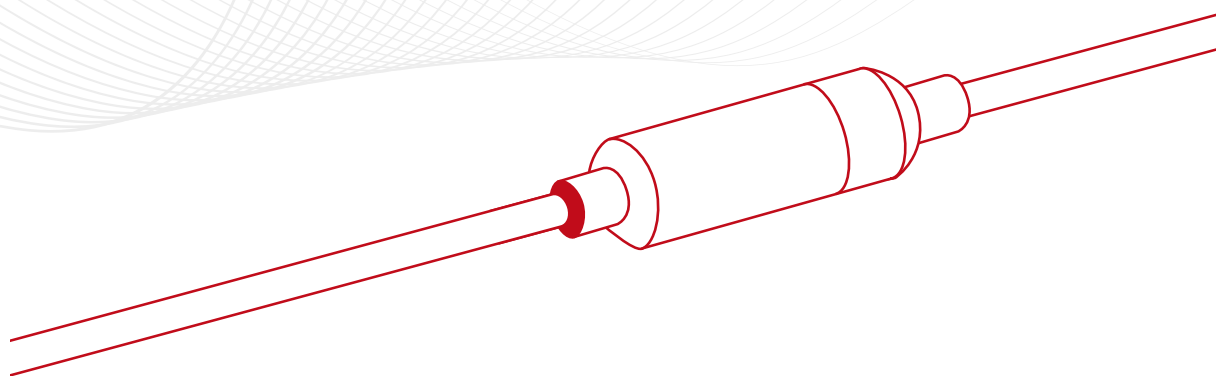


INSTALLATION MANUAL



ELK-MI

Installation and operation
Factory terminated ELK-MI heating cables

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IMPORTANT INFORMATION

- RETAIN FOR LATER USE



Please follow these instructions for proper and safe use of the ELK-MI 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 Factory terminated ELK-MI heating cables	
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	Revision: 09	Jonas Schmidt	Date:	25.09.2023

INTRODUCTION

GENERAL INFORMATION

ELK-MI trace heaters are suitable for industrial use on piping, vessels, instrumentation and related equipment in non-classified (ordinary) areas and in areas where combustible gasses or dust may be present. The heaters are supplied with integral cold leads and glands M20 ready for installation. Cable sheath and joint are consisting of stainless steel AISI 321 (1.4541). For use in corrosive environment, consideration of the material properties and the specific application conditions is recommended.

WARRANTY



ATTENTION

In order to fulfil 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 the purchase order and the delivery slip.
- Inspect the heating cable and components for transport damage.
- Carry out all measurements required for the respective materials (insulation measurement on the heating cables, etc.)
- The label is attached to one of the cold leads and carries the following information:

MARKING

eltherm GmbH Burbach

<Type> <Order-No.>

<Part No.> <Lot No.>



<Voltage> <Amperes> <Frequency>

<Power> <max. Operating Temp.>

Additional information in case of Ex applications:



<Group> <T-class>



0637

<Certificate No.>

STORAGE

- The goods have to be stored in a dry environment at an ambient temperature of -20...+60 °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. In case a circuit consists of a number of individual heater lengths which are designed to be connected in series, make sure that the voltage applied corresponds with the voltage suitable for the individual length (as per attached label).

MOUNTING

SAFETY INSTRUCTIONS

- Design and installation of heating circuits is to be made compliant to the standards EN 60519-10 and EN 62395-2 (EN 60079-30-2 in hazardous areas) as well as to any other locally applicable codes and standards.
- Unless otherwise stated, mineral insulated trace heaters have to be operated with controller and limiter. In hazardous areas Zone 1 and Zone 21, operation of the heater in controlled design or stabilized design as defined in EN 60079-30-2 is required.
- Suitable positioning of the temperature sensors will avoid overheating of pipeline / tank, medium and trace heater. Make sure the sensors are properly attached.
- When using the trace heater on metallic surface, this surface also has to be integrated in the leakage current protection according to DIN VDE 100, part 410 before operation of the system.
- A RCD with a tripping level of max. 30 mA above the inherent leakage current level needs to be provided for each heating circuit.
- The metallic sheath of the trace heater has to be connected to potential earth.
- Prior to installation work or maintenance work, the relevant system components must be de-energised and secured against being switched on again.
- The heating cables must be cooled down to ambient temperature before installation or maintenance work.

DANGER

- Improper mounting or damage to the electrical trace heating can lead to a danger of short circuit and fire while the system is in 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.

DANGER

The parameters listed in the test certificate as well as any special conditions cited must be strictly observed.

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 the exact details of the applicable regulations.
- The instructions must be kept with the system documentation for later use (maintenance, servicing).

PREPARATION OF MOUNTING

ATTENTION

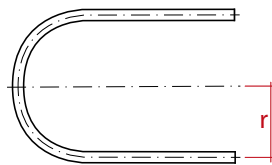
- Make certain that all mounting work is complete on the pipe system that will be heated.
- All pressure and material tests as well as coating and painting work on the pipelines must be completed. The coat of paint on the pipes must feel dry to the touch.
- Check the nature of the pipe surface. It must 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 the necessary material and tools are on hand.
- Measure the electrical and the 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.

Mounting the heating cable



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 lengths 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.

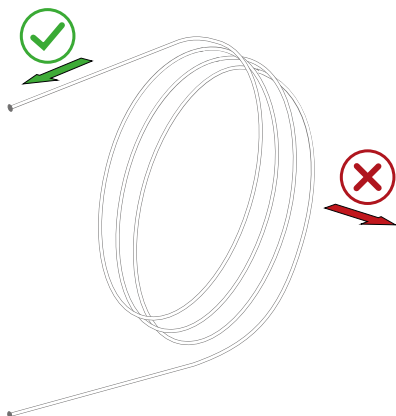


Preparation of the system

- 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

- Carefully unwind the heating cable from the spiral. Please ensure that the heating cable is not pulled at right angles to the winding direction.
- Ensure that the unwinding device runs smoothly to prevent damage to the heating cable due to excessive tensile force.
- Use a stable holder to unwind the heating cable.



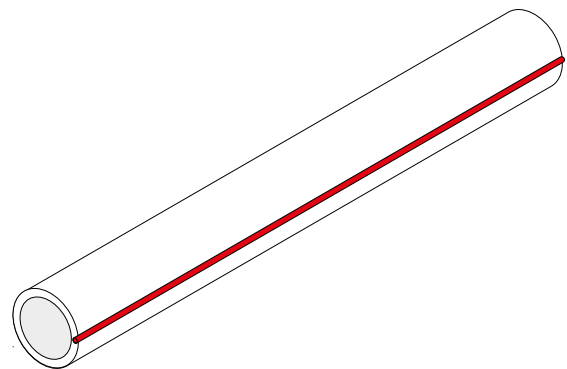
Laying the heating cable



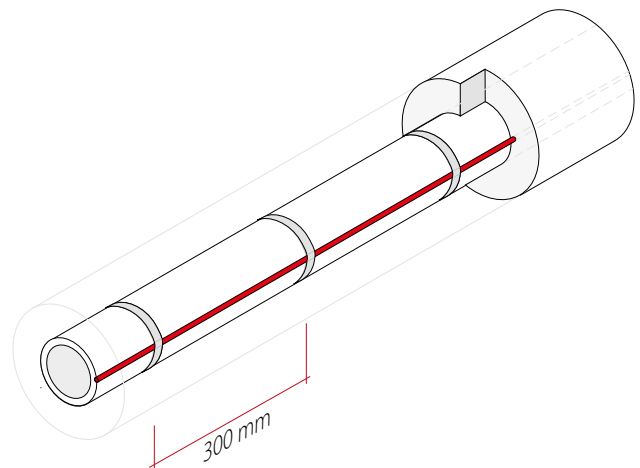
DANGER

- 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.

Fastening the heating cable to the pipe



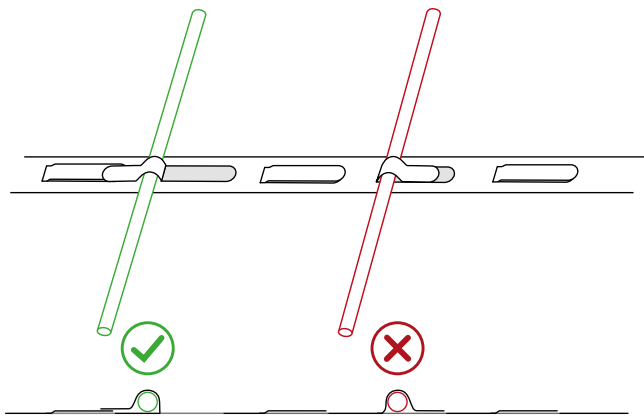
- Normally the heating cable is laid stretched out along the pipe. Lay heating cables in a spiral pattern only if the projects planning explicitly calls for it.



- 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 other elements (such as aluminium adhesive tape for better heat transfer) is required in the design documents.

⚠ WARNING

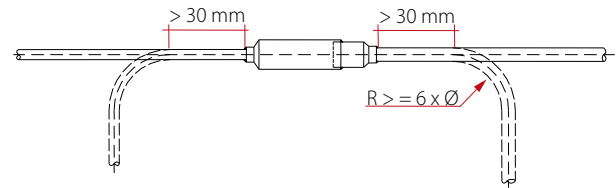
- Never use metal clips for fastening as doing so could cause the heating cable to be damaged.
- Heating cables must be able to move slightly in the fastenings (for expansion and contraction).
- When using a pre-stamped stainless steel band, note that a burr is produced inside the tab due to punching.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



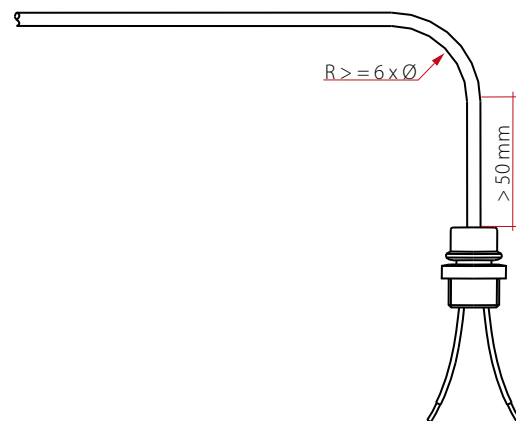
Bending radii

⚠ ATTENTION

- The following must be observed when bending and laying the heating cables:
- Keep bends away from connection sleeves at least 30 mm. Do not subject connection sleeves and adjacent heater parts to mechanical stress (torsion, pull, deformation).
- Keep bends away from potted end seals at least 50 mm.
- Do not bend at radii smaller than the minimum bend radius ($6 \times$ heater diameter).
- Avoid repeated bending at the same point, as this can lead to material fatigue.
- When laying two individual heating cables strands, a distance of at least 25 mm must be maintained between the individual cables!
- In the case of heating cables with bilateral supply, the cable-entry and -exit must be arranged next to each other.



Minimum bending distance and minimum bending radius in the area of the connection sleeves.



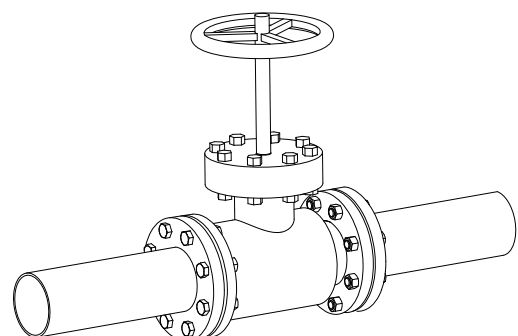
Minimum bending distance and minimum bending radius in the area of the potted end seals.

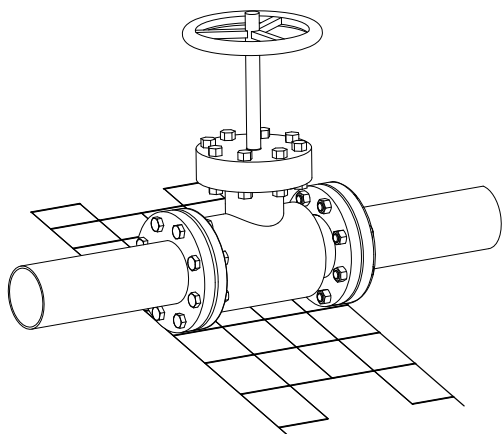
Fastening the heating cable onto metall braiding

A Special mounting variant consists of fastening the heating cable onto metal braidings. This variant is used mainly for heating geometrically complex shapes. This variant is also used if fittings (such as valves and pumps) have to be heated and easy access to the fittings is especially important (for maintenance purposes, etc.) This ensures that the metal braiding will be easy to open and close again without having to remove the heating cable first.

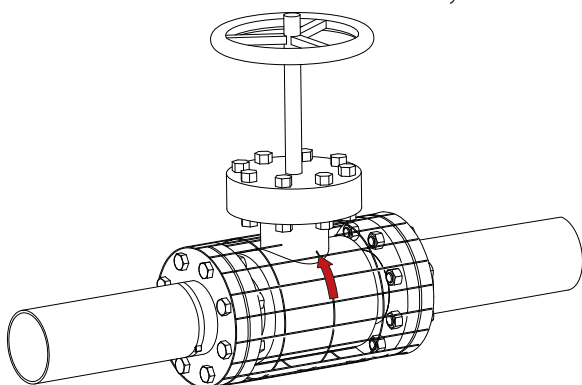
⚠ ATTENTION

- Make certain the metal braiding has the best possible contact with the surface of the fitting.
- Only fasten the heating cable with the fastening material provided by the manufacturer and follow the recommendations for fastening.

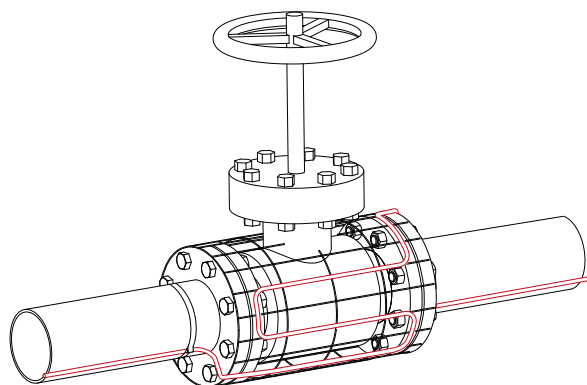




- Cut the braid to size so that it fits exactly



- Fasten the braiding onto the fitting with metal cable ties



- Fasten the heating cable to the braiding every 300 mm using binding wire or insert it into lugs.
- If the heating cable is alternatively fastened with tensioning straps, ensure that the heating cable is held in position but can still be moved lengthways.
- Clamping too tightly can lead to fatigue fracture over time due to thermal expansion.
- The heating cable connections must be inserted into a junction box and the screw connections on the cold lead screwed in tightly.
- Position the moulded end pot and tighten the union nut to the stop to secure the cold lead.
- Caution: The press rising inside the screw connection can only be tightened once!

- The moulded end caps must be arranged in such a way that they are not exposed to temperatures $> 90^{\circ}\text{C}$.
- Then place the stranded wires on the terminals.

! ATTENTION

- Attach heater to pumps, valves and other components in such way that those components are accessible for maintenance or exchange without major mechanical stress for the heater.
- The joints between cold lead and heating cable should be placed directly on the heated surface if the max. operating temperature is lower than 500°C . For higher operating temperatures, joint and cold lead should be placed in areas not exposed to temperatures $> 500^{\circ}\text{C}$.
- The heating and connection cable must be suitable protected directly upstream and downstream of the connection sleeve (e.g. with temperature-resistant adhesive tape or temperature-resistant binding wire).

! DANGER

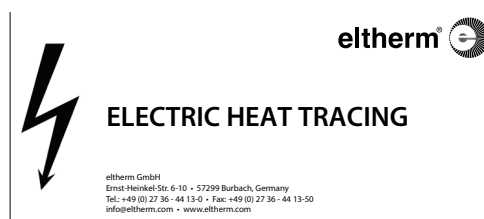
- The max. operating temperature of the heated device as defined by the plant owner as well as the maximum heating cable temperatures as given on the label must not be exceeded. This may be achieved by use of an appropriate temperature control.
- Make sure the heater has a good contact to the surface to be heated. In case of gaps, fill those with thermally conductive and temperature resistant materials.

Cover 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 to protect the heating cable from 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 warnig label per pipe-branch respectively.

INSPECTION OF THE HEATINGCIRCUIT

- After the completion of a heating circuit and prior to the installation of the thermal insulation, the following steps have to be taken.
- A visual check of the trace heater regarding possible mechanical damages and/or incorrect installation.
- 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 overheating.

! ATTENTION

- Test voltage minimum 500 VDC, maximum 1000 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.
- Damaged heaters need to be replaced immediately.
- Repeat the tests after the thermal insulation has been applied.

OPERATION & MAINTENANCE

- Trace heaters ELK-MI generally operate maintenance free. However, it is recommended that the system be checked by qualified personnel in regular intervals for visual damages 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 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.

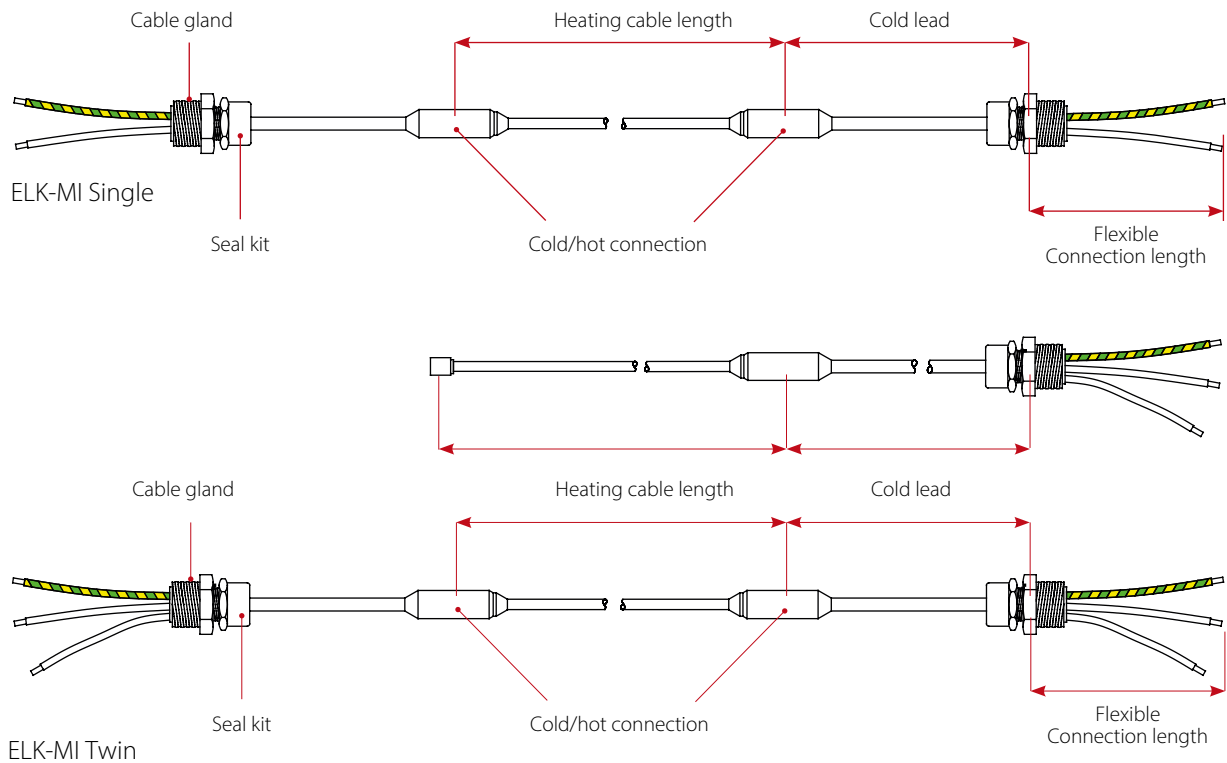
- Measurements of the resistance and insulation resistance of installed heating cables may only be carried out when they are cold.
- Temperature control units and controls must be checked annually by trained specialists.
- Damaged heating circuits shall not be operated. This is the case when:
 - Heater or attached leads show damage or deformation
 - The circuit ist electrically defective (open circuit, high leakage current).
 - There is a riks of damage to the heating cable as a result of previous work or 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 of temperature controll.

MARKING (by customer)

i NOTE

Customer-side labeling with an identification plate is possible

AVAILABLE VARIANTS



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