SR270 / SV340
Tier 4B (final)
Alpha Series Skid Steer Loader
PIN NGM418237 and above

TR340 / TV380
Tier 4B (final)
Alpha Series Compact Track Loader
PIN NGM418237 and above

SERVICE MANUAL

Part number 47916277
1st edition English
October 2016

CASE

Fluids and lubricants

Fuel tank

Capacity	**96.5 L** (**25.5 US gal**)
Specifications	#2 Diesel ultra-low sulfur

Cooling system

Capacity	**19.0 L** (**5.0 US gal**)
Specifications	**CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**

Hydraulic system

Reservoir capacity	**22.7 L** (**6.0 US gal**)
System capacity:	**45.4 L** (**12.0 US gal**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

Chain compartments

Capacity - each side	
SR270, SV340	**22.2 L** (**23.5 US qt**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

Grease fittings

Quantity	As required
Specifications	**TUTELA MOLY GREASE GR-75** (Molydisulfide)

Engine crank case oil

Capacity - with filter change	**8.5 L** (**9.0 US qt**)
Specifications	**CASE AKCELA UNITEK NO. 1™ SBL CJ-4**

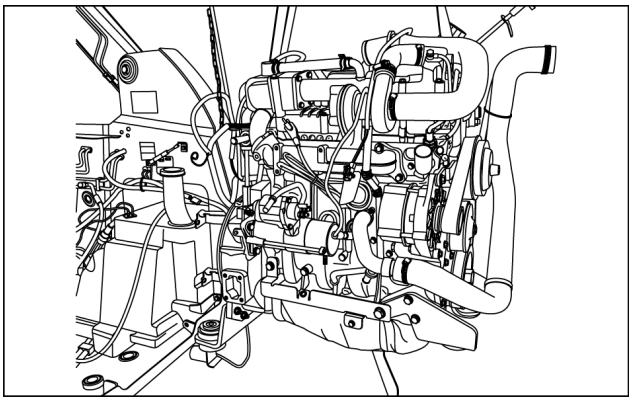
Final track drive

Capacity - each side	
TR340, TV380	**1.0 L** (**1.06 US qt**) +/- **0.1 L** (**0.1 US qt**)
Specifications	**TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

Emissions fluid

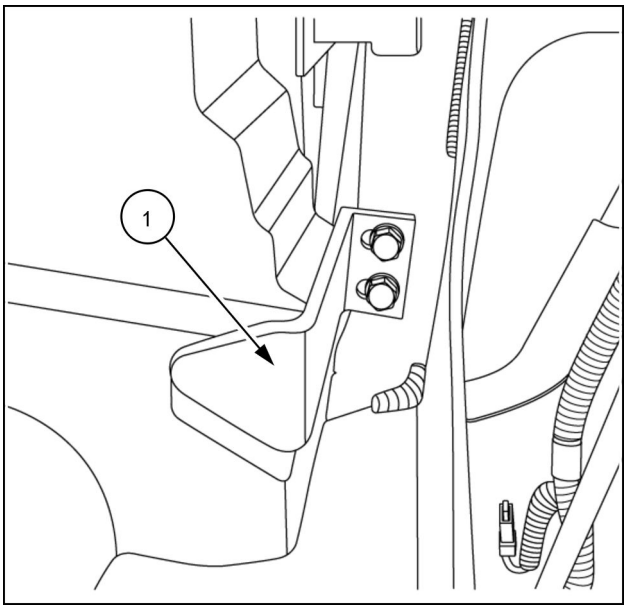
Reservoir capacity	**10.7 L** (**2.8 US gal**)
DEF/ADBLUE® low volume indicator	**2.4 L** (**0.6 US gal**)
Specifications	**DEF/ADBLUE®**

61. Attach adequate lifting equipment to the engine.
62. Carefully lift the engine from the chassis.



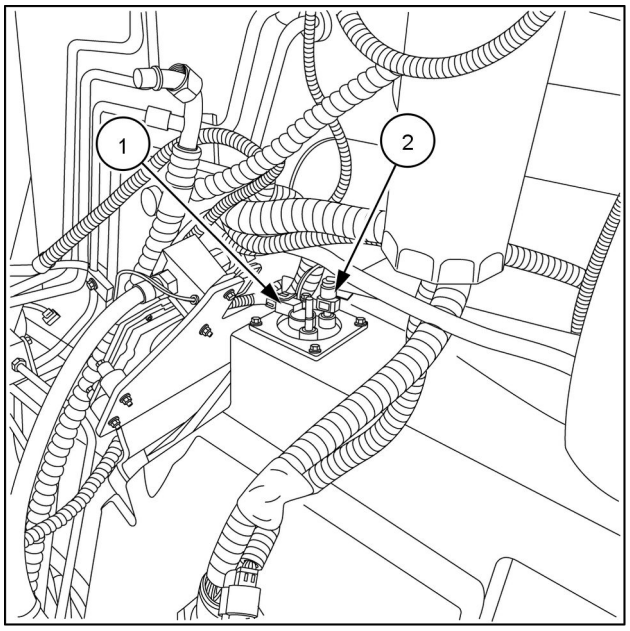
931001946 35

3. Install the right-hand side fuel tank bracket **(1)**.



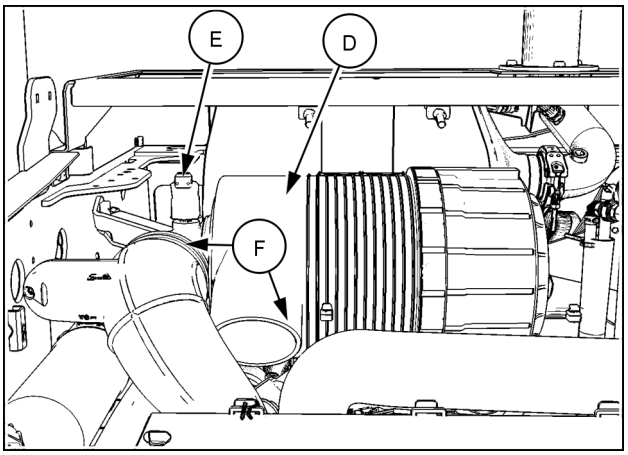
931002100B 3

4. Connect the fuel level sensor **(1)**.
5. Connect the fuel outlet line **(2)**.



RAPH12SSL0042AA 4

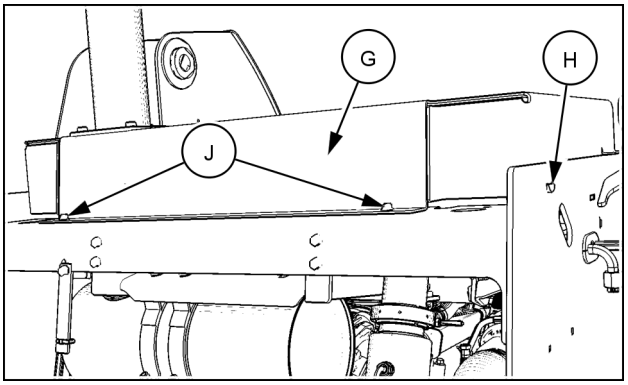
6. Remove the air cleaner **(D)** by disconnecting the air filter restriction switch **(E)**, and loosening the clamps **(F)** on the hoses.
7. Remove the bolt on the backside of the air cleaner, that secures it to the Selective Catalytic Reduction (SCR) muffler.



RAPH16SSL0060BA 5

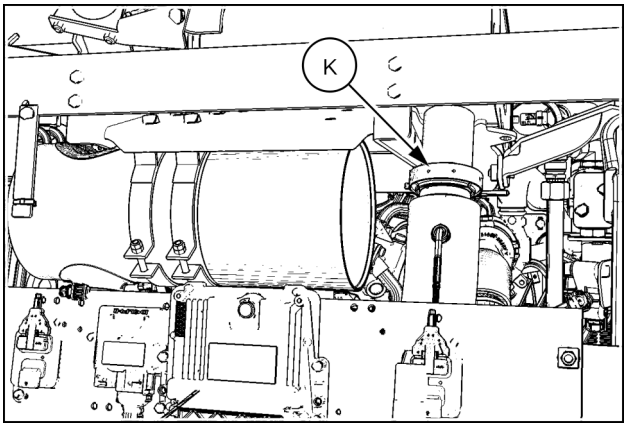
8. Remove the rear cover **(G)** with the exhaust stack from the chassis by removing the two **M6 x 30 mm** bolts **(H)**, and the two **M8 x 25 mm** bolts **(J)** on the top of the crossmember.

NOTE: *Once the bolts are removed, the rear cover* ***(G)*** *can be lifted and slid forward to be removed completely.*

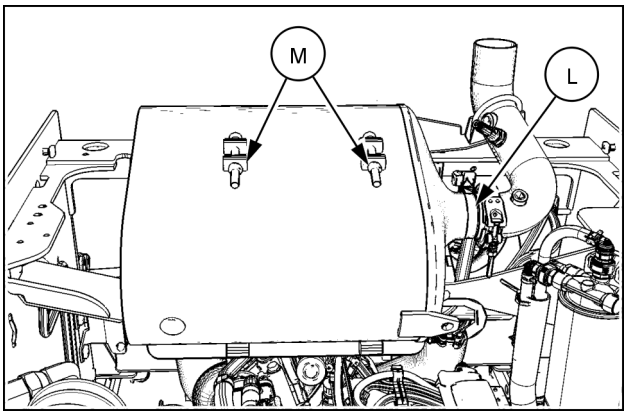


RAPH16SSL0061AA 6

9. Remove the SCR muffler by loosening the clamp **(K)** on the under side of the muffler, and also the clamp **(L)** on the right-hand side to the exhaust stack pipe.
10. Remove the banding **(M)** that secures the SCR muffler to the muffler bracket.
11. Remove the SCR muffler from the engine compartment.



RAPH16SSL0063BA 7



RAPH16SSL0064BA 8

Contents

Engine - 10

Fan and drive - 414

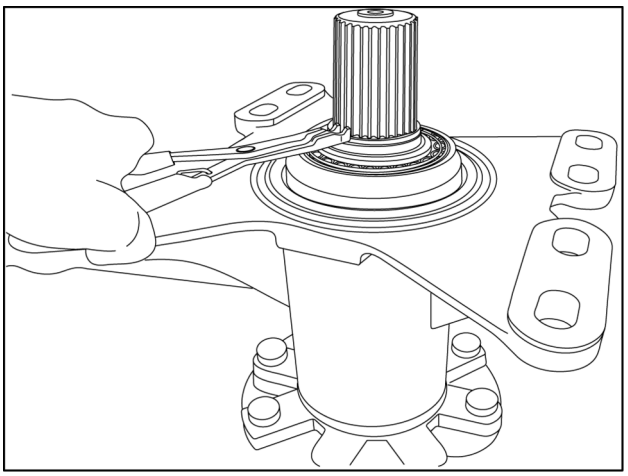
SERVICE

(*) See content for specific models

Axle - Disassemble

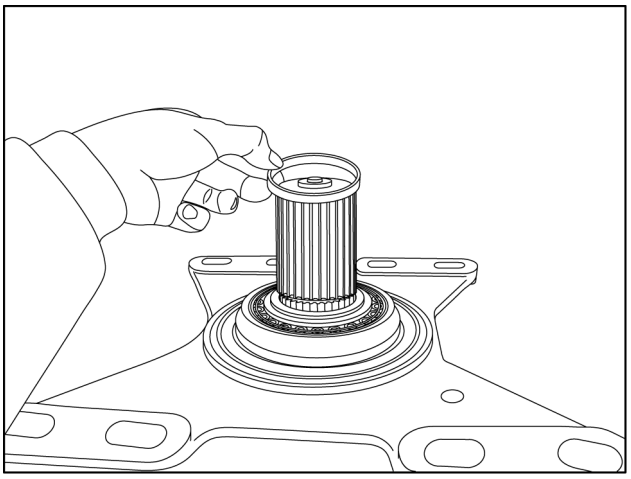
SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA

1. Remove the snap ring.



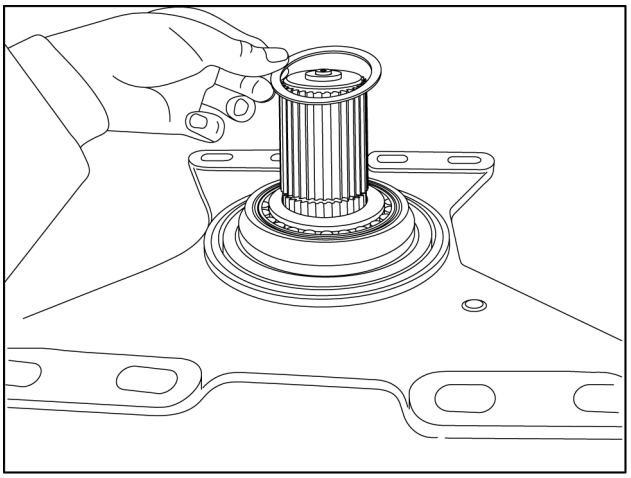
RAIL13SSL0388BA 1

2. Remove the shim.



RAIL13SSL0387BA 2

3. Remove the spacer.

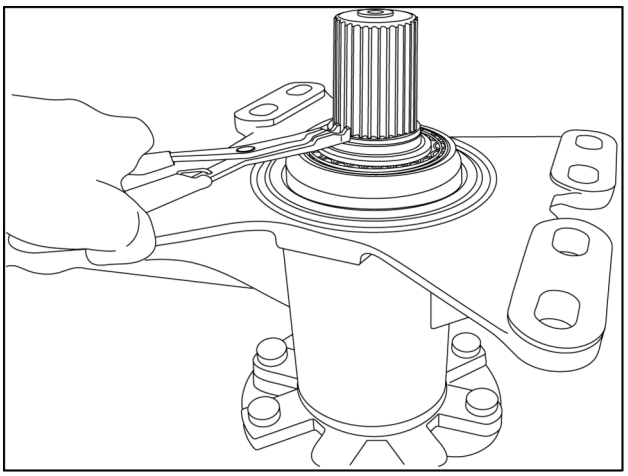


RAIL13SSL0386BA 3

Axle - Disassemble

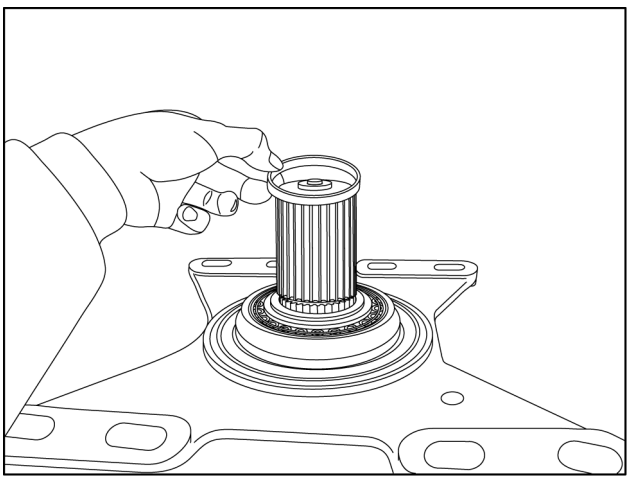
SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA

1. Remove the snap ring.



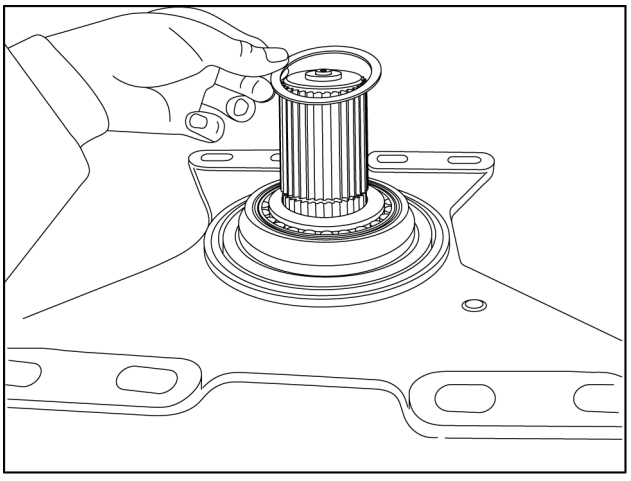
RAIL13SSL0388BA 1

2. Remove the shim.



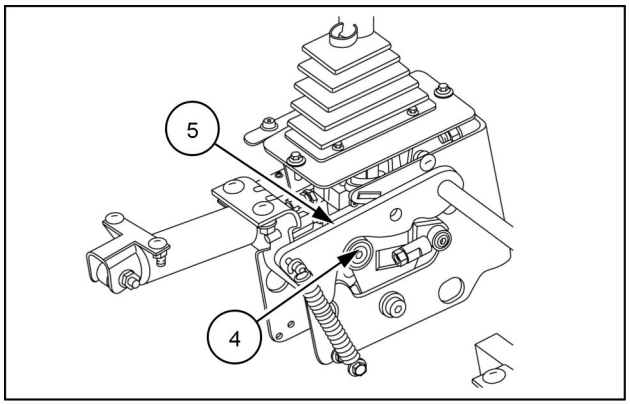
RAIL13SSL0387BA 2

3. Remove the spacer.



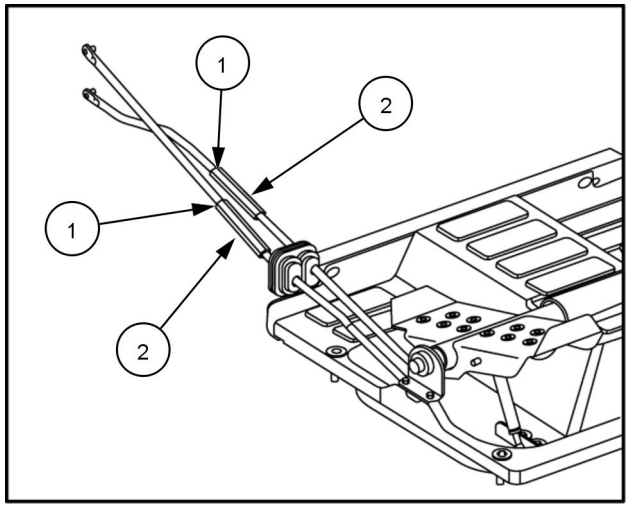
RAIL13SSL0386BA 3

3. Loosen the roller **(4)** and position the roller **(4)** in the center of the cam **(5)**. Tighten the roller **(4)**.
4. Reinstall the tag along springs that was removed in step **1**.
5. Repeat steps **2**, **3** for the other pump.

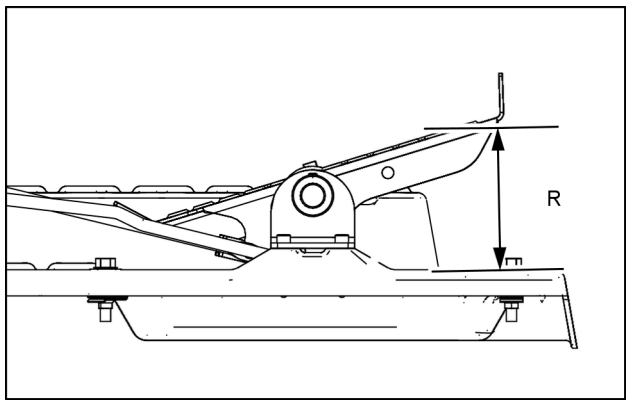


23112920 4

6. Loosen the nuts **(1)** on the rods for the foot controls.
7. Turn the couplings **(2)** until you have reached a pedal angle of **17 ° (R)**. Please see image **6** for details.
8. Tighten the nuts **(1)**.

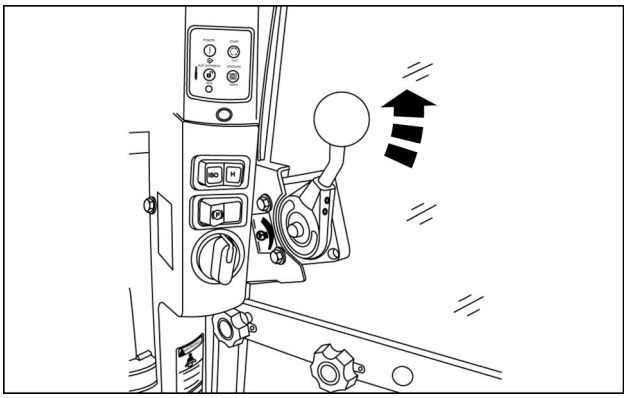


RAPH12UTL0663AA 5



RAIL14SSL0856AA 6

4. Start the machine and run at high idle.

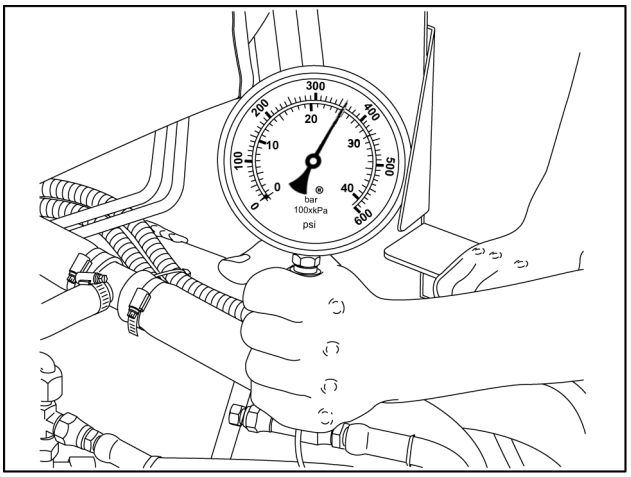


931007504 5

5. Read the pressure gauge and record the charge pressure reading. Stop the engine.

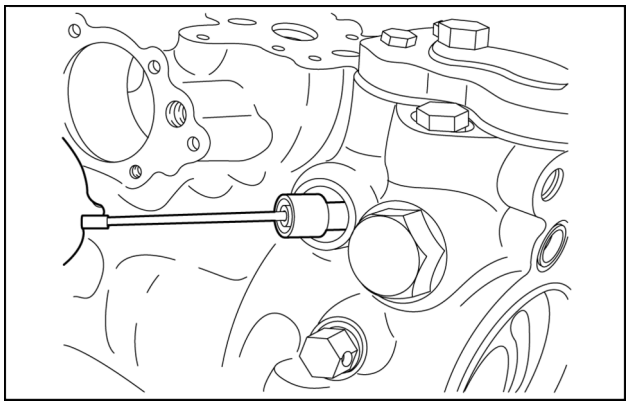
NOTE: *Image **6** is an example of a pressure reading. Image **6** may not match your reading.*

6. The pressure reading must be approximately **24 bar** (**350 psi**).
   Please see **Pump - General specification (29.218)** for general specifications about the hydrostatic pumps.



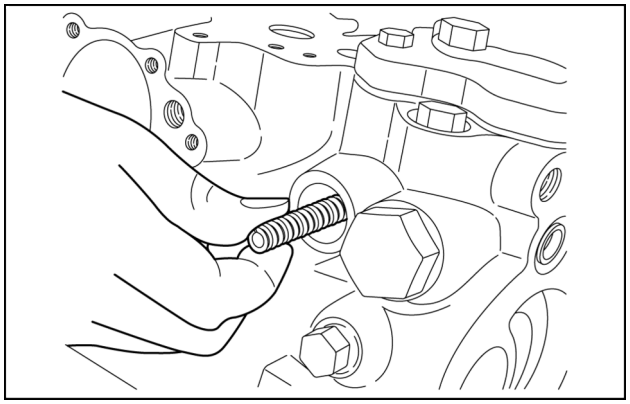
RAPH12SSL0422AA 6

8. Use a slide hammer to insert the valve poppet into the housing for the charge pressure relief valve.



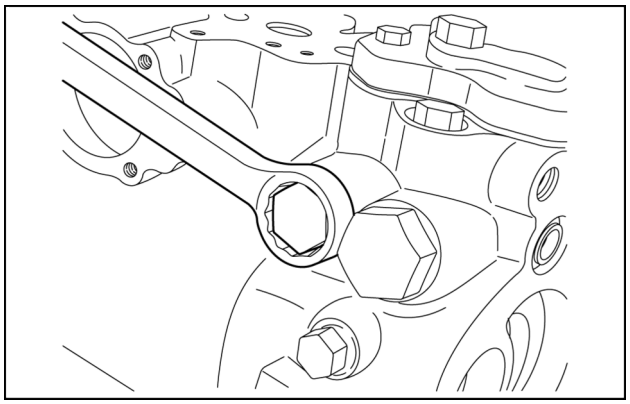
83111610T 8

9. Insert the spring on top of the valve poppet.



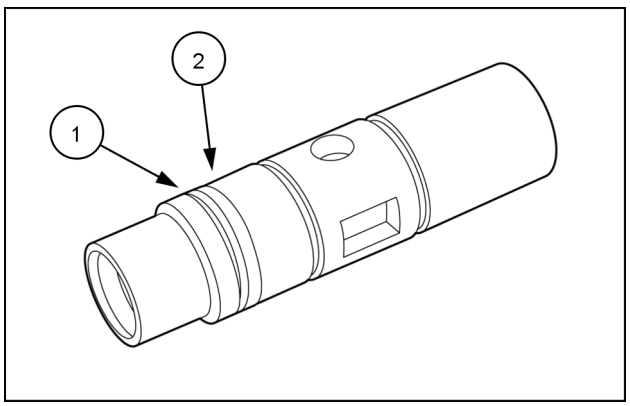
83111609S 9

10. Insert the necessary quantity of shims into the hex plug. Thread the hex plug on top of the spring. Tighten but do not overtighten.



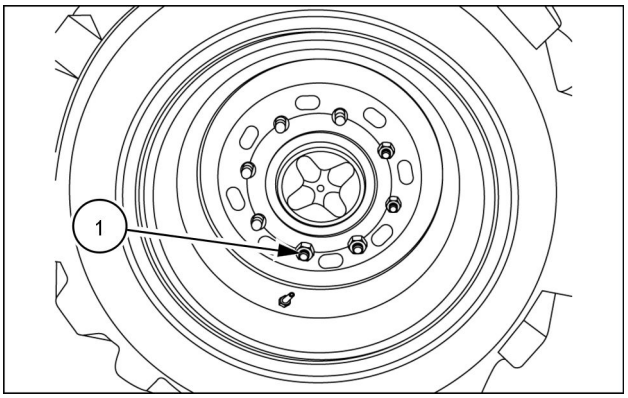
83111607- 10

11. Slide a new O-ring **(2)** and backup ring **(1)** into the grooves of the sleeve.



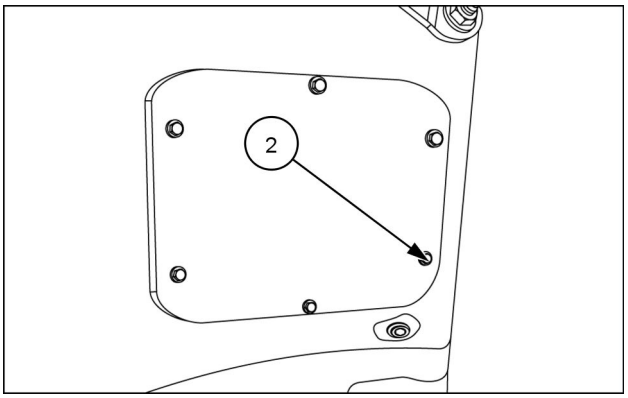
83111606H 11

3. Remove the wheel hardware **(1)** and pull wheels from hub.



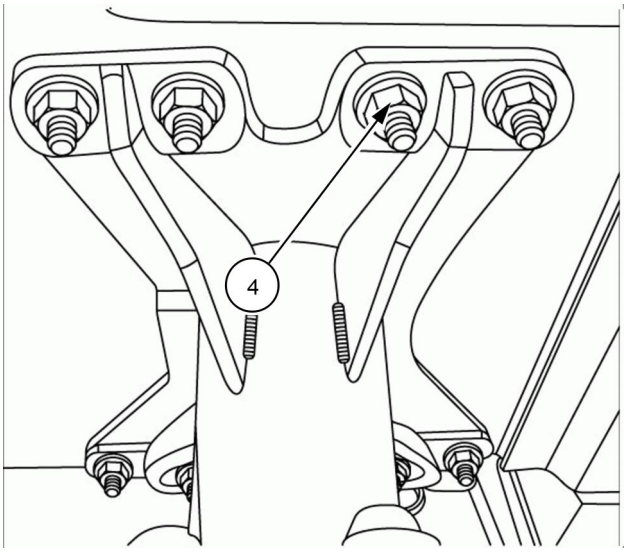
931002070 3

4. Remove the six bolts **(2)** securing the drive chain inspection cover and remove cover.



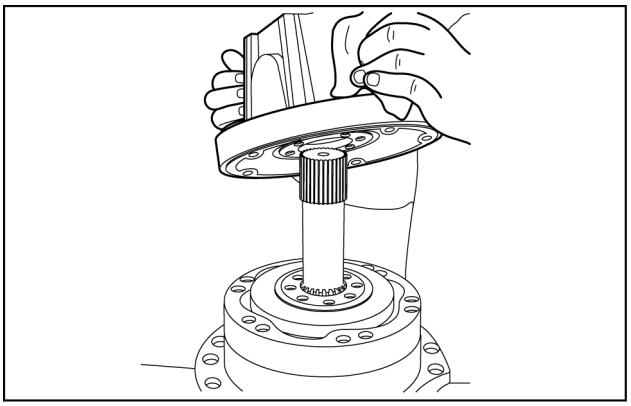
931002080 4

5. Remove front and rear axle housing hardware **(4)**.



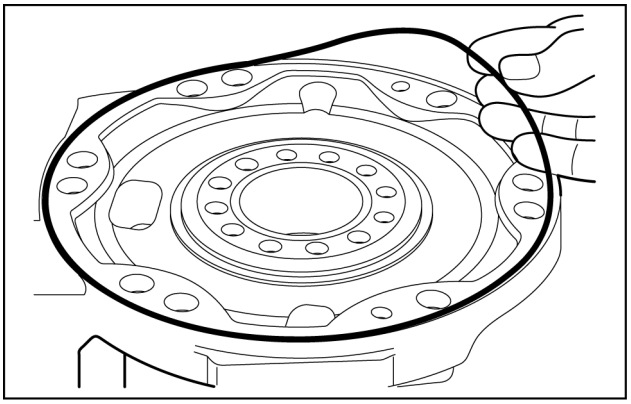
931002082B 5

17. Remove the rear motor case.



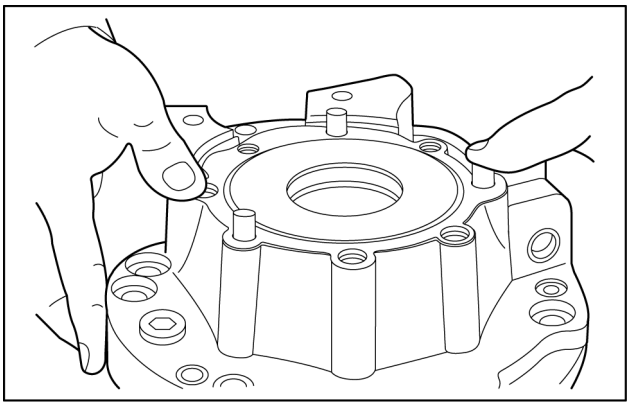
83115708 17

18. Remove the seal from the rear case.



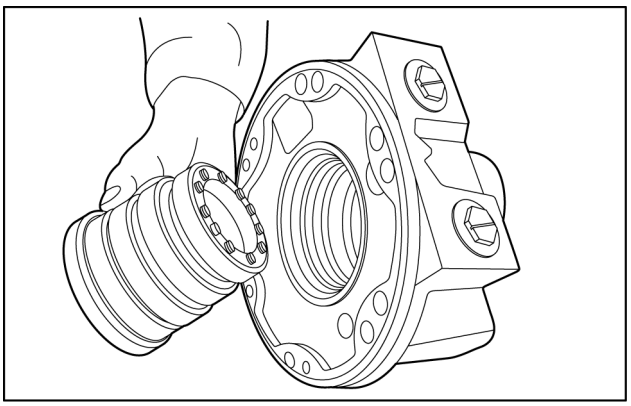
83115567 18

19. Drop the rear case assembly from approximately **80 mm** (**3.1 in**) onto a wooden or plastic surface. This will release the distributor from the rear case.



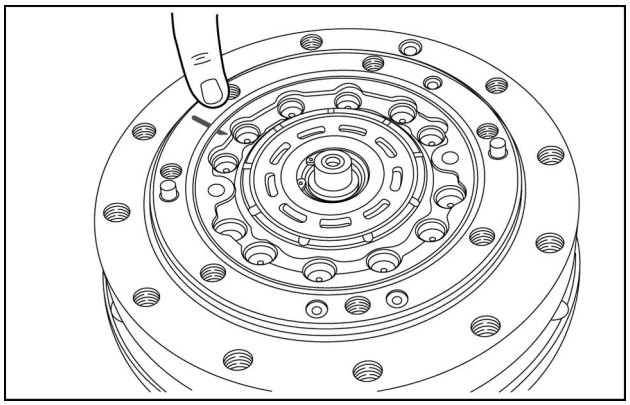
83115568 19

20. Remove the distributor from the rear case. Make a record of the number of springs and the stop pin location in the distributor for use during the assembly procedure.



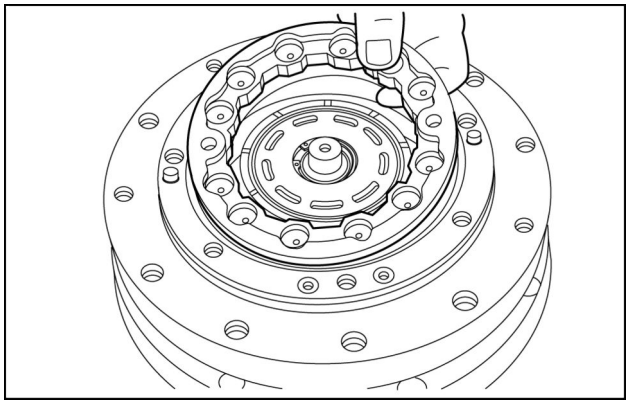
83115709 20

35. Mark the position of the brake piston as a reference for reassembly.



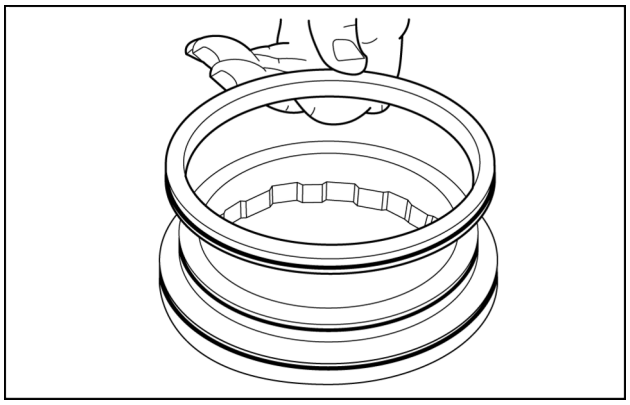
83115740 32

36. Remove the brake piston.



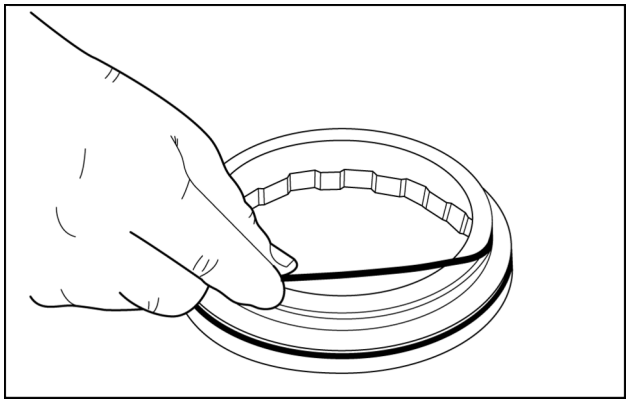
83115741 33

37. Separate the brake spacer from the brake piston.



83115742 34

38. Remove and discard the O-rings from the brake piston.

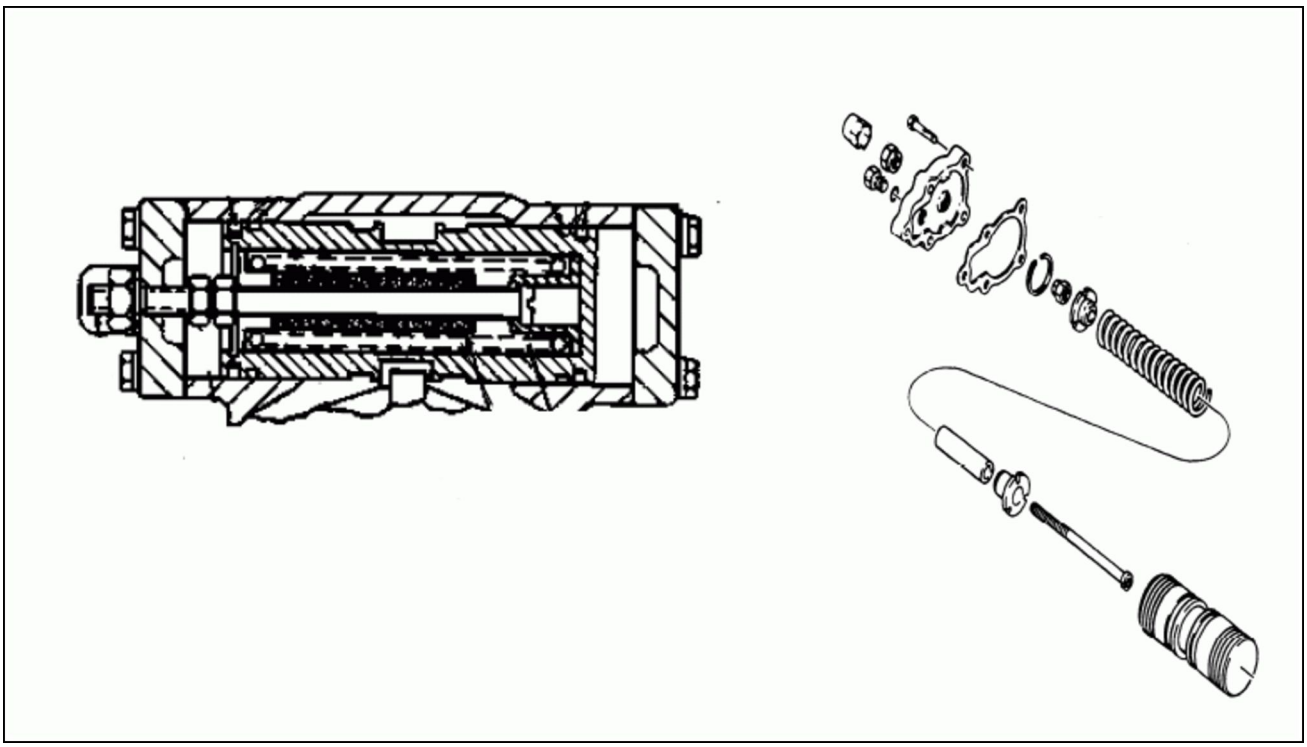


83115743 35

8. Move the faulty hydrostatic pump's control levers in both directions. The servo control is properly adjusted when an even amount of lever travel is required to begin the rotation of the wheels/tracks in either direction. Readjust the servo control and/or the linkage if necessary.
9. Test drive the machine. If the machine steers in either direction more than **1.8 m** (**6 ft**) from the centerline after traveling **30.5 m** (**100 ft**) forward or **15.2 m** (**50 ft**) backward, or if one or both of the pumps continue to travel after the control levers have returned to neutral, recheck the linkage. Please see **Mechanical control - Adjust (29.200)** for linkage adjustment procedures.

Center the servo piston spring

If the adjustment screw requires more than one, full turn to begin tire movement, or a pump has the tendency to continue traveling in the direction that is was last going, please see the following steps:



23111053 5

Exploded view of the piston spring assembly

Contents

Hydraulic systems - 35

Fixed displacement pump - Flow test - Auxiliary couplers

SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380	NA

⚠ CAUTION

Burn hazard!
Do not handle any service fluid (engine coolant, engine oil, hydraulic oil, etc.) at temperatures that exceed 49 °C (120 °F). Allow fluids to cool before proceeding.
Failure to comply could result in minor or moderate injury.

C0107B

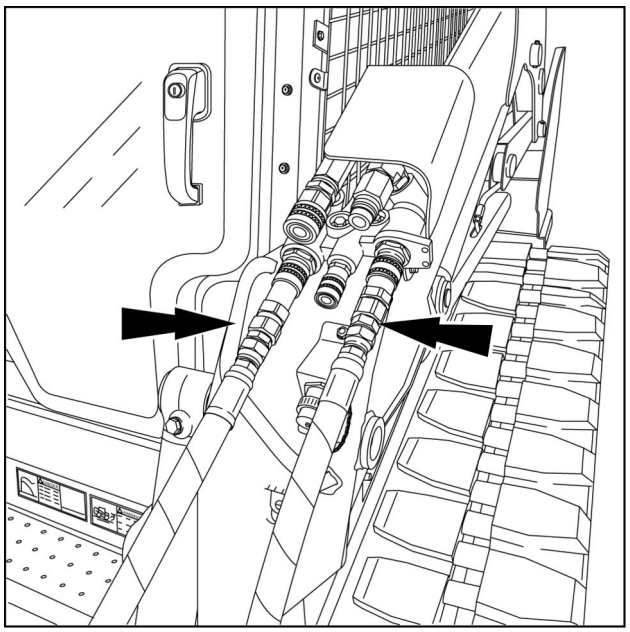
Pump efficiency test using the auxiliary couplers

NOTE: *Hydraulic oil temperature should be a minimum of **52 °C (125 °F)** before attempting any tests on the hydraulic system.*

NOTE: *Two persons are required to perform the flow meter tests to safely avoid possible injury. One person must be seated in the operators seat when the engine is running. The second person is to control the flow meter and take the readings.*

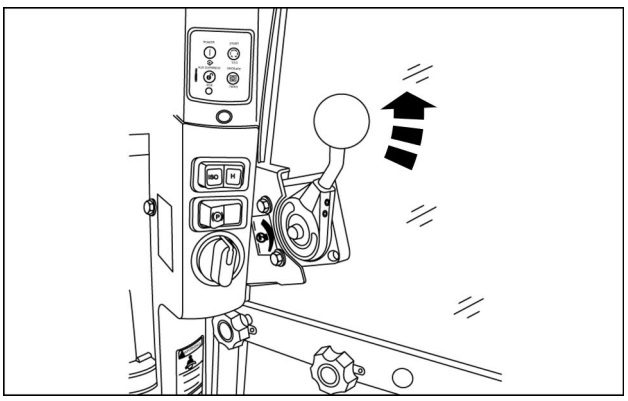
1. Attach the flow meter, part number **380500047**, to the auxiliary couplers on the loader arm.

NOTE: *Verify that the flow inlet and outlet direction is correct on the flow meter.*



RAPH12SSL0241AA 1

2. Start the machine and run at full throttle.
3. Adjust the machine's RPM to **200 RPM** less than the full throttle RPM.
4. Record the set RPM on the data collection sheet located on the following page.

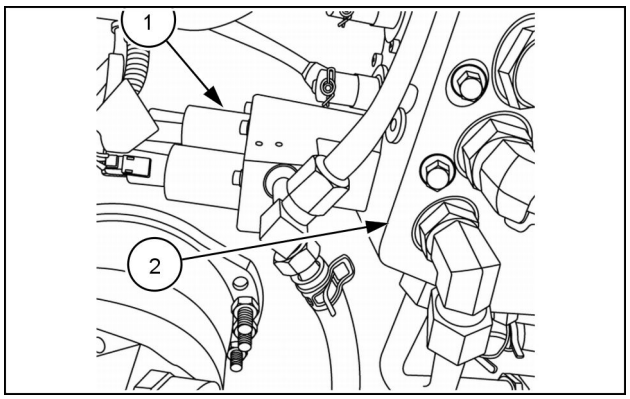


931007504 2

Main control valve - Install - Proportional auxiliary valve extend solenoid

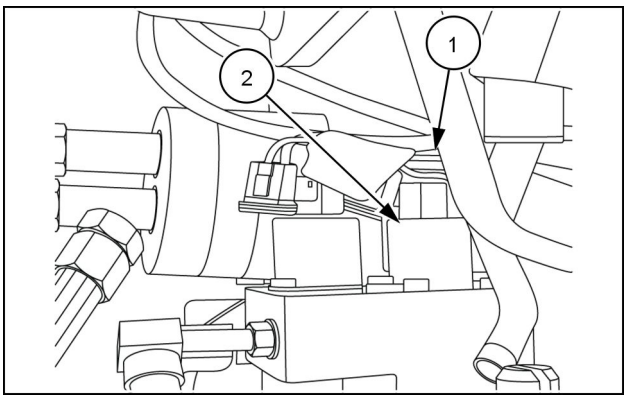
Alpha Series Compact Track Loaders	NA Mechanical hydraulic controls
Alpha Series Skid Steer Loaders	NA Mechanical hydraulic controls

1. Insert the proportional auxiliary valve extend solenoid **(1)** into the loader valve block **(2)**.



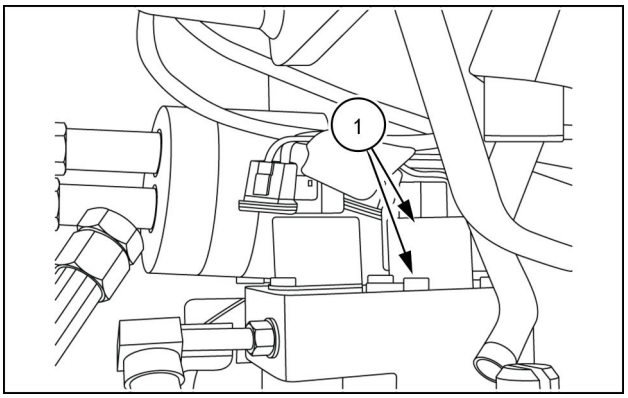
931002092B 1

2. Connect connector **(1)** to the proportional auxiliary valve extend solenoid **(2)**.



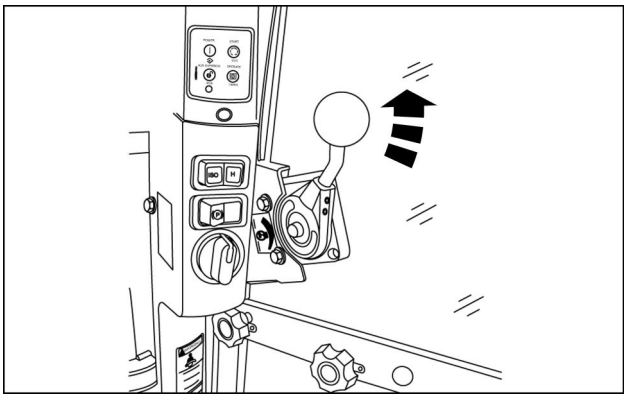
931002095 2

3. Insert the two retaining screws **(1)** into proportional auxiliary valve extend solenoid. Tighten to **5 N·m** (**3.7 lb ft**).



931002095 3

4. Start the machine and run the engine at high idle.

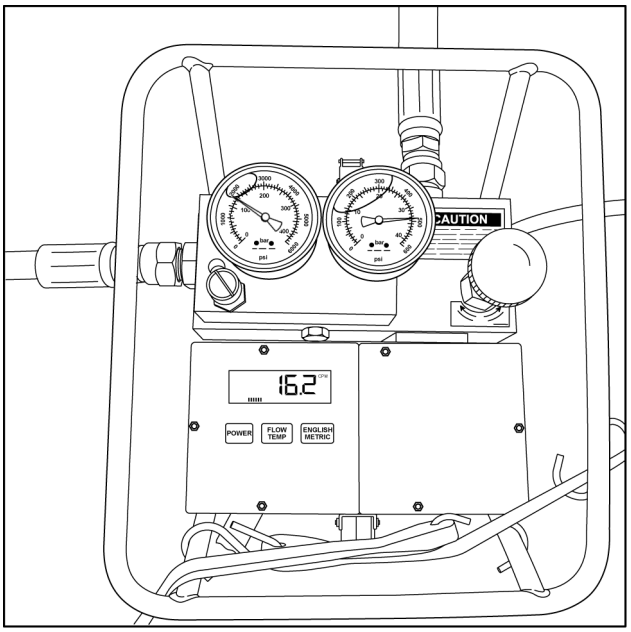


931007504 3

5. Adjust the flow meter pressure until **124 bar** (**1800 psi**) is achieved. While watching the flow meter liter per minute (l/min) gauge or gallon per minute (gpm) gauge, activate the auxiliary couplers in both directions. Record the pump flow on the data collection sheet located on the following page.
   Compare the flow of every auxiliary function. Differences in pump flow indicate internal leaks and/or easier paths to tank.

NOTE: *Pump flow should be within* ***4 l/min*** *(****1 US gpm****) of pump specification. Please see* ***Fixed displacement pump - General specification (35.104)*** *for specifications on the pumps.*

NOTE: *Image* ***4*** *is an example of a flow reading. Image* ***4*** *may not match your reading.*



RAPH12SSL0329AA 4

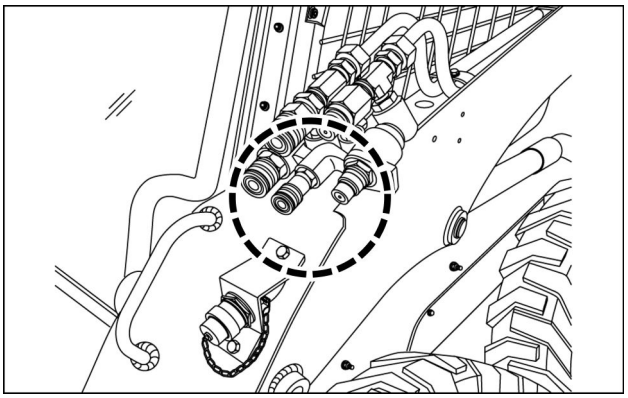
Pilot valve - Pressure test

SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380	NA

NOTE: *Hydraulic oil temperature should be a minimum of* ***52 °C*** *(****125 °F****) before attempting any tests on the hydraulic system.*

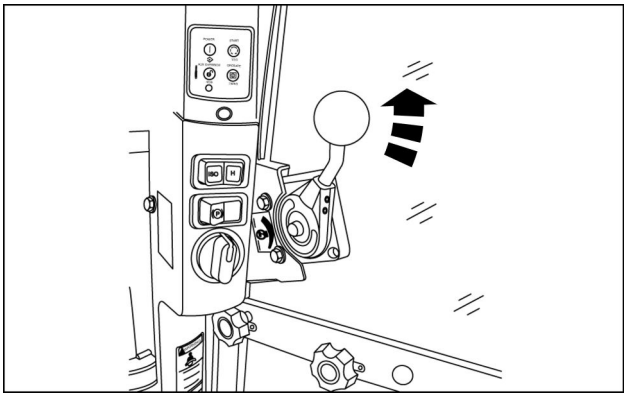
1. Connect a **345 bar** (**5000 psi**) pressure gauge, part number **380500129**, to the high flow, outlet auxiliary coupler.

NOTE: *Verify flow direction for accurate reading and machine safety.*



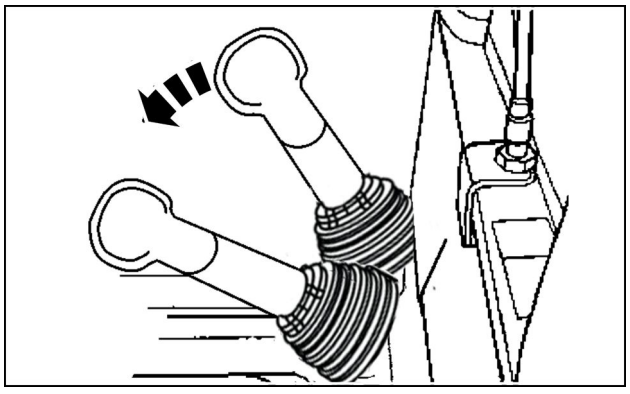
93106839B 1

2. Start the machine, and raise the engine speed to full throttle.



931007504 2

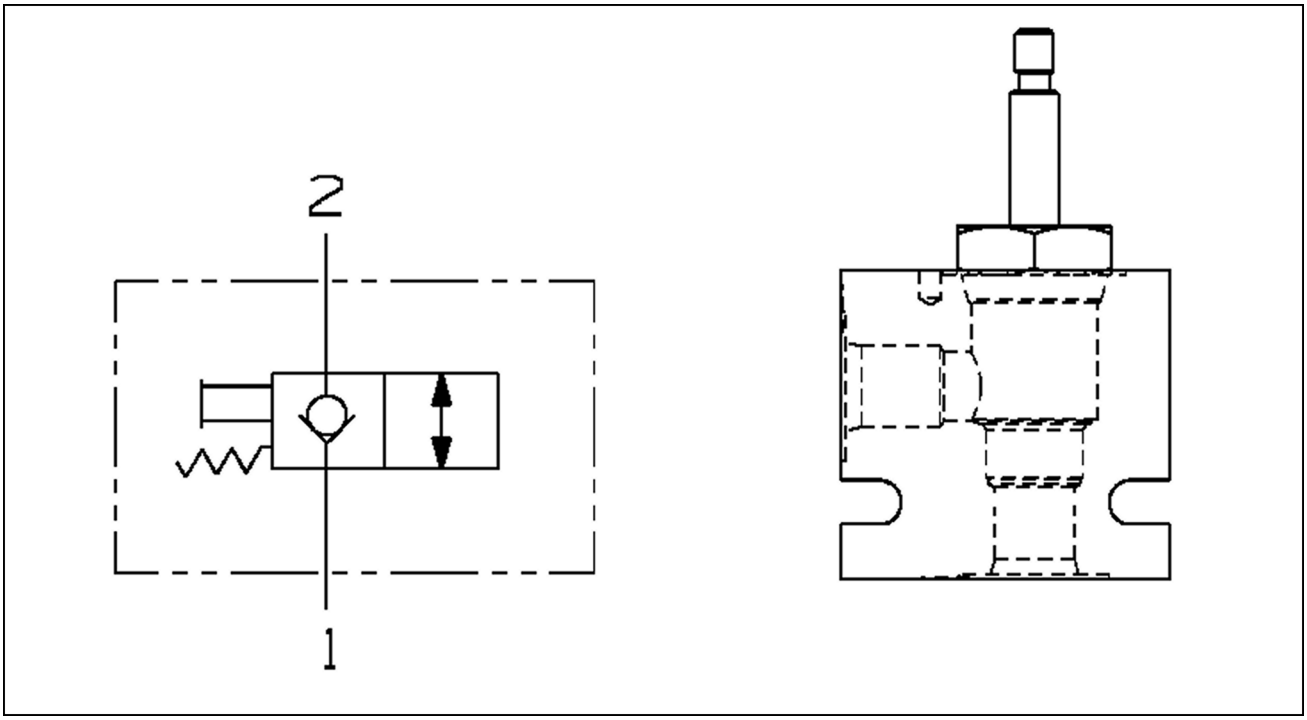
3. Engage the auxiliary hydraulics.
4. Stroke a bucket function to the end of the cylinder travel on the machine, and hold the bucket in that position using the joystick; This will put a load on the machine.



BS06H186AA 3

Front loader arm hydraulic system - General specification - Override valve

SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380	NA



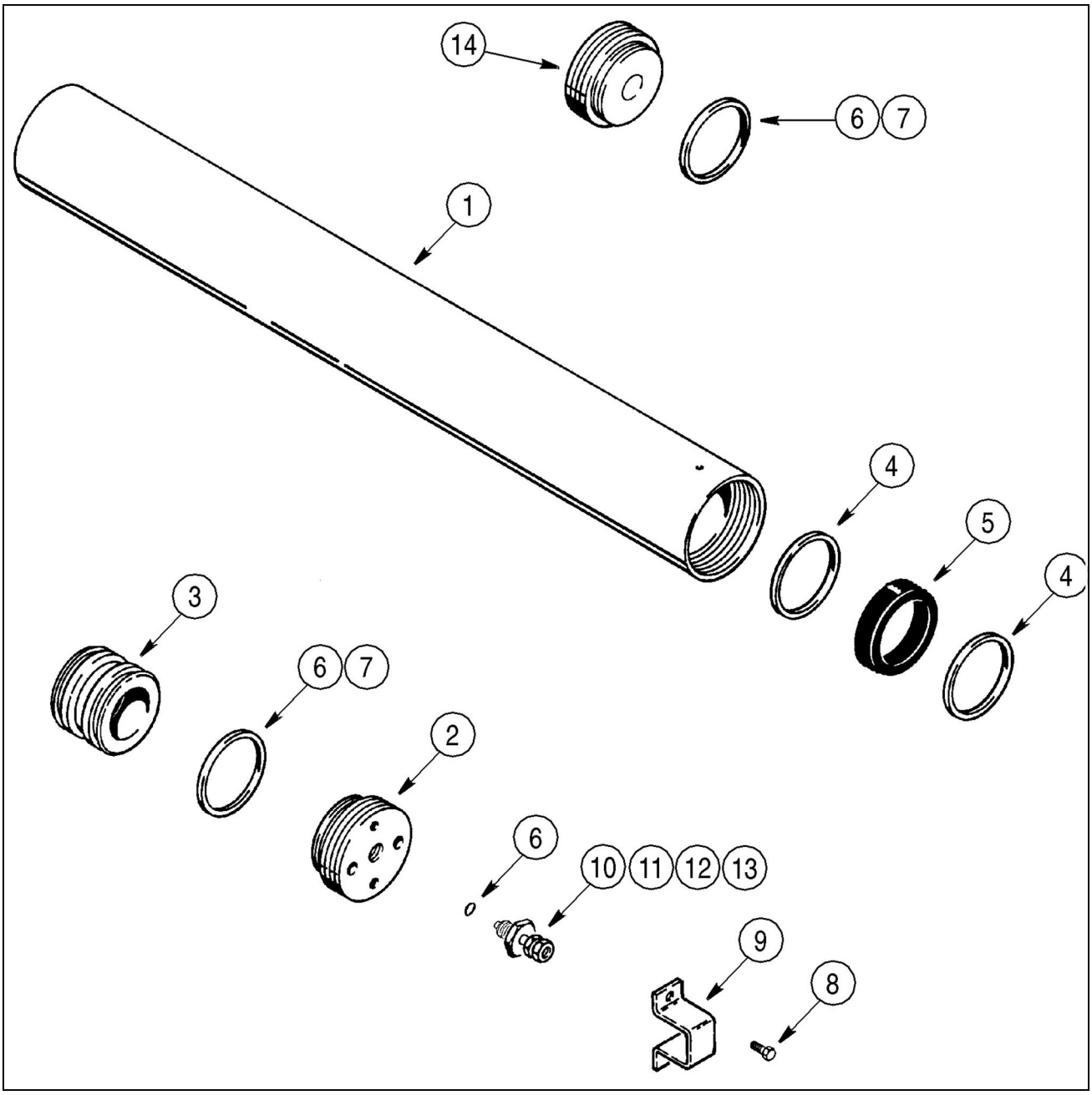
RAPH12SSL0340GA 1

Override valve for the loader arm

Hydraulic requirements:	Flow = **22.7 l/min** (**6 US gpm**).
	System pressure = **210 bar** (**3050 psi**).
Port identification	1 - Tank return
	2 - Lift cylinder base port

Accumulator - Visual inspection

SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380	NA



BS96H067 1

1. Tube	5. Quad ring	9. Guard	13. Body
2. Gland with gas valve	6. O-ring	10. Gas valve assembly	14. Gland without gas valve
3. Piston	7. Backup ring (if used)	11. Cap	
4. Seal	8. Cap screw	12. Valve core	

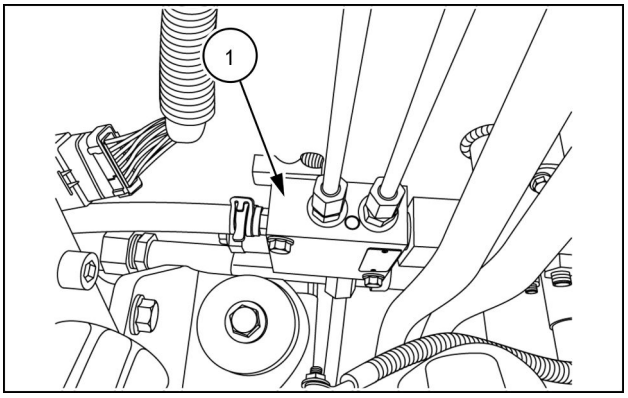
Prior operation:
Accumulator - Disassemble (35.701)

1. Clean all parts in cleaning solvent.

Tool quick coupler hydraulic system - Install

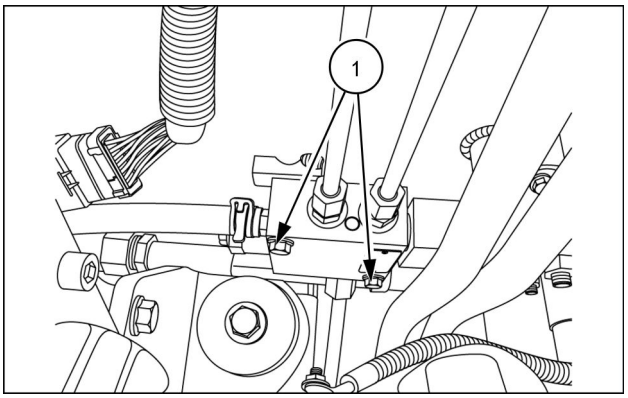
SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380	NA

1. Locate where the command valve **(1)** should be positioned on the body.



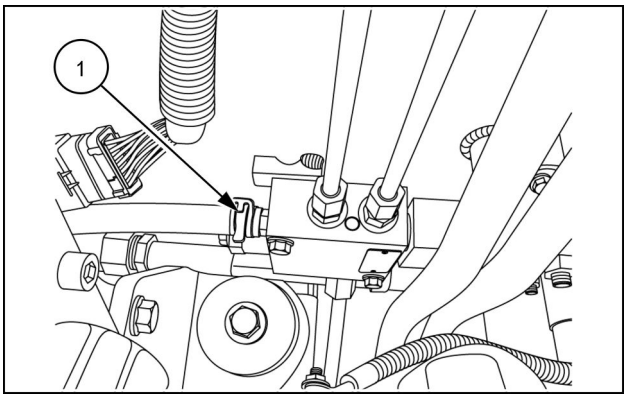
931001720 1

2. Install the mounting hardware **(1)**.



931001720 2

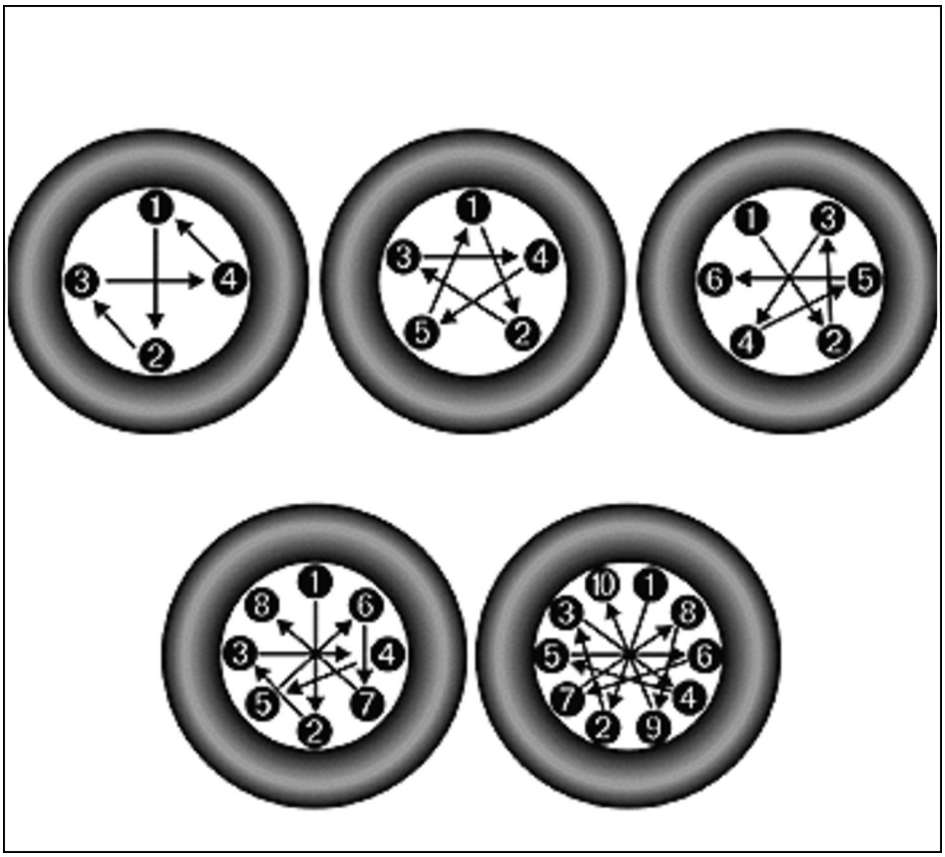
3. Connect the valve drain hose **(1)**.



931001720 3

Front wheels - Torque

SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA



63109344 1

Torque pattern

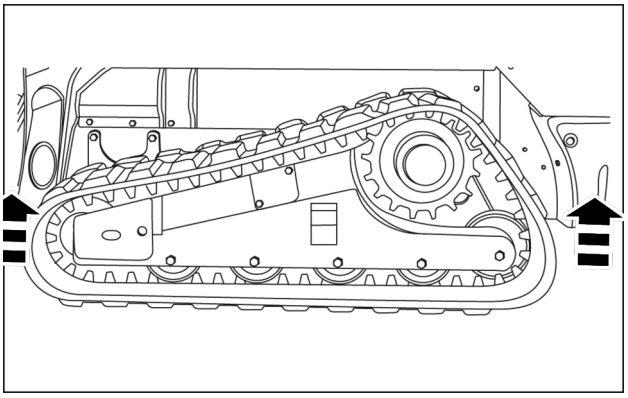
Torque table

Taper nut torque	**169.5 N·m** (**125 lb ft**)
Flange nut torque	**203.5 N·m** (**150 lb ft**)

Rubber track - Tension adjust

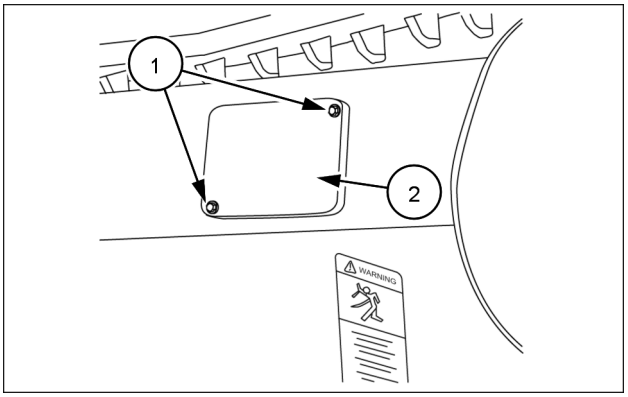
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380	NA

1. Park the machine on a level surface.
2. Lift the machine off of the ground approximately **12.7 cm** (**5 in**), using adequate lifting equipment.



231002469 1

3. Remove the screws **(1)** from the adjuster cover **(2)**, and remove the cover **(2)**.

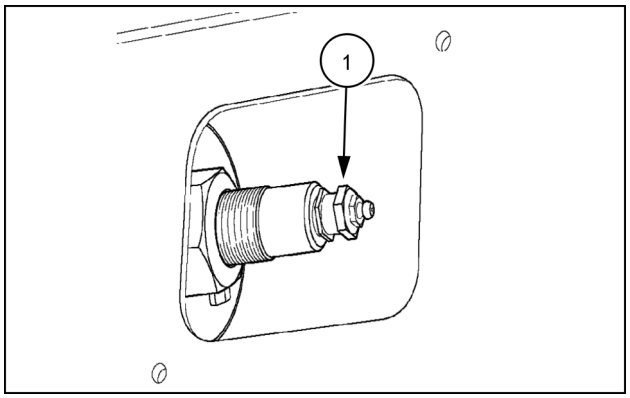


231002468A 2

4. Loosen the grease valve **(1)**, but do not remove.

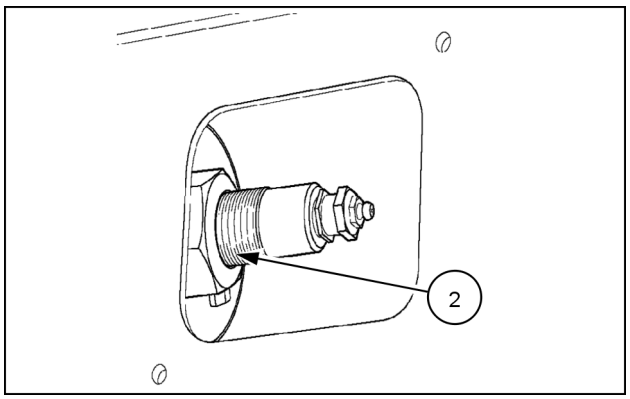
NOTE: *Do not remove the grease valve body from the adjuster. Internal parts (ball, spring, and poppet) may be lost.*

5. Install a grease gun on the grease valve **(1)**.



231002478 3

6. To tighten the track on the frame, apply grease to the adjuster **(2)**.



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SERVICE

(*) See content for specific models

Air conditioning - Discharging

SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380	NA

⚠ WARNING

Avoid injury!
Avoid breathing air-conditioning refrigerant, lubricant vapor or mist. If accidental system discharge occurs, ventilate the work area before resuming service.
Failure to comply could result in death or serious injury.

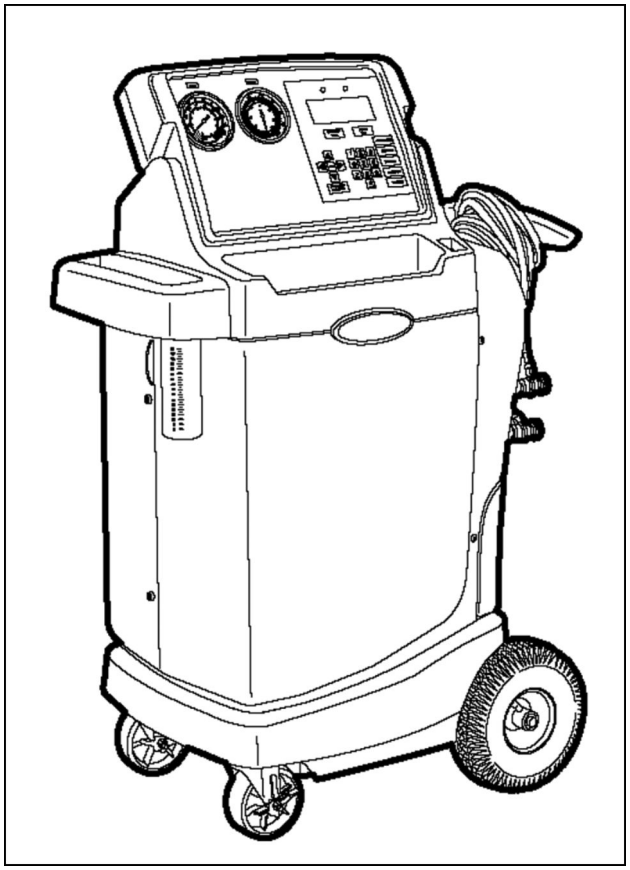
W1000B

Prior operation:
Operate the air conditioning system for approximately ten minutes before starting the following procedure. Turn the system off after ten minutes of operation.

NOTICE: *A/C systems are to be maintained by a certified professional. Do not attempt the following procedure without A/C certification.*

NOTE: *Recovered refrigerant passes through an oil separator and filter-drier before entering the refrigerant tank. The moisture indicator will turn green when dry refrigerant passes over it.*

1. Clean the external surfaces of the compressor and hoses.
2. Remove the caps from the service ports on the machine.
3. Verify the valves on the charging station, part number **34788**, are in the closed position.
4. Connect the hose from the low pressure gauge to the low pressure port on the machine.
5. Connect the hose from the high pressure gauge to the high pressure port on the machine.
6. Turn in both thumbscrews to depress the service valves.
7. Open the high and low valves on the charging station, part number **34788**.
8. Make certain the refrigerant tank valves are open.
9. Turn on the charging station, part number **34788**, and recover the refrigerant.



RAPH15SSL0059CA 1

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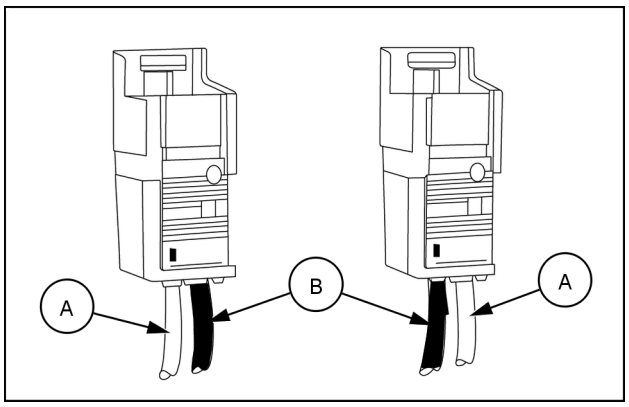
Electrical system - 000

Cross connection

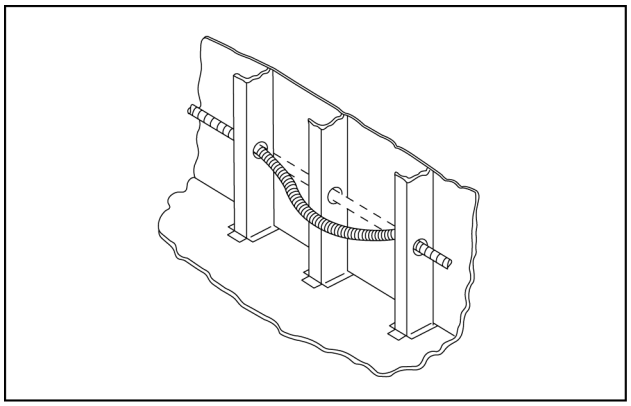
- Terminals that are connected in the wrong cavity will result in system malfunction.



RAIL14SSL0604AA 18

Incorrect routing

- A wiring harness not routed properly can lead to problems.



RAIL14SSL0607AA 19

Wiring harnesses - Electrical schematic sheet 04 Ignition / Charging System

Type	Component	Connector / Link	Description
Sensor	**B-001**		AIR FILTER RESTRICTION SWITCH
Voltage source	**G-001**	P91	BATTERY
Voltage source	**G-002**	B_ALTX-TACHX-LAMP	ALTERNATOR
Ground	**GND-008**	GND-008	
Ground	**GND-014**	GND-014	Earth
Relay	**K-006**		Relay
Motor	**M-001**	B_START	STARTER MOTOR
Resistor	**R-003**		STARTER HOLD-IN
Resistor	**R-004**		STARTER PULL-IN
Switch	**S-004**		
Switch	**S-008**		Ignition Sw Contacts
Switch	**S-044**		BATTERY DISCONNECT SWITCH
Connector	X-005	X-005	STARTER/ALTERNATOR
Connector	X-005A	**X-005A**	STARTER/ALTERNATOR JUMPER
Connector	X-508	**X-508**	
Connector	X-9	**X-9**	
Connector	X-LAMP	X-LAMP	
Connector	X-POS_TERM	**X-POS_TERM**	X-POS_TERM BATTERY POWER
Connector	X-TACH	X-TACH	RPM SIGNAL
Connector	X-UNSW_PWR	**X-UNSW_PWR**	UNSWITCHED POWER

Wiring harnesses - Electrical schematic sheet 16 Left-Hand Cab Console

Type	Component	Connector / Link	Description
Diode	**D-001**		Diode
Switch	**S-001**	**X-301**	ROTATING BEACON SWITCH
Switch	**S-005**	**X-306**	LOADER LOCKOUT SWITCH
Switch	**S-009**	**X-300**	HYDRAULIC COUPLER SWITCH
Switch	**S-011**	**X-365**	NH PARK BRAKE SWITCH
Switch	**S-013**	**X-317**	SELF LEVEL SWITCH
Switch	**S-041**	**X-302**	HAZARD LAMP SWITCH
Switch	**S-042**	**X-303**	HIGH FLOW SWITCH
Connector	X-300	**X-300**	
Connector	X-301	**X-301**	
Connector	X-302	**X-302**	
Connector	X-303	**X-303**	
Connector	X-306	**X-306**	
Connector	X-310	**X-310**	
Connector	X-317	**X-317**	
Connector	X-365	**X-365**	
Connector	X-ACC	X-ACC	
Sub-Assembly	**Z-008**	X-ACC	ACCESSORY POWER OUTLET

Wiring harnesses - Electrical schematic sheet 28 HVAC

Type	Component	Connector / Link	Description
ECU	**A-003**	**X-HVC1**	HVAC BOX
Relay	**K-020**	**X-111**	CONDENSER RELAY
Motor	**M-003**		Motor
Switch	**S-017**	**X-275**	A/C SWITCH (LEFT CONSOLE)
Switch	**S-020**	**X-270**	BLOWER SWITCH (LEFT CONSOLE)
Switch	**S-040**		HVAC HIGH PRESSURE SWITCH
Connector	X-11	X-11	A/C COMPRESSOR
Connector	X-111	**X-111**	
Connector	X-252	**X-252**	
Connector	X-270	**X-270**	
Connector	X-271	**X-271**	
Connector	X-275	**X-275**	
Connector	X-58	**X-58**	
Connector	X-74	**X-74**	
Connector	X-75	**X-75**	
Connector	X-76	**X-76**	
Connector	X-HVC1	**X-HVC1**	
Solenoid	**Y-002**	AC_COMP	A/C COMP
Sub-Assembly	**Z-017**	**X-252**	TEMP CONTROL (LH CONSOLE)
Sub-Assembly	**Z-019**	**X-271**	WATER VALVE
Sub-Assembly	**Z-074**	**X-74**	HVAC CONDENSER FAN

Wiring harnesses - Electrical schematic sheet 41 Unswitched Power Option

Type	Component	Connector / Link	Description
Voltage source	**G-003**	0M10	BATTERY

Wiring harnesses - Electrical schematic sheet 12 Left-Hand Cab Console

Type	Component	Connector / Link	Description
Switch	**S-001**		ROTATING BEACON /STROBE SWITCH
Switch	**S-005**		LOADER LOCKOUT SWITCH
Switch	**S-007**		NH PARK BRAKE SWITCH
Switch	**S-009**		HYDRAULIC COUPLER SWITCH
Switch	**S-013**		SELF LEVEL SWITCH
Switch	**S-039**		HIGH FLOW SWITCH
Switch	**S-040**		HAZARD LAMP SWITCH
Connector	X-300	**X-300**	
Connector	X-301	**X-301**	
Connector	X-302	**X-302**	
Connector	X-303	**X-303**	
Connector	X-306	**X-306**	
Connector	X-317	**X-317**	
Connector	X-365	**X-365**	
Connector	X-ACC	X-ACC	
Sub-Assembly	**Z-008**		ACCESSORY POWER OUTLET

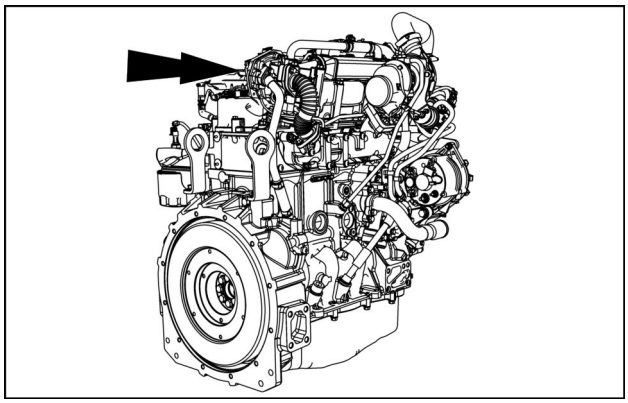
Wiring harnesses - Electrical schematic sheet 24 Radio

Type	Component	Connector / Link	Description
Speaker	**H-011**		RH SPEAKER
Speaker	**H-012**		LH SPEAKER
Connector	X-330	**X-330**	
Connector	X-331	**X-331**	
Connector	X-332	**X-332**	
Connector	X-333	**X-333**	
Connector	X-335	**X-335**	RADIO CONNECTOR
Connector	X-HVC1	**X-HVC1**	

Wire connectors - Component diagram 01 - Connectors X-9010 to X-9019

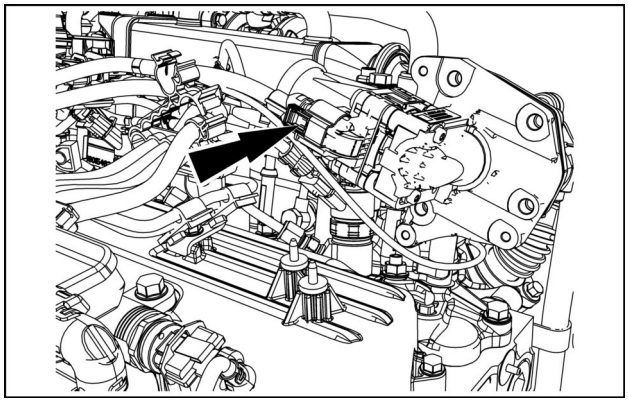
Connector X-9010 - Exhaust gas recirculation valve

CONNECTOR X-9010 - Exhaust gas recirculation valve			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	EN-9095	Actuator supply	**SHEET 06**
2	EN-9093	Signal	
3	-	-	
4	EN-9097	Ground	**SHEET 06**
5	EN-9096	Actuator supply	
6	EN-9094	Sensor supply	



NHIS14ENG0978AA 1

Connector X-9010 is located at the top rear of the engine.



NHIS14ENG0982AA 2

Connector X-9010 is located near the cylinder 4 injector.

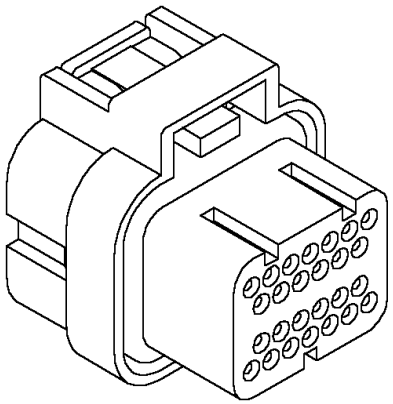
Connector X-9011 - Throttle valve actuator

CONNECTOR X-9011 - Throttle valve actuator			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
1	EN-9098	Sensor supply	**SHEET 06**
2	EN-9135	Actuator supply	
3	EN-9100	Ground	
4	-	-	
5	EN-9099	Signal	**SHEET 06**
6	EN-9134	Actuator supply	

CONNECTOR X-9121 - ECU connector A			
PIN NUMBER	**WIRE NUMBER**	**CIRCUIT REFERENCE**	**ELECTRICAL SCHEMATIC FRAME**
A13	VE-9109	**+5 V** sensor supply, Camshaft speed sensor	**SHEET 05**
A14	VE-9111	Input signal, Camshaft speed sensor	
A15	VE-9137	Switched voltage supply, Fuel metering unit	
A16	VE-9125	High Side Driver (HSD), Bank 1 Injector 1 (Cylinder 1)	
A17	VE-9129	High Side Driver (HSD), Bank 1 Injector 2 (Cylinder 4)	
A18	VE-9139	High Side Driver (HSD), Diesel Exhaust Fluid (DEF)/AdBlue® dosing valve	
A19	-	-	
A20	VE-9026	Low side switch, Selective Catalytic Reduction (SCR) main relay	**SHEET 05**
A21	-	-	
A22	-	-	
A23	VE-9116	Reference ground, Fuel temperature sensor	**SHEET 05**
A24	VE-9097	Reference ground, Exhaust Gas Recirculation (EGR) valve position sensor	
A25	VE-9103	Reference ground, Intake manifold pressure sensor	
A26	VE-9106	Reference ground, Rail pressure sensor	
A27	VE-9118	Reference ground, Exhaust manifold pressure sensor	
A28	VE-9110	Reference ground, Camshaft speed sensor	
A29	-	-	
A30	-	-	
A31	VE-9127	Low Side Driver (LSD), Bank 2 Injector 1 (Cylinder 3)	**SHEET 05**
A32	VE-9126	Low Side Driver (LSD), Bank 1 Injector 1 (Cylinder 1)	
A33	-	-	
A34	VE-9135	H-bridge Pulse-Width Modulated (PWM) supply, Throttle Valve Actuator (TVA) motor	**SHEET 05**
A35	VE-9096	H-bridge Pulse-Width Modulated (PWM) supply, Exhaust Gas Recirculation (EGR) motor	
A36	-	-	
A37	VE-9100	Reference ground, Throttle Valve Actuator (TVA) position sensor	**SHEET 05**
A38	VE-9117	Input signal, Fuel temperature sensor	
A39	VE-9093	Input signal, Exhaust Gas Recirculation (EGR) position sensor	
A40	VE-9102	Input signal, Intake manifold pressure sensor	
A41	VE-9107	Input signal, Rail pressure sensor	
A42	-	-	

X-CAB_GNDB - (Male)

X-CN1A - UCM CN1A (87410948) (Male)

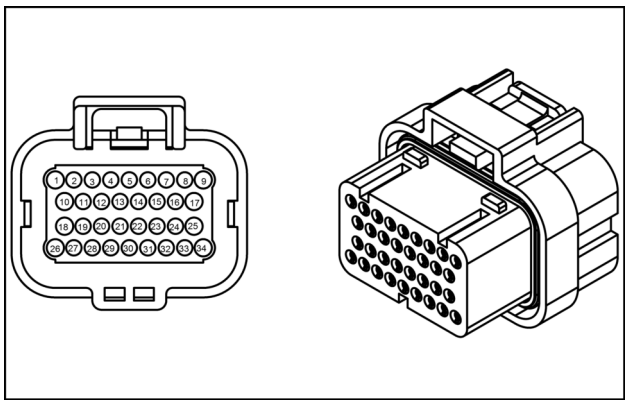


87410948 11

87410948

Pin	From	Wire	Description	Color-Size	Frame
1	SP-120-P-X	1075	UCM GROUND 1A.01	BK/WH - 0.8	**SHEET 05**
7	SP-120-P-X	1076	UCM GROUND 1A.07	BK/WH - 0.8	
8	SP-134-P-X	202	SENSOR SUPPLY 1	PK - 0.8	**SHEET 10**
9	X-BULKHEAD-Male-P-50 CAB/CHASSIS INTERCONNECT	200	SENSOR SUPPLY 3	PK - 0.8	
13	**X-10 pin 2** CHASSIS/LOADER INTERFACE	1018	BUCKET RETURN	BL - 0.8	
14	SP-100-P-X	525	UCM WAKE-UP	YE - 0.8	
16	**X-005A pin 4** STARTER/ ALTERNATOR JUMPER	124	ENGINE RPM SIGNAL	YE - 0.8	
19	SP-099-P-X	1022	DRIVE REVERSE RETURN	BL - 0.8	
20	FUSE1-P-38	189	UCM UNSWITCHED BATTERY FUSE OUT	RD - 0.8	
22	**X-88 pin 11** LOADER / CHASSIS INTERFACE	1020	PROPORTIONAL AUX RETURN	BL - 0.8	
24	**X-88 pin 10** LOADER / CHASSIS INTERFACE	515	PROPORTIONAL AUX RETRACT SIGNAL	WH - 0.8	
26	SP-119-P-X	240	5V REF SUPPLY FUSE	OR - 0.8	

X-CN1B - UCM CN1B (87410946) (Female)

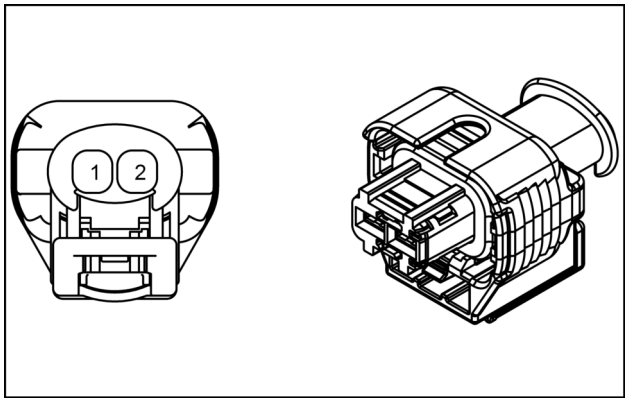


87410946 12

87410946

Pin	From	Wire	Description	Color-Size	Frame
1	SP-120-P-X	1026	UCM GROUND 1B.34	BK/WH - 0.8	**SHEET 05**
9	SP-120-P-X	1025	UCM GROUND 1B.26	BK/WH - 0.8	
13	X-ECC-Male-P-20	560	RH UA2 Y SENSOR OUTPUT	GN - 0.8	**SHEET 12**
15	X-ECC-Male-P-19	548	CONTROL PATTERN NEUTRAL	GN - 0.8	**SHEET 14**

X-028 - UPSTREAM CATALYST TEMP SENSOR [B-007] (84532147) (Female)

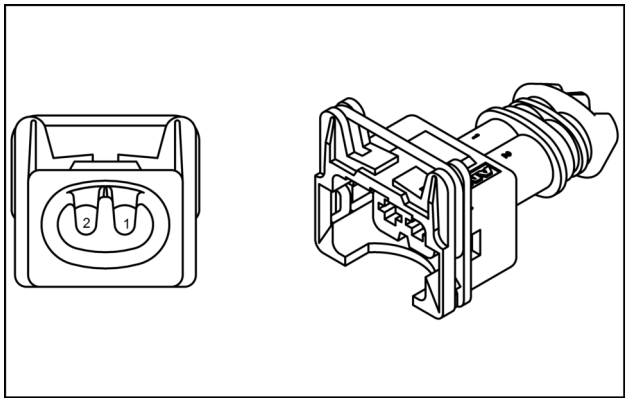


84532147 7

84532147

Pin	From	Wire	Description	Color-Size	Frame
1	**X-012 (Female) pin 82**	1820	CATALYST TEMP SENSOR UPSTREAM	YE - 0.5	**SHEET 06**
2	**X-012 (Female) pin 81**	1810	CATALYST TEMP SENSOR UPSTREAM	BL - 0.5	

X-029 - DOSING MODULE (84607243) (Female)

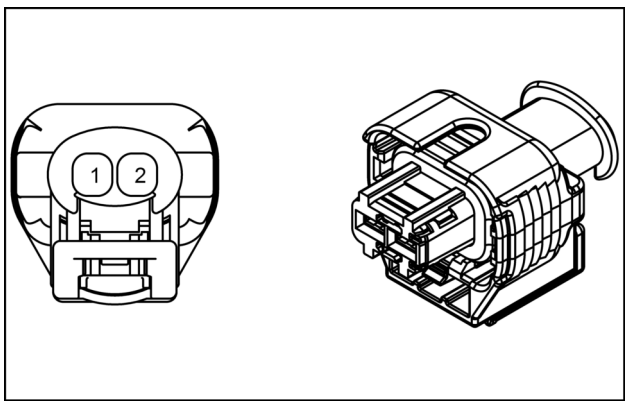


84607243 8

84607243

Pin	From	Wire	Description	Color-Size	Frame
1	**X-016 (Female) pin 3**	2030	DOSING VALVE L	YE - 0.8	**SHEET 07**
2	**X-016 (Female) pin 18**	2180	DOSING VALVE H	BL - 0.8	

X-029B - DOSING MODULE (84532147) (Female)

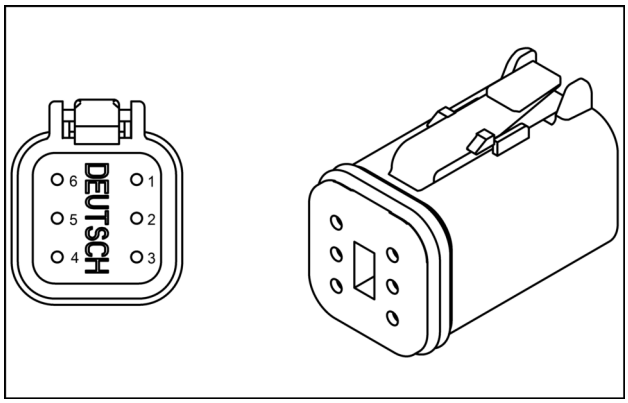


84532147 9

84532147

Wire connectors - Component diagram 09 Connectors X-090 to X-099

X-93 - RH PUMP SWASH PLATE SENSOR [B-026] (87694112) (Female)

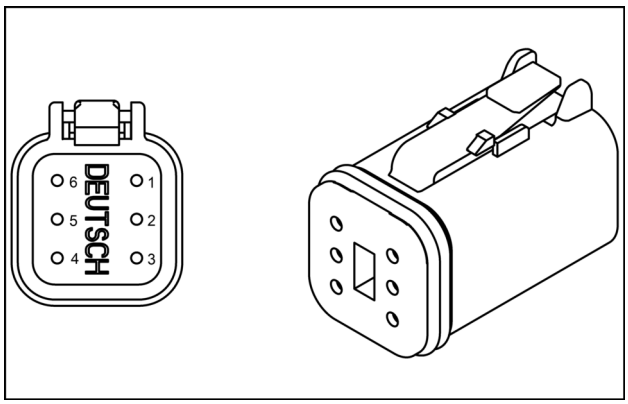


87694112 1

87694112

Pin	From	Wire	Description	Color-Size	Frame
1	SP-124-P-X	1055	RH PUMP ANGLE SENSOR GROUND	BK/WH - 0.8	**SHEET 05**
2	SP-136-P-X	223	RH PUMP ANGLE SENSOR REFERENCE #1	PK - 0.8	
3	**X-CN2B pin 33** UCM CN2B	575	RH PUMP ANGLE #2	YE - 0.8	
4	**X-CN2B pin 32** UCM CN2B	576	RH PUMP ANGLE #1	YE - 0.8	
5	SP-136-P-X	221	RH PUMP ANGLE SENSOR REFERENCE #2	PK - 0.8	
6	SP-125-P-X	1074	RH PUMP ANGLE SENSOR GROUND #2	BK/WH - 0.8	

X-94 - LH PUMP SWASH PLATE SENSOR [B-025] (87694112) (Female)

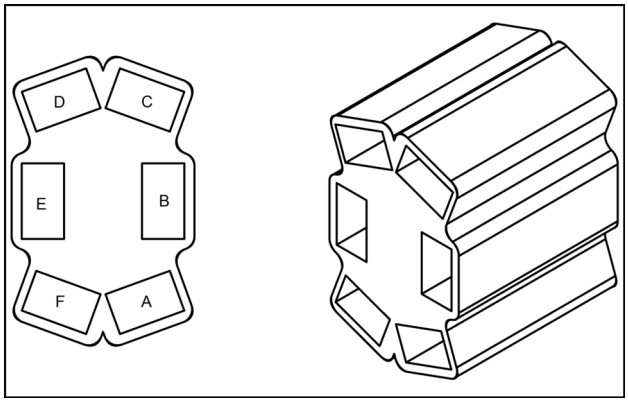


87694112 2

87694112

Pin	From	Wire	Description	Color-Size	Frame
1	SP-124-P-X	1054	LH PUMP ANGLE SENSOR GROUND	BK/WH - 0.8	**SHEET 05**
2	SP-136-P-X	222	LH PUMP ANGLE SENSOR REFERENCE #1	PK - 0.8	**SHEET 10**
3	**X-CN3A pin 9** UCM CN3A	574	LH PUMP ANGLE #1	YE - 0.8	
4	**X-CN3A pin 10** UCM CN3A	573	LH PUMP ANGLE #2	YE - 0.8	
5	SP-136-P-X	209	LH PUMP ANGLE SENSOR REFERENCE #2	PK - 0.8	
6	SP-125-P-X	1073	LH PUMP ANGLE SENSOR GROUND #2	BK/WH - 0.8	**SHEET 05**

X-302 - [S-041] (84159858) (Male)

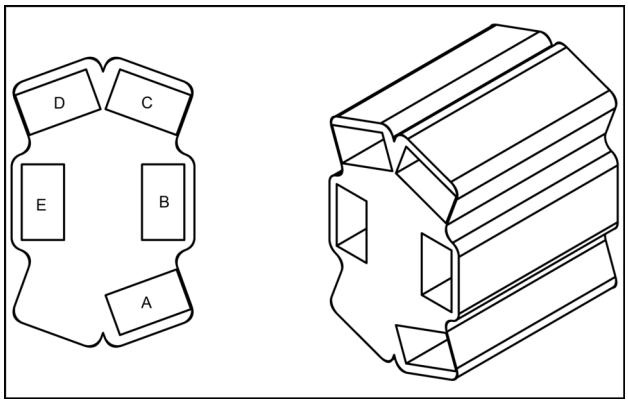


84159858 3

84159858

Pin	From	Wire	Description	Color-Size	Frame
A	SP-018-P-X	776	HAZARD SW LH TURN SIGNAL OUTPUT	VT - 1.0	**SHEET 16**
B	SP-138-P-X	784	LH HAZARD FLASHER POWER IN	OR - 1.0	**SHEET 14**
C	SP-025-P-X	920	HAZARD SW INDICATOR GROUND	BK - 0.8	**SHEET 16**
E	SP-138-P-X	785	RH HAZARD FLASHER POWER IN	OR - 0.8	**SHEET 14**
F	X-HZRDDIODE-P-A	778	HAZARD SW RH TURN SIGNAL OUTPUT	VT - 0.8	**SHEET 16**

X-303 - [S-042] (87693037) (Male)



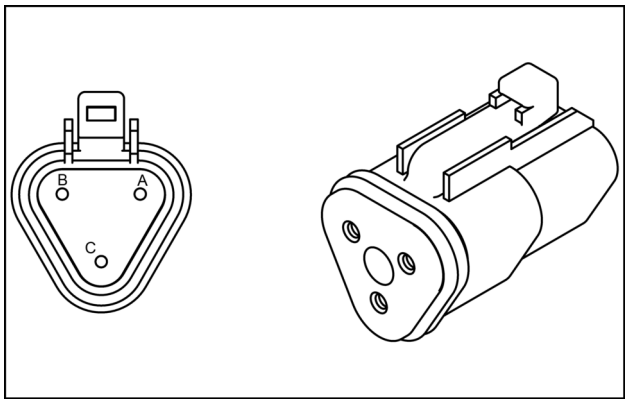
87693037 4

87693037

Pin	From	Wire	Description	Color-Size	Frame
A	X-BULKHEAD-P-26 CAB/ CHASSIS INTERCONNECT	755	HIGH PERFORMANCE HIGH FLOW SIGNAL	WH - 0.8	**SHEET 15**
B	SP-053-P-X	753	HIGH FLOW SW IN	OR - 0.8	
C	X-ECC-P-28	750	STANDARD HIGH FLOW SIGNAL	WH - 0.8	**SHEET 16**
E	SP-025-P-X	921	HIGH FLOW SW INDICATOR GROUND	BK - 0.8	

X-901 - FUEL FILTER (Male)

X-904 - BOOM LOCK INTERLOCK SWITCH [S-025] (87695580) (Female)

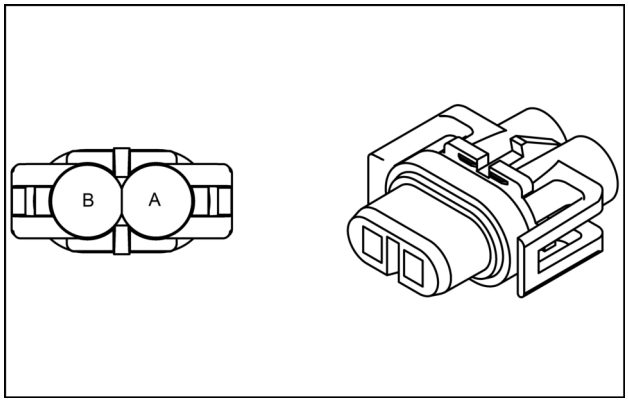


87695580 3

87695580

Pin	From	Wire	Description	Color-Size	Frame
A	**X-CN2A pin 17** UCM CN2A	1103	BOOM LOCK INTERLOCK SW SIGNAL	YE - 0.8	**SHEET 10**
B	SP-037-P-X	1102	BOOM LOCK VALVE POWER	OR - 0.8	

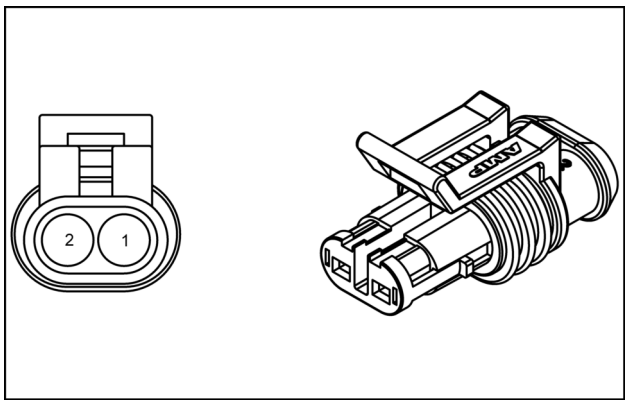
X-038 - (Male)



82003123 5

82003123

X-039 - LH REAR POSITION LIGHT [U-013] (82012083) (Female)



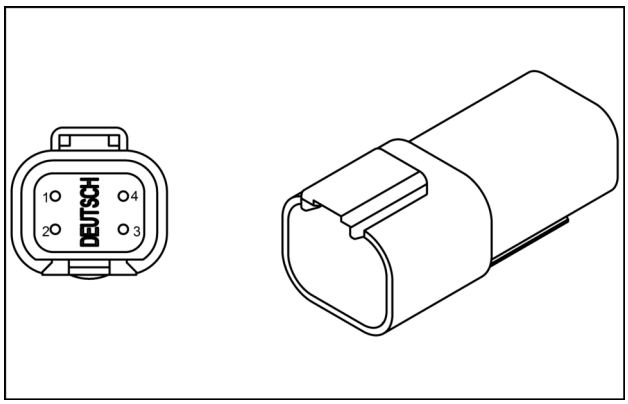
82012083 6

82012083

Pin	From	Wire	Description	Color-Size	Frame
1	**X-201 pin 3** REAR LAMP JUMPER/CHASSIS INTERFA	731	LH TAIL LAMP POWER	VT - 0.8	**SHEET 17**
2	SP-080-P-X	998	LH STOP / TAIL LAMPS GROUND	BK - 0.8	**SHEET 18**

X-30 - (Female)

X-30 - (Male)

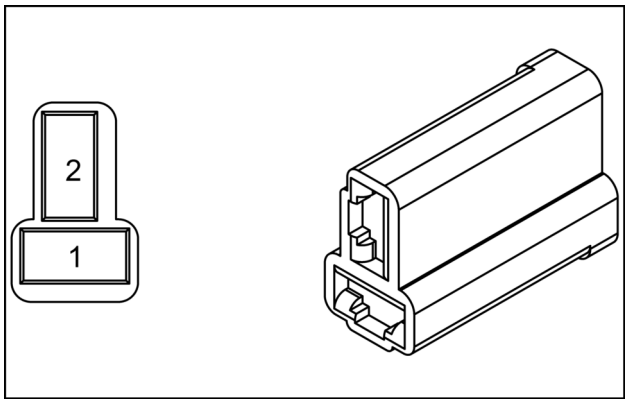


87694154 7

87694154

Wire connectors - Component diagram 17 Connectors X-170 to X-179

X-178 - (84398826) (Female)



84398826 1

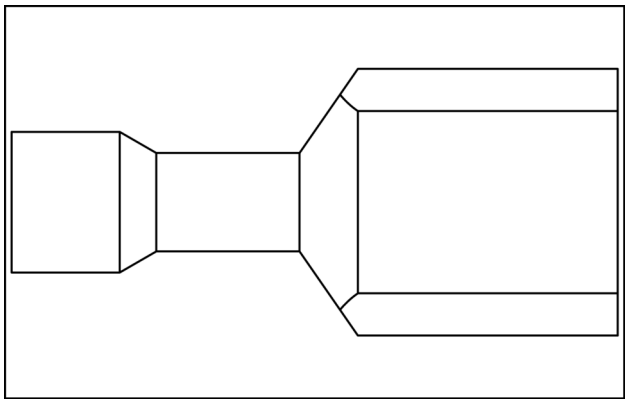
84398826

X-178 - [U-007] (Male)

Pin	From	Wire	Description	Color-Size	Frame
1	SP-027-P-X	928	BEACON LAMP SOCKET GND	BK - 0.8	**SHEET 17**
2	**X-301 pin D**	761	BEACON SW OUTPUT	VT - 0.8	**SHEET 12**

X-331 - [H-011] (Male)

X-332 - (87697629) (Female)



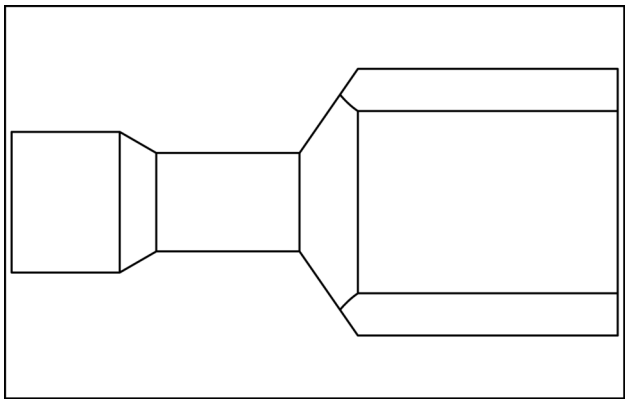
87697629 3

87697629

Pin	From	Wire	Description	Color-Size	Frame
1	**X-335 (Male) pin 6** RADIO CONNECTOR	453	LEFT SPEAKER (+)	WH - 0.8	**SHEET 24**

X-332 - [H-012] (Male)

X-333 - (87697629) (Female)



87697629 4

87697629

Pin	From	Wire	Description	Color-Size	Frame
1	**X-335 (Male) pin 2** RADIO CONNECTOR	452	LEFT SPEAKER (-)	BL - 0.8	**SHEET 24**

Cab harness, mechanical drive, closed cab, Tier 4B (Final) - 47747239

Connector Number	Connector Name	Connector Diagram
X-200A	Chassis/Rear Lamp Jumper Interface	**Wire connectors - Component diagram 20 Connectors X-200 to X-209 (55.100)**
X-205	Door/Chassis Interface	**Wire connectors - Component diagram 20 Connectors X-200 to X-209 (55.100)**
X-231	Chassis Option/Right-Hand Boom Lights Interconnect	**Wire connectors - Component diagram 23 Connectors X-230 to X-239 (55.100)**
X-313	GCU Power	**Wire connectors - Component diagram 31 Connectors X-310 to X-319 (55.100)**
X-314	Right-Hand Power	**Wire connectors - Component diagram 31 Connectors X-310 to X-319 (55.100)**
X-901	Chassis Interface	**Wire connectors - Component diagram 90 Connectors X-900 to X-909 (55.100)**
X-CHS_GND_RR	Chassis Ground	**Wire connectors - Component diagram 00 Connectors X-001 to X-009 and Alphanumeric Connectors A to Z (55.100)**
ECU_GND	ECU Ground	**Wire connectors - Component diagram 00 Connectors X-001 to X-009 and Alphanumeric Connectors A to Z (55.100)**

Chassis harness, Electro-Hydraulic (EH) drive, no Enhanced High-Flow (EHF), Tier 4B (Final) - 47747261

Electrical components - Diode description

D-001 - Diode (Diode)

Component Type	Diode
Wiring frames	**SHEET 16**

A-020 - DENOX 6.3 SUPLLY ECU (ECU)

Component Type	ECU
Wiring frames	**SHEET 06**
Connectors	**X-020 (Female)**

A-050 - GLOW PLUGS (ECU)

Component Type	ECU
Wiring frames	**SHEET 07**

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Battery - Install

SR270 TIER 4B (FINAL) [NGM418237 -]	NA
SV340	NA
TR340 TIER 4B (FINAL) [NGM418237 -]	NA
TV380 TIER 4B (FINAL) [NGM418237 -]	NA

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders.
Failure to comply could result in death or serious injury.

W0398A

⚠ WARNING

Hazardous chemicals!
Battery electrolyte contains sulfuric acid. Contact with skin and eyes could result in severe irritation and burns. Always wear splash-proof goggles and protective clothing (gloves and aprons). Wash hands after handling.
Failure to comply could result in death or serious injury.

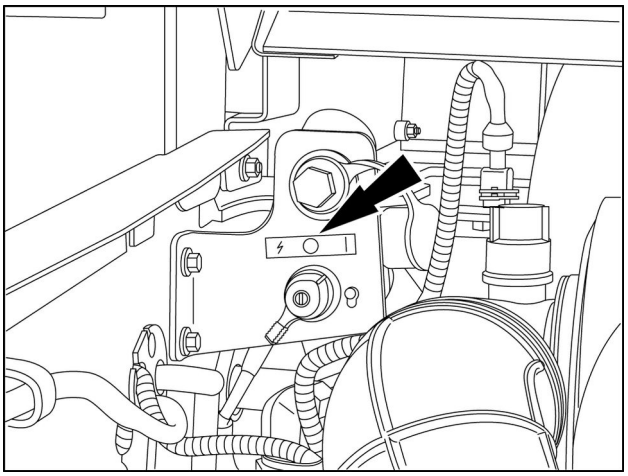
W0006A

⚠ WARNING

Chemical hazard!
When lifting a plastic-cased battery, excessive pressure on the end walls could cause acid to spill through the vent caps. Lift a plastic-cased battery with a battery carrier or with your hands positioned on opposite corners of the battery. Always wash your hands after handling.
Failure to comply could result in death or serious injury.

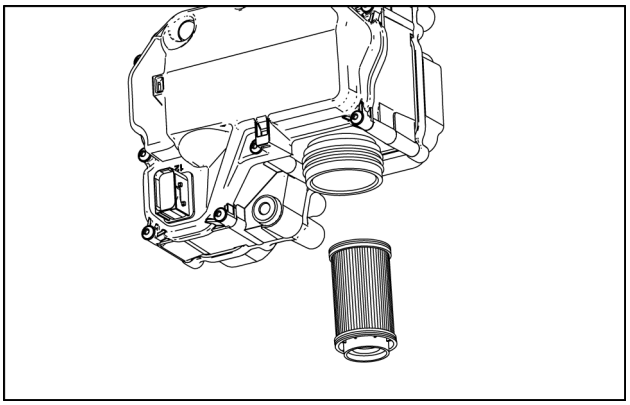
W0385A

1. Confirm that the battery quick disconnect switch is in the OFF position.



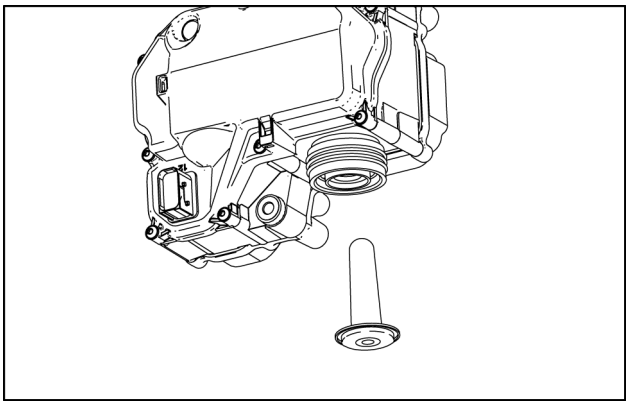
RAIL14SSL0714AA 1

7. Oil the O-rings on the new filter element. Insert the filter element fully into the supply module.



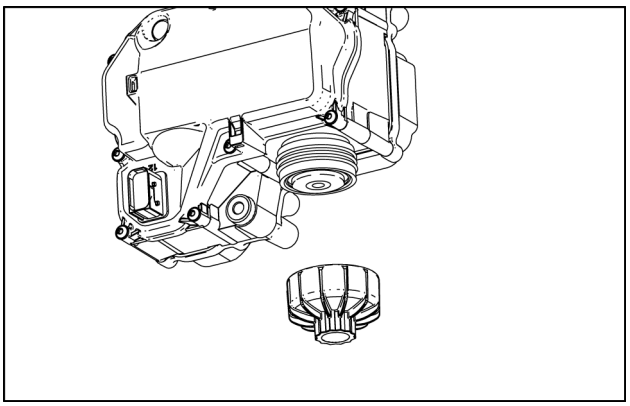
RAIL13GEN0032AA 8

8. Install the new equalizing element.



RAIL13GEN0027AA 9

9. Install the filter cover. Torque to **15 - 25 N·m** (**11 - 18 lb ft**)



RAIL13GEN0026AA 10

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Hydrostatic drive control system - 019

(*) See content for specific models

Text display

The operator may choose a continuous display of one of the four following parameters or select cycle from the dSPLY top level menu and momentarily display all four of the parameters in a cycle for a few seconds each.

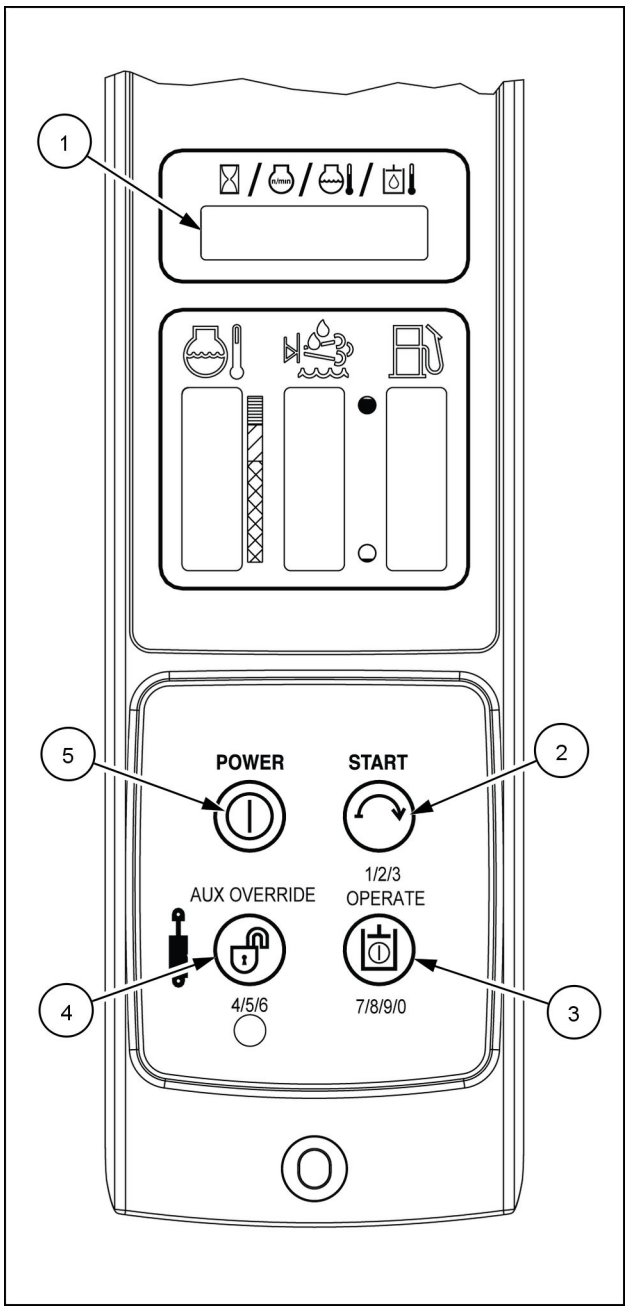
- HOUR - Engine hours.
- RPM - Engine RPM.
- COOLT - Engine coolant temperature.
- HOILT - Hydraulic fluid temperature.
- CYCLE - Cycle though all four parameters.

NOTE: *The instrument cluster is programmed to display the last setting selected when you sit in the seat.*

Change or select from the dSPLY level menu

Access the SETUP menu, press the START button until dSPLY appears on the screen.

1. Push the POWER button **(5)** to display the current selection.
2. Push the START button **(2)** to toggle through the selections.
3. Once the desired selection appears on the text display, push the POWER button **(5)** to save the selection.



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(*) See content for specific models

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Warning indicators, alarms, and instruments - 408

1030-Foot Throttle Sensor Is Below Range - Open Or Shorted To Ground

Context:
The instrument cluster has detected an problem with the foot throttle signal to the instrument cluster. Diagnostic Trouble Code **1030 - Foot Throttle Sensor Is Below Range - Open Or Shorted To Ground** has an error priority of White.
The engine speed is based on the hand throttle sensor while Diagnostic Trouble Code **1030 - Foot Throttle Sensor Is Below Range - Open Or Shorted To Ground** is active.

Cause:
The instrument cluster has sensed that the foot throttle signal has failed. The fault is active while the engine is on and the foot throttle input voltage, **X-C23 (Male) pin 22** falls below **0.2 V**.

Possible failure modes:

1. A short circuit in the wiring.
2. An open circuit in the wiring.
3. A failure of the foot throttle position sensor.
4. A failure of the instrument cluster.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code **1030 - Foot Throttle Sensor Is Below Range - Open Or Shorted To Ground** is recorded again. Go to step **2**.
2. Verify the harness is not damaged.

   Turn the ignition switch OFF.

   Verify the connections from the instrument cluster to the foot throttle position sensor are tight and secure.

   Verify the harness is free of damage, abrasion, corrosion, and incorrect attachment from the instrument cluster to the foot throttle position sensor.

   A. The foot throttle position sensor harness is not damaged and all connections are secure. Go to step **3**.

   B. The foot throttle position sensor harness is damaged or the connectors are loose or damaged. Repair or replace the harness or the connectors as required. Return to step **1** to confirm elimination of fault.
3. Measure the supply voltage to the foot throttle sensor.

   Turn the ignition switch OFF.

   Disconnect the foot throttle connector.

   Turn the ignition switch to the ON position.

   Measure the voltage between **X-20 (Female) pin C** and **X-20 (Female) pin B**. The voltage should be approximately between **5 V**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The voltage is between **4.8 V** and **5.2 V**. Go to step **4**.

   B. The voltage is greater than **5.2 V** or less than **4.8 V**. Go to step **6**.

Disconnect the instrument cluster connector **X-C23 (Male)** . Measure the resistance between X-C23 pin 5 and X-C23 pin 6 on the instrument cluster. The resistance should be between **108 Ω** and **132 Ω**.

Disconnect the ECU connector **X-012 (Female)** . Measure the resistance between X-012 pin 24 and X-012 pin 25 on the ECU. The resistance should be between **108 Ω** and **132 Ω**.

A. All connections are secure. Both resistance measurements are within the specified range. OK to return the machine to service.

B. The harness is damaged or the connectors are loose or damaged. Repair or replace the harness or the connectors as required. Return to step **2** to confirm elimination of the fault.

C. One or both resistance measurements are less than **108 Ω** or greater than **132 Ω**. Replace the control module that has the bad resistance value. Return to step **2** to confirm elimination of fault.

1532-Backup Alarm - Short to Ground

Context:
The UCM has sensed an improper current from the backup alarm. Diagnostic Trouble Code **1532 - Backup Alarm - Short to Ground** has an error priority of White.
The backup alarm is disabled while Diagnostic Trouble Code **1532 - Backup Alarm - Short to Ground** is active.

Cause:
The UCM has sensed an improper current from the backup alarm. The fault is active only when both pumps are in reverse and the backup alarm solenoid output current is high.

Possible failure modes:

1. A short circuit in the wiring.
2. A faulty backup alarm.
3. The UCM has an internal failure.

Solution:

1. Use the machine to recreate conditions for error. Use the EST to verify fault code **1532 - Backup Alarm - Short to Ground** is active.

   A. If the fault is active, continue with step **2**.

   B. If the fault is not active, the fault may be intermittent and not currently active, continue with step **4**.
2. Check for a short circuit to ground.

   Disconnect connector X-BKUP-PWR from the backup alarm.

   Disconnect UCM connector **X-CN3B (Female)** .

   Measure the resistance between **X-CN3B (Female) pin 18** and chassis ground. The resistance should be greater than **20,000 Ω**.

   A. The resistance is greater than **20,000 Ω**. Go to step **3**.

   B. The resistance is less than **20,000 Ω**. There is a short circuit in the wiring. Repair as required. Return to step **1** to confirm elimination of the fault.
3. Measure the resistance through the backup alarm.

   Disconnect connector X-BKUP-GND from the backup alarm.

   Use a multi-meter to measure the resistance between the pins on the backup alarm.

   A. If resistance is normal, replace the UCM.

   B. If resistance is infinite, the backup alarm has developed an open. Replace the backup alarm .

   C. If resistance is **0 Ω**, the backup alarm has shorted internally. Replace the backup alarm.
4. Visually inspect the relevant harnesses and connectors for damage, bent or dislocated pins, corroded terminals or broken wires. Verify that the connectors are fully installed. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned. Operate the machine while monitoring the EST and the display. Investigate the nearby wiring.

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

   B. If no damage or other than normal display readings are indicated, erase the Diagnostic Trouble Code and continue operation.

Wiring harnesses - Electrical schematic sheet 22 Lamps (55.100.DP-C.20.E.22)

1909-VCM - Rail 12VF3 - Boom Raise/Lower Input Power Off

Context:
The UCM has sensed that the voltage on **X-CN2B (Male) pin 9** and **X-CN2B (Male) pin 17** is less than **9 V**. Diagnostic Trouble Code **1909 - VCM - Rail 12VF3 - Boom Raise/Lower Input Power Off** has an error priority of Red.
Boom functions are disabled while Diagnostic Trouble Code **1909 - VCM - Rail 12VF3 - Boom Raise/Lower Input Power Off** is active.

Cause:
The UCM has sensed that the voltage on **X-CN2B (Male) pin 9** and **X-CN2B (Male) pin 17** is less than **9 V**. The fault is active while the ignition is ON, the engine is not cranking, and Diagnostic Code **1903 - VCM - VCM Supply Voltage Below Operational Limit** is not active.

Possible failure modes:

1. Fuse F-022 is blown or missing.
2. An open circuit in the wiring.
3. A failure of the UCM.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code **1909 - VCM - Rail 12VF3 - Boom Raise/Lower Input Power Off** is recorded again. Go to step **2**.
2. Verify the harness is not damaged.

   Turn the ignition switch OFF.

   Inspect the UCM connections and the accessory power distribution fuse block #1 connections. All connections should be secure, tight, free of corrosion, abrasion, and damage.

   Inspect the harness from the UCM connector **X-CN2B (Male)** to the accessory power distribution fuse block #1. Verify that the harness is free of damage, corrosion, abrasion, and incorrect attachment.

   A. The wiring harness is not damaged and all connections are secure. Go to step **3**.

   B. The harness is damaged or the connectors are loose or damaged. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.
3. Measure the voltage at the fuse.

   Turn the ignition switch ON.

   Measure voltage between the accessory power distribution fuse block #1 pin 2 and chassis ground. The voltage should be approximately **12 V**.

   A. The voltage is between **9 V** and **14.8 V**. Go to step **4**.

   B. The voltage is less than **9 V**. Go to step **5**.
4. Test the UCM connection.

   Turn the ignition switch OFF.

   Fabricate a jumper wire that will connect from the positive battery post to UCM connector **X-CN2B (Male) pin 9** and **X-CN2B (Male) pin 17**.

A. If there is continuity, there is a short circuit in the intake manifold temperature sensor wiring. Repair or replace the harness as required.

B. If there is no continuity, leave the intake manifold temperature sensor disconnected and continue to step **4**.

4. Replace the intake manifold temperature sensor.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is no longer active, return the machine to service.

   B. If the fault is still active, check the ECU for the appropriate software and re-flash, if necessary.

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

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 07 Engine F5C T4B (55.100.DP-C.20.E.07)
Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)

From	To	Value
X-012 pin 2	Chassis ground	There should be continuity.
X-012 pin 4	Chassis ground	There should be continuity.
X-012 pin 6	Chassis ground	There should be continuity.

A. If there is no continuity, there is a faulty ECU ground supply. Repair or replace the harness as required.

B. If there is continuity, check the ECU for the appropriate software and re-flash, if necessary.

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

A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 07 Engine F5C T4B (55.100.DP-C.20.E.07)
Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)

B. If there is no continuity, continue to step **4**.

4. Replace the rail pressure sensor.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is no longer active, return the machine to service.

   B. If the fault is still active, check the ECU for the appropriate software and re-flash, if necessary.

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

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 07 Engine F5C T4B (55.100.DP-C.20.E.07)
Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)

3180-CAN communication error between vehicle controller to ECU

Context:
The Engine Control Unit (ECU) is capable of connecting to and communicating on two or more separate Controller Area Networks (CAN). Proper configuration and monitoring of these twisted pair configured networks is also a function of the ECU. CAN Node A Bus is the main vehicle interface bus. The ECU provides a CAN termination resistor for the CAN Node A Bus, internal to the ECU. The ECU receives and responds to proprietary information like low and high idle or intermediate speed set points and parameters or feedback. If the ECU does not receive the message every **0.050 s**, this fault will occur.

Cause:
ECU has sensed a timeout of required vehicle controller data provided on CAN Node A.

Possible failure modes:

1. Faulty vehicle system, related CAN fault.
2. Faulty supply voltage or ground, missing.
3. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
4. Faulty ECU, termination resistor or software.

Solution:

1. Verify fault is present and in active state.

   Use the Electronic Service Tool (EST) to check the status of this fault.

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

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with step **6**.
2. Check for other vehicle CAN faults.

   Use the EST to determine if vehicle CAN faults exist.

   A. If other vehicle CAN faults do exist, resolve the vehicle CAN faults, then check to see that this fault is also resolved.

   B. If other vehicle CAN faults do not exist, continue with step **3**.
3. Check the ECU supply voltage.

   Disconnect the ECU connector X-012.

   To energize the main relay, place a jumper wire between X-012 pin 28 and chassis ground.

   Use a multimeter to check for voltage on the harness :

From	To	Value
X-012 pin 1	Chassis ground	There should be **12.0 V**.
X-012 pin 3	Chassis ground	There should be **12.0 V**.
X-012 pin 5	Chassis ground	There should be **12.0 V**.

   A. If the voltage is present on all of the checks, leave connector X-012 disconnected and continue with step **4**.

   B. If the voltage is not present for one or more of the checks, Locate and restore supply power to the ECU. Repair or replace the harness as required.
4. Check the ECU grounding.

   Use a multimeter to check for continuity on the harness :

From	To	Value
X-012 pin 53	All pins in connector X-012	There should be no continuity.

A. If there is continuity, there is a short circuit in the engine relay A wiring. Locate and repair the shorted conductors. Repair or replace the harness as required.

B. If there is no continuity, check the ECU for the appropriate software and re-flash, if necessary.

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

A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 06 Engine F5C T4B (55.100.DP-C.20.E.06)
Wiring harnesses - Electrical schematic sheet 42 Chassis Interconnection (55.100.DP-C.20.E.42)
Wiring harnesses - Electrical schematic sheet 38 Power Distribution (55.100.DP-C.20.E.38)
Wiring harnesses - Electrical schematic sheet 07 Engine F5C T4B (55.100.DP-C.20.E.07)
Wiring harnesses - Electrical schematic sheet 33 Chassis Connection (55.100.DP-C.20.E.33)
Wiring harnesses - Electrical schematic sheet 03 Accessory Power Distribution (55.100.DP-C.20.E.03)

3338-CAN communication failure between vehicle controller and ECU controller - TSC1_VE message

Context:
The Engine Control Unit (ECU) is capable of connecting to and communicating on two or more separate Controller Area Networks (CAN). Proper configuration and monitoring of these twisted pair configured networks is also a function of the ECU. CAN Node A Bus is the main vehicle interface bus. The ECU provides a CAN termination resistor for the CAN Node A Bus, internal to the ECU. The ECU receives and responds to Torque/Speed Control (TSC) information at two different rates (active and passive) dependant upon change request status. If the ECU is not sensing the TSC message at the active rate, this fault will occur.

Cause:
ECU has sensed a timeout of required vehicle controller data provided on CAN Node A.

Possible failure modes:

1. Faulty vehicle system, related CAN fault.
2. Faulty supply voltage or ground, missing.
3. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
4. Faulty ECU, termination resistor or software.

Solution:

1. Verify fault is present and in active state.

   Use the Electronic Service Tool (EST) to check the status of this fault.

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

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with step **6**.
2. Check for other vehicle CAN faults.

   Use the EST to determine if vehicle CAN faults exist.

   A. If other vehicle CAN faults do exist, resolve the vehicle CAN faults, then check to see that this fault is also resolved.

   B. If other vehicle CAN faults do not exist, continue with step **3**.
3. Check the ECU supply voltage.

   Disconnect the ECU connector X-012.

   To energize the main relay, which provides power to the ECU, place a jumper wire between the X-012 pin 28 and chassis ground.

   Use a multimeter to check for voltage on the harness :

From	To	Value
X-012 pin 1	Chassis ground	There should be **12.0 V**.
X-012 pin 3	Chassis ground	There should be **12.0 V**.
X-012 pin 5	Chassis ground	There should be **12.0 V**.

   A. If the voltage is present on all of the checks, leave connector X-012 disconnected and continue with step **4**.

   B. If the voltage is not present for one or more of the checks, Locate and restore supply power to the ECU. Repair or replace the harness as required.
4. Check the ECU grounding.

3502-ECU internal failure - Software resets in DSM 1

Context:
The Engine Control Unit (ECU) will perform a software reset if a software failure is detected. If this fault is active, a software failure has been reported and a software reset has occurred.

Solution:

1. Check the ECU for the appropriate software and re-flash, if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

3652-CAN A Bus off passive failure

Context:
The Engine Control Unit (ECU) is capable of connecting to and communicating on two separate Controller Area Networks (CAN). Proper configuration and monitoring of the two twisted pair configured networks is also a function of the ECU. CAN Node A Bus is the main vehicle interface bus. The ECU provides a CAN termination resistor for the CAN Node A Bus, internal to the ECU. If the ECU senses that CAN Node A Bus is not functioning properly, this fault will occur.

Cause:
ECU has sensed a “Bus Off” state to be present at the CAN Node A.

Possible failure modes:

1. Faulty supply voltage or ground, missing.
2. Faulty CAN circuit wiring, open circuit, short to ground, or short circuit.
3. Faulty ECU, termination resistor or software.

Solution:

1. Verify fault is present and in active state.

   Use the Electronic Service Tool (EST) to check the status of this fault.

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

   B. If the fault is no longer present or is in an inactive state, the fault may be intermittent and not currently active. Continue with step **6**.
2. Check for other vehicle CAN faults.

   Use the EST to determine if vehicle CAN faults exist.

   A. If other vehicle CAN faults do exist, resolve the vehicle CAN faults, then check to see that **3652 - CAN A Bus off passive failure** is also resolved.

   B. If other vehicle CAN faults do not exist, continue with step **3**.
3. Check the ECU supply voltage.

   Disconnect the ECU connector X-012.

   To energize the Main relay , place a jumper wire between X-012 pin 28 and chassis ground.

   Use a multimeter to check for voltage on the harness :

From	To	Value
X-012 pin 1	Chassis ground	There should be **12.0 V**.
X-012 pin 3	Chassis ground	There should be **12.0 V**.
X-012 pin 5	Chassis ground	There should be **12.0 V**.

   A. If the voltage is present on all of the checks, leave connector X-012 disconnected and continue with step **4**.

   B. If the voltage is not present for one or more of the checks, Locate and restore supply power to the ECU. Repair or replace the harness as required.
4. Check the ECU ground circuits.

   Use a multimeter to check for continuity in the harness :

From	To	Value
X-012 pin 2	Chassis ground	There should be continuity.
X-012 pin 4	Chassis ground	There should be continuity.

3755-ECU internal failure - Torque request comparison

Context:
The Engine Control Unit (ECU) determines engine torque based on the requests of many vehicle functions. The total requested engine torque is compared to the maximal engine torque allowed. If the total requested torque is greater than the maximal allowed torque, the ECU has a calibration error and this fault will occur.

Solution:

1. Check the ECU for the appropriate software and re-flash, if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

From	To	Value
Intake manifold pressure and temperature sensor connector pin 3	Chassis ground	There should be no continuity.
Intake manifold pressure and temperature sensor connector pin 3	Intake manifold pressure and temperature sensor connector pin 1	There should be no continuity.
X-017 pin 17	All pins in connector X-017	There should be no continuity.

With the key in the OFF position, use a multimeter to perform the following continuity checks :

From	To	Value
X-017 pin 17	All pins in connector X-017	There should be no continuity.
X-016 pin 10	All pins in connector X-016	There should be no continuity.

A. If the specified values are measured, re-connect the engine interface connector X-017 and leave the ECU connectors X-012 and X-016 disconnected. Then, continue to step **9**.

B. If the specified values are not measured, there is a failure in the intake manifold pressure and temperature sensor voltage supply wiring. Locate and repair the failed conductor. Repair or replace the harness as required.

9. Check the rail pressure sensor voltage supply wiring.

With the key in the ON position, use a multimeter to perform the following voltage check :

From	To	Value
Rail pressure sensor connector pin 3	Chassis ground	There should be no voltage.

Disconnect connector X-017.

With the key in the OFF position, use a multimeter to perform the following continuity checks :

From	To	Value
Rail pressure sensor connector pin 3	Chassis ground	There should be no continuity.
Rail pressure sensor connector pin 3	Rail pressure sensor connector pin 1	There should be no continuity.
X-017 pin 7	All pins in connector X-017	There should be no continuity.

With the key in the OFF position, use a multimeter to perform the following continuity checks :

From	To	Value
X-017 pin 7	All pins in connector X-017	There should be no continuity.
X-016 pin 11	All pins in connector X-016	There should be no continuity.

A. If the specified values are measured, re-connect the connector X-017 and leave the ECU connectors X-012 and X-016 disconnected. Then, continue to step **10**.

B. If the specified values are not measured, there is a failure in the rail pressure sensor voltage supply wiring. Use the appropriate service manual, if necessary, to locate and repair the failed conductor.

10. Check the camshaft speed sensor voltage supply wiring.

With the key in the ON position, use a multimeter to perform the following voltage check :

From	To	Value
Camshaft speed sensor connector pin 3	Chassis ground	There should be no voltage.

Disconnect connector X-017.

With the key in the OFF position, use a multimeter to perform the following continuity checks :

4055-Park Brake Valve (On/Off) - Solenoid Supply Open Circuit

Context:
The UCM has sensed that the voltage on **X-CN3A (Female) pin 4** is less than **1 V** or greater than **8 V**. Diagnostic Trouble Code **4055 - Park Brake Valve (On/Off) - Solenoid Supply Open Circuit** has an error priority of Red. Ground drive is disabled while Diagnostic Trouble Code **4055 - Park Brake Valve (On/Off) - Solenoid Supply Open Circuit** is active.

Cause:
The UCM has sensed that the voltage on **X-CN3A (Female) pin 4** is less than **1 V** or greater than **8 V**.

Possible failure modes:

1. An open circuit in the wiring.
2. The park brake valve solenoid has failed.
3. The UCM has an internal failure.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code **4055 - Park Brake Valve (On/Off) - Solenoid Supply Open Circuit** is recorded again. Go to step **2**.
2. Verify that the wiring and connectors are free of damage.

   Inspect the UCM and the park brake solenoid connections. All connections should be secure, tight, free of corrosion, abrasion, and damage.

   Inspect the harness from the UCM to the park brake solenoid. Verify that the harness is free of damage, corrosion, abrasion, and incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **3**.

   B. The connectors or the harness has damage. Repair or replace the harness or the connectors as required. Return to step **1** to confirm elimination of fault.
3. Measure the resistance through the signal wire.

   Turn the ignition switch OFF.

   Disconnect UCM connector **X-CN3A (Female)** .

   Disconnect the brake valve solenoid connector X-BRK.

   Fabricate a jumper wire that will connect between X-BRK pin 1 and X-BRK pin 2.

   Connect the jumper wire between X-BRK pin 1 and X-BRK pin 2.

   Measure the resistance between **X-CN3A (Female) pin 4** and chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance is less than **10 Ω**. Go to step **4**.

   B. The resistance is greater than **10 Ω**. There is an open circuit in the wiring. Repair or replace the harness as required. Return to step **1** to confirm elimination of the fault.
4. Measure the resistance through the solenoid.

4362-Reverse Pump Control Valves (Directional) - Solenoid Right (A) Supply Short to Ground

Context:
The UCM has sent a signal to the right reverse ground drive solenoid to energize, but no voltage was detected. Diagnostic Trouble Code **4362 - Reverse Pump Control Valves (Directional) - Solenoid Right (A) Supply Short to Ground** has an error priority of Red.
Reverse ground drive is disabled while Diagnostic Trouble Code **4362 - Reverse Pump Control Valves (Directional) - Solenoid Right (A) Supply Short to Ground** is active.

Cause:
The UCM has sent a signal to the right reverse ground drive solenoid to energize, but no voltage was detected. The current on **X-CN2B (Male) pin 8** is greater than **3 A**. The fault is active while the hydraulics are enabled and the current on **X-CN2B (Male) pin 8** is greater than **3 A**.

Possible failure modes:

1. A short circuit in the wiring.
2. The right drive pump forward solenoid has an internal short circuit.
3. The UCM has an internal failure.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code **4362 - Reverse Pump Control Valves (Directional) - Solenoid Right (A) Supply Short to Ground** is recorded again. Go to step **2**.
2. Verify that the wiring and connectors are free of damage.

   Inspect the UCM and the right drive pump reverse solenoid connections. All connections should be secure, tight, free of corrosion, abrasion, and damage.

   Inspect the harness from the UCM to the right drive pump reverse solenoid. Verify that the harness is free of damage, corrosion, abrasion and incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **3**.

   B. The connectors or the harness has damage. Repair or replace the harness or the connectors as required. Return to step **1** to confirm elimination of fault.
3. Measure the resistance of the signal wire to chassis ground.

   Turn the ignition switch OFF.

   Disconnect UCM connectors **X-CN2B (Male)** , **X-CN1A (Male)** , and the right drive pump reverse solenoid connector **X-18 (Female)** .

   Measure the resistance between **X-CN2B (Male) pin 8** and chassis ground. The resistance should be greater than **20,000 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   Measure the resistance between **X-CN1A (Male) pin 19** and chassis ground. The resistance should be greater than **20,000 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. Both resistance measurements are greater than **20,000 Ω**. Go to step **4**.

B. The voltage measurement is less than **10 V**. There is a problem in the voltage supply or sensor ground wire to the sensor. Repair or replace the harness or connectors as required. Return to step **1** to confirm elimination of fault.

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

   Turn the ignition switch OFF.

   Disconnect UCM connector **X-CN2B (Male)** .

   Disconnect the right-hand swash plate sensor connector **X-93 (Female)** .

   Measure the resistance between **X-CN2B (Male) pin 33** and chassis ground. The resistance should be greater than **20,000 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance measurement is greater than **20,000 Ω**. Go to step **5**.

   B. The resistance measurement is less than **20,000 Ω**. There is a short circuit to chassis ground in the signal wire. Repair or replace the harness or connectors as required. Return to step **1** to confirm elimination of fault.

5. Measure the resistance through the signal wire.

   Turn the ignition switch OFF.

   Disconnect connector **X-93 (Female)** .

   Disconnect UCM connector **X-CN2B (Male)** .

   Fabricate a jumper wire that will connect between the UCM connector **X-CN2B (Male)** and chassis ground.

   Connect the jumper wire between the UCM connector **X-CN2B (Male)** and chassis ground.

   Measure the resistance between **X-93 (Female) pin 3** and chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance measurement is less than **10 Ω**. Go to step **6**.

   B. The resistance measurement is greater than **10 Ω**. There is an open circuit in the signal wire. Repair or replace the harness or connectors as required. Return to step **1** to confirm elimination of fault.

6. Test the UCM.

   Turn the ignition switch OFF.

   Remove the jumper wire.

   Reconnect UCM connector **X-CN2B (Male)** .

   Disconnect swash plate sensor connectors **X-93 (Female)** and **X-94 (Female)** .

   Connect the left-hand swash plate sensor into the right-hand swash plate sensor connector **X-93 (Female)** .

   Connect the right-hand swash plate sensor into the left-hand swash plate sensor connector **X-94 (Female)** .

   Turn the ignition switch ON.

   Monitor the active diagnostic screen. Fault code **4734 - Right Swash Plate Angle Sensor - Pin B Short to Ground/ Open Circuit** should no longer be active. Fault code **4741 - Left Swash Plate Angle Sensor - Pin A Short to Ground/ Open Circuit** is active.

   A. Fault code **4734 - Right Swash Plate Angle Sensor - Pin B Short to Ground/ Open Circuit** is no longer active. Fault code **4741 - Left Swash Plate Angle Sensor - Pin A Short to Ground/ Open Circuit** is active. Replace the Swash Plate Angle sensor and retest. Return to step **1** to confirm elimination of the fault.

   B. Fault code **4734 - Right Swash Plate Angle Sensor - Pin B Short to Ground/ Open Circuit** is still active. Fault code **4741 - Left Swash Plate Angle Sensor - Pin A Short to Ground/ Open Circuit** did not become active. Replace the UCM and retest. Return to step **1** to confirm elimination of fault.

4781-Solenoid Valve - Solenoid Supply Open Circuit

Context:
The UCM has sent a signal to the two speed solenoid to energize, but the UCM does not sense proper voltage. Diagnostic Trouble Code **4781 - Solenoid Valve - Solenoid Supply Open Circuit** has an error priority of White. The two speed operating mode is disabled while Diagnostic Trouble Code **4781 - Solenoid Valve - Solenoid Supply Open Circuit** is active.

Cause:
The UCM has sent a signal to the two speed solenoid to energize, but the UCM does not sense proper voltage. The fault is active while the engine is ON and the solenoid output **X-CN3A (Female) pin 25** is greater than **8 V** or less than **1 V**.

Possible failure modes:

1. An open circuit in the wiring.
2. A short circuit in the wiring.
3. The two speed solenoid has failed.
4. The UCM has an internal failure.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code **4781 - Solenoid Valve - Solenoid Supply Open Circuit** is recorded again. Go to step **2**.
2. Verify that the wiring and connectors are free of damage.

   Inspect the UCM and two speed solenoid connections. All connections should be secure, tight, free of corrosion, abrasion, and damage.

   Inspect the harness from the UCM to the two speed solenoid. Verify that the harness is free of damage, corrosion, abrasion, and incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **3**.

   B. The connectors or the harness has damage. Repair or replace the harness or the connectors as required. Return to step **1** to confirm elimination of fault.
3. Measure the resistance through the harness.

   Turn the ignition switch OFF.

   Disconnect the two speed connector, X-2SPD.

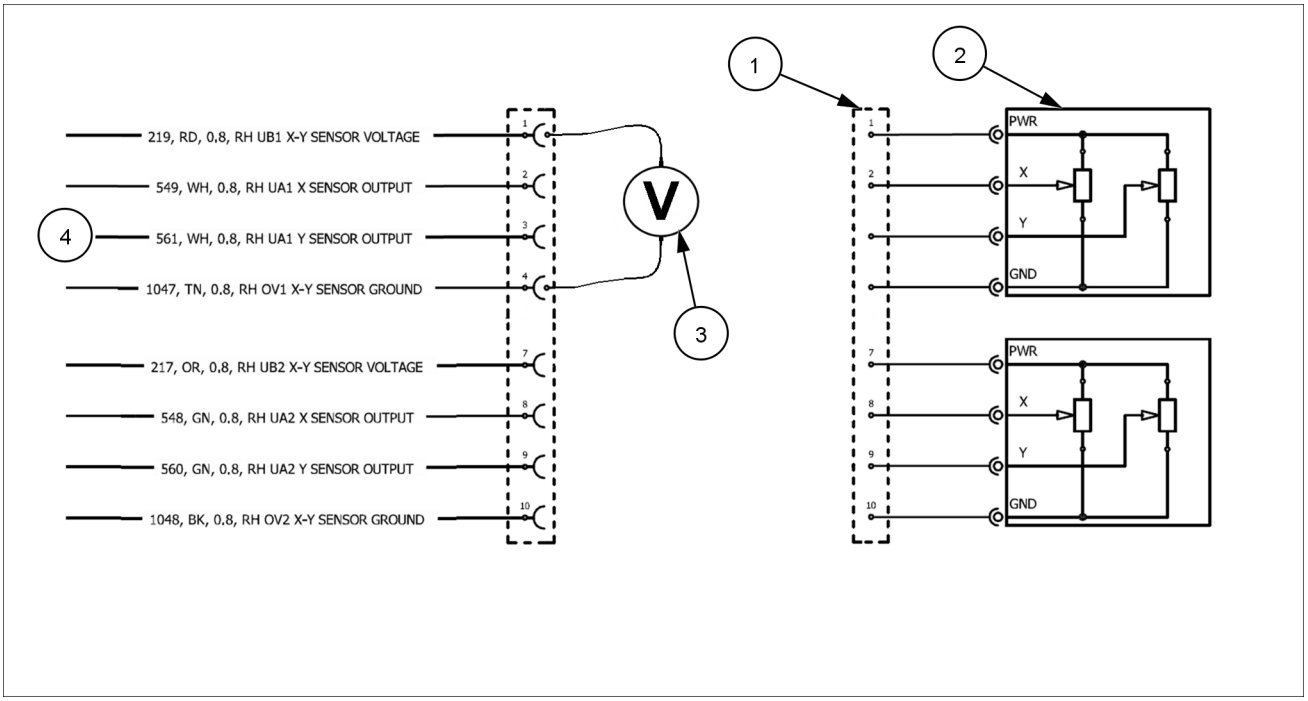
   Fabricate a jumper wire that will connect between the two speed solenoid connector X-2SPD pin A and X-2SPD pin B.

   Use the jumper wire to short X-2SPD pin A to X-SPD pin B.

   Disconnect UCM connector **X-CN3A (Female)** .

   Measure the resistance between **X-CN3A (Female) pin 25** and chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance is less than **10 Ω**. Go to step **4**.



RAPH12SSL0351FA 1

Schematic legend			
(1)	Connector X-UJMR	**(3)**	DVM set to measure voltage.
(2)	Joystick X-Y Position Sensor	**(4)**	Right joystick F-B **X-CN4A (Male) pin 17**

A. The voltage is approximately **5 V**. Go to step **7**.

B. The voltage is not within range. There is a problem with the voltage supply to the sensor. Verify the voltage from the UCM. If the voltage from the UCM is correct, there is a problem in the voltage supply to the sensor. Repair as required. Return to step **1** to confirm elimination of fault.

7. Measure the voltage output of the sensor.

   Turn the ignition switch OFF.

   Disconnect the right joystick connector X-UJMR.

   Fabricate a breakout harness to measure the voltage output of the sensor.

4. Measure the resistance through the signal wire.

   Turn the ignition switch OFF.

   Fabricate a jumper wire that will connect between connector **X-CN3A (Female) pin 11** and chassis ground.

   Connect the jumper wire between connector **X-CN3A (Female) pin 11** and chassis ground. The chassis ground connection must be clean and free of rust, dirt, oil, and paint.

   Measure the resistance between connector X-UJMR pin 8 and chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance is less than **10 Ω**. Go to step **5**.

   B. The resistance is greater than **10 Ω**. There is an open circuit in the signal wire. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.

5. Measure the voltage to the sensor.

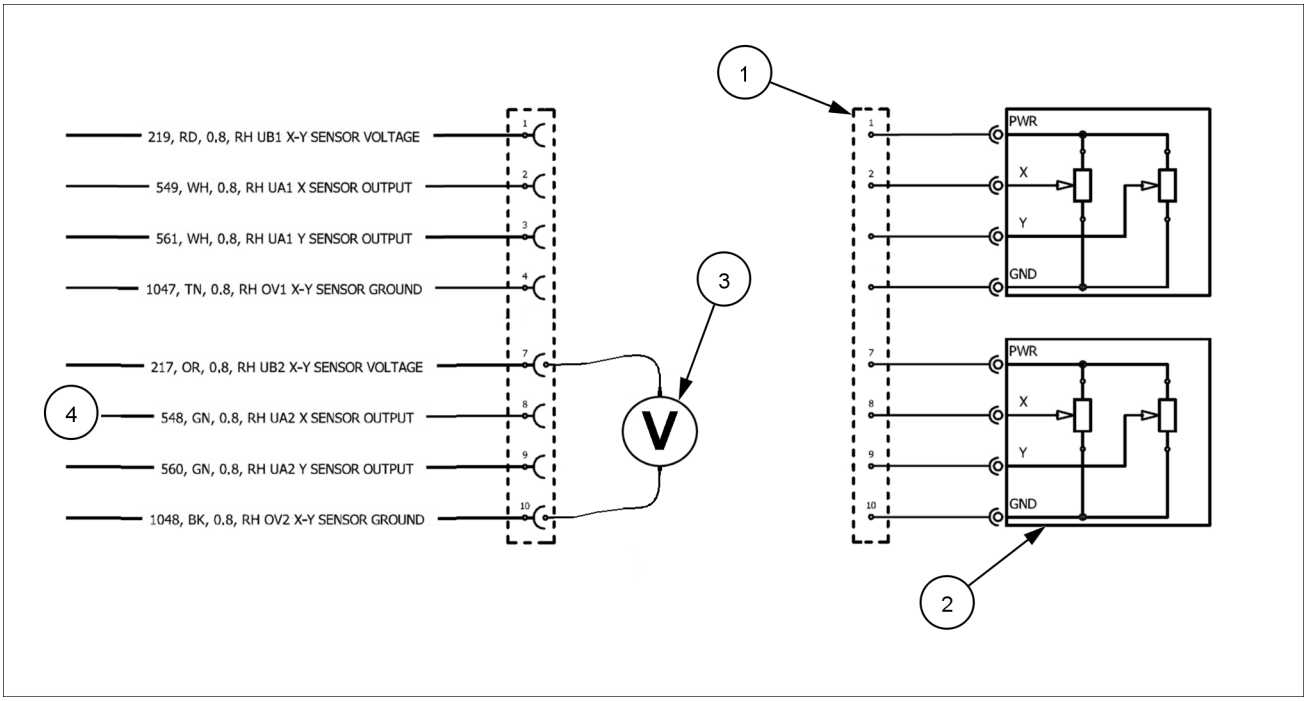
   Turn the ignition switch OFF.

   Reconnect the UCM connector(s).

   Disconnect the right joystick connector X-UJMR.

   Turn the ignition switch ON.

   Measure the voltage between X-UJMR pin 7 and X-UJMR pin 10. The voltage should be approximately **5 V**. Wiggle the harness during measurement to reveal an intermittent condition.



RAPH12SSL0353FA 1

Schematic legend			
(1)	Connector X-UJMR	**(3)**	DVM set to measure voltage.
(2)	Joystick X-Y position sensor	**(4)**	Right Joystick R-L **X-CN3A (Female) pin 11**

   A. The voltage is approximately **5 V**. Go to step **6**.

   B. The voltage is not within range. There is a problem with the voltage supply to the sensor. Verify the voltage from the UCM. If the voltage from the UCM is correct, there is a problem in the voltage supply to the sensor. Repair as required. Return to step **1** to confirm elimination of fault.

B. The voltage is greater than **0.5 V**. There is a short circuit to another voltage source. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.

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

   Turn the ignition switch OFF.

   Disconnect the UCM connector **X-CN2B (Male)** .

   Disconnect the left joystick connector X-UJML.

   Measure the resistance between X-UJML pin 8 and chassis ground. The resistance should be greater than **20,000 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance is greater than **20,000 Ω**. Go to step **5**.

   B. The resistance is less than **20,000 Ω**. There is a short circuit to chassis ground. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.

5. Measure the resistance through the signal wire.

   Fabricate a jumper wire that will connect between connector **X-CN2B (Male) pin 14** and chassis ground.

   Connect the jumper wire between connector **X-CN2B (Male) pin 14** and chassis ground. The chassis ground connection must be clean and free of rust, dirt, oil, and paint.

   Measure the resistance between connector X-UJML pin 8 and chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance is less than **10 Ω**. Go to step **6**.

   B. The resistance is greater than **10 Ω**. There is an open circuit in the signal wire. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.

6. Measure the voltage to the sensor.

   Turn the ignition switch OFF.

   Reconnect the UCM connector.

   Disconnect the left joystick connector X-UJML.

   Turn the ignition switch ON.

   Measure the voltage between X-UJML pin 7 and X-UJML pin 10. The voltage should be approximately **5 V**. Wiggle the harness during measurement to reveal an intermittent condition.

B. The voltage is greater than **0.5 V**. There is a short circuit to another voltage source. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.

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

   Turn the ignition switch OFF.

   Disconnect the UCM connector **X-CN4A (Male)** and **X-CN2B (Male)** .

   Disconnect the left joystick connector X-UJML.

   Measure the resistance of X-UJML pin 3 to chassis ground. The resistance should be greater than **20,000 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   Measure the resistance of X-UJML pin 9 to chassis ground. The resistance should be greater than **20,000 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance is greater than **20,000 Ω**. Go to step **5**.

   B. The resistance is less than **20,000 Ω**. There is a short circuit to chassis ground. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.

5. Measure the resistance of the signal wire.

   Fabricate a jumper wire that will connect between connector **X-CN4A (Male) pin 18** to chassis ground.

   Connect the jumper wire between connector **X-CN4A (Male) pin 18** to chassis ground. The chassis ground connection must be clean and free of rust, dirt, oil, and paint.

   Measure the resistance between connector X-UJML pin 3 to chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   Remove the jumper wire from **X-CN4A (Male) pin 18**.

   Connect the jumper wire between connector **X-CN2B (Male) pin 31** and chassis ground. The chassis ground connection must be clean and free of rust, dirt, oil, and paint.

   Measure the resistance between connector X-UJML pin 9 to chassis ground. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The resistance is less than **10 Ω**. Go to step **6**.

   B. The resistance is greater than **10 Ω**. There is an open circuit in the signal wire. Repair or replace the harness as required. Return to step **1** to confirm elimination of fault.

6. Measure the voltage to the sensor.

   Turn the ignition switch OFF.

   Reconnect the UCM connectors.

   Disconnect the left joystick connector X-UJML.

   Turn the ignition switch ON.

   Measure the voltage between X-UJML pin 1 and X-UJML pin 4. The voltage should be approximately **5 V**. Wiggle the harness during measurement to reveal an intermittent condition.

   Measure the voltage between X-UJML pin 7 and X-UJML pin 10. The voltage should be approximately **5 V**. Wiggle the harness during measurement to reveal an intermittent condition.

5262-Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Shorted To Ground

Context:
The UCM has sensed that the bucket extend solenoid current is too high. Diagnostic Trouble Code **5262 - Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Shorted To Ground** has an error priority of Red.
Bucket functions are disabled while Diagnostic Trouble Code **5262 - Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Shorted To Ground** is active.

Cause:
The UCM has sensed that the bucket extend solenoid current is too high. The fault is active when hydraulics are enabled and solenoid output current, **X-CN4A (Male) pin 19** is greater than **3 A**.

Possible failure modes:

1. A short circuit in the solenoid wiring.
2. The bucket valve solenoid has failed.
3. The UCM has an internal failure.

Solution:

1. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code **5262 - Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Shorted To Ground** is recorded again. Go to step **2**.
2. Verify that the wiring and connectors are free of damage.

   Inspect the UCM and the bucket solenoid connections. All connections should be secure, tight, free of corrosion, abrasion, and damage.

   Inspect the harness from the UCM to the bucket solenoids. Verify that the harness is free of damage, corrosion, abrasion, and incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **3**.

   B. The connectors or the harness has damage. Repair or replace the harness or the connectors as required. Return to step **1** to confirm elimination of fault.
3. Test the UCM.

   Turn the ignition switch OFF.

   Disconnect solenoid connector **X-26 (Female)** .

   Turn the ignition switch ON. Activate the hydraulics.

   Use the electronic service tool to access the fault code screen. Fault code **5262 - Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Shorted To Ground** should no longer be active. Fault code **5261 - Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Open Circuit** is now active.

   A. Fault code **5262 - Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Shorted To Ground** is no longer active. Fault code **5261 - Loader Bucket Valve (Directional) Solenoid Dump (B) Supply Open Circuit** is now active. Replace the solenoid and retest. Return to step **1** to confirm elimination of the fault.

4. Test the UCM.

   Reconnect UCM connectors **X-CN3A (Female)** and **X-CN2B (Male)** .

   Disconnect connector **X-19 (Female)** .

   Turn the ignition switch ON.

   Activate the hydraulics while monitoring the fault code screen. Fault code **5371 - EHF Forward Solenoid (A) Supply STG** should no longer be active. Fault code **5372 - EHF Forward Solenoid (A) Supply OC** should become active.

   A. Fault code **5372 - EHF Forward Solenoid (A) Supply OC** is active and fault code **5371 - EHF Forward Solenoid (A) Supply STG** is no longer active. Temporarily replace the solenoid and retest. Return to step **1** to confirm elimination of the fault.

   B. Fault code **5371 - EHF Forward Solenoid (A) Supply STG** is still active. Fault code **5372 - EHF Forward Solenoid (A) Supply OC** did not become active. Temporarily replace the UCM and retest. Return to step **1** to confirm elimination of the fault.

Wiring harnesses - Electrical schematic sheet 21 Unit Control Module (55.100.DP-C.20.E.21)
Wiring harnesses - Electrical schematic sheet 33 EHF (55.100.DP-C.20.E.33)
Wiring harnesses - Electrical schematic sheet 20 Unit Control Module (55.100.DP-C.20.E.20)

5507-Auxiliary Valve Spool Sensor Open Or Shorted To Ground

Context:
The UCM has sensed that the auxiliary spool position sensor signal has failed low. Diagnostic Trouble Code **5507 - Auxiliary Valve Spool Sensor Open Or Shorted To Ground** has an error priority of White.
The auxiliary hydraulic functions are disabled while Diagnostic Trouble Code **5507 - Auxiliary Valve Spool Sensor Open Or Shorted To Ground** is active.

Cause:
The UCM has sensed that the auxiliary spool position sensor signal, **X-CN3B (Female) pin 14** has failed low. The fault is active while the engine is ON and the auxiliary spool position sensor signal is less than **0.2 V**.

Possible failure modes:

1. The spool is sticking inside the valve body.
2. Improper wiring in the circuit. Connector **X-24 (Female)** is swapped with connector **X-29 (Female)** .
3. The auxiliary spool position sensor has failed.
4. The UCM has an internal failure.

Solution:

1. Verify that the spool is not stuck in the valve.

   Turn the ignition switch OFF.

   Remove the proportional aux spool position sensor from the valve body.

   Turn the ignition switch ON.

   Access EST and monitor the spool position.

   Move the pintle arm while monitoring the valve position sensor signal. The value should change linearly and not become erratic.

   A. The sensor values change in a linear fashion. The problem is in the valve body. Repair or replace the valve or spool as required.

   B. The fault sensor values did not change in a linear fashion. The problem is in the sensor circuit. Go to step **2**.
2. Verify that the fault code is active.

   Connect the Electronic Service Tool to the service tool connector.

   To check for fault codes: Start and operate the machine.

   A. The fault code is not recorded again. OK to return the machine to service.

   B. Fault code **5507 - Auxiliary Valve Spool Sensor Open Or Shorted To Ground** is recorded again. Go to step **3**.
3. Verify that the wiring and connectors are free of damage.

   Inspect the UCM and the auxiliary spool position sensor connections. All connections should be secure, tight, free of corrosion, abrasion, and damage.

   Inspect the harness from the UCM to the auxiliary spool position sensor. Verify that the harness is free of damage, corrosion, abrasion, and incorrect attachment.

   A. The connectors are secure and the harness is free of damage. Go to step **4**.

   B. The connectors or the harness has damage. Repair or replace the harness or the connectors as required. Return to step **2** to confirm elimination of the fault.

Fabricate a jumper with that will connect between **X-306 (Male) pin B** and **X-306 (Male) pin A**.

Connect the jumper between **X-306 (Male) pin B** and **X-306 (Male) pin A**.

Turn the ignition switch ON.

Monitor the fault code screen. Fault code **5811 - Loader Port Lock Switch Is In An Implausible State** should no longer be active.

Use the EST to monitor the loader lockout switch status. The switch status should change from OFF to ON.

Turn the ignition switch OFF.

Connect the jumper between **X-306 (Male) pin B** and **X-306 (Male) pin C**.

Turn the ignition switch ON.

Monitor the fault code screen. Fault code **5811 - Loader Port Lock Switch Is In An Implausible State** should no longer be active.

Use the EST to monitor the loader lockout switch status. The switch status should change from ON to OFF.

A. The switch status displayed ON when the jumper was connected between **X-306 (Male) pin B** and **X-306 (Male) pin A**. The switch status displayed OFF when the jumper was not connected between **X-306 (Male) pin B** and **X-306 (Male) pin C**. Replace the loader lockout switch and retest. Return to step **1** to confirm elimination of the fault.

B. The switch status did not change or fault code **5811 - Loader Port Lock Switch Is In An Implausible State** remained active. Go to step **5**.

5. Measure the resistance through the signal wires.

   Turn the ignition switch OFF.

   Use the jumper wire to connect **X-306 (Male) pin A** to **X-306 (Male) pin C**.

   Disconnect UCM connectors **X-CN2B (Male)** and **X-CN3B (Female)** .

   Measure the resistance between X-CN2B pin 23 and **X-CN3B (Female) pin 19**. The resistance should be less than **10 Ω**. Wiggle the harness during measurement to reveal an intermittent condition.

   A. The measured resistance is less than **10 Ω**. Go to step **6**.

   B. The measured resistance is greater than **10 Ω**. There is an open circuit in the wiring. Check connector X-ECC4A/4B. Repair or replace the harness or connectors as required. Return to step **1** to confirm elimination of the fault.

6. Measure the voltage on the signal wires.

   Remove the jumper wire connected between **X-306 (Male) pin A** and **X-306 (Male) pin C**.

   Turn the ignition switch ON.

   Measure the voltage between X-CN2B pin 23 and chassis ground. The voltage should be less than **0.5 V**. Wiggle the harness to reveal an intermittent condition.

   Measure the voltage between **X-CN3B (Female) pin 19** and chassis ground. The voltage should be less than **0.5 V**. Wiggle the harness to reveal an intermittent condition.

   A. Both measured voltages are less than **0.5 V**. Temporarily replace the UCM and retest. Return to step **6**.

   B. One or both voltage measurements are greater than **0.5 V**. There is a short circuit to another voltage source. Repair or replace the harness as required. Return to step **1** to confirm elimination of the fault.

Wiring harnesses - Electrical schematic sheet 20 Unit Control Module (55.100.DP-C.20.E.20)
Wiring harnesses - Electrical schematic sheet 21 Unit Control Module (55.100.DP-C.20.E.21)
Wiring harnesses - Electrical schematic sheet 14 Bulkhead Connection (55.100.DP-C.20.E.14)

9406-No CAN Communication From VCM

Context:
CAN bus communications between modules on the data link have been lost. This fault code may be displayed with other CAN bus fault code messages.

Cause:
CAN bus communications between modules on the data link have been lost.

Possible failure modes:

1. CAN data link wiring or circuits open.
2. CAN data link wiring or circuits shorted.
3. Faulty CAN Data Link device.
4. Faulty instrument cluster.
5. Faulty ECU.

Solution:

1. Verify that the fault code is active.

   Use the Electronic Service Tool to verify that the CAN data link faults are ACTIVE.

   To check for fault codes: Start and operate the machine. Wiggle the harness to reveal an intermittent condition.

   If three or more fault codes are active, such as **1051 - Timeout of CAN message EEC1** through **1059 - Timeout of CAN Message DM1** or **3096 - CAN A Bus off failure**, **3334 - CAN communication failure between vehicle controller and ECU controller - TSC1_PE message**, **3338 - CAN communication failure between VCM and EDC controller - TSC1_VE message**or **3358 - CAN transmit error - EEC1 message (Electronic Engine Control 1 message - Torque, accelerator pedal, engine speed, and other signals)**, this is an indication of a problem in the CAN bus circuit, continue with this procedure. If one or two CAN bus fault codes are active, this is an indication of an intermittent connection in the CAN circuit. Check the wiring and connectors to verify they are secure and free of damage, corrosion, abrasion or incorrect attachment.

   A. CAN bus fault codes are not recorded again and are no longer ACTIVE. OK to return the machine to service.

   B. CAN bus fault codes are present and ACTIVE. Refer to **1051-No CAN Communication With Engine Controller (55.408)**.

17322-EGR valve position sensor voltage is higher than expected

NOTE: *Because the Engine Control Unit (ECU) stores historical data relevant to the operation of the Exhaust Gas Recirculation (EGR) valve, it is necessary to perform the "Replacement of the Exhaust Gas Recirculation Valve (EGR) – Reset ECU Data" with the Electronic Service Tool (EST), if the EGR valve is replaced. Refer to the engine service manual* ***Exhaust Gas Recirculation (EGR) valve - Configure - Reset ECU data (EGR valve) (10.501)****, if necessary.*

Context:
The ECU monitors the electrical signal provided by the EGR valve position feedback potentiometer. If the signal level becomes greater than **4.86 V** the ECU provides a replacement value and this fault will occur. For information regarding the functional operation of the EGR valve, refer to the engine service manual **Exhaust Gas Recirculation (EGR) valve - Overview (10.501)**. For more information regarding the technical specifications of the EGR valve, refer to the engine service manual **Exhaust Gas Recirculation (EGR) valve actuator - Technical Data (55.989)**.

Cause:
The ECU is sensing the EGR valve position signal is greater than **4.86 V**.

Possible failure modes:

1. Faulty EGR valve, failed internally.
2. Faulty EGR valve position sensor circuit wiring, shorted to a high source.
3. Faulty ECU, software.

Solution:

1. Verify that the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

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

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with step **6**.
2. Check the EGR valve potentiometer signal circuit for a short to voltage source condition.

   Disconnect the EGR valve.

   With the key switch in the ON position, use a multimeter to check for voltage in the harness :

From	To	Result
EGR valve connector pin 2	Chassis ground	There should be less than **4.86 V**.

   A. If there is greater than **4.86 V**, leave the EGR valve disconnected and continue with step **3**.

   B. If there is less than **4.86 V**, leave the EGR valve disconnected and continue with step **5**.
3. Locate the short to voltage source condition.

   Disconnect connector X-017.

   With the key switch in the ON position, use a multimeter to check for voltage in the harness :

From	To	Result
X-017 pin 34	Chassis ground	There should be less than **4.86 V**.

   A. If there is less than **4.86 V**, the short to a voltage source condition is between EGR valve connector pin 2 and connector X-017 pin 34. Locate and repair the damaged conductors. Repair or replace the harness as required.

   B. If there is greater than **4.86 V**, leave connector X-017 disconnected and continue with step **4**.
4. Locate the short to voltage source condition.

17378-MI1 energizing time is low

Context:
The Engine Control Unit (ECU) checks the condition for splitting the main injection in Injection Rate Shaping (IRS) mode. If quantities and energizing times for both injection parts are sufficient, there is a split main injection. This fault is the result of a wrong energizing time calculation.

Solution:

1. Check the ECU for the appropriate software and re-flash if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

17415-Over temperature error

Context:
The Engine Control Unit (ECU) controls the Selective Catalytic Reduction (SCR) relay with a low side driver control circuit. If the ECU detects a short circuit condition in the low side driver circuit, this fault will occur.

Cause:
The ECU has detected a short circuit condition in the SCR low side driver control circuit.

Possible failure modes:

1. Faulty SCR relay, internal failure.
2. Faulty SCR relay wiring, short circuit.
3. Faulty ECU, software.

Solution:

1. Verify the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

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

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with step **4**.

2. Check the SCR relay coil for an internal failure.

   Remove the SCR relay.

   Use a multimeter to measure the relay coil resistance on the SCR relay pins :

From	To	Value
SCR relay pin 85	SCR relay pin 86	There should be approximately **70 - 130 Ω**.

   A. If there is approximately **70 - 130 Ω**, leave the SCR relay disconnected and continue to step **3**.

   B. If there is not approximately **70 - 130 Ω**, the relay has failed. Replace the SCR relay and retest.

3. Check the SCR relay wiring for a short circuit condition.

   Disconnect the ECU connector X-016.

   With the key in the ON position, use a multimeter to check for voltage on the harness :

From	To	Value
FUSE2 pin 21	Chassis ground	There should be no voltage.

   A. If there is voltage, there is a short to a voltage source condition in the wiring. Locate and repair the damaged conductors. Repair or replace the harness as required.

   B. If there is no voltage, check the ECU for the appropriate software and re-flash, if necessary.

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

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

With the key in the OFF position, use a multimeter to perform the following continuity check :

From	To	Value
X-017 pin 38	All pins in connector X-017	There should be no continuity.
X-016 pin 34	All pins in connector X-016	There should be no continuity.

A. If there is continuity, there is a short to high source in the throttle valve actuator output 2 wiring. Locate and repair the shorted conductor. Repair or replace the harness as required.

B. If there is no continuity, continue to step **5**.

5. Replace the throttle valve actuator.

   Use the Electronic Service Tool (EST) to check the status of this fault.

   A. If the fault is no longer active, return the machine to service.

   B. If the fault is still active, check the ECU for the appropriate software and re-flash, if necessary.

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

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 07 Engine F5C T4B (55.100.DP-C.20.E.07)
Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)

With the key switch in the OFF position, use a multimeter to check for continuity in the harness :

From	To	Value
X-020 pin 2	Chassis ground	There should be no continuity.

A. If there is voltage in the first check or continuity in the second check, there is a short to a voltage source or a short circuit to ground condition in the wiring. Locate and repair the damaged conductors or grounded conductor. Repair or replace the harness as required.

B. If there is no voltage in the first check and no continuity in the second check, the ECU has failed internally. Replace the ECU and retest.

4. Check the wiring for an open or short circuit condition.

Disconnect the ECU connector X-012.

Place a jumper wire between the X-012 pin 76 and chassis ground.

Use a multimeter to check for continuity in the harness :

From	To	Value
X-012 pin 2	Chassis ground	There should be continuity.

Remove the jumper wire between X-012 pin 76 and chassis ground.

Use a multimeter to check for continuity in the harness :

From	To	Value
X-012 pin 76	All other pins on connector X-012	There should be no continuity.

A. If there is no continuity in the first check or there is continuity in the second check, there is an open circuit or short to another circuit condition in the wiring. Locate and repair the broken conductor or shorted conductors. Repair or replace the harness as required.

B. If there is continuity in the first check and no continuity in the second check, continue with step **5**.

5. As there is no method of field testing or re-flashing the DEF/AdBlue® supply module, replace the DEF/AdBlue® supply module.

Then check to see that this fault has been resolved.

A. If the fault is resolved, return the machine to service.

B. If the fault is not resolved, check the ECU for the appropriate software and re-flash, if necessary.

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

A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 07 Engine F5C T4B (55.100.DP-C.20.E.07)
Wiring harnesses - Electrical schematic sheet 42 Chassis Interconnection (55.100.DP-C.20.E.42)
Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)
Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)
Wiring harnesses - Electrical schematic sheet 33 Chassis Connection (55.100.DP-C.20.E.33)
Wiring harnesses - Electrical schematic sheet 06 Engine F5C T4B (55.100.DP-C.20.E.06)

17504-Signal fault of the temperature sensor located in the Urea Quality sensor (reported via CAN Frame ComRx_CRI1)

Context:
For information regarding the functional operation of the DEF/AdBlue® urea quality sensor, refer to the engine service manual **Diesel Exhaust Fluid (DEF)/AdBlue® quality sensor - Overview (55.988)**. The DEF/AdBlue® urea quality sensor has internal monitoring for operating conditions and reports status along with sensed data to the Engine Control Unit (ECU). If an internal sensor system error is detected, this fault will occur.

Cause:
The DEF/AdBlue® urea quality sensor has reported to the ECU that it has an internal sensor system error.

Possible failure modes:

1. Faulty DEF/AdBlue® urea quality sensor hardware or firmware.
2. Faulty ECU, software.

Solution:

1. As there is no method for field testing, replace the DEF/AdBlue® urea quality sensor.

   Then check to see that the fault is resolved.

   A. If the fault is resolved, return the machine to service.

   B. If the fault is not resolved, check the ECU for the appropriate software and re-flash, if necessary.

19018-NH3 sensor power supply failure

Context:
The NH3 Control Unit is required to report information at regular intervals to the Engine Control Unit (ECU) A-9000via Controller Area Network (CAN). This fault will occur if the NH3 Control Unit reports an error related to the expected voltage required for heater or sensor operation. For information regarding the functional operation of the NH3 sensor and/or the NH3 Control Unit, refer to the engine service manual **Ammonia (NH3) sensor - Dynamic description (55.988)**.

Cause:
The NH3 Control Unit has reported, via CAN, to the ECU that there is an error related to the expected power supply voltage.

Possible failure modes:

1. Faulty supply voltage, sourcing circuit failure.
2. Faulty NH3 Control Unit, hardware or firmware.
3. Faulty ECU, software.

Solution:

1. Verify fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

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

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with step **4**.

2. Check the level of the NH3 Control Unit supply voltage.

   Disconnect the NH3 Control Unit.

   Use a multimeter to measure the voltage on the harness :

From	To	Value
X-033 connector pin 1	X-033 connector pin 4	There should be approximately **12 V**.
***NOTE:** If voltage measurement is less than **10 V**, it may be necessary to start the vehicle and recheck the voltage measurement.*		

   A. If less than adequate voltage is measured, refer to the appropriate vehicle electrical schematics to locate and resolve the issue.

   B. If adequate voltage is measured, continue with step **3**.

3. As there is no method for field testing or re-flashing the NH3 Control Unit, replace the controller.

   Then check to see that this fault is resolved.

   A. If the fault is resolved, return the machine to service.

   B. If the fault is not resolved, check the ECU for the appropriate software and re-flash, if necessary.

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

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

19062-Upstream NOx sensor values are not plausible

Context:
For information regarding the functional operation of the smart Diesel Oxidation Catalyst (DOC) upstream NO_x sensor, refer to the engine service manual **Nitrogen Oxide (NOx) sensor - Dynamic description (55.988)**. The smart DOC upstream NO_x sensor delivers information about its error status and the results of self diagnosis procedure, via CAN, to the Engine Control Unit (ECU). If the DOC upstream NO_x sensor sends the message Lambda or NO_x signal not plausible, this fault will occur.

Cause:
The DOC upstream NO_x sensor has reported, via CAN, to the ECU that the Lambda or NO_x signal is not plausible.

Possible failure modes:

1. Faulty DOC upstream NO_x sensor, hardware or firmware.

Solution:

1. Check for related fault.

   Use the Electronic Service Tool (EST) to check for fault **19071 - SCR catalyst efficiency lower than first NOx production threshold level**.

   A. If fault **19071 - SCR catalyst efficiency lower than first NOx production threshold level** is present, the DOC upstream NO_x sensor is poisoned. Replace the DOC upstream NO_x sensor. Then use EST, refer to the engine service manual **Nitrogen Oxide (NOx) sensor - Configure - Reset ECU data (Upstream sensor) (55.988)** if necessary, to perform the Replacement of Nox Upstream Sensor - Reset ECU Data configuration.

   B. If fault **19071 - SCR catalyst efficiency lower than first NOx production threshold level** is not present, ignore fault **19062 - Upstream NOx sensor values are not plausible**.

4. As there is no method of field testing or re-flashing the HCU, replace the HCU.

   Then check to see that this fault has been resolved.

   A. If the fault is resolved, return the machine to service.

   B. If the fault is not resolved, check the ECU for the appropriate software and re-flash, if necessary.

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

   A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

   B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)
Wiring harnesses - Electrical schematic sheet 06 Engine F5C T4B (55.100.DP-C.20.E.06)

19255-Open Load error of DEF/AdBlue Pressure Line Heater Actuator powerstage

Context:
The Heater Control Unit (HCU) A-9105 controls and monitors operation of the Diesel Exhaust Fluid (DEF)/AdBlue® supply module suction line heater R-9102, the DEF/AdBlue® supply module back-flow line heater R-9103, and the DEF/AdBlue® supply module pressure line heater R-9104. The DEF/AdBlue® supply module suction line heater R-9102 and the DEF/AdBlue® supply module back-flow line heater R-9103 are wired in series and share a high side driver controlled circuit. The DEF/AdBlue® supply module pressure line heater R-9104 has its own high side driver controlled circuit. The HCU A-9105 communicates electrical failures, via Controller Area Network (CAN), to the Engine Control Unit (ECU) A-9000. If the HCU A-9105 senses an open circuit condition in the DEF/AdBlue® supply module pressure line heater R-9104 control circuit, this fault will occur.

Cause:
The HCU A-9105 has communicated, via CAN, to the ECU A-9000 that an open circuit condition has been detected in the DEF/AdBlue® supply module pressure line heater R-9104 circuit.

Possible failure modes:

1. Faulty DEF/AdBlue® supply module pressure line heater R-9104 circuit wiring, open circuit.
2. Faulty HCU A-9105, internal failure.
3. Faulty ECU A-9000, software.

Solution:

1. Verify the fault is present and active.

   Use the Electronic Service Tool (EST) to check the status of this fault.

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

   B. If the fault is no longer present or in an inactive state, the fault may be intermittent and not currently active. Continue with step **5**.

2. Verify the condition of the heater strip.

   Disconnect the harness from the DEF/AdBlue® supply module pressure line heater at connector X-023.

   Use a multimeter to measure the resistance of the heater strip :

From	To	Value
X-023 pin 1	X-023 pin 2	There should be a nominal amount of resistance, typically around **10 Ω**.

   A. If there is a nominal amount of resistance, re-connect connector X-023 and continue with step **3**.

   B. If there is an infinite amount of resistance, the DEF/AdBlue® supply module pressure line heater strip is open. Repair or replace the heater strip.

3. Check the wiring for an open circuit condition.

   Disconnect the harness from the HCU at connector X-024.

   Use a multimeter to measure the resistance in the harness :

From	To	Value
X-024 pin 4	Chassis ground	There should be a nominal amount of resistance, typically around **10 Ω**.

   A. If there is an infinite amount of resistance, there is an open circuit in the wiring. Locate and repair the broken conductor. Repair or replace the harness as required.

19435-ECU internal failure - EEPROM read error

Context:
The Engine Control Unit (ECU) has the capability of reading and writing values to flash or Electrically Erasable Programmable Read Only Memory (EEPROM). The ECU monitors the reading and writing capability of this function. If the ECU determines that at least three memory blocks can not be read during this monitoring, this fault will occur.

Solution:

1. Check the ECU for the appropriate software and re-flash, if necessary.
   A. If the fault has been resolved, return the machine to service.
   B. If the fault has not been resolved, escalate an ASIST concern.

With the key in the OFF position, use a multimeter to perform the following continuity check :

From	To	Value
X-017 pin 27	Chassis ground	There should be no continuity.
X-017 pin 27	All pins in connector X-017	There should be no continuity.

A. If there is continuity, there is an short circuit in the wastegate pressure modulator valve vehicle harness (VE) wiring. Locate and repair the shorted conductor. Repair or replace the harness as required.

B. If there is no continuity, check the ECU for the appropriate software and re-flash, if necessary.

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

A. If you find damage or the display indicates other than normal display readings, then repair the damage discovered during the inspection or locate and repair the other than normal display condition and verify that the error has been resolved.

B. If you do not find damage and the display indicates only normal readings, then erase the fault code and continue operation.

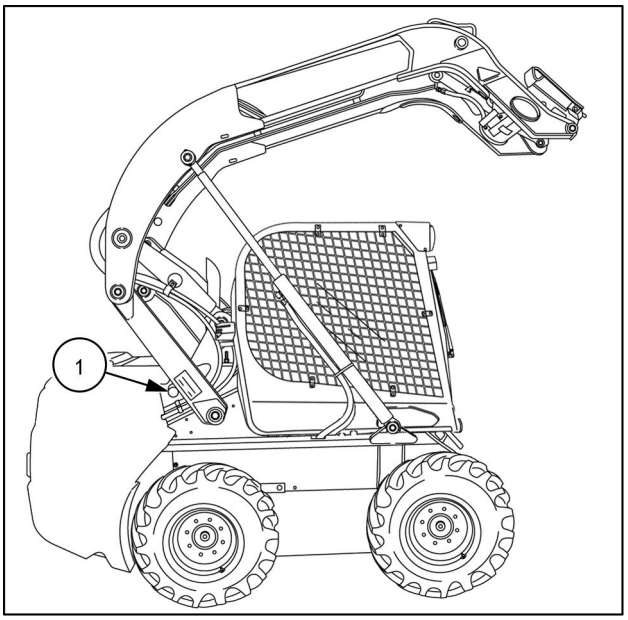
Wiring harnesses - Electrical schematic sheet 07 Engine F5C T4B (55.100.DP-C.20.E.07)
Wiring harnesses - Electrical schematic sheet 08 Engine F5C T4B (55.100.DP-C.20.E.08)

Arm - Remove

SV340	NA
TV380 TIER 4B (FINAL) [NGM418237 -]	NA

NOTE: *The following steps show left side, loader arm components. Please repeat all steps to right side, loader arm components.*

1. Raise the loader arm, and engage the loader arm lock pins **(1)**. Lower the loader arm down on the pins **(1)**.



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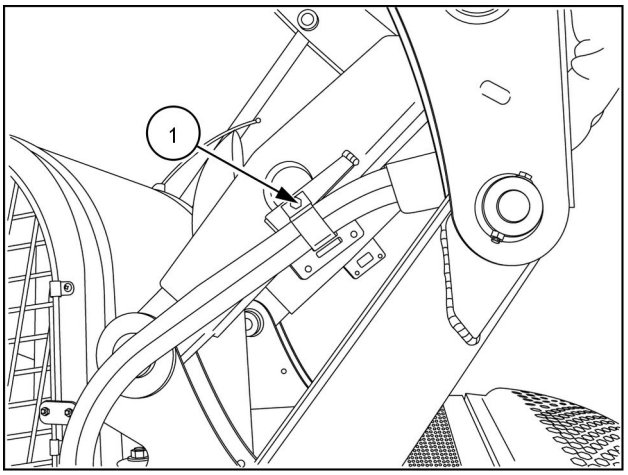
2. Remove the hold-down clamp **(1)** for the auxiliary hoses, located on the loader arm link.



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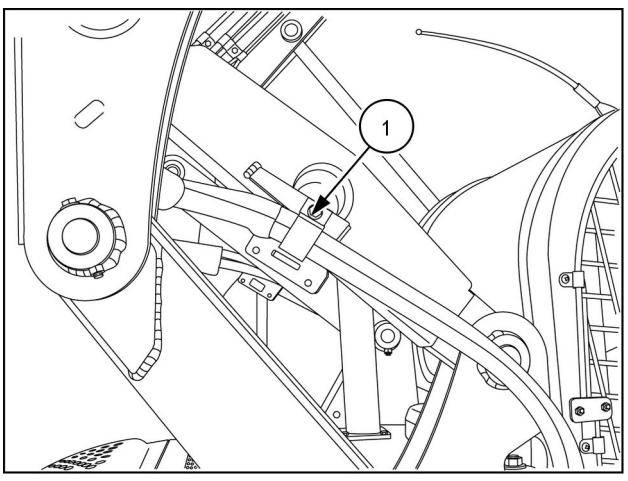
3. Remove the hold-down clamp **(1)** for the bucket cylinder hoses, located on the loader arm link.



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