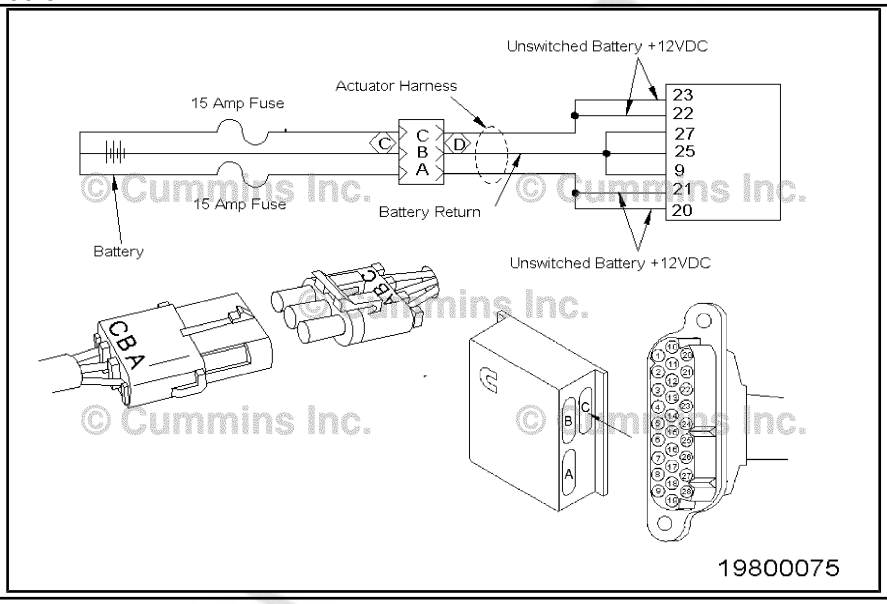
Fault Code 434

Unswitched Battery Supply Circuit

CODES	REASON	EFFECT
Fault Code: 434 PID(P), SID(S): S251 FMI: 4 Lamp: Yellow SRT: 00-614	Battery voltage at pin 20, 21, 22, and 23 of actuator harness connector (relative to return pins 9, 25, and 27 of the actuator harness connector) fell below 6.2 VDC for a fraction of a second... OR... electronic control module (ECM) was **not** allowed to power down correctly (retain the battery supply voltage for 3 seconds) after keyswitch "OFF".	Possibly no noticeable performance effects or possibility of the engine dying or difficulty in starting the engine.

Unswitched Battery Supply



Circuit Description:

The ECM receives constant voltage from the batteries through the unswitched battery wires that are connected directly to the positive (+) battery post. There are two in-line 15 Amp fuses in the unswitched battery wires to protect the engine harness from overheating. The ECM receives switched battery input through the vehicle keyswitch wire, when the vehicle keyswitch is turned "ON." The battery return wires are connected directly to the negative (-) battery post.

Component Location:

The ECM is connected to the battery by the actuator harness. This direct link provides a constant power supply for the ECM. The location of the battery will vary with the OEM. Refer to the OEM Manual.

Shop Talk:

- Examine the injector pigtail nuts, and make sure they are tightened down to the proper torque. Confirm that the pigtail nuts and solenoid posts do **not** have damaged threads.
- If the ECM unswitched battery supply is taken from the starter, check for low voltage during cranking. Low voltage during cranking can cause the ECM power supply to drop below specifications and log Fault Code 434.
- Optimally, the unswitched battery supply for the ECM can be wired directly to the battery.

TROUBLESHOOTING SUMMARY

⚠WARNING⚠

The injector solenoids receive high voltage when the engine is operating. Do not wear jewelry or damp clothing, and do not touch the injector solenoids or the solenoid wires when the engine is operating. This can result in electrical shock that can cause personal injury or death.

⚠CAUTION⚠

To avoid pin and harness damage, use the following test leads when taking a measurement:
Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead
Part Number 3823996 - female Weather-Pack test lead.

⚠CAUTION⚠

To avoid damaging a new ECM, all other active fault codes must be investigated prior to replacing the ECM.

STEPS		SPECIFICATIONS	SRT CODE
STEP 1:	Read the fault codes.		
STEP 1A:	Read the fault codes.	No active or inactive injector fault codes	
STEP 2:	Check the batteries and the power connector.		
STEP 2A:	Inspect the 3-pin power connector.	No damaged pins or loose connections	
STEP 2B:	Check the resistance of the battery supply circuit.	Less than 10 ohms	
STEP 2C:	Check the battery voltage.	Normal conditions: At least 12 VDC; During cranking: At least 6.2 VDC	
STEP 2D:	Check the battery voltage.	Connections are tight and corrosion free	
STEP 3:	Check the two 15 Amp fuses.		
STEP 3A:	Check if the two 15 Amp fuses are installed correctly.	Fuses installed correctly	
STEP 3B:	Check if the two 15 Amp fuses are blown.	Fuses not blown	
STEP 4:	Check the actuator harness.		
STEP 4A:	Inspect the harness and the ECM connector pins.	No damaged pins	
STEP 4B:	Check for an open circuit in the battery power circuits.	10 to 15 VDC	
STEP 4C:	Check for a short circuit in the battery return wires.	More than 100k ohms	
STEP 4D:	Check the add-on or the accessory wiring at positive (+) terminal of the battery.	No damaged wires	
STEP 4E:	Check battery cable grounds.	Meet OEM specifications	
STEP 4F:	Check the injector solenoid captive nuts for proper torque.	Captive nuts are correctly torqued	
STEP 5:	Clear the fault code.		
STEP 5A:	Disable the fault code.	Fault Code 434 inactive	
STEP 5B:	Clear the inactive fault codes.	All faults cleared	

TROUBLESHOOTING STEP

STEP 1: Read the fault codes.

STEP 1A: Read the fault codes.

Condition:
- Turn keyswitch "ON".

Action	Specification/Repair	Next Step
read the fault codes. • Read the fault codes using Compulink™, Part Number 3823549, Echek™, Part Number 3824437, or INSITE™, Part Number 3824638.	**OK** No active or inactive injector fault codes	2A
	NOT OK Troubleshoot the injector fault codes. Refer to the appropriate injector fault code tree.	5A

STEP 2: Check the batteries and the power connector.

STEP 2A: Inspect the 3-pin power connector.

Condition:
- Turn keyswitch "OFF".
- Disconnect the actuator harness from the battery at the 3-pin connector.

Action	Specification/Repair	Next Step
inspect the 3-pin power connector for: • bent or broken pins • pushed back or expanded pins • corroded pins • moisture in or on the connector • missing or damaged seals.	**OK** No damaged pins or loose connections	2B
	NOT OK Repair the 3-pin connector. Refer to Procedure 019-2010 and 019-202 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130.	5A

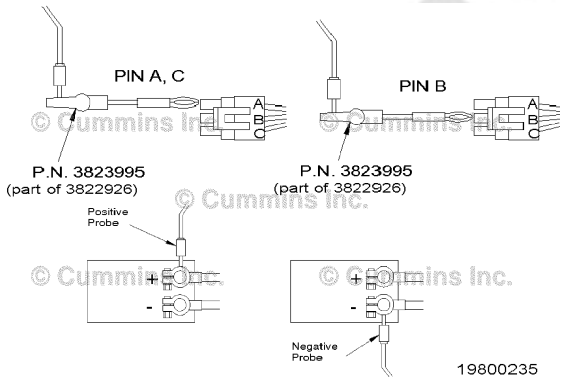
STEP 2B: Check the resistance of the battery supply circuit.

⚠CAUTION⚠

To avoid pin and harness damage, use the following test lead when taking a measurement: Part Number 3823996 - female Weather-Pack test lead.

Condition:
- Turn keyswitch "OFF".
- Disconnect the actuator harness from the battery at the 3-pin connector.

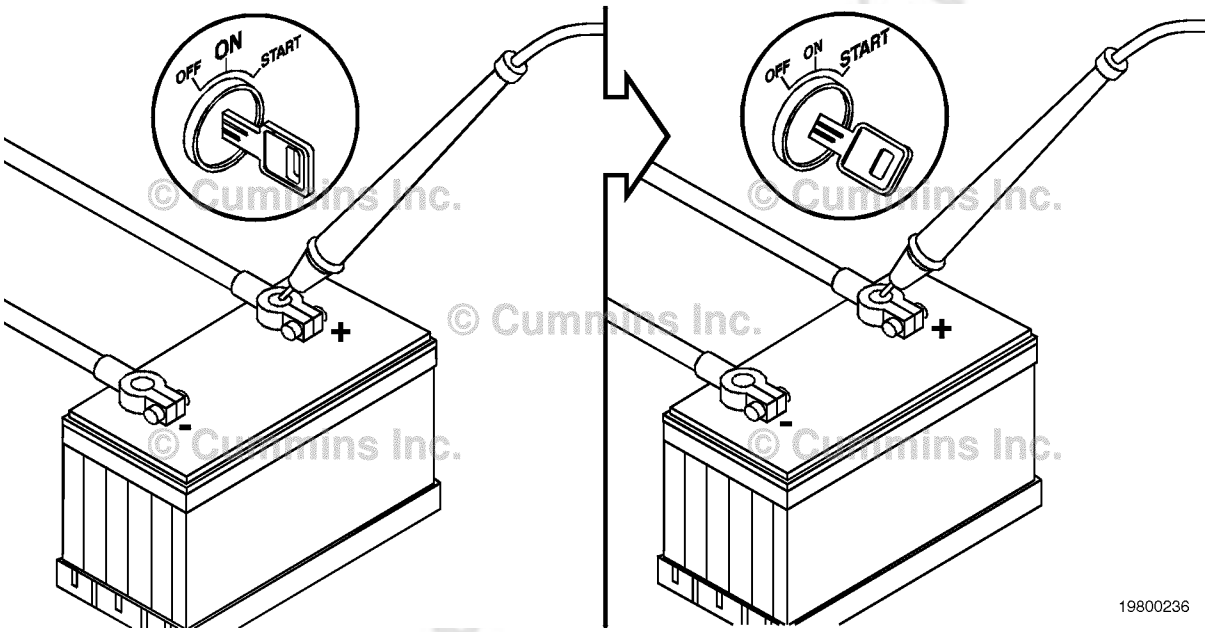
Action	Specification/Repair	Next Step
check the resistance of the battery supply circuit. • Measure the resistance from pin A to the positive (+) battery terminal. • Measure the resistance from pin C to the positive (+) battery terminal. • Measure the resistance from pin B to the negative (-) battery terminal.	**OK** Less than 10 ohms	2C
	NOT OK Repair or replace the power harness. Refer to the OEM Troubleshooting and Repair Manual.	5A



STEP 2C: Check the battery voltage.

Condition:
- Turn keyswitch "ON".

Action	Specification/Repair	Next Step
check the battery voltage. • Place positive (+) probe of the multimeter on the positive (+) battery terminal, and touch negative (-) probe to the negative (-) battery terminal while trying to start engine.	**OK** Normal conditions: At least 12 VDC; During cranking: At least 6.2 VDC	2D
	NOT OK Charge or replace the battery. Refer to the OEM Troubleshooting and Repair Manual.	5A



STEP 2D: Check the battery voltage.

Condition:
- Turn keyswitch "OFF".

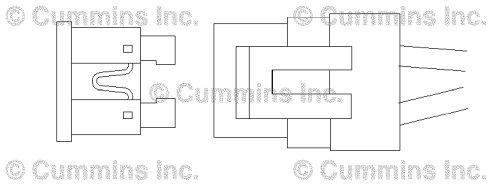
Action	Specification/Repair	Next Step
check the battery voltage. • Check the battery terminal connections on both positive (+) and negative (-) terminals.	**OK** Connections are tight and corrosion free	3A
	NOT OK Tighten the loose connections, and clean the terminals. Refer to the OEM Troubleshooting and Repair Manual.	5A

STEP 3: Check the two 15 Amp fuses.

STEP 3A: Check if the two 15 Amp fuses are installed correctly.

Condition:
- Turn keyswitch "OFF".

Action	Specification/Repair	Next Step
check if the two 15 amp fuses are installed correctly. • Inspect the two 15 Amp fuses for correct installation.	**OK** Fuses installed correctly	3B
	NOT OK Install the fuses correctly. Refer to Procedure 019-198 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130.	5A



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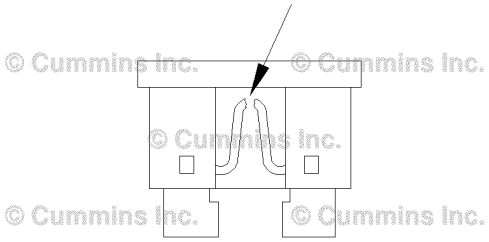
STEP 3B: Check if the two 15 Amp fuses are blown.

Condition:
- Turn keyswitch "OFF".

Action	Specification/Repair	Next Step
check if the two 15 amp fuses are blown. • Inspect the two 15 Amp fuses to see if they are blown.	**OK** Fuses not blown	4A
	NOT OK Locate the short circuit • Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130. • Replace the blown fuse(s).	5A



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STEP 4: Check the actuator harness.

STEP 4A: Inspect the harness and the ECM connector pins.

⚠CAUTION⚠

To avoid damaging a new ECM, all other active fault codes must be investigated prior to replacing the ECM.

Condition:
- Turn keyswitch "OFF".
- Disconnect the actuator harness connector from the ECM.

Action	Specification/Repair	Next Step
inspect the harness and the ecm connector pins for: • bent or broken pins • pushed back or expanded pins • corroded pins • moisture in or on the connector • missing or damaged seals.	**OK** No damaged pins	4B
	NOT OK Repair the damaged pins. Repair or replace the engine harness, connector, or ECM, whichever has the damaged pins. • Repair the engine harness. Refer to Procedure 019-203 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130. • Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130. • Replace the ECM. Refer to Procedure 019-031 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130. • Replace the o-ring on the 28-pin connector if it is damaged or missing. Refer to Procedure 019-203 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130.	5A

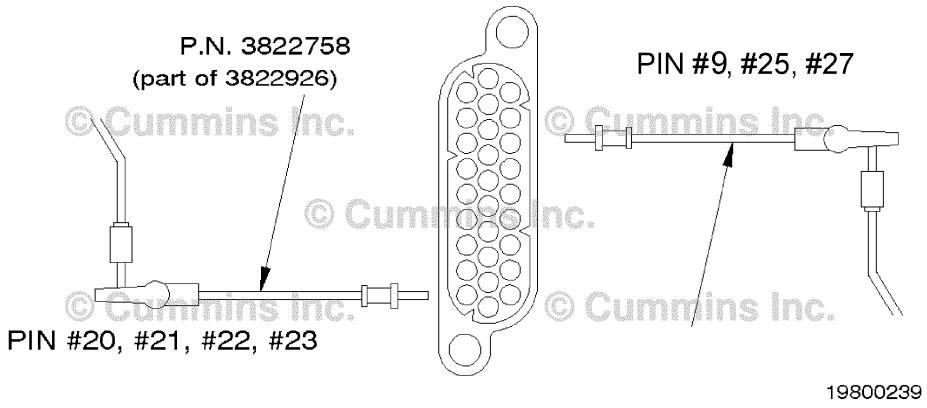
STEP 4B: Check for an open circuit in the battery power circuits.

⚠CAUTION⚠

To avoid pin and harness damage, use the following test lead when taking a measurement: Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead.

Condition:
- Turn keyswitch "OFF".
- Disconnect the actuator harness connector from the ECM.

Action	Specification/Repair	Next Step
check for an open circuit in the battery power circuits. • Measure the voltage from pin 20 to pin 9 of the actuator harness. • Measure the voltage from pin 21 to pin 25 of the actuator harness. • Measure the voltage from pin 22 to pin 27 of the actuator harness. • Measure the voltage from pin 23 to pin 9 of the actuator harness.	**OK** 10 to 15 VDC	4C
	NOT OK Repair or replace the engine harness. Refer to Procedure 019-203 or 019-043 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130.	5A



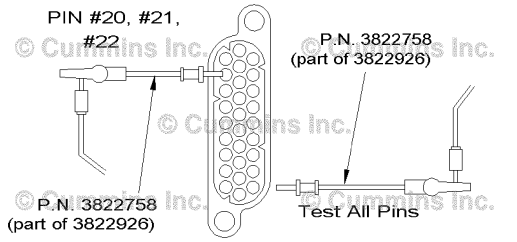
STEP 4C: Check for a short circuit.

⚠CAUTION⚠

To avoid pin and harness damage, use the following test lead when taking a measurement: Part Number 3822758 - male Deutsch/AMP/Metri-Pack test lead.

Condition:
- Turn keyswitch "OFF".
- Disconnect the actuator harness to the 3-pin battery connector.
- Disconnect the actuator harness connector from the ECM.

Action	Specification/Repair	Next Step
check for a short circuit . • Measure the resistance from pin 20 of the actuator harness connector to the all other pins in the connector, except pin 21. • Measure the resistance from pin 21 of the actuator harness connector to the all other pins in the connector, except pin 20. • Measure the resistance from pin 22 of the actuator harness connector to the all other pins in the connector, except pin 23. • Measure the resistance from pin 23 of the actuator harness connector to the all other pins in the connector, except pin 22.	**OK** More than 100k ohms	4D
	NOT OK Replace the engine harness. Refer to Procedure 019-043 in the Troubleshooting and Repair Manual, Industrial CELECT™ Plus System Bulletin 3666130.	5A



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STEP 4D: Check the add-on or accessory wiring at (+) terminal of the battery.

Condition:
- Turn keyswitch "OFF".

Action	Specification/Repair	Next Step
check the add-on or the accessory wiring at (+) terminal of the battery. • Starting at the (+) terminal, follow any add-on or accessory wiring, and examine wire(s) for damaged insulation or an installation error that can cause the supply wire to be shorted to the engine block.	**OK** No damaged wires	4E
	NOT OK Repair or replace the damaged wiring.	5A

STEP 4E: Check for good vehicle grounds.

Condition:
- Turn keyswitch "OFF".

Action	Specification/Repair	Next Step
check for good ground wires and connections. • Check from negative (-) battery post to block ground. • Check from block ground to negative (-) starter post ground. • Check block to frame ground. • Check block to cab ground.	**OK** Meets OEM specifications for voltage drop under electrical load	4F
	NOT OK Repair vehicle grounds.	5A

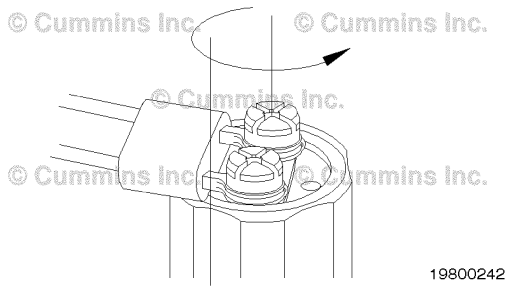
STEP 4F: Check the injector solenoid captive nuts for proper torque.

⚠WARNING⚠

The injector solenoids receive high voltage when the engine is operating. Do not wear jewelry or damp clothing, and do not touch the injector solenoids or the solenoid wires when the engine is operating. This can result in electrical shock that can cause personal injury or death.

Condition:
- Turn keyswitch "OFF".

Action	Specification/Repair	Next Step
check the injector solenoid captive nuts for proper torque. • Remove the valve covers and check the injector solenoid captive nuts for proper torque.	**OK** Captive nuts are correctly torqued	5A
	NOT OK Tighten the captive nuts. Replace the valve covers.	5A



STEP 5: Clear the fault code.

STEP 5A: Disable the fault code.

Condition:
- Connect all the components.

Action	Specification/Repair	Next Step
disable the fault code. • Start the engine and let it idle for one (1) minute. • Verify Fault Code 434 is inactive.	**OK** Fault Code 434 inactive	5B
	NOT OK Return to the troubleshooting steps or contact your local Cummins Authorized Repair Location if all the steps have been completed and checked again.	1A

STEP 5B: Clear the inactive fault codes.

Condition:
- Connect all the components.

Action	Specification/Repair	Next Step
clear the inactive fault codes. • Erase the inactive fault codes using Compulink™, Part Number 3823549, Echek™, Part Number 3824437, or INSITE™, Part Number 3824638.	**OK** All faults cleared	Repair complete
	NOT OK Troubleshoot any remaining active fault codes.	Appropriate troubleshooting chart