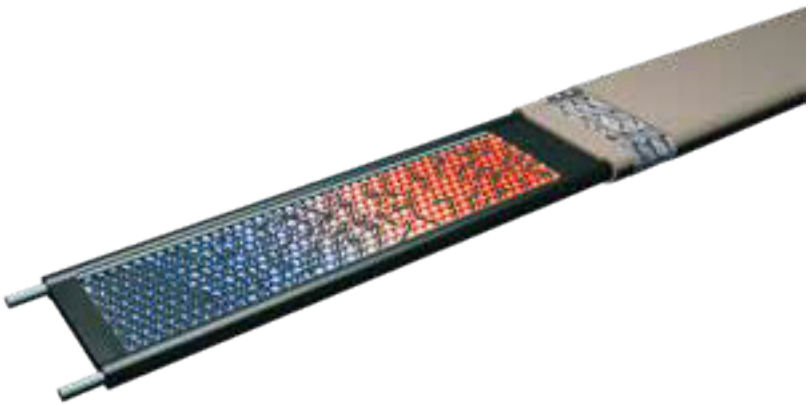
VARMEKABLER

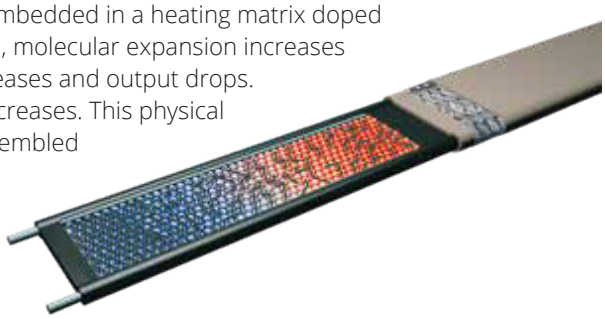


SELVREGULERENDE VARMEKABEL

NEWTRONIC

SELF-REGULATING TRACE HEATERS

Self-regulating trace heaters consist of two parallel bus wires embedded in a heating matrix doped with carbon particles. When the temperature rises in operation, molecular expansion increases the distance between the carbon particles. The resistance increases and output drops. When temperatures fall, this process is reversed and output increases. This physical property means that the heater will never overheat, can be assembled crosswise and can be operated without a temperature limiter. Moreover, selected ELSR heating cables are approved for use in hazardous areas.



APPLICATIONS

The ELSR (eltherm-self-regulating) trace heater is used for freeze prevention and temperature maintenance on vessels, pipes, valves, etc. It may be immersed in fluids. For use in aggressive environments (e.g. in chemical or petrochemical industry), the trace heater is coated with a special chemically resistant outer jacket (fluoropolymer), option "BOT".

DESIGN

A wide selection of self-regulating heater designs to handle almost any application, including
service in harsh conditions and corrosive environments.

AO Aluminium foil with a thermoplastic outer jacket. Trace heater for all low-temperature and medium-temperature applications, particularly easy to assemble.

BO Protective braid with a thermoplastic outer jacket. Trace heater with protective tinplated copper braid for all low-temperature and medium-temperature applications.

BOT Protective braid with fluoropolymer outer jacket (Teflon). Trace heaters with fluoropolymer outer jacket for use in aggressive chemical, oil and fuel environments*.

AF Aluminium foil and outer jacket approved for potable water. Special trace heaters designedcfor use inside potable water lines in Freeze prevention (-M) applications.

BF Protective braid and outer jacket approved for potable water Special trace heaters with robust protective braid for water and drinking water lines.
ELSR-N...1... = Nominal voltage 110 V
ELSR-N...2... = Nominal voltage 230 V

We also offer trace heaters with braid only, without outer jacket, upon request.
*A detailed list of chemical resistances is available online.

AT A GLANCE

BENEFITS

- Self-regulating with adaptable output
- Various temperature ranges
- Demand-orientated output grading
- High chemical resistance
- No temperature limitation required (Ex-area)
- Easy to install
- Can be cut to length off the roll
- Fast connection with El-Clic

DESIGN

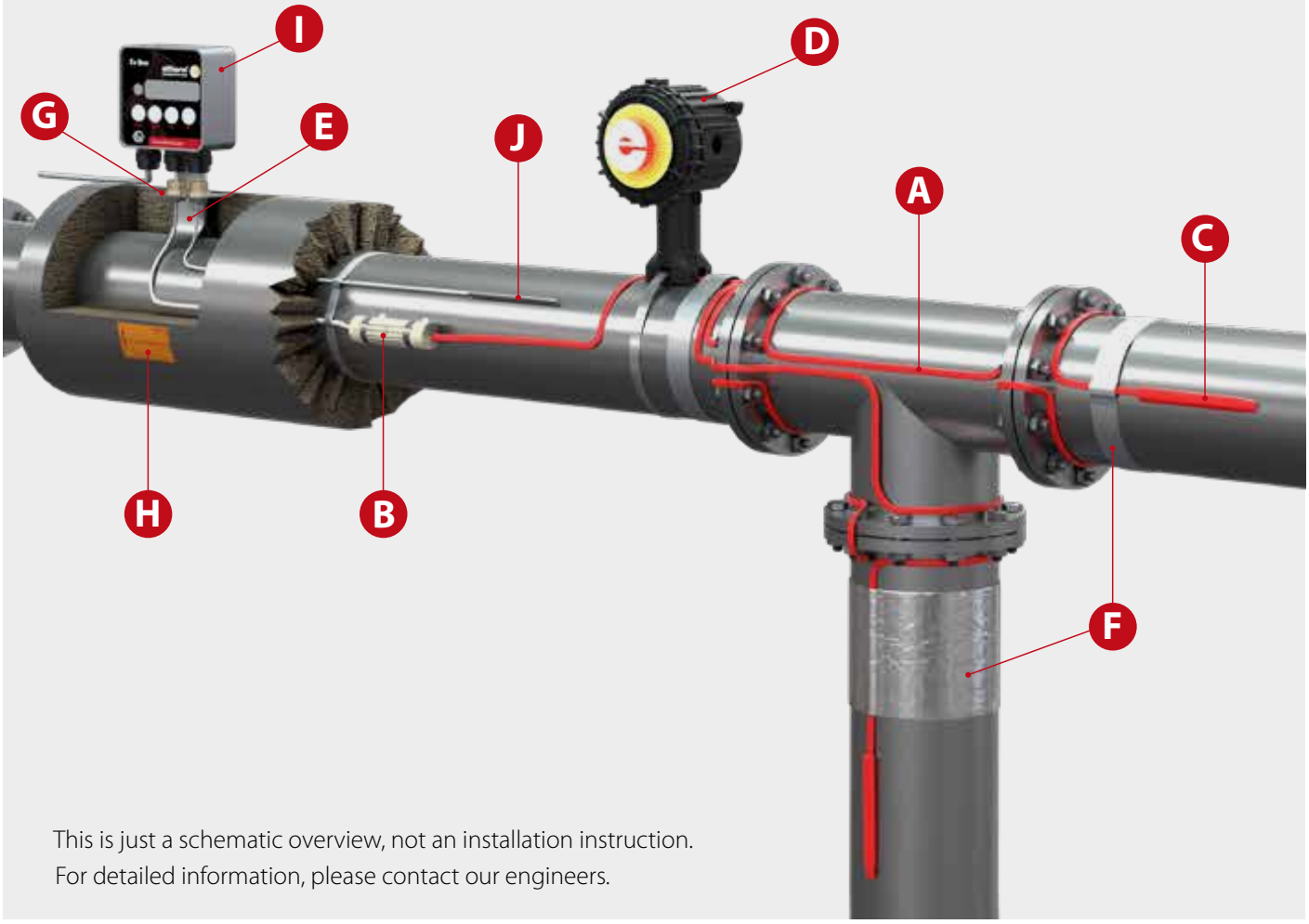
AO BO BOT
AF BF

APPROVALS

CHECKLIST

The Self-Regulating Trace Heating System

A Trace Heater	**F** Fasteners and Self-adhesive Tapes, Foils
B Power Connection Kit	**G** Insulation Bushing
C End Termination Kit	**H** Warning Sign
D Junction Box	**I** Temperature Controller
E Pipe Mounting Bracket	**J** Temperature Sensor



This is just a schematic overview, not an installation instruction.
For detailed information, please contact our engineers.

SELECTION GUIDE

	LOW TEMPERATURE		
TYPE	**ELSR-N**	**ELSR-LS**	**ELSR-M**
			
APPLICATIONS:	Freeze prevention; Temperature maintenance; Pipelines; Valves, pumps; Silos, vessels, tanks		
	Self-regulating trace heaters for freeze prevention and temperature maintenance in lower temperature ranges, predominantly in industrial applications. ELSR-N and -LS are approved for use in hazardous areas. The BOT version of ELSR-N is resistant to aggressive chemicals, oil and fuel. ELSR-M is very flexible and ideal where small heater dimensions are required.		
MAXIMUM MAINTAIN TEMPERATURE	65 °C	65 °C	65 °C
MAXIMUM EXPOSURE TEMPERATURE (DE-ENERGIZED)	80 °C	80 °C	65 °C
NOMINAL OUTPUT AT 10°C	10 W/m; 20 W/m; 30 W/m; 40 W/m	10 W/m; 15 W/m; 25 W/m	10 W/m; 15 W/m
MAX. HEATING CIRCUIT LENGTH AT 10°C, 16 AMPERE, 230 V	177,0 m; 109,0 m; 83,0 m; 57,0 m	196.0 m; 160.5 m; 103.0 m	126.5 m; 105.5 m
HAZARDOUS AREAS	•	•	

LOW TEMPERATURE

ELSR-M-AF/BF

Freeze prevention

Pipelines

ELSR-M-AF/BF is suited for freeze prevention in pipes and pipelines with seasonal exposure. Typical applications are water supply systems and sanitary facilities on building sites, outdoor events, winter markets etc.

65 °C	
65 °C	
10 W/m	
89.5 m	

LOW TEMPERATURE

ELSR-R

Freeze prevention

Special solutions

The ELSR-R line is used where its round geometry facilitates installation in sealing and door profiles. Typical applications are doors and gateways to cold-storage facilities, cold water lines in beverage production and breweries.

65 °C		
65 °C		
19 W/m	27 W/m	
102.0 m	32.0 m	

SELECTION GUIDE

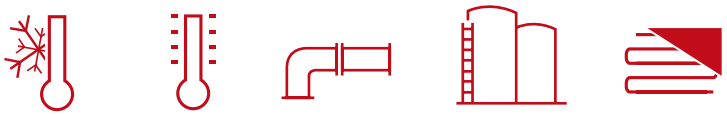
Medium temperature

ELSR-W

ELSR-Ramp

ELSR-FHP

APPLICATIONS:



Freeze prevention | Temperature maintenance | Pipelines | Silos, vessels, tanks | Open area

ELSR-W is employed for temperature maintenance on hot water pipelines and fat disposal lines in canteens or commercial kitchens. It is also used for bacteria and legionella prevention in water lines. ELSR-Ramp for freeze prevention is specially designed for concrete ramps and outdoor surfaces. ELSR-FHP was specially developed for frost heave protection in foundations, for instance in LNG terminals.

MAXIMUM MAINTAIN TEMPERATURE	80 °C			80 °C		65 °C (ELSR-FHP-23) 80 °C (ELSR-FHP-38)	
MAXIMUM EXPOSURE TEMPERATURE (DE-ENERGIZED)	100 °C			100 °C		80 °C (ELSR-FHP-23) 110 °C (ELSR-FHP-38)	
NOMINAL OUTPUT AT 10°C	water supply lines		fat/oil	50 W/m at 10 °C	110 W/m at 5 °C	23 W/m at 5 °C	38 W/m at 5 °C
	9 W/m at 55 °C	13 W/m at 65 °C	22 W/m at 40 °C				
MAX. HEATING CIRCUIT LENGTH AT 10°C, 16 AMPERE, 230 V	113.0 m	73.5 m		at -10 °C 28.0 m		at -5 °C 48.5 m	at -5 °C 36.5 m
HAZARDOUS AREAS							

HIGH TEMPERATURE

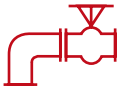
ELSR-H

ELSR-SH

ELSR-SHH

Freeze prevention

Temperature maintenance



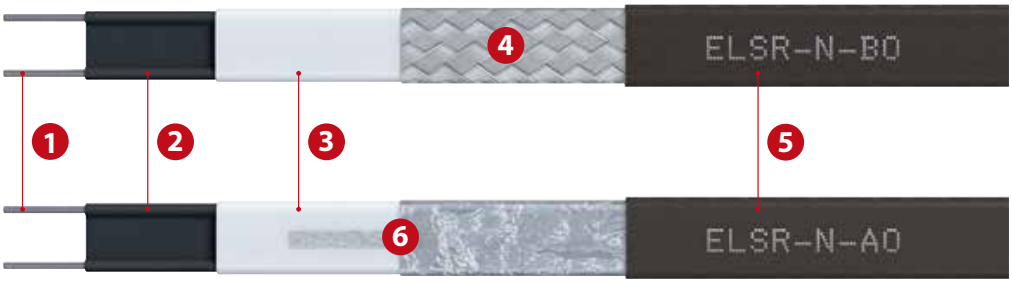
Valves, pumps

Silos, vessels, tanks

The ELSR-H, -SH and -SHH high temperature trace heater range is designed for temperature maintenance in industrial processesand applications in hazardous areas. The trace heaters' high chemical resistance allows them to be installed in environments with exposure to aggressive influences.

			120 °C							165 °C				250 °C		
			210 °C							250 °C				250 °C		
10 W/m	15 W/m	20 W/m	30 W/m	45 W/m	60 W/m	75 W/m	15 W/m	35 W/m	45 W/m	75 W/m	90 W/m	15 W/m	30 W/m	45 W/m	60 W/m	75 W/m
193.0 m	158.0 m	122.0 m	82.0 m	55.0 m	41.0 m	33.0 m	172,0 m	80,0 m	58,0 m	30,0 m	27,0 m	76.0 m	52.0 m	38.0 m at 10 A	24.0 m	14.0 m
			●						●					●		

TYPE ELSR-N
UP TO 80 °C



1 Bus wire
Nickel plated copper

2 Self-regulating heating element

3 Insulation

4 Protection Protective braid (Cu, tin plated)

5 Outer jacket

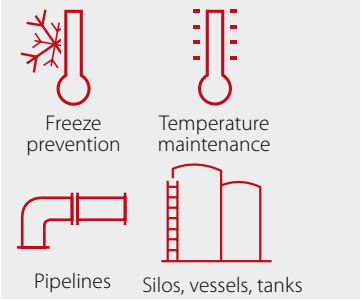
6 Protective conductor connection
see **4** or Cu, tin plated with aluminium foil

CHECKLIST ELSR-N

B + C Power Connection & End Termination		
ELVB-SRAN-Ex-20	Power connection, glued, Gland M20, brass, Ex d	0X81PND
EL-ECN-ex	Silicone termination cap black, glued, transparent with ex marking	0X81EN1
ELVB-SREx-25	Power connection, glued, Gland M25 x 1,5, PE, Ex e	0X81PA1
Ex-Con-SR	Ex connection sleeve Ø 36 x 210 mm 4J	0X81125
ELVB-SREx-IT	Power connection, glued, without gland	091AIT1
ELVB-SRA-25	Power connection, glued, Gland M25 x 1,5, PE	091A010
EL-ECN	Silicone termination cap, glued, transparent	09112N1
ELVB-SRV-N-L-W	Connection set, shrink-fit	0911116
El-Clic P/S	El-Clic P Fast connector with integrated cold lead El-Clic S Fast connector T-splice	09ClicP 09ClicS
D Junction Boxes		
ELAK-Ex-3.5	122 x 120 x 90 mm, 1 heater, capillary thermostat, IP 66	0X80055
ELAK-Ex-3.7	122 x 120 x 90, 1-3 heaters, power supply lead max. 10 mm², IP66	0X80057
Ex-it-R	ø 150 x 125 mm, 3 heaters, 1 Pt100 power supply lead, incl. mounting stand, IP 65	0X80070
ELAK-2	104 x 104 x 70 mm, polycarbonate, breakouts 7x M25, IP 66	0920030
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
ELAK-RS-T	150 x 125 mm, twin Pt100, 3 heaters incl. mounting stand, IP 65	0920059
J Temperature Sensors		
ELTF-PTEx.2	Pt100, 4 conductors, 3 m PTFE cable	0X70002
ELTF-PTEx.4	2x Pt100, 3 conductors, 3 m cold lead	0X70030
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS



- Chemistry and Petrochemistry
- Maritime and offshore
- Food Processing Industry
- Water and sanitation utilities

BENEFITS

- Benefits
- Four nominal outputs
- UV-resistant
- Moisture proof
- Junction box for pipe mounting

DESIGN

AO **BO** **BOT**

APPROVALS

- Trace Heater classification
  II 2G Ex 60079-30-1 IIC Gb
  II 2D Ex 60079-30-1 IIIC Db
- System classification
  II 2G Ex 60079-30-1 eb IIC T6 Gb
  II 2D Ex 60079-30-1 tb IIIC T85°C Db
- Certification
  EPS IECEx 18.0064U
  EPS IECEx 19.007X
  EPS 18 ATEX 1133 U
  EPS 19 ATEX 1014 X
- Temperature class
  T6

TECHNICAL INFORMATION

Maximum maintain temperature	65 °C
Maximum exposure temperature (de-energized)	80 °C
Nominal voltage*	230 V
Bending radius, min.	25 mm
Installation temperature, min.	– 60 °C

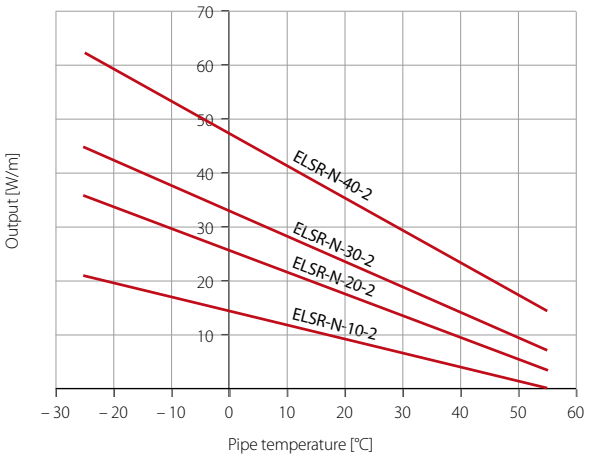
*Further power inputs on request

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

ELSR-N-…-2 output

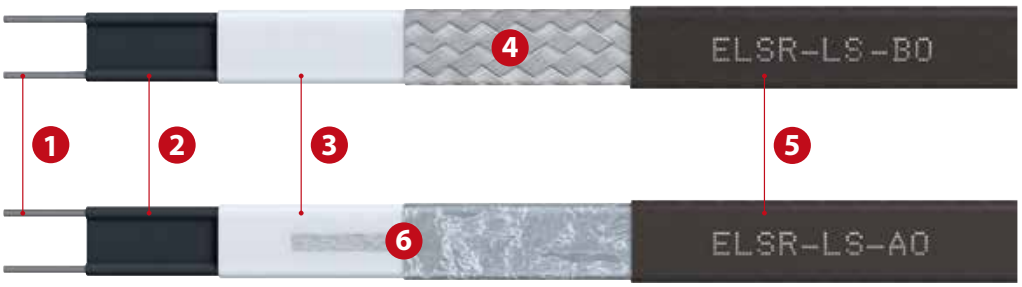
(on insulated metallic pipes in accordance with EN 62395-1)



Switch-on temperature (°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	10	128.0	68.0	52.0	36.0
	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
	32	177.0	129.0	113.0	94.0
0	10	106.0	57.0	45.0	31.0
	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
	32	160.0	119.0	105.0	88.0
-10	10	90.0	50.0	39.0	28.0
	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
	32	149.0	111.0	98.0	83.0
-20	10	78.0	44.0	35.0	25.0
	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
	32	139.0	104.0	87.0	78.0
-40	10	62.0	35.0	28.0	21.0
	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
	32	124.0	88.0	71.0	66.0

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-N-10-2-AO	10 W/m at 10 °C	13.6 x 5.5	91	B0200130
ELSR-N-10-2-BO	10 W/m at 10 °C	14.1 x 5.8	108	B0200110
ELSR-N-10-2-BOT	10 W/m at 10 °C	13.8 x 5.6	108	B0200119
ELSR-N-20-2-AO	20 W/m at 10 °C	13.6 x 5.5	91	B0200230
ELSR-N-20-2-BO	20 W/m at 10 °C	14.1 x 5.8	108	B0200210
ELSR-N-20-2-BOT	20 W/m at 10 °C	13.8 x 5.6	108	B0200219
ELSR-N-30-2-AO	30 W/m at 10 °C	13.6 x 5.5	91	B0200330
ELSR-N-30-2-BO	30 W/m at 10 °C	14.1 x 5.8	108	B0200310
ELSR-N-30-2-BOT	30 W/m at 10 °C	13.8 x 5.6	108	B0200319
ELSR-N-40-2-AO	40 W/m at 10 °C	13.6 x 5.5	91	B0200430
ELSR-N-40-2-BO	40 W/m at 10 °C	14.1 x 5.8	108	B0200410
ELSR-N-40-2-BOT	40 W/m at 10 °C	13.8 x 5.6	108	B0200419

TYPE ELSR-LS
UP TO 80 °C



1 Bus wire
Nickel plated copper

2 Self-regulating heating element

3 Insulation

4 Protection Protective braid (Cu, tin plated)

5 Outer jacket TPE-O

6 Protective conductor connection
see **4** or Cu, tin plated with aluminium foil

CHECKLIST ELSR-N

B + C Power Connection & End Termination

ELVB-SREx-25	Power connection, glued, Gland M25 x 1,5, PE, Ex e	0X81PA1
ELVB-SRAL-Ex-20	Power connection, glued, Gland M20, brass	0X81PLD
EL-ECL-ex	Silicone termination cap black, glued, transparent with ex marking	0X81EL1
Ex-Con-SR	Ex connection sleeve Ø 36 x 210 mm 4J	0X81125
ELVB-SRA-25	Power connection, glued, Gland M25 x 1,5, PE	091A010
ELVB-SRV-N-L-W	Connection set, shrink-fit	0911116
EL-ECL	Silicone termination cap, glued, transparent	09112L1
El-Clic P/S	El-Clic P Fast connector with integrated cold lead El-Clic S Fast connector T-splice	09ClicP 09ClicS

D Junction Boxes

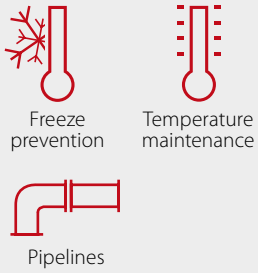
ELAK-Ex-3.5	122 x 120 x 90 mm, 1 heater, capillary thermostat, IP 66	0X80055
ELAK-Ex-3.7	122 x 120 x 90, 1-3 heaters, power supply lead max. 10 mm², IP66	0X80057
ELAK-2	104 x 104 x 70 mm, polycarbonate, breakouts 7x M25, IP 66	0920030
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
ELAK-RS-T	150 x 125 mm, twin Pt100, 3 heaters incl. mounting stand, IP 65	0920059

J Temperature Sensors

ELTF-PTEx.2	Pt100, 4 conductors, 3 m PTFE cable	0X70002
ELTF-PTEx.4	2x Pt100, 3 conductors, 3 m cold lead	0X70030
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS



- Chemistry and Petrochemistry
- Maritime and offshore
- Food Processing Industry
- Water and sanitation utilities

BENEFITS

- Benefits
- Four nominal outputs
- UV-resistant
- Moisture proof
- Junction box for pipe mounting

DESIGN

AO **BO**

APPROVALS

- Trace Heater classification
  II 2G Ex 60079-30-1 IIC Gb
  II 2D Ex 60079-30-1 IIIC Db
- System classification
  IBExU II 2G Ex 60079-30-1 eb IIC T6 Gb
  II 2D Ex 60079-30-1 tb IIIC TX Db
- Certification
  EPS 19 ATEX 1 215 U
  IBExU 09 ATEX 1047 X
- Temperature class
  T6

TECHNICAL INFORMATION

Maximum maintain temperature	65 °C
Maximum exposure temperature (de-energized)	80 °C
Nominal voltage*	230 V
Bending radius, min.	25 mm
Installation temperature, min.	– 60 °C

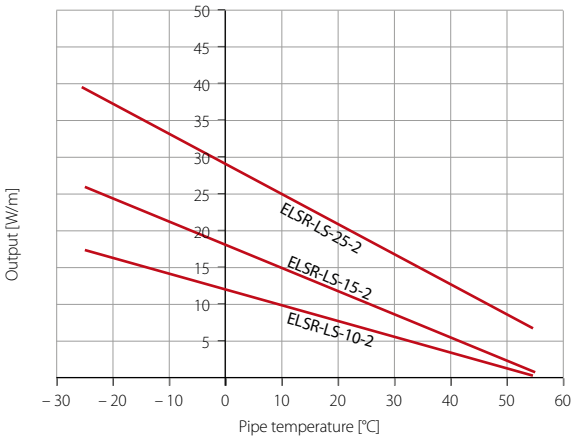
*Further power inputs on request

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

ELSR-LS-…-2 output

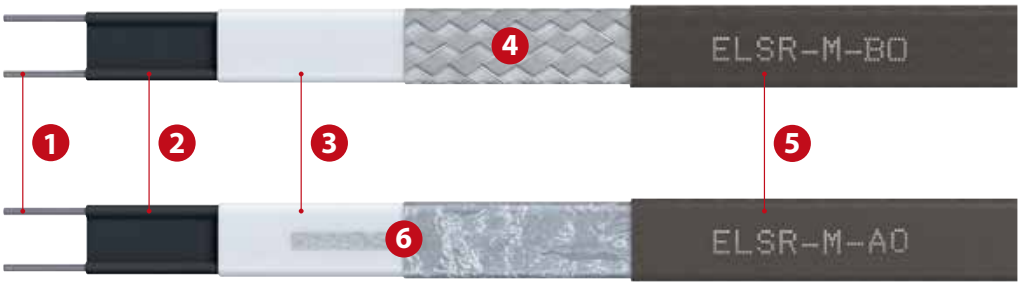
(on insulated metallic pipes in accordance with EN 62395-1)



Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for		
		ELSR-LS-10-2	ELSR-LS-15-2	ELSR-LS-25-2
10	10	152.0	103.0	64.0
	16	196.0	160.5	103.0
	20	196.0	160.5	126.0
	25	196.0	160.5	126.0
0	10	141.0	84.0	54.0
	16	188.5	134.0	87.0
	20	188.5	145.0	108.0
	25	188.5	145.0	116.0
-10	10	119.0	71.0	47.0
	16	173.5	114.0	75.0
	20	173.5	133.0	94.0
	25	173.5	133.0	107.5
-20	10	103.0	62.0	37.5
	16	161.0	99.0	60.0
	20	161.0	124.0	75.0
	25	161.0	124.0	94.0

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-LS-10-2-BO	10 W/m at 10 °C	11,0 x 5,6	98	B0223102
ELSR-LS-10-2-AO	10 W/m at 10 °C	10,3 x 5,3	78	B0223104
ELSR-LS-15-2-BO	15 W/m at 10 °C	11,0 x 5,6	98	B0223152
ELSR-LS-15-2-AO	15 W/m at 10 °C	10,3 x 5,3	78	B0223154
ELSR-LS-25-2-BO	25 W/m at 10 °C	11,0 x 5,6	98	B0223252
ELSR-LS-25-2-AO	25 W/m at 10 °C	10,3 x 5,3	78	B0223254

TYPE ELSR-M
UP TO 65 °C



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	TPE-O
6	**Protective conductor connection**	see **4** or Cu, tin plated with aluminium foil

CHECKLIST ELSR-M

B + C Power Connection & End Termination		
ELVB-SRAM-25	Power connection, shrink-fit, Gland M25 x 1,5, PE	091A015
EL-ECM	Silicone termination cap, glued, transparent	09112M1
ELVB-SRV-M	Connection set, shrink-fit	0911122
D Junction Boxes		
ELAK-2	104 x 104 x 70 mm, polycarbonate, breakouts 7x M25, IP 66	0920030
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
J Temperature Sensors		
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

Temperature maintenance

Pipelines

Valves, pumps

- Food Processing Industry
- Water and sanitation utilities

BENEFITS

- Two nominal outputs
- UV-resistant
- Moisture proof
- Small dimensions

DESIGN

AO BO

APPROVALS

TECHNICAL INFORMATION

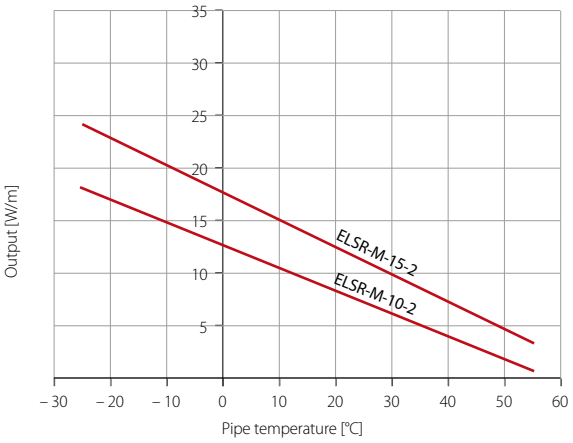
Maximum maintain temperature	65 °C
Maximum exposure temperature (de-energized)	65 °C
Nominal voltage	230 V
Bending radius, min.	25 mm
Installation temperature, min.	– 45 °C

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

ELSR-M-…-2 output

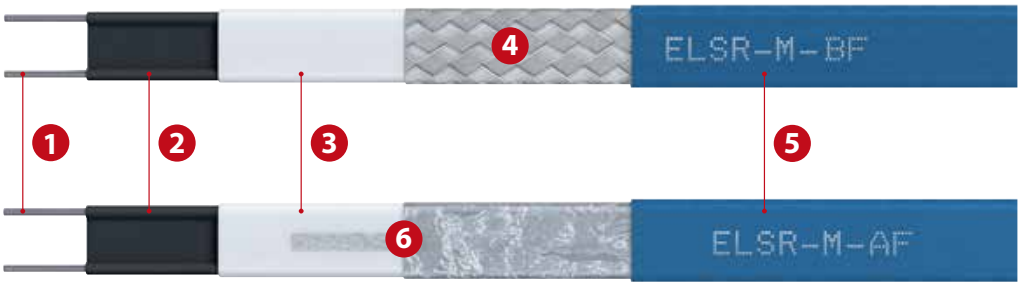
(on insulated metallic pipes in accordance with EN 62395-1)



Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for	
		ELSR-M-10-2	ELSR-M-15-2
10	10	126.5	98.0
	16	126.5	105.5
	20	126.5	105.5
0	10	115.5	83.0
	16	115.5	97.5
	20	115.5	97.5
-10	10	100.0	72.0
	16	106.5	91.0
	20	106.5	91.0
-20	10	87.0	64.0
	16	99.5	85.5
	20	99.5	85.5
-40	10	69.0	52.0
	16	88.5	77.0
	20	88.5	77.0

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-M-10-2-AO	10 W/m at 10 °C	8.0 x 5.5	53	B0225110
ELSR-M-10-2-BO	10 W/m at 10 °C	8.5 x 5.8	62	B0225102
ELSR-M-15-2-AO	15 W/m at 10 °C	8.0 x 5.5	53	B0225160
ELSR-M-15-2-BO	15 W/m at 10 °C	8.5 x 5.8	62	B0225152

TYPE ELSR-M-AF/BF
UP TO 65 °C



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	TPE-O
6	**Protective conductor connection**	see **4** or Cu, tin plated with aluminium foil

CHECKLIST ELSR-M-AF/BF

B + C Power Connection & End Termination		
ELVB-70	Cable gland Ms 3/4", brass, approved for drinking water	0911703
ELVB-71	Y-connector 32 mm, brass, approved for drinking water	0911704
ELVB-SRAM-25	Power connection, shrink-fit, Gland M25 x 1,5, PE	091A015
EL-ECMF	Silicone termination cap, glued, transparent	09112MF
ELVB-SRV-M	Connection set, shrink-fit	0911122
D Junction Boxes		
ELAK-2	104 x 104 x 70 mm, polycarbonate, breakouts 7x M25, IP 66	0920030
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
J Temperature Sensors		
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS

Freeze prevention

Pipelines

- In-pipe trace heating approved for potable water pipes and flexible tubes

BENEFITS

- Officially approved
- Can be used in liquids
- Suitable for drinking water
- Small dimensions

DESIGN

AF BF

APPROVALS

- Certification K-229437-13-Bs/st

TECHNICAL INFORMATION

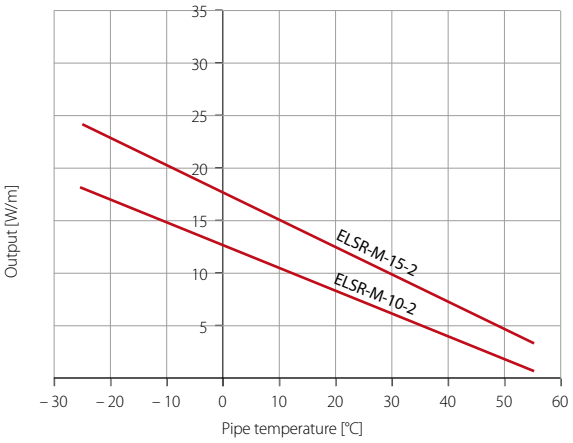
Maximum maintain temperature	65 °C
Maximum exposure temperature (de-energized)	65 °C
Nominal voltage	230 V
Bending radius, min.	25 mm
Installation temperature, min.	– 45 °C

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

ELSR-M-…-2 output

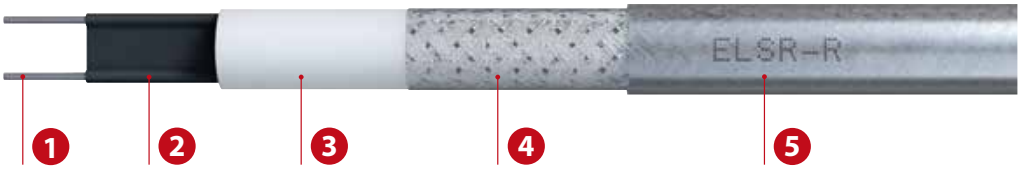
(on insulated metallic pipes in accordance with EN 62395-1)



Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for	
		ELSR-M-10-2	ELSR-M-15-2
10	10	126.5	98.0
	16	126.5	105.5
	20	126.5	105.5
0	10	115.5	83.0
	16	115.5	97.5
	20	115.5	97.5
-10	10	100.0	72.0
	16	106.5	91.0
	20	106.5	91.0
-20	10	87.0	64.0
	16	99.5	85.5
	20	99.5	85.5
-40	10	69.0	52.0
	16	88.5	77.0
	20	88.5	77.0

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-M-10-2-AO	10 W/m at 10 °C	8.0 x 5.5	53	B0225110
ELSR-M-10-2-BO	10 W/m at 10 °C	8.5 x 5.8	62	B0225102
ELSR-M-15-2-AO	15 W/m at 10 °C	8.0 x 5.5	53	B0225160
ELSR-M-15-2-BO	15 W/m at 10 °C	8.5 x 5.8	62	B0225152

TYPE ELSR-R
UP TO 65 °C



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	Fluoropolymer

CHECKLIST ELSR-R

B + C Power Connection & End Termination		
ELVB-SRAR-25	Power connection, shrink-fit, Gland M25 x 1,5, PE	091A020
EL-ECM	Silicone termination cap, glued, transparent	09112M1
ELVB-SRV-M	Connection set, shrink-fit	0911122
D Junction Boxes		
ELAK-2	104 x 104 x 70 mm, polycarbonate, breakouts 7x M25, IP 66	0920030
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
J Temperature Sensors		
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS

Freeze prevention

Special solutions

- Doors and seals of refrigerating chambers
- Profile Heating
- Boarding Bridges

BENEFITS

- Round design
- Moisture proof
- UV-resistant
- Ideal for profile installation

DESIGN

BOT

APPROVALS

TECHNICAL INFORMATION

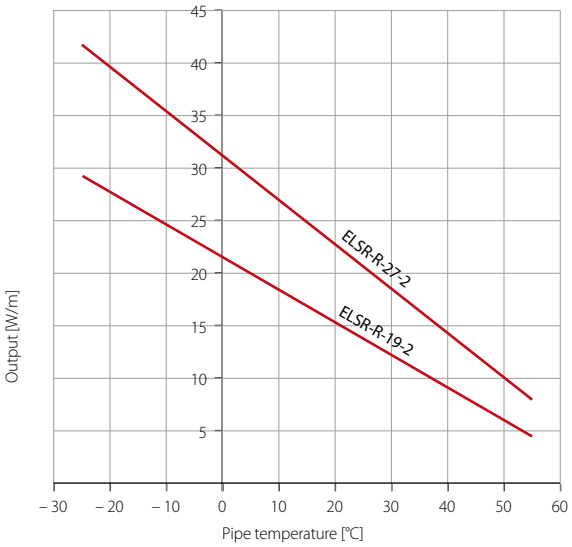
Maximum maintain temperature	65 °C
Maximum exposure temperature (de-energized)	65 °C
Nominal voltage	230 V
Bending radius, min.	30 mm
Installation temperature, min.	– 30 °C

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

ELSR-R-...-2-BOT output

(in a filled water pipeline)



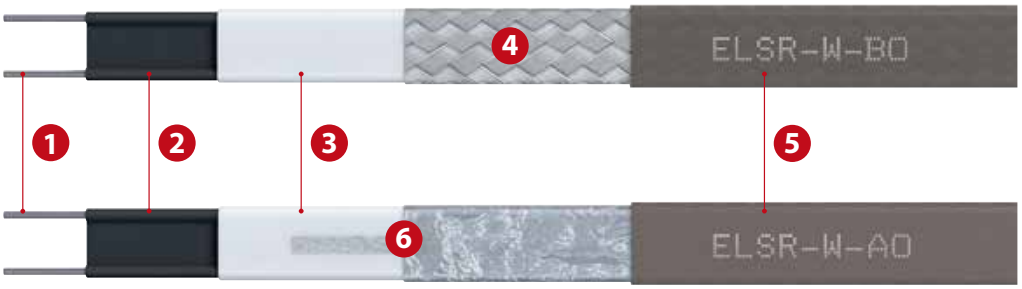
Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for	
		ELSR-R-19-2	ELSR-R-27-2
10	10	75.0	20.0
	16	102.0	32.0
	20	102.0	40.0
0	10	62.0	16.5
	16	94.0	26.5
	20	94.0	33.0
-10	10	51.0	13.5
	16	81.5	21.5
	20	88.0	27.0
-20	10	41.0	11.0
	16	65.5	17.5
	20	82.0	22.0
-40	10	30.0	7.5
	16	48.0	12.0
	20	60.0	15.0

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-R-19-2-BOT	19 W/m at 10 °C	7.3	77	B0200507
ELSR-R-27-2-BOT	27 W/m at 10 °C	7.3	74	B0200605

Other versions are available upon request.

This heating cable has specially been developed for the use with doors of refrigerating chambers. Please contact our engineers for more details on our ELSR-R.

TYPE ELSR-W
UP TO 100 °C



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	TPE-O
6	**Protective conductor connection**	see **4** or Cu, tin plated with aluminium foil

CHECKLIST ELSR-R

B + C Power Connection & End Termination		
ELVB-SRA-25	Power connection, glued, Gland M25 x 1,5, PE	091A010
EL-ECW	Silicone termination cap, glued, transparent	09112W1
ELVB-SRV-N-L-W	Connection set, shrink-fit	0911116
EI-Clic P/S	EI-Clic P Fast connector with integrated cold lead EI-Clic S Fast connector T-splice	09ClicP 09ClicS
D Junction Boxes		
ELAK-2	104 x 104 x 70 mm, polycarbonate, breakouts 7x M25, IP 66	0920030
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
ELAK-RS-T	150 x 125 mm, twin Pt100, 3 heaters incl. mounting stand, IP 65	0920059
J Temperature Sensors		
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS

Temperature maintenance

Silos, vessels, tanks

Pipelines

- Doors and seals of refrigerating chambers
- Profile Heating
- Boarding Bridges

BENEFITS

- Two nominal outputs
- Moisture proof

DESIGN

AO **BO**

APPROVALS

TECHNICAL INFORMATION

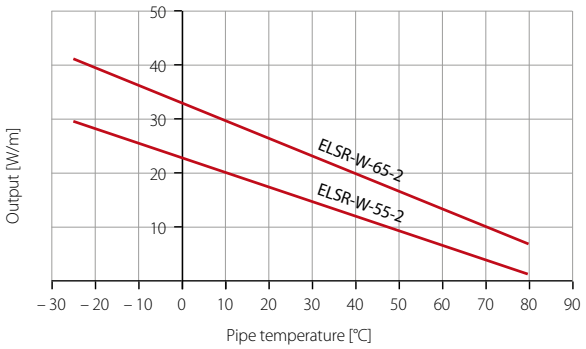
Maximum maintain temperature	80 °C
Maximum exposure temperature (de-energized)	100 °C
Nominal voltage	230 V
Bending radius, min.	20 mm
Installation temperature, min.	– 20 °C

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

ELSR-W-…-2 output

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

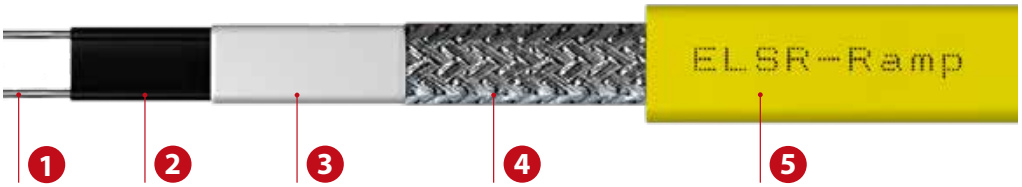


Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for ELSR-W-55-2	Heating circuit length (m) for ELSR-W-65-2
10	10	70.0	45.5
	16	113.0	73.5
	20	131.0	92.0
	25	131.0	106.0
	32	131.0	106.0
0	10	63.0	41.5
	16	101.0	66.0
	20	123.5	83.0
	25	123.5	99.5
	32	123.5	99.5
-10	10	57.0	37.5
	16	91.0	60.0
	20	113.5	75.0
	25	117.0	94.0
	32	117.0	95.0
-20	10	52.0	34.0
	16	83.0	55.0
	20	104.0	69.5
	25	112.0	86.0
	32	112.0	90.5
-40	10	44.0	29.5
	16	70.0	48.0
	20	88.0	59.0
	25	103.0	74.0
	32	103.0	83.5

Type	Nominal output used for *water supply lines*	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-W-55-2-AO	9 W/m at 55 °C	12.9 x 5.0	86	B0200360
ELSR-W-55-2-BO	9 W/m at 55 °C	12.9 x 5.0	105	B0200350
ELSR-W-65-2-AO	13 W/m at 65 °C	12.9 x 5.0	86	B0200455
ELSR-W-65-2-BO	13 W/m at 65 °C	12.9 x 5.0	105	B0200450

Type	Nominal output used with *fat/oil lines*	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-W-65-2-AO	22 W/m at 40 °C	12.9 x 5.0	86	B0200455
ELSR-W-65-2-BO	22 W/m at 40 °C	12.9 x 5.0	105	B0200450

TYPE ELSR-RAMP
UP TO 100 °C



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	TPE pressure-grouted with protective braid

CHECKLIST ELSR-RAMP

B + C Power Connection & End Termination		
ELVB-SRV-Ramp	Connection set, shrink-fit	0911124
EL-ECRA	Silicone termination cap, glued, transparent	09112RA
D Junction Boxes		
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
J Temperature Sensors		
Sensor Set	Sensor set for ELSR-Ramp	TBA000202

AT A GLANCE

APPLICATIONS

Freeze prevention

Open area

- Parking garages entrances, exits
- Helicopter landing sites
- Concrete ramps
- Stairs and footpaths

BENEFITS

- Highly robust
- Suited for hardest installing conditions
- Flexible mounting
- Radially and longitudinally waterproof
- Outer jacket is strongly grouted with protective braid

APPROVALS

NOTE

- Not suited for use in asphalt

TECHNICAL INFORMATION

Maximum maintain temperature	80 °C
Maximum exposure temperature (de-energized)	100 °C
Nominal voltage	230 V
Bending radius, min.	50 mm
Installation temperature, min.	– 20 °C

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for ELSR-Ramp
-10	10	18.0
	16	28.0
	20	36.0
	25	45.0
	32	55.0

Heating circuit lengths may vary in specific installation situations. Please contact our engineers for more details.

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-Ramp	50 W/m at 10 °C	17,2 x 9,5	253	B02RAMP0
ELSR-Ramp	110 W/m at 5 °C in concrete	17,2 x 9,5	253	B02RAMP0

Electrical protection

Maximum heating circuit length

- According to local standards and regulations.
- Take into account the supply lead conductor size and max. permitted voltage drop.
- A higher voltage drop can occur at start-up of heating.

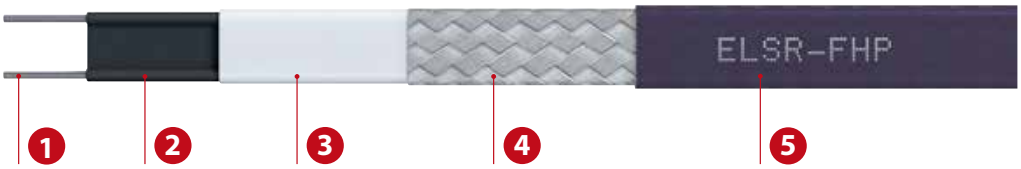
Power at start-up

- According to local standards and regulations.
- To determine the installed power with the electrical system designer, the nominal current of the series connected fuse or the current value at the system start-up temperature must be taken into account (e.g. 32 A for 55 m ELSR-Ramp (–10 °C).
- Residual current device (RCD) 30 mA required, max. 500 m heating cable per RCD.

Remark

- For the use of standard control cabinets, the maximum heating circuit length of 55 m at 32 A per heating circuit must not be exceeded.

TYPE ELSR-FHP
UP TO 110 °C



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	Fluoropolymer

CHECKLIST ELSR-FHP

B + C Power Connection & End Termination		
EL-ECFHP	End termination kit for ELSR-FHP	09112F1
ELVB-SRA-25	Power connection, glued, Gland M25 x 1,5, PE	091A010
D Junction Boxes		
ELAK-2	104 x 104 x 70 mm, polycarbonate, breakouts 7x M25, IP 66	0920030
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
ELAK-5.1	130 x 130 x 75 mm, polycarbonate, breakouts 9x M20/M25, IP 66	0920002
J Temperature Sensors		
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS

Freeze prevention

Silos, vessels, tanks

- Cryogenic Storage Tanks

BENEFITS

- Highly robust
- Suitable for harsh installed environment
- Flexible mounting
- Waterproof

APPROVALS

TECHNICAL INFORMATION

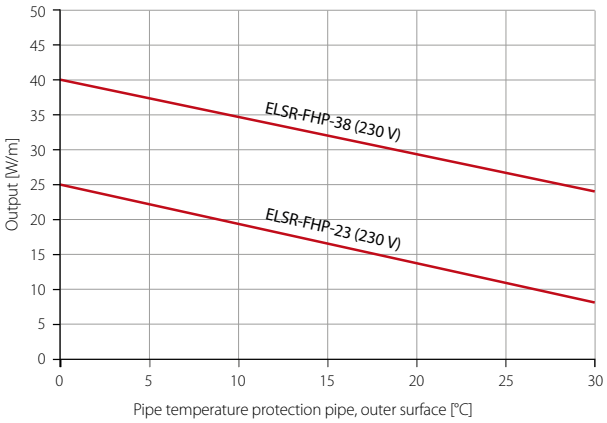
Maximum maintain temperature	80 °C (ELSR-FHP-38) 65 °C (ELSR-FHP-23)
Maximum exposure temperature (de-energized)	110 °C (ELSR-FHP-38) 80 °C (ELSR-FHP-23)
Nominal voltage	230 V
Bending radius, min.	50 mm
Installation temperature, min.	– 45 °C

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end, in 25 mm/1“ conduit

ELSR-FHP-...-2 output

(in empty metallic protection pipes 1“)

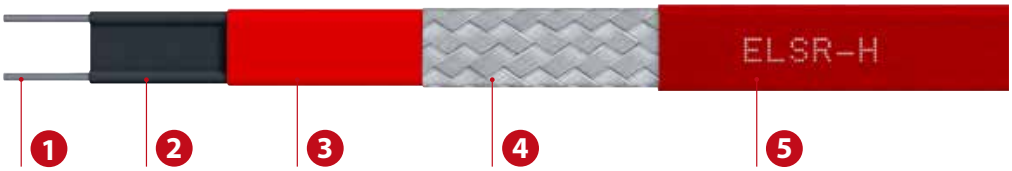


Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for	
		ELSR-FHP-23	ELSR-FHP-38
-5	10	30.0	23.0
	16	48.5	36.5
	20	60.5	45.5
	25	75.5	57.5
	32	97.0	72.5
	40	121.0	91.5
-15	10	23.0	21.5
	16	37.0	34.5
	20	46.0	43.0
	25	57.5	54.0
	32	74.5	68.5
	40	92.0	85.5

Heating circuit lengths may vary in specific installation situations. Please contact our engineers for more details.

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-FHP-23	23 W/m at 5 °C	14,0 x 5,5	155	B02FHP23
ELSR-FHP-38	38 W/m at 5 °C	14,0 x 5,5	155	B02FHP38

TYPE ELSR-H
UP TO 210 °C*



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	Fluoropolymer
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	Fluoropolymer

CHECKLIST ELSR-N

B + C Power Connection & End Termination

EL-ECSH-Ex	Silicone termination cap, red, glued, with ex marking	0X81EH2
Ex-Con-SR	Ex connection sleeve Ø 36 x 210 mm 4J	0X81125
ELVB-SREx-25	Power connection, glued, Gland M25 x 1,5, PE, Ex e	0X81PA1
ELVB-SREx-IT	Power connection, glued, without gland	091AIT1
ELVB-SRAH-Ex-20	Power connection, glued, Gland M20, brass	0X81PHD
ELVB-SRV-H	Connection set, shrink-fit	0911117
ELVB-SRAH-25	Power connection, glued, Gland M25 x 1,5, PE	091A040

D Junction Boxes

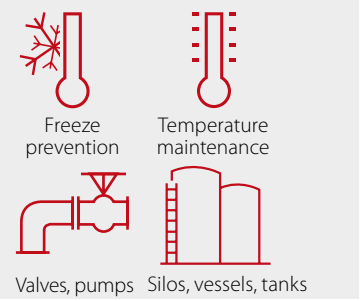
ELAK-Ex-3.7	122 x 120 x 90, 1-3 heaters, power supply lead max. 10 mm², IP66	0X80057
Ex-it-R	ø 150 x 125 mm, 3 heaters, 1 Pt100 power supply lead, incl. mounting stand, IP 65	0X80070
ELAK-Ex-3.5	122 x 120 x 90 mm, 1 heater, capillary thermostat, IP 66	0X80055
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013

J Temperature Sensors

ELTF-PTEx.2	Pt100, 4 conductors, 3 m PTFE cable	0X70002
ELTF-PTEx.4	2x Pt100, 3 conductors, 3 m cold lead	0X70030
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS



- Chemistry and Petrochemistry
- Oil and Gas Industry
- Power plants
- Water and sanitation utilities

BENEFITS

- Seven nominal outputs
- Moisture proof
- Resistant to chemicals
- Use in hazardous areas

DESIGN

BOT

APPROVALS

- Trace Heater classification
  II 2G Ex 60079-30-1 IIC Gb
  II 2D Ex 60079-30-1 IIIC Db
- System classification
  II 2G Ex 60079-30-1 eb IIC T3 Gb
  II 2D Ex 60079-30-1 tb IIIC T200°C Db
- Certification
  EPS IECEx 12.0004U
  EPS IECEx 19.0006X
  EPS 12 ATEX 1 429 U
  EPS 19 ATEX 1013 X
- Temperature class
  T6 to T3
- * Use in Ex areas is permitted up to 180 °C

TECHNICAL INFORMATION

Maximum maintain temperature	120 °C
Maximum exposure temperature (de-energized)	210 °C (max. 1000 h)
Nominal voltage*	230 V
Bending radius, min.	25 mm
Installation temperature, min.	– 60 °C

*Further power inputs on request

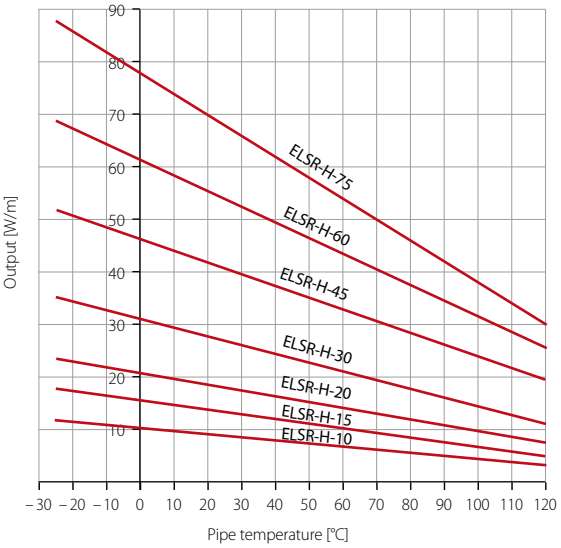
Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-H-10-2-BOT	10 W/m at 10 °C	12.4 x 5.0	120	B0221103
ELSR-H-15-2-BOT	15 W/m at 10 °C	12.4 x 5.0	120	B0221153
ELSR-H-20-2-BOT	20 W/m at 10 °C	12.4 x 5.0	120	B0221203
ELSR-H-30-2-BOT	30 W/m at 10 °C	12.4 x 5.0	120	B0221303
ELSR-H-45-2-BOT	45 W/m at 10 °C	12.4 x 5.0	120	B0221453
ELSR-H-60-2-BOT	60 W/m at 10 °C	12.4 x 5.0	120	B0221603
ELSR-H-75-2-BOT	75 W/m at 10 °C	12.4 x 5.0	120	B0221753

ELSR-H-...-2-BOT output

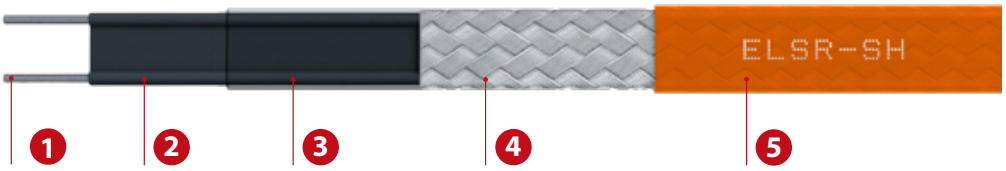
(on insulated metallic pipes according to 62395-1)



Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for ELSR-H-10-2	ELSR-H-15-2	ELSR-H-20-2	ELSR-H-30-2
10	16	193.0	158.0	122.0	82.0
	20	193.0	158.0	136.0	102.0
	25	193.0	158.0	136.0	111.0
	32	193.0	158.0	136.0	111.0
0	16	189.0	153.0	116.0	77.0
	20	189.0	153.0	132.0	97.0
	25	189.0	153.0	132.0	108.0
	32	189.0	153.0	132.0	108.0
-10	16	184.0	146.0	110.0	73.0
	20	1840.	148.5	129.0	92.0
	25	1840.	148.5	129.0	105.5
	32	184.0	148.5	129.0	105.5
-20	16	180.0	139.0	104.0	70.0
	20	180.0	145.0	125.5	87.0
	25	180.0	145.0	125.5	103.0
	32	180.0	145.0	125.5	103.0
-40	16	173.0	126.0	95.0	64.0
	20	173.0	138.0	119.0	80.0
	25	173.0	138.0	120.0	98.0
	32	173.0	138.0	120.0	98.0

Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for ELSR-H-45-2	ELSR-H-60-2	ELSR-H-75-2
10	16	55.0	41.0	33.0
	20	68.0	51.0	41.5
	25	85.0	64.0	51.5
	32	91.0	79.0	66.0
0	16	52.0	39.0	30.0
	20	65.0	49.0	37.5
	25	81.0	61.0	47.0
	32	88.5	77.0	60.0
-10	16	50.0	37.0	28.5
	20	62.0	46.0	35.5
	25	77.0	58.0	44.5
	32	86.5	70.0	57.0
-20	16	47.0	36.0	26.5
	20	59.0	44.0	33.5
	25	74.0	56.0	41.5
	32	84.5	67.0	53.5
-40	16	43.0	33.0	23.5
	20	54.0	41.0	29.0
	25	68.0	51.0	36.5
	32	81.0	61.0	46.5

TYPE ELSR-SH
UP TO 250 °C



1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	Fluoropolymer
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	Fluoropolymer

CHECKLIST ELSR-SH

B + C Power Connection & End Termination

ELVB-SREx-25	Power connection, glued, Gland M25 x 1,5, PE, Ex e	0X81PA1
ELVB-SREx-IT	Power connection, glued, without gland	091AIT1
EL-ECSH-Ex	Silicone termination cap, red, glued, with ex marking	0X81EH2
ELVB-SRASH-Ex-20	Power connection, glued, Gland M20, Ex d	0X81PSD
ELVB-SRAH-25	Power connection, glued, Gland M25 x 1,5, PE	091A040

D Junction Boxes

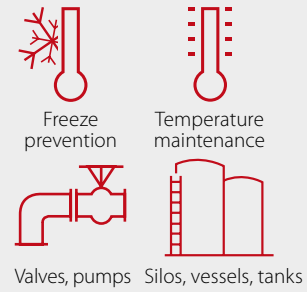
ELAK-Ex-3.7	122 x 120 x 90, 1-3 heaters, power supply lead max. 10 mm², IP66	0X80057
Ex-it-R	ø 150 x 125 mm, 3 heaters, 1 Pt100 power supply lead, incl. mounting stand, IP 65	0X80070
ELAK-Ex-3.5	122 x 120 x 90 mm, 1 heater, capillary thermostat, IP 66	0X80055
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013

J Temperature Sensors

ELTF-PTEx.2	Pt100, 4 conductors, 3 m PTFE cable	0X70002
ELTF-PTEx.4	2x Pt100, 3 conductors, 3 m cold lead	0X70030
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS



- Chemistry and Petrochemistry
- Oil and Gas Industry
- Power plants

BENEFITS

- Temperature classification T3*
- Five nominal outputs
- Moisture proof
- Resistant to chemicals
- Use in hazardous areas
  *Except for 90 W/m: T2

DESIGN

BOT

APPROVALS

- Trace Heater classification
  II 2G Ex 60079-30-1 IIC Gb
  II 2D Ex 60079-30-1 IIIC Db
- System classification
  II 2G Ex 60079-30-1 eb IIC T2 Gb
  II 2D Ex 60079-30-1 tb IIIC T220°C Db
- Certification
  EPS IECEx 18.0019U
  EPS IECEx 18.0014X
  EPS 18 ATEX 1 028 U
  EPS 18 ATEX 1 020 X
- Temperature class
  T3/T2

TECHNICAL INFORMATION

Maximum maintain temperature	165 °C
Maximum exposure temperature (de-energized)	250 °C
Nominal voltage	230 V
Bending radius, min.	25 mm
Installation temperature, min.	– 60 °C

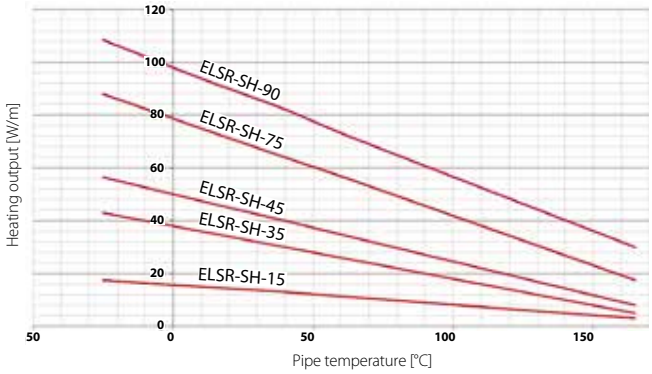
Heating circuit lengths on the following conditions

230 V nominal voltage
Delayed action circuit breakers (C-characteristic) with 100 % load
Maximum 10 % line voltage drop on heating cable bus wire
Power connection to one heater end

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-SH-15-2-BOT	15 W/m at 10 °C	14 x 5,4	146	B0226153
ELSR-SH-35-2-BOT	35 W/m at 10 °C	14 x 5,4	146	B0226353
ELSR-SH-45-2-BOT	45 W/m at 10 °C	14 x 5,4	146	B0226453
ELSR-SH-75-2-BOT	75 W/m at 10 °C	14 x 5,4	146	B0226753
ELSR-SH-90-2-BOT	90 W/m at 10 °C	14 x 5,4	146	B0226903

ELSR-SH-...-2-BOT output

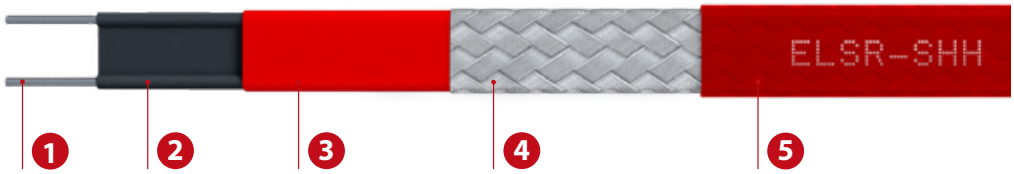
(on insulated metallic pipes according to 62395-1)



Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for ELSR-SH				
		15-2 BOT	35-2 BOT	45-2 BOT	75-2 BOT	90-2 BOT
10	10	113	50.0	36.25	18.75	17.0
	16	172	80.0	58.0	30.0	27.0
	20	172	99.0	72.5	37.5	34.0
	25	172	107.5	90.625	47.0	42.5
	32	172	107.5	98.0	60.0	54.0
	40	172	107.5	98.0	73.0	68.0
0	10	106	47.0	34.5	17.75	16.0
	16	169	75.0	55.0	28.5	26.0
	20	172	94.0	69.0	35.5	32.0
	25	172	107.5	86.25	44.5	40.0
	32	172	107.5	98.0	57.0	52.0
	40	172	107.5	98.0	71.0	64.0
-10	10	99	44.0	32.5	16.5	15.5
	16	159	71.0	52.0	26.5	25.0
	20	172	89.0	65.0	33.0	31.0
	25	172	107.5	81.25	41.25	38.75
	32	172	107.5	98.0	53.0	50.0
	40	172	107.5	98.0	66.0	62.0

Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for ELSR-SH				
		15-2 BOT	35-2 BOT	45-2 BOT	75-2 BOT	90-2 BOT
-20	10	94	42.0	30.0	15.5	15.0
	16	150	67.0	48.0	25.0	24.0
	20	172	84.0	60.0	31.0	30.0
	25	172	105.0	75.0	38.75	37.5
	32	172	107.5	96.0	50.0	48.0
	40	172	107.5	98.0	62.0	60.0
-30	10	89	40.0	27.5	15.0	14.5
	16	142.5	64.0	44.0	24.0	23.0
	20	172	80.0	55.0	30.0	29.0
	25	172	100.0	68.75	37.5	36.25
	32	172	107.5	88.0	48.0	46.0
	40	172	107.5	98.0	60.0	58.0
-40	10	84	38.0	25.0	14.0	14.0
	16	135	61.0	40.0	22.5	22.0
	20	169	76.0	50.0	28.0	28.0
	25	172	95.0	62.5	35.0	35.0
	32	172	107.5	80.0	45.0	44.0
	40	172	107.5	98.0	56.0	56.0

TYPE ELSR-SHH
UP TO 250 °C



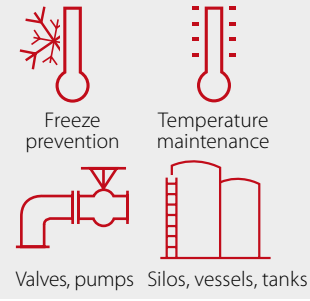
1	**Bus wire**	Nickel plated copper
2	**Self-regulating heating element**	
3	**Insulation**	
4	**Protection**	Protective braid (Cu, tin plated)
5	**Outer jacket**	TPE-O, Fluoropolymer

CHECKLIST ELSR-SH

B + C Power Connection & End Termination		
ELVB-SREx-25	Power connection, glued, Gland M25 x 1,5, PE, Ex e	0X81PA1
EL-ECSH-Ex	Silicone termination cap, red, glued, with ex marking	0X81EH2
D Junction Boxes		
ELAK-Ex-3.7	122 x 120 x 90, 1-3 heaters, power supply lead max. 10 mm², IP66	0X80057
Ex-it-R	ø 150 x 125 mm, 3 heaters, 1 Pt100 power supply lead, incl. mounting stand, IP 65	0X80070
ELAK-Ex-3.5	122 x 120 x 90 mm, 1 heater, capillary thermostat, IP 66	0X80055
ELAK-5	122 x 120 x 90 mm, polyester, 3 breakouts M25, IP 66	0920013
J Temperature Sensors		
ELTF-PTEx.2	Pt100, 4 conductors, 3 m PTFE cable	0X70002
ELTF-PTEx.4	2x Pt100, 3 conductors, 3 m cold lead	0X70030
ELTF-PT.1	Pt100, 5 x 50 mm PVC 5 m	0650001
ELTF-PT.3	Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	0650003
ELTF-PT.3.1	Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	0650002

AT A GLANCE

APPLICATIONS



- Chemistry and Petrochemistry
- Oil and Gas Industry
- Power plants

BENEFITS

- Temperature classification T3*
- Five nominal outputs
- Moisture proof
- Resistant to chemicals
- Use in hazardous areas
  *Except for 75 W/m: T2

DESIGN

BOT

APPROVALS

- Trace Heater classification
  II 2G Ex 60079-30-1 IIC Gb
  II 2D Ex 60079-30-1 IIIC Db
- System classification
  II 2G Ex eb IIC T3 Gb
  II 2D Ex tb IIIC T200°C Db
- Certification
  EPS 17 ATEX 1 169 X
  EPS IECEx 17.0064X
  CML20ATEX3171
- Temperature class
  T3/T2

TECHNICAL INFORMATION

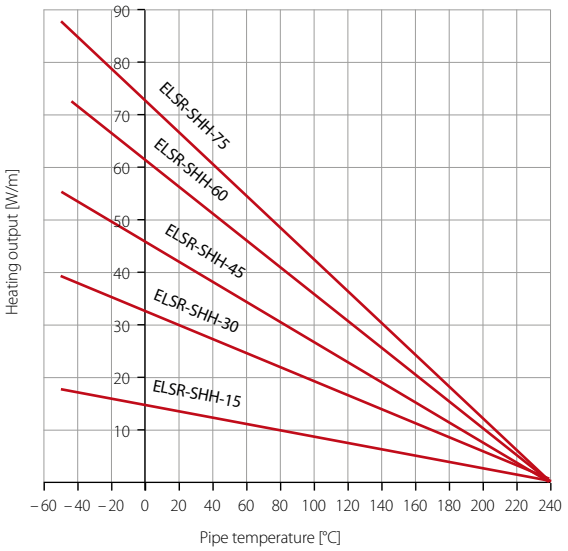
Maximum maintain temperature	250 °C
Maximum exposure temperature (de-energized)	250 °C
Nominal voltage	230 V
Bending radius, min.	35 mm
Installation temperature, min.	– 40 °C

Heating circuit lengths on the following conditions

- 230 V nominal voltage
- Delayed action circuit breakers (C-characteristic) with 80 % maximum load
- Maximum 10 % line voltage drop on heating cable bus wire
- Power connection to one heater end

ELSR-SHH-...-2-BOT output

(on insulated metallic pipes according to 62395-1)



Switch-on temperature (°C)	Nominal cutout value (A)	Heating circuit length (m) for ELSR-SHH				
		15-2	30-2	45-2	60-2	75-2
10	10	76.0	52.0	38.0	24.0	14.0
	16	122.0	82.0	62.0	38.0	24.0
	20	154.0	102.0	76.0	46.0	28.0
	32	154.0	108.0	88.0	76.0	46.0
0	10	70.0	46.0	32.0	18.0	12.0
	16	112.0	74.0	52.0	30.0	18.0
	20	140.0	92.0	66.0	36.0	22.0
	32	146.0	104.0	84.0	58.0	36.0
-20	10	62.0	40.0	24.0	12.0	8.0
	16	98.5	66.0	38.0	20.0	12.0
	20	122.5	82.0	46.0	26.0	16.0
	32	138.5	98.0	76.0	42.0	24.0
-40	10	52.0	30.0	14.0	8.0	4.0
	16	82.0	50.0	24.0	12.0	8.0
	20	102.0	62.0	28.0	16.0	10.0
	32	126.0	88.0	46.0	24.0	14.0

Type	Nominal output	Dimensions approx. (mm)	Weight approx. (g/m)	Part No.
ELSR-SHH-15-2-BOT	15 W/m at 10 °C	12,1 x 5,4	146	B0HH1153
ELSR-SHH-30-2-BOT	30 W/m at 10 °C	12,1 x 5,4	146	B0HH1303
ELSR-SHH-45-2-BOT	45 W/m at 10 °C	12,1 x 5,4	146	B0HH1453
ELSR-SHH-60-2-BOT	60 W/m at 10 °C	12,1 x 5,4	146	B0HH1603
ELSR-SHH-75-2-BOT	75 W/m at 10 °C	12,1 x 5,4	146	B0HH1753

ACCESSORIES
SELF-REGULATING TRACE HEATER SYSTEM

B* – POWER CONNECTION KITS

	Type	suitable for ELSR	Ex	Description	Ambient temperature	Part No.
	EI-Clic P	**-N, -LS, -W**		Fast connector with integrated cold lead	-40 °C to +100 °C	09ClicP
	EI-Clic S	**-N, -LS, -W**		Fast connector T-splice	-40 °C to +100 °C	09ClicS
	ELVB-SRA-25	**-N, -LS, -W, -FHP**		Power connection, glued, Gland M25 x 1,5, PE	+100 °C	091A010
	ELVB-SRAH-25	**-H, -SH**		Power connection, glued, Gland M25 x 1,5, PE	+100 °C	091A040
	ELVB-SRAM-25	**-M**		Power connection, shrink-fit, Gland M25 x 1,5, PE	+100 °C	091A015
	ELVB-SRAR-25	**-R**		Power connection, shrink-fit, Gland M25 x 1,5, PE	+100 °C	091A020
	ELBV-BF	**-M-AF/BF**		Power connection/termination set, suitable for drinking water KTW approved	+65 °C	0911022
	ELVB-SRAN-Ex-20	**-N, -FHP**	●	Power connection, glued, Gland M20, brass, Ex d	-60 °C to +180 °C	0X81PND
	ELVB-SRAL-Ex-20	**-LS**	●	Power connection, glued, Gland M20, brass	-60 °C to +180 °C	0X81PLD
	ELVB-SRAH-Ex-20	**-H, -SH, -SHH**	●	Power connection, glued, Gland M20, brass	-60 °C to +180 °C	0X81PHD
	ELVB-SRASH-Ex-20	**-SH**	●	Power connection, glued, Gland M20, Ex d	-60 °C to +180 °C	0X81PSD
	ELVB-SREx-25	**-N, -LS, -H, -FHP**	●	Power connection, glued, Gland M25 x 1,5, PE, Ex e	-25 °C to +70 °C	0X81PA1
	ELVB-SREx-IT	**-N, -H**	●	Power connection, glued, without gland	-60 °C to +180 °C	091AIT1
	ELVB-SRV-N-L-W	**-N, -LS, -W**		Connection set, shrink-fit	+65 °C	0911116
	ELVB-SRV-M	**-M, -R**		Connection set, shrink-fit	+65 °C	0911122

B* – POWER CONNECTION KITS

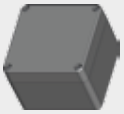
	Type	suitable for ELSR	Ex	Description	Ambient temperature	Part No.
	ELVB-SRV-H	**-H**		Connection set, shrink-fit	+100 °C	0911117
	ELVB-SRV-Ramp	**-Ramp**		Connection set, shrink-fit	+100 °C	0911124
	Ex-Con-SR	**-N, -LS, -H**	●	Ex connection sleeve Ø 36 x 210 mm 4J	-32 °C to +200 °C	0X81125
	ELVB-70	**-M-AF/BF**		Cable gland MS 3/4", brass, approved for drinking water	+65 °C	0911703
	ELVB-71	**-M-AF/BF**		Y-connector 32 mm, brass, approved for drinking water	+65 °C	0911704
	M20	**-N, -H**	●	Ex-d cable gland, brass, fits Y-connector	-60 to +180 °C	2572020003

ACCESSORIES
SELF-REGULATING TRACE HEATER SYSTEM

C* – END TERMINATION KITS

	Typ	geeignet für ELSR	Ex	Beschreibung	Umgebungs-temperatur	Art.-Nr.
	EL-ECSH-ex	**-H, -SH, -SHH**	●	Silicone termination cap red, glued, with ex marking	-60 °C to +250 °C	0X81EH2
	EL-ECL	**-LS**		Silicone termination cap transparent, glued	-45 °C to +85 °C	09112L1
	EL-ECL-ex	**-LS**	●	Silicone termination cap black, glued, with ex marking	-60 °C to +135 °C	0X81EL1
	EL-ECN-ex	**-N**	●	Silicone termination cap black, glued, with ex marking	-60 °C to +135 °C	0X81EN1
	EL-ECN	**-N**		Silicone termination cap transparent, glued	-45 °C to +85 °C	09112N1
	EL-ECFHP	**-FHP**		Silicone termination cap transparent, glued	-45 °C to +85 °C	09112F1
	EL-ECM	**-M, -R**		Silicone termination cap transparent, glued	-45 °C to +85 °C	09112M1
	EL-ECMF	**-M-AF/BF**		Silicone termination cap transparent, glued	-45 °C to +85 °C	09112MF
	EL-ECW	**-W**		Silicone termination cap transparent, glued	-45 °C to +85 °C	09112W1
	EL-ECRA	**-Ramp**		Silicone termination cap transparent, glued	-45 °C to +85 °C	09112RA
	Ex-It-S	**-N, -LS, -H**	●	Heating circuit extension with blind cap, IP65	-60 °C to +55 °C	0X8ITS0
	Ex-It-L	**-N, -LS, -H**	●	Heating circuit termination with LED signal light, IP65	-60 °C to +55 °C	0X8ITLG
	ELHKV-E1-1	**all**		Heating circuit manifold, 1 circuit		0640001
	ELHKV-E1-2	**all**		Heating circuit manifold, 2 circuits		0640002
	ELHKV-St-3	**all**		Heating circuit manifold, 3 circuits		0640003
	ELHKV-St-6	**all**		Heating circuit manifold, 6 circuits		0640006
	ELHKV-St-9	**all**		Heating circuit manifold, 9 circuits		0640009
	ELHKV-St-12	**all**		Heating circuit manifold, 12 circuits		0640012

D* – JUNCTION BOXES

	Type	suitable for ELSR	Ex	Description	Ambient temperature	Part No.
	ELAK-2	**all**		104 x 104 x 70 mm, polycarbonate, IP 66, up to 3 heaters, cable gland 1x M25, stamp 7x M20/M25	-40 °C to +70 °C	0920030
	ELAK-5	**all**		122 x 120 x 90 mm, polyester, IP 66, up to 2 heaters, cable gland 3x M25	-40 °C to +90 °C	0920013
	ELAK-5.1	**all**		130 x 130 x 75 mm, polycarbonate, IP 66, up to 3 heaters, stamp 9x M20/M25	-35 °C to +80 °C	0920002
	ELAK-5.7	**all**		122 x 120 x 90 mm, polyester, grey, IP 65, up to 3 heaters, cable gland 1x M25, holes 3x M25	-40 °C to +90 °C	0920014
	ELAK-5.8	**all Pt100 temperature sensors**		122 x 120 x 90 mm, polyester, grey, IP 65, cable gland 2x M25 1x M16, holes 1x M16	-40 °C to +90 °C	0920015
	ELAK-Ex-3.5	**-N, -LS, -H, -SH, -SHH**	●	122 x 120 x 90 mm, 1 heater, capillary thermostat, IP 66, cable gland 1x M25, holes 2x M25	-40 °C to +60 °C	0X80055
	ELAK-Ex-3.7	**-N, -LS, -H, -SH, -SHH**	●	122 x 120 x 90, 1-3 heaters, power supply lead max. 10 mm², IP66, cable gland 1x M25 2x M12	-40 °C to +60 °C	0X80057
	ELAK-Ex-3.8	**all Pt100 temperature sensors**	●	122 x 120 x 90, 1-2 Pt100, max. 2,5 mm², IP66, cable gland 1x M25 2x M12	-40 °C to +60 °C	0X80058
	ELAK-Ex-R5	**all**	●	ø 150 x 125 mm, 1 heater, IP 65, cable gland 1x M25, 1x M20, holes 1x M25, 1x M16	-40 °C to +60 °C	0X80075
	ELAK-Ex-R7	**-N, -LS, -H, -SH, -SHH**	●	ø 150 x 125 mm, 1-3 heaters, power supply lead max. 6 mm², IP 65, cable gland 1x M25, holes 3x M25	-40 °C to +50 °C	0X80077
	ELAK-Ex-R8	**all Pt100 temperature sensors**	●	ø 150 x 125 mm, 1-2 Pt100, max. 2,5 mm², IP 65, cable gland 1x M25 2x M12	-40 °C to +50 °C	0X80078

ACCESSORIES
SELF-REGULATING TRACE HEATER SYSTEM

D* – JUNCTION BOXES

	Type	suitable for ELSR	Ex	Description	Ambient temperature	Part No.
	Ex-it-R	**-N, -LS, -H, -SH, -SHH**	●	ø 150 x 125 mm, 3 heaters, 1 Pt100 power supply lead, incl. mounting stand, IP 65, cable gland 1x M25	-20 °C to +50 °C	0X80070
	Ex-it-R-T	**-N, -LS, -H, -SH, -SHH**	●	ø 150 x 125 mm, 3 heaters, incl. mounting stand, IP 65, cable gland 1x M25	-20 °C to +50 °C	0X80082
	Ex-it-R-Pt	**all Pt100 temperature sensors**	●	150 x 125 mm, 1 Pt100, 1 sensor cable, incl. mounting stand, IP 65, cable gland 1x M25	-20 °C to +50 °C	0X80092
	ELAK-RS-T	**-N, -LS, -W**		150 x 125 mm, twin Pt100, 3 heaters incl. mounting stand, IP 65, cable gland 1x M25	-45 °C to +50 °C	0920059
	ELAK-RS	**-N, -LS, -H, -SH, -SHH**		150 x 125 mm, incl. mounting stand, IP 65, cable gland 1x M25, holes 1x M25 1x M20	-45 °C to +50 °C	0920050

D* – JUNCTION BOXES

	Type	suitable for	Ex	Description	Part No.
	ELB-13V1	**all**	●	Tightening strap, threaded, 11 mm, 30 m, Mat. 1.4301	2723001010
	ELB-13V2	**all**	●	Turnbuckle 1.4301 (selling unit 10 pieces), Mat. 1.4301	0930042
	ELB-15.04	**all**	●	Hose clamp, 25 - 40 mm, Mat. 1.4301	2723001025
	ELB-15.06	**all**	●	Hose clamp, 40 x 60mm, Mat. 1.4301	2723001040
	ELB-15.09	**all**	●	Hose clamp 40-90 mm (DN 25-65), Mat. 1.4301	2723040090
	ELB-15.11	**all**	●	Hose clamp, 50 - 110 mm, Mat. 1.4301	2723050110

E* – PIPE MOUNTING BRACKET

	Type	suitable for	Ex	Description	Part No.
	ELB-15.288	**all**	●	Hose clamp, 60 - 288 mm, Mat. 1.4301	2723060288
	ELB-15.650	**all**	●	Hose clamp, 60 - 650 mm, Mat. 1.4301	2723060650
	ELB-18	**all**	●	Assembly and fastening plate for gutters, 290 x 30 x 1,5 mm, Mat. 1.4301	0930040
	ELB-20	**all**	●	Mounting bracket 90° for downpipes, Mat. 1.4301	0930043
	ELB-21	**all**	●	Mounting profile for gutters, Mat. 1.4301, 290 mm long	0930044
	ELB-22	**all**	●	PE mounting profile for trace heaters, spacing 25 mm	0942000
	ELMW-5	**ELAK-2**	●	Support bracket, 85 x 85 mm, Mat. 1.4301	0941005
	ELMW-9	**ELAK-5, ELAK-Ex 3, ELth-1, -BTB, -BSTW**	●	Support bracket, 122 x 120 mm, Mat. 1.4301	0941009
	ELMW-11	**ELTC-05,-14,-15 ELAK-5.1**	●	Support bracket, 130 x130 mm, Mat. 1.4301	0941011
	ELMW-Ex-Box	**Ex-Box REG / Ex-Box-LIM**	●	Support bracket, 185 x 185 mm, Mat. 1.4301	0941072
	ELMW-CT	**EL-CT...**	●	Support bracket, Mat. 1.4301	0941025
	ELMW-GP1	**ELT-GP 1**	●	Support bracket 175 x 125 mm, Mat. 1.4301	0941020
	EL-VSB 300	**all**	●	Variable support bracket, height adjustable from 180 - 300 mm, Mat. 1.4301	0941085
	EL-VSB 400	**all**	●	Variable support bracket, height adjustable from 280 - 400 mm, Mat. 1.4301	0941086

ACCESSORIES
SELF-REGULATING TRACE HEATER SYSTEM

F* – FASTENERS AND SELF-ADHESIVE TAPES, FOILS

	Type	suitable for ELSR	Ex	Description	max. Operating temperature	Part No.
	ELB-02A	all	●	Adhesive tape, glass silk 30 m x 12 mm	+180 °C	2486800126
	ELB-02B	alle	●	Adhesive tape, glass silk 50 m x 12 mm	+180 °C	2486800130
	ELB-06	all	●	Aluminium foil, 50 m x 75 mm, self-adhesive	-40 °C to +140 °C	0942200
	ELB-06D	all	●	Aluminium foil 100 m x 75 mm, self-adhesive	-40 °C to +140 °C	2701900076
	ELB-06C	all	●	Aluminium foil 50 m x 50 mm, reinforcement grid, -40 ... +80 °C	-40 °C to +130 °C	2701900051
	ELB-06E	all	●	Aluminium foil 50 m x 536 mm, self-adhesive	+150 °C	2701900500
	ELB-16.10	all	●	Plastic tightening straps 100 x 2,5 mm, black, UV resistant, selling unit = 100 pcs.	+85 °C	2796000001
	ELB-16.20	all	●	Plastic tightening straps 200 x 3,6 mm, black, UV resistant, selling unit = 100 pcs.	+85 °C	2796000002
	ELB-16.36	all	●	Plastic tightening straps 360 x 4,8 mm, black, UV resistant, selling unit = 100 pcs.	+85 °C	2796000003

G* – INSULATION BUSHING

	Type	suitable for ELSR	Ex	Description	Part No.
	ELISD-1.12	all temperature sensors	●	3,5 - 7 mm, 70 x 70 mm, 1 x M12 x 1,5	0921011
	ELISD-1.16	all temperature sensors	●	Cover plate, aluminium, 4,5 - 10 mm, 70 x 70 mm, 1 x M16	0921015
	ELISD-1.20	all connections	●	7 - 13 mm, 70 x 70 mm, 1 x M20	0921019
	ELISD-1.25	all connections	●	9 - 17 mm, 70 x 70 mm, 1 x M25	0921023
	ELISD-R1	-N, -LS, -W	●	Cover plate, aluminium, 70 x 70 mm	0921035
	ELISD-R5	-M, -R	●	Insulation bushing	0921101
	ELISD-R4	-H, -SH, -SHH	●	Cover plate, aluminium, 70 x 70 mm	0921047

H* – WARNING SIGNS

	Type	suitable for ELSR	Ex	Description	Part No.
	EL-WS01D	all	●	German "Elektrische Begleitheizung"	2986900002
	EL-WS01E	all	●	English "Electrical Heat Tracing"	2986900012
	EL-WS01F	all	●	French "Traçage Electrique"	2986900032
	EL-WS01R	all	●	Russian"Electrical Heat Tracing"	2986900013
	EL-WS01I	all	●	Italian "Electrical Heat Tracing"	2986900089

ACCESSORIES
SELF-REGULATING TRACE HEATER SYSTEM

I* – TEMPERATURE CONTROLLERS

	Type	suitable for ELSR	Ex	Description	Operating temperature	Part No.
	ELTC 05	all		Pt100, 1 relay, 230 V Frostcontrol, +3 °C, 1 load relay	-30 °C to +50 °C	0610002
	ELTC-14	all		Pt100, 2 conductors, 3 conductors, 0 °C to + 390 °C, without Pt100	-25 °C to +55 °C	0620000
	ELTC-14P	all		Pt100, 2 conductors, 3 conductors	-30 °C to +60 °C	0620010
	ELTC-15	all		Pt100, 2 conductors, 3 conductors temperature controller to 999 °C, with ramp function	-25 °C to +55 °C	0621500
	ELTC-21	all		Pt100, 2 conductors, 3 conductors 0 °C bis 400 °C, rail-mounted 230 VAC	-25 °C to +55 °C	0610093
	ELTC-22	all		Pt100, 2 conductors, 3 conductors 0 °C to 400 °C, rail-mounted 24 VDC	-25 °C to +55 °C	0610094
	ELTC-24P	all		Pt100, 2 conductors, 3 conductors	-30 °C to +60 °C	0620011
	ELTC-41	all		Pt100, 2-2 conductors, 3 conductors 90 to 260 V AC	-25 °C to +55 °C	0620041
	ELTC-42	all		2 x Pt100, 2 conductors, 3 conductors microprocessor, front assembly	-25 °C to +55 °C	0620042
	ELTC-W	-W		Water Comfort System, power controller	-25 °C to +65 °C	0630000
	Ex-Box REG/DIS	all	●	Electronic controller with display, Pt100, 2-Leiter, 3-Leiter	-30 °C to +60 °C	0X60020
	Ex-Box REG/LED	all	●	Electronic controller with LED, Pt100, 2 conductors, 3 conductors	-30 °C to +60 °C	0X60021
	Ex-Box LIM/LED	all	●	Electronic controller with LED, Pt100, 2 conductors, 3 conductors	-30 °C to +60 °C	0X60023
	Ex-Box LIM/DIS	all	●	Electronic controller with Display Pt100, 2 conductors, 3 conductors	-30 °C to +60 °C	0X60024

I* – TEMPERATURE CONTROLLERS

	Type	suitable for ELSR	Ex	Description	Operating temperature	Part No.
	ISD-1	all		Ice and snow sensor for gutters, including sensor devices	-10 °C to +50 °C	0620623
	ISD-1.1	all		Ice and snow sensor for gutters, including sensor devices	-10 °C to +50 °C	0620624
	EL-CT 50	all	●	Capillary thermostat	-30 °C to +50 °C	0X63050
	EL-CT 30	all	●	Capillary thermostat	-30 °C to +50 °C	0X63030
	Ex-TC/A	alle	●	Electronic Controller with Alarm Function	-40 °C to +50 °C	0X60103 0X60101
	Ex-TC/AL	alle	●	Electronic Controller and Limiter with Alarm Function	-40 °C to +50 °C	0X60123 0X60121
	Ex-TC/M	alle	●	Electronic Controller with Modbus communication	-40 °C to +50 °C	0X60133 0X60131

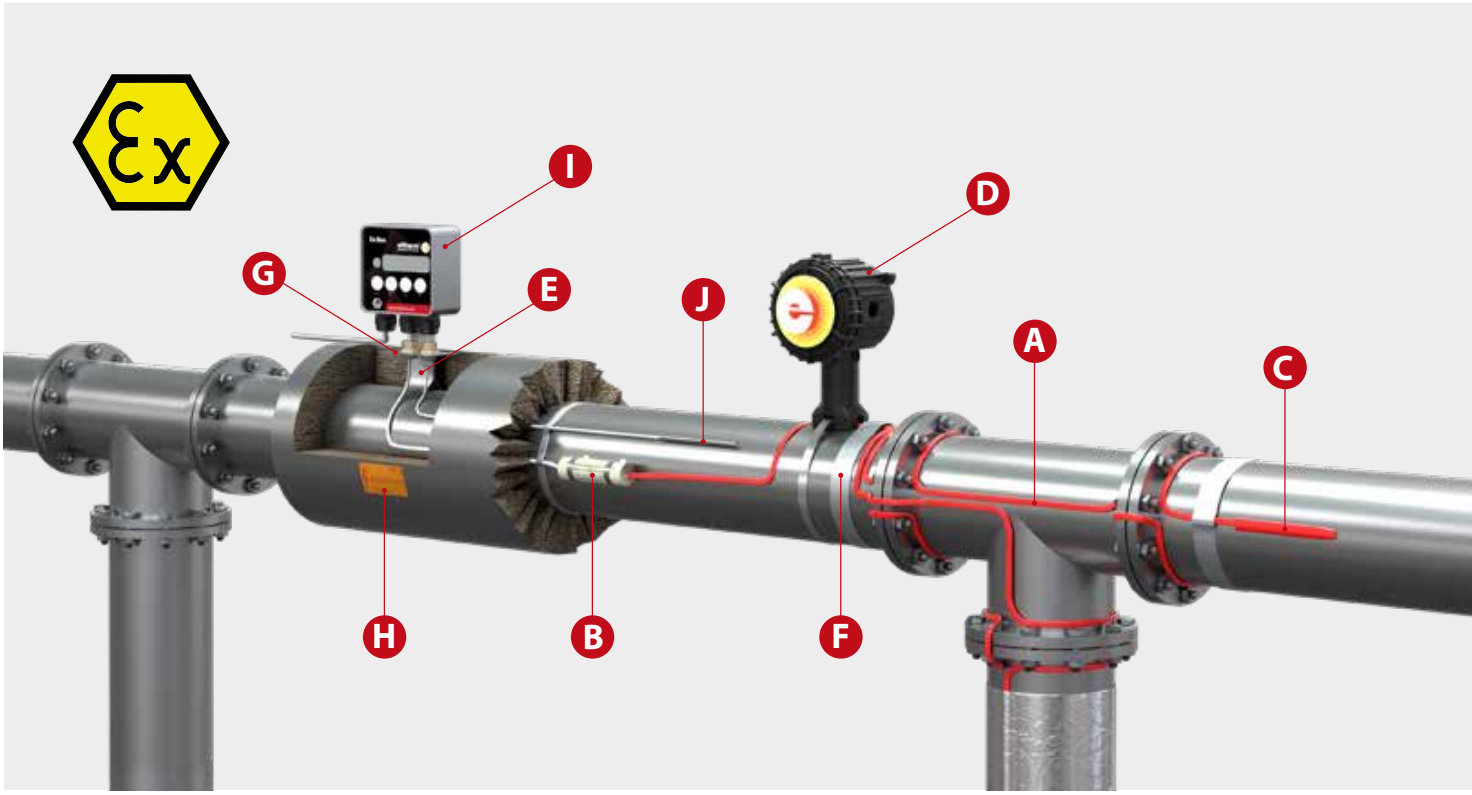
J* – TEMPERATURE SENSORS

	Type	suitable for ELSR	Ex	Description	Operating temperature	Part No.
	ELTF-PT.1	all		Pt100, 5 x 50 mm PVC 5 m	-30 °C to +80 °C	0650001
	ELTF-PT.3	all		Pt100, 2 conductors, 5 x 50 mm, 3 m PTFE cable	-50 °C to +250 °C	0650003
	ELTF-PT.3.1	all		Pt100, 3 conductors, 5 x 50 mm, 3 m PTFE cable	-50 °C to +250 °C	0650002
	ELTF-PTEx.2	all	●	Pt100, 4 conductors, 3 m PTFE cable	-45 °C to +235 °C	0X70002
	ELTF-PTEx.4	all	●	2x Pt100, 3 conductors, 3 m cold lead	-45 °C to +235 °C	0X70030
	ISD-STH	all		Temperature- / moisture sensor for gutters	-40 °C to +85 °C	TBC0001

ACCESSORIES
SELF-REGULATING TRACE HEATER SYSTEM

IN HAZARDOUS AREAS

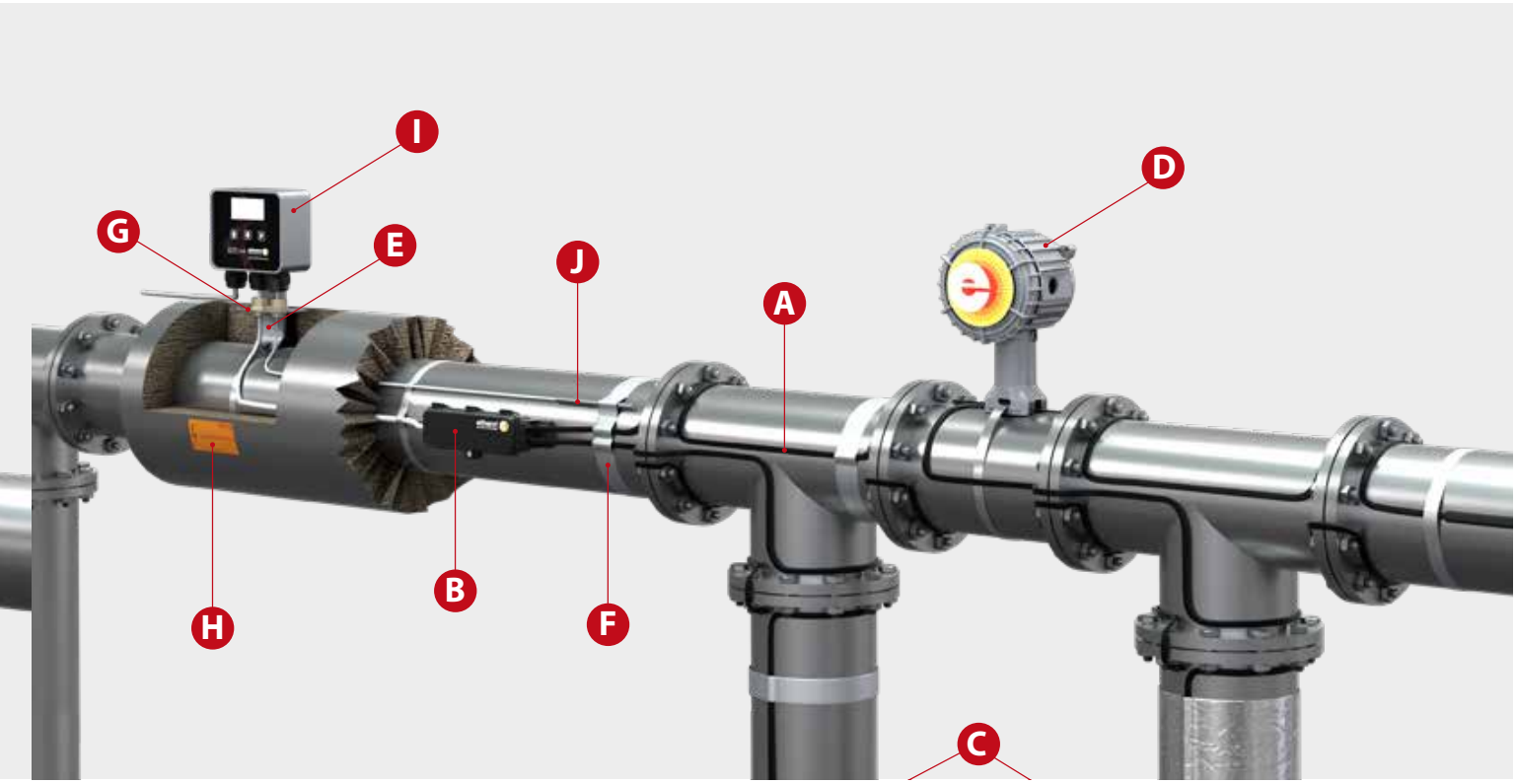
A	**Trace Heater**	ELSR-N, -LS, -FHP, -H, -SH, -SHH
B	**Connection Kit**	e. g. Ex-Con-SR (or ELVB...Ex...)
C	**End Termination Kit**	EL-EC...ex
D	**Junction Box**	e. g. Ex-it-R (or ELAK-Ex-...)
E	**Pipe Mounting Fitting**	ELMW-..., ELB-...
F	**Fasteners and Self-adhesive Tapes, Foils**	ELB-...
G	**Insulation Bushing**	ELISD-...
H	**Warning Sign**	EL-WS...
I	**Temperature Controller**	e. g. Ex-Box Temperature Controller
J	**Temperature Sensor**	



IN NON-HAZARDOUS AREAS

A	**Trace Heater**	ELSR-N, -LS, - M, -M-AF/BF, -R, -W, - Ramp, -FHP, -H, -SH, SHH
B	**Connection Kit**	e. g. El-Clic-P (or ELVB-...)
C	**End Termination Kit**	EL-EC...
D	**Junction Box**	e. g. ELAK-RS
E	**Pipe Mounting Fitting**	ELMW-..., ELB-...
F	**Fasteners and Self-adhesive Tapes, Foils**	ELB-...
G	**Insulation Bushing**	ELISD-...
H	**Warning Sign**	e. g. ELTC-14 Temperature Controller
I	**Temperature Controller**	ELTF-...
J	**Temperature Sensor**	

This is just a schematic overview, not an installation instruction. For detailed information, please contact our engineers.



DESIGN GUIDE
SELF-REGULATING TRACE HEATER SYSTEM

TABLE 1: DESIGN GUIDE FREEZE PREVENTION +5 °C
FOR SELF-REGULATING TRACE HEATERS, TYPE SERIES ELSR-N-10...40-2-BO(T)

Pipe size	Inches: DN	1/2 15	3/4 20	1 25	1 1/4 32	1 1/2 40	2 50	2 1/2 65	3 80	4 100	5 125	6 150	7 175	8 200	9 225	10 250	12 300
Insulation thickness (mm)	Ambient temperature, min. (°C)	Heating cable Type ELSR-N-10...40-2-BO(T)															
10	– 15	10	10	20	20	20	30	30	30	40	2x30	2x30	2x40	2x40	2x40	3x30	3x40
	– 20	10	20	20	20	30	30	40	40	2x30	2x30	2x40	2x40	3x30	3x40	3x40	4x40
	– 25	10	20	20	30	30	40	40	2x30	2x30	2x40	2x40	3x40	3x40	3x40	4x40	4x40
20	– 15	10	10	10	10	10	20	20	20	30	30	30	40	40	40	2x30	2x30
	– 20	10	10	10	10	20	20	20	30	30	30	40	2x30	2x30	2x30	2x30	2x40
	– 25	10	10	20	20	30	30	30	30	40	40	2x30	2x30	2x30	2x30	2x40	2x40
30	– 15	10	10	10	10	10	10	10	20	20	20	20	30	30	30	40	40
	– 20	10	10	10	10	10	20	20	20	20	20	20	30	40	40	40	2x30
	– 25	10	10	10	10	20	20	30	20	30	30	30	40	40	2x30	2x30	2x30
40	– 15	10	10	10	10	10	10	10	10	20	20	20	20	20	30	30	30
	– 20	10	10	10	10	10	10	20	20	20	20	20	30	30	30	30	40
	– 25	10	10	10	10	10	20	20	20	20	20	20	30	30	40	40	2x30
50	– 15	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20	30
	– 20	10	10	10	10	10	10	10	10	20	20	20	20	30	30	30	30
	– 25	10	10	10	10	10	10	20	20	20	20	20	30	30	30	30	40
60	– 15	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20
	– 20	10	10	10	10	10	10	10	10	20	20	20	20	20	20	30	30
	– 25	10	10	10	10	10	10	10	20	20	20	20	20	30	30	30	30
80	– 15	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20
	– 20	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20
	– 25	10	10	10	10	10	10	10	10	20	20	20	20	20	20	20	30
100	– 15	10	10	10	10	10	10	10	10	10	10	10	10	10	20	20	20
	– 20	10	10	10	10	10	10	10	10	10	10	10	20	20	20	20	20
	– 25	10	10	10	10	10	10	10	10	10	20	20	20	20	20	20	20

Basis: Thermal conductivity of the insulation 0.04 W/mK; increased factor of safety 20 %

TABLE 2: TRACE HEATER ADDITIONS (M) FOR

DN	15	20	25	32	40	50	65	80	100	125	150	175	200	225	1250	300
Pair of flanges	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.8
Flanged fitting	0.4	0.4	0.4	0.55	0.55	0.55	0.55	0.55	1.5	2.0	2.4	2.4	2.4	2.4	2.4	2.4
Pumps	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0

For non-insulated pipe supports: Heating pipe allowance = 4 x support width. Per heating pipe connection in the terminal box / thermostat: Heating pipe allowance approx. 0.5 m. **Attention:** If there is multiple laying of the heating pipes, the allowances above must be correspondingly multiplied.

TABLE 3: HEAT LOSS OF PIPELINES IN W/M AT 10 °K TEMPERATURE DIFFERENCE

Pipe size	Inches: DN	1/2 15	3/4 20	1 25	1 1/4 32	1 1/2 40	2 50	2 1/2 65	3 80	4 100	5 125	6 150	7 175	8 200	9 225	10 250	12 300
Insulation thickness (mm)	DELTA T																
10	10	4.4	5.2	6.1	7.8	8.7	10.5	12.9	14.8	18.6	22.3	26.6	30.3	34.1	37.8	41.9	49.3
20	10	2.9	3.3	3.7	4.5	5.0	5.9	7.1	8.1	10.0	11.9	14.1	16	17.8	19.7	21.9	25.6
30	10	2.2	2.6	2.9	3.4	3.7	4.2	5.2	5.8	7.1	8.4	9.8	11.1	12.4	13.7	15.1	17.6
40	10	1.9	2.2	2.5	2.8	3.1	3.5	4.2	4.7	5.7	6.6	7.7	8.7	9.6	10.6	11.7	13.6
50	10	1.7	2.0	2.2	2.5	2.7	3.0	3.6	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	11.2
60	10	1.6	1.8	2.0	2.2	2.4	2.7	3.2	3.6	4.2	4.9	5.6	6.2	6.9	7.5	8.2	9.5
80	10	1.4	1.6	1.7	1.9	2.1	2.3	2.7	3.0	3.4	3.9	4.5	5.0	5.5	6.0	6.5	7.5
100	10	1.3	1.4	1.5	1.7	1.8	2.0	2.4	2.6	3.0	3.4	3.8	4.2	4.6	5.1	5.5	6.3
120	10	1.2	1.3	1.4	1.6	1.7	1.9	2.2	2.3	2.7	3.0	3.4	3.7	4.1	4.4	4.8	5.4

Basis: Thermal conductivity of the insulation 0.04 W/mK; increased factor of safety 20 %.
If there are other thermal conductivity figures, the values must be multiplied by a corresponding factor.

Example: **Thermal conductivity of the insulation 0.045 W/mK** $\frac{\textbf{0,045 W/mK}}{\textbf{0,040 W/mK}}$ **= 1,125**

Example 1

Task: Frost protection for a DN 100, 25 m long pipeline with 2 pairs of flanges, 1 fitting, 1 pump, 4 supports 0.1 m wide; at an ambient temperature of – 25 °C and with a 50 mm thick heat insulation, 230 V.

D J* – TEMPERATURE SENSORS

from table 2:	Pair of flanges 2 x 0,6 m	= 1.2 m
Fitting	1 off x 1.5 m	= 1.5 m
Pump	1 off x 5.0 m	= 5.0 m
Pipe support	4 off x 0.1 m x 4	= 1.6 m
Connection	1 off x 0.5 m	= 0.5 m
		= 34.8 m = order 35 m ELSR-N-20-2-BO

Example 2:

Task: Temperature maintenance for 15 m DN 50 pipeline at 20 °C (caustic soda solution) at minimum ambient temperatures of -10 °C (total DELTA-T of 30 K) and a 40 mm thick heat insulation. Installations: 2 pairs of flanges, 2 fittings, 230V.

If the heating is designed using type ELSR-N self-regulating heating cables, please proceed as follows to select the correct nominal output: Design (from table 3): DELTA-T 10 K heat loss = 3.5 W/m. As total DELTA-T is 30 K (that is to say is 3x higher than DELTA-T in the table), the value found is multiplied by 3: 3.5 W/m x a factor of 3 = 10.5 W/m.
In the temperature output diagram on the ELSR-N datasheet, the intersection of the two lines heating output W/m = 10.5 and temperature +20 °C is between the curves (ELSR-N-10) and (ELSR-N-20). Select the heating cable with the next highest power output (ELSR-N-20). You can now proceed with the heating pipe allowance for the installations as in Example 1.

ELVARME

VORES PRODUKTSORTIMENT INKLUDERER:

KONSTANT WATT VARMEKABEL

TEMPERATUR SENSORS

VARMEKABEL STYRING

ROBUST DEMANDING EVIROMENTS

NIKKELLIDSE

VARMEKABLER

VI FØRER PRODUKTER INDENFOR KATEGORIERNE:

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