Operating Instructions

FCF Evo Series

Marine air conditioning systems

English

Contents

1 About this document

1.1 Purpose of this document

The Operating Instructions (OI) are an integral part of the product and provide the information required to ensure correct and safe operation.

1.2 Using this document

Before operating the unit, read this operating instruction and the supplementary sheet "Important Information on Operating and Installation Instructions".

Keep these operating instructions ready to hand.

Hand these operating instructions on to the following owner or user of the unit.

1.3 Use of symbols and highlighting

This document uses warning labels and colours for hazard classification in accordance with ISO 3864:
See also https://www.iso.org/standard/55814.html.

DANGER
This signal word denotes a hazard with a high degree of risk which, if not avoided, will lead to death or serious injury.

WARNING
This signal word denotes a hazard with a moderate degree of risk which, if not avoided, may lead to minor or moderate injury.

CAUTION
This signal word denotes a hazard with a low degree of risk which, if not avoided, will lead to minor or moderate injury.

NOTE
This signal word denotes a Special Technical Feature or (if not observed) potential damage to the product.

Refers to separate documents which are enclosed or can be requested from Webasto.

✓	Requirements for the following necessary action.

1.4 Warranty and liability

Webasto shall not assume liability for defects or damage that are the result of the Installation Instructions / Operating Instructions and the instructions contained therein being disregarded.

This liability exclusion particularly applies to:

- Improper use.
- Repairs not carried out by a Webasto service workshop.
- Use of non-genuine parts.
- Conversion of the unit without permission from Webasto.

1.5 Webasto Service App

The type label of the FCF Evo Series unit (see Type label) contains a QR code that can be used to call up additional technical documentation in various languages. For this purpose, please use the Webasto Service App, which can be downloaded for iOS (Apple) and Android (Google). For more information regarding the app, visit:
https://dealers.webasto.com

2 Safety

2.1 Intended use

The FCF Evo Series is used for heating and cooling on boats and ships.

The FCF Evo Series has been built according to the current state of technology and the recognised safety rules.

DANGER

Improper or inappropriate use may result in danger to life and limb of the user and others, as well as impairment of the unit and other property.

Any other use of this product is not permissible.

Any other use of or changes to the product, including as part of assembly and installation, will result in any and all warranty claims being voided.

WARNING

Moving parts

Risk of injury, damage to the product.

The FCF Evo Series must only be operated in their final installed position.

WARNING

Ignition of surrounding gases or highly flammable liquids by sparking of the FCF Evo Series.

You must always switch off the air-conditioning system when refuelling, or while in a petrol station area.

WARNING

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the unit by a person responsible for their safety.

- ▶ Children should be supervised to ensure that they do not play with the unit.
- ▶ Cleaning and user maintenance must not be carried out by children.
- ▶ This unit should not be accessible to the public.
- ▶ Non-observance of these precautionary measures may lead to severe or mortal injuries.

2.2 Regulations and legal requirements

Regulations on the supplementary sheet “Important Information on Operating and Installation Instructions” must be observed.

3 Operation

3.1 Description

Fig. 1 Control element

1	Display		2	Plus button for changing the setpoint temperature	
3	Minus button for changing the setpoint temperature		4	Fan setting button for controlling the fan speed	
5	Function button for setting/ programming		6	On/Off button	
7	LED display for heating mode		8	LED display for automatically switching between operating modes	
9	LED display for cooling mode				

The FCF Evo Series air-conditioning systems are operated with the control element that enables access to all functions for normal operation of the air-conditioning system.

3.2 Operating levels for operator

The operating level for the operator is accessible without an access code. It shows important information and offers adjustment options which require no special prior knowledge.

3.3 Switching on the system

After connecting the power supply, first all LEDs and all segments of the numeric display flash for a few seconds, then **"INIT"** is briefly displayed on the control element.

This is followed by the "**boot**" message and the firmware version, e.g. V104.

If the system was switched on before cutting off the power supply, the current cabin temperature appears on the control element and the system starts up automatically in the set operating mode. Otherwise the control element will go dark and the system will assume standby mode.

- ▶ Switch on the system by pressing the "On" button

Now the electronic controller assumes the step-by-step start-up of the air-conditioning system and the standard operation.

The control element shows the current cabin temperature of the cabin in which the control panel is mounted or where the cabin temperature sensor is located (if it is in another cabin). After approx. 20 seconds, the control element provides information on which operating mode (cooling or heating) the system is started in. The selection depends on the selected setpoint temperature and the cabin temperature measured by the cabin temperature sensor.

After another approx. 50 seconds, the compressor is switched on and the standard mode begins.

The sea water pump always runs as soon as the system is switched on and the compressor starts up. If only the system is switched on and no change is made on the control element, the compressor and the sea water pump start up with a delay of 20 sec.

3.4 Switching off the system

The system can be switched off by pressing the "On/Off" button . The condition for this is that the user is in the start menu with the display of the cabin temperature.

On the setting levels, the "On/Off" button is used to confirm the setting and not to switch off the system.

3.5 Switching on cooling mode/ heating mode

NOTE

The system only cools under the following conditions:

- ▶ Cabin temperature > 15 °C.
- ▶ Sea water temperature < 35 °C.
- ▶ Setpoint temperature < cabin temperature.

NOTE

The system only heats under the following conditions:

- ▶ Cabin temperature < 29 °C.
- ▶ Sea water temperature > 6 °C.
- ▶ Setpoint temperature > cabin temperature.

- ▶ Switch on the system, see chapter 3.3, "Switching on the system" on page 4.

Switching over to cooling (heating) means selecting an operating mode which contains cooling (heating):

- F01 = cooling only.
- F02 = only heating (reverse heating operation).
- F03 = automatic toggling between cooling and heating (via reverse heating operation).
- F07 = dehumidification (when ship is unmanned).

F01 and F03 are possible for cooling (F02 and F03 for heating).

- ▶ Press the function button 3 times until "**F x**" appears on the display.
- ▶ Cooling mode: The value "**F x**" (operating mode) changes to "**F01**" or "**F03**".
  Heating mode: Press the plus button or minus button repeatedly to change the value "**F x**" (operating mode) to "**F02**" or "**F03**".
- ▶ Confirm the entry by pressing the "On/Off" button .

3.6 Setting setpoint temperature

Set the setpoint temperature in accordance with your own preferences.

- ▶ Press the plus button or minus button . The setpoint temperature is displayed.

- ▶ Press the plus button ⊕ or minus button ⊖ to change the setpoint temperature.
- ▶ Confirm the entry by pressing the "On/Off" button ⏻ or wait at least 5 seconds so that the entered value is automatically adopted.

Standby mode

The control element will enter into standby mode if no button is pressed for 5 minutes. The corresponding operating mode LED will then flash discretely every 20 seconds. Press any button to return to the normal display.

3.7 Set the fan speed

- ▶ Switch on the system, see chapter 3.3, "Switching on the system" on page 4.
- ▶ Press the fan setting button . The current fan speed is displayed.
- ▶ Press the plus button ⊕ or minus button ⊖ to change the setpoint temperature.

If the plus button ⊕ is pressed again when the highest speed has already been selected, automatic fan mode is switched on and "**b A**" appears on the control element. Pressing the minus button ⊖ exits the automatic fan mode and returns to the manual mode.

- ▶ Confirm the entry by pressing the "On/Off" button ⏻ or wait at least 5 seconds so that the entered value is automatically adopted.

3.8 Setting the brightness

The brightness of the display can be set to four levels. To do this, simultaneously press the function button ⚙ and either the plus button ⊕ or the minus button ⊖ to increase or decrease the brightness.

4 Faults

4.1 Troubleshooting

ATTENTION

Troubleshooting is restricted to professionals

Troubleshooting requires comprehensive knowledge on the design and operation of the individual components of the air-conditioning system and may only be carried out by authorized professionals trained by Webasto for this purpose.

NOTE

Only use genuine Webasto spare parts to ensure fault-free operation of the air-conditioning system.

If faults occur, the system must be switched off immediately.

4.2 Faults that are displayed

The FCF Evo Series can display malfunctions in the following ways:

- On the screen in the form of a code (e.g. E101) and a text message.
- As an LED flash code, directly in the electrical box of the air conditioning system.

Every time a fault code occurs, the unit stops for approx. 60 seconds and then attempts to restart. If the same malfunction occurs more than six times consecutively within 30 minutes, then the system is completely shut down and a fault code is displayed continuously. No further restarts are attempted. The FCF Evo Series can only be reset after the cause of the fault has been rectified.

To reset the FCF Evo Series switch the device off and on again via the control element. Alternatively, disconnect and re-connect the power supply to reset the FCF Evo Series.

Fault code		Description	Possible cause	Correction
Display	"Alive" LED			
AAA	1x flashing, pause...	Undervoltage	Switch-off in case of under-voltage. Power supply below set undervoltage value for longer than 5 seconds. The cause is probably excessively long power cable for the on-shore connection, small cable cross sections, overloading or low power generator output.	Check setting (default setting 195 V (230 V) or 97 V (115 V)). Do not set below 195 V (230 V) or 97 V (115 V) to prevent damage to the compressor and subsequently voiding of the warranty. Ensure a better power supply. If necessary retrofit soft starts to lower the start-up current and therefore reduce the voltage drop.
A01	2x flashing, pause...	Compressor 1 shut-down due to low pressure	Pressure switch defective or power circuit interruption/short circuit.	Check electrical wiring. Replace pressure switch on Schrader valve.
			Cooling mode: - Air supply insufficient	Check air supply. Difference between air inlet/air outlet temperature of evaporator at least 4 K.
			Heating mode: - Sea water flow rate insufficient or sea water too cold (Temperature below 6 °C) - Sea water strainer blocked or no intake.	Check the flow rate of the sea water circuit at the sea water outlet. Difference between in/outflow temperature of condensers approx. 5 K. At sea water temperature < 6 °C: no heating possible in reverse heating operation. Clean sea water strainer and bleed sea water circuit.
			Refrigerant shortage.	Check for refrigerant leak.
A02	3x flashing, pause...	Compressor shut-down due to high pressure	Pressure switch defective or power circuit interruption/short circuit.	Check electrical wiring. Replace pressure switch on Schrader valve.
			COOLING MODE: - Sea water cooling insufficient. Sea water strainer soiled or no intake.	Check the flow rate of the sea water circuit at the sea water outlet. The minimum flow rates must be complied with. Clean sea water strainer and bleed sea water circuit.
			HEATING MODE: - Air supply insufficient	Check air supply. Difference between air inlet/air outlet temperature of evaporator at least 4 K.
			HEATING MODE: - Sea water temperature too high	Check sea water flow, set lower setpoint temperature, increase fan speed.

Fault code		Description	Possible cause	Correction
Display	"Alive" LED			
A09	4x flashing, pause...	Fault, cabin temperature sensor	Cabin temperature sensor defective, break/short-circuit in electrical circuit, cabin temperature sensor not connected.	Connect or replace cabin temperature sensor.
A10	5x flashing, pause...	Fault in temperature sensor of evaporator	Temperature sensor of evaporator defective or power circuit interruption/short circuit.	Check electrical wiring or replace sensor.
tA11[*1]	n/a	Set evaporator temperature exceeded	Evaporator temperature too low in cooling mode or too high in heating mode	No corrective measures necessary. The compressor switches off and switches on again as soon as the cut-in temperature is reached.[*1]
INIT	6x flashing, pause...	Initialisation procedure or system blocked.	Electrical wiring defective, power circuit interrupted/short circuit.	Check cables and connections of pc-board and of control element. Replace defective cable, control element or pc-board.
n/a	n/a	No pc-board output.	Fuse faulty or break/short-circuit in this electrical circuit.	Repair or replace fuse, rectify break/short-circuit in electrical circuit or replace pc-board.
			Pc-board damaged by high voltage (RT1 blown)	Replace pc-board.
			Electronic relay (TRIAC) defective.	Replace defective TRIAC or defective pc-board.
n/a	n/a	Compressor not running.	Compressor defective or break/short-circuit in compressor wiring.	Check electrical wiring or replace defective compressor.
			Compressor overload or overload protection element on top of compressor defective.	Allow to cool down for some time or replace defective overload protection element.
n/a	n/a	No or insufficient cooling or heating capacity.	Poor air or sea water flow, soiling or circulation blocked.	Secure adequate air or sea water flow (see A01 and/or A02).
			Refrigerant shortage.	A low refrigerant level is generally indicated by low static pressure before start-up as well as non-fluctuating low pressure in connection with low high pressure reading. Check for refrigerant leaks, repair if necessary and top up required quantity of refrigerant.
			Oil block.	Leave air-conditioning system running in heating mode. Call out a refrigerant specialist if necessary. Technical datasheet available.
			Refrigerant circuit blocked. (capillary lines).	Have checked by refrigerant specialist. Technical datasheet available
			Compressor fault.	Have checked by refrigerant specialist.

Fault code		Description	Possible cause	Correction
Display	"Alive" LED			
n/a	n/a	Incorrect cabin/ambient temperature or water temperature displayed.	Temperature sensor positioned incorrectly, subject to interference or displayed values are not correct.	Check whether the sensor is subject to direct fault sources such as direct sunlight or devices radiating heat. Calibrate sensor. Replace defective sensor.
*1 = This status code is system information and not a fault which must be eliminated. The status indicator will go out automatically on reaching the cut-in temperature.				

Table 1: Fault and status codes

4.3 Faults not displayed on control element

	Symptom		
1	After switching on, the system does not react.	Check:	power supply,
			fuses in supply lines,
			fuses on pc-board, etc.
2	The compressor starts up, however no sea water exits from the sea water outlet:	If the sea water pump is running:	Check whether the shut-off valves are opened.
			Check whether the sea water strainer is blocked.
			There could be air in the pump head causing the pump to malfunction. Bleed the air out of the sea water line, e.g. with a bleeder valve downstream of the pump.
		If the sea water pump is not running:	Check the power supply to the sea water pump.
			The pump rotor may be blocked by dirt. If possible and accessible, using a tool turn the pump rotor from the motor side until it moves freely.
3	The compressor and the sea water pump are running, but neither the heating mode nor the cooling mode function satisfactorily.		Allow the fan to run in the automatic fan mode.
			Check the air ducts.
			If the air flow is interrupted with the compressor running, the evaporator can completely freeze, causing the entire air stream to be blocked.
			If the sea water flow rate is too low, the sea water in the condenser can freeze in heating mode, blocking and damaging the system.
			Check the fan speed setting, correct if necessary.
			Check the voltage level. Do not operate the system continually with insufficient voltage (under 195 V (230 V) or 97 V (115 V)).
			Heating mode takes a long time to start up. This is normal when the sea water is very cold. When the temperature of the sea water drops below approx. 6 °C, the heating efficiency decreases and the air-conditioning system takes a long time before producing the expected heat.
			If the performance of the system is still unsatisfactory after checking all of the above points, you should check the refrigerant filling.
			Check the fan speed setting, correct if necessary.
4	The compressor does run, however it switches off continually before the set setpoint temperature has been reached. The high-pressure and low-pressure switch switch off the compressor due to an excessively high or excessively low working pressure.		Check the minimum flow rate in the sea water circuit.
5	An incorrect cabin temperature is displayed.	Cabin temperature sensor positioned incorrectly, fault sources are present or display values are falsified.	Check whether the cabin temperature sensor is subject to direct fault sources, like direct sunlight or devices radiating heat.
			Calibrate sensor or replace defective sensor.

Table 2: Faults not displayed on control element

Webasto
Feel the Drive

Europe, Asia Pacific:

Webasto
Kraillinger Str. 5
82131 Stockdorf
Germany

UK only:

Webasto Thermo & Comfort UK Ltd
Webasto House
White Rose Way
Doncaster Carr
South Yorkshire
DN4 5JH
United Kingdom

USA only:

Webasto Thermo & Comfort N.A., Inc.
15083 North Road
Fenton, MI 48430

Technical Assistance Hotline
USA: (800) 860-7866
Canada: (800) 667-8900

www.webasto.us
www.techwebasto.com

2511368A