



winkler

# Instructions for installation and operation

Heating jackets, heating mats and insulation jackets  
Series **WOT / WOG / WOQ / WOI / WOB...**





### Important safety information for the use of heating jackets, heating mats and insulation jackets

Please read the installation and operating instructions very carefully before using the heating jackets. Pay attention to the information on the type plate and any warnings on the product. The installation and operating instructions are an important element of the product, they must be available to all users. Keep the installation and operating instructions in a safe place if the product is to be used later. The product should only be installed and operated by persons with necessary skills.

Heating jackets and heating mats are used in areas where particular operating conditions exist and where certain requirements must be fulfilled. Please consider this and obtain information about the relevant regulations beforehand to ensure trouble-free operation as intended.

If you have any questions, do not hesitate to contact us; you will find the details in Section 9. We will be happy to advise you and provide assistance to ensure safe and proper operation of our heating jackets, heating mats and insulation jackets.

### Heating jackets and heating mats are electrical devices

To prevent electrical hazards the heating jackets and heating mats must be checked regularly and if necessary, maintained in accordance with the generally recognised codes of practice (VDE / BGV A3 / ...).



**A 30 mA residual current device should be installed to ensure safe operation.  
This must be tested before start-up and in periodic intervals to ensure it's functioning.**

### Additional safety information

In case of obvious damage, the heating jackets and heating mats must be disconnected immediately and must not be used any more. Determine and eliminate the cause of the damage.

- Mechanical damage to the outer or inner sheath > caused by external forces.
- Mechanical damage to the connection cables/screw-in joints > caused by external forces.
- Brittle or broken protective tube > thermal stress or extreme sunlight.

Avoid overheating of the heating jackets, heating mats and insulation jackets. Observe the minimum and maximum operation temperature and never exceed or undercut these. Overheating can occur in many different ways. Please check the operating and ambient conditions in advance and monitor the first heating processes.

Monitored operation with suitable temperature controllers and/or temperature cut-outs (e.g. Winkler Series WRW-500 / WRT560SW / WRT570SW / WRW00223-UNIXW00K / WRWB0223-UNIWW00K) is a requirement for heating jackets to be operated as intended.

### Guidelines and regulations

Design, production and inspection of the heating jackets / heating mats are according to the following guidelines and regulations:

**EU-Low Voltage Directive 2014/35/EU** from 26.02.2014

**EU-Electromagnetic Compatibility Directive 2014/30/EU** from 26.02.2014

**EU Directive 2011/65/EU** RoHS Directive

**EN 60519-1 (VDE0721-1)** Safety In electro heat Installations **EN**

**60398 (VDE0721-50)** Industrial electro heat Installations **DIN**

**VDE 0100-600** Testing

**DIN VDE 0701-0702** Recurrent Tests

With Winkler heater you have acquired a high-quality product which can successfully be operated within its application when considering corresponding standards and regulations. It is always our main objective that the products manufactured by us function to your full satisfaction and meet the desired requirements. As a rule, the installation and intended use must be in compliance with the valid regulations for electric heating systems (VDE) and the recognized rules of engineering practice (DIN, accident prevention regulations).



The heating mats / heating jackets / insulating jackets may only be installed by suitably trained technical personnel in accordance with the following instructions for installation and operation. If the heaters are operated in conditions deviating from these installation and operating instructions or are not operated as intended all warranty claims expire and the product could also be damaged. If you have any questions please contact us and ask for assistance (see chapter 9. Contact).

Below the heating jackets and heating mats are simply referred to as „heaters“; the insulation jackets are simply referred to as „insulation “.

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## 1. General information / checking the heater

The heaters must be applicable to the intended application. Before installing the heating system check that the data on the type plate is identical with your ordering data (mains voltage, power, type, max. working temperature, etc.).

- Is the heater fitting closely to the heated object?
- Are precautionary measures in place against excessive temperatures?
- Is the temperature sensor located at the hottest point?
- Is it ensured that the heater can be disconnected quickly from the mains supply in the event of danger?

The heaters are generally suitable for a large variety of applications. However, if the heater has been designed for a specific application which changes in the course of time, the user should contact the manufacturer and enquire about further areas of application and operation. The heater needs to be protected against chemical, mechanical or aggressive environments which could damage the heater and thus endanger its safe and correct operation.



The maximum operating temperatures are specified on the type plate. These must not be exceeded at any point in the heater. In the case of the heaters with Velcro® fasteners, the ambient temperature of +100°C (or + 180 ° C for high-temperature Velcro® version) must not be exceeded, as this would result in damage.

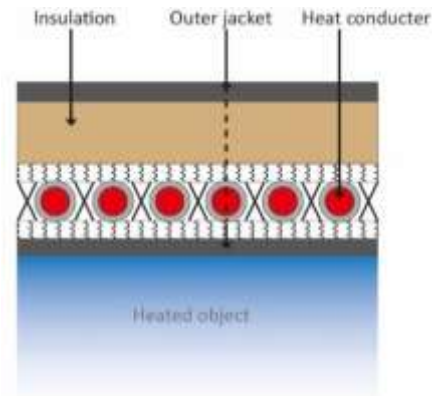
Use suitable temperature controllers (e.g. WRW-500 / WRT560SW / WRT570SW / WRW00223-UNIXW00K / WRWB0223-UNIZW00K from Winkler) to control the heater temperature.

## 2. Structure of the heater

A high-temperature resistant heat conductor made of nickel alloy is arranged immovably and evenly by means of crocheting or sewing. The even turn-to-turn spacing prevents short-circuiting and hot spots in the heater unit. The heat conductor material with its large surface ensures optimum surface loading of the heat conductor and consequently uniform temperature distribution. High quality fibre-based insulation material, with suitably matched thickness, reduces heat release towards the outside. The connection from the heat conductor to the cold conductor is established by using nickel sleeves. All connecting leads are made of temperature resistant cable materials with corresponding electrical insulation strength.

The aluminium-coated outer cover is included into the protection measures of the heaters (protective earth). The same applies to any lace-up hooks on the device, independent of the outer cover.

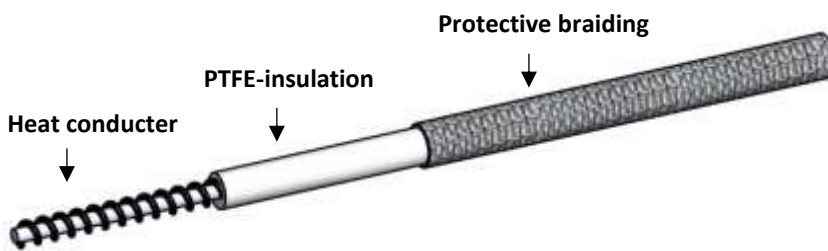
### Cross section / Principle structure of a heating jacket



### Series WOT / WOB

is provided with a moisture resistant, PTFE insulated heat conductor which is covered by braided nickel-plated copper wires functioning as a protective conductor. This protective conductor braiding is included into the protection measures.

### Structure heat conductor series WOT / WOB

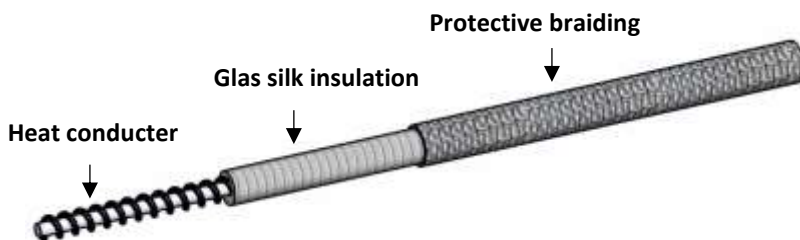


### Series WOG

features a glass-silk insulated heat conductor with protective braiding made of pure nickel wires. This protective conductor braiding is included into the protection measures.

**If version WOG is not provided with protective conductor braiding, the heated object will need to be integrated into the protection measures!**

### Structure heat conductor series WOG



### Series WOQ

incorporates a silicate-insulated heating spiral without protective conductor braiding.

**With this version the heated object has to be included into the protection measures!**

Structure heat conductor series WOQ



### In terms of structure, insulating jacket WOI

corresponds to heating jackets WOT / WOB / WOG / WOQ (depending on operating temperature), but does not have a heat conductor. The insulating thickness may differ to suit the particular application.



Versions **WOG** and **WOQ** need to be protected against moisture. If any moisture has ingressed into the heater due to incorrect storage or application etc., the device should be returned to the manufacturer for inspection.



Optionally, temperature sensors with reliable separation from the potential equalisation of the heater and consistent shielding (sensor, connection cable and plug) may be installed. Before the heater is used, you must ensure reliable separation (visual check and/or measurement). If there is obvious or measurable damage to the separation, have the heater inspected professionally (e.g. responsible department, manufacturer).



Electrical heaters must be installed and operated so that they cannot cause hazards even if they are not supervised or switched on accidentally.

Suitable safety precautions must be taken, such as operation with a controller and/or cut-out (DIN EN 60519-1 /-2. (VDE 0721-1) Safety in electro heating Installations)

## 3. Area of application / electrical connection

The supply is normally 230 V. Other voltages are possible. The voltage specification on the heater's type plate is decisive and must be observed. Electrical protection measures and shock-hazard protection must be provided in compliance with DIN VDE 0100. The connecting mains cable has a standard-length of 1000 mm, but may also be supplied shorter or longer depending on the layout of your system. The electric cables (supply network) must be dimensioned according to fuse capacity and max. permissible voltage change. The cross-section of the connecting cable must be dimensioned according to VDE 0100 corresponding to the current input. However, there must be a minimum of 0.75 mm<sup>2</sup>. The requirement also applies to all connecting leads of control devices. If the heater is equipped with a protective conductor, this will need to be included into the protection measures (protective conductor has to be connected to PE terminal).



The electrical connection of the heater must be via a residual current device (FI=30 mA) to ensure that dangerous touch voltage cannot occur on the heater in the event of a fault.



Different ambient temperatures near the heater cause different inner temperatures. Important for controlling the heater is the ambient temperature where the sensor is located, which must be in the range of the highest ambient temperature to avoid overheating. This must be determined beforehand and be taken into account in the project planning. By default, the cut-out sensor is installed directly on the heat conductor. The sensor location for the operating temperature can be defined specifically for the customer or the application.

## 4. Installation / Start-up

Depending on the application and the customer's requirements, the heating/insulation is assembled ready for connection and can be used in accordance with the following installation instructions and proper operation:

1. The heater/insulation is mechanically sensitive. It must not be laid over burrs or sharp edges.
2. Special care must be taken when installing the series **WOQ** heater, as the design of a heating spiral is more susceptible to damage than a heat conductor.
3. If metal parts or metallic surfaces are heated, these must be included in the protective measures (e.g. protective earthing).
4. When used outdoors, appropriate measures must be taken in accordance with the relevant regulations, as the heater is either moisture-proof or not moisture-proof, depending on the design.
5. The connecting cables of the heating systems must not be laid in a twisted or kinked manner.
6. Depending on the type of closure of the heating system (hooks, eyes or Velcro fasteners), it must be firmly connected to the object to be heated. Care must be taken to ensure good heat transfer to the heated object. A heating system that is not in contact with the object to be heated cannot release the heat.
7. Several heaters must not be laid one on top of the other, as this can cause an excess temperature. In places where the heat is not dissipated, the excess temperature that occurs can damage the heater.
8. It must also be noted that heating systems operating with incorrectly adjusted temperature controllers and temperature sensors may exceed the specified temperature range and thus cause damage.

The following safety measures are recommended to install the heater:



Protective eyewear



Long-armed work clothing



Leather gloves (EN 388)

## 5. Operation / dismantling

1. **Always monitor the first heating phases** so that you see any faults in good time and can make any necessary changes.
2. Extreme vibrations or movements should be avoided when the heater is operating (shaking, vibrating, etc.) or suitable measures should be taken so that the heater is not damaged.
3. Make sure that the object to be heated is not hotter than the maximum operating temperature of the heater, otherwise the heater may be damaged.
4. Before you dismantle the heater, allow it to cool and disconnect it from the power supply.
5. Never pull the heaters by the connecting cables, as they are not suitable for this.
6. If damage or irregularities in the function of the heater occur during operation, switch it off as quickly as possible and disconnect it from the power supply. For this purpose, a separation device (main switch) with min. 3 mm contact opening and a 16 A or 20 A fuse suitable for the cable cross-section must be fitted. The exact cause of the fault must be analysed. Our experts can help you in this respect.
7. Direct sunlight on the heating sleeve must be avoided or, if not possible, protection must be provided. Direct and prolonged exposure to sunlight can cause damage to the outer jacket, which can only be detected after prolonged and dynamic operation and thus impair the protective effect.
8. Check the information on the type plate to make sure that the type, design, mains voltage, power and temperature match your requirements. Check visually that the design is what you ordered. If you have any doubts, check that the documentation is correct.
9. Is the heater suitable for the conditions where it will be used?
10. Suitable temperature controllers must be used. The controller power, sensor type and temperature range must correspond. Is the heater connected to the right controller? If the sensors are confused, the heater can heat until it is destroyed. With the temperature control systems from Winkler, you will have no problems, as they are designed especially for the heaters.
11. Are there special conditions at the installation location, and were they considered during installation (explosion risk area, fire risk area, etc.)?

12. Users must check whether the materials that come into contact with the medium are resistant to the media to be heated (see General technical specifications, Section 8). If you have any questions, contact us directly so that we can advise you (see Contact details, Section 9).
13. Check whether any surrounding objects, system components or other items could damage or have adverse effects on the heating function and remove these.
14. Include conductive parts that can be touched in the potential equalisation.
15. A residual current device (RCD) (IF < 30mA) must be used.
16. The use of a residual current device RCD (FI) (IF < 30 mA) is required.



**Please note: The heaters are largely made of glass silk (insulation). This material will harden (vitrify) under correspondingly high working temperatures and become brittle. If the heater is then subjected to excessive movement, it may lead to insulation defects. Any heater exposed to high working temperatures over longer periods of time, should not be constantly shifted or removed. After removal the insulation resistance against the heated object needs to be measured prior to putting the device back into operation.**

**A heater that is continuously installed and dismantled or that was not used for a long time must be checked before it is used and the insulation resistance to the object to be heated must be measured.**

## **6. Inspections according to DIN VDE 0100-600 / periodic inspections according to DIN VDE 0701-0702**

**DIN VDE 0100-600** “Low voltage electrical installations – verification“ obliges the installer of electrical plant to ascertain – before putting the system into operation – whether the required protection measures, corresponding to the intended application, are in place for the different plant elements, and whether perfect functioning of these protection measures is assured. This necessitates a thorough inspection of all the plant components that are important for the safety of the protection measures as well as measurements and tests for verifying the effectiveness of the protection measures.

**DIN VDE 0701-0702** “Inspection after repair, modification of electrical appliances – Periodic inspection on electrical appliances“ obliges the operator of electrical installations to carry out inspections at regular intervals and to keep a record as proof of the correct and safety-compliant operation of the electrical installation.

## **7. Thermal insulation / temperature effect**

The heaters are provided with thermal insulation. The thickness of the thermal insulation will depend on the specific heater type or application and may vary according to the customer’s specifications. Where heaters without thermal insulation are applied, thermal insulation should be fitted by the customer according to specifications before putting the device into operation, otherwise the heater’s calculated heat output will not be transferred to the object as planned. It must be ensured that burns to the body or damage of any other kind are prevented. DIN VDE 0100-420 lays down corresponding measures, such as mineral wool, foam insulation, safety guards.

In order to mark the heated plant components, marking labels (WZX00531) with the wording **“ELECTRICAL HEATER”** are to be stuck onto the thermal insulation.

To protect the heaters from overheating and maintain accurate process temperatures, the device must be operated in combination with a control system and/or thermal cut-out. The temperature sensor should always be installed at the hottest spot (When using external sensors, observe our “Instructions for installation and application of temperature sensors”).

The operating temperatures stated on the type plate are the max. permissible temperatures at the heat conductor. The operator must take corresponding measures to ensure that the maximum operating temperature is not exceeded at any point.

### **Attention:**



**If operation takes place without temperature control there will be a danger that the object to be heated, the medium and the heater become overheated.**

**However, the max. operating temperature of the heater can also be exceeded because of other operating conditions:**

- **Heat accumulation (hot spot) if the heater is not closely fitted, or only partially so, against the heated object**
- **Varying filling level of the medium or temperature sensor / sensors located in the wrong place**
- **Overtemperatures caused by exothermic chemical processes.**
- **As well as changing ambient conditions.**



Electric heaters must be installed and operated so that they cannot cause hazards even if they are not supervised or are switched on accidentally. Suitable safety measures must be taken, such as operation with a controller and/or limiter.

Use of a RCD safety plug (FI) ( $I_f < 30 \text{ mA}$ ) is recommended.

Also remember that heaters continue to heat if wrongly coordinated temperature controllers or sensors are used and this may cause the max. operating temperature to be exceeded.



**Note:**

When the heater is used for the first time, depending on the application, there may be some fumes because of the glass silk material that is used, this is quite normal and will stop shortly (binder in the glass silk evaporates).

## 8. General technical data

	Serie WOT / WOB	Serie WOG	Serie WOQ	Serie WOI
<b>Max. operating temperature</b>	up to 250 °C	up to 400 °C	up to 900 °C	up to 900 °C
<b>Max. ambient temperature</b>	depending on outer cover and lock system	depending on outer cover and lock system	depending on outer cover and lock system	depending on outer cover and lock system
<b>Power</b>	according to requirements	according to requirements	according to requirements	
<b>Max. power Depending on the version (stitched / crocheted)</b>	3,0 – 5,0 kW / m <sup>2</sup>	6,0 – 13,0 kW / m <sup>2</sup>	15,0 - 20 kW / m <sup>2</sup>	
<b>Power tolerance</b>	+ / - 10 %	+ / - 10 %	+ / - 10 %	
<b>Nominal voltage (other voltages possible)</b>	230 V / 50...60 Hz	230 V / 50 ... 60 Hz	230 V / 50 ... 60 Hz	
<b>Disruptive strength</b>	2,0 Kv	1,0 kV	1,0 kV	
<b>Dimensions</b>	as specified	as specified	as specified	as specified
<b>Mains cable connection</b>	1000 mm (or as specified)	1000 mm (or as specified)	1000 mm (or as specified)	

## 9. Contact

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10. Quality Management Certificate according to ISO 9001:2015

ZERTIFIKAT ◆ CERTIFICATE ◆ CERTIFICADO ◆ CERTIFICAT ◆ 認證證書 ◆ CERTIFICATE ◆ ZERTIFIKAT



Management Service

# CERTIFICATE

The Certification Body  
of TÜV SÜD Management Service GmbH  
certifies that

**winkler.eu**  
**Winkler AG**

Englerstr. 24 • 69126 Heidelberg • Germany  
for the scope of application  
Development, manufacture and sales  
of heat engineering products with  
control and monitoring systems

Kleinfeldweg 38 • 69190 Walldorf • Germany  
for the scope of application  
Manufacture of heat engineering products  
with control and monitoring systems

has established and applies  
a Quality Management System.  
An audit was performed, Order No. 70002379.  
Proof has been furnished that the requirements  
according to

**ISO 9001:2015**

are fulfilled.

The certificate is valid from 2021-04-20 until 2024-04-19.  
Certificate Registration No.: 12 100 28096 TMS.

  
Head of Certification Body  
Munich, 2021-04-12



## 11. Declaration of EU conformity (CE marking)

### EU-DECLARATION OF CONFORMITY



**Manufacturer** : WINKLER AG  
Englerstraße 24  
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[sales@winkler.org](mailto:sales@winkler.org) [www.winkler.org](http://www.winkler.org)

**Product group** : Heating mats / Heating jackets

**Product** : **WOT... / WOG... / WOQ... / WOI... / WOB...**

**Directives** : **EU Directive 2014/35/EU**  
Low Voltage Directive from 26.02.2014  
"Electrical equipment for use within certain voltage limits"

**EU Directive 2014/30/EU**  
Electromagnetic compatibility from 26.02.2014

We hereby declare that the basic safety and health requirements of the above-mentioned EU directives and the currently applicable RoHS directive were complied with when planning and manufacturing this product.

Other national standards and technical specifications applied:

**DIN EN IEC 60519-1 VDE 0721-1:2020-12**  
Safety in electro heat installations

**DIN EN 60398 VDE 0721-50:2016-02**  
Industrial electro heat installations

Any modification to the product without our consent will make this declaration invalid.

Heidelberg, 5<sup>th</sup> of July 2023

Winkler AG  
  
D. Ernst  
Technical Director