Installation Instructions

Chilled Water Marine Air Conditioning Systems

BlueCool C-Series

English

Valid for BlueCool C-Series as of change index D (2017 ->):

Type:

C16:	**WBCL1205001F ->**	**C40:**	**WBCL1207002E ->**
C20:	**WBCL1205002E ->**	**C55:**	**WBCL1207003E ->**
C27:	**WBCL1205003E ->**	**C81:**	**WBCL1207004E ->**
C32:	**WBCL1207001F ->**	**C108:**	**WBCL1207005E ->**

WARNING: Cancer and Reproductive Harm
www.P65Warnings.ca.gov

Table of Content

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 C-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.

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

2 Safety

2.1 Intended use

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

The BlueCool C-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 C-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 air handler.

- ▶ BlueCool C-Series and connected air handlers should only be operated in the final installed position.

WARNING

Ignition of surrounding gases or highly flammable liquids by sparking of the BlueCool C-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 cold water pipes 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

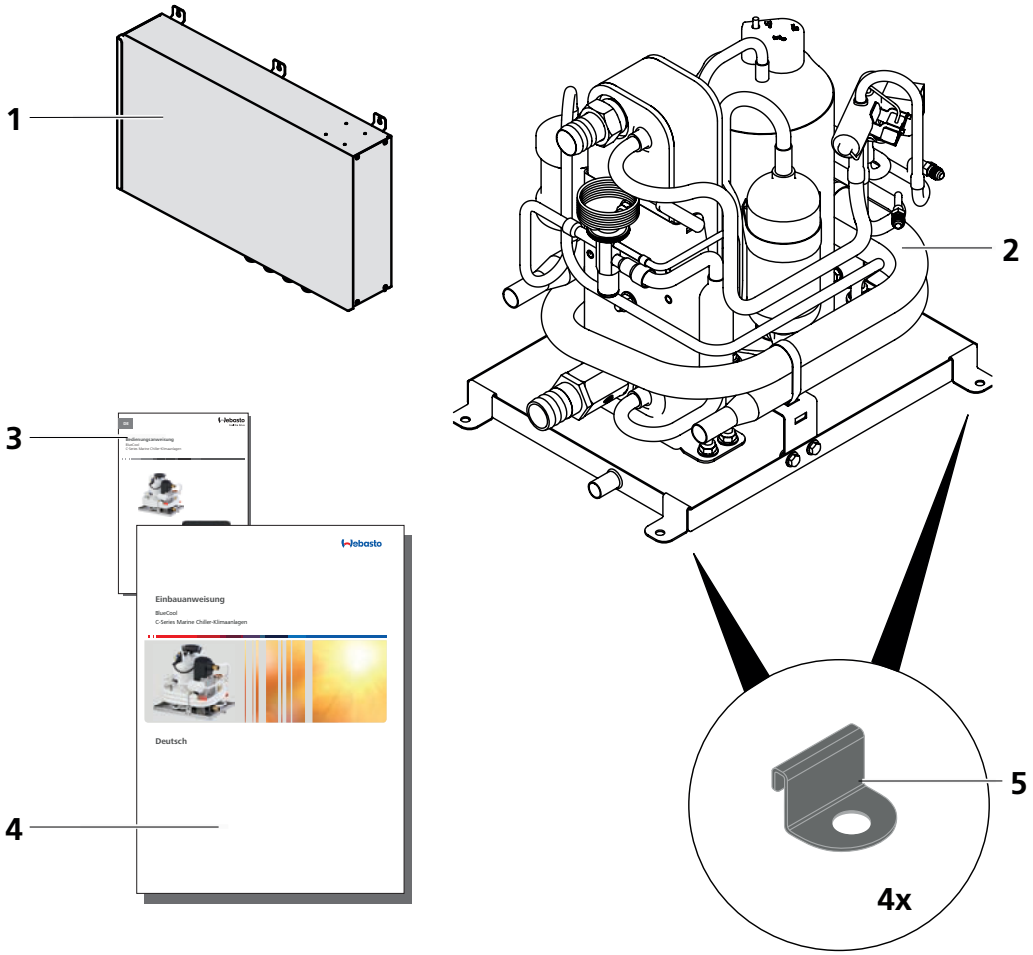
Danger posed by live parts

- ▶ 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 C-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



1 Electrical box
2 Chiller unit BlueCool C-Series (Example C16M)
3 Operating instructions
4 Technical documentation on DVD
5 Retaining bracket (only for mono-compressor systems)

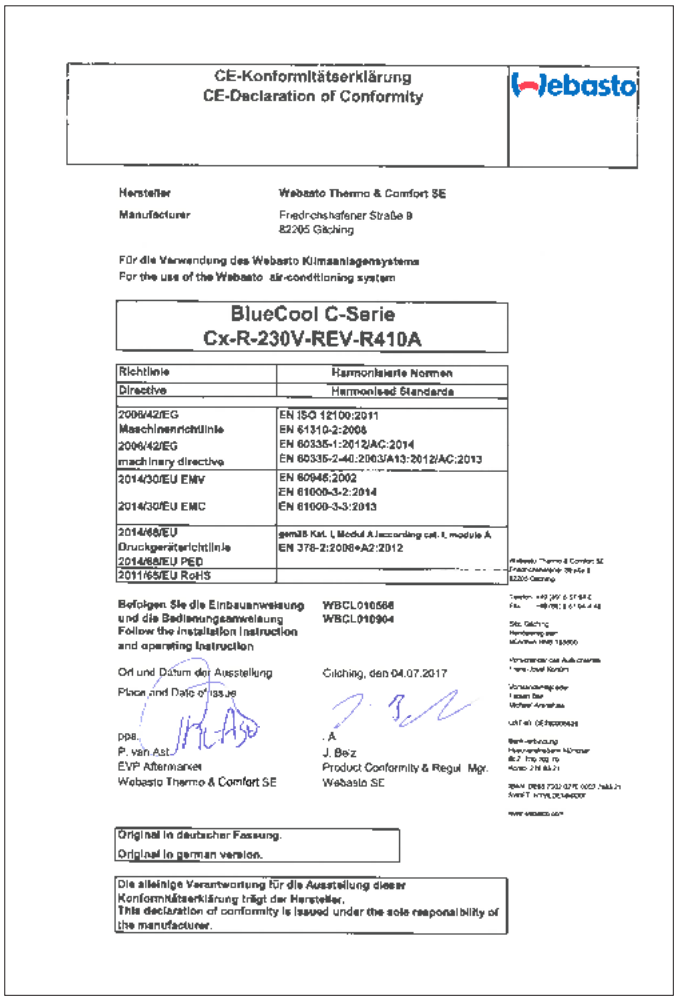
Fig. 1 Scope of delivery, example BlueCool C-Series chiller unit

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.

2014/68/EU	Pressure Equipment Directive in accordance with DIN EN 387
2014/30/EU	Electromagnetic compatibility (EMC)
2006/42/EC	Machine directive
2011/65/EU	RoHS



CE-Konformitätserklärung
CE-Declaration of Conformity

Webasto

Hersteller / Manufacturer: Webasto Thermo & Comfort SE, Friedrichshafener Straße 9, 82205 Gilching

Für die Verwendung des Webasto Klimaanlagensystems
For the use of the Webasto air-conditioning system

BlueCool C-Serie
Cx-R-230V-REV-R410A

Richtlinie / Directive	Harmonisierte Normen / Harmonised Standards
2006/42/EG Maschinenrichtlinie 2006/42/EG machinary directive	EN ISO 12100:2011 EN 61310-2:2008 EN 60335-1:2012/AC:2014 EN 60335-2-40:2003/A13:2012/AC:2013
2014/30/EU EMV 2014/30/EU EMC	EN 60945:2002 EN 61000-3-2:2014 EN 61000-3-3:2013
2014/68/EU Druckgeräterichtlinie 2014/68/EU PED	gemäß Kat. I, Modul A / according cat. I, module A EN 378-2:2008+A2:2012
2011/65/EU RoHS	

Befolgen Sie die Einbauanweisung und die Bedienungsanweisung
Follow the installation instruction and operating instruction
WBCL010566
WBCL010904

Ort und Datum der Ausstellung / Place and Date of issue: Gilching, den 04.07.2017

ppa. P. van Ast, EVP Aftermarket, Webasto Thermo & Comfort SE
i. A. J. Betz, Product Conformity & Regul. Mgr. Webasto SE

Original in deutscher Fassung.
Original in german version.

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

Fig. 2 Declaration of conformity

4.2 Variants

Chiller unit:

- **Mono:**

C16 M-R-230V-REV-R410a

C20 M-R-230V-REV-R410a

C27 M-R-230V-REV-R410a

- **Twin:**

C32 T-R-230V-REV-R410a

C40 T-R-230V-REV-R410a

C55 T-R-230V-REV-R410a

- **Triple:**

C81 R-R-230V-REV-R410a

- **Quattro:**

C108 Q-R-230V-REV-R410a

4.3 Type label

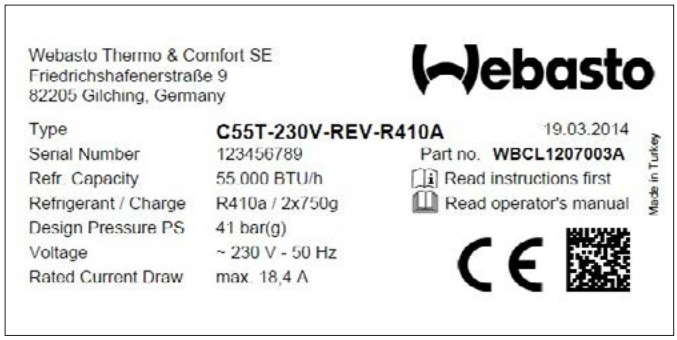


Fig. 3 Example of type label

The type label is located next to the electrical connection at the rear of the device (see Fig. 4).

You will find the output, serial number and registration data there.

Example of type label, see 4.4.

4.4 Unit description

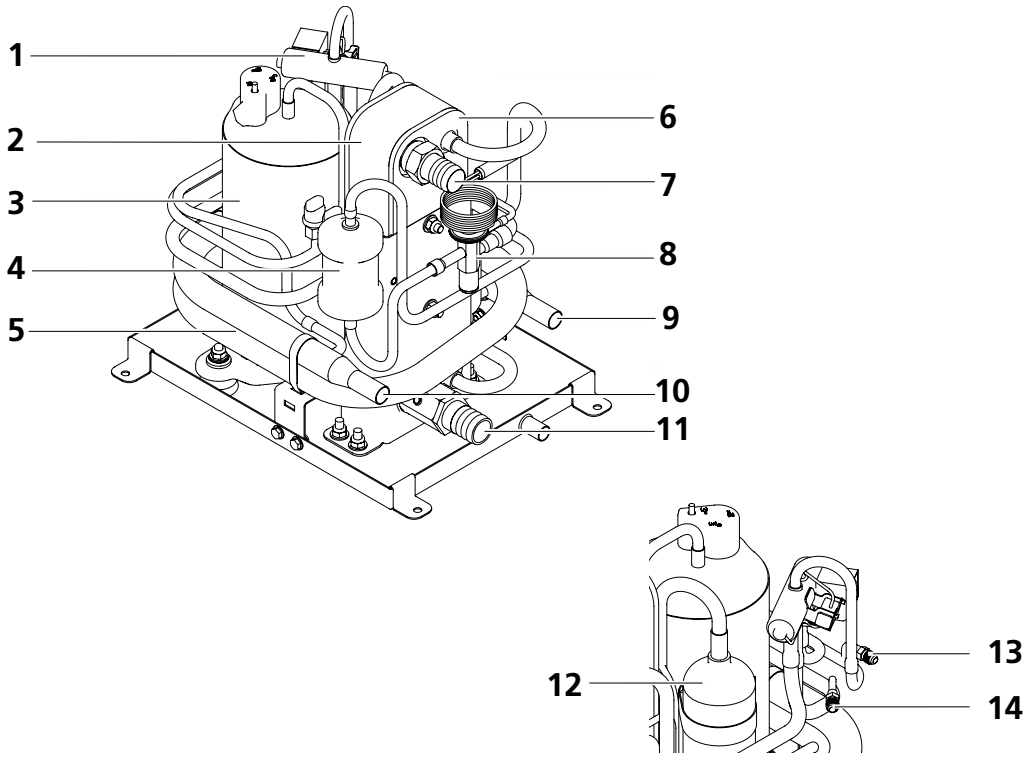


Fig. 4 Chiller unit BlueCool C-Series

1 4/2-way reverse valve (cooling / heating)
2 Low-pressure switch and high-pressure switch (behind evaporator)
3 Compressor unit
4 Strainer
5 Cupronickel condenser
6 Evaporator
7 Cold water inlet
8 Expansion valve
9 Sea water inlet
10 Sea water outlet
11 Cold water outlet
12 Collector
13 High pressure service port
14 Service port, Low pressure

4.4.1 General

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

- Evaporator (liquid heat exchanger)

Refrigerant vaporises at low pressure and a temperature below the cold water temperature, thus absorbing heat from the cold water circuit 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 (thermostatic expansion valve)

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

4.4.2 Cooling operation mode

Heat transfer in Webasto BlueCool C-Series air-conditioning systems takes place in a two-stage process. Circulating cold water (a water/glycol mixture) serves as the heat transfer medium.

In cooling mode, the cooling water flows in a closed circuit from the BlueCool C-Series air-conditioning system to a series of air handlers located in various cabins. Heat is absorb from the room air. The cooled air is blown into the room by the fan of the air handler. The room air is cooled by approx. 15°K. The heated cold water is routed through piping systems to the BlueCool C-Series chiller unit and gives off the heat via an evaporator (liquid heat exchanger) to the refrigerant circuit. The supplied heat causes the refrigerant to evaporate. 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 refrigerant is evapo-

rated and superheated again, thus absorbing heat from the cold water. The cooled cold water is now fed again to the air handler, thus closing the cooling circuit.

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 C-Series air-conditioning systems are designed for maximum sea water temperatures of 35 °C.

4.4.3 Heating operation mode

BlueCool C-Series air-conditioning systems that are designed as reverse cycle systems can also produce heat. A 4/2-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 evaporator now becomes the condenser and gives off the condensation heat to the cold water and heats it up to 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. In this case we recommend you use diesel-operated Webasto water heaters that can be easily integrated in the cooling water circuit. Refer to Webasto BlueComfort Premium systems for more details. This will make heating mode completely independent of adverse ambient conditions.

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 C-Series in rooms with highly flammable liquids or gases.

BlueCool C-Series chiller units can be installed in any suitable location. The chiller unit is normally installed in the engine room or other technical areas. Noise reduction can be achieved by insulating the area around the chiller unit. The BlueCool C-Series chiller unit is internally cooled so that ventilation is therefore unnecessary.

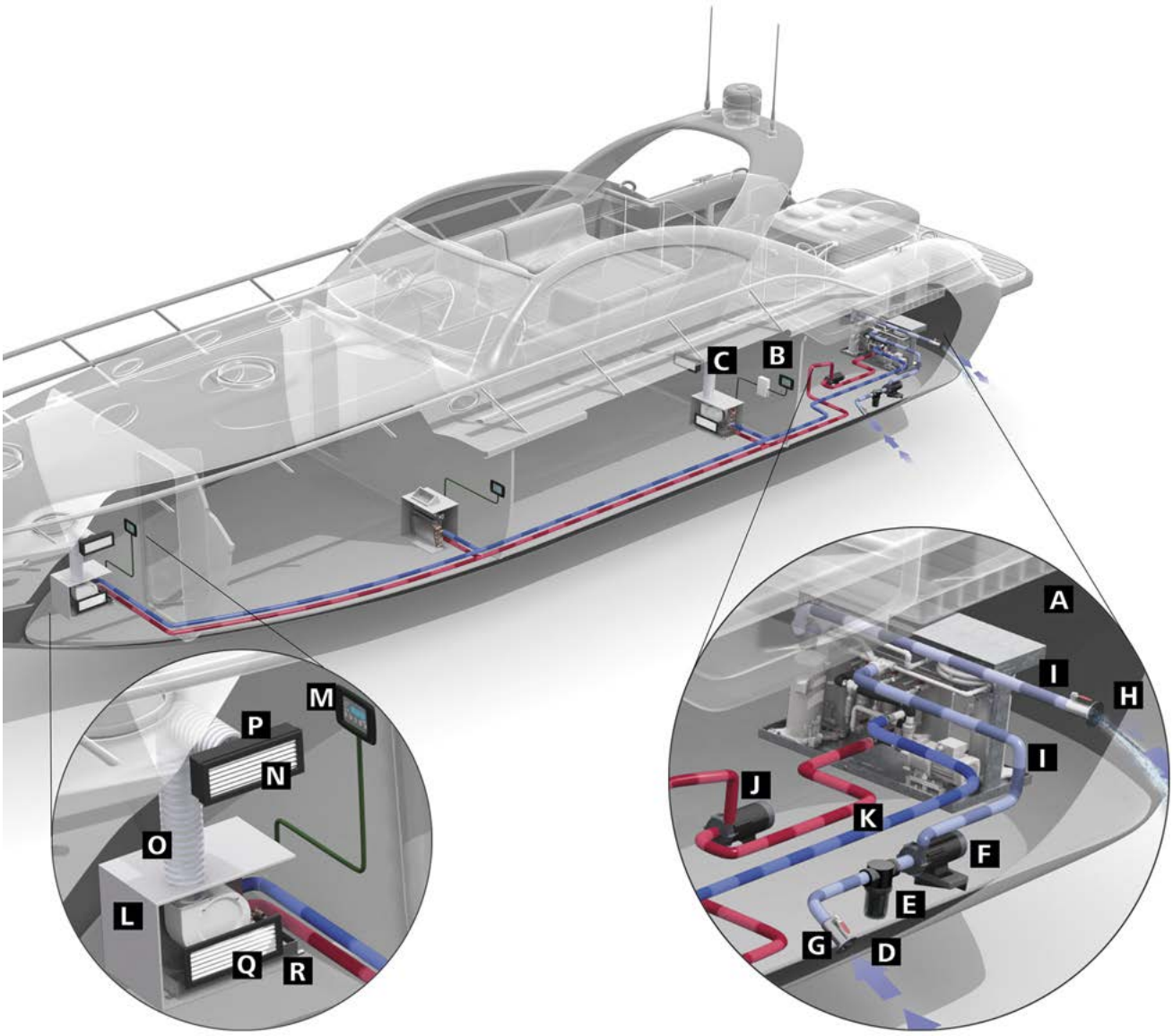
5.2.1 Requirements for the installation location:

- Sufficient space must be available to ensure access to the cold water connections, condensed-water drain and electrical connections.
  See “13 Technical Data” on page 38 and “13.1 Dimensions and minimum distances” on page 39.
- The system must be accessible for service and maintenance purposes.
- The BlueCool C-Series must be mounted on an even, horizontal surface.
- Since operation of the BlueCool C-Series leads to condensation, two drain lines must be provided on the condensed-water tray.
- Do not directly expose the chiller unit to splash water or overwash.
- The BlueCool C-Series chiller units are approved for a maximum ambient temperature of 60 °C.
- To avoid local ambient temperatures in excess of 60 °C, the chiller 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 C-Series air-conditioning system.

In addition to the BlueCool C-Series, a further 3 air handlers are shown in this installation example for heating and cooling the respective cabins.



A BlueCool chiller unit

B Control element (BlueCool MyTouch)

C Control element connection cable

D Sea water inlet

E Sea water strainer

F Sea water pump

G Sea valve

H Sea water outlet

I Sea water line

J Cold water pump

K Insulated cold water line

L Air handler

M Cabin control panel (BlueCool MyTouch with connection cable, temperature sensor and electrical box)

N Air outlet grille

O Flexible air duct

P Transition box

Q Air inlet grille

R Condensed-water drain line

Fig.5 Installation example

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.

- ▶ Lift the unit only at the lifting eyes on the stainless steel frame, cupronickel condenser or the condensed-water tray.
- ▶ Only use lifting gear with a lifting tackle for heavy systems. See Fig.6.

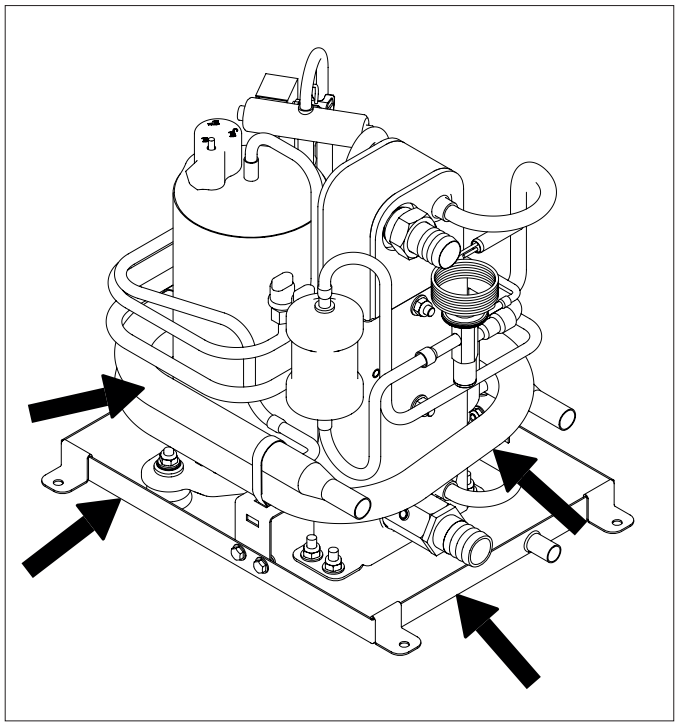


Fig.6 Transport the unit

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.

The cold condensation water in the condensed-water tray can also cool down the condensed-water tray thus forming condensation on the outside or underside of the condensed-water tray. For this reason, do not place the chiller unit on a moisture-sensitive surface.

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.
- For mono-chiller units, use the supplied retaining brackets for this purpose.

- ▶ Lift unit and position it at the installation location.
- ▶ Secure the unit on the condensed-water tray to the mounting surface.

Note

If vibration dampers are used, they are installed between the condensed-water tray and the mounting surface. This will increase the installation height of the system. Observe the information provided in the vibration damper installation instructions.

5.6 Installing the condensed-water drain line

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.

Route the condensed-water drain line with a downhill slope and without water pockets to ensure sufficient emptying of the condensed-water tray and to prevent damage by backed-up condensed water.

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.

5.7 Installing the sea water circuit

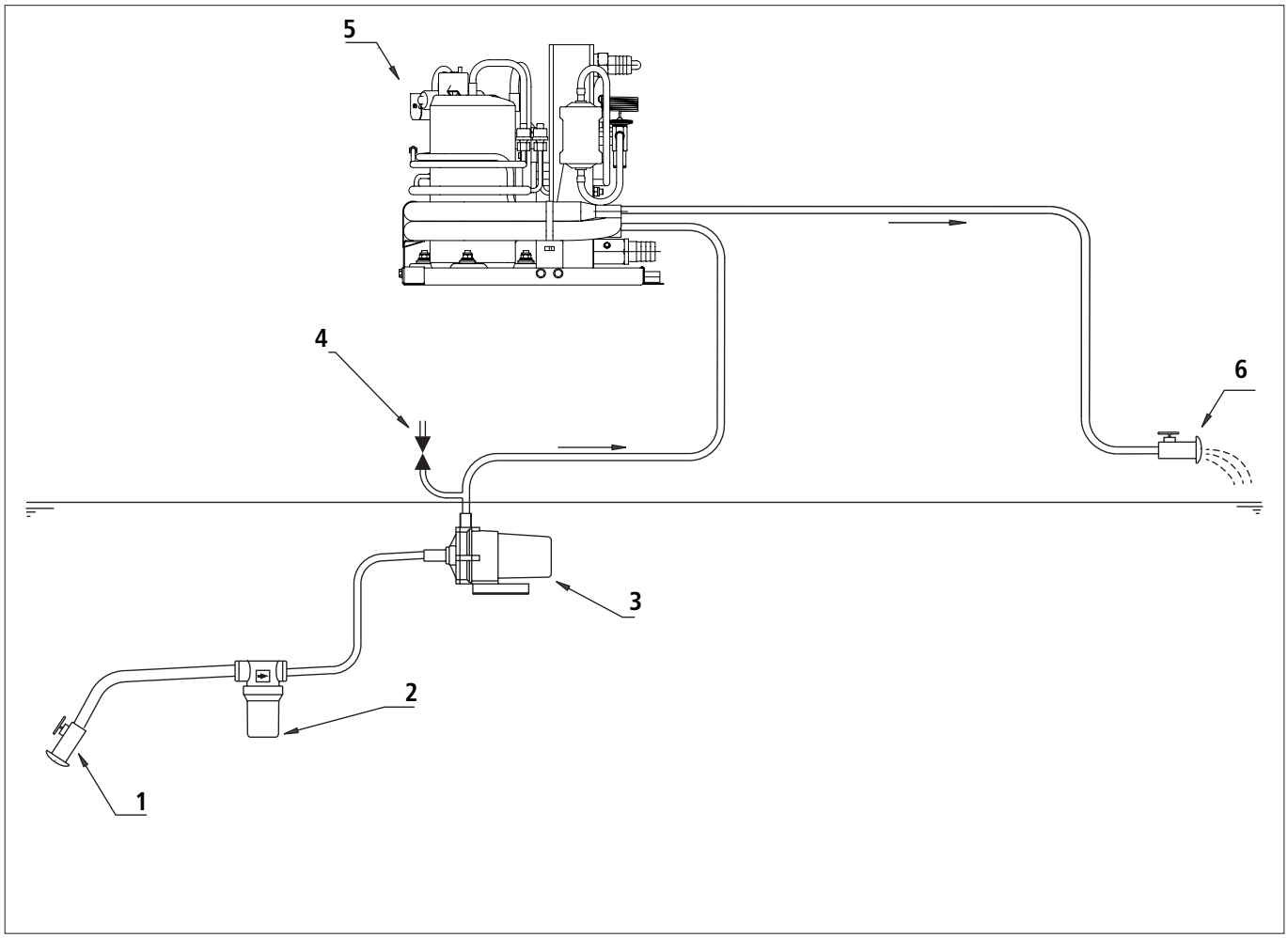


Fig.7 Installation example

1 Through-hull fitting with sea valve
2 Sea water strainer
3 Sea water pump
4 Bleeding
5 Chiller unit
6 Sea water outlet

Notes

The sea water components are installed continuously ascending from the through-hull fitting via the strainer and pump up to the chiller unit. 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.

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.

It is recommended that each BlueCool C-Series chiller unit is supplied by its own separate sea water pump in order to achieve the minimum required sea water flow rate.

If, due to the installation situation, several chiller units are connected to form one overall system, each chiller unit should have its own separate sea water outlet in order to be able to check the minimum flow rate of each unit. If necessary, throttles that reduce the cross section should be used to adjust the flow rates.

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 column 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. Do not confuse this with the position of the pump below the water line.

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.
- 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 C-Series chiller 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 chiller unit.

▶ Install pressure line(s) to the chiller unit and to the sea water outlet.

5.8 Installing the cold water circuit

5.8.1 System example

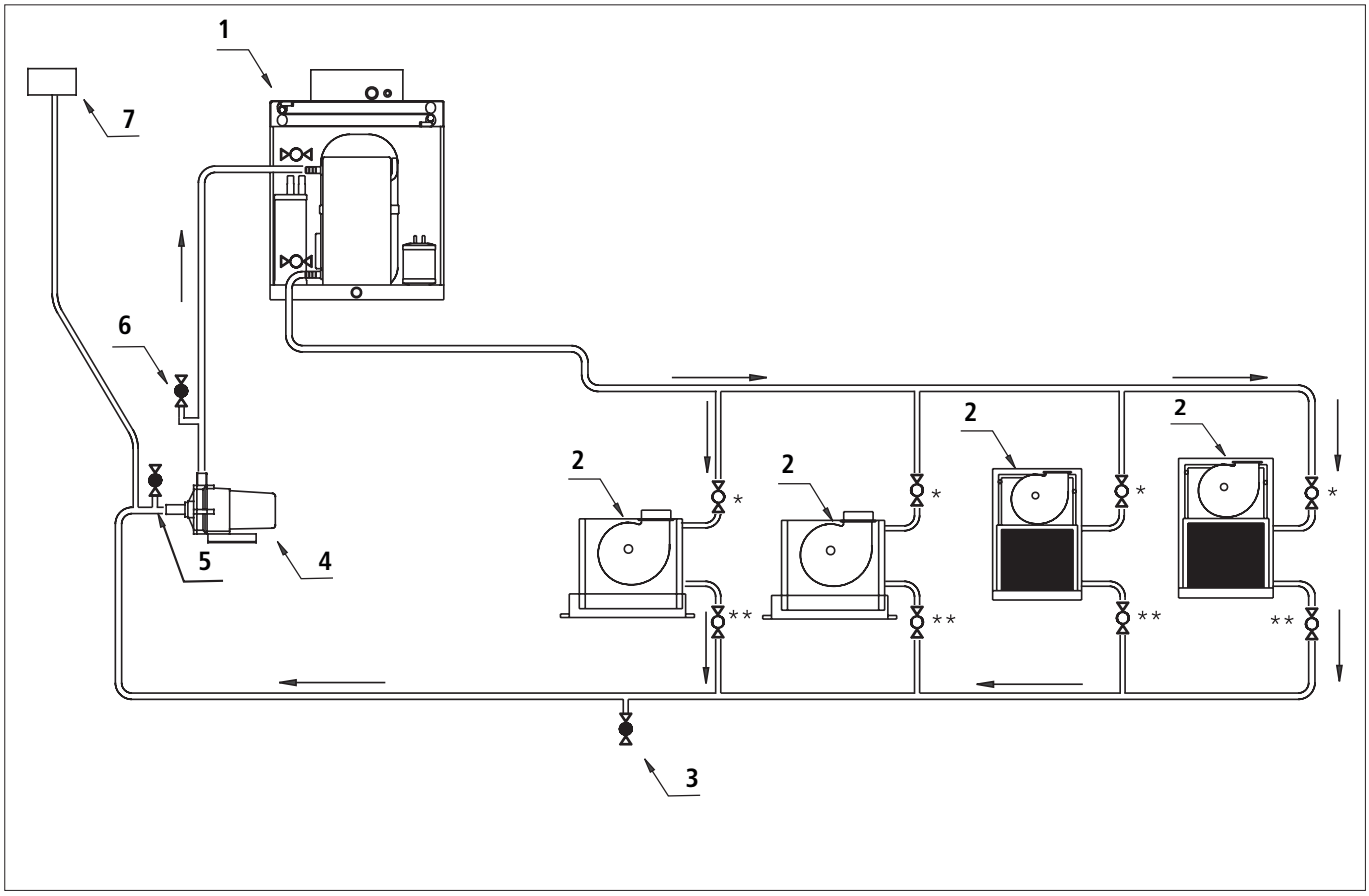


Fig.8 Example of cold water circuit - open system: 1 chiller unit and 4 air handlers

1 Chiller unit
2 Air handler
3 Drain valve
4 Cold water pump
5 Filler connection (T-piece with shut-off valve)
6 Bleeding
7 Expansion tank

For maintenance purposes we recommend the installation of a shut-off valve at the inlet (*) and outlet (**) of each air handler.

The line leading to the expansion tank can be used to fill the circuit if it rises over its entire length (no downward section at any point). Otherwise, use the filler connection and temporarily fit a filler hose with filler reservoir (the filler reservoir must be positioned at the highest point and above the highest air handler).

Use transparent filler hose with a minimum inside diameter of 15 mm.

A drain valve at the lowest point in the cold water circuit allows the circuit to be completely emptied after an initial pressure test has been conducted or when it is uncertain whether the cold water contains the necessary percentage of glycol (antifreeze).

5.8.2 Open or closed system

The cold water circuit can be designed either as an open system with a non-pressurised expansion tank or as a closed, pressurised system with a diaphragm expansion tank.

Note

Webasto recommends using a pressurised system wherever possible. The advantage of this system is that the air intake into the system is low during operation, resulting in fewer air bubbles in the system in the long-term which has a positive effect on the overall performance. This also renders the use of an expansion tank unnecessary.

In an open system, the expansion tank must be the highest point in the circuit. The possible angle of heel while sailing must be taken into account. Expansion tanks should always be connected on the intake side of the cold water pump.

5.8.3 Antifreeze

Make sure that there is sufficient antifreeze in the cold water circuit. The antifreeze prevents the evaporator from freezing during operation. The antifreeze additionally makes the boat winterproof

without having to drain the cold water circuit.

Note

The water/glycol mix ratio should be 25% to 40% glycol and 75% to 60% fresh water. A lower glycol percentage will in all probability result in the evaporator freezing and breaking down in cooling mode, thus rendering any product warranty claims with Webasto null and void.

If there are leaks in the cold water system, fresh water alone should not be used to top up the system as this will dilute the mix ratio and frost protection will no longer be guaranteed.

Increase the glycol level accordingly at particularly low ambient temperatures in winter in order to prevent the lines from freezing.

Commercially available glycol such as used in motor vehicles can be used for this purpose.

5.8.4 Flow rates

The cold water circuit of the BlueCool C-Series operates with an average temperature difference between inflow and return of approx. 5 K (e.g. inflow temperature 7 °C and return temperature 12 °C). However, the actual temperature difference depends on further influencing factors such as sea water temperature for example.

Due to this minimal temperature difference a considerably higher flow rate is required than in domestic heating applications for instance.

To check the flow rate it is recommended to install pressure gauges on the intake and pressure side of the pump. The effective flow rate can then be determined based on the derived pressure difference and the pump characteristic.

Note

To achieve the full cooling capacity and trouble-free operation, the specified minimum flow rates must be maintained (see Section "13 Technical Data" on page 38).

5.8.5 Selection of cold water pump

The pump characteristics facilitate the selection and sizing of the cold water pump based on the pressure losses to be expected in the overall 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 column and represents the pressure drop between the pump inlet and outlet. This pressure drop corresponds to the total pressure loss in the cold water system. Do not confuse this with the height difference from the pump up to the highest air handler.

The minimum volumetric cold water flow rate through the air-conditioning system must be maintained at all times. A temperature difference of 5 K between the colder water inlet and outlet of the chiller unit in cooling mode indicates that the volumetric cold water flow rate is adequate. Greater temperature differences are an indication that the volumetric cold water flow rate it too low.

5.8.6 Cold water pump installation

- ▶ Install cold water pump.
- ▶ Make sure that the pump is accessible for maintenance work.
- ▶ Fit a T-piece to the inlet of the pump for filling purposes.
- ▶ Install a vent directly after the pump outlet. This especially applies to the pumps WB1000/1500 and 2000. The pumps WB2500 and higher do not require a vent to maintain smooth operation.
- ▶ Fit pressure gauges or pressure gauge connections on the intake and pressure side of the pump.

5.8.7 Installing the cold water lines

Notes

- Bear in mind that for each branch the sum of the nominal cross sections of the branches is not less than the nominal cross section of the supply.
- Only use reducers when this serves the specific distribution of the cold water flow.
- The cold water lines must be installed as follows:
  - as short as possible
  - kink-free
  - protected against rubbing.
- Avoid 90° fittings wherever possible as they create a considerable pressure loss, thus unnecessarily reducing the cold water flow. It is preferable to install the line in a kink-free bend. SeeFig.9
- If fittings are required, wherever possible use fittings with a generous radius as they offer a lower pressure loss. The pressure loss is considerably higher in 90° fittings with a tight radius. If pipe bends with a wide radius are not available use two 45° bends with a tight radius fitted one after the other.

In addition to the pump output, the effective flow rate in the cold water circuit greatly depends on the resistance to flow in the entire system. Each component, e.g. pipes, hoses, adapters, fittings, distributors, air handlers, cross section reducers, etc. offers resistance to flow. Essentially, resistance to flow or pressure loss in the entire system should be kept as low as possible in order to maintain the minimum required flow rate.

Fig.9 Use pipe bends with large radius

Rigid plastic pipes and/or flexible, reinforced hoses can be used as cold water lines.

Primary lines should at least have the same diameter as the connections of the BlueCool C-Series chiller unit. Secondary lines used as branches to air handlers should have the same diameter as the connections of the air handlers.

Y-pieces should preferably be used to make a secondary branch, See Fig.10.

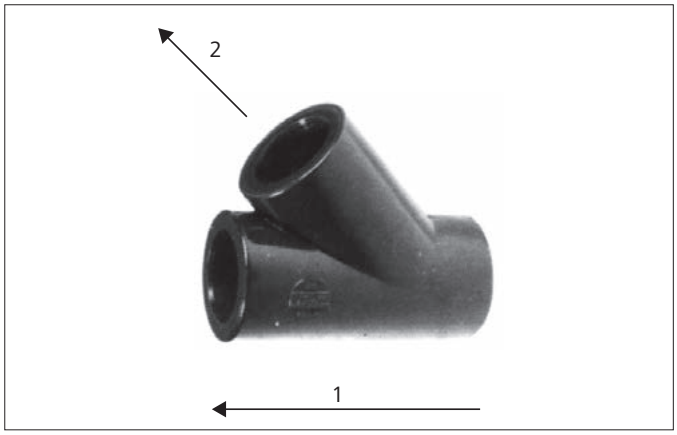


Fig.10 Y-junction

1 Cold water flow, main line
2 Cold water flow, secondary line

If no Y-pieces are available, make sure that the diameter of the secondary line is reduced only after the T-branch in order to keep the inlet diameter as large as possible.

SeeFig.11

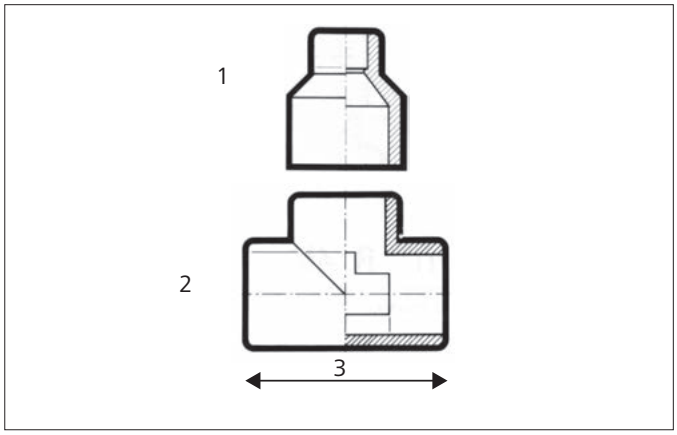


Fig.11 T-piece

1 Cold water flow, main line
2 T-piece
3 Reducer pipe

▶ Install cold water lines as shown in Fig.8 or Fig.23.

5.8.8 Insulation

CAUTION

Water damage can occur. Danger of water damage to furniture, units etc. as a result of condensation.

Adequately insulate lines of the cold water circuit.

Condensation forms on the lines of the cold water circuit as their temperature in normal operation is far below the dew point temperature of the ambient air.

The condensation can settle unchecked and cause damage to furniture, installed equipment etc.

Make sure that all lines of the cold water circuit are adequately insulated to prevent condensation forming.

- For insulation purposes, only use closed-cell foam materials that are suitable for use in low-temperature applications.
- The foam material insulation should be at least 9 mm thick.
- Do not use insulation with an adhered longitudinal joint as this joint generally detaches over time.
- When fitting the insulated pipes make sure that the insulation is not pinched.

5.8.9 Cold water temperature sensors

Note

To ensure the system operates satisfactorily, the cold water temperature sensors pre-installed at the factory must be left in their installed positions. They control the cold water circuit and prevent the evaporator from freezing.

Tampering with the cold water temperature sensors fitted at the factory will render any product warranty claims with Webasto null and void.

5.8.10 Installing the air handlers

The selection, installation and setting of the air handlers is carried out in accordance with the separate Installation Instructions enclosed with the air handlers.

6 Electrical Connections

6.1 General

CAUTION

Connection of electrical system carries 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 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.

Note

Operation and temperature sensing:
The BlueCool MyTouch, the connection cable to the control element and the cabin temperature sensor do not form part of the scope of delivery and should be ordered separately.

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

In addition to the power supply for the pc board, a separate power supply must be provided for each compressor, the sea water pump and the cold water pump. This means, for example, a total of 7 power supply lines, which must be individually fuse-protected, is required for a BlueCool C-Series system with 4 compressors.

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 C-Series can be found in Chapter "13 Technical Data" on page 38.

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 "13 Technical Data" on page 38 and Section "14.3.2 Line fuses" on page 43. 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 38. Make sure that the voltage, frequency and number of phases match the data of the type used.

6.2 Installing the electrical box

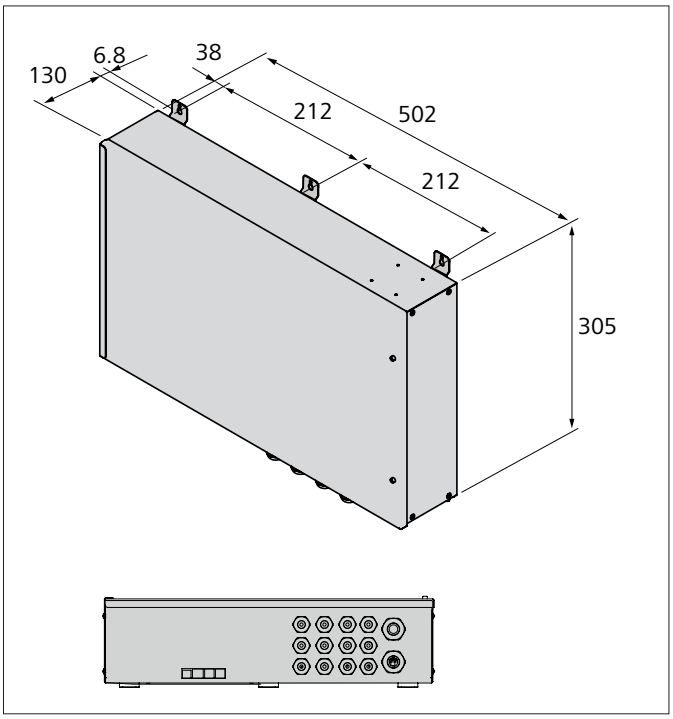


Fig.12 Electrical box dimensions (Type C16 to C55)

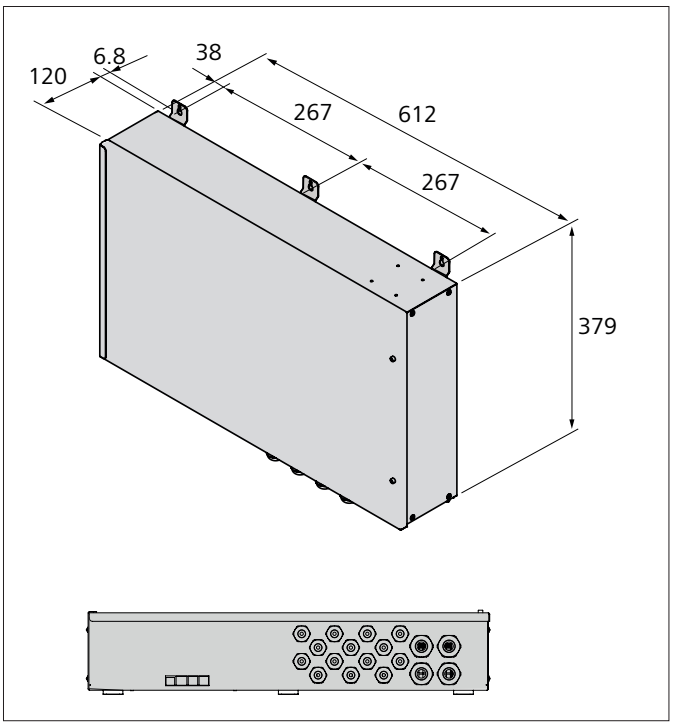


Fig.13 Electrical box dimensions (Type C81 and C108)

Note

Make sure that the maximum permissible ambient temperature of 60 °C is not exceeded.

- If the air handler is connected to the electrical box for the chiller unit, no further electrical box is needed for the air handler.
- An additional electrical box is required when the air handler is installed remotely. See BlueCool A-Series air handler installation instructions.

Note

Chiller unit **with** automatic mode:

If the chiller unit will be operated in automatic mode (F3 or F4, see Chapter "7.6.6 Screen settings" on page 23), the following installation is required:

- Connect the air handler(s) and the cabin temperature sensor for the reference cabin to the electrical box for the chiller unit.
- Set the screen settings to "Chiller unit with cabin control (Yes)"; see Chapters "7.6.6 Screen settings" on page 23 and "7.2 Home screen and symbols" on page 20.

Chiller unit **without** automatic mode:

If the chiller unit is to be operated in manual operating mode (F1, F2 or F5, see Chapter "7.6.1 Operating modes" on page 23), there is no need to connect an air handler and cabin temperature sensor to the electrical box for the chiller unit.

Set the screen settings to "Chiller unit with cabin control (No)"; see Chapters "7.6.6 Screen settings" on page 23 and "7.3 Chiller unit Home screen without cabin control" on page 22

The Operating Modes menu will then no longer display the options "Automatic toggling between cooling and heating F3" (via reverse heating operation) and "Automatic toggling between cooling and heating F4" (via external diesel heater); see Chapter "7.6.1 Operating modes" on page 23.

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 the chiller unit

Note

Always refer to the wiring diagrams.

See "14.3 Wiring diagrams" on page 43.

The BlueCool C-Series chiller unit has a number of pre-installed electrical connections.

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 43. Make sure that the phase and zero conductors are installed correctly.

6.5 Installing the BlueCool MyTouch control element

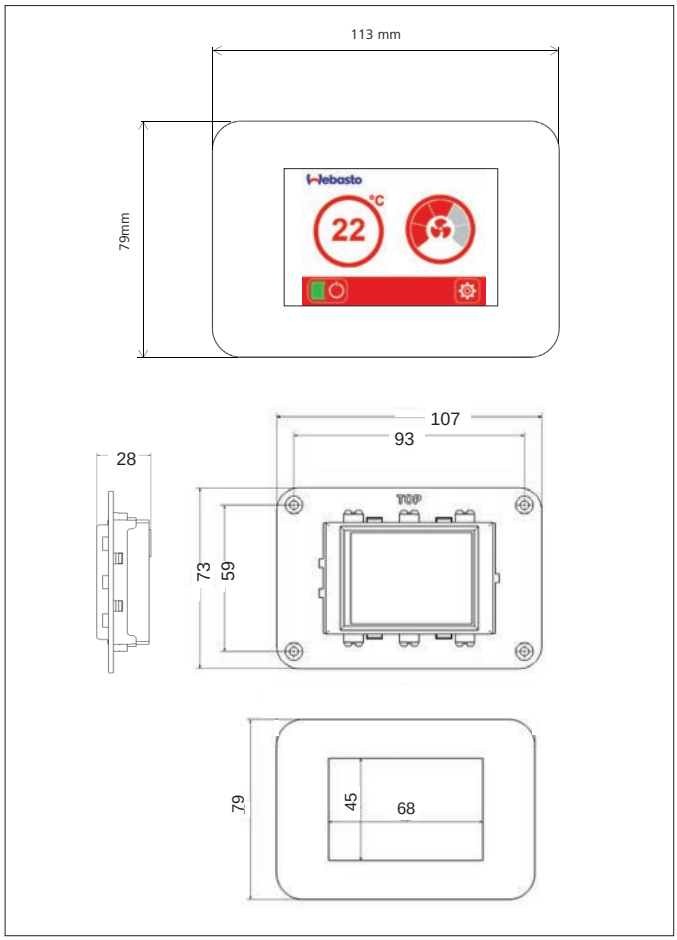


Fig.14 Installation BlueCool MyTouch

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.14.

▶ 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 position the cabin temperature sensor for the chiller unit in the immediate vicinity of an outlet air grille.
- If the chiller unit is not to be operated in automatic mode (F3 or F4, see Chapter "7.6.1 Operating modes" on page 23), there is no need to connect a cabin temperature sensor to the chiller unit pc-board.
  Set the screen settings to "Chiller unit with cabin control (No)"; see Chapters „7.6.6 Screen settings" on page 23 and „7.3 Chiller unit Home screen without cabin control" on page 22. The fault message "A09 Cabin temperature sensor" is then suppressed and the standard Home screen is replaced by the Home screen for the chiller unit without cabin control. (Chapter „7.3 Chiller unit Home screen without cabin control" on page 22). The Operating Modes menu will then no longer display the options "Automatic toggling between cooling and heating F3" (via reverse heating operation) and "Automatic toggling between cooling and heating F4" (via external diesel heater); see Chapter „7.6.1 Operating modes" on page 23.

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 from the air handler in the cabin, 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.
Type C16 to C55: see Fig.12
Type C81 and C108: see Fig.13.

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 C-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:

http://dealers.webasto.com

7 Operation

7.1 Description

The BlueCool MyTouch is the standard control element for the BlueCool C-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 “7.5 Setting level 1 (Passenger menu)” on page 22.

Air handlers are connected to the chiller unit

If air handlers are connected to the chiller unit, you should select “Chiller unit with cabin control - Yes”. See “7.6.6 Screen settings” on page 23.

In such cases, using the MyTouch control element, the chiller unit and the temperature in the cab can be controlled.

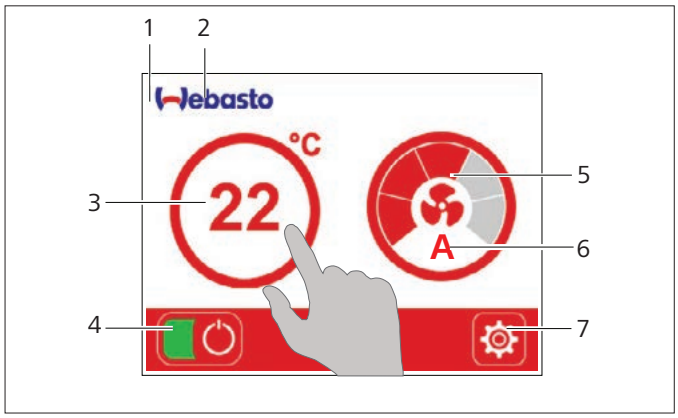


Fig.15 Design 1

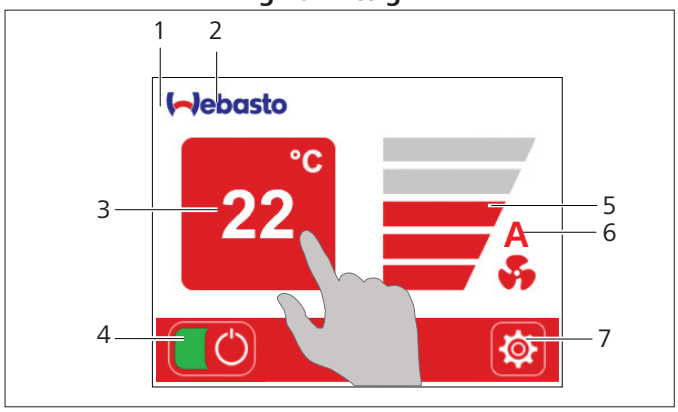


Fig.16 Design 2

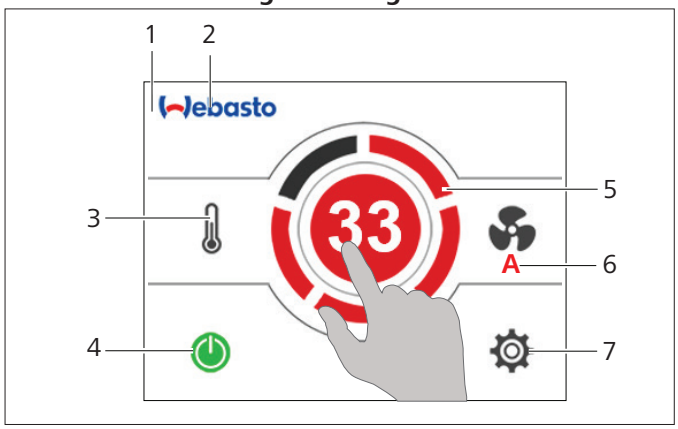


Fig.17 Design 3

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	Webasto	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	2	Parameter value
15		Select
16		Home screen
17		Scroll up
18		Scroll down
21	1 2 3 4 5 6 7 8 9 0 clear	Keypad
22		Display selection

Fig.18 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 chiller unit and the connected air handler in steps and then assumes normal operation. The control element now shows the current temperature where the temperature sensor of the chiller 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 chiller 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.

If the cold water temperature is higher (cooling) or lower (heating) than the cabin temperature, status message BA11 is displayed and the fan will not yet be in operation.

In cooling mode, the cold water temperature is significantly below 15 °C and above 40 °C in heating mode. The current cold water temperature at the outlet of the BlueCool C-Series can be requested in setting level 2 (crew menu).

See Chapter “7.6 Setting level 2 (Crew menu)” on page 23.

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 Chiller unit Home screen without cabin control

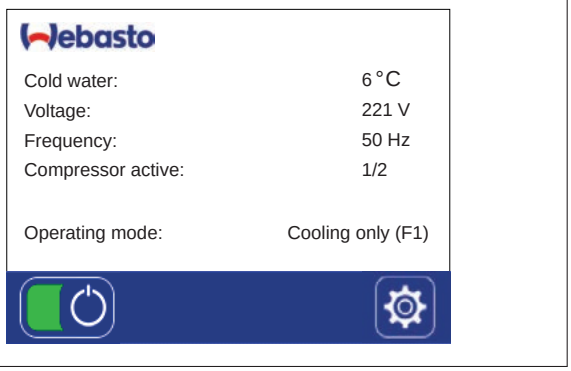


Fig.19 Example Chiller unit Home screen without cabin control

If the BlueCool C-Series chiller unit will be operated without any connected air handlers, an alternative Home screen can be selected which displays the current operating values for the chiller unit.

▶ The chiller Home screen "Chiller unit with cabin control (No)" can be selected from setting level 2 (crew menu); see "7.6.6 Screen settings" on page 23.

Note

The following settings are not possible with MyTouch on chiller units without cabin control:

- Setting fan speed
- Setting setpoint temperature
- Operating modes with automatic changeover between cooling and heating

Note

If no air handlers are connected to the chiller unit, there is no need to connect a cabin temperature sensor.

7.4 System settings

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

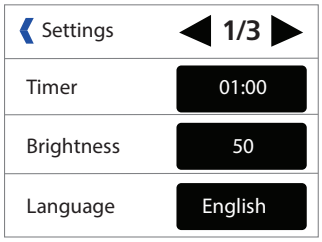


Fig.20 Example, Settings, setting level 1

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.

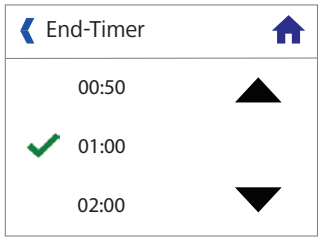


Fig.21 Timer

▶ 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.

7.5 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:

7.5.1 Timer

Adjust the preset Start or Stop on the chiller 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.

7.5.2 Brightness

Adapts the screen brightness to the ambient light levels.

7.5.3 Language

Sets the operating language.

7.5.4 Design

Changes the screen design.

7.5.5 Colour

Adapts the background colour.

7.5.6 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.

7.5.7 Key tone

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

7.5.8 °C / °F

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

7.5.9 Cleaning

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

7.6 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 Webasto logo.

You then have access to the following functions:

7.6.1 Operating modes

Change the operating mode:

- **Cooling only**
  F1
- **Heating only**
  F2 (reverse heating operation)
- **Automatic toggling between cooling and heating**
  F3 (via reverse heating operation)
- **Automatic toggling between cooling and heating**
  F4 (with external diesel heater).
- **Heating only**
  F5 (with external diesel heater).
- **Dehumidification**
  F7

Note

Operating modes F3 and F4 with automatic toggling between heating and cooling can only be selected if "Chiller unit with cabin control" is selected as the standard display (see Chapter "7.6.6 Screen settings" on page 23) and a cabin temperature sensor is connected.

7.6.2 Dehumidification cycle

Note

The dehumidification function requires synchronisation with the air handlers; for more information see Chapter "8 Dehumidification" on page 26.

- **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.

7.6.3 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.

7.6.4 Operating values

- **Cold water**
  Shows the cold water temperature in °C or °F.
- **Frequency**
  Shows the supply frequency of the power supply.
- **Voltage**: Shows the voltage of the power supply

7.6.5 Firmware

Display of current firmware version.

7.6.6 Screen settings

- **Chiller unit with cabin control**
  Chiller unit with cabin control (Yes):
  control of the cabin temperature and fan speed is possible; the automatic operating modes (F3 and F4) for toggling between cooling and heating are available.
  Chiller unit with cabin control (No):

control of the cabin temperature and fan speed is not possible; the automatic operating modes (F3 and F4) for toggling between cooling and heating are no longer shown.
(See "7.3 Chiller unit Home screen without cabin control" on page 22 and chapter "7.6.1 Operating modes" on page 23).

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

7.6.7 System settings

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

7.7 Setting level 3 (Parameter menu)

You access setting level 2 (Crew menu) by tapping and holding the Webasto 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:

7.7.1 Relay functions

Setting the relay functions for relay 1, relay 2 and relay 3

Selection:	Setting:
0	External heater
1	Alarm Relay switches with fault code
2	Load shedding Other electrical loads are switched off for a defined period during compressor start-up.
3	Valve Air handler: Switches the bypass valve for the cold water circuit to the air handler when there is no demand for cold or warm air in the cabin.
4	Valve heater: Switches the 3-way valve for integration of an external heater
5	Heating indicator

7.7.2 Compressor switching points

Setting the temperature switching points for the compressor

Selection:

- **Switch-off temperature for cooling:**
  lower target value for the cold water temperature in cooling mode.
- **Switch-on temperature for cooling:**
  upper target value for the cold water temperature, at which the compressor should switch on again.
- **Switch-on temperature for heating:**
  lower target value for the cold water temperature in heating mode, at which the compressor should switch on again.
- **Switch-off temperature for heating:**
  upper target value for the cold water temperature in heating mode, at which the compressor should switch on again.
- **Interval for compressor start:**
  setting the interval between starting for the compressors in a system. This avoids extreme power peaks caused by all compressors starting at the same time.
- **Initial start-up delay:**
  Staggered start for multiple chiller units when switching on the AC power supply after a shut-down.

7.7.3 Thermostatic Advance

CAUTION

Impairment to the function of the air conditioning system

▶ It is necessary to precisely analyse the cooling loads and their cyclic distribution before changing the factory settings.

Setting the Thermostatic Advance function.

Selection:

- **Offset compressor 1-6:**
  setting a thermostatically staggered start and stop for the compressors. As a result, the compressors cut in and out depending on the cooling load. For systems with multiple compressors, significant fluctuation in the cold water temperature and frequent on/off cycles of the compressors can be avoided.
  Factory setting:

	x 0.1K	x 0.1°F
o1	0	0
o2	10	18
o3	20	36
o4	30	54
o5	40	72
o6	50	90

- **Hysteresis:**
  setting the hysteresis of the cold water temperature in "Thermostatic Advance" mode at which the compressor is switched on.

Note

If all parameters (o1 - o6) are set to 0, the hysteresis h is deactivated.

Factory setting:

	x 0.1K	x 0.1°F
h	20	36

Example calculation for the switching thresholds in cooling mode:

Switch-off temperature for compressor X = switch-off temperature for cooling + offset for compressor X.

Switch-on temperature for compressor X = switch-off temperature for cooling + offset for compressor X + hysteresis.

Example temperatures:
Switch-off temperature for cooling = 4 °C
Offset for compressor 1 = 0K
Offset for compressor 2 = 1K
Hysteresis = 2K

Switch-off temperature for compressor 1 = 4°C + 0K = 4°C
Switch-on temperature for compressor 1 = 4°C + 0K + 2K = 6.0°C
Switch-off temperature for compressor 2 = 4°C + 1K = 5.0°C
Switch-on temperature for compressor 2 = 4°C + 1K + 2K = 7.0°C

7.7.4 Fan settings

Setting the fan type and fan speed with connected air handler

Selection:

- Fan type:
  - AC: Standard AC fan motor
  - EC: Electronically commutated (EC) fan motor with 0-10V speed requirement.
  - Electronic silencer: when using the additional electronic silencer module.
- **Continuous fan operation.**

Note

A permanently running fan is only expedient in combination with a 3/2-way bypass valve mounted on the air handler to stop the flow of water through the handler when the setpoint temperature in the cabin is reached.

- **Blower levels 1-5**:
  setting the fan speed for the individual fan speeds 1-5.

7.7.5 Deactivation components

Selection:

- **Compressor 1,2,3,4,5,6:**
  manual switching on and off of compressors 1 to 6.
- **Flow monitor (if installed):**
  To activate or deactivate a flow monitor and select whether this is normally open or closed (i.e. cold water flow or no cold water flow).

7.7.6 Further settings

- **Access code**
  This setting changes the access code for setting level 3.
- **Undervoltage trip**:
  The undervoltage trip for a supply voltage of 230V. If the supply falls below the undervoltage threshold for more than 5 seconds, the system will shut down.
- **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 chiller unit.
- **Valve air handler**
  The 3/2-way bypass valve opens and remains open for 4 hours until it is operated again.

Note

The 3/2-way bypass valve can be individually activated with this function to allow water to flow through the air handler in order to bleed the system.

- **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 air handler, 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. The 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 "7.7 Setting level 3 (Parameter menu)" on page 24.

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 "7.6.2 Dehumidification cycle" on page 23.

Synchronising all installed BlueCool air conditioning system components

If the entire boat is to be optimally dehumidified, it is necessary to switch off the control elements for all the components of the air conditioning system in succession, such as the chiller unit and air handler(s), within a few seconds of each other, using On/Off. All components of the BlueCool air conditioning system will then switch on simultaneously when the dehumidification cycle selected previously begins, and will switch off again automatically following the cycle. If all control elements are not switched off simultaneously, the individual components in the air conditioning system 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 expected. 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). Heating mode may switch off (Fault message A02 - high pressure) 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 cold water lines are firmly fitted and not leaking.

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 Filling cold water circuit

9.4.1 Filling and flushing an open cold water circuit

The cold water circuit can be filled with a water/glycol mixture using the following procedure. Carry out each step in the specified order:

▶ Fit a filler connection to the intake side of the cold water pump. See Fig.22.

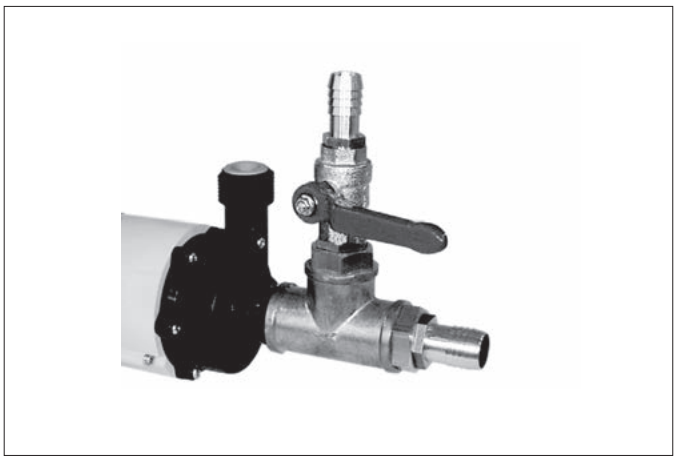


Fig.22 Filler connection

Notes

- The filler connection should be suitable for temporary connection of a filling hose with an inside diameter of at least 15 mm.
- The filler opening must point upwards.
- Fit a shut-off valve to be able to quickly shut off the access point on completion of this procedure.

▶ Fit a reservoir with a prepared water/glycol mixture such that it forms the highest point in the circuit and the tube leading from the filler connection (access point) to the reservoir is constantly rising.

Note

Use a transparent tube from the filler connection to the reservoir; no air bubbles should be present.

▶ Open all vents at the air handlers.

▶ If there is a bypass valve on the air handler, temporarily open the valve using the air handler valve function in MyTouch to enable flow through the heat exchanger; see Chapter 7.7.4

▶ Fill the reservoir with pre-treated water/glycol mixture.

▶ Open the filler connection and fill the circuit with the water/glycol mixture.

Notes

- Observe the vents at all air handlers. Close all vents as soon as bubble-free liquid flows out.
- It will not be necessary to bleed the air handlers again later.
- Top up the water/glycol mixture in the reservoir as require to ensure it never runs empty.

▶ Connect the power supply to the cold water pump and to the electrical box to enable manual switching on and off of the cold water pump.

Notes

- The easiest way to do this is with the Webasto BlueCool Expert Tool. This software can be downloaded from the Webasto dealer portal and makes it possible to activate the pump relay from a laptop.
- The reservoir must be at least half full at this point.
- Run the cold water pump for approx. 15 seconds and then switch it off again. Large air bubbles can be seen to rise in the filler hose. Repeat this procedure until the air bubbles are small enough to run the pump continuously without cavitation.

▶ Run the pump for at least 45 minutes without interruption.

Note

You will notice that an uninterrupted flow of small bubbles drifts upwards and a clear liquid flows downward.

- ▶ Flush the circuit by closing the shut-off valves at the air handlers such that the flow of liquid is routed through the other one.

Note

This will flush out all remaining air that may have collected in the form of air inclusions in one of the air handlers.

- ▶ Stop the cold water pump when there are no more air bubbles in the system.
- ▶ Close the shut-off valve at the filler connection and disconnect the filler reservoir.

9.4.2 Filling and flushing a closed system

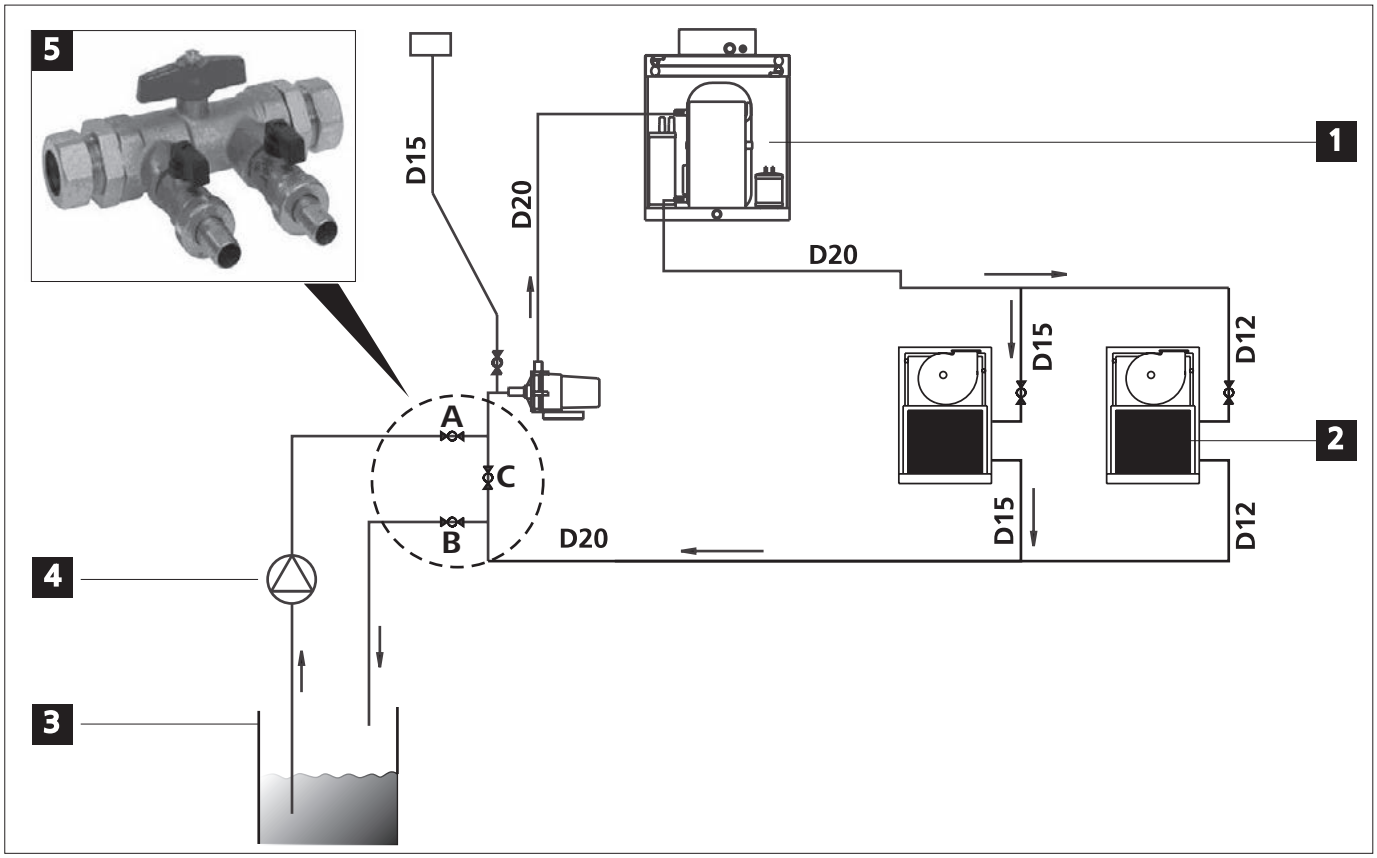


Fig.23 Filling and flushing a pressurised cold water circuit

1 Chiller unit
2 Air handler
3 Water/glycol mixture tank
4 Self-priming filler pump
5 Filler valve (with 3 shut-off valves A, B, C)

To fill and bleed a pressurised cold water circuit fit a special filler valve 5 in the cold water circuit or alternatively install three shut-off valves (A, B, C). This will achieve the same effect.

Use a filler station, consisting of:

- Water/glycol mixture tank
- Self-priming filler pump (impeller pump)
- Two (transparent) water hoses.

Fig.24 Filler station

Connect the filler station to the filler valve 5.

Proceed as follows to fill and bleed the system:

▶ Fill the tank of the filler station with a known quantity of water (e.g. volume of entire system plus 50%).

Note

Do not add any water/glycol mixture at this point, as if there is a leak this will make the boat dirty.

▶ Connect the filler station to the filler valve 5, shut-off valves A and B.

▶ Filler valve 5: close C and open A and B.

▶ Start the filler pump and fill the entire cold water circuit with water until clear water without bubbles flow back into the tank.

Note

Pay attention to the liquid level in the tank (not too low).

▶ Bleed all air handlers one after the other.

Note

Leave the filler pump running.

▶ Check the entire cold water circuit for leaks. Seal off any leaks.

▶ Add glycol into the tank.

Note

- In terms of quantity, add sufficient glycol to achieve a water/glycol mix ratio of 25 to 40% glycol.
- Leave the filler pump running.

▶ Close shut-off valve B and A at filler valve 5.
First close shut-off valve B and wait until the required pressure is built up.

▶ Stop the filler pump

▶ Disconnect the filler station from the cold water circuit.

▶ Open shut-off valve C at filler valve 5.

▶ The system is completely filled and bled and can now be started.

9.5 Test run

▶ Connect the power supply as shown in the wiring diagram.

▶ Switch on the generator if necessary.

▶ Switch on the air-conditioning system in the cooling mode. See Chapter "13 Technical Data" on page 38.

9.5.1 Check the sea water flow rate

▶ Determine the flow rate of the outflowing sea water using a receptacle and a stop watch or a flow meter.

Note

The actual flow rate must be above the required minimum flow rate (see Chapter "13 Technical Data" on page 38) 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
- Install fewer bends
- Install shorter lines
- Use a more powerful sea water pump

9.5.2 Check the flow rate of the cold water circuit

▶ Connect the pressure gauge to the connection on the suction and pressure side of the cold water pump and determine the pressure difference.

▶ Determine the effective flow rate based on the pump characteristic of the cold water pump used.

If the minimum value is not reached, there may still be air bubbles in the cold water circuit.

▶ Bleed the system completely.

If the cold water flow rate is still too low, the pressure losses in the cold water circuit should be reduced using the following measures:

- Use larger cross-sections
- Install fewer bends
- Install larger water manifolds
- Install shorter lines
- Use a more powerful cold water pump

10 Inspection and Maintenance

We recommend performing a series of routine checks at regular intervals to ensure the system functions long-term and retains its capacity.

At least once a month, the function of the air conditioning system must be checked. To do this, the system must be switched on and must run for at least 10 minutes.

CAUTION: Chlorine can be very corrosive when used improperly. Industry reports are mixed concerning the safety, dangers, and applications. If chlorine is chosen as the marine growth control agent, then the user must fully understand and accept the risk to equipment and dangers of handling corrosive chemicals. If used excessively or improperly, damage could occur to the equipment that is no fault of the equipment design and is not covered under warranty.

10.1 Sea water circuit

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

- ▶ Check immediately after each switch-on of the air-conditioning system whether sea water flows out of the sea water outlet.
- ▶ The minimum flow rates should be complied with.
- ▶ Immediately switch off the air-conditioning system if no sea water flows out after the compressor starts up.
- ▶ Check the sea water strainer for contaminants at least once a week. Clean if necessary.
- ▶ At least once a month, check the entire sea water circuit from the through-hull fitting to the sea water outlet for leaks.
- ▶ Check the condensate outflow from the condensed-water tray and the condensed-water drain line for free passage and leaks at least once a month.
- ▶ Once a year, the sea water circuit including the condenser of the chiller unit should be cleaned. 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.

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

10.2 Cold water circuit

The operation of the cold water circuit must always be checked, especially after prolonged absence.

- In open systems, check the liquid level in the expansion tank at least once a month and top up with water/glycol mixture if necessary.
- In closed systems, check the static prepressure in the system at least once a month. In the event of a pressure drop, repair leaks and top up with water/glycol mixture.
- At least once a month check the entire cold water circuit from the chiller unit through the cold water pump to the air handlers for leaks.
- At least once a year manually bleed the system. For this purpose, open the bleeder valves at the air handlers and bleed off air until bubble-free liquid flows out.
- Check the water/glycol mixture for adequate mixing ratio (25 to max. 40% glycol) at least once a year and rectify if necessary.

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.25 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 flow rate of the sea water circuit at the sea water outlet. See Chapter “10.1 Sea water circuit” on page 30 and Fig.7, No. 6										
2	Check and clean the sea water strainer. Refer to the filter manufacturer's specifications. See Chapter “10.1 Sea water circuit” on page 30 and Fig.7, No. 2.										
3	Check the entire sea water circuit for leaks. See Chapter “10.1 Sea water circuit” on page 30 and Fig.7.										
4	Cold water circuit See Chapter “10.2 Cold water circuit” on page 30 and Fig.8.										
	Open system: Check liquid level in expansion tank and correct if necessary.										
	Closed system: Check static prepressure. In the event of a pressure drop, repair leaks.										
	Check the entire cold water circuit for leaks.										
	Manually bleed cold water circuit.										
	Check mix ratio of water/glycol mixture.										
5	Check the condensate outflow from the condensed-water tray and the condensed-water drain line for free passage and leaks. See Chapter “10.1 Sea water circuit” on page 30.										
6	Clean the sea water circuit. See Chapter “10.1 Sea water circuit” on page 30.										
7	Check the electrical connections for corrosion to the contacts and firm seating. See Chapter “10.3 Electrical wiring” on page 30 and Fig.25.										
8	Check shaft seal of the pumps (sea water, cold water) and replace it if necessary (does not apply to pump with magnetic coupling).										

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.
- Completely empty sea water circuit, i.e. sea water lines, sea water strainer, sea water pump and condenser or fill with anti-freeze.
- Check adequate mix ratio of water/glycol mixture in the cold water circuit and correct if necessary.

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 C-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 on the pc-board of the chiller unit.

Every time a fault code occurs, the chiller 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 C-Series can be reset once the cause of the error has been eliminated.

To reset the BlueCool C-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 C-Series pc-board (LED display)

See "12.3.1 Fault code table" on page 34 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 flashes briefly 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: indicates a fault; see "12.3.1 Fault code table" on page 34.

12.3.1 Fault code table

Status / Fault message		LED "Alive"	Possible reason	Correction
AAA	Undervoltage	1x flashing, pause...	Switch-off in case of undervoltage. 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). Do not set below 195 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 1	2x flashing, pause...	Pressure switch defective or power circuit interruption/short circuit.	Check electrical wiring. Replace pressure switch on Schrader valve.
			COOLING MODE: Cold water flow rate too low.	Check cold water flow rate and if necessary, increase by changing system layout. Difference between evaporator inlet/outlet temperature approx. 5 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. 5K. 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	High pressure compressor 1	3x flashing, pause...	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: Cold water flow rate too low.	Check cold water flow rate and if necessary, increase by changing system layout. Difference between evaporator inlet/outlet temperature approx. 5 K.
A03	Low pressure compressor 2	4x flashing, pause...	See A01	See A01
A04	High pressure compressor 2	5x flashing, pause...	See A02	See A02
A05	Low pressure compressor 3	6x flashing, pause...	See A01	See A01
A06	High pressure compressor 3	7x flashing, pause...	See A02	See A02
A07	Low pressure compressor 4	8x flashing, pause...	See A01	See A01

Status / Fault message		LED "Alive"	Possible reason	Correction
A08	High pressure compressor 4	9x flashing, pause...	See A02	See A02
A09	Cabin temperature sensor	10x flashing, pause...	Cabin temperature sensor defective, break/short-circuit in electrical circuit, cabin temperature sensor not connected.	Connect or replace cabin temperature sensor.
A10	Cold water temperature sensor	11x flashing, pause...	Cold water temperature sensor defective or break/short-circuit in electrical circuit.	Check electrical wiring or replace sensor.
A11	Low pressure compressor 5	12x flashing, pause...	See A01	See A01
A12	High pressure compressor 5	13x flashing, pause...	See A02	See A02
A13	Low pressure compressor 6	14x flashing, pause...	See A01	See A01
A14	High pressure compressor 6	15x flashing, pause...	See A02	See A02
A15	Cold water flow.	16x flashing, pause...	Cold water circuit is blocked. Cable break on the flow monitor. Setting error on the control element.	Check cold water circuit and wiring. If no flow monitor is installed, the flow monitor must be deactivated using the control element. See Chapter „7.7.5 Deactivation components“ on page 25.
BA11	Cold water temperature not yet reached	n.a.	Air handler is only switched on when the required cold water temperature is reached.	No action required. The air handler starts up automatically.
CA11	Compressors deactivated	n.a.	Set compressor(s) in the control setting are not active.	Check settings on the control element. At least one compressor must be set as active. See Chapter „7.7.5 Deactivation components“ on page 25.
INIT	Data communication	17x flashing, pause...	Data communication: Electrical wiring defective. Power circuit interruption/short circuit.	Check cables and connections of pc-board and of control element. Replace defective connection cable, control element or pc-board.
n/a	No pc-board output	n.a.	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.	Replace pc-board.
			Electronic relay (TRIAC) defective.	Replace defective pc-board.
n/a	Compressor not running.	n.a.	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.
			Incorrect compressor settings.	Check settings. At least one compressor must be set as active.
n/a	Sea water pump(s) start up directly after the control is switched on.	n.a.	Wiring of sea water pump and cold water pump interchanged.	Check electrical wiring.

Status / Fault message		LED "Alive"	Possible reason	Correction
n/a	Compressor keeps cutting in and out.	n.a.	Too little cold water.	Check cold water system for leaks.
n/a	No or insufficient cooling or heating capacity.	n.a.	Poor air or water flow, soiled or circulation blocked.	Secure adequate air or water flow
			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 coolant leaks, repair if necessary and refill the system.
			Oil block.	Leave air-conditioning system running in heating mode. Call out a refrigerant specialist if necessary. Technical datasheet available.
			Refrigerant circuit blocked (drier, capillary lines or expansion valve).	Have checked by refrigerant specialist. Technical datasheet available.
			Compressor fault.	Have checked by refrigerant specialist.
n/a	Incorrect cabin/ambient temperature or water temperature displayed.	n.a.	Temperature sensor positioned incorrectly, subject to interference or displayed values are not correct.	Check whether the temperature sensor is subject to direct fault sources such as direct sunlight or devices radiating heat. Replace defective sensor.
n/a	The automatic operating modes cannot be selected.	n.a.	Screen settings are not selected correctly.	Select the setting "Chiller unit with cabin control (Yes)" in setting menu 2, screen settings; see Chapter „7.6.6 Screen settings" on page 23
n/a	Chiller unit in cooling mode (or heating mode) required despite cabin temperatures needing heating mode (or cooling mode).	n.a.	Wrong position selected for the cabin temperature sensor.	Check position of cabin temperature sensor Select screen settings "Chiller unit with cabin control (Yes)". Now select automatic mode (F3/F4, see Chapter „7.6.6 Screen settings" on page 23)

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.
   - Check whether the cold water pump is running.
   - If necessary, check the power supply to the pump.
   - Check whether the shut-off valves in the cold water circuit are opened.
   - Allow the fan to run in the automatic fan mode.
   - Check the air ducts of the air handlers.
   - 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 voltage level. Do not operate the system continually with insufficient voltage (under 195 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.
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 cold water circuit.
   - 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 installed in the cabin (and not, for example, in the chiller unit installation space).
   - 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

Type	C16 M	C20 M	C27 M	C32 T	C40 T	C55 T	C81 R	C108 Q
Cooling capacity [BTU/h] *1	16,000	20,000	27,000	32,000	40,000	55,000	81,000	108,000
Cooling capacity [kW] *1	4.7	5.8	7.9	9.4	11.7	16.1	23.7	31.7
Rated voltage [V]	230							
Frequency [Hz]	50/60							
Current consumption, operation [A] 50Hz *2	4.4 - 6.0	6.9 - 8.1	8.6 - 9.2	8.8 - 12	14 - 16	17 - 18	26 - 28	34 - 37
Max. starting current intake, current peak [A] 50 Hz	54	60	77	60	68	87	97	107
Starting current intake RMS40 [A] 50 Hz *3	35	39	49	41	47	59	69	79
Starting current intake RMS300 [A] 50 Hz *4	19	20	32	25	28	42	52	62
Max. starting current intake, current peak with soft start [A] 50 Hz	22	22	34	28	30	44	54	64
Current consumption RMS40 with soft start [A] 50 Hz *3	12	14	18	18	22	28	38	48
Current consumption RMS300 with soft start [A] 50 Hz *4	9	10	17	15	18	27	37	47
Current consumption with rotor [A] blocked (for one compressor)	37	43	54	37	43	54	54	54
Current consumption, operation *2 [A] 60 Hz	6.6 - 7.4	8.6 - 9.2	9.5-12	13 - 15	17 - 18	19-24	29-36	38-48
Max. starting current intake, current peak [A] 60 Hz	47	54	69	53	62	81	89	99
Starting current intake RMS40 [A] 60 Hz *3	30	35	44	36	43	56	64	74
Starting current intake RMS300 [A] 60 Hz *4	20	22	41	26	30	53	61	71
Max. starting current intake, current peak with soft start [A] 60 Hz	26	26	40	32	34	52	60	70
Current consumption RMS40 with soft start [A] 60 Hz *3	15	17	23	21	25	35	43	53
Current consumption RMS300 with soft start [A] 60 Hz *4	12	13	20	18	21	32	40	50
Minimum cold water flow rate [l/min]	13	16	19	26	32	38	57	76
Recommended cold water pump *5	WB500		WB1000		WB1500		WB2000	WB3500
Recommended line fuse protection [A]	16	16	20	2x16	2 x 16	2 x 20	3 x 20	4 x 20
ø Cold water connection [mm] (inch)	25 (1")				25 (1")		32 (1¼")	32 (1¼") F BSP
ø Sea water connection [mm] (inch)	19 (3/4")							
Minimum sea-water flow rate [l/min]	17	17	21	28	34	42	63	84
Recommended sea water pump *5	WB500 WB500G		WB1000		WB1500 WB1000G	WB1500 WB2000	WB2000 WB2500G	WB3000G
max. permissible ambient temperature [°C]	60							
Net weight per chiller unit [kg]	34	37	45	65	70	86	119	173
Dimensions of chiller unit (LxDxH) [mm] (inch) See also Fig.26.	390 x 290 x 355 (15.4 x 11.4 x 14)	440 x 330 x 360 (17.3 x 13 x 14)	440 x 330 x 395 (17.3 x 13 x 15.6)	590 x 410 x 500 (23.2 x 16.1 x 19.7)	590 x 410 x 500 (23.2 x 16.1 x 19.7)	590 x 410 x 550 (23.2 x 16.1 x 21.7)	870 x 430 x 575 (34.3 x 16.9 x 22.6)	860 x 640 x 600 (33.9 x 22.4 x 23.6)
Minimum clearance [mm], front.	300							
Minimum clearance [mm], right.	50							300
Minimum clearance [mm], rear.	50							
Minimum clearance [mm], left.	50							300
Minimum clearance [mm], top.	50							
Refrigerant quantity R410a [g]	480	650	750	2x480	2 x 650	2 x 750	3 x 750	4 x 750
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 chiller unit is dependent on compressor output. Maximum values under tropical conditions.

*3 Effective value of current consumption (RMS) for the chiller unit for the first 40 ms

*4 Effective value of current consumption (RMS) for the chiller unit for the first 300 ms

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

13.1 Dimensions and minimum distances

Note

For dimensions and minimum distances by type see table „13 Technical Data“ on page 38.
The values with * are exceptions.

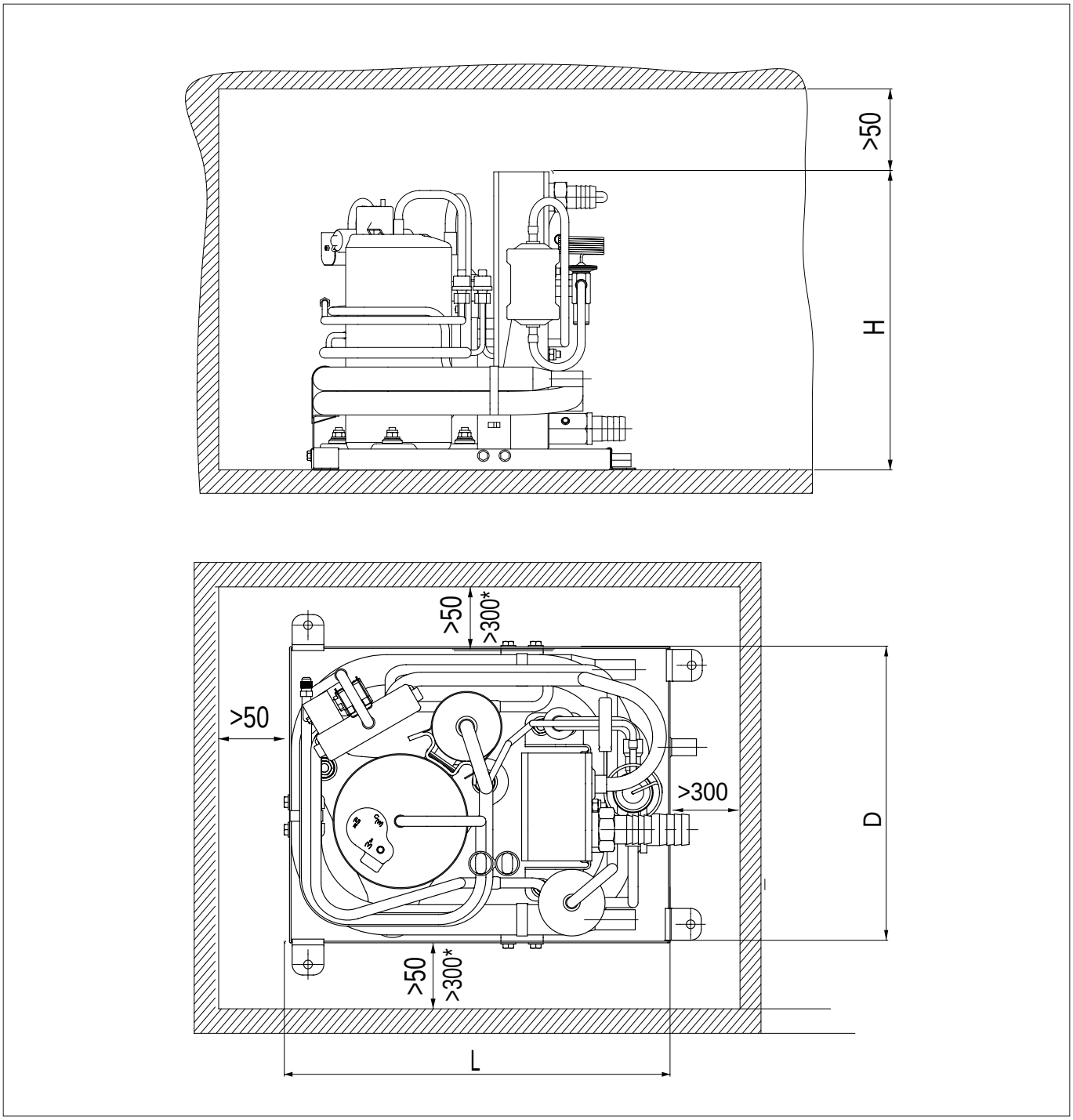


Fig.26 Dimensions and minimum distances in mm

Using the C16 M as an example

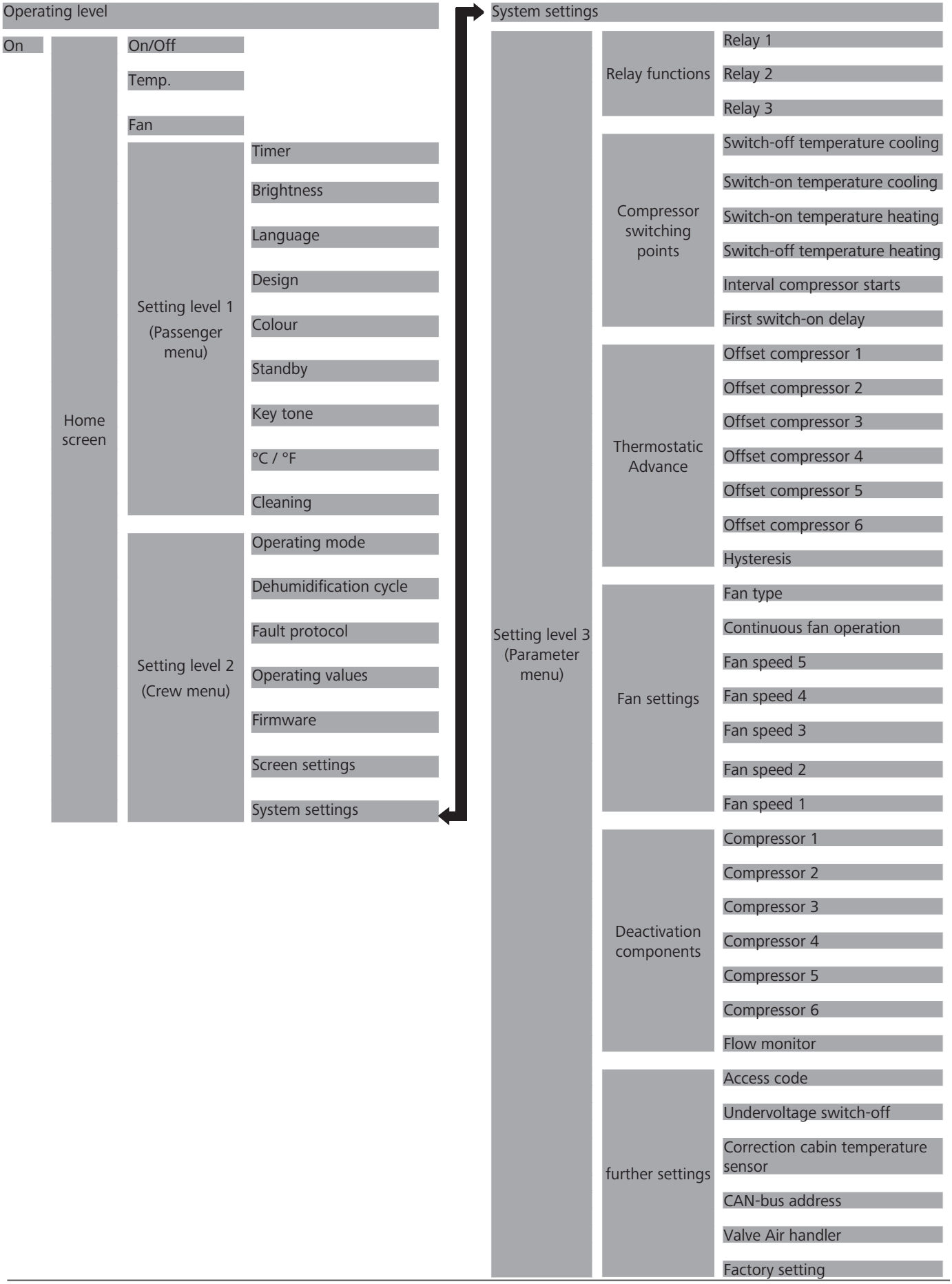
LxDxH: See table „13 Technical Data“ on page 38.

> xx : Minimum distance

> 300* : For exceptions, See „13 Technical Data“ on page 38.

14 Annex

14.1 Overview of control and setting levels



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 chiller unit is switched on or switched off.	Hours:minutes	off, 00:10 – 24:00	1:00	22
	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	
	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) • Auto Cooling/Heating with ext. heater • Heating only with ext. heater (F5) • Dehumidification (F7)	Auto Cooling/Heating (F3)	23
	Dehumidification cycle	• Number of cycles per day • Heating time • Cooling time	• Number • min. • min.	• 0, 1, 2, 3 • 0 to 99 • 0 to 99	-	
	Fault protocol	• Event counter • Fault code • Fault counter • Operating time	Number	Example: 1 - 99999, A1 - A54, 1-99999, 1-99999	-	
	Operating values	• Cold water • Frequency	• °C, °F • Hz	• - • 50 or 60	-	
	Firmware	Firmware version	-	Example: 3.2	-	
	Screen settings	Chiller unit with cabin control	-	Yes / No	Yes	
		Save	-	-	-	
		reset	-	-	-	
	System settings	Access to setting level 3 with code entry. Code entry is not required if code = 00	-	-	-	

Note

F3 and F4 can only be selected if “Chiller unit with cabin control (Yes)” is selected as the standard display (see “7.6.6 Screen settings” on page 23) and a cabin temperature sensor is connected.

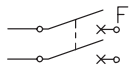
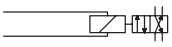
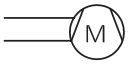
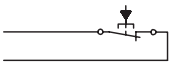
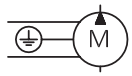
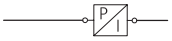
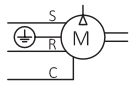
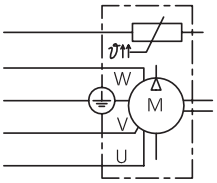
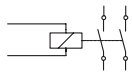
14.2.3 Parameter list, setting level 3 (Parameter menu)

	Parameter	Meaning	Unit / parameter	Value range	Factory setting	See Page
Setting level 3	Relay functions	• Relay 1 • Relay 2 • Relay 3	-	• External heater (0) • Alarm indicator (1) • Load shedding (2) • Valve Air handler (3) • Valve heater (4) • Heating mode indicator (5)	• Relay 1: External heater (0) • Relay 2: Valve Air handler (3) • Relay 3: Valve heater (4)	24
	Compressor switching points	• Switch-off temperature cooling • Switch-on temperature cooling • Switch-on temperature heating • Switch-off temperature heating • Interval compressor starts • First switch-on delay	• °C (°F) • °C (°F) • °C (°F) • °C (°F) • Sec. • Sec.	• 0 to 15 (32 to 59) • 2 to 18 (36 to 64) • 27 to 49 (81 to 120) • 30 to 52 (86 to 126) • 01 to 60 • 01 to 200	• 4 °C / 39 °F • 7 °C / 45 °F • 45 °C / 113 °F • 50 °C / 122 °F • 09 • 10	24
	Thermostatic Advance	• Offset compressor 1 • Offset compressor 2 • Offset compressor 3 • Offset compressor 4 • Offset compressor 5 • Offset compressor 6 • Hysteresis	• °C (°F) • °C (°F) • °C (°F) • °C (°F) • °C (°F) • °C (°F) • (K, °F)	• 0.0 to 5.5 or 0.0 to 9.9 • 0.0 to 5.5 or 0.0 to 9.9 • 0.0 to 5.5 or 0.0 to 9.9 • 0.0 to 5.5 or 0.0 to 9.9 • 0.0 to 5.5 or 0.0 to 9.9 • 0.0 to 5.5 or 0.0 to 9.9 • 0.0 to 9.9 or 0.0 to 17.8	• 0 °C / 0 °F • 10 °C / 18 °F • 20 °C / 36 °F • 30 °C / 54 °F • 40 °C / 72 °F • 50 °C / 90 °F • 2 K/ 3.6 °F	24
	Fan settings	• Fan type • Continuous fan operation • Fan speed 5 • Fan speed 4 • Fan speed 3 • Fan speed 2 • Fan speed 1	- - - - - - -	• AC, EC, electronic silencer • On/Off • 30 - 100 • 30 - 100 • 30 - 100 • 30 - 100 • 30 - 100	• AC • Off • 50 / 60 Hz 100 • 50 Hz: 58 / 60 Hz: 69 • 50 Hz: 49 / 60 Hz: 60 • 50 Hz: 41 / 60 Hz: 53 • 50 Hz: 35 / 60 Hz: 45	24
	Deactivation components	• Compressor 1 • Compressor 2 • Compressor 3 • Compressor 4 • Compressor 5 • Compressor 6 • Flow monitor	-	• On, Off • On, Off • On, Off • On, Off • On, Off • On, Off • Off normally open (NO) normally closed (NC)	• On • On • On • On • On • On • Off	
		Note Compressors that are present are On, those that are not are Off				
	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 to 210*	• 195	
		• Correction cabin temperature sensor K or °F		• -5.5 to 5.5 / -9.9 to 9.9	• 0	
		• CAN-bus address		• 1 to 239	• -	
		• Valve		• Opens for 4 hours	• -	
		• Factory setting		• Reset	• -	

* Webasto shall accept no liability whatsoever for faults caused by operating the compressors below the recommended voltage level. Do not select any settings that are lower than the factory settings.

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
	Cold/sea water pump		sensor
	Compressor		Compressor with temperature sensor
	Relay		

14.3.2 Line fuses

Line fuse protection		Chiller unit	
		C16 M, C20 M, C27 M, C32 T, C40 T	C55 T, C81 R, C108 Q
F1	Cold water pump	Max. 16 A	Max. 16 A
F2	Sea water pump		
F3	Compressor		Max. 20 A*
F4			
F5			
F6			
F7	Pc-board		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 C-Series if the following two conditions are met:

- Pc-board with part number WBCL000842D or higher installed.
- Firmware version for C-Series 3.00 or higher used.

14.3.3 Layout diagram - pc-board BlueCool C-Series

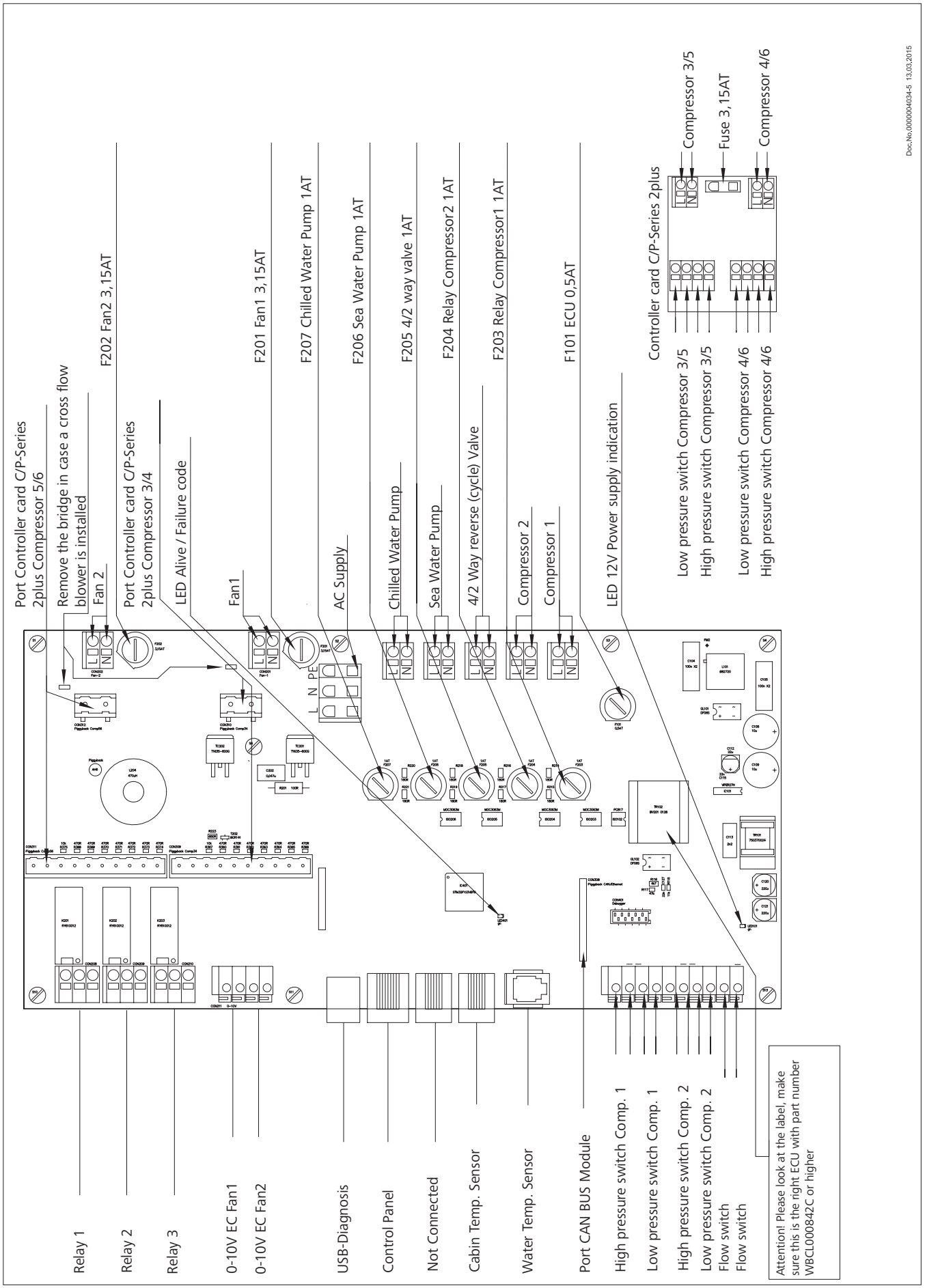


Abb.27 Layout diagram - pc-board BlueCool C-Series

14.3.4 BlueCool C-Series wiring diagram, Mono

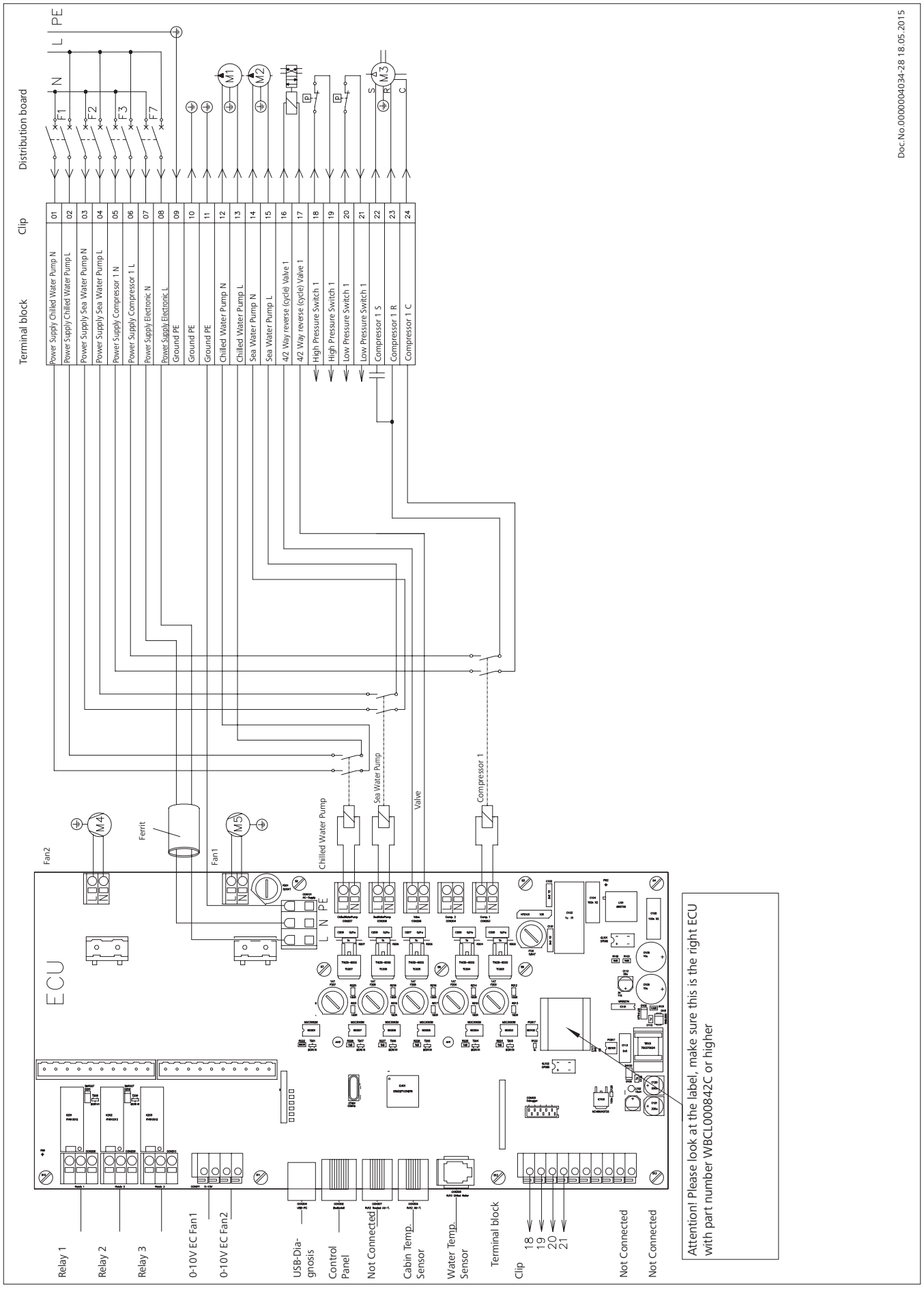
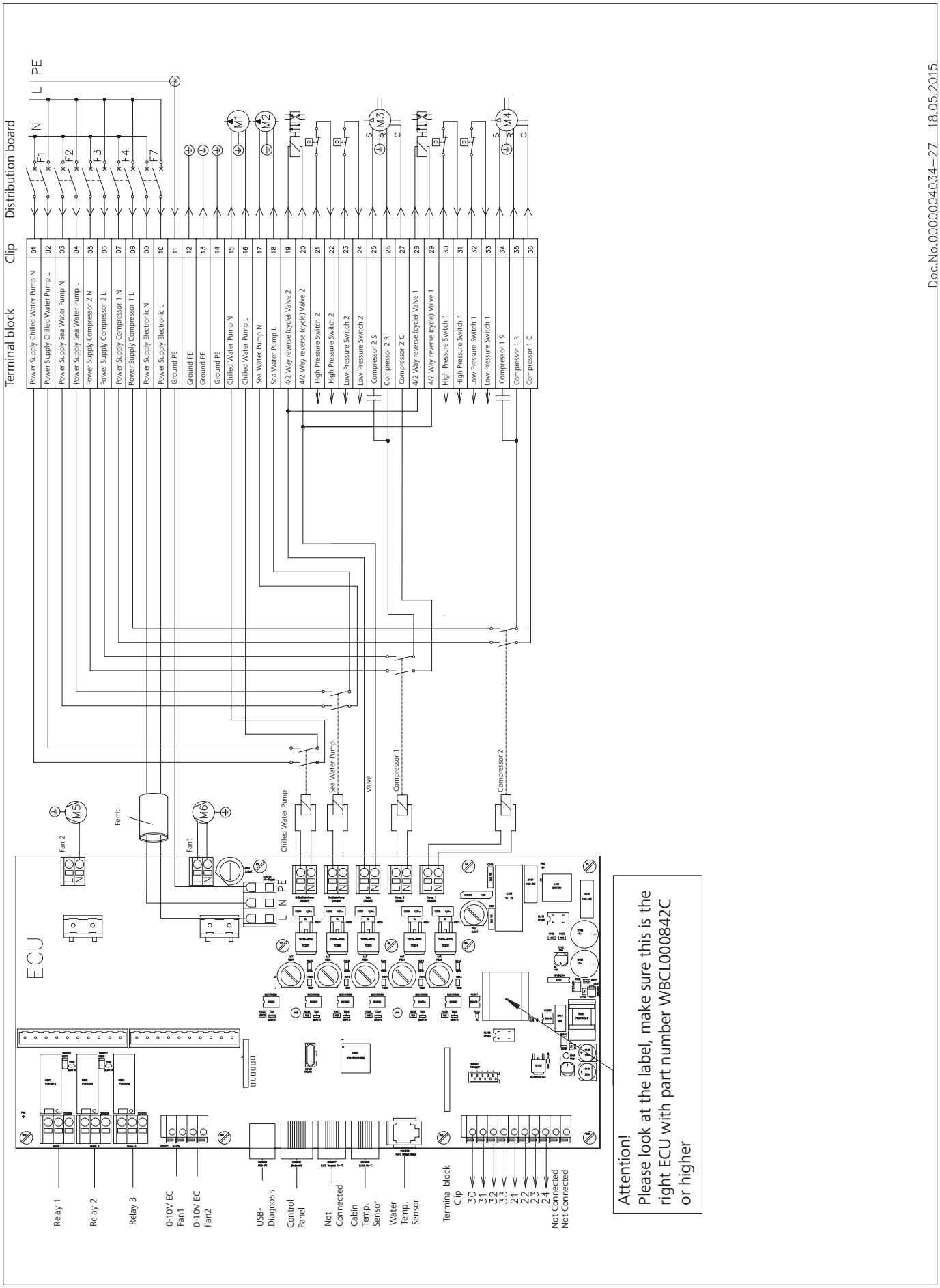


Abb.28 BlueCool C-Series wiring diagram, Mono

14.3.5 BlueCool C-Series wiring diagram, Twin



Doc.No.0000004034–27 18.05.2015

Abb.29 BlueCool C-Series wiring diagram, Twin

14.3.6 BlueCool C-Series wiring diagram, Triple

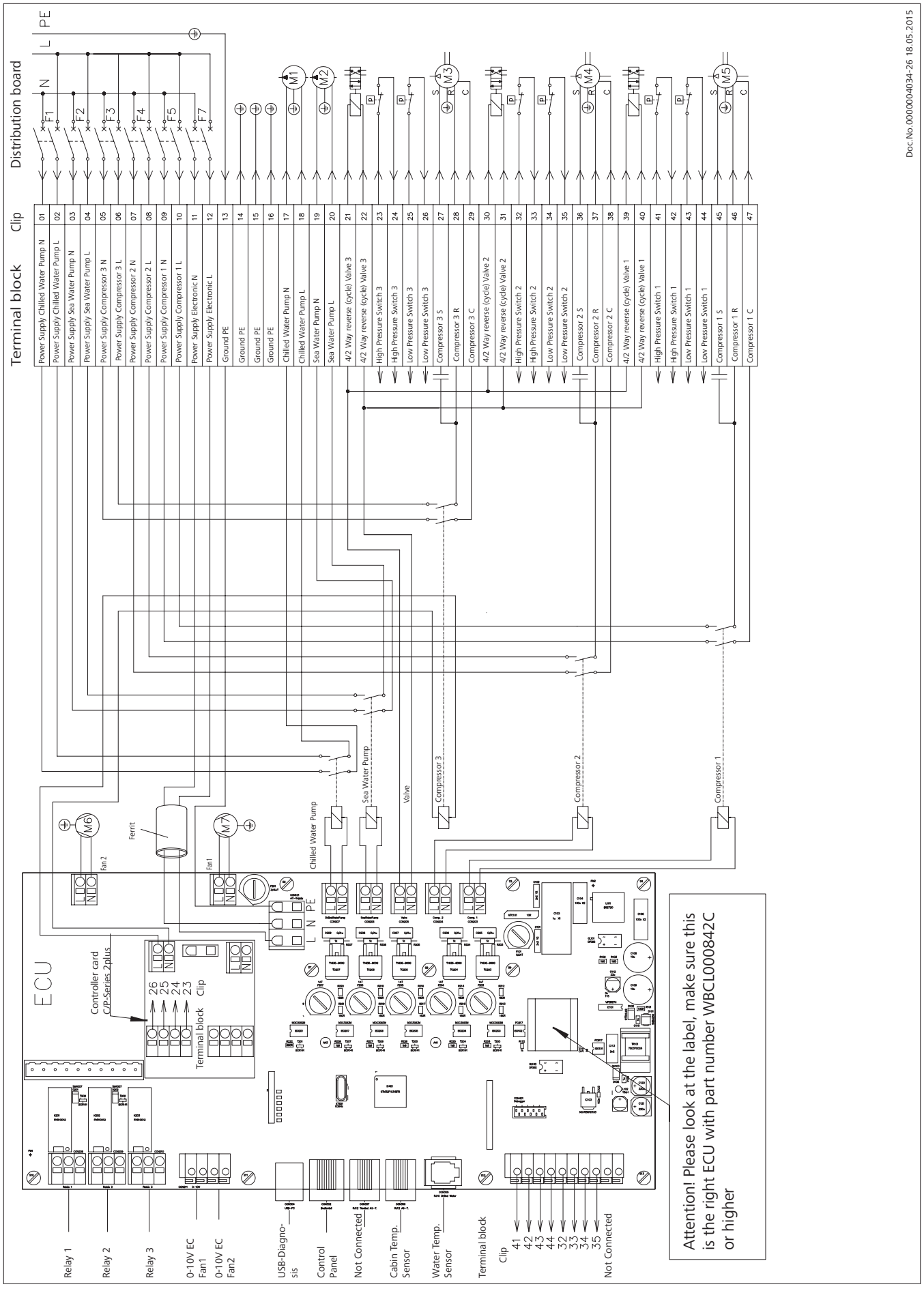


Abb.30 BlueCool C-Series wiring diagram, Triple

14.3.7 BlueCool C-Series wiring diagram, Quattro

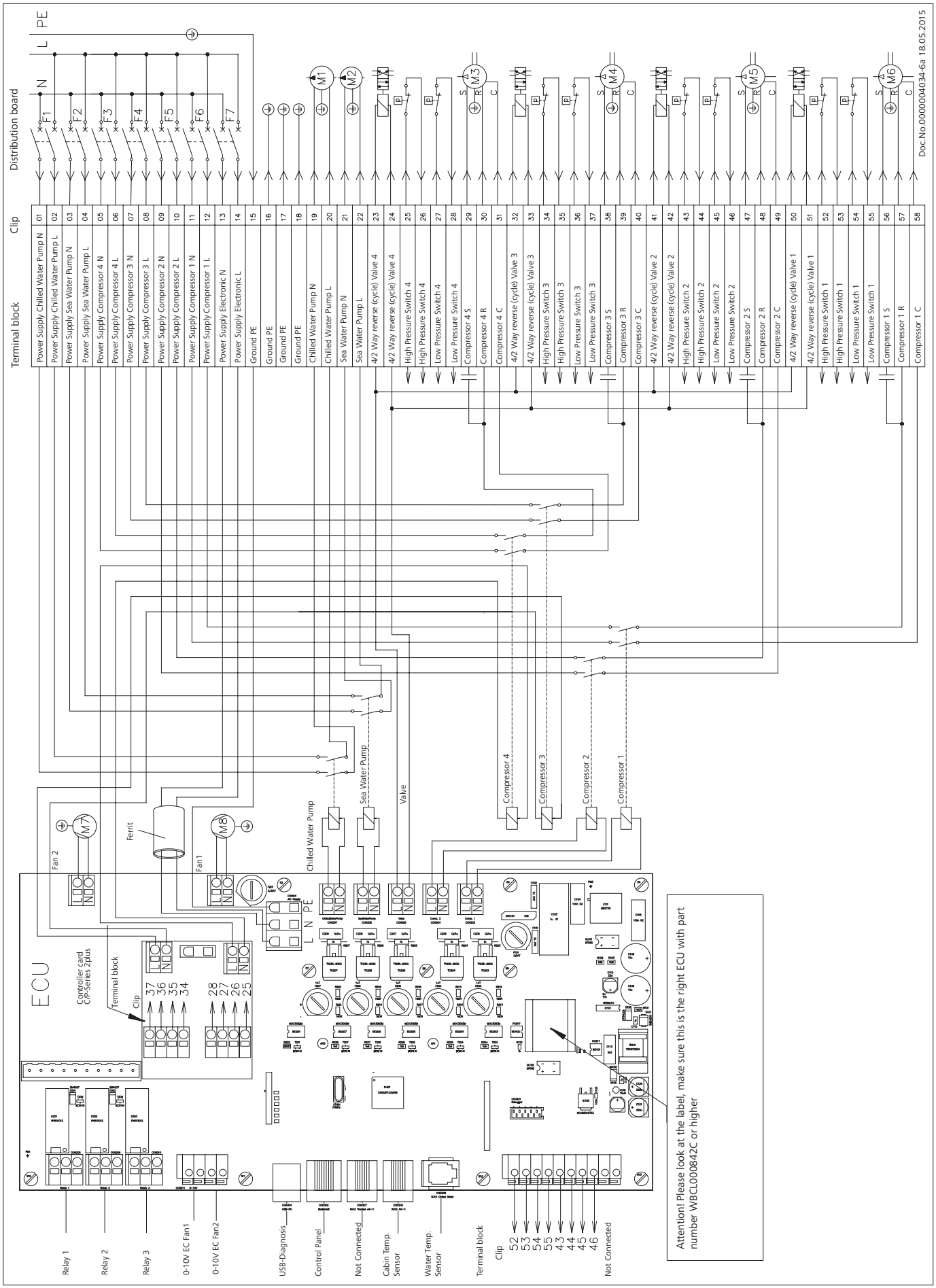


Abb.31 BlueCool C-Series wiring diagram, Quattro

14.3.8 BlueCool C-Series wiring diagram, Mono, with soft start

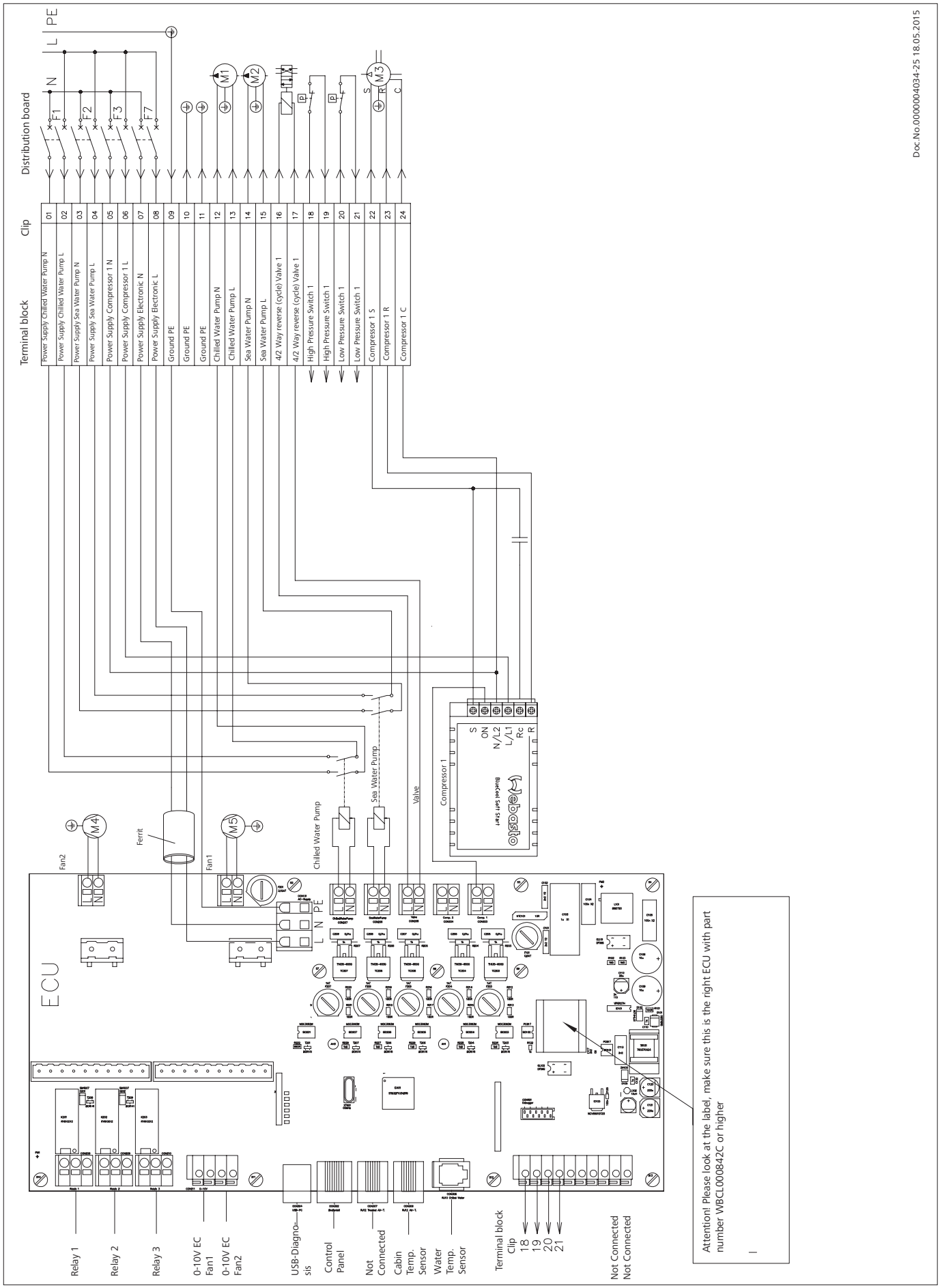


Abb.32 BlueCool C-Series wiring diagram, Mono, with soft start

14.3.9 BlueCool C-Series wiring diagram, Twin, with soft start

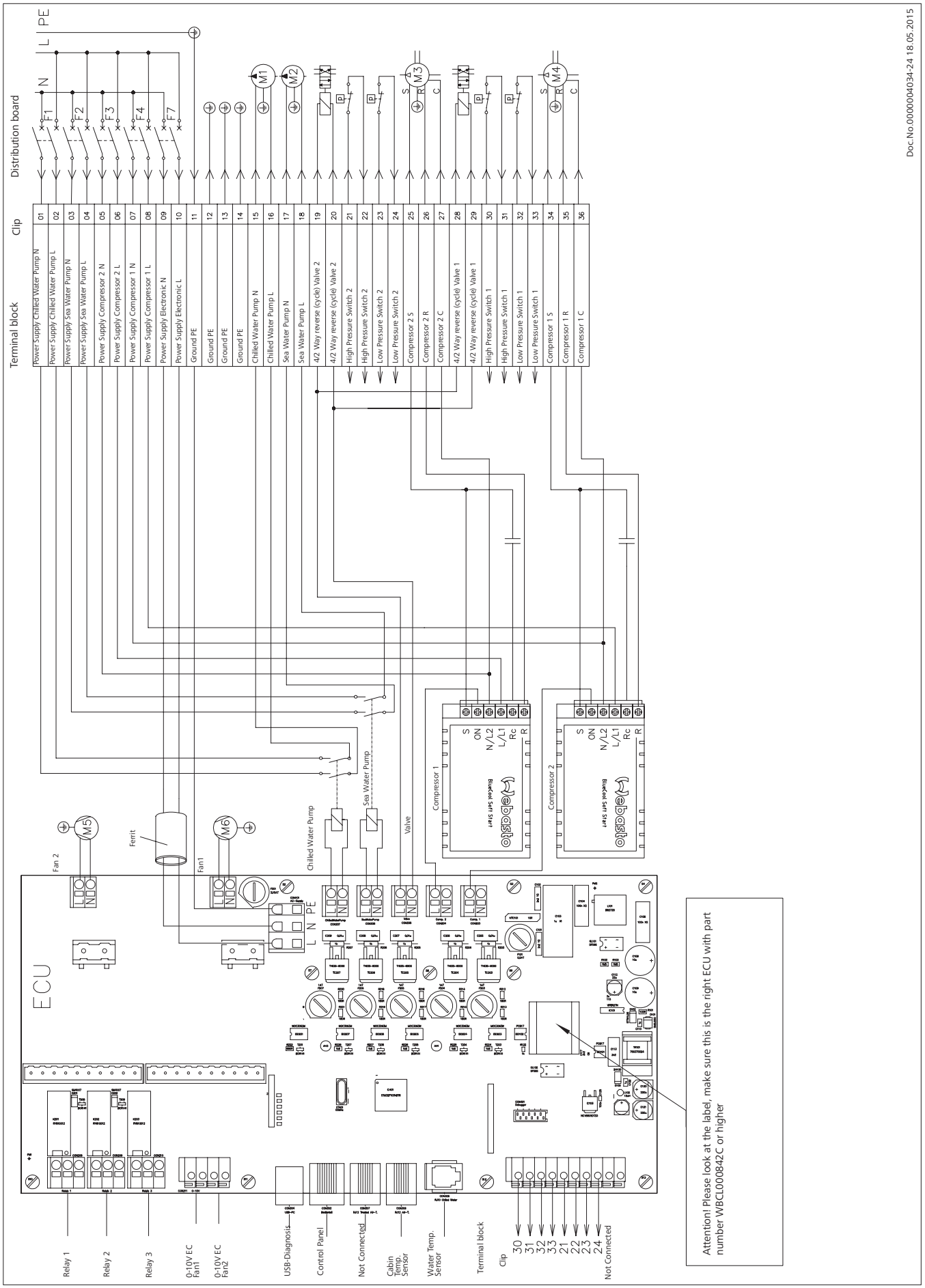


Abb.33 BlueCool C-Series wiring diagram, Twin, with soft start

14.3.10 BlueCool C-Series wiring diagram, Triple, with soft start

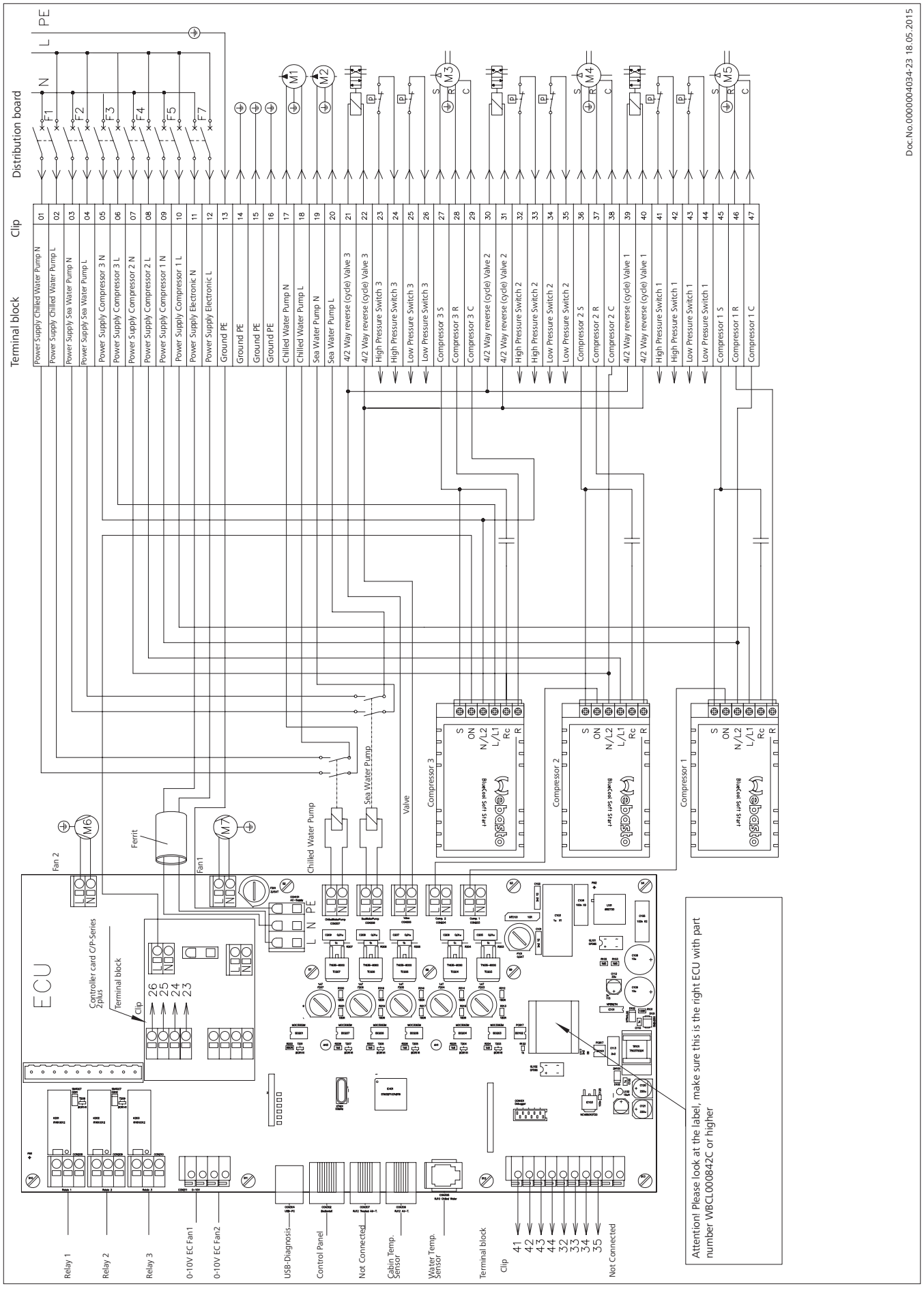


Abb.34 BlueCool C-Series wiring diagram, Triple, with soft start

14.3.11 BlueCool C-Series wiring diagram, Quattro, with soft start

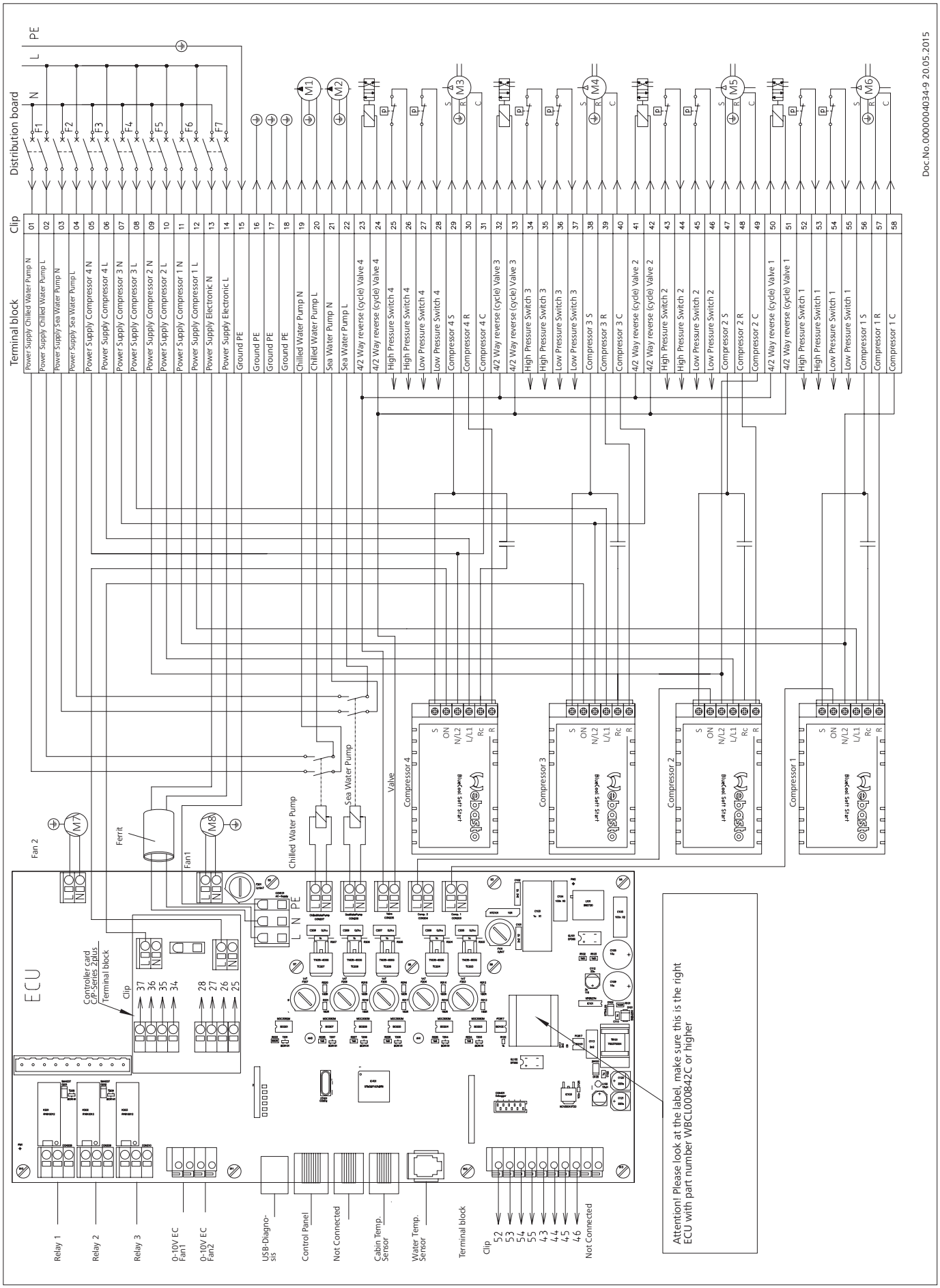


Abb.35 BlueCool C-Series wiring diagram, Quattro, with soft start

14.3.12 BlueCool C-Series wiring diagram, with electrical water heater or external heater

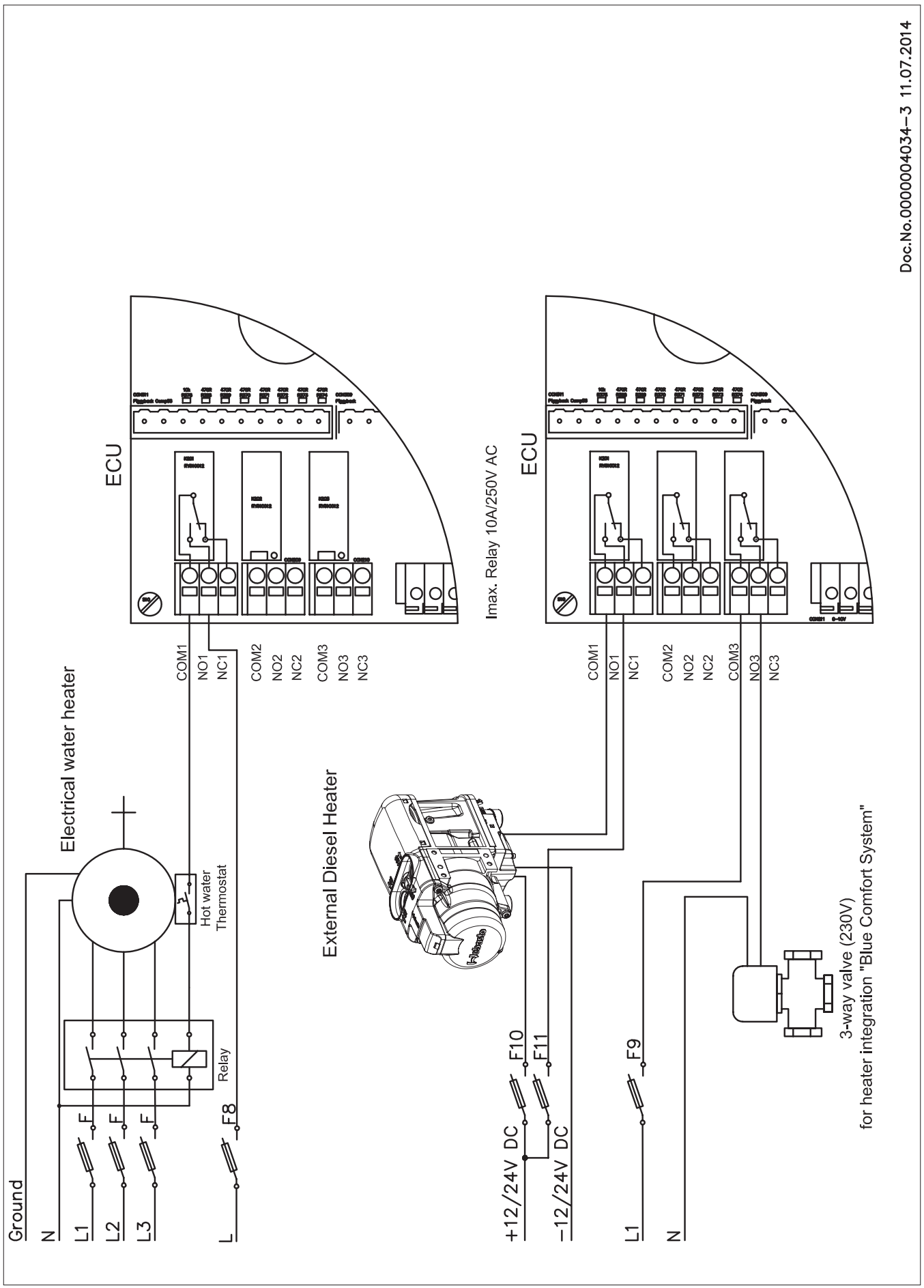


Abb.36 BlueCool C-Series wiring diagram, with electrical water heater or external heater

14.3.13 Wiring diagram BlueCool C-Series, with electronic silencer

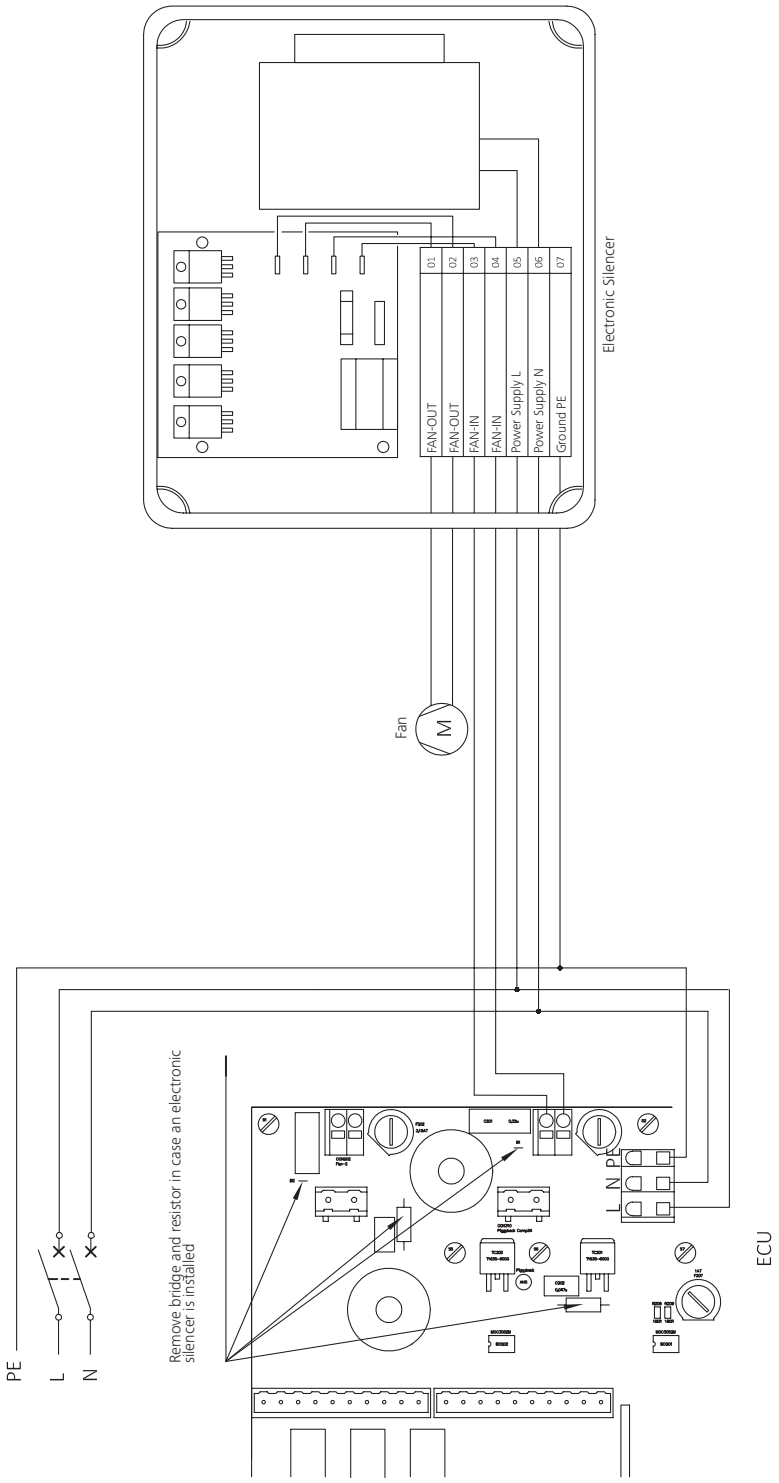


Abb.37 Wiring diagram BlueCool C-Series, with electronic silencer

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.

Webasto Thermo & Comfort SE
Postfach 1410
82199 Gilching
Germany

Visiting address:
Friedrichshafener Str. 9
82205 Gilching
Germany

Technical Extranet: http://dealers.webasto.com

CE

www.webasto.com