Regulation of ECOFLOOR heating systems

As with other electric heating systems, correctly designed regulation is extremely important also in the case of heating cables.

Floor heating

For all floor heating systems the floor temperature is usually monitored using a thermostat with a floor probe. Temperature monitoring is important because it enables the floor temperature to be kept at the required level and it also prevents undesired overheating. The floor probe itself is placed into a grooved flexible tube – known as a 'goose neck'. This protective tube enables the removal and subsequent re-insertion of the probe if needed – either due to a malfunction or when the thermostat is exchanged for another type. Therefore, the bend in the protective tube from the groove in the wall into the floor has to have a sufficiently large radius. If the bend is pinched closed, it is possible to take the probe out but it isn't possible to put it back again. The end of the protective tube is sealed so that bonding cement doesn't get in. The thermistor of the probe is thus not in immediate contact with the heated floor, but the deviation in the measurement from what it would be is negligible.

The floor probe is placed into the heated surface, as close to the wear layer as possible. It should be placed in the middle of the heating loops – the thermistor mustn't touch the heating cable. If it is too close, it will measure the temperature near the jacket of the heating cable, which can be approx. 50°C. The thermostat would then keep switching the floor heating off, even if the floor was cold.

WARNING: It isn't usually possible to swap the floor probes of individual types of thermostat. It isn't possible to install a floor probe and then buy a thermostat for it – the probe is usually included in the packaging of the thermostat.

In the case of supplementary comfort floor heating, only the floor temperature is read, and in the case of primary floor heating, the air temperature is also monitored. A thermostat with integrated air temperature reading is placed at a height of approx. 1.2m (the height of switches). It should be situated in such a way that it isn't affected by other sources of heat (a fireplace, cooking appliances, sunlight etc.) or cold (peripheral walls without heat cladding, unsealed openings). Thermostats can be **analogue or digital**. Thermostats which are suitable for floor heating can be found in the chapter **Regulation**, sections **Home regulation**, **Central regulation** and **Wireless regulation**.

Outdoor applications

Regulation can be provided in three ways for outdoor applications:

1. The most reliable, the most economical as far as operational costs are concerned but unfortunately also the most expensive to acquire is regulation which reads not only the outdoor temperature but also the presence of snow, ice or water in locations which are protected against icing. In practice, the regulator is placed in the switchboard and reads the outdoor temperature using a cable temperature probe. If the temperature drops below the set value (usually +1°C), current is switched into the second (humidity] sensor, which will start to warm up. Any snow or ice which is on the humidity sensor will melt and the created humidity will conductively connect the two metal sensors. The regulator will "recognize" that there is a danger of ice formation and it will switch on the connected heating cable.
2. The second option is control only on the basis of temperature. With the help of a suitable thermostat, the heating cable is switched on in the case that the outdoor temperature drops below the set value. What are known as differential thermostats are also available – i.e. thermostats that allow the setting of the temperature at which switching on and off takes place.

These thermostats are suitable for applications where the user knows from long-term experience that if, for example, the temperature drops below more than -10°C, the icing is so strong that the snow doesn't melt any more on the roof. This system is less accurate and reliable as it cannot, for example, react to a situation when it is freezing but there is no snow - the heating cable is thus in operation pointlessly - but on the other hand it ensures at least that the cable won't be operational at temperatures above freezing point.

3. The last option is manual control – the cable is switched on by the user. However, with this method there is a real danger that the system won't function in practice. If the user doesn't start up the heating system at the time when the ice is starting to form, switching on later may not have the desired effect. The opposite situation may also occur in which there is a danger that the cable will be in operation when it is absolutely unnecessary by mistake. Not only will this result in high operating costs but also the life span of the heating cable may be reduced considerably if it is operated at temperatures above 10°C.

Pipe protection

If heating cables with an integrated thermostat are not used for the heating of pipes, industrial thermostats with a separate contact sensor are used. The thermostat reads the temperature of the surface of the pipe and if this drops below the set temperature, it will switch on the heating cable. In these cases it is necessary to pay attention to ensuring that the contact sensor doesn't touch or isn't in very close proximity to the heating cable.

If self-regulating cables are used for pipe protection, their switching can also be controlled either by an industrial thermostat with a contact sensor or only by a thermostat which reads the ambient temperature. Self-regulating cables cannot overheat due to their construction, therefore simpler regulation, which only makes sure that the heating cables are switched off when the temperature rises to a value when the pipes cannot freeze any more, is sufficient.

You can find an overview of regulation which is suitable for outdoor applications as well as pipe protection in the section Outdoor and industrial regulation.

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