eltherm®
innovations in heat tracing

Heated hoses

Pressure hoses

innovations in heat tracing

eltherm GmbH

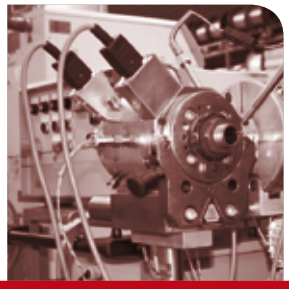
eltherm GmbH is an international mid-size company that provides electrical trace heating products. The owner-operated company has charted a course for growth with over 40 years of know-how, the highest standards of quality and flexibility. eltherm's clear commitment to maintaining its production location in Germany underscores its philosophy of providing the very best trace heating solutions, individually adapted to its customers' requirements. Thus eltherm, an engineering company with its own development and production of heating cable, heated hoses, heating mats and jackets, instrumentation and control systems and accessories, is considered one of the leading manufacturers of electrical trace heating in the world.

Production in Burbach

With the production of self-regulating heating cables, eltherm GmbH has rounded out its product line of heating cables and risen to the top tier of heating cable manufacturers on the basis of its demanding high-tech standards. Only about 10 heating cable manufacturers in the world have mastered this technology and eltherm is the only one in Germany.

In addition to frost protection and temperature maintenance up to 900 °C, eltherm is the competent partner for complete system solutions, including heating for entire chemical and other industrial plants. eltherm has already proven its competence and capabilities in a wide and varied range of applications including the oil and gas industry, power plant construction and the automotive and food industry.

innovations in heat tracing



Solutions for your challenge!

Competent solutions

In addition to production, eltherm has also an established in-house development area. This is where innovative solutions are created and products are continuously improved to meet market demands. Along the way, our quality management system ensures that we ship out only high-quality and technically sound products.

In addition to complying with requirements, such as EAC certification and VDE directives, eltherm also fulfils the strict demands of ATEX certification. Beyond that, the company has also been certified according to the standards of ISO 9001 and ISO 14001 for years.

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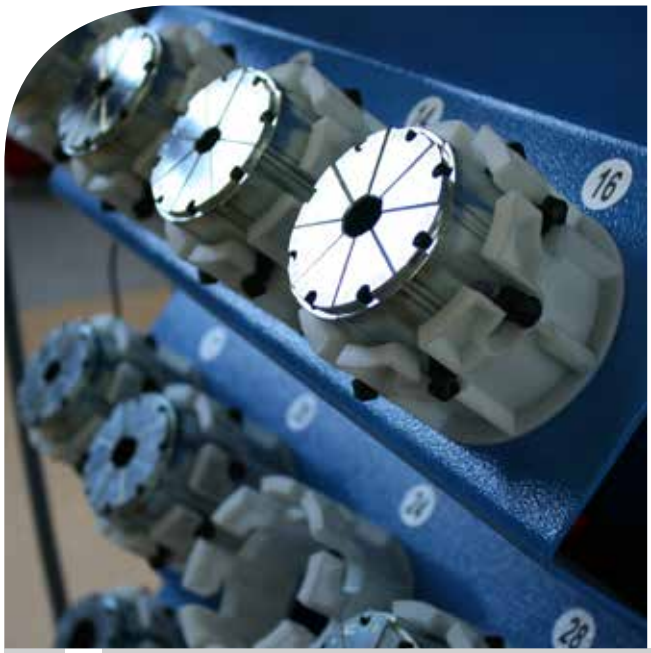


Heated hoses

eltherm is one of Europe's leading suppliers of heated hoses and flexible, heated pipes. Depending on the requirements and application, flexible heated pipes by eltherm ensure the transport of liquid and gaseous media without the loss of temperature.

Areas of application for eltherm heated hoses:

- Gas analysis where fixed heated hoses take flue gas samples from the chimney to the analyser system
- Gas analysis and transportable measurement systems, for example taking samples in the field.
- Industrial applications in mechanical and plant engineering
- In the chemical and petrochemical industry
- Food industry
- Automotive industry, for example adhesion of body parts by movable system components (robots)

In this way standard frost protection and process temperatures up to 450 °C can be implemented without any problems.

What types of applications are available?

1. Analyser technology

Frost protection / holding temperature:	5 to 450 °C
Typical nominal widths:	4 to 10 mm

2. Industrial applications / heated pressure hoses

Frost protection / holding temperature:	5 to 250 °C
Typical nominal widths:	8 to 100 mm

All heated hoses made by eltherm are designed and produced specifically according to customer specifications. Our in-house development department is happy to develop a custom solution based on your requirements.

Of course, eltherm also provides flexible heated hoses designed for use in hazardous (Ex) areas.

Solutions for your areas of application

■ Gas analysis

■ Bitumen processing

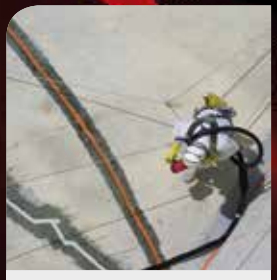
■ Environmental and water technologies

■ Chemical / petro-chemical industry

■ Food industry

■ Mechanical engineering

■ Automotive industry



■ Surface technology

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innovations in heat tracing

Heating hose product range: ELH…/ELSH…

Analytic heated hoses

- Controlled: a…/ad…/ai…/adi…/ae…
- Self-regulating: asb…/adsb…/aisb…/adisb…/aesb…

Explanations:
a: Analysis

Heated pressure hoses

- Controlled: md…/hd…/shd…
- Self-regulating: mdsb…/hdsb…/shdsb…

Explanations:
md: Medium pressure T1
hd: High pressure T2
shd: Super high pressure T3

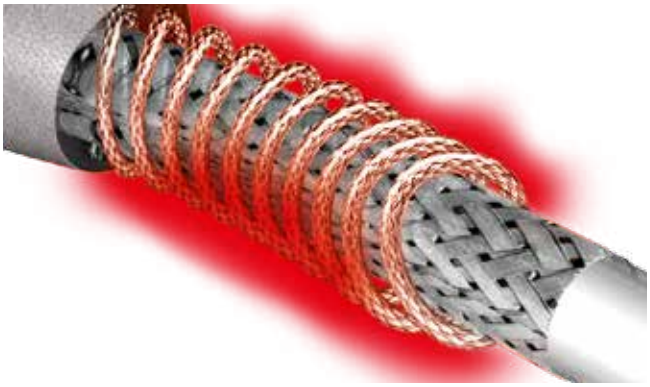
eltherm hose design with spacer

To meet the high quality standards eltherm has set for itself and to ensure optimum heating cable output on the carrier hose, our standard hoses are configured to include a bifilar heating cable and special spacer. Creating spatial density in the hose carrying the heating cable ensures perfectly homogeneous heat distribution throughout the hose as well as optimum element loading. The additional glass-fibre spacer serves to prevent hot spots even in moving applications with great bending strain as contact between the heating cables is avoided.

Advantages

- High power density resulting from tight winding of the heating cable with spacer
- Homogeneous and therefore optimal heat distribution
- Resistance to great bending strain
- Longer service life and durability
- Very high quality standard
- Hot spot prevention

Homogeneous heat distribution with eltherm heating hose



Heat distribution with conventional heated hose configuration without spacer: risk of hot spots due to bending.

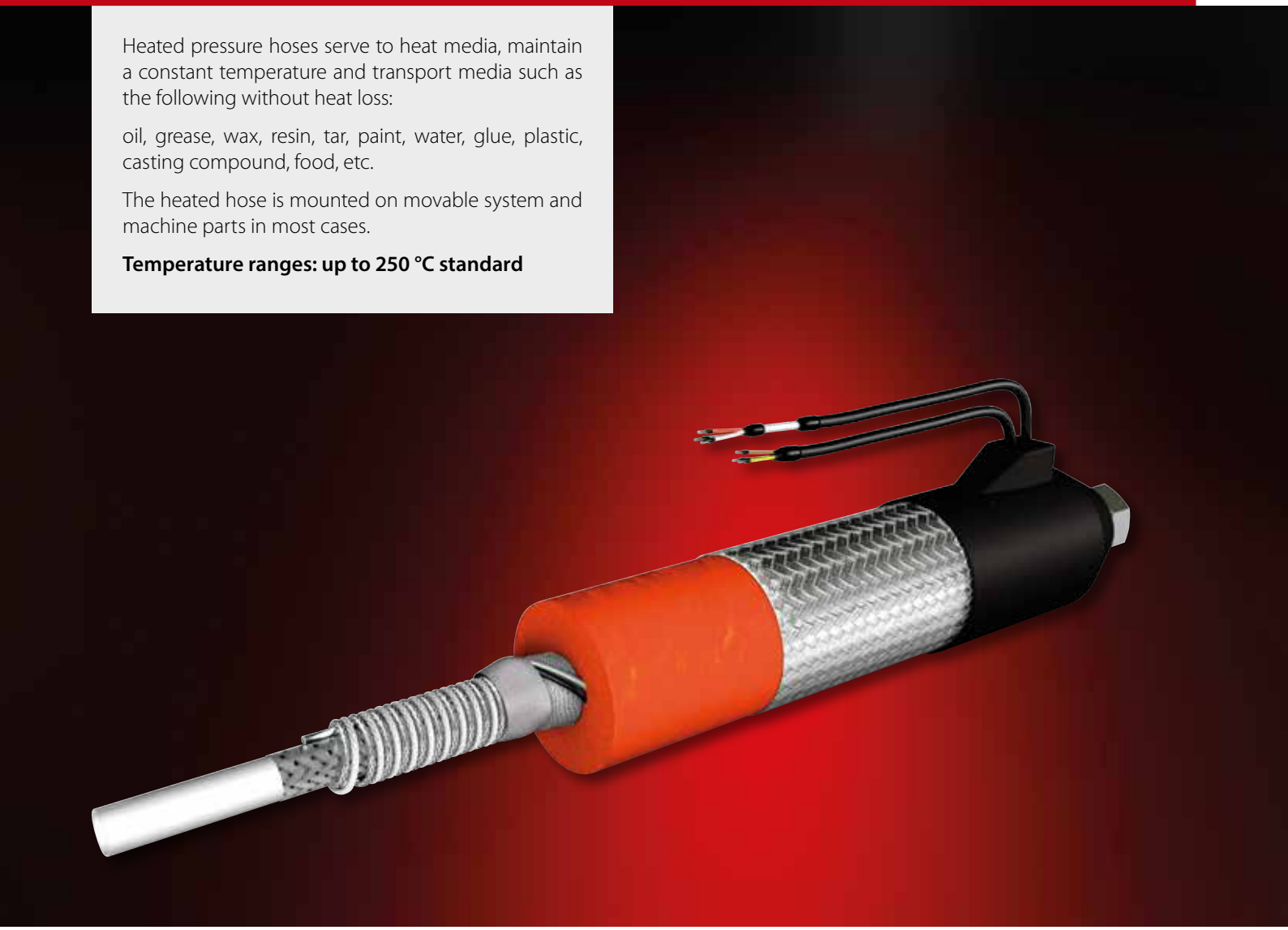
Controlled heated pressure hoses type ELH/md… hd… shd

Heated pressure hoses serve to heat media, maintain a constant temperature and transport media such as the following without heat loss:

oil, grease, wax, resin, tar, paint, water, glue, plastic, casting compound, food, etc.

The heated hose is mounted on movable system and machine parts in most cases.

Temperature ranges: up to 250 °C standard



Application background

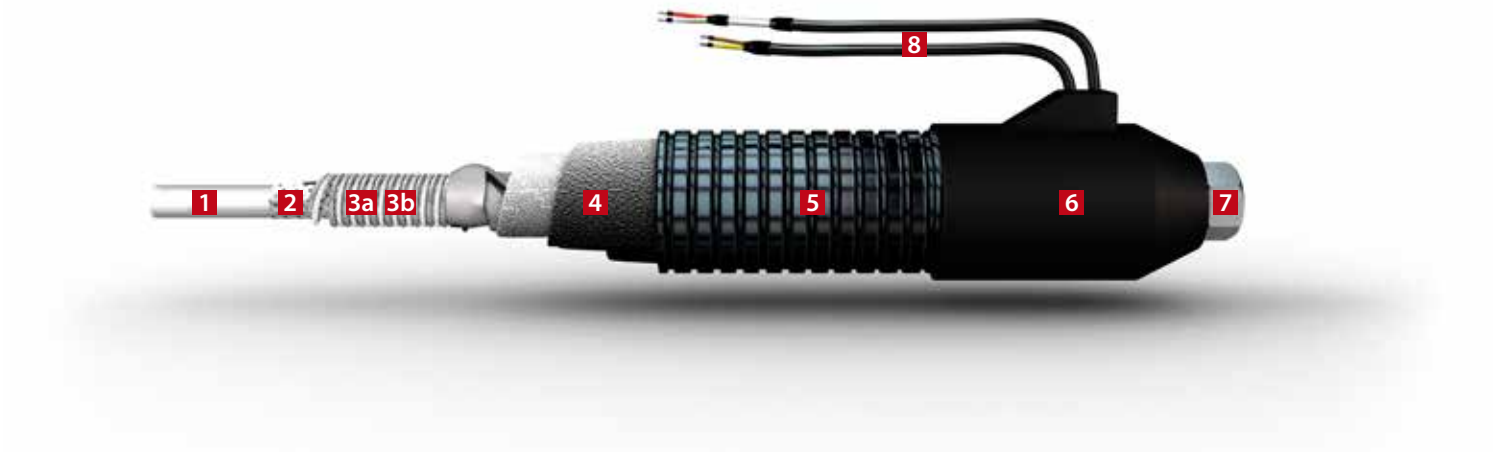
- The medium is only free-flowing at a specific temperature.
- The medium only reaches its specific processing properties in a certain temperature range.
- The medium can only be processed at a specific temperature.
- The heated hose must be transportable or flexible due to movable system parts.

Advantages

- Operating temperature: 5 °C to 250 °C as standard
- Nominal widths: 4 mm to 25 mm as standard
- Voltages: 12 V to 400 V
- Operating pressures: up to 500 bar
- Heat output optimised for application
- Heating cables produced in-house
- Available for the automotive industry as silicone-free/LABS-free version

Application examples

- Fastening technology/hot-melt systems, packaging, gluing and labelling machines
- Surface technology/dosing and paint spraying plants
- Food industry, bottling systems
- Foam plants, PU foaming, roof renovation, packaging systems
- Epoxy resin systems
- Washing systems, steam cleaners, pipe cleaning
- Filling and silo hoses
- Dosing systems
- Heavy oil lines
- Glass industry for coating and pasting thermal glass panes
- Pasting robot



1 **Inner liners:** The selection of inner liners is based on the max. operating pressure, max. operating temperature and the specific application. For further details see the various types of inner liners.

2 **Sensor:** a temperature sensor is mounted between the inner liner and heating cable for temperature control. Additional sensors can be mounted in any position for further temperature detection. eltherm uses PT-100 sensors based on 2-wire technology as standard. In addition, nearly any standard commercial temperature sensor can be integrated (e.g. thermocouple type K / J, PT-1000, etc.).

3a **Heating cable:** the resistance heating cable is produced in-house as a basic element. eltherm uses only PTFE or PFA-insulated heating cables. We focus on the highest possible power density with the result of excellent homogeneous heat distribution. We use our ELKM-AE heating cable up to max. 250 °C in standard applications or, for heavy dynamic loading, ELKM-AG.

3b **Spacer:** The spacer is made of braided glass-fibre and provides reliable protection for the heating cable against mechanical damage and hot spots in the event of bending strain.

4 **Insulation:** Insulation depends on max. operating temperature and selection of outer jacket (see hose configuration page) As a rule, special thermal fleece materials and foam hoses are used (up to 100 °C elastomer foam hose, up to 250 °C silicone foam hoses).

5 **Outer jacket:** Selection of the outer jacket is determined by application, bending radius and ambient temperature. The outer jacket provides heated hoses with reliable protection against humidity, weather and external environmental effects as well as mechanical and dynamic loading (for example on the robot).

6 **End caps:** End caps seal off heated hoses at both ends. The integrated strain relief provides reliable relief for the connection cable. End caps are available as standard in silicone, EPDM, plastic (polyamide) and galvanised metal.

7 **Connection fitting:** connects the heating hose to the system part (connection, spray nozzle, etc.)

8 **Connection cable:** Sensor and connection cables are routed separately in standard configuration. The default length of the connection cables is 1.5 m each. Upon request, any customary plug can be mounted to the connection cable.

Hose configuration type ELH... / w / T / GSI

1 Inner liners

T1 NW 4-25 mm

max. 250 °C

ELH/md: PTFE smooth hose with one pressure carrier layer

T2 NW 6-40 mm

max. 250 °C

ELH/hd: PTFE high pressure smooth hose with two pressure carrier layers

Temperatures provided here refer to max. operating temperatures of inner liners.

The max. operating temperature of heating hoses depends on the type of heated hose. Additional inner liners on request!

(NW= nominal width)

T3 NW 6-25 mm

max. 250 °C

ELH/shd: PTFE super high pressure smooth hose with three pressure carrier layers

T1VA NW 6-100 mm

max. 500 °C

ELH/md: Stainless steel hose Mat. 1.4404 with one pressure carrier layer made of stainless steel wire

T3A NW 6-25 mm

max. 100 °C

ELH/shd: Thermoplastic super high pressure hose with multiple pressure carrier layers made of aramid and steel wire, inner liner made of polyamide

6 End caps

Silicone end cap/ EPDM end cap with anti-kink protection

Silicone end cap/ EPDM end cap

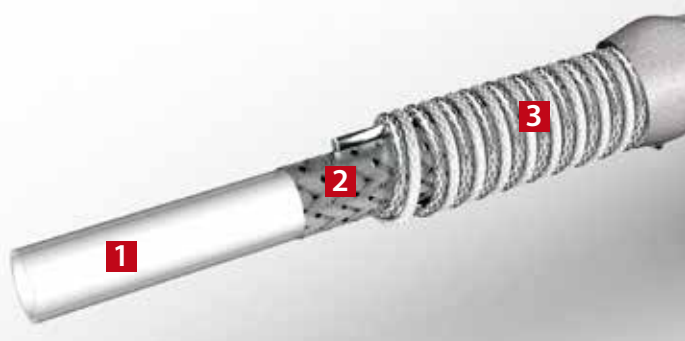
Plastic end cap

Plastic end cap with terminal housing

with terminal housing

4 Insulation

Multi-layered thermal fleece



5 Outer jacket

Corrugated PA hose (PA-12)
Standard

Corrugated PA hose (PA-12)
for robotic applications

Corrugated PU hose
Highly flexible for robotic applications

Corrugated metal hose, stainless steel
Tread-resistant, sturdy design, highly corrosion-resistant (Mat. 1.4306). For indoor use only, IP40.

Corrugated metal hose, galvanised steel
tread resistant, sturdy design. Only for indoor use IP 40

Corrugated metal hose with PVC outer jacket / ANACONDA
Tread-resistant, sturdy design. Can also be used outdoors

Silicone outer jacket, red
Wide temperature range. Surface is easy to clean

2 Sensor

Stationary-mounted temperature sensor

3 Heating cable

with spacer

Matching **fittings**
can be found on pages 40-43

Hose configuration type ELH... / N / SS / Fe / Si

1 Inner liners

T1 NW 4-25 mm

max. 250 °C

ELH/md: PTFE smooth hose with one pressure carrier layer

T2 NW 6-40 mm

max. 250 °C

ELH/hd: PTFE high pressure smooth hose with two pressure carrier layers

Note: Temperatures provided here refer to max. operating temperatures of inner liners.

The max. operating temperature of heating hoses depends on the type of heated hose. Additional inner liners on request!

(NW= nominal width)

T3 NW 6-25 mm

max. 250 °C

ELH/shd: PTFE super high pressure smooth hose with three pressure carrier layers

T1VA NW 6-100 mm

max. 500 °C

ELH/md: Stainless steel hose Mat. 1.4404 with one pressure carrier layer Stainless steel

T3A NW 6-25 mm

max. 100 °C

ELH/shd: Thermoplastic super high pressure hose with multiple pressure carrier layers made of aramid and steel wire, inner liner made of polyamide

6 End caps

Silicone end cap/ EPDM end cap with anti-kink protection

Silicone end cap/ EPDM end cap

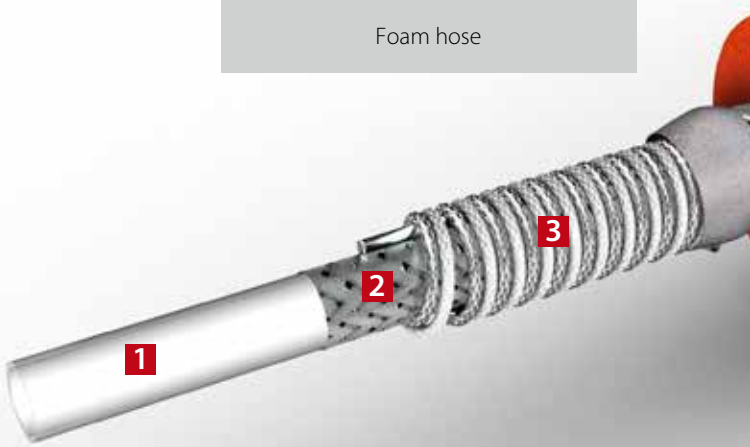
Plastic end cap

Plastic end cap with terminal housing

Metal end cap

4 Insulation

Foam hose



5 Outer jacket

Nylon braiding / polyamide braiding
standard design, highly flexible,
smallest bending radii possible

Stainless steel braiding
Mat. 1.4301
Highly corrosion-resistant

Galvanised iron braiding

Silicone outer jacket, black
Highly flexible, easy to clean,
lengths up to 20 m max.

2 Sensor

Stationary-mounted temperature sensor

3 Heating cable

with spacer

Matching **fittings**
can be found on pages 40-43

Technical data

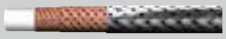
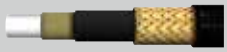
Heat output / heating circuit lengths

Power tolerances: < 200 W: +/-10 % > 200 W +5/-10 % acc. to VDE /
values applicable with ambient temperatures from -20 °C to +45 °C

to 100 °C	Type ELH/md/hd/shd with **fixed inner liner**							
DN	**4**	**6**	**8**	**10**	**13**	**16**	**20**	**25**
Output in W/m	90	100	110	140	160	180	210	240
Max. heating circuit lengths in m								
115 V	20	18	18	15	12	12	10	9
230 V	45	40	38	35	28	23	20	18
400 V	60	58	55	45	40	35	30	25

to 200 °C	Type ELH/md/hd/shd with **fixed inner liner**							
DN	**4**	**6**	**8**	**10**	**13**	**16**	**20**	**25**
Output in W/m	100	120	130	150	180	220	260	290
Max. heating circuit lengths in m								
115 V	18	18	16	14	12	10	8	7
230 V	40	35	34	30	23	20	17	15
400 V	55	50	50	40	35	29	25	22

to 250 °C	Type ELH/md/hd/shd with **fixed inner liner**							
DN	**4**	**6**	**8**	**10**	**13**	**16**	**20**	**25**
Output in W/m	110	130	150	180	210	240	270	310
Max. heating circuit lengths in m								
115 V	16	14	12	10	9	8	7	6
230 V	36	30	27	21	18	16	14	12
400 V	53	48	37	32	28	23	21	20

	Applications	Advantages
 **T1 to max. 250 °C,** smooth hose with one pressure carrier layer	In the low and medium pressure range, for example in the food industry (basic material has FDA approval) for dosing systems and bottling plants, sealing systems, bitumen systems, etc.	■ PTFE hoses exhibit a high level of chemical resistance against almost all chemicals, cleaning agents and solvents. (Not resistant to substances and compounds containing fluorine, halogens and alkali metals such as potassium and sodium) ■ High temperature range from -60 to 250 °C ■ Maximum flexibility with high bending strength ■ Smooth surface with extremely low coefficient of friction
 **T2 to max. 250 °C,** PTFE high pressure smooth hose with two pressure carrier layers	In the low and medium pressure range, for example in 2-component systems, PU foaming systems, gluing systems, hot-melt systems, etc.	
 **T3 to max. 250 °C,** PTFE super high pressure smooth hose with three pressure carrier layers	In the high pressure range, for example in gluing systems, extruder plants, paint spraying plants, coating systems, etc.	
 **T1A to max. 550 °C,** stainless steel hose mat. 1.4404 with one pressure carrier layer made of stainless steel wire	In the low and medium pressure range, for example in bottling and dosing systems, bitumen systems, general mechanical and plant engineering	■ Stainless steel hoses are suitable for universal applications for many liquid and gaseous media. (Not suitable for robotic applications with frequent changes in bending load) ■ Absolutely diffusion-resistant ■ Also suitable for temperatures above 250 °C ■ Highly flexible due to corrugation pattern ■ Also available in other materials and designs on request
 **T3A to max. 100 °C,** thermoplastic super high pressure hose with multiple pressure carrier layers made of aramid and steel wire, inner liner made of polyamide	In the high pressure range, for example in gluing systems, extruder plants, paint spraying plants, coating systems	■ Thermoplastic super high pressure hoses are used primarily in the high pressure range. ■ Good chemical resistance against most cleaning agents and solvents ■ High operating pressure ■ High pulse stability/low expansion under max. pressure

Max. working pressure

The specified operating pressures apply only to the relevant inner hose.

The operating pressures apply only to statically laid hoses.

PTFE pressure hoses

DN	4	6	8	10	13	16	20	25
md/T1	275	240	200	175	150	135	100	80
hd/T2	-	275	250	225	200	175	150	130
shd/T3	-	500	475	475	450	363	275	225

The working pressures listed here apply to a temperature range from +20 °C to +50 °C. At higher operating temperatures, the following correction factors must be taken into account!

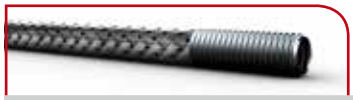
ELH/md/hd/shd temperature correction factors for PTFE pressure hoses			
100 °C	**150 °C**	**200 °C**	**250 °C**
0,98	0,90	0,83	0,60

Thermoplastic super high pressure hose

DN	8	10	13	16	20	25
shd/T3A	500	500	440	335	320	320

The working pressures listed here apply to a temperature range up to +20 °C. At higher operating temperatures, the following correction factors must be taken into account!

ELH/shd temperature correction factors for thermoplastic super high pressure hose	
50 °C	**100 °C**
0,98	0,95



Stainless steel hose

DN	6	8	10	13	16	20	25
md/T1VA	95	95	90	65	60	40	40

The working pressures listed here apply to a temperature range up to +20 °C. At higher operating temperatures, the following correction factors must be taken into account!

ELH/md temperature correction factors for stainless steel hose type 1A				
50 °C	**100 °C**	**150 °C**	**200 °C**	**250 °C**
0,85	0,72	0,65	0,60	0,55

Example

- Operating temperature: 200 °C
- Nominal width: 13
- Operating pressure: 180 bar

- Selected inner liner: PTFE smooth hose type T3
- Operating pressure: 450 bar at 20 °C
- Operating pressure at 200 °C: 450 bar x 0,83 = 373,5 bar

Technical data

Outer diameter / bending radius

Note: Bending radii are applicable to static condition. Please request a custom quote for dynamic condition.

External diameters are based on the standard configuration for an ambient temperature of -20 °C.

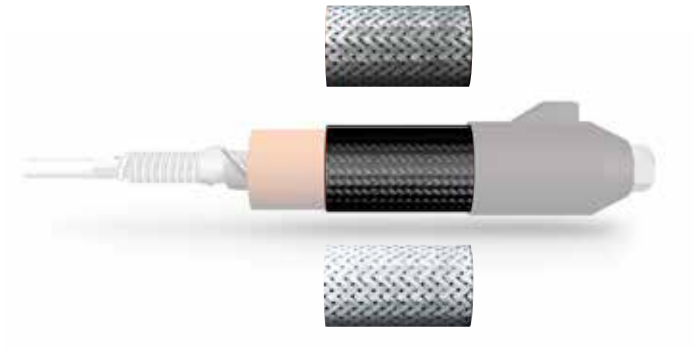
Outer jacket: **Nylon braiding / stainless steel braiding / galvanised braiding**

to 200 °C Type: **ELH/md/hd/shd**

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	170		220		280		350	
External Ø in mm	45				49	55	61	

to 250 °C

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	170		250		280	290	360	
External Ø in mm	45	49	55		61			68



Outer jacket: **Corrugated PA hose / TPRI-B* / corrugated PA hose, robotic design**

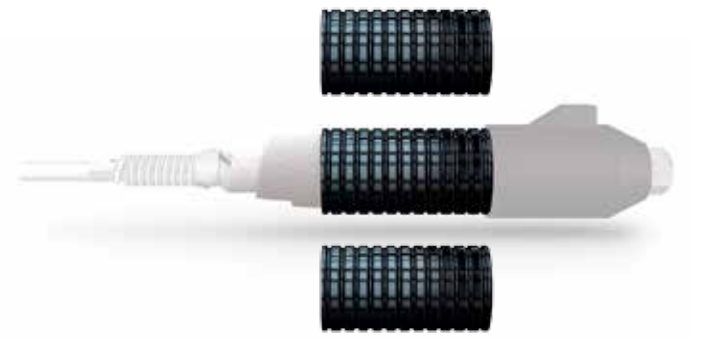
to 200 °C Type: **ELH/md/hd/shd**

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	200		250		280		350	450
External Ø in mm	43				55		63	83

to 250 °C

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	200	280		300	330		450	
External Ø in mm	43	55			63		83	

* TPRI-B corrugated hose available up to NW 16



Outer jacket: **Corrugated PU nose**

to 100 °C Type: **ELH/md/hd/shd**

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	200		250		270		300	320
External Ø in mm	42				50		62	

Outer jacket: **Corrugated metal hose, galvanised / corrugated metal hose, stainless steel**

to 200 °C Type: **ELH/md/hd/shd**

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	280		320		400		500*	a. A.
External Ø in mm	39		45		56		65*	a. A.

to 250 °C

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	330	350			400	500	a. A.	
External Ø in mm	45	56				65	a. A.	

* Only possible with galvanised metal hoses

Outer jacket: **corrugated metal hose with PVC outer jacket / Anaconda**

to 200 °C Type: **ELH/md/hd/shd**

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	290			340		420	540	a. A.
External Ø in mm	42			48		60	73	a. A.

to 250 °C

Dimensions	DN							
	4	6	8	10	13	16	20	25
Min. bending radius in mm	350		390		410	500	a. A.	
External Ø in mm	48		60			73	a. A.	

Heated pressure hoses with multiple heated inner liners

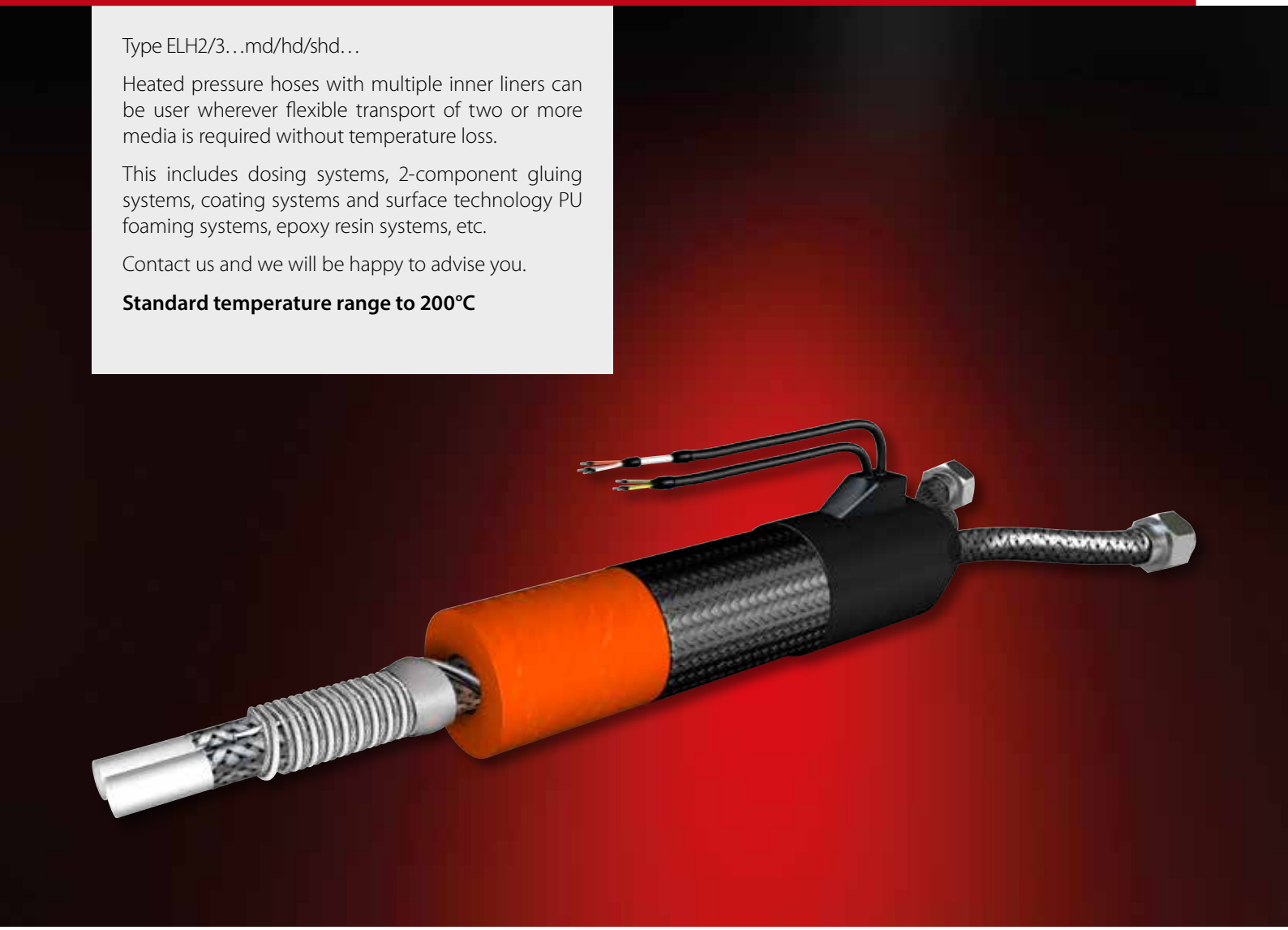
Type ELH2/3…md/hd/shd…

Heated pressure hoses with multiple inner liners can be user wherever flexible transport of two or more media is required without temperature loss.

This includes dosing systems, 2-component gluing systems, coating systems and surface technology PU foaming systems, epoxy resin systems, etc.

Contact us and we will be happy to advise you.

Standard temperature range to 200°C

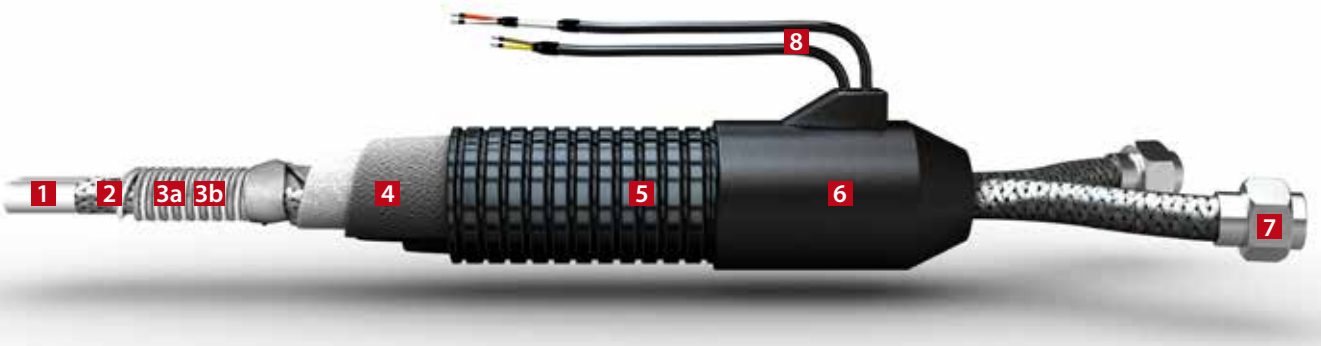


Application background

- When flexible transport of two or more media is required separately from each other and without temperature loss so that they can react optimally with each other at the dispensing location
- They are only free-flowing or can only be pumped at a certain temperature.

Advantages

- All inner liners can be heated together in a heated hose.
- This lowers costs and minimises installation expense.
- Compact dimensions
- Nominal widths: 4 to 20 mm
- Heat output optimised for application
- Available for the automotive industry as silicone-free/ LABS-free version



1 **Inner liners:** The selection of inner liners is based on the max. operating pressure, max. operating temperature and the specific application. For further details see the various types of inner liners.

2 **Sensor:** A temperature sensor is mounted between inner liner and heating cable for temperature control. Additional sensors can be mounted in any position for further temperature detection. eltherm uses PT-100 sensors based on 2-wire technology as standard. In addition, nearly any customary temperature sensor can be integrated (e.g. thermocouple type K / J, PT-1000, etc.).

3a **Heating cable:** The basic element, the resistance heating cable, is produced in-house. eltherm uses only PTFE or PFA-insulated heating cables. We further focus on the highest possible power density with the result of excellent homogeneous heat distribution. We use our ELKM-AE heating cable up to max. 250 °C in standard applications or, for heavy dynamic loading, ELKM-AG.

3b **Spacer:** The spacer is made of braided glass-fibre and provides reliable protection for the heating cable against mechanical damage and hot spots in the event of bending strain.

4 **Insulation:** Insulation depends on max. operating temperature and selection of outer jacket (see hose configuration page) As a rule, special thermal fleece materials and foam hoses are used (up to 100 °C elastomer foam hose, up to 250 °C silicone foam hoses).

5 **Outer jacket:** Selection of the outer jacket is determined by application, bending radius and ambient temperature. The outer jacket provides heated hoses with reliable protection against humidity, weather and external environmental effects as well as mechanical and dynamic loading (for example on the robot).

6 **End caps:** End caps seal off heated hoses at both ends. The integrated strain relief provides reliable relief for the connection cable. End caps are available standard in silicone, EPDM, plastic (polyamide) and galvanised metal.

7 **Connection fitting:** connects the heating hose to the system part (connection, spray nozzle, etc.)

8 **Connection cable:** Sensor and connection cables are routed separately in standard configuration. Default length of the connection cables is 1.5 m each. Upon request, any customary plug can be mounted to the connection cable.

Hose configuration type ELH/2/3… / w / N

1 Inner liners

T1 NW 4-25 mm

max. 250 °C

ELH/md: PTFE smooth hose with one pressure carrier layer

T2 NW 6-40 mm

max. 250 °C

ELH/hd: PTFE high pressure smooth hose with two pressure carrier layers

Temperatures provided here refer to max. operating temperatures of inner liners.

The max. operating temperature of heating hoses depends on the type of heated hose. Additional inner liners on request!

(NW= nominal width)

T3 NW 6-25 mm

max. 250 °C

ELH/shd: PTFE super high pressure smooth hose with three pressure carrier layers

T1VA NW 6-100 mm

max. 500 °C

ELH/md: Stainless steel hose Mat. 1.4404 with one pressure carrier layer made of stainless steel wire

T3A NW 6-25 mm

max. 100 °C

ELH/shd: Thermoplastic super high pressure hose with multiple pressure carrier layers made of aramid and steel wire, inner liner made of polyamide

2 Sensor: optional

Stationary-mounted temperature sensor

4 Insulation

Multi-layered thermal fleece

Foam hose

3 Heating cable

Heating cable

5 Outer jacket

w

-40 to 80 °C

Corrugated PA hose (PA-12)
Standard

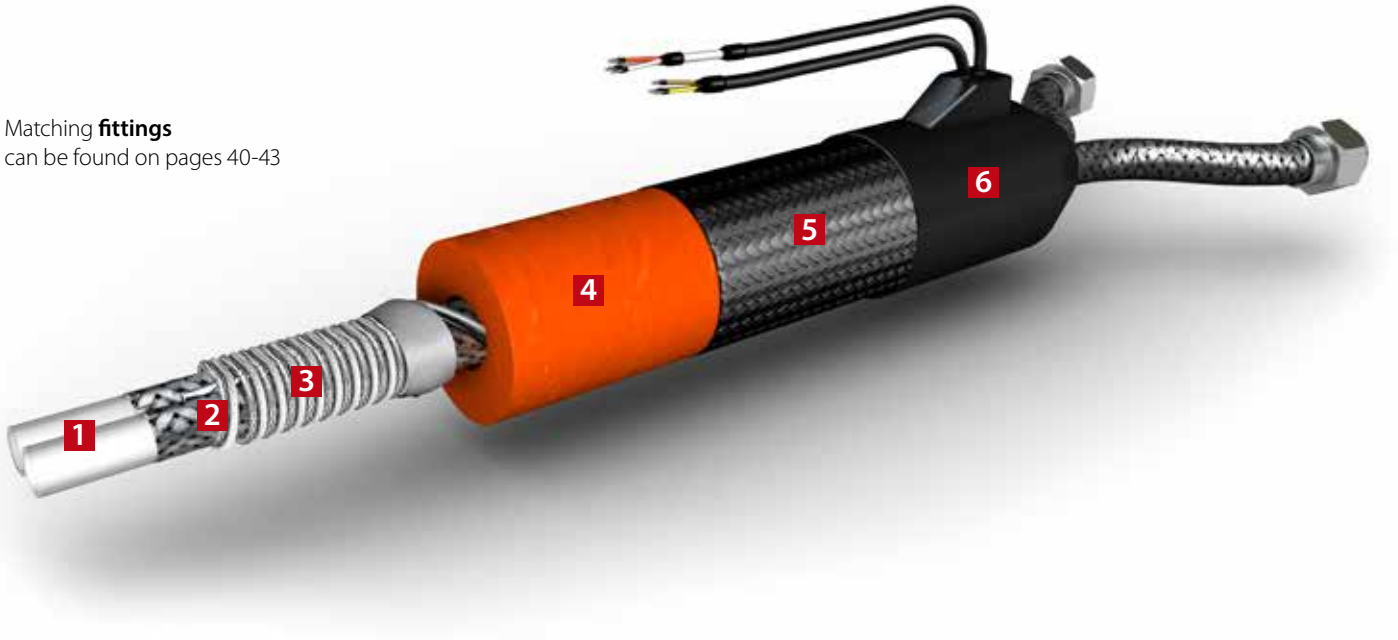
N

-30 to 120 °C

Nylon braiding / polyamide braiding
standard design, highly flexible, smallest bending radii possible

Additional **outer jackets** on request!

Matching **fittings**
can be found on pages 40-43



6 End caps

Silicone end cap/ EPDM end cap
with anti-kink protection

Silicone end cap/ EPDM end cap

Plastic end cap

Plastic end cap
with terminal housing

Technical data

General information

Heated pressure hoses with multiple inner liners are designed individually for your specific application. Please contact us, we will be happy to advise you.

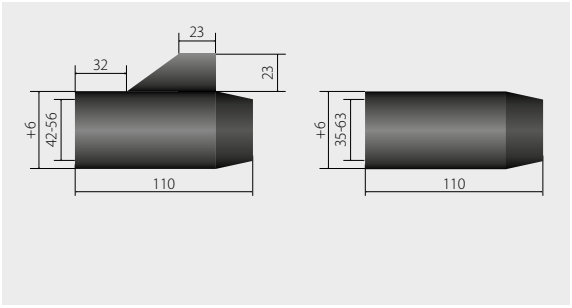
Length	up to 30 m (depending on the power inner liners and nominal widths)
Nominal widths	4-20
Voltages	12-500 V
Temperatures	5-200 °C

Also available for hazardous (Ex) areas on request!

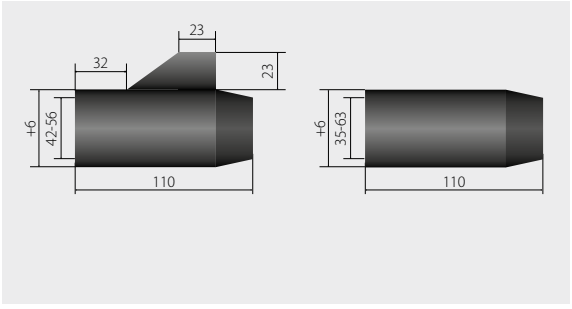
Technical data

End caps

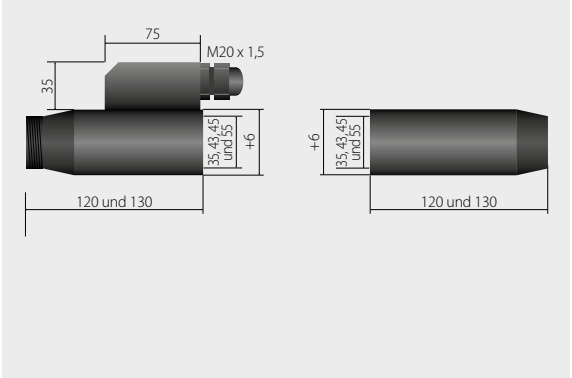
Type	Material	Max. operating temp.	Application
Silicone end cap with anti-kink protection	Silicone black	200 °C	Standard cap for universal application The end cap is bonded firmly to the outer jacket using special adhesives, thus ensuring a high degree of protection.
Silicone end cap without anti-kink protection			



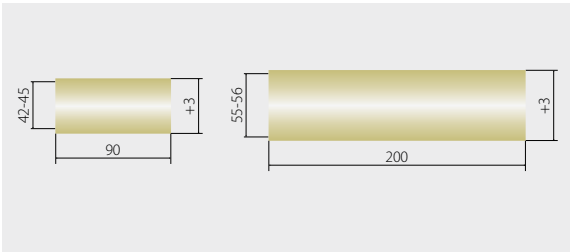
Type	Material	Max. operating temp.	Application
EPDM end cap with anti-kink protection	EPDM black	100 °C	Standard end cap for applications requiring an absence of silicone. The end cap is bonded firmly to the outer jacket using special silicone-free adhesives, thus ensuring a high degree of protection.
EPDM end cap without anti-kink protection			



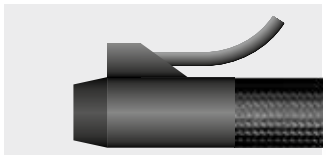
Type	Material	Max. operating temp.	Application
Plastic end cap with terminal housing	Polyamide	100 °C	Plastic end caps are used where the area of the end cap has to be reinforced. Upon customer request, connection cables can also be replaced by terminal strips in the terminal housing. The end cap is best used in conjunction with a corrugated PA hose.
Plastic end cap			



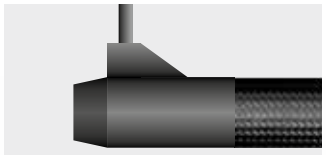
Type	Material	Max. operating temp.	Application
Metal end cap	Bichromated steel, available in stainless steel on request	350 °C	Used with high ambient temperatures in conjunction with a corrugated metal hose to serve as an outer jacket.



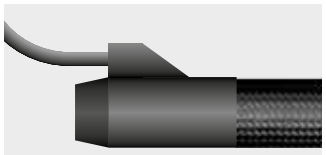
Cable exit



Silicone
Standard, returned

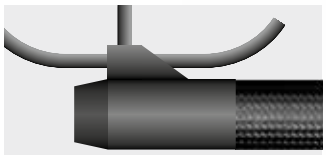


Silicone
On the side

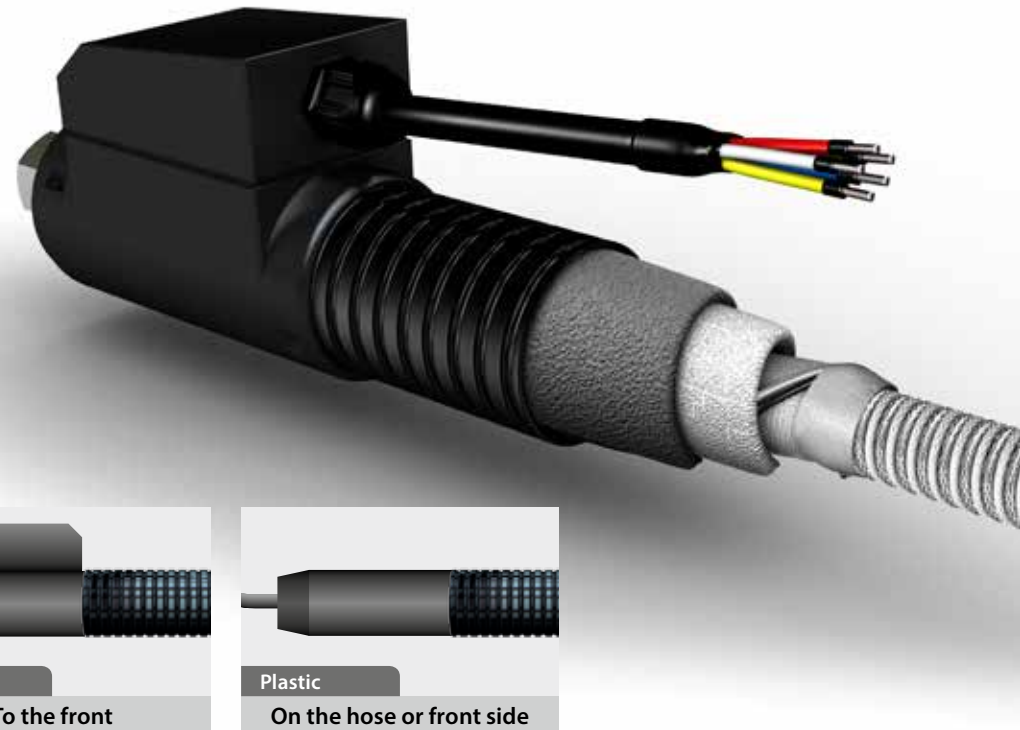


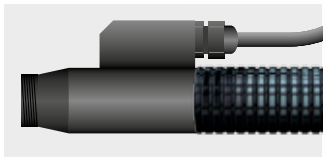
Silicone
To the front

Silicone
On the hose or front side



Silicone
Combination

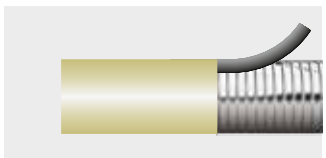




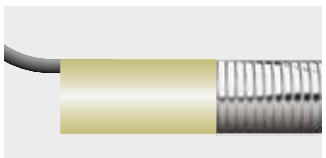
Plastic
Standard, returned

Plastic
To the front

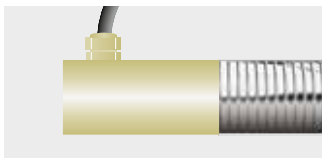
Plastic
On the hose or front side



Metal
Standard, returned



Metal
On the front



Metal
On the side

On the side

Temperature sensors

Temperature detection and overtemperature protection

- PT 100, 2-, 3- and 4-wire
- Thermocouple Fe-CuNi type f
- Thermocouple NiCr-Ni type K
- PTC
- Temperature switch (break contact/make contact) 80... 200 °C

Option:

- 2. Sensor
- Sensor and/or switch replaceable

PT 100, 2-, 3- and 4-wire

Thermocouple Fe-CuNi

Thermocouple NiCr-Ni

Temperature switch (break contact/make contact)

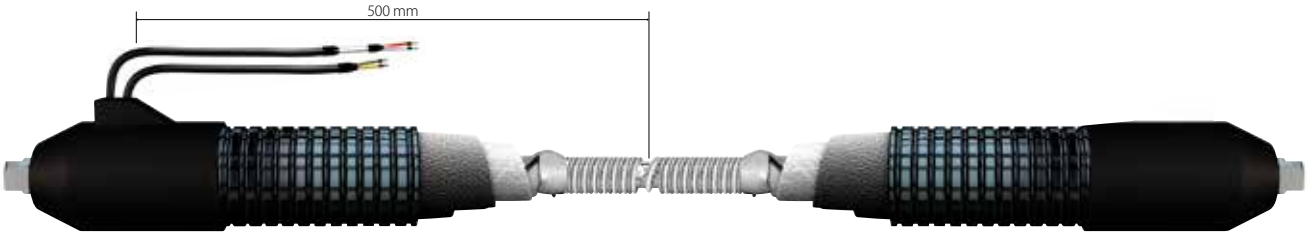
Sensor positioning:

The temperature sensor(s) is/are mounted 500 mm upstream of the power connection in the standard configuration.

In general, the temperature sensor can be mounted in nearly any position within the heated area of the heated hose.

Correct sensor positioning is crucial especially when laying the heated hose across different temperature zones.

Contact us and we will be happy to advise you.



Standard connecting plugs and connecting couplings

- Type **6-pole plug + PE** and **coupling 6-pole + PE**

Electrical data	
Rated voltage	250 V
Rated surge voltage	4000 V
Current load rating	10 A

Technical data	
Min./max. operating temp.	-40 °C to +100 °C
Protection	IP65
Contact surface	silver coated

Stecker und Kupplung 6-pol+PE

- Type **4-pole plug + PE** and **coupling 4-pole + PE**

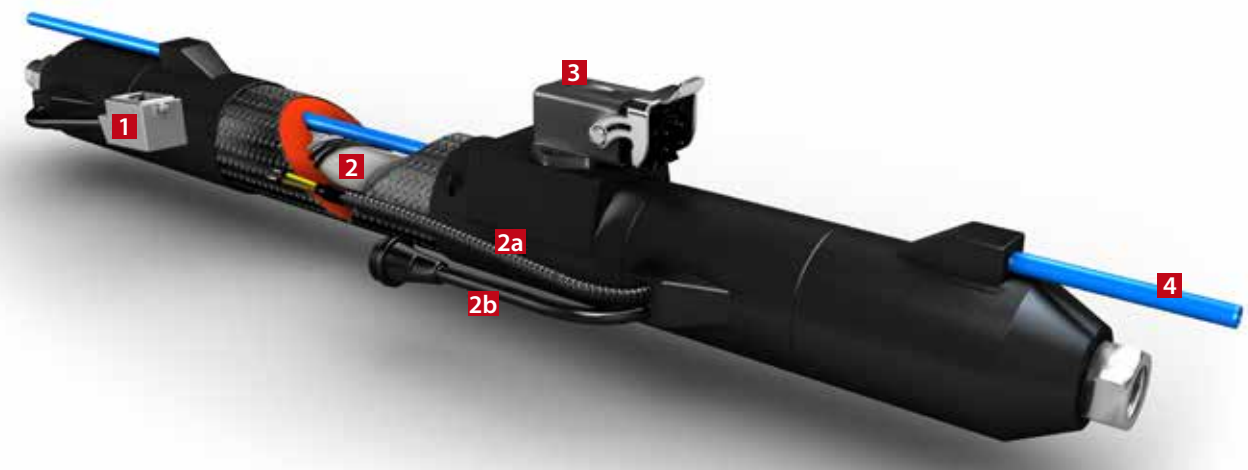
Electrical data	
Rated voltage	400 V
Rated surge voltage	6000 V
Current load rating	20 A

Technical data	
Min./max. operating temp.	-40 °C to +100 °C
Protection	IP65
Contact surface	silver coated

Additional connecting plugs and couplings upon request

Stecker und Kupplung 4-pol+PE

Additional options: Additional wires / connecting couplings and attachment connectors



1 Multi-pole connection plug. Type and assignment according to customer specification, e.g. type Harting HAN 15D

2 Integrated additional wire on the first insulation layer of the heated hose

2a Integrated additional wires with open cable ends and reinforced connection wires

2b Integrated additional wire with connection coupling or connecting plug. Type and assignment according to customer specification

3 Configuration coupling or plug on the 5-pole or 7-pole plastic end cap. Assignment according to customer specification

4 Integrated compressed air control line (for pneumatic control of a valve, etc.)

Additional options:

Integrated additional wires:

- All heated pressure hoses can optionally be equipped with additional wires.
- For example, they can be used to control solenoid valves or as the power supply for a heated applicator gun.
- Additional wires can be supplied with open cable ends or with plug connections (plug and coupling) as requested by the customer.
- When there is great mechanical strain, we offer the option of using reinforced connecting wires in corrugated PA hoses.

Additional types of inner liner:

- It is also possible optionally to install additional inner liners, both heated and unheated, in all heated pressure hoses, (shown above unheated). This includes for example additional compressed air lines, which can be used as applicator guns.

Attachment connectors and connecting couplings:

- All heated pressure hoses can optionally be equipped with all standard commercial multi-pole connecting plugs.
- We stock type and connection assignment according to customer specification.
- It is also possible optionally for all heated pressure hoses to mount 5-pole or 7-pole attachment connectors or an attachment coupling directly to the heated hoses.

Advantages of integrated additional wires and inner liners

- No additional hose, signal or control lines need to be laid in the system. As a result, the installation expenditure is reduced as only the heated hose still has to be laid.
- To protect them from damage and environmental impact, additional wires and inner liners are incorporated into the heated hose.
- Optimum use of space, especially advantageous under cramped installation conditions.

Advantages of attachment connectors and attachment couplings

- Heated hoses can be changed quickly, for example in mobile applications
- Our heated hoses can be optimally inserted into existing systems with the appropriate attachment plugs
- Connection lines can be optimally adjusted to the system. This will prevent mechanical damage to long or short connection cable.
- Faulty connection lines can be replaced without opening the heated hose

Heated pressure hoses with self-regulating heating cable

Type ELH/md…/hs…/shd…/sb…

Self-regulating pressure hoses are used whenever media must be transported flexibly without temperature loss up to max. 100 °C.

They are suited for use when the temperature of media only needs to be maintained and the process does not require any heating up phases. Due to their self-regulating behaviour, they are not suitable for every application. These pressure hoses cannot be used for robotic applications because they cannot be used for rapid changes in bending load.

Contact us and we will be happy to advise you.

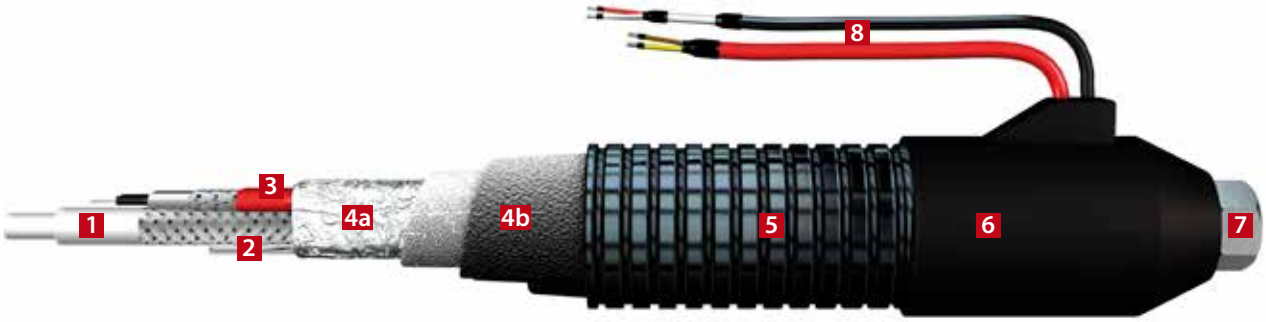
Temperature maintenance: up to 100 °C standard

Application background

- The medium being pumped must be protected against frost
- The temperature of the medium must not fall below a certain limit for technical reasons related to the process
- The line requires a flexible design due to the plant geometry
- Frost protection for fuel lines
- Frost protection for hydraulic lines
- Generally maintaining a constant temperature in plant and mechanical engineering

Advantages

- Operating temperature: 5-100 °C
- Nominal widths DN4-DN25
- Output adjusts to the ambient temperature
- Self-regulating output / control is not mandatory
- Heating cables produced in-house



1 **Inner liners:** see types of inner liners

2 **Sensor:** For precise temperature control, an optional temperature sensor can be mounted between inner liner and heating cable. Additional sensors can be mounted in any position for further temperature detection. eltherm uses PT-100 sensors based on 2-wire technology as standard. In addition, it is possible to integrate nearly any custom temperature sensor (e.g. thermocouple type K / J, PT-1000, etc.).

3 **Self-regulating heating cable:** The self-regulated heating cable is produced in-house. These heating cables consist of two parallel supply wires embedded in a matrixed plastic heating element doped with carbon particles. If the temperature increases during operation, the plastic will expand as a result of molecular expansion and the distances between the carbon particles will increase. This will cause resistance to increase and output to drop. This process is reversed during cool-down and the output will increase.

4a **Aluminium foil:** for improved heat distribution

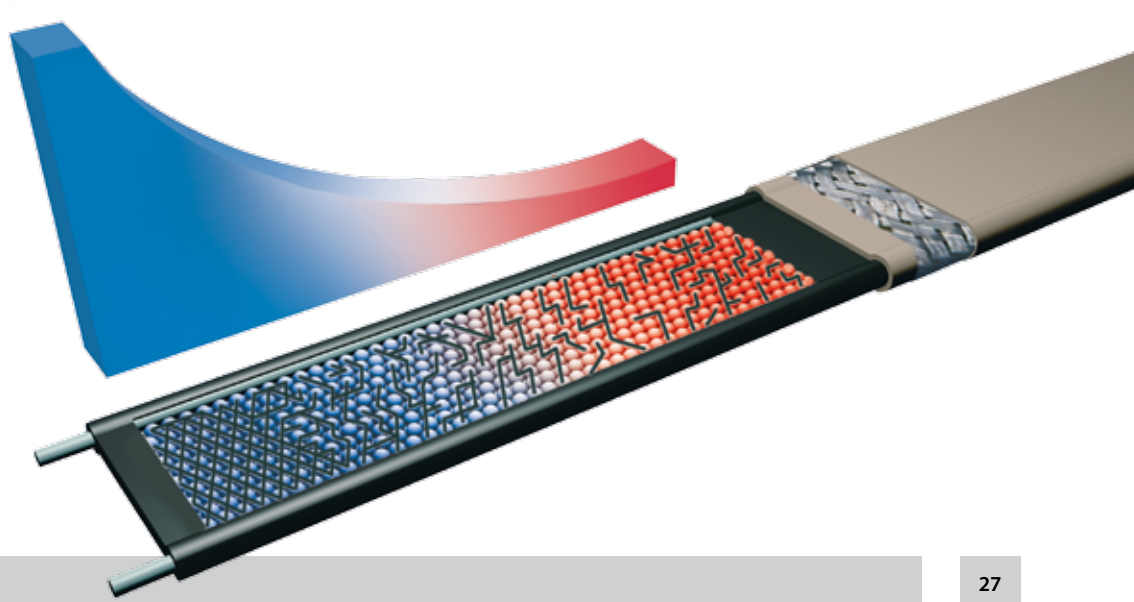
4b **Insulation:** Insulation depends on max. operating temperature and selection of outer jacket (see hose configuration page) As a rule, special thermal fleece materials and foam hoses are used (up to 100 °C elastomer foam hose, up to 250 °C silicone foam hoses).

5 **Outer jacket:** Outer jacket selection is determined by application, bending radius and ambient temperatures. The outer jacket provides heated hoses with reliable protection from humidity, weather, external environmental impact and mechanical strain.

6 **End caps:** End caps seal off heated hoses at both ends. The integrated strain relief provides reliable support for the connection cable. End caps are available standard in silicone, EPDM, plastic (polyamide) and galvanised metal.

7 **Connection fitting:** connects the heating hose to the system part (connection, spray nozzle, etc.)

8 **Connection cable:** Sensor and connection cables are routed separately in standard configuration. Default length of the connection cables is 1.5 m each. Upon request, any specified plug can be mounted to the connection cable.



Hose configuration type ELH… sb / W / N to 100 °C

1 Inner liners

T1 NW 4-25 mm

max. 250 °C

ELH/md: PTFE smooth hose with one pressure carrier layer

T2 NW 6-40 mm

max. 250 °C

ELH/hd: PTFE high pressure smooth hose with two pressure carrier layers

Note: Temperatures provided here refer to max. operating temperatures of inner liners.

The max. operating temperature of heating hoses depends on the type of heated hose. Additional inner liners on request!

(NW= nominal width)

T3 NW 6-25 mm

max. 250 °C

ELH/shd: PTFE super high pressure smooth hose with three pressure carrier layers

T1VA NW 6-100 mm

max. 500 °C

ELH/md: Stainless steel hose Mat. 1.4404 with one pressure carrier layer Stainless steel

T3A NW 6-25 mm

max. 100 °C

ELH/shd: Thermoplastic super high pressure hose with multiple pressure carrier layers made of aramid and steel wire, inner liner made of polyamide

2 Sensor: optional

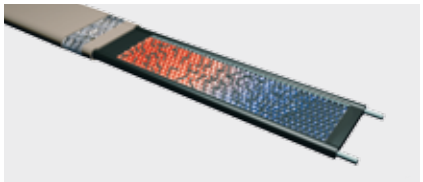
Stationary-mounted temperature sensor

4 Insulation

Multi-layered thermal fleece

Foam hose

3 Heating cable



Self-regulating

5 Outer jacket

W

-40 to 80 °C

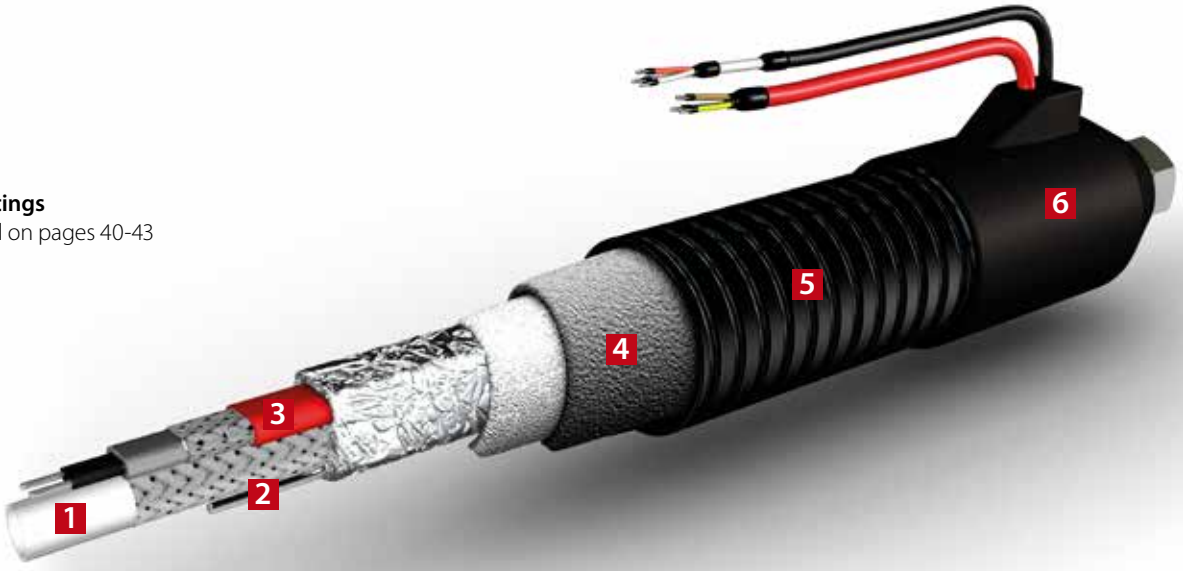
Corrugated PA hose (PA-12)
Standard

N

-30 to 120 °C

Nylon braiding / polyamide braiding
standard design, highly flexible, smallest bending radii possible

Matching **fittings**
can be found on pages 40-43



6 End caps

Silicone end cap/ EPDM end cap
with anti-kink protection

Silicone end cap/ EPDM end cap

Plastic end cap

Plastic end cap
with terminal housing

Technical data

General information

Self-regulating pressure hoses may only be used for certain applications. They are therefore designed individually for your specific application. Please contact us for details, we will be happy to advise you.

Length	up to 50 m (depending on the power inner liner and nominal width)
Nominal widths	4-25
Voltage	230 V (other voltages on request)
Heating cables used	ELSR-N-…-2-AO and ELSR-H-…-2-BOT

Temperatures, output, heating cables used

Holding temperature in °C	Output in W/m at +10 °C	Type of heating cable used	Max. admissible temp in °C	
			Switched on	Switched on
5-30	10 to 40	ELSR-N…	65	80
5-100	10 to 60	ELSR-H…	120	210

Also available for hazardous (Ex) areas on request!

Heated pressure hoses for Ex area

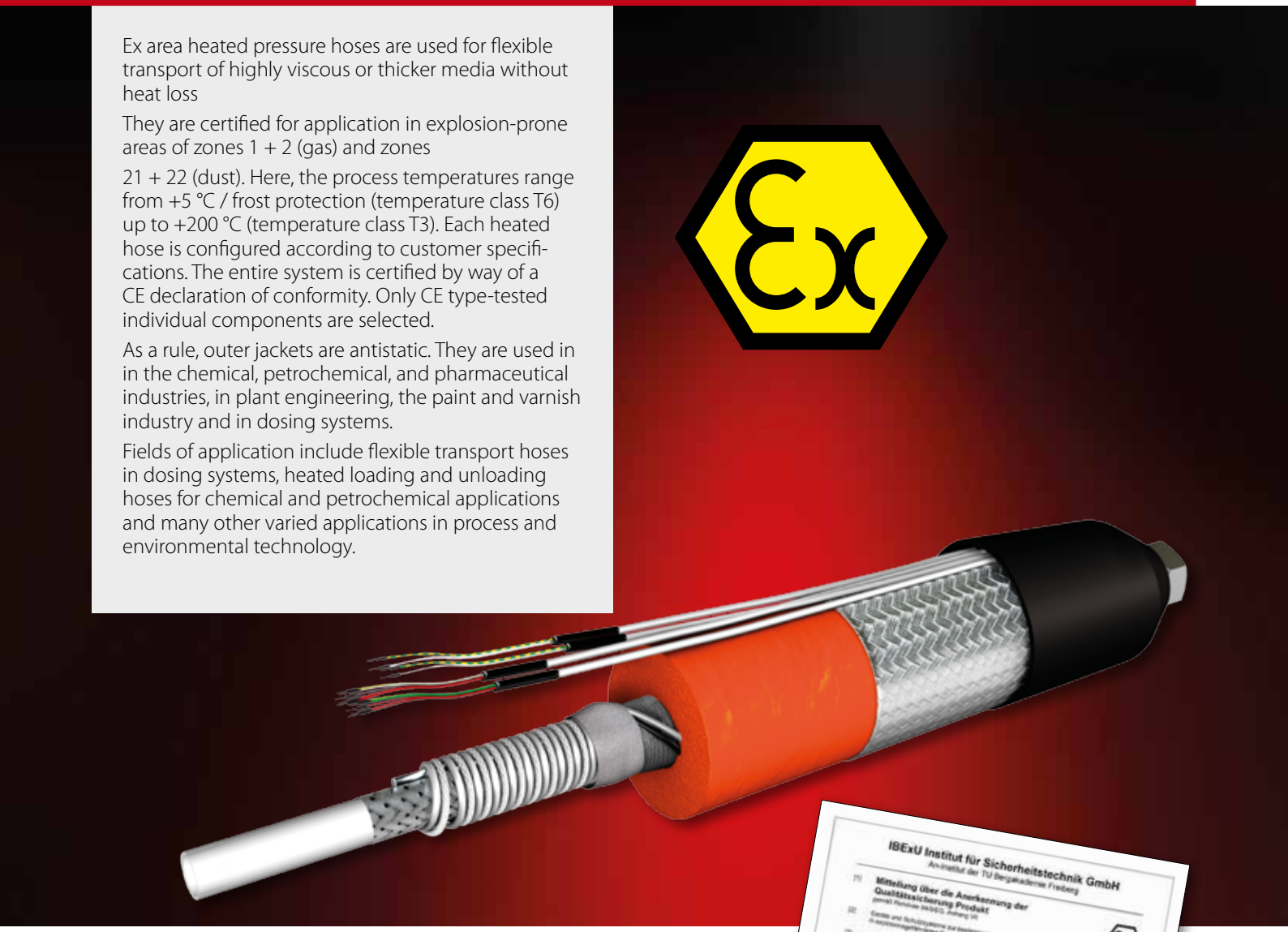
Ex area heated pressure hoses are used for flexible transport of highly viscous or thicker media without heat loss

They are certified for application in explosion-prone areas of zones 1 + 2 (gas) and zones

21 + 22 (dust). Here, the process temperatures range from +5 °C / frost protection (temperature class T6) up to +200 °C (temperature class T3). Each heated hose is configured according to customer specifications. The entire system is certified by way of a CE declaration of conformity. Only CE type-tested individual components are selected.

As a rule, outer jackets are antistatic. They are used in in the chemical, petrochemical, and pharmaceutical industries, in plant engineering, the paint and varnish industry and in dosing systems.

Fields of application include flexible transport hoses in dosing systems, heated loading and unloading hoses for chemical and petrochemical applications and many other varied applications in process and environmental technology.




IBExU Institut für Sicherheitstechnik GmbH

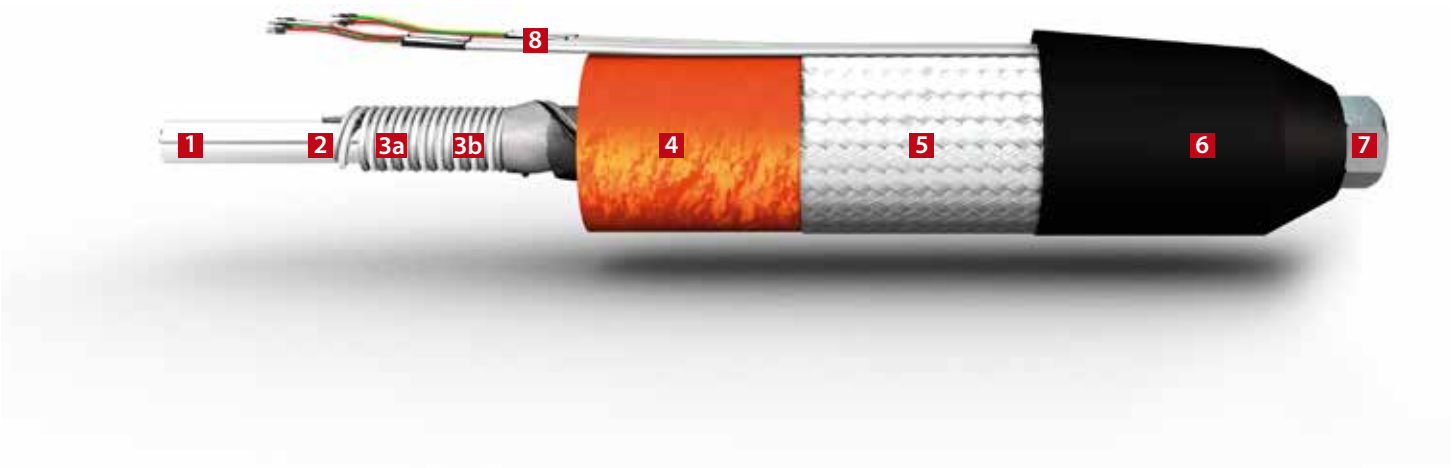
Mitteilung über die Anerkennung der Qualitätssicherung Produkt

Heated pressure hoses for the Ex area

As an ATEX-certified company (IBExU12ATEX Q006), eltherm GmbH meets the requirements of a higher safety standard in accordance with the most recent 94/9/EC (ATEX 95) Ex Protection Directives.

Owing to our ATEX-certified heating components, such as heating cables, heating tapes, connecting fittings, temperature sensors, etc., we are able to supply heated pressure hoses certified for used in Ex areas.

In addition to heated pressure hoses, eltherm also offers the required accessories, such as temperature controllers, temperature regulators and corresponding junction boxes for the Ex area.



1 **Inner liners:** see types of inner liners

2 **Sensor:** Two temperature sensors are mounted between inner liner and heating cable to provide control and limit the temperature to the level required. Ex-proof PT-100 temperature sensors based on 3- or 4-wire temperatures or PT-100 sensors are normally used for intrinsically safe control.

3a **Heating cable:** the resistance heating cable is produced in-house as a basic element. eltherm uses only fluoropolymer insulated heating cables. We further focus on the highest possible power density with the result of excellent homogeneous heat distribution. We used our heating cable type ELKM-AG-N in all our controlled Ex pressure hoses as a standard feature.

3b **Spacer:** The spacer made of braided glass-fibre provides reliable protection for the heating cable against damage and hot spots in the event of bending strain.

4 **Insulation:** Insulation depends on max. operating temperature and selection of outer jacket (see hose configuration page) As a rule, special thermal fleece materials and foam hoses are used (up to 100 °C elastomer foam hose, up to 200 °C silicone foam hoses).

5 **Outer jacket:** Selection of the outer jacket is determined by application, bending radius and ambient temperature. The outer jacket provides heated hoses with reliable protection from humidity, weather, external environmental impact and mechanical strain. In accordance with Ex Protection Directives 94/9/EC (ATEX 95), all our heated Ex pressure hoses are made with a conductive outer jacket.

6 **End caps:** End caps seal off heated hoses at both ends. The integrated strain relief provides reliable relief for the connection cable. The end caps of our ex-proof heated hoses are available in silicone or EPDM as standard.

7 **Connection fitting:** connection to the system part, for example to the container or spray nozzle

8 **Connection cable:** Sensor and connection cables are routed separately in standard configuration. The default length of connection cables is 1.5 m each. Only special ATEX-certified, PTFE-insulated connection wires are used for our connecting cables.

Hose configuration type ELH…Ex to 200 °C

1 Inner liners

T1 **NW 4-25 mm**

max. 250 °C

ELH/md: PTFE smooth hose with one pressure carrier layer

T2 **NW 6-40 mm**

max. 250 °C

ELH/hd: PTFE high pressure smooth hose with two pressure carrier layers

T3 **NW 6-25 mm**

max. 250 °C

ELH/shd: PTFE super high pressure smooth hose with three pressure carrier layers

T1VA **NW 6-100 mm**

max. 550 °C

ELH/md: Stainless steel hose Mat. 1.4404 with one pressure carrier layer Stainless steel

T3A **NW 6-25 mm**

max. 100 °C

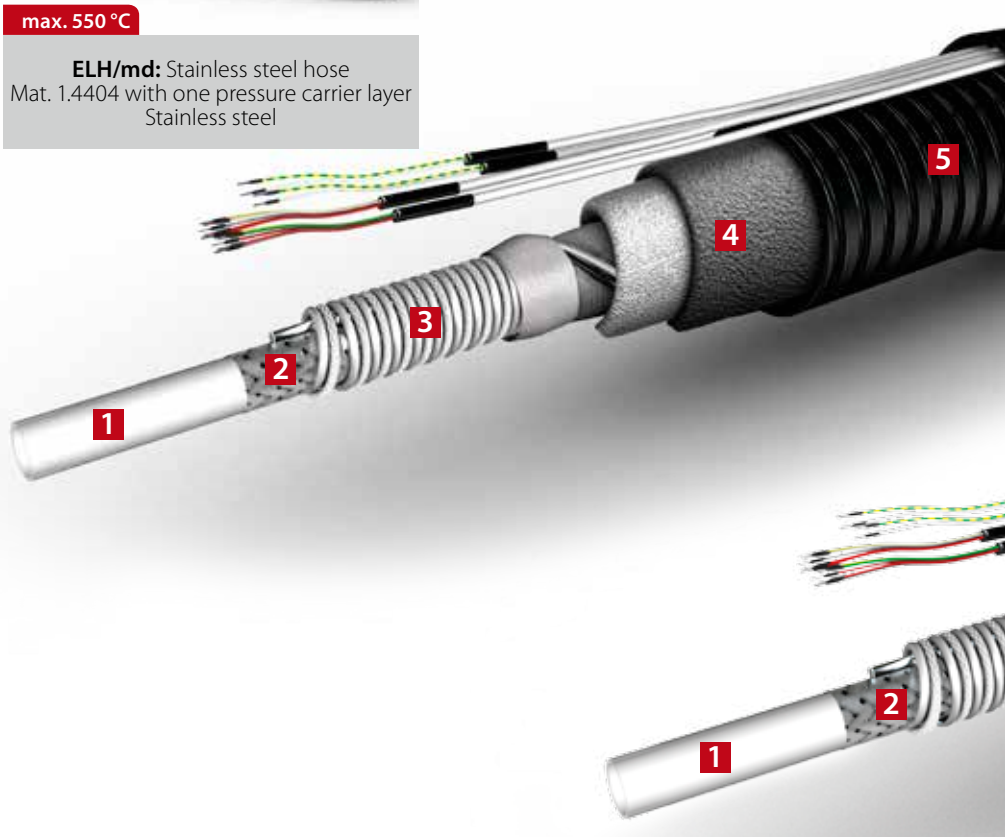
ELH/shd: Thermoplastic super high pressure hose with multiple pressure carrier layers made of aramid and steel wire, inner liner made of polyamide

Temperatures provided below refer to max. operating temperatures of inner liners.

The max. operating temperature of heating hoses depends on the type of heated hose.

Additional inner liners on request!

(NW= nominal width)



6 End caps

Silicone end cap/ EPDM end cap

3 Heating cable

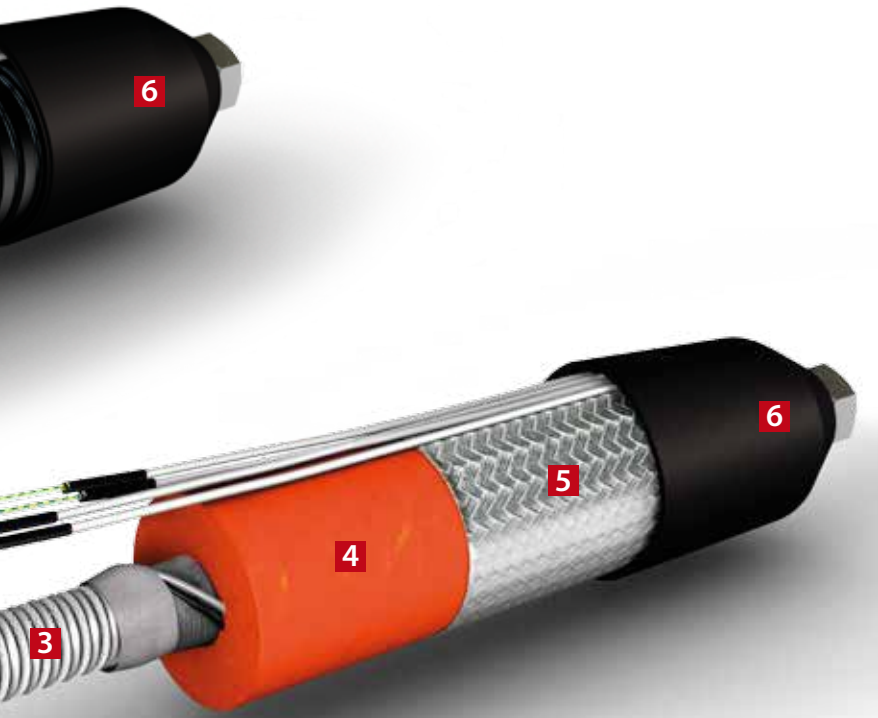
Type ELKM-AG-N
ATEX-certified
Certificate no.: PTB 09ATEX1029 U

5 Outer jacket

Corrugated PA hose (PA-12)
electrically conductive

Stainless steel braiding
Mat. 1.4301
highly corrosion-resistant

galvanised iron braiding



4 Insulation

Multi-layered thermal fleece

Foam hose

2 Sensors for controlling and limiting temperatures

PT-100/3-wire for intrinsic safety
Control

Ex-proof PT-100/4-wire
or 3-wire, type ELTF-PTEx.1
Certificate no.: IBExU04ATEX1004 X

Technical data

Heat output / heating circuit lengths

Power tolerances: <200W: +/-10% > 200W +5/-10% acc. to VDE /

values applicable with ambient temperatures from -20°C to +45°C

A serial resistance heating cable type ELKM-AG-N is used for the heated hose type ELH/md/hd/shd…Ex. In addition to a suitable controller, use of an appropriate safety limiter (e.g. our Ex box controller and limiter series) in the Ex area is mandatory.

Equipment class: II 2G EEx em [ib] IIC T6-T3 II 2D IP 65 T 100 °C

to 100 °C Type ELH/md/hd/shd with **fixed inner liner**

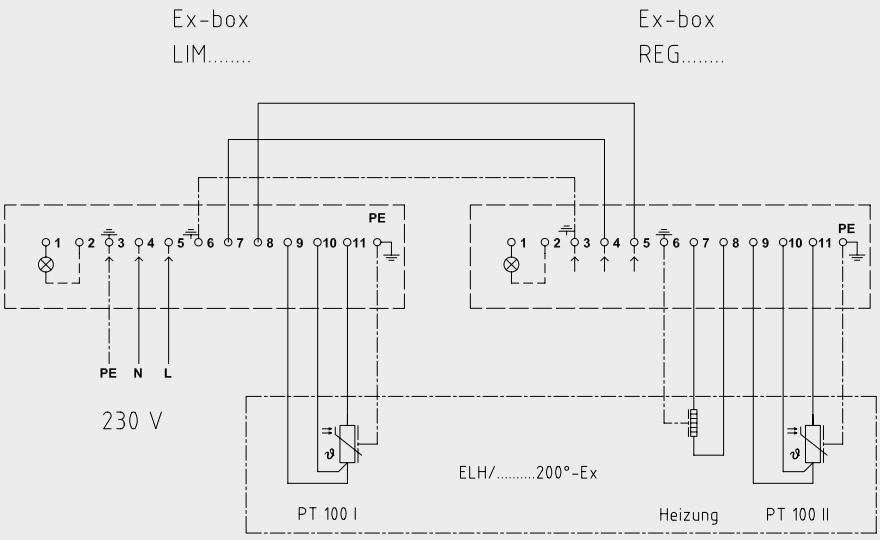
DN	13	16	20	25
Output in W/m	160	180	210	240
Max. heating circuit lengths in m				
115 V	7	7	6	5
230 V	15	14	12	10
400 V	25	24	20	18

to 200 °C Type ELH/md/hd/shd with **fixed inner liner**

DN	13	16	20	25
Output in W/m	180	210	240	270
Max. heating circuit lengths in m				
115 V	7	6	5	4
230 V	14	12	10	9
400 V	24	20	18	15

Wiring diagram

Power connection of a regulated heated wire type ELH/md/hd/shd...Ex to a controller and limiter, For example: Ex box



Technical data

Outer diameter / bending radii

Note: bending radii are applicable to static condition. Please request a custom quote for bending radii for dynamic condition.
External diameters are designed for standard configuration at -20 °C.

The hose must not be subject to bending strain in the marked areas of the connection sleeves and the temperature sensors.

to 200 °C	Outer jacket: **Stainless steel braiding / galvanised braiding**				
Type	**Dimensions**	**DN**			
		13	**16**	**20**	**25**
ELH/md/hd/ shd…EX	Min. bending radius in mm	300		380	
	External Ø in mm	55		61	
	External Ø in mm in the area of the connecting sleeves	77		83	

to 200 °C	Outer jacket: **corrugated PA hose, conductive**				
Type	**Dimensions**	**DN**			
		13	**16**	**20**	**25**
ELH/md/hd/ shd…EX	Min. bending radius in mm	350	400	450	
	External Ø in mm	63		83	

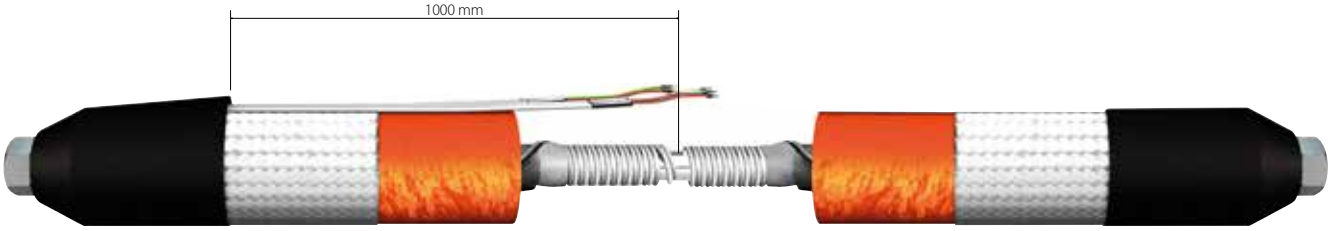
Sensor positioning:

Temperature sensors are installed 1000 mm from the power connection for our pressure hoses for the Ex area.

In general, temperature sensors can be mounted in nearly any position within the heated area of the heated hose.

Correct sensor positioning is crucial especially when laying the heated hose across different temperature zones.

Contact us and we will be happy to advise you.



Special heated hoses

Type ELH/md…, Type ELH/hd…, Type ELH/shd...SP

In addition to the standard designs shown here for our heated pressure hoses, we can also offer special designs optimally customised to suit your application and requirements.

Our business thrives on bespoke requirements.

Contact us.

ELH-TW-Plus, 5 °C, NW 25
Internally heated drinking water hose
Application: Frost protection for drinking water lines

ELH-mdsbw, 5 °C, NW 16
Heated pressure hose with specialist dry coupling
Application: Frost protection for flexible diesel lines

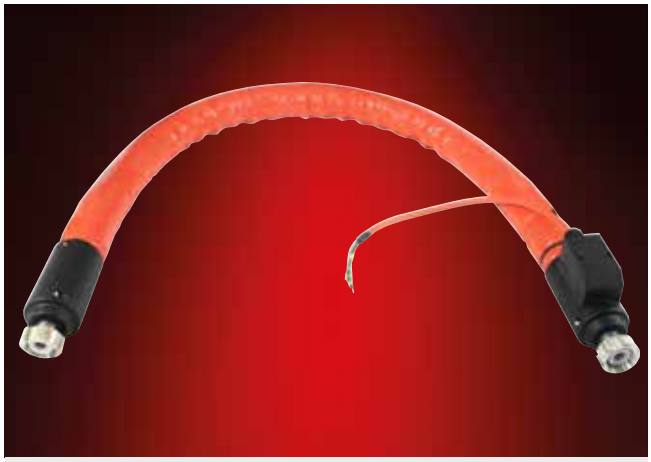
ELH-3mdN-SP, 80 °C
Heated pressure hose with 2 heated inner liners and additional compressed air line
Application: Coating technology / 2-component polyurea system

ELH-hdT 200 °C, NW 16
Heated pressure hose featuring tread-resistant design with corrugated metal hose as outer jacket, additional wire and special end cap; Application: Bitumen technology

ELH/shdw-200 °C-DN10
Heated pressure hose with anti-kink protection springs, Suspension mechanisms and robotic outer jacket
Application: Use on robot for an extruder system

ELH/mdw-200 °C-DN10
Heated pressure hose with excess heated cable length For heating the connection fitting. Application: Plant engineering / transporting oil and grease for a coating system

ELH-mdw-SP 200 °C, NW 16
Special bitumen casting hose with heated casting lance



ELH/mdGSI-100 °C-N13
Application: Food industry with PTFE coated fittings

ELH/mdw-100 °C-NW10-SP
Heated hose with attached special spray lance
Application: Dosing systems

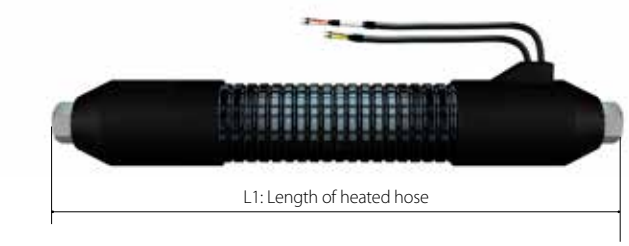
ELH/mdsb-80 °C-NW25-EX
Heated hose for the Ex area with PTFE coated special flange
Application: Filling hose in the pharmaceutical industry

Defined terms

Lengths

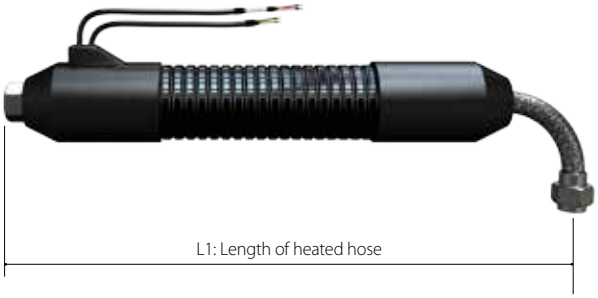
Hose lengths of our standard heated pressure hoses are defined as follows:

1.) Standard heated hoses with straight connection fittings types ELH/md…/hd…/shd…
The length is measured from the sealing surface of the fitting on the power connection side to the sealing surface of the fitting on the sealed end side



2.) For heated hoses with excess hose length (for example in heated hoses with 2 inner liners type ELH/2md…2hd… 2shd…):
Heated length = length of the heated hose
Excess length will be identified separately

3.) For hoses with angled fittings:
The length is measured from the sealing surface of the sealing surface to the centre of the angled fitting.



Length allowances

Allowable deviations from L1 measurement in fully assembled heated hoses.
Manufacturing tolerances as per DIN 20066

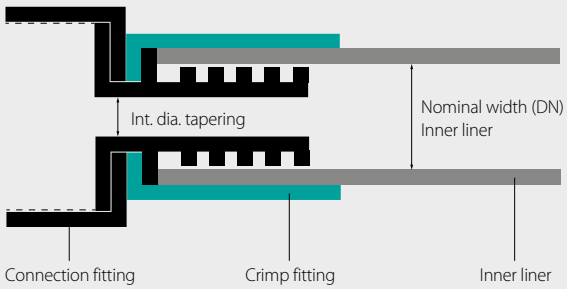
Length L1 in mm	Allowable tolerance up to NW 16
up to 630	+7 / -3 mm
over 630 to 1250	+12 / -4 mm
over 1250 to 2500	+20 / -6 mm
over 2500 to 8000	+1,5% / -0,5%
more than 8000	+3% / -1%

Defined terms

Note regarding connection fittings

Please note: The diameter of inner liners tapers somewhat in the area of the connection fitting (see table below). The drilling dimensions of the fitting is always somewhat smaller than the internal diameter of the hose.

Standard fittings

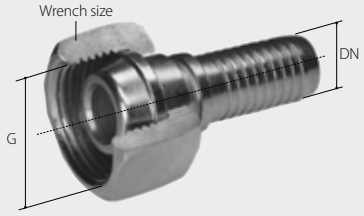
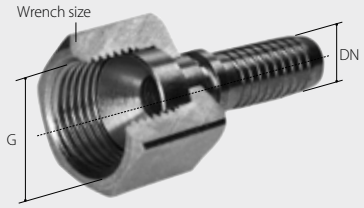
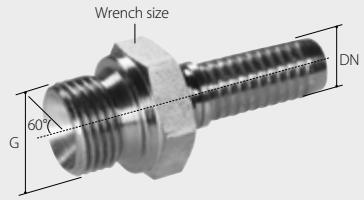
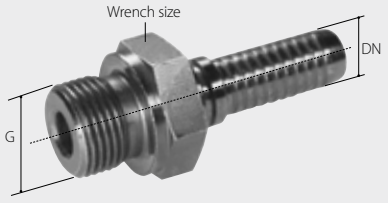


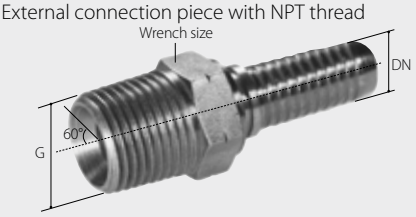
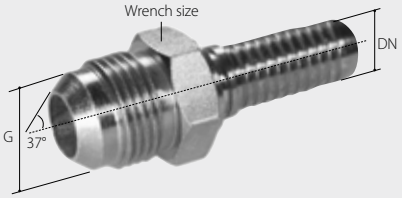
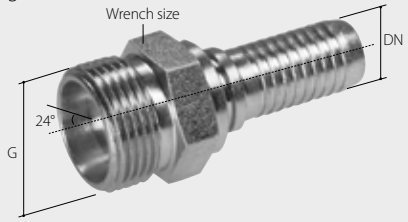
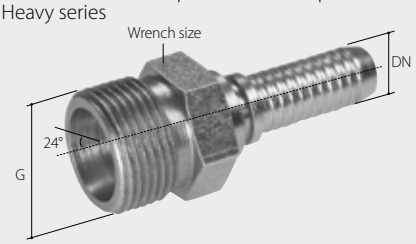
DN in mm	Internal diameter of fitting in mm
4	3
6	4
8	6
10	7,5
13	10
16	12,5
20	16
25	20,5

The internal diameter varies from specified values depending on the connection fitting.

Fittings

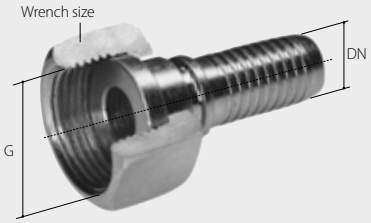
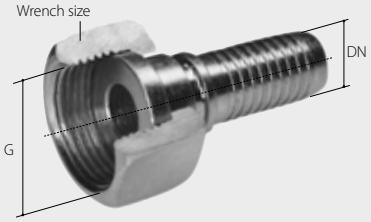
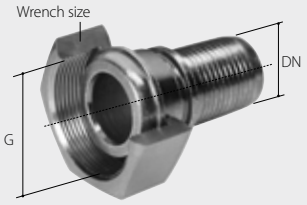
Connection fittings

Fitting	DN	Thread	Wrench size
DKR Universal sealing head with 60° sealing cone union nut with inch thread as per gem. ISO 228-1 	05	G 1/4"	17
	06	G 1/4"	17
	08	G 3/8"	19
	10	G 3/8"	19
	10	G 1/2"	27/24
	13	G 1/2"	27/24
	16	G 3/4"	32
	20	G 1"	41
	25	G 1"	41
	25	G 1 1/4"	50
	32	G 1 1/4"	50
	40	G 1 1/2"	56
DKJ JIC sealing head 74° union nut with UNF thread 	06	UNF 7/16-20	14
	06	UNF 1/2-20	17
	06	UNF 9/16-18	17
	08	UNF 9/16-18	17
	10	UNF 3/4-16	24
	13	UNF 3/4-16	22/24
	13	UNF 7/8-14	27/32
	16	UNF 7/8-14	27/32
	16	UNF 1 1/16-12	32
	20	UNF 1 1/16-12	32
	25	UNF 1 5/16-12	41
	32	UNF 1 5/8-12	51
	40	UNF 1 7/8-12	56
AGR 60° Male connection piece with inch thread as per ISO 228-1 with 60° inner taper 	05	G 1/8"	14
	06	G 1/4"	17
	08	G 3/8"	22
	10	G 3/8"	22
	10	G 1/2"	27
	13	G 1/2"	27
	16	G 3/4"	32
	20	G 3/4"	32
	20	G 1"	36
	25	G 1"	41
	32	G 1 1/4"	50
	40	G 1 1/2"	55
AGR Male connection piece with inch thread as per ISO 228-1, flat flanged 	05	G 1/8"	14
	06	G 1/4"	17
	08	G 3/8"	22
	10	G 3/8"	22
	10	G 1/2"	27
	13	G 1/2"	27
	16	G 3/4"	32
	20	G 3/4"	32

Fitting	DN	Thread	mm to pipe	Wrench size
AGN/NPT External connection piece with NPT thread 	06	1/4" 18 NPT		14
	08	3/8" 18 NPT		17
	10	3/8" 18 NPT		19
	10	1/2" 14 NPT		22
	13	1/2" 14 NPT		22
	16	3/4" 14 NPT		27
	20	3/4" 14 NPT		27
	20	1" 11 1/2 NPT		36
	25	1" 11 1/2 NPT		36
	32	1 1/4" 11 1/2 NPT		46
	40	1 1/2" 11 1/2 NPT		50
AGJ External connection piece with UNF 37° 	06	UNF 7/16-20		14
	06	UNF 1/2-20		14
	08	UNF 1/2-21		14
	08	UNF 9/16-18		17
	10	UNF 9/16-18		17
	13	UNF 3/4-16		22
	16	UNF 7/8-14		24
	20	UNF 1 1/16-12		27
	25	UNF 1 5/16-12		36
	32	UNF 5/8-12		46
	40	UNF 1 7/8-12		50
CEL External connection piece with/bore profile W 24° Light series 	05	M 12x1,5	6	12
	06	M 14x1,5	8	14
	08	M 16x1,5	10	17
	10	M 18x1,5	12	19
	13	M 22x1,5	15	22
	16	M 26x1,5	18	27
	20	M 30x2	22	32
	25	M 36x2	28	36
	32	M 45x2	35	46
	40	M 52x2	42	55
CES External connection piece with/bore profile W 24° Heavy series 	05	M 16x1,5		14
	06	M 18x1,5		17
	08	M 20x1,5		22
	10	M 22x1,5		22
	13	M 24x1,5		27
	16	M 30x2		27
	20	M 36x2		32
	25	M 42x2		32
	32	M 52x2		36

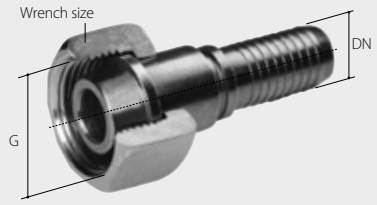
Armaturen

Anschlussarmaturen

Fitting	DN	Thread	mm to pipe	Wrench size
BDN Flat flanged nipples, union nut with inch thread as per ISO 228-1 	05	G 1/4″		17
	06	G 1/4″		17
	08	G 3/8″		19
	10	G 3/8″		19
	10	G 1/2″		27
	13	G 1/2″		27
	16	G 3/4″		32
	20	G 1″		41
	25	G 1″		41
	25	G 1 1/4″		50
	32	G 1 1/4″		50
	40	G 1 1/2″		56
BDN M Flat flanged nipple, union nut with metric thread 	05	M 12x1,5	6	14
	06	M 14x1,5	8	17
	08	M 16x1,5	10	19
	10	M 18x1,5	12	22
	13	M 22x1,5	15	27
	16	M 26x1,5	18	32
	20	M 30x2	22	36
	25	M 36x2	28	41
	32	M 45x2	35	50
	40	M 52x2	42	60
DKM Universal sealing head, union nut with metric thread, very light series 	20	M 30x1,5	22	36
	25	M 38x1,5	28	46
	32	M 45x1,5	35	55
	40	M 52x1,5	42	60
	50	M 65x2	52	75

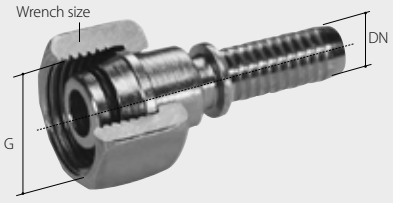
Fitting	DN	Thread	mm to pipe	Wrench size
DKS Universal sealing head, union nut with metric thread, heavy series 	06	M 18x1,5	10	22
	08	M 20x1,5	12	24
	10	M 22x1,5	14	27
	13	M 24x1,5	16	30
	16	M 30x2	20	36
	20	M 36x2	25	46
	25	M 42x2	30	50
	32	M 52x2	38	60

Fitting	DN	Thread	mm to pipe	Wrench size	Max. operating pressure
DKL Universal sealing head, light design, universal with metric thread	05	M 12x1,5	6	14	250 bar
	06	M 14x1,5	8	17	250 bar
	08	M 16x1,5	10	19	250 bar
	10	M 18x1,5	12	22	250 bar
	13	M 22x1,5	15	27	250 bar
	16	M 26x1,5	18	32	160 bar
	20	M 30x2	22	36	160 bar
	25	M 36x2	28	41	100 bar
	32	M 45x2	35	50	160 bar
	40	M 52x2	42	60	160 bar



Fitting	DN	Thread	mm to pipe	Wrench size
DKOL Conical seal with O-ring, union nut with metric thread, universal sealing head, light series	06	M 14x1,5	8	17
	08	M 16x1,5	10	19
	10	M 18x1,5	12	22
	13	M 22x1,5	15	27
	16	M 26x1,5	18	32
	20	M 30x2	22	36
	25	M 36x2	28	41
	32	M 45x2	35	50
	40	M 52x2	42	60

DKOS O-ring, universal sealing head heavy series	05	M 16x1,5	8	19
	06	M 18x1,5	10	22
	08	M 20x1,5	12	24
	10	M 22x1,5	14	27
	13	M 24x1,5	16	30
	16	M 30x2	20	36
	20	M 36x2	25	46
	25	M 45x2	30	50
	32	M 52x2	38	60



Material of standard fittings:

- Bichromated steel
- Stainless steel 1.4571
- Fittings for stainless steel hoses available in stainless steel 1.4571 only
- Special materials and fittings on request

Accessories: ELH/md/hd/shd... Hose protection

Plastic abrasion protection, polyamide protectors, type ELH/protector

Field of application:

- Additional abrasion and impact protection for our heated hoses with corrugated PA hose
- Additional labelling of heated hoses

Special characteristics:

- Simple subsequent installation
- Highlyabrasion-resistant
- absolutely firm and optimal stability on ourcorrugated PA hoses

Colour:

- black

Temperature range:

- from min. –40°C to max. +100°C

Material:

- Polyamide

Designation	Item no.	for hose external Ø (mm)
ELH/ protect-PG29	5XZC006	35
ELH/ protect-PG36	5XZC007	43
ELH/ protect-PG48	5XZC008	55
ELH/ protect-PG52	5XZC009	63
ELH/ protect-PG70	5XZC010	83

Plastic abrasion protection, protective plastic spiral, type ELH/protect-PE…

Field of application:

- Additional abrasion protection for heated hoses and hose lines.
- Additional contact protection for heated hoses with high surface temperature.
- Also suitable for bundling of unheated hose lines or connecting cables.

Special characteristics:

- Highly abrasion-resistant
- Easy subsequent installation by wrapping
- UV-resistant / tolerance for acids, oils and solutions
- Antistatic additives included
- Recyclable
- Rounded edges

Colour:

- black

Temperature range:

- min. –50 °C to max. +100 °C

Material:

- HD polyethylene

Designation	Item no.	Internal Ø (mm)	External Ø (mm)	Wall thickness	for hose external Ø (mm)
ELH/ protect-PE 09	5XZC000	9,6	12	1,2	9-13
ELH/ protect-PE 13	5XZC001	13,4	16	1,3	13-18
ELH/ protect-PE 27	5XZC002	27,0	32	2,5	27-36
ELH/ protect-PE 34	5XZC003	34,6	40	2,7	34-44
ELH/ protect-PE 43	5XZC004	43,2	50	3,4	43-55
ELH/ protect-PE 55	5XZC005	55,6	63	3,7	55-67

Electronic temperature controller

Type ELTC/H-14

The electronic temperature controller of type series ELTC/H-14 is a controller with digital display for wall mounting. The temperature measured with a Pt 100 temperature sensor is processed and displayed by a micro controller. After comparison of actual and set-point value the output relay is switched in keeping with the configuration. The device is equipped with installation sockets. It device is available in splash-proof housing fitted with a transparent housing lid.

Advantages:

- LED display to -25 °C
- Programmable 0 °C to +390 °C
- Switches max. 20 A resistive load with hybrid relay
- Signal contact (configurable as alarm contact or enable contact)
- Pt 100 possible in 2-wire and 3-wire circuit
- Operating voltage: 90 - 260 VAC / 50/60 Hz

Fields of application:

- industrial applications
- Heated sleeves, heated hoses

Data

Operating voltage	90-260 VAC 50/60 Hz
Power consumption	max. 4 mA, < 5 W
Switching capacity of relay 1	max. 20A with hybrid relay*
Switching capacity of relay 2	8 A, changeover contact (alarm)
Operating temperature	-25 °C ... +55 °C
Storage temperature	-30 °C ... +60 °C
Display range	-50 °C ... +400 °C
Adjustment range	0 °C ... +390 °C, configurable
Sensor connection	Pt 100 2-wire, 3-wire, configurable
Display	LED, red
Protection	IP 65
Dimensions (WxHxD)	130 x 130 x 75 mm

* Depending on the relevant installation socket

Type	Design	Item number
ELTC/H1-14	Installation socket 7-pole (10 A)	0620001
ELTC/H2-14	Installation socket 3+4-pole (16 A)	0620002
ELTC/H3-14	Installation socket 5-pole (20 A)	0620003

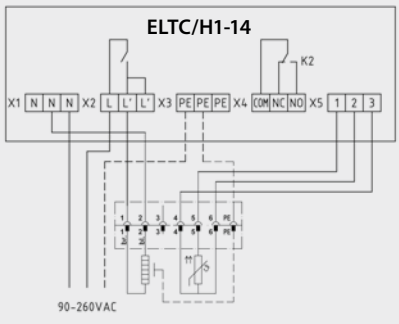
Sensor and display: 2 different sensor types can be used, Pt100/2-wire or Pt100/3-wire, and values can be displayed either as °C or °F. When using a Pt100/2-wire, the actual temperature value can be corrected. Range +/- 10 K or +/- 18 F. If a Pt100/3-wire is used, the temperature is automatically corrected.

Relay configuration: Relay 1: Controller relay
relay 2: Alarm relay: Alarm / temp. reached.

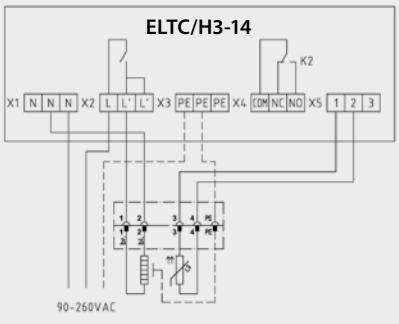
Temperature alarm: If the measured actual value deviates from pre-set limit values, an alarm is triggered and passed on using the K2 relay as an alarm relay.

Connection diagram

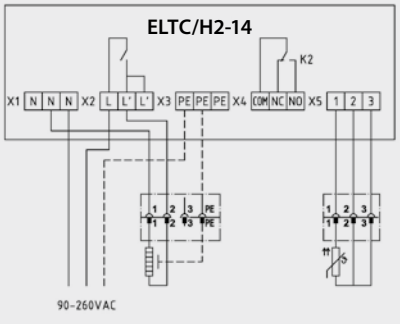
7-pole



5-pole



3- and 4-pole



Electronic temperature controllers

Type ELTC-21 and type ELTC-22 for 24 VDC

ELTC-21 and ELTC-22 are electronic temperature controllers with digital display for rail-mounting. The temperature measured with a Pt 100 temperature sensor is processed and displayed by a micro controller. After comparison of actual and set-point value the output relay is switched in keeping with the configuration.

Advantages:

- LED display to -25 °C
- Programmable -50 °C to +400 °C
- Switches 16 A resistive load
- Alarm contact
- Pt 100 possible in 2-wire and 3-wire circuit

Fields of application:

- Industrial applications
- Building services

Technical data

Power consumption	max. 4 mA < 5W
Switching capacity of relay 1	16 A make contact (heater)
Switching capacity of relay 2	8 A, changeover contact (alarm)
Operating temperature	-25 °C ... +55 °C
Storage temperature	-25 °C ... +60 °C
Temperature range	0 °C ... +400 °C, configurable
Sensor connection	Pt 100 2-wire, 3-wire, configurable
Display	LED, red
Protection class	IP20
Mounting	on top hat rail
Dimensions [WxHxD in mm]	51.5 x 87.5 x 58.0
Operating voltage ELTC-21	230 V
Operating voltage ELTC-22	24 VDC

Mini temperature controller, fully assembled

Type ELTC-Mini

The ELTC-Mini is an electronic temperature controller with extremely compact dimensions. It can be mounted directly onto our heated hoses, heated jackets as well as special heating systems. It offers the ideal solution for application where external controllers cannot be used and set-point values do not need to be changed. The controller is installed in very stable and extremely compact polyamide housing resistant to vibration and impact. A multi-colour LED displays the operational status.

Advantages:

- Compact design
- Vibration and impact-resistant due to fully encapsulated electronics
- Operating temperature -25 °C to +55 °C
- Switching capacity 1500 W, produced specifically for heating applications, optimised with a zero-voltage switch

Data

Operating voltage	230V / 50/60Hz
Power consumption	max. 2VA
Operating temperature	25 °C to 55 °C
Storage temperature	-30 °C to 60 °C
Sensor connection	PT-100/ 2-wire
Hysteresis	2…30K, configurable ex works
Temperature range	0 °C to 400 °C, werkseitig konfigurierbar
Switching capacity	1500 W
Dimensions	75 x 46 x 35 mm (LxWxH)
Protection	IP54
2.00-metre high temperature rubber hose line, temperature-resistant to 120 °C, also available with two-pin earthed plug on request	

Additional controllers can be found in our separate Measurement and Control Technology catalogue.

eltherm®
innovations in heat tracing

Questionnaire for heated pressure hoses

Send via e-mail to: info@eltherm.com or by fax to: +49 27 36 44 13-50

Company: _____ Contact person: _____

Street: _____ Postal code/city: _____

Tel.: _____ E-mail: _____

Heated hose type

☐ ELH/md ☐ ELH/hd ☐ ELH/shd

Ex-proof design

☐ no ☐ yes

ATEX zone:

Temperature class:

Number: _____ Pieces

Inner liner NW: _____ mm

Material of inner hose or inner liner

☐ PTFE/ VA braided* ☐ Polyamide ☐ Corrugated stainless steel hose (1.4404) ☐ Special:

* Braided multiple times dependign on the pressure and temperature

Number of inner liners: _____ Pieces

Length: _____ mm

Max. operating temperature: _____ °C

Holding temperature: _____ °C

Voltage: _____ V

Min. ambient temperature

☐ Standard (-20 °C) ☐ Special: °C

Operating pressure

bar, at °C

Medium: _____

Outer jacket

☐ Corrugated PA hose (w)	☐ TPRIB Corrugated hose (w)	☐ Corrugated robot hose (w)	☐ Corrugated metal hose Stainless steel (T)	☐ Corrugated metal hose (T) galvanised steel	☐ Corrugated metal hose with PVC outer jacket (T)
☐ Nylon braiding (N)	☐ Stainless steel braiding (SS)	☐ Galvanised iron braiding (Fe)	☐ Silicone outer jacket red (GSI)	☐ Silicone outer jacket black (SI)	

Sensor Number of sensors: Pieces

☐ PT-100 / 2-wire	☐ Ex-proof PT-100/ 3-wire	☐ Thermocouple type NiCr-Ni	☐ Special:
☐ PT-100/3-wire	☐ Ex-proof PT-100/ 4-wire	☐ Thermocouple type FeCu-Ni	
Sensor position:	☐ Standard (500 mm from power connection)	☐ Special:	mm from power connection

Fittings (see pp. 40-43)

Power connection side (type)		Sealed end side	
Material:	☐ Bichromated machining steel	☐ Stainless steel (1.4571)	☐ Special:

Additional wires

☐ Number of strands: mm²

Connector cable exit

☐ Standard (returned)	☐ On the side	☐ To the back (hose side)	☐ On the front

Connection cable length: _____ mm

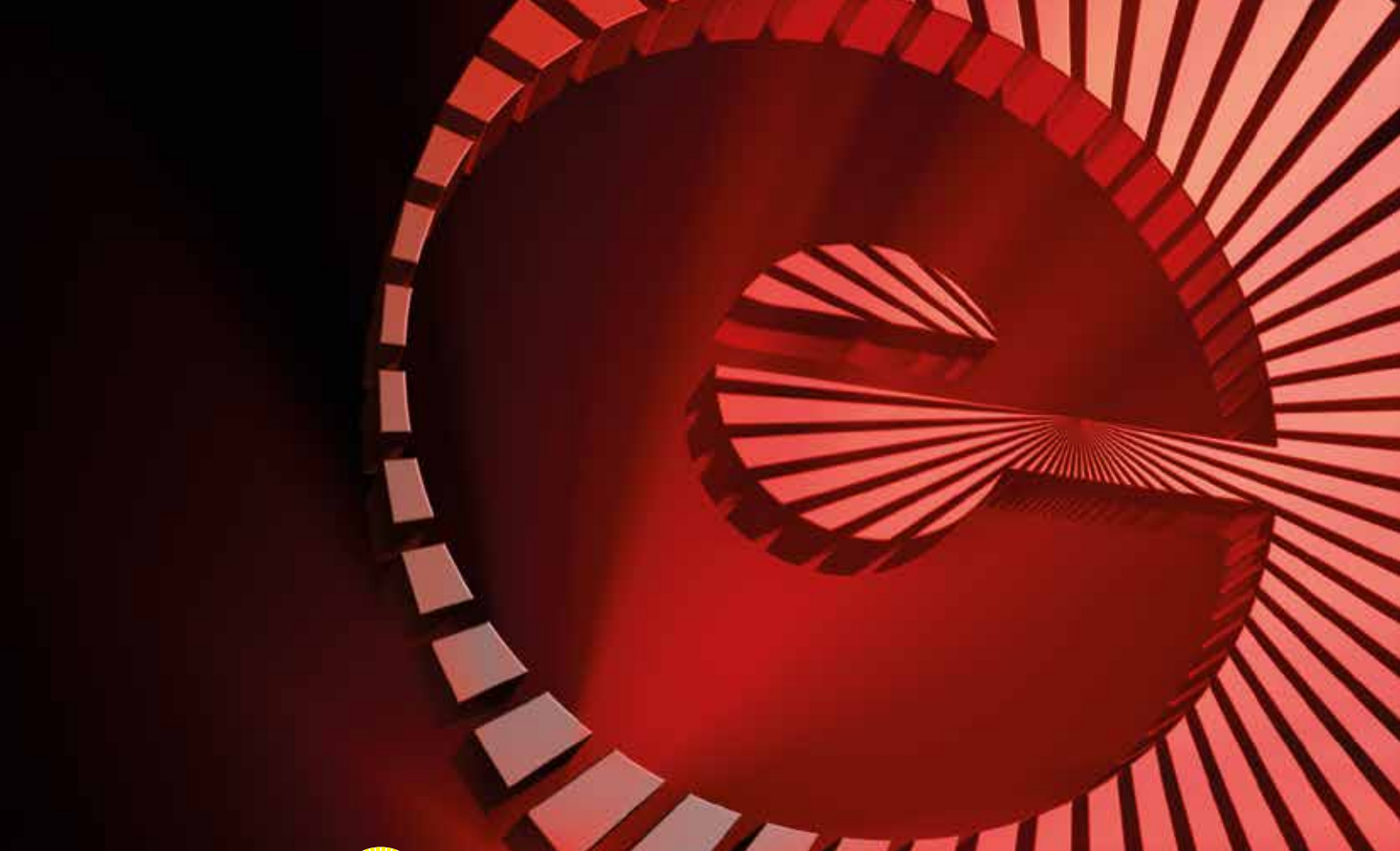
Connection plug

☐ Without ☐ With plug type:

Control

☐ provided by customer	☐ with ELTC-14	☐ with ELTC-Mini set
☐ permanently with ELTC-21	☐ with ELTC-22	permanently to °C

Comments: _____



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