ELECTRIC TRENCH HEATERS

FET - with fan-forced convection
FEK - with natural convection

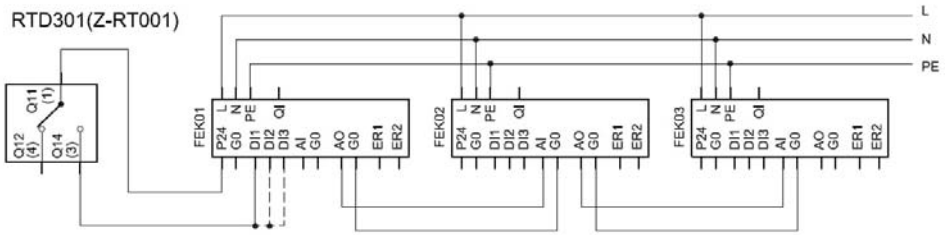
User and Installation Guide

FET models with fan-forced convection
FET 0110 0250, lengths 800, 1200, 1600, 2000 mm

FEK models with natural convection
FEK 0140 0250, lengths 800, 1200, 1600, 2000 mm

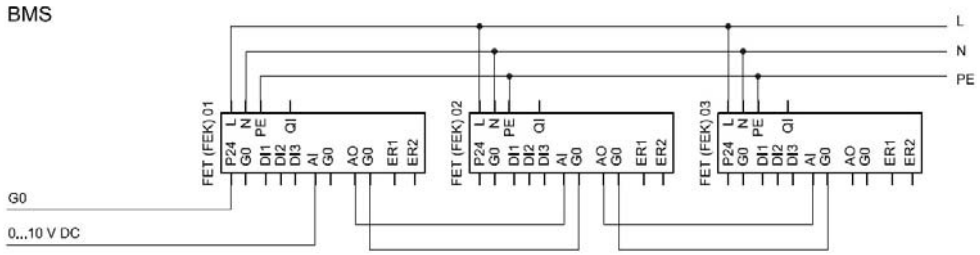
14.2 Natural Convection FEK Trench Heaters

14.2.1 RTM301, Z-RT001 thermostat wiring



14.3

14.4 FET/FEK trench heating control using 0 … 10 V DC control signals



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1. Introduction

You have purchased a modern product that meets the electrical equipment operating requirements for households and areas utilized for similar purposes. The product is equipped with modern electronics and sensors to facilitate its control and operation, as well as safety features designed to monitor proper functioning in the event of unforeseen circumstances, such as a covered exhaust grille.

The product is intended for in-floor installation with only the designer exhaust grille remaining visible. The heating thus does not disrupt the overall room appearance when installed in front of large glass surfaces.

Its typical application includes operation in dry environments such as flats, family houses, administrative buildings and corridors. Electrical FET/FEK trench heaters provide a high level of heating comfort when combined with control elements (manual/digital thermostats, building control systems, etc.). FET/FEK trench heaters are powered exclusively by electricity; no other source of heat is used. The heater incorporates a modern advanced controller to regulate the heating output of the heating element, determine the fan speed (FET), and evaluate and regulate the temperature of the air released from the heater outlet. The heater includes safety features designed to regulate, reduce or suspend its operation in the event of abnormal conditions.

Prior to installing and using the heater, please read this instruction manual carefully. Keep the manual in a safe place for future reference!

2. Symbols

Caution! Danger!
Non-compliance with this information may result in serious injury or material damage.

Electrical hazard!
Non-compliance with this information may result in serious injury or material damage from electric current.

3. Safety Instructions and Operating Principles

3.1 General Overview

FET/FEK trench heaters are not to be used by people (including children) whose physical, sensory and mental debility or lack of experience or knowledge prevents them from the safe use of the appliance, unless they are supervised or instructed on the use of the appliance by a person responsible for their safety. Children should be supervised in order to prevent their playing with the appliance.

Children of less than 3 years should be kept away unless continuously supervised.

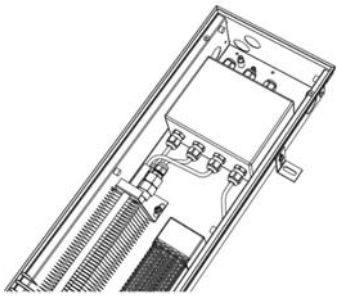
Children aged from 3 years and less than 8 years shall only switch on/off the appliance provided that it has been placed or installed in its intended normal operating position and they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children aged from 3 years and less than 8 years shall not plug in, regulate and clean the appliance or perform user maintenance.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

CAUTION! Some parts of this product can become very hot and cause burns. Particular attention has to be given when children and vulnerable people are present.

Tampering with the appliance or unprofessional servicing may pose a risk of serious injury or result in damage to the product. Any installation work, repairs, adjustments and modifications of the appliance must be carried out exclusively by a service engineer or a duly qualified person.

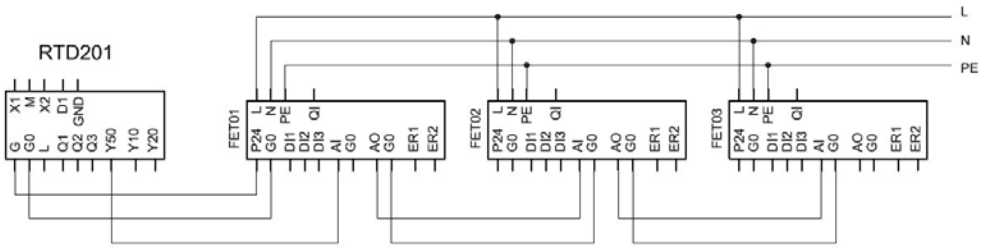
Notice:
Suitable cable diameters must be used to ensure proper electric protection of the EKON regulator. The EKON regulator is placed inside an aluminium box with bushings. To comply with the IP44 protection rating requirements applicable to the regulator, connect sections **A** and **B** using a cable 4-8 mm in diameter (M16 bushing).



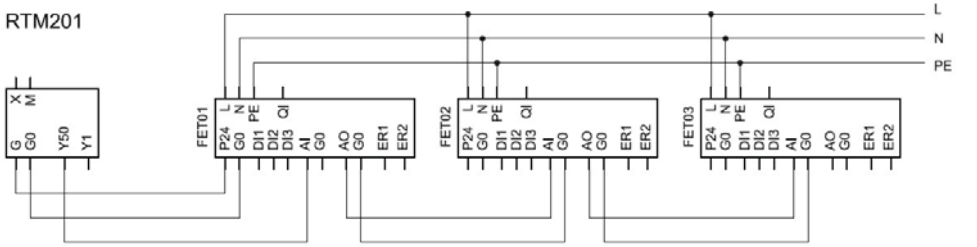
14. Wiring Diagram

14.1 Fan-forced FET Trench Heaters

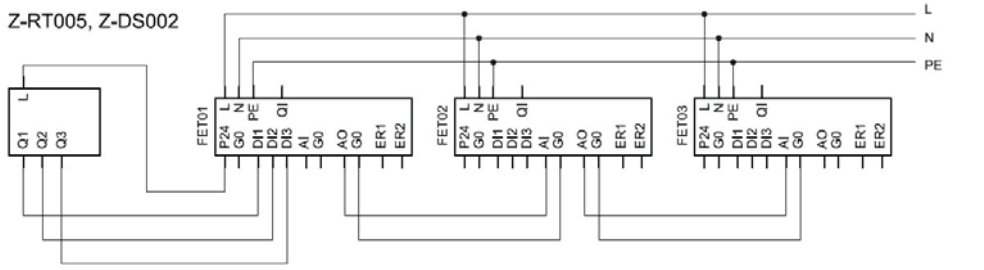
14.1.1 RTD201 thermostat wiring



14.1.2 RTM201 thermostat wiring



14.1.3 Z-RT005, thermostat and Z-DS002 switcher wiring



13. Wiring Diagrams and Connections

The trench heater is controlled via the E-KON regulator installed inside the heater. The heater can be safely wired by following the basic rules indicated in section (3.2. Design and Installation)

13.1 Description of EKON Regulator Terminals

13.1.1 Customer wiring

Section A

L	phase	230 VAC supply
N	neutral conductor	230 VAC supply
PE	protective conductor	supply
IQ1	empty position	(do not connect)

Section B

P24	+ 24 V DC	thermostat power supply +24V - output
G0	- 0 V DC	thermostat power supply -0V- earthing terminal
DI1, DI2, DI3	digital inputs	
AI	0-10 V DC	input (opposite G0)
AO	0-10 V DC	output (opposite G0)
ERR1, ERR2	fault	potential-free contact, heater error ERR1 and ERR2 interconnect in the event of a fault

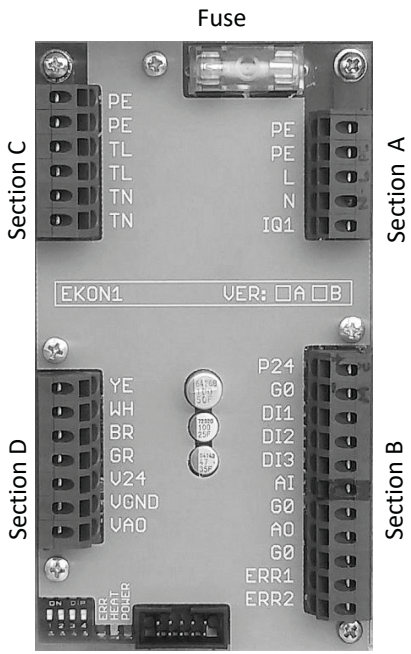
13.1.2 Factory wiring

Section C

PE	protective conductor
TL	heating unit power supply
TN	heating element power supply

Section D

YE	yellow temperature sensor conductor
WH	white temperature sensor conductor
BR	brown temperature sensor conductor
GR	grey temperature sensor conductor
V24	fan power supply +24V DC
VGND	fan power supply - 0 V DC
VAO	fan control 0 - 10 V DC



Any tampering with the components of FET/FEK trench heaters is prohibited. Do not dismantle and/or modify the equipment in any unprofessional manner. Otherwise, you run the risk of electric shock, fire or other injuries.

Electric FET/FEK trench heaters can only be used for the purposes for which they were designed. Using the heaters contrary to the instructions in this manual can be dangerous.

Uses not mentioned or referenced in this manual will not be regarded as proper and/or intended. The operator of the appliance will be solely responsible for any resulting damage. Proper and correct use also includes adherence to the instructions provided in this manual.

Failure to comply with these rules and operating instructions may result in malfunction and subsequent damage of the heating equipment and/or personal injury. Wire crossing due to incorrect connection may lead to a fatal injury.

3.2 Design and Installation

Each trench heater is an electrical device whose installation and commissioning must invariably be carried out by a qualified and duly licensed technician in accordance with relevant project documentation.

The assembly, installation and operation of the appliance must comply with the laws, regulations and standards applicable in the destination country. The assembly and installation must always be preceded by the completion of mains wiring with adequate line protection. A device with contacts no less than 3 mm apart when disengaged, designed to disconnect all poles of the appliance from the mains (hereafter referred to as the “main switch”), must be installed in the fixed power distribution system upstream of the appliance.

The trench heater must never be installed directly below a wall socket.

Prior to placing the electrical device into service, ensure that all required tests and inspections have been performed to verify its proper functioning in accordance with applicable regulations. The device must be installed in a manner that does not pose any threat to people, animals or property.

The electric source and supply must comply with applicable standards and be compatible with the required voltage, including the maximum current consumption requirements.

Connect the heater wiring to fixed cables only.

Incorrect wiring may result in damage to the unit! The user/operator will be deemed fully responsible for any damage caused by improper installation.

Voltage fluctuations in excess of 10 % may cause damage to the appliance. The use of incorrect voltage may cause fire, electric shock and/or malfunction of the appliance.

Always use a separate electrical branch for trench heater control with its own circuit breaker.

The heater is considered to be a Class I appliance in terms of electric shock protection in accordance with EN 60 335-1.

The appliance is designed for interior operation in dry environments. Avoid installing the

heater in close proximity to a bathtub or shower, in humid environments or in areas where excessive water vapour condensation may occur (showers, saunas, etc.). Failure to do so may result in electric shock.

3.3 Operation

If the appliance does not work or behaves abnormally, disconnect it immediately from the mains supply for at least 2 minutes. If, after reconnection, the appliance continues to function abnormally, switch off also the relevant circuit breaker/residual current device. Send the malfunctioning appliance to an authorized service centre for repair.

Disconnect the main power source prior to any substantial changes to the environment in which the appliance is installed (paint or glue application, etc.).

When handling the appliance or if the appliance is not to be used for extensive periods of time, switch off the main power switch upstream the appliance.

We recommend having the trench heater checked for proper functioning and maintained by a service technician at least once every two years. This will help prevent possible malfunctions and extend the life of the equipment.

Take precautions to ensure that no liquids or objects enter the trench heater. If this happens despite your precautions, it is essential that the power supply of the FET/FEK heater is disconnected and secured directly at the mains until the liquid has been drained/removed from the heater casing and/or the object has been extracted. (See also the section entitled “Trench Heater Cleaning”). If the FET/FEK heater **does not function properly** following the removal of the object/liquid and reconnection of the appliance to the mains, disconnect it from power supply permanently and request professional assistance (a qualified servicing technician).

12. Technical Data

12.1 Technical Parameters:

Rated voltage of the trench heater:	230 V AC, 50/60 Hz
Rated voltage of the heating unit:	230 V AC, 50/60 Hz
Rated voltage of the fan: 24 V DC	(EC motor with continuous speed regulation)
Protection rating of the trench heater	IP20, dry environments
Connection and control electronics protection	IP44
Ambient conditions: at relative humidity of 20 to 70%	ambient temperature of +2 to 40 °C
Inputs:	230 V AC 0 - 10 V DC DI1 - DI3, digital
Outputs:	230 V AC (regulated heating element) 0 - 10 V DC switch contact fault channel 24 V DC thermostat power supply 24 V DC fan power supply (FET only) 0 - 10 V DC (FET only)

Max. power input of the heater (length / input power)
FET: 800 mm/**550 W**, 1200 mm/**1000 W**, 1600 mm/**1600 W**, 2000 mm/**2200 W**
FEK: 800 mm/**250 W**, 1200 mm/**500 W**, 1600 mm/**750 W**, 2000 mm/**1000 W**

Control and regulation
FET
- RTD201, digital programmable thermostat for FET models, continuous regulation
- RTM201, manual thermostat for FET models, 3-step regulation ranging from 0 to 10 V DC
- Z-RT005, manual thermostat for FET control, 3-step regulation
- Z-DS002, three-step mechanical switch for FET models

FEK
- RTD301, thermostat for FEK models, digital, programmable
- Z-RT001, thermostat for FEK models, manual

FET, FEK
- control 0 … 10 V DC inlet for control via higher-level BMS regulation or a SMART Home system

Max. temperature at the grille: interior temperature + max. 45 K (in accordance with EN 60335-2-30)

11. Cleaning and Maintenance

As the heating unit is installed inside the floor where it is exposed to dust and debris, it must be cleaned on a regular basis.

We recommend cleaning the unit especially prior to and after the heating season. If debris, liquids or other impurities evidently enter the heater while cleaning the surrounding floor, it is essential that the heating unit be immediately disconnected from the mains and cleaned.

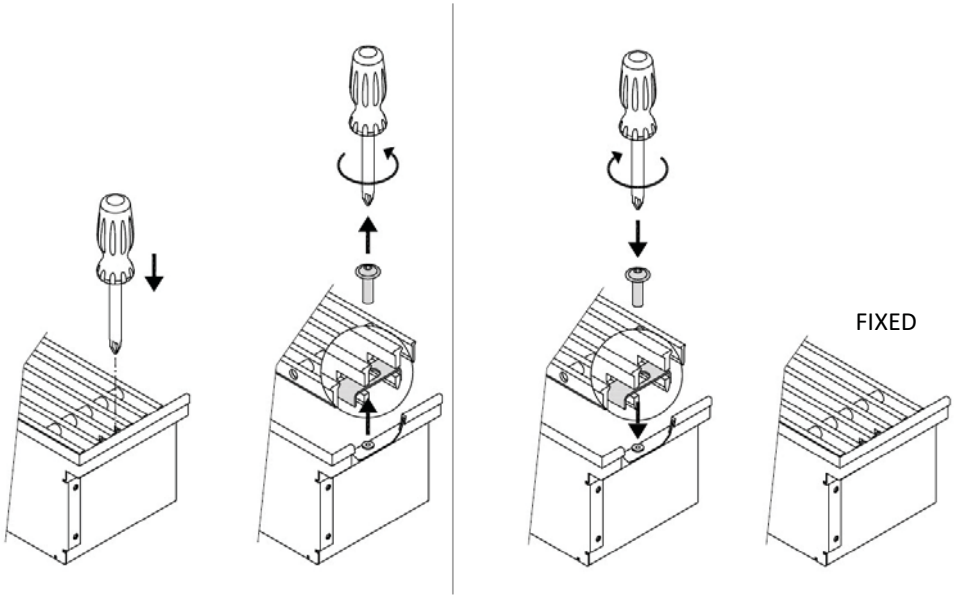
Clean the disconnected/unplugged trench heater using a vacuum cleaner to remove the accumulated dust, being careful not to damage the sensor tubing located above the heat exchanger. Remove the dust around the fan, as well as in front of and between the fins of the heating unit.

Wipe the remaining surfaces with a wet cloth without detergent or any other cleaning agent, solvent, petrol, etc.

To clean the unit, remove the upper designer grille using a screwdriver.

Caution! Replace the upper grille after cleaning and before the heater is returned to operation.

Grille removal **Grille installation**



3.4 Maintenance and Service

Regular maintenance and servicing. Any servicing work must be performed by a qualified servicing technician.

It is essential that the FET/FEK trench heater is secured against activation prior to starting any cleaning and maintenance work performed by the user – always disconnect the device and secure it against reconnection directly at the mains power inlet for the duration of cleaning and maintenance. Internal components can become very hot (the heating element, sensor piping, etc.). Wait at least 10 minutes before proceeding to remove the upper grille.

Any repair work must be performed by a qualified servicing technician.

3.5 Grille

Never cover the grille or place parts of furniture or other items, such as carpets or flowerpots, on top of it. The grille must remain completely free of any covering material. The warning label is located on the heater casing below the upper gill.

Do not remove the upper grille unless the heater has been unplugged or disconnected from the mains supply to prevent serious injuries. The heater must always have the upper designer grille properly attached while in operation.

Do not use any abrasive or chemical cleaning agents to clean the designer grille of the heater; use a **wet** cloth with some regular detergent only. Avoid damaging the grille by running floor cleaning machines over it, for example.

The grille is designed to be walked on, to accommodate regular foot traffic. Avoid applying excessive concentrated load on the grille. Avoid overloading the grille via impact loading (e.g. jumping on its surface).

4. Disposal of Electrical Equipment

4.1 Equipment

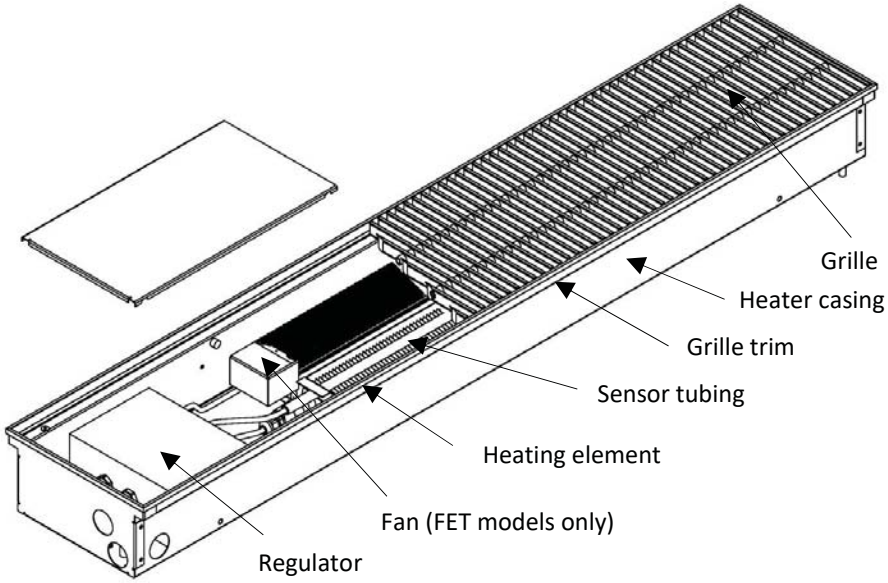
Used electrical equipment must not be disposed of as regular municipal waste. Any such equipment should be delivered to designated collection facilities to ensure its proper disposal, recovery and recycling. Alternatively, in some EU Member States or other European countries, used products can be returned to the local vendor upon the purchase of an equivalent new product. Proper disposal of this product will help prevent potential negative impacts on the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

4.2 Packaging

Used packaging handling instructions and information:
Do not allow children to play with used packaging. The appliance comes packaged in a plastic bag. Suffocation hazard! Used packaging should be recycled or deposited at a designated waste collection point.

5. FET/FEK Trench Heater Description

Casing	galvanized sheet metal with surface finish and black spray coating, black cover connection sheets
Heating element	an electrical heating element with aluminium fins, black coating
Grille	a designer walk-on grille, aluminium, transverse, non-roll, fixed to the casing, bespoke finish (Al natural, Al black, Al bronze, Al stainless steel)
Grille trim	anodized aluminium, customer-specified type and colour (Al natural, Al black, Al bronze)
Regulator	a modern electronic regulator with protection elements and sensors
Fan	a modern tangential fan with a 24 V DC EC high-efficiency motor, shielded rotors (only FET)
Installation components	casing levelling screws, seat angles
Installation manual	an installation manual and user instructions
Wiring diagram	trench heating wiring diagrams
Mounting plate	a cover and spacing chipboard for easy installation
Packaging	transport packaging to prevent damage during transportation and handling



10. Connection, Regulation, Operation using Controls (accessories to order)

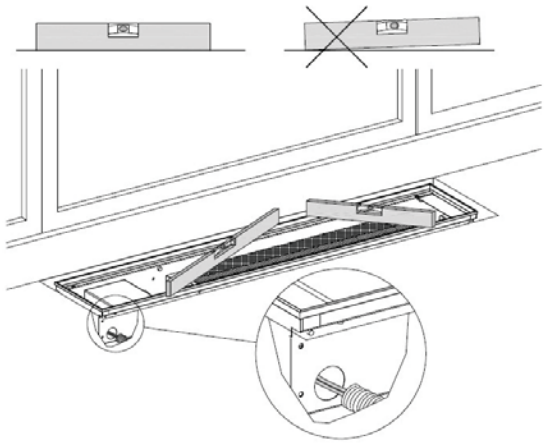
Electric trench heaters are regulated using controls normally mounted on the wall in the room where the heating unit is installed. Thermostat and switches must be installed at locations indicated in the documentation enclosed with the control element. Control **0…10 V DC** inlet for control via higher-level BMS regulation or a SMART Home system can be used.

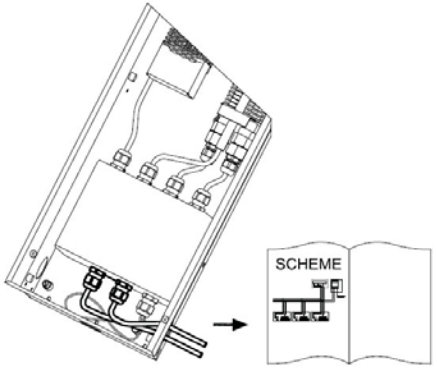
10.1 FET Electric Trench Heaters with Fan-forced Convection

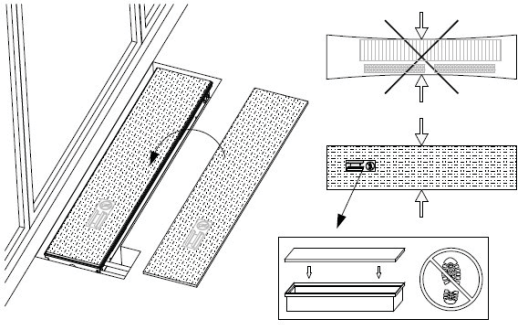
RTD201 	A digital room thermostat for smooth fan-forced trench heating control.	- digital room thermostat with a backlit LCD display - weekly program, 8-time blocks/day - manual or automatic speed switching - operating modes: Comfort, Standby and Protection - front cover colour: RAL9003 White - supply voltage: 24 V DC - control signal: 0 … 10 V DC
RTM201 	A mechanical room thermostat for 3-step fan-forced trench heating control. Individual speed modes can be pre-set.	- mechanical-electronic room thermostat - manual 3-speed fan switch - front cover colour: RAL9003 White - supply voltage: 24 V DC - control signal ranging from 0 to 10 V DC
Z-RT005 	A mechanical room thermostat for 3-step trench heating control.	- manual 3-speed fan switch - front cover colour: RAL9003 White - supply voltage: for voltage-free SELV control in FET models **!!! The thermostat is identical in appearance to the RTM201 model (RTM201 is equipped with internal electronics, while Z-RT005 is mechanical only)**
Z-DS002 	A mechanical switch for 3-step fan-forced trench heating control.	- manual 3-speed fan switch - front cover colour: RAL9003 White - supply voltage: for voltage-free SELV control in FET models

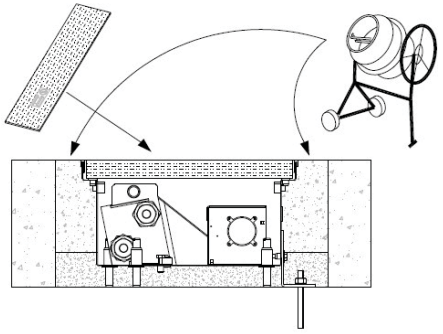
10.2 FEK Electric Trench Heaters with Natural Convection

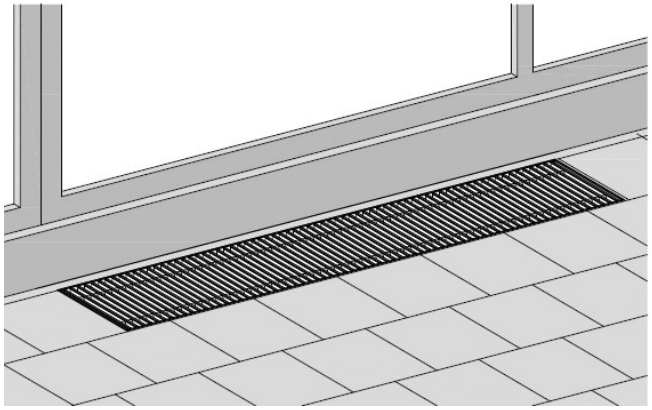
RTD301 	A digital LCD room thermostat for natural convection trench heating control.	- 2-position ON/OFF heating control - operating modes: Comfort, Standby, Automatic and Protection Mode - weekly program, 15-minute time blocks - front cover colour: RAL9003 White - supply voltage: 3 V DC (2x1.5 alk. AAA battery)
Z-RT001 	A mechanical room thermostat for natural convection trench heating control.	- 2-position ON/OFF heating control - mechanical room thermostat - front cover colour: white





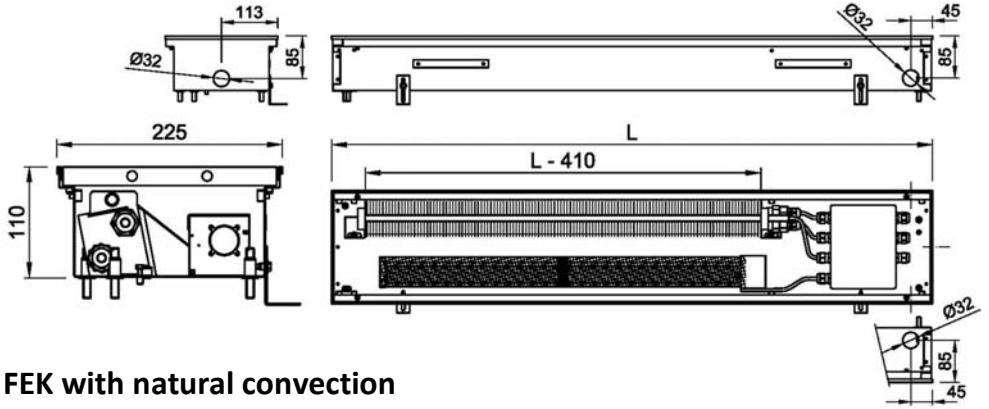




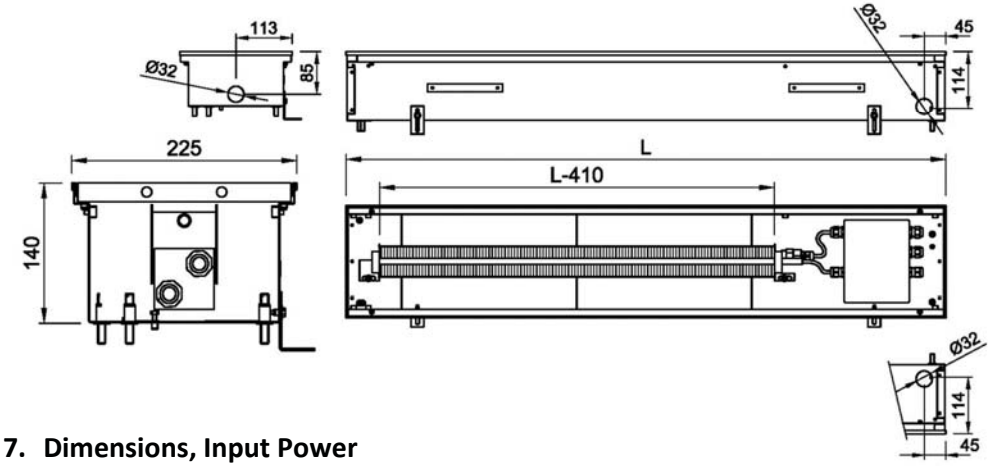


6. Dimensional Drawing of the Heater

FET with fan



FEK with natural convection



7. Dimensions, Input Power

Trench heater	Dimensions			Input power
	Width	Height	Length	Max. heating element power input
FET 0110 0225 0800	225 mm	110 mm	800 mm	550 W
FET 0110 0225 1200			1200 mm	1000 W
FET 0110 0225 1600			1600 mm	1600 W
FET 0110 0225 2000			2000 mm	2200 W
FEK 0140 0225 0800	225 mm	140 mm	800 mm	250 W
FEK 0140 0225 1200			1200 mm	500 W
FEK 0140 0225 1600			1600 mm	750 W
FEK 0140 0225 2000			2000 mm	1000 W

8. Floor Installation of the Trench Heater

Placement of the unit

- the trench heater is designed for in-floor installation, normally in front of large window surfaces
- a clearance of approximately 15 cm around the heater is required to ensure the proper functioning and safe operation of the unit
- do not place any interior equipment, such as furniture, flowerpots, tables and chairs, within this space
- do not place highly flammable objects and flammable or explosive liquids in the vicinity of the heating unit

8.1 Trench Heater Installation

Follow these installation instructions:

- the casing is not self-supporting and the levelling screws are not designed for load bearing
- during construction work, always cover the unit with chipboard and carefully seal all openings
- the casing bottom must rest on a concrete base or a level load-bearing structure;
- if thin mixtures are used (such as ANHYDRIDE) to complete the flooring, the trench heater must be SEALED; NO WARRANTY APPLIES to trench heaters damaged by liquid building materials entering the unit
- in designing the type of casing insulation, compression strength and volume absorbability in particular should be taken into consideration
- the proper setting of the unit into a particular floor structure will be specified by the heating designer.
-

8.2 Installation of the Grille Trim

- The “J” trim is factory fixed to the heater perimeter; ensure that the upper part of the unit is flush with the top floor level.

- The “L” trim is installed lastly by attaching it to the heater using silicone or adhesive cement. The upper edge of the heater must be level with the final flooring layer. Placing it higher could make installation of the “L” type trim problematic.

9. Assembly