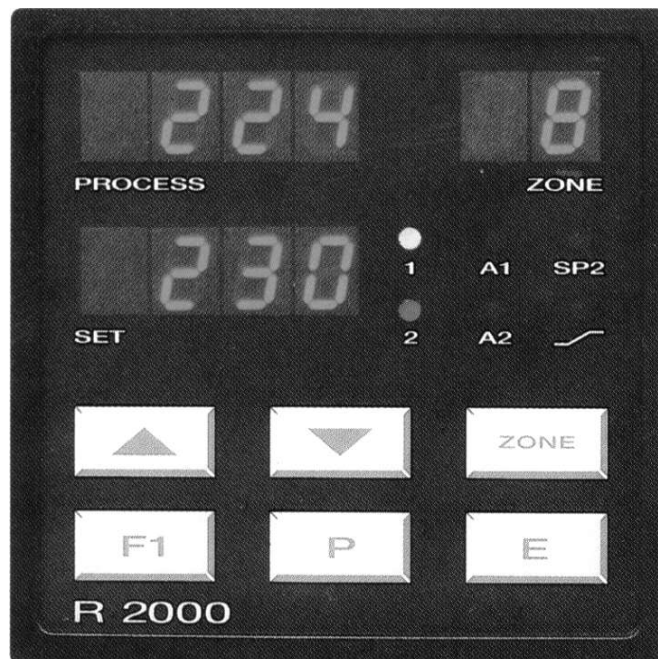


**R 2000 - 42x**  
**4 - Zones „heat-only“ Temperature Controller**

**R 2000 - 62x**  
**6 - Zones „heat-only“ Temperature Controller**

**R 2000 - 82x**  
**8 - Zones „heat-only“ Temperature Controller**



Format: 96 x 96 mm (1/4-DIN)  
Installation depth: 122 mm

## **DESCRIPTION AND OPERATING MANUAL**

Nr.: R2-82Z-E 06/96

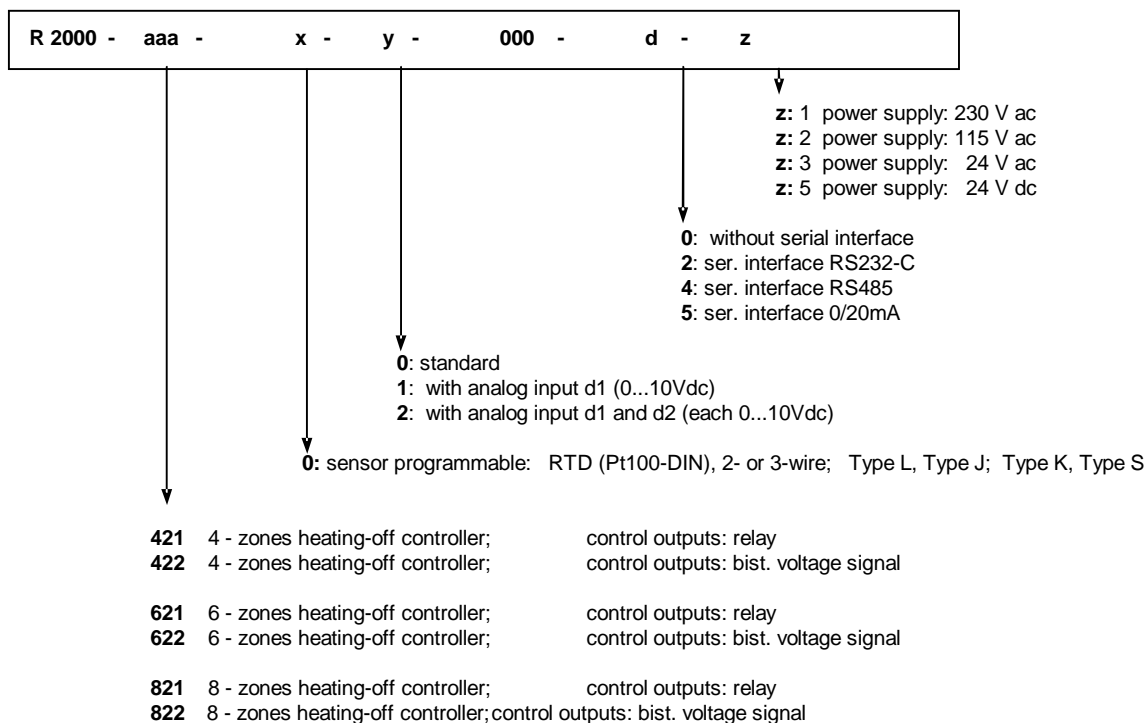
## Contents

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Connection diagram, bist. voltage control outputs		4	R2000 -422, -622, -822
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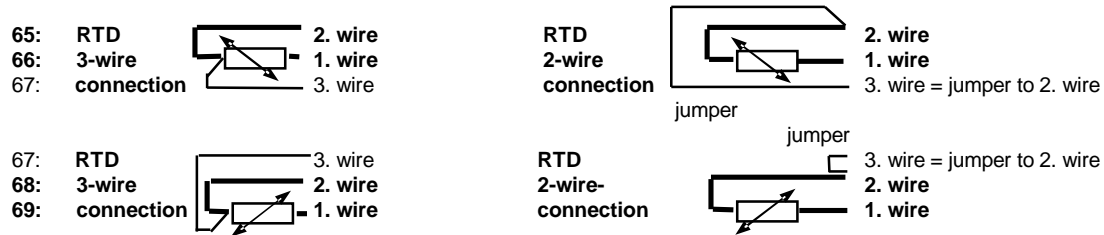
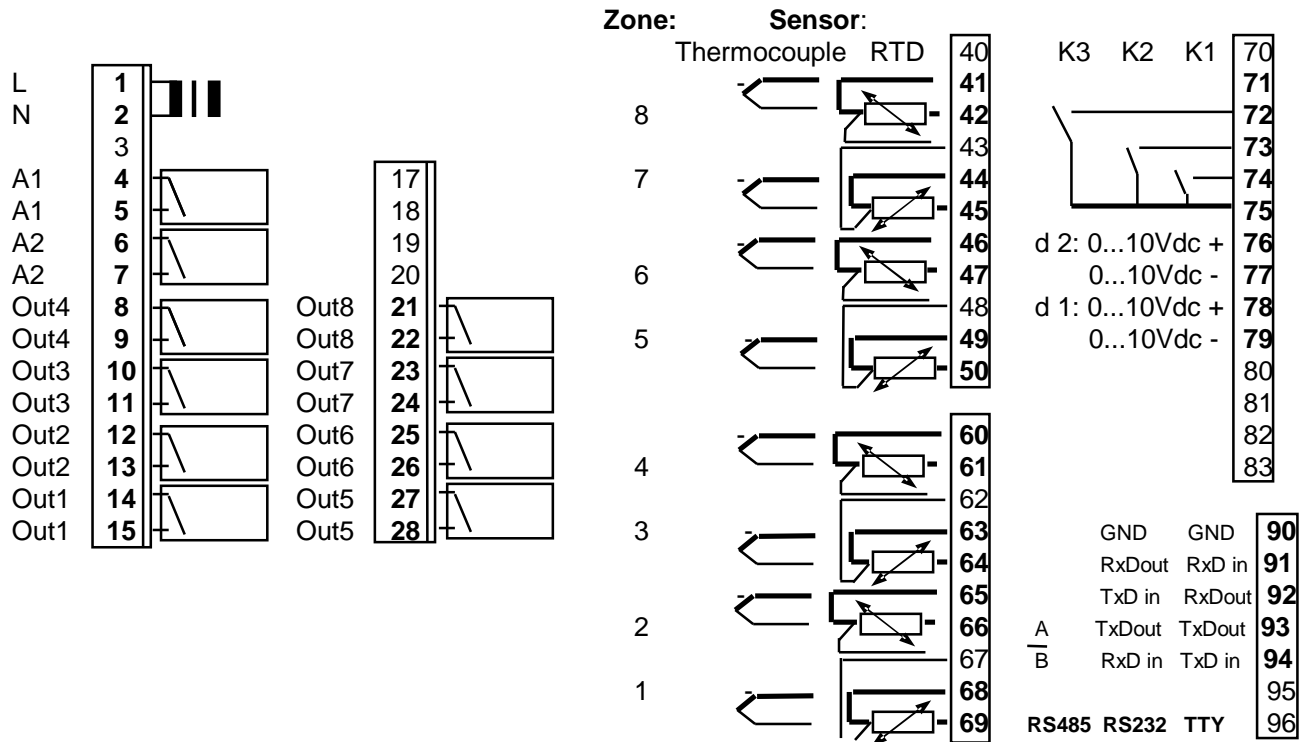
**Please read this operating manual carefully before starting up.**

**Observe the installation and connecting instructions.**

## Type code



**Connection Diagram:    R2000-421                      R2000-621                      R2000-821**



**Control output OUT 1:** Zone 1; 2-point-controller  
to  
**Control output OUT 4:** Zone 4; 2-point-controller    R2000-421

to  
**Control output OUT 6:** Zone 6; 2-point-controller    R2000-621

to  
**Control output OUT 8:** Zone 8; 2-point-controller    R2000-821

**Alarm Output A1:** Alarm 1 ( Temperature alarm A1 for all zones)  
**Alarm Output A2:** Alarm 2 ( Temperature alarm A2 for all zones)

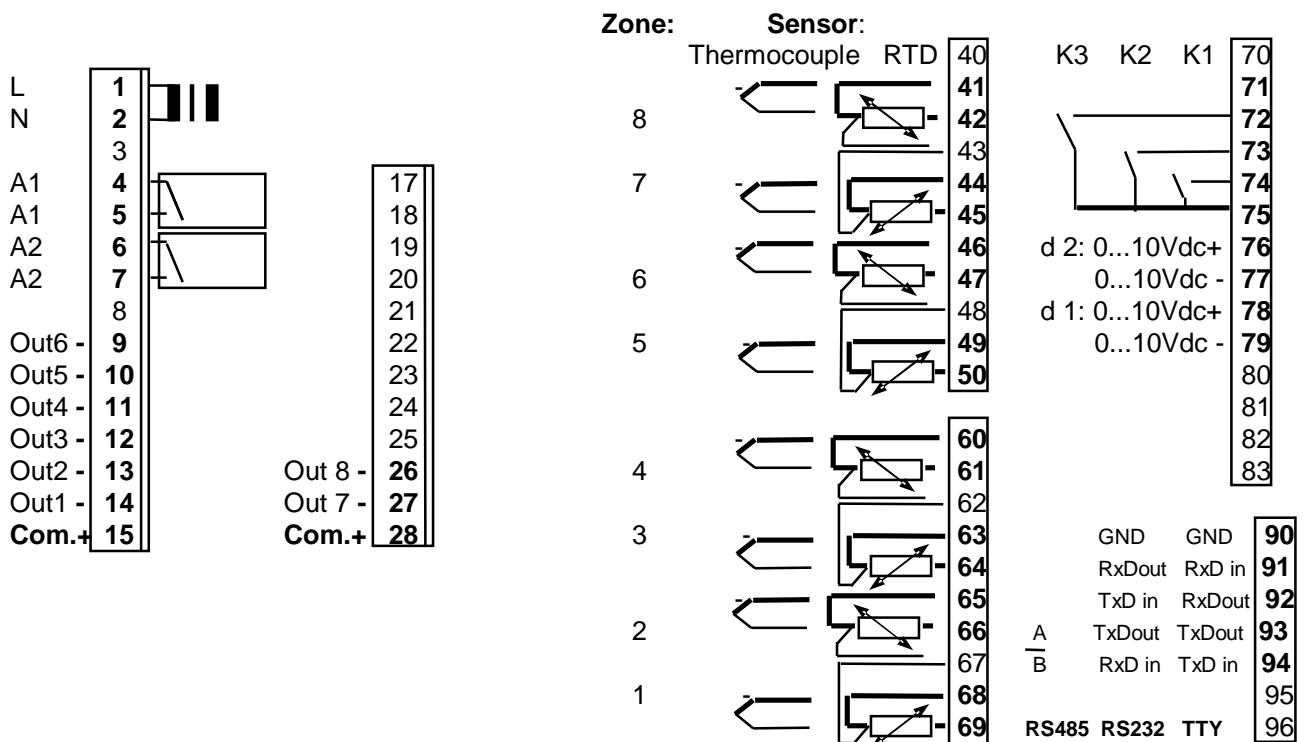
**Input d1:** 0 ... 10 Vdc, OPTION    Zone: d1  
**Input d2:** 0 ... 10 Vdc, OPTION    Zone: d2

**Setpoint Controlling:** K1: open = Setpoint 1 (SP1) valid  
K1: closed = Setpoint 2 (SP2) valid, for all zones

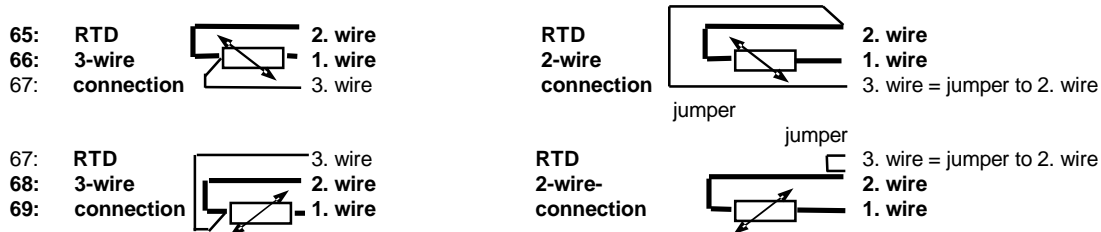
**Adjustment lock (LOC):** K2: open = Adjustment lock only via „software code“ (see parameter: LOC)  
K2: closed = Adjustment locked according to the choosen „software code“.

**Setpoint changing:** K3: open = individual setpoint adjustment for each zone  
K3: closed = if setpoint has been changed in one zone,  
this new setpoint is valid (will be overtaken) for all other zones automatically.

**Connection Diagram: R2000-422 R2000-622 R2000-822**



It is not permitted to connect the grounds of the sensor-inputs and bist. voltage-outputs with each other.



**Control output OUT 1:** Zone 1; 2-point-controller to

**Control output OUT 4:** Zone 4; 2-point-controller R2000-422

to

**Control output OUT 6:** Zone 6; 2-point-controller R2000-622

to

**Control output OUT 8:** Zone 8; 2-point-controller R2000-822

**Alarm Output A1:** Alarm 1 ( Temperature alarm A1 for all zones)

**Alarm Output A2:** Alarm 2 ( Temperature alarm A2 for all zones)

**Input d1:** 0 ... 10 Vdc, OPTION Zone: d1

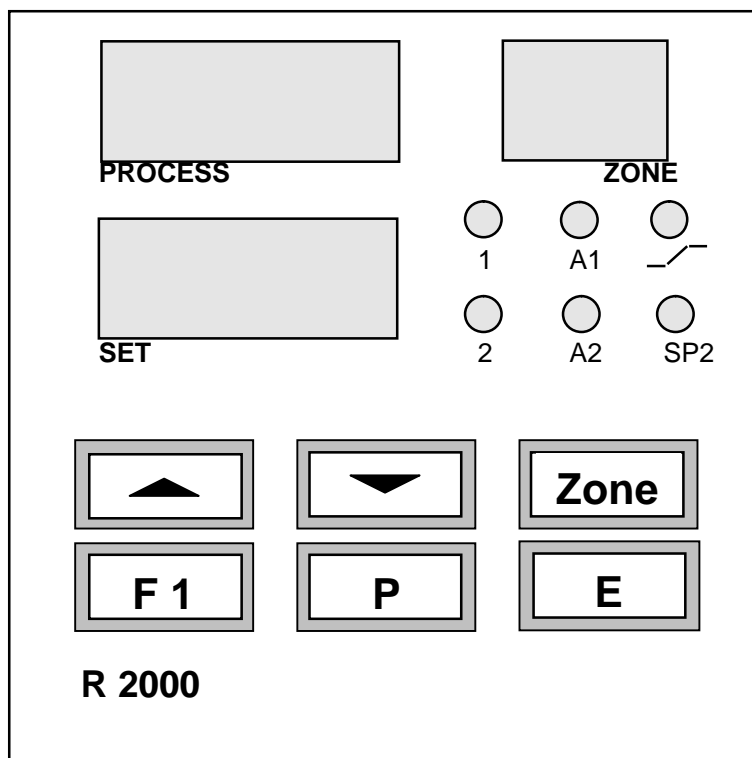
**Input d2:** 0 ... 10 Vdc, OPTION Zone: d2

**Setpoint Controlling:** K1: open = Setpoint 1 (SP1) valid  
K1: closed = Setpoint 2 (SP2) valid, for all zones

**Adjustment lock (LOC):** K2: open = Adjustment lock only via „software code“ (see parameter: LOC)  
K2: closed = Adjustment locked according to the choosen „software code“.

**Setpoint changing:** K3: open = individual setpoint adjustment for each zone  
K3: closed = if setpoint has been changed in one zone, this new setpoint is valid (will be overtaken) for all other zones automatically.

## Display and Keyboard



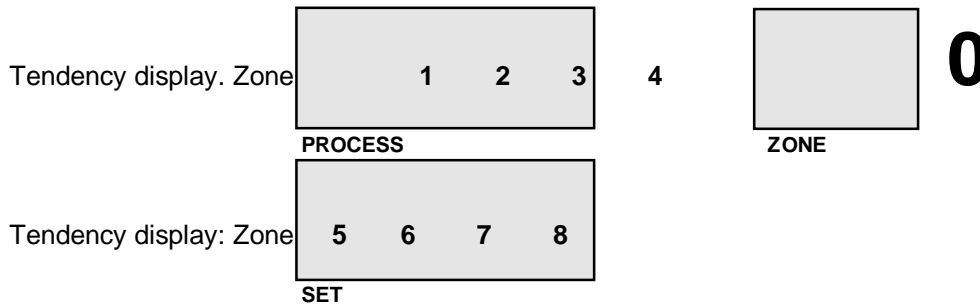
**LED 1:** Control output „heating“ of the choosen zone active  
**LED A1:** Alarm output A1, indication  
**LED A2:** Alarm output A2, indication

**LED 2:** Out of operation  
**LED  $\overline{\text{SP}}$ :** Setpoint ramp of the choosen zone active  
**LED SP2:** Setpoint 2 valid (for all zones)

<b>ZONE</b>	Zone preselection
<b>P</b>	Parameter key (parameter preselection)
▲	Adjustment of chosen parameter (e.g. setpoint) to higher or lower values.
▼	Short operation: single-step adjustment Longer operation: quick-scanning When the parameter adjustments have been altered but not entered, the display will flash bright/dark.
<b>E</b>	Confirmation and storage of the pre-selected values. The display will show a light chain as a control of this function.
<b>P</b>	Sets the parameter back to the originally stored value. Any alterations made to the parameters, that are not confirmed (E-key) within 30 seconds, will not be accepted and the parameter will return to its originally stored value. The actual process value and the setpoint value will be indicated.
<b>F1</b>	Function key, E. g. all zones are displayed cyclic (zone scanning on/off). Zones, which are not in action (OFF), are not displayed. The function of this key can be programmed into the configuration level of zone 0. See parameter „Co.F1“ (page 9).

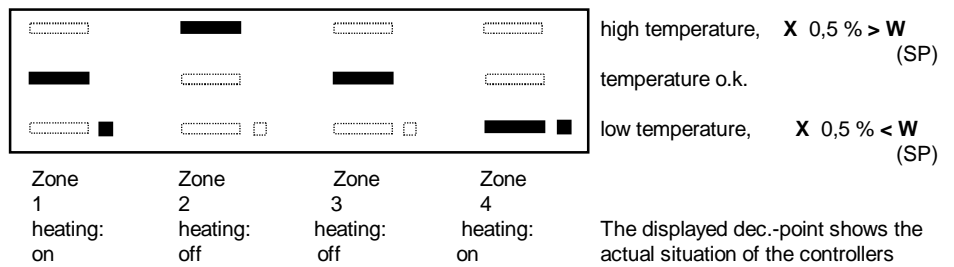
# Tendency Display

After switching the instrument „on“ a temperature tendency display will be shown, to give an overview about the temperatures deviations relating to the setpoints in the individual controller zones.



## Display „PROCESS“:

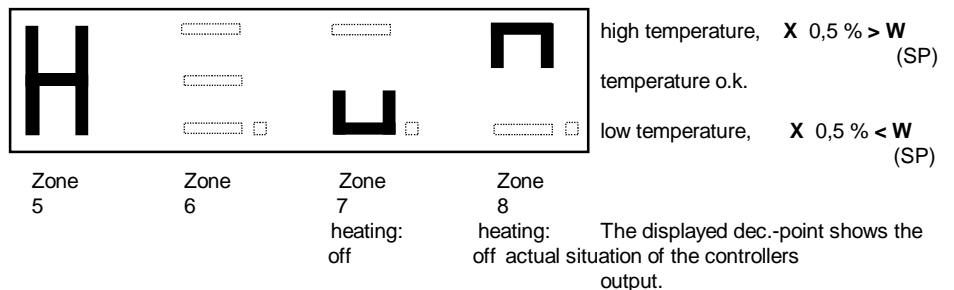
### Temperature deviation zones 1...4:



**Flashing:** Alarm indication in the matching zone

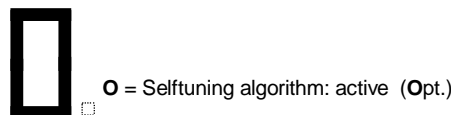
## Display „SET“:

### Temperature deviation zones 5...8:



Zone 5: H = Manual output ratio. Flashing: sensor error  
Zone 6: Zone „OFF“, not in use (display: off)  
Zone 7: Bottom range end has been reached ( sensor error )  
Zone 8: Top range end has been reached ( sensor break, no sensor connected )

**Flashing:** Alarm indication in the matching zone



## Zone scanning:

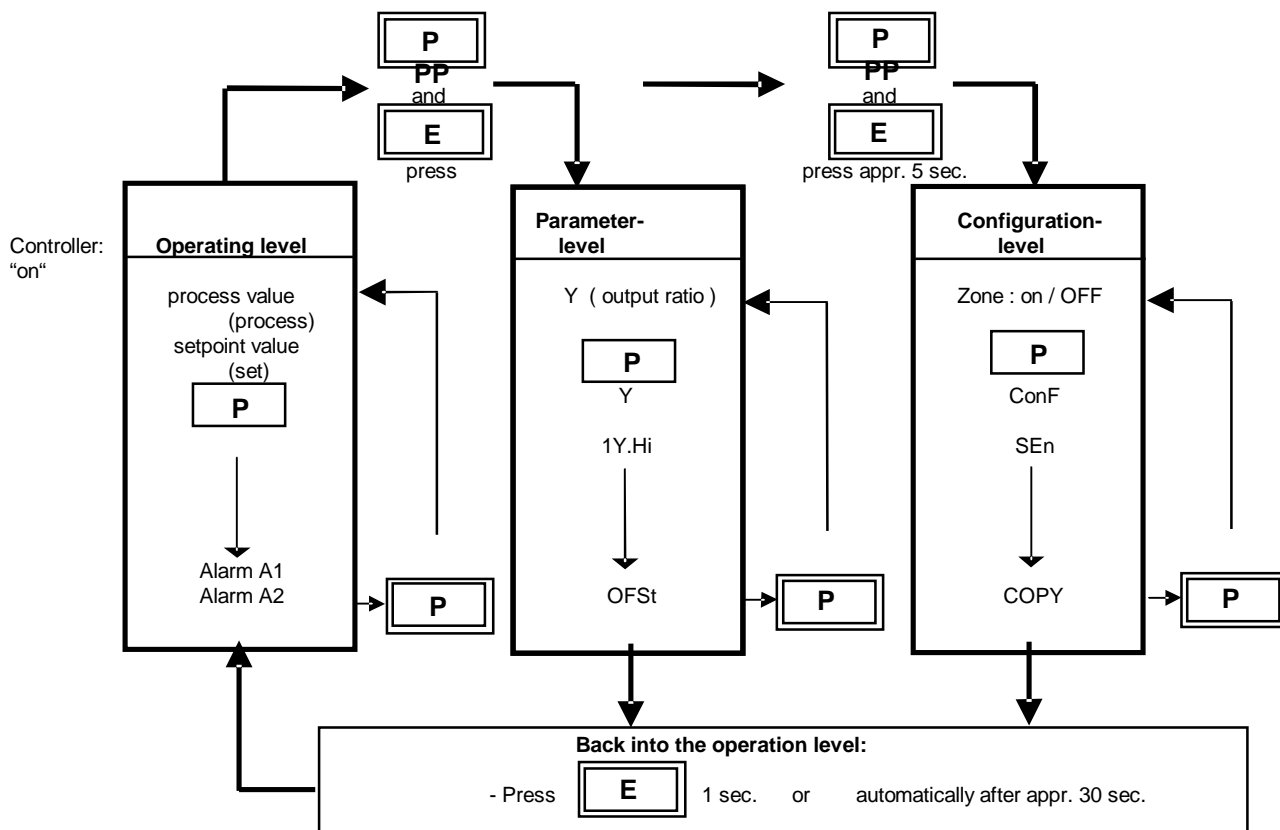
Now ( according to the configuration of key „F1“ ) the process and setpoint values of the individual zones are shown in a scanning mode.

If „F1“ is not configured in this mode (see configuration level) , the individual zones have to be selected manual by pressing key „ZONE“.

## Operating Levels

The operation of the controller is divided into 3 levels.

After switching on the unit, it will be automatically in the operating level.



### Operating level (for each zone separately):

Process- and Setpoint value will be displayed simultaneously. Within the operating level the setpoint can be adjusted by pressing the "▲"/"▼" - keys.

Every adjustment has to be quit by pressing the „E“ - key.

All parameters within the operating level ( including the alarm values ) can , in succession, be displayed by pressing the „P“ - key and adjusted by pressing the "▲"/"▼" - keys. Quit by pressing the „E“ - key.

### Parameter level (for each zone separately):

Within the parameter level the values are adjusted to suit each individual process.

This level is reached by simultaneously pressing the "P" - and "E" -keys.

The display of each single parameter within the parameter level and their adjustment, are made in the same fashion as within the operating level.

After either pressing the „E“ - key for approx. 1 second, or waiting for a period of approx. 30 seconds, the unit will automatically return to the operating level (display of process value and setpoint).

### Configuration level: This primary informations have to be entered before taking the instrument into operation.

The configuration level is reached by simultaneously pressing the "P" - and "E" - keys for a period of approx. 5 seconds.

**First choose the configuration level in zone 0. Here general settings have to be made.**

**This has to be programmed at first:**

- Only TC- or RTD-connection for all zones? Or: Mixed connection ?
- Alarm configuration (valid for all zones) - Function of key „F1“
- Software key - Serial interface informations

**Then choose the configuration level of each individual controller zone.**

**This has to be programmed at second:**

- Controller type (for each zone)
- Input type (sensor type), sensor range (for each zone)
- Min. and max. setpoint range (for each zone)

The display of each single parameter within the configuration level and their adjustment, made in the same fashion as within the operating level.

There is also a copy function available. So it is possible, to copy the programmed parameters of one zone to other zones.

After either pressing the „E“ - key for approx. 1 second, or waiting for a period of approx. 30 seconds, the unit will automatically return to the operating level (display of process value and setpoint).

## Configuration Level, general

( select zone 0 and press „P“ - and „E“ - key appr. 5 sec.  
general settings )

Display "Process"	Parameter	Display „Set“	
P - tc	Sensor mix	-	8,6,4
		2	x
		4	x
		6	x
		8,6,4	-

all zones : prepared for thermocouple - connection  
Zones 1 - 2 : RTD - connection; other zones: Thermocouple connection  
Zones 1 - 4 : RTD - connection; other zones: Thermocouple connection  
Zones 1 - 6 : RTD - connection; other zones: Thermocouple connection  
all zones : prepared for RTD - connection

### Co.A1 Alarm 1-Configuration (switches relay A1)

The selected configuration is effective for all control zones.  
The individual temperature alarms A1 of all zones are connected to the main, common contact A1.  
If a control zone indicates a fault (sensor short circuit / break ), the alarm output A1 is generally switched.

OFF

alarm OFF, no alarm signalisation (ex works)

1

signal contact, setpoint dependend: off-on

2

limit contact, process value dependend: off-on

3

limit comparator: off-on-off

4

signal contact: on-off

5

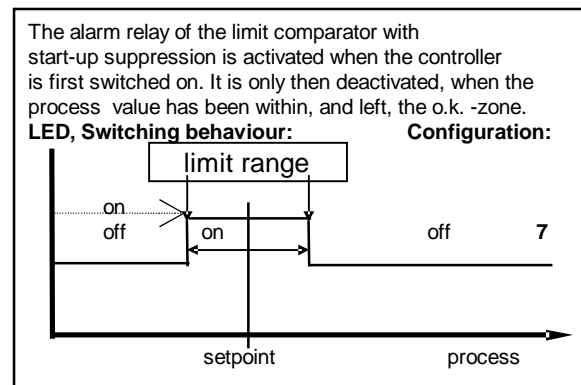
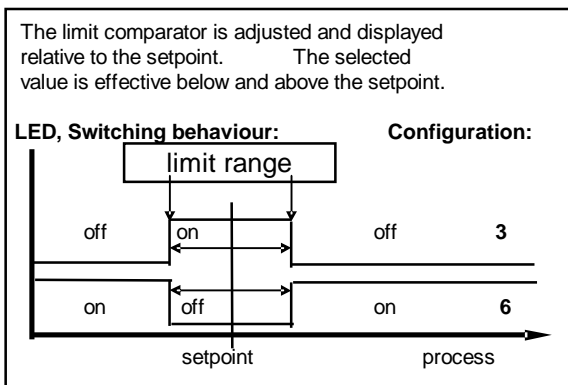
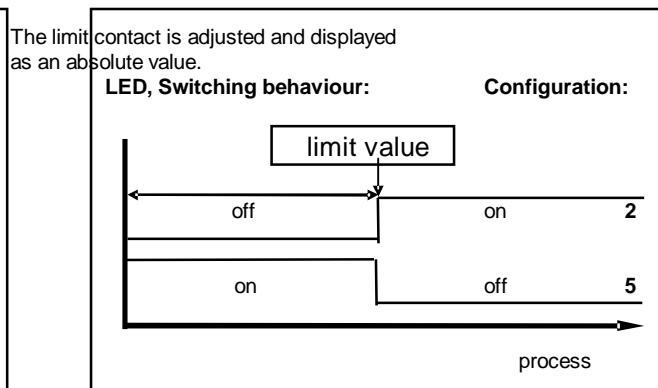
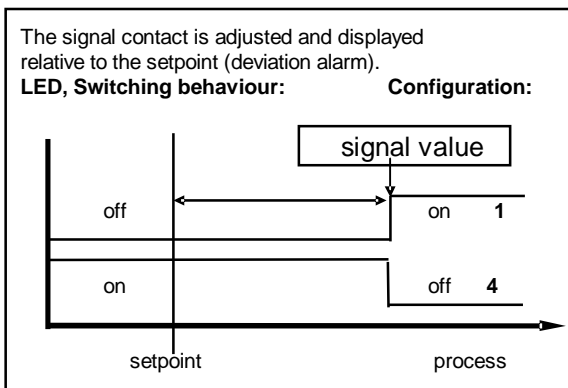
limit contact: on-off

6

limit comparator: on-off-on

7

limit comp. with start-up suppression: off-on-off



### rE.A1 Relay A1 switching behaviour

dir

on: LED A1 „on“. Relay A1 "activated"  
off: LED A1 „off“. Relay A1 "not active"

inv

on: LED A1 „on“. Relay A1 "not active",  
off: LED A1 „off“. Relay A1 "activated",

#### Please note:

In case of sensor error the alarms will react in the same way as range override. The alarm contacts therefore do not offer protection against all types of plant breakdown. With this in mind, we recommend the use of a second, independent monitor unit.

Care should be used to ensure, that the setpoints of the alarm contacts are programmed within the selected measuring range.

If a setpoint ramp has been programmed, the alarms that are relative to the setpoint (signal contact, limit comparator) follow the setpoint up the ramp.

Display "Process"	Parameter	Display „Set“
<b>Co.A2</b>	<b>Alarm 2-Configuration</b> (switches relay A2)	see Co.A1 (alarm 1 - configuration)
<b>rE.A2</b>	<b>Relay A2 switching behaviour</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;">dir</div> <div style="width: 20%;">on: LED A2 „on“. off: LED A2 „off“.</div> <div style="width: 60%;">Relay A2 "activated", Relay A2 "not active",</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 20%;">inv</div> <div style="width: 20%;">on: LED A2 „on“. off: LED A2 „off“.</div> <div style="width: 60%;">Relay A2 "not active", Relay A2 "activated",</div> </div>
<b>Co.F1</b>	<b>Select funktion of key „F1“</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;">OFF SCAN OPt  Y LEd.t</div> <div style="width: 80%;">           No function            Automatically zone-scanning „on“/ „off“.            Selftuning algorithm can be activated by pressing key „F1“            in the matching zone. „F1“ appr. 2sec.: stops selftuning.            Shows the actual percentage output ratio, while pressing „F1“.            Lamp (LED) test, while pressing „F1“.         </div> </div>
<b>LOC</b>	<b>Adjustment lock</b>	<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;">OFF P C n.SP1 ALL</div> <div style="width: 80%;">           no adjustment lock (ex works)            parameter and configuration levels locked            all parameters apart from SP1 locked (<b>not SP1</b>)            all parameters locked            All parameters that have been locked with „LOC“ can be            selected and read, but not altered.            This adjustment cannot be changed if the external contact K2 is closed.         </div> </div>

The following parameters are only valid, if the unit is equipped with a serial interface.		See interface-description: SST2000E																		
<b>Adr</b>	<b>Unit adress</b>	1 .... 255 (ex works: 1) The computer addresses the unit at this adress. Each unit has ist own adress. It is possible to adress 32 units.																		
<b>For</b>	<b>Data format</b>	<table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 30%;">7E1</td><td>7 data, even, 1 stopbit</td></tr> <tr><td>7o1</td><td>7 data, odd, 1 stopbit</td></tr> <tr><td>7E2</td><td>7 data, even, 2 stopbit</td></tr> <tr><td>7o2</td><td>7 data, odd, 2 stopbit</td></tr> <tr><td>7n2</td><td>7 data, none, 2 stopbit</td></tr> <tr><td>8E1</td><td>8 data, even, 1 stopbit</td></tr> <tr><td>8o1</td><td>8 data, odd, 1 stopbit</td></tr> <tr><td>8n1</td><td>8 data, none, 1 stopbit</td></tr> <tr><td>8n2</td><td>8 data, none, 2 stopbit</td></tr> </table>	7E1	7 data, even, 1 stopbit	7o1	7 data, odd, 1 stopbit	7E2	7 data, even, 2 stopbit	7o2	7 data, odd, 2 stopbit	7n2	7 data, none, 2 stopbit	8E1	8 data, even, 1 stopbit	8o1	8 data, odd, 1 stopbit	8n1	8 data, none, 1 stopbit	8n2	8 data, none, 2 stopbit
7E1	7 data, even, 1 stopbit																			
7o1	7 data, odd, 1 stopbit																			
7E2	7 data, even, 2 stopbit																			
7o2	7 data, odd, 2 stopbit																			
7n2	7 data, none, 2 stopbit																			
8E1	8 data, even, 1 stopbit																			
8o1	8 data, odd, 1 stopbit																			
8n1	8 data, none, 1 stopbit																			
8n2	8 data, none, 2 stopbit																			
<b>bAud</b>	<b>Baud rate</b>	OFF; 0,3 ... 9,6 kBaud (ex works: 9,6) The baud rate denotes the transmission rate at which one bit is transmitted.																		

**20xx**  
**EL.xx**    **Control number**            No function. End of configuration level

## Configuration Level

individual selectable for zones 1 ... 8; d1, d2

(select zone n and press „P“ - and „E“ - key appr. 5 sec.)

Display "Process"	Parameter	Display „Set“	
<b>Zone</b>	<b>Zone on / off</b>	OFF on	measuring- or controller zone „off“ measuring- or controller zone „on“
<b>ConF</b>	<b>Controller configuration</b>	2P h 2P c 2Pnc  diSP	2-point-controller „heating-off“ (ex works) 2point-controller „cooling-off“ 2point-controller „cooling-off“ with non-linear cooling *) *) non-linear cooling: Cooling action can be pre-selected with either linear or non-linear cooling response curve ( e.g. for vapour cooling). Zone works as an indicator, no controller action
<b>SEn</b>	<b>Sensor selection</b>	P1 °C P1 °F P2 °C P2 °F P4 °C P4 °F P8 °C P8 °F	Pt 100, -50,0...100,0 °C Pt 100, -58,0...212,0 °F Pt 100, -90,0...205,0 °C Pt 100, -130... 401 °F Pt 100, 0... 400 °C (ex works) Pt 100, 32... 752 °F Pt 100, 0... 800 °C Pt 100, 32...1472 °F

or, if selected as a thermocouple-input zone (depending on parameter „P - tc“ in Zone 0):

L4 °C	T/C Fe-CuNi (L),	0... 400 °C
L4 °F	T/C Fe-CuNi (L),	32... 752 °F
L8 °C	T/C Fe-CuNi (L),	0... 800 °C
L8 °F	T/C Fe-CuNi (L),	32... 1472 °F
J8 °C	T/C Fe-CuNi (J),	0... 800 °C
J8 °F	T/C Fe-CuNi (J),	32... 1472 °F
n1 °C	T/C NiCr-Ni (K),	0... 1200 °C
n1 °F	T/C NiCr-Ni (K),	32... 2192 °F
S1 °C	T/C Pt10Rh-Pt (S),	0... 1600 °C
S1 °F	T/C Pt10Rh-Pt (S),	32... 2912 °F

If the Sensor selection have been changed, the following parameters will be set as follows and need to be re-adjusted:

Setpoint 1, setpoint 2:	SP.Lo	Process value offset:	OFF
Lower setpoint limitation:	Bottom range end;	Higher setpoint limitation:	Top range end;
Setpoint-ramp values:	OFF;	Alarm values:	OFF;

OPTION: The following parameters are only valid for zones d1 and d2 (Input: 0...10 Vdc).

It is to configurate the display range of the 0...10 Vdc inputs.

The difference between the bottom end of the display range and the top end must amount to a minimum of 100 units and a maximum of 2000 units. By adjustment of one of the above parameters, the other in this case will automatically follow.

<b>rA.SP</b>	<b>decimal points</b>	0; 1; 2	(ex works: 1)
<b>rA.Lo</b>	<b>display range bottom end</b>	-1999 ... rA.Hi	(ex works: 0,0)
<b>rA.Hi</b>	<b>display range top end</b>	rA.Lo ... 9999	(ex works: 100,0)
<b>unit</b>	<b>selectable physical. unit</b>	shown in the display „set“	( e.g. : °C, °F, bar, volt ... )

**SP.Hi** **higher setpoint limitation** programming range: SP.Lo ... top range (ex works: 400)

**SP.Lo** **lower setpoint limitation** programming range: bottom range ... SP.Hi (ex works: 0)

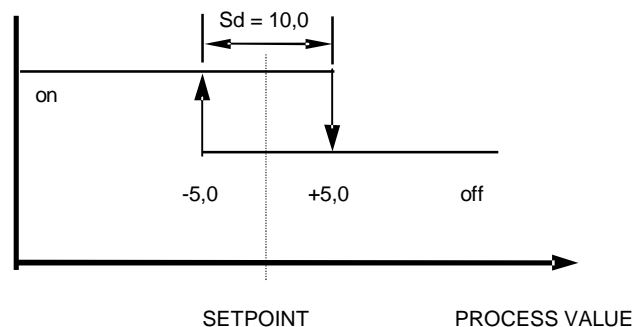
**COPY** **Copy function** to 1 ... to x Copy all parameter values of the actual zone to the selected zone x. Select the target zone (1,2 .... or „to A“ (to all) with the „up/down“ - keys and press „E“ (enter). After this, the datas would be copied.  
**Note:** It is only possible to copy the configuration, if the sensor configuration ( Parameter: P - tc ) in the target-zone is the same as in the actual zone. This means, that it is not possible, to copy configurations of e.g. RTD-input zones to thermocouple-input zones.



## Parameter Level

individual selectable for zones 1 ... 8, d1, d2  
(select zone n and press „P“ - and „E“ - key appr. 1 sec.)

Display "Process"	Parameter	Display „Set“	
Y	<b>valid output ratio</b>	-100...100 %	The output ratio shows the momentary calculated ratio. It cannot be altered. The display is in percent of the installed performance capability for heating or cooling. Output ratio for cooling is shown as a negative value.
1Y.Hi	<b>output ratio limit</b>	0...100 %	(ex works: 100) Limitation of the output ratio is only necessary when: the heating or cooling energy supply is grossly over-dimensioned compared to the power required, or to turn off a control output (setting = 0%). under normal circumstances no limitation is needed (setting = 0%). the limitation becomes effective, when the controllers' calculated output ratio is greater than the maximum permissible (limited) ratio. <b>Warning!</b> The output ratio limitation does not work during autotune.
1 P	<b>Xp prop. band (P)</b>	OFF; 0,1...100,0 % If „ 1 P “ = OFF (control action: on-off, without feedback) next parameter: „ 1 sd “.	(ex works: 3,0)
1 d	<b>Tv rate (D)</b>	OFF; 1...200 secs	(ex works: 30)
1 J	<b>Tn reset (I)</b>	OFF; 1...1000 secs	(ex works: 150)  Normally the controller works using PD/I control action. This means, controlling without deviation and with practically no overshoot during start-up. The control action can be altered in its structure by making the following adjustments to the parameters: a. no control action, on-off (setting P = OFF) b. P-action (setting D and I = 0) c. PD-action (setting I = 0) d. PI-action (setting D = 0) e. PD/I modified PID-action
1 CY	<b>Cycle time</b>	0,5...240,0 secs	(ex works: 10,0) The switching frequency of the actuator can be determined by adjusting the cycle time. This is the total time needed for the controller to switch on and off once. a) Relay outputs: cycle time > 10 secs b) Bistable voltage outputs: cycle time 0,5...10 secs
1 Sd	<b>Control sensitivity</b>	OFF; 0,1...80,0°C	(ex works: 0,1) Only if: 1 P = Xp = OFF (On-off action, without feedback)



Display "Process"	Parameter	Display „Set“
<b>OPt</b>	<b>self tuning</b> (autotune)	on
		OFF self tuning out of action self tuning on request ( one time)

The tuning algorithm determines the characteristic values within the controlled process, and calculates the valid feedback parameters ( P,D,I ) and the cycle time (  $C = 0.3 \times D$  ) of a PD/I-controller for a wide section of the range.

The self tuning activates during start-up shortly before the setpoint is reached. The setpoint must amount to the least 5% of the total range.

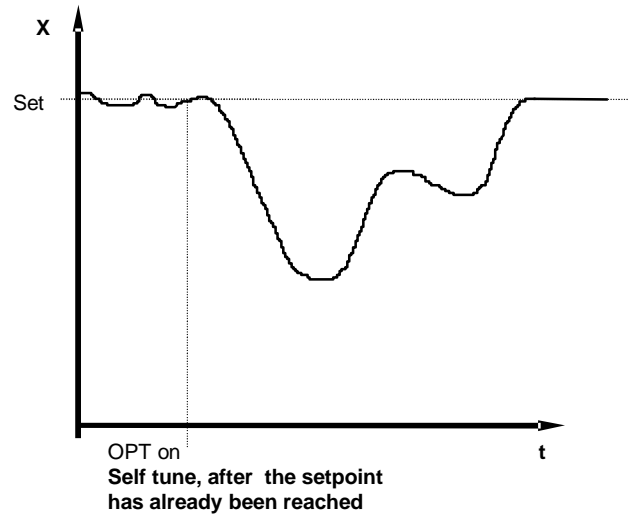
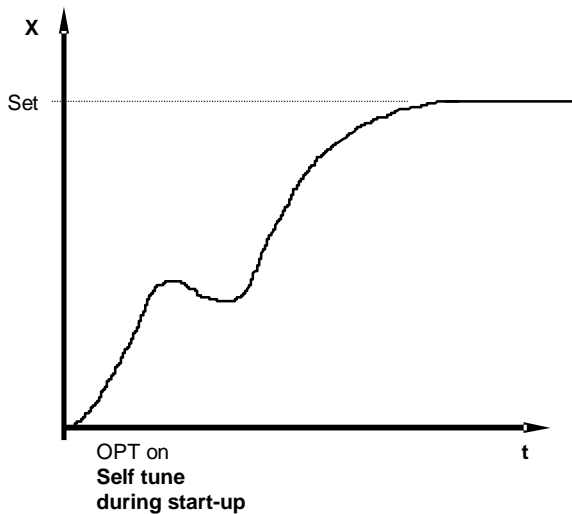
If activated after the setpoint has already been reached, the temperature will first drop by approx. 5% of the total range, in order to detect the exact amplification of the process.

The tuning algorithm can be activated at any time by selecting the **OPT=on** and pressing the „E“-key.

Zone display: During self tuning „OPt“ is shown in the set-display, alternating with the setpoint value.

Tendency display: „O“ is shown.

After having calculated the correct feedback parameters, the controller will lead the process value to the setpoint.



Self-tuning can be stopped by selecting the option **OPT = OFF** and pressing the „E“ - key.

<b>OFSt</b>	<b>process value offset</b>	-999 ... OFF ...1000 Units (ex works: OFF)
		-99,9 ... OFF ... 100,0

This parameter serves to correct the input signal, e.g. for:

- the correction of a gradient between the measuring point and the sensor tip,
- the line resistance balancing of 2-line RTD (Pt100) sensors and
- correction of the control deviation when using P- or PD-action.

If for example the offset value is set to +5°C, then the real temperature measured by the sensor (when process is balanced) is 5°C less than the setpoint and the displayed process value.

## Operating Level

( individual selectable for zones 1 ... 8 )

Display "Process"	Parameter	Display „Set“
----------------------	-----------	------------------

**Process**  
(process)

and

Setpoint 1 (set)	SP.Lo...SP.Hi	(ex works: 0)
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are displayed simultaneously (basic setting) in the selected zone.

SP2	Setpoint 2	OFF; SP.Lo SP.Hi	(ex works: OFF)
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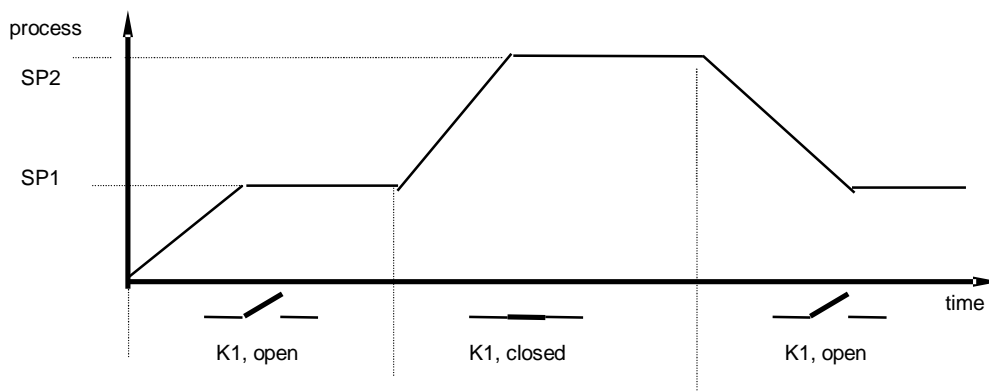
The 2. setpoint is active when the external contact K1 is closed.

The corresponding LED „SP2“ lights up on the faceplate, and the second setpoint is shown in the setpoint-display. In order to change the value the parameter SP2 has to be selected.

SP1	rising ramp	OFF; 0,1...100,0	°C/min. or °F/min.	(ex works: OFF)
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SP1	falling ramp	OFF; 0,1...100,0	°C/min. or °F/min.	(ex works: OFF)
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A programmed ramp is always activated when the setpoint is altered or when the mains supply is switched on. The ramp constructs itself out of the momentary process value and the pre-selected setpoint. If the ramp is active, the corresponding LED lights up on the faceplate. The ramp can be activated for both setpoint1 and setpoint2. By programming the second setpoint accordingly a setpoint profile can be obtained (please see example below).



A1	Alarm value 1, switching point (switches relay A1)	signal contact, limit comparator, limit contact OFF; -999... 1000 °C/°F (ex works) OFF; -99,9... 100,0 °C/°F OFF; 0... 1000 °C/°F
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A2	Alarm value 2, switching point (switches relay A2)	signal contact, limit comparator, limit contact OFF; -999... 1000 °C/°F (ex works) OFF; -99,9... 100,0 °C/°F OFF; 0... 1000 °C/°F
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The range of adjustment is dependant on the sensor and the alarm configuration. Both have to be set in the configuration level.

## Operating Level, OPTION

( only inputs zone d1 and d2 )

Display "Process"	Display „Zone“
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input d1	d1	Display 1:	0...10 Vdc, corresp. the progr. range	(ex works: 0...100)
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input d1	d2	Display 2:	0...10 Vdc, corresp. the progr. range	(ex works: 0...100)
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## Technical Data

<b>Input RTD, Pt 100 (DIN):</b>	2 - or 3 - wire connection possible. Built-in protection against sensor breakage and short circuit. Max. permissible line resistance by 3-wire connection: 80 Ohms Sensor current: $\leq 1$ mA Calibration accuracy: $\leq 0,2$ % Linear error: $\leq 0,2$ % Influence of the ambient temperature: $\leq 0,01$ % / K
<b>Input Thermocouple:</b>	Built-in internal compensation point and protection against sensor breakage and incorrect polarity. Re-calibration not required for a line resistance of up to 50 Ohms. Calibration accuracy: $\leq 0,25$ %
<b>Analoge input (Option):</b>	0 ... 10 V dc (Display range programmable)
<b>Setpoint selection:</b>	Ext. potential-free contact, switching voltage appr. 24 V dc, max. 1 mA. Selection between SP1 and SP2 valid for all zones.
<b>Control outputs OUT 1 ... OUT 8:</b>	Bist. voltage signal, 0/18 V dc, max. 10 mA, short-circuit proof or Relay, max. 250 Vac, max. 3 A (cos-phi = 1)
<b>Alarm outputs A1 and A2:</b>	Relay, max. 250 Vac, max. 3 A (cos-phi = 1)
<b>7-Segment-Display:</b>	Process: 10 mm red, Set: 10 mm red
<b>Data protection:</b>	EAROM
<b>CE - Mark:</b>	EMC tested according to 89 / 336 / EEC EN 50081-2, EN 50082-2
<b>Power supply:</b>	230 V ac, $\pm 10$ %, 48...62 Hz
<b>Connections:</b>	Screw terminals, Protection mode IP 20 (DIN 40050), Insulation class C
<b>Permissible operating conditions:</b>	Operating temperature: 0...50 °C / 32...122 °F Storage temperature: -30...70 °C / -22...158 °F Climate class: KWF DIN 40040; equivalent to annual average max. 75 % rel. humidity, no condensation
<b>Casing:</b>	Format: 96 x 96 mm (DIN 43700), installation depth 122 mm Panel cutout: 92 +0,5 mm x 92 +0,5 mm Material: Noryl, self-extinguishing, non-drip, UL 94-V1 Protection mode: IP 20 (DIN 40050), IP 50 front side
<b>Weight:</b>	app. 800 g

Subject to technical improvements!

## Error displays

Display	Cause	Possible remedy
SP.Lo	Lower setpoint limit has been reached	Reduce limit, if need be
SP.Hi	Upper setpoint limit has been reached	Increase limit, if need be
LOC	Parameter has been locked	Unlock, if need be
Er.Hi	Top range end has been exceeded, sensor defect	Check sensor and cable
Er.Lo	Bottom range end has been exceeded, sensor defect	Check sensor and cable
Er.OP	Self tuning error	Extinguish error signal by pressing the „E“-key. Check the self tuning conditions and restart.
Er.SY	System error	Extinguish error signal by pressing the „E“-key. Check all parameters. If the error signal continues please send the controller for examination.
Co.A1	Alarmconfiguration of alarm A1: OFF	No alarm signal available
Co.A2	Alarmconfiguration of alarm A2: OFF	No alarm signal available
-no- -PA-	Parameter not available in this zone.	

## Installation Instructions

Make certain that the devices described here are used only for the intended purpose.  
They are intended for installation in control panels.  
The controller must be installed so that it is protected against impermissible humidity and severe contamination.  
In addition, make sure that the permitted ambient temperature is not exceeded.

**The electrical connections must be made according to the relevant locally applicable regulations.**

If using a thermocouple sensor, the compensation cables must be laid directly to the controller terminals.  
Transducers must be connected only in compliance with the programmed range.

Transducer cables and signal lines (e.g. logic or linear voltage outputs) must be laid physically separated from control lines and mains voltage supply cables (power cables).  
Spatial separation between controller and inductive loads is recommended.  
Interference from contactor coils must be suppressed by connecting adapted RC-combinations parallel to the coils.  
Control circuits (e.g. for contactors) should not be connected to the mains power supply terminals of the controller.

### IMPORTANT:

**Before operation, the unit must be configured for its intended purpose**

(e.g. controller type, sensor type and range, alarm adjustment etc.)

Please see „Configuration Level“.

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