

## INSTRUCTIONS FOR PREVENTING UNDERTEMPERATURE

e.g. KTO & STO



### Necessity of heating an enclosure

Optimal climate conditions make sure that every sensitive component is working reliably and is protected against freeze and condensation. For the user it is necessary to provide suitable environmental conditions for the components in the enclosure and to ensure the optimal temperature range for the electric components.

The prevention of too low temperatures and freeze is ensured with thermostats and heaters of STEGO.

### Temperature setting of thermostats

Mechanical thermostats are working with a so-called bimetal-switch, which is changing its shape depending on certain temperatures. This induces that an electrical contact is closing (or opening). KTO and STO are so-called opener: If the temperature is exceeding the set temperature, the contact is opening and the heater switches off. In result, the temperature on the setting dial is the switch-off temperature of the heater.

**The heater switches off when reaching the set temperature!**

To calculate the switch-on temperature, you have to consider the switch temperature difference (hysteresis) and the tolerance. The switch temperature difference is - as the name suggests - the difference between the switch-on and the switch-off temperature (KTO: 7 K / STO: 4 K). The tolerance is the inaccuracy which is unavoidable for mechanical components (KTO:  $\pm 4$  K / STO:  $\pm 3$  K).

Thus, the switch-on temperature is the switch-off temperature (set temperature) minus the switch temperature and the tolerance.

**Switch-on temperature = set temperature - switch temperature difference  $\pm$  tolerance**

### Calculation example for the KTO

Switch temperature difference: 7 K

Tolerance:  $\pm 4$  K

To avoid condensation, the heater must switch-on when the temperature reaches 10°C.

Thus, the correct temperature on the setting dial is

$$10^{\circ}\text{C} + 7\text{ K} \pm 4\text{ K} = \mathbf{17^{\circ}\text{C}}$$



A temperature setting of 17°C + 4°C guarantees a running heater at 10°C.

## Calculation example for the STO

Switch temperature difference: 4 K

Tolerance:  $\pm 3$  K

To avoid condensation, the heater must switch- on when the temperature reaches 10°C. Thus, the correct temperature on the setting dial is

$$10^{\circ}\text{C} + 4 \text{ K} \pm 3 \text{ K} = \mathbf{14^{\circ}\text{C}}$$



The anti-frost assurance is an icon on the setting scale of the STO at 11°C. This setting assures closing of the switch contact before the temperature drops down to 0°C, the tolerance is already considered.



The heaters of type CR 027, CR 030, CR 130, CS 030 and CS 130 already have an integrated thermostat in the housing. There is no other external thermostat needed. The products are ready for setting and action when they are connected with supply voltage. The adjustment routine for the definition of the switch-on temperature is identical to the external thermostats.



If there is no variable and flexible placement needed, it is recommended to use one of our fix-thermostats with a permanently fix switch temperature. Several heaters can be acquired with permanently mounted fix-thermostats. Therefore, the operation safety is guaranteed from the beginning without any settings adjustment.

