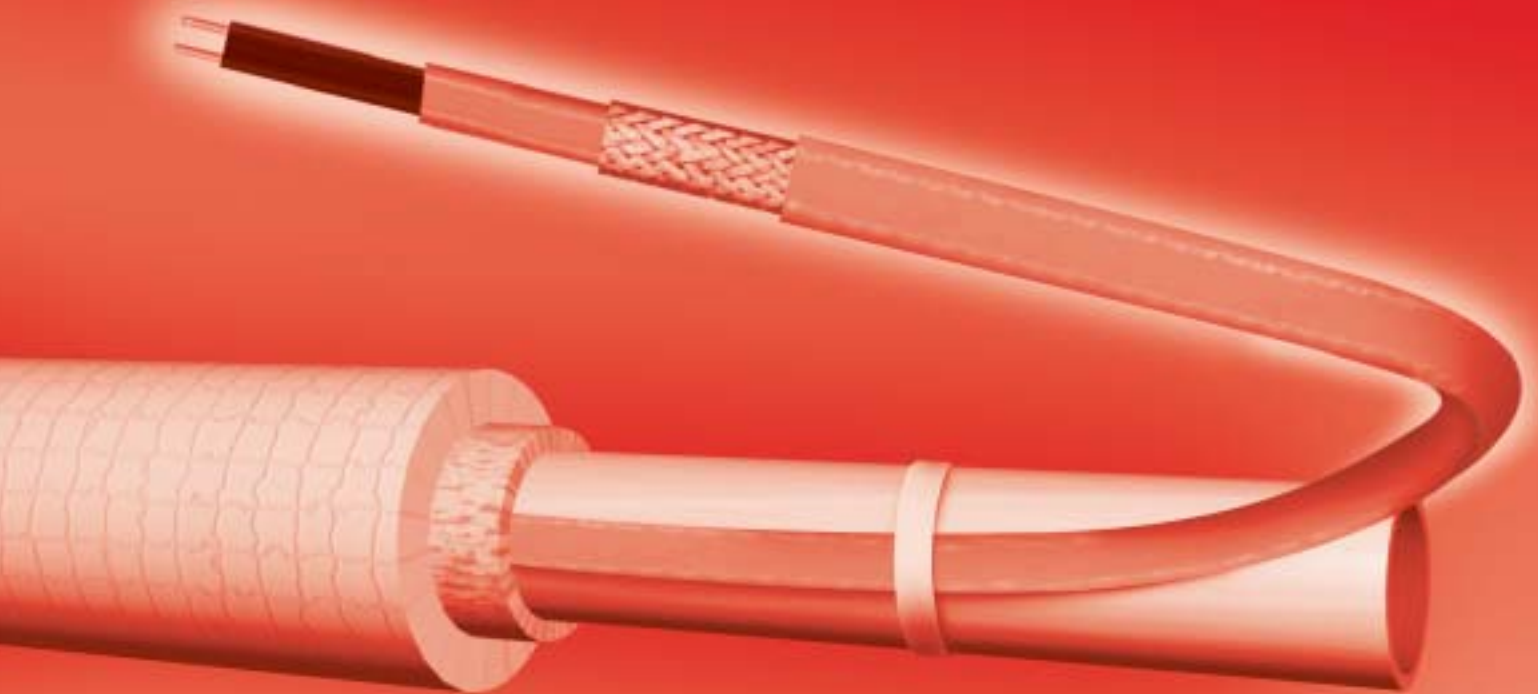


eltherm




ELSR SELF-REGULATING
HEATING TAPES
AND ANCILLARIES



Introduction

eltherm products are available for temperature ranges up to 240°C.

The -symbol shown next to the description of many eltherm products means that special models, with Ex-certificates, of these cable or tape types are also available for use in hazardous areas.

All temperatures mentioned in this catalogue are the maximum allowed exposure temperatures. The well experienced eltherm engineers will offer you individual and economical solutions to your heating problems. Our project datasheet on page 22/23 will help you to define your requirements.

Ancillaries, fasteners and termination sets are shown on page 19 - 21.

Most products shown are available from stock. Please refer to our price list.

Please keep in mind that

- all products shown in this catalogue are only to be connected and put into operation by a qualified electrician.
- all standards and regulations are to be followed when installing or operating a heating system.
- electric heating systems that will not be supervised during operation require an additional temperature limiter with manual reset to prevent the waste of energy.
- earth-leakage circuit breakers should be used.


The information and advertising statements in this product catalog, regardless of type, in particular descriptions, illustrations, drawings, patterns, and data concerning quality, design, composition, performance, consumption and applicability as well as dimensions of the range of products are subject to alterations unless they are expressly stated as binding. They do not represent any assurances or guarantees, regardless of type.

Slight deviations from the product information are regardless as authorized, as far as they are not considered to be unacceptable to the customer.

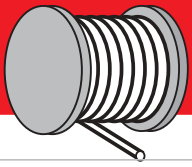
The right to amend errors and technical data is reserved.



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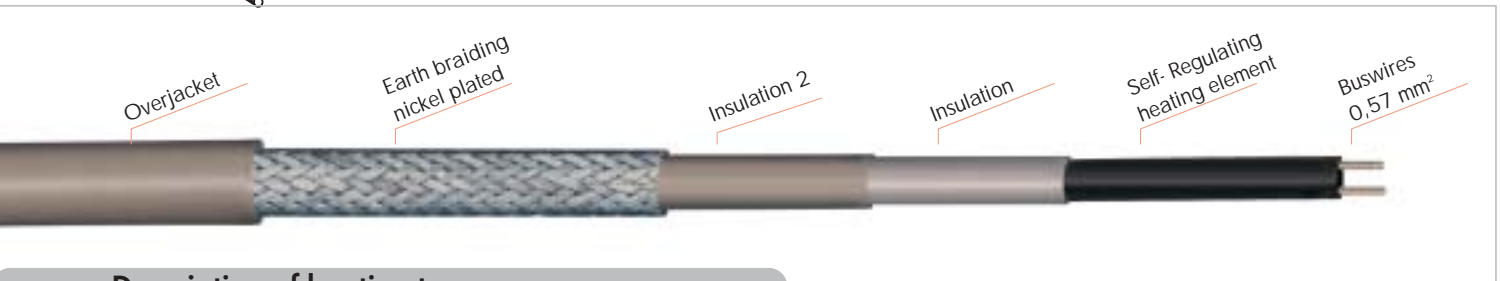
Off-the-reel 

Type ESR-R	up to 65°C	Page 4
Type ELSR-M	up to 65°C	Page 5
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Type ELSR-A	up to 80°C	Page 7
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Heating System		Page 11
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Self-Regulating parallel heating tape

Type ESR-R
up to 65°C



Description of heating tape

- Circular shape
- Self-regulating
- Variable loading
- Cut-to-length
- High flexibility

Applications:

ESR-R is a self-regulating heating tape that may be used for freeze protection, of cold room, doors and seals and for floorheating.

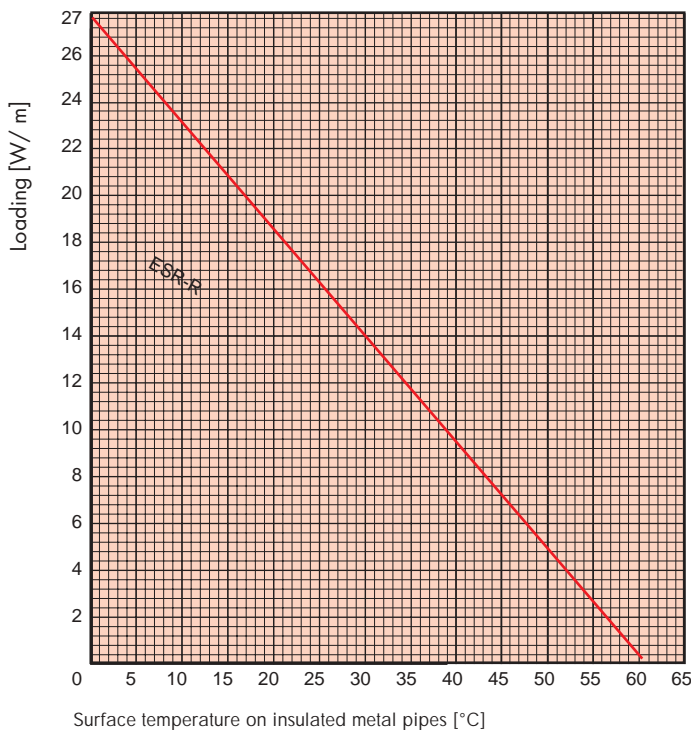
Technical Data:

Overjacket TPE
 Buswires nickel plated
 Maximum temperature . . . 55 °C
 Nominal voltage 230 V
 Minimum bending radius .. 30 mm
 Minimum installation temperature -10 °C
 Moisture protected yes

Type	Nominal loading on Insulated Pipes	Maximum Permissible temperature		Earth Braiding Description	Dimensions Ø [mm]	Order Number
		power on [° C]	power off [° C]			
ESR-R	27 W/m at 0 °C	55	55	none	6	0200500
ESR-R O	12 W/m at 36 °C	65	65	with second insulation	6	upon request
ESR-R B	27 W/m at 0 °C	55	55	stainless steel*	6.7	0200502
ESR-R BO	27 W/m at 0 °C	55	55	tinned copper	6.7	0200503
ESR-R A BO	27 W/m at 0 °C	55	55	aluminium foil	6.7	0200504

*nickel plated braiding upon request

Temperature/Loading diagram ESR-R



Maximum heating circuit length

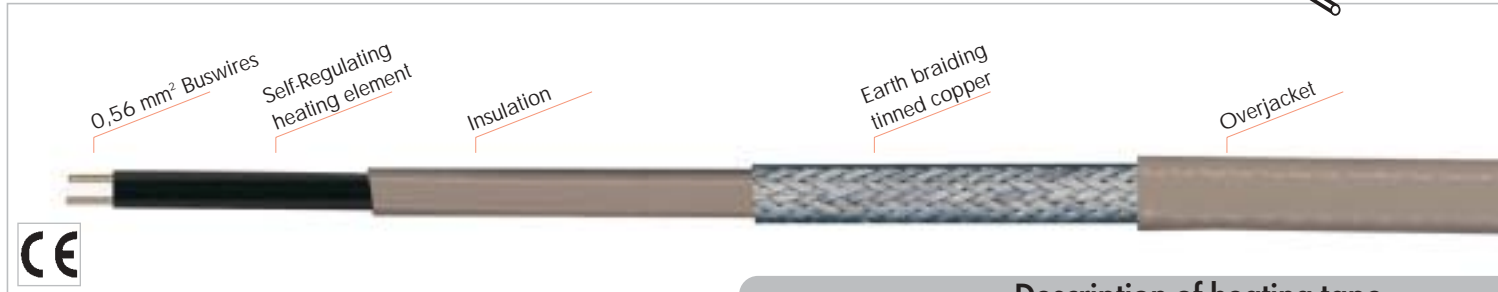
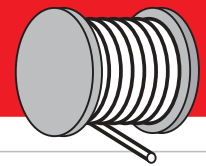
Type	Circuit Length m
ESR-R	80
ESR-R O	80
ESR-R B	80
ESR-R BO	80
ESR-R A BO	80

B: Braiding
 O: Doubled insulated
 BO: Braid and thermoplastic overjacket
 BOT: Braid and fluoropolymer overjacket

Type ELSR-M 10...15- BO(T)

up to 65°C

Self-Regulating parallel heating tape



Description of heating tape

- Self-regulating
- 2 temperature ranges
- Variable loading
- Cut-to-length

Applications:

ELSR-M is a light construction grade self-regulating heating tape that may be used for freeze protection, or low temperature maintenance of pipework and vessels.

Technical Data:

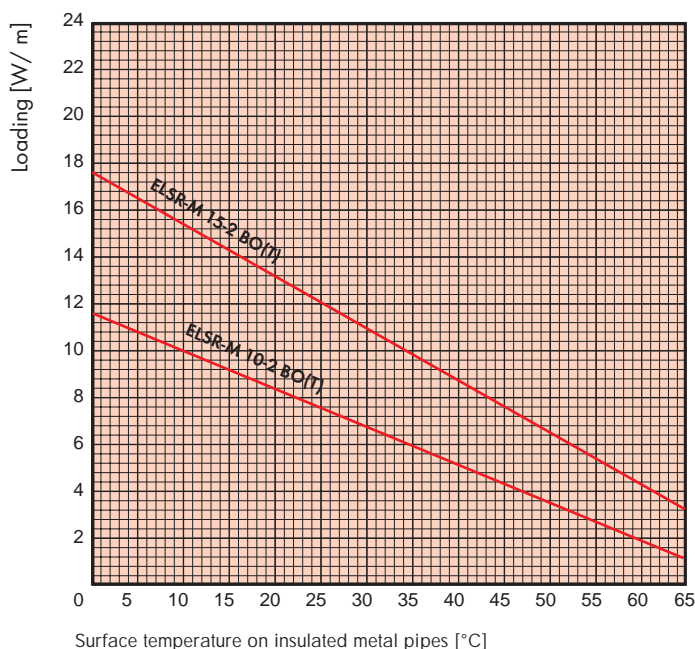
Overjacket TPE
 Buswires tinned copper
 Maximum temperature . . . 65 °C
 Nominal voltage 230 V
 115 V available upon request
 Minimum bending radius .. 35 mm
 Minimum installation temperature -30 °C
 Moisture protected yes

Approval Details

Certificate. SEMCO, DNV E-6773

Type	Nominal loading on Insulated Pipes at 10 °C (W/m)	Maximum Permissible temperature power on [° C]	power off [° C]	Earth Braiding Description	Dimensions [mm]	Order Number
ELSR-M 10-2 BO	10	65	65	tinned copper	7.9x5.6	0225102
ELSR-M 10-2 BOT	10	65	65	tinned copper	7.9x5.6	0225103
ELSR-M 15-2 BO	15	65	65	tinned copper	7.9x5.6	0225152
ELSR-M 15-2 BOT	15	65	65	tinned copper	7.9x5.6	0225153

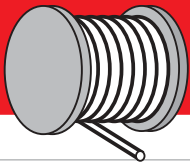
Temperature/Loading diagram ELSR-M



Maximum heating circuit length

Start up temperature °C	Circuit Breaker A	ELSR-M 10-2 BO(T) ELSR-M 15-2 BO(T)	
		m	m
+5°C	6	70	39
	10	100	60
	16	110	70
0°C	6	65	37
	10	95	58
	16	105	65
-20°C	6	44	25
	10	77	44
	16	90	50
-30°C	6	38	23
	10	67	41
	16	80	47

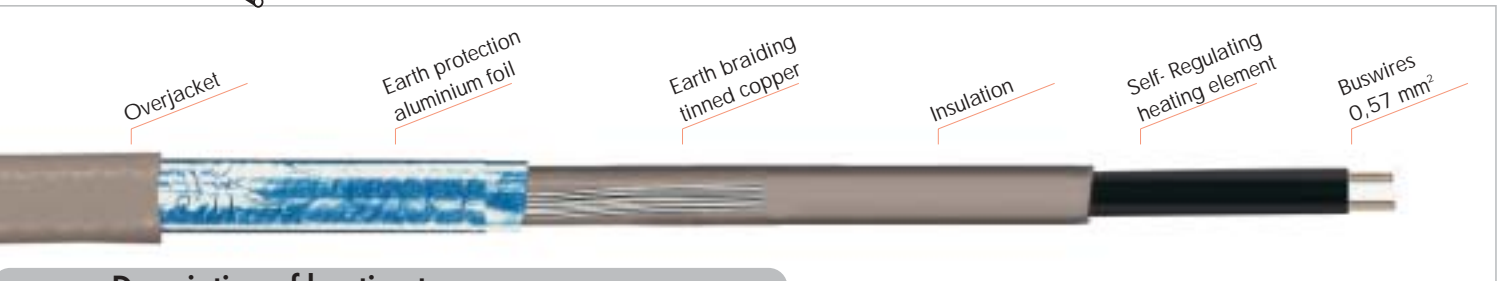
BO: Braid and thermoplastic overjacket
 BOT: Braid and fluoropolymer overjacket



Self-Regulating parallel heating tape

Type ELSR-A-S-BO

up to 80°C



Description of heating tape

Applications

These extremely small heating tape is very flexible and is used for special application where installation dimensions are needed to be kept small and where standard heating tapes may not be used.

Technical Data:

Overjacket TPE
 Buswire tinned copper
 Nominal temp. 65 °C
 Nominal voltage 230 V
 Buswires cross section 0.57 mm²
 Min. installation temperature . -10 °C

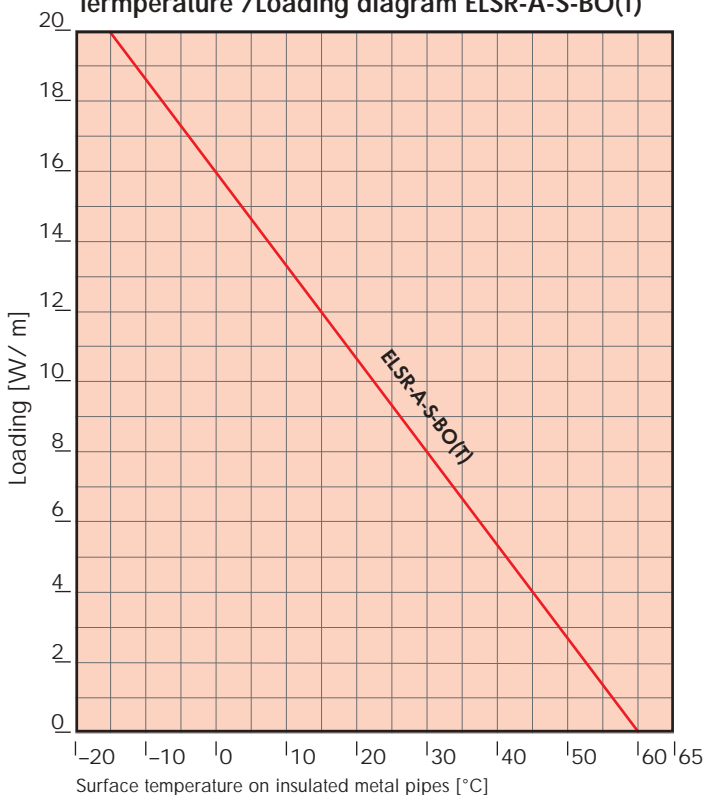
Min. bending radius. 20 mm
 Moisture resistant yes

Approval Details

Manufactured acc. toDIN VDE 0254: 1994-06
 VDE Reg. No7579
 El. codeNH1PXPEQUTPE 80
 Thermal safety according to
 DIN VDE 0721 T2A3 Class 0

Type	Nominal loading on insulated pipes at 0 °C [W/m]	Maximum permissible temperature		Earth Braiding Description	Earth Braiding [mm ²]	Dimensions [mm]	Order Number
		power on [° C]	power off [° C]				
ELSR-A-S-BO	16	65	80	aluminium + tinned copper	0.57	8.9x6.1	0200170
ELSR-A-S-BOT	16	65	80	aluminium + tinned copper	0.57	8.9x6.1	upon request

Temperature /Loading diagram ELSR-A-S-BO(T)



Maximum heating circuit length

Start up temperature °C	Circuit Breaker A	ELSR-A-S-BO(T) m
+ 10 °C	16	130
0 °C	16	120
- 10 °C	16	110
- 20 °C	16	100

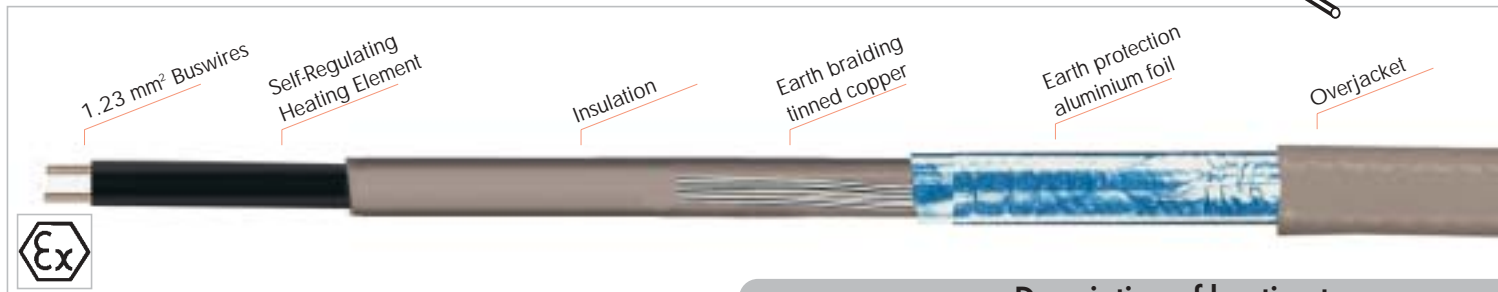
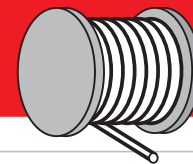
Maximum recommended length of heating circuit at 230V using Type-C circuit breakers.

BO: Braid and thermoplastic overjacket
 BOT: Braid and fluoropolymer overjacket

Type ELSR-A-10...40-BO(T)

up to 80°C

Self-Regulating parallel heating tape



Description of heating tape

Applications

For frost protection and temperature maintenance up to approximately 30°C on vessels, pipes, valves, and gutters. The heating tape (excluding the termination) can be set in liquids under certain circumstances. For applications in aggressive environment (chemical industry, petrochemical industry) we use a special overjacket with a chemical resistant fluoropolymer material

Technical Data:

Overjacket TPE-O
 Buswire tinned copper
 Operating temp 65 °C

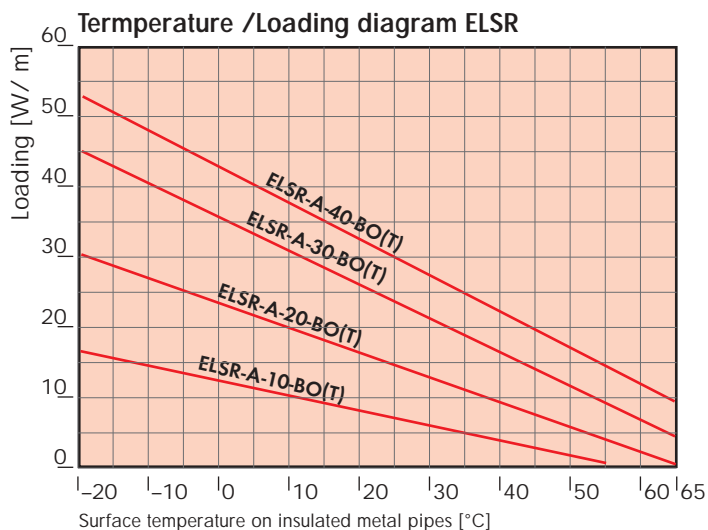
Nominal voltage 230 V
 Buswires cross section 1.23 mm²
 Installation temp. min. -10 °C
 Min. bending radius. 20 mm
 Moisture resistant yes

Approval Details

Manufactured acc. to DIN VDE 0254:1994-06
 VDE-Reg.-No. 97033 / 7579
 El. Code NH1PXPE QU TPE 80
 Thermal safety according to
 DIN VDE 0721 T2A3 Class 0
 Certificate. LCIE 01 ATEX 6019X
 Classification II 2 G EEx eI T6

Type	Nominal loading on insulated pipes at 10° C [W/m]	Maximum permissible temperature		Earth Braiding Description	Earth braiding [mm ²]	Dimension [mm]	Order Number
		power on [° C]	power off [° C]				
ELSR-A-10-BO	10	65	80	aluminium foil/tinned copper	1.23	13.3x5.2	0200130
ELSR-A-10-BOT	10	65	80	aluminium foil/tinned copper	1.23	13.3x5.2	0200140
ELSR-A-20-BO	20	65	80	aluminium foil/tinned copper	1.23	13.3x5.2	0200230
ELSR-A-20-BOT	20	65	80	aluminium foil/tinned copper	1.23	13.3x5.2	0200240
ELSR-A-30-BO	30	65	80	aluminium foil/tinned copper	1.23	15.0x5.2	0200330
ELSR-A-30-BOT	30	65	80	aluminium foil/tinned copper	1.23	15.0x5.2	0200340
ELSR-A-40-BO	40	65	80	aluminium foil/tinned copper	1.23	15.0x5.2	0200430
ELSR-A-40-BOT	40	65	80	aluminium foil/tinned copper	1.23	15.0x5.2	0200440

BO: Braid and thermoplastic overjacket
 BOT: Braid and fluoropolymer overjacket

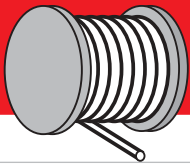


Maximum heating circuit length

Start up temperature °C	Circuit breaker A	ELSR-A-10-BO(T)	ELSR-A-20-BO(T)	ELSR-A-30-BO(T)	ELSR-A-40-BO(T)
		m	m	m	m
+10°C	16*	161	120	84	70
	20	262	150	105	87
	25	328	187	131	109
0°C	16*	142	94	70	62
	20	204	116	87	76
	25	255	146	109	95
-10°C	16*	126	78	61	54
	20	160	96	76	68
	25	200	121	95	85
-20°C	16*	109	77	52	49
	20	136	83	64	61
	25	170	104	80	76

Maximum recommended length of heating circuit at 80% switching capacity of the delayed action circuit breakers (C-characteristic).

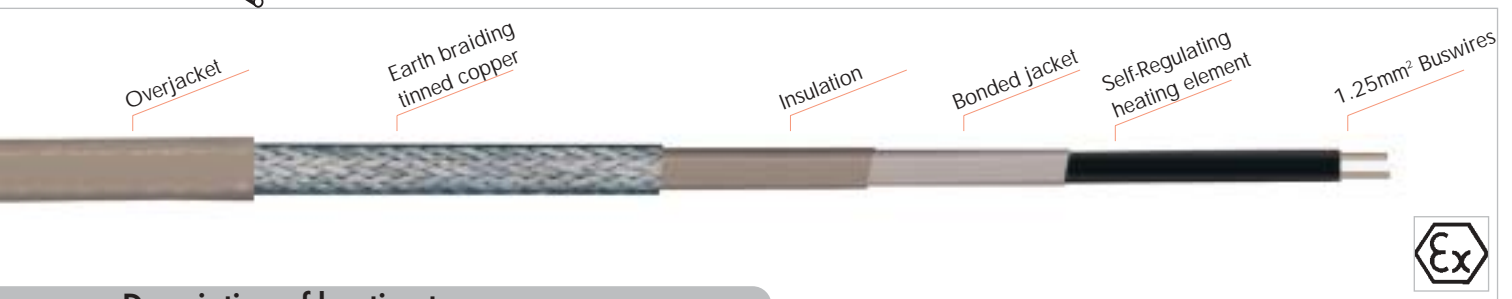
*be single end power input and max. 10% power loss.



Self-Regulating parallel heating tape

Type ELSR 10...40-..BO(T)

up to 85°C



Description of heating tape

- Self-regulating
- 4 power output ranges
- Cut-to-length

Applications:

ELSR is a for construction / light industrial grade self-regulating heating tape that may be used for freeze protection, or low temperature maintenance of pipework and vessels.

Function:

Self-regulating heating tapes consist of two parallel buswires, embedded in semi-conductive self-regulating matrix. This means that the heating cable automatically responds to changes in ambient conditions.

With increase in temperature, the synthetic material expands by molecular force, and the connections between the carbon particles diminish, reducing the load. Conversely, as the temperature decreases, so the load increases as the connections between the carbon particles increase accordingly. Thus, the heating power varies according to the temperature of the surface the heating tape is applied to.

Self-regulating heating tapes will not overheat or burnout - even when overlapped.

Technical Data:

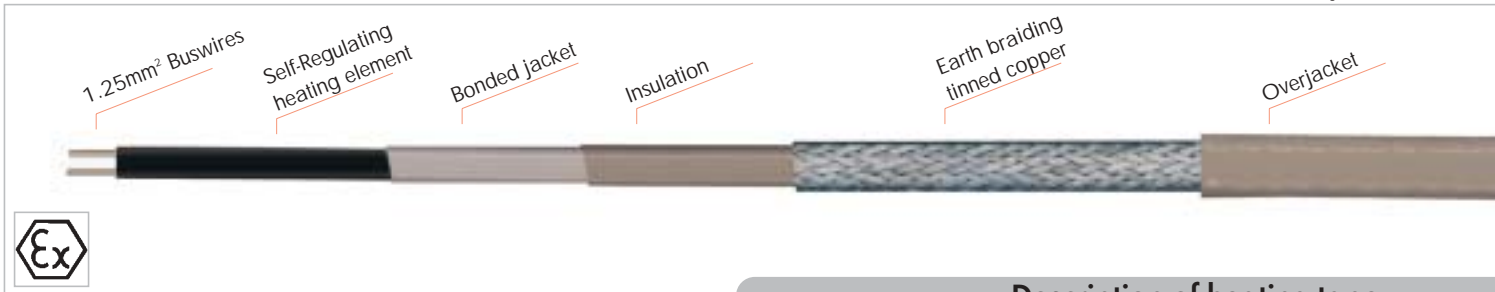
Maximum exposure temperature (unpowered) 85°C/*ELSR 40...80°C
 Maximum operating temperature (powered) 65°C
 Nominal voltage 230 V (120V available to order, except ELSR-40-...)
 Minimum bending radius . . 25 mm/*ELSR 40...20 mm
 Min. installation temp. . . . -30 °C/*ELSR 40....-20 °C
 Maximum resistance of braid 18.2 Ω/km
 T-Rating 10, 20, 40 W/m T6
 T-Rating 33 W/m T5
 Querschnitt Buswires cross section 1.25 mm²/*ELSR 40....1.23 mm²

Type	Nominal loading on Insulated Pipes at 10° C (W/m)	Maximum permissible temperature		Earth Braiding Description	Dimensions [mm]	Order Number
		power on [° C]	power off [° C]			
ELSR 10-2 B	10	65	85	tinned copper	10.5 x 4.5	0223101
ELSR 10-2 BO	10	65	85	tinned copper	11.5 x 5.5	0223102
ELSR 10-2 BOT	10	65	85	tinned copper	11.5 x 5.5	0223103
ELSR 20-2 B	20	65	85	tinned copper	10.5 x 4.5	0223201
ELSR 20-2 BO	20	65	85	tinned copper	11.5 x 5.5	0223202
ELSR 20-2 BOT	20	65	85	tinned copper	11.5 x 5.5	0223203
ELSR 33-2 B	33	65	85	tinned copper	10.5 x 4.5	0223331
ELSR 33-2 BO	33	65	85	tinned copper	11.5 x 5.5	0223332
ELSR 33-2 BOT	33	65	85	tinned copper	11.5 x 5.5	0223333
ELSR-40-B	40*	65	80	tinned copper	15.0 x 5.2	0200408
ELSR-40-BO	40*	65	80	tinned copper	15.0 x 5.2	0200410
ELSR-40-BOT	40*	65	80	tinned copper	15.0 x 5.2	0200420

B: Tinned copper braid
 BO: Braid and thermoplastic overjacket
 BOT: Braid and fluoropolymer overjacket

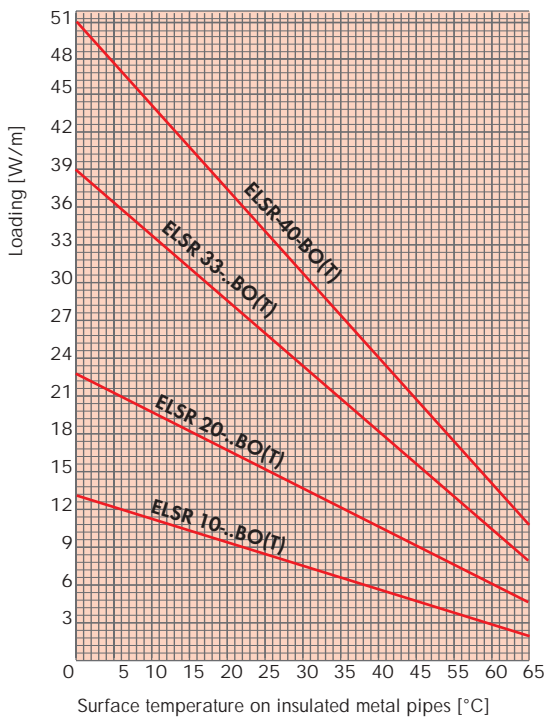
Type ELSR 10...40-..BO(T)
up to 85°C

Self-Regulating
parallel heating tape



Description of heating tape

Temperature/Loading diagram



BO: Braid and thermoplastic overjacket
BOT: Braid and fluoropolymer overjacket

Maximal heating circuit length

Start up temperature		230V			120V		
		16A	20A	30A	16A	20A	30A
ELSR 10	+10	205			95		
	-15	140	186	195	69	90	95
	-25	123	165	195	60	81	95
ELSR 20	+10	116	140		58	70	
	-15	75	93	140	37	46	70
	-25	62	85	115	31	42	57
ELSR 33	+10	70	90	108	33	45	54
	-15	50	65	95	25	33	53
	-25	45	58	85	22	30	43
ELSR 40	+10	70	87				
	-15	51	64				
	-25	46	57				

Maximum recommended length of heating circuit at 230VAC using Type-C circuit breakers.

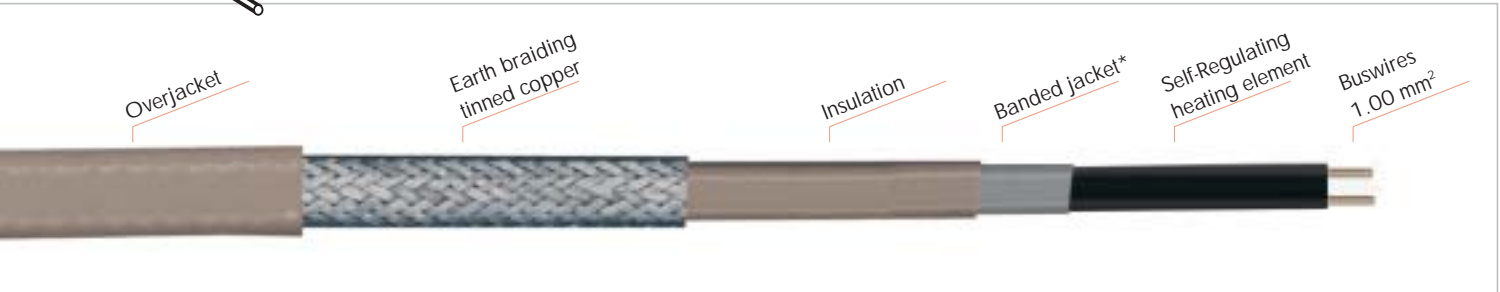
Approval Details

Standard EN 50014:1997, EN 50019:2000
Certificate KEMA 03 Atex 2090 U
Classification II 2 G EEx ell



Self-Regulating parallel heating tape

Type ELSR-L 10...25 BO(T)
up to 85°C



- Self-regulating
- 4 power output ranges
- Cut-to-length

Applications:

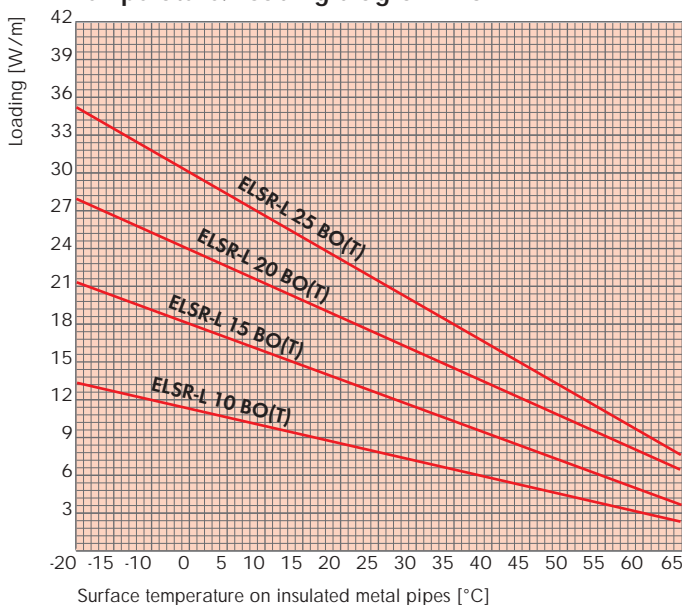
ELSR-L is a for construction / light industrial grade self-regulating heating tape that may be used for freeze protection, or low temperature maintenance of pipework and vessels.

Technical Data:

Maximum exposure temperature (unpowered) 85°C
 Maximum operating temperature (powered) 65°C
 Nominal voltage 230 V
 (*120V available upon request)
 Minimum bending radius . . 35 mm
 Minimum installation temp. . -30 °C
 Maximum resistance of braid 18 Ω/km
 *Waterproof Banded jacket . . optional

Type	Nominal loading on Insulated Pipes at 10° C (W/m)	Maximum permissible temperature		Earth Braiding Description	Dimensions [mm]	Order Number
		power on [° C]	power off [° C]			
ELSR-L 10-2 BO	10	65	85	tinned copper	10.5 x 6.0	0222102
ELSR-L 10-2 BOT	10	65	85	tinned copper	10.5 x 6.0	0222103
ELSR-L 15-2 BO	15	65	85	tinned copper	10.5 x 6.0	0222152
ELSR-L 15-2 BOT	15	65	85	tinned copper	10.5 x 6.0	0222153
ELSR-L 20-2 BO	20	65	85	tinned copper	10.5 x 6.0	0222202
ELSR-L 20-2 BOT	20	65	85	tinned copper	10.5 x 6.0	0222203
ELSR-L 25-2 BO	25	65	85	tinned copper	10.5 x 6.0	0222252
ELSR-L 25-2 BOT	25	65	85	tinned copper	10.5 x 6.0	0222253

Temperature/Loading diagram ELSR-L



BO: Braid and thermoplastic overjacket
 BOT: Braid and fluoropolymer overjacket

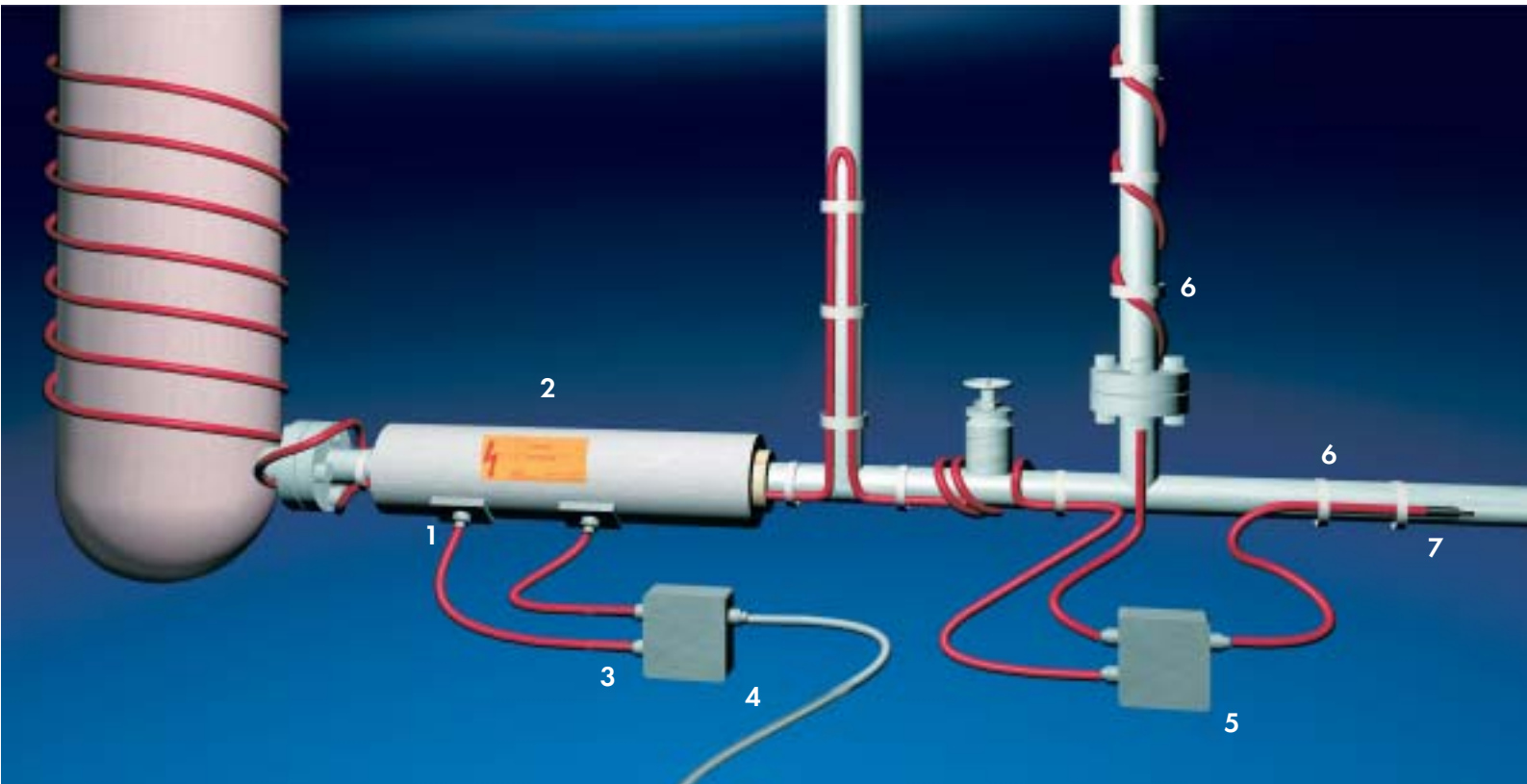
Maximum heating circuit length

Type	Circuit breaker	Start up temperature			
		+10°C	0°C	-15°C	-25°C
ELSR-L 10	10A	118m	109m	90m	79m
	16A	154m	154m	139m	128m
ELSR-L 15	10A	104m	95m	78m	70m
	16A	139m	139m	122m	113m
ELSR-L 20	10A	79m	73m	62m	57m
	16A	116m	113m	97m	89m
ELSR-L 25	10A	60m	51m	45m	42m
	16A	100m	86m	72m	65m

Maximum recommended length of heating circuit at 230VAC using Type-C circuit breakers.

Approval Details SEMCO, DNV E-6773

Heating system



1 - Insulation

2 - Warning label

3 - Connection

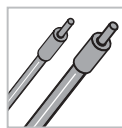
4 - Junction Box

5 - T-Switch

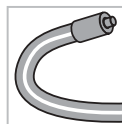
6 - Fasteners

7 - Termination

Ask for more information:



Heating cable



Heated hoses



Heating mats
Heating jackets



Special heating systems
(for antennas, containers)

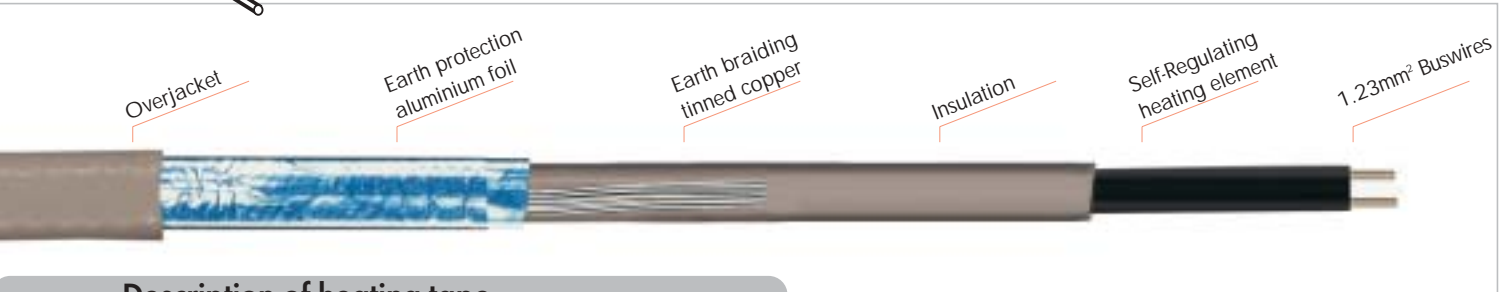


Control and display units



Self-Regulating parallel heating tape

Type ELSR-(A)-W
up to 100°C



Description of heating tape

Applications:

Low cost heating tape for process temperatures between 30°C and approximately 80°C on vessels, pipes, valves, and gutters. The heating tape (excluding the termination) can be set in liquids under certain circumstances.

Technical Data:

Overjacket TPE-O
Operating temp. 80 °C

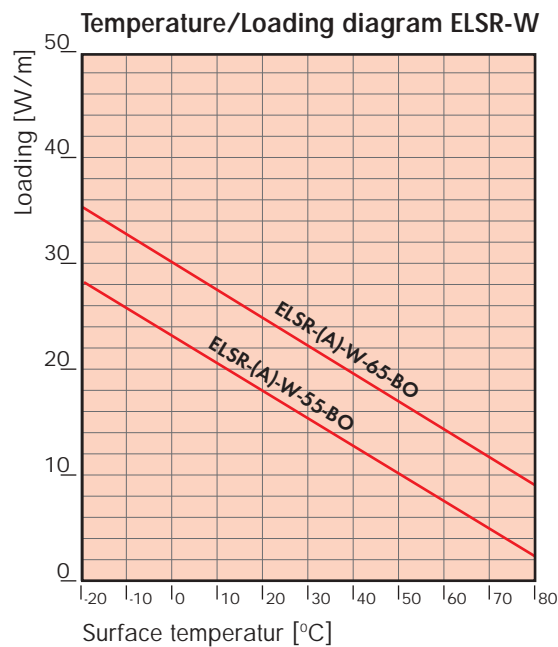
Nominal voltage 230 V
Buswire. tinned copper
Installation temp. min -20 °C
Min. bending radius. 20 mm
Moisture resistant yes

Approval details:

Manufactured acc. to DIN VDE 0254:1994-06
El. Code NH1PXPE QU TPE 100
Thermal safety according to
DIN VDE 0721 T2A3 Class 0

Type	Nominal loading on insulated pipes [W/m]	Maximum permissible temperature		Earth Braiding Description	Earth Braiding [mm²]	Dimensions [mm]	Order Number
		power on [° C]	power off [° C]				
ELSR-W-55-BO	at 55 °C/9W	80	100	tinned copper	2.2	12.9x5.0	0200350
ELSR-A-W-55-BO	at 55 °C/9W	80	100	Aluminium/tinned copper	1.23	12.9x5.0	0200360
ELSR-W-65-BO	at 65 °C/13W	80	100	tinned copper	2.2	12.9x5.0	0200450
ELSR-A-W-65-BO	at 65 °C/13W	80	100	Aluminium/tinned copper	1.23	12.9x5.0	0200455

Construction of ELSR-W comparable with ELSR on page 9



BO: Braid and thermoplastic overjacket

Maximum recommended circuit length

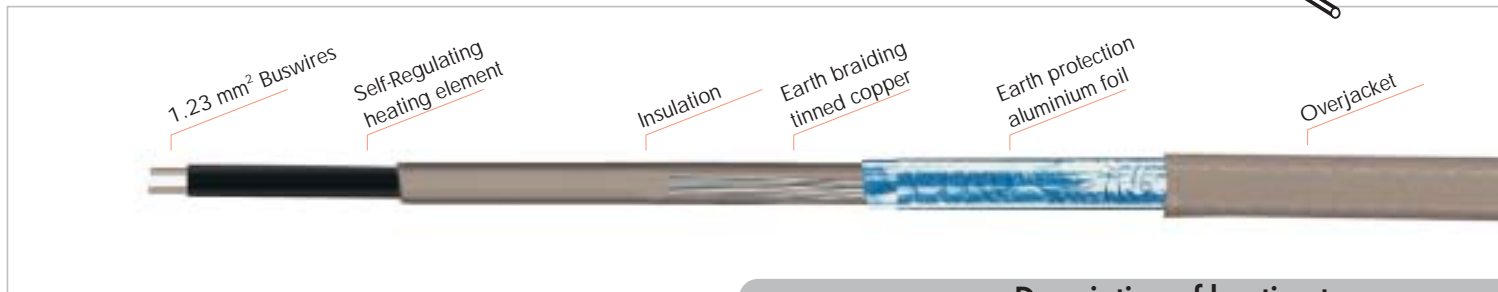
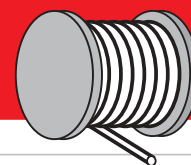
Start up temperature °C	Circuit breaker A	ELSR(A)-W-55-BO m	ELSR(A)-W-65-BO m
+50 °C	16*	158	110
	20	225	137
	25	285	171
+20 °C	16*	121	76
	20	150	95
	25	189	118
0 °C	16*	106	63
	20	130	78
	25	166	98
-20 °C	16*	96	54
	20	120	67
	25	150	84

Max. recommended length of heating circuit at 80 % switching capacity of the "delayed action circuit breakers" (C - characteristic) *by single end power input and max. 10% power loss.

Type ELSR-A-F-22-BO

up to 100°C

Self-Regulating parallel heating tape



Description of heating tape

- Self-regulating
- Cut-to-length
- For fat/oil pipes and vessels

Applications:

Clogged waste-water pipes in commercial kitchens or failures of the oil heating during the winter because the temperature is too low for the oil to flow are problems of the past.

Technical Data:

Self-regulating heating tapes consist of two parallel buswires, embedded in semi-conductive self-regulating matrix. This means that the heating cable automatically responds to changes in ambient conditions.

With increase in temperature, the synthetic material expands by molecular force, and the connections between the carbon particles diminish, reducing the load. Conversely, as the temperature decreases, so the load increases as the connections between the carbon particles increase accordingly. Thus, the heating power varies according to the temperature of the surface the heating tape is applied to.

Technical Data:

Overjacket	TPE-O
Buswire	tinned copper
Maximum exposure temperature (unpowered)	100°C
Maximum operating temperature (powered)	80°C
Nominal voltage	230 V
Minimum installation temperature	-10 °C
Minimum bending radius	20 mm
Max. heating circuit length with 16A and one-sided power supply at 0°C	63 m
Maximal power output at 40°C	22 W/m

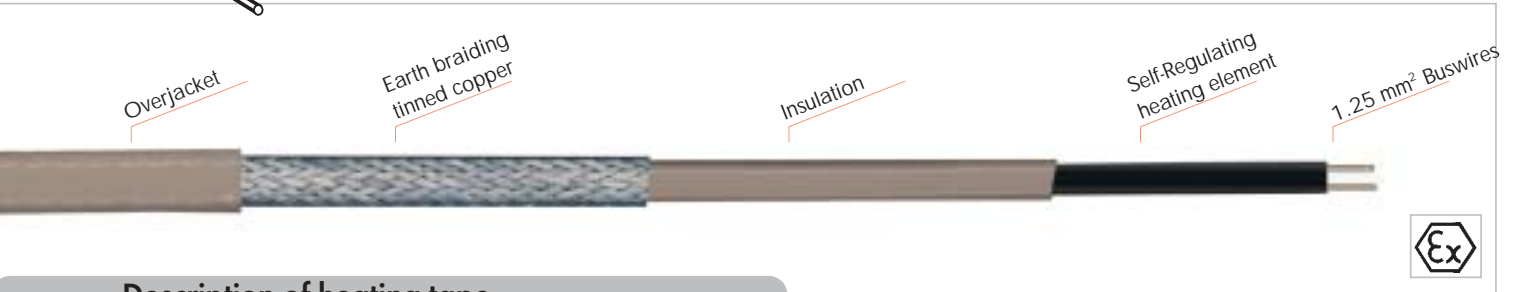
Type	Nominal loading at +40° C (W/m)	Maximum permissible temperature		Earth Braiding Description	Dimensions [mm]	Order Number
		power on [° C]	power off [° C]			
ELSR-A-F22-BO	22	80	100	Aluminium/ tinned copper	12.9 x 5.0	0200460

BO: Braid and thermoplastic overjacket



Self-Regulating parallel heating tape

Type ELSR-H 10...60-...BOT
up to 190°C



Description of heating tape

Applications:

ELSR-H is a construction and industrial grade self-regulating heating tape that may be used for freeze protection, or low temperature maintenance of pipework and vessels. The heating tape is with a special chemical resistant Fluoropolymere overjacket.

Technical Data:

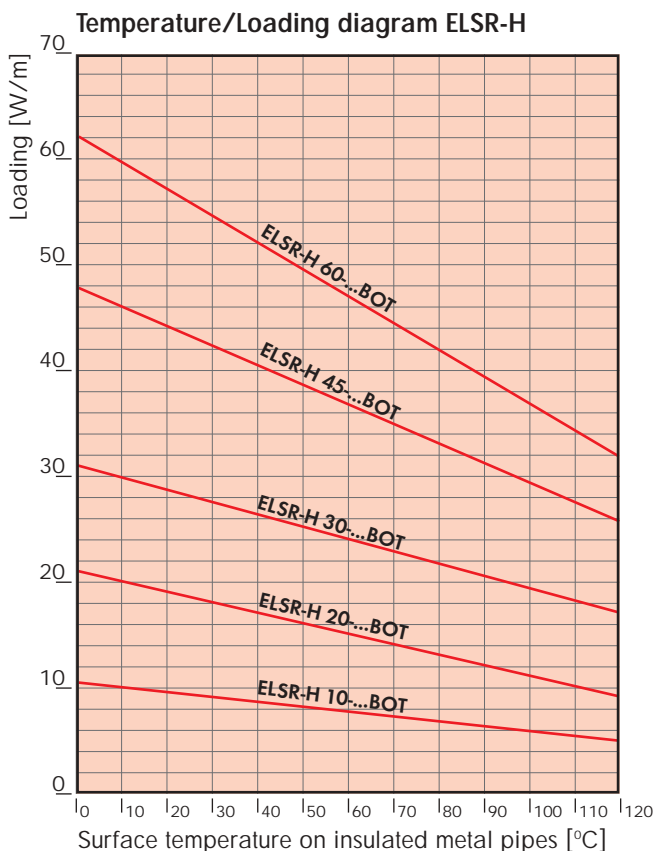
Overjacket FEP
 Operating temp. 120 °C
 Nominal voltage 230 V
 (120V available upon request)

Buswire. nickel-plated
 Minimum installation temp. . . -30 °C
 Minimum bending radius . . . 25 mm
 Moisture resistant yes

Approval Details:

Manufactured acc. to. DIN VDE 0254:1994-06
 El. Code NH1P PFA QU PFA 220
 Thermal safety according to
 DIN VDE 0721 T2A3 Class 0
 Certificate. KEMA, 03 Atex 2091U
 Classification II 2 GD EEx e II T3

Type	Nominal loading on Insulated Pipes at 10° C [W/m]	Maximum permissible temperature		Earth Braiding Description	Earth Braiding [mm²]	Dimensions [mm]	Order Number
		power on [° C]	power off [° C]				
ELSR-H 10-BOT	10	120	190	tinned copper	1.9	10.5x5.0	0221103
ELSR-H 20-BOT	20	120	190	tinned copper	1.9	10.5x5.0	0221203
ELSR-H 30-BOT	30	120	190	tinned copper	1.9	10.5x5.0	0221303
ELSR-H 45-BOT	45	120	190	tinned copper	1.9	10.5x5.0	0221453
ELSR-H 60-BOT	60	120	190	tinned copper	1.9	10.5x5.0	0221603



Maximum recommended circuit length

Nominal voltage V	Circuit breaker A	Start up temperature °C	ELSR-H 10 m	ELSR-H 20 m	ELSR-H 30 m	ELSR-H 45 m	ELSR-H 60 m
230	16	+10°C	200	135	85	70	50
		-25°C	175	100	69	49	38
230	20	+10°C	235	160	114	82	64
		-25°C	235	130	92	66	52
230	30	+10°C		160	114	82	64
		-25°C					
120	16	+10°C	100	67	44	35	25
		-25°C	89	50	35	24	20
120	20	+10°C	120	80	58	41	32
		-25°C	120	65	45	33	25
120	30	+10°C		80	58	41	32
		-25°C					

Max. recommended length of heating circuit at 80 % switching capacity of the "delayed action circuit breakers" (C - characteristic)

BOT: Braid and fluoropolymer overjacket

Self-regulating heating tapes

- **Self-regulating**
- **5 temperature ranges**
- **Variable loading**
- **High chemical resistance**
- **No need for temperature controller**
- **Cut-to-length**

Applications:

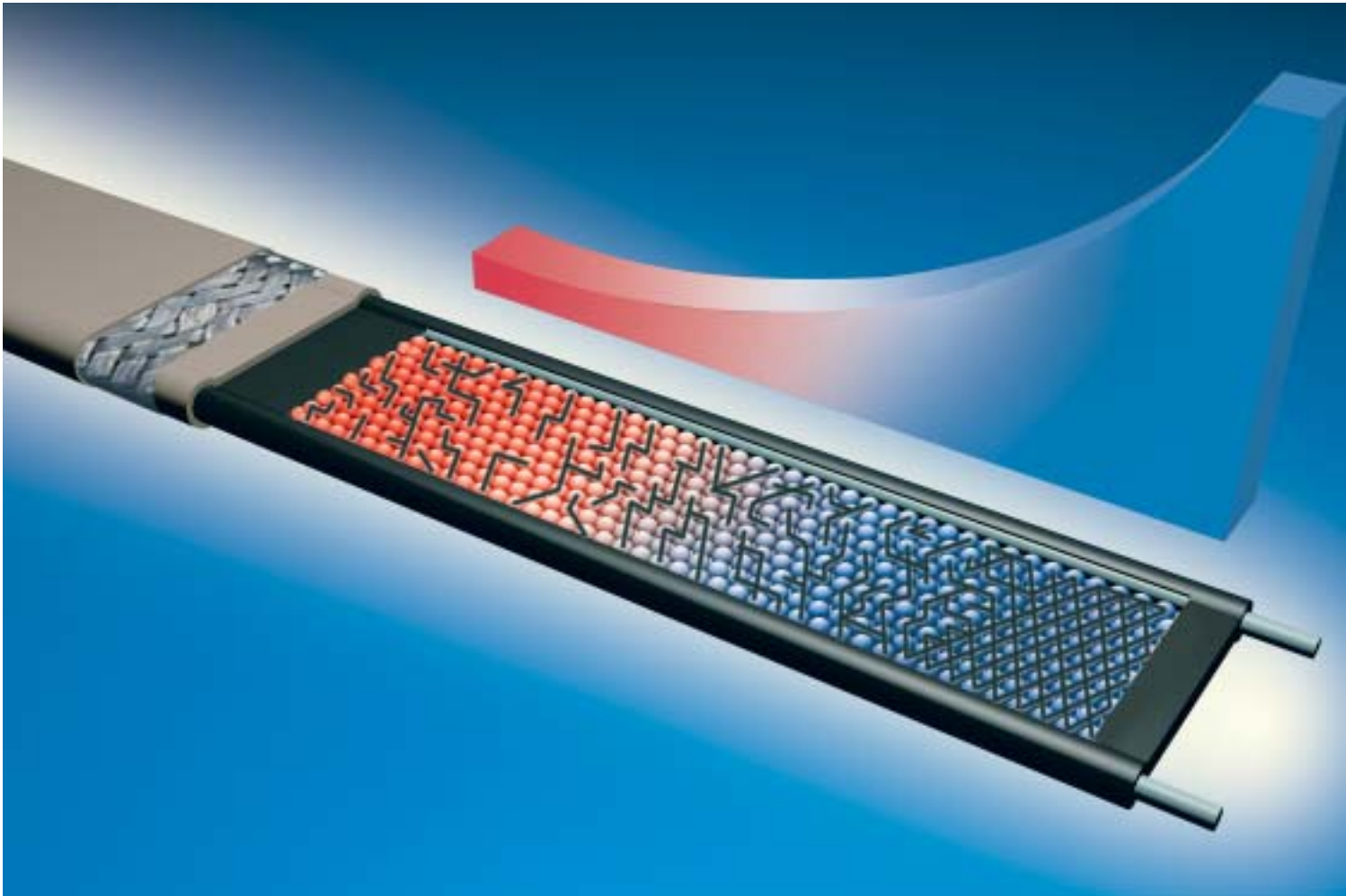
For frost protection and temperature maintenance up to approximately 30°C on vessels, pipes, valves, and gutters. The heating tape can be set in liquids under certain circumstances.

For applications in corrosive environments (Chemical or Petrochemical Industry) The heating tape has a special chemical resistant overjacket made of Fluoropolymer (Option "T")

Function:

Self-regulating heating tapes consist of two parallel bus wires, embedded in semi-conductive self-regulating matrix. This means that the heating cable automatically responds to changes in ambient conditions. With increase in temperature, the synthetic material expands by molecular force, and the connections between the carbon particles diminish, reducing the load. Conversely, as the temperature decreases, so the load increases as the connections between the carbon particles increase accordingly. Thus, the heating power varies according to the temperature of the surface the heating tape is applied to.

Self-regulating heating tapes will not overheat or burnout - even when overlapped.





Self-Regulating parallel heating tape

Type ELSR-SH 15...100-B0(T)
up to 240°C



Description of heating tape

- Self-regulating
- 6 Power Output Ranges
- Cut-to-length

Applications:

ELSR-SH is a construction / industrial grade self-regulating heating tape that may be used for freeze protection, or temperature maintenance of pipework and vessels.

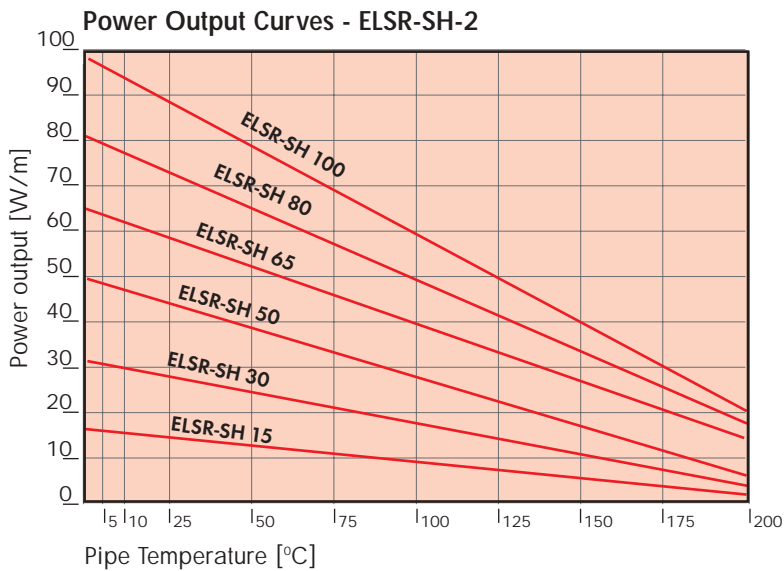
Technical Data:

Output wattage 15 - 100 W/m at 10°C
 Supply voltages 110 - 120 or 208V - 277VAC
 Continuous maintenance temperature 190 °C max
 Intermittent exposure temperature (max. 1000 hours exposure time) 190 °C max

Min. bending radius 35 mm
 Braid resistance nickel plated copper
 T Rating 15 to 50 W/m: T4
 65 to 100 W/m: T3

Approvals/Certifications

Factory Mutual:
 Ordinary locations
 Hazardous locations Class I, Div 1, B, C, D
 Class I, Div 2, A, B, C, D
 Class II/III, Div 1, E, F, G
 Class II/III, Div 2, F, G
 Class I, Zone 1, IIB + H2
 Class I, Zone 2, IIC
 Certificate 03ATEX2499
 Classification II 2 G EEx e II T3



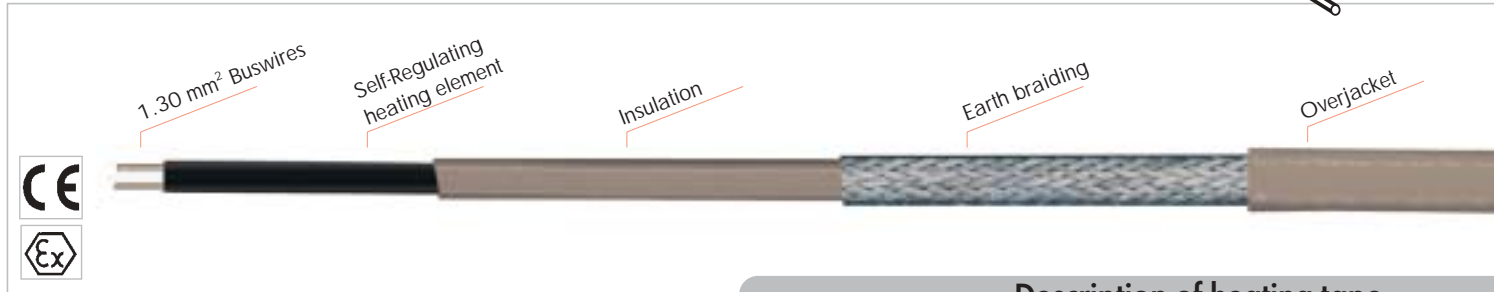
240 Volt Circuit Breaker Sizing vs. Max Circuit Length (m)

Series	Starting Temp.	15A	20A	30A
ELSR-SH 15-2	10°C	109	146	164
	-20°C	99	131	164
	-45°C	88	117	164
ELSR-SH 30-2	10°C	73	97	109
	-20°C	70	92	109
	-45°C	68	91	109
ELSR-SH 50-2	10°C	48	64	82
	-20°C	42	56	82
	-45°C	36	48	73
ELSR-SH 65-2	10°C	35	45	70
	-20°C	33	44	67
	-45°C	32	42	64
ELSR-SH 80-2	10°C	27	36	51
	-20°C	24	30	48
	-45°C	24	30	48
ELSR-SH 100-2	10°C	24	30	42
	-20°C	21	27	42
	-45°C	21	27	42

Type ELSR-SH 15...100-B0(T)

up to 240°C

Self-Regulating parallel heating tape



Description of heating tape

120 Volt Circuit Breaker Sizing vs. Max Circuit Length (m)

Series	Starting Temp.	15A	20A	30A
ELSR-SH 15-1	10°C	54	73	102
	-20°C	50	67	100
	-45°C	65	61	91
ELSR-SH 30-1	10°C	36	48	54
	-20°C	32	42	54
	-45°C	27	36	54
ELSR-SH 50-1	10°C	24	32	41
	-20°C	21	27	41
	-45°C	18	24	36

Series	Starting Temp.	15A	20A	30A
ELSR-SH 65-1	10°C	18	27	36
	-20°C	16	21	33
	-45°C	15	19	30
ELSR-SH 80-1	10°C	13	18	26
	-20°C	12	15	24
	-45°C	12	15	24
ELSR-SH 100-1	10°C	12	15	21
	-20°C	10	13	21
	-45°C	10	13	21

Type	On insulated Metal Pipes at +10° C (W/m)	Temperatures		Description	Dimensions [mm]	Order Number
		power on [° C]	power off [° C]			
ELSR-SH 15-2-BOT	15	190	240	nickel plated copper	11.75 x 5.4	0226152
ELSR-SH 30-2-BOT	30	190	240	nickel plated copper	11.75 x 5.4	0226302
ELSR-SH 50-2-BOT	50	190	240	nickel plated copper	11.75 x 5.4	0226502
ELSR-SH 65-2-BOT	65	190	240	nickel plated copper	11.75 x 5.4	0226652
ELSR-SH 80-2-BOT	80	190	240	nickel plated copper	11.75 x 5.4	0226802
ELSR-SH 100-2-BOT	100	190	240	nickel plated copper	11.75 x 5.4	0226002

BOT: Braiding and fluoropolymer overjacket

*120 Volt series only available upon request.

** Stainless steel or tinned copper braiding are available upon request and according to quantity to be ordered.

Control and Monitoring

Electronic Temperature Controller Type ELTC/05

Applications:

Freeze protection applications. Used for surface and ambient applications.

Technical Data:

Control range unchangeable set point +3°C
 Hysteresis approx. 1 K (by +4°C unpowered)
 Switch rating 16 A / 230 V, 1- or 2-pole (or 10A/400V)
 Connection cable max. 2,5 mm² (pull cage)
 Power usage max. 5 VA
 Power supply 230 V 50/60 Hz +/- 10%
 Protection IP 65
 Exposure temperature - 30 ... +80°C
 Dimensions (WxHxD) 130 x 130 x 75 mm Polystyrol housing
 Including cable gland 1xM12/1xM16/1xM25,
 2-wire PT100 with 5 m PVC conn. cable



Electronic Temperature Controller

Type ELTC/1 Control range..... - 5 bis + 15°C

Type ELTC/2 Control range..... 0 bis + 100°C

Type ELTC/3 Control range..... 0 bis + 250°C

Applications:

Freeze prot. and electrical trace heating systems. Used for surface and ambient applications.

Technical Data:

Hysteresis adjustable 1 to 50 K (symetric to set point)
 Switch rating 16 A / 230 V, 1- or 2-pole (or 10A/400V)
 Connection cable max. 2,5 mm² (pull cage)
 Power usage max. 5 VA
 Power supply 230 V 50/60 Hz +/- 10%
 Protection IP 65
 Exposure temperature - 30 to + 80°C
 Dimensions (WxHxD) 130 x 130 x 75 mm Polystyrol housing
 Including cable gland 1xM12/1xM16/1xM25,
 2-wire PT100 with 5 m PVC conn. cable
 Type 2 and 3 with 3 m Teflon conn. cable



Electronic Heating Circuit Monitor Type ELHC/2

Applications:

Power interruption monitoring from self-regulating heating tapes.

Type ELHC/2.1 rail type monitoring unit

Report contact 2 A / 230 V AC 1 changer
 Switch rating 16 A / 230 V AC
 Connection cable max. 2,5 mm²
 Power supply 230 V 50/60 Hz +/- 10%
 Protection IP 30
 Dimensions (WxHxD) 45 x 70 x 120 mm on DIN rail
 in Polycarbon housing

Type ELHC/2.2 housed type monitoring unit

Protection IP 65
 Dimensions (WxHxD) 130 x 130 x 75 mm Polycarbon housing



Capillary thermostat controller Ex-Classification Type EL-CTC (EEx d IIC) / Type EL-CTB (EEx d IIB)

Applications:

Electrical trace heating systems in classified areas.

Technical Data:

Control range -50 C ...+30 C/0...+50 C/0...+200 C/
 Switch difference 2,5%
 Connection cable max. 4.0 mm²
 Switch rating 16 A / 230 V AC
 Power supply 230 V 50/60 Hz +/- 10%
 Classification/Protection II 2 GD EEx d II C T6 / IP66
 Exposure temperature - 32 ...+50°C
 Dimensions (WxHxD) 120 x 120 x 110 mm Aluminium
 Including with EL-CTC 1.0m Pigtail for connection to ext. junction box
 (box not included), Stainless steel capillary tube,
 length 2 m
 Including with EL-CTB 1xM20 cable gland (cable 10 - 14 mm in diameter)
 and 1xM20 threaded entry, Stainless steel capillary
 tube, length 2 m



EL-TWIST connection and end termination kits



- Efficient power termination
- Clamp coupling technology
- Installed in less than a minute

Description:

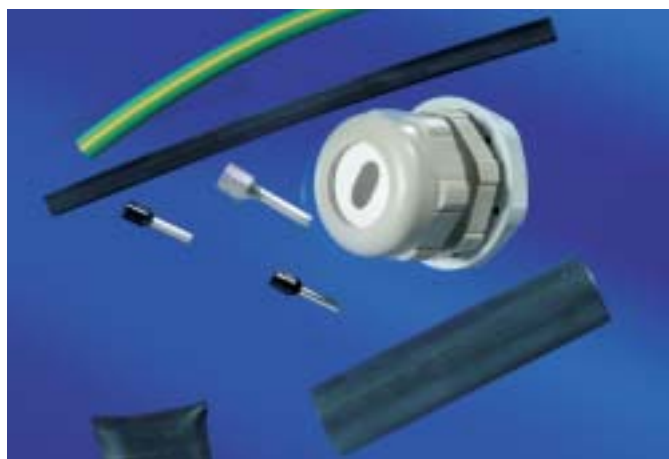
EL-Twist termination set is a easy, fast and inexpensive method for power termination of some eltherm self-regulating heating tapes in non-hazardous areas (upon request). The installation times are decreased when using the EL-Twist termination set. Just slide the heating tape end through the sleeve, expose the heating tape braiding and prepare for insertion into the clamping sleeve, plug the parts together, twist the threaded power termination and sleeve together. This procedure can be used to install in less than a minute with only a small amount of experience.

Technical Data:

Supply voltages max. AC 250V/16A
 IP rating EN 60 529
 VDE
 IP66, IP68
 Exposure temperature
 continuous (power on) +80 °C
 intermittent (power off) . . . +100 °C
 Nominal voltage 230 V
 Minimal exposure
 temperature -25 °C

EL-TWIST	Type	Description	Order Number
	EL-TWIST 1	Power connection kit, length 1,5 m, cross section 3 x 1,5 mm²	0913001
	EL-TWIST 2	End termination	0913002
	EL-TWIST 3	Connection/Termination kit, length 1,5 m, cross section 3 x 1,5 mm	0913003
	EL-TWIST 4	Connection for two heating tapes	0913004
	EL-TWIST -T	T-Connection for three heating tapes and end termination	0913009
	EL-TWIST-T2	T-Connection for two heating tapes with end termination and power connection, length 1,5 m, cross section 3 x 1,5 mm²	0913006
	EL-TWIST-T3	T-Connection for three heating tapes with end termination and power connection, length 1,5 m, cross section 3 x 1,5 mm²	0913007
	EL-TWIST-C	Cross-connection for four heating tapes, and two end terminations, length 1,5 m, cross section 3 x 1,5 mm²	0913008

Ancillaries



Type	Description	Order Number
Standard connection/end termination kits and cold ends		
ELVB05	connection/end termination kit for ELSR-M, ELSR-S with cable gland M25	0911020
ELVB35	connection/end termination kit for ELSR-M, ELSR-S with cable gland Pg16	0911108
ELVB01	connection/end termination kit for ELSR, ELSR-L with cable gland M25	0911004
ELVB31	connection/end termination kit for ELSR with cable gland Pg16	0911092
ELVB02	connection/end termination kit for ELSR-(A)-30/40-BO(T) with cable gland M25	0911008
ELVB32	connection/end termination kit for ELSR-(A)-30/40-BO(T) with cable gland Pg16	0911096
ELVB03	connection/end termination kit for ELSR-F/W with cable gland M25	0911012
ELVB33	connection/end termination kit for ELSR-F/W with cable gland Pg16	0911100
ELVB04	connection/end termination kit for ELSR-H with cable gland M25	0911016
ELVB34	connection/end termination kit for ELSR-H with cable gland Pg16	0911104
Insulation entry kits		
ELISD-R5	insulation entry kit for ELSR-M, ELSR-S, dimensions cover plate 70x70mm	0921051
ELISD-R1	insulation entry kit for ELSR, ELSR-L, dimensions cover plate 70x70mm	0921035
ELISD-R2	insulation entry kit for ELSR-(A)-30/40-BO(T), dimensions cover plate 70x70mm	0921039
ELISD-R3	insulation entry kit for ELSR-F/W, dimensions cover plate 70x70mm	0921043
ELISD-R4	insulation entry kit for ELSR-H, dimensions coverplate 70x70mm	0921047
ELISD-1.12	insulation entry kit 1xM12, dimensions cover plate 70x70mm, sealing range 3,5...7mm	0921011
ELISD-1.16	insulation entry kit 1xM16, dimensions cover plate 70x70mm, sealing range 4,5...10mm	0921015
ELISD-1.20	insulation entry kit 1xM20, dimensions cover plate 70x70mm, sealing range 7...13mm	0921019
ELISD-1.25	insulation entry kit 1xM25, dimensions cover plate 70x70mm, sealing range 9...17mm	0921023
Self-adhesive tape and foils		
ELB-01	25m PVC adhesive tape, 19mm wide, max. operating temperature 90°C	2481800190
ELB-02	20m glass-cloth adhesive tape, 12mm wide, max. operating temperature 140°C	2486800125
ELB-03	50m glass-cloth adhesive tape, 12mm wide, max. operating temperature 90°C	2481800120
ELB-06B	100m self-adhesive aluminium foil, 1000mm wide, max. operating temperature 90°C	2701901000
ELB-06C	50m self-adhesive aluminium foil, 50mm wide, max. operating temperature 90°C	2701900050
ELB-06D	100m self-adhesive aluminium foil / PE foil, 75mm wide, max. operating temperature 140°C	2701900076
ELB-06E	25m self-adhesive aluminium foil, 500mm wide, max. operating temperature 150°C	2701900500
Mechanical fasteners		
ELB-16.10	plastic fasteners, length 102mm, width 2.5mm, max. operating temperature 85°C, package 100 pcs.	2796000001
ELB-16.20	plastic fasteners, length 200mm, width 3.6mm, max. operating temperature 85°C, package 100 pcs.	2796000002
ELB-16.36	plastic fasteners, length 360mm, width 4.8mm, max. operating temperature 85°C, package 100 pcs.	2796000003
Warning Labels		
EL-WS01E	Warning label "Electric Heat Tracing"	2986900012

Ancillaries

Type	Description	Order Number
Standard Junction Boxes		
ELAK-2	Junction Box, 98x98x58mm	0920001
ELAK-5	Junction Box, 122x120x90mm	0920013
ELAK-5.1	Junction Box, 130x130x75mm	0920002
ELAK-6	Junction Box, 220x120x90mm	0920016
ELAK-7	Junction Box, 260x160x90mm	0920019
Mounting brackets and attachments		
ELMW-5	Pipe mounting bracket for ELAK-2	0941005
ELMW-9	Pipe mounting bracket for ELAK-5	0941009
ELMW-11	Pipe mounting bracket for ELAK 5.1, ELTC1/4 and 05	0941011
ELMW-13	Pipe mounting bracket for ELAK-6	0941013
ELMW-15	Pipe mounting bracket for ELAK-7	0941015
ELB-15.02	Pipe attachment band, mat. no. 1.4301, dia. 16/25mm, max. operating temp. 450°C	2723001016
ELB-15.04	Pipe attachment band, mat. no. 1.4301, dia. 25/40mm, max. operating temp. 450°C	2723001025
ELB-15.06	Pipe attachment band, mat. no. 1.4301, dia. 40/60mm, max. operating temp. 450°C	2723001040
ELB-15.09	Pipe attachment band, mat. no. 1.4301, dia. 70/90mm, max. operating temp. 450°C	2723001070
ELB-15.11	Pipe attachment band, mat. no. 1.4301, dia. 90/110mm, max. operating temp. 450°C	2723001090
ELB-19.06	Taut strip, mat. no. 1.4301, dia. up to 60mm, max. operating temp. 450°C, 10 pcs. / pkg.	0931081
ELB-19.09	Taut strip, mat. no. 1.4301, dia. up to 90mm, max. operating temp. 450°C, 10 pcs. / pkg.	0931083
ELB-19.12	Taut strip, mat. no. 1.4301, dia. up to 120mm, max. operating temp. 450°C, 10 pcs. / pkg.	0931085
ELB-19.18	Taut strip, mat. no. 1.4301, dia. up to 180mm, max. operating temp. 450°C, 10 pcs. / pkg.	0931087
ELB-13S1	Pipe attachment band, galvanized steel, 11mm wide, max. operating temp. 150°C, 30m	2720301010
ELB-13S2	ELB13S1 lock, max. operation temp. 150°C, 100 pcs. / pkg.	2720301011
ELB-13V1	Pipe attachment band, mat. no. 1.4301, 11mm wide, max. operating temp. 450°C, 30m	2723001010
ELB-13V2	ELB13V1 lock, max. operation temp. 450°C, 100 pcs. / pkg.	2723001011
Ex Ancillaries and connection/end termination kits		
ELVB-SRAEx-1	Termination kit for ELSR-(A)-10/20-BO(T) M25	0X81001
ELAK-Ex 3	Junction Box, polyester housing, 122x120x90 mm	0X80003
ELAK-Ex 4	Junction Box, aluminium housing, 122x120x90 mm	0X80004
ELMW-9	Mounting bracket	0941009
Electronic Temperature Controller		
ELTC-05	ELTC-05 Frostcontrol +3° C including PT100, 1 relay	0610002
ELTC-05	ELTC-05 Frostcontrol +3° C including PT100, 2 relay	0610005
ELTC-1	ELTC-1 Control range -5°C bis +15°C including PT100	0610015
ELTC-1	ELTC-1 Control range -5°C bis +15°C including PT100, 2 relay	0610014
ELTC-1	ELTC-1 Control range -5°C bis +15°C including PT100, 1relay	0610008
ELTC-2	ELTC-2 Control range 0°C bis +100°C including PT100, 1 relay	0610017
ELTC-2	ELTC-2 Control range 0°C bis +100°C including PT100, 2 relay	0610020
ELTC-2	ELTC-2 Control range 0°C bis +100°C including PT100, 2 relay	0610026
ELTC-3	ELTC-3 Control range 0°C bis +250°C including PT100, 1 relay	0610031
ELTC-3	ELTC-3 Control range 0°C bis +250°C including PT100, 2 relay	0610034
ELTC-3	ELTC-3 Control range 0°C bis +250°C including PT100	0610035
Electronic Heating Circuit Monitor		
ELHC/2.1	ELHC/2.1 electronic heating circuit monitor	0641001
ELHC/2.2	ELHC/2.2 end heating circuit unit, 130x130x75 mm, IP65	0641002
Capillary thermostat Ex-Classification		
EL-CTC	EL-CTC Capillary thermostat EEx d II C	0X63031
EL-CTB	EL-CTB Capillary thermostat EEx d II B	0X63030



Design Manual frost protection + 5°C for self-regulating parallel heating tapes type ELSR- 10...40-BO(T)

Table 1

Pipe dimension:	Inch:	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	7	8	9	10	12
	DN	15	20	25	32	40	50	65	80	100	125	150	175	200	225	250	300
Thermal insulation (mm)	min. ambient temperature (°C)	Heating Tape Type ELSR-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	20	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	40	40	40
	-20	10	10	10	10	10	20	20	20	20	20	30	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	30	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: Conduction coefficient of the insulation 0,04 W/mK; Wind speed 10m/s; addition for safety 20%.

Heating tape additions (m)

Table 2

	DN	15	20	25	32	40	50	65	80	100	125	150	175	200	225	250	300
Flange pair		0,2	0,2	0,25	0,3	0,3	0,35	0,4	0,5	0,6	0,7	0,8	0,9	1,0	1,1	1,3	1,5
Flange fitting		0,4	0,45	0,5	0,55	0,6	0,8	0,9	1,1	1,5	2,0	2,4	2,8	3,3	3,8	4,2	5,0
Pumps		1,5	1,5	2,0	2,0	2,5	2,5	3,0	4,0	5,0	5,0	6,0	6,0	6,5	6,5	7,0	8,0

For bare pipe supports: Heating tape addition = 4 x length of support. Please add for each heating tape connection in the junctionbox/Thermostat approximately ca. 0.5 m. Attention: For multiple tracing of the heating tapes the above mentioned additions have to be multiplied accordingly.

Example 1

Application: Frost protection of a pipeline DN 100, 25 m long with 2 flange pairs, 1 fitting, 1 Pump, 4 supports 0.1 m width; at -25 °C ambient temperature and a thermal insulation of 50 mm, voltage 230V.

Design from table 1: Heating tape Type ELSR-20-BO single tracing
 Length of pipe: 25 m x 1 tracing = 25 m
 From table 2: Flange pair 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
 Supports 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 amount 35 m ELSR-(A)-20-BO(T)

Heat losses at pipe lines in W/m at 10 K temperature difference

Table 3

Pipe dimension:	Zoll:	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	7	8	9	10	12
	DN	15	20	25	32	40	50	65	80	100	125	150	175	200	225	250	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: Conduction coefficient of the insulation 0,04 W/mK, wind speed 10m/s, safety addition 20%

For other conduction coefficients the values have to be multiplied with the corresponding factor.

Example: Conduction coefficient of the insulation 0,045 W/mK

$$\frac{0,045 \text{ W/mK}}{0,040 \text{ W/mK}} = 1,125$$

Example 3

Application: Temperature maintenance of a pipeline 15 m long, DN 20 of 20 °C (caustic soda) at a min. ambient temperature of - 10° C and a thermal insulation of 40 mm..

Attachments: 2 pairs of flanges, 2 fittings, voltage 230 V

Design:

From **table 3**: T 10 K loss of heat = 3,5 W/m

Since there is a total-T of 30 K, the loss of heat has to be multiplied with factor 3.

3,5 W/m x 3 = 10.5 W heat loss per m of pipeline.

Length of pipeline: = 15 m

Pairs of flanges 2 x 0.35 m = 0.7 m

Fittings 2 x 0.80 m = 1.6 m

Connection 1 x 0,50 m = 0.5 m

Order = 18.0 m ESR-20-BO(T)

The following steps have to be taken for a heating with heating tapes type ESR...-BO(T):

Select the corresponding heating tape from the power diagram. The intersection of the two lines heating power W/m = 10.5 and temperature +20°C lies between the curves A and B.

The heating tape with next higher power has to be selected (B = ESR-20-BO(T)).

Additional heating tape for the attachments can be taken from table 2.

eltherm



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