


EX HKA / U AT

Radiator



Identification	 II 2 Ex eb mb IIC
EU-type examination certificate	PTZ 16 ATEX 0023 U
Ambient temperature range	-55°C - +100°C
Heating capacity	max. 370 W
Nominal current	1,8 A - 4,4 A
Nominal voltage	230 V
Protection degree	IP 65

Radiator

Electric heater for the heating of instrument enclosure cabinets in hazardous areas. The radiator is also available as HKA with integrated temperature monitoring and an integrated controller and limiter.

Equipment and protective systems for the intended use in hazardous areas according to directive 2014/34/EU

Radiator	Ex HKA ... U/AT
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Warning

The installation, configuration and commissioning may only be carried out by accordingly trained persons. The local installation and safety regulations must be respected.



Proviso

We reserve the right for technical changes. Aberrations and printing errors do not constitute grounds for any claims to damages. For safety components and systems the relevant standards and regulations as well as the according instruction manual and the assembly instructions should be observed.



Installation instructions

For the installation/operation the EN 60079-14 ff and the respectively applicable installation regulations as well as the generally recognized rules of technique and this operating manual are relevant. The radiator Ex HKA...U/AT is a component of a heating system and approved in connection with the declaration of the manufacturer and with the other components (EN50014 and EN50019 see declaration of conformity). Only at compliance with this regulation and the appropriate VDE guidelines the EU-declaration of conformity is valid. In the case of doubt the manufacturer should be contacted or rather the local expert for the plant should be consulted. At not already tested control cabinet heating we recommend to send us an arrangement sketch.

Maintenance

The relevant regulations of the EN 60079-14 for the repair / maintenance / inspection must be observed. The device is maintenance-free.



Repair

Dismantling takes place in reverse order than the installation. Due to the small heavy metal abundance a defect device must be disposed of as hazardous waste.

The device is irreparable. An intervention is not permitted. If there is no company standard available for the installation on the part of the operator, we must be informed about this. At non-compliance with the installation instructions the warranty expires.

The devices may not be thrown or fall down. If a deformation is observable at the device (connection cable), it must be sent back for examination. The devices may not be thrown or fall down..

Read through this operating manual carefully, before you take the device into operation. Keep this manual at a place accessible for all users at any time.

Please support us to improve this operating manual. We are grateful for your suggestions!

Please contact us for technical queries!
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1.0 GENERAL DESCRIPTION

Characteristics

- High capacity
- Optimized radiation by black paint and sealed heating ribs
- Controller and limiter integrated in the terminal block
- Mounting bracket included



The radiator consists of two flat tube heat conductors, which are pressed into heating ribs. The standard version is galvanized and enamelled. The junction box includes the temperature limitation, temperature control and, if applicable, the temperature signal and it is filled with resin. The cable is about 1,20 m long and for the standard version of PTFE.

Special version:
-V2A protective sleeve over cable

For the annexation of iron assembly, four holes with a diameter of 6,5 mm are provided. The radiators can be installed in two different positions into the cabinets, vertically and horizontally. Because of this and because of the low space requirements they can be easily installed in existing, with equipment fitted cabinets, additionally. The heating element is designed for space heaters with high specific need of heat (2 W/liter volume) at the lowest possible temperature difference in the room. It is especially designed for ambient temperatures up to 80°C without derating.

The various internal resistances are provided for series circuit of different heating elements and need of heat at constant voltage systems e.g. 3 A. The same applies for pilot schemes.

The radiator is used for heating cabinets, especially instrument enclosure cabinets and may only be operated with an equivalent external protection.

The radiator contains no facility for the surface temperature limit. The surface temperature limit must, depending on the application, be guaranteed by an outside body or other measures.

By the use of external measures it can be guaranteed that the conditions according to EN 50014 are met. To achieve with, for example, a room thermostat and a limiter that monitors the surface temperature. Or the radiator is operated with a system voltage that excludes an impermissible heating at proper installation.



Depending on the design it is intended for a system, in which also other users are switched in row and where the operating voltage of the system is reduced so far by phase angle control depending on the demand, that the operating voltage is only so big that the indicated nominal current of the radiator is not exceeded by more than 10%.***

The series voltage for all versions is 230 V ~ +10%.

1.1 PROTECTIVE MEASURES

The protective measure for the heating circuits is grounding (potential equalization). Due to often long supply lines and the thereby caused capacitive residual currents, which can essentially increase, due to humidity saturation of the insulation, residual current circuit breakers with 300 mA are advisable. Dependant on the product, residual current circuit breakers respond differently at capacitive residual currents.

2.0 GENERAL TECHNICAL DATA

Series voltage	≤ 252 V ~	
Nominal voltage	230 V	
Nominal current	1,8 A - 4,4 A (see table 1 below)	
Nominal output power	max. 370 W*	
Protection class	H2G	
Dimensions (mm)	210 x 273 x 50	
Mounting dimensions (mm)	210 (15) x 30	
Ambient temperature range	-55°C to +100°C	
Maximum temperature at the terminal compartment (encapsulation)	130 °C	
Surface temperature	166 °C	
Protection class	IP 65/ DIN 40 0 50	
Type of ignition protection (gas)	II 2 G Ex eb mb IIC	
EU-type examination certificate	PTZ 16 ATEX 0023 U	
Identification	 0344	 II 2 G Ex eb mb IIC

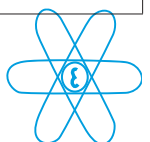
* Horizontal installation, ground clearance 40mm, Δt supply air to radiator surface 90°K. Max. warming up at vertical installation.

** System certification in preparation for the following application:
a) Operating voltage is reduced so far that a physical limitation is given.
b) HKA U/ AT in connection with capillary controller and limiter.

Table 1

Internal resistance	Nominal current	Nominal operating voltage
Ohm	Ampère	Volt
130	1,8	230
105	2,2	230
80	2,2	180
33	3,4	115
20	4,4	90

Electrical connection. Connection cable made of silicone 3 x 1,5mm² or rather ², 1,2m long, 5-6 mm



3.0 PRODUCTION NUMBER

xxxx / 03.03

Year
Month
Serial number

3.1 ORDER REFERENCE

EX HKA 1 / **U AT** 2

1		Internal resistance (see table 1)
2	-	Standard
	s	With protective tube
	T	With teflon coating
	sT	With protective tube and teflon coating

Table 1

Internal resistance in Ohm	130	105	80	33	20
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Example: Device with internal resistance of 130 Ohm, without protective tube, version T3:

ExHKA 130 **U/ 100 AT** -
1 2

4.0 INSTALLATION

1. If the connection cable has no additional protection, no metal part or any other object may be laid on the connection cable. (Applies to transport and storage.)
2. The radiator may not be carried by the connection cable.
3. If the radiator falls down, the connection cable must be checked for damaging.
4. The installation should always be carried out horizontally inside the protective cabinet.
5. A type of surface temperature limitation is necessary.
6. A temperature control of the protective cabinet is necessary.
7. It must be checked, if the max. achievable internal temperature of the protective cabinet is admissible for the installations.
8. The connection cable must be laid mechanically protected.

4.1 MOUNTING INSTRUCTIONS

- a. If the protective cabinet is often open for the purpose of operation, a protection against accidental contact must be provided.
- b. In built-in condition a short time load of less than 5 kg is admissible for the radiator.
- c. For works on the piping in the protective cabinet the heating element must be dismantled.
- d. No objects may be laid on the radiator.

4.2 PROJECTING (ONLY FOR T3 VERSION)

The following informations refer to a radiator that has a temperature controller of 100°C in the connection compartment. The radiator Ex HKA ... U/AT ... does not have this. Quid pro is valid for it accordingly for other temperatures, site of the limiter, controller or control system. The excess of power needed to fulfil the necessary capacity is responsible for the heating up time until first the heating element has reached its temperature and then the protective cabinet with its installations. Besides the voltage drop must be construed dependant on the solid shaft current for the lines to be installed and for fuses at controllers with phase angle control. The heating elements give out a certain power inside the protective cabinet depending on the installation of the air temperature inside and outside. (Pay attention to the lapse rates in the protective cabinet). The difference between the possible power drain and the electrical connected load is, if not by the room thermostat then by the integrated temperature controller, adapted via the on / off switching relation (open protective cabinet). Hereinafter the conditions, which power the radiator delivers.

1.) See table 2 and diagram 1(Chapter: 4.3 and 4.4):
 Max. power of the Ex - HKA depending on the room temperature. The ambient temperature around the protective cabinet (150l) has only a very little influence on the possible output power. The ambient temperature only has an influence on the necessary power for the cabinet, whereas a wind velocity of 5 m/s is taken as a basis. Besides it was considered that the protective cabinet is installed with a differential pressure transmitter, the air outlet pipes lead uninsulated into the open air and that the protective cabinet is mounted on a steel construction.

2.) The surface temperatures as well as the power output change, depending on the distance to the wall. At horizontal installation the distance between ground and radiator was varied in the range of 0 to 100 mm. At vertical installation the wall distance was varied between 0 + 100 mm. Depending on the type of installation and the distance from the wall the discharged power reduction could be taken from the diagram in percents as well as the temperature changes in that way. The shaded area shows the influence of the adjusted temperature at the room thermostat between 10°C and 25°C. By use of the table the nominal power = max. power at room temperature can be accordingly converted. After that it can be determined, up to which max. room temperature the cabinet can be heated up.

3.) In a first approximation the temperature relations and the outputs can be converted via the surface not via the volume.

4.) Similar to the following, temperature profiles must be developed at new operating conditions. It is recommended to record the transient response:
 a. Internal temperature is similar to the lowest temperature to be expected when switching on.
 b. At the lowest temperature to be expected, the interior space is on set-point temperature. Then the cabinet is opened, without switching off the heating, for 20 minutes and closed again.

If no inadmissible temperature has been achieved, but all desired, the expert may be appointed.

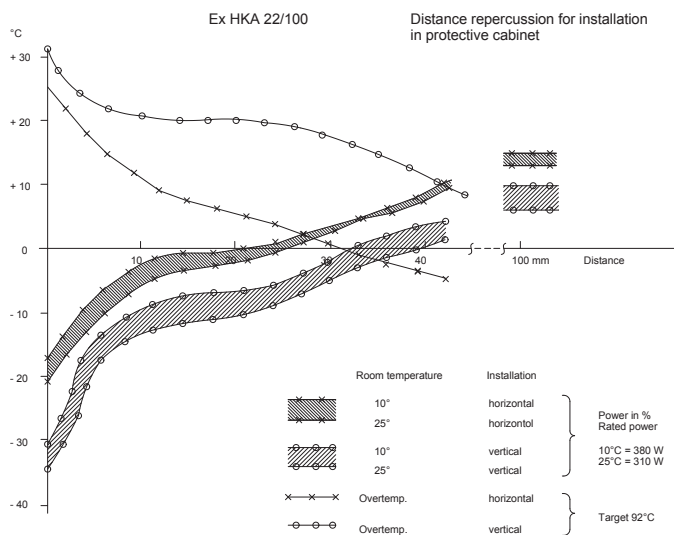
4.3 TABLE 2 (ONLY FOR T3 VERSION)

Power of the Ex HKA in the protective cabinet 150l ss at an ambient temperature of -25°C. Integrated limitation to 100°C and room thermostat at optimal measuring point with setpoint value like interior temperature* determines the temperature rise time.

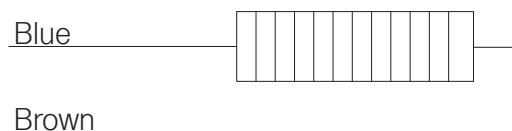
Interior temperature	10°C	20°C	30°C	40°C
Needed power	120 W	150 W	185 W	225 W
Max. power output of the Ex HKA (leaks)	380 W	330 W	280 W	240 W
Power reserve determines the heating up time	68%	54%	34%	6%

* Due to other setpoint values of the controllers the temperatures change accordingly. Better results are achieved, if the surface temperature is limited directly.

4.4 DIAGRAM 1 (ONLY FOR T3 VERSION)



5.0 CONNECTION PLAN



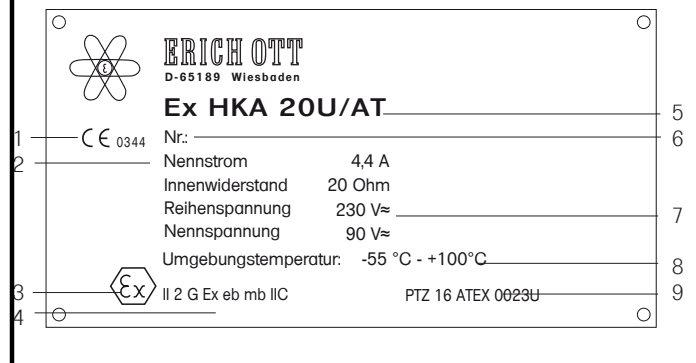
6.0 CABLES AND WIRES

The supply line, if it is longer than 5m and the radiator, if it is controlled with phase angle control (voltage reduction), must have an exterior network that is connected with PE at the entry point. The minimum cross-section is 1,5 mm². The voltage drop at 230 V must not be determined according to the effective current but as if the load resistance was connected directly. At rotary current allocation the neutral conductor must be fully loadable. VDE 100, VDE 106.

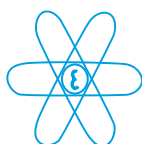
If multiple heating circuits are connected to one supply line, it can lead to mutual influence of the momentary regulation via the voltage drop, if the voltage settings have approximately equal values. This leads to little temperature fluctuations of the individual heating circuits. The size of the temperature fluctuations is dependant on the size of the voltage drop. For heatings without special functions this can be neglected.

The coldflow behaviour sinks per 10°K temperature rise by approximately one decimal power. According to VDE type of examination a bending radius of the for flexible cables valid 5 x D (D = diameter radius) is given, but not at inflexible type of installation. The PTFE connection cable must be laid free of twists at continuous temperatures over 80°C, without tensile load (> 1 kg) and with a bending radius of 10 x D, corresponds to >60 mm.

7.0 TYPE PLATE



1- Supervising agency	6- Serial number
2- Nominal current	7- Nominal voltage
3- Ex- Identification	8- Ambient temperature range
4- Type of ignition protection	9- EU-type examination certificate
5- Type designation	



8.0 HOUSING CONSTRUCTION AND TEMPERATURE POINTS

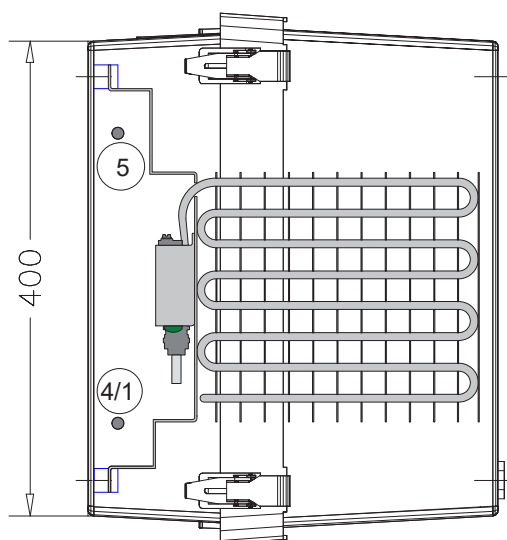
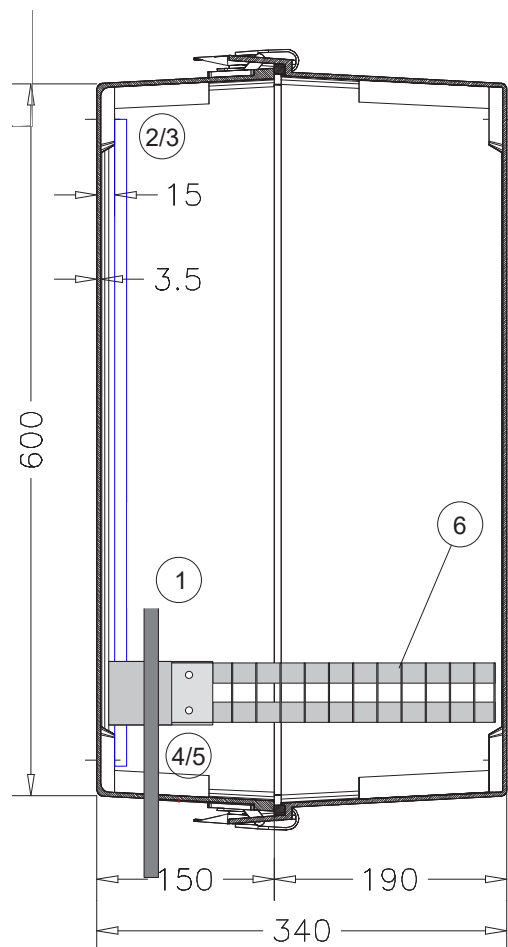
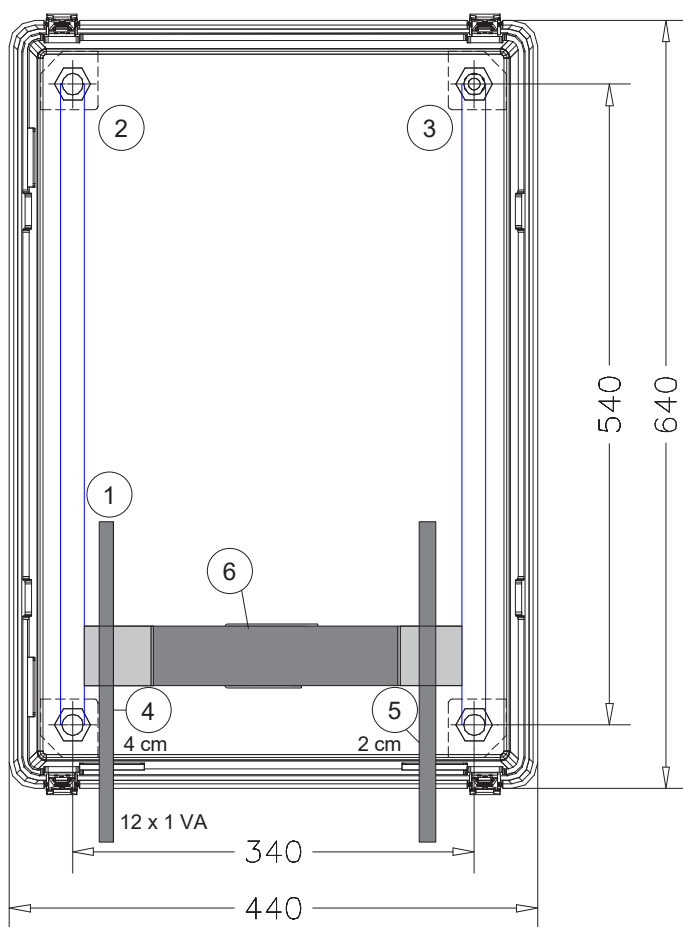


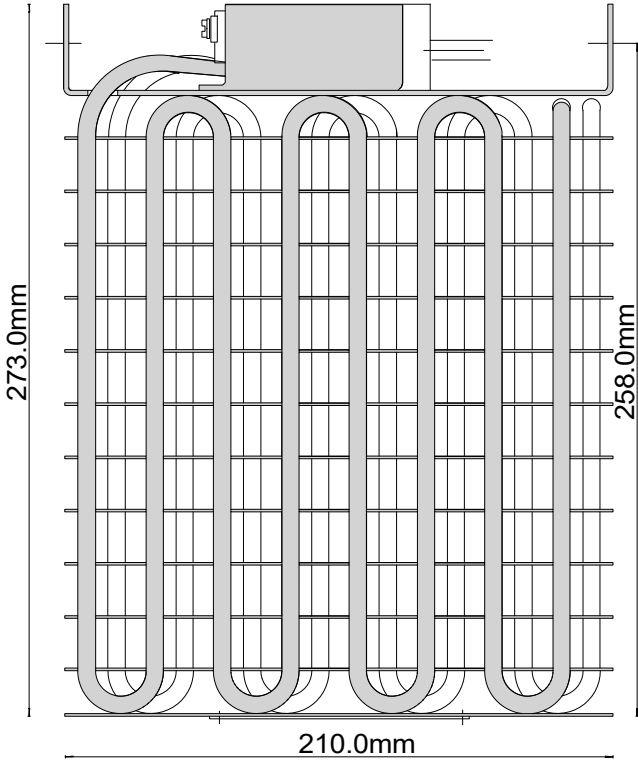
Table 3 (only for T3 version):

Repercussions of the mounting height of the radiator in the protective cabinet 150L ss at an ambient temperature of -11°C

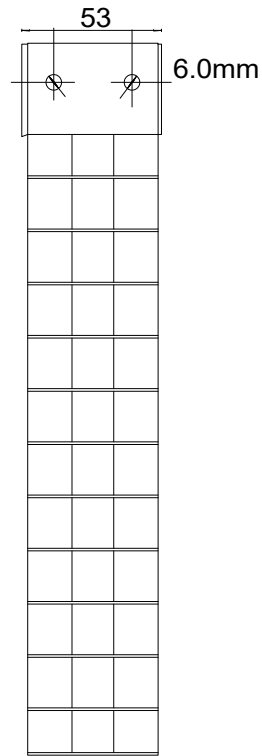
Measuring points	Height 4cm	Height 9cm
1	22°C	17°C
2	28°C	33°C
3	28°C	22°C
4	19°C	1°C
5	15°C	-2°C
6	53°C	73°C
N	146 W	146 W

9.0 DIMENSIONS

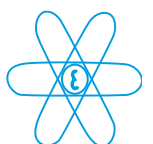
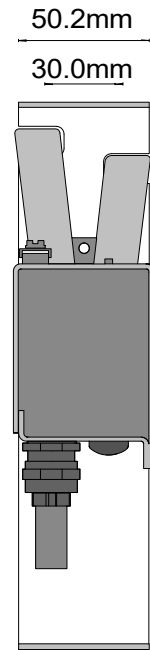
View



Side view



Top view



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