hillesheim®

Innovations for heating

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zertifiziert ISO 9001 certified

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Giving and conserving heat
Welcome to Hillesheim GmbH

Do you have problems to transfer liquid media or gases from A to B without temperature loss? Or do you want them to be heated up from temperature X to temperature Y?

Heating and heat conservation: Competent, innovative and economical

If you are looking for a technically and financially optimal solution for such tasks, then you should call on us. Because we deliver the accumulated know-how of over 35 years of application experience. Thousands of electrical heating systems that we have designed and manufactured (heating hoses, heating tapes, heating mats) still do their job today, even after decades of service at the customers.

Individual solutions for trace- and surface heating

From our extensive and reliable product range we put together technology to suit your needs. Our materials cover temperatures up to 1000°C - including the associated control technologies.

We work closely together with you, to meet the special requirements of your industry and to provide you with optimal solutions – tailored to your specifications.

Explosion prevention – an important part of our portfolio

In industries that work with potentially explosive materials (e.g. chemical engineering) it's critically important to consistently implement measures for explosion prevention and protection. This includes avoidance of effective ignition sources.

Production sites and factories that present a significant risk of explosion, due to the nature of the materials they process, require heating elements that meet certain requirements. You can count on our EX-heating solutions to meet those requirements, because they are ATEX certified.

Industrial heating solutions – on the cutting edge of technology

Our developments are setting the standards for state-of-the-art technology in our field - and often keeping ahead of it. Today's know-how is the sum of solutions worked out together with our customers. You can benefit from that knowledge today. Challenge us.

Are you looking for electrical heat tracing?
We have the right product!

For more than 35 years, we have been developing and manufacturing tailor-made electrical heating systems for our customers.

Use our many years of experience and heat up
with Hillesheim products - Made in Germany!

Quality - Reliability - Promptness - Hillesheim

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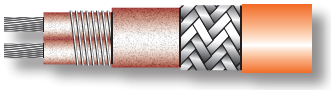

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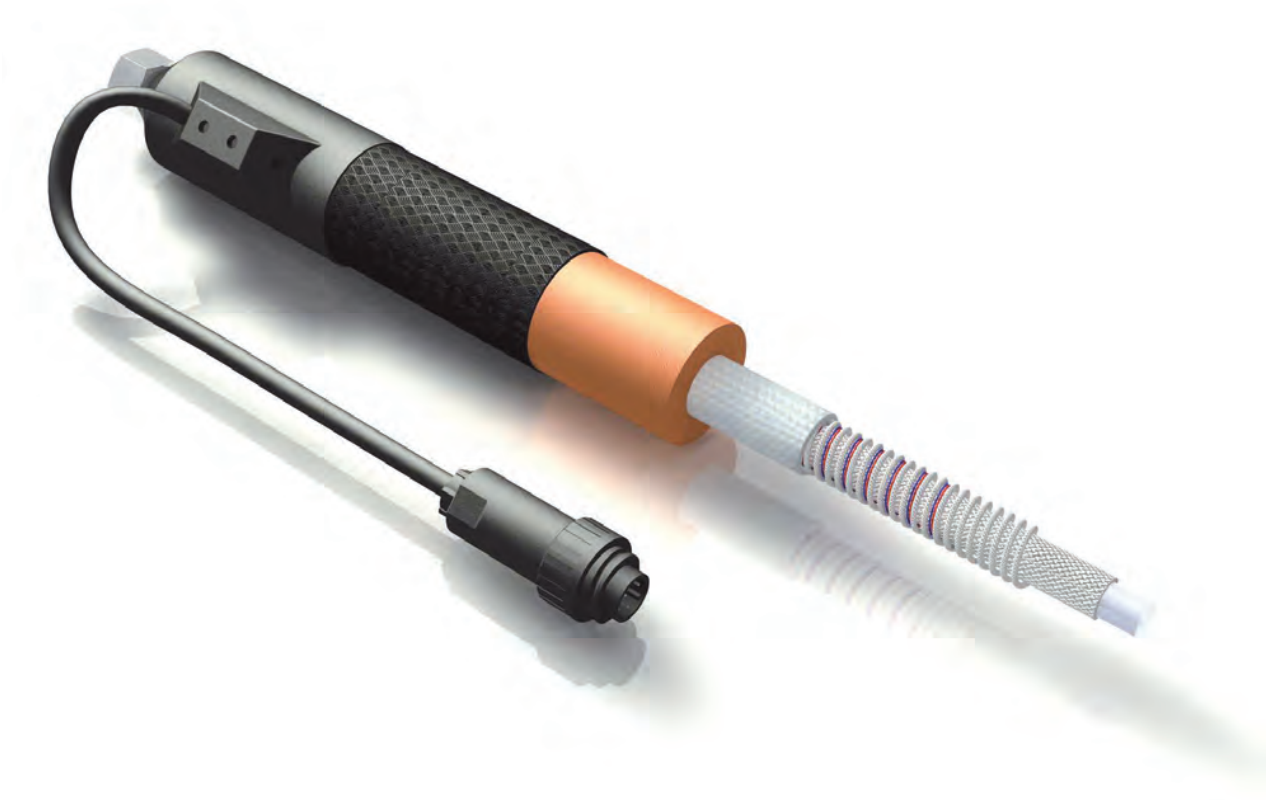
General technical information and data for our heating heated hoses



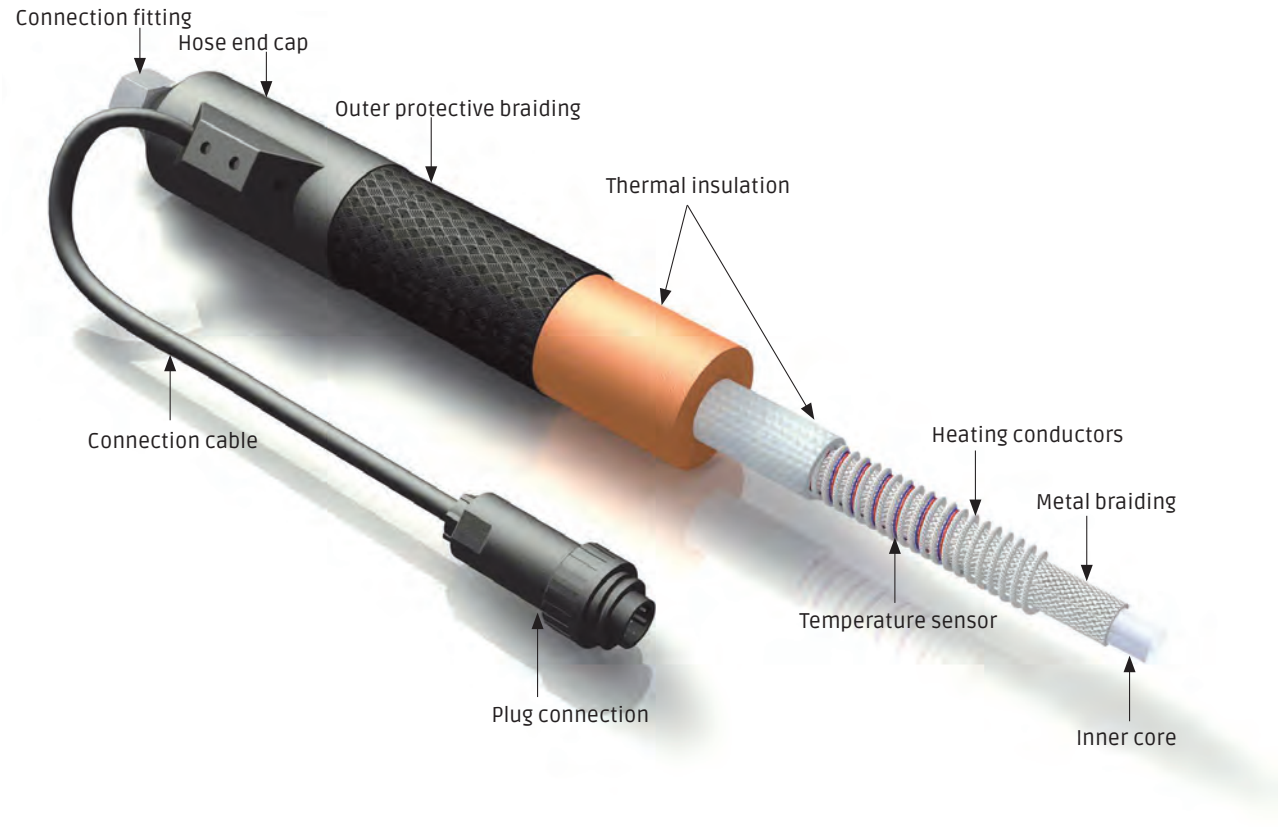
Description and structure of a Hillesheim heating hose

Whenever hot and warm media have to be transported from a device to another part of the device or plant without heat loss and the lines are not intended be rigidly routed, flexible heating hoses are recommended as conveying elements.

In most applications, it is necessary to maintain the product temperature at a predefined value. By using Hillesheim heating hoses, a constant temperature of the material conveyed is ensured through to the application site, without the material temperature being influenced by ambient temperatures and heat losses along the way.

Why heating hoses are used:

- To keep media fluid for processing
- To achieve their optimum properties for processing
- To avoid condensation of gaseous media
- To process in a more rational way (robotic applications)
- To ensure consistent quality
- To avoid having to produce in a particular place
- To connect moving parts and devices



The structure shown is a schematic representation of the heating hose. There may be differences, however, depending on the hose type and application. Similarly, the structure can change with new developments and advancements.

Application examples

Plastics processing
Injection moulding
Extrusion, Co-extruders
Mould-making

Adhesives and dosing systems
Hot-melt equipment
Adhesive robots
Packaging equipment
Dosing equipment

Surface technology
Bitumen plants
Spray-coating plants
Airless equipment

Isolation technology
Packaging foam equipment
PUR foam equipment
2-component equipment
4-component equipment

Process and environmental technology
Exhaust gas stations
Exhaust gas measurement technology
Sampling probes
Flue gas analytical
Emission measurements

Chemical thermal process engineering
Heavy fuel oil systems
Chemical pipelines
Fluid metals
Silo heating systems

Explosion hazard areas
Ex-heated hoses
Ex-heated plates
Ex-control technology

Transportation technology
Transfer and delivery hoses
Silo and levelling hoses

Plant and apparatus engineering
Filling and sealing equipment
Food processing
Tool heating

Information about Hillesheim heating hoses

Electrical engineering: The mains power and sensor cables are prepared for connection to the specified mains voltage (measurement voltage) and the sensor type. The standard connection design complies with the CE standard (DIN-VDE). Designs can be realised in accordance with other directives (UL, CSA, SEV...).

The heating system is designed such that optimal heat distribution is achieved over the entire length of the heating hose.

Hillesheim heating hoses are equipped with temperature sensors and have to be monitored with the suitable controllers. For unsupervised operation, we can fit additional sensors (bimetal monitors, temperature fuses ...) or additional temperature sensors for connection to controller/limiter combinations **(Safety in electrical heating installations DIN EN 60519-2.**

Attention! Standard heating hoses must not be operated in explosion-risk-areas. Only our specially explosion-protected heating hoses with ATEX-approved components may be used in explosion-prone areas.

Nominal diameter: The nominal diameter (inner diameter) (DN for short) is determined from the flow rate and the viscosity of the medium. Standard sizes for hoses are 4....50 mm. Larger diameters are available on request (also see Transfer and delivery hoses).

Pressure hoses: The pressure hose type is usually determined from the same parameters as the nominal diameter. The required operational pressure also applies in this case. Other selection criteria, such as heat transfers, bend radii or strong pulsing loads are also important parameters. Please always refer to the tables for bend radii and operating pressures. We also heat special hoses made of Viton, silicone, NBR ... that can also be provided by the customer.

Attention! → The pressure specifications in the table are defined at 20...50°C. Increasing temperatures reduce the pressure loading capacity. Please observe temperature correction factors.

Connection fittings: The selection of fittings is dependent on the nominal diameter and the pressure loading capacity (light, medium and heavy duty fitting series) of the hose. The heating hose may have different fittings attached as both ends. Open ends without fittings and many types of special fittings (clamp, flange, milk pipe ...) are also possible.

Temperature sensors: Our heating hoses come equipped with Fe-CuNi (J) thermoelements as standard. NiCr-Ni (K) thermoelements and PT100 PTC sensors in 2, 3 or 4-wire connections are also possible. Other thermoelements and PTC/NTC sensors are available on request. A variety of sensors may also be installed depending on the application. The HTI and HTP integral integral controllers monitor the temperature directly at the heating wire with PTC response, without additional sensors on the heating system.

Control lines: The heating hose can have electrical connections, flexible empty pipes for air, test gas or fluid media or combinations of these incorporated. The entry and exit points and the relevant connecting elements (extension connectors, couplings ...) have to be specified. Parallel pickups allow further loads to be connected. Wire cross-sections and pipe diameters depend on the loads connected.

Connection cable: As described in the 'Connection cable outlet' sheet, the mains cable exits from the end caps. Industrial hoses have 1.5 m analysis lines and 3.0 m connection cables as standard. Special designs with recessed cable outlets, other dimensions, separated cables for heating, sensors and control lines ... are possible.

Plug connections: The plug connections on Hillesheim standard heating hoses are equipped with a plug compatible with one of our controllers. The HT43 temperature controller is provided with a round socket as standard.

Please note that for unsupervised operation. there must be an additional safety device (limiter, temperature fuse...) fitted in the heating system.

We can also supply our hoses without plugs for connecting the cable to terminals or for fitting to customer plugs. We use plug connectors from many well-known manufacturers. We can also fit their plugs on our hoses for you if you state the order reference and the pin configuration.

Heating-up time / Safety: Under normal conditions (closed room, approx. +20°C) the time for Hillesheim heating hoses to heat up to 200°C is 15 to 30 minutes. Before putting your system into operation, it has to be ensured that the medium in the hose and in the connection parts has reached its processing temperature. Bending loads and blockages in the fittings can damage the hose before the processing temperature is attained.

Please read the operating instructions and assembly guidelines before starting operation for the first time.

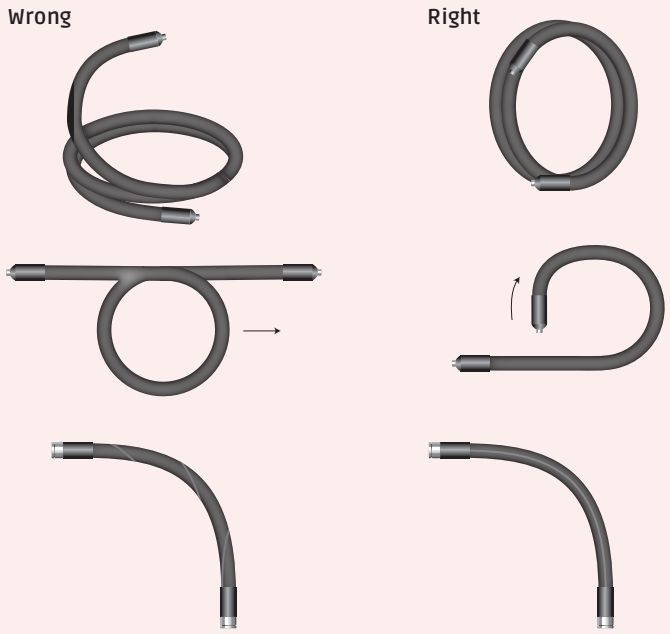
Certification

Along the lines of DIN 20066

Pulling on the ends of rolled hoses causes torsional stress and can subject them to bending radii smaller than is permissible.

Hoses are not to be twisted.

Remedy: unroll the ring of hose rather than pulling it off.

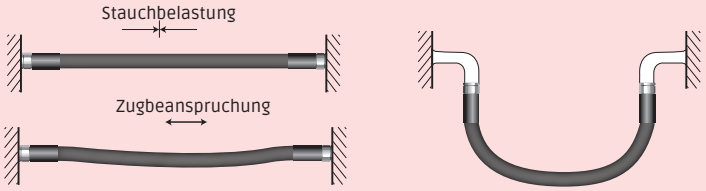


Hose lines should be installed in such a manner that they are free of tensile stress in all operational states; similarly, jamming stress (i.e. axial compression along the length) on short lengths of hose is to be avoided.

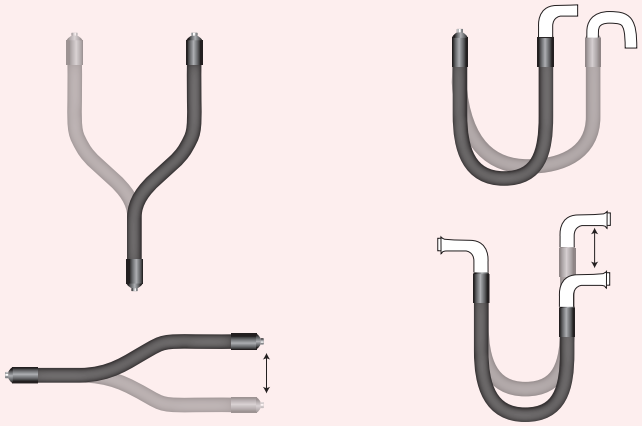
Axial compression due to incorrect installation or space-reducing motion degrades the hose's pressure resistance.

Compensation of expansion due to hoses installed in straight sections can lead to their destruction.

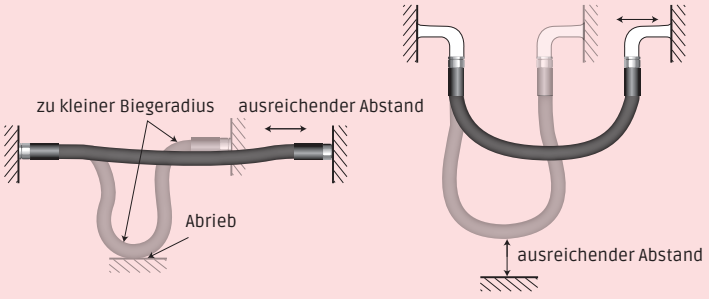
Remedy: place elbow fittings at connecting points.



Do install straight sections of hose which are subjected to a large range of motion, make such hose connections in a U-shape.



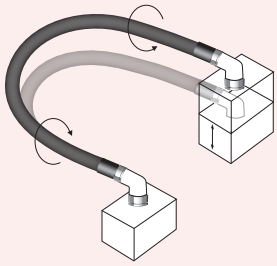
When connecting hose lines to moving parts, the hose length must be calculated such that the hose's smallest permissible bending radius is not underrun in any possible position and/or that the hose is not subjected to tensile stress.

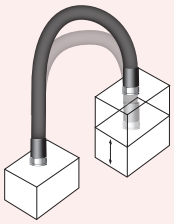


Installation recommendations

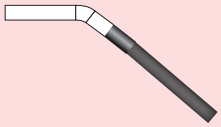
Wrong

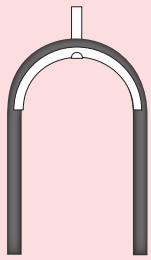
Right





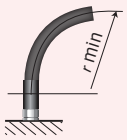
Avoid twisting the hose when connecting it to moving parts, particularly when motion and bending take place in the same plane. This can be achieved through proper installation or design measures (e.g. swivel joint).

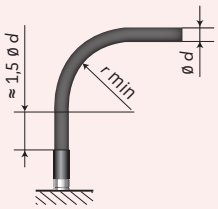




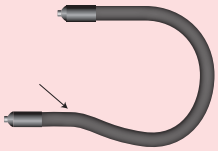
The danger of kinking is particularly high for handheld devices.

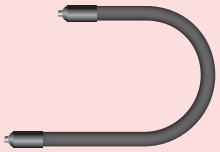
Remedy: Depending on the operating position, install a elbow or kink protection (e.g. corrugated hose).

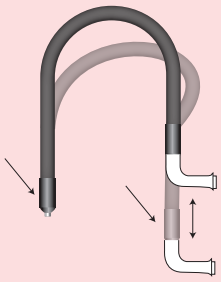


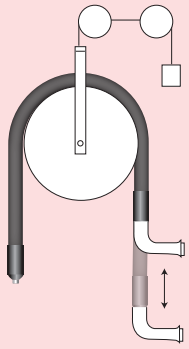


For installation in an arc, a hose length should be selected such that the intended bend can be formed beyond a length of ≈ 1.5 d_0 ; kink protection may also be necessary (e.g. hard cap).



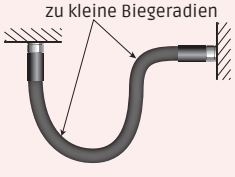


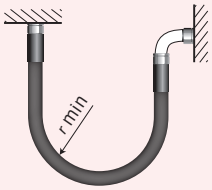




It is disadvantageous to allow free-hanging spans.

Remedy: supports or counterweight rollers.

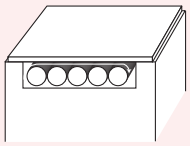




Hose lines should be installed as close as possible to their natural position, whereby their smallest permissible bend radius must be observed.

Additional stresses on the hose can be avoided through the use of suitable fittings and adapters.

Wrong



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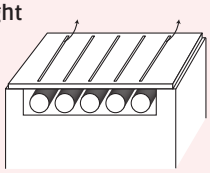
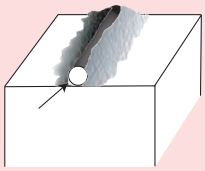
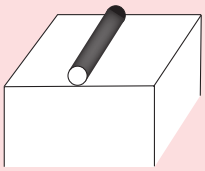


Heat build-up will occur if heating hoses are routed through a closed channel or shaft.

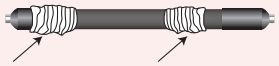
Remedy: hoses may not touch one another. Furthermore, sufficient ventilation is to be provided.



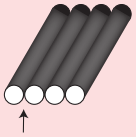


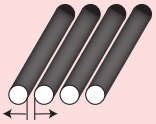
If, for example, powder-like substances, adhesives or other thermally insulating materials accumulate on heating hoses, then overheating will occur at such points.

Remedy: eliminate the cause with regular cleaning to remove such materials.



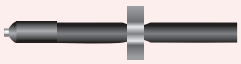
Heat build-up is caused by incorrect wrapping of the heating hose with other materials. The heating hose will overheat at such points. If the sensor area is wrapped, then the remainder of the hose will cool off.

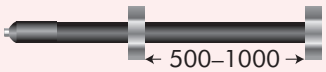


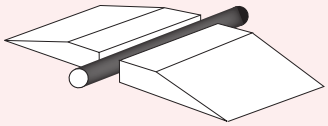


Bundling or routing that permits contact between hoses will lead to overheating at these points of contact.

Remedy: route with open space between hoses.



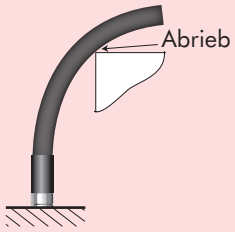


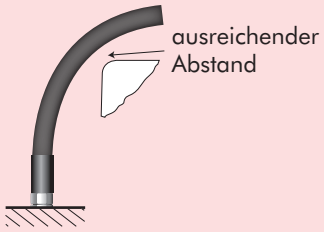


Do not fasten clips or brackets so tightly that they cause the hose's outer braiding to be pressed internally against the heat conductor.

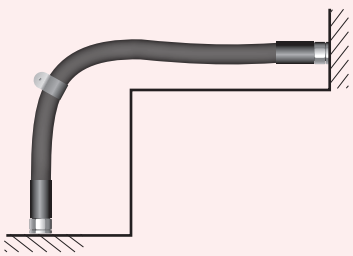
Disregard for this rule can lead to damage of the protective braiding and the hose.

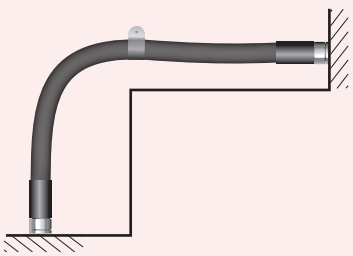
Openly routed hose lines along paths where there is vehicle or pedestrian traffic are to be protected against damage from abrasion and deformation, e.g. by using hose bridges.



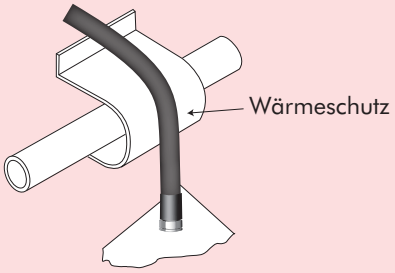


Appropriate measures can be taken to arrange and affix hose lines to prevent them from being damaged externally by external mechanical influences. To the extent necessary, hoses are to be secured in place, e.g. by protective jackets. Sharp-edged components should be avoided.





Hose brackets are to be avoided at points where they would prevent the heating hose's natural free movement and length changes.



Where hose lines are exposed to high external temperatures, they must either have sufficient physical separation from the external heat source or be protected by appropriate measures (e.g. shielding).

Protection types for electrical equipment according to EN 60529

Protection types against solid foreign objects, denoted by the first numeral		
First numeral	**Short description**	**Definition**
0	Not protected	–
1	Protected against solid foreign objects 50 mm diameter and larger	The object probe, a sphere of 50 mm diameter shall not fully penetrate
2	Protected against solid foreign objects 12.5 mm diameter and greater	The object probe, a sphere of 12.5 mm diameter shall not fully penetrate
3	Protected against solid foreign objects 2.5 mm diameter and greater	The object probe, a sphere of 2.5 mm diameter shall not fully penetrate
4	Protected against solid foreign objects 1 mm diameter and greater	The object probe, ball 1 mm diameter must not penetrate at all
5	Dust-protected	Ingress of dust is not completely prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the device or impair safety
6	Dust-tight	No ingress of dust

* Note: The full diameter of the object probe must not pass through an opening of the enclosure

Protection type against water, denoted by the second numeral		
Second numeral	**Short description**	**Definition**
0	Not protected	–
1	Protected against falling water drops	Vertically falling drops shall have no harmful effects
2	Protected against falling water drops when the enclosure is tilted up to 15°	Vertically falling drops shall have no harmful effects when the enclosure is tilted at any angle up to 15° on either side of the vertical
3	Protected against spraying water	Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects
4	Protected against splashing water	Water splashed against the enclosure from any direction shall no harmful effects
5	Protected against water jet	Water projected in jets against the enclosure from any direction shall no harmful effects
6	Protected against powered water jets	Water projected in powerful jets against the enclosure from any direction shall no harmful effects
7	Protected against the effects of temporary immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when enclosure is temporarily immersed in water under standardised conditions of pressure and time
8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7 However, these conditions must be more stringent than those described under numeral 7
9	Water at high pressure / steam jet cleaning	

Example numerals **IP 6 8**

Protection classes

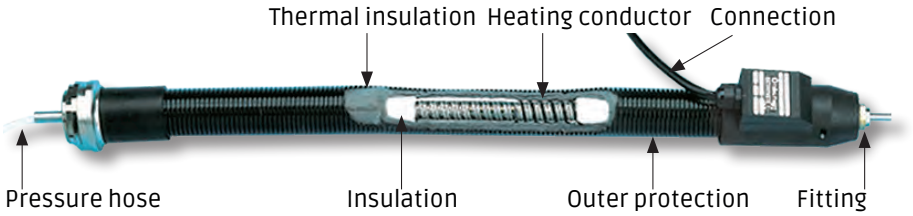
Electrical devices and enclosures require safety requires protective measures to prevent exposed metal parts from conducting electric current in the event of a fault. Classification into protection classes provides information about the given measures taken.

Protection class	Symbol	Protective measures
I		All exposed metal parts are galvanically connected to one another and also connected to the mains protective earth conductor.
II		The device is appropriately isolated such that it has no exposed metal parts that can conduct electric current in the event of a fault. A protective earth conductor is not implemented.
III		The device is operated on low voltage, not in excess of 42 V, which is obtained from a safety transformer or battery.

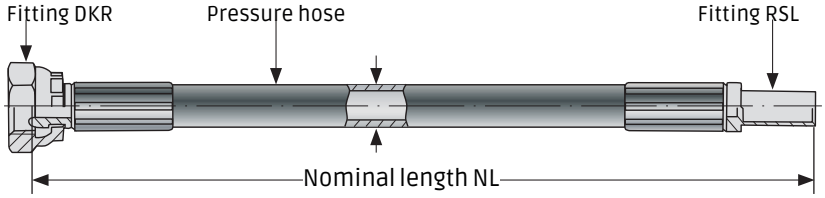
Industrial heating hoses

Heating hose	Sensor	Outer protection	Fitting	Pressure hoses
1 = H 100 2 = H 200 4 = H 400 5 = H 500 6 = H 600 7 = H 700 8 = H 800 9 = H 900	0 = Fe-CuNi 1 = Fe-CuNi + limiter 2 = PT100 3 = PT100 + limiter 4 = NiCr-Ni 5 = NiCr-Ni + limiter 6 = limiter 7 = without sensor 8 = HTI controller 9 = PT100 + 2nd PT100	0 = polyamide standard braiding 1 = stainless steel braiding 2 = galv. steel braiding 3 = PA corrugated hose 4 = metal ring corr. hose 5 = textile glass braiding 6 = PU corrugated hose 7 = silicone outer skin 8 = rubber hose	0 = without 1 = DKR steel 2 = RSL/RSS steel 3 = DKR-V2 A 4 = RSL/RSS-V2 A 5 = DKR-V4 A 6 = RSL/RSS-V4 A 7 = DKJ steel 8 = DKL steel 9 = BDN steel	T1 T2 T3 T4 T5 TAW T46

H [ ] [ ] [ ] [ ] – Nominal length in dm – DN - [ ]



Determination of the nominal length



Rated power Watt/metre at 230 V ~ for standard heating hoses:

Type	DN mm	4	6	8	10	12	16	20	25	32	40	50
H 100	100°C	80	100	120	140	160	200	260	330	380	440	550
H 700 H 200 H 800	170°C 200°C 250°C	100	120	140	160	200	260	330	380	440	550	660
H 900	450°C / 350°C			220	250	280	310	400	460	610	660	880
H 900	600°C			330	375	420	465	600	690	900	990	1300
H 400	80°C	70	70	70	90	90	120	120				
Outer Ø with standard braiding:	approx. mm	40	40	40	45	45	50	50	55	60	70	85

Special power and voltage ratings on request.

Tolerances

Rated power / rated voltage	+ 5% / -10%
Diameter	± 10%
Length	± 2%
Test voltage for heating hoses (230 V measurement voltage)	2000 Volt high voltage test heating conductor – PE conductor

T 1

Smooth PTFE hose with one braided layer of stainless steel wire (1.4301) max. operating temperature 250 °C

DN (NW) mm	4	6	8	10	12	16	20	25
*operating pressure / bar	275	240	200	175	150	135	100	80
Bend radius / mm	50	75	100	120	135	160	200	250

T 2

Smooth PTFE hose with two braided layers of stainless steel wire (1.4301) max. operating temperature 250 °C

DN (NW) mm	6	8	10	12	16	20	25	32	40
*operating pressure / bar	275	250	225	200	175	150	130	70	50
Bend radius / mm	75	100	120	135	160	200	250	500	850

T 3

Smooth PTFE hose with two wound layers and one braided layer of steel wire, max. operating temperature 250 °C

DN mm	6	8	10	12	16	20	25	32
* operating pressure / bar	500	475	475	450	400	300	275	250
Bend radius / mm	60	85	110	150	175	200	240	275

TAW

Smooth PTFE hose with one braided layer of Aramid and one braided layer of steel wire, max. operating temperature 100 °C

DN mm	16	20	25
operating pressure / bar	345	345	345
Bend radius / mm	150	200	300

T 4

Corrugated PTFE hose one layer of stainless steel wire. (1.4301), max. operating temperature 200 °C

DN mm	25	32	40	50
* operating pressure / bar	62	62	51	34
Bend radius / mm	90	100	150	180

T 46

Corrugated PTFE hose inside smooth with stainless steel spirals and steel braiding, max. operating temperature 250 °C

DN mm	12	16	20	25	32	40	50
* operating pressure / bar	50	50	60	40	45	40	25
Bend radius / mm	40	50	60	70	90	110	150

Also available antistatic

T 5

Corrugated stainless steel hose (1.4404 or 1.4571) with one braided layer of stainless steel wire (1.4301), max. operating temperature 550 °C

Reference values for the **light** design:

DN mm	4	6	8	10	12	16	20	25	32	40	50
* operating pressure / bar	100	150	100	100	65	65	40	50	25	40	25
Bend radius / mm	80	80	120	130	140	160	170	190	260	300	320

Hoses made of stainless steel may be used virtually without limitation in the range -190°C up to max. +550°C for liquids and gaseous media in all industries, and are completely diffusion resistant; not suitable for chlorides, bromides and other halogens.

Attention! – The pressure specifications in the table are defined at 20...50°C. Increasing temperatures reduce the pressure loading capacity. Please observe temperature correction factors

* Operating Pressure: temperature correction factor for T1 – T4, 100°C x 0,95; 150°C x 0,9; 200°C x 0,83; 250°C x 0,6
* Operating Pressure: temperature correction factor for T5, 100°C x 0,7; 200°C x 0,6; 250°C x 0,55; 350°C x 0,49; 500°C x 0,46; 550°C x 0,4
* Operating Pressure: temperature correction factor for T46 by design

The hoses made of PTFE T1, T2, T3, T4, T46, can be universally employed in the range from -70°C to +250°C and are characterised by their unusual chemical stability; they are only unstable in the presence of compounds containing fluorine, as well as alkaline metals sodium or potassium and halogens.

It is essential that you observe the minimum bend radius, since if this is exceeded this will cause the pressure hose to leak thus making the complete heating hose unusable or no longer repairable. We accept no liability for such damage.

Recommendation: For dynamic load, double of the minimum bend radius should be kept, in order to achieve a longer life!

DKR

Universal conical nipple, union nut inch (BSP) *2

DN mm	G = thread / inch	
4	G 1/8"-28	G 1/4"-19
6	G 1/4"-19	
8	G 3/8"-19	
10	G 3/8"-19	G 1/2"-14
12	G 1/2"-14	G 5/8"-14
16	G 3/4"-14	
20	G 1"-11	
25	G 1"-11	G 1 1/4"-11
32	G 1 1/4"-11	G 1 1/2"-11
40	G 1 1/2"-11	

RSL/RSS

Pipe connection light / heavy duty series

DN mm	RSL L (mm)	RSL d (mm)	RSS L (mm)	RSS d (mm)
4	25	6	27	8
6	25	8	29	10
8	26	10	29	12
10	26	12	29	14
12	28	15	33	16
16	30	18	39	20
20	32	22	44	25
25	30	28	44	30
32	35	35	41	38
40	38	42		

DKL/DKM/DKS

Universal conical nipple, union nut metric thread
light / heavy duty series

DN mm	Thread DKL	DKM	DKS
4	12 x 1.5		
6	14 x 1.5		18 x 1.5
8	16 x 1.5		20 x 1.5
10	18 x 1.5		22 x 1.5
12	22 x 1.5		24 x 1.5
16	26 x 1.5		30 x 2
20	30 x 2	30 x 1.5	36 x 2
25	36 x 2	38 x 1.5	42 x 2
32	45 x 2	45 x 1.5	52 x 2
40	52 x 2	52 x 1.5	

DKJ

Nipple with 74° tapered JIC, union nut UNF thread

DN mm	UNF = thread
4	7/16" -20 UNF
6	1/2" -20 UNF
8	1/2" -20 UNF
8	9/16" -18 UNF
8	5/8" -18 UNF
10	9/16" -18 UNF
10	3/4" -16 UNF
12	3/4" -16 UNF
16	7/8" -14 UNF
20	1 1/16" -12 UNF
25	1 5/16" -12 UNF
32	1 5/8" -12 UNF
40	1 7/8" -12 UNF

BDN

Flanged nut flat packing, union nut inch / metric

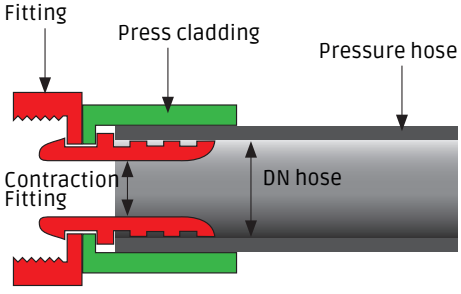
DN mm	G = thread / inch	Thread DKL	DKM	DKS
4	G 1/8"-28	12 x 1.5		
6	G 1/4"-19	14 x 1.5		18 x 1.5
8	G 3/8"-19	16 x 1.5		20 x 1.5
10	G 3/8"-19	18 x 1.5		22 x 1.5
12	G 1/2"-14	22 x 1.5		24 x 1.5
16	G 3/4"-14	26 x 1.5		30 x 2
20	G 1"-11	30 x 2	30 x 1.5	36 x 2
25	G 1"-11	36 x 2	38 x 1.5	42 x 2
32	G 1 1/4"-11	45 x 2	45 x 1.5	52 x 2
40	G 1 1/2"-11	52 x 2	52 x 1.5	

The stability of the heating hose must include the fitting. Normally the heating hose fittings are supplied in machining steel with Cr-VI free surface coating. Special fittings are available in 1.4305 and 1.4571 and in many other materials. In addition, heating hoses can also be supplied with flanges, small flanges, clamp pipe connections or pipe connections (DIN and ASA*1).

Fittings with internal PTFE *3 or PFA *4 coating are available.

*1 ASA = US standard
*2 BSP = British Standard Pipe
*3 PTFE = polytetrafluorethylene
*4 PFA = perfluoralkoxyl

* These fittings are also available as external thread.



DN mm	Inner Ø mm Fitting
4	3.0
6	4.5
8	6.0
10	7.5
12	10.0
16	12.5
20	16.0
25	20.1
32	27.5
40	31.5

Inner Ø may vary depending on the fitting

Please note that the fittings cause a reduction in the hose throughput.

Outside protective hoses - Industrial

PA standard protective braiding

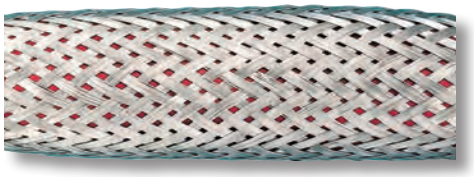
Material	PA 6, polyamide
Temperature stability	+150°C *

Very flexible, available in various colours

Metal protective braiding

Material	steel, galvanised or stainless steel
Temperature stability	+300°C to +500°C *

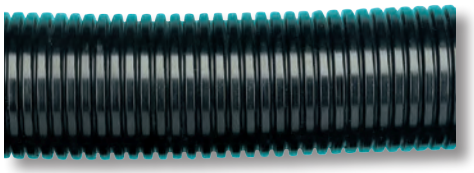
Very flexible, very good protection against abrasion



PA corrugated hose / Pur corrugated hose

Material polyamide	PA6	PA12	PUR
Temperature stability	+120°C *	+100°C *	+90°C

Very flexible, highly recommended for applications on robots, non-crush, flame-retardant, non halogen



PUR corrugated hose with steel coil

Material	PU (polyurethane)
Temperature stability	+90°C *

Very flexible, highly recommended for applications on robots, non-crush, flame-retardant, non halogen

Metal ring corrugated hose

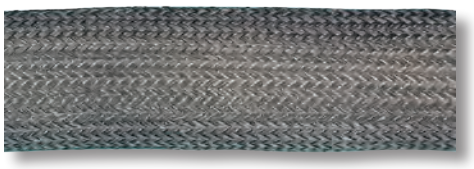
Material	steel, galvanised
Temperature stability	+250°C *

Very flexible, non-crush, very resistant against sharp objects and swarf

Textile glass braiding

Material	textile glass - black
Temperature stability	+400°C *

Very flexible, very good protection against abrasion, protection against falling glowing swarf etc. standard for H 900 series



Silicone outer skin

Material	silicone smooth - black/white
Temperature stability	+200°C *

Very flexible, smooth surface, easy-to-clean, moisture-proof

Rubber outer protection

Material	rubber / ATG-L dark
Temperature stability	+80°C *

Outer textile patterned, abrasion resistant, weather resistant, conductive

* The temperature stability relates to brief contact with a correspondingly hot environment. In case of prolonged use above the operating temperature of the external protective hose, the structure of the heating hose must also be changed accordingly.

Hard cap

Tear and twist protection

The fibreglass reinforced PA hard cap is firmly bonded with the basic hose. This prevents tearing or twisting of the cap due to heat expansion or strong movements of the heating hose.

Bending protection

The hard cap shifts the bending point of the basic hose behind the fitting and therefore neutralises the critical transition hose - fitting and increases the service life of the heating hose.

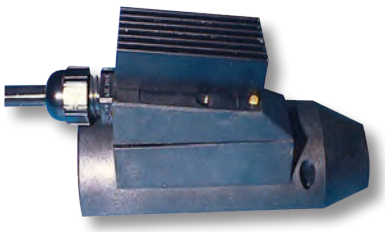
Connection

A terminal block is integrated in the connection space of the hard cap to which the connecting wires may be connected. This allows the connecting cable to be replaced without great effort.

The hard caps are available for heating hoses up to DN 25.

Option: Miniature control unit integrated in the hard cap

For further information see chapter Control technology



Rated voltage	230V / 50 Hz
Switching power	1000 W - 1500 W
Power switch	triac in zero-crossing
Control range	0 ... 254 °C
Setting	setpoint 2°C steps with a DIP switch
Housing material	PA glass-fibre reinforced
Protection type	IP42 / Cast: IP65
Response	two-point controller
Sensor	sensor PT100 / HTI
Inputs	cable glands

Soft cap

Temperature stability

The soft cap made of silicone or elastomer is characterised by its high temperature stability.

Space requirement

Their suppleness means they fit snugly around the ends of the heating hose and thus require less space than hard caps.

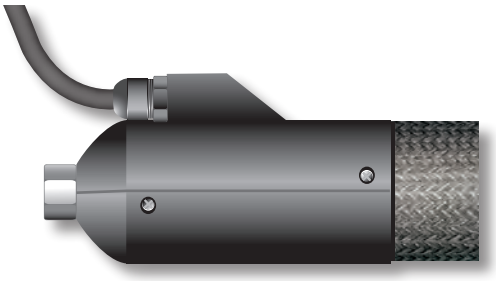
Kink protection

Their kink protection and the inner strain relief prevents hoses kinking and the mains cable from being pulled out.

The soft caps are available for heating hoses up to DN 50.

Connection cable outlet - Industrial

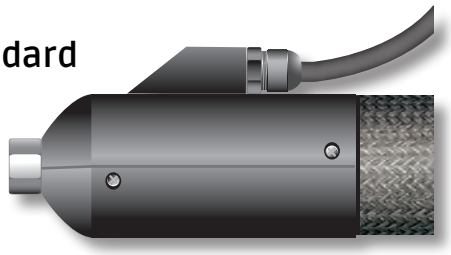
Hard cap –
made of polyamide PA6
glass-fibre reinforced



forward

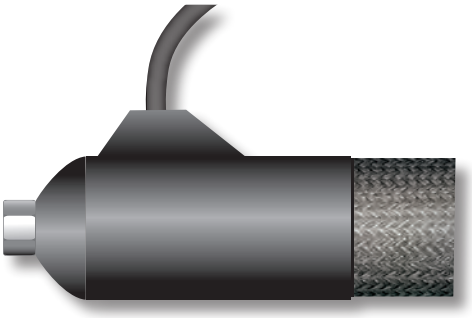
hose sided or frontal

Standard

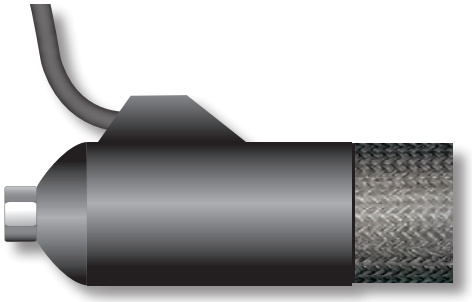


backward

Soft cap –
made of silicone or elastomer



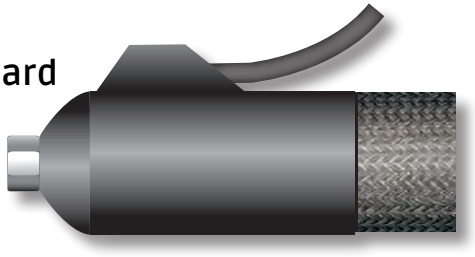
bent up



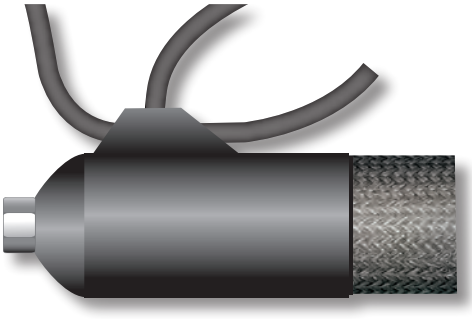
forward

hose sided or frontal

Standard



backward



combined

H 100 / H 700 / H 200 / H 800 series 250°C

Standard heating hose

Applications:

Heat-loss free transport of: oil, grease, resin, tar, paint, water, carbon dioxide, plastic, moulding compounds etc.

Deployable pressure hose made of PTFE of DN 4 – 50 mm; pressure load depending on the nominal diameter up to 600 bar.

Operating temperature	H 100 100°C	H 700 170°C	H 200 200°C	H 800 250°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)			
Rated power	Watt/metre, see type codes			
Pressure hose type	see Pressure hoses			
Connection fitting	steel / stainless steel, see Fittings			
Heating	heating conductor, structure according to DIN, moisture-proof with protective braiding			
Thermal insulation	heat stabilized, closed-pore silicone foam up to 250°C elastomer foam up to 170°C			
Outer protective braiding	polyamide, black, options possible			
Hose end caps	PA hard cap or elastomer cap			
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT100 and integral control system (HTI) possible			
Connecting cable	1.5 m			
Plug connection	round connector			
Production lengths	from 0.3 to 50 m depending on DIN			
Protection type	up to IP54 (EN 60529), protection class I			

Tolerance	
Operating temperature	±10°C

Temperature control using our controllers, in chapter Control technology.

Extended usages according to customer requirements with special equipment possible.

H 200 Special series 250°C

Heating hose for adhesive application systems

Applications:

Heat-loss free transport of: adhesives, hot-melt etc.

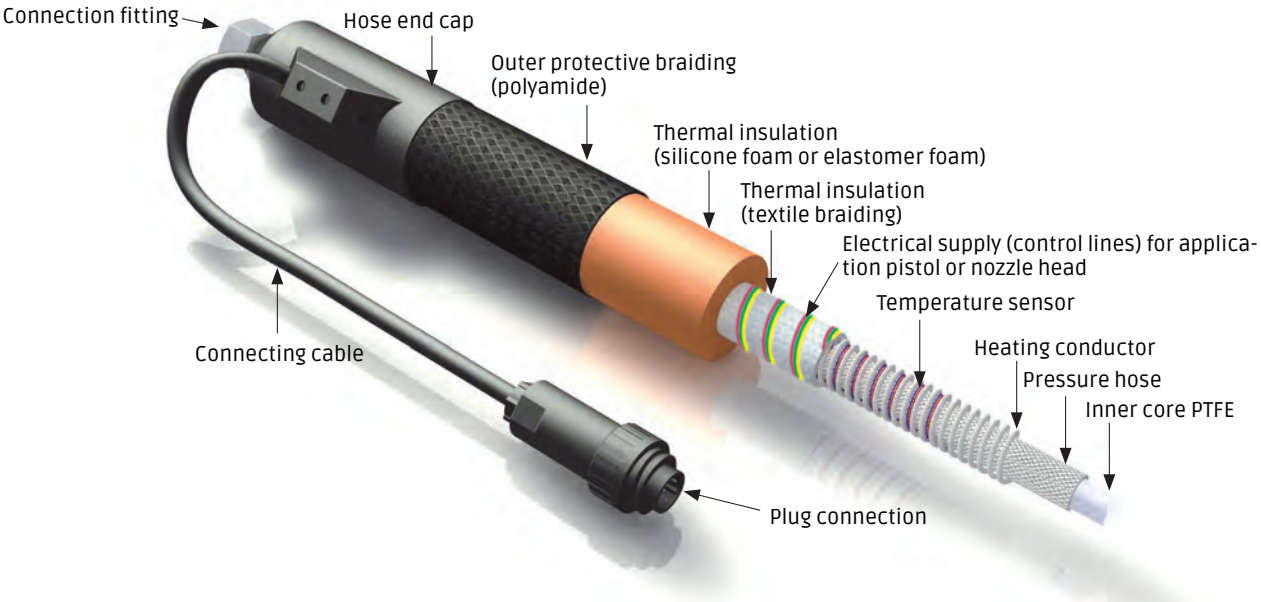
Deployable pressure hose made of PTFE of DN 4 – 50 mm; pressure load depending on the nominal diameter up to 600 bar.

Replacement hoses available for all common hot-melt application systems.

Operating temperature	100°C	170°C	200°C	250°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)			
Rated power	Watt/metre depending on selection			
Pressure hose type	see Pressure hoses			
Connection fitting	steel /stainless steel, see fittings			
Heating	heating conductor, structure according to DIN, moisture-proof with protective braiding			
Thermal insulation	heat stabilized, closed-pore silicone foam up to 250°C elastomer foam up to 170°C			
Outer protective braiding	polyamide, black, options possible			
Hose end caps	PA hard cap or elastomer cap			
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT100 Ni 120			
Connecting cable	dependent on the installation			
Plug connection	special plug dependent on the installation			
Control lines	number according to customer requirements			
Production lengths	from 0.3 to 50 m depending on DIN			
Protection type	up to IP54 (EN 60529), protection class I			

Tolerance	
Operating temperature	±10°C

Extended usages according or customer requirements with special equipment possible. (Manual - or robotic application, diffusion-sealed version).



H 800 Special

250°C

Heating hose system for co-extrusion in the plastics industry

For very high temperatures and pressure loads.

The H 800 series heating hose systems combined with the T3 PTFE series pressure hose are very often used as connection hoses between a co-extruder and a tool. Rigid connections and a multitude of connection elements are eliminated, which would normally need to be individually heated, insulated and controlled. The flexible connection considerably simplifies tool changing and maintenance. The H 800 also compensates thermal expansion and vibrations. The heating system can be easily fitted in your installation.

Operating temperature	250°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	see table below
Pressure hose type	T3 PTFE, see Pressure hoses
Connection fitting	stainless steel, 1.4305; 1.4571; 1.2316; The fitting is tapered on the inside and polished so that little or no material can stick to it. See table below
Fitting (optional)	loose and fixed flanges according to DIN and ASA are possible
Heating	heating conductor, structure according to DIN, moisture-proof with protective braiding
Thermal insulation	heat stabilized, closed-pore silicone foam up to 250°C
Outer protective braiding	polyamide, black, options possible
Hose end caps	PA hard cap or elastomer cap
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT100
Connecting cable	1.5 m
Plug connection	optional
Production lengths	from 0.3 m to 50 m
Protection type	up to IP54 (EN 60529), protection class I

Tolerance	
Operating temperature	±10°C

DN	DKS	BDN	Pressure loading capacity	Fitting inner Ø	Bend radii	Rated power
T3	preferably heavy duty series; union nut metric	union nut in inch	at 250°C operating temperature		Minimum bend radius in operating state	
8	M 20 x 1.5	G 3/8"-28	285 bar	6.0 mm	85 mm	140 W/m
10	M 22 x 1.5	G 1/2"	285 bar	7.5 mm	110 mm	160 W/m
12	M 24 x 1.5	G 1/2"	270 bar	10.0 mm	150 mm	200 W/m
16	M 30 x 2.0	G 3/4"	240 bar	12.5 mm	175 mm	260 W/m

Other fittings and nominal diameters are available in our fittings table.

Temperature control using our controllers, in chapter Control technology.

H 900 series

550°C

High temperature heating hose with T5 stainless steel pressure hose

Applications:

Heating or heat loss free transport of: oil, grease, resin, tar, paint, water, carbon dioxide, plastic, moulding compounds etc.

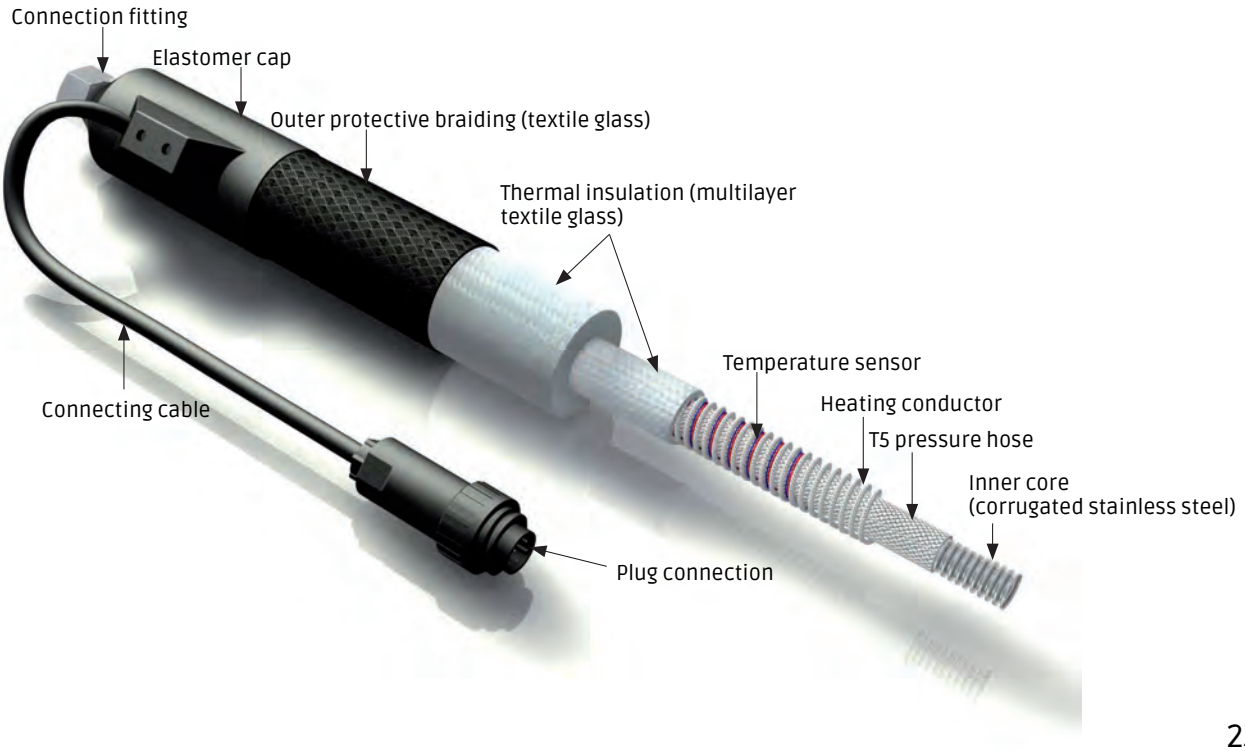
The pressurised hose made of stainless steel, corrugated version, allows very high temperatures up to 550°C. It is also diffusion sealed.

Operating temperature	350°C / 450°C / 250°C / 550°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	Watt/metre, see type codes
Pressure hose type	T5 stainless steel, see Pressure hoses
Connection fitting	see Fittings
Heating	heating conductor, structure according to DIN, glass insulated with PE conductor
Thermal insulation	textile glass
Outer protective braiding	textile glass black
Hose end caps	elastomer with strain relief and kink protection
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT100
Connecting cable	1.5 m
Plug connection	round connector
Production lengths	from 0.3 to 10 m depending on DIN
Protection type	up to IP20 (EN 60529), protection class I

Tolerance	
Operating temperature	±20°C

Temperature control using our control equipment, in chapter Control technology.

Extended applications are possible with special equipment.



H 400 series

80°C

Heated twin-hose for PU foam installations

Applications

Polyurethane foam processing. epoxy resin systems, paint spraying, dual-component casting systems.

Heating two separate pressure hoses prevents the components from cooling down during transportation from the machine to the working site and therefore not reacting together properly. A pneumatic hose made of PVC, with 6 mm inner diameter and rated for 8 bar pressure, is listed with outer protection.

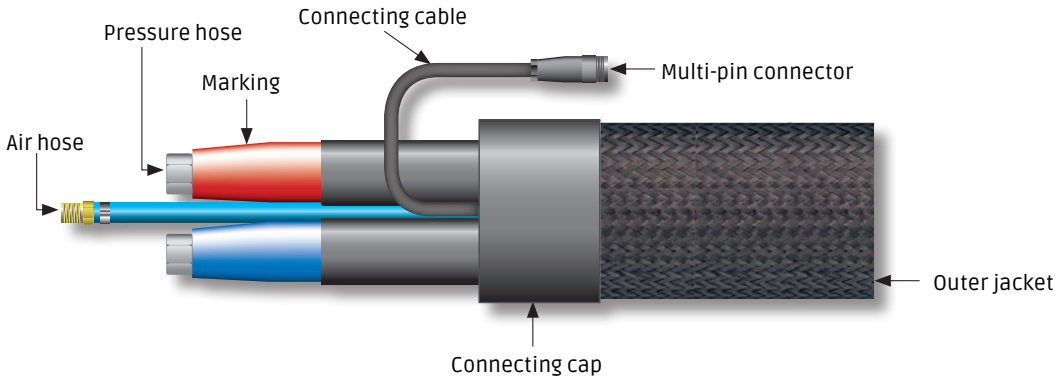
Special designs will be fabricated to your specifications.

Custom designs based on the H 100 / 200 hose series are available on request.

Operating temperature	max. 80 °C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	Watt/metre depending on configuration
Pressure hose type	T1 – T4, see Pressure hoses
Connection fitting	stainless steel / steel, see Pressure hoses
Heating	heating conductor, structure according to DIN, moisture-proof with protective braiding
Thermal insulation	inner protective hose and elastomer foam
Outer protective braiding	polyamide black, optional: Textile glass braiding
Outer diameter	approx. 70 mm / depending on DN
Hose end caps	PA hard caps
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT100 and integral control system (HTI) possible
Connecting cable	1.5 m
Plug connection	one plug / coupling per hose
Production lengths	7.5 m / 15 m / 30 m / 60 m, other lengths on request
Protection type	up to IP54 (EN 60529), protection class I

Tolerance	
Operating temperature	±10°C

Temperature control using our control equipment, see chapter Control technology



H 500 / HIF series

100°C

Heating hose with inner heater

Temperature control using heating conductor with HTI controller

Applications:

Heating low viscosity and gaseous media, such as water, oils, lyes, paints, acids or air.

The heating element inside the hose has direct contact with the media. This ensures optimum heat transfer.

This configuration means the heating hose has a small outer diameter and is very flexible.

No thermal insulation is required up to an operating temperature of 60°C.

Operating temperature	max. 100°C
Rated voltage	230 V AC
Rated power	approx. 60 W/m
Pressure hose type	PTFE DN 10 to 12 mm, T1 – T2
Connection fitting	AG or ½" union nut
Connector head	stainless steel or galvanised steel / 100 bar pressure
Heating	PTFE heating conductor, insulated
Outer protection	stainless steel braiding from the main hose
Temperature sensor	integral control system (HTI)
Connecting cable	1.5 m
Plug connection	Plug for HTI controller
Fuse protection	on-site circuit breaker (optional ex works)
Production lengths	10, 20, 40, 70 m
Protection type	up to IP54 (EN 60529), protection class I

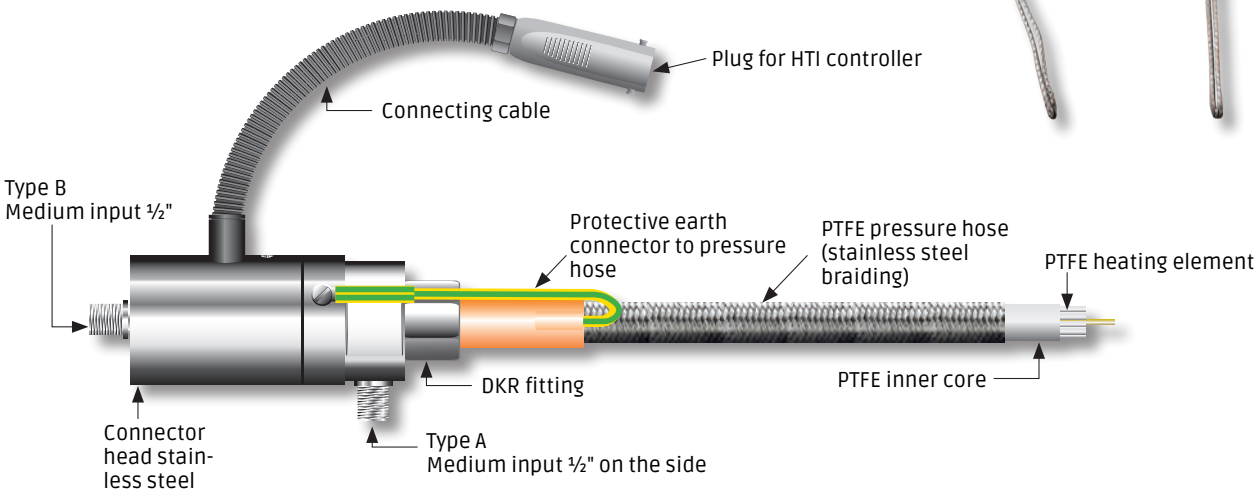
Tolerance	
Operating temperature	±5°C

Temperature control from our HTI-16 controller, see chapter Control technology.

Other pressure hoses can be offered on request.

H500 with pressure hose

HIF without pressure hose



HIE-06 / HIE-16 series

100°C

HIE-16 type with plug (for HTI-16 controller)

HIE-6 type (with HTI-6 mini controller)

Integral temperature controller HTI-16

HIE inner heater for hoses and pipes

The HIE inner heater is very well suited for pre-installed and hoses - the customer can simply insert the single wire heating conductor into them via a screw system and seal using a brass compression fitting. A T-junction is required.

Two versions of the HIE are available. HIE-6 with mini controller on the screw fitting for max. 1500 W / 230 V.

HIE-16 for a separate controller HTI-16 up to 3600 W / 230 V.

Operating temperature	max. 100°C
Rated voltage	230 V AC/DC (other voltages 115 to 400 V)
Rated power	depending on configuration 5-70 W/m
Heating conductor outer diameter	2 - 5 mm
Brass connector head	½" internal thread
Pressure-resistant	up to 15 bar
Temperature setting	0 - 100°C on controller
Temperature measure-ment	integral heating conductor HTI control system
Plug connection	HIE-06 German "Schuko" mains plug HIE-16 plug for HTI-16
Production lengths	3 - 100 m
Connecting cable	1.5 m
Protection type	IP42, cast IP44, protection class I

Operation of the HIE inner heater has to be protected with a circuit breaker. Temperature measurement using an integral controller, see chapter Control technology.

The HIE inner heater with mini controller can be used up to a length of max. 30 - 35 m.

The HIE-16 up to max. 100 m

HWI 19/25 series

80°C

Compact heating hose with integrated inner heater for drinking or waste water.

Frost protection hose for mobile water supplies in winter and under cold ambient conditions.

Applications

Container settlements, stables, washing and cleaning plants, Christmas markets, catering, agriculture, road construction, construction sites.

The heating element of the HWI hose is located directly in the medium. This direct heating technique consumes a low level of energy. This hose no longer differs visibly or in its usage from an unheated hose. A mini-controller in its connector head keeps the temperature in the hose constant above freezing point. The water hoses are approved under BT-DVGW / KTW-A and may be used for drinking water applications. For service water applications, the HWI hose is also available without plastic - drinking water approval (KTW) and is thus more economical. The hose heater is to be connected by way of a fault current circuit breaker.

Operating temperature	-20 to +80°C
Rated voltage	230 V AC
Rated power	depending on configuration 10 - 20 W/m
Outer hose	drinking water hose with BT-DVGW / KTW-A approval EPDM - waste water hose without KTW
Structure	smooth inside, outer surface is ozone and weather resistant
Production lengths	15 / 20 / 30 / 35 / 40 / 45 and 60 m
Connector fittings	GEKA-plus in brass
Pressure rating	max. 10 bar
Smallest bend radius	200 mm
Dimensions ø	19 or 25 mm, wall thickness approx. 4-5 mm
Connecting cable	1.5 m with German "Schuko" mains plug Optional: German "Schuko" mains plug with integrated fault current circuit breaker
Regulation	Control HTI-6 mini-controller set to +10°C, other temp 0-80°C on customer request, see chapter Control technology
Protection type	up to IP44 (EN 60529), protection class I

HDM 95 / 200 series

95°C / 200°C

Double-jacket heating hose / heat transfer medium

Applications:

Explosion hazard areas.

Dosing equipment, food industry, filling lines.

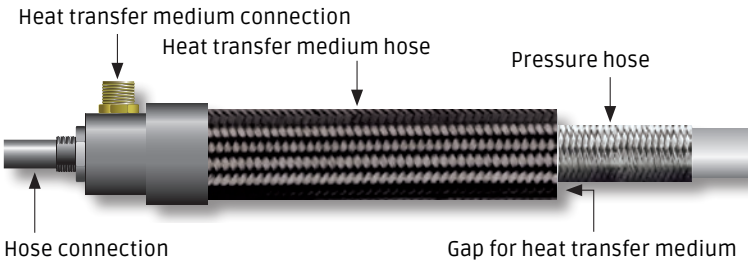
The HDM hose can be used as a HEATABLE ELEMENT, as a COOLABLE ELEMENT and as a SAFETY ELEMENT.

A temperature regulating unit which works with water or heat-transfer oil in a circulating system is required to operate HDM as a heating hose.

Operating temperature	95°C / 200°C
Pressure hose	T1 – T3, see Pressure hoses
Connection fitting	RSL pipe connector stainless steel / inner hose
Heat transfer medium connection	AGR 3/8" to 1/2"
Heat transfer hose	Elastomer hose, PTFE hose, Viton hose
Heat transfer fluid	water (70°C), oil (95/200°C)
Outer diameter	DN 4 – 10 approx. 35 mm DN 12 – 16 approx. 45 mm DN 20 – 25 approx. 55 mm
Bend radius	DN 4 – 10 200 mm DN 12 – 16 400 mm DN 20 – 25 500 mm
Production lengths	from 1 to 25 m
Option	thermal insulation with 10 mm foam insulation and PA external braiding, end caps on both sides, special pressure hose TA / DN 2 mm

* The pressure specification is valid for the heat transfer medium in the outer hose when the inner hose is filled and is under operating pressure. There must be no negative pressure difference between the outer hose and the inner hose, i.e. the pressure in the inner hose must always be higher than in the outer hose. A negative pressure difference (e.g. during filling) can cause the inner hose to collapse. If a negative pressure difference is unavoidable, the inner hose can be provided with an outer jacket. The outer jacket distributes the pressure over the stainless steel braiding and prevents the inner core collapsing.

In the case of an integrated inner pressure hose T3, only use oil or another heat transfer media. **No water! Braiding rusts!**



HDM 60 / 62 / 68 series 60°C / 200°C / 250°C

Heat transfer medium hose

Applications:

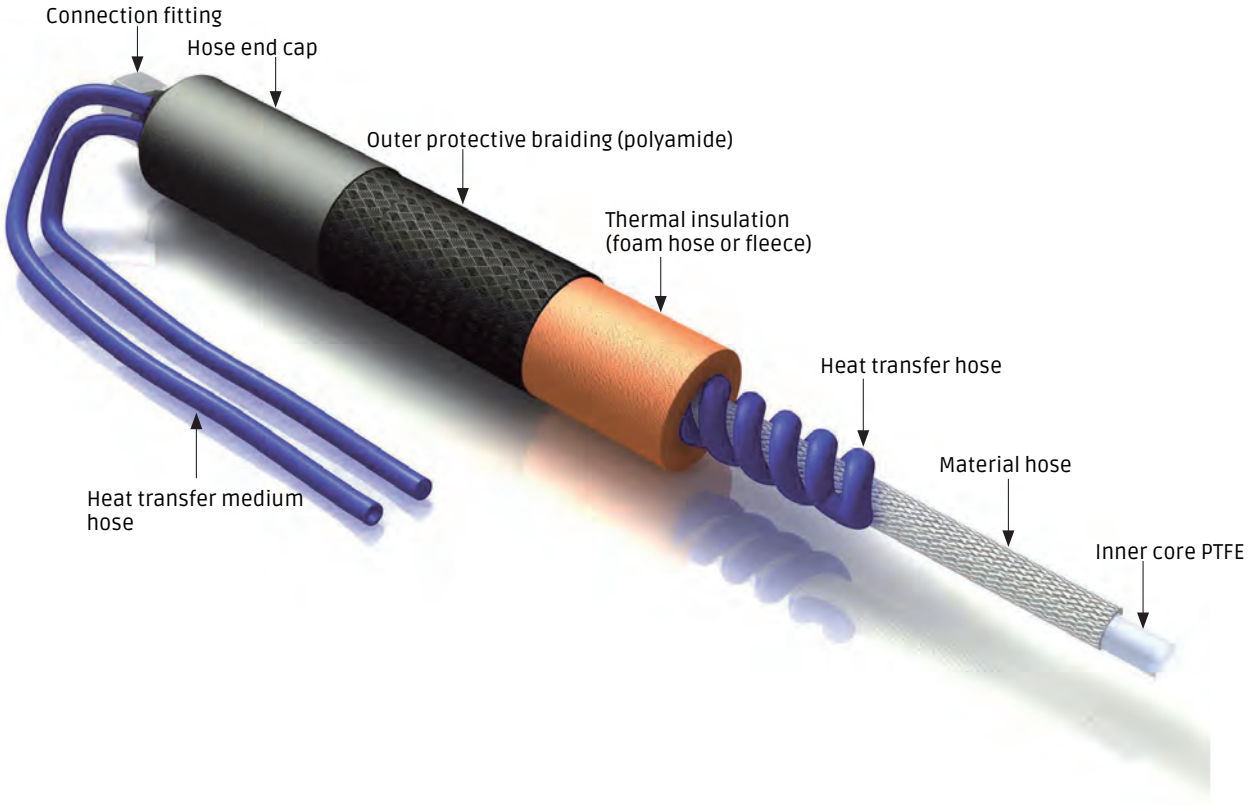
Plastics equipment, PU equipment, 2-component equipment, adhesive equipment.

The HDM hose can be used as a HEATING or as a COOLING ELEMENT and as an antistatic version is also suitable for use in explosion hazard areas.

A temperature regulating unit which works with steam, water or heat-transfer oil in a circulating system is required to operate HDM as a heating hose.

A pressure hose is tightly coiled around the heat transfer medium hose, in which the heat transfer fluid flows in order to heat the material in the material hose. This construction precludes the type of fault which would allow an intrusion of heated material from the material hose into the heat transfer circulation system to destroy the temperature regulating unit.

Operating temperature	60°C / 200°C / 250°C
Pressure hose	T1 – T4, see Pressure hoses
Connector fittings material hose	see Fittings
Execution	HDM 60: PUR 6 mm Ø 60°C HDM 62: PTFE 6 mm Ø 200°C HDM 68: PTFE 6 mm Ø 250°C
heat transfer medium hose	Single or double ended extending 1.0 m out of the material hose
Heat transfer fluid	water (70°C), oil (60/200/250°C), steam (164°C) 8 bar max.
Production lengths	1 – 25 m
Connector fittings heat transfer hose	AG ¼", ¼" union nut special fittings possible
Thermal insulation	fleece of foam hose
Outer protective braiding	polyamide black
Hose end caps	PA hard cap or elastomer cap



HR series

600°C

Heated pipe, tanks, valves

Applications:

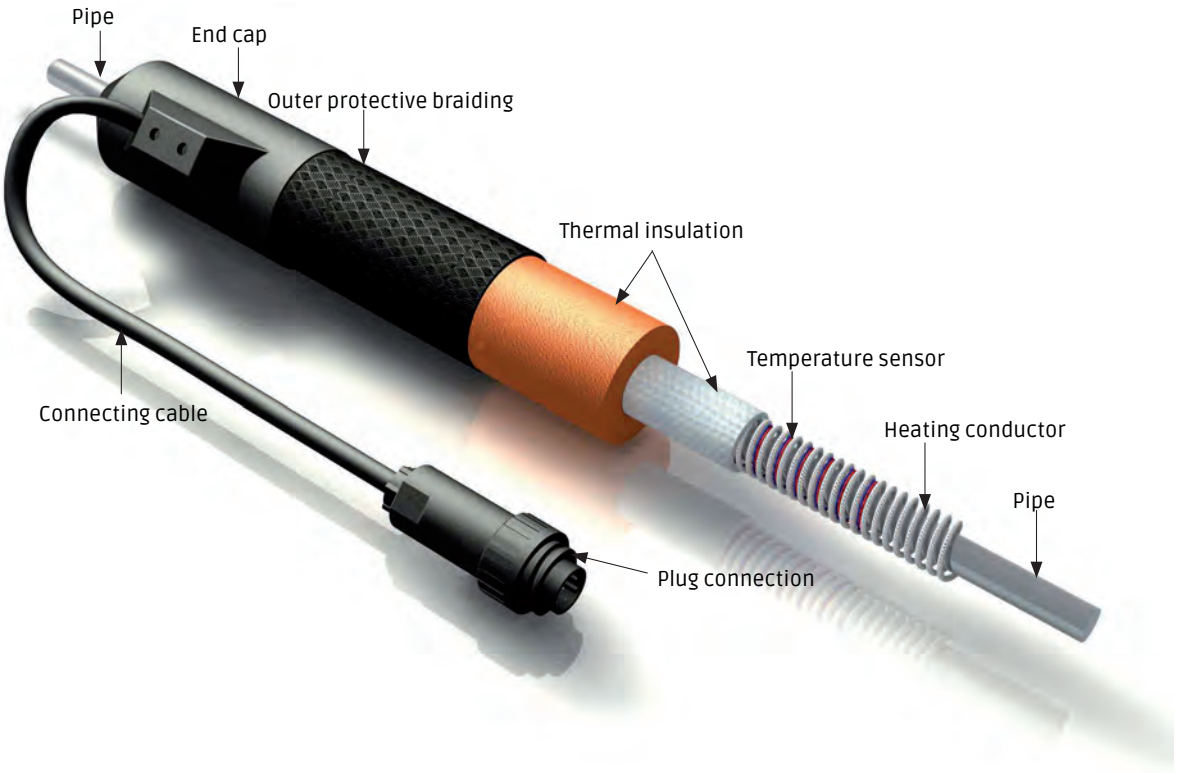
Filters, valves, measuring gas distributors, cold zones and tanks.

The HR series is manufactured in consultation with the customer and is specially matched to the respective application. Pre-formed pipes can be provided by the customer.

They are heated and insulated as straight pipe systems or in various shapes. With a multitude of heat transfer materials in stock, the pipes can be optimally matched to the different operating temperatures ranging from frost protection to 600°C. Optimal outside protection and end caps round off the system.

Operating temperature	from frost protection to 600°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	depending on the configuration
Nominal diameters	4 – 100 mm
Pipe materials	metal, glass, quartz, plastic, etc.
End caps	PA hard cap, elastomer or aluminium cap
Built-on accessories	heated, thermally insulated with outer jacket
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT100 and integral control system (HTI) possible
Connecting cable	1.5 m
Plug connection	optional

Temperature control using our controller equipment, see chapter Control technology.



HFM series – flexible heating jackets

600°C

The flexible heating jackets are constructed from heating tape and insulation and are suitable as trace heaters for customer pipes, also pre-shaped pipes. Heating of bundles of pipes is also possible.

The HFM heating jackets are slid onto the pipes to be heated, so the customer has a heating system that is easy to install and can be replaced.

Operating temperature	from frost protection to 600°C
Rated voltage	230 V AC (other voltages up to 500 V)
Rated power	depending on configuration
Heat insulation	up to 250°C silicone up to 450°C textile glass up to 600°C silicate fibre
Heating jacket	lengths 0.3 m up to approx. 10 m; optionally can also be split into individual segments, so that greater lengths or complete installations can be incorporated in the system.
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT100 and integral control system (HTI) possible
Pipe diameter	from capillary to 50 mm outer diameter (larger diameters on request)
Inner hose	flexible metal corrugated hose
Bend radii	adaptable to the heating system
Connecting cable	1.5 m
Plug connection	optional

Temperature control using controller equipment, see chapter Control technology.

SIM series

150°C

Clip attachment tracer heater for heating thin pipes and hoses

This tracer heater for thin steel and copper pipes, as well as for hoses, consists of a silicone profile with parallel heating elements.

The slotted shape enables pre-installed pipe systems, e.g. in analytical cabinets, to be heated without having to dismantle them. This saves considerable assembly costs.

The version presently available covers piping from 4-12 mm OD. The lengths and power ratings are flexibly adapted to customer requirements. The tracer heaters are therefore very easy to replace.

Operating temperature	-20 to +150 °C
Rated voltage	12 - 230 V AC/DC
Rated power	depending on configuration 50 - 100 W/m
Heating	heating conductor, structure according to DIN, moisture-proof with protective braiding
Thermal insulation	heat-stabilised closed-pore silicone hose
Outer protection	silicone profile smooth
Pipe diameter	4 - 12 mm
End cap	PA hard cap / at the connecting end
Temperature sensor	PT100
Connecting cable	1.5 m
Plug connection	optional
Production lengths	max. 5 m
Protection type	up to IP54 (EN 60529), protection class I

HDM 90 / 200 series

90°C / 200°C

PTFE smooth hose T46

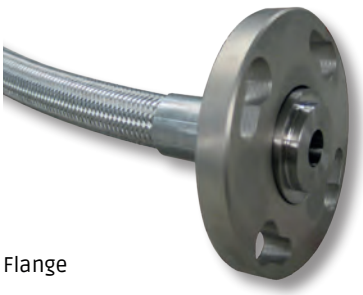
Transfer and delivery hoses with large nominal diameters DN > 200 mm

HE heating hose has a special structure, which makes it suitable for its special structure makes it suitable for maintaining the temperature of the most diverse types of media, such as chemicals, solvents, oils, greases, and abrasive materials etc. For example, this heated hose can be used for loading and delivery of lorries and ships. An antistatic version is also optional.

Operating temperature	90°C / 200°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	depending on the configuration
Nominal diameters	20 to 200 mm
Pressure hose type	rubber (NR, NBR, EPDM, SBR), plastic hose (PTFE, PUR, PA, PE), stainless steel corrugated hose Optional: steel spring spiral / suction hose
Outer cover	abrasion resistant, weather resistant
Hose end caps	PA hard cap, elastomer or aluminium cap
Couplings / fittings	flange, couplings: Storz, TW, Kamlok, external thread special fittings: on request
Temperature sensor	PT100
Connecting cable	1.5 m
Production lengths	up to max. 40 m
Protection type	up to IP44 (EN 60529), protection class I

A range of devices is available for temperature control. The line extends from the HT 54 integral mini-controller with fixed temperature setting to convenient microprocessor controlled devices. See chapter Control technology for more detailed information.

Lever arm coupling



Flange

Tanker lorry

HL 40 / 80 series

40°C / 80°C

Heating hose with vulcanised heating conductor Approval for foodstuffs

The HL foodstuffs hose stands out by virtue of its innovative construction. The heating element is spiral-wound on the NBR hose core and thus lies vulcanised in the inner hose material. This hose does no longer differs visibly or in its usage from an unheated hose, thus handling is simplified considerably. A temperature sensor is also integrated into the hose which measures temperature directly in the hose wall. Suitable for transporting fatty and non-fatty foodstuffs, as well as passing alcoholic and non-alcoholic beverages.

Operating temperature	40°C / 80°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	see table below
Pressure hose structure	light NBR core, tension and compression-resistant fabric inserts, smooth inside surface, outer smooth textile patterned
Outer cover	abrasion resistant, weather resistant
Colour outer cover	blue/white or according to customer requirements
Connection fitting	bubble-free vulcanised and heated stainless steel fitting, milk pipe screw connector / RD
Optional fittings	conical hose connector, grove nut, threaded hose connector, flange (aseptic), clamp connector
Temperature sensor	integrated heating element with PT100 sensor
Connecting cable	1.5 m
Cleaning	short duration steam cleaning up to 130°C suitable for CIP and conventional cleaning
Protection type	up to IP44 (EN 60529), protection class I
Manufacturing length	up to max. 40 m

All the hose materials used meet the requirements (EC) no. 1935/2004 of the instructions from the Federal Institute for Risk Assessment (BfR) (Recommendation XXI, cat. 2) and FDA CFR § 177.2600 Approval for foodstuffs.

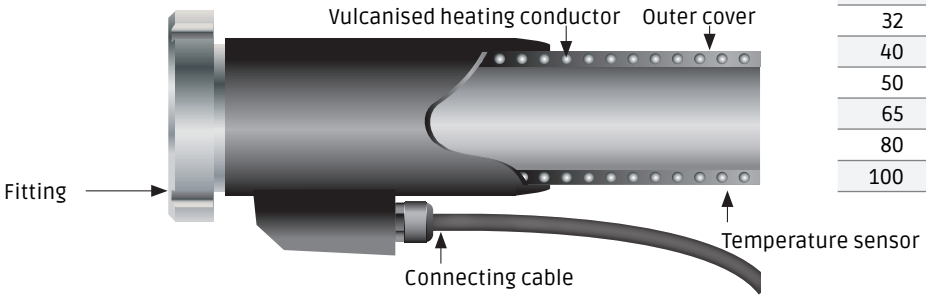
On request, we can also supply suction and pressure hoses with steel coil. Special hoses made of fluoropolymer (Viton) can be fabricated for higher temperatures. Connections with flanges, quick couplings or outer treads are also available on request.

A range of devices is available for temperature control. The line extends from the mini-controller with fixed temperature setting to convenient microprocessor controlled devices. See chapter Control technology.

milk hose thread / RD

DN (mm)	Fitting (RD)	Wall (mm)	BD (bar)	Bend radius approx. (mm)
20	44 x 1/6"	6	10	150
25	52 x 1/6"	6	10	175
32	58 x 1/6"	6	10	225
40	65 x 1/6"	7	10	280
50	78 x 1/6"	7	10	350
65	95 x 1/6"	7	10	455
80	110 x 1/4"	8	10	560
100	130 x 1/4"	8	10	700

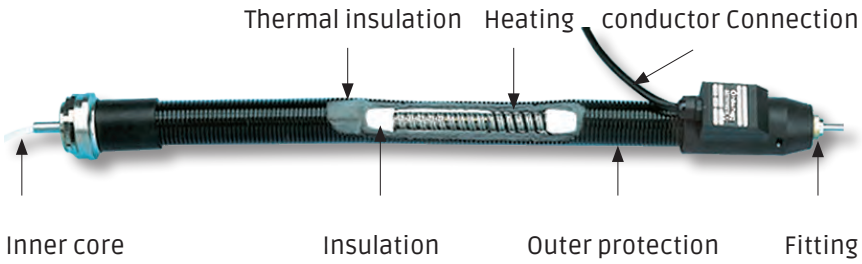
DN (mm)	Power HL 40 (W/m)	Power HL 80 (W/m)
20	30	50
25	40	60
32	50	75
40	60	90
50	75	120
65	90	150
80	110	200
100	140	250



Analytical heating hoses

Heating hose	Sensor	Outer protection	Fitting	Temperature
3 = H 300	0 = Fe-CuNi 1 = Fe-CuNi + limiter 2 = PT 100 3 = PT 100 + limiter 4 = NiCr-Ni 5 = NiCr-Ni + limiter 6 = limiter 7 = without sensor 8 = HTI controller 9 = PT 100 + 2nd PT 100	0 = polyamide standard braiding 1 = stainless steel braiding 2 = galv. steel braiding 3 = PA corrugated hose 4 = metal ring corr. hose 5 = textile glass braiding 6 = PU corrugated hose 7 = silicone outer skin 8 = rubber hose	0 = without 6 = RSL/V4 A A = H 300 A B = H 300 B C = H 300 C	100 °C 170 °C 200 °C 250 °C 350 °C

H [ ] [ ] [ ] [ ] – Nominal length in dm – DN - [ ]



Rated power Watt/metre at 230 V ~ for the H 300 series analytical heating hoses

Type	DN mm	4	6	8	10	12
H 300	200°C	100	120	140	160	200
H 300 A+C	200°C	120	140	160	200	260
H 300	350°C	200	220	250	280	310
H 300 A	350°C	220	250	280	310	400

Tolerances

Rated power / rated voltage	+ 5% / -10%
Diameter	± 10%
Length	± 2%
Test voltage for heating hoses (230 V measurement voltage)	2000 Volt high voltage test heating conductor – PE conductor

Inner core (or pipe) for the H 300 analytical heating hose series

PFA or PTFE 250 °C
Core with 1 mm wall thickness

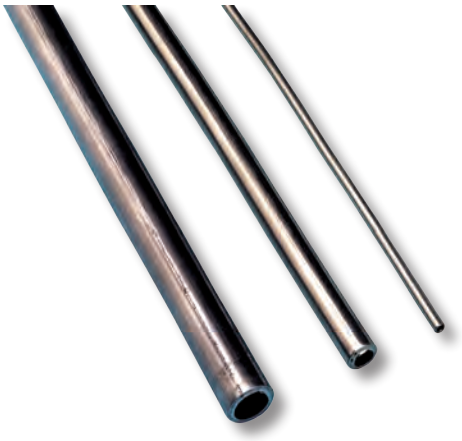
DN mm	4	6	8	10	12
Minimum bend radius / mm***	200	250	300	350	400
Pressure / bar**	12	9	7	6	5

Vacuum 8 mbar

VA stainless steel 350°C
inner core with 1 mm wall thickness (1.4571)

DN mm	4	6	8	10	12
Minimum bend radius / mm*	300	350	400	500	600
Pressure / bar*	60	60	50	50	40

Vacuum 50 mbar

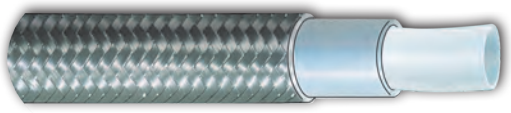


PFA or PTFE 250°C
core type TA with braiding layer of soft steel. Optional with replaceable core

DN mm	2	4	6	8	10	12
Minimum bend radius / mm***	40	50	75	100	120	130
Pressure / bar* with industial fitting	20	20	20	15	15	15
Pressure / bar** without fitting	20	12	9	7	6	5

Vacuum 8 mbar. The braiding layer reduces the risk of the core kinking

Rigid core TA



Replaceable core TA

The inner cores are partly also available in inch dimensions.

PTFE = polytetrafluoroethylene
PFA = perfluoroalkoxy

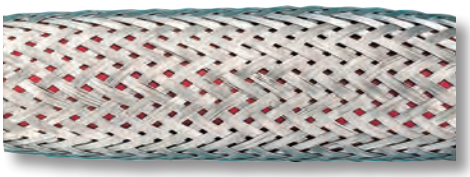
* temperature correction factor 100°C x 0.9; 200°C x 0.8; 250°C x 0.7; 350°C x 0.6
** temperature correction factor 100°C x 0,68; 150°C x 0,53; 200°C x 0,39; 250°C x 0,28
*** Minimum bend radius in static operation in millimetres
Cores made of stainless steel may be used virtually without limitation in the range -190°C to max. +550°C for liquids and gaseous media in all industries, and are completely diffusion resistant; not suitable for chlorides, bromides and other halogens.

All basic hoses are subjected to a pressure test after installing the fitting if technically possible (double the operating pressure). A heater element with a close pitch is mounted or a heating tape (H300B type) depending on the model. Heater elements can be encapsulated with polyolefin, silicone, fluor plastic (FEP, PFA, PTFE...), glass fibre and mineral insulation, and may or may not include earth-wire sheathing.

PA standard protective braiding

Material	PA 6, polyamide
Temperature stability	+150°C *

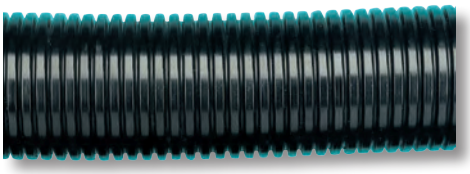
Very flexible, available in various colours



Metal protective braiding

Material	steel, galvanised or stainless steel
Temperature stability	+300°C to +500°C *

Very flexible, very good protection against abrasion



PA corrugated hose / PUR corrugated hose

Material polyamide	PA6	optional PA12	PUR
Temperature stability	+120°C *	+100°C	+90°C

Very flexible, non-crush, flame-retardant, non-halogen

PUR corrugated hose with steel coil

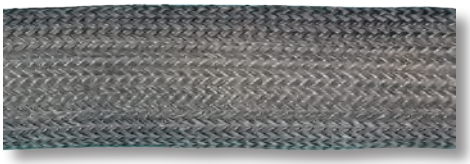
Material	PU (polyurethane)
Temperature stability	+90°C *

Very flexible, non-crush, flame-retardant, non-halogen

Metal ring corrugated hose

Material	steel, galvanised
Temperature stability	+250°C *

Very flexible, non-crush, very resistant against sharp objects and swarf



Textile glass braiding

Material	textile glass - black
Temperature stability	+400°C *

Very flexible, very good protection against abrasion, protection against falling glowing swarf etc.

Silicone outer skin

Material	silicone smooth - black/white
Temperature stability	+200°C *

Very flexible, smooth surface, easy-to-clean, moisture-proof

* The temperature stability relates to brief contact with a correspondingly hot environment. In case of prolonged use above the operating temperature of the external protective hose, the structure of the heating hose must also be changed accordingly.

Also partly available antistatic

For H300 B series heating hoses

End cap made of silicone
Connection cable 3 m long
H 300 B B-S

Ends caps made of polyamide with terminals in the hard cap
Available as a self-assembly set
H 300 B-K

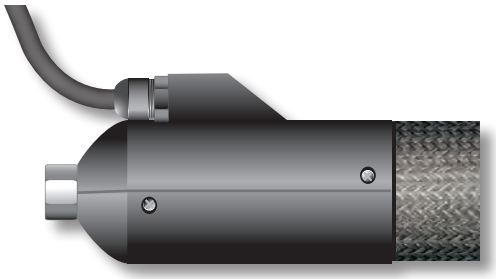
Terminal with KV screw connector on the end.
H 300 B-KVE

Terminal with sliding KV screw connector.
H 300 B-KV

All end connections technologies can be combined with each other.

H 300 B
On a cable drum

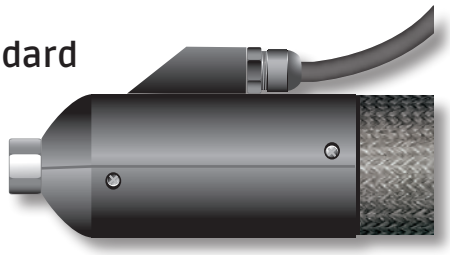
Hard cap –
made of polyamide PA6
glass-fibre reinforced



forward

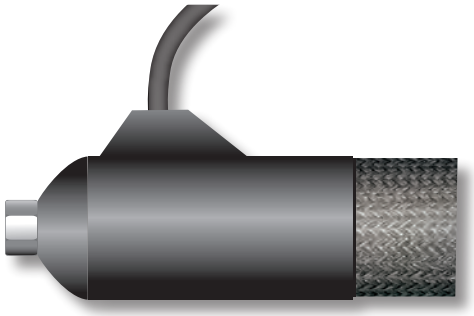
hose sided or frontal

Standard

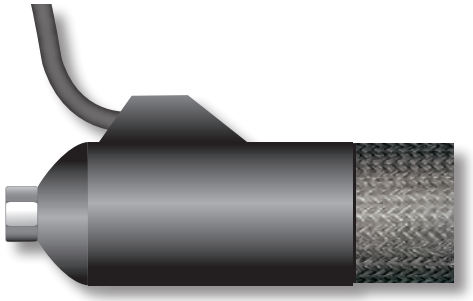


backward

Soft cap –
made of silicone or elastomer



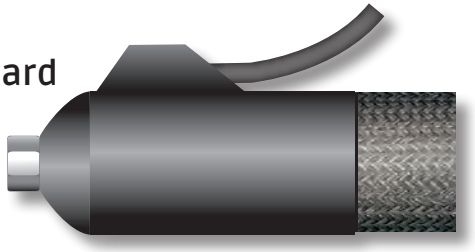
bent up



forward

hose sided or frontal

Standard



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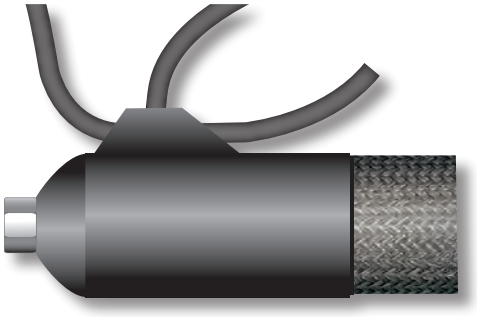


combined

H 300 series

350°C

Analytical sample gas lines with RSL fitting

Application potential:

Maintaining the temperature of motor exhaust, CO_2 measurements, industrial exhaust gasses, blast furnace exhaust gasses, air testing, environmental testing, etc.

This heated sample-extraction line prevents condensation from forming or a temperature drop below the dew point, thus no gas components are eliminated or lost.

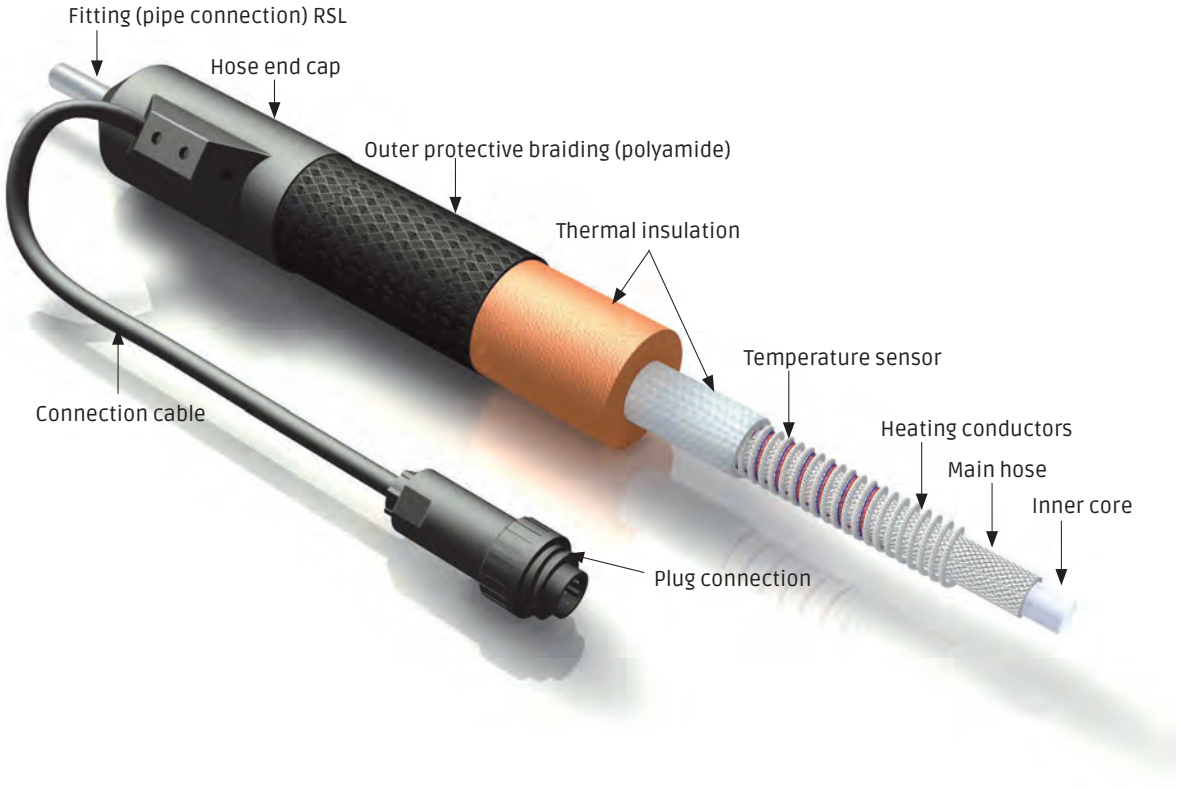
Operating temperature	100°C / 200°C / 250°C / 350°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	Watt/metre, see type codes
Inner core **DN 4 – 12 mm**	up to 250°C PTFE or PFA above 250°C stainless steel see Inner cores analytics
Connection fitting	RSL 1.4571 steel, for cutting ring screw, without transition, see table
Heating	heating conductor, structure according to DIN, moisture-proof with PE conductor braiding; > 250°C not moisture-proof
Thermal insulation	depending on the operating temperature heat stabilized, close-pore silicone foam or thermal fleece, elastomer foam
Outer protective braiding	polyamide black, options - see Outer protection
Hose end caps	PA hard cap or elastomer cap
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT 100 and integral control system (HTI) possible
Connection cable	3 m
Plug connection	according to specification
Production lengths	up to 100 m
Protection type	IP44 (EN 60529), protection class I

Tolerance	
Operating temperature	±10°C

RSL

Pipe connection for cutting ring screw

DN	RSL L (mm)	d (mm)
4	25	6
6	25	8
8	26	10
10	26	12
12	28	15



H 300 A series

350°C

Analytical sample gas lines with replaceable inner core and cable screw fitting.

Application potential:
Maintaining the temperature of probe lines for motor exhaust, CO_2-measurements, industrial exhaust gasses, blast furnace exhaust gasses, air testing, etc.

The core of this heating hose runs uninterrupted and unrestricted from the extraction point to the analysis unit.

Threaded cable fittings on both ends simplify assembly on housings.

This version permits quick on-site replacement of the inner core if the inside walls are contaminated.

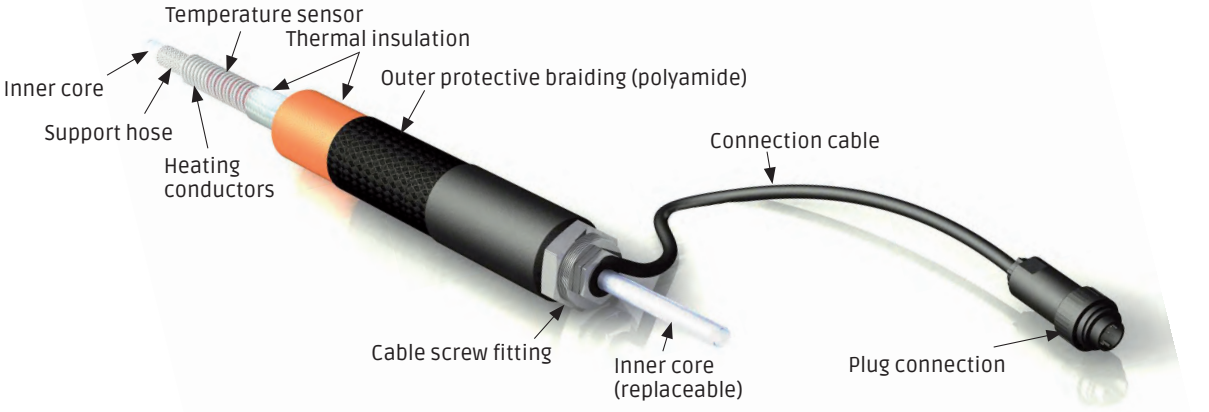
Operating temperature	100°C / 200°C / 250°C / 350°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	Watt/metre, see type codes
Inner core **DN 4 – 12 mm**	up to 250°C PTFE or PFA above 250°C stainless steel - see Inner cores analytics 100 mm protruding on both sides **seamless**
Heating	heating conductor, structure according to DIN, moisture-proof with PE conductor; > 250°C not moisture-proof
Thermal insulation	depending on the operating temperature heat stabilized, close-pore silicone foam or thermal fleece, elastomer foam
Outer protective braiding	polyamide black, options - see Outer protection
End of hose **KV screw connector**	Strain relief from cable screw fitting, bore hole Ø 42 mm DN 4 – 6 bore hole Ø 52 mm DN 8 – 12 bore hole Ø 65 mm DN 16
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT 100 and integral control system (HTI) possible
Connection cable	3 m
Plug connection	according to specification
Production lengths	up to 50 m
Protection type	IP44 (EN 60529), protection class I

Tolerance	
Operating temperature	±10°C

Temperature control using our controllers, in chapter Control technology.

Extended applications are possible with special equipment.

Diffusion proof on special request.



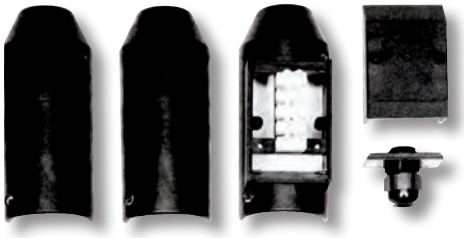
H 300 B series

120°C

Analytical sample gas lines, cut to size with PTFE inner core, available on reels of by the metre

For user assembly on the construction site:
H 300 B heating hoses are available as meter goods up to a length of 150 m. This makes it possible for the customer to determine hose lengths for themself "from the roll". In combination with our H 300 B-K assembly set, the end connections can be fitted on-site. Heating tapes are used for heating.

The H 300 B heating hoses with **HBR semiconductor heating tapes** limit their power on heating. The temperature attained depends on the environmental conditions, A temperature controller may be required, depending on the application, as too high temperatures destroy the semiconductor layer. If temperature differences occur along sections of routed heating hoses, the heating power adapts to the environmental temperature from section to section. This ensures uniform heating overall.



H 300 B-K assembly set end connection Option

Operating temperature depending on the selection of heating tape	Data relate to an outside temperature of approx. +10°C - see table below
Rated voltage	230 V AC (other voltages on request)
Inner core DN 4 – 12 mm	PFA, PTFE or stainless steel - see Inner cores analytics, Option: replaceable core
Connection fitting	cores protruding, seamless
Thermal insulation	thermally stabilised, close-pore foam or thermal fleece
Outer protection	PA corrugated hose
Hose end caps	PA hard cap or elastomer cap separate assembly set optional
Temperature sensor	Fe-CuNi, PT 100 or HTI optional
Outer diameter	42 mm, ±10%
Production lengths	up to 150 m - see table below
Protection type	IP44 (EN 60529), protection class I

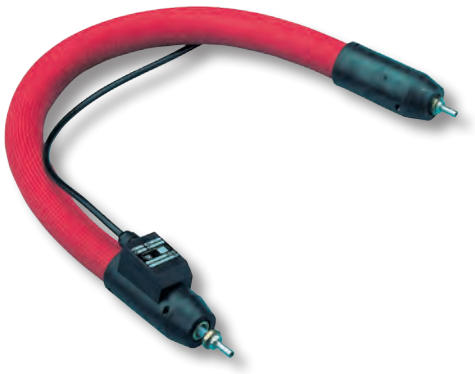
Technical data H 300 B Analytical lines at +10°C outer temperature:

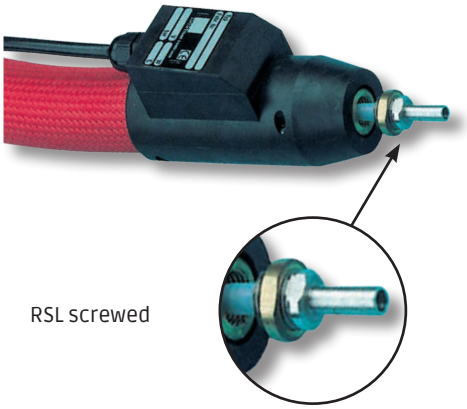
	Watt/m	can be cut to size at intervals of	Holding temp.	max. heating circuit length**
Limited heating tape HBR  reduced power on heating	10 17 25 31 40 60	can be cut to size for each length	35°C 40°C 50°C 60°C 90°C 120°C	150 m 130 m 100 m 70 m 60 m 40 m

*HTI / system ** at 16A

H 300 C series

250°C





RSL screwed

RSL

Pipe connection for cutting ring screw

DN	RSL L (mm)	d (mm)
4	25	6
6	25	8
8	26	10
10	26	12
12	28	15

Analytical sample gas lines with replaceable PTFE inner core and screwed fitting

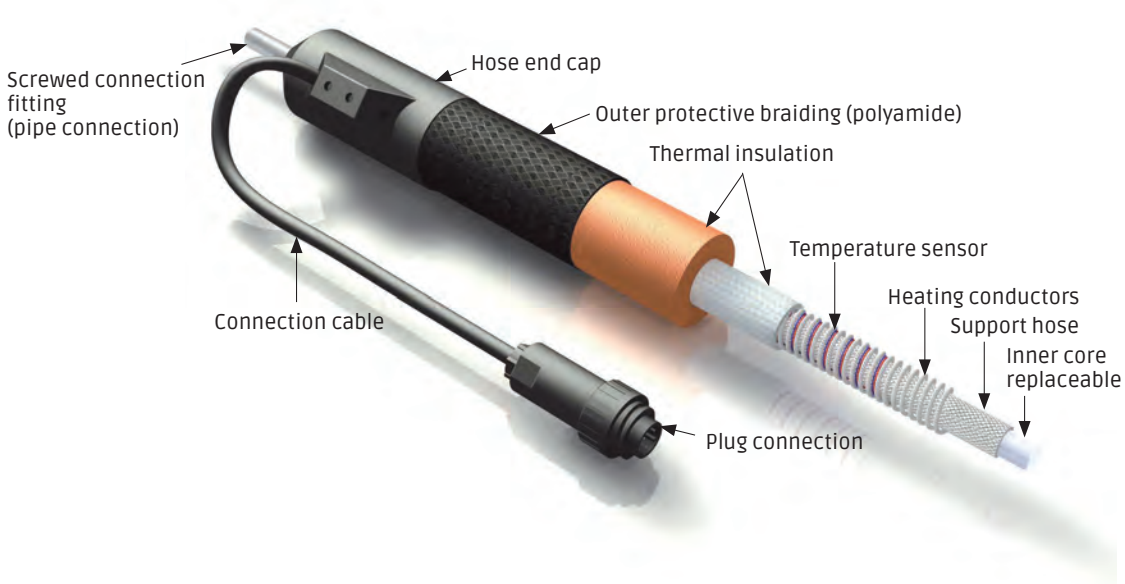
Application potential:
Maintaining the temperature of probe lines for motor exhaust, CO_2 measurements, industrial exhaust gasses, blast furnace exhaust gasses, air testing, etc.

The special fittings made of 1.4571 steel prevent the movement or kinking of the PTFE core at the end of the analysis heating hose. A clamping ring fitting can be attached. Strain relief is accomplished by way of the outer braid.

Operating temperature	max. 100°C, 200°C, 250°C
Rated voltage	230 V AC/DC (other voltages up to 500 V)
Rated power	Watt/metre, see type codes
Inner core **DN 4 – 12mm**	PFA or PTFE. see Inner cores Analytical
Connection fitting	RSL special fitting 1.4571 stainless steel, screwed without transition
Heating	heating conductor, structure according to DIN, moisture-proof with PE conductor
Thermal insulation	heat stabilized, closed-pore silicone foam, thermal fleece or elastomer foam
Outer protective braiding	polyamide black, options - see Outer protection
Hose end caps	PA hard cap or elastomer cap
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT 100 and integral control system (HTI) possible
Connection cable	3 m
Plug connection	according to specification
Production lengths	up to 100 m
Ingress protection	IP44 (EN 60529), protection class I

Tolerance	
Operating temperature	±10°C

Temperature control using our controllers, in chapter Control technology.



HAF series

200°C

Heating hose with integrated filter

Application potential:
Portable measuring instruments, TÜV (technical inspection agencies) application.

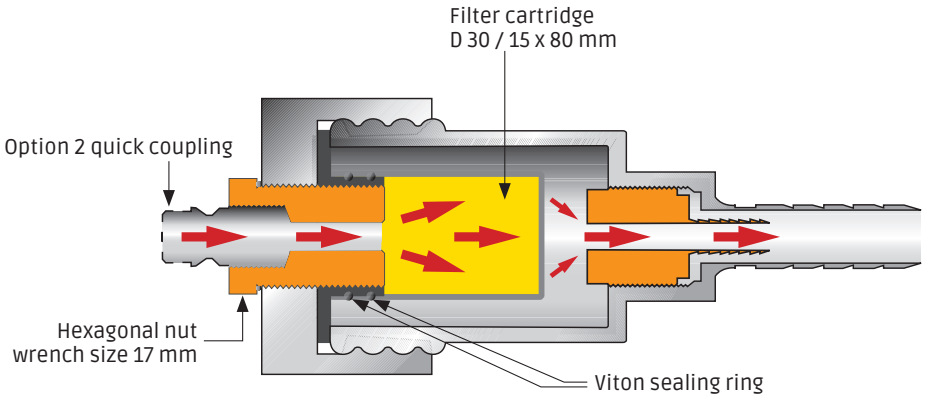
Analytical heating hoses with integrated filter are an advanced development of the previous separated systems of heated hose and heated filter section. This version was preferentially designed for use with portable measuring instruments. For this purpose, special importance was placed on a light and flexible construction. The version shown is designed for this application.

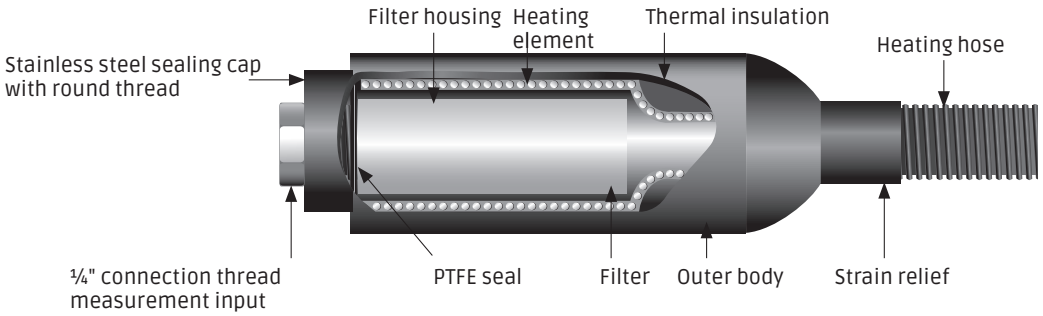
HAF specification
Test gas pipes (PTFE core DN 2 or DN 4) and **control lines** can be built into this system as options. The filter housing is made of 1.4571 steel. Versions in Hasteloy or with **PTFE coating** are also possible. The heating hoses can be connected to all our controller types (see chapter Control technology). Our **HTI integral system** is preferred. Temperature measurement is performed on the filter housing for all other control systems.

For general use, the filter housing can be adapted to other filter dimensions, other hose diameters and hose lengths so that this new development can be matched to all our existing analytical heating hose systems and covers the **complete range of analytical technology**.

Inner core PTFE:

Nominal diameter	fixed	replaceable
8	X	
4	X	X





HMI series

200°C

Mini heating hose

Applications:

In analytical technology for portable measuring systems; connection hoses in medical technology in all application areas; for maintaining the heat of a medium.

The HMI mini heating hoses are a miniaturized version of our standard H300 hose series. The structure is similar, only less thermal insulation is used.

Operating temperature	max. 200°C
Rated power	individually adaptable
Rated voltage	low voltage and mains voltage
Main hose type	PTFE cores, silicone-Viton hoses, capillaries made of stainless steel and copper, plastic hoses made of PA/PP/PE/PVC/...
Outer diameter	min. 20 mm possible
Available execution	self-limiting, with in-built (customer-specific) sensor. with connection to an HTI integral controller

Depending on the application, the outer jacket consists of an SI hose, red-brown/black or a closed PA corrugated hose.

The end connections are silicone moulded parts and tapered or cast shapes.

SIM series

150 °C

Clip attachment trace heater for heating thin pipes and hoses

This trace heater for thin steel and copper pipes, as well as for hoses, consists of a silicone profile with parallel heating elements.

The slotted shape enables pre-installed pipe systems, e.g. in analytical cabinets, to be heated without having to dismantle them. This saves considerable assembly costs.

The version presently available covers piping from 4-12 mm OD. The lengths and power ratings are flexibly adapted to customer requirements. The tracer heaters are therefore very easy to replace.

Operating temperature	-20 to +150°C
Rated voltage	12 - 230 V AC/DC
Rated power	depending on configuration 50 - 100 W/m
Heating	heating conductor, structure according to DIN, moisture-proof with protective braiding
Thermal insulation	heat-stabilised closed-pore silicone hose
Outer protection	silicone profile smooth
End caps	PA hard cap single ended
Temperature sensor	PT100
Connection cable	1.5 m
Plug connection	according to specification
Production lengths	max. 5 m
Protection type	up to IP54 (EN 60529), protection class I

Heated hose junctions 200°C

If you have an unheated fitting and need to keep your medium at the right temperature, then our HIH heating sleeve is the right solution.

Application potential:

Interconnection of heating hoses, connection of heating hose system, feeders in the heating hose system, or as an adapter between different fittings.

HIH heating sleeve

Operating temperature	200°C, maximum
Rated voltage	230 V AC/DC (other voltages 12 to 500 V)
Power rating	Sleeve Ø 22 mm = 12 W Sleeve Ø 40 mm = 24 W

The rated power is designed so that heating hoses are set to operating temperatures of up to 200°C and the temperature in the connector component does not drop. For this reason, in the majority of cases HIH does not need any controller, although it can be fitted with one if required.

Type	Inner Ø	Heated length	Total length
HIH – 08	22 mm	70 mm	96 mm
HIH – 16	40 mm	90 mm	120 mm

For special applications, the sleeves can be provided with outlets. These permits special feeder types. Other dimensions are available.

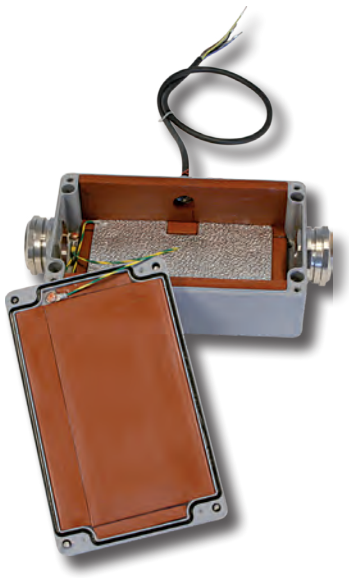
HI insulation sleeve without heating

Type	Temperature	Inner Ø	Total length
HI – 08	200°C	22 mm	70 mm
HI – 16	200°C	40 mm	90 mm

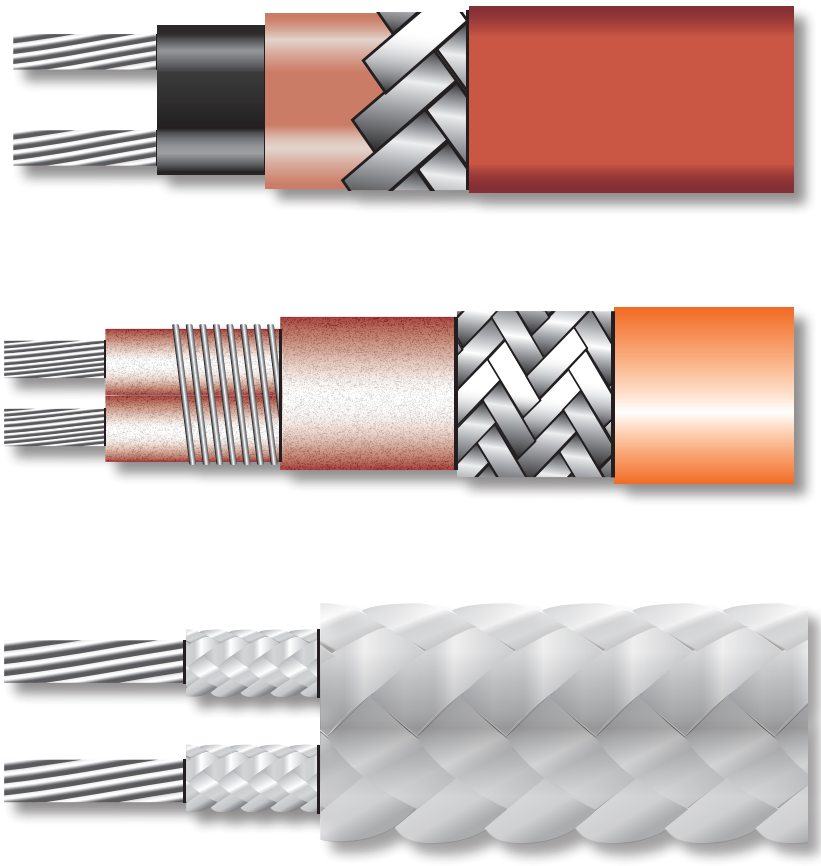
with loop fastening Other dimensions are available.

Hot box

Housing with integrated heater for loss-free thermal connection to analysis lines made with robust metal casing.



Operating temperature	max. 250°C
Rated voltage	230 V AC/DC (other voltages 12 to 500 V)
Power rating	adapted to design requirements
Dimensions	adapted to design requirements
Insulation	10 mm silicone foam
Temperature sensor	optional
Connection cable	3 m
Temperature regulators	see chapter Control technology



Type HST

250°C

Moisture-proof heating cords of small diameter

HST is a PTFE-insulated, inexpensive heating cord for heating pipes of small diameter, area etc.

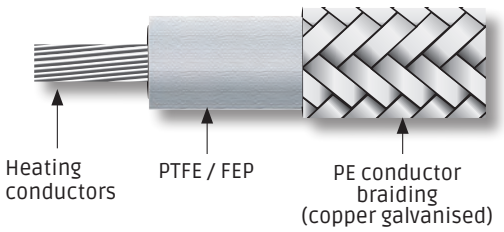
The connecting cables are PTFE insulated.

The heating cord is moisture-proof and protective earthed (PE).

Operating temperature	max. 250°C (integral controlled HTI 150°C)
Rated voltage	230 V AC/DC (special voltages possible)
Minimum bend radius	4 mm
Connection cable	1.5 m single-wires at both ends
Diameter	Ø 2.5 – 3.5 mm
Protection type	IP54 (EN 60529), protection class I
PE conductor braiding	copper nickel-plated, moisture-proof

With a **spacer tape** the heating cord can be fixed in place for surfaces and cylindrical heating, see Accessories.

Our HTI integral controller, which is controllable without a sensor, is recommended. Further information, see chapter Control technology.



Metres	Watt	Order no.
4.5	125	HST/045
5.5	135	HST/055
6.0	125	HST/060
8.0	220	HST/080
9.0	195	HST/090
12.0	275	HST/120
14.0	235	HST/140
14.0	360	HST/141
15.0	335	HST/150
16.0	315	HST/160
17.0	300	HST/170
20.0	510	HST/200
30.0	700	HST/300
35.0	600	HST/350
38.0	1000	HST/380
42.0	900	HST/420
48.0	790	HST/480
50.0	1200	HST/500
58.0	1400	HST/580

In addition to the listed lengths, larger and intermediate lengths are also available.

Type HS

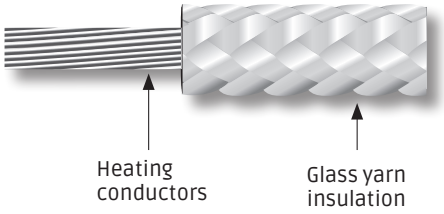
450°C

Heating cord for tight winding radii

Glass silk insulated heating cord. Very flexible, especially suitable for tight winding radii and concentrated power.

The connecting cables are glass silk insulated. The heating cord has no PE conductor and is not moisture-proof

Operating temperature	max. 450°C
Rated voltage	230 V AC
Minimum bend radius	4 mm
Connection cable	1.5 m single-wires at both ends
Diameter	Ø 3 – 4 mm
Protection type	IP20 (EN 60529), protection class I
PE conductor braiding	none, not moisture-proof



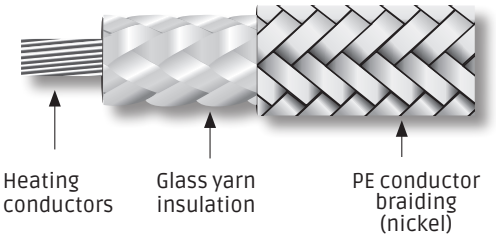
Type HSS

450°C

with additional PE conductor braiding.
Construction is the same as type HS.

Operating temperature	max. 450°C
Rated voltage	230 V AC
Minimum bend radius	6 mm
Connection cable	1.5 m single-wire both ends
Diameter	Ø 3.5 – 4.5 mm
Protection type	IP20 (EN 60529), protection class I
PE conductor braiding	nickel, not moisture-proof

Metres	Watt	Order no.	
0.6	75	HS/006	HSS/006
1.0	100	HS/010	HSS/010
2.0	250	HS/020	HSS/020
3.0	350	HS/030	HSS/030
4.0	500	HS/040	HSS/040
5.0	600	HS/050	HSS/050
6.0	800	HS/060	HSS/060
8.0	1000	HS/080	–
10.0	1250	HS/100	HSS/100
15.0	1500	HS/150	HSS/150



In addition to the listed lengths, longer lengths and powers, as well as intermediate lengths, are also available. Please state the length and power of the heating cord, as required.

Temperature control using our controllers, in chapter Control technology.

Type HSQ

900°C

High temperature heating cord

Quartz glass insulated heating cord for very high temperatures. It is very flexible and especially suitable for tight winding radii and concentrated power.

The connecting cables are glass silk insulated.

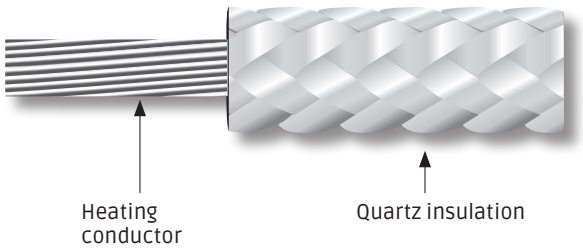
This heating cord has no PE conductor and is not moisture-proof.

Operating temperature	max. 900°C
Rated voltage	230 V AC
Minimum bend radius	10 mm
Connecting cables	1.5 m single-wire both ends
Diameter	Ø 3.5 – 4.5 mm
Protection type	IP20 (EN 60529), protection class 0
PE conductor braiding	none, not moisture-proof

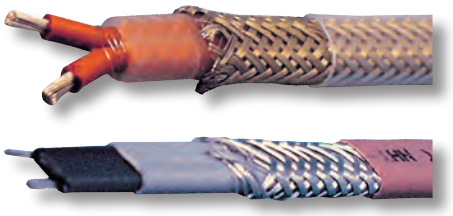
Metres	Watt	Order no.
1.0	170	HSQ/010
2.1	370	HSQ/021
3.0	500	HSQ/030
4.0	700	HSQ/040
5.0	850	HSQ/050
6.0	1000	HSQ/060

In addition to the listed lengths, longer lengths and powers, as well as intermediate lengths, are also available. Please state the length and power of the heating cord, as required.

Temperature control using our controllers, in chapter Control technology.



Heating tape configuration sets



for parallel and self-limiting heating tapes
Sold by the metre

Type HKS and HBR heating tapes

Examples of configuration ex works

Configuration ex works	Self-configuration set
KFE-80	**KF-80**

For heating tapes: **HBR-ILLw** and **HKSP 20** up to max. 90°C; configuration with 1.5 m connecting cable; **(shrink fit technology)**

KFE-90	**KF-90**

For heating tapes: **HBR-ILLw** and **HKSP 20** up to max. 90°C; configuration for direct connection in junction box; **(shrink fit technology)**

KFE-120	**KF-120**

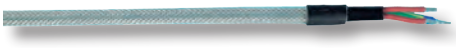
For heating tapes: **HBR-ILS** and **HBR-ILH** up to max. 200°C; configuration with 1.5 m connecting cable; **(shrink fit technology)**

KFE-180	**KF-180**

For heating tapes: **HKSI 70 NI** and **HKSI 40** up to max. 200°C; configuration with 1.5 m connecting cable; (**silicone adhesion technology** incl. 25 g silicone tube)

KFE-190	**KF-190**

For heating tapes: **HKSI 70 NI** and **HKSI 40** up to max. 200°C; configuration for direct connection in junction box;
(**silicone adhesion technology** incl. 25 g silicone tube)



KFE-130	**KF-130**

For heating tapes HBR-ILLw, HKSP 20 up to max. 130°C
Screw connection technology; protection type IP65, terminal cross section 2.5 mm^2, connector length 125 mm, termination length 58 mm.
Also suitable for HBR-ILS, HKSI-40 and HKSI70 if connection is installed outside the insulation, with 1.5 m connecting cable

Type HKSI 70 Ni

150°C

High-Tech-Integral; HTI heating tape with the heating conductor as sensor / on a reel

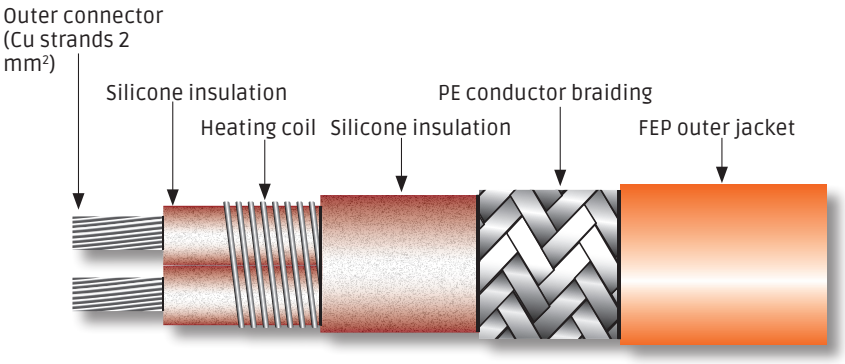
With HTI parallel heating tape, the entire length of the heating tape is used for temperature measurement with the (integral) HTI controller, so even temperature measurement over the entire length is achieved.

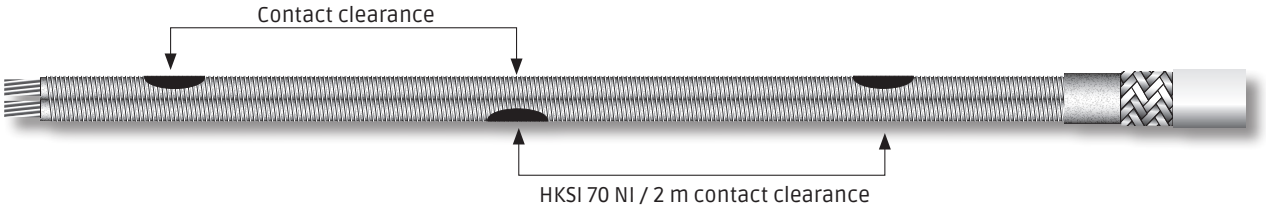
Further advantage: The parallel heating tape can be cut to size in-situ and can be specifically adapted to the existing system on installation.

Holding temperature	150°C depending on the insulation thickness on the pipe
Rated voltage	max. 230 V AC
Rated power at 20°C	approx. 70 W/m
Rated power at 150°C	approx. 30 W/m
Surface temperature	max. 200°C
Heating circuit length	max. 60 m
Contact clearance	2 m
Minimum bend radius	50 mm
Outer dimensions	approx. 8 x 11 mm (oval)
Outer jacket	FEP
Protection type	IP65 (EN 60529), protection class I
PE conductor braiding	yes

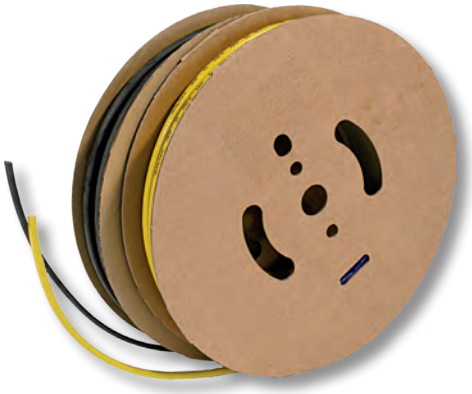
Heating tape connection, see Configuration sets

Temperature control using our HTI integral controller, in chapter Control technology.





Type HKSP 20 — 60°C
Type HKSI 40 — 150°C



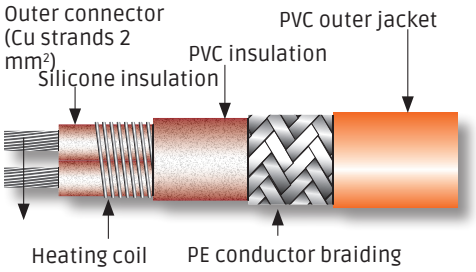
Parallel heating tape by the metre for self-configuration / on a reel

The HKS heating tapes were specially developed for heating industrial plants, gutters, pipes, tanks and for similar uses outdoors and in damp rooms.

They can be supplied by the metre, so the tape can be routed in-situ, as required, and can be configured ready for connection using an additionally available configuration set. On request, the quoted length can be supplied ex works configured ready for connection.

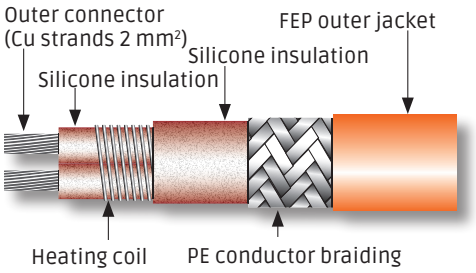
	HKSP 20
Holding temperature	approx. 60°C depending on the insulation thickness on the pipe
Rated voltage	230 V AC
Power rating	approx. 20 W/m
Surface temperature	max. 90°C
Heating circuit length	max. 150 m
Contact clearance	0.7 m
Minimum bend radius	50 mm
Outer dimensions	approx. 8 x 11 mm (oval)
Outer jacket	PVC
Protection type	IP65 (EN 60529), protection class I
PE conductor braiding	yes

HKSP 20

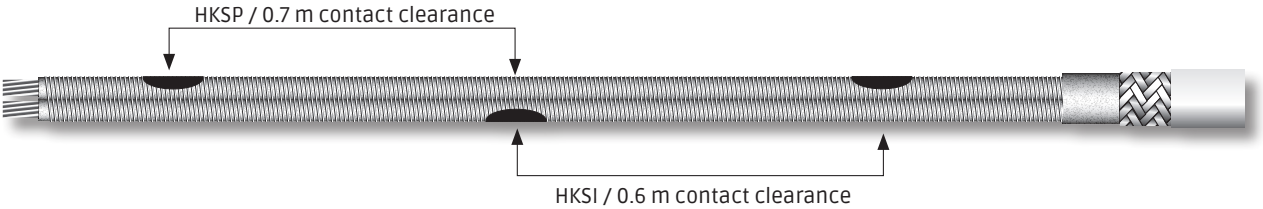


	HKSI 40
Holding temperature	approx. 150°C depending on the insulation thickness on the pipe
Rated voltage	230 V AC
Power rating	approx. 40 W/m
Surface temperature	max. 200°C
Heating circuit length	max. 100 m
Contact clearance	0.6 m
Minimum bend radius	50 mm
Outer dimensions	approx. 8 x 11 mm (oval)
Outer jacket	FEP
Protection type	IP65 (EN 60529), protection class I
PE conductor braiding	yes

HKSI 40



Heating tape connection, see Configuration sets



Type HBR-ILLw / ILH / ILS

120°C

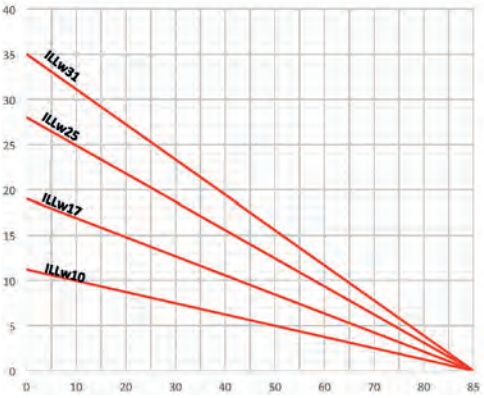
Self-limiting heating tape / on a reel reduced power on heating

The HBR self-limiting heating tapes regulate their heating power according to the respective temperature level, so that after attaining the final temperature it is maintained. If temperature differences arise between sections, the heating power adapts from section to section. This ensures uniform heating. The tapes can be laid overlapping; this is especially suitable for uneven surfaces, such as on pumps, valves and branches.

HBR heating tape is sold by the metre with the appropriate heating tape connector, see Configuration sets for individual adaptation of the length in situ or the available preconfigured length ex works.

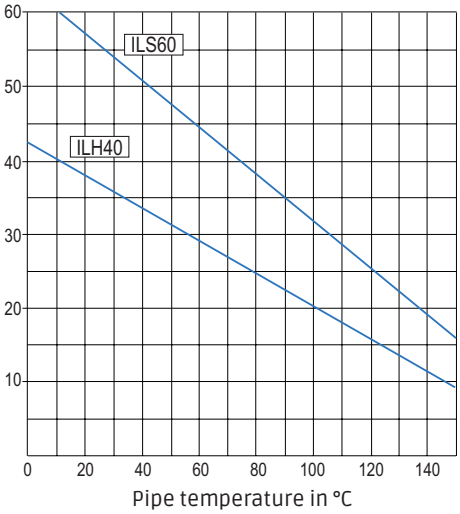
Heating tape versions		
Max. permissible temperature	ILLw ILH ILS	85°C / 85°C switched off 150°C / 200°C switched off 200°C / 250°C switched off
Outer jacket	ILLw ILH ILS	Polyolefin (CT) Fluoropolymer (CF) PTFE (NF)
Rated voltage		230 V AC / other voltages on request
Minimum bend radius		35 mm
Protection type		IP 65 (EN 60529), protection class I

W/m** ILLw



Pipe temperature in °C

W/m** ILH / ILS

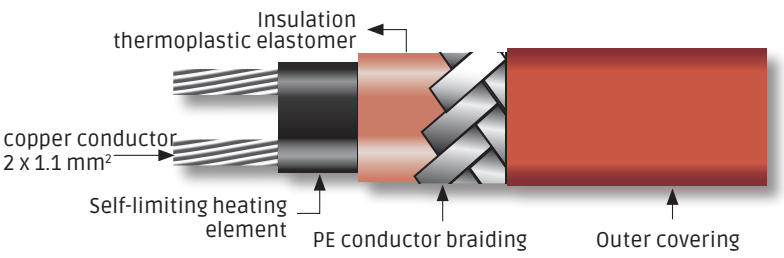


Pipe temperature in °C

Heating tape technical data				
Type	Temp.*	Watt/m*	Heating circuit length*	Outer dimensions Width x thickness (mm)
HBR-ILLw-10	40 °C	10	196 m	12,95 x 5,95
HBR-ILLw-17	50 °C	17	130 m	12,95 x 5,95
HBR-ILLw-25	55 °C	25	98 m	12,95 x 5,95
HBR-ILLw-31	60 °C	31	54 m	12,95 x 5,95
HBR-ILH-40	90 °C	40	64 m	12,2 x 5,2
HBR-ILS-60	120 °C	60	46 m	12,2 x 5,2

* at +0°C outside temperature, 16 A fuse protection, in accordance with EN 60899
approx. holding temperature depending on mounting position, insulation thickness and outside temperature on the pipe.

** Rated output power at 230 V AC if the heating tape is installed on insulated metal pipes.



Type HSTD

250°C

Narrow version heating tape

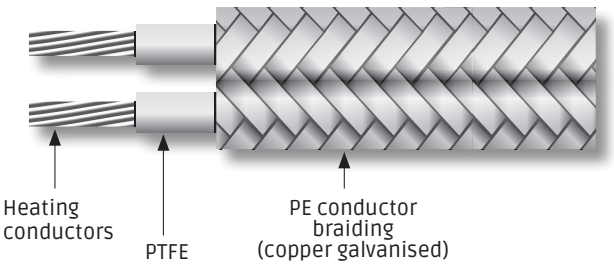
With this very narrow heating tape, two PTFE insulated heating conductors with a PE conductor are wrapped in a common braiding and resistant to splashing water.

Operating temperature	max. 250°C / HTI max. 150 °C
Rated voltage	230 V AC/DC (special voltages possible)
Power rating	approx. 50 W/m
Minimum bend radius	6 mm
Outer dimensions	approx. 4 x 9 mm (thickness x width)
Outer jacket	braiding, copper galvanised
Connection	1.0 m cable at one end
Protection type	IP44 (EN 60529), protection class I
Option	Sensor integrated in tape

For temperature control, we can recommend our HTI integral control, which is controllable without a sensor via the heating conductor. Further information, see chapter Control technology.

Metres	Watt	Order no.
0.5	30	HSTD/005
1.0	50	HSTD/010
1.5	90	HSTD/015
2.5	150	HSTD/025
4.0	220	HSTD/040
6.0	275	HSTD/060
8.0	400	HSTD/080
10.0	500	HSTD/100
15.0	700	HSTD/150
20.0	1100	HSTD/200

In addition to the listed lengths, larger and intermediate lengths are also available.



Type HSTP

250 °C

Heating tape with high performance

With this narrow heating tape, two PTFE insulated heating conductors are wrapped in a common braiding and resistance to splashing water. Due to the high performance large pipes and containers can be heated with relatively short heating tapes.

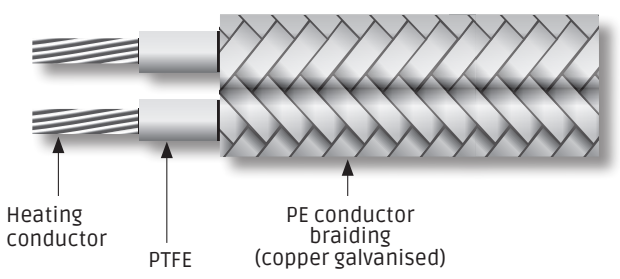
Operating temperature	max. 250°C / HTI max. 150 °C
Rated voltage	230 V AC/DC (special voltages possible)
Power rating	approx. 200 W/m, 300 W/m
Minimum bend radius	30 mm
Outer dimensions	approx. 6 x 20 mm (thickness x width)
Outer jacket	braiding, copper galvanised
Connection	1.0 m cable at one end
Protection type	IP 54 (EN 60529), protection class I
Option	Sensor integrated in tape

For temperature control, we can recommend our HTI integral control, which is controllable without a sensor via the heating conductor. Further information, see chapter Control technology.

Metres	Watt	Order no.
1,2	250	HSTP/200012
1,8	370	HSTP/200018
2,7	580	HSTP/200027
4,0	820	HSTP/200040
6,0	1250	HSTP/200060
9,0	1900	HSTP/200090
11,0	2400	HSTP/200110
15,0	2700	HSTP/200150
21,0	4200	HSTP/200210

Metres	Watt	Order no.
1,5	440	HSTP/300015
2,3	680	HSTP/300023
3,3	1000	HSTP/300033
5,0	1500	HSTP/300050
7,5	2350	HSTP/300075
9,0	3000	HSTP/300090
12,0	3400	HSTP/300120
17,0	5000	HSTP/300170

In addition to the listed lengths, larger and intermediate lengths are also available.



Type HSTDD

250°C

Wide version heating tape

With this heating tape, four PTFE insulated heating conductors are laid parallel with the PE conductor and are wrapped in common Cu braiding and are resistant to splashing water.

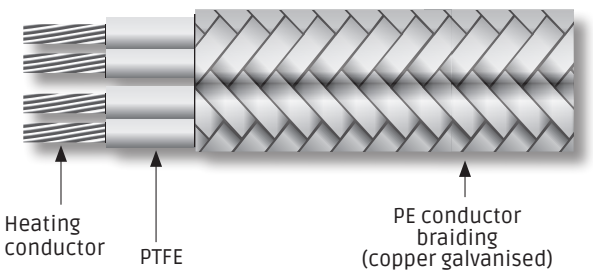
This structure makes the heating strip very flexible and the outer braiding ensures very good heat transfer to the pipe or container to be heated.

Operating temperature	max. 250°C / HTI max. 150 °C
Rated voltage	230 V AC/DC (special voltages possible)
Power rating	approx. 100 W/m
Minimum bend radius	10 mm
Outer dimensions	4 x 20 mm (thickness x width)
Outer jacket	braiding, copper galvanised
Connection	1.0 m cable at one end
Protection type	IP44 (EN 60529), protection class I
Option	Sensor integrated in tape

For temperature control, we can recommend our HTI integral control, which is controllable without a sensor via the heating conductor. Further information, see chapter Control technology.

Metres	Watt	Order no.
0.5	50	HSTDD/005
1.0	100	HSTDD/010
1.5	125	HSTDD/015
3.0	275	HSTDD/030
4.0	420	HSTDD/040
6.0	430	HSTDD/060
8.0	660	HSTDD/080
10.0	1100	HSTDD/100
15.0	1250	HSTDD/150
20.0	1740	HSTDD/200

In addition to the listed lengths, larger and intermediate lengths are also available.



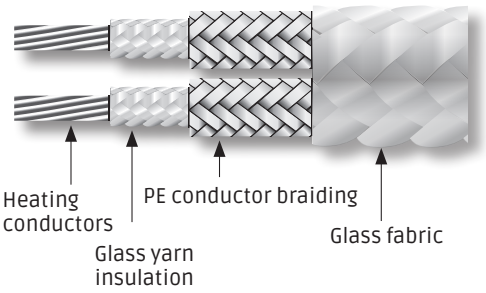
Type HBS
Type HB

350°C / 450°C

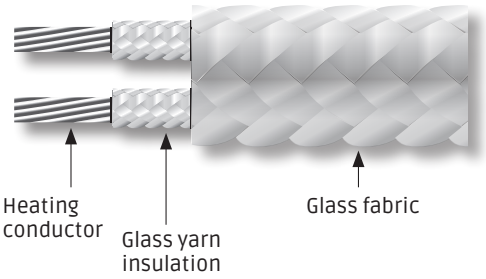
Hightemperature heating tape with glass fabric

Only suitable for a dry environment, very flexible version. Multiple glass silk insulated with additional PE conductor above the heating conductor. One-ended connection. For diverse use in the lab, technical education institutions and industry, not moisture-proof.

The HB version has no PE conductor. This makes it even thinner and more supple than the HBS series.



HBS		
Operating temperature	up to 7.0 m from 10.0 m	max. 450°C max. 350°C
Rated voltage	230 V AC/DC	
Power rating	approx. 250 W/m	
Minimum bend radius	10 mm	
Outer dimensions	approx. 5.5 x 30 mm (thickness x width)	
Outer jacket	Glass fabric	
Connection cable	0.5 m with connection box	
Protection type	IP20 (EN 60529), protection class I	
PE conductor braiding	Nickel	



HB		
Operating temperature	up to 7.0 m from 10.0 m	max. 450°C max. 350°C
Rated voltage	230 V AC/DC	
Power rating	approx. 250 W/m	
Minimum bend radius	6 mm	
Outer dimensions	approx. 3.5 x 30 mm (thickness x width)	
Outer jacket	glass fabric	
Connection cable	0.5 m with connection box	
Protection type	IP20 (EN 60529), protection class I	
PE conductor braiding	none	

Metres	Watt	Order no.	
0.5	100	HBS/005	HB/005
1.0	250	HBS/010	HB/010
1.5	350	HBS/015	HB/015
2.0	500	HBS/020	HB/020
2.5	600	HBS/025	HB/025
3.0	800	HBS/030	HB/030
4.0	900	HBS/040	HB/040
5.0	1250	HBS/050	HB/050
7.0	1550	HBS/070	HB/070
10.0	2000	HBS/100	HB/100
15.0	3000	HBS/150	

Temperature control using our controllers, in chapter Control technology.

Type HBQ

900°C

High temperature heating tape with quartz fabric

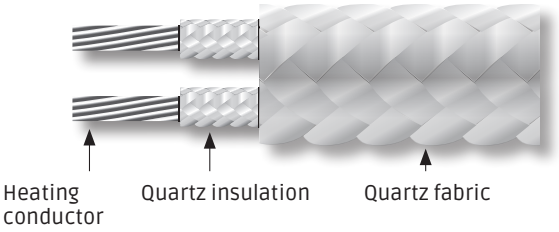
Very flexible heating tape, with high temperature stability and high power concentration, not moisture-proof.

The heating conductor is integrated in the quartz fabric and has no PE conductor.

Operating temperature	max. 900°C
Rated voltage	230 V AC
Power rating	approx. 350 W/m
Minimum bend radius	10 mm
Outer dimensions	approx. 5 x 30 mm (thickness x width)
Outer jacket	quartz fabric
Connection cable	1.0 m with connection box
Protection type	IP20 (EN 60529), protection class 0
PE conductor braiding	none

Metres	Watt	Order no.
0.5	170	HBQ/005
1.0	350	HBQ/010
1.5	500	HBQ/015
2.0	700	HBQ/020
2.5	850	HBQ/025
3.0	1000	HBQ/030

Temperature control from our controllers, see chapter Control technology.



Type HIL-SS

800°C

Heating cable with metal jacket stainless steel 1.4541

Applications:

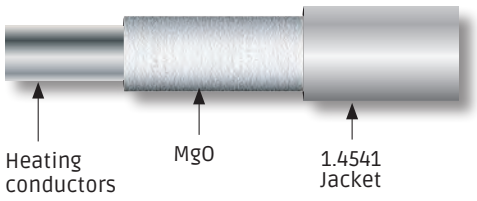
immersion heaters, tanks, valves, pump, mould, plate heaters.

This mineral-insulated heating cable with a jacket of stainless steel 1.4541 can also be used in extremely corrosive and damp environments. The HIL heating cable is extremely robust and easy to bend. The stainless steel jacket is watertight, oil-tight and gas-tight. Its deployment temperature up to 800°C opens up a multitude of applications.

The cold end of the heating cable can be fed into a terminal box and connected using a M20X1.5 screw connection.

Operating temperature	max. 800°C
Rated voltage	230 V AC
Power rating	100 / 200 / 250 W/m
Outer jacket	stainless steel 1.4541
Length cold ends	0.5 m
Protection type	IP67 (EN 60529), protection class I
PE conductor	yes

Temperature control in chapter Control technology.



Also available in Ex

Metres	100 Watt/m	Order no.	Ø mm Heating con. OD	Heating conductor Ω/m	Bend radius
7.2	720	HIL-SS/10007	3.2	10.0	> 12
9.1	910	HIL-SS/10009	3.2	6.3	> 12
11.5	1150	HIL-SS/10011	3.2	4.0	> 12
14.5	1450	HIL-SS/10014	3.6	2.5	> 15
18.0	1800	HIL-SS/10018	3.8	1.6	> 15
23.0	2300	HIL-SS/10023	4.1	1.0	> 16
29.0	2900	HIL-SS/10029	4.5	0.63	> 18
36.0	3600	HIL-SS/10036	5.0	0.4	> 20
46.0	4600	HIL-SS/10046	5.6	0.25	> 25
57.5	5750	HIL-SS/10057	6.5	0.16	> 30

Metres	200 Watt/m	Order no.	Ø mm Heating con. OD	Heating conductor Ω/m	Bend radius
5.1	1020	HIL-SS/20005	3.2	10.0	> 12
6.5	1300	HIL-SS/20006	3.2	6.3	> 12
7.7	1540	HIL-SS/20008	3.2	4.0	> 12
10.3	2060	HIL-SS/20010	3.6	2.5	> 15
12.7	2540	HIL-SS/20012	3.8	1.6	> 15
15.5	3100	HIL-SS/20015	4.1	1.0	> 16
20.3	4060	HIL-SS/20020	4.5	0.63	> 18
25.5	5100	HIL-SS/20025	5.0	0.4	> 20
32.5	6500	HIL-SS/20032	5.6	0.25	> 25
40.0	8000	HIL-SS/20040	6.5	0.16	> 30

Metres	250 Watt/m	Order no.	Ø mm Heating con. OD	Heating conductor Ω/m	Bend radius
4.6	1150	HIL-SS/25004	3.2	10.0	> 12
7.3	1825	HIL-SS/25007	3.2	4.0	> 12
9.2	2300	HIL-SS/25009	3.6	2.5	> 15
12.0	3000	HIL-SS/25012	3.8	1.6	> 15
14.0	3500	HIL-SS/25014	4.1	1.0	> 16
18.0	4500	HIL-SS/25018	4.5	0.63	> 18
23.0	5750	HIL-SS/25023	5.0	0.40	> 20
29.0	7250	HIL-SS/25029	5.6	0.25	> 25

Type HIL-IC

1000°C

Heating cable with metal jacket Inconel 2.4816

Applications:

radiation heaters, vacuum technology, immersion heaters, containers, valves, pumps, forms, process and plate heaters.

This mineral-insulated heating cable with a jacket of Inconel 2.4816 can also be used in extremely corrosive and damp environments. The HIL heating cable is extremely robust and easy to bend. The Inconel jacket is watertight, oil-tight and gas-tight. It deployment temperature up to 1000°C opens up a multitude of applications.

The cold end of the heating cable can be fed into a terminal box and connected using a M20X1.5 screw connection.

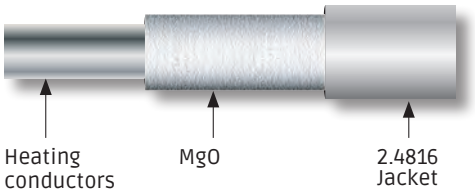
Metres	100 Watt/m	Order no.	Ø mm Heating con. OD	Heating conductor Ω/m	Bend radius
7.2	720	HIL-IC/10007	3.2	10.0	> 15
9.1	910	HIL-IC/10009	3.2	6.3	> 15
11.5	1150	HIL-IC/10011	3.2	4.0	> 15
14.5	1450	HIL-IC/10014	3.6	2.5	> 15
18.0	1800	HIL-IC/10018	3.8	1.6	> 15
23.0	2300	HIL-IC/10023	4.1	1.0	> 20
29.0	2900	HIL-IC/10029	4.5	0.63	> 20
36.0	3600	HIL-IC/10036	5.0	0.4	> 30
46.0	4600	HIL-IC/10046	5.6	0.25	> 30
57.5	5750	HIL-IC/10057	6.5	0.16	> 30

Metres	100 Watt/m	Order no.	Ø mm Heating con. OD	Heating conductor Ω/m	Bend radius
5.1	1020	HIL-IC/20005	3.2	10.0	> 15
6.5	1300	HIL-IC/20006	3.2	6.3	> 15
7.7	1540	HIL-IC/20008	3.2	4.0	> 15
10.3	2060	HIL-IC/20010	3.6	2.5	> 15
12.7	2540	HIL-IC/20012	3.8	1.6	> 15
15.5	3100	HIL-IC/20015	4.1	1.0	> 20
20.3	4060	HIL-IC/20020	4.5	0.63	> 20
25.6	5100	HIL-IC/20025	5.0	0.4	> 30
32.5	6500	HIL-IC/20032	5.6	0.25	> 30
40.0	8265	HIL-IC/20040	6.5	0.16	> 33

Metres	100 Watt/m	Order no.	Ø mm Heating con. OD	Heating conductor Ω/m	Bend radius
4.6	1150	HIL-IC/25004	3.2	10.0	> 15
7.3	1825	HIL-IC/25007	3.2	4.0	> 15
9.2	2300	HIL-IC/25009	3.6	2.5	> 15
12.0	3000	HIL-IC/25012	3.8	1.6	>15
14.0	3500	HIL-IC/25014	4.1	1.0	> 20
18.0	4500	HIL-IC/25018	4.5	0.63	> 20
23.0	5750	HIL-IC/25023	5.0	0.25	> 30

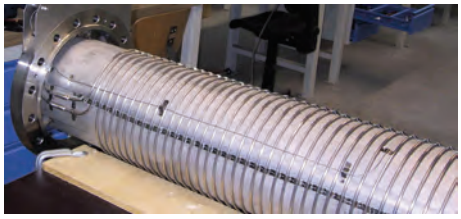
Operating temperature	max. 1000°C
Rated voltage	230 V AC
Power rating	100 / 200 / 250 W/m
Outer jacket	Inconel 2.4816
Length cold ends	0.5 m
Protection type	IP67 (EN 60529), protection class I
PE conductor	yes

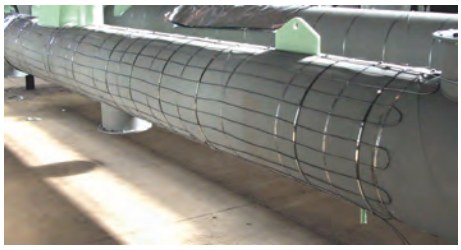
Temperature control in chapter Control technology.

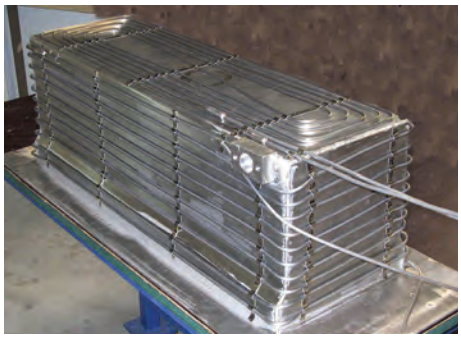


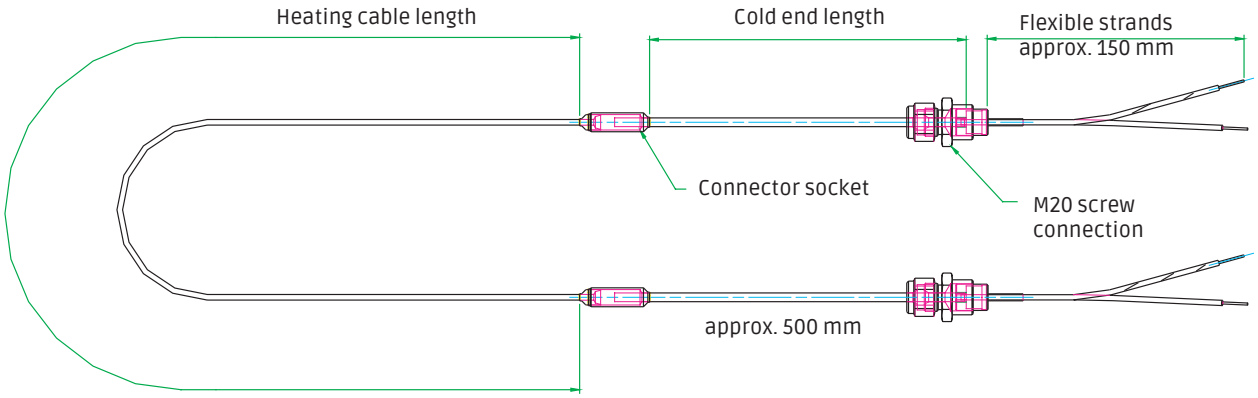
Also available in Ex

Practical examples









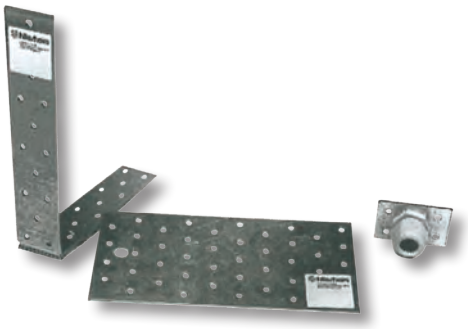
Stainless steel mounting bracket

To attach the connection housing on pipes or tanks.

Insulation bushing for PG 16 (M 20) heating tape with plate

Mounting plate to be mounted with the mounting bracket in association with the following controllers: AZT, UTR, HZ-EK 2 with HTE53, the threads are pre-bored and screws are provided.

Order no.	
HZ/MW	bracket
HZ/MP	plate
HZ-I	grommet



IP65 connection housing

Both housings are provided with KV cable glands.

Order no.	Length x width x height	Terminal
HZ-G	94 x 65 x 56 mm	5 x 4 mm²
HZ-K	94 x 94 x 56 mm	8 x 4 mm²

KSP

Heat-stabilized plastic tie to secure heating cables and heating tapes
up to 130°C

Order no.	Length x width	Delivery unit
KSP/200	200 mm x 4.8 mm	100 pcs.
KSP/360	360 mm x 4.8 mm	100 pcs.
KSP/450	450 mm x 7.8 mm	100 pcs.

AB

Spacer tape to fix HST heating conductors for area and cylindrical heating systems.

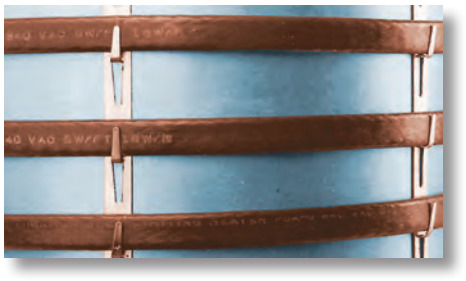
Smallest layout spacing 15 mm

Order no.	Delivery unit
AB/015	Sold by the metre

ABF

Spacer tape made of stainless steel 1.4301 for routing heating tapes and heating cables on tanks. The spacer tape can be attached by spot-welding or with straps.

Order no.	Delivery unit	Routing spacing
ABF/030	5 m	30 mm
ABF/040	5 m	40 mm
ABF/045	5 m	45 mm



GKB

up to 160°C

Adhesive tape. Glass fabric with acrylate adhesive (hardening) to attach heating tapes and temperature sensors.

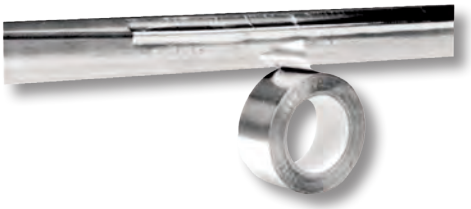
Order no.	Width	Delivery unit
GKB/160	15 mm	50 m roll

GKB

up to 140°C

High-grade adhesive tape, glass fabric with silicone adhesive.

Order no.	Width	Delivery unit
GKB/180	19 mm	33 m roll



GAB

up to 160°C

Heavy duty aluminium foil tape with acrylate adhesive (hardening) to bond plastic insulating heating tapes, cables and conductors. The aluminium ensure very good heat distribution.

Order no.	Width x thickness	Delivery unit
GAB/160	50 mm / 0.13 mm	50 m roll

GAB

up to 450°C

Thin, supple glass tape for binding and wrapping heating conductors.

Order no.	Width x thickness	Delivery unit
GB/25	25 mm x 0.15 mm	50 m roll
GB/16	16 mm x 0.15 mm	50 m roll

GBB

up to 500°C

Wide glass silk tape for bandaging heating conductors. Also suitable for thicker pipes and tanks.

Order no.	Width x thickness	Delivery unit
GBB/75	70 mm x 0.7 mm	100 m roll

GBW

up to 450°C

Fleecy, around 3 mm thick glass fabric tape for insulating heated routes.

Order no.	Width x thickness	Delivery unit
GBW/25	25 mm x 3 mm	30 m roll

KSV

up to 100°C

Simple to handle Velcro fasteners to bind and fix insulation sleeves on pipes.

Order no.	Width	Delivery unit
KSV/25	25 mm	10 m Velcro, 2 m fleece

KSV

up to 80 °C

Velcro tape, Velcro one side, fleece the other (sold by the metre)

Order no.	Width	Delivery unit
KSV/20	20 mm	Sold by the metre

SJ

up to 250°C

Closed-pore, water-tight silicone foam hose to insulate pipes and hoses.

Order no.	Inner Ø	Outer Ø	Length
SJ/15	15 mm	30 mm	up to 25 m
SJ/20	20 mm	40 mm	up to 25 m
SJ/25	25 mm	45 mm	up to 25 m
SJ/30	30 mm	50 mm	up to 25 m
SJ/40	40 mm	60 mm	up to 25 m
SJ/50	50 mm	80 mm	up to 20 m
SJ/80	80 mm	104 mm	up to 20 m

Other dimensions on request

Silicone foam mat

up to 200 C

Order no.	Thickness	Width	Length
SJ/05	5 mm	1000 mm	1000 mm
SJ/10	10 mm	1000 mm	1000 mm

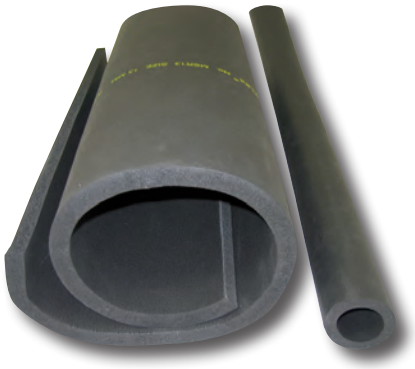
AF

up to 150°C

Polymer foam hoses for insulation

Order no.	Inner Ø	Outer Ø	Length
AF 18	18	38	2 m piece
AF 22	22	42	2 m piece
AF 28	28	49	2 m piece
AF 35	35	57	2 m piece
AF 42	42	64	2 m piece

Other dimensions on request



Polymer foam mat

up to 150°C

Order no.	Thickness	Width	Length
AF 13	13 mm	1000 mm	up to 11 m
AF 19	19 mm	1000 mm	up to 7 m

MG

up to 450°C

Needle-punched fibreglass mat for insulating pipes and tanks.

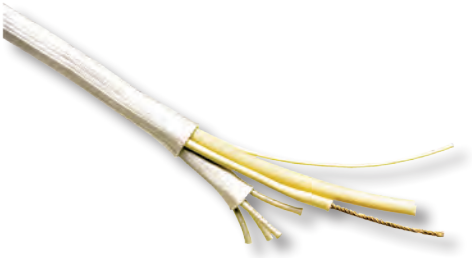
Order no.	Width	Thickness	Length
MG/12	1000 mm	12 mm	per metre

MQ + 1000

up to 1000°C

High-grade flexible ceramic fibre mat for insulating in the temperature range up to 1000°C.

Order no.	Width	Thickness	Length
MQ/10	1000 mm	13 mm	per metre



GS

Glass fabric hoses to insulate electrical conductors. (sold by the meter)
GSH max. 450°C
GSI with outer coating silicone max. 250°C

Order no.	Order no.	Inner Ø
GSH/03	GSI/04	4 mm
GSH/06	GSI/06	6 mm
GSH/08	GSI/08	8 mm
GSH/12	GSI/12	12 mm

GSK

up to max. 900°C

High-grade quartz fabric hoses to insulate electrical conductors.

Order no.	Inner Ø	Delivery unit
GSK/04	4 mm	10 m
GSK/30	30 mm	5 m

FIL

up to 260°C

Connection wires of Cu-nickel with PTFE insulation for wiring in different colours.

Order no.	Cross section	Delivery unit
FIL/075	0.75 mm²	10 m
FIL/150	1.50 mm²	10 m
FIL/250	2.50 mm²	10 m

KF-SILT 25

Tube of silicone adhesive 25 g

KF-SILT 100

Tube of silicone adhesive 100 g

Silicone adhesive in tubes to produce self-configuration connections for HKSI heating tapes (silicone adhesive technology). You need 10 to 15 g of adhesive per heating tape.

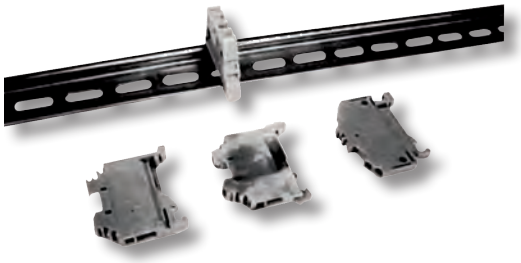
AA

Porcelain terminals, for use up to 250°C.

Cross section	Delivery unit
1 x 2.5 mm²	10 pcs.
2 x 2.5 mm²	10 pcs.
3 x 2.5 mm²	10 pcs.
4 x 2.5 mm²	10 pcs.

Spring terminals / mounting rails

Description
Spring terminal, 4 mm², grey
Spring terminal, 4 mm², blue
Spring terminal, 4 mm², gr-ye
End plate, 4 mm², grey
Mounting rail, 35 mm
End bracket for mounting rail



Fuse protection circuit breaker

For permanent connection to equipment or extension cables, all-pole disconnection, plug in accordance with DIN VDE 0661.

Technical data	
Rated tripping current	30 mA (residual current)
Undervoltage trip	16 A, 230 V ~ IP44
Housing dimensions	B 240 x H 190 x T 60 mm

Thermoswitch

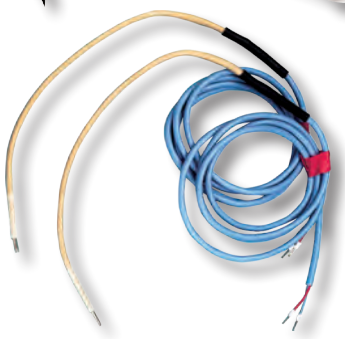
For the simplest control tasks and temperature monitoring.

Technical data	
Switching power	max. 10 A (2300 W)
Switching frequency	approx. 10000 switching cycles
Switch-off point	±5 K to rated switching temperature
Re-switch-on point	approx. 30 ±15 K below the switching off point

Rated switching temperature	80°C / 100°C / 120°C / 140°C / 160°C / 200°C

Thermocouple flat sensor

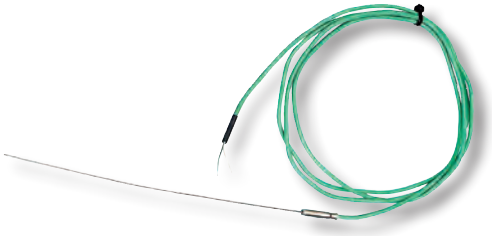
with 1.5 m long silicone-insulated compensating cable



Order no.	Sensor type	Max. temperature
HT/FF	Fe-CuNi (J)	450°C
HT/NF	NiCr-Ni (K)	450°C

Thermocouple rod sensor

Mineral-insulated, sensor tip bendable, for soldering-in, preferably for use at high temperatures, in fluids and aggressive atmospheres, diameter 1.5 mm, length 250 mm, silicone-insulated, 2 m long, compensating cable



Order no.	Sensor type	Max. temperature	Jacket material
HT/FM	Fe-CuNi (J)	600°C	1.4571
HT/NM	NiCr-Ni (K)	1000°C	2.4816 (Inconel)

PT100 sensor

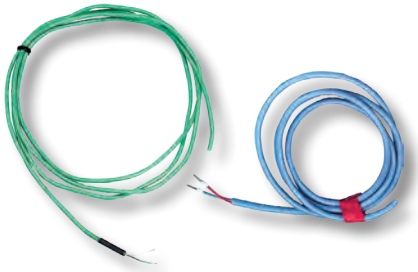
Also available in Ex version

+200°C	+250°C, +350°C	+500°C
Brass	Jacket material 1.4571	Jacket material 1.4571
Diameter 4 mm	Diameter 4 mm	Diameter 5 mm
Length 30 mm	Length 40 mm	Length 40 mm
PTFE insulated	PTFE/glass insulated	Glass silk insulated
2 m long conductor	2 m long conductor	2 m long conductor

Order no.	Order no.	Order no.
HTI/MS	HTI/PM HTI/PH	HTI/PT

Compensating cables

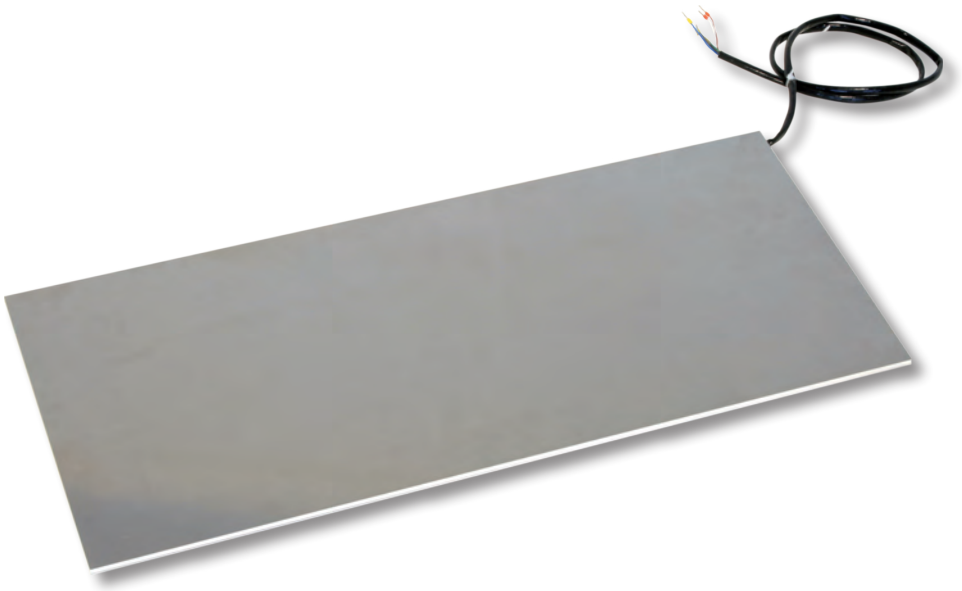
For extending the connecting cables for the thermoelements above. Structure: Silicone / silicone-insulated, 2 x 0.25 mm², diameter 5 mm

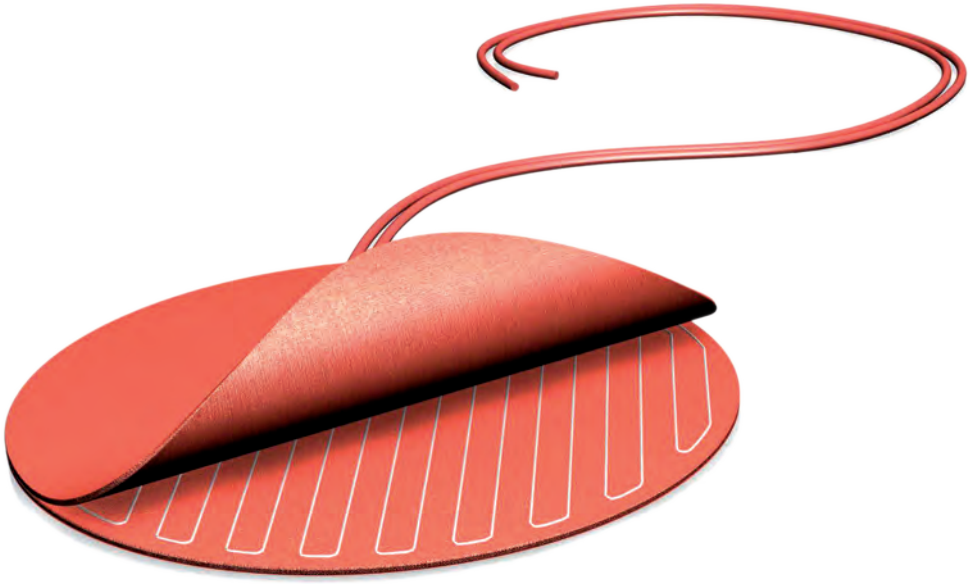


Order no.	Sensor type	Max. temperature
AG/F	Fe-CuNi (J)	200°C
AG/N	NiCr-Ni (K)	200°C

Self-adhesive sign

Electrically heated 50 x 200 mm





Type HAP

250°C

Aluminium electric heating plate

Applications

Heating of parts and moulds, wood and paper industry, automobile industry, mould-making, plastics industry, bookbinding.

The HAP aluminium heating plates cover a temperature range up to 250°C and can handle extreme pressure loads and are impact and vibration resistant. Their shapes can be individually fabricated – whether round, oval or L-shaped. Special designs with cut-outs, bore holes and bolt threads can be manufactured.

Even combinations with liquid and air channels for cooling can be implemented.

Operating temperature	max. 250°C
Rated voltage	up to 500 V AC/DC (1 – 3 phases)
Rated power	up to 10 kW/m²
Heating plate material	Aluminium (AlMg3 EN-AW-5754) (AlMg4.5 EN 573-3)
Dimensions	up to 1450 x 2400 mm
Heating plate thickness	10 – 20 mm, special dimensions possible
Weight	for thickness: 10 mm approx. 26 kg/m²
Surface	rolled aluminium, finely milled etc.
Pressure rating	80 N/mm²
Expansion	0.24 mm 1°K / over 1000 mm length
Temperature sensor	PT100 / Fe-CuNi (J)
Connection cable	1.5 m long, with or without plug
Plug connection	optional
Protection type	IP40 - IP65 (EN 60529), depending on heating conductor, protection class I
Temperature control	from our temperature controllers
Option insulation plate	silicone, silicate, Pertinax, PTFE
Optional cooling plate	on request

We manufacture special designs of our heating plates to customer requirements, for example:

- Aluminium heating plates for heating electronic components, to reduce soldering times
- Aluminium heating plates to heat CDs and solar cells during manufacture and final inspection
- Aluminium heating plates for pressing in the wood and paper industry for laminates and hot adhesives
- Aluminium heating plates for moulding PU foam and GRP prefabricated components
- Aluminium heating plates for catering requirements, keeping food and drink warm
- Heating and cooling plates with pipe system for heat transfer fluids, also for use in Ex areas (separate temperature regulating unit necessary)

Self-limiting HAP aluminium heating plates
holding temperatures approx. 80°C, 60°C, 40°C with +10°C ambient temperature. For use without controller.

Type HA-HT / HA-HKT 100°C

Heating/cooling table

Applications

Form-making, automobile construction, wood and paper industry, book binderies, plastics industry.

Various materials, such as plastics and metals can be kept or heated to an even temperature on the mobile heating/cooling table. The temperature of the aluminium heating plate is continuously adjustable up to 100°C using an built-in electronic controller. The special HTI16 integral controller detects temperature across the entire surface of the heat plate, thereby ensuring a much more uniform surface temperature than would be possible with conventional sensor control.

Optionally, the heating table can be equipped with an additional built-in cooling plate. This feature permits cooling processes to be accelerated with liquids or even compressed air. This feature requires a separate cooling unit or compressed air source (provided by customer).

Operating temperature	max. 100°C
Rated voltage	230 V AC
Heating plate material	Aluminium (AlMg3 EN-AW-5754) (AlMg4.5 EN 573-3)
Height	approx. 90 cm
Pressure rating	up to 400 kg
Connection cable	3.5 m long with German "Schuko" mains plug with integrated fault current circuit breaker
Protection type	IP54 (EN 60529), protection class I
Frame colours	green RAL 6011, light grey RAL 7035, red RAL 3003, blue RAL 5007
Temperature control	HTI 16 on the heating table

HTI 16
Integral temperature controller

The heating table is available in four sizes (other sizes on request)

Type	L x W mm	Power	Area	Type with cooling plate
HA-HT-1	approx. 900 x 550	1200 Watt	0.47 m²	HA-HKT-1
HA-HT-2	approx. 1050 x 750	1800 Watt	0.79 m²	HA-HKT-2
HA-HT-3	approx. 1250 x 850	2800 Watt	1.06 m²	HA-HKT-3
HA-HT-4	approx. 1550 x 850	3400 Watt	1.31 m²	HA-HKT-4

Warm-up time from +20°C to 100°C, approx. 45 - 60 minutes

Option: The HDI controller can be supplied with an additional controller module and with a separate sensor (PT100), which serves for temperature monitoring of the applied component. This avoids overheating of the component on the table.

Special sizes, heavy duty version or higher temperatures on request.

Type HP 60

80°C

Heating tarpaulins for IBC containers

Heating tarpaulins for tanks

Robust heater tarpaulin for large surfaces

Applications

Heating or temperature regulation of large surfaces and containers up to 80°C, e.g. IBC containers, silos, lorries.

The heater tarpaulin is heated with electric heater elements sealed in coated polyester fabric. The tarpaulin surface is washable and spray waterproof.

The heating tarpaulin has a 5 mm thick foam thermal insulation.

The shape of the HP 60 heater tarpaulin can be individually adapted to container sizes; this includes both round and square openings. Options for fastening, by way of hooks, eyes and Velcro, make attachment easy.

The HP 60 heater tarpaulin is rated to produce up to 500 Watt of heat per m²; depending on ambient temperature, this ensures a short warm-up time for the tarpaulin.

Operating temperature	max. 80°C
Rated voltage	up to 500 V AC/DC (one, two, or three phase)
Rated power	up to 500 W/m²
Min. ambient temperature	-20°C, installation temp. min. +5°C
Material	polyester fabric with PVC coating
Dimensions	max. 5 x 10 m
Heater element thickness	ca. 10 mm, with 5 mm insulation foam
Fastening options	hooks, eyes, Velcro
Temperature sensor	PT100 / HTI control
Connection cable	3.0 m
Plug connection	optional
Protection type	IP44 (EN 60529), protection class I

Sensors can be placed either in or on the heater tarpaulin to monitor or control temperature. Especially effective is our HTI 16 integral electronic controller/monitor combination which allows the tarpaulin's heating conductors to also act as probes; thus the heater tarpaulin's limit temperature can be monitored while simultaneously regulating the temperature of the medium in the container precisely with a separate PT100 sensor.

Type HSI

200°C

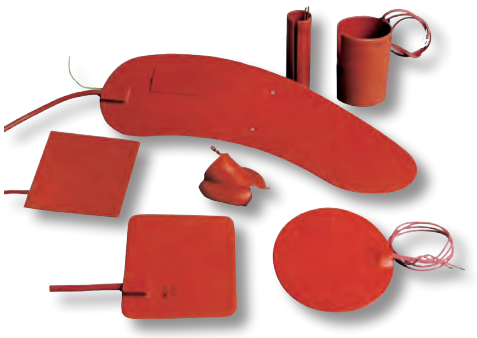
Flexible silicone heating mats

Applications

Heating of complicated surfaces, parts and moulds.

The silicone heating elements are characterised by their very uniform heat distribution. They are very flexible and are available in different designs. As mats or shaped parts, they are used as an economical solution in countless applications.

The HSI silicone heating mats are always manufactured specifically for the respective applications.

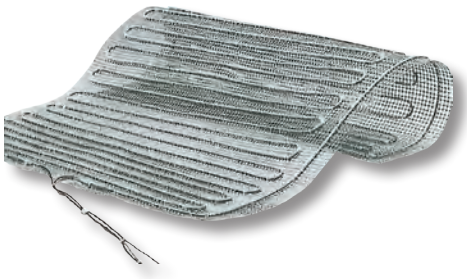


Operating temperature	max. 200°C
Rated voltage	230 V AC/DC
Rated power	6500 W/m² (standard) and more
Minimum ambient temperature	-60°C
Material	silicone, silicone-coated textile glass fabric
Dimensions	max. 3.0 x 1.2 m
Heater element thickness	approx. 3 mm without mains cable
Fastening options	adhesives, binding, hooks, eyes, Velcro, self-adhesive coating
Temperature sensor	vulcanised or in sensor pocket PT100, FeCuNi
Over-temperature protection	with 2nd PT100 or thermoswitch (option)
Connection cable	various connection technologies possible
Plug connection	according to specification
Protection type	IP4x (EN 60529), protection class II or III

Temperature control using our controllers, in chapter Control technology.

HM series

The HM heating mats are very flexible so they can not only be used on flat surfaces, but also on cylindrical tanks and pipes. A NiCr-Ni sensor is incorporated in each mat for temperature control. The temperature-stable connecting wires have a length of 1 m.

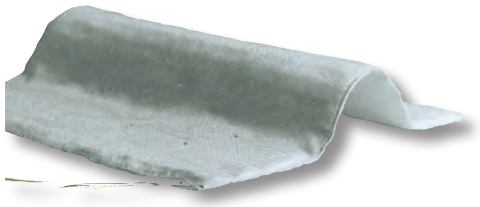


Type HMST — up to 250°C

This heating mat is reinforced with a PTFE lattice. The heating conductors are PTFE insulated and have PE conductor braiding. The maximum operating temperature is 250°C. The heating mat can be stretched over tanks and pipes with Velcro fastenings (accessories).

Type HMSG — up to 450°C

HMSG is a very flexible heating mat made of textile glass fabric with a maximum operating temperature of 450°C. The fibreglass insulated heating conductor is incorporated in textile glass fabric on both sides. The heating mats have longitudinal eyes with which they can be fastened with fibreglass fabric tape (accessory).



Type HMSQ — up to 900°C

This flexible heating mat made of quartz garn has a maximum operating temperature of 900°C. It is fastened to pipes or tanks with high temperature stable cords (accessory).

Standard heating mats

Technical data				
Width (mm)	Length (mm)	HMST Power	HMSG Power	HMSQ Power
135	500	50 W	250 W	500 W
236	500	150 W	500 W	1000 W
355	500	250 W	1000 W	2000 W
515	500	350 W	1200 W	2400 W
659	500	500 W	1600 W	3200 W
820	500	690 W	2000 W	

Special dimensions and power ratings available

Type HMG

up to 250°C

This heating mat is reinforced with a metal lattice. The heating conductors are PTFE insulated and have PE conductor braiding. The maximum operating temperature is 250°C. The heating mat can be stretched over tanks and pipes with Velcro fastenings (accessory).

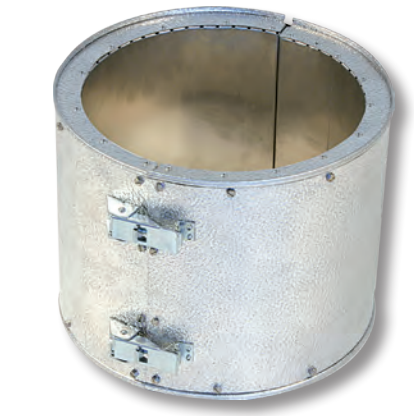
Operating temperature	max. 250°C
Rated voltage	up to 500 V AC/DC (one, two, or three phase)
Rated power	up to 2000 W/m²
Min. ambient temperature	-40 °C
Design	PTFE heating conductor on VA lattice or galvanised lattice
Dimensions	max. 1000 x 5000 mm / Lattice separation 10 x 10 mm
Heater element thickness	approx. 5 mm
Temperature sensor	PT100 (Optional: NiCr-Ni, Fe-CuNi, HTI)
Connection cable	1.5 m
Plug connection	optional
Protection type	IP54 (EN 60529), protection class I
Thermal insulation (optional)	Polymer foam (150°C), Silicon foam (200°C)

The HMG heating mat can also be used as an underfloor heating system.

HGM lattice mat incorporated in a housing to heat a distributor with a geometrically difficult surface.

Type HMM

250°C



Hinged heating sleeves with metal jacket

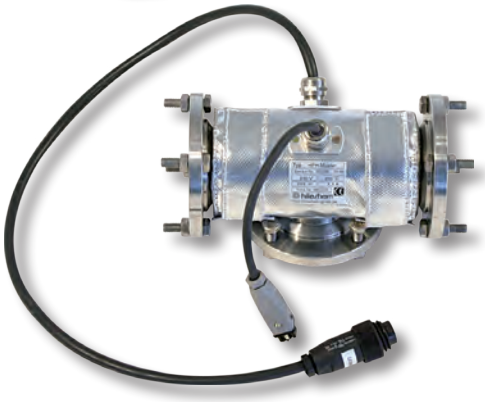
The HMM heating sleeve is a complete heating element consisting of heating, thermal insulation and closed outer metal jacket. The metal jacket encloses all edges and the inside surface of the sleeve, which consists of two half shells. One side has a hinge, on the other side there are adjustable turnbuckles. This means that tolerances in the outer diameter can be compensated. The length, inner diameter and insulation thickness are designed for your special applications.

Longer built-on accessories can consist of several segments.

Operating temperature	max. 250°C with moisture-proofing of the heating element.
Rated voltage	230 V AC (other voltages on request)
Rated power	designed for special applications
Material	aluminium or stainless steel
Height	max. 2000 mm
Inner diameter	100 to 2000 mm
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT 100 and integral control system (HTI) possible
Connection cable	1.5 m
Plug connection	optional
Protection type	IP40 (basic version), IP54 (on request), protection class I

Type HFH

450°C



Heating sleeve with glass silk fabric jacket

The structure is similar to type HMM. However, the entire heating sleeve consists of glass silk material that clings effectively and closely to the heated object. The sleeves are specifically adapted and manufactured to the object to be heated.

Operating temperature	up to 250°C with PTFE heating conductors up to 450°C with glass heating conductors
Rated voltage	230 V AC (other voltages on request)
Rated power	designed for special applications
Material	glass silk coated
Dimensions	depending on requirements
Temperature sensor	Fe-CuNi type J, NiCr-Ni type K, PT 100 and integral control system (HTI) possible
Connection cable	1.5 m
Plug connection	optional
Protection type	IP40 (basic version), IP54 (on request), protection class I

The HFH heating sleeve is also available with aluminium and Teflon coating (optional).

Example of HFH custom fabrications

Heating systems for vacuum systems

These high vacuum pumps are heated to 350°C with a removable split heating sleeve.

The requirement was uniform heat distribution over the entire surface.

Removable insulating heating sleeve

The complicated geometry could be insulated against heat losses and heated in a cost-effective and service-friendly way by splitting into several segments. All parts are quick and easy to seal and remove with Velcro fasteners.

Heating mobile tanks

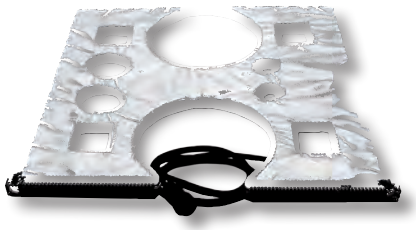
Here the removable heating sleeve is adapted with thermal insulation and temperature control to the mobile tank.

Pressure sensor heating

This high-grade capacitative pressure sensor is heated to the required 160°C with the removable heating sleeve.

Heating sleeve on a support

Simple surfaces, as well as a group of several components, for example a pump with valve and manometer, can be heated by means of an enclosed cage consisting of heating sleeves on supports made of a perforated stainless steel plate.



Heating for reactors

A temperature of 600°C was required for a pilot plant for recycling plastic-coated aluminium in this reactor, so as to thermally separate the plastic and aluminium in this reactor with a conveyor screw.

With several individually controlled heating circuits, the heating system achieved a precisely adapted heat distribution.

Type HM 10

80°C

Flexible barrel heating sleeve

PVC-coating for 200 litre barrel

Operating temperature	80°C
Rated voltage	230 V AC
Rated power	1000 Watt
Material	PU foam / PVC coating
Insulation thickness	5 mm
Dimensions	Ø 605 mm, height 890 mm
Fastener	Velcro / fleece
Temperature sensor	PT100
Connection cable	2.0 m cable
Plug connection	optional
Protection type	IP65 (EN 60529), protection class I
Temperature control	see chapter Control technology
Design	also available for barrels in other sizes

Type HFI 10

80°C

Flexible barrel insulation sleeve

with PVC-coating for 200 litre barrels

Max. insulation temperature	80°C
Insulation thickness	5 mm
Material	PU foam / PVC coating
Inner diameter	605 mm
Outer diameter	625 mm
Height	890 mm
Fastener	Velcro / fleece
Design	also available for barrels in other sizes

Type HFI 20

160°C

Flexible barrel insulation sleeve

Robust and high-grade insulation for 200 litre barrels. Simple installation wit Velcro fasteners.

Max. insulation temperature	160°C
Inner diameter	605 mm
Insulation thickness	17 mm
Outer diameter	640 mm
Height	880 mm
Material	glass fabric aluminium coated
Insulation material	fibreglass
Fastener	Velcro / fleece

Type HBR 10

100°C

Mobile barrel heating

Almost all 200 litre metal and plastic barrels fit on this practical, heated barrel roller. The built-in heater for maintaining the temperature of the barrel's medium has a range from frost protection to 100°C and can also be used outdoors. Various controller versions are available for temperature control of the HBR 10 barrel base heating system, see chapter Control technology.

The polyamide steering rollers (Ø 100mm) have a load bearing capacity of 450 kg

Operating temperature	up to 100°C (mechanical limiter)
Rated voltage	230V AC
Rated power	1200 Watt
Material	Aluminium and steel
Inner Ø	610 mm
Total height	175 mm
Temperature sensor	PT100
Connection cable	2.0 m
Protection type	IP44 (EN 60529), protection class I

Type HB 20

110°C

Heavy, stable barrel base heating plate

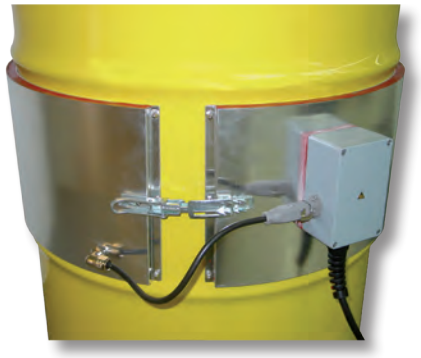
The design of aluminium and galvanised steel ensures functionality and safety, also under difficult installation conditions. The temperature controller is located on the underside, protected in an aluminium housing. The heating surface temperature can be varied between 30°C and 110°C.

Operating temperature	up to 110°C
Rated voltage	230 V AC (other voltages on request)
Rated power	1300 Watt
Material	aluminium and galvanised steel
Dimensions	Ø 510 x 85 mm
Connection cable	2.0 m
Plug connection	German "Schuko" mains plug
Protection type	IP65 (EN 60529), protection class I

Order no.		
HB 20	without control	Option: PT100 sensor
HB 20 K	with controller	setting range 30 – 110°C

Type HM 20

110°C



Robust barrel heating sleeve

The HM 20 is a jacket heater to heat segments of 200 litre DIN barrels. Both the inner and the outer jacket of the barrel jacket heater are manufactured from aluminium, which ensures maximum protection of the electrical components against mechanical damage.

A hinge with adjustable turnbuckle that divides the heating surface into two semi-shells permits convenient installation without having to bend the heating element; the barrel can be completely heated by using three sleeves.

The integrated thermal insulation increases efficiency and reduces the temperature of the touchable surfaces. The heating surface temperature can be set on the attached aluminium housing using a mechanical thermostat in the range 30 – 110°C. A 120°C thermoswitch is also incorporated in each semi-shell, as well as a 140°C thermal fuse as protection against overheating.

Operating temperature	up to 110°C
Rated voltage	230 V AC (other voltages on request)
Rated power	1400 Watt
Material	aluminium sheet
Dimensions	ø 570 mm, height 230 mm
Heater element thickness	approx. 17 mm
Connection cable	2.0 m
Plug connection	German "Schuko" mains plug
Protection type	IP65 (EN 60529), protection class I

Order no.		
HM 20	without control	Option: PT100 sensor
HM 20 K	with controller	setting range 30 – 110°C

Type HF

Socket distributor with temperature control

The plastic housing placed next to the barrel has four "Schuko" sockets, main switch and optionally with temperature control for the barrel content.

Regulation range	0 to 100°C
Rated voltage	230 / 400 V AC
Switching power	3 x 3500 W
Temperature controller	HTE 53
Connection cable	1.5 m with CEE plug 16 A
Protection type	IP54 (EN 60529), protection class I

Order no.	Design
HFV	only terminal block with four "Schuko" sockets, main switch
HFT	with temperature controller, four "Schuko" sockets, main switch
HFP Option	Temperature sensor for barrel contents, PT100 in VA pipe 6 x 1400 mm, 1.5 m supply lead

HVT 1 basic element 250°C

Rated voltage	12 - 660 V AC/DC
Power consumption	up to 3 kW/m²
Continuous temperature	controlled up to 250°C depending on the design
Glass thickness	4 – 6 mm, SPSG / LSG
Transparency	approx. 75%
Surface	from approx. 0.1 m² up to 4 m²
Weight	4 mm 10 kg/m², 6 mm 15 kg/m²
Control	attachment of sensors is possible
Accessories	measurement and control devices freely selectable

Additional properties

- High transparency
- Large surface and uniform heat development
- High level of thermal radiation
- Very short heating time through high power output with low mass
- High tensile strength through SPSG safety glass
- Long service life, no measurable wear

Application examples

- Panel radiators in many shapes, colours and sizes
- Wall and ceiling heating systems, also flush mounted
- Drier ovens
- Hotplates, heating plates
- Window or door panel heating
- Mist-free windows in cold-storage depots, refrigerated displays, construction machinery
- Sight glasses on machines and installations
- Additional heating for window ledges, tiled ovens and tiled walls
- Heating elements for industry
- Heating elements for aquariums and terrariums
- Heating elements for indoor swimming pools and hospitals

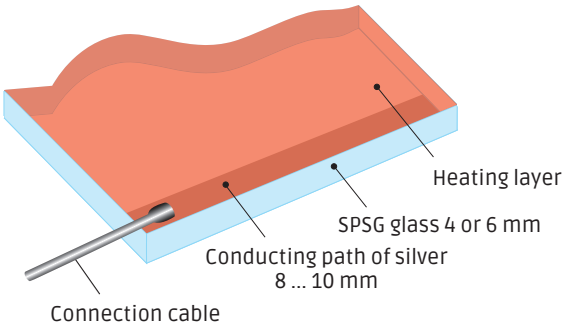
HVT 4 and 5 insulated glass heating elements 60°C

Rated voltage	50 – 230 V
Power	approx. 400 – 800 W/m²
Temperature	60°C, maximum
Glass thickness	see construction
Translucence	approx. 80 %
Surface	0.1 – 4 m²

HVT Hillesheim VitroTherm

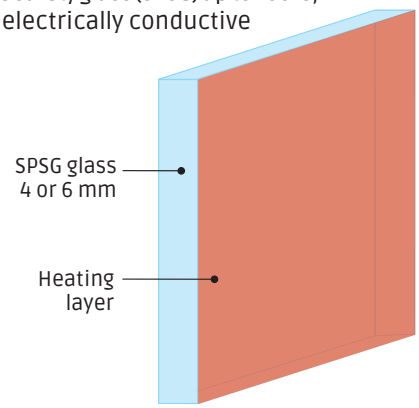
Glass elements which can be used for heating. This was enabled with a special development, coating tempered safety glass with a wafer-thin heating jacket.

Basic structure



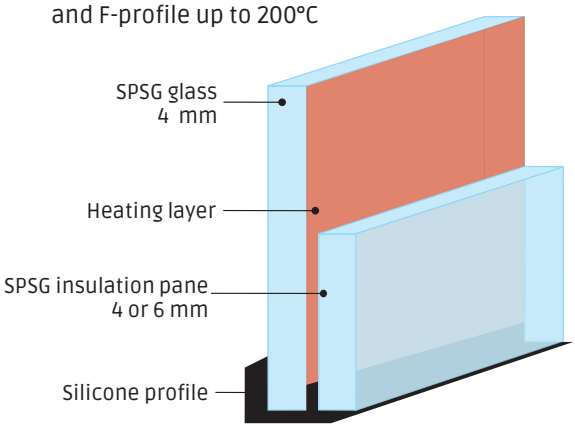
HVT 1 Basic element

as single-pane safety glass (SPSG) up to 250°C, reverse side electrically conductive



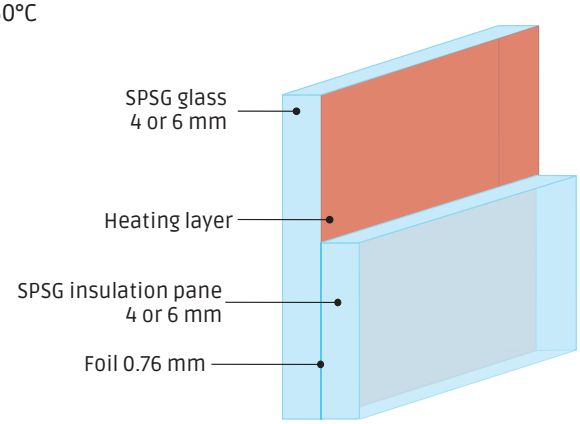
HVT 2

like HVT 1, but with SPSG insulating pane and F-profile up to 200°C



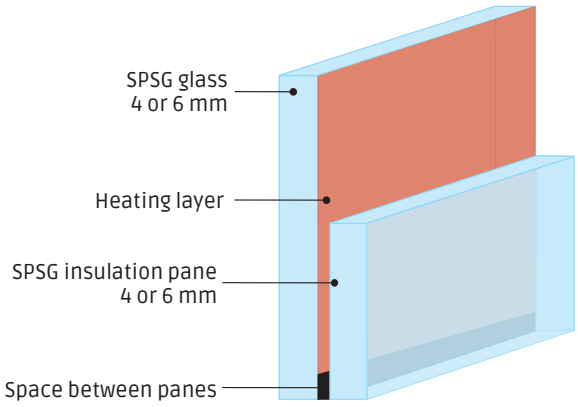
HVT 3

as LSG (laminated safety glass) pane up to 60°C



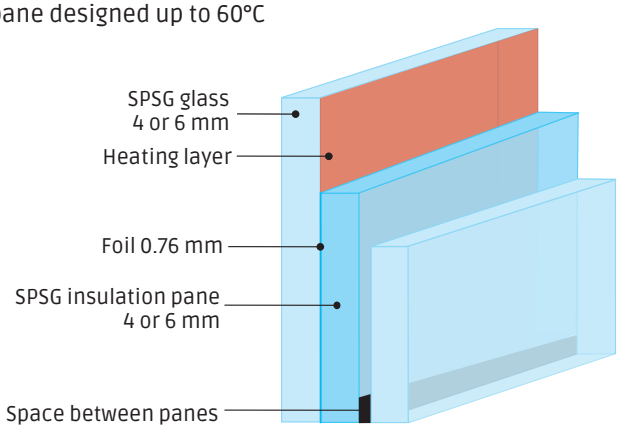
HVT 4

Heating pane as isolation glass element for windows up to 60°C



HVT 5

like HVT 4, but with heating pane as LSG pane designed up to 60°C



SPSG = single-pane safety glass **LSG = laminated safety glass**


Ex

Zones – Explosion groups – Temperature classes

Introduction

Explosion hazard areas are divided into zones, the equipment in device groups and device categories. For a certified device, the marking on the type plate makes it identifiable for which zone the explosion protected equipment may be used.

Classification into device groups

Devices are divided in Groups into I and II, whereby Group I involves mining "underground" and Group II involves gas and dust explosion protection in all other applications.

Classification into zones

Explosion hazard areas are divided into six zones, whereby the division is determined by the probability of how often and long it is expected that a hazardous explosive atmosphere occurs. Combustible gases, mists, vapours and combustible dusts are distinguished.

Zones 0, 1 and 2 arise for gases-mists-vapours, whereby the requirements for the equipment used there ascend from zone 2 to 0.

Zones 20, 21 and 22 arise for dusts, whereby the requirements for the equipment used there ascend from zone 22 to 20.

Classification into ignition protection categories

The ignition protection type does not represent a quality feature, but is a constructive solution to achieve explosion protection for the equipment.

For electrical equipment in gas

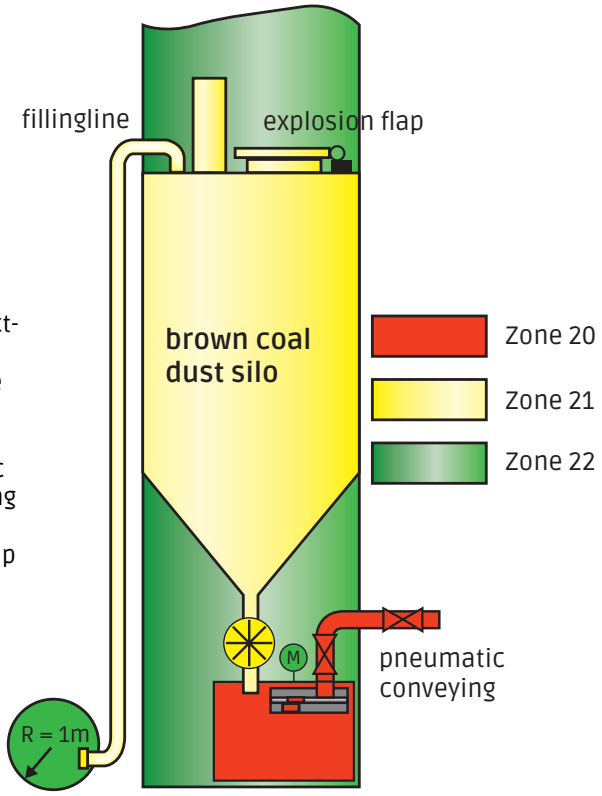
- Intrinsic safety Ex i
- Pressure-proof enclosure Ex d
- Increased safety Ex e
- Pressurized enclosure Ex p
- Oil immersion Ex o
- Cast enclosure Ex m
- Powder filling Ex q
- Ignition protection for Zone 2 Ex n
- Special ignition protection Ex s

For non-electrical equipment

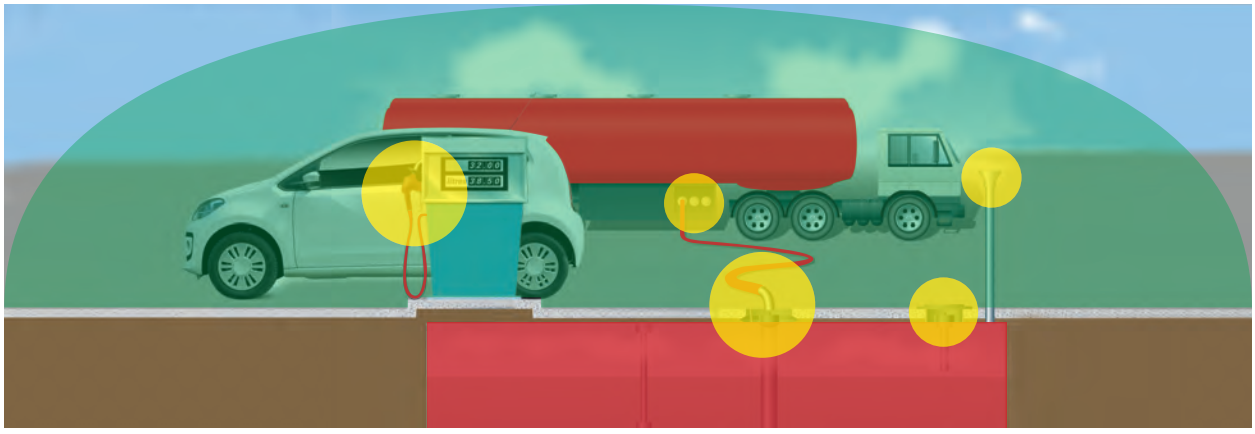
- Protection by flow restricting enclosure Ex fr
- Pressure-proof enclosure Ex d
- Intrinsic safety Ex g
- Constructional safety Ex c
- Ignition source monitoring Ex b
- Pressurized enclosure Ex p
- Liquid immersion Ex k

For electrical equipment in dust

- Pressurized enclosure Ex pD
- Intrinsic safety Ex iD
- Cast enclosure Ex mD
- Dust ignition protection Ex tD

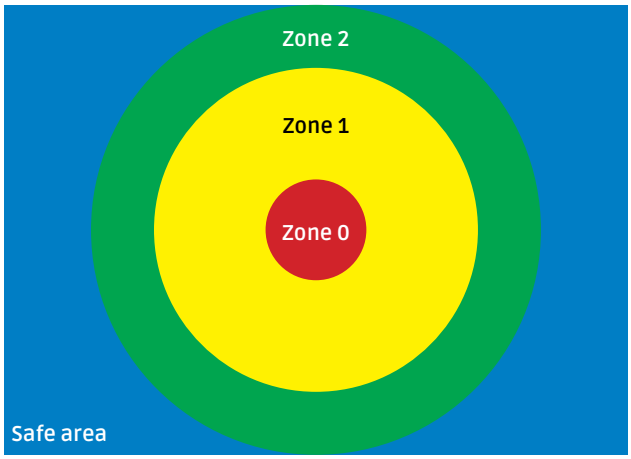


Ex zone plan for a pulverized lignite silo

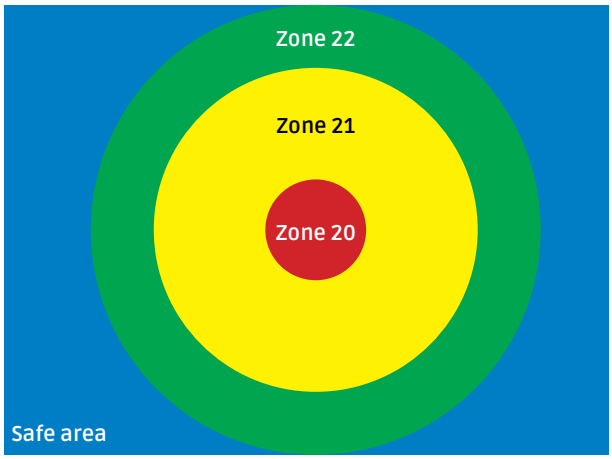


Example: Filling station with Ex zones (explosion hazard areas)

Zone 0 Zone 1 Zone 2



Typical zone sequence for gases-mists-vapours originating from a **petrol drum** with filling in a closed room.



Typical zone sequence for gases-mists-vapours originating from a **grain silo** with filling in a closed room.

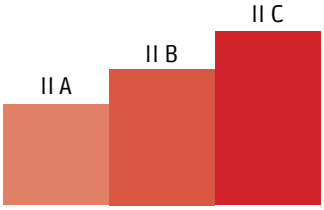
Hillesheim devices and heating systems are approved for gases in zone 1/2 and dusts in zone 21/22.

Classification into device categories

The device category defines which equipment may be used in which zone. In turn, there are six device categories. Categories 1G, 2G and 3G are classifications for gas explosion protection (G = gas); equipment with 1G is suitable for zone 0, 1 and 2, equipment with 2G for zone 1 and 2 and equipment with 3G for zone 2. The categories 1D, 2D and 3 D are classifications for dust explosion protection (D = dust); equipment with 1D is suitable for zone 20, 21 and 22, equipment with 2D for zone 21 and 22 equipment with 3D for zone 22.

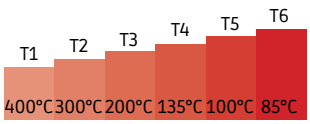
Explosion groups, temperature classes

The device group and device category defines in which zones an item of equipment can be used. It is defined from the explosion group and temperature class for which media within the zones the equipment may be used.



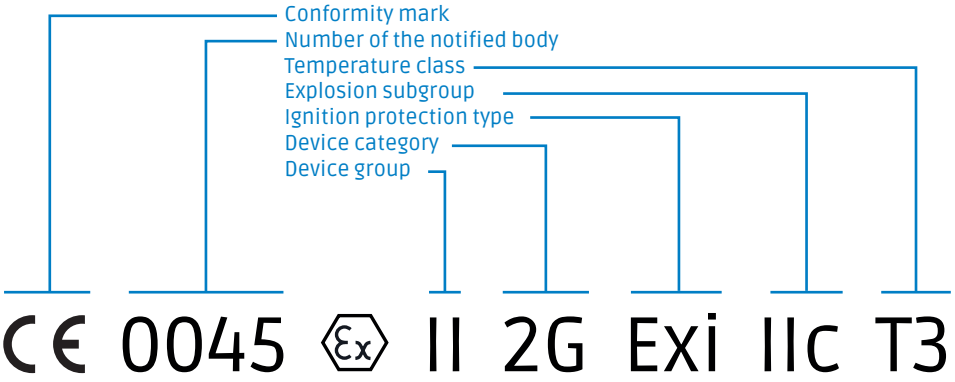
Classification into explosion groups

Depending on the ignition type, the explosion protected equipment is sub-divided for gases, mists and vapours in three explosion groups (IIA-IIB-IIC). The explosion groups are split according to how flammable a gas is. The requirements for the equipment rise from II A to II C.



Classification in temperature classes

The explosion protected equipment installed within the explosion hazard area is divided in six temperature classes (T1 to T6). The temperature class is not - as it is often erroneously interpreted - the deployment temperature of the equipment, but rather the maximum permissible surface temperature on the equipment, which, in relation to an environmental temperature of + 40°C, must not be exceeded at any point on the surface at any time. **The maximum surface temperature must always be lower than the ignition temperature of the surrounding medium. The requirements for the equipment rise from T1 to T6.**



Example

Labelling of devices for operation in explosion hazard areas according to the ATEX product directive 2014/34/EU

HX6 series

200°C

Industrial heating hose with constant power

The industrial heating hose with HX6 series heating conductors is designed for use in Ex areas. The heating hoses are above all characterised by their compact construction with connection configuration. The HX series heating hoses are tested to ATEX standards and with an EC type examination certificate they are certified for the entire heating hose.

The specially structured HX6 series heating hoses can be used in temperature classes T1 ... T3 depending on the temperature control and are suitable for use in zones 1/2 (gas) and zones 21/22 (dust). Their operation in zones 0 and 20 is not permissible.

The HX6 series industrial heating hoses are equipped with **two EX-PT100** sensors. PT100 Exi intrinsically safe are also optional.

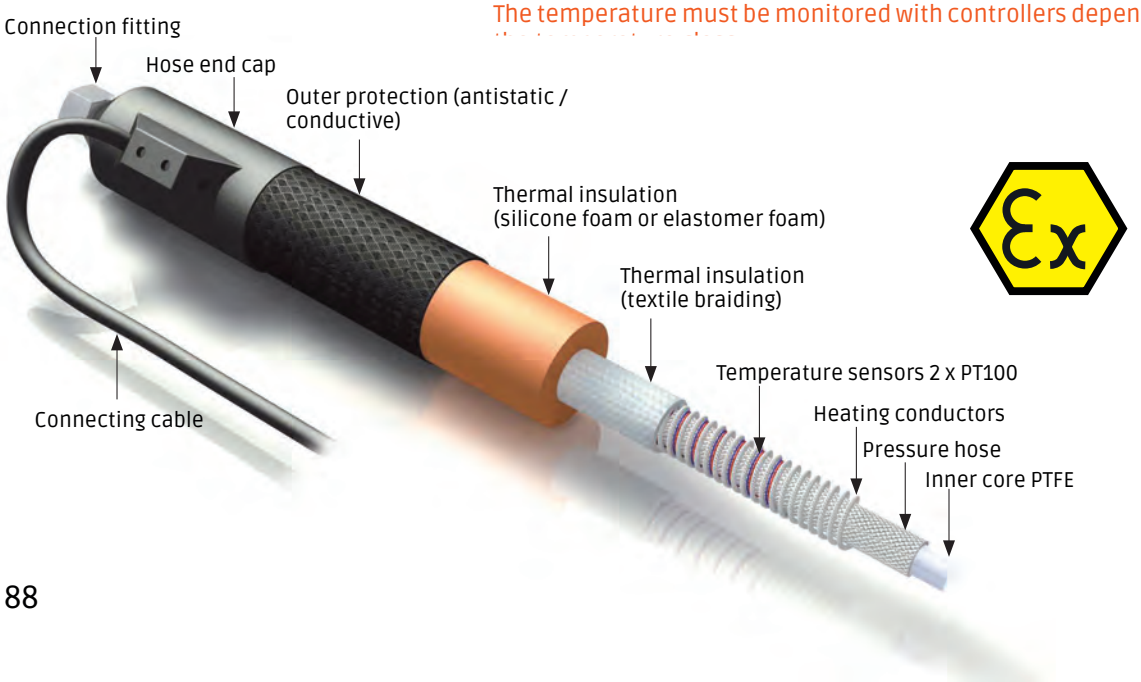
Applications:

Heat-loss free transport of: oil, grease, resin, tar, paint, water, carbon dioxide, plastic, moulding compounds etc. in Ex areas.

Temperature classes	T3=200°C
Ex areas	Zone 1/2 (gas) Zone 21/22 (dust)
Marking	II2G Ex eb IIC T1... T6 II2D Ex tb IIIC T85°C... T450°C CE 2004
EC type examination certificate	EPS 11 ATEX 1 341 X
Directive	2014/34/EU, EN 60079-0, EN 60079-7, EN 60079-18

Operating temperature	200°C
Rated voltage	230 V AC
Power rating	depending on the design of the nominal diameter
Connecting cable	1.0 m
Pressure hose	see Industrial pressure hoses
Connector fittings	steel / stainless steel, see Fittings
Thermal insulation	thermally stabilised, close-pore foam or thermal fleece
Outer protection	antistatic, see Outer protection hoses
Hose end caps	PA hard cap or elastomer cap

The temperature must be monitored with controllers dependent upon



HX6B series Ex 120°C

Industrial heating hose with self-limiting power

The HX6B series industrial heating hoses is designed for use in Ex areas. The heating hoses are above all characterised by their compact construction with connection configuration. The HX series heating hoses are tested to ATEX standards and with an EC type examination certificate they are certified for the entire heating hose.

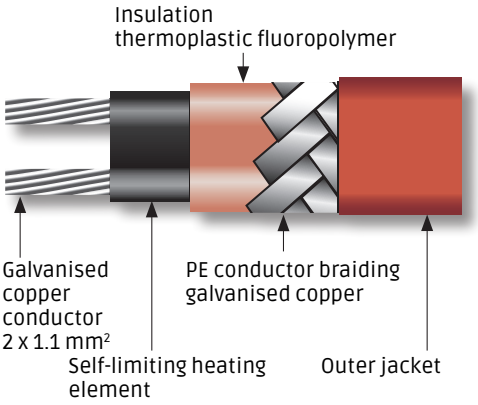
The specially structured HX6B series heating hoses can be used in temperature classes T1 ... T6 depending on the temperature control and are suitable for use in zones 1/2 (gas) and zones 21/22 (dust). Their operation in zones 0 and 20 is not permissible.

The HX6B series industrial heating hoses can be deployed, even without temperature regulation, as a consequence of their self-limiting characteristic. The maximum final temperature must be monitored with controllers dependent upon the application.

Applications:

Heat-loss free transport of: oil, grease, resin, tar, paint, water, carbon dioxide, plastic, moulding compounds etc. in EX areas.

HBR heating tapes, built into HX6B

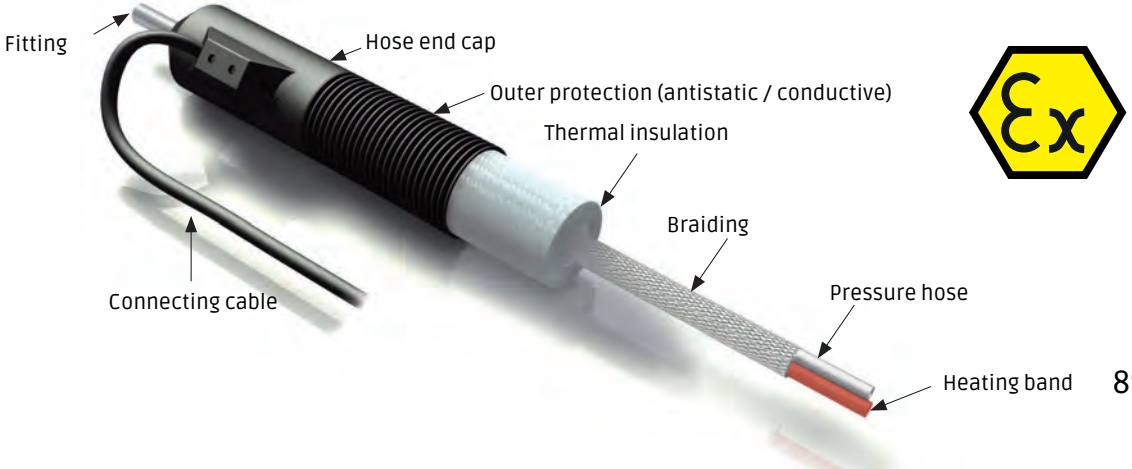


Temperature classes	T6 = 85°C, T4 = 135°C, T3 = 200°C
EX areas	Zone 1/2 (gas) Zone 21/22 (dust)
Marking	Ex II2G Ex mb IIC T3... T6 Ex II2D Ex mb IIIC T85°C... T200°C CE 2004
EC type examination certificate	EPS 11 ATEX 1 341 X
Directive	2014/34/EU, EN 60079-0 , EN 60079-7, EN 60079-18

Operating temperature	approx. 35°C... 120°C
Rated voltage	230 V AC
Power rating	see table below
Connecting cable	1.0 m
Pressure hose	see Industrial pressure hoses
Connector fittings	steel / stainless steel, see Fittings
Thermal insulation	thermally stabilised, close-pore foam or thermal fleece
Outer protection	antistatic, see Outer protection hoses
Hose end caps	PA hard cap or elastomer cap
Option	Ex PT100 or PT100 Exi intrinsically safe sensors

Data relate to an outside temperature of approx. +10°C

Approx. power per metre up to DN12 pressure hose	10 W/m	17 W/m	25 W/m	31 W/m	40 W/m	60 W/m
Holding temperature approx.	35°C	40°C	50°C	60°C	95°C	120°C
Permissible temperature switched on	85°C	85°C	85°C	85°C	150°C	200°C
Max. heating circuit length at 16A	150 m	130 m	100 m	70 m	60 m	40 m
Temperature classes	T6	T6	T6	T6	T3	T3



HX3 series

100 C / 200°C

Analytical heating hose with constant power

The HX3 series analytical heating hoses with Ex heating conductor is designed for use in Ex areas. The heating hoses are above all characterised by their compact construction with connection configuration. The HX series heating hoses are tested to ATEX standards and with an EC type examination certificate they are certified for the entire heating hose.

The specially structured HX3 series heating hoses can be used in temperature classes T1 ... T3 depending on the temperature control and are suitable for use in zones 1/2 (gas) and zones 21/22 (dust). Their operation in zones 0 and 20 is not permissible.

The HX3 series analytical heating hoses are equipped with **two EX-PT100**. PT100 Exi intrinsically safe are also optional.

Applications:

Maintaining temperature and avoidance of frost and condensation (motor exhaust fumes, CO_2-measurement, measuring samples, industrial gases, air & environmental measurements) in EX areas.

Temperature classes	T3=200°C
Ex areas	Zone 1/2 (gas) Zone 21/22 (dust)
Marking	Ex II2G Ex eb IIC T1... T6 Ex II2D Ex tb IIIC T85°C... T450°C CE 2004
EC type examination certificate	EPS 11 ATEX 1 341 X
Directive	2014/34/EU, EN 60079-0, EN 60079-7, EN 60079-18

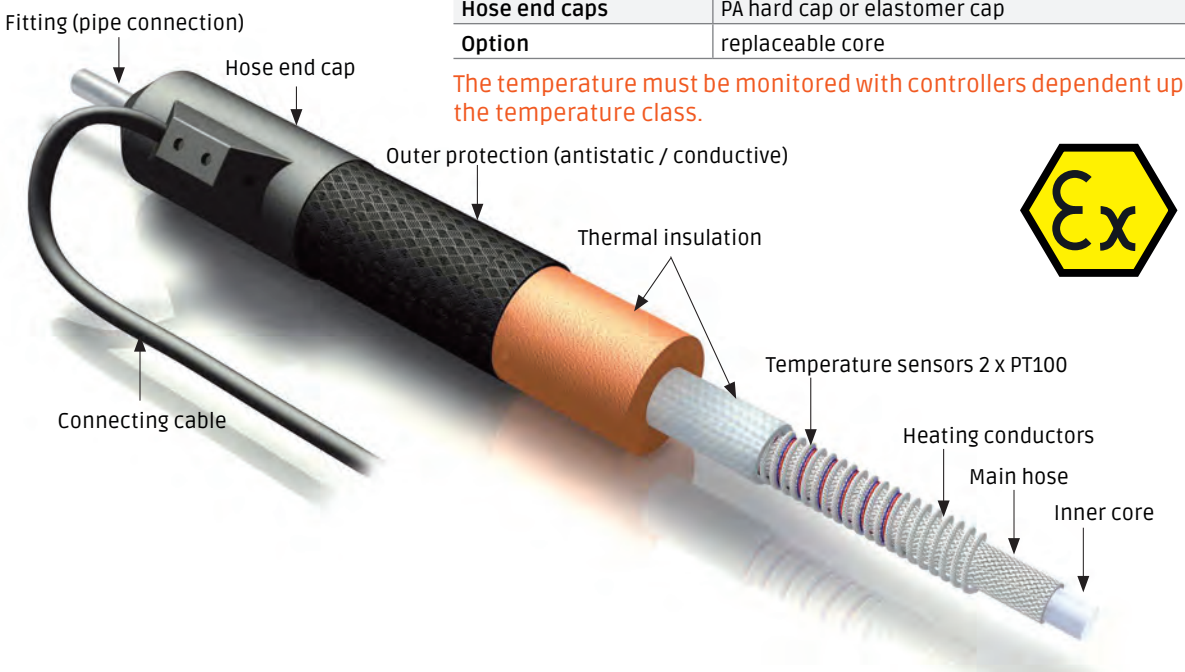
Operating temperature	200°C
Rated voltage	230 V AC
Power rating	depending on the design of the nominal diameter
Connecting cable	1.0 m
Inner core DN 4-12 mm	PTFE, PFA or VA, see Inner cores analytics
Connector fittings	steel / stainless steel, RSL
Thermal insulation	thermally stabilised, close-pore foam or thermal fleece
Outer protection	antistatic, see Outer protection hoses
Hose end caps	PA hard cap or elastomer cap
Option	replaceable core

The temperature must be monitored with controllers dependent upon the temperature class.

RSL

Pipe connection for cutting ring screw connection

DN	RSL L (mm)	d (mm)
4	25	6
6	25	8
8	26	10
10	26	12
12	28	15



HX3B series 120°C

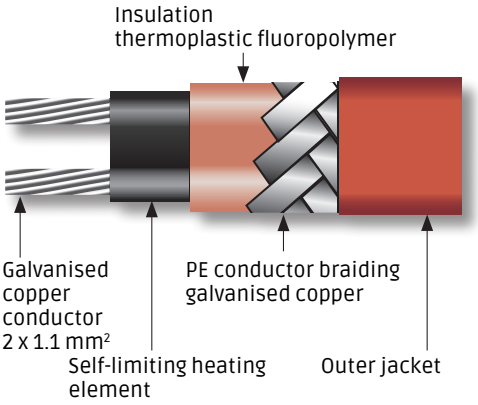
Analytical heating hose with self-limiting power

The self-limiting analytical heating hoses is designed for use in Ex areas. The heating hoses are above all characterised by their compact construction with internal connection configuration. The HX series heating hoses are tested to ATEX standards and with an EC type examination certificate they are certified for the entire heating hose.

The specially structured HX3B series heating hoses can be used in temperature classes **T1 ... T6** depending on the temperature control and are suitable for use in zones 1/2 (gas) and zones 21/22 (dust). Their operation in zones 0 and 20 is not permissible.

The HX3B series industrial heating hoses can be deployed, even without temperature regulation, as a consequence of their self-limiting characteristic. The maximum final temperature must be monitored with controllers dependent upon the application.

HBR heating tapes, built into HX3B



Applications:

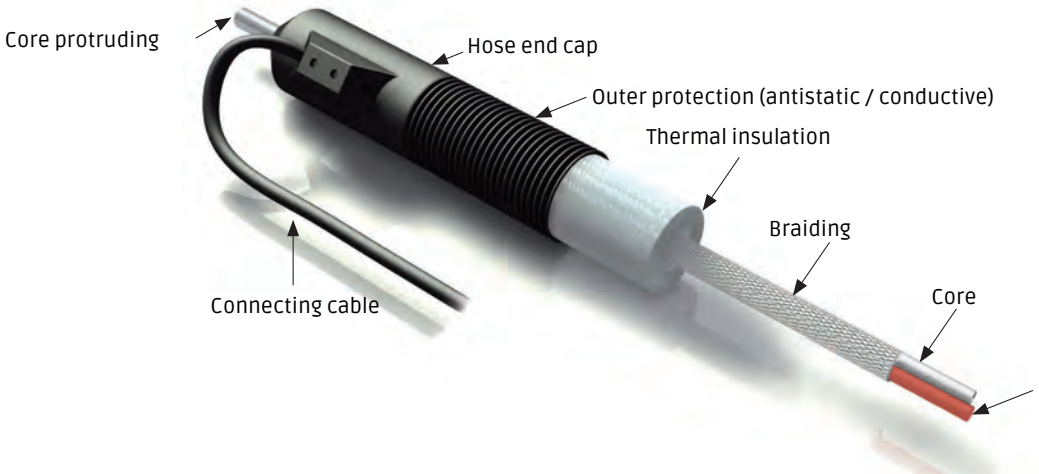
Maintaining temperature and avoidance of frost and condensation (motor exhaust fumes, CO_2-measurement, measuring samples, industrial gases, air & environmental measurements) in EX areas.

Temperature classes	T6 = 85°C, T4 = 135°C, T3 = 200°C
Ex areas	Zone 1/2 (gas) Zone 21/22 (dust)
Marking	Ex II2G Ex mb IIC T3... T6 Ex II2D Ex mb IIIC T85°C... T200°C CE 2004
EC type examination certificate	EPS 11 ATEX 1 341 X
Directive	2014/34/EU, EN 60079-0, EN 60079-7, EN 60079-18

Operating temperature	35°C ... 120°C
Rated voltage	230V AC
Power rating	depending on the configuration of nominal diameter
Connecting cable	1.0 m
Inner core DN 4 – -12 mm	PTFE, PFA, stainless steel 100 mm protruding, without transition
Option	replaceable core
Thermal insulation	thermally stabilised, close-pore foam or thermal fleece
Outer protection	antistatic, see Outer protection hoses
Hose end caps	PA hard cap or elastomer cap
Option	Ex-PT100 / PT100 Exi intrinsically safe sensors

Data relate to an outside temperature of approx. +10°C

Approx. power per metre up to DN12 core	10 W/m	17 W/m	25 W/m	31 W/m	40 W/m	60 W/m
Holding temperature approx.	35°C	40°C	50°C	60°C	95°C	120°C
Permissible temperature switched on	85°C	85°C	85°C	85°C	150°C	200°C
Max. heating circuit length at 16A	150 m	130 m	100 m	70 m	60 m	40 m
Temperature classes	T6	T6	T6	T6	T3	T3



Airtherm air heater 100°C

Air heater with highly flexible connection hose

The Airtherm air heater was specially designed for heating compressed air. The air in the connection heat is heated, which is equipped with a ceramic heating element and the appropriate sensor. The feed connection is via a highly flexible line in which both compressed air and also the electrical connection are integrated. The air and electrics are separated in a connector housing.

Operating temperature	20 to 100°C
Connection thread	G ¼
Manufacturing lengths of the compressed air line	2.5 m, 5.0 m, 7.5 m, 10 m (special lengths on request)

Depending on requirements, the air temperature can be set up to max. 100°C (measured at the pistol nozzle). The compact design permits easy integration into existing systems

Applications

Painting technology:
automatic paint spraying systems, painting robots, manual spraying, prevention of condensation

Breathing air heating (protective wear):
in fire fighting, chemical industry, tank cleaning

General mechanical engineering
For control purposes, our HT 40 controllers, the HT 55L with special air software (connection of two Airtherms possible) or an appropriately approved Airtherm controller for the Ex version can be used.

Airtherm air heater system
Components for the Ex protected area

Connection housing	
Testing and approval	PTB 03 ATEX 1125 X
– IP protection type	IP 65
– Ignition protection type	II 2 G EX e II T3 (gas)
– Ignition protection type	II 2 D IP65 T 200°C (dust)
Cable glands	
PG 16 – testing and approval	EX 80407016 Rose
PG 9 – testing and approval	EX 80407016 Rose
Control line	
Testing and approval	PTB 03 ATEX 1125 X
Heating cartridge	
Testing and approval	PTB 03 ATEX 1125 X
– IP protection type	IP 65
– Ignition protection type	T3
Operating voltage	230 V AC
Power rating	500 VA
Airtherm hose (hybrid round cable)	
Testing and approval	PTB 03 ATEX 1125 X
Air pressure range	1 – 8 bar

HAPX series

80°C

Aluminium heating plate with self-limiting power

Applications:

Heating of parts and moulds, wood and paper industry, automobile industry, mould-making, plastics industry, bookbinding.

The HAPX aluminium heating plates cover a temperature range of up to 80°C and can handle extreme pressure loads and are impact and vibration resistant. Their shapes can be individually fabricated – whether round, oval or L-shaped. Special designs with cut-outs, bore holes and bolt threads are possible.

Even combinations with liquid and air channels for cooling can be implemented.

Holding temperature	approx. 80°C to +10°C
Rated voltage	230 VAC
Power rating	depending on the configuration
Material	Aluminium (AlMg3 EN-AW-5754) (AlMg4.5 EN 573-3)
Dimensions / max.	1450 x 2400 mm
Heating plate thickness	20 mm >
Weight	Thickness: 20 mm approx. 52 kg/m²
Surface	rolled aluminium, finely milled etc.
Pressure rating	80 N/mm²
Expansion	0.24 mm 1°K / over 1000 mm length
Connecting cable	1.5 m long
Protection type	IP65 (EN 60529), protection class I
Temperature regulation	via our temperature controllers on request
Temperature classes	depending on the version T1 ... T6
Ex areas	Zone 1/2 (gas) Zone 21/22 (dust)
Certification	Only the individual components are certified.
Directive	2014/34/EU, EN 60079-0, EN 60079-7
Optional cooling plate	on request
Optional temperature sensor	Ex-PT100 or PT100 Ex i intrinsically safe

We manufacture special designs of our Ex heating plates to customer requirements, for example:

- Aluminium heating plates for heating electronic components, to reduce soldering times
- Aluminium heating plates to heat CDs and solar cells during manufacture and final inspection
- Aluminium heating plates for pressing in the wood and paper industry for laminates and hot adhesives
- Aluminium heating plates for moulding PU foam and GRP prefabricated components

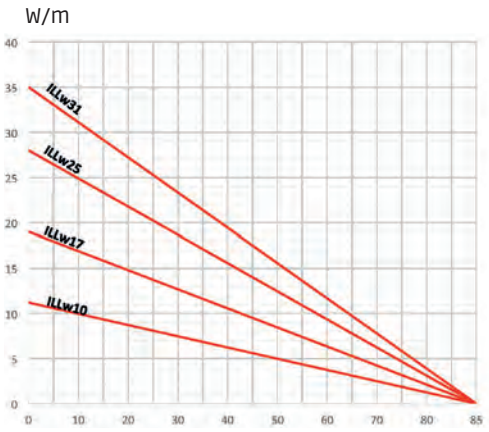
The maximum final temperature must be monitored with controllers.

HBR-ILLw...(CT) type 85°C

Approval:

Output power

Rated output power at 230V AC if the heating system is installed on insulated metal pipes.



Pipe temperature in °C

Accessories

Hillesheim offers a complete range of accessory parts, such as controllers, connection/termination sets, as well as the relevant connection housings. These items are recommended for trouble-free operation.

Self-limiting heating conductor

HBR-ILLw is a self-limiting heating conductor for frost protection or for maintaining temperature in pipes and containers.

This heating conductor can be cut to length in-situ for exact adaptation to the workpiece.

Under the respective worldwide standards, HBR-ILLw is approved for use in explosion hazard and aggressive environments.

As a result of its self-limiting characteristic, the heating conductor cannot overheat even when overlaps exist in its placement. Its output power is limited in depending upon the temperature of the object.

HBR-ILLw is quick and simple to install, it can be fit to size and attached without any special tools. Connection, termination and coupling components are available with explosion hazard area ratings.

Max. permissible temperature	Switched on 85°C / Switched off 85°C
Minimum installation temperature	-40°C
Voltage supply	220-277 V AC / 110-120 V AC / 12 V, 24 V DC
Temperature classification	T6
Maximum resistance of the protective braiding	≤ 18.2 Ohm/km

Type	Nominal dimensions (mm)	Weight kg/100m	Min. bend radius (mm)	Screw connection
ILLw...CT	12.95 x 5.95	10.2	35	M20

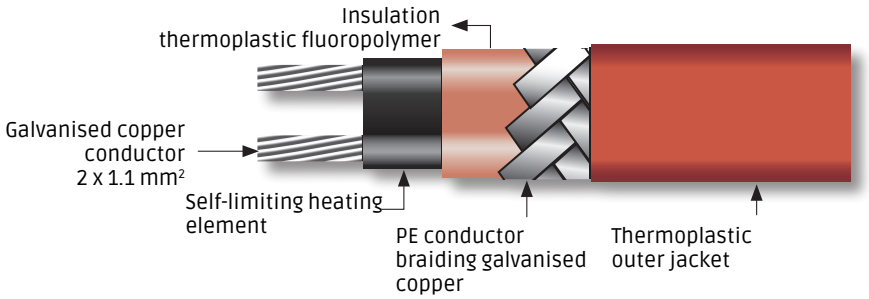
Max. lengths (m) depending on the fuse protection

Typ	Holding* Temp	Start Temp.	10A	16A	20A	25A
ILLw10	40 °C	10 °C	152	198	198	198
		0 °C	122	196	198	198
		-20 °C	84	136	170	198
ILLw17	50 °C	10 °C	102	154	154	154
		0 °C	82	130	154	154
		-20 °C	66	106	132	154
ILLw25	55 °C	10 °C	76	122	124	124
		0 °C	62	98	122	124
		-20 °C	34	56	70	88
ILLw31	60 °C	10 °C	46	74	92	110
		0 °C	34	54	66	84
		-20 °C	26	40	50	64

Fuse protection characteristic type C in accordance with EN60898

The maximum final temperature must be monitored with controllers dependent upon the application.

* approx. holding temperature depending on mounting position, insulation thickness and outer temperature on the pipe.



HBR-ILH...(CF) type Ex 150°C

Self-limiting heating conductor

HBR-ILH is a self-limiting heating conductor for maintaining temperature in pipes and containers.

This heating conductor can be cut to length in-situ for exact adaptation to the particular workpiece.

Under the respective worldwide standards, HBR-ILH is approved for use in explosion hazard and aggressive environments.

As a result of its self-limiting characteristic, the heating conductor cannot overheat even when overlaps exist in its placement. Its output power is limited in depending upon the temperature of the object.

HBR-ILH is quick and simple to install, it can be fit to size and attached without any special tools. Connection, termination and coupling components are available with explosion hazard area ratings.

Max. permissible temperature	Switched on 150°C / switched off 200°C
Minimum installation temperature	-30°C
Voltage supply	220-277V AC / 110 V / 120 V AV
Temperature classification	T3 (200°C)
Maximum resistance of the protective braiding	≤ 18.2 Ohm/km

Type	Nominal dimensions (mm)	Weight kg/100m	Min. bend radius (mm)	Screw connection
ILH...CF	12.2 x 5.2	15.4	30	M20

Max. lengths (m) depending on the fuse protection

Type	Holding* temp	Start temp.	10A	16A	20A
ILH40	90°C	10°C	42	66	84
		0°C	40	64	80
		-20°C	36	58	72

Fuse protection characteristic type C in accordance with EN60898

The maximum final temperature must be monitored with controllers dependent upon the application.

* approx. holding temperature depending on mounting position, insulation thickness and outer temperature on the pipe.

Approval:

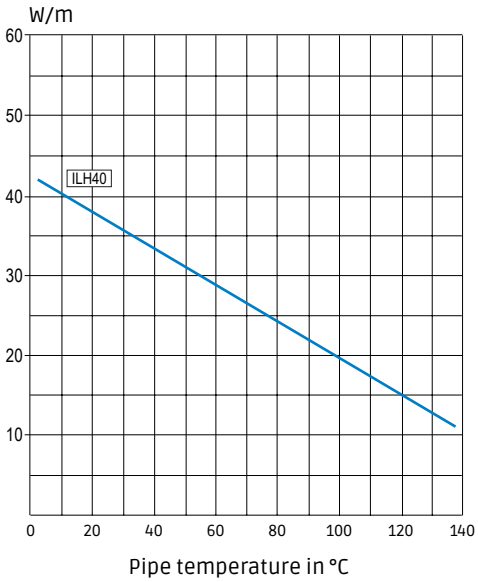
ATEX IECEx EAC

Output power

Rated output power at 230V AC if the heating system is installed on insulated metal pipes.

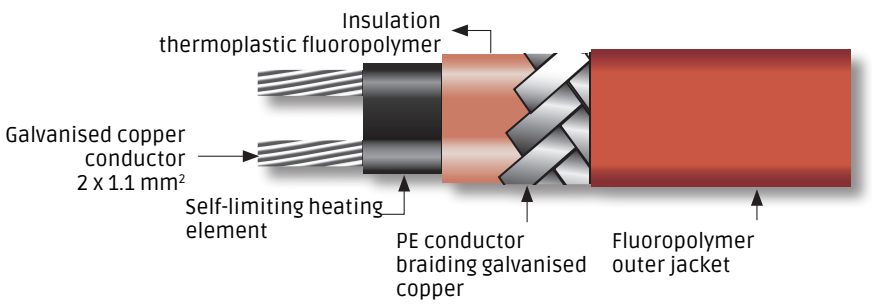
Output power

Rated output power at 230V AC if the heating system is installed on insulated metal pipes.



Accessories

Hillesheim offers a complete range of accessory parts, such as controllers, connection/termination sets, as well as the relevant connection housings. These items are recommended for trouble-free operation.



HBR-ILS...(NF) type 200°C

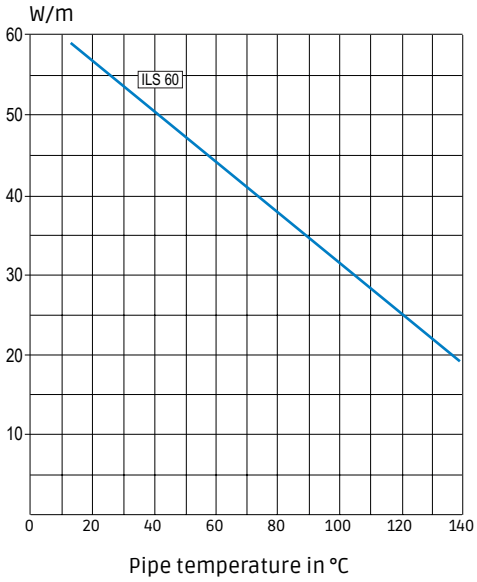
Approval:

Output power

Rated output power at 230V AC if the heating system is installed on insulated metal pipes.

Output power

Rated output power at 230V AC if the heating system is installed on insulated metal pipes.



Accessories

Hillesheim offers a complete range of accessory parts, such as controllers, connection/termination sets, as well as the relevant connection housings. These items are recommended for trouble-free operation.

Self-limiting heating conductor

HBR-ILS is a self-limiting heating conductor intended for industrial use for maintaining the temperature of e.g. pipes and conductors in which high temperature stability is an important factor.

This heating conductor can be cut to length in-situ for exact adaptation to the workpiece.

Under the respective worldwide standards, HBR-ILS is approved for use in explosion hazard and aggressive environments.

As a result of its self-limiting characteristic, the heating conductor cannot overheat even when overlaps exist in its placement. Its output power is limited in depending upon the temperature of the object.

HBR-ILS is quick and simple to install, it can be fit to size and attached without any special tools. Connection/termination and coupling components are available with explosion hazard area ratings.

Max. permissible temperature	Switched on 200 °C / Switched off 250 °C
Minimum installation temperature	-40°C
Voltage supply	220-240 V AC
Temperature classification	T3 (200°C)
Maximum resistance of the protective braiding	≤ 18.2 Ohm/km

Type	Nominal dimensions (mm)	Weight kg/100m	Min. bend radius (mm)	Screw connection
ILS..NF	12.2 x 5.2	15.4	30	M20

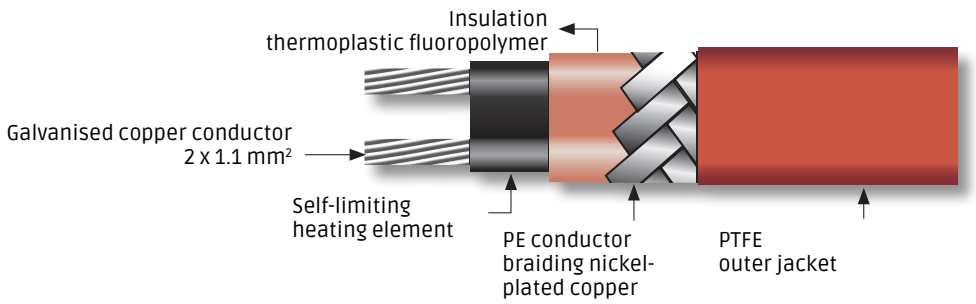
Max. lengths (m) depending on the fuse protection

Type	Holding* temp	Start temp.	10A	16A	20A
ILS60	120°C	10°C	30	50	62
		0°C	30	46	58
		-20°C	26	42	52

Fuse protection characteristic type C in accordance with EN60898

The maximum final temperature must be monitored with controllers dependent upon the application.

* approx. holding temperature depending on mounting position, insulation thickness and outer temperature on the pipe.



Type HBR-IAL8 Ex 190°C

Connection and termination set for parallel heating systems in terminal technology for use in explosive hazard areas

The HBR-IAL8EX system includes a quick and simple to fit connection technology to connect the connecting cable and heating tape and termination based on a screw connection.

The dimensions can be selected so the system can be accommodated beneath the thermal insulation.

Neither a hot-air gun nor any other special tool is required for configuration.

- Temperature stability up to +190°C
- Current load capacity up to 20 A
- For parallel heating systems HBR-ILLw, ILH, ILS
- Very stable, as completely made of nickel-plated brass
- Compact dimensions
- Alternative: Low temperature version up to 135°C, only for HBR-ILLw heating tape

Heating tape - assembled

Self-configuration	
190°C HBR-ILH/ILS	Type HBR-IAL8Ex-HKSS
135°C HBR-ILLw	Type HBR-IAL8Ex-MKSS

Temperature class	T6 / T5 / T4 / T3
Terminal range for supply line	7.0 - 10.5 mm
Terminal range for heating conductor	4.7 x 10 - 6.5 x 13 mm
Max. current load capacity	20 A AC
Measurement voltage	12...400 V AC
Terminal cross section	2.5 mm²
Protection type	IP65
Length connection/termination	110 mm / 70 mm
Diameter	25 mm
Weight connection/termination	168 g / 116 g
Material	Nickel-plated brass
Marking	Ex II 2G Ex e IIC T6/T5/T4/T3 Gb Ex II 2D Ex tb IIIC T195°C Db IP65

Connecting cable Ex (option) by the metre	
HBR-ALF-25	3 x 2.5 mm² 200°C
HBR-ALR-15	3 x 1.5 mm² 135°C

Further information
Please observe installation instructions!

Type HBR-IAL4SS

200°C

Heating tape – assembled ex works

Connection/termination set in silicone technology for use in explosion hazard areas

The connection technology includes easy-to-configuration connection and termination connections in a set. The structure is selected such that the connection can be made directly in a housing approved for Ex areas, e.g. connection housing from the QXEx series or controllers from the IRMBEx series. Additional connecting cables are no longer necessary. In addition, the high temperature stability up to 200°C also allows use with high temperature heating conductors, such as the ILH and ILS series.

- Compact dimensions
- Temperature stability up to 200°C
- Quick and easy to assemble
- For various heating systems

Self-configuration set
Type HBR-IAL4SS

Temperature class	T3
Connection/termination material	Silicone
Length connecting sleeve	125 mm
Length of termination sleeve	66 mm
For following heating tapes	HBR-ILLw ... ILS ... ILH

Type HBR-IAL3Ex-HQSS

180°C

Heating tape – assembled ex works

Connection/termination set in shrink technology for use in explosion hazard areas

The system includes a very flexible and space-saving connection technology for use in explosion hazard areas.

The use of a special temperature stable FEP connecting cable offers various applications, also at very high temperatures.

The set includes the connection and the termination.

- Compact dimensions
- Continuous temperature stability up to 180°C
- Flexible in use
- Used for ILH and ILS heating conductors

Configuration ex works	Self-configuration set
Type HBR-IAL3Ex-HQSS-E	Type HBR-IAL3Ex-HQSS

Temperature class	T3
For following heating tapes	HBR-ILH, HBR-ILS
Length of connection piece	140 mm
Length of termination	55 mm
Marking	Ex II 2G Ex mb IIC T3

Connecting cable Ex (option) by the metre 200°C	
HBR-ALF-25	FEP – connecting cable 3x2.5 mm²

Further information
Please observe installation instructions!

Type HBR-IAL3Ex-MQSS 85°C

Connection/termination set in shrink technology for use in explosion hazard areas

The system includes a very flexible and space-saving connection technology for use in explosion hazard areas.

A heating conductor is connected with a special connecting cable via an insulated joint connector and is subsequently sealed with a heat shrink hose. The very compact dimensions also enable installation under confined conditions.

The installation instructions illustrated allow sources of error to be virtually excluded. The set includes the connection and the termination.

- Compact dimensions
- Temperature stability up to +85°C
- Quick and easy to assemble
- For ILLw... Use of a heating conductor possible

Configuration ex works	Self-configuration set
Type HBR-IAL3Ex-MQSS-E	Type HBR-IAL3Ex-MQSS

Heating tape – assembled ex works

Type HBR-IAL3Ex-MKSS 65°C

Configuration set like MQSS, but for max. 65°C, with terminal block up to 2.5 mm²

Self-configuration set
Type HBR-IAL3Ex-MKSS

MQSS and MKSS data

Temperature class	T6
For following heating tapes	HBR-ILLw
Connecting cable cross section	1.5 mm²
Connecting cable length	140 mm
Length of termination	58 mm
Marking	Ex II 2G Ex mb IIC T4/T5/T6

Connecting cable Ex (option) by the metre 135°C	
HBR-ALR-15	Radox connecting cable 3 x 1.5mm²

Further information

Please observe installation instructions!

Type HT-ExBR

Electronic controller-limiter combination for use in explosion hazard areas

The electronic Ex-controller is a combination of controller and limiter. The settings of the controller parameters are adjustable via precision Potentiometers. The combination of controller and limiter allows easy and space-saving operation of an electrical tracer heater or a heating hose in explosion hazard areas.

- Compact design
- 16 A switching power
- Protection type IP65 / 230 V
- Min. temperature monitoring
- Fault signal lamp

Ambient temperature	-20 to +40 °C
Temperature class	T4
Marking	Ex II 2G Ex e mb d II C T4
Control ranges	Controller: 0..200 °C Limiter: 0..200 °C

Voltage	230 V AC 50-60 Hz
Current	16 A / 3680 W
Switching point accuracy	⩽ 1,5 %
Switching hysteresis	⩽ 3 K
Protection type	IP65
Sensor connection	2 x EX-PT100
Housing dimension L x W x H (mm)	260 x 160 x 90
M25/M16 screw connections	3/2
Terminal cross section (mm²)	4
Error message	fault signal lamp
Alarm connector	Relais 5A
Option EX-PT100	HBR-IRPT100Ex

Type HT-IRM2Ex/AG

Mechanical frost protection thermostat in the housing

The M2Ex/AG is characterised as a bimetal thermostat through its compact dimensions combined with a high switching power. It is outstanding for frost protection monitoring with a heating tape or also suitable for heating plates.

The thermostat is cast into an M20 screw connection, which is installed in a glass-fibre reinforced polyester housing. Up to two heating circuits can be connected in this pre-wired housing.

- Compact dimensions
- For up to two heating circuits
- 16 A switching power
- Low switching hysteresis
- Protection type IP65

Voltage	250 V AC
Switching power	16A
Switching points outside temperature	On 4°C, Off 11°C
Switching accuracy	+/- 3K
Min. ambient temperature	-40°C
Max. ambient temperature	**+40°C (T6)** **+50°C (T5)**
Dimensions	122 x 122 x 90 mm (**LxWxH**)

Ex connection housing HBR-QX

Glass-fibre reinforced polyester housing for use in explosion hazard areas

Ex connection housing made of glass-fibre reinforced polyester for connecting self-limiting heating conductors, single-wire heating conductors and mineral-insulated heating conductors. The connection housings are available in many different versions for all common uses. Usage under extreme environmental conditions, aggressive chemical media and severe mechanical stresses are no problem for these robust distributor housings.

- Temperature stable
- Chemical resistant
- Antistatic
- 2 + 6 + 8 terminals 4 mm²
- Corrosion resistant / UV-resistant

Dimensions HBR-QX-P1 **HBR-QX-P5**	80 x 75 x 55 mm (**LxWxH**) 122 x 120 x 90 mm
Protection type	IP65
Min. ambient temperature	-40°C (-55°C on request)
Temperature class	T6 at +50°C T5 at +55°C T4 at +60°C
Marking	Ex II 2G D, II 1G-D, T6 Exe/Exi

Type HT-IR2M

Mechanical capillary thermostat for use in explosion hazard areas

The IRM series Ex controllers are mechanical 2-point temperature monitors. The black glass-fibre reinforced polyester housing is mechanically robust and serves as a connection for self-limiting heating conductors. The controllers switch the heating circuit directly up to a current of 16 A. If the set temperature is exceeded, the contact opens.

- Compact design
- 16 A switching power / 230 V
- Protection type IP65
- 4 mm sensor thickness
- Resistant against chemical influences

HT-IR2M...Ex	Type 0120	Type 0200
Setting range (°C)	0..120	0..200
Measurement voltage (VAC)	230	230
Measurement current (A)	16	16
Switching difference	7%	7%
max. sensor temperature (°C)	138	225
Protection type	IP65	IP65
Capillary length (mm)	1000	1000
Sensor diameter (mm)	4.0	4.0
Housing dimensions L x D x H (mm)	122x120x90	122x120x90
M25 screw connections	1x	1x
M20 screw connections	1x	1x
Terminal cross section (mm²)	4	4

Marking	Ex II 2G Ex ed IIC T6 Ex II 2D Ex tb IIIC T=80°C IP65

Further information
Please observe wiring instructions!

Type HT-IRB2M

Dual device with mechanical capillary thermostat and mechanical capillary limiter for use in explosion hazard areas

The Ex controllers / limiters are mechanical 2-point controllers. The glass-fibre reinforced polyester housing is mechanically robust. The combination of controller and limiter allows easy and space-saving operation of an electrical tracer heater in explosion hazard areas. The sensors with just 4 mm outer diameter are especially well suited for electrical trace heaters.

- Compact design
- 16 A switching power
- Protection type IP65 / 230 V
- 4 mm sensor thickness
- Resistant against chemical influences

Minimum ambient temperature:	-40°C
Temperature class	T6 at +50°C
Marking	Ex II 2G Ex ed IIC T6 Ex II 2D Ex tb IIIC T=80°C IP65

	Control ranges
HT-IRB2M0120/130190Ex	Controller: 0..120°C Limiter: 130..190°C
HT-IRB2M0200/0200Ex	Controller: 0..200°C Limiter: 0..200°C

	0120/130190	**0200/0200**
Voltage (VAC)	230	230
Current (A)	16	16
Switching difference	7%	7%
max. sensor temperature (°C)	138/215	225/215
Protection type	IP65	IP65
Capillary length (mm)	1000/1000	1000/1000
Sensor diameter (mm)	4/4	4/4
Housing dimensions L x W x H (mm)	220 x 120 x 90	220 x 120 x 90
M25/M20 screw connections	1/2	1/2
Terminal range M25/M20 (mm)	6-13/7-17	6-13/7-17
Terminal cross section (mm²)	4	4

HBR-IRPT 100Ex

200°C

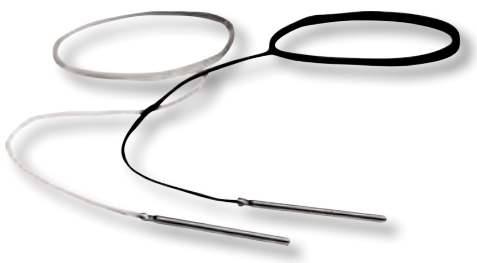
PT100 for use in explosion hazard areas

The PT100 temperature sensor has a PTFE connecting cable. It serves to record temperature and is attached directly to the object to be heated. It's flexible design makes it outstandingly well suited to also be attached to small components.

- Small design
- Very flexible through PTFE cable
- Up to 200°C
- 4-wire technology
- Latest standards

Voltage	max. 60 V
Measuring range	up to 200°C
Signal circuit	max. 10 mA AC/DC
Sensor diameter	6 mm
Sensor length	60 mm
Connecting cable	length 1.5 / 10 m
Measurement method	4-wire
Marking	II2GD Ex e II T1-T6 / II2GD Ex td A21 IP66T 60°C

HBR-HTI 100



PT 100 sensor +200°C	PT 100 sensor +250°C

The HTI type PT100 sensor is available as Exi intrinsically safe.


hillesheim
HT 40
Reset
ON/OFF


HT-55 DUO-REGLER
hillesheim

HT 43 series

Electronic controller

Thanks to its compact design, the HT 43 temperature controller is a universal controller in machine, system and apparatus applications. In the design of this device, particular attention was paid to making its handling simple and comprehensible.

The controllers are permanently configured ex works and require no further reprogramming.

The contactless switching power is 2300 Watt.

All our standard series heating hoses have a 6+PE-pin plug that is perfectly matched to this controller.

Voltage supply	230 Volt AC / 60 Hz, option 115 Volt
Switching power	2300 Watt, 10A
Sensor types	Fe-CuNi (J), NiCr-Ni (K) with reference point compensation, sensor breakage protection and sensor polarity control PT100 2-wire DIN/IEC
Tolerance	0.1 % – 0.2 % of full range
Controller outputs	elect. switch (controller) (10 A), triac
Alarm outputs	alarm output relay 6 A, limit comparator Y3, ±10 K from setpoint, alarm output limit contact set to max. temperature range, Y2
Controller response	P-PID
Display actual/target value	4-digit LED display (13 mm)
Deviation display	7 LED ±12°C flashes
Operation	foil keypad 4 push buttons
Housing material	Makrolon
Housing dimensions	160 x 80 x 55 (L x W x H)
Mounting plate dimensions	160 x 100 mm H x W / serves as a heat sink
Fastening	4 bores for M4 screws
Protection type	IP65 (EN 60529), protection class I
Load outputs	6+PE-pin socket, mains cable 1.2 m, 1 x for signal outputs, KV screw connectors
Mains plug	German "Schuko" mains plug, 1.2 m long
Option	external setpoint input

Setting ex works					
Sensor type PT100		**Sensor type Fe-CuNi (J)**		**Sensor type NiCr-Ni (K)**	
Type	Control range	Type	Control range	Type	Control range
HT 43 – 10P	0 – 100°C	HT 43 – 10P	0 – 100°C	HT 43 – 10P	0 – 100°C
HT 43 – 20P	0 – 200°C	HT 43 – 20F	0 – 200°C	HT 43 – 20N	0 – 200°C
HT 43 – 25P	0 – 250°C	HT 43 – 25F	0 – 250°C	HT 43 – 25N	0 – 250°C
HT 43 – 50P	0 – 500°C	HT 43 – 50F	0 – 500°C	HT 43 – 50N	0 – 500°C
		HT 43 – 100F	0 – 999°C	HT 43 – 100N	0 – 999°C

HT 41 / 42 series

Controller / limiter combination

As a result of their free configurability and compact design, the HT 41 / 42 self-programmable temperature controllers are universal controllers in machine, system and apparatus applications.

In the design of this device, particular attention was paid to the **limiter function** with a permanent shutdown for unattended operation according to DIN/VDE 0721 and to non-contact switching of **3680 Watt**.

Voltage supply	230 Volt AC / 60 Hz, option 115 Volt
Switching power	3680 Watt, 16 A
Sensor types	Fe-CuNi (J), NiCr-Ni (K) with reference point compensation, sensor breakage protection and sensor polarity control, PT100 2-wire DIN/IEC
Tolerance	0.1% – 0.2% of full range
Controller outputs	elect. switch (controller) (16 A), triac
Alarm outputs	alarm output relay 6 A, limit comparator Y3, ±10 K from setpoint
Controller response	P-PID
Limiter function	Signal via 2nd PT100
Cutout temperature Limiter	50°C – 500°C adjustable, actuates 16 A mechanical relay
Display actual/target value	4-digit LED display (13 mm)
Measuring range	-199 to +999 digits
Deviation display	7 LED ±12°C flashes
Operation	foil keypad 4 push buttons
Housing material	Makrolon
Housing dimensions	160 x 80 x 56 mm (W x H x D)
Mounting plate dimensions	160 x 100 mm (H x W), serves as a heat sink
Fastening	4 bores for M4 screws
Protection type	IP65 (EN 60529), protection class I
Type HT41 cable inputs/outputs	8+PE-pin socket HANQ8 / load mains cable 1.2 m with German "Schuko" mains plug
Type HT42 terminal connections	KV screw connectors without mains cable
Option	external setpoint input

Setting ex works Sensor type PT100	
Type	Control range
HT 41	0 – 200°C
HT 42	0 – 200°C

These parameters can be reprogrammed by the customer, or we will supply the setting as required (additional charge).

HT42 with screw connections

HT41 with 8-pin socket

HT44 series

Power output via SSR, 3-pin, 6900 Watt

Thanks to its compact design, the HT44 temperature controller is a universal controller in machine, system and apparatus applications. In the design of this device, particular attention was paid to making its handling simple and comprehensible. **Operation as with the HT40 series.**

Voltage supply	230/400 V AC 50/60 Hz
SSR switching power	3 x 2300 W 3 x 10A, electronic
Control range	0 to 999°C
Sensor types	PT100, Fe-CuNi (J), NiCr-Ni(K)
Alarm output	limit comparator
Display actual/target value	4-digit LED display 13 mm
Deviation display	7 LEDs +/- 12°C flashes
Operation	4 push-buttons, foil keypad
Protection type	IP65 (EN60529), protection class I
Housing dimensions	ABS, dimensions 180x190x70 mm (WxHxD) incl. connection socket
Mounting plate dimensions	180 x 160mm (W x H)
Mains cable length	1.5 m
Plug	CEE plug, 16 A
Output / load	HAN Q8 socket, 8-pin

HT45series

Power output via SSR, 1-pin, 4600 Watt

Thanks to its compact design, the HT45 temperature controller is a universal controller in machine, system and apparatus applications. In the design of this device, particular attention was paid to making its handling simple and comprehensible. **Operation as with the HT40 series.**

Voltage supply	230 V AC 50/60 Hz
SSR switching power	1 x 4600 W 1 x 20 A, electronic
Control range	0 to 999°C
Sensor types	PT100, Fe-CuNi (J), NiCr-Ni(K)
Alarm output	limit comparator
Display actual/target value	4-digit LED display 13 mm
Deviation display	7 LEDs +/- 12°C flashes
Operation	4 push-buttons, foil keypad
Protection type	IP65 (EN60529), protection class I
Housing dimensions	ABS, dimensions 180x190x70 mm (WxHxD) incl. connection socket
Mounting plate dimensions	180x160 mm (WxH)
Mains cable length	1.5 m / 3x2.5 mm²
Plug	without plug
Output / load	Binder 694 4-pin + PE

HTI 16 / HTP 16 series

Integral controller / monitor combination

The device impresses with its perfect matching with our trace heating systems with HTI heating conductor and its compact design and simple handling. Easy mounting via the mounting plate serving as a heat sink and modern connection systems are self-evident.

The HTI 16 temperature controller controls the temperature of the heating conductor via the change in resistance of the heating wire without further sensors. The integral controller does not measure at one point, but rather the average value over the entire length / surface of the heating system directly from the heating wire and registers a temperature change immediately without any delay. The measured value corresponds to the temperature profile over the entire system and not the temperature at a single point, as is the case with a sensor. A special nickel alloy is used as the heating wire. **A PT100 is also required as a HTP 16 controller-monitor.**

Voltage supply	230 V AC (optional 115 V / 400 V AC), 50 ... 60 Hz
Controllable heating power	3680 W (max. 16 A resistive load, ED 70 ... 80 %) 230 V 6400 W at 400 Volt, 1840 W at 115 Volt
Min. output current	1 A resistive load
Control range (-20 ... +250°C in 4 segments)	-20 – +40°C 0 – 100°C 10 – 150°C 10 – 250°C
Display actual/target value	3-digit LED display
Temperature setting	digital via keys
Power unit	triac
Signal relay	changeover relay 230 V AC, 6 A
Protection type	IP65 (EN 60529), protection class I
Mounting surface	160 x 122 mm (H x W)
Fastening	4 bores for M4 screws
Terminal clamps	2.5 mm^2
Control	pulse package control with zero passage detection and defined heating pause
Versions Output / load	**D** – 1.3 m cable with Schuko plug **K** – terminal clips / KV screw connection
Housing dimensions	81 x 161 x 65 mm (W x H x D) ABS housing without screw connections
Option HTP 16	2nd control circuit with PT100 sensor as controller-monitor combination

The HTI controller is always calibrated on the corresponding heating circuit. On supply of a heating system with an assigned controller system, the device is factory set. The heating system and the controller are then labelled accordingly. The calibration is stored as a mode and can be performed without great effort.

The calibration and matching to different heating systems is performed at the press of a button.

HT 55 series

HT 55

Self-optimizing dual controller for the installation in a switchgear cabinet on a top-hat rail

Thanks to its free configurability, the HT 55 is a universal controller in machine, system and apparatus applications. In the design of this device, particular attention was paid to making its handling simple and comprehensible. Mounting on standard rails and the removable terminals (plug-in blocks) guarantee use even under difficult installation conditions in the switchgear cabinet.

Voltage supply	230 Volt AC / 50 Hz or 24 Volt DC 115 Volt AC / 50 – 60 Hz optional
Sensor types	Fe-CuNi (J), NiCr-Ni (K) PT100 NI-120, sensor breakage protection, sensor polarity control, short-circuit monitoring
Tolerance	1 % of the relative temperature
Actual/target value display	3-digit LED display (13 mm) scan operation between channel 1 and 2
Measuring range	0 – 250°C units
Controller output A	via 2 internal triacs max. power 1200 W for both channels together
Controller output B	via two mechan. changeover relays, switching power 2 x 1500 W at 230 V AC
Controller output C	2 x 12 V DC to control a solid state relay to switch higher powers
Configuration	as dual controller, each channel is configured as a controller / limiter each channel monitors the other
Optional	two independent 4 – 20 mA inputs for external setting of setpoint
Protection type	IP40 (EN 60529), protection class
Controller dimensions	72 x 70 x 90 mm (H x W x D)
Connections	pluggable connection terminals
Operation	parameter assignment and configuration using keypad
Special functions	self-optimization of controller parameters for fast adaptation to environmental conditions. Safety operation mode by connecting the relays before the triac control to switch off fault alarm. Setpoint limitation and setpoint correction adjustable. Attachment on 35 x 7.5 mm rail according to DIN 50022

Installation housing for HT 55	
Housing dimensions HZ-EK 2	for 1 unit 125 x 200 x 122 mm
Housing dimensions HZ-EK 4	for 2 units 200 x 200 x 122 mm
Housing dimensions HZ-EK 6	for 3 units 250 x 200 x 122 mm
HT 55 protection type	IP40 (EN 60529) without housing IP65 (EN 60529) in installation housing
Design	in accordance with VDE 0631

HT 55H series

HT 55H dual controller

Installed in housing
Design with socket or screw connections. Ready wired. For controlling two heating circuits

Technical data, see HT 55

The HT 55 is illustrated in the HZ-EK2 housing, installed and ready to plug in.

HT 55 H

HLD 55 series

Temperature controller for high load currents

Three-phase or deviating voltages can be connected potential-free (floating) via an in-built contactor or SSR relay.

The modern wall housing is easy to mount and the integrated microprocessor controller is programmable for every task.

Switching power	with contactor 3 x 4.6 kW (20 A) with SSR relay 1 x 5.7 kW (25 A) 2-channel double power
Panel mounting controller	data, see HT 55
Voltage supply	230 Volt / 400 Volt AC
Inputs	KV screw connections
Terminal clamps	2.5 – 4 mm²
Protection type	IP65 (EN 60529), protection class I
Housing	polystyrene (with transparent cover), hinged cover
Housing dimensions	depending on the design

HTM 55 series

Multi-channel controller

Control circuits	4 – 10
Switching power	per circuit triac 600 W or relay 1500 W
Voltage supply	230 Volt / 400 Volt AC
Panel mounting controller	data, see HT 55
Inputs	KV screw connections
Protection type	IP65 (EN 60529), protection class I
Housing	polystyrene (with transparent cover), hinged cover
Housing dimensions	depending on the number of controllers

HTE 53 series

Simple controller for top-hat rail installation 2300 Watt / 230 Volt

The dimensions of this controller correspond to a conventional built-in fuse and is easy to install in switchgear cabinets and distribution fuse boards.

Voltage supply	230V AC
Switching power	1 x 2300 W, 10 A, mechanical
Control range	-200°C ... +500°C adjustable
Sensor type	PT100 2-wire
Special features	switchable to Fahrenheit
Display actual/target value	3 digits LCD display 16mm high
Switching status	1 LED
Operation	3 push buttons
Protection type	IP20 (EN 60529)
Housing material	polycarbonate
Housing dimensions	23x90x62mm (W x H x D)
Connection	screw terminals
Fastening	top-hat rail 35x7.5 mm

Installation housing for HTE 53	
Housing dimensions HZ-EK 2	for 4 units 125 x 200 x 122 mm
Housing dimensions HZ-EK 4	for 8 units 200 x 200 x 122 mm
Housing dimensions HZ-EK 6	for 12 unit 250 x 200 x 122 mm
Protection type	IP65 (EN 60529), in housing
Design	in accordance with VDE 0631

HT52 series

Front panel mounted controller 3680 Watt / 230 Volt

Front panel controllers generally have very low switching power, in the range of 2 - 3 Amperes. This is why additional power switches must be built into control cabinets, at substantial extra cost, in order to accommodate higher heating power requirements.

In contrast, our HT52 panel regulator is a true power package capable of providing 3680 Watt – without contacts – via a SSR from a 16 A, 230 Volt power source.

This regulator is also very simple to program and it has practical functions, like ramp-up circuitry, self-optimisation, heat circuit control and broken sensor indicator.

Voltage supply	230V (optional: 24V DC)
Switching power	1 x 3680W 16A, electronic
Control range	0 ... 999°C (adjustable)
Sensor types	PT100 / FeCuNi (J) / NiCr Ni (K)
Alarm output	2x relay (closer) 2 A
Display actual/target value	10 mm high segmented display
Controller type	two-point controller
Operation	4 push-buttons, foil keypad
Switching status	LED
Protection type	IP20 (front-side IP50), protection class I
Housing dimensions	Noryl, 96 x 96 x 95 mm (W x H x D)
Connection	terminal strip / pluggable

UTR series

Temperature controller for wall mounting

This is a simple and inexpensive temperature controller with PTC sensor, and internal or external setpoint setting.

It is built into a housing and carries out simple temperature control of heating strips and underfloor heating systems.

The PTC temperature sensor can be extended up to 50 m.

Voltage supply	230 V AC, +6 / -15%, 50 / 60 Hz
Switching power	3600 Watt
Display	"Heating on", "Sensor break" LED
Perm. ambient temp.	-20° to +50°C
Switching temperature difference	adjustable approx. 10 K
Max. perm. switching current	16 A
Contact (relay contact)	1 changeover contact, potential-free (floating)
Electr. connections	screw connections
Setpoint setting	knob
Mounting	wall mounting
Protection type	IP65 (EN 60529), protection class II
Cable entry	3 x KV screw connectors
Housing material	plastic
Housing dimensions	120 x 122 x 56 mm (W x H x D)

PTC temperature sensor	Type: UTR-175-PTC
Sensor	(PTC) linearised, self-monitoring
Cable length	1.5 m
Sensor diameter	8.5 mm
Ambient temp.	-20° to +175°C

Type	Control range
UTR-60	0 – 60°C
UTR-100	40 – 100°C
UTR-160	100 – 160°C

Sensor UTR (optional)

HTK series

Mechanical two-point controller

This capillary tube controller is suitable for simple temperature control or monitoring, for example for antifreeze and roof gutter heating. It is available in three temperature ranges.

Voltage supply	230 V AC, 50 / 60 Hz
Switching power	3600 W / 16 A
Switching hysteresis	5 K
Protection type	IP65 (EN 60529), protection class II
Accuracy class	5 %
Control response	P
Connection	screw terminals
Power control	via spring contact
Housing material	ABS, polycarbonate
Housing dimensions	160 x 80 x 75 mm (H x W x D)

Type	Control range
HTK 40	0 – 40°C
HTK 85	0 – 85°C
HTK 200	50 – 250°C

AZT series

Electronic antifreeze controller

This is an inexpensive electronic antifreeze controller, with internal or external setpoint setting.

When the outside temperature drops, it switches the heating on for antifreeze protection and switches off again when the outside temperature rises.

Voltage supply	230 V AC, +6 / -15%, 50 / 60 Hz
Display	"Heater on" control lamp
Control range	-15° to +15°C
Max. perm. switching current	10 A / 250 V
Switching power	2.2 kW
Contact (relay contact)	1 changeover contact
Perm. ambient temp.	-20° to +40°C
Switching temperature difference	approx. 0.5 K
Sensor element	NTC linearised, in the housing
Protection type	IP54 (EN 60529), protection class II
Mounting	wall mounting
Internal setting	Type: AZT-I 15
External setting	Type: AZT-A 15
Housing material	plastic
Housing dimensions	91 x 91 x 46 mm (W x H x D)

HTL 13 series

Interval power controller

The Hillesheim HTL 13 is suitable for automatic, continuously adjustable temperature control of electrical heating systems and heating units. The load is connected via an in-built flange socket. The continuously adjustable temperature control is achieved by automatically switching the power supply on and off in precise time intervals. The duty cycle of the power supply can be continuously adjusted with the knob on the power controller. This means that with a low setting the power output cycle is briefly on - long off, with a higher setting the power controller is briefly off - long on.

Voltage supply	230 V AC, 50 / 60 Hz
Controllable heating power	2990 W (max. 13 A)
Temperature setting	knob / scale
Switching cycle	depending on setting 10 – 80%, or max. 100%
Protection type	IP54 (EN 60529) in the connected state
Connecting cable	1.3 m
Plug	Euro 16 A
Socket	Hirschmann STAKEI 200, 2 + PE
Housing material	polycarbonate, grey
Housing dimensions	80 x 80 x 80 mm (W x H x D)

HTI 6 series

Integral mini-controller

The HTI 6 is a temperature controller manufactured with highly-integrated electronic components used in nano Watt technology. Temperature detection is accomplished directly through the heater wire. The temperature setting is made by way of a DIL switch which permits settings in 2°C increments up to a maximum of 254°C. A triac is used in this temperature controller to achieve wear-free switching.

Voltage supply	230 V AC +6/-10%, / 50...60 Hz
Switching power	max. 1500 Watt (max. 7A) min. load current 1A
Controller type	integral / without sensor / special heating conductor
Display	LED red / green
Power switch	triac in zero-crossing
Control range	0 .... 254°C, +/-5°C
Setting	setpoint setting 2°C steps with a DIP switch
Protection type	IP42 / Cast: IP65 (EN 60529)
Response	two-point controller
Inputs	cable glands
Housing material	PA glass-fibre reinforced
Housing dimensions	62 x 44 mm (D x W)

HT 54 series

SMD miniature controller for PT100 sensor

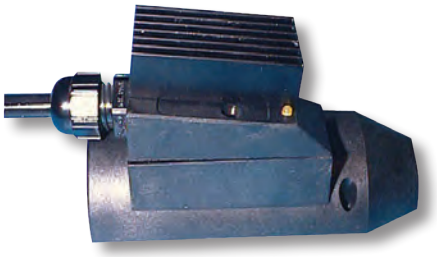
The idea of integrating a temperature controller directly on the relevant heating system failed in the past due to the size of the components.

Today's SMD technology only takes up a fraction of the space of earlier electronics. This prompted us to develop a complete temperature controller for installation in the upper part of the PA hard cap of our heating hoses.

The HT 54 is the result!

We have accommodated the controller board on an area of just 35 x 40 mm. Thanks to this construction, the customer can save on external control devices. This creates space in the switchgear cabinet.

The HT 54 can also be used just as well for control purposes on heating jacket heating plates or heating strips. Its small dimensions open up new fields of application.



Voltage supply	230 V AC / 50 Hz
Switching power	1000 W / 5 A
Power switch	triac in zero-crossing
Control range	0 .... 254°C, +/-5°C
Setting	setpoint setting 2°C steps with a DIP switch
Display	heating operation yellow LED
Protection type	IP42 / Cast: IP65 (EN 60529)
Response	two-point controller
Sensor	PT100
Inputs	cable glands
Housing material	PA glass-fibre reinforced
Housing dimensions	62 x 44 mm (D x W)

HE series

SSR electronic load relay 30 A / 20 A

The HER load relay is a ready-to-install electronic power actuator for electrical heating systems. It is intended for continuous use with high switching frequency. In contrast to an electromechanical relay or contactor, no wear of switching contacts is possible here.

The HER is prepared for use on a top-hat rail (TS 35), completely equipped with heat sink and over-voltage protection.

Load voltage	230 V AC
HER 30 D load current	0.2 – 30 A AC 1 at < 40°C
HER 20 D load current	0.2 – 20 A AC 1 at < 40°C
Protection type	IP20 (EN 60529), protection class II
Connection terminals	2.5 mm² / 4 mm²
Housing dimensions	81 x 22.5 x 100 mm (H x W x D)

Type	Control voltage
HER	4 – 32 V DC

Solid state relay – SSR 25 A

This electronic switching relay can be installed anywhere, saving space in the housing.

Installation is a metal housing is recommended for high load currents to ensure sufficient cooling for dissipated heat.

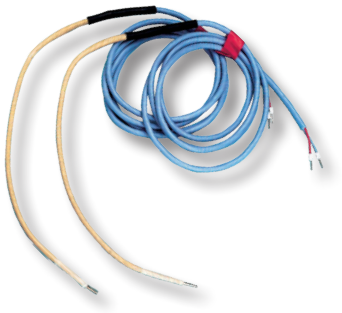
Load voltage	24 to 230 V AC
Load current	25 A AC 1 (max. load)
Protection type	IP20 (EN 60529), protection class I
Connection terminals	2.5 mm²
Dissipated heat	sufficient cooling must be ensured for switching power above 5 A (heat sink)
Housing dimensions	57 x 45 x 30 mm (H x W x D)
Note	Solid state relay pass residual current even in the open switching state. Therefore connect an upstream main switch or contactor.

Type	Control voltage
HED	3 – 32 V DC
HEA	90 – 280 V DC

Temperature sensor

Thermocouple flat sensor

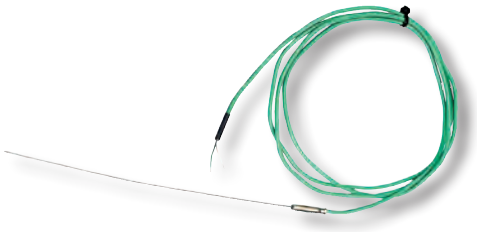
with 1.5 m long silicone-insulated compensating cable



Order no.	Sensor type	Max. temperature
HT/FF	Fe-CuNi (J)	450°C
HT/NF	NiCr-Ni (K)	450°C

Thermocouple rod sensor

Mineral-insulated, sensor tip bendable, for soldering-in, preferably for use at high temperatures, in fluids and aggressive atmospheres, diameter 1.5 mm, length 250 mm, silicone-insulated, 2 m long, compensating cable



Order no.	Sensor type	Max. temperature	Jacket material
HT/FM	Fe-CuNi (J)	600°C	1.4571
HT/NM	NiCr-Ni (K)	1000°C	2.4816 (Inconel)

PT100 sleeve sensor

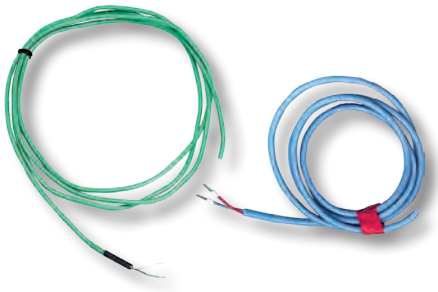
PT100 sensor +200°C	PT100 sensor +250°C	PT100 sensor +350°C
Brass diameter 4 mm, length 40 mm, PTFE-insulated, 2 m cable	Jacket material 1.4571, diameter 4 mm, length 40 mm, PTFE-insulated, 2 m cable	Jacket material 1.4571, diameter 4 mm, length 40 mm, glass silk insulated, 2 m cable

Order no.	Order no.	Order no.
HTI/MS	**HTI/PM**	**HTI/PH**

PT 100 in EExi design also available.

Compensating cables

For extending the connecting cables for the temperature sensors above. Structure: Silicone / silicone-insulated, 2 x 0.25 mm², diameter 5 mm



Order no.	Sensor type
AG/F	Fe-CuNi (J)
AG/N	NiCr-Ni (K)

Notes

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