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Technical Leaflet M 1.3

Instruction for troubleshooting by temperature controlling troubles

1. Determining the type of thermocouple

1.1 Verifying the name of product

"T-…" and "TI-…" are both designations for the thermocouple type K (NiCr-Ni). "TK-…" is the sign for a thermocouple type J (Fe-CuNi). The positive pole of the thermocouple has a green colored insulating bead. The positive wire from thermocouple type K is nonmagnetic and from type J it is magnetic.

2. Verifying the thermocouple

2.1 Measure the electric resistance

The resistance of a functioning thermocouple is smaller then 5 ohms, measured directly at the heating element.

2.2 Measurement of the function

Connect the thermocouple with a millivoltmeter instrument and heat the radiator without controlling for a maximum time of 20 minutes. The thermocouple voltage rises steadily (about 1 mV/25 °C). If it increases continuously without breaking down in between then the inspected thermocouple is faultless.

3. Checking the wiring from thermocouple until temperature controller

3.1 Optical check

If IEC Standard wiring green-white is used for thermocouple type "K" the green marked wire of compensating and thermocouple line from thermocouple type K must be connected to the green marked pole of the thermocouple.

In case of type J, the green marked plus pole must be connected to the black wire of the black-white thermocouple- or compensating line.

If other colored wire material is used, to care for that the right type and the right polarity of the connection is used. Information about other standards of thermocouple lines can be found on the Internet by the manufacturers of thermocouples.

The use of copper wire is not permitted.

3.2 Verifying of the junctions

Check the clamping points for good contact.

3.3 Measurement of the function

Separate the thermocouple line or compensating line from the temperature control unit and measure the thermocouple-voltage here corresponding to point 2.2 at the end of the line. Approximately the same values as in the check mentioned before must be measured. If this is not the case it must be assumed that the fault is in the connection line. One lead of one thermocouple wire is connected incorrect. After troubleshooting repeat the measuring for safety reasons.

4. Verifying of the temperature control unit

In the last step has to be checked whether the temperature control unit, which is used, rated for thermocouple type K. Here the specifications of the temperature control unit manufacturer must be pointed out. Elstein temperature controller TRD are optimally factory preset on the Elstein products.

5. Information to an other malfunction

Because of the short distance thermocouple – heating wire induced AC voltage on the thermocouple line could generate a mistake at the temperature controller or PLC. In such a case an AC voltage filter (potential isolation unit) has to be used.