



Surge protection for gutter heating systems

Solar radiation and waste heat from buildings may melt ice or snow even under frost conditions. Such melt water then re-freezes, preventing water from draining away and causing it to back up. As a result, the roof drainage is blocked and icicles may form which involves an increased risk.

An even more serious problem is a heavy snow and ice build up on the roof that may exceed the maximum load capacity of the roof.

Gutter heating systems prevent damage provided that their reliable function is ensured even under lightning and surge conditions.

Structure without external lightning protection system

If a structure has no external lightning protection system, it can be assumed that the operator considers the probability of lightning striking the structure to be low. In this case, type 2 surge arresters according to IEC 60364-1 (HD 60364-1) must be used to protect the structure from inductive coupling.

Since both the heating bands and the temperature and moisture sensor are located outside the structure, their connecting cables are exposed to inductive coupling which may cause damage to the structure. For this reason, type 2 surge arresters are installed to protect these cables directly at the entry point into the structure and the feeder cable upstream of the control unit (Figure 9.29.1).

Structure with external lightning protection system

The IEC 62305-1 to 4 (EN 62305-1 to 4) standard must be observed when installing lightning protection systems on structures. In such systems, the gutters and/or downpipes are typically conductively connected to the air-termination systems and are therefore at a high potential in case of a lightning strike. Both the heating band and moisture sensor cables directly contact these lightning current carrying gutters and downpipes, meaning that lightning currents are automatically injected on the cables. For this reason, type 1 lightning current arresters must be installed directly at the point where the cables enter the structure. It must be observed that the lightning current

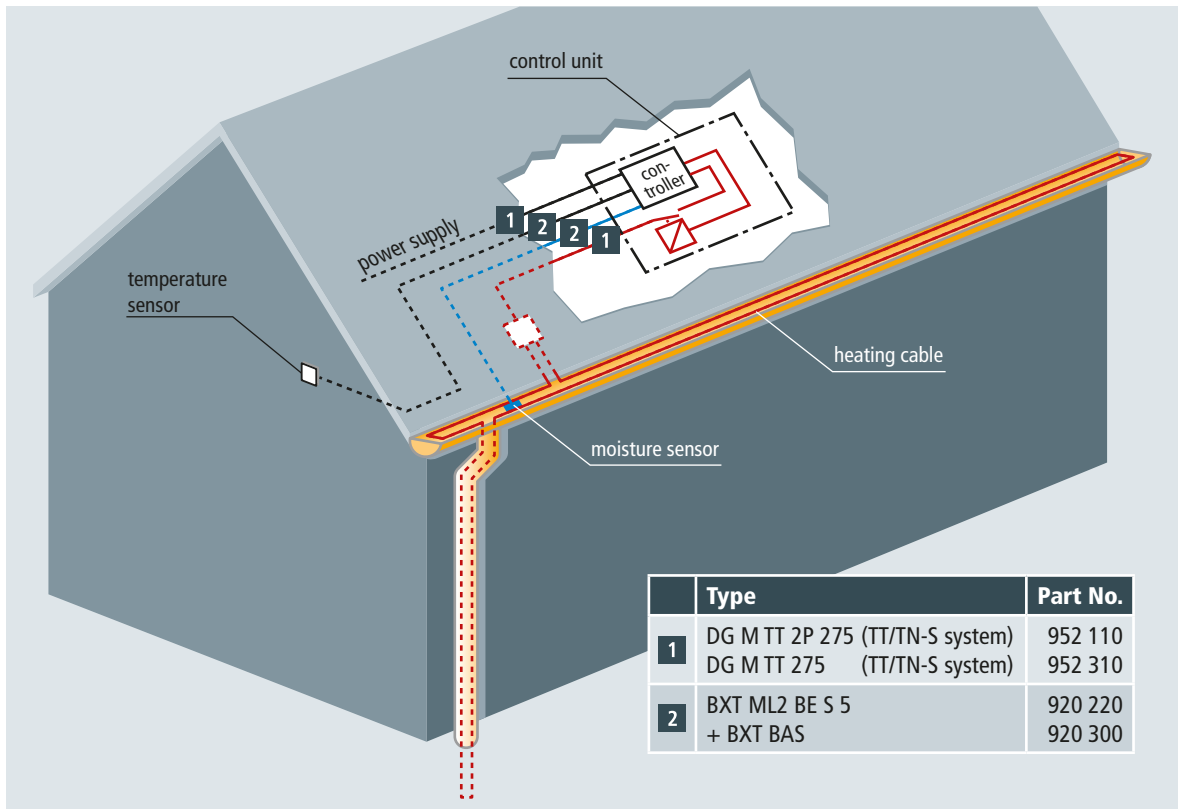


Figure 9.29.1 Control unit protected by surge arresters in a structure without external lightning protection system

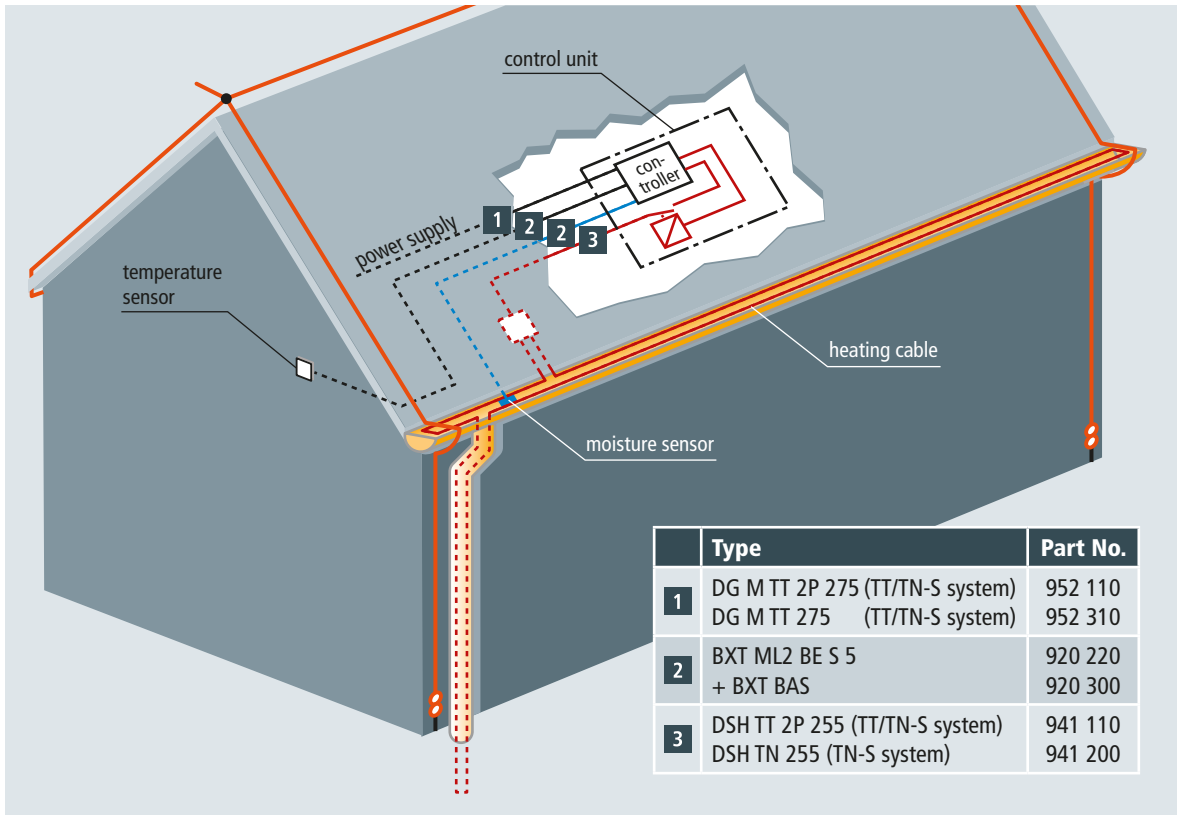


Figure 9.29.2 Installation of lightning current and surge arresters if the control unit is located far from the entry point into a structure with external lightning protection system

splits both between the down conductors directly connected to the metallic gutter and the down conductors connected to the air-termination mesh. Even if the external lightning protection system only has four down conductors, lightning currents of less than 10 to 12 kA per core are to be expected in case of LPL III. A type 2 surge arrester must be provided in the feeder cable upstream of the control unit (Figure 9.29.2).

Buildings with an interconnected reinforced concrete or steel frame construction (IEC 62305-4 (EN 62305-4)) are an excep-

tion. If the air-termination systems ensure that the cables beyond the roof are not hit by a lightning strike, surge protective devices according to Figure 9.29.1 can be used.

If loss of the control unit is acceptable (the control unit and/or the incoming cables must not present a risk of fire), the structure can be protected by installing combined arresters directly at the point where the cables enter the structure (Figure 9.29.3).

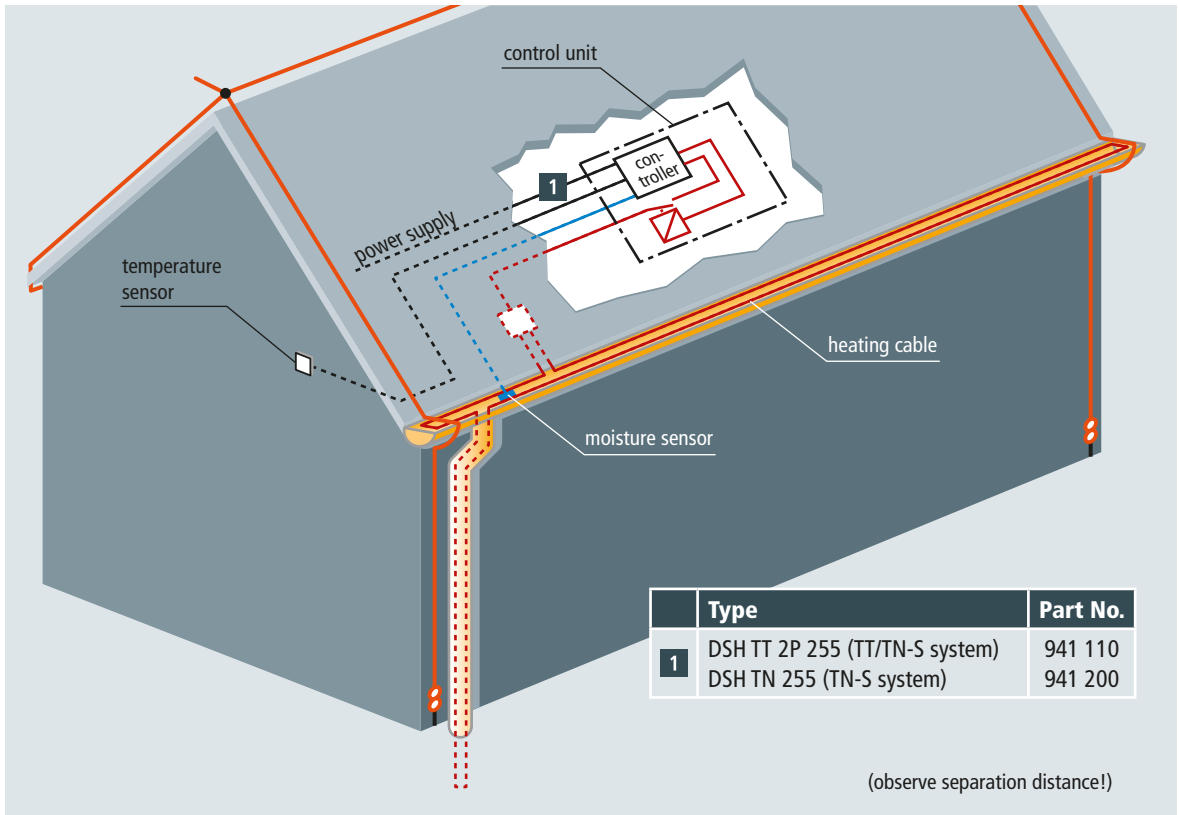


Figure 9.29.3 Installation of lightning current arresters if the control unit (loss is accepted) is located near the entry point into a structure with external lightning protection