

Installation Instructions

Marine self-contained air-conditioning units

BlueCool S-Series



English

Valid for BlueCool S-Series 230 V as of change index D (2017 ->):

Type:

S6-R-230V-REV-R410a	WBCL120000A	S16-R-230V-REV-R410a	WBCL120004D
S8-R-230V-REV-R410a	WBCL120001D	S20-R-230V-REV-R410a	WBCL120005D
S10-R-230V-REV-R410a	WBCL120002D	S27-R-230V-REV-R410a	WBCL120006E
S13-R-230V-REV-R410a	WBCL120003D		

Valid for BlueCool S-Series 115 V as of change index A (2018 ->):

Type:

S6-R-115V-REV-R410a	2510139A	S13-R-115V-REV-R410a	2510142A
S8-R-115V-REV-R410a	2510140A	S16-R-115V-REV-R410a	2510143A
S10-R-115V-REV-R410a	2510141A		

Table of Content

1	About this document	1		
1.1	Purpose of the document	1	7.3	System settings 19
1.2	Using this document	1	7.4	Setting level 1 (Passenger menu) 19
1.3	Use of symbols and highlighting	1	7.5	Setting level 2 (Crew menu) 20
1.4	Warranty and liability	1	7.6	Setting level 3 (Parameter menu) 20
2	Safety	2	8	Dehumidification 21
2.1	Intended use	2	9	Commissioning 22
2.2	Qualifications of installation personnel	2	9.1	Check connections 22
2.3	Regulations and legal requirements	2	9.2	Checking operation of condensed-water drain 22
2.4	Safety precautions	2	9.3	Filling sea water pump head 22
3	Scope of delivery	3	9.4	Test run 22
4	Information on Unit	4	10	Inspection and Maintenance 23
4.1	Conformity	4	10.1	Air filter 23
4.2	Variants	4	10.2	Sea water circuit 23
4.3	Type label	4	10.3	Electrical wiring 23
4.4	Unit description	5	10.4	Checklist for inspection and maintenance 24
5	Installation	7	11	Decommissioning 25
5.1	General	7	12	Malfunctions 26
5.2	Installation location	7	12.1	Troubleshooting 26
5.3	Installation example	8	12.2	Faults that are displayed 26
5.4	Transport the unit	9	12.3	Fault indication on the BlueCool S-Series pc-board (LED display) 26
5.5	Installing the unit	9	12.4	Faults not displayed on control element 29
5.6	Installing the condensed-water drain line	9	13	Technical Data 30
5.7	Installing the sea water circuit	10	13.1	Self-contained air-conditioning units BlueCool S-Series 230 V 30
5.8	Installing the air ducts	12	13.1	Self-contained air-conditioning units BlueCool S-Series 115 V 31
6	Electrical Connections	14	13.2	Dimensions and minimum distances Type S6 - S20 32
6.1	General	14	13.3	Dimensions and minimum distances Type S27 33
6.2	Installing the electrical box	14	14	Annex 34
6.3	BlueCool S-Seriesconnecting 15	15	14.1	Overview of control and setting levels 34
6.4	Installing soft start	15	14.2	Parameter settings 35
6.5	Installing the BlueCool MyTouch control element	15	14.3	Wiring diagrams 37
6.6	Installing the cabin temperature sensor	16		
6.7	Accessories	16		
7	Operation	17		
7.1	Description	17		
7.2	Home screen and symbols	17		



1 About this document

1.1 Purpose of the document

These installation instructions are part of the product and contain all the information required to ensure correct and safe installation.

1.2 Using this document

Before installing the unit, read the installation instructions and the supplementary information "Important Information on Operating and Installation Instructions".

Technical documentation for BlueCool S-Series is also available at <http://dealers.webasto.com>

- For the operator:

Operating instructions

- For the installer (password-protected):
 - Maintenance instructions
 - Troubleshooting Guide
 - Validation Report

1.3 Use of symbols and highlighting



WARNING

Type and source of hazard
Non-compliance can result in serious or fatal injuries.

- ▶ Actions to protect yourself against risks.



CAUTION

Type and source of hazard
Particular danger of damage to components

- ▶ Actions to protect yourself against risks.



Further information can be found in following documents



Note on a special technical feature

Disregard can result in damage to the system or its surroundings

1.4 Warranty and liability

Webasto shall not assume liability for defects or damage that are the result that the installation and operating instructions as well as the instructions contained therein being disregarded.

This liability exclusion particularly applies for:

- installation by untrained personnel
- improper use
- repairs not carried out by a Webasto service workshop
- use of non-genuine parts
- conversion of the unit without permission from Webasto

Highlight	Explanation
✓	Requirements for the following necessary action
▶	Necessary action

2 Safety

2.1 Intended use

The BlueCool S-Series is used for heating and cooling on ships.

The BlueCool S-Series has been built according to the current state of technology and the recognised safety rules.



WARNING

In case of improper or in appropriate use, danger to the life and limb of the user or others and impairments of the unit and other property may result.

- ▶ Any other use of the BlueCool S-Series 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 self-contained air-conditioning unit.**

- ▶ Only operate the BlueCool S-Series when installed.



WARNING

Ignition of surrounding gases or highly flammable liquids by sparking of the BlueCool S-Series.

- ▶ The air conditioning system must ALWAYS be switched off during refuelling or while in a petrol station area.



Follow the information in these Installation Instructions when laying the electric wiring and when installing the electrical box and air ducts.

2.2 Qualifications of installation personnel

The installation personnel must have the following qualifications:

- Successful completion of Webasto training
- Corresponding qualification for working on technical systems

2.3 Regulations and legal requirements

- ▶ Regulations on the supplementary sheet "Important Information on Operating and Installation Instructions" must be observed.

2.4 Safety precautions

Safety information on installation

Danger posed by live parts

- ▶ Disconnect the power supply prior to installation.
- ▶ Make sure the electrical system is earthed correctly.
- ▶ Always comply with legal requirements.
- ▶ Observe data on type label.

Risk of fire or toxic gasses by incorrect installation

- ▶ Protect components in the vicinity of the BlueCool S-Series from impermissible overheating by implementing the following measures:
 - Maintain minimum safety distances.
 - Ensure adequate ventilation.
 - Use fire-resistant materials or heat shields.

3 Scope of delivery

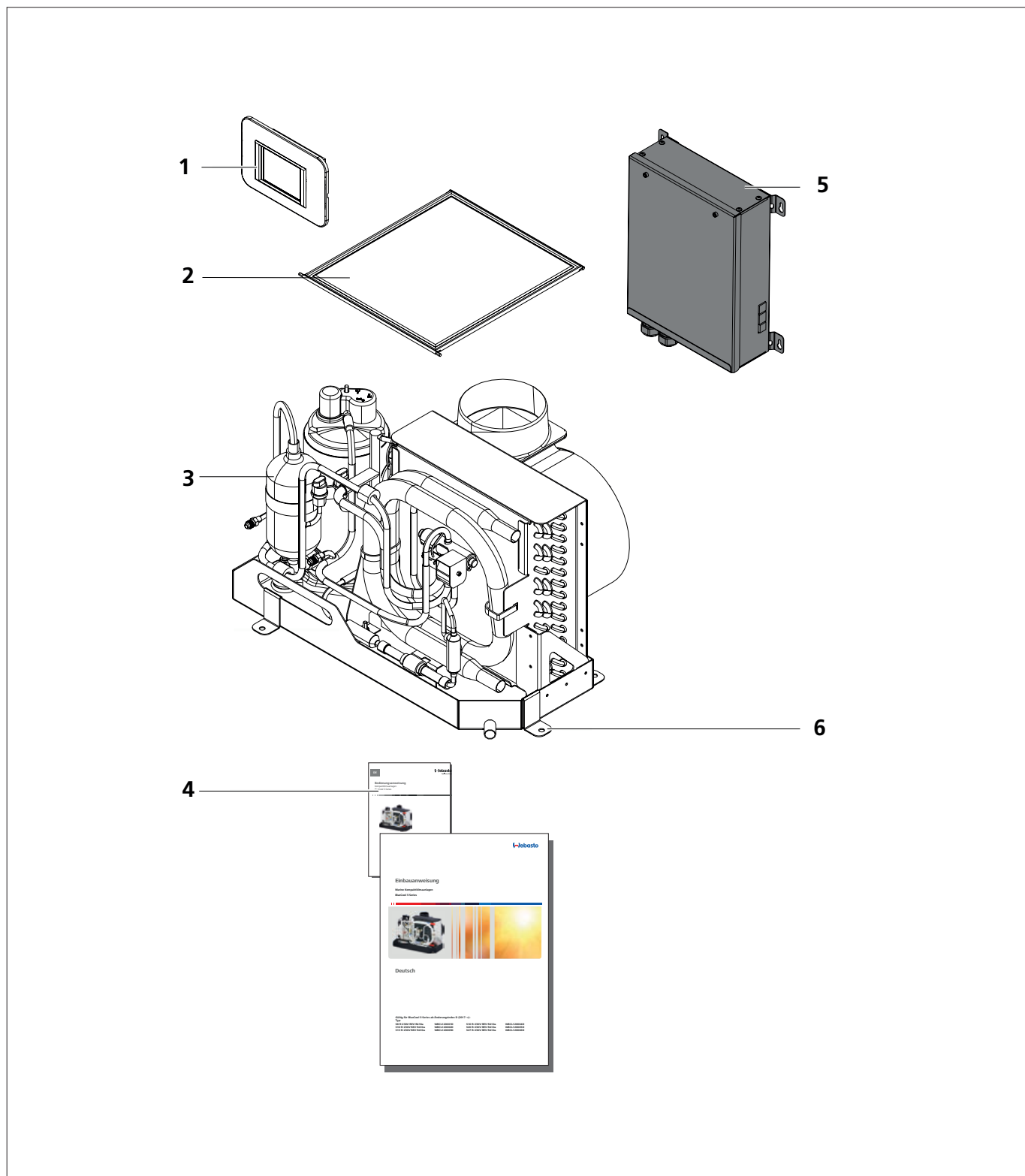


Fig.1 Scope of delivery, example BlueCool S-Series air conditioning system

- 1 Control element with cover
- 2 Air filter (already installed)
- 3 air conditioning unit
- 4 Installation instructions / Operating instructions
- 5 Electrical box
- 6 Fixation bracket/L clamp (4x)
- 7 Cabin temperature sensor (without illustration)
- 8 Cable for control element (without illustration)

4 Information on Unit

4.1 Conformity

We, as the manufacturers, herewith declare that this product conforms with the basic directives for marketing in the EU.

97/23/EC	Pressure Equipment Directive in accordance with DIN EN 387
2004/108/EC	Electromagnetic compatibility (EMC)
2006/95/EC	Electrical equipment (Low Voltage Directive) in accordance with DIN EN 60335-2-40
2011/65/EU	RoHS

4.2 Variants

Self-contained air-conditioning unit:

115V

- S6-R-115V-REV-R410a
- S8-R-115V-REV-R410a
- S10-R-115V-REV-R410a
- S13-R-115V-REV-R410a
- S16-R-115V-REV-R410a

230V

- S6-R-230V-REV-R410a
- S8-R-230V-REV-R410a
- S10-R-230V-REV-R410a
- S13-R-230V-REV-R410a
- S16-R-230V-REV-R410a
- S20-R-230V-REV-R410a
- S27-R-230V-REV-R410a

Example: S20-R-230V-REV-R410a

- S: Self-contained air-conditioning unit
- 20: Cooling capacity in kBTU/h
- R: Rotary compressor
(S: Scroll compressor)
- 230V: Rated voltage
- REV: Reverse Cycle cooling and heating (COOL: cooling only)
- R410a: Refrigerant



Fig. 2 Declaration of conformity

4.3 Type label



Fig. 3 Example of type label

The type label is located on the evaporator of the unit (see Fig. 4). You will find the output, serial number and registration data there.

4.4 Unit description

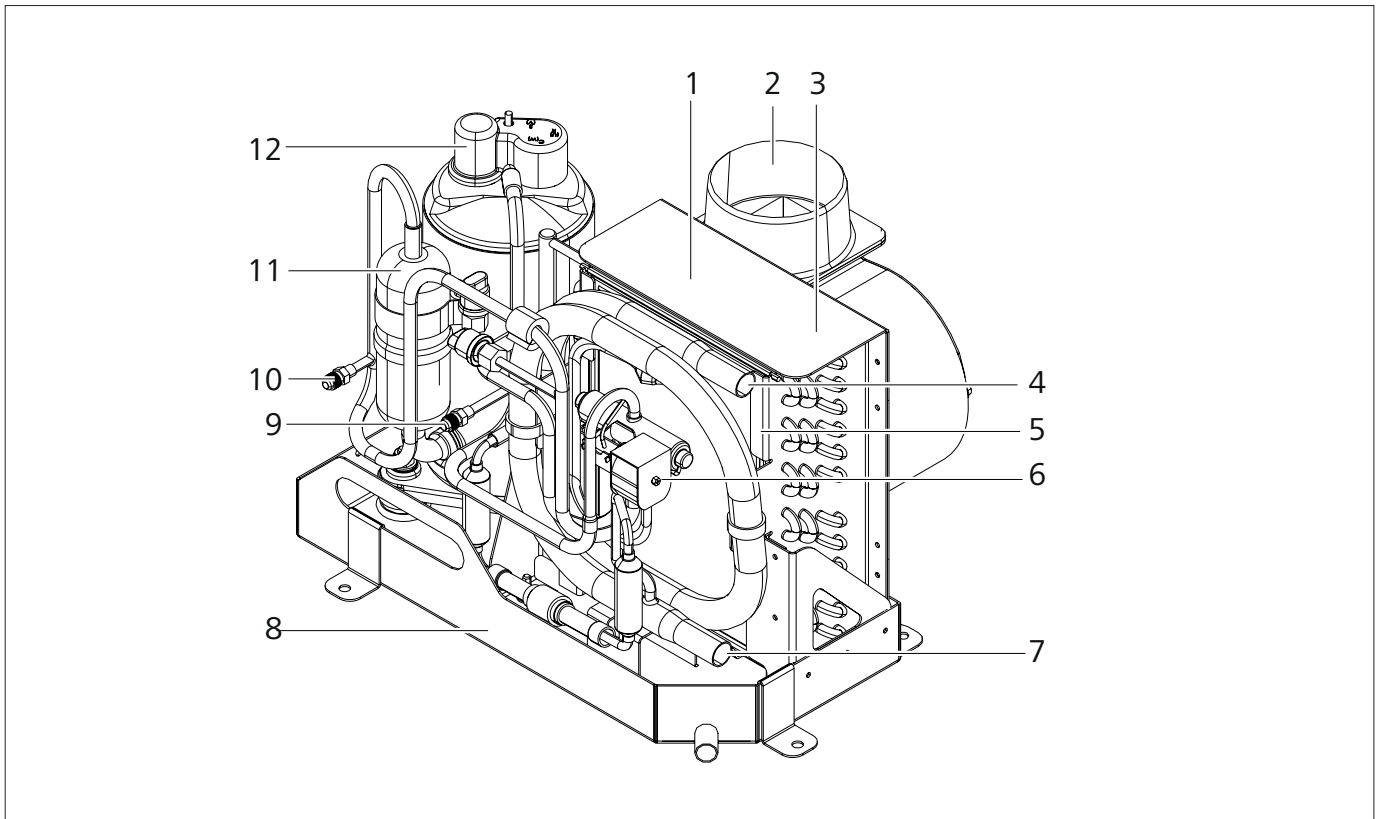


Fig. 4 Self-contained air-conditioning unit BlueCool S-Series

- | | |
|---|-------------------------------|
| 1 Evaporator | 7 Sea water inlet |
| 2 Fan outlet | 8 Condensed-water tray |
| 3 Type label | 9 High pressure service port |
| 4 Sea water outlet | 10 Service port, Low pressure |
| 5 Air filter | 11 Refrigerant collector |
| 6 4/2-way reverse valve (cooling / heating) | 12 Compressor unit |

4.4.1 General

The BlueCool S-Series is an air-conditioning system with its four basic components, i.e. compressor, condenser, evaporator and throttle element.

■ Evaporator (air heat exchanger)

Refrigerant vaporises at low pressure and a temperature below the ambient temperature of the evaporator. It absorbs heat from the ambient air in the process.

■ Compressor (refrigerant compressor)

The refrigerant vapour extracted from the evaporator at low pressure is compressed to a higher pressure, and therefore to a higher temperature. In the process, additional heat is fed to the refrigerant.

■ Condenser (sea water heat exchanger)

The compressed, heated refrigerant vapour is condensed at a temperature which is above the sea water temperature. In the process, the entire heat absorbed in the evaporator and compressor is given off to the sea water.

■ Throttle element (capillary tube)

The pressure in the refrigerant subjected to condensing pressure is relieved and transferred to the evaporator.

4.4.2 Cooling operation mode

The air-conditioning system absorbs heat from the cabin air in the evaporator and cools it down by approx. 15°K. The cooled air is blown into the cabin with the fan. The compressor now compresses the refrigerant vapour, which is then condensed to a liquid when flowing through a condenser cooled with sea water. The heat released is emitted to the sea water. The condensed refrigerant passes through the throttle element and the pressure is relieved to form wet vapour on entering the evaporator. The liquid component of the refrigerant is now evaporated and again takes up heat from the cabin air. As a result, the refrigerant circuit is closed.



Notes

With these air-conditioning systems, sea water flows through the condenser, which is sucked in via a pump. This ensures the cooling process. BlueCool S-Series air-conditioning systems are designed for maximum sea water temperatures of 35 °C.

4.4.3 Heating operation mode

Heat can also be generated with the BlueCool S-Series air-conditioning system. A 4-way reversing valve is installed in the system for this purpose. As a result, the condenser becomes an evaporator and vice versa. The sea water heat exchanger (now evaporator) takes available heat away from the sea water which is then transferred to the refrigerant. The air heat exchanger becomes the condenser and gives off the condensation heat to the cabin air and heats it up to 45/50 °C.



Notes

Heating mode becomes inefficient when the sea water temperature drops to below 6 °C as sufficient heat can no longer be taken from the cold sea water. The interior air then cannot be heated sufficiently.

5 Installation

5.1 General



Note

To ensure proper operation, the following must be observed:

- All components must be positioned and installed in accordance with their installation instructions.

5.2 Installation location



DANGER OF FIRE AND EXPLOSION

Danger of ship exploding.

- ▶ Do not install BlueCool S-Series in rooms with highly flammable liquids or gases.

BlueCool S-Series air-conditioning systems are generally installed in the living area.

5.2.1 Requirements for the installation location:

- Sufficient space must be available to ensure access to the condensed-water drains and electrical connections.
See Chapter "13 Technical Data" on page 30 and Chapter "13.2 Dimensions and minimum distances Type S6 - S20" on page 32 or Chapter "13.3 Dimensions and minimum distances Type S27" on page 33.
- The system must be accessible for service and maintenance purposes.
- The BlueCool S-Series must be mounted on an even, horizontal surface.
- Since operation of the BlueCool S-Series leads to condensation, two drain lines must be provided on the condensed-water tray.
- Do not directly expose the self-contained air-conditioning unit to splash water or overwash.
- The BlueCool S-Series self-contained air-conditioning units are approved for a maximum ambient temperature of 40 °C
- To avoid local ambient temperatures in excess of 40 °C, the self-contained air-conditioning unit and the electrical box must not be installed in the immediate vicinity of heat sources.

5.3 Installation example

The illustration below shows an example of a typical installation of a BlueCool S-Series air-conditioning system.

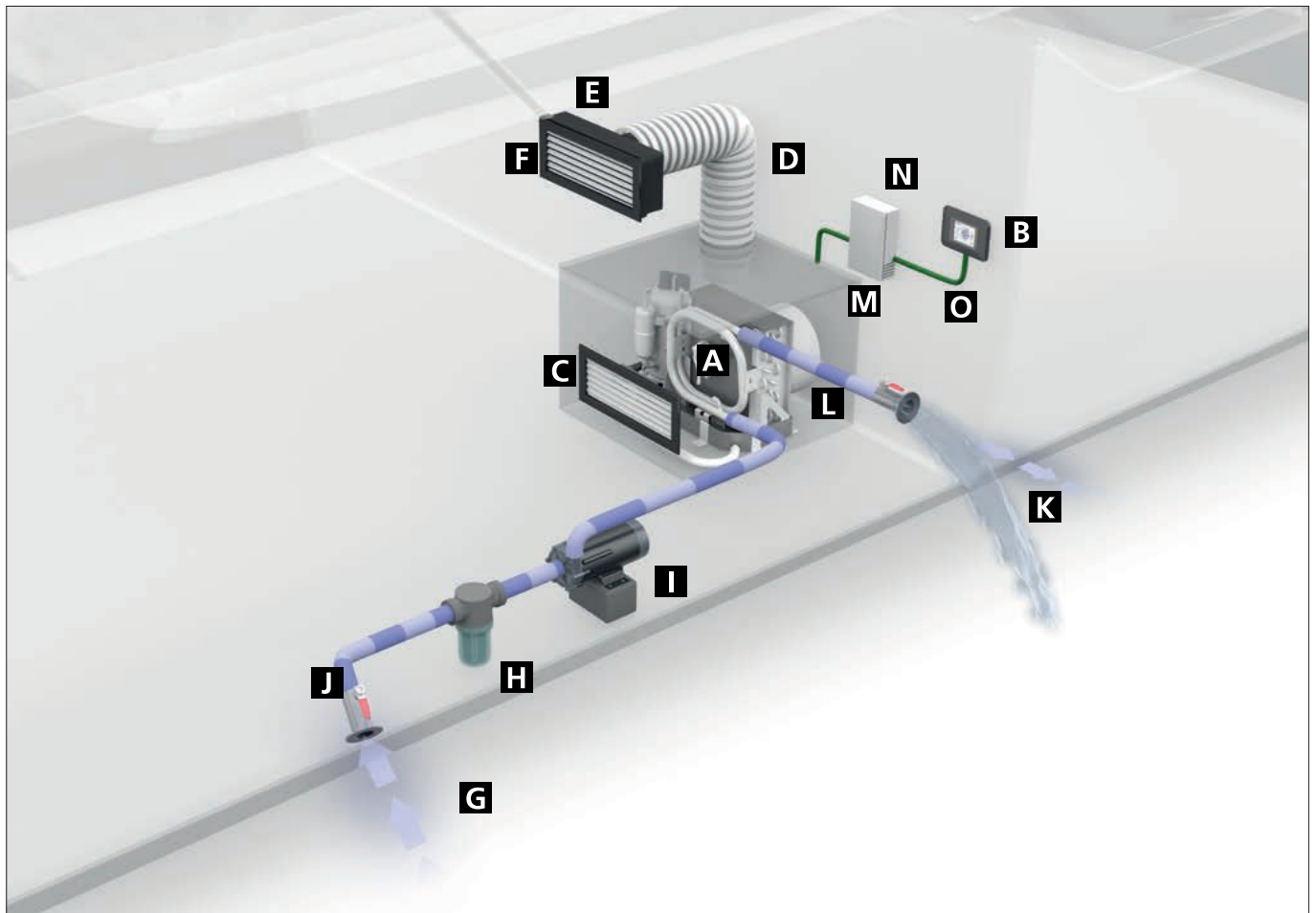


Fig.5 Installation example

- | | |
|---|-----------------------------|
| A BlueCool S-Series air conditioning unit | I Sea water pump |
| B Control element (BlueCool MyTouch) | J Sea valve |
| C Air inlet grille | K Sea water outlet |
| D Flexible air duct | L Sea water hose |
| E Transition box | M Electrical box |
| F Supply air grille | N Power supply |
| G Sea water inlet | O Cable for control element |
| H Sea water strainer | |

5.4 Transport the unit



WARNING

Risk of injury if the unit is dropped or carried incorrectly.

Never grasp and carry the units by the refrigerant lines. The unit is heavy and can be carried incorrectly.

- ▶ Only carry the unit by the condensed-water tray, by the fan or by the upper pipe elbows of the condenser.

Never grasp and carry the unit by other pipes. See Fig.6.

- ▶ The evaporator fins can be easily bent. When installing, make sure that bent fins are correctly aligned again to ensure proper air feed.

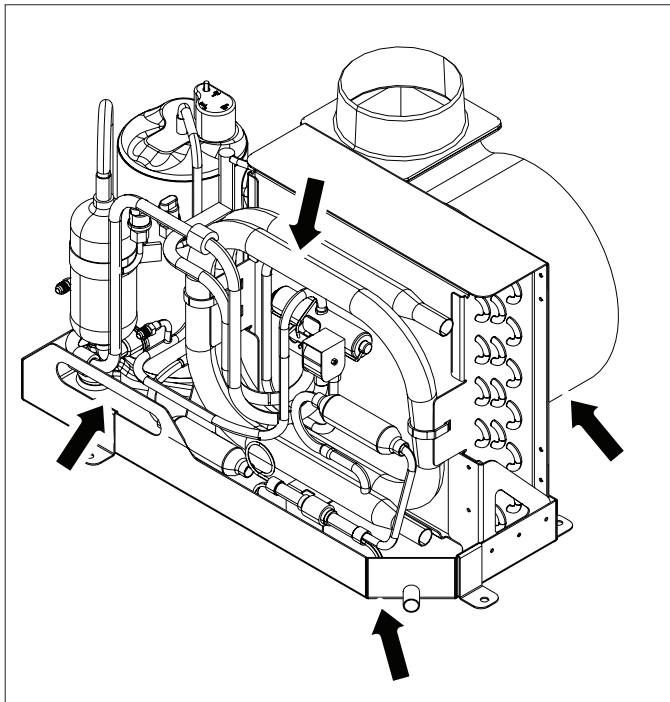


Fig.6 Transport the unit

5.5 Installing the unit



CAUTION

Danger of damage to the electrical components and refrigerant loss.

Do not remove covers, caps or fittings

Do not remove covers, caps or fittings used to protect the electrical wiring or to seal off the refrigerant.



CAUTION

Danger of water damage to installations, equipment, etc.

Do not damage the insulation of the condensed-water tray to avoid condensed-water from forming on the outside of the condensed-water tray.

5.5.1 Mounting



Notes

- Ensure the unit is mounted stably.
- Fasten the unit so that secure seating is ensured, however the unit can be removed again later for maintenance purposes if necessary.
- Use the retaining brackets supplied for mounting the air conditioning system.

- ▶ Lift unit and position it at the installation location.



Notes

- If vibration absorbers are used, they are installed between the condensed-water tray and the mounting surface. This will increase the installation height of the system. Refer to the information provided in the installation instructions for the Blue-Cool Vibration Absorber Kit.
- A noise reduction can be achieved if desired by insulating the area around the system.

5.6 Installing the condensed-water drain line



CAUTION

The air conditioning system can intake and distribute escaping carbon monoxide and other gases.

- Condensed-water drain lines must not merge in the engine room.
- To prevent carbon monoxide or other harmful gases from potentially getting in, a siphon should be installed in the drain line, which is closed by the condensate during normal drainage.
- Condensed-water drains that lead outwards through the hull must not be installed closer than 915 mm to exhaust gas outlets from combustion engines.



CAUTION

Water damage can occur. Danger of water damage to furniture, devices, etc.

Do not connect the condensed-water drain line to the sea water line of the air conditioning system.

Ensure the condensed-water tray drains off properly to prevent damage caused by condensation backing up.

**Notes:**

- Ensure the unit is mounted stably.
- Install condensed-water drain lines on a downward slope and without water pockets.
- The diameter of the condensed-water drain line must match the condensed-water drain fitting on the condensed-water tray.
- Connect the condensed-water tray via the condensed-water drain line to the bilge or other condensation/water collection points.
- There must be no backpressure in the condensed-water drain line.
- If necessary, make a new water collection point complete with pump, level switch and drain line.

- ▶ Secure hose connector to connection socket of condensed-water tray.
- ▶ Ensure leak-proof fit.

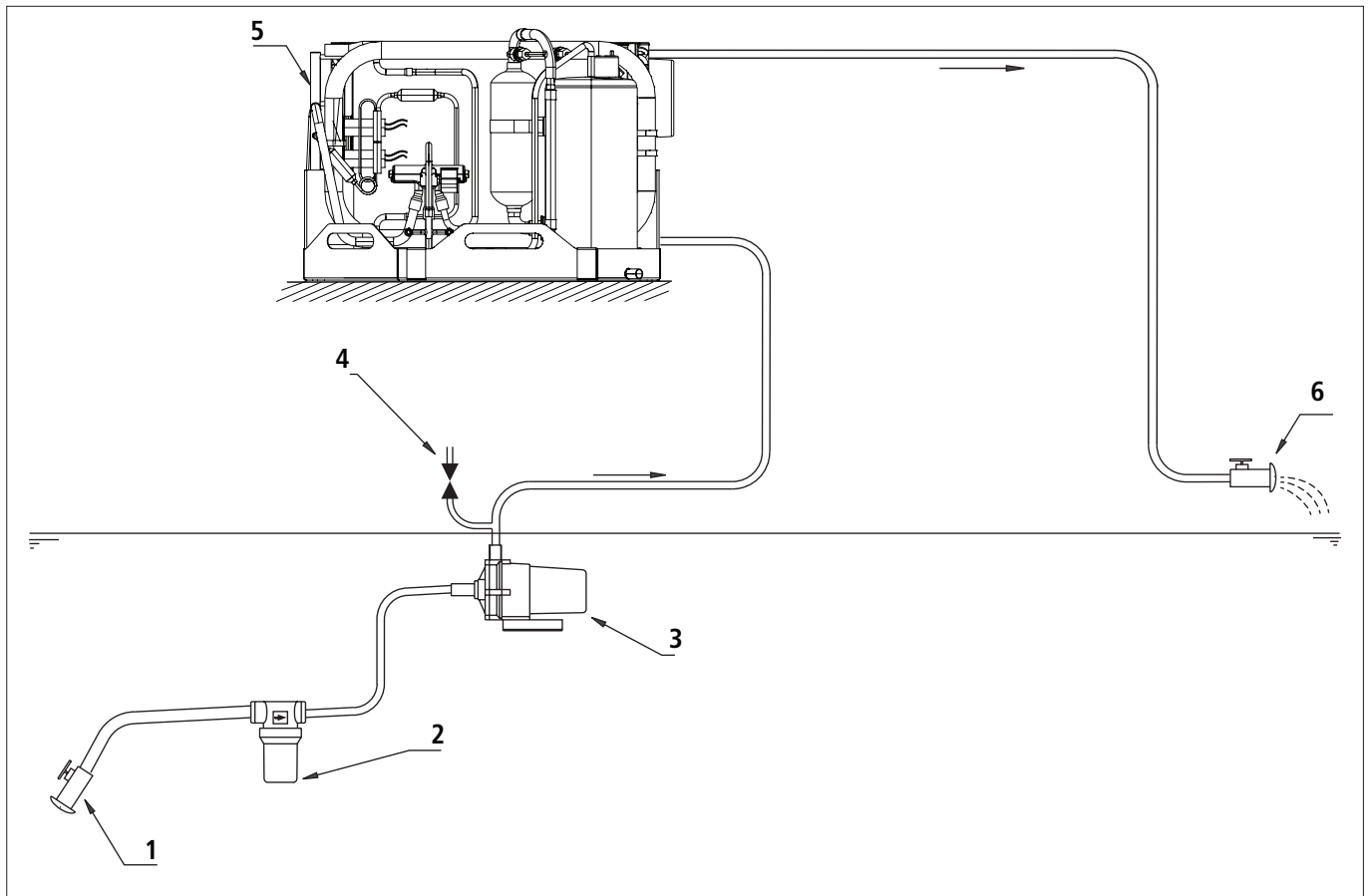
**Notes**

The sea water components are installed continuously ascending from the through-hull fitting via the strainer and pump up to the BlueCool S-Series. This arrangement ensures that bubbles, which would otherwise cause the pump to malfunction, cannot collect in the sea water circuit.

5.7.1 Installing through-hull fitting for the sea water inlet**CAUTION**

Sea water enters when installed incorrectly. Boat can sink; danger of drowning.

Suitable measures must be taken to install the through-hull fitting in order to prevent an unchecked entry of sea water.

5.7 Installing the sea water circuit**Fig.7 Installation example**

- 1 Through-hull fitting with sea valve
- 2 Sea water strainer
- 3 Sea water pump
- 4 Bleeding
- 5 BlueCool S-Series
- 6 Sea water outlet



Notes

- The sea water inlet must be arranged at the lowest possible point below the water line and below the sea water pump.
- The through-hull fitting for the sea water inlet must be installed with the opening facing in direction of travel in order to create a boosting back-pressure in the intake line.
- Sailboats: install the through-hull fitting near the centre of the hull.
- Fast motor boats: install through-hull fitting in rear section of hull.

The sea valve on the through-hull fitting is used for safety and maintenance purposes.

- ▶ Install through-hull fitting, seal off with sealant and check for leak-tight seating.

5.7.2 Installing sea water pump



Notes

- We recommend installing the sea water pump at least 0.25 m below the water line.
- If installation below the water line is not possible, a self-priming pump must be used.

Selecting sea water pump

To increase the operating safety, we recommend the use of self-priming pumps. These are significantly less susceptible to air accumulations, which can enter the system during reverse travel or when in a tilted position, for example.

Parallel connection of several BlueCool S-Series systems supplied via one sea water pump and one sea water inlet is possible. However, the maximum number should be limited to four BlueCool S-Series systems.

Each system requires a separate sea water outlet to check the respective minimum flow rate and to enable an operating check of the systems.

If necessary, throttles that reduce the cross section should be used to adjust the flow rates.

A water manifold and pump relay must be fitted if one sea water pump is supplying several BlueCool S-Series. Refer to Chapter "14.3.7 Wiring diagram , several systems with one sea water pump" on page 42.

A shut-off valve must also be provided for each air conditioning unit.

Self-priming sea water pumps

If a self-priming pump is installed above the water line, the pump head must be pre-filled during initial start-up or after longer times at standstill to enable self-priming.

Pump characteristics

The pump characteristics enable the selection and dimensioning of the sea water pump depending on expected pressure losses in the entire system.

Operating the pumps outside the pump characteristic can damage the pumps due to motor overloading or cavitation. Damage which occurs due to improper operation is excluded from the warranty.

The delivery head of a pump is often specified in metres water col-

umn and represents the pressure drop between the pump inlet and outlet. This pressure drop corresponds to the total pressure differential in the sea water system from the sea water inlet up to the sea water outlet.

The effective water flow through the pump and therefore through the sea water system changes considerably depending on the pressure drop.

The minimum sea water flow rate through the air-conditioning system must be maintained at all times. This should be checked every time the system is placed into operation.

Installation



Notes

- Make sure that the pump is accessible for maintenance work.
- It is urgently recommended that a vent be installed directly behind the outlet opening of the sea water pump to allow the collected air bubble to escape when the system is started up.

- ▶ Install the sea water pump.

See Fig. 7

5.7.3 Installing sea water strainer



Notes

- Match the size of the sea water strainer to the sea water quality. If a great deal of dirt is to be expected, then a strainer of the corresponding size should be chosen.
- The sea water strainer must be installed between the through-hull fitting and the sea water pump.
- Comply with specified direction of flow.
- Make sure that the sea water strainer is accessible for maintenance work.

- ▶ Install the sea water strainer in accordance with the manufacturer's specifications.

5.7.4 Installing sea water outlet



Notes

- The sea water outlet must be installed approx. 0.10 m above the water line.
- At least the first 150 mm of the sea water outlet line within the interior of the boat should be self-emptying to prevent breakage caused by freezing.
- Do not install the sea water outlet in the bow area of the ship to prevent back flow.

The sea water outlet may not be mounted below the waterline. Although this leads to a reduction in the operating noise of the sea water outlet, it increases the counterpressure in the system and significantly lowers the flow rate and thus the system capacity. Then a simple test of the flow rate is no longer possible.

Each BlueCool S-Series self-contained air-conditioning unit requires a separate sea water outlet to be able to check and secure the minimum required sea water flow rate.

5.7.5 Installing sea water lines



WARNING

Boat can sink; danger of drowning Sea water enters when installed incorrectly

Install double hose clamps on sea water lines. Install the two hose clamps mirror-inverted.



Notes

- Pay attention to the minimum required diameter of the sea water lines.
 - Only use reducers when this serves the specific distribution of the volume flows when several systems are connected to one pump.
 - The sea water lines must be installed as follows:
 - as short as possible
 - kink-free
 - Without water pockets
 - protected against rubbing.
 - Avoid 90° fittings wherever possible as they create a considerable pressure loss, thus unnecessarily reducing the sea water flow. It is preferable to install the line in a kink-free bend.
 - On the intake side of the pump, it is advisable to use a line with over-dimensioned cross-section, as soiling can occur here most frequently, resulting in an unintentional reduction of the flow rate.
- ▶ Install intake line(s) so that there is a slight upward incline from the sea water inlet to the self-contained air-conditioning unit.
- ▶ Install pressure line(s) to the self-contained air-conditioning unit and to the sea water outlet.

5.8 Installing the air ducts



CAUTION

Condensation can form on the outer surfaces of cold air ducts.

Danger of water damage.

Completely insulate the air ducts, as otherwise condensed water will result on the outside of the air duct and drip water will form.



CAUTION

Damage to objects behind installation surfaces during sawing, drilling and screwing work.

Risk of damage to furniture, equipment, lines, etc.

Bear in mind there may be objects behind the point where openings for air inlet grille and supply air grille are to be made.

5.8.1 Mounting



Notes

- Prevent a restriction of the air supply due to excessively tight bending radii of the air ducts or due to accidental deformations.
- Keep the air ducts as short as possible (<2.5 m). Excessively long air ducts result in a reduction in the air quantities, and therefore in a decrease in the cooling/heating capacity of the system.
- The air inlet grille should be mounted offset so that the air flowing in does not flow directly into the evaporator inlet. This enables the intake noises from the fan to be considerably reduced. See Fig.8.
- Avoid a cold air short-circuit between the air outlet and air inlet. These must be mounted with a sufficient distance from each other.
- Air outlets must be installed above below the ceiling to ensure sufficient mixing and cooling or heating of the cabin air.

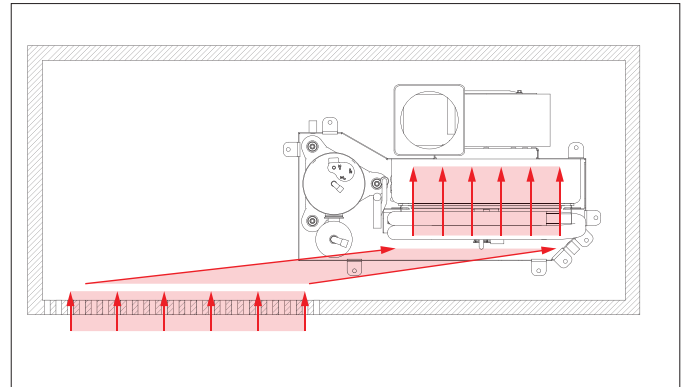


Fig.8 Mount air inlet grille offset.

Minimum cross section of air inlet and supply air grilles

The minimum cross-sections of the air inlet and outlet air grille and the air ducts must be taken into account for a satisfactory functionality of the air conditioning system

Requirements for air duct

BlueCool S-Series	Cross section of outlet air grille	Cross section of air inlet grille	Air duct diameter < 2 m length	Air duct diameter < 5 m length
6,000 BTU/h	150 cm ²	325 cm ²	100 mm	125 mm
8,000 BTU/h	235 cm ²	490 cm ²	100 mm	125 mm
10,000 BTU/h	235 cm ²	490 cm ²	100 mm	125 mm
13,000 BTU/h	250 cm ²	550 cm ²	125 mm	150 mm
16,000 BTU/h	390 cm ²	800 cm ²	125 mm	150 mm
20,000 BTU/h	390 cm ²	800 cm ²	125 mm	150 mm
27,000 BTU/h	650 cm ²	1,600 cm ²	2 x 125 mm	2 x 150 mm

Type of duct

If flexible air ducts are used they must be high quality and adequately reinforced with steel or plastic spirals to avoid them being dented.

Flexible air ducts should be extended to their maximum length to ensure the inner surface is as smooth as possible.

For extremely long air duct sections, rigid ducts (e.g. made of PVC) should be given preference. These ducts are much smoother than flexible air ducts, and therefore also have a considerably lower inside resistance.

Fan outlet

Flexible air ducts mounted directly on the fan outlet and then bent at right angles must be avoided, as they considerably restrict the air flow. All Webasto fans can be mounted in several positions to enable a straight outlet out of the fan. An example of proper installation is shown in Fig.9.

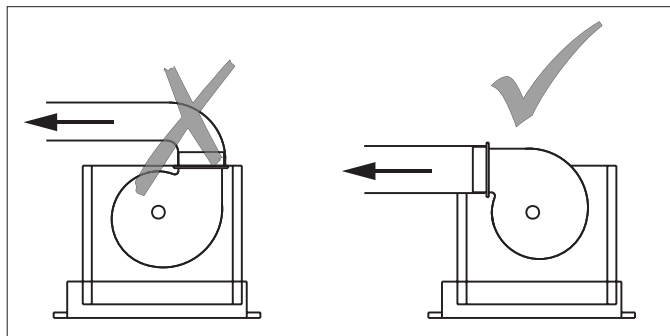


Fig.9 Fan outlet turned (on right)

Turning fan

The fan must be removed to turn it:

- ▶ Remove the black insulation off the fastening screws of the fan motor on the back of the fan.
- ▶ Screw out the screws of the fan motor and carefully remove the fan without bending the fan wheel. The power cable to the fan can remain connected when doing so.
- ▶ The fastening screws of the fan housing are now accessible through the opening of the fan motor. Undo the mounting screws, detach the fan housing and reinstall in the required position.
- ▶ Remount the fan motor.

Transition boxes

The transition boxes behind the supply air grilles serve as an equalisation volume for the air flow and thus reduce the noise level of the air flowing through the grille fins. The depth of the transition box therefore has a considerable effect on the distribution of the air flow.

- ▶ Install air inlet grille.
- ▶ Install transition boxes and supply air grille.
- ▶ Install insulated air ducts from the air conditioning unit to the transition box.
- ▶ Secure air ducts to ensure they do not move at high fan speeds.

6 Electrical Connections

6.1 General



CAUTION

Connection of electrical system carries 115 V/230 V

Danger of injuries or fatal accidents and damage to the air conditioning system or other electrical devices.

- ▶ Work on electrical systems which carry 115 V / 230 V may only be carried out by persons certified accordingly for this purpose.
- ▶ Before working on the electrical system the system must be disconnected from the power supply.

The entire air conditioning system must be protected by an external circuit breaker.

With the BlueCool S-Series S20 and S27, not only the power supply of the PCB, but also a separate power supply for the compressor must be provided, which must also be protected externally.

6.1.1 Minimum wire cross sections

Minimum wire cross sections must be taken into account.

Information on determining the minimum wire cross-sections for each device in the BlueCool S-Series can be found in Chapter "13.2 Dimensions and minimum distances Type S6 - S20" on page 32 and "13.3 Dimensions and minimum distances Type S27" on page 33.



Note

- Earth conductors are not specified.
- Pay attention to the following requirements:
 - Line length
 - Power consumption (same table)
 - Maximum temperatures in the vicinity of the cables

6.1.2 Installing line fuse protection

Line fuse protection must be selected corresponding to the data in Section "14.3 Wiring diagrams" on page 37. The fuses must also be selected in accordance with the national and local standards. Fuses of class gG for IEC and UL-type T with a tripping time of less than 0.5 s are generally required; if a magnetic circuit breaker (MCB) is used it must be of type B as specified in the data in chapter "13 Technical Data" on page 30. Make sure that the voltage, frequency and number of phases match the data of the type used.

6.2 Installing the electrical box

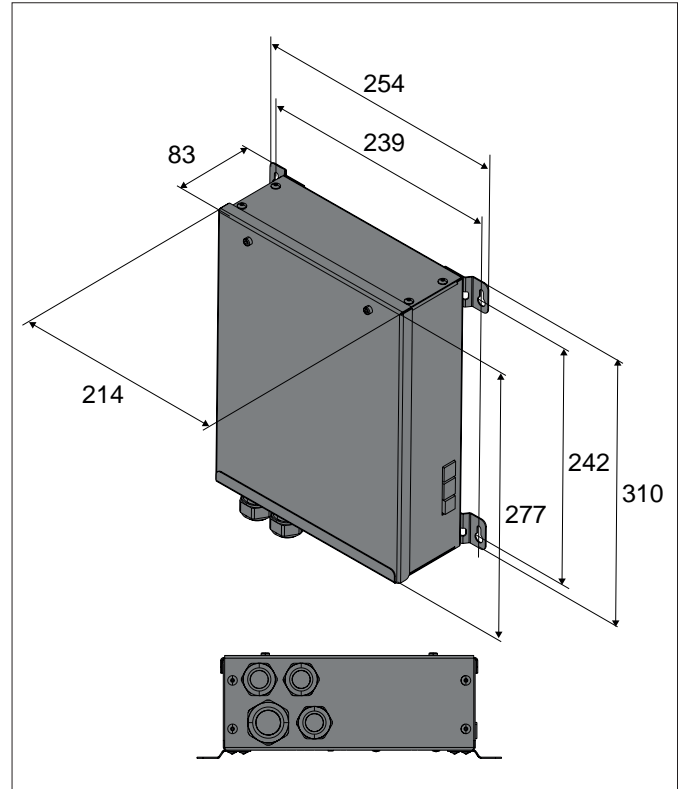


Fig.10 Electrical box dimensions



Note

- For Protection Class IP21 and higher, the connections for the control element and cabin temperature sensor and the USB connection must be directed downward.
- Make sure that the maximum permissible ambient temperature of 40 °C is not exceeded.
- ▶ Any desired installation position may be chosen for the electrical box if no requirements are placed on the IP protection class. For protection class IP21 and higher, the electrical box must be installed either horizontally reclined with the cover facing upward or vertically upright with the connections facing downward.
- ▶ Install the electrical box. Make sure that the fastening screws are accessible for opening and removal.

6.3 Connecting BlueCool S-Series



Note

Always refer to the wiring diagrams.

See Chapter "14.3 Wiring diagrams" on page 37.

Many electrical connections are already pre-assembled on the BlueCool S-Series self-contained air-conditioning unit.

- ▶ Connect the sea water pump. Pass connection cable through a PG cable gland and connect to the cable terminal (Fig.21, sea water pump). When operating several BlueCool S-Series units with one sea water pump, observe Fig.25.
- ▶ Produce the mains connection. Guide the mains cable through the PG cable gland. Slide the ferrite over the mains cable in the electrical box and secure it with cable ties. Connect the phase and neutral (PEN) conductor of the power supply cable to the cable terminal (see Fig.21, power supply) on the pc-board.
- ▶ Secure the earthing cable for the sea water pump and power supply at the marked earthing terminal in the electrical box next to the pc-board.

Additionally for S20 and S27:

- ▶ Guide the mains cable for the compressor through the PG cable gland and connect the phase and neutral conductor to the external relay.
- ▶ The mains connection for the compressor must be produced via a separate supply line (fusing 16 A with S20, 20 A with S27).

6.4 Installing soft start

It is possible to retrofit the Webasto BlueCool Soft Start in the electrical box. Refer to the wiring diagrams in section "14.3 Wiring diagrams" on page 37. Make sure that the phase and zero conductors are installed correctly.

6.5 Installing the BlueCool MyTouch control element

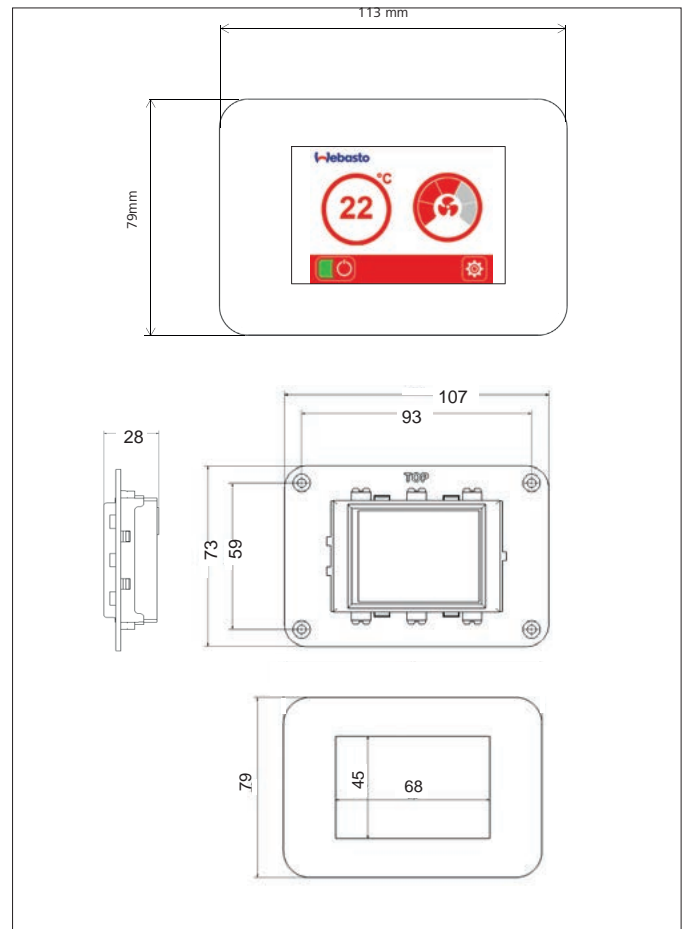


Fig.11 InstallationBlueCool MyTouch



Note

Use the supplied connection cable to connect the control element. A commercially available 8-pin cable with RJ45 connector (e.g. same as the power cable) can also be used. The connection cables formerly used by Webasto for the control element with a membrane keypad are no longer suitable as their polarity has been changed.

- ▶ Make the cutout for the control element in the required position. For cutout dimensions see Fig.11.
- ▶ Plug in the connector of the connection cable for the control element at the back of the control panel.
- ▶ Connect the connection cable for the control element to the electrical box from the outside.
- ▶ Attach the control element with screws.
- ▶ Fit trim cover.

6.6 Installing the cabin temperature sensor

The cabin temperature sensor is required to register the cabin temperature.

To ensure trouble-free operation make sure the cabin temperature sensor is positioned correctly.



Notes

- Direct sunlight and other heat sources can impair the operation of the system.
- Do NOT install the cabin temperature sensor in the immediate vicinity of a supply air grille.

Select an installation location which is free from external influences if possible. Among other things, the following external influences should be avoided:

- Radiator
- Kitchen cooker
- Light sources

It is advisable to mount the cabin temperature sensor in the area of the return flow, e.g. on the back of the air inlet grille.

- ▶ Fit cabin temperature sensor in required location.
- ▶ Connect the sensor cable to the electrical box from the outside.

6.7 Accessories

6.7.1 BlueCool Expert Tool

The BlueCool Expert Tool, which enables easy setting, actuation and diagnostics, is available for the BlueCool S-Series. Please see the corresponding documentation for additional information on this subject.

Authorised users can download the software for this free of charge from the Webasto dealer portal at:

<https://dealers.webasto.com>

7 Operation

7.1 Description

The BlueCool MyTouch is the standard control element for the BlueCool S-Series and enables easy operation and setting of the connected system. The screen is designed as a touch screen. System operation is described in the following.



Caution

Damage to BlueCool MyTouch

- The screen should not come in contact with any other electrical devices as electrostatic discharge could cause malfunctions.
- Do not use pointed or sharp objects to operate the screen and do not exert excessive pressure with your fingers.



Notes

- It is recommended to operate the screen with your fingers. The touch sensitivity of the screen is optimised to direct contact with the fingers. The screen may not respond to touch if gloves are worn.
- Tapping outside the touch-sensitive area at the edge of the screen may not be recognised.

7.2 Home screen and symbols

There is a choice of 3 different designs of the Home screen with temperature and fan setting. The functions are the same.

To change the design (in Passenger menu) see "7.4 Setting level 1 (Passenger menu)" on page 19.

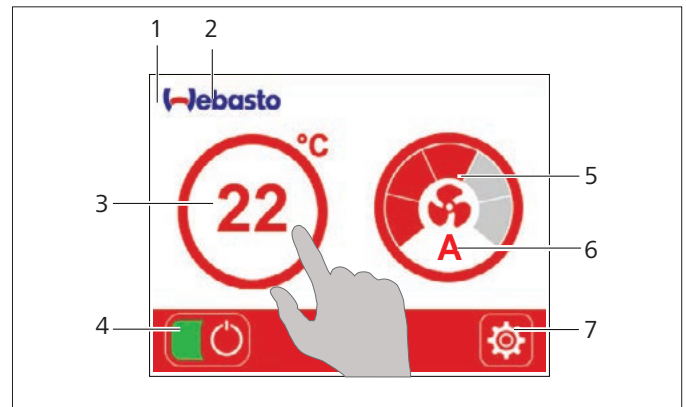


Fig.12 Design 1

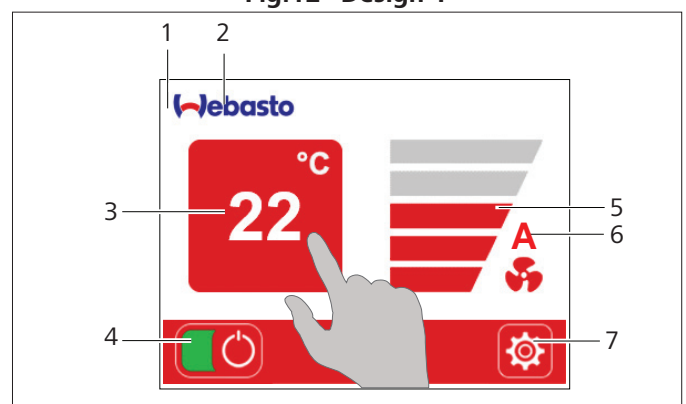


Fig.13 Design 2

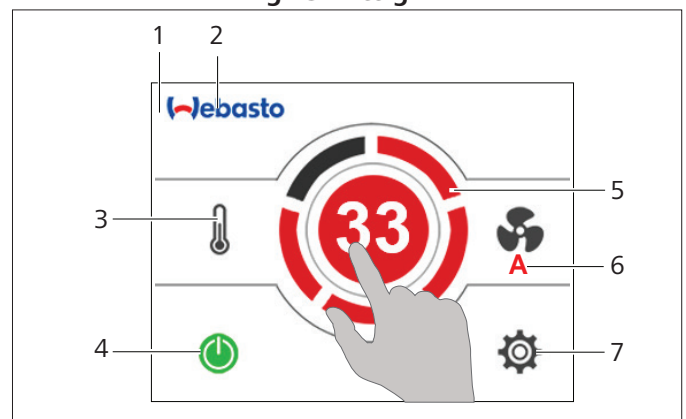


Fig.14 Design 3

The illustrations show examples of design 1 to 3.

- 1 Home screen
- 2 Select Crew menu (and Parameter menu)
- 3 Temperature setting
- 4 ON/OFF
- 5 Fan display
- 6 Display of automatic air handler control
- 7 Settings (Passenger menu)

The symbols on the Home screen provide information on the system status. The symbols are explained in the table below:




















Symbol	Meaning
1 	On/Off
2 	Temperature
3 	Fan
4 	Settings
5 	Crew menu
6 	Notification
7 	Increase values
8 	Decrease values
9 AUTO	Automatic fan control
10 	previous
11 22	Setpoint temperature
12 	previous
13 	Forward
14 	Parameter value
15 	Select
16 	Home screen
17 	Scroll up
18 	Scroll down
21 	Keypad
22 	Display selection

Fig.15 Meaning of symbols

7.2.1 Standby

The screen will go to Standby mode after 5 minutes if no entries are made on the screen. Tap anywhere on the screen to call up the Home screen.

7.2.2 Notification

The notification symbol  appears on the bottom status line to draw your attention to the current status of the system. Tap on the symbol to show the corresponding status message.

7.2.3 ON/OFF

■ When the screen is switched off:

- ▶ Tap the screen.

The screen switches on.

■ When the screen is switched on:

- ▶ Tap .

The colour of the ON/OFF symbol indicates the operating status (green = switched on, grey = switched off).

7.2.4 Operation

After switching on, the control system starts up the self-contained air-conditioning unit in steps and then assumes normal operation. The control element now shows the current temperature where the temperature sensor of the self-contained air-conditioning unit is installed. Depending on the installation location, this may also be the temperature of another cabin for example.

After approx. 20 seconds, the base colour of the control element changes to indicate the operating mode (cooling or heating) in which the self-contained air-conditioning unit was started. Blue indicates cooling mode, red heating mode. The selection is dependent on the set setpoint temperature and the room temperature measured by the cabin temperature sensor. The system will assume standby mode if the cabin temperature and the setpoint temperature are the same.




Note



- The system only cools under the following conditions: cabin temperature > 15 °C. Setpoint temperature < cabin temperature.
- The system only heats under the following conditions: cabin temperature < 29 °C. Setpoint temperature > cabin temperature.

7.2.5 Setting setpoint temperature

To set the required cabin temperature:

- ▶ Tap on the temperature or  on the Home screen.

The setpoint temperature appears to the right.

- ▶ Tap Plus  or Minus  to increase or decrease the setpoint temperature.

The Settings menu is automatically exited after 30 seconds and the value last set is adopted.




Note

Alternatively:

Save and exit menu immediately:




- ▶ Tap Previous .

7.2.6 Setting fan speed

- ▶ To set the required fan speed tap on Fan  on the Home screen.

With automatic fan control mode selected, the symbol A appears on the Home screen. The control system of the fan automatically adapts the fan speed.


To manually adapt the fan speed:

- ▶ Tap the Fan symbol (design 1, 2) or .
- ▶ You can now change the displayed fan speed by tapping Plus  or Minus .
- ▶ Tap AUTO when you wish to return to automatic fan mode.

The Settings menu is automatically exited after 30 seconds and the value last set is adopted.



Note

Alternatively:
Save and exit menu immediately:
▶ Tap Previous .

7.3 System settings

The operating logic is explained based on the Timer function. The explanation also applies to other setting levels or functions.

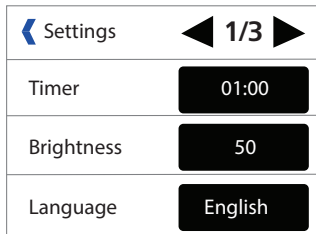





Fig.16 Example of system settings

Select setting level 1 (Passenger menu):

- ▶ Tap the Settings  symbol.
- Setting level 1 (Passenger menu) is displayed.
- ▶ Tap  or  to scroll between the various pages.



- ▶ Tap Timer . The setting window for this function opens up.

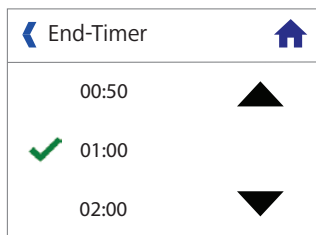







Fig.17 Timer


- ▶ Tap  to reduce the time interval or tap  to increase the time interval.
- The  symbol marks the current selection.
- ▶ Tap on the required time to set the time interval.
- ▶ Tap the Previous  symbol to go to the previous level. The selected settings are then adopted.

or:

- ▶ Tap the Home screen  symbol to return to the Home screen. The selected settings are then adopted.

7.4 Setting level 1 (Passenger menu)

You can call up setting level 1 (Passenger menu) from the Home screen:

- ▶ Tap the Settings  symbol.

Setting level 1 (Passenger menu) is displayed. The available functions are:

7.4.1 Timer

Adjust the preset Start or Stop on the self-contained air-conditioning unit.

With the system already switched on: The timer acts as a remaining time counter. The air conditioning system switches off automatically after the set time runs down.

With the system switched off: The timer acts as a start timer. The system starts up automatically after the set time has elapsed.

It is not possible to program a switch-on and switch-off time at the same time.

7.4.2 Brightness

Adapts the screen brightness to the ambient light levels.

7.4.3 Language

Sets the operating language.

7.4.4 Design

Changes the screen design.

7.4.5 Colour

Adapts the background colour.

7.4.6 Standby

Sets the BlueCool MyTouch display to standby mode. The available functions are:

- **Webasto Logo**
Shows the Webasto logo.
- **Customer logo**
Shows an individual file (.bmp format) that can be loaded onto BlueCool MyTouch with the aid of the BlueCool Expert tool.
- **Cabin temperature - bright**
Shows the current cabin temperature at high brightness levels in areas with bright ambient light.
- **Cabin temperature - dark**
Shows the current cabin temperature at low brightness levels in areas with little ambient light.
- **Display off**
No display in standby mode.
- **Operation indicator** An illuminated dot indicates that the system is ready for operation.
- **Standby off**
Home screen remains active.

7.4.7 Key tone

For setting whether the control element makes a sound when you touch the surface of the screen.

7.4.8 °C / °F

Sets the temperature display in degrees Celsius °C or degrees Fahrenheit °F.

7.4.9 Cleaning

Disables the screen functions for 30 seconds to clean the surface.

7.5 Setting level 2 (Crew menu)



Note

Access to setting level 2 (Crew menu) is purposefully not intuitive as it contains setting options that are intended only for authorised persons (crew).

- ▶ You access setting level 2 by tapping and holding the **Jebasto** logo.

You then have access to the following functions:

7.5.1 Operating mode

Change the operating mode:

- **Cooling only**
F1
- **Heating only**
F2 (reverse heating operation)
- **Automatic toggling between cooling and heating**
F3 (via reverse heating operation)
- **Dehumidification**
F7

7.5.2 Dehumidification cycle

- **Number of cycles per day**
Sets the number of dehumidification cycles per day.
- **Heating time in minutes**
Selection of heating time during a dehumidification cycle.
- **Cooling time in minutes**
Selection of cooling time during a dehumidification cycle.

7.5.3 Fault protocol

- **Event counter**
Number of events.
- **Fault code**
Fault code display.
- **Fault counter**
Number of faults.
- **Operating time in hours**
Display of operating time.

7.5.4 Operating values

- **Evaporator**
Display of evaporator temperature.
- **Supply frequency**
Shows the supply frequency of the power supply.
- **Operating voltage**
Display of operating voltage.

7.5.5 Firmware

Display of current firmware version.

7.5.6 Display settings

- **save**
Saves the current screen settings.
- **reset**
Resets the screen settings to the status last saved.

7.5.7 System settings

Access to setting level 3 (Parameter menu) by entering a code (default : 64)

7.6 Setting level 3 (Parameter menu)

You access setting level 2 (Crew menu) by tapping and holding the **Jebasto** logo. You access setting level 3 by selecting System Settings in the menu and entering the access code (factory setting 64). You then have access to the following functions:

7.6.1 Compressor switching points

Setting the temperature switching points for the compressor

Selection:

- Min. switch-off temperature for cooling: this parameter is used to set the minimum evaporator temperature.
- Switch-off temperature for cooling: lower target value of evaporator temperature
- Switch-on temperature for cooling: setting for the evaporator temperature at which the compressor is to be switched on again.
- Switch-off temperature for heating: setting for the maximum condenser temperature at which the compressor is switched off.
- Switch-on temperature for heating: setting for the condenser temperature at which the compressor is to be switched on again.
- Hysteresis: setting for the switch-on hysteresis of the setpoint temperature at which the compressor is switched on.
- Initial start-up delay: Staggered start for multiple BlueCool S-Series self-contained air-conditioning units when switching on the AC power supply after a shut-down.
- Max. switch-off period: setting for the time (in seconds) for which the compressor still remains switched on, although the evaporator has already reached the "Switch-off temperature, compressor cooling".

7.6.2 Fan settings

Fan type and speed settings.

Selection:

- Fan type
- Continuous fan operation.
- Blower levels 1-5: setting the fan speed for the individual fan speeds 1-5.

7.6.3 Further settings

- **Access code**
This setting changes the access code for setting level 3.
- **Undervoltage trip:**
The undervoltage trip for a supply voltage of 115 V/230V. If the supply falls below the undervoltage threshold for more than 5 seconds, the system will shut down. The fault message AAA - undervoltage is displayed.
- **Correction cabin temperature sensor**
Correction of the cabin temperature display when the display deviates from the actual cabin temperature due to unfavourable positioning of the sensor or external influence.
- **CAN bus address**
Selection of CAN-bus address of the self-contained air-conditioning unit.
- **Factory setting**
All parameters are reset to the factory setting.

8 Dehumidification

In the dehumidification operating mode F7, the BlueCool air conditioning system can control the heating and cooling on the boat in the absence of the crew, removing humidity from the cabin air in the process. For this purpose, the air-conditioning system runs in heating mode for a set period of time and then in cooling mode. In cooling mode condensation forms on the heat exchanger, thus drying the cabin air. The heat/cooling cycles can be activated up to 3 times in 24 hours. There must be sufficient power available for the air-conditioning system. Dehumidification mode cannot run simultaneously with regular air conditioning; simultaneous temperature control is not possible. Dehumidification does however take place in regular cooling mode.

Settings

It may be necessary to enter further system settings before dehumidification can run. This is generally already done during the installation/commissioning phase. Setting level 3 must be called up if the system parameters need to be changed, see chapter "7.6 Setting level 3 (Parameter menu)" on page 20.

To achieve efficient operation of the dehumidification cycle throughout the boat, the same settings should be chosen for all components of the air conditioning system.

Selecting the dehumidification profile

The system can be set such that it starts dehumidification mode once, twice or three times in a 24-hour period or there is no dehumidification at all. To change the cycles you need to set the number of cycles per day in setting level 3 under the parameter "Dehumidification cycle". See "7.5.2 Dehumidification cycle" on page 20.

Synchronising all installed BlueCool air conditioning system components

If the entire boat is to be optimally dehumidified, it is expedient to switch off all the BlueCool S-Series self-contained air-conditioning units in succession at the control elements, within a few seconds of each other, using On/Off. All BlueCool S-Series air conditioning plants switch on simultaneously when the previously selected dehumidification cycle starts and then switch off again automatically. If all control elements are not switched off simultaneously, the BlueCool S-Series self-contained air-conditioning units will start the dehumidification cycle at different times. This will restrict the dehumidification efficiency.

Operating restrictions - extreme climatic conditions

The dehumidification cycle is designed for use in temperate climatic regions where extreme weather conditions are not expect-

ed. In the dehumidification cycle, the air-conditioning system runs in both heating as well as cooling mode and may therefore not function correctly if the temperature of the sea water is either too high or too low. At low sea water temperatures, the system operates inefficiently in heating mode and there is a danger that the sea water could freeze in the condenser. As a precautionary measure, the air conditioning system may therefore switch off at low water temperatures (at approx. 6 °C and below) (Fault message A01 - low pressure compressor). Heating mode may switch off (Fault message A02 - high pressure compressor) at high sea water temperatures (above 25 °C) as the air conditioning system is designed to produce heat under cold climatic conditions where sea water temperatures in excess of 25 °C are unlikely.

9 Commissioning

9.1 Check connections

- ▶ Check all connections:
 - Check the electrical connections for firm seating.
 - Check that the sea water piping is firmly mounted and not leaking.
 - Check that the air ducts are firmly mounted and not leaking.
 - The air inlet and outlet air grilles must not be blocked.

9.2 Checking operation of condensed-water drain

- ▶ Pour water into the condensed-water tray and ensure correct drainage.
 - The drain must be clear
 - Connections sealed

9.3 Filling sea water pump head

Self-priming sea water pumps:

- ▶ Fill pump head with water.

9.4 Test run

- ▶ Connect the power supply as shown in the wiring diagram. Switch on the generator if necessary.
- ▶ Switch on the self-contained air-conditioning unit in cooling mode. See Chapter "7 Operation" on page 17
- ▶ Check the sea water flow rate. Determine the flow rate of the exiting sea water with catch containers and a stop watch.



Note

The actual flow rate must be above the required minimum flow rate (see Chapter "13 Technical Data" on page 30) to ensure fault-free operation at high sea water temperatures.

If the minimum value is not reached, the pressure losses in the sea water system should be reduced using the following measures:

- Use larger cross-sections
- fewer bends
- shorter lines
- use a more powerful pump

10 Inspection and Maintenance



WARNING

Evaporator fins can be damaged.

The evaporator fins can be easily bent. When installing, make sure that bent fins are correctly aligned again to ensure proper air feed.

It is recommended that a number of routine checks be carried out at regular intervals and when switching on the air-conditioning system so that the system continues to function properly and maintains its performance level for many years.

At least once per month:

Check the operation of the air conditioning system.

- ▶ Switch on the self-contained air-conditioning unit
The self-contained air-conditioning unit must run for at least 10 minutes.

10.1 Air filter

At least once per year:

Check the air filter on the evaporator of the air conditioning unit and clean if necessary:

- ▶ Pull the air filter upward out of the guide rails.
- ▶ Clean the air filter with a vacuum cleaner and use water to flush it if necessary.
- ▶ Reinsert the air filter into the self-contained air-conditioning unit.

10.2 Sea water circuit

The operation of the sea water circuit must always be checked, especially after a longer absence.

Every time it is switched on, immediately

- ▶ Check whether sea water flows out of the sea water outlet.

At least once per week

- ▶ Check the sea water strainer for cleanliness.
- ▶ Clean if necessary.

At least once per month

- ▶ Check the entire sea water circuit from the through-hull fitting to the sea water outlet for leaks.

At least once per month

- ▶ Check the condensate outflow from the condensed-water tray for free passage and leaks.
- ▶ Check the condensed-water drain line for free passage and leaks.

Once per year



Note

The sea water circuit is only to be cleaned by an expert (installer or Webasto Service Centre).

- ▶ Clean the sea water circuit, including the condenser of the self-contained air-conditioning unit.

The time interval depends on the degree of biological fouling (by shellfish etc.).

Soiling of the sea water circuit reduces the sea water flow rate, which decreases the heat dissipation and can result in high-pressure switch-offs.

If the condenser is soiled, the cooling or heating capacity of the system decreases.

10.3 Electrical wiring

At least once a year, the electrical connections must be checked for corrosion of the contacts and firm seating. Also check the mechanical strain relief of the lines.

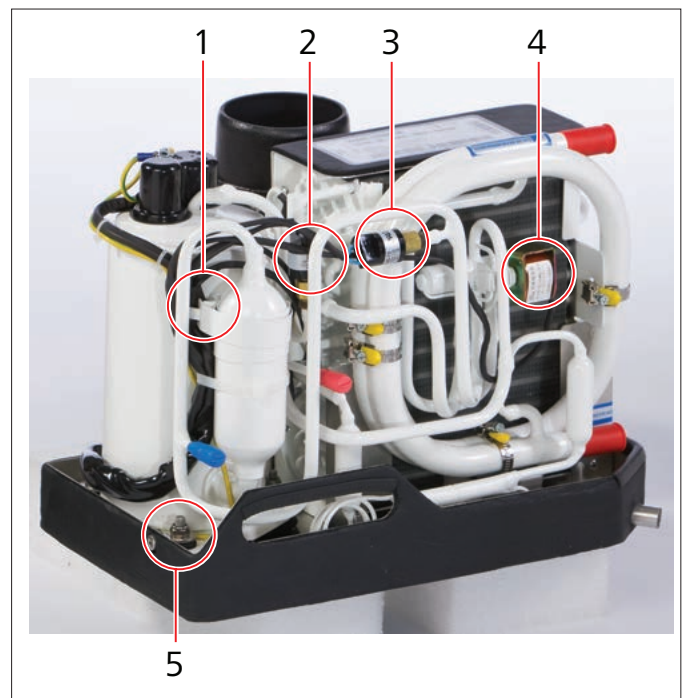


Fig.18 Graphic for checking wiring

- 1 Compressor connection cable with earth
- 2 High-pressure switch
- 3 Low pressure switch
- 4 Coil 4/2-way reverse valve
- 5 Condensed-water tray earthing cable

10.4 Checklist for inspection and maintenance

Maintenance task		Date:							
1	Check the air filter on the evaporator and clean if necessary. See Chapter "10.1 Air filter" on page 23 and Fig. 4, No. 5								
2	Check the flow rate of the sea water circuit at the sea water outlet. See Chapter "10.2 Sea water circuit" on page 23 and Fig. 7, no. 6								
3	Check and clean the sea water strainer. Refer to the filter manufacturer's specifications. See Chapter "10.2 Sea water circuit" on page 23 and Fig. 7, no. 2.								
4	Check the entire sea water circuit for leaks. See Chapter "10.2 Sea water circuit" on page 23 and Fig. 7.								
5	Check the condensate outflow from the condensed-water tray and the condensed-water drain line for free passage and leaks. See Chapter "9.2 Checking operation of condensed-water drain" on page 22.								
6	Clean the sea water circuit. See Chapter "10.2 Sea water circuit" on page 23.								
7	Check the electrical connections for corrosion to the contacts and firm seating. See Chapter "10.3 Electrical wiring" on page 23 and Fig. 18.								
8	Check the shaft seal of the sea water pump and replace it if necessary (does not apply to magnetically coupled pumps).								

11 Decommissioning

If the air conditioning system is to be decommissioned, e.g. during the winter, the following procedure must be complied with:

- Switch off the system with BlueCool MyTouch.
- Disconnect the power supply.
- Close all sea water valves.
- Completely empty sea water circuit, i.e. sea water lines, sea water strainer, sea water pump and condenser or fill with antifreeze.

12 Malfunctions

12.1 Troubleshooting



CAUTION

Troubleshooting only by 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 authorised professionals trained by Webasto for this purpose.



Note

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

If faults occur, the system must be switched off.

12.2 Faults that are displayed

The BlueCool S-Series can display malfunctions in two different ways:

- On the BlueCool MyTouch screen, in the form of a code (e.g. A02) and a text message.
- As an LED flash code, directly in the electrical box of the self-contained air-conditioning unit.

Every time a fault code occurs, the self-contained air-conditioning unit will stop for approx. 60 seconds and then attempt to restart.

If the same fault occurs more often than 6 times consecutively within 30 minutes, the system is completely shut down and the fault code is displayed continuously.

No further restarts are attempted. The BlueCool S-Series can be reset once the cause of the error has been eliminated.

To reset the BlueCool S-Series:

- ▶ Switch the air handler off and on via BlueCool MyTouch. (Alternatively: Disconnect and reconnect the power supply).

12.3 Fault indication on the BlueCool S-Series pc-board (LED display)

See "12.3.1 Fault code table" on page 27 for description of the fault codes.

■ LED 12 V


This LED lights up as soon as the +12 V supply is applied.

■ "Alive" LED

This LED indicates the operating and fault status by various flash sequences.

- LED briefly flashes every 7 seconds: Normal operation, no malfunction.
- LED flashes once or several times at short intervals, then goes out and flashes again once or several times: a fault is indicated, see Chapter "12.3.1 Fault code table" on page 27.

12.3.1 Fault code table

Fault code		Possible cause	Correction
Screen	LED "Alive"		
AAA - Undervoltage	1x flashing, pause...	Switch-off in case of undervoltage. Power supply below set undervoltage value for longer than 5 seconds. Cause is probably excessively long cable, overloading or an insufficiently high 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 90 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 - low pressure compressor	2x flashing, pause...	Compressor switches off 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 condenser inlet/outlet temperature approx. 5 K. At sea water temperature <6 °C: Heating not possible in reverse heating operation. Clean sea water strainer and bleed sea water circuit.
		Refrigerant shortage.	Check for refrigerant leak.
A02 - High pressure compressor	3x flashing, pause...	Compressor switches off due to high pressure. Pressure switch defective or power circuit interruption/short circuit.	Check electrical wiring. Replace pressure switch on Schrader valve.
		In 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.
		In heating mode: Air supply insufficient	Check air supply. Difference between air inlet/air outlet temperature of evaporator at least 4 K.
A09 - Cabin temperature sensor	4x flashing, pause...	Cabin temperature sensor defective, break/short-circuit in electrical circuit, cabin temperature sensor not connected.	Connect or replace cabin temperature sensor.
A10 - Evaporator temperature sensor	5x flashing, pause...	Temperature sensor of evaporator defective or power circuit interruption/short circuit.	Check electrical wiring or replace sensor.
TA11 - Evaporator temperature value exceeded	n.a.	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.
 Note Fault code TA11 - Evaporator temperature value exceeded: This code is a system information and not a fault which must be eliminated. The status indicator will go out automatically on reaching the cut-in temperature.			
INIT	6x flashing, pause...	Initialisation procedure or system blocked. Electrical wiring defective, interruption in power circuit/short circuit.	Check cables and connections of pc-board and of control element. Replace defective cable, control element or pc-board.

Fault code		Possible cause	Correction
Screen	LED "Alive"		
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.
		Compressor not running. Compressor defective or break/short-circuit in compressor wiring.	Check electrical wiring or replace defective compressor.
		Compressor not running. Compressor overload or overload protection element on top of compressor defective.	Allow to cool down for some time or replace defective overload protection element.
		No or insufficient cooling or heating capacity. Poor air or sea water flow, soiled or circulation blocked.	Secure adequate air or sea water flow (see A01 and/or A02).
		No or insufficient cooling or heating capacity: 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.
		No or insufficient cooling or heating capacity: Oil block.	Leave air-conditioning system running in heating mode. Call out a refrigerant specialist if necessary. Technical datasheet available.
		No or insufficient cooling or heating capacity: Refrigerant circuit blocked. (capillary lines).	Have checked by refrigerant specialist. Technical datasheet available.
		No or insufficient cooling or heating capacity: Compressor fault.	Have checked by refrigerant specialist.
		Incorrect cabin/ambient temperature or water temperature displayed. Temperature sensor positioned incorrectly, subject to interference or display values falsified.	Check whether the sensor is subject to direct fault sources such as direct sunlight or devices radiating heat. Calibrate sensor. Replace defective sensor.

12.4 Faults not displayed on control element

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 displayed values are not correct.
 - 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.

13 Technical Data

13.1 Self-contained air-conditioning units BlueCool S-Series 230 V

Type	S6-R-230V-REV-R410a	S8-R-230V-REV-R410a	S10-R-230V-REV-R410a	S13-R-230V-REV-R410a	S16-R-230V-REV-R410a	S20-R-230V-REV-R410a	S27-R-230V-REV-R410a
Cooling capacity [BTU/h] *1	6,000	8,000	10,000	13,000	16,000	20,000	27,000
Cooling capacity [kW] *1	1.8	2.4	2.9	3.8	4.7	5.9	7.9
Rated voltage [V]	230						
Frequency [Hz]	50/60						
Current consumption, operation [A] 50 Hz *2	2.0 - 2.4	2.4 - 3.5	2.6 - 4.0	3.6 - 7.1	4.9 - 7.1	5.9 - 8.9	7.0 - 10.5
Max. starting current intake, current peak [A] 50 Hz	14	28	27	37	54	60	77
Starting current intake RMS40 [A] 50 Hz *3	5	17	17	22	35	39	49
Starting current intake RMS300 [A] 50 Hz *4	3	9	9	11	19	20	32
Max. starting current intake, current peak with soft start [A] 50 Hz	11	12	11	13	22	23	34
Current consumption RMS40 with soft start [A] 50 Hz *3	4	7	7	7	12	14	19
Current consumption RMS300 with soft start [A] 50 Hz *4	3	5	5	5	9	10	17
Current consumption with blocked rotor LRA [A]	12	19	19	24	37	43	62
Current consumption, operation *2 [A] 60 Hz	2.4 - 2.9	3.5 - 4.9	3.5 - 5.2	4.5 - 7.7	6 - 8.7	6.5 - 10.8	8.5 - 13.7
Max. starting current intake, current peak [A] 60 Hz	15	25	25	34	47	54	69
Starting current intake RMS40 [A] 60 Hz *3	5	16	15	21	30	35	44
Starting current intake RMS300 [A] 60 Hz *4	4	10	10	12	20	22	41
Max. starting current intake, current peak with soft start [A] 60 Hz	13	14	14	15	26	28	40
Current consumption RMS40 with soft start [A] 60 Hz *3	5	8	8	9	15	17	23
Current consumption RMS300 with soft start [A] 60 Hz *4	4	6	6	7	12	13	20
Fan output, free-blowing [m ³ /h] (cfm)	275 (162)	275 (162)	400 (235)	500 (294)	625 (368)	625 (368)	2x550 (2x324)
Supply air grille [cm ²]	150	235	235	250	390	390	650
Air inlet grille [cm ²]	325	490	490	550	800	800	1600
Minimum thickness insulation air duct [mm] (inch)	5 mm						
Recommended line fuse protection [A]	16						20 *5
Fan connection [mm] (inch)	100, (4)			125, (5)			2x125 (2x5)
ø Sea water connection [mm] (inch)	19, 3/4"	19, 3/4"	19, 3/4"	19, 3/4"	19, 3/4"	19, 3/4"	19, 3/4"
Minimum sea-water flow rate [l/min] 50 Hz	6	8	10	12	14	17	21
Minimum sea-water flow rate [l/min] 60 Hz	7.5	10	12	14	17	20	25
Recommended sea water pump 50Hz *6	WB250	WB350	WB350 / WB500G	WB500 / WB500G	WB500 / WB500G*		WB1000 / WB1000G
Recommended sea water pump 60Hz *6					WB500 / WB1000G		WB1000 / WB1000G
max. permissible ambient temperature [°C]	+40°C						
Net weight [kg]	20	20	22	27	31	34	46
Dimensions of self-contained air-conditioning unit (LxDxH) [mm] (inch) See also Fig.19 on page 32 and Fig.20 on page 33.	400 x 320 x 305 (15.7 x 12.6 x 12.0)	400 x 320 x 305 (15.7 x 12.6 x 12.0)	475 x 310 x 310 (18.7 x 12.2 x 12.2)	500 x 350 x 320 (19.7 x 13.8 x 12.6)	540 x 350 x 370 (21.3 x 13.8 x 14.6)	590 x 340 x 370 (23.2 x 13.4 x 14.6)	570 x 510 x 410 (22.4 x 20.1 x 16.1)
Refrigerant quantity R410a [g]	450	250	280	420	550	520	670
Min. sea water temperature in heating mode [°C]	6						
Max. sea water temperature in cooling mode [°C]	35						

*1 BTU/h and electrical data are based on 7 °C evaporation temperature and 38 °C condensation temperature

*2 Current consumption of self-contained air-conditioning unit is dependent on compressor output. Maximum values under tropical conditions.

*3 Effective value of current consumption (RMS) for the self-contained air-conditioning unit for the first 40 ms

*4 Effective value of current consumption (RMS) for the self-contained air-conditioning unit for the first 300 ms

*5 Compressor only

*6 Only a recommendation. The pump size must be adjusted to the application so that the minimum flow rate is ensured.

13.1 Self-contained air-conditioning units BlueCool S-Series 115 V

Type	S6-R-115V-REV-R410a	S8-R-115V-REV-R410a	S10-R-115V-REV-R410a	S13-R-115V-REV-R410a	S16-R-115V-REV-R410a
Cooling capacity [BTU/h] *1	6,000	8,000	10,000	13,000	16,000
Cooling capacity [kW] *1	1.8	2.4	2.9	3.8	4.7
Rated voltage [V]	115				
Frequency [Hz]	60				
Current consumption, operation [A] 60Hz *2	3.6 - 5.5	4.5 - 6.1	5.6 - 7.9	7.6 - 11	8.0 - 15.7
Max. starting current intake, current peak [A] 60 Hz	39	54	55	70	89
Starting current intake RMS40 [A] 60 Hz *3	25	35	36	47	59
Starting current intake RMS300 [A] 60 Hz *4	19	20	21	30	35
Current consumption with blocked rotor LRA [A]	27	34	37	57	70
Fan output, free-blowing [m ³ /h] (cfm)	275 (162)	275 (162)	350 (206)	430 (253)	650 (382)
Supply air grille [cm ²]	150	235	235	250	390
Air inlet grille [cm ²]	325	490	490	550	800
Minimum thickness insulation air duct [mm] (inch)	4				
Recommended line fuse protection [A]	16				25 *5
Fan connection [mm] (inch)	100, (4)			125, (5)	
∅ Sea water connection [mm] (inch)	19, 3/4"	19, 3/4"	19, 3/4"	19, 3/4"	19, 3/4"
Minimum sea-water flow rate [l/min] 60 Hz	6	8	10	12	14
Recommended sea water pump 60Hz *6	WB250	WB350		WB350 / WB500G	WB500 / WB500G
max. permissible ambient temperature [°C]	+40				
Net weight [kg]	18	18	20	25	28
Dimensions of self-contained air-conditioning unit (LxDxH) [mm] (inch) See also Fig.19 on page 32 and Fig.20 on page 33.	400 x 320 x 305 (15.7 x 12.6 x 12.0)	400 x 320 x 310 (15.7 x 12.6 x 12.2)	475 x 330 x 320 (18.7 x 13.0 x 12.6)	500 x 350 x 325 (19.7 x 13.8 x 12.8)	540 x 350 x 380 (21.3 x 13.8 x 15)
Refrigerant quantity R410a [g]	440	260	240	420	400
Min. sea water temperature in heating mode [°C]	6				
Max. sea water temperature in cooling mode [°C]	35				

*1 BTU/h and electrical data are based on 7 °C evaporation temperature and 38 °C condensation temperature

*2 Current consumption of self-contained air-conditioning unit is dependent on compressor output. Maximum values under tropical conditions.

*3 Effective value of current consumption (RMS) for the self-contained air-conditioning unit for the first 40 ms

*4 Effective value of current consumption (RMS) for the self-contained air-conditioning unit for the first 300 ms

*5 Compressor only

*6 Only a recommendation. The pump size must be adjusted to the application so that the minimum flow rate is ensured.

13.2 Dimensions and minimum distances Type S6 - S20



Note

For dimensions by type see table „13 Technical Data“ on page 30.

If the cover plate cannot be removed, a distance of >100 mm should be maintained above the system to allow the air filter to be removed and cleaned.

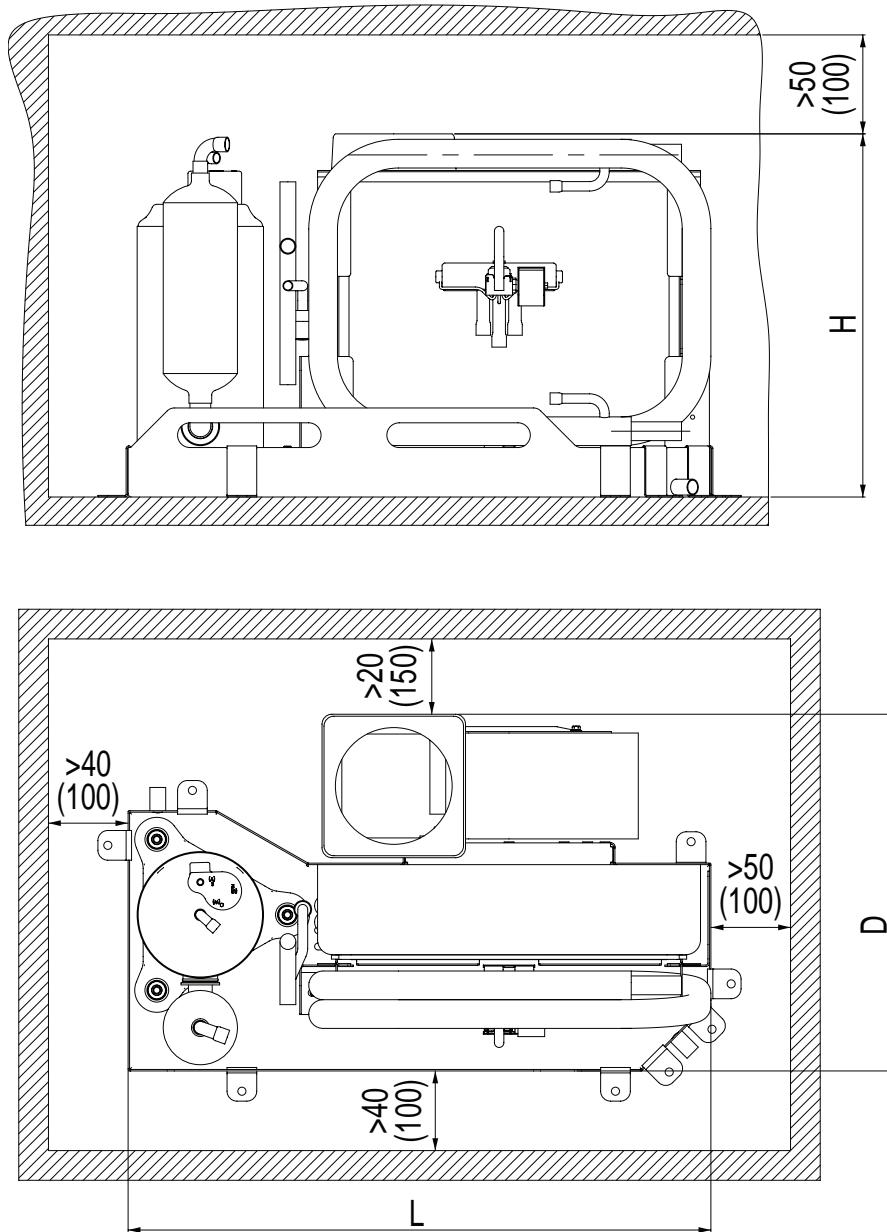


Fig.19 Dimensions and minimum distances Type S6 - S20 (mm)

LxDxH: See table „13 Technical Data“ on page 30.

> xx : Minimum distance (mm)

> (xx): Recommended distance (mm)

13.3 Dimensions and minimum distances Type S27



Note

For dimensions by type see table „13 Technical Data“ on page 30.

If the cover plate cannot be removed, a distance of >100 mm should be maintained above the system to allow the air filter to be removed and cleaned.

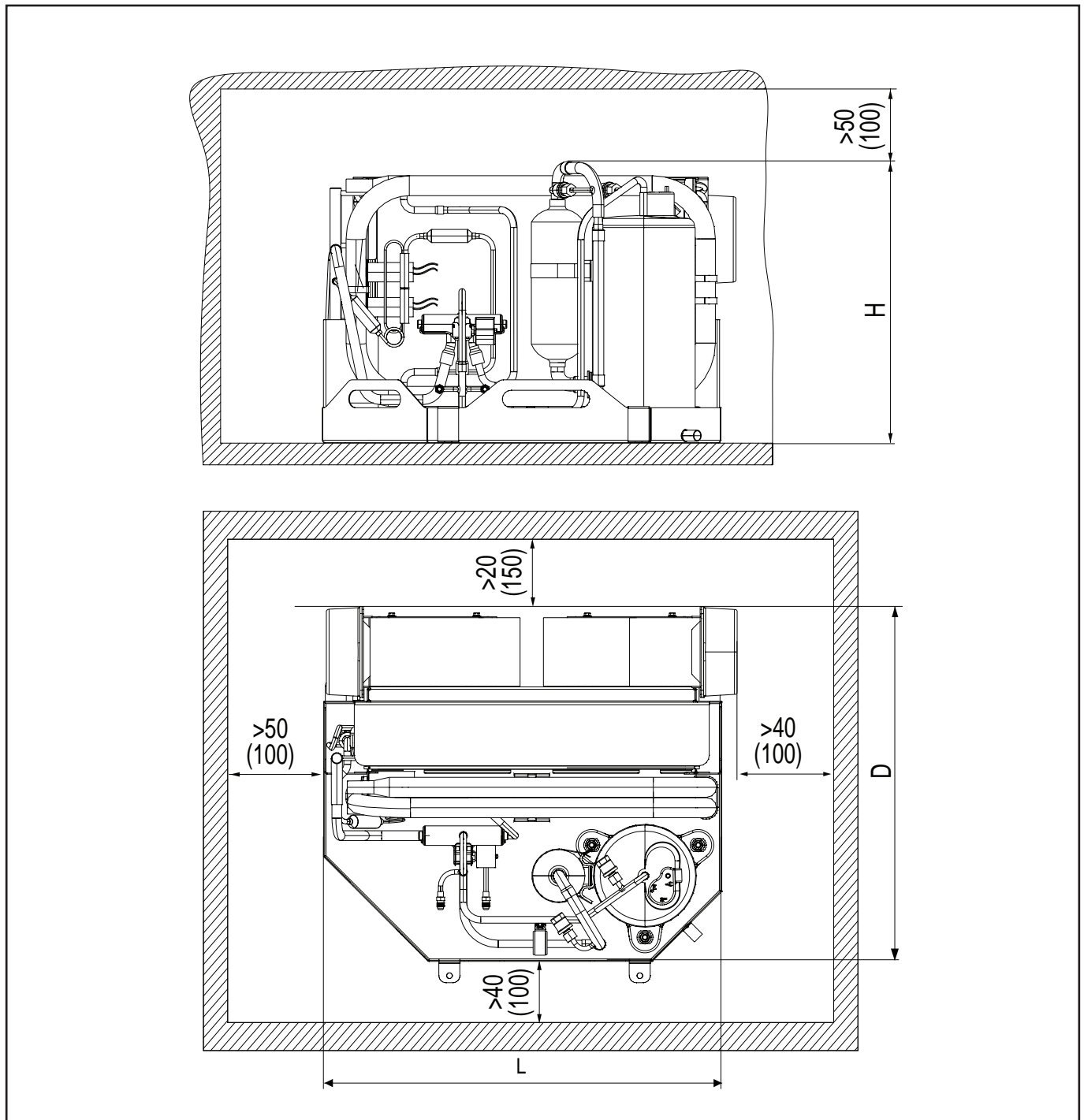


Fig.20 Dimensions and minimum distances Type S27 (mm)

LxDxH: See table „13 Technical Data“ on page 30.

> xx : Minimum distance (mm)

> (xx): Recommended distance (mm)

14 Annex

14.1 Overview of control and setting levels



14.2 Parameter settings

14.2.1 Parameter list, setting level 1 (Passenger menu)

	Parameter	Meaning	Unit / parameter	Value range	Factory setting	See Page
Setting level 1	Timer	Sets the time interval after which the self-contained air-conditioning unit is switched on or switched off.	Hours:minutes	off, 00:10 – 24:00	1:00	page 19
	Brightness	Sets the screen brightness	Percentage	5-100%	100%	
	Language	Sets the operating language	Language	Deutsch, English, Français, Español, Italiano, Nederlands, Polski, Русский, Türkçe , Slovenščina	English	
	Design	Sets the Home screen design	-	1, 2, 3	1	
	Colour	Background colour	-	white, black	white	
	Standby	Selects the standby mode display	-	Webasto logo, customer logo, cabin temperature bright, cabin temperature dim, display off, operating indicator, standby off	Webasto logo	
	Key tone	-	-	On, Off	On	
	°C / °F	Temperature display	-	°C, °F	°C	
Cleaning	Disables the touch screen for 30 seconds	-	-	-		

14.2.2 Parameter list, setting level 2 (Crew menu)

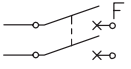


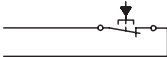
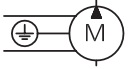
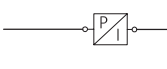
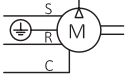
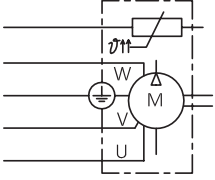
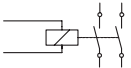
	Parameter	Meaning	Unit / parameter	Value range	Factory setting	See Page
Setting level 2	Operating mode	Changes the operating mode	-	Cooling only (F1) Heating only (F2) Auto Cooling/Heating (F3) Dehumidification (F7)	Auto Cooling/Heating (F3)	page 20
	Dehumidification cycle	Cycles per day	Number	0, 1, 2, 3	1	
		Heating time	min.	0 to 99	1	
		Cooling time	min.	0 to 99	1	
	Fault protocol	Event counter	Number	Example: 1 - 99999, A1 - A54, 1-99999, 1-99999	-	
		Fault code				
		Fault counter				
		Operating time				
	Operating values	Evaporator	°C, °F	-	-	
		Supply frequency	Hz	50 or 60	-	
Operating voltage		V	-	-		
Firmware	Firmware version	-	Example: 3.2	-		
Display settings	Save	-	-	-		
	reset	-	-	-		
System settings	Access to setting level 3 with code entry. Code entry is not required if code = 00	-	-	-		

14.2.3 Parameter list, setting level 3 (Parameter menu)

	Parameter	Meaning	Unit / parameter	Value range	Factory setting	See Page
Setting level 3	Compressor switching points	Min. switch-off temperature cooling	°C (°F)	-4 to 15 (24 to 59)	-4 °C / 25 °F	page 20
		Switch-off temperature cooling	°C (°F)	-4 to 15 (24 to 59)	-2 °C / 28 °F	
		Switch-on temperature cooling	°C (°F)	2 to 18 (36 to 64)	4 °C / 39 °F	
		Switch-off temperature heating	°C (°F)	30 to 55 (86 to 131)	52 °C / 126 °F	
		Switch-on temperature heating	°C (°F)	27 to 50 (81 to 122)	48 °C / 118 °F	
		Hysteresis	sec.	0,1 to 0,8 (0,2 to 1,4)	0,8 °C / 1,4 °F	
		First switch-on delay	sec.	01 to 200	10	
		Max. duration shortfall		000 to 999	600	
		Fan settings	Fan type	-	AC, EC, electronic silencer	
	Continuous fan operation		-	On/Off	Off	
	Fan speed 5		-	30 - 100	100 (50Hz)	
	Fan speed 4		-		100 (60Hz)	
	Fan speed 3		-	30 - 100	58 (50Hz)	
	Fan speed 2		-		69 (60Hz)	
	Fan speed 1		-	30 - 100	49 (50Hz)	
			-		60 (60Hz)	
	Further settings	Access code	-	00 = entry of access code not necessary to access setting level 3. 01 to 99 = Access code activated.	64	
		Undervoltage switch-off	V	180 - 210 (230 V) 90 - 105 (115 V)	195 (230 V) 97 (115 V)	
		Correction cabin temperature sensor K or °F	°C (°F)	-5.5 to 5.5 / -9.9 to 9.9	0	
		CAN-bus address		1 to 239	-	
		Factory setting		Reset	-	

14.3 Wiring diagrams

14.3.1 Wiring diagram, overview of symbols

Symbol	Description	Symbol	Description
	Line fuse protection		4/2-way reversing valve
	Fan		Pressure switch
	Sea water pump		sensor
	Compressor		Compressor with temperature sensor
	Relay		

14.3.2 Line fuses

Line fuse protection		Values
F1	Compressor	Max. 20 A
F2	Power supply	Max. 16 A



Note

*: Use Type K or C circuit breaker conforming to EN IEC 60898-1.

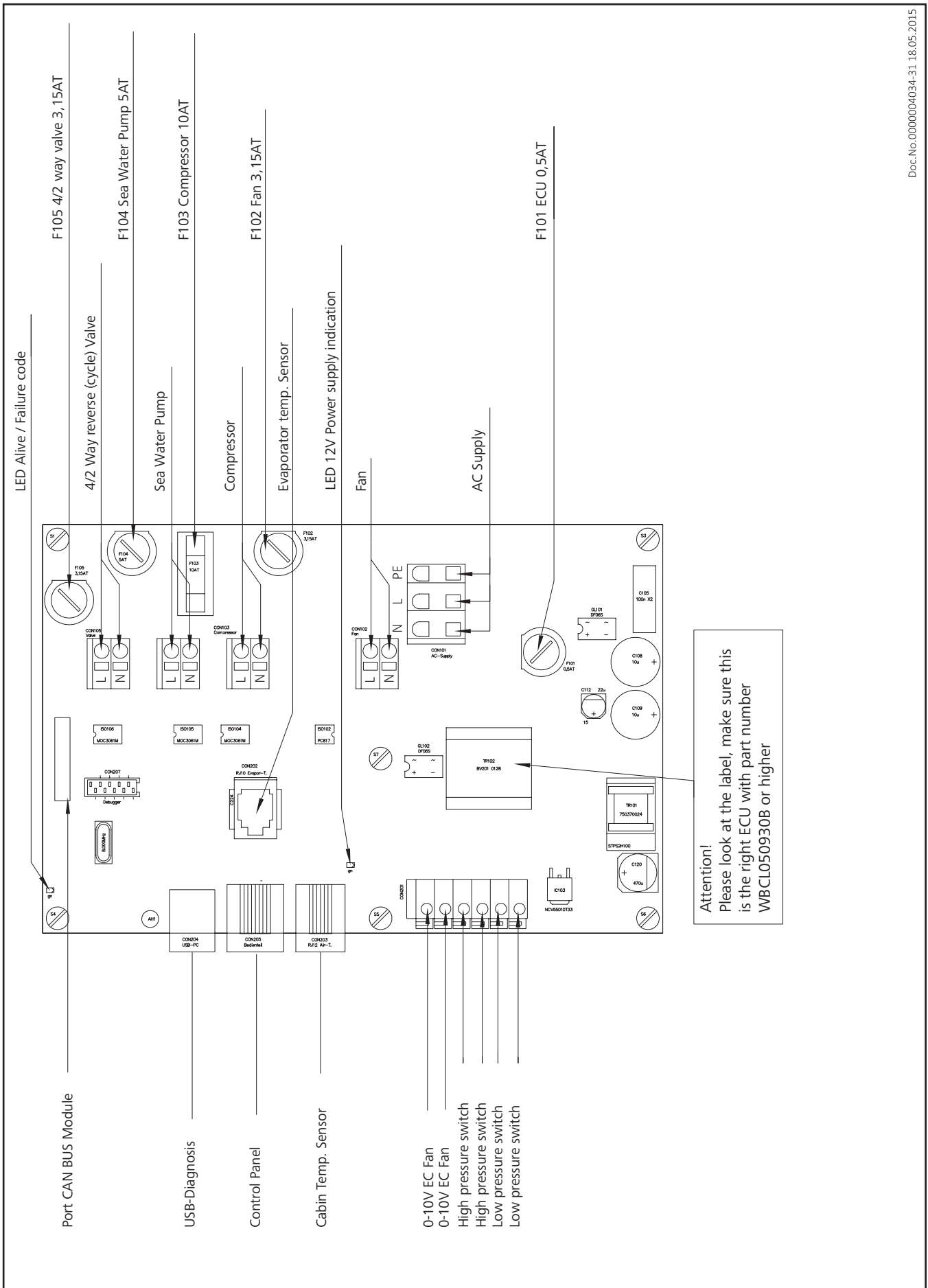


Notes

The BlueCool MyTouch control element is compatible with the BlueCool S-Series if the following two conditions are met:

- Pc-board with part number WBCL050930B or higher installed.
- Firmware version for BlueCool S-Series 3.0 or higher used.

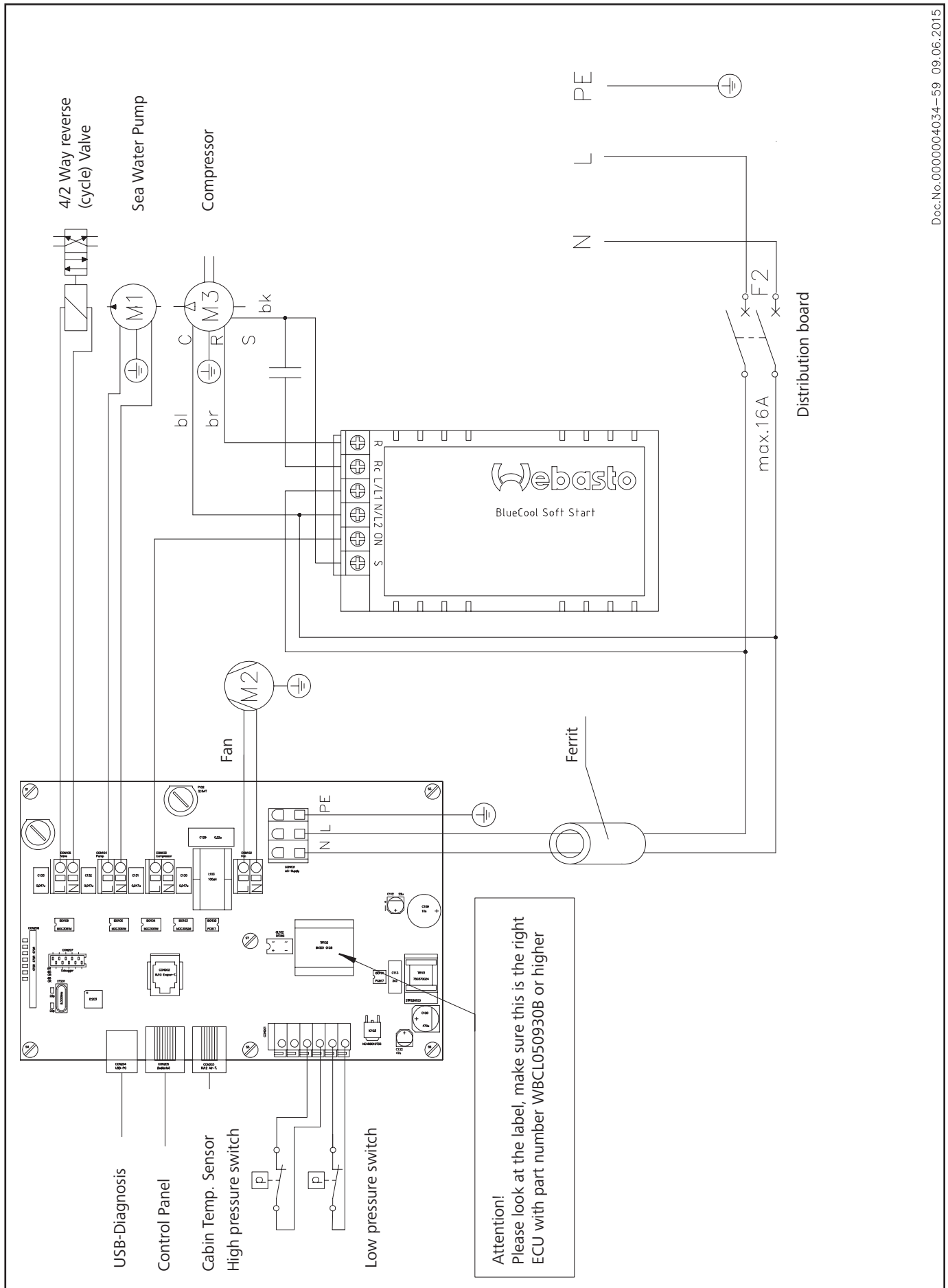
14.3.3 Layout diagram - pc-board BlueCool S-Series



Doc.No.0000004034-31.18.05.2015

Fig.21 Layout diagram - pc-board BlueCool S-Series

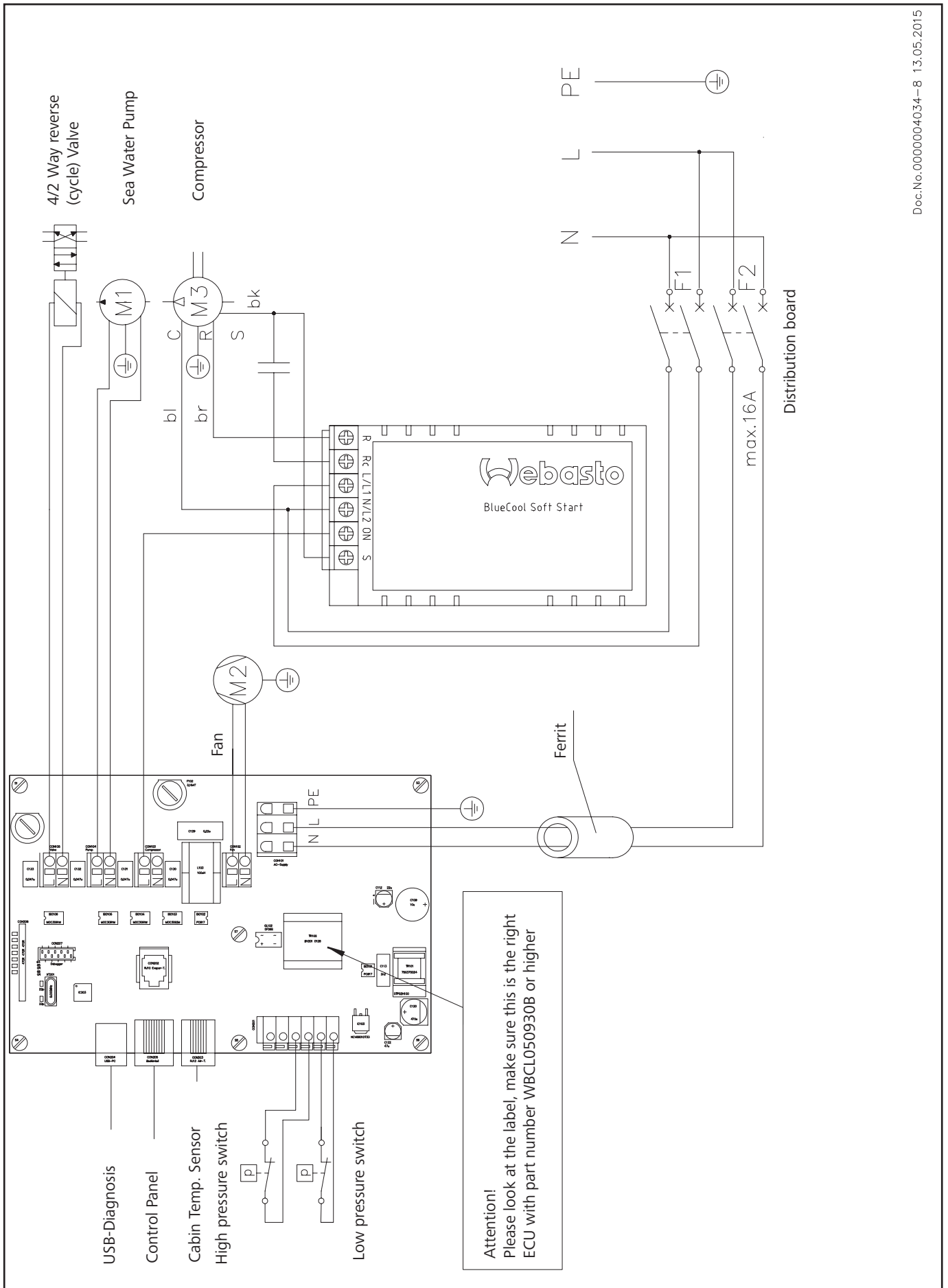
14.3.5 Wiring diagram BlueCool S-Series, S6 to S16 with soft start (230 V systems only)



Doc.No.0000004034-59 09.06.2015

Fig.23 Wiring diagram BlueCool S-Series, S6 to S16 with soft start (230 V systems only)

14.3.6 Wiring diagram BlueCool S-Series, S20 and S27 with soft start (230 V systems only)



Doc.No.0000004034-8 13.05.2015

Fig.24 Wiring diagram BlueCool S-Series, S20 and S27 with soft start (230 V systems only)

14.3.7 Wiring diagram BlueCool S-Series, several systems with one sea water pump

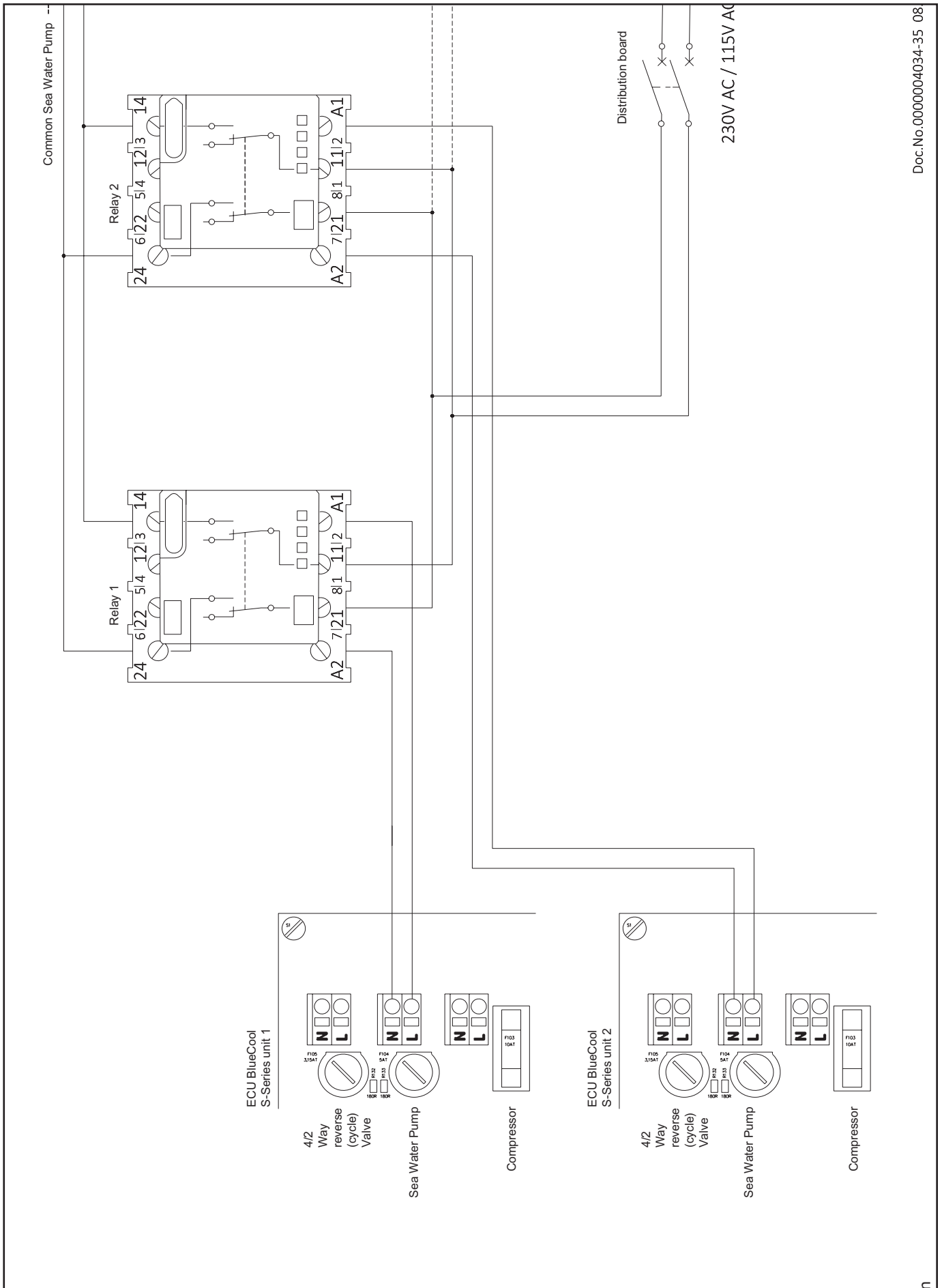


Fig.25 Wiring diagram BlueCool S-Series, several systems with one sea water pump

In multilingual versions the German language is binding.
The telephone number of each country can be found in the Webasto service centre leaflet or the website of the respective Webasto representative of your country.

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