GENERAL

The microcomputer-based KS 4 ensures high-accuracy multi-loop temperature control at a low price. Featuring a set-point lowering function and two alarms, the unit is particularly suitable for temperature control of plastics processing machinery, machine tools, packaging machines, tempering units and other similar thermal processes. Self-tuning ensures very short start-up times.

DESCRIPTION

Each of the 4 control loops can be considered as a completely independent controller with the following functions:

Input circuit monitor
If the input circuit is defective, a built-in input circuit monitor ensures increased system operating safety. The output action is “upscale” and the outputs are switched off. The input circuit monitor is triggered by wrong sensor polarity or break.

Controller and positioner functions
KS 4 can be configured as a signaller, a positioner or a two-point controller. In manual mode, the positioning output can be adjusted for any duty cycle.

Alarm functions
The alarm outputs are controlled by alarm triggering. Monitoring is provided for process value (absolute alarm) and control deviation (relative alarm). An absolute alarm can be triggered by any value, a relative alarm is always by an adjustable amount lower than the set-point.

For each of the 4 controllers, an absolute alarm and a relative alarm are possible. Each alarm group connected to an output is configured internally as an “OR” function.

a) Relative measured value alarm
for minimum temperature monitoring, e.g. for enabling machine functions

b) Absolute measured value alarm
for limit monitoring (independent of set-point).

Second set-point
By means of an external control signal, a second set-point can be activated in common for all 4 controllers (e.g. standby set-point, which can be used also when starting after mains recovery).

Self-tuning
Self-tuning for automatic determination of the best control parameters is fitted as standard. Self-tuning is started by pressing a key combination and calculates the optimum parameters for fast line-out to the set-point without overshoot from delay time Tu and max. rate of change Vmax. For calculating optimum parameters with interactive control loops, self-tuning can be started synchronously for all required channels. Enabling or disabling each control loop for self-tuning are possible at parameter level.

Outputs
In total, the multiple-temperature controller is provided with 6 opto-isolated outputs: 4 controller outputs and 2 alarm outputs. All outputs are of the “open-collector” type, protected against short circuit and need a separate 24 V DC supply.

Controller outputs
The outputs are firmly allocated to the controllers. The control output switching status is displayed by a blinking point on each display. By adjusting the set-point below the min. limit (all outputs as in de-energized condition), the controller outputs can be switched off.

Alarm outputs
For each of the four controllers, the two alarm outputs of KS 4 are connected internally as “OR functions”:
1. relative alarm: adjustable by the specified value below the set-point.
2. absolute alarm: activated at a fixed temperature value – which is mostly above the set-point.

TECHNICAL DATA

INPUTS

Thermocouples
Type L,J,K, DIN IEC 584
Ranges: 0 ... 900 °C (type L and J) 0...1350 °C (type K)
Display in °C or °F
Measurement error: up to 700°C: 1K±1digit >700°C: 3K±1digit
Input resistance: ≥1MΩ
Break monitor: sensor current = 1 µA
Output action: upscale
Polarity monitor: responds when the input signal is by 30°C below span start. Temperature compensation: built-in
The compensating lead must be taken up to the controller terminals.
**SET-POINT**
The min. and max. set-point adjustment range is selectable within the TC measuring range limits.

**DISPLAYS**
For process value and set-point display, each controller is provided with a separate, red 3-digit 7-segment LED display, digit height 13 mm. When values > 999 are displayed, units are suppressed. Status point LED for the output switching status.

**OUTPUTS**
Short-circuit proof “open collector outputs
Positive-switching (grounded load)
Output voltage range: 18 V – 30 V DC
*) to DIN 19240
Nominal output current: < 70 mA
Voltage drop at full load: 0,3V typ.
V 1 V max.

**POWER SUPPLY**
1. 230V 48...62Hz
Power consumption: approx. 5 VA
2. 24 V DC (for the outputs)
Voltage range 18 V to 30 VDC
*) Power consumption: approx. 0,1W
(KS 4) The SSR power consumption must be taken into account additionally. The protective low-voltage conditions are met.

**CONTROL BEHAVIOUR**
Configurable as:
Signaller, positioner or two-point controller with PIDP behaviour (Different control behaviours are possible by switching off the relevant parameters.)
Positioner operation with 0 ... 100% duty cycle

**CONTROL PARAMETERS**
Self-adjusting or adjustable parameters;
Switching difference as signaler: 1K

**ALARM FUNCTIONS**
Alarm 1: relative measured value alarm
Alarm 2: absolute measured value alarm, The output level is low with exceeded alarm temperature.

Sensor break alarm: Sbr is displayed and the relevant output is switched off.

*) The SSR voltage limits must not be exceeded.

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The min. and max. set-point adjustment range is selectable within the TC measuring range limits.

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