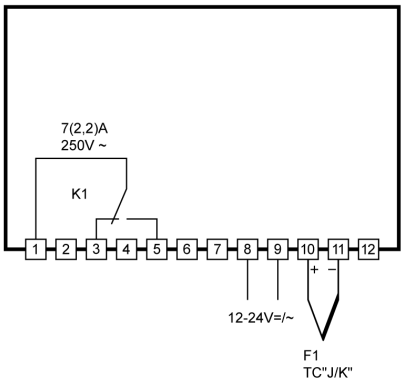
ST70-31.10

Temperature controller

Order number 900380.007

Wiring diagram

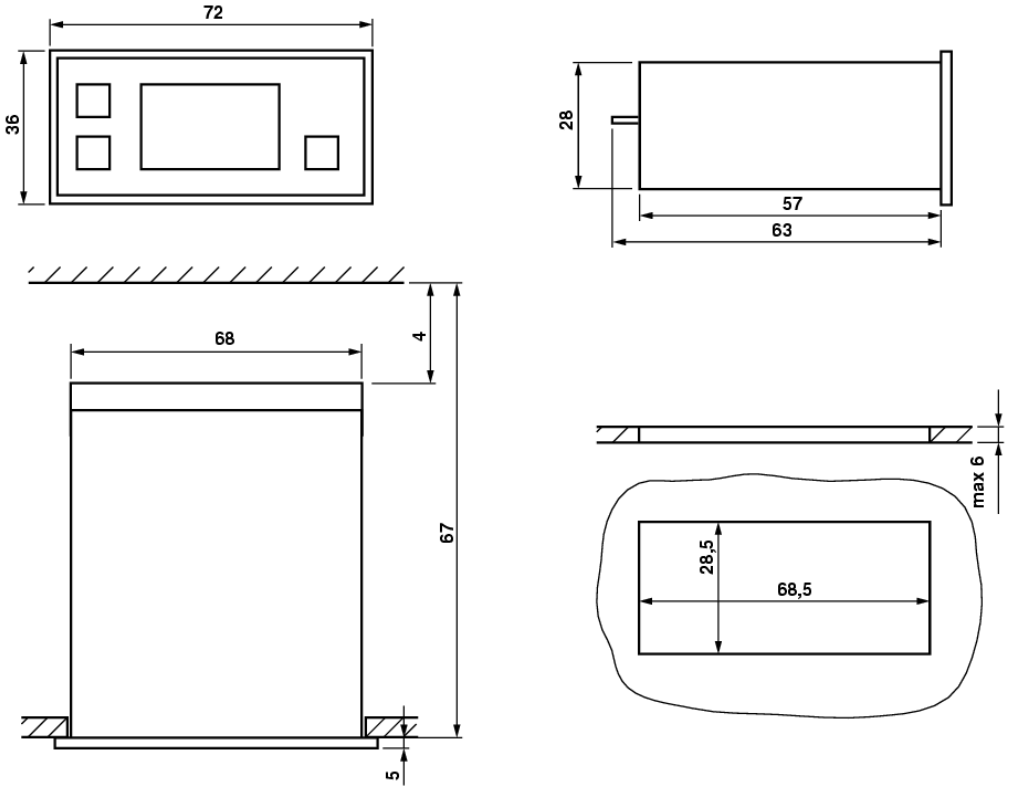


Product description

The controller ST70-31.10 was developed for simple thermostatic controls. The setpoint and parameters are adjusted with a 3-field plastic foil keyboard.
The controller can be supplied with a tension of 12-24V AC/DC.
The installed relay has a maximum electric Ohm load of 7A. Inductive loads can be switched up to 2.2A.

Sensor: Thermo couple
Range: type J -99...700°C
Range: type K -99...999°C
Front size: 72mm x 36mm
Panel cut-out: 68.5mm x 28.5mm
Connector: screw terminal

ST 70 ...



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 increased.
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

Para-meter	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

Para-meter	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).

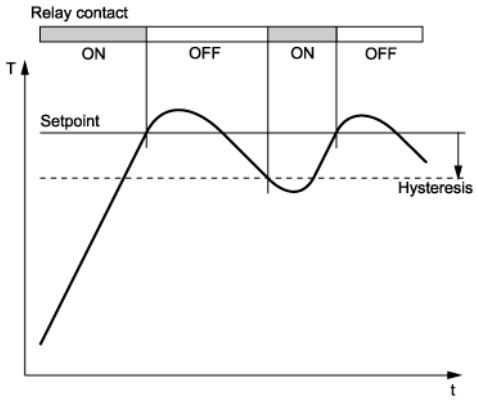


Fig. 1: Heating controller, one-sided hysteresis

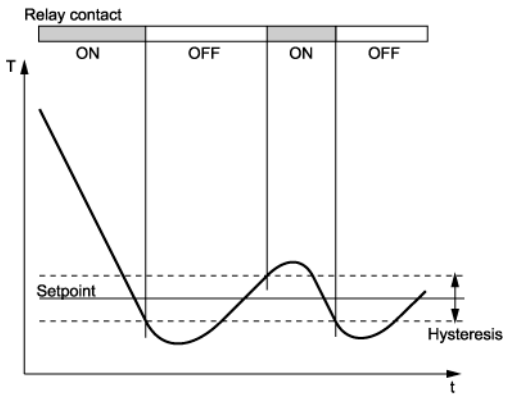


Fig. 2: Cooling controller, symmetrical hysteresis

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.

Para-meter	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	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”	0.0 … 999 sec.	0.0 sec.	
A60	Sensor type	0: Thermo element type J 1: Thermo element type K 2: Pt100 3-wire 3: Pt100 2-wire 4: PTC (KTY81-121) 5: 2...10V or 4...20mA 6: 0...10V or 0...20mA	Dependent on hardware	
A70	Software filter	0: 0.0 Sek. 1: 0.8 Sek. 2: 2.4 Sek. 3: 6.0 Sek. 4: 16.0 Sek. 5: 38.6 Sek. 6: 96.0 Sek.	3	
A80	Temperature scale	0: Fahrenheit 1: Celsius	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 ST70-31.10

Measuring input

F1: Thermo element type J or type K
Measuring range: type J: -99 ... 700°C
type K: -99 ... 999°C
Measuring accuracy: +/- 2K or +/- 0.5% of measuring range.

Outputs

K1: Relay, change-over contact, 7(2,2)A 250V (cosφ=1)

Display

One 3-digit LED display, height 13 mm, colour red
One LED

Power supply

12...24 V AC (50/60 Hz) or 16...36V DC

Connectors

screw terminal

Ambient conditions:

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

Weight

ca. 135g

Enclosure

Front IP50

Installation data

Front size:	72 x 36 mm
Panel cut-out:	68.5 x 28.5 mm
Installation depth:	ca. 67 mm with connector

Mounting by fixing strap.