



winkler

Operating Instructions

Heated lines and heated hoses



With the Winkler heated hose system you have acquired a high quality product to be used in accordance with the relevant standards and regulations as well as the conditions set out here. It is always our main objective that the products manufactured by us function to your full satisfaction and meet the desired requirements. To ensure that this can be properly implemented for your own benefit, please read the following carefully and observe the instructions concerning installation and operation.

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1 General information

The central element of the heated hose is the inner tube or hose core through which the fluid flows. It is made of high-grade PTFE with a smooth surface. Since the PTFE hose core does not in itself possess any high pressure resistance, it is covered with stainless steel braiding, i. e. one layer of stainless steel armouring for medium pressure and two layers for high pressure. The integrated fittings are moulded into the hose structure with a defined pressure and time period. The heating system consists of high-grade heat conductor alloys combined with different insulating materials depending on temperature. The thermal insulation is adapted to the temperature range and the specific heated hose type, and finished on both sides with temperature resistant connection caps. The entire heated hose is designed in such a way that the high flexibility of the pressure hose or the bending potential of the tube is hardly affected.



It is important to observe the corresponding minimum bending radius in relation to the length of the heating hose or the nominal cross-section (see sect. 7, Minimum bending radii). The maximum operating temperatures are stated on the type plate and must on no account be exceeded at any point along the length of the heated hose. Use suitable control devices for the temperature control.

The entire hose is designed in adaptation to the valid regulations or Directives and reflects the state of the art. EC conformity is indicated by the CE marking on the type plate (see sect. 12, Declaration of EC conformity).

2 Area of application

The heated hoses can be used in many industrial fields under the operating conditions specified in the present instructions for installation and operation. The area of application ranges from freeze protection, e.g., -20°C, via temperature maintenance to temperature increases up to max. 200° C. The standard nominal voltage of the heated hoses is 230 V (other supply voltages are possible!). The maximum permissible ambient temperature (environment) spans from -20° C to + 40° C.

Suitable temperature control devices (controller/cut-out unit) must be provided to ensure that the max. Fluid temperature is not exceeded. The heating power depends on the hose length and cross-section. You will find the exact data specified on the yellow type plate attached to the electrical connecting cable.



Different ambient temperatures along the hose route will result in different internal temperatures. The decisive factor for temperature control is the ambient temperature at the sensor location, and to avoid overheating the sensor should therefore be installed at the point where the highest ambient temperature occurs.

Since the product is a heating system with a flexible range of application, all the relevant Directives, rules and regulations need to be determined and complied with, including monitoring of compliance. In addition, it is absolutely essential to observe the following manufacturer's information (instructions for installation and operation). Before putting the system into operation, please check which regulations or internal works rules are applicable in your case to ensure safe and trouble-free use of the heated hose.

3 Installation / putting into operation



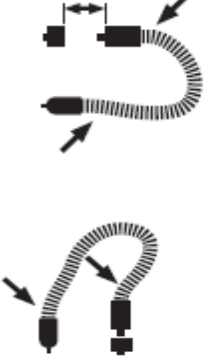
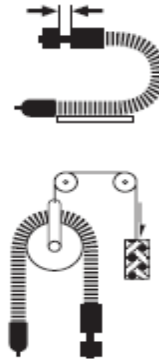


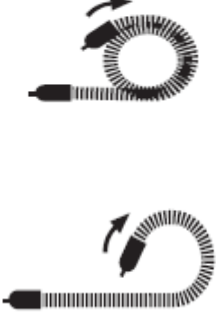
1. Check the data on the type plate to make sure that the type, design, mains voltage, power and operating temperature correspond to your specifications. Check visually if the hose design corresponds to the one ordered by you. If in doubt, compare with your documentation. Does the heated hose meet the conditions for the intended application or is it unsuitable for this purpose?
2. If you use clamps or similar fasteners for supporting the hose, it must be ensured that pressing does not reduce the external diameter by more than 10 % at the most. Above this 10 % limit, there is a risk of damage to heat conductors, control leads and sensor wires.
3. If there are control cores running through the hose, please observe the electrical load capability of these cores. Their standard cross-section is 0.75 mm².
4. Please ensure that you are using the correct type of temperature controller. Controller rating, sensor type and temperature range must be compatible. Is the heated hose connected to the correct controller? An accidentally reversed sensor, for example, will result in heating up the hose until it is completely destroyed. There will be no such problems if you employ the available Winkler hose controller systems.
5. If the heated hose is laid outdoors it must be protected against wind, because it would otherwise be subjected to cooling and may then not be able to attain the desired temperature. Likewise, the heated hose should not be exposed to rain or direct solar radiation for any length of time. In such cases suitable covering must be provided for protection.
6. Observe all the following installation guidelines (wrong-right chart). These guidelines were drawn up on the basis of many years of experience and fault analysis to avoid the most common causes of failure.
- 7.
8. Do not use the fitting to pull the heated hose. The fittings are resistant to pressure, but more susceptible to tension forces.
9. Neither should the connecting cable be used for pulling the heated hose because it is not suitable for this.
10. Are there any special rules or regulations applicable at the place of installation and has the installation taken this into account?
11. The operator/customer must check if the material that comes into contact with the fluid is resistant to the fluid to be heated (> see technical data). If you have any questions in this respect please contact us directly for advice (s. contact).
12. Always monitor the first heating-up phases of the heated hose very carefully so that any possible faults can be detected and, where appropriate, remedied at an early stage.
13. Check whether any nearby objects, plant components or other parts could cause damage to the heated hose or impair its function and, where applicable, remove or rearrange such items.
14. Any accessible (exposed) electroconductive parts must be included into the equipotential bonding measures.
15. It is recommended to use a residual current device RCD (FI) of IF < 30mA.

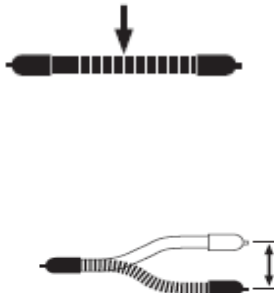
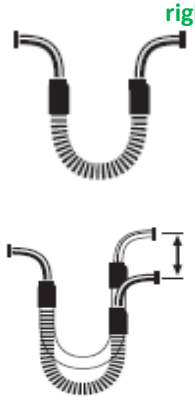

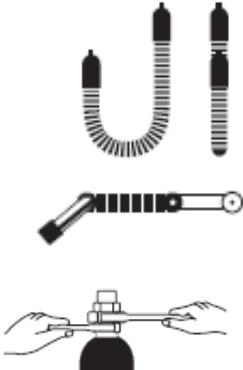


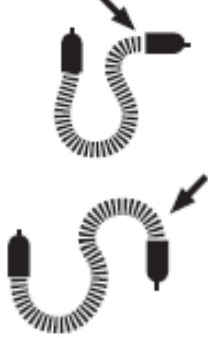



4 During operation



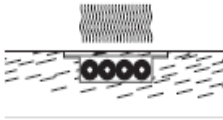
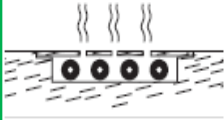


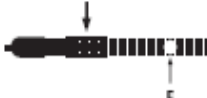
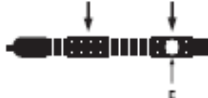


1. Has the installation / putting into operation been carried out successfully in accordance with the present instructions and guidelines?
2. Check the first heating-up phase exactly and monitor the further operation of the heated hose.
3. Make sure that the fluid at the inflow or inlet point is not hotter than the max. Permissible heated hose temperature, otherwise the heated hose could suffer damage at this point.
4. Extreme movements or vibrations, shaking etc. should be avoided during operation of the heated hose.
5. If you want to remove the heating hose, you should first check that the hose has cooled down and that it is totally disconnected from the mains power supply.

6. The fitting should never be used to pull the heated hose; the fittings are resistant to pressure, but more susceptible to tension forces.
7. It can happen that a fitting becomes clogged up when the liquid hardens and that the fitting only becomes unclogged after a certain heating-up period. Do not try to shorten this waiting period by applying heat externally (e.g. using a burner etc.). This will damage the heated hose, and waiting for a replacement delivery will certainly take longer!
8. If you notice any damage to the heated hose or abnormal functioning during operation, the hose must be switched off and disconnected from the power supply immediately. For this purpose a disconnection device (master switch) with a minimum contact gap of 3mm is to be provided by the customer together with a 16A or 20A fuse depending on the lead cross-section. Any fault needs to be exactly analysed in order to determine the cause. Our experienced specialists will be pleased to assist you.
9. Avoid exposing the hose to direct solar radiation for any length of time or, if unavoidable, provide suitable protection

5 Installation guidelines

<p>1.</p>	<p>If the heated hose is too short, it will be bent excessively at the connection ends. Remedy: Include a straight section (5 x hose diameter). A large bending radius will increase the service life of the hose.</p>	<p>wrong</p> 	<p>right</p> 
<p>2.</p>	<p>Hose is laid with a sagging part. Remedy: Supports or rollers with counterweight.</p>		
<p>3.</p>	 <p>Caution: The heating tube may be not operated in the rolled up condition or lying on top of each other, because otherwise the outside coat (Corrugated tube) can be destroyed.</p> <p>Pulling at the end of a rolled up hose will result in torsional stress and a bending radius smaller than permissible.</p> <p>Remedy: Unroll the hose ring without pulling at the hose. Observe minimum bending radius (5 x hose diameter).</p>		

<p>4.</p>	<p>Compression along the longitudinal axis due to wrong installation or during movement will reduce the pressure resistance. Stretch compensation by fixed hoses leads to their destruction.</p> <p>Remedy: Bends at connection points.</p>	<p>wrong</p> 	<p>right</p> 
<p>5.</p>	<p>Torsional movements will destroy the heated hose. This is often due to wrong installation, particularly to turning the hose in the wrong direction when connecting it up.</p> <p>Remedy: Ensure that the hose axes run parallel and that the direction of motion is on one plane. Use a counter-wrench during installation to prevent twisting the hose.</p>		
<p>6.</p>	<p>Corners are danger spots because of the risk of kinks and bending stress.</p> <p>Remedy: Saddle support or roller with suitable diameter.</p>		
<p>7.</p>	<p>Excessive bending stress just behind the connection points is damaging.</p> <p>Remedy: Pipe bends</p>	<p>wrong</p> 	<p>right</p> 
<p>8.</p>	<p>With hand-held equipment, the risk of kinks is particularly great.</p> <p>Remedy: Depending on working position, fit bend or anti-kink system (e.g., wire spiral).</p>		

<p>9.</p>	<p>If powdery substances, adhesives or other materials with thermal insulation properties are spilt onto the heated hose, overheating will occur at these points. Remedy: Constant cleaning/removing of such materials and eliminating the cause.</p>	<p>wrong</p> 	<p>right</p> 
<p>10.</p>	<p>If heated hoses are laid in a closed channel or duct, this will result in heat concentration. Remedy: The hoses must not be in contact with each other. Additionally, adequate ventilation should be provided.</p>		
<p>11.</p>	<p>Bundling of hoses or laying hoses in close contact next to each other will lead to overheating at the points of contact. Remedy: Always leave sufficient space between the hoses.</p>		
<p>12.</p>	<p>Heat concentration with overheating can also be caused by wrapping other materials around the heated hose. If the sensor area is wrapped up, the remaining hose section will cool down.</p>		
<p>13.</p>	<p>When fixing the hose with clamps or similar it must be ensured that the outer structure is not squeezed.</p>		

6 Maintenance and repair / inspections

- Should any defects become apparent on the outside of the heated hose or the connecting mains lead, the heated hose must be disconnected immediately from the mains supply, removed and sent back to our works for inspection. Never open the heated hose or any of its components on your own initiative, i.e. unauthorized.
- Inspection or maintenance of the heated hose should be carried out at regular intervals in order to guarantee operational safety. The inspection intervals should be chosen in relation to the operating conditions on site. However, according to DGUV V3 (safety instructions for electrical installations and equipment) inspections by a qualified electrician should take place every 6 months using suitable measurement and test equipment.
- The service life of the heated hose will depend on the actual operating conditions. Therefore it is not possible to make a generally valid statement about the length of the service life. However, the service life will generally be shorter under severe operating conditions as against occasional use under optimum conditions. For more information please contact us directly for competent advice.
- If a cut-out switches the hose off permanently, the cause has to be analysed before putting the hose back into service and appropriate measures have to be taken to prevent reoccurrence. (Special operation > safety-specific applications)
- If you intend to use the heated hose for another purpose than originally planned, please get in touch with our specialists to check if it is really suited to this. Unauthorized change of use is not permitted.
- Any changes on the hose performed by the customer will endanger the operational safety and will automatically result in the manufacturer's warranty becoming invalid.
- If you have any problems or questions, please contact us directly for quick and competent advice. (see contact below).

7 Minimum bending radii of heated hoses



The heated hoses have been designed to withstand bending stress. However, non-observance of the minimum bending radius or kinks or strong torsional movement will lead to the destruction of the heated hose. The permissible bending radius depends on the material and the nominal diameter (DN) of the heated hose. **As a general rule: Minimum bending radius > 5 x outer hose diameter**
Should you require any other bending radius, please get in touch with us so that we can advise you!

8 General technical data

(For specific technical data, see yellow type plate on the heated hose.)

Max. ambient temperature	- 20 °C to + 40 °C
Max. operating temperature	depending on hose type stated on the type plate
Nominal operating voltage	230 V / 50 Hz (other voltages possible)
Nominal power	depending on hose type stated on the type plate
Power tolerance	+/- 10 %
Heated hose diameter	+/- 10 %
Heated hose length	+/- 5 % (Due to varying pressure loads, changes in length up to +/- 2 % may occur during operation.)
Connecting mains lead	1,5 m
Connecting sensor lead	1,5 m
Chemical resistance	resistant against all chemicals, including acids and lyes of any concentration. <u>Exception:</u> molten alkali metals and fluorine compounds.

9 Pressure load

Medium pressure



The pressure load capacity of the flexible heated hoses varies according to the different working temperatures. Please observe the values in the table below! Up to a temperature of 200°C, the load capacity can still be stated, but as from 250°C it drops to 0 bar. In the range in between, the pressure should be carefully calculated depending on the given load using a correction factor of 0.7 related to 24° C. It is important to take account of pressure peaks. They can be very high and are not indicated on normal pressure gauges. The operating pressure must never be exceeded

DN mm	Operating pressure bar at 24 °C	Operating pressure bar at 100 °C	Operating pressure bar at 150 °C	Operating pressure bar at 200 °C	Operating pressure bar
4	275	260	248	228	1100
6	240	228	216	199	960
8	200	190	180	166	800
10	175	166	158	145	700
13	150	143	135	125	600
16	135	128	122	112	540
20	100	95	90	83	400
25	80	76	72	66	320

* At room temperature and with pressure increase p of max. 5 +10 sec.

Pressure load capacity at high pressure: burst pressure approx. 25 % above the values of medium-pressure hoses

PTFE tube

DN mm	Operating pressure bar at 24 °C	Operating pressure bar at 100 °C	Operating pressure bar at 150 °C	Operating pressure bar at 200 °C	Operating pressure bar
4	20	11	9	6	60
6	13	7	6	4	39
8	11	6	5	3	33

10 Declaration of EC conformity

**EU-
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Produktgruppe : Analysenleitungen und Heizschläuche

Produkt : **Typ WA... / WS...**

Grundlage : **EU-Richtlinie 2014/35/EU**
Niederspannungsrichtlinie vom 26.02.2014
„Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen“

EU-Richtlinie 2014/30/EU
Elektromagnetische Verträglichkeit vom 26.02.2014

Hiermit erklären wir, dass bei der Planung und Herstellung dieses Produkts die grundlegenden Sicherheits- und Gesundheitsanforderungen der EU-Richtlinien und die derzeit geltende RoHS-Richtlinie eingehalten wurden.

Weitere angewandte nationale / europäische Normen:

DIN EN 60519-1 (VDE 0721-1)
Sicherheit in Elektrowärmeanlagen

DIN EN 60398 (VDE 0721-50)
Industrielle Elektrowärmeanlagen

Bei einer mit uns nicht abgestimmten Änderung des Produktes verliert diese Erklärung ihre Gültigkeit.

Heidelberg, den 01.02.2020

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Produktgruppe : Analysenleitungen und Heizschläuche WA.. / WS.. (Baukastensystem)

Produkt : **BEB / BEM.. BIB / BIM.. BSB / BSM..**

Grundlage : **EU-Richtlinie 2014/35/EU**
Niederspannungsrichtlinie vom 26.02.2014
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Heidelberg, den 01.02.2020

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