Space heaters, temperature monitored

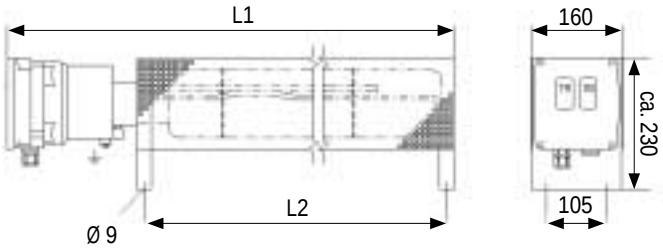
Design
Heating bundle of 3 or 6 stainless steel heating elements Ø8,5 mm, protection cage made of 1 mm steel sheet with 6 mm square perforations, mounting feet, flameproof casing (Exd) made of cast iron with built-in temperature regulator and limiter. Ex-space heaters serve for heating of space in hazardous areas. Thermal protection class I according to EN 60519-2.

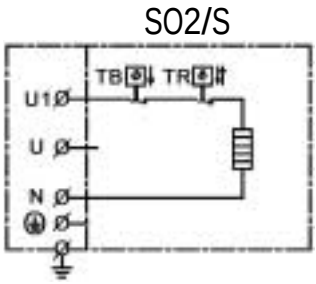
Surface treatment
Casing and protection cage painted. Stainless steel cage on request, extra charge.

Temperature control
The built-in temperature controller is adjusted to the heater surface temperature. The controller indirectly regulates the room temperature with sufficient precision. The temperature limiter monitors the maximum permissible temperature of the heating elements referring to the temperature class. If automatic room temperature control with freely adjustable temperatures is required, the Ex room thermostat type QTREK is to be used. See page 8.

Electrical connection
230V AC at terminals U1, N and PE.
400 V 3 phase on request, extra charge.
Nominal connection cross section 2,5 mm².
Cabel gland M25x1,5 for cable diameters of Ø 8 to 13 mm.
TR = Temperature regulator
TB = Temperature limiter
U = Connecting terminal for room thermostat

Accessories Ex room thermostat
Type QTREK, -20°C...+50°C, see page 8.





Attention! It is not allowed to cover the radiator

DHGSTB1/R with built-in temperature regulator and limiter

Ex II 2 G EEx de IIC T4, T3, T2, IP56								PTB 02 ATEX 1085
Art. nr	**Type**	**Rated power W**	**Current A**	**Voltage V Cabel glands**	**Temp-class**	**Length L1 mm**	**Length L2 mm**	**Weight kg**
126250	DHGSTB1/R-0,5-T4	500	2,2		T4	1450	1190	19
126300	DHGSTB1/R-0,75-T4	750	3,3			1225	965	20
126350	DHGSTB1/R-1-T4	1000	4,3			1450	1190	21
126400	DHGSTB1/R-0,5-T3	500	2,2		T3	900	640	17
126450	DHGSTB1/R-0,75-T3	750	3,3	230V		1225	965	18
126500	DHGSTB1/R-1-T3	1000	4,3	1xM25 (8-13)		1450	1190	19
126550	DHGSTB1/R-1,5-T3	1500	6,5	+ 1 blind		1225	965	20
126600	DHGSTB1/R-2-T3	2000	8,7			1450	1190	21
126650	DHGSTB1/R-3-T3	3000	13,0			2025	1765	24
126800	DHGSTB1/R-1,5-T2	1500	6,5		T2	1450	1190	19
126900	DHGSTB1/R-3-T2	3000	13,0			1450	1190	21

Safety regulations

Application
Explosion protected heaters serve for heating of space air in hazardous areas. They are used mainly in petrochemical, chemical and pharmaceutical industries, oil and natural gas production and distribution as well as in paint and lacquer industries.
Temperature classes and admissible surface temperatures:
T4<135°C T3<200°C T2<300°C.

Installation
Floor- or wall-mounted, horizontally. Reference is made to DIN VDE 0165 02/91, section 5..2.4 and 6.1.7

Maintenance
Cleaning fo the heating elements and protective cage with a damp cloth or brush in regular intervals. Repairs, e.g. heating element replacement, may only be carried out by the manufacturer or trained local experts.

Finned tube heaters without thermostat

Design
A special ceramic elements is fitted in a finned tube. It can be replaced via the attached flameproof casing. The heating elements are chosen in a way that even in case of fault (covering of the heater) the temperature class will not be exceeded.

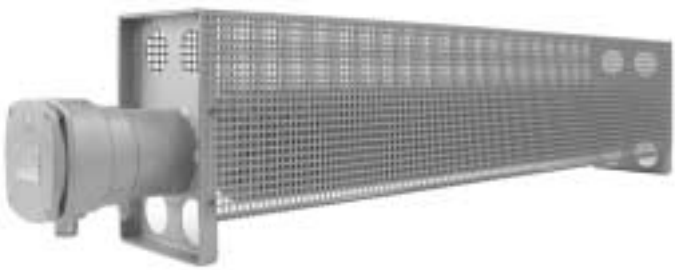
Surface treatment
Casing and protective cage painted. Finned tube galvanized or powder coated.

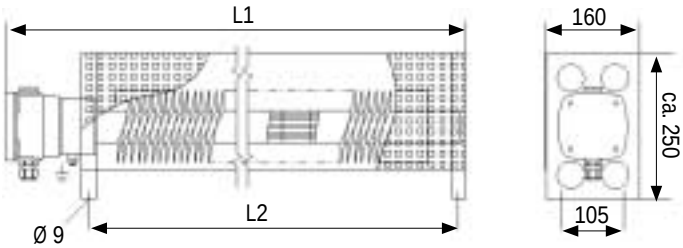
Types of protection
Explosion protection type "flameproof enclosure" and "increased safety", EEX de IIC T4, T3 resp. T2 according to EN 50014 ff. Certificate of conformity PTB no. Ex-84/1148.
Approved for all IIA, IIB and IIC hazardous areas in EC countries.
Degree of protection IP66 according to EN 60529.
Thermal protection class I according to EN 60519-2

Electrical connection
230V AC +6% at terminals U1, N and PE.
The initial current with a cold unit is considerably higher than with the unit warmed up (see selection table). Nominal connection cross section 2,5 mm².
Cable gland M25x1,5 for cable diameters of Ø 8 and 13 mm.
U = Connecting terminal for room thermostat.

Accessories: Ex room thermostat
Explosion-proof thermostat type QTREK, -20°C...+50°C, see page 8.

This heater is also available with dust approval
Ⓔx II 3 D, see page 5





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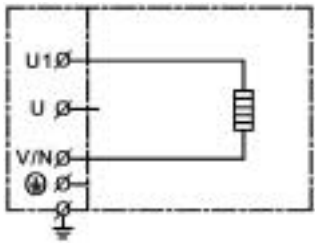


Attention! It is not allowed to cover the radiator.

DRHAO without thermostat

Ⓔx II 2 G EEx de IIC T4, T3, T2, IP66									PTB 03 ATEX 1029
Art. nr	**Type**	**Rated power W**	**Power consumption W ****	**Initial current A**	**Voltage V Cabel glands**	**Temp-class**	**Length L1 mm**	**Length L2 mm**	**Weight kg**
125500	DRHAO-0741	250	200	1,4		T4	740	575	14
125550	DRHAO-0731	500	360	3,7		T3	740	575	14
125600	DRHAO-0721	850	610	7,1		T2	740	575	14
125650	DRHAO-1241	450	360	3,0	230V	T4	1235	1070	22
125700	DRHAO-1231	1000	780	7,8	1xM25	T3	1235	1070	22
125750	DRHAO-1221	1600	1280	16,0	(8-13)	T2	1235	1070	22
125800	DRHAO-1841	700	575	4,5	+ 1 blind	T4	1840	1670	30
125850	DRHAO-1831	1500	1145	11,0		T3	1840	1670	30
125900	DRHAO-1821*	2500	2000	25,0		T2	1840	1670	30

* DRHAO-1821: to be connected with heat-resistant cable
** When the heating radiator is warm

Safety regulations, see page 1

Finned tube heater in stainless steel, without thermostat

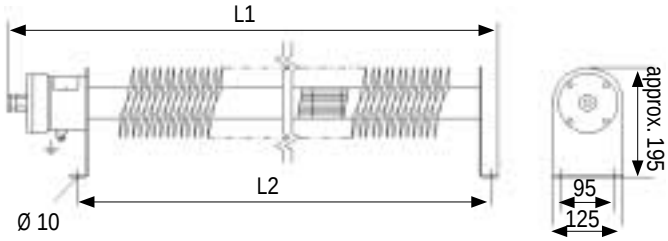
Design
A special ceramic element is fitted in a finned tube. It can be replaced via the attached flameproof casing.
The heating element are chosen in a way that the temperature class T3 resp. T2 will not be exceeded.

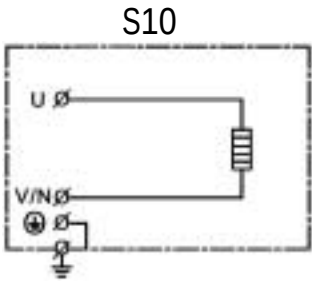
Surface treatment/Material
Casing, finned tube and mounting feet are completely made of stainless steel.

Types of protection
Explosion protection type "flameproof enclosure".
EEx d IIC T3 resp. T2 according to EN 50014 ff.
Certificate of conformity PTB no. Ex-84/1148.
Approved for all IIA,I IIB and IIC hazardous areas in EC countries.
Degree of protection IP66 according to EN 60529.
Thermal protection class I according to EN 60519-2.

Electrical connection
230V AC +6% at terminals U, V/N and PE.
The initial current with a cold unit is considerably higher than with the unit warmed up (see table).
Nominal connection cross section: 2,5 mm².
Cable gland: M20x1,5 for cable diameters of 11 to 14,2 mm.

Accessories
Ex room thermostat
Type QTREK, -20°C...+50°C with freely adjustable temperatures,
see page 8.
Type QTRKK, +5°C, +10°C and +15°C, with one fixed temperature setpoint
see page 9.





Attention! It is not allowed to cover the finned tube heater.

DRHAO with protective cage in stainless steel and without thermosat

⟨Ex⟩ II 2 G EEx d IIC, T3, T2, IP66									PTB 03 ATEX 1029
Art. no	**Type**	**Nominal power W**	**Power consumtion W ****	**Init.current A**	**Voltage V Cable gland**	**Temp-klass**	**Length L1 mm**	**Length L2 mm**	**Weight kg**
126206	DRHAO-0732-1V	500	360	3,7		T3	735	600	12
126208	DRHAO-0722-1V	850	610	7,1		T2	735	600	12
126210	DRHAO-1232-1V	1000	780	7,8	230V	T3	1230	1095	18
126212	DRHAO-1222-1V	1600	1280	16,0	1xM20 (11-14,2)	T2	1230	1095	18
126214	DRHAO-1832-1V	1500	1145	11,0		T3	1835	1700	25
126216	DRHAO-1822-1V*	2500	2000	25,0		T2	1835	1700	25

* DRHAO-1822: to be connected with heat-resistant cable e.g. type NSSH or silicon-sheathed cable.
** when the heating element is warm.

Safety regulations of heating element, see page 1

Finned tube heaters without thermostat and protective cage

Design

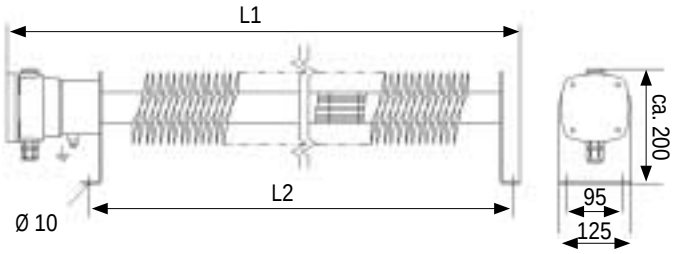
A special ceramic element is fitted in a finned tube. It can be replaced via the attached flameproof casing. The heating elements are chosen in a way that the temperature class T3 is not exceeded.
Thermal protection class I according to EN 60519-2.

Surface treatment/material

Casing, finned tube and mounting feet powder coated hammer finish silver grey.

Electrical connection

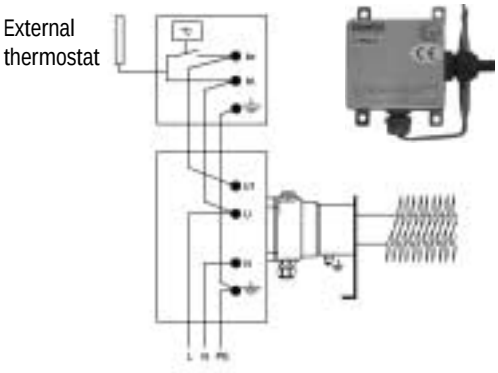
230V AC +6% at terminals U1, N and PE.
The initial current with a cold unit is considerably higher than with the unit warmed up (see table).
Nominal connection cross section: 2,5 mm².
Cable gland M25x1,5 for cable diameters of 8 and 13 mm.
U = Connecting terminal for room thermostat.



Accessories: Ex room thermostat

Explosion-proof thermostat
Type QTREK, -20°C...+50°C with freely adjustable temperatures,
see page 8.
Type QTRKK, +5°C, +10°C and +15°C, with one fixed temperature setpoint,
see page 9.

External thermostat



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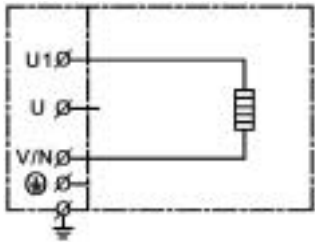


Attention! It is not allowed to cover the finned tube heater.

DRH without thermostaat and protective cage

Ex II 2 G EEx de IIC T3, IP66									(DRH) PTB 03 ATEX 1029 (QTR) ZELM 02 ATEX 0077
Art. no	**Type**	**Rated power W**	**Power consumtion W **)**	**Initial current A**	**Voltage V Cable glands**	**Temp-class**	**Length L1 mm**	**Length L2 mm**	**Weight kg**
129220*	DRHAO 0732-1	500	360	3,7	230V, +6%		765	600	12
129222*	DRHAO 1232-1	1000	780	7,8	1xM25 (8-13)	T3	1260	1095	18
129224*	DRHAO 1832-1	1500	1145	11,0	+ 1 blind		1865	1700	25
129310*	QTRKK +5°C	Suitable thermostats with fixed setpoint, 16A/400V, see also page 9							
129312*	QTRKK +10°C								
129314*	QTRKK +15°C								

* Standard product in stock
**) When the heating radiator is warm

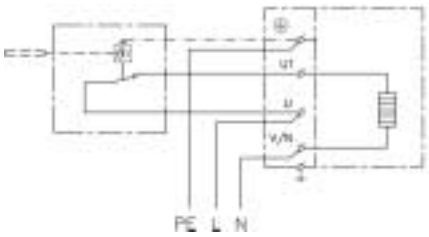
Safety regulations of radiator, see page 1

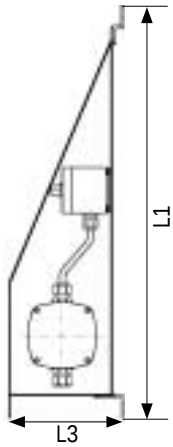
Heating element

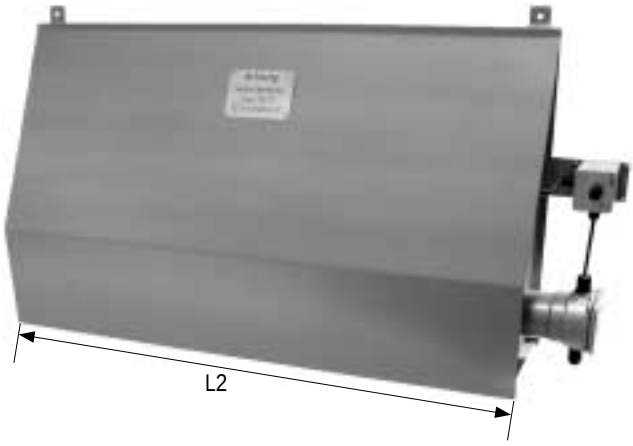
Surface treatment/Material
Grey painted steel plate.

Electrical connection
230V AC. inclusive thermostat QTREKK 0-100°C.

Mounting
Zone 22, dust atmospheres.







Ex II 3 D EEx de IIC, IP56									PTB 03 ATEX 1029
Art. no	**Type**	**Nominal power W**	**Current A**	**Voltages V Cabel gland**	**Temperature limited to**	**Length L1 mm**	**Length L2 mm**	**Length L3 mm**	**Weight kg**
	DRHAO-ST-0,85-T120 DRHAO-ST-1,6-T120 DRHAO-ST-2-T120 DRHAO-ST-2,5-T120	850 1600 2000 2500	230 V		100°C	690	800 1295 1360 1870	200	

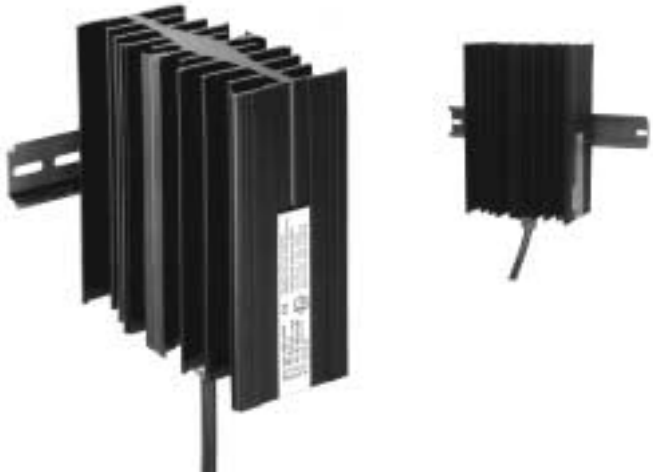
Enclosure heaters 50 W and 100 W

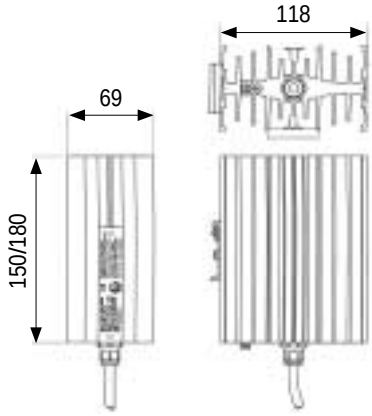
Surface treatment/Material
Heater body of aluminium profile, black anodised.

Electrical connection
240V AC. 1 meter long silicon cable, 3 x 0,75 mm².
PE-connection 4 mm². Cable diameter 7 mm.

Mounting
Clip for 35 mm DIN-rail according to EN 50022. The clip can either be vertically connected on the short or the long side.

Accessories
Explosion proof thermostat.
Type REx 015, +15°C with one fixed temperature setpoint, see page 9.
Type REx 025, +25°C with one fixed temperature setpoint, see page 9.
Type QTREK, -20°C...+50°C with freely adjustable temperatures, see page 8.
Type QTRKK, +5°C, +10°C and +15°C, with one fixed temperature setpoint, see page 9.





Ex II 2 G EEx d IIC, T4, T5, IP65								LCIE 01 ATEX 6073
Art. no	**Type**	**Surface temp. °C Vertical monting**	**Heating capacity W**	**Voltage V AC**	**Temp-class**	**Dimensions w x b x d (mm)**	**Montage**	**Weight kg**
128020*	CREx 050	100°C	50	230-240, 50/60 Hz	T5	150 x 118 x 69	Vertical	1,22
128021*	CREx 100	135°C	100	230-240, 50/60 Hz	T4	180 x 118 x 69	Vertical	1,45

* Standard, in stock

Safety regulations for convection heaters

Application
Compact convection heater for use in areas with explosion hazard for prevention of formation of condensaation, temperature fluctuations and for protection against frost in transmitter housing, switch cabinets and measuring equipment.

Mounting
The heater is mounted vertically on DIN-rail TS35.
The clip can either be vertically connected on the short or the long side of the heater.

Maintenance
Regular cleaning by using damp cloth or brush.
Other maintenance, please contact Malux for consultation.

Enclosure heaters 50-900 W

Design
Self-regulating heater with flying lead for use in instrument enclosures.

Surface treatment/Material
Heating plates made of stainless steel 316L.

Electrical connection
220-240V AC. Use max. size of 16 A circuit breaker.
1 meter long silicon cable, 3x0,75 mm². Cable diameter 5 mm.

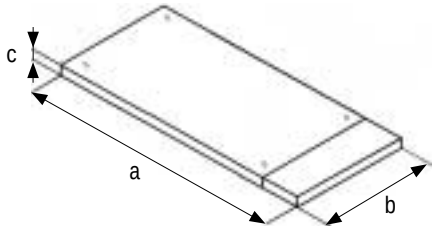
Mounting
Mounting holes on the bottom side or on the sides.

Accessories
Explosion-proof thermostat.
Type REx 015, +15°C with one fixed temperature setpoint, see page 9.
Type REx 025, +25°C with one fixed temperature setpoint, see page 9.
Type QTREK, -20°C...+50°C with freely adjustable temperatures, see page 8.
Type QTRKK, +5°C, +10°C and +15°C, with one fixed temperature setpoint, see page 9.

Heater plate mounted in a instrument enclosure.

50 Watt

100/200 Watt



Ex II 2 G EEx e II T4, IP54					NEMKO 02 ATEX 394 X
Art. no	**Type**	**Max. surface temperature**	**Heating capac. W**	**Voltage V AC**	**Dimension mm a x b x c**
128026*	TEF 9201110	110°C	50	220-240, 50 Hz	263 x 88 x 23 mm
128029	TEF 9201121		100		300 x 200 x 24 mm
128034	TEF 9201122		200		450 x 200 x 24 mm
128039	TEF 9201123		300		550 x 240 x 24 mm
128040	TEF 9201124		400		570 x 280 x 24 mm
128041	TEF 9201125		500		700 x 280 x 24 mm
128043	TEF 9201126		600		700 x 320 x 24 mm
128044	TEF 9201127		700		700 x 320 x 24 mm
128045	TEF 9201128		800		880 x 360 x 24 mm
128046	TEF 9201129		900		880 x 360 x 24 mm

* Standard, in stock

Safety regulations for enclosure heaters

Application
Explosion-proof plate heaters for heating air in enclosures and instrument enclosures. Mostly used in petrochemical, chemical and pharmaceutical industries.
Temperature class and allowed surface temperatures:
T5<100°C T4<135°C.

Mounting
The heating plates can be mounted horizontally as well as verically on mounting rail.

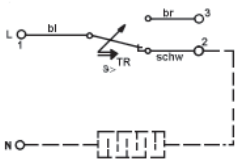
Maintenance
Regular cleaning by using damp cloth or brush.
Other maintenance, please contact Malux for consultation.

Thermostat with internal regulation

Design
The thermostat has a temperature sensor that via a capillary tube is lead inside the casing. The capillary cable is protected by a tube in stainless steel. The casing has connection terminals for outgoing contact functions. Cable gland Pg16 for cable diameter 7-15 mm.

Surface treatment/Material
Enclosure of impact resistant polyester. 1.0 mm capillary tube protected by a 8,2 mm tube of stainless steel.

Ambient temperature
-40°C...+60°C = T5
-40°C...+40°C = T6



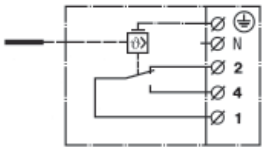
With overheating protection will connections 4, 5 and 6 be added.

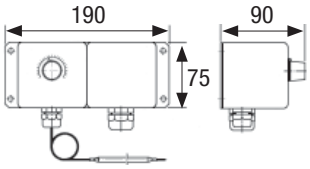
Ex II 2 G EEx de IIC T5/T6, IP65							KEMA 03 ATEX 2196
Art. no	**Type**	**Temperature adjustments °C**	**Sensor length mm**	**Material of sensor**	**Accuracy**	**Dimensions mm a x b x c**	**Connection functions**
600045	TRK 1001 KA	0-100°C	135	V4A SS	± 1,5°C	160 x 75 x 75	Endurance
600050	TRK 3001 KA	0-300°C	135	V4A SS	± 3,0°C	160 x 75 x 75	16 A/380V AC1
129350	TBK 1001/1001 KC	0-100°C/0-100°C	135	V4A SS	± 1,5°C	260 x 160 x 90	0,25 A/250 DC1
129360	TBK 1001/3001 KC	0-100°C/0-300°C	135	V4A SS	± 3,0°C	260 x 160 x 90	

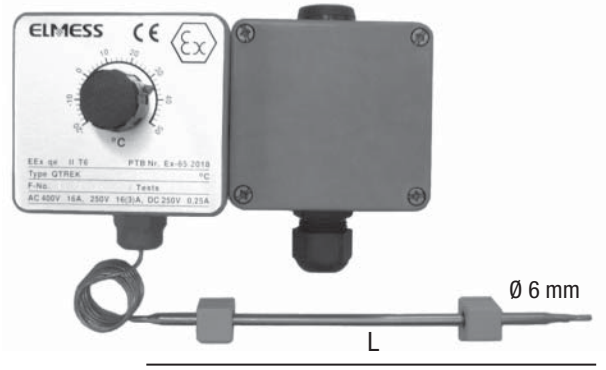
Thermostat with external regulation

Design
The thermostat has a temperature sensor that via a capillary cable is lead inside the casing. The casing has connection terminals for outgoing contacts. Cable gland M20x1,5 for cable diameter Ø 6-12 mm.

Surface treatment/Material
Enclosure of impact resistant polyester, bottom plate of stainless steel.







Ex II 2 G EEx qe II T6, IP54								ZELM 02 ATEX 0077
Art. no	**Type**	**Temperature adjustm. °C**	**Sensor limit temperature °C**	**Length L sensor**	**Sensor material**	**Switching differential**	**Dimension h x b x d, mm**	**Connection functions**
129300	QTREK	-20...+50°C	75°C	200 mm	Copper	± 2,5°K	190 x 75 x 90	Endurance AC 16 A/400V DC 0,25 A/250V
	QTREK	0...+70°C	95°C	200 mm	Copper	± 2,5°K		
129302	QTREK	0...+100°C	125°C	150 mm	Copper	± 2,5°K		
	QTREK	0...+150°C	170°C	110 mm	Copper	± 3,75°K		
	QTREK	0...+190°C	230°C	90 mm	Copper	± 5,0°K		
	QTREK	+40...+290°C	335°C	90 mm	CrNi/SS	± 7,5°K		

Safety regulations for thermostates

Application
The Ex-temperature thermostats serves as on-off controller to control room temperatures, medium or surface temperatures within hazardous areas. They are mostly used in petrochemical, chemical and pharmaceutical industries.
Temperature class and allowed surface temperatures: T6<85°C.

Mounting
The thermostats are installed close to the measuring point.

Maintenance
Regular cleaning by moistured dust cloth.
Other maintenance, please contact Malux for consultation.

Thermostat with fixed setpoint

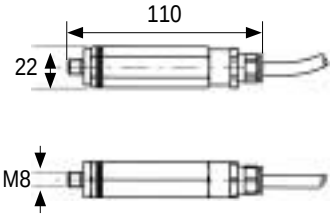
Design

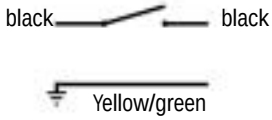
Compact small mechanical thermostat for temperature regulation and monitoring of heaters in, for example, transmitter cabinets, control panels and measuring equipment which are deployed in areas with explosion hazard. The special switch construction enables high response accuracy, small switch temperature difference and a very long service life. High switching performance allows direct control of the heaters.

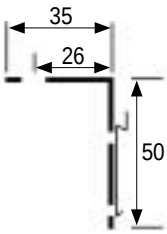
Mounting bracket for DIN-rail and wall mounting.

Surface treatment/Material

Casing of aluminium, black anodised.







Ex II 2 G EEx d IIC T6, IP65						LCIE 01 ATEX 6074
Art. no	**Type**	**Switch-off temperature**	**Switching capacity A**	**Connection**	**Life-time**	**Contact type therm. bimetal**
129396*	REx 015	+15°C ±3°C	250V AC, 4A, resistive load 250V AC, 1A, inductive load cos φ 0,6	length 1 meter 3x0,75 mm²	300 000 operations	opens with rising temperatures
129397*	REx 025	+25°C ±3°C				

* Standard, in stock

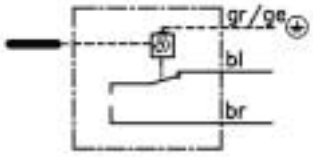
Room thermostat with fixed setpoint

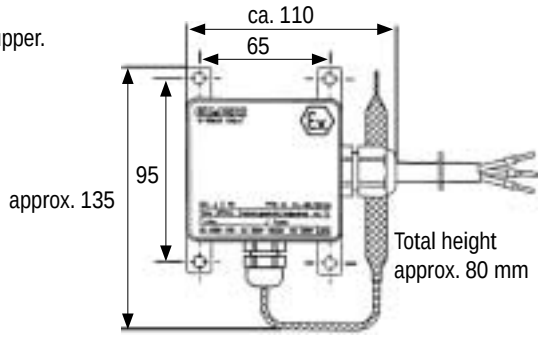
Design

The thermostat has a temperature sensor that controlles a fixed temperature. The thermostat is equipped with a cable for connection to e.g. a junction box. By achieved temperature the connection opens.

Surface treatment/Material

Casing of impact resistant polyester.
Capillary cable and protection tube of cupper.





Ex II 2 G EEx q II T6, IP54							ZELM 02 ATEX 0077
Art. no	**Type**	**Switch-off temperature**	**Switching capacity A**	**Connection**	**Hysteres °C**	**Cable**	**Contact type**
129310*	QTRKK	+5°C ± 3°C	AC 16A/400V DC 0.25A/250V	length 2 meter	2.5-3.0°C	Rubber H07RN-F 3 x 1,5 Ø 9 mm	Capillary cable
129312*	QTRKK	+10°C ± 3°C					
129314*	QTRKK	+15°C ± 3°C					

* Standard, in stock

Safety regulations for thermostates, see page 8

Safety regulation of immersion heaters

Applications

Explosion proof immersion heaters are approved by certified testing and research institute. They are used for heating of non flammable liquids[1] or liquids in open tanks with a flash point of min. 55°C, which will not be heated above their flash point.
The heaters correspond to type of protection "flame-proof enclosure" for mounting of heating elements and thermostats, and "increased safety" for the connection of the power and control cable, both according to EN 50014, EN 50018 and EN 50019.
The mechanical protection type is min IP54, but can be increased by means of manufacturing measures to IP65.
All heaters are permitted for temperature class
T6 = max 85°C to T1 = max 450°C.
The marking indicates acceptable use: EEx de IIC T6-T1.
Attention! Temperature class is defined according to operation temperatures and construction of the installation or apparatus to be heated up, see classification plan (classification plan is replaced by explosion protection ducumentation according to ATEX from the 1st of July 2003).
Connection diagram for all immersion heaters, see page 19.

Temperature limiter TB according to EN 50014		**Temperature regulator TR according to EN 50014**	
Class	**Temperature limits**	**Type**	**Control range °C**
T6	85°C	R50, R70	-20... +50, 0... 70
T5	100°C	R90	20... 90
T4	135°C	R125	0... 125
T3	200°C	R190	0... 190
T2	300°C	R290	40... 290
T1	450°C	R450	20... 440

Both temperature regulator (TR) and limiter (TL) are mounted inside the flameproof enclosure part in such a manner, that setting and resetting can be done externally. The temperature regulator scale range as well as the fixed adjusted cut-off value of the temperature limiter are adjoined to the respective temperature class.
The tempererature limiter must be hand-reset after tripping and cooling down of the system.

Electric data:

Rated supply voltage[2]	up to 690V AC
Control voltage	up to 400V AC, 16A
Rated current[2]	up to 72A
Rated power	up to 80kW
Cross section connect wire[2]	up to 25 mm²

Attention! Order data
- medium to be heated
- quality respectively flow volume
- temperature range (initial and final temperature)
- type of protection and temperature class
- supply voltage
- control voltage
- mounting position (horizontal or vertical)
- materials
- if not otherwise stated the permissible ambient temperature will be -20-+40°C..

[1] In closed air ventilated systems, e.g. vessels and pipes beeing pressurized or having vacuum, liquids are non-flammable.
[2] Depending on size of enclosure, rated power and fitted post type bushings respectively conductor bushings.

Mounting of immersion heaters

1. To avoid undue temperatures the installation has to be equipped with an explosion proof limiter with nonautomatic resetting function. This temperature limiter has to be set according to the respective temperature class and/or the respective flash point of the liquid
2. By means of an explosion proof level switch it must be ensured that the installation is in working order only when the liquid level is at least 50 mm above the highest heating element point.
3. At installation for streaming liquids an additional explosion proof flow monitoring device might be necessary which guarantees that the installation is in working order only when the minimum flow rate is assured.
Heaters with medium temperatures higher than 120°C have a temperature cooling down extension of 145 mm between flange and enclosure.

Maintenance

The exchangable heating inset is made of ceramic heating elements.
Please consultate Malux regarding maintenace.

Standard values for specific surface loadings:

Heavy fuel oil, transmission lubricant, bitumen	1,0 W/cm²
Hydraulic oil, lubricant, heat carrier oil	1,5 W/cm²
Water heating	6,0 W/cm²
Streaming gaseous mediums	0,5-2,0 W/cm²

Other heating capacities, threads and immersion lengths on request.

Immersion heater DHF 1-12 kW with flange for heating of liquids

Design
Flameproof enclosure, Exd, with mounting flange, cartidge pipe and exchangeable heating insert of ceramic heating elements. Maximal capacities 12 kW.

Surface treatment/Material
Standard: carbon steel St 35.
Special: stainless steel 1.4541 and 1.4571.
Other materials on request.

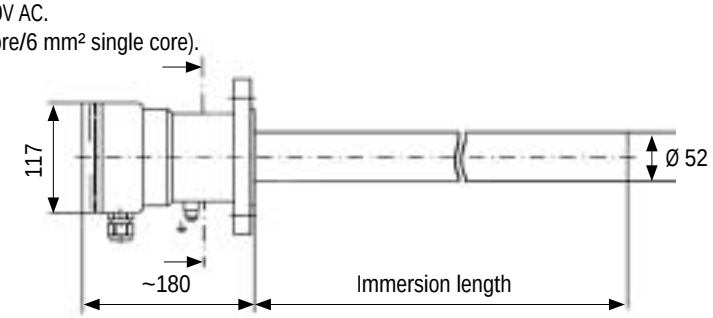
Protection
Explosion protection "flameproof enclosure" and "increased safety",
Ex II 2 G EEx de IIC T1-T6 according to EN 50014.
Approved for all IIA, IIB and IIC hazardous areas in EC countries.
Protection degree at least IP54, on request IP65. According to EN 60529.
Please check which temperature class is required for the Zone were the element is going to be mounted, see Zone specification plan. (Zone specification plan has to be included in the explosion protection documentation according to ATEX from the 1st of July 2003).

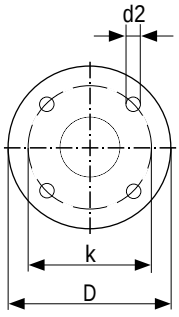

DHF 1-12 Ø 52

Cartige pipe also available in diameter 32 and 38 mm.
Other heating capacities, mounting flanges and immersion lengths on request.

Cabel glands
M25 for cable Ø 10-17 mm. Other sizes on request.

Electrical connection
Up to 12kW. 3-phase 690V AC.
(Cable 4 mm² multiple core/6 mm² single core).
Up to 30kW on request.





Ex II 2 G EEx de IIC T1-T6, IP54									PTB 01 ATEX 1145 U
Art. no	Type DHF	Heating power kW	Specific surface load W/cm²	Immersion length mm	Cartidge diameter mm	Flange dimensions			DN65/PN16
						D	k	d2	Number of holes
	H0090011	1,0		320					
	H0090012	2,0		580					
	H0090013	3,0		850					
	H0090014	4,5		1250					
	H0090015	6,0	2,3	1650	52	185	145	18	4
	H0090016	7,5		2050					
	H0090017	9,0		2450					
	H0090018	12,0		3240					

Safety regulations concerns all immersion heaters, see page 10

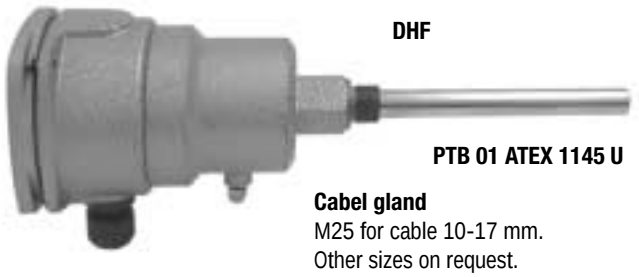
Immersion heater 0.5-9 kW with screw connection
DHF for heating of liquids
DHG for heating gas

Design
Flameproof enclosure, Exd, integrated temperature regulator and limiter. Screw-in nipple G1 ½" (G2 2"). Heating bundle made of hair-pin bended tubular heating elements 8,5 mm in diameter.
At heaters for medium temperatures above 120°C the distance between nipple and enclosure will be increased from 38 mm to 145 mm.

Surface treatment/Material
Standard: carbon steel St 35.
Special: stainless steel 1.4541 and 1.4571.
Other materials on request.

Protection
Explosions protection "flameproof enclosure" and "increased safety",
Ⓔx II 2 G EEx de IIC T1-T6 enligt EN 50014.
Approved for all IIA, IIB and IIC hazardous areas in EC countries.
Protection degree at least IP54, on request IP65. According to EN 60529.
Please check which temperature class is required for the Zone were the element is going to be mounted, see Zone specification plan. (Zone specification plan has to be included in the explosion protection documentation according to ATEX from the 1st of July 2003).

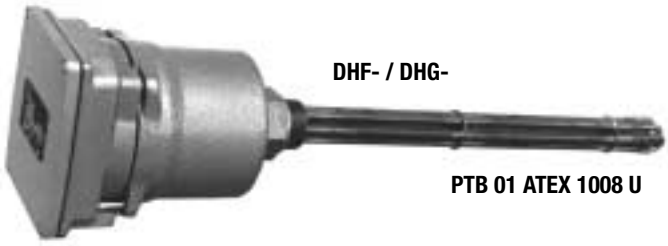
Electrical connection
230V AC max 3.0kW.
400V AC from 3.0kW.



DHF

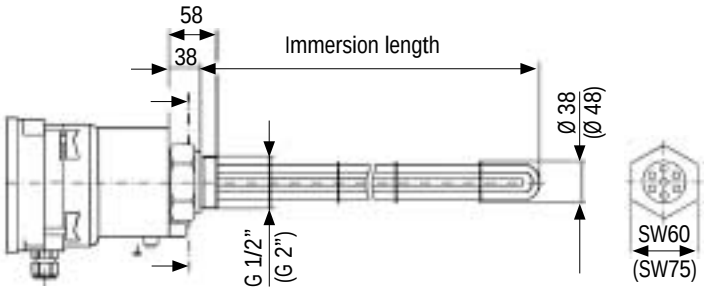
PTB 01 ATEX 1145 U

Cabel gland
M25 for cable 10-17 mm.
Other sizes on request.



DHF- / DHG-

PTB 01 ATEX 1008 U



Ⓔx II 2 G EEx de IIC T1-T6, IP54 / IP65				PTB 01 ATEX 1145 U	PTB 01 ATEX 1008 U
Art. no	**Type DHF- / DHG-**	**Heating power kW**	**Specific surface load W/cm²**	**Immersion length mm**	**Number of heating elements**
	H0010011	0,5	1,0	440	2
	H0010031	1,0		940	2
	H0010041	1,5		940	3
	H0010051	2,0		1190	3
	H0011021	0,75	1,5	440	2
	H0011031	1,0		600	
	H0011041	1,5	2,0	940	2
	H0011061	2,0		1190	
	H0012021	1,0		470	
	H0012041	1,5		690	
	H0012061	2,0		940	
	H0012081	2,5	6,0	1190	2
	H0012091	3,0		940	3
	H0013021	2,0		300	2
	H0013041	3,0		440	2
	H0013061	4,5		440	3
	H0013071	6,0		600	3
	H0013081	7,5		790	3
	H0013091	9,0		940	3

Safety regulations concerns all immersion heaters, see page 10

Immersion heater 0,5-4 kW with flange
DHG for heating of liquids

Design
Flameproof enclosure, Exd, with integrated regulator and limiter. Setting board and seperately located connection terminals covered by the common casing cover. Flange connection DN40-65 PN16 (40). Heating bundle made of hair-pin bended tubular heating elements Ø 8,5 mm.

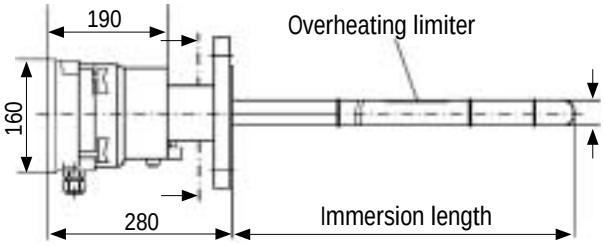
Surface treatment/Material
Standard: carbon steel St 35.
Special: stainless steel 1.4541 and 1.4571.
Other materials on request.

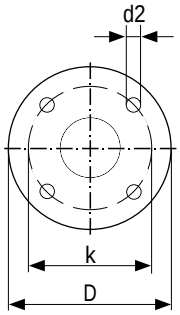
Protection
Explosions protection "flameproof enclosure" and "increased protection".
Ⓔx II 2 G EEx de IIC T4 according to Cenelec-standard.
Protection degree at least IP54 according to EN-60529.
Tested and certified for temperature class T4.

Cable gland
M25 for cable Ø 10-17 mm.
Other sizes on request.

Application
Flanged heater for the heating of liquids in machinary, vessels and installations, which allows other suitable level control measures like regular check via an inspection glass, discharge opening above the highest heater element location, plant inspection walks for determining leakages and so on, instead of the so far requested explosion proof level switch.

Electrical connection
Up to 3,0kW at 230V single-phase.
From 3,0kW at 400-690V three-phase.





Ⓔx II 2 G EEx de IIC T4, IP54 (IP65)											PTB 02 ATEX 1086 X
Art. no	Type DHG-	Heating power kW	Specific surface load W/cm²	Immersion length mm	Heating bundle diameter mm	Number of heating elements	Flange dimensions PN16				
							DN	D	k	d2	No. of holes
	H0014011	0,50		440	40	2	40	150	110		
	H0014021	0,75		440	47	3	50	165	125		
	H0014031	1,00	1,0	620	47	3	50	165	125	18	4
	H0014041	1,50		940	47	3	50	165	125		
	H0014051	2,00		1190	47	3	50	165	125		
	H0014111	0,66		440	40	2	40	150	110		
	H0014121	1,00		440	47	3	50	165	125		
	H0014131	1,50	1,5	620	47	3	50	165	125	18	4
	H0014141	2,25		940	47	3	50	165	125		
	H0014151	3,00		1190	47	3	50	165	125		
	H0014211	1,50		430							
	H0014221	2,25	1,0	730	62	6	65	185	145	18	4
	H0014231	3,00		930							
	H0014241	4,00		1180							

Safety regulations concerns all immersion heaters, see page 10

Immersion heater with flange 1.5-30 kW
DHFB for heating of liquids
DHGB for heating of gas

Design
Flameproof enclosure with integrated temperature regulator and limiter-Setting board and seperately located connection terminals covered by the common casing cover. Flange connection DN80 (125) PN16. Heating bundle made of hair-pin bended tubular heating elements Ø 8,5 mm.
At heaters for medium temperatures above 120 °C the distance between flange and enclosure will be increased from 65 mm to 145 mm.

Surface treatment
Standard: carbon steel St 35.
Special: stainless steel 1.4541 and 1.4571.
Other materials on request.

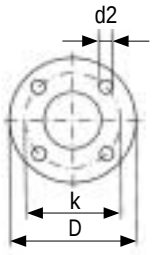
Protection
Explosion protection ”flameproof enclosure” and ”increased protection”.
Ex II 2 G EEx de IIC T1-T6 according to EN 50014.
Approved for all IIA, IIB and IIC hazardous areas in EC countries.
Protection degree at least IP54, on request IP65. According to EN 60529.
Please check which temperature class is required for the Zone were the element is going to be mounted, see Zone specification plan. (Zone specification plan has to be included in the explosion protection documentation according to ATEX from the 1st July 2003).

Electrical connection
Up to 3,0kW at 230V single-phase.
From 3,0kW at 400-690V three-phase.

DHFB for heating of liquids

DHGB for heating of gas

Cable glands
M25 for cable Ø 10-17 mm.
Other sizes on request.



Ex II 2 G EEx de IIC T1-T6, IP54 (IP65)											PTB 01 ATEX 1008 U
Art. no	Type DHFB- / DHGB-	Heating pow. kW	Specific surface load W/cm²	Immersion length mm	Number of heat. elem.	Cartidge diameter	Flange diameter PN16				
							DN	D	k	d2	Holes
	H0015061	1,5	1,0	430	6	78	80	200	160	18	8
	H0015111	3,0		930	6	78	80	200	160		
	H0015141	4,5		730	12	120	125	250	210		
	H0015151	6,0		930	12	120	125	250	210		
	H0016091	2,0	1,5	430	6	78	80	200	160	18	8
	H0016121	3,0		610	6	78	80	200	160		
	H0016151	4,5		480	6 double	120	125	250	210		
	H0016171	6,0		605	6 double	120	125	250	210		
	H0017081	2,0	2,0	305	6	78	80	200	160	18	8
	H0017111	3,0		430	6	78	80	200	160		
	H0017121	4,5		730	6	78	80	200	160		
	H0017141	6,0		930	6	78	80	200	160		
	H0017161	7,5		605	12	120	125	250	210		
	H0017181	9,0		730	12	120	125	250	210		
	H0017191	12,0		930	12	120	125	250	210		
	H0018081	6,0	6,0	305	6	78	80	200	160	18	8
	H0018101	7,5		380	6	78	80	200	160		
	H0018121	9,0		430	6	78	80	200	160		
	H0018131	12,0		590	6	78	80	200	160		
	H0018151	15,0		730	6	78	80	200	160		
	H0018171	18,0		480	6 double	120	125	250	210		
	H0018181	24,0		610	12	120	125	250	210		
	H0018191	30,0		730	12	120	125	250	210		

Heater with stainless steel enclosure on request, add letter ”V” in the end of the type number, see page 17.

Safety regulations concerns all immersion heaters, see page 10.

Immersion heater with flange 0.75-18 kW
DHFB for heating of liquids

Design

Flameproof, Exd, enclosure integrated temperature regulators/limiters in combination. Setting board and seperatly located connection terminals covered by the common casing cover. Flange connections DN80-DN150 PN16. Cartidge diameter 52 mm and exchangeable heating inset made of ceramic heating elements or made of tubular heating elements when vibration proof construction is required. Length when cold Lu=52 mm.
If exchange of heating inset is needed, please contact Malux.

Surface treatment

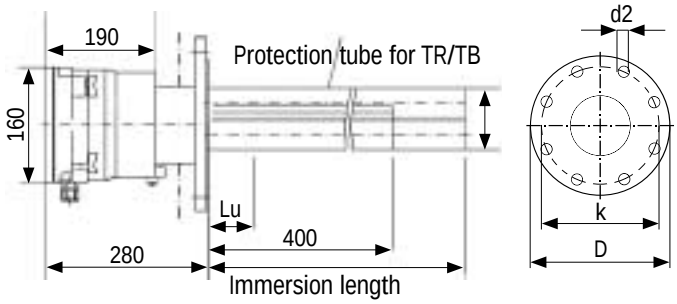
Standard: carbon steel St 35.
Special: stainless steel 1.4541 and 1.4571.
Other material on request.

Protection

Explosion protection "flameproof enclosure" and "increased protection".
Ex II 2 G EEx de IIC T1-T6 according to EN 50014.
Protection degree at least IP54 according to DIN 40050, IEC 144.
Please check which temperature class is required for the Zone were the element is going to be mounted, see Zone specification plan. (Zone specification has to be included in the explosion protection documentation according to ATEX from the 1st of July 2003).

At heaters for medium temperatures above 120 °C the distance between flange aand enclosure will be increased from 65 mm to 145 mm.

Cable gland
M25 for cable Ø 10-17 mm. Other sizes on request.



Ex II 2 G EEx de IIC T1-T6, IP54 (IP65)											PTB 01 ATEX 1008 U
Art. no	Type DHFB-	Heating pow. kW	Specific surface load W/cm²	Immersion length mm	Cartidge diam. mm	No of cartidge	Flange diameter PN16				
							DN	D	k	d2	Holes
	H0019011	0,75		380							
	H0019021	1,00		500							
	H0019031	1,50	1,5	710	75	1	80	200	160	18	8
	H0019041	2,00		950							
	H0019051	3,00		1400							
	H0019111	4,50		710							
	H0019121	6,00		950							
	H0019131	7,50	1,5	1150	120	3	125	250	210	18	8
	H0019141	9,00		1400							
	H0019151	12,00		1850							
	H0019211	6,00		710							
	H0019221	7,50		875							
	H0019231	9,00		1050							
	H0019241	12,00	1,5	1400	145	4	150	285	240	22	8
	H0019251	15,00		1650							
	H0019261	18,00		2050							

Other capacities, mounting flanges and immersion lengths on request.

Heater with stainless steel enclosure on request, add letter "V" in the end of the type number, see page 17.

Safety regulations concerns all immersion heaters, see page 10.

L-shaped immersion heater 4.5-30 kW
DHF for heating of liquids

Design
Flameproof enclosure, Exd, made of cast iron GG 25 with temperature regulator and limiter. Flange, riser stand pipe, temperature probe protection pipe, junction box and heating bundle made of carbon or stainless steel. Flange or mounting plate dimensions according to customers request. Heating bundle made of hair-pin bended tubular heating elements Ø 8,5 mm, stabilized by means of rods and spacers.

Surface treatment
Standard: carbon steel St 35.
Special: stainless steel 1.4541 and 1.4571.
Other materials on request.

Protection
Explosion protection "flameproof enclosure" and "increased protection".
Ex II 2 G EEx deq IIC T3-T6 according to EN 50014.
Protection degree at least IP54 according to DIN 40050, IEC 144.

Application
Heater for the heating of tanks and lubricating oil plants where top-mounting is necessary because of design or operational reasons. The main advantage is the fact that the heater can be exchanged without discharging the often large volumes of lube oil.

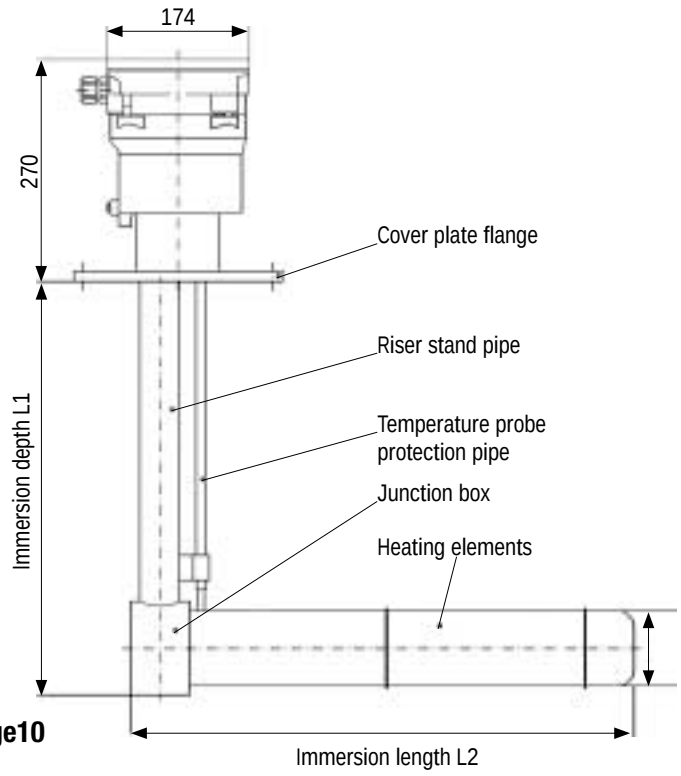
Elecrical connection
Rated voltage: max 690V
Rated power: max 30kW
Wire cross section: max 25 mm²

PTB 01 ATEX 1008 U

Cable glands
M25 for cable Ø 10-17 mm.
Other sizes on request.

L-shaped immersion heater 4,5kW
Type DHF-4,5-T6

Other capacities, flange diameters and immersion lengthes (L1, L2) can be adapted to customer specifications.



Safety regulations concerns all immersion heaters, see page10

Immersion heater in stainless steel with flange 3.0-49 kW
DHFB for heating of liquids
DHGB for heating of gas

Design
Flameproof enclosure, Exd, thread studs for cable entries, external ground terminal and screws are made of stainless steel 1.4571. Temperature regulator and limiter are fixed mounted inside the enclosure by means of a common mounting plate. Power and control wires are wired to terminals. All components are arranged clearly and conveniently for connection, settings and maintenance. Flange connection DN80 (125) PN16. Heating bundle made of hair-pin bended tubular heating elements, Ø 8,5 mm or cartridge pipes with exchangeable ceramic heating elements, in each case made of high quality stainless steel materials.

Surface treatment
Standard: Stainless steel 1.4571

Protection
Explosions protection ”flameproof enclosure” and ”increased protection”
Ex II 2 G EEx de IIC T1-T6 according to EN 50014
PTB 01 ATEX 1008 U
Protection degree at least IP54 according to DIN 40050, IEC 144
Certified for all temperature classes.
At heaters for medium temperatures above 120°C the distance between flange and enclosure will be increased from 55 mm to 145 mm.

Application
Ex-enclosure made of stainless steel are mainly used when corrosion resistance is required by the users, i.e. at the crude oil and natural gas production offshore and onshore, in waste water purification plants, refuse deposit gas recovery installations and chemical plants with sulfurous atmosphere. Apart from the application for flanged heaters the enclosures may also be used for heating coils, flow heaters and for all tailor-made stainless steel heater constructions.

Electrical connections
Up to 3,0kW at 230V single-phase
From 3,0kW at 400-690V three-phase.

Heaters on pages 14 and 15 can be delivered with this enclosure in stainless steel. Please add letter ”V” in the end of the type number.

DHFB3V/DHGB3V

PTB 01 ATEX 1008 U

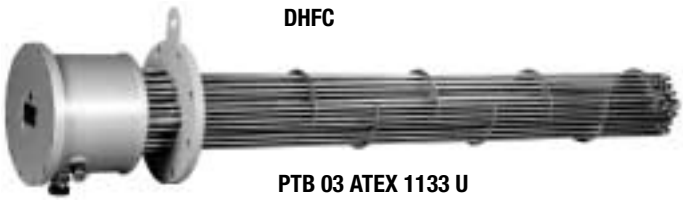
Cable glands
M25 for cable Ø 10-17 mm.
Other dimensions on request.

Safety regulations concerns all immersion heaters, see page 10.

Immersion heater with flange, max 110 kW
DHFC 5 for heating of liquids

Design

Casing, casing cover, thread studs for cable entries made of steel, cable glands made of brass (CuZn). Max. 3 temperature regulaters/limiters in combination on a common base plate fix mounted inside the enclosure. Power and control connections wired to suitable terminals. All components are arranged functional and conviniently for connection, settings and maintenance. Flange connection DN 200/250 PN 16, heating bundle made of hair-pin bended tubular heating elements Ø 8,5 mm or cartridge pipes Ø 38 (52) mm and exchangeable heating insets made of either ceramic heating elements or tubular heating elements when vibration proof construction is required. Unheated length Lu=d50 mm (standard).



Picture: Flange heater with tubular heating elements
Typ DHFD5-75-T6

Surface treatment

Standard: carbon steel St 35
Special: stainless steel 1.4541 or 1.4571
Other material on request.

Protection

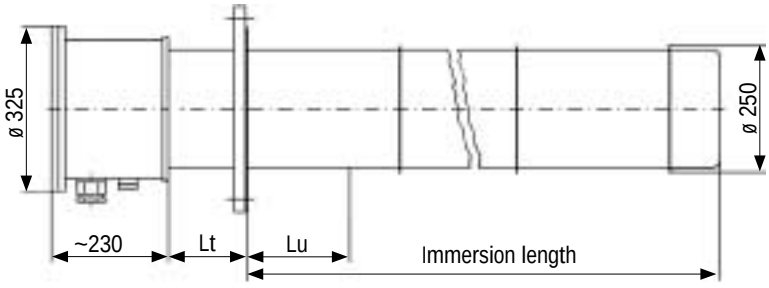
Explosion protection "flameproof tight".
Ⓔx II 2 G EEx d IIB T1-T6 according to Cenelec-standard.
Protection degree IP54 according to DIN 40050, IEC 144.
Tested and certified according to PTB 03 ATEX 1133 U.

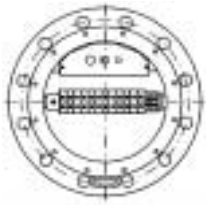
Application

Flanged heater for the heating of liquids in machinery, vessels and plants which are endangered by explosion of gases group IIB. (All gases except Hydrogen H_2, Acytelene C_2H_2 and Carbon Disulfide CS_2).

Electrical connections

Rated voltages:	max. 690V
Rated current:	max. 100 A per group
Rated power:	max. 3 stages each 110kW
Wire cross section:	max. 3x35 mm²





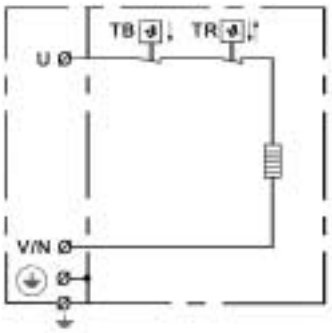
Illustrates terminal enclosure Ex d IIB cover removed.

Safety regulations concerns all immersion heater, see page 10.

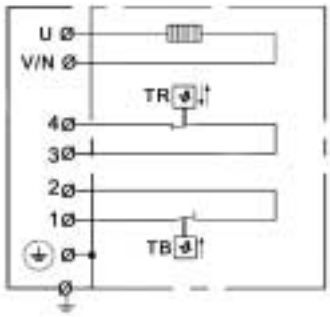
Connection diagram

Alternating current, single-phase

S02

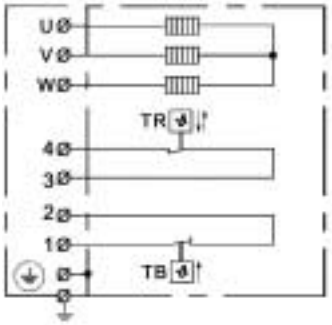


S02-3BR

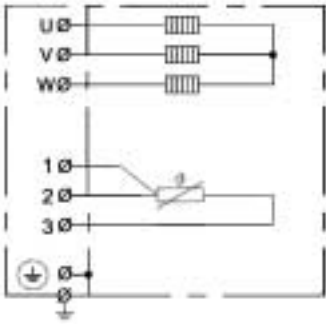


Alternating current, three-phase

S12-3BR



S09-2W



TB = Temperature limiter (with mechanical resetting)
TR = Thermostat

Heater with integrated temperature sensors for connection at electronic temperature monitoring devices installed in safe area.

Electrical flow heater up to 6000 kW

Electrical flow heaters are used in all areas for heating of liquid and gaseous mediums.

Typical application examples are:

Oil heating (lubricating oil, fuel oil, heat carrier oil)
Water heating (industrial heating systems)
Air heating (pressurized air, burner air, drying technology)
Gas heating (natural gas, process gases, technical gases)
Environmental technology (exhaust air cleaning, catalytic afterburning)
Steam generator, steam super heater (industrial process technology)

Design

Three different series are manufactured, using flanged heaters as discribed on pages 10-18 and adequate tube systems.
Series I and II, which enable optimum matching of studs and flanges to on-site piping systems, heat the medium directly. At series III tube bundle system and heater are commonly cast in an aluminium block. In this case the medium is heated indirectly.
Specific surface load and the determination of baffles for efficient heat transfer respectively grid disks to minimize pressure losses are the essential design criteria. Optional safety valve, vent and drain fittings, heat insulation, pump and complete temperature controls can be delivered.

Surface treatment/Material

Selection of material results under consideration of operation data pressure, temperature and medium to be heated. Available materials are carbon steel St.37, St.35.8, stainless steel 1.4541, 1.4571 and other alloy steels.

Protection

Design codes are AD-standard, CE-marking (pressure vessel), ASME, Stoomwezen, British Standard or further rules. Material certificates according to applicable rules. Third party inspection or works test certificate including necessary documentation are part of the delivery.

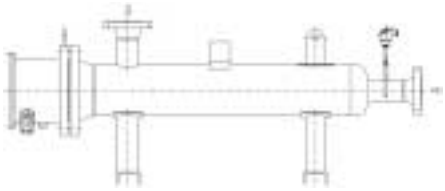
Electrical connetion

Rated power: Ex-execution up to 300kW, other up to 1000kW (6600kW)
Rated voltage: 230-690V
Nominal width: DN40-DN700
Nominal pressure: PN16-PN100
Installation length: 400-3000 mm

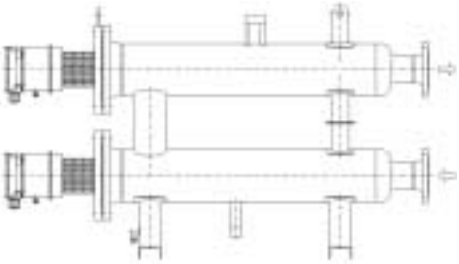
Preheater

Flow heater for liquid and gaseous mediums

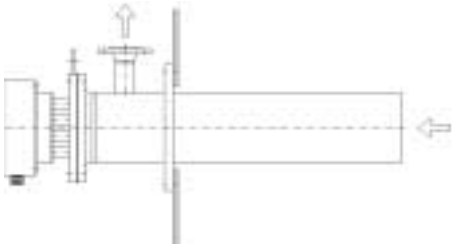
(Size I)

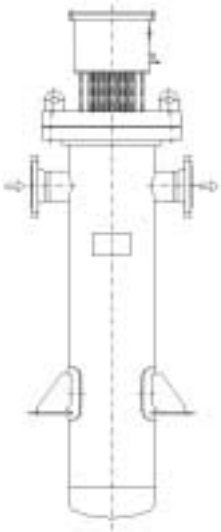


Flow heater for high medium temperatures
(Size I)

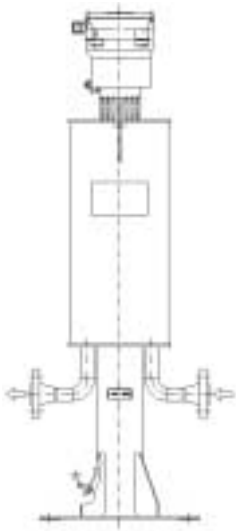


Oil preheater for extraction of storage tanks
(Size I)

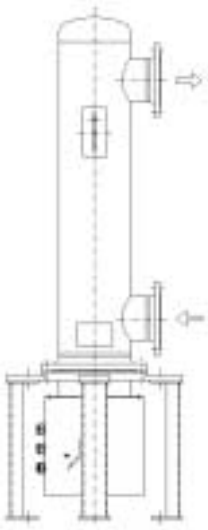




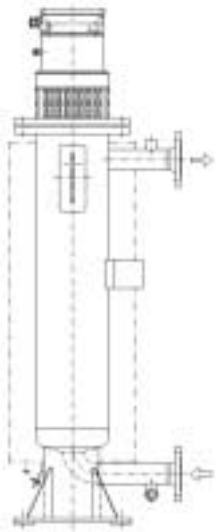
Gas preheater
(Size II)



Tube coil gas preheater
(Size III)



Regeneration gas heater
(Size I)



Preheater for water, fuel and lubrication (Size I)

Electric air heater 0.5-300 kW

Application

Electric air heaters fit for mounting in HVAC (heating, ventilating and air conditioning) plants or for heating process air or technical gases. They are also used for ovens, dryers or heating chambers.
Main fields of application are the petrochemical, chemical and pharmaceutical industries, oil and natural gas production and distribution, paint and lacquer industries, environmental industries etc.
Explosion proof air heaters are suitable for operation in hazardous areas, Zone 1. Air heaters in high industrial quality (IP54 at minimum) are for use in the safe area.

Design

Finned or plain tubular heating elements are fitted in a flanged frame or mounting flange made of sheet steel or stainless steel. They are connected electrically to a flameproof wiring chamber. Depending on the power rating, the heaters are fitted with up to 3 explosion proof casings.
The temperature monitoring to meet the temperature class is secured by temperature regulator (thermostate) and limiter. The temperature probes are thermally coupled to each heating group.
A high thermal efficiency is achieved by a specific surface load "p_a" which is optimized according to the operating conditions.
Under normal conditions, flow control is required for the safe operation of the heater. Alternatively, the Ex air heater can be designed for operation without flow control with a low specific surface load.

Design data

Air heaters for other operating conditions and heating capacities will be quoted on request. For the design, we need at least the following information:

- Type of protection, temperature class
- Required heating capacity, voltages
- Medium, flow rate, inlet and outlet temperature
- Air duct dimensions, mounting positions

Protection

Explosion protection "flameproof enclosure", "increased protection".
Ⓔx II 2 G EEx deq IIC T1-T4, according to EN 50014.
Certificate PTB 02 ATEX 1086 X.
Protection degree at least IP54 according to EN 60529.
Thermal protection class I according to EN 60519-2.

Electrical connection

Voltage: 230-690V
Heating capacity: 0,5-300kW

Airheater for pipe mounting

Air heater to be used as heating inset in HVAC plants

Air heater 4 kW for crane cabine heating, Zone 2

Air duct heater 300 kW, 5 stages, offshore

Air heater 4.5kW analyse house heating

Air blow heater 4,5-30 kW

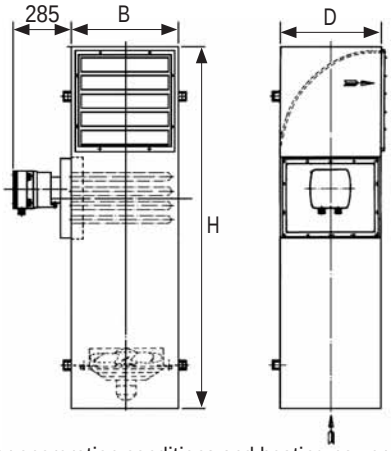
Applications and technical data, see page 21

Surface treatment/Material

Heating coil and ventilator in air duct housing made of steel, painted.
Control cabinet required. *)

Figure I
4.5-12 kW
W = 540 mm
D = 270 mm
H = 1650 mm

Figure II
15-30 kW
W = 530 mm
D = 515 mm
H = 1800 mm

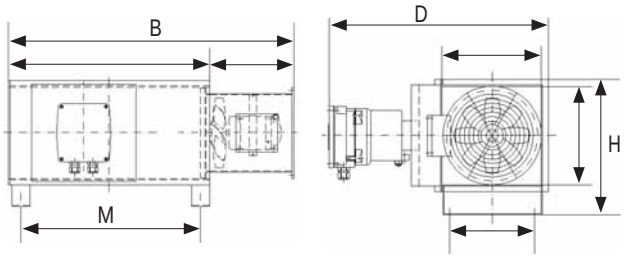


Air blow heaters for other opereration conditions and heating power on request.

Ex II 2 G EEx deq IIC T3, IP54						PTB 02 ATEX 1086 X
Art. no	**Type**	**Power kW**	**Voltage V**	**Flow m³/h**	**Size**	**Cable glands**
127000 127050 127100 127150 127200 127250 127300 127350 127400 127450	DHGSTB/ RHV	4,5 6,0 9,0 12,0 15,0 18,0 21,0 24,0 27,0 30,0	3-phase, 400V/50 Hz	500	Figure I	M25x1,5 (Ø 9-13)
				1000		
				2800	Figure II	M32x1,5 (Ø 10-18) (HL 3)
						M40x1,5 (Ø 17-25)

Surface treatment/Material

Heating coil and ventilator in air duct housing made of steel, painted.
Control cabinet required. *)



Ex II 2 G EEx deq IIC T3, IP54					PTB 02 ATEX 1086 X			
Art. no	**Type**	**Power kW**	**Voltage V/Hz**	**Flow m³/h**	**Dimensions mm**			
					W	**H**	**D**	**M**
127460 127470 127480	DHGSTB/RHV (compact mini)	4,5 6,0 9,0	400V/50 Hz	500 500 1100	805	350	570	500

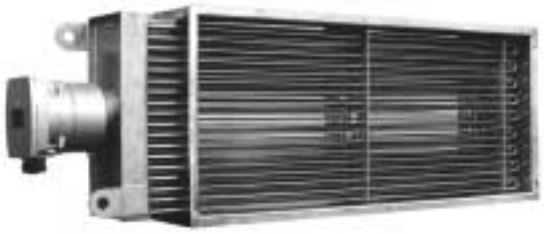
230V single-phase available.
Carry handle on request, extra charge (total weight approx. 75-80 kg)
*) External control cabinet on request.

Air heater 3,0-15 kW

Applications, see page 21

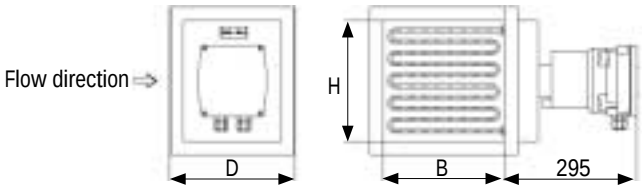
Design

In an enclosure of carbon steel or stainless steel is either heating elements with smooth surface or with solder jointed lamellas of fined tube type mounted. They are connected electrically to a flameproof wiring chamber. Depending on the power rating, the heaters are fitted with up to 3 explosion proof casings.
The temperature monitoring to meet the temperature class is secured by temperature regulator (thermostat) and limiter. The temperature probes are thermally coupled to each heating group.
A high termal efficiency is achieved by a specific surface load which is optimized according to the operating conditions.



Installation data

Under normal conditions flow contol is required. Alternatively, the Ex air heater can be designed for operation without flow control with a low specific surface load.



Electrical connection

Voltage: 230–690V
Heating capacity: 0,5–15kW

Ex II 2 G EEx deq IIC T3								PTB 02 ATEX 1086 X
Art. no	**Type**	**Heating capacity kW**	**Flow rate m³/h**	**Surface load W/cm²**	**Temperature raise °C**	**Dimension mm**		
						W	**H**	**D**
	DHG/HR-3-T3	3,0	250...750			200	200	380
	DHG/HR-4,5-T3	4,5	400...1100			250	250	380
	DHG/HR-6-T3	6,0	550...1750			315	315	300
	DHG/HR-9-T3	9,0	750...2200	P_a 0,9	30°C...10°C	355	355	380
	DHG/HR-12-T3	12,0	1000...3000			400	400	380
	DHG/HR-15-T3	15,0	1500...5000			500	500	300

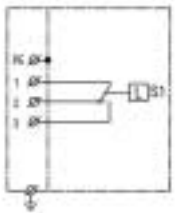
Level switch

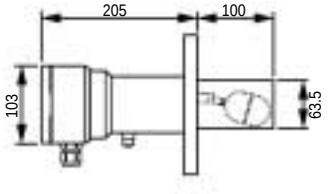
Application

Level switches for horizontal mounting serve for monitoring and control of flammable and non flammable liquids in tanks, vessels, machines, plant installations etc. in hazardous areas Zone 1.
For direct switching of rated power up to 3kW.
Max. permitted operation temperature 120°C.
Liquid density ≧0,7 g/cm³.

Level switch NW3 for horizontal mounting

A change-over switch is mounted in the flameproof enclosure. A built-on magnetic system, actuated by a stainless steel swimmer, performs the switching.
Standard execution with connecting flange DN65 PN16 Form B.
EEx d enclosure for direct cable entry on request. Cabel diameter required.





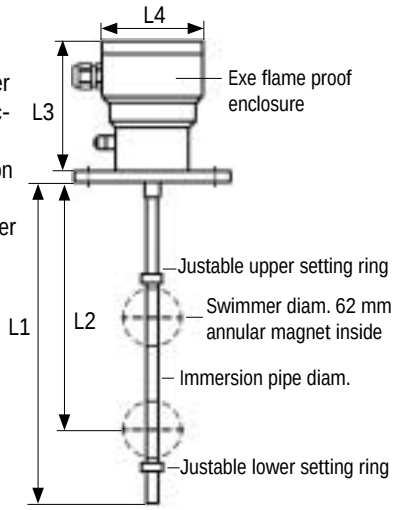
Surface treatment/Material

Enclosure and flange made of steel and cast iron, painted hammer finish silver grey.
Magnetic system made of galvanized steel.
Swimmer and screwed protective cover made of stainless steel.

Ex II 2 G EEx de IIC T6, IP54			PTB 03 ATEX 1001
Art. no	**Type NW3**	**Breaking capacity**	**Connection**
119627 119628	DNWAOO-16 DNWAOO-6	AC/DC-250V-0,15 A 24V-1,0 A/0,4 A	Cable gland M20x1,5 and connection wire 4 mm²

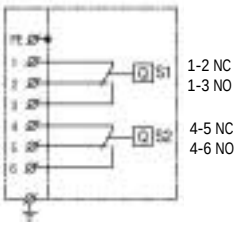
Level switch NW2 for vertical mounting

In an immersion pipe made of stainless steel two gas-protected change-over switches are mounted. They are wired to terminals inside the EEx e -connection box via bushings.
The annular magnet inside the swimmer actuates the switches depending on its location.
The swimmer is fixed on the immersion pipe by mean of one upper and lower setting ring.
Standard execution with connecting flange DN65 PN6 Form B.
Level switch with EEx d -enclosure
and EEx d cable glands on request.



Surface treatment/Material

Flange, immersion pipe, swimmer
and setting rings
made of stainless steel 1.4571.
Enclosure made of cast iron or
steel painted hammer finish, silver grey.
Kapslingen av lackerat gjutjärn.



Ex II 2 G EEx de IIC T6, IP54								PTB 03 ATEX 1002
Art. no	**Type NW2**	**Breaking capacity**	**Connection**	**L1 mm**	**L2 mm**	**L3 mm**	**L4 mm**	**Weight kg**
119630	DNRAOO-12-H 100	AC-250V/1,15 A 24V/0,4 A	Cable glands M20x1,5 and connection wire 4 mm²	200	140	145	103	6,5
119635	DNRAOO-12-H 150			210	150			6,6
119640	DNRAOO-12-H 200			300	240			6,6
119645	DNRAOO-12-H 450			510	450			6,9
119648	DNRAOO-12-H 1500			1500	1540			7,5

Temperature and level control

Application

Example: Cascade control for gas preheater.
At higher heating power or when a constant outlet gas temperature is required we recommend a continuos electronic power and temperature control with equipment of our scope of supply.
The surface temperature in the heater resp. gas temperature at the heater outlet measured by means of a Pt100 sensor each guarantee in conjuction with a field proven cascade control loop the optimum operating mode of the heater.

Solid state power controllers

TS 30-480 / TS 50-480
2TS 70 / F-480
Solid state power controller for a range 0-100%. ON/OFF zero-crossover switching. To control with a logic signal 6-32V DC or with 90-280V AC.
Switching of ohmic loads with rated currents up to 30 A, 50 A resp 70 A.
Suitable for rated voltages of 480V AC, optional to 500V AC.
For panel mounting on 35 mm standard DIN-rail.
For three-phase economic application 2 pieces each of the 30 A respectively 50 A units are needed. Operation without additional control voltages possible. When integrated monitoring function is provided, control voltage 24V DC necessary.
The heat sunk of the 2TS 70/F-480 device is equipped with a cooling fan and a temperature switch.

Power and temperature control panels for indoor mounting

Panel systems from renowned manufacturers (e.g. Rittal, Eldon) for indoor installation, protection class min. IP43.
Circuit design: contactor step control, continuous solid-state power control or both in combination, in conjuction with the control devices of this leaflet. Switch gear and accessories from renowned manufacturers (Moeller, Siemens, ABB).
PTSK-approved execution according to VDE 0660 resp. EN 60039, part
Rated voltages: 230-690V
Rated current: up to 1250 A

Power and temperature control panels for mounting in Zone 2

Restricted brathing enclosure EEx nR IIB T6.
Protection class min. IP54.
Contractor step control or continuous solid state power control.
Temperature controller, monitoring devices and safety barriers built-in.
Sight glass for temperature display in panel door.
Push buttons for ON/OFF, reset and temperature settings in panel door or in separate control box possible.
Special cable glands M20 for repeating tests provided.
Rated voltages: 230-690V
Rated current: up to 150kW

Ex-proof power and temperature control panels for Zone 1

Flameproof enclosure with connecting box increased safety, type of protection EEx dei IIC T6 / IP54 according to ATEX.
Contractor step control or continuous solid state power control.
Temperature controller monitoring devices and safety barriers for intrinsically safe wiring built-in.
Sight glass in EEx d cover for temperature display possible.
Push buttons and signal lamps mounted in EEx e box cover.
Rated voltages: 230-690V.
Circuit diagrams, manuals and test certificates belong to the delivery of all panels, on request also as electronic file.

Malux Finland Oy, P.O.Box 69 • FIN-06151 Porvoo • Phone: +358 (0)19 5745 700 • Fax: +358 (0)19 5745 750
E-mail: info@malux.fi • Internet: www.malux.fi

Temperature regulator

eR-500-a
On/off-regulator with fix set switching differential.
For panel mounting on 35 mm standard rail.
Temperature settings according to scale.
Temperature probe input Pt100 (standard),
type K, type J, KTY or current signal 4-20 mA.
Control output: 1 relay with change-over contact.
Monitoring of sensor short circuit and break.
Display of function by means of 1 light diod.

Safety temperature limiter

eB-500-b
For panel mounting on 35 mm standard rail.
For cut-out temperature of the limiter will be fix set at works.
Temperature probe input Pt100 (standard), type K, type J, KTY or current signal 4-20 mA.
Two-state relay output with switch-over contact.
Sensor short circuit and break monitoring.
Safety against unallowed reset possible.
Display of function by means of 2 light diodes.

Temperature regulator/limiter

eR/B-500-a
Combination of temperature limiter and on-off regulator with only one sensor.
For panel mounting on 35 mm standard rail.
The cut-out temperature of the limiter will be fix set at works, the regulator temperature can be adjusted according to scale.
Temperature probe input Pt100 (standard), type K, type J, KTY or current signal 4-20 mA. One relay output each with change-over contact. Monitoring of sensor short circuit and break.
Display of function by means of light diodes.

Temperature controller with display

N6100
Controller for exacting temperature control loops.
For mounting in panel door.
Permanent display of actual and desired temperature value.
Temperature probe input Pt 100 (standard), type K, type J, KTY or current signal 4-20 mA.
Relais, current or pulse-train-signal output possible. Configuration at works.
On site automatic matching of control requirements by incorporated autotuning function.
Monitoring of sensor short circuit and break.

Process- and program controller

Dicon 500
For complex control application, cascade control loop or contractor step control.
For mounting in panel door.
Permanent display of actual and desired value and a third characteristic (text display).
Up to 4 analog inputs. Up to 6 outputs possible.
Binary in- and outputs for control purpose.
Bus compatible with serial port.
Configuration and programming at works. On site automatic matching of control requirements by incorporated autotuning function.

Intrinsically safe apparatus

Apparatus in which all the circuits are intrinsically safe. The intrinsically safe apparatus has to be approved by a testing and research institute that can settle maximum safety values for U_i , I_i, P_i and defined values for inductance and kapacity (L_i , C_i). Also explosion groups in which the apparatus is safe and temperature classes has to be defined. If nothing else is mentioned, ambient temperature may not exceed 40°C.
Marking e.g.: Ex II 1 G EEx ia IIC T4 (T_a ≤85°C), T5 (T_a ≤ 65°C), T6 (T_a ≤ 50°C).

Simple apparatus

A simple apparatus is an apparatus with one or a few electrical components what has well defined values, for example passive components such as sockets, junction boxes, potentiometers and simple semiconductor components. Sources of stored energy with well defined parameters, for example condensators or inductances (not coils with iron core). Sources of generated energy, for example thermo elements and photocells that do not generate more than 1.5V, 100 mA, and 25 mW.
Simple apparates must full fill all standards according to SS EN 50020, but do not have to be approved by a testing and research institute. The temperature classification is defined by the system designer.
T6 can be given a contact funtion of ≤ 40°C, for other see T4-rule on page 16 in SS EN 50020. (One component with ambient temperature ≤ 80°C and with a surface of ≥ 20 mm², connected to a barrier with P_0 ≤ 1.0 W, can have temperature class T4).

Barriers (in connection to electrical apparatus)

The barriers are the interface between intrinsically safe and non intrinsically safe circuits, and are normally not placed in an explosion hazardous area. The construction is designed so that the intrinsically safe field circuit cannot be dangerous even if a fault in the non intrinsically safe circuit is occured. The barrier must be approved. In the certificate is mentioned voltage, current and possible power (U_0 , I_0 , P_0) that it max. can release. In the certificate is also mentioned max. inductance and kapacity (L_0, C_0).
Marking e.g. Ex II (1) G [EEx ia] or Ex II 2 G EEx dem [ia] IIC T6. The square brackets indicates that the apparatus as whole doesn't have the protection mentioned. For this reason it cannot be placed in a Zone where this protection is required. It can only energize equipment in that Zone. Barriers can also be marked with U_m, often 250 V. This is the highest voltage rate that apparatus connected to barriers can be energized with.

PID-regulation in Zone 1 and 2
P.130.R

3 analogue input signals (1xPT100)
4 digital input signals
2 analogue output
4 digital output
Numerical data -9999...+9999
Protection degee IP55
Explosion protection Ex II 2 G EEx ib IIC T6

Pic. 1

Pic. 3

Exi, intrinsically safe transformers for measuring signals

For 2, 3 and 4-threads PT-100-sensor or potentiometer to mA-signals.
- For voltage signals -10V...+10V to mA-signals.
- For thermoelements to mA-signals.
- For analogue current outputs.
- For contacts and namur-sensors to reverced contacts.

Explosion Ex II (1) G [EEx ia/ib] IIC

Pic. 2

Pic. 4

Art. nro	Type	Channels	Pic.	Voltage	Other information
570191*	Switch amplifier, 2 pcs reverced contacts	2	1	230V AC	Input: Namur or contact function
570178	Switch amplifier, 4 pcs reverced contacts	4	1	24 V DC	Ingång: Namur or contact function
570102*	Transmitter PT-100 to 4-20 mA	1	1	24V DC	Temperature range -200°C...+850°C
570104*	Transmitter for thermoelements to 4-20 mA	1	1		For thermo elements B, E, J, K , N, R, S, T
570103*	Transmitters from -10...+10V to 4-20 mA	1	1		Load < 750 Ohm
570185	Fan switch (air blower)/controller with timer	1	2	24V AC/DC	Input: Namur, PTC or contact function
600616	Programmable control unit for passive sensors with LCD-display for DIN-rail	1	3	24V AC/DC	Output: 0...10V/0-20 mA Output: 0...10V/0-20 mA
	PID-regulator P130.R -9999...+9999		4	24V DC	Input: 3 analogue + 4 digital Output: 2 analogue + 4digital

* Standard product, in stock

Transmitters for simple apparatus

ATEX-certified

We have in our product range sensors for controlling temperature, humidity, pressure and resistance. These applications have ATEX-approval and do not need to be certified again. The alarm function outputs are operated from the panel of the device.

Approved sensors:

TFR, TFK, TFT, FFR, TFF, DFK and SGR.

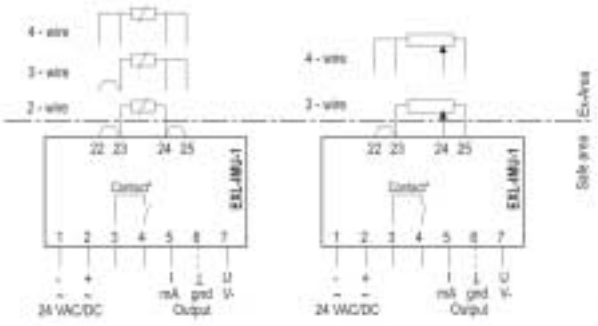
Other compatible sensors:

Passive potential free sensors, e.g.

Pt 100/500/1000 DIN	-200°C ...+850°C
Ni 100/200/500/1000 DIN	-60°C ...+180°C
LS-Ni 1000 (Siemens)	-30°C ...+130°C
LF20 (Honeywell)	-20°C ...+100°C
KP 250 (Kieback&Peter)	-50°C ...+150°C
0...1 KΩ	
0...10 KΩ	

Ordering example

Humidity measuring 30-100 r.h.
Transmitter EXL-IMU-1 + sensor FFR-2G.



⟨Ex⟩ II 2 (1) G/D			PTB 03 ATEX 2092
Art. no.	**Type**	**Voltages**	**Out put**
600616	EXL-IMU-1	24V AC/DC	0...10V - 0(4)...20mA

⟨Ex⟩ II 2 (1) G/D					PTB 03 ATEX 2092
Art. no	**Type**	**Function**	**Range**	**Sensor**	**Zone**
	TFR-2G	Room temperature	-30°C...+60°C	Pt 100 DIN	1, 2
	TFR-2G3D	Room temperature	-50°C...+90°C	Pt 100 DIN	1, 2, 22
	TFK-2G3D	Duct temperature	-30°C...+60°C	Pt 100 DIN, 200 mm	1, 2, 22
	TFT-2G3D	Probe temperature, tubing G 1/2" brass	-30°C...+150°C	Pt 100 DIN, 100 mm	1, 2, 22
	TFT-V4A-2G3D	Probe temperature, tubing G 1/2" stainless st.	-30°C...+150°C	Pt 100 DIN, 100 mm	1, 2, 22
	FFR-2G	Room humidistat	30...100% r.H.	0...1kOhm	1, 2
	FFK-2G	Duct humidistat	30...100% r.H.	0...1kOhm	1, 2
	TFFR-2G	Room combination humidity/temperature	30...100% r.H., -10°C...+60°C	0...1kOhm, Pt100	1, 2
	TFFK-2G	Duct combination humidity/temperature	30...100% r.H., -20°C...+60°C	0...1kOhm, Pt100	1, 2
	DFK-07-2G	Differencail pressure	ΔP < 700 Pa	x...y Ohm	1, 2
	DFK-17-2G	Differencial pressure	ΔP < 1700 Pa	x...y Ohm	1, 2
	VFK-07-2G	Volyme control	0...15 m/s	x...y Ohm	1, 2
	SGR-2G3D	Potentiometer (IP65)	Resistans	0...1kOhm	1, 2, 22

Ex-heat chamber with fan

Heat chambers
Type TEB 2 with thermostat, holds 1 EUR-pool pallet 1400x900x1600 mm
Type TEB 4 with thermostat, holds 1 Chemical pool pallet or 1 container 1400x1370x1600 mm
Type TEB 8 with thermostat 20-150°C, holds 2 pcs Chemical pool pallet
or 2 pcs container 2800x1370x1600 mm

Ex-heat chambers for temperatures up to 250°C, special max 400°C

Heat chambers
Type Dampf-WK with vapour heater, holds 40 pcs of 200L
Type Elektro-WK with electric heater, holds 6 pcs 200L

Barell heater ”plate” for barrels of 200 litres

Barell heater, voltages 230V AC/50 Hz
Type CF/B 1000W, without thermostat
Type CF/BC 1000W, with thermostat 20°C-150°C
Type CF/BCH 1840W, without thermostat
Type CF/BP 300W, for plastic ballels

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