

Katherm HK

Ready-to-install trench heating units for heating or cooling with EC tangential fan

► Assembly and installation instructions

Keep these instructions in a safe place for future use!



Kampmann.de/installation_manuals

I517/06/17 GB SAP-Nr. 1237680

KAMPMAN
Genau mein Klima.

1.43 Katherm HK

Ready-to-install trench heating units with EC tangential fan

Assembly and installation instructions

Key to symbols:



Non-compliance with this information can lead to serious personal injuries or damage to property.



Non-compliance with this information can lead to serious personal injuries or damage to property by electrocution.

Carefully read these instructions in full prior to any assembly and installation work!

Anyone involved with the installation, commissioning and use of this product is obliged to pass these instructions on to tradespeople who are involved at the same time or subsequently, as well as to end users or operators. Retain these instructions until final decommissioning!

We reserve the right to make content or design-related changes without prior notice!

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1. Intended use

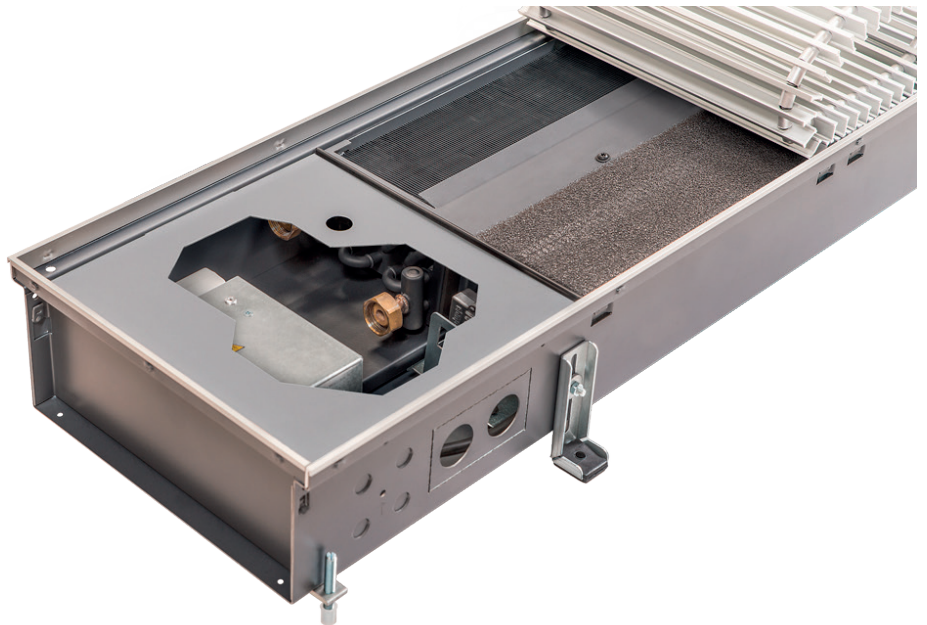
1.1 Description



Kampmann Katherm HK trench heating units are built in line with the state of the art and recognised safety regulations. Nevertheless their use can result in danger to people or damage to the unit or other material property if they are not properly installed or properly used.

Katherm HK trench heating units should only be used indoors (e.g. residential properties, offices, showrooms etc.) They are not suitable for use in humid environments, such as swimming pools or outdoors. Protect the products from any moisture during installation. Check the application with the manufacturer in case of any doubt. Any use other than the use specified above is deemed not to be correct and proper. The operator of the unit is solely responsible for any damage arising as a result of this. Intended use is deemed to include compliance with the installation instructions described in these instructions.

The installation of this product requires specialist knowledge of heating, cooling, ventilation and electrical engineering. This knowledge, generally learned in vocational training in the fields mentioned in section 2, is not described separately. Damage caused by improper installation is the responsibility of the operator.



1.2 Limits of operation and use

Limits of operation		
Min./max. water temperature	°C	5-120
Min./max. air intake temperature	°C	15-40
Min./max. air humidity	%	15-75
Max. operating pressure	bar	10
Min./max. glycol percentage	%	25-50

We would refer to VDI-2035 Sheets 1 & 2, DIN EN 14336 and DIN EN 14868 with regard to the properties of the medium used to protect the equipment. The following values provide further guidance. The water used should be free of contamination, such as suspended substances and reactive substances.

Water quality		
pH value*1		8-9
Conductivity*1	µS/cm	< 700
Oxygen content (O ₂)	mg/l	< 0.1
Hardness	°dH	4-8.5
Sulphur ions (S)		not measurable
Sodium ions (Na ⁺)	mg/l	< 100
Iron ions (Fe ²⁺ , Fe ³⁺)	mg/l	< 0.1

Manganese ions (Mn ²⁺)	mg/l	<0.05
Ammonia ions (NH ₄ ⁺)	mg/l	< 0.1
Chlorine ions (Cl)	mg/l	< 100
CO ₂	ppm	< 50
Sulphate ions (SO ₄ ²⁻)	mg/l	< 50
Nitrite ions (NO ₂ ⁻)	mg/l	< 50
Nitrate ions (NO ₃ ⁻)	mg/l	< 50

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2. Safety information



Only allow a qualified electrician to perform installation, assembly and maintenance work on electrical units in compliance with VDE guidelines. Wiring should comply with the applicable VDE regulations and provisions laid down by the regional electricity providers. Non-compliance with the regulations and operating instructions can result in the units malfunctioning with consequential damage and danger to people. There is a danger of fatal injury caused by wires being crossed due to incorrect wiring! Disconnect all parts of the system from the mains power supply and prevent them from being reconnected before starting any connection and maintenance work!

Please read this manual in full to ensure correct and proper installation.

Please note the following safety-relevant information:

- Disconnect all parts of the system that are being worked on.
- Ensure that the system cannot be accidentally switched on again!
- Before commencing installation/maintenance work, wait until the fan has come to a standstill after the unit has been switched off.
- Caution! Pipes, casings and fittings can become very hot or very cold depending on the operating mode!
- Qualified personnel must have undergone training to provide them with adequate knowledge of the following:
 - Safety and accident prevention regulations
 - Guidelines and recognised technical regulations, i.e. Association of German Electricians (VDE)
 - DIN and EN standards
 - Accident prevention regulations VBG, VBG4, VBG9a
 - DIN VDE 0100, DIN VDE 0105
 - EN 60730 (Part 1)
 - Technical wiring regulations (TABs) issued by the regional electricity providers

Modifications to the unit

Do not undertake any modifications or upgrades on Katherm HK trench heating units without discussing them with the manufacturer as they can impair the safety and operation of the unit.

Do not carry out any measures on the unit not described in this manual. Make sure that on-site systems and cabling are suitable for connection to the intended system!

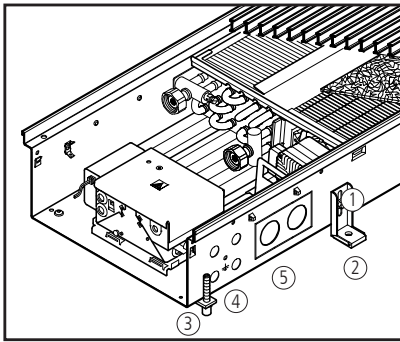


The trench heating unit has openings provided for the installation of a potential equalisation line.

3. Designs/Scope of Delivery

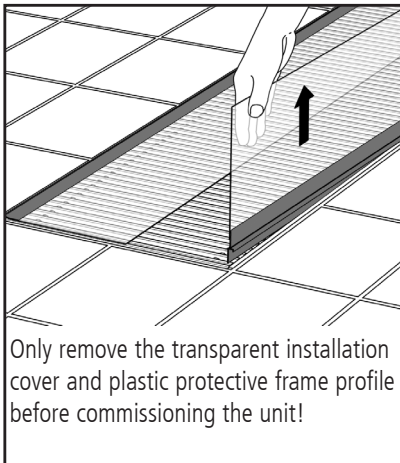
Trench heating units are delivered as standard with:

- Height adjustment feet, room-side, ① rubber pads for acoustic decoupling ② (with screed); screws and dowels to be provided by others,
- Raised floor adjustment feet with adjustment screws ③ and sound insulation ④.

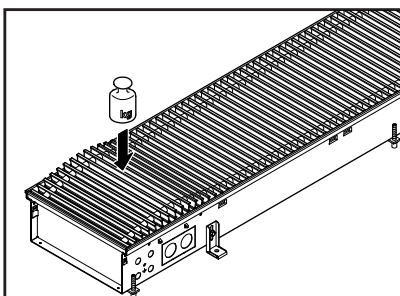


Position of air discharge outlet/convector

Katherm HK 320 with trench height 130 mm	window-side arrangement
Katherm HK 290 with trench height 160 mm	window-side arrangement



Only remove the transparent installation cover and plastic protective frame profile before commissioning the unit!



Roll-up grilles packed separately, for instance when using installation covers to protect the trenches from dirt, are rolled up in the factory. The grille can become slightly over-long due to the steel springs extending. Unrolling the grille and laying it flat for a few hours can return the grille to its original length. Laying the grille into the trench, as shown on the figure above, helps it to fit more easily into the frame.

4. Levelling/Water connection

- Remove the outer film and the packaging.
- Flap open the transparent protective cover.
- Arrange the convector on the window side.
- Then level the trench heating unit and adjust the height using the adjustment feet ① with rubber pads for acoustic decoupling ② and adjustment screws on the raised floor feet ③ with sound decoupling ④.
- Use screws and dowels to fix the height-adjustment feet on the room side with rubber pads.
- Use the pipe openings ⑤ for the water-side connection.
- Remove the punched pipe entry opening or use the round connection openings for electrical wiring. Screw on the thermostatic valve and return shut-off valve without the need for additional sealing to the Eurokonus connections on the convector.
- Then fit the flow and return pipes.
- Perform a pressure test.
- Adhere these installation instructions very visibly to the trench heating unit for subsequent trades.
- Cover the grille and trench with the installation cover to protect it from dirt or cement.

Caution! Grilles are suitable for foot traffic. Avoid point loads (e.g. chair legs).

5. Thermoelectric actuator

The thermoelectric actuator can be connected directly in the trench heating unit to the PCB in the control box.

6. Screed works

Before commencing screeding, check whether

- the water connection has been correctly done,
- the electrical connection has been done correctly,
- the height of the trench heating unit and air flow direction are correct,
- the grille is covered (Caution! Cement destroys the surface of the grille!),
- sound insulation (not with raised floors) is fitted underneath the trench heating unit,
- there are no sound bridges to the concrete slab, especially close to the height adjustment feet,
- requisite empty pipes have been laid,
- appropriate materials have been used to seal all openings and punched openings in the trench heating unit from the ingress of screed.
- seal the openings and punched openings on the trench when using screed or other low-viscosity floor coverings.

Caution!

- Do not allow screed or the floor to press the trench heating unit. Provide expansion joints if necessary.

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Ready-to-install trench heating units with EC tangential fan

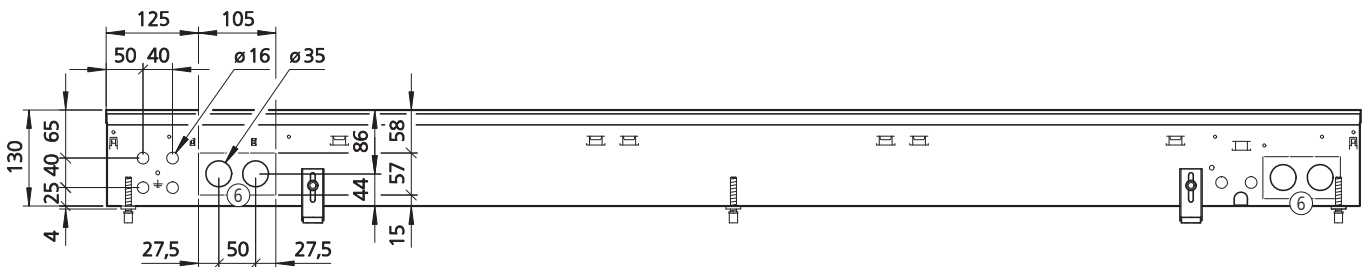
Assembly and installation instructions

7. Water connection • Pipe openings

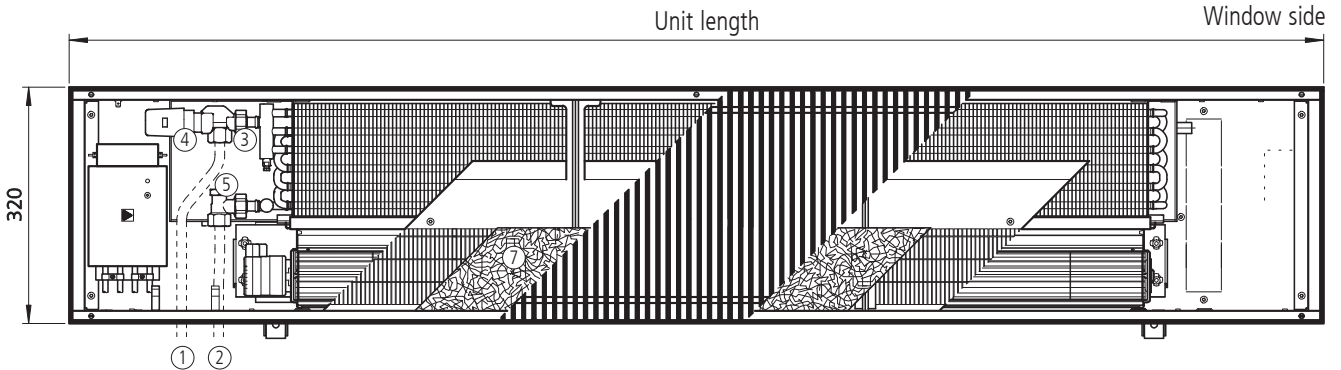
Katherm HK 320, 2-pipe, trench height 130 mm

- ① Heating/cooling flow
- ② Heating/cooling return
- ③ 1/2" valve body, axial, type 346914 and/or type 346911 (flow-dependent)
- ④ Thermoelectric actuator, type 146906
- ⑤ 1/2" return shut-off valve, angled, type 145953
- ⑥ Pipe openings, punched
- ⑦ Filter (optional)

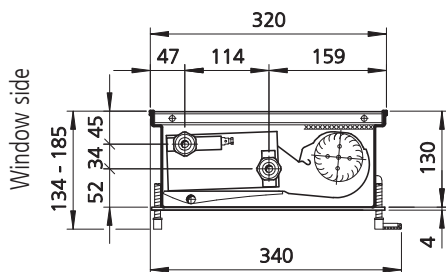
Alternatively: Valve kit type 143241 or type 143211 (flow-dependent)



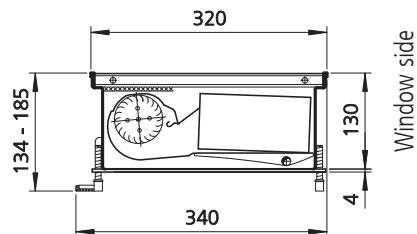
Front view, connection openings



Plan view, water connection on room-side



Cross-section (cooling or heating)
Example shown: roll-up grille

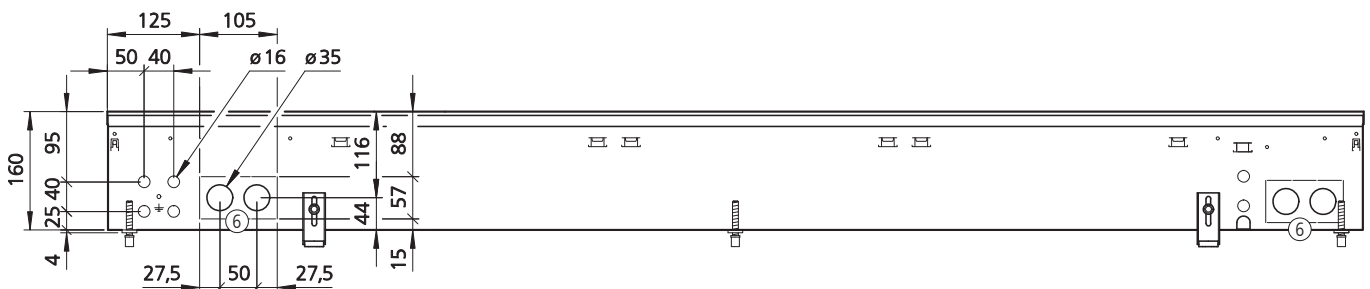


Cross-section (cooling or heating)
Example shown: roll-up grille

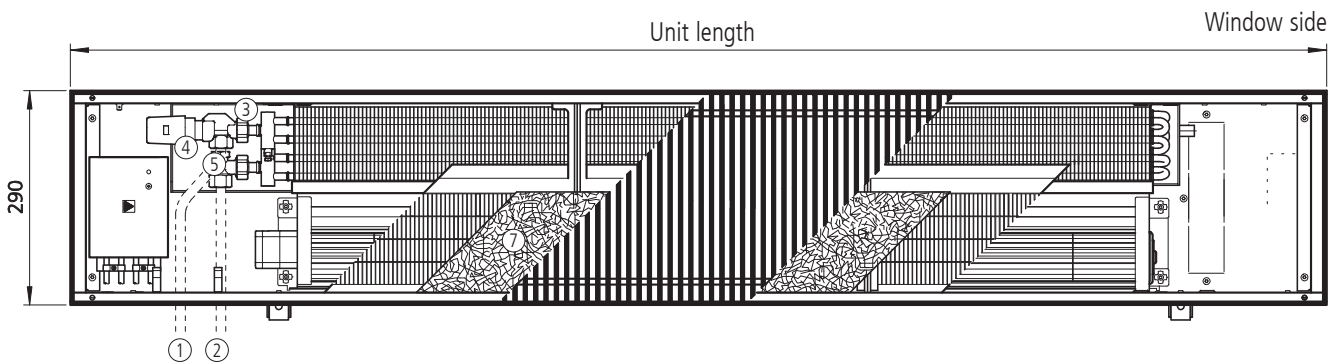
Katherm HK 290, 2-pipe, trench height 160 mm

- ① Heating/cooling flow
- ② Heating/cooling return
- ③ 1/2" valve body, axial, type 346914 and/or type 346911
- ④ Thermoelectric actuator, type 146906
- ⑤ 1/2" return shut-off valve, angled, type 145953
- ⑥ Pipe openings, punched
- ⑦ Filter (optional)

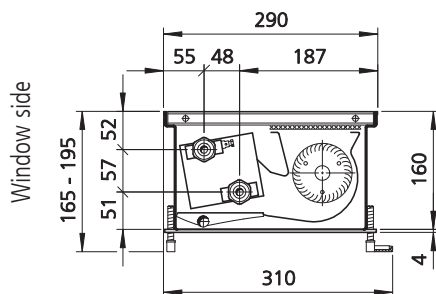
Alternatively: Valve kit type 143241 or type 143211 (flow-dependent)



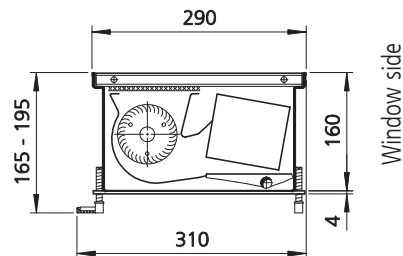
Front view, connection openings



Plan view, water connection on room-side



Cross-section (cooling or heating)
Example shown: Roll-up grille



Cross-section (cooling or heating)
Example shown: Roll-up grille

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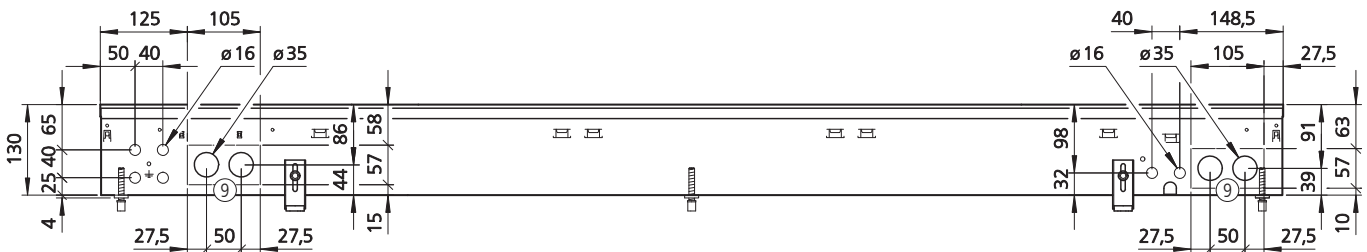
Ready-to-install trench heating units with EC tangential fan

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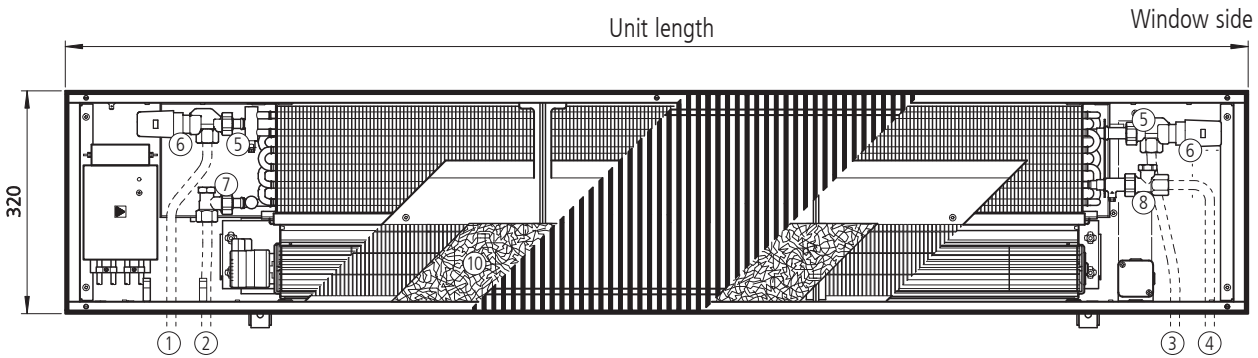
Katherm HK 320, 4-pipe, trench height 130 mm

- ① Flow pipe for cooling
- ② Return pipe for cooling
- ③ Flow pipe for heating
- ④ Heating return
- ⑤ 1/2" valve body, axial, type 346914 and/or type 346911 (flow-dependent)
- ⑥ Thermoelectric actuator, type 146906
- ⑦ 1/2" return shut-off valve, angled, type 145953
- ⑧ 1/2" return shut-off valve, straight, type 145952
- ⑨ Pipe openings, punched
- ⑩ Filter (optional)

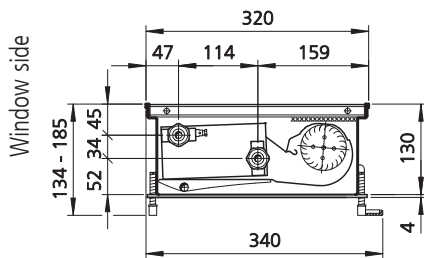
Alternatively: Valve kit type 143441 or type 143411 (flow-dependent)



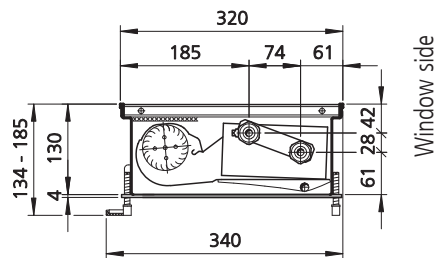
Front view, connection openings



Plan view, water connection on room-side



Cross-section (cooling or heating)
Example shown: roll-up grille

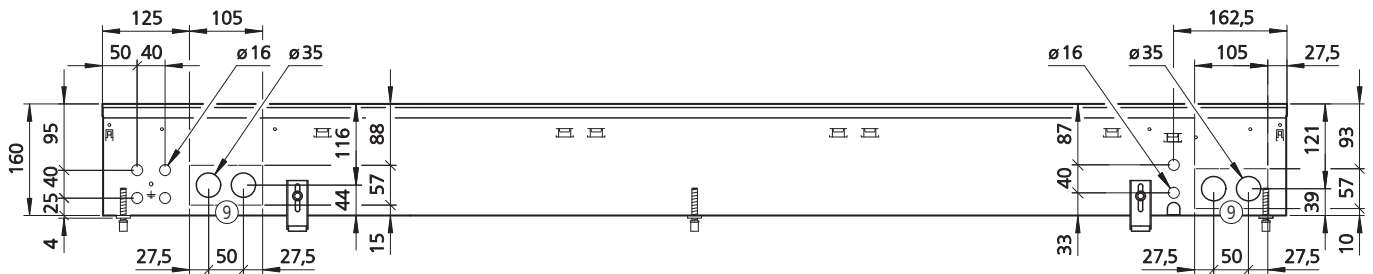


Cross-section (cooling or heating)
Example shown: roll-up grille

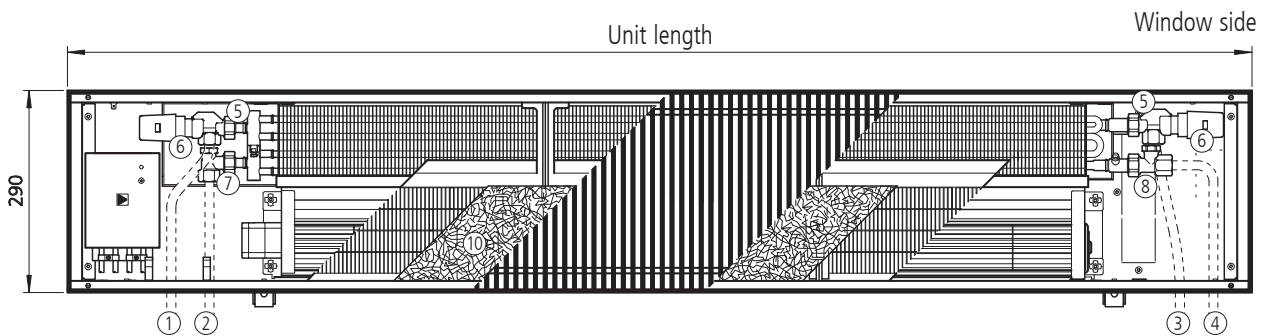
Katherm HK 290, 4-pipe, trench height 160 mm

- ① Flow pipe for cooling
- ② Return pipe for cooling
- ③ Flow pipe for heating
- ④ Heating return
- ⑤ 1/2" valve body, axial, type 346914 and/or type 346911
- ⑥ Thermoelectric actuator, type 146906
- ⑦ 1/2" return shut-off valve, angled, type 145953
- ⑧ 1/2" return shut-off valve, straight, type 145952
- ⑨ Pipe openings, punched
- ⑩ Filter (optional)

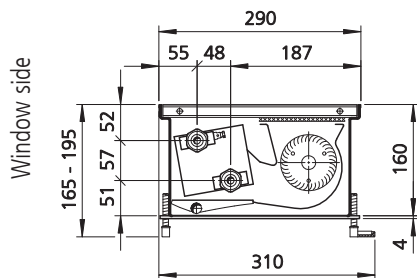
Alternatively: Valve kit type 143441 or type 143411 (flow-dependent)



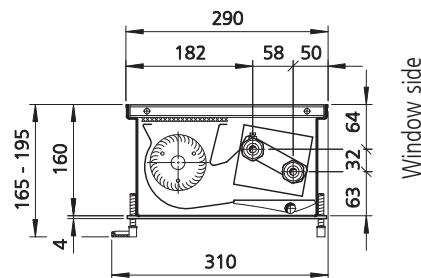
Front view, connection openings



Plan view, water connection on room-side



Cross-section (cooling or heating)
Example shown: roll-up grille



Cross-section (cooling or heating)
Example shown: roll-up grille

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Ready-to-install trench heating units with EC tangential fan

Assembly and installation instructions

8. Connection of condensation pump fitting kit

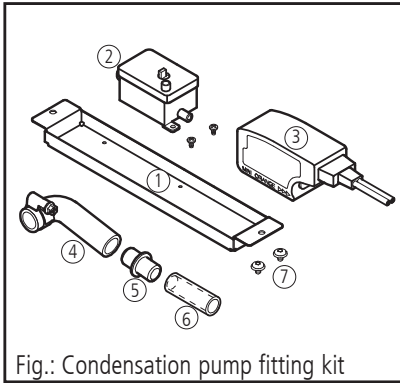
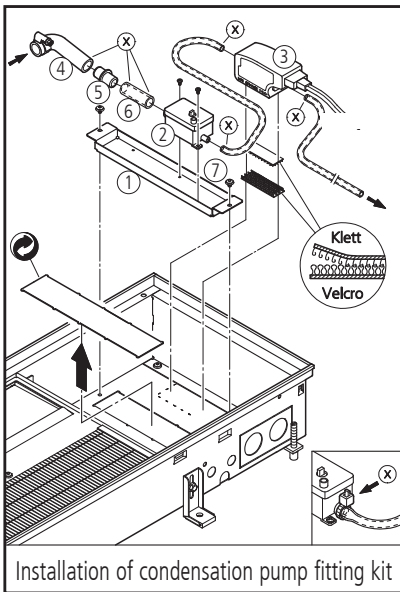


Fig.: Condensation pump fitting kit



Installation of condensation pump fitting kit

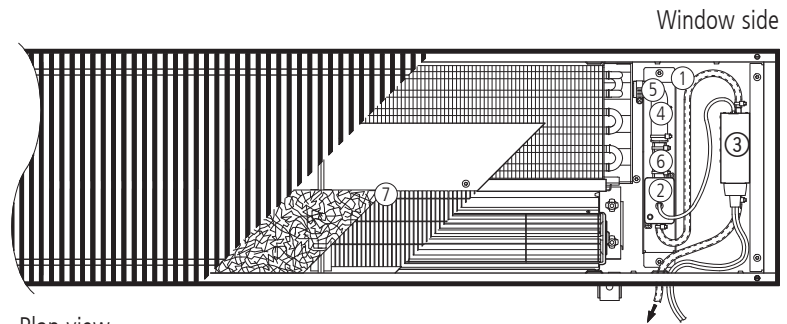
- ① Mounting bracket for float module
- ② Float module
- ③ Pump unit
- ④ Condensation bend section
- ⑤ Coupling section
- ⑥ Condensation hose
- ⑦ Metal screws
- ⊗ Fixing with cable ties provided

8.1 Condensation pump fitting kit

If it is impossible to remove any accumulated condensation by the natural slope of the pipe, a fitting set can be ordered depending on the design of Katherm HK.

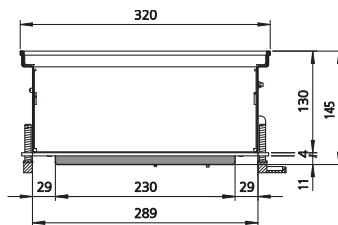
8.2 Connection of fitting kit for Katherm HK 320, H = 130 mm or Katherm HK 290, H = 160 mm

Caution! Note the increase in the height of the trench when the fitting kit is installed. Fit the condensation pump fitting kit before fitting the valves for the water connection (with 4-pipe systems).

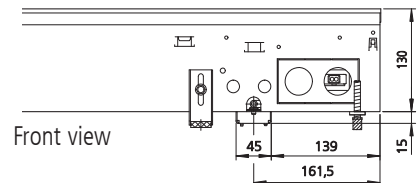


Plan view

Window side



Side view



Front view

Example shown: Katherm HK 320, H = 130 mm, 2-pipe, extended trench height with condensation pump*

- ① Mounting bracket for float module
- ② Float module
- ③ Pump unit
- ④ Condensation bend with clamp
- ⑤ Condensation tray outlet connector
- ⑥ Condensation hose section
- ⑦ Filter (optional)

Step 1: Remove the narrow punched panel of the base of the unit on the right-hand connection side. Position the retaining bracket for the float module ① here and use the screws provided to fix it in place.

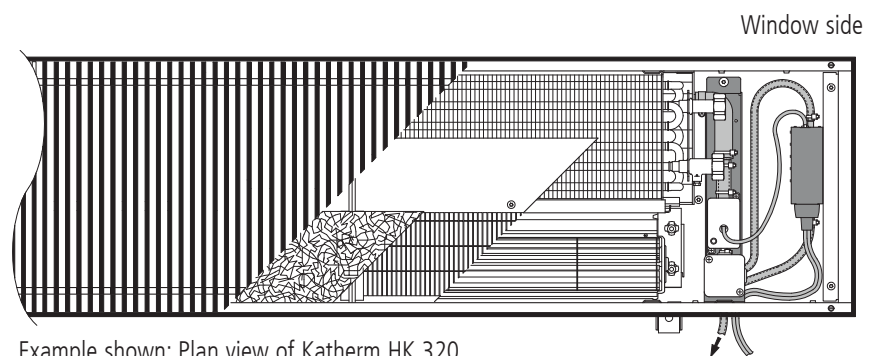
Step 2: Fix the pump unit ② to the base of the trench using the double-sided velcro provided.

* With Katherm HK 290, H = 160 mm, the installation position of the condensation tray and thus also the corresponding dimensions are identical to those of the Katherm HK 320, H = 130 mm. Only the dimensions of the trench height differ.

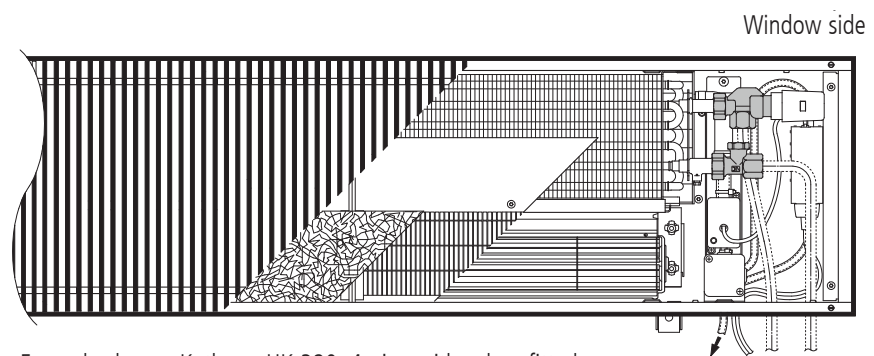
Step 3: Insert the float module ③ into the mounting bracket and use the screws provided to fix it in place.

Step 4: Fix a section of condensation hose ⑥ to the float module with a cable tie provided. Use the coupling section ⑤ to connect the condensation hose section to the condensation end section ④. You will need cable ties to fix it in place. Finally use the hose clamp to fix the condensation bend to the outlet connection of the condensation tray ⑧.

Step 5: Please refer to the separate manufacturer's installation instructions and the electrical wiring information for further steps to ensure the correct installation of the condensation pump.

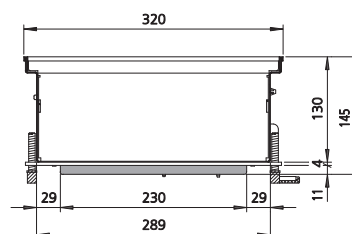


Example shown: Plan view of Katherm HK 320 with condensation pump fitting kit installed

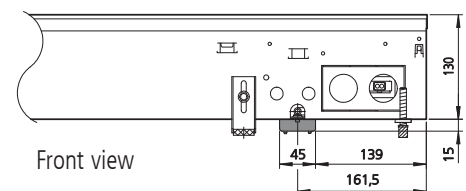


Example shown: Katherm HK 320, 4-pipe with valves fitted

Window side



Side view



Front view

* With Katherm HK 290, H = 160 mm, the installation position of the condensation tray and thus also the corresponding dimensions are identical to those of the Katherm HK 320, H = 130 mm. Only the dimensions of the trench height differ.

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8.3 Condensation pump connection data

Max. delivery height	8 m
Max. pump volume	3 l/h
Supply voltage	230 V/50 Hz (separate power line needed)
Power consumption	20 W
Condensation pressure line	DN 6 mm (hose connection)
Signal contact for condensation overflow	Changeover contact, potential free; Switching capacity 230 V/8 (5)A

9. Number of height-adjustment feet and raised floor feet

Katherm HK 320/290	Trench length [mm]	Quantity of height-adjustment feet	Quantity of raised floor brackets
H 130 mm/ H 160 mm 2-pipe / 4-pipe	915 /950*	2	2
	1200	2	3
	1700	2	4
	2000	2	4
	2500	2	5
	3000	2	5

* applies to Katherm HK 290

10. Maintenance

10.1 Information

Only permit trained qualified personnel to perform maintenance work on Katherm HK trench heating units in compliance with the installation and operating instructions as well as any regulations currently in force. Regularly maintain and inspect Katherm HK units to ensure their proper function and performance.

Filter

- Regularly check the filters installed above the tangential fans for any dirt and possible damage (visual inspection). Do this every 3 months.
- Clean the filters carefully by tapping or vacuuming them in the event of dirt. Never use a cleaning agent to clean the filters!
- Replace the filters if they are heavily soiled.

Fan

- Inspect the tangential fans every six months for dirt and damage (visual inspection).
- Clean the fan shafts carefully with a cloth if dirty.

Heat exchanger

- Inspect the in-built heat exchanger every six months for dirt and possible damage. Visual inspection is sufficient here too.
- Carefully vacuum the heat exchanger if dirty.

Condensation drain

- Check the condensation drain every 12 months to ensure that it is working properly (visual check).

Valves

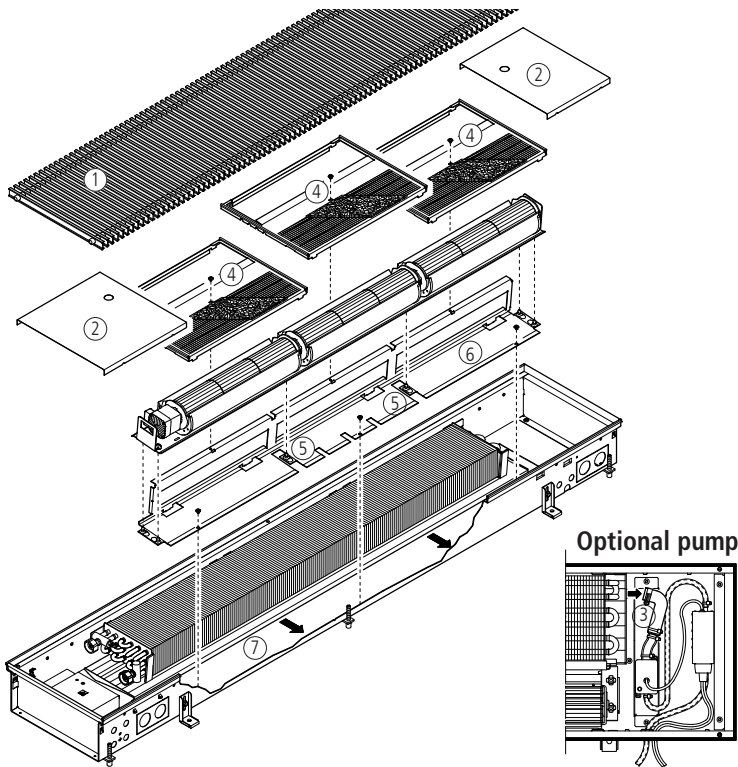
- Inspect the valves every 12 months and check that they are leak-tight (visual inspection)!

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Assembly and installation instructions

10.2 Cleaning the condensation tray



Example shown: Katherm HK 320



Important:

Disconnect all parts of the system from the mains power supply and prevent them from being reconnected before starting any maintenance work.

Before commencing maintenance work, wait until the fan has come to a standstill after the unit has been switched off.

Inspect the condensation tray every 3 months for dirt, corrosion, damage and leak-tightness and clean and repair if necessary. Adjust the maintenance intervals to suit the actual level of wear and tear if there are signs of increased wear/dirt during regular checks.

Risk of injury from sharp metal parts! Wear protective gloves!

Dismantling / Assembly steps:

1. Remove the grille from the trench heating unit ①.
2. Remove the cover plates for the connections and return end and between if necessary ②.
3. Loosen the clamp from the condensation bend section and carefully pull the condensation bend section from the condensation tray drain connection ③.
4. Loosen the screws from the sections panels and remove them carefully from the brackets on the walls of the trench heating unit ④.
5. Carefully remove the motor connection plug from the tangential fan.
6. Carefully remove the tangential fans from the mounting bolts ⑤ on the central wall ⑥.
7. Loosen the screws on the central wall and remove the central wall from the trench.
8. Pull the condensation tray positioned underneath the heat exchanger to the room side of the trench ⑦.
Important: Do not remove the condensation tray.
9. Clean the condensation tray.
10. Fit the aforementioned components in reverse order.

11. Consumption figures

Katherm HK - Power consumption (P)* / Current consumption (A)											
Design Katherm HK	Trench length [mm]	Speed setting [%]									
		20		40		60		80		100	
		P [W]	I [mA]	P [W]	I [mA]	P [W]	I [mA]	P [W]	I [mA]	P [W]	I [mA]
HK 320, H 130 mm 2-pipe / 4-pipe	915	4.7	49.0	5.0	52.0	5.6	58.0	6.5	67.0	7.9	82.0
	1200	4.9	51.0	5.5	57.0	6.5	67.0	8.4	86.0	11.4	118.0
	1700	5.3	55.0	6.5	67.0	9.0	93.0	13.3	137.0	16.4	169.0
	2000	9.8	102.0	11.0	114.0	13.0	135.0	16.7	173.0	22.9	237.0
	2500	10.2	106.0	12.0	124.0	15.5	160.0	21.6	224.0	27.8	288.0
	3000	10.6	110.0	12.9	134.0	17.9	185.0	26.5	275.0	32.7	339.0
HK 290, H 160 mm 2-pipe / 4-pipe	950	4.1	59.0	5.3	68.0	7.1	82.0	10.1	104.0	12.6	124.0
	1200	4.3	59.0	5.9	71.0	9.0	95.0	14.2	133.0	18.4	166.0
	1700	6.1	74.0	8.3	92.0	13.9	127.0	21.3	188.0	28.3	237.0
	2000	6.3	76.0	9.1	100.0	15.3	146.0	25.8	222.0	34.8	293.0
	2500	7.8	88.0	11.3	113.0	18.6	168.0	32.5	274.0	45.6	370.0
	3000	8.1	92.0	13.0	127.0	22.9	200.0	41.8	335.0	61.8	478.0

* Add an additional power consumption of 3 W per valve drive type 146906.

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12. Electrical wiring

Personnel:

- Installation personnel
- Qualified electrician

Protective equipment:

- Safety shoes
- Protective gloves
- Workwear



Only allow qualified electricians to perform electrical work. Further connections, for instance to building control systems or external controllers, may be necessary. Refer to the manufacturer's literature in this respect.

- Only wire the unit in accordance with the enclosed wiring diagram.
- Only wire the unit in accordance with currently applicable VDE and EN guidelines, as well as Technical Wiring Regulations stipulated by the regional energy supply companies.
- Only connect the unit to fixed cables.

Only use the room or clock thermostat as a room control unit with the 230 V electromechanical model.

Only use the KaController in conjunction with the KaControl system.

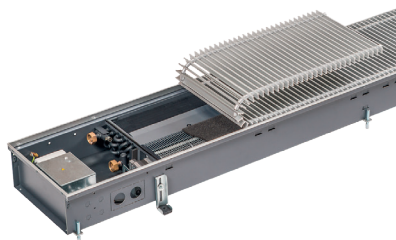


Important:

Provide an all-pole mains separator in the wiring on site that can be reliably secured to avoid the system being reconnected (e.g. a lockable switch with a contact opening of at least 3 mm up to a rated voltage of 480 V).

No protective measures are indicated in the Kampmann wiring diagrams. These must be provided additionally when installing the system and when connecting the units in accordance with VDE 0100 and the regulations of each of the respective energy supply companies.

12.1 Overview of controls



The unit comes in a series of different electrical versions. Connect it via a terminal strip in the electrical junction box, located on the side of the unit's water connection. Wire the unit as per the wiring diagram, which is different for each version.

Design	Art. no. suffix
24 V electromechanical	_24
230 V electromechanical	_00
KaControl	_C1

Example of 24 V electromechanical:
1432926111424, Katherm HK 290

Ask a qualified electrician to determine the type of cable and cable cross-sections: the cable cross sections basically depend on the fuses for the cable length and the wiring capacity of the electric motors on site.

Maximum electrical power / current consumption

Katherm HK model	Control	Trench length [mm]	Maximum power consumption [W]	Maximum current consumption [mA]
HK 320, H 130 mm 2-pipe / 4-pipe	*24 *00 *C1	915	7.9	82.0
		1200	11.4	118.0
		1700	16.4	169.0
		2000	22.9	237.0
		2500	27.8	288.0
		3000	32.7	339.0
HK 290, H 160 mm 2-pipe / 4-pipe	*24 *00 *C1	950	12.6	124.0
		1200	18.4	166.0
		1700	28.3	237.0
		2000	34.8	293.0
		2500	45.6	370.0
		3000	61.8	478.0

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12.2 24 V electromechanical electrical model

Product features

The operating voltage must be provided by a central on-site 24 V DC voltage supply.

Kampmann offers a range of switching power units in different output classes as accessories for the voltage supply (24 V DC).

The fan automatically switches off in the event of a motor fault.



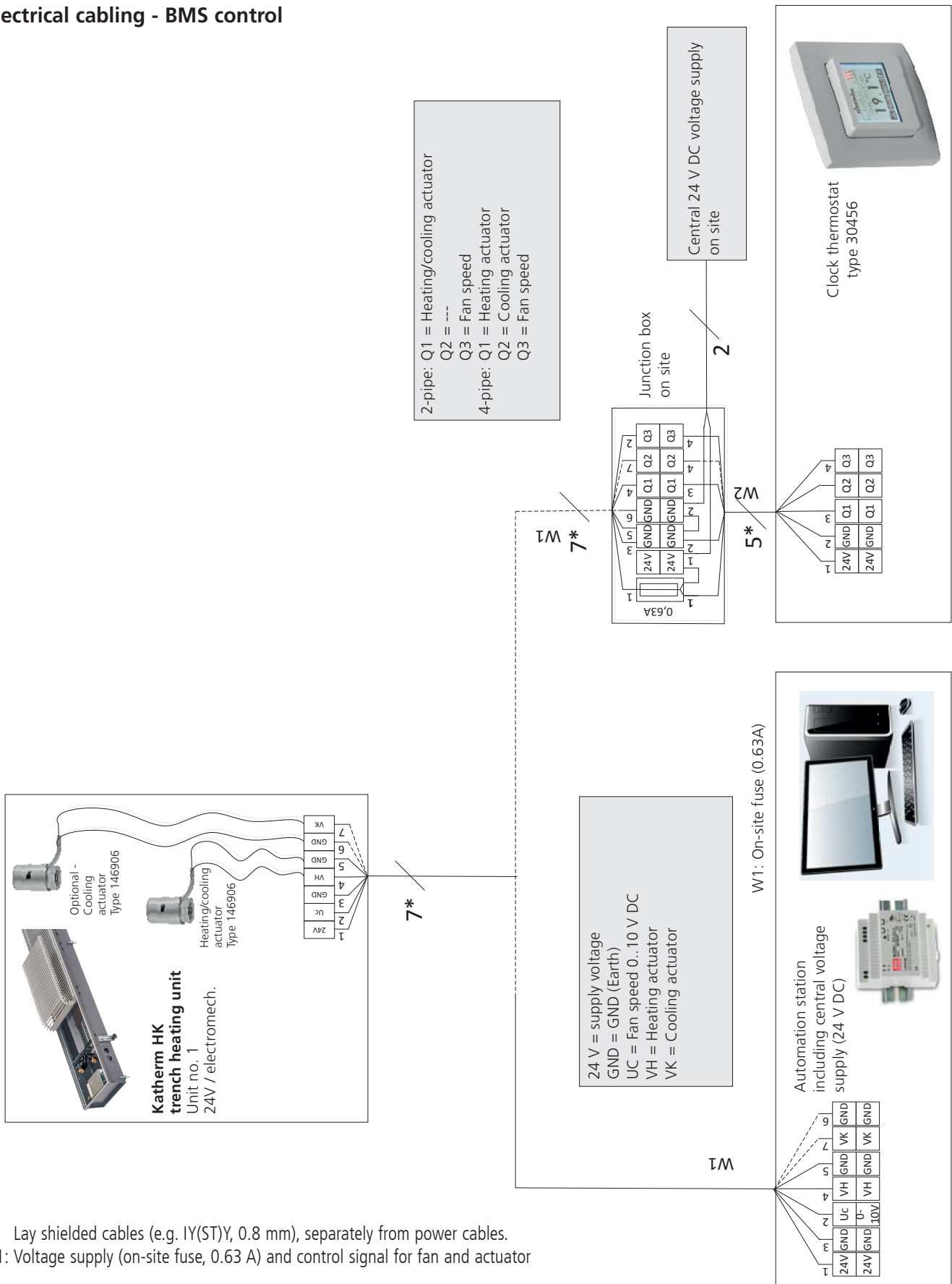
Fig.: Clock thermostat

The clock thermostat 30456 permits the operation and temperature control of 24 V electromechanical **Katherm** HK units.

The room temperature is set by sensor-controlled functional keys.

Complete with 10-stage fan speed adjustment in manual and automatic operating mode, including automatic summer/winter changeover and a day or week program.

Electrical cabling - BMS control



* Lay shielded cables (e.g. IY(ST)Y, 0.8 mm), separately from power cables.
W1: Voltage supply (on-site fuse, 0.63 A) and control signal for fan and actuator

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12.3 230 V electromechanical electrical model



Fig.: Room thermostat type 30155

Product features

The clock thermostat type 30155 permits the operation and temperature control of 230V electromechanical Katherm HK units.

Features:

- Operating mode switch OFF/MAN/Auto
- Fan speed selector switch 1/2/3
- Setpoint dial 5-30 °C

When the operating mode switch is in the OFF position, the room frost protection function is activated. If the room temperature falls below approx. 5 °C, the heating valve is opened and the fan is switched on at fan stage 3. In MAN position, the fan speed can be specified at 3 parametrisable levels. In AUTO position, a fan speed is set automatically, which is dependent on the difference between the target and actual temperature and the set proportional band. Fan switch-off delay is active once the heating or cooling output has been switched off.

Dimensions W x H x D: 110x111x26 mm

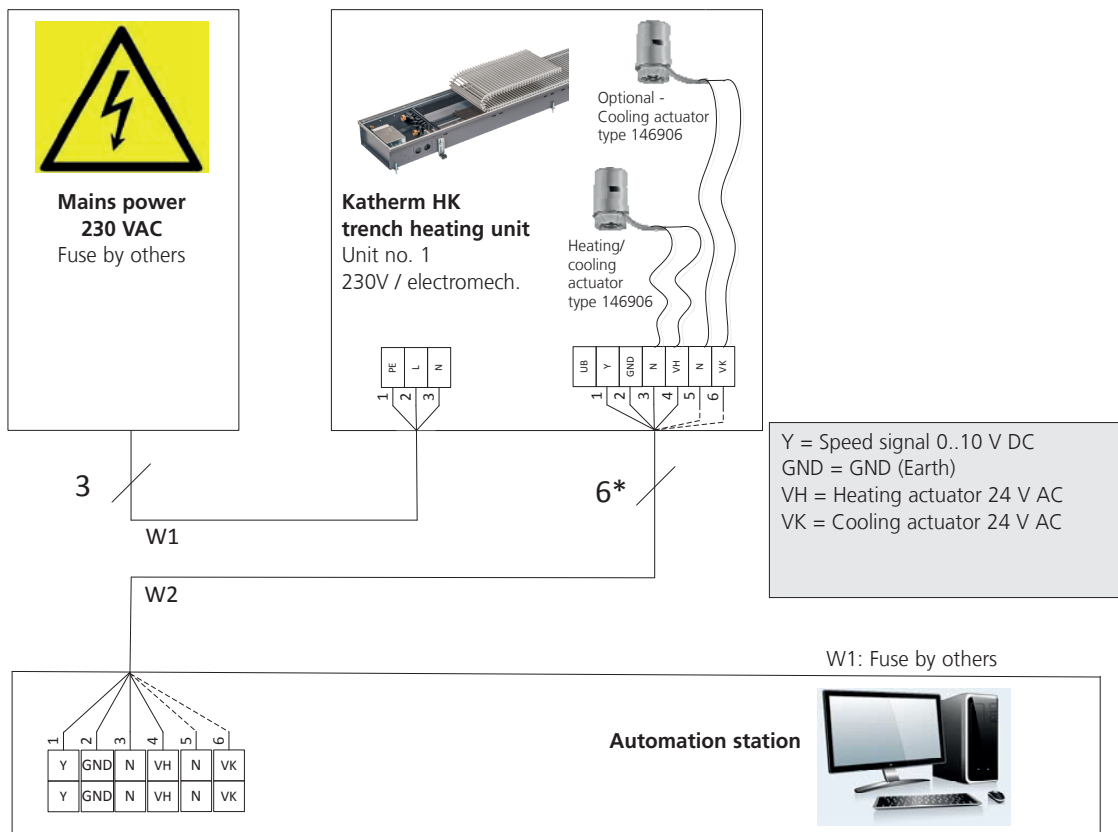


Up to five Katherm HK and room thermostats type 30155 can be connected.



Use 230 V AC actuators type 146905 when using room thermostat type 30155.

Electrical cabling - BMS control

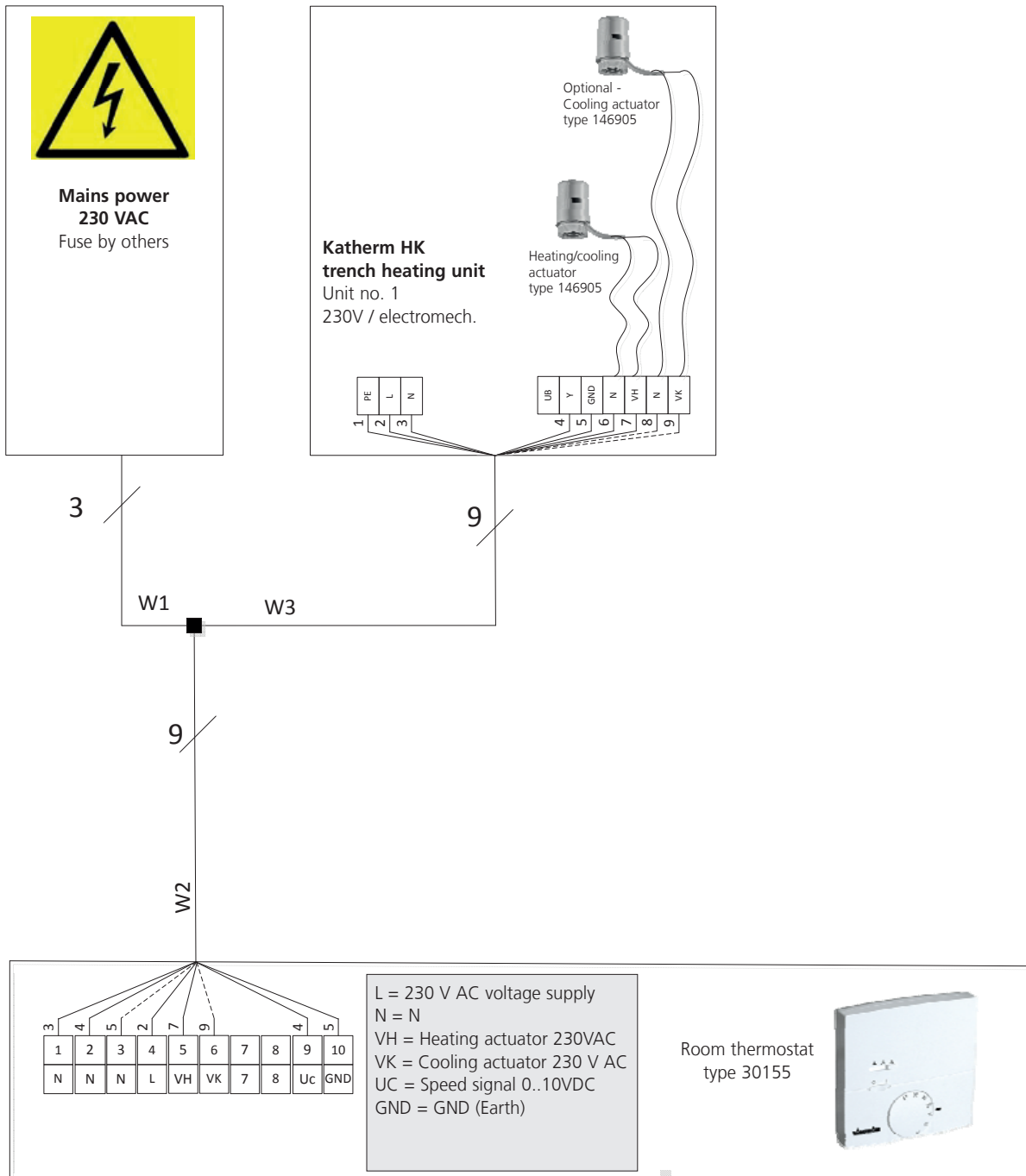


* Lay shielded cables (e.g. IY(ST)Y, 0.8 mm), separately from power cables.

W1: Voltage supply (fuse by others)

W2: Control signal for fan and actuator

Electrical cabling – Control via clock thermostat, type 30155



W1: Voltage supply (fuse by others)
W2: Voltage supply, control signal for fan and actuator
W3: Voltage supply, control signal for fan and actuator

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13. Katherm HK, KaControl model (*C1)

13.1 Intended Use



Kampmann KaControllers and KaControl modules are built in line with the state of the art and recognised safety regulations. Nevertheless, their use can result in danger to people or damage to the units or other material property if they are not appropriately installed and operated or correctly and properly used.

Applications

The KaController should only be used as a room unit in conjunction with Kampmann systems.

KaControllers should only be used

- indoors (for instance in residential properties and offices, showrooms etc.)

KaControllers should not be used

- outdoors,
- in humid areas, such as swimming pools, in wet rooms,
- in areas where there is a risk of explosion,
- in areas with a high dust content,
- in areas with an aggressive atmosphere

Protect the products from any moisture during installation. Check the application with the manufacturer in case of any doubt. Any use other than the use specified above is deemed not to be correct and proper.

The operator of the unit is solely responsible for any damage arising as a result of this. Intended use is deemed to include compliance with the installation instructions described in these instructions.

Specialist knowledge

The installation of this product requires specialist knowledge of heating, cooling, ventilation and electrical engineering. This knowledge, generally learned in vocational training in one of the fields mentioned above, is not described separately. Damage caused by improper installation is the responsibility of the operator.

The installer of these units should have adequate knowledge of the following gained from specialist vocational training

- Safety and accident prevention regulations
- Guidelines and recognised technical regulations, i.e. Association of German Electricians (VDE) regulations, DIN and EN standards.

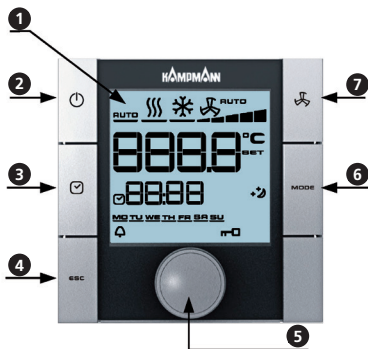
Purpose and scope of these instructions

This manual contains information on the commissioning, functionality and operation of the KaControl system. The information contained in these instructions can be changed without prior notification.



These instructions only outline a few of the possible options. All the setting options can be found in the complete instructions for the KaControl at "www.Kampmann.de/....."

13.2 Function keys, display elements



KaController with function keys
type 3210002

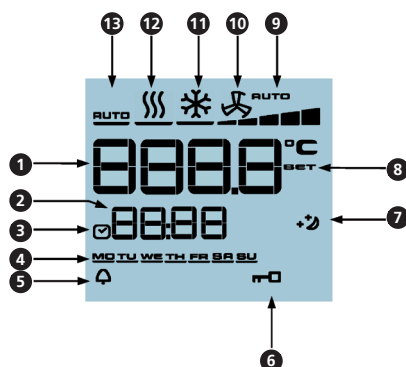
- 1 Display with LED background lighting
- 2 ON/OFF button (depending on setting)
 - ON / OFF (factory setting)
 - Eco mode/Day mode
- 3 TIMER button
 - Set time
 - Set timer programs
- 4 ESC button
 - Back to the standard display
- 5 Navigator dial
 - Change settings
 - Call up menus
- 6 MODE button
 - Set operating modes (disabled with 2-pipe applications)
- 7 FAN button
 - Set fan control



KaController without function keys
(single-button operation)
type 3210001

All menus can be selected and set using the navigator dial.

The LED background lighting is automatically switched off 5 seconds after the KaController is last used. The LED background lighting can be permanently disabled by means of a parameter setting.



Display

- 1 Display of setpoint room temperature
- 2 Current time
- 3 Timer program activated
- 4 Weekday
- 5 Alarm
- 6 Selected function is locked
- 7 Eco mode
- 8 Setpoint setting activated
- 9 Fan control setting Auto-0-1-2-3-4-5
- 10 Ventilation mode
- 11 Cooling mode
- 12 Heating mode
- 13 Automatic heating/cooling changeover mode

The symbols on the display depend on the application (2-pipe, 4-pipe etc.) and the parameters set.

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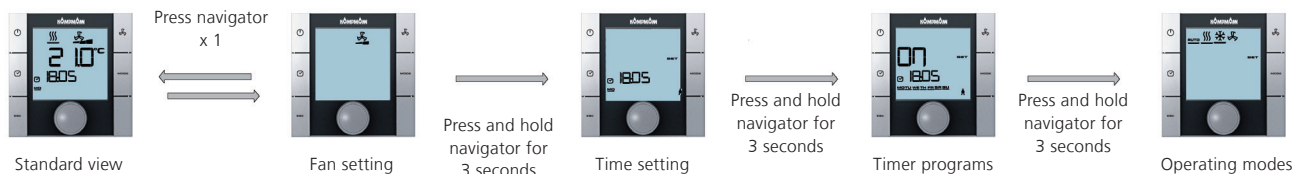
13.3 Operation

The KaController is operated by the navigator dial and the function keys.

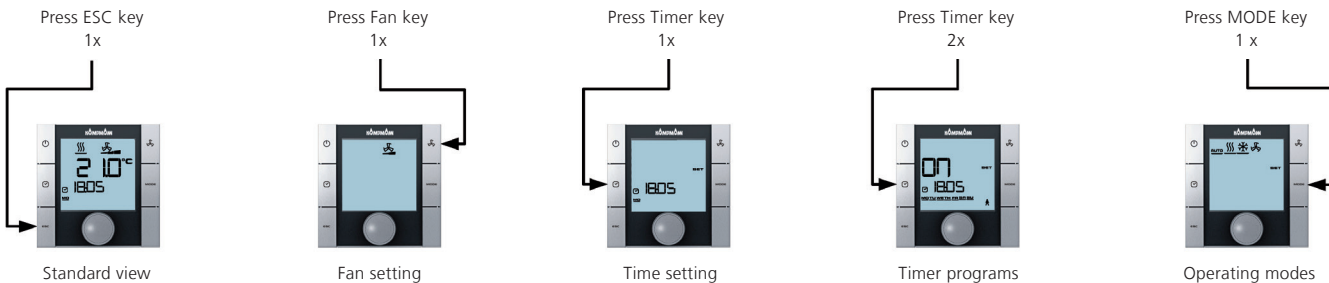
The functions that can be called up and set using the navigator are identical on both versions (with and without function keys on the side). An illustration of the KaController with the function keys at the side is used throughout these instructions for ease of understanding.

The navigator dial or side function keys are also used to select the various selection menus.

Menu selection using the navigator dial



Menu selection using function keys



i If no action is carried out using the navigator dial or the function keys for longer than 3 seconds, the last change made is saved and the standard view is called up.

13.4 Activating and deactivating the control

When the control is switched on, the display shows the standard view with the current room temperature setpoint and the fan stage set.



Following initial commissioning of the KaController, the time is no longer shown in the standard view (see "Time setting" selection menu).



Standard view

There are 3 options for switching off the control:

1. Press the ON/OFF button.
2. Turn the navigator dial to the left until OFF appears.
3. Press and hold down the navigator dial until OFF appears.



Controller OFF view

Activating the control:

There are 2 options for switching on the control:

1. Press the ON/OFF button.
2. Press the navigator dial.

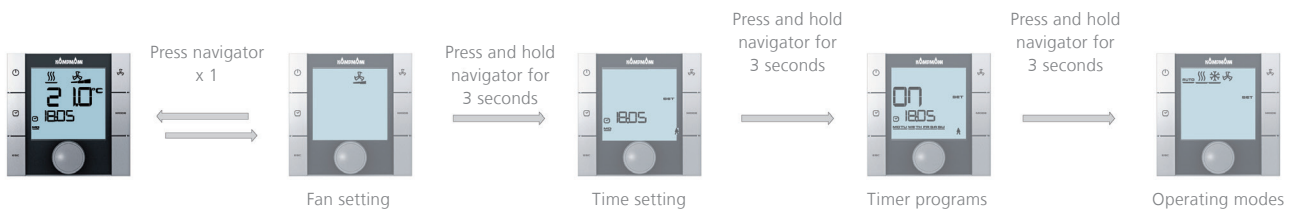
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13.5 Temperature adjustment (absolute value)

The temperature setpoint is entered from the standard view.
To call up the standard view, press ESC or do not touch the KaController for 3 seconds.



Standard view

Setting the temperature setpoint:

A new temperature setpoint can be set by turning the navigator in the standard view.

Apply the set value by pressing the navigator dial and calling up the standard view.



If no action is carried out using the navigator dial or the function keys for longer than 3 seconds, the last change made is saved and the standard view is called up.

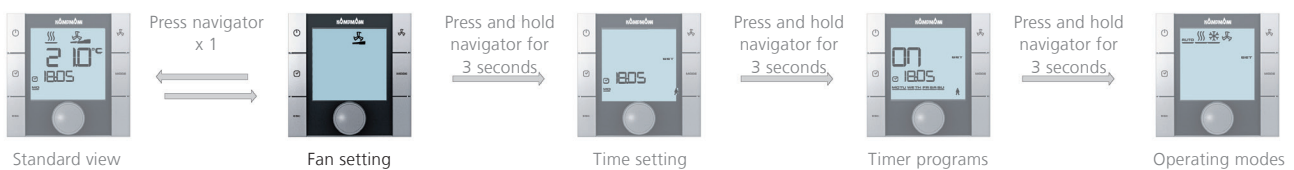


Setting the temperature setpoint

13.6 Fan setting

Press the FAN key (quick access) or use the navigator dial to call up the "Fan setting" selection menu.

Calling up the "Fan setting" menu using the navigator dial:



Fan stage 3

The room temperature is initially controlled with natural convection in automatic mode and then by continually adjusting the fan speed. Users also have the option of setting fan stages Auto-0-1-2-3-4-5 as required.

Pressing the navigator dial in the standard view switches the display to the "Fan setting" menu.

You can select the required fan stage Auto-0-1-2-3-4-5- by turning the navigator.

Pressing the navigator dial activates the selected fan stage.

i If no action is carried out using the navigator dial or the function keys for longer than 3 seconds, the last change made is saved and the standard view is called up.

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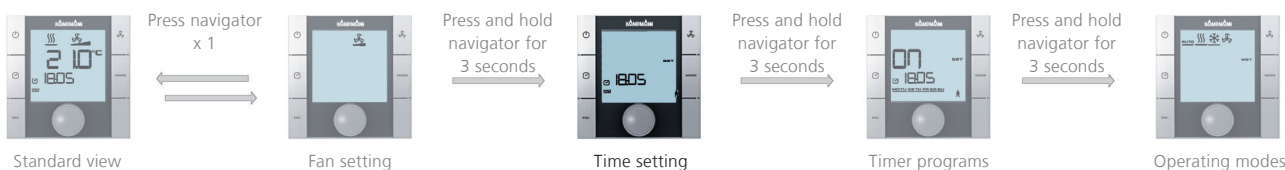
Ready-to-install trench heating units with EC tangential fan

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13.7 Time setting

Press the TIMER key (quick access) or use the navigator dial to call up the "Time setting" selection menu.

Calling up the "Time setting" menu using the navigator dial:



Time setting view

Setting the time:

Use the navigator dial to set the following:

1. Current hour
2. Current minute
3. Current day

i The "Timer programs" selection menu is automatically called up once the current day has been confirmed by pressing the navigator dial.

i If no action is carried out using the navigator or function keys for 7 seconds the last change of value is saved and the standard view is called up.



Setting to hide the time in the standard view

i Following initial commissioning of the KaController, the time is no longer shown in the standard view. Only when the time has been set, is the current time shown in the standard view!
If "- : -" is entered for hours and minutes, the real-time clock is disabled and the time is hidden in the standard view.

13.8 Timer programs

The KaController provides the option of programming switching on and off times using a timer program if rooms are only to be air conditioned during certain times of the day. Unlike with conventional thermostatic controllers where only one switching on and off time can be selected, two switching on and off times can be set for each day.

Timer matrix

	ON1	OFF1	ON2	OFF2
MO	6 : 00	18 : 00	---	---
TU	6 : 00	18 : 00	---	---
WE	6 : 00	18 : 00	---	---
TH	6 : 00	18 : 00	---	---
FR	6 : 00	18 : 00	---	---
SA	8 : 00	14 : 00	---	---
SU	---	---	---	---

Example of a weekly timer program



Set the time in the "Time setting" selection menu before parametrising the switch-on and off times.

The KaController can manage 2 switch-on and 2 switch-off times per day. The switch-on and off times can be entered as a block or individually for each day.



The timer program switches the controller on and off in accordance with the timer entries. After switching off the controller using the timer program, the user then has the option of switching the controller on using the ON/OFF key or the navigator dial.



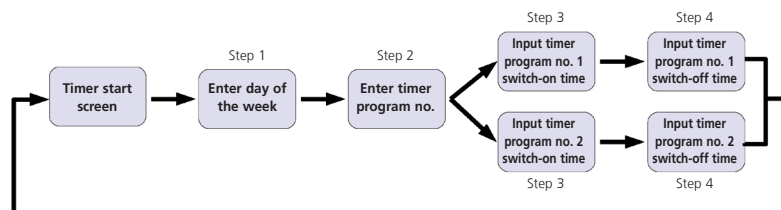
If no switch-on or off time is entered in the timer program matrix, the "Clock" symbol is hidden in the standard view.



Display elements in the „Timer programs“ selection menu

- 1 ON = SWITCH ON timer program
OFF = SWITCH OFF timer program
- 2 1 = Timer program no. 1
2 = Timer program no. 2
- 3 Switching on/switching off time
- 4 Weekday
- 5 If no switch-on or off time is entered in the timer program matrix, the „Clock“ symbol is hidden in the standard view.

The diagram below shows the sequence for setting the timer program. Steps 1-4 are described in more detail in the next section.



To exit the "Timer programs" selection menu, press and hold down the navigator dial for 3 seconds in the timer program start screen or do not use the KaController for 15 seconds.

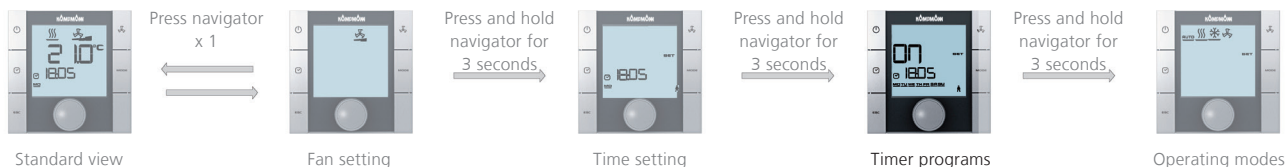
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Press the TIMER key twice (quick access) or use the navigator dial to call up the "Timer programs" selection menu.

Use the navigator dial to call up the "Timer programs" menu:



Timer Start screen

Step 1:

Turn the navigator to select a weekday for which you would like to program a switch-on or off time.

You have the option of selecting the days of the week as a block (MO-FR, SA-SU, MO-SU) or individually.

Press the navigator dial to apply the figure (for instance: MO-FR) and call up the next input screen.



Enter timer program no.

Step 2:

Turn the navigator dial to select the number of the timer program (no. 1 or no. 2).

Press the navigator dial to apply the figure (for instance: Timer program no. 1) and call up the next input screen.



Input screen for **switch-on time**

Step 3:

Set the **switch-on time** you require by turning the navigator dial.

Once the minutes have been set, the set **switch-on time** is carried over by pressing the navigator dial and the input screen for the switch-off time of the selected program no. is called up.



Input screen for **switch-off time**

Step 4:

Turn the navigator dial to set the required **switch-off time**.

Once the minutes have been set, press the navigator dial (⇒ Step 1) to apply the **switch-off time** and to call up the timer start screen.

IMPORTANT NOTE!

- Call up the respective weekday and associated timer program no. to delete switching-on and switching-off times entered (Step 1 + Step 2). Replace the switch-on or off time entered by "--:--:--" (Step 3 + Step 4).
- You can overwrite timer entries at any time either as a block or for each day
- Only request switch-on and off times singly for each day. It is not possible to request switching-on and off times as a block where there are differing time entries for the respective days of the week and the time is then shown by "--:--":
- To exit the "Timer programs" selection menu, press and hold down the navigator dial for 3 seconds in the timer program start screen or do not use the KaController for 15 seconds.

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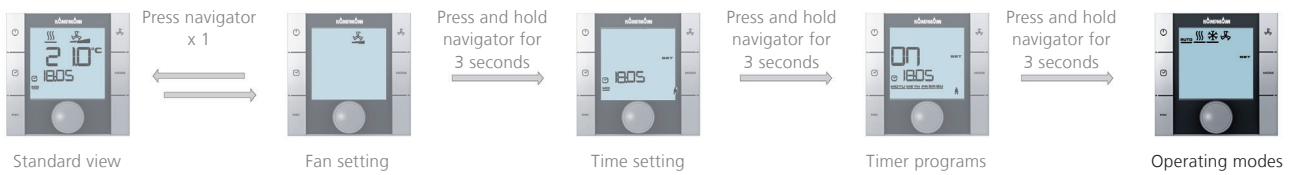
Ready-to-install trench heating units with EC tangential fan

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13.9 Operating modes (Mode key)

Press the MODE key (quick access) or use the navigator dial to call up the "Operating modes" selection menu.

Calling up the "Operating modes" menu using the navigator dial:



You can use the navigator dial to set the operating mode depending on the parameter setting.

Automatic mode: The control switches automatically between heating mode and cooling mode, while maintaining a neutral zone.

Heating mode: The control only works in heating mode.

Cooling mode: The control only works in cooling mode.

Ventilation mode: The control only works in ventilation mode

The operating mode required can be selected by turning the navigator dial in the 'Operating mode' selection menu.

Pressing the navigator dial activates the selected operating mode.



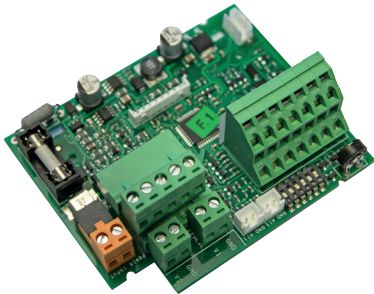
Setting heating operating mode

i The MODE key can be locked with 2-pipe applications, as Heating and Cooling mode is specified by an external contact or clip-on sensor. As a rule, it is not possible to alter the operating mode using the KaController in 2-pipe applications.

i If no action is carried out using the navigator dial for longer than 3 seconds, the last change made is saved and the standard view is called up.

i If the symbols for Heating or Cooling operating mode are flashing, it means that the water temperature to activate the selected operating mode has not yet been reached.

14. Alarm messages



The KaController displays faults by means of the alarm messages listed in the table below. The alarm messages are displayed according to their priority.

In the event of an alarm, note down the alarm message and contact the responsible member of staff (System Administrator or Installer/Service Technician) to fix the fault quickly.

14.1 Alarm messages from KaControl PCB, display on KaController



View of "Condensation alarm" (Alarm A14 shown)

KaController PCB alarm table

Code	Alarm	Priority
A11	Faulty control sensor	1
A12	Motor fault (local stop)	2
A13	Room frost protection	3
A14	Condensation alarm	4
A15	General alarm	5
A16	Sensor A11, A12 or A13 faulty	6
A17	Unit frost protection	7
A18	EEPROM error	8
A19	Offline slave in the CAN bus network	9

14.2 KaController alarm messages



View "Real-time clock in KaController faulty" (example shows alarm tAL3)

KaController alarm table

Code	Alarm
Code	Alarm
tAL1	Temperature sensor in KaController faulty
tAL3	Real-time clock in KaController faulty
tAL4	EEPROM in KaController faulty
Cn	Communication fault with the external control

Should more than one fault occur simultaneously in the KaController control electronics, the alarm messages are displayed alternately in the display.

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15. Troubleshooting

General:

Faults in the motor of a slave unit are not shown on the KaController. Only a motor fault in a master unit is shown on the KaController.

15.1 A11 control sensor faulty

The room temperature is regulated on the selected control sensor, that is to say that the external room sensor/air intake sensor can be faulty, depending on the DIP switch setting. If the room sensor in the KaController is faulty, this display alternates to tAL1.

Cause:

The RGB sensor, AI1 sensor or the virtual sensor measures a temperature of $\geq 90^{\circ}\text{C}$ or the input has short-circuited.

Effect of this alarm:

the fan is switched off and the valves close.

15.2 A12 motor protection

The motor is continuously monitored and "A12" appears on the display of the KaController if a motor fault is detected.

Cause:

see 5.10

Effect of this alarm:

The fan is switched off and the cooling valve is closed.

15.3 A13 room frost protection function

The room temperature is monitored at each phase in the system to the defined limit of 8°C . The room frost protection function is enabled if the room temperature drops below 8°C . The room frost protection function is disabled when the room temperature rises above the limit of 8.5°C .

Cause:

The RGB sensor, AI1 sensor or the virtual sensor measures a temperature of $\leq 8^{\circ}\text{C}$.

Effect of this alarm:

The fan is switched on at stage 1 and the heating valve is opened.



The limit of 8°C is fixed for the room frost protection function and cannot be changed.

15.4 A14 condensation alarm

The parametrised input for detecting condensation is continuously monitored and "A14" appears on the display of the KaController if a condensation alarm is emitted.

Cause:

condensation produced

Effect of this alarm:

The fan is switched on at stage 1 and the cooling valve is closed.

15.5 A15 general alarm

The parametrised input for the general alarm is continuously monitored and "A15" appears on the display of the KaController if a general alarm is emitted.

Effect of this alarm:

the fan is switched off and the heating/cooling valve is closed.

15.6 A16 sensor AI1, AI2 or AI3 faulty

The sensor alarm is displayed if one of the active sensors does not transmit any plausible measured values to the KaControl.

Cause:

The sensor AI1, AI2 or AI3 has to be parametrised as a sensor and record a temperature of $\geq 90^{\circ}\text{C}$ or one of the inputs has short-circuited.

Effect of this alarm:

the fan is switched off and the heating and cooling valve is closed.

15.7 A17 unit frost protection function

The temperature is monitored at each phase in the system by every parametrised or fitted sensor to the defined limit of 4°C . The unit frost protection function is activated if the room temperature drops below 4°C . The unit frost protection function is disabled when the room temperature rises above the limit of 4.5°C .

Cause:

The RGB sensor, AI1, AI2, AI3 sensor or the virtual sensor measures a temperature of $\leq 4^{\circ}\text{C}$.

Effect of this alarm:

the fan is switched off and the heating and cooling valve is opened.



The limit of 4°C is fixed for the unit frost protection function and cannot be changed.

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15.8 A18 EEPROM error

The EEPROM error is displayed if an error is detected in the internal memory on the KaControl PCB.

Cause:

Overflow of values, maximum read and write cycles reached.

Effect of this alarm:

communication in the tLan network and control is interrupted.

15.9 A19 slave offline in the CAN network

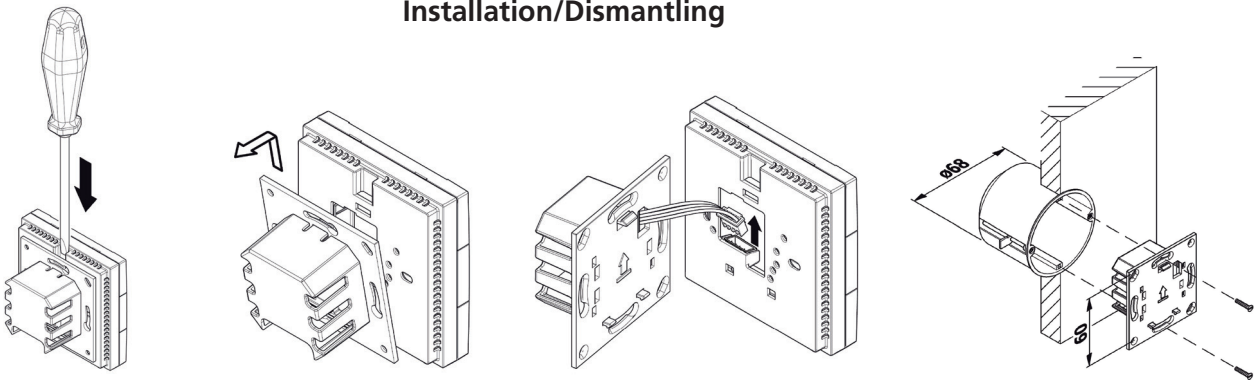
reserved for subsequent use.

15.10 Problemsolving

Problemsolving	Lösung
The fan of a slave unit does not start up.	<ol style="list-style-type: none">1. If a clip-on temperature sensor is fitted, the parametrised medium temperature has not been reached.2. The room temperature has already reached the setpoint. => Check parameter setting. => Inform Service personnel if the fan is not activated despite the request to do so.
The fan does not rotate at the set speed.	<ol style="list-style-type: none">1. If a clip-on temperature sensor is fitted, the parametrised medium temperature has not been reached.2. Ventilation cycle is in operation => Check parameter setting. => Inform Service personnel if the fan does not rotate at the desired fan speed despite the request to do so.
The KaControl-KaControl PCB was not switched on / off at the set time.	Possible power failure
"Motor fault" message	Check the fan for a blockage ==> Eliminate the cause of the fault. Disconnect the unit prior to eliminate the cause of the fault
"Condensation alarm" message	Check the function of the condensation pump and the water level in the condensation tray. => Check the condensation pump should there be a fault. => Check the water train should there be water standing in the condensation pump.
"EEPROM" message	Reset the parameters to the default values.
Sensor A11, A12 or A13 faulty	Check the sensor values and the electrical connection of the sensors.

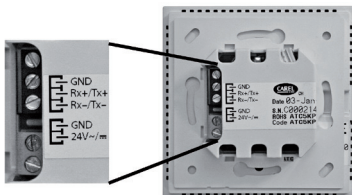
16. KaController installation

Installation/Dismantling



Electrical wiring

- Connect the KaController to the nearest KaControl in accordance with the wiring diagram. The maximum bus length between the KaController and the KaControl is 30 m.
- By connecting a KaController, the respective KaControl unit automatically becomes the master unit in the control circuit.



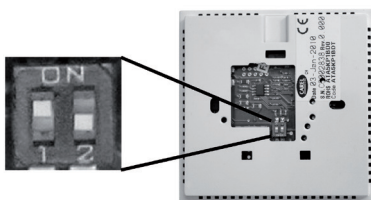
KaController terminals



Disconnect the unit prior to embarking on "all" wiring work!



Only connect the bus lines to the KaControl when the unit is fully disconnected.



DIP switch setting
KaController
DIP switch no. 1: **ON**
DIP switch no. 2: **OFF**

DIP switch setting

- The DIP switches on the rear of the KaController should be set according to the illustration at the side:

DIP switch no. 1: **ON (factory setting)**

DIP switch no. 2: **OFF (factory setting)**

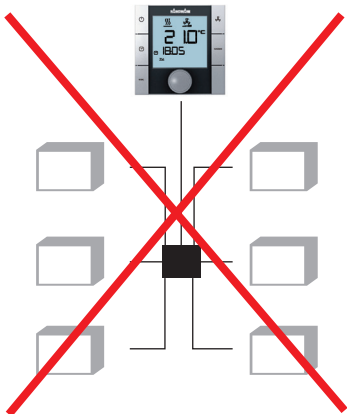
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17. Cabling

17.1 General information



Wrong!
Star-shaped wiring of the bus lines.

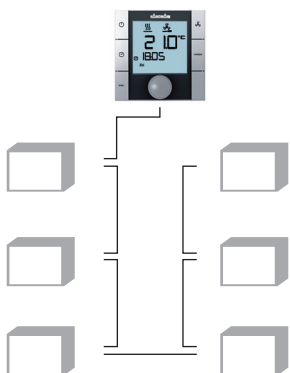
- Route all low voltage cables along the shortest route.
- Ensure that low-voltage and power cables are separated, using metal partitions on cable harnesses.
- Use only shielded cables as low-voltage and bus cables.
- Lay all BUS cables in a linear pattern. Star-shaped wiring is not permitted (Figure on left).
- The KaController is connected via a bus connection to the respective KaControl PCB on the unit.



Lay shielded, paired cables, e.g. UNITRONIC® BUS LD 2X2X0.22 or similar, separately from power cables!

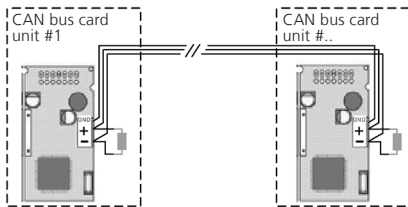


When laying bus cables, avoid the formation of star points, for instance in junction boxes. Pass the cables through to the units!



Right!
Linear wiring of the bus lines.

17.2 Terminal resistors in a CAN bus system

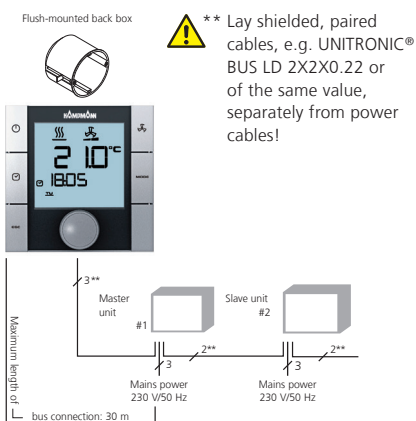


- The bus cables between the CAN bus cards must be linear.
- Disconnect the unit before adjusting the terminal resistors.
- A terminal resistor must be connected between terminals "+" and "-" on the first and last CAN bus card in a bus line.
- Resistance of terminal resistance: 120 Ohm.

17.3 Bus connections between the units

- Bus communication between the unit with CAN bus cards is solely done via the CAN bus.
The tLAN bus communication between the units used in single-circuit controls is not connected.
- Refer to the technical data sheet for the CAN bus cards for the connection conditions for the CAN bus cards.

17.4 KaController



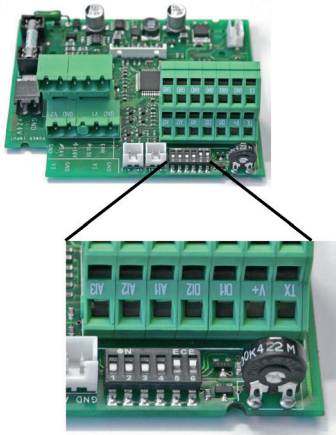
- A flush-mounted back box is required for the KaController.
- Connect the KaController to the nearest KaControl as per the wiring diagram. The maximum bus length between the KaController and the KaControl unit is 30 m.
- Connecting a KaController to it automatically converts the respective KaControl into the master unit in the control circuit.

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18. Setting configuration of unit by means of DIP switch



Set the configuration of a KaControl unit using the DIP switch on the KaControl PCB.

Once the DIP switch has been set, all the basic functions of the configuration have been parametrised and the KaControl can be operated immediately.

Special setting options, such as lowering the temperature setpoint during Eco mode, have to be parametrised in the Service menu. This parametrisation is possible using the KaController.

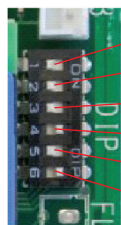
Open the control unit to check and possibly adjust the DIP switches.

The DIP switches are factory-set in accordance with the unit configuration!



Disconnect the control before starting to adjust the DIP switches.

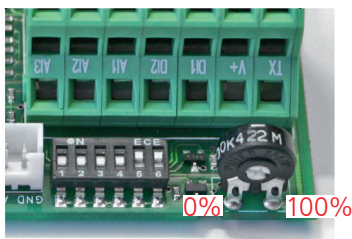
Functional table of DIP switch settings on the KaControl PCB



DIP1	OFF = --- ON = 0..10V actuation by on-site measurement and control technology
DIP2	OFF = --- ON = Activation by 0..100 kOhm potentiometer
DIP3	OFF = Clip-on sensor not fitted ON = Clip-on sensor fitted
DIP4	OFF = 4-pipe or heating/cooling changeover with clip-on sensor ON = Heating/cooling changeover via DI2
DIP5	OFF = 2-pipe system ON = 4-pipe system
DIP6	OFF = Room control on intake air/ext. room sensor ON = Room control to sensor in the KaController



With slave units, DIP switch no. 6 has to be set to ON if the room temperature is detected via the external room sensor of the master unit or the KaController.



The maximum fan speed can alternatively be prescribed by setting the potentiometer. The potentiometer setting is set by default to 100%

DIP switch no. 1

DIP switch no. 1 must be set to ON to actuate a KaControl by means of 0...10 V signals within a building management system provided by others. The parameter settings required are described in Section 20.1.

DIP switch no. 2

It is essential that DIP switch no. 2 is set to OFF.

DIP switch no. 3

Optionally install a clip-on sensor to monitor the water temperature. The following functions can be triggered by a clip-on sensor: including changeover in a 2-pipe system (see section 19.3).

DIP switch no. 4

In a 2-pipe system, changeover between heating and cooling is activated as standard by the switching of the digital input DI2, with the following operating modes being executed depending on the external contact:

DIP4 = ON + ext. contact open ⇒ Heating mode

DIP4 = ON + ext. contact closed ⇒ Cooling mode

Alternatively the changeover between heating and cooling in a 2-pipe system can also be activated by a clip-on sensor. In this version, set DIP switch no. 4 must be set to DIP 4 = OFF (see section 19.4).

DIP switch no. 5

The convector configuration (2-pipe/ 4-pipe) is set by means of DIP switch no. 5.

DIP switch no. 6

There is an option of using the internal sensor in the KaController or an external room temperature sensor for room temperature control.

DIP switch no. 6 = OFF ⇒ Room temperature control to an external room sensor

DIP switch no. 6 = ON ⇒ Room temperature control to the internal sensor of the KaController or the selected sensor on the master unit



With slave units, DIP switch no. 6 has to be set to ON if the room temperature is detected via the external room sensor of the master unit or the KaController.

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19. Parameter settings

19.1 General

Special system requirements can be configured using parameter settings in the Service menu.

Special system requirements may include:

- Display: room temperature or setpoint temperature
- Lock operating functions
- Set absolute setpoint temperature or $\pm 3K$
- Setting parameters in Eco / Day mode
- Sensor calibration

The required settings can be made using the KaController.

19.2 Calling up the Service menu



The following steps are needed to set the parameters:

1. Switch off the KaControl unit by:
 - Pressing the ON/OFF key or
 - Pressing the navigator for a minimum of 5 seconds or
 - Turn the navigator to the left until OFF appears.
2. Press the navigator dial for a minimum of 10 seconds to call up the Service menu. The display shows "Para" and then "CODE" with the value 000 in sequence.
3. Select the password (code) 22 by turning the navigator dial and confirm by pressing the navigator dial. You are now in Service level 1 and the display shows the current software version (P000=...).
4. Parameters can now be set using the navigator.
5. Setting parameters:
 - Turn the navigator dial to select the parameter.
 - Press the navigator dial to call up Edit mode.
 - Set the required value by turning the navigator dial.
 - Press the navigator dial to save the new value.
6. There are 3 options for exiting the Service menu and calling up the standard view:
 - If no action has been carried out using the navigator dial for longer than 2 minutes.
 - Hold down the navigator dial for 5 seconds.
 - Turn the navigator dial, select "ESC" on the display and confirm the selection by pressing the navigator dial.



Parameter changes within the Service menu are only transmitted in the master unit.
Connect a KaController to the respective slave unit to change the parameters on slave units.

19.3 Heating/cooling changeover via clip-on sensor in 2-pipe systems

The changeover between heating and cooling is performed as standard in 2-pipe systems via an external contact and the digital input DI2. If there is no external contact to change over between heating and cooling, the changeover can be made via a clip-on sensor. Order the clip-on sensor separately and, after installation, wire it to the analogue input AI2 of the KaControl control board (PCB) (as per the wiring diagram). The configuration is documented in the following description.



The slave units in one control zone have to be fitted with a clip-on sensor to provide the function of "Heating/cooling changeover using clip-on sensor".



The installation of a 3-way valve is recommended when using a clip-on sensor for heating/cooling changeover.

19.4 Setting DIP switch no. 3, DIP switch no. 4

If the changeover between heating and cooling is performed by a clip-on sensor, then the DIP switches must be set to

DIP switch no. 3 = ON

DIP switch no. 4 = OFF

The functions of the DIP switches are described in Section 18 "Adjusting the unit configuration using DIP switches".

19.5 Setting automatic heating/cooling or Day/Eco changeover mode

Parameter P38

Parameter P38 is used to set Automatic mode, as heating and cooling modes can only be specified via the clip-on sensor.

Parameter P38 can also be set for "ON/OFF and Eco/Day" function.

Parameter P38 can also be set for Day/Eco changeover.

The ON/OFF key function and the timer programs are specified using parameter P38.

Use the ON/OFF button and the timer programs to switch the unit on and off or between Eco and Day mode.

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Option 1:

The ON/OFF key and timer programs are used to switch between Eco mode and Day mode.

Option 2:

Use the ON/OFF key and the timer programs to switch the KaControl on and off.

The following table shows the settings of parameter P38!

	Function
P38	8 = Eco/Day mode changeover 26 = Eco/Day mode changeover + Heating/Cooling changeover via clip-on sensor (2-pipe system) 72 = ON/OFF changeover 90 = ON/OFF changeover + Heating/Cooling changeover via clip-on sensor (2-pipe system)



If a clip-on sensor is used for changeover in a 2-pipe system, parameter P38 must be set to P38=26 or P38=90 as required.



The installation of a 3-way valve is recommended when using a clip-on sensor.

19.6 Function of digital inputs DI1 and DI2

The function of digital inputs DI1 and DI2 can be configured using parameters settings.

19.6.1 Function of DI1

Parameter P43

Parameter P43 is used to set the function of the digital input DI1.

	Function	Standard	Min.	Max.	Unit
P43	Function of DI1	1	0	14	
	0 = no function				
	1 = ON/OFF (contact open ⇨ ON)				
	2 = Winter/summer (contact open ⇨ heating)				
	3 = Eco/day mode (contact open ⇨ day)				
	4 = no function (contact open ⇨ no function)				
	5 = Condensation alarm (contact open ⇨ no condensation)				
	6 = General alarm (contact open ⇨ no alarm)				
	7 = ext. frost protection monitor (contact open ⇨ no frost)				
	8 = ON/OFF (contact closed ⇨ ON)				
	9 = Heating/cooling changeover (contact closed ⇨ heating)				
	10 = Eco/Day mode (contact closed ⇨ day)				
	11 = no function (contact closed ⇨ no function)				
	12 = Condensation alarm (contact closed ⇨ no condensation)				
	13 = General alarm (contact closed ⇨ no alarm)				
	14 = ext. frost protection monitor (contact closed ⇨ no frost)				

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19.6.2 Function of DI2

The digital input DI1 is predominantly used to execute specific functions. If the use of the digital input DI2 is needed, then the following settings have to be made:

1. Set DIP switch no. 4 to OFF.
2. Configuration of the digital input DI2 using parameter settings P44.



If DIP switch no. 4 is set to ON, digital input DI2 changes over from heating to cooling in a 2-pipe system.

Parameter P44

Parameter P44 is used to set the function of the digital input DI2 when DIP switch no. 4 = OFF.

	Function	Standard	Min.	Max.	Unit
P44	Function DI2 0 = no function 1 = ON/OFF (contact open ⇨ ON) 2 = Heating/cooling changeover (contact open ⇨ heating) 3 = Eco/day mode (contact open ⇨ day) 4 = no function (contact open ⇨ no function) 5 = Condensation alarm (contact open ⇨ no condensation) 6 = General alarm (contact open ⇨ no alarm) 7 = ext. frost protection monitor (contact open ⇨ no frost) 8 = ON/OFF (contact closed ⇨ ON) 9 = Heating/cooling changeover (contact closed ⇨ heating) 10 = Eco/Day mode (contact closed ⇨ day) 11 = no function (contact closed ⇨ no function) 12 = Condensation alarm (contact closed ⇨ no condensation) 13 = General alarm (contact closed ⇨ no alarm) 14 = ext. frost protection monitor (contact closed ⇨ no frost)	0	0	14	

Parameter P56

The polarity of digital input DI2 is set using parameter P56 when DIP switch no. 4 is set to ON.

	Function	Standard	Min.	Max.	Unit
P56	Polarity of DI2 when DIP4 = ON (Heating/cooling changeover using DI2) 0 = Contact closed ⇨ heating Contact open ⇨ cooling 1 = Contact open ⇨ heating Contact closed ⇨ cooling	1	0	2	

19.6.3 Function of digital outputs V1 and V2

The function of the digital output V1 is fixed depending on the system (2-pipe / 4-pipe).
The function of the digital output V2 can be configured using parameters.

19.6.4 Digital output V1

The digital output V1 is used for the following function, depending on the application;
2-pipe system ⇒ V1 = Heating/cooling valve
4-pipe system ⇒ V1 = cooling valve

19.6.5 Digital output V2

The digital output V2 is used to control the heating valve in a 4-pipe system.

The digital output V2 can be configured using parameter P39 in a 2-pipe system.

	Function	Standard	Min.	Max.	Unit
P39	Function V2 in a 2-pipe system 0 = no function 1 = heat requirement 2 = cooling requirement 3 = unit alarm	0	0	3	



24 V DC is connected to digital output V2. The digital output is not a potential-free contact and can only be used with appropriate wiring!

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19.6.6 Function of multifunctional inputs AI1, AI2 and AI3

The function of the multifunctional inputs AI1, AI2 and AI3 can be configured using parameter settings.

19.6.7 Function of AI1

Parameter P15

Parameter P15 is used to set the function of the multifunctional input AI1.



The multifunctional input AI1 can only be set using parameter P15 if DIP switch no. 6 is set to ON! The setting of DIP switches is described in section 10.

	Function	Standard	Min.	Max.	Unit
P15	Function of AI1 0 = not used (input disabled) 1 = NTC outside air sensor 2 = NTC cold/hot water sensor (clip-on sensor) 3 = NTC cold water sensor (clip-on sensor) 4 = NTC hot water sensor 5 = NTC ext. room temperature sensor/air intake sensor 6 = 0..100 kOhm fan control 7 = 0..100 kOhm temperature setpoint 8 = 0..100V BMS control heating/cooling 9 = 0..100V BMS control heating 10 = Eco/Day mode contact open ⇔ Day 11 = no function contact open ⇔ no function 12 = Condensation alarm contact open ⇔ no condensation 13 = General alarm contact open ⇔ no alarm 14 = ext. frost protection monitor contact open ⇔ no frost 15 = Eco/Day mode contact closed ⇔ Day 16 = no function contact closed ⇔ no function 17 = Condensation alarm contact closed ⇔ no condensation 18 = General alarm contact closed ⇔ no alarm 19 = ext. frost protection monitor contact closed ⇔ no frost	0	0	19	

19.6.8 Function of AI2

Parameter P16

Parameter P16 is used to set the function of the multifunctional input AI2.



The multifunctional input AI2 can only be set using parameter P16 if DIP switch no. 3 is set to OFF! The setting of DIP switches is described in section 10.

	Function	Standard	Min.	Max.	Unit
P16	Function AI2: see P15	0	0	19	

19.6.9 Function of AI3

Parameter P17

Parameter P17 is used to set the function of the multifunctional input AI3.



The multifunctional input AI3 can only be set using parameter P17 if DIP switch no. 3 is set to OFF! The setting of DIP switches is described in section 10.



The multifunctional input AI3 can only process analogue signals unlike inputs AI1 and AI2.

	Function	Standard	Min.	Max.	Unit
P17	Function of AI3 0 = not used (input disabled) 1 = NTC outside air sensor 2 = NTC cold/hot water sensor (clip-on sensor) 3 = NTC cold water sensor (clip-on sensor) 4 = NTC hot water sensor 5 = NTC ext. room temperature sensor / air intake sensor 6 = 0..100 kOhm fan actuation 7 = 0..100 kOhm temperature setpoint 8 = 0..100 V BMS control of heating/cooling 9 = 0..100 V BMS control of heating	0	0	9	

Other functions and parameter settings can be carried out in accordance with the complete KaControl instructions.

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20. Functional testing of connected assemblies



The KaController provides the option of checking the function of the external units connected independently of the software application. The function of individual assemblies, such as the EC fan, can be directly activated and checked by means of inputs on the KaController.

The functional checks of the connected assemblies are called up and performed by the following operating steps:



1. Switch off the KaController by:
 - Pressing the ON/OFF key or
 - Press the navigator for a minimum of 5 seconds or
 - Turn the navigator to the left until OFF appears
2. Call up the Parameter menu by pressing the navigator dial for a minimum of 10 seconds. The display shows "Para" and then "CODE" with the value 000 in sequence.
3. Select the password (code) 77 by turning the navigator dial and confirm by pressing the navigator dial.
4. "L01" is shown on the display and the functional testing of the connected assemblies can start.



Important:

The individual test steps are called up by pressing the navigator dial. The standard view with "OFF" showing appears once the test has been completed (L09).



Step	Input/Output	Display flashes	Display does not flash
L01*	Input AI1	Sensor faulty	Sensor OK
L02*	Input AI2	Sensor faulty	Sensor OK
L03*	Input AI3	Sensor faulty	Sensor OK
L04	Input DI1	Contact open	Contact closed
L05	Input DI2	Contact open	Contact closed
L06	Fault signal input	no alarm	Alarm pending
L07	Fan speed 0 – 10 V	--	Increased actuation Fan 0 V => 10 V
L08	Valve output V1	--	Output V1 activated
L09	Valve output V2	--	Output V2 activated

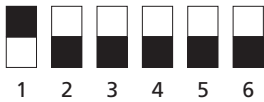
* The control automatically detects the requisite sensors on the analogue inputs AI1 - AI3 using the DIP switch settings. The respective display (L01-L03) flashes if sensors are faulty or not connected.



Observe hardware-related locks during functional testing (refer to the respective wiring diagram!)

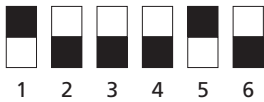
20.1 External control via 0..10 Volts

ON

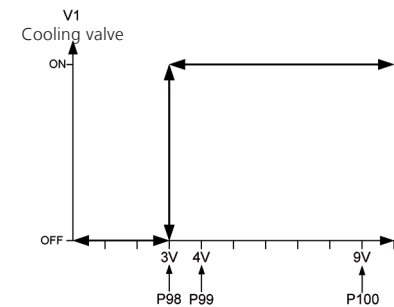


Setting of DIP switches in 2-pipe system control using 0..10V

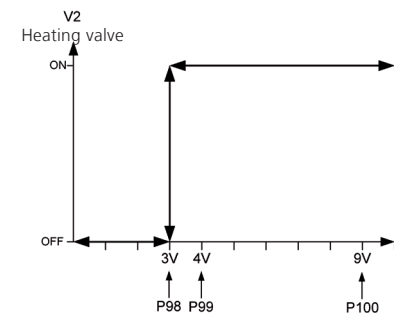
ON



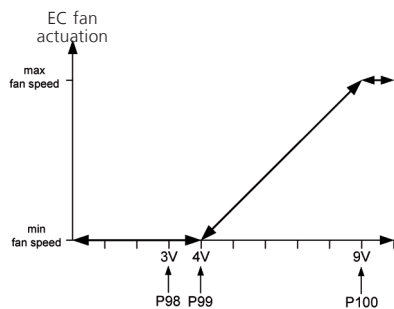
Setting of DIP switches in 4-pipe system control using 0..10V



Cooling valve actuation



Heating valve actuation



Valve actuation

The analogue inputs AI2 and AI3 offer the option of actuating the valves and the EC fan by means of 0..10 volt signals.

Set the DIP switches in accordance with the diagram with actuation using 0..10 volt signals.

Connect the 0..10 V control signals to the analogue inputs AI2 and AI3.

2-pipe system:

heating/cooling 0..10 V ⇒ Analogue input AI2

4-pipe system:

cooling 0..10 V ⇒ Analogue input AI2

heating 0..10 V ⇒ Analogue input AI3

Parameter setting for actuation of the KaControl unit using an 0..10 V signal on site.

	Function	Standard	Min.	Max.	Unit
P98	Switching on limit of valve	30	0	100	V/10
P99	Starting point fan speed (min)	40	0	100	V/10
P100	End point fan speed (max)	90	0	100	V/10

Function of standard setting:

0 V...3 V valve CLOSED, fan OFF

3 V...4 V valve OPEN, fan OFF

4 V...9 V valve OPEN, fan speed min ⇒ max



Connect a KaController to configure the parameters.

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20.2 Parameter list for KaControl PCB

Parameter	Function	Standard – V1.9 from July 2011	Min.	Max.	Unit	Katherm 05.05.2014 SAP: 9000260
P000	Software version	-	0	255	-	-
P001	Base setpoint for setpoint entry $\pm 3K$	22	8	32	°C	22
P002	Switching on / off hysteresis for valves	3	0	255	K/10	1
P003	Neutral zone in a 4-pipe system (only in automatic mode)	3	0	255	K/10	3
P004	Cooling without fan assistance (natural convection)	0	0	255	K/10	0
P005	Heating without fan assistance (natural convection)	5	0	255	K/10	3
P006	Fan On/Off hysteresis (only in ventilation mode0)	5	0	255	K/10	5
P007	P-band, heating	15	0	100	K/10	17
P008	P-band, cooling	20	0	100	K/10	20
P009	Offset to the base setpoint for setpoint input $\pm 3K$	3	0	10	K	3
P010	Clip-on sensor: limit temperature to activate fan stages 1 and 2 in heating mode	29	0	255	°C	26
P011	Clip-on sensor: limit temperature to activate fan stages 3 and 4 in heating mode	31	0	255	°C	28
P012	Clip-on sensor: limit temperature to activate fan stage 5 in Heating mode	33	0	255	°C	30
P013	Clip-on sensor: hysteresis for limit temperatures P010, P011, P012, P014	10	0	255	K/10	10
P014	Clip-on sensor: limit value temperature to activate the fan stages in cooling mode	18	0	255	°C	18
P015	Function of input AI1	0	0	19	-	0
P016	Function of input AI2	0	0	19	-	0
P017	Function of input AI3	0	0	9	-	0
P018	Temperature raising of cooling setpoint in Eco mode	30	0	255	K/10	30
P019	Temperature lowering of heating setpoint in Eco mode	30	0	255	K/10	30
P020	ADC limit coefficient	6	0	15	-	6
P021	ADC average coefficient	6	0	15	-	6
P022	Activation/disabling of sun symbol in Comfort mode	0	0	1	-	0
P023	Difference for compensation during cooling	0	-99	127	K/10	0
P024	Coefficient for compensation during heating	0	-20	20	1/10	0
P025	Difference for compensation during heating	0	-99	127	K/10	0
P026	Coefficient for compensation during heating	0	-20	20	1/10	0
P027	Fan setting: maximum run-time for manual fan mode	0	0	255	MIN	0
P028	Rinsing function: Fan stage during the rinsing function	2	1	5	-	2
P029	Activation of continuous fan mode	0	0	1	-	0
P030	Ventilate temperature activation	12	0	255	°C	12
P031	Ventilation interval	27	0	255	°C	27
P032	Flushing function: maximum idle time of fan	15	0	255	MIN	15
P033	Rinsing function: duration of rinsing function	240	0	255	s	240

P034	Rinsing function: activation in operating modes	0	0	3	-	0
P035	Time the fan runs at Stage 1 after change of operating mode	0	0	255	s	0
P036	Type of setpoint setting	0	0	1	-	0
P037	Display	1	0	7	-	1
P038	Lock/disable function on control unit	64	0	255	-	72
P039	Function of digital output V2 (in 2-pipe system)	0	0	3	-	0
P040	Valve actuation by means of pulse width modulation	0	0	1	-	0
P041	Reset time of PI controller to actuate the fan in automatic fan mode	0	0	20	MIN	0
P042	Fan setting: lock and activate fan stages	0	0	127	-	0
P043	Function of digital input DI1	1	0	14	-	5
P044	Function of digital input DI2	0	0	14	-	0
P045	Threshold voltage for potentiometer, which switches on unit	10	0	100	kOhm	10
P046	Temperature setting corresponds to minimum resistance value = 10 kOhm in the potentiometer	18	12	34	°C	18
P047	Temperature setting corresponds to maximum resistance value = 100 kOhm in the potentiometer	24	13	35	°C	24
P048	Threshold voltage for potentiometer for starting up fans	10	0	100	kOhm	10
P049	Threshold voltage for potentiometer for maximum fan speed	90	0	100	kOhm	90
P050	Fan setting: max. fan speed	100	0	100	%	100
P051	Fan setting: min. fan speed	0	0	90	%	0
P052	Fan setting: speed limitation activated	0	0	1	-	0
P053	Valve actuation by pulse width modulation of valve switching cycle	15	10	30	MIN	15
P054	Configuration of bus system	0	0	2	-	0
P055	Display of heating/cooling symbols in Automatic mode	0	0	1	-	1
P056	DI2 setting (polarity) when DIP 4 = ON	1	0	1	-	1
P057	Reset setpoint setting to the value of P01 (after changing operating program)	0	0	1	-	0
P058	Sensor calibration: sensor AI1	0	-99	127	K/10	0
P059	reserved	-	-	-	-	-
P060	reserved	-	-	-	-	-
P061	Sensor calibration: sensor in the KaController	0	-99	127	K/10	0
P062	Sensor calibration: sensor AI2	0	-99	127	K/10	0
P063	reserved	-	-	-	-	-
P064	Sensor calibration: sensor AI3	0	-99	127	K/10	0
P065	reserved	-	-	-	-	-
P066	Master/Slave assignment in CAN bus	0	0	1	-	0
P067	CAN bus serial address	1	1	125	-	1
P068	Logic of idronic algorithms	0	0	7	-	0
P069	Network address	1	0	207	-	1
P070	Dependence of idronic algorithm (for slave units)	0	0	7	-	0
P071	Serial address of Slave 1	0	0	207	-	0
P072	Serial address of Slave 2	0	0	207	-	0

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P073	Serial address of Slave 3	0	0	207	-	0
P074	Serial address of Slave 4	0	0	207	-	0
P075	Serial address of Slave 5	0	0	207	-	0
P076	Serial address of Slave 6	0	0	207	-	0
P077	Serial address of Slave 7	0	0	207	-	0
P078	Serial address of Slave 8	0	0	207	-	0
P079	Serial address of Slave 9	0	0	207	-	0
P080	Serial address of Slave 10	0	0	207	-	0
P081	Dependence of idronic algorithms Slave 1	0	0	7	-	0
P082	Dependence of idronic algorithms Slave 2	0	0	7	-	0
P083	Dependence of idronic algorithms Slave 3	0	0	7	-	0
P084	Dependence of idronic algorithms Slave 4	0	0	7	-	0
P085	Dependence of idronic algorithms Slave 5	0	0	7	-	0
P086	Dependence of idronic algorithms Slave 6	0	0	7	-	0
P087	Dependence of idronic algorithms Slave 7	0	0	7	-	0
P088	Dependence of idronic algorithms Slave 8	0	0	7	-	0
P089	Dependence of idronic algorithms Slave 9	0	0	7	-	0
P090	Dependence of idronic algorithms Slave 10	0	0	7	-	0
P091	Upload of default values	0	0	255	-	0
P092	Password management	0	0	255	-	0
P093	Type of pre-comfort (room occupancy)	0	0	3	-	0
P094	Pre-comfort timer	60	1	255	MIN	60
P095	DIP switch settings switched off	0	0	1	-	0
P096	reserved	-	-	-	-	-
P097	Reading of DIP switch	-	0	63	-	-
P098	Actuation 0..10V: switch on limit of valves	30	0	100	V/10	30
P099	Actuation 0..10V: switch on limit for min. fan speed	40	0	100	V/10	40
P100	Actuation 0..10V: switch on limit for max. fan speed	90	0	100	V/10	90
P101	Valve actuation by pulse width modulation of P-band in heating mode	15	0	100	K/10	15
P102	Valve actuation by pulse width modulation of P-band in cooling mode	15	0	100	K/10	15
P103	Valve actuation by means of pulse width modulation	0	0	20	MIN	0
P104	Rest time for PI controller	3	0	20	MIN	3
P105	Minimum ON time with valve actuation PWM	-	-	-	-	-
P106	reserved	-	-	-	-	-
P107	reserved	5	0	255	MIN	5
P108	Duration of valve open to check water temperature	240	35	255	MIN	240
P109	Duration of valve closed	-	-	-	-	-
P110	reserved	-	-	-	-	-
P111	reserved	-	-	-	-	-
P112	reserved	-	-	-	-	-

P113	reserved	-	-	-	-	-
P114	reserved	-	-	-	-	-
P115	reserved	-	-	-	-	-
P116	reserved	-	-	-	-	-
P117	Locking operating functions (function keys on KaController)	0	0	7	-	0
P118	reserved	-	-	-	-	-
P119	reserved	-	-	-	-	-
P120	reserved	-	-	-	-	-
P121	reserved	-	-	-	-	-
P122	reserved	-	-	-	-	-
P123	reserved	-	-	-	-	-
P124	reserved	-	-	-	-	-
P125	reserved	-	-	-	-	-

Other functions and parameter settings can be carried out in accordance with the complete KaControl instructions.

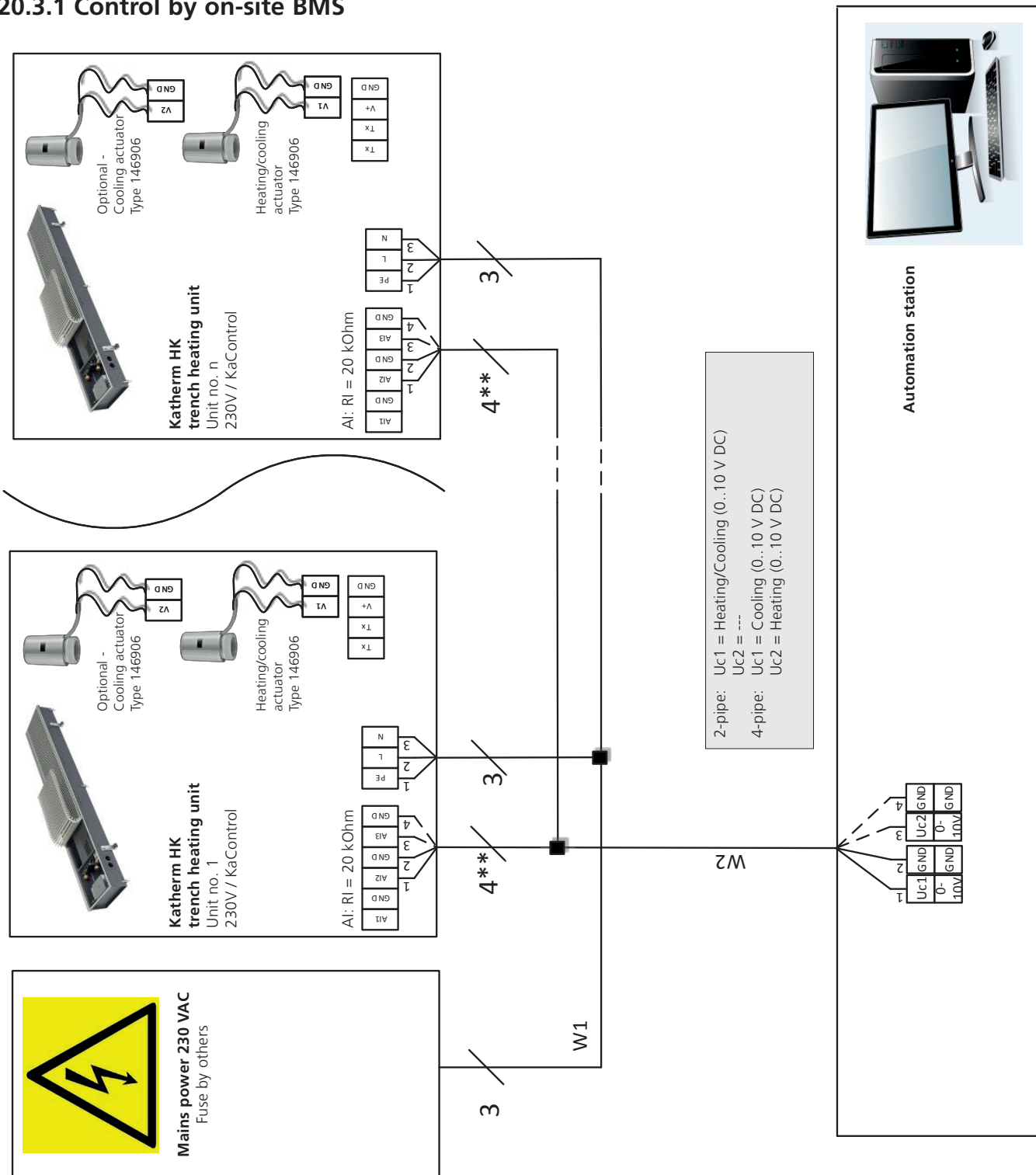
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Ready-to-install trench heating units with EC tangential fan

Assembly and installation instructions

20.3 Electrical wiring

20.3.1 Control by on-site BMS



** Route shielded, paired cables e.g. UNITRONIC® BUS LD 2x2x0.22 or similar separate from power cables.

W1: Power supply

W2: Control signal for fan and actuator.

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Ready-to-install trench heating units with EC tangential fan

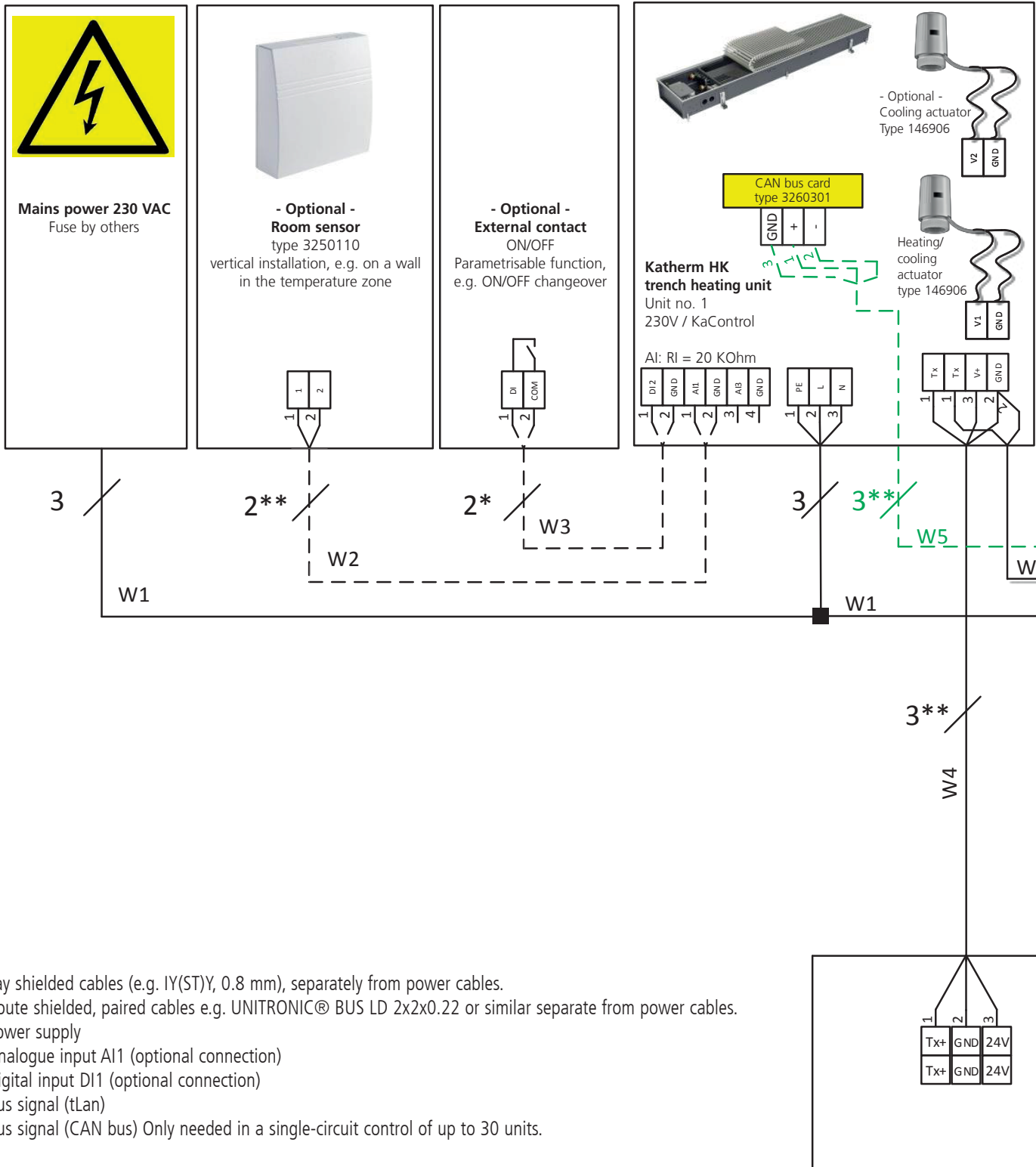
Assembly and installation instructions

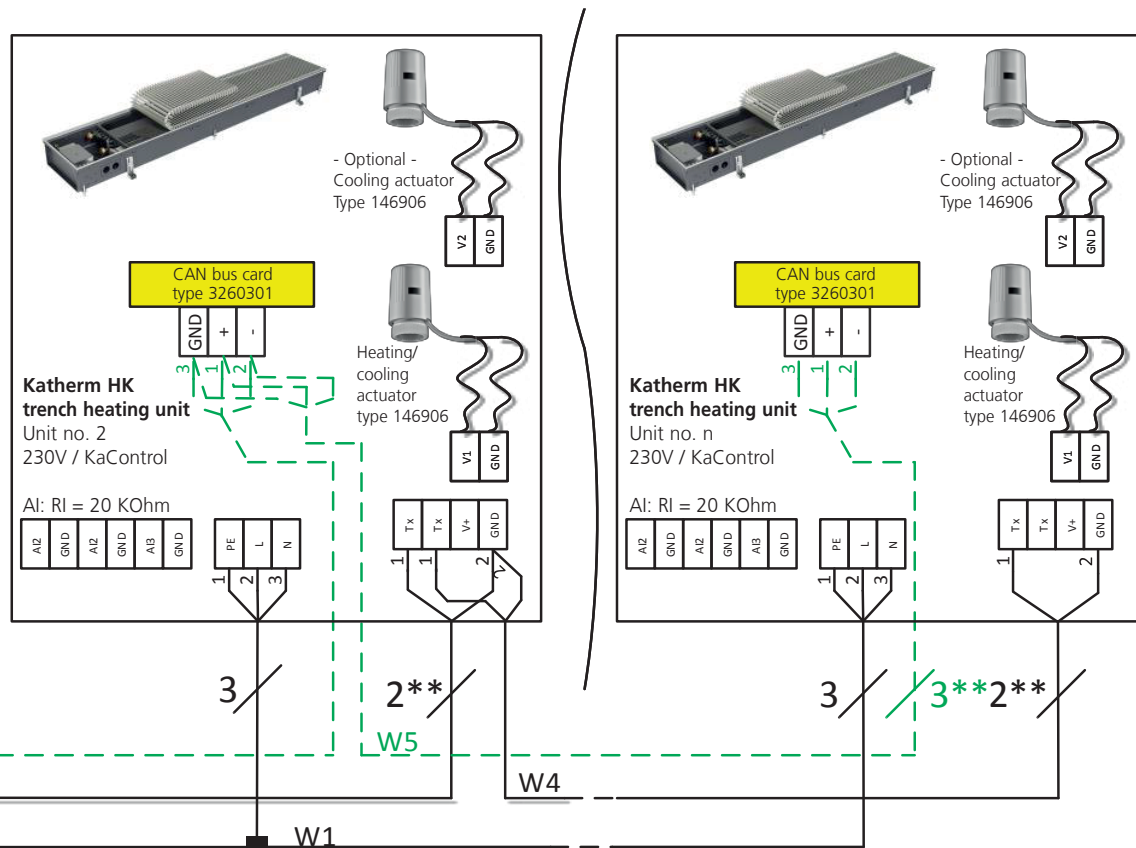
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Assembly and installation instructions

20.3.2 Master unit and slave units





Single-circuit control of up to 6 units:
W4 cable required, total maximum cable length 30 m.

Single-circuit control of up to 30 units:
CAN bus card and W5 cable needed, total maximum cable length 500 m.

KaController 24V
3210001,
3210002
or
3210006

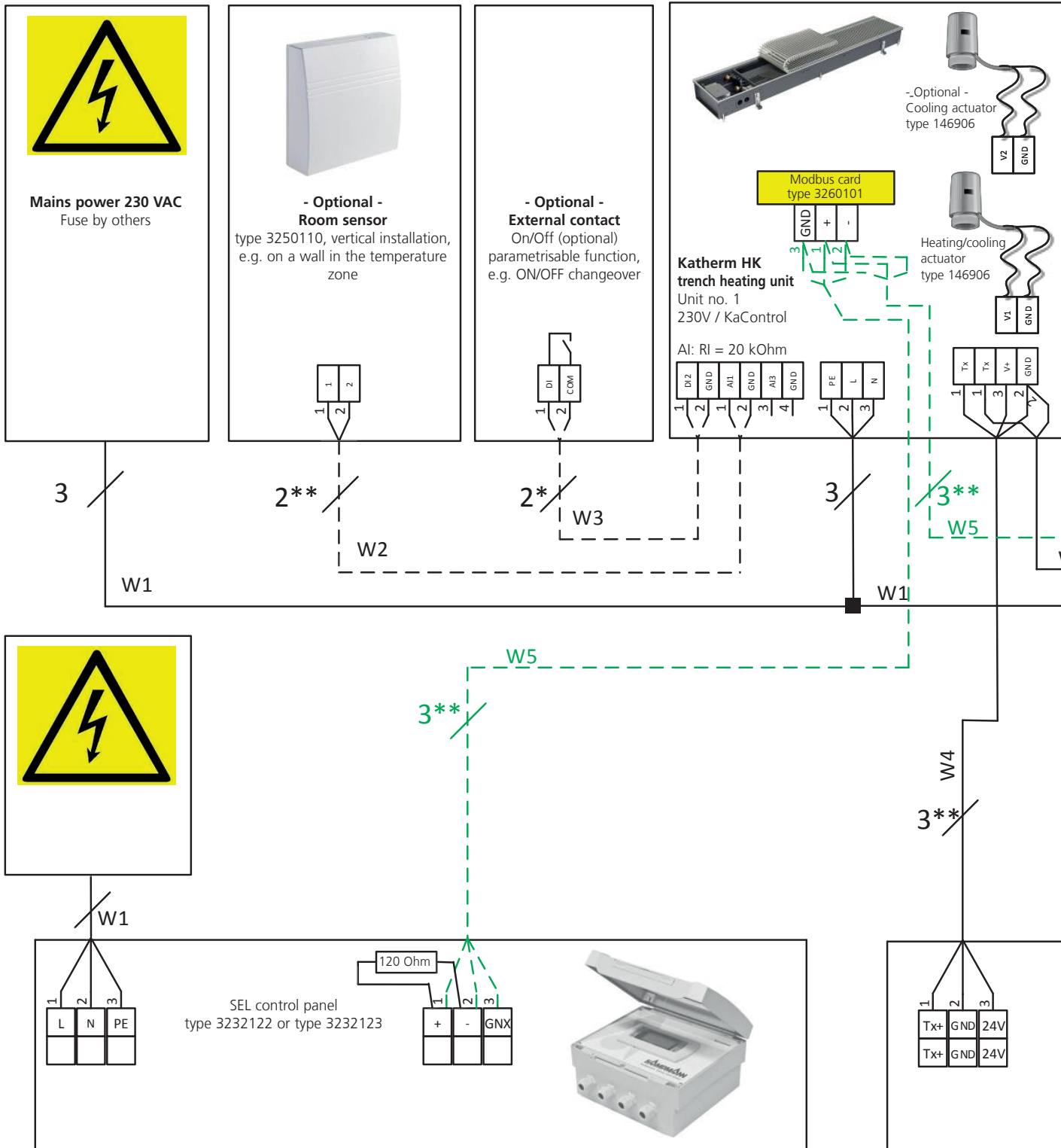


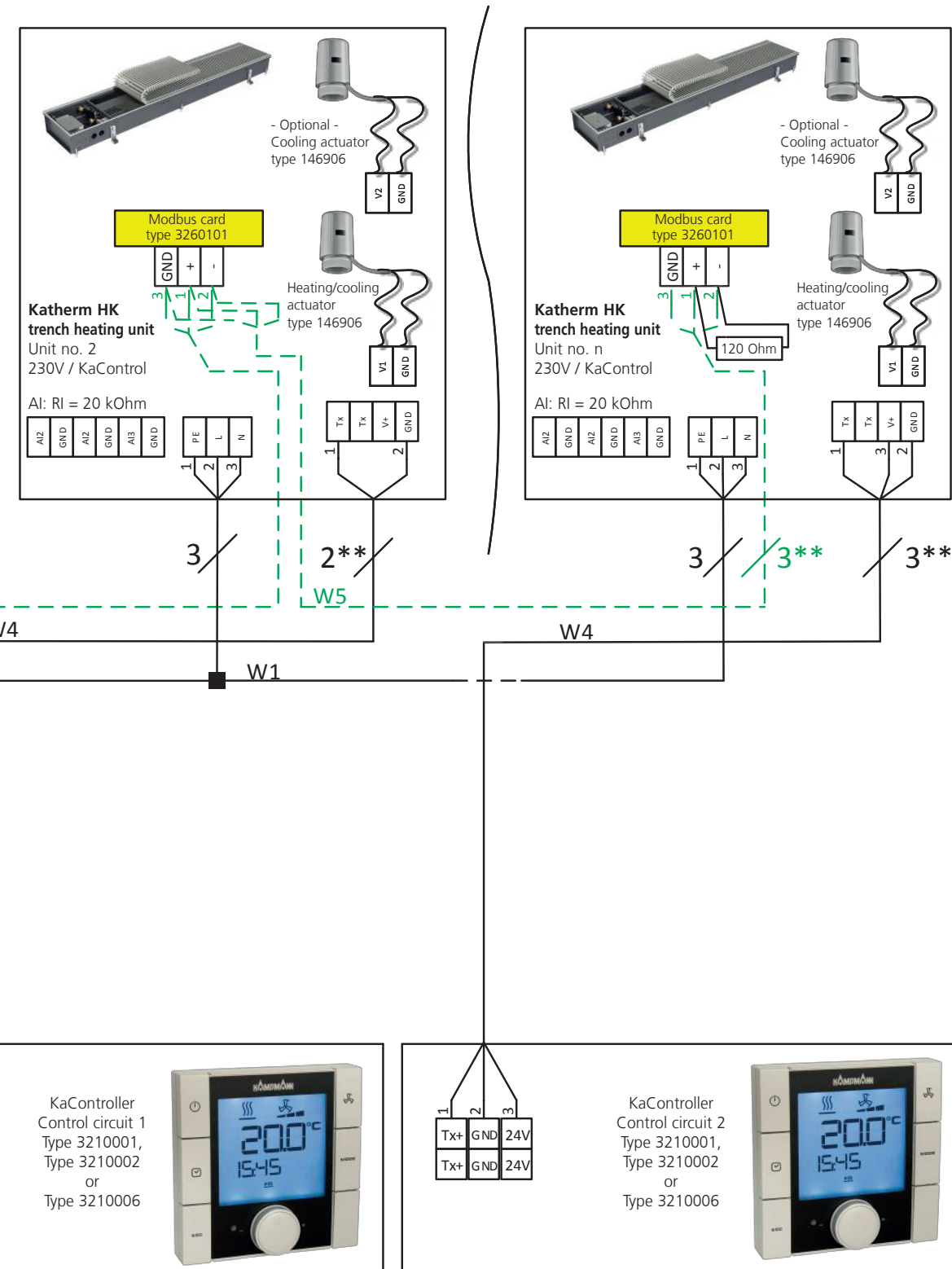
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Assembly and installation instructions

20.3.3 Control via SEL panel





* Lay shielded cables (e.g. IY(ST)Y, 0.8 mm), separately from power cables.

** Route shielded, paired cables e.g. UNITRONIC® BUS LD 2x2x0.22 or similar separate from power cables.

W1: Power supply

W2: Analogue input AI1 (optional connection)

W3: Digital input DI1 (optional connection)

W4: Bus signal (tLan)

W5: Bus signal (Modbus)

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