Air heaters Troubleshooting / Fault Codes

Air Top 2000 ST

Type AT 2000 ST B (petrol)
Type AT 2000 ST D (diesel)

5 Troubleshooting

5.1 General

This section describes how to identify and remedy faults on the Air Top 2000 ST air heater.

If a fault occurs, an error code will be output in the displayof the combination timer. If the heater has a control element, the ON control light will flash. In addition, the heater can be checked using a personal computer (see PC heater diagnostic operating manual).

CAUTION

Troubleshooting work demands precise knowledge of the structure and theory of operation of the various components and must be carried out by trained personnel only.

If in doubt, refer to sections 2 and 3 for a description of how the functions interact.

NOTE

For ADR mode only:

After an ADR shut-down or an operating voltage has been applied by switching the main vehicle switch and control element to “ON”, the control unit will be set to the “Fault lock-out” position. Before it can be restarted, the control element must be set to “OFF” or the Immediate heat button pressed on the combination timer.

CAUTION

The troubleshooting guide is restricted to the localisation of defective components. The following potential sources of malfunctions have not been included and should always be checked so that they can then be excluded as the cause of the particular fault:

- **Corrosion on plugs**
- **Loose plug contacts**
- **Poor crimp contacts on plugs**
- **Corroded cables and fuses**
- **Corroded battery terminals**

If you wish to check individual components, the electrical plug connectors on the control unit must be disconnected.

Conduct a function test in the vehicle after rectifying each fault.

5.2 General error symptoms

The following table (Fig. 501) lists the possible error symptoms.

Error symptom	**Possible cause**	**Remedy**
Heater cuts out automatically	No combustion after start and restart ON indicator flashes	Switch heater off and then on again
	Flame extinguishes during operation ON indicator flashes	Switch heater off and then on again
	Heater overheats ON indicator flashes	Check that the hot air system is clear, allow the heater to cool, switch heat off briefly and then on again
	Battery voltage too low ON indicator flashes	Charge battery Switch heater off and then on again
Heater produces black smoke	Combustion air and/or exhaust system blocked	Check that the combustion air and exhaust systems are clear

Fig. 501 General error symptoms

5.3 Error symptoms during function

The following table (Fig. 502) lists the possible error symptoms in the order in which they may occur during operation.

In the event of a fault, the error is to be located using this table and rectified. It is important that the error symptom is correctly identified.

If the error symptom is not included in this table or the fault is not found under the specific error symptom heading, in an emergency you can contact our technicians on our service hotline (see last page).

NOTE

Every fault is indicated by the flashing LED on the control element after the slow down time has finished. If the other components are OK, a defective control unit may be the cause of all the faults.

There are statuses that are the same as errors.

Error symptom	Occurrence	Possible cause
No start and no illumination of the LED on the control element	Immediate	Incorrect cabling, defective fuse
No start but LED is lit	Immediate	The heater goes straight to control pause when it is switched on, whereby the control pause speed is 0 rpm for a boat heater.

Fig. 502 Error symptoms during function

5.4 Error code output

If the heater is fitted with a combination timer, an error code output will appear on the display of the timer aftera fault occurs.

NOTE

The error code is output if the heater is fitted with a controlelement after an error has occurred by the switch-on indicator/error code indicator flashing. After 5 seconds of fast flashing, the error code will be output by a sequence of long flash pulses, the number of flashes is shown in the table below (for example F04 – 4 long flash pulses).

Error code	Error (group)	Additional information during PC diagnostic	Remedy
F 00	Control unit error	**01** Control unit error **81** EOL checksum error **11** Incorrectly coded control unit or incorrect heater (fuel type) installed (the heater will not work if this error occurs) **91** Neutrally coded or disabled control unit (the heater will not work if this error occurs) **92** Maintain command failed (the heater will not work if this error occurs) **18** Customer bus defective	Replace control unit
F 01	No start	**02** Even after the restart, no flame has formed **82** No start in test	Check fuel supply (tank empty, lines blocked) Clean burner insert, Petrol: Replace flame sensor Diesel: Replace overheating sensor / control unit
F 02	Flame failure	**03** The flame has gone out during operation and has not reformed after a restart attempt **83** The flame has gone out during a heating cycle more than FAZ times (EEPROM)	Check fuel supply (tank empty, lines blocked) Clean burner insert, Petrol: Replace flame sensor Diesel: Replace overheating sensor / control unit
F 03	Undervoltage or overvoltage	**84** The voltage was less than 10.5 V or 21 V for longer than 20 seconds **04** The voltage was more than 16 V or 32 V for longer than 6 seconds	Charge battery

Fig. 503 Troubleshooting (page 1 of 3)

Error code	Error (group)	Additional information during PC diagnostic	Remedy
F 04	Premature flame recognition	**05** A flame was detected before combustion had started	Diesel: Replace overheating sensor / control unit Petrol: Replace flame sensor
F 05	Flame sensor interrupt or short circuit (only petrol heater)	**1A** Flame sensor circuit The switched cable of the element has a short circuit to earth **9A** Flame sensor circuit Break or short circuit to +Ub	Replace flame sensor Replace flame sensor
F 06	External temperature sensor break or short circuit	**14** Temperature sensor circuit Short circuit to earth **94** Temperature sensor circuit break or short circuit to +Ub	Check cables / replace temperature sensor Check cables and terminating resistor / replace temperature sensor
F 07	Metering pump interrupt or short circuit	**88** Break or short circuit to +Ub **08** Short circuit to earth	Check cables / replace metering pump Check cables / replace metering pump
F 08	Drive unit (combustion and hot air blower) break or short circuit	**89** Break or short circuit to +Ub **09** The switched drive unit cable (combustion and hot air blower) has a short circuit to earth or the drive unit is overloaded **15** Burner motor block guard has tripped **95** Burner motor blocking detection has tripped	Replace drive unit (combustion and hot air blower) Eliminate the cause of the blockage / difficulty in movement Replace drive unit (combustion and hot air blower)
F 09	Glow plug interrupt or short-circuit	**8A** Glow plug: Break or short circuit to +Ub **19** Glow circuit The switched cable of the element has a short circuit to earth	Replace glow plug Replace glow plug

Fig. 503 Troubleshooting (page 2 of 3)

Error code	Error (group)	Additional information during PC diagnostic	Remedy
F 10	Overheating	**06** The overheating fault lock-out has tripped (heater overheated) **17** Incorrect application or illegal insulation (ÜHS gradient too high)	Find and remove the cause of the overheating **NOTE** If no other cause can be found for the overheating, the pressure losses caused by the hot air distribution (too many resistance points) are too high or a hot air filter is soiled
F 11	Overheating sensor interrupt or short circuit	**AB** Overheating sensor circuit break or short circuit to +Ub **1B** Overheating sensor circuit. The switched cable of the element has a short circuit to earth	Replace overheating sensor Replace overheating sensor
F 12	Heater fault lock-out	**07** The heater fault lock-out has been activated	Remove the fuse and then refit it **NOTE** The following error has occurred several times: Fault counter more than 3 times Incorrect start counter more than 9 times Overheating counter more than 3 times
F 14	Overheating sensor incorrect position	**97**Incorrect position of overheating sensor (ÜHS gradient too low)	Position the overheating sensor correctly
F 15	Nominal sensor break	**9B** Nominal value potentiometer circuit break or short circuit to +Ub	Check cables / replace control element

Fig. 503 Troubleshooting (page 3 of 3)

Page for notes