



**Challenger<sup>®</sup>**  
**Terra Gator 3244**  
**Chassis**  
**SERVICE MANUAL**  
**627333-A**

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- **Expandable storage binder (Binder label provided in printed material packets.)**

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## IMPORTANT SAFETY INFORMATION

Most personal injuries occur during product operation, maintenance or repair and are caused by failure to observe basic safety rules and precautions. In most cases, an injury can be avoided by recognizing hazardous situations before an injury occurs.

Operator must be alert to potential hazards and have the necessary training, skills and tools to perform functions properly.

Improper operation, lubrication, maintenance or repair of product can be hazardous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair of machine until reading and understanding associated information.

Safety precautions and warnings are provided in manual and on machine. If these hazard warnings are not heeded, bodily injury or death could occur to operator or bystanders.

Not every circumstance involving a potential hazard can be anticipated. Warnings in this publication and on machine are, therefore, not all inclusive. If a tool, procedure, work method or operating technique, not specifically recommended by AGCO is used, ensure it is safe for operator and others.

Make sure machine will not be damaged or be made unsafe by operation, lubrication, maintenance or repair procedures chosen. Information, specifications and illustrations in publication are on basis of information available at time publication was written.

Specifications, torques, pressures, measurements, adjustments, illustrations and other items can change at any time. These changes can affect service given to product. Obtain complete and most current information before starting any job. Local AGCO dealer has the most current information available.



**WARNING: When replacement parts are required for this product, AGCO recommends using AGCO replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material. Failure to heed this warning can lead to premature failures, product damage, personal injury or death.**

## GENERAL HAZARD INFORMATION

Do not start engine until area is free of personnel to avoid personal injury due to unexpected machine movement.

Know width of machine to maintain proper clearance when operating near fences or boundary obstacles.

As required, wear a hard hat, protective glasses and other protective equipment.

Do not wear loose clothing or jewelry that can snag on controls or other parts.

All protective guards and covers must be secured in place.

Keep machine free of foreign material. Remove debris, oil, tools and other items from deck, walkways and steps.

Secure lunchboxes, tools and other loose items not a part of machine.

Know appropriate work site hand signals, personnel authorized to give hand signals and only accept hand signals from one person.

Drain all liquids into a suitable container, never put maintenance fluids into glass containers.

Discard any drained fluids and filter elements according to local regulations.

Use all cleaning solutions with care.

Report all necessary repairs.

Do not allow unauthorized personnel on machine.

Do not smoke when servicing air conditioner or when refrigerant gas may be present. Inhaling fumes released from a flame that contacts air conditioner refrigerant can cause bodily harm or death.

Inhaling gas from air conditioner refrigerant through a lit cigarette can cause bodily harm or death.

Unless otherwise instructed, perform maintenance under the following conditions:

- Park on level ground
- Lower implements to ground
- Transmission control lever in park
- Stop engine
- Engine start switch is off and key removed
- Machine has cooled down

## STAY CLEAR OF ROTATING DRIVE LINES AND MOVING PARTS

**FIG. 16:** Entanglement in rotating drive lines or moving components will cause serious injury or death.



FIG. 16

**FIG. 17:** Keep all safety guards and shields in place at all times when operating the vehicle.

Turn the key switch to the OFF position. Remove the key from the switch to prevent unauthorized operation of the vehicle before removing any safety guards and shields.

Wear close fitting clothing. Stop the engine and make sure the drive lines are stopped before making any adjustments or performing any type of service on the engine or vehicle.

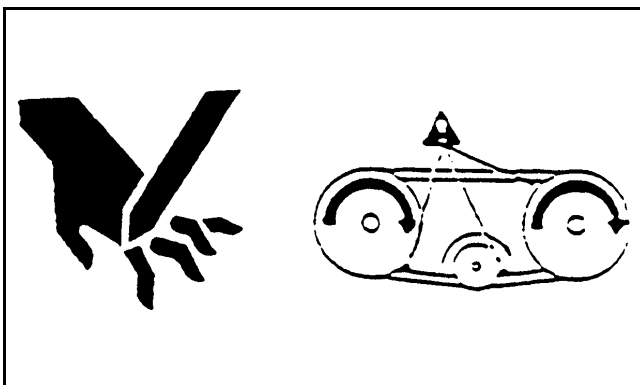


FIG. 17

## TOWING OTHER VEHICLES / TRAILERS / EQUIPMENT

**FIG. 18:** Towing of other vehicles without brakes is NOT approved by Challenger.

Using the vehicle for towing can create a safety hazard and can void the vehicle or system warranty.

## MODIFICATIONS

Welding or altering the chassis in any way (such as adding implement towing hitches) can cause damage or failure of components and create a safety hazard. Modifications not approved by Challenger can also void the vehicle or system warranty.

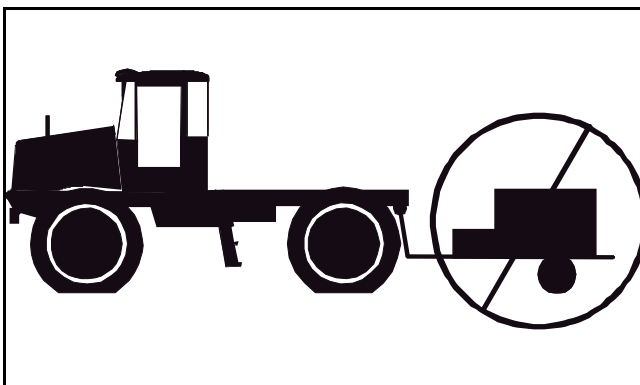
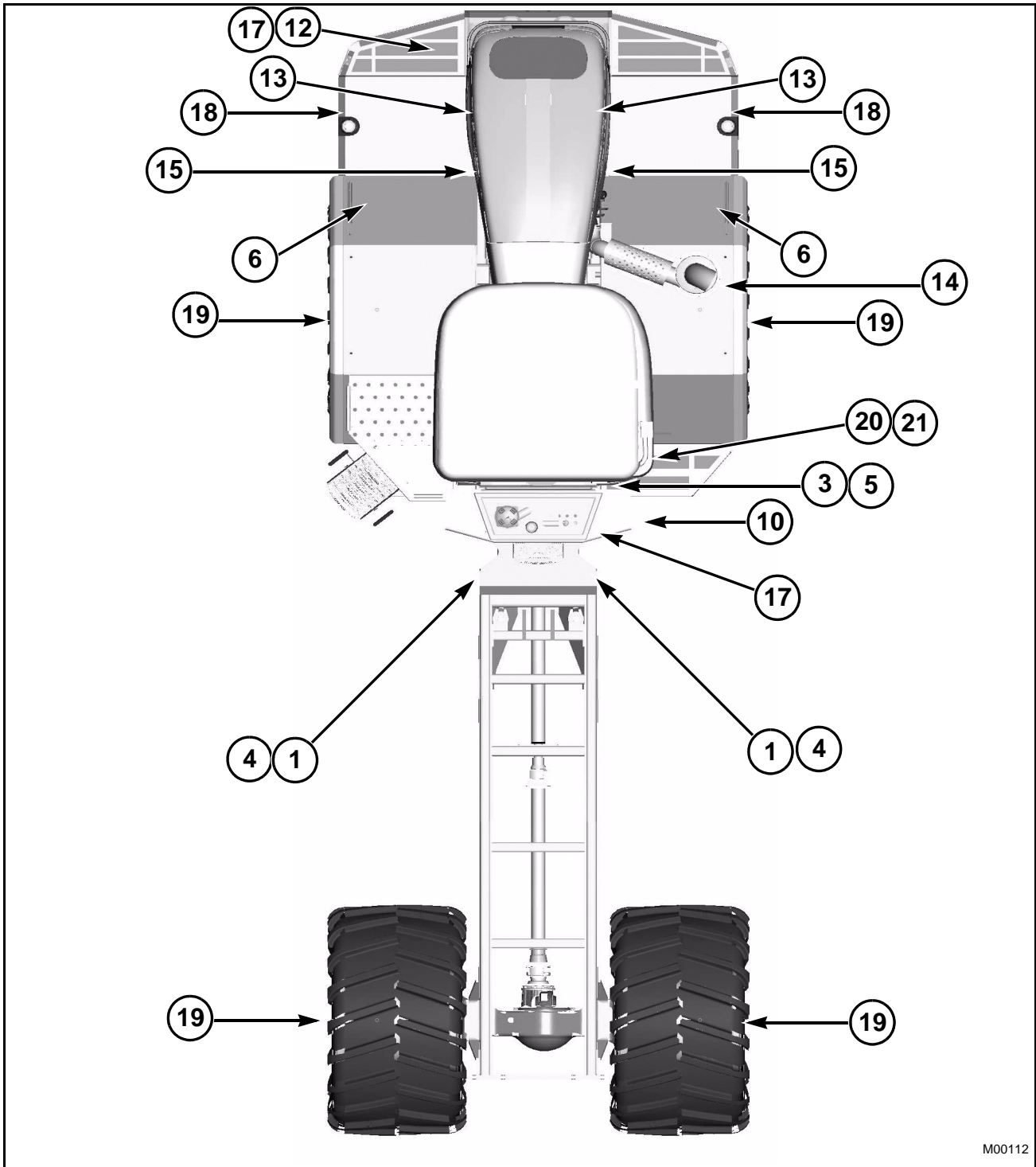


FIG. 18

**SAFETY AND SERVICE DECAL  
LOCATIONS CHASSIS**



**WARNING:** Carefully read and understand all safety signs on your vehicle. Failure to read and understand all safety signs may result in personal injury or death. Always be aware of a safety hazard. Make sure new equipment components and repair parts include the current safety signs.



M00112

FIG. 42

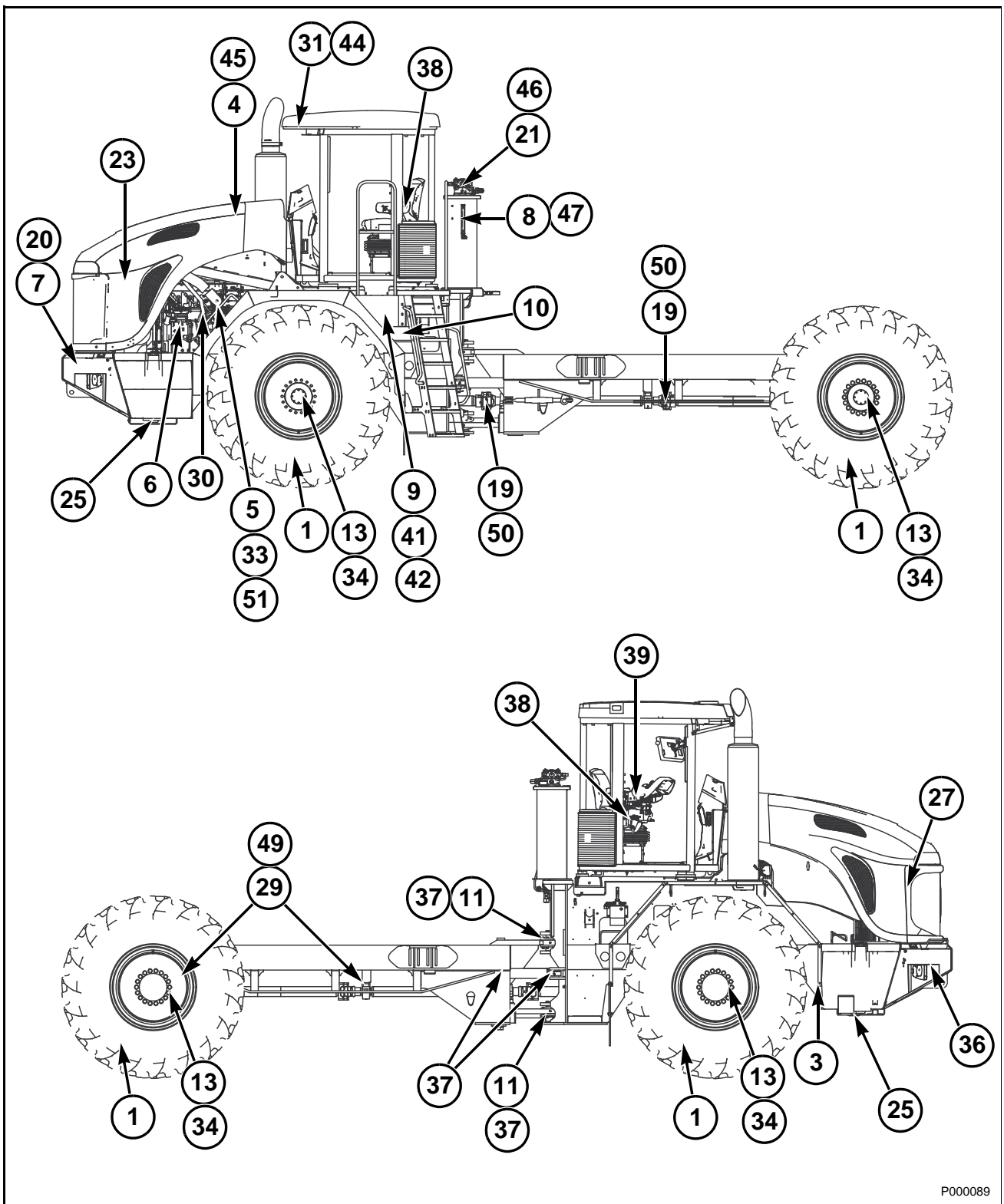
**SAFETY AND SERVICE DECAL  
LOCATIONS CABINE**



**WARNING:** Carefully read and understand all safety signs on your vehicle. Failure to read and understand all safety signs may result in personal injury or death. Always be aware of a safety hazard. Make sure new equipment components and repair parts include the current safety signs.



FIG. 66



P000089

FIG. 10

## SAE Fasteners

### Assembly Torque for SAE Fasteners

Standard			High		Low	
Thread Size	Torque lbf ft	Torque Nm	Torque lbf ft	Torque Nm	Torque lbf ft	Torque Nm
1/4 - 20	9 ± 1	12 ± 3	10 ± 1	13 ± 3	4 ± 0.5	6 ± 1
5/16 - 18	18 ± 2	25 ± 6	20 ± 2	28 ± 7	10 ± 1	13 ± 3
3/8 - 16	35 ± 4	47 ± 9	40 ± 4	50 ± 10	18 ± 2	25 ± 6
7/16 - 14	50 ± 5	70 ± 15	60 ± 6	80 ± 15	30 ± 3	40 ± 8
1/2 - 13	75 ± 8	105 ± 20	90 ± 9	120 ± 20	45 ± 5	60 ± 12
9/16 - 12	120 ± 10	160 ± 30	130 ± 13	175 ± 30	60 ± 5	85 ± 15
5/8 - 11	160 ± 15	215 ± 40	175 ± 15	240 ± 40	85 ± 10	115 ± 20
3/4 - 10	275 ± 30	370 ± 50	320 ± 30	430 ± 60	150 ± 15	200 ± 40
7/8 - 9	460 ± 50	620 ± 80	520 ± 50	700 ± 90	240 ± 25	325 ± 40
1 - 8	660 ± 70	900 ± 100	775 ± 75	1050 ± 150	370 ± 35	500 ± 65
1 1/8 - 7	960 ± 100	1300 ± 150	1070 ± 105	1450 ± 150	515 ± 50	700 ± 90
1 1/4 - 7	1320 ± 130	1800 ± 200	1550 ± 155	2100 ± 250	975 ± 95	1000 ± 125
1 3/8 - 6	1780 ± 180	2400 ± 300	1990 ± 200	2700 ± 300	1315 ± 130	1000 ± 150
1 1/2 - 5	2280 ± 230	3100 ± 350	2650 ± 265	3600 ± 400	1680 ± 165	1700 ± 200

Standard Taperlock Studs		
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
1 1/4	550	750
1 3/8	700	950
1 1/2	880	1200

## REAR CHASSIS



**DANGER:** When the machine needs to be jacked up. Be extremely careful. If the machine falls off the jack, death or serious injury can result.

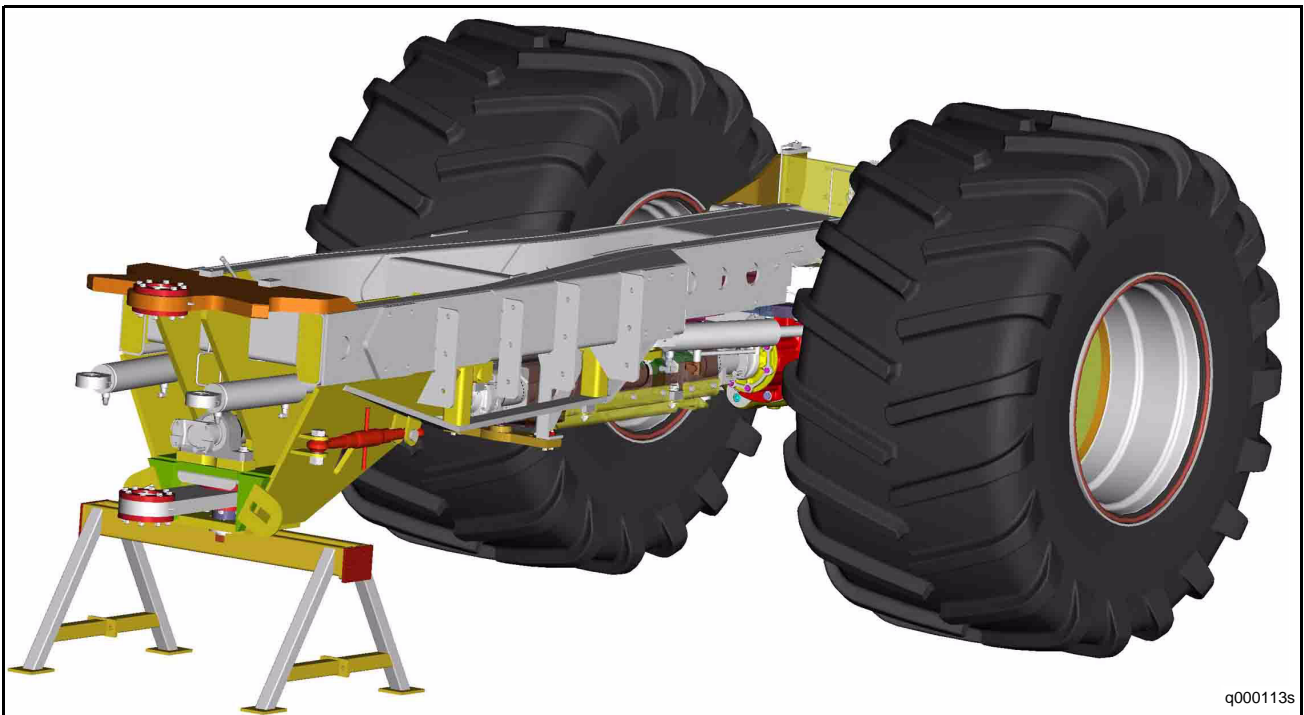


**DANGER:** When the machine is jacked up, always place a support. Place the machine on the supports, and remove the jack underneath the machine. A jack can lose the force and the machine will fall. Death or serious injury and damage to the machine will result.



**WARNING:** Use proper supports. Be sure the supports can carry the weight of the chassis. Otherwise serious injury, death and damage to the machine can result.

The weight of the rear chassis is 3880 kg (8554 lb). This weight is without system.



q000113s

FIG. 3



**WARNING:** When the rear chassis is disconnected from the front chassis, the centre of gravity is in front of the axle. If the chassis falls off the jacks/supports, the chassis will tip over to the front.



**WARNING:** When the parking brake is released the vehicle does not have any park brake function. You must block the wheels to prevent the vehicle from moving. Serious personal injury or death and damage to components can result.

**IMPORTANT:** If the rear chassis contains a hitch. Remove the application machine which is in the hitch, before disassembly the pivot. Otherwise the centre gravity point can be behind the axle and the rear will tip backwards.

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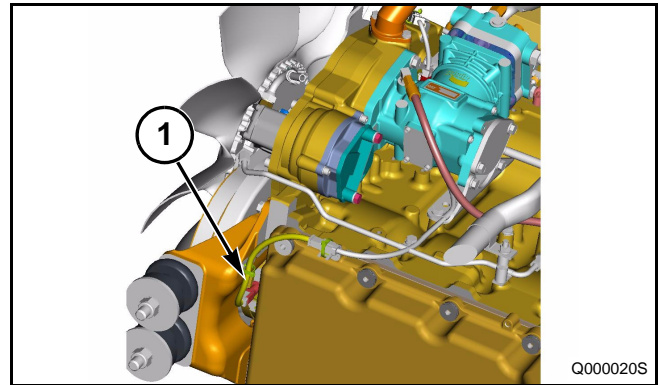
**U**

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## Sensor Location

**FIG. 4:**

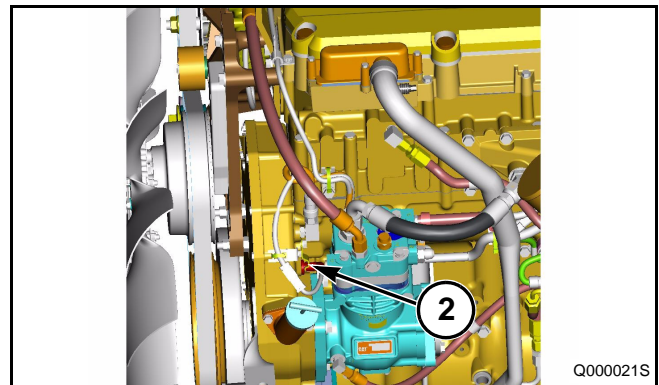
1. Crankshaft Speed/Timing Sensor;



**FIG. 4**

**FIG. 5:**

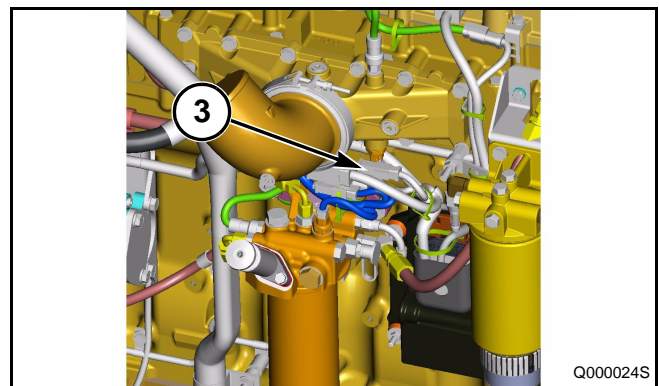
2. Camshaft Speed/Timing Sensor;



**FIG. 5**

**FIG. 6:**

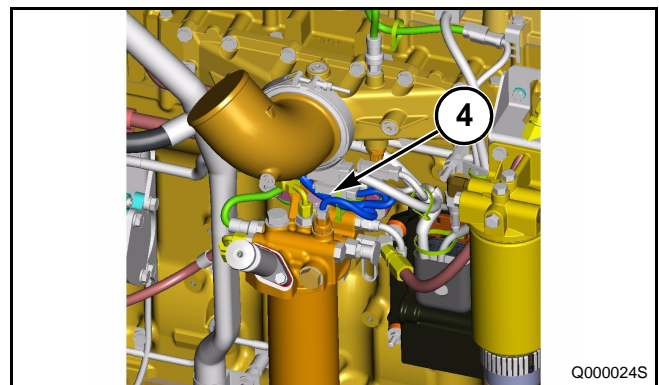
3. Timing Cal probe, Adapter, Cable;



**FIG. 6**

**FIG. 7:**

4. Fuel Temperature Sensor



**FIG. 7**

# Challenger®

## Terra Gator 3244 Chassis

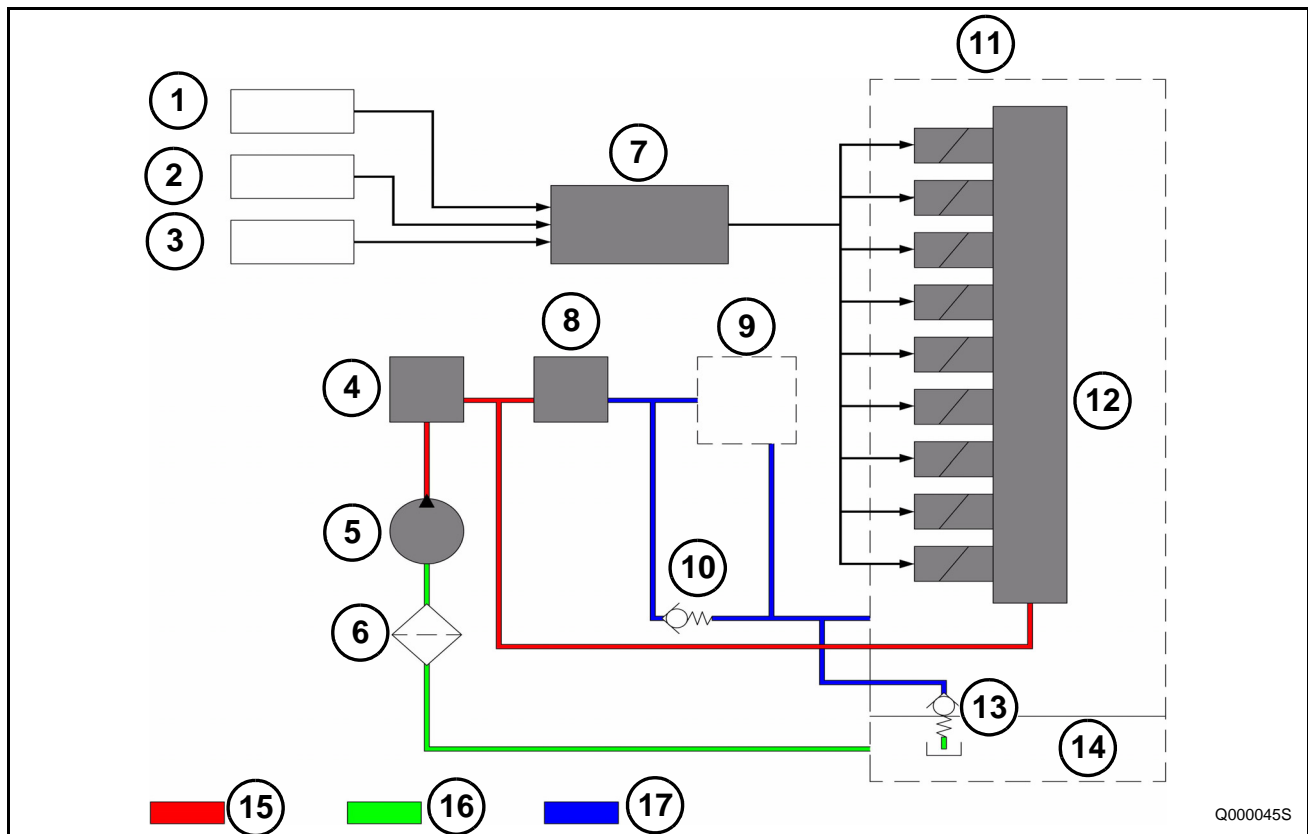
### SERVICE MANUAL 627333-A

#### 03 - Powertrain

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## Transmission System



Q000045S

**FIG. 9**

1. Inching Pedal;
2. Shift Lever;
3. Auto Switch;
4. Filter;
5. Charge Pump;
6. Suction Filter;
7. Transmission ECM;
8. Main Relief Valve;
9. Oil Cooler;
10. Cooler Bypass;
11. Transmission;
12. Modulating Valves;
13. Lube Relief Valve;
14. Sump;
15. Charge Pressure;
16. Sump;
17. Lube Pressure.

The operator can initiate a hydraulic function by using one of the following controls:

- Inching Pedal (1);
- Shift Lever (2);
- Auto Shift Switch (3).

Oil from sump (14) is drawn through suction filter (6) by the charge pump (5). Suction filter (6) is rated at 200 micron. Hydraulic oil filter (4) filters the oil from charge pump (5).

Filtered oil is supplied to following valves:

- Modulating valves (transmission) (11);
- Relief valve (8).

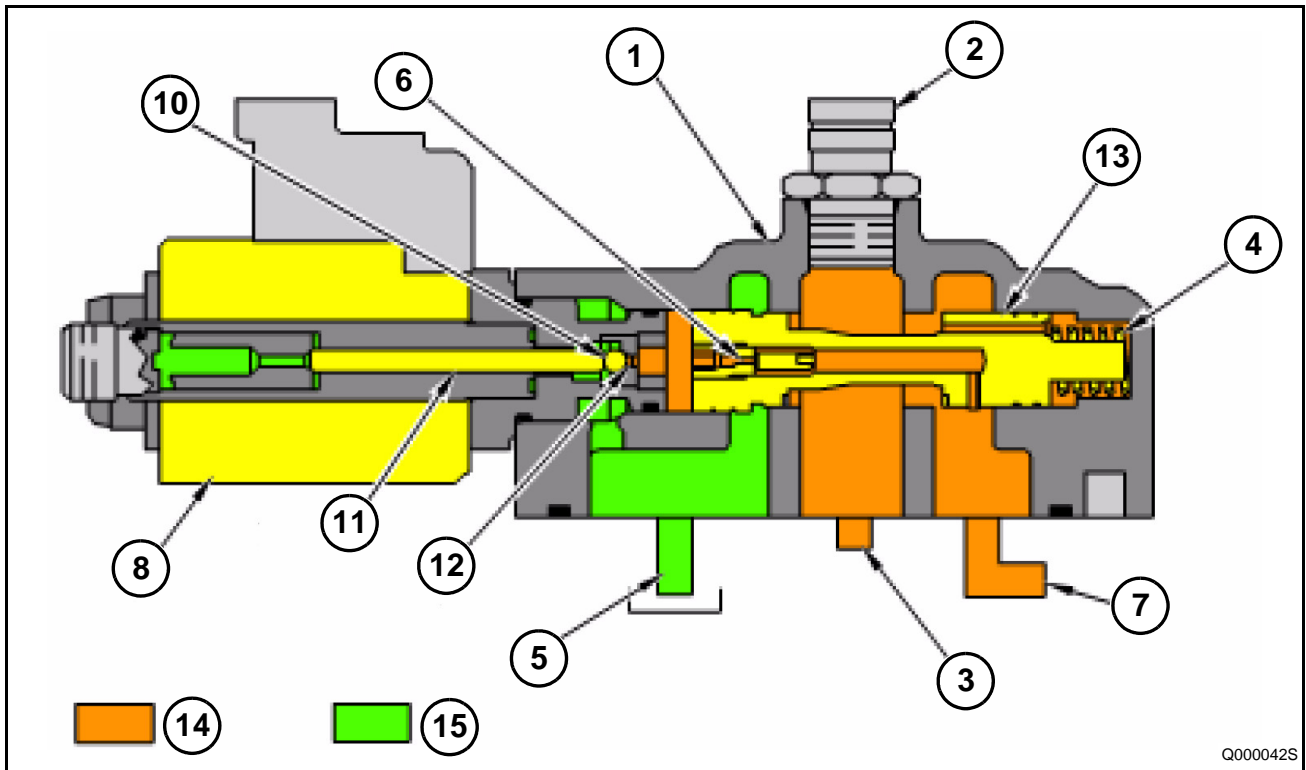
When the modulating valves are energized, oil flows to the transmission clutches. When the modulating valves are de-energized, oil flows from the valve to the sump.

The relief valve (charge pressure) regulates the pressure in the transmission hydraulic system to a maximum pressure of 2100 kPa (305 psi).

Excess oil flows from relief valve (8) (charge pressure) to hydraulic oil cooler (9). Cooler bypass valve (10) will open if a pressure of 520 kPa (75 psi) is felt at the input side of the hydraulic oil cooler. Normally, the cooler bypass valve will remain closed unless there is a restriction in the hydraulic oil cooler or if the oil is very cold.

Oil from transmission oil cooler (9) flows to the transmission for lubrication of the clutches. The transmission lubrication relief (13) regulates the oil pressure for lubrication to 275 kPa (40 psi).

## Maximum Signal Current (Clutch Fully Engaged)



Q000042S

FIG. 18

### Modulating Valve

1. Modulating Valve;
2. Test Port;
3. Clutch;
4. Spring;
5. Line to Sump;
6. Spool Orifice;
7. Charge Pressure Oil;
8. To Transmission Clutch;
9. Solenoid;
10. Ball;
11. Valve Spool;
12. Drain Orifice;
13. Pin;
14. Charge Pressure;
15. Sump;

In a short period of time, maximum pressure is felt at both ends of the valve spool. This pressure and the additional force that is produced by spring (4) causes the valve spool to move to the left until the forces on the right end and the left end of the valve spool are balanced.

The movement of the valve spool to the left balanced position reduces the flow of oil to the engaged transmission clutch. The transmission ECM sends a constant maximum specified signal current to solenoid (8) in order to maintain the desired clutch pressure.

When the modulation cycle stops, the transmission ECM will send the maximum specified signal current in order to fully engage the transmission.

The constant signal current pushes pin (11) firmly against ball (10) in modulating valve (1).

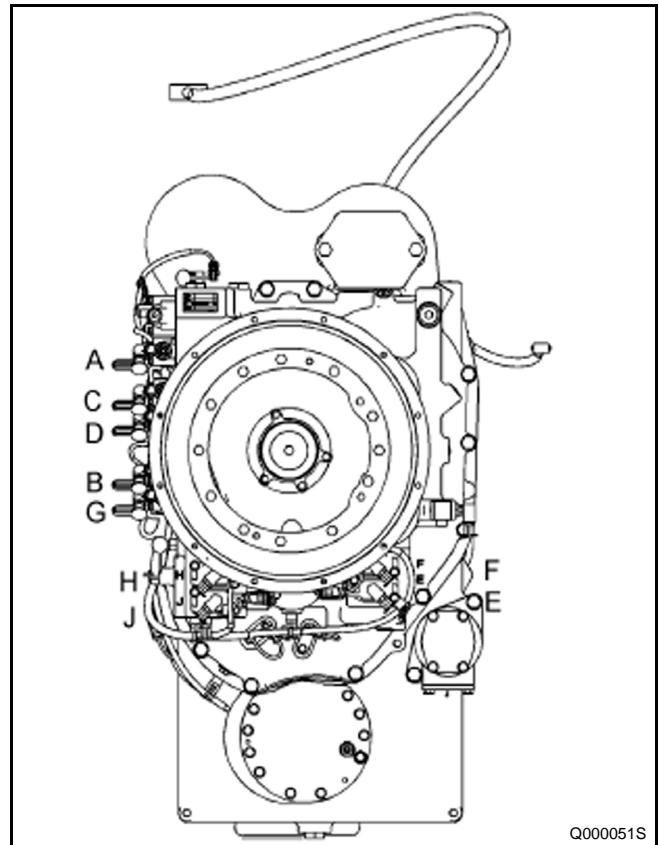
The force against the ball reduces the amount of oil flow through drain orifice (12). This restriction causes an increase in pressure on the left side of valve spool (13).

The valve spool moves to the right to allow the charge oil to fully engage the transmission clutch.

**FIG. 11:** Modulating Valves

Each modulating valve has a designated letter, as shown. The letters have been cast into the transmission housing.

Log the clutch pressures in the table on the next page. There are always two clutches that are engaged for each gear selection. Neutral position only uses one clutch. See the table in order to determine the clutches that are engaged for gear selection.

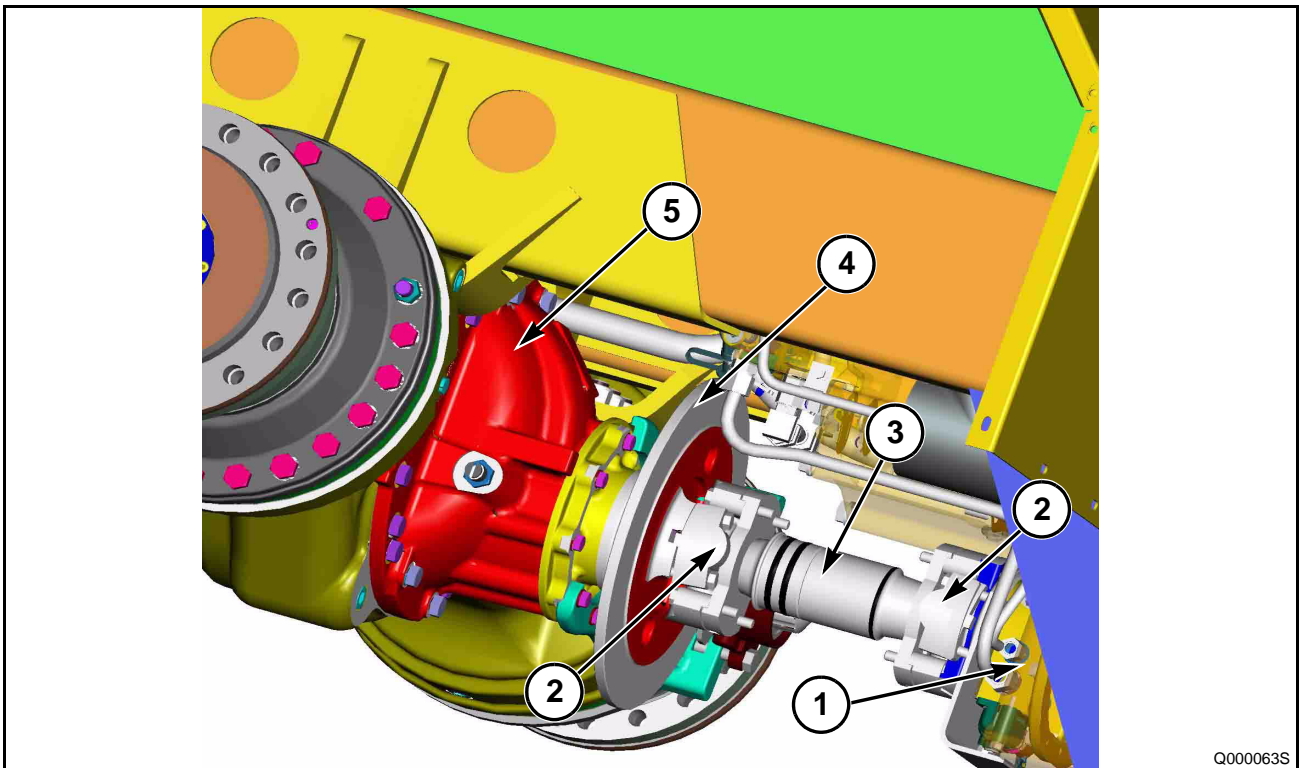


**FIG. 11**

## Transmission Troubleshooting

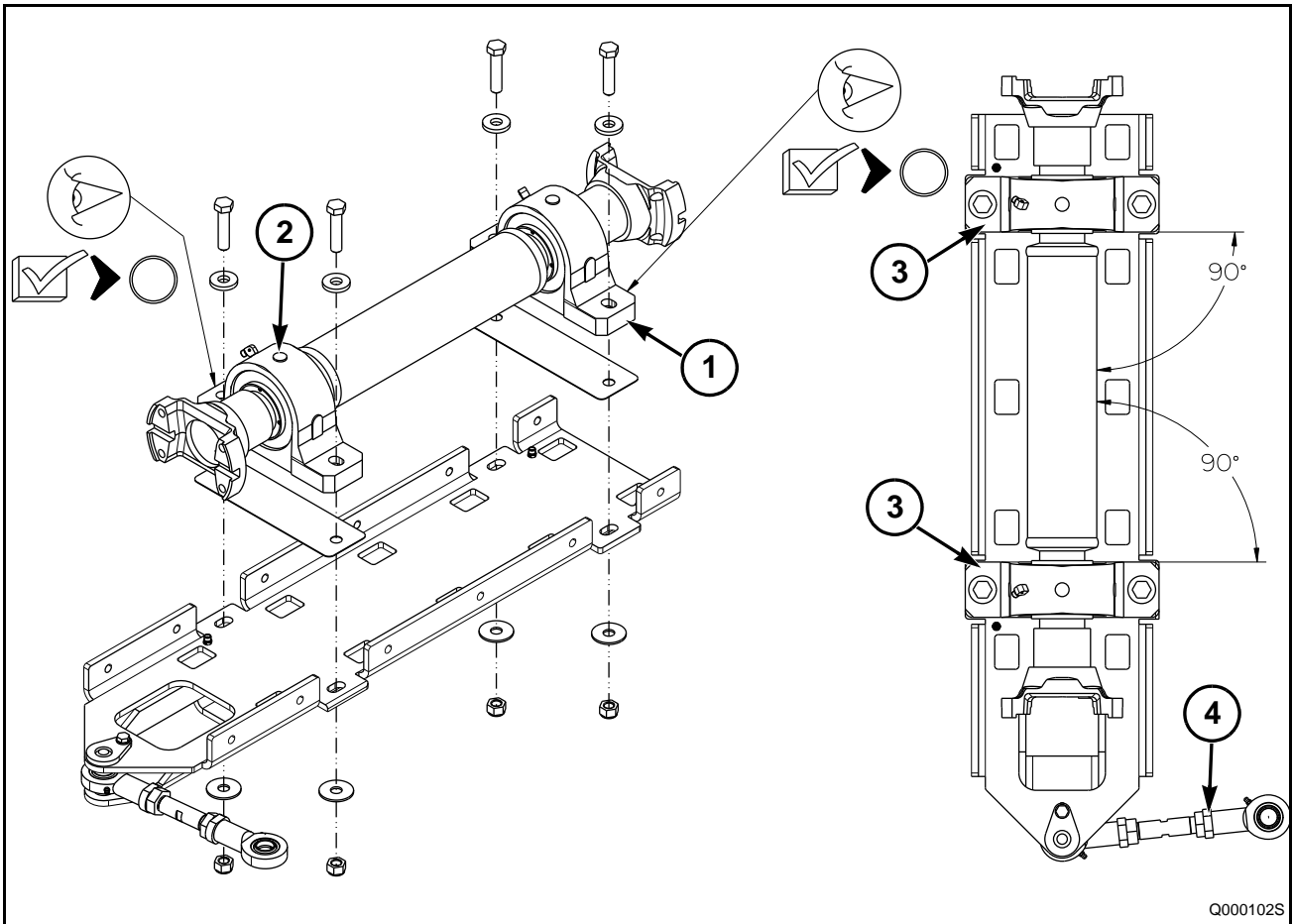
Codes	Description	Possible Cause
735-6	Transmission clutch #2 solenoid short to ground.	The energize circuit of the solenoid is shorted to ground. The solenoid has failed. The ECM has failed. This is unlikely.
736-3	Transmission clutch #3 solenoid short to positive terminal of the battery.	The solenoid has failed. The energize circuit of the solenoid is shorted to the + battery circuit. The ECM has failed. This is unlikely.
736-5	Transmission clutch #3 solenoid open circuit.	The energize circuit of the solenoid is open. the return circuit of the solenoid is open. The solenoid has failed. The ECM has failed. This is unlikely.
736-6	Transmission clutch #3 solenoid short to ground.	The energize circuit of the solenoid is shorted to ground. The solenoid has failed. The ECM has failed. This unlikely.
737-3	Transmission clutch #4 solenoid short to positive terminal of the battery.	The solenoid has failed. The energize circuit of the solenoid is shorted to the + battery circuit. The ECM has failed. This is unlikely.
737-5	Transmission clutch #4 solenoid open circuit.	The energize circuit of the solenoid is open. The return circuit of the solenoid is open. The solenoid has failed. The ECM has failed. This is unlikely.
737-6	Transmission clutch #4 solenoid short to ground.	The energize circuit of the solenoid is shorted to ground. The solenoid has failed. The ECM has failed. This is unlikely.
738-3	Transmission clutch #5 solenoid short to positive terminal of the battery.	The solenoid has failed. The energize circuit of the solenoid is shorted to the + battery circuit. The ECM has failed. This is unlikely.
738-5	Transmission clutch #5 solenoid open circuit.	The energize circuit of the solenoid is open. The return circuit of the solenoid is open. The solenoid has failed. The ECM has failed. This is unlikely.
738-6	Transmission clutch #5 solenoid short to ground.	The energize circuit of the solenoid is shorted to ground. The solenoid has failed. The ECM has failed. This unlikely.

## DRIVE LINE FRONT

**FIG. 3**

To provide the Terra Gator of a 4-wheel drive there need to be a drive line from the transmission to the front axle.

1. Transmission;
2. Cross Bearing (2x);
3. Drive shaft;
4. Disc Park Brake;
5. Front Axle.



Q000102S

**FIG. 13**

1. Fixed Bearing;
2. Sliding Bearing;
3. Position of the bearing is very important. A good aligned position increase life time of the bearings.

The bearings have to be align horizontal and vertical. The horizontal alignment can be set with the shims under the bearings

4. Adjust the bar untill the dog walk tunnel in straight underneath the Terra Gator, when the Terra Gator is not in Dog walk position.

# Disassembly and Assembly Section

i02536685

## Relief Valve (Transmission Main) - Remove

i02648750

SMCS Code: 5069-011-T3

### Removal Procedure

#### NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

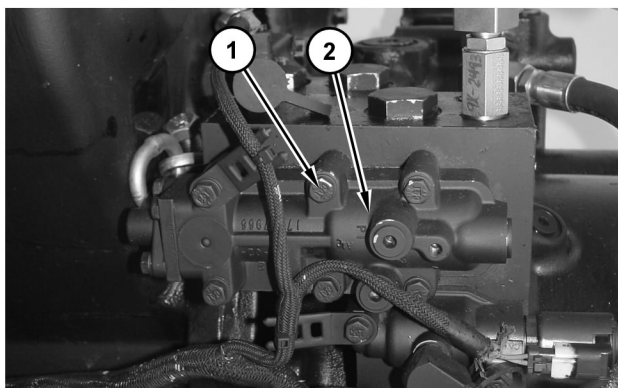


Illustration 1

g01329210

1. Remove bolts (1).
2. Remove relief valve (2).

## Relief Valve (Transmission Main) - Disassemble

SMCS Code: 4059-015-T3; 5069-015-T3

### Disassembly Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	1P-1853	Retaining Ring Pliers	1

#### Start By:

- a. Remove the relief valve. Refer to Disassembly and Assembly, "Relief Valve (Transmission Hydraulic Control) - Remove".

**Note:** Cleanliness is an important factor. Before you begin the disassembly procedure, the exterior of the components should be thoroughly cleaned. This will help to prevent dirt from entering the internal mechanism. Precision components can be damaged by contaminants or by dirt. Perform disassembly procedures on a clean work surface. Keep components covered and protected at all times.

#### NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

**Note:** If new bearings are installed, check the end play of the shaft assembly. Refer to Disassembly and Assembly, "Transmission - Assemble".

12. Repeat Step 11 for the other retainers.

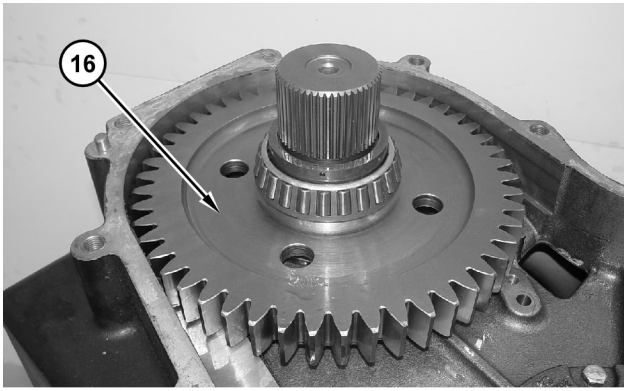


Illustration 45

g01265831

13. Use two people in order to install gear assembly (16). The weight of gear assembly (16) is approximately 30 kg (70 lb).

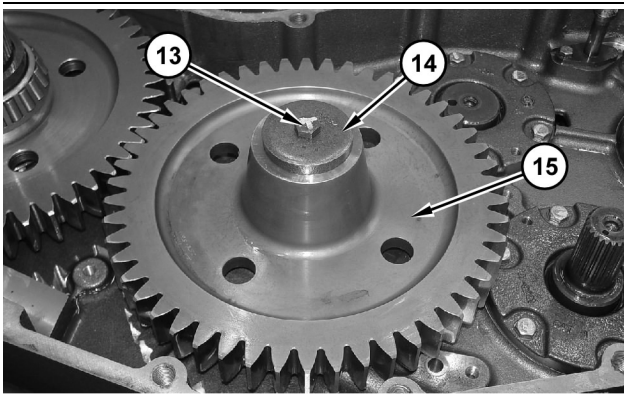


Illustration 46

g01265829

14. Use two people in order to install gear (15). The weight of gear (15) is approximately 23 kg (50 lb). Install retainer (14) and bolt (13).

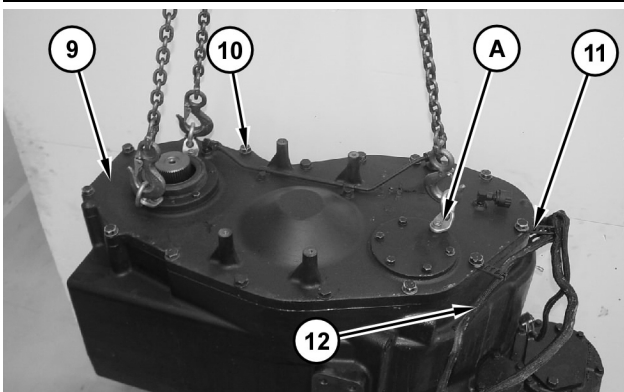


Illustration 47

g01265805

15. Apply Tooling (F) to cover assembly (9).

16. Use Tooling (A) and a suitable lifting device in order to install cover assembly (9). The weight of cover assembly (9) is approximately 60 kg (130 lb).

17. Check the end play of the shaft assembly. Refer to Disassembly and Assembly, "Transmission - Assemble".

18. Position harness assembly (12).

19. Install bracket assemblies (11) and bolts (10).

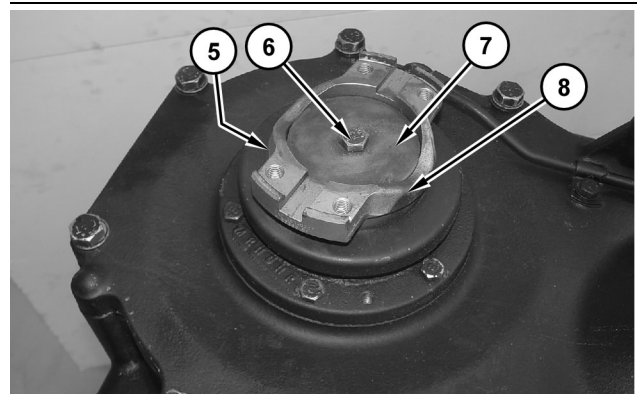


Illustration 48

g01265795

20. Install O-ring seal (5). Install yoke (8), retainer (7), and bolt (6).

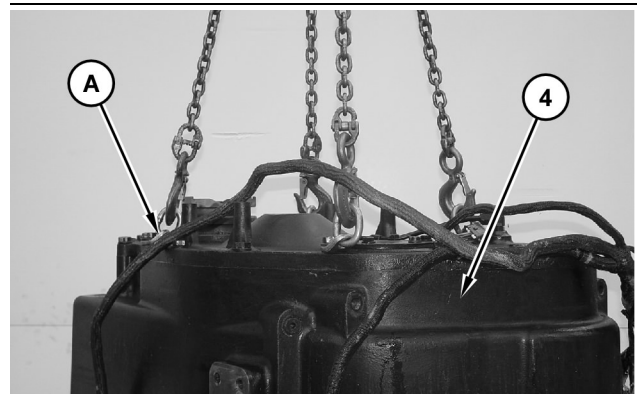


Illustration 49

g01265775

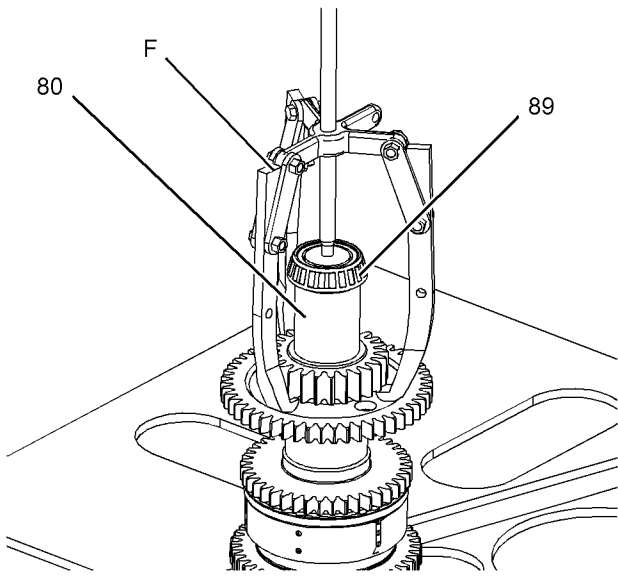


Illustration 89 g01269966

**38.** Use Tooling (F) in order to remove bearing cone (89) from shaft assembly (80).

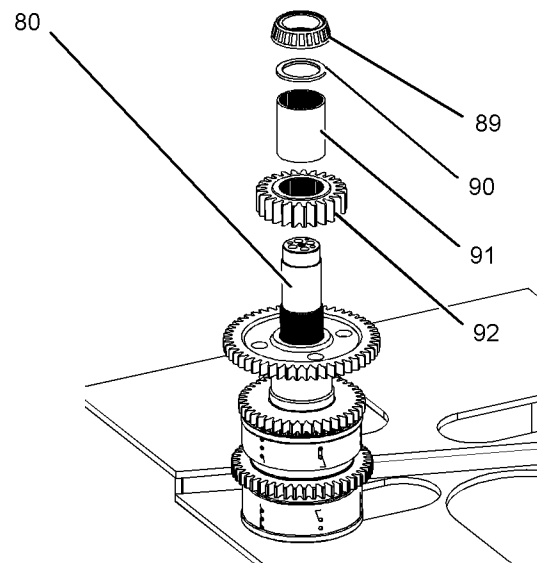


Illustration 90 g01269968

**39.** Remove bearing cone (89), spacer (90), spacer (91), and gear (92) from shaft assembly (80).

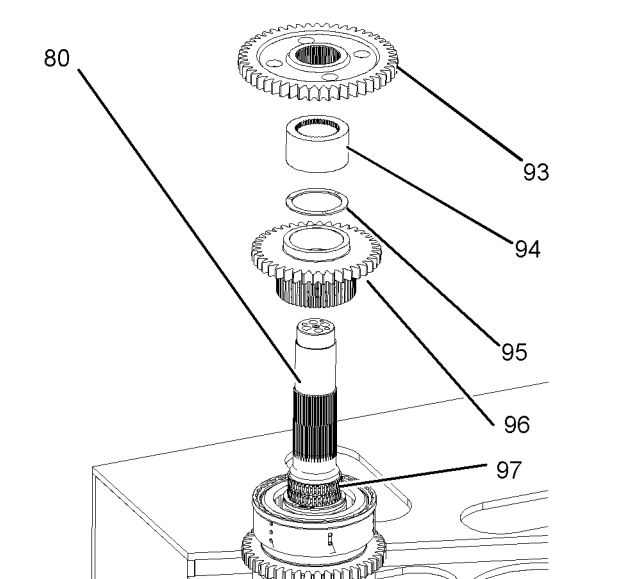


Illustration 91 g01269969

**40.** Remove gear (93), spacer (94), thrust washer (95), and gear (96). Remove bearing (97) and thrust washer (95) from shaft assembly (80).

**Note:** The procedure for the disassembly of the clutch packs are identical.

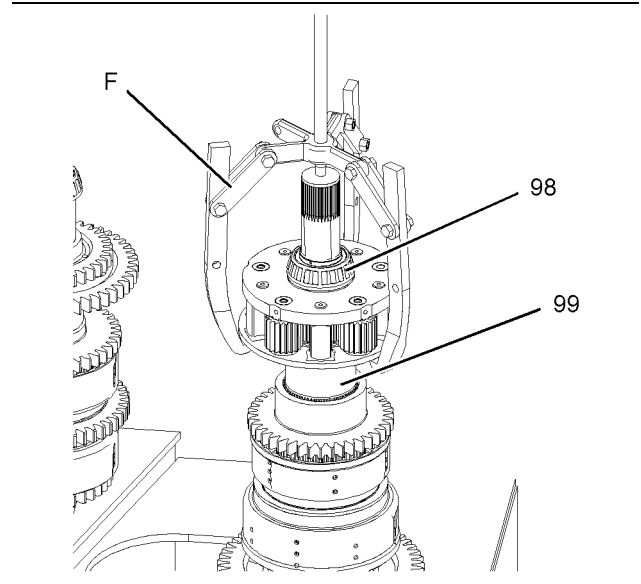


Illustration 92 g01269974

Output Shaft

**41.** Use Tooling (F) in order to remove bearing cone (98) from shaft assembly (99).

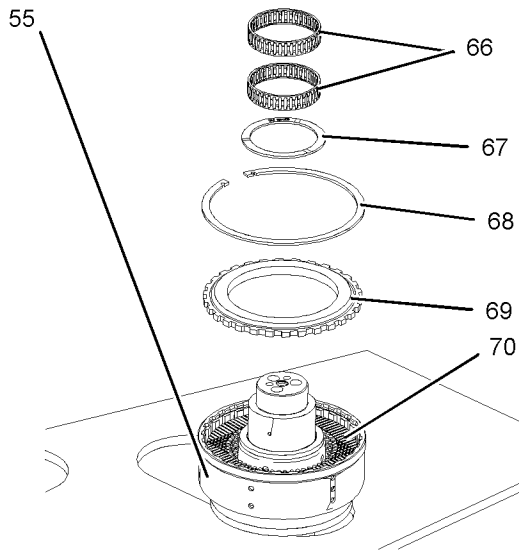


Illustration 128

g01269758

**20.** Install the friction discs and plates (70) onto shaft (55). Install clutch plate (69). Use Tooling (H) in order to install retaining ring (68). Install thrust washer (67) and bearings (66).

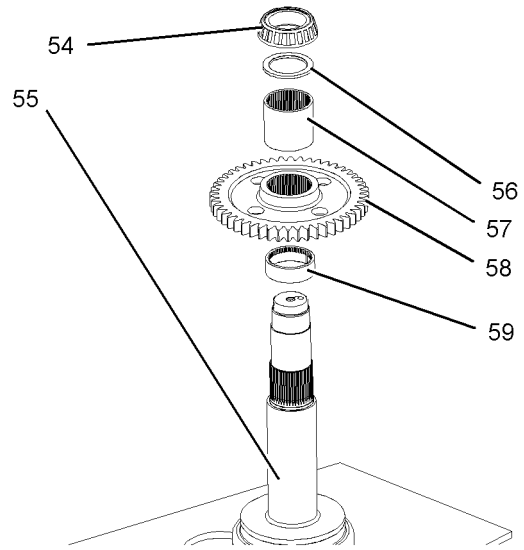


Illustration 130

g01269685

**22.** Install spacer (59), gear (58), spacer (57), and spacer (56) onto shaft assembly (55). Raise the temperature of bearing cone (54). Install bearing cone (54) onto shaft assembly (55).

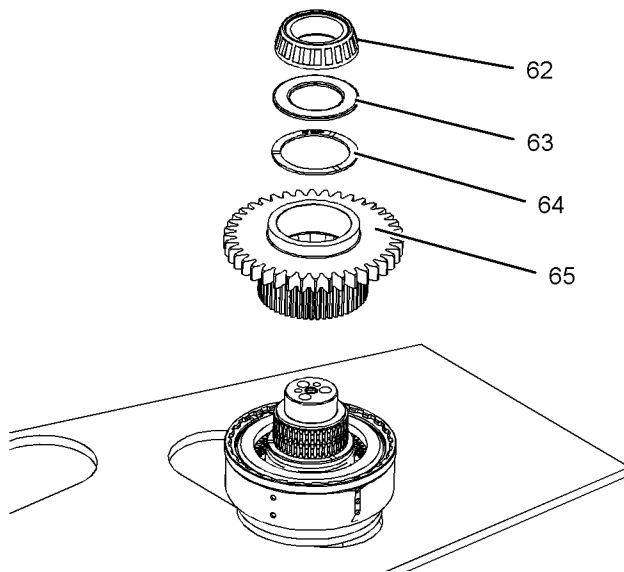


Illustration 129

g01269751

Reverse Shaft

**21.** Install gear (65) and thrust washer (64). Install spacer (63). Raise the temperature of bearing cone (62). Install bearing cone (62).

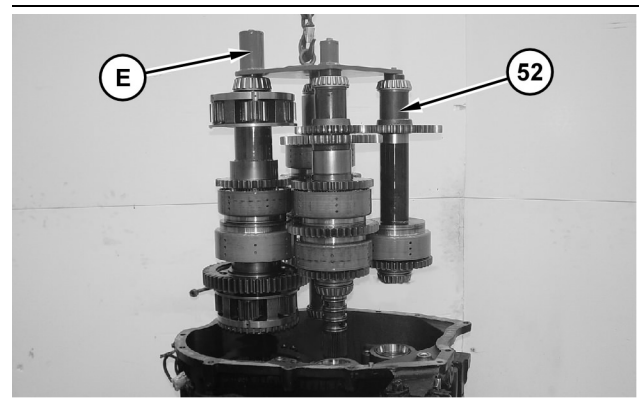


Illustration 131

g01281829

**23.** Attach Tooling (E) and a suitable lifting device to shaft assemblies (52). The weight of shaft assemblies (52) is approximately 370 kg (820 lb). Install shaft assemblies (52).

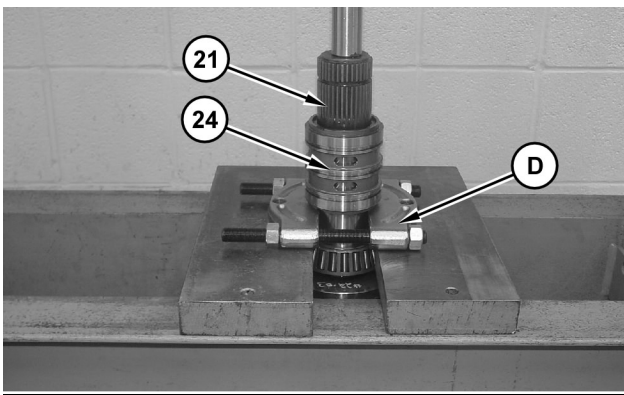


Illustration 175 g01267991

12. Use Tooling (D) and a suitable press in order to remove seal ring carrier (24) from shaft assembly (21).

**Note:** Support shaft assembly (21) from the bottom.

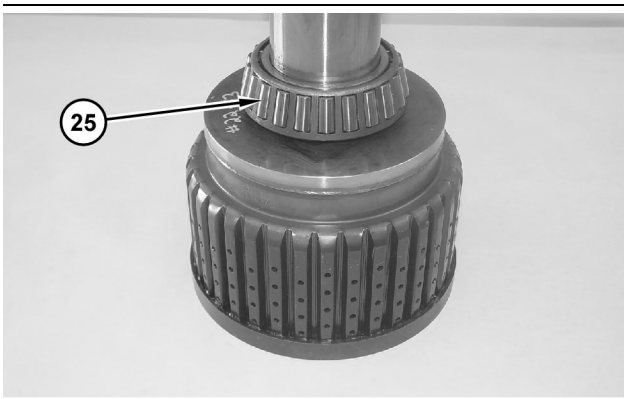


Illustration 176 g01267996

13. Remove bearing cone (25).

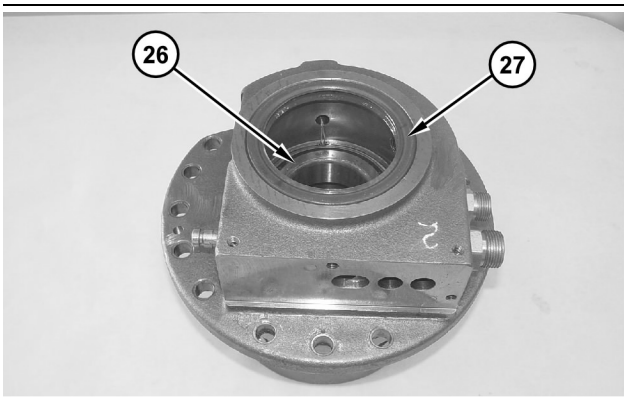


Illustration 177 g01267997

14. Remove lip seal (27) and bearing cone (26).

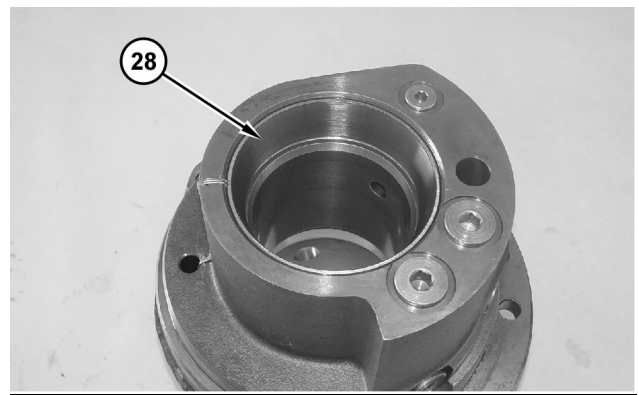


Illustration 178 g01267998

15. Remove bearing cups (28).

i02649552

## Clutch (Front Wheel Assist) - Assemble

**SMCS Code:** 3053-016-OJ; 3054-016-OJ;  
3055-016-OJ

### Assembly Procedure

Table 9

Required Tools			
Tool	Part Number	Part Description	Qty
A	207 - 8153	Spring Compressor	1
B	2P - 8312	Retaining Ring Pliers	1
E	8T - 5096	Dial Indicator Gp	1

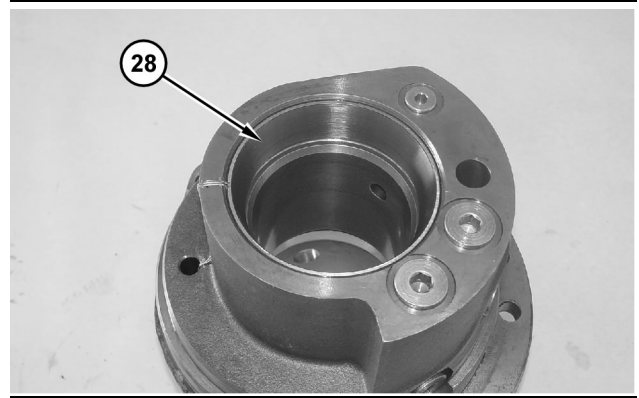


Illustration 179 g01267998

1. Lower the temperature of bearing cups (28). Install bearing cups (28).

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## Symptom Troubleshooting

i02652578

### Transmission

SMCS Code: 3030-035

### Transmission Clutch Engagement

Each transmission control valve has a designated letter, as shown. The letters have been cast into the transmission housing.

Each transmission control valve controls an individual clutch. Each letter is assigned to a corresponding transmission control valve. See Illustration 5.

These letters are used in Table 3 to show the clutches that are engaged for each gear.

No more than two clutches are ever engaged at a time. Also, no more than one clutch is ever engaged on a shaft.

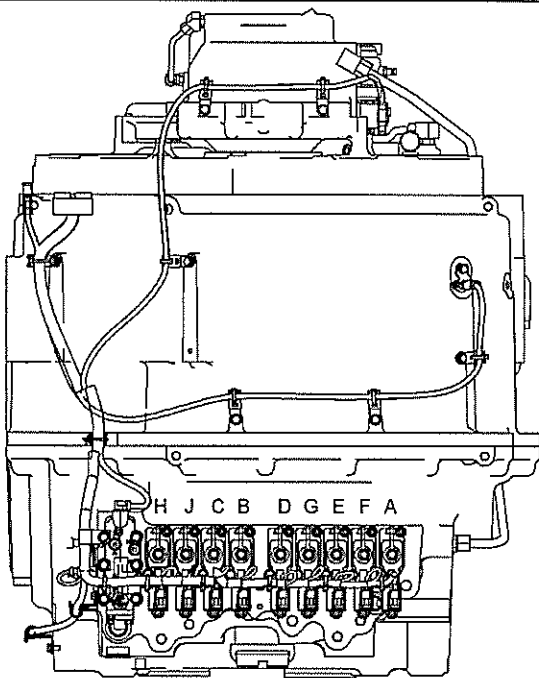


Illustration 5  
Modulating Valves (Transmission Control Valves)

g01343698

Table 2

Clutch	Clutch Designation
1	C
2	D
3	E
4	F
5	G
6	B
7	H
8	J
9	A

**Results:**

- YES – The resistance from contact A to contact B is greater than 5000 ohms, and the resistance from contact A to contact C is less than 5 ohms. Proceed to Test Step 2.
- NO – The resistance measurements do not differ. The switch has failed.

**Repair:** Replace the switch.

STOP.

**Test Step 2. CHECK THE OPERATION OF THE SWITCH**

- Connect one lead from the multimeter to the common contact (A) for the switch.
- Connect the other lead from the multimeter to the normally open contact (B) for the switch.
- Actuate the switch and measure the resistance between contact A and contact B. Note the resistance.
- Disconnect the lead from contact B and connect the lead to the normally closed contact (C).
- Actuate the switch and measure the resistance between contact A and contact C. Note the resistance.

**Expected Result:**

The resistance from contact A to contact B is greater than 5 ohms, and the resistance from contact A to contact C is less than 5000 ohms.

**Results:**

- YES – The resistance from contact A to contact B is greater than 5 ohms, and the resistance from contact A to contact C is less than 5000 ohms. Proceed to Test Step 3.
- NO – The resistance measurements do not differ. The switch has failed.

**Repair:** Replace the switch.

STOP.

**Test Step 3. CHECK THE GROUND CIRCUIT OF THE SWITCH IN THE WIRE HARNESS.**

- Connect one lead from the multimeter to contact A of the wire harness connector for the switch.

- Connect the other lead from the multimeter to frame ground.

- Measure the resistance between contact A and frame ground.

**Expected Result:**

The resistance is less than 5 ohms.

**Results:**

- OK – The resistance is less than 5 ohms. The circuit is correct. Proceed to Test Step 4.
- NOT OK – The resistance is greater than 5000 ohms. The circuit is open. The machine harness has failed.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 4. CHECK THE SWITCH CIRCUITS FOR A SHORT CIRCUIT.**

- The disconnect switch and the key start switch remain in the OFF position.
- Disconnect the machine harness connector(s) from the ECM.
- The connector for the switch remains disconnected.
- At the machine harness connector for the ECM, measure the resistance from contact J1-47 and contact J1-46 of the machine harness to all the contacts that are used in the machine harness connectors for the ECM.

**Expected Result:**

Each resistance measurement is greater than 5000 ohms.

**Results:**

- OK – Each resistance measurement is greater than 5000 ohms. The harness is correct. Proceed to Test Step 5.
- NO – One or more of the measurements were less than 5 ohms. There is a short in the machine harness.

- NOT OK – One or more resistance measurements is not correct. There is a short in the machine harness.

**Repair:** The short is between signal contact J1-62 and the circuit with the low resistance measurement. Repair the machine harness or replace the machine harness.

STOP.

**Test Step 3. CHECK IF THE DIAGNOSTIC CODE REMAINS.**

- Inspect the contacts of the harness connectors and clean the contacts.
- Reconnect all harness connectors.
- Turn the disconnect switch and the key start switch to the ON position.
- Operate the machine.
- Check the status of the SPN 177 FMI 4.

**Expected Result:**

The SPN 177 FMI 4 is active.

**Results:**

- YES – The SPN 177 FMI 4 is active. The diagnostic code has not been corrected. The ECM may have failed.

**Repair:** It is unlikely that the ECM has failed. Exit this procedure and perform this procedure again. If the cause of the diagnostic code is not found, replace the ECM. See Testing and Adjusting, "Electronic Control Module (ECM) - Replace".

STOP.

- NO – The SPN 177 FMI 4 is not active. The diagnostic code does not exist at this time.

**Repair:** The initial diagnostic code was probably caused by a poor electrical connection or a short at one of the harness connectors that was disconnected and reconnected. Resume normal machine operation.

STOP.

i02654819

## Transmission, SPN 191 - FMI 12

**SMCS Code:** 1439-038-T3; 3175-038-OJ

**Conditions Which Generate This Code:**

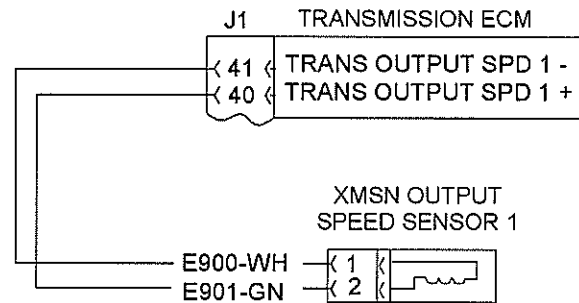


Illustration 14

g01338835

Connections of the transmission output speed sensor 1

This diagnostic code is associated with the transmission output speed sensor 1. The FMI 12 means that the ECM has determined that the signal frequency or the signal pulse width is not within the expected range.

**System Response:**

A diagnostic code will be displayed on the Caterpillar Electronic Technician (Cat ET). The tractor will operate normally unless more than one speed sensor has failed.

**Test Step 1. CHECK THE RESISTANCE OF THE CASE OF THE SENSOR .**

- Turn the key start switch and the disconnect switch (if equipped) to the OFF position.
- Disconnect the machine harness connector from the sensor.
- Measure the resistance from contact 1 and from contact 2 to the case of the sensor.

**Expected Result:**

The resistance is greater than 5,000 ohms.

**Results:**

- OK – The resistance is greater than 5,000 ohms. Proceed to Test Step 2.

**Results:**

- OK – Each resistance measurement is greater than 5000 ohms. The machine harness is correct. Proceed to Test Step 3.
- NOT OK – Each resistance measurement is not greater than 5000 ohms. There is a short in the machine harness. The short is between J2-63 and the circuit with the low resistance measurement.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 3. CHECK IF THE DIAGNOSTIC CODE REMAINS.**

- A. Inspect the harness connectors. Clean the contacts of the harness connectors and check the wires for damage to the insulation that is caused by excessive heat, battery acid, or chafing.
- B. Perform a 45 N (10 lb) pull test on each of the wires that are associated with the circuit.
- C. Reconnect all harness connectors. Make sure that the harness connectors are fully seated and that the clips for each connector are completely fastened.
- D. Turn the disconnect switch and the key start switch to the ON position.
- E. Operate the vehicle.
- F. Check the status of the SPN 701 FMI 6.

**Expected Result:**

The SPN 701 FMI 6 is active.

**Results:**

- YES – The SPN 701 FMI 6 is active. The diagnostic code has not been corrected.

**Repair:** Check the circuit again. If the Caterpillar Electronic Technician (Cat ET) is available, use the Cat ET service tool in order to perform a "Wiggle Test" on the machine wiring harness. The "Wiggle Test" can detect shorts and opens in the machine wiring harness that are momentary or intermittent.

It is unlikely that the ECM has failed. Exit this procedure and perform this procedure again. If the cause of the diagnostic code is not found, replace the ECM. Prior to replacing an ECM, always contact your dealership for possible consultation with Caterpillar. This consultation may greatly reduce repair time. See Testing and Adjusting, "Electronic Control Module (ECM) - Replace".

STOP.

- NO – The SPN 701 FMI 6 is not active. The diagnostic code does not exist at this time. The initial diagnostic code was probably caused by a poor electrical connection or a short at one of the harness connectors that was disconnected and reconnected. Resume normal vehicle operation. STOP.

i02654888

**Transmission, SPN 702 - FMI 2**

**SMCS Code:** 1435-038-T3

**Conditions Which Generate This Code:**

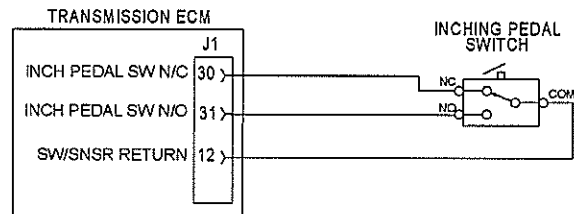


Illustration 20

g01343739

Connections of the inching pedal switch

This diagnostic code is associated with the inching pedal switch. The switch is connected to two inputs of the ECM. The inputs are "Normally Open" and "Normally Closed". One of the inputs is open and the other input is grounded during proper operation.

The FMI 2 means that the ECM has determined that the "Normally Open" and "Normally Closed" circuits are in the same state.

**Note:** The following test procedure may create other diagnostic codes. Ignore these diagnostic codes and clear these diagnostic codes when the original diagnostic code has been corrected. **Ensure that the diagnostic code of SPN 702 FMI 2 is active before performing this procedure.**

- F. Without disconnecting the sensor or the hardware that is associated with the sensor from the machine, take the sensor through the full operating range of the sensor.

**Note:** On some machines, it may be necessary to start the engine in order to take the sensor through the full operating range of the sensor.

**Expected Result:**

The sensor's signal responds in the manner that is described at the beginning of this procedure. The SPN 703 FMI 1 is not active at the maximum range of the sensor.

**Results:**

- OK – The sensor's signal responds correctly. The sensor is operating correctly. Proceed to Test Step 5.
- NOT OK – The sensor's signal does not respond correctly. The sensor is NOT operating correctly.

**Repair:** Replace the sensor.

STOP.

**Test Step 5. CHECK THE SIGNAL AT THE ECM.**

- Turn the key start switch and the disconnect switch to the OFF position.
- Insert the multimeter probes into the back of the ECM connector along J1-3 and J1-9.
- Turn the disconnect switch and the key start switch to the ON position.
- Monitor the signal of the sensor with the digital multimeter.
- Without disconnecting the sensor or the hardware that is associated with the sensor from the machine, take the sensor through the full operating range of the sensor.

**Note:** On some machines, it may be necessary to start the engine in order to take the sensor through the full operating range of the sensor.

**Expected Result:**

The sensor's signal responds in the manner that is described at the beginning of this procedure. The SPN 703 FMI 1 is not active at the maximum range of the sensor.

**Results:**

- OK – The sensor's signal responds correctly. The sensor is operating correctly. Proceed to Test Step 6.
- NOT OK – The sensor's signal does not respond correctly. The harness has failed.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 6. CHECK THE SIGNAL CIRCUIT FOR A SHORT IN THE HARNESS.**

- The key start switch and the disconnect switch remain in the OFF position.
- Disconnect the machine harness connectors from the sensor and the ECM.
- Measure the resistance between contact J1-3 and all contacts that are used in the machine harness connectors for the ECM.

**Expected Result:**

Each resistance measurement is greater than 5000 ohms.

**Results:**

- OK – Each of the resistance measurements are greater than 5000 ohms. The circuit is correct. Proceed to Test Step 7.
- NOT OK – The resistance is less than 5 ohms. The signal circuit is shorted to another circuit in the harness.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 7. CHECK IF THE DIAGNOSTIC CODE REMAINS**

- Inspect the harness connectors and clean the contacts of the machine harness connectors.
- Reconnect all harness connectors.
- Turn the disconnect switch and the key start switch to the ON position.
- Operate the machine and take the sensor through the operating range of the sensor.

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i02655282

## Transmission, SPN 735 - FMI 3

SMCS Code: 3139-038-T3

Conditions Which Generate This Code:

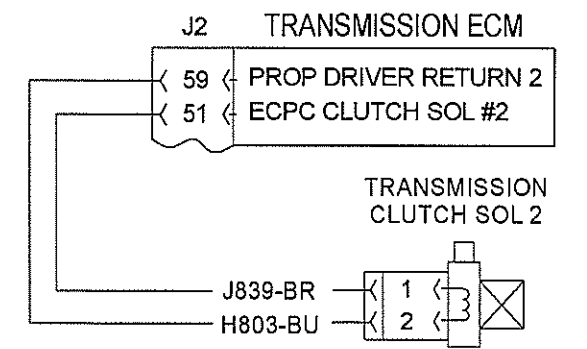


Illustration 29

g01335058

Schematic of the transmission clutch solenoid 2

This diagnostic code is associated with the transmission clutch solenoid 2. The FMI 3 means that the ECM has determined that the voltage of the solenoid circuit is above normal.

The possible causes of the diagnostic code are listed:

- The solenoid has failed.
- The energize circuit of the solenoid is shorted to the +battery circuit.
- The ECM has failed. This is unlikely.

**Note:** The following test procedure may create other diagnostic codes. Ignore these created diagnostic codes and clear these diagnostic codes when the original diagnostic code has been corrected. **Ensure that the diagnostic code of SPN 735 FMI 3 is active before performing this procedure.**

**Note:** Use a digital multimeter for the measurements in this procedure.

### Test Step 1. CHECK THE ENERGIZE CIRCUIT OF THE SOLENOID FOR A SHORT TO THE +BATTERY CIRCUIT.

- Turn the key start switch and the disconnect switch to the OFF position.
- Disconnect the machine harness connectors from the solenoid and the ECM.

C. At the machine harness connector for the ECM, measure the resistance from contact J2-51 to all contacts that are used in the machine harness connectors for the ECM.

#### Expected Result:

Each resistance measurement is greater than 5000 ohms.

#### Results:

- OK – Each resistance measurement is greater than 5000 ohms. The machine harness is correct. Proceed to Test Step 2.
- NOT OK – Each resistance measurement is not greater than 5000 ohms. There is a short in the machine harness. The short is between J2-51 and the circuit that has a low resistance measurement.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

### Test Step 2. CHECK IF THE DIAGNOSTIC CODE IS STILL ACTIVE.

- Inspect the harness connectors. Clean the contacts of the harness connectors and check the wires for damage to the insulation that is caused by excessive heat, battery acid, or chafing.
- Perform a 45 N (10 lb) pull test on each of the wires that are associated with the circuit.
- Reconnect all harness connectors in order to make sure that the connectors are fully seated. Also, make sure that the clips for each connector are completely fastened.
- Turn the disconnect switch and the key start switch to the ON position.
- Operate the machine.
- Determine if the SPN 735 FMI 3 is active.

#### Expected Result:

The SPN 735 FMI 3 is active.

#### Results:

- YES – The SPN 735 FMI 3 is active. The diagnostic code has not been corrected.

D. Observe the status of the SPN 737 FMI 5.

**Expected Result:**

The diagnostic code is active. Then, the diagnostic code changes from FMI 5 to FMI 6 as the jumper wire is installed.

**Results:**

- YES – The diagnostic code remains active. The jumper wire does not affect the diagnostic code. Proceed to Test Step 2.
- NO – The diagnostic is no longer active. The solenoid has failed.

**Repair:** The solenoid has failed. Replace the solenoid. Verify that the new solenoid corrects the problem.

STOP.

**Test Step 2. CHECK THE HARNESS FOR AN OPEN.**

- Turn the key start switch and the disconnect switch to the OFF position.
- Disconnect the machine harness connector(s) from the ECM.
- The jumper wire that was installed in the previous Test Step remains in place.
- At the machine harness connector, measure the resistance from signal contact J2-14 to contact J2-59.

**Expected Result:**

The resistance is less than 5.0 ohms.

**Results:**

- OK – The resistance is less than 5.0 ohms. The machine harness is correct. Proceed to Test Step 3.
- NOT OK – The resistance is greater than 5000 ohms. The resistance measurement is not correct. There is an open circuit in the machine harness.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 3. CHECK IF THE DIAGNOSTIC CODE REMAINS.**

- Inspect the harness connectors. Clean the contacts of the harness connectors and check the wires for damage to the insulation that is caused by excessive heat, battery acid, or chafing.
- Perform a 45 N (10 lb) pull test on each of the wires that are associated with the circuit.
- Reconnect all harness connectors. Make sure that the harness connectors are fully seated and that the clips for each connector are completely fastened.
- Turn the disconnect switch and the key start switch to the ON position.
- Operate the vehicle.
- Check the status of the SPN 737 FMI 5.

**Expected Result:**

The SPN 737 FMI 5 is active.

**Results:**

- YES – The SPN 737 FMI 5 is active. The diagnostic code has not been corrected.

**Repair:** Check the circuit again. If the Caterpillar Electronic Technician (Cat ET) is available, use the Cat ET service tool in order to perform a "Wiggle Test" on the machine wiring harness. The "Wiggle Test" can detect shorts and opens in the machine wiring harness that are momentary or intermittent.

It is unlikely that the ECM has failed. Exit this procedure and perform this procedure again. If the cause of the diagnostic code is not found, replace the ECM. Prior to replacing an ECM, always contact your dealership for possible consultation with Caterpillar. This consultation may greatly reduce repair time. See Testing and Adjusting, "Electronic Control Module (ECM) - Replace".

STOP.

- NO – The SPN 737 FMI 5 is not active. The diagnostic code does not exist at this time. The initial diagnostic code was probably caused by a poor electrical connection at one of the harness connectors that was disconnected and reconnected. Resume normal vehicle operation. STOP.

**Expected Result:**

Each resistance measurement is greater than 5000 ohms.

**Results:**

- OK – Each resistance measurement is greater than 5000 ohms. The machine harness is correct. Proceed to Test Step 3.
- NOT OK – Each resistance measurement is not greater than 5000 ohms. There is a short in the machine harness. The short is between J2-48 and the circuit with the low resistance measurement.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 3. CHECK IF THE DIAGNOSTIC CODE REMAINS.**

- A. Inspect the harness connectors. Clean the contacts of the harness connectors and check the wires for damage to the insulation that is caused by excessive heat, battery acid, or chafing.
- B. Perform a 45 N (10 lb) pull test on each of the wires that are associated with the circuit.
- C. Reconnect all harness connectors. Make sure that the harness connectors are fully seated and that the clips for each connector are completely fastened.
- D. Turn the disconnect switch and the key start switch to the ON position.
- E. Operate the vehicle.
- F. Check the status of the SPN 739 FMI 6.

**Expected Result:**

The SPN 739 FMI 6 is active.

**Results:**

- YES – The SPN 739 FMI 6 is active. The diagnostic code has not been corrected.

**Repair:** Check the circuit again. If the Caterpillar Electronic Technician (Cat ET) is available, use the Cat ET service tool in order to perform a "Wiggle Test" on the machine wiring harness. The "Wiggle Test" can detect shorts and opens in the machine wiring harness that are momentary or intermittent.

It is unlikely that the ECM has failed. Exit this procedure and perform this procedure again. If the cause of the diagnostic code is not found, replace the ECM. Prior to replacing an ECM, always contact your dealership for possible consultation with Caterpillar. This consultation may greatly reduce repair time. See Testing and Adjusting, "Electronic Control Module (ECM) - Replace".

STOP.

- NO – The SPN 739 FMI 6 is not active. The diagnostic code does not exist at this time. The initial diagnostic code was probably caused by a poor electrical connection or a short at one of the harness connectors that was disconnected and reconnected. Resume normal vehicle operation. STOP.

**Results:**

- OK – The resistance that is measured is greater than 5000 ohms. The harness circuit is correct. The ECM has failed.

**Repair:** It is unlikely that the ECM has failed. Exit this procedure. Perform the diagnostic code procedure for SPN 1079 FMI 4 again. If the cause of the diagnostic code is NOT found, replace the ECM . See Testing and Adjusting, "Electronic Control Module (ECM) - Replace".

STOP.

- NOT OK – The resistance that is measured is less than 5000 ohms. The machine harness has failed. There is a short between frame ground and the contact for the sensor supply voltage in the machine harness.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Note:** On some machines, it may be necessary to start the engine in order to take the sensor through the full operating range of the sensor.

**Expected Result:**

The sensor's signal responds in the manner that is described at the beginning of this procedure. The SPN 1619 FMI 1 is not active at the maximum range of the sensor.

**Results:**

- OK – The sensor's signal responds correctly. The sensor is operating correctly. Proceed to Test Step 5.
- NOT OK – The sensor's signal does not respond correctly. The sensor is NOT operating correctly.

**Repair:** Replace the sensor.

STOP.

**Test Step 5. CHECK THE SIGNAL AT THE ECM.**

- Turn the key start switch and the disconnect switch to the OFF position.
- Insert the multimeter probes into the back of the ECM connector along J1-26 and J1-9.
- Turn the disconnect switch and the key start switch to the ON position.
- Monitor the signal of the sensor with the digital multimeter.
- Without disconnecting the sensor or the hardware that is associated with the sensor from the machine, take the sensor through the full operating range of the sensor.

**Note:** On some machines, it may be necessary to start the engine in order to take the sensor through the full operating range of the sensor.

**Expected Result:**

The sensor's signal responds in the manner that is described at the beginning of this procedure. The SPN 1619 FMI 1 is not active at the maximum range of the sensor.

**Results:**

- OK – The sensor's signal responds correctly. The sensor is operating correctly. Proceed to Test Step 6.

- NOT OK – The sensor's signal does not respond correctly. The harness has failed.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 6. CHECK THE SIGNAL CIRCUIT FOR A SHORT IN THE HARNESS.**

- The key start switch and the disconnect switch remain in the OFF position.
- Disconnect the machine harness connectors from the sensor and the ECM.
- Measure the resistance between contact J1-26 and all contacts that are used in the machine harness connectors for the ECM.

**Expected Result:**

Each resistance measurement is greater than 5000 ohms.

**Results:**

- OK – Each of the resistance measurements are greater than 5000 ohms. The circuit is correct. Proceed to Test Step 7.
- NOT OK – The resistance is less than 5 ohms. The signal circuit is shorted to another circuit in the harness.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 7. CHECK IF THE DIAGNOSTIC CODE REMAINS**

- Inspect the harness connectors and clean the contacts of the machine harness connectors.
- Reconnect all harness connectors.
- Turn the disconnect switch and the key start switch to the ON position.
- Operate the machine and take the sensor through the operating range of the sensor.
- Check the status of the SPN 1619 FMI 1.

**Expected Result:**

The SPN 1619 FMI 1 is not active at the minimum range of the sensor.

**Results:**

- OK – Each resistance measurement is greater than 5000 ohms. The machine harness is correct. Proceed to Test Step 3.
- NOT OK – Each resistance measurement is not greater than 5000 ohms. There is a short in the machine harness. The short is between J2-61 and the circuit with the low resistance measurement.

**Repair:** Repair the machine harness or replace the machine harness.

STOP.

**Test Step 3. CHECK IF THE DIAGNOSTIC CODE REMAINS.**

- Inspect the harness connectors. Clean the contacts of the harness connectors and check the wires for damage to the insulation that is caused by excessive heat, battery acid, or chafing.
- Perform a 45 N (10 lb) pull test on each of the wires that are associated with the circuit.
- Reconnect all harness connectors. Make sure that the harness connectors are fully seated and that the clips for each connector are completely fastened.
- Turn the disconnect switch and the key start switch to the ON position.
- Operate the vehicle.
- Check the status of the SPN 2905 FMI 6.

**Expected Result:**

The SPN 2905 FMI 6 is active.

**Results:**

- YES – The SPN 2905 FMI 6 is active. The diagnostic code has not been corrected.

**Repair:** Check the circuit again. If the Caterpillar Electronic Technician (Cat ET) is available, use the Cat ET service tool in order to perform a "Wiggle Test" on the machine wiring harness. The "Wiggle Test" can detect shorts and opens in the machine wiring harness that are momentary or intermittent.

It is unlikely that the ECM has failed. Exit this procedure and perform this procedure again. If the cause of the diagnostic code is not found, replace the ECM. Prior to replacing an ECM, always contact your dealership for possible consultation with Caterpillar. This consultation may greatly reduce repair time. See Testing and Adjusting, "Electronic Control Module (ECM) - Replace".

STOP.

- NO – The SPN 2905 FMI 6 is not active. The diagnostic code does not exist at this time. The initial diagnostic code was probably caused by a poor electrical connection or a short at one of the harness connectors that was disconnected and reconnected. Resume normal vehicle operation. STOP.

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**Transmission, SPN 2906 - FMI 3**

**SMCS Code:** 3139-038-T3

**Conditions Which Generate This Code:**

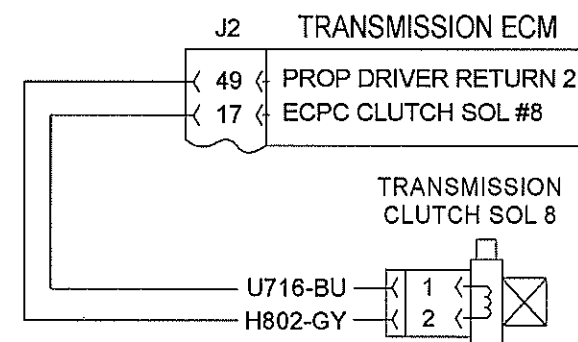


Illustration 59

g01341071

Connections of the transmission shift solenoid 8

This diagnostic code is associated with the transmission clutch solenoid 8. The FMI 3 means that the ECM has determined that the voltage of the solenoid circuit is above normal.

The possible causes of the diagnostic code are listed:

- The solenoid has failed.
- The energize circuit of the solenoid is shorted to the +battery circuit.
- The ECM has failed. This is unlikely.

D. At the switch, measure the resistance between the ground wire and frame ground.

**Expected Result:**

The resistance is less than 5 ohms.

**Results:**

- OK – The resistance is less than 5 ohms.

**Repair:** The machine harness is not the cause of the failure. The ECM has failed. It is unlikely that the ECM has failed. Exit this procedure and perform this procedure again. If the fault is not found, replace the ECM. See Testing and Adjusting, "Electronic Control Module (ECM) - Replace".

STOP.

- NOT OK – The resistance is greater than 5.0 ohms.

**Repair:** The machine harness has failed. Repair the machine harness or replace the machine harness.

STOP.

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## Electronic Control Module (ECM) - Replace

**SMCS Code:** 7610-510-DTN

Prior to replacement of the ECM, ensure that replacement is absolutely necessary. The ECM is seldom the cause of a diagnostic code. Always check that power is available to the ECM. Battery voltage is required between J1-1 and J1-2 of the machine harness connector for the ECM. Prior to replacing an ECM, always contact your dealership's Technical Communicator for possible consultation with Caterpillar. This consultation may greatly reduce repair time.

**Note:** The New Electronic Control Modules are either pre-programmed for a particular machine or the modules are not programmed. An unprogrammed electronic control module must be programmed by using the Caterpillar Electronic Technician (ET). See Testing And Adjusting, "Electronic Control Module - Flash Program". In order to determine that the ECM is programmed or that the ECM is not programmed, proceed to 6.

1. Turn the key start switch and the disconnect switch to the OFF position. Disconnect the machine harness from the ECM.
2. Remove the ECM.
3. Make sure that the new ECM has the correct part number.
4. Connect the machine harness to the replacement ECM.
5. Install the replacement ECM.
6. Determine if the replacement ECM is programmed or if the replacement ECM is not programmed. This can be done in two different ways. Proceed to 6.a or 6.b.
  - a. Enter the component data display mode.
 

If the display shows blanks, then the ECM is NOT programmed. See Testing and Adjusting, "Electronic Control Module - Flash Program".

If the display shows the expected information, then the ECM is programmed. Proceed to 7.
  - b. Connect the service tool for the Caterpillar Electronic Technician (ET) to the service connector for the data link of the machine. The ET service tool will communicate with the power train ECM.

If the ECM is NOT programmed, the ET service tool will indicate the problem.

If the ECM is programmed, the ET service tool provides access to the expected areas of the ECM.

7. Proceed to Testing and Adjusting, "Calibration". Perform ALL of the calibration and adjustment procedures.

**Note:** Performance will be greatly affected if ANY of the calibration procedures are omitted. PERFORM ALL OF THE CALIBRATION PROCEDURES. Even if the replacement ECM was acquired from a similar machine, perform all calibration procedures.

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## Connector Contact Description

**SMCS Code:** 7610-CY

### Transmission ECM

Table 10

The Contact Description for the Transmission ECM (Connector "J1") <sup>(1)</sup>	
No.	Function
3	Inching Pedal Sensor
6	SAE J1939 CAN Low
7	Cat Data Link -
8	Cat Data Link +
9	Digital Sensor Return
10	5 Volt supply
11	8 Volt supply
12	Analog Sensor Return
13	10 Volt supply
18	SAE J1939 CAN High
19	CAN Shield
26	Transmission Control Lever
30	Switch (inching pedal) (NC)
31	Switch (inching pedal) (NO)
32	Speed sensor (transmission output) (No. 2) +
33	Speed sensor (transmission output) (No. 2) -
40	Speed sensor (transmission output) (No. 1) +

(continued)

**Challenger<sup>®</sup>**  
**Terra Gator 3244**  
**Chassis**  
**SERVICE MANUAL**  
**627333-A**

**04 - Chassis**

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# AXLE

## FRONT AXLE

### Description

The rear axle is an Axle Tech axle is attached directly to the frame with twelve M22 x 240 10.9 bolts. Weight of the axle approximately 1150 Kg (2535 lb)

### Removal

Park chassis on hard, level surface and block the rear wheels.

Drain axle fluid into suitable container.

**NOTE:** *Be prepared to collect and contain all fluids in an approved container.*

Place jacks under the machine and raise the frame until the weight is off the rear wheels. Install jack stands to securely support the machine frame.

**IMPORTANT:** *Make sure the jack stands are rated for supporting the weight of the machine.*

Remove the wheels from the front axle.

**FIG. 1:** Place an alignment mark on the slide yoke in the event the slide yoke should come apart. Remove the four bolts (1) that mount the front driveline assembly (2) to the front axle. Disconnect the rear drive shaft assembly

Using a suitable lifting device support the axle (3).

Loosen and remove the twelve nuts with washer that secure the axle. Remove the twelve M22 x 240 10.9 bolts (4) and carefully remove the axle.

### Installation

Make sure the machine is adequately supported with jackstands.

**IMPORTANT:** *Make sure the jack stands are rated for supporting the weight of the machine.*

Position the axle (3) under the machine. Raise the axle and mount to the frame with twelve M22 x240 10.9 bolts (4) and fasten with eight nuts with washers.

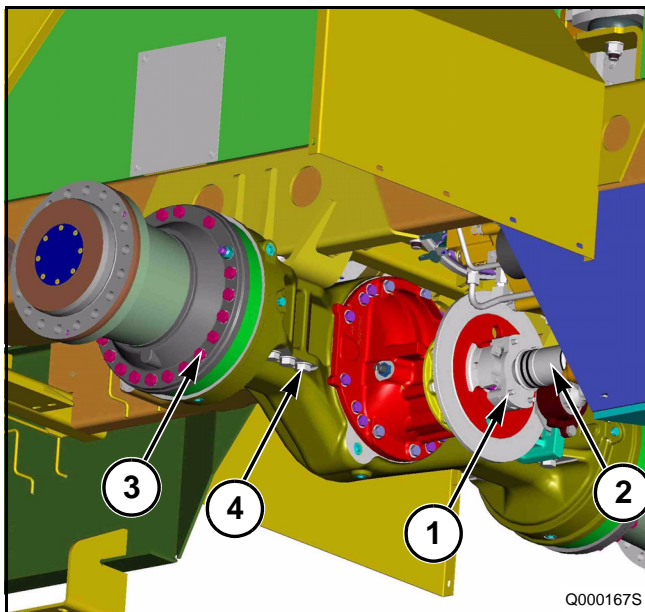
**IMPORTANT:** *Always use new nuts, or use Loctite 242-41.*

Install the wheels to the axle.

Once the machine has been lowered to the ground and the full weight applied to the wheels a final tightening will be necessary. Tighten the twelve bolts in even increments to 515 Nm (380 lbf - ft)

**IMPORTANT:** *Check the bolt torque daily for the next 50 hours of operation and every 500 thereafter.*

Install the front drive shaft (2) assembly to the front axle. Mount the driveline with four bolts (1). Torque bolts to 215 Nm (158 lbf - ft).

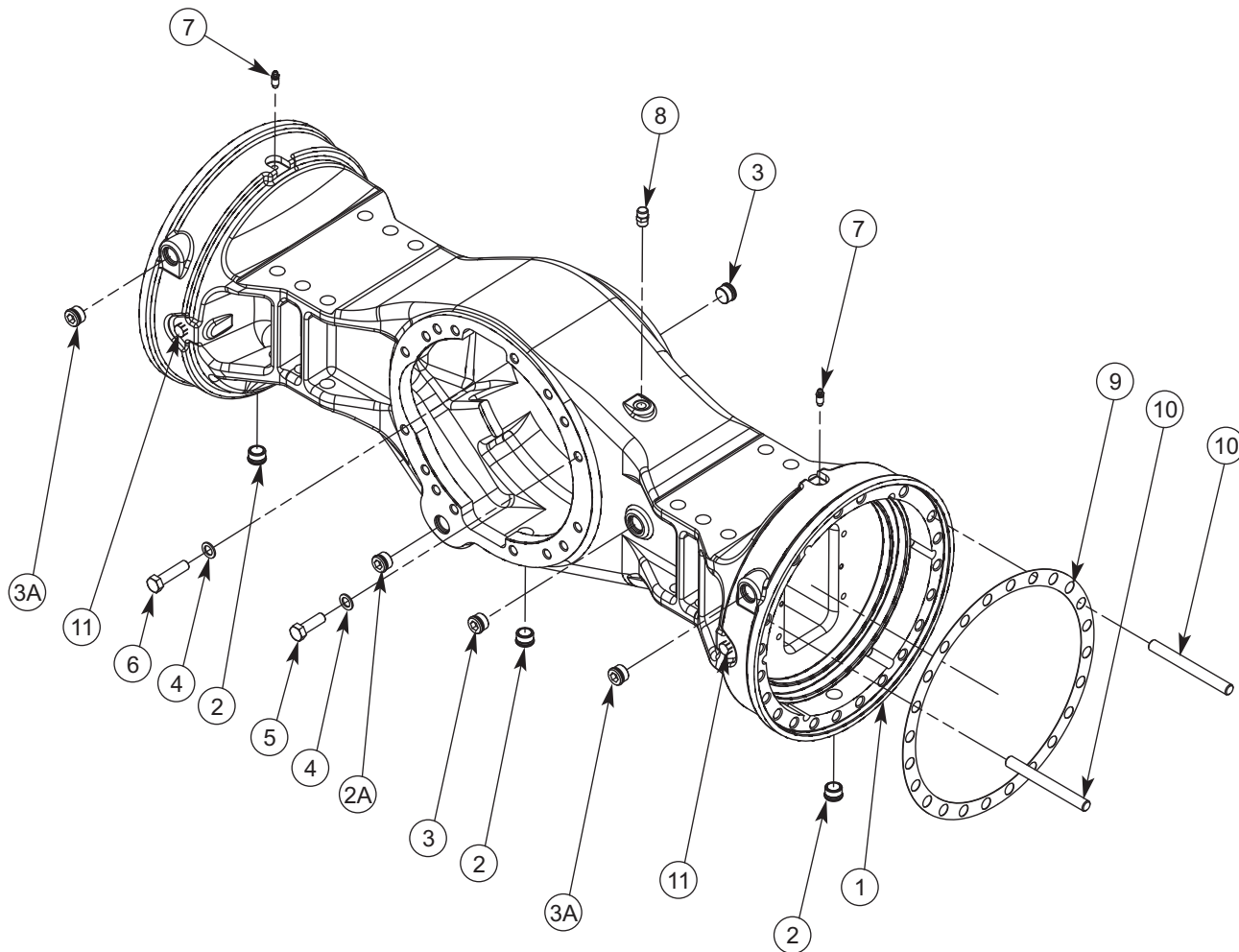


**FIG. 1**

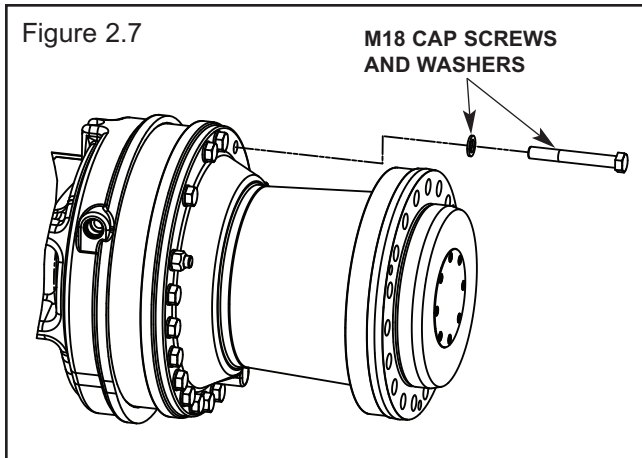
## 651 - 699

Error Code	Module Number	Pin Number	Failure	Function
651	I/O MODULE 6	J3 PIN 6	Open load	WORKLIGHT #5 (Location on rear of application)
652	I/O MODULE 6	J3 PIN 7	Over temp/current	WORKLIGHT #6 (On system)
653	I/O MODULE 6	J3 PIN 7	Open load	WORKLIGHT #6 (On system)
654	I/O MODULE 6	J3 PIN 8	Over temp/current	WORKLIGHT #7 (On system)
655	I/O MODULE 6	J3 PIN 8	Open load	WORKLIGHT #7 (On system)
664	I/O MODULE 6	J3 PIN 4	Over temp/current	LH END ROW
665	I/O MODULE 6	J3 PIN 4	Open load	LH END ROW
666	I/O MODULE 1	J3 PIN 5	Over temp/current	SECTION 1
667	I/O MODULE 1	J3 PIN 5	Open load	SECTION 1
668	I/O MODULE 1	J3 PIN 6	Over temp/current	SECTION 2
669	I/O MODULE 1	J3 PIN 6	Open load	SECTION 2
670	I/O MODULE 1	J3 PIN 7	Over temp/current	SECTION 3
671	I/O MODULE 1	J3 PIN 7	Open load	SECTION 3
672	I/O MODULE 1	J3 PIN 8	Over temp/current	SECTION 4
673	I/O MODULE 1	J3 PIN 8	Open load	SECTION 4
674	I/O MODULE 1	J3 PIN 9	Over temp/current	SECTION 5
675	I/O MODULE 1	J3 PIN 9	Open load	SECTION 5
676	I/O MODULE 1	J3 PIN 10	Over temp/current	RH END ROW
677	I/O MODULE 1	J3 PIN 10	Open load	RH END ROW
678	I/O MODULE 1	J3 PIN 11	Over temp/current	BOOM CLEANOUT / WETBOOM PUMP
679	I/O MODULE 1	J3 PIN 11	Open load	BOOM CLEANOUT / WETBOOM PUMP
680	I/O MODULE 1	J2 PIN 10/11	Over temp/current	MAIN BOOM SHUTOFF
681	I/O MODULE 1	J2 PIN 10/11	Open load	MAIN BOOM SHUTOFF

### Axle Housing Assembly With Forced Cooling Option



Item	Description	Item	Description
1	AXLE HOUSING	6	CAPSCREW
2	MAGNETIC PLUG	7	BLEEDER SCREW
2A	MAGNETIC PLUG- FORCE COOLING OUTLET PORT	8	BREATHER ASSEMBLY
3	FILL PLUG	9	SHIM
3A	FILL PLUG - FORCE COOLING INLET PORT	10	STUD
4	HARDENED WASHER	11	BRAKE ACTUATION PORT FITTING
5	CAPSCREW		

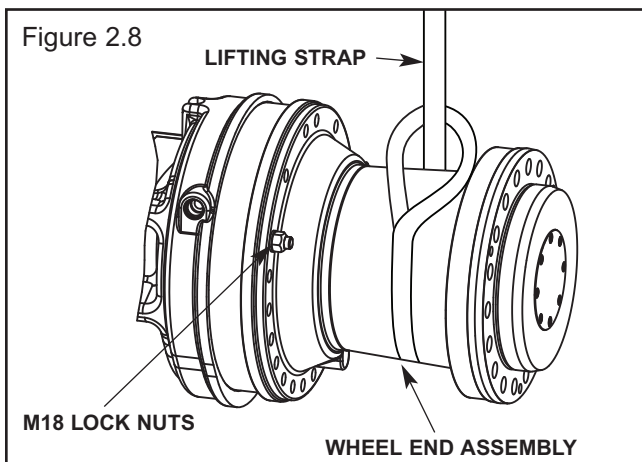


**NOTE:** These capscrews had medium strength thread locker added at original axle assembly.

### ⚠ WARNING

Take care when using lifting devices. When you use a lifting strap, inspect the strap for damage before you use it. Do not use a lifting strap to shock load or drop load a component. Serious personal injury and damage to components can result. Figure 2.8.

- Support the wheel end to be serviced with a lifting device.
- Loosen without removing the M18 lock nuts and washers at the studs at the spindle to axle housing joint. Figure 2.8.



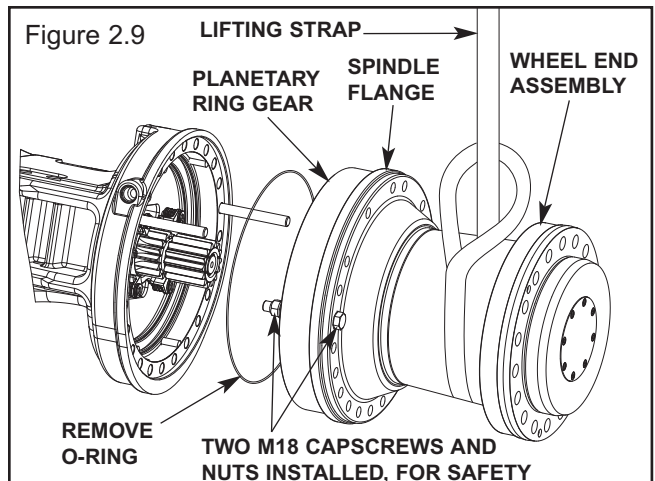
### ⚠ CAUTION

Do **Not** remove the studs as they support the planetary ring gear and spindle assembly on the axle housing. Use care to keep planetary ring gear from falling off spindle flange.

- Use a brass or leather mallet to hit spindle flange and loosen wheel end assembly from the axle housing. Figure 2.9.

- Remove O-Ring from inner side of ring gear. For safety, remove M18 lock nuts while wheel end is still supported by studs, assemble (2) M18 capscrews with washers through spindle flange and planetary ring gear mounting holes and assemble (2) nuts with washers onto capscrew threads so the ring gear cannot fall off the spindle flange. Figure 2.9.

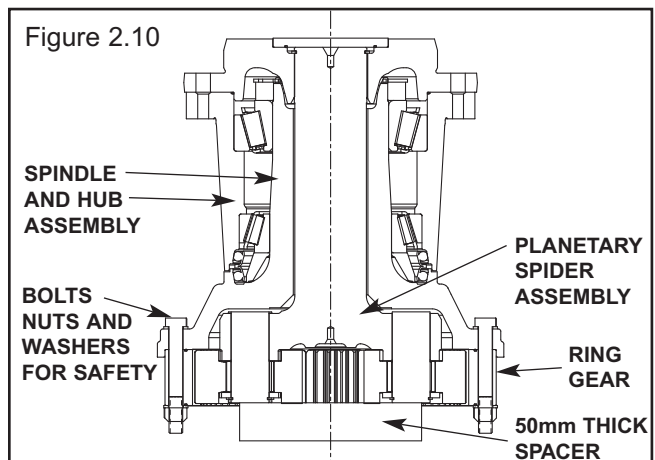
- Remove the wheel end assembly from the axle housing assembly and place safely on a work bench. Where further wheel end disassembly can be completed. Figure 2.9.



**NOTE:** If the axle to be serviced does not require the planetary wheel end assembly to be further disassembled, please go to required section for specific area of disassembly required.

**NOTE:** To further disassemble the planetary wheel end assembly and to service all the internal wheel end components, the following procedure is recommended:

- For further disassembly set with planetary pin facing downward with planet pins on a 50mm thick spacer whose O.D. is smaller than ring gear's I.D. Figure 2.10.



### Repairing or Replacing Parts

Replace worn or damaged parts of an axle assembly. The following are some examples to check for repair and possible replacement:

- Replace any fastener if corners of the head are worn.
- Replace washers if damaged.
- Replace oil seals or grease seals at the time of axle repair.
- Clean parts and apply new liquid gasket material where required when the axle is assembled.
- Remove nicks, marks and burrs from parts having machined or ground surfaces including axle shaft splines. Use a fine file, India stone, emery cloth or crocus cloth for this purpose.



#### CAUTION

**Threads must be without damage and clean so that accurate adjustment and correct torque values can be applied to fasteners and parts.**

- Clean and repair threads of fasteners and holes. Use a thread die or tap of the correct size or a fine file for this purpose.
- Tighten all fasteners to correct torque values.

### Removing Dri-Loc Fasteners

If it is difficult to remove fasteners from components, the strength of Dri-Loc, adhesive or medium and high strength thread-locking compound can be decreased by heating. Refer to the following procedure.



#### CAUTION

**Do not exceed 177° C (350° F) maximum. Heating must be done slowly to prevent thermal stresses in the other components.**

1. Heat the fastener for three to five seconds only. Try to loosen the fastener with a wrench. Do not use an impact wrench to loosen the fastener or hit the fastener with a hammer.
2. Repeat Step 1 until you remove the fastener.

### Preparing Surfaces, Threaded Holes and Fasteners for Later Assembly.

1. Clean the oil and dirt from threaded holes. Use a wire brush.
2. Remove all the old gasket material from both surfaces.
3. Clean the surfaces where silicone gasket material will be applied. Remove all the oil, grease, dirt and moisture without damaging the mating surfaces.
4. Dry both surfaces.

### Flush Lube from the Axle

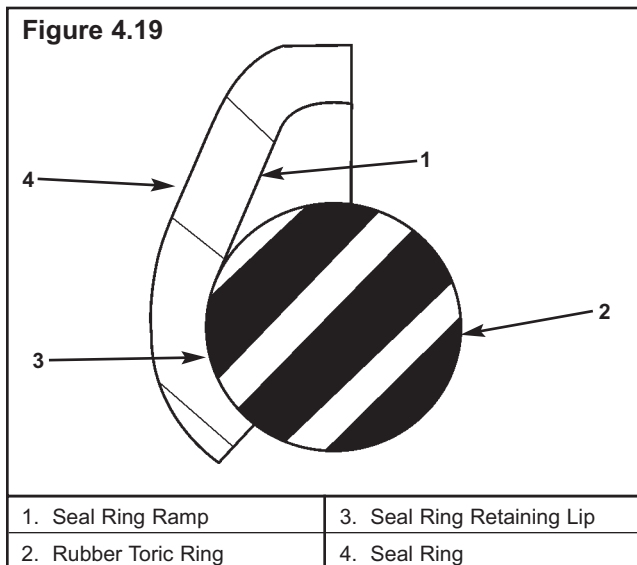
The entire rigid mount axle housing assembly shares the same oil. Lubricant contamination of the wheel end or housing bowl can spread to all areas of the axle. Flush the lubricant from the entire axle housing before you assemble the axle.

1. Reminder note that there are (3) magnetic plugs in an axle assembly, (1) in the carrier bowl bottom and (1) each in the axle housing flange bottom. These must be removed and cleaned of any metallic debris before axle reassembly.
2. The oil fill plug located in back of axle housing bowl is non-magnetic. This plug can also be removed during axle cleaning.
3. For axles that have internal wet brake option: there are (2) wet brake inspection plugs that are located (1) in each axle housing flange. These plugs are also non-magnetic.
4. Clean any debris from behind internal flange in housing bowl area.
5. Verify all contaminants in housing leg areas have been removed.

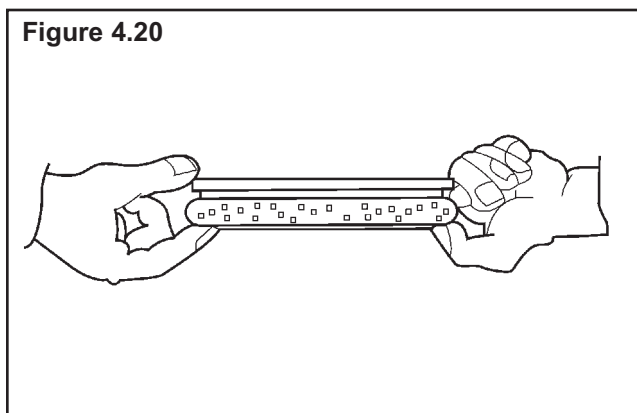
### ⚠ CAUTION

Do not use Stanosol<sup>®</sup> or any other liquid that leaves an oily film and does not evaporate quickly, since this may result in incorrect seating of the Toric Ring in the housing, resulting in seal leakage.

- A. Wet the rubber Toric Ring with isopropyl alcohol and install it onto the formed seal ring so that it is seated at the bottom of the seal ring ramp and against the retaining lip. **Figure 4.19.**



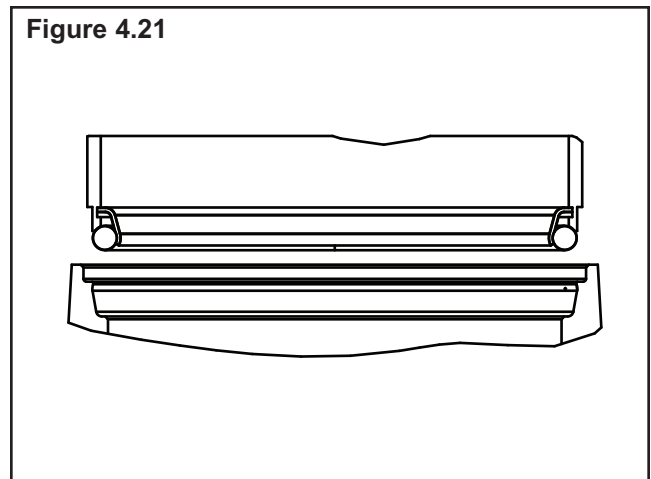
- B. Make sure the Toric Ring is not twisted by rapidly pulling it away from the seal ring and letting it snap back. Do this in a number of places until the seal is correctly seated. Be careful not to nick or cut the Toric Ring seal, as this will cause leaks. **Figure 4.20.**



### ⚠ CAUTION

Do not use Stanosol<sup>®</sup> or any other liquid that leaves an oily film and does not evaporate quickly, since this may result in incorrect seating of the O-ring in the housing, resulting in seal leakage.

- Coat the Toric Ring with isopropyl alcohol so that it slides easily past the retainer lip in the wheel hub and installs correctly on the spindle ramp. **Figure 4.21.**
- Place installation tool part number TC-79461 (see Special Tool Section) around the metal seal ring and Toric Ring. Installation tools are available from AxleTech International at in North America 1-877-547-3907, in Europe 33-477-92-8868 or at [www.axletech.com/aftermarket.htm](http://www.axletech.com/aftermarket.htm).
- Wipe the O-ring with a lint-free towel or clean foam brush saturated with isopropyl alcohol.
- Shake excess lubricant from the assembly. Immediately install ("pop") the seal into the wheel hub with a firm push of the installation tool. **Figure 4.21.**



- Remove the installation tool.

**TORQUE TABLE**

THREAD SPEC	TYPE	LOCATION	THREAD COMPOUND [1]	TORQUE N•m (lb-ft)	
				nominal	range
<b>FASTENERS</b>					
M8x1.25	capscrew L16 Allen-head	Wheel Sup: Cover-Wheel Driver	medium-strength	38.3 (28.2)	33.5 (24.7) – 43.1 (31.8)
	capscrew L25 Allen-head	Wheel Sup: Lock Plate-Wheel Nut	medium-strength	38.3 (28.2)	33.5 (24.7) – 43.1 (31.8)
		Wheel Sup: Wheel Driver-Wheel Hub			
		Planet: Spring Hsg-Axle Hsg			
		HDL: Inlet Port-Carrier Hsg			
capscrew L30 Allen Head	Carrier: Bearing Cap (Adj. Ring Lock)	medium strength	33.0 (24.3)	28 (20.7) - 38(28)	
M10x1.5	setscrew L16 socket-head	Planet: Pinion Shaft-Spider	medium-strength	27.0 (19.9)	23.0 (16.9) - 31.0 (22.9)
M12x1.75	capscrew L45 hex-head	Carrier Pinion Cage-Carrier Hsg	medium-strength	132 (97.4)	119 (87.7) - 145 (107)
	capscrew L70 hex-head	Carrier: Diff. Case-Diff. Case	STF 02-452	143 (105.5)	130 (96) - 155 (114)
	capscrew L80 Allen-head	Trunnion: Adapter-Axle Hsg	Oil	119 (87.8)	107 (78.9) - 131 (96.6)
Trunnion: Bracket-Trunnion Shaft					
M16x2	capscrew L50 hex-head	Carrier: Carrier Hsg-Axle Hsg	high-strength	328 (241.9)	295 (217.6) - 361 (266.3)
	capscrew L65 hex-head				
M16x1.5	capscrew L62 hex-head	Carrier: Hypoid Gear-Diff. Case	medium-strength	350 (258)	315 (232) - 385 (284)
M18x1.5	capscrew L140 hex-head	Wheel Sup: Spindle-Axle Hsg	medium-strength	509 (375.4)	458 (337.8) - 560 (413.1)
	stud L170	Wheel Sup: Spindle-Axle Hsg	medium-strength	engage all threads	
	nut	Wheel Sup: Spindle-Axle Hsg	oil	412 (303.9)	371 (273.6) - 453 (334.1)
M20x2.5	capscrew L120 hex-head	Carrier: Bearing Cap-Carrier Hsg	oil	485 (358)	430 (317) - 540 (398)
M22x1.5	nut-jam	Carrier: Hypoid Gear Thrust Screw	none	204 (150.5)	136 (100.3) - 272 (200.6)
M39x1.5	nut	Carrier: Yoke-Hypoid Pinion	oil	1,393 (1,027.5)	1,250 (922) - 1,535 (1132.2)
M150x2	nut	Wheel Sup: Wheel Brg-Spindle	oil	678 (500)	610 (449.9) - 746 (550.2)
<b>PLUGS, FITTINGS</b>					
M12x1.5	fitting-Banjo	WDB:Banjo Fitting-Axle Hsg	oil	47.3 (34.9)	45.0 (33.2) - 49.5 (36.5)
M14x1.5	nut-fitting	WDB: Banjo Fitting-Tube	oil	finger tight + 1.5 turn	
M22x1.5	port-inlet	WDB: Inlet Port-Axle Hsg	STF 02-452	37.8 (27.9)	34.0 (25.1) - 41.6 (30.7)
7/16"-20	screw-bleeder	WDB:Bleeder Screw-Axle Hsg	oil	23.5 (17)	20 (15) - 27 (20)
9/16"-18	fitting-Tee	WDB: Tee Fitting-Inlet Port	oil	35.7 (26.3)	34.0 (25.1) - 37.4 (27.6)
11/16"-16	nut-fitting	WDB: Tee Fitting-Tube	oil	42.0 (30.9)	40.0 (29.5) - 44.0 (32.5)
1 1/16"-12	plug-fill	Hsg: Fill Plug	oil	93 (68.6)	79 (58.3) - 107 (78.9)
	plug-drain	Hsg: Drain Plug			
3/8-18 NPSF	breather	Top of Housing Breather	sealant-RTV or Permatex #51	28 Minimum	

[1] Thread compounds = Medium-strength: Loctite #241/242/243, Three Bond #1334  
 High-strength: Loctite #271/273, Three Bond #1305  
 STF 02-452: Loctite 680  
 Sealants: Loctite Ultra Grey RTV, Permatex #51

Torque conversion factors 1N•m = 0.7376 lb-ft  
 1N•m = 10.20 kgf.cm

# CAB SEAT

## DELUXE SEAT

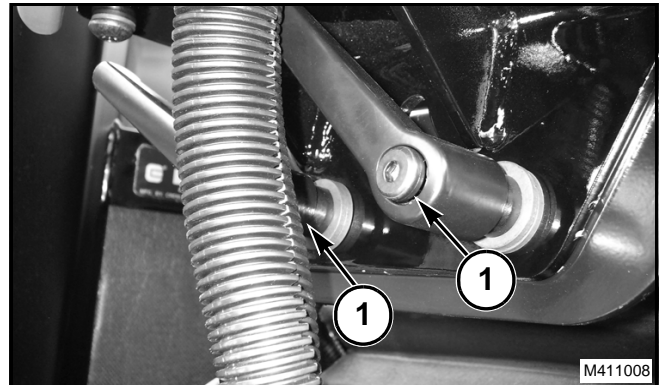
Seat is a self-contained air ride seat with its own air compressor under seat base to provide air for air spring. Seat is mounted on top of HVAC cabinet.



**CAUTION:** Turn off engine and remove key from ignition.

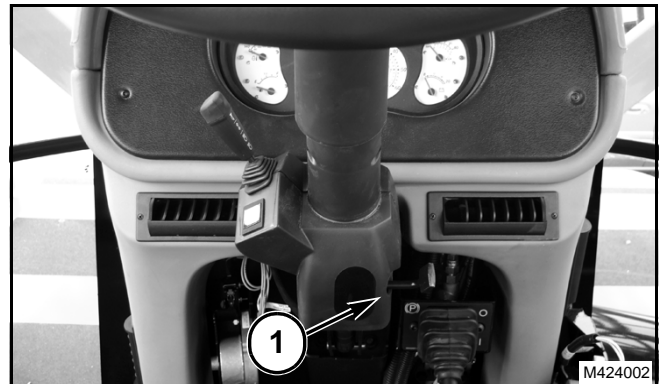
### Removal

**FIG. 1:** Remove two bolts (1) holding shift console to right-hand side of seat. Lower shift console to floor.



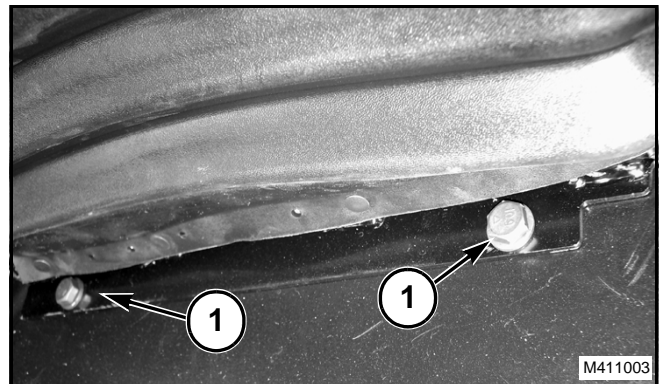
**FIG. 1**

**FIG. 2:** Using tilt control lever (1), raise steering column up to a vertical position to allow seat removal.



**FIG. 2**

**FIG. 3:** Loosen and remove two bolts (1) on right-hand side of base plate.



**FIG. 3**

## Troubleshooting

To display diagnostics, depress key three times. Digital display shows any active fault codes. Repeatedly pressing key scrolls through active codes. Each code displayed should be addressed until No Faults code E00 is displayed.

### Fault Codes

Cause	Display Reads
No Faults Detected	E0
Cab Sensor Shorted	E1
Cab Sensor Open	E2
Evap Probe Shorted	E3
Evap Probe Open	E4
Water Valve Shorted	E9
Water Valve Open	E10
No Communications w/ ECU	E17

For all fault codes is the possible solution check the wiring and connectors.

### No Display

- Press control panel on key.
- Make sure display illuminates.
- Verify control panel is plugged into wire harness.
- Check if wire harness is wired into vehicle properly.

### No Fan

- Turn up fan with fan up key.
- Make sure fan is plugged into wire harness.
- Verify circuit breakers or fuses are intact.
- If all other functions work properly, replace electronic control unit (ECU).

### No Heat

- Turn up heat with temperature up key. Use the advanced diagnostics to verify that the water valve is commanded open.
- Inspect and verify all wiring connections.
- Verify that any coolant shut off valves on the engine are open.
- Verify that warm coolant is flowing into the heater core by testing the heater hoses.
- Inspect and replace the electronic water valve if necessary.
- Inspect and replace ECU if necessary.

### No Cooling

- Turn down heat with temperature down key and enable defrost mode. Use the advanced diagnostics to verify that the A/C clutch is requested ON.

- Verify that the system is fully charged with refrigerant.
- Verify correct voltage is present at clutch relay on wire harness.
- Inspect and verify all wiring connections.
- Inspect and replace clutch relay if necessary.
- Inspect and replace refrigerant high pressure and/or low pressure cut out switches if necessary.
- Inspect compressor and clutch assembly and clutch assembly and replace clutch if necessary.

### The system is not controlling the cab temperature properly.

- Inspect the Cab Air Temperature sensor.
- Verify that the recirculation vent inlet not obstructed.
- Inspect and replace recirculation vent air filter if necessary.
- Change the setpoint temperature in small increments.
- Verify that the water valve is working properly (see No Heat).
- Verify that the compressor clutch is working properly (see No Cooling).

### The evaporator core is icing up and restricting airflow.

- Inspect the Evaporator Core Probe.
- Verify that the probe is making good contact with the evaporator fins and is not loosely inserted.
- Reposition the probe and check the core temperature during operation using the advanced diagnostics.
- Replace the evaporator core if necessary.

### System is putting out cool air when heat is needed.

- Reposition cab temperature sensor as required.
- Verify compressor clutch is working properly (see No Heat).

### System is putting out hot air when cooling is needed.

- Reposition cab temperature sensor as required.
- Verify compressor clutch is working properly (See No Cooling).

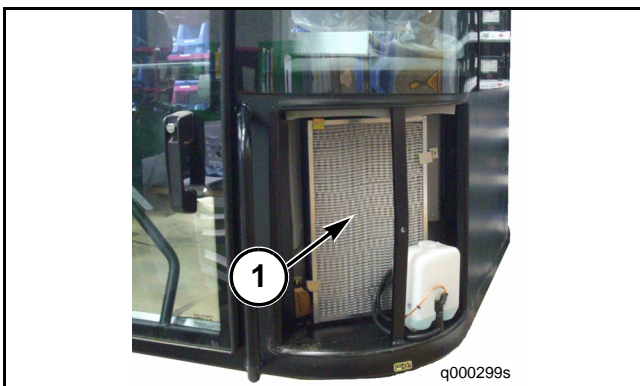
**Charcoal Air Filter**

**FIG. 20:** Charcoal Air Filter

*IMPORTANT: To maintain proper cab pressurization, baffle must be in the fully raised position when used with charcoal filter. When used with a standard cab filter, baffle must be in fully lowered.*

Charcoal filter (1) is used in conjunction with a baffle on cab air filter cover.

Life of filter is affected by environmental conditions and should be replaced when odor, taste or other symptoms of contamination are detected. Replace the filter at least every 1000 hours / annually



**FIG. 20**

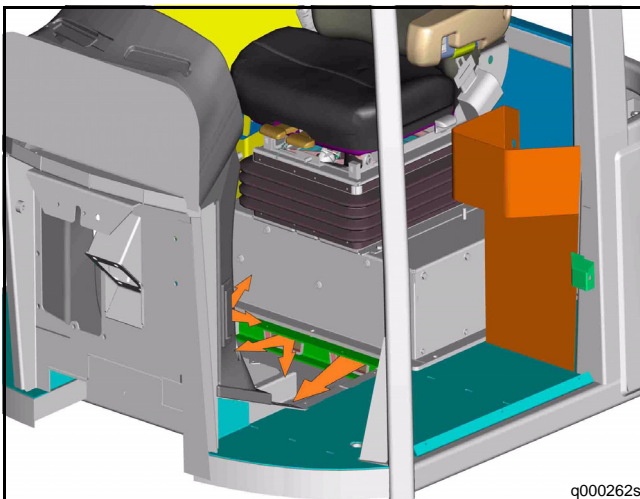
**Head, Foot and Defrost**

**FIG. 21:** Airflow to Vents

Vents on front console direct cab airflow toward operator's top, sides and feet.

Rear posts for ROPS are incorporated with air ducting.

Operator has control of all vents, however, a motorized damper controls airflow for front console. Damper is automatically controlled by control module.



**FIG. 21**

**MOTOR (AIR CONDITIONING BLOWER)**

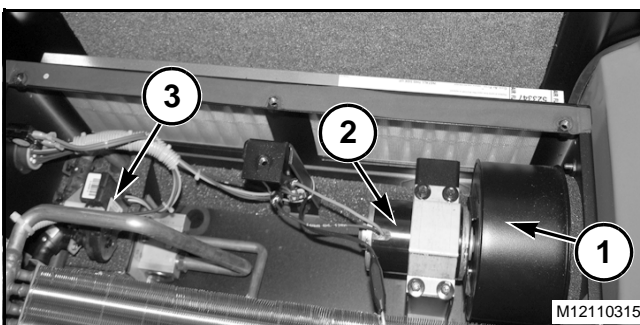
**FIG. 22:** Blower Components

Fan (1) is used to circulate air for HVAC system and is located in HVAC unit (3).

Motor (2) drives fan.

**Overpressure blower**

Inside the cab of Terra Gator is always a overpressure to keep the air inside the cab clean. The blower which prevent the overpressure is located underneath the operator's seat.



**FIG. 22**

---

# HVAC TESTING AND ADJUSTING

## TROUBLESHOOTING MACHINE PREPARATION



**WARNING:** Personal injury can result from contact with refrigerant.

**System is always under pressure, even if engine is not running. Never apply heat to a charged system.**

**Refrigerant contact can cause frostbite. Keep face and hands away to prevent injury.**

**Even if gauges indicate no refrigerant in system, protective goggles must always be worn when refrigerant lines are opened.**

**Always use caution when removing a fitting and always loosen fittings slowly. If system is still under pressure, evacuate and recover refrigerant before removing fitting.**

**Personal injury or death can result from inhaling refrigerant through a lit cigarette or other smoking method.**

**Inhaling fumes released from a flame, contacting with air conditioner refrigerant gas, can cause bodily harm or death.**

**Do not smoke when servicing air conditioners or anytime refrigerant gas may be present.**

**Before checking air conditioning and heating system, move machine to a level surface and lower all implements to the ground. Ensure transmission is in neutral or park and parking brake is engaged. Keep all other personnel away from unit or where they are visible.**

Before any problem solving procedures are performed, refer to Testing and Adjusting, Visual Inspection. Make a visual inspection of the complete air conditioning and heating system.

- All charging and leak testing must be done in a well-ventilated area.
- Avoid any physical contact with refrigerant as contact can cause frostbite.
- Always wear goggles when working on or testing any part of the air conditioning system.
- Place a clean cloth over any open valve or connection.
- Never weld, solder or steam clean any charged components.
- Do not smoke when recovering or recycling refrigerant, charging, performing a leak test or flushing the system.
- Do not carry refrigerant drums in cab or expose them to direct sunlight.
- Dispose of any opened, but unused, oil that is poly alkaline glycol (PAG). Moisture will contaminate unused oil and the air conditioning system.

## HVAC Testing and Adjusting

Relationship Between Temperature and Pressure (R-134a Refrigerant)	
Temperature Degrees C (degrees F)	Pressure kPa (PSI)
-18 C (0.0 F)	44 kPa (6.4 PSI)
-17 C (2.0 F)	51 kPa (7.4 PSI)
-16 C (4.0 F)	59 kPa (8.5 PSI)
-14 C (6.0 F)	66 kPa (9.6 PSI)
-13 C (8.0 F)	74 kPa (10.7 PSI)
-12 C (10.0 F)	82 kPa (11.9 PSI)
-11 C (12.0 F)	90 kPa (13.1 PSI)
-10 C (14.0 F)	99 kPa (14.3 PSI)
-9 C (16.0 F)	108 kPa (15.6 PSI)
-8 C (18.0 F)	117 kPa (17.0 PSI)
-7 C (20.0 F)	127 kPa (18.4 PSI)
-6 C (21.0 F)	132 kPa (19.1 PSI)
-6 C (22.0 F)	137 kPa (19.8 PSI)
-5 C (23.0 F)	141 kPa (20.5 PSI)
-4 C (24.0 F)	147 kPa (21.3 PSI)
-4 C (25.0 F)	152 kPa (22.0 PSI)
-3 C (26.0 F)	157 kPa (22.8 PSI)
-3 C (27.0 F)	163 kPa (23.6 PSI)
-2 C (28.0 F)	168 kPa (24.4 PSI)
-2 C (29.0 F)	174 kPa (25.2 PSI)
-1 C (30.0 F)	179 kPa (26.0 PSI)
-1 C (31.0 F)	185 kPa (26.8 PSI)
0 C (32.0 F)	191 kPa (27.7 PSI)
1 C (33.0 F)	197 kPa (28.5 PSI)
1 C (34.0 F)	203 kPa (29.4 PSI)
2 C (35.0 F)	209 kPa (30.3 PSI)
2 C (36.0 F)	215 kPa (31.2 PSI)
3 C (37.0 F)	221 kPa (32.1 PSI)
3 C (38.0 F)	228 kPa (33.0 PSI)
4 C (39.0 F)	234 kPa (34.0 PSI)
4 C (40.0 F)	241 kPa (34.9 PSI)
5 C (41.0 F)	248 kPa (35.9 PSI)
6 C (42.0 F)	254 kPa (36.9 PSI)

Relationship Between Temperature and Pressure (R-134a Refrigerant)	
Temperature Degrees C (degrees F)	Pressure kPa (PSI)
6 C (43.0 F)	261 kPa (37.9 PSI)
7 C (44.0 F)	263 kPa (38.9 PSI)
7 C (45.0 F)	275 kPa (39.9 PSI)
8 C (46.0 F)	283 kPa (41.0 PSI)
8 C (47.0 F)	290 kPa (42.0 PSI)
9 C (48.0 F)	297 kPa (43.1 PSI)
9 C (49.0 F)	305 kPa (44.2 PSI)
10 C (50.0 F)	312 kPa (45.3 PSI)
11 C (51.0 F)	320 kPa (46.4 PSI)
11 C (52.0 F)	328 kPa (47.5 PSI)
12 C (53.0 F)	336 kPa (48.7 PSI)
12 C (54.0 F)	344 kPa (49.9 PSI)
13 C (55.0 F)	352 kPa (51.0 PSI)
13 C (56.0 F)	360 kPa (52.2 PSI)
14 C (57.0 F)	369 kPa (53.5 PSI)
14 C (58.0 F)	377 kPa (54.7 PSI)
15 C (59.0 F)	385 kPa (55.9 PSI)
16 C (60.0 F)	394 kPa (57.2 PSI)
16 C (61.0 F)	403 kPa (58.2 PSI)
17 C (62.0 F)	412 kPa (59.8 PSI)
17 C (63.0 F)	421 kPa (61.1 PSI)
18 C (64.0 F)	430 kPa (62.4 PSI)
18 C (65.0 F)	440 kPa (63.8 PSI)
19 C (66.0 F)	450 kPa (65.2 PSI)
19 C (67.0 F)	459 kPa (66.8 PSI)
20 C (68.0 F)	469 kPa (68.0 PSI)
21 C (69.0 F)	478 kPa (69.4 PSI)
21 C (70.0 F)	488 kPa (70.8 PSI)
22 C (71.0 F)	498 kPa (72.3 PSI)
22 C (72.0 F)	509 kPa (73.8 PSI)
23 C (73.0 F)	519 kPa (75.3 PSI)
23 C (74.0 F)	530 kPa (76.8 PSI)
24 C (75.0 F)	540 kPa (78.3 PSI)
24 C (76.0 F)	551 kPa (79.9 PSI)
25 C (77.0 F)	562 kPa (81.5 PSI)
26 C (78.0 F)	573 kPa (83.1 PSI)
26 C (79.0 F)	584 kPa (84.7 PSI)

# Challenger®

## Terra Gator 3244 Chassis

### SERVICE MANUAL 627333-A

## 06 - Electrical

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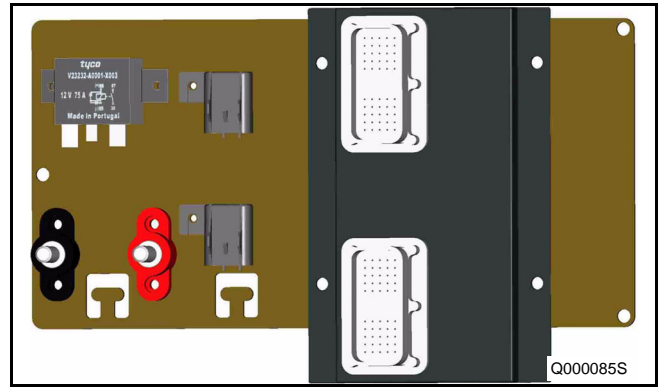
**PRIMARY CAN BUS COMPONENTS**

**FIG. 3:** Master Module

Master Module is located behind the right rear curved panel on outside of the cabin. To access panel loosen hand nut located in center of curved panel. Master module accepts signals from switches and other modules in cab, translates, and transfers those commands via a two-wire shielded harness to I/O (Input/Output) interface module. Master module also accepts inputs back from I/O interface modules and forwards those signals to proper component.

J1 Connector (1) - pins are inputs except where designated.

J2 Connector (2) - pin is output except where designated.



**FIG. 3**

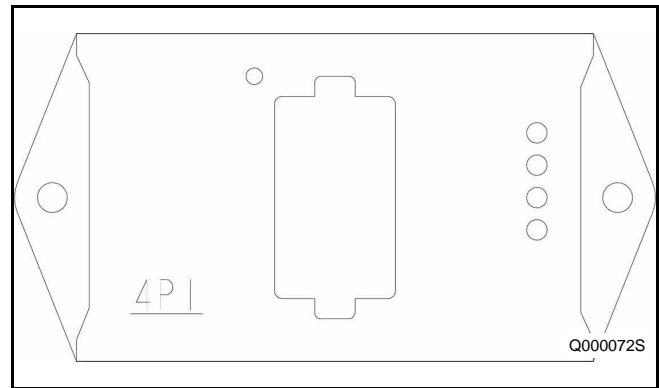
<b>Master Module</b>			
<b>J1</b>		<b>J2</b>	
1	B+	1	B+
2	Left-Hand Foam Marker Input	2	Radar Output
3	Right-Hand Foam Marker Input	3	Left-Hand Turn Signal Output
4	Master Apply	4	Right-Hand Turn Signal Output
5	-	5	Left-Hand Amber Flashing Warning Light Out
6	-	6	Right-Hand Amber Flashing Warning Light Out
7	-	7	Low Beams Output
8	-	8	High Beams Output
9	-	9	Work Lights 1 Output
10	-	10	Work Lights 2 Output
11	-	11	-
12	-	12	Work Lights 4 Output
13	-	13	Reverse Output
14	-	14	Service Brake Output
15	-	15	Park Brake Output
16	Work Light #6	16	Park Lights Output
17	-	17	-
18	-	18	-
19	Work Light #5	19	-
20	Work Light #7	20	-
21	Fog Light	21	Foam Marker On Output
22	Beacon	22	-
23	-	23	-
24	-	24	-
25	BCO Input	25	-
26	Left-Hand End Row Input	26	-
27	Section 1 Input	27	-

### 4-Pack Relay Module

**FIG. 15:** 4-Pack Relay Module

4-Pack relay modules contain 4 independent non-replaceable relays. All relays share a common ground. Module housing contains 4 green LEDs to indicate which relays are on. Each output can source a maximum of 15 amps. Relay pin are as follows:

PIN	RELAY	FUNCTION
1	3	COMMON INPUT
2	3	COIL INPUT
3	4	COIL INPUT
4	4	N.O. OUTPUT
5	3	N.O. OUPUT
6	4	COMMON INPUT
7	2	COMMON INPUT
8	1	COIL INPUT
9	2	COIL INPUT
10	1	N.O. OUTPUT
11	2	N.O. OUTPUT
12	1	COMMON INPUT



**FIG. 15**

#### Relay Module 4P1

Relay 1 - Neutral Start

Relay 2 - Remote Throttle Safety

Relay 3 - Reverse Alarm

Relay 4 - Illumiation

#### Relay Module 4P2

Relay 1 - Fog light Enable

Relay 2 - Hazard Key Off

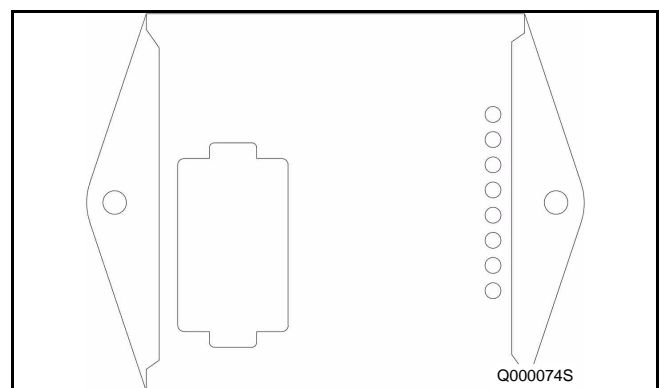
Relay 3 - Park Brake

Relay 4 - Not Used

### Flasher Module

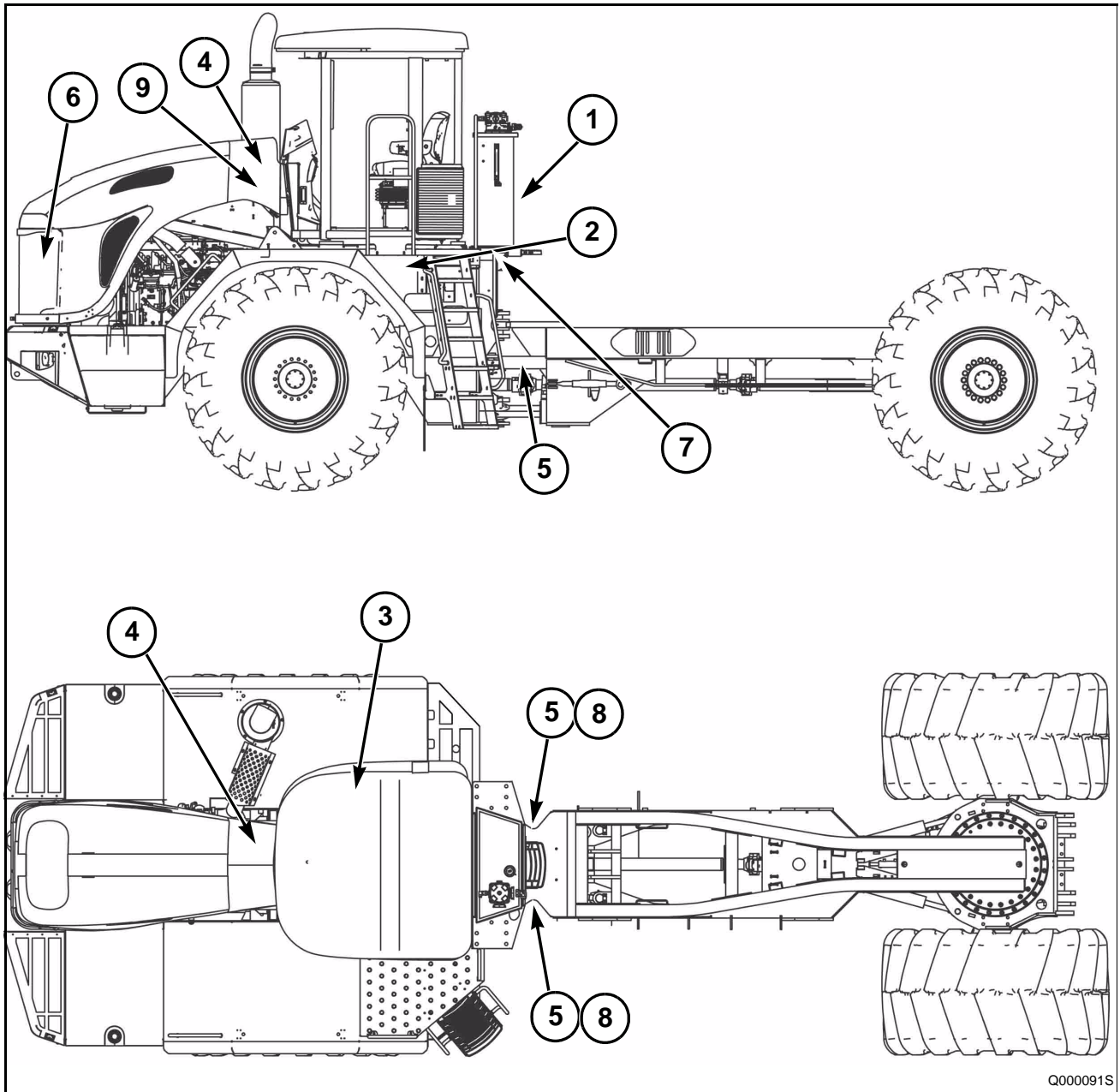
**FIG. 16:** Flasher Module

Flasher module is located in upper right corner of right panel next to relay modules. Flasher module accepts inputs from turn signal and hazard switches. Module then flashes corresponding lights at proper rate. Following table illustrates pinout and logic used by flasher module.



**FIG. 16**

## COMPONENT LOCATION AND FUNCTION



Q000091S

**FIG. 4**

Component layout:

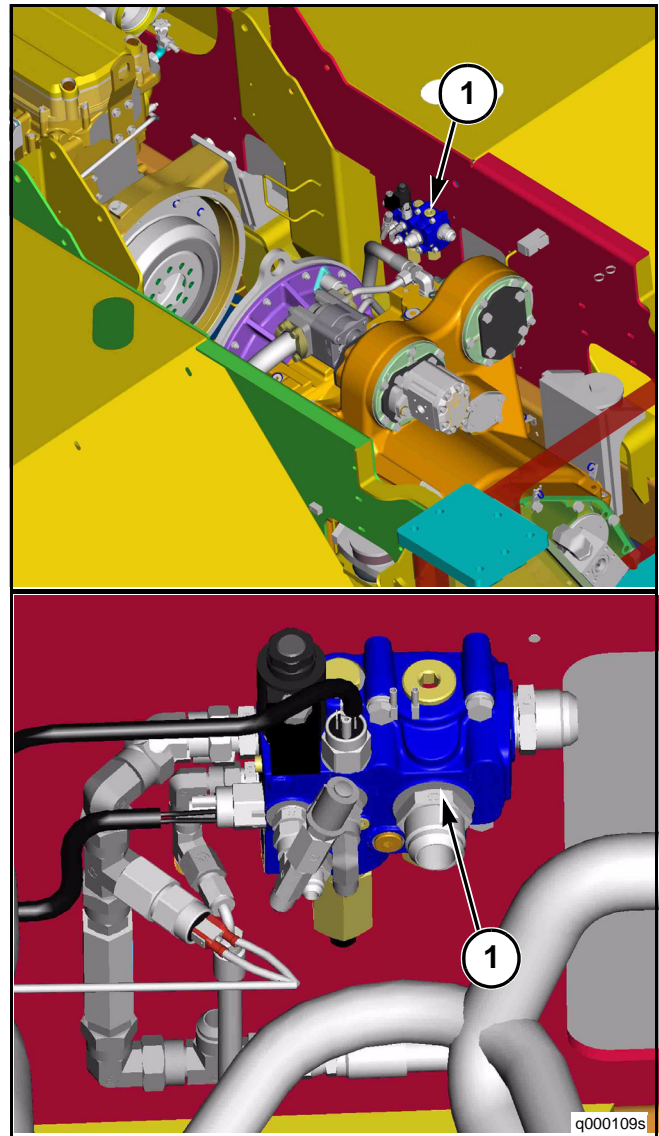
1. Hydraulic Oil Tank;
2. Hydraulic Gear Pump;
3. Priority Valve;
4. Steering Unit;
5. Steering Cylinder;
6. Hydraulic Oil Cooler;
7. Application System Hydraulics;
8. Pivot Point;
9. 3 Accumulators.

## PRIORITY VALVE

The priority valve receives hydraulic pressure from the hydraulic pump mounted on the transmission and controls the flow to the steering system and the auxiliary hydraulic systems. The steering system maintains priority over the braking system. As the steering wheel is turned, pressure to the steering unit drops, which drops the pressure in the line and shifts the priority valve to supply more oil to the steering unit.

Priority valve has four ports and a construction hole. P-port (pressure) is incoming from hydraulic pump. LS-port (load sense) goes to steering unit. CF-port (control flow) goes to steering valve. EF-port (excess flow) goes to auxiliary hydraulic system and power washer (if equipped). PP-port is used in valve construction and is plugged.

**FIG. 3:** Priority Valve (1) right side underneath the cab.



**FIG. 3**

# AIR TANK AND PRESSURE CONTROL CHECK VALVE

## THEORY OF OPERATION

There are two air tanks in the standard air system. The wet tank and the dry tank. The wet tank collects condensation from compression and has a drain valve to remove moisture. Compressed air flows from the wet tank to the dry tank. The dry tank supplies air to the braking and accessory systems.

There is a pressure control check valve (PCCV) mounted in the output port of the wet tank. The PCCV lets air flow from the secondary tank to the supply tank as long as system pressure remains between the cut in/out range for the governor.

*NOTE: The air which reached the wet air tank has already past the air dryer. So the term "wet tank" is a proverbial expression and means the air can be a little wet. But the practice shows there is rarely fluid in this tank.*

# AIR GOVERNOR

## THEORY OF OPERATION

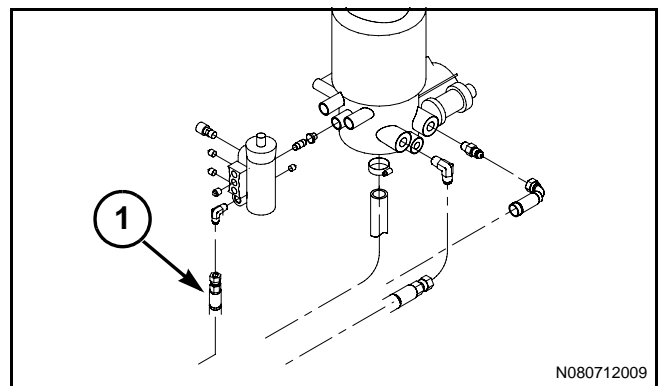
The air governor is directly mounted to the air dryer and controls the opening of the purge valve when the air pressure in the tanks reaches 7,93 to 8,61 bar (115 to 125 psi). Then the purge valve should stay open until the air pressure falls to 6,55 to 7,23 bar (95 to 105 psi), when the purge valve should close to refill the tanks.

## AIR GOVERNOR REMOVAL



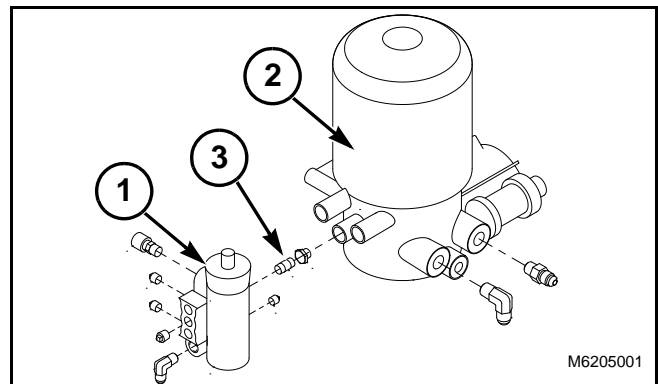
**WARNING:** Remove all air pressure from the tanks before disconnecting any air hoses. Pressurized air can cause serious personal injury.

**FIG. 1:** Mark and disconnect the air hose attached to elbow (1) on governor.



**FIG. 1**

**FIG. 2:** Unthread governor (1) from dryer (2) at coupler (3).



**FIG. 2**

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