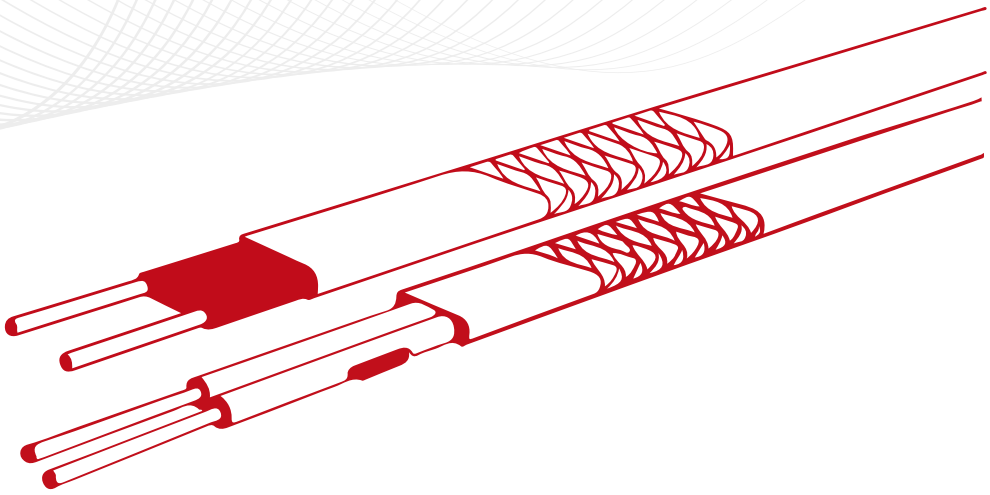
INSTALLATION MANUAL



ELSR & ELP

Installation and operation
self-regulating & parallel trace heaters

eltherm GmbH
Ernst-Heinkel-Strasse 6-10
57299 Burbach, Germany
P.: +49 2736 4413-0
F.: +49 2736 4413-50
info@eltherm.com

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IMPORTANT INFORMATION

- RETAIN FOR LATER USE

Please follow these instructions for proper and safe use of the ELSR- and ELP 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

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Author:	J. Shilling	Date:	01.12.2003
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INTRODUCTION

GENERAL INFORMATION

The trace heating systems ELSR-... and ELP-... are suitable for industrial use on pipelines, containers and associated equipment in non-classified (common) areas, outdoor areas, wet areas and areas where flammable gases, dust or fibres may be present.

WARRANTY

ATTENTION

In order tu 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. Alway 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 trace heater and components for transport damage.
- Carry out all measurements required for the respective materials (insulation measurement on the trace heaters, etc.)

ATTENTION

Ensure that the data sheet for the supplied trace heater 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 enviroment at an ambient temperature of -20...+60 °C.
- If measured lengths of the trace heater have to be removed from storage, the end of the remaining trace heater must be protected effectively against penetration of moisture (for example by attaching an original end connection of the trace heater 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 max. allowable length of a heating circuit (according to the corresponding data sheet) for unilateral feed depends on the admissible voltage drop (we recommend not to exceed a voltage drop of 10%) and the utilisation of the circuit Breaker (recommended: 16 A CB with „C“ characterisation, utilisation 80 %).

MOUNTING

SAFETY INSTRUCITONS

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).

DANGER

- Prior to installation and maintenance work the relevant heating circuits and plant sections need to be de-energized!
- 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.
- Improver 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.

- Design and installation of heating circuits is to be made compliant to the standards IEC EN 60519-10 and IEC EN 62395-2 as well as to any other locally applicable codes and standards.
- Trace heaters ELP should only be operated with a controller. A controlled or stabilised mode of operation as per EN 62395-2 is to be implemented.
- Heaters and sensors need to be placed on the designated pipes / tanks in the planned positions in order to avoid overheating of equipment as well as insufficient temperature maintenance. Make sure the sensors are properly attached.
- For use as trace heating in accordance with IEC EN 62395-1 and IEC EN 60159-10 and for Ex applications, an RCD (30 mA) is mandatory.
- When using the heating tapes and metal surfaces, they also have to be protected against indirect contact acc. to DIN VDE 100, part 410 (or equivalent standards) before operation of the system.

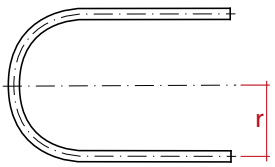
PREPARATION OF MOUNTING

- 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 wheather all the necessary material and tools are on hand.
- Measure the electrical and the insulation resistance of the trace heater 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 trace heaters.

MOUNTING THE TRACE HEATER

⚠ WARNING

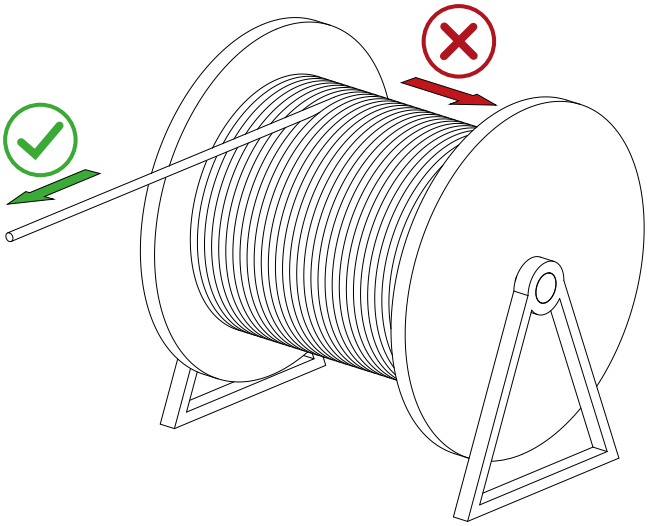
- Do not use adhesive tape with emollients (i.e. PVC)!
- Install according to the min. bending radius and installation temperature stated on the data sheet.
- **ELP types:** Make sure the tapes will not have contat to each other or cross after installation, this may lead to overheating and damage of the heating tapes and nearby placed objects!
- **ELSR types:** An overlapping or contacting installation of the heating tape does not cause overheating due to the self-regulating heating characteristic.
- A heating circuit should be installed as shown in the following diagrams using the original Eltherm accessories.
- Do not crush the trace heater or pull it over sharp edges.
- Avoid stepping on or driving over the trace heater at all costs.
- Never use the trace heater 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

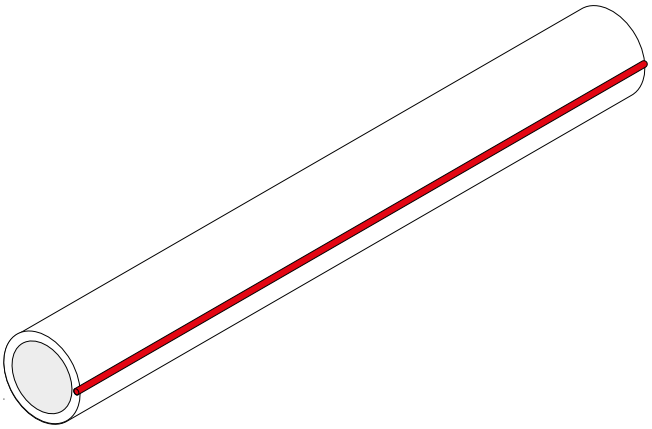
- Remove all unevenness, such as sharp burrs or similar, from the surface to be heated and clean the surface of grease and oil.
- Mark the installaion distances required according to the projection on the surface to be heated.

Unrolling the trace heater

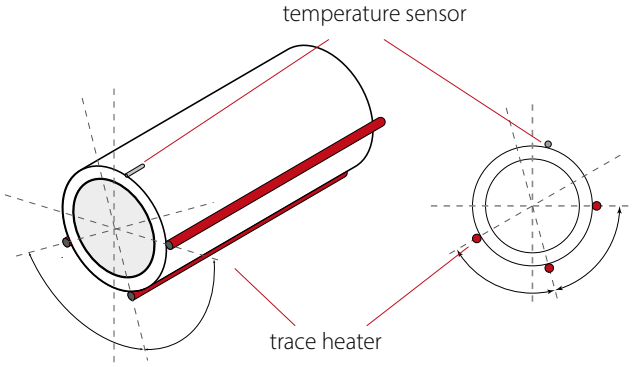


- Use a stable holder to unwind the trace heater.
- Ensure that the unwinding device runs smoothly to prevent damage to the trace heater due to excessive tensile force.
- Unroll the trace heater straight over the edge of the drum, not off to the side.

Fastening the trace heater to the pipe



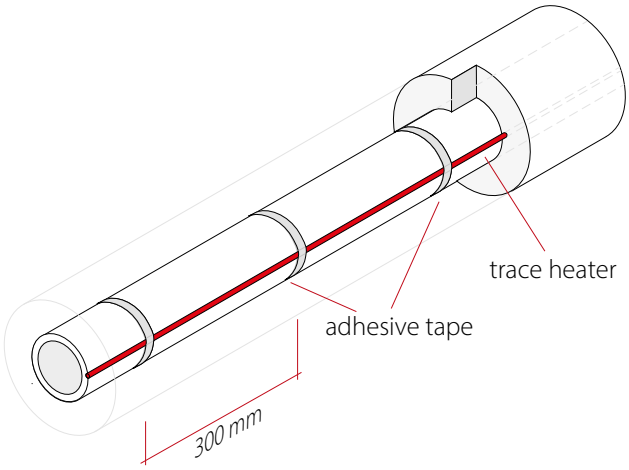
- Normally the trace heater is laid streched out along the pipe. Lay trace heaters in a spiral pattern only if the projects planning explicity calls for it.



- Do not lay the trace heater on the lowest point of the horizontal pipeline.
- Laying the trace heater 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.

ATTENTION

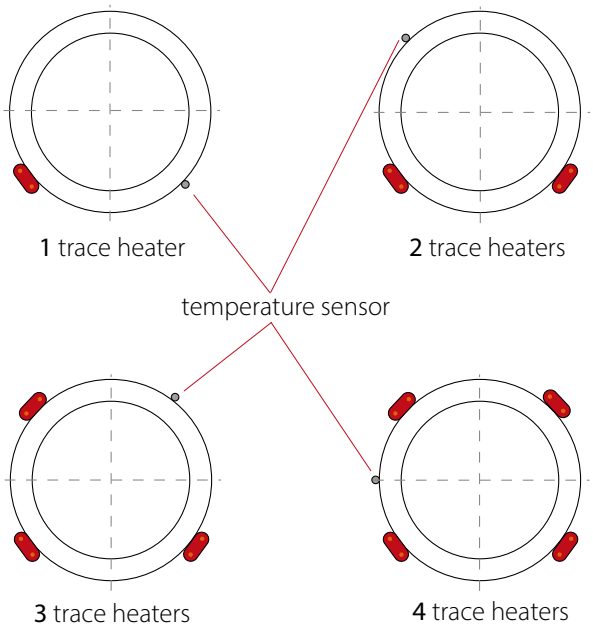
- The electrical connection and termination of the trace heaters must only be carried out using eltherm accessories in accordance with the relevant assembly instructions. Failure to do so will invalidate any warranty claims.
- When making the electrical connection, it must be ensured that no tensile,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



- Fasten the trace heater 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.

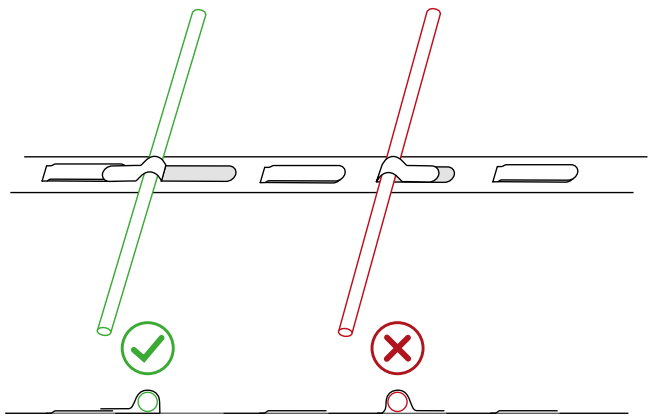
- Make certain that the selected materials meet the requirements (for temperature, mechanical and chemical resistance).
- Check whether the use of other elements (such as aluminium adhesive tape for better heat transfer) is required in the design documents.

- When installing several trace heaters on one pipe please refer to the following sketch.



WARNING

- Never use metal clips or binding wire for fastening as doing so could cause the trace heater to be damaged.
- Trace heaters 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 trace heater.



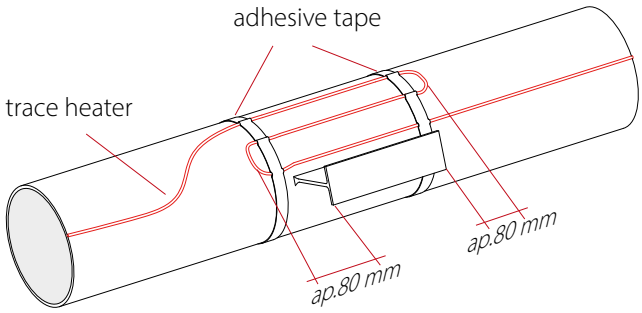
NOTE

- We recommend covering the entire surface of the trace heater on plastic containers or pipes (PE/PP/PVC/GRP/GRP or similar) with aluminium foil.
- To save energy and to keep process temperatures constant, the application of superior control units are recommended. Please ask our project engineers when in doubt.

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 tapes.
- Make sure that the trace heaters are never used at or exposed temperatures above the nominal exposure temperature ratings.

Fastening the trace heater on pipe supports



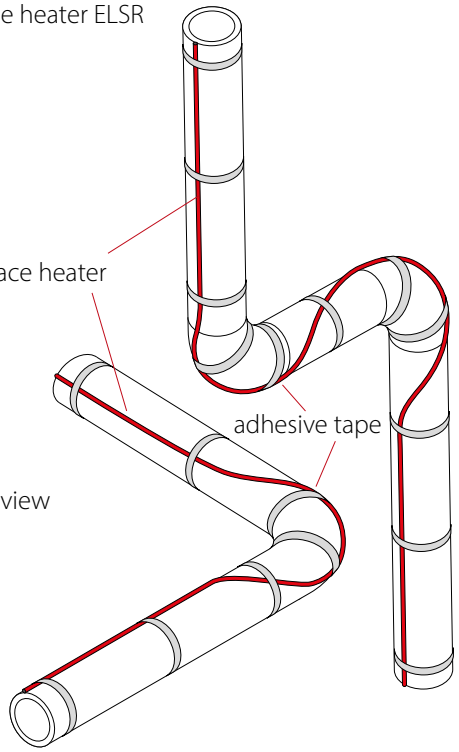
- In areas of pipe supports, trace heaters must be laid in a looped manner in order to be able to provide sufficient power at this point.

ATTENTION

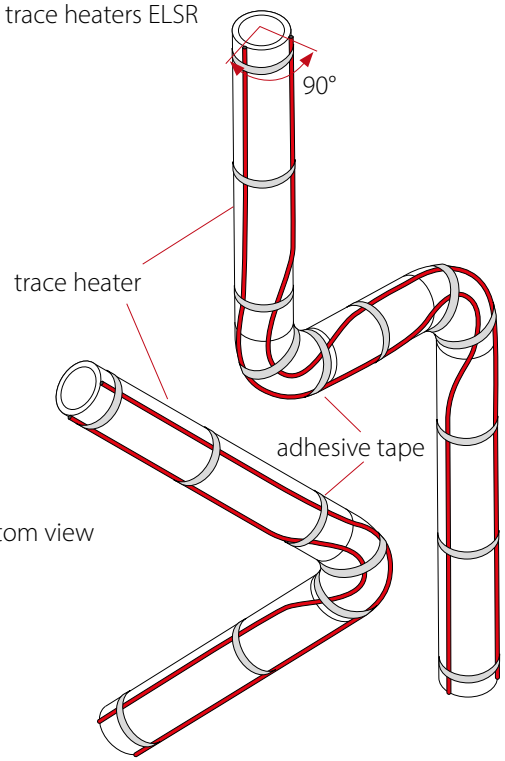
- Observe the specified length allowances in project planing or design (for example in eltherm Designer).

Fastening the trace heater on elbows

one trace heater ELSR

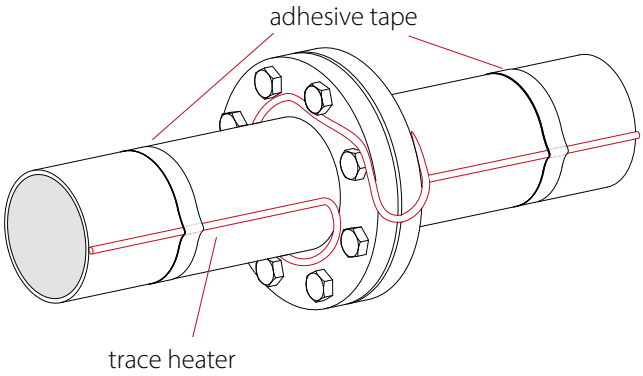


two trace heaters ELSR



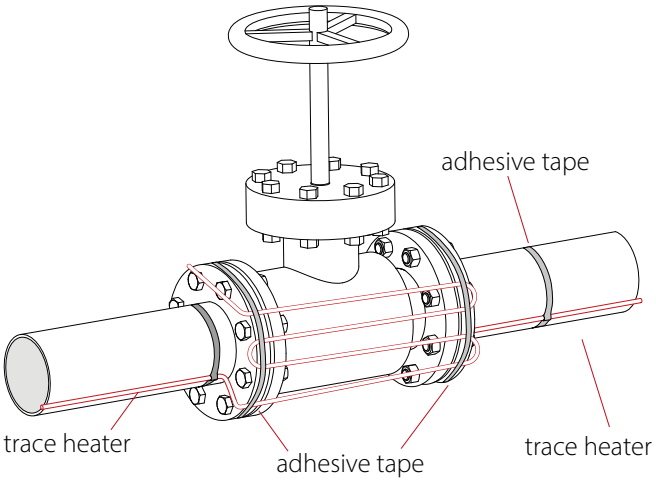
- When laying a trace heater around a pipe bend, the trace heater must be laid on the outside of the pipe bend. If it is laid on the inside, the flow medium may be deposited in the pipe due to the lower heat input to the pipe.

Fastening the trace heater on flanges



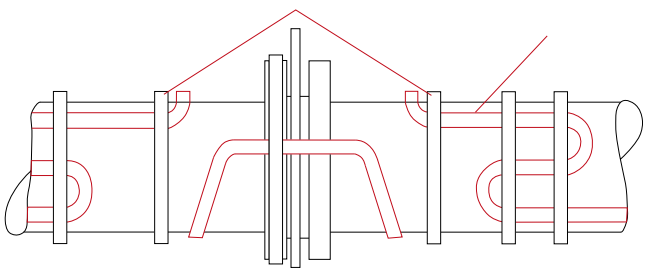
- When laying a trace heater around a flange connection, it must be ensured that the trace heater is laid once around the pipe directly in front of the flange connection. More power must be applied to the pipe at this point due to higher thermal expansion.

Fastening the trace heater on valves

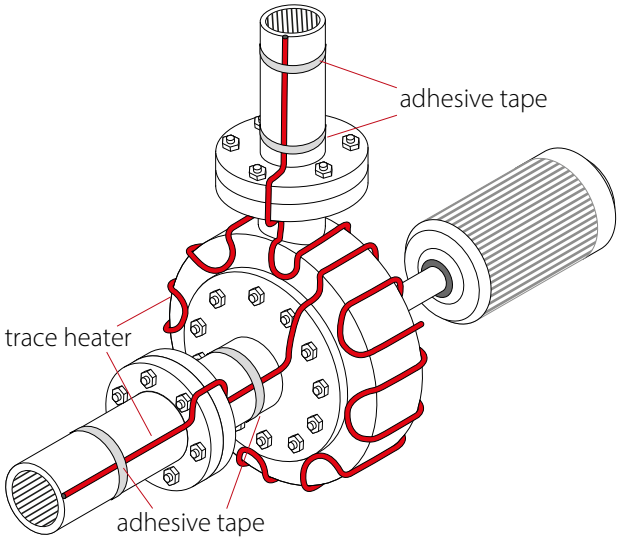


- In areas with large pipe diameters, trace heaters must be laid in a loop.

Fastening the trace heater on Plug-in disc



Fastening the trace heater on pumps

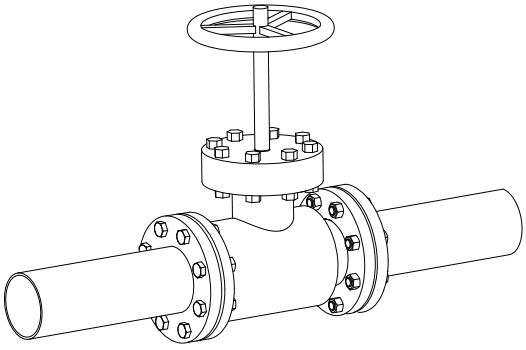


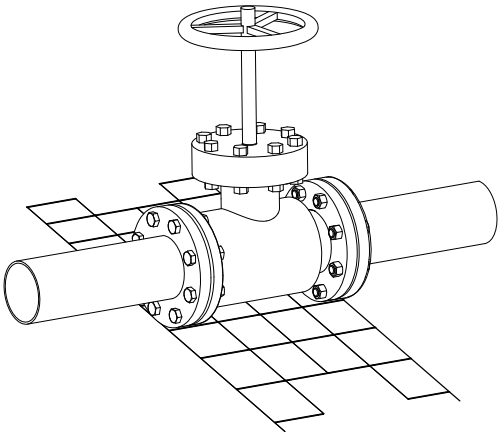
Fastening the trace heater onto wire guard

- A Special mounting variant consists of fastening the trace heater onto wire guards. 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 purpose, etc.) This ensures that the wire guard will be easy to open and close again without having to remove the trace heater first.

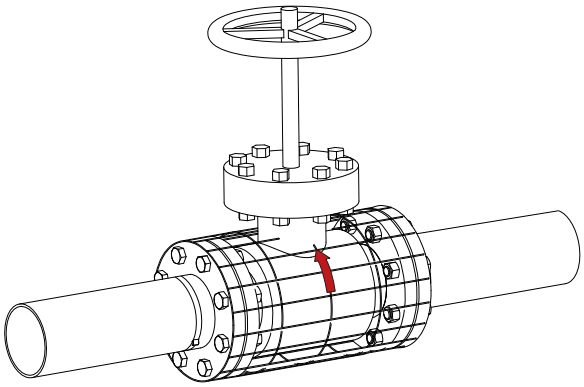
⚠ ATTENTION

- Make certain the wire guard has the best possible contact with the surface of the fitting.
- Only fasten the trace heater with the fastening material provided by the manufacturer and follow the recomendations for fastenings.

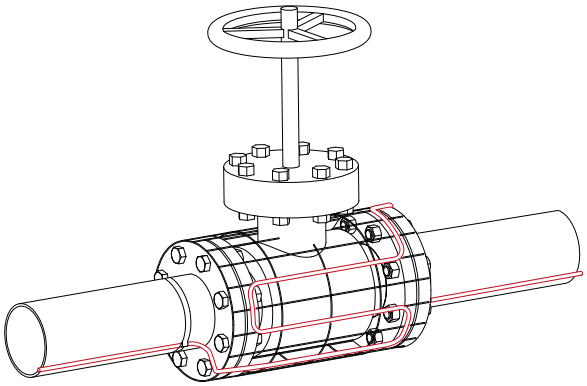




- Cut the wire guard to size so that it fits exactly



- Fasten the wire guard onto the fitting

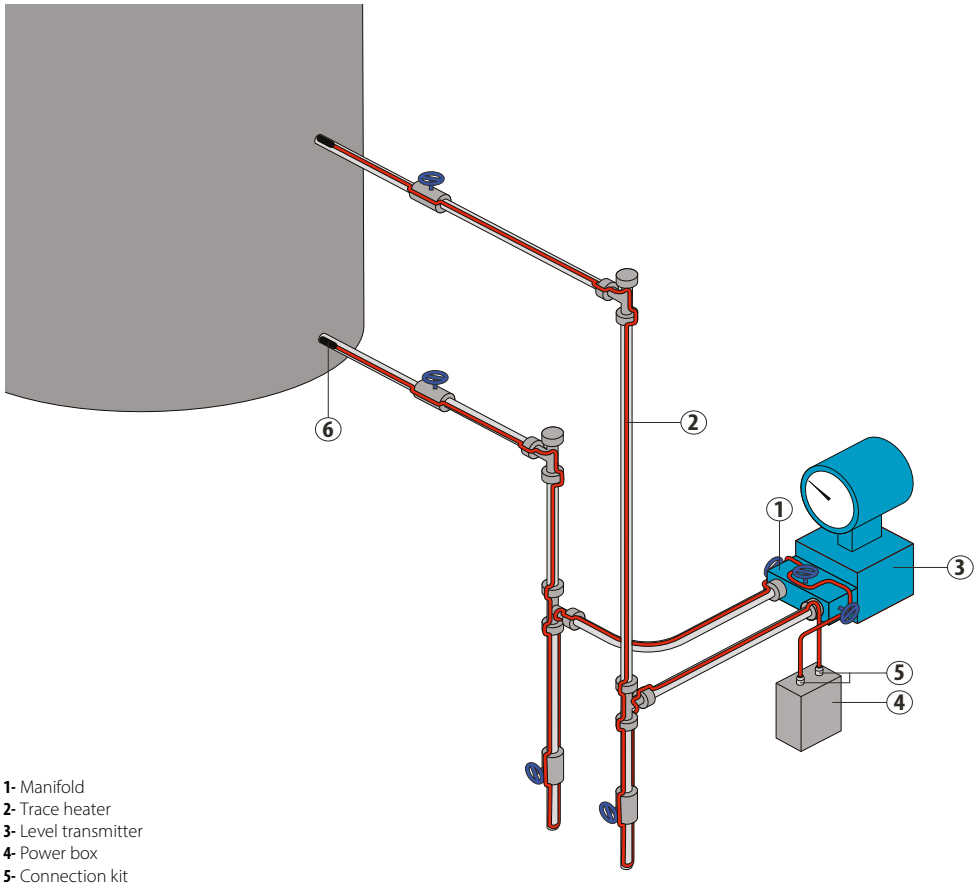


- Fasten the trace heater onto the wire guard

⚠ DANGER

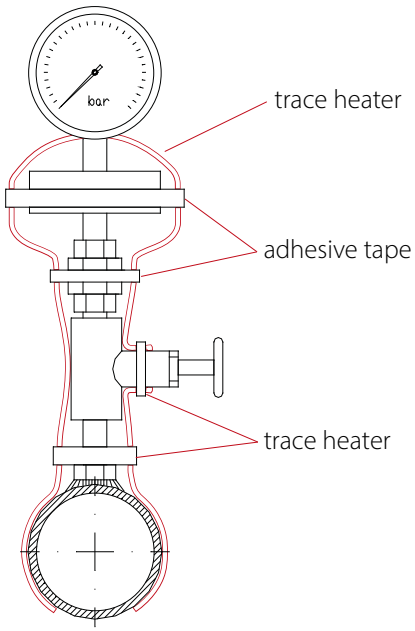
- The max. operating temperature of the heated device as defined by the plant owner as well as the maximum trace heater temperatures as given on the label must not be exceeded. This may be achieved by use of an appropriate temperature control.
- Make sure the heater has a good contact to the surface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

Fastening the trace heater on level indicators



1- Manifold
2- Trace heater
3- Level transmitter
4- Power box
5- Connection kit
6- End seal

Fastening the trace heater on fittings



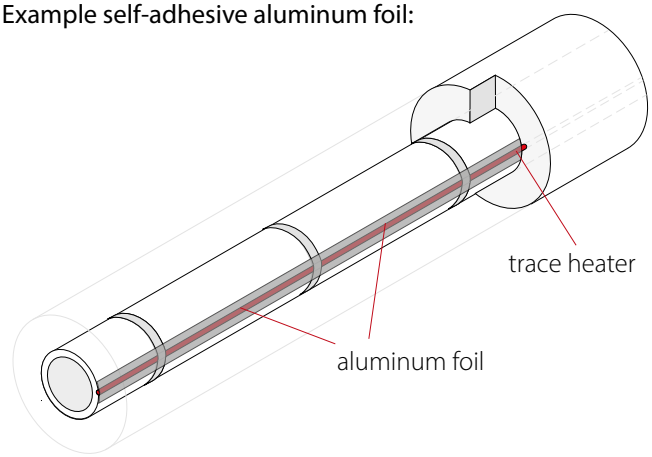
⚠ ATTENTION

Fittings and level indicators must be installed all round to ensure uniform thermal expansion.

Cover the trace heater with metal foil

- To prevent the penetration of thermal insulation material between the trace heater and the surface to be heated and to keep the surface temperature of the trace heater as low as possible, the trace heater 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 trace heater from mechanical damage when it is led out of the panelling.

Example self-adhesive aluminum foil:



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.

INSPECTION OF THE HEATING CIRCUIT

- 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 trace heater temperature must be specifically monitored to prevent the trace heater 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 detect hast to be determined and eliminated.
- Any damage that hast occured must be repaired immediately. For short heating circuits by replacing the trace heater and for longer trace heater lenghts by cutting out the damaged area and inserting a new trace heater section (see assembly instructions for connection set).
- Repeat the tests after the terminal insulation has been applied.

OPERATION & MAINTENANCE

NOTE

Trace heaters ELSR-... and ELP-... 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 / 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.

ATTENTION

- Installed trace heaters has to be protected against damge 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 trace heater as a resut 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)

NOTE

Customer-side labeling with an identification plate is possible

eltherm®

eltherm GmbH
Ernst-Heinkel-Straße 6-10
57299 Burbach. Germany

T.: +49 2736 4413-0
F.: +49 2736 4413-50
info@eltherm.com

This document can also be found on the eltherm website.
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