

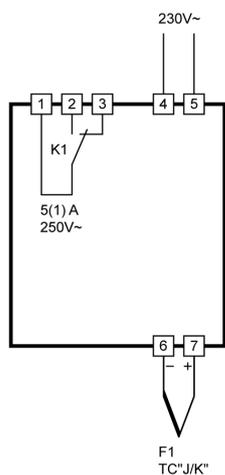
ST46-31.10

Temperature controller

Order number 900237.005



Wiring diagram



Product description

The controller ST46-31.10 J/K is intended for the assembly on DIN rail, which allows easy installation in the switch gear cabinet. The setpoint and all parameters of the controller are set on a three-field plastic foil keyboard. The controller is supplied with 230V AC and has an exit relay with an Ohm maximum electric load of 5A. Inductive loads can be connected with up to max. 1A permanent current.

Sensor: thermo element J/K

Range: type J -99...700°C

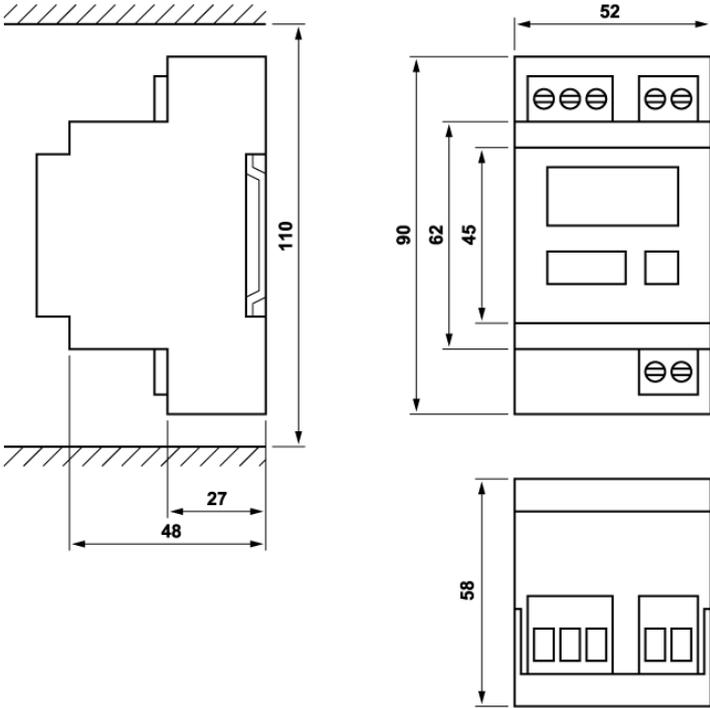
Range: type K -99...999°C

Housing size(L x W x H): 95 x 53 x 59mm

Installation: Clip-on mounting on DIN-Rail 35 x 7.5mm

Connector: screw terminal

ST 46...



SOFTWARE .10

Adjustment options



UP key

By pressing this key the parameter or parameter value is increased.



DOWN key

By pressing this key the parameter or parameter value is decreased.
The alarm buzzer can be cancelled by this key.



SET key

The display normally shows the actual value. When the SET key is pressed, the display changes to show the control setpoint.

First control level:

Adjusting the setpoint

Pressing the SET key, the setpoint S1 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

Parameter	Function	Adjustable Range	Standard setting	Customer setting
S1	Setpoint	P4...P5	0.0°C	

Second control level (P-Parameters):

Adjusting the 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. Release the UP or DOWN button before releasing the SET button and the new value is saved into the non-volatile memory.

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	Functions	Adjustable range	Standard Setting	Customer setting
P2	Hysteresis K1	0.1 ... 99.9 °K	1.0 °K	
P4*	Control range limitation – minimum setpoint	-99...P5	-99 °C	
P5*	Control range limitation – maximum setpoint	P4...999 °C	999 °C	
P6	Actual Value Correction	-20.0 ... +20.0 °K	0.0 °K	
P19	Keyboard lock	0: not locked 1: locked	0	

* Standard setting depends on type of sensor.

Parameter description second control level

P2: Hysteresis contact K1

The hysteresis can be set symmetrically or one-sided at the setpoint (see A40). At one-sided setting, the hysteresis works downward with heating contact and upward with cooling contact (see fig. 1 – 2).

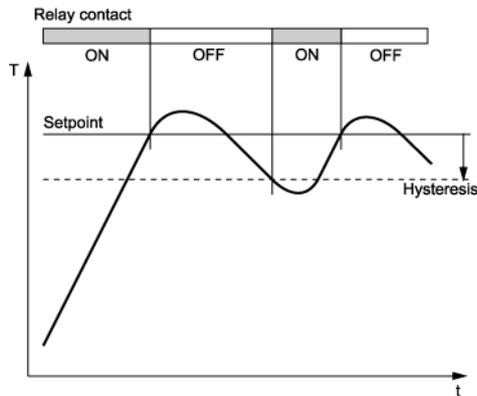


Fig. 1: Heating controller, one-sided hysteresis

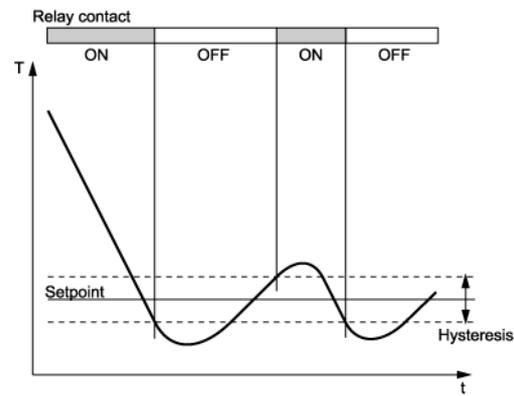


Fig. 2: Cooling controller, symmetrical hysteresis

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):

Adjusting the 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	Functions	Adjustable Range	Standard Setting	Customer setting
A1	Switch mode K1	0: heating contact 1: cooling contact	0	
A3	Function of contact K1 at sensor error	0: relay off 1: relay on	0	
A8	Display mode (all parameter indications are presented in 0.1°K)	0: integrals, without leading zeros 1: with decimals, without leading zeros 2: integrals, with leading zeros 3: with decimals, with leading zeros	1	
A10*	Indication value for lower value linear analogue input	-99 ... 999	0	
A11*	Indication value for upper value linear analogue input	-99 ... 999	100	
A40	Hysteresis mode contact K1	0: symmetrically 1: one-sided	0	
A50	Minimum action time contact K1 "On"	0...999 sec.	0 sec.	
A60	Sensor type	0: Thermo element type J 1: Thermo element type K 2: Pt100 3-wire 3: Pt100 2-wire 4: KTY81-121 5: 2...10V or 4...20mA 6: 0...10V or 0...20mA	Dependent on hardware	
A70	Software filter	1: inactive 2...32: average value with 2...32 measuring values (ca. 0.6...9.6 sec.)	8	
A80	Temperature scale	0: Fahrenheit (50 Hz) 1: Celsius (50 Hz) 2: Fahrenheit (60 Hz) 3: Celsius (60 Hz)	1	
Pro	Program version	-	-	

* Only available if there is a voltage or current input.

Parameter description third control level

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

A1: Switch mode contact K1

The switch mode for the relay, 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.

A3: Function of contact K1 at sensor error

At sensor error the selected relay falls back into the condition pre-set here.

A8: Display mode

The value can be indicated in integrals or with decimals in 0.1°K. In general, all parameter indications are presented in 0,1°K.

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.

A40: Hysteresis mode contact K1

These parameter allows selection as to whether the hysteresis value which is adjustable with P32, is 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.

A50: Minimum action time contact K1 "On"

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

A60: Sensor type

These parameter permits selection of the sensor type, if the needed hardware prerequisites are available.

A70: Software filter

With several measuring values, it is possible to obtain an average value. This parameter can determine by how many measured values an average value is to be formed. If a sensor with a very fast reaction to external influences is used, an average value ensures a calm signal process.

A80: Temperature scale

Indication can be switched between Fahrenheit and Celsius. At conversion, the parameters and setpoints maintain their numerical value and adjustment range. (Example: A controller with the desired value of 0°C is switched to Fahrenheit. The new desired value is then interpreted as 0°F, which corresponds to a temperature of -18°C).

NOTE: Indication limits with °F can be smaller than the actual measuring range!

Status messages

Display	error	What to do
---	Keyboard lock active	see Parameter P19
F1L	sensor short-circuit	check sensor
F1H	sensor open-circuit	check sensor
F2	Sensor error at 3-wire connection	wrong 3-wire sensor connection
EP	Data loss at parameter memory (Contacts K1 and K2 are switched off)	If error cannot be eliminated by switching on/off, the controller must be repaired

Technical data of ST46-31.10

Measuring input

F1: Thermo element type J/K
Measuring range: J: -99...700°C
K: -99...999°C
Measuring accuracy: 0.5% +/- 2K, without sensor

Outputs

K1: Relay, 5(1)A 250V, change-over contact

Display

One 3-digit LED-display, height 7mm, for temperature display, colour red
One LED, for status display of K1

Power supply

230V 50/60Hz, ca. 2VA
Power supply is galvanically separated from sensor by means of the transformer.

Connectors

Screw terminal, for cable up to 2.5mm²

Ambient conditions:

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

Weight

ca. 250g, without sensor

Enclosure

Front IP50

Installation data

The unit is clip-on mounted on DIN-Rail 35 x 7.5 mm according to DIN EN 50022.
Housing size: L 95mm x W 53mm x H 59mm