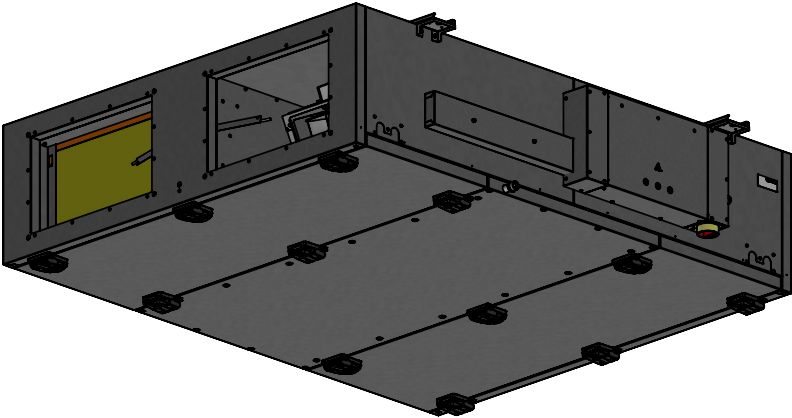


PHE ... F

Air handling unit with heat recovery



Example configuration shown



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1. FOREWORD

Dear customers,

Thank you for choosing our device.

Before operating the unit, please read carefully these installation, operating and maintenance instructions. If you have any questions, please contact: (Contact details see page 1)

The data provided in these installation, operating and maintenance instructions are for the product description only. A statement about a certain condition or a suitability for a certain application cannot be derived from our information. The information does not release the user from his own assessments and examinations.

All rights reserved by the manufacturer, even in the event of industrial property rights.

Any disposal such as copying and distribution rights lies with us.

2. IMPORTANT INFORMATION

This manual contains important information on the safe and appropriate assembly, transport, commissioning, operation, maintenance, disassembly and simple troubleshooting of the product.

The product has been manufactured according to the accepted rules of current technology.

There is, however, still a danger of personal injury or damage to equipment if the following general safety instructions and the warnings before the steps contained in these instructions are not complied with.

- Read these instructions completely and thoroughly before working with the product.
- Keep these instructions in a location where they are accessible to all users at all times.
- Always include the operating instructions when you pass the product on to third parties.

2.1. Applicable Documents

The following documents and information on the device must be observed in addition to the installation, operating and maintenance instructions:

Nameplate

Other applicable standards:

- DIN VDE 0100-100
- DIN EN 60204-1
- DIN EN ISO 13857
- DIN EN ISO 12100
- VDMA 24186-1

Available documents at

- Installation, operating and maintenance instructions
- EC Declarations of conformity
- EC-Declaration of Incorporation (Directive 2006/42/EC)
- Commissioning report
- Call to Tender
- Dimensioned drawing
- Technical drawing DWG
- Technical drawing DXF
- 3D STEP

2.2. Provisions and regulations

When properly installed and operated, the device complies with the applicable standards and EU Directive at the time of its placing on the market.

In addition, observe generally valid, legal and other binding regulations of the European or national legislation as well as the regulations in your country for accident prevention and environmental protection.

2.3. Warranty and liability

Our devices are manufactured to the highest technical level in accordance with the generally accepted rules of technology. They are subject to constant quality controls. Because the products are being constantly developed, we reserve the right to make changes to the products at any time and without prior announcement. We assume no liability for the correctness or completeness of these installation, operating and maintenance instructions.

To ensure your warranty claims, it is imperative to provide a commissioning report and a maintenance record.

Warranty and liability claims for personal injury and property damage are excluded if they are due to one or more of the following causes:

- Improper use
- Improper mounting, commissioning, operation and maintenance
- Operating the device with defective and / or non-functional safety and protective devices
- Failure to observe the instructions regarding transportation, installation, operation and maintenance
- Unauthorized structural changes to the device
- Poor monitoring and replacement of maintenance parts
- Improperly performed repairs
- Disasters and force majeure

3. GENERAL SAFETY INSTRUCTIONS

Planners, plant engineers and operators are responsible for ensuring that the product is installed and operated correctly.

- Use our devices only in perfect technical condition.
- Check the device for obvious defects, such as cracks in the housing or missing rivets, screws, caps or other application-relevant defects.
- Only use the device in the power range specified in the technical data and on the nameplate.
- Protection against contact and being sucked in and safety distances should be provided in accordance with DIN EN 13857.
- Generally prescribed electrical and mechanical protection devices are to be provided by the client.
- The locking latch can and must only be locked or unlocked with an Allen key SW8. The latches must always be locked after closing the lids..
- Safety components must not be bypassed or put out of operation.
- The product may be operated by personnel with limited physical, sensory or mental capacities only if they are supervised or have been instructed by responsible personnel.
- Children must be kept away from the product.

3.1. Intended use

Our devices are incomplete machineries as defined in the EU Machinery Directive 2006/42/EC (partly completed machinery). The product is a not ready-for-use machine in terms of the machine directive.

It is intended exclusively for installation in a machine or in ventilation equipment and installations or for combination with other components to form a machinery or installation. The product may be commissioned only if it is integrated in the machinery/system for which it is designed and the machinery/system fully complies with the EC machinery directive.

Observe the operating conditions and performance limits specified in the technical data.

Conveying and ambient temperatures must be observed according to the technical data and the nameplate.

The units are designed for use in comfort ventilation applications.

The units must not be used for ventilation of buildings where humidity is continuously high such as swimming pools, saunas, spas.

Intended use also implies that you have fully read and understood this manual.



Improper use may result in danger to the life and limb of the user or third parties or damage to the system or other property.

3.2. Improper use

Any use of the product other than described in chapter "Intended use" is considered as improper.

The following points are improper and dangerous:

- Delivery of explosive and flammable media or operation in potentially explosive atmospheres.
- The conveyance of greasy and moist media (over 90% relative humidity).
- Delivery of aggressive and abrasive media.
- The installation in wet rooms.
- Operation without the duct system.
- Operation with closed air connections.
- The use on vehicles, aircrafts and ships.

3.3. Personnel qualifications

Assembly, commissioning, operation, disassembly and service (including maintenance and repair) require basic mechanical and electrical knowledge, as well as knowledge of the appropriate technical terms. In order to ensure operating safety, these activities may therefore only be carried out by qualified technical personnel or a person under the direction and supervision of qualified personnel. Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area.

3.4. Safety instructions in this manual

In this manual, there are safety instructions before the steps whenever there is a danger of personal injury or damage to the equipment. The measures described to avoid these hazards must be observed.

Safety instructions are set out as follows:

- | | |
|--------------------------------|---|
| Safety sign (warning triangle) | - Draws attention to the risk. |
| ● Type of risk! | - Identifies the type or source of the hazard. |
| » Consequences | - Describes what occurs when the safety instructions are not complied with. |
| → Precautions | - States how the hazard can be avoided. |

Safety sign (warning triangle)



General warning!

Indicates possible hazardous situations. Failure to observe the warnings may result in personal injury and / or damage to property.



Electricity warning (hazardous voltage)!

Indicates possible hazards due to electricity. Failure to observe the warnings may result in death, injury and/or damage to property.



Hot surface warning!

Indicates possible hazards due to high surface temperatures. Failure to observe the warnings may result in personal injury and/or damage to property.



Finger-Crushing Warning!

Indicates possible hazards due to moving and rotating parts. Failure to observe the warnings may result in personal injury.



Overhead load warning!

Indicates possible hazards due to overhead loads. Failure to observe the warnings may result in death, injury and/or damage to property.



Follow important information!

Instructions for safe, optimum use of the product.



● General warning

- » Failure to observe the warnings may result in personal injury and / or damage to property.
- Unauthorized repairs may cause personal injury and / or damage to property, in which case the manufacturer's guarantee or warranty will not apply.



● Electricity warning (hazardous voltage)!

- » Failure to observe the hazard may result in death, injury or damage to property.
- Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.



● Caution! Burning hazard.

- » Failure to observe the hazard may result in personal injury and/or damage to property.
- Do not touch the surface until the motor and heater have cooled.



● Never reach into the impeller or other rotating or moving parts.

- » Failure to observe the hazard may lead to serious injury.
- Work may only be performed once the impeller has come to a complete halt.



● Never reach into the impeller or other rotating or moving parts.

- » Failure to observe the hazard may lead to serious injury.
- Work may only be performed once the impeller has come to a complete halt.



● Never clean the internal space with flowing water or a high-pressure cleaner. Do not use aggressive or easily flammable products for cleaning (impellers/housing).

- Only use mild soapsuds. The impeller should be cleaned with a cloth or brush.



3.5. Safety labels on the product

Fig. 3-1
Safety labels
Electrical heating coil

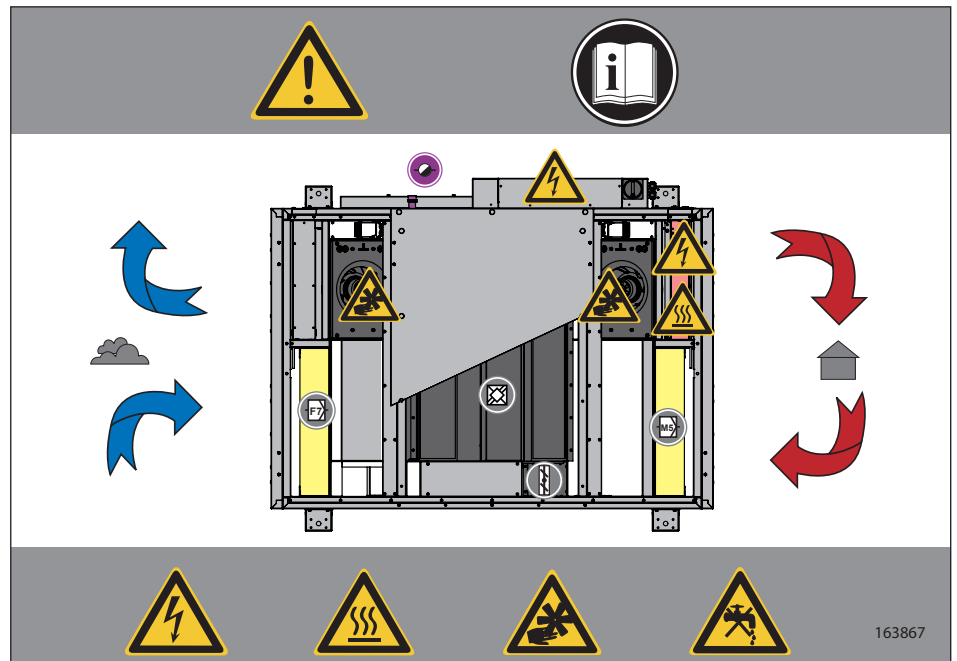


Fig. 3-2
Safety labels
Heater

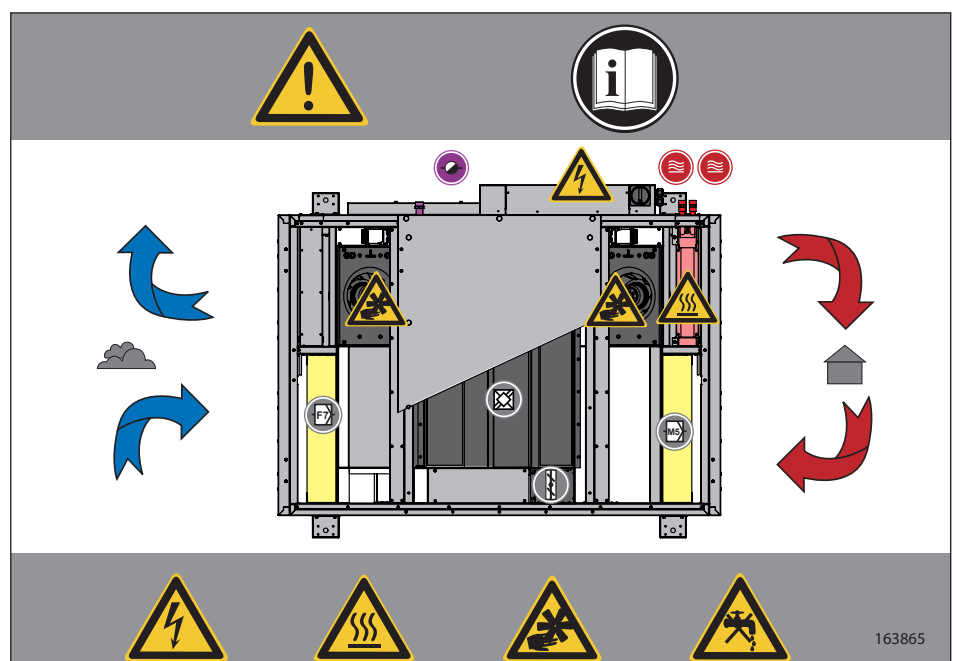
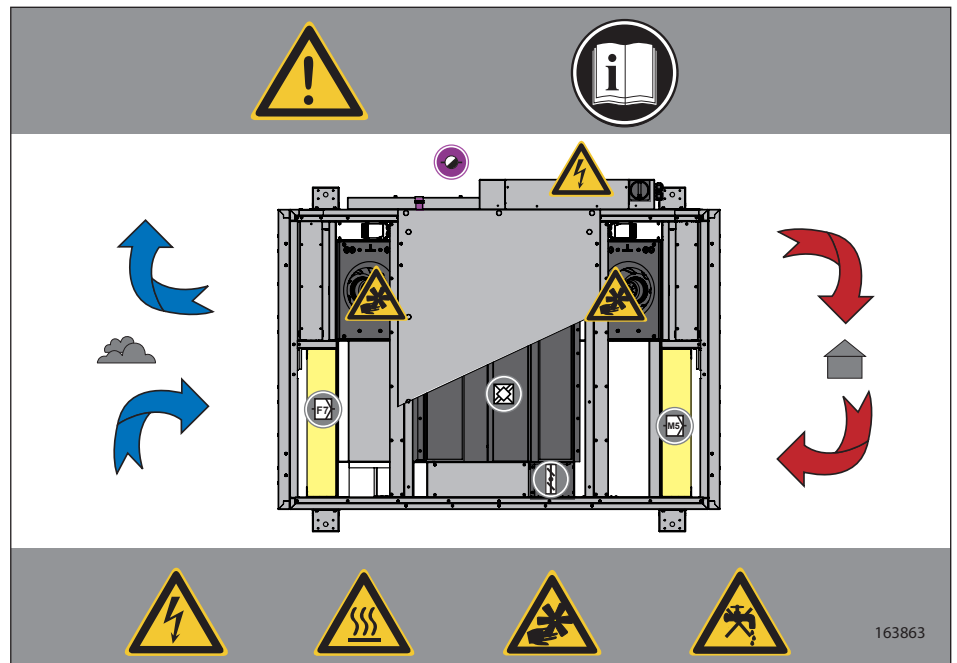


Fig. 3-3
Safety labels
Units without heating/cooling



4. ADHERE TO THE FOLLOWING INSTRUCTIONS

4.1. General instructions

- Persons who assemble, operate, disassemble or maintain our devices must not be under the influence of alcohol, drugs or pharmaceuticals that may affect perception and responsiveness.
- Responsibilities for the operation, maintenance and regulation of the product should be clearly determined and observed so that there can be no unclear areas of responsibility with regard to safety.

4.2. Indications assembly

- Disconnect all of the product's poles from the mains before installing the product or connecting or removing plugs. Make sure that the product cannot be switched back on again.
- Lay cables and lines so that they cannot be damaged and no one can trip over them.
- Information signs must not be changed or removed.

4.3. Indications Commissioning

- Make sure that all electrical connections are either used or covered. Commission the product only if it is installed completely.
- The power switch must always be fully functional and easy accessible!

4.4. Indications during operation

- Only authorized personnel is allowed to operate the setting mechanisms of the components or parts, under the provision that the system is used as intended.
- In an emergency, or if there is a fault, or other irregularities, switch the equipment off and make sure it cannot be switched back on again.
- The technical data given on the rating plate must not be exceeded.

5. PRODUCT INFORMATION

Description:

The unit is an air handling unit with integrated counterflow heat exchanger for optimal heat recovery. Integrated in the unit are large panel filter ISO ePM1/ ePM10, warm water heating coil or electric heating coil (depending on version) and control electronics. The device has a remote control for controlling and setting the operating parameters. The high quality housing consists of a frameless sheet metal structure with smooth internal and external walls. The housing is insulated with 40 mm mineral wool. The unit can be operated at a constant volume. The control system, in conjunction with external sensors, enables demand-based ventilation.

- Frameless casing manufactured from galvanized steel sheet.
- Extractable counter cross-flow heat exchanger.
- Hot water coil or electrical heating coil (depending on the type)
- Extractable large panel filters ISO ePM10 (M5) / ISO ePM1 (F7)
- Controller installed, wired, ready to plug in.
- Main / Isolator switch
- External control unit with control cable.

5.1. Device description

1. Housing
2. Maintenance cover
3. Isolator switch
4. Cover with condensate tray
5. EC-fan
6. Cable glands
7. Rating plate
8. Connection heating coil
9. Connection supply air
10. Connection extract air
11. Connection condensate drainage
12. Remote control
13. Remote control cable
14. Hot water coil or electrical heating coil (depending on the type)
15. Supply air temperature sensor
16. Controller board
17. Safety labels
18. Switchboard cover
19. Extracted air temperature sensor
20. Air filter ISO ePM10 (M5) - extract air
21. Counter cross-flow heat exchanger
22. Air filter ISO ePM1 (F7) - supply air
23. Connection intake air
24. Connection exhaust air

Fig. 5-1

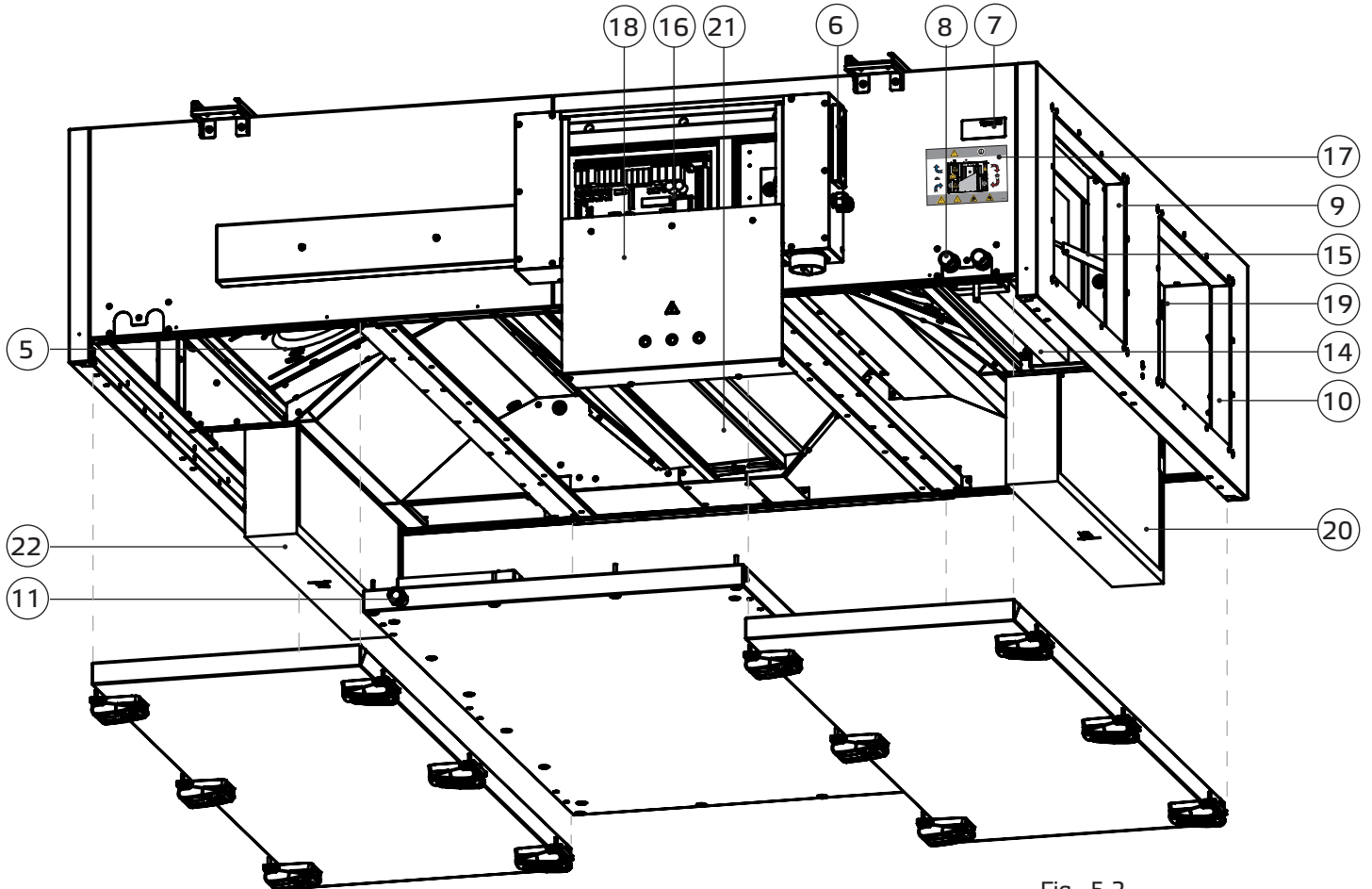
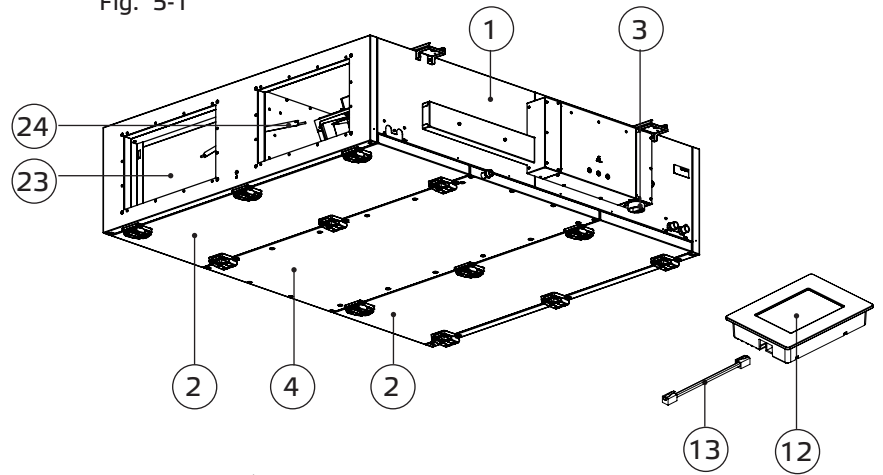
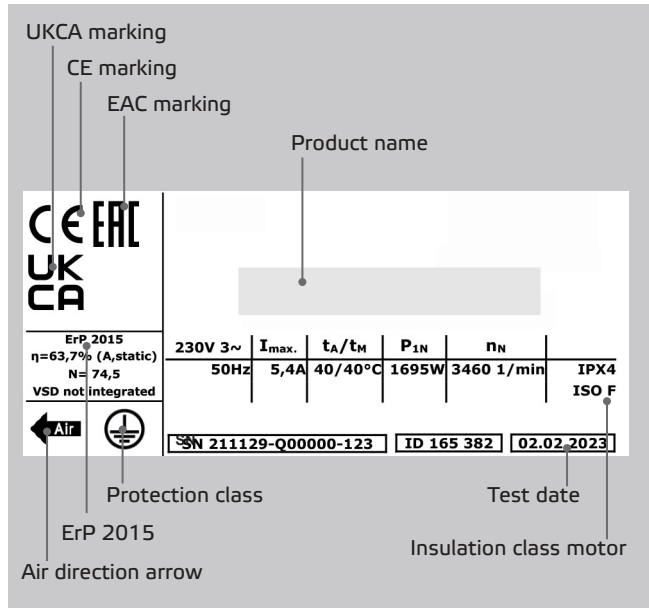


Fig. 5-2

5.2. Nameplate

ATTENTION! The information on the nameplate must always be observed!



Legend:

- I_{max} Max. current consumption
- t_A / t_M Max. ambient temperature / Max. medium temperature
- P_{IN} Rated power consumption
- n_N Rated speed
- ErP Data ErP Conformity, if required according to Reg. 327/2011
- η Overall efficiency
- N Efficiency at the optimum energy efficiency
- ID Item number
- SN Serial number

Fig. 5-3 Nameplate

6. DELIVERY CONTENTS

- 1 x Ventilation unit with heat recovery
 - 2 x EC Fan
 - 1 x panel filter ISO ePM10 (M5)
 - 1 x panel filter ISO ePM1 (F7)
 - 1 x main heater (Hot water coil or electrical heating coil, depending on the type)
 - 1 x counter cross-flow heat exchanger
 - 1 x bypass flap with actuator
- 1 x remote control with control cable
- 1 x Installation, operating and maintenance instructions
- EC Declarations of conformity
- EC-Declaration of Incorporation (Directive 2006/42/EC)

7. TECHNICAL DATA

Product name		PHE 700 F OOJR	PHE 700 F OOJL	PHE 700 F EOJR	PHE 700 F EOJL	PHE 700 F WOJR	PHE 700 F WOJL		PHE 1300 F OOJR	PHE 1300 F OOJL	PHE 1300 F EOJR	PHE 1300 F EOJL	PHE 1300 F WOJR	PHE 1300 F WOJL
Item number		163295	163709	163292	163708	163217	163710		163793	163790	163787	163784	163799	163796
Voltage U_N	V	230V ~	230V ~	230V ~	230V ~	230V ~	230V ~		230V ~	230V ~	400V 3~N	400V 3~N	230V ~	230V ~
Frequency f_N	Hz	50	50	50	50	50	50		50	50	50	50	50	50
Rated power consumption P_N	W	370	370	3370	3370	370	370		700	700	6700	6700	700	700
Max. motor current I_{max}	A	3,2	3,2	16,0	16,0	3,2	3,2		3,9	3,9	13,0	13,0	2,6	2,6
Fuse device		1x16A	1x16A	1x16A	1x16A	1x16A	1x16A		1x16A	1x16A	3x16A	3x16A	1x16A	1x16A
Fuse external electric heater		-	-	-	-	-	-		-	-	-	-	-	-
Max. medium temperature t_M	°C	40	40	40	40	40	40		40	40	40	40	40	40
Max. air volume	m³/h	870	870	870	870	870	870		1500	1500	1500	1500	1450	1450
RPM	1/min	3570	3570	3570	3570	3570	3570		2520	2520	2520	2520	2510	2510
Max. primary static pressure	Pa	860	860	860	860	860	860		800	800	800	800	800	800
Sound power level supply air $L_{WA\ 6}$	dB(A)	80	80	80	80	80	80		78	78	78	78	78	78
Sound power level extract air $L_{WA\ 5}$	dB(A)	60	60	60	60	60	60		61	61	61	61	61	61
Sound power level outdoor air $L_{WA\ 5}$	dB(A)	61	61	61	61	61	61		60	60	60	60	60	60
Sound power level exhaust air $L_{WA\ 6}$	dB(A)	80	80	80	80	80	80		80	80	80	80	80	80
Sound power level casing $L_{WA\ 2}$	dB(A)	57	57	57	57	57	57		56	56	56	56	56	56
Weight	kg	138,0	138,0	138,0	138,0	138,0	138,0		245,0	245,0	247,0	247,0	247,0	247,0
Wiring diagrams No.		164186							164187					
Heating coil warm water						X	X						X	X
Electrical heating coil				X	X						X	X		
external electrical heating coil														

Product name		PHE 1700 F 00JR	PHE 1700 F 00JL	PHE 1700 F EOJR	PHE 1700 F EOJL	PHE 1700 F WOJR	PHE 1700 F WOJL		PHE 2500 F 00JR *	PHE 2500 F 00JL *	PHE 2500 F EOJR *	PHE 2500 F EOJL *	PHE 2500 F WOJR *	PHE 2500 F WOJL *
Item number		163731	163734	163717	163732	163730	163733		163756	163758	163755	163757	163743	163745
Voltage U_N	V	230V ~	230V ~	400V 3~N	400V 3~N	230V ~	230V ~		230V ~	230V ~	230V ~	230V ~	230V ~	230V ~
Frequency f_N	Hz	50	50	50	50	50	50		50	50	50	50	50	50
Rated power consumption P_N	W	1200	1200	7200	7200	1200	1200		1600	1600	1600	1600	1600	1600
Max. motor current I_{max}	A	5,0	5,0	13,0	13,0	5,0	5,0		7,0	7,0	7,0	7,0	7,0	7,0
Fuse device		1x16A	1x16A	3x16A	3x16A	1x16A	1x16A		1x16A	1x16A	1x16A	1x16A	1x16A	1x16A
Fuse external electric heater		-	-	-	-	-	-		-	-	3x32A	3x32A	-	-
Max. medium temperature t_M	°C	40	40	40	40	40	40		40	40	40	40	40	40
Max. air volume	m³/h	2060	2060	2060	2060	1985	1985		3030	3030	2975	2975	2975	2975
RPM	1/min	2970	2970	2970	2970	2960	2960		3050	3050	3050	3050	3050	3050
Max. primary static pressure	Pa	1120	1120	1120	1120	1120	1120		1280	1280	1280	1280	1280	1280
Sound power level supply air $L_{WA 6}$	dB(A)	84	84	84	84	83	83		85	85	85	85	85	85
Sound power level extract air $L_{WA 5}$	dB(A)	65	65	65	65	65	65		66	66	66	66	66	66
Sound power level outdoor air $L_{WA 5}$	dB(A)	64	64	64	64	64	64		65	65	66	66	66	66
Sound power level exhaust air $L_{WA 6}$	dB(A)	85	85	85	85	85	85		85	85	85	85	85	85
Sound power level casing $L_{WA 2}$	dB(A)	61	61	61	61	61	61		63	63	63	63	63	63
Weight	kg	248,0	248,0	250,0	250,0	250,0	250,0		355,0	355,0	355,0	355,0	355,0	355,0
Wiring diagrams No.		164188							164189					
Heating coil warm water						X	X						X	X
Electrical heating coil				X	X									
external electrical heating coil											X	X		

* Switching the device off and then on again using the main switch within 90 seconds can lead to permanent damage. To ensure proper, long time operation of the device, please wait at least 90 seconds before switching the device on again.

Product name		PHE 2800 F 0OJR	PHE 2800 F 0OJL	PHE 2800 F EOJR	PHE 2800 F EOJL	PHE 2800 F WOJR	PHE 2800 F WOJL		PHE 3500 F 0OJR	PHE 3500 F 0OJL	PHE 3500 F EOJR	PHE 3500 F EOJL	PHE 3500 F WOJR	PHE 3500 F WOJL
Item number		171600	171602	171604	171606	171596	171598		171665	171792	171790	171788	171797	171795
Voltage U_N	V	400V 3~N	400V 3~N	400V 3~N	400V 3~N	400V 3~N	400V 3~N		400V 3~N	400V 3~N	400V 3~N	400V 3~N	400V 3~N	400V 3~N
Frequency f_N	Hz	50	50	50	50	50	50		50	50	50	50	50	50
Rated power consumption P_N	W	2250	2250	2250	2250	2250	2250		3000	3000	3000	3000	3000	3000
Max. motor current I_{max}	A	3,5	3,5	3,5	3,5	3,5	3,5		4,7	4,7	4,7	4,7	4,7	4,7
Fuse device		3x16A	3x16A	3x16A	3x16A	3x16A	3x16A		3x16A	3x16A	3x16A	3x16A	3x16A	3x16A
Fuse external electric heater		-	-	3x32A	3x32A	-	-		-	-	3x32A	3x32A	-	-
Max. medium temperature t_M	°C	40	40	40	40	40	40		40	40	40	40	40	40
Max. air volume	m³/h	3510	3510	3480	3480	3480	3480		4450	4450	4450	4450	4450	4450
RPM	1/min	3400	3400	3400	3400	3400	3400		3790	3790	3790	3790	3790	3790
Max. primary static pressure	Pa	1320	1320	1310	1310	1310	1310		1430	1430	1430	1430	1430	1430
Sound power level supply air $L_{WA\ 6}$	dB(A)	87	87	86	86	86	86		90	90	90	90	90	90
Sound power level extract air $L_{WA\ 5}$	dB(A)	68	68	68	68	68	68		70	70	70	70	70	70
Sound power level outdoor air $L_{WA\ 5}$	dB(A)	70	70	70	70	70	70		71	71	71	71	70	70
Sound power level exhaust air $L_{WA\ 6}$	dB(A)	87	87	87	87	87	87		93	93	93	93	93	93
Sound power level casing $L_{WA\ 2}$	dB(A)	61	61	61	61	61	61		68	68	68	68	68	68
Weight	kg	339,0	339,0	339,0	339,0	345,0	345,0		402,0	402,0	402,0	402,0	418,0	418,0
Wiring diagrams No.		171289							171290					
Heating coil warm water						X	X						X	X
Electrical heating coil														
external electrical heating coil				X	X						X	X		

8. DIMENSIONS

PHE ... F

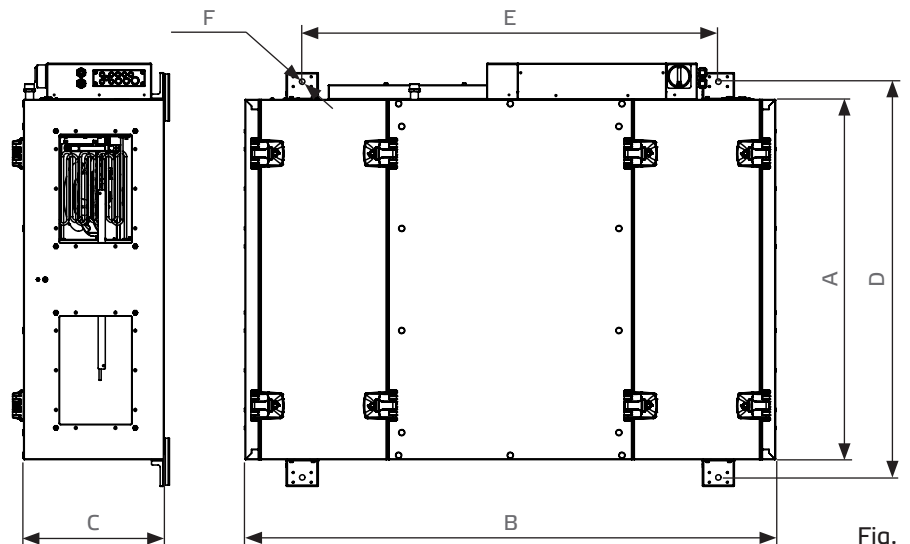


Fig. 8-1
Dimensions of the supply air unit

Product name	Item number	Duct connection	A	B	C	D	E	F
		mm	mm	mm	mm	mm	mm	mm
PHE 700 F OOJR	163295	200 x 300	1000	1473	390	1099	1155	4 x Ø15
PHE 700 F OOJL	163709	200 x 300	1000	1473	390	1099	1155	4 x Ø15
PHE 700 F EOJR	163292	200 x 300	1000	1473	390	1099	1155	4 x Ø15
PHE 700 F EOJL	163708	200 x 300	1000	1473	390	1099	1155	4 x Ø15
PHE 700 F WOJR	163217	200 x 300	1000	1473	390	1099	1155	4 x Ø15
PHE 700 F WOJL	163710	200 x 300	1000	1473	390	1099	1155	4 x Ø15
PHE 1300 F OOJR	163793	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1300 F OOJL	163790	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1300 F EOJR	163787	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1300 F EOJL	163784	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1300 F WOJR	163799	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1300 F WOJL	163796	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1700 F OOJR	163731	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1700 F OOJL	163734	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1700 F EOJR	163717	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1700 F EOJL	163732	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1700 F WOJR	163730	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 1700 F WOJL	163733	300 x 500	1460	1800	435	1560	1215	4 x Ø15
PHE 2500 F OOJR	163756	300 x 700	1900	2000	520	2000	1350	4 x Ø15
PHE 2500 F OOJL	163758	300 x 700	1900	2000	520	2000	1350	4 x Ø15
PHE 2500 F EOJR	163755	300 x 700	1900	2000	520	2000	1350	4 x Ø15
PHE 2500 F EOJL	163757	300 x 700	1900	2000	520	2000	1350	4 x Ø15
PHE 2500 F WOJR	163743	300 x 700	1900	2000	520	2000	1350	4 x Ø15
PHE 2500 F WOJL	163745	300 x 700	1900	2000	520	2000	1350	4 x Ø15
PHE 2800 F OOJR	171600	350 x 700	1900	2200	520	2000	1550	6 x Ø15
PHE 2800 F OOJL	171602	350 x 700	1900	2200	520	2000	1550	6 x Ø15
PHE 2800 F EOJR	171604	350 x 700	1900	2200	520	2000	1550	6 x Ø15
PHE 2800 F EOJL	171606	350 x 700	1900	2200	520	2000	1550	6 x Ø15
PHE 2800 F WOJR	171596	350 x 700	1900	2200	520	2000	1550	6 x Ø15
PHE 2800 F WOJL	171598	350 x 700	1900	2200	520	2000	1550	6 x Ø15
PHE 3500 F OOJR	171665	400 x 700	1820	2400	660	1920	1600	6 x Ø15
PHE 3500 F OOJL	171792	400 x 700	1820	2400	660	1920	1600	6 x Ø15
PHE 3500 F EOJR	171790	400 x 700	1820	2400	660	1920	1600	6 x Ø15
PHE 3500 F EOJL	171788	400 x 700	1820	2400	660	1920	1600	6 x Ø15
PHE 3500 F WOJR	171797	400 x 700	1820	2400	660	1920	1600	6 x Ø15
PHE 3500 F WOJL	171795	400 x 700	1820	2400	660	1920	1600	6 x Ø15

8.1. Dimensions Control unit

Size	LxBxH	mm	122 x 89 x 23
Assembly size	Ø A	mm	60
	Ø D	mm	27,9

Fig. 8-2
Outside dimensions of the control unit.

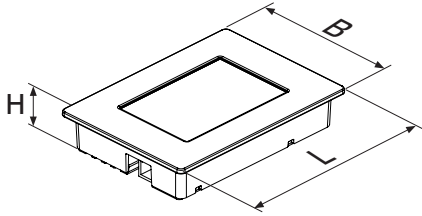
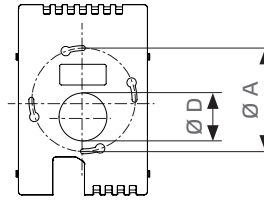


Fig. 8-3
Installation dimensions of the control unit.



9. TRANSPORT AND STORAGE

Transport and storage should only be performed by specialist personnel in accordance with the assembly and operating manual and regulations in force.

The following points should be noted and followed:

- Check the delivery according to the delivery note to ensure it is complete and correct and check for any damage. Any missing quantities or damage incurred during transport should be confirmed by the carrier. No liability is accepted if this is not observed.
- For weight see technical data
- It should be transported with suitable lifting equipment in the original packaging or on the transport equipment indicated.
- If transported with a forklift, it should be ensured that the product is resting with the basic profile or base frame completely on the forks or on a pallet and the product's centre of gravity is between the forks.
- The driver must be authorized to drive a forklift.
- Do not go beneath the suspended load.
- Never lift and transport the unit by the door handles, covers or other mounting parts!
- Avoid damage or deformation of the housing.
- The product must be stored in a dry area and protected from the weather in the original packaging. Open pallets should be covered with tarpaulins. Even weatherproof modules should be covered because their weather resistance is only guaranteed after complete installation. If moisture has penetrated into the original packaging, remove it immediately.
- Storage temperature between +5 °C and +40 °C. Avoid severe temperature fluctuations.
- If the product has been in storage for more than a year, check the smooth running of impellers and valves by hand.

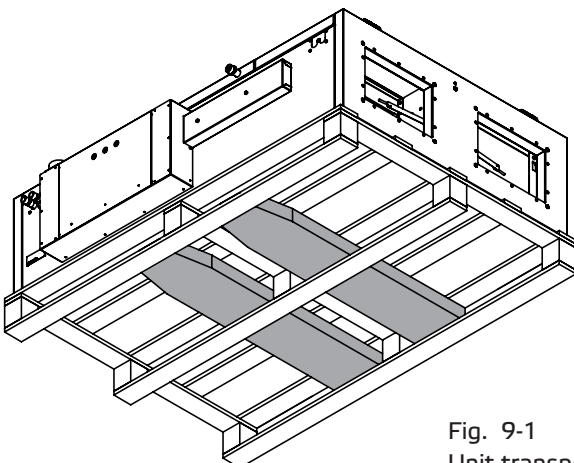


Fig. 9-1
Unit transported on a pallet with a forklift.

10. ASSEMBLY

Assembly work may only be performed by specialist personnel in accordance with the installation and operating manual and the regulations and standards in force.

The following points should be noted and followed:

- Mount and align the unit with the aid of a water level. Only if the machine is horizontally installed can proper condensate drainage be guaranteed.
- Only suitable installation aids, in accordance with regulations, should be used.
- The device must be installed in such a way that it is easily accessible for maintenance and cleaning purposes.
- The unit should only be installed with authorized and suitable fastening materials at all fastening points.
- Do not distort the unit when installing.
- The unit should be suitably secured.
- Just use the indicated mounting and fixing places. No holes should be made in the housing or any screws screwed into it.
- The duct system must not be supported on the housing.
- It is recommended that the duct system is attached with flexible connections or connection collars in order to isolate any structure-borne noise. For floor or wall mounting, all units should be mounted to isolate structure-borne noise.
- Make sure that the intake duct has direct access to the intake air. Warning: branches in the intake duct, to other fan units for example, may, if the dimensions are too small, lead to low pressure in the duct and therefore malfunction of the unit.
- The pressure loss in the duct system must not exceed the capacity of the unit! The pressure loss in the duct should not be more than 2/3 the unit's maximum pressure so that an adequate air output can still be achieved. This will prevent malfunction. Pressure losses in the duct system are adversely affected by: the length of the duct system, small duct cross-section, elbows, additional filters, valves, etc.

10.1. Unit suspension / Permitted installation positions

Install insulated against structure-borne sound

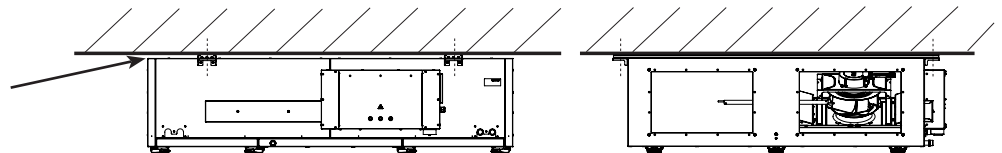


Fig. 10-1
Unit suspension

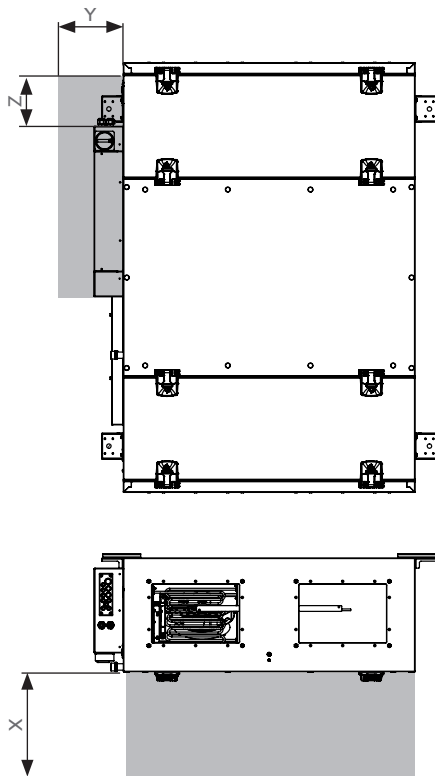
Only ceiling mounting possible.



Before suspending the unit, check that the ceiling is suitable for the load. Only fastening materials appropriate to the load and suitable for the nature of the ceiling may be used.

Product name	Quantity fasteners	Weight Devices kg
PHE 700 F	4	150
PHE 1300 F	4	250
PHE 1700 F	4	260
PHE 2500 F	4	355
PHE 2800 F	6	345
PHE 3500 F	6	410

10.2. Minimum distance for maintenance works



Product name	Remove door min.	Open door min.	Remove filter min.	electrical connection min.	electrical connection recommended	Connection cable min.
	X	X	X	Y	Y	Z
	mm	mm	mm	mm	mm	mm
PHE 700 F	170	450	320	200	300	200
PHE 1300 F	170	600	380	200	300	200
PHE 1700 F	170	600	380	200	300	200
PHE 2500 F	170	650	460	200	300	200
PHE 2800 F	170	750	460	100	300	200
PHE 3500 F	170	775	320	100	300	200

Fig. 10-2
Minimum distance for maintenance works

10.3. Duct connections

Duct connections should be made such way that no condensate can get into the unit via the ducts.

- Insulate cold ducts in warm rooms
 - Insulate warm ducts in cold rooms
 - Ground heat exchangers should be equipped with a controlled condensate drain positioned before the unit
- The air connections must be matched to the duct connections. (see under „Technical data“)

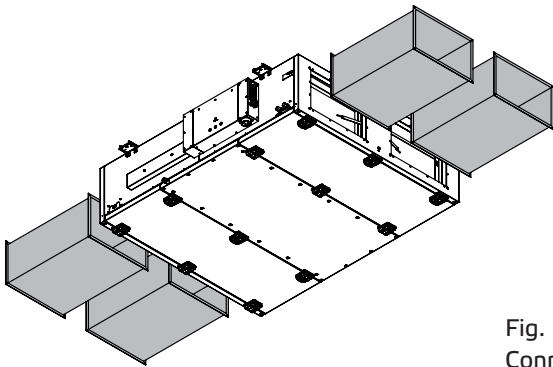


Fig. 10-3
Connection air duct

10.4. Operating limits

Operating limits indoor installation

Fresh air temperature	-20 °C / 95% rH to +40 °C / 20% rH
Installation place:	min. +5°C / 80% rH
Extract air class EN 13779	ETA 1 / ETA 2
Absolute humidity extract air	max. 12g/kg

For the ventilation of rooms where the emission sources are human metabolism or building materials and structures, e.g. offices, spaces for public service, meeting rooms as well as in rooms where smoking is allowed.

The suitability for enclosure condensation has to be checked by the customer, it is possible that suitable measures like ventilation of the installation area, or an additional insulation of the outdoor air intake area, are going to be necessary.

Ventilation unit not suitable for outdoor installation.

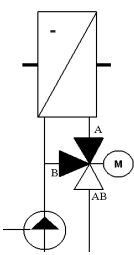
10.5. Medium connections / Heating Coil

- Before connecting heating coil, the duct system must be thoroughly cleaned.
- Use only permitted sealants (DIN EN 751-2, DVGW tested).
- When connecting the pipelines on the water side, the counterflow principle must be observed.
- When making pipe connections to the unit with screw connections, a wrench, for example, must be used to hold against the tightening torque.
- The connection must be executed without tension.
- Air bleeding must be done on site.
- All pipes and fittings of the medium connections must be insulated.

Hydraulic circuits

For air conditioning applications, there are three basic circuits:

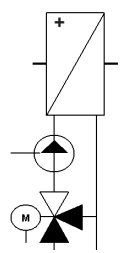
Fig. 10-4



Bypass circuit

With the bypass circuit, only the hot water is fed to the heating coil. The rest of the water supplied by the pump, bypasses the heating coil. This can lead to a temperature difference between top and bottom of the heating coil if the flow of water through it is very small. The resulting temperature gradients can lead to false temperature measurements in the duct or to draught effects in the room. The bypass circuit is usually used in air coolers. In air coolers, the air is partly cooled below the dew point and thereby dehumidified.

Fig. 10-5

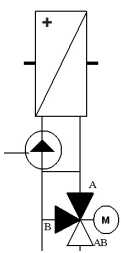


Admixture circuit

In the admixture circuit, the circulating pump always supplies the full amount of water required by the heating coil with an amount of hot water determined by the valve setting. The temperature control is thus much better. Furthermore, the risk of frost damage when the pump is running is reduced as the continuous circulation and increased pressure reduce the freezing point of the water.

The only advantage of the bypass circuit over the admixture circuit arises when the pipe lengths between three-way ball valve and water heater are very long. Because the pump is ahead of the valve, there is always hot water available at the valve that can be immediately fed to the heat exchanger if required. It is possible that the water in the pipe to the valve cools during admixture circuit. When heating is required there is a short delay before hot water gets into the heating coil.

Fig. 10-6



Injection circuit

The combination of these circuits is the injection circuit which is generally recommended.

10.6. Condensate drainage

- The counter cross-flow heat exchanger is equipped with a stainless steel condensate pan.
- A drainage connection from the condensate pan is brought out of the unit.
- To avoid corrosion, the drain pipe from this connection should be in stainless steel, copper or plastic.
- A siphon for negative pressure must be installed at the condensate drain pipe.
- The water seal height in the siphon depends on the pressure inside the unit, the minimum is 60 mm. If the pressure in the device exceeds 400 Pa, please use the sealing water heights from the table.

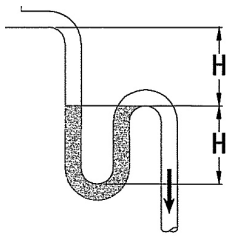


Fig. 10-7
Water seal height H

Δp_{st} [Pa]	H [mm]
300	60
400	60
500	66
600	76
700	86
800	97

Table: Water seal height H in siphon as a function off pressure.

The water seal height can also be determined by calculation, provided the minimum of 60 mm is maintained:

Example calculation::

$$\Delta p_{st} = \Delta p_t - \Delta p_d$$

$$\Delta p_{st} = 500 \text{ Pa (see technical data)}$$

$$1 \text{ mm water gauge equals } 9,81 \text{ Pa}$$

Water seal H:

$$H = \Delta p_{st} / 9,81 \text{ Pa/mm} + 15 \text{ mm}$$

$$H = 500 \text{ Pa} / 9,81 \text{ Pa/mm} + 15 \text{ mm}$$

$$H = 66 \text{ mm}$$

Legend

Δp_{st} = Static pressure [Pa]

Δp_t = Total pressure [Pa]

Δp_d = Dynamic pressure [Pa]

H = Water seal [mm]

For hygienic reasons, it is recommended to use the suitable siphon SYS 02 for the unit. This siphon provides sufficient water seal height and is equipped with a self-closing ball siphon.

The water seal height for on site siphons can also be determined by calculation, provided the minimum water seal height of 60 mm is maintained.

10.7. Ball siphon installation

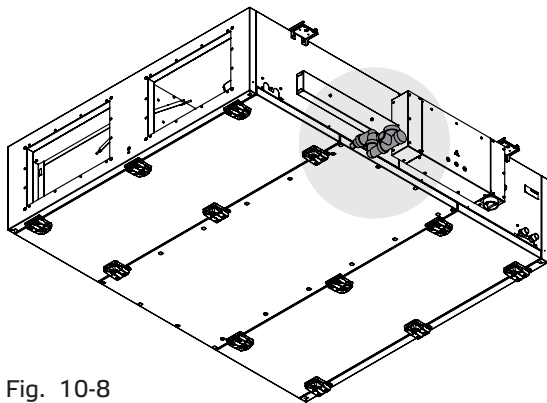
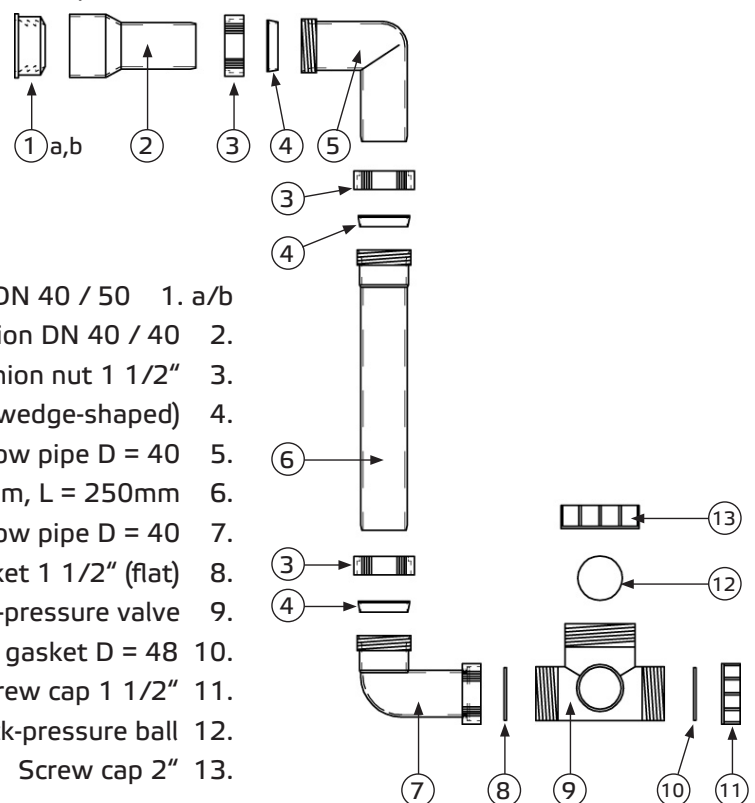


Fig. 10-8
ball siphon

Fig. 10-9
Systemskizze
ball siphon SYS 02



Rubber collar DN 30 / 50 / Rubber collar DN 40 / 50 1. a/b

Connection DN 40 / 40 2.

Union nut 1 1/2" 3.

Combo gasket D = 40 (wedge-shaped) 4.

Elbow pipe D = 40 5.

Immersion pipe D = 40mm, L = 250mm 6.

Elbow pipe D = 40 7.

Gasket 1 1/2" (flat) 8.

Back-pressure valve 9.

Round rubber gasket D = 48 10.

Screw cap 1 1/2" 11.

Back-pressure ball 12.

Screw cap 2" 13.

11. ELECTRICAL CONNECTION



- Electricity warning (hazardous voltage)!
- » Failure to observe the hazard may result in death, injury or damage to property.
- Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.

The electrical installation may only be carried out by qualified electricians in compliance with the installation, operating and maintenance instructions and the applicable national regulations, standards and guidelines:

- ISO, DIN, EN and VDE specifications, including all safety requirements.
- Technical connection conditions.
- Safety at work and accident prevention requirements.

This list does not claim to be complete.

Requirements should be applied under one's own personal responsibility.

- The electrical connections must be made as shown in the corresponding wiring diagrams and terminal diagrams.
- The type of cable, size of cable and method of laying should be determined by an authorized electrician.
- Low and extra-low voltage cables should be laid separately.
- If no repair switch is integrated in the device, an all-pole mains disconnecting switch with min. 3 mm contact opening must be provided in the supply line.
- Use a separate cable inlet for each cable.
- Any cable inlets that are not used must be sealed so that it is airtight.
- All cable inlets must have strain relief.
- Create equipotential bonding between the unit and the duct system.
- Check all protective measures after the electrical connection work (earthing resistance, etc.)
- Motor current and motor power must not exceed the values stated on the motor nameplate. The specified max. fan speed must never be exceeded, otherwise the motor and fan will be destroyed by this overload and dissolved or flying parts can destroy other components.

Connection compartment / Connections on the unit

The connection compartment is inside the unit. At first, remove the terminal box cover. Each lead that is connected must pass through a separate cable gland.

For this, use the supplied cable glands, fittings and cover plate. Cables that carry mains voltage must be fastened with the tension relief devices available.

Unit supply cable

Connect the mains supply cable as shown in the wiring diagram. For the dimensioning of the line, observe the unit's rating plate and the relevant guidelines. Appropriate protection with correctly dimensioned automatic safety breakers (circuit protection breaker) must be provided.

The device must be connected according to the wiring diagram. For fans which are controlled by external control devices, the corresponding operating instructions of the manufacturer must be observed.

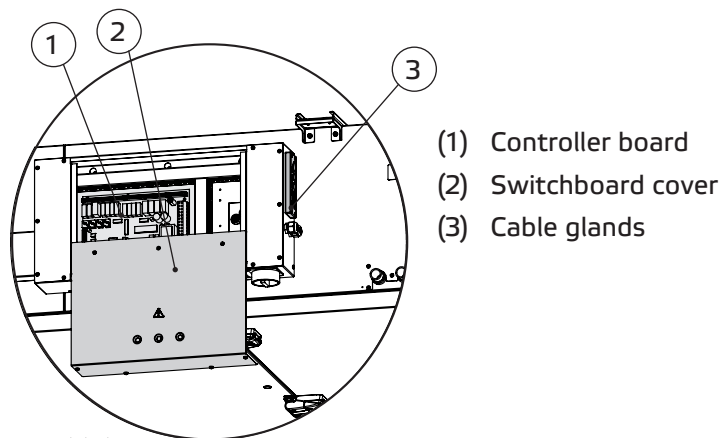


Fig. 11-1
Connection compartment

11.1. Overcurrent protection

- The unit may only be operated with the correct overcurrent protection.
- This must be established by a qualified electrician.
- The recommended fuse can be found in the technical data.

11.2. Description external inputs and outputs

11.2.1. Inputs

Unit enabling

The unit can be switched on and off with an external potential-free contact (see wiring diagram). An external voltage must never be applied to this connection. The control system would be destroyed. Any devices providing a potential-free contact (e.g. central building control system) can be used to control the unit. This contact must be securely isolated from external voltages because otherwise dangerous conditions might occur in the event of a fault.

The extra-low voltage control cables must be laid separately from the mains cables.

Motion detector

See description „Party Input“.

External, potential-free contact.

Fire detector

An external, potential-free fire detection contact switches the device off. The control unit display shows „Fire protection fault“. This signals requires a manual reset.

Frost protection via supply air sensor

If the supply air temperature drops below 4°C, the unit goes into the preheating mode. The dampers are closed, the fans are switched off, the circulation pump is switched on and the heating valve is opened. If the supply air temperature is still below 4°C after 20 minutes, the system switches off completely and the fault message F7 Frost protection appears on the control panel. The circulation pump remains switched on and the heating valve opened. If the supply air temperature rises again within 20 minutes, the device returns to normal operation.

Optional frost protection thermostat

An external frost protection thermostat can be connected to the controls. As soon as the temperature drops below the set value, the dampers are closed, the fans are switched off, the circulation pump is switched on and the heating valve is opened. If the set value is not reached after 20 minutes, the system switches off completely and the fault message F7 Frost protection appears on the control panel. The circulation pump remains switched on and the heating valve opened. If the supply air temperature rises again within 20 minutes, the device returns to normal operation.

External 0 - 10V input

An external measuring transducer can be connected to the 0 - 10V input for demand controlled ventilation.

External pressure sensor

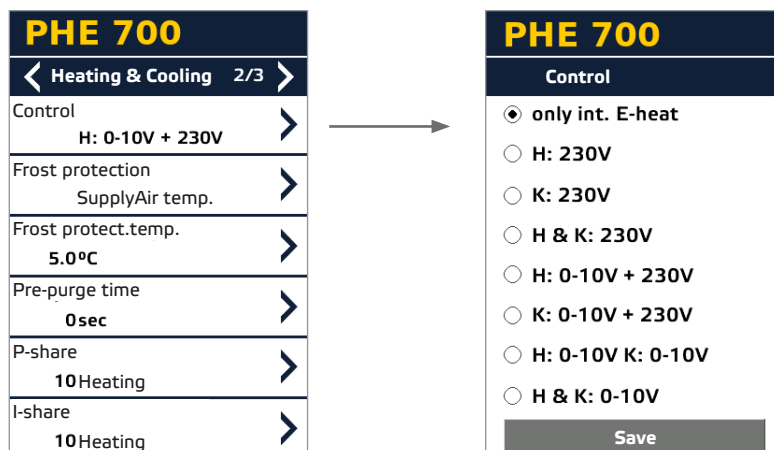
Two pressure sensors can be connected to the control unit for the operation with constant pressure control. One sensor for extract air pressure, one sensor for supply air pressure.

11.2.2. Outputs

Control outputs for heating and cooling

The following configurations for controlling the outputs for heating and cooling are possible.

only int. E-heat	Only internal E-heating
H: 230 V	Heating 3-way mixing valve 230V output (X6:N,8,9)
K: 230 V	Cooling 3-way mixing valve 230V output (X3:N,2,3)
H & K: 230 V	Heating 3-way mixing valve 230V output (X6:N,8,9) Cooling 3-way mixing valve 230V output (X3:N,2,3)
H: 0-10 V & 230 V	Heating 3-way mixing valve 230V output (X6:N,8,9) Heating 3-way mixing valve 0-10V output (X15:5,9)
K: 0-10 V & 230 V	Cooling 3-way mixing valve 230V output (X3:N,2,3) Cooling 3-way mixing valve 0-10V output (X15:5,9)
H: 0-10 V K: 0-10 V	Heating 3-way mixing valve 0-10V output (X15:4,8) Cooling 3-way mixing valve 0-10V output (X15:5,9)
H & K: 0-10 V	Heating and cooling 0-10V output (X15:5,9) Enable cooling device open = heating Enable cooling device closed = cooling



Enable circulation pump heating

A circulation pump can be connected to the controller (see circuit diagram). If heating is required, the heating valve is opened by the controller and the circulation pump output is activated. Any pump connected must be inherently safe and block-proof.

Electrical connection with $V_{max} = 230 \text{ VAC}$ and $I_{max} = 2 \text{ A}$.

Enable circulating pump cooling

A circulation pump can be connected to the controller (see circuit diagram). When cooling is required, the control system opens the cooling valve and activates the „Circulation pump“ output. Any pump connected must be inherently safe and block-proof.

Electrical connection with $V_{max} = 230 \text{ VAC}$ and $I_{max} = 2 \text{ A}$.

3-way valve heating

Temperature control for the optional warm water heating coil, e.g. active heating to cover the heating demand by the ventilation system. Control output 3-position. Control output 230V.

3-way valve cooling

Temperature control for the optional cold water cooling coil, e.g. active outdoor air cooling by the ventilation system. Control output 3-position. Control output 230V.

Unit malfunction

If there is a unit malfunction, an error message appears on the display and at the same time switches a relay. A closing and opening signal is available (see wiring diagram). Electrical connection of the changeover contact with $U = 230 \text{ VAC}$ and $I_{max} = 2 \text{ A}$. (There is not any double insulation on the mains cables).

11.2.3. Interfaces

Control unit

The control unit is connected to the supply air unit's control system with a control cable.

A connector on the control cable is plugged directly into the socket on the control unit from beneath (see Fig. 13-1). On the unit, the control cable is first fed through a cable gland (see Fig. 11-1), placed in the cable duct and then connected to the RJ10 socket provided in the controller board. The control cable must not be shortened. Any excess length must be stowed outside of the housing. If the cable is too short, extensions can be ordered from the manufacturer or supplier. Alternatively, a 4-wire data cable with 120 Ohm resistance can also be connected. Max. cable length 100 m. This is fed through the back wall of the control unit and connected to the spring-loaded terminals. In the unit, instead of being connected to the controller board in the RJ10 socket, the cable is connected in the spring-loaded terminals next to it (see wiring diagram).

Modbus RTU

The communication interface with Modbus RTU protocol is already integrated as standard. The central building control system can be connected directly to the integrated interface via Modbus.

12. COMMISSIONING



Commissioning by trained technical personnel may only be performed after any risk has been ruled out. The following checks should be performed in accordance with the installation and operating manual and the regulations in force:

- Correctly sealed installation of the unit and duct system.
- Check the duct system, unit and medium lines, if present, remove any foreign bodies if necessary.

- The intake opening and inflow into the unit must be clear.
- Check all mechanical and electrical protection measures (e.g. earthing).
- Voltage, frequency and type of current must correspond with the rating plate.
- Check all electrical connections and wiring.
- Check any electrical, switching, safety and control devices connected.
- The unit may not be switched on when the housing is open.
- Measure electricity consumption at operating speed and compare with the rated current.
- Check the fan for excessive vibrations and noise generation.

13. OPERATION

13.1. Control unit

The control unit allows the selection and the command of various unit functions. A setpoint sensor for measuring the room temperature and humidity is integrated in the control panel. The display shows the various operating parameters and error messages. You can switch between displaying different menu points and make changes to your unit settings and values.

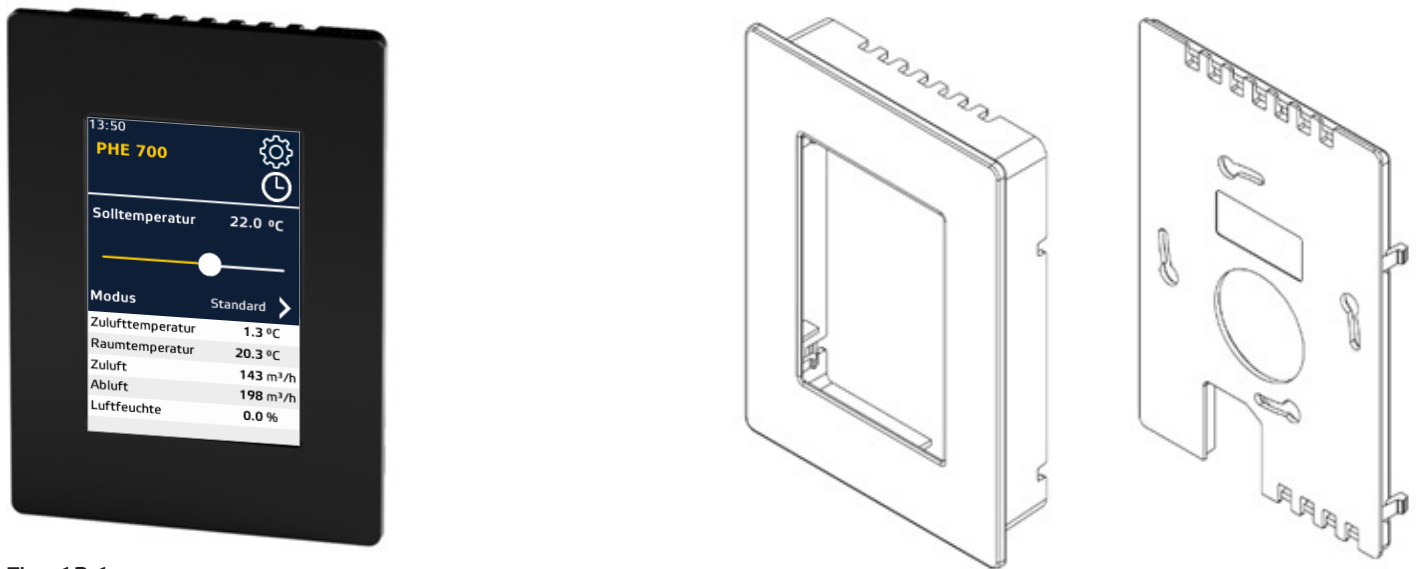
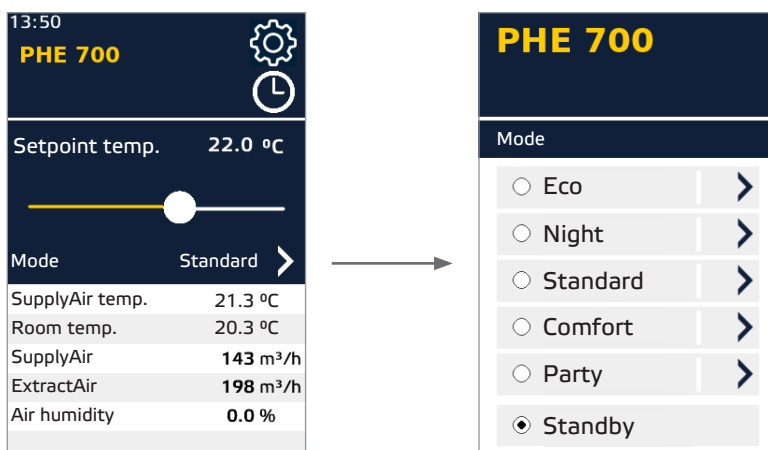


Fig. 13-1
Control unit

13.1.1. Mode selection

Preconfigured modes (Eco, Night, Standard, Comfort, Party) with flow rates, temperatures, sensor setpoints. In User 2 can only be selected the different modes, changes can only be made in User 3

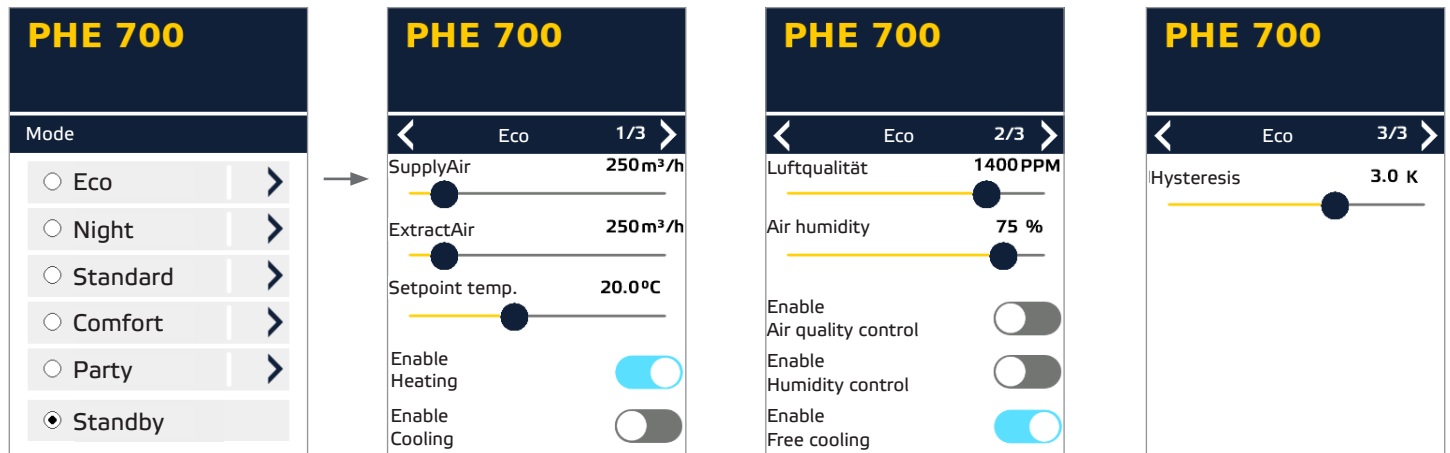


13.1.2. Adjust Mode setpoint

The setpoints for volume flow, temperature and demand-based control (with additional sensors) stored in the respective mode as well as permissions can be set here.

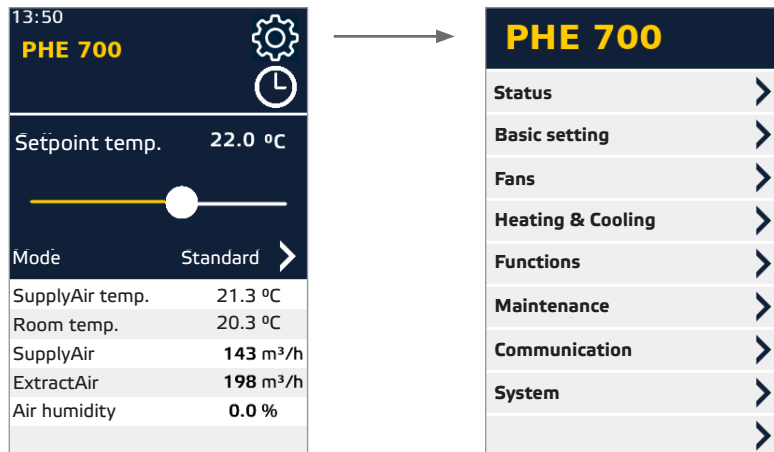
Can only be changed at user level „User 3“ or higher.

The setpoint value for the volume flow corresponds to the basic ventilation setting. This value is not exceeded in the set mode, but can be exceeded up to the maximum volume flow rate through demand-based control.



13.1.3. Main menu overview

Overview page with all relevant settings. This is opened by clicking on the cogwheel symbol.

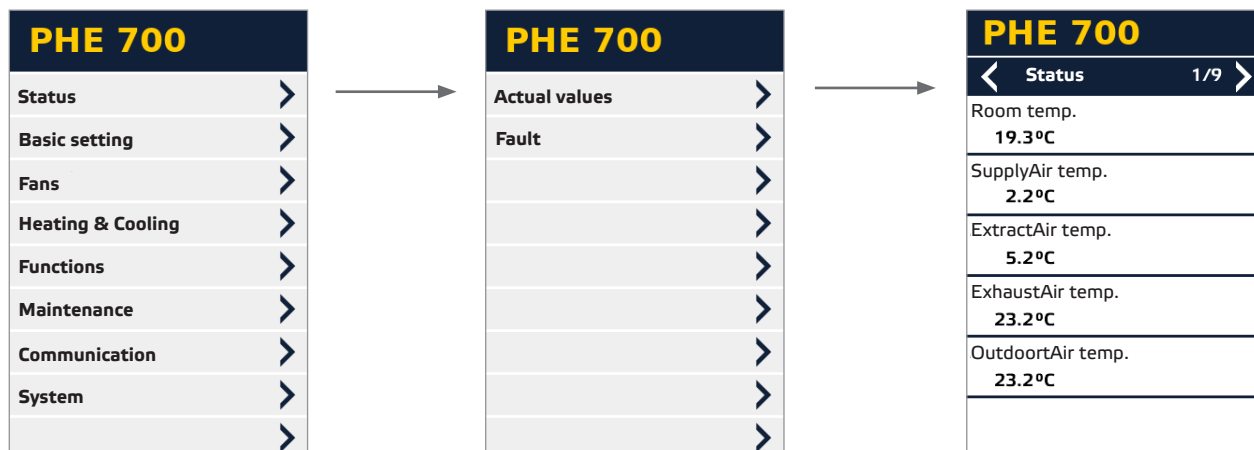


13.1.4. Status display actual values / Disruptions

All measured values and status of the inputs/outputs can be viewed under Settings/Status.

Display of the currently measured sensor values of the ventilation unit, as well as display of faults.

Visible for all user levels.



13.1.5. Basic settings

Under Settings/ Basic settings, the most important basic parameters such as unit type and minimum or maximum setpoints can be set.

Can only be changed at user level „Service“.

Individual unit parameters can only be set by the factory customer service.

PHE 700			PHE 700	
Status	>		< Basic setting	1/2 >
Basic setting	>	→	Control type	>
Fans	>		V-Control	
Heating & Cooling	>		Control type	>
Functions	>		SupplyAir temp.	
Maintenance	>		Type	>
Communication	>		ETA K	
System	>		Unit size	>
	>		700 HW	
	>			
	>			

13.1.6. Fan settings

All parameters related to the fans, such as control types, minimum and maximum volume flows or correction factors, can be set here.

Can only be changed at user level „Service“.

Individual unit parameters can only be set by the factory customer service.

PHE 700			PHE 700		PHE 700	
Status	>		< Fans	1/4 >	< Fans	2/4 >
Basic setting	>		Min Airflow Eco	>	Max Airflow Eco	>
Fans	>	→	200 m³/h		700 m³/h	
Heating & Cooling	>		Min Airflow Night	>	Max Airflow Night	>
Functions	>		200 m³/h		700 m³/h	
Maintenance	>		Min Airflow Standard	>	Max Airflow Standard	>
Communication	>		200 m³/h		700 m³/h	
System	>		Min Airflow Comfort	>	Max Airflow Comfort	>
	>		200 m³/h		700 m³/h	
	>		Min Airflow Party	>	Max Airflow Party	>
	>		200 m³/h		700 m³/h	
	>					
	>					

13.1.7. Heating & Cooling

Type of temperature control, heating/cooling mode and related control parameters can be set.

Can only be changed at user level „Service“.

Individual unit parameters can only be set by the factory customer service.

The parameters for ‘minimum cooling temperature’ and ‘maximum heating temperature’ are limit values for the supply air temperature.

PHE 700		PHE 700		PHE 700		PHE 700
Status >		< Heating & Cooling 1/3 >		< Heating & Cooling 2/3 >		< Heating & Cooling 3/3 >
Basic setting >		Min. temp. 16.0°C >		Control H: 0-10V + 230V >		P-share 10Cooling >
Fans >		Max. temp. 26.0°C >		Frost protection SupplyAir temp. >		I-share 10Cooling >
Heating & Cooling >	→	Hysteresis Min 1.0°C >		Frost protect.temp. 5.0°C >		Correct. SupplyAir 0.0°C >
Functions >		Hysteresis Max 4.0°C >		Pre-purge time 0sec >		Correct. ExtractAir 0.0°C >
Maintenance >		Min.temp. cooling 15.0°C >		P-share 10Heating >		Correction room 0.0°C >
Communication >		Max.temp. heating 40.0°C >		I-share 10Heating >		
System >						

13.1.8. Functions

Under Settings/ Functions all parameters for further functionality, such as air quality control with external sensor, overrun or automatic restart are accessible.

Can only be changed at user level „Service“.

Individual unit parameters can only be set by the factory customer service.

PHE 700		PHE 700
Status >		< Functions 1/5 >
Basic setting >		Autorestart Off >
Fans >		Autorestart mode Mode as before >
Heating & Cooling >		Auto operation Off >
Functions >	→	Auto operation mode LQ-Control >
Maintenance >		
Communication >		
System >		

Autorestart:

If Autorestart is activated, the unit switches back on automatically after a voltage drop. With the selection „Auto-restart Mode“ you can determine in which mode the unit starts..

Auto operation:

When Auto operation mode is activated, the unit automatically switches to Standard mode if the setpoint for the sensor set under „Auto operation mode“ is not reached.

Auto mode is activated outside the set operating times if one or more set threshold values of the sensor inputs are exceeded. When this function is activated, the device automatically switches to Standard mode. Up to three sensor values can be monitored (temperature, humidity, air quality).

14:16	
PHE 700	
 	
Setpoint temp.	26.0 °C
	
Mode	AUTO Standard >
SupplyAir temp.	21.3 °C
Room temp.	20.3 °C
SupplyAir	0 m³/h
ExtractAir	0 m³/h
Air humidity	52.6 %
Air quality	2205 PPM

When auto mode is active, the 'Auto' symbol appears on the home screen of the remote control unit.

PHE 700	
< Functions	2/5 >
Night cooling	Off >
NightCool.temp.	21.0°C >
NightCool.SupplyAir	300m³/h >
NightCool.ExtractAir	300m³/h >
Night cooling mode	Room temp. >
OutdoortAir sensor	Off >

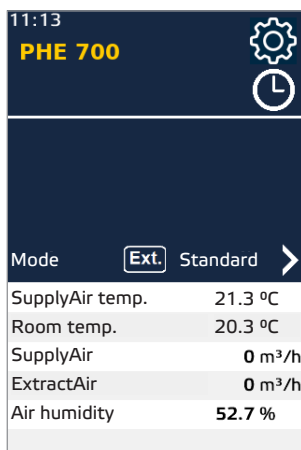
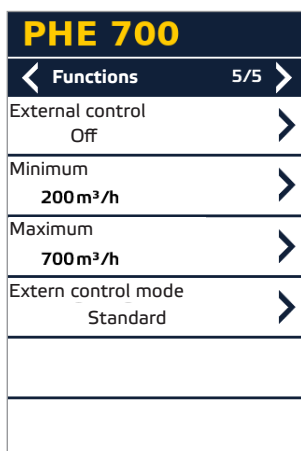
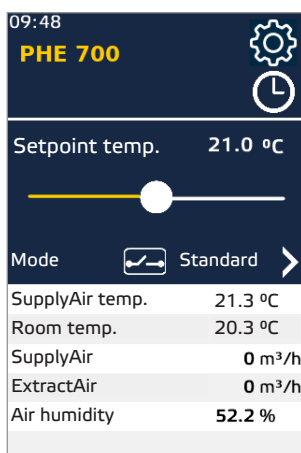
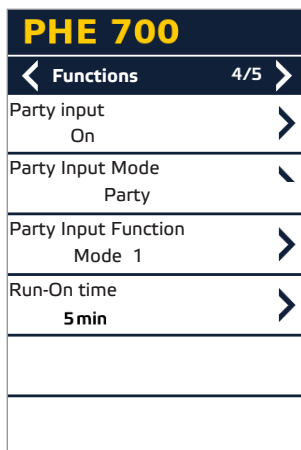
Night cooling:

The night cooling function is intended to save energy in the summer months. By using the cool air during the night hours, it is possible to cool down heated rooms. If the unit is in standby mode and the night cooling function is activated, it switches on for a few minutes every hour between 00:00 and 05:00 to check whether the room can be passively cooled. If this is the case, the system runs either until the setpoint is reached in the room or until 06:00 at the latest.

PHE 700	
< Functions	3/5 >
ExtractAir Qsensor	Off >
Minimum value 0V	0PPM >
Maximum value 10V	2000PPM >
ExtractAir rHsensor	Off >
Minimum value 0V	0% >
Maximum value 10V	100% >

Demand-led control according to air quality or humidity:

Activation of an external air quality sensor (CO₂, VOC) or humidity sensor and setting of the measuring range. The desired setpoints can be set in each mode.



Party Input:

If Party Input is activated, the unit switches to the operating mode set under „Party Input Mode“ after the external input „Motion Detector“ X15:6,7 is closed. If the contact is opened again, the unit switches back to the previously set mode after the overrun time has elapsed.

With the parameter „Party Input Function“, you can select whether the function should also be active when the system is in standby mode.

Mode 1 = Only active when the unit is already running.

Mode 2 = Additionally active when the unit is in standby mode.

While the motion detector contact is still closed or the follow-up time is active, the normally open contact symbol appears on the start page of the remote control unit.

External control:

When external control is activated, the setpoint for the volume flow is specified via an external 0-10V signal at input X15:3.9.

The parameter „External control mode“ can be used to select whether the mode can be selected manually or whether a fixed mode is always used.

When external control is activated, the symbol 'Ext.' appears on the start page of the remote control unit.

13.1.9. Maintenance

All settings related to the maintenance of the device can be made here, such as calibrating the filters and the maximum pressure loss of the filter. The set pressure loss corresponds to a contamination level of 100%.

Can only be changed at user level „Service“.

PHE 700	
< Functions 1/2 >	
Filter SupplyAir 1	>
Pressure measurement	
FilterCal.SupplyAir1	>
Off	
Pres.Sup.AirFilter1	>
75 PA	
Filter ExtractAir 1	>
Pressure measurement	
FilterCal.Extr.Air1	>
Off	
Pres.Extr.AirFilter1	>
75 PA	

13.1.10. Communication

Modbus communication parameters can be set here.

Can only be changed at user level „Service“.

PHE 700		PHE 700	
		< Communication 1/1 >	
Status	>	Modbus address	>
Basic setting	>	1	
Fans	>	Modbus baud rate	>
Heating & Cooling	>	9600	
Functions	>	Parity	>
Maintenance	>	NO 1 Stop Bit	
Communication	>		
System	>		
	>		

13.1.11. System settings

Permissions, language settings, display settings, time and unit name can be set.

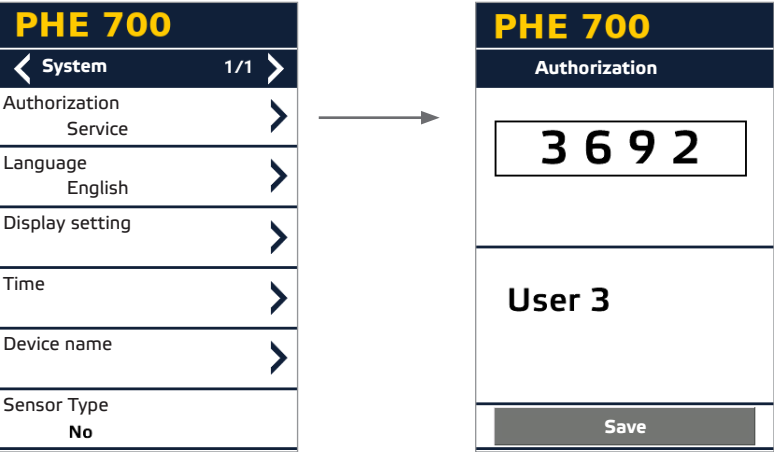
Can only be changed at user level „Service“.

Individual unit parameters can only be set by the factory customer service.

PHE 700		PHE 700	
		< System 1/1 >	
Status	>	Authorization	>
Basic setting	>	Service	
Fans	>	Language	>
Heating & Cooling	>	English	
Functions	>	Display setting	>
Maintenance	>	Time	>
Communication	>	Device name	>
System	>	Sensor Type	>
	>	No	

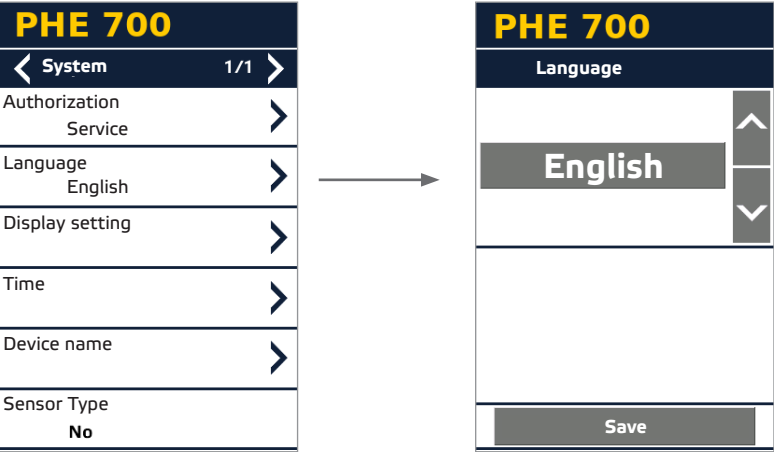
13.1.12. User levels

Four different user levels available (default user 3).



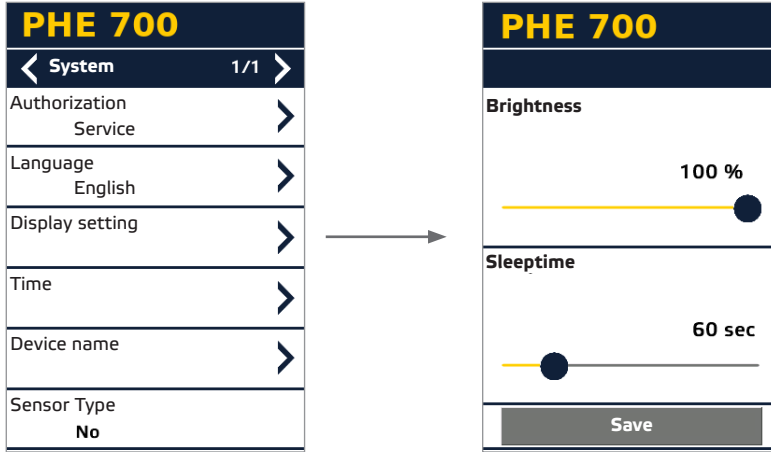
Authorization	Password	Explanation
User 1	1111 or any other number	■ Settings are possible only in the timer. ■ Cannot make settings in the mode or in the settings menu. Cannot change the set mode.
User 2	2222	■ Settings are possible only in the timer. ■ Cannot make settings in the mode or in the settings menu. Can change the set mode.
User 3	3692	■ Can make settings in the timer and mode. ■ Can change the set mode. ■ Cannot make settings in the settings menu.
Service	4826	■ Can make settings in the timer and mode. ■ Can change the set mode. ■ Can make settings in the settings menu.

13.1.13. Language selection



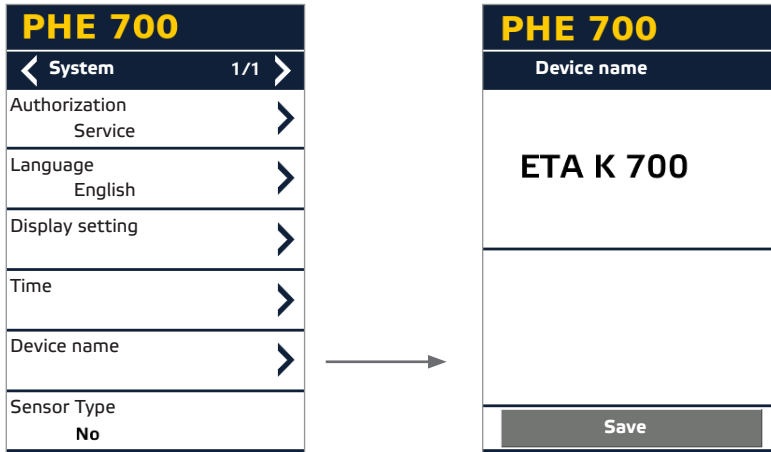
13.1.14. Display setting

Display brightness and stand-by time can be set.



13.1.15 Device name

Device name can be set.

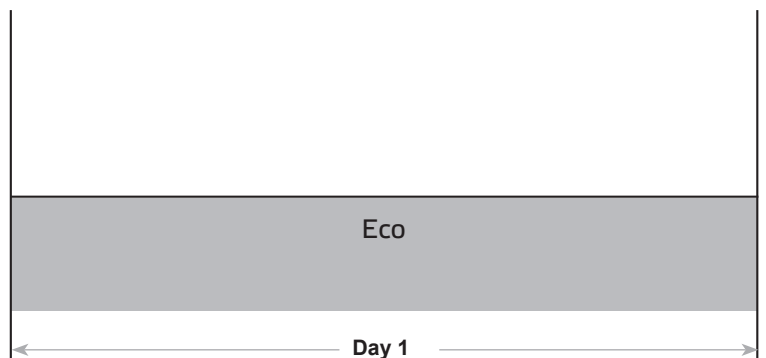
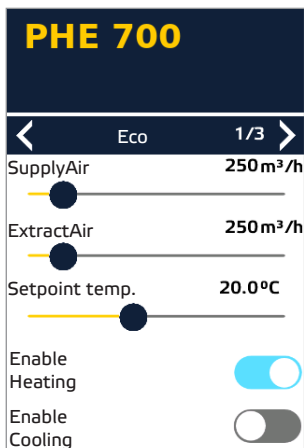


13.2. Fan control types

The fan control mode can be changed in the main menu under Basic settings. The following types of control are possible.

Constant volume flow control (V-Control)

A constant volume flow rate can be set separately for supply and extract air. This control mode is preset for the unit in the delivery state.



CO2-controlled volume flow control

CO2-controlled air quality control is possible via a room or duct sensor with a 0-10V output.

PHE 700	
< Functions 3/5 >	
ExtractAir Qsensor	>
Off	
Minimum value 0V	>
0PPM	
Maximum value 10V	>
2000PPM	
ExtractAir rHsensor	>
Off	
Minimum value 0V	>
0%	
Maximum value 10V	>
100%	

With the parameter minimum value 0V and maximum value 10V, the measuring range of the sensor used must be set to 0-10V.

(Factory setting CO2 sensor: 0 – 2000PPM → 0 – 10V)

PHE 700	
< Eco 1/3 >	
SupplyAir	250m³/h
ExtractAir	250m³/h
Setpoint temp.	20.0°C
Enable Heating	☒
Enable Cooling	☐

PHE 700	
< Eco 2/3 >	
Luftqualität	1400PPM
Air humidity	75 %
Enable Air quality control	☐
Enable Humidity control	☐
Enable Free cooling	☒

PHE 700	
< Fans 2/4 >	
Max Airflow Eco	>
700m³/h	
Max Airflow Night	>
700m³/h	
Max Airflow Standard	>
700m³/h	
Max Airflow Comfort	>
700m³/h	
Max Airflow Party	>
700m³/h	

If air quality control or humidity control is activated, the set volume flow is also the minimum volume flow for this mode.

The maximum volume flow in this mode can be set in the Fans section on the second page according to the mode.

If the actual CO2 value is below the setpoint value, the air volume is calculated from the ratio of the actual value to the setpoint value, based on the maximum set volume flow.

If the measured CO2 level is above the set setpoint value, the device runs at the maximum set air flow rate.

Humidity-guided volume flow control

For humidity-controlled regulation, an external humidity sensor can be installed in the extract air duct or in the room.

If no external humidity sensor is activated and connected, the measured humidity is used and displayed in the control panel as a control variable.

If the measured humidity is below the setpoint, the unit runs with the minimum set air volume. If the measured humidity rises above the setpoint, the control system increases the air volume to the maximum volume flow in order to reduce the humidity in the room back to the setpoint.

Not possible in conjunction with P-Control.

External volume flow control

With external volume flow control, the air volume is controlled by an external 0-10V signal. The preset volume flow is changed proportionally to the external signal. At 2 V control voltage, the set minimum volume flow is supplied, at 10 V the maximum volume flow. If the control voltage is less than 1.5 V, the unit is switched off.

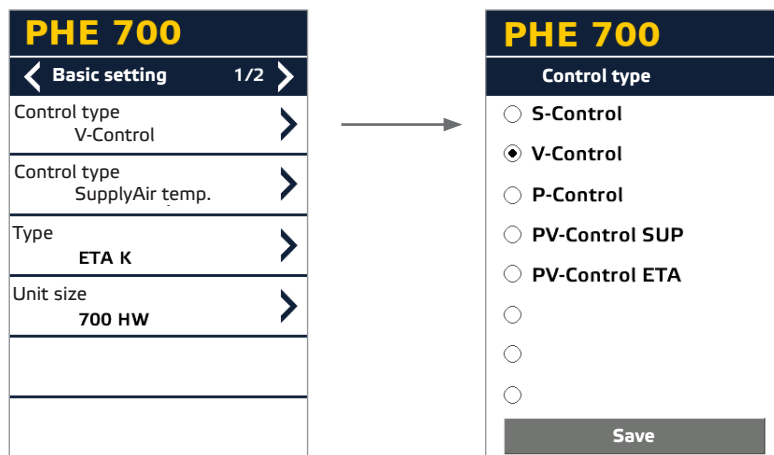
Constant pressure control P (P-Control)

The constant pressure control P-Control is designed for operation of the ventilation unit with variable air flow rates through individual volume flow controllers. The desired pressure setpoint for supply air and extract air can be set on the

control unit. Two SEN P pressure sensors are required as accessories for this operating mode. The air volume balance of the supply air and extract air strings is not balanced by the control. For the P-Control operation mode, the use of a heating coil is recommended.

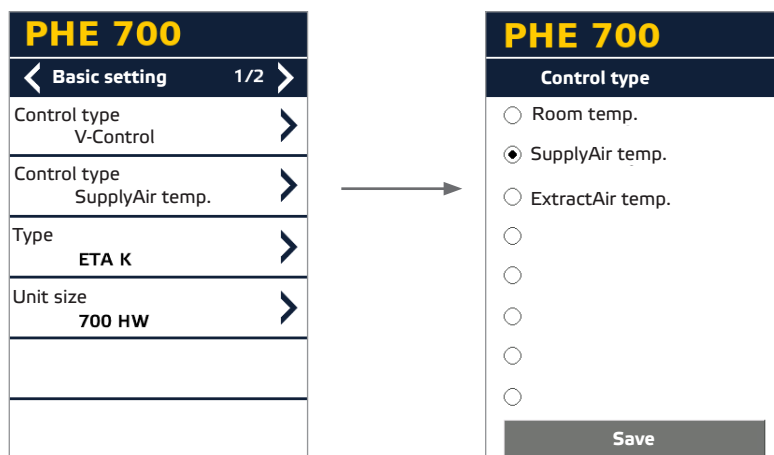
Constant pressure control PV (PV-Control SUP / PV-Control ETA)

The constant pressure control PV is a pressure control with balanced air volume. This is especially designed for airtight low-energy buildings with variable air performance through individual volume flow controllers. The control of the ventilation unit automatically balances the air volume when areas are switched on or off. If the control mode PV-Control SUP is set, the supply air pressure is specified and the extract air volume flow is adjusted; if the control mode PV-Control ETA is set, the extract air pressure is specified and the supply air volume flow is adjusted. One SEN P pressure sensor is required as an accessory for this operating mode. Feedback from volume flow controllers to the unit is not required.



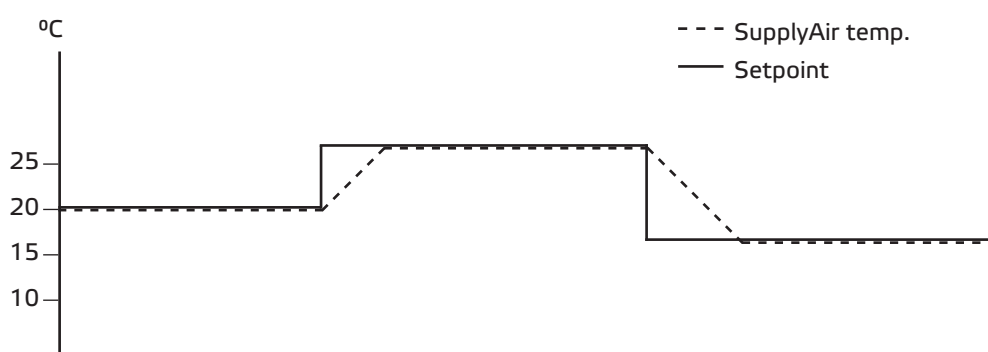
13.3. Temperature control modes (supply air, extract air or room temperature control).

The temperature measured at the sensors is compared with the setpoint temperature. The deviation between the setpoint and actual temperature causes an increased or reduced heating power. The desired control mode can be selected under Settings/Heating & Cooling.



Supply air temperature control

External heat occurring in the room is not taken into account in the supply air temperature control. The supply air temperature is fixed.

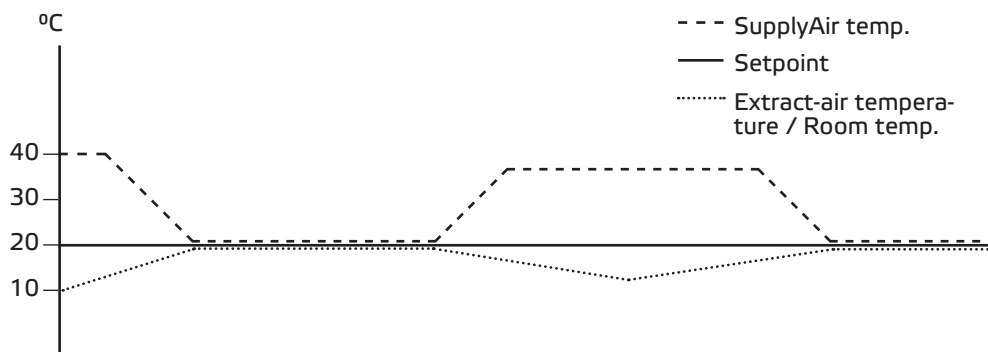


Extract air temperature control

External heat occurring in the room is compensated by correcting the supply air temperature.

Room temperature control

External heat occurring in the room is compensated by correcting the supply air temperature. The temperature sensor is integrated in the remote control unit.



13.4. Time and schedules

The time can be set and is maintained even in the event of an interruption in the input voltage.

PHE 700

< System 1/1 >

Authorization Service >

Language English >

Display setting >

Time >

Device name >

Sensor Type No

→

PHE 700

Time

Day dd . mm . yyyy
11 . 10 . 2022

+1 +1 +1
-1 -1 -1

Time hh : mm
10 : 54

+1 +1
-1 -1

Save

Schedules with up to 6 changes of mode per day - individually for 7 days of the week.

13:50

PHE 700

Setpoint temp. 22.0 °C

Mode Standard >

SupplyAir temp. 21.3 °C

Room temp. 20.3 °C

SupplyAir 143 m³/h

ExtractAir 198 m³/h

Air humidity 0.0 %

→

PHE 700

Daytime timer >

☐ Active

→

PHE 700

Monday >

SP 1 Not Set >

SP 2 Not Set >

SP 3 Not Set >

SP 4 Not Set >

SP 5 Not Set >

SP 6 Not Set >

→

PHE 700

Switching point

Party Not Set

Standby

00 : 00

+1 +5
-1 -5

Save

13.4.1. Switch on/off with schedule

Schedules can be used to switch the ventilation unit on and off at specific times.

13:50
PHE 700

Setpoint temp. 22.0 °C

Mode Standard

SupplyAir temp. 21.3 °C
Room temp. 20.3 °C
SupplyAir 143 m³/h
ExtractAir 198 m³/h
Air humidity 0.0 %

PHE 700

Daytime timer
☐ Active

PHE 700

< Wednesday >

SP 1
04:00 Standard

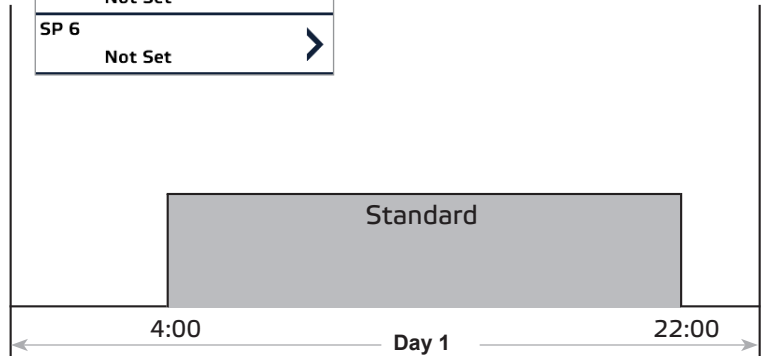
SP 2
22:00 Standby

SP 3
Not Set

SP 4
Not Set

SP 5
Not Set

SP 6
Not Set



09:47
PHE 700

Setpoint temp. 23.0 °C

Mode Standard

SupplyAir temp. 21.3 °C
Room temp. 20.3 °C
SupplyAir 0 m³/h
ExtractAir 0 m³/h
Air humidity 51.8 %

If the device mode has been changed by the timer, the clock symbol appears on the display of the remote control unit.

13.4.2. Night setback

For the night setback function, the „Night“ mode can be selected in the schedules. In this, the volume flow for basic ventilation is set as the default setting. The volume flows for supply air and extract air can basically be lowered or increased. In addition, the setpoint temperature can be adjusted if required. The night cooling function is particularly suitable for energy-saving operation of the ventilation unit with reduced volume flow, or for free cooling with increased volume flow in the summer months.

13:50
PHE 700

Setpoint temp. 22.0 °C

Mode Standard

SupplyAir temp. 21.3 °C
Room temp. 20.3 °C
SupplyAir 143 m³/h
ExtractAir 198 m³/h
Air humidity 0.0 %

PHE 700

< Wednesday >

SP 1
04:00 Standard

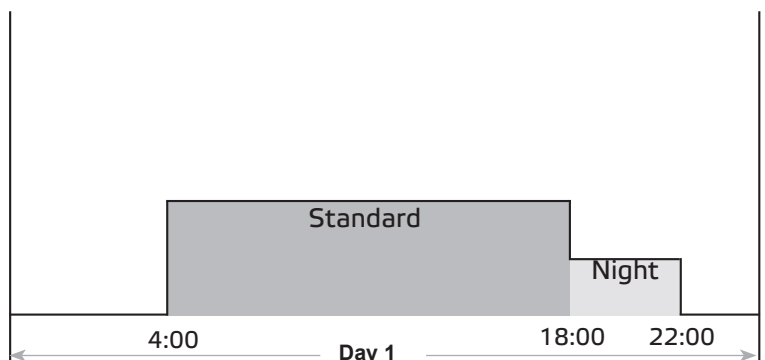
SP 2
18:00 Night

SP 3
22:00 Standby

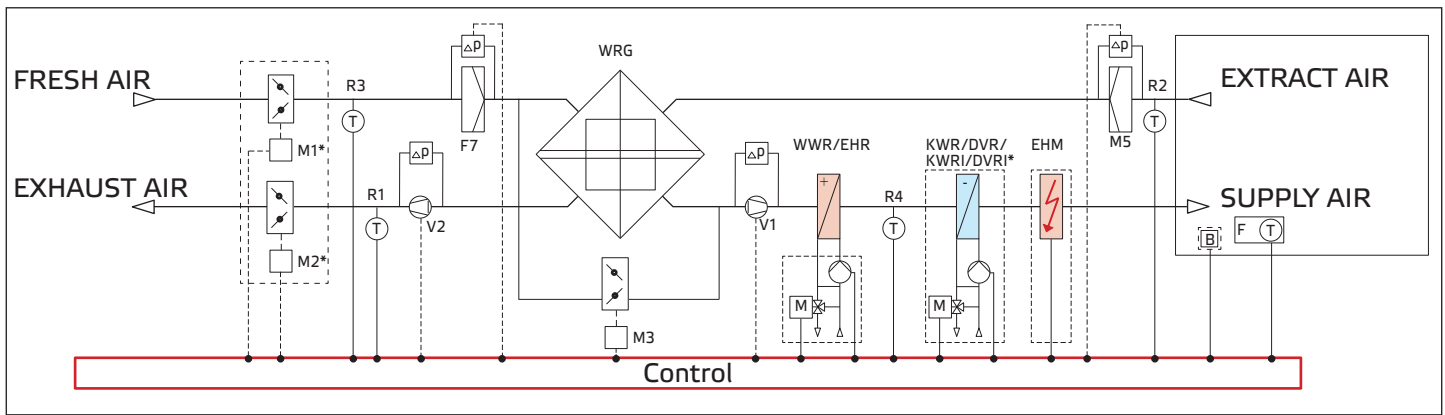
SP 4
Not Set

SP 5
Not Set

SP 6
Not Set



13.5. Connection diagram



M1 - M2*	Flap system drive
V1 - V2	EC-fan
M5/ F7	Air filter Class ISO ePM10 (M5) / ISO ePM1 (F7)
WRG	Heat exchanger
M3	Bypass Actuators Damper system
WWR	Warm water heating coil
EHR	Electric heating element (Version 700,1300,1700 ...E)
EHM	Electric heater (Version 2500, 2800, 3500 ...E)
KWR*/KWRI*	Cold water cooling coil
DVR*/DVRI*	Direct evaporator
M	3-way valve with actuator
⊙	Temperature sensor
⊙ ⊙	Remote control with room temperature sensor
⊙ *	Fire detector

*Optimal depending on the type.

Fig. 13-2
Connection diagram

13.6. Functions

13.6.1. Fan error message contact

Each motor has an error message contact which is closed during fan operation. The unit switches off when the contact opens. After correction of the fault (see Fault diagnosis chart), the unit can then be restarted.

If a fault occurs regarding the fans, the device will switch off, and an error message will be displayed. To reset the fan, the electricity supply must be switched off at the main switch for at least 20 s.

13.6.2. Hot water coil / frost protection

The power of the hot water coil is steplessly regulated with the heating valve. An installed heating coil is protected against icing by temperature monitoring or by an optional frost protection thermostat. If the supply air temperature drops below the temperature set on the anti-freeze controller, the valves close and the circulating pump runs constantly, the heating valve opens and a fault message is given. The device automatically runs „PRE-RINSING“ until heating provides the desired operation temperature. The unit restarts then automatically. If the desired operating temperature cannot be achieved after 20 min., an error message is displayed. Afterwards, the unit turns itself completely off until the fault is repaired. (see Error table F7)

14:54	
PHE 700	 
Setpoint temp.	22.0 °C
	
Mode	 Standard >
SupplyAir temp.	21.3 °C
Room temp.	20.3 °C
SupplyAir	0 m³/h
ExtractAir	0 m³/h
Air humidity	53.3 %

When the device is in pre-rinse mode, the snowflake and lock symbols appear on the display of the remote control unit. The pre-rinse mode is activated if the contact for the frost protection thermostat is open or if the temperature of the supply air has fallen below the frost protection temperature.

13.6.3. Safety temperature limiter for types with electrical heating coil

PHE 700 F E / PHE 1300 F E / PHE 1700 F E



● Electricity warning (hazardous voltage)!

» Failure to observe the hazard may result in death, injury or damage to property.

→ Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.

Depending on the type and in case of a fault, the safety temperature limiter (STL) switches off the electrical heating coil when the temperature reaches 75 °C. Once the safety temperature limiter has been tripped, it has to be reset manually (see Fig. 13-3/4). Before resetting the STL and reinstalling the electrical heating coil, the cause for tripping of the STL needs troubleshooting and debugging.

Fig. 13-3
Position reset button STL
PHE 700 F E (2 STB)

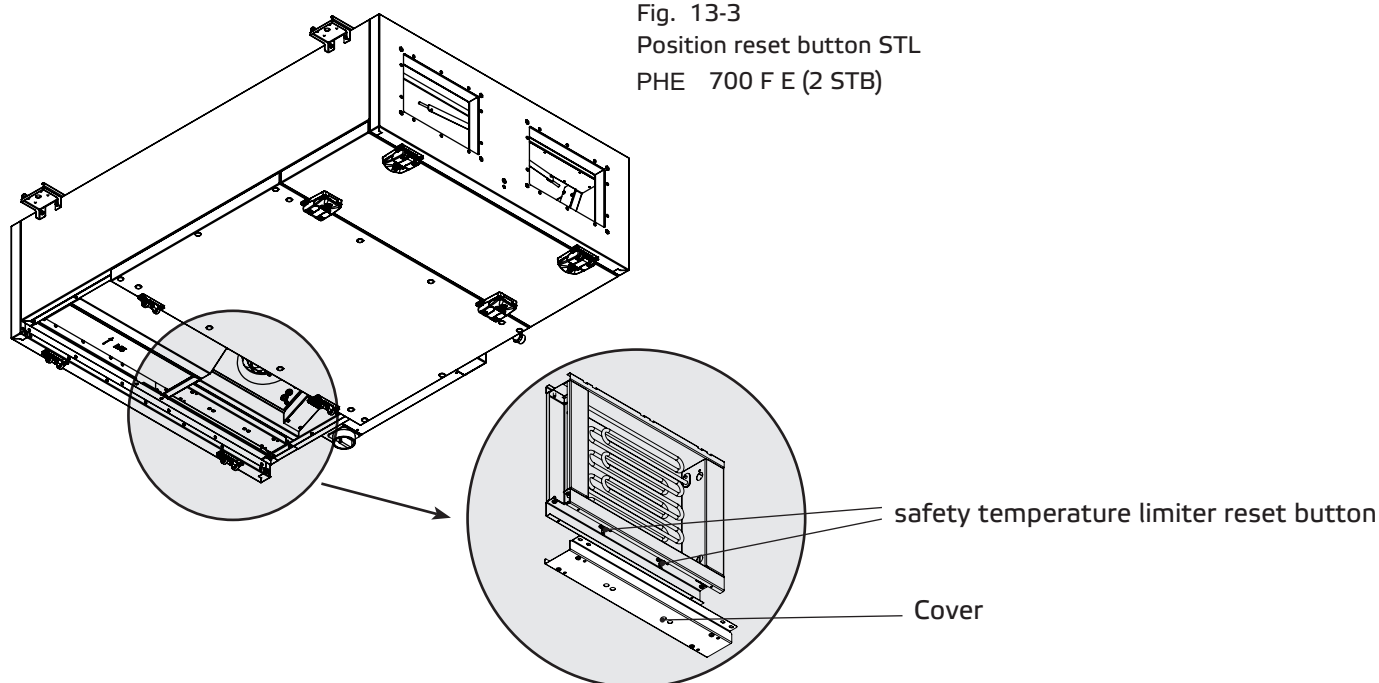
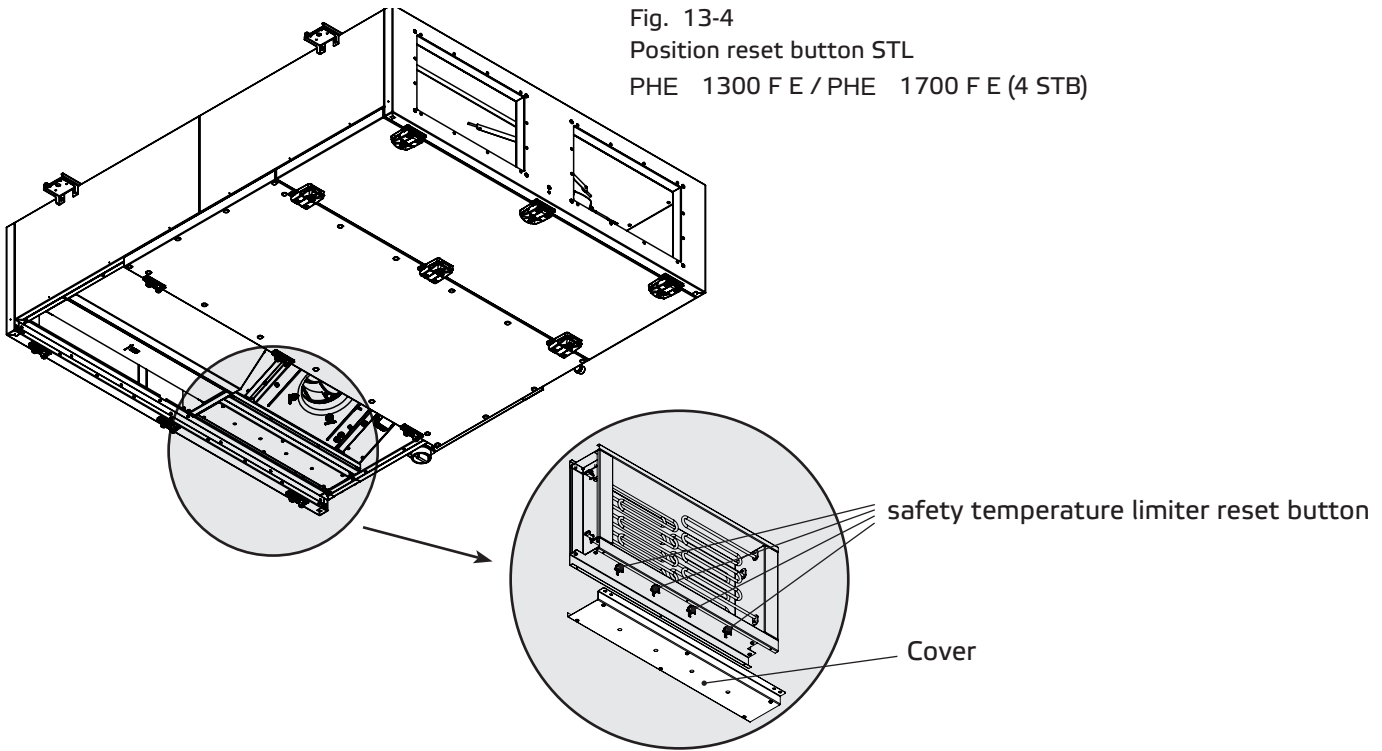


Fig. 13-4
Position reset button STL
PHE 1300 F E / PHE 1700 F E (4 STB)



CAUTION: Tripping of the STL indicates no direct error message. (Possibly in conjunction with error F18.)

Possible cause for tripping of the STL:

- Regulation fault
- Relay fault
- Supply air fan failure
- Air duct is blocked

13.6.4. For version with electric heating module (EHM)

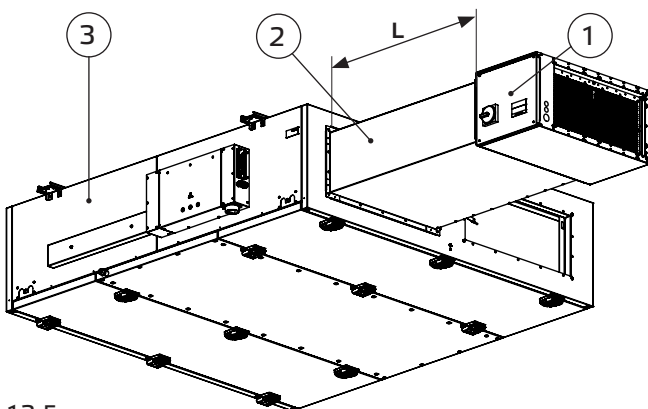
PHE 2500 F E / PHE 2800 F E / PHE 3500 F E

PHE 2500 ... F E is fitted with an external electric heating module.

Air connections

When installing a heating module, the following must be observed:

- For the duct diameter transition, accessories are used.
- Fasten transition piece to the housing (Rotoline) with 4 hexagon-head bolts (M8x20).
- The heating module must maintain a minimum distance (L) of between 0.50m and 4.00m from the air handling unit.



- (1) Heating module
- (2) Air duct
- (3) Air handling unit

Fig. 13-5
Connection EHM to device

Electrical connection



- Electricity warning (hazardous voltage)!
 - » Failure to observe the hazard may result in death, injury or damage to property.
 - Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.

The electrical installation may only be carried out by qualified electricians in compliance with the installation, operating and maintenance instructions and the applicable national regulations, standards and guidelines:

- ISO, DIN, EN and VDE specifications, including all safety requirements.
- Technical connection conditions.
- Safety at work and accident prevention requirements.

This list does not claim to be complete.

Requirements should be applied under one's own personal responsibility.

- The electrical connections must be made as shown in the corresponding wiring diagrams and terminal diagrams.
- The type of cable, size of cable and method of laying should be determined by an authorized electrician.
- Low and extra-low voltage cables should be laid separately.
- If no repair switch is integrated in the device, an all-pole mains disconnecting switch with min. 3 mm contact opening must be provided in the supply line.
- Use a separate cable inlet for each cable.
- Any cable inlets that are not used must be sealed so that it is airtight.
- All cable inlets must have strain relief.
- Create equipotential bonding between the unit and the duct system.
- Check all protective measures after the electrical connection work (earthing resistance, etc.)

Connection compartment / Connections on the unit

The connection compartment is inside the unit. You must first remove the side cover from the unit. Each lead that is connected must pass through a separate cable gland. The cable glands can be on either the left or the right side of the unit. Use the cable glands and fittings supplied for this purpose.

Unit supply cable

Connect the mains supply cable as shown in the wiring diagram. For the dimensioning of the line, observe the unit's rating plate and the relevant guidelines. Suitable fuse protection should be provided. A qualified electrician must determine the necessary fuse requirements.

Low voltage control leads must be installed so that they are separated from mains leads.

Control unit

First use the control cable (1) supplied with the heating module to connect the air handling unit (4) to the heating module (3). Connect the surplus control cable (2) from the air handling unit to the second RJ10 socket on the control board of the heater module (3). Then connect the other end of the control cable directly from below to the RJ10 socket on the control unit. The control cable must not be shortened. Any excess length must be stowed outside of the housing. If the cable is too short, extensions can be ordered from the manufacturer or supplier.

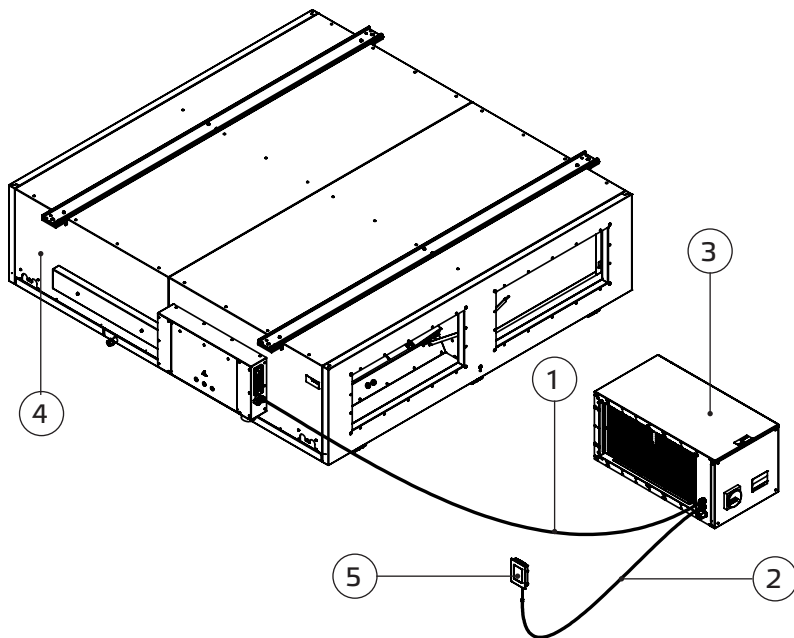


Fig. 13-6
Connecting the control unit to the heating module

Commissioning



● Electricity warning (hazardous voltage)!

» Failure to observe the hazard may result in death, injury or damage to property.

→ Before performing any work on conductive parts, always disconnect the unit completely from the electricity supply and make sure that it cannot be switched back on again.



● Caution! Burning hazard.

» Failure to observe the hazard may result in personal injury and/or damage to property.

→ Do not touch the surface until the motor and heater have cooled.

Commissioning by trained technical personnel may only be performed when any risk has been ruled out. The following checks should be performed in accordance with the installation and operating manual and the regulations in force:

- Correctly sealed installation of the unit and duct system.
- Check the duct system, unit and medium lines, if present, remove any foreign bodies if necessary.
- The intake opening and inflow into the unit must be clear.
- Check all mechanical and electrical protection measures (e.g. earthing).
- Voltage, frequency and type of current must correspond with the rating plate.
- Check all electrical connections and wiring.
- Check any electrical, switching, safety and control devices connected.
- The unit may not be switched on when the housing is open.

Operation

Heating module display

When the heating module is correctly connected, a symbol appears in the control unit display.

08:52			
PHE 700			
Mode	Standard	>	
SupplyAir temp.	21.3 °C		
Room temp.	20.3 °C		
SupplyAir	0 m³/h		
ExtractAir	0 m³/h		
Air humidity	60.3 %		

14. MAINTENANCE AND CLEANING



Servicing, troubleshooting and cleaning may only be performed by specialised personnel in accordance with this installation and operating manual and the regulations in force.



- Make sure that no connections or components are loosened unless the device is disconnected from the mains. Make sure that the equipment cannot be switched back on again.



- Individual components must not be interchanged. For example, the components intended for one product may not be used for other products.



- The regular maintenance and care of our devices is designed to ensure proper function, value retention and avoidance of damage. Keep a maintenance log.

- Perform the specified maintenance on the unit at the specified intervals.

Our devices require little maintenance when operated properly.

The following work should be performed at regular intervals, in accordance with health and safety regulations:

- Check the operation of the control system and safety devices.
- Check electrical connections and wiring for damage.
- Remove any dirt from the fan impeller or impellers and from inside the fan housing in order to prevent any unbalance or reduction in output.
 - Do not use aggressive or easily flammable products for cleaning (impellers/housing).
 - Preferably only water (not flowing water) or mild soapsuds should be used.
 - The impeller should be cleaned with a cloth or brush.
 - Never use a high-pressure cleaner.
 - Balancing clips must not be moved or removed.
 - The impeller and fittings must not be damaged in any way.
- Check the operation of the bearing with a visual inspection and by checking running noise.
- Check the unit for leaks on the air side.
- Check the correct running of the counter cross-flow heat exchanger.

Before putting the unit back into operation after maintenance and servicing work, carry out a visual inspection as described in section 11. and 12.

14.1. Counter cross-flow heat exchanger

Counter cross-flow heat exchangers generally require no maintenance. For hygienic reasons, cleaning of the exchanger is occasionally recommended. Damage to the blades should always be avoided. Use warm, flowing water for cleaning.

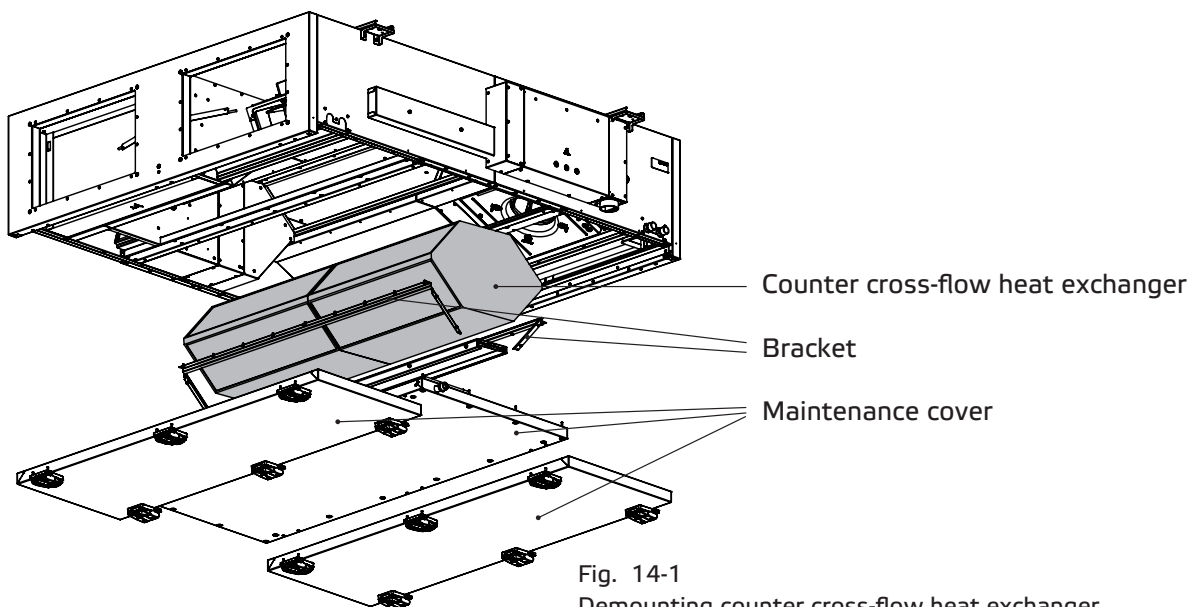


Fig. 14-1
Demounting counter cross-flow heat exchanger

14.2. Air filters

To ensure that the air filter is changed correctly, proceed as follows:

- The air filter can be removed without the use of tools.
- The air filter should be replaced if severely clogged.
- When changing the filter, make sure that the filter frame is sitting correctly on the guide rail in the device.
- Finally, the filter display should be reset and the new air filter calibrated.

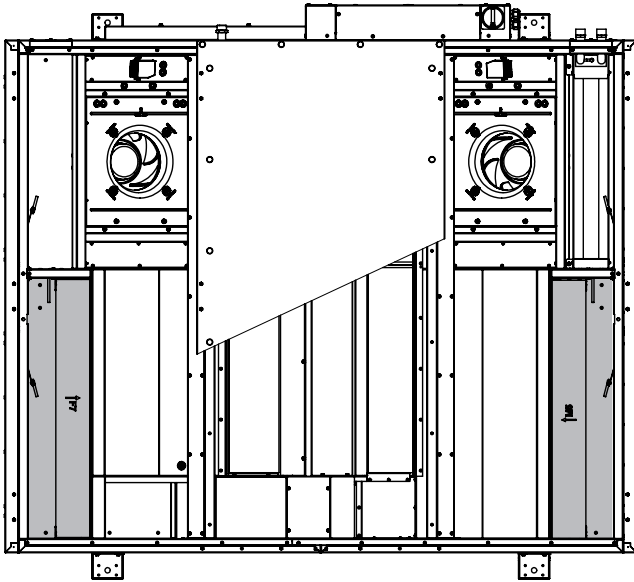
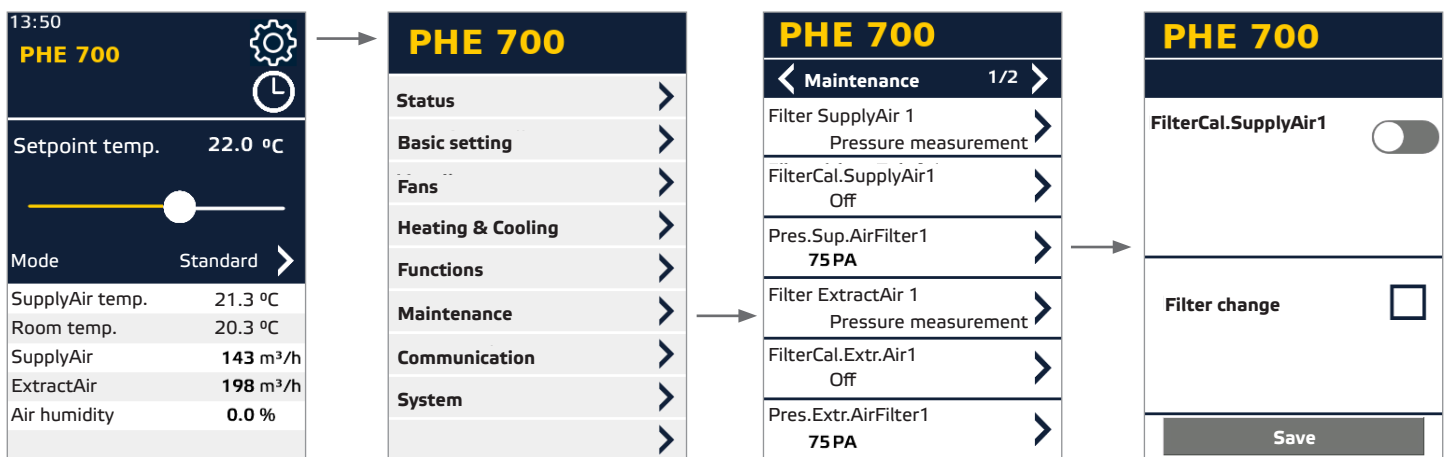


Fig. 14-2
Position air filter

Calibrate filter

The differential pressure increases as one of the air filters becomes more clogged. When the pressure reaches the value set on the corresponding pressure sensor, this can be seen on the status display. The filter must be changed when the level of clogging reaches 100%. The device must be recalibrated under the menu item Maintenance/ Calibrate filter.



14.3. Changing the battery

Change the battery as follows:

- Remove the control cable (1) from the control unit.
- Open the control unit by removing the cover (2).
- The holder (3) for the battery is on the board. Take the battery out and replace it with a new one, as shown in the image.
- The control unit can now be closed again and the control cable connected again.
- You only have to reset the current time. The battery symbol disappears from the status display. Your control unit is fully functional again.

Note: requires a 3 V lithium CR 1220 button cell battery.

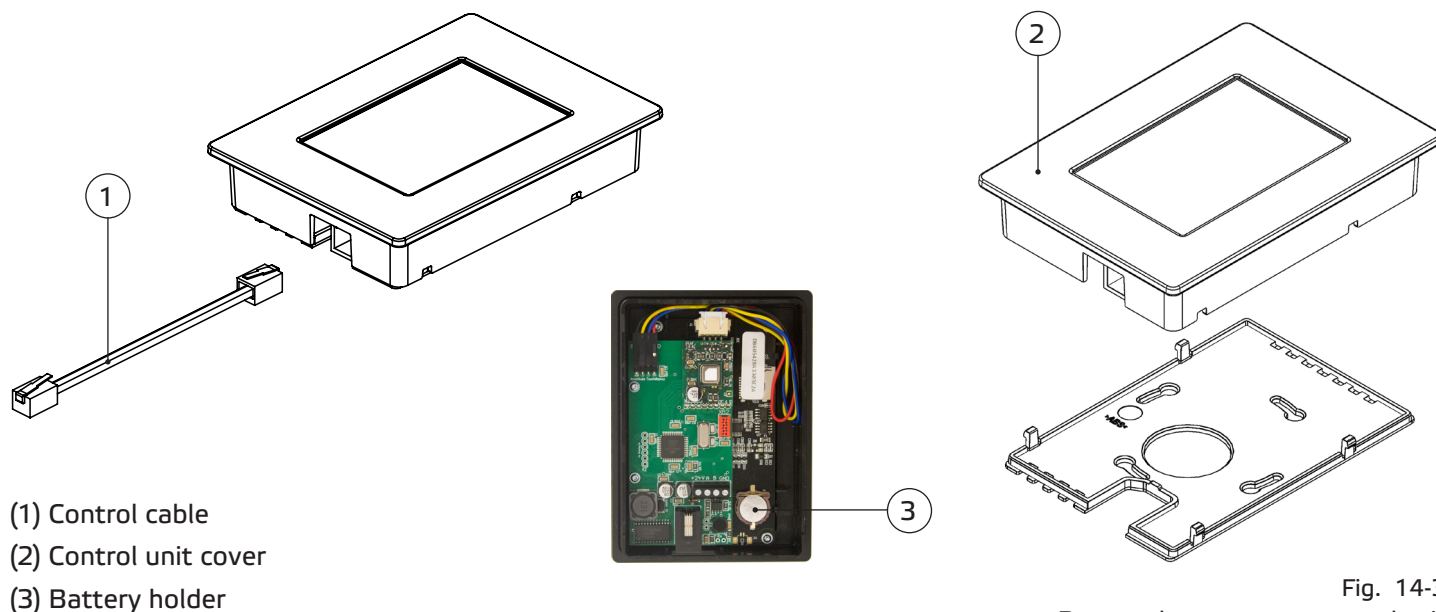


Fig. 14-3
Battery change remote control unit

15. MODBUS COMMUNICATION INTERFACE

15.1. Wiring diagram

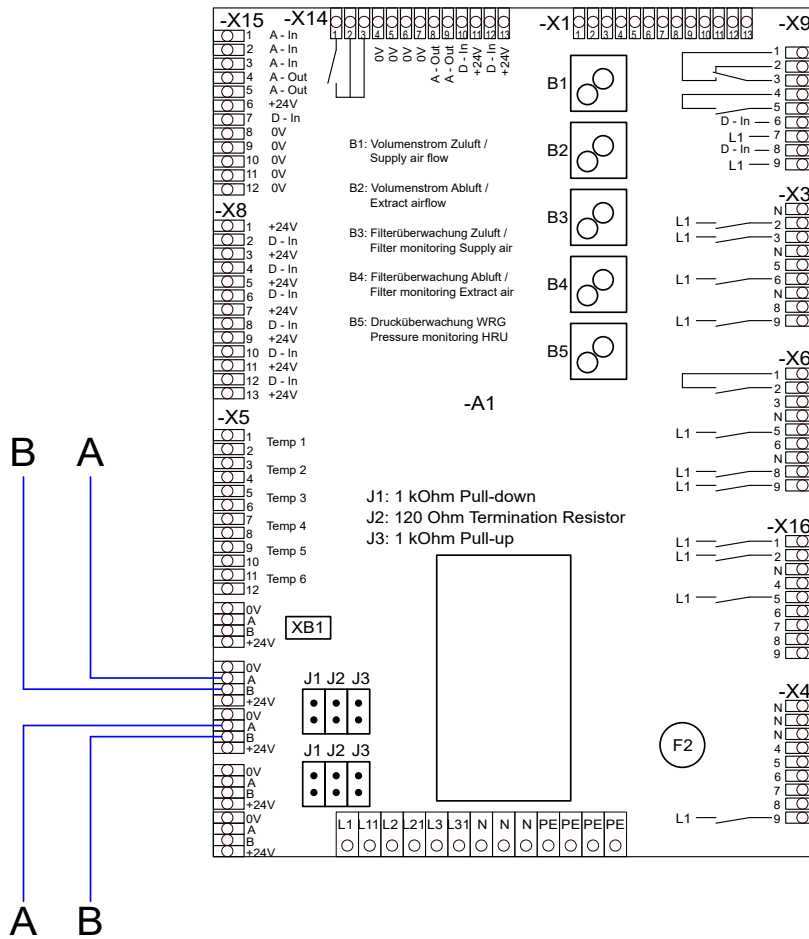


Fig. 15-1
Connection diagram ModBus

15.2. Interface information

The device works as a Modbus RTU slave. The interface configuration is 8N1, 9600Baud, slave address 1. The address and the baud rate can be set via parameters P7 and P8. As bus line is recommended a twisted pair data cable with 120 Ohm impedance.

15.3. Functions implemented

Function code	Name	Description
03 Hex	Read Hold Register	Read device parameter
04 Hex	Read Input Register	Read current value
06 Hex	Write Single Register	Write device parameter word by word
10 Hex	Write Multiple Register	Write several device parameters word by word

Function code	Name	Sub-function	Description
08 Hex	Return Query Dat	00	Send the received message back
08 Hex	Restart Communications	01	Restart communication
08 Hex	Force Listen Only Mode	04	Switch to listen-only mode

15.4. Parameter table

Register address	Protocol address	Parameter name		Value range	Data type	Authority
40101	100	Reserved			integer	R/W
40110	109	Operating mode		0 - 5 (0 = Standby, 1 = Eco, 2 = Night, 3 = Standard, 4 = Comfort, 5 = Party)	integer	R/W
40111	110	Set-point temperature 1	Eco	Parameter 232 - 233	integer	R/W
40112	111	Set-point temperature 2	Night	Parameter 232 - 233	integer	R/W
40113	112	Set-point temperature 3	Standard	Parameter 232 - 233	integer	R/W
40114	113	Set-point temperature 4	Comfort	Parameter 232 - 233	integer	R/W
40115	114	Set-point temperature 5	Party	Parameter 232 - 233	integer	R/W
40116	115	Reserved			integer	R/W
40117	116	Hysteresis 1	Eco	Parameter 234 - 235	integer	R/W
40118	117	Hysteresis 2	Night	Parameter 234 - 235	integer	R/W
40119	118	Hysteresis 3	Standard	Parameter 234 - 235	integer	R/W
40120	119	Hysteresis 4	Comfort	Parameter 234 - 235	integer	R/W
40121	120	Hysteresis 5	Party	Parameter 234 - 235	integer	R/W
40122	121	Reserved			integer	R/W
40123	122	Set point humidity 1	Eco	40 - 80%	integer	R/W
40124	123	Set point humidity 2	Night	40 - 80%	integer	R/W
40125	124	Set point humidity 3	Standard	40 - 80%	integer	R/W
40126	125	Set point humidity 4	Comfort	40 - 80%	integer	R/W
40127	126	Set point humidity 5	Party	40 - 80%	integer	R/W
40128	127	Reserved			integer	R/W
40129	128	Target air quality 1	Eco	600 - 1600 PPM	integer	R/W
40130	129	Target air quality 2	Night	600 - 1600 PPM	integer	R/W
40131	130	Target air quality 3	Standard	600 - 1600 PPM	integer	R/W
40132	131	Target air quality 4	Comfort	600 - 1600 PPM	integer	R/W
40133	132	Target air quality 5	Party	600 - 1600 PPM	integer	R/W
40134	133	Reserved			integer	R/W
40135	134	Set point volume supply air 1	Eco	Parameter 220 - 226	integer	R/W
40136	135	Set point volume supply air 2	Night	Parameter 221 - 227	integer	R/W
40137	136	Set point volume supply air 3	Standard	Parameter 222 - 228	integer	R/W
40138	137	Set point volume supply air 4	Comfort	Parameter 223 - 229	integer	R/W
40139	138	Set point volume supply air 5	Party	Parameter 224 - 230	integer	R/W
40140	139	Reserved			integer	R/W
40141	140	Target volume extract air 1	Eco	Parameter 220 - 226	integer	R/W
40142	141	Target volume extract air 2	Night	Parameter 221 - 227	integer	R/W
40143	142	Target volume extract air 3	Standard	Parameter 222 - 228	integer	R/W
40144	143	Target volume extract air 4	Comfort	Parameter 223 - 229	integer	R/W
40145	144	Target volume extract air 5	Party	Parameter 224 - 230	integer	R/W
40146	145	Reserved			integer	R/W
40147	146	Set point pressure supply air 1	Eco	25 - 250 Pa	integer	R/W
40148	147	Set point pressure supply air 2	Night	25 - 250 Pa	integer	R/W
40149	148	Set point pressure supply air 3	Standard	25 - 250 Pa	integer	R/W
40150	149	Set point pressure supply air 4	Comfort	25 - 250 Pa	integer	R/W
40151	150	Set point pressure supply air 5	Party	25 - 250 Pa	integer	R/W
40152	151	Reserved			integer	R/W
40153	152	Set point pressure extract air 1	Eco	25 - 250 Pa	integer	R/W
40154	153	Set point pressure extract air 2	Night	25 - 250 Pa	integer	R/W

Register address	Protocol address	Parameter name		Value range		Data type	Authority
40155	154	Set point pressure extract air 3	Standard	25 - 250 Pa		integer	R/W
40156	155	Set point pressure extract air 4	Comfort	25 - 250 Pa		integer	R/W
40157	156	Set point pressure extract air 5	Party	25 - 250 Pa		integer	R/W
40158	157	Reserved				integer	R/W
40159	158	Target percent supply air 1	Eco	25 - 100%		integer	R/W
40160	159	Target percent supply air 2	Night	25 - 100%		integer	R/W
40161	160	Target percent supply air 3	Standard	25 - 100%		integer	R/W
40162	161	Target percent supply air 4	Comfort	25 - 100%		integer	R/W
40163	162	Target percent supply air 5	Party	25 - 100%		integer	R/W
40164	163	Reserved				integer	R/W
40165	164	Target percent extract air 1	Eco	25 - 100%		integer	R/W
40166	165	Target percent extract air 2	Night	25 - 100%		integer	R/W
40167	166	Target percent extract air 3	Standard	25 - 100%		integer	R/W
40168	167	Target percent extract air 4	Comfort	25 - 100%		integer	R/W
40169	168	Target percent extract air 5	Party	25 - 100%		integer	R/W
40170	169	Reserved				integer	R/W
40171	170	Enable heating 1	Eco	0 - 1	0 = OFF, 1 = ON	integer	R/W
40172	171	Enable heating 2	Night	0 - 1	0 = OFF, 1 = ON	integer	R/W
40173	172	Enable heating 3	Standard	0 - 1	0 = OFF, 1 = ON	integer	R/W
40174	173	Enable heating 4	Comfort	0 - 1	0 = OFF, 1 = ON	integer	R/W
40175	174	Enable heating 5	Party	0 - 1	0 = OFF, 1 = ON	integer	R/W
40176	175	Reserved				integer	R/W
40177	176	Enable cooling 1	Eco	0 - 1	0 = OFF, 1 = ON	integer	R/W
40178	177	Enable cooling 2	Night	0 - 1	0 = OFF, 1 = ON	integer	R/W
40179	178	Enable cooling 3	Standard	0 - 1	0 = OFF, 1 = ON	integer	R/W
40180	179	Enable cooling 4	Comfort	0 - 1	0 = OFF, 1 = ON	integer	R/W
40181	180	Enable cooling 5	Party	0 - 1	0 = OFF, 1 = ON	integer	R/W
40182	181	Reserved				integer	R/W
40183	182	Enable free cooling 1	Eco	0 - 1	0 = OFF, 1 = ON	integer	R/W
40184	183	Enable free cooling 2	Night	0 - 1	0 = OFF, 1 = ON	integer	R/W
40185	184	Enable free cooling 3	Standard	0 - 1	0 = OFF, 1 = ON	integer	R/W
40186	185	Enable free cooling 4	Comfort	0 - 1	0 = OFF, 1 = ON	integer	R/W
40187	186	Enable free cooling 5	Party	0 - 1	0 = OFF, 1 = ON	integer	R/W
40188	187	Reserved				integer	R/W
40189	188	Enable humidity control 1	Eco	0 - 1	0 = OFF, 1 = ON	integer	R/W
40190	189	Enable humidity control 2	Night	0 - 1	0 = OFF, 1 = ON	integer	R/W
40191	190	Enable humidity control 3	Standard	0 - 1	0 = OFF, 1 = ON	integer	R/W
40192	191	Enable humidity control 4	Comfort	0 - 1	0 = OFF, 1 = ON	integer	R/W
40193	192	Enable humidity control 5	Party	0 - 1	0 = OFF, 1 = ON	integer	R/W
40194	192	Reserved				integer	R/W
40195	194	Enable LQ control 1	Eco	0 - 1	0 = OFF, 1 = ON	integer	R/W
40196	195	Enable LQ control 2	Night	0 - 1	0 = OFF, 1 = ON	integer	R/W
40197	196	Enable LQ control 3	Standard	0 - 1	0 = OFF, 1 = ON	integer	R/W
40198	197	Enable LQ control 4	Comfort	0 - 1	0 = OFF, 1 = ON	integer	R/W
40199	198	Enable LQ control 5	Party	0 - 1	0 = OFF, 1 = ON	integer	R/W
40200	199	Reserved				integer	R/W
40201	200	Enable Auto-Temp 1	Eco	0 - 1	0 = OFF, 1 = ON	integer	R/W
40202	201	Enable Auto-Temp 2	Night	0 - 1	0 = OFF, 1 = ON	integer	R/W

Register address	Protocol address	Parameter name		Value range		Data type	Authority
40203	202	Enable Auto-Temp 3	Standard	0 - 1	0 = OFF, 1 = ON	integer	R/W
40204	203	Enable Auto-Temp 4	Comfort	0 - 1	0 = OFF, 1 = ON	integer	R/W
40205	204	Enable Auto-Temp 5	Party	0 - 1	0 = OFF, 1 = ON	integer	R/W
40206	205	Reserved				integer	R/W
40214	213	Automatic restart enable		0 - 1	0 = OFF, 1 = ON	integer	R/W
40215	214	Automatic restart mode		0 - 5	(0 = Mode as before, 1 = Eco, 2 = Night, 3 = Standard, 4 = Comfort, 5 = Party)	integer	R/W
40221	220	Min volume 1	Eco	see table volumetric flow range		integer	R/W
40222	221	Min volume 2	Night		"	integer	R/W
40223	222	Min volume 3	Standard		"	integer	R/W
40224	223	Min volume 4	Comfort		"	integer	R/W
40225	224	Min volume 5	Party		"	integer	R/W
40226	225	Reserved				integer	R/W
40227	226	Max volume 1	Eco	see table volumetric flow range		integer	R/W
40228	227	Max volume 2	Night		"	integer	R/W
40229	228	Max volume 3	Standard		"	integer	R/W
40230	229	Max volume 4	Comfort		"	integer	R/W
40231	230	Max volume 5	Party		"	integer	R/W
40232	231	Reserved				integer	R/W
40233	232	Min. set point temp.		0 - 200	corresponds to 0°C - 20,0°C	integer	R/W
40234	233	Max. set point temp.		200 - 400	corresponds to 20,0°C - 40,0°C	integer	R/W
40235	234	Min. hysteresis		0 - 25	corresponds to 0°C - 2,5°C	integer	R/W
40236	235	Max. hysteresis		25 - 100	corresponds to 2,5°C - 10,0°C	integer	R/W
40237	236	Auto operation		0 - 1	0 = OFF, 1 = ON	integer	R/W
40238	237	Auto Operation Mode		see table Auto Operation Mode		integer	R/W
40239	238	external control enable		0 - 1	0 = OFF, 1 = ON	integer	R/W
40240	239	external regulation min		see table volumetric flow range		integer	R/W
40241	240	external regulation max		see table volumetric flow range		integer	R/W
40242	241	external control mode		0 - 5	(0 = Mode manually selectable, 1 = fixed Eco, 2 = fixed Night, 3 = fixed Standard, 4 = fixed Comfort, 5 = fixed Party)	integer	R/W
40243	242	LQ extract air sensor enable		0 - 1	0 = OFF, 1 = ON	integer	R/W
40244	243	Min sensor value		0 - 500 PPM		integer	R/W
40245	244	Max sensor value		2000 - 5000 PPM		integer	R/W
40251	250	Extract air humidity sensor enable		0 - 1	0 = OFF, 1 = ON	integer	R/W
40252	251	Min sensor value		0 - 20 %		integer	R/W
40253	252	Max sensor value		60 - 100 %		integer	R/W
40257	256	Calibration filter supply air 1		0 - 1	0 = OFF, 1 = ON	integer	R/W
40258	257	Calibration filter supply air 2		0 - 1	0 = OFF, 1 = ON	integer	R/W
40259	258	Calibration filter extract air 1		0 - 1	0 = OFF, 1 = ON	integer	R/W
40260	259	Calibration filter extract air 2		0 - 1	0 = OFF, 1 = ON	integer	R/W
40262	261	Δ P supply air filter 1		50 - 200 Pa		integer	R/W
40266	265	ΔP extract air filter 1		50 - 200 Pa		integer	R/W
40269	268	Motion detector enable		0 - 1	0 = OFF, 1 = ON	integer	R/W
40270	269	Motion detector mode		0 - 4	(0 = Eco, 1 = Night, 2 = Standard, 3 = Comfort, 4 = Party)	integer	R/W
40271	270	Motion detector functionality		0 - 1	(0 = Only active when unit is running, 1 = Always active)	integer	R/W
40272	271	Motion detector overrun time		0 - 60 min		integer	R/W
40273	272	Modbus address		1 - 240		integer	R/W

Register address	Protocol address	Parameter name	Value range	Data type	Authority
40274	273	Modbus baud rate	0 - 4 (0 = 2400, 1 = 4800, 2 = 9600, 3 = 14400, 4 = 19200)	integer	R/W
40275	274	Modbus parity	0 - 3 (0 = 8N1, 1 = 8N2, 2 = 8E1, 3 = 8O1)	integer	R/W
40276	275	Night cooling enable	0 - 1 0 = OFF, 1 = ON	integer	R/W
40279	278	Night cooling set temp	Parameter 232 - 233	integer	R/W
40280	279	Night cooling supply air volume	see table volumetric flow range	integer	R/W
40281	280	Night cooling extract air volume	see table volumetric flow range	integer	R/W
40282	281	Night cooling control mode	0 - 1 (0 = Room temperature control, 1 = Extract air temperature control)	integer	R/W
40284	283	Outdoor air sensor enable	0 - 1 0 = OFF, 1 = ON	integer	R/W
40290	289	Fan control type	0 - 4 (0 = S-Control, 1 = V-Control, 2 = P-control, 3 = PV-Control SUP, 4 = PV-Control ETA)	integer	R/W
40293	292	Fan calibration supply air	800 - 1200 corresponds to 80 - 120%	integer	R/W
40299	298	Fan calibration extract air	800 - 1200 corresponds to 80 - 120%	integer	R/W
40303	302	Temperature control mode	0 - 2 (0 = Room temperature control, 1 = Supply air temperature control, 2 = Extract air temperature control)	integer	R/W
40305	304	Control heating and cooling coils	see table Control heating and cooling coils	integer	R/W
40310	309	Pre-rinsing time	0 - 3000 corresponds to 0 - 300 sec	integer	R/W
40311	310	P-share heating	5 - 20	integer	R/W
40312	311	I-share heating	5 - 20	integer	R/W
40313	312	Max temp heating	350 - 500 corresponds to 35,0°C - 50,0°C	integer	R/W
40317	316	P-share cooling	5 - 20	integer	R/W
40318	317	I-share cooling	5 - 20	integer	R/W
40319	318	Min temp cooling	0 - 200 corresponds to 0,0°C - 20,0°C	integer	R/W
40320	319	Temperature correction supply air	-50 - 50 corresponds to -5,0°C - 5,0°C	integer	R/W
40321	320	Temperature correction extract air	-50 - 50 corresponds to -5,0°C - 5,0°C	integer	R/W
40322	321	Temperature correction room air	-50 - 50 corresponds to -5,0°C - 5,0°C	integer	R/W
40323	322	Filter change supply air 1	0 - 1 0 = OFF, 1 = ON	integer	R/W
40324	323	Filter change supply air 2	0 - 1 0 = OFF, 1 = ON	integer	R/W
40325	324	Filter change extract air 1	0 - 1 0 = OFF, 1 = ON	integer	R/W
40326	325	Filter change extract air 2	0 - 1 0 = OFF, 1 = ON	integer	R/W
40341	340	Parameter_Save	12439 = Save parameter, value changes to 0 after saving	integer	R/W
40342	341	Control word1	32 = Clear fault, Value change after saving under 0	integer	R/W
40401	400	Set 1 SP1	0000 - 2359 corresponds to 00:00 h - 23:59 h	integer	R/W
40402	401	Set 1 SP2	"	integer	R/W
40403	402	Set 1 SP3	"	integer	R/W
40404	403	Set 1 SP4	"	integer	R/W
40405	404	Set 1 SP5	"	integer	R/W
40406	405	Set 1 SP6	"	integer	R/W
40407	406	Set 2 SP1	"	integer	R/W
40408	407	Set 2 SP2	"	integer	R/W
40409	408	Set 2 SP3	"	integer	R/W
40410	409	Set 2 SP4	"	integer	R/W
40411	410	Set 2 SP5	"	integer	R/W
40412	411	Set 2 SP6	"	integer	R/W
40413	412	Set 3 SP1	"	integer	R/W
40414	413	Set 3 SP2	"	integer	R/W
40415	414	Set 3 SP3	"	integer	R/W

Register address	Protocol address	Parameter name	Value range	Data type	Authority
40416	415	Set 3 SP4	"	integer	R/W
40417	416	Set 3 SP5	"	integer	R/W
40418	417	Set 3 SP6	"	integer	R/W
40419	418	Set 4 SP1	"	integer	R/W
40420	419	Set 4 SP2	"	integer	R/W
40421	420	Set 4 SP3	"	integer	R/W
40422	421	Set 4 SP4	"	integer	R/W
40423	422	Set 4 SP5	"	integer	R/W
40424	423	Set 4 SP6	"	integer	R/W
40425	424	Set 5 SP1	"	integer	R/W
40426	425	Set 5 SP2	"	integer	R/W
40427	426	Set 5 SP3	"	integer	R/W
40428	427	Set 5 SP4	"	integer	R/W
40429	428	Set 5 SP5	"	integer	R/W
40430	429	Set 5 SP6	"	integer	R/W
40431	430	Set 6 SP1	"	integer	R/W
40432	431	Set 6 SP2	"	integer	R/W
40433	432	Set 6 SP3	"	integer	R/W
40434	433	Set 6 SP4	"	integer	R/W
40435	434	Set 6 SP5	"	integer	R/W
40436	435	Set 6 SP6	"	integer	R/W
40437	436	Set 7 SP1	"	integer	R/W
40438	437	Set 7 SP2	"	integer	R/W
40439	438	Set 7 SP3	"	integer	R/W
40440	439	Set 7 SP4	"	integer	R/W
40441	440	Set 7 SP5	"	integer	R/W
40442	441	Set 7 SP6	"	integer	R/W
40457	456	Reserved		integer	R/W
40491	490	Day timer On Off	0 = Timer deactivated 255 = Timer activated	integer	R/W
40496	495	Save timer data	1243 = Save timer data, value changes to 0 after saving.	integer	R/W
40501	500	Set 1 Modus 1	0 - 7 (0 = Standby, 1 = Eco, 2 = Night, 3 = Standard, 4 = Comfort, 5 = Party, 6 = Reserve, 7 = Switch point not active)	integer	R/W
40502	501	Set 1 Modus 2	"	integer	R/W
40503	502	Set 1 Modus 3	"	integer	R/W
40504	503	Set 1 Modus 4	"	integer	R/W
40505	504	Set 1 Modus 5	"	integer	R/W
40506	505	Set 1 Modus 6	"	integer	R/W
40507	506	Set 2 Modus 1	"	integer	R/W
40508	507	Set 2 Modus 2	"	integer	R/W
40509	508	Set 2 Modus 3	"	integer	R/W
40510	509	Set 2 Modus 4	"	integer	R/W
40511	510	Set 2 Modus 5	"	integer	R/W
40512	511	Set 2 Modus 6	"	integer	R/W
40513	512	Set 3 Modus 1	"	integer	R/W
40514	513	Set 3 Modus 2	"	integer	R/W
40515	514	Set 3 Modus 3	"	integer	R/W

Register address	Protocol address	Parameter name	Value range	Data type	Authority
40516	515	Set 3 Modus 4	"	integer	R/W
40517	516	Set 3 Modus 5	"	integer	R/W
40518	517	Set 3 Modus 6	"	integer	R/W
40519	518	Set 4 Modus 1	"	integer	R/W
40520	519	Set 4 Modus 2	"	integer	R/W
40521	520	Set 4 Modus 3	"	integer	R/W
40522	521	Set 4 Modus 4	"	integer	R/W
40523	522	Set 4 Modus 5	"	integer	R/W
40524	523	Set 4 Modus 6	"	integer	R/W
40525	524	Set 5 Modus 1	"	integer	R/W
40526	525	Set 5 Modus 2	"	integer	R/W
40527	526	Set 5 Modus 3	"	integer	R/W
40528	527	Set 5 Modus 4	"	integer	R/W
40529	528	Set 5 Modus 5	"	integer	R/W
40530	529	Set 5 Modus 6	"	integer	R/W
40531	530	Set 6 Modus 1	"	integer	R/W
40532	531	Set 6 Modus 2	"	integer	R/W
40533	532	Set 6 Modus 3	"	integer	R/W
40534	533	Set 6 Modus 4	"	integer	R/W
40535	534	Set 6 Modus 5	"	integer	R/W
40536	535	Set 6 Modus 6	"	integer	R/W
40537	536	Set 7 Modus 1	"	integer	R/W
40538	537	Set 7 Modus 2	"	integer	R/W
40539	538	Set 7 Modus 3	"	integer	R/W
40542	539	Set 7 Modus 4	"	integer	R/W
40541	540	Set 7 Modus 5	"	integer	R/W
40542	541	Set 7 Modus 6	"	integer	R/W

15.5. Current value table

Register address	Protocol address	Parameter name	Value range	Data type	Authority
30101	100	Reserved		integer	R
30111	110	Unit identification		integer	R
30112	111	Room temperature		integer	R
30113	112	Supply-air temperature		integer	R
30114	113	Extract-air temperature		integer	R
30115	114	Exhaust-air temperature		integer	R
30116	115	Outdoor-air temperature 1		integer	R
30118	117	Pressure difference supply air filter 1		integer	R
30120	119	Pressure difference extract air filter 1		integer	R
30122	121	Pollution supply air filter 1		integer	R
30124	123	Pollution extract air filter 1		integer	R
30127	126	CO2 value		integer	R
30128	127	VOC value		integer	R
30129	128	Extract air humidity		integer	R
30131	130	Pressure difference supply air fan		integer	R
30132	131	Pressure difference extract air fan		integer	R
30133	132	Volume flow supply air fan		integer	R
30134	133	Volume flow extract air fan		integer	R
30135	134	Duct pressure supply air		integer	R
30136	135	Duct pressure extract air		integer	R
30137	136	Control supply air fan		integer	R
30138	137	Control extract air fan		integer	R
30139	138	Control heating		integer	R
30140	139	Cooling control		integer	R
30149	148	Total power		integer	R
30150	149	Inputs	see table inputs	integer	R
30151	150	Outputs	see table outputs	integer	R
30152	151	Error number	see table fault number	integer	R
30153	152	Status		integer	R
30154	153	Program version 1		integer	R
30155	154	Program version 2		integer	R
30156	155	Hours of operation		integer	R
30157	156	Filter change supply air filter 1		integer	R
30159	158	Filter change extract air filter 1		integer	R
30162	161	Control value External control		integer	R
30163	162	Differential pressure HRU		integer	R

Volume flow range

PHE 700 F	200 - 700 m ³ /h
PHE 1300 F	400 - 1300 m ³ /h
PHE 1700 F	400 - 1800 m ³ /h
PHE 2500 F	500 - 2500 m ³ /h
PHE 2800 F	500 - 3000 m ³ /h
PHE 3500 F	750 - 3800 m ³ /h

Auto Operation Mode Protocol address 237

0	LQ-Control
1	RH-Control
2	LQ + RH-Control
3	LQ + RH + Temp-Control
4	Temp-Control
5	LQ + Temp-Control
6	RH + Temp-Control

Control heating and cooling coils Protocol address 304

0	Only internal E-heating
1	Heating 3-way mixing valve 230V output (X6:N,8,9)
2	Cooling 3-way mixing valve 230V output (X3:N,2,3)
3	Heating 3-way mixing valve 230V output (X6:N,8,9)
	Cooling 3-way mixing valve 230V output (X3:N,2,3)
4	Heating 3-way mixing valve 230V output (X6:N,8,9)
	Heating 3-way mixing valve 0-10V output (X15:5,9)
5	Cooling 3-way mixing valve 230V output (X3:N,2,3)
	Cooling 3-way mixing valve 0-10V output (X15:5,9)
6	Heating 3-way mixing valve 0-10V output (X15:4,8)
	Cooling 3-way mixing valve 0-10V output (X15:5,9)
	Heating and cooling 0-10V output (X15:5,9)
7	Enable cooling device open = heating
	Enable cooling device closed = cooling

Inputs Protocol addresses 149

Bit 0	1 = External enable
Bit 1	1 = Fault relay fans ok
Bit 2	1 = Thermal contact fan ok
Bit 3	1 = Frost protection OK
Bit 4	1 = Motion detector closed
Bit 5	1 = Fire detector ok
Bit 6	Reserved
Bit 7	Reserved
Bit 8	Reserved
Bit 9	Reserved
Bit 10	Reserved
Bit 11	1 = Night cooling active
Bit 12	Reserved
Bit 13	Reserved
Bit 14	Reserved
Bit 15	Reserved

Outputs Protocol addresses 150

Bit 0	Reserved
Bit 1	Pump cooling
Bit 2	Enable cooling device
Bit 3	Bypass open
Bit 4	Bypass closed
Bit 5	Heating valve open
Bit 6	Heating valve closed
Bit 7	Pump heating
Bit 8	Unit defective
Bit 9	Damper closed
Bit 10	Damper open
Bit 11	Cooling valve open
Bit 12	Cooling valve closed
Bit 13	E-heating on
Bit 14	Reserved
Bit 15	Reserved

Error number Protocol address 151

0	No error
1	Supply-air temperature sensor defective
2	Room-air temperature sensor defective
3	Exhaust-air temperature sensor defective
4	Outdoor-air temperature sensor defective
5	Extract-air temperature sensor defective
6	Reserved
7	Frost protection fault
8	Safety thermostat triggered
9	Thermal switch for ventilator triggered
10	Fan defective
11	Reserved
12	Not enabled
13	Reserved
14	Fault fire detector
15	Reserved
16	Reserved
17	Supply-air temperature too low
18	Supply-air temperature too hot
19	Reserved
20	Fault heat exchanger

16. EXPANSION AND RECONFIGURATION

The unit must not be reconfigured.

The warranty only applies to the configuration delivered.

The warranty will cease to apply after any reconfiguration or expansion.

17. LIFETIME AND DISPOSAL

17.1. Product life

The motors are equipped with maintenance-free, permanently lubricated ball bearings. Under normal operating conditions, the expected lifetime is about 40,000 operating hours.

The information given here depends strongly on the respective field of application as well as the environmental conditions.

17.2. Decommissioning and disposal



When disassembling, parts under voltage are exposed, which can lead to electric shock when touched. Before disassembly, disconnect the unit from the mains and secure it against being switched on again!

Parts and components of the device that have reached their lifetime, e.g. due to wear, corrosion, mechanical stress, fatigue and/or all other, not directly recognizable effects, must be disposed of professionally and properly after disassembly in accordance with national and international laws and regulations. The same applies to excipients in use such as oils and fats or other substances. The conscious or unconscious reuse of used components such as e.g. impellers, rolling bearings, motors, etc. can lead to a risk to persons, the environment as well as machinery and equipment. The applicable local operating regulations must be observed and applied.

17.3. Spare parts (motor + impeller)

Replacement may only be carried out by trained and authorized personnel.

18. TROUBLESHOOTING

Fault	Possible cause	Remedy methods
■ Fan does not start	■ No power supply ■ Impeller does not rotate freely	■ Check mains supply / connections ■ Find out the causes and, if possible, remove the fault. If not possible, contact the supplier.
■ Motor overheated / temperature protection is triggered	■ Fault of the ball bearings ■ Too high operating temperature ■ Air flow is too low, motor cannot cool down	■ Contact the supplier ■ Observe the data on the nameplate ■ See fault „Low air flow“
■ Device too noisy / casing vibrations	■ Dirt deposits on the impeller ■ Imbalance of the impeller ■ Connection with intake or exhaust pipe / duct causes vibrations / oscillations ■ Fixing screws released ■ Fault of the ball bearings ■ Loose impeller blade	■ See chapter maintenance and cleaning ■ Contact the supplier ■ Install fan with vibration dampers ■ Tighten screws ■ Contact the supplier ■ Contact the supplier

Fault	Possible cause	Remedy methods
■ Low airflow	■ Impeller runs in the wrong direction (wrong air transport direction) ■ High pressure losses in the system ■ Return flaps closed or only partially open ■ Duct system clogged ■ Speed control incorrectly set / incorrectly connected	■ Note the marking on the device / nameplate. Check electrical connections ■ Improve piping configuration or select a more powerful fan ■ Check drive system / installation position of the return flap ■ Remove blockage / clean protective grille ■ Check settings / switching unit and possibly adjust / connect

Please note the following instructions:

- Proceed systematically and purposefully when troubleshooting, even under time pressure.
- In the worst case, randomly and indiscriminately dismantling and changing settings may result in it no longer being possible to determine the original cause of the fault.
- Get an overview of the unit's operation in conjunction with the overall installation.
- Try to clarify whether the unit provided the required function in the overall installation before the fault occurred.
- Try to find any changes to the overall system in which the unit is installed:
 - Have the unit's operating conditions or operating range been changed?
- Have any changes (e.g. reconfigurations) or repairs been performed on the overall system (installation, electrics, control) or to the unit? If yes: what?
 - Has the unit been operated correctly?
 - How does the fault appear?
- Form a clear idea of the cause of the fault. If necessary, question the immediate operator or the installation operator.

If you have not been able to remove the fault, please contact the manufacturer. The contact address can be found on the back of these installation, operating and maintenance instructions.

18.1. Low-current fuses

There is one low-current fuse built-in at the controller circuit board to protect the electrical equipment. If the fuse blows, the fault can be located and repaired by using the following table. A low-current fuse must be changed by specialised personnel.

The low-current fuses must comply with EN 60127, dimensions 5 x 20 mm.

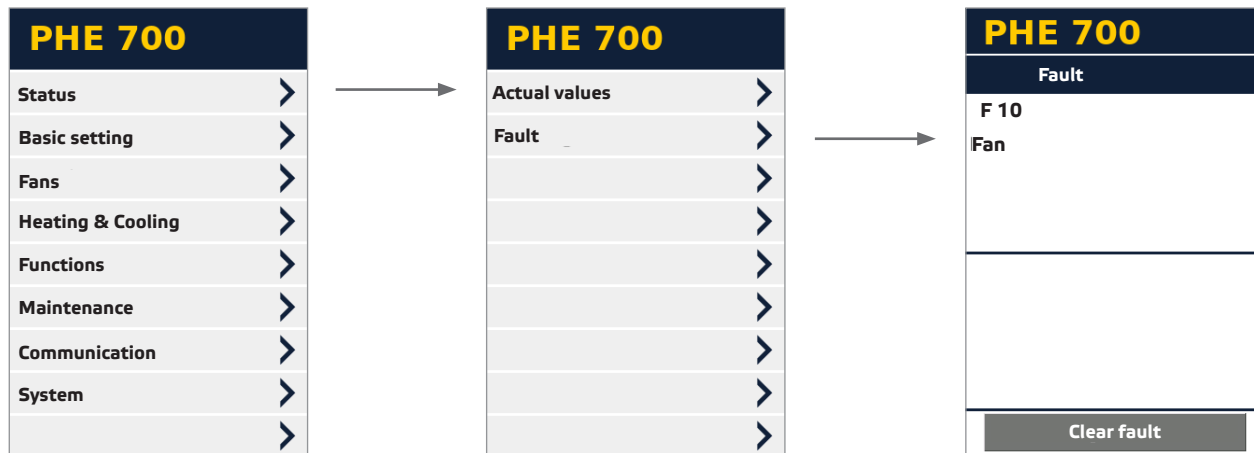
For position of microfuse see wiring diagrams.

Fuse	Possible cause	Fault correction
F2 / T 6,3 A	■ Valve gear and cable defect. ■ Circulating pump and cable defect. ■ Damper drive and cable defect.	■ Replace valve gear and cable. ■ Replace circulating pump and cable. ■ Replace damper drive and cable.

18.2. Fault diagnosis chart

If a fault occurs on the unit, one or more fault messages will appear on the display. The error is acknowledged with the „Clear fault“ button. It is not possible to use the control unit until all of the faults have been removed and acknowledged. Depending on the priority of the fault, the installation will either switch off or continue working with the last settings.

The following faults might be shown on the display:



Error message	Type of fault and repair
---------------	--------------------------

ERROR	
	» The control unit has no connection. » Check the connection or replace the cable if necessary.
Supply air temperature sensor fault	
F 1	» The supply air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
Room temperature sensor fault.	
F 2	» The room temperature sensor malfunctions. » Replace the remote control unit. » After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
Exhaust air temperature sensor fault.	
F 3	» The exhaust air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
Outside air temperature sensor fault.	
F 4	» The outside air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
Extracted air temperature sensor fault.	
F 5	» The extracted air temperature sensor is defective or the cable is broken. » Replace the defective temperature sensor or replace the broken cable if necessary. » After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
Error frost protection	
F 7	» The air temperature has fallen below the value set on the antifreeze thermostat. The fans will be switched off, the air flaps closed, the heating valve fully opened and the circulating pump switched on. » Check fuse F2. » After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
Fault in the safety thermostat - electric heating element temperature monitoring	
F 8	» The housing temperature is higher than 75 °C. The control circuit is broken, the electric heater is switched off. Possible cause: defective supply air valve, fan has failed, etc. » Repair supply air valve, check fuses F2. » After the failure reason is remedied, the reset button of the safety thermostat has to be reset manually, and the failure has to be confirmed at the control unit with „Clear fault“.

Error message Type of fault and repair

F 9	Fault, fan thermal contact
	» The thermal contact has been tripped, device will be switched off. Possible cause: motor overheating or defective. (X9: 6,7,8,9)
	» The power supply must be switched off at the main switch for at least 20 s. Check fuse F2, replace the motor if necessary.
	» After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
F 10	Error fan
	» Error monitoring of a fan has been triggered.
	» Switch the unit off, check wiring and fans and if needed, replace damaged fan.
	» After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
F 14	Fire protection signal
	» The fire protection contact is open. The fire detector has tripped.
	» After the fire detection has been remedied, you have to confirm with „Clear fault“.
F 17	Insufficient temperature of supply air
	» The maximum set supply air temperature (12 °C) was undershot longer than 30 minutes.
	» After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
F 18	Excess temperature, supply air
	» The maximum supply air temperature of 80 °C was exceeded longer than 10 sec. or the cable of the air supply temperature sensor is broken.
	» Switch off the device, check fans.
	» After the failure reason is remedied, the failure must be confirmed with „Clear fault“.
	No release
	» The release contact is not closed.
	» Close the release contact. The unit can then be started.
	Device is off and cannot be switched on
	» SENSORTYP stands at EXT. REG. (external controls)
	» Check the setting SENSOR TYPE in the operating parameters.
	Pre-rinse
	» The frost protection thermostat or the supply air temperature sensor has triggered the frost protection function due to the supply air temperature being too low.

14:54

NAME





Setpoint temp. 22.0 °C



Mode  Standard 

SupplyAir temp. 21.3 °C

Room temp. 20.3 °C

SupplyAir 0 m³/h

ExtractAir 0 m³/h

Air humidity 53.3 %

19. WIRING DIAGRAM

19.1. PHE 700 (164186)

Schaltplan / Circuit diagram : PHE

Warmwasserheizung / E-Heizung

Hot water heating / E-Heating

Lüftung / Ventilation **Hot water heating**

Netzspannung : 230V 1~ / N / 50Hz
Mains voltage

Leistung : 350W
Power

Vorsicherung : 1 x 16A
Fuse

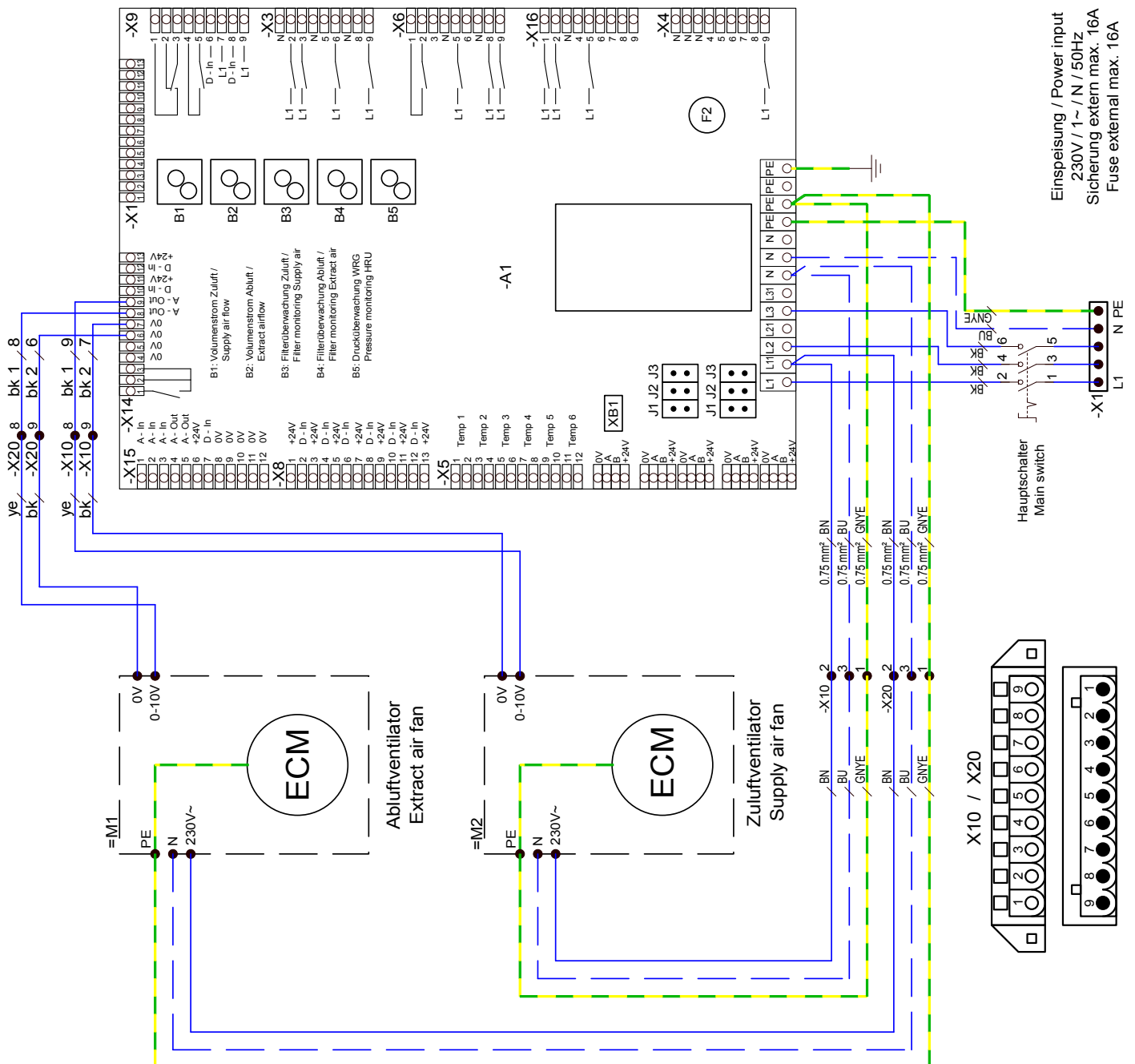
Lüftung / Ventilation **Electric heating**

Netzspannung : 230V 1~ / N / 50Hz
Mains voltage

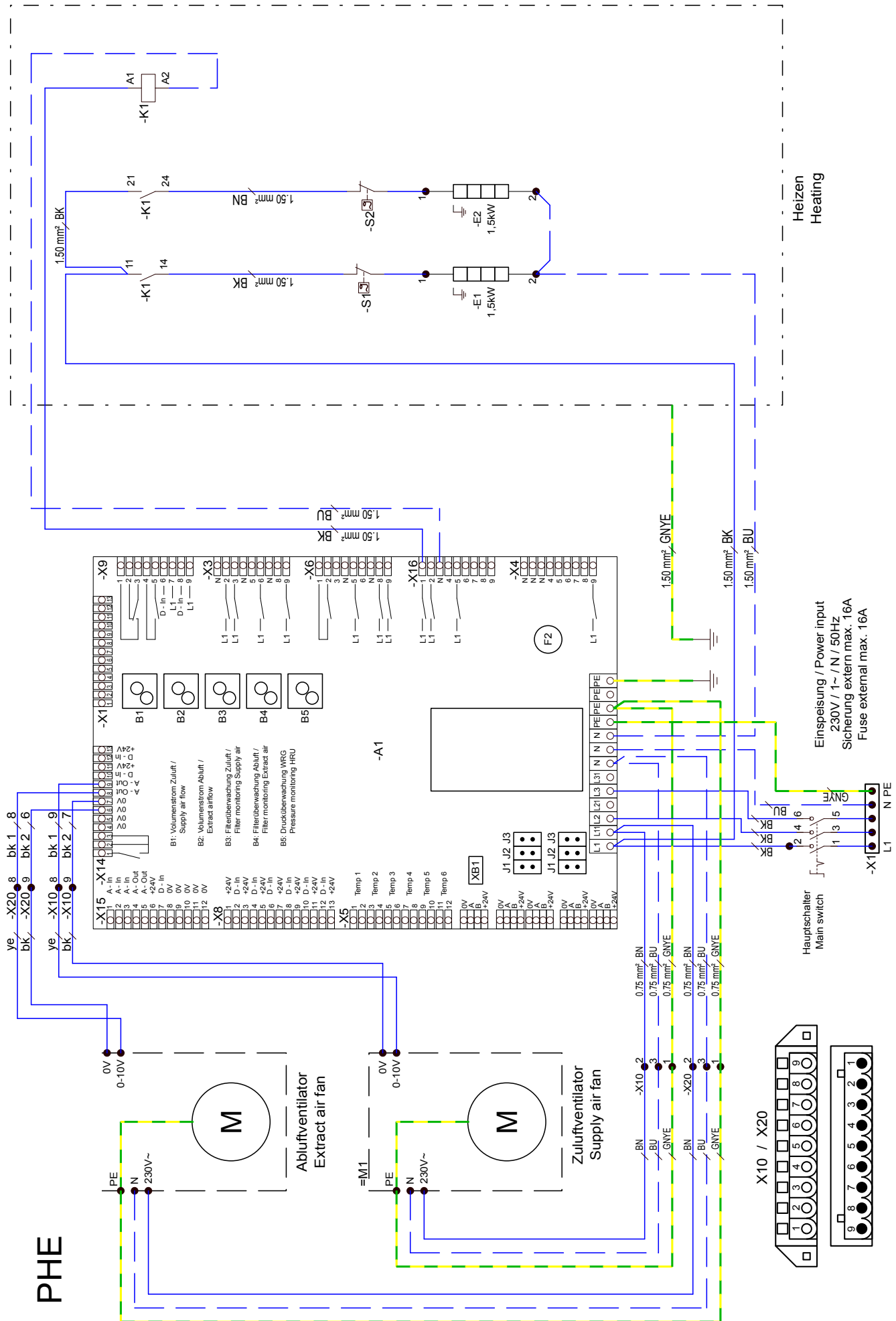
Leistung : 3350W
Power

Vorsicherung : 1 x 16A
Fuse

Hot water heating / without integrated heating:



Electric heating:



19.2. PHE 1300 (164187)

Schaltplan / Circuit diagram : PHE

Warmwasserheizung / E-Heizung
Hot water heating / E-HeatingLüftung / Ventilation **Hot water heating**

Netzspannung : 230V 1~ / N / 50Hz
Mains voltage

Leistung : 590W
Power

Vorsicherung : 1 x 16A
Fuse

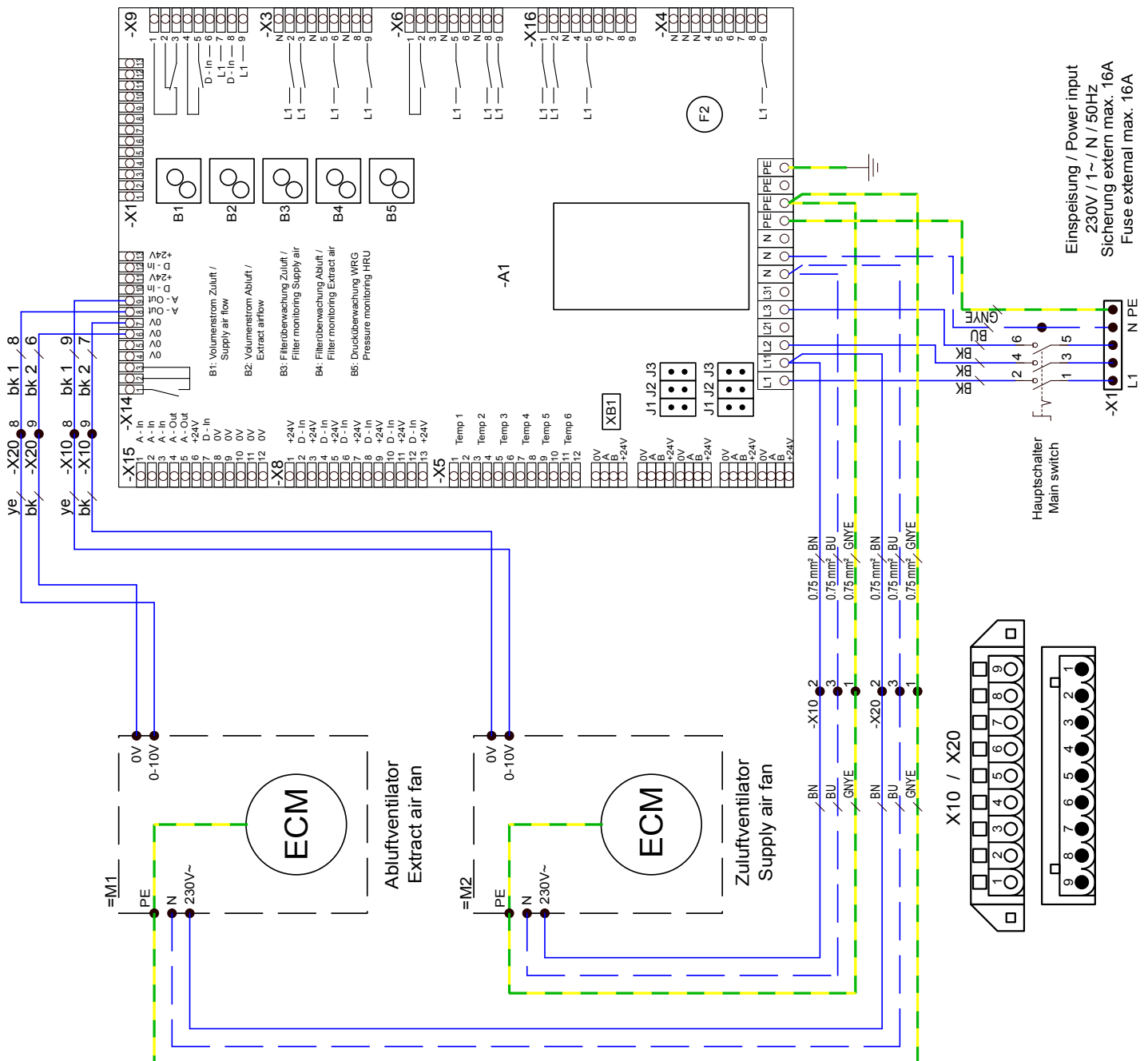
Lüftung / Ventilation **Electric heating**

Netzspannung : 400V 3~ / N / 50Hz
Mains voltage

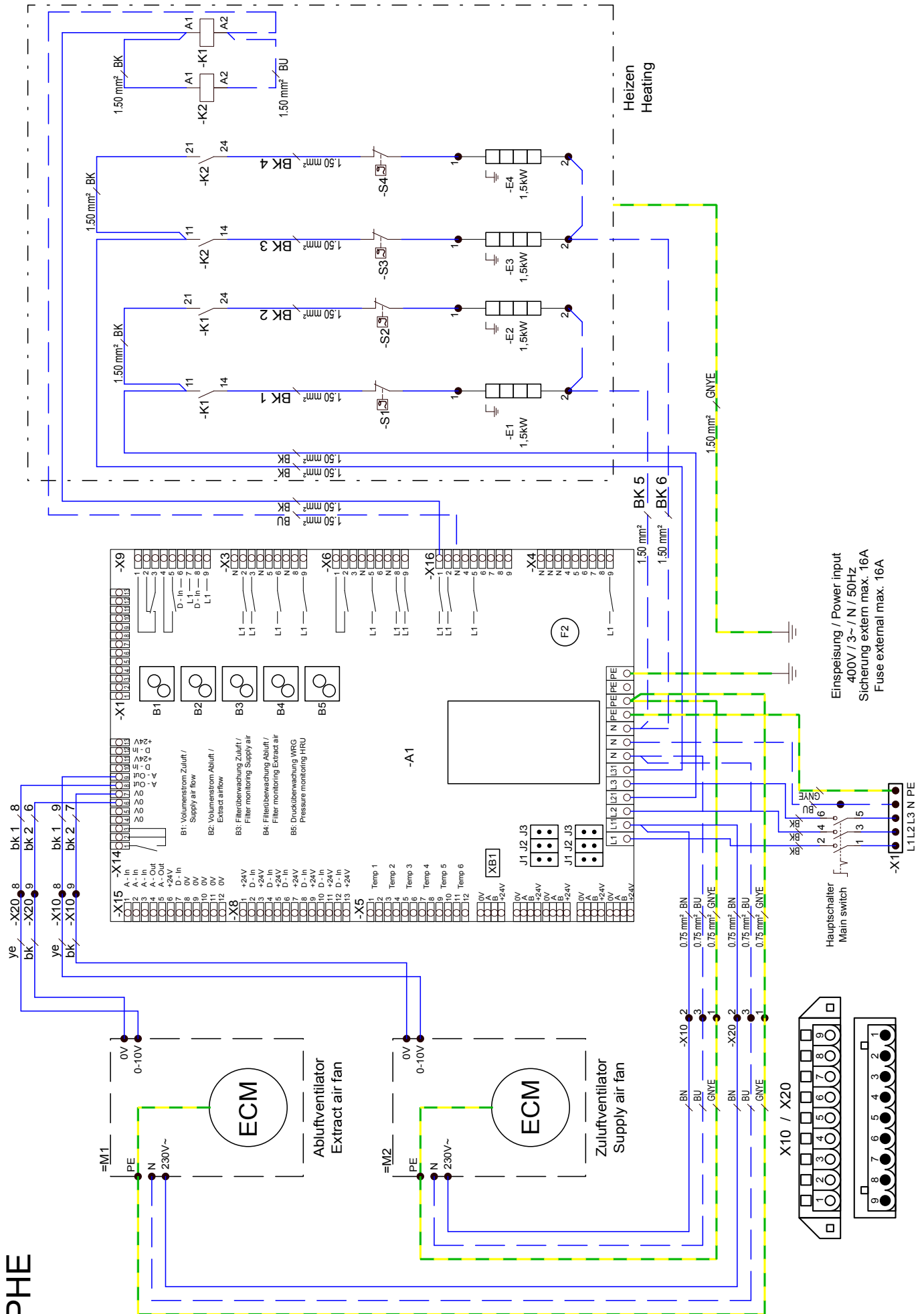
Leistung : 6590W
Power

Vorsicherung : 3 x 16A
Fuse

Hot water heating / without integrated heating:



Electric heating:



19.3. PHE 1700 (164188)

Schaltplan / Circuit diagram : PHE

Warmwasserheizung / E-Heizung
Hot water heating / E-Heating

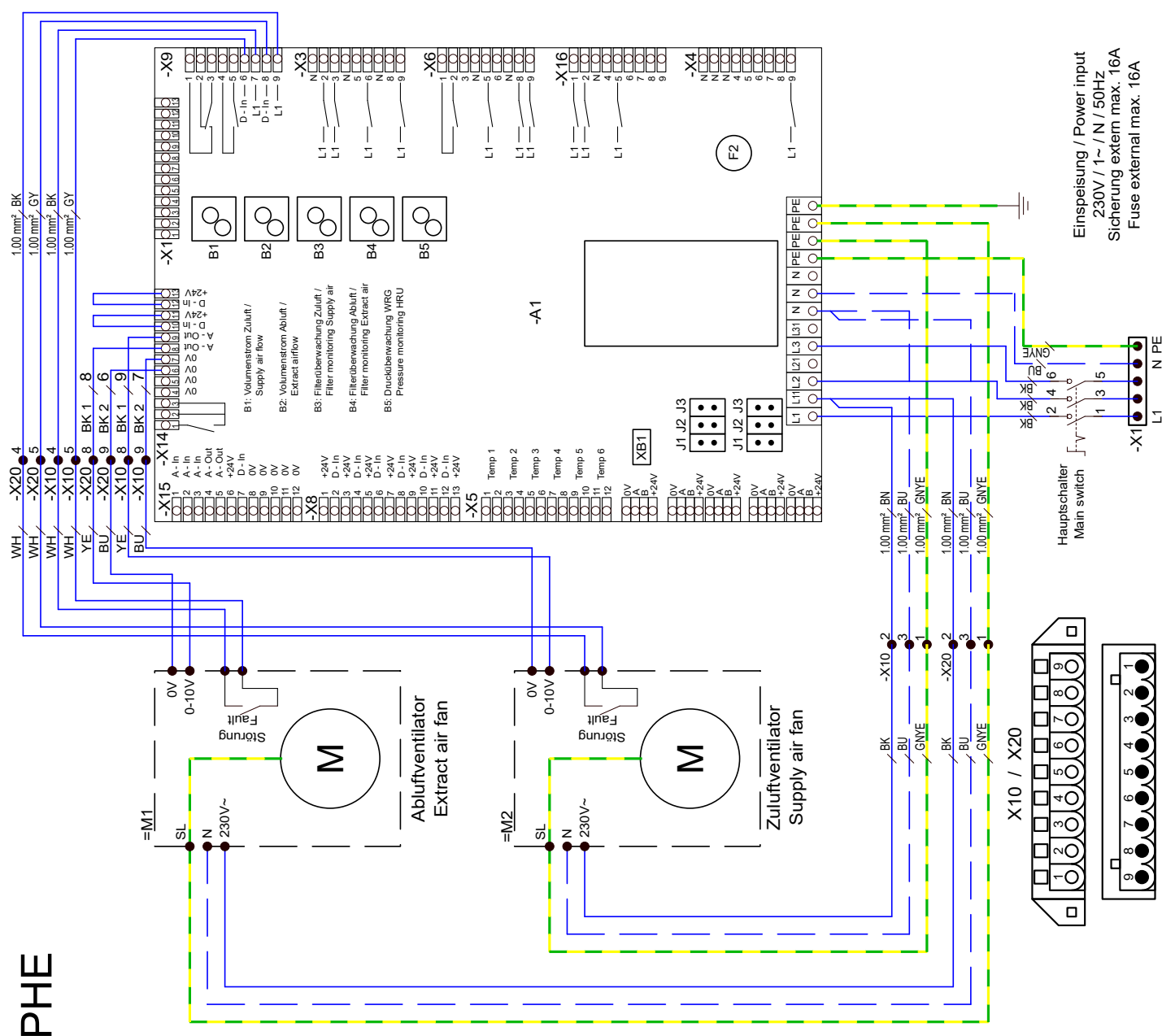
Lüftung / Ventilation **Hot water heating**

Netzspannung Mains voltage	:	230V 1~ / N / 50Hz
Leistung Power	:	1060W
Vorsicherung Fuse	:	1 x 16A

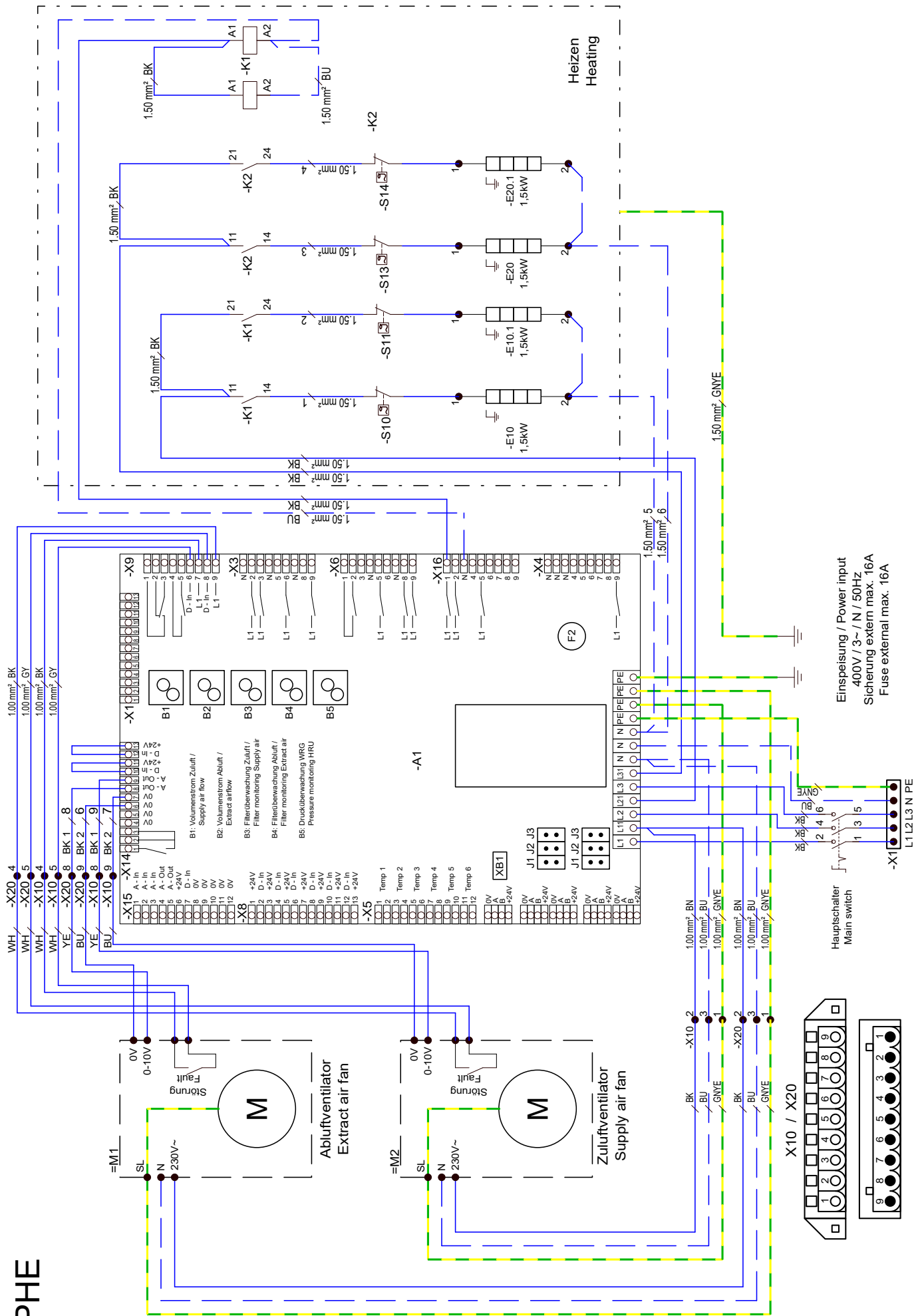
Lüftung / Ventilation **Electric heating**

Netzspannung Mains voltage	:	400V 3~ / N / 50Hz
Leistung Power	:	7060W
Vorsicherung Fuse	:	3 x 16A

Hot water heating / without integrated heating:



Electric heating:



19.4. PHE 2500 (164189)

Schaltplan / Circuit diagram

: PHE

Warmwasserheizung / E-Heizung

Hot water heating / E-Heating

Lüftung / Ventilation

PHE

Netzspannung : 230V 1~ / N / 50Hz
Mains voltage

Leistung : 1520W
Power

Vorsicherung : 1 x 16A
Fuse

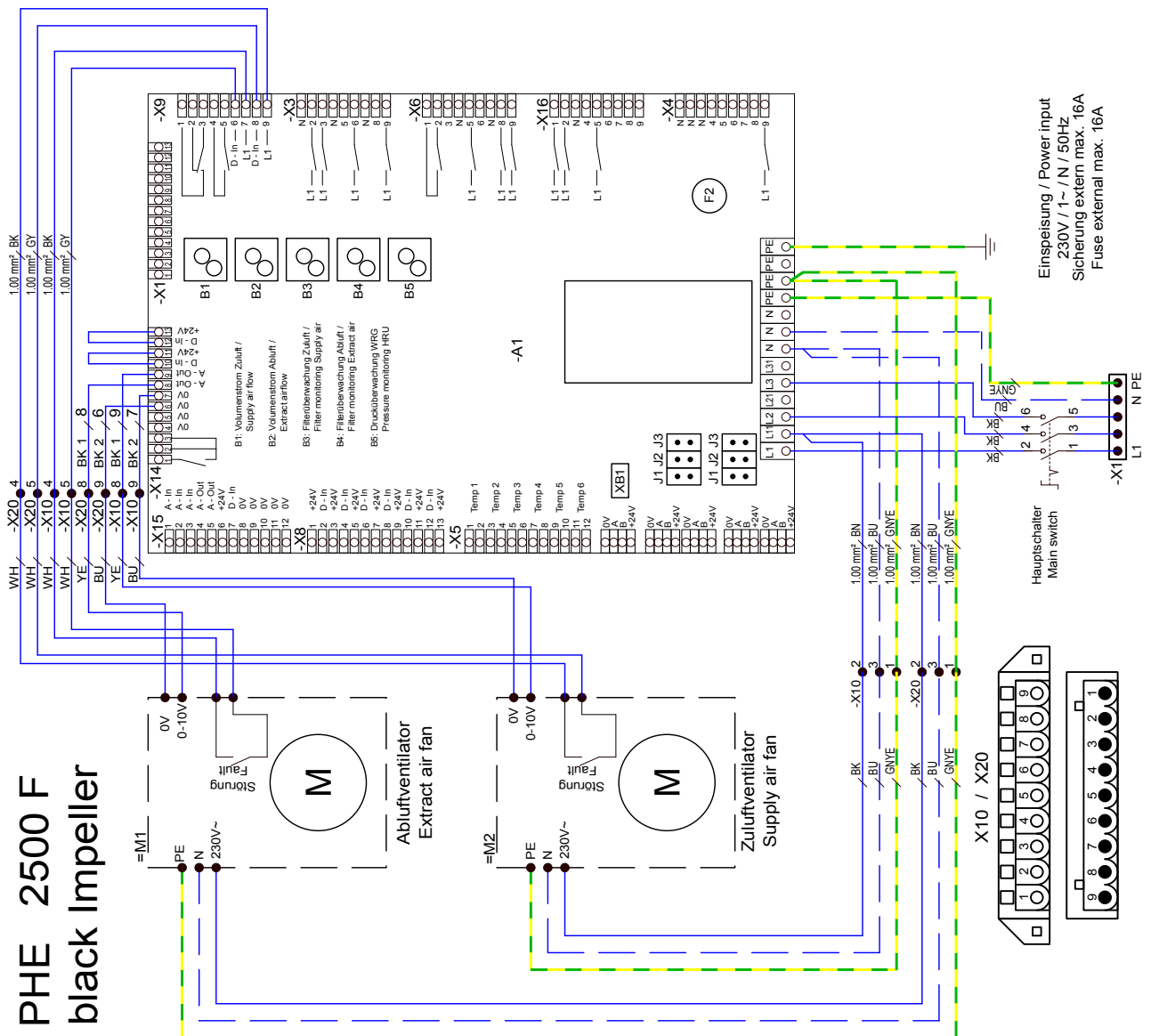
Electric heating

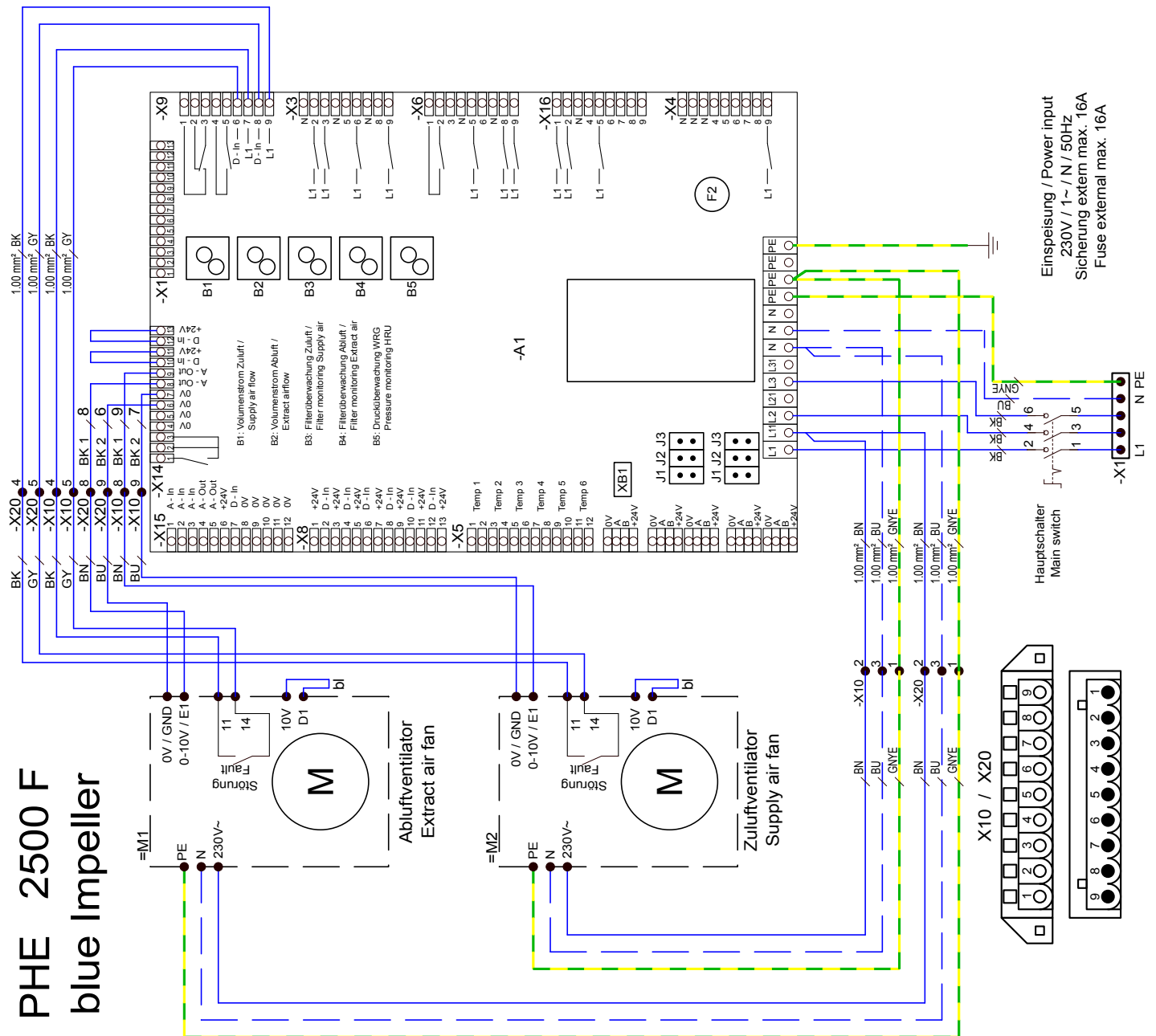
EHM 6030

Netzspannung : 400V 3~ / N / 50Hz
Mains voltage

Leistung : 18000W
Power

Vorsicherung : 3 x 32A
Fuse





19.5. PHE 2800 (171289)

Schaltplan / Circuit diagram :

PHE

Warmwasserheizung / E-Heizung

Hot water heating / E-Heating

Lüftung / Ventilation PHE

Netzspannung : 400V 3~ / N / 50Hz
Mains voltage

Leistung : 2150W
Power

Vorsicherung : 3 x 16A
Fuse

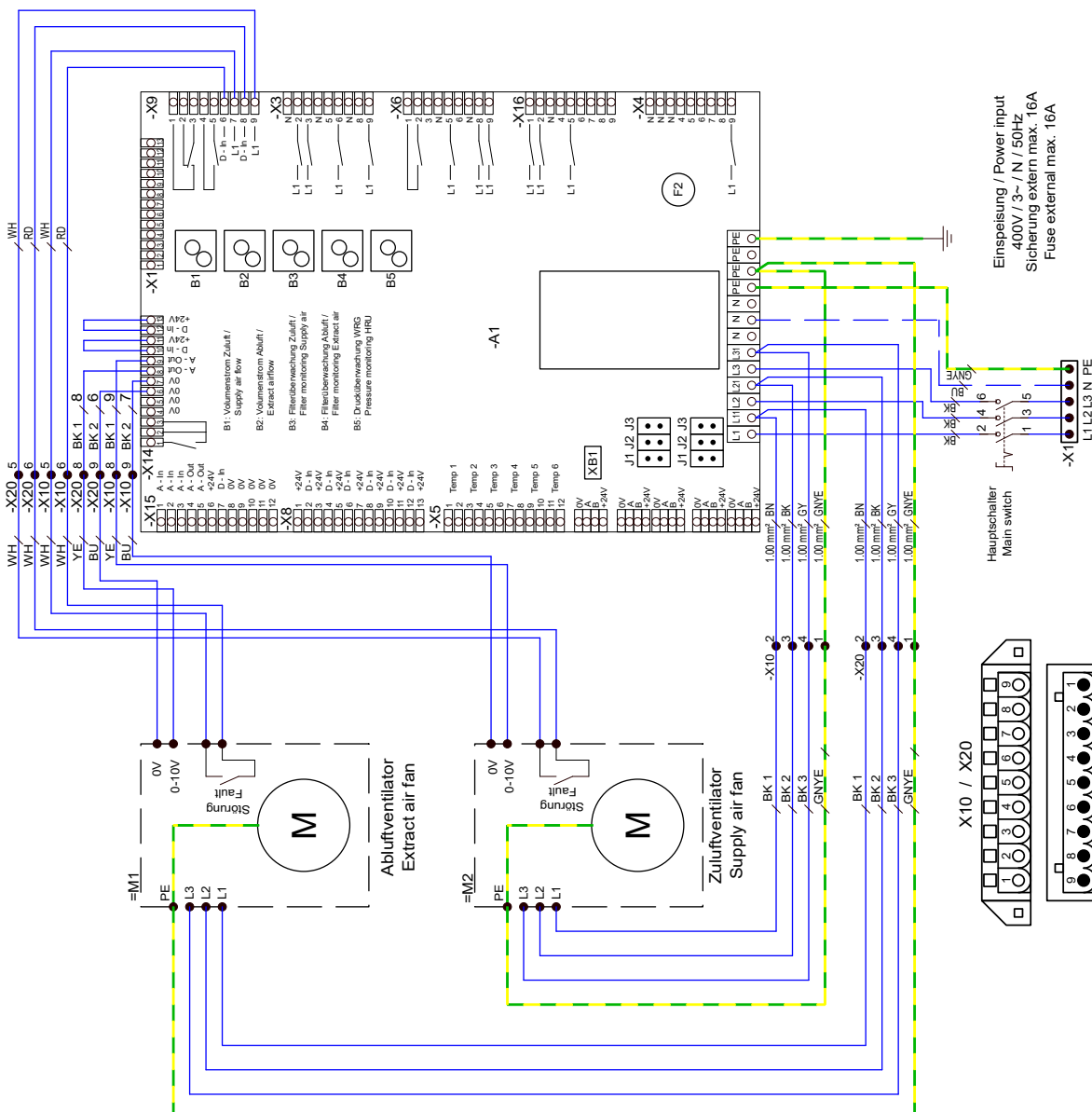
Electric heating

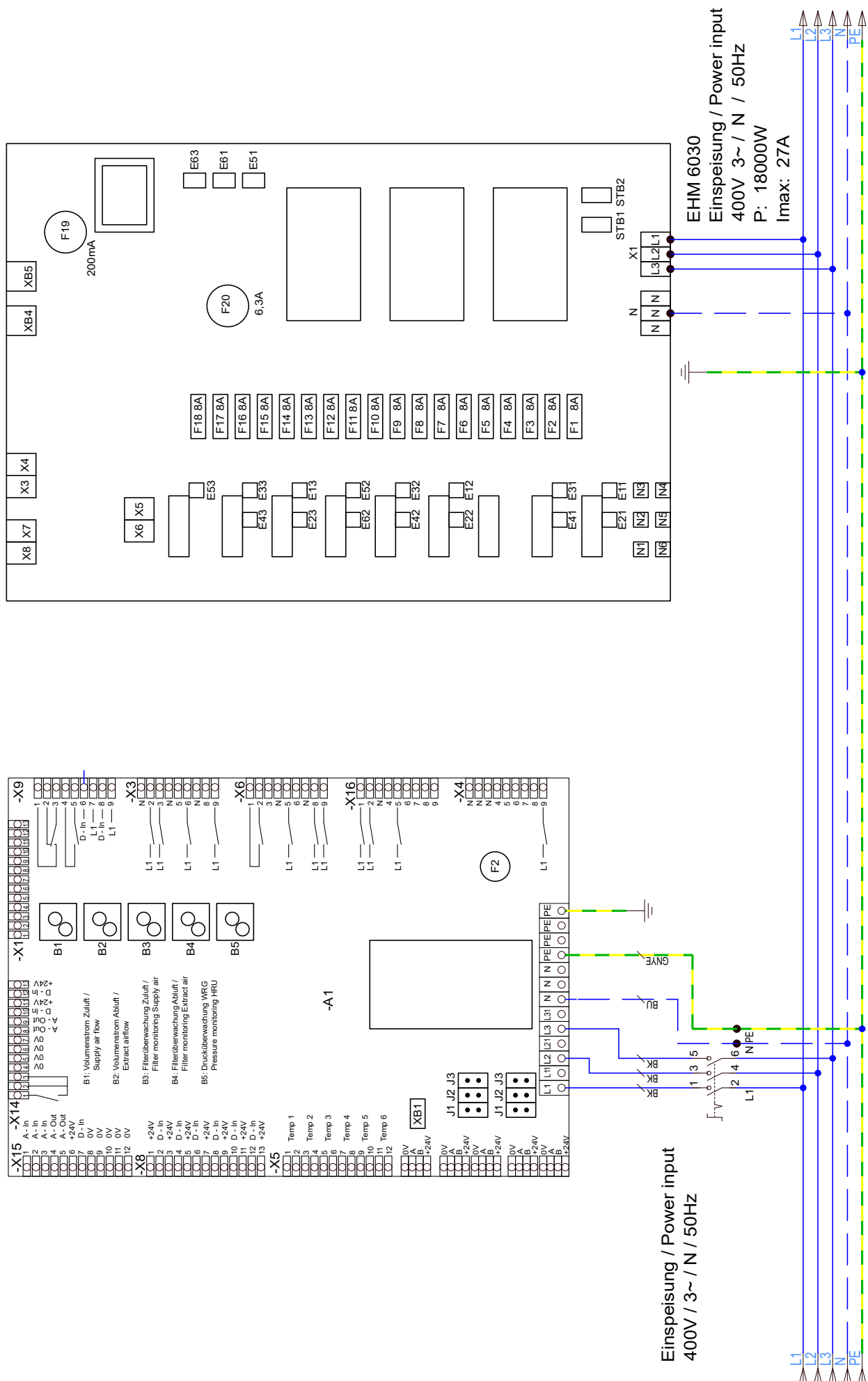
EHM 6030

Netzspannung : 400V 3~ / N / 50Hz
Mains voltage

Leistung : 18000W
Power

Vorsicherung : 3 x 32A
Fuse





19.6. PHE 3500 (171290)

Schaltplan / Circuit diagram : PHE

Warmwasserheizung / E-Heizung
Hot water heating / E-Heating

Lüftung / Ventilation PHE

Netzspannung : 400V 3~ / N / 50Hz

Mains voltage

Leistung : 3100W
Power

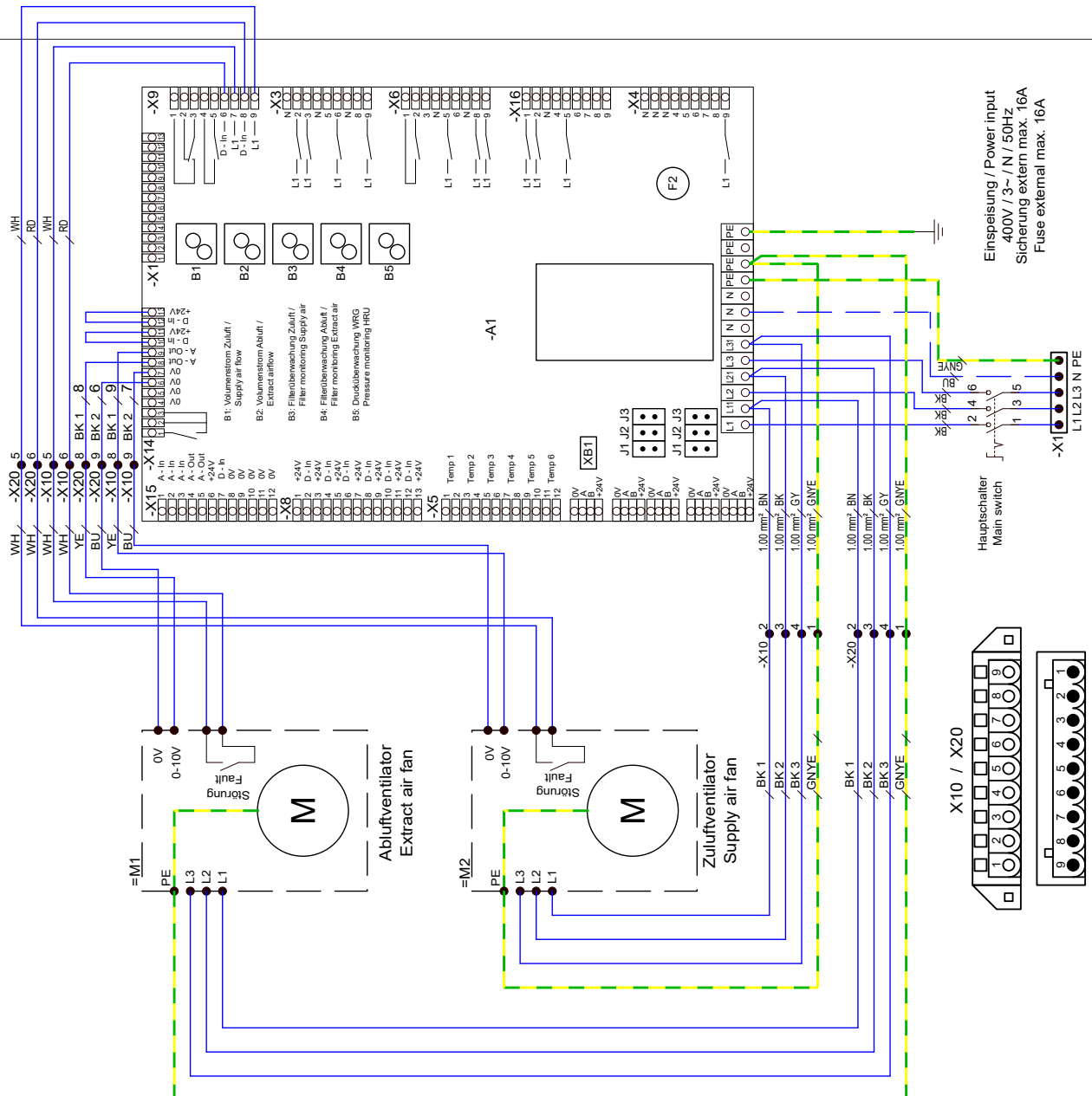
Vorsicherung : 3 x 16A
Fuse

Electric heating

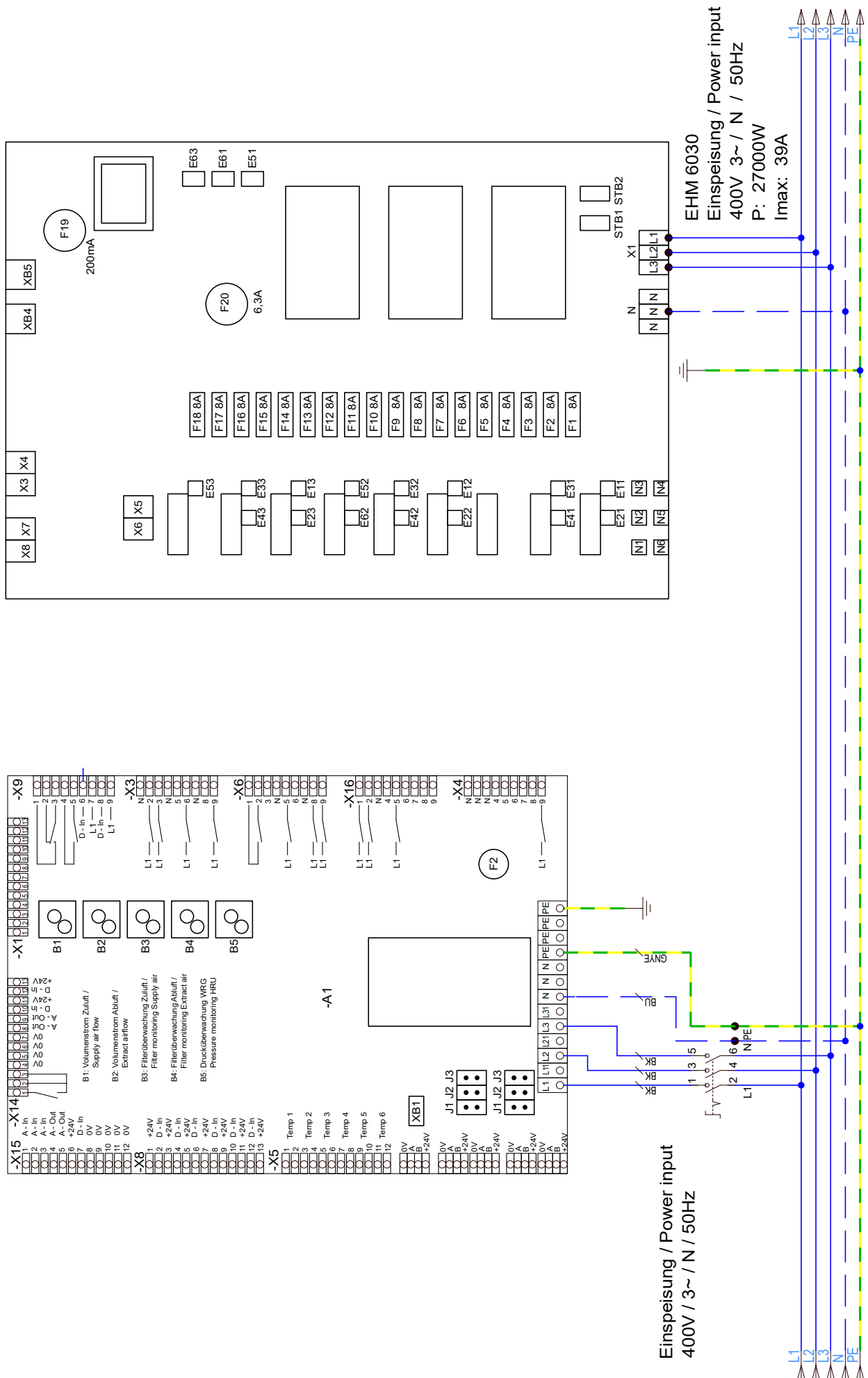
EHM 6030

Netzspannung : 400V 3~ / N / 50Hz
Mains voltage

Leistung : 27000W
Power

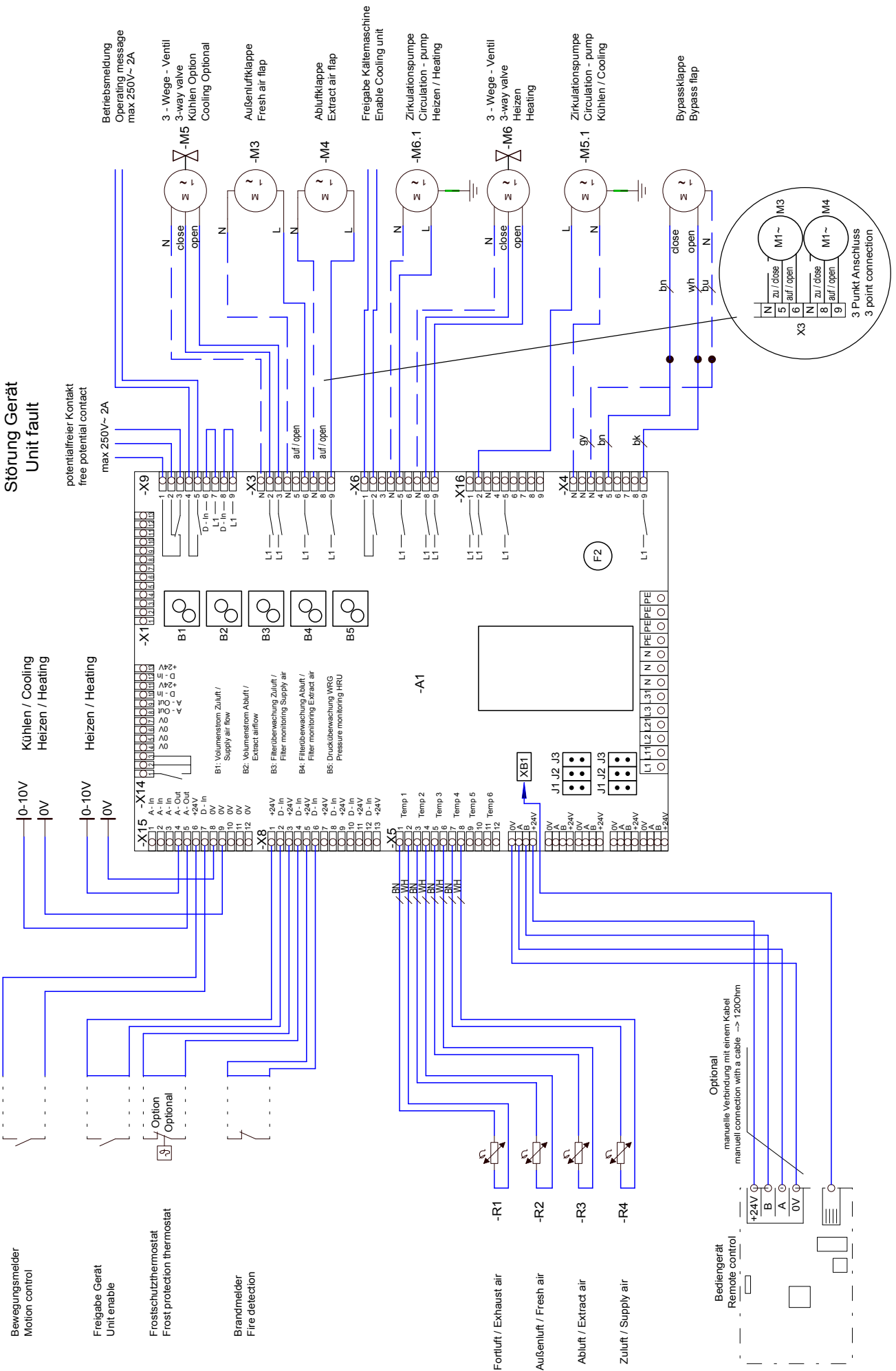


Electric heating:



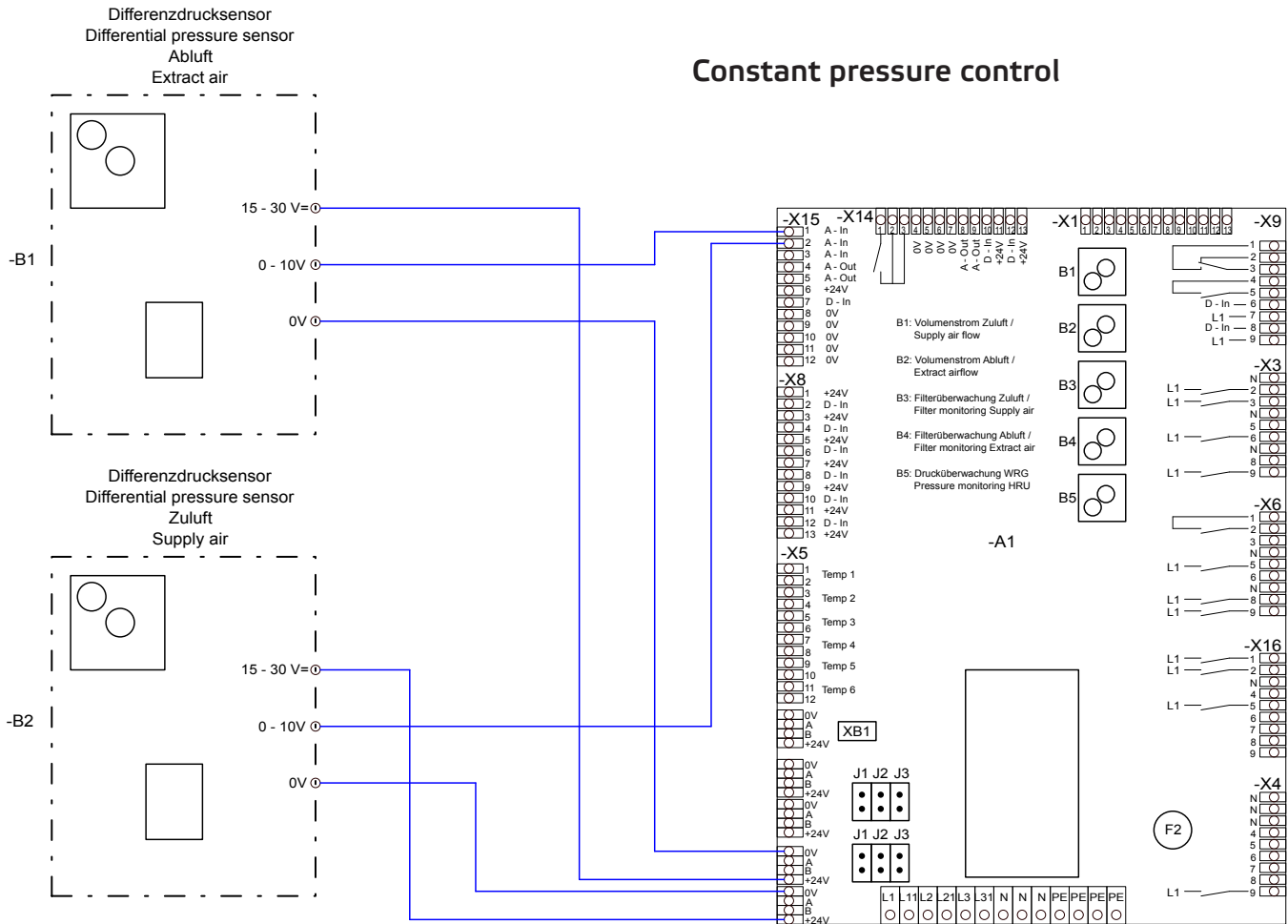
see under „Control outputs for heating and cooling“

Störung	Gerät	Unit fault
Kühlen / Cooling	10-10V	
Heizen / Heating	10V	



19.8. External sensor (differential pressure)

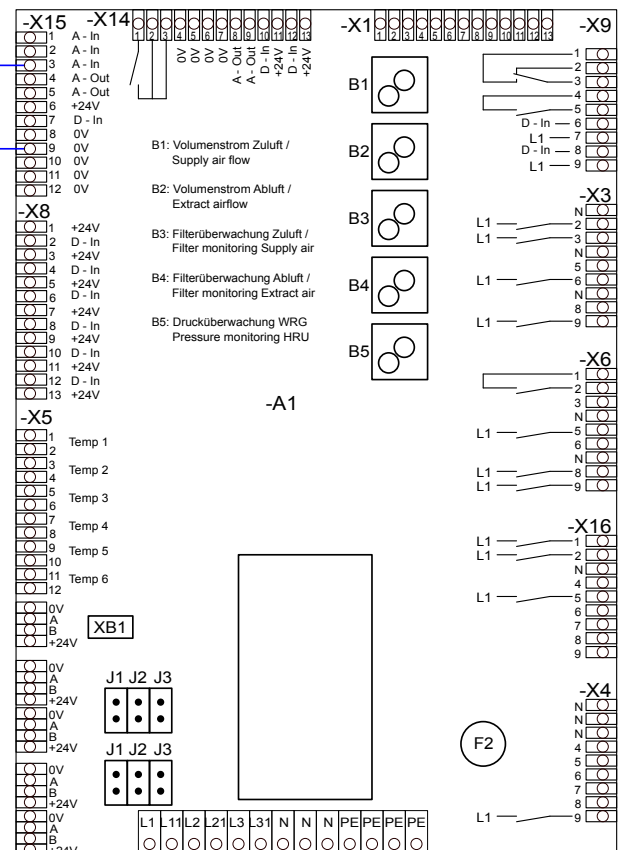
Constant pressure control



19.9. External volume flow control

10V: max. Volumenstrom
2V : min. Volumenstrom
<2V: Gerät Aus

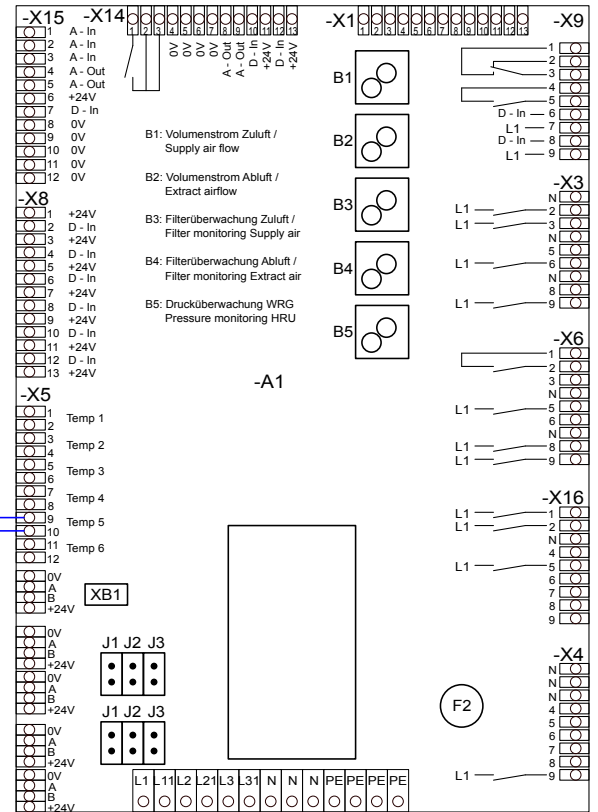
0-10V
GND



19.10. Connection Roomtemperatur Sensor

Optionaler / Optional
Raumtemperatur / Roomtemperatur

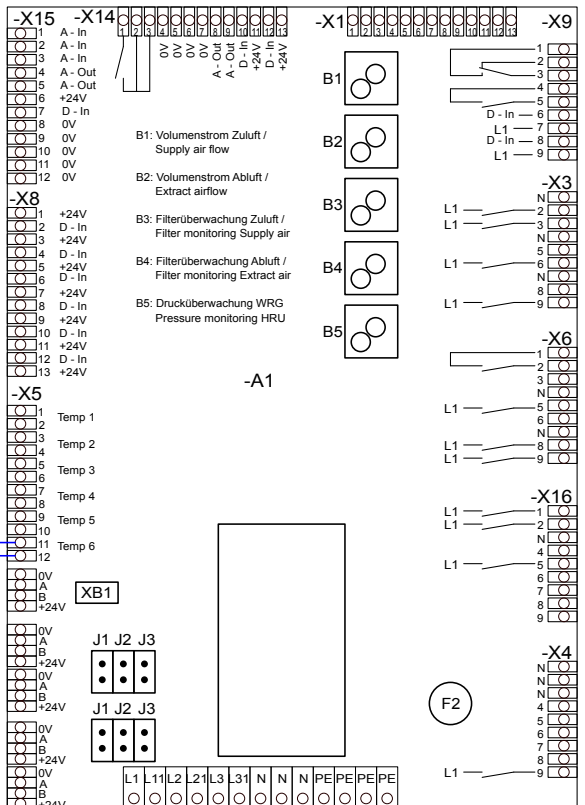
-R5



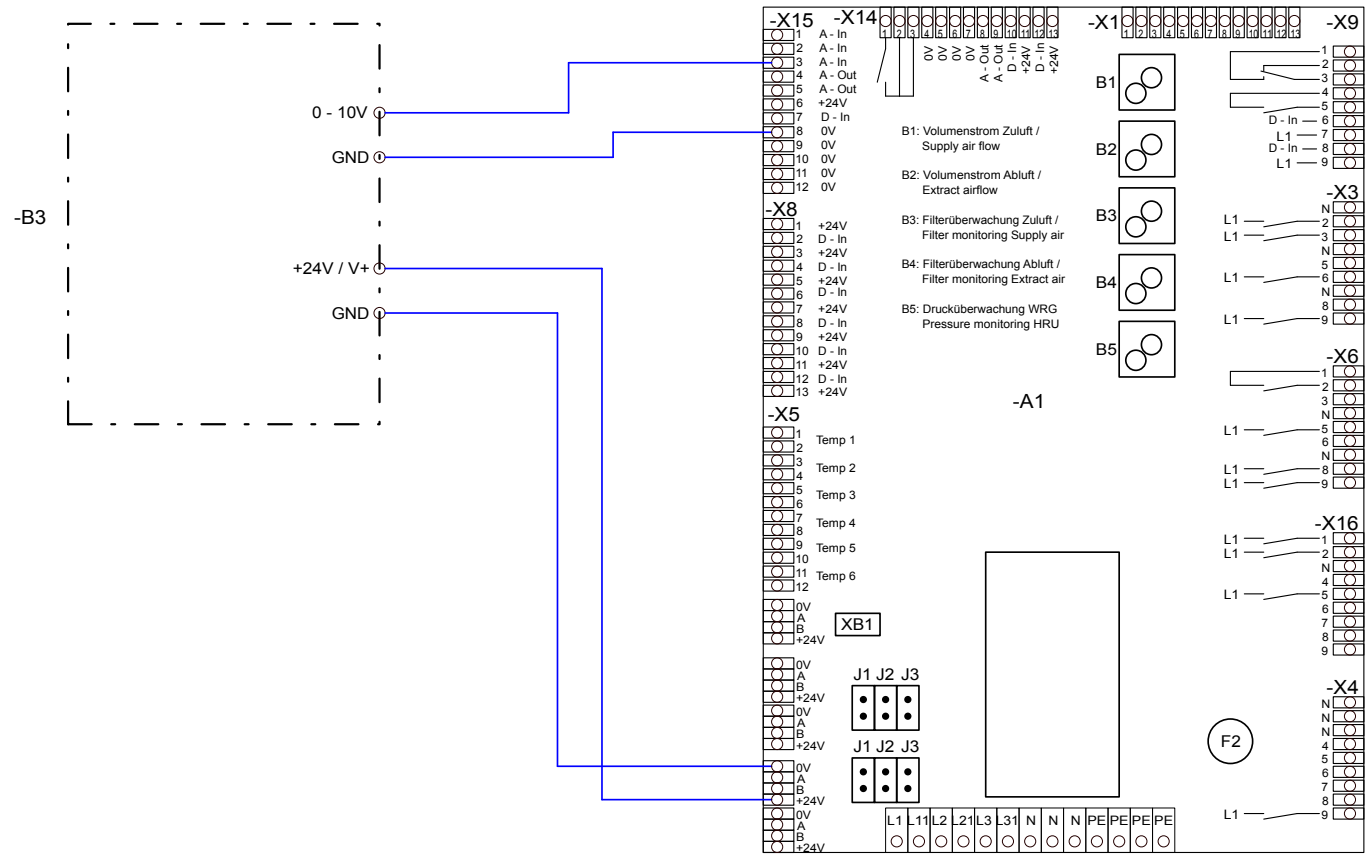
19.11. Connection Outsidetemperatur Sensor

Optionaler / Optional
Außentemperatur / Outsidetemperatur

-R5



19.12. External sensor (CO₂, VOC)



19.13. External set-point (humidity)

