LH LEV UP	27/29
RP5C	LH LEV DN	27/29
RP5D	LH FOLD OUT	27/29
RP5E	LH FOLD IN	27/29
RP5F	FOAM MARKER	31

TABLE OF RELAYS

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
RP6A	RH LEV DN	27/28
RP6B	RH LEV UP	27/28
RP6C	RH FOLD IN	27/28
RP6D	RH FOLD OUT	27/28
RP6E	NEUTRAL	39/29
RP6F	CNTRL POWER	47/33

TABLE OF RELAYS EXTERNAL

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
J507	BOOM POWER RELAY	33
J805	STARTER RELAY	8

TABLE OF RELAYS VIPER ONLY

RELAY NUMBER	FUNCTION DESCRIPTION	PAGE SH--PG
R1	CNTRL PWR	46/33

COMPONENT LOCATION CHART

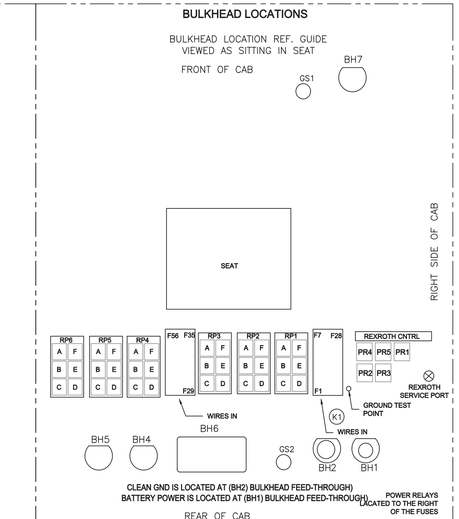
COMPONENT	PAGE
AIR CONDITIONER	25
AIR CONDITIONER CLUTCH	42
ALARM, BACKUP	12
ALTERNATOR	08
BATTERIES	07
CIGAR LIGHTER	24
CONNECTOR, GPS	33
DIODE, PACK	12
HORN	20
INTERMEDIATE START RELAY	08
LAMP, DOME LIGHTS	22
LAMP, FRONT ROOF WKLT	19
LAMP, FRONT TURN SIGNAL	21
LAMP, FRONT WKLT	17
LAMP, HEADLIGHTS	17
LAMP, REAR ROOF WKLT	19
LAMP, REAR TURN SIGNAL	21
LAMP, REAR WKLT	17
LAMP, RH CONSOLE (OPRA)	22
LAMP, ROOF HAZARDS	21
LAMP, STOP/TAIL	21
LAMPS, BACKLIGHTING	16
LAMPS, BACKUP / WORK	12
LAMPS, BOOM	19
MIRRORS, ELECTRIC	23
MODULE, AIR CONDITIONER	25
MODULE, DRIVE CONTROLLER	40
MODULE, RATE CONTROLLER	45/46
MODULE, FLASHER	20
MODULE, FLOWMETER	33
MODULE, FOAM MARKER	31
MODULE, ICU	13
MODULE, REMOTE BOX	37
MODULE, SPLICE PACKAGE	38
MODULE, TPS	41
MODULE, TURN SIGNAL POD	20
MOTER, STARTER	08
MOTOR, CAB PRESSURIZATION	14
MOTOR, FOAM	31
MOTOR, WASHER PUMP	15
MOTOR, WIPER FRONT	15
PANEL, FUSE (FP1)	09
PANEL, FUSE (FP2)	10
PASSIVE TERMINATOR	44
POTENTIOMETER, FOAM ADJUST	31
POTENTIOMETER, GROUND SPEED	40
POTENTIOMETER, HYDRO CNTRL	40
POWER PORT, #1	24
POWER PORT, #2	24
POWER PORT, ROOF	24
POWER PORT, SIDE	24
RADAR	26
RADIO, AM/FM, SPEAKERS	22
SENSOR, BOOM PRESSURE	38

COMPONENT LOCATION CHART

COMPONENT	PAGE
SENSOR, FUEL LEVEL	14
SENSOR, HYD CHARGE PSI	26
SENSOR, HYD FLTR RSTR	26
SENSOR, HYD OIL LEVELS	26
SENSOR, SPARGE PRESSURE	38
SENSOR, WATER IN FUEL	14
SOLENOID, AXLE OUT / AUX	30
SOLENOID, FOAM AIR	31
SOLENOID, FOAM LIQUID	31
SOLENOID, FOWARD	40
SOLENOID, LH BOOM FUNCT	29
SOLENOID, LOADSHARE	39
SOLENOID, PARK BRAKE	12
SOLENOID, REVERSE	40
SOLENOID, RH BOOM FUNCT	28
SOLENOID, A/C HIGH LIMIT SAFTY	42
SOLENOID, AIR RESTRICTION	14
SOLENOID, AUTO CENTER LH	29
SOLENOID, AUTO CENTER RH	28
SOLENOID, AXLE ADJUST	30
SOLENOID, BOOM EZ TOUCH	47
SOLENOID, BOOM FUNCT (HANDLE)	27
SOLENOID, BOOM HEIGHT	30
SOLENOID, BOOM ON	32
SOLENOID, BRAKE PSI	40
SOLENOID, CCM BLOWER CNTRL	25
SOLENOID, CCM OUTPUT	25
SOLENOID, CRUISE INC/DEC	41
SOLENOID, DOOR JAM	22
SOLENOID, ENGINE KILL	41
SOLENOID, FENCEROWS	36
SOLENOID, FOAM ADVANCE (HANDLE)	27
SOLENOID, FOAM MARKER	31
SOLENOID, HEADLIGHT/HAZ	16
SOLENOID, HORN	20
SOLENOID, IGNITION	11
SOLENOID, LH TIP FOLD	29
SOLENOID, LOADSHARE	39
SOLENOID, MASTER POWER	29
SOLENOID, NEUTRAL	39
SOLENOID, PARK BRAKE	12
SOLENOID, PUMP ON	32
SOLENOID, REVERSE	39
SOLENOID, RH TIP FOLD	28
SOLENOID, ROTARY WKLT	18
SOLENOID, SEAT CNTRL	24
SOLENOID, SECT 1--3	34
SOLENOID, SECT 4--6	35
SOLENOID, SELF CANSELING	20
SOLENOID, SERVICE BRAKE	11
SOLENOID, SPARGE	32
SOLENOID, SPREAD/HOLD (HANDLE)	27
SOLENOID, TEMP CNTRL	25
SOLENOID, WIPERS	15

BULKHEAD LOCATIONS

BULKHEAD LOCATION REF. GUIDE
VIEWED AS SITTING IN SEAT



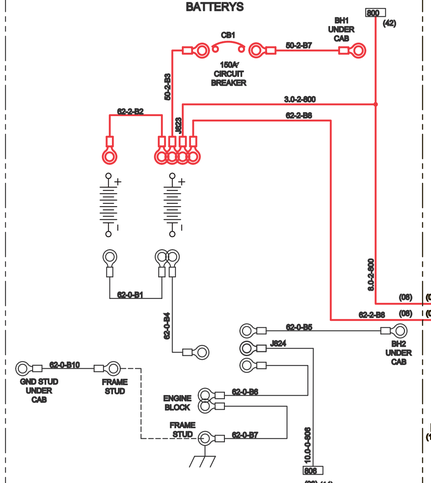
CLEAN GND IS LOCATED AT (BH2) BULKHEAD FEED-THROUGH)
BATTERY POWER IS LOCATED AT (BH1) BULKHEAD FEED-THROUGH)

POWER RELAYS LACATED TO THE RIGHT OF THE FUSES

REAR OF CAB

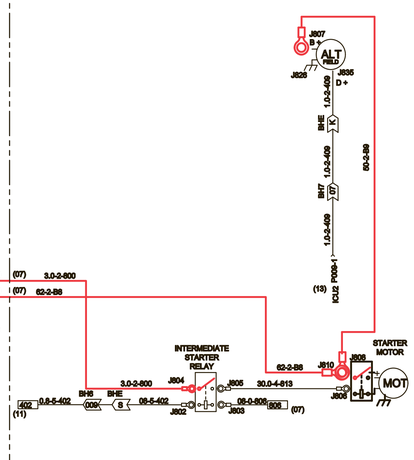
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BATTERYS



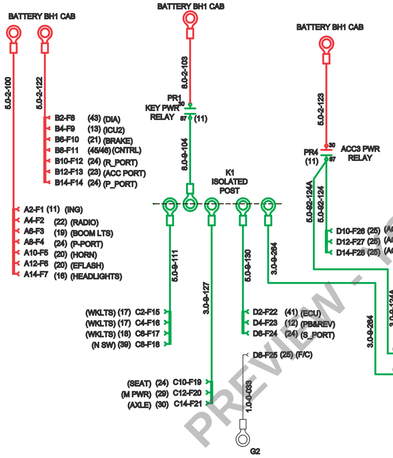
2

STARTER / ALTERNATOR



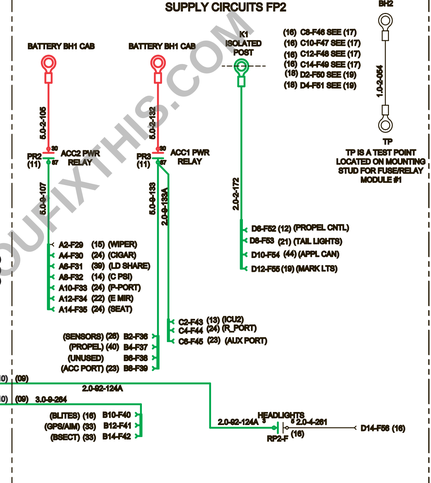
3

SUPPLY CIRCUITS FP1



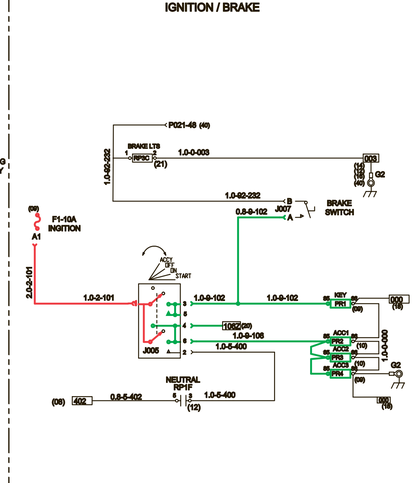
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SUPPLY CIRCUITS FP2



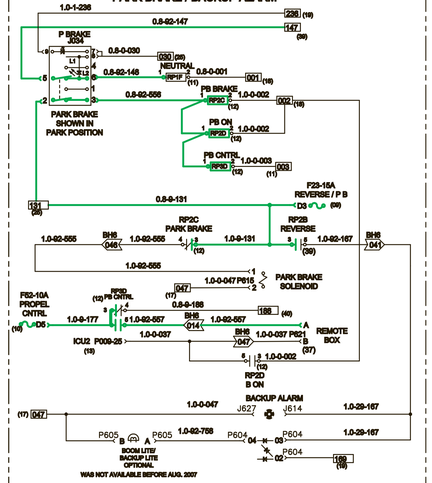
5

IGNITION / BRAKE



6

PARK BRAKE / BACKUP ALARM



7

ICU2 DISPLAY

CN1			
RADAR PRESENT	P010--01	[534]	(25)
SEAT SWITCH	P010--02	[344]	(24)
HIGH BEAM	P010--03	[216]	(16)
RH FOAM	P010--04	[522]	(31)
LIGHT SWITCH	P010--05	[218]	(16)
TRACTION CNTRL	P010--06	[411]	(39)
LH FOAM	P010--07	[521]	(31)
MAIN AUGAR ON	P010--08	[537]	(41)
CRUISE DEC.	P010--09	[538]	(41)
CRUISE INC.	P010--10	[539]	(41)
CRUISE ON/OFF	P010--11	[535]	(26)
RADAR TRANS. SPEED	P010--12	[533]	(26)
RADAR SPEED	P010--13	[532]	(26)
CAN--L #1	P010--14	[C1Y]	(45)
CAN--H #1	P010--15		
FAN FREQ. INPUT	P010--18		
ALTERNATOR SPEED	P010--19		
ENG. COOLENT TEMP	P010--20		
AIRZAIR TEMP	P010--21	[414]	(14)
FUEL LEVEL SIGNAL	P010--22		
ENG. OIL PSI	P010--23		
TRANS. OIL TEMP	P010--24	[406]	(41)
TPS SIGNAL	P010--25		
ENG OIL LEVEL	P010--26		

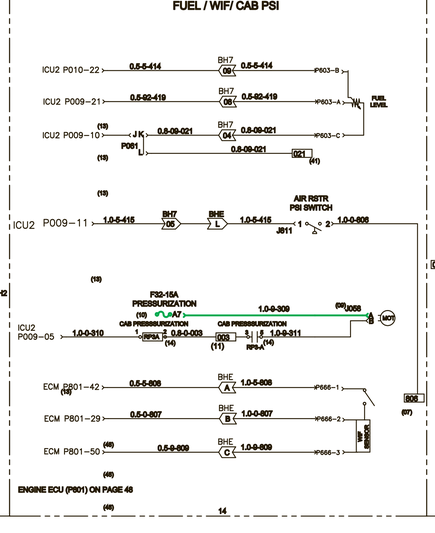
CN2			
ALTERNATOR EXCITE	P009--01	[409]	(08)
KEYED POWER	P009--02	0.8-02-138	C1 (10)
UNKEYED POWER	P009--03	0.8-0-120	
GROUND	P009--04	0.8-0-027	FE
CAB PSI MOTOR RELAY	P009--05	[310]	(14)
EGRESS LIGHTING	P009--06	P010 G P081 P010 H	
	P009--07		
TPS POWER	P009--08	[406]	(41)
DO NOT SHIFT	P009--09		
SENSOR GROUND	P009--10	[521]	(14)
AIR FILTER REST	P009--11	[415]	(14)
	P009--12		
	P009--13		
BUZZER GROUND	P009--14	0.8-0-053	
	P009--15		
	P009--16		
LH BOOM STABE	P009--17		
RH BOOM STABE	P009--18	[227]	(20)
RH TURN IND	P009--19	0.8-2-368	P011 P011 0.8-0-053
BUZZER SIGNAL	P009--20	[418]	(14)
FUEL LEVEL SUPPLY	P009--21		
	P009--22		
	P009--23		
	P009--24		
PARK BRAKE	P009--25	[537]	(12)
	P009--26		

CN3			
	P008--01		
	P008--02		
	P008--03		
BRAKE PSI	P008--04		
	P008--05		
	P008--06	[742]	(32)
NO PROD PUMP	P008--07		
CAN--H #2	P008--08		
CAN--L #2	P008--09		
	P008--10		
LADDER DOWN	P008--11	[705]	(26)
CHARGE OIL PSI	P008--12	[740]	(26)
HYD OIL WARN	P008--13		
RS232--IN	P008--14		
RS232--OUT	P008--15	[703]	(26)
HYD OIL TEMP	P008--16	[702]	(26)
HYD FILTER REST	P008--17	[704]	(26)
HYD OIL LOW	P008--18		
	P008--19		
	P008--20		
	P008--21		
LH TURN IND	P008--22	[226]	(20)
NO PROD CENTER	P008--23	[743]	(32)
HYD. ENG. DERATE	P008--24	[741]	(26)
	P008--25		
	P008--26		

F49-5A ICU SW PWR
P080
P049-2 F9-10A F P021 ICU DISPLAY

8

FUEL / WIF/ CAB PSI

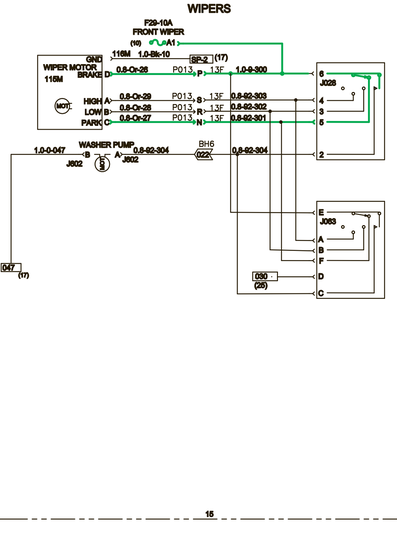


ENGINE ECU (P801) ON PAGE 48

(48)

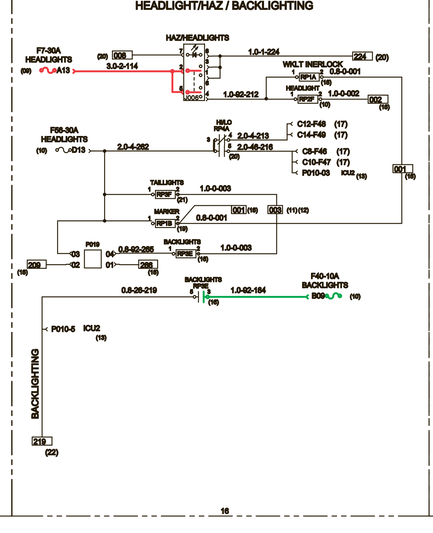
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WIPERS



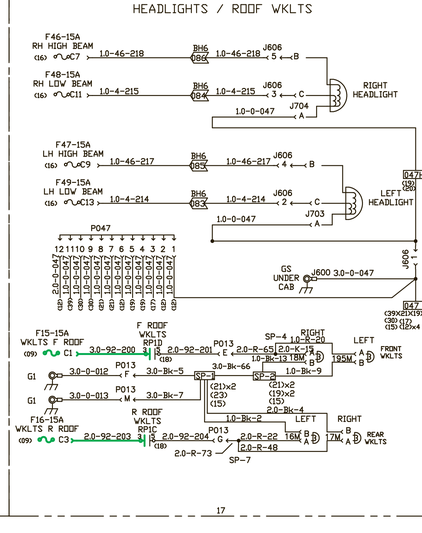
10

HEADLIGHT/HAZ / BACKLIGHTING



11

HEADLIGHTS / ROOF WKLTS



12

ELECTRICAL SCHEMATIC PATRIOT 3230 AND 3330 SPRAYERS RAC 84242809

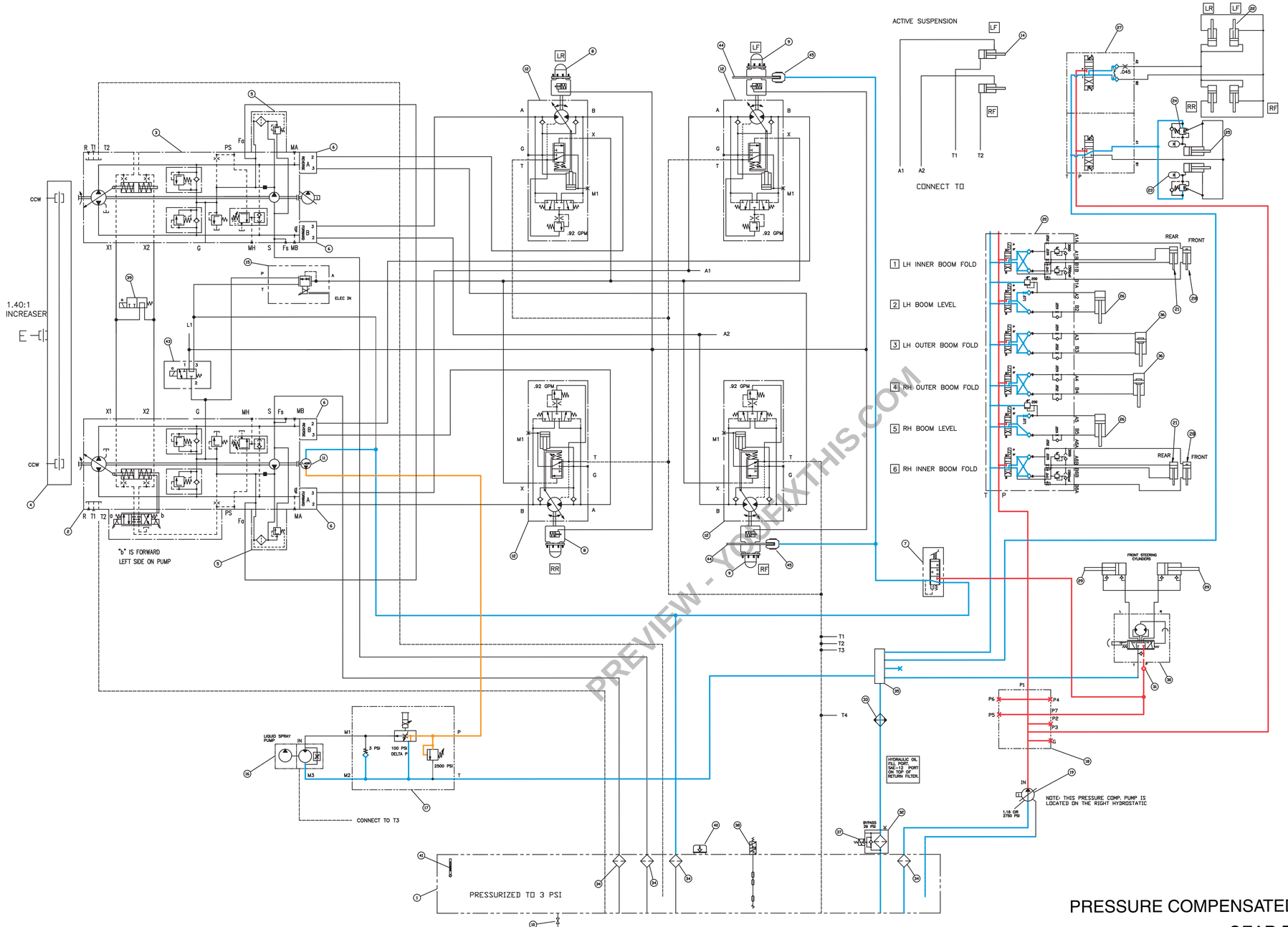
LEGEND

INDICATES CONSTANT POWER

INDICATES POWER WHEN KEY SWITCH IS ON

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ITEM	DESCRIPTION
45	BRAKE CALIPERS
44	BRAKE ROTOR
43	VALVE BRAKE (PARK)
42	ORIFICE, .042 (LADDER FOLD)
41	INDICATOR, SIGHT GUAGE / TEMP. GUAGE, HYD. OIL
40	BREATHER 3 PSI
39	VALVE SHUNT DEUTSCH -4
38	MULTI-LEVEL, HYD. OIL TEMP. - N/C 200 DEGREE F TO OPEN
37	INDICATOR, AUX FILTER, PRESSURE SWITCH - N/C 25 PSI TO OPEN
36	CYL., OUTER BOOM FOLD CUSHIONED
35	HYDRAULIC RETURN MANIFOLD
34	STRAINER, SUCTION
33	OIL COOLER, (HEAT EXCHANGER)
32	FILTER ASSY. COMPLETE, RETURN AUXILIARY FLOW
31	CHECKVALVE
30	STEERING CONTROL UNIT
29	CYL., STEERING
28	CYL., RH & LH INNER BOOM FOLD CUSHIONED
27	2 - SECTION VALVE BANK
26	CYL., RH & LH BOOM LEVEL
25	CYL., PARALLEL LINKAGE
24	VALVE, C'BALANCE SET @ 2200 PSI
23	ACCUMULATOR
22	CYL., AXLE ADJUST
21	CYL., RH & LH INNER BOOM FOLD & BRAEKAWAY
20	6 BANK VALVED, CUSHIONED CONTROLLED
19	PRESSURE COMP PUMP
18	VALVE MANIFOLD
17	PWM VALVE PRODUCT PUMP
16	PRODUCT PUMP W/ HYD. MOTOR
15	CONTROL VALVE
14	CYLINDER, ACTIVE SUSPENSION
13	CYLINDER, LADDER FOLD
12	WHEEL MOTOR - 55cc
11	GEAR PUMP (PRODUCT PUMP)
10	VALVE DRAIN
9	FRONT WHEEL HUB W/ BRAKE - 25.2:1
8	REAR WHEEL HUB W/ BRAKE - 31:1
7	VALVE, BRAKE ASSY
6	TEE BLOCK
5	FILTER ASSY., CHARGE PUMP
4	2 PUMP DRIVE, GEAR INCREASER-1.40:1
3	PUMP, HYDROSTATIC - w/13T
2	PUMP, HYDROSTATIC - w/11T
1	RESERVOIR, HYDRAULIC OIL

LEGEND

PRESSURE COMPENSATED PISTON PUMP SUPPLY

GEAR PRODUCT PUMP SUPPLY

RETURN TO TANK/SUMP

PATRIOT 3230 AND 3330 SPRAYERS HYDRAULIC SCHEMATIC RAC 84242812

84242812S1S1

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SPECIAL TORQUES

	Metric Value	U.S Value
Product Control Valve Solenoid	128.8 to 135.6 Nm	(95 to 100 lb ft)
Product Control Valve Relief Valve	50.2 Nm	(37 lb ft)
Product Control Valve Check Valve	50.2 Nm	(37 lb ft)
Neutral Adjusting Screw Lock Nut	7 Nm	(62 lb in)
Charge Pressure Adjustment Lock Nut	52 Nm	(39 lb ft)

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Gear Increaser

Oil Type..... Case SSL 75W-90
Capacity..... 2.8 L (3 qt)

Hub Lubricant

Oil Type.....Case 85w140 EP Gear Oil
Hub Capacity (Each) .....0.95 L (32 oz)

Hubs and Tires

Planetary Gearbox.....25.2:1 Front / 31:1 Rear
Tire Size ..... 320/90R46, 380/86R46 - 3230 only, 380/90R46, 520/85 R38, 650/85 R38

Drive System

Hydrostatic with full-time, 4-wheel drive. Infinitely variable speed control returns wheel motor swash plates to maximum angle each time hydro lever is returned to neutral, allowing maximum torque for each start.

Hydraulic System

Oil Type.....Case Hy-Tran Ultra®
Oil Capacity - Tank .....109.8 L (29 Gal)
Hydrostatic Pump Charge Pressure .....27.5 to 28.9 bar (400 to 420 PSIG)
Pressure checked at full engine rpm.
Gauge pressure reading equal to charge relief setting plus case pressure.
Pressure Limiter Setting / System Pressure.....449.8 bar (6525 PSIG)
Pressure checked at 2200 engine rpm.
Gauge pressure reading equal to pressure limiter setting (6090 PSI) plus charge pressure.
Wheel Motor Flush Flow (per motor) ..... 3.4 L/min (0.92 GPM)
Check at 2200 engine rpm.
Nulling spools and caps required to perform test.
Wheel Motor Shift Point..... 5.0 bar (72.5 PSI)
Pressure Compensated Pump Setting ..... 203.4 bar (2950 PSI)
Pressure Compensated Pump Flow (Max)..... 58.5 L/min (15.47 GPM)
Check at full engine rpm.
Auxiliary Gear Pump Flow (Max)..... 70.1 L/min (18.53 GPM)
Check at 2200 engine rpm.
Product Pump Circuit Relief Valve Setting..... 172.4 bar (2500 PSI)
Check at 2200 engine rpm.
Inner Boom Fold Relief Valve Settings ..... Port A / 203.4 bar (2950 PSI)
Port B / 103.4 bar (1500 PSI)
Boom Level Relief Valve Setting..... 13.8 bar (200 PSI)

Hydraulic Pump Drive

Drive .....2 Pump, Durst 2PD06

Hydraulic Pumps

Pumps Hydrostatic .....Rexroth AA4VG
Pump Pressure Compensated .....Rexroth 19 cu. cm (1.16 cu-in)
Pump Gear .....Rexroth 22.7 cu. cm (1.39 cu-in)

Hydraulic Motors

Wheel Motor .....Rexroth AA6VE
Product Pump.....ACE

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Drive Circuit Troubleshooting Chart

Symptom	Possible Cause	Corrective Action
Machine will not move.	Hydraulic oil level low.	Fill hydraulic tank to proper level. See Hydraulic Tank Filling in Section 8020.
	Park brake switch is ON.	Turn off park brake switch.
	Park brake failed to release.	Release park brake. See Parking Brake Fails To Release Section 4000.
	Neutral safety switch out of adjustment or faulty.	Adjust or replace neutral safety switch. See Neutral Safety Switch Adjustment in Section 4000.
	Power train control module fuse faulty.	Test power train control module. See Power Train Control Module in Section 4000. Repair or replace as required.
	Power train control module relay faulty.	
	Power train control module faulty.	
	Power train control module wiring faulty.	
	Park brake switch faulty.	Test park brake valve and park brake valve. See Park Brake Valve Test Section 4000. Repair or replace faulty component.
	Park brake valve faulty.	
	Motor control valve is faulty.	Test motor control valve. See Motor Control Valve Test in Section 4000. Replace if required.
	Shunt valve is faulty.	Test shunt valve. See Shunt Valve Test in Section 4000. Replace if required.
	Suction strainers clogged.	Clean or replace suction strainer. See Hydraulic Strainer Servicing in Section 8020.
	Hydrostatic pump failure.	Test hydrostatic pump. See Hydrostatic Pumps Section 4000. Replace hydrostatic pump if required. See Hydrostatic Pump in Section 8040.
	Pump drive is faulty.	Repair or replace. See Pump Drive in Section 8060.

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SPECIFICATIONS

Diesel Engine

Model	3230: Case IH* NEF 667TA/EBY Tier III 164 kW HPCR 3330: Case IH* NEF 667TA/EB1 Tier III 186 kW HPCR *Manufactured by Fiat Power Train (FTP)
Type	Six Cylinder, Four-Stroke Cycle, Turbocharged, Air-to-Air Aftercooled
Firing Order	1-5-3-6-2-4
Bore	104 mm (4.0 in)
Stroke	132 mm (5.19 in)
Displacement	6.7 L (409 cu-in)
Compression Ratio	17.1:1
Cylinder Sleeves	Replaceable Wet Type
High Engine Idle (without load)	2266 RPM
Rated Engine Speed	2200 RPM
Engine Idle Speed	900 RPM

Engine Lubrication System

Oil Type	Case No. 1
Oil Capacity - Without Filter Change	15 L (16 qt)
Oil Capacity - With Filter Change	16 L (17 qt)
Oil Pressure at Idle Speed (Minimum)	69 kPa (10 PSI)
Oil Pressure at High Idle	276 to 344 kPa (40 to 50 PSI)
Type of System	Pressure and Spray

Cooling System

Coolant Type	Case XHD ASTM D 4546 and ASTM D 5345
Coolant Mix with deionized water	50-50
System Coolant Capacity	51 L (13.5 Gal)

Fuel System

Fuel Injection Pump	BOSCH
Fuel Injectors	BOSCH

Fuel Tank

Fuel Type	ASTM D 975 Grade 2 Diesel Fuel
Fuel Tank Capacity	454 L (120 Gal)

Air Intake System

Type	Dry Type, Two-Stage Aspirator System with Service Indicator in Instrument Cluster

Battery

Battery Type:	12 Volt, Low Maintenance Type Group Size 31
Rating:	950 CCA at -17°C (0°F)
Reserve Capacity:	170 Minutes
Polarity:	Negative Ground
Battery quantity	Two

Brakes

Service Brake	Hydraulic Dry Disc Service Brake on Front Wheels
Park Brake	Electronically Controlled, Spring Applied and Pressure Released

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HYDRAULIC VALVES ..... SECTION 8070
SPECIAL TORQUES 8070-3
SPECIAL TOOLS 8070-3
PRODUCT PUMP CONTROL (PWM) VALVE 8070-4
NEUTRAL SHUNT VALVE 8070-7
MOTOR CONTROL VALVE 8070-12
PARK BRAKE VALVE 8070-15
TWO SECTION VALVE BANK 8070-20
BOOM VALVE BANK 8070-28
SOLENOID FUNCTION TEST 8070-35
MANIFOLD 8070-36
SERVICE BRAKE VALVE 8070-42

HYDRAULIC CYLINDERS ..... SECTION 8080
SPECIAL TORQUES 8080-3
AXLE ADJUST CYLINDER 8080-4
INNER BOOM FOLD CYLINDER 8080-8
BOOM FOLD OUTER CYLINDER-60 FT. 90 FT. 100 FT. 8080-10
OUTER AND MID BOOM FOLD CYLINDER-12O FT. 8080-12
BOOM HEIGHT CYLINDER 8080-15
BOOM LEVEL CYLINDER 8080-20
LADDER CYLINDER 8080-23
SHOCK ABSORBER/ ACTIVE SUSPENSION CYLINDER 8080-25
STEERING CYLINDER 8080-29
CYLINDER OVERHAUL 8080-32

HYDRAULIC SCHEMATIC POSTER 84242812 ..... IN SERVICE MANUAL BINDER

BOOK 3 - 84258781

AIR CONDITIONING SYSTEM - TROUBLESHOOTING AND FAULT CODES ..... SECTION 9000
SPECIAL TOOLS 9000-3
A/C THERMAL OPERATION 9000-5
A/C SYSTEM COMPONENTS 9000-7
AUTOMATIC TEMPERATURE CONTROL (ATC) OPERATION 9000-10
ATC FAULT CODES 9000-17
LOCATING SYSTEM PROBLEMS WITHOUT FAULT CODES 9000-26
ATC CONTROLLER TEST (CONNECTOR J8 TEST POINTS) 9000-28
COMPRESSOR AND CLUTCH 9000-32
HIGH AND LOW PRESSURE SWITCH CLUTCH LATCHING CIRCUIT 9000-37
HEATER CONTROL VALVE 9000-41
BLOWER SPEED AND TEMPERATURE CONTROL POTENTIOMETERS 9000-43
BLOWER AND BLOWER SPEED DRIVER 9000-45
CAB AND EVAPORATOR TEMPERATURE SENSORS 9000-47
CONTROLLER POWER, GROUND, AND ATC SWITCH 9000-55
CAB PRESSURIZER BLOWER 9000-58
ACCESSING THE HVAC BOX 9000-59
STANDARD AIR CONDITIONING (STD) TROUBLESHOOTING 9000-60

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NOTICE: *Not for use on 3330, 120-ft.-boom-equipped machines*	**Tire Size** 380/90R46	**Load Rating** 157A8B
In-field Speed* KM/H (MPH)	**Minimum Tire Pressure Bar** (PSI)	**Maximum Tire Pressure Bar** (PSI)
16 (10)	**2.8** (41)	**3.6** (52)
24 (15)	**3.6** (52)	**3.6** (52)
32 (20)	**3.6** (52)	**3.6** (52)
40-48 (25-30)	Speed Not Recommended	Speed Not Recommended
NOTICE: **In-field speeds and inflation pressures represent cyclical loading of the tires as product tank empties during application. It is not recommended to transport or road the unit with any product in the tank.*		

	Tire Size 520/85R38	**Load Rating** 155A8B
In-field Speed* KM/H (MPH)	**Minimum Tire Pressure Bar** (PSI)	**Maximum Tire Pressure Bar** (PSI)
16 (10)	**1.4** (20)	**2.0** (29)
24 (15)	**1.6** (23)	**2.0** (29)
32 (20)	**1.8** (26)	**2.0** (29)
40-48 (25-30)	Speed Not Recommended	Speed Not Recommended
NOTICE: **In-field speeds and inflation pressures represent cyclical loading of the tires as product tank empties during application. It is not recommended to transport or road the unit with any product in the tank.*		

	Tire Size 650/65R38	**Load Rating** 157A8B
In-field Speed* KM/H (MPH)	**Minimum Tire Pressure Bar** (PSI)	**Maximum Tire Pressure Bar** (PSI)
16 (10)	**1.2** (17)	**2.0** (29)
24 (15)	**1.6** (23)	**2.0** (29)
32 (20)	**1.8** (26)	**2.0** (29)
40-48 (25-30)	Speed Not Recommended	Speed Not Recommended
NOTICE: **In-field speeds and inflation pressures represent cyclical loading of the tires as product tank empties during application. It is not recommended to transport or road the unit with any product in the tank.*		

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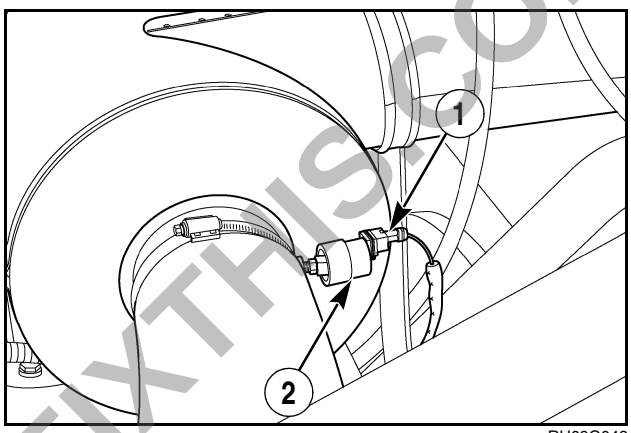
RESTRICTION INDICATOR SWITCH

NOTICE: *For torque specifications not listed, see Section 1000 Standard Torque. If replacing hardware must use the hardware noted in this machine's parts manual.*

Restriction Indicator Switch Removal

STEP 1

Remove wire harness connector (1) from switch. Remove switch (2).

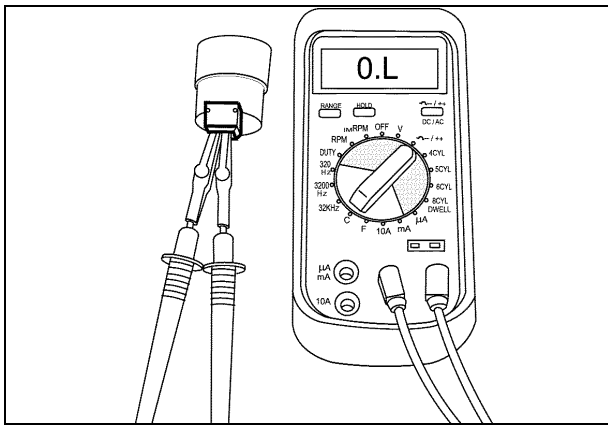


RH09G043

Restriction Indicator Switch Testing

STEP 1

1. Install the test leads of a multimeter to the switch terminals.
2. Set the multimeter to ohms or continuity testing. The multimeter should show an open circuit.
3. If the multimeter shows a closed circuit, replace the switch.



mk00d303

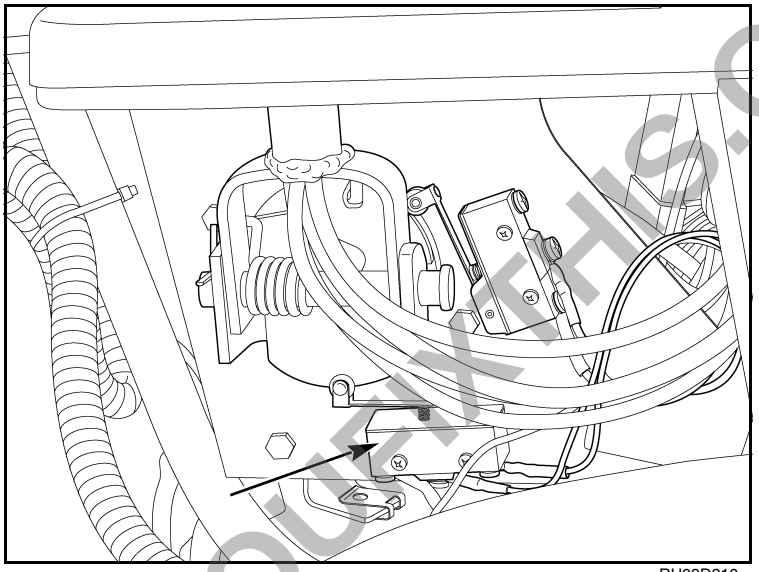
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PROPEL SYSTEM

Neutral Safety Switch Adjustment

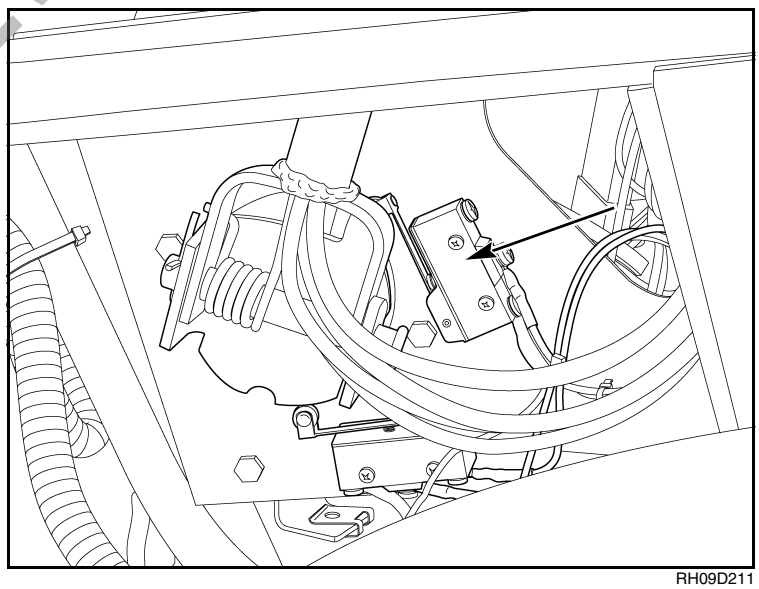
The neutral safety switch (located below the propel handle cam) allows the vehicle to start ONLY in neutral. The switch also activates the shunt valve to allow the vehicle to propel when not in neutral. The switch position should be adjusted such that the neutral position should be centered in the neutral cam recess while the propel handle is in the neutral position. The point that the switch transfers out of neutral should be at the midpoint between forward and reverse.



RH09D210

Reverse Switch Adjustment

The reverse switch (located rearward of the propel handle cam) engages the back-up alarm. When moving the propel handle from neutral to reverse, observe both the reverse and neutral switches transfer point. The reverse switch should be timed so that it transfers from NOT in reverse, to into reverse, at approximately the same time that the neutral safety switch transfers from neutral position to NOT in neutral.

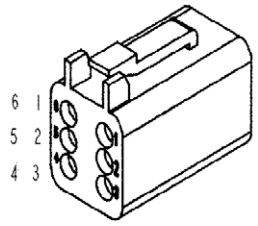


RH09D211

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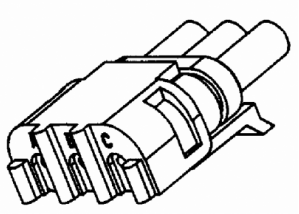
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CONNECTOR 225351C1



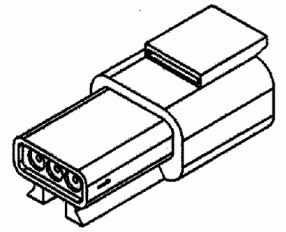
CONNECTOR P6		
Splice Pack 1		
CAV	**WIRE NUMBER**	**CIRCUIT REFERENCE**
1	001a	Vehicle Switch +B
2	001b	Vehicle Switch +B
3	001c	Vehicle Switch +B
4	001d	Vehicle Switch +B
5	001e	Vehicle Switch +B
6	001f	Vehicle Switch +B

CONNECTOR 245484C1



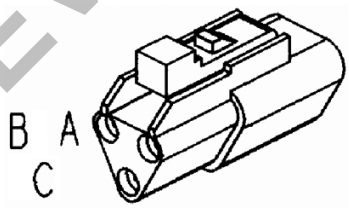
CONNECTOR P15		
Ag Inside Chassis1		
CAV	**WIRE NUMBER**	**CIRCUIT REFERENCE**
A	003	Vehicle + B
B	020a	ECU Gnd
C	001a	Vehicle Switch + B

CONNECTOR 276426A1



CONNECTOR J8		
Ag Inside Display 1		
CAV	**WIRE NUMBER**	**CIRCUIT REFERENCE**
1	CB2	CAN High
2	CB2	CAN Low
3	001b	Vehicle Switch +B

CONNECTOR 225295C1



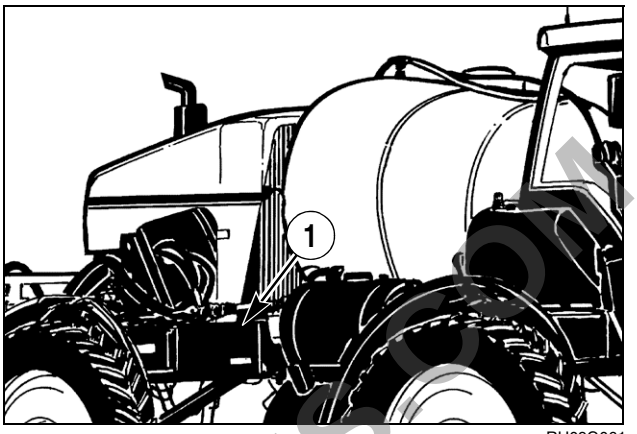
CONNECTOR P12		
Terminator		
CAV	**WIRE NUMBER**	**CIRCUIT REFERENCE**
A	CB1	CAN High
B	CB1	CAN Low
C	---	Open

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ACCESS TO BATTERIES

The battery compartment is located on the right-hand side of the machine. To access the batteries, open the rubber covered latches (1) located on both sides of the compartment cover. Remove the battery cover.



RH09G061

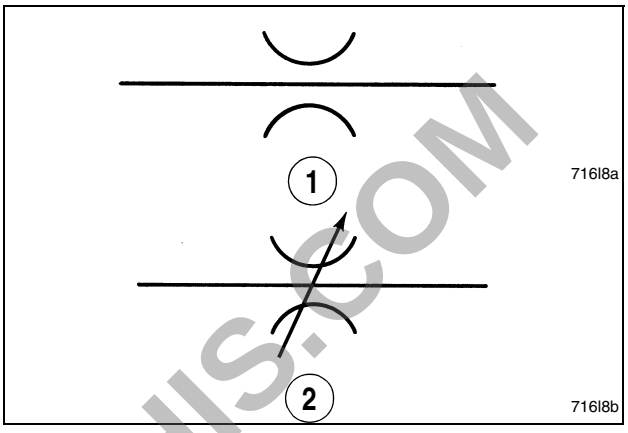
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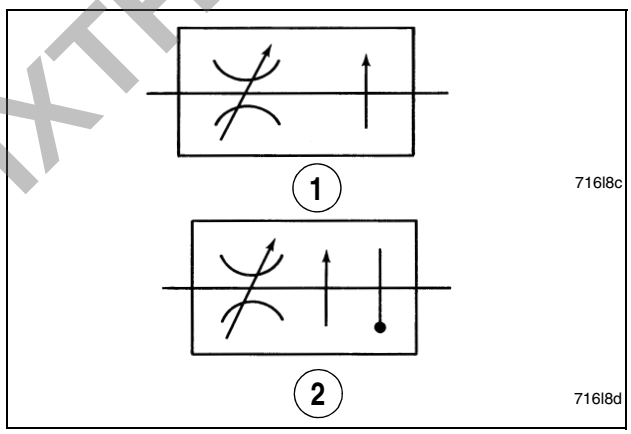
Flow Control Symbols

Restrictors

The basic flow control symbol is a representation of a restrictor (1). If the restrictor is adjustable (2), a slanted arrow is drawn across the symbol. The restrictor could be a special fitting with a small hole in it or a small drilled passageway within a valve. If it is an adjustable restriction, it could be thought of as a water faucet that can be controlled by turning the handle to regulate the flow. Restrictors can be applied to meter out, meter in and bleed off circuits.



There are adjustable restrictors that are pressure compensated. That means that the size of the opening in the restrictor will change with increases and decreases in pressure. A perpendicular arrow indicates pressure compensation (1). If the restrictor has both pressure and temperature compensation, the symbol for a thermometer will also be shown (2).



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STEP 3

Engage park brake and start the engine. Allow the hydraulic oil to warm to 49°C (120°F).

STEP 4

On the pump station remote box, place the auto/manual switch to the manual position.

STEP 5

Turn the pump switch to the ON position and hold the increase/decrease switch towards the increase position. Increase the engine to 2200 RPM.

STEP 6

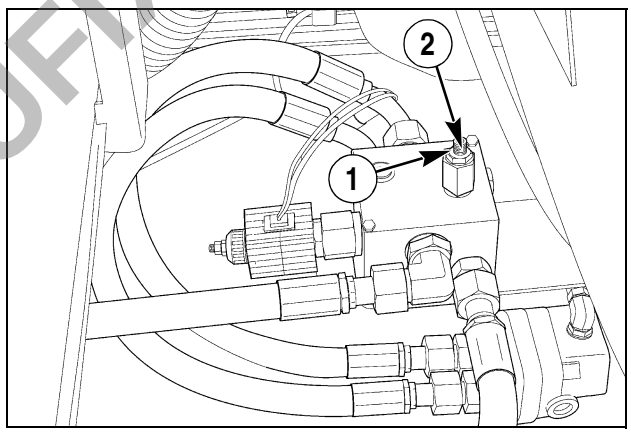
Record the reading on the gauge.

If the reading is not 172 bar (2500 PSI), the product pump control adjustable relief valve needs to be adjusted.

STEP 7

Adjust relief valve pressure by loosening nut (1) on end of valve. Turn adjusting screw (2) in to increase pressure and out to decrease pressure. Tighten nut after proper pressure setting is reached.

NOTICE: *If the relief valve pressure cannot be set to specifications, remove relief valve for repair or replacement.*



RH09E080.tif

STEP 8

Return the engine to low idle speed, turn the pump switch OFF and place the auto/manual switch in the auto position.

STEP 9

Remove the gauge in the M1 port (1) and connect the hydraulic motor hose line to the M1 port.

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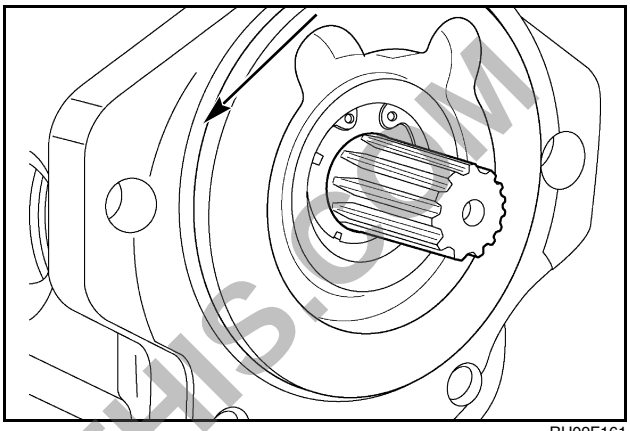
Gear Pump Installation

NOTICE: *New O-rings need to be installed on any fittings that are being installed.*

STEP 1

Install a new O-ring on the pump.

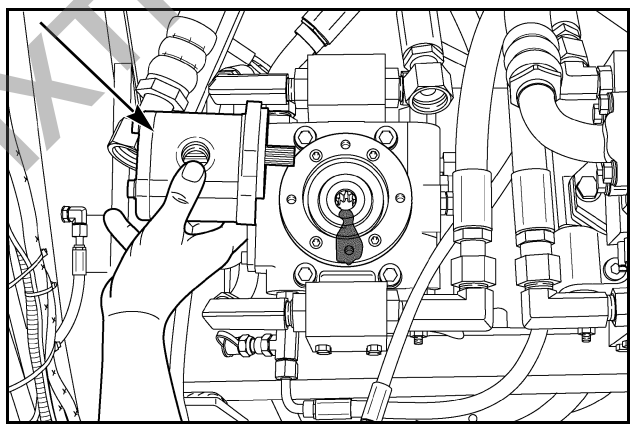
NOTICE: *Lubricate O-ring with clean petroleum jelly.*



RH09F161

STEP 2

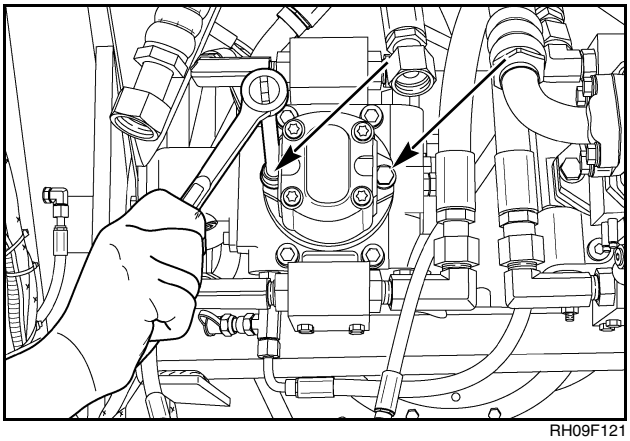
Install the gear pump.



RH09F122

STEP 3

Secure the pump with two mounting bolts and washers.



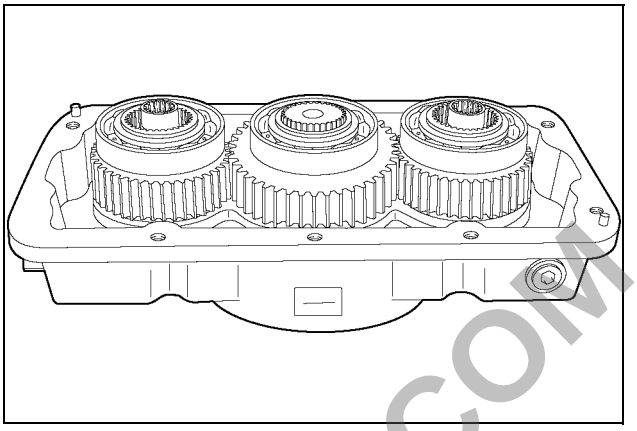
RH09F121

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STEP 4

Lift the output housing half off, being careful not to lift any of the gears.

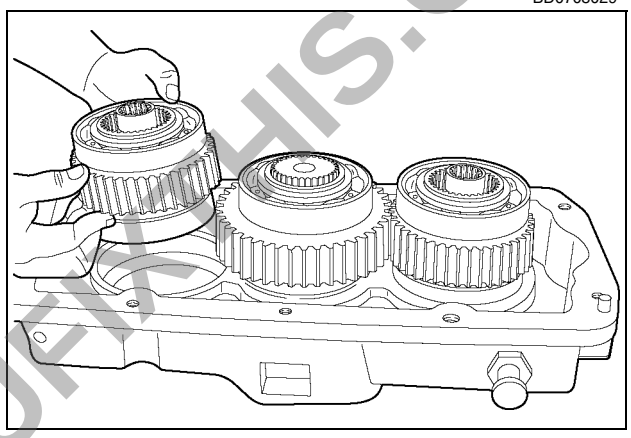


BD0708029

STEP 5

Evenly lift the gears and bearings from the housing.

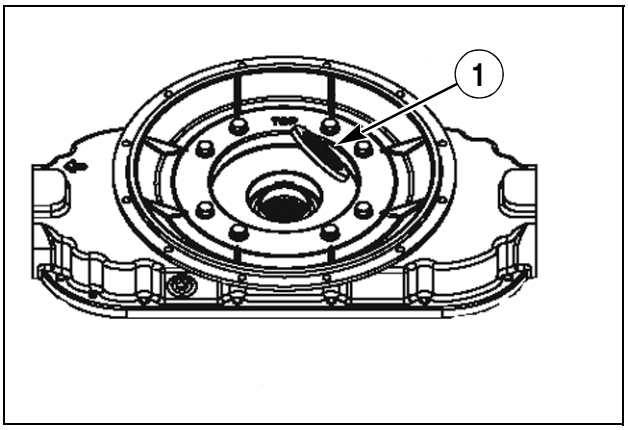
NOTICE: *The gears and bearings can be removed by hand.*



BD0708028

STEP 6

Drive the input seal (1) out towards the engine adapter.

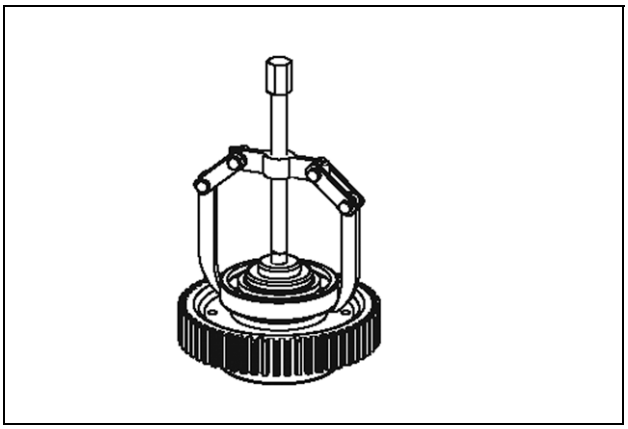


BD0508142

STEP 7

Remove bearings from gears. Use a gear puller or arbor press.

NOTICE: *Bearings MUST be replaced any time they have been removed from the gear.*



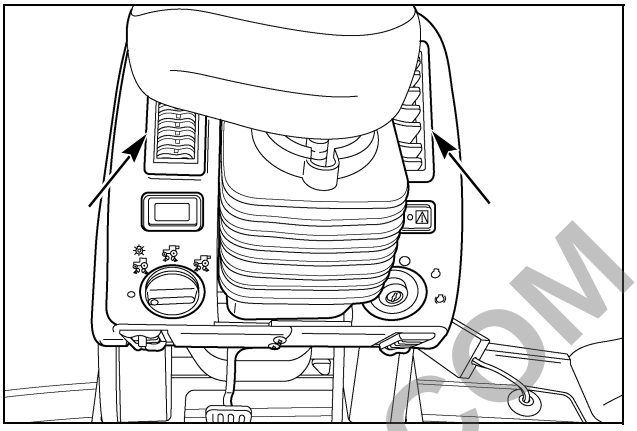
BD0508145

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STEP 12

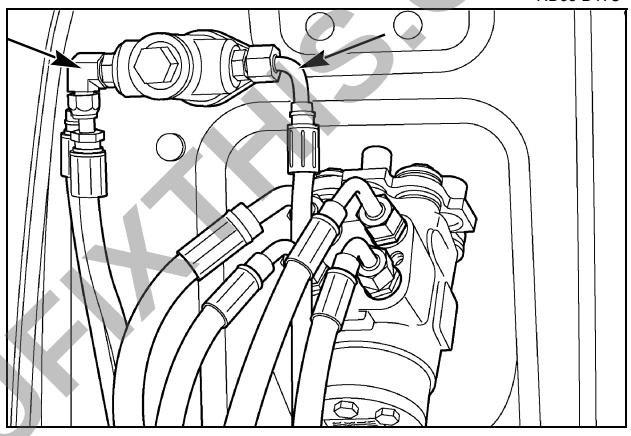
Install the air louvers into the top of the front console.



RD09 D173

STEP 13

Disconnect the hydraulic lines to the brake valve.



RH09E072

STEP 14

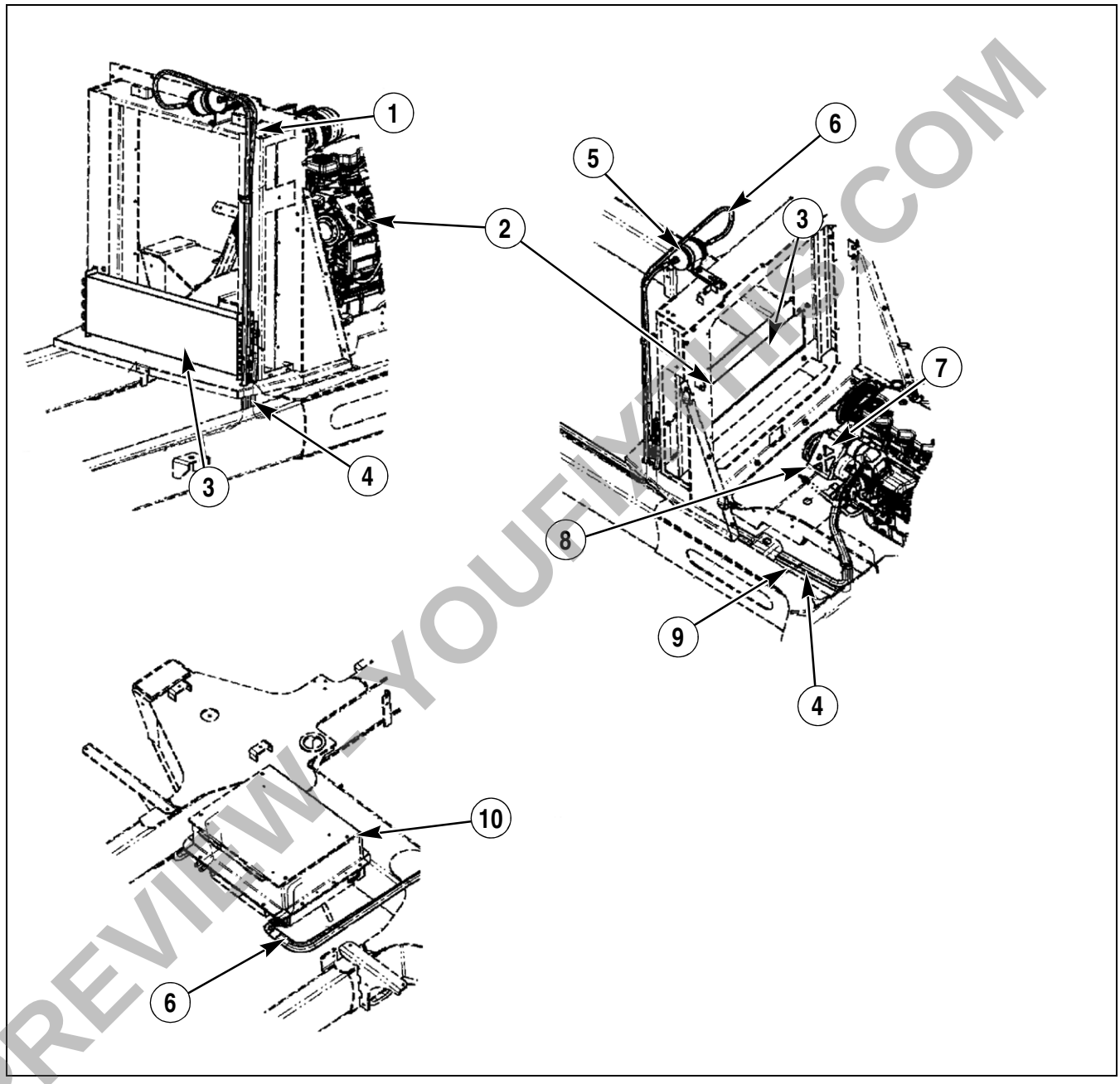
Install the fuel tank and front hood. Refer to sections in Service Manual.

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Chassis Components

NOTICE: *Make sure that all A/C hose and line connections are properly torqued. Check hoses for bends or cracks. Replace all hoses that have damage.*



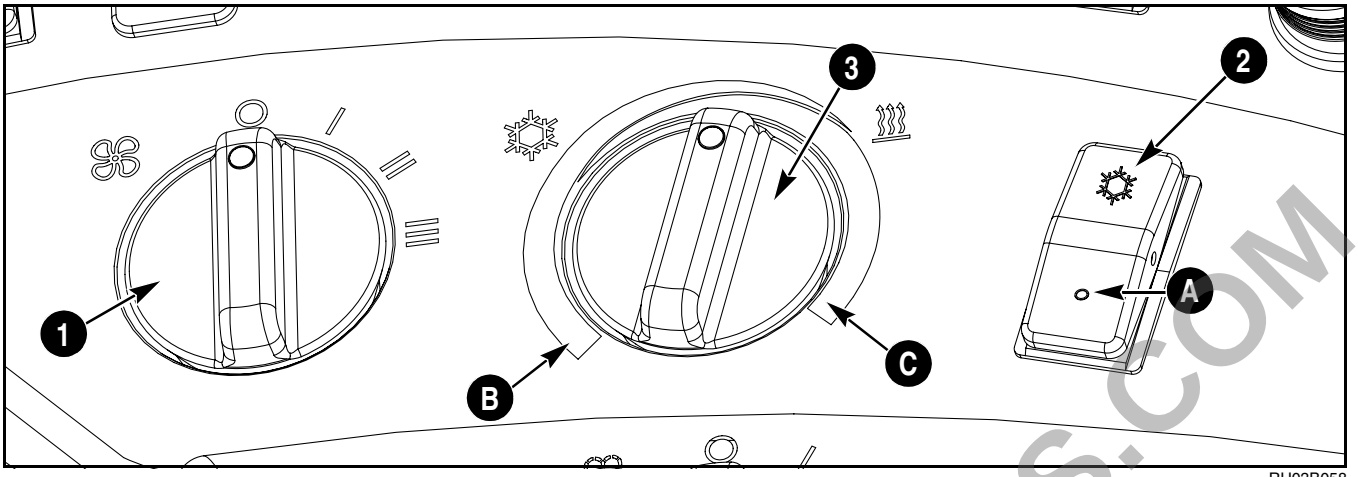
BD0109100

1. HOSE ASSEMBLY, CONDENSER TO DRIER
2. ENGINE COMPARTMENT
3. CONDENSER
4. HOSE ASSEMBLY, CONDENSER TO COMPRESSOR
5. RECEIVER DRIER
6. HOSE ASSEMBLY, CAB TO DRIER
7. COMPRESSOR
8. HIGH PRESSURE SWITCH
9. HOSE ASSEMBLY, CAB TO COMPRESSER
10. HVAC COMPARTMENT (BELOW THE CAB)

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Standard A/C Controls and Their Function



RH03B058

1. Blower Speed Control	Manual selection of blower speed: Low, Medium or High or OFF. With A/C switch in the OFF position and any blower speed selected, the control provides fresh air circulation for the cab with outside ambient air introduced with the cab pressurizer blower to the HVAC box.	
2. A/C ON/OFF Switch	Toggles cooling On or Off	A. Pressure Warning Indicator: the warning lamp blinks slowly, approximately 7 times in a 10 second period for low pressure switch activation, or quickly, approximately 13 times in a 10 second period for the high pressure switch activation.
3. Temperature Control	Compressor is engaged or heater valve is opened in direct proportion to the movement of the control.	B. Maximum Cooling Zone - 0°C (32°F); compressor runs continuously until the freeze setting at the evaporator temperature sensor cycles the clutch OFF. The clutch is cycled ON again when the evaporator thaws to 3°C (37°F).
		C. Maximum Heating Zone, heater control valve at 100% open position

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LEAK DETECTION

⚠ DANGER ⚠

Never leak test with compressed air or flame tester. Tests have indicted that compressed mixtures of HFC R-134a and air can form a combustible gas. Failure to comply will result in death or serious injury.

M746A

⚠ CAUTION ⚠

Inhalation hazard! Phosgene gas forms when refrigerant comes in contact with an open flame. Never breathe these fumes. Failure to comply could result in minor or moderate injury.

SM109B

Two methods are recommended to test the A/C system for refrigerant leaks: electronic leak testing with OEM1437 and UV-florescent leak detecting. Whatever method is used, the following components or areas should be checked, always looking for signs of leakage - oily residue, dust accumulation:

A. Compressor: line connections, surfaces where parts are joined, compressor to clutch seal.

NOTICE: *When checking compressor seal for a leak, remove the dust cover and rotate the compressor shaft clockwise.*

B. Condenser: line connections, all welded joints, any visible damage.

C. Receiver-drier: line connections.

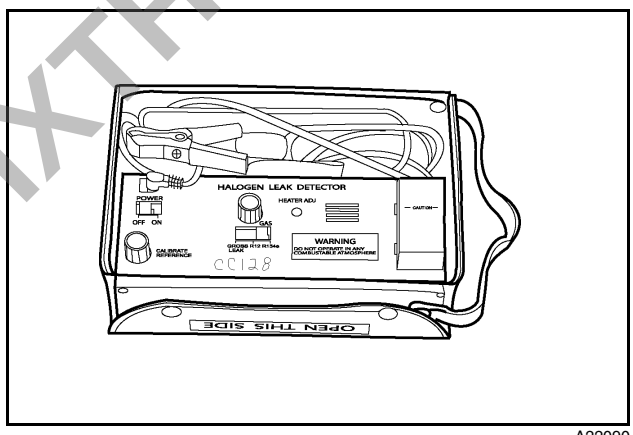
D. Thermal expansion valve: line connections.

NOTICE: *Remove the thermal insulation tape to check the expansion valve for leaks; replace the tape when completed.*

E. Service ports: valve core under the caps.

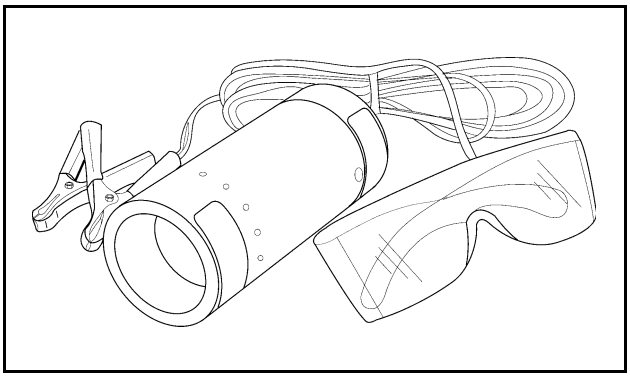
F. Low and high pressure switches: Check around the entire switch body where it is threaded into the line.

G. Hoses: line connections where the hose end meets a metal connector, any area that shows damage or rubbing contact.



A22090

OEM1437



RR00F098

UV Leak Detecting Lamp and Goggles

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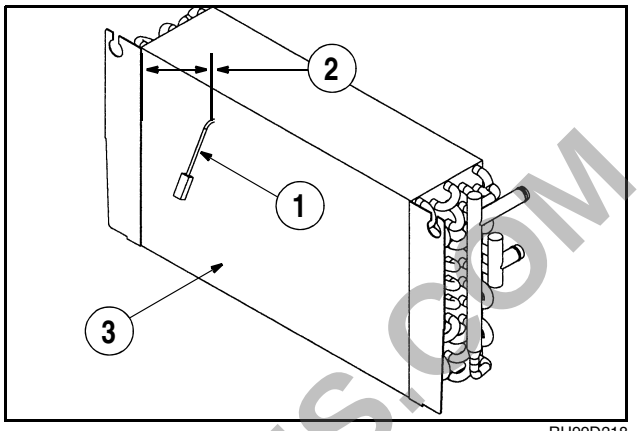
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EVAPORATOR AND CAB TEMPERATURE SENSOR LOCATION

STEP 1

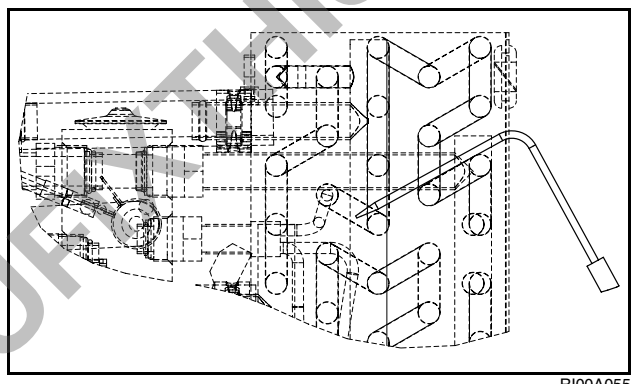
The evaporator temperature sensor MUST be installed 107 mm (4.2 in) from the left hand rear side of the evaporator. The sensor must be installed below the second refrigeration tube row at a 30° downward angle.

Insert the sensor in the evaporator up to the angled section, being careful not to kink the sensor.



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Rear View



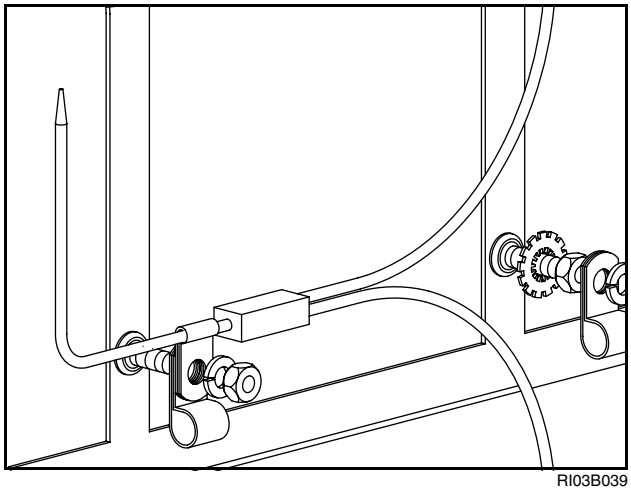
RI00A055

Side View

1. EVAPORATOR TEMPERATURE SENSOR
2. 4.2 INCH (107 MM)
3. EVAPORATOR CORE

STEP 2

The cab temperature sensor must be installed without contact with any box components in the return air stream at the rear of the HVAC box.



RI03B039

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RADIATOR ASSEMBLY 9040-20

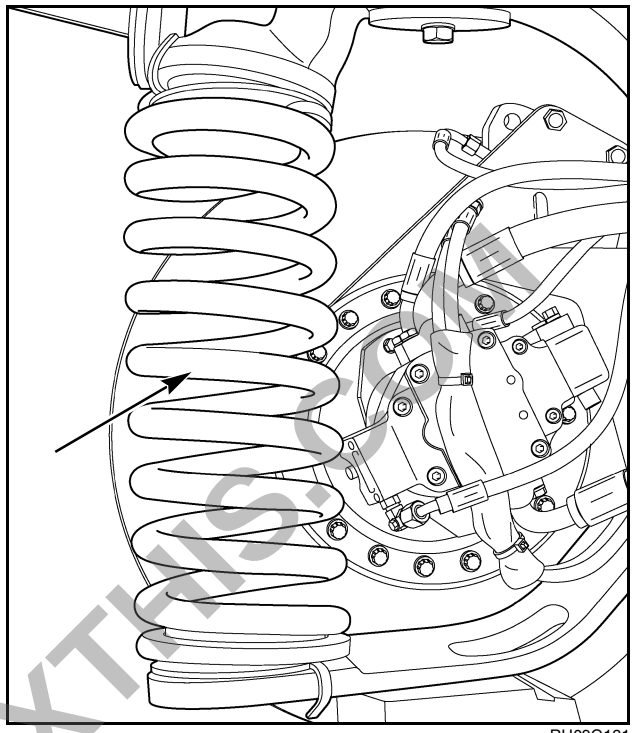
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STEP 8

Secure spring from falling. Slowly lower the trailing arm and remove the spring.

NOTICE: *The spring is very heavy, be sure to have assistance in its removal.*



RH09G131

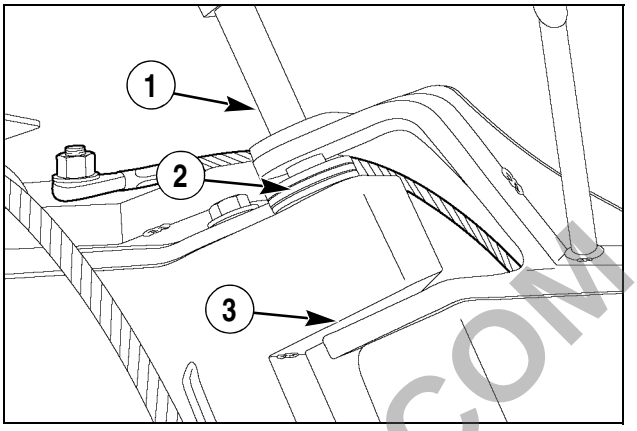
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STEP 3

Position boom breakaway tip onto the outer boom section. Install upper hinge bolt (1), three nylon washers (2), one nylon washer (3) and nut.

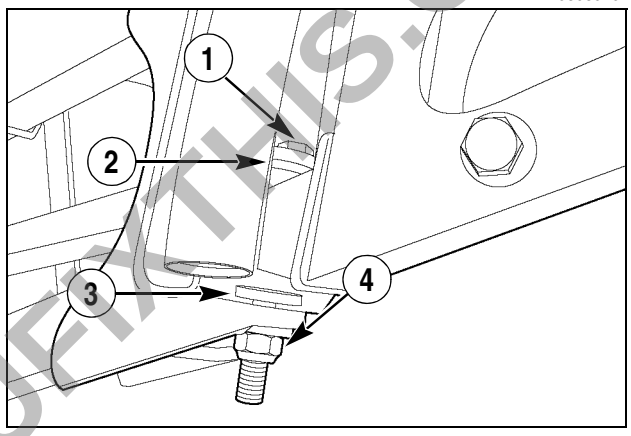
NOTICE: *Leave bolt loose until lower hinge bolt is installed. See Step 4.*



BD0808016

STEP 4

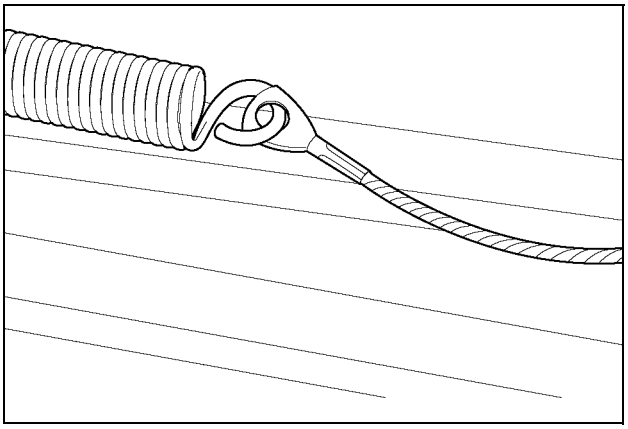
Install lower hinge bolt (1), one nylon washer (2), two nylon washers (3) and nut (4). Torque upper and lower hinge nuts to 67.8 Nm (50 lb ft).



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STEP 5

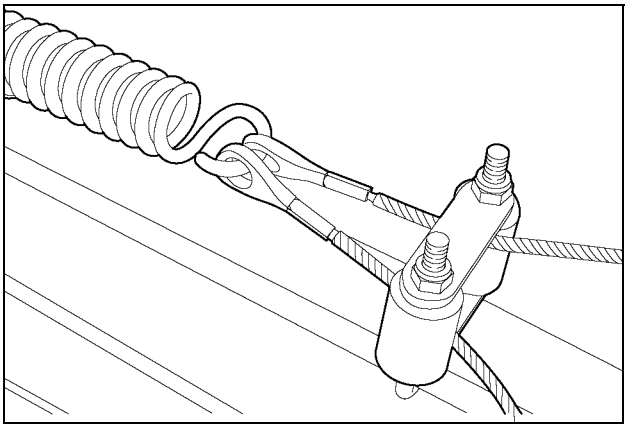
Pull the boom breakaway tip over center far enough to create slack in the breakaway cable and attach the cable end to the spring.



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STEP 6

Push the boom breakaway tip over center the other direction and attach the other cable end to the spring.



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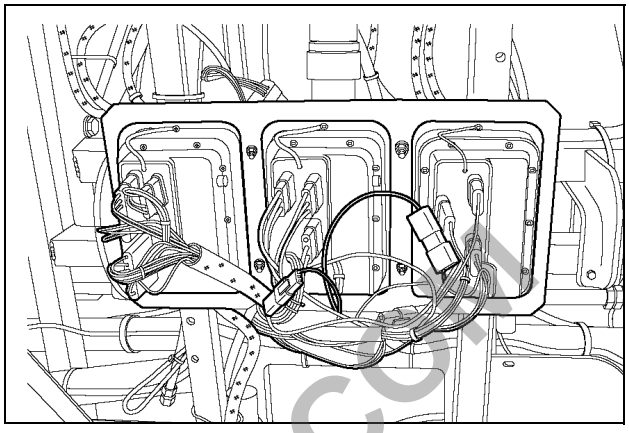
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STEP 7

Disconnect the electrical connections at the center section.

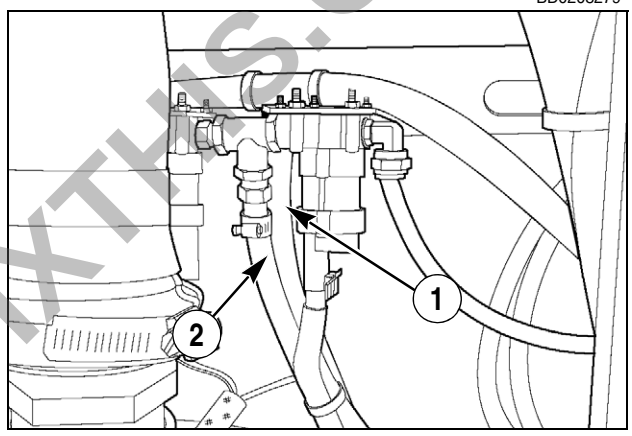
NOTICE: *Mark connectors for proper installation.*



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STEP 8

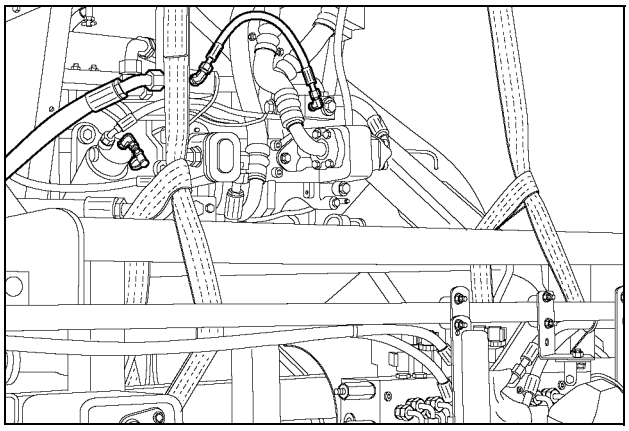
Disconnect air line hose (1) from tee and liquid foamer line (2) from solenoid valve.



BD0208278

STEP 9

Attach a proper lifting device to support the center section and mast.

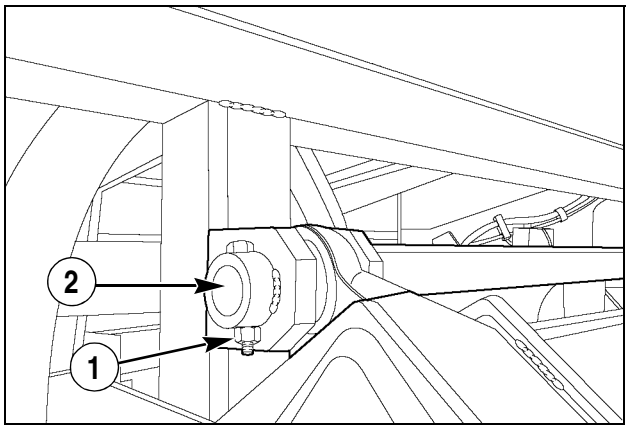


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STEP 10

NOTICE: *When removing hardened pins such as a pivot pin, or a hardened shaft, use a soft head (brass or bronze) hammer or use a driver made from brass or bronze and a steel head hammer. Failure to comply may result in damage to the machine.*

Remove nuts and bolts (1) from upper mast mounts and remove the pivot pins (2).



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