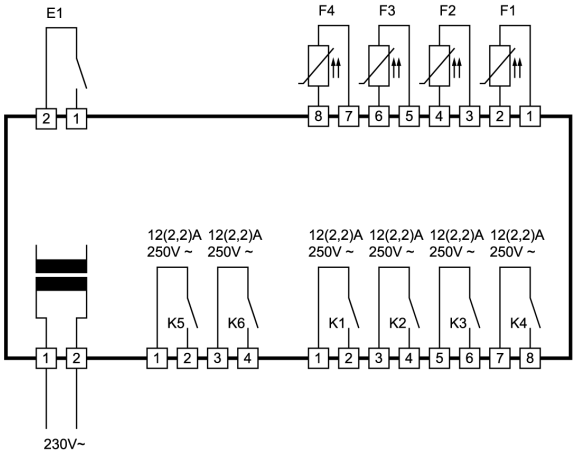
ST182-VRMA

Hot bar controller

Order number 900223.021
Old Id.Nr.: 388850

Wiring diagram



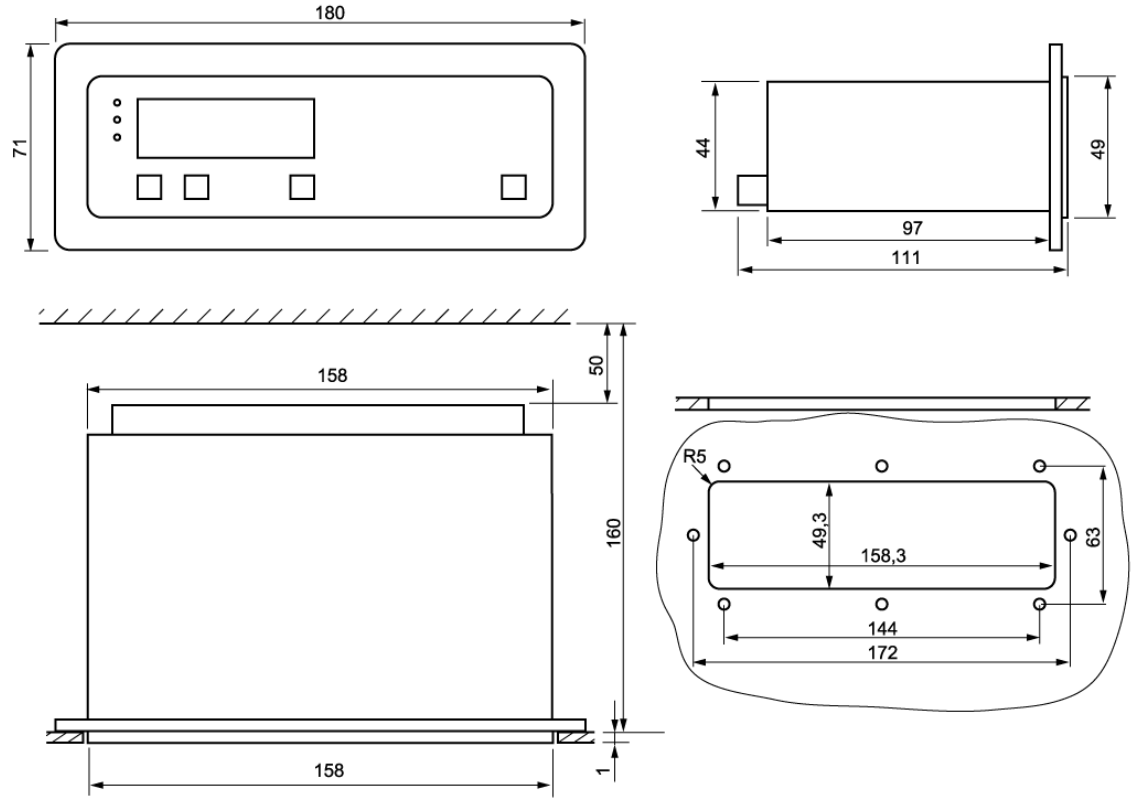
Product description

The flush panel control ST182-VRMA was specifically conceived for the requirements of hot bars. The continuous frontal plastic foil keyboard ensures the high tightness absolutely required for this application. Depending on the parameters, the control can operate 1 - 4 independent warm water baths. For the registration of the warm-water temperature, PTC temperature sensors are used in each case. A special feature of this control is the possibility of the free allocation of the individual output contacts. That way, among other, it is possible to operate a warm water bath with several output contacts, and thus several heating elements.The output contacts can be maximally loaded with 12A at 250V. Two independent outputs operable with assigned front keys are intended for switching of lighting and/or infrared or other surface jet heating elements. For water baths an automatic water level regulation is programmable. At the input side, there is a switching or capacitive transmitter, at the output side, there is a water valve.

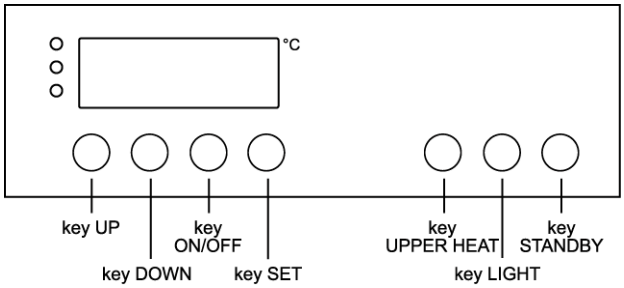
Sensor: PTC
Range: -55...130°C
Front size: 158mm x 49mm

Installation size: 180mm x 71mm
Tightness: front IP65
Connector: plug and socket

ST 182...



SOFTWARE hot bar controller



Adjustment options

Key UP
Pressing this key the heating channel is selected and together with the SET key the desired heating temperature value is increased. When setting the parameters, they can be selected with this key and together with the SET key their values can be changed.

Key DOWN
Pressing this key the heating channel is selected and together with the SET key the desired heating temperature value is decreased. When setting the parameters, they can be selected with this key and together with the SET key their values can be changed.

Key ON/OFF
This key is to switch on/off a selected water bath. With parameter A84 it can be deactivated.

Key SET
While pressing this key, the desired heating value can be changed with the keys UP and DOWN. Likewise, this key is used to set parameters.

Key UPPER HEAT
Pressing this key, infrared heating is activated or deactivated. When activated, the light emitting diode above the key is illuminated.

Key LIGHT
Pressing this key, the exit for the lighting is activated or deactivated. Parameters allow to select whether this is also possible in standby mode, see parameter A83.

Key STANDBY
This key puts the controller into standby mode. Pressing the key a second time, restarts the unit. The key can be deactivated by setting the respective parameter, see parameter A81.

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 of the selected control circuit shows on the display.
If the setpoint is to be changed, the SET key is to be kept pressed while adjusting the desired value with the keys UP and DOWN.
Please note that the desired value can only be changed within the set desired value limits.

Para-meter	Function	Adjustment range	Standard setting	Custom setting
S1	Main setpoint circuit 1	P4...P5	10 °C	
S2	Main setpoint circuit 2	P4...P5	20 °C	
S3	Main setpoint circuit 3	P4...P5	30 °C	
S4	Main setpoint circuit 4	P4...P5	40 °C	

Second control level (P-parameter):

Setting of control parameters
The parameters can also be set in standby mode. 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 45 seconds, or by simultaneously pressing the UP and DOWN key for approx. 4 seconds

Para-meter	Function	Adjustment range	Standard setting	Custom setting
P1	Operating mode	1: One-circuit controller 2: Multi-circuit controller with 2 circuits 3: Multi-circuit controller with 3 circuits 4: Multi-circuit controller with 4 circuits	4	
P4	Min. control range limitation (applies to all circuits)	0,0...P5 °C	0,0 °C	
P5	Max. control range limitation (applies to all circuits)	P4...99.0 °C	99.0 °C	
P11	Hysteresis circuit 1	0.1 ... 20.0 K	2.0 K	
P12	Hysteresis circuit 2	0.1 ... 20.0 K	2.0 K	
P13	Hysteresis circuit 3	0.1 ... 20.0 K	2.0 K	
P14	Hysteresis circuit 4	0.1 ... 20.0 K	2.0 K	
P19	Key-lock	0: no key-lock 1: key-lock		
P20	Indication actual value circuit 1	-----	-----	
P21	Actual value correction sensor 1	-30 ... 30.0 K	0.0 K	
P22	Indication actual value circuit 2	-----	-----	
P23	Actual value correction sensor 2	-30 ... 30.0 K	0.0 K	

Para-meter	Function	Adjustment range	Standard setting	Custom setting
P24	Indication actual value circuit 3	-----	-----	
P25	Actual value correction sensor 3	-30 ... 30.0 K	0.0 K	
P26	Indication actual value circuit 4	-----	-----	
P27	Actual value correction sensor 4	-30 ... 30.0 K	0.0 K	
P30	Lower alarm value (applies to all circuits)	-99 ... 99.0 °C	0.0 °C	
P31	Upper alarm value (applies to all circuits)	-99 ... 99.0 °C	99.0 °C	
P32	Alarm hysteresis, one-sided	0.1 ... 20.0 K	1.0 K	

Parameter description:

P1: Operating mode
This parameter determines the circuits assisting the regulation.

P4: Control range limitation minimum
P5: Control range limitation maximum
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.

P11: Hysteresis 1
P12: Hysteresis 2
P13: Hysteresis 3
P14: Hysteresis 4
This parameter sets the temperature margin between switching off and switching on of the relay for the respective circuit. A small hysteresis permits a more exact regulation, however also leads to more frequent switching. The hysteresis is set one-sided below the setpoint.

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.

P20: Indication actual value circuit 1
Possibility to indicate actual value of circuit 1 for easy correction of the actual value with P21.

P21: Actual value correction circuit 1
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.

P22: Indication actual value circuit 2
Possibility to indicate actual value of circuit 2 for easy correction of the actual value with P23.

P23: Actual value correction circuit 2
The regulation measure value is increased or decreased by the here adjusted value.

P24: Indication actual value circuit 3
Possibility to indicate actual value of circuit 3 for easy correction of the actual value with P25.

P25: Actual value correction circuit 3
The regulation measure value is increased or decreased by the here adjusted value.
P26: Indication actual value circuit 4
Possibility to indicate actual value of circuit 4 for easy correction of the actual value with P27.

P27: Actual value correction circuit 4
The regulation measure value is increased or decreased by the here adjusted value.

P30: Lower alarm value
P31: Upper alarm value
The exit alarm is a boundary alarm or a range alarm with symmetrical hysteresis (see parameter P32). Both at the boundary alarm and the range alarm, limit values can be relative, i.e. going along with the setpoint, or absolute, i.e. independent of the setpoint. At boundary alarm the hysteresis works one-sided inwardly, and at range alarm outwardly (see parameter A30).

Boundary alarm function (see fig. 1):
The alarm contact is closed if the process temperature is above the upper or below the lower boundary value.

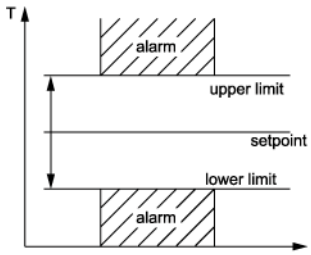


Fig. 1: Boundary alarm, rel. boundaries

Range alarm function (see fig. 2):
Opposite switching behaviour to the boundary value alarm. The alarm contact is closed if the actual value remains between the boundary values.

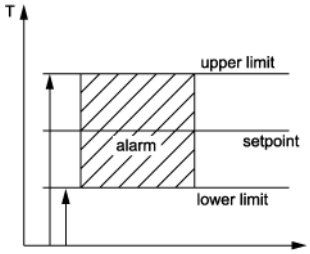


Fig. 2: Range alarm, abs. boundaries

P32: Hysteresis alarm circuit
Hysteresis is set one-sided at the adjusted limit value. It becomes effective depending on alarm definition.

Third control level (A-parameter):

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.

Para-meter	Function	Adjustment range	Standard setting	Custom setting
A1	Function of contact K1 at sensor error	0: relay off 1: relay on	0	
A2	Function of contact K2 at sensor error	0: relay off 1: relay on	0	
A3	Function of contact K3 at sensor error	0: relay off 1: relay on	0	
A4	Function of contact K4 at sensor error	0: relay off 1: relay on	0	
A8	Display mode (all parameter indications are presented in 0,1°K)	0: integrals 1: decimals in 0.5°C 2: decimals in 0.1°C	0	
A19	Parameter lock	0: no lock 1: A-parameter locked 2: A- and P-parameter locked	0	
A30	Function alarm exit (temperature control according parameters P30 and P31)	0: boundary alarm, relative 1: boundary alarm, absolute 2: range alarm, relative 3: range alarm, absolute	1	
A31	Special function in case of alarm (effective for temperature alarm)	0: without function 1: display flashing 2: buzzer active 3: display flashes and buzzer active 4: like 3, buzzer can be terminated	4	
A32	Setpoint display	0: display shows actual value 1: display shows setpoint S1	1	
A54	Time delay relays after mains ON	0...600 sec.	0 sec.	
A56	Alarm suppression after mains ON	0...60 min.	0 min.	
A60	Sensor type	21: PTC 22: Pt1000 2-wire	21	
A70	Software filter	1: not active 2...32: average value with 2-32 measuring values	2	
A80	Temperature scale and text in standby mode	0: Fahrenheit (“AUS”) 1: Celsius (“AUS”) 2: Fahrenheit (“OFF”) 3: Celsius (“OFF”)	3	

Para-meter	Function	Adjustment range	Standard setting	Custom setting
A81	Function standby key	0: not active 1: active	1	
A82	Reaction time standby key	0,1...5,0 sec.	2,0 sec.	
A83	Function key light	0: key deactivated in standby mode 1: key activated in standby mode	0	
A84	Function key On/Off	0: no function 1: key active	1	
A85	Selection external switching input (input E2 for capacitive level switch is optional)	0: not evaluated 1: E1 as level switch 2: E2 as level switch	1	
A86	Switch mode external switching input (water valve switched on)	0: level switch normally-closed 1: level switch normally-open	1	
A87	Post-running time water valve "on"	0...20 sec.	5 sec.	
A88	Post-running time water valve "off"	0...20 sec.	5 sec.	
A90	Output connection K1	0: no connection 1: connection to circuit 1 2: connection to circuit 2 3: connection to circuit 3 4: connection to circuit 4 5: connection to key UPPER HEAT 6: connection to key LIGHT 7: connection to alarm exit 8: connection to water valve	1	
A91	Output connection K2	(see A90)	2	
A92	Output connection K3	(see A90)	3	
A93	Output connection K4	(see A90)	4	
A94	Output connection K5	(see A90)	5	
A95	Output connection K6	(see A90)	6	
Pro	Program version	-----	-----	

Parameter description:

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

A1: Function of circuit 1 at sensor error
A2: Function of circuit 2 at sensor error
A3: Function of circuit 3 at sensor error
A4: Function of circuit 4 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 0,5°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.
If the parameter is set for decimals, the space between channel number and temperature indication is lost in case of more than one activated channel.

A19: Parameter lock
This parameter enables locking of each parameter level. If third level is locked, only parameter A19 may be changed. In locked condition, the parameters can be indicated but not adjusted.

A30: Function alarm exit
The alarm exit evaluates an upper and a lower limit value (see parameters P30 and P31), whereas a selection is possible as to whether the alarm is active if the temperature lies within these two limits (range alarm), or whether the alarm is released if the temperature lies beyond them (boundary alarm). In the case of sensor error, the alarm is activated independently of this adjustment. The limit values can be absolute (free adjustable) or relative to the main setpoint.

A31: Special function at alarm
Here can be selected whether, in the case of an alarm, the indication is to flash and/or the buzzer is to start. Sensor alarm (display F1L or F1H) is indicated independently thereof by flashing display and the buzzer.

A32: Setpoint display
This is to define whether the continuous indication on the display is to show the actual value or the setpoint of the selected circuit.

A54: Delay after mains on
This parameter allows a switching-on delay of all relays after switching-on the mains voltage. This delay corresponds with the time set here. After the first switching-on the delay is longer effective. This delay applies not to the alarm output.

A56: Alarm suppression after mains on
This parameter allows a switching-on delay of the alarm contact after switching on the mains voltage or setpoint change-over. This delay corresponds with the time set here. After the first alarm the delay is longer effective. This delay applies not to the control outputs.

A60: Sensor type
These parameters permit selection of the sensor type, if the needed hardware prerequisites are available. The setting applies to all connected sensors.

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. With A70=1 the software filter is deactivated.

A80: Temperature scale and text in standby mode
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
Additionally this parameter sets the indicated text for the standby mode (“AUS” or “OFF”).

A81: Function standby key
If the standby key is not used, the controller is active after switching on the mains voltage. If the key is activated, the controller can be switched to standby mode (display indicates “OFF” or “AUS” depending on parameter A80).

A82: Reaction time standby key
In order to avoid inadvertent switching on or off, the standby key can be delayed by the time adjusted here.

A83: Function key light
This parameter determines whether the key functions in standby mode, i.e. whether the light can be switched on/off when the controller is switched off.

A84: Function key on/off
This parameter can deactivate the function of key on/off. At A84=0 the key has no function and the circuits activated with P1 are always switched on. At A84=1 the key is in function and pressure effects activation or deactivation of the indicated channel.

A85: Selection external switching input
This parameter determines whether the external input is evaluated. Optionally an additional input for a capacitive level switch can be provided. In this case, apart from the activation, there is the possibility to define which of the two external inputs is relevant for the water valve outlet.

A86: Switch mode external switching input
This parameter determines the switch mode of the activated external switching input. Depending on the execution of the employed level switch, the water valve is operated with a normally-closed or a normally-open contact. With regard to safety, the opening of a water valve with a normally-open contact is correct.

A87: Post-running time water valve "on"
Switching-on of the water valve is retarded by the time adjusted here. De-bouncing of the switching medium and inertial operation start is effected. At A87=0 there is a brief delay due to the reaction of the control part.

A88: Post-running time water valve "off"
Switching-off of the water valve is retarded by the time adjusted here. De-bouncing of the switching medium and inertial operation is effected. At A88=0 there is a brief delay due to the reaction of the control part.

A90: Function output K1
A91: Function output K2
A92: Function output K3
A93: Function output K4
A94: Function output K5
A95: Function output K6
Generally, the outputs 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 outputs to the controller function.

Pro: Program version
The version of the control program is indicated. There is no adjustment option.

Status messages

Message	Cause	Error elimination
F1L, F2L, ...	Sensor error circuit 1, circuit 2, ... (short circuit)	Check the sensor
F1H, F2H, ...	Sensor error circuit 1, circuit 2, ... (break)	Check the sensor
EP	Data loss at parameter memory	If error cannot be eliminated by switching on/off, the controller must be repaired
"--" (SET is not pressed)	Selected circuit is deactivated	Switch on circuit with On/Off
"---" (SET is pressed)	Key-lock active	In der Parametrierung entriegeln
Temperature indication flashes	Temperature alarm (if activated)	-----

Note: In case of an error or an alarm the display flashes if accordingly parametered.

Technical data of ST182-VRMA

Inputs
E1: Switching input for an extern potential-free switch

Measuring input
F1, F2, F3, F4: Temperature sensor

Measuring range:	PTC (KTY81-121)	-50°C...+130°C
	PT1000 (2-wire)	-99°C...+300°C

Measuring accuracy: ±0,5K ± 0,5 % at 25°C, without sensor
±1K ± 0,5 % of scale range (0 – +55°C), without sensor

Outputs
K1...K6: Relay 16(2,2) A, 250 V~, normally-open contact, function see A90…A95
permanent current max. 12(2,2)A, limited by connectors and/or conductive strips

Display
One 4-digit LED-display, 13 mm height, for temperature indication and status messages
Five LEDs, diameter 3mm, for status of the control circuits 1, 2, 3, 4 as well as indication of activated upper heat

Power supply
230 V +/-10 %, 50/60 Hz
power consumption max. 5 VA

Ambient conditions

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

Connectors
plug and socket, for cables up to 2,5 mm²

Enclosure
IP65

Installation data
The unit is foreseen to be installed in an instrument panel.

Front size:	158 x 49 mm
Installation size:	180 x 71 mm
Installation depth:	ca. 160 mm