

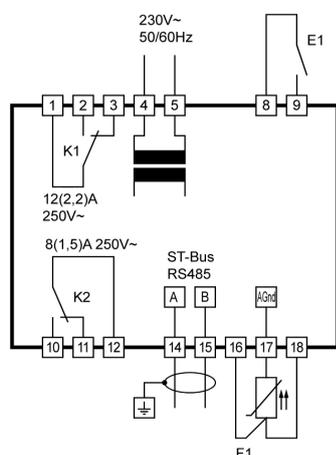
ST46-IE1TAR.100

Temperature controller

Order number 900237.020



Wiring diagram



Product description

The controller ST46 is intended for the assembly on DIN rail, which allows easy installation in the switch gear cabinet. It has 1 sensor input, a switching input and two switching relays. The setpoint and all parameters of the controller are set on a three-field plastic foil keyboard. The LEDs indicate the status of the control exits. The controller is supplied with 230V AC.

Networking of the controller takes place via ST Bus interface.

Sensor: multi resistance

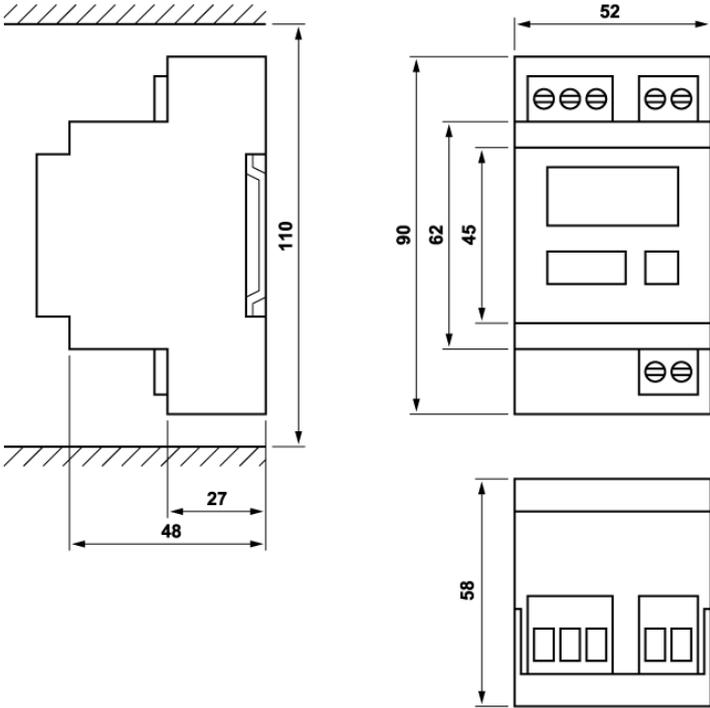
Range: depending on type of sensor

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 .100

Adjustment options



Key UP

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



Key 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.



Key SET

Holding this key, the setpoint is indicated. Additionally, this key is used for setting parameters.

First control level:

Parameter setting of the control setpoint

The control setpoint **[1]** is accessible directly with SET key. Pressing also the UP or DOWN key it can be adjusted.

Parameter	Function description	Adjustment range	Standard setting	Custom setting
[1]	Control setpoint 1 for control circuit 1	[10]...[11]	0.0 °C	
[2]	Control setpoint 2 for control circuit 1 (*)	-99 ... 99.0 °C	0.0 °C	

* The activation of the second setpoint of circuit 1 **[2]** is indicated on the display with a flashing point to the right. It can either be activated via switching entrance (see **H70, H71**) (depending on parameter).

Software version

The version number of the software will show when pressing SET + UP + DOWN at the same time. In addition the software version can be determined with parameter **Pr0** via ST-Bus.

Menu level

When simultaneously pressing the UP and DOWN key for at least 4 seconds, the controller changes to menu level. It consists of several sub-menus listed by the respective initial letter followed by 2 lines (e.g. **[-** for the [-level).

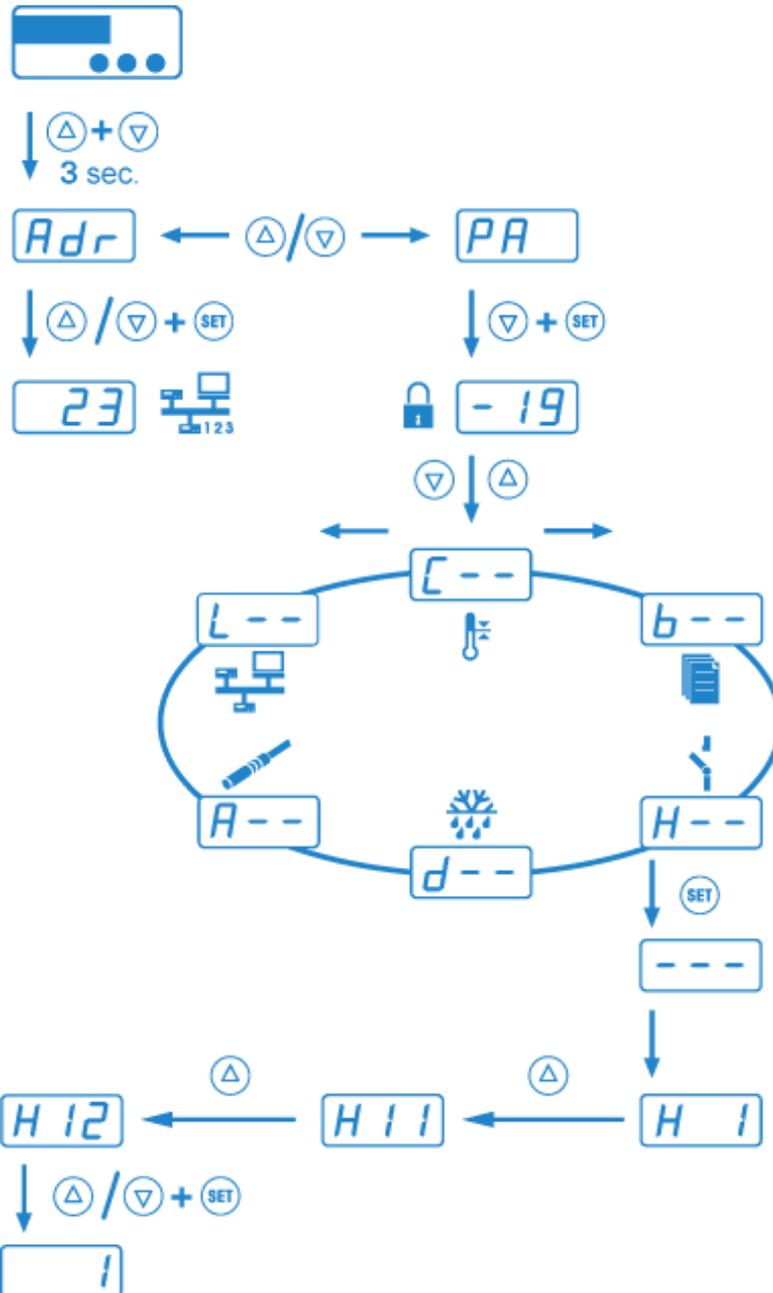
Parameter	Sub-menu	Function
[-	Controller level	Application parameters
b-	Intermediate level	Connecting parameters
H-	Hardware level	Hardware parameters
d-	Defrost level	Defrosting parameters (control circuit 1)
A-	Analogue level	Parameter for analogue in- and outputs
L-	Networking level	Parameter for networking

Adjustment of control parameters

To activate parameterisation mode, press buttons **UP** and **DOWN** at the same time. After approx. 3 seconds, the code word **Adr** will be displayed. Press **UP** or **DOWN** to switch between code words **PA** and **Adr**. Under code word **Adr** you can set a network address. This is required for commissioning networked systems.

By selecting code word **PA**, you can enter a password required for parameterisation. Once the password - **19** has been entered, the name of the first group of parameters is displayed (**[-**). Now, using the buttons **UP** and **DOWN** you can select any of the parameter groups quickly. By pressing the **SET** key you can enter the password of the respective level (default: 0).

Parameterisation



The last parameter of each sub-level (e.g. **C99**, **b99**, ...) represents the actual password of this level and can be changed there.

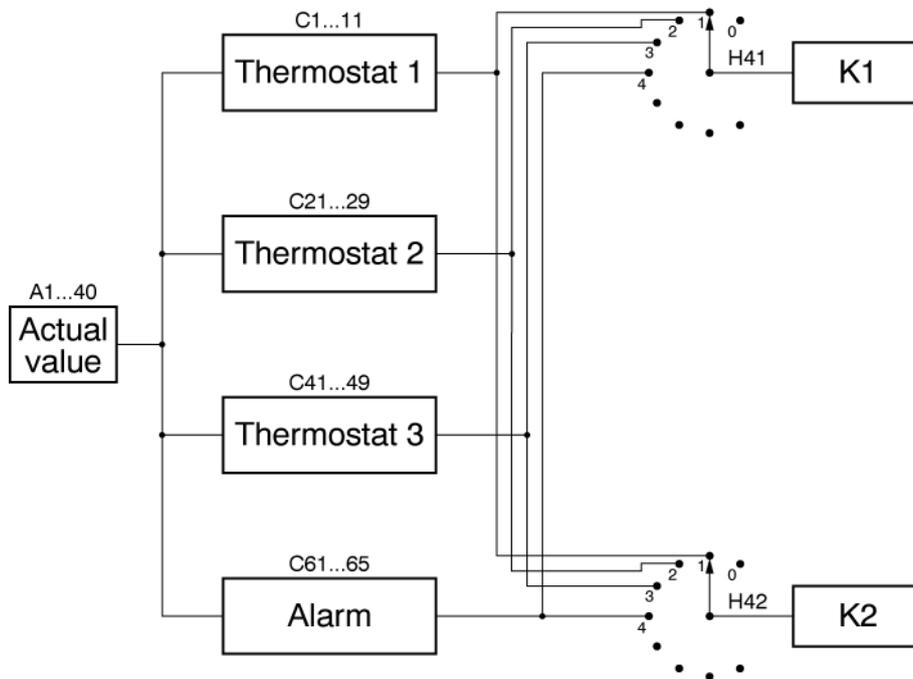
NOTE: Forgetting the password requires sending the controller to Störk Tronic.

If the password is correct, the display jumps to the sub-menu and shows the first listed parameters when the set key is released. Pressing the SET key, the value of the selected parameter is indicated. Additionally pressing the UP or DOWN key, the value can be adjusted. Releasing all keys, the new value is saved long term.

If UP and DOWN keys are simultaneously pressed again for at least 4 seconds, the display switches to the menu level again. Upon repeated pressing for 4 seconds or no pressing of any key for more than 60 seconds, the system jumps back to the initial state.

Controller structure

Block diagram of the controller structure. A specific control function can be assigned to each of the outputs via different parameters (*H41*...*H42*). Each control module is configured by the respective parameters.



The C-level (controller)

This level contains the application parameters.

Thermostat 1

Parameter	Function	Adjustment range	Standard setting	Custom setting
C1	Setpoint control circuit 1	C10 ... C11	0.0°C	
C2	Setpoint control circuit 1 (*)	-99.0 ... 99.0°C	0.0°C	
C3	Offset for C1/C2	-99.0 ... 99.0°K	0.0°K	
C4	Switching sense control circuit 1	0: heating function 1: cooling function	0	
C5	Hysteresis control circuit 1	0.1 ... 99.9°K	1.0°K	
C6	Hysteresis mode control circuit 1	0: symmetrical 1: one-sided	0	
C7	Minimum action time control circuit 1 "ON"	0 ... 400 sec.	0 sec.	
C8	Minimum action time control circuit 1 "OFF"	0 ... 400 sec.	0 sec.	
C9	Function control circuit 1 at sensor error	0: relay off 1: relay on	0	
C10	Control range limitation, minimum Setpoint 1	-99.0°C ... C11	-99.0°C	
C11	Control range limitation, maximum Setpoint 1	C10 ... 999.0°C	999.0°C	

* The activation of the second desired value [C2](#) is indicated on the display with a flashing point to the right. It can either be activated via switching entrance (see [H70](#), [H71](#)).

Thermostat 2

Parameter	Function	Adjustment range	Standard setting	Custom setting
C21	Setpoint control circuit 2 (b1 =0)	C10 ... C11	0°C	
C23	Delta W2 (b1 =1)	-99...99°K	0°K	
C24	Switching sense control circuit 2	0: heating function 1: cooling function	0	
C25	Hysteresis control circuit 2	0.1 ... 99.9°K	1°K	
C26	Hysteresis mode control circuit 2	0: symmetrical 1: one-sided	0	
C27	Minimum action time control circuit 2 "ON"	0...400 sec.	0 sec.	
C28	Minimum action time control circuit 2 "OFF"	0...400 sec.	0 sec.	
C29	Function control circuit 2 at sensor error	0: relay off 1: relay on	0	

Thermostat 3

Parameter	Function	Adjustment range	Standard setting	Custom setting
[41]	Sollwert control circuit 3 (b2=0)	[10]...[11]	0.0°C	
[43]	Delta W3 (b2=1)	-99.0 ... 99.0°K	0.0°K	
[44]	Switching sense control circuit 3	0: heating function 1: cooling function	0	
[45]	Hysteresis control circuit 3	0.1 ... 99.9°K	1.0°K	
[46]	Hysteresis mode control circuit 3	0: symmetrical 1: one-sided	0	
[47]	Minimum action time control circuit 3 "ON"	0...400 sec.	0 sec.	
[48]	Minimum action time control circuit 3 "OFF"	0...400 sec.	0 sec.	
[49]	Function control circuit 3 at sensor error	0: relay off 1: relay on	0	

Alarm circuit

Parameter	Function	Adjustment range	Standard setting	Custom setting
[61]	Lower alarm value	-99.0 ... [62]	-10.0	
[62]	Upper alarm value	[61] ... 999.0	10.0	
[63]	Alarm functions	0: Boundary alarm, relative boundaries 1: Boundary alarm, absolute boundaries 2: Range alarm, relative boundaries 3: Range alarm, absolute boundaries 4: Boundary alarm, relative boundaries, alarm invers 5: Boundary alarm, absolute boundaries, alarm invers 6: Range alarm, relative boundaries, alarm invers 7: Range alarm, absolute boundaries, alarm invers	0	
[64]	Special function at boundary alarm	0: not active 1: flashing display 2: buzzer 3: buzzer + flashing display 4: like 3, buzzer can be cancelled 5: like 4, restarts after 10 min. 6: like 4, restarts after 30 min.	0	
[65]	Hysteresis alarm circuit	0.1 ... 9.9°K	1°K	

Password

Parameter	Function	Adjustment range	Standard setting	Custom setting
[99]	Password C-level	-99...999	0	

Parameter description C-level:

Ⓛ1: Setpoint control circuit 1

This value corresponds with the setpoint set at the first control level.

Ⓛ2: Setpoint control circuit 1 (thermostat) at closed switching input

By closing switching input E1, setpoint Ⓛ1 can be switched to a setpoint Ⓛ2.

The setpoint Ⓛ2 can only be accessed if entrance E1 is closed.

The setpoint Ⓛ2 can only be activated, if the external input is configured for setpoint change-over (see H70, H71).

Ⓛ3: Offset for Ⓛ1/Ⓛ2

This adjusted value will build the difference to the setpoint for control circuit 1, i.e. there is no regulation according to the pre-set value, but according to the sum of desired value and the value of Ⓛ3.

Ⓛ4: Switching sense control circuit 1

The switching sense for the relays, i.e. cooling or heating function, can be programmed independently. Heating function means that the contact falls as soon as the pre-set setpoint is reached, thus power interruption. At cooling function the contact only tightens, if the actual value is above the required setpoint.

Ⓛ5: Hysteresis control circuit 1

The hysteresis can be set symmetrically or one-sided at the desired value (see Ⓛ6). 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).

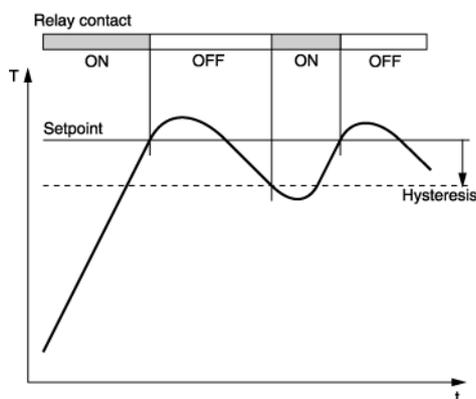


Fig. 1: Heating controller, one-sided hysteresis

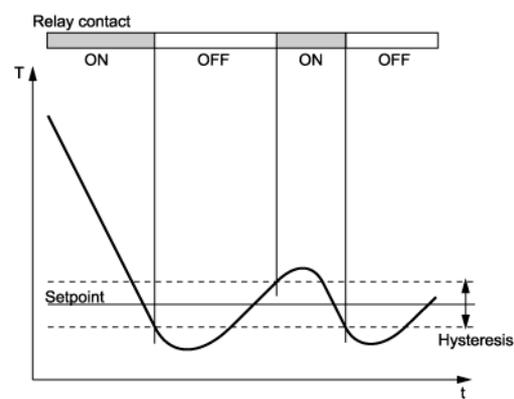


Fig. 2: Cooling controller, symmetrical hysteresis

Ⓛ6: Hysteresis mode control circuit 1

These parameters allow selection as to whether the hysteresis values which are adjustable with Ⓛ5, 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.

Ⓒ7/Ⓒ8: Minimum action time control circuit 1 "On"/"Off"

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.

Ⓒ9: Function control circuit 1 at sensor error

At sensor error the selected relay (see [H4 I, 42](#)) falls back into the condition pre-set here.

Ⓒ10: Setpoint limit (minimum) setpoint 1

Ⓒ11: Setpoint limit (maximum) setpoint 1

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.

Ⓒ21: Setpoint control circuit 2 (thermostat) (b1=0)

If $b1=1$, this value is ineffective.

Ⓒ23: Value deltaW2 (b1=1)

If $b1=1$, the setpoints for control circuit 1 and 2 are linked with one another via switching difference deltaW2 ([Ⓒ23](#)) (operation with deltaW).

The following applies: Setpoint thermostat 2 = setpoint control circuit 1 ([Ⓒ1/Ⓒ2](#)) + deltaW2.

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

Ⓒ24: Switching sense control circuit 2

The switching sense for the relays, i.e. cooling or heating function, can be programmed independently at works. Heating function means that the contact falls as soon as the pre-set setpoint is reached, thus power interruption. At cooling function the contact only tightens, when the actual value is above the required setpoint.

Ⓒ25: Hysteresis control circuit 2

The hysteresis can be set symmetrically or one-sided at the setpoint (see [Ⓒ26](#)). 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).

Ⓒ26: Hysteresis mode control circuit 2

These parameters allow selection as to whether the hysteresis values which are adjustable with [Ⓒ25](#), 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.

Ⓒ27: Minimum action time control circuit 2 "On"

Ⓒ28: Minimum action time control circuit 2 "Off"

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.

⌈29: Function control circuit 2 at sensor error

At sensor error the selected relay (see [H41, 42](#)) falls back into the condition pre-set here.

⌈41: Setpoint thermostat 3 (b2=0)

If $b2=1$, this value is ineffective.

⌈43: Value deltaW3 (b2=1)

If $b2=1$, the setpoints for thermostat 1 and 3 are linked with one another via switching difference $\Delta W3$ (operation with ΔW). The following applies:

Setpoint thermostat 3 = setpoint thermostat 1 ([⌈1/⌈2](#)) + $\Delta W3$.

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

⌈44: Switching sense control circuit 3

The switching sense for the relays, i.e. cooling or heating function, can be programmed independently at works. Heating function means that the contact falls as soon as the pre-set setpoint is reached, thus power interruption. At cooling function the contact only tightens, if the actual value is above the required setpoint.

⌈45: Hysteresis control circuit 3

The hysteresis can be set symmetrically or one-sided at the setpoint (see [⌈46](#)). 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).

⌈46: Hysteresis mode control circuit 3

These parameters allow selection as to whether the hysteresis values which are adjustable with [⌈45](#), 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.

⌈47: Minimum action time control circuit 3 "On"

⌈48: Minimum action time control circuit 3 "Off"

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.

⌈49: Function control circuit 3 at sensor error

At sensor error the selected relay (see [H41, 42, 43](#)) falls back into the condition pre-set here.

⌈61: Lower alarm value

⌈62: Upper alarm value

The exit alarm is a boundary alarm or a range alarm with one-sided hysteresis (see parameter [⌈65](#)). Both at the boundary alarm and the range alarm, limit values can be relative, i.e. going along with the setpoint [⌈1/⌈2](#), or absolute, i.e. independent of the setpoint [⌈1/⌈2](#). At boundary alarm the hysteresis works one-sided inwardly, and at range alarm outwardly (see fig. 3-6, next side).

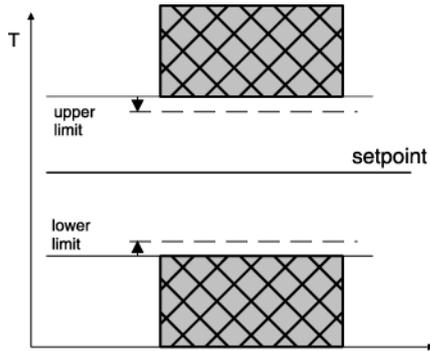


Fig. 3: Boundary alarm, alarm contact normal
C63=0 limits relative
C63=1 limits absolute

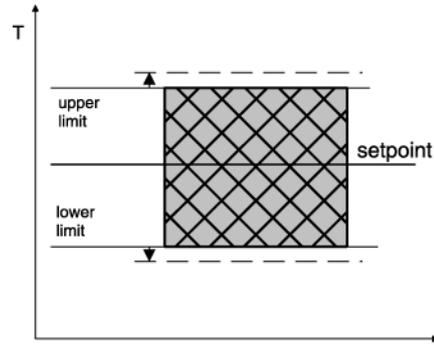


Fig. 4: Range alarm, alarm contact normal
C63=2 limits relative
C63=3 limits absolute

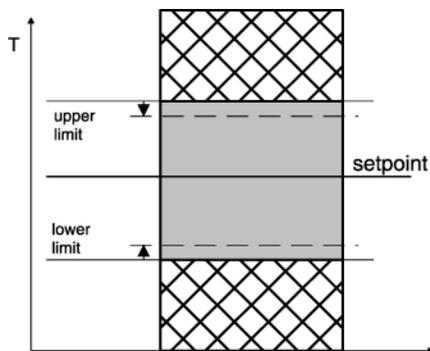


Fig. 5: Boundary alarm, alarm contact invers
C63=4 limits relative
C63=5 limits absolute

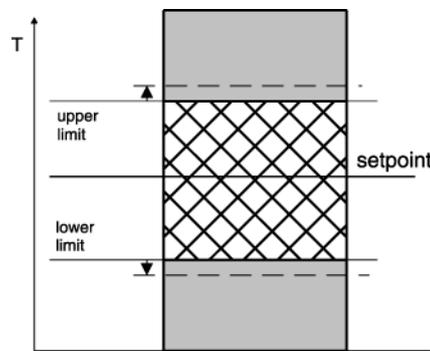


Fig. 6: Range alarm, alarm contact invers
C63=6 limits relative
C63=7 limits absolute



63: Function exit alarm

The exit alarm evaluates an upper and a lower limit value (see parameters 61 and 62), whereas a selection is possible as to whether the alarm is active if the temperature lies within these two limits, or whether the alarm is released if the temperature lies beyond them. In the case of sensor error, the alarm is activated independently of this adjustment. The exit can also be inverted, so that it functions like a release (see fig. 3 – 6).

64: Special function at alarm

Here can be selected whether, in the case of emergency, the indication to flash and/or the buzzer is to start. Sensor alarm (display *F IL* or *F IH*) is indicated independently thereof by flashing display and the buzzer runs off.

65: Hysteresis alarm circuit

Hysteresis is set one-sided at the adjusted limit value. It becomes effective depending on alarm definition (see fig. 3-6).

99: Password

This parameter is to set the password for the -- level.

b-level (between)

This level contains the parameters for different combinations.

Parameter	Function	Adjustment range	Standard setting	Custom setting
b1	Activation setpoint combination for thermostat 1 and 2 ($[C23] = \text{deltaW2}$)	0: no combination 1: Setpoint thermostat 2 = $[C1]/[C2] + [C23]$	0	
b2	Activation setpoint combination for thermostat 1 and 3 ($[C43] = \text{deltaW3}$)	0: no combination 1: setpoint thermostat 3 = $[C1]/[C2] + [C43]$	0	
b11	Delay control circuit 1, 2, 3 after "Power-On"	0...400 sec.	0 sec.	
b12	Mutual delay control circuit 1, 2, 3	0...400 sec.	0 sec.	
b13	Alarm suppression after "Power-On", "setpoint"	0...60 min.	0 min.	
b99	Password b-level	-99 ... 999	0	

Parameter description b-level:

b1: Activation setpoint combination for thermostat 1 and thermostat 2 (deltaW2)

This parameter determines whether the setpoints for thermostat 1 and 2 independently adjustable (parameter $[C21]$) or whether they are tied with one another via a switching offset deltaW2 (parameter $[C23]$).

b2: Activation setpoint combination for thermostat 1 and thermostat 3 (deltaW3)

This parameter determines whether the setpoints for thermostat 1 and 3 independently adjustable (parameter $[C41]$) or whether they are tied with one another via a switching offset deltaW2 (parameter $[C43]$).

b11: Delay control circuit 1, 2, 3 after "Power-On"

This parameter allows a switching-on delay of relays after switching-on the mains voltage. This delay corresponds with the time set here.

b12: Mutual delay control circuit 1, 2, 3

This parameter makes a mutual switching-on delay of relays possible, depending on whichever contact is switched first.

b13: Alarm suppression after "Power-On", "setpoint"

This parameter allows a switching-on delay of the alarm contact after switching on the mains voltage. This delay corresponds with the time set here.

b99: Password

This parameter is to set the password for the **b--** level.

H-level (hardware)

This level contains the hardware parameters.

Parameter	Function	Adjustment range	Standard setting	Custom setting
H 1	Key-lock	0: no key-lock 1: key-lock	0	
H 11	Indication mode display 1	0: integrals 1: decimals in 0.5°K 2: decimals in 0.1°K	1	
H 12	Display 1 mode	1: actual value 2: setpoint	1	
H 15	Temperature scale	0: Celsius 1: Fahrenheit	0	
H 16	Indication standby	0: display deactivated (point to the right) 1: AUS 2: OFF	1	
H 17	Mode following "Power-On" "	0: Off 1: On 2: Auto	1	
H35	Activation of key acknowledgement	0: no key acknowledgement 1: key acknowledgement with buzzer	0	
H4 1	Function output K1	0: no connection 1: thermostat 1 2: thermostat 2 3: thermostat 3 4: alarm function	1	
H42	Function output K2	see H4 1	2	
H5 1	Mains frequency	0: 50Hz 1: 60Hz	0	
H6 1	Function LED 1	0: deactivated 1: K1 2: K2 3: defrost 4: flashing while defrosting	1	
H62	Function LED 2	See H6 1	2	
H63	Function LED 3	See H6 1	0	
H70	Function switching input E1	0: no function 1: Controller on/off (Standby) 2: Setpoint C1 / Setpoint C2	0	
H7 1	Switching sense input E1	0: NO contact 1: NC contact	0	
H99	Password H-level	-99..999	0	

Parameter description H-level:

H 1: 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.

H 11: Indication mode display 1

The value can be indicated in integrals or with decimals in 0.5°K or 0.1°K. At indication in 0.5°K the value is rounded up or down. In general, all parameter indications are presented in 0.1°K.

H 12: Display 1 mode

H 12=1 indicates the actual value and **H 12**=2 indicates the setpoint **C 1** or **C 2** in the display. Therefore, the current actual value can only be indicated with parameter **A 1**.

H 15: 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 setpoint of 0°C is switched to Fahrenheit. The new setpoint 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!

H 16: Indication standby

In standby mode the here set value appears in the display.

H 17: Mode following "Power-On"

After switching on the mains voltage the controller automatically goes to the condition set here.

H 17=2 applies to the condition prior to the separation from the net.

H35: Activation of key acknowledgement

This parameter permits to switch the internal buzzer on/off by key confirmation.

H4 1-42: Function output K1-2

Generally, the exits are exchangeable with parameter adjustments, in order to achieve an optimal relation of the existing hardware with regard to contact rating, kind of contact and cycle number. Therefore, these parameters first assign the exits to the controller function.

H5 1: Mains frequency

This parameter is to select the mains frequency.

H6 1-H63: Function LED1-LED3

Assignment of the status LEDs.

H70: Function of switching input E1

If **H70**=0 the switching input is deactivated. With **H70**=1 the controller is switched to standby mode.

With **H70**=2 the input switches between setpoint **C 1** and setpoint **C 2**.

H7 1: Switching sense of input E1

With this parameter E1 can be configured as NO (**H7 1**=0) or NC (**H7 1**=1) contact.

H99: Password

This parameter is to adjust the password for the **H- -** level.

d-level (defrosting functions)

This level contains the parameters for defrosting.

NOTE: Defrosting parameter only affects **control circuit 1**

Parameter	Function	Adjustment range	Standard setting	Custom setting
d0	Defrosting interval TH1	1 ... 99h 0: no defrosting	0	
d2	Defrosting temperature TH1	-99.0 ... 999.0°C	10.0 °C	
d3	Defrosting time limit TH1	1 ... 99 min. 0: no time limit	30 min.	
d9	Manual defrosting TH1	0...1	0	
d99	Password d-level	-99...999	0	

Parameter description d-level:

d0: Defrosting interval

The "defrosting interval" defines the time, after which a defrosting process is started. After each defrosting start, this time is reset and runs the next interval.

Manual defrosting:

Pressing the key UP for at least 3 sec. the defrosting interval is activated earlier. Alternatively parameter **d9** can be applied for this function, too. The next automatic defrosting process takes place again after the time **d0**. (defrosting synchronisation)

d2: Defrosting temperature

This permits to terminate defrosting when the adjusted desired temperature value is reached. The defrosting time set with "**d3**" nevertheless runs at the same time, i.e. it functions as safety net to terminate the defrosting process in case the defrosting temperature is not reached.

d3: Defrosting time limit

After the here set time the defrosting process is terminated.

d9: Defrosting time limit

At change of 0 - > 1 the defrosting process is started and the defrosting interval is re-set. (defrosting synchronisation)

d99: Password

This parameter is to set the password for the **d-** level.

A-level (analogue values)

This level contains the parameters for analogue inputs and outputs.

Parameter	Function	Adjustment range	Standard setting	Custom setting
A1	Indication of actual value analogue input	-		
A2	Actual value correction analogue input	-99.0 ... 99.9 °K	0 °K	
A3	Weighing factor analogue input	0.50 ... 1.50	1.00	
A4	Sensor type	11: Pt100 two-wire 12: Pt100 three-wire 13: Pt1000 two-wire 21: PTC (KTY81-121 two-wire)	11	
A40	Software filter	1...32 measuring values (2*X s)	4	
A99	Password A-level	-99 ... 999	0	

Parameter description A-level:

A1: Indication of actual value analogue input

The here indicated temperature value is the sum of the actual measured value of sensor F1 and the actual value correction according to parameter **A2**.

A2: Actual value correction analogue input

With this parameter it is possible to correct actual value deviations caused by sensor tolerances or extremely long sensor lines for example. The control measuring value is increased or decreased by the here set value.

A3: Weighing factor analogue input

With this parameter the actual value can be submitted to weighing. The measured value is multiplied by it and both indicated in the display and applied for regulation.

A4: Analogue input type

These parameters permit selection of the sensor type, respectively the type of analogue input if the needed hardware prerequisites are available.

A40: Time constant of the software filter

With several measuring values, it is possible to obtain an average value. If a sensor with a very fast reaction to external influences is used, an average value ensures a calm signal process.

A99: Password

This parameter permits setting of the password for the **A--** level.

L-level (networking)

This level contains the networking parameters.

Parameter	Function	Adjustment range	Standard setting	Custom setting
L0	Own address ST-bus	0: deactivated 1...250	5	
L40	Release mask for ST-Bus (functions)	0...255	0	
L42	10 minutes release to reset counters and operating times	0: locked 1: Enable Reset for 10 minutes (see N98 and T98)	0	
Pro	Software version	---	0	
L99	Password L-level	-99 ... 999	0	

Parameter description L-level:

L0: ST-bus own address

With the address set here, the controller can be addressed via the bus. Each bus client must have its own address. Addresses must be unique, i.e. must not be assigned several times.

L40: Mask on enabled functions (Bit 0...7)

Here, you can specify the functions enabled via the bus using a binary mask. The bits have the following meaning:

Bit	Valency	Function
0	1	Controller on/off
1	2	Defrost
2	4	Acknowledge
3	8	Change-over C1/C2
4	16	---
5	32	---
6	64	---
7	128	---

To determine the value to be parameterised, all valencies must be added up.

L42: 10 minutes release to reset counters and operating times

As soon as the parameter is set to 1, counters and operating times can be reset by means of parameters **n98** and **t98** during the following 10 minutes.

Pro: Software-Version

L99: Password

This parameter permits setting of the password for the **L--** level.

N-level (counters)

Parameters are only accessible via ST-Bus.

Parameter	Function	Adjustment range	Standard	
N0	Switching cycles of K1 (lower 16 bit)	---		
N1	Switching cycles of K1 (upper 16 bit)	---		
N2	Switching cycles of K2 (lower 16 bit)	---		
N3	Switching cycles of K2 (upper 16 bit)	---		
N98	Delete relay switching cycles	0: --- 1: delete	0	
N99	Password for N-level	-99 ... 999	0	

Parameter description N-level:

N0: Switching cycles of K1 (lower 16 bit)

N1: Switching cycles of K1 (upper 16 bit)

The number of switching cycles is calculated as follows: **number = 65536 * N1 + N0.**

N2: Switching cycles of K2 (lower 16 bit)

N3: Switching cycles of K2 (upper 16 bit)

The number of switching cycles is calculated as follows: **number = 65536 * N3 + N2.**

N98: Delete relay switching cycles

Parameter N98 resets the counters for all relays. It depends on the setting of parameter [L42](#). The return value is set back to "0" automatically.

N99: Password for N-level

With this parameter, you can set the password for parameter level **N**.

T-level (operating times)

Parameters are only accessible via ST-Bus.

Parameter	Function	Adjustment range	Standard	
t0	Overall operating time (lower 16bit)	---		
t1	Overall operating time (upper 16bit)	---		
t2	Operating time since last reset (lower 16bit)			
t3	Operating time since last reset (upper 16bit)			
t4	Operating time relay K1 (lower 16bit)			
t5	Operating time relay K1 (upper 16bit)			
t6	Operating time relay K2 (lower 16bit)			
t7	Operating time relay K2 (upper 16bit)			
t98	Reset operating hours	0: --- 1: Reset	0	
t99	Password for T-level	-99 ... 999	0	

Parameter description T-level:

T0: Overall operating time (lower 16 bit)

T1: Overall operating time (upper 16 bit)

The overall operating time is calculated as follows: Operating time (in minutes) = 65536 * T1 + T0.
This value is non-erasable.

T2: Operating time since last reset (lower 16 bit)

T3: Operating time since last reset (upper 16 bit)

The operating time since the last resets calculated as follows:

Operating time (in minutes) = 65536 * T3 + T2.

Parameter T98 resets the counters for all operating times (except for T0 and T1). It depends on the setting of parameter L42. The return value is set back to "0" automatically.

T4: Operating time relay K1 (lower 16 bit)

T5: Operating time relay K1 (upper 16 bit)

The operating time of the relay K1 calculated as follows:

Operating time (in minutes) = 65536 * T5 + T4.

Parameter T98 resets the counters for all operating times (except for T0 and T1). It depends on the setting of parameter L42. The return value is set back to "0" automatically.

T6: Operating time relay K2 (lower 16 bit)

T7: Operating time relay K2 (upper 16 bit)

The operating time of the relay K2 calculated as follows:

Operating time (in minutes) = 65536 * T7 + T6.

Parameter T98 resets the counters for all operating times (except for T0 and T1). It depends on the setting of parameter L42. The return value is set back to "0" automatically.

T98: Delete relay switching cycles

Parameter T98 resets the counters for T2...T7. It depends on the setting of parameter L42. The return value is set back to "0" automatically.

T99: Password for T-level

With this parameter, you can set the password for parameter level T.

Status indications and error messages

Message	Cause	Error elimination
F 1L	Sensor error: short-circuit at sensor F1)	Check sensor
F 1H	Sensor error: open-circuit at sensor F1)	Check sensor
F 2L	Sensor error: short-circuit at 3-wire correction	Check sensor
F 2H	Sensor error: open-circuit at 3-wire correction	Check sensor
E P0	Error program memory => ALL EXITS WILL BE SWITCHED OFF	Repair controller
E P1	Error parameter memory => ALL EXITS WILL BE SWITCHED OFF	Repair controller
---	Display overrun or key-lock	
flashing display	Temperature alarm at too high or too low temperatur (see C64)	
Buzzer	Temperature alarm at too high or too low temperatur (see C64)	Buzzer can be cancelled with DOWN key.

Technical data of ST46-IE1TAR.100

Measuring input

F1: Resistance thermometer Pt100-3L, Pt100-2L, Pt1000-2L, PTC
Measuring range: Pt100 -99°C...+600 °C
Pt1000-99°C...+330°C
PTC -50°C...+150°C
Measuring accuracy: 0.5 K, without sensor

Input

E1: external potential-free contact

Outputs

K1: Relay, change-over contact, 12(2.2)A 250V ($\cos\varphi=1$)
K2: Relay, change-over contact, 8(1.5)A 250V ($\cos\varphi=1$)
Buzzer, ca. 85dB

Display

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

ST-Bus communication interface

Interface driver: RS485, galvanically separated with transformer at power supply
The network has to be installed in lines topology and terminated with a 120 Ohm resistance on each side.

In case of networking always connect port "A" with port "A" and port "B" with port "B". Crossing over is not permissible.

Power supply

230V 50/60Hz

Connectors

screw terminal, spacing 5.0 mm, for cable up to 2.5 mm²

Ambient conditions:

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

Weight

ca. 250g

Enclosure

Front IP50

Installation data

Clip-on mounting on DIN rail 35 x 7.5mm
Housing dimensions: L 95mm x B 53mm x H 59mm