Countries:	CANADA, UNITED STATES, MEXICO	**Document ID**:	IK1600171
Availability:	ISIS, FleetISIS	**Revision**:	0
Major System:	CAB / SLEEPER / HOOD	**Created**:	12/13/2012
Current Language:	English	**Last Modified**:	12/18/2012
Other Languages:	NONE	**Author**:	Kevin Beirne
Viewed:	676		

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Title: Espar® Heater

Applies To: 2007-2010 ProStar and LoneStar with Feature Codes 16UZL

Description

This article provides for the diagnosis and repair procedure for the Espar Hydronic Heater.

Feature Codes Covered By This Article

16UZL

Triage

Check Vehicle History
Check for any Open Campaign

Customer Questionnaire:
1) Can you hear the heater start up?
2) Is there warm/hot air coming out of the vents?
3) When is the heater malfunctioning? Is it intermittent?
4) How many attempts have been made before it stopped working altogether?
5) When was the last time the heater was run with no known issues? How long did it run for?

Verify complaint using cab controls (use link below):

Espar Heater Control Switches

Preliminary Checks

Review the customer concern and perform basic troubleshooting.
Basic Troubleshooting should be performed prior to an major troubleshooting or disassembly of the heater.

In the event of failure, first check the following:

- Battery
- Fuses
- Fuel
- Coolant Transfer (kinked hoses?)
- For interference in combustion air or exhaust pipes

NOTE:

If the customer has attempted to start the heater more than 20 times, or if 3 consecutive overheats have been detected, the heater will lock.

To unlock the control unit you will need to use the Fault Code Retrieval Device:

To unlock the control unit you must be equipped with the EDiTH diagnostic software and ISO Adapter.

Must run "General Data Test" and then select "Error" tab, then click the "Delete" button.

Special Tools

FIGURE A

FIGURE B

DESCRIPTION:

The Espar Heater Diagnostic Tools have been released for diagnosing the following Espar

Heaters:

- The ISO Adaptor (for EDiTH Diagnostics) ESP22154189000000Z (**Figure A**) is used for all Espar Heaters.

- The 'Y' adaptor ESP2029007050280Z (**Figure B**) is used with the ISO Adaptor for the Hydronic D5 SC heater and 12V DC NO IDLE HVAC System.

TROUBLESHOOTING

Use the below link for "No Start" and "Heater Stops" conditions:

HYDRONIC TROUBLESHOOTING

To troubleshoot using the EZTech, follow the steps in the link below for connection procedure.

HYDRONIC D5 ADAPTER AND EDiTH ISO ADAPTER

System Tests using EDiTH Software (Use to diagnose or verify repairs, record readings on R.O.)

DIAGNOSTIC TESTS, FUNCTION TEST, FAULT CONDITIONS, AND COMMON ISSUES

FAULT CODE TABLE (Address Active Codes First)
For Wiring diagrams and DTC Table, refer to table below. **To Print** - click link below:

ESPAR D5 WIRING DIAGRAMS (MODEL # SPECIFIC)

ESPAR D5 DTC TABLE

FAULT CODE	FAULT DESCRIPTION	CAUSES/REPAIR
000 replace	Normal Operation	
010	Overvoltage	Check voltage between terminals 1 (red) and 2 (brown) at connector (B1). If voltage is > 15 volts then check battery, electrical leads and vehicle charging system.
011	Under voltage shut down	Check voltage between terminals 1 (red) and 2 (brown) at connector (B1). If voltage is < 10 volts, then check battery, electrical leads and vehicle charging system.
012	Overheating	Check for possible causes of overheat (water circuit), Sensor. Check overheat switch resistance values. Temperature at temperature sensor or overheat sensor is greater than 125 degrees Celsius.
	Possible overheating	Difference of measured values at temperature sensor > 25 degrees Celsius (min. 80 degrees Celsius water temperature and metering pump in

014	detected (difference evaluation)	operation); Check temperature sensor and overheating sensor, replace if necessary. Check for air in coolant system. Check values from previous page.
015	Too many overheats	Remove cause of over heat. Reset control unit using an Espar diagnostic option. Permanent overheating counter reading exceeded. Heating enable only possible by means of diagnostics system (press both "LL" keys simultaneously).
017	Overheating detected	Temperature at temperature or overheating sensor > 130 degrees celsius, emergency OFF if Fault Code 012 or 014 not applicapble; check water circuit, check temperature sensor and overheating sensor; replace if necessary. See graph HERE.
020	Open circuit - glow pin	Check glow pin and electrical leads for continuity, replace if necessary
021	Short circuit - glow pin	Check glow pin and electrical leads for continuity, replace if necessary
030	Combustion air blower motor	Blower impeller or electric motor may be jammed (frozen solid, dirty, etc.) Fix jam, replace electric motor if necessary.
031	Combustion air blower motor	Check lead to combustion air motor for continuity, replace motor if necessary.
032	Combustion air blower motor short-circuit	Check combustion air blower motor (electric motor); replace if necessary. Check power supply (chafed, corroded etc.)
038	Vehicle fan relay control break	Check electric lead to relay, fix break, replace relay if necessary. For wiring harness (20 2900 70 0401) without relay, replace harness.
039	Vehicle fan relay control short circuit	Check electric lead to relay, fix break, replace relay if necessary. For wiring harness (20 2900 70 0401) without relay, replace harness.
041	Water pump break	Check supply lead to water pump for continuity, remedy break, replace water pump if necessary.
042	Water pump short-circuit	Check supply lead to water pump for short circuit, check water pump, replace water pump if necessary.
047	Short circuit - fuel metering pump	Check for wires for short to fuel metering pump. Test fuel metering pump. Replace if necessary.
048	Open circuit - fuel metering pump	Check supply lead to metering pump for continuity, remedy break, replace if necessary.

050	Too many no start attempts	Safety time counter reading exceeded. Reset control unit using 7 day time or fault code retrieval device to unlock control unit.
051	Faulty Flame Recognition	At start, if flame sensor is at above 70 degrees Celsius > 240 seconds, check exhaust gas and combustion air supply, check flame sensor, replace if necessary. For flame sensor values: See graph HERE.
052	No start safety time exceeded	No flame detected on start attempt. Check fuel delivery and fuel supply, Check exhaust gas and combustion air ducts.
053	Flame cutout in high mode	Heater has started successfully the flame has extinguished. Check fuel supply. Check combustion air and exhaust flow. Check flame sensor resistance value HERE. Replace flame sensor if necessary.
054	Flame cutout in bust mode	Heater has started successfully the flame has extinguished. Check fuel supply. Check combustion air and exhaust flow.
056	Flame cutout in low mode	Check flame sensor resistance value HERE.
060	Open circuit - temperature sensor	Temperature sensor detects a value beyond its range. Check connections. Check sensor resistance values between 11 and 12 at connector B2 > 2 M Ohms (if open circuit).
061	Short circuit - external temperature sensor	Check connections. Check sensor resistance values between 11 and 12 at connector B2 < 50 Ohms (if short circuit). Temperature sensor values HERE.
064	Open circuit - flame sensor	Sensor is sensing value outside of range. Check connection leads. Resistance values between 1 and 2 at connector B2 > 3040 Ohms (if open circuit).
065	Short circuit - flame sensor	Check connection leads. Resistance values between 1 and 2 at connector B2 > 780 Ohms (if short circuit). Flame sensor values HERE.
071	Open circuit - overheat sensor	Check connection leads. Resistance values between 9 and 10 at connector B2 > 2 M Ohms (if open circuit).
072	Short circuit - overheat sensor	Check connection leads. Resistance values between 9 and 10 at connector B2 > 50 M Ohms (if short circuit).
091	External interference voltage	Error in controller from interference voltage from vehicle network. Possible causes: poor batteries, poor battery charges, other interference sources;

		eliminate interference voltages.
090 092-103	Controller Defect	Control unit malfunction due to interference voltage from vehicle electrical system; possible low batteries, charges, other sources of interference, eliminate interference voltages. Internal faults detected in microprocessor/memory. Replace control unit. Internal failure. Replace control unit.

Faults not show by the diagnosis system *HRYDRONIC WON'T START*		After switching *HYDRONIC* on, the water pump and vehicle fan start immediately -Remove and check the temperature sensor. After switching *HYDRONIC* on, the vehicle fan starts, functioning "preventing" is activated. - Changeover venting to heating at "heating/venting" changeover switch.

TECHNICAL SPECIFICATIONS NOTE:

- Voltage requirement on Hydronic D5 SC unit is 10.2 V minimum and 16 V maximum.
- Technician should first check battery voltage - then voltage sensed by heater.
- To Check voltage sensed by heater:

Use EDiTH diagnostics and run "Function Test". Voltage sensed by heater will be displayed.

OR

Connect Hydronic Y Adapter and probe the red and brown wire terminal on the white 6 pin connector

Repair Information

- **Espar Repair Information**
- **Espar Repair Information (continued)**
- **MaxxPower HVAC wiring diagram CLICK HERE**
- ESPAR.COM
- For Hydronic Espar Pre-Season Maintenance **CLICK HERE**

PUBLICATIONS

- **ESPAR HYRDRONIC INSTALLATION/TROUBLESHOOTING/PARTS MANUAL**
- **MaxxPower No Idle Battery-Powered AC System Diagnostic Guide**

- **No Idle Unit Diagnosis (Refer to if heater operable but still have air movement issues)**

Related Information

Espar Training Presentation (Slides only)

For further information in regards to Espar Heaters and A/C HVAC, refer to the **HVAC RESOURCE CENTER**

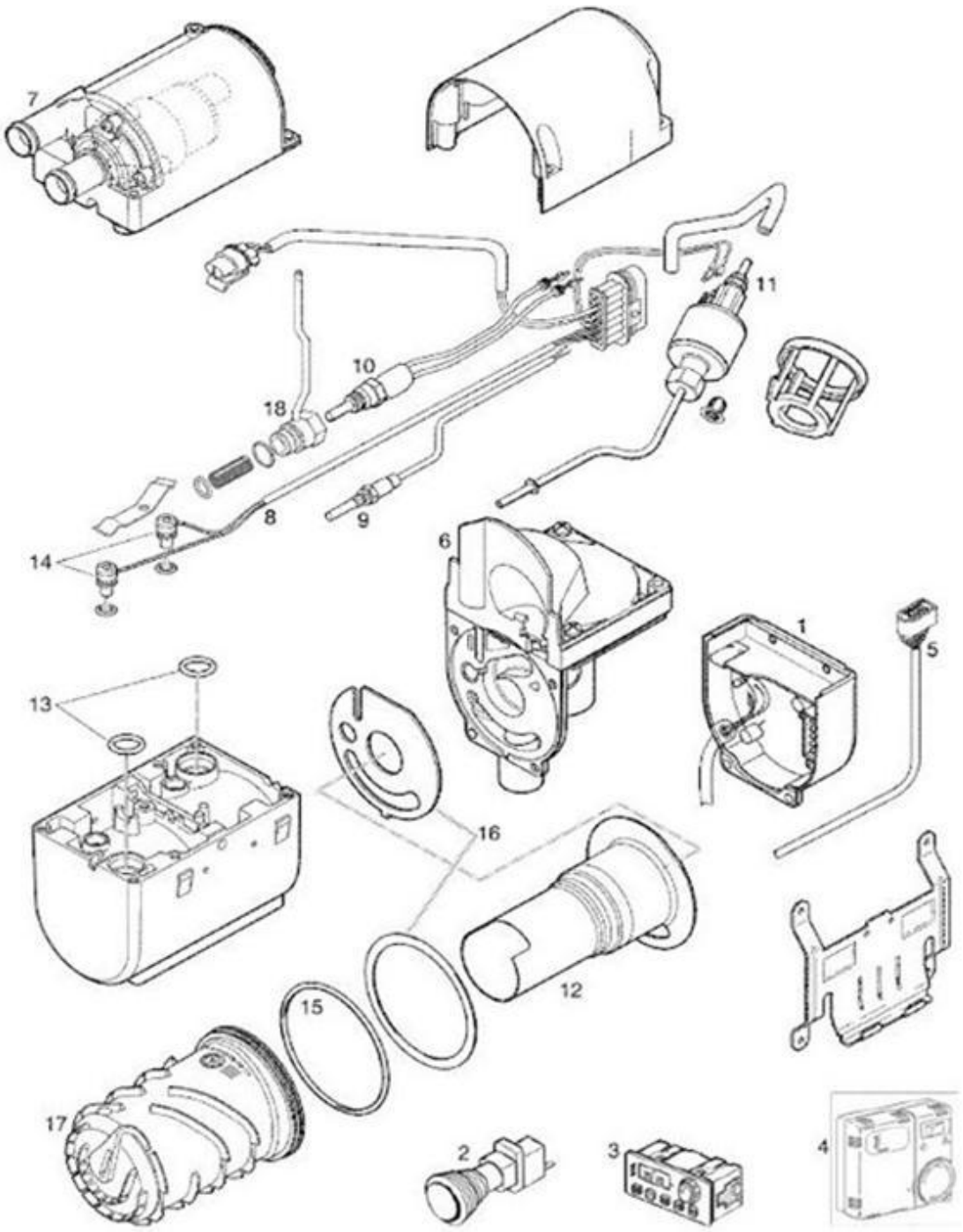
WARRANTY

- When replacing components in the Espar Heater (Auxiliary Fuel Fired Heater) Use Major Group 19030 Noun 633 along with the applicable cause coding.
- The below SRT times reflect applicable times for component replacement

STANDARD REPAIR TIMES

Diagram Ref.	Part Description		ProStar SRT code	LoneStar SRT Code	Time
Diagnosis			**R19-8013A**	**S19-8016A**	**.5**
1	Electronic Control Unit ECU		R19-7633A-31	S19-7633A-31	.4
6	Blower Unit		R19-7633A-20	S19-7633A-20	.5
7	Coolant Pump		R19-7633A-21	S19-7633A-21	.3
8	Overheat Sensor		R19-7633A-22	S19-7633A-22	.5
9	Flame Sensor		R19-7633A-23	S19-7633A-23	.3
10	Glow Pin		R19-7633A-24	S19-7633A-24	.3
11	Fuel Metering Pump		R19-7633A-25	S19-7633A-25	.4
12	Burner / Flame Tube		R19-7633A-26	S19-7633A-26	.5
13	O-Rings, Coolant Pump		R19-7633A-27	S19-7633A-27	.3
14	O-Rings, Sensors		R19-7633A-28	S19-7633A-28	.3
15	O-Ring, Heat Exchanger		R19-7633A-29	S19-7633A-29	.5
16	Seal Kit		R19-7633A-30	S19-7633A-30	.5
	Complete Unit		R19-7633A	S19-7633A	1.0
Heater Function Test			**R19-8014A**	**S19-8017A**	**.5**

Required Repair Parts (Refer to table above for callout numbers)



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