ParkSmart™/Espar Auxiliary Heater Service

83-137

FLA COE
FLB COE
FLD Conventional
Business Class
FLC 112 Conventional
Century Class Conventional
Argosy COE
Cargo
Columbia
Coronado
Business Class M2
> Cascadia

Freightliner Service Bulletin

Description of Revisions: *This bulletin replaces the version dated January 2015. The troubleshooting procedure for Problem 1 has been revised.*

General Information

NOTE: The following information applies to the Cascadia ParkSmart™ system, but Espar Airtronic heaters used for NITE and stand-alone auxiliary heaters would use the same diagnostic tool, with similar adapters and procedures.

This bulletin is designed to give a general overview and assist in locating the root cause of an auxiliary heater malfunction, and assist in locating the proper Espar diagnostic manual for repairing the unit.

Espar Service Literature

For service information for any Espar heater, refer to the service literature posted on the Espar website.

1. Go to **www.Espar.com**.
2. Select "Warranty" at the top of the Espar home page. See **Fig. 1**.

Fig. 1, Espar Home Page

3. On the Warranty screen, select the manual for the heater model being serviced (ParkSmart uses Hydronic 5). See **Fig. 2**.

This manual will give all the Espar specific information and troubleshooting procedures needed. If the issue is with the wiring to the Espar unit, refer to the appropriate vehicle workshop manual and wiring diagrams for more information.

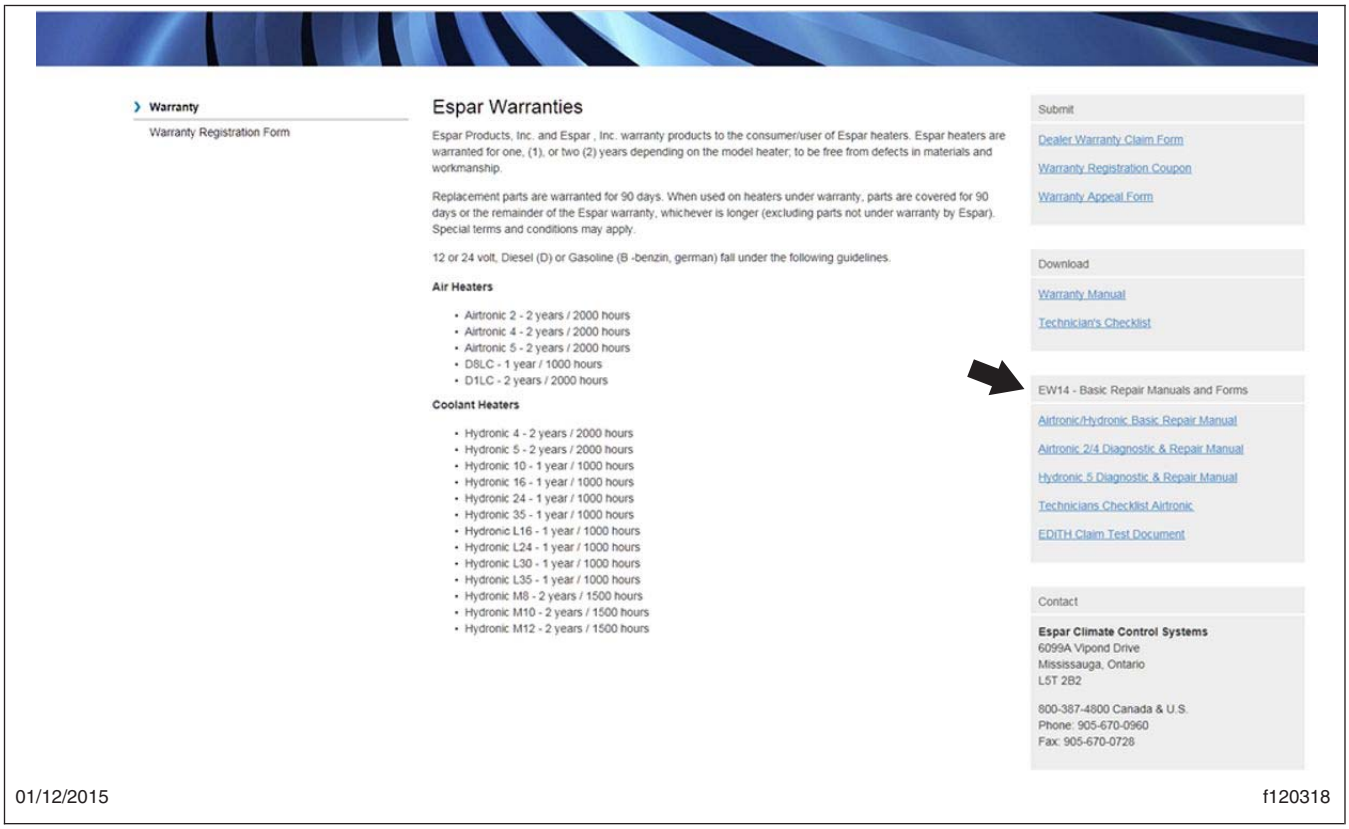


Fig. 2, Espar Technical Manuals

Espar Special Tools

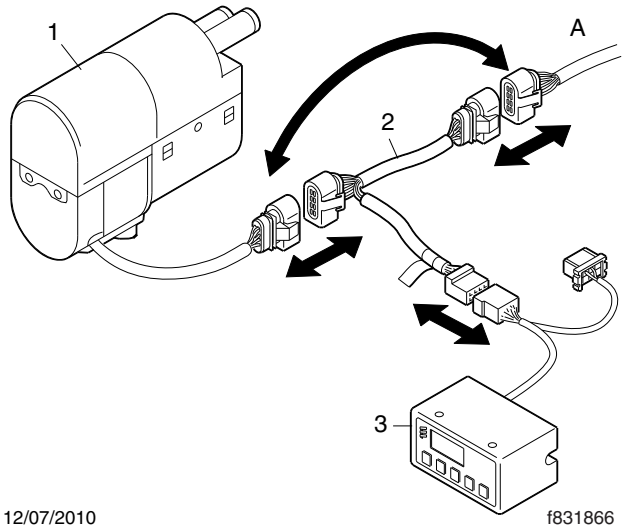
The ParkSmart system requires a special tool for troubleshooting the Espar coolant heater. See **Fig. 3**. **Table 1** lists these tools, and the associated part numbers. Dealers can place direct ship orders through normal parts ordering channels. These tools, with similar part numbers, are also available from Espar. These are the only tools needed for reading and clearing Espar fault codes.

Espar Special Tools	
Description	**Part Number**
Y-Adaptor (ParkSmart only)	ESP 2527867000010A
Diagnostic Tool	ESP 202900705020

Table 1, Espar Special Tools

EDiTH Diagnostic Tool and Software package

As an alternative to the diagnostic tool listed above, the EDiTH diagnostic tool and software package can be used. See **Fig. 4**. The EDiTH package delivers more information, however it is not required to read or clear fault codes. The standard Espar control module or a fault code retrieval device will perform the basic functions for diagnosing most unit issues. The Edith tool requires the use of the ParkSmart Y-adaptor to communicate with the Espar heater in a ParkSmart system.



Insert the adaptor cable in the harness and attach the fault code reader.

A. To ParkSmart
1. Espar Heater
2. Adaptor Cable
3. Fault Code Reader

Fig. 3, Adaptor Cable and Fault Code Reader

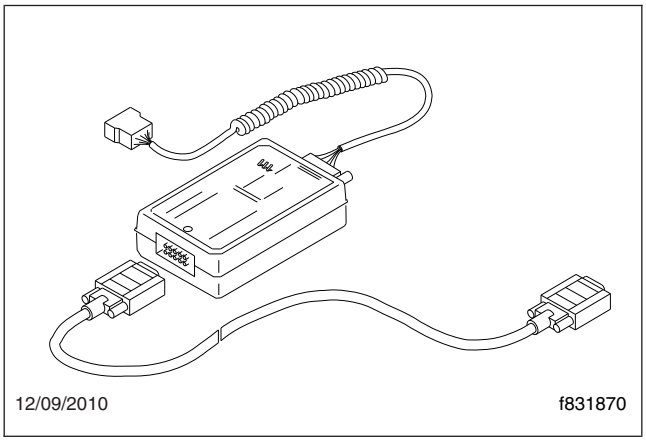


Fig. 4, EDiTH Diagnostic Tool

Periodic Maintenance

The following checks should be performed on the Espar heater system during regularly scheduled maintenance of the vehicle, and after any repairs are made.

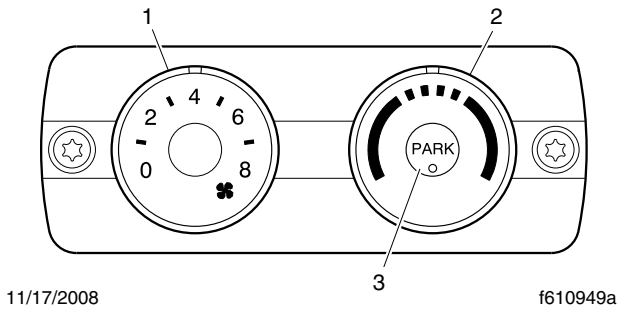
- Check coolant hoses, clamps, and make sure all valves are open. Maintain the engine manufacturers recommended coolant level. Ensure that the heater is properly bled after servicing the coolant system.
- Check the heater intake and exhaust for blockages.
- Check all of the heater fuel lines for leaks.
- Check, and if necessary, replace the fuel filter inserts.
- Check the electrical lines and connections for corrosion.
- Run the heater for a minimum of 15 minutes, at least once a month throughout the year to avoid filter fouling.
- Maintain the batteries and all electrical connections in good condition. The heater will not start without sufficient power. Low and high voltage cutouts will shut the heater down automatically.
- Check the glow pin and replace if necessary.

Heater Troubleshooting

Use **Table 2** to diagnose the Espar heater used in the ParkSmart system.

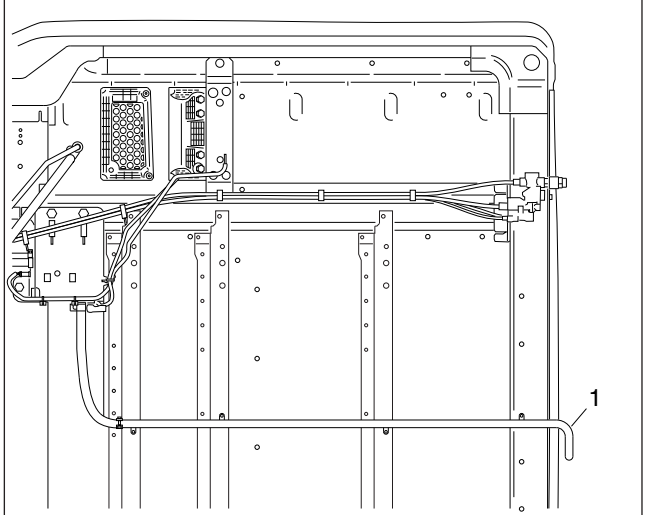
ParkSmart System General Heating Test		
Set Up	Expected Result	Results
Engine off Park brake set Temperature control set to full heat Blower set to 4 Press the PARK button See **Fig. 5**.	The blower should turn on at medium speed. The condenser fan should start and run for approximately 30 seconds. The heater should begin operation (you will be able to hear this within 2 minutes) and you should be able to feel the exhaust at the pipe exit, below the back of the cab. See **Fig. 6**.	If the heater does not start and run use the heater test to determine which system to diagnose.

Table 2, ParkSmart System General Heating Test



1. Fan Switch
2. Temperature Control
3. "PARK" Mode Button

Fig. 5, ParkSmart Control Module



1. Exhaust Pipe

Fig. 6, Exhaust Pipe Installation

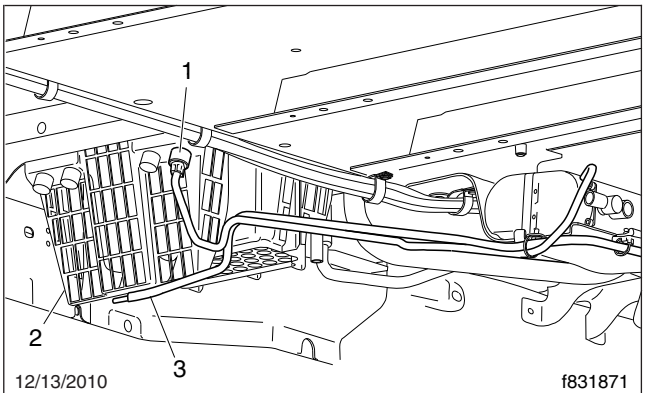
Heater Test

The Espar heater requires 3 conditions to work.

- Power and ground at the connector on the exhaust basket
- 12V on the yellow signal wire at the connector
- Fuel in the tank

Test the heater function as follows.

1. Verify that there is power and ground at the connector.
2. Jump the power from the red wire to the yellow wire (so that both supply 12V to the heater). See **Fig. 7**.



Jump power from red wire to yellow wire.
1. Heater Electrical Harness
2. HVAC Unit Outlet Basket
3. Fuel Line

Fig. 7, Testing the Heater Function

3. If the heater powers up and begins to run, the ParkSmart system is not providing the request message needed. The Espar heater is not faulty; continue diagnosis using the ParkSmart Controls Test that follows.

   If the heater does not turn on, refer to the Espar Hydronic 4-5 manual, and use the Espar diagnostic tool to diagnose the issue. See **Table 3** for common problems with the system.

Fuel Operated Coolant Heater Troubleshooting: "No Start" and "Heater Stops" Conditions		
Problem	**Description of the Problem**	**Possible Reason and Method of Repair**
1	Absolutely nothing happens when the heater is turned on. Coolant pump is not pumping.	1. Check the voltage at the heater harness connector pins 1 and 2. Turn the heater ON and make sure that the voltage is still OK. Repair the harness and connections if necessary.
		2. If the voltage is OK, then try to start the heater by connecting the red and yellow wires together using a jumper wire. If the heater starts, go to step 3. If the heater does not start, go to step 4.
		3. If the heater starts, check the park brake pressure switch in the "PK2" position, at the front wall pass through. It must be a N.O. switch. If not, replace the switch. Go to "Park Brake Pressure Switch Test" below.
		4. If the heater still does not start, then most likely the ECU is locked or the start-up self test fails. NOTE: Use the 7-Day Timer, EDiTH, or diagnostic tool, to retrieve fault codes from the heater's memory and to unlock the ECU if it is locked. Follow the heater manufacturer's service manual for the fault code's description and repair methods.

Fuel Operated Coolant Heater Troubleshooting: "No Start" and "Heater Stops" Conditions		
Problem	**Description of the Problem**	**Possible Reason and Method of Repair**
2	When turned on, heater just pumps coolant, never stops and never performs a start attempt. No fault codes found in memory.	1. Check and replace temperature sensor.
		2. If the sensor is good, replace the ECU.
3	Heater switches into shutdown phase 20 seconds after being turned on (the most likely, fault code 11 found in memory).	Check the voltage at the heater harness connector pins 1 and 2. Turn the heater ON and make sure that the voltage is still OK. Repair the harness and connections if necessary.
4	Heater makes two attempts to start with no success, and then stops completely. No smoke comes from the exhaust pipe, some smoke can be seen between the exhaust pipe and heater.	1. Check if the exhaust pipe is plugged with ice. Reroute it if this is the case.
		2. Check the combustion air intake pipe. If the exhaust and combustion air intake pipes are OK, see problem 5 below.
5	Heater makes two attempts to start, may smoke for awhile and then it stops.	1. Do the fuel quantity check, and if the amount of fuel is insufficient, than check the fuel pick-up pipe, fuel lines and connections, and the fuel filter on the pump. Replace the filter or pump if necessary.
		2. Check the glow pin, and replace the atomizing screen. Clean the combustion tube (including all its airways) and the heat exchanger.
6	Heater starts and runs, but smokes excessively. NOTE: Minor smoking at startup is normal, but large amounts of continued smoke indicates combustion problem.	1. The heater needs to have the combustion screen/chamber serviced. 2. There is a combustion air flow restriction causing a rich running condition.
7	Heater makes two attempts to start, then stops. Both times it sounds like the ignition takes place and then combustion process stops together with the fuel metering pump. Usually no smoke comes from the exhaust pipe.	1. The heater ignited but the flame was not detected. Check the flame sensor and replace it if bad.
		2. Replace the ECU if the flame sensor is good.
8	Heater ignites normally, but often stops. (codes 52-56 found in memory)	1. Check the fuel lines for gaps in the connections inside the connection pieces.
		2. If the heater stops only when the vehicle is in motion, reroute the combustion air intake and exhaust pipes, or bend their ends toward the rear of the vehicle.
9	Heater overheats and stops soon after being turned on. The temperature of the heat exchanger raises quickly after the start.	1. Bleed the air from the coolant lines and heat exchanger. Check the plumbing to ensure there are no restrictions to coolant flow.
		2. Check to see if the coolant pump spins. Unblock and clean it if necessary.
10	Heater does not provide enough power. Mostly working on low power level, which can be detected by measuring electrical current draw.	1. Check the coolant pump for a blockage.
		2. Check the heater plumbing for a blockage or damage.
11	Ground wire burned out.	The vehicle starter was turned on, or a short circuit happened in the vehicle power circuits while the vehicle power switch in the battery ground wire was turned off. Fix the wire or replace the ECU.

Table 3, Fuel Operated Coolant Heater Troubleshooting: "No Start" and "Heater Stops" Conditions

ParkSmart Controls Test

If the heater worked during the "Heater Test" but does not power up with the ParkSmart controls, check the following.

- The park brake switch is operating correctly and parking brake is set. See the "Park Brake Pressure Switch Test" below.
- The engine must be off (J1939 report of engine rpm will also cause the unit not to run)
- The internal controller must be waking up. The light must stay illuminated on the control head when the fan is set to anything but 0 and the "PARK" button is pressed.

If the three above conditions are met, test for 12V on the yellow wire when heat request is initiated. If the yellow wire does not show 12V, but the Espar unit will function when yellow wire is jumped to 12V, there is an internal problem with the ParkSmart. Diagnose the issue using the published information in the *Cascadia Troubleshooting Manual*, and *Freightliner Service Bulletin 83-136*.

RPL35

When the Espar coolant heater will not start it is possible that the parking brake switch (see **Fig. 8**) is not operating correctly. This switch is normally open (infinite resistance across the terminals) when the parking brake is set. The Espar coolant heater will not operate if this circuit is closed. In order to test the circuit and switch when the heater is not otherwise operational:

1. Turn the engine off.
2. Set the parking brake.
3. Remove the covers in the driver footwell that cover the air brake distribution panel.

NOTE: The wiring to the switches is labeled. The ParkSmart switch has the number of the harness on it (this can be found in Parts Pro if necessary). This switch does not report on the J1939 databus, thus the value on the databus is not indicative of the status of this switch.

4. Disconnect one of the wires from the switch.
5. Set the ParkSmart unit on full heat, blower set at 4. Press the PARK button.

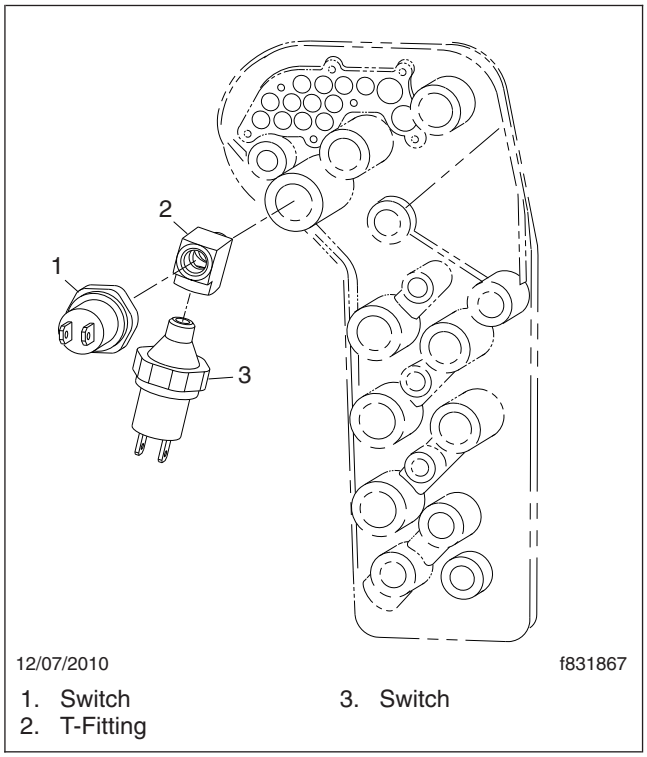
   At this point you should hear the blower start. After approximately 2 minutes you will be able to hear and feel the Espar fuel operated heater exhaust at the pipe. If the heater does not operate at this time, the switch is not the problem.

   To verify that the switch is operating correctly:

   5.1 Disconnect both wires from the switch.

   5.2 With the parking brake set, place a multimeter across the terminals. You should see infinite resistance.

   5.3 Verify that the wheels are securely chocked, then release the parking brake. You should now see 0 resistance.

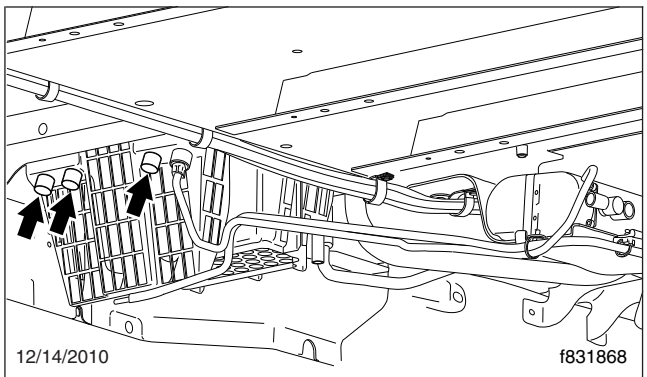


1. Switch
2. T-Fitting
3. Switch

Fig. 8, Park Brake Pressure Switch Location (typical)

ParkSmart Controller Lockout

Under certain conditions the ParkSmart controller may lock out inputs and outputs. To reset the ParkSmart controller, disconnect the two red power wires and the black power wire at the outlet basket on the underside of the vehicle for two minutes. See **Fig. 9**.



Disconnect the power connectors at the outlet basket for two minutes.

Fig. 9, Resetting the Controller

FLA COE
FLB COE
FLD Conventional
Business Class
FLC 112 Conventional
Century Class Conventional
Argosy COE
Cargo
Columbia
Coronado
Business Class M2
> Cascadia

Warranty

This bulletin is informational only. Warranty does not apply.