APPLICATOR

SERVICE MANUAL

RG700
Chassis

AGCO
Your Agriculture Company

1.1 Service manual

WARNING:
Some pictures in the manual show the shields removed to permit a clearer view. Never operate the machine with any shields removed.

This service manual has been prepared with the latest service information available at publication. Read and understand the service manual carefully before doing any service on the machine.

Right-hand and left-hand, as used in this manual, are determined by facing the direction of machine travel when in use.

Photos, illustrations, and data used were current at the time of printing, due to possible production changes, the machine can vary slightly. The manufacturer reserves the right to redesign and change the machine as necessary without notification.

1.1.1 Units of measurement

Measurements are given in metric units followed by the equivalent in US units. Hardware sizes are given in millimeters for metric hardware and inches for US hardware.

1.1.2 Replacement parts

To receive prompt efficient service, remember to have the following information:

Correct part description and part number
Model number of the machine
Serial number of the machine

1.1.3 Identification plates

The product identification number (PIN) will be used to identify a machine.

Components such as engines, transmissions and major attachments are identified by serial numbers.

For quick reference, record the identification numbers in the spaces provided.

Machine PIN

Machine PIN. Plate (1) is located on right-hand side frame rail in front of fuel tank.

Machine PIN:_____

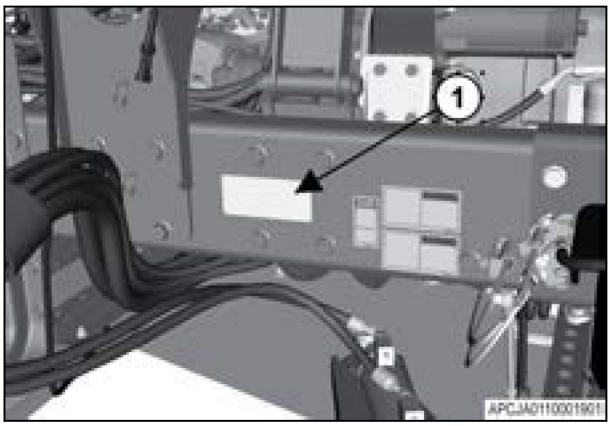

Fig. 1

Engine serial number

Always walk around and visually inspect machine before roading on public roads. As a warning, honk the horn twice before starting engine. Check for damage and/or faulty components that can fail and create a dangerous condition. Make sure all the machine systems operate correctly. Including, but not limited to: front road lamps, tail and brake lamps, hazard warning lamps, parking brake, horn, windshield wiper and washer and rear view mirrors. Repair or replace any component not in correct working order.

Never drive at a speed causing the machine to bounce or lose control.

Obey all traffic rules. Operate the machine with hazard warning lamps on, unless prohibited by law. The use of road lamps while roading on public roads is the operator's responsibility.

2.1.18 Operating on a slope

Keep the machine in a lower range when going down slopes. Use the same range when going down a slope as used for going up the slope. Avoid holes, ditches and obstructions that can cause the machine to roll-over, especially on hillsides. Avoid sharp turns on hills.

Never drive near the edge of a gully or steep embankment.

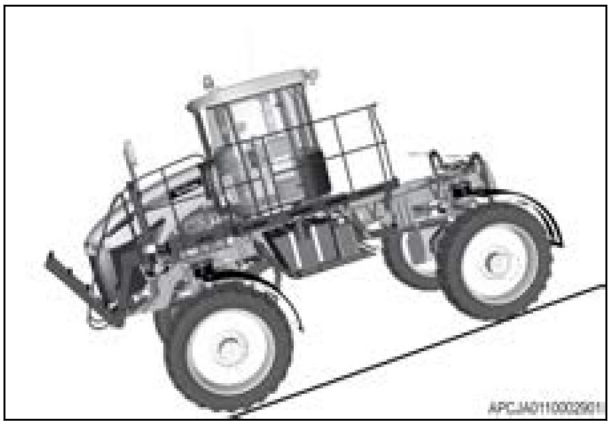

Fig. 10

2.1.19 Maintenance safety

Fully clean the work area, the machine, systems, and components before starting a job. Dirty and greasy areas can create work hazards.

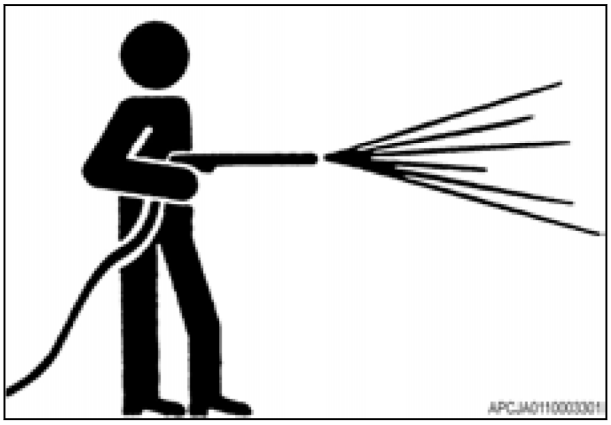

Fig. 11

Standard			High		Low	
5/8 - 11	145 to 175	175 to 255	160 to 190	200 to 280	75 to 95	95 to 135
3/4 - 10	245 to 305	320 to 420	290 to 350	370 to 490	135 to 165	160 to 240
7/8 - 9	410 to 510	540 to 700	470 to 570	610 to 790	215 to 265	285 to 365
1 - 8	590 to 730	800 to 1000	700 to 850	900 to 2200	335 to 405	435 to 565
1 1/8 - 7	860 to 1060	1150 to 1450	965 to 1175	1300 to 1600	465 to 565	610 to 790
1 1/4 - 7	1190 to 1450	1600 to 2000	1395 to 1705	1850 to 2350	880 to 1070	875 to 1125
1 3/8 - 6	1600 to 1960	2100 to 2700	1790 to 2190	2400 to 3000	1185 to 1445	850 to 1150
1 1/2 - 5	2050 to 2510	2750 to 3450	2385 to 2915	3200 to 40000	1515 to 1845	1500 to 1900

Assembly torque for inch fasteners

Thread size	Torque lbf ft	Torque Nm
1/4	6	8
5/16	13	17
3/8	26	35
7/16	33	45
1/2	48	65
5/8	80	110
3/4	125	170
7/8	190	260
1	300	400
1 1/8	390	525

2. Connect the wiring harness (1) to the bottom alternator (2).

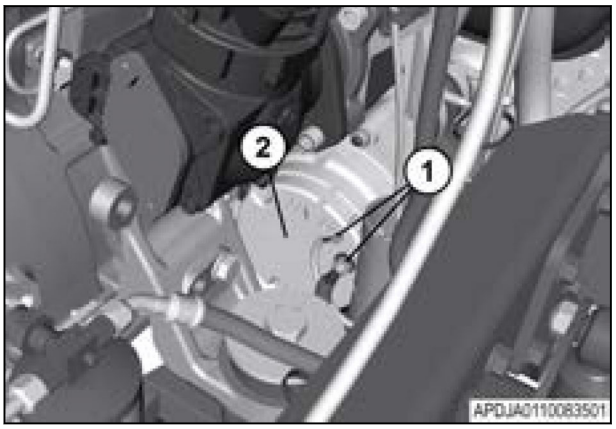

Fig. 22

3. **WARNING:**
Equipment or parts under spring tension can cause bodily injury. Use caution in releasing belt tension.

Install a 1/2 inch drive breaker bar into the square drive of the main serpentine belt tensioner (1). Push the breaker bar counterclockwise and install the main serpentine belt (2) on the tensioner and the bottom alternator.

4. Correctly seat the main serpentine belt (2) in the pulley grooves. Slowly release the tension until the belt tensioner makes contact with the main serpentine belt. Remove the 1/2 inch breaker bar.

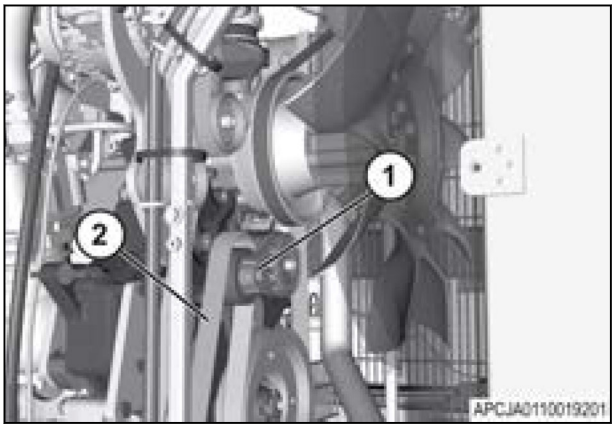

Fig. 23

5. Fasten the right-hand fan guard (3) to the shield bracket with the hardware (2). Fasten the hoses to the shield bracket with plastic ties (1).

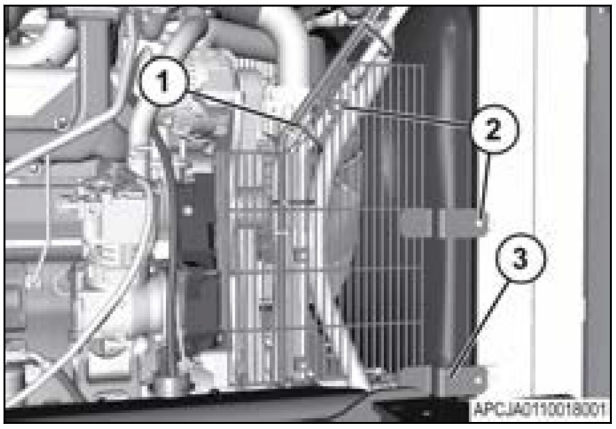

Fig. 24

6. Remove the hardware (1) and the condenser (2).

The weight of the cooler is approximately 19 kg (42 lb).

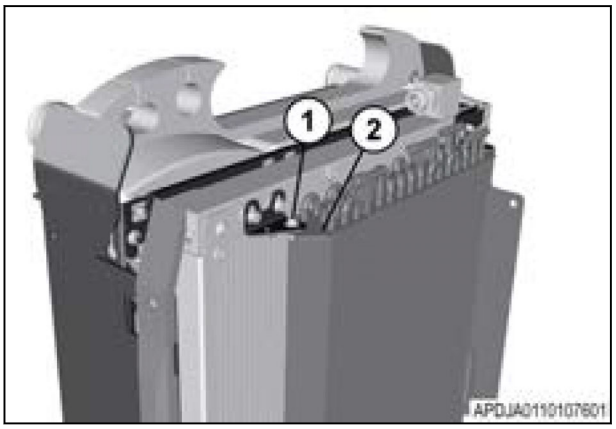

Fig. 72

7. Remove the hardware (1), both cooler brackets (2), and both cooler pivots (3).

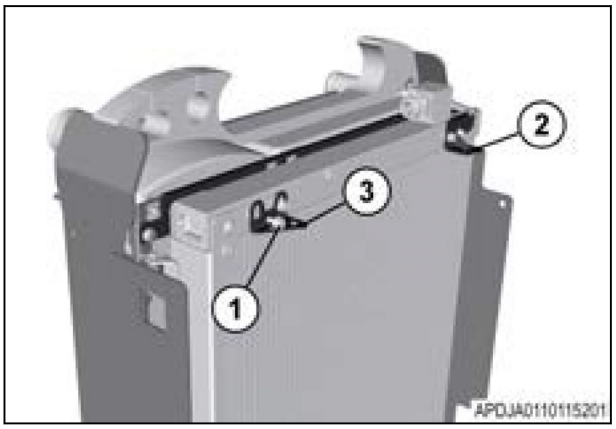

Fig. 73

8. Remove the top fitting (1) and the bottom fitting (2) from the hydraulic oil cooler.

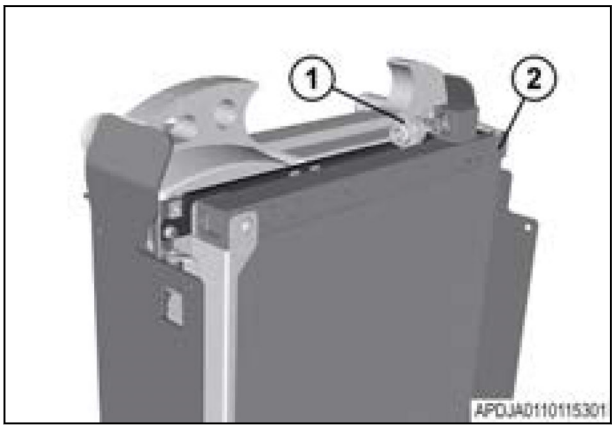

Fig. 74

21. Install the batteries (1).

See the information for installing the batteries.

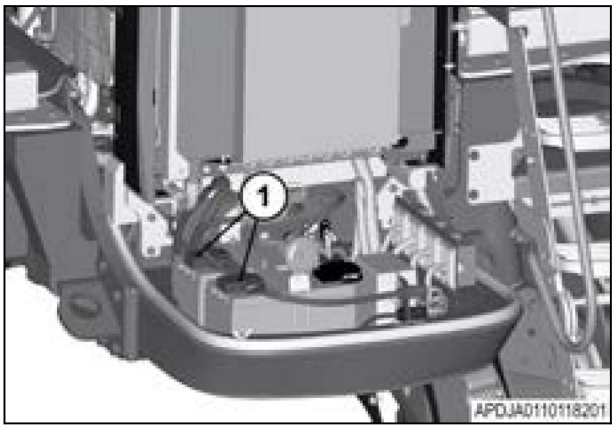

Fig. 125

22. Replace the air conditioning receiver-drier (1).

See the information for air conditioning receiver-drier replacement.

23. Use a certified technician to evacuate and fill the air conditioning system.

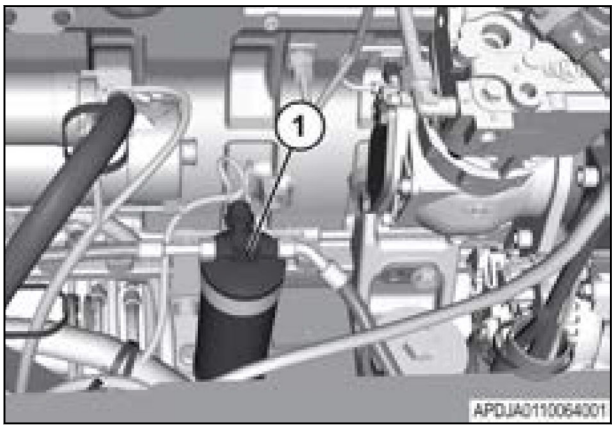

Fig. 126

24. Operate the engine until the engine is at operating temperature. Check the air conditioning performance.

25. Check the oil level in the hydraulic tank.

See the information for oil specifications.

26. Stop the engine, apply the parking brake, and take the key with you.

27. Let the system cool, then remove the expansion tank cap (1), and check the coolant level in the expansion tank (2).

Keep the coolant level to 51 mm (2 in) below the top of the filler.

WARNING:

Hot components can burn. Severe personal injury can result. Let the engine and components cool before doing maintenance.

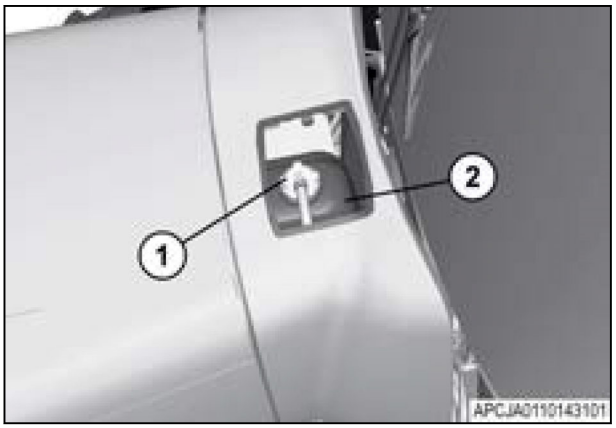

Fig. 127

7. Remove the hardware (2) from the condenser/cooler (1) brackets. Set the condenser and hoses to the side.

The weight of the cooler is approximately 19 kg (42 lb).

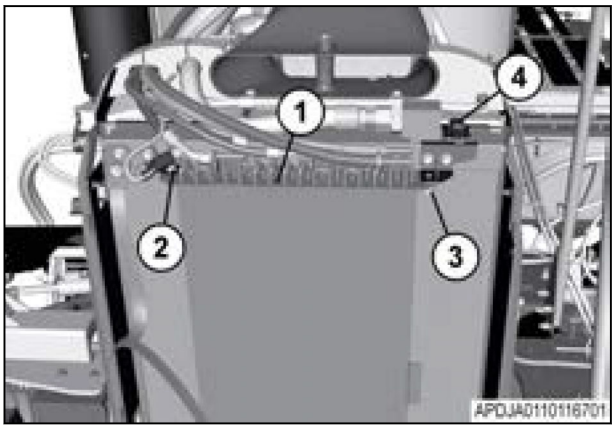

Fig. 173

8. Disconnect the top hose (2), and P-clamp (1) from the hydraulic oil cooler.

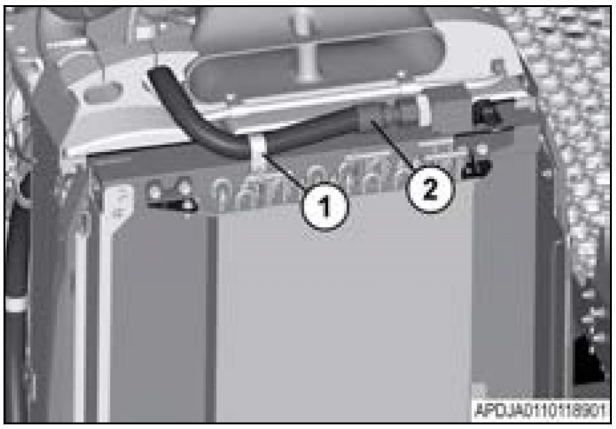

Fig. 174

9. Disconnect the bottom hose (1) from the hydraulic oil cooler (2).

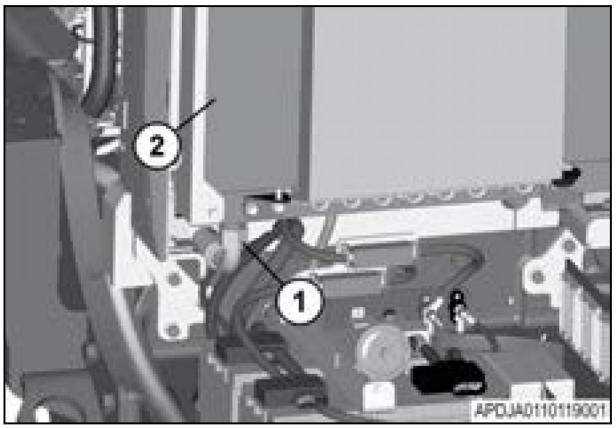

Fig. 175

17. Pull out the hydraulic oil cooler (1).

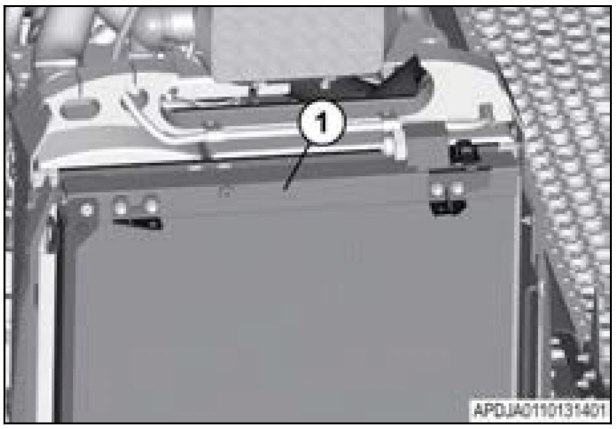

Fig. 221

18. Remove the hardware (1), and the two front crossmembers (2).

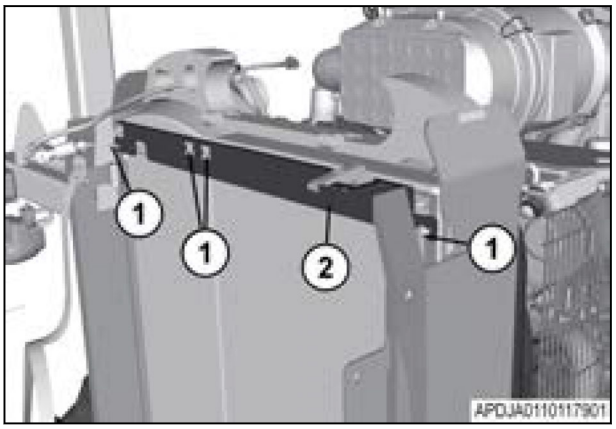

Fig. 222

19. Remove the hardware (1), the pins (2), and the two rear crossmembers (3).

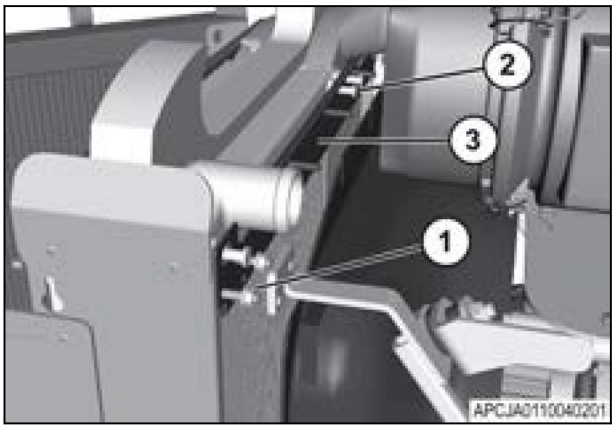

Fig. 223

3.9 Air filters

3.9.1 Removing the air filters

WARNING:

Hot components can burn. Severe personal injury can result. Let the engine and components cool before doing maintenance.

NOTE:
Before removal, fasten identification tags on the components for correct installation at assembly. Put caps and plugs on all hoses, fittings, and ports to prevent contamination from entering the system.

NOTE:
Fully clean all components to prevent contamination from entering the system. Contamination can damage the precision components. Complete the disassembly procedures on a clean work surface. Put a clean cloth on top of the components.

Procedure

1. Park the machine on a solid level surface. Stop the engine, apply the parking brake, and take the key with you.
2. Turn the battery disconnect switch key (1) counterclockwise to disconnect the battery power.

   NOTE:
   The battery disconnect switch is shown in the off position.

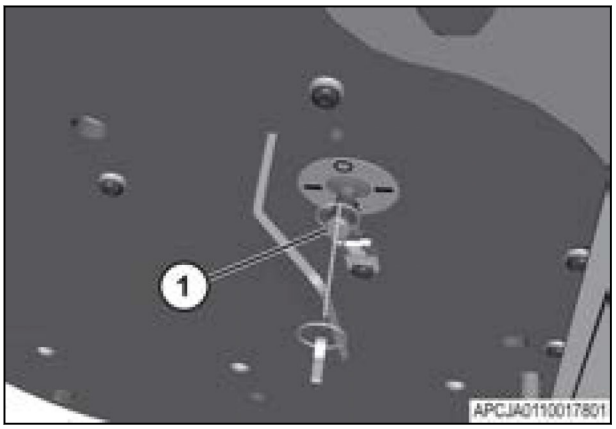

Fig. 271

3. Remove the battery disconnect switch key (1).

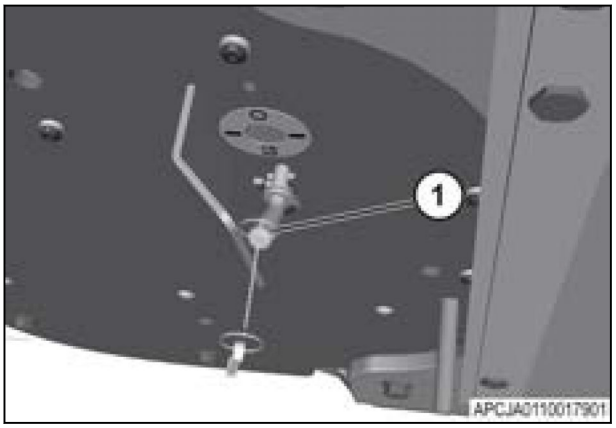

Fig. 272

4. Remove the battery disconnect switch key (1).

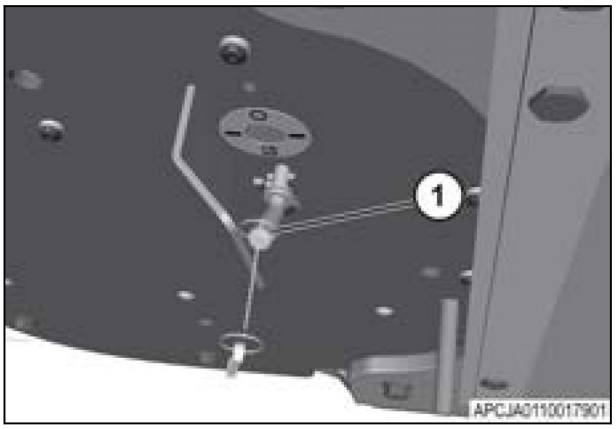

Fig. 320

5. Raise the terminal covers (1), loosen the positive battery clamps (2) and remove the positive battery cables. Set the battery cables clear of the batteries.

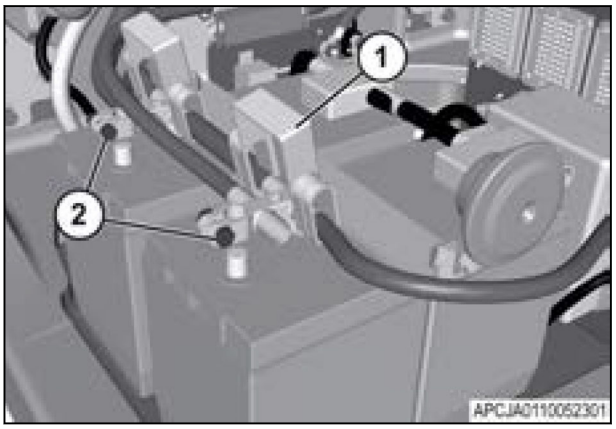

Fig. 321

6. Raise the terminal covers (1), loosen the negative battery clamps (2) and remove the negative battery cables. Set the battery cables clear of the batteries.

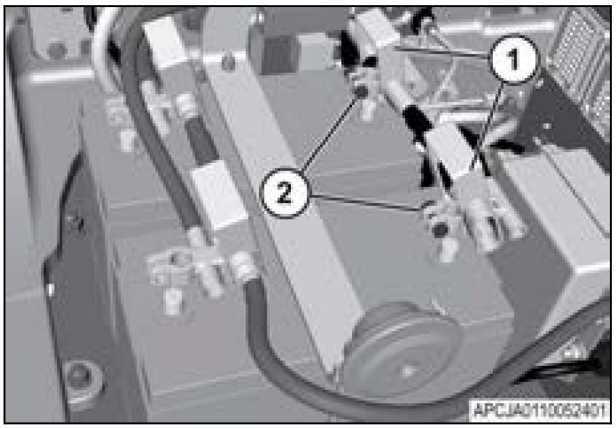

Fig. 322

12. Turn the battery disconnect switch key (1) clockwise to connect power.

The battery disconnect switch is shown in the on position.

13. Have a certified technician, evacuate and fill the air conditioning system.

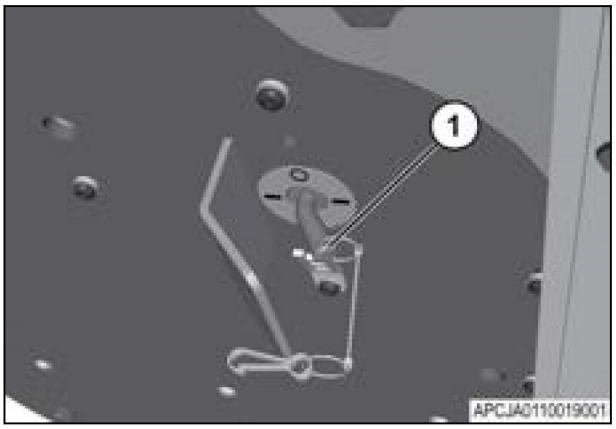

Fig. 370

14. Start the engine and check the air conditioning performance.

15. Close and latch the engine cover (1).

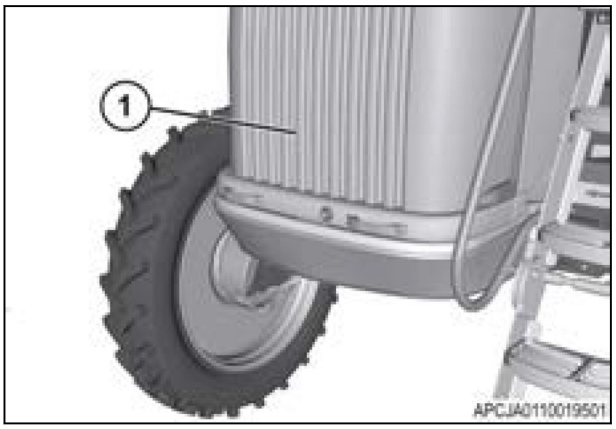

Fig. 371

9. Fasten the headlamp harness (3) to the engine cover with the P-clamps (2), and the hardware (1).

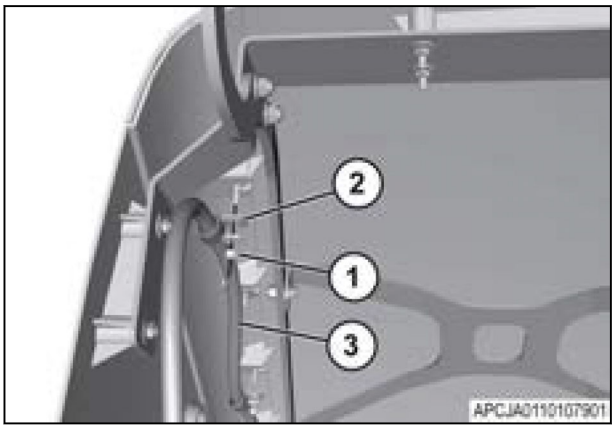

Fig. 420

10. Clean all inside surfaces of the engine cover. Mount the insulation panels (1) to both sides and the top with the correct adhesive.

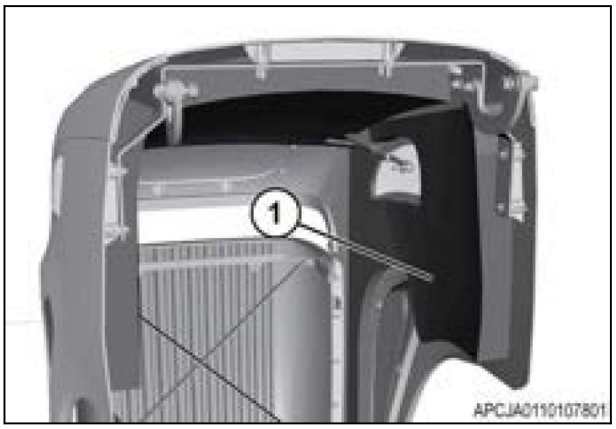

Fig. 421

11. Mount the foam headlamp seal (1) with the correct adhesive. Install the top engine cover seal (2) to the grille frame. Install the two side engine cover seals (3).

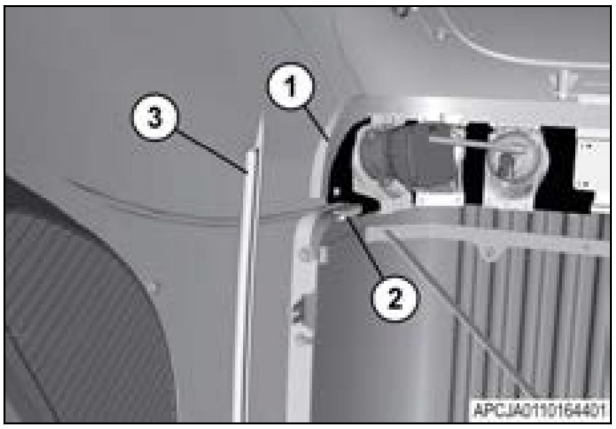

Fig. 422

16. Remove the cap (1) from the expansion tank (2), and check the coolant level.

Keep the coolant level to 51 mm (2 in) below the top of the filler.

WARNING:

Hot components can burn. Severe personal injury can result. Let the engine and components cool before doing maintenance.

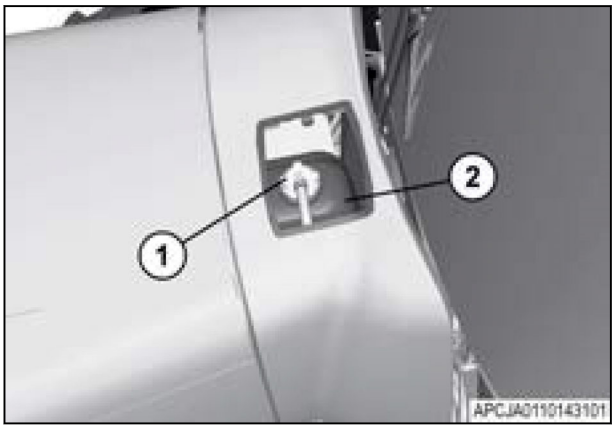

Fig. 472

17. Close and latch the engine cover (1).

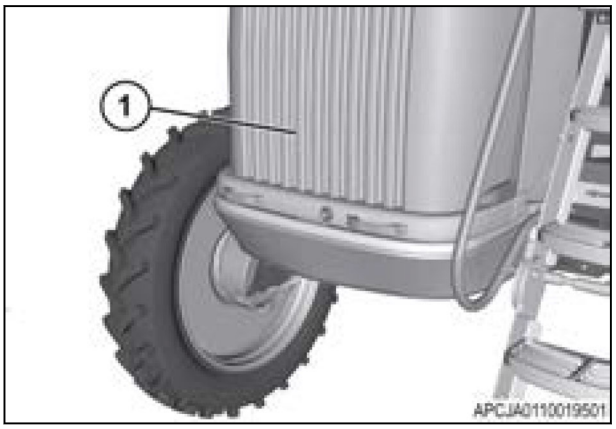

Fig. 473

39. Label and disconnect the wiring harness and the cable (1) from the starter.

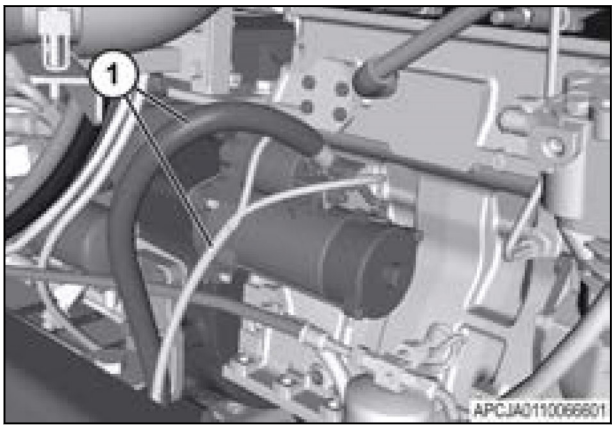

Fig. 520

40. Label and disconnect the wiring harnesses (1) from both alternators (2).

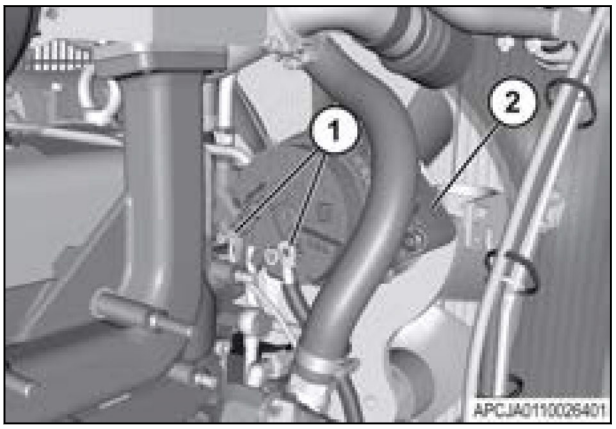

Fig. 521

41. Disconnect the ground cable (1) from the engine.

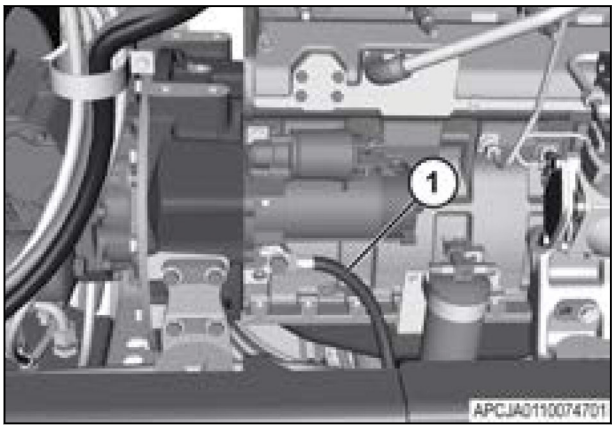

Fig. 522

34. Connect the hose (4) to the water pump (1). Tighten the hose clamp (2).

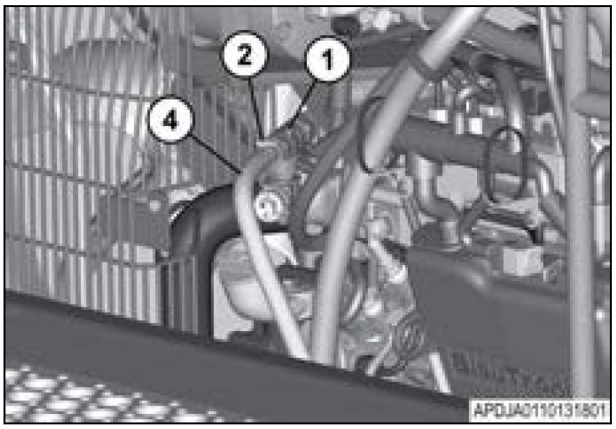

Fig. 573

35. Connect the hose (4) to the diesel exhaust fluid (DEF) tank (3). Tighten the hose clamp (2).

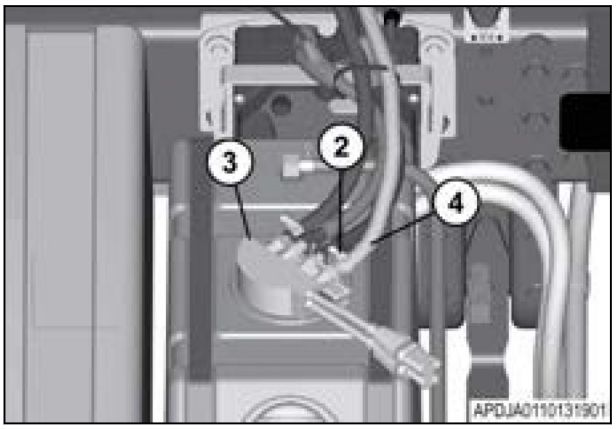

Fig. 574

36. Connect the hose (4) to the pump fitting (1). Tighten the hose clamp (2).

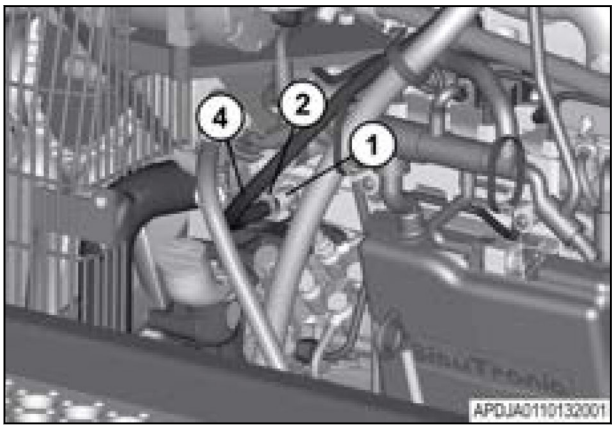

Fig. 575

18. Disconnect the three wiring harnesses (1) from the DEF line heaters.

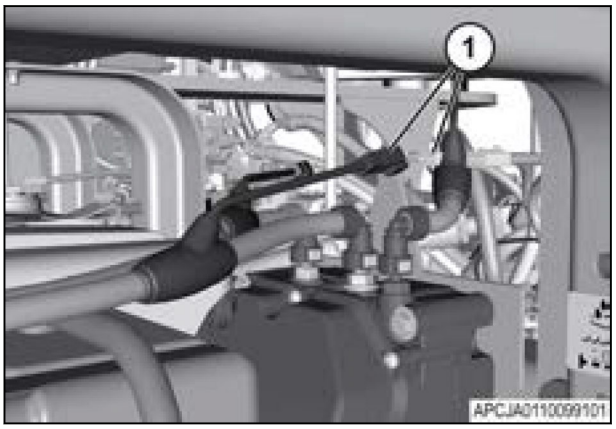

Fig. 621

19. Disconnect the DEF line (3) from the supply module (1).

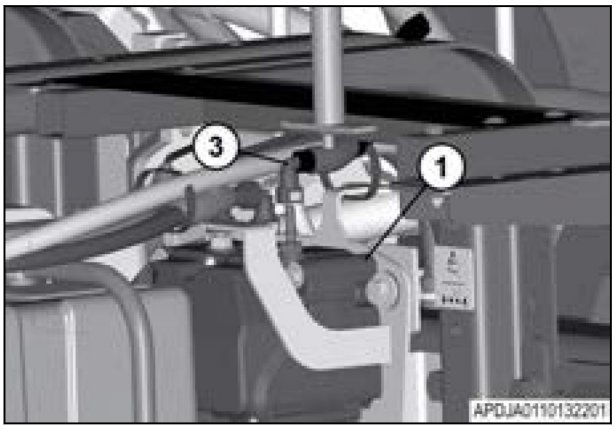

Fig. 622

20. Disconnect the other end of line (3) from the dosing module (2).

NOTE:
Some parts have been removed for clarity.

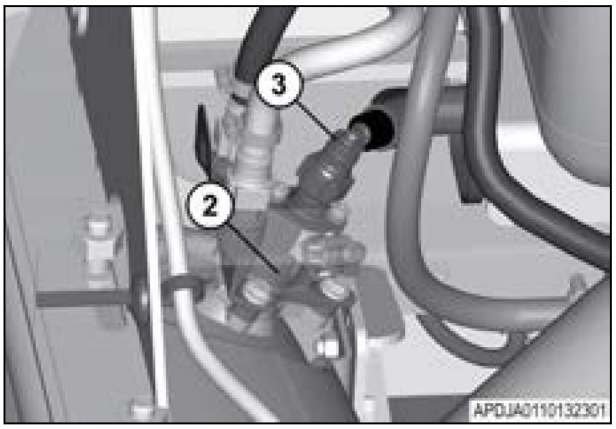

Fig. 623

2. Remove the plugs and caps. Connect the pump fuel line (2) to the fuel cooler (3) with the hose clamp (1).

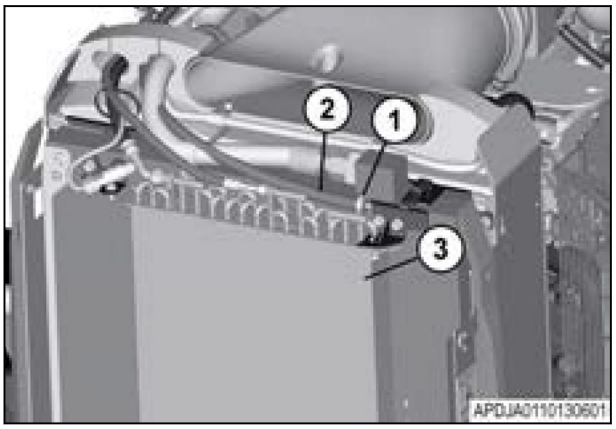

Fig. 670

3. Remove the plugs and caps. Connect the return fuel line (2) to the fuel cooler (3) with the hose clamp (1).

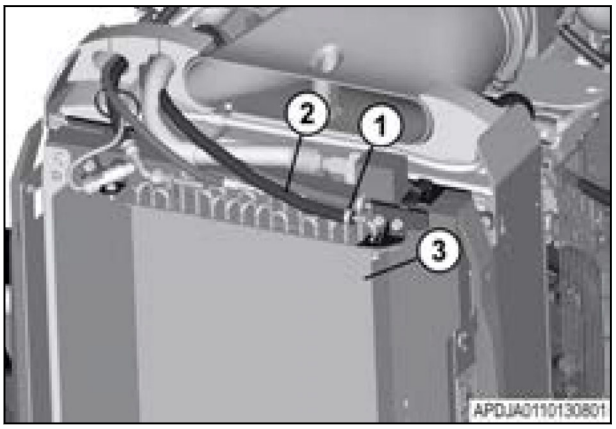

Fig. 671

4. Remove the plugs and caps. Connect the return fuel line (1) to the fuel tank with the hose clamp (2).

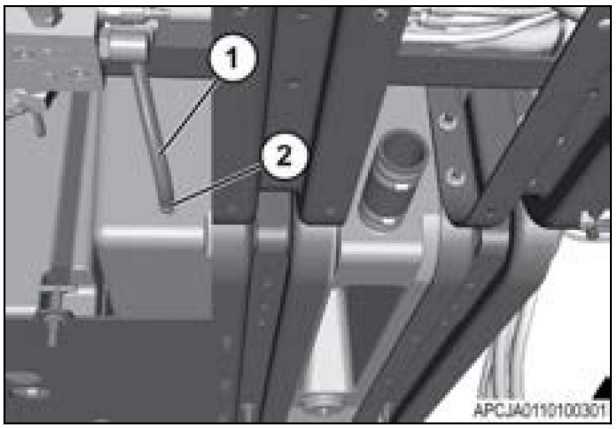

Fig. 672

8. Push on the hand pump (1) until the fuel flow is clear of air bubbles.

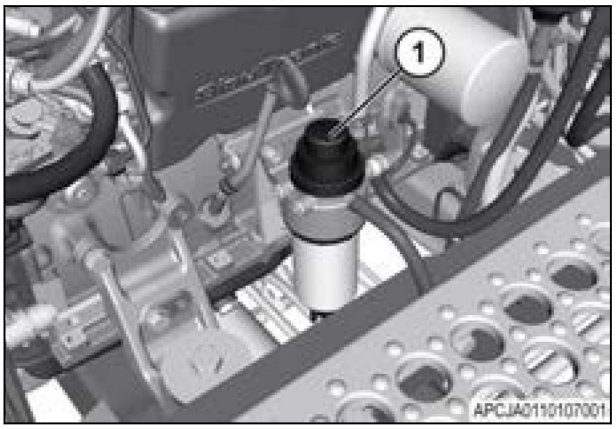

Fig. 715

9. Remove the hose and tighten the bleed plug (1).

10. Clean the engine area of any spilled fuel.

Fig. 716

11. Start the engine.

IMPORTANT:
The fuel system will automatically remove any remaining air from the system.

Installing the primary air filter

Procedure

1. Install the new primary air filter (2) into position.

   IMPORTANT: *Make sure the arrow on the filter is pointing upward for correct operation.*

2. Lift the panel (1) in position and tighten the thumb screw to lock in position.

   NOTE: *Make sure the seals come in contact with surface to prevent air leaks.*

Fig. 23

Secondary fresh air filter

The secondary fresh air filter is carbon-based. The filter is located in the left rear cab corner and is commonly referred to as the clean air filter. The carbon base removes the chemical fumes and the particles from the air. The secondary filter is the last filter that air moves through before reaching the heating and cooling side of the HVAC system.

NOTE: *When the filter is removed from the protective packaging, immediately install the filter. Exposure to the atmosphere reduces the effectiveness of the filter.*

Removing the secondary air filter

Procedure

1. Loosen the large black hand nut (1) on the corner panel and remove the panel.

Fig. 24

4.6 Heating, ventilation, air conditioning and cooling

4.6.1 System operation

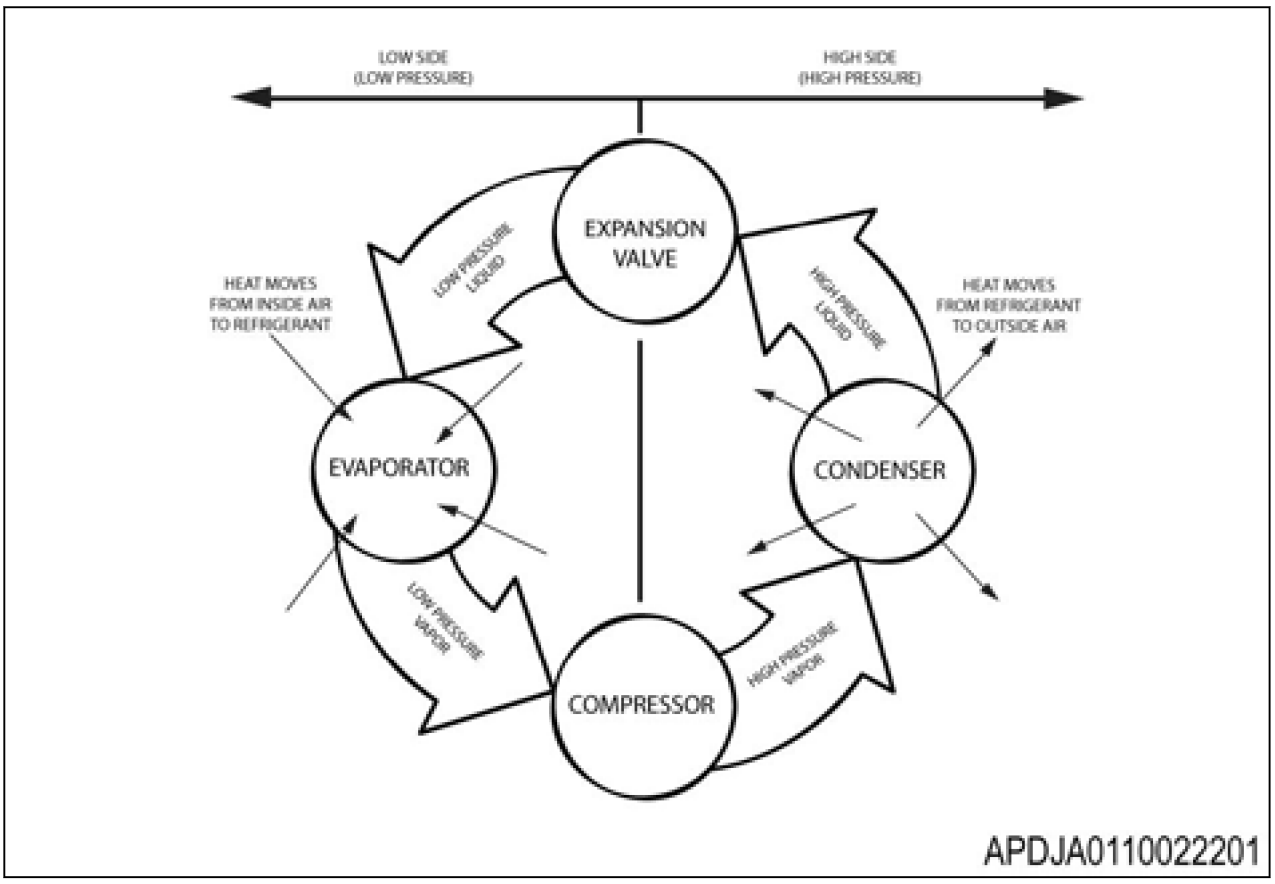

Fig. 68

The air conditioning cycle is divided into high and low pressure sides.

The high pressure side refers to the side of the system where the high pressure and the high temperature is located. The high pressure side comes out of the outlet side of the compressor. The high pressure moves through the condenser and moves to the thermal expansion valve (TXV).

The expansion valve is the dividing point between the high pressure and the low pressure sides. The low pressure side is the term for the portion of the air conditioning system in which the low pressure and low temperature is located. Low pressure moves from the expansion valve, through the evaporator, and to the inlet side of the compressor. The refrigerant is in the low pressure state.

Refrigerant in the air conditioning cycle is divided into a gas or a liquid state.

Refrigerant changes state in the condenser and the evaporator. The refrigerant enters the condenser as a vapor. The vapor cools in the condenser and changes to a liquid. The refrigerant remains a liquid through the expansion valve to the evaporator. The liquid refrigerant absorbs heat in the evaporator and boils into a vapor. The refrigerant remains a vapor through the compressor and returns to the condenser.

The compressor moves the refrigerant through the system. The refrigerant is compressed to a high pressure gas. The refrigerant is compressed to a high pressure gas and heated above ambient air temperature. The compressor moves the hot high pressure gas into the condenser where the refrigerant cools. As the refrigerant condenses into a liquid, heat is released to the condenser and air flowing through the condenser.

4.10 Refrigerant recovery

4.10.1 Refrigerant recovery tools

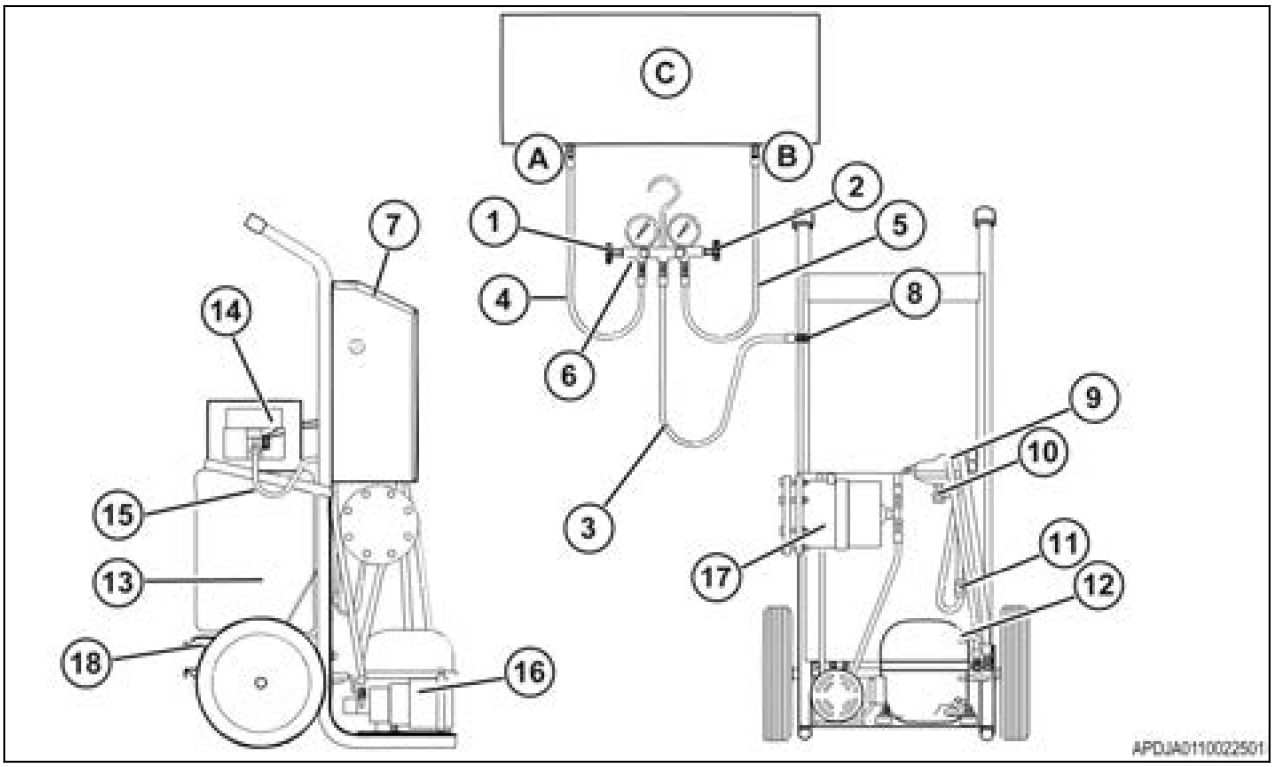

Fig. 71

(1) Low pressure valve
(2) High pressure valve
(3) Yellow charging hose
(4) Blue low pressure hose
(5) Red high pressure hose
(6) Manifold gauge set
(7) Control panel
(8) Inlet on recovery station
(9) Accumulator/oil separator
(10) Drain valve
(11) Pressure valve on accumulator
(12) Compressor
(13) Refrigerant tank
(14) Blue hose (liquid)
(15) Red hose (vapor)
(16) Refrigerant pump
(17) Filter dryer
(18) Scale for measuring refrigerant
(A) Low pressure side (suction)
(B) High pressure side (discharge)
(C) Refrigerant compressor

IMPORTANT: *Effective on July 1, 1992 regulations prohibit venting refrigerant into the atmosphere. Make sure to use proper procedure and environment to reclaim refrigerant from any equipment.*

4.10.2 Recovering refrigerant

Refrigerant must be removed from the system before loosening any line or removing any component containing refrigerant.

IMPORTANT: *It is illegal to knowingly release refrigerant to the atmosphere. Federal Clean Air Act Amendments of 1990 require that after July 1, 1992, no refrigerant must be intentionally released.*

Refrigerant must be removed with an approved refrigerant recovery station or recovery/recycling station.

A refrigerant recovery station removes refrigerant from the system and places the refrigerant in a storage cylinder. The refrigerant that is removed will must be processed before being used again.

11. Slide the left ladder rails (1) off of the hinge support rod (2).

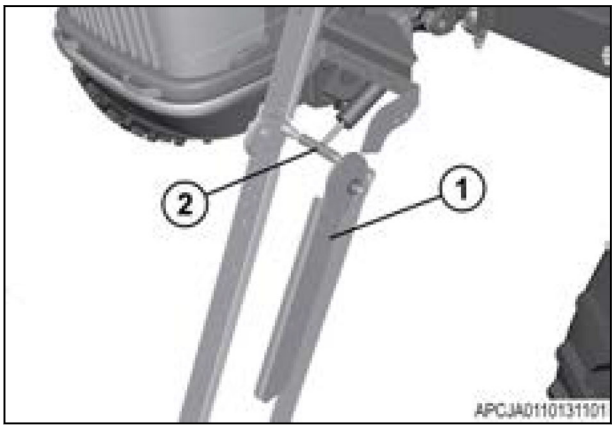

Fig. 95

12. Support the hydraulic cylinder (1) and remove the hinge support rod (2).

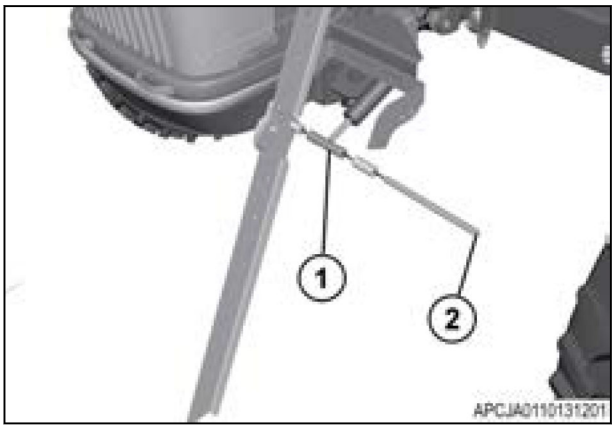

Fig. 96

13. Remove the hardware (1), and the hydraulic cylinder (2).

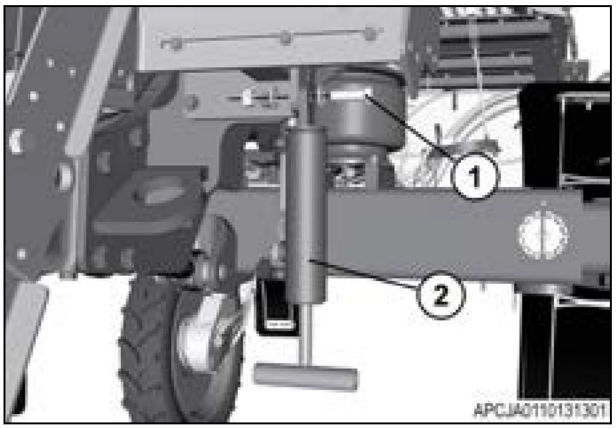

Fig. 97

15. Remove mounting hardware (1) and bracket (2).

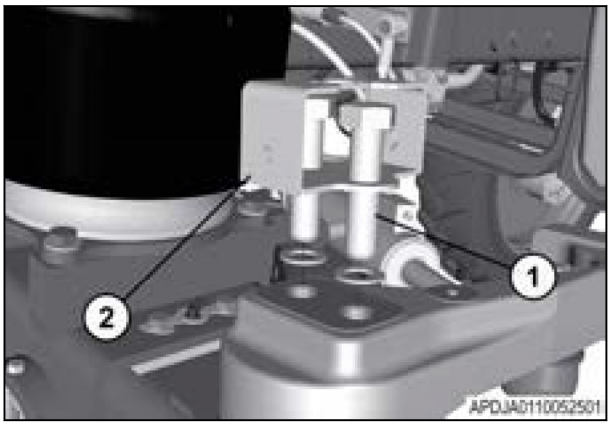

Fig. 15

16. Remove the steering plate (1) and the thrust bushing (2).

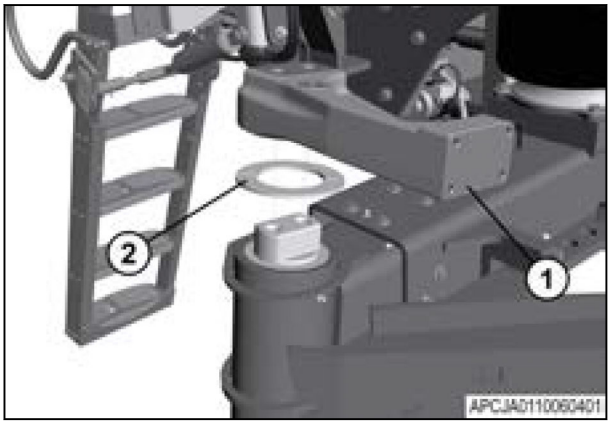

Fig. 16

17. Remove the king pin (1) and the thrust bushing (2) from the steerable axle weldment.

Fig. 17

6. Remove the mounting hardware (1) that fastens the air spring to the axle.
7. Raise the machine and remove the air spring.

NOTE:
Disconnect the shock absorber (2) and limiter strap (3) if necessary.

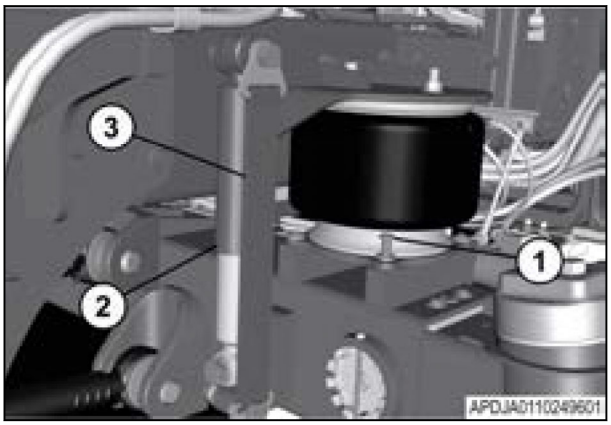

Fig. 68

8. Remove the mounting hardware (1) that fastens the bracket (2) to the air spring (3).
9. Repeat the procedure for the opposite side of the machine.

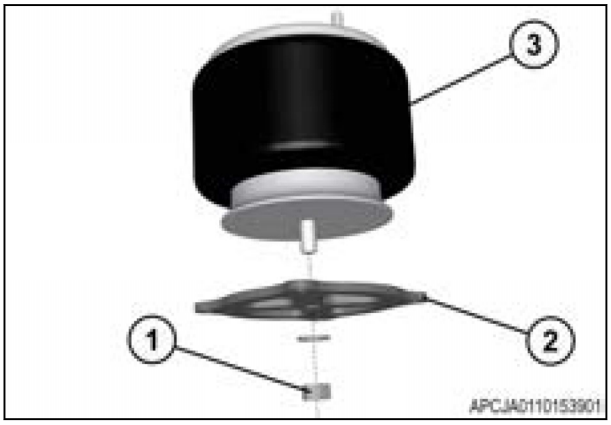

Fig. 69

8. Apply Loctite® 242-41 to the bolts (1) and bracket (2). Tighten the bolts to 618 Nm (456 lbf ft).

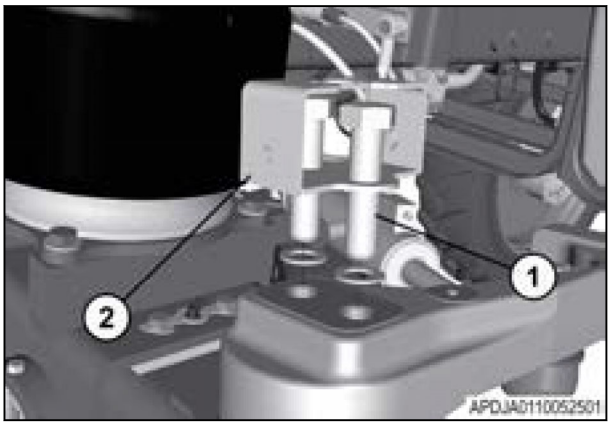

Fig. 121

9. Install the base end of the steering cylinder (3) to the inner axle weldment with the slotted nut (2). Tighten the slotted nut to 145 Nm (107 lbf ft). Continue tightening until the cotter pin hole aligns with the slot in the slotted nut. Install the cotter pin (1).

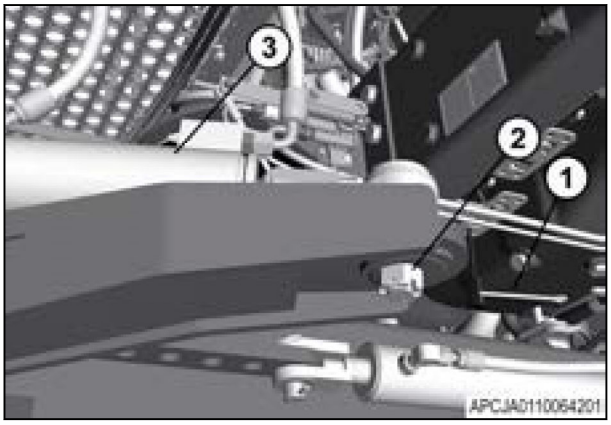

Fig. 122

10. Install the rod end of the steering cylinder to the steering plate with the slotted nut (2). Tighten the slotted nut to 145 Nm (107 lbf ft). Continue tightening until the cotter pin hole aligns with the slot in the slotted nut. Install the cotter pin (1).

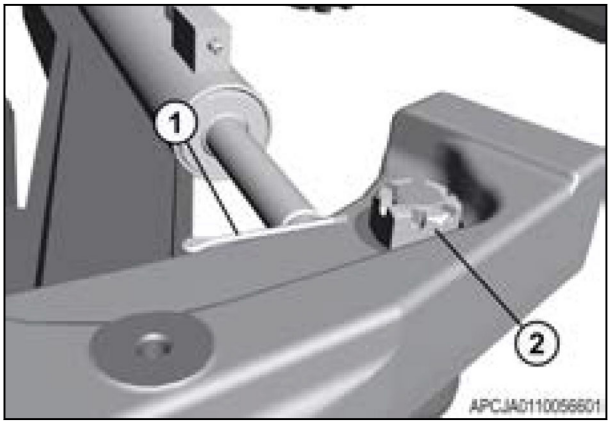

Fig. 123

26. Remove the mounting hardware (1) and the pin (2) that fastens the bottom torque rod (3) to the frame.

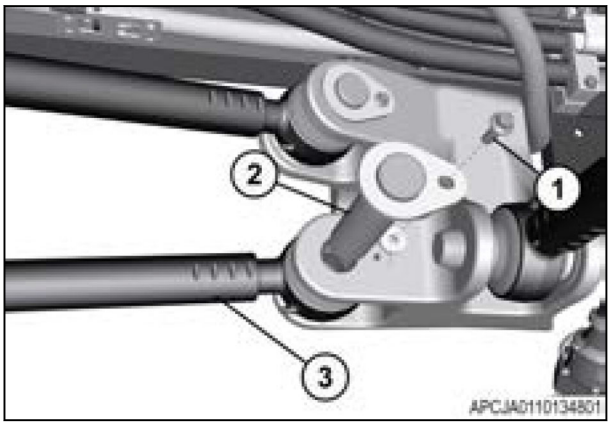

Fig. 169

27. Remove the mounting hardware (1) and the pin (2) that fastens the bottom torque rod (3) to the axle weldment.

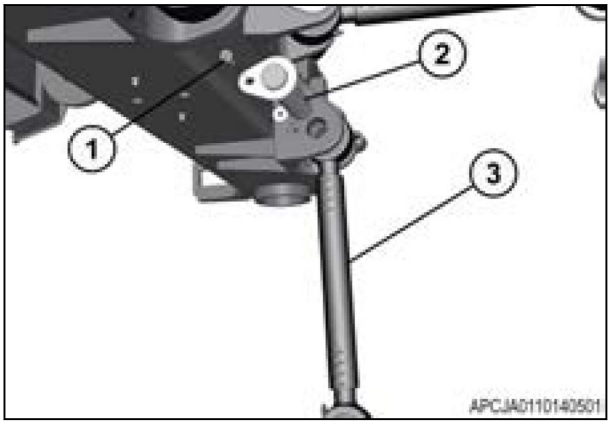

Fig. 170

28. Remove the mounting hardware (1) and the pin (2) that fastens the upper torque rod (3) to the frame.

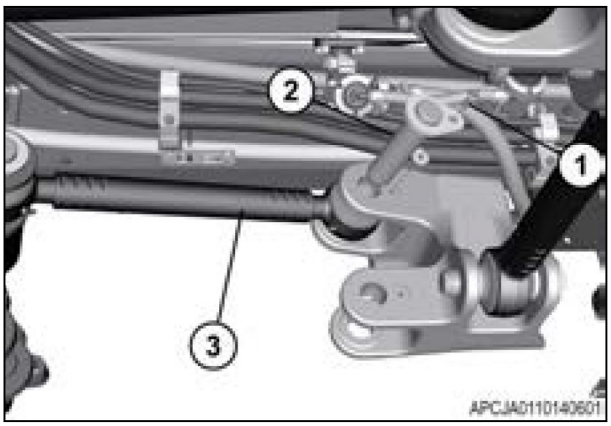

Fig. 171

14. **NOTE:**
Manual adjustment is available on the 72, 90, and 120 inch chassis.

    Manually adjust the rear inner axle to the desired width. Align the mounting hole on the rear inner axle with the mounting hole on the rear axle weldment.

15. Install the mounting hardware (1) for the manual tracking.

Fig. 222 72 inch manual adjustment chassis

16. Lock the axle width with the mounting hardware (1). Tighten the hardware to 100 Nm (74 lbf ft).

17. Repeat this procedure for the opposite side of the machine.

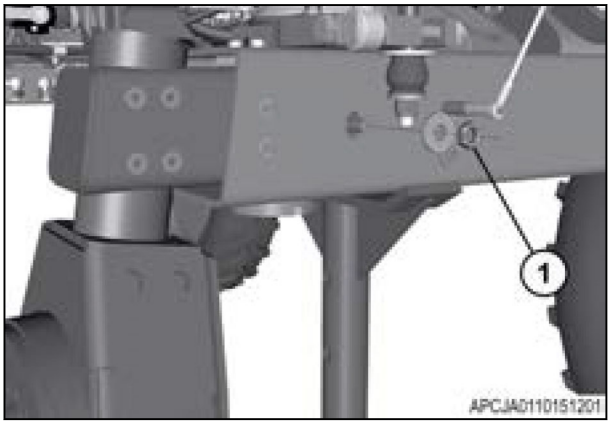

Fig. 223 72 inch manual adjustment chassis

18. Manually adjust the rear inner axle to the desired width. Align the mounting hole on the rear inner axle with the mounting hole on the track width adjust bar.

19. Install the pin (2) and the lynch pin (1) for the manual track width adjustment.

20. Repeat this procedure for the opposite side of the machine.

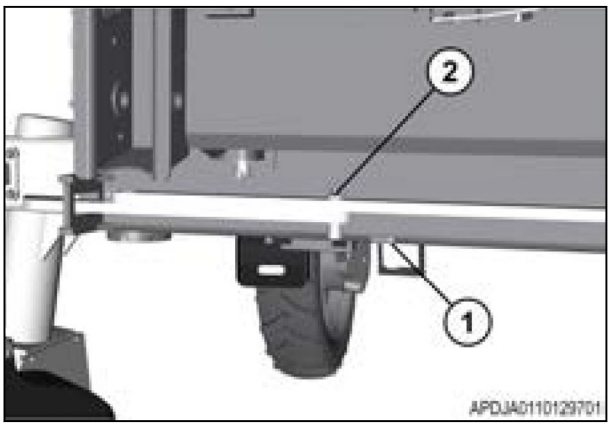

Fig. 224 90 and 120 inch manual adjustment chassis

6. Disconnect the supply line (1) to the regulator.
7. Disconnect the fitting (2) from the regulator output.

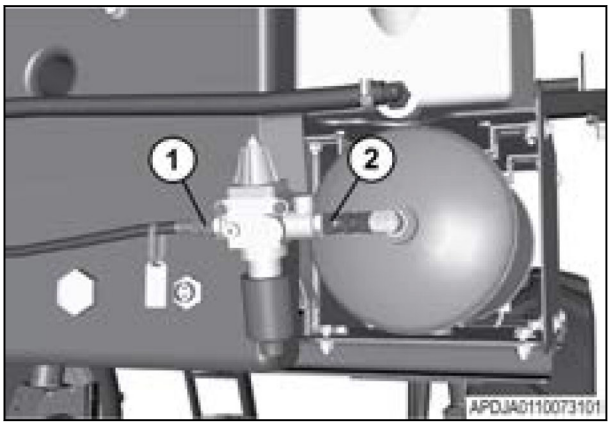

Fig. 266

8. Support the regulator (1) and remove the two bolts (2) holding the regulator to the bracket.

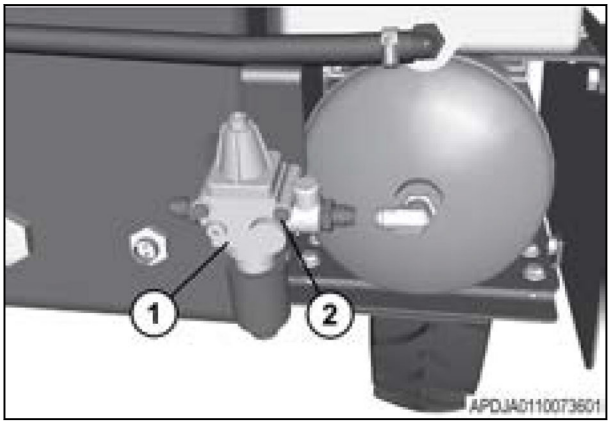

Fig. 267

5.10.4 Installing the regulator

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Fasten the regulator (1) to the bracket with two bolts (2).

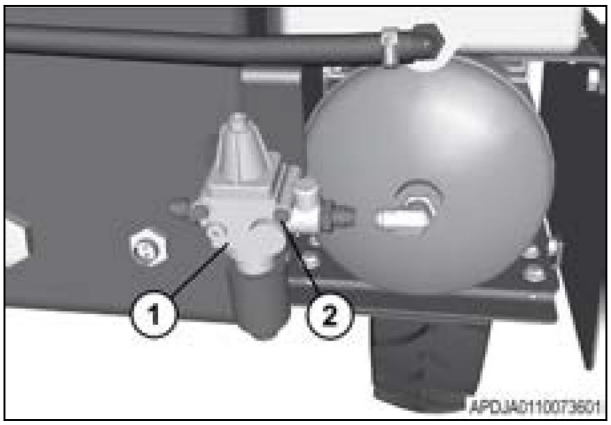

Fig. 268

5. Install the air spring on the frame with the mounting hardware (1).

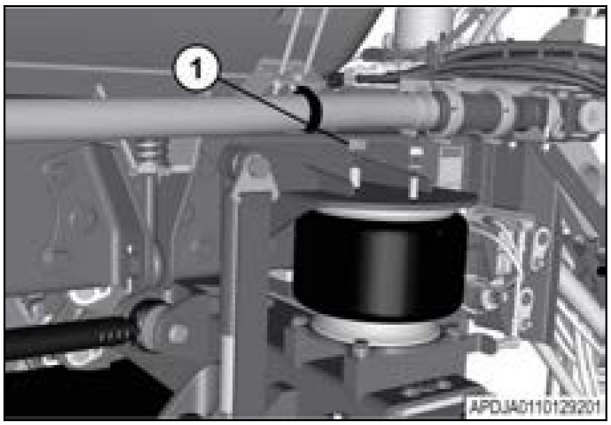

Fig. 317

6. Install the air line (2) on the air spring.
7. Install the connecting rod (1) on the axle.

   NOTE:
   Do not over tighten or compress the connecting rod during installation.
8. Carefully lower the machine to the ground and remove the lifting tool.
9. Repeat the procedure for the opposite side of the machine.
10. Adjust the ride height of the machine after all service work is complete.

    See the information for adjusting the ride height.

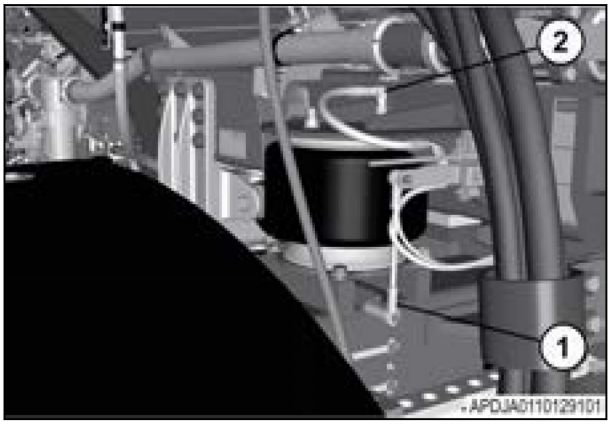

Fig. 318

5.10.16 Removing the air dump valve

Before starting the procedure

WARNING:

Pressurized gases or fluids can be hazards. Personal injury can result. Relieve the pressure from the system or component before disconnecting components.

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Park the machine on a solid level surface.
3. Stop the engine, apply the parking brake, and take the key with you.
4. Before removal, fasten identification tags on components for correct installation at assembly. Put caps and plugs on all hoses, fittings, ports, and openings to prevent contamination from entering the system.

6.1 Battery compartment components

6.1.1 Removing the battery compartment components

IMPORTANT:
Before removal, fasten identification tags on the components for correct installation at assembly.

Procedure

1. Remove the batteries.
   See the information for removing the batteries.
2. Remove the hardware (1) and both fuse holders (2).

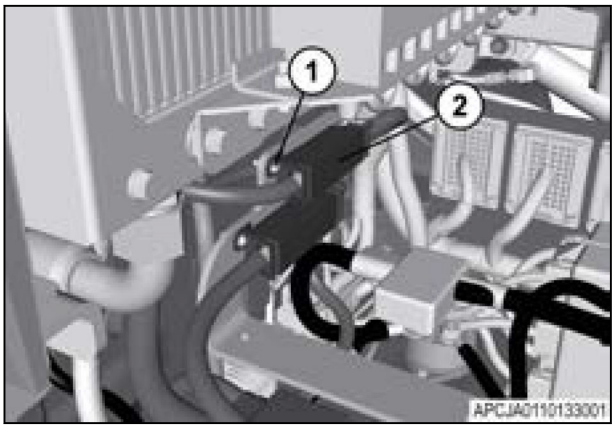

Fig. 1

3. Remove both wire connectors (1) from the horn (2).

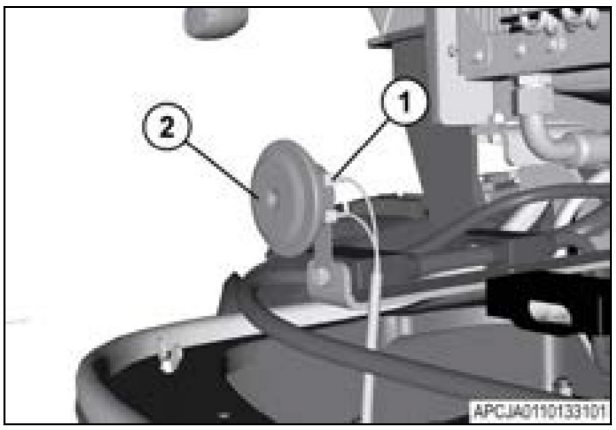

Fig. 2

One or more components is sending a signal that is below the correct range. FMI 17 is the first warning.

Example: The transmission lubrication hydraulic pressure is below the correct range.

FMI 18

The data is correct but less the correct range.

One or more components is sending a signal that is less than the correct range. FMI 18 is a secondary warning.

Some possible causes of an FMI 16 are:

- The signal is more than the correct range.
- There is a short circuit in the sensor wire.
- The sensor is bad.

FMI 19

Received network data in error

The software specified conditions not met, or the CAN bus is not communicating

FMI 31

A condition that prevents the safe operation of the machine. Continued operation of the machine will cause injury or cause damage to machine components.

Example: The hydraulic oil filter has reached the end of service life. Continued operation will damage the hydraulic components.

Item	Term	Term description
-	CHASSIS	Chassis
-	AIR PRESSURE SWITCH	Air pressure switch
-	DEF DOSING VALVE	Diesel exhaust fluid dosing valve
-	DEF TANK HEATER VALVE	Diesel exhaust fluid
-	ENGINE ECM	Engine electric control module
-	I/O CLEAN FUSE/RLY BLOCK	I/O clean fuse/relay block
-	DNOX SUPPLY MODULE	supply module
-	DOSING VALVE CNTRL	Dosing valve control
-	AMBIENT TEMPERATURE SENSOR	Ambient air temperature sensor
-	DEF TANK LEVEL/ TEMPERATURE SENSOR	Diesel exhaust fluid
-	DOSING VALVE SUPPLY	Dosing valve supply
-	DEF TANK HTR VALVE CNTRL	Diesel exhaust fluid tank heater valve control
-	DEF TANK HTR VALVE SUPPLY	Diesel exhaust fluid tank heater valve supply
-	DEF PUMP GND	Diesel exhaust fluid pump ground
-	DEF REVERT VALVE SUPPLY	Diesel exhaust fluid revert valve supply
-	DEF PRESSURE SENSOR 5V	Diesel exhaust fluid pressure sensor 5 volts
-	DEF REVERT VALVE CNTRL	Diesel exhaust fluid revert valve control
-	DEF HEATER SIG	Diesel exhaust fluid heater signal
-	DEF PUMP SUPPLY	Diesel exhaust fluid pump supply
-	DEF PRESS SENSOR GND	Diesel exhaust fluid sensor ground
-	DEF PRESS SENSOR SIG	Diesel exhaust fluid sensor signal

Item	Term	Term description
-	CHASSIS	Chassis
-	AIR PRESSURE SWITCH	Air pressure switch
-	DEF DOSING VALVE	Diesel exhaust fluid dosing valve
-	DEF TANK HEATER VALVE	Diesel exhaust fluid
-	ENGINE ECM	Engine electric control module
-	I/O CLEAN FUSE/RLY BLOCK	I/O clean fuse/relay block
-	DNOX SUPPLY MODULE	supply module
-	DOSING VALVE CNTRL	Dosing valve control
-	AMBIENT TEMPERATURE SENSOR	Ambient air temperature sensor
-	DEF TANK LEVEL/ TEMPERATURE SENSOR	Diesel exhaust fluid
-	DOSING VALVE SUPPLY	Dosing valve supply
-	DEF TANK HTR VALVE CNTRL	Diesel exhaust fluid tank heater valve control
-	DEF TANK HTR VALVE SUPPLY	Diesel exhaust fluid tank heater valve supply
-	DEF PUMP GND	Diesel exhaust fluid pump ground
-	DEF REVERT VALVE SUPPLY	Diesel exhaust fluid revert valve supply
-	DEF PRESSURE SENSOR 5V	Diesel exhaust fluid pressure sensor 5 volts
-	DEF REVERT VALVE CNTRL	Diesel exhaust fluid revert valve control
-	DEF HEATER SIG	Diesel exhaust fluid heater signal
-	DEF PUMP SUPPLY	Diesel exhaust fluid pump supply
-	DEF PRESS SENSOR GND	Diesel exhaust fluid sensor ground
-	DEF PRESS SENSOR SIG	Diesel exhaust fluid sensor signal

Schematic

Schematic legend		
Item	**Term**	**Term description**
-	FUSE RELAY BLOCK 4	Fuse relay block 4
-	I/O CLEAN FUSE/RELAY BLOCK	I/O clean fuse/relay block
-	ENGINE ECM	Engine electronic control module
-	DEF SUCTION HEATED LINE	Diesel suction heated line
-	DEF RETURN HEATED LINE	Diesel return heated line
-	DEF PRESSURE HEATED LINE	Diesel pressure heated line
-	CHASSIS	Chassis
-	ENGINE KILL	Engine kill
-	MAIN RLY CNTRL	Main relay control
-	HEATER RELAY CONTROL	Heater relay control

6.3.18 Code SA 00 SPN 4342 FMI 04

The diesel exhaust fluid (DEF) backflow line heater control circuit short circuit to ground.

Common failures

- The DEF backflow line heater wire is bad
- The DEF backflow line heater relay is bad

A CAN message indicates active fault code.

The fault code is stored and warning lamp is activated.

NOTE:
Present fault is classified for emission related fault. Reduced engine power occurs after a specific amount of time defined by authorities.

Diagnosis and Solution

1. Check the DEF suction line heater relay wire, the DEF suction line heater relay connector and the connector pins for dirt or corrosion.
2. Check the DEF suction line heater relay operation with another the DEF suction line heater relay. If system is functional and fault is not active with a replacement the DEF suction line heater relay, the DEF suction line heater relay is bad.

Diesel exhaust fluid power electrical schematic
Schematic

Schematic

Schematic legend		
Item	**Term**	**Term description**
-	FUSE RELAY BLOCK 4	Fuse relay block 4
-	I/O CLEAN FUSE/RELAY BLOCK	I/O clean fuse/relay block
-	ENGINE ECM	Engine electronic control module
-	DEF SUCTION HEATED LINE	Diesel suction heated line
-	DEF RETURN HEATED LINE	Diesel return heated line
-	DEF PRESSURE HEATED LINE	Diesel pressure heated line
-	CHASSIS	Chassis
-	ENGINE KILL	Engine kill
-	MAIN RLY CNTRL	Main relay control
-	HEATER RELAY CONTROL	Heater relay control

6.3.27 Code SA 00 SPN 4346 FMI 03

The diesel exhaust fluid (DEF) pressure line heater control circuit short circuit to high source.

Common failures

- The DEF pressure line heater wire is bad
- The DEF pressure line heater is bad

A CAN message indicates active fault code.

The fault code is stored and warning lamp is activated.

NOTE:
Present fault is classified for emission related fault. Reduced engine power occurs after a specific amount of time defined by authorities.

Diagnosis and Solution

1. Check the DEF pressure line heater wire, the DEF pressure line heater connector and the connector pins for dirt or corrosion.
2. Check the DEF pressure line heater relay operation with another the DEF pressure line heater relay. If system is functional and fault is not active with a replacement the DEF pressure line heater relay, the DEF pressure line heater relay is bad.

Diesel exhaust fluid power electrical schematic
Schematic

Schematic

Schematic legend		
Item	**Term**	**Term description**
-	FUSE RELAY BLOCK 4	Fuse relay block 4
-	I/O CLEAN FUSE/RELAY BLOCK	I/O clean fuse/relay block
-	ENGINE ECM	Engine electronic control module
-	DEF SUCTION HEATED LINE	Diesel suction heated line
-	DEF RETURN HEATED LINE	Diesel return heated line
-	DEF PRESSURE HEATED LINE	Diesel pressure heated line
-	CHASSIS	Chassis
-	ENGINE KILL	Engine kill
-	MAIN RLY CNTRL	Main relay control
-	HEATER RELAY CONTROL	Heater relay control

6.3.36 Code SA 00 SPN 4357 FMI 04

The diesel exhaust fluid (DEF) pressure line heater relay high side (heater, main relay) open circuit.

Common failures

- The DEF pressure line heater relay wire is bad
- The DEF pressure line heater relay is bad

A CAN message indicates active fault code.

The fault code is stored and warning lamp is activated.

NOTE:
Present fault is classified for emission related fault. Reduced engine power occurs after a specific amount of time defined by authorities.

Diagnosis and Solution

1. Check the pressure line heater relay wire, the connector and the connector pins for dirt or corrosion.
2. Check the DEF pressure line heater relay operation with another the DEF pressure line heater relay. If system is functional and fault is not active with a replacement, the DEF pressure line heater relay is bad.

Diesel exhaust fluid power electrical schematic
Schematic

Schematic

Schematic legend		
Item	**Term**	**Term description**
-	FUSE RELAY BLOCK 4	Fuse relay block 4
-	I/O CLEAN FUSE/RELAY BLOCK	I/O clean fuse/relay block
-	ENGINE ECM	Engine electronic control module
-	DEF SUCTION HEATED LINE	Diesel suction heated line
-	DEF RETURN HEATED LINE	Diesel return heated line
-	DEF PRESSURE HEATED LINE	Diesel pressure heated line
-	CHASSIS	Chassis
-	ENGINE KILL	Engine kill
-	MAIN RLY CNTRL	Main relay control
-	HEATER RELAY CONTROL	Heater relay control

6.3.45 Code SA 00 SPN 521001 FMI 04

The diesel exhaust fluid (DEF) heater main relay open circuit.

Common failures

- The DEF heater main relay wiring harness is bad
- The DEF heater main relay is bad

A CAN message indicates active fault code.

The fault code is stored and warning lamp is activated.

NOTE:
Present fault is classified for emission related fault. Reduced engine power occurs after a specific amount of time defined by authorities.

Diagnosis and Solution

1. Check the DEF heater main relay wiring harness, the heater main relay connector and the connector pins for dirt or corrosion.
2. Check the DEF heater main relay operation with another heater main relay . If system is functional and fault is not active with a replacement heater main relay , the heater main relay is bad.

Diesel exhaust fluid power electrical schematic
Schematic

Schematic legend		
Item	**Term**	**Term description**
-	EXHAUST TEMPERATURE SENSOR UPSTREAM	Exhaust temperature sensor upstream
-	NOX TEMPERATURE SENSOR DOWNSTREAM	Nox temperature sensor downstream
-	GROUND	Ground
-	NOX PWR	NOX power
-		
-		
-		
-		

6.3.54 Code SA 00 SPN 521004 FMI 11

Downstream nitrogen oxide (NOx) sensor missing.

Common failures

- The downstream NOx sensor wiring harness is bad
- The downstream NOx sensor is bad

A CAN message indicates active fault code.

The fault code is stored and warning lamp is activated.

NOTE:
Present fault code is classified for emission related fault. Reduced engine power occurs after a specific amount of time defined by authorities.

Diagnosis and Solution

1. Check the NOx sensor wiring harness, the NOx sensor connector and the connector pins for dirt or corrosion.
2. Check the NOx sensor operation with another sensor . If system is functional and fault is not active with a replacement sensor , the sensor is bad.

Diesel exhaust fluid NOX sensor electrical schematic

Schematic

Item	Term	Term description
-	DEF PUMP PWM/SM TEMP	Diesel exhaust fluid pump PWM/SM temperature
-	AMBIENT AIR TEMP	Ambient air temperature
-	DEF TANK LEVEL GND	Diesel exhaust fluid tank level ground
-	DEF TANK LEVEL SIG	Diesel exhaust fluid tank level signal
-	DEF TANK TEMP	Diesel exhaust fluid tank temperature

6.3.62 Code SA 00 SPN 521007 FMI 31

SCR system error: the diesel exhaust fluid (DEF) supply module is unable to stabilize pressure.

Common failures

- The DEF supply module backflow connector is plugged
- the DEF supply module main filter is bad.
- The dosing valve is plugged.
- The DEF supply module is bad.

A CAN message indicates active fault code.

The fault code is stored and warning lamp is activated.

NOTE:
Present fault code is classified for emission related fault. Reduced engine power occurs after a specific amount of time defined by authorities.

Diagnosis and Solution

1. Change DEF supply module backflow connector.
2. Change DEF supply module main filter.
3. Check DEF quality. Change DEF if contaminated.
4. Check system visually to detect possible leakage in system.
5. Check operation with another DEF supply module. If system is functional and fault is not active with replacement module, original module is bad.

DEF tank sensor electrical schematic

Schematic

- No - one or more resistances are not open circuit. The signal wire circuit is not correct.

  Repair or the replace the wire harness.

  Stop.

7. Check switch voltage supply wires for open circuit.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the hand throttle switch and the armrest module.
e) Disconnect the voltage regulator (see chapter *Throttle mode switch electrical circuit,* page 6-181).
f) Check the resistance between contact 72 on the armrest module connector and contact 4 on the to the hand throttle switch connector.
g) Check the resistance between contact 70 on the armrest module connector and contact 8 on the hand throttle switch connector.
h) Check resistance between contact 2 on the voltage regulator connector and contact 1 on the hand throttle switch connector.

Result

Expected results:

All resistances are less than five ohms.

Results:

- Yes - all resistance are less than five ohms.

  Go to see step 8, page 6-187 .
- No - one or more resistance are not less than five ohms. Any voltage supply wire with a resistance more than five ohms is bad.

  Repair or replace the wire harness.

  Stop.

8. Check if the diagnostic code remains.

a) Inspect the contacts and electrical connectors at the armrest module and the hand throttle switch.
b) Clean, repair or replace damaged or dirty contacts and electrical connectors.
c) Connect electrical harness connectors at the armrest module and hand throttle switch.
d) Turn the battery disconnect switch and key start switch to the on position.
e) Check the active code screen for the SA 05 SPN 898 FMI 04 diagnostic code.

Result

Expected result:

The diagnostic code is not active.

Results:

- Yes - the diagnostic code is not active.

  Continue machine operation.

  Stop.
- No - the diagnostic code is active.

  A bad module is not common. Exit the procedure and start the procedure at step 1. Replace the armrest module if the cause of the code is not found.

  Stop.

6.4.5 Code SA 05 SPN 2349 FMI 02

The armrest electronic control module (ECM) has found the low beam headlamp switch signal is erratic, intermittent, or incorrect.

Common Failures

- Electrical harness is bad.
- The low beam lamp switch is bad.
- An electrical connection is bad.

Before starting the procedure

Use a digital multimeter for the test procedures.

Diagnosis and solution

1. Check the switch signal wire for an open circuit.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the armrest ECM see *page 6-203* and the steering column switch see *page 6-203* .
e) Check the resistance between contact 67 at the armrest ECM connector and contact 4 at the steering column switch connector.

Result

Expected result:

the resistance is less than five ohms.

Results:

- Yes - the resistance is less than five ohms.

  Go to see step 2, page 6-205 .
- No - the resistance is more than five ohms. The circuit is not correct.

  Repair or replace signal wire between the armrest ECM and the steering column switch.

  Stop.

2. Check the switch signal wire for a short circuit.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the armrest ECM see *page 6-203* and the steering column switch see *page 6-203* .
e) Check the resistance from contact 67 to all other contacts at the at the armrest ECM harness connector.

Result

Expected result:

all resistances are open circuit.

Results:

- Yes - all resistances are open circuit.

  Go to see step 3, page 6-206 .

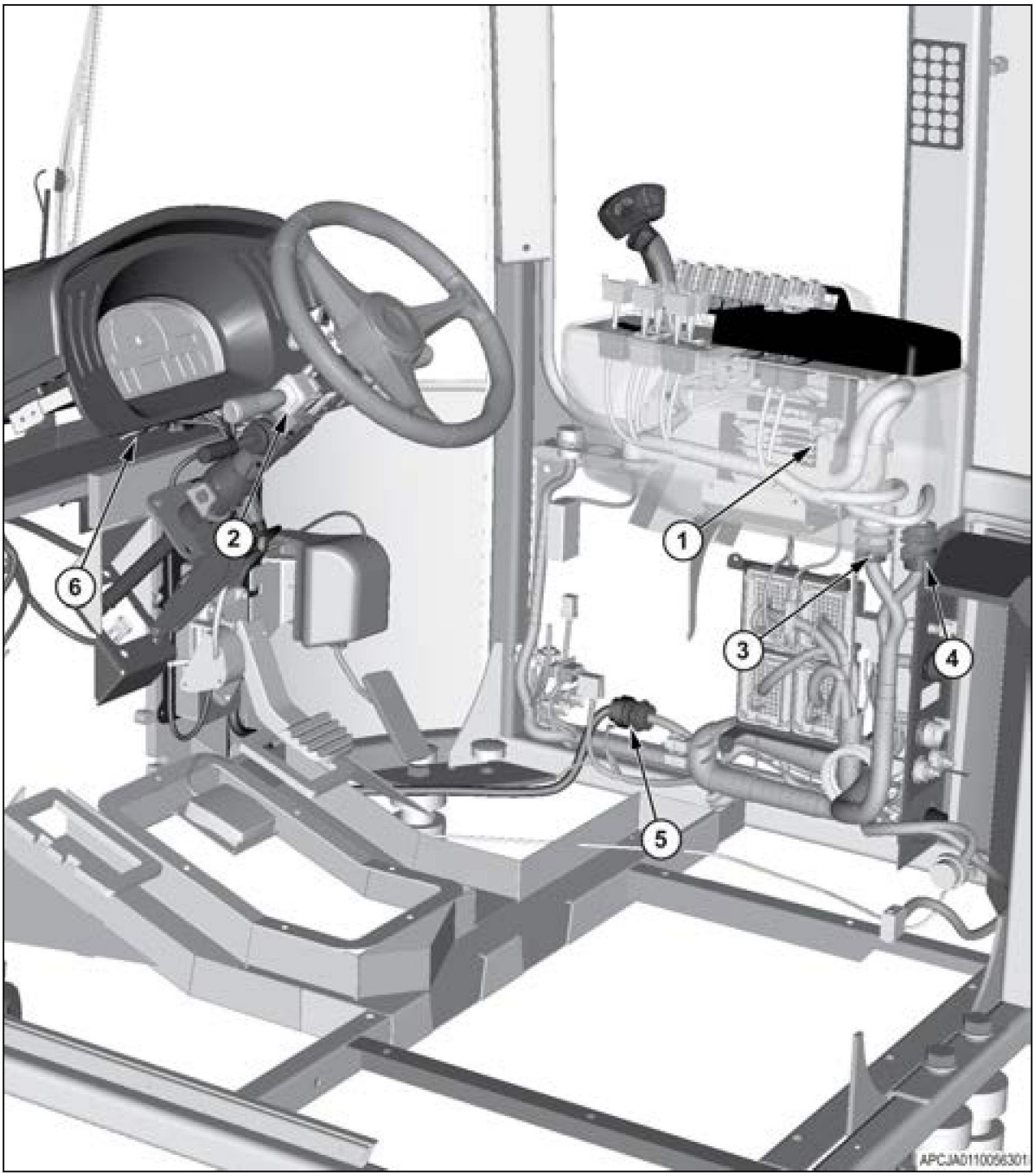

Fig. 126

(1) Armrest electronic control module
(2) Steering column switch
(3) 31 contact C106 harness connector
(4) 31 contact C107 harness connector
(5) 31 contact C110 harness connector
(6) 12 contact C3 harness connector

Schematic

(1) 24 contact harness connector C100, to boom section switch harness
(2) Two contact harness connector C11. boom section configuration
(3) 31 contact harness connector C107, to adapter harness

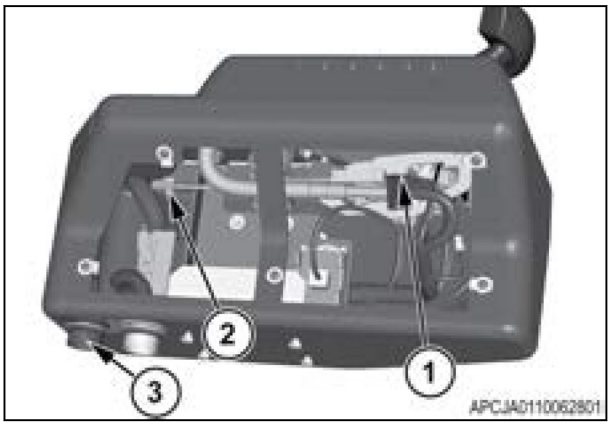

Fig. 138

(1) 31 contact harness connector C110, to center console harness
(2) 12 contact harness connector C103, to main roof harness

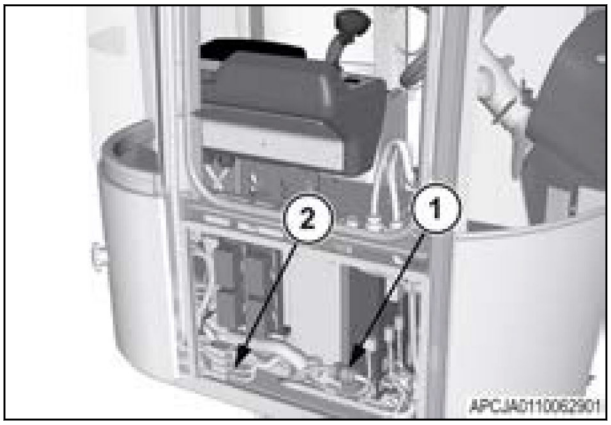

Fig. 139

(1) 12 contact harness connector C3, steering column switch
(2) Six contact harness connector C8, brake pedal
(3) Six contact harness connector C7, foot throttle,

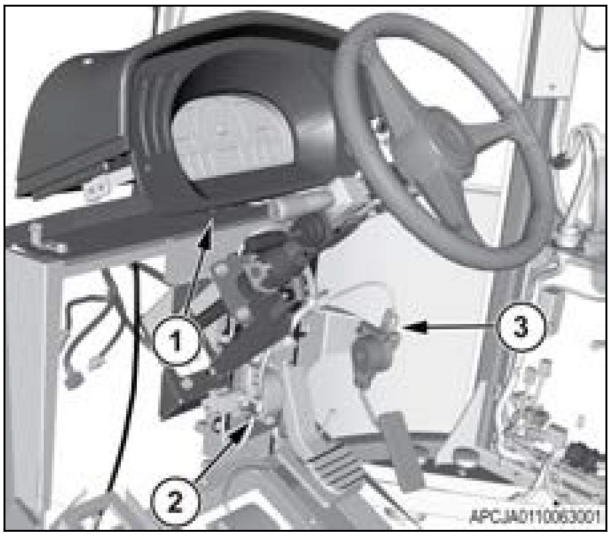

Fig. 140

h) Turn the battery disconnect switch to the on position.
i) Turn the key start switch to the on position.
j) Check the active code screen for the SA 05 SPN 3511 FMI 04 diagnostic code.

Result

Expected result:

The diagnostic code is not active.

Results:

- Yes - the diagnostic code is not active.

  Continue machine operation.

  Stop.
- No - the diagnostic code is active.

  A defective ECM is not common. Exit the procedure and start the procedure at step 1. If the cause of the code is not found, replace the armrest ECM.

  Stop.

3.3 volt switch/sensor supply electrical circuit
Component locations

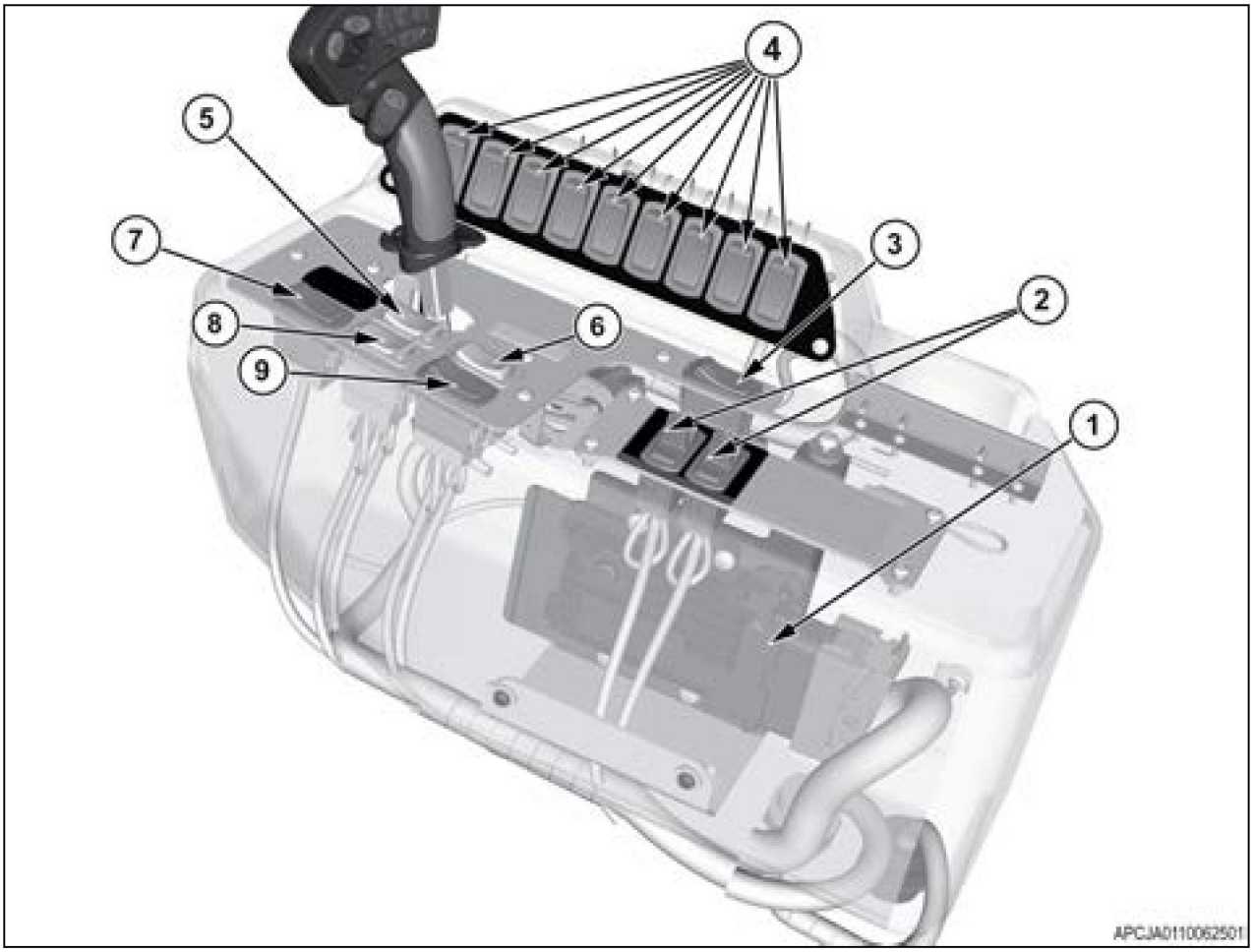

Fig. 153

(1) 94 contact harness connector C1, armrest electronic control module

(2) 12 contact harness connectors C18 and C19, tracking adjustment switches,

The resistance between contact 1 and contact 2 is less than one ohm. The resistance between contact 4 and contact 2 is open circuit.

Results:

- Yes - the resistances are correct.

  Go to see step 3, page 6-277 .
- No - one or both resistances are not correct. The section 1 switch is bad.

  Replace the section 1 switch.

  Stop.

3. Check the section 1 switch in the on position.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the section 1 switch see *page 6-278* .
e) Move the section 1 switch to the on position.
f) Check the resistance between contact 1 and contact 2 on the section 1 switch .
g) Check the resistance between contact 4 and contact 2 on the section 1 switch.

Result

Expected result:

The resistance between contact 1 and contact 2 is open circuit. The resistance between contact 4 and contact 2 is less than one ohm.

Results:

- Yes - the resistance s are correct.

  Go to see step 4, page 6-277 .
- No - one or more resistances are not correct. The section 1switch is bad.

  Replace the switch 1 switch.

  Stop.

4. Check the section 1 switch signal circuit for a short circuit.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the section 1 switch see *page 6-278* and the armrest ECM see *page 6-278* .
e) Check the resistance between contact 23 and all other contacts on the armrest ECM harness connector.

Result

Expected results:

All resistances are open circuit.

Result:

- Yes - all resistances are open circuit.

  Go to see step 5, page 6-277 .
- No - one or more resistances are not open circuit. The signal circuit is not correct.

  Repair or the replace the wire harness.

  Stop.

5. Check if the diagnostic code is active.

a) Turn the key start switch to the off position.

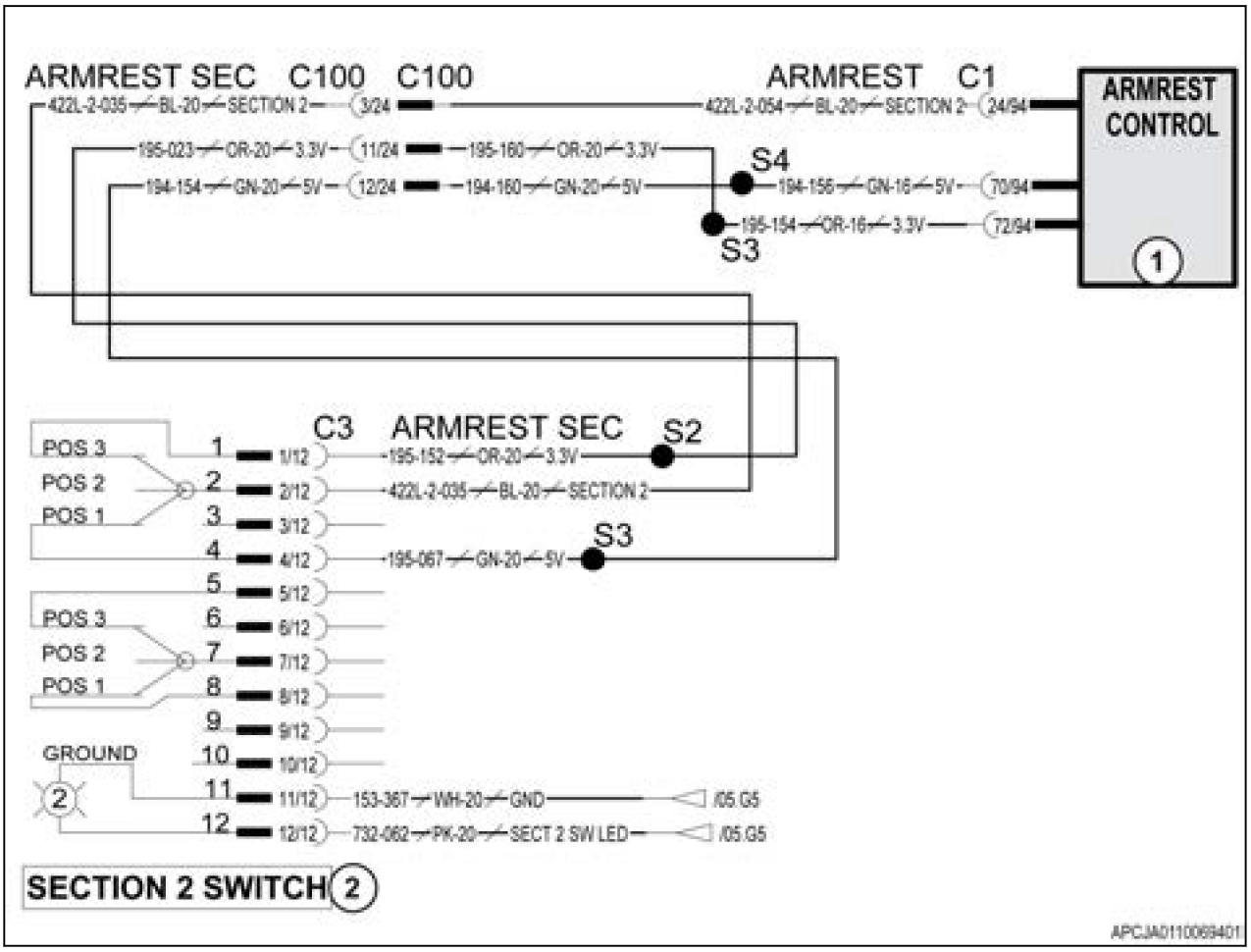

Fig. 171

Schematic

Schematic legend		
Item	**Schematic term**	**Description**
1	ARMREST CONTROL	Armrest electronic control module
2	SECTION 2 SWITCH	Section 2 switch
-	ARMREST SEC	Armrest boom section switch wire harness
-	ARMREST	Armrest wire harness
-	SECTION 2	Section 2 switch signal wire
-	5V	5 volt switch/sensor supply
-	3.3V	3.3 volt switch/sensor supply
-	POS 1	Switch position 1 (on position)
-	POS 2	Switch position 2 (not used)

5. Check the switch signal wire for an open circuit.
   a) Turn the key start switch to the off position.
   b) Turn the battery disconnect switch to the off position.
   c) Remove the key from the battery disconnect switch.
   d) Disconnect the section 4 switch see *page 6-308* and the armrest ECM see *page 6-308* .
   e) Check the resistance between contact 26 at the armrest ECM harness connector and contact 2 at the section 4 switch connector.

   Result

   Expected results:

   The resistance is less than one ohm.

   Result:
   - Yes - the resistance measurement is less than one ohm.

     Go to see step 6, page 6-313 .
   - No - the resistance is more than one ohm or the resistance is open circuit.

     Repair or the replace the wire harness.

     Stop.

6. Check if the diagnostic code remains.
   a) Turn the key start switch to the off position.
   b) Turn the battery disconnect switch to the off position.
   c) Remove the key from the battery disconnect switch.
   d) Disconnect the armrest ECM see *page 6-308* and section 4 switch see *page 6-308* .
   e) Inspect the contacts and connectors.
   f) Clean, repair or replace damaged or dirty contacts.
   g) Connect all harness connectors.
   h) Turn the battery disconnect switch to the on position.
   i) Turn the key start switch to the on position.
   j) Check the active code screen for the SA 05 SPN 522066 FMI 04 diagnostic code.

   Result

   Expected result:

   The diagnostic code is not active.

   Results:
   - Yes - the diagnostic code is not active.

     Continue machine operation.

     Stop.
   - No - the diagnostic code is active.

     A bad ECM is not common. Exit the procedure and start the procedure at step 1. If the cause of the code is not found, replace the armrest ECM.

     Stop.

Section 4 switch electrical circuit

Schematic legend		
Item	**Schematic term**	**Description**
-	POS 3	Switch position 3 (off position)
-	S2	Splice 2
-	S3	Splice 3
-	S4	Splice 4

6.4.27 Code SA 05 SPN 522068 FMI 04

The armrest electronic control module (ECM) has found the signal from the section 6 switch is not correct. The voltage signal is less than 3.05 volts.

Common failures

- There is a short circuit in the signal circuit for the section 6 switch.
- There is a short circuit in the power supply circuit for the section 6 switch.
- The signal wire for the section 6 switch is open circuit.
- The section 6 switch is bad.

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Check for other diagnostic codes.
   a) Turn the battery disconnect switch and key start switch to the on position.
   b) Check the monitor in the cab for other diagnostic for 3.3 volt or five volt sensor/switch supply circuits.

   Result

   Expected results:

   The 3.3 volt and five volt sensor/switch supply diagnostic codes are not active.

   Results:
   - Yes - the 3.3 volt and five volt sensor/switch supply codes are not active.

     Go to see step 2, page 6-331 .
   - No - the 3.3 volt and/or five volt sensor/switch supply codes are active.

     Find and repair active, 3.3 volt and five volt sensor/switch supply codes.

     Stop.
2. Check the section 6 switch in the off position.
   a) Turn the key start switch to the off position.
   b) Turn the battery disconnect switch to the off position.
   c) Remove the key from the battery disconnect switch.
   d) Disconnect the section 6 switch see *page 6-328* .
   e) Move the section 6 switch to the off position.
   f) Check the resistance between contact 1 and contact 2 on the section 6 switch.
   g) Check the resistance between contact 4 and contact 2 on the section 6 switch.

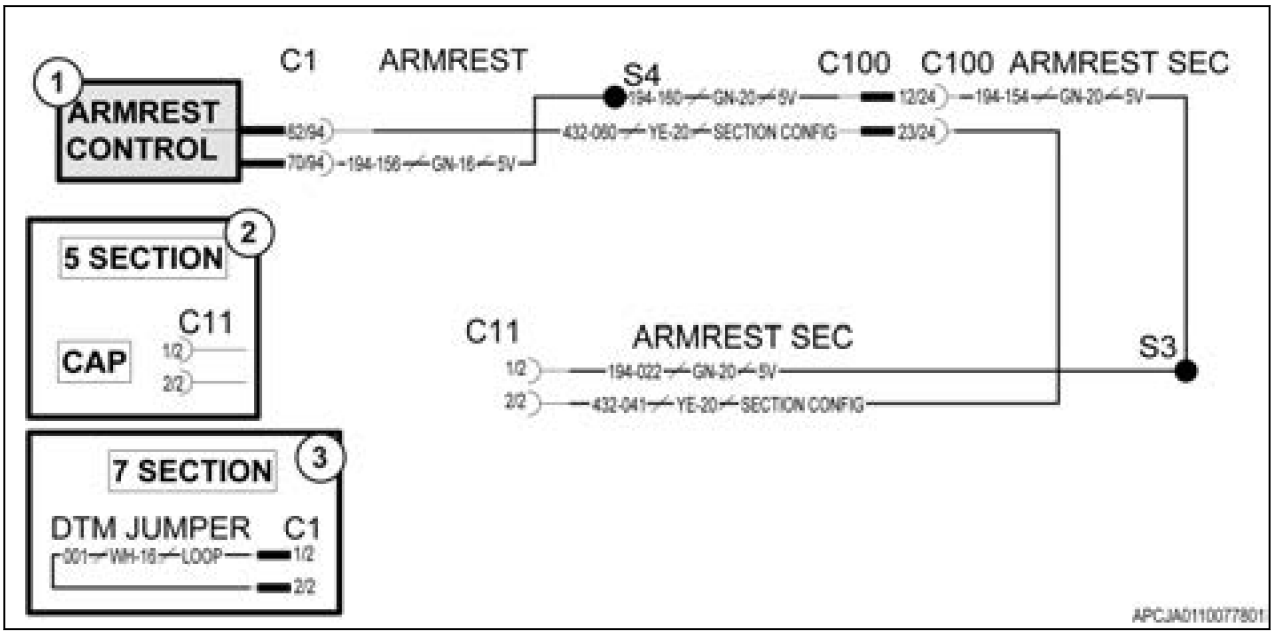

Fig. 193

Schematic

Schematic legend		
Item	**Schematic term**	**Description**
1	ARMREST CONTROL	Armrest electronic control module
2	5 SECTION	5 section configuration harness connector cap
3	7 SECTION	7 section configuration jumper harness
-	ARMREST SEC	Armrest boom section switch wire harness
-	ARMREST	Armrest wire harness
-	SECTION CONFIG	Section configuration signal wire
-	5V	5 volt switch/sensor supply
-	S4	Splice 4
-	S3	Splice 3

6.4.31 Code SA 05 SPN 522070 FMI 04

The armrest electronic control module (ECM) has found the section configuration signal voltage is below 4.75 volts.

Common failures

- There is a short circuit in the signal wire for the section switch configuration.
- There is a short circuit in input voltage circuit for the section switch configuration.

- No - the 3.3 volt and/or five volt sensor/switch supply codes are active.

  Find and repair active, 3.3 volt and five volt sensor/switch supply codes.

  Stop.

2. Check the right-hand end row switch in the off position.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the right-hand end row switch see *(2)*.
e) Move the right-hand end row switch to the off position.
f) Check the resistance between contact 1 and contact 2 on the left-hand end row switch.
g) Check the resistance between contact 4 and contact 2 on the left-hand end row switch.

Result

Expected result:

The resistance between contact 1 and contact 2 is less than one ohm. The resistance between contact 4 and contact 2 is open circuit.

Results:

- Yes - the resistance measurements are correct.

  Go to see step 3, page 6-367 .
- No - one or both resistance measurements is not correct. The switch is bad.

  Replace the right-hand end row switch.

  Stop.

3. Check the right-hand end row switch in the on position.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the right-hand end row switch.
e) Move the right-hand end row switch to the on position.
f) Check the resistance between contact 1 and contact 2 on the left-hand end row switch.
g) Check the resistance between contact 4 and contact 2 on the left-hand end row switch.

Result

Expected result:

The resistance between contact 1 and contact 2 is open circuit. The resistance between contact 4 and contact 2 is less than one ohm.

Results:

- Yes - the resistance measurements are correct.

  Go to see step 4, page 6-367 .
- No - one or more resistance measurements is not correct. The switch is bad.

  Replace the right-hand end row switch.

  Stop.

4. Check for a short circuit in the signal wire for the right-hand end row switch.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the right-hand end row switch and the armrest module see *(1)*.

6.4.38 Code SA 05 SPN 522104 FMI 05

The armrest electronic control module (ECM) found the current for projection lamp power circuit is below normal.

Common failures

- An electrical harness is bad.
- The power or ground circuit is open circuit.

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Check the ground circuit connection at the ground stud.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Inspect the ground stud.
e) Check the ground terminal rings at the ground stud for corrosion.
f) Make sure the ground stud retaining hardware is tight.

Result

Expected results:

The ground terminal rings are clean. The retaining hardware is tight.

Results:

- Yes - the ground terminal rings are clean. The retaining hardware is tight.

  Go to see step 2, page 6-385 .

- No - the ground terminal rings are not clean and/or the retaining hardware for the ground stud is not tight.

  Clean the ground terminal rings and tighten retaining hardware.

  Go to see step 4, page 6-386 .

2. Check the ground circuit.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Disconnect the hazard lamp switch.
e) Check the resistance between contact 9 at the hazard lamp switch connector and the ground stud.

Result

Expected results:

The resistance is less than five ohms.

Results:

- Yes - resistance is less than five ohms.

  Go to see step 3, page 6-386

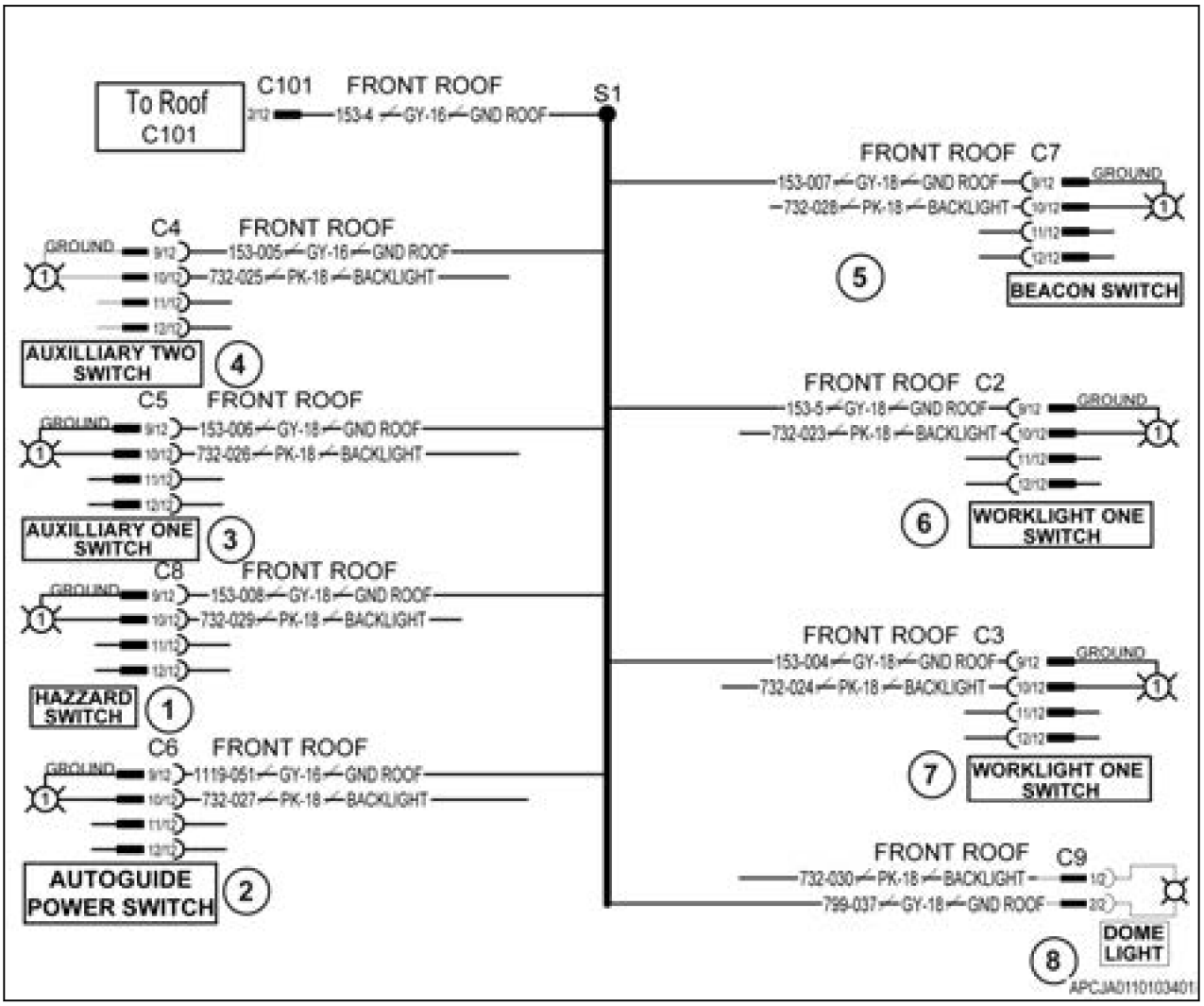

Fig. 221 Front roof harness: projection lamp ground circuit

Schematics

Schematic legend		
Item	**Schematic term**	**Description**
1	ARMREST CONTROL	Armrest electronic control module
2	HYDRAULIC LOCKOUT	Hydraulic enable switch
3	FRONT TRACK ADJUST SWITCH	Front axle tracking adjustment switch
4	REAR TRACK ADJUST SWITCH	Rear axle tracking adjustment switch
5	ENGINE A/B SWITCH	Engine A/B speed switch
6	FOOT/LEVER MODE	Foot throttle/hand throttle mode switch
7	SPEED VARIABLE 1/2 +/-	Speed variable 1and 2 increase/decrease switch

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

Calibrate the radar.

a) Do the radar calibration procedure.

Result

Expected results:

The radar calibration is successful and the code is not active.

Results:

- Yes - the radar calibration is successful and the code is not active.

  Resume machine operation.

  Stop.
- No - the radar calibration is not successful and the code is active.

  Do the radar calibration procedure again.

  Stop.

6.4.44 Code SA 05 SPN 522176 FMI 31

The armrest electronic control module (ECM) has found the remote throttle switch is in the on position and the parking brake is not engaged.

Common failures

- The parking brake is not engaged and the remote throttle switch is in the on position.

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Engage the parking brake.

a) Make sure the parking brake is engaged.

b) Move the remote throttle switch to the on position.

c) Check for the active code SA 05 SPN 522176 FMI 31.

Result

Expected results:

The code is not active.

Results:

- Yes - the code is not active.

  Stop.
- No - the parking brake is engaged and the code is active.

  Go to see step 2, page 6-421 .

2. Check for other diagnostic codes.

a) Turn the battery disconnect switch to the on position.

b) Turn the key start switch to the on position.

c) Check for active codes for the parking brake, park brake switch, and the remote throttle switch.

The resistance from the switch contact 2 to the switch contact 4 is less than one ohm. The resistance from the switch contact 2 to the switch contact 1 is open circuit. The resistance from the switch contact 7 to the switch contact 5 is less than one ohm. the resistance from the switch contact 7 to the switch contact 8 is open circuit.

Results:

- Yes - all resistance measurements are correct.

  Go to see step 5, page 6-439 .
- No - One or more of the resistance measurements is not correct. The switch is bad.

  Replace the engine A/B speed switch with a switch of the same type and specifications.

  Stop.

5. Check the engine A/B speed switch in the top switch position (A speed position).

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Make sure the engine A/B speed switch harness connector is disconnected.
e) Remove the engine A/B speed switch from the armrest.
f) Check the resistance from the switch contact 2 to the switch contact 4. Record the resistance measurement.
g) Check the resistance from the switch contact 2 to the switch contact 1. Record the resistance measurement.
h) Check the resistance from the switch contact 7 to the switch contact 5. Record the resistance measurement.
i) Check the resistance from the switch contact 7 to the switch contact 8. Record the resistance measurement.

Result

Expected results:

The resistance from the switch contact 2 to the switch contact 4 is less than one ohm. The resistance from the switch contact 2 to the switch contact 1 is open circuit. The resistance from the switch contact 7 to the switch contact 5 is open circuit. the resistance from the switch contact 7 to the switch contact 8 is less than one ohm.

Results:

- Yes - all resistance measurements are correct.

  Go to see step 6, page 6-439 .
- No - One or more of the resistance measurements is not correct. The switch is defective.

  Replace the engine A/B speed switch with a switch of the same type and specifications.

  Stop.

6. Check the engine A/B speed switch in the top switch position (A speed position).

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the key from the battery disconnect switch.
d) Make sure the engine A/B speed switch harness connector is disconnected.
e) Remove the engine A/B speed switch from the armrest.
f) Check the resistance from the switch contact 2 to the switch contact 4. Record the resistance measurement.
g) Check the resistance from the switch contact 2 to the switch contact 1. Record the resistance measurement.
h) Check the resistance from the switch contact 7 to the switch contact 5. Record the resistance measurement.

e) Check resistance at drive pump connector(2) contact 2 to the chassis ground stud.

Result

Expected result:

Resistance is less than 1 ohm.

- Yes - resistance is less than 1 ohm.

Stop

Go to see step 4, page 6-457

- No - resistance is open circuit.

Harness is bad.

Repair or replace harness

Go to see step 4, page 6-457

4. Check if the diagnostic code remains.

a) Inspect and clean the contacts of the harness connectors.
b) Connect all harness connectors.
c) Turn the disconnect switch to the on position
d) Turn the key start switch to the on position.
e) Check the condition of SPN 300721 FMI 31.

Result

Expected result:

SPN 300721 FMI 31 is not active.

Results:

- Yes—SPN 300721 FMI 31 is not active.

  Stop.
- No—SPN 300721 FMI 31 is active.

  Failure of the ECM is possible but not common. Exit the procedure and do the procedure again. If the cause of the diagnostic code is not found and the diagnostic code remains active, replace the ECM.

Hydrostatic drive pump electrical circuit schematic

Schematic

- No - resistance is open circuit.

  Harness is bad.

  Repair or replace harness

Go to see step 4, page 6-475

3. Check for open circuit on ground wire.
   a) Turn the key start switch to the off position.
   b) Turn the battery disconnect switch to the off position.
   c) Remove the battery disconnect switch key.
   d) Disconnect the drive pump connector(2).
   e) Check resistance at drive pump connector(2) contact 2 to the chassis ground stud.

   Result

   Expected result:

   Resistance is less than 1 ohm.

   - Yes - resistance is less than 1 ohm.

   Stop

   Go to see step 4, page 6-475

   - No - resistance is open circuit.

     Harness is bad.

     Repair or replace harness

   Go to see step 4, page 6-475

4. Check if the diagnostic code remains.
   a) Inspect and clean the contacts of the harness connectors.
   b) Connect all harness connectors.
   c) Turn the disconnect switch to the on position
   d) Turn the key start switch to the on position.
   e) Check the condition of SPN 300724 FMI 31.

   Result

   Expected result:

   SPN 300724 FMI 31 is not active.

   Results:

   - Yes—SPN 300724 FMI 31 is not active.

     Stop.

   - No—SPN 300724 FMI 31 is active.

     Failure of the ECM is possible but not common. Exit the procedure and do the procedure again. If the cause of the diagnostic code is not found and the diagnostic code remains active, replace the ECM.

Hydrostatic drive pump electrical circuit schematic

Schematic

- Yes - the resistance is more than 5000 ohms.

  Go to see step 3, page 6-493 .
- No - the resistance is less than 5000 ohms.

  The harness is bad.

  Repair: Repair or replace the harness.

  Go to see step 3, page 6-493 .

3. Check if the diagnostic code remains.

a) Inspect the contacts of the harness connectors and clean the connectors
b) Connect all harness connectors.
c) Turn the battery disconnect switch to the on position.
d) Turn the key start switch to the on position.
e) Operate the machine.
f) Check the condition of SA 46 SPN 300750 FMI 05.

Result

Expected result:

SA 146 SPN 300750 FMI 05 is not active.

Result

- Yes - SA 46 SPN 300750 FMI 05 is not active.

  Stop
- No - SA 46 SPN 300750 FMI 05 is active.

  Failure of the system module is possible but not common. Exit the procedure and do the procedure again. If the cause of the diagnostic code not found and the diagnostic code remains active, replace the system module.

Hydrostatic drive pump electrical circuit schematic

Schematic

Hydrostatic drive pump electrical circuit schematic

Schematic

Hydrostatic drive pump electrical circuit schematic

Schematic

- No - the resistance is less than 5000 ohms.

  The harness is bad.

  Repair: Repair or replace the harness.

  Go to see step 3, page 6-547 .

3. Check if the diagnostic code remains.

a) Inspect the contacts of the harness connectors and clean the connectors
b) Connect all harness connectors.
c) Turn the battery disconnect switch to the on position.
d) Turn the key start switch to the on position.
e) Operate the machine.
f) Check the condition of SA 46 SPN 300758 FMI 05.

Result

Expected result:

SA 146 SPN 300758 FMI 05 is not active.

Result

- Yes - SA 46 SPN 300758 FMI 05 is not active.

  Stop
- No - SA 46 SPN 300758 FMI 05 is active.

  Failure of the system module is possible but not common. Exit the procedure and do the procedure again. If the cause of the diagnostic code is not found and the diagnostic code remains active, replace the system module.

Hydrostatic drive pump electrical circuit schematic

Schematic

6.6.3 Code SA 192 SPN 2370 FMI 06

Short circuit to ground in the right-hand amber flashing warning lamp (AFWL) in the liquid system.

Common failures

- The wire harness is bad.
- Short circuit in the sensor signal
- Power circuit or ground circuit defect.

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Check the system right-hand (AWFL) bulbs.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the battery disconnect switch key.
d) Operate right-hand AWFL lamp.
e) nspect right-hand AWFL bulbs for missing or bad bulb.

Result

Expected result:

Right-hand AWFL bulbs are correct.

Results:

- Yes -right-hand AWFL bulbs are correct.

  Go to see step 2, page 6-565
- No - one or more bulbs bad or missing.

  Go to see step 3, page 6-566

2. Check right AWFL circuit for short circuit.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the battery disconnect switch key.
d) Disconnect the system ECM (see chapter *Tail light electrical circuit schematic,* page 6-561), the right-hand AFWL (see chapter *Tail light electrical circuit schematic,* page 6-561) and right-hand AFWL (see chapter *Tail light electrical circuit schematic,* page 6-561) harness connectors.
e) At the system ECM see chapter *Tail light electrical circuit schematic,* page 6-561 J4 harness connector, check resistance from contact J4-4 to all other ECM harness connector contacts.

Result

Expected Result:

All resistance are open circuit.

Results:

- Yes - all resistance are open circuit.

Go to to see step 3, page 6-566

Result

Expected results:

Resistance is less than five ohms.

Results:

- Yes - resistance is less than 5 ohms.

  Go to see step 3, page 6-583

- No - resistance is more than 5 ohms.

  Harness is bad.

  Repair or replace harness.

  Go to see step 4, page 6-583 .

3. Check ground circuit for open.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the battery disconnect switch key.
d) The left-hand AWFL connector (see chapter *Tail light electrical circuit schematic,* page 6-561) and the right-hand AWFL connector (see chapter *Tail light electrical circuit schematic,* page 6-561) and the system module (see chapter *Tail light electrical circuit schematic,* page 6-561) J4 connector stay disconnected.
e) Check resistance from the left-hand AFWL connector (see chapter *Tail light electrical circuit schematic,* page 6-561) contact 5 to frame ground.

Result

Expected results

Resistance is less than five ohms.

Results:

- Yes - resistance is less than 5 ohms.

  Go to see step 4, page 6-583 .

- No - resistance is more than 5 ohms.

  Harness is bad.

  Repair or replace harness.

  Go to see step 4, page 6-583 .

4. Check if the diagnostic code remains.

a) Inspect the contacts of the harness connectors and clean the connectors.
b) Connect all harness connectors.
c) Turn the battery disconnect switch to the on position.
d) Turn the key start switch to the on position.
e) Operate the machine.
f) Check the condition of SA 192 SPN 2392 FMI 05.

Result

Expected result:

SA 192 SPN 2392 FMI 05 is not active.

Result:

- Yes - SA 192 SPN 2392 FMI 05 is not active.

  Stop

Schematic

Schematic legend		
Item	**Schematic Term**	**Description**
1	SYSTEM MODULE	System module
-	LEFT-HAND BOOM FOLD IN	Left-hand boom fold in solenoid
2	LEFT-HAND BOOM FOLD OUT	Left-hand boom fold out solenoid
-	RIGHT-HAND BOOM FOLD IN	Right-hand boom fold in solenoid
-	RIGHT-HAND BOOM FOLD OUT	Right-hand boom fold out solenoid
-	LEFT-HAND BOOM FOLD TIP IN	Left-hand boom tip fold in solenoid
-	LEFT-HAND BOOM FOLD TIP OUT	Left-hand boom tip fold out solenoid
-	RIGHT-HAND BOOM FOLD TIP IN	Right-hand boom tip fold in solenoid
-	RIGHT-HAND BOOM FOLD TIP OUT	Right-hand boom tip fold out solenoid

6.6.14 Code SA 192 SPN 522021 FMI 06

Left-hand boom fold out circuit current is above normal or short to ground.

Common failures

- The wiring harness is bad
- Short circuit in the sensor signal
- Power circuit or ground circuit is bad

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Check for open circuit.

a) Turn the key start switch to the off position.

b) Turn the battery disconnect switch to the off position.

c) Remove the battery disconnect switch key.

d) Disconnect the system module (see chapter *Left-hand boom fold out circuit schematic,* page 6-599) and the boom fold out solenoid connectors (see chapter *Left-hand boom fold out circuit schematic,* page 6-599).

e) At the system module (see chapter *Left-hand boom fold out circuit schematic,* page 6-599) J5 harness connector, check the resistance from contact J5-12 to all other module connector contacts.

Result

Expected result:

All resistance are open circuit.

Results:

Schematic

Schematic legend		
Item	**Schematic**	**Description**
1	SYSTEM MODULE	System module
-	LEFT-HAND BOOM LOWER	Left-hand boom lower solenoid
2	LEFT-HAND BOOM RAISE	Left-hand boom raise solenoid
-	RIGHT-HAND BOOM LOWER	Right-hand boom lower solenoid
-	RIGHT-HAND BOOM RAISE	Right-hand boom raise solenoid
-	BOOM HOIST UP	Boom hoist up
-	BOOM HOIST DOWN	Boom hoist down
-	SYSTEM	System
-	GROUND	Ground

6.6.20 Code SA 192 SPN 522024 FMI 06

Left-hand boom raise circuit current is above normal or short to ground.

Common failures

- The wiring harness is bad
- Short circuit in the sensor signal
- Power circuit or ground circuit is bad

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Check for open circuit.

a) Turn the key start switch to the off position.

b) Turn the battery disconnect switch to the off position.

c) Remove the battery disconnect switch key.

d) Disconnect the system module (see chapter *Left-hand boom raise circuit schematic,* page 6-617) and the boom raise solenoid (see chapter *Left-hand boom raise circuit schematic,* page 6-617) connectors

e) At the system module (see chapter *Left-hand boom raise circuit schematic,* page 6-617) J5 connector, check the resistance from contact J5-12 to all other module connector contacts.

Result

Expected result:

All resistance are open circuit.

Results:

Schematic

Schematic legend		
Item	**Schematic**	**Description**
1	SYSTEM MODULE	System module
-	LEFT-HAND BOOM LOWER	Left-hand boom lower solenoid
-	LEFT-HAND BOOM RAISE	Left-hand boom raise solenoid
2	RIGHT-HAND BOOM LOWER	Right-hand boom lower solenoid
-	RIGHT-HAND BOOM RAISE	Right-hand boom raise solenoid
-	BOOM HOIST UP	Boom hoist up
-	BOOM HOIST DOWN	Boom hoist down
-	SYSTEM	System
-	GROUND	Ground

6.6.26 Code SA 192 SPN 522027 FMI 06

Right-hand boom lower circuit current is above normal or short to ground.

Common failures

- The wiring harness is bad
- Short circuit in the sensor signal
- Power circuit or ground circuit is bad

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Check for open circuit.

a) Turn the key start switch to the off position.

b) Turn the battery disconnect switch to the off position.

c) Remove the battery disconnect switch key.

d) Disconnect the system module (see chapter *Right-hand boom lower circuit schematic,* page 6-635) and the boom lower solenoid connector (see chapter *Right-hand boom lower circuit schematic,* page 6-635).

e) At the system module (see chapter *Right-hand boom lower circuit schematic,* page 6-635) J5 connector, check the resistance from contact J5-12 to all other module connector contacts.

Result

Expected result:

All resistance are open circuit.

Results:

Schematic

Schematic legend		
Item	**Schematic Term**	**Description**
1	SYSTEM MODULE	System module
-	LEFT-HAND BOOM FOLD IN	Left-hand boom fold in solenoid
-	LEFT-HAND BOOM FOLD OUT	Left-hand boom fold out solenoid
-	RIGHT-HAND BOOM FOLD IN	Right-hand boom fold in solenoid
-	RIGHT-HAND BOOM FOLD OUT	Right-hand boom fold out solenoid
-	LEFT-HAND BOOM FOLD TIP IN	Left-hand boom tip fold in solenoid
-	LEFT-HAND BOOM FOLD TIP OUT	Left-hand boom tip fold out solenoid
2	RIGHT-HAND BOOM FOLD TIP IN	Right-hand boom tip fold in solenoid
-	RIGHT-HAND BOOM FOLD TIP OUT	Right-hand boom tip fold out solenoid

6.6.32 Code SA 192 SPN 522030 FMI 06

Right-hand boom tip fold in circuit current is above normal or short to ground.

Common failures

- The wiring harness is bad
- Short circuit in the sensor signal
- Power circuit or ground circuit is bad

Before starting the procedure

Use a digital multimeter for measurements in the test procedures.

Diagnosis and solution

1. Check for open circuit.

a) Turn the key start switch to the off position.

b) Turn the battery disconnect switch to the off position.

c) Remove the battery disconnect switch key.

d) Disconnect the system module (see chapter *Right-hand boom tip fold in circuit schematic,* page 6-653) and the boom tip fold in solenoid connector (see chapter *Right-hand boom tip fold in circuit schematic,* page 6-653).

e) At the system module (see chapter *Right-hand boom tip fold in circuit schematic,* page 6-653) J1 connector, check the resistance from contact J1-3 to all other system module connector contact.

Result

Expected result:

All resistance are open circuit.

Results:

see step 2, page 6-673 .

- No - resistance is open circuit.

Harness is bad.

Repair or replace harness

see step 4, page 6-673 .

2. Check for bad solenoid.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the battery disconnect switch key.
d) At boom hoist down solenoid connector, check the resistance from contact 1 to contact 2.

Result

Expected Result:

Resistance is between 6 ohms and 8 ohms.

Results:

- Yes - resistances are between 6 ohms and 8 ohms.

see step 3, page 6-673 .

- No - resistance is not between 6 ohms and 8 ohms.

Repair or replace the solenoid.

see step 4, page 6-673 .

3. Check for open circuit between the system module and AutoBoom module.

a) Turn the key start switch to the off position.
b) Turn the battery disconnect switch to the off position.
c) Remove the battery disconnect switch key.
d) Check resistance between the system module contact J6-10 and AutoBoom module contact W2-30.

Result

Expected Result:

Resistance is less than 1 ohm.

Results:

- Yes - resistance is less than 1 ohm.

see step 4, page 6-673 .

- No - resistance is open circuit.

Harness is bad.

Repair or replace harness.

see step 4, page 6-673 .

4. Check if diagnostic code remains.

a) Inspect contacts of the connectors and clean contacts.
b) Connect all the connectors.
c) Turn the battery disconnect switch to on position.
d) Turn the key start switch to on position.
e) Operate boom hoist down solenoid.
f) Check condition of SPN 522033 FMI 05.

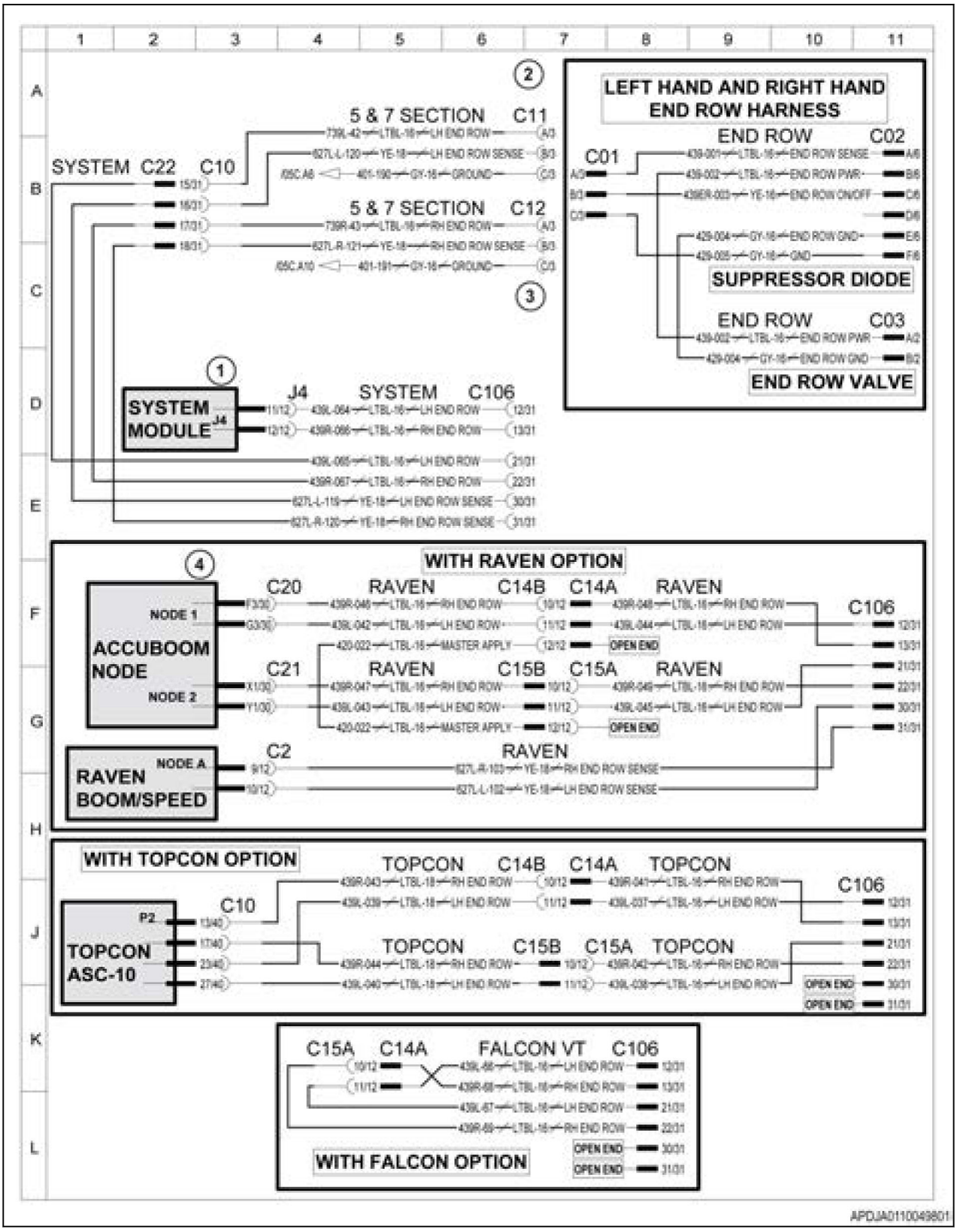

Fig. 314 End row electrical circuit schematic

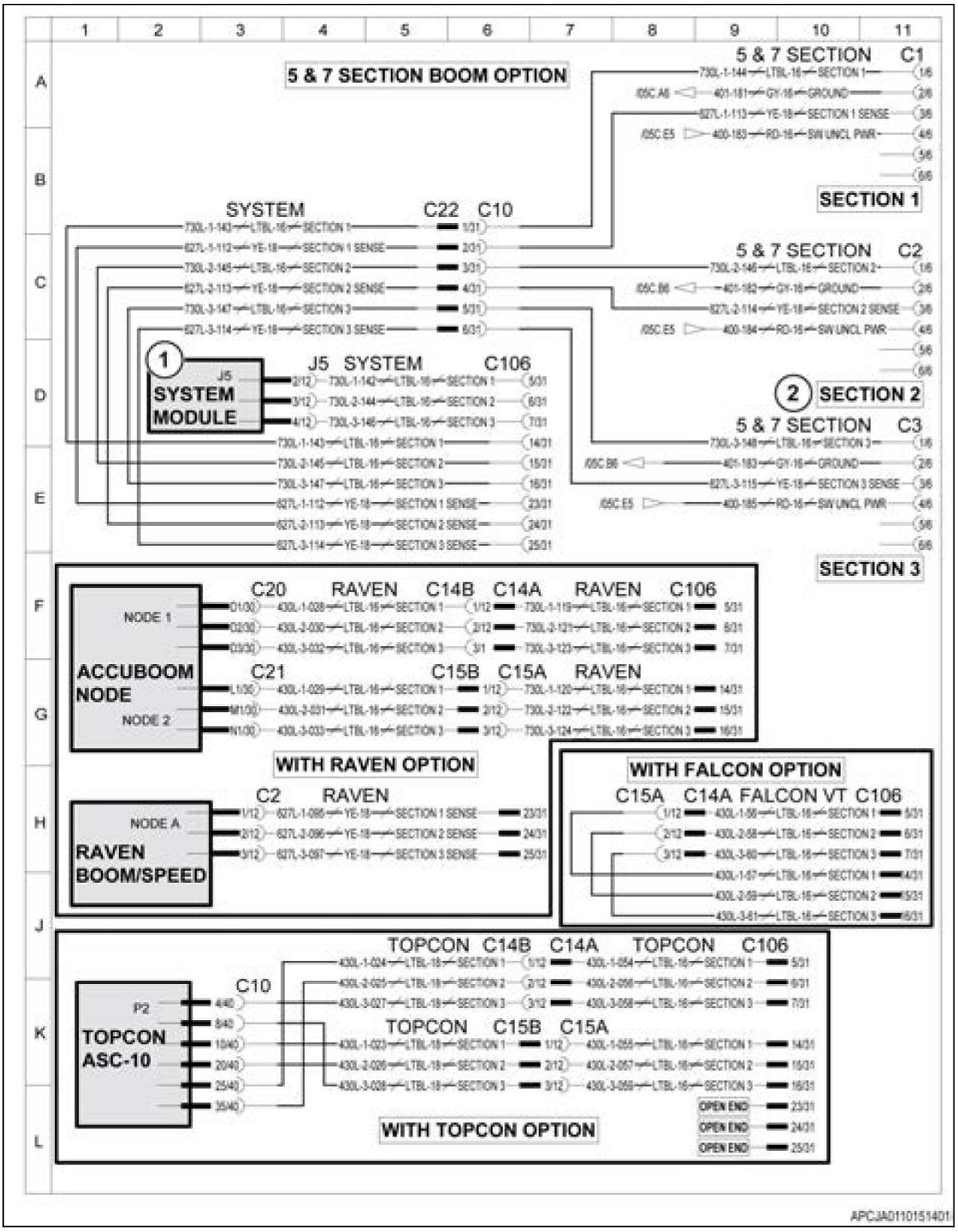

Fig. 319 Section 2 valve solenoid circuit schematic

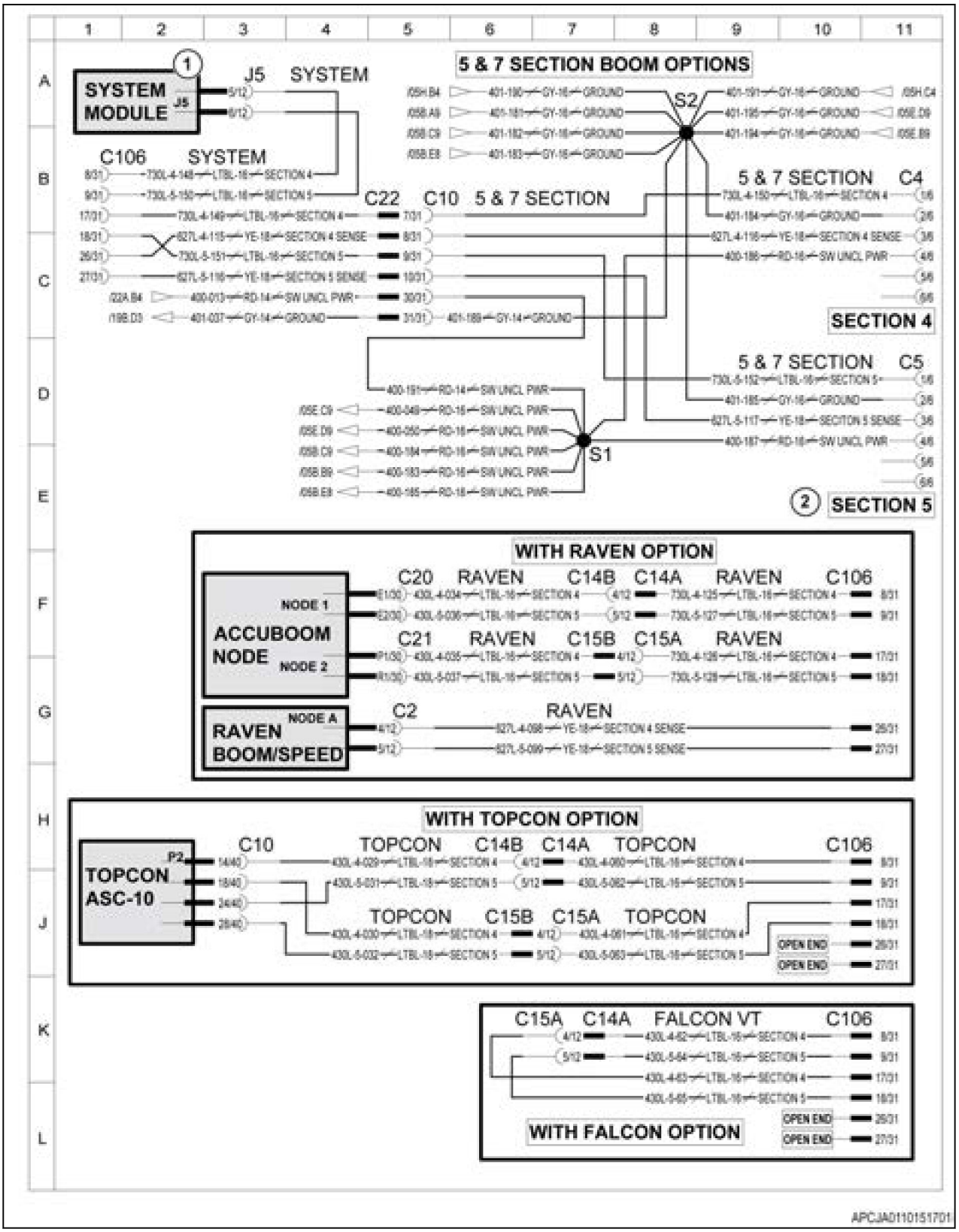

Fig. 324 Section 5 valve solenoid circuit schematic

Schematic

Schematic legend		
Item	**Schematic Term**	**Description**
1	SYSTEM MODULE	System module
-	SECTION 6	Section 6 valve solenoid
2	SECTION 7	Section 7 valve solenoid
-	TOPCON ASC-10	Topcon ASC-10
-	ACCUBOOM NODE	AccuBoom node
-	RAVEN BOOM/SPEED	Raven Boom/Speed
-	FALCON VT	Falcon VT

6.6.57 Code SA 192 SPN 522050 FMI 05

Left-hand foam marker circuit current is below normal or open circuit.

Common failures

- The wire harness is bad
- Short circuit in the sensor signal
- Power circuit or ground circuit is bad

Diagnosis and solution

1. Check for open circuit.

a) Turn the key start switch in the off position.
b) Turn the battery disconnect switch in the off position.
c) Remove the battery disconnect switch key.
d) Disconnect the system module (see chapter *Foam marker circuit schematic,* page 6-746) and the foam marker metering (see chapter *Foam marker circuit schematic,* page 6-746) connectors.
e) At the foam marker metering unit connector, insert the jumper wire from contact 3 to contact 8.
f) At the system module J4 connector check resistance from contact J4-8 to frame ground.
g) Record the resistance and remove the jumper wire.

Result

Expected result:

Resistance is less than 1 ohm.

Results:

- Yes - resistance is less than 1 ohm.

Go tosee step 2, page 6-745

- No - resistance is open circuit.

Harness is bad.

Go to see step 3, page 6-746

2. Check for bad foam marker metering unit.

- No - voltage is more than 6 V

The pressure sensor is bad.

Replace the pressure sensor.

see step 4, page 6-763

4. Check if diagnostic code remains.

a) Inspect contacts of the connectors and clean contacts.
b) Reconnect all the connectors.
c) Turn the battery disconnect switch to on position.
d) Turn the key start switch to on position.
e) Operate the product pump.
f) Check status of SPN 522056 FMI 00.

Result

Expected result:

SPN 522056 FMI 00 is not active.

Results:

- Yes — SPN 522056 FMI 00 is not active.

Stop

- No — SPN 522056 FMI 00 is active.

Failure of the system module is possible but not common. Exit the procedure and do the procedure again. If the cause of the diagnostic code not found and the diagnostic code remains active, replace the system module.

Pump pressure circuit schematic
Schematic

Result

Expected results:

Resistance is less than 1 ohm.

Results:

- Yes - resistance is less than 1 ohm.

The circuit is correct.

see step 3, page 6-781

- No - resistance is more than 1 ohm.

Harness is bad.

Repair or replace the harness.

see step 4, page 6-781

3. Check for bad sensor.

a) Inspect the contacts of the connectors and clean the contacts.
b) Reconnect all the connectors.
c) Turn the battery disconnect switch to the on position.
d) Turn the key start switch to the on position.
e) Put the multimeter probe in rear of the pressure sensor connector at contact C and at contact B.
f) Operate the product pump.
g) Monitor signal voltage.

Result

Expected result:

Voltage is between 1 V and 6 V.

Results:

- Yes - Voltage is between 1 V and 6 V.

see step 4, page 6-781 .

- No - Voltage is more than 6 V.

The pressure sensor is bad.

Replace the pressure sensor.

see step 4, page 6-781 .

4. Check if diagnostic code remains.

a) Inspect the contacts of connectors and clean the contacts.
b) Reconnect all the connectors.
c) Turn the battery disconnect switch to the on position.
d) Turn the key start switch to the on position.
e) Operate the product pump.
f) Check the status of SPN 522057 FMI 03.

Result

Expected Result:

SPN 522057 FMI 03 is not active.

Results:

- Yes — SPN 522057 FMI 03 is not active.

2. Check the fuel pull up splice pack.
   a) Turn the battery disconnect switch to the on position
   b) Turn the key start switch to the on position.
   c) Remove the battery disconnect switch key.
   d) Remove the fuel pull up splice pack.
   e) Check the resistance across the splice pack from the splice pack contact A to the splice pack contact F.

   Result

   Expected result

   The resistance measurement is between 165 and 195 ohms.

   Results

   - Yes - the resistance measurement is between 165 and 195 ohms. The splice pack is correct.

     Go to see step 3, page 6-799 .
   - No - the resistance measurement is not between 165 and 195 ohms. The splice pack is bad.

     Replace the fuel pull up splice pack with a splice pack of the same type and specifications.

     Stop.

3. Check the fuel sender circuit between the fuel level sender and the fuel pull up splice pack.
   a) Turn the battery disconnect switch to the on position
   b) Turn the key start switch to the on position.
   c) Remove the battery disconnect switch key.
   d) Disconnect the fuel level sender and the fuel pull up splice pack.
   e) Check the resistance from contact 1 at the fuel level sender to contact E the fuel pull up splice pack.

   Result

   Expected result

   The resistance measurement is less than one ohm

   Results

   - Yes - the resistance measurement is less than one ohm.

     Go to see step 4, page 6-799 .
   - No - the resistance measurement is not less than one ohm.

     Repair the fuel sender signal circuit between the fuel level sender and the fuel pull up splice pack.

     Stop.

4. Check the fuel sender circuit between the fuel pull up splice pack and the work light ECM
   a) Turn the battery disconnect switch to the on position
   b) Turn the key start switch to the on position.
   c) Remove the battery disconnect switch key.
   d) Disconnect the J2 harness connector for the work light ECM.
   e) Disconnect the harness connector for the fuel pull up splice.
   f) Check the resistance from contact 1 at the J2 connector for the work light ECM to contact F at the the splice pack.

   Result

   Expected result

   The resistance measurement is less than one ohm.

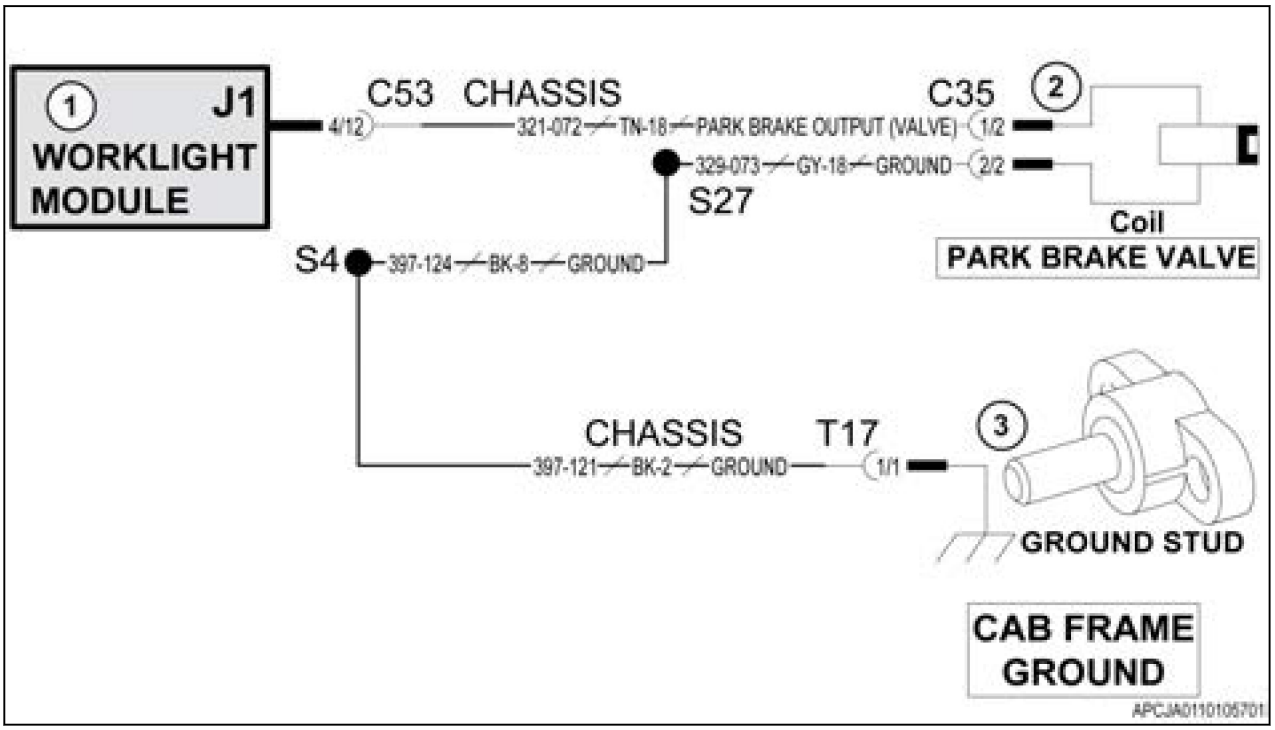

Fig. 355

Schematic

Schematic legend		
Item	**Schematic term**	**Description**
1	WORKLIGHT MODULE	Work light electronic control module (ECM)
2	PARK BRAKE VALVE	Parking brake valve solenoid
3	CAB FRAME GROUND STUD	Cab frame ground stud
-	CHASSIS	Chassis electrical harness
-	PARK BRAKE OUTPUT (VALVE)	Parking brake valve solenoid power circuit wire
-	GROUND	Ground circuit wire
-	S27	Splice 27
-	S4	Splice 4

6.7.5 Code SA 234 SPN 1638 FMI 00

The work light electronic control module (ECM) found the hydraulic oil temperature is above the correct range.

Common failures

- There is a short circuit in the switch signal circuit.

- No - The resistance measurement open circuit.

  The oil level switch signal wire or power supply wire are open circuit.

  Repair or replace the electrical harness.

  Go to see step 5, page 6-835 .

4. Check the hydraulic oil level switch signal wire for a short circuit.
   a) Turn the key start switch in the off position.
   b) Turn the battery disconnect switch in the off position.
   c) Remove the battery disconnect switch key.
   d) Disconnect the hydraulic oil level switch, and the work light ECM.
   e) Check the resistance from contact 3 at the J2 connector on the work light ECM to all other ECM harness connector contacts.

   Result

   Expected results

   The resistance measurement is open circuit.

   Results

   - Yes - the resistance measurement is open circuit.

     Go to see step 5, page 6-835 .
   - No - The resistance measurement is not open circuit.

     The oil level switch signal wire short circuit.

     Repair or replace the electrical harness.

     Go to see step 5, page 6-835 .

5. Check if the diagnostic code remains.
   a) Turn the key start switch in the off position.
   b) Turn the battery disconnect switch in the off position.
   c) Remove the battery disconnect switch key.
   d) Disconnect the work light ECM and all electrical harness connectors for the hydraulic oil level switch circuits.
   e) Inspect the contacts of the harness connectors and clean the connectors.
   f) Connect all harness connectors.
   g) Turn the battery disconnect switch to the on position.
   h) Turn the key start switch to the on position.
   i) Check the active code screen for the SA 234 SPN 2602 FMI 01 diagnostic code.

   Result

   Expected results

   The diagnostic code is not active.

   Results

   - Yes - the diagnostic code is not active.

     Continue machine operation.

     Stop.

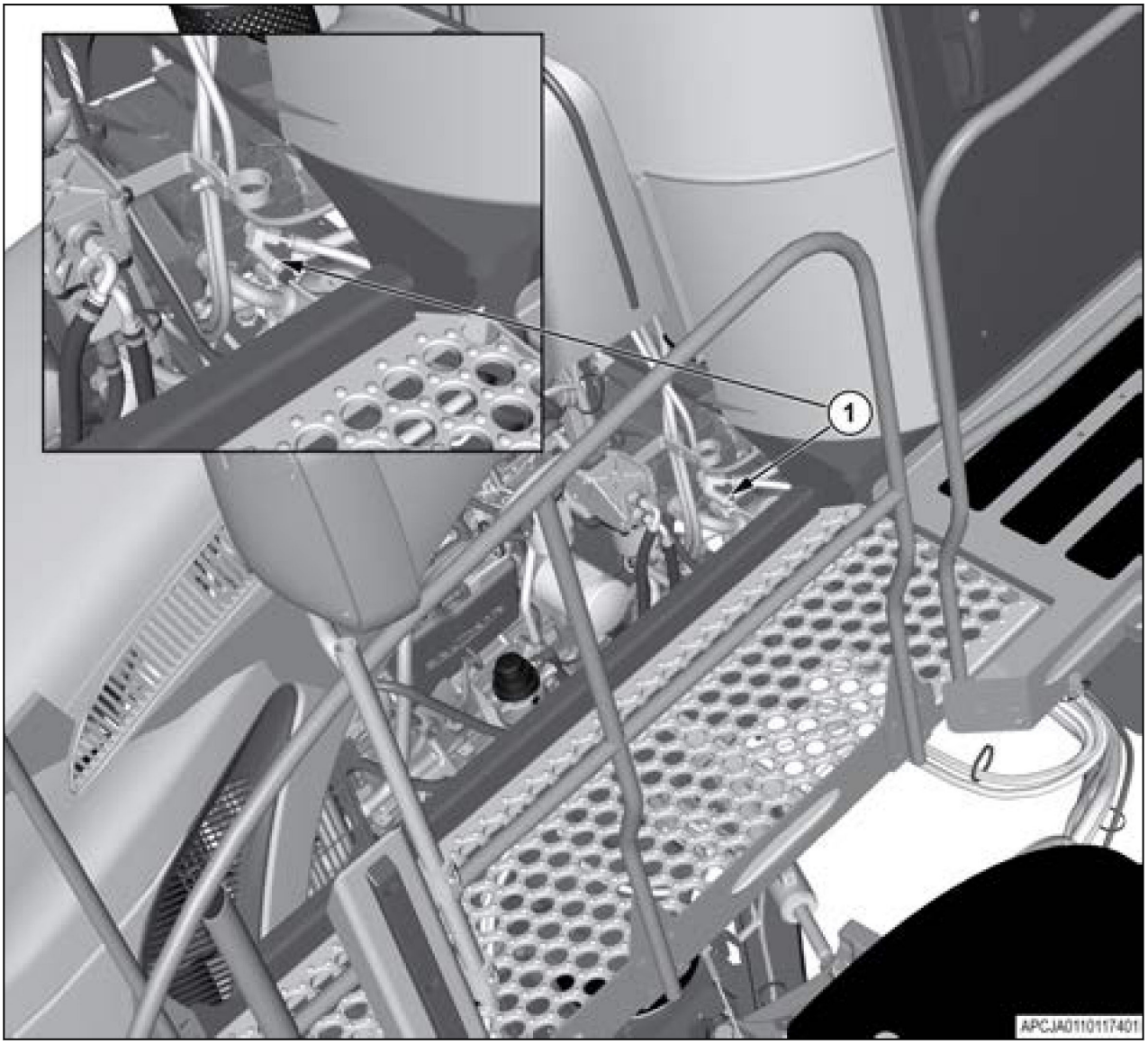

Fig. 374

(1) Three contact electrical connector C43, hydraulic charge pressure sensor

Schematic

Schematic legend		
Item	**Schematic term**	**Description**
-	LEFT WORKLIGHT #1	Left-hand work light one lamp power supply wire
	RIGHT WORKLIGHT #1	Right-hand work light one lamp power supply wire
-	HALOGEN LIGHT	Halogen lamp (standard equipment)
-	HID LIGHT	HID lamp (optional)
-	GROUND	Ground circuit wire
-	S23	Splice 23
-	S3	Splice 3
-	S4	Splice 4

6.8.4 Code SA 235 SPN 2365 FMI 05

The head light electronic control module has found the current for the work light two circuit is below the correct range.

Common failures

- The electrical harness or electrical harness connection is bad.
- A work lamp is bad.

Diagnosis and solution

1. Check the work light two lamps.
   a) Turn the battery disconnect switch to the on position.
   b) Turn the key start switch to the on position.
   c) Move the work light two switch to the on position.
   d) Check work light two lamps for illumination.

   Result

   Expected result:

   All work light two lamps are on.

   Results:
   - Yes - all work light two lamps are on.

     Go to see step 5, page 6-873 .
   - No - One or more work light two lamps are not on.

     Go to see step 2, page 6-871 .
2. Check for bad lamps.
   a) Turn the key start switch in the off position.
   b) Turn the battery disconnect switch in the off position.
   c) Remove the battery disconnect switch key.
   d) Disconnect the work light two lamps.

Schematic legend		
Item	**Schematic term**	**Description**
5	C4	Boomrest harness connector
6	HID/HAL WORKLIGHT	HID or halogen lamp for work light two
-	CHASSIS	Chassis electrical harness
-	BOOMREST	Boomrest electrical harness
-	RIGHT WORKLIGHT #1	Right-hand work light one lamp power supply wire
-	HALOGEN LIGHT	Halogen lamp (standard equipment)
-	LEFT WL #2	Work light two, left-hand lamp power circuit wire
-	RIGHT WL #2	Work light two, right-hand lamp power circuit wire
-	GROUND	Ground circuit wire
-	S3	Splice 3
-	S4	Splice 4

6.8.7 Code SA 235 SPN 2368 FMI 06

The head light electronic control module has found the current for the left-hand hazard lamp circuit is above the correct range.

Common failures

- The electrical harness or electrical harness connection is bad.
- A work lamp is bad.

Diagnosis and solution

1. Check the left-hand hazard lamp.

a) Turn the key start switch in the off position.
b) Turn the battery disconnect switch in the off position.
c) Remove the battery disconnect switch key.
d) Turn on the hazard lamps.
e) Check the hazard lamps for illumination.

Result

Expected result:

The left-hand hazard lamp is on.

Results:

- Yes - the left-hand hazard lamp is on.

  Go to see step 4, page 6-890 .

Schematic legend		
Item	**Schematic term**	**Description**
5	C4	Boomrest harness connector
6	HID/HAL WORKLIGHT	HID or halogen lamp for work light two
-	CHASSIS	Chassis electrical harness
-	BOOMREST	Boomrest electrical harness
-	RIGHT WORKLIGHT #1	Right-hand work light one lamp power supply wire
-	HALOGEN LIGHT	Halogen lamp (standard equipment)
-	LEFT WL #2	Work light two, left-hand lamp power circuit wire
-	RIGHT WL #2	Work light two, right-hand lamp power circuit wire
-	GROUND	Ground circuit wire
-	S3	Splice 3
-	S4	Splice 4

6.8.10 Code SA 235 SPN 2653 FMI 05

The head light electronic control module has found the current for the left-hand low beam lamp is below the correct range.

Common failures

- The electrical harness or electrical harness connection is bad.
- The low beam lamp is bad.

Diagnosis and solution

1. Check the low beam lamps.

a) Turn the battery disconnect switch to the on position.
b) Turn the key start switch to the on position.
c) Turn on the low beam lamps.
d) Check the left-hand low beam lamp for illumination.

Result

Expected result:

The left-hand low beam lamp is on.

Results:

- Yes - the left-hand low beam lamp is on.

  Go to see step 4, page 6-908 .

Schematic legend		
Item	**Schematic term**	**Description**
-	S23	Splice 23
-	S1	Splice 1
-	S4	Splice 4

6.8.13 Code SA 235 SPN 2655 FMI 06

The head light electronic control module has found the current for the right-hand low beam lamp is above the correct range.

Common failures

- A electrical harness or electrical harness connection is bad.
- The right-hand low beam lamp is bad.

Diagnosis and solution

1. Check the low beam lamps.

a) Turn the battery disconnect switch to the on position.
b) Turn the key start switch to the on position.
c) Turn on the low beam lamps.
d) Check the low beam lamps for illumination.

Result

Expected result:

The low beam lamps are on.

Results:

- Yes - the low beam lamps are on.

  Go to see step 4, page 6-926 .
- No - the right-hand low beam lamp is not on.

  Go to see step 2, page 6-925 .

2. Check for a bad lamp.

a) Turn the key start switch in the off position.
b) Turn the battery disconnect switch in the off position.
c) Remove the battery disconnect switch key.
d) Disconnect the right-hand low beam lamp.
e) Check for a bad lamp.
f) Inspect the lamp electrical harness connectors for bad contacts.
g) Check for wrong electrical harness connector installation.

Result

Expected result:

The lamp is not bad. The electrical harness connectors and electrical connector contacts are not bad.

Results:

Schematic legend		
Item	**Schematic term**	**Description**
-	HOOD	Hood electrical harness
-	LEFT HIGH BEAM	Left-hand high beam lamp power supply wire
-	RIGHT HIGH BEAM	Right-hand high beam lamp power supply wire
-	GROUND	Ground circuit wire
-	S23	Splice 23
-	S2	Splice 1
-	S4	Splice 4

6.8.16 Code SA 235 SPN 4012 FMI 05

The head light electronic control module has found the current for the right-hand high beam lamp is below the correct range.

Common failures

- The electrical harness or electrical harness connection is bad.
- The high beam lamp is bad.

Diagnosis and solution

1. Check the high beam lamps.
   a) Turn the battery disconnect switch to the on position.
   b) Turn the key start switch to the on position.
   c) Turn on the high beam lamps.
   d) Check the right-hand high beam lamp for illumination.

   Result

   Expected result:

   The right-hand high beam lamp is on.

   Results
   - Yes - the right-hand high beam lamp is on.

     Go to see step 4, page 6-944 .
   - No - the right-hand high beam lamp is not on.

     Go to see step 2, page 6-943 .

2. Check for a bad lamp.
   a) Turn the key start switch in the off position.
   b) Turn the battery disconnect switch in the off position.
   c) Remove the battery disconnect switch key.
   d) Disconnect the right-hand high beam lamp.
   e) Check for bad lamp.
   f) Inspect the lamp electrical harness connectors for bad contacts.

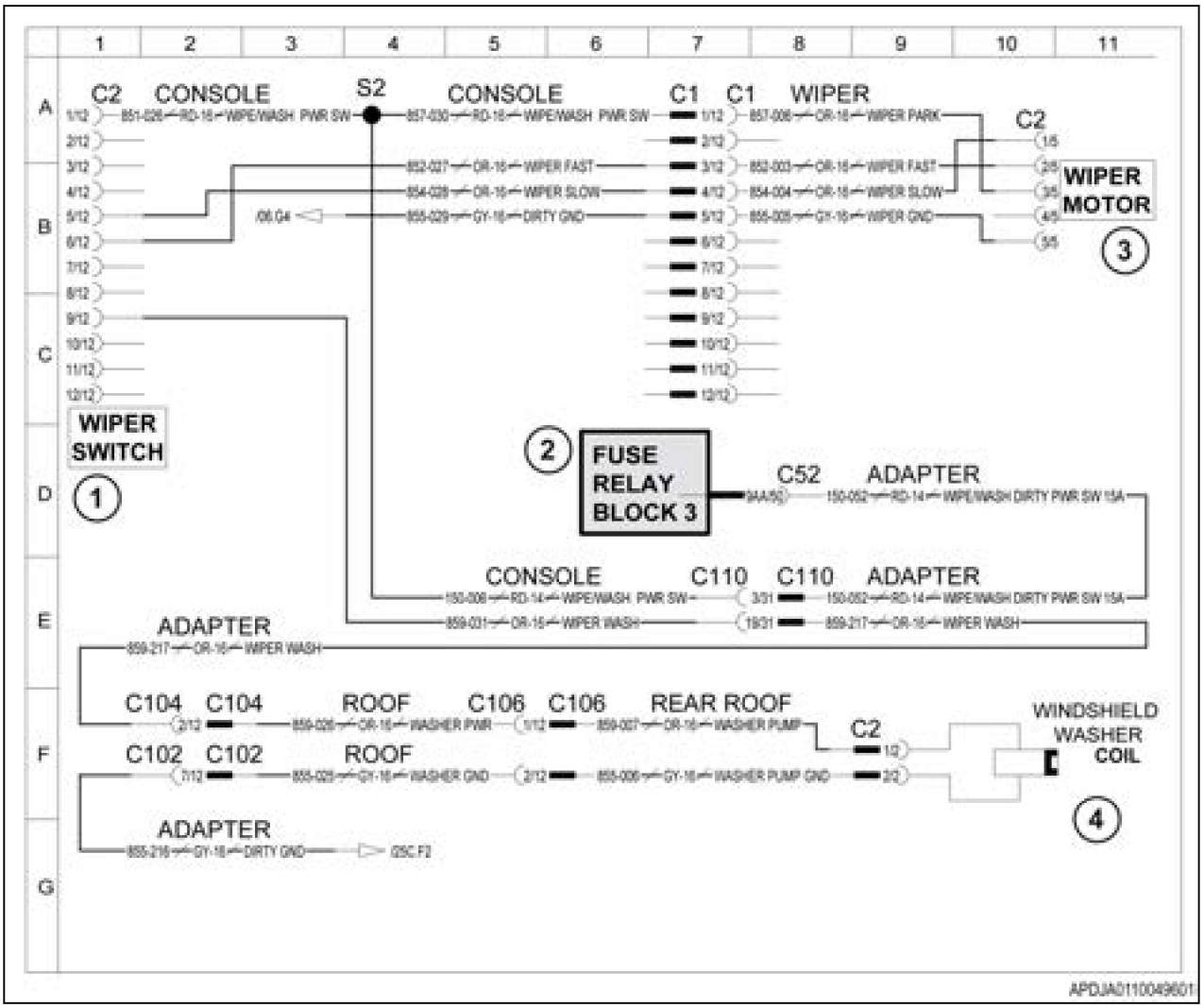

Fig. 428

Wiper motor circuit schematic

Schematic Legend		
Item	**Term**	**Term description**
1	WIPER SWITCH	Wiper Switch
2	FUSE RELAY BLOCK 3	Fuse Relay Block 3
3	WIPER MOTOR	Wiper Block
4	WINDSHIELD WASHER COIL	Windshield Washer Coil

6.9.4 Windshield wiper circuits short circuit to ground

Short to ground in windshield wiper power circuit.

Description

The windshield wiper circuit provides the 12-volt power and the ground to operate the windshield wiper.

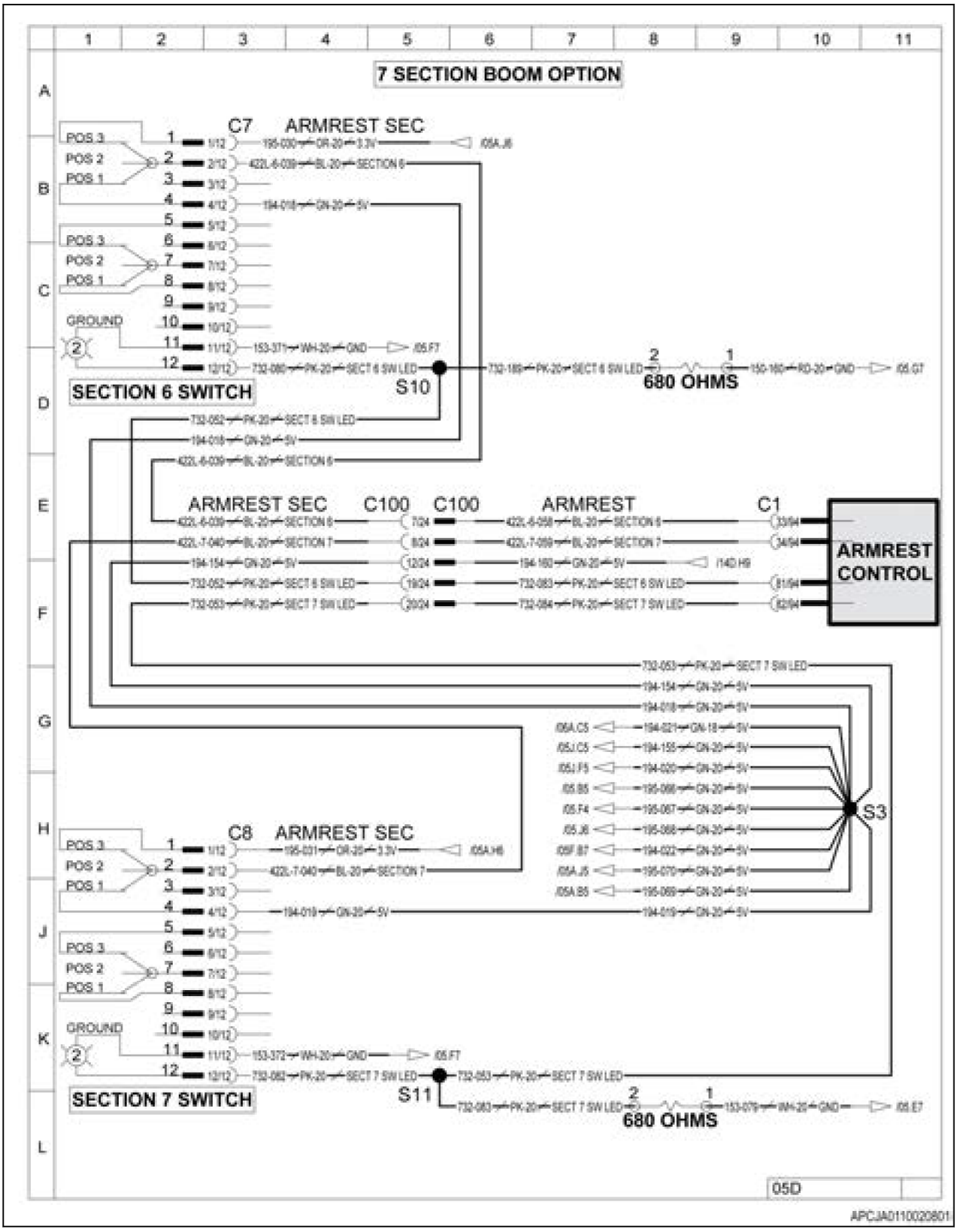
7 SECTION BOOM OPTION
C7 ARMREST SEC
POS 3
POS 2
POS 1
GROUND
SECTION 6 SWITCH
S10
680 OHMS
ARMREST SEC
C100
C100
ARMREST
C1
ARMREST CONTROL
S3
C8 ARMREST SEC
SECTION 7 SWITCH
S11
680 OHMS
05D
APCJA0110020801

Fig. 443

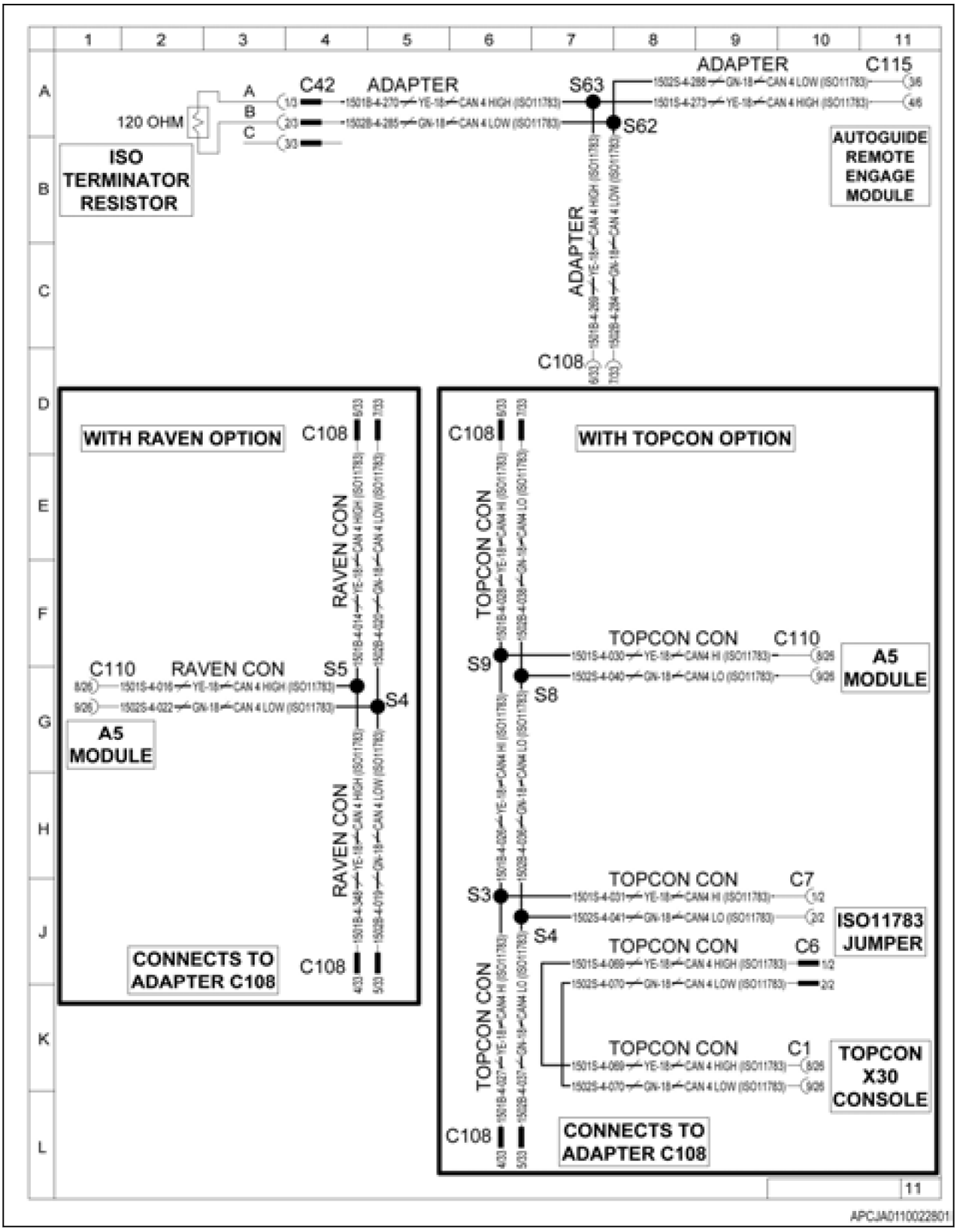
ADAPTER
C115
C42
ADAPTER
S63
120 OHM
S62
ISO
TERMINATOR
RESISTOR
AUTOGUIDE
REMOTE
ENGAGE
MODULE
ADAPTER
C108
WITH RAVEN OPTION
C108
RAVEN CON
C110
RAVEN CON
S5
S4
A5
MODULE
RAVEN CON
CONNECTS TO
ADAPTER C108
C108
WITH TOPCON OPTION
C108
TOPCON CON
TOPCON CON
C110
S9
S8
A5
MODULE
S3
TOPCON CON
C7
S4
ISO11783
JUMPER
TOPCON CON
C6
TOPCON CON
C1
TOPCON
X30
CONSOLE
TOPCON CON
C108
CONNECTS TO
ADAPTER C108
APCJA0110022801

Fig. 461

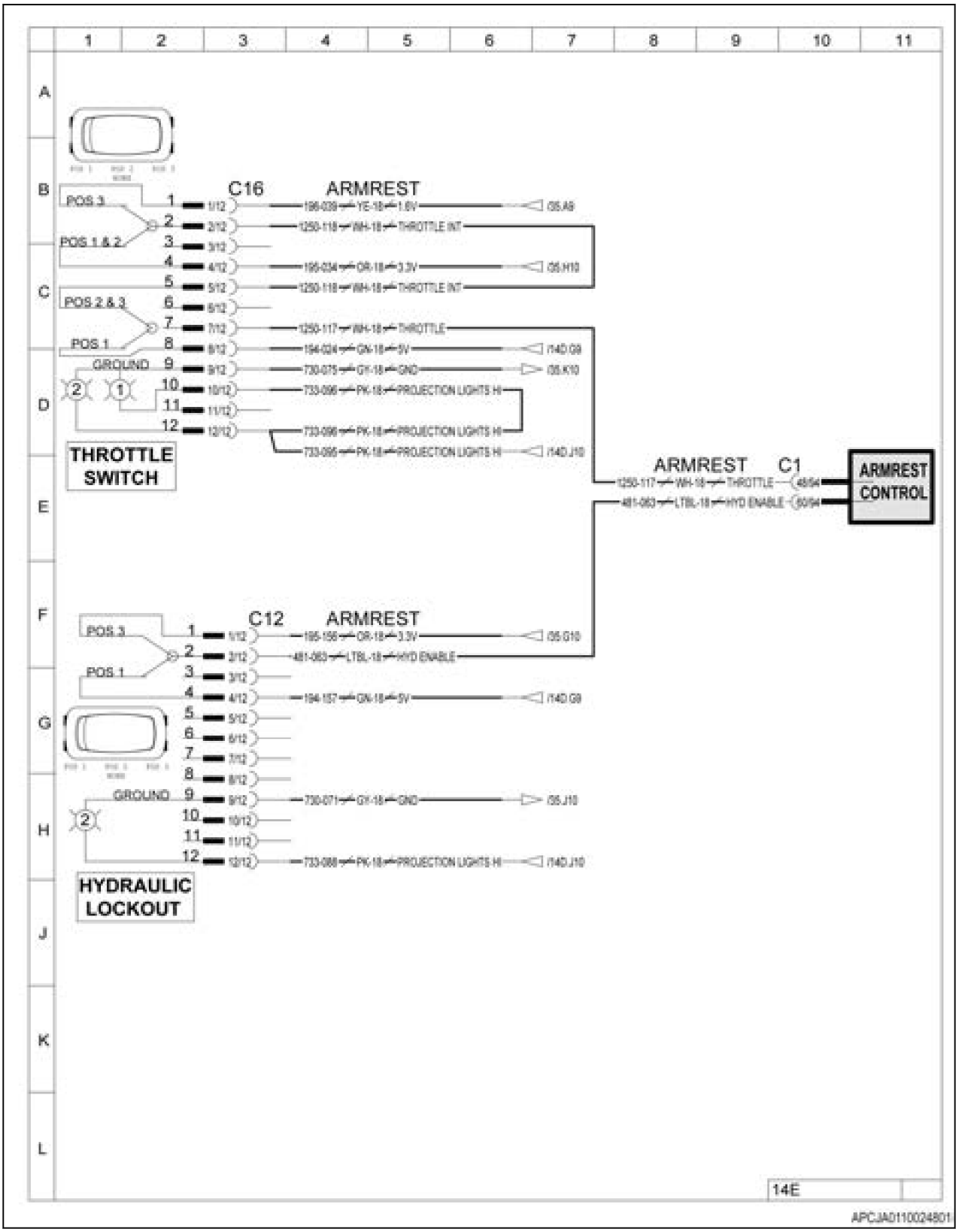
C16
ARMREST
POS 3
POS 1 & 2
POS 2 & 3
POS 1
GROUND
THROTTLE SWITCH
C12
ARMREST
POS 3
POS 1
GROUND
HYDRAULIC LOCKOUT
ARMREST C1
ARMREST CONTROL
14E
APCJA0110024801

Fig. 479

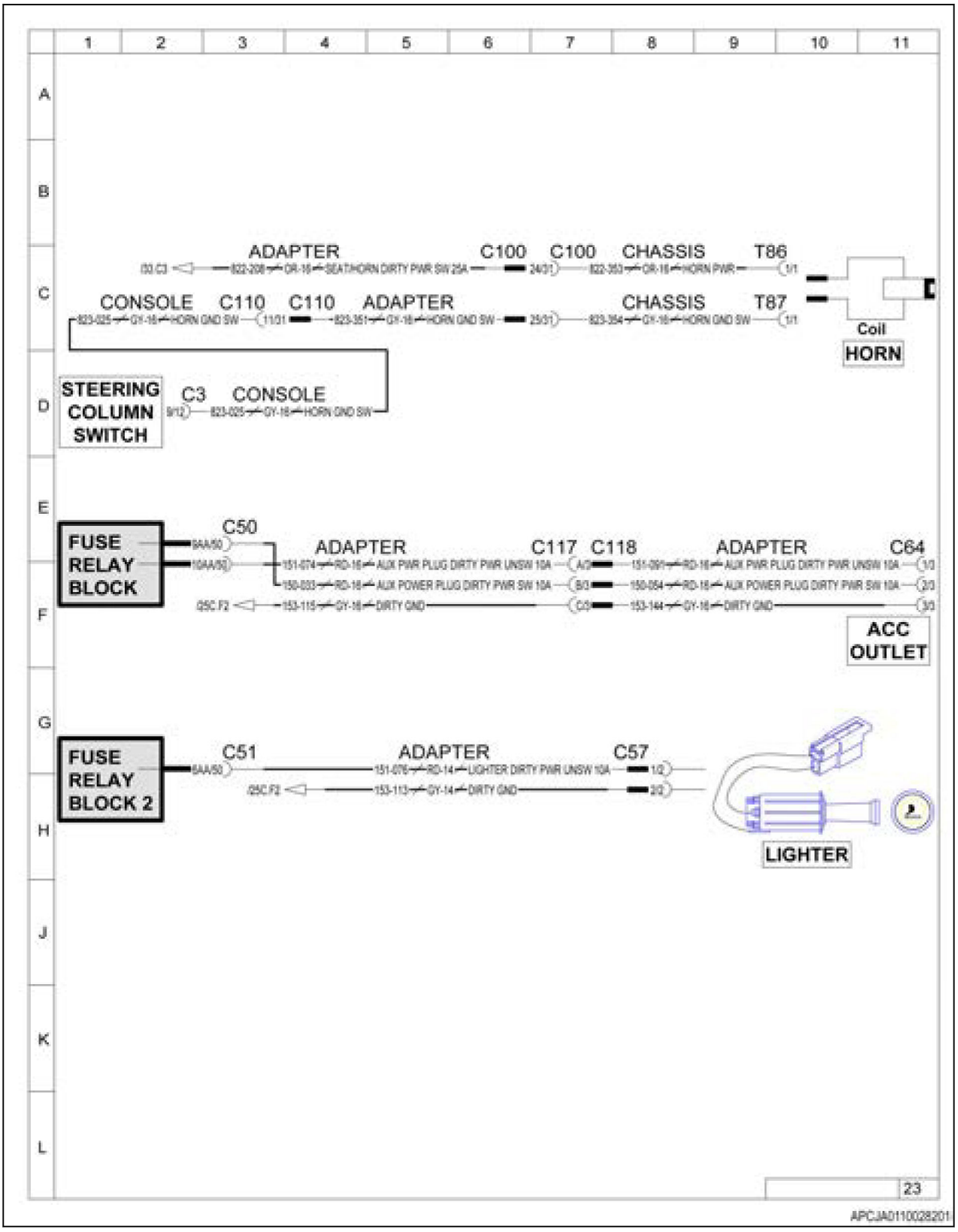
ADAPTER
C100
C100
CHASSIS
T86
CONSOLE
C110
C110
ADAPTER
CHASSIS
T87
Coil
HORN
STEERING COLUMN SWITCH
C3
CONSOLE
FUSE RELAY BLOCK
C50
ADAPTER
C117
C118
ADAPTER
C64
ACC OUTLET
FUSE RELAY BLOCK 2
C51
ADAPTER
C57
LIGHTER
APCJA0110028201

Fig. 497

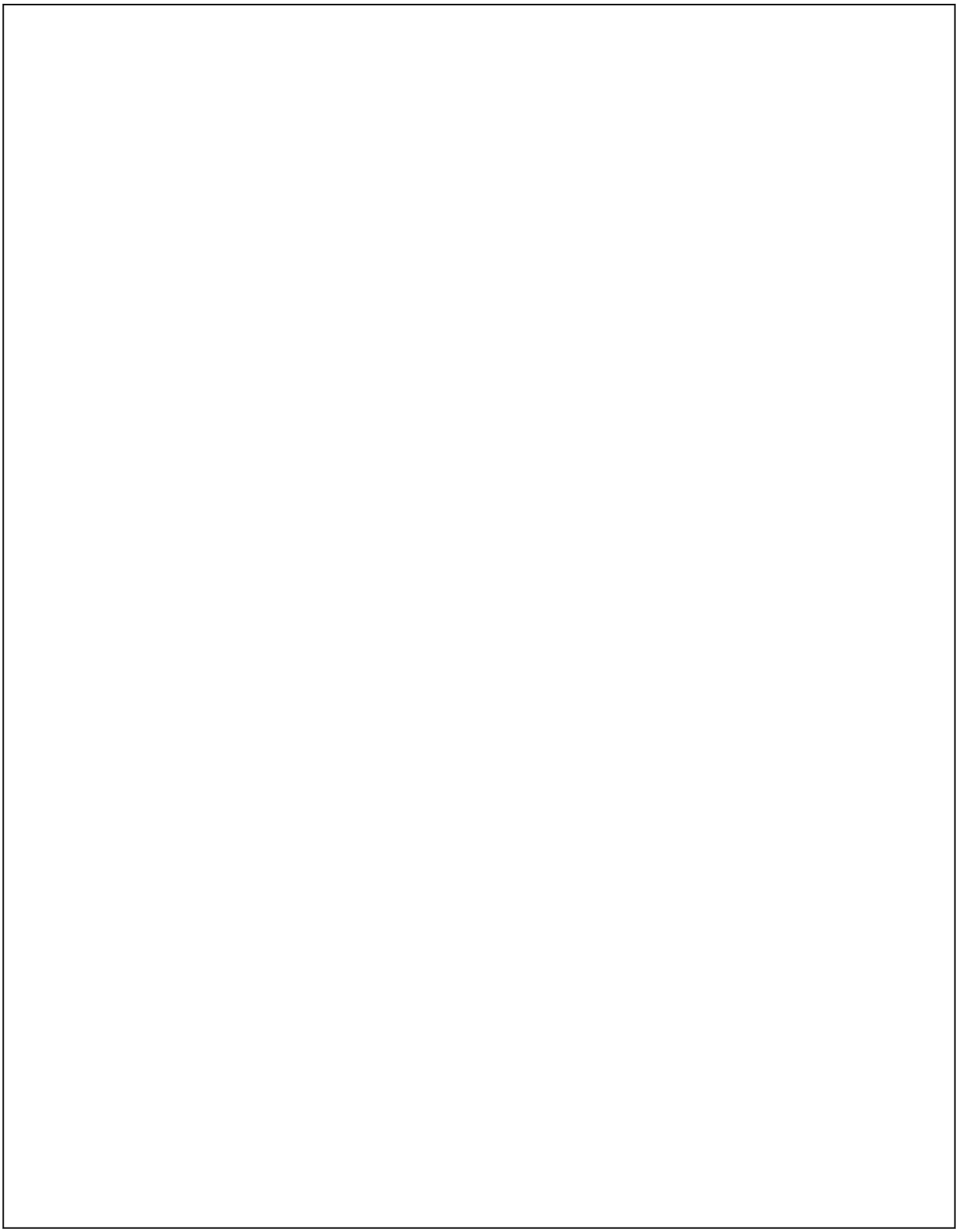

Fig. 515

(1) Pressure (port P)
(2) Pressure relief valve
(3) Test port

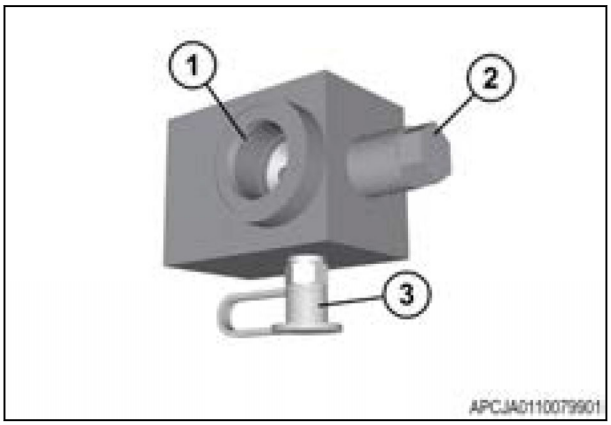

Fig. 27

7.6.9 Return filter manifold

The return filter manifold (1) is mounted to the center crossmember, between the frame rails of the machine. Hydraulic oil flows through the return filter manifold and the oil filters before flowing back to the hydraulic reservoir

The return filter manifold has many ports for hydraulic oil to return from different circuits. Oil flows through the two filters before returning to the hydraulic reservoir.

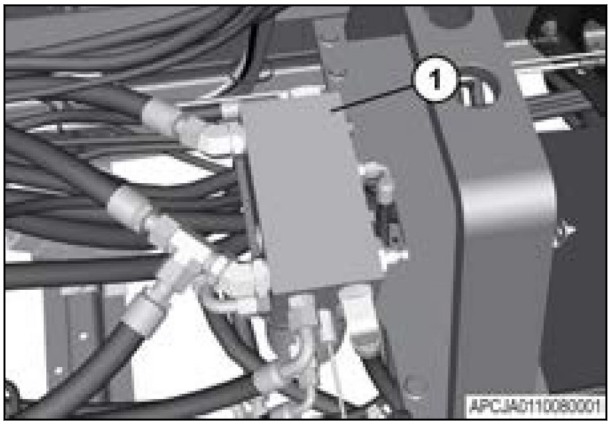

Fig. 28

A temperature sensor (1) on the return filter manifold alerts the operator of high oil temperature.

A pressure switch (2) on the return filter manifold alerts the operator of a high pressure drop across the filters. A pressure drop can show a plugged filter. The pressure switch closes when the pressure rises above 290 kPa (42 psi), indicating a plugged filter.

A 172 kPa (25 psi) relief valve in the return filter manifold will let oil bypass the filters. In this condition, hydraulic oil bypassing the oil filters will cause contamination of the hydraulic oil in the reservoir. It is recommended to change the oil filters to remove any contamination.

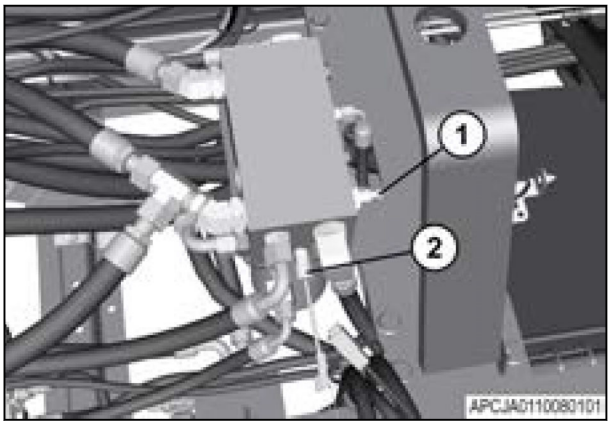

Fig. 29

7.6.10 Ladder valve

7. Use the hardware (1) to fasten the bracket (2), spacer (3), adapter (4), and steering angle sensor (5) to the steering unit (6).

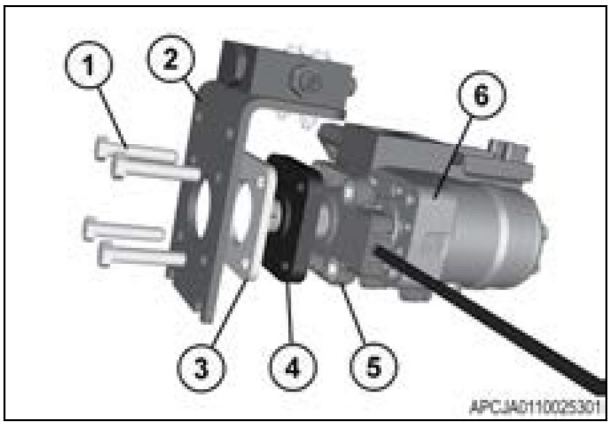

Fig. 77

8. Pull the firewall insulation (1) down to get access to the mounting surface.

9. Start installing the bottom bolts (2) into the firewall.

10. Support the steering shaft (3) with a plastic tie or untied string.

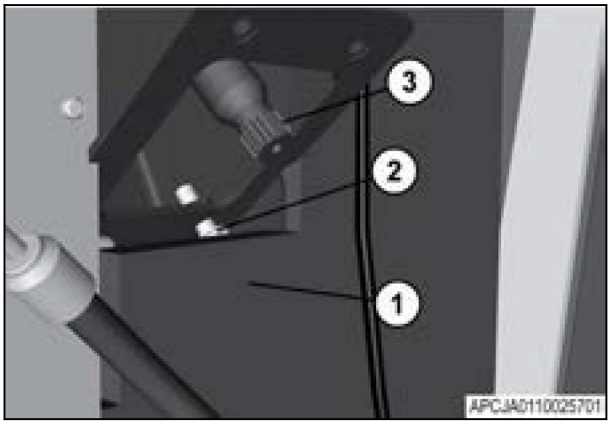

Fig. 78

11. Put the mounting plate on the bottom bolts.

12. Start the steering shaft into the adapter.

13. Start the top bolts (3) and slowly tighten the bolts.

NOTE: *Make sure the shaft splines are started correctly before tightening the bolts all the way.*

14. Connect the load sense hose (2) to the adapter fitting in the priority valve flow control (PVFC) load sense valve.

15. Connect the steering angle sensor (1) to the wiring harness.

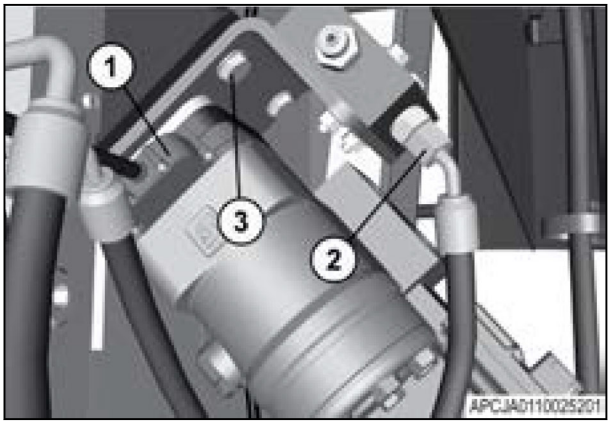

Fig. 79

4. Connect the harness to the oil level sensor (1).
5. Fasten the strap to the hat channel with a nut (2) and washer.

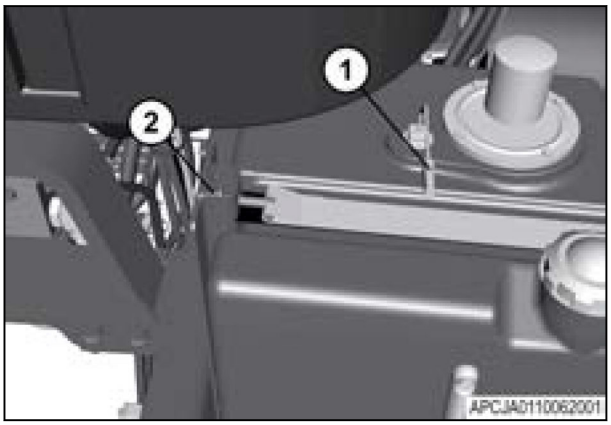

Fig. 127

6. Fasten the oil reservoir to the support with the bolts (1).

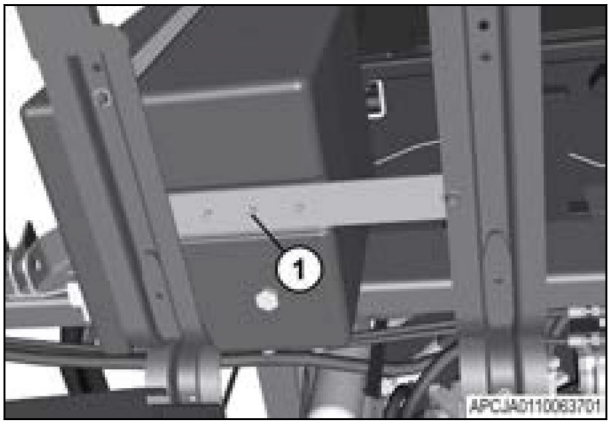

Fig. 128

7. Connect the system hydraulic pump supply hose (3) to the suction screen in port S2 .
8. Connect the hydrostatic drive pump supply hose (2) to the suction screen in port S4.
9. Connect the steering pump supply hose (1) to the suction screen in port S3.

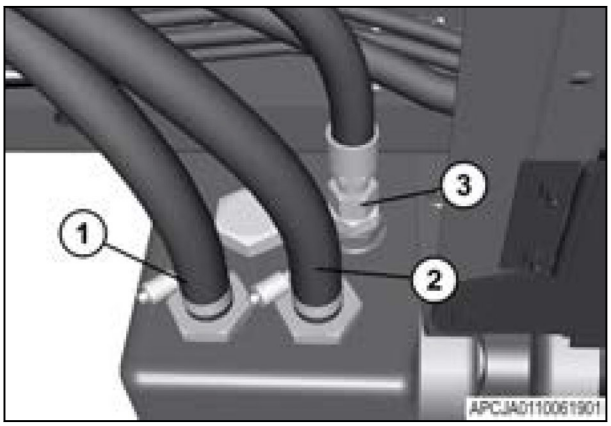

Fig. 129

6. Fasten the ladder valve and the parking brake valve to the chassis mount with the hardware (1).

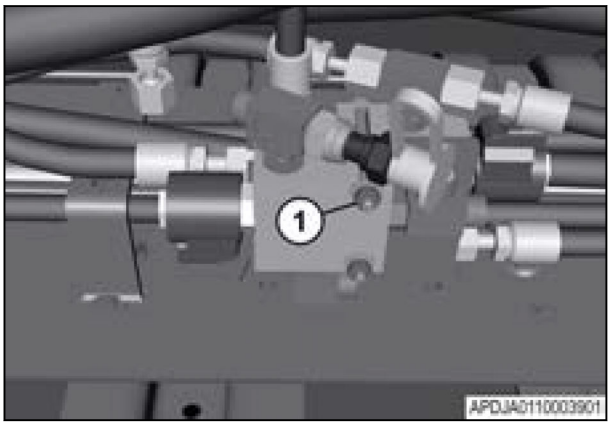

Fig. 177

7. Connect the harness (1) to the solenoid.
8. Connect the service pressure hose (2) to the ladder cylinder to the 90° fitting in port 2.

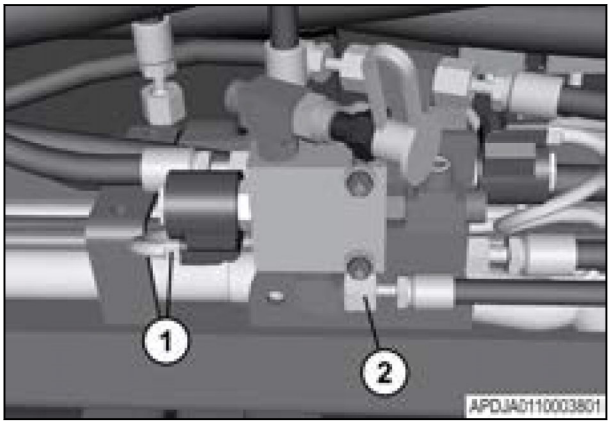

Fig. 178

9. Connect the return hose (1) to the parking brake valve to the tee fitting in port 1.
10. Connect the return hose (2) to the ladder cylinder to the tee fitting in port 1.
11. Connect the pressure supply hose (3) to the tee fitting in port 3.
12. Check the level of the hydraulic oil and add hydraulic oil as necessary. See Specifications.
13. Start the engine and run at idle.

IMPORTANT:
Make sure pumps are full of hydraulic oil and monitor the hydraulic oil pressure gauge at starting. If the hydraulic oil pressure gauge does not show pressure within 20 seconds, stop the machine. Check the hydraulic oil level in the pump cases and hydraulic reservoir. Add hydraulic oil as necessary.

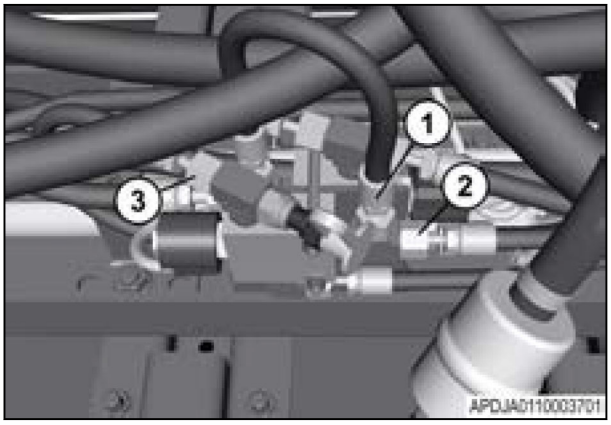

Fig. 179

6. If the machine is equipped with the belly pan option, remove the bolts and strap (1) holding the belting (2).
7. Lower the belting.

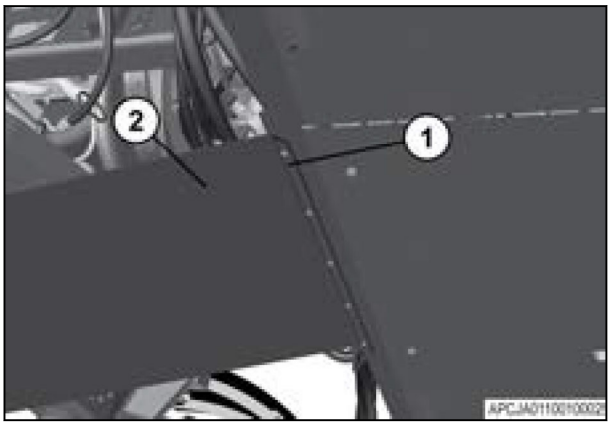

Fig. 224

8. Remove the hose (1) connecting the extend ports.
9. Remove the hose (2) connecting the retract ports.
10. Disconnect the hose (3) to the extend port.
11. Disconnect the hose (4) to the retract port.

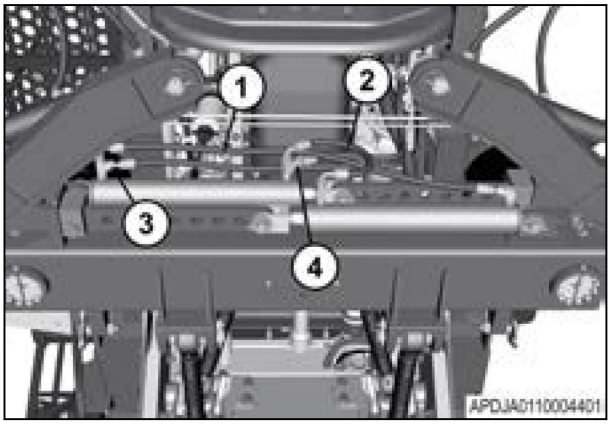

Fig. 225

12. Remove the cotter pin (1) and washer (2) from the pins (3) in both ends of the cylinder (4).
13. Support the cylinder and remove the pins.
14. Repeat the procedure for the other cylinder.

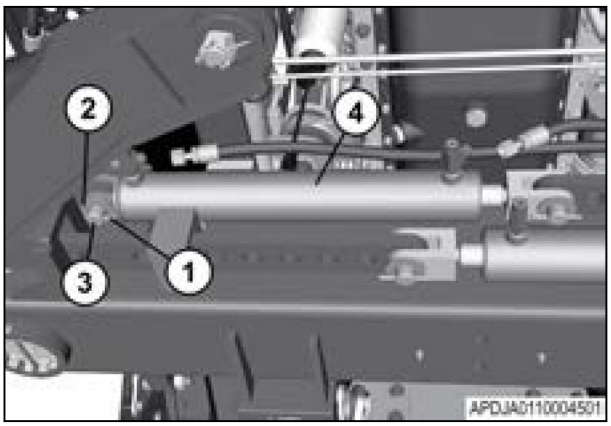

Fig. 226

7.7.22 Installing the front track adjust cylinder

Procedure

1. Completely clean all components to prevent contamination from entering the system.

6. Fasten the service brake valve to the pedal with the two bolts (1).

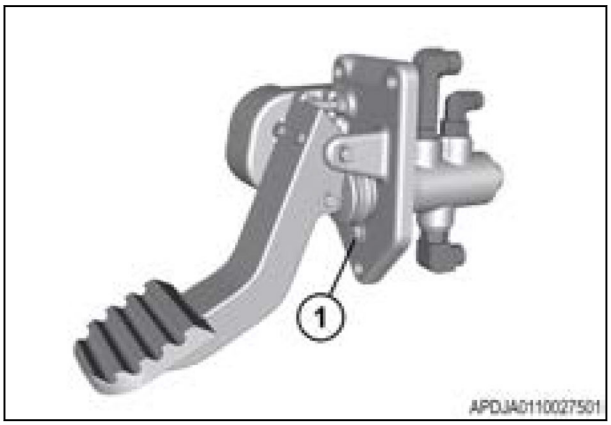

Fig. 270

7. Mount the brake assembly (2) to the firewall with three bolts (3).
8. Connect the harness (1) to the service brake pedal.

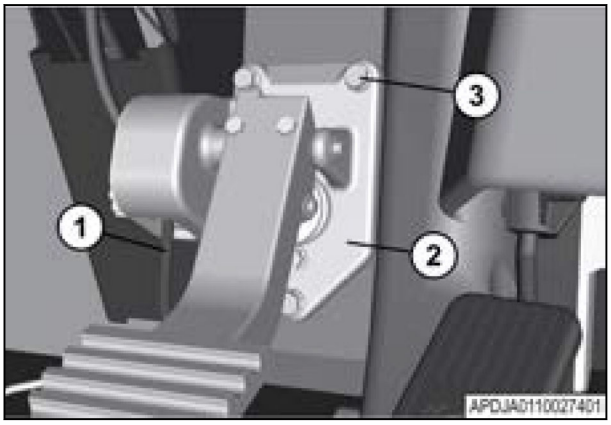

Fig. 271

9. Connect the Tee fitting (3) for the service hoses to the fitting in port A.
10. Connect the pressure hose (2) to the fitting in port P.
11. Connect the return hose (1) to the fitting in port T.
12. Add AGCO approved hydraulic oil if necessary.
13. Start the engine and run at idle.

IMPORTANT:
Make sure pumps are full of hydraulic oil and monitor the hydraulic oil pressure gauge at starting. If the hydraulic oil pressure gauge does not show pressure within 20 seconds, stop the machine. Check the hydraulic oil level in the pump cases and hydraulic reservoir. Add hydraulic oil as necessary.

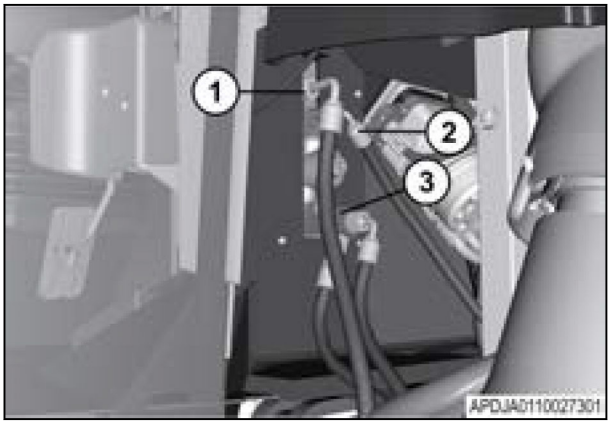

Fig. 272

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Park the machine on a solid level surface.
3. Stop the engine, apply the parking brake, and take the key with you.
4. Wait for about five minutes for the hydraulic pressure to bleed off.
5. Before removal, fasten identification tags on components for correct installation at assembly. Put caps and plugs on all hoses, fittings, ports, and openings to prevent contamination from entering the system.
6. Remove the hardware (1) holding the cover (2) to the wheel leg.

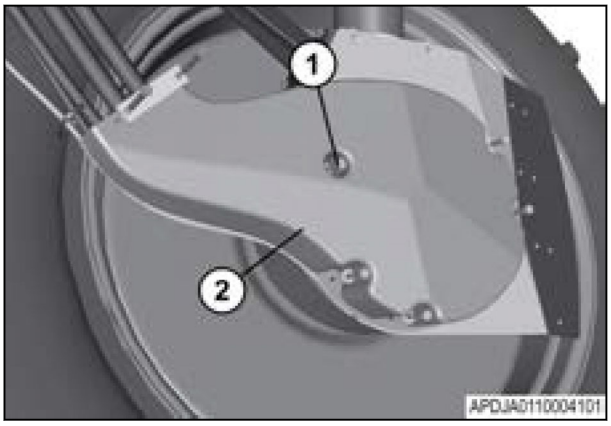

Fig. 316

7. Disconnect the wiring harness (1).
8. Disconnect the pressure hose (2) from port B.
9. Disconnect the pressure hose (3) from port A.

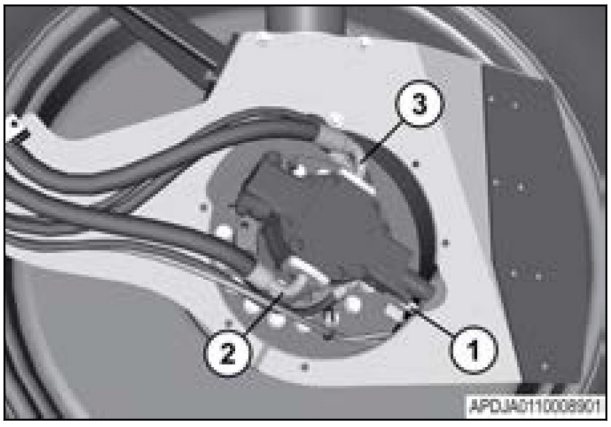

Fig. 317

10. Disconnect the case drain hose (1) from the fitting in port T1.
11. Support the wheel motor (2) and remove the two bolts (3).

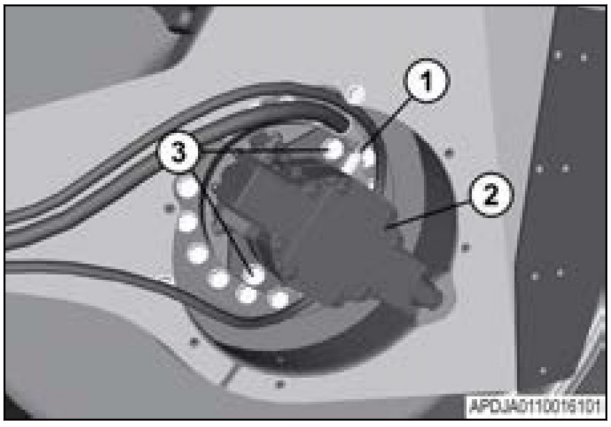

Fig. 318

5. Use an adjustable spanner-wrench or chain vise-grip to turn the head gland until the wire is all the way out.

   One revolution is enough to remove the wire.

   NOTE:
   Use a needle-nose pliers to pull on the wire while turning the head gland if the wire does not come out.

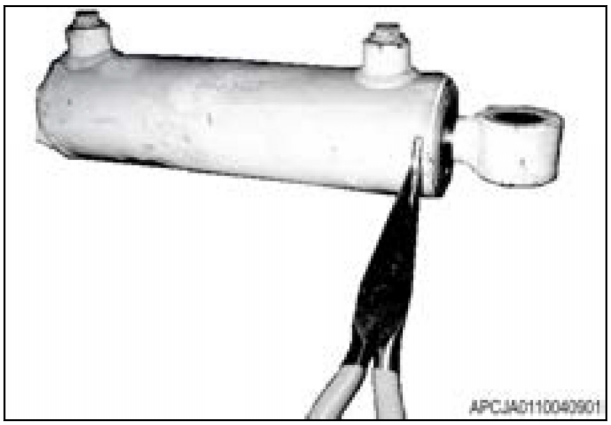

Fig. 364

6. Align the rod assembly and the cylinder tube.

   IMPORTANT:
   Do not pull rod assembly out at an angle. This can cause the piston or rod to scratch inner surface of the cylinder tube. Lifting devices can be necessary for heavy rod assemblies.

7. Pull the assembly out.

   The rod, head gland, and the piston are at this time in view.

   NOTE:
   Do not scratch the chrome of the rod.

8. Inspect the parts and inner surface of the tube for scratches, pitting, or burrs.
9. Inspect all threads.

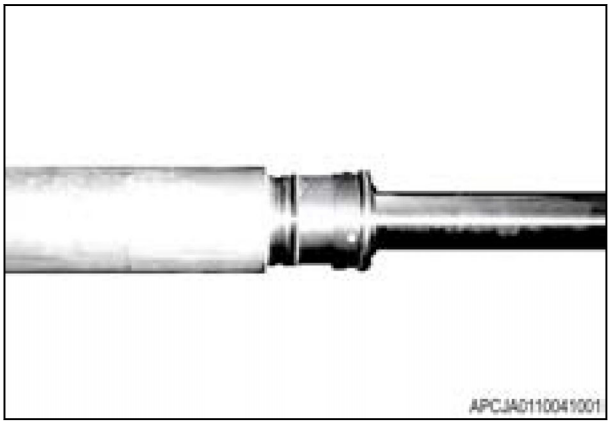

Fig. 365

7.8.2 Removing the head gland (with external threads)

The cylinder can look different from the cylinder in the graphics.

Before starting the procedure

IMPORTANT:
Contain all fluids during the performance of inspection, maintenance, doing tests, adjusting, and repair of the machine. Prepare to collect fluids with correct containers before opening any compartment or disassembling any component containing fluids.
Discard all fluids according to local regulations and laws.

NOTE: *There are a couple variations of caps: A basic cap over the top of the head gland that is pushed into the tube and then threaded on. The other being a gland cap and head gland together that turns on the tube.*

Procedure

1. Completely clean all components to prevent contamination from entering the system.
2. Extend and retract the cylinder rod with the ports open to remove hydraulic oil from the cylinder. Some oil will remain in the cylinder.

6. Tighten the head gland. Make sure that the threads are starting straight.

Fig. 405

7. Continue to tighten the head gland with a torque wrench with the spanner wrench.

   NOTE:
   Make sure to put the torque wrench at 90° to the spanner wrench. This transfers the same amount of torque that the wrench is set to.

Fig. 406

7.8.15 Installing the head gland (retaining ring)

The cylinder can look different from the cylinder in the graphics.

Before starting the procedure

IMPORTANT:
When installing the seal, be careful not to scratch the gland and piston. Scratches will decrease the efficiency of seals.

Procedure

1. Clean all components fully to prevent dirt from entering the internal mechanism or the system.
2. Lubricate the wear band and O-ring on the piston and head gland.

7.9.6 Charge pump schematic

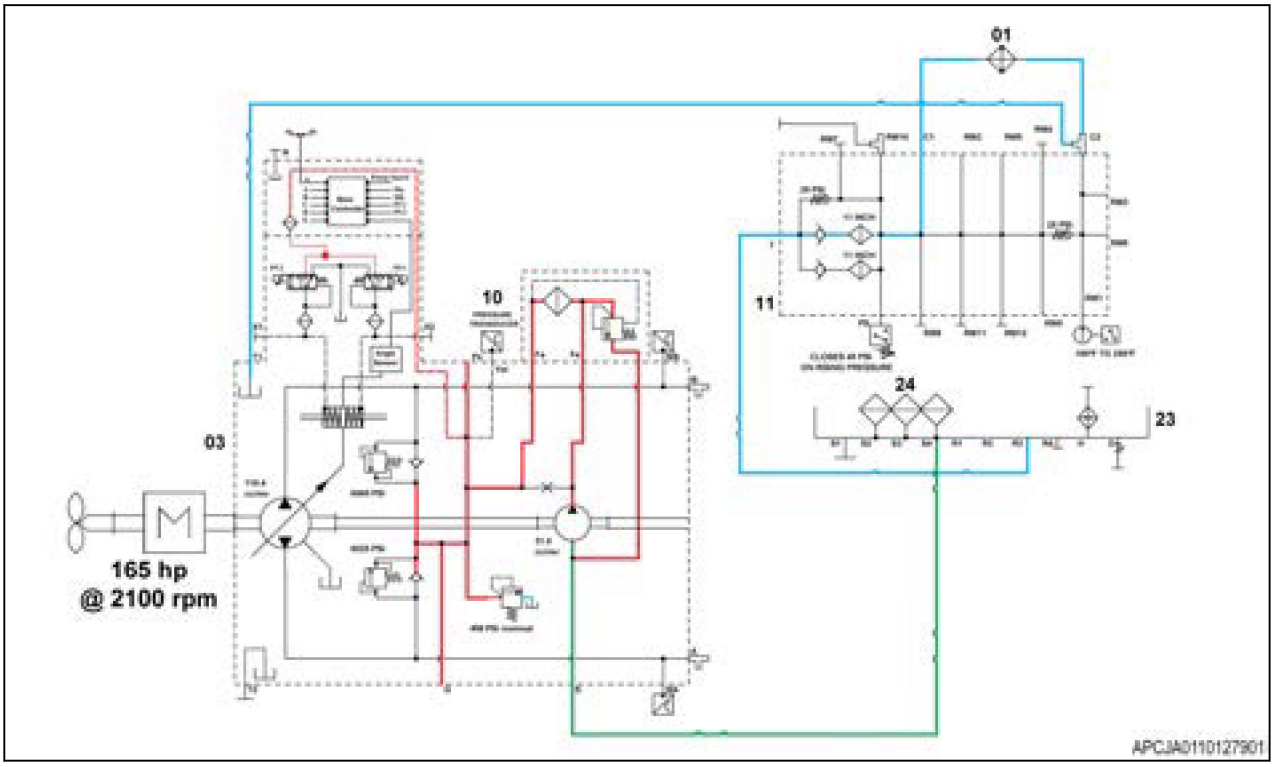

Fig. 433

(01) Oil cooler
(03) Hydrostatic drive pump
(10) Pressure transducer - charge pressure
(11) Return filter manifold
(23) Hydraulic oil reservoir
(24) Suction screen

Oil is drawn into the charge pump through the suction screen in the hydraulic oil reservoir. The oil from the charge pump flows through the internal filter then to the make up valves and the directional control valves.

The make up valves let charge pump oil to enter the low pressure side of the drive circuit. This oil replaces oil lost from normal internal drive circuit leakage.

There are drive pressure transducers in both the A and B pressure lines. These pressure transducers send information to the cab to show the forward and reverse drive pressures. The transducer in port Yst sends information to the cab to show the charge pump pressure.

When the machine is in neutral, the charge pressure is controlled by the charge relief located in the hydrostatic drive pump. Nominal charge pressure is 28 bar (406 psi).

7.9.7 Ladder valve operation

Ladder cylinder retracted