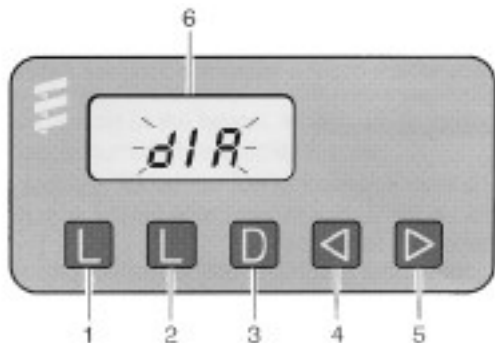


The Diagnostic Unit is used for reading, displaying and deleting fault codes saved in the electronic control unit of the heater. The electronic control unit can save up to 5 fault codes, labeled F1 to F5. The most recent fault code is in memory location F1.

The current or actual fault code is shown as “AF” and is always written into the F1 memory location. Previous fault codes are transferred to memory locations F2 to F5.



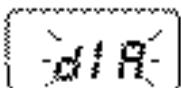
1. Button : delete fault memory
2. Button : delete fault memory
3. Button : switch heater on/off, request diagnostic fault codes
4. Button : backwards, fault F5 – F1, AF
5. Button : forward AF, F1 – F5
6. Display

### Connection

1. When available, connect the unit to the diagnostic pigtail (8-pin black connector) on the heater’s main wiring harness, located at the heater main connection.
2. If the diagnostic pigtail is not present, connect the unit as outlined in the appropriate heater technical manual. A wiring adaptor may be required.

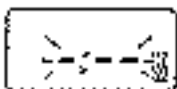
Heater	Wiring Adaptor Part Number
D8LC	CA1 05 031
HYDRONIC 4/5	CA1 05 028
D7WB (boxed)	CA1 05 025
D7WB (Freightliner)	CA1 05 029
D9W / HYDRONIC 10	CA1 05 030
HYDRONIC 16/24/30/35	CA1 05 036

3. Once correctly connected, the Diagnostic Unit display shows:



### Fault Code Retrieval

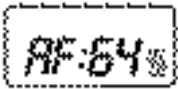
4. Press the button on the diagnostic unit to switch on the heater. The display shows:



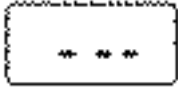
5. After 8 seconds, the display shows one of the following:



No error



Current fault (i.e. fault code 64)



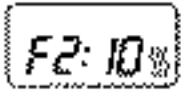
Fault diagnosis not possible

Possible causes:

- Adapter cable not connected properly.
- Control unit defect or incapable of diagnosis (i.e. control unit not equipped with self-diagnostics)

### Display of the Fault Memory F1 – F5 or F5 – F1

6. Press the buttons or once or several times to show the individual fault code memories in decreasing or increasing order. The display shows:

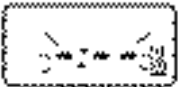


i.e. fault memory 2 / fault code 10

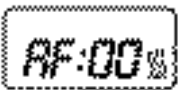
Only those fault memories occupied by a fault are shown.

### Delete Fault Memory

7. Eliminate the cause of the fault. Be sure to correct the root cause, not just the symptom.
8. Press both buttons at the same time until the display shows:



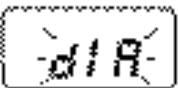
9. Once the fault memories are deleted, the last current fault is shown. The current fault is not reset to 00 until the next restart of the heater, providing no other current fault has occurred. The display shows:



Heater no faults

### End Diagnosis

10. Press button on the diagnosis unit to switch the heater off. The display shows:



11. Wait for the end of the heater cool down period.

12. Remove the adapter cable from the cable harness and restore the connection.

# Diagnostic Fault Codes



Espar Heater Systems

**Note:** Consult the appropriate Troubleshooting and Repair Manual for heater-specific diagnosis and repair procedures.

<b>Fault Code</b>	<b>Fault Description</b>	<b>Comments</b>
00	Normal operation	
01	Warning – over voltage	Check batteries and charging system.
02	Warning – under voltage	
04	Warning – output short circuit	Refer to heater technical manual.
05	Warning – output short circuit, anti-theft alarm	
09	TRS – shut down	Replace control unit.
10	Over-voltage shutdown	Check batteries and charging system.
11	Under-voltage shutdown	
12	Overheat at overheat sensor	Check air duct or coolant hose for blockage. Test overheat sensor.
13	Overheat at flame sensor	Check air duct or coolant hose for blockage. Test flame sensor.
14	Potential overheat detected	Excessive temperature rise through the heater. Check air duct or coolant hose for blockage.
15	Too many overheat shutdowns Overheat with excessive temperature ( <i>AIRTRONIC</i> )	Check air duct or coolant hose for blockage. Test overheat sensor. Reset control unit using Diagnostic Unit or 7-Day Timer.
17	Overheat with excessive temperature	Check air duct for coolant hose for blockage. Test overheat sensor. Replace control unit.
20	Open circuit – glow pin / glow plug	Test glow pin / plug and wire harness.
21	Short circuit – glow pin / glow plug	
22	Short circuit – glow plug relay contacts	Test glow plug relay and replace (only D2H control unit).
23	Open circuit – glow plug relay	Test relay and wire harness.
24	Short circuit – glow plug relay	
25	Short circuit – diagnostic output	Test diagnostic wire harness for short circuit
30	Blower motor will not turn	Relieve cause of jam Replace blower if necessary
31	Open circuit – blower motor	Test blower motor and wire harness.
32	Short circuit – blower motor	
33	Blower motor speed deviation (>10%)	Measure blower speed using no-contact instrument. (Air heater only)
34	Open circuit – water valve relay	Test wiring and relay connections.
35	Open circuit – partial load resistor relay	Test resistor and wire harness.
36	Short circuit – partial load resistor relay	
37	Coolant pump does not rotate	Test coolant pump.
38	Open circuit – vehicle blower relay	Test relay and wire harness.
39	Short circuit – vehicle blower relay	Replace relay.
40	Short circuit – water valve relay	Test water valve relay and wire harness for short circuit. Replace relay.

<b>Fault Code</b>	<b>Fault Description</b>	<b>Comments</b>
41	Open circuit – coolant pump	Test coolant pump and wire harness.
42	Short circuit – coolant pump	
43	Short circuit – external components	Test external components for short circuit.
47	Short circuit – fuel-metering pump	Test fuel-metering pump and wire harness for short circuit.
48	Open circuit – fuel-metering pump	
50	Too many start attempts	Perform fuel-quantity test. Check combustion air and exhaust hose for blockage. Test glow pin / glow plug. Test flame sensor. Reset control unit using Diagnostic Unit or 7-Day Timer.
51	Faulty flame recognition	Test flame sensor.
52	No start Safety time exceeded	Perform fuel-quantity test. Check combustion air and exhaust hose for blockage. Test glow pin / glow plug. Test flame sensor.
53	Flame cutout in boost mode	Flame was established, but was extinguished.
54	Flame cutout in high mode	Perform fuel-quantity test.
55	Flame cutout in medium mode	Check combustion air and exhaust hose for blockage.
56	Flame cutout in low mode	Test glow pin / glow plug. Test flame sensor.
57	Flame sensor defect	Test connection at flame sensor.
58	Flame detected on cool down	Test flame sensor.
59	Coolant excessive temperature rise	Check coolant flow.
60	Open circuit –temperature control sensor	Test external temp sensor and wire harness (air heater).
61	Short circuit –temperature control sensor	Test water temperature sensors (coolant heater).
62	Open circuit – potentiometer	Test controller and wire harness.
63	Short circuit – potentiometer	
64	Open circuit – flame sensor	Test flame sensor and wire harness.
65	Short circuit – flame sensor	
71	Open circuit – overheat sensor	Test overheat sensor and wire harness.
72	Short circuit – overheat sensor	
73	Overheat sensor – excessive temperature rise	Check air duct or coolant hose for blockage. Test overheat sensor.
90	Control unit defect – internal fault	Malfunction due to interference voltage from vehicle electrical system (i.e. poor battery or charger). Remove interference voltage. Replace control unit.
91	External voltage disturbance	
92	Control unit defect – ROM error	
93	Control unit defect – RAM error	
94	Control unit defect – EEPROM error	
96	Control unit defect – internal temperature sensor	Replace control unit or use external air temperature sensor (air heater).
97	Control unit defect	Replace control unit.