

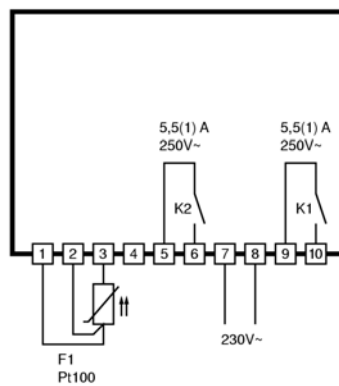
ST96-31.01

Temperature controller

Order number 900023.001



Wiring diagram



Product description

The controller ST96-31.01 was developed for thermostatic applications. The switching outputs can be programmed as two-point controller with alarm contact, three-point controller or two-stage controller.

The setpoint and all parameters of the controller are set on a three-field plastic foil keyboard. The controller is supplied with 230V.

Sensor: Pt100-3 wire

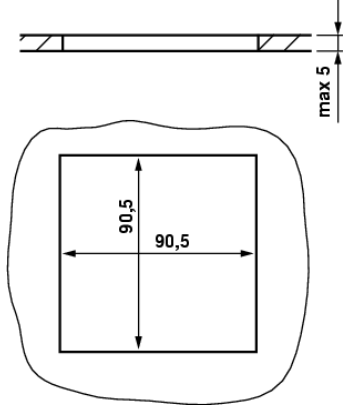
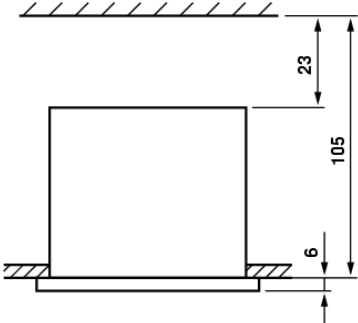
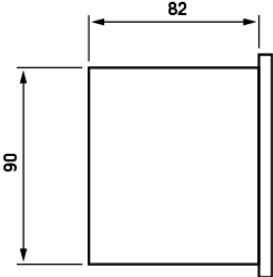
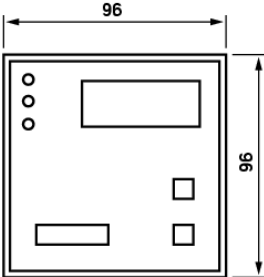
Range: -80...600°C

Front size: 96mm x 96mm

Panel cut-out: 90,5mm x 90,5mm

Connector: plug and socket

ST 96...



SOFTWARE .01

Adjustment options

**Key: UP**

Pressing this key you can increase the parameter or parameter value or scroll the parameter list.

**Taste: DOWN**

Pressing this key you can decrease the parameter or parameter value or scroll the parameter list. At alarm the buzzer function can be switched off with this key.

**Taste: SET**

While SET key is pressed, the setpoint is indicated.
In addition, the SET key is used for setting parameters.

First control level:

Parameter setting for the main setpoint.

If none of the keys is pressed, the display indicates the actual value of the temperature. Pressing the SET key, the setpoint shows on the display.

If the setpoint is to be changed, the SET key is to be kept pressed while adjusting the setpoint with the keys UP and DOWN.

Please note that the setpoint can only be changed within the adjusted setpoint limits. Otherwise the display flashes.

General reference

Note that the value is transferred to the captive memory and is safe also after power failure. Each key operation is acknowledged by the internal buzzer.

Parameter	Function	Adjustment range	Standard setting	Customer setting
S1	Setpoint	P4...P5	0.0°C	

Second control level (P parameters):

Setting of control parameters

Simultaneously pressing the UP and DOWN key for at least 4 seconds opens a parameter list containing control parameters.

With the UP and DOWN keys the list can be scrolled in both directions.

Pressing the SET key will give you the value of the respective parameter. Pressing also the UP or DOWN key at the same time the value can be adjusted.

Return to the initial position takes place automatically, if no key is pressed for 60 seconds.

Parameter	Function description	Adjustment range	Standard setting	Custom setting
P1	Setpoint or DeltaW	P4...P5 -99...99.9 K	10.0 K	
P2	Hysteresis contact K1	0.1... 99.0 K	1.0 K	
P3	Hysteresis contact K2	0.1... 99.0 K	1.0 K	
P4	Control range limitation – minimum setpoint	-99°C...P5	-99°C	
P5	Control range limitation – maximum setpoint	P4...999°C	999°C	
P6	Actual value correction	-10...10.0 K	0.0 K	
P19	Key-lock	0: no key-lock 1: key-lock	0	

Parameter description:

P1: Setpoint / DeltaW for control circuit 2

Adjusting the setpoint of control circuit 2.

If A5=1, the setpoints for control circuit 1 and 2 are linked with one another via switching difference DeltaW, which can be adjusted with P1. (operation with DeltaW)

The following applies: setpoint thermostat 2 = setpoint control circuit 1 + delta W2.

This difference can take positive or negative values. Thus, a leading or following contact can be realised.

P2: Hysteresis contact K1

P3: Hysteresis contact K2

The hysteresis can be set symmetrically or one-sided at the setpoint (see A40, A41).

At one-sided setting, the hysteresis works downward with heating contact and upward with cooling contact. At symmetrical hysteresis, half of the hysteresis' value is effective below and half of the value above the switching point (see fig. 1 and 2).

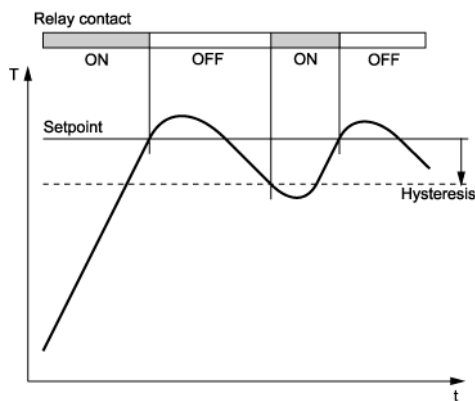


Fig. 1: Heating controller, one-sided hysteresis

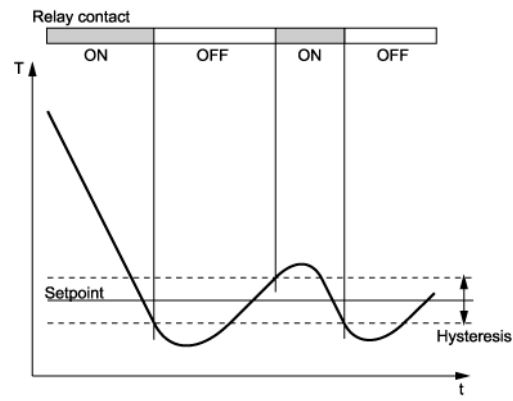


Fig. 2: Cooling controller, symmetrical

P4: Control range limitation – minimum setpoint

P5: Control range limitation – maximum setpoint

The adjustment range of the setpoint can be limited in both directions. This is to prevent the end user of a unit from setting inadmissible or dangerous setpoints.

P6: Actual value correction

This parameter allows the correction of actual value deviations caused for example by sensor tolerances or extremely long sensor lines. The regulation measure value is increased or decreased by the here adjusted value.

P19: Key-lock

The key-lock allows blocking of the control keys. In locked condition parameter adjustments with keys is not possible. At the attempt to adjust the parameters despite key-lock the message "===" appears in the display.

Third control level, (A parameters):

Setting of control parameters

Access to the third control level is granted when selecting the last P-parameter on the second control level. Continue to press the UP key for approximately 10 seconds until "PA" appears. Continue to press the UP key and additionally press the DOWN key for about 4 seconds and the first A-parameter of the third control level is indicated.

With the keys UP and DOWN you can scroll the list in both directions. Pressing the SET key will give you the value of the respective parameter. By pressing the UP or DOWN key at the same time the value can be adjusted.

Return to the initial position takes place automatically, if no key is pressed for 60 seconds, or by simultaneously pressing the UP and DOWN key for approx. 4 seconds.

Parameter	Function description	Adjustment range	Standard setting	Custom setting
A1	Switch mode contact K1	0: heating contact 1: cooling contact	0	
A2	Switch mode contact K2	0: heating contact 1: cooling contact	1	
A3	Function of contact K1 at sensor error	0: relay off 1: relay on	0	
A4	Function of contact K2 at sensor error	0: relay off 1: relay on	0	
A5	Selection setpoint 2 or DeltaW	0: operation with setpoint 2 1: operation with DeltaW	1	
A6	Control characteristic K1	0: thermostatic 1: PD	0	
A8	Display mode	0: integrals, without leading zero 1: with decimals, without leading zero 2: integrals, with leading zero 3: with decimals and leading zero	1	
A10	Voltage input Tu	-99...999	0.0	
A11	Voltage input To	-99...999	100	
A30	Function K3 and/or LED 3	0: no function 1: alarm with flashing 2: alarm with permanent light	1	
A40	Hysteresis mode contact K1	0: symmetrically 1: one-sided	0	
A41	Hysteresis mode contact K2	0: symmetrically 1: one-sided	0	
A50	Minimum action time contact (on/off) K1	0.0...300 sec.	0	
A51	Minimum action time contact (on/off) K2	0.0...300 sec.	0	

Parameter description:

The following values can change the equipment characteristics and are therefore to be set with utmost care.

A1: Switch mode contact K1

A2: Switch mode contact K2

The switch mode for the relays, i.e. cooling or heating function, can be programmed independently at works. Heating function means that the contact opens as soon as the setpoint is reached, thus power interruption. At cooling function the contact closes, if the actual value is above the required setpoint. (see fig. 1 + 2)

A3: Function of contact K1 at sensor error

A4: Function of contact K2 at sensor error

At sensor error the selected relay falls back into the condition pre-set here. If there is a data-loss in parameter memory (display indicates "EP") both contacts K1 and K2 are switched off.

A5: Selection setpoint 2 or DeltaW

This parameter determines whether the setpoints for thermostat 1 and 2 independently adjustable (A5=0) or whether they are tied with one another via a switching offset DeltaW (A5=1). This parameter applies only to contact K2 (see parameter P1).

A6: Control characteristic K1

This parameter determines the control characteristic of the output.

A8: Display mode

The value can be indicated in integrals or with decimals and if there is a leading zero. In general, all parameter indications are presented with decimals.

A10: Indication value for lower value linear analogue input

A11: Indication value for upper value linear analogue input

Only relevant, if the controller is programmed for a voltage input (0...10V linear) or a current input (4...20mA linear). These parameters allow scaling of the linear analogue input. The value to be indicated for the lower and upper entrance value then defines the range the controller will indicate. For input range 4...20mA the display will show sensor error if the input signal drops below 4mA.

A19: Parameter lock

This parameter enables locking of each parameter level. If third level is locked, only parameter A19 may be changed.

A30: Function K3 and/or LED 3

This parameter determines the behaviour of LED 3 (contact K3) in case of an alarm. The LED lights up or flashes if the control setpoint deviation exceeds +10 K or -10 K.

A40: Hysteresis mode contact K1

A41: Hysteresis mode contact K2

These parameters allow selection as to whether the hysteresis values which are adjustable with P2 and P3, are set symmetrically or one-sided at the respective switching point. At symmetrical hysteresis, half of the hysteresis' value is effective below and half of the value above the switching point. The one-sided hysteresis works downward with heating contact and upward with cooling contact (see fig. 1 + 2).

A50/A51: Minimum action time contact K1/K2

These parameters permit a delay in switching on/off the relay in order to reduce the switching frequency. The adjusted time sets the entire minimum time period for a switching-on or switching-off phase.

Status messages

Message	Cause	Error elimination
AUS or OFF	Standby modus, no regulation	Switch on by key or switching entrance
F1L	Sensor error, open-circuit at sensor	Check sensor
F1H	Sensor error, short-circuit at sensor	Check sensor
---	Key-lock activated	See parameter P19 and A19
flashing display	Temperature alarm (A31)	
Buzzer	Temperature alarm at too high or too low temperature (if activated) see A31	The buzzer function can be switched off with the DOWN-key
EP	Data loss in parameter memory	If error cannot be eliminated by switching on/off, the controller must be repaired

Technical data of ST96-31.01

Measuring input

F1: Resistance thermometer Pt100-3L
Measuring range: -80...600°C
Measuring accuracy: +/- 0.5 K

Outputs

K1: Relay, normally-open contact, 5.5A 250V (cosφ=1)
K2: Relay, normally-open contact, 5.5A 250V (cosφ=1)

Display

One 3-digit LED Display, height 13 mm, colour red
3 LEDs, diameter 3mm, for status display

Power supply

230V 50/60Hz

Connectors

plug and socket

Ambient conditions:

Storage temperature: -20...+70°C
Operating temperature: 0...+55°C
Relative humidity: max. 75% without dew

Weight

ca. 585g

Enclosure

Front IP50

Installation data

Front size: 96 x 96 mm
Panel cut-out: 90.5 x 90.5 mm
Installation depth: ca. 105 mm with connector
Mounting: by fixing strap