Rittal – The System.

Faster – better – everywhere.

TopTherm Chiller

3335.790	3335.860
3335.830	3335.870
3335.840	3335.880
3335.850	3335.890

Assembly and operating instructions

EN

Contents

1 Notes on documentation

These instructions are aimed at installers and operators who are familiar with the installation and the operation of the chiller. It is very important to read and follow these operating instructions prior to commissioning. The manufacturer will not accept any liability for damage or operating problems resulting from failure to observe these operating instructions.

1.1 Other applicable documents

In conjunction with these instructions the flow diagram and electrical wiring diagram for the related model apply (see section 14 "Appendix").

1.2 CE conformity

The declaration of conformity is included in the appendix of these installation and operating instructions.

1.3 Retention of documents

These instructions and all associated documents constitute an integral part of the product. They must be supplied to the operator. The operator is responsible for storage of the documents so they are readily available when needed.

1.4 Symbols used

Please observe the following safety instructions and other notes in this guide:

Safety and other notes:

Danger!
Immediate danger to life and limb!

Risk of burns!
Risk of injury due to contact with hot surfaces or hot fluids!

Danger!
Risk of injury due to contact with cold surfaces!

Risk of cuts!
Risk of injury on touching the fins on the condenser!

Danger!
Danger of death due to electric shock!

Caution!
Explosion hazard!

Caution!
Potential threat to the product and the environment.

Note:
Useful information and special features.

Symbol identifying required actions:

■ The bullet point indicates an action to be performed.

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2 Safety notes

Please observe the following general safety notes when operating and installing the chiller:

- Assembly, installation and maintenance must only be carried out by qualified personnel.
- Only use original spare parts and accessories authorised by the manufacturer to ensure the protection and safety of the chiller. The usage of other parts will render any liability void.
- Do not make any changes to the chiller that have not been agreed with and approved by the manufacturer.
- It is also imperative that you observe the special safety instructions for the individual activities in the individual chapters.

2.1 Risks in case of failure to observe the safety instructions

In case of failure to observe the safety notes, people, the environment and the chiller may be placed at risk. Failure to comply with the safety notes makes all claims for compensation void.

2.2 Safety instructions for assembly, inspection and maintenance work

– The installation, commissioning and servicing of the chiller must be carried out in strict compliance with the technical documentation for the chiller and in such a way that no potentially hazardous situations are allowed to occur.
– Cleaning and maintenance work on the chiller must only be performed with the unit shut down. For this purpose, it is vital to ensure that the chiller is disconnected from the power supply and is secured against switching back on. It is imperative that you observe the procedure for shutting down the chiller described in the operating instructions.
– All safety devices and protective equipment must be reattached or put in a functional condition immediately after the work is complete.
– Modifications or changes to the chiller are not allowed.
– Only appropriately qualified personnel as defined by BGR500 chap. 2.35 / EN 378 are allowed to work on the refrigerant circuit.
– Do not install the chiller without protection outside of covered areas, or in an explosive or aggressive environment.
– Do not install the chiller on an unstable surface or a surface that is not designed for the weight of the chiller.
– Do not bypass any electrical safety devices to make it possible to operate the chiller.

2.3 Unauthorised operation

The safety of the chiller supplied is only ensured if it is used properly (see section 3.6 "Proper usage"). Under no circumstances should the limit values specified in the technical data be exceeded.

The chiller is not allowed to be used for the direct cooling of liquids that are used for foodstuffs (e.g. drinking water).

Any existing contact hazard protection for moving parts must not be removed from chillers while operational. Hazards due to electrical power, do not remove any switch box cover!

Explosion hazard!
The use of the chiller for cooling inflammable or pyrophoric substances is prohibited.

2.4 Health risks due to the refrigerant R410A and the cooling medium

The refrigerant changes status during operation and becomes pressurised. The R410A safety data sheet must be observed.

The cooling medium (additive) is a liquid. We suggest: "Cooling medium for chillers" (see section 6.1 "Cooling medium"). The safety data sheet "Cooling medium for chillers" must be observed.

2.5 First aid measures

Please refer to safety data sheets R410A and "Cooling medium for chillers".

Note:
Safety data sheets are available for downloading at www.rittal.com.

2.6 Fire-fighting measures

Suitable extinguishing agent

All known extinguishing agents can be used.

2.7 Safety measures and equipment

- Ensure adequate ventilation.
- Hand protection: Safety gloves.
- Eye protection: Safety goggles.
- Body protection: Wear safety shoes when handling pressurised gas bottles.

2.8 Potential hazards and how to avoid them

The following table provides an overview of other potential sources of danger and how to avoid them.

Location	Hazard		Cause	Precautionary measures
Device exterior: Louvred condenser	Minor cuts		Accidental contact or contact while installing the air filter (option, see section 5.8 "Installing the filter mats (accessories)")	Wear safety gloves.
Device exterior: Area around the chiller	Major burns		Fire caused by short-circuiting or overheating of the electricity supply line to the chiller	Ensure that the cable cross-section and electricity supply line comply with the valid regulations.
Device exterior	Cuts		Contact with fan wheel	Do not remove the protective cover around the fan wheel.
Device interior: Hot or cold parts	Burns / frostbite	 	Contact with parts with a high or low surface temperature.	The chiller may only be opened by trained, qualified personnel.
Device interior	Explosion		Soldering work inside the chiller may lead to an explosion due to the installed cooling circuit.	Maintenance may only be carried out by specialist personnel. Before carrying out soldering work on the cooling circuit or in its immediate vicinity, the refrigerant should be drained from the chiller.
Device exterior: Chiller with wheels	Personal injury or damage to property		The chiller starts to move due to unevenness of the floor surface.	If the recooling system is equipped with wheels (option), they must be locked with brakes while operational.
Device exterior	Severe personal injury or damage to property		The floor on which the chiller is installed is unstable and unable to support its weight. The chiller tips over or the floor gives way.	The weight of the chiller is shown on the rating plate. Additionally, please allow for the weight of the liquid in the tank (the tank capacity volume is shown on the rating plate) and make sure that the floor is suitable for installation purposes.
Device interior: Cooling medium circuit	Fungus and algae formation		Use of pure water as a cooling medium or refrigerant.	Use a water-glycol mixture as your cooling medium. Rittal recommends the use of "Cooling medium for chillers" (ready-mix). Further information may be found in sections 6–8.
Device interior: Cooling medium circuit	Personal injury or damage to property		Hazard due to pressure	Recurrent function test of pressure switch

Tab. 1: Hazards and precautionary measures

Location	Hazard		Cause	Precautionary measures
Device exterior	Personal injury or damage to property		Displacement of oxygen due to escape of larger amounts of refrigerants	Recurrent leak test. Operation of cap valves by cooling technology experts or service companies only.
			If refrigerant escapes, poisonous gases may be generated under the effect of flames.	
	Risk for the environment		Risk for the environment due to escape of refrigerant	
Device interior	Personal injury or damage to property		Electrical hazard while working on the chiller	The power to the chiller must be disconnected via the main switch.
Device exterior	Personal injury or damage to property		Hazards when transporting or assembling the chiller	Secure the chiller against any risk of tilting (eyebolts) when transporting or assembling.
Device interior	Severe personal injury or damage to property		Hazard due to electrical equipment of the chiller	Recurrent testing of electrical equipment (Germany BGV A3)
Device interior	Risk for the product		Liquid level after transport not in upright position	Only transport the chiller upright. Should the chiller be tilted during transportation, please wait some minutes before switching on again.

Tab. 1: Hazards and precautionary measures

Note:
Specialist personnel are individuals who, by virtue of their training, education, experience and knowledge of the relevant provisions, regulations and measures for accident prevention and relating to the operating conditions, have been authorised by the owner or responsible individual to ensure the safety of the system, carry out all essential tasks, and are therefore in a position to identify and avert all potential threats.

3 Device description

Chillers are used for the central and economical cooling and supply of a cooling medium (water + glycol, see section 8.2 "Cooling medium") in the event of physical separation between the place where cooling is required and the refrigeration. The cooling medium is supplied using a pipe system.

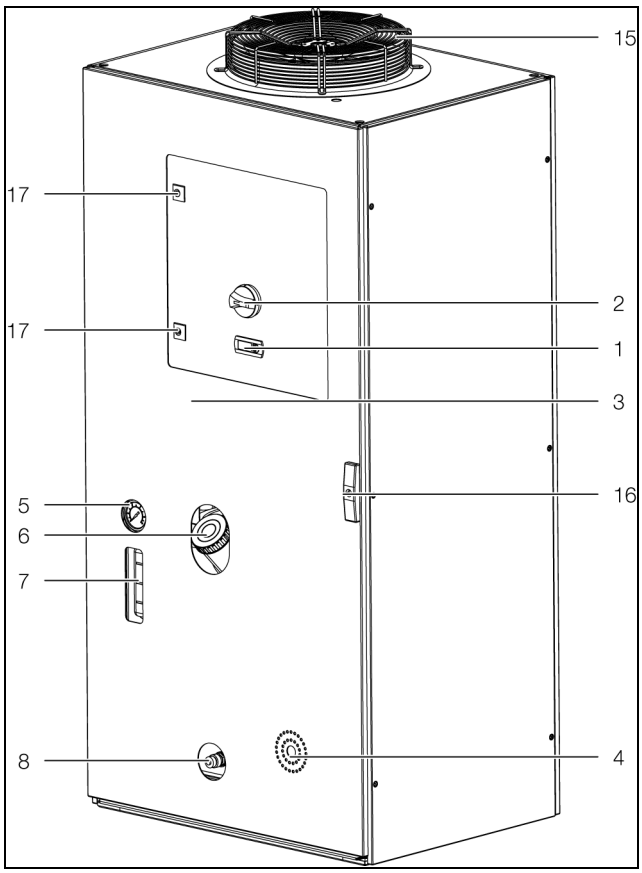

Fig. 1: View from front (3335.790, 3335.830, 3335.840, 3335.850)

Key to figures 1 to 8

1 Controller
2 Master switch
3 Rating plate
4 Ventilation pump motor
5 Manometer
6 Fill nozzle for cooling medium
7 Water level display
8 Tank drain nozzle
9 Cooling medium return
10 Cooling medium inlet
11 Air inlet on the condenser
12 Harting connector (option)
13 Connection cable
14 Cable gland for room sensor (option)
15 Condenser fan
16 Door lock of chiller
17 Enclosure locks

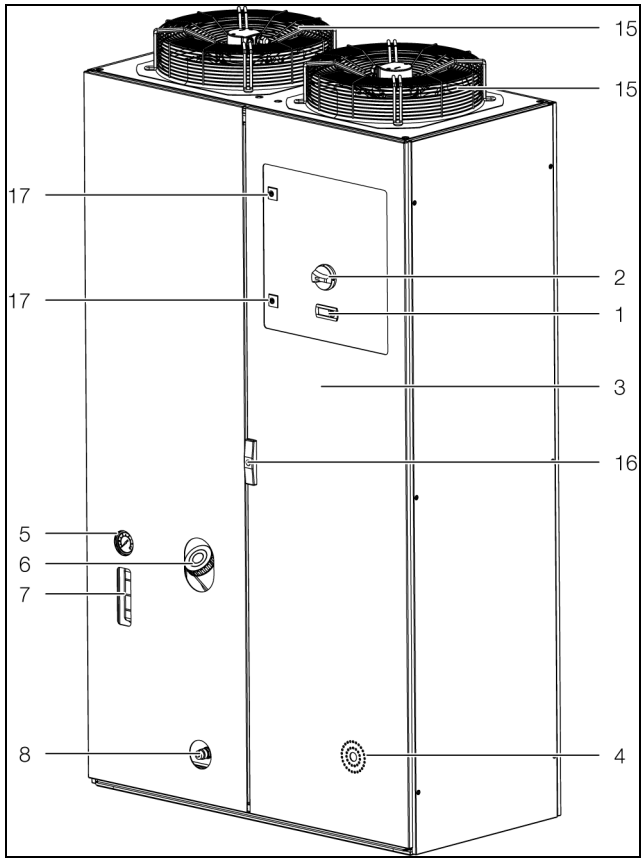

Fig. 2: View from front (3335.860, 3335.870)

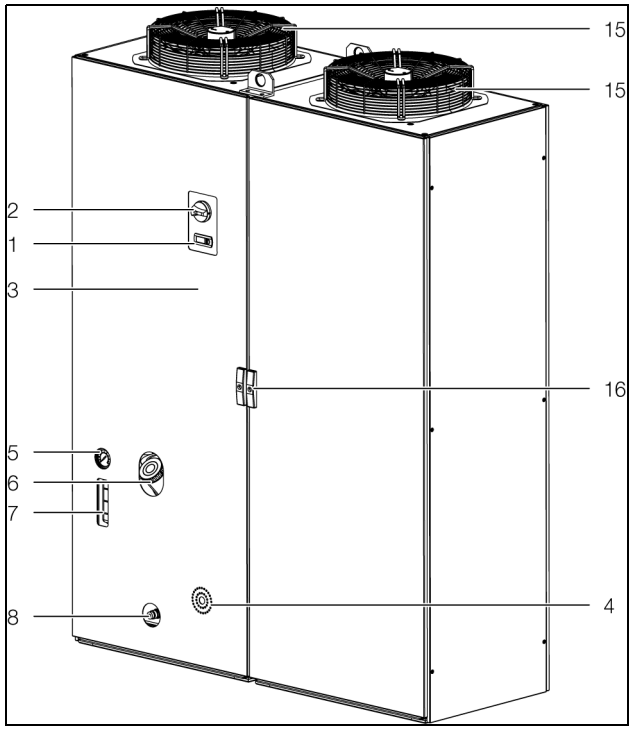

Fig. 3: View from front (3335.880)

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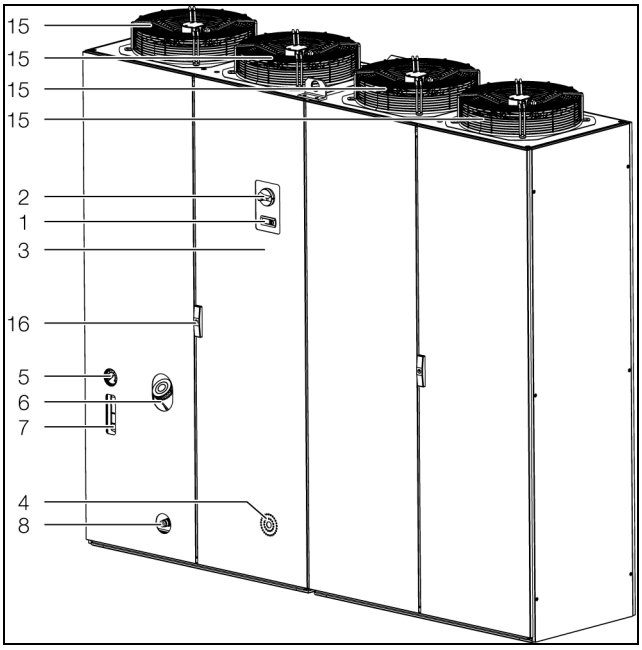

Fig. 4: View from front (3335.890)

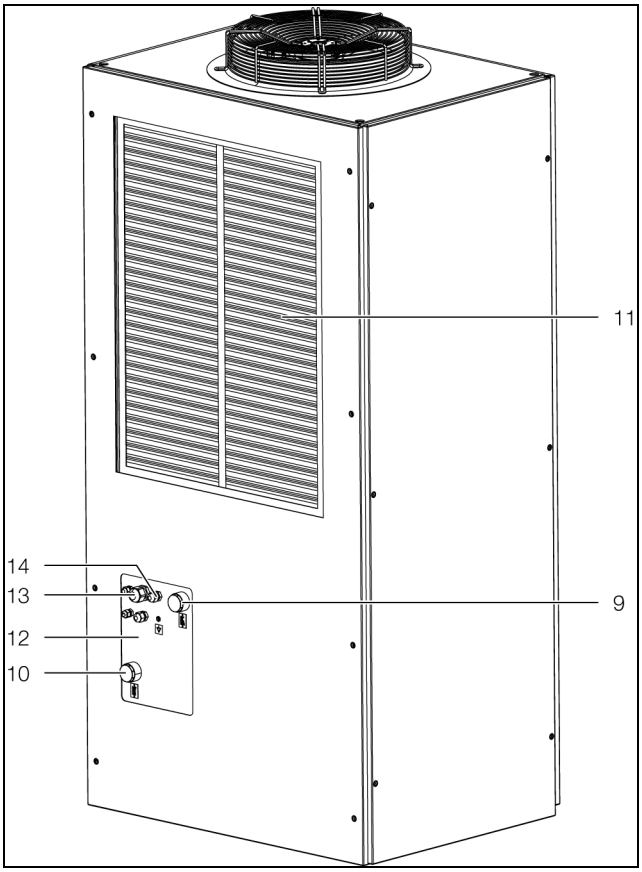

Fig. 5: View from rear (3335.790, 3335.830, 3335.840, 3335.850)

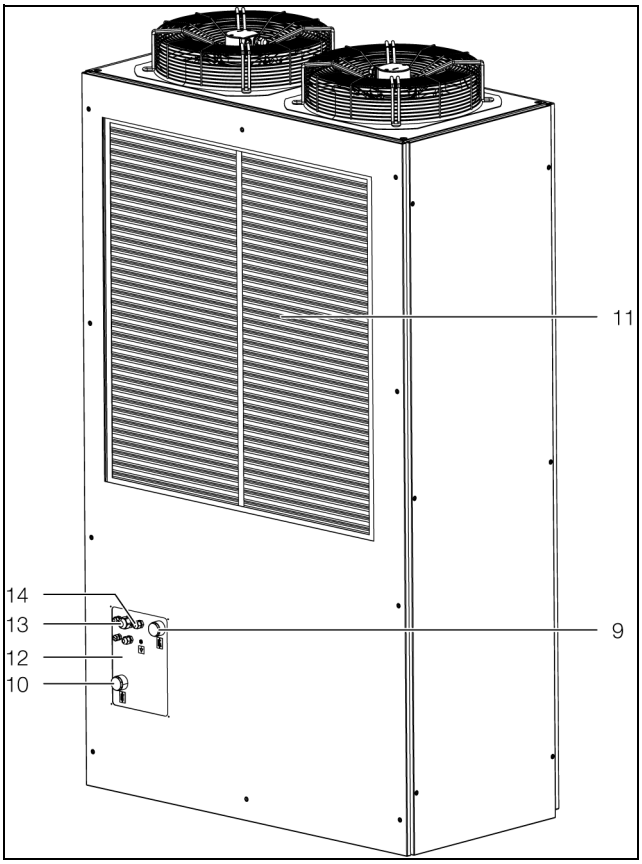

Fig. 6: View from rear (3335.860, 3335.870)

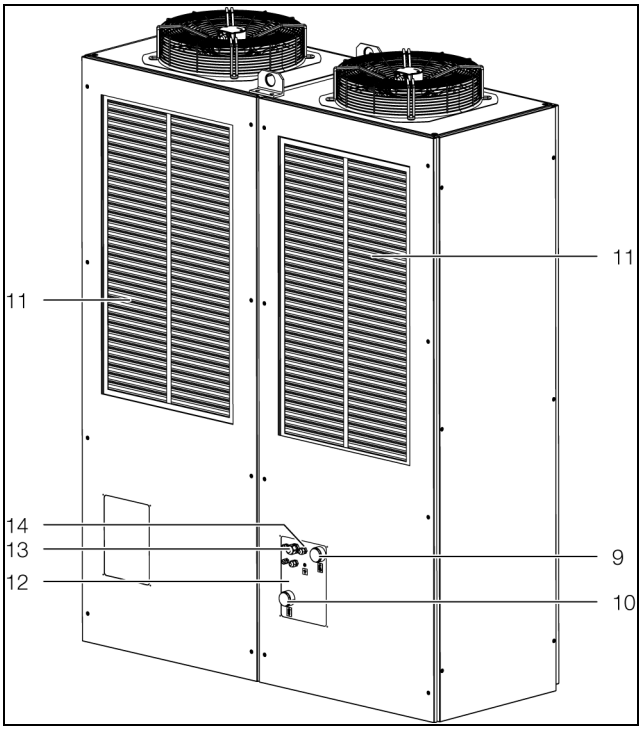

Fig. 7: View from rear (3335.880)

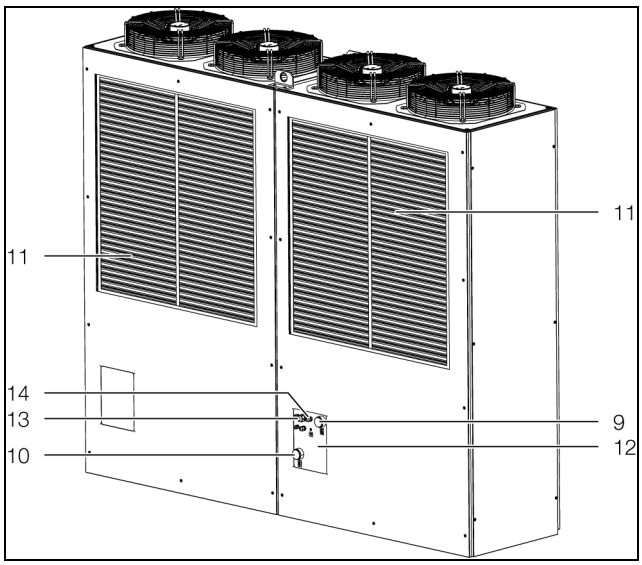

Fig. 8: View from rear (3335.890)

3.1 General functional description

The chiller comprises four main components (see fig. 9 or 10):

– Evaporator coil (item 15),
– refrigerant compressor (item 1),
– condenser (item 5) with fan (item 10),
– expansion valve (item 20),

which are connected together by pipes. A high-pressure switch (item 70) limits the maximum pressure in the refrigerant circuit. The low-pressure switch (item 71) switches off the refrigerant cycle in the event of low pressure. The R410A refrigerant is chlorine-free. Its Ozone Depletion Potential (ODP) is 0.

A filter drier (item 25) which is integrated into the hermetically sealed refrigerant circuit provides effective protection against moisture, acid, dirt particles, and foreign bodies. A temperature control with temperature probe (item 80) ensures that the cooling medium is maintained at a preset setpoint temperature.

In the evaporator coil (item 15), the liquid refrigerant is converted to a gaseous state. The heat necessary for this purpose is taken from the cooling medium in the plate heat exchanger, which has the effect of cooling the cooling medium. The refrigerant is compressed in the compressor (item 1). As a result the refrigerant has a higher temperature than the ambient air.

This heat is dissipated to the ambient air over the surface of the condenser (item 5), resulting in the refrigerant liquefying again.

The refrigerant is injected into the evaporator (item 15) using a thermostatic expansion valve (item 20), as a result it is expanded and as a consequence can absorb the heat from the cooling medium (water or water-glycol mixture).

The cooling medium is pumped to the equipment in a closed circuit using a pump (item 55) and cooling medium tank (item 10). Temperature monitoring of the evaporator coil (item 15) ensures protection against freezing if the flowrate is insufficient. The inlet temperature of the cooling medium (water-glycol mixture) is regulated via the controller (item 80).

Flow diagrams for the individual chiller types may be found in section 14 "Appendix".

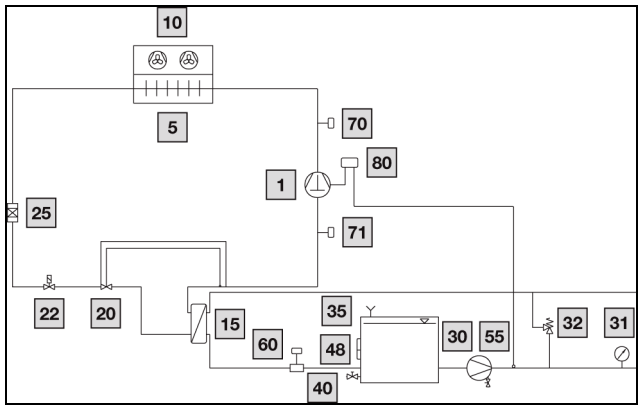

Fig. 9: Schematic diagram of chiller 3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870

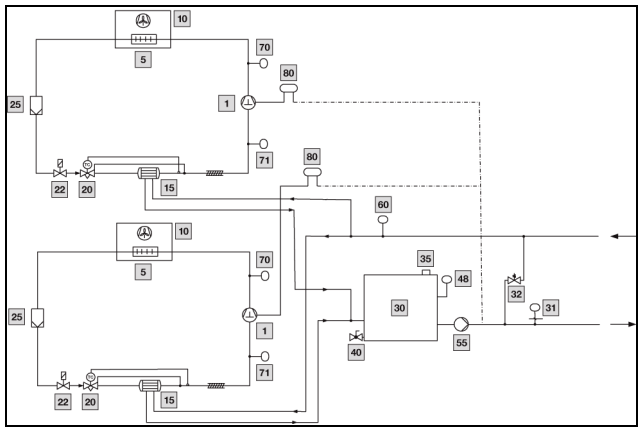

Fig. 10: Schematic diagram of chiller 3335.880, 3335.890

Key

1	Compressor
5	Condenser
10	Fan
15	Evaporator (plate heat exchanger)
20	Expansion valve
22	Magnetic valve
25	Filter drier
30	Cooling medium tank
31	Manometer (water pressure)
32	Bypass valve, automatically opening (opton)
35	Fill nozzle
40	Tank drain nozzle
48	Water level display
55	Cooling medium pump
60	Flow monitor (option)
70	High-pressure switch
71	Low-pressure switch
80	Controller

3.2 Control

The chillers are fitted with a controller for setting the functions of the chiller. Operating states are displayed using a display unit and parameters can be set using buttons.

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3.3 Characteristic curves

3.3.1 Characteristic curves of pump

Characteristic curves measured under the following conditions:

– Ambient temperature (T_a) = 32°C
– Medium temperature (T_w) = 18°C
– Cooling medium with 20% glycol

Key to figures 11 to 17

— 50 Hz standard pump
— 60 Hz standard pump
- - 50 Hz reinforced pump (option)
- - 60 Hz reinforced pump (option)
P External static pressure [bar]
Q Delivery flow [l/min]

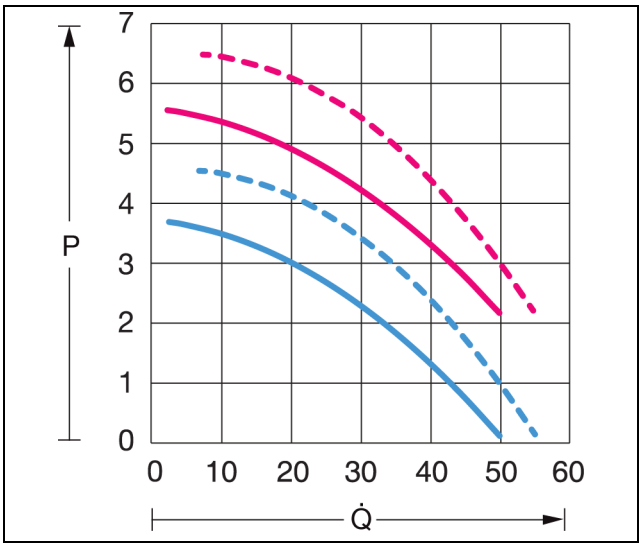

Fig. 11: Characteristic curve 3335.790 and 3335.830

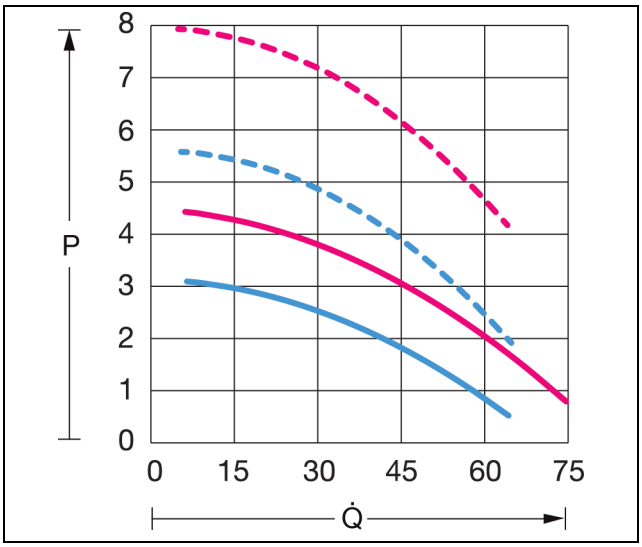

Fig. 12: Characteristic curve 3335.840

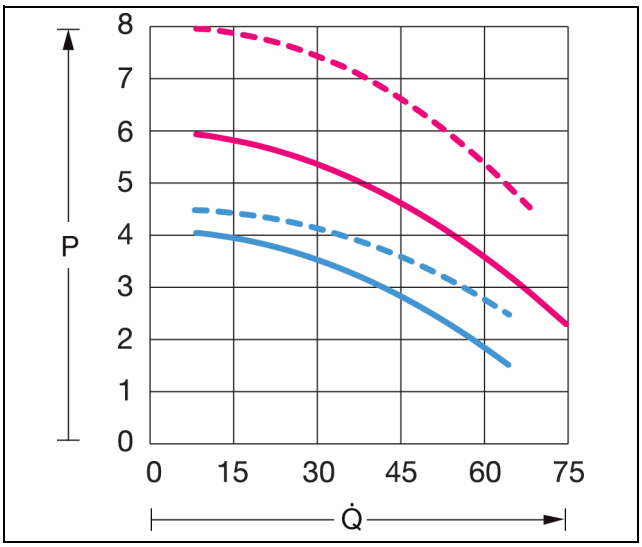

Fig. 13: Characteristic curve 3335.850

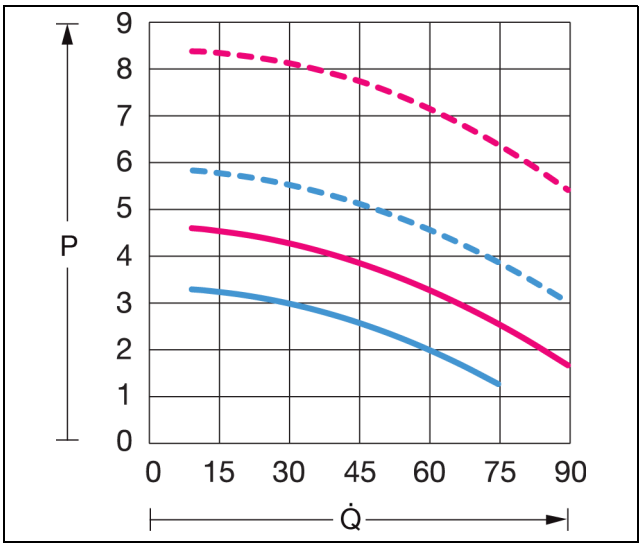

Fig. 14: Characteristic curve 3335.860

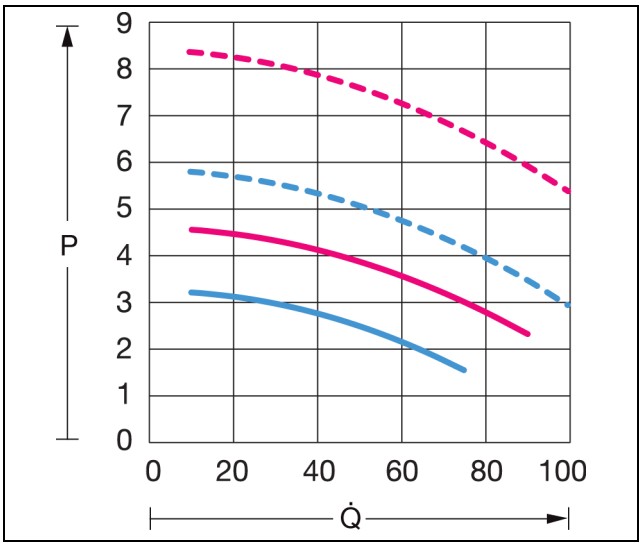

Fig. 15: Characteristic curve 3335.870

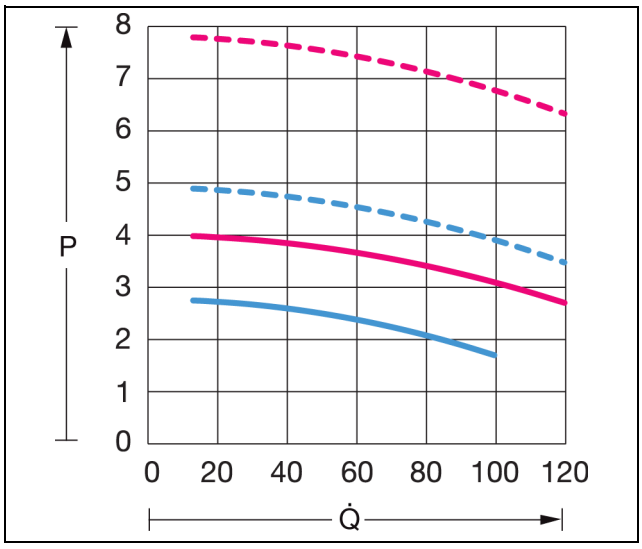

Fig. 16: Characteristic curve 3335.880

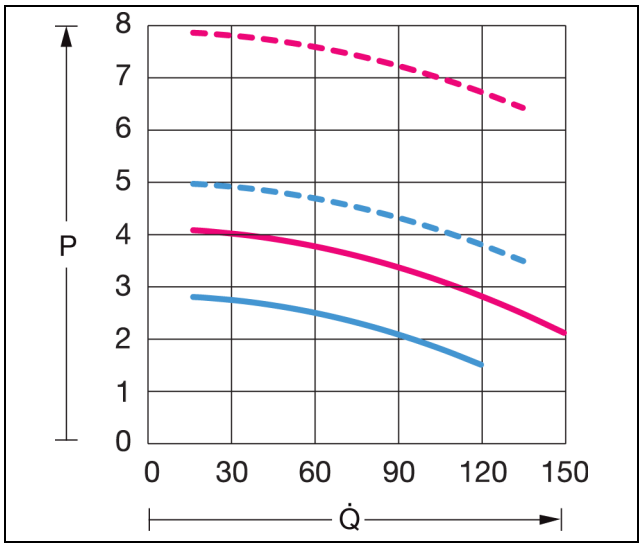

Fig. 17: Characteristic curve 3335.890

3.3.2 Performance diagrams

Characteristic curves measured under the following conditions:

– Ambient temperature (T_a) = 32°C
– Frequency = 50 Hz
– For further performance diagrams, see Rittal chiller configurator

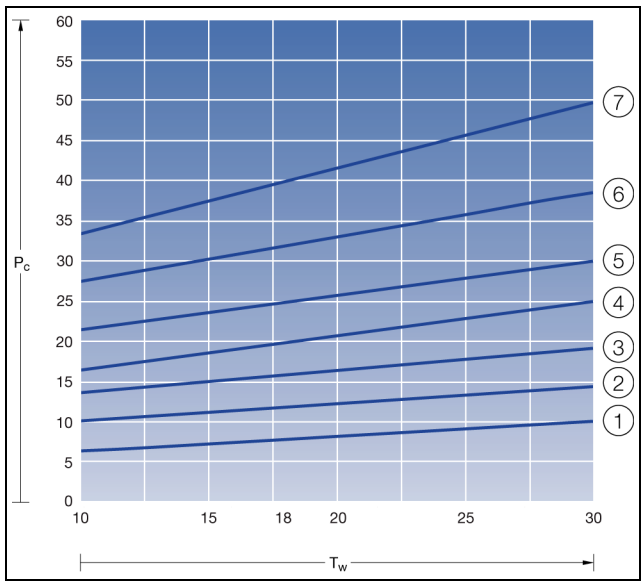

Fig. 18: Performance diagrams

Key

1 Model 3335.790 and 3335.830
2 Model 3335.840
3 Model 3335.850
4 Model 3335.860
5 Model 3335.870
6 Model 3335.880
7 Model 3335.890
T_W Water inlet temperature [°C]
P_C Total cooling output [kW]

3.4 Safety devices

– The chiller has a pressure switch in accordance with EN 12263, tested at component level, in the refrigerant circuit; this device is set to the maximum permissible pressure (PS).
– If there is a risk of icing of the evaporator, the compressor switches itself off and automatically switches itself back on again at higher temperatures.
– The refrigerant compressor motor, the fan motors and the pump are equipped with thermal winding protection switches against excess current and excess temperatures.
– The chiller also has a door contact switch to prevent activation while the door is open.

3.5 Filter mats (accessories)

For coarse dust and lint in the ambient air and/or air containing oil condensate, we recommend installing an additional metal filter mat (see section 11 "Accessories") in the chiller. The filter mats may be cleaned with suitable detergents and reused.

3.6 Proper usage

The chillers have been developed and designed in accordance with the state of the art and the recognised rules governing safety. Nevertheless, if used improperly, they may pose a threat to life and limb or cause damage to property.

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The chillers units described in these instructions must only be used for cooling water-glycol mixtures. When using other fluids, please refer to the technical specifications contained in the appendix, or contact the manufacturer. Under no circumstances should the limit values specified in the technical data be exceeded.

3.7 Scope of supply

The chiller is supplied in a packaging unit in a fully assembled state.

- Please check the scope of supply for completeness (tab. 2).
- Check the packaging carefully for signs of damage. Traces of oil on damaged packaging, for example, may be an indication of refrigerant loss.

Note:
Any packaging damage may be the cause of a subsequent functional failure.

Qty.	Description
1	Chiller
1	Dispatch bag with
1	– Set of operating and installation instructions
1	– Closing cap for the drain tap

Tab. 2: Scope of supply

EN

4 Transportation

If the chiller is stored or transported at temperatures below freezing, you must completely drain the cooling medium circuit and flush it with a water-glycol mixture to prevent frost damage. This instruction also applies to the external condenser circuit for a water-cooled condenser (option).

- Only transport the chiller in its original packaging material before commissioning for the first time. In case of damage, inform the manufacturer without delay.
- When transporting the chiller, the weight specified on the rating plate must be taken into consideration.
- Use lifting gear with a suitable load capacity.
- Only transport the chiller upright.
- Only transport the chiller on the pallet supplied with the chiller or with the eyebolts provided (fig. 19 to fig. 22, item 1).
- Ensure that the load is evenly distributed on all eyebolts.
- Prevent excessive vibration.
- If it is necessary to move the chiller in the factory, you must disconnect all connections on the chiller.
- Before transporting, empty the water circuit and tank (see section 8 "Inspection and maintenance").

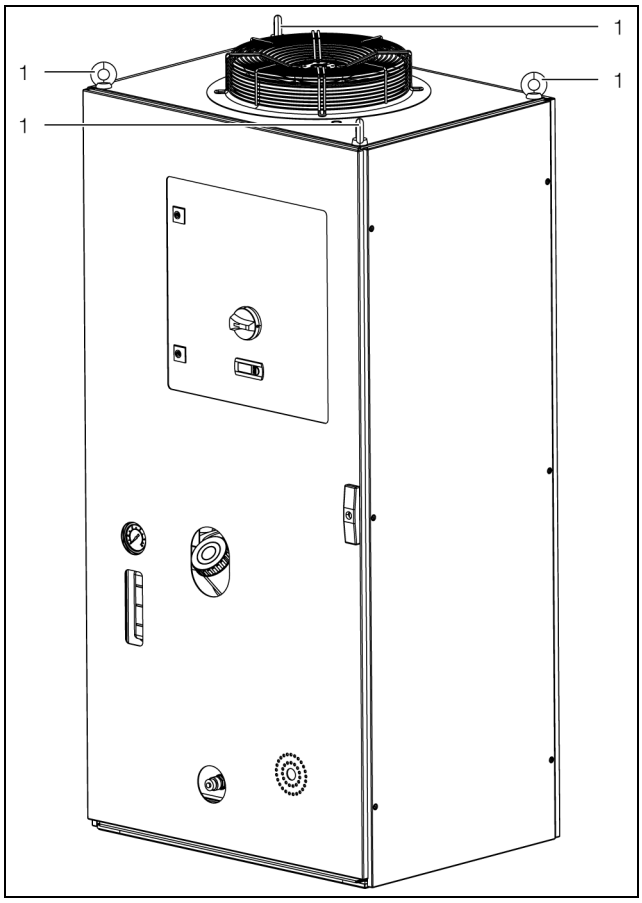

Fig. 19: Eyebolt for transportation (3335.790, 3335.830, 3335.840, 3335.850)

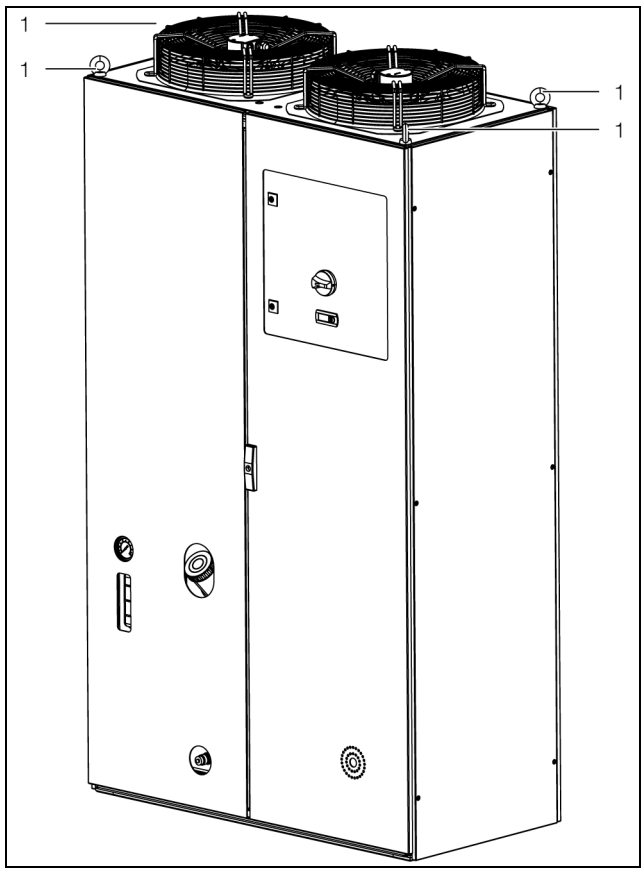

Fig. 20: Eyebolt for transportation (3335.870, 3335.860)

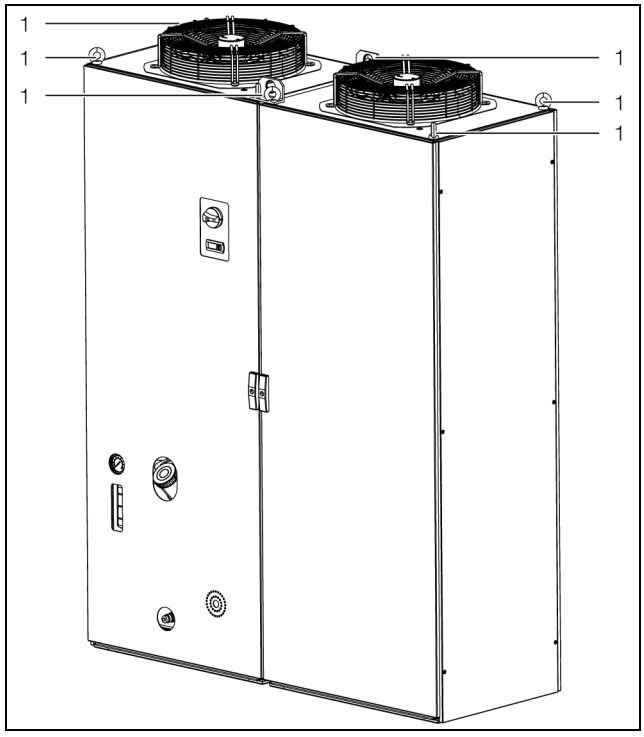

Fig. 21: Eyebolt for transportation (3335.880)

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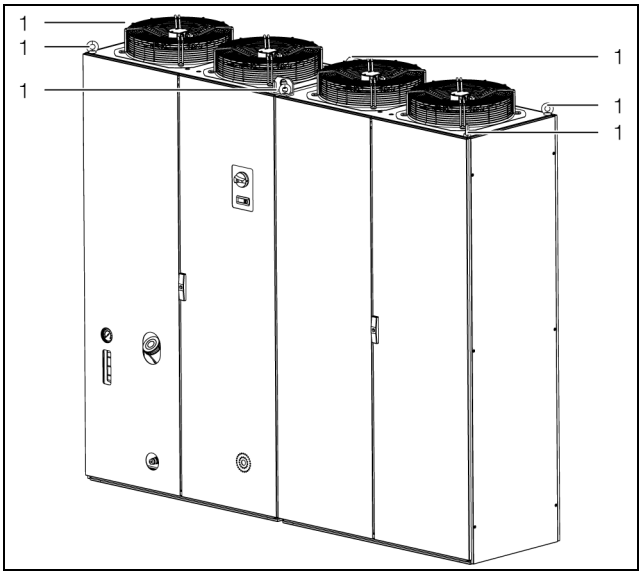

Fig. 22: Eyebolt for transportation (3335.890)

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5 Installation site, connection and assembly

5.1 Dimensions

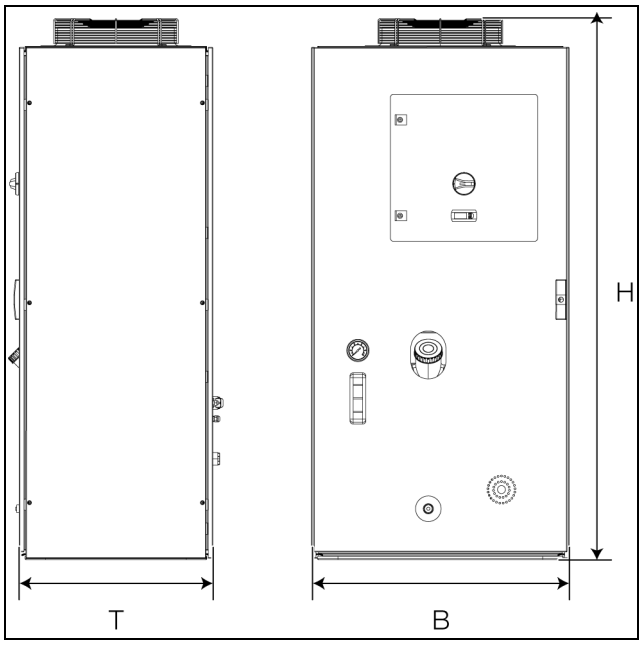

Fig. 23: Dimensions of front excluding base/plinth (shown 3335.790)

Model	Dimensions [mm]		
	W	H	D
3335.790	805	1700	605
3335.830	805	2100	605
3335.840	805	2140	605
3335.850	805	2140	605
3335.860	1205	2140	605
3335.870	1205	2140	605
3335.880	1605	2140	605
3335.890	2405	2140	605

Tab. 3: Dimensions of front excluding base/plinth

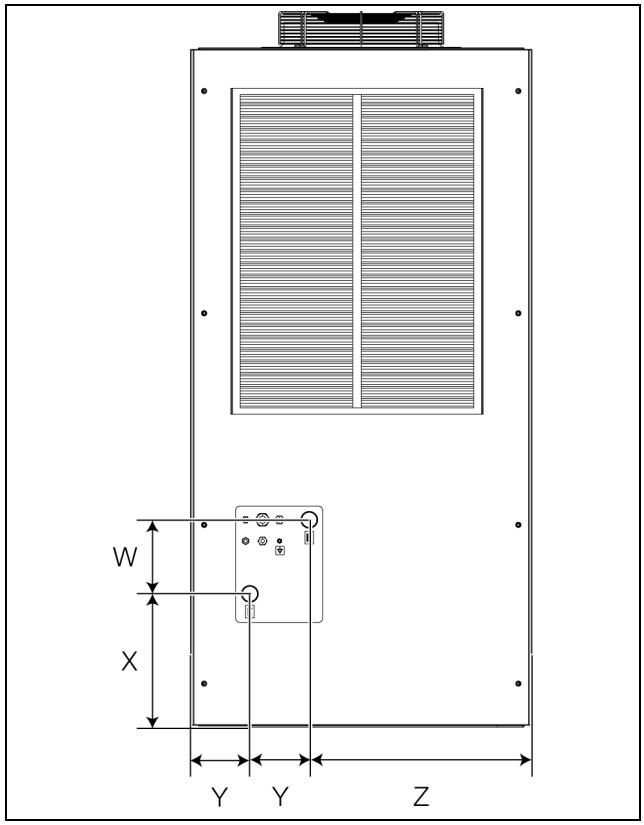

Fig. 24: Dimensions (supply connections) of rear excluding base/plinth (shown 3335.790)

Model	Dimensions [mm]			
	W	X	Y	Z
3335.790	175	315	140	525
3335.830	175	315	140	525
3335.840	175	315	140	525
3335.850	175	315	140	525
3335.860	175	315	140	925
3335.870	175	315	140	925
3335.880	175	315	140	525
3335.890	175	315	140	925

Tab. 4: Dimensions of rear excluding base/plinth

5.2 Installation site requirements

– The chiller must be adequately protected from external weather conditions.
– If the ambient air contains a high concentration of dust or oily substances, the chiller should be fitted with a metal filter (see section 11 "Accessories").
– The supporting surface should be flat and sufficiently robust to hold the weight (see rating plate) during operation.
– The ambient temperature must not exceed +43°C nor fall below +10°C (or -20°C with a winter controller, optionally available).

– In order to prevent performance losses caused by pressure drops in the pipework, the chiller should be sited as close as possible to the equipment.
– In order to make maintenance and repair work easier, the minimum distances shown in tab. 5 should be adhered to.
– In order to avoid an "air short-circuit" (mixing of air intake and waste air) and ensure full cooling output, the minimum distances shown in tab. 5 should be adhered to.

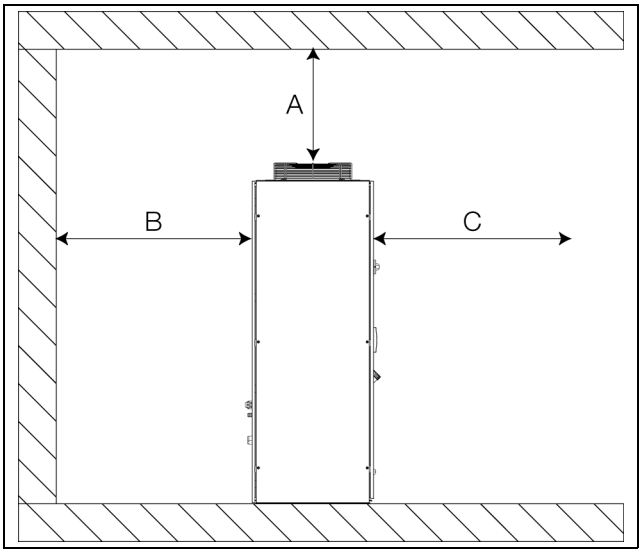

Fig. 25: Minimum distances

Page	Minimum distance [mm]	Reason
A (air outlet, top)	1000	Required distance from air outlet
B (air intake, rear)	800	Required distance from air inlet
C (front)	800	Minimum distance for maintenance

Tab. 5: Minimum distances

■ Ensure the room is adequately ventilated by installing the chiller such that the warm exhaust air does not heat the room excessively.

Note:
With a water-cooled condenser (option), the distances shown in tab. 5 need not be observed.

Caution!
The connection of an air intake / waste air duct is inadmissible. These devices are equipped with axial fans and are incapable of developing the requisite pressure resistance.

■ To prevent performance losses, do not install the chiller near any form of heating.

Outdoor siting
Chillers must be installed such that they cannot become damaged by internal traffic and transport operations.

5.3 Minimum volume of installation site

The minimum volume of the installation site is calculated from the ratio of refrigerant fill volume [kg] to the practical limit [kg/m³] of the refrigerant.

Note:
The practical limit (PL) is a refrigerant-specific value. It indicates the maximum permissible volume of refrigerant per m³ of space which could be released suddenly without injury to persons.

Example:
The practical limit of refrigerant R410A is 0.44 kg/m³.
The refrigerant fill volume of chiller 3335.790 is 2.3 kg.
The minimum volume of the installation site [m³] is therefore:

$$Vr = \frac{G_{zul.}}{PL} = \frac{2.3\ kg}{0.44\ kg/m^3} = 5.2\ m^3$$

Whereby:
Vr = Minimum room volume of installation site [m³]
PL = Practical limit of refrigerant [kg/m³]
$G_{zul.}$ = Max. fill volume of refrigerant [kg]

The following table shows the minimum room volume of the installation site depending on the chiller.

3335.	790	830	840	850	860	870	880	890
Refrigerant R410A weight:								
[kg]	2.3	2.3	2.8	2.8	3.3	4.0	5.6	6.6
Empty weight of chiller								
[kg]	242	248	282	282	360	374	511	646
Weight with full water tank:								
[kg]	317	323	357	357	510	524	586	796

Tab. 6: Weights and minimum volume of installation site

3335.	790	830	840	850	860	870	880	890
Minimum room volume of installation site								
[m³]	5.2	5.2	5.4	5.4	7.5	9.1	12.7	15

Tab. 6: Weights and minimum volume of installation site

5.4 Installing the chiller

- Install the chiller on an even, firm surface. The maximum permissible deviation from the vertical is 2°.

– A pressureless water tank is installed in the chiller. It must therefore be installed higher than the equipment. For installation at a lower height we recommend installing a non-return valve in the inlet and a magnetic valve in the return of the cooling medium circuit (option) so as to avoid a potential tank overflow (fig. 26).

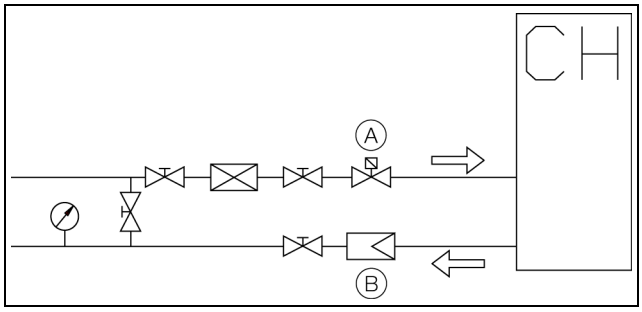

Fig. 26: Installation example with non-return and magnetic valve

Key

A Magnetic valve
B Non-return valve

– Installing an overflow valve (option, see section 11 "Accessories") ensures that cooling water circulation is always maintained with the magnetic valves of the air/water heat exchangers closed and the chiller pump running. This is achieved by opening the overflow valve as soon as the static pressure exceeds the value set on the valve (fig. 27).

Note:
To set the valve to the required pressure, please proceed as follows:

- Remove the cap nut (1).
- Loosen the lock nut (3) by twisting in a counter-clockwise direction and set the pressure screw (2) to the required pressure.
- Screwing it lower will increase the pressure.
- Screwing it higher will reduce the pressure.
- Next, tighten the lock nut (3) again by twisting in a clockwise direction.

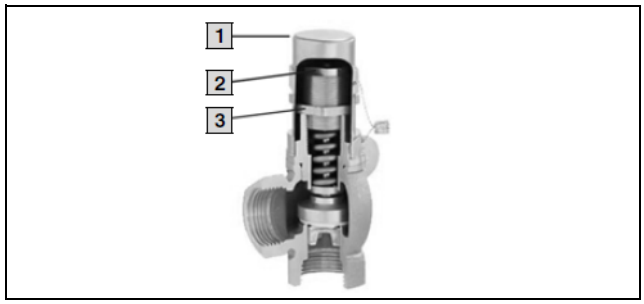

Fig. 27: Overflow valve

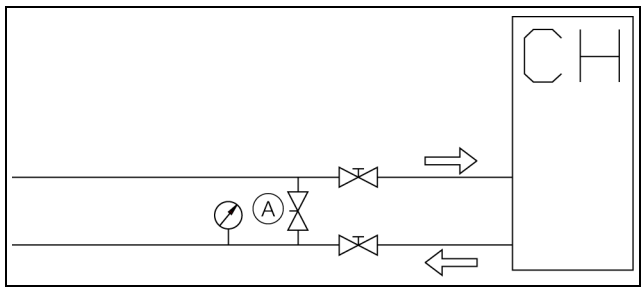

Fig. 28: Installation example with overflow valve

5.5 Making the hydraulic connection

Caution!
Risk of damage to the cooling medium pump due to soiling in the cooling medium circuit! Flush the cooling medium circuit prior to connecting the chiller.

The cooling medium outlet (fig. 5 to fig. 8, item 10) on the chiller must be connected to the cooling medium inlet on the equipment to be cooled. At the same time, the cooling medium inlet (fig. 5 to fig. 8, item 9) on the chiller must be connected to the cooling medium outlet on the equipment to be cooled. Please observe the following:

– To avoid condensation, always connect the equipment using insulated pipelines and/or hoses.
– The nominal width of the piping must correspond at least to the nominal width of the media connections on the chiller.
– The pipework must be approved for the maximum pressure expected (see section 14.4 "Technical specifications").

Note:
The use of steel pipes or galvanised steel pipes is inadmissible.

Prior to commissioning, it is imperative that the cooling medium pump is filled with cooling medium and bled (see section 6 "Commissioning").

Note:
With the water-cooled condenser (option), make the cooling water connections with the requisite volumetric flow (as per the diagram in the R+ID fluid plan).

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Caution!
If the liquid to be cooled contains solid particles, we recommend installation of a mechanical filter upstream of the cooling medium inlet. In order to ensure regular cleaning, two shut-off valves should additionally be installed.

5.6 Making electrical connection

Danger!
It is imperative that you follow the instructions given below.

- When carrying out the electrical installation, observe all applicable national and regional regulations as well as the regulations from the responsible utility company. Electrical installation must only be carried out by a qualified electrician who is responsible for compliance with the existing standards and regulations.
  - The connected voltage and frequency must correspond to the values stated on the rating plate.
  - No additional temperature control may be connected upstream of the chiller at the supply end.
- Set the pre-fuse (motor circuit-breaker) as per the specifications on the rating plate.
  - The mains connection must ensure low-noise potential equalisation. The chiller must be integrated into the building's equipotential bonding system.
  - The conductor cross-sections of the power cable must be selected according the rated current (see rating plate).
  - The chiller does not have its own overvoltage protection. Measures must be taken by the operator at the supply end to ensure effective lightning and overvoltage protection. The mains voltage must not exceed a tolerance of ±10% (see section 14 "Appendix").
  - In accordance with IEC 61 000-3-11, the chiller is intended solely for use at sites with a continuous current-carrying capacity (incoming mains power supply) of more than 100 A per phase and with a supply voltage of 400/230 V. If necessary, the power supply company must be consulted to ensure that the continuous current-carrying capacity at the point of connection to the public grid is sufficient for connection of the chiller.
  - The connection must be made with the field rotating clockwise. The direction of rotation of the field can be measured at the connection terminals L1, L2 and L3. Connection with a clockwise rotating field ensures that all three-phase motors rotate in the correct direction.

Caution!
Electrical connection with 460 V / 60 Hz.

If your chiller uses an auxiliary supply of 24 V AC and you wish to operate your chiller at 460 V/3~/60 Hz, it is necessary to rewire the transformer. This transformer assignment must be carried out by an authorised, trained member of staff prior to installation, observing all safety requirements.

Note:
The guarantee is not affected by this rewiring.

Note:
In its delivered state, the transformer is defined to a supply voltage of 400 V. Disconnect this connection and reassign it to 460 V (see fig. 29).

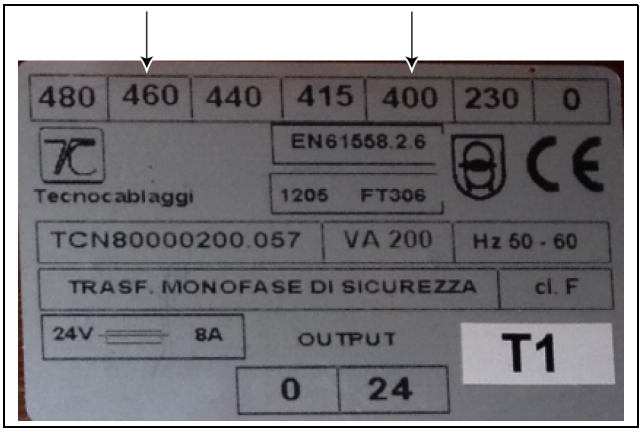

Fig. 29: Transformer connection

Note:
If the chiller has a black main switch (option), a respective emergency-off device must be installed in addition according to DIN EN 60204. If this is not provided by the customer, the EC declaration of conformity will not be valid.

5.6.1 Connecting the power supply

The chiller is prewired ready for connection in the factory and equipped with a connection cable (length 3 m).

- Make the electrical connection as per the electrical circuit diagram (see circuit diagram for the relevant unit type in section 14 "Appendix").

5.6.2 Connecting the alarm relay query device

You can also query fault messages with a floating contact on the connection clamp of the chiller. The necessary wires are already present in the connection cable and are connected in the chiller.

- Connect the correspondingly labelled wires of the connection cable to the controller as shown in the electrical circuit diagram (fig. 30).

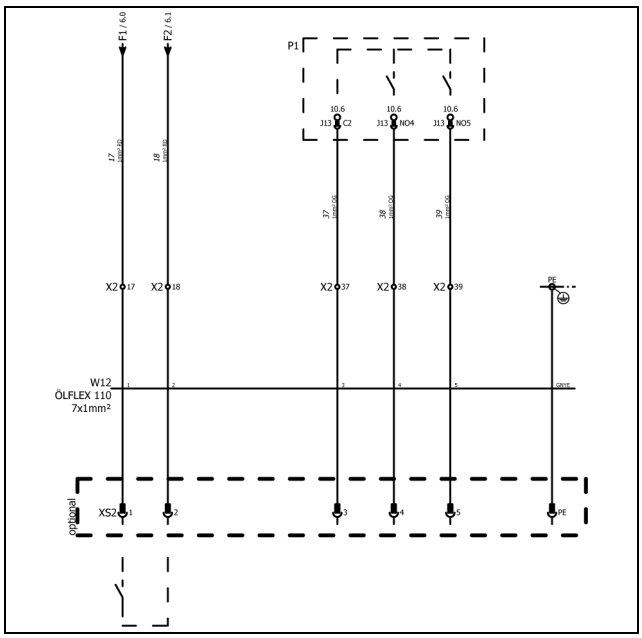

Fig. 30: System message

5.6.3 External activation

The chiller has been prepared for control via an external signal. To implement this, the customer must connect contacts 1 and 2 on the signal cable.

Caution!
If you are using external activation, the bridge implemented in the factory must be removed.

5.7 Room temperature sensor (option)

The chiller allows for room-temperature-based control (see section 7.2.4 "Types of operation (control mode)"). To this end, a room temperature sensor (cable length from chiller: 4 m) is required, which is available as an optional accessory. The cable entry is on the rear of the chiller (see fig. 5 to fig. 8, item 14). The electrical connection is described in section 14.2 "Electrical circuit diagram"). The activation parameters are described in section 7 "Operation".

5.8 Installing the filter mats (accessories)

For coarse dust and lint in the ambient air and/or air containing oil condensate, we recommend installing an additional metal filter mat (available as accessories, see section 11 "Accessories") in the chiller. These may be cleaned with suitable detergents and reused.

For the installation, proceed as follows (fig. 31):

- Remove the protective grille from the rear of the chiller by loosening the 4 screws.
- Push the filter mat (item 1) into the top recess.
- Press the filter mat lightly against the membranes of the condenser heat exchanger (item 2).
- Allow the filter mat to slide into the bottom recess.

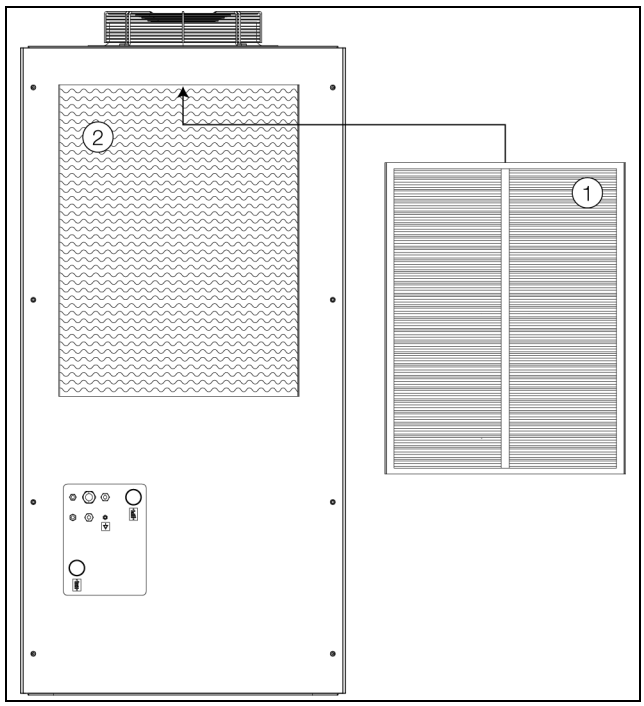

Fig. 31: Installation of the air filter

Key

1 Filter mat
2 Membranes of the condenser heat exchanger

Caution!
Risk of injuries from sharp edges.

The table below provides an overview of the Model Numbers for metal filters depending on the chiller type:

Type	Model No.
3335.790	3286.550
3335.830	
3335.840	3286.530
3335.850	
3335.860	3286.540
3335.870	
3335.880	2 x 3286.530
3335.890	2 x 3286.540

Tab. 7: Model Numbers for metal filters

EN

6 Commissioning

The chiller has a red (optionally available in black) master switch (see fig. 1 to fig. 4, item 2). Rotate it by a quarter-turn in a clockwise direction to ready the machine for operation.

6.1 Cooling medium

As standard, the chiller is not suitable for operation below the specified minimum temperature (see section 14 "Appendix"), unless you have selected the option "winter control" for an extended ambient temperature range.
Generally speaking, a water-glycol mixture with a maximum glycol proportion of between 20 and 34% by volume should be used as the cooling medium. We recommend our ready-mixed "Cooling medium for chillers" (see section 11 "Accessories"). Other water-glycol mixtures may be possible in individual cases, but only in consultation with the manufacturer. For further information, please refer to section 8 "Inspection and maintenance".

Model No.	Quantity [l]	Application
3301.950	10	Outdoor
3301.960	10	Indoor
3301.955	25	Outdoor
3301.965	25	Indoor

Tab. 8: Model numbers – Cooling medium for chillers

Note:
Only use distilled or de-ionised water in chillers specified for such use (see section 14 "Appendix").

Caution!
Other additives may damage the pipes and the seal on the cooling medium pump, and are therefore only admissible by arrangement with Rittal.

To prevent problems in the cooling medium circuit (including water-cooled chillers), it is imperative that the VGB Cooling Water Guidelines (VGB-R 455 P) are observed.
The correct glycol concentration proportions may be read and determined using a refractometer.

6.2 Filling the cooling medium

- Ensure that any shut-off valves installed in the cooling medium circuit are open.
- Fill the cooling medium into the chiller tank via the fill nozzle (fig. 32, item 1).

The correct fill volume (between minimum and maximum) may be read from the water level display (see fig. 32, item 2) on the outside of the tank without having to open the door of the chiller.

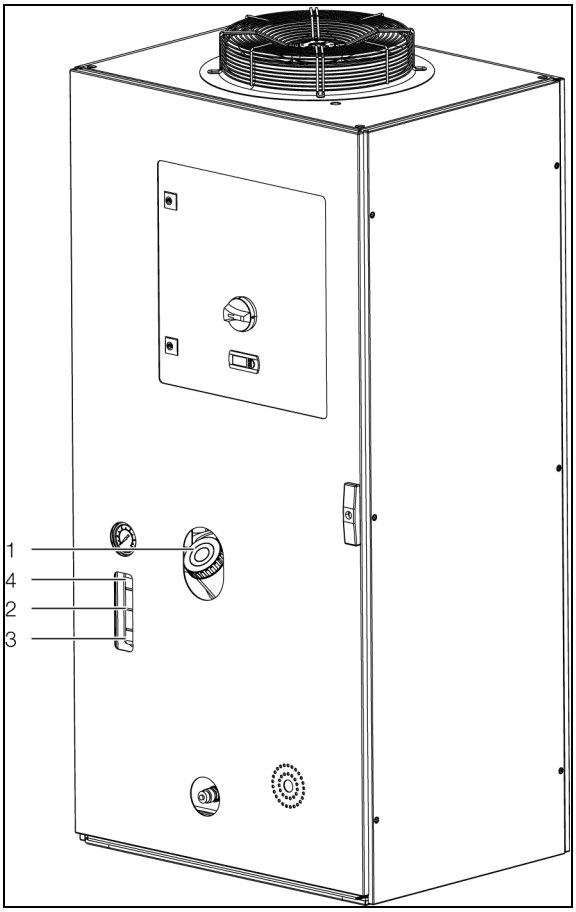

Fig. 32: Filling the cooling medium (shown 3335.790)

Key
1 Fill nozzle
2 Water level display
3 Minimum fill volume
4 Maximum fill volume

6.3 Commissioning procedure

Please observe the general procedure when commissioning the chiller:

Phase	Description
Read the manual	Ensure that the operator of the chiller has read and understood the operating instructions. Also, please ensure that all valid provisions are adhered to and the safety systems referred to in this manual have been set up.
Open the system valves	Open the shut-off valves (if installed) on the inlet and outlet of the chiller. Do not open the manual bypass valve or overflow kit (if installed) (refer to overflow kit instructions).

Tab. 9: Commissioning

Phase	Description
Fill the cooling medium	Fill the chiller with cooling medium as per the rating plate (see section 6.2 "Filling the cooling medium").
Establish the power supply	Supply the chiller with voltage as per the rating plate. Next, twist the red master switch to ON. Caution! If power is supplied by a generator, always ensure that the generator is running normally before switching on the chiller.
Wait for the controller to reboot	After switching on the chiller, the electronic controller will take about 30 seconds to reboot. After this, the cooling medium pump will start up. The factory setting is 18°C. If the temperature of the liquid to be cooled is below this, the compressor and fan will fail to start. **Caution!** If the phase position is incorrect, a corresponding alarm will appear on the display. Implement a phase change after disconnecting the power.
Top up the cooling medium	With the pump operational, the cooling medium will start to circulate throughout the entire system, and the fill level in the tank will drop. Please top up the cooling medium to restore the fill level described in section 6.2 "Filling the cooling medium".
Set the temperature	Set the required temperature if this differs from the preset value (18°C).

Tab. 9: Commissioning

Note:
If the compressor and condenser fan do not start to operate, the temperature of the cooling medium added is lower than the setpoint temperature set.

- If necessary, lower the setpoint temperature momentarily (see section 7 "Operation").

6.4 Bleeding the cooling medium pump

- Bleed the cooling medium pump (with the system at a standstill) by loosening the bleed screw a little (fig. 33, item 1).
- As soon as cooling medium escapes, re-tighten the screw.

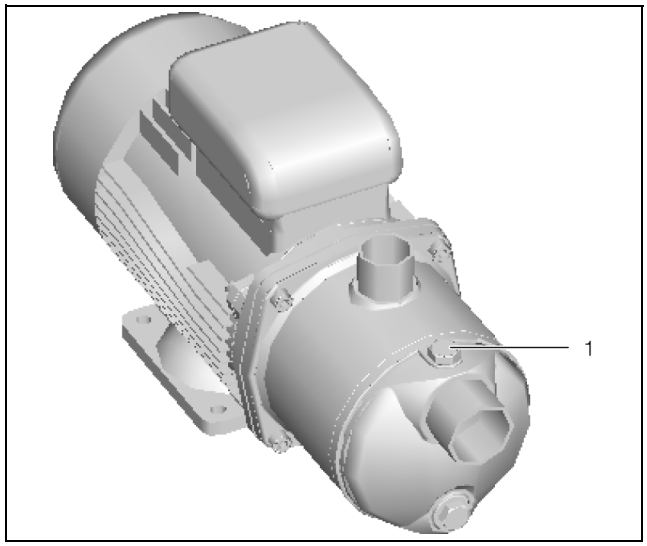

Fig. 33: Bleeding the cooling medium pump

Note:
With a water-cooled condenser (option), you must activate the external condenser circuit for the condenser (optionally by the operator).

- Check the connection lines and pipe connections for leaks during commissioning.

EN

7 Operation

The chiller is switched on and off using the master switch. After the power supply is switched on, the display "E0" appears for approx. 30 seconds to indicate that the unit is operational. During operation, the inlet temperature (to the equipment) of the refrigerant is displayed in °C.

7.1 Control components

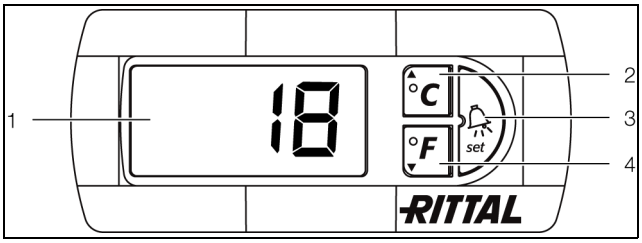

Fig. 34: Control components

Key

1 Display showing the temperature and parameters
2 Green LED = Compressor active
3 Orange LED = Warning
4 Red LED = Alarm

Note:
If no LEDs are illuminated and the display shows the inlet temperature, the machine will run, but the cooling medium does not need to be cooled.

Using buttons 2, 3 and 4, you can change the control parameters within the preset ranges.

7.2 Programming and settings

7.2.1 Basic functions

The following diagram illustrates some of the basic functions of the chiller:

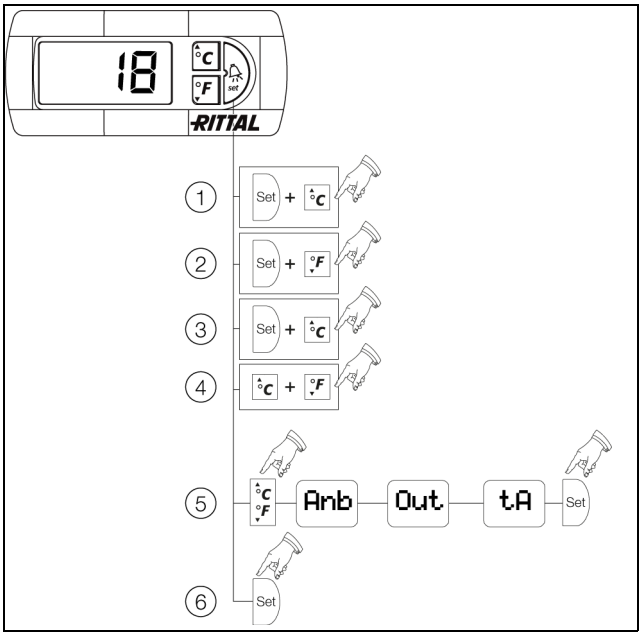

Fig. 35: Basic functions

Key

1 Switch on the chiller (from standby)
2 Switch off the chiller (to standby)
3 Exit menu
4 Restart the pump
5 Displays: Ambient temperature (Anb) (optional), medium temp. (Out), temp. of anti-freeze (tA)
6 Summer suppression

Note:
"+" means that both buttons must be pressed simultaneously.

Switch the chiller on and off:

When switching the Chiller on for the first time, please note that after pressing the master switch (fig. 1 to fig. 4, item 2) and ending the reboot phase, the chiller will be in standby mode. For this reason, in order to switch it on, it is additionally necessary to press the key combination set + °C. The chiller is switched off into standby mode by pressing the key combination set + °F. Alternatively, the device can also be disconnected from the mains directly via the main switch (fig. 35).

Note:
The chiller can only be switched into standby mode in its original state (display of the inlet temperature during operation).

Temperature displays

During operation, as well as the inlet temperature (OUT), it is also possible to display the ambient temperature

(Anb) (only with optionally available external temperature sensor) and the temperature on the plate heat exchanger (anti-freeze sensor) (tA). To do so, press the °F or °C keys during operation until the required sensor is displayed, and confirm your selection with set. Pressing the set key again will return you to the start menu.

Apart from these basic functions (fig. 35), changes to the parameters may only be made in the appropriate levels (see section 7.2.2 "Access levels").

7.2.2 Access levels

The parameters are accessed via menus, which are located at three different levels.

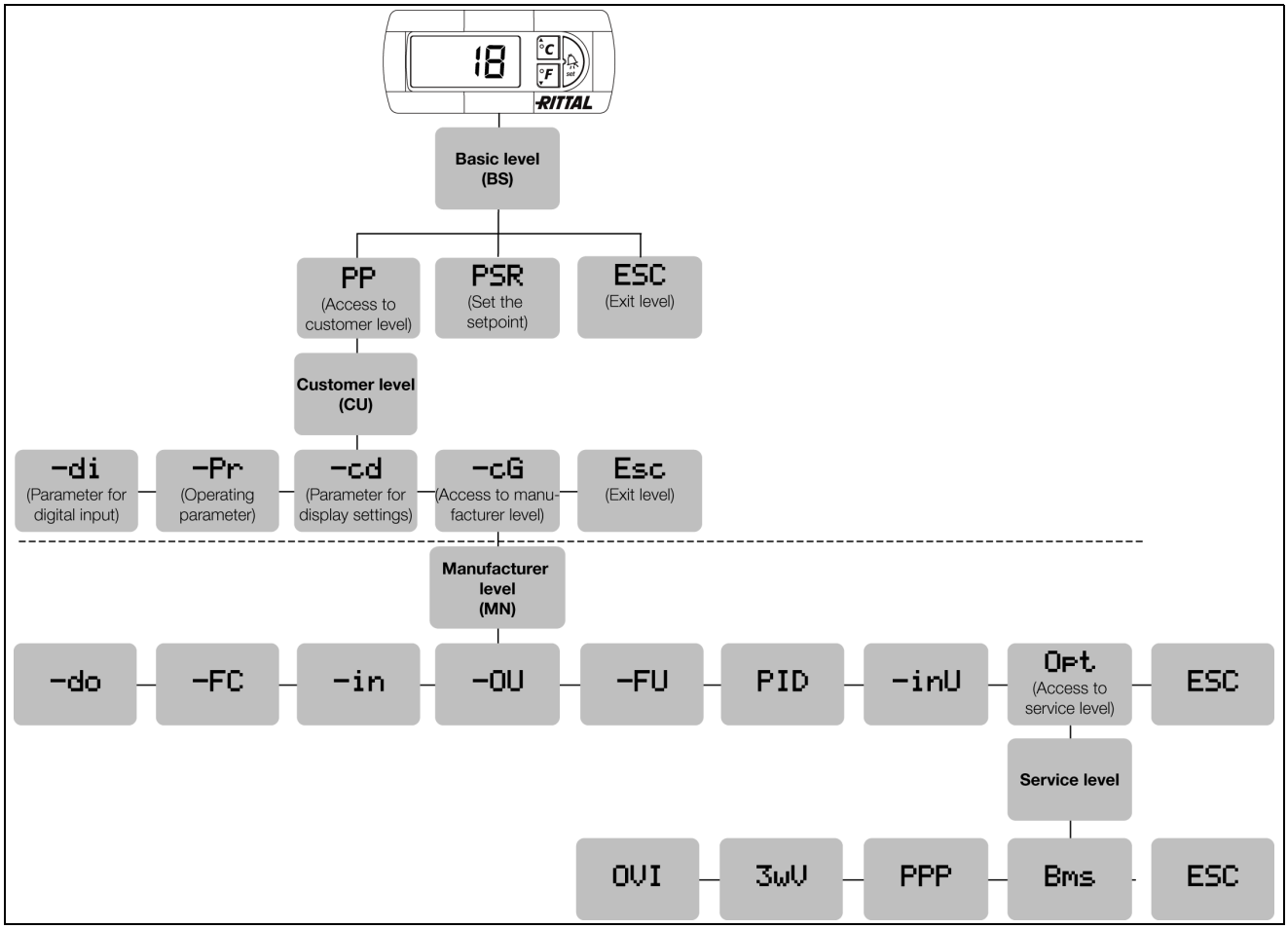

Fig. 36: Overview of programming levels

7.2.3 Basic and customer level

To gain access to the basic level (BS), you must hold the set button down for approximately 2 seconds until PP appears in the display. As shown in fig. 37, you have the following options:

– Switch to customer level (via PP)
– Set the required temperature (parameter "PSr")
– Exit the basic level (via ESC)

The customer level can be accessed by entering the customer password "22". You access the customer level menus with the °C and °F keys and then confirm with the set key (fig. 37).

Note:
The manufacturer level is reserved for trained service staff and is only accessible by entering the manufacturer password.

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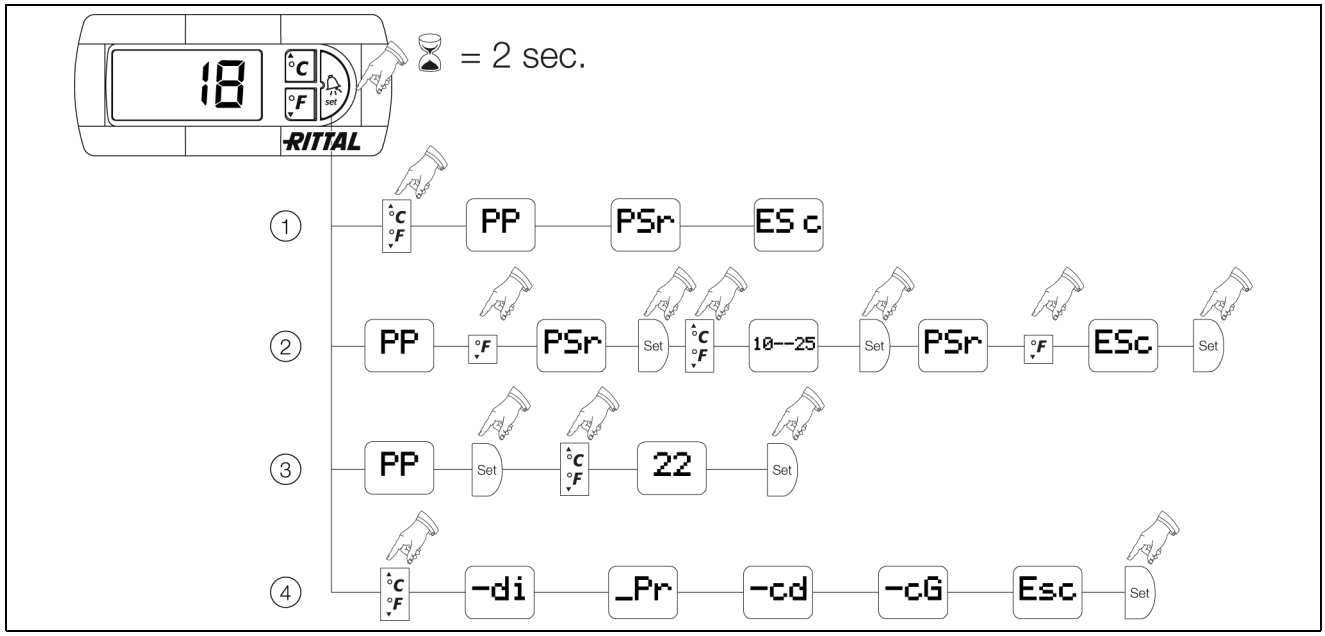

Fig. 37: Basic and customer level

Key

1 Options at basic level
2 Set the required temperature (PSr)
3 Switch to customer level
4 Scroll through the menus at customer level

Note:
Parameter adjustment is aborted if no entries are made for around 2 minutes.
The value currently being edited will be saved. The indicator will then show normal operating values again.

7.2.4 Types of operation (control mode)

No.	Operating mode	Application
1	Absolute (fixed value control)	To be used if the application requires a constant medium temperature
2	Relative (room temperature-based control **with** limit values)	To be used when a combination of the relevant and absolute operating modes is required. Depending on the ambient temperature, the target value is thus either constant (absolute) or variable (relative). With due regard for the adjustable upper and lower limit values.
3	Relative (room temperature-based control **without** limit values)	To be used if the application requires a medium temperature that varies depending on the ambient temperature. Adjustment of the medium temperature to the ambient temperature may be set here (e.g. so that the medium temperature is always 2°C below the ambient temperature). However, it is limited by the limits PJr and PYr. This application requires an external temperature sensor (option).

Tab. 10: Overview of operating modes

Operating mode 1 – Absolute (fixed value control)

To be used if the chiller requires a constant medium temperature
– PSr = Setpoint
– Pdr = Hysteresis
If the medium temperature is above "PSr+Pdr", the chiller is switched on. If it is below "PSr", the chiller is switched off.
The selectable parameters are:
– PAr = ABS (standard)
– PSr = Setpoint (standard: +18°C)
– Pdr = Switching difference (standard: 2 K)
– PJr = Smallest value that may be set (standard: 10°C)
– PYr = Highest value that may be set (standard: 25°C)

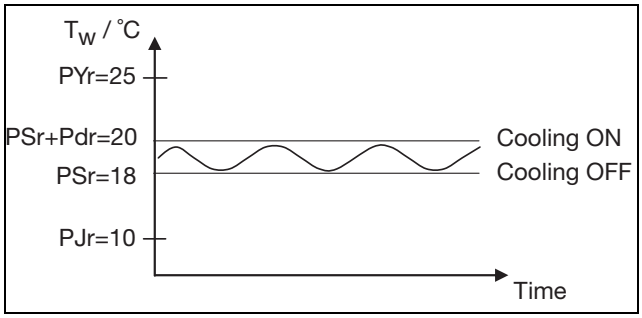

Fig. 38: Fixed value control

Key
PSr = Setpoint T_w = 18°C
Pdr = Hysteresis = 2 K

Note:
The limits PJr and PYr are preset in the factory to 10°C (PJr) and 25°C (PYr). The setpoint PSr may therefore only have a value within this range. If a setpoint of > 25°C is required, you must first adjust the limit PYr (see section 7.2.5 "Setting the operating mode").

Operating mode 2 – Relative (room temperature-based control)
If the ambient temperature falls below a certain parameter (PS1), fixed value control (absolute) becomes active. At higher temperatures, the chiller is in room temperature-based mode. If the compensated setpoint value exceeds parameter PHc, the chiller returns to fixed value control.

The following parameters will need to be set:

Parameter	Setting Min/Max	Description
PAr	ABS	For fixed value control
POC	EST	For summer equalisation
PS1	0 - 40	If the ambient temperature drops below this value, fixed value control will become active.
PSr	10 - 25	Setpoint in fixed value control mode
Pdr	2 - 5	Hysteresis
PHc	5 - 30	Maximum setpoint
PCE	0.5 - 2	Gradient of the compensated setpoint adjustment
KSW (compensated setpoint)	PSr + (AMB - PS1) x PCE	Setpoint in room temperature-based control mode

Tab. 11: Parameter

Example:
– PS1 = 25
– PSr = 24
– Pdr = 2
– PHc = 30
– PCE = 1.5

– AMB below 25°C = Mode: absolute
– AMB above 25°C to 29°C = Mode: room temperature-based
– AMB above 29°C = Mode: absolute

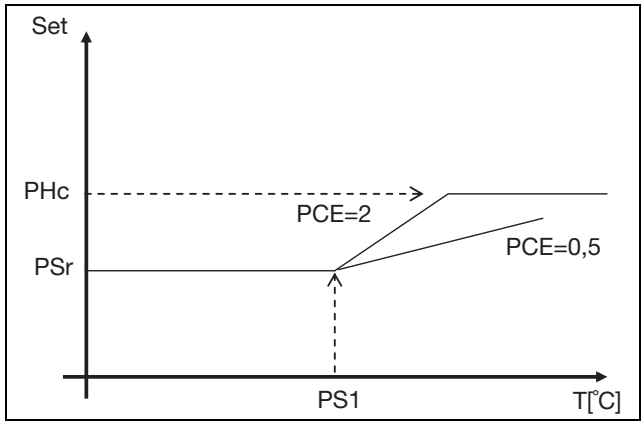

Fig. 39: Operating mode 2 – Relative (room temperature-based control **with** limit values)

Operating mode 3 – Relative (room temperature-based control without limit values)
To be used if the application requires a medium temperature that varies depending on the ambient temperature.
– AMB = ambient temperature
– PSr = Setpoint as the difference from the ambient temperature
– Pdr = Hysteresis
– Setpoint = AMB + PSr
For the majority of applications, the setpoint must be below the ambient temperature. The PSr value must therefore be negative.
If the medium temperature is above "PSr+Pdr", the chiller is switched on. If it is below "PSr", the chiller is switched off. We recommend a negative value of -2 for PSr.
The selectable parameters are:
– PAr = REL
– PSr = Setpoint as the difference from the ambient temperature. We recommend the use of values <0, e.g. PSr = -2
– Pdr = Hysteresis
– PJr = Minimum setpoint
– PYr = Maximum setpoint

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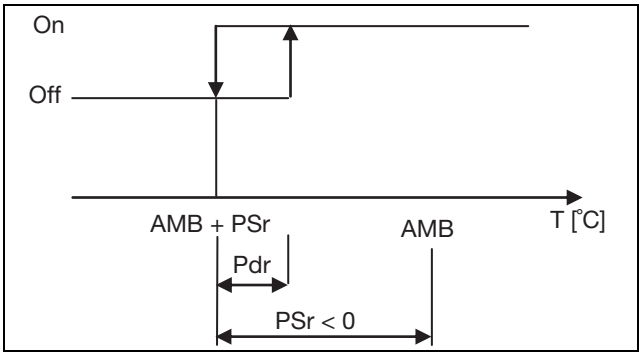

Fig. 40: Operating mode 3 – Relative (room temperature-based control **without** limit values)

Example:

– PSr = -2 K
– Pdr = +5 K
– AMB = 15°C

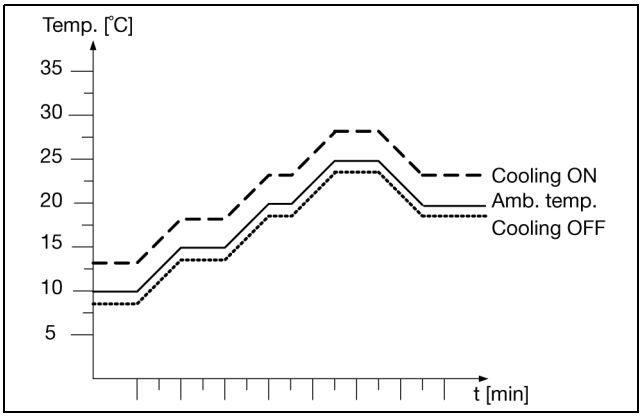

Fig. 41: Example

K_{on} = AMB + PSr + Pdr = 15 + (-2) + 5 = 18°C
With these parameters, the chiller will start to cool at a medium temperature of 18°C.

K_{off} = AMB + PSr = 15 + (-2) = 13°C
Upon reaching the setpoint of 13°C, the chiller will swtich off.

K_{on} = Chiller ON
K_{off} = Chiller OFF

Note:
Negative values for parameter PSr will mean a setpoint below the ambient temperature (and vice versa). Please note that the entry for PSr is limited by the parameters PJr and PYr. As such, you will need to modify these limits first (see section 7.2.5 "Setting the operating mode").

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7.2.5 Setting the operating mode

The following illustration shows the changeover from fixed-value to room temperature-based control.

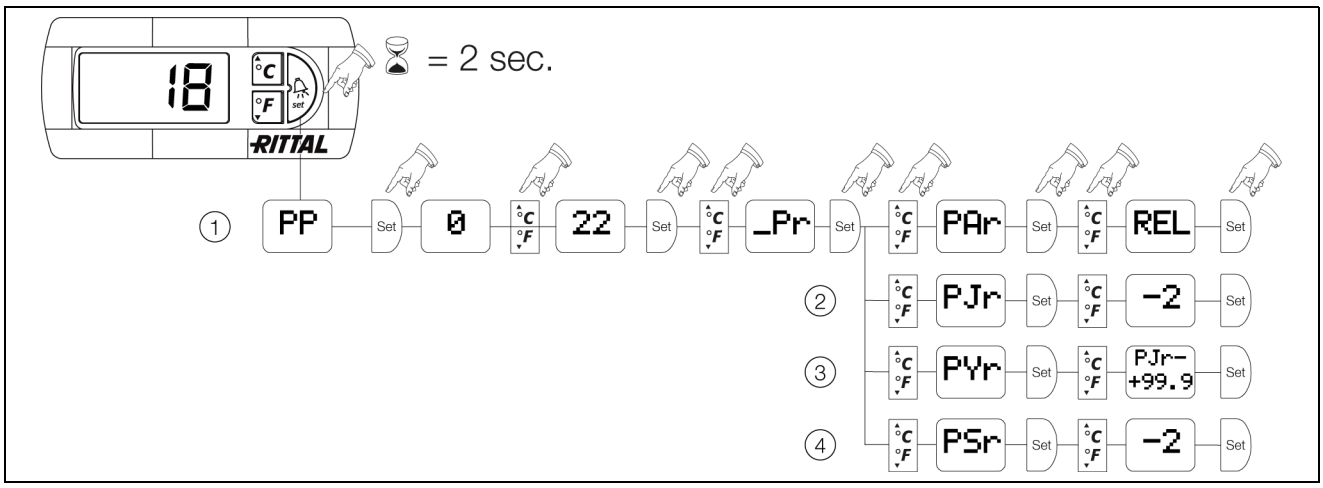

Fig. 42: Changing the operating mode

Key

1 Change operating mode (fixed value to room temperature-based)
2 Adjust lower limit
3 Adjust upper limit
4 Adjust setpoint (in room temperature-based control mode)

In order to switch the device to room temperature-based control, you will first need to access the customer level. From there, you have the option of changing the operating mode from absolute (ABS) to relative (REL) via the _Pr menu. All other adjustable parameters in the _Pr menu are described in section 7 "Operation".

Note:
With combined control, other parameters (e.g. PJr) must be taken into account.

7.2.6 Hot gas bypass control (optional)

A hot gas bypass control (hereinafter abbreviated to HGBP) refers to a circuit with a controllable bypass circuit from the high-pressure to the low-pressure side (see P+ID cooling circuit) with an infeed between the expansion valve and the evaporator coil (fig. 43).

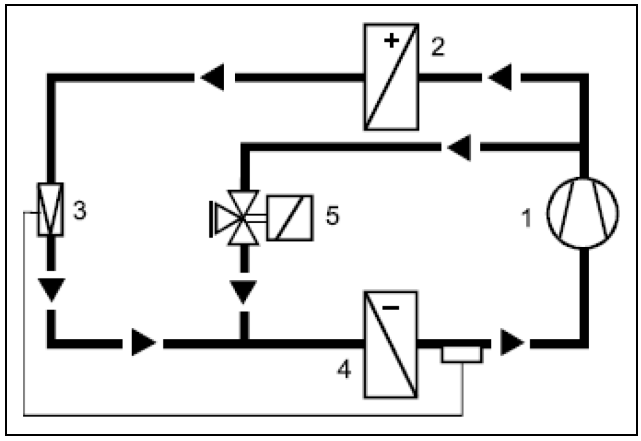

Fig. 43: Cooling circuit with HGBP valve

Key:

1 Compressor
2 Condenser
3 Expansion valve
4 Evaporator
5 HGBP valve

The control valve (fig. 43, item 5) in the bypass circuit remains closed when the cooling demand is high. The chiller will then supply its full output. If the required output is reduced, the HGBP valve is continuously opened via the controller. Hot gas will then flow via the bypass circuit to the evaporator coil input (fig. 43, item 4). There, it is mixed with the refrigerant flowing out of the expansion valve and cooled down. As a result, the mixture partially evaporates in the supply line to the evaporator coil, causing the evaporation temperature to rise, and the cooling output to decrease. Overheating of the extracted gas upstream of the compressor is monitored and regulated by the expansion valve.
The HGBP control is used if a hysteresis of < 2 K is required. The maximum medium temperature hysteresis achievable with this control is 0.5 K. If there is an HGBP

valve built into the chiller, the following parameters may be set:
– PSr = Setpoint
– Pdr = Hysteresis
– Hrr = Difference between setpoint PSr and operating point of the bypass valve
– Hdr = Hysteresis of bypass

Set value bypass = PSr + Hrr
The HGBP valve opens if the medium temperature is below PSr + Hrr – Hdr. The HGBP valve closes if the medium temperature is above PSr + Hrr.

Note:
For machines with 32 kW and 40 kW, the parameter eBP must additionally be selected.
eBP = Activation of the HGBP with dual circuit (enter "YES").

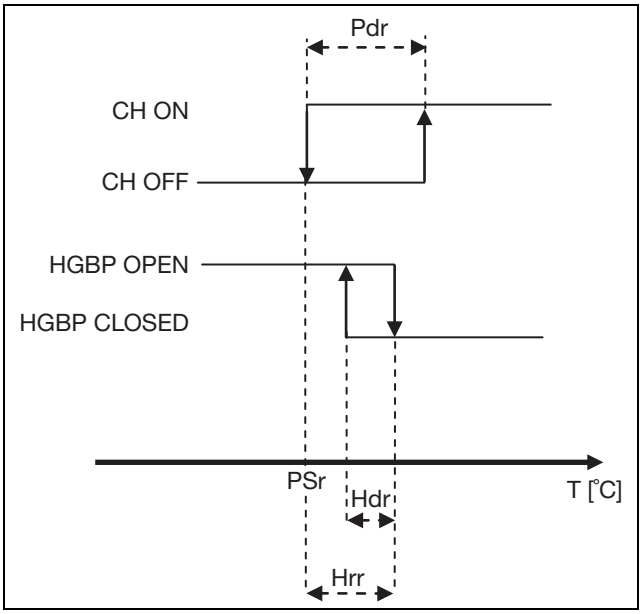

Fig. 44: Circuit for the HGBP valve

7.3 Setting the temperature alarms

Adjustment of the alarm levels is a standard function available on all models. Depending on your application, there are two logic systems available for alarm reproduction (tab. 12):
– Absolute
– Relative

Logic	Parameter description
Absolute	The pre-alarms (ALr and AHr) will sound if the entered minimum and maximum temperatures are undercut or exceeded. Parameter: POr (Tab. 13) POr = ABS PLr = Minimum temperature pre-alarm PHr = Maximum temperature pre-alarm
Relative	If the liquid temperature differs significantly from the setpoint, the pre-alarms will sound (ALr or AHr). Parameter: POr (Tab. 13) POr = REL Pbr = Difference to POr **Example:** For inlet temperature > PSr + Pbr: Pre-alarm (AHr) over-temperature For inlet temperature < PSr - Pbr: Pre-alarm under-temperature (ALr)

Tab. 12: Setting the alarms

7.4 Meaning of the control parameters

The software is used for various different types of chillers. As a result, not all functions are always relevant. The inactive functions are displayed as "nn" to indicate that they are not required. They should not be edited (see "type" column in the following list of parameters).

No.	Level			PAR	Type	Parameter description	Min. value	Max. value	Factory setting	Unit	New setting
	BS	CU	MN								
1	PP					Password for customer level	0	999	22	-	
2	PSr					Set temperature (inlet temperature to equipment)	PYr	PJr	18	°C	
3	ESC					Exit menu	–	–	–	–	–
MENU		**_di**	**Settings for digital inputs**								
4		_di		dLP		Delay time for low-pressure switch when starting up the compressor	0	60	0	sec.	
5		_di		dPr		Delay time for low-pressure switch when compressor already operational	0	60	0	sec.	
6		_di		dSu		Delay time of flow switch alarm for pump start	0	60	5	sec.	
7		_di		dtr		Delay time for flow switch alarm when pump already operational	0	60	5	sec.	
8		_di		dSL	nn	Alarm delay with minimal water level (optional)	0	60	10	sec.	
9		_di		ESC		Exit menu	–	–	–	–	–
MENU		**_Pr**	**Operating parameter**								
10		_Pr		PC1		Calibration of ambient sensor	-9.9	+9.9	0	°C	
11		_Pr		PS1		Setpoint in summer / winter equalisation mode	0	40	15	°C	
12		_Pr		PC2	nn	Calibration of input sensor	-9.9	+9.9	0	°C	
13		_Pr		PC3		Calibration of output sensor	-9.9	+9.9	0	°C	
14		_Pr		PS4	nn	Switchpoint of evaporator coil frost protection in fixed value control mode	-20	+10	-2	°C	
15		_Pr		Pd4	nn	Switchpoint of evaporator coil frost protection in relative control mode	0.0	9.9	5	°C	
16		_Pr		PC4	nn	Calibration of frost protection sensor	-9.9	+9.9	0	°C	
17		_Pr		PSr		Set temperature (inlet temperature to equipment)	PYr	PJr	18	°C	
18		_Pr		Pdr		Hysteresis	2	5	2	°C	

Tab. 13: Meaning of the control parameters

No.	Level			PAR	Type	Parameter description	Min. value	Max. value	Factory setting	Unit	New setting
	BS	CU	MN								
19		_Pr		PAr		Control mode: ABS = absolute (fixed value control) REL = relative (room temperature-based control)	ABS	REL	ABS	Flag	
20		_Pr		PLr		A pre-alarm is generated if the operating temperature is less than PLr	-99.9	+99.9	3	°C	
21		_Pr		PHr		A pre-alarm is generated if the operating temperature is greater than PHr	-99.9	+99.9	40	°C	
22		_Pr		PJr		Minimum setpoint that may be entered	-99.9	PYr	10	°C	
23		_Pr		PYr		Maximum setpoint that may be entered	PJr	+99.9	25	°C	
24		_Pr		Prd		Delay time of temperature alarm	0	350	0	s	
25		_Pr		Pbr		An overtemperature alarm will sound if the inlet temperature exceeds the value PSr+Pbr, and an under-temperature alarm will sound if the inlet temperature falls below the value PSr-Pbr.	0	10	5	°C	
26		_Pr		POr		Defines the mode in which the temperature alarm should be emitted. ABS = absolute REL = relative	ABS	REL	ABS	Flag	
27		_Pr		POC		Setpoint equalisation: You may choose between: Summer (EST), winter (INV) or no equalisation (NOT)	-	-	NOT	Flag	
28		_Pr		PCE		Degree of equalisation	-2	2	1	Nr	
29		_Pr		PLC		In compensation mode: The setpoint becomes PLC if the compensated setpoint is lower than PLC.	-99.9	+99.9	10	°C	
30		_Pr		PHC		In compensation mode: The setpoint becomes PHC if the compensated setpoint is greater than PHC.	-99.9	+99.9	25	°C	
31		_Pr		HSr		Absolute setpoint for the hot gas bypass valve	-99.9	+99.9	10.5	°C	
32		_Pr		Hdr		Hysteresis for the hot gas bypass valve	0	10	0.3	°C	

Tab. 13: Meaning of the control parameters

No.	Level			PAR	Type	Parameter description	Min. value	Max. value	Factory setting	Unit	New setting
	BS	CU	MN								
33				Hrr		Setpoint in relative control mode	-99.9	+99.9	0.5	°C	
34		_Pr		HAr		Absolute or relative operating mode for the hot gas bypass valve ABS = absolute REL = relative	ABS	REL	REL	Flag	
35		_Pr		rSr	nn	Switching temperature for tank heater. The setting is linked to the sensor selected under parameter PIO.	-99.9	PSr	-30	°C	
36		_Pr		rdr	nn	Hysteresis of tank heater	-9.9	+9.9	2	°C	
37		_Pr		ESC		Exit menu	–	–	–	–	–
MENU		**_cd**	**Configuration of the display**								
38		_cd		bOF		Defines the buzzer settings: 0 = Buzzer OFF 1-14 = Buzzer ON for 1-14 minutes (except when suppressed) 15 = Buzzer always ON (except when suppressed)	0	15	15	Flag	
39		_cd		Aut		Nature of alarm reset: AUT = Automatic MAN = Manual	AUT	MAN	AUT	Flag	
40		_cd		di		Determines which temperature should be displayed in the main mask. AMB = ambient temperature (optional) IN = Input temperature OUT = Output temperature tA = temperature on the anti-freeze sensor	-	-	OUT	Flag	
41		_cd		Adr		BMS address (only if a BMS card is installed)	1	207	1	Nr	
42		_cd		nCA		Change the customer password	0	999	22	-	-
43		_cd		ESC		Exit menu	–	–	–	–	–

Tab. 13: Meaning of the control parameters

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7.5 Meaning of the alarm and system messages

Alarm message for models: 3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
AAb	Alarm, ambient temperature sensor	Serious	Malfunction, disconnection or break of temperature sensor cable / short-circuit of ambient temperature sensor	Check sensor cable. If defective: Request a sensor from service department and replace.
AAH	Motor circuit-breaker, fan, tank heater and/or phase control alarm	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
ACF	Motor circuit-breaker and/or Klixon of compressor and/or fan	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
ACH	Motor circuit-breaker of compressor and/or phase control alarm	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
ACr	Motor circuit-breaker of compressor and/or tank heater	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
AFb	Anti-freeze sensor	Serious	Malfunction, disconnection or break of temperature sensor cable / short-circuit of anti-freeze sensor	Check sensor cable. If defective: Request a sensor from service department and replace.
AFd	Flow switch in cooling medium circuit has tripped (optional).	Serious	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit.
			Cooling medium pump faulty	Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Plate heat exchanger iced up	Contact service.
			No cooling medium in tank	Check cooling medium level and top up as necessary.
AFH	Motor circuit of compressor and/or fan and/or phase control alarm	Serious	Overheating	Check motor circuit-breaker. if fault cannot be rectified, contact service.
AFP	Anti-freeze alarm	Serious	Anti-freeze sensor on plate heat exchanger has tripped. Pump defective, sensor defective	Contact service.
			Lack of refrigerant	If the cooling medium pump and sensor are not defective, there is a lack of refrigerant. Contact service.

Tab. 14: Error codes (3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870)

Alarm message for models: 3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
AHC + AHP	High-pressure monitor	Serious	Filter mat (accessories) contaminated	Clean filter mat.
			Condenser soiled	Clean condenser.
			Ambient temperature too high	Lower the ambient temperature. Ventilate room.
			With water-cooled condenser (optional), no or inadequate water flowrate through the condenser	Check external medium circuit and make water connection if necessary. Check external medium temperature.
			Lack of refrigerant, defective expansion valve, inadequate heat load, defective evaporator coil fan	Contact service.
AHH	Motor circuit-breaker of compressor and/or tank heater and/or phase control alarm	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
ALC + ALP	Low-pressure alarm	Serious	Lack of refrigerant, defective expansion valve, inadequate heat load, defective evaporator coil fan	Contact service.
AHr	Cooling medium temperature exceeds the setpoint	Pre-alarm or signal	Cooling capacity too low	Wait until the error message disappears or occurs again after being acknowledged or other error messages are displayed. Remedy, see that section.
AHt	Ambient temperature too high	Pre-alarm or signal	This alarm is generated by a malfunction in the ambient temperature sensor or due to disconnection/ short-circuiting of the sensor cable. In room temperature-based mode, the alarm is dependent on the liquid temperature.	Check ambient temperature sensor. If defective: Request a sensor from service department and replace.
Aib	Alarm, input sensor	Serious	This alarm is generated by a malfunction in the input sensor or due to disconnection/short-circuiting of the sensor cable.	Check sensor cable. If defective: Request a sensor from service department and replace.
ALr	Cooling medium temperature is below the setpoint.	Pre-alarm or signal	Medium temperature has dropped (cold environment)	Check heater (optional).

Tab. 14: Error codes (3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870)

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Alarm message for models: 3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
ALt	Ambient temperature too low	Pre-alarm or signal	This alarm is generated by a malfunction in the ambient temperature sensor or due to disconnection/ short-circuiting of the sensor cable. In room temperature-based mode, the alarm is dependent on the liquid temperature.	Check ambient temperature sensor.
AOb	Alarm, output sensor	Serious	This alarm is generated by a malfunction in the output sensor or due to disconnection/short-circuiting of the sensor cable.	Check sensor cable.
AOC	Circuit-breaker and/or Klixon of compressor has tripped.	Serious	Overheating	Contact service.
AOF	Circuit-breaker and/or Klixon of fan has tripped.	Serious	Overheating	Contact service.
AOP	Circuit-breaker and/or Klixon of pump has tripped.	Serious	Overheating	Contact service.
AOr	Circuit-breaker of tank heater has tripped.	Serious	Overheating	Contact service.
APC	Phase control alarm	Serious	Phase position (clockwise phase rotation) incorrect	Check phases (L1,L2,L3) for clockwise phase rotation and exchange L1 and L2 if necessary.
APD	Alarm of differential pressure switch (optional)	Serious	The condenser (accessory filter mat) may be congested.	Clean filter mat and condenser.
AqH	Motor circuit-breaker of compressor and/or fan and/or heater and/or phase control alarm	Serious	Overheating	Contact service.
Aqq	Motor circuit-breaker of compressor and/or fan and/or tank heater alarm	Serious	Overheating	Contact service.
ArH	Motor circuit-breaker of tank heater and/or phase control alarm (optional)	Serious	Overheating	Contact service.
ASL	Alarm, float-actuated switch (optional)	Serious	Triggered if the medium fill level in the tank is lower than the intake nozzle.	Check fill level and top up cooling medium if necessary (see section 6.2 "Filling the cooling medium").

Tab. 14: Error codes (3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870)

Alarm message for models: 3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
AtA	Anti-freeze alarm of mechanical thermostat on evaporator coil	Serious	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit. Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Lack of refrigerant	If the cooling medium pump is not faulty, there is not enough refrigerant. Contact service.
AVH	Motor circuit-breaker of fan and/or phase control alarm	Serious	Overheating	Contact service.
AVr	Motor circuit-breaker of fan and/or tank heater alarm	Serious	Overheating	Contact service.
PFd	An alarm generated by the flow switch which merely indicates that there is no water flow in the equipment end. Neither the pump nor the compressor will be stopped (optional).	Pre-alarm or signal	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit. Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Cooling medium pump faulty	Replace pump and contact service as necessary.
			Plate heat exchanger iced up	Contact service.
			No or not enough cooling medium in the tank	Check cooling medium level and top up as necessary.
PSL	Pre-alarm, float-actuated switch (optional)	Pre-alarm or signal	This merely indicates a low fill level. Neither the pump nor the compressor will be stopped.	Check the cooling medium level and top up if necessary (see section 6.2 "Filling the cooling medium").
APA	Gas pressure transducer alarm	Serious	Malfunction, disconnection or break of temperature sensor cable	Check sensor cable. If defective: Request a sensor from service department and replace.
ADO	Door contact alarm	Serious	Door open	Close the door.
Further alarm and system messages for 3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870				
AP1	Pressure transducer alarm – circuit 1	Serious	Malfunction, disconnection or break of temperature sensor cable / short-circuit of sensor cable	Check sensor cable. If defective: Request a sensor from service department and replace.
AP2	Pressure transducer alarm – circuit 2			
APF	Filter mat monitoring	Pre-alarm or signal	Filter mat soiled	Clean or change filter mat (see section 8.4 "Cleaning the filter mat (accessories)").

Tab. 14: Error codes (3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870)

EN

Alarm message for models: 3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
FF2 / FI2	Flow switch in cooling medium circuit 2 has tripped (optional).	Serious	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit.
			Cooling medium pump faulty	Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Plate heat exchanger iced up	Contact service.
			No cooling medium in tank	Check cooling medium level and top up as necessary.
FW2	An alarm generated by the flow switch which merely indicates that there is no water flow in the equipment end. Neither the pump nor the compressor will be stopped (optional).	Pre-alarm or signal	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit. Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Cooling medium pump faulty	Replace pump and contact service as necessary.
			Plate heat exchanger iced up	Contact service.
			No or not enough cooling medium in the tank	Check cooling medium level and top up as necessary.
LA2	Alarm, float-actuated switch (cooling medium circuit 2, optional)	Serious	Triggered if the medium fill level in the tank is lower than the intake nozzle.	Check fill level and top up cooling medium if necessary (see section 6.2 "Filling the cooling medium").
LW2	Pre-alarm, float-actuated switch (cooling medium circuit 2, optional)	Pre-alarm or signal	This merely indicates a low fill level. Neither the pump nor the compressor will be stopped.	Check the cooling medium level and top up if necessary (see section 6.2 "Filling the cooling medium").
OP2	Circuit-breaker and/or Klixon of pump 2 has tripped.	Serious	Overheating	Contact service.
AOL	The expansion card (pCOe) is not connected to the main controller (uPC).	Serious	–	Contact service.

Tab. 14: Error codes (3335.790, 3335.830, 3335.840, 3335.850, 3335.860, 3335.870)

Alarm message for models: 3335.880, 3335.890				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
AAb	Alarm, ambient temperature sensor	Serious	Malfunction, disconnection or break of temperature sensor / short-circuit of ambient temperature sensor	Check sensor cable. If defective: Request a sensor from service department and replace.
AC1	Motor circuit-breaker and/or Klixon (compressor) – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
AC2	Motor circuit-breaker and/or Klixon (compressor) – circuit 2			
AF1	Motor circuit-breaker and/or Klixon (fan) – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
AF2	Motor circuit-breaker and/or Klixon (fan) – circuit 2			
Fb1	Anti-freeze sensor alarm – circuit 1	Serious	Malfunction, disconnection or break of temperature sensor cable / short-circuit of anti-freeze sensor	Check sensor cable. If defective: Request a sensor from service department.
Fb2	Anti-freeze sensor alarm – circuit 2			
AFd	Flow switch in cooling medium circuit has tripped (optional).	Serious	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit.
			Cooling medium pump faulty	Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Plate heat exchanger iced up	Contact service.
			No cooling medium in tank	Check cooling medium level and top up as necessary.
FP1	Anti-freeze alarm – circuit 1	Serious	Anti-freeze sensor on plate heat exchanger has tripped. Pump defective, sensor defective or lack of refrigerant:	If the cooling medium pump and sensor are not defective, there is a lack of refrigerant. Contact service.
FP2	Anti-freeze alarm – circuit 2			
AH1	Motor circuit-breaker of fan and/or pump and/or phase control alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
AH2	Motor circuit-breaker of fan and/or pump and/or phase control alarm – circuit 2			
AHr	Cooling medium temperature exceeds the setpoint	Pre-alarm or signal	Insufficient cooling capacity	Wait until the error message disappears or occurs again after being acknowledged or other error messages are displayed. Remedy, see relevant section.

Tab. 15: Error codes (3335.880, 3335.890)

EN

Alarm message for models: 3335.880, 3335.890				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
AHt	Ambient temperature too high	Pre-alarm or signal	This alarm is generated by a malfunction in the ambient temperature sensor or due to disconnection/ short-circuiting of the sensor cable. In room temperature-based mode, the alarm is dependent on the liquid temperature.	Check ambient temperature sensor. If defective: Request a sensor from service department and replace.
Aib	Alarm, input sensor	Serious	This alarm is generated by a malfunction in the input sensor or due to disconnection/short-circuiting of the sensor cable.	Check sensor cable. If defective: Request a sensor from service department and replace.
ALr	Cooling medium temperature is below the setpoint.	Pre-alarm or signal	Medium temperature has dropped (cold environment)	Check heater (optional).
ALt	Ambient temperature too low	Pre-alarm or signal	This alarm is generated by a malfunction in the ambient temperature sensor or due to disconnection/ short-circuiting of the sensor cable. In room temperature-based mode, the alarm is dependent on the liquid temperature.	Check ambient temperature sensor.
AOb	Alarm, output sensor	Serious	This alarm is generated by a malfunction in the output sensor or due to disconnection/short-circuiting of the sensor cable.	Check sensor cable.
AOP	Circuit-breaker and/or Klixon of pump has tripped.	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
APC	Phase control alarm	Serious	Phase position (clockwise phase rotation) incorrect	Check phases (L1, L2, L3) for clockwise phase rotation and exchange L1 and L2 if necessary.
APD	Alarm of differential pressure switch (optional)	Serious	The condenser (accessory filter mat) may be congested.	Clean filter mat and condenser.
APP	Motor circuit-breaker of pump and/or phase control alarm	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
ASL	Alarm, float-actuated switch (optional)	Serious	Triggered if the medium fill level in the tank is lower than the intake nozzle.	Check fill level and top up cooling medium if necessary (see section 6.2 "Filling the cooling medium").

Tab. 15: Error codes (3335.880, 3335.890)

Alarm message for models: 3335.880, 3335.890				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
tA1	Anti-freeze alarm of mechanical thermostat on evaporator coil Circuit 1	Serious	Insufficient cooling medium flow through the evaporator (plate heat exchanger) Lack of refrigerant	Check whether a valve is shut in the cooling medium circuit. Check whether the cooling medium pump is running (listen). If faulty, contact service. If the cooling medium pump is not faulty, there is not enough refrigerant. Contact service.
tA2	Anti-freeze alarm of mechanical thermostat on evaporator coil Circuit 2			
CF1	Motor circuit-breaker and/or Klixon (compressor) and/or fan alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
CF2	Motor circuit-breaker and/or Klixon (compressor) and/or fan alarm – circuit 2			
CH1	Motor circuit-breaker of compressor and/or phase control alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
CH2	Motor circuit-breaker of compressor and/or phase control alarm – circuit 2			
Cr1	Motor circuit-breaker of compressor and/or pump alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
Cr2	Motor circuit-breaker of compressor and/or pump alarm – circuit 2			
FH1	Motor circuit-breaker of compressor and/or fan and/or phase control alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
FH2	Motor circuit-breaker of compressor and/or fan and/or phase control alarm – circuit 2			
HC1 + HP1	High pressure alarm – circuit 1	Pre-alarm or signal	Filter mat (accessories) contaminated	Clean filter mat.
			Condenser soiled	Clean condenser.
			Ambient temperature too high	Lower the ambient temperature. Ventilate room.
HC2 + HP2	High pressure alarm – circuit 2		With water-cooled condenser (optional), no or inadequate water flowrate through the condenser	Check external medium circuit and make water connection if necessary.
			Lack of refrigerant, defective expansion valve, inadequate heat load, defective evaporator coil fan	Check external medium temperature. Contact service.

Tab. 15: Error codes (3335.880, 3335.890)

EN

Alarm message for models: 3335.880, 3335.890				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
HH1	Motor circuit-breaker of compressor and/or pump and/or phase control alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
HH2	Motor circuit-breaker of compressor and/or pump and/or phase control alarm – circuit 2			
LC1 + LP1	Low pressure alarm – circuit 1	Pre-alarm or signal	Lack of refrigerant, defective expansion valve, inadequate heat load, defective evaporator coil fan	Contact service.
LC2 + LP2	Low pressure alarm – circuit 2			
PFd	An alarm generated by the flow switch which merely indicates that there is no water flow in the equipment end. Neither the pump nor the compressor will be stopped (optional).	Pre-alarm or signal	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit. Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Cooling medium pump faulty	Replace pump and contact service as necessary.
			Plate heat exchanger iced up	Contact service.
			No or not enough cooling medium in the tank	Check the cooling medium level and top up if necessary (see section 6.2 "Filling the cooling medium").
PSL	Pre-alarm, float-actuated switch (optional)	Pre-alarm or signal	This merely indicates a low fill level. Neither the pump nor the compressor will be stopped.	Check the cooling medium level and top up if necessary (see section 6.2 "Filling the cooling medium").
qH1	Motor circuit-breaker of compressor and/or fan and/or pump and/or phase control alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
qH2	Motor circuit-breaker of compressor and/or fan and/or pump and/or phase control alarm – circuit 2			
qq1	Motor circuit-breaker and/or fan and/or pump alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
qq2	Motor circuit-breaker and/or fan and/or pump alarm – circuit 2			
VH1	Motor circuit-breaker of fan and/or phase control alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
VH2	Motor circuit-breaker of fan and/or phase control alarm – circuit 2			

Tab. 15: Error codes (3335.880, 3335.890)

Alarm message for models: 3335.880, 3335.890				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
Vr1	Motor circuit-breaker of fan and/or pump alarm – circuit 1	Serious	Overheating	Check motor circuit-breaker. If fault cannot be rectified, contact service.
Vr2	Motor circuit-breaker of fan and/or pump alarm – circuit 2			
ADO	Door contact alarm	Serious	Door open	Close the door.
Further alarm and system messages for 3335.880 and 3335x890				
AP1	Gas pressure transducer alarm – circuit 1	Serious	Malfunction, disconnection or break of temperature sensor cable / short-circuit of sensor cable	Check sensor cable. If defective: Request a sensor from service department and replace.
AP2	Gas pressure transducer alarm – circuit 2			
PF1	Filter mat monitoring 1	Pre-alarm or signal	Filter mat soiled	Clean or change filter mat (see section 8.4 "Cleaning the filter mat (accessories)").
PF2	Filter mat monitoring 2	Pre-alarm or signal	Filter mat soiled	Clean or change filter mat (see section 8.4 "Cleaning the filter mat (accessories)").
FF2 / FI2	Flow switch in cooling medium circuit 2 has tripped (optional).	Serious	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit.
			Cooling medium pump faulty	Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Plate heat exchanger iced up	Contact service.
			No cooling medium in tank	Check cooling medium level and top up as necessary.
FW2	An alarm generated by the flow switch which merely indicates that there is no water flow in the equipment end. Neither the pump nor the compressor will be stopped (optional).	Pre-alarm or signal	Insufficient cooling medium flow through the evaporator (plate heat exchanger)	Check whether a valve is shut in the cooling medium circuit. Check whether the cooling medium pump is running (listen). If faulty, contact service.
			Cooling medium pump faulty	Replace pump and contact service as necessary.
			Plate heat exchanger iced up	Contact service.
			No or not enough cooling medium in the tank	Check cooling medium level and top up as necessary.
LA2	Alarm, float-actuated switch (cooling medium circuit 2, optional)	Serious	Triggered if the medium fill level in the tank is lower than the intake nozzle.	Check fill level and top up cooling medium if necessary (see section 6.2 "Filling the cooling medium").

Tab. 15: Error codes (3335.880, 3335.890)

Alarm message for models: 3335.880, 3335.890				
Alarm code	**System message / meaning**	**Alarm type**	**Cause**	**Remedy**
LW2	Pre-alarm, float-actuated switch (cooling medium circuit 2, optional)	Pre-alarm or signal	This merely indicates a low fill level. Neither the pump nor the compressor will be stopped.	Check the cooling medium level and top up if necessary (see section 6.2 "Filling the cooling medium").
OP2	Circuit-breaker and/or Klixon of pump 2 has tripped.	Serious	Overheating	Contact service.
AOL	The expansion card (pCOe) is not connected to the main controller (uPC).	Serious	–	Contact service.

Tab. 15: Error codes (3335.880, 3335.890)

8 Inspection and maintenance

Proper, regular inspections and maintenance (once a year is recommended) and usage of original spare parts only are crucial for problem-free operation and a long service life of the chiller.
We therefore recommend a maintenance contract.

We offer maintenance service.
Our service contact:
Phone: +49 2772 505-1855
Fax: +49 2772 505-1850
E-mail: service@rittal.de

Danger!
Risk of electric shock at live connections!
Prior to any inspection and maintenance work, the chiller must be disconnected from the power supply.

Overview of the inspection and maintenance tasks

Assembly	Task	Interval
Compressor	No maintenance is necessary on the fully hermetic compressor.	–
Cooling medium level	Check for sufficient filling, top up if necessary.	1 week
Filter mat (accessories)	Clean or replace filter mat.	4 weeks
Cooling medium	Check cooling medium circuit for soiling and any foreign bodies (chips and the like).	4 weeks
Tank, components, and all connections (piping, valves and fittings, hoses) in the circuit for the equipment to be cooled	Check for leaks.	4 weeks
Condenser (air-cooled)	Clean fins using compressed air, or with a brush.	2 months
Condenser fan (air-cooled)	Check noise generation, clean.	6 months
Cooling medium	Replace cooling medium	1 year
Condenser (water-cooled)	Check for adequate flow rate.	1 year
Refrigerant circuit	Have refrigerant circuit checked by a specialist refrigeration company.	1 year

Tab. 16: Inspection and maintenance tasks

8.1 Maintaining the refrigerant circuit

As a hermetically sealed system, the refrigerant circuit has been filled in the factory with the required amount of refrigerant, tested for leaks and subjected to a function test run.
Maintenance tasks on the refrigerant circuit are only allowed to be undertaken by a specialist refrigeration company. We recommend a maintenance contract that includes an annual inspection of the refrigerant circuit (European regulation EC no. 842/2006 / fluorinated greenhouse gases).

8.2 Cooling medium

8.2.1 General remarks

When cooling the water-glycol mixture in an open circuit, always remember that algae, deposits and corrosion can damage the chiller. Residues will always impair the performance of the chiller. Without water treatment it is only seldom possible to achieve satisfactory conditions. By means of regular monitoring of the quality of the cooling medium and cooling medium treatment, you must ensure that deposits and corrosion are avoided, even under extreme conditions.

8.2.2 Cooling medium requirements

The cooling medium must not cause any limescale deposits or loose debris. In other words, it should have a low level of hardness, particularly a low level of calcium hardness. In particular, the level of calcium hardness should not be too high when using the equipment for recirculated cooling. On the other hand, the cooling medium should not be so soft that it attacks the materials.
When recooling the cooling medium, the salt content should not be allowed to increase excessively due to the evaporation of large quantities of water, since the electrical conductivity will increase as the concentration of dissolved substances rises, and the cooling medium will become more corrosive. For this reason, not only is it always necessary to add a corresponding quantity of fresh water, but also to remove part of the enriched cooling medium.
Furthermore, the properties of the water used must not deviate from the following list of hydrological data:

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Properties	Value
p_H value	(7) 7.5 – 8.5
Electrical conductivity	200 – 1000 µS/cm
Residue on evaporation	< 500 mg/dm³
Sedimentary substances	< 3 mg/dm³
Hardness	3 – 8°dH (for German-speaking regions)
Ca + Mg	0.5 – 2 mmol/l (for international region)
Hydrogen carbonate	1 – 5 mmol/dm³ (60 – 300 mg/dm³)
Free CO_2	< 10 mg/dm³
Sulphide	< 0.01 mg/dm³
Chloride	< 50 mg/dm³
Sulphate	< 250 mg/dm³
Nitrate	< 25 mg/dm³
Nitrite	< 0.1 mg/m³
COD	< 7 mg/dm³
NH_4	< 0.05 mg/dm³
Fe	< 0.1 mg/dm³
Mn	< 0.1 mg/dm³
Cu	< 0.1 mg/dm³

Tab. 17: Hydrological data

Note:
The cooling medium thickens due to evaporation. You can return the values to within the usual ranges by completely replacing the cooling medium. Only use distilled or de-ionised water in chillers specified for such use (see data sheet in section 14.4 "Technical specifications").

8.2.3 Preparation and care

There are specific cooling medium requirements depending on the type of equipment being cooled. A suitable process must then be used to prepare and/or maintain the cooling medium to suit the level of contamination and the size and design of the chiller. The most common types of contamination and most frequently used techniques to eliminate them in industrial cooling are shown in the following table:

Type of impurity	Removal
Mechanical contamination	Filtering of the cooling medium via mesh filter, gravel filter, cartridge filter, or pre-coated filter
Excessive hardness:	Softening of the cooling medium using ion exchange
Moderate content of mechanical contaminants and hardeners	Addition of stabilisers and/or dispersing agents to the water
Moderate levels of chemical contaminants	Addition of passifiers and/or inhibitors to the cooling medium
Biological contaminants, slime bacteria and algae	Addition of biocides to the cooling medium

Tab. 18: Impurities and removal

8.2.4 Recommended "Cooling medium for chillers"

Rittal recommends the use of "Cooling medium for chillers" (water-glycol mixture). This is a ready-mixed solution and is therefore suitable for immediate use (without the need for mixing) (tab. 19 and tab. 20).

Composition

Glycol (20-30% max.) + water (70-80% max.) = ready-mix ("Cooling medium for chillers")

Model No.	Quantity [l]	Application
3301.950	10	Outdoor
3301.960	10	Indoor
3301.955	25	Outdoor
3301.965	25	Indoor

Tab. 19: Model numbers – Cooling medium for chillers

Note:
When glycol is used, the cooling performance is reduced, depending on the glycol concentration (tab. 20).

Cooling medium for chillers	Temp. [°C]	Loss of cooling performance compared with pure water [%]
Standard (20% glycol) Antifreeze: -10°C	10	-6
	15	-6
	18	-6
Outdoor (30% glycol) Antifreeze: -20°C	10	-13
	15	-13
	18	-13

Tab. 20: Performance loss

8.2.5 Monitoring the cooling medium

- Regularly check the level in the cooling medium tank.
- Regularly check the quality of the cooling medium, and if necessary, improve it as described under section 8.2.3 "Preparation and care".
- Regularly measure the glycol content with the aid of a refractometer (fig. 45). If you have any questions about this, please contact our service department.
- In order to prevent the formation of fungus and algae, the cooling medium should be replaced at least once a year. The use of pure water may also cause the formation of fungus or algae.

If the chiller is used under certain physical conditions (T_W < 10°C), condensation may form in the system. This can be minimised by means of suitable insulation or the optionally available room-temperature-based control.

Fig. 45: Refractometer

Note:
The manufacturer's guarantee and liability will be rendered void in cases of incorrect use and treatment of the chiller. To prevent problems in the cooling medium circuit (including water-cooled chillers), it is imperative that the VGB Cooling Water Guidelines (VGB-R 455 P) are observed.

8.3 Cleaning the condenser

To ensure the correct function of the chiller, the fins on the air-cooled condenser must be kept clean. Cleaning must be undertaken at regular intervals of at least once per half year; the frequency of cleaning depends on the degree of soiling in the rooms where the unit is installed. Ambient air containing oil in conjunction with dust will result in increased soiling of the condenser fins. In such cases, thorough cleaning with compressed air is only possible under certain circumstances. In such cases, the additional use of a metal filter mat is required (see section 5.8 "Installing the filter mats (accessories)"). When cleaning, it is imperative to observe the following warning and safety notes below.

Danger!
Prior to any inspection and maintenance work, the chiller must be disconnected from the power supply.

Danger!
Temperatures of up to 60°C may occur inside the chiller. Wait approx. 10 min. after you have switched off the chiller to allow the pipe to cool down.

Risk of cuts!
Risk of injury due to sharp-edged condenser fins! Use gloves as personal protection equipment.

Caution!
Risk of damage for the condenser fins due to powerful compressed air!
Use the compressed air carefully to avoid damage.

When cleaning, please proceed as follows:

- Deactivate the chiller by switching off the power supply to the higher level control and secure against switching back on.
- The condenser membranes are located on the rear of the chiller (fig. 46, item 1). To expose them, first remove the protective grille as described in section 5.8 "Installing the filter mats (accessories)" and/or remove the installed filter mat (accessories).

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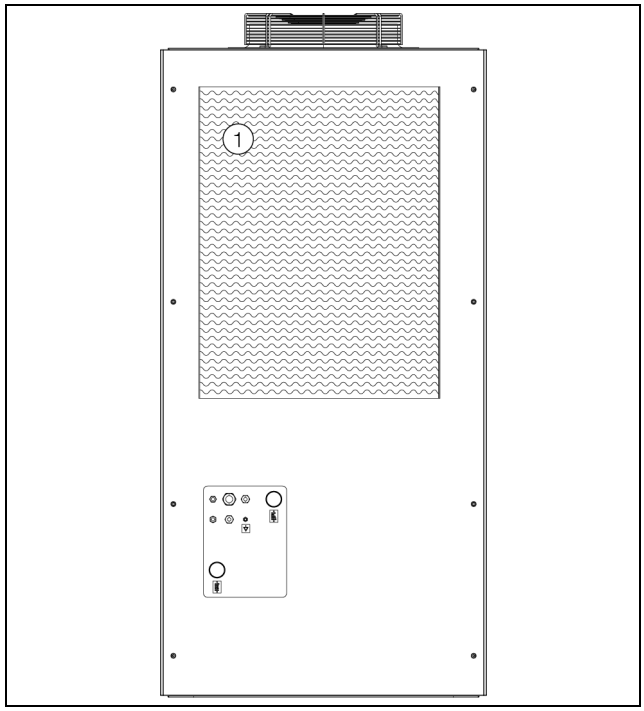

Fig. 46: Condenser membranes

Key
1 Membranes on the rear

■ Clean the condenser with compressed air (fig. 47) and then fit the protective grille and/or the filter mat again.

Fig. 47: Cleaning the condenser

8.4 Cleaning the filter mat (accessories)

The metal filter mat may likewise be cleaned using compressed air.

■ To do so, remove it from its holder (see section 5.8 "Installing the filter mats (accessories)").

8.5 Draining cooling medium tank

■ Drain the cooling medium tank via the tank drain nozzle (fig. 48, item 1) either directly or using a hose into a container.

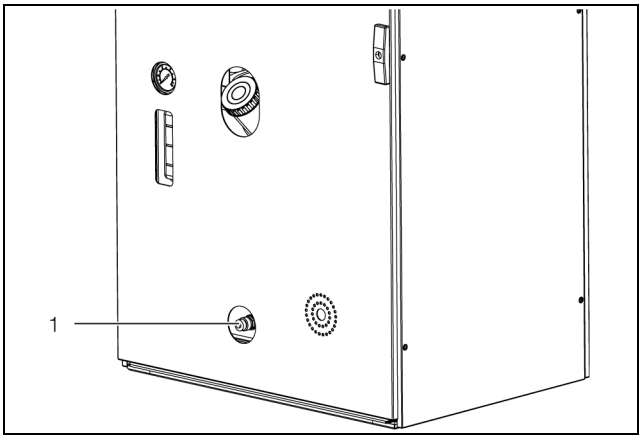

Fig. 48: Draining the tank

■ When disposing of the cooling medium, observe the locally application regulations on water pollution.

9 Troubleshooting

In operation, the chiller operates in a safe state. The chiller maintains the cooling medium inlet temperature at the setpoint set. Possible causes for deviation from the setpoint could be:

– Cooling demand too high
– Ambient temperature too high
– Failure to observe required distances
– Soiled evaporator
– Soiled condenser
– Lack of refrigerant
– Level of cooling medium in tank too low
– Cooling medium temperature set too low
– Parameters set incorrectly

The malfunctions are only allowed to be rectified by suitably instructed, qualified personnel. For information on malfunction analysis, refer to tab. 14 and tab. 15 or contact our service department.

Service contact:

Rittal International Service
Auf dem Stützelberg
35745 Herborn

Phone: +49 2772 505-1855
Fax: +49 2772 505-1850
E-mail: service@rittal.de

EN

10 Decommissioning and disposal

The chiller is only allowed to be shut down by authorised, qualified personnel. For this purpose the chiller must be decommissioned.

- Electrically isolate the chiller by disconnecting it from the power supply.

10.1 Decommissioning

If the chiller is not to be used for an extended period (more than 6 months) the cooling medium circuit must be drained. This will prevent the evaporation of water, and the water-glycol ratio of the cooling medium will not be altered. If the glycol concentration increases, the pump seal may be irreparably damaged.

- Disconnect the chiller from the supply of power and secure it against switching back on.
- Disconnect the cooling medium circuit connections.
- For disposal of the cooling medium, observe the applicable regulations on water pollution, in Germany the Wasserhaushaltsgesetz (Federal Water Act).
- Drain the cooling medium circuit as described in section 8 "Inspection and maintenance".
- To recommission the chiller, proceed as described in section 6 "Commissioning". Make the same checks as described in that section.

10.2 Disposal

Caution!
Risk for the environment! Intentional release of the refrigerant is strictly prohibited. Refrigerant must be disposed of properly.

- Decommission the chiller (see section 10.1 "Decommissioning").
- Notify your supplier or our service department for proper disposal of the chiller.

Certificate in accordance with BGR 500 chap. 2.35 and DIN EN 378-2 on the inspection of a cooling system

Note:
If a system is changed or taken out of operation for more than 2 years, it is to be re-inspected and a new certificate issued. A system has been modified:

- if a system is opened and converted to a different refrigerant,
- if stationary system is moved elsewhere,
- if an existing system is extended or converted
- or major improvements are carried out.

EN

11 Accessories

11.1 Connection set for air/water heat exchangers

The connection set is used to ensure professional laying of water connections between chiller and air/water exchanger. The pressure hoses (L = 3.60 m) may be cut to length individually, depending on the application.
Supply includes:
– Hose for water return
– Hose for water inlet including regulator valve for regulating the volumetric flow (setting range 3 to 12 l/min)
– Assembly parts

Fig. 49: Connection set

Material	Packs of	Model No.
Water-carrying parts EPDM/ brass	1	3201.990

Tab. 21: Connection set for air/water heat exchangers

11.2 Flow regulator valve

For use with air/water heat exchangers, especially if more than one heat exchanger (n > 1) is used in the water cooling circuit. The correctly set valve then ensures the same quantity of cooling medium for all equipment. The valve is used for hydraulic balancing.
– Material: Brass
– Setting range: 3 – 12 l/min

Fig. 50: Flow regulator valve

Version	Packs of	Model No.
G ¾" x Rp ½" for volumetric flow control	1	3301.930
G ¾" x Rp ¾" for volumetric flow control	1	3301.940

Tab. 22: Flow regulator valve

11.3 Metal filter (aluminium filter)

Particularly when chiller units are used in dusty and oil-laden environments, it is advisable to use washable metal filters. If air or steam condenses on the metal surfaces, any particles that may be present will adhere to the metal and are easily washed out with water or grease-dissolving detergents.

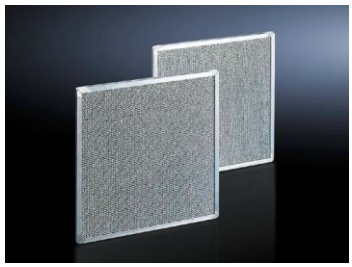

Fig. 51: Metal filters

Chiller	Packs of	Model No.
3335.790-830	1	3286.550
3335.840-850	1	3286.530
3335.860-870	1	3286.540
3335.880	1	2 x 3286.530
3335.890	1	2 x 3286.540

Tab. 23: Metal filters

11.4 Cooling medium for chillers (ready-mix)

Chiller systems are only suitable for the cooling of a water/glycol mixture. As well as protecting against frost, this cooling medium also serves to inhibit bacterial growth and provide optimum corrosion protection.

Fig. 52: Cooling medium for chillers (ready-mix)

Mixing ratio	Content	Model No.
1:4 (indoor)	10 l	3301.960
	25 l	3301.965
1:4 (outdoor)	10 l	3301.950
	25 l	3301.955

Tab. 24: Cooling medium for chillers (ready-mix)

EN

12 System manual (log book)

For systems with more than 3 kg of synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see technical specifications), a log book must be kept in accordance with DIN EN 378. The following points should be observed:

– Details of all maintenance and repair work
– When topping up: Quantity and type of refrigerant
– When exchanging or refilling: Quantity
– Analysis of purified refrigerant, if available
– Origin of purified refrigerant
– Components exchanged
– Time and duration of longer shutdowns

First-time installation of the unit:

■ To be completed when installing the chiller for the first time.

Location data	
Name	
Street	
Town, post code	
Phone	
Installation location	

Owner of the system	
Name	
Contact person	
Street	
Town, post code	
Phone	

Specific data for the unit and system	
Item or spare part number	
Refrigerant	
Original volume [kg]	
Year of construction	
System type	☐ New ☐ Extension to an existing system ☐ Modification to an existing system ☐ Spare part in an existing system
Operating range	☐ Industry ☐ Commerce ☐ Climate control technology

Details of installation company	
Company name	
Street	
Town, post code	
Name of installer	
Date of installation	
Signature	

EN

First-time commissioning

■ To be completed when commissioning the chiller for the first time.

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of first commissioning	
Signature	

Remarks on first installation	
Any remarks	

Second installation of the unit:

■ To be completed if the chiller was relocated to a different building or another location.

Location data	
Name	
Street	
Town, post code	
Phone	
Installation location	

Owner of the system	
Name	
Contact person	
Street	
Town, post code	
Phone	

Specific data for the chiller and system	
Item or spare part number	
Refrigerant	
Original volume [kg]	
Year of construction	
System type	☐ New ☐ Extension to an existing system ☐ Modification to an existing system ☐ Spare part in an existing system
Operating range	☐ Industry ☐ Commerce ☐ Climate control technology

Details of installation company	
Company name	
Street	
Town, post code	
Name of installer	
Date of installation	
Signature	

EN

Second commissioning

■ To be completed upon commissioning the chiller at the new location or in the new building.

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of first commissioning (at the second location)	
Signature	

Remarks on second installation	
Any remarks	

Third installation of the unit:

■ To be completed if the chiller was relocated to a different building or another location.

Location data	
Name	
Street	
Town, post code	
Phone	
Installation location	

Owner of the system	
Name	
Contact person	
Street	
Town, post code	
Phone	

Specific data for the chiller and system	
Item or spare part number	
Refrigerant	
Original volume [kg]	
Year of construction	
System type	☐ New ☐ Extension to an existing system ☐ Modification to an existing system ☐ Spare part in an existing system
Operating range	☐ Industry ☐ Commerce ☐ Climate control technology

Details of installation company	
Company name	
Street	
Town, post code	
Name of installer	
Date of installation	
Signature	

EN

Third commissioning

■ To be completed upon commissioning the chiller at the new location or in the new building.

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of first commissioning (at the third location)	
Signature	

Remarks on third installation	
Any remarks	

Information about disposal:

Location data	
Name	
Street	
Town, post code	
Phone	
Installation location	

Owner of the system	
Name	
Contact person	
Street	
Town, post code	
Phone	

Specific data for the chiller	
Item or spare part number	
Refrigerant	
Original volume [kg]	
Year of construction	

Details of specialist disposal company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of decommissioning	
Signature	

Note:
- The system must be adequately drained at the instruction of the owner.
- The refrigerant must be emptied and disposed of as per the relevant regulations.
- The oil must be emptied out and disposed of as per the relevant regulations.

EN

13 Maintenance register

Regular inspections are prescribed by law and regulated by European Regulation 842/2006 of 17 May 2006, excerpts from which are shown below. However, this is no substitute for a detailed knowledge of the Regulation itself.

– Inspections must be carried out by certified personnel and with due regard for Article 5 of the provisions.
– All inspections should be registered on a maintenance certificate (pages to follow).
– The volumes of refrigerant contained in the machine are shown on the rating plate.
– The inspection periods for machines vary according to whether or not they are hermetically sealed (see label with technical specifications)
– If gas escapes and is followed by a machine repair, a further inspection should be carried out one month after the repair in order to ascertain any losses.

kg of HERMETICALLY sealed greenhouse gases in the cooling circuit (not medium circuit)	Frequency	Control
Fill capacity < 6 kg	–	No inspection for possible losses
6 kg ≤ fill capacity < 30 kg	1 year	Inspection for possible losses
30 kg ≤ fill capacity < 300 kg	6 months	Inspection for possible losses
Fill capacity ≥ 300 kg	3 months	Inspection for possible losses

kg of NON-hermetically sealed greenhouse gases in the cooling circuit (not medium circuit)	Frequency	Control
Fill capacity < 3 kg	–	No inspection for possible losses
3 kg ≤ fill capacity < 30 kg	1 year	Inspection for possible losses
30 kg ≤ fill capacity < 300 kg	6 months	Inspection for possible losses
Fill capacity ≥ 300 kg	3 months	Inspection for possible losses

Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

13 Maintenance register

EN

Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

13 Maintenance register

EN

Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

13 Maintenance register

EN

Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

13 Maintenance register

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Maintenance certificate:

- To be completed for systems with more than 3 kg synthetic refrigerant (if not hermetically sealed) or more than 6 kg (if hermetically sealed) (see section 14.4 "Technical specifications").

Details of specialist company	
Company name	
Street	
Town, post code	
Name of specialist	
Date of inspection and/or maintenance	
Signature	

Inspection/maintenance data	
Work carried out / parts replaced	Refrigerant removed/added in kg

Next inspection	
Date of next inspection	
Signature	

14 Appendix

14.1 P+ID diagram

Explanations of the abbreviations used may be found in the spare parts list for the relevant type.

Types 3335.790, 3335.830, 3335.840, 3335.850

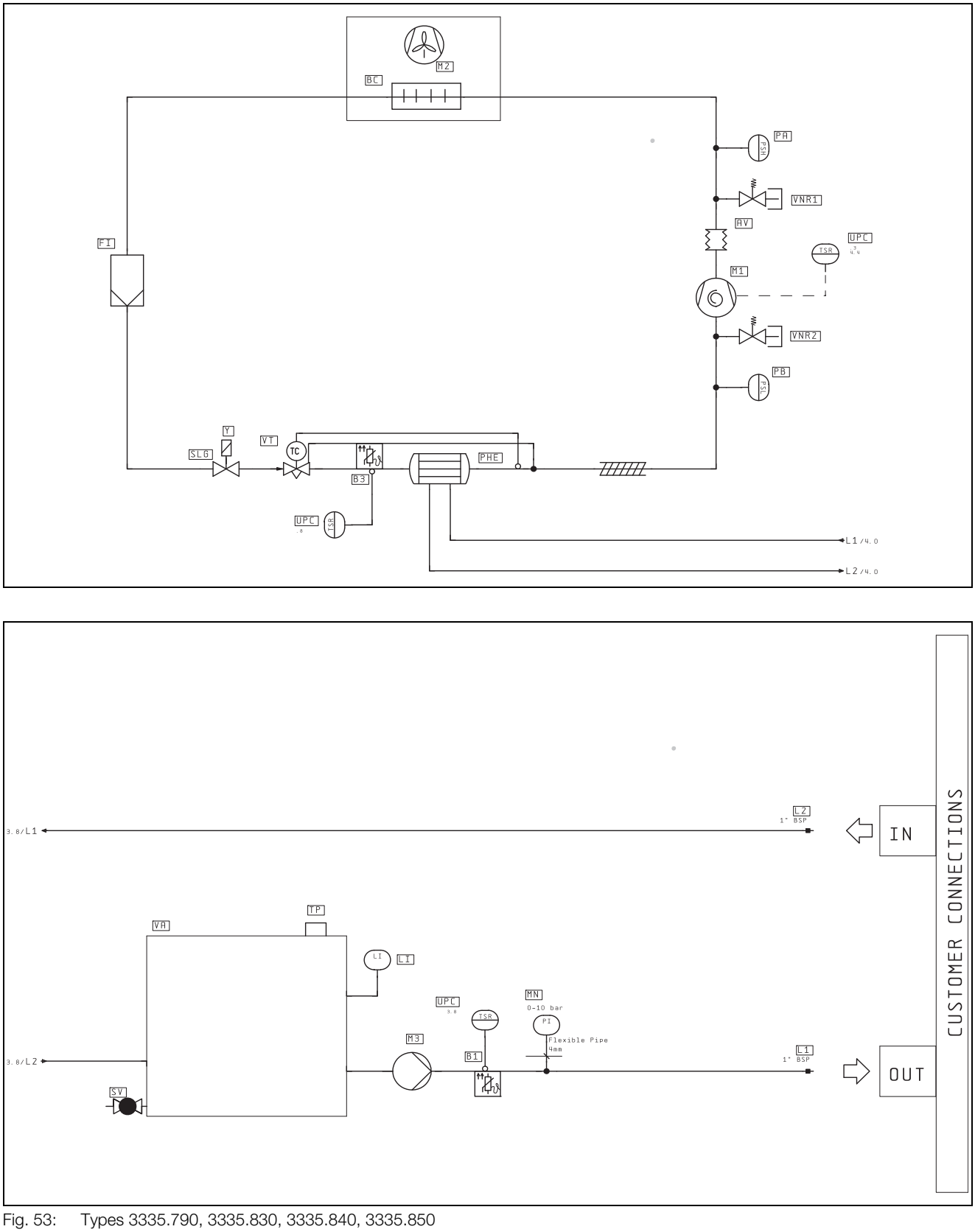

Fig. 53: Types 3335.790, 3335.830, 3335.840, 3335.850

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Types 3335.860, 3335.870

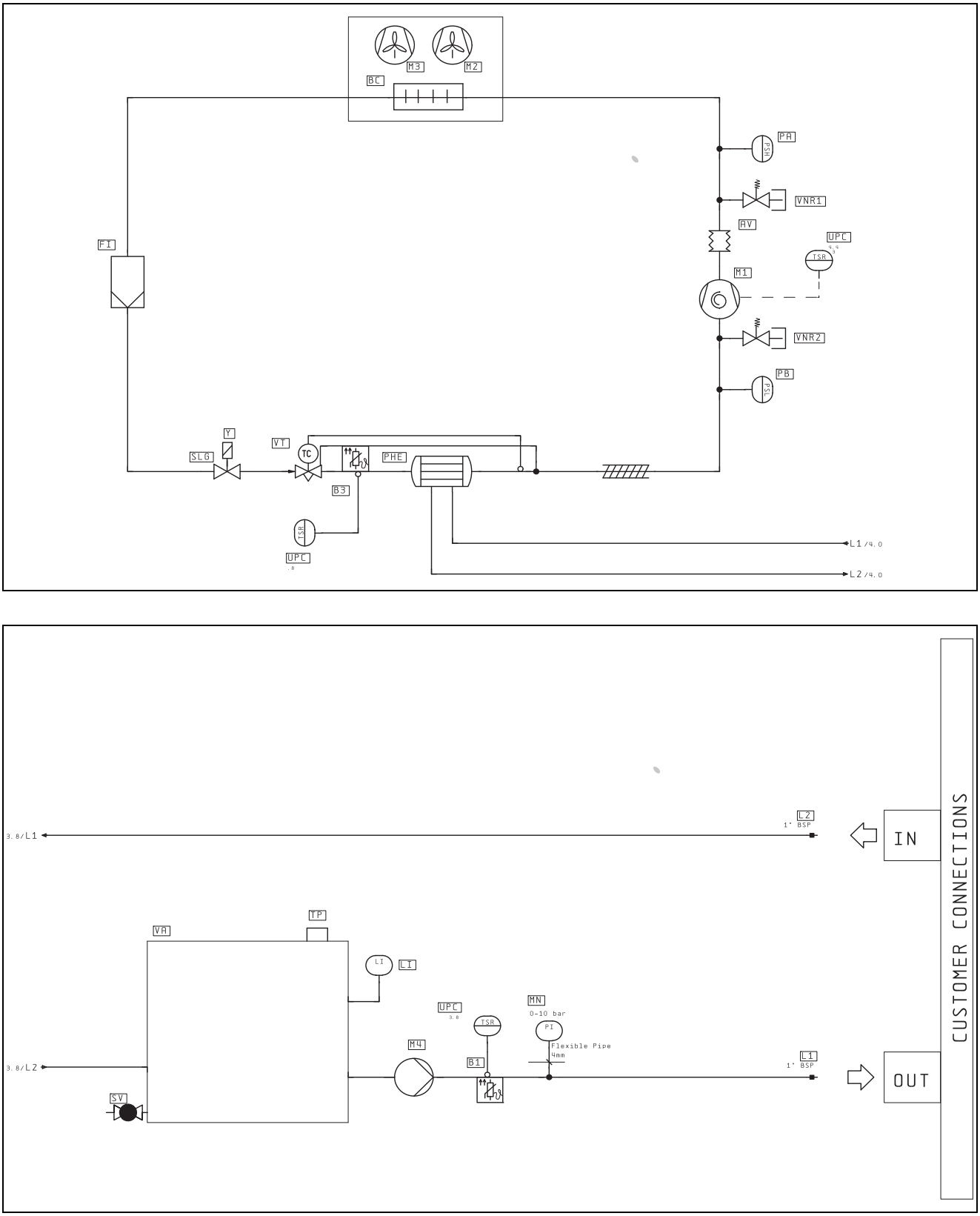
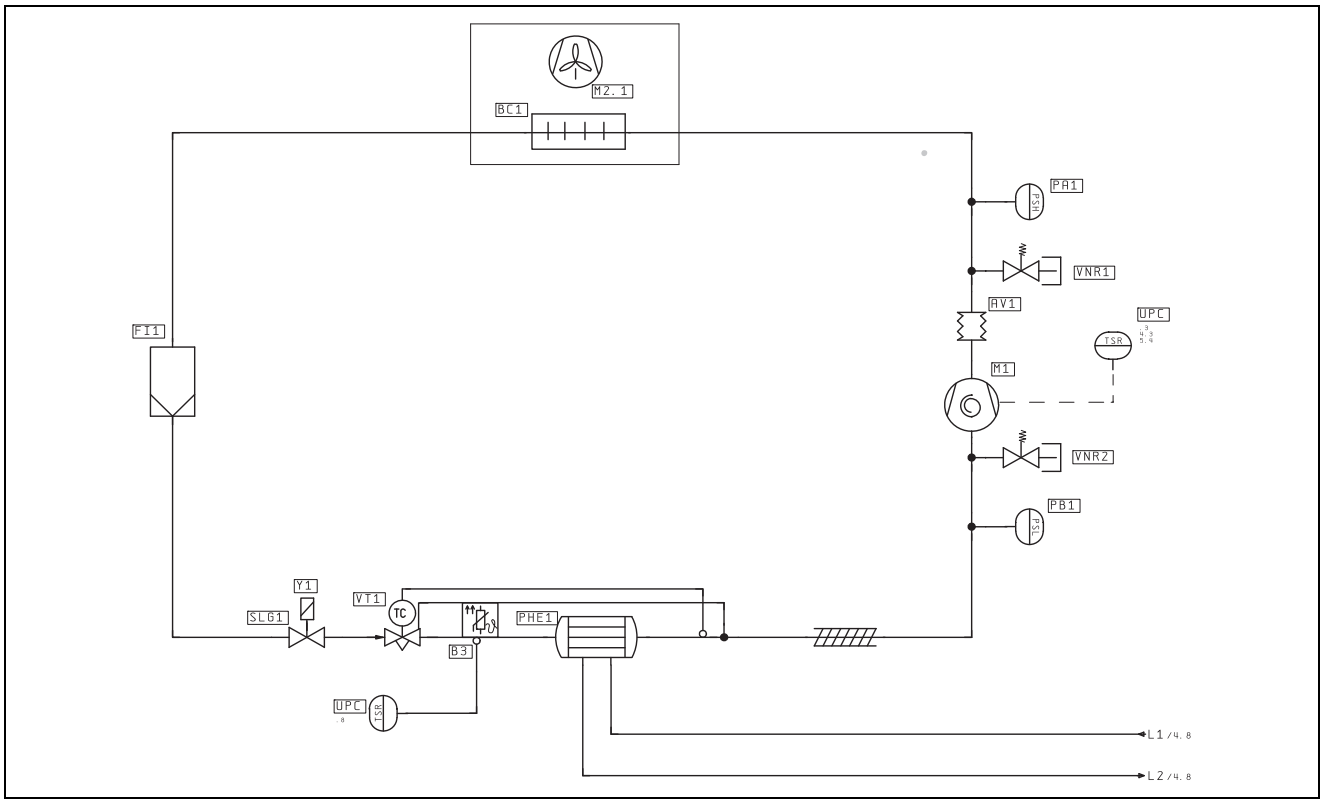
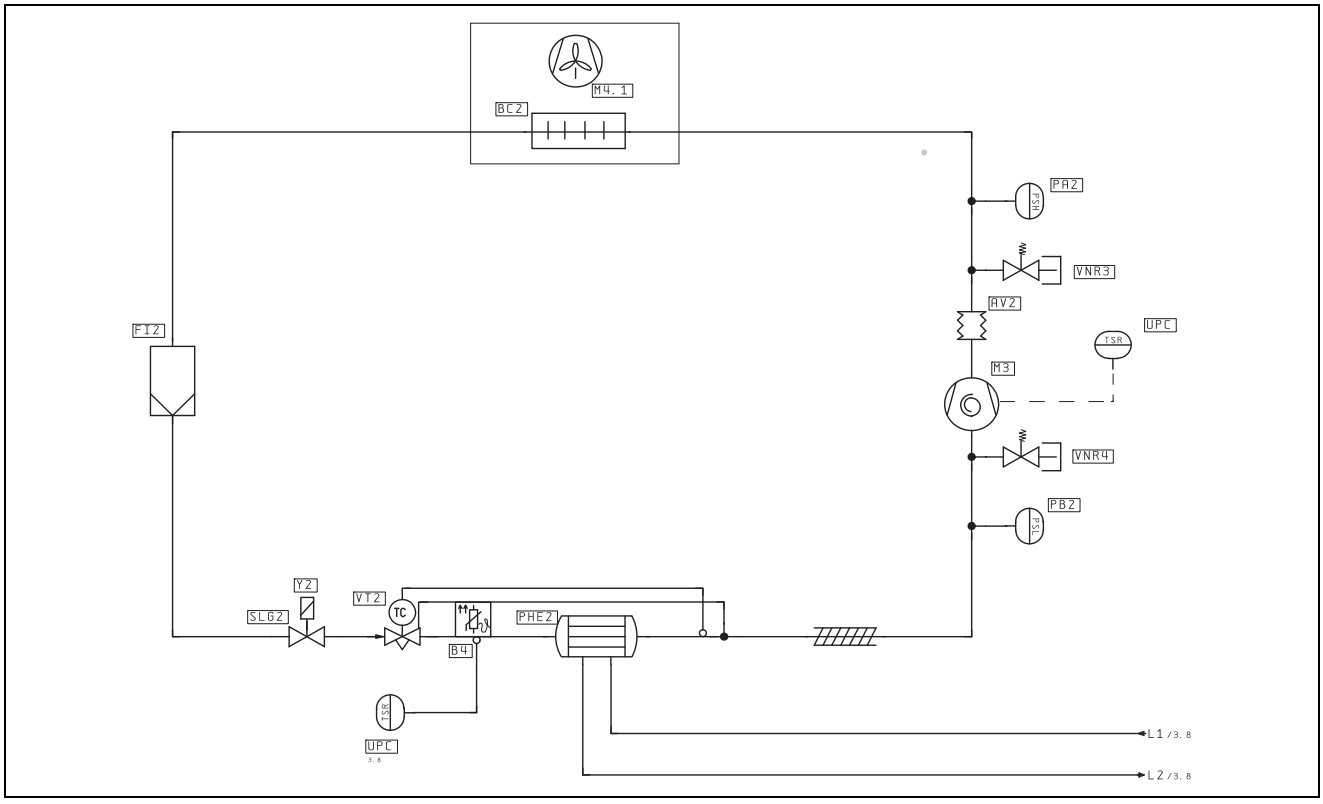


Fig. 54: Types 3335.860, 3335.870

EN

Type 3335.880





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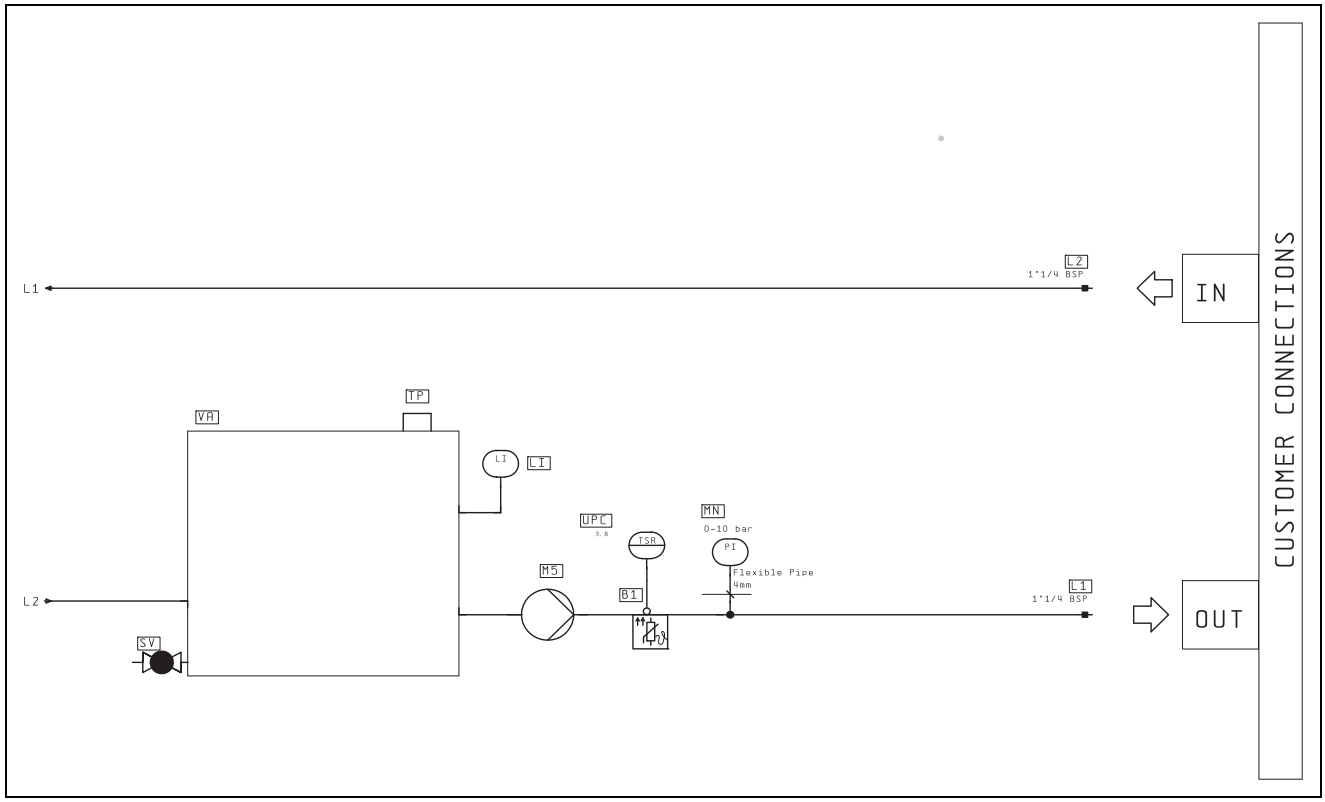
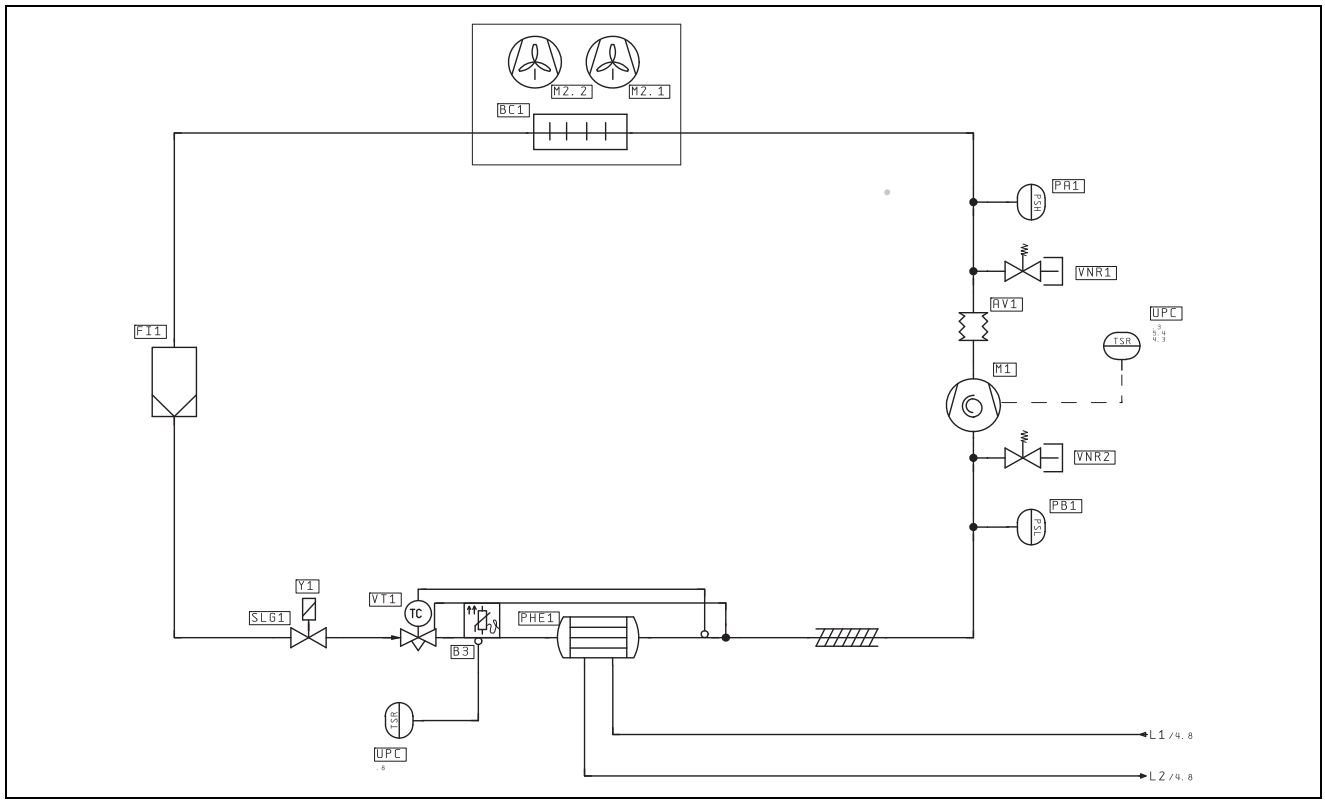


Fig. 55: Type 3335.880

Type 3335.890



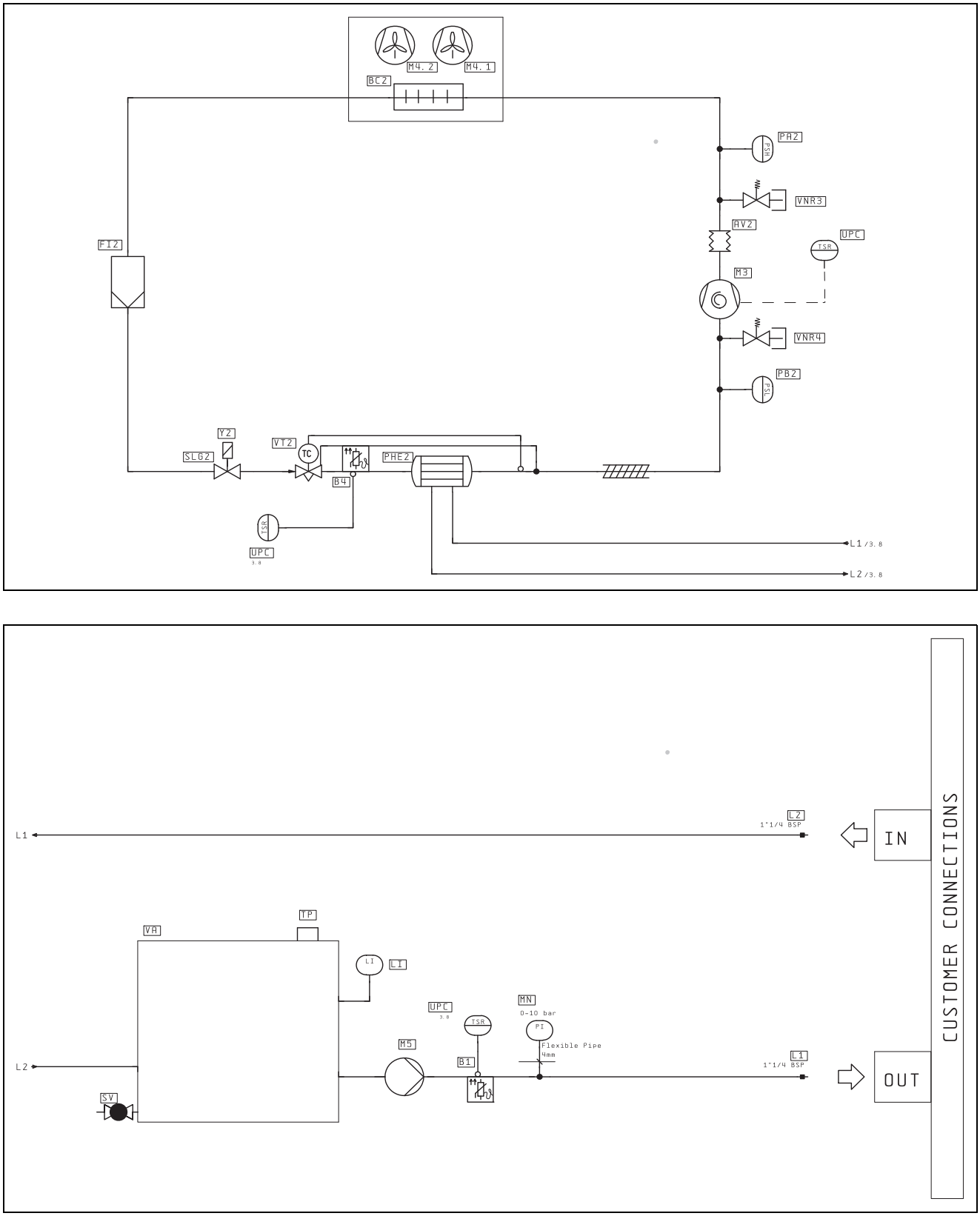


Fig. 56: Type 3335.890

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14.2 Electrical circuit diagram

Types 3335.790, 3335.830

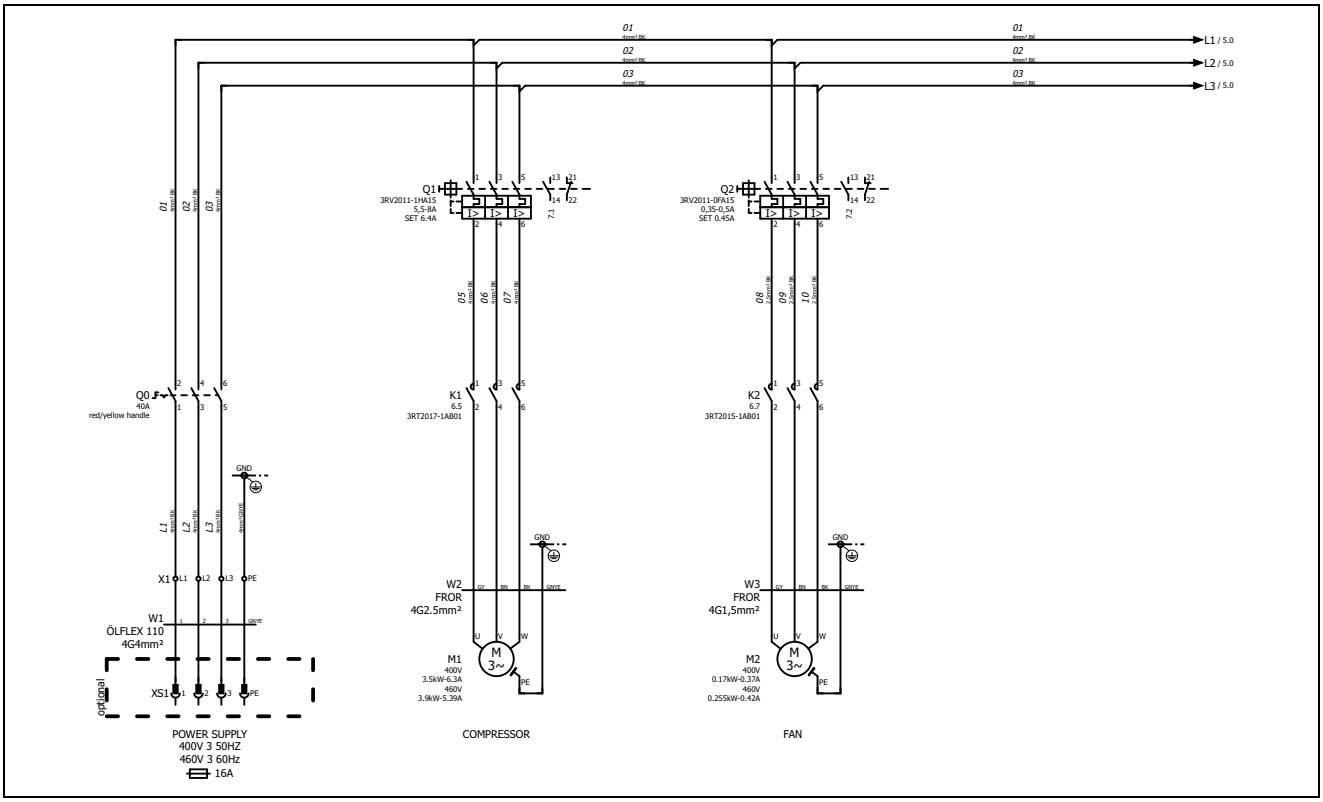

Fig. 57: Types 3335.790, 3335.830

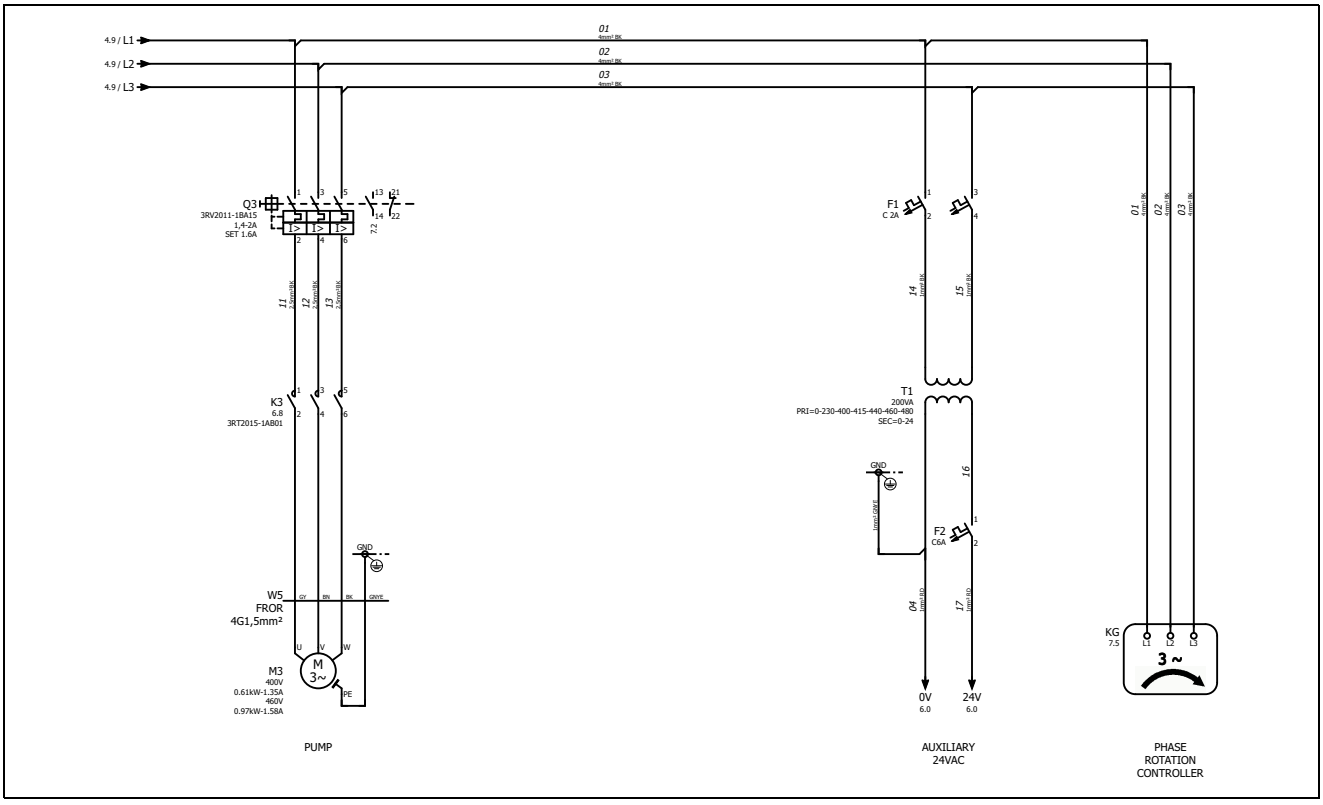

Fig. 58: Types 3335.790, 3335.830

EN

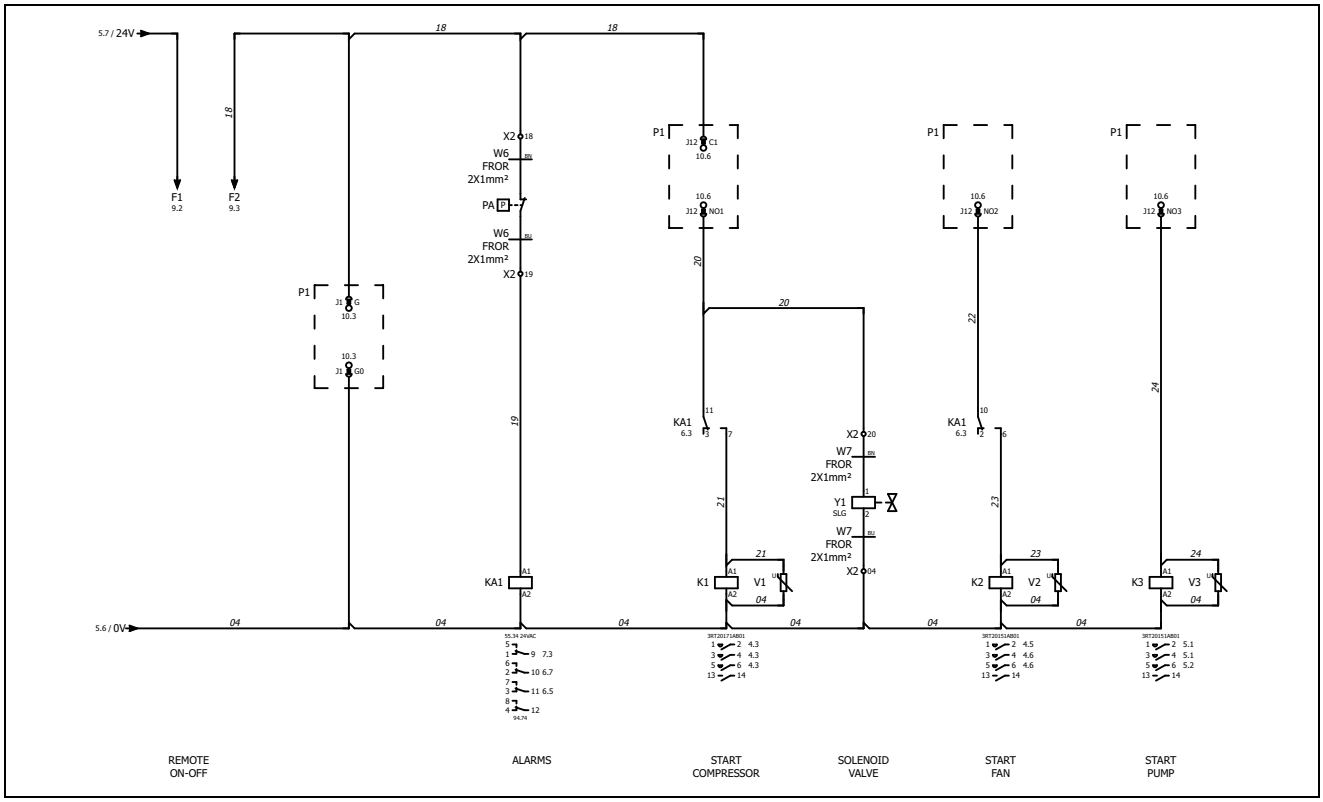

Fig. 59: Types 3335.790, 3335.830

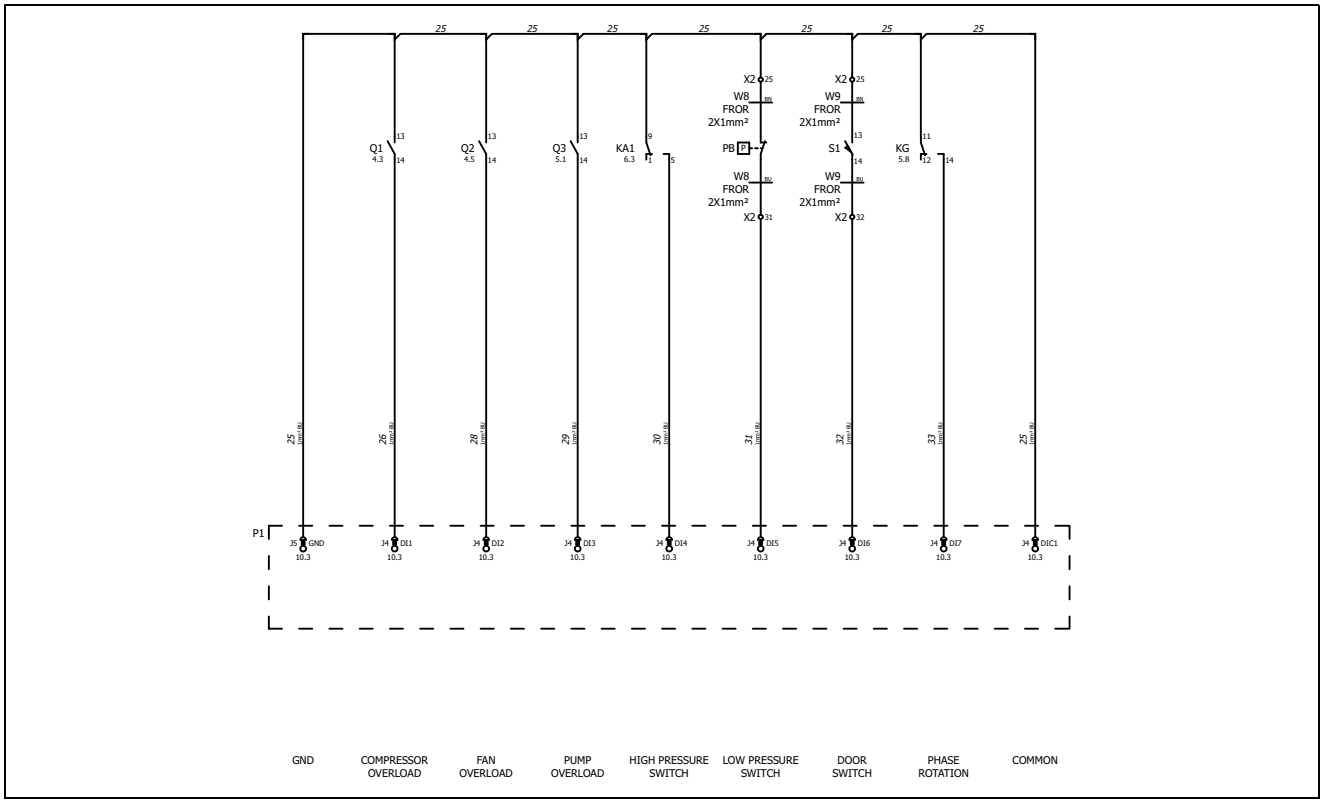

Fig. 60: Types 3335.790, 3335.830

EN

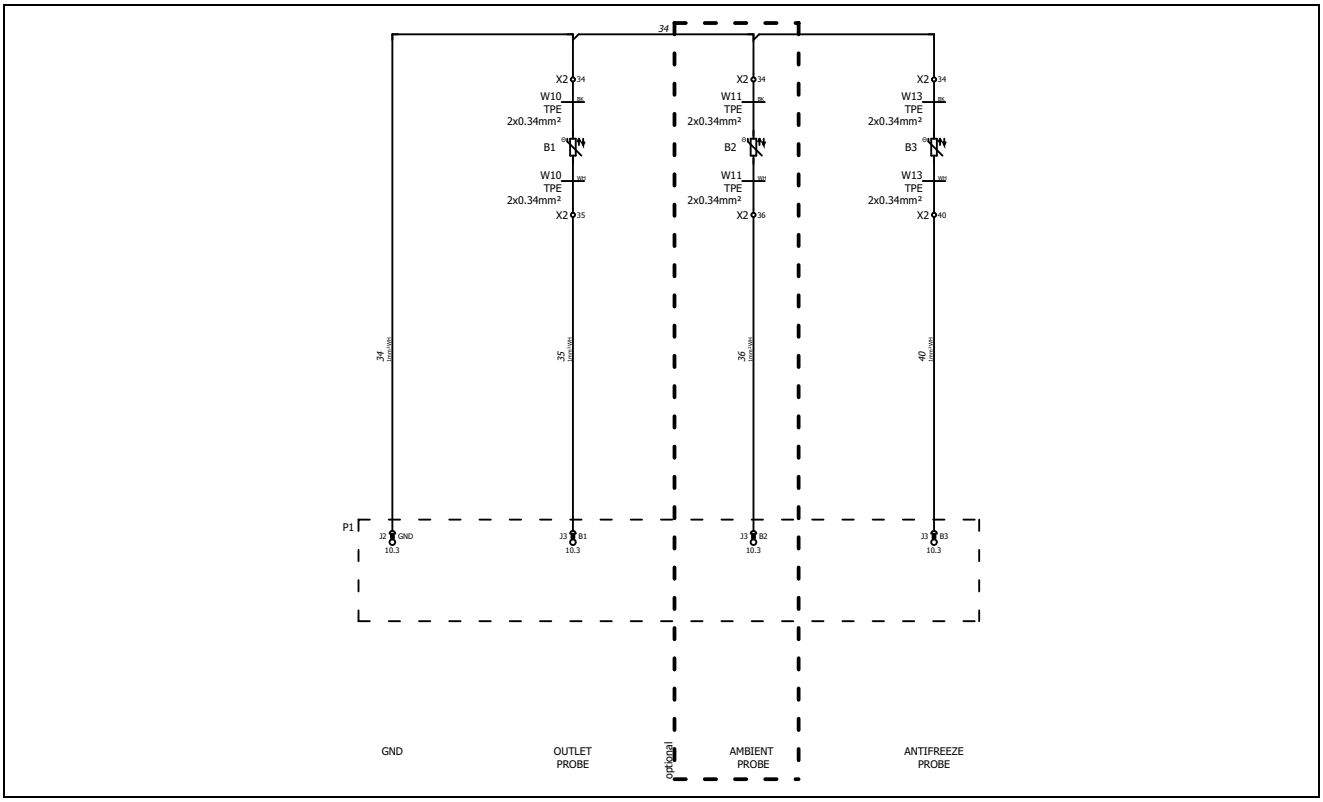

Fig. 61: Types 3335.790, 3335.830

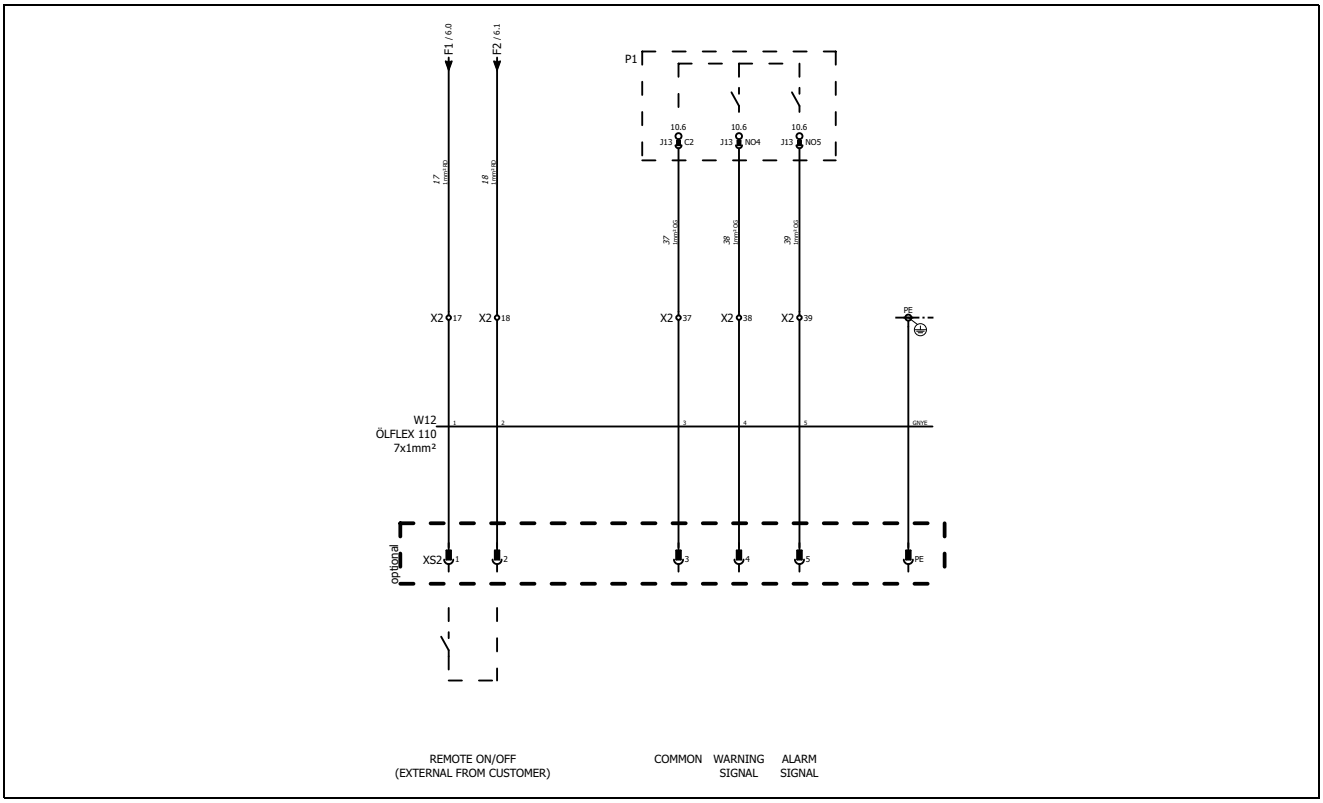

Fig. 62: Types 3335.790, 3335.830

EN

Type 3335.840

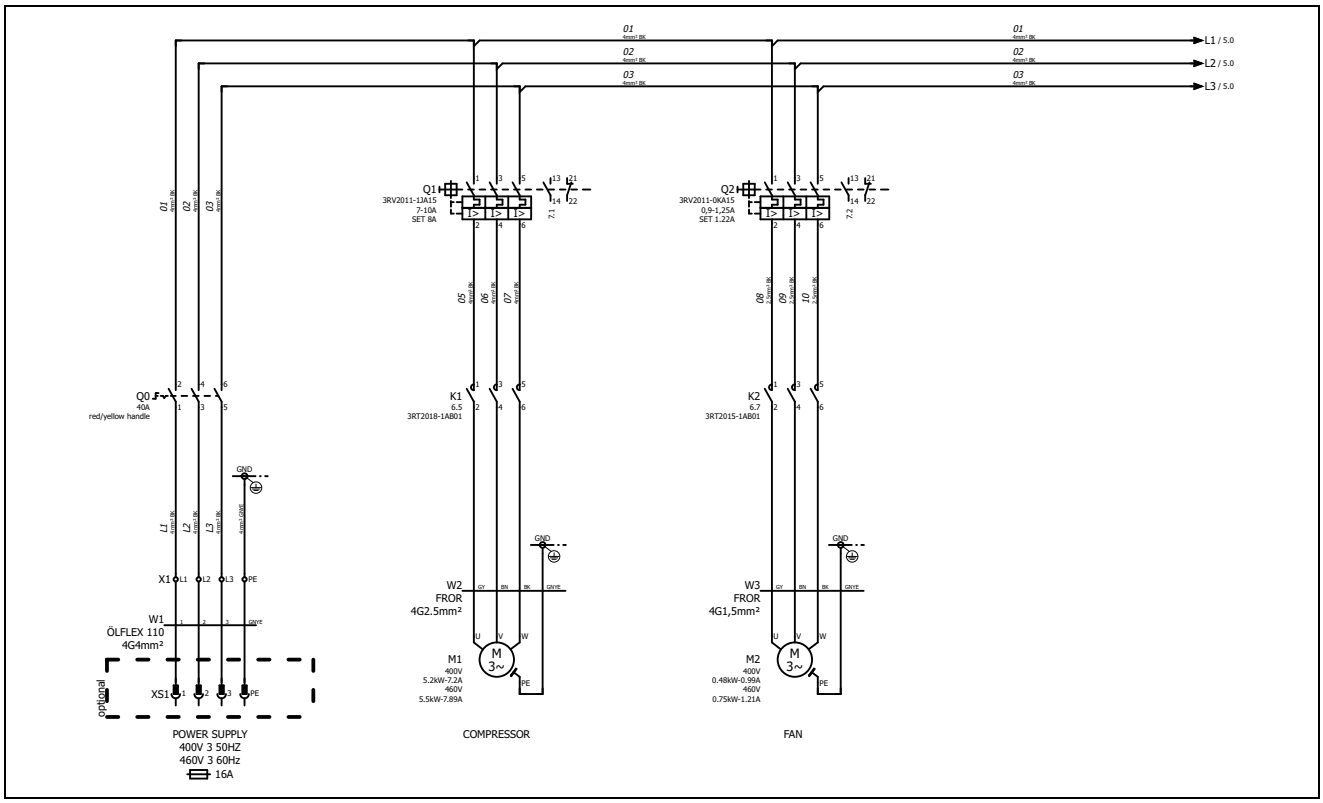

Fig. 63: Type 3335.840

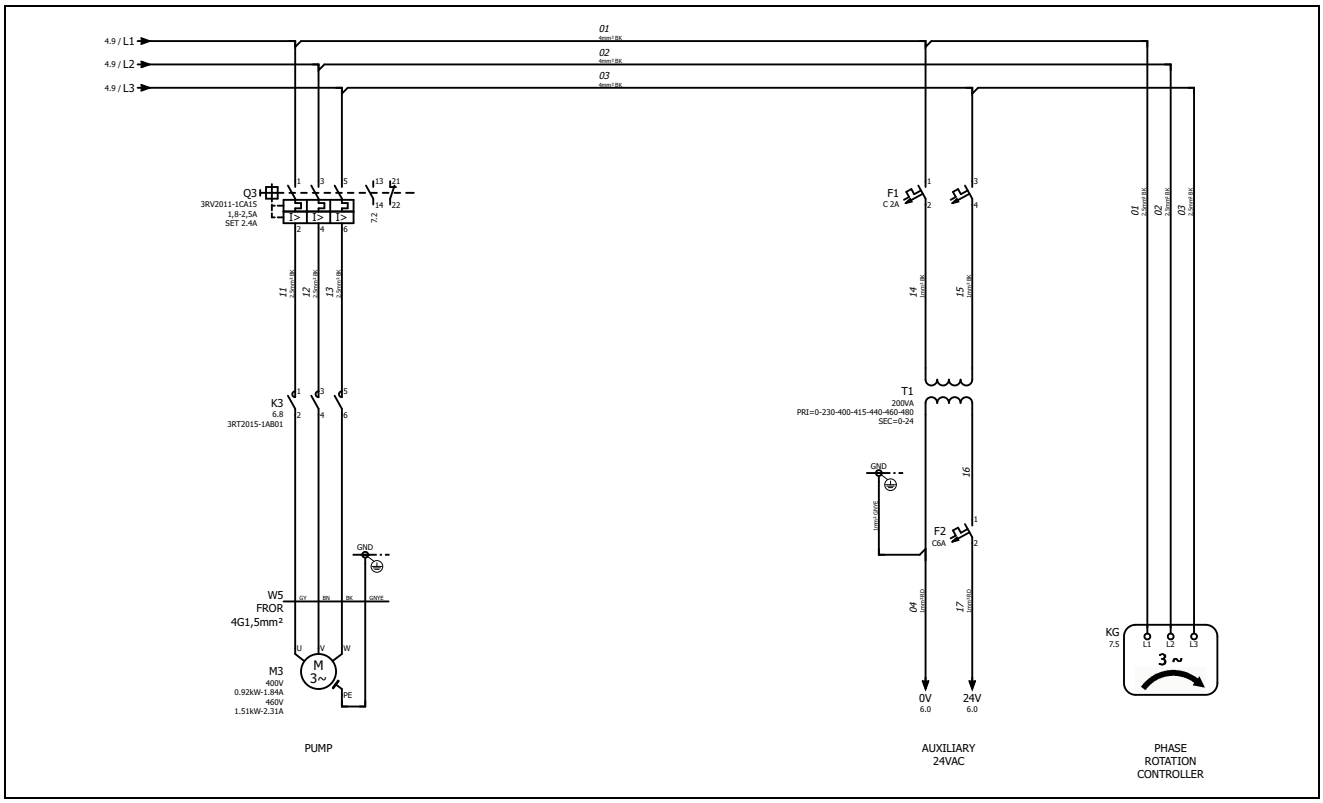

Fig. 64: Type 3335.840

EN

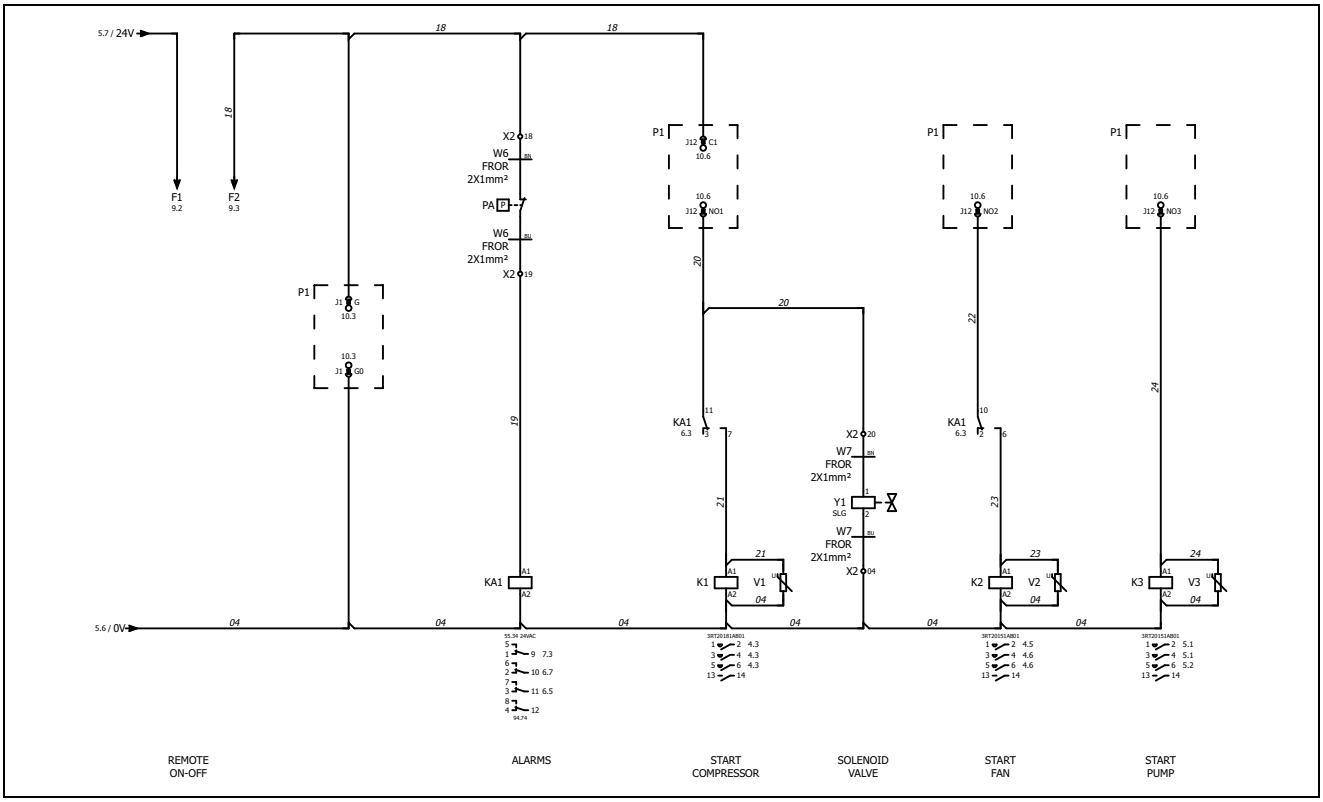

Fig. 65: Type 3335.840

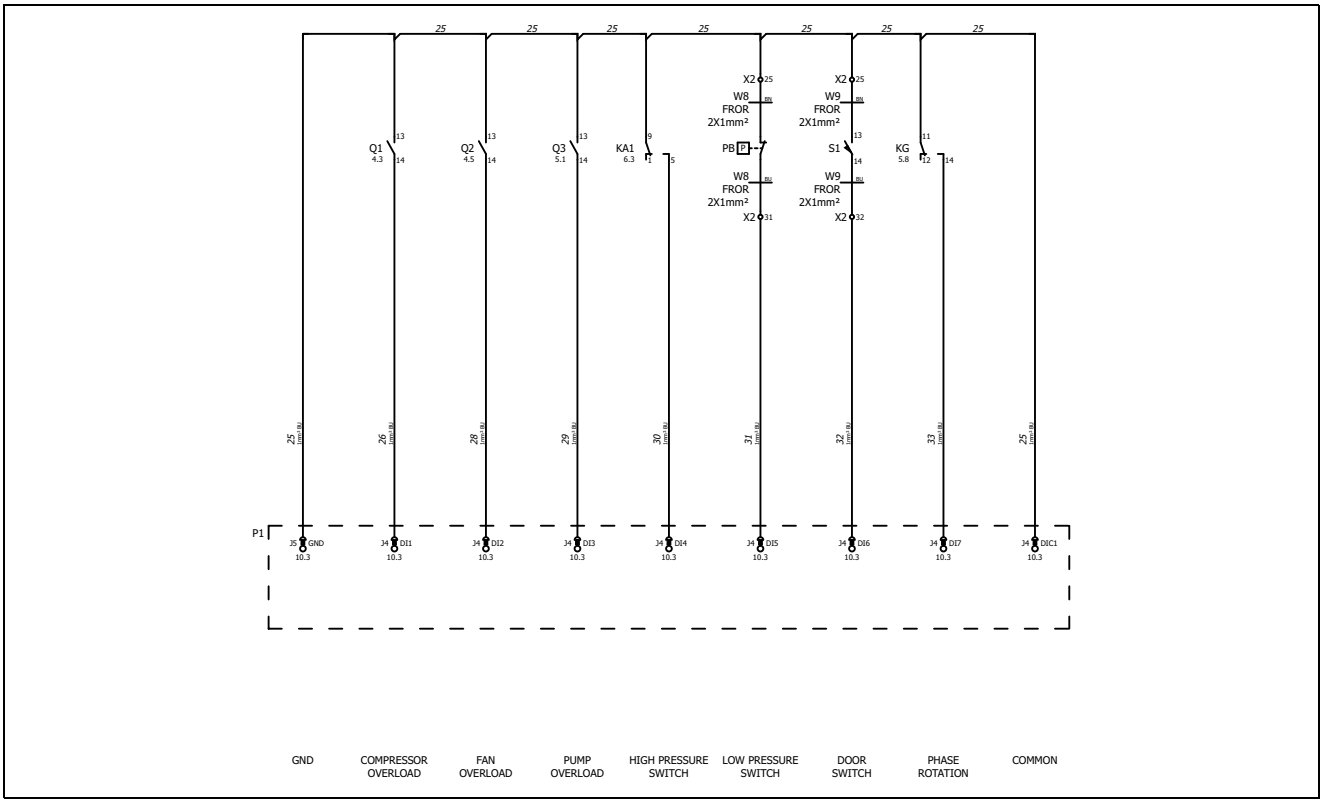

Fig. 66: Type 3335.840

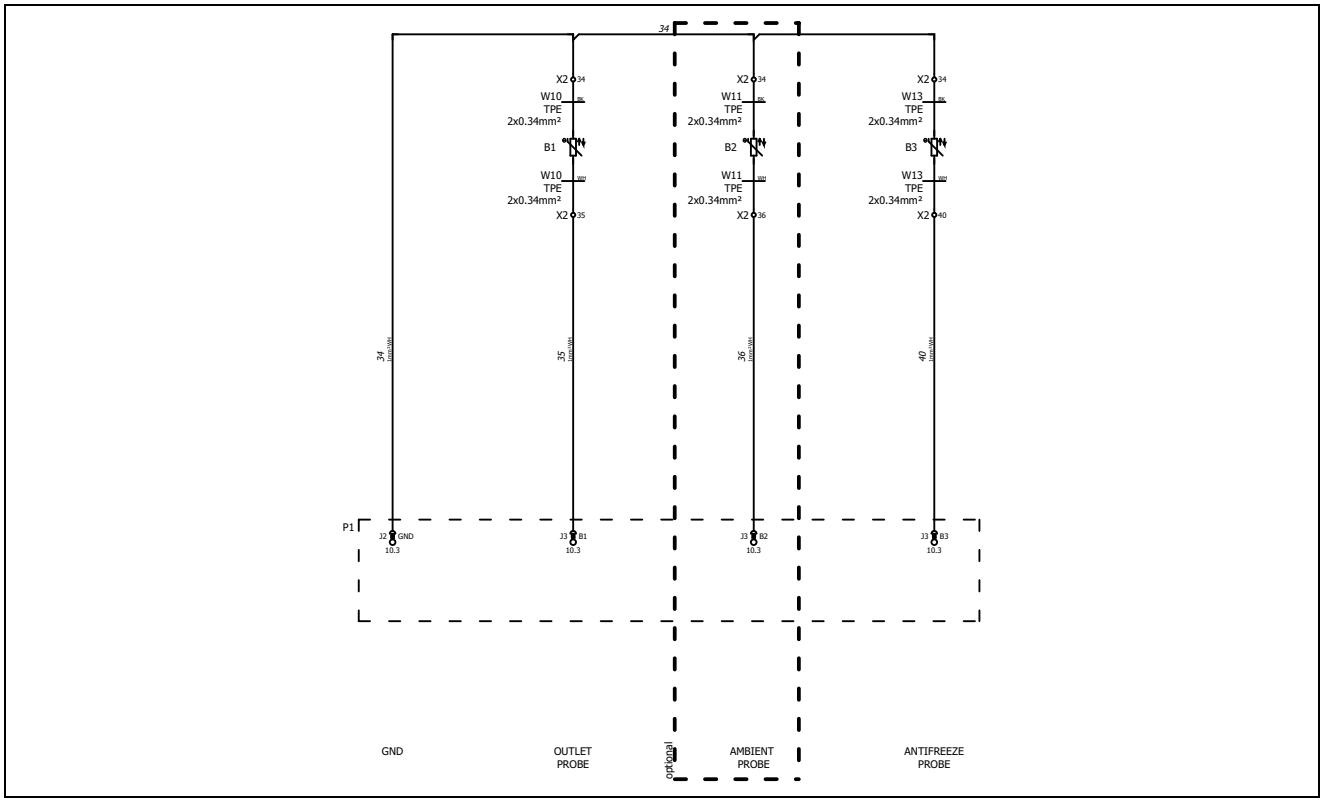

Fig. 67: Type 3335.840

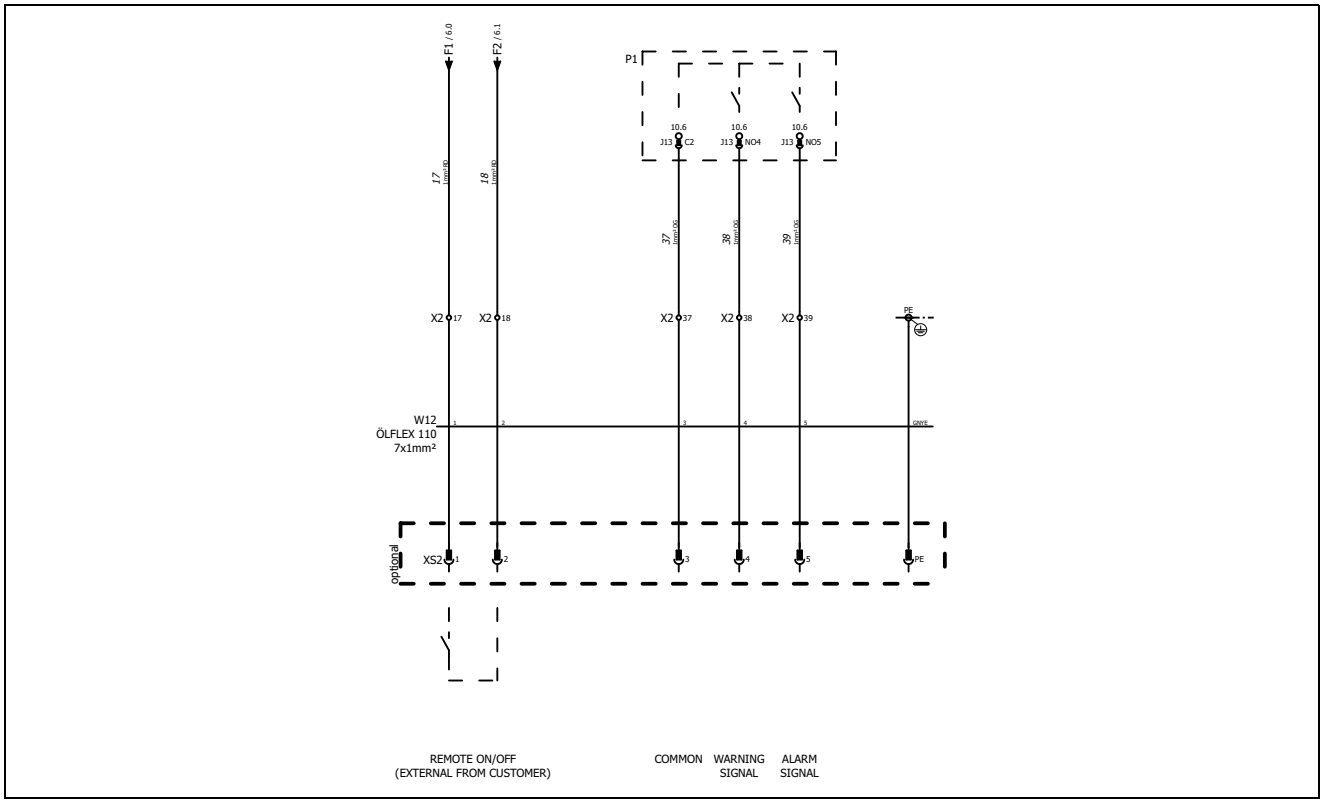

Fig. 68: Type 3335.840

EN

Type 3335.850

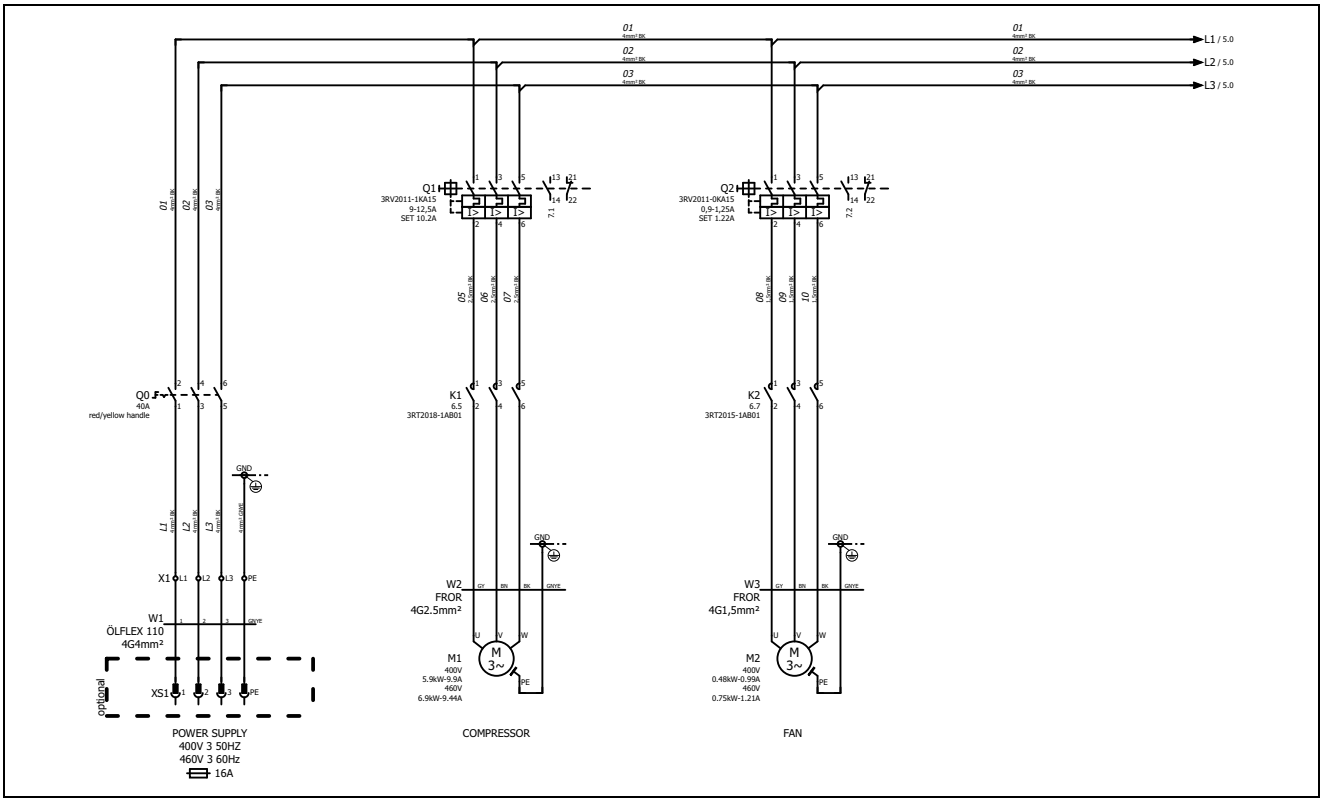

Fig. 69: Type 3335.850

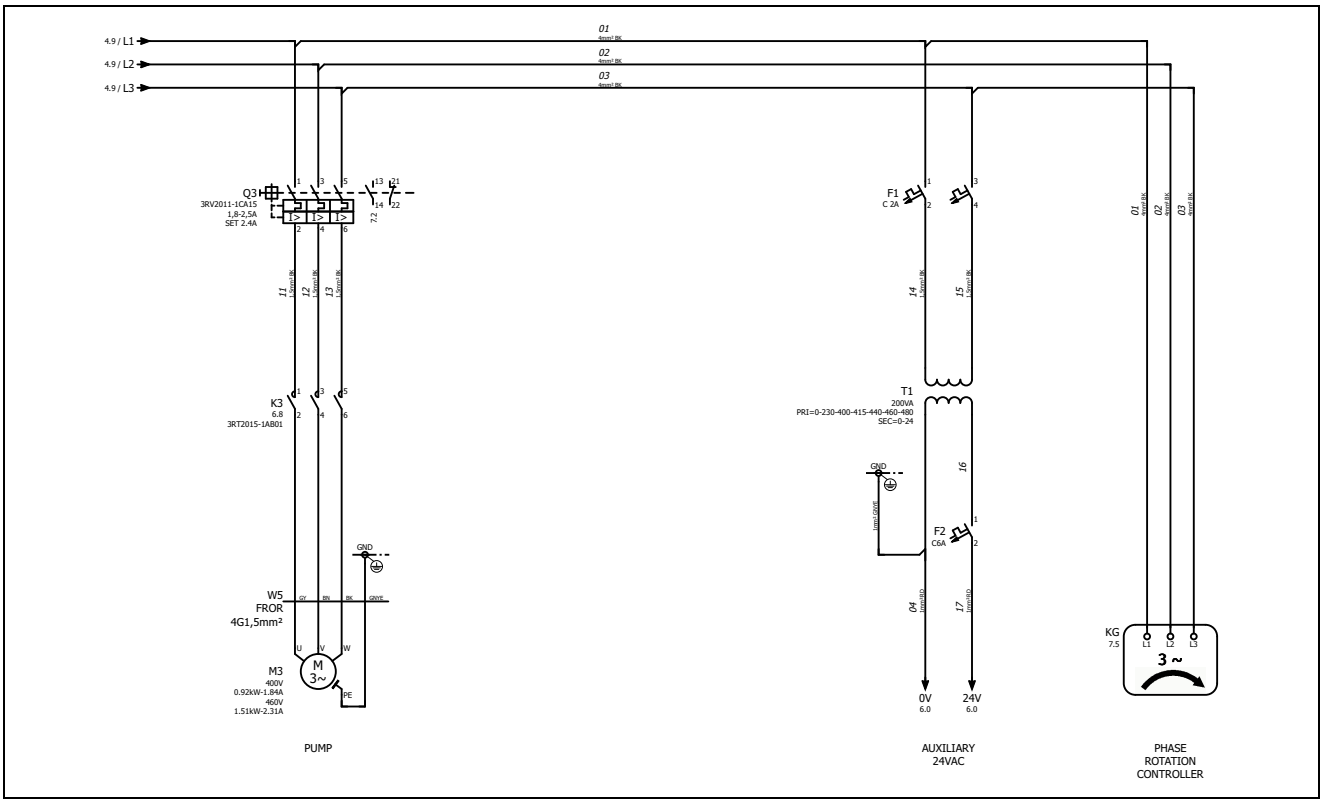

Fig. 70: Type 3335.850

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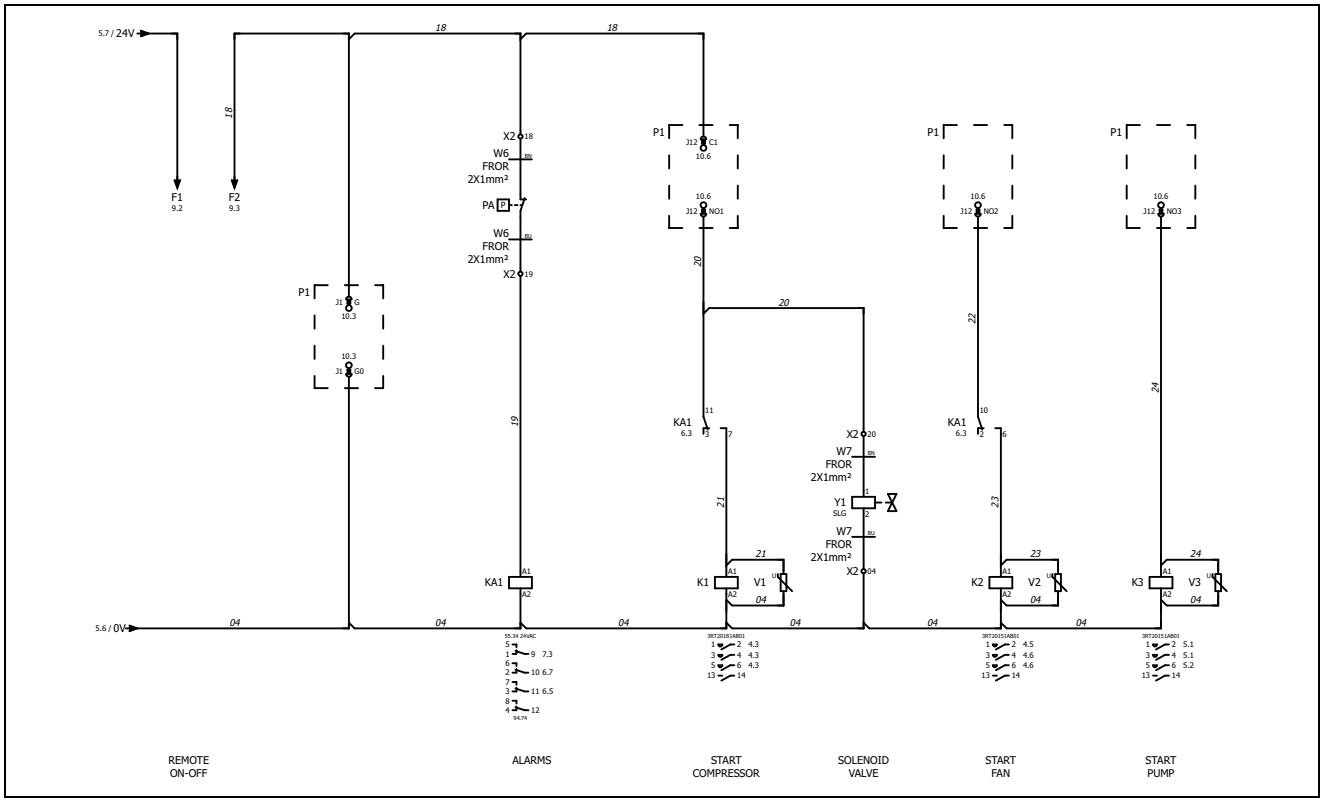

Fig. 71: Type 3335.850

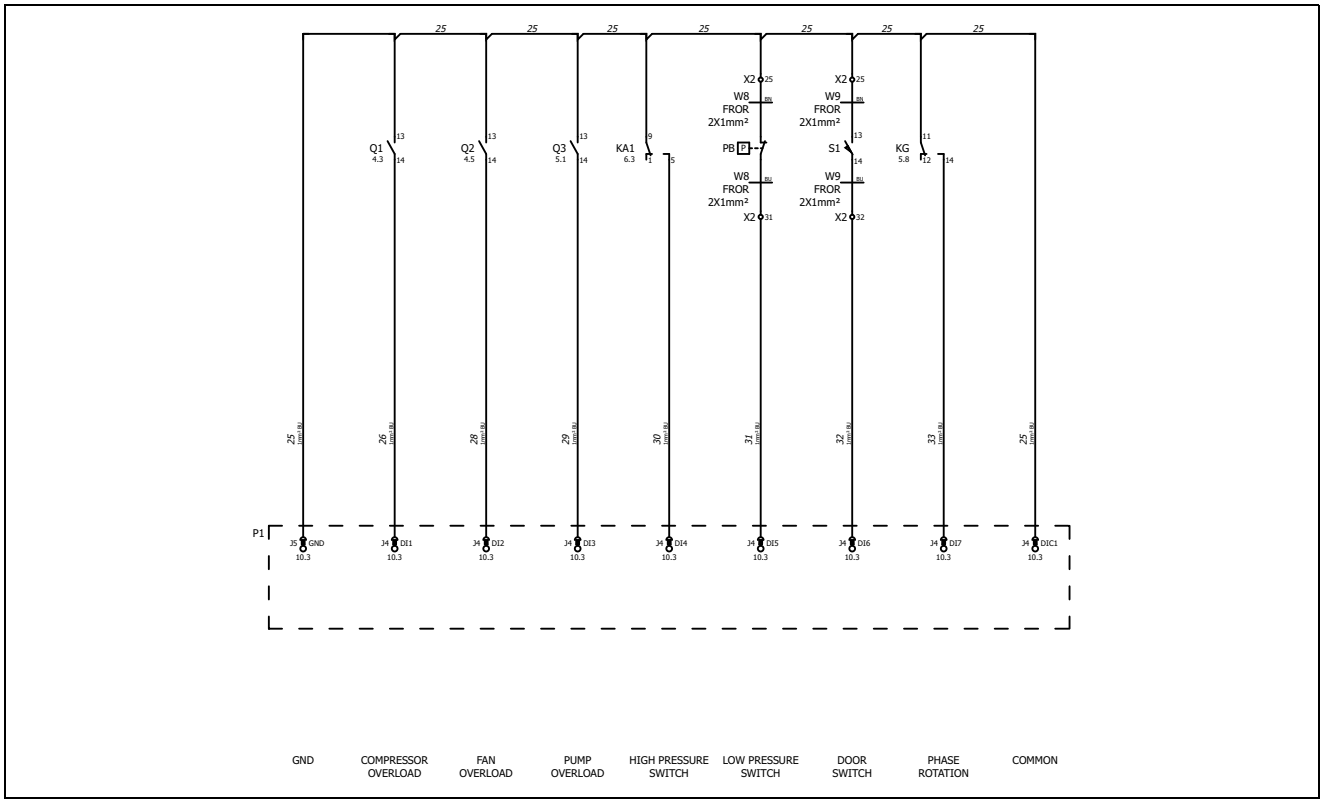

Fig. 72: Type 3335.850

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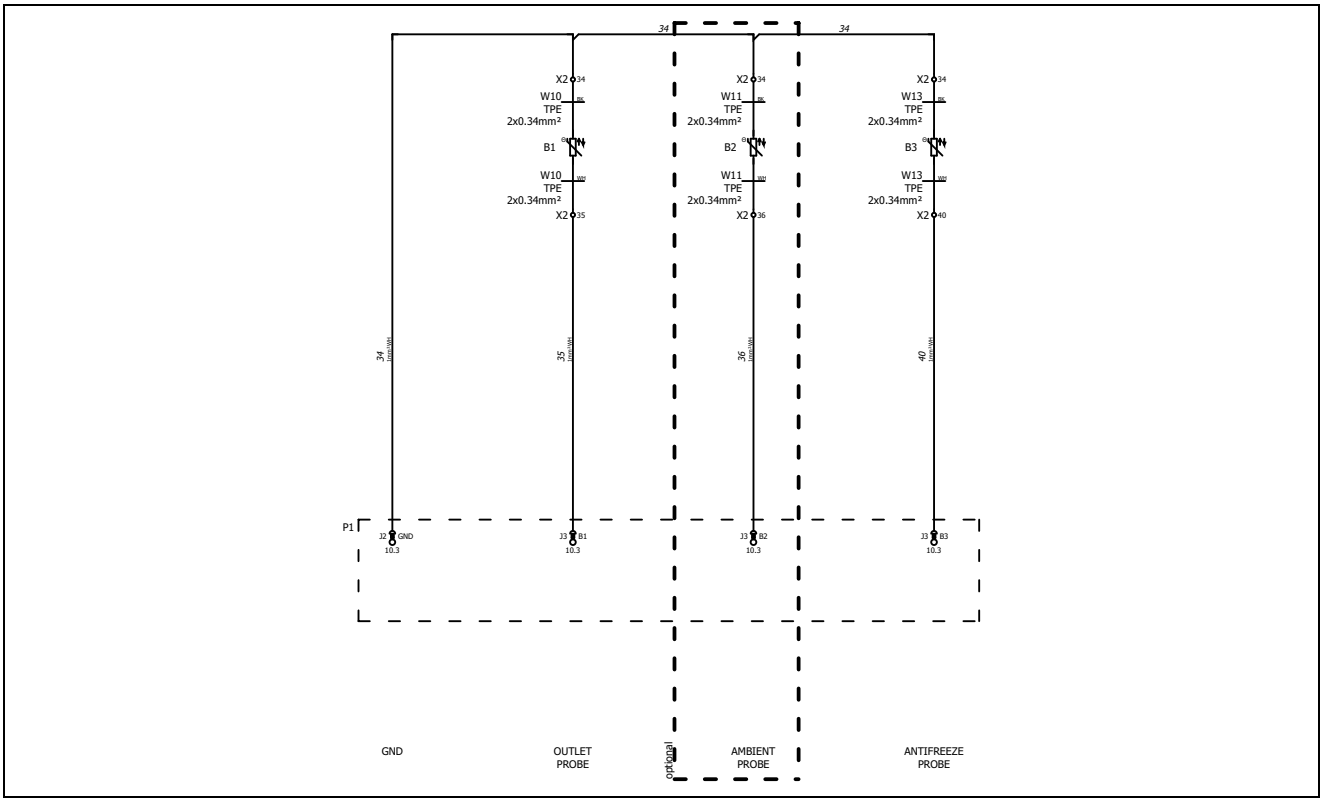

Fig. 73: Type 3335.850

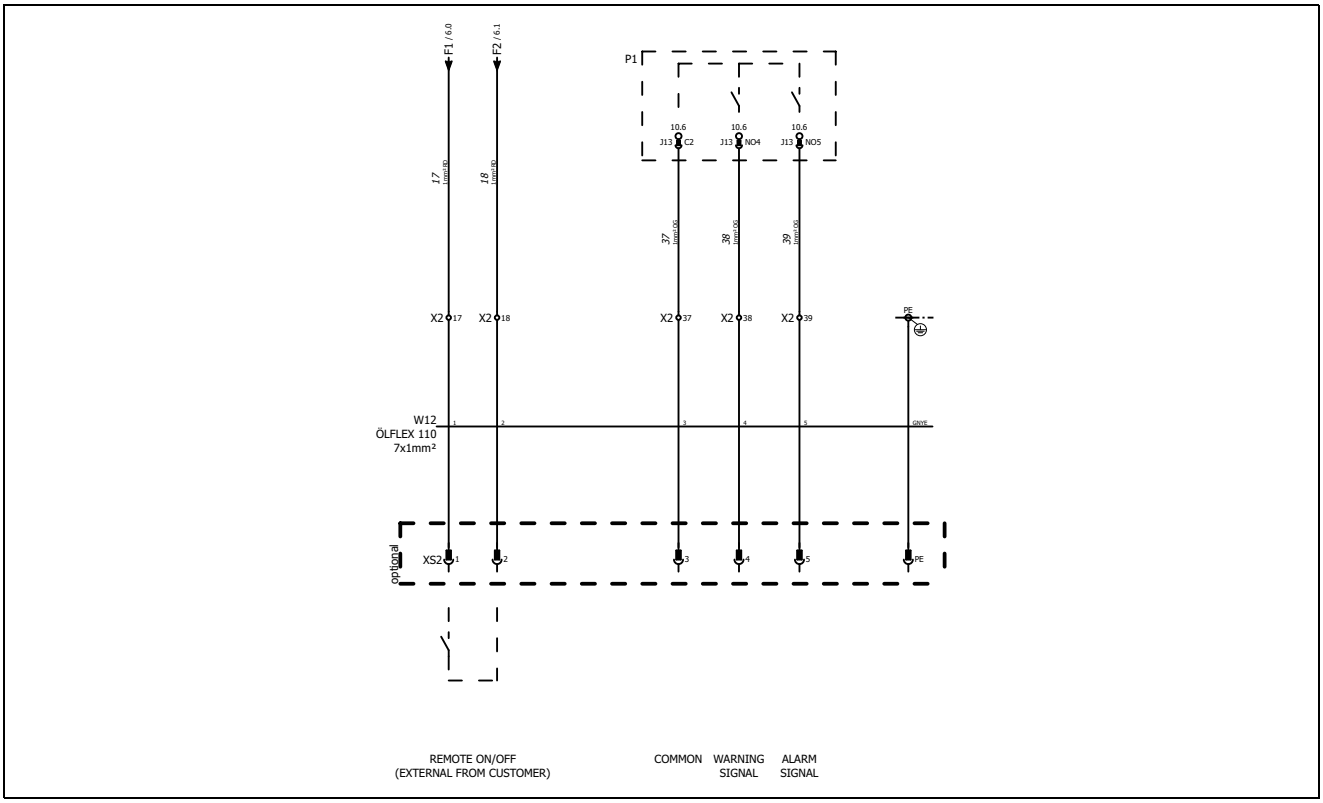

Fig. 74: Type 3335.850

EN

Type 3335.860

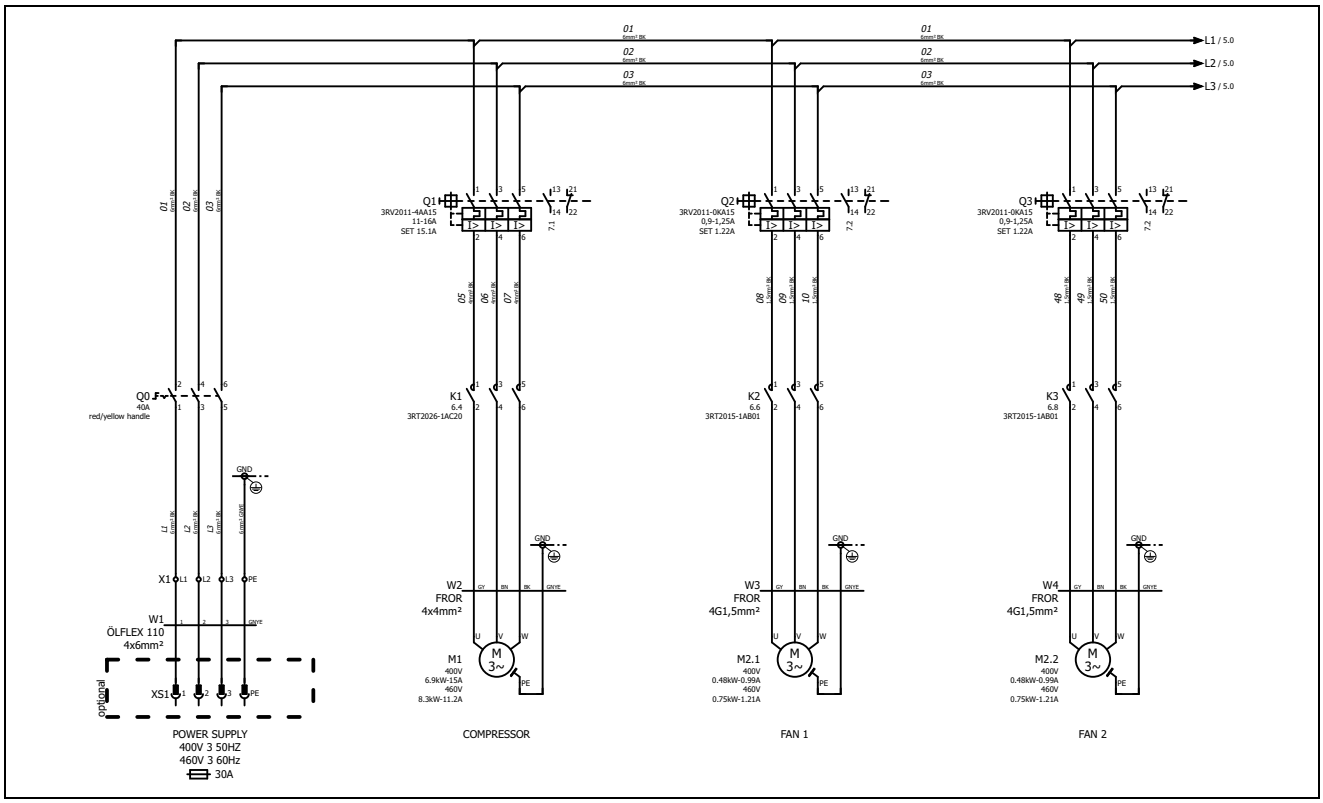

Fig. 75: Type 3335.860

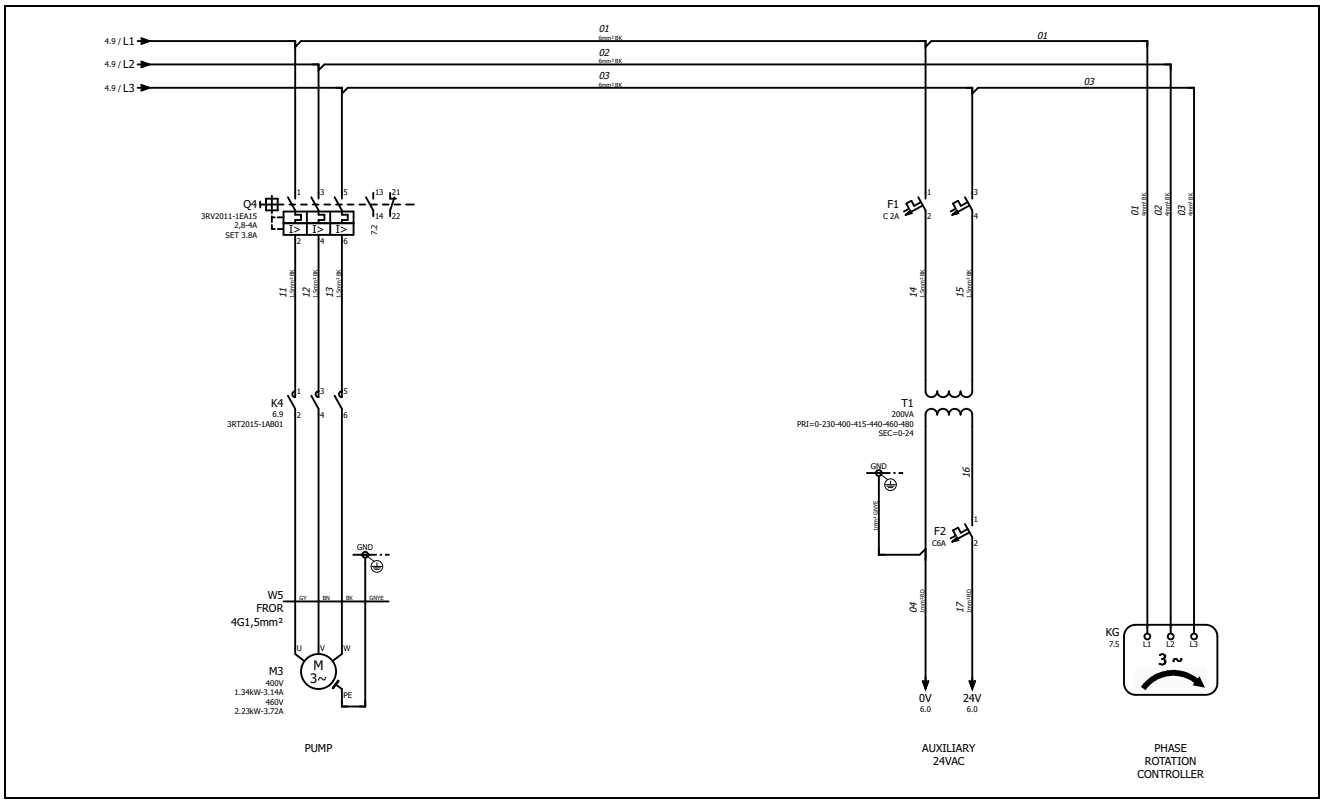

Fig. 76: Type 3335.860

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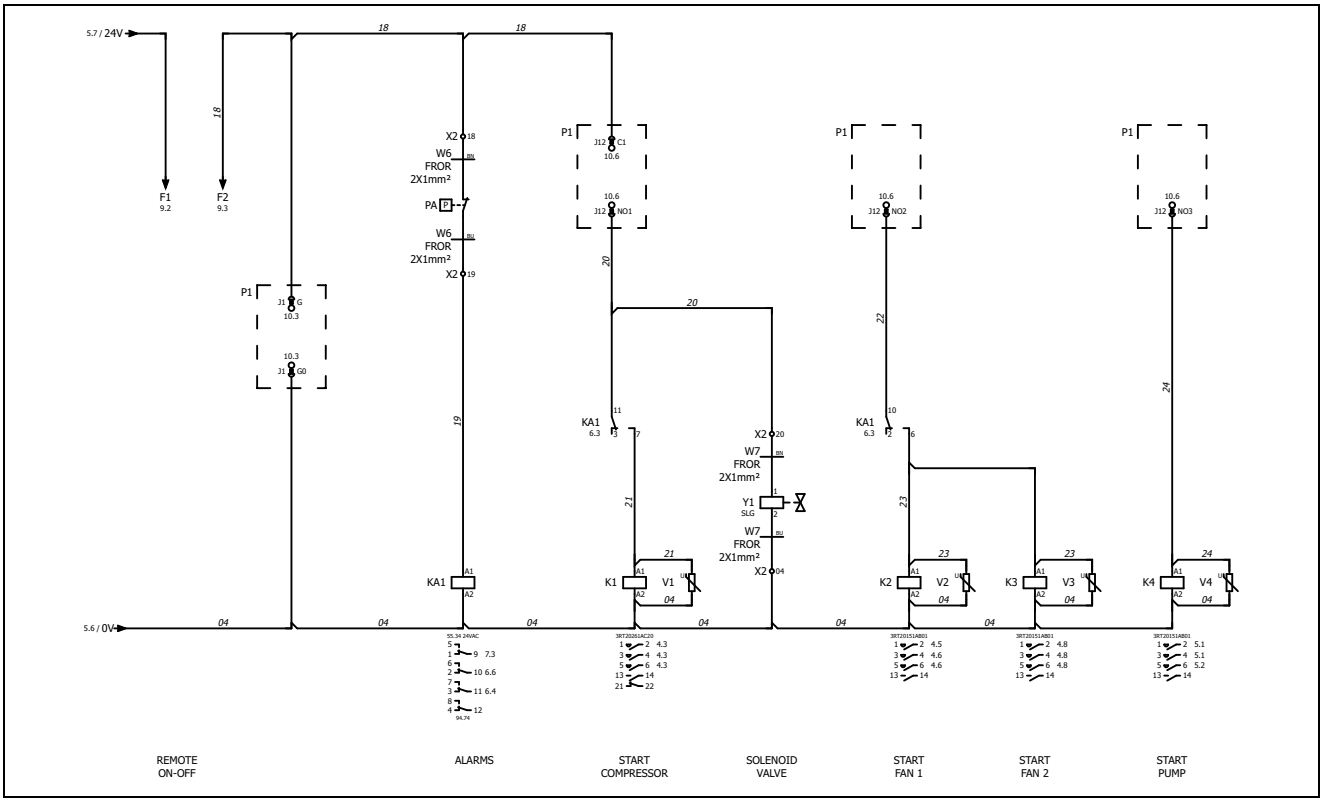

Fig. 77: Type 3335.860

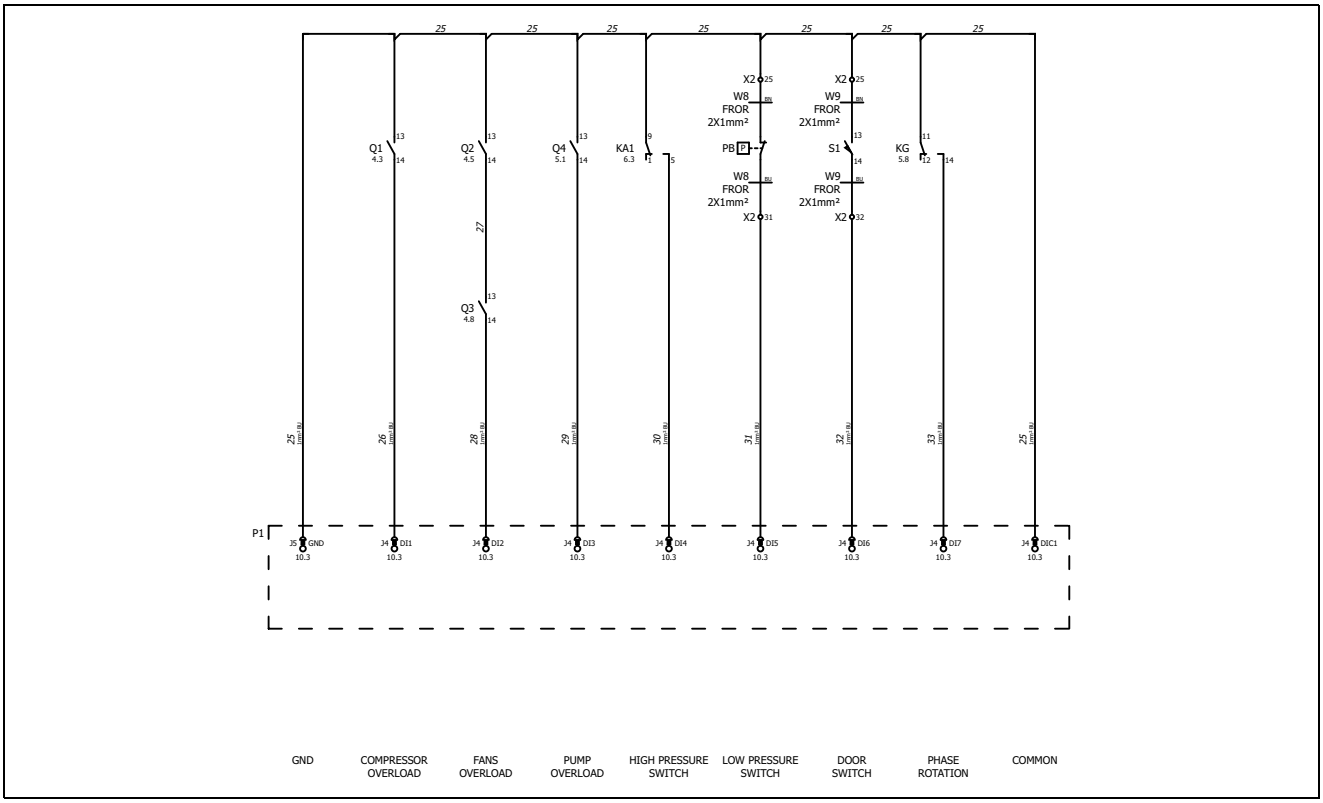

Fig. 78: Type 3335.860

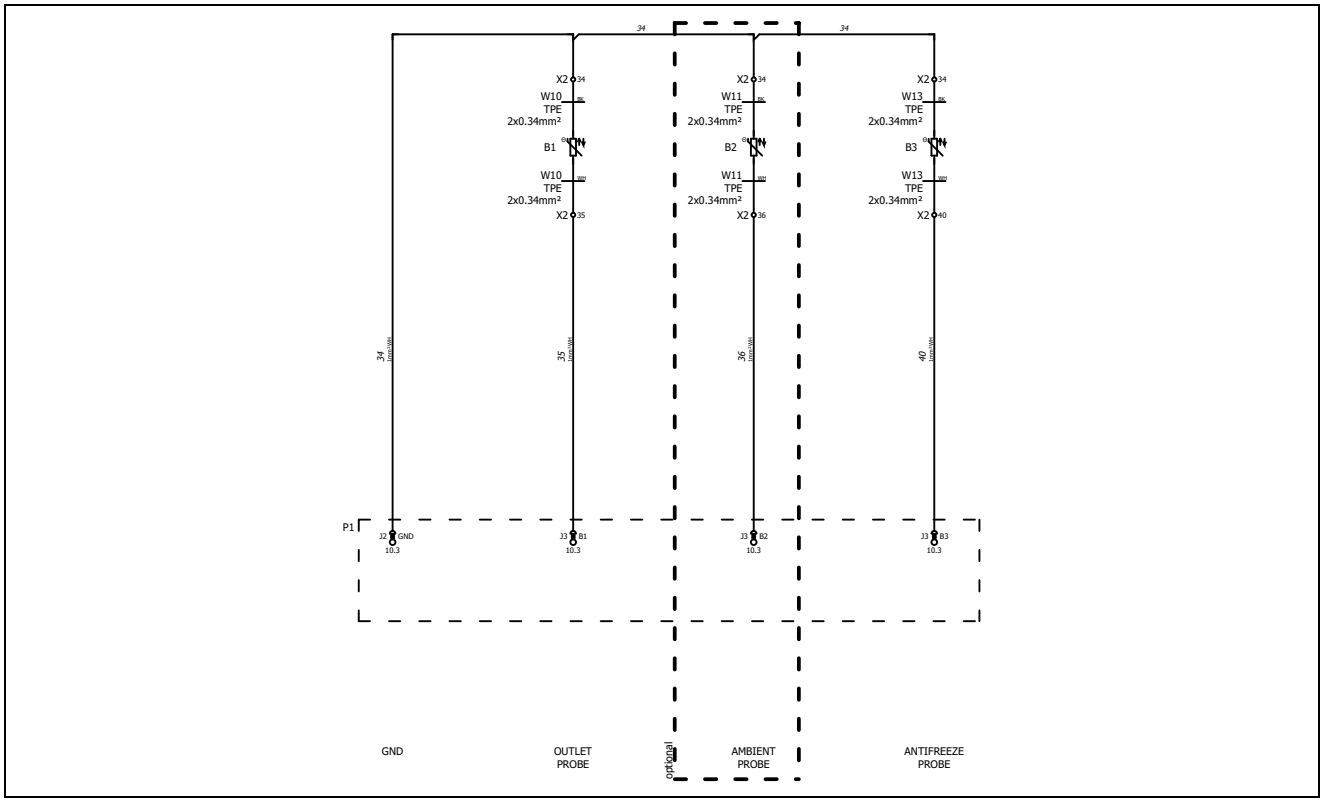

Fig. 79: Type 3335.860

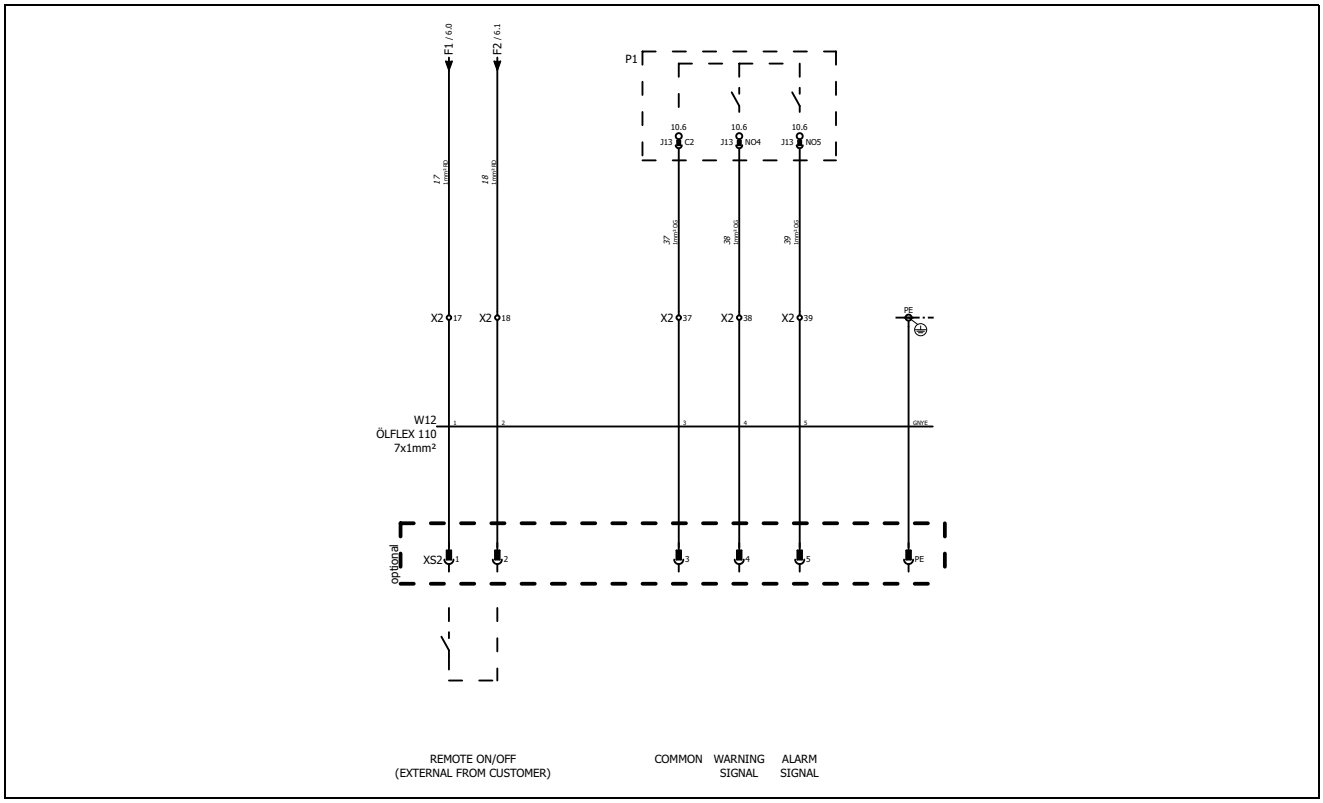

Fig. 80: Type 3335.860

EN

Type 3335.870

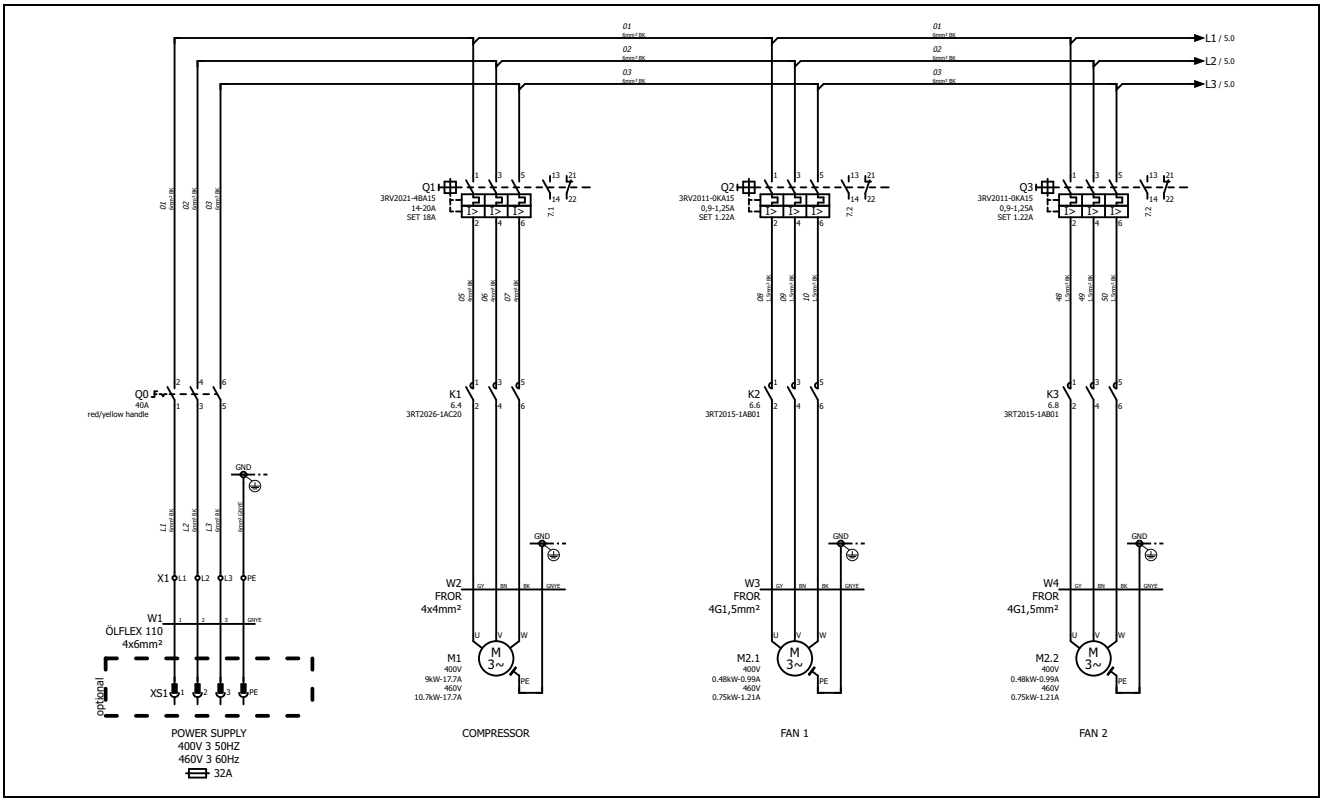

Fig. 81: Type 3335.870

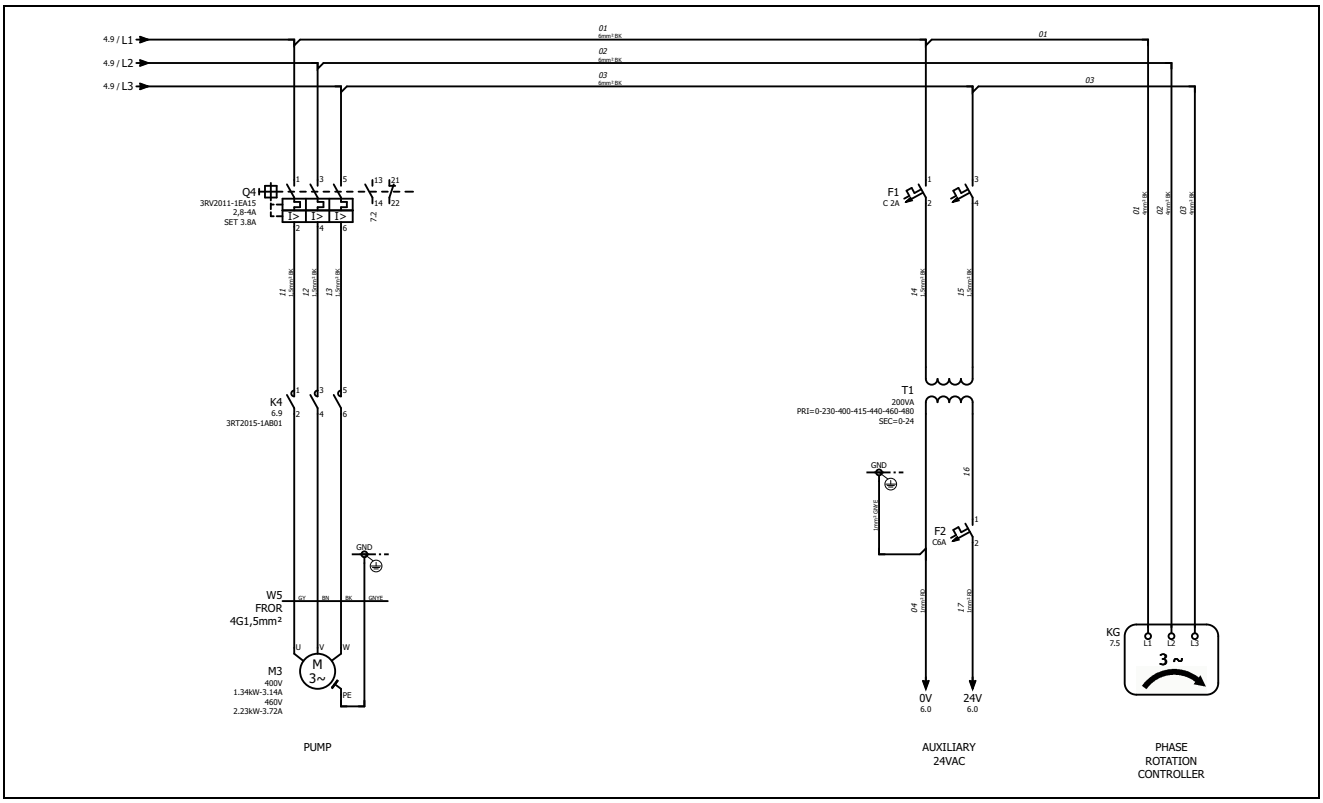

Fig. 82: Type 3335.870

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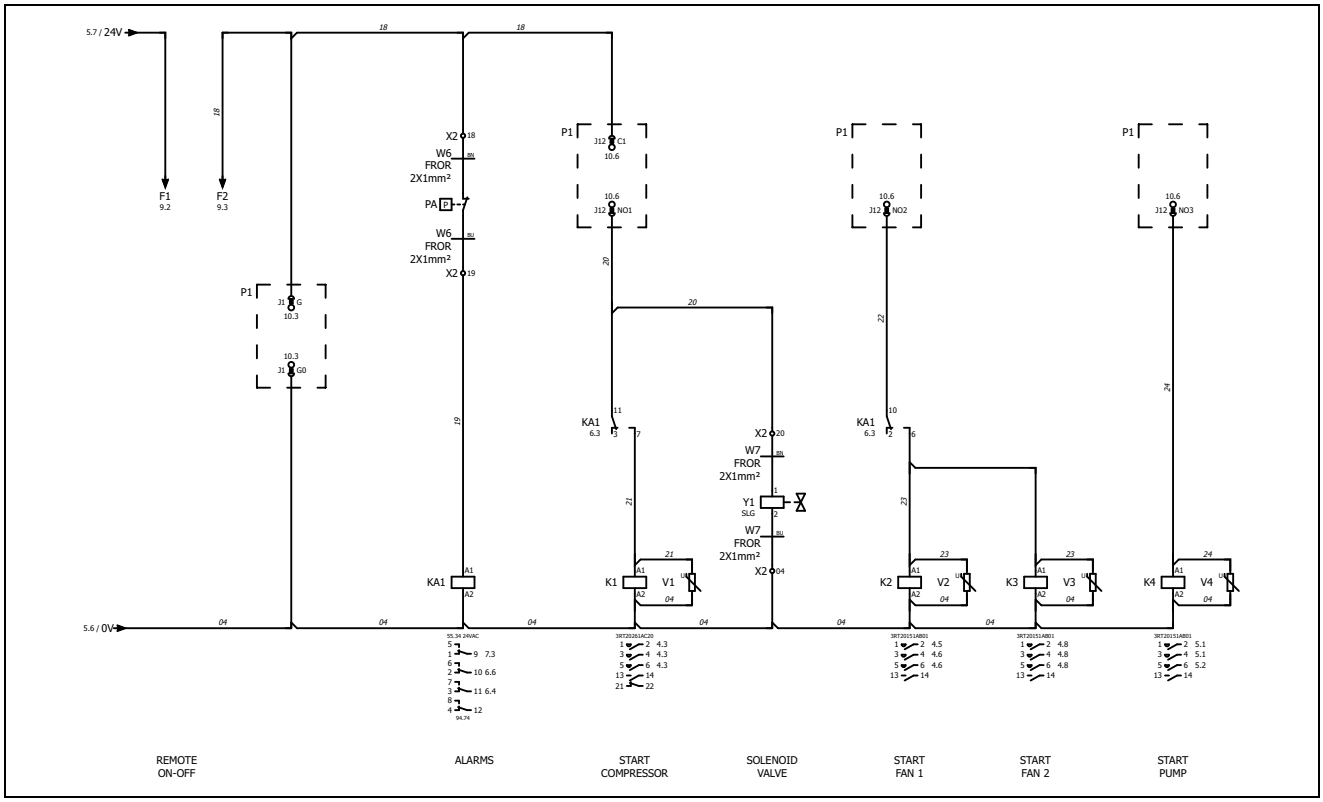

Fig. 83: Type 3335.870

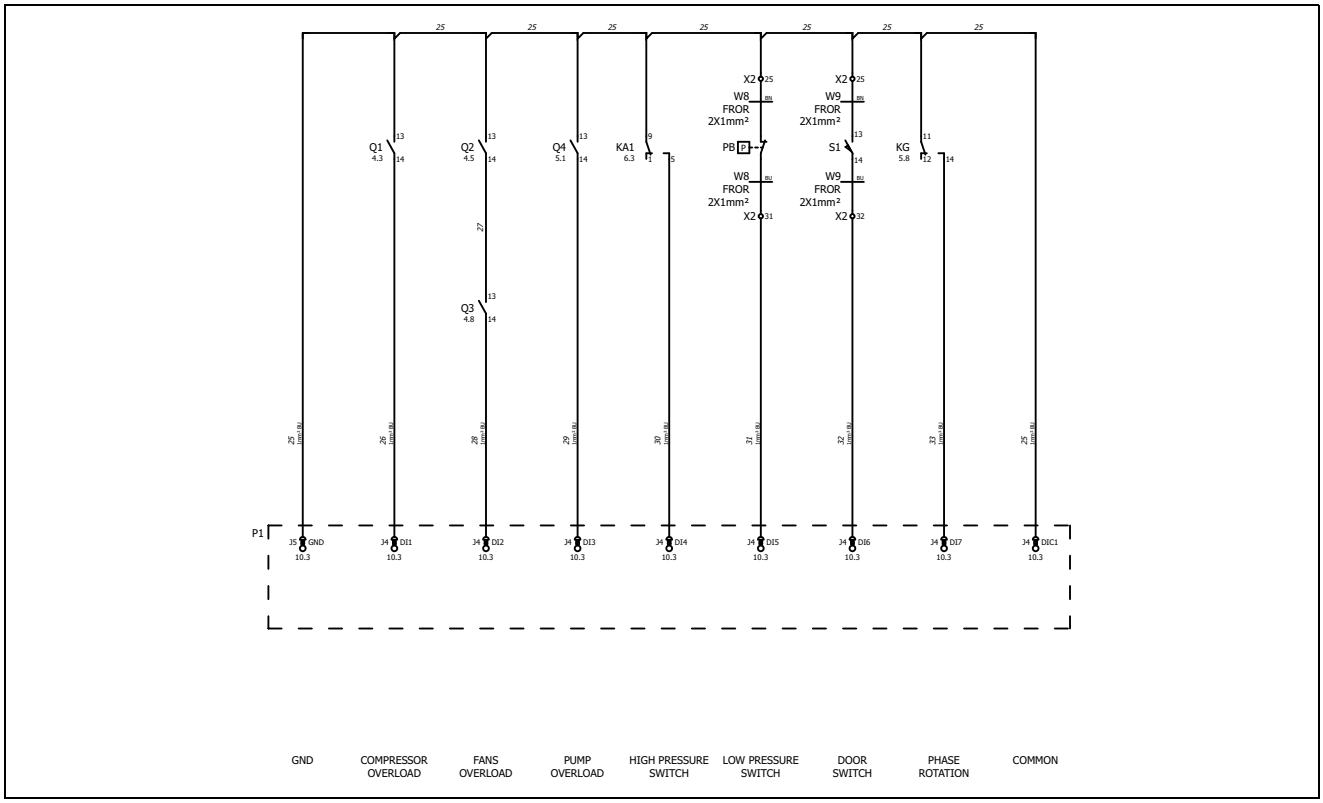

Fig. 84: Type 3335.870

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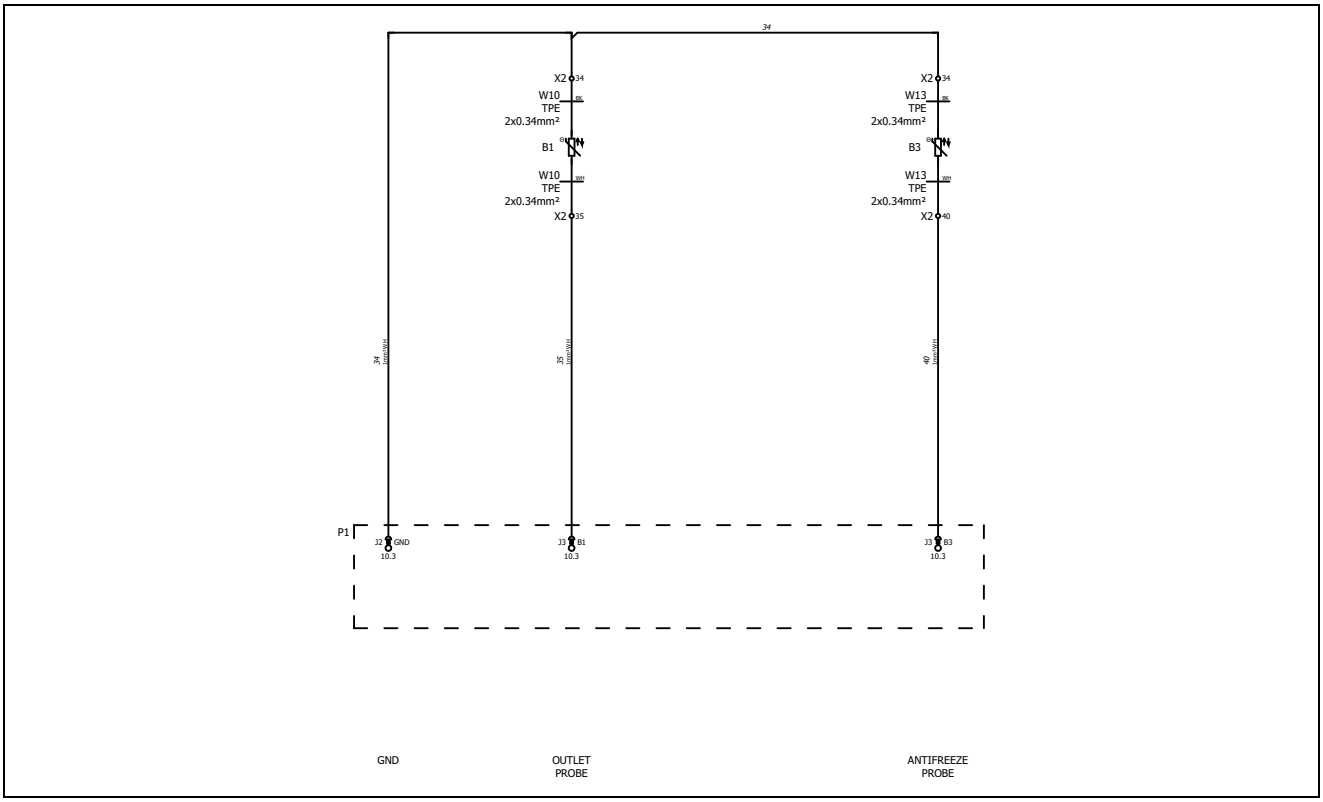

Fig. 85: Type 3335.870

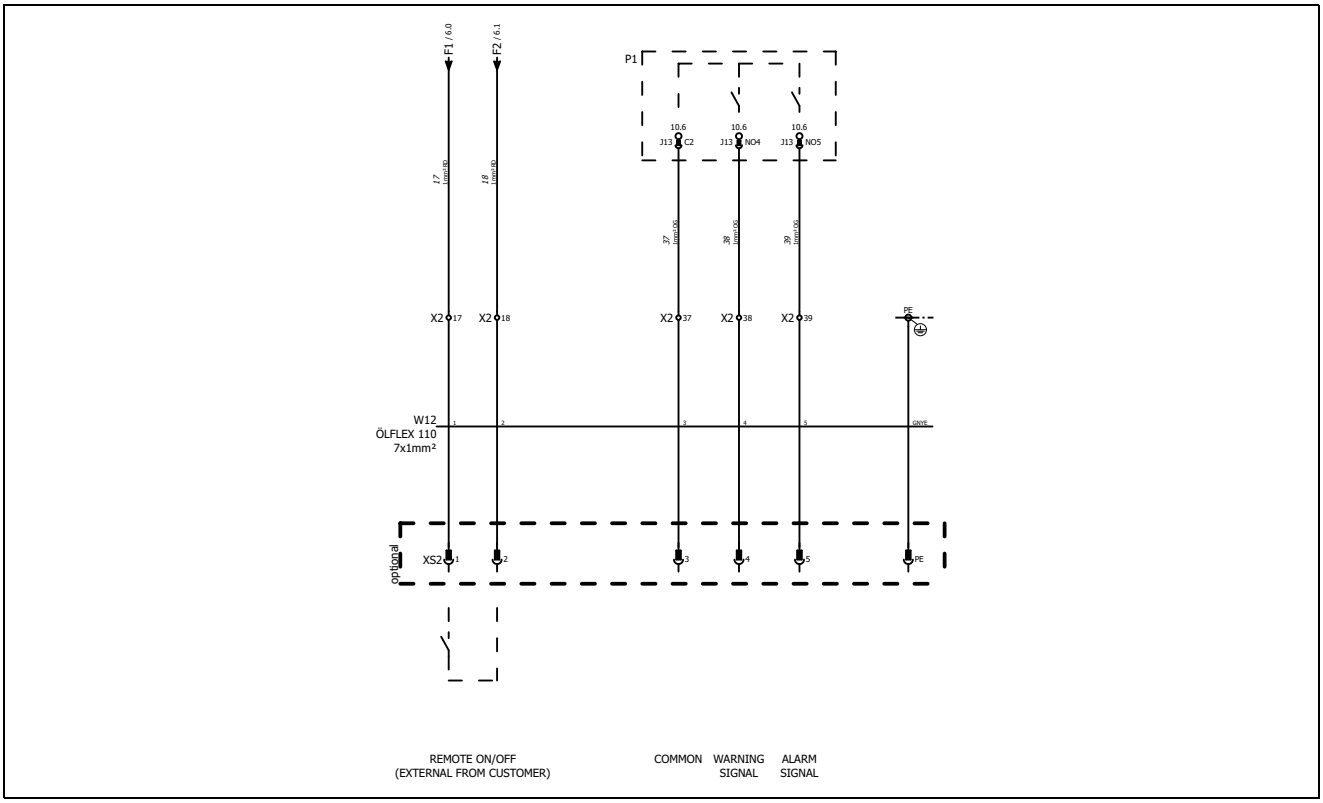

Fig. 86: Type 3335.870

EN

Type 3335.880

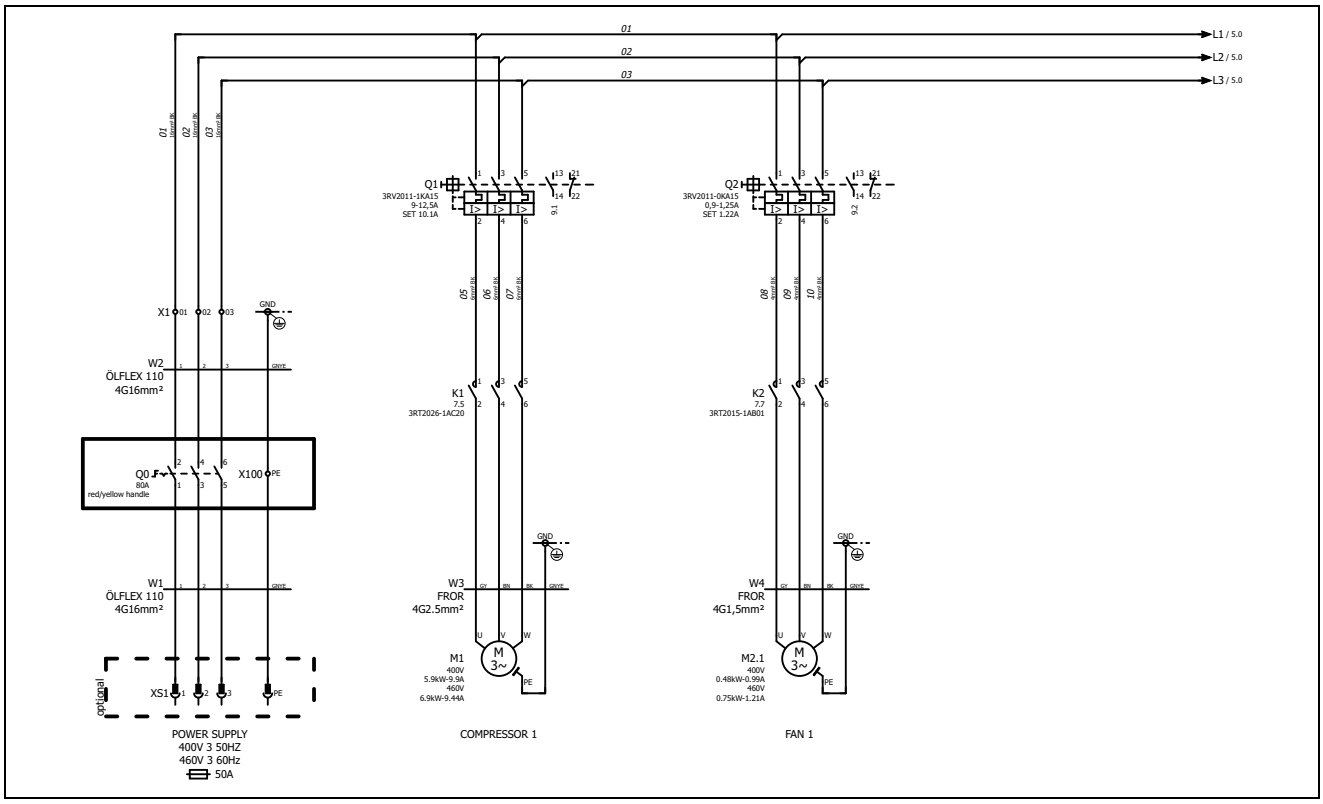

Fig. 87: Type 3335.880

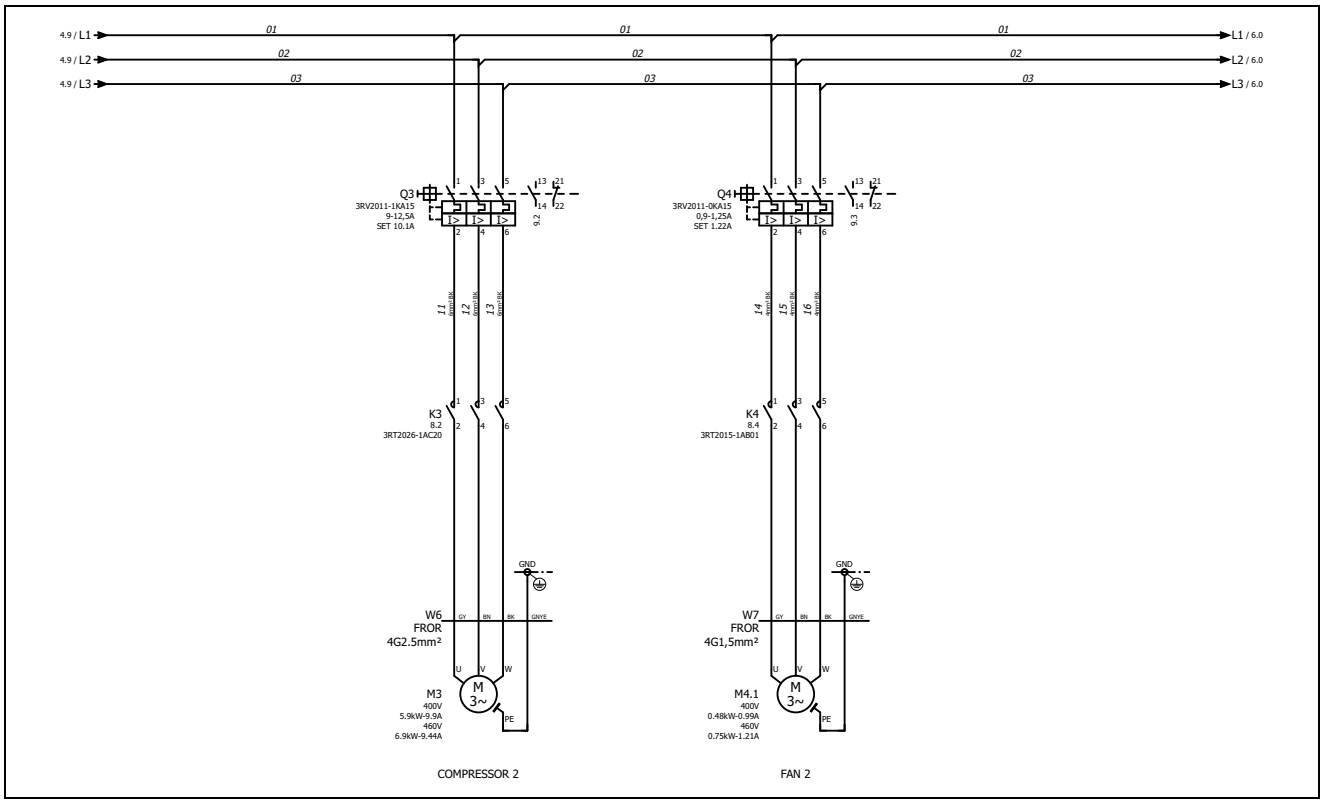

Fig. 88: Type 3335.880

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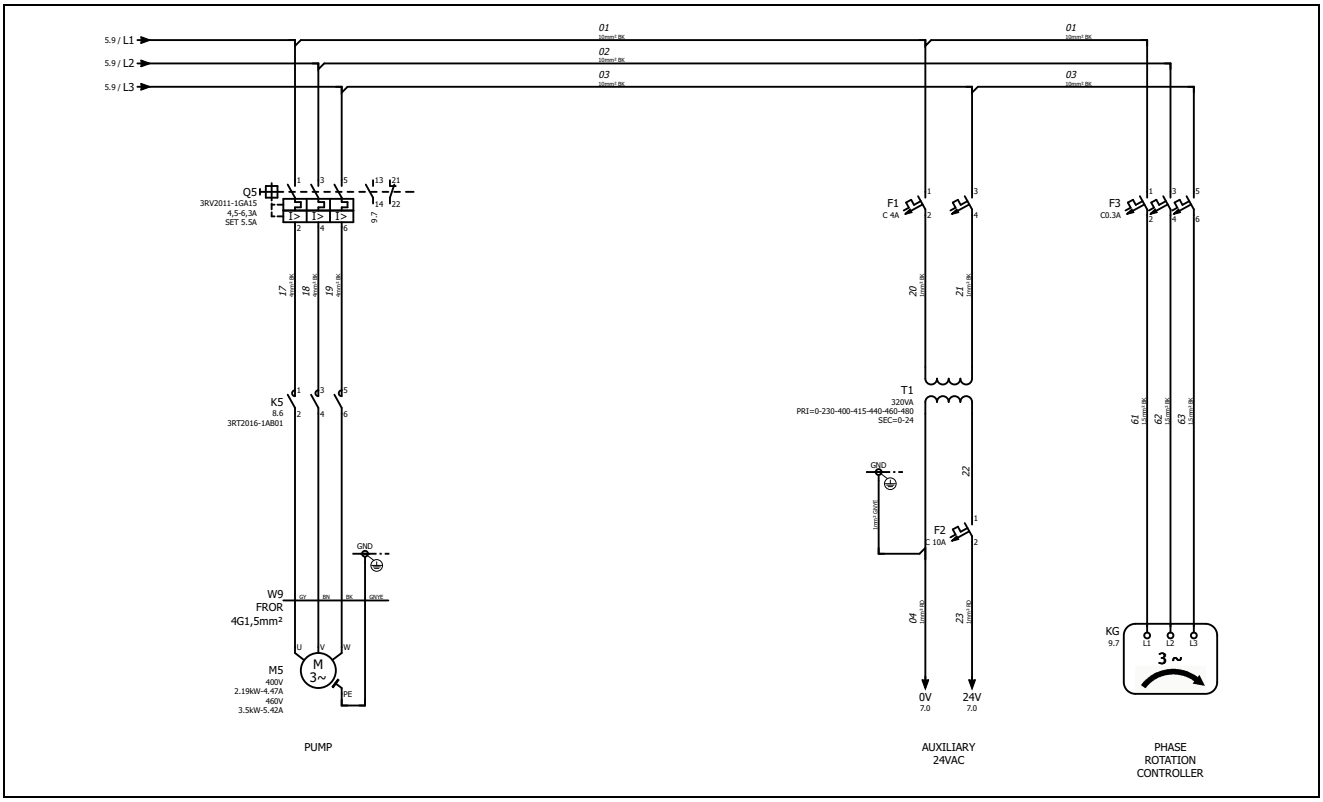

Fig. 89: Type 3335.880

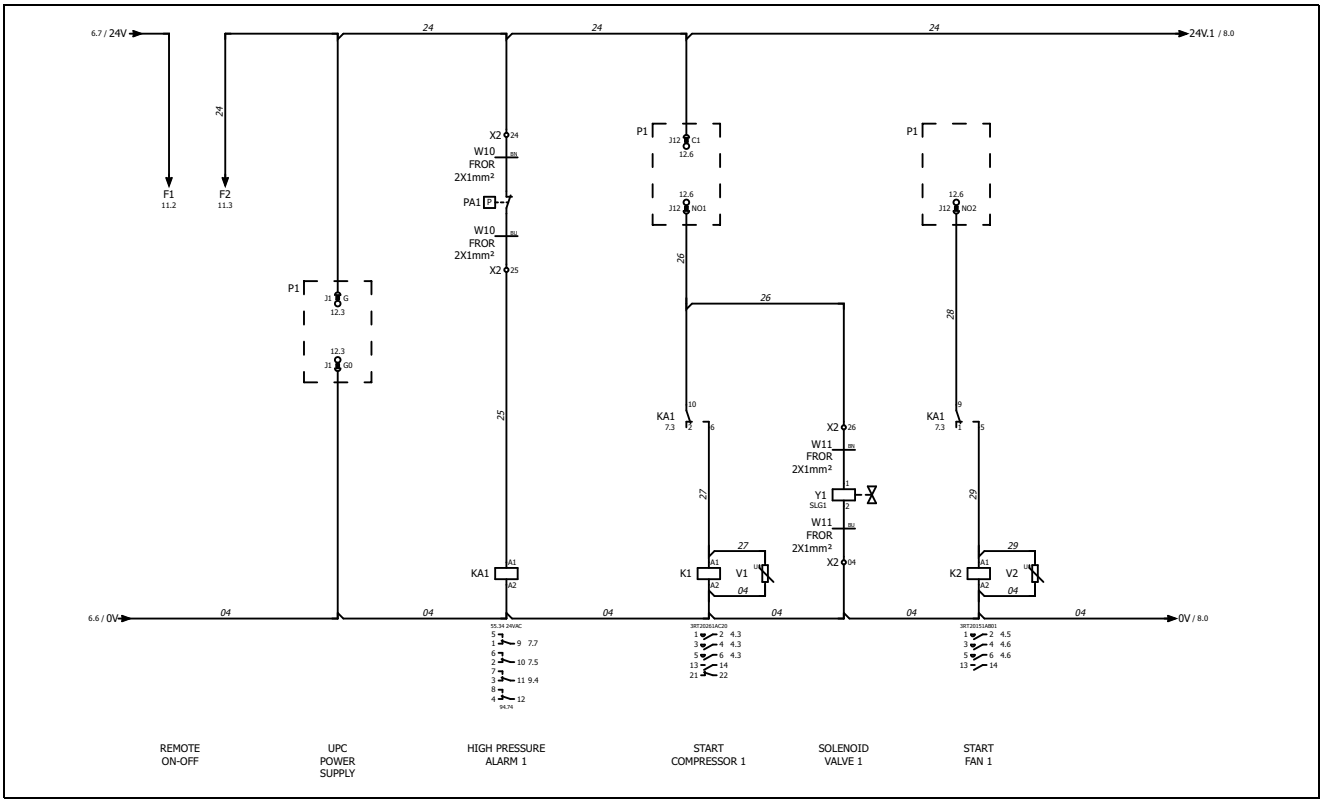

Fig. 90: Type 3335.880

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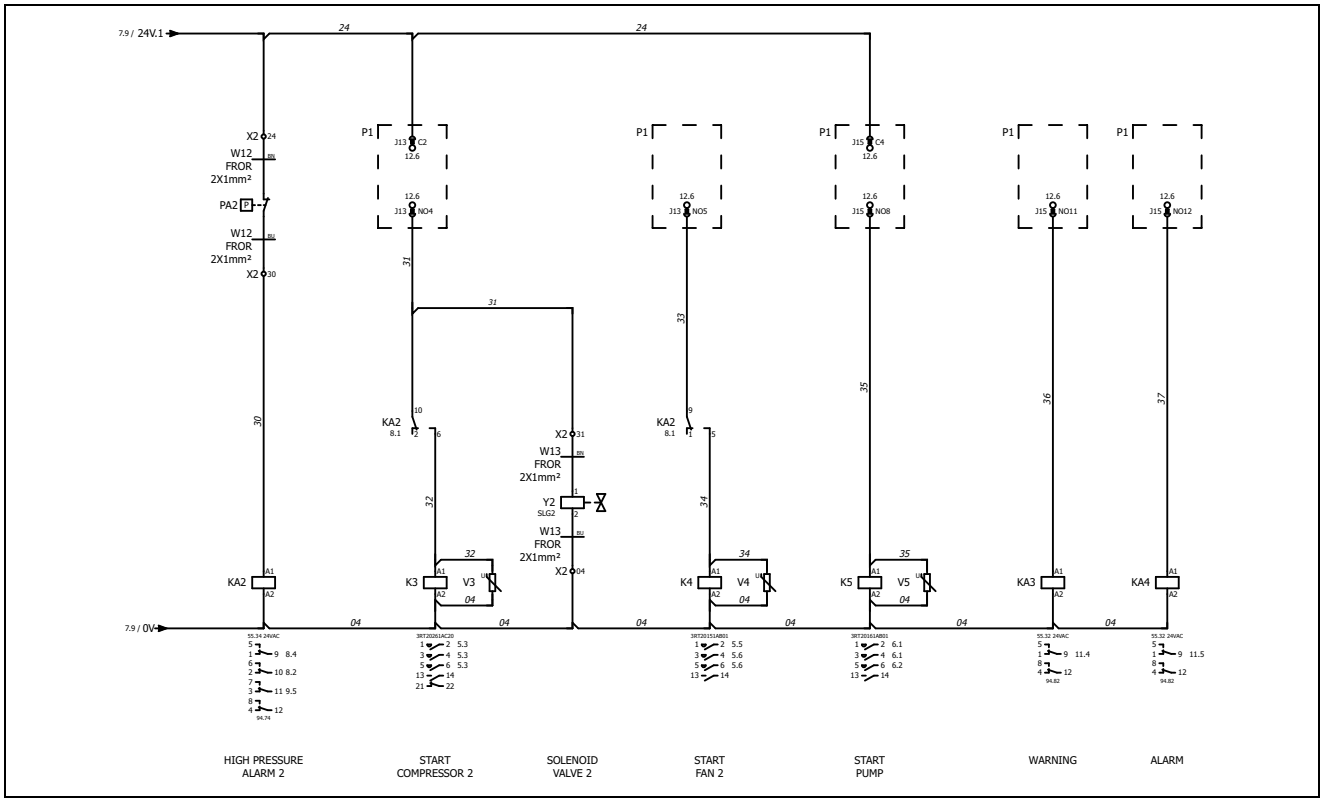

Fig. 91: Type 3335.880

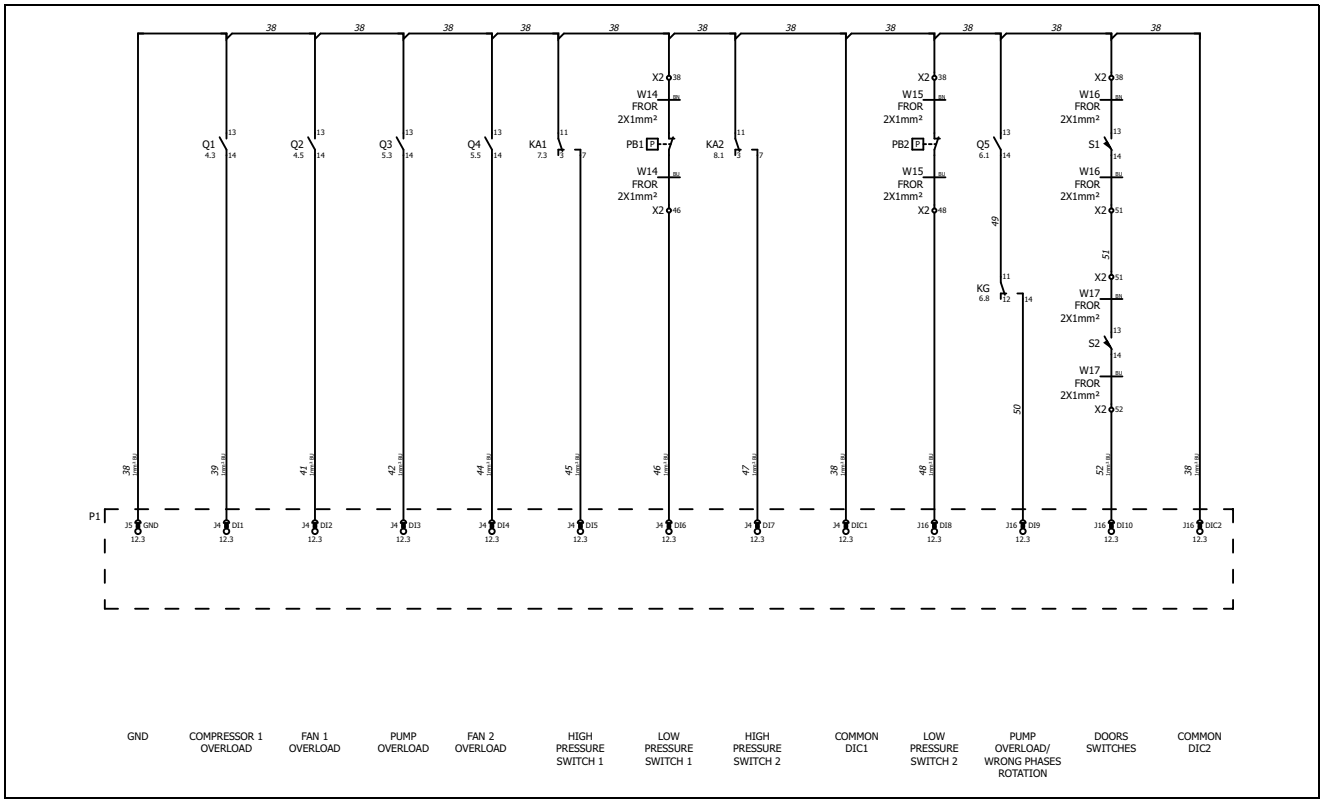

Fig. 92: Type 3335.880

EN

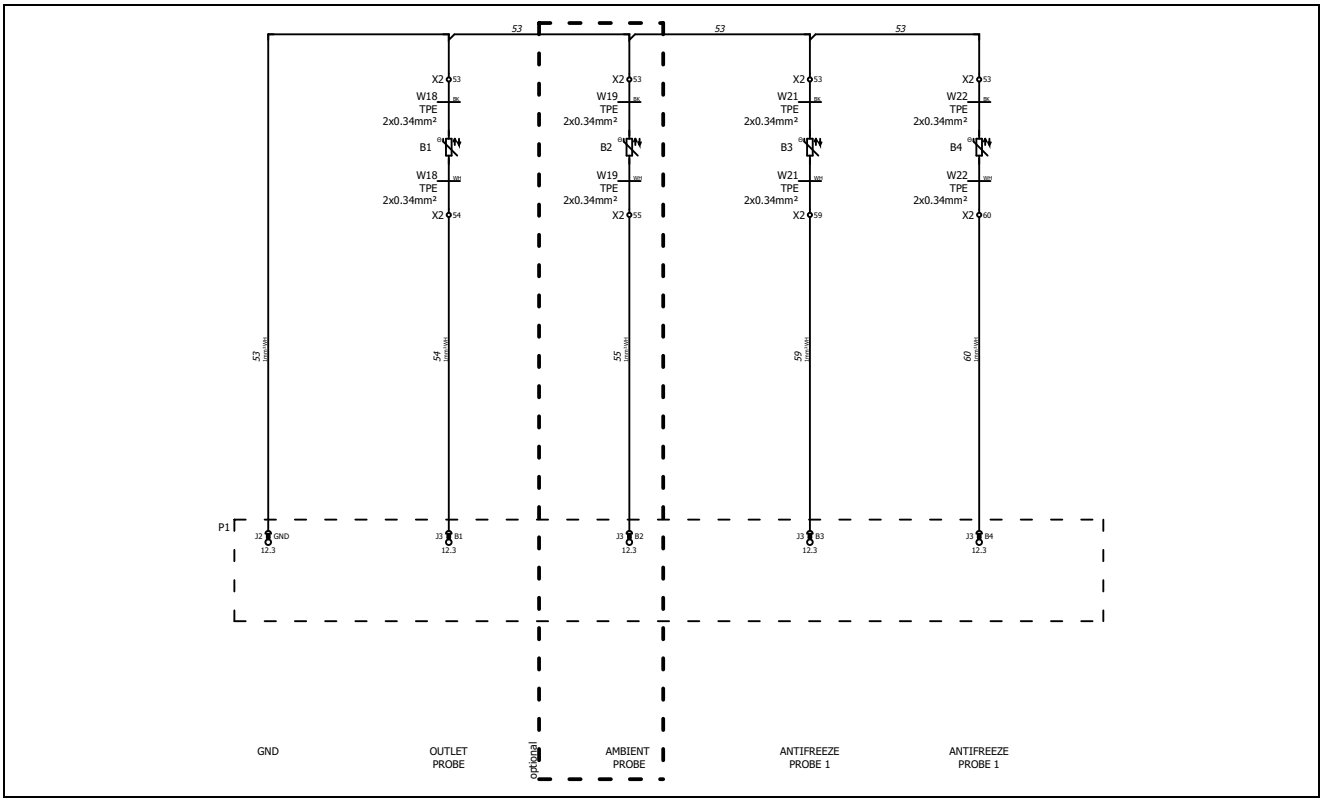

Fig. 93: Type 3335.880

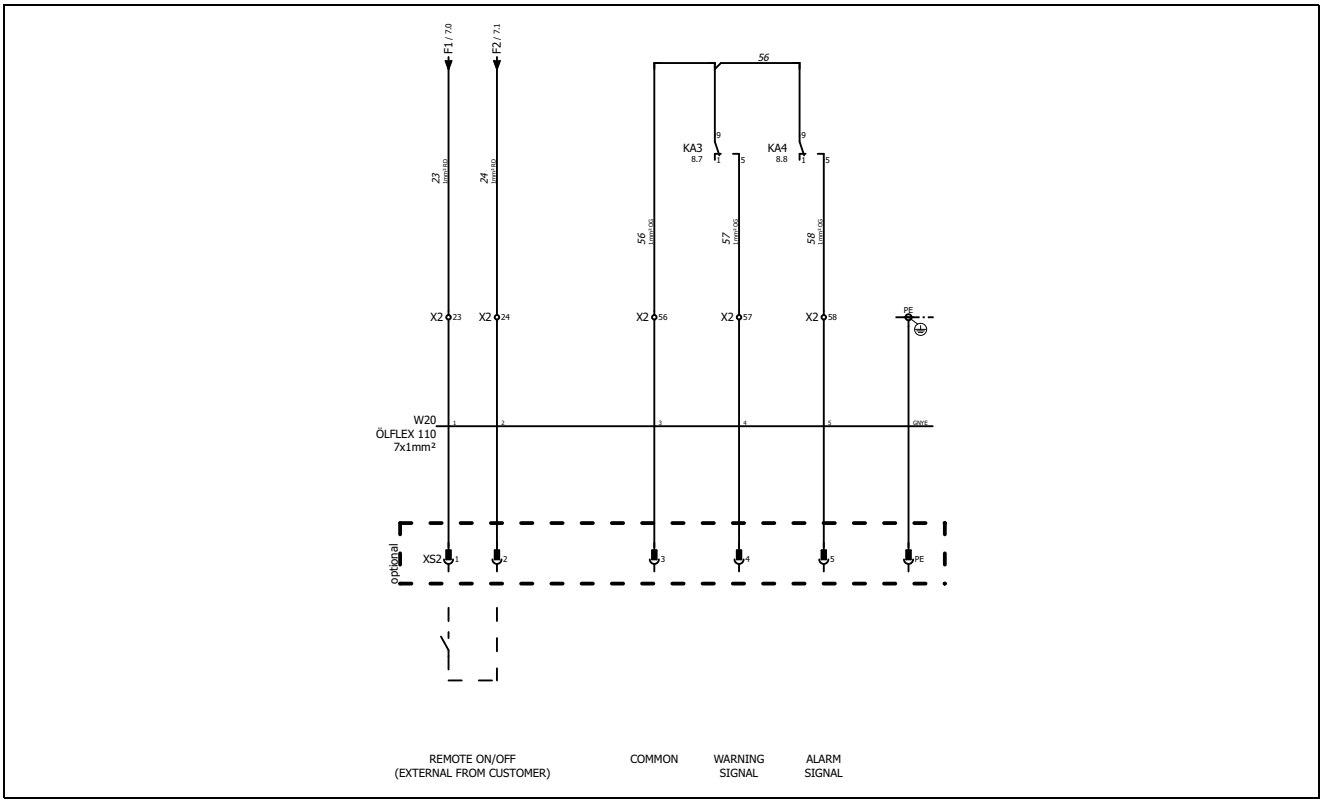

Fig. 94: Type 3335.880

EN

Type 3335.890

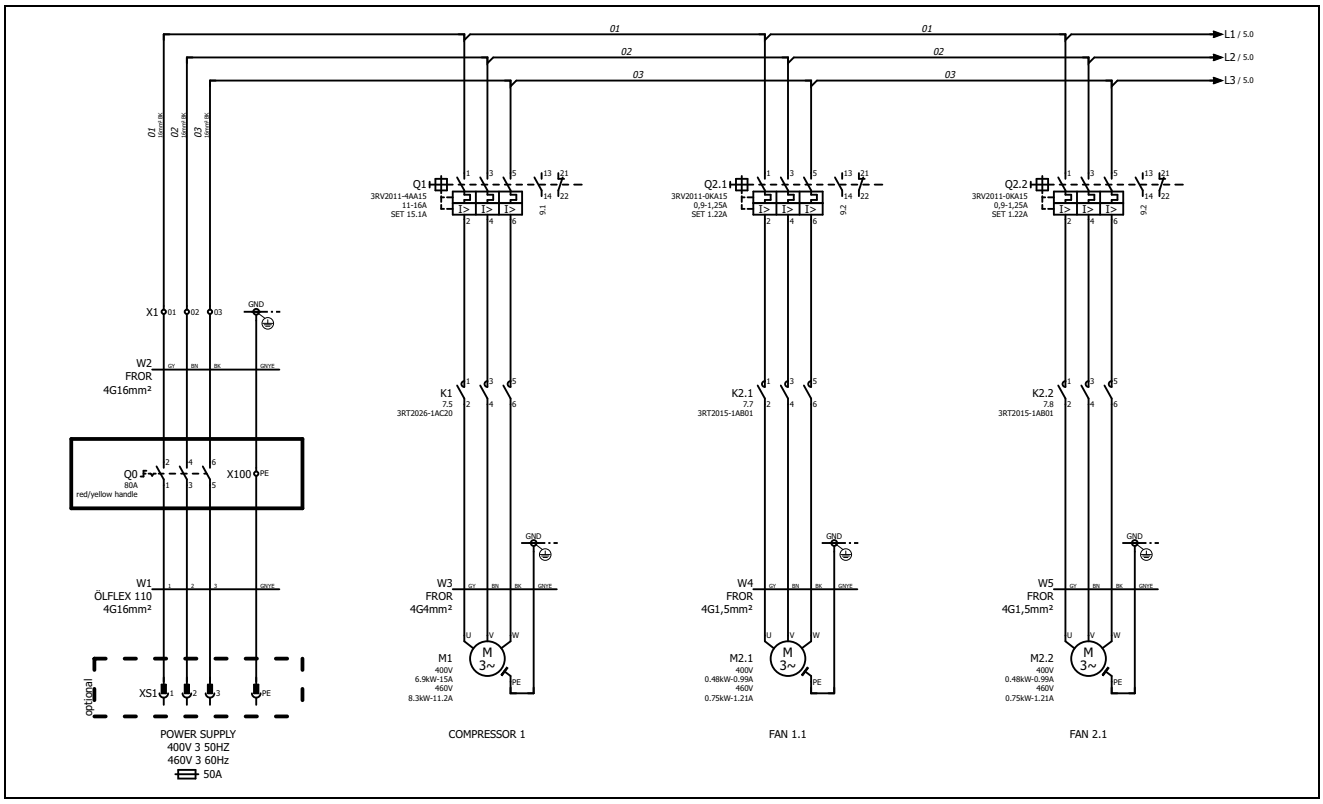

Fig. 95: Type 3335.890

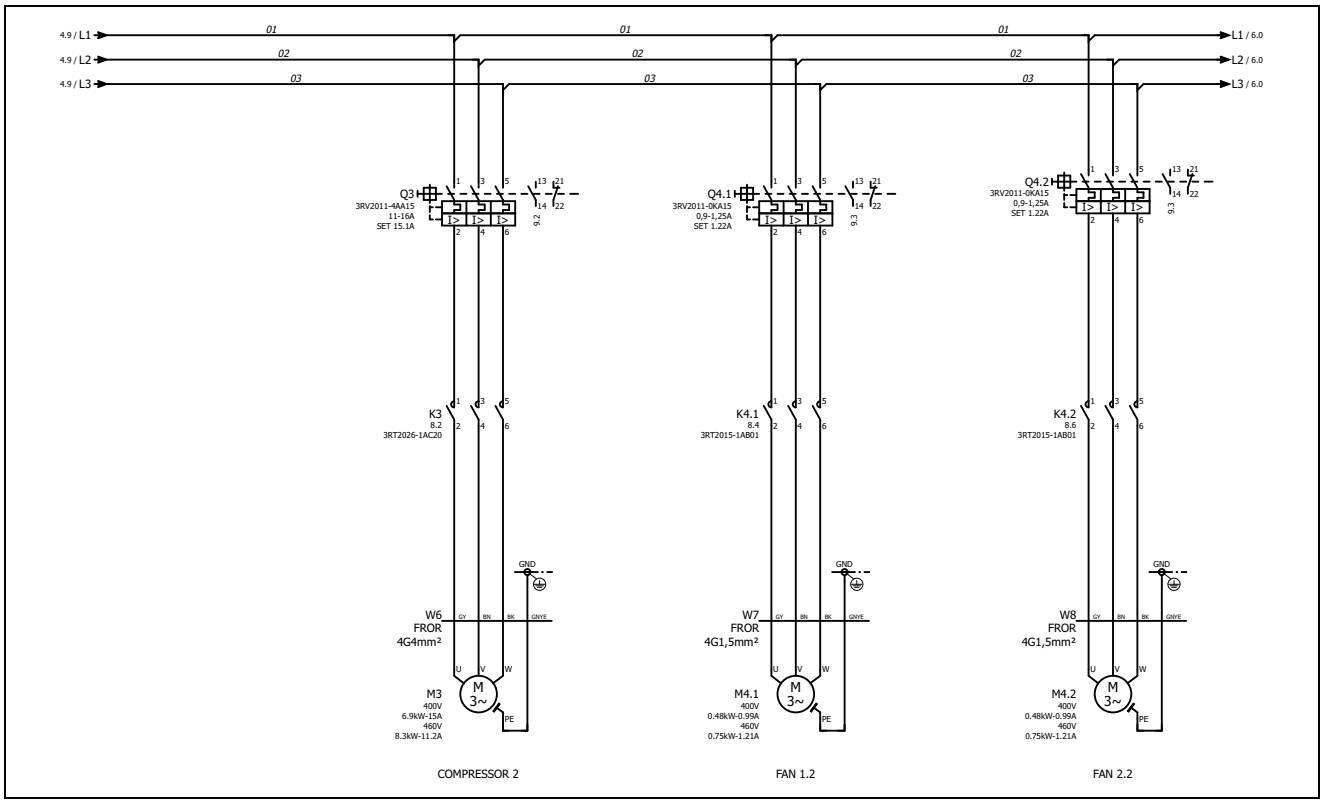

Fig. 96: Type 3335.890

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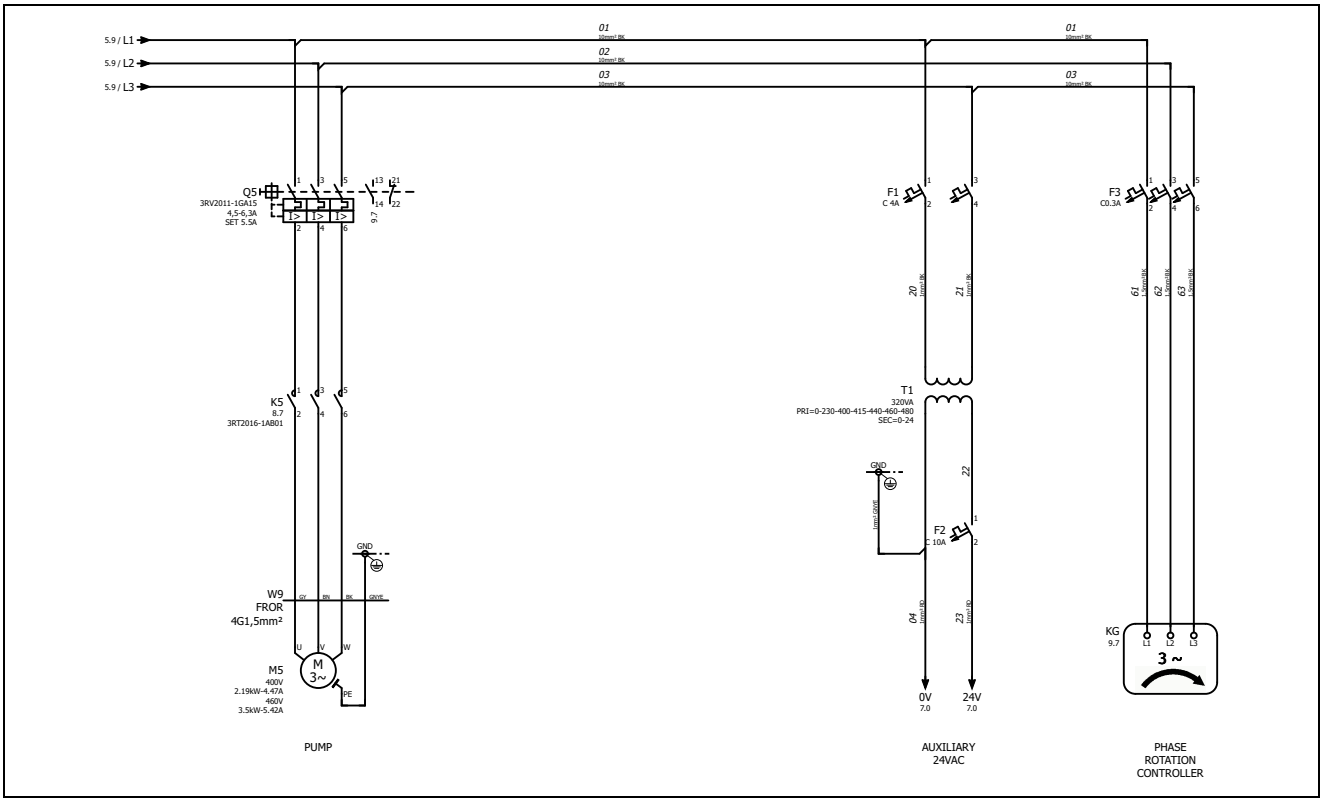

Fig. 97: Type 3335.890

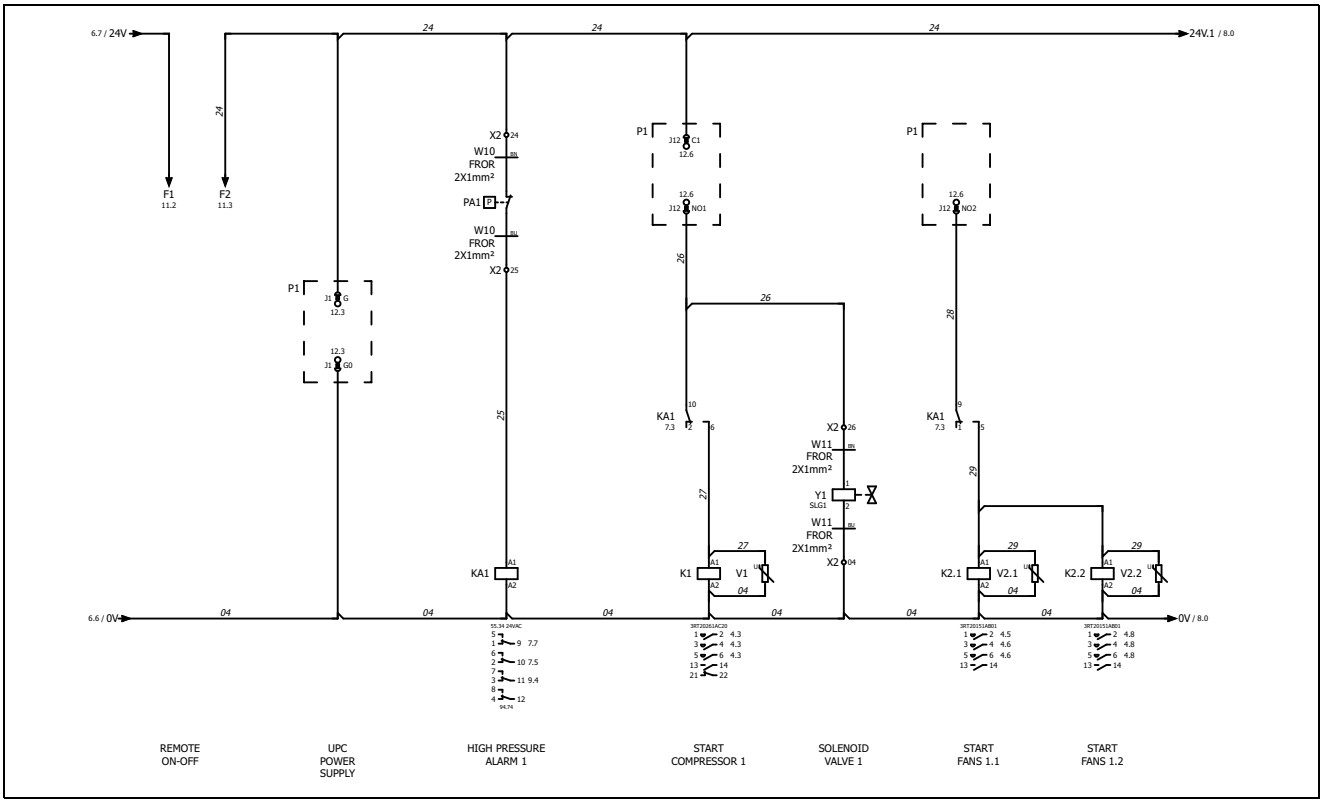

Fig. 98: Type 3335.890

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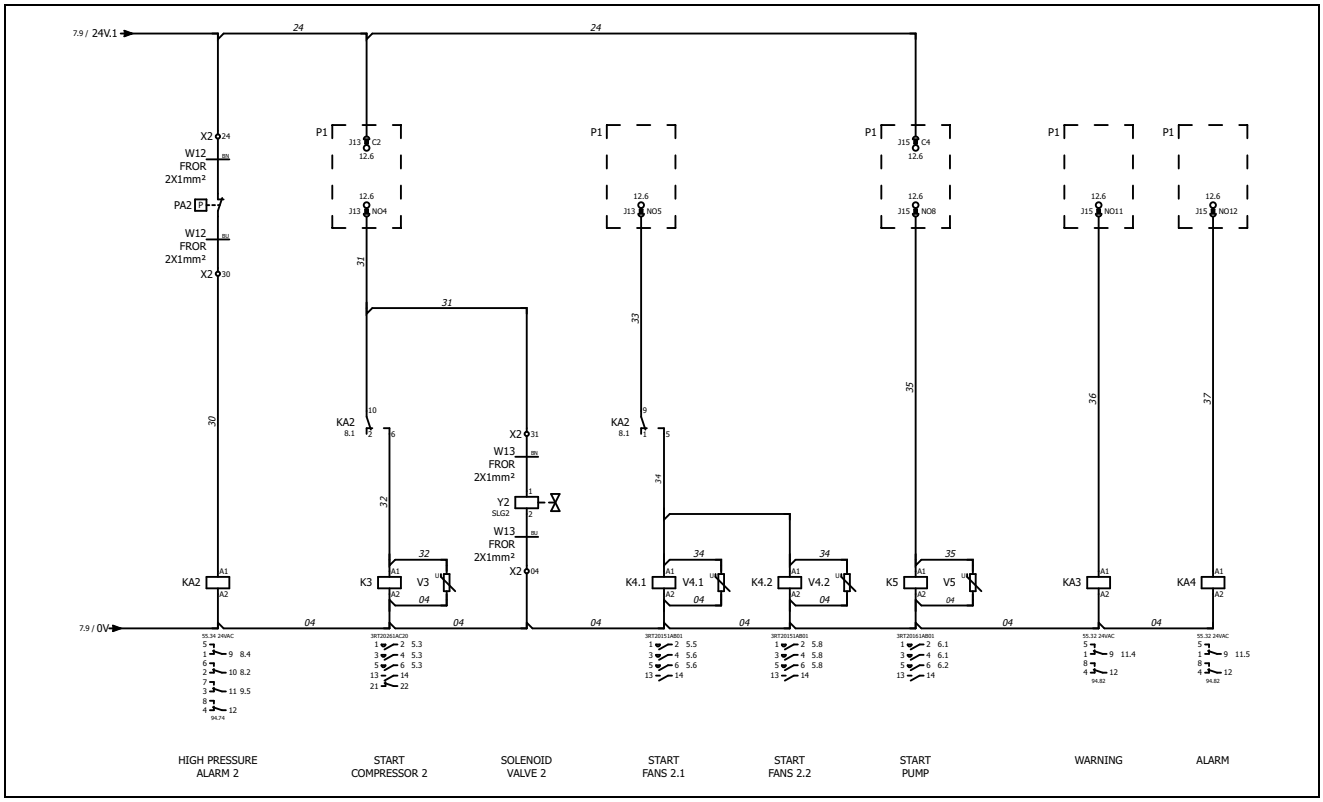

Fig. 99: Type 3335.890

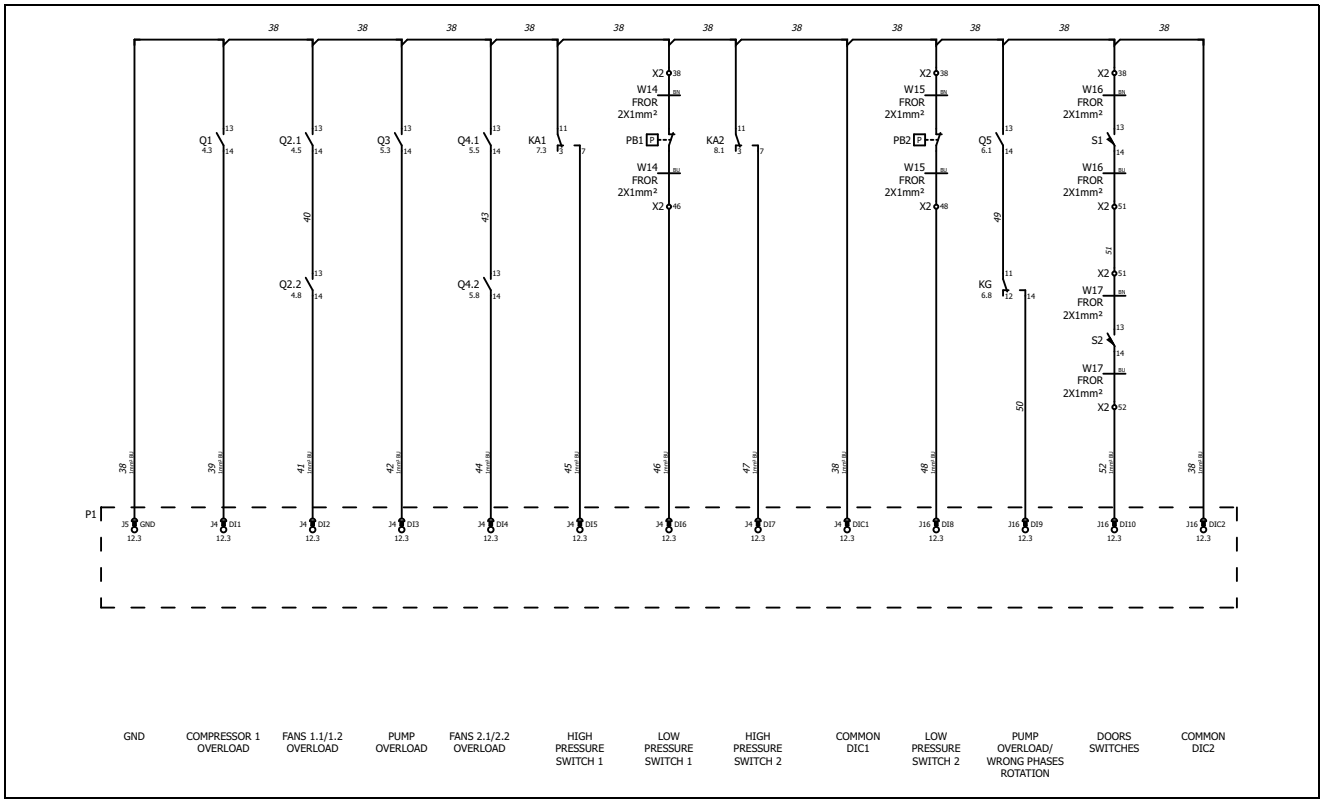

Fig. 100: Type 3335.890

EN

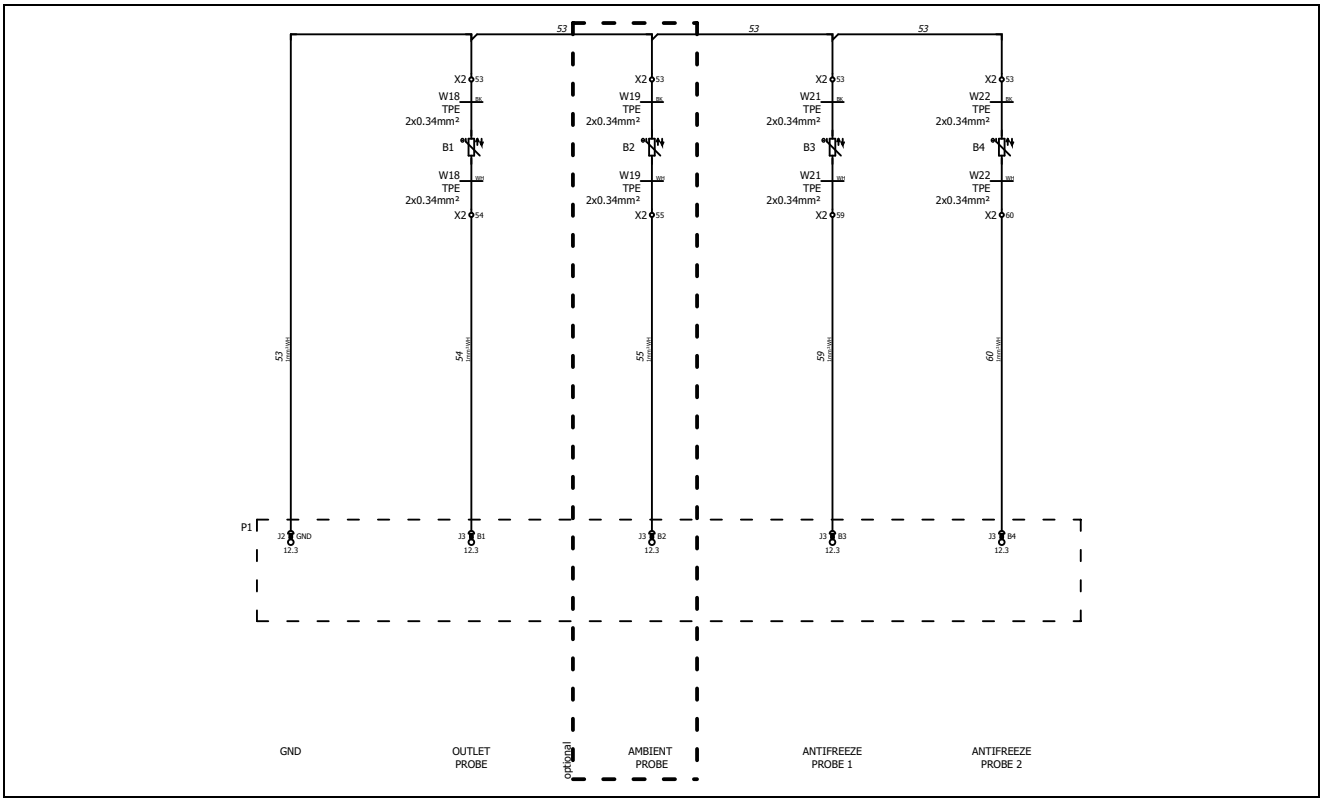

Fig. 101: Type 3335.890

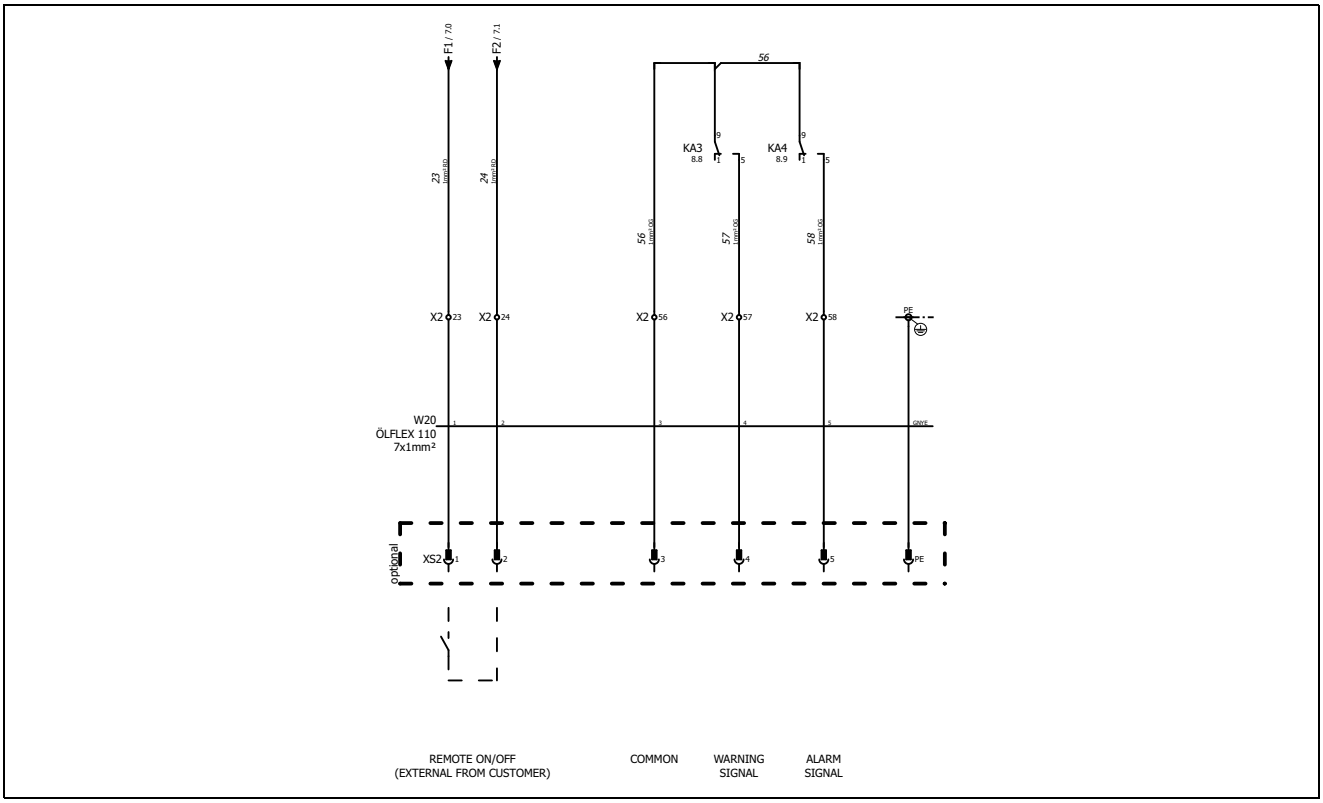

Fig. 102: Type 3335.890

14.3 Spare parts

Spare parts may be ordered directly from the Rittal website:

– http://www.rittal.com/com_en/spare_parts

■ Select the model number of your chiller and click on "continue".

Note:
The components used are Rittal-specific components. We recommend using only original Rittal spare parts to ensure the guaranteed unit properties (output).

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Types 3335.790, 3335.830, 3335.840, 3335.850

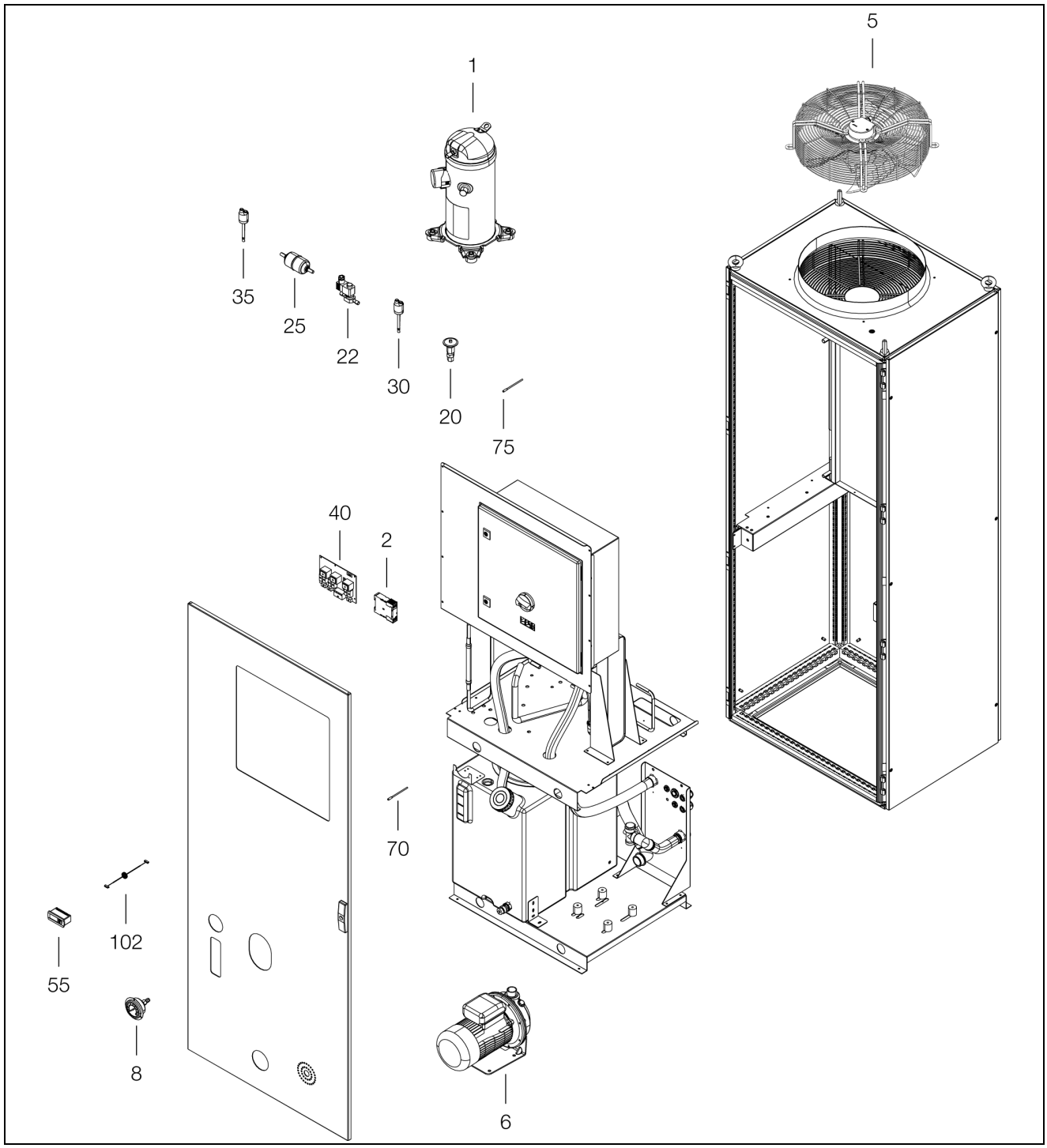

Fig. 103: Spare parts drawing for types 3335.790, 3335.830, 3335.840, 3335.850

Key

1 Compressor
2 Phase relay
5 Radial fan
6 Pump
8 Manometer
20 Expansion valve
22 Valve
25 Dryer
30 Pressostat
35 Pressostat
40 Controller
55 Display
70 Temperature sensor
75 Temperature sensor
102 Display cable

Types 3335.860 and 3335.870

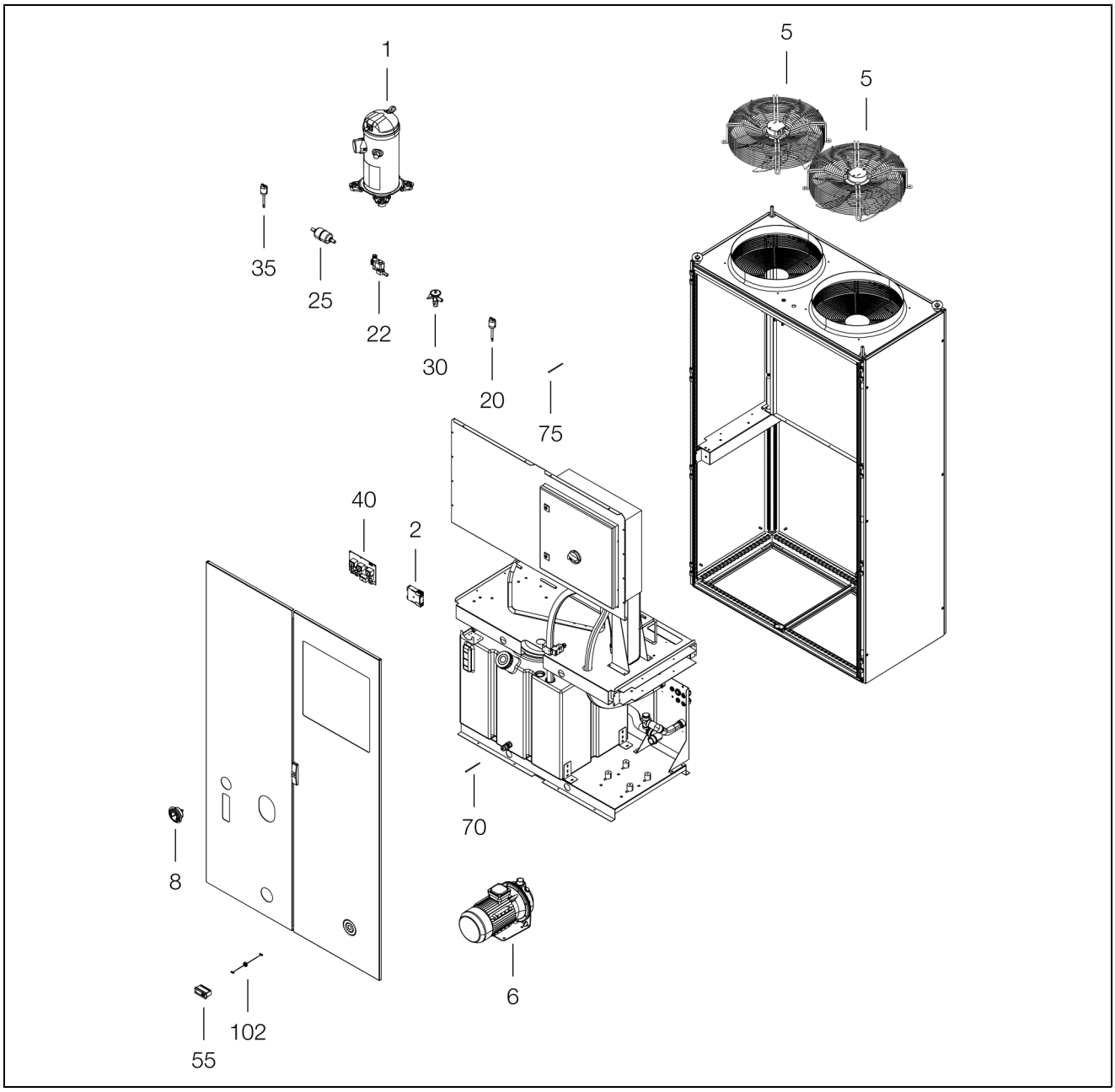

Fig. 104: Spare parts drawing for types 3335.860 and 3335.870

Key

1	Compressor
2	Phase relay
5	Radial fan
6	Pump
8	Manometer
20	Expansion valve
22	Valve
25	Dryer
30	Pressostat
35	Pressostat
40	Controller
55	Display
70	Temperature sensor
75	Temperature sensor
102	Display cable

EN

Type 3335.880

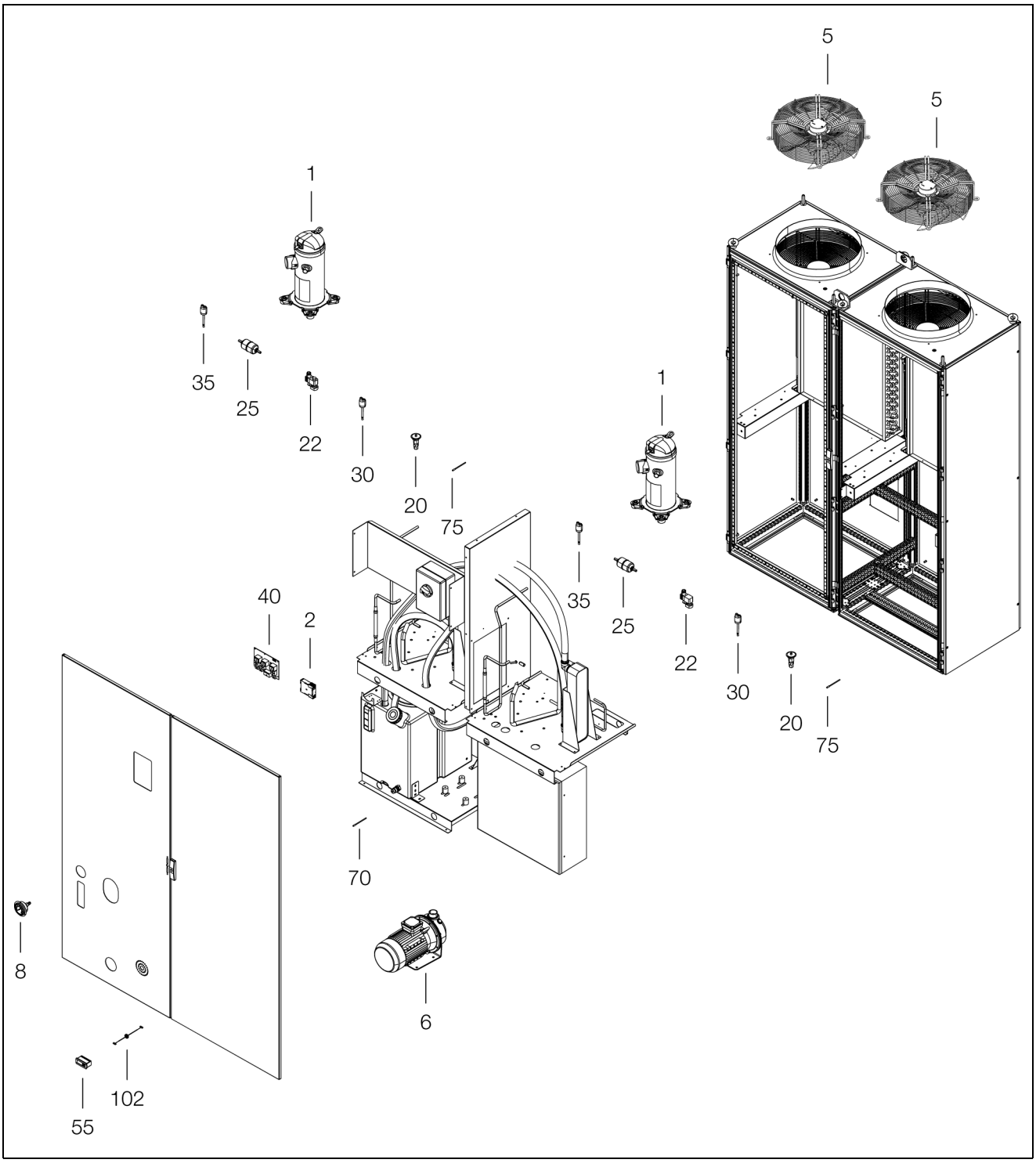

Fig. 105: Spare parts drawing for type 3335.880

Key

1 Compressor
2 Phase relay
5 Radial fan
6 Pump
8 Manometer
20 Expansion valve
22 Valve
25 Dryer
30 Pressostat
35 Pressostat
40 Controller
55 Display
70 Temperature sensor
75 Temperature sensor
102 Display cable

Type 3335.890

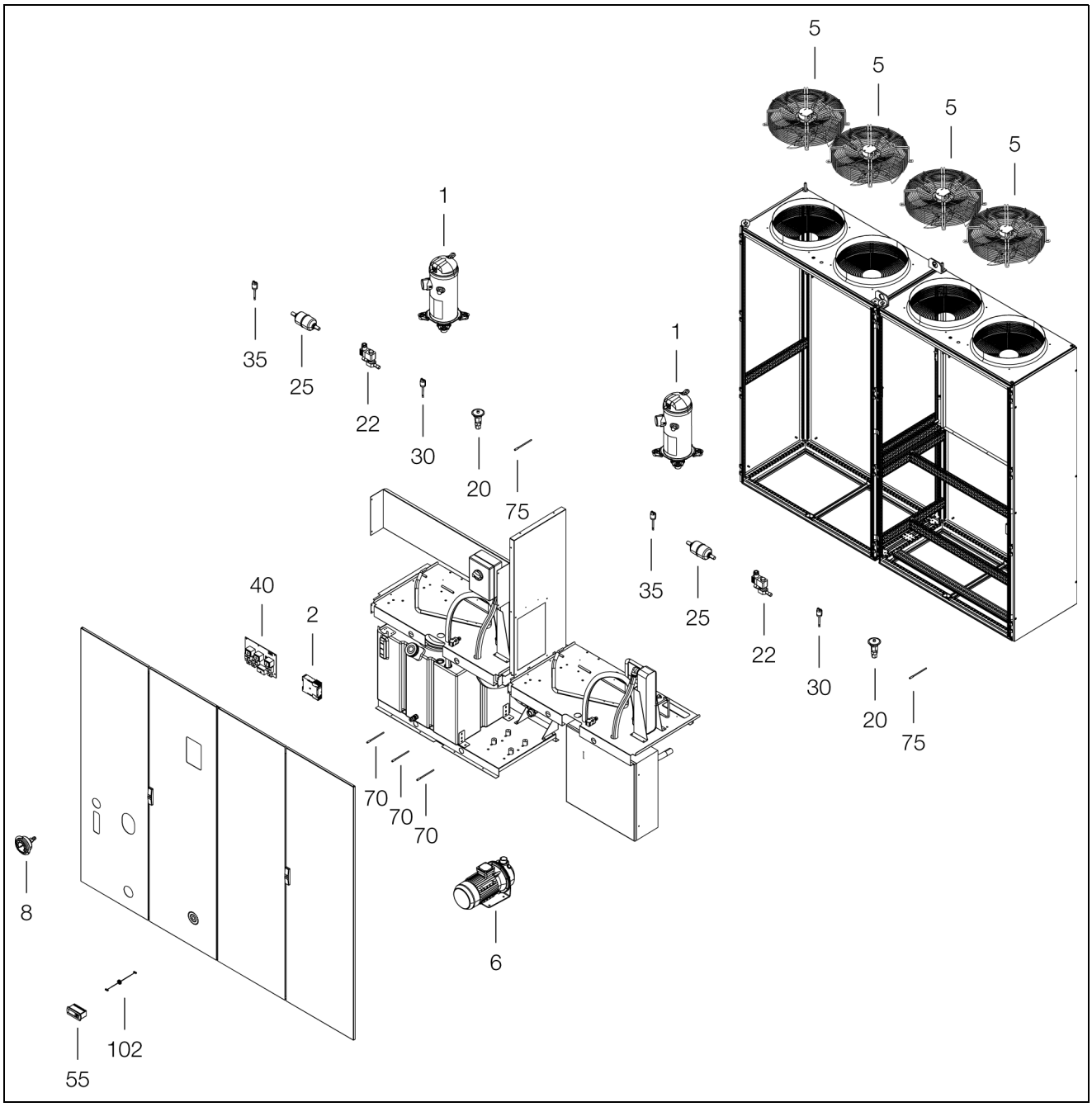

Fig. 106: Spare parts drawing for type 3335.890

Key

1 Compressor
2 Phase relay
5 Radial fan
6 Pump
8 Manometer
20 Expansion valve
22 Valve
25 Dryer
30 Pressostat
35 Pressostat
40 Controller
55 Display
70 Temperature sensor
75 Temperature sensor
102 Display cable

EN

14.4 Technical specifications

Types 3335.790, 3335.830

Description	Unit	Model No.			
		3335.790		3335.830	
Rated voltage	V Hz	400, 3~ 50	460, 3~ 60	400, 3~ 50	460, 3~ 60
Dimensions (W x H x D)	mm	805 x 1700 x 605		805 x 2100 x 605	
Enclosure type		TS 8 enclosure system			
Base/plinth (height)		without			
Cooling power P_C at: T_W = 18°C, T_U = 32°C	kW	8.0	8.6	8.0	8.6
Cooling power P_C at: T_W = 10°C, T_U = 32°C	kW	6.5	7.5	6.5	7.5
Cooling power P_C at: T_W = 18°C, T_U = 35°C | to DIN EN 14511	kW	7.8	8.4	7.8	8.4
Energy efficiency ratio (EER) 50 Hz		1.8	–	1.8	–
Power consumption P_{el}	kW	4.37	5.21	4.37	5.21
Rated current	A	8.23	7.71	8.23	7.71
Refrigerant: Type/Filling	–/kg	R410A/2.3			
P_S Refrigerant circuit	bar	42			
Ambient temperature range	°C	+10...+43			
Temperature range of the cooling medium	°C	+10...+25			
Pump capacity volume	l/min	30	47	30	47
Static pressure (external)	bar	2.5			
Pump heat loss (50/60 Hz)	kW	1.22	1.47	1.22	1.47
Tank capacity	l	75			
Water connections		R 1" internal thread			
Weight / operating weight	kg	242/317		248/323	
Colour		RAL 7035			
Protection category		IP 44			
Temperature hysteresis	K	±2			
Tank material		Plastic (PP)			
Noise pressure level*	dB (A)	69			

Tab. 25: Technical specifications for 3335.790, 3335.830

* Measured in free field at a distance of 1 m and at an height of 1 m from ground

Types 3335.840, 3335.850

Description	Unit	Model No.			
		3335.840		3335.850	
Rated voltage	V Hz	400, 3~ 50	460, 3~ 60	400, 3~ 50	460, 3~ 60
Dimensions (W x H x D)	mm	805 x 2140 x 605			
Enclosure type		TS 8 enclosure system			
Base/plinth (height)		without			
Cooling power P_c at: T_w = 18°C, T_u = 32°C	kW	12.0	13.1	16.0	17.6
Cooling power P_c at: T_w = 10°C, T_u = 32°C	kW	10.3	11.3	13.8	15.2
Cooling power P_c at: T_w = 18°C, T_u = 35°C to DIN EN 14511	kW	11.7	12.7	15.6	17.0
Energy efficiency ratio (EER) 50 Hz		1.8	–	2.1	–
Power consumption P_{el}	kW	6.6	7.76	7.3	9.2
Rated current	A	10.03	11.41	12.73	13.30
Refrigerant: Type/Filling	–/kg	R410A/2.8			
P_S Refrigerant circuit	bar	42			
Ambient temperature range	°C	+10...+43			
Temperature range of the cooling medium	°C	+10...+25			
Pump capacity volume	l/min	30	55	35	63
Static pressure (external)	bar	2.5			
Pump heat loss (50/60 Hz)	kW	0.8	1.1	1.5	2.69
Tank capacity	l	75			
Water connections		R 1" internal thread			
Weight / operating weight	kg	282/357			
Colour		RAL 7035			
Protection category		IP 44			
Temperature hysteresis	K	±2			
Tank material		Plastic (PP)			
Noise pressure level*	dB (A)	69			

Tab. 26: Technical specifications for 3335.840, 3335.850

* Measured in free field at a distance of 1 m and at an height of 1 m from ground

EN

Types 3335.860, 3335.870

Description	Unit	Model No.			
		3335.860		3335.870	
Rated voltage	V Hz	400, 3~ 50	460, 3~ 60	400, 3~ 50	460, 3~ 60
Dimensions (W x H x D)	mm	1205 x 2140 x 605			
Enclosure type		TS 8 enclosure system			
Base/plinth (height)		without			
Cooling power P_c at: T_w = 18°C, T_u = 32°C	kW	20.0	21.8	25.0	27.6
Cooling power P_c at: T_w = 10°C, T_u = 32°C	kW	16.6	18.7	20.8	23.8
Cooling power P_c at: T_w = 18°C, T_u = 35°C to DIN EN 14511	kW	19.4	21.2	24.3	26.8
Energy efficiency ratio (EER) 50 Hz		2.1	–	2.2	–
Power consumption P_{el}	kW	9.2	12	11.4	13.9
Rated current	A	20.12	17.34	22.82	23.84
Refrigerant: Type/Filling	–/kg	R410A/3.3		R401A/4.0	
P_S Refrigerant circuit	bar	42			
Ambient temperature range	°C	+10...+43			
Temperature range of the cooling medium	°C	+10...+25			
Pump capacity volume	l/min	43	76	49	86
Static pressure (external)	bar	2.5			
Pump heat loss (50/60 Hz)	kW	1.35	1.92	1.068	1.54
Tank capacity	l	150			
Water connections		R 1" internal thread			
Weight / operating weight	kg	360/510		374/524	
Colour		RAL 7035			
Protection category		IP 44			
Temperature hysteresis	K	±2			
Tank material		Plastic (PP)			
Noise pressure level*	dB (A)	70			

Tab. 27: Technical specifications for 3335.860, 3335.870

* Measured in free field at a distance of 1 m and at an height of 1 m from ground

Types 3335.880, 3335.890

Description	Unit	Model No.			
		3335.880		3335.890	
Rated voltage	V Hz	400, 3~ 50	460, 3~ 60	400, 3~ 50	460, 3~ 60
Dimensions (W x H x D)	mm	1605 x 2140 x 605		2405 x 2140 x 605	
Enclosure type		TS 8 enclosure system			
Base/plinth (height)		without			
Cooling power P_c at: T_w = 18°C, T_u = 32°C	kW	32.0	35.2	40.0	44.0
Cooling power P_c at: T_w = 10°C, T_u = 32°C	kW	27.0	30.4	32.5	37.5
Cooling power P_c at: T_w = 18°C, T_u = 35°C to DIN EN 14511	kW	31	34.2	38.8	42.7
Energy efficiency ratio (EER) 50 Hz		2.1	–	2.2	–
Power consumption P_{el}	kW	14.95	17.60	17.91	23.10
Rated current	A	26.25	26.72	38.43	32.66
Refrigerant: Type/Filling	–/kg	R410A/5.6		R401A/6.6	
P_S Refrigerant circuit	bar	42			
Ambient temperature range	°C	+10...+43			
Temperature range of the cooling medium	°C	+10...+25			
Pump capacity volume	l/min	55	70	52	73
Static pressure (external)	bar	2.5	3.5	2.5	3.5
Pump heat loss (50/60 Hz)	kW	1.64	2.43	1.43	1.97
Tank capacity	l	75		150	
Water connections		R 1¼" internal thread			
Weight / operating weight	kg	511/586		646/796	
Colour		RAL 7035			
Protection category		IP 44			
Temperature hysteresis	K	±2			
Tank material		Plastic (PP)			
Noise pressure level*	dB (A)	72			

Tab. 28: Technical specifications for 3335.880, 3335.890

* Measured in free field at a distance of 1 m and at an height of 1 m from ground

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