

Product identification

These instructions fit an 8 x 11 mm black Parallel Resistive heating cable of 20, 30 or 40 watts per metre (W/m). The cables are available in two types with different outer covers: polyolefin and elastoprene, respectively. Elastoprene is easy to strip and to install as this material remains fairly soft, even at low temperatures.

Polyolefin is a stiffer material than elastoprene. Elastoprene and polyolefin have comparable mechanical strength.

The scope of application is ice and snow melting and frost protection

Frost protection in gutters, downspouts, eaves gutters, roof surfaces, etc. The scope of application is the same regardless of the type of outer cover.

Parallel Resistive heating cables are typically used for:

- Frost protection of gutters and downspouts
- Frost protection of eaves gutters
- Frost protection of tubes
- Ice and snow melting on roof surfaces. Max. 20 W/m on flammable surfaces such as roofing felt.

Structure and function of the cable

- Structure

The Parallel Resistive heating cable is a resistance cable.

The cable is built in such a way that it can be shortened without losing its thermal properties.

Inside, the cable is made up of individual heating units of approx. 0.6 – 1.0 m in length (see Fig. 1).

The start/end of each heating unit can be seen and felt as small grooves on the outer sheath of the cable.

A heating unit that is cut no longer produces heat.

The end which is not connected to the terminal must be double insulated and sealed to comply with IPX7 as a minimum.

- Cold end

When the cable is cut, the piece of cable from the cut to the next point of contact no longer produces heat. Therefore, if the cut is made immediately after a point of contact, a cold end of between 0.6 – 1.0 m will result, depending on the type of cable. The cold end can be directly connected to a terminal.

Obviously, the part of the cable which is still heating should be connected in a way which ensures that the heat is not accumulated, thus causing damage to the cable due to overheating.

- Maximum length – 20W/m max. 160m | 30W/m max. 110m | 40W/m max. 80m.

The maximum length of the Parallel Resistive cable is always the same, no matter the ambient temperature, when voltage is applied to the cable. It is therefore easy to ensure that the length of the cable does not exceed the maximum length allowed. (Contrary to a self-regulating heating cable whose maximum length must be carefully adjusted to the current conditions.)

Important general information!

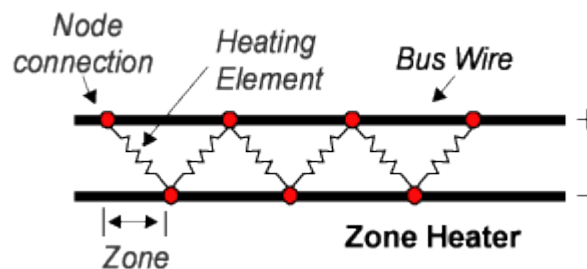
- The heating cable must not be embedded.
- The heating cable must always be connected to a thermostat control.
- The heating cable must not cross.
- The heating cable must be located at least 30 mm from hot objects such as hot water tubes or other parts of the heating cable. Failure to do so may cause overheating of the cable.
- Joints, if any, must not be subjected to tensile and pressure loads. Cable straps, for instance, must not sit too tightly around joints or cable.
- Joints on the heating cable, if any, must not be bent, and at least 20 cm of wire on each side of a joint must be placed in a straight line without being bent or twisted.
- The heating cable must be able to release the heat uniformly throughout its entire length, i.e. a cable located in a gutter, for instance, must not be led through a wall.
- The heating cable must not come into contact with insulation materials or be prevented in any other way from releasing the heat.

- Joints and ends must not be permanently immersed in water. Furthermore, locate them in a way which best protects them from water.
- Do not locate the joints or ends of a heating cable close to or in a drain but keep them away from the effects of water if at all possible.
- Do not connect the heating cable directly to the mains. The cable must be controlled by a thermostat.
- Heating cables connected in series must observe the total maximum length of the specific cable. If cables are connected in series, they must be of the same type.
- All cold leads must be connected in parallel in the connection box.
- Measure the resistance between the heating wires and the insulation resistance to ground. Carry out these measurements three times to ensure that the cable is not damaged or defective. Write down the results and save them with the other documentation. The insulation resistance must be >20 MΩ after one minute at min. 500 V DC. If the insulation resistance does not correspond to the description, the product is defective.
- An authorised electrician must approve the installation, as well as make tests and connections.
- Local rules and requirements and these instructions must be observed.
- The installation must be connected to ground and to a 30 mA fault current relay such as HFI or PHFI.
- A note in a visible place – on the control cabinet, for instance – must announce that electric heating is installed.

Technical data

Voltage	230 V ~ 50 Hz
Output	20, 30 or 40 W/m
Outer cover	Polyolefin or elastoprene
Cable type	Parallel Resistive + ground shield (see Fig. 1)
Shield	Tinned copper
Insulation, inner conductors	Silicone
Cable dimension	8 x 11 mm
Contact points	Can be seen and felt on cable cover
Max. cable length	Depending on cable type
Resistance	Depending on cable length
Max. temp. allowed on cable	120°C
Min. bending radius	6 x cable dimension: W 66 mm / H: 48 mm
Cable temp. at installation	Min. -10°C
Warranty	10 years
Standard	EN60335-2-96 / EN60800 M1
Approval	CE

Fig. 1 Parallel Resistive heating cable, basic design



Preparations in general

Choose the right cable

1. Determine the area to be heated. For a regular gutter of approx. 10 cm in width, the area is 0.1 m² pr. m. Therefore, a cable of 30 or 40 W/m will be sufficient in a regular gutter of 10 cm in width.
2. Determine the power requirement and the output of the cable per m (W/m). See fig. 2 if in doubt.

Scope of application		Cable	Normal power requirement *)	Max. output
Frost protection	Gutters and downspouts	20, 30, 40 W/m	30-40 W/m	-
	Eaves gutters	20, 30, 40 W/m	250-300 W/m ²	300 W/m ²
	Tubes	20, 30, 40 W/m	According to actual heat loss	-
Ice and snow melting	Roof surfaces, flammable	20 W/m	200-300 W/m ²	300 W/m ²
	Roof surfaces, non-flammable	20, 30, 40 W/m	200-300 W/m ²	300 W/m ²

Fig. 2. Examples of general scopes of application and power requirement

*) Actual power requirement may differ from normal power requirement.

Pay attention to factors with a decisive impact on the power requirement such as:

Whether the heat is supplied to the roof from below, or whether it is allowed to blow freely underneath the roof.

Frost protection of tubes presupposes that the power requirement is determined by a heat loss calculation.

The temperature must always be controlled by a thermostat.

Plan, document and check

- Determine the following and draw a sketch with essential details.
 - Dimensions for the installation.
 - Connecting point for thermostat and location of sensor(s).
 - Other heating sources, if any.
 - Do not install cable and joints permanently in water.
 - Plan the location of the heating cable in detail. 10 cm is the typical C-C distance in gutters, eaves gutters, etc. Calculate the C-C distance if the area is larger than a regular 10 cm gutter or downspout. See Fig. 3.
 - Check that the maximum temperature of 120 °C is not exceeded, and check which temperature the material on which the heating cable is going to be installed is able to tolerate. This may determine the maximum permissible temperature. For instance, the material may be flammable and unable to tolerate temperatures above 80 °C. Make a note of the maximum temperature and the reason for selecting this particular temperature.
 - Check that the maximum cable length is not exceeded. Make a note of the maximum length and the length of the installed cable.

Save the sketch and any photos you may have taken during the installation as well as any information on resistance measurements. The documentation provides you with an overview in case of subsequent changes or troubleshooting.

Fig. 3 Calculation of C-C distance. C-C is the centre-to-centre distance between the individual cable loops.

Method 1:

$$C - C = \frac{\text{Area with heating}}{\text{Cable length}}$$

Ex. Method 1: Area with heating = 7.9 m².
Cable length = 84 m

$$C - C = \frac{7.9}{84} = 0.094 \text{ m}$$

Method 2:

$$C - C = \frac{\text{W/m cable}}{\text{W/square metre}}$$

Ex. Method 2: W/m cable = 30 W/m
W/square metre = 300 W/m²

$$C - C = \frac{30}{300} = 0.10 \text{ m}$$

Installation instructions for specific types of installation

Installation – frost protection of gutters, downspouts and eaves gutters

Place the heating cable in/on the parts to be protected against frost. Fix the cable in such a way that it does not hit itself. The distance between the cables should always be at least 30 mm. Fit the sensors and connect the thermostat.

Read Important general information!

Read Preparations in general

Installation

1. Plan the installation.
2. Perhaps, calculate the C-C distance for eaves gutters/surfaces and/or choose W/m cable (see Fig. 2 and 3)
3. Preparing the place of installation
 - Make sure that the place of installation does not have any sharp edges or anything else that could damage the cable.
 - Use edge protectors for sharp edges.
 - If the cable or cable straps are to be glued on, make sure that the surface is stable, dry and clean.
4. Installing and fixing the heating cable
 - The installation must be such that the heating cable does not touch itself as this would result in overheating of the cable. Also, take the movements of the cable in the sun and the wind into account.
 - If cable straps are used, do not tighten these too tightly around the cable.
 - Do not fit cable straps on a joint/end terminal as cable straps may eventually deform the joint which will result in faults.
 - Do not bend joints/end terminal, and keep at least 20 cm of wire on each side of a joint/end terminal in a straight line. Joints/end terminal must not be subjected to tensile and compressive loads.
 - Place the joint/end terminal where it is the least exposed to water.
5. Installing the sensors
 - Install the sensor(s) where an accurate overall temperature will be provided.
 - Install moisture sensors where ice and snow are likely to disappear the last - in the shade, for instance.
6. Connection and approval
 - The installation must be made and approved by an authorised electrician.
 - Local rules and requirements and these instructions must be observed.
 - Connect the cable to ground and to a 30 mA fault current relay such as HFI or PHFI.
 - Do not connect the heating cable directly to the mains. The cable must be controlled by a thermostat.
 - A note in a visible place – on the control cabinet, for instance – must announce that electric heating is installed.
7. Operation and maintenance
 - Inspect the installation at regular intervals. Check that the cables are still correctly fixed.
 - Cables are often covered by leaves and other things. Carefully remove what is covering the cables so that they do not overheat but are able to melt ice and snow as intended.

Installation – frost protection of tubes

Place the heating cable on the tube. Fix the cable in such a way that it does not hit itself. The distance between the cables should always be at least 30 mm. Then fit the sensor and insulate with pipe sections or the like. Attach "Warning" labels to the installation. Connect the thermostat.

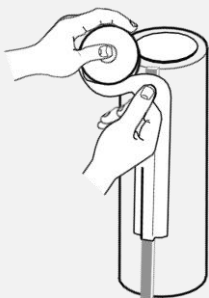
Read [Important general information!](#)

Read [Preparations in general](#)

Installation

1. Plan the installation.
2. Select W/m cable according to power requirement (see Fig. 2).
3. Preparing the place of installation
 - Make sure that the place of installation does not have any sharp edges or anything else that could damage the cable.
4. Installing and fixing the heating cable
 - The best location of the heating cable is on the lower part of the tube.
 - The installation must be such that the heating cable does not touch itself as this would result in overheating of the cable.
 - If the tube is made of plastic, aluminium foil tape must be applied across cable and tube throughout the length of the cable, otherwise there is a risk that the heat will not be adequately distributed into the pipe (see Fig. 4).
 - Preferably, fix with aluminium foil tape, at every 0.3 m interval as a minimum. If cable straps are used, do not tighten these too tightly around the cable.
 - Do not fit cable straps on a joint/end terminal as cable straps may eventually deform the joint, which will result in faults.
 - Do not bend joints/end terminal, and keep at least 20 cm of wire on each side of a joint/end terminal in a straight line. Joints/end terminal must not be subjected to tensile and compressive loads.
5. Installing the sensors
 - Install the sensor(s) at least 0.5 m from the ends of the heated tube. The location must provide an accurate overall temperature. Do not place the sensor on the opposite side of the cable.
 - If there is a difference in ambient temperature, place the sensor in a cold place. The effect of sunrays, etc. should also be taken into account.
6. Connection and approval
 - The installation must be made and approved by an authorised electrician.
 - Local rules and requirements and these instructions must be observed.
 - Connect the cable to ground and to a 30 mA fault current relay such as HFI or PHFI.
 - Do not connect the heating cable directly to the mains. The cable must be controlled by a thermostat.
 - A note in a visible place – on the control cabinet, for instance – must announce that electric heating is installed.

Fig. 4. Heat distribution across plastic tubes, with aluminium foil tape



The cable is attached to the entire length of the plastic tube with aluminium foil tape.

The method can be used for all types of tube material.

Installation – ice and snow melting on roofs

Locate the heating cable on the roof area where snow and ice accumulate. Fix the cable in such a way that it does not hit itself. The distance between the cables should always be at least 30 mm.

Fit the sensors strategically in relation to shade, shelter, etc. Connect the thermostat.

Remember to locate heating cables in gutters and downspouts, too, to allow the melting water to drain away.

These installations can be very large and consume a large amount of power. Investigate in advance whether the on-site power supply is sufficient or if more is required.

Read [Important general information!](#)

Read [Preparations in general](#)

Installation

8. Plan the installation.

9. Perhaps, calculate the C-C distance for eaves gutters/surfaces and/or choose W/m cable (see Fig. 2 and 3)

10. Preparing the place of installation

- Make sure that the place of installation does not have any sharp edges or anything else that could damage the cable.
- Use edge protectors for sharp edges.
- If the cable or cable straps are to be glued on, make sure that the surface is stable, dry and clean.

11. Installing and fixing the heating cable

- The installation must be such that the heating cable does not touch itself as this would result in overheating of the cable. Also, take the movements of the cable in the sun and the wind into account.
- If cable straps are used, do not tighten these too tightly around the cable.
- Do not fit cable straps on a joint/end terminal as cable straps may eventually deform the joint, which will result in faults.
- Do not bend joints/end terminal, and keep at least 20 cm of wire on each side of a joint/end terminal in a straight line. Joints/end terminal must not be subjected to tensile and compressive loads.
- Place the joint/end terminal where it is the least exposed to water.

12. Installing the sensors

- Install the sensor(s) where an accurate overall temperature will be provided.
- Install moisture sensors where ice and snow are likely to disappear the last - in the shade or on the leeward side of a wall, for instance.

13. Connection and approval

- The installation must be made and approved by an authorised electrician.
- Local rules and requirements and these instructions must be observed.
- Connect the cable to ground and to a 30 mA fault current relay such as HFI or PHFI.
- Do not connect the heating cable directly to the mains. The cable must be controlled by a thermostat.
- A note in a visible place – on the control cabinet, for instance – must announce that electric heating is installed.

14. Operation and maintenance

- Inspect the installation at regular intervals. Check that the cables are still correctly fixed.
- Cables are often covered by leaves and other things. Carefully remove what is covering the cables so that they do not overheat but are able to melt ice and snow as intended.