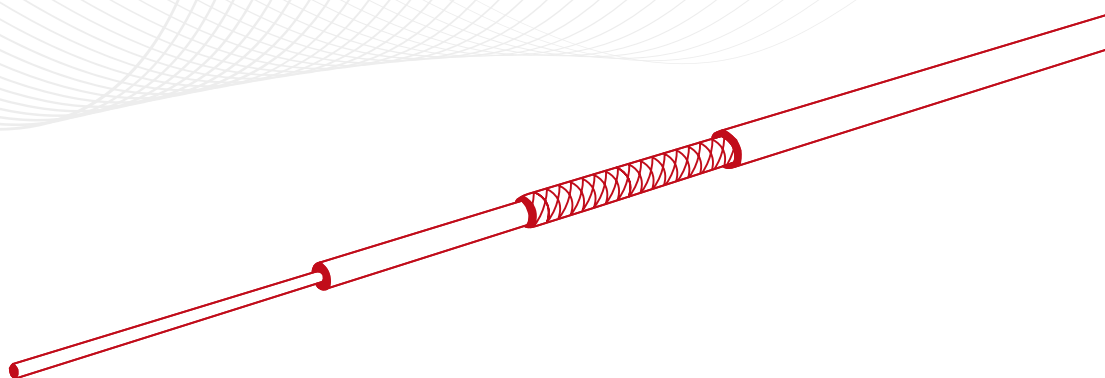


# INSTALLATION MANUAL



## ELKM

Installation and operation  
Fluoropolymer-insulated heating cables

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QAA 024  
Rev.09

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# CONTENTS

Topic	Page
<b>INTRODUCTION</b>	<b>4</b>
GENERAL INFORMATION	4
WARRANTY	4
INCOMING GOODS	4
MARKING	4
STORAGE	4
LENGTH OF HEATING CIRCUIT	4
<b>MOUNTING</b>	<b>5</b>
SAFETY INSTRUCTIONS	5
PREPARATION OF MOUNTING	5
MOUNTING THE HEATING CABLE	6
Preparation of the system	6
Unrolling the heating cable	6
Laying the heating cable	6
Fastening the heating cable to the pipe	7
Fastening the heating cable onto metal braiding	7
Cover the heating cable with metal braiding	8
Attach type plate	8
INSPECTION OF THE HEATING CIRCUIT	9
OPERATION & MAINTENANCE	9
MARKING (by customer)	9
AVAILABLE VARIANTS	10

## IMPORTANT INFORMATION

### - RETAIN FOR LATER USE



Please follow these instructions for proper and safe use of the ELKM heating cables.

Please retain these instructions for later reference purposes (for example in the system documentation).

### - FOR DISPOSAL



The WEEE logo indicates that this product must not be disposed of with residential waste.

Further information about disposal and recycling of old electrical and electronic devices and where to find collection points is available from your local disposal company or from the manufacturer from which you bought the product.



### ATTENTION

Refers to a potentially dangerous situation. If it is not prevented, there is a risk of damage or malfunction.



### DANGER

Refers to an extremely dangerous situation. If it is not prevented there is risk of death or at least a high risk of serious injuries.



### NOTE

Important information and instructions for safe, effective and environmentally compatible usage.



### WARNING

Refers to a dangerous situation. If it is not prevented there is risk of injury or at least a high risk of material damage.

#### Proviso

We reserve the right to make technical changes. Changes, errors or misprints shall not form the basis for any claim to compensation for damages. Comply with the applicable and currently valid standards and regulations for safety-related components and systems.

eltherm GmbH Ernst-Heinkel-Str. 6-10 57299 Burbach T.: +49 2736 4413-0 F.: +49 2736 4413-50 info@eltherm.com	Document: 864304203300X		Installation manual ELKM heating cables	
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Revision: <b>09</b>	Jonas Schmidt	Date:	04.04.2024	

# INTRODUCTION

## GENERAL INFORMATION

The fluoropolymer-insulated heating cables are suitable for heating containers, pipelines and their attachments in typical industrial environments and for commercial applications.

## WARRANTY



### ATTENTION

In order to fulfil the warranty conditions, the instructions of the respective product manuals must be followed. Please note that these instructions provide information on general installation methods. Always follow the project planning specifications and contact our project office if you have any queries.

## INCOMING GOODS

- Compare the delivered goods with purchase order and the delivery slip.
- Inspect the heating cable and components for transport damage.
- Carry out all measurements required for the respective materials (e.g. resistance and insulation measurement on the heating cables).



### ATTENTION

Ensure that the data sheet for the supplied heating cable is available in addition to these instructions. The information in the data sheet is required for safe installation. Installation must therefore not be carried out without the data sheet.

## STORAGE

- The goods have to be stored in a dry environment at an ambient temperature of  $-20...+60\text{ }^{\circ}\text{C}$ .
- If measured lengths of the heating cable have to be removed from storage, the end of the remaining heating cable must be protected effectively against penetration of moisture (for example by attaching an original end connection of the heating cable manufacturer).
- Make certain the goods are stored so they will be protected against mechanical damage.
- While the goods are in storage, avoid contact with chemicals (solvents, petrochemical products, etc.).

## LENGTH OF HEATING CIRCUIT

The circuit lengths of factory terminated goods are designed by eltherm. For shortening or elongation, please contact eltherm. The design of „off the reel“ goods is to be done in accordance with the supplied product data sheet. The given voltage, operating temperature and output per metre must not be exceeded. Cross sections of the cold leads are to be designed to suit the nominal current as per applicable local installation codes.

# MOUNTING

## SAFETY INSTRUCTIONS



### ATTENTION

- Mounting, testing and maintenance of electrical trace heating systems may only be carried out by qualified employees who have been trained in handling electrical equipment.
- Strict compliance with the relevant standards and safety regulations is a prerequisite for the safety of persons, systems and devices.
- The persons tasked with planning, installation and maintenance have a special responsibility and must be familiar with exact details of the applicable regulations.
- The instructions must be kept with the system documentation for later use (maintenance, servicing).



### DANGER

- Prior to installation and maintenance work the relevant heating circuits and plant sections need to be de-energized and secured against being switched on again!
- Prior to accessing plant sections (pipelines, vessels etc.) ensure sufficient cooling down to avoid burns.
- The metallic screen (protective braid or aluminium foil with embedded earth wires), this has to be connected to the potential earth.
- Improper installation or damage to the electrical trace heating can lead to a risk of short-circuit and fire hazard during operation
- To ensure safe and error-free operation of eltherm electrical trace heating, only the original initial and medial connecting sets and termination sets specially developed and tested for this purpose may be used.

- When designing and installing a heating circuit, all locally applicable regulations must be observed in addition to the standards IEC EN 60519-10 and IEC EN 62395-2.
- The heating cables must always be used in conjunction with a temperature control system. A controlled or stabilised operating mode in accordance with IEC EN 62395-2 must be provided.
- Heating cables and sensors must be attached to the intended locations on the pipes/tanks to prevent overheating of the appliances and inadequate temperature maintenance. Make sure that the sensors are fitted correctly.
- For use as trace heating in accordance with IEC EN 62395-1 and IEC EN 60159-10 as well as for Ex applications a residual current circuit breaker (30 mA) is mandatory
- If the heating cable is used on metal, this must be included in the protection against indirect contact in accordance with DIN VDE 100, Part 410 before the trace heating system is put into operation.

## PREPARATION OF MOUNTING

- The minimum bending radius and installation temperatures must be observed in accordance with the data sheet.
- When laying, ensure that the heating cables do not form any kinks (the heating cable must not be twisted) and that the laid strands do not touch or cross each other, as this can lead to localised overheating and thus damage to the heating cable. The minimum bending radius is 10 mm for heating cables without an outer sheath (ELKM-A, -AE, -AS and ELW-VA, -GS, -GN) and 2.5 x cable diameter for heating cables with an outer sheath (ELKM-AG, -AG-N, -AG-L, AG-E). Heating cables with a flat cross-section must be bent over the narrow side.
- The installation of a heating circuit should be carried out according to the following diagrams, using the original eltherm accessories.

## MOUNTING THE HEATING CABLE

### DANGER

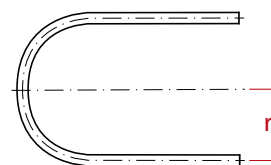
- Fixed resistance heating cables must not touch, overlap or cross each other. This would lead to local overheating and a danger of fire.
- When laying a heating cable, always observe the minimum distance between heating cables.

### ATTENTION

- Make certain that all mounting work is complete on the pipe system that will be heated.
- All pressure and material tests as well as coating and painting work on the pipelines must be completed. The coat of paint on the pipes must feel dry to the touch.
- check the nature of the pipe surface. It must not have any sharp edges or burrs that could cause damage during installation. If necessary remove any or cover them with suitable material.
- Compare the design of the pipeline (dimensions, structure, nature and number of inserts) with the design data.
- Check all materials required for heating to ensure they are complete and for any transport damage.
- Compare the material list of the delivered components with the design documents.
- Check whether there are any special mounting instructions and whether all necessary material and tools are on hand.
- Measure the electrical and insulation resistance of the heating cable and write them down in the mounting protocols provided for this purpose. Compare the value with the data in the design documents and technical specifications of the heating cables.

### WARNING

- Installation must be carried out by personnel trained in the installation of heating cables.
- Do not crush the heating cable or pull it over sharp edges.
- Avoid stepping on or driving over the heating cable at all costs.
- Never use the heating cable as a step loop.
- Keep to the length specified in the project planning for the fixtures.
- The installation must be carried out on the intended system components at the positions specified by the planner in order to prevent system components from overheating and the desired holding temperatures from not being reached.
- The specified minimum bending radius must be observed and adhered to.

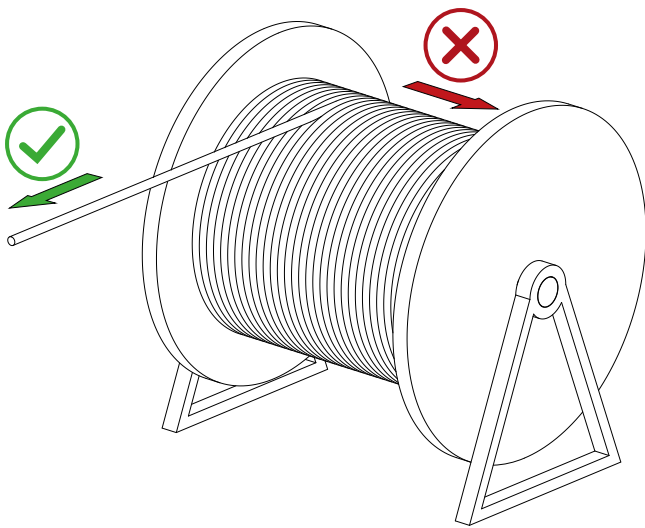


## Preparation of the system

- Remove all unevenness, such as sharp burrs or similar, from the surface to be heated and clean the surface of grease and oil.
- Mark the installation distances required according to the projection on the surface to be heated.

## Unrolling the heating cable

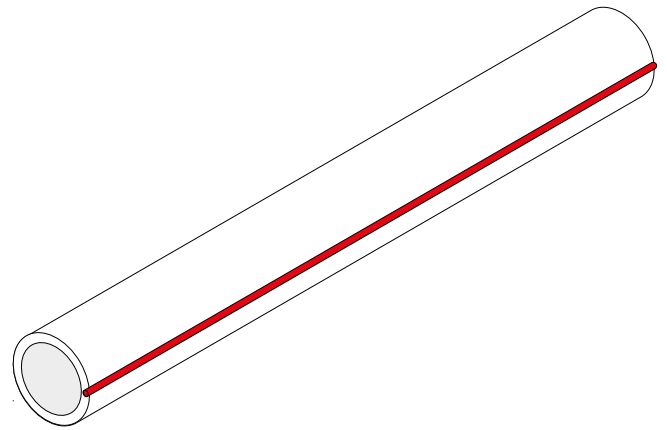
- Use a stable holder to unwind the heating cable.
- Ensure that the unwinding device runs smoothly to prevent damage to the heating cable due to excessive tensile force.
- Unroll the heating cable straight over the edge of the drum, not off to the side.



## Laying the heating cable on the pipe

### ! ATTENTION

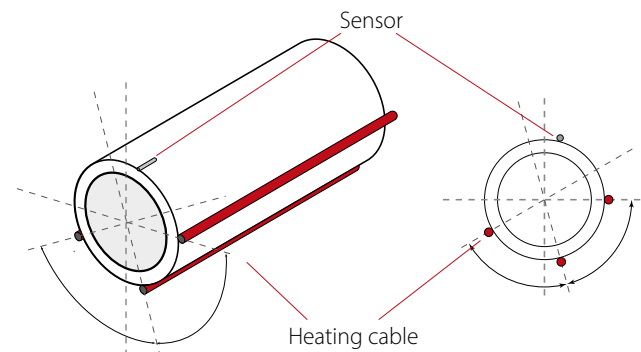
- To avoid short circuit, do not connect the two bus wires of the heating tape to each other. Under all circumstances observe the termination and maintenance instructions for the connection and termination of the heating tape.
- Make sure that the trace heaters are never used at or exposed to a temperature above the nominal exposure temperature ratings.
- For single conductor trace heaters that are fed from both ends: Arrange cable entry and exit next to each other for the ease of power supply.
- The max. operating temperature of the heated device as defined by the plant owner as well as the maximum heating cable temperatures as given on the label must not be exceeded. This may be achieved by use of an appropriate temperature control.
- Make sure the heater has a good contact to the surface to be heated. In case of gaps, fill those with thermally conductive and temperature resistant materials.



- Normally the heating cable is laid stretched out along the pipe. Lay heating cables in a spiral pattern only if the project planning explicitly calls for it.

### ! ATTENTION

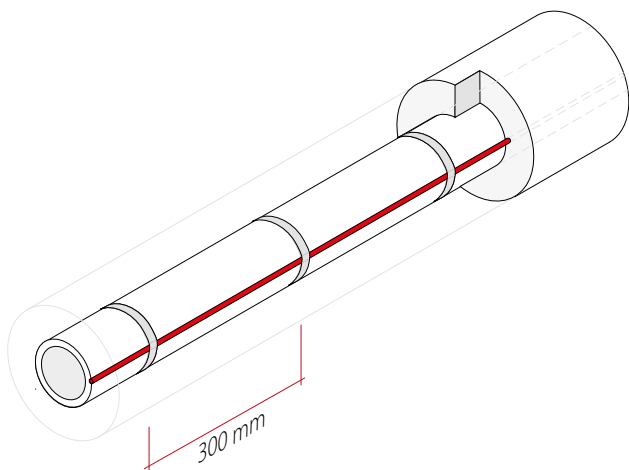
- Observe the specified length allowances in project planning or design (for example in eltherm Designer).



- Do not lay the heating cable on the lowest point of the horizontal pipeline.
- Laying the heating cable on the top half of a horizontal pipeline is unfavourable for reasons of heat distribution and should only be done if the project planning calls for it.
- The trace heater and its supply lead is to be secured to the heated surface directly before and after the connection sleeve (e.g. by adhesive tape or temperature resistant wire straps).

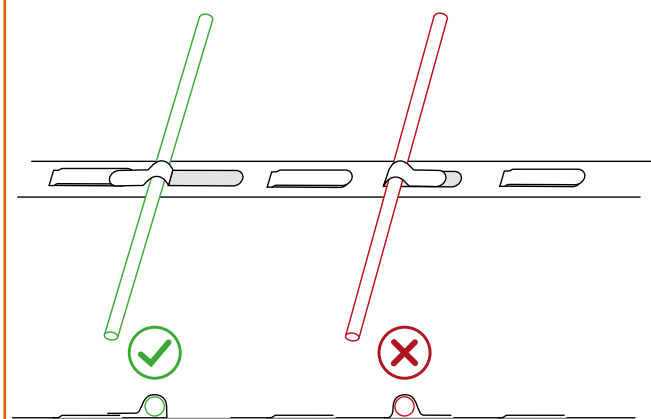
## Fastening the heating cable to the pipe

- Fasten the heating cable at intervals of 300 mm.
- Use only fastening materials that have been defined as suitable accessories by the manufacturer and that were selected in the design documents.
- Make certain that the selected materials meet the requirements (for temperature, mechanical and chemical resistance).
- Check whether the use of the other elements (such as aluminium adhesive tape for better heat transfer) is required in the design documents.

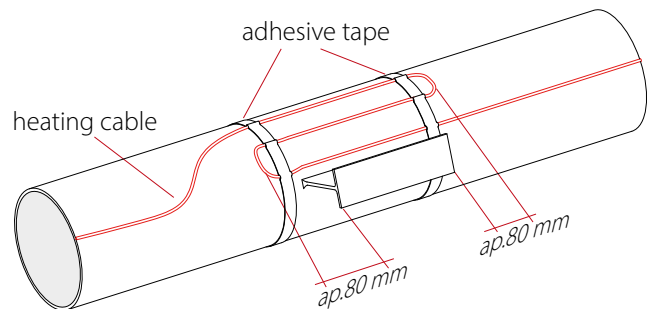


### WARNING

- Never use metal clips or binding wire for fastening as doing so could cause the heating cable to be damaged.
- Heating cables must be able to move slightly in the fastenings (for expansion and contraction).
- When using a pre-stamped stainless steel band, note that a burr is produced inside the tab due to punching. Follow the installation instructions in the drawing below. This is the only way to ensure that the burr cannot damage the heating cable.



## Fastening the heating cable on pipe supports

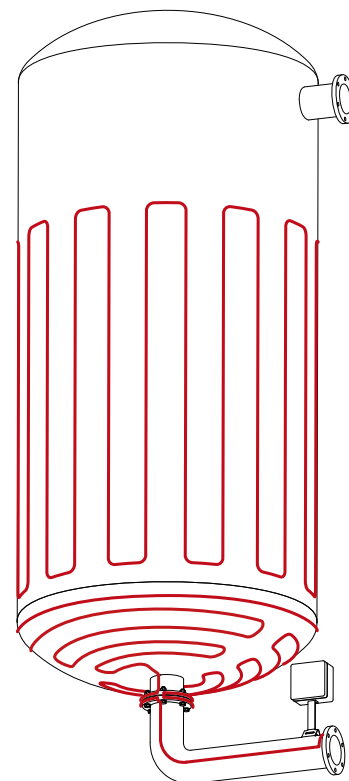


- In areas of pipe supports, heating cables must be laid in a looped manner in order to be able to provide sufficient power at this point.

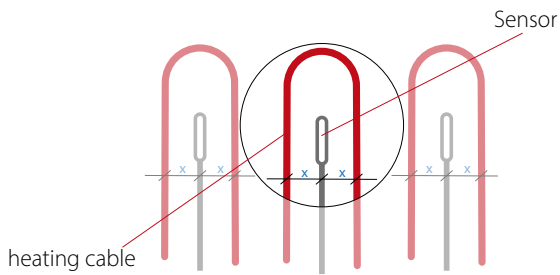
### NOTE

- We recommend covering the entire surface of plastic containers or pipes (PE/PP/PVC/GRP or similar) with aluminium foil before installing the heating cable

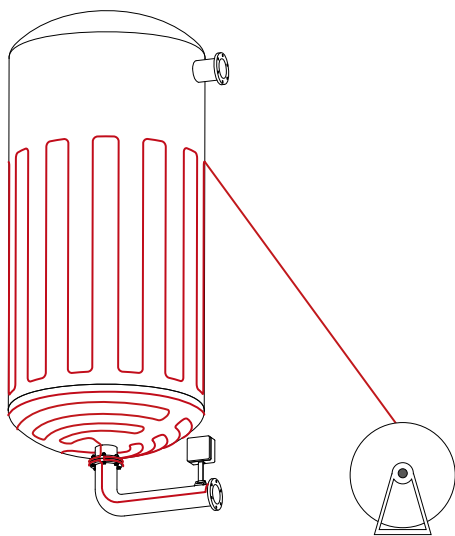
## Laying the heating cable on containers



- Basically, the heating cables are laid in a meandering manner on vessels and on surfaces. Wrap the vessels with the heating cable only if the project planning explicitly prescribes it.



- The temperature sensor must be installed centrally between the heating cables. Care must be taken to ensure the best possible contact between the sensor and the surface.



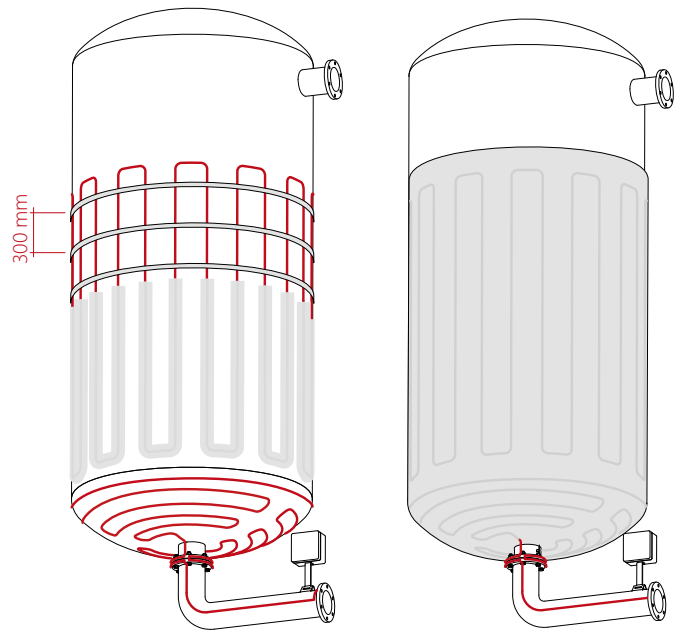
- Lay the heating cable starting from the feed point and fix the heating cable at the specified distances using the preassembled tensioning straps. Please note the necessary material allowance for the floors (see project planning documents).
- Align the heating cable exactly according to the project planning and fastening the heating cable with the help of further tensioning straps (max. distance 300 mm).

### **ATTENTION**

Make sure that the tensioning straps are not too tight so as not to damage the heating cable. It should still be possible to move the heating cable easily under the tensioning strap.

### **Fastening the heating cable to containers**

- If provided, install aluminium foil over the ready-fitted heating cable. This serves to improve the heat transfer and prevents the penetration of insulating material between the heating cable and the tank wall.
- Connect the heating cable to the junction box and carry out an commissioning test and report.



Fastening with tension strap or with aluminium adhesive tape.

Covering with aluminium foil.

### **Covering the heating cable with metal foil**

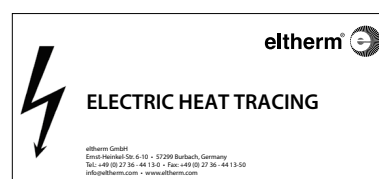
- To prevent the penetration of thermal insulation material between the heating cable and the surface to be heated and to keep the surface temperature of the heating cable as low as possible, the heating cable must be covered over its entire length with self-adhesive metal foil.
- If thermal insulation with a sheet metal jacket is used, an insulation bushing must be used protect the heating cable from the mechanical damage when it is led out of the panelling.

### **Attach type plate**

- After completion of the heating circuit, a weather-resistant, permanently legible identification plate with all relevant system details must be attached to the junction box or the connection pipe immediately at the entry to the junction box.

### **DANGER**

- Electrically heated parts have to be identified in reasonable distances with warning labels „Electrical heating“ on the thermal insulation.
- Approx. 5 m distance between each label on pipelines or at least 1 warning label per pipe-branch respectively.





## Electrical connection

### **ATTENTION**

- The electrical connection and termination of the heating cables must only be carried out using eltherm accessories in accordance with the relevant assembly instructions. Failure to do so will invalidate any warranty claims.
- When making the electrical connection, it must be ensured that no tensile, shear or torsional forces can act on the connection this is achieved by providing suitable support for the heating cable in the immediate vicinity of the connection.

## INSPECTION OF THE HEATING CIRCUIT

- After the completion of a heating circuit and prior to the installation of the thermal insulation, following steps have to be taken.
- Carry out a visual inspection for any mechanical damage and check compliance with the installation guidelines. Check whether a heating circuit type plate is attached. The information it contains must be legible.
- Check the insulation resistance.
  - The insulation resistance of each circuit is to be measured between each single bus wire and the protective braid or screen. The measured values are to be noted.
- Check the heating circuit function.
  - The heating cable temperature must be specifically monitored to prevent the heating cable from over heating.

### **ATTENTION**

- Test voltage minimum 500 VDC, recommended 2500 VDC
- Independent of the heating circuit length, the insulation resistance must not be lower than 20 MOhm. In case of a lower insulation resistance, the source of defect has to be determined and eliminated.
- Any damage that has occurred must be repaired immediately. For short heating circuits by replacing the heating cable and for longer heating cable lengths by cutting out the damaged areas and inserting a new heating cable section (see assembly instructions for connection set).
- Repeat the tests after the terminal insulation has been applied.

## OPERATION & MAINTENANCE

### **NOTE**

Trace heaters ELK-... and ELW-... generally operate maintenance free. However it is recommended that the system be checked by qualified personnel in regular intervals for visual damage and insulation resistance.

- During operation of the system, local laws and regulations for the use of electrical trace heaters in hazardous areas as well as all other applicable standards and safety regulations are to be followed.
- The permissible operating conditions according to the rating plate / data sheet must be observed.
- The maximum operating temperature given on the label must not be exceeded.
- Covers and cable entries of connected controllers, junction boxes and connection sleeves must be closed or tightened in accordance with the manufacturer's instructions.
- Installed trace heaters has to be protected against damage that may occur during repair work on heated components.
- After completion of the repair, the heating circuit will once again need to be tested.
- Readings of ohmic resistance and insulation resistance are to be taken from cold heaters only.
- Temperature control units and controls must be checked annually by trained specialists.

### **DANGER**

- Damaged heating circuits shall not be operated. This is the case when:
  - Heater or attached leads show damage or deformation.
  - The circuit is electrically defective (open circuit, high leakage current).
- There is a risk of damage to the heating cable as a result of previous work or damage to the heated part of the system.
  - After thermal or mechanical overstress.
  - After failure or temperature control.



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