

# SAN<sup>®</sup>

Electro Heat



**Ex Material**

**SAN**<sup>®</sup>

Electro Heat

**SAN**<sup>®</sup> Electro Heat a/s

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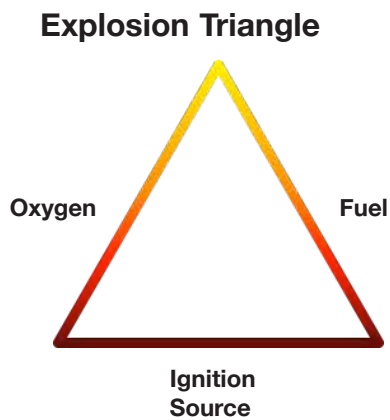
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## EX-INFORMATION

Information concerning  
explosion protected  
electrical material.  
Marked Ex.



Within the production and process plant industry, there are many processes where hazardous areas with danger of explosions exist. Some examples could be in the pharmaceutical industry, chemical industry and especially offshore on platforms.

In companies, production plants and process facilities explosion hazard may occur during cleaning, refining / distilling, machining, handling and painting etc.

Explosions can be caused by arch, sparks and heat, generated by electrical or mechanical components or from static electrical sparks.

What we basically do as an engineering company and manufacturer of explosion protected products is to take the ignition source away in the explosion triangle, by moulding, encapsulation and heat limitation.

The ATEX standards (European) is made from the IEC standards (International) but is adapted with additional safety to cover the European markets.

There are two EU directives for hazardous areas with potentially explosive atmospheres.

ATEX directive 94/9 – EU

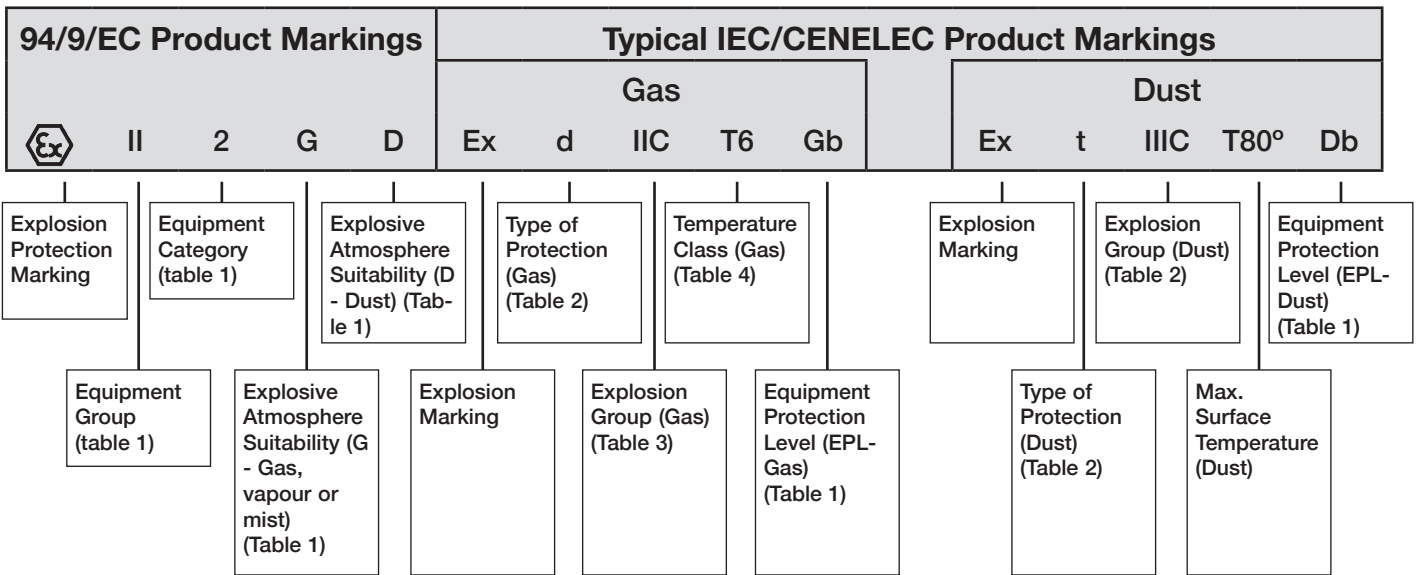
ATEX directive 1999/92/EF (user directive)

**ATEX** comes from the French words: **AT**mosphères **EX**plosives

IEC Ex standards are based on the worldwide IEC standards and can be accepted all around the world except for areas with own certificate standards.

There are several other Hazardous area standards that apply for explosion protection around the world and many countries have their own type of certification, North America – NEC. Russia – GOST. Brazil – Inmetro Etc.

There can be other directives that may apply for your application contact us for further information.



**Table 1. Zone Classification / Equipment Group / Equipment Level**

Hazardous mixture	Period of presence of the flammable substances	Zone Classification	Necessary Marking for the Equipment				
			Acc. to 94/9/EC		Acc. to IEC 60079-0		
			Equipment Group	Category	Protection Group	Equipment Protection Level EPL	Protection Level
Gas Mist Vapour	Continuously for long periods or frequently	Zone 0	II	1 G	II	Ga	Very High
	Occasional occurrence	Zone 1	II	2 G	II	Gb	High
	Not likely, but if it does occur, only rarely and for a short period	Zone 2	II	3 G	II	Gc	Increased
Dust	Continuously for long periods or frequently	Zone 20	III	1 D	III	Da	Very High
	Occasional occurrence	Zone 21	III	2 D	III	Db	High
	Not likely, but if it does occur, only rarely and for a short period	Zone 22	III	3 D	III	Dc	Increased
Methane Coal Dust		Mining	I	M1	I	Ma	Very High
		Mining	I	M2	I	Mb	High

**Table 2. Method of Explosion Protection**

Electrical Type of Protection for Atmospheres made explosive by gases, vapours and mists					
Type of Protection	Type of Protection	Zone	/ ATEX Category	/ EPL	Protection Concept
d	Flameproof enclosure	Zone 1 or 2	/ 2 G	/ Gb	Contain the explosion, prevent the flame propagation
e	Increased safety	Zone 1 or 2	/ 2 G	/ Gb	No arcs, sparks or hot surfaces
ia	Intrinsic safety	Zone 0, 1 or 2	/ 1 G	/ Ga	Limit the energy of the spark and the surface temperature
ib	Intrinsic safety	Zone 1 or 2	/ 2 G	/ Gb	Limit the energy of the spark and the surface temperature
ic	Intrinsic safety	Zone 2	/ 3 G	/ Gc	Limit the energy of the spark and the surface temperature
ma	Encapsulation	Zone 0, 1 or 2	/ 1 G	/ Ga	Exclusion of Ex-atmosphere
mb	Encapsulation	Zone 1 or 2	/ 2 G	/ Gb	Exclusion of Ex-atmosphere
mc	Encapsulation	Zone 2	/ 3 G	/ Gc	Exclusion of Ex-atmosphere
nA	Non-sparking	Zone 2	/ 3 G	/ Gc	No arcs, sparks or hot surfaces
nC	Enclosed break	Zone 2	/ 3 G	/ Gc	Prevent the flame propagation
nR	Restricted breathing	Zone 2	/ 3 G	/ Gc	Protection by enclosure
o	Oil immersion	Zone 1 or 2	/ 2 G	/ Gb	Exclusion of Ex-atmosphere
q	Powder filling	Zone 1 or 2	/ 2 G	/ Gb	Prevent the flame propagation
Electrical Type of Protection for Atmospheres made explosive by dusts					
Type of Protection	Type of Protection	Zone	/ ATEX Category	/ EPL	Protection Concept
ia	Intrinsic safety	Zone 20, 21 or 22	/ 1 D	/ Da	Limit the surface temperature
ib	Intrinsic safety	Zone 21 or 22	/ 2 D	/ Db	Limit the surface temperature
ic	Intrinsic safety	Zone 22	/ 3 D	/ Dc	Limit the surface temperature
ma	Encapsulation	Zone 20, 21 or 22	/ 1 D	/ Da	Exclusion of Ex-atmosphere
mb	Encapsulation	Zone 21 or 22	/ 2 D	/ Db	Exclusion of Ex-atmosphere
mc	Encapsulation	Zone 22	/ 3 D	/ Dc	Exclusion of Ex-atmosphere
p	Pressurized	Zone 22	/ 3 D	/ Dc	Exclusion of Ex-atmosphere
t	Protection by enclosure	Zone 20, 21 or 22	/ 1 D, 2 D, or 3 D	/ Da, Db, Dc	Keep the combustible dust out and avoid hot surfaces

**Table 3. Gas Groups**

Gas Groups	
IIA	Acetone, Ethane, Benzene, Petrol, Butane, Propane, Methane
IIB	Ethylene, Town Gas
IIC	Hydrogen, acetylene

**Table 4. Temperature Classes**

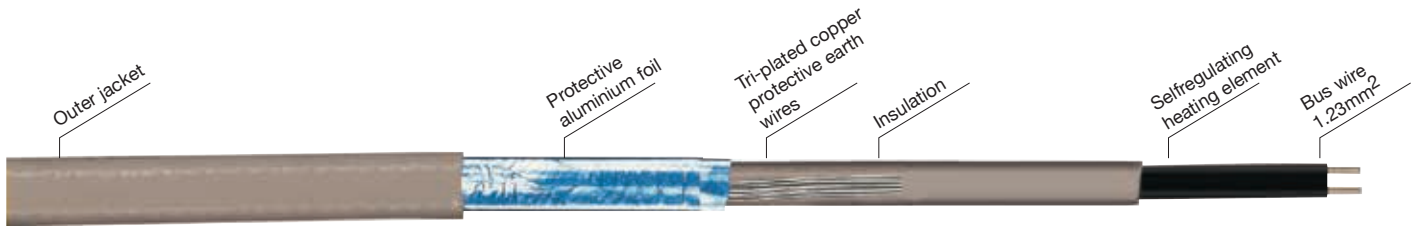
Temperature class	Maximum Surface Temperature	Maximum Permissible Surface Temperature for Permanent Hot Surfaces
T1	≤ 450°C	440°C
T2	≤ 300°C	290°C
T3	≤ 200°C	195°C
T4	≤ 135°C	130°C
T5	≤ 100°C	95°C
T6	≤ 85°C	80°C

**Table 5. IP Protection**

IP Protection IEC/EN 60529		
	First digit Degrees of protection against solid foreign objects	Second digit Degrees of protection against water
0	Non-protected	Non-protected
1	Protected against solid foreign objects of 50mm Ø and greater	Protected against vertically falling water drops (condensation)
2	Protected against solid foreign objects of 12.5 mm Ø and greater	Protected against vertically falling water drops when enclosure tilted up to 15°
3	Protected against solid foreign objects of 2.5mm Ø and greater	Protected against spraying water, up to 60° angle
4	Protected against solid foreign objects of 1.0mm Ø and greater	Protected against splashing water from any direction
5	Dust-protected	Protected against water jets from any direction
6	Dust-tight	Protected against powerful water jets from any direction
7		Protected against the effects of temporary immersion into water
8		Protected against the effects of continuous immersion of water

Example: IP 54 dust proof / protected against spraying water from any direction.

## Selfregulating parallel heating cable Type ELSR-N up to 80°C



- Self-regulating
- Four nominal outputs
- Can be cut to length from the roll
- Moisture proof
- UV-resistant

For example, the ELSR-N heating cable is used for frost protection on emergency water tanks, to maintain constant temperatures for caustic soda and for heating liquid level displays. If you wish to get to know the diverse fields of application for this heating cable, ask us...

### Applications:

The ELSR-N is our "standard" self-regulating heating cable for use in industry and house construction market. The applications range from frost protection to temperature maintenance for pipes and receptacles. We also have suitable designs for the hazardous area.

We offer our "classic" in the ELSR-N-BOT variant, also with a fluoropolymer outer jacket (more commonly known as Teflon). This heating cable even withstands aggressive chemicals, oil and fuel - simply indestructible!

### Technical Data:

Outer jacket..... TPE-O  
 Bus wire..... Cu nickel-plated  
 Maximum exposure temperature (deenergized) .....80°C  
 Maximum exposure temperature (energized).....65°C  
 Nominal voltage .....230V  
 Bending radius minimum .....25mm  
 Minimum installation temperature..... -50°C  
 Atex approval Ex II 2 G Ex e II II Ex 2 D Ex tD A21 T<sub>MAX</sub> 80°C

Type	Nom. output at 10°C (W/m)	Dimensions approx. (mm)	Weight approx. (g/m)	Part no.
ELSR-N-10-2-AO	10	13.6x5.5	91	3660050
ELSR-N-10-2-BO	10	14.1x5.8	108	3660109
ELSR-N-10-2-BOT	10	13.8x5.6	108	3660110
ELSR-N-20-2-AO	20	13.6x5.5	91	3660053
ELSR-N-20-2-BO	20	14.1x5.8	108	3660209
ELSR-N-20-2-BOT	20	13.8x5.6	108	3660120
ELSR-N-30-2-AO	30	13.6x5.5	91	3660056
ELSR-N-30-2-BO	30	14.1x5.8	108	3660309
ELSR-N-30-2-BOT	30	13.8x5.6	108	3660130
ELSR-N-40-2-AO	40	13.6x5.5	91	3660059
ELSR-N-40-2-BO	40	14.1x5.8	108	3660409
ELSR-N-40-2-BOT	40	13.8x5.6	108	3660140

### Design:

- BO: Protective braiding and a thermoplastic outer jacket  
 AO: Aluminium foil and a thermoplastic outer jacket  
 BOT: Protective braiding and a fluoropolymer outer jacket

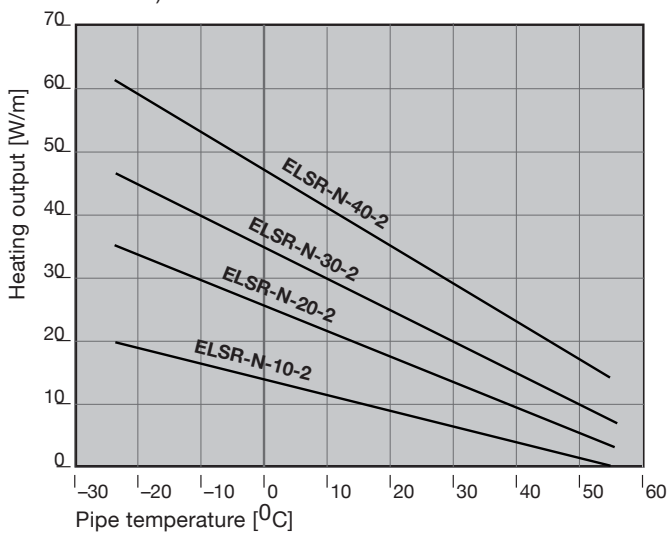


# Selfregulating parallel heating cable Type ELSR-N up to 80°C



### ELSR-N-...-2 output

(on insulated metallic pipes in accordance with EN 62395-1)



### Heating circuit lengths ELSR-N-...-2

considering

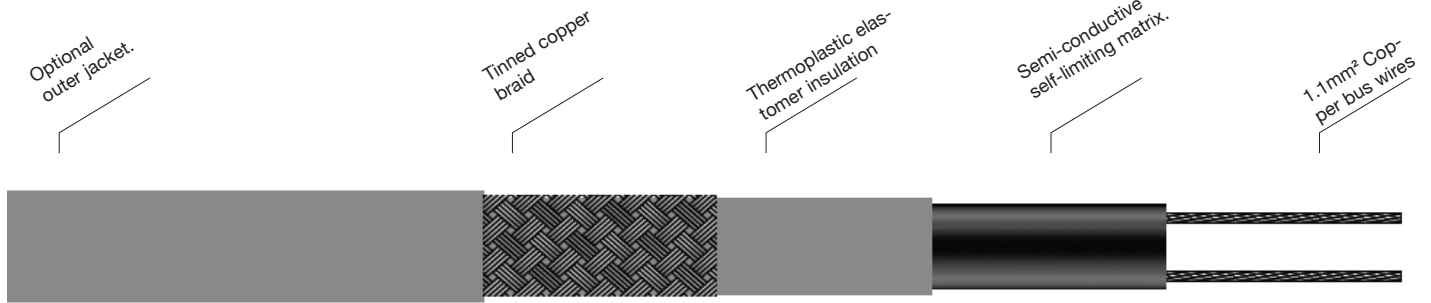
- 230V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 per cent maximum load
- Maximum 10 per cent line voltage drop on the heating cable bus wire
- A (1) single end power input heating cable into consideration

Switch-on temp. °C	Nominal cutout value A	Heating circuit length (m) for			
		ELSR-N-10-2	ELSR-N-20-2	ELSR-N-30-2	ELSR-N-40-2
+10°C	16	177.0	109.0	83.0	57.0
	20	177.0	129.0	104.0	71.0
	25	177.0	129.0	113.0	89.0
0°C	16	160.0	92.0	71.0	50.0
	20	160.0	115.0	89.0	62.0
	25	160.0	119.0	105.0	78.0
-10°C	16	144.0	79.0	63.0	44.0
	20	149.0	99.0	78.0	55.0
	25	149.0	111.0	98.0	69.0
-20°C	16	125.0	70.0	56.0	40.0
	20	139.0	87.0	69.0	50.0
	25	139.0	104.0	87.0	62.0
-40°C	16	99.0	56.0	45.0	33.0
	20	124.0	71.0	57.0	42.0
	25	124.0	88.0	71.0	52.0

Termination Kit	Description	Part no.
ELSR-N-10/20	For box PG16	7399101
ELSR-N-30/40	For box PG16	7399106
ELSR-N-10/20	For box M25	7399114
ELSR-N-30/40	For box M25	7399116
ELSR-N-10/20/30/40	For cold cable	7399108

EX-termination Kit	Description	Part no.
ELSR-N-10/20	Complete w/M20 brass gland	7399030
ELSR-N-30/40	Complete w/M20 brass gland	7399032
ELSR-N-10/20	Complete w/M20 plastic gland	7399034
ELSR-N-30/40	Complete w/M25 plastic gland	7399036

## Selfregulating heating tape Type GTe up to 85°C



### Roof and gutter protection from snow and ice build up

- Automatically adjusts heat output in response to changes in ambient temperature
- Can be cut-to-length with no wastage
- Will not overheat or burnout, even when overlapped
- Full range of accessories available
- Optional fluoropolymer outer jacket for use in corrosive environments
- Available for 110-120VAC and 220-277 VAC

#### Description:

Snow that has built up on a roof will start to melt as a result of either exposure to the sun or from heat rising from the building below.

As the melted snow runs from the roof into cold gutters and drain pipes, it can re-freeze forming layers of ice that can continue to build up until the flow is blocked. This can result in damaged drains and gutters.

In addition, water can get into the roof and walls of the building, leading to expensive structural damage such as broken roof tiles, damaged plaster and facades, etc.

#### The Solution

We have the solution in the form of G-Trace.

The self-regulating characteristics of the heating tape means that the cable can adjust it's heat output in accordance with the ambient temperature.

In snow and icy water, the heating cable operates at full power. As the snow melts and the water drains away, GTrace self-regulates to half power while it dries. As it gets warmer, so G-Trace gradually reduces it's output.

The G-Trace system is safe and reliable. As self-regulation prevents overheating, G-Trace can even be installed in plastic gutters and with the UV resistant outer jacket, the heating cable is protected from the sun's harmful rays – thus making it totally durable and reliable. G-Trace provides a cost effective, preventive maintenance solution to damaged roof tops and gutters and the system consumes no more power than it takes to prevent ice formation.

Design and installation of a G-Trace system is simple as there are no fixed lengths. The heating tape can be cut to length during installation. G-Trace is cut off the reel and placed in the gutter. The heating tape is hung down into the down pipe without the need for spacers.

All systems - from the simplest to the most elaborate – use the same components, thereby providing maximum flexibility and ease of design.

Max temperature ..... 85°C  
 Minimum installation temp. .... -40°C  
 ..... (CENEL -20°C)  
 Power supply..... 110-120VAC, 220-277VAC  
 Max. resistance of protective braiding..... 18.2 Ohm/km

#### Weight & dimensions

Type Ref	Nom. Dims. (mm)	Weight kg/100m	Min. bending radius
GTe	10.5 x 5.9	10.0	35mm

#### Power Output

In ice at 0°C..... 36W/m  
 In air at 0°C ..... 18W/m

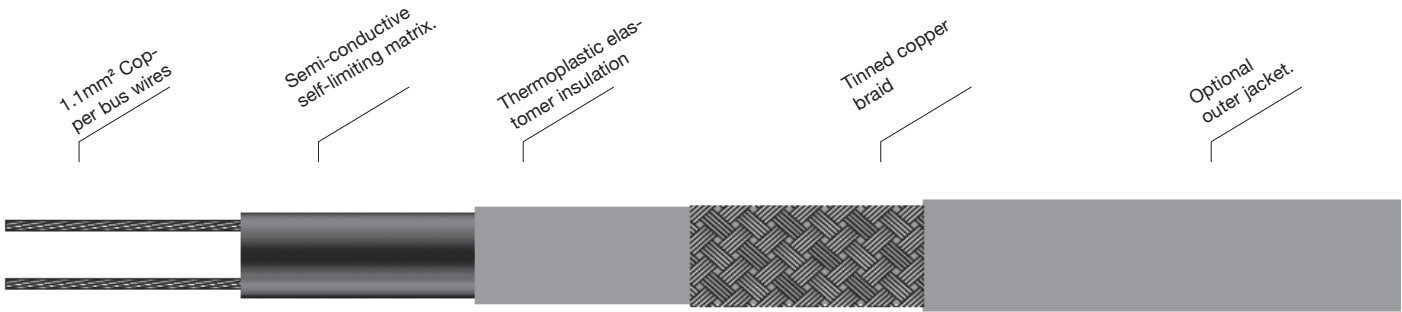
#### Cold Start Data (300 Second Rating)

Start at °C	Start Current (A/m)
	230V
-20°C	0.272
0°C	0.212
+10°C	0.180

#### Accessories

We supply a complete range of accessories including termination/splice kits, end seals, junction boxes and controls. These items are recommended for the correct operation of G-Trace heaters.

# Selfregulating heating tape Type GTe up to 85°C



### Maximum Length (m) vs. Circuit breaker size

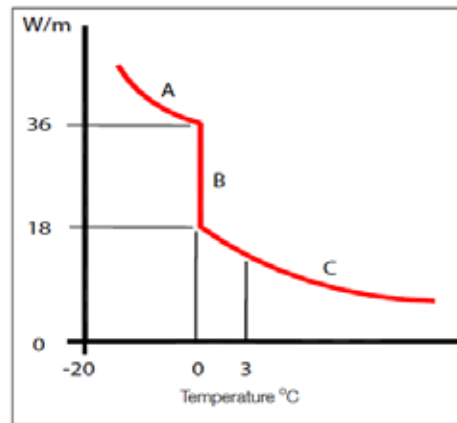
The following circuit details relate specifically to the trace heating of pipework and equipment. For any other application consult SAN.

Cat Ref	Start-up Temp.	230V				
		6A	10A	16A	20A	30A
GTe	10°C	34	56	88	92	-
	0°C	28	48	76	92	-
	-20°C	22	36	58	74	92

For use with Type C circuit breakers to IEC60898:1991

### Thermal ratings

Nominal output at rated voltage.



### Power Output Multiplying Factors

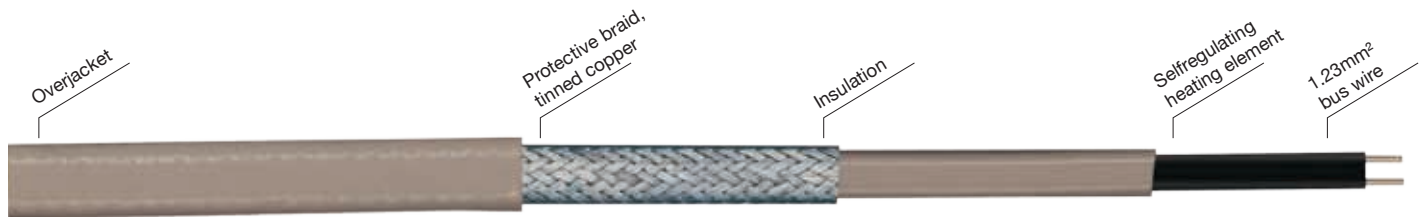
230V Heating Tape

200V	Multiply output by 0.91
208V	Multiply output by 0.93
220V	Multiply output by 0.97
230V	Multiply output by 1.00
240V	Multiply output by 1.03
250V	Multiply output by 1.06
277V	Multiply output by 1.15

Notes:

1. In snow and ice water, the heating tape will operate at full power.
2. As the snow begins to melt and the water drains away, the heating tape self-regulates to half power while it dries.
3. As it gets warmer, the heating tape will reduce its power output.

## Selfregulating heating tape Type ELSR-H up to 210°C



### High Temperature

The versatile self-regulating heating cable ELSR-H is for high temperatures up to 210 °C in a large number of industrial applications. It also suited and approved for use in hazardous areas. The BOT version of this heating cable even withstands aggressive chemicals, oil and fuel and, thanks to this high chemical resistance, stands out for a long life span.

- Up to 120 °C/210 °C
- Self-regulating
- Six nominal outputs
- Can be cut to length off the roll
- Moisture proof
- Resistant to chemicals
- Approved for use in hazardous areas

### Applications:

- Chemical & petrochemical industries
- Oil & gas industry
- Power plants
- Ex-areas
- Frost protection
- Water & sanitation utilities
- Temperature maintenance on vessels, pipes & valves

### Technical Data

Outer jacket.....Fluoropolymer  
 Bus wire..... nickel-plated copper  
 Maximum exposure temperature (deenergized) ..... 210°C  
 Maximum operating temperature (energized) ..... 120°C  
 Nominal voltage ..... 230V/120V\*  
 (\*upon request)  
 Minimum installationtemp. .... -45°C  
 Minimum bending radius..... 25mm  
 Classification ..... II 2G Ex e IIC Gb II 2D Ex tb IIIC Db  
 Certificate ..... IECEx EPS 12.0004

### IMPORTANT!

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**

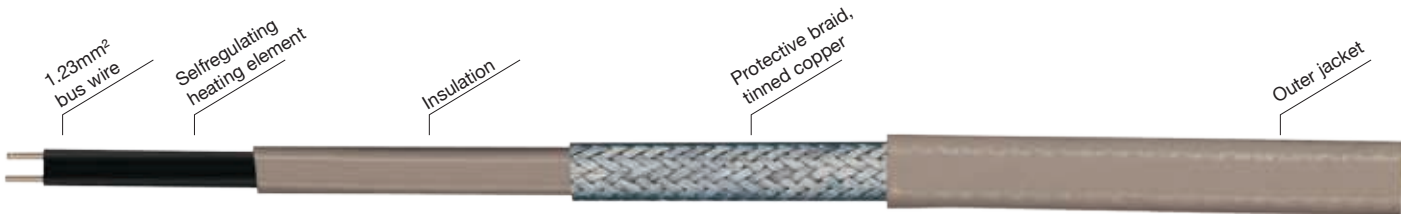
Type	Nom. loading at 10°C (W/m)	Dimensions (mm)	Weight approx. (g/m)	Part no.
ELSR-H-10-2-BOT	10	12,4x5,0	120	
ELSR-H-15-2-BOT	15	12,4x5,0	120	
ELSR-H 20-2-BOT	20	12.4x5.0	120	3663020
ELSR-H 30-2-BOT	30	12.4x5.0	120	3663030
ELSR-H 45-2-BOT	45	12.4x5.0	120	3663045
ELSR-H 60-2-BOT	60	12.4x5.0	120	3663060

BOT: Protective braiding and a fluoropolymer outer jacket.

Termination Kit	Description	Part no.
ELSR-H-10/20/30/45/60-2-BOT	w/plastic gland M25	7399021
ELSR-H-10/20/30/45/60-2-BOT	For cold cable	7399108

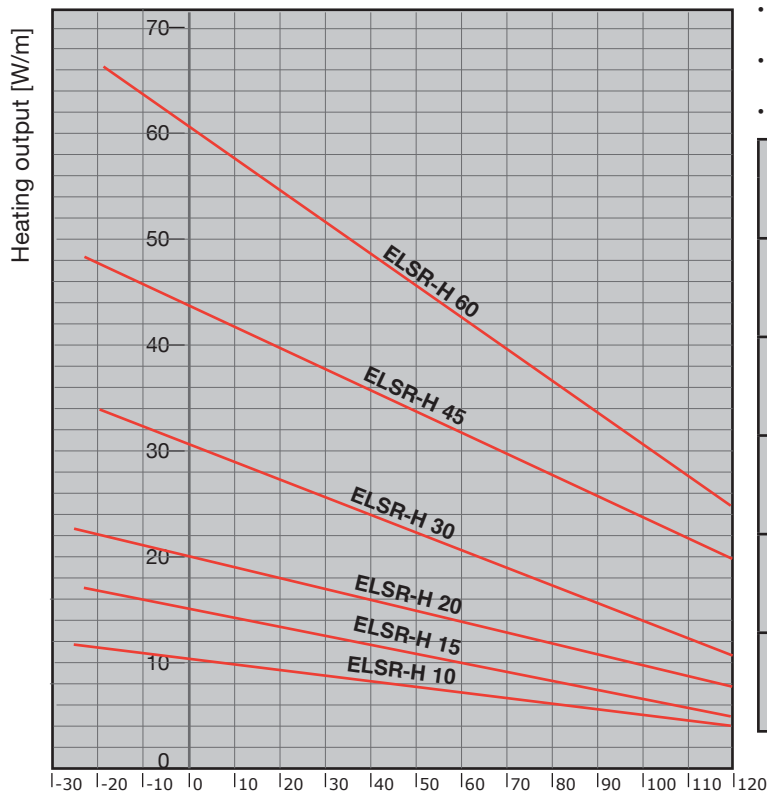
EX-termination Kit	Description	Part no.
ELSR-H-10/20/30/45/60-2-BOT	w/2 brass gland M20 for 2 boxes with earth	7399020

# Selfregulating heating tape Type ELSR-H up to 210°C



### ELSR-H output

(on insulated metallic pipes in accordance with EN 62395-1)



Pipe temperature (°C).

### Heating circuit lengths ELSR-H...-2-BOT on the following conditions:

- 230V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 per cent maximum load
- Maximum 10 per cent line voltage drop on the heating cable bus wire
- A (1) single end power input heating cable into consideration

Switch-on temp. (°C)	Nominal cutout value (A)	Heating circuit length (m) for at 230V					
		ELSR-H-10	ELSR-H-15	ELSR-H-20	ELSR-H-30	ELSR-H-45	ELSR-H-60
10	16	193.0	158.0	122.0	82.0	55.0	41.0
	20	193.0	158.0	136.0	102.0	68.0	51.0
	25	193.0	158.0	136.0	111.0	85.0	64.0
	32	193.0	158.0	136.0	111.0	91.0	79.0
0	16	189.0	153.0	116.0	77.0	52.0	39.0
	20	189.0	153.0	132.0	97.0	65.0	49.0
	25	189.0	153.0	132.0	108.0	81.0	61.0
	32	189.0	153.0	132.0	108.0	88.5	77.0
-10	16	184.0	146.0	110.0	73.0	50.0	37.0
	20	184.0	148.5	129.0	92.0	62.0	46.0
	25	184.0	148.5	129.0	105.5	77.0	58.0
	32	184.0	148.5	129.0	105.5	86.5	70.0
-20	16	180.0	139.0	104.0	70.0	47.0	36.0
	20	180.0	145.0	125.5	87.0	59.0	44.0
	25	180.0	145.0	125.5	103.0	74.0	56.0
	32	180.0	145.0	125.5	103.0	84.5	67.0
-25	16	173.0	126.0	95.0	64.0	43.0	33.0
	20	173.0	138.0	119.0	80.0	54.0	41.0
	25	173.0	138.0	120.0	98.0	68.0	51.0
	32	173.0	138.0	120.0	98.0	81.0	61.0

### Selfregulating heating tape Type FS+ up to 225°C\*

Optional corrosion resisting outer jacket. (-S) or (-F)

Metal braid (-C)

Or continuous metal jacket (-A)

Silicone rubber electrical insulation

Inherently temperature safe self-regulating matrix

Bus wires



A high temperature self-regulating heating cable.

- 225°C exposure temperature withstand, (energised or switched off).
- Inherently temperature-safe. (ITS)
- Power outputs to 60W/m at 10°C
- External temperature controls not necessary

#### Description:

FS+ is a high temperature self-regulating heating cable, having an exposure limit of 225°C, energised or not. It may be provided with a continuous extruded metal jacket for applications where high mechanical strength is required or a metal braid where flexibility is preferred. The continuous metal outer jacket is ductile, yet withstands high mechanical loads, thus averting damage when being installed in arduous environments. Easy terminations, cut-to-length. Safest ever self-regulating product range for high temperature exposure; will not overheat even when exposed to 225°C when energised or switched off as it is inherently temperature-safe. ATEX/IECEx Approved.

#### Inherently Temperature-Safe:

“ The inherent ability to self-regulate at a temperature level below the maximum product rating and withstand temperature of the insulating materials, without the need for temperature control.” Similar competitor self-regulating products are typically limited to a maximum energised temperature, typically 120°C at which point, their retained power output prevent the cable from self-regulating at its own limiting temperatures. All such products require temperature control to ensure their own temperature safety.

Maximum continuous exposure temp.

(Energised or switched off)..... 225°C (437°F)\*

Minimum installation temp. .... -40°C (-40°F)

Minimum ambient temp. .... -60°C (-76°F)

Power supply.....208-277VAC  
(other voltages available on request)

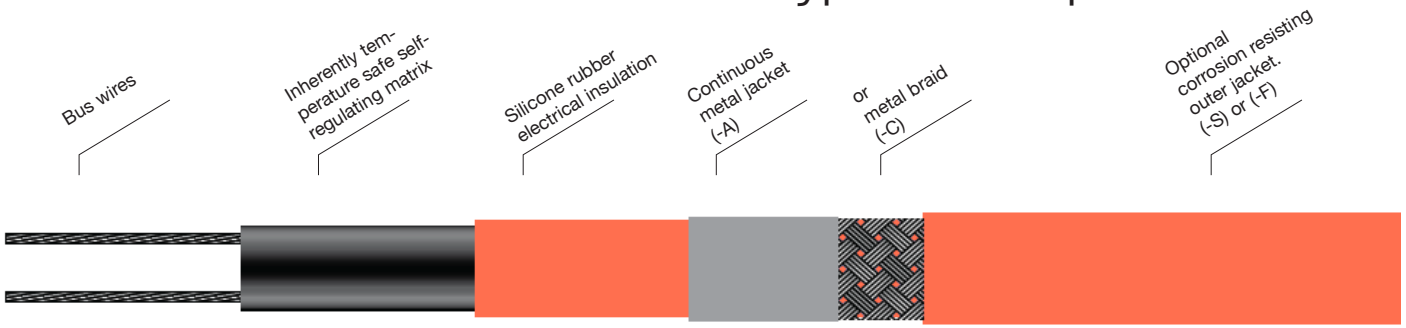
#### Weight & dimensions

Type Ref	Nom. Dims. (mm)	Weight kg/100m	Min. bending radius	Gland size
FS+A	11.05x5.65	14.3	20mm	M20
FS+AS	12.05x6.65	14.7	25mm	M20
FS+AF	11.85x6.45	14.6	30mm	M20
FS+C	10.25x4.85	12.2	20mm	M20
FS+CS	11.25x5.85	12.5	25mm	M20
FS+CF	11.05x5.65	12.5	30mm	M20

#### Approval details

ATEX	Sira 12ATEX3136	EN60079-0:2009 EN60079-7:2007 EN60079-30:2007 IEC d60079-31:2008
IECEx	SIR 12.0054	IEC 60079-0:2011 IEC 60079-30:2007-01 IEC 60079-31:2008

# Selfregulating heating tape Type FS+ up to 225°C\*



### Maximum Length (m) vs. Circuit breaker size

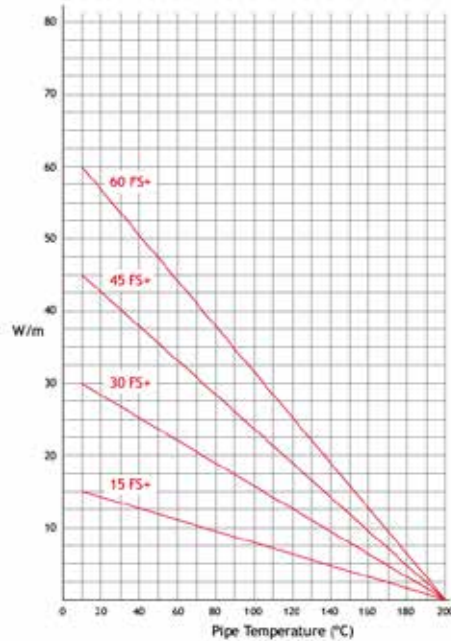
The following circuit details relate specifically to the trace heating of pipework and equipment. For any other application consult SAN.

Cat Ref	Start-up Temp.	230V	
		20A	32A
15FS+	10°C	154	-
30FS+	10°C	102	108
45FS+	10°C	76	88
60FS+	10°C	62	76

For use with Type C circuit breakers to IEC60898

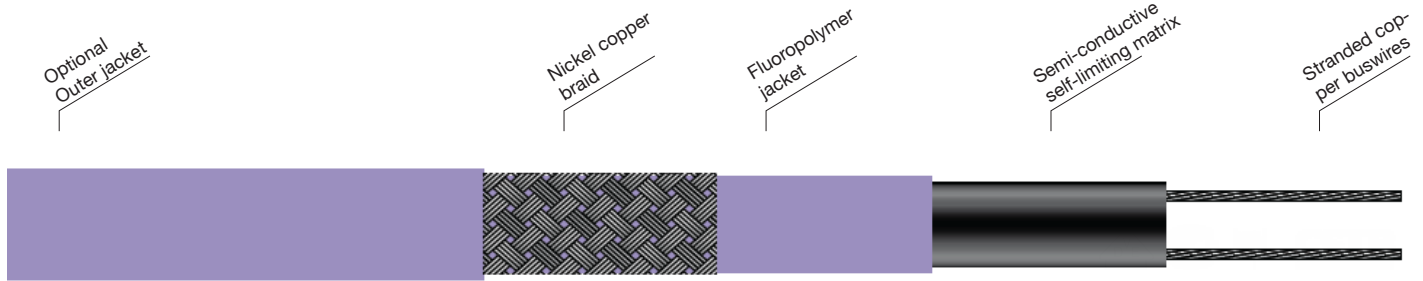
### Thermal ratings

Nominal output @ 230V when FS+ is installed on thermal insulated carbon steel pipes, being fixed with aluminium fixing tape.





## Selfregulating heating tape Type FSU up to 250°C\*



Electrical heating tape for process heating or temperature maintenance of pipework and vessels where high temperature withstand is required

- Automatically adjusts heat output in response to increasing or decreasing pipe temperature
- Can be cut to length with no wastage
- Will not overheat or burnout
- Available for 220/240VAC (110/120VAC on demand)
- High power outputs up to 90W/m
- Full range of controls and accessories
- Approval to International Standards for hazardous and corrosive environments.
- Inherently temperature safe

**Features:**

FSU is an industrial grade, self-regulating heating cable that can be used for applications ranging from process heating or maintenance of temperatures up to 200°C.

It can be cut to length on site and exact piping lengths can be matched without any complicated design considerations.

FSU is used where high temperatures are required and where the heater must be capable of withstanding high exposure temperatures up to 250°C\*.

Its self-regulating characteristics improve safety and reliability. FSU will not overheat or burnout.

The installation of FSU heating tape is quick and simple and requires no special skills or tools. Termination, splicing and power connection components are all provided in convenient kits.

\*Limited to 240°C only in hazardous areas.

**Options:**

**FSU**

Unbraided base heater protected against corrosive chemical solutions and vapours. Heaters must have additional protection from mechanical damage in service.

**FSU..N**

Nickel plated braid for where traced equipment does not provide an effective earth path, eg. plastic pipework. Heaters must have additional protection from mechanical damage in service.

**FSU..NF**

Fluoropolymer outerjacket over nickel plated braid provides additional protection where corrosive chemical solutions or vapours may be present.

Maximum permissible temp..... 250°C (482°F)\*  
ON or OFF

\*Limited to 240°C only in hazardous areas

Minimum installation temp..... -40°C (-40°F)

Temperature classification..... 75 & 90W/m = T2 (300°C)  
15-60W/m = T3 (200°C)

Power supply.....220-240VAC  
(110-120VAC on demand)

Maximum resistance  
of protective braiding ..... 18.2 Ohm/km

**Weight & dimensions**

Type Ref	Nom. Dims. (mm)	Weight kg/100m	Min. bending radius @-20°C	Gland size
FSU	10.4x3.4	7.6	20mm	M20
FSU..N	11.4x4.4	11.7	25mm	M20
FSU..NF	12.2x5.2	15.4	30mm	M20

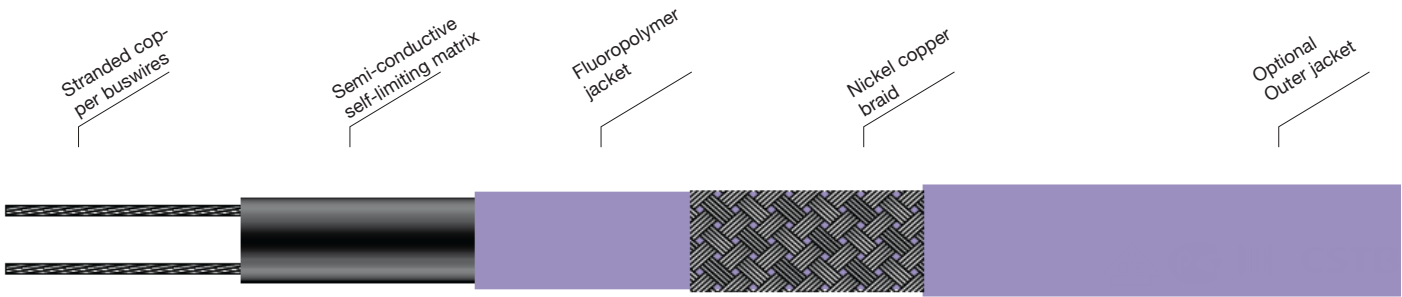
N denotes nickel plated copper braid

**Approval details**

Testing authority	Certificate no.	Standard
IEC	Sira Ex 02Y3063x	IEC60079-0:2000 IEC60079-7:2001 IEC62086-0:2001
ATEX 	Sira ATEX3073x Sira ATEX3072	IEC60079-0:2009 IEC60079-31:2008 EN60079-30-1:2007
CSA 	214197-1295278	C22.2 No. 130.1 C22.2 No. 130.2 C22.2 No. 138
Standard Area Approval		Zone 1 and Zone 2
GOST R 	GB.ГБ05.В02364	GOST R 51330.0-99 (МЭК 60079-0-98) GOST R 51330.8-99



# Selfregulating heating tape Type FSU up to 250°C\*



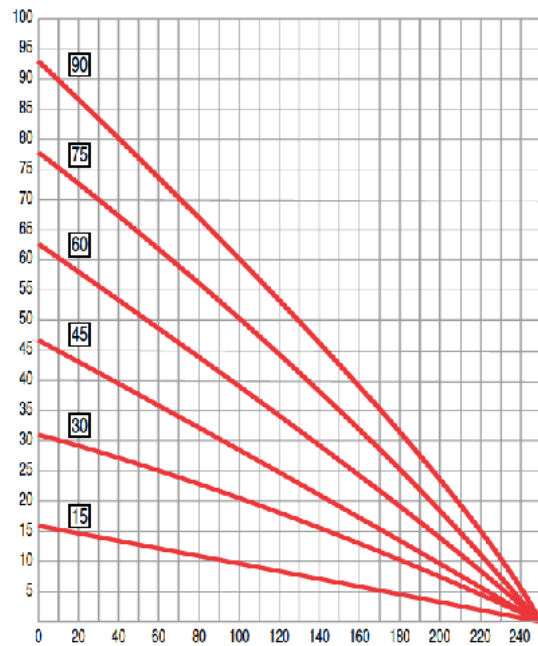
### Maximum Length (m) vs. Circuit breaker size

Cat Ref	Start-up Temp.	230V					
		6A	10A	16A	20A	25A	32A
15FSU	10°C	48	78	126	154	-	-
	0°C	46	76	120	150	154	-
	-20°C	40	68	108	136	154	-
30FSU	10°C	30	52	82	102	108	-
	0°C	30	48	78	96	108	-
	-20°C	26	44	70	88	108	-
45FSU	10°C	24	38	62	78	88	-
	0°C	22	36	58	74	88	-
	-20°C	20	34	52	66	82	88
60FSU	10°C	18	30	50	62	76	-
	0°C	18	30	46	58	72	76
	-20°C	16	26	42	52	66	76
75FSU	10°C	16	26	42	52	64	82
	0°C	14	24	40	48	60	78
	-20°C	14	22	36	44	54	70
90FSU	10°C	12	22	34	42	54	68
	0°C	12	20	32	40	50	64
	-20°C	10	18	30	36	46	58

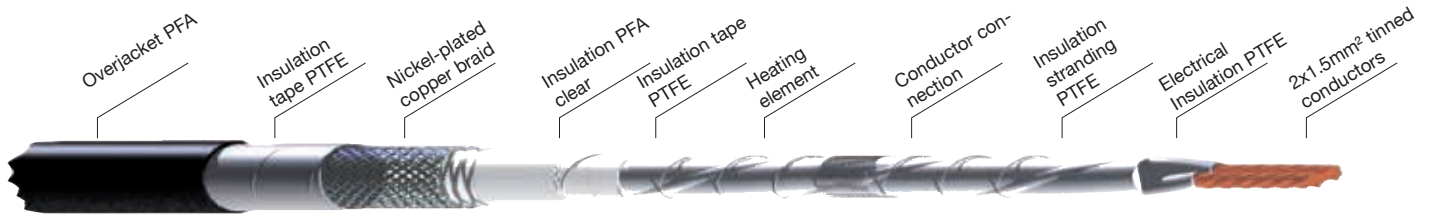
For use with Type C circuit breakers to BS EN60898:1991

### Thermal ratings

Nominal output @ 230V when installed on insulated metal pipe. W/m.



## Constant Wattage parallel heating tape Type FHT up to 260°C




### Applications:

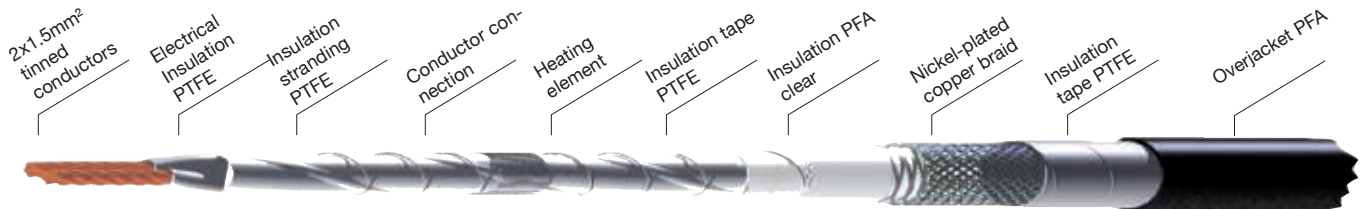
The FHT is a family of constant wattage parallel circuit heating cables designed for pipe and equipment trace heating in industrial applications. FHT can be used for frost protection and process temperature maintenance requiring high power output and/or high temperature exposure.

FHT can provide process temperature maintenance up to 150°C and can withstand routine steam purges and temperature exposure to 260°C power off. FHT heating cables are zone

parallel heaters constructed from a heating element wrapped around two parallel conductors. The distance between conductor contact points forms the heating zone length. This parallel construction allows it to be cut to any length and terminated in the field. Its round shape provides excellent flexibility during installation as it allows for bending in every direction. FHT heating cables are approved for use in hazardous areas. Approvals are listed below.

	FHT/2/10-CT	FHT/2/20-CT	FHT/2/30-CT
Size	ø7.5mm	ø7.5mm	ø7.5mm
Specification: Nominal power output Supply voltage (AC)	10W/m 230V	20W/m 230V	30W/m 230V
Area classification	Hazardous Area, Zone 1 or zone 2. Ordinary		
Approvals	<p>The FHT heating cable is approved for use in hazardous areas Zone 1 and Zone 2 by KEMA.</p> <p> II 2 G EExe II T6 to 230°C (T2) KEMA 01ATEX2085X</p> <p>(Where T is the applicable temperature classification in accordance with the certificate schedule)</p>		
Max circuit length	200m	150m	120m
Max withstand temperature (power off)	260°C	260°C	260°C
Max work piece temperature (power on)	Refer to stabilised design tables		
Min installation temperature	-65°C	-65°C	-65°C
Min. bending radius	20mm	20mm	20mm
Min. spacing between turns*	40mm	40mm	40mm
Colour	White	Red	Green
Cold lead / heating zone length	1.5m	1.5m	1.5m

# Constant Wattage parallel heating tape Type FHT up to 260°C



**Stabilized design tables:**

The temperature values listed represent the maximum stabilized design surface temperature permitted for a work piece for temperature classification T6, T5, T4, T3 and 230°C (T2).

**FHT/2/xxx heating tape with 100mm spacing when spirally wound on a surface to be heated:**

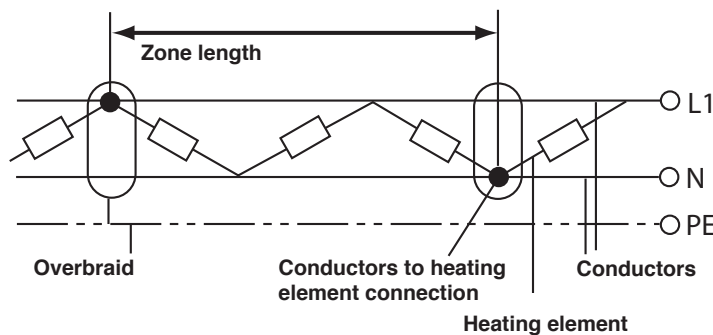
Nominal Power (W/m)	Power Density (Q) (W/m)	Temperature classification (°C)				
		T6	T5	T4	T3	230°C (T2)
10	12.7	50	67	104	170	200
20	25.5	18	40	82	151	178
30	38.2	X	X	35	114	144

**FHT/2/xxx heating tape with 40mm spacing when spirally wound on a surface to be heated:**

Nominal Power (W/m)	Power Density (Q) (W/m)	Temperature classification (°C)				
		T6	T5	T4	T3	230°C (T2)
10	12.7	45	63	102	167	196
20	25.5	X	17	70	145	172
30	38.2	X	X	X	93	127

Ordering details			
Part description	FHT/2/10-CT	FHT/2/20-CT	FHT/2/30-CT
Part no.	3665010	3665020	3665030
<b>Components</b>	SAN offers a full range of components for power connections, splices and end seals. These components must be used to ensure proper functioning of the product and compliance with electrical requirements.		
<b>Accessories</b>			
<b>Termination kit</b>			
Part description	Connection kit FHT 2-CT, seal kit, with M20 ATEX, C20-01-F		
Part no.	7399123		
Part description	End kit Cold-applied FHT 2-CT, ATEX		
Part no.	7399124		

**Wiring Diagramme**

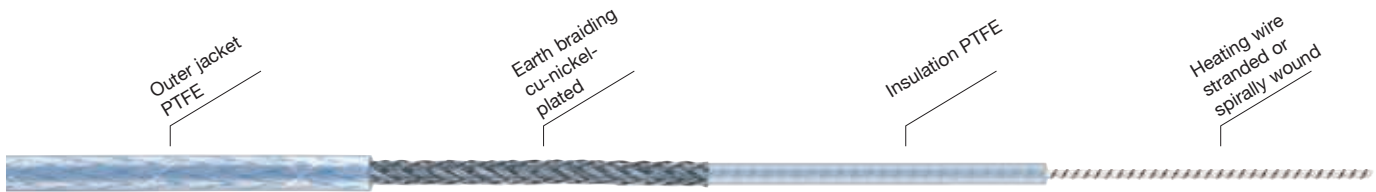


**SAN** Electro Heat a/s

Gillelejevej 30b - DK-3230 Graested - Denmark

Tel.: +45 48 39 88 88 - Fax: +45 48 39 88 98 - info@san-as.com - www.san-as.com

CVR No.: 42 16 59 13



Resistance (Ω/km)	OD (mm)	Heating cable design	Temperature coefficient (1/K)	Part no.
1.95	6.64	Stranded	0.00430	1TA002E
2.90	5.74	Stranded	0.00430	1TA003E
4.40	5.14	Stranded	0.00430	1TA004E
7.20	4.64	Stranded	0.00430	1TA007E
10.00	4.34	Stranded	0.00430	1TA010E
11.70	4.24	Stranded	0.00430	1TA011E
15.00	4.04	Stranded	0.00430	1TA015E
25.00	3.94	Stranded	0.00300	1TA025E
31.50	4.24	Stranded	0.00160	1TA031E
50.00	3.94	Stranded	0.00160	1TA050E
65.00	3.74	Stranded	0.00160	1TA065E
80.00	4.04	Stranded	0.00090	1TA080E
100.00	3.94	Stranded	0.00090	1TA110E
157.00	3.94	Stranded	0.00045	1TA115E
180.00	3.64	Stranded	0.00090	1TA118E
200.00	3.74	Stranded	0.00045	1TA120E
260.00	3.64	Stranded	0.00045	1TA126E
280.00	3.54	Stranded	0.00038	1TA128E
328.00	3.84	Stranded	0.00018	1TA132E
360.00	3.44	Stranded	0.00045	1TA138E
430.00	3.64	Stranded	0.00018	1TA143E
480.00	3.64	Stranded	0.00018	1TA148E
600.00	3.54	Stranded	0.00018	1TA160E
800.00	3.44	Stranded	0.00018	1TA180E
1000.00	3.54	Stranded	0.00004	1TA210E
1470.00	3.34	Stranded	0.00004	1TA214E
1750.00	3.34	Stranded	0.00004	1TA217E
1900.00	3.64	Stranded	0.00040	1TA219E
2900.00	3.44	Stranded	0.00040	1TA229E
4000.00	3.34	Stranded	0.00040	1TA240E
4700.00	3.24	Stranded	0.00015	1TA247E
6000.00	3.14	Stranded	0.00020	1TA260E
7000.00	3.14	Stranded	0.00015	1TA270E
8000.00	3.14	Stranded	0.00015	1TA280E

- High chemical resistance
- Can be used in all industrial areas
- Minimum impact resistance 4 Joules
- High working temperature
- Can be immersed in fluids

#### Applications:

The heating cable is suitable for highly corrosive environmental conditions for assembly on devices, receptacles, pipes, valves and similar. Except for the splices, it may be immersed in fluids. Heating cable ELKM-AG is also suitable for use in the hazardous area. The robust PTFE outer jacket also renders this heating cable resistant against aggressive chemicals.

#### Technical Data:

Insulation	.....PTFE
Earth braiding	.....Cu nickel-plated
Outer jacket	.....PTFE
Nominal voltage	.....500V
Max. loading	.....30W/m*
Operating temperature max	.....260°C when switched off
Min bending radius	.....5 x External-Ø
Min installation temperature	.....-50°C
Moisture protected	.....Yes
Impact resistance	.....4 Joule

#### Standards:

Manufactured acc. to	.....DIN VDE 0253
	.....EN 62395-1
Short term	.....NH5Y1Q5Y 220
VDE marks approval	.....40001594, 40024940
ATEX certificate	.....LCIE 01 ATEX 6048 X
Equipment category	.....Ex II 2G EEx e II T3, T4, T5

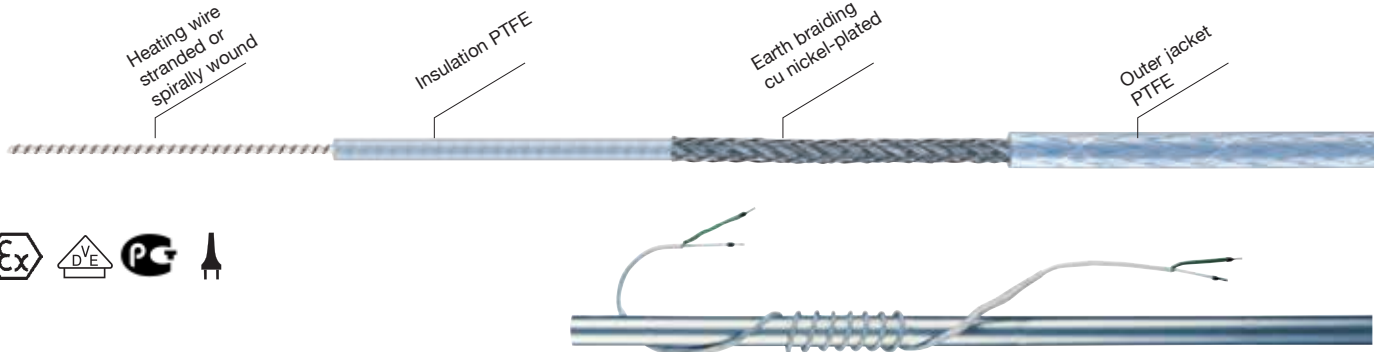
\*Information: The output per meter of heating cable and the maximum possible working temperatures depend on the respective application. We recommend that you contact our engineers on an individual basis - we will gladly assist you.

Further resistances up to 1,500,000 Ω/Km upon request.

#### IMPORTANT!

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**

# Heating Cable ELK-AG up to 260°C



- **Factory terminated**
- **High chemical resistance**
- **Can be used in all industrial areas**
- **Minimum impact resistance 4 Joules**
- **High working temperature**
- **Can be immersed in fluids**

**Applications:**

Factory terminated heating cable, suitable for assembly on devices, receptacles, pipes, valves and similar with a highly corrosive environment. Except for the connection sleeve, it may be immersed in fluids. Heating cable ELK-AG is also suitable for use in the hazardous area. The robust PTFE outer jacket also renders this heating cable resistant against aggressive chemicals.

**Technical Data:**

Insulation	.....PTFE
Earth braiding	.....Cu nickel-plated
Outer jacket	.....PTFE
Nominal voltage	..... 230V
Output	..... approx. 25W/m
Operating temperature max	.....260°C when switched off
Heating cable Ø	.....4.1-4.8mm
Min bending radius	.....5 x External-Ø
Moisture resistant	.....Yes
Cold lead length on both sides	..... 1.2m
Protection class	..... I
Impact resistance	..... 4 Joule

**Standards:**

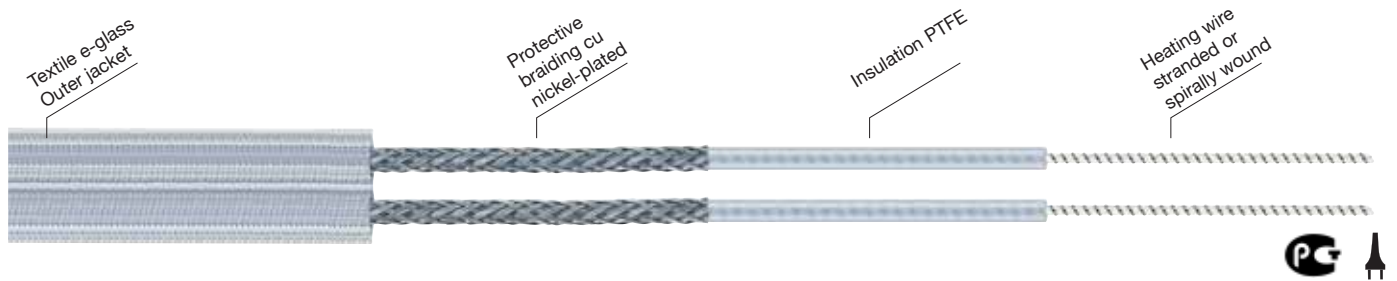
Manufactured acc. to	..... DIN VDE 0253
	..... EN 62395-1
El. code	.....NH5Y1Q5Y 220
VDE marks approval	..... 40001594, 40024940
ATEX certificate	..... LCIE 01 ATEX 6048 X
Equipment category	.....Ex II 2G EEx e II T3, T4, T5

**IMPORTANT!**

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**

Item	Heated length	Nominal output (W) max. Temp. 100°C	Part no.	Nominal output (W) max. Temp. 150°C	Part no.	Nominal output (W) max. Temp. 200°C	Part no.
ELK-AG 1.2	1.2	30	135011	-	-	-	-
ELK-AG 2.2	2.2	54	135021	-	-	-	-
ELK-AG 3.4	3.4	78	135031	52	135032	24	135033
ELK-AG 4.8	4.8	94	135041	69	135042	37	135043
ELK-AG 6.0	6.0	147	135061	88	135062	44	135063
ELK-AG 8.4	8.4	210	135081	126	135082	63	135083
ELK-AG 10.8	10.8	245	135101	163	135102	82	135103
ELK-AG 12.0	12.0	294	135121	176	135122	88	135123
ELK-AG 14.0	14.0	344	135141	-	-	-	-
ELK-AG 20	20.0	464	135201	294	135202	-	-
ELK-AG 25	25.0	623	135251	371	135252	192	135253
ELK-AG 30	30.0	705	135301	441	135302	220	135303
ELK-AG 35	35.0	864	135351	521	135352	-	-
ELK-AG 42.0	42.0	1.008	135421	611	135422	315	135423
ELK-AG 56.0	56.0	1.390	135561	756	135562	378	135563

Further resistances available upon request; all output information are nominal outputs at +20°C



- **Factory terminated**
- **Can be used instantly**
- **Single end connection**
- **Highly flexible**
- **Gentle to surfaces**
- **Low bending radius**
- **Easy to assemble**
- **Moisture resistant**

**Applications:**

The factory terminated heating tape ELW-GN is suitable for heating apparatus, devices and systems in a non-corrosive environment and its preferred use is for glass devices and systems with sensitive surfaces. This heating tape is also available upon request for hazardous area applications.

**Technical Data:**

Insulation	.....PTFE
Earth braiding	.....Cu nickel-plated
Overjacket	.....textiles E-Glas
Nominal voltage	..... 230V
Max. loading	..... approx. 50W/m*
Max. operating temperature.....	260°C when switched off
Dimensions (WxH)	.....approx. 25x6mm
Min. bending radius, flat	..... 10mm
Min. installation temperature.....	-50°C
Moisture protected	.....Yes
Connection cable length	..... 1.2m without plug
Protection class	..... I

**Standards:**

Manufactured acc. to .....DIN VDE 0721  
 Short term based on DIN VDE 0253 .....NH5YIQMF 220  
 VDE reg. no. .... 7615  
 Final inspection acc. to .....DIN VDE 0721 T411  
 2.5kV AC - 1min.

\*Information: The output per meter of heating cable and the maximum possible working temperatures depend on the respective application. We recommend that you contact our engineers on an individual basis - we will gladly assist you.

**IMPORTANT!**

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**

# Heating Cable

## ELW-GN up to 260°C



Item	Heated length (m)	Nominal output (W) max. Temperature 100°C	Part no.	Nominal output (W) max. Temperature 150°C	Part no.	Nominal output (W) max. Temperature 200°C	Part no.
ELW-GN 0.6	0.6	30	231001	-		-	
ELW-GN 1.1	1.1	54	231011	-		-	
ELW-GN 1.7	1.7	78	231701	52	231012	24	231013
ELW-GN 2.4	2.4	94	231021	69	231022	37	231023
ELW-GN 3.0	3.0	147	231031	88	231032	44	231033
ELW-GN 4.2	4.2	210	231041	126	231042	63	231043
ELW-GN 5.4	5.4	245	231051	163	231052	82	231053
ELW-GN 6.0	6.0	294	231061	176	231062	88	231063
ELW-GN 7.0	7.0	344	231071	-		-	
ELW-GN 10.0	10.0	464	231101	294	231102	-	
ELW-GN 12.5	12.5	623	231121	371	231122	192	231123
ELW-GN 15.0	15.0	705	231151	441	231152	220	231153
ELW-GN 17.5	17.5	864	231171	521	231172	-	
ELW-GN 21.0	21.0	1.008	231211	611	231212	315	231213
ELW-GN 28.0	28.0	1.390	231281	756	231282	378	231283

Further resistances available upon request; all output information are nominal outputs at +20°C

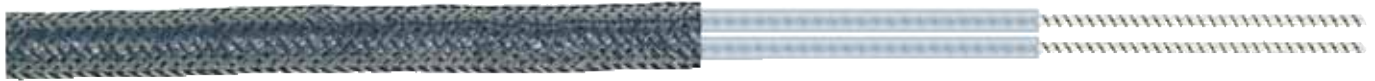


## Heating Cable Type ELW-VA up to 260°C

Protection  
braiding SS  
AISI 304

Insulation PTFE

Heating wire  
stranded or  
spirally wound



- **Factory terminated**
- **Can be used instantly**
- **Single end connection**
- **Highly flexible**
- **Low bending radius**
- **Low dimension**
- **Robust**
- **Easy to assemble**
- **Moisture resistant**

### Applications:

The factory terminated heating tape ELW-VA is suitable for heating apparatus, devices and systems in a corrosive environment. The minimal dimensions of the heating tape enable close tracing. The heating tape is not sensitive to rough surfaces. This heating tape is also available upon request for hazardous area applications.

### Technical Data:

Insulation	.....PTFE
Protective braiding	.....SS AISI 304
Max. loading	..... approx. 50W/m*
Max. operating temperature.....	260°C when switched off
Dimensions (WxH)	..... approx. 10x5mm
Dimensions sleeve (WxHxL).....	32x16x65mm
Min. bending radius, flat	..... 15mm
Min. installation temperature.....	-30°C
Moisture protected	.....Yes
Connection cable length	..... 1.2m silicone cable without plug
Protection class	..... I

### Standards:

Manufactured acc. to .....DIN VDE 0721  
 Short term based on DIN VDE 0253 ..... NH5Y1Q 220  
 Test procedure acc. to .....DIN VDE 0721 T411  
 2.5kV AC - 1min.  
 ATEX certificate .....LCIE01ATEX 6048X  
 Equipment category .....Ex II 2G EEx e II T3, T4, T5

\*Information: The output per meter of heating cable and the maximum possible working temperatures depend on the respective application. We recommend that you contact our engineers on an individual basis - we will gladly assist you.

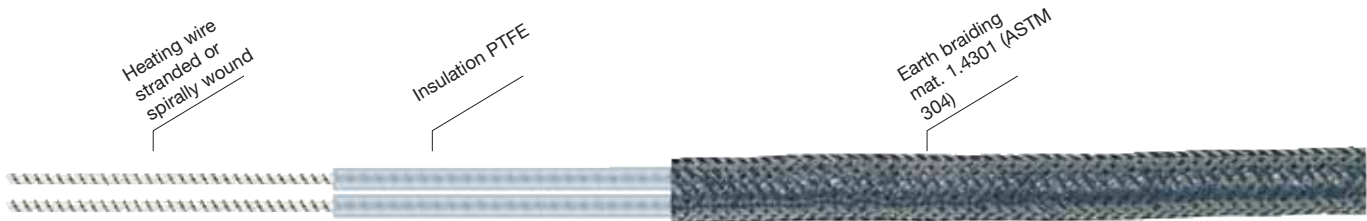
### IMPORTANT!

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**





# Heating Cable ELW-VA up to 260°C



Item	Heated length	Nominal output (W) max. Temperature 100°C	Part no.	Nominal output (W) max. Temperature 150°C	Part no.	Nominal output (W) max. Temperature 200°C	Part no.
ELW-VA 0.6	0.6	30	232001	-		-	
ELW-VA 1.1	1.1	54	232011	-		-	
ELW-VA 1.7	1.7	78	232701	52	232012	24	232013
ELW-VA 2.4	2.4	94	232021	69	232022	37	232023
ELW-VA 3.0	3.0	147	232031	88	232032	44	232033
ELW-VA 4.2	4.2	210	232041	126	232042	63	232043
ELW-VA 5.4	5.4	245	232051	163	232052	82	232053
ELW-VA 6.0	6.0	294	232061	176	232062	88	232063
ELW-VA 7.0	7.0	344	232071	-		-	
ELW-VA 10.0	10.0	464	232101	294	232102	-	
ELW-VA 12.5	12.5	623	232121	371	232122	192	232123
ELW-VA 15.0	15.0	705	232151	441	232152	220	232153
ELW-VA 17.5	17.5	864	232171	521	232172	-	
ELW-VA 21.0	21.0	1008	232211	611	232212	315	232213
ELW-VA 28.0	28.0	1390	232281	756	232282	378	232283

Further resistances available upon request; all output information are nominal outputs at +20°C

Overjacket  
mat. 1.4541 (ASTM 321)

Insulation  
Magnesium Oxide

Heating wire



**Type KMV 8      100W/m      230V**

Length L1 (m)	Diameter mm	Wattage W	Part no.
1.3	3.2	135*	4520050
1.9	3.2	190**	4520051
3.5	3.2	345***	4520052
5.5	3.2	550***	4520053
7.2	3.2	720	4520054
9.1	3.2	910	4520055
11.5	3.2	1150	4520056
14.5	3.6	1450	4520057
18	3.8	1800	4520058
23	4.1	2300	4520059
36	5.0	3600	4520060
46	5.6	4600	4520061
57.5	6.5	5750	4520062

\*=40Volt    \*\*=60Volt    \*\*\*=110Volt

Cross section of connection (mm <sup>2</sup> )	OD (mm)
2.5	5.3
6	6.4

**Type KMV 8      200W/m      230V**

Length L1 (m)	Diameter mm	Wattage W	Part no.
1.0	3.2	180*	4520070
1.2	3.2	240*	4520071
1.3	3.2	270*	4520072
1.7	3.2	340**	4520073
2.1	3.2	420**	4520074
2.5	3.2	480***	4520075
3.1	3.2	620***	4520076
3.9	3.2	780***	4520077
4.9	3.6	980***	4520078
5.1	3.2	1020	4520079
6.5	3.2	1300	4520080
7.7	3.2	1540	4520081
10.3	3.6	2060	4520082
12.7	3.8	2540	4520083
15.5	4.1	3100	4520084
20.3	4.5	4060	4520085
25.5	5.0	5100	4520086
32.5	5.6	6500	4520087
40.0	6.5	8000	4520088

\*=42Volt    \*\*=60Volt    \*\*\*=110Volt      Not stocked

- Sealed metal overjacket
- Very durable
- Moisture-proof
- High chemical resistance
- Highest operating temperature
- Higher loading

**Applications:**

For use on appliances, containers, pipes, valves, and many others, in corrosive atmosphere. This cable can be used in liquids.

**Technical Data:**

Insulation .....Magnesium oxide  
 Overjacket ..... 1.4541 (ASTM 321)  
 Nominal temperature ..... 800°C  
 Nominal voltage ..... 500V  
 Max. loading .....~200W/m  
 Min. bending radius ..... 5 x dia.  
 Min. installation temperature..... none  
 Moisture protected .....yes  
 Cable gland ..... M20 x 1.5  
 Cold ends on both sides..... 0.5m

**Caution:**

Do not bend to the minimum bending radius more than once. This may damage the metallic overjacket. This type of heating cable is also available with an overjacket of Inconel 600 (mat. no. 2.4816).

EX-ATEX version upon request.

**IMPORTANT!**

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**

# Heating Cable Type KM CN up to 400°C



- Terminated
- Sealed metal overjacket
- Very durable
- Moisture-proof
- High chemical resistance
- High loading

**Applications:**

For use on appliances, containers, pipes, valves, and many others. Suitable for applications where a high loading and a high temperature are required. This terminated, very durable cable can be used in liquids, and has a high chemical resistance. Further it has a sealed metal overjacket, and it is moisture-proof.

**Caution:**

Do not bend to the minimum bending radius more than once. This may damage the metallic overjacket.

**Technical Data:**

Insulation .....	Magnesium oxide
Overjacket .....	copper nickel alloy
Nominal temperature .....	400°C
Nominal voltage .....	500V
Min. bending radius .....	5 x dia.
Min. installation temperature.....	none
Moisture protected .....	yes
Cable gland .....	M20 x 1.5
Cold ends on both sides.....	0.5m

**IMPORTANT!**

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**

**Type KM CN      Approx. 50W/m      230V**

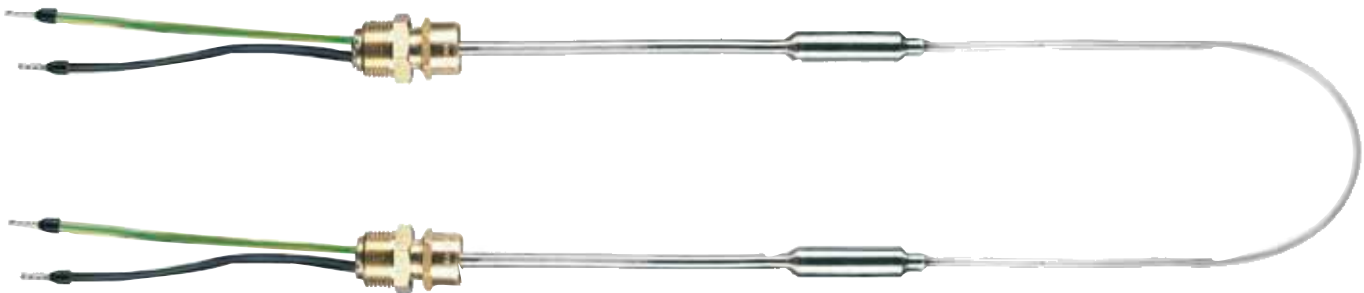
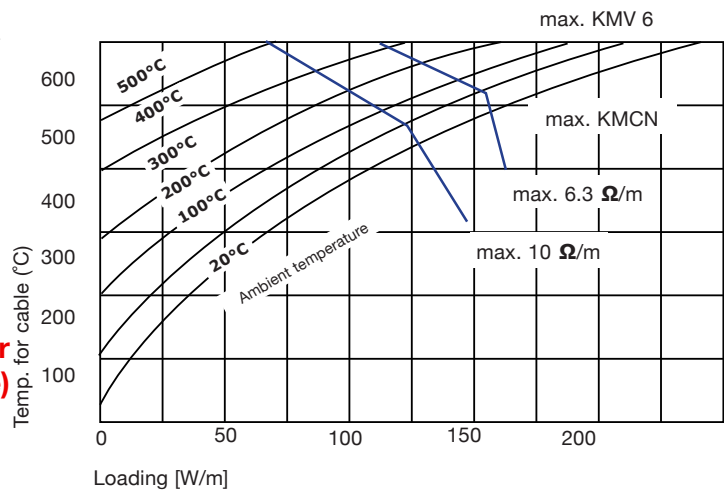
Length L1 (m)	Diameter mm	Wattage W	Part no.
25.7	3.2	1285	4590501
32	3.4	1600	4590502
41	3.7	2050	4590503
51	4.0	2550	4590504
65	4.4	3250	4590505
81	4.9	4050	4590506

**Engineering:**

Generally, the maximum operating temperature (pipe or surface temperature) is known. This is the ambient temperature of the heating system. The curve "Ambient temperature" shows a relation between the temperature of the heating cable (vertical) and the loading (horizontal).

The loading shown in the diagram must be multiplied by the factor (see above) as the diameter and the material of the heating cable must be taken into account.

Please contact our project engineers.



## Heating Tape Type KMIN MIL-HC-INC up to 900°C



### Type KMIN:

A tailored, mineral insulated heating cable with Inconel 2.4816 metal jacket, equipped with 0.5 cold ends and M20 cable gland at each end. Water tight version. High load heating cable for transferring bigger heating power.

Radiant heating for vacuum technique, immersion heaters, heating of vessels, flow heaters, process heating, heating of moulds and plates, etc.

Max. surface temperature: 900°C.

### Technical Data

Insulation	.....Magnesium oxide
Overjacket	..... 2.4816 Inconel 600
Nominal temperature	..... 900°C
Nominal voltage	..... 230V
Dimensions	.....Ø3,2 - 6,5mm
Min. bending radius	..... 5 x dia.
Min. installation temperature	..... none
Moisture protected	.....yes
Protection	.....IP67 (water tight)
Cable gland	..... M20 x 1.5
Cold ends on both sides	.....2x0.5m in Inconel 2.4816

### Caution:

Do not bend to the minimum bending radius more than once. This may damage the metallic overjacket.

This type of heating cable is also available with an overjacket of Inconel 600 (mat. no. 2.4816).

EX-ATEX version upon request.

### IMPORTANT!

**This cable can be produced and delivered for hazardous areas (Ex-area, with ATEX certificate) - please state when ordering.**

### Type KMIN 100W/m 230V

Length L1 (m)	Diameter mm	Wattage W	Part no.
7.2	3.2	720	4591005
9.1	3.2	910	4591006
11.5	3.2	1150	4591007
14.5	3.6	1450	4591008
18	3.8	1800	4591009
23	4.1	2300	4591010
29	4.5	2900	4591014
36	5.0	3600	4591011
46	5.6	4600	4591012
57.5	6.5	5750	4591013

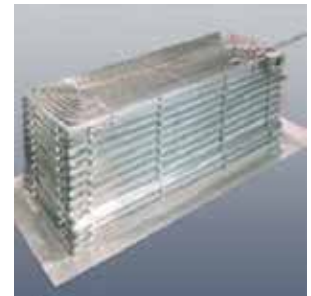
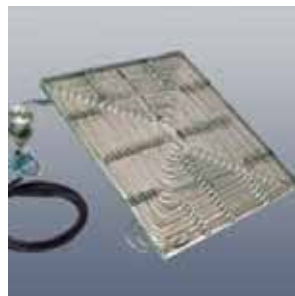
### Type KMIN 200W/m 230V

Length L1 (m)	Diameter mm	Wattage W	Part no.
5.1	3.2	1035	4592010
6.5	3.2	1300	4592011
7.7	3.2	1720	4592012
10.3	3.6	2060	4592013
12.7	3.8	2600	4592014
15.5	4.1	3400	4592015
20.3	4.5	4135	4592016
25.5	5.0	5185	4592017

### Type KMIN 250W/m 230V

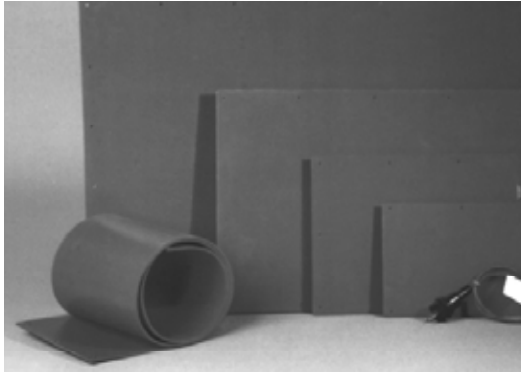
Length L1 (m)	Diameter mm	Wattage W	Part no.
4.6	3.2	1150	4593001
7.3	3.2	1812	4593002
9.2	3.6	2300	4593003
11.5	3.8	2875	4593004
14.0	4.1	3780	4593005
18.2	4.5	4610	4593006
23.0	5.0	5750	4593007

Other length and wattage are available upon request.



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CVR No.: 42 16 59 13



**IP-DASi** and **IP-SIMA** heating mats are water proof and consist of glass tissue insulated heating cable casted into silicone rubber, thickness 3.5 mm. For non-hazardous areas.

Especially suitable for surface heating because of high flexibility.

IP-DASi is delivered in sizes A1-A4.

IP-SIMA is delivered on request in sizes according to customer's requirements.

Thermostat control is recommended.

Delivered with 1 m rubber cable.

**IP-DASi and IP-SIMA can be delivered as heating panels for hazardous areas on request!**



**IP-Q** quartz cloth heating panel is a flexible customized panel for non-hazardous areas about 20KW/m<sup>2</sup>. Max. temperature: 900°C.

Available on request in sizes according to customer's requirements.

**This product can be delivered as heating panels for hazardous areas on request!**



**IP-GL / FIP-GL** glass cloth heating panel is a flexible customized panel for non-hazardous areas about 7KW/m<sup>2</sup>. Max. temperature: 450°C.

Available on request in sizes according to customer's requirements.

**This product can be delivered as heating panels for hazardous areas on request!**



**IP-M** metal heating panel is a flexible customized panel for non-hazardous areas. Different heaters possible. Different surface materials. Max. 36kW/m<sup>2</sup>. Max. surface temperature: <1000°C.

**FIP-M-SRB** - Foot Warming Plate

Delivered in size 500x600mm.

240W - 230V.

**This product can be delivered as heating panels for hazardous areas on request!**



### HEATING MAT IP-DASi

230 V

Type	Size mm	Power W	Max. media temperature	Part no.
IP-DASi	297 x 210	220	<200°C	2770630
IP-DASi	420 x 297	440	<200°C	2771130
IP-DASi	594 x 420	980	<200°C	2771270
IP-DASi	841 x 594	1960	<200°C	2771500

## Quartz Cloth Heating Mats

## Glass Cloth Heating Mats

## Metal Heating Mats

## Heated Hoses at a glance



### Construction and function

Heated hoses are the ideal solution for flexible transportation of liquid or gas substances without heat loss.

The necessary temperature, power, application, and outer protection material determine the choice of the heated hose technique.

Gas substances are channeled from the measurement point to the analysis instrument in the analysis technique, i.e. in trash burning ovens, refineries, chemical industry, motor exhaust analysis, etc. For these applications the gases are to be freeze protected, protected against condensation, or guarantee for constant temperatures up to 250°C.



All our heated hose types can be used in hazardous areas under certain considerations.

Under certain circumstances, terms and approvals heated hoses can be used in hazardous areas. As an **ATEX** certified company (IBExU 03 ATEX 004Q) we fulfill the high level security standard of the Ex-guiding rules 94/4/EG (ATEX 100a). With our **ATEX** approved heating components like heating cable, heating tapes, connection kits, temperature sensors and controllers we supply heated hoses for applications in hazardous areas. Caused by complexity of possible Ex-area applications please contact our engineering department.

### Application in general

- Frost protection for different media
- Prevention of condensation
- Maintenance of liquids or gases at operational temperature
- Transportation of gas samples from the measurement point to an analyzer
- Medium transportation of high viscosity materials in a fluid state
- Medium transportation where certain temperatures are essential for the fabrication characteristic
- Medium carrier must be transportable or moveable due to a mobile supply station

### Application examples

- Analysis Measurement
- Hot Melt Machines
- Polyurethane foaming equipment
- Wax processing equipment
- Bitumen processing equipment
- Heavy oil processing equipment
- Food processing equipment
- Filling Machines

# SAN<sup>®</sup>

Electro Heat

## Finned Extruded Enclosure Heater Type SAN-FXE

The FXE range of heaters is designed specifically for frost protection, anti-condensation and temperature control within Zone 1 and Zone 2 Hazardous Areas. The FXE delivers a constant power output and comes complete with mounting bracket and a 1.5 metre flying lead.

### Features

- Certified to meet the requirements of the ATEX Directive 94/9/EC, Gost and IECEx.
- Compact design, requires minimal space.
- Optional over-temperature protection.
- Black anodized convective surface.
- Standard product available with short delivery times.
- Suitable for ambient temperatures -50°C up to +80°C.



### Typical Applications:

Control / monitoring panels  
Instrumentation cabinets  
Condensation prevention  
Temperature fluctuations  
Frost protection  
Motor enclosures

### Certification

IECEx & ATEX certified Ex II 2 G/D, Ex d IIC (Gas) T3-T4 Gb, Ex t IIIC (Dust) T200-T135°C Db, EN/IEC60079-0 & EN/IEC60079-1 & EN/IEC 60079-31

### Extrusion

Finned Aluminium, Anodized Matt Black

### Mounting:

Vertically Mounted by Bracket or Rail

### Voltage:

Up to 254VAC

### Rating:

Available in 30, 50, 75 & 100 Watts

### Controls

If required, heaters can be supplied with a range of remote mounted thermostats.

### Element:

18mm dia 321 St/Steel cartridge element with 1.5m silicone flex cable.

### Weather protection:

IP6X

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CVR No.: 42 16 59 13



# Heater - CREx 020 Series

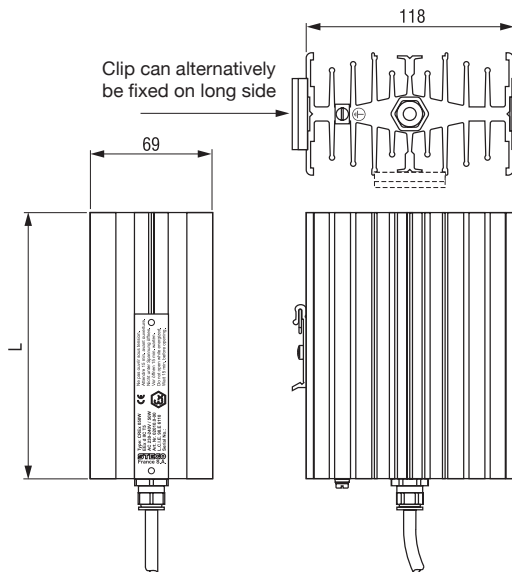
- Large convection surface
- Clip fixing
- Ready for use
- Maintenance free

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



## Technical Data:

Explosion protection acc. to EN	LCIE (Laboratoire Central des Industries Electriques)
Conformity certificate	01 ATEX 6073/03, LCIE N° 06 ATEX Q8011, IECEx LCI 07, 0020
Heating element	High performance cartridge
Heater body	Aluminium profile, black anodised
Connection	Si HF-JZ 3 x 0.75mm <sup>2</sup> cable, length 1m
Connection PE	4mm <sup>2</sup>
Mounting	Clip for 35mm DIN rail, EN 60715
Fitting position	Vertical
Operating/storage temperature	-20 to +40°C / -45 to 70°C
Protection type /Protection class	IP65 / I (earthed)



Hazardous area Thermostat REx 011  
see page 40

Art. No.	Operating voltage	Heating capacity*	Ex protection type	Surface temperature	Length (L)	Weight (approx.)
83197	230-240VAC	50W	d IIC T5 - Ex tD A21 IP6X T100°C	100°C	150mm	1.3kg
83198	230-240VAC	100W	d IIC T4 - Ex tD A21 IP6X T135°C	135°C	180mm	1.5kg
	110-120VAC	50W	d IIC T5 - Ex tD A21 IP6X T100°C	100°C	150mm	1.3kg
	110-120VAC	100W	d IIC T4 - Ex tD A21 IP6X T135°C	135°C	180mm	1.5kg

Direct-heaters for Hazardous locations, designed for direct mounting onto e.g. manifolds etc.

- Freeze protection
- Anti-condensation
- Temperature maintenance



### Features and Advantages

- Certified to meet the requirements of the ATEX Directive 94/9/EC, Gost and IECEx.
- Self-limiting heating elements
- Small dimensions
- No moving parts, no maintenance required therefore long lifetime
- Suitable for T4 and T3 classifications
- Can be used for 110 / 240 VAC/DC

### Description

All Cameo Heaters are designed around self-limiting heating elements. These self-limiting semi-conductor elements are saving power consumption. Our Cameo Direct-heaters are designed to heat the installed equipment. If properly selected for freeze protection, no thermostat will be needed.

Optional body #5 :        4 holes diam. 5,2 mm. available in  
                                 Aluminium and SS range  
                                 For easy mounting, at no extra charge

Alternative 316 Stainless Steel heaters can be delivered for the 100-10 Watt range.  
Also possible is an aluminium body with four holes drilled through (body #5), for easy mounting.  
Please see below for further technical data.

### Range

LP-1A	T3	ca. 115 °C Surface temperature	100-10 Watt
LP-2A	T4	ca. 105 °C Surface temperature	100-10 Watt
LP-3A	T4	ca. 90 °C Surface temperature	100-10 Watt
LP-4A	T4	ca. 70 °C Surface temperature	100-10 Watt

### High Power model:

LP-0AHP	T3	ca. 130 °C Surface temperature	200-20 Watt
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\* these temperatures are measured at 20 °C ambient temperature.

## Electrical Space Heater

# SAN-LP AF Ex Heater

Space-heaters for Hazardous locations, designed for :

- Freeze protection
- Anti-condensation
- Temperature maintenance



### Technical Data:

Power consumption	100-10 Watt
Electrical cable	3x1 sqmm
Material cable	braided silicone, optional: non-braided cable
Standard length	approx. 1 mtr. Other lengths optional
Other lengths	To be specified
Overall dimensions	164x100x60mm (LxWxH)
Material	black anodized aluminium
EX protection class	II 2G Ex d IIC T4 or T3; II 2D Ex tD A21 IP66 T 135°C or T200°C
Certification	KEMA 01ATEX2124X and IECEx DEK 11.0017
Protection degree	IP66
Voltage	110/240
Ambient temp. range	-60°C...+90°C

### Features and Advantages

- Self-limiting heating elements
- Small dimensions
- No moving parts, no maintenance required therefore long lifetime
- Suitable for T4 and T3 classifications
- Can be used for 110 / 240 VAC/DC

### Range

LP-1AF	T3	ca. 115 °C Surface temperature	100-10 Watt
LP-2AF	T4	ca. 105 °C Surface temperature	100-10 Watt
LP-3AF	T4	ca. 90 °C Surface temperature	100-10 Watt
LP-4AF	T4	ca. 70 °C Surface temperature	100-10 Watt

\* these temperatures are measured at 20 °C ambient temperature.

### Description

All Cameo Heaters are designed around self-limiting heating elements. These semi-conductor elements are saving power consumption. Our Cameo Space-heaters heat the air inside an enclosure and indirectly the installed equipment. If properly selected for freeze protection, no thermostat will be needed.

In other situations, if the equipment, e.g. analyzers, it is normal practice to use our Space-Heaters in combination with our Fix-Therm96 thermostats (range from 10°C up to 135°C)

Do not cover the fins to guarantee free convection.

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CVR No.: 42 16 59 13

Space-heaters for Hazardous locations, this compact model is designed for

- Anticondensation
- Freeze protection
- Temperature maintenance
- Small spaces



### Features and Advantages

- Certified to meet the requirements of the ATEX Directive 94/9/EC, Gost and IECEx.
- Self-limiting heating elements
- Small dimensions
- No moving parts, no maintenance required therefore long lifetime
- Suitable for T4 and T3 classifications
- Can be used for 110 / 240 VAC/DC

### Description

All SMART Space-heaters are designed around self-limiting heating elements. These semi-conductor elements are saving power consumption.

Our SMART Space-heaters are designed to heat the air inside an enclosure and indirectly the installed equipment. If properly selected for freeze protection, no thermostat will be needed.

In other situations, if the equipment may not exceed a maximum temperature value, you can add our Fix-Therm96 thermostat as a maximum temperature protection, in the system.

When required in other applications, e.g. analyzers, it is normal practice to use our SMART Space-heaters in combination with our FixTherm96 thermostats (range from 10°C up to 135°C).

Do not cover the fins to guarantee free convection..

### Range

SMLP-1A	T3	ca. 115°C Surface temperature	100-10 Watt
SMLP-2A	T4	ca. 105°C Surface temperature	100-10 Watt
SMLP-3A	T4	ca. 90°C Surface temperature	100-10 Watt
SMLP-4A	T4	ca. 70°C Surface temperature	100-10 Watt

### High power model:

SMLP-0AHP	T3	ca. 130°C Surface temperature	200-20 Watt
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\* these temperatures are measured at 20 °C ambient temperature.

# Explosion proof Anti Condensation Heater - SP

Space-heaters for Hazardous locations are designed for

- Freeze protection
- Anti-condensation
- Temperature maintenance

Features and Advantages

- Self-limiting heating elements
- Small dimensions
- No moving parts, no maintenance required therefore long lifetime
- Suitable for T4 and T3 classifications
- Can be used for 110 / 240 VAC/DC



## Technical Data:

Power consumption	250-25Watt or 500-50Watt
Electrical cable	3x1 sqmm
Material cable	Braided silicone (standard) n on-braided optional
Standard length	approx. 1 mtr. Other lengths optional, on request
Other lengths	To be specified
Overall dimensions	165x164x56mm (LxWxH)
Weight	Approx. 1600g
Material	black anodized aluminium or nickel plated
EX protection class	II 2G Ex d IIC T4 or T3 II 2D Ex tD A21 IP66 T135°C or T200°C
Certification	KEMA 01ATEX2124X and IECEx DEK 11.0017
Protection degree	IP66
Voltage	110/240 VAC/DC
Ambient temp. range	-60°C...+90°C

## Description

All SP Heaters are designed around self-limiting heating elements. These semi-conductor elements are saving power consumption.

Our SP Space-Heaters are designed to heat the air inside an enclosure and indirectly the installed equipment.

If properly selected for freeze protection, no thermostat will be needed.

In other situations, if the equipment may not exceed a maximum temperature value, our FixTherm96 can be added to the system.

Do not cover the fins to guarantee free convection.

Part No.	Temp. class	Surface temp.	Wattage
SP-1A	T3	Approx 115°C	250-25
SP-2A	T4	Approx 105°C	250-25
SP-3A	T4	Approx. 90°C	250-25
SP-4A	T4	Approx. 70°C	250-25
<b>High power model</b>			
SP-0AHP	T3	Approx. 130°C	500-50

\*these temperatures are measured at 20°C ambient temperature.

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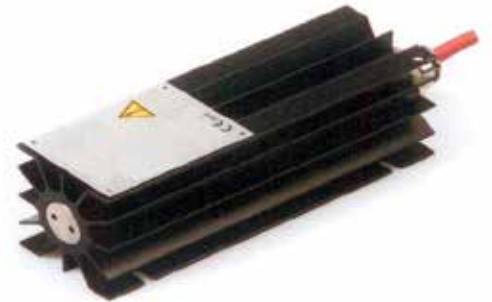
CVR No.: 42 16 59 13

Space-heaters for Hazardous locations, designed for

- Freeze protection
- Anti-condensation
- Temperature maintenance
- Small spaces

Features and Advantages

- Self-limiting heating elements
- Small dimensions
- No moving parts, no maintenance required therefore long lifetime
- Suitable for T4 and T3 classification
- Can be used for 110 to 240 VAC/DC



### Technical Data:

Power consumption	250-25Watt or 500-50Watt
Electrical cable	3x1 sqmm
Material cable	Braided silicone (standard) Non-braided optional
Standard length	approx. 1 mtr. Other lengths optional, on request
Other lengths	To be specified
Overall dimensions	164x54x54mm (LxWxH)
Weight	Approx. 400g
Material	black anodized aluminium
EX protection class	II 2G Ex d IIC T4 or T3: II 2D Ex tD A21 IP66 T 135°C or T200°C
Certification	KEMA 01ATEX2124X and IECEx DEK 11.0017
Voltage AC/DC	110/240 VAC/DC
Protection degree	IP66
Ambient temp. range	-60°C...+90°C

### Description

All Smart Space-Heaters are designed around self-limiting heating elements. These semi-conductor elements are saving power consumption.

Our Smart Space-Heaters are designed to heat the air inside an enclosure and indirectly the installed equipment. If properly selected for freeze protection, no thermostat will be needed.

In other situations, if the equipment may not exceed a maximum temperature value, our Fix-Therm96 thermostat can be added as a maximum temperature protection, in the system.

When required in other applications, e.g. analyzers, it is normal practice to use our Smart Space-Heaters in combinations with our FixTherm96 (range from 10°C up to 135°C).

Part No.	Surface temp.	Wattage
Smart SM-1A	Approx 115°C	250-25
Smart SM-2A	Approx 105°C	250-25
Smart SM-3A	Approx. 90°C	250-25
Smart SM-4A	Approx. 70°C	250-25
High power model		
Smart SM-0AHP	Approx. 130°C	500-50

\*these temperatures are measured at 20°C ambient temperature.

## Electrical Direct Ex Heater Type CS-\*A

Space-heaters for Hazardous locations, designed for direct mounting onto e.g. manifolds etc.

- Freeze protection
- Anti-condensation
- Temperature maintenance

### Features and Advantages

- Self-limiting heating elements
- Small dimensions
- No moving parts, no maintenance required therefore long lifetime
- Suitable for T4 and T3 classification
- Can be used for 110 to 240 VAC/DC



### Technical Data:

Power consumption	250-25Watt
Electrical cable	3x1 sqmm
Material cable	Braided silicone; optional: Non-braided optional
Standard length	approx. 1 mtr. Other lengths optional
Other lengths	To be specified
Overall dimensions	85x65x28mm (LxWxH)
Weight	Approx. 900g
Material	stainless steel 316
EX protection class	II 2G Ex d IIC T4 or T3; II 2D Ex tD A21 IP66 T 135°C or T200°C
Certification	KEMA 01ATEX2124X and IECEx DEK 11.0017
Voltage AC/DC	110/240 VAC/DC
Protection degree	IP66
Ambient temp. range	-60°C...+90°C

### Description

All Cameo Heaters are designed around self-limiting heating elements. These semi-conductor elements are saving power consumption.

Our Cameo Direct Heaters are designed to heat the installed equipment. If properly selected for freeze protection, no thermostat will be needed.

Part No.	Classification	Surface temp.	Wattage
CS-1S	T3	Approx 115°C	250-25
CS-2S	T4	Approx 105°C	250-25
CS-3S	T4	Approx. 90°C	250-25
CS-4S	T4	Approx. 70°C	250-25

\*these temperatures are measured at 20°C ambient temperature.

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CVR No.: 42 16 59 13

Direct heaters for Hazardous locations, designed for

- Freeze protection
- Anti-condensation
- Temperature maintenance

Features and Advantages

- Self-limiting heating elements
- Small dimensions
- No moving parts, no maintenance required therefore long lifetime
- Suitable for T4 and T3 classification
- Can be used for 110 to 240 VAC/DC



### Technical Data:

Power consumption	250-25Watt
Electrical cable	3x1 sqmm
Material cable	Braided silicone; optional: Non-braided optional
Standard length	approx. 1 mtr. Other lengths optional
Other lengths	To be specified
Overall dimensions	88x70x35mm (LxWxH)
Weight	Approx. 550g
Material	black anodized aluminium
EX protection class	II 2G Ex d IIC T4 or T3; II 2D Ex tD A21 IP66 T 135°C or T200°C
Certification	KEMA 01ATEX2124X and IECEx DEK 11.0017
Voltage AC/DC	110/240 VAC/DC
Protection degree	IP66
Ambient temp. range	-60°C...+90°C

### Description

All Cameo Heaters are designed around self-limiting heating elements. These semi-conductor elements are saving power consumption.

Our Cameo Direct Heaters are designed to heat the installed equipment. If properly selected for freeze protection, no thermostat will be needed.

Part No.	Classification	Surface temp.	Wattage
CT-1A	T3	Approx 115°C	250-25
CT-2A	T4	Approx 105°C	250-25
CT-3A	T4	Approx. 90°C	250-25
CT-4A	T4	Approx. 70°C	250-25

\*these temperatures are measured at 20°C ambient temperature.



## Anti Condensation & Space Heater Type SAN-HEF Hazardous Area

The self-regulating properties of the HEF enclosure heaters eliminate the requirement for a thermostat. Coupled with the compact design, this makes the HEF ideal for anti condensation, frost protection and temperature control where the enclosure is located within Zone 1 and Zone 2 Hazardous Areas.

Certified to ATEX Directive 94/9/EC IECEx, they are suitable for use where the flammable atmosphere is Group IIA, IIB or IIC Gas.



### Features

- Certified to meet the requirements of the ATEX Directive 94/9/EC, Gost and IECEx.
- Compact, low profile, stainless steel case, requires minimal space.
- Self-regulating - can be used without a thermostat.
- Suitable for ambient temperatures from -60° to +80°C.
- Mounting of the heater can be in any orientation.
- Design allows installation close to internal components and cables without fear of damage by overheating.

### Typical Applications:

Control / monitoring panels  
Instrumentation cabinets  
Condensation prevention  
Temperature fluctuations  
Frost protection

### Certification

ATEX certified Ex II 2 G  
IECEx & ATEX certified Ex'e' T4  
EN/IEC60079-0 & EN/IEC60079-7

### Casing

Perforated stainless steel

### Element

Self-regulating

### Controls

The HEF is self-regulating, automatically reducing its output as the ambient temperature rises if overall enclosure temperature control is required it is recommended that the HEF heater is used in conjunction with one of the Ex'd' thermostats.

### Mounting

The heater may be mounted in any orientation, using appropriate securing bolts through the mounting feet.

### Rating

The HEF range is available in a nominal 30, 50, 100, 200 & 500 Watt outputs, models available for 110V or 230-240V single phase supplies.

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CVR No.: 42 16 59 13

**SAN-EX-FWD  
Air Warmers**



**Construction**

The RFT of ari warmers is designed for use in small work or storage areas which are located in Zone 1 and 2 or Zone 21 and 22 Hazardous Areas where the flammable atmosphere is a IIA, IIB or IIC Gas Group.

**Features**

- Certified to meet the ATEX Directive 94/9/EC and IECEx
- Fabricated steel enclosure weatherproof to IP66
- Suitable for 110V or 230/254V supplies
- Temperature classes T2, T3 and T4 available
- Suitable for floor or wall mounting
- 2 x 20mm (plugged) cable entries provided as standard
- Corrosion resistant powder coated finish
- Suitable for ambient temperatures from -60°C to +60°C (subject to conditions to be discussed with sales engineer)
- Individually replaceable heating elements

**Typical Applications**

- Aircraft hanger service bays
- Fuel servicing areas
- Chemical plants
- Offshore installations
- Battery stores
- Gas installations
- Containers
- Crane cabs
- Paint/solvent stores

**Rating**

500W to 2kW

**Certification**

ATEX certified II 2 G/D  
IECEX & ATEX certified Ex'd' IIC T2 to T4  
Ex tD A21 IP66 T300°C to T135°C  
EN/IEC60079-0, EN/IEC60079-1, EN/  
IEC61241-0 & EN/IEC61241-1

**Enclosure**

Mild steel powder coated orange/grey, stainless steel option available to special order

**Controls**

If required the heaters can be controlled from the SAN range of remote mounted thermostats available for use in Safe or Hazardous Areas

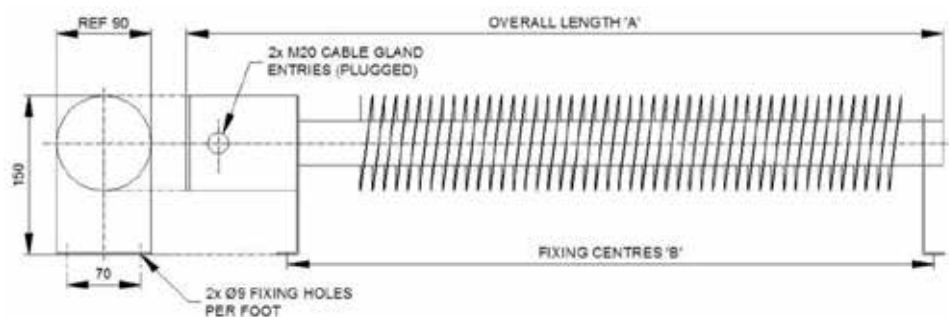
**Mounting**

Pre-drilled support feet supplied as standard

**Voltage**

1 phase 230/254V or 110V

# SAN-EX-FWD Air Warmers



Model	"T" Class	Rating Watts	Dimensions		Weight (kg)
			A	B	
FWD-500-T3	T3	500	800	670	9
FWD-1000-T3	T3	1000	1300	1170	12
FWD-1500-T3	T3	1500	1900	1770	17
FWD-2000-T3	T3	2000	2450	2320	20
FWD-500-T4	T4	500	1300	1170	12
FWD-750-T4	T4	750	1900	1770	17
FWD-1000-T4	T4	1000	2450	2320	20

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## SAN-EX-AAW Hazardous Area Air Warmers



### Construction

The AAW range of Air Warmers has been designed for heating small work or storage areas and similar applications, located in Zone 1 or 2 Hazardous Areas, where the flammable atmosphere is a group IIA, IIB or IIC Gas.

### Features

- Certified to meet the ATEX directive 94/9/EC IECEx
- Lightweight enclosure certified Weatherproof to IP66
- Suitable for single or three phase (3 or 4 wire) a.c. and d.c. power supplies.
- Temperature classifications T2, T3 and T4 available.
- Suitable for floor or wall mounting (additional brackets may be required).
- A 20mm cable entry is provided as standard, additional entries can be provided as required.
- Coated Mild Steel or Stainless Steel.
- Optional range of flameproof room thermostats can also be provided.
- Suitable for ambient temperatures from -60°C to +60°C.
- Individually replaceable heating elements.

### Typical Applications

- Aircraft Hangers
- Fuel servicing areas
- Chemical Plants
- Offshore installations
- Battery stores
- Gas installations

### Certification

ATEX certified IECEx II 2 G Ex'e' II T2 to T4 EN60079-0 & EN60079-7.

### Enclosure

Lightweight Stainless Steel or Coated Mild Steel.

### Controls

If required the heaters can be controlled from the SAN range of remote mounted thermostats available for use in safe or Hazardous Areas. (See separate data sheet).

### Mounting

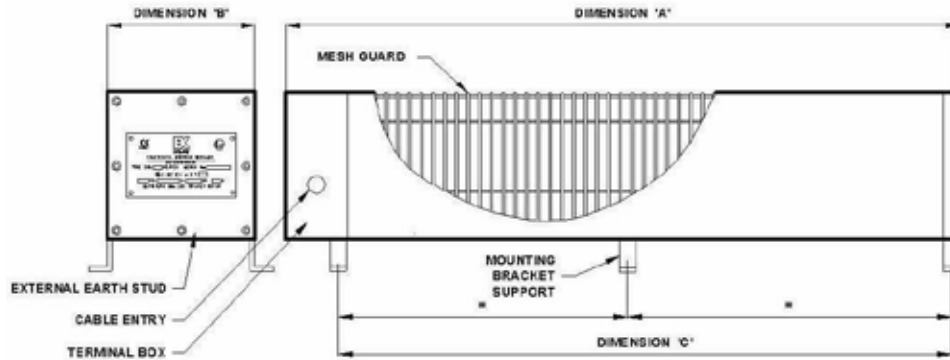
Support feet pre-drilled suitable for floor mounting supplied as standard. (Wall mounting brackets available on request).

### Voltage

Any electrical supply may be specified up to 440v.

# SAN-EX-AAW

## Hazardous Area Air Warmers



**Rating:** Standard heater ratings and sizes are shown below. Other ratings to suit client individual requirements can be provided on request

Model	"T" Class	Rating Watts	Voltage	Supports	Dimensions			Weight (kg)
					A	B	C	
<b>Compact range</b>								
AAW-C-250	T2/T3	250	254 or 110	2	350	160	282	5
AAW-C-500	T2/T3	500	254 or 110	2	350	160	282	6
AAW-C-750	T2/T3	750	254 or 110	2	615	160	545	6
AAW-C-1000	T2/T3	1000	254 or 110	2	615	160	545	9
<b>Standard range</b>								
AAW250	T2/T3	250	254	2	971	160	860	8
AAW500	T2/T3	500	254 or 110	2	971	160	860	10
AAW750	T2/T3	750	254/440 or 110	2	971	160	860	12
AAW1000	T2/T3	1000	254/440 or 110	2	1221	160	1120	14
AAW1500	T2/T3	1500	254/440 or 110	3	1741	160	1640	20
AAW2000	T2/T3	2000	254 or 110	3	1741	272	1640	32
AAW2500	T2/T3	2500	254	3	1741	272	1640	38
AAW3000	T2/T3	3000	254/440	3	1741	272	1640	42
AAW250	T4	250	254	3	1886	160	1784	13
AAW500	T4	500	254	3	1886	160	1784	17
AAW750	T4	750	254/440	3	1886	160	1784	21
AAW1000	T4	1000	254	3	1886	272	1784	33
AAW1250	T4	1250	254	3	1886	272	1784	38
AAW1500	T4	1500	254/440	3	1886	272	1784	42

## SAN-EX-FWDT Adjustable Air Warmers



### Construction

The FWD-T range with an easy to adjust external thermostat which is designed for heating small work or storage areas and similar applications, located in Zone 1 and 2 or Zone 21 and 22 Hazardous Areas where the flammable atmosphere is a IIA, IIB or IIC Gas Group.

### Features

- Certified to meet the ATEX Directive 94/9/EC and IECEx
- Weatherproof to IP66
- Suitable for 110V or 230/254V supplies
- Temperature classes T2, T3 and T4 available
- Corrosion resistant powder coated finish
- Suitable for floor or wall mounting
- 2 x 25mm (plugged) cable entries provided as standard
- Rotatable terminal box
- Externally adjustable 0-40°C room temperature controlled thermostat
- Suitable for ambient temperatures from -60°C to +60°C (subject to conditions to be discussed with sales engineer)
- Individually replaceable heating elements

### Typical Applications

- Aircraft hanger service bays
- Fuel servicing areas
- Chemical plants
- Offshore installations
- Battery stores
- Gas installations
- Containers
- Crane cabs
- Paint/solvent stores

### Rating

500W to 2kW

### Certification

ATEX certified II 2 G/D  
IECEx & ATEX certified Ex'd' IIC T2 to T4  
Ex tD A21 IP66 T300°C to T135°C  
EN/IEC60079-0, EN/IEC60079-1, EN/  
IEC61241-0 & EN/IEC61241-1

### Enclosure

Mild steel powder coated orange/grey, stainless steel option available to special order

### Controls

If required the heaters can be controlled from the SAN range of remote mounted thermostats available for use in Safe or Hazardous Areas

### Mounting

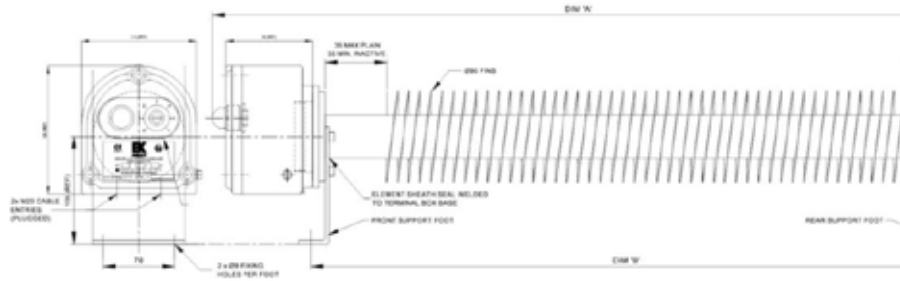
Pre-drilled support feet supplied as standard

### Voltage

1 phase 230/254V or 110V

# SAN-EX-FWDT

## Adjustable Air Warmers



Model	"T" Class	Rating Watts	Dimensions		Weight (kg)
			A	B	
FWDT-500-T3	T3	500	800	670	9
FWDT-1000-T3	T3	1000	1300	1170	12
FWDT-1500-T3	T3	1500	1900	1770	17
FWDT-2000-T3	T3	2000	2450	2320	20
FWDT-500-T4	T4	500	1300	1170	12
FWDT-750-T4	T4	750	1900	1770	17
FWDT-1000-T4	T4	1000	2450	2320	20

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#### Construction

The 'RFA' range of flameproof rod-type immersion heaters is suitable for installation in process tanks, safety showers, engine sumps, pressure vessels and similar plant, located in Zone 1 and Zone 2 Hazardous Areas where the flammable atmosphere is a Group IIA, IIB or IIC Gas. They are suitable for heating all process liquids or gases which are non-erosive to the materials of construction.

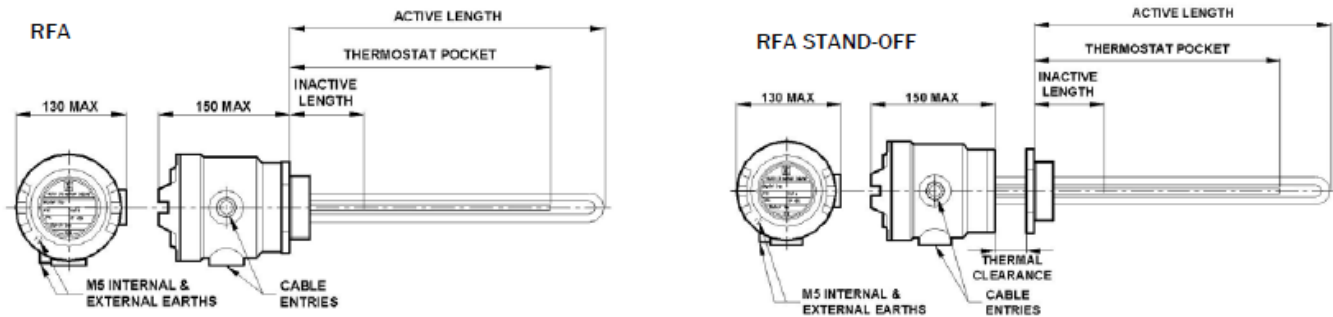
#### Features

- Certified to meet the requirements of the ATEX Directive 94/9/EC
- Lightweight cast aluminium alloy terminal enclosure with weatherproof protection to IP67
- Choice of built in process temperature sensors
- Suitable for ambient temperatures down to -40°C
- Mounting of the heater can be by a threaded boss or an industry standard flange
- Designed for horizontal installation (vertical mounting version available on request)

#### Typical Applications

- Pre-heating oil/water
- Processing equipment
- Cleaning and rinsing tanks
- Heating transfer systems
- Boiler equipment
- Frost protection

# RFA Flameproof Immersion Heaters



## Product Specification

Certification	ATEX Certified II 2 G Ex'd' IIC T3 to T6 to EN60079-0 and EN60079-1.
Enclosure	Cast Aluminium alloy with a maximum of two cable entries, external and internal earths and screwed terminal cover. Certified EEx'd' IIC T4-T6 with the option of T3-T6 where the terminal enclosure is stood away from the Processing Equipment.
Elements	A maximum of three rod type elements comprising 80/20 Nickel Chrome resistance wire, compacted in high purity Magnesium Oxide insulating powder and encased in either Copper, Mild Steel, Monel, Inconel, Incoloy, Stainless Steel or Titanium Sheath, secured by either brazing or welding depending upon the process application.
Controls	Heater over-temperature protection is fitted as standard
Mounting	Any threaded boss or flange in any material can be specified within the limits of the design parameters Heaters can be either 'direct-on' or 'standoff' as required by the 'T' Classification.
Rating	Maximum loading - 18kW. (Depending on amps and watts density)
Voltage	Any electrical supply up to 690V



### Construction

The FP range of Flameproof rod-type immersion heaters is a highly adaptable solution that can be customised to suit the process requirements of our clients. They are suitable for heating all types of process liquids and gases which are non-corrosive to the materials of construction.

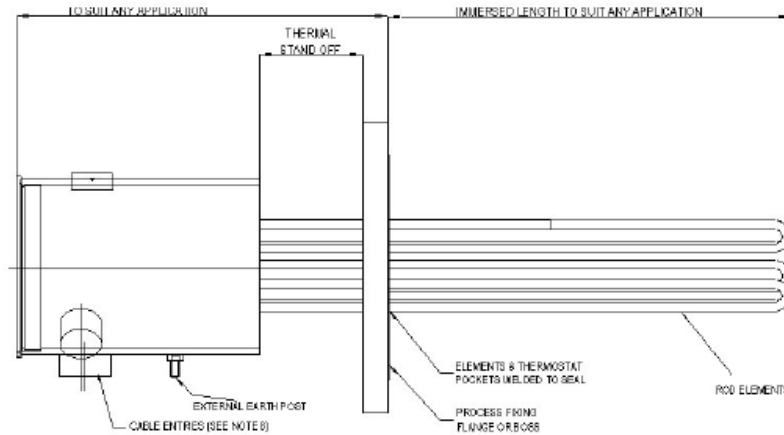
### Features

- Certified to meet the requirements of the ATEX Directive 94/9/EC and IECEx
- Mild steel or 316 stainless steel terminal enclosure with weatherproof protection to IP65
- Choice of built in process temperature sensors
- Suitable for ambient temperatures from -50°C to +60°C
- Mounting of the heater can be by a threaded boss or an industry standard flange
- Designed for horizontal installation (vertical mounting version available on request)
- Can be supplied with the terminal box mounted away from the fixing boss/flange for high process temperatures

### Typical Applications

- Pre-heating oil/water
- Processing equipment
- Cleaning and rinsing tanks
- Heating medium
- Boiler equipment
- Frost protection
- Heat transfer systems
- Tank heating

# FP Rod-Type Immersion Heaters



Terminal box type	Minimum Flange Size Without Stand off		kW LOAD with a maximum immersed Length of 3665mm	
	ins	mm	Max cable entries	Max. no. of elements without stand off
FP 4	3	75	1 off M25 & 1 off M20	6
FP6	6	150	1 off M32 & 2 off M25	15
FP8	8	200	2 off M25 & 1 off M40	21
FP10	10	250	2 off M32 & 1 off M25	39
FP12	12	300	3 off M32 & 1 off M20	54

## Product Specification

Certification	ATEX certified II 2 G/D IECEx & ATEX certified Ex'd' IIC T1 to T6 Ex tD A21 IP66 T450 to 85°C CSA certified Class I, Div 1, Gas Groups A, B, C & D EN/IEC 60079-0, EN/IEC 60079-1, EN/IEC 61241-0 & EN/IEC 61241-1 CCOE (India) & KGS (Korea)
Enclosure	Mild steel or 316 stainless steel, external and internal earths, screwed terminal cover, finished in epoxy paint (if required)
Elements	A choice of rod-type elements comprising of 80/20 nickel chrome resistance wire, compacted in high purity magnesium oxide insulating powder and encased in either Incoloy or stainless steel sheath, secured by either brazing or welding depending upon the process application
Controls	Heater over-temperature protection is fitted as standard (optional process temperature sensing devices can be incorporated in the form of thermostats, RTD's or thermocouples)
Mounting	Any threaded boss or flange in any material can be specified within the limits of the design parameters Heater terminal box can be either 'direct-on' or 'stand-off', depending on process temperature
Rating	To suit process requirements
Voltage	Any electrical supply up to 690V

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## FP-C Removable Core Immersion Heaters



### Construction

The FP range of Flameproof removable single and multi core heaters offers a Hazardous Area heating solution for oil and similar applications where low heat density is required. The element can be withdrawn for inspection without system drain down. The standard heater consists of a single element or multi core fitted into a mounting flange. A robust Ex'd' terminal enclosure protects the electrical connections. The watts density of the element core fitted depends upon the media to be heated and the kilowatt rating required.

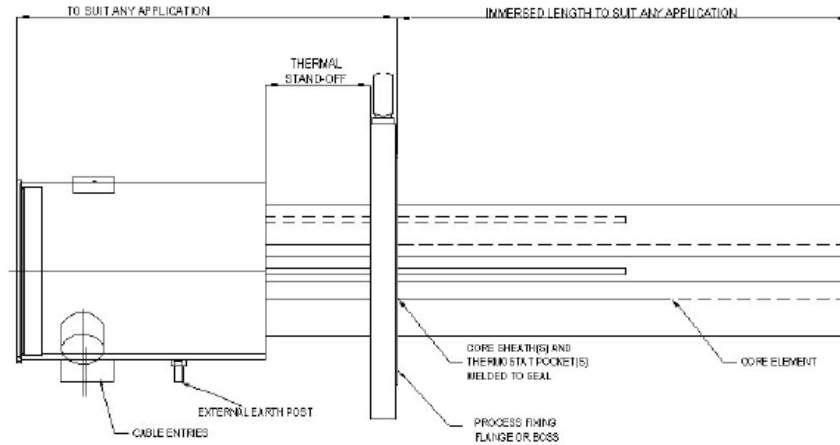
### Features

- Certified to meet the requirements of the ATEX Directive 94/9/EC and IECEx
- Mild steel or 316 stainless steel terminal enclosure with weatherproof protection to IP65
- Choice of built in process temperature sensors
- Suitable for ambient temperatures from -50°C to +60°C
- Mounting of the heater can be by a threaded boss or an industry standard flange
- Designed for horizontal installation (vertical mounting version available on request)
- Can be supplied with the terminal box mounted away from the fixing boss/flange for high process temperatures

### Typical Applications

- Pre-heating oil/water
- Processing equipment
- Cleaning and rinsing tanks
- Heating transfer systems
- Boiler equipment
- Frost protection
- Compressors
- Turbines

# FP-C Removable Core Immersion Heaters



Terminal box type	Minimum Flange Size		kW LOAD with a maximum immersed Length of 3665mm	
	ins	mm	Max cable entries	Max. no. of cores
FP 4	3	75	1 off M25 & 1 off M20	1
FP6	6	150	1 off M32 & 2 off M25	3
FP8	8	200	2 off M25 & 1 off M40	6
FP10	10	250	2 off M32 & 1 off M25	9
FP12	12	300	3 off M32 & 1 off M20	12

## Product Specification

Certification	ATEX certified II 2 G/D IECEx & ATEX certified Ex'd' IIC T1 to T6 Ex tD A21 IP66 T450 to 85°C EN/IEC60079-0, EN/IEC60079-1, EN/IEC61241-0 & EN/IEC61241-1 CCOE (India) & KGS (Korea)
Enclosure	Mild steel or 316 stainless steel, external and internal earths, screwed terminal cover, finished in epoxy paint (if required)
Elements	Removable core, comprising high quality 80/20 nickel chrome resistance wire, contained within ceramic formers housed in plain or extended surface tubes
Controls	Heater over-temperature protection is fitted as standard (optional process temperature sensing devices can be incorporated in the form of thermostats, RTD's or thermocouples)
Mounting	Any threaded boss or flange in any material can be specified within the limits of the design parameters Heater terminal box can be either 'direct-on' or 'stand-off', depending on process temperature
Rating	To suit process requirements within the design parameters and ATEX approval
Voltage	Any electrical supply up to 690V



#### Construction

The 'ISES' electric heater comprises a large range of process immersion heaters, certified for use in a Zone 1 or Class 1, Div 2 Hazardous Areas, custom-built to meet client specifications.

#### Features

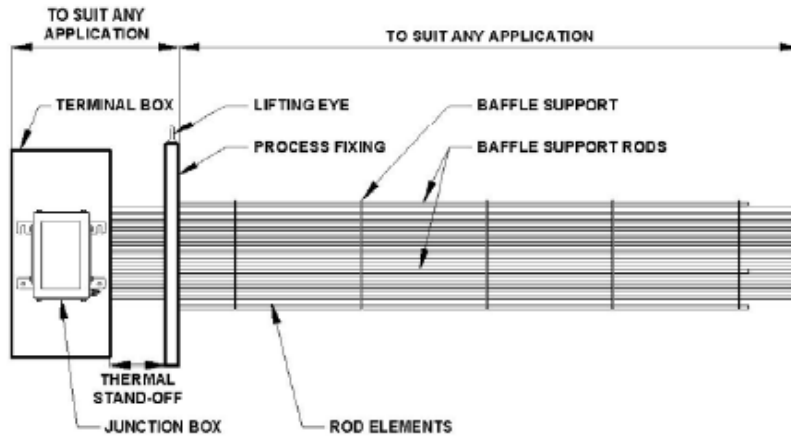
- Up to 5000kW
- ATEX approved 11 2 G.
- Certified EE'e' Zone 1, Gas Group II
- Certified Class 1, Div. 2, Gas Group A, B, C, D
- CENELEC, Standards Australia, CSA
- Terminal box is certified weatherproof to IP67 or NEMA 4X
- Anti condensation heaters fitted, if required
- Elements are specially sealed to prevent moisture ingress
- Elements are individually replaceable on site without the need for special tools
- Withdrawable type elements are available to facilitate replacement without draining the vessel
- Lightweight stainless steel construction terminal box
- Suitable and certified for use in ambient temperature of -60°C to +60°C
- Temperature classifications T1-T6

#### Typical Applications

- Butane/Propane vaporisers
- Molecular Sieve Regeneration
- Crude Oil
- Glycol (TEG & MEG) Reboilers
- Synthetic Oils
- Fuel Oils
- Fresh Water
- Sea Water
- Heating Medium
- Tank Heating
- KO Drums



## ISES Range of Hazardous Area EEx'e' Certified Immersion Heaters



Nominal flange size		kW LOAD with maximum immersed length of 5665mm		
6	150	30	80	200
8	200	60	160	400
10	250	100	260	650
12	300	150	380	950
14	350	180	460	1150
16	400	245	620	1550
18	450	325	800	2000
20	500	400	980	2500
24	600	585	1460	3650
30	750	1110	2780	5000
36	900	1610	4040	n/a
40	1000	1995	5000	n/a



### Construction

The 'FP/BFP' type flameproof electric heaters comprise a large range of process flow heaters, certified for use in a Zone 1 or Class 1, Div 1 Hazardous Area, custom built to meet client specifications.

### Features

- Up to 1000kW (larger ratings achieved by a combination of enclosures.)
- ATEX approved 11 2 G/D.
- Certified EEx'd', Zone 1, Gas Group II, A, B, C.
- Certified Class 1, Div. 2, Gas Group B, C, D
- CENELEC, Standards Australia, CSA, FM
- Terminal box is certified weatherproof to IP66/67 or NEMA 7
- Temperature classifications T1 – T6.
- Elements are specially sealed to prevent moisture ingress
- Elements are individually replaceable on site without the need for special tools
- Suitable and certified for use in high ambient temperatures, e.g. Middle East.
- Anti-condensation heaters fitted, if required

### Typical Applications

- Fuel Gas
- Industrial Gases
- Natural Gas
- Molecular Sieve Regeneration
- Heat Transfer Oils
- Fuel Oils
- Water
- Crude Oil / Hydrocarbon /Liquids
- Heating Medium

### Vessel Design Codes

- PED Compliant
- Stoomwezen
- CODAP
- PD 5500 2000 Cat 1
- ASME VIII Div 1/2
- A.D. Merkblatter
- AS 1210

### Vessel Materials

- Carbon Steel
- Stainless Steel
- Titanium
- Monel
- Low Temperature Steel
- Duplex
- Super Austenitic
- Nickel Alloys

### Elements

Manufactured from 80/20 NiCr resistance wire with high purity compacted Magnesium Oxide powder sheathed within corrosion/erosion resistant tube, e.g.:

- Incoloy 800/825
- Inconel 600/625
- Titanium
- 316/316L Stainless Steel
- 321 Stainless Steel
- Monel

Element sheath available in welded or seamless tube up to 1.6mm thick.

**Internals** Elements are supported in a segmental or rod type baffle assembly to prevent flow induced vibration and hot spots, generally complying with TEMA standards.

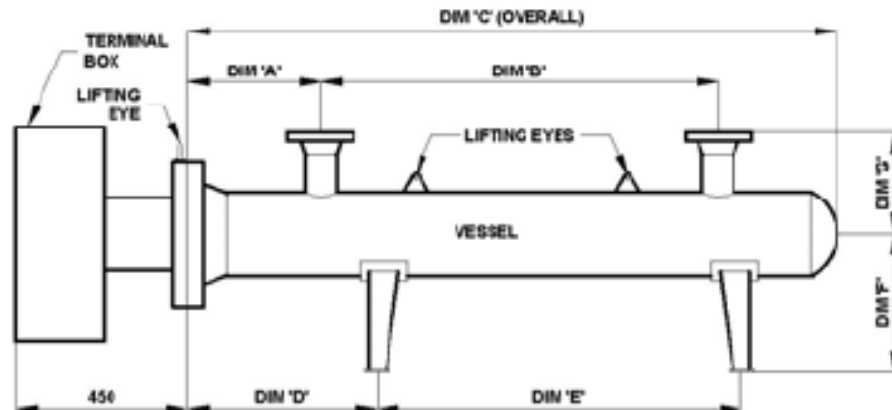
**Element to Tubesheet** Generally, elements are sealed into the flange by 'Bite' type couplings which provide a 100% seal at pressures up to 400 bar.g and give the opportunity to replace individual elements on site.

**Vessel material** Elements can be welded to the tubesheet, in stand-off and non-stand-off configurations.

**Terminal box** Manufactured from either Cast Iron or Stainless Steel.

**Voltage** Suitable for voltages up to 690V.

## FP/BFP Range of Explosionproof/ Flameproof Certified Process Flow Heaters



Short option kW	Withdrawal	A	B	C	D	E	F	G	Diameter (inches)	Diameter (mm)
25	2200	1490	1605	1985	215	1555	400	250	4	100
50	2200	240	1555	2035	265	1505	400	275	6	150
75	2200	240	1555	2035	265	1505	400	275	6	150
100	2200	240	1555	2035	265	1505	400	275	6	150
125	2200	290	1520	2100	315	1470	400	300	8	200
175	2200	290	1520	2100	315	1470	400	300	8	200
200	2200	333	1500	2166	358	1450	400	325	10	250
225	2200	335	1500	2170	360	1450	400	325	10	250
250	2200	335	1500	2170	360	1450	400	325	10	250
275	2200	335	1500	2170	360	1450	400	325	10	250
300	2200	335	1500	2170	360	1450	400	325	10	250
325	2200	385	1450	2220	410	1400	400	350	12	300
350	2200	385	1450	2220	410	1400	400	350	12	300
375	2200	385	1450	2220	410	400	400	350	12	300
400	2200	385	1450	2220	410	1400	400	350	12	300
425	2200	385	1450	2220	410	1400	400	350	12	300
450	2200	385	1450	2220	410	1400	400	350	12	300
475	2200	425	1440	2290	450	1390	400	375	14	350
500	2200	425	1440	2290	450	1390	400	375	14	350
600	2200	450	1410	2310	475	1360	400	400	16	400
700	2200	450	1410	2310	475	1360	400	400	16	400
800	2200	500	1375	2375	525	1325	400	425	18	450
900	2200	500	1375	2375	525	1325	400	425	18	450

Tables indicate standard designs for hydrocarbon gas heating applications. Dimensions may vary from other mediums on compliance with project specification

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Long option kW	Wit-drawal	A	B	C	D	E	F	G	Diam-eter (inches)	Diam-eter (mm)
50	3600	190	3005	3385	215	2955	400	250	4	100
100	36900	240	2955	3435	265	2905	400	275	6	150
150	3600	240	2955	3435	265	2905	400	275	6	150
200	3600	240	2955	3435	265	2905	400	275	6	150
250	3600	290	2920	3500	315	2870	400	300	8	200
300	3600	290	2920	3500	315	2870	400	300	8	200
350	3600	290	2920	3500	315	2870	400	300	8	200
400	3600	335	2900	3570	360	2850	400	325	10	250
450	3600	335	2900	3570	360	2850	400	325	10	250
500	3600	335	2900	3570	360	2850	400	325	10	250
600	3600	335	2900	3570	360	2850	400	325	10	250
700	3600	385	2850	3620	410	2800	400	350	12	300
800	3600	385	2850	3620	410	2800	400	350	12	300
900	3600	385	2850	3620	410	2800	400	350	12	300

Tables indicate standard designs for hydrocarbon gas heating applications. Dimensions may vary from other mediums on compliance with project specification



## EX-Drum Heater - 230V EX-Base Heater - 230V



Our **EX-Drum Heaters** and **EX-Base heaters** are used to provide medium flow and process temperature in hazardous environments. The special design including a self-regulating heating cable embedded in a solid metal housing ensures the maximum in safety at operating conditions. Using this design and additional temperature limiter is not necessary.

Protection class: 1  
 System of protection: IP 65  
 Permissible ambient temp.: -40 - +50°C  
 Rated voltage: max. 254 Vac  
 Zone: Gas: 1,2, Dust: 21, 22  
 Temperature class: T2, T4, T6  
 Ingress protection: IP6X (IP65)

Part no.	Std. sizes (ltr)	Height (mm)	Inner dia. (ID) (mm)	Outer dia. (OD) (mm)	Temp. class	Nominal power (W)	Nominal Voltage (Vac)	Weight (kg)
<b>Drum Heaters</b>								
SAN-SRX	200	990	650	770	T1/T2	3930	230	60
SAN-SRQ	200	990	650	770	T3/T4	3990	230	60
SAN-SRB	200	990	650	770	T5/T6	1810	230	60
<b>Base Heaters</b>								
SAN-SRX	200	78	-	546	T1/T2	1150	230	20
SAN-SRQ	200	78	-	546	T3/T4	1170	230	20
SAN-SRB	200	78	-	546	T5/T6	530	230	20
<b>Insulated lid</b>								
SAN-lid	200	85	790	798		-	-	20

**SAN**<sup>®</sup> Electro Heat a/s

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 CVR No.: 42 16 59 13



Our gas bottle heaters are electrical heaters for gas bottles. They are used where the temperature around is under the optimum temperature of the media in the gas bottle. The gas bottle heater is designed to maintain the temperature of gas bottles heated up in hazardous areas according to identification card IIC.

The heaters are manufactured from a two-part metal sheath which folds up over a hinge strip. The heating cables built into the unit, as well as the junction box and the thermostat are approved for hazardous areas.

Protection class: 1  
System of protection: IP 65  
Permissible ambient temp.: -40 - +50°C  
Rated voltage: max. 254 Vac

Part no.	Capacity at +10°C ±10%	T-Class	Maintain temp.*
SAN-SRX/10L	630W	(T1) / T2	max. approx. 120°C
SAN-SRQ/10L	640W	(T3) / T4	max. approx. 80°C
SAN-SRB/10L	290W	(T5) / T6	max. approx. 40°C
SAN-SRX/20L	820W	(T1) / T2	max. approx. 120°C
SAN-SRQ/20L	830W	(T3) / T4	max. approx. 80°C
SAN-SRB/20L	380W	(T5) / T6	max. approx. 40°C
SAN-SRX/40L	1550W	(T1) / T2	max. approx. 120°C
SAN-SRQ/40L	1570W	(T3) / T4	max. approx. 80°C
SAN-SRB/40L	710W	(T5) / T6	max. approx. 40°C
SAN-SRX/50L	1490W	(T1) / T2	max. approx. 120°C
SAN-SRQ/50L	1510W	(T3) / T4	max. approx. 80°C
SAN-SRB/50L	680W	(T5) / T6	max. approx. 40°C
SAN-SRX/79L	1510W	(T1) / T2	max. approx. 120°C
SAN-SRQ/79L	1540W	(T3) / T4	max. approx. 80°C
SAN-SRB/79L	700W	(T5) / T6	max. approx. 40°C

# Ex FixTherm96 Thermostat

The Ex FixTherm96-Thermostats are often used as maximum thermostat in instrumentation cabinets with

- Prevention of overheating
- Temperature controlling

## Features and Advantages

- Setpoints up to 135°C
- Accurate set-point ( $\pm 3^\circ\text{C}$ )
- Small hysteresis
- Anodized Aluminium housing (Stainless steel housing available)
- Armoured electrical cable standard
- Suitable for T6 and T4 classification
- Can be used for 6A / 240 VAC/DC



## Technical Data:

Housing	Anodized aluminium or stainless steel
Current / voltage	6A / 240 VAC
Cable	3x 0,75 sqmm
Material cable	silicone braided cable, optional: non-braided cable
Standard length	Approx. 1 mtr
Other lengths	On request
Overall dimensions	o.d. 30mm x 49mm length
Weight	Approx. 160g
Switch	SPST
Set-point tolerance	+/-3°C
Hysteresis	Approx. 2°C
Mounting bracket	available (B)
Ambient temp. range	-50°C...+90°C
EX protection class	II 2G Ex d IIC T6 or T4 II 2D Ex tD A21 IP66T T 85°C or T 135°C
Certification	KEMA 01ATEX2125X and IECEx DEK 11.0017

## Description

The housing is made from anodized Aluminium or Stainless Steel type 316 (on request).

When required in other applications, e.g. analyzers, it is normal practice to use our Space-heaters in combination with these Fix-Therm96 thermostats (range from 10°C up to 135°C). The FixTherm96 can also be used for cooling purposes e.g. FixTherm TH-10/5F.

## Range

Aluminium: TH-10/5 € going up with 5°C setpoints e.g. 10/5“ 15/10“ 20/15 etc. up to 135°C maximum.

Stainless Steel bodies: identical range.



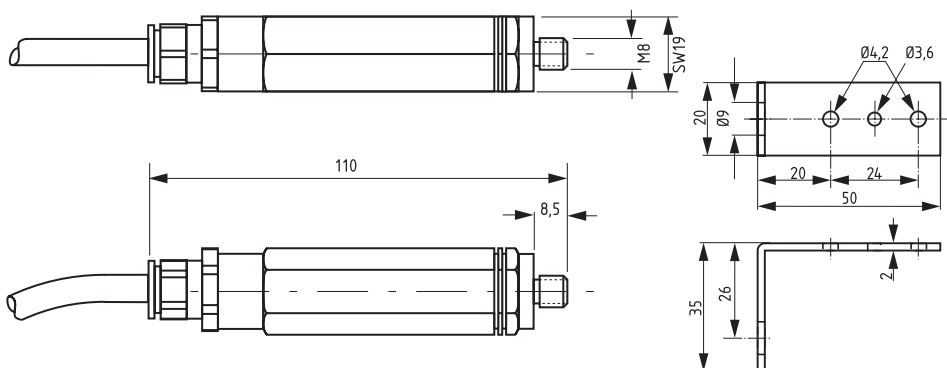
- Compact design
- Set temperature
- High switching capacity

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.



### Technical Data:

Explosion proof acc. to EN	LCIE (Laboratoire Central des Industries Electriques)
Conformity certificate	01 ATEX 6074/02, LCIE N° 06 ATEX 08011, IECEx LCI 07. 0021
Sensor element	Thermostatic bimetal
Contact type (1-pole)	Opens with rising temperature
Service life	>100,000 cycles
Max. switching capacity	250VAC, 4 (1) A
Connection	SI HF - JZ 3x0.75mm <sup>2</sup> , length 1m
Mounting	mounting bracket with nut M8 (see illustration)
Casing	Aluminium, black anodised
Dimensions	length 110mm
Weight	Approx. 0.2kg
Fitting position	Variable
Op/storage temp.	-20 to +40°C / -45 to +70°C
Prot. type/ Prot. class	IP65 / I (earthed)



Aluminium  
Mounting Bracket

Art. No.	Ex protection type	Switch-off temperature	Switch temperature difference
	d IIC T6 - Ex tD A21 IP6X T85°C	+15°C (±4K tolerance)	4K (±1K tolerance)
	d IIC T6 - Ex tD A21 IP6X T85°C	+25°C (±4K tolerance)	4K (±1K tolerance)

# SAN EX Thermostat Type RTF



### Construction

All our Flameproof thermostats are ATEX certified Ex'd' IIC T6, suitable for installation in Zone 1 or 2 Hazardous Areas. The SAN EX Thermostat has external adjustment enabling quick and accurate variable control for liquid, gas and air applications.

### Features

- ATEX certified II 2 G/D IECEx & ATEX certified Ex'd' IIC T6 Ex tD A21 IP6X T85°C for Zone 1 or 2 (Gas) and Zone 21 or 22 (Dust)
- Externally adjustable option
- Wall mounted/threaded boss or industry standard flange
- Suitable for ambient temperatures from -60°C to +60°C
- Typical Applications

### Certification

ATEX certified II 2 G/D IECEx & ATEX certified Ex'd' IIC T6 Ex tD A21 IP6X T85°C for Zone 1 or 2 (Gas) and Zone 21 or 22 (Dust)

### Enclosure

Cast Aluminium alloy with a maximum of two cable entries and external and internal earths.

### Controls

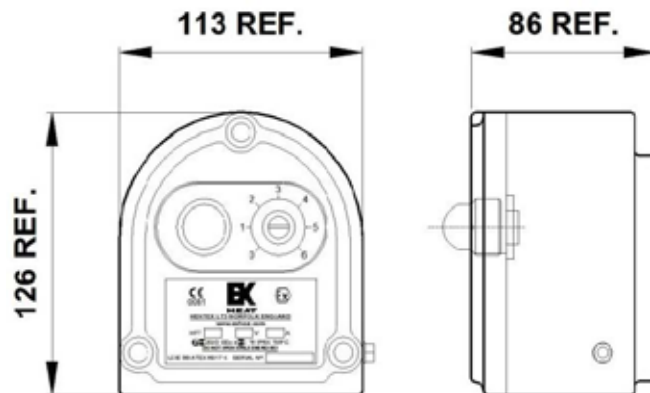
Choice of control range to suit process application.

### Mounting

Any threaded boss or flange in any material can be specified within the limits of the design parameters.

### Voltage

16 Amp 250v in a choice of switching configurations.



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CVR No.: 42 16 59 13

## CSN-Ex-Ambient Temperature Controller - Type ATHF-Ex-2



Ignition protection mode:	EEx ed IIC T6
Protection mode	IP65
EC-Type Approval Certificate:	PTB 03 ATEX 1180
Control range	-20 to +50°C
Casing:	Polyester, impact-proof
Casing dimensions:	WxHxD = 120x122x90mm
Weight:	1,2 kg
Switch element:	1-pole quick break, switch with two-way-contact
Breaking capacity:	16A, AC 250V 10A, AC 250V
Cable glands:	2 x M25

# Ex Temperature Limiter Ex Temperature Monitor Type BTB/BSTW



## Features:

- 16A switching capacity
- Pre-set limit point for BSTB
- Suitable for use in zone 1 areas
- Temperature setting directly in zone 1 areas
- Resettable lockout on the device
- Direct heating circuit connection via sheathed cable/cold lead
- Temperature ranges from -20°C to +500°C

## Description:

The 16A Ex temperature monitor BSTW / temperature limiter BTB are switch-over controllers housed in an EExe certified polyester enclosure. Heaters, fans, motors and other equipment are energised and de-energised by means of this thermostat when specific temperature ranges are exceeded. These devices can also be used to control the temperature in air, liquids or on various surfaces.

## Function:

Any change in temperature at the sensor bulb causes a change in the volume of fluid in the measuring system, which in turn results in a movement of the diaphragm membrane. This membrane is connected to a mechanical device that activates a microswitch. If the temperature at the sensor bulb exceeds the pre-set value, terminals 1 and 4 are opened. The BTB devices 'lock-out' permanently if the set temperature is exceeded. After a temperature decrease of about 9% below the set value, BTB can be re-set manually. If there is a rupture or break in the sensor tube (leakage), then the switch remains permanently open (fail-safe). If the temperature falls below the minimum setting, the autocontrol opens the circuit but closes again on temperature rise.

## Applications:

The BTB and BSTW thermostats can directly switch temperature-dependent equipment loads (heaters etc.) of up to 16A. Higher switching currents of 3-phase applications are switched by means of a contactor.

## Legend:

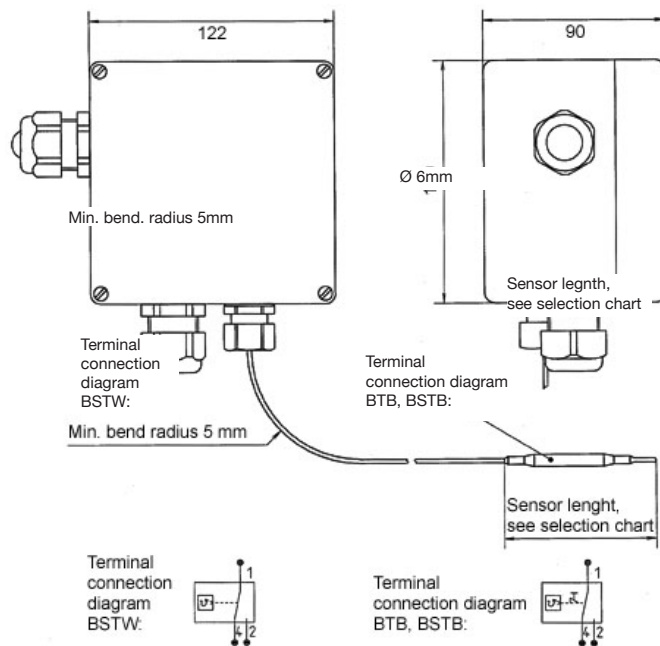
- BSTW fail-safe safety temperature detector  
BTB fail-safe temperature limiter

Protection class..... IP 65/EN 60529  
Min. storage temperature ..... -50°C  
Max. storage temperature ..... +65°C  
Capillary tube .....1000 mm long,  
OD sensor line 1.5mm  
min. bend radius 5mm  
sensor bulb diameter 6mm  
sensor material: stainless steel  
VA 1.4571

## Enclosure dimensions (mm)

Single unit:.....122 x 120 x 90mm  
Double unit:.....220 x 120 x 90mm  
Weight  
Single unit:.....1.1kg  
Double unit: .....2.0kg  
Switching capacity ..... 16A NC  
10A NO  
Rated voltage ..... AC 250V/50 Hz  
Contacts .....1 switch-over contact  
Terminals .....4 with 2.5 mm<sup>2</sup> + 1 PE  
Cable glands .....2 x M 25  
Ex protection type ..... II 2G EEx ed IIC T6  
Certification ..... PTB 03 ATEX 1180

## Ex Temperature Limiter Ex Temperature Monitor Type BTB/BSTW



Temperature ranges		-20°C to +50°C	0°C to +200°C	+50°C to +300°C
Switching accuracy in the lower third of the scale range	BSTW Thermostat	-0K to +3.5K	-0K to +10K	
	BTB Limiter		+0K to -10K	
Switching accuracy in the upper third of the scale range	BSTW Thermostat			+0K to +125K
	BTB Limiter			+0K to -12.5K
Max sensor temperature	BSTW/BTB	+60°C	+230°C	+345°C
Min sensor temperature	BSTW/BB	-30°C	-10°C	-10°C
Sensor bulb length	BSTW/BTB	130mm	71mm	57mm

Selection chart Type	Temperature range	Order no.
Fail-safe temperature monitor BSTW Thermostat	-20°C to +50°C	
Fail-safe temperature monitor BSTW Thermostat	0°C to +200°C	
Fail-safe temperature monitor BSTW Thermostat	+50°C to +200°C	
Fail-safe temperature limiter BTB Limiter	0°C to +200°C	
Fail-safe temperature limiter BTB Limiter	+50°C to +300°C	

Other temperature ranges or combinations on request.

# Measurement and Control



## ex-box DIS

### Description

The new eltherm ex-box is a hazardous location temperature controller developed from and by eltherm for customer needs. This product may either be used separately as a controller or limiter or as a controller-limiter combination.

### Attributes

- Rugged housing IP 65
- Operation and programming in hazardous area
- Optional hand held controller (ex-control)
- Optional as controller or limiter
- Information transfer with a personal computer
- Fail alarm, high safety
- Switch rating 16A
- Integrated heating circuit monitoring

### Technical data ex-box DIS

with ex-box enclosed operation panel:

Certificate .....	IBExU 04 ATEX 1165
Classification .....	II 2GD E Ex em [ib] IIC T4 IP65 T100
Housing dimensions.....	170 x 130 x 140 mm (wxhxd) (incl. cooling device and mounting bracket)
Housing material .....	Aluminium
IP rating .....	IP 65
Ambient temperature.....	- 32 to 60°C
Cable entrances .....	2 x M20 1 x M25
Display.....	2 x 4 35-Segment LED
Supply Voltage .....	230V +/- 10%
Power Supply .....	230V / 16A, 2-pole
Alarm output.....	optically separated 100mA
Bus-card.....	current loop, intrinsically safe
Measurement entrance .....	Pt-100 2/3 core, intrinsically safe
Measurement range .....	-40 C° to +300°C
Control range.....	over entire measurement range
Control characteristics .....	Dual mode controller
Weight .....	approx. 3.5 kg (without mounting bracket)



### ex-box LED

#### Description

ex-box LED: Same as the ex-box DIS with ex-control except for the following: no personal computer bus-card, but interface and supply (8.2 V 100mA)  
 green: ok, no heating  
 orange: ok, heating on  
 red blinking: Alarm or fault but still ready for operation  
 red: severe fault, separation from supply

#### Technical Data ex-box LED

Certificate ..... IBExU 04 ATEX 1165  
 Classification ..... II 2GD E Ex em [ib] IIC T4 IP65 T100  
 Housing dimensions..... 170 x 130 x 140 mm (wxhxd)  
 (incl. cooling device and mounting bracket)  
 Housing material ..... Aluminium  
 IP rating ..... IP 65  
 Ambient temperature..... - 32 to 60°C  
 Cable entrances ..... 2 x M20  
 1 x M25  
 Supply Voltage ..... 230V +/- 10%  
 Power Supply ..... 230V / 16A, 2-pole  
 Alarm output..... optically separated 100mA  
 Bus-card..... intrinsically safe for ex-control  
 Measurement entrance ..... Pt-100 2/3 core, intrinsically safe  
 Measurement range ..... -40 C° to +300°C  
 Control range..... over entire measurement range  
 Control characteristics ..... Dual mode controller  
 Weight ...approx. 3.5 kg (without mounting bracket) ex-control

### ex-control

#### Description

Intrinsically safe hand held controller pad, without local power supply, power supply from ex-box, to connection on ex-box.

#### Technical Data ex-control

Dimensions..... 135 x 80 x 35 mm (l x w x h)  
 Classification ..... II 2GD EEx ib II C T4 IP65 T100  
 IP rating ..... IP 65  
 Cable entrance ..... 1.5 m connection cable with  
 5-pole plug  
 Display ..... 2 x 4 35-Segment LED  
 with back lighting  
 Bus-card..... intrinsically safe for ex-box LED  
 Weight ..... 0.5 kg

#### Programmable Parameters

- upper set point of adjustable temperature range
- Temperature set point
- Alarm, under-temperature
- Alarm, over-temperature
- Loaded disconnecting
- Bus address 1 – 32
- Adjusting point PT100
- Degree Unit °C and °F

#### Fault display

- Sensor short
- Sensor cut
- Over-temperature at PT100
- Under-temperature at PT100
- Over-temperature internal
- External Bus fault
- Internal Bus fault
- Internal Hardware fault
- Operation supply fault
- Supply voltage fault







# Mounting Accessories Terminal boxes

## Terminal Boxes:

Terminal boxes	Description	Designation	Part no.
Thermo plastics Dimensions Cable gland Terminals	98x98x58mm 2xPg16 5x2.5mm	ELAK-2	85820
Reinforced polyester Dimensions Cable gland Terminals	110x75x55mm 3xPg16 5x2.5mm <sup>2</sup>	ELAK-3	85821
Dimensions Cable gland Terminals	160x75x55mm 3xPg16 2x4mm <sup>2</sup> x1xPE	ELAK-4	85855
Dimensions Cable gland Terminals	120x120x90 4xPg16 6x4mm <sup>2</sup> x3xPE	ELAK-5	85823
Aluminium	75x30x54mm 122x122x80mm 160x160x90mm		5890010 5890011 5890012
EEx-version Dimensions Cable gland Terminals	EEx e II T5-T6 120x120x90mm 1xM20 2x4mm <sup>2</sup> x1xPE IP65	ELAK-Ex3	85824
Dimensions	120x120x90mm without holes	ELAK-Ex3	85825



## Terminal Box, customizable:

### Technical Data:

#### Measures:

Width ..... 122mm  
 Length ..... 120mm  
 Height ..... 81mm  
 Inner height ..... 72mm

#### Material:

Base and cover ..... Aluminium Si 12,  
 silver gray, similar to RAL 7001  
 Sealing ..... Polyurethane

#### Other attributes

Ingress protection ..... IP 66 - acc. EN 60529 /  
 DIN VDE 0470-1  
 Impact resistance ..... IK09 acc. DIN EN 5012 /  
 VDE 470 segment 100  
 Heavy metals-free ..... Yes  
 PVC-free ..... Yes  
 Silicone-free ..... Yes  
 Fitted for outdoor application ..... Yes  
 Knockouts ..... No



#### Environmental attributes:

Ambient temperature (min) ..... -40°C  
 Ambient temperature (max) ..... 75°C  
 Ambient temperature (24h) ..... 60°C

## Mounting Accessories Splice Connector Kit - Ex



This splice connector kit for heating cables was especially developed for the application in hazardous areas. In doing so our engineers focused on a high level of safety, simple installation and perfect fit.

### Advantages:

- Cold and dry termination
- Simple installation

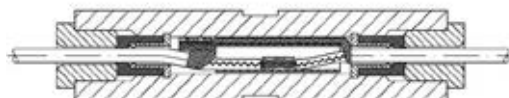
### Applications:

- Chemical & petrochemical industry
- Oil and gas industry
- Paints and varnishes
- Heat tracing of apparatus, appliances and plants
- Heat tracing of pipes, pumps and valves.

- Classification Ex II 2G Ex e IIC T6...T3 Gb  
Ex II 2D Ex tb IIIC TX Db
- Certificate 04ATEX1005X, 07ATEX1080X,  
07ATEX1023X, IECEx IBE 13.0012 X
- Standard EN 60079-0:2009, EN 60079-7:2007,  
EN 60079-31:2009

Maximum maintenance temperature (Ex-Con-22/4 & -25/7)			
Type	up to 10A	up to 16A	up to 20A
T6	60°C	45°C	25°C
T5	75°C	60°C	25°C
T4	110°C	95°C	75°C
T3	170°C	155°C	135°C

Example: assembled unit



Classification for ELKM AG	Cable cross section	impact resistance (J)	Nominal current (A)	Rated voltage (V)	Diameter (mm)	Length (mm)	Art. no.
Ex-Con-22/4	up to 2,5mm <sup>2</sup>	4	20	550	22	105	
E-Con-25/7	up to 2,5mm <sup>2</sup>	7	20	550	25	105	
Ex-Con-36/4*	2,5mm <sup>2</sup> up to 35mm <sup>2</sup>	4	145	550	36	175	

Classification for ELSR	Cable cross section	impact resistance (J)	Nominal current (A)	Rated voltage (V)	Diameter (mm)	Length (mm)	Art. no.
Ex-Con-SR	3 x 1,5mm <sup>2</sup> and 3 x 2,5mm <sup>2</sup>	4	145	240 (550)	36	210	7399042

# Mounting Accessories Fittings

## Mounting Fittings for Mounting of Terminal Boxes on Pipes:

Type	Part no.
For ELAK-2	85725
For ELAK-5 + Ex3	85728

When the connection cable or the selfregulating heating cable is lead through insulation and out of the terminal box it **must** be protected against the cladding or cover plate over the insulation. This is done by placing a Pg cable gland, which is fastened to a sheet-metal plate, to the cladding.

Finally, a number of warning tag plates are adhered to the cladding.



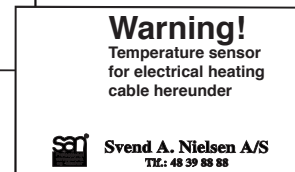
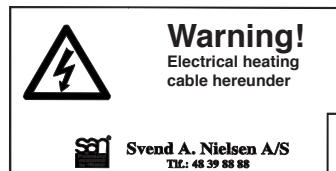
## Covering Cable Glands:

Type	Part no.
With Pg 11	172 003
With M25	172 004
With Pg 16, selfregulating heating cable ELSR, for PT 100 sensor	172 005
With Pg 9, selfregulating heating cable ELSR, for PT 100 sensor	172 027



## Warning Tag Plates:

Type	Part no.
Type 1 For heating cables	DK 85710
	ENG 85717
	RUS 85724
Type 2 For thermo sensor	DK 85718
	ENG 85719



**Type Metal Clamping band:**

10 x 0,4mm

Material: V2A  
roll length: 10m

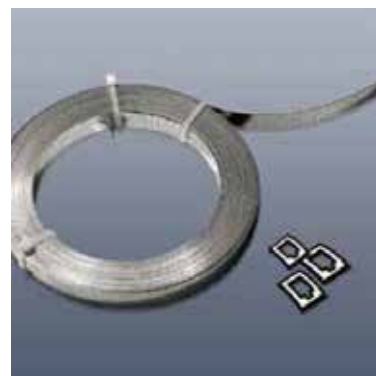
Order no.: 173040

**Type Thread clamping head  
for metal clamping band**

Material: V2A  
25 pc. in a bag

Order no.: 173041

Suitable for fix mineralinsulated heating cable on pipe, container, valves.



**Type Distance band**

15 x 0,5mm

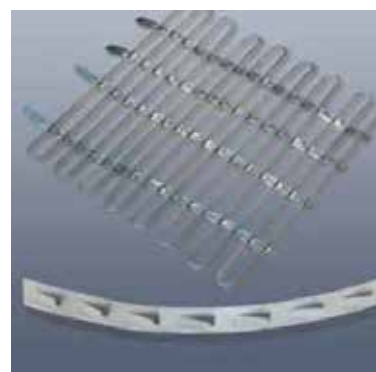
Material: V2A (1.4301)  
- bulk -

Order no.: installation distance: 30mm

Order no.: installation distance: 40mm

Order no.: 85716, installation distance: 50mm

Suitable for fix heating cable, heating tape or flat surface mats  
Distance band can be weld or fix with a wire on a pipe or container.



# SAN Flow Heaters

*SAN flow heaters are the perfect solution for heating assignments with fluids and gasses.*

## Typical applications are:

- Water heating (heating plants)
- Pressure air heating (drying technique)
- Oil heating (lubricating oil - heat transport oil)
- Moisture extraction - over-heating
- Process gas heating (N<sub>2</sub>, CO<sub>2</sub>, air etc.) (Desulphurizing, catalytic post-combustion) (Environment technique)

## Product description

The complete construction unit, "low heater", consists of a flow system (see the following constructions).

The flow heater can be manufactured in various building-in lengths so that the present conditions are considered when dimensioning.

The high specific watt load of the tubular heating element enables a compact construction at high total power. Half-circles, placed staggered in the heating bundle, provide a good "whirlwind" and thus a good and even heat transmission to the media.

## Technical data:

Heating power up to approx. 500 kW. At higher power, series- and parallel connection of the system is possible.

Connection voltage up to 690 V.

Inner diametre DN40 to DN500.

Construction length corresponding to the insertion depth of the flange heating element of 350-3000 mm.

Nominal pressure up to PN100 (standard PN16).

## Materials:

Dependant of media (pressure, temperature), the following materials are available for the flow systems:

Steel: St 37, St 35.8, 13 CrMo 44

Stainless steel: 1.4541, 1.4571

Special steel: Incoloy, Inconel

All flow heaters can be delivered with a heat insulation of mineral fibre mats with outer alu-coating.

For building-into an existing pipeline the following pipeline connections can be delivered:

Flange-, thread- or welding connections.

Fixing possibilities for the flow heater is feet, gripping jaws or a fixing flange.

## Extra equipment:

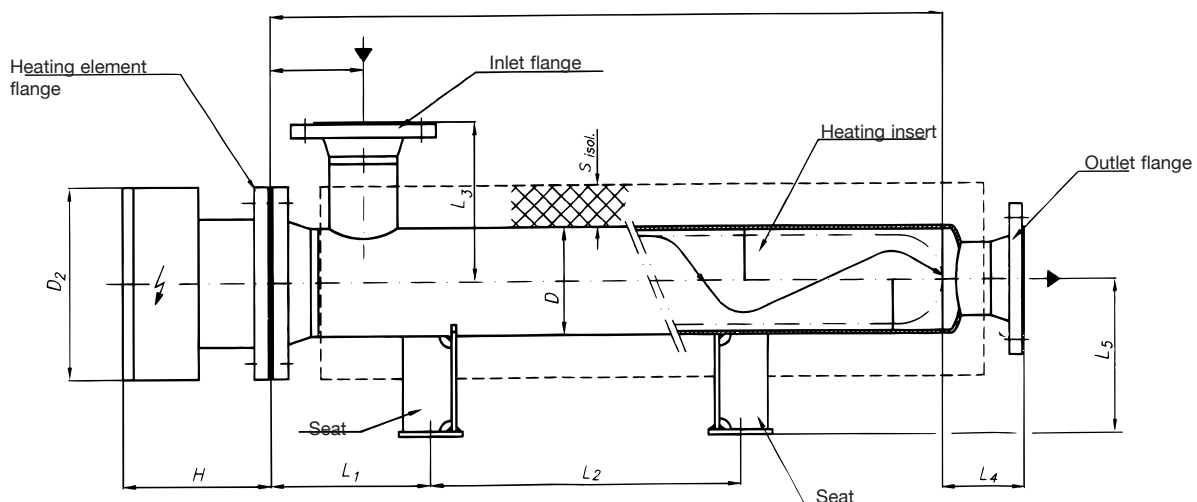
- Safety valve
- Flow monitoring valve
- Drain valve
- Ventilation valve
- Temperature regulation and -limiting

## Directions, tests and acceptance:

Dimensioning of the flow heater is made according to the TRB-TRD/AD-regulations. Deviations and other settings, e.g. ASME-code, Stomwezen, can be agreed. The used materials can be given works certificate according to DIN 50049-3.1B. Works certificates can be issued for finished tests, incl. water pressure test. According to agreement the acceptance can be made through an impartial expert.

The electrical parts of the plant correspond to the DIN VDE regulations 0100, 0700, 0720, 0721 and 0727 (GENELEC).

**For erection, control and monitoring, our operation instructions must be followed unconditionally!**

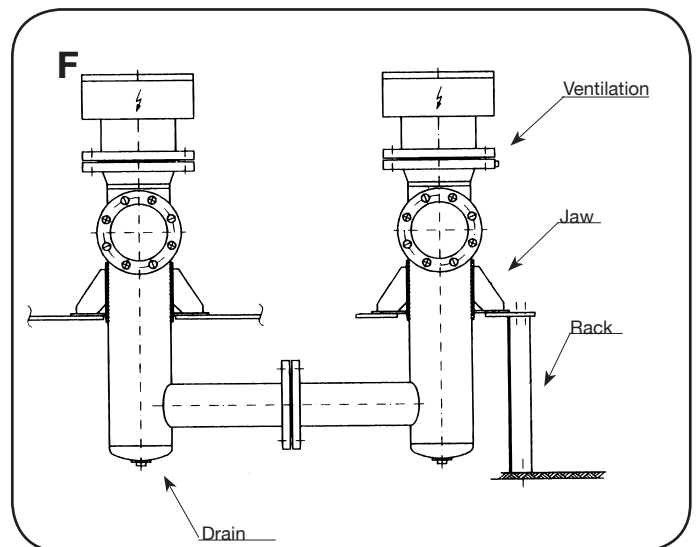
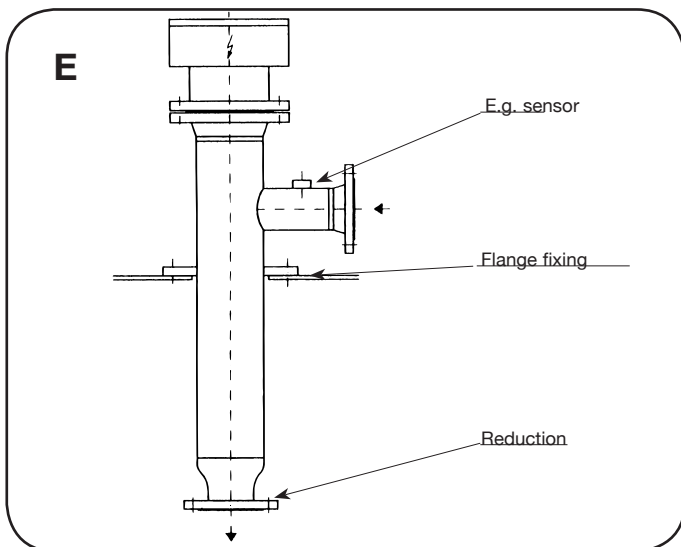
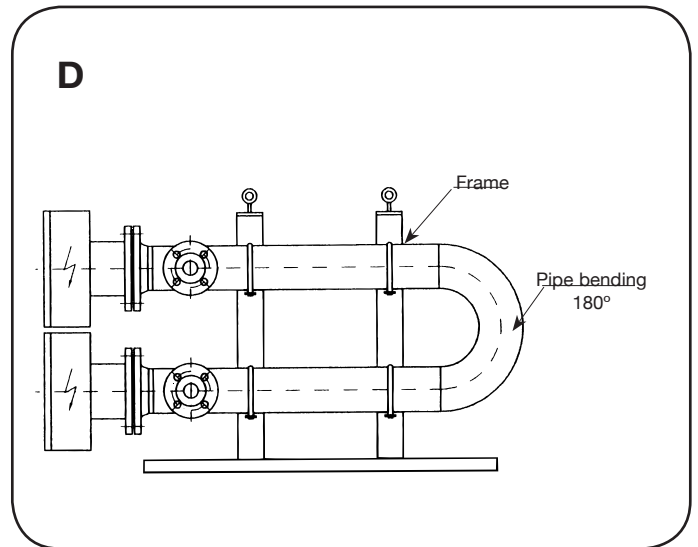
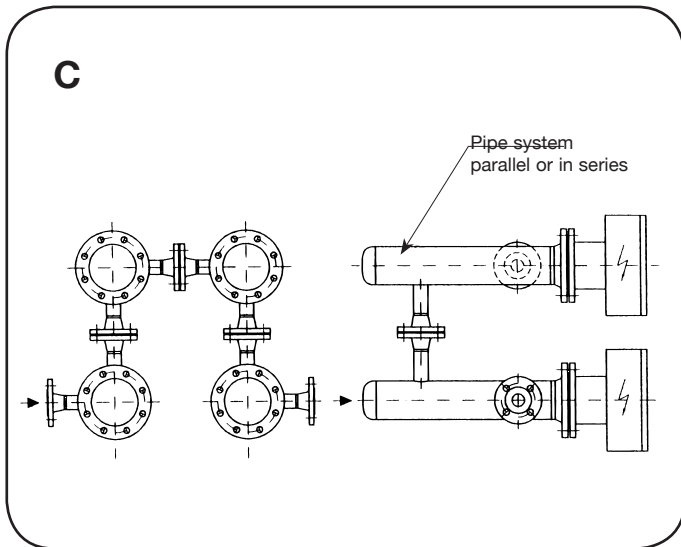
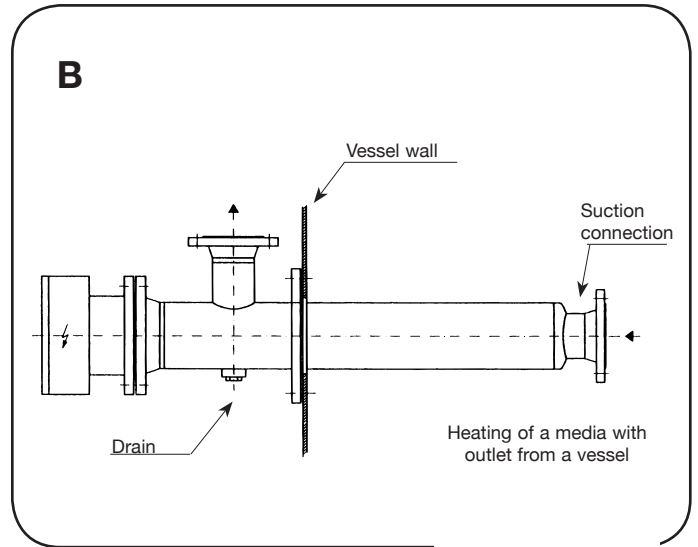
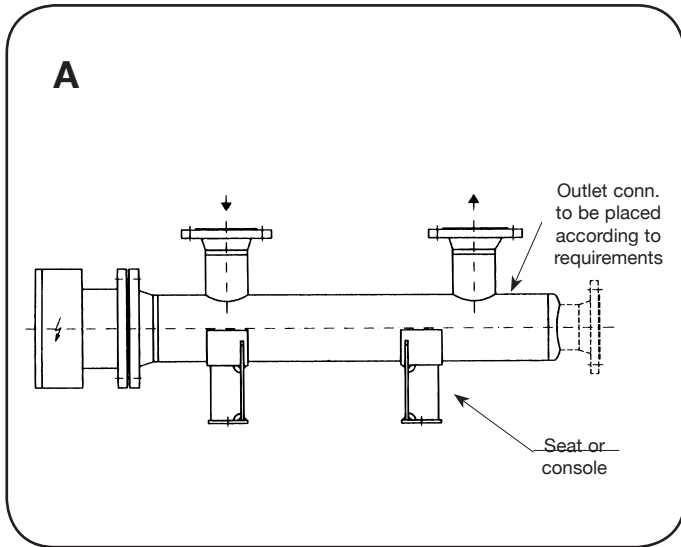


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- High-voltage
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- Controllers



With more than 50 years of experience SAN Electro Heat's most valuable asset is special knowhow about design, product development and manufacturing of professional electrical heating equipment for industrial use.

The company is geared to deliver 100% customized products, and thus functions both as a catalyst for a development project and as supplier of the final product. At the same time we insure and maintain the required quality level, mechanical and electrical dimensioning, approvals and documentation.



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