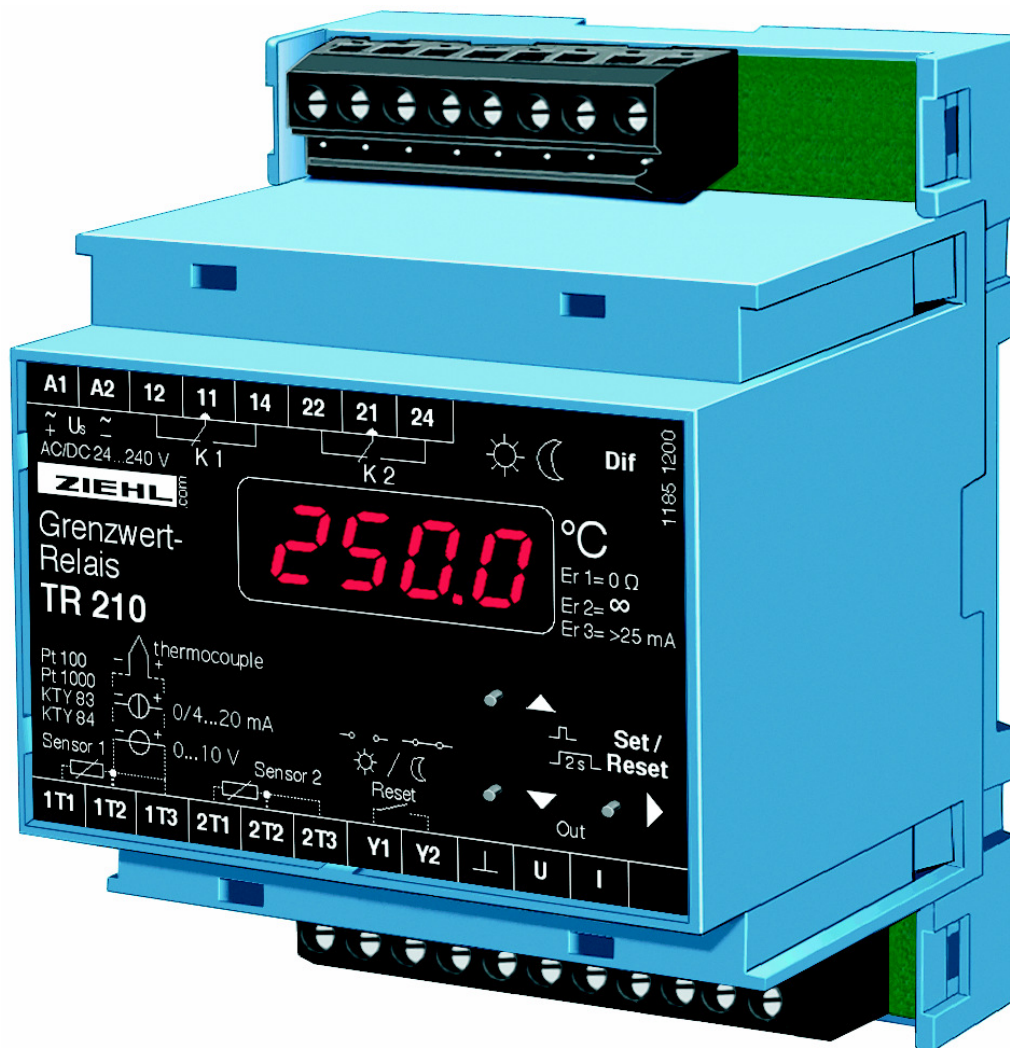


# Operating manual

## Limit Value Switch TR 210



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# Application and Short description

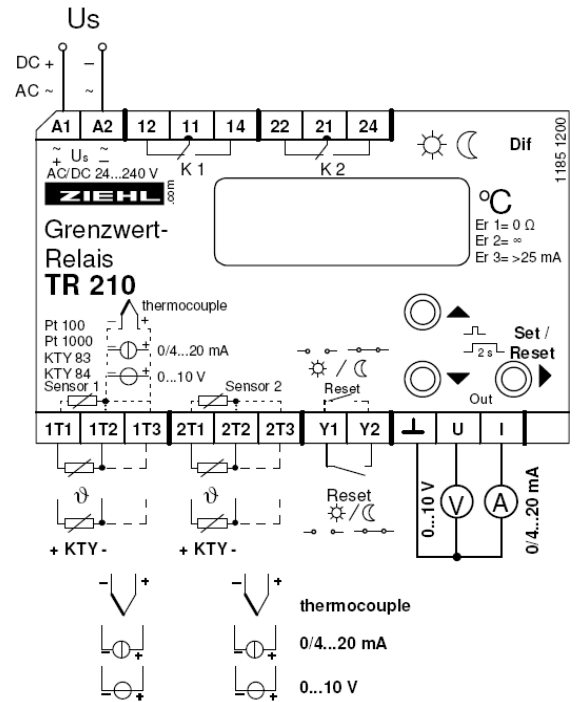
Control units type TR 210 control up to 2 limit values.  
The TR 210 is used as:

- General temperature protection of machines and installations
- Temperature control unit, also for cooling applications
- Difference temperature controller unit for air-conditioning technology

## Overview of functions

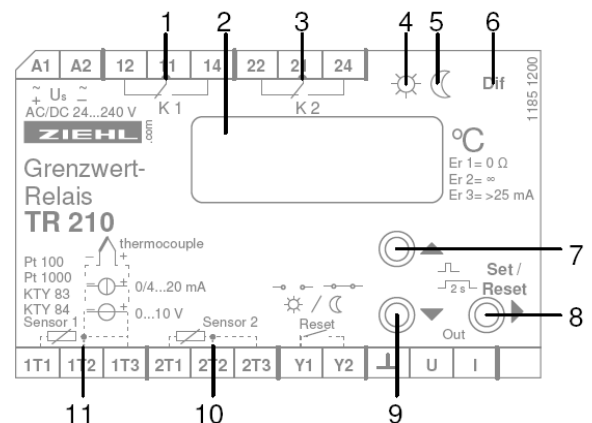
- 2 Sensor inputs:
  - Pt 100, Pt 1000, KTY 83 or KTY 84 in 2- or 3-wire configuration
  - Thermocouples Type B, E, J, K, L, N, R, S, T
  - Input signal DC 0-10 V; DC 0/4-20 mA
- 0,1 °C resolution between -199,9...999,9 °C
- 2 Relay outputs (each 1 change-over contact)
- 1 Analogue output DC 0-10 V or 0/4-20 mA parameterizable (not potentially separated from the inputs)
- Universal power supply AC/DC 24-240 V
- Several selectable programs
- Storage and indication of the measured MIN- und MAX-values
- pluggable terminals

## Connection Plan



## Display and operation parts

- |        |                              |
|--------|------------------------------|
| 1, 3   | LEDs state of relay          |
| 2      | Digital display, 4 digits    |
| 4, 5   | LEDs day/night switching     |
| 6      | LED measuring of differences |
| 7      | Up pushbutton                |
| 8      | Pushbutton set/reset         |
| 9      | Down pushbutton              |
| 10, 11 | LEDs sensor                  |



## Programs

9 programs (Pr), that are preset ex works, can be selected. Due to these programs, the device can be adapted very easily to the application.

Choose the program, which fits to your application and after that change the parameters! In case of changing the program, each parameter is being resetted to "factory setting". (see chart " factory setting")

Choosing the programs:

When applying the power supply hold the pushbutton Set for 10 s. Then the program (Pr 1 ... Pr 9) can be selected with the pushbuttons up/down and confirmed with Set.

| Pr | Input                   | Limit value                  |
|----|-------------------------|------------------------------|
| 1* | 1 temperature sensor    | 2                            |
| 2  | 2 temperature sensors   | 1 per sensor                 |
| 3  | 1 temperature sensor    | 2 day and 2 night            |
| 4  | 2 temperature sensors   | 1 day and 1 night per sensor |
| 5  | 2 temperature sensors   | 2 difference temperature     |
| 6  | 1x 0-10 V or 0/ 4-20 mA | 2                            |
| 7  | 2x 0-10 V or 0/ 4-20 mA | 1 per input                  |
| 8  | 2x 0-10 V or 0/4- 20 mA | 2 difference                 |
| 9  | 2 temperature sensors   | 2 MIN/MAX                    |

\* factory setting

### Please note:

Pr 1, 2, 5-9: Y1 / Y2 = remote – reset (external)

Pr 3+4: Y1 / Y2 = switching day / night

## Important Information

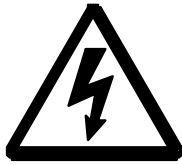
To use the equipment flawless and safe, transport and store properly, install and start professionally and operate as directed.

Only let persons work with the equipment who are familiar with installation, start and use and who have appropriate qualification corresponding to their function. They must observe the contents of the instructions manual, the information which are written on the equipment and the relevant security instructions for the setting up and the use of electrical units.

The equipments are built according to DIN / EN and checked and leave the plant according to security in perfect condition. To keep this condition, observe the security instructions with the headline „Attention“ written in the instructions manual. Ignoring of the security instructions may lead to death, physical injury or damage of the equipment itself and of other apparatus and equipment.

If, in any case the information in the instructions manual is not sufficient, please contact our company or the responsible representative.

Instead of the industrial norms and regulations written in this instructions manual valid for Europe, you must observe out of their geographical scope the valid and relevant regulations of the corresponding country.



### **ATTENTION**

**Dangerous electrical voltage!  
May lead to electrical shock and burn.  
Before beginning of work switch unit and equipment free of voltage.**

**Observe the maximum temperature permissible when installing in switching cabinet. Make sure sufficient space to other equipment or heat sources. If the cooling becomes more difficult e.g. through close proximity of apparatus with elevated surface temperature or hindrance of the cooling air, the tolerable environmental temperature is diminishing.**

### **Attention! Connecting the temperature sensors**

The temperature sensors are connected to the clamps 1T1, 1T2, 1T3 and so on. These pluggable terminals have a special contact material and may only be used for the connection of the sensors.

When connecting 2 thermocouples they must be isolated from each other.

### **Attention! Universal power supply**

The unit is equipped with an universal power supply, that is suitable for DC- and AC-voltages. Before connecting the unit to the current, make sure that the allowed scope of voltage of the control voltage  $U_s$ , written on the lateral type plate, corresponds to the supply voltage of the unit.



### **Attention!**

**When all relays are programmed in operation current mode (= pick up at alarm), a loss of the supply voltage or an instrument failure can remain unidentified.**

**When the relay is applied as control instrument, the operator must ensure, that this error is recognized by regular examinations.**

**We recommend to program and accordingly evaluate at least one relay in the closed-circuit current mode.**

## Installation

The unit can be installed as follows:

- Installation in switchgear cabinet on 35 mm mounting rail according to EN 60715
  - With screws M4 for installation on walls or panel. (additional latch included in delivery)
- Connection according to connection plan or type plate.

## Putting into operation

Decimal point behind the last digit:

- Off = display mode, displays values of measuring inputs
- On = menu mode, select the menu items
- blinking = parameter setting mode

### Display mode

Indication of the current sensor temperature. The temperature is shown in degrees centigrade. The indication for voltage (0-10 V) and current (0/4-20 mA) can be scaled.

#### LED relay (K1, K2)

ON = relay picked up

#### LED sensor

ON = appropriate value in the display  
flashes = sensor error

#### Function of buttons UP/DOWN

Push short change into menu mode  
Push for > 2 s Display of the stored MIN- or MAX-values of the chosen sensor

#### Function button SET/RESET

Push short  
two sensors Display sensor 1 / sensor 2 (/ difference)  
one sensor Display sensor / alarm limit 1 / alarm limit 2  
Push for 2 s Reset restart interlock  
Push for 4 s Display of chosen program  
Push for 10 s Display of software version

### Menu mode (Decimal point behind the last digit ON)

Selection of the menu items for changing the parameters. In the menu items for sensor- and alarm parameterizing the LEDs indicate the special classification sensor-alarm-day/night - difference.

#### Function button UP/DOWN

Push short Selection of menu item; Change into display mode

#### Function button SET/RESET

Push short Change into parameter setting mode

### Parameter setting mode (Decimal point behind the last digit FLASHES)

LEDs indicate sensors and relays concerned by the selected parameter setting point as well as day/night-switching and differentiation measurement.

#### Function button UP/DOWN

Press short/long Adjustment of parameter value (slow/fast)

#### Function button SET/RESET

Press short Storage of setting and choice of next parameter.  
Change into menu mode after the last parameter

### Parameterizing the sensors (S 1 / S 2):

Dependent on the chosen program: temperature (Pr 1-5, 9) or current/voltage (Pr 6-8)

Choose menu item with up/down until in indication S 1 and type of sensor alternate.

Here it can be read clearly, which type of sensor is selected and on which alarm the sensor works (corresponding LEDs alarm on).

Enter with Set in parameterizing sensor e.g. S 1 / 100 for Pt 100.

Choose sensor type with up/down

Set cable resistance or 3-wire configuration (3-L).

2-wire configuration, cable resistance compensation:

Short-circuit the wires nearby the sensor and measure the cable resistance. Set parameter „LR“ on this value.

With 2-wire connection and a common wire for all sensors, all sensor measuring currents will be added on the common wire. The compensation value LR to be set is calculated as follows:

$$LR = 3 \times RL/2 \quad (RL = \text{resistance of two wires})$$

We recommend 3-wire connection for each sensor.

### Parameterizing of the alarms (AL 1 / AL 2):

Choose menu item with up/down until AL 1 and limit (limit value) alternate in display, e.g.

AL 1 und 130 for 130 °C.

Here it can be read clearly, which limit value is parameterized and to which sensor works on the alarm (yellow LEDs sensor on).

Begin to parameterize with Set.

Adjust limit with up/down. Adjust hysteresis. Negative hysteresis = MAX-switching point, the relay switches when the adjusted limit is reached and switches back when the signal is fallen by the hysteresis. E.g. limit 130 °C and hysteresis -5 °C: Relais switches at 130 °C and switches back at 125 °C. Positive hysteresis vice versa = MIN-switching point.

Alarm delay time dRL: An alarm is suppressed for the adjusted time, short-timed exceeding of the limit does not cause an alarm.

Switch-back delay dOF: An alarm is only switched off after the signal is below the limit and after delay of this time, e.g. a cooling ventilator can cool further on for this time to avoid, that it has to switch be switched on again after a short time.

Function of relay:

- r-Closed-current circuit mode, relay is picked up in GOOD-state (=limit not reached) and releases when the limit is exceeded. Advantage: errors and faults normally cause an alarm. Disadvantage: alarm also when supply-voltage is switched off and after switching on until the relay has picked up. Unfavourable e.g. with transformers, particularly, when the supply-voltage of the TR 210 comes from the monitored transformer.
- R-Operating-current mode: relay is released in GOOD state and picks up when the limit is exceeded. No alarm at errors and when supply-voltage switched off. Used normally switch ventilators or heatings or for tripping of transformers.
- r-L / R-L: alarm switches locked. Set back with reset only after fall short of the limit (with hysteresis) and end of the switch-back delay. Ready for Reset is indicated with „R 12L“ in the display mode.

Error report: With ERR it can be selected, if the relay switches in the alarm state in case of sensor-error E 1-9 (short circuit or break). (ON / OFF)

### Test relay (tSt):

Here it can be programmed, that a relay switches into the alarm state after a certain time  $d_{on}$ , e.g. 1 weeks (= 168 hours) for the time  $d_{oF}$ , e.g. 10 s, to make a ventilator or a pump run for a short time, to make them move and protect the bearings from damage through long standstill.

Choice of the alarm with up/down. Set switches to  $d_{on}$  and  $d_{oF}$ .

$d_{on} = oFF =$  test not active.

### Sensor simulation (Si):

A sensor can be selected, and a measured temperature can be simulated with the buttons up/down. All functions of the unit work as if this temperature was really measured. If there is no button pushed for 15 minutes, the device automatically switches back into the display mode.

### Code:

After setting all parameters they can be protected by activating the code lock. After pushing Set, the display indicates  $P_{in}$ . Adjust with buttons up/down  $P_{in}$  504 (factory setting). After pushing Set, code lock can be activated or switched off. After pushing Set again, an individual  $P_{in}$  can be selected (write down).

When code lock is activated all parameters can be seen but not be changed anymore.

In case of problems with the code lock (forgotten  $P_{in}$ ) the lock can be switched off and the  $P_{in}$  can be set back to 504, by pushing button set while connecting the device to supply-voltage until  $Code / oFF$  is indicated in the display.

### **Tips:**

- With the pre-set programs  $P_{r1}$  to  $P_{r9}$  the most important parameters can be set in advance, so that only little modifications are necessary, e.g. setting of the limits (limit values) for each alarm.
- After finishing one menu item it is switched automatically on the next one. E.g. after programming the line resistance of sensor 1 and pushing Set, the devices switches on to sensor 2.
- When the right decimal point in the 7 segment display is on, the display mode has been left, and the menu items can be chosen with up/down (menu mode).
- When the right decimal point blinks, you are in the parameter setting mode and can change the setting with up/down.
- Long pushing on up/down speeds up the changes in the display.
- Pushing button up and down at the same time sets values to zero.
- With reset (press set/reset for 2s) the display mode can be reached from every position (exception: simulation) of the parameter setting mode (the last selected value in is being stored).



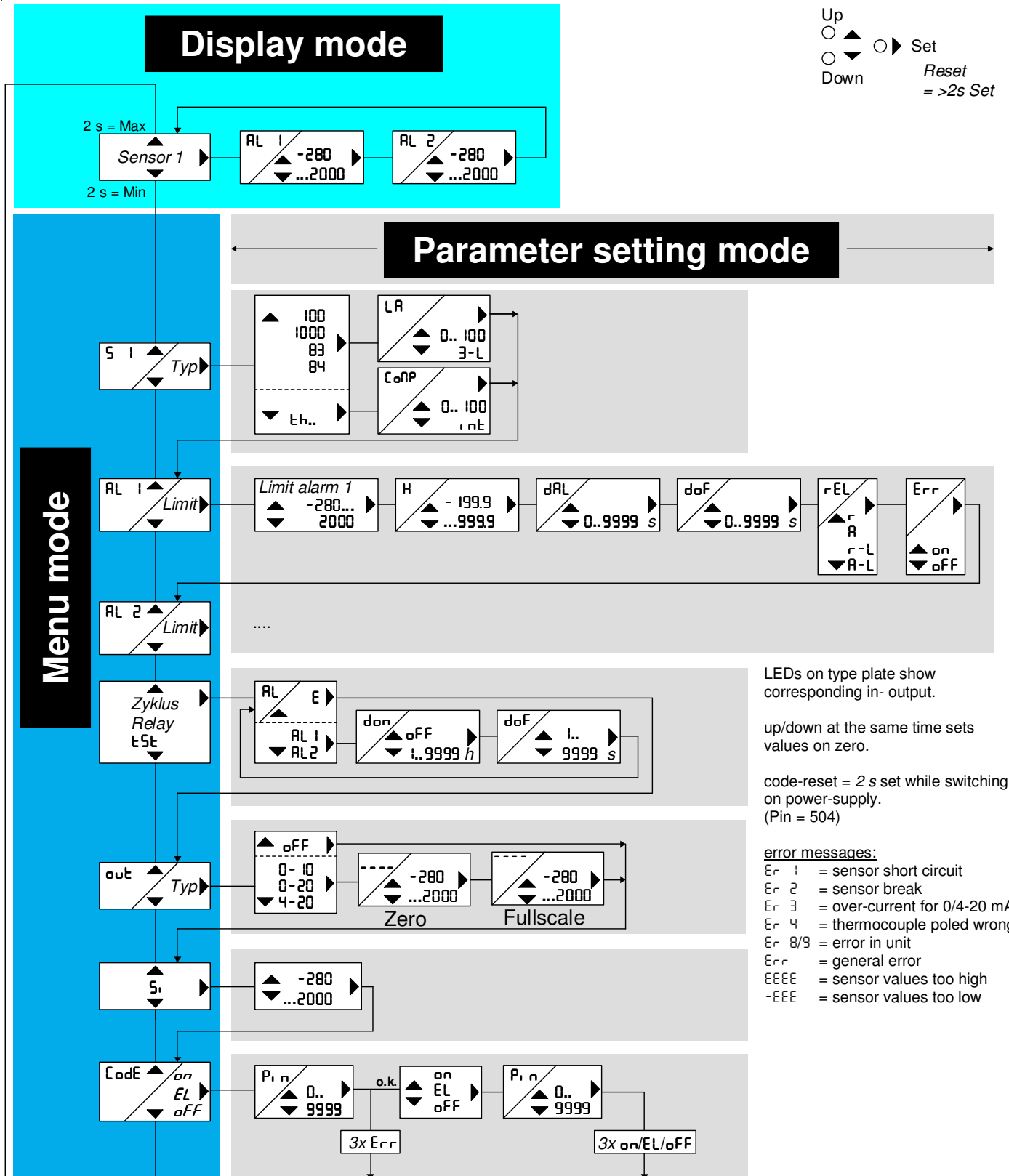
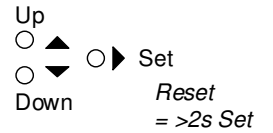
## Indication of the digital display:

Pr 1 ... Pr 9 = program number  
 A 1, A 2 = alarm 1 or alarm 2 active  
 A 12 = alarm 1 and alarm 2 active  
 additional L = alarm locked, for setting back „reset“ is necessary.

S = sensor  
 100, 1000 = Pt 100, Pt 1000  
 83, 84 = KTY-sensor 83, 84  
 LA = 2-wire cable resistance  
 3-L = 3-wire configuration  
 Thermocouples (th..)

| Display | thb | thE | thJ | thK | thL | thn | thr | thS | tht |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Type    | B   | E   | J   | K   | L   | N   | R   | S   | T   |

CoNP = compensation of the reference temperature of thermocouples  
 int = internal reference temperature or fix reference temperature  
 0- 10 = 0-10 V voltage input  
 0/4-20 = 0/4-20 mA current input  
 SCAL = scaling of display for voltage- and current input  
 AUto = to adopt zero point, full scale and decimal point from the chosen type  
 USEr = free scaling of zero point, full scale and decimal point  
 ==== = zero point value for 0 V, 0/4 mA  
 = full scale value for 10 V, 20 mA  
 dP = decimal point  
 AL 1, AL 2 = alarm limit  
 ALd = alarm limit day  
 ALn = alarm night  
 H = hysteresis  
 dAL = alarm delay (time delay until alarm)  
 doF = switch back delay (time delay until alarm switches back to good)  
 rEL = function of relay  
 r, R = closed-circuit current mode, operating current mode  
 r-L, R-L = closed-circuit- / operating current with interlocked switching (Locked)  
 tSt = relay test periodically in hours after the time don for the duration doF  
 don = periodical time in hours for testing alarm/relay (oFF = no test)  
 doF = duration of test  
 E = exit (leave loop)  
 out = analogue output: oFF, 0-10 V, 0-20 mA, 4-20mA parameterizable  
 SEn = sensor select for analogue output  
 S 12<sup>+</sup> = maximum value of sensor 1 or sensor 2 is put out  
 S 12<sup>-</sup> = minimum value of sensor 1 or sensor 2 is put out  
 ==== = value, at which 0 V, 0/4 mA is put out  
 = value, at which 10 V, 20 mA is put out  
 di F = difference sensor 2 minus sensor 1  
 on, oFF = on/off  
 Si = simulation  
 CodE = code (pin)  
 Pi n = factory setting of Pin: 504



LEDs on type plate show corresponding in- output.

up/down at the same time sets values on zero.

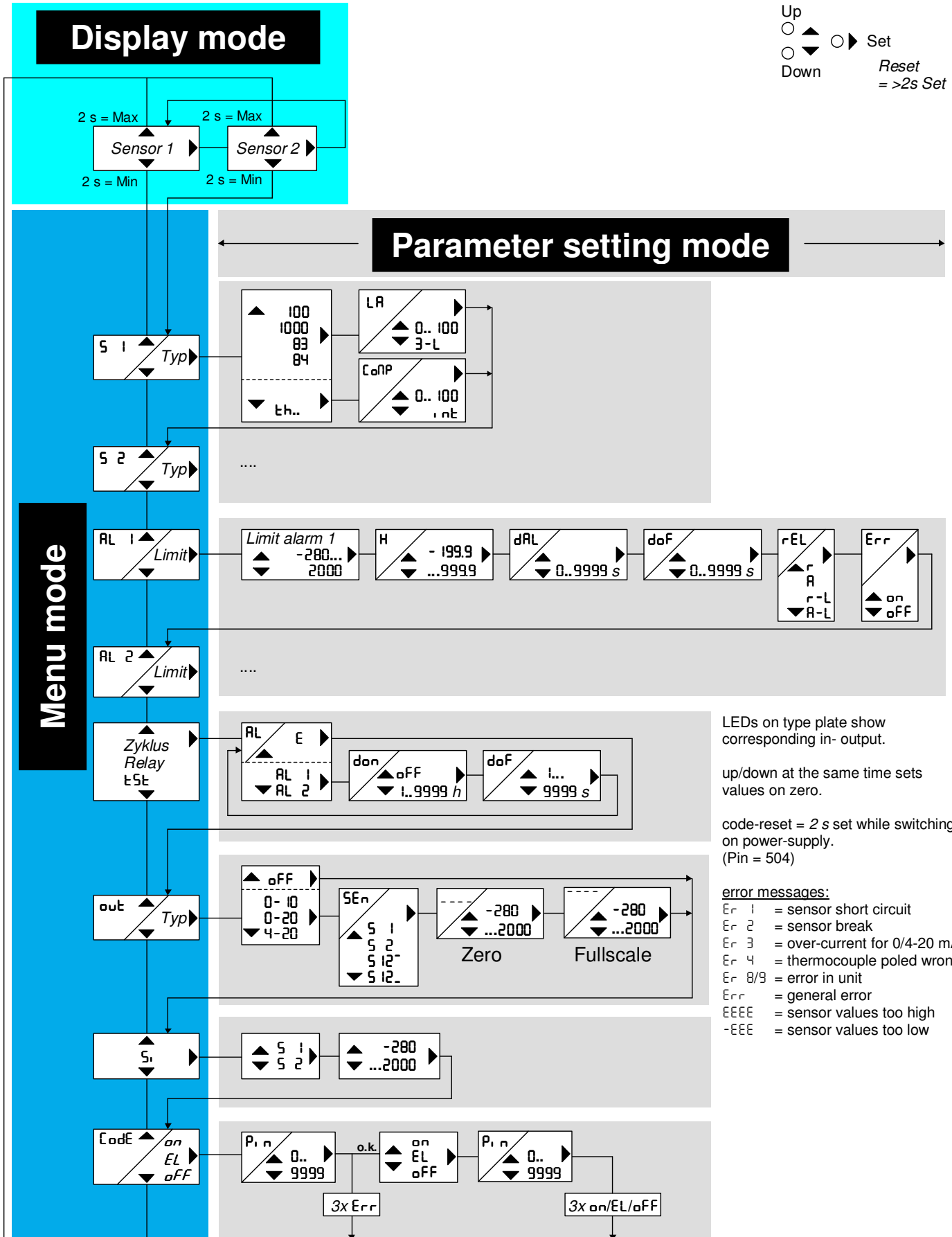
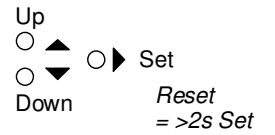
code-reset = 2 s set while switching on power-supply.  
(Pin = 504)

**error messages:**

- Er 1 = sensor short circuit
- Er 2 = sensor break
- Er 3 = over-current for 0/4-20 mA
- Er 4 = thermocouple poled wrong
- Er 8/9 = error in unit
- Err = general error
- EEEE = sensor values too high
- EEE = sensor values too low

Operation: P<sub>r</sub>2 / 2 temperature sensors, each 1 limit value

Operation with pushbuttons:



LEDs on type plate show corresponding in- output.

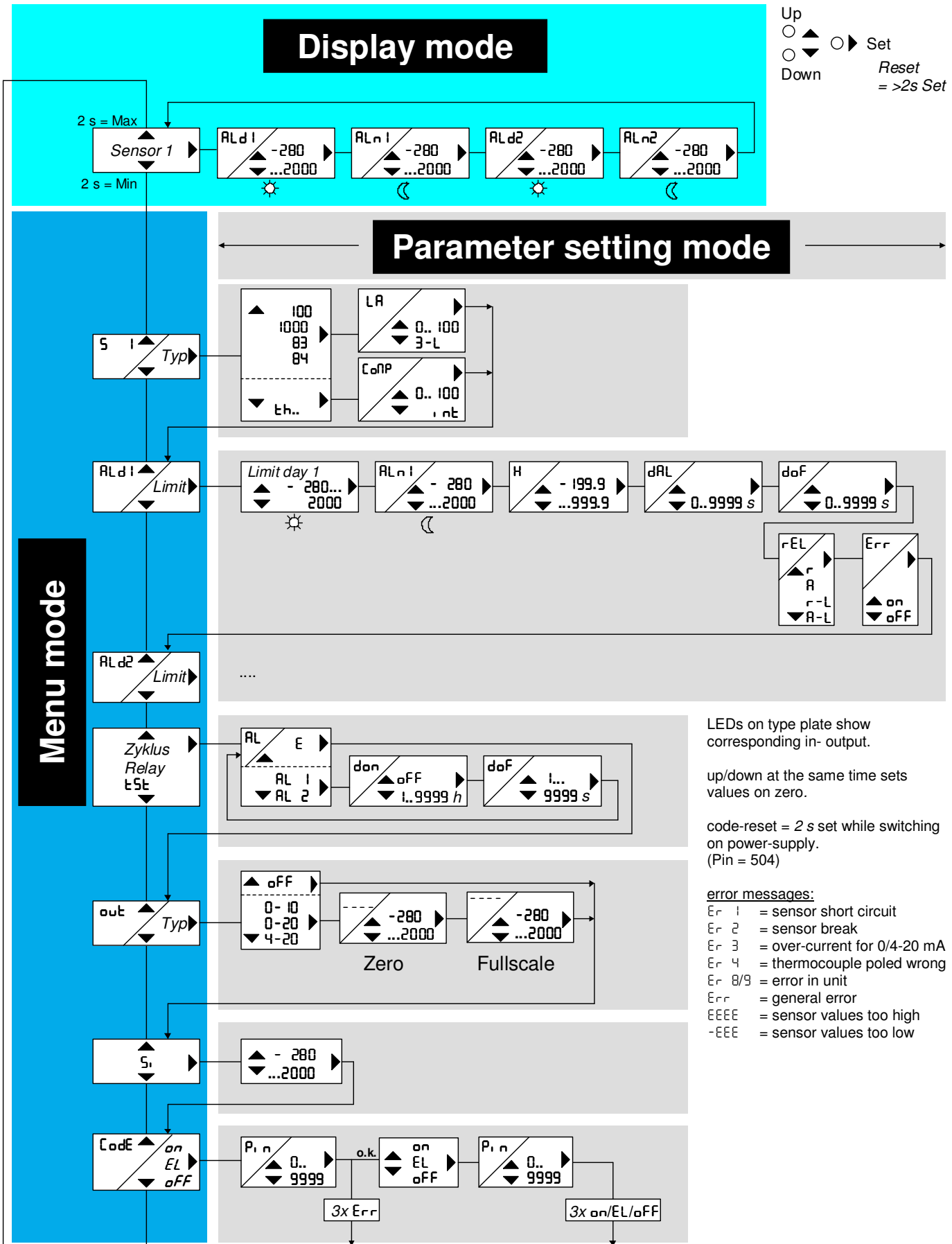
up/down at the same time sets values on zero.

code-reset = 2 s set while switching on power-supply. (Pin = 504)

error messages:

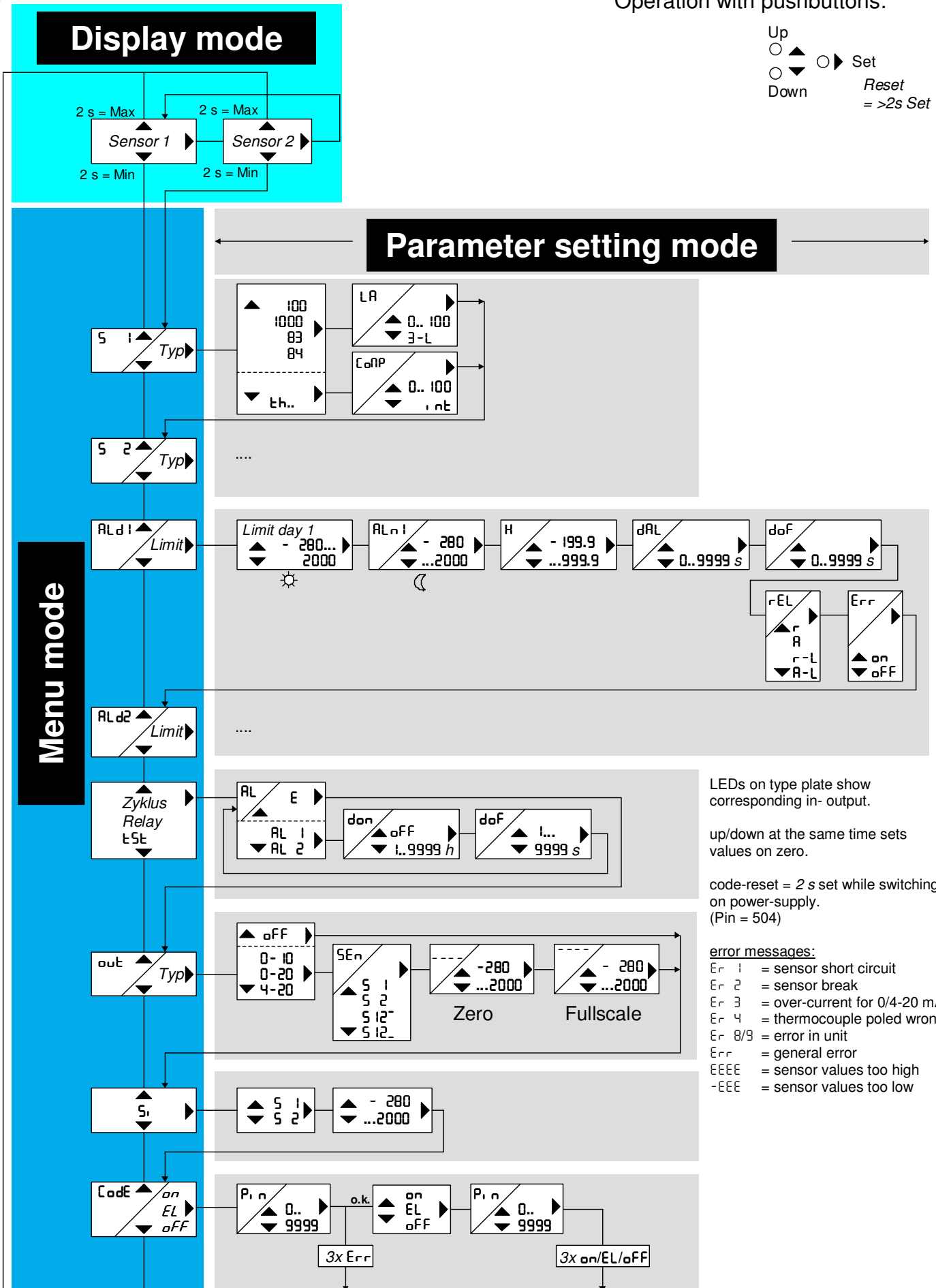
- Er 1 = sensor short circuit
- Er 2 = sensor break
- Er 3 = over-current for 0/4-20 mA
- Er 4 = thermocouple poled wrong
- Er 8/9 = error in unit
- Err = general error
- EEEE = sensor values too high
- EEE = sensor values too low

Up  
 ○ ▲ ○ ▶ Set  
 Down ○ ▼ ○ ▶ Reset  
 = >2s Set



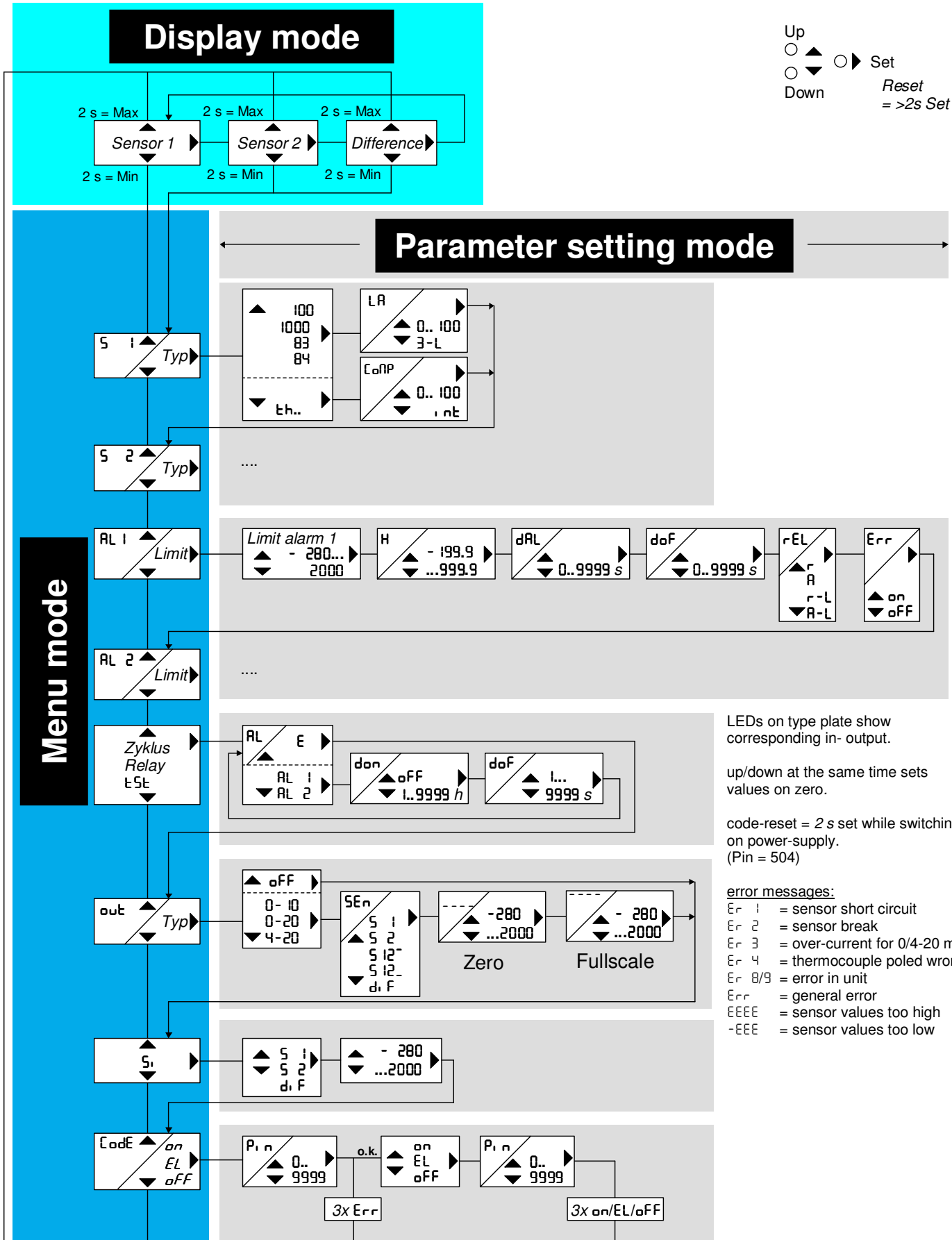
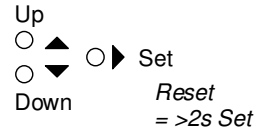
Operation: P-4 / 2 temperature sensors, each 1 limit value day and 1 limit value night  
 Operation with pushbuttons:

Up  
 ○ ▲ ○ ▶ Set  
 Down ○ ▼ ○ ▶ Reset  
 = >2s Set



Operation: P-r5 / 2 temperature sensors, temperature difference 5 2 minus 5 1

Operation with pushbuttons:



LEDs on type plate show corresponding in- output.

up/down at the same time sets values on zero.

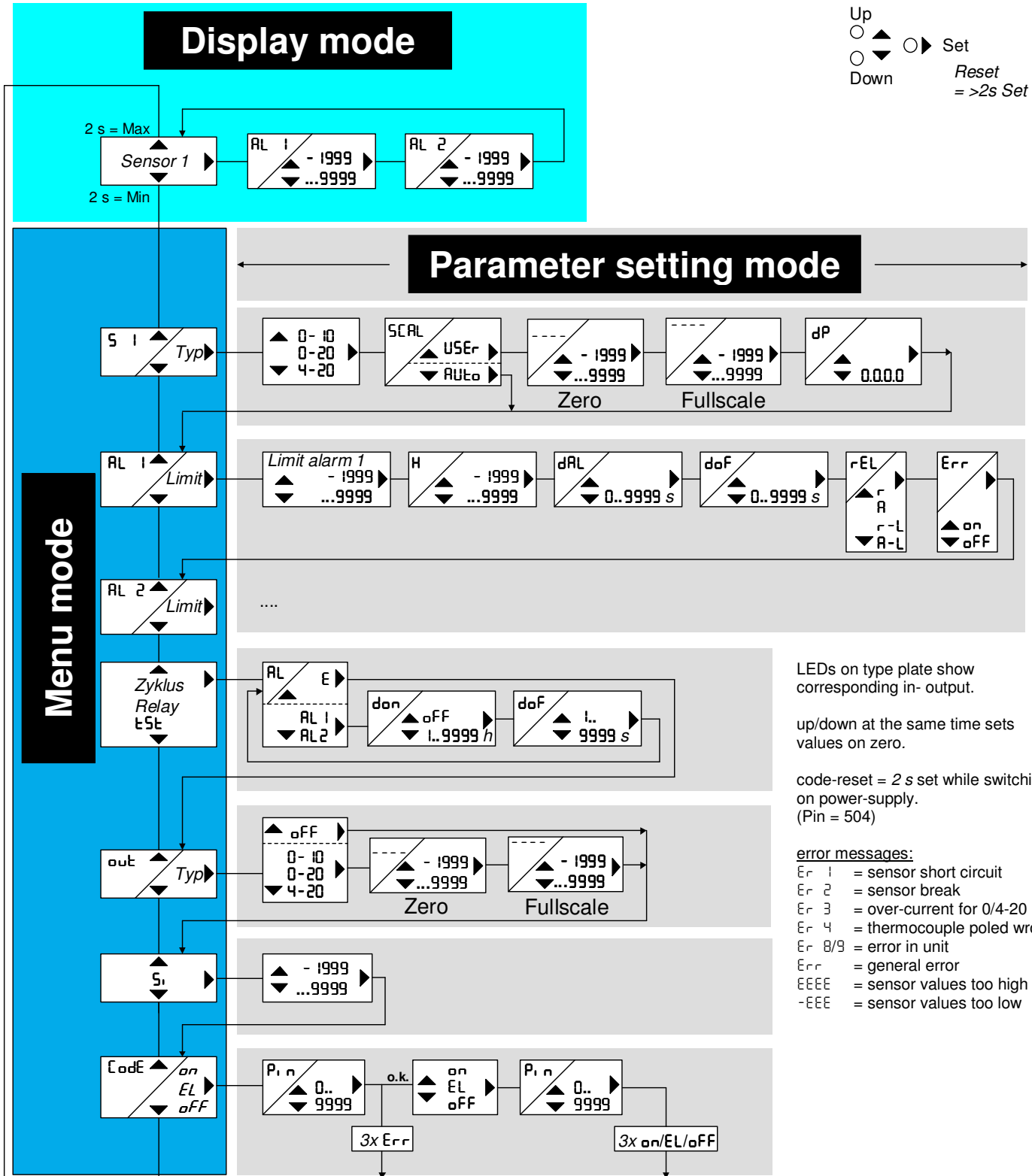
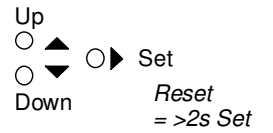
code-reset = 2 s set while switching on power-supply. (Pin = 504)

**error messages:**

- Er 1 = sensor short circuit
- Er 2 = sensor break
- Er 3 = over-current for 0/4-20 mA
- Er 4 = thermocouple poled wrong
- Er 8/9 = error in unit
- Err = general error
- EEEE = sensor values too high
- EEE = sensor values too low

Operation: P-r5 / 1 input 0-10 V or 0/4-20 mA, 2 limit values

Operation with pushbuttons:



LEDs on type plate show corresponding in- output.

up/down at the same time sets values on zero.

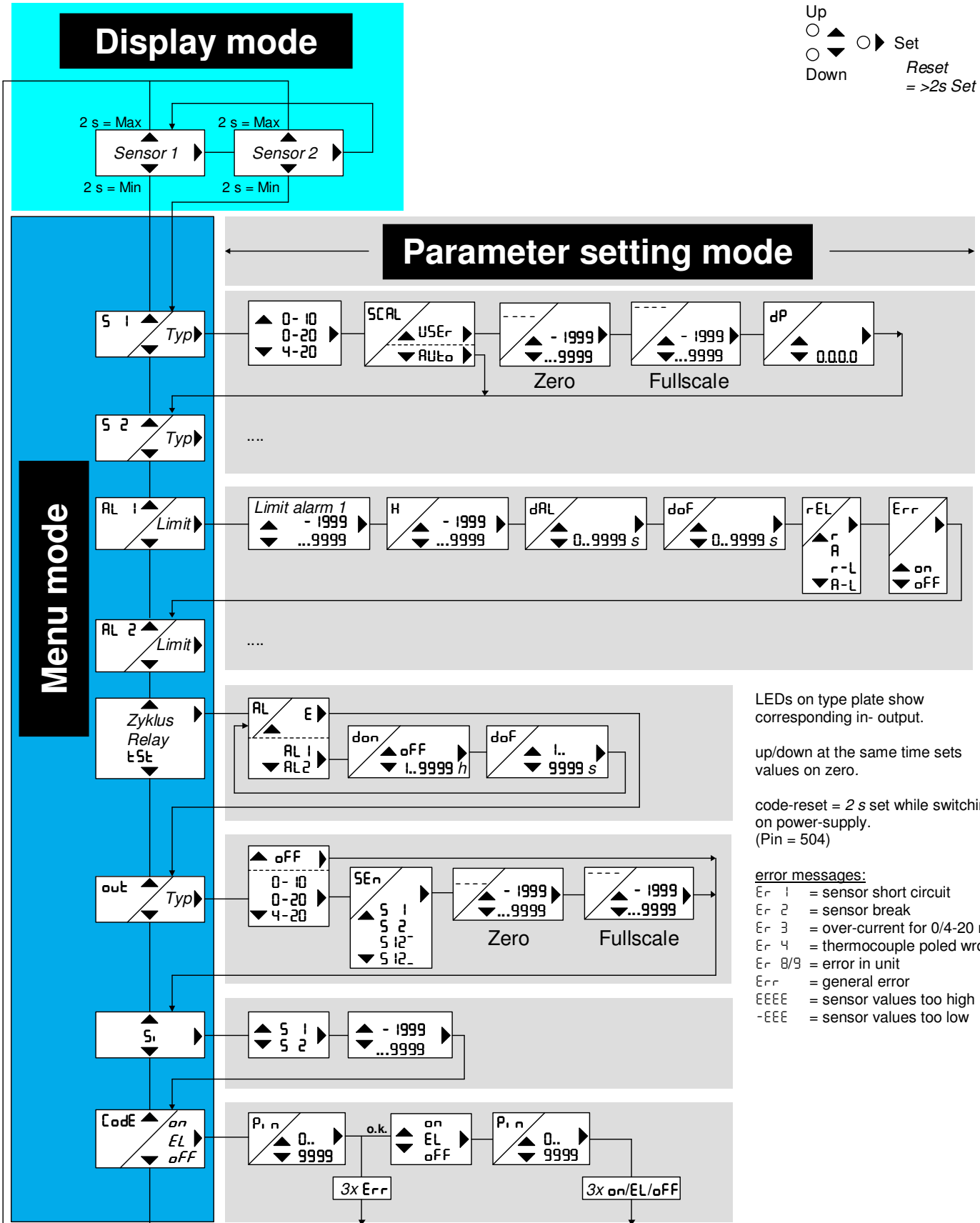
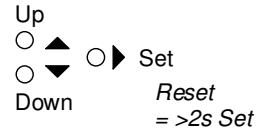
code-reset = 2 s set while switching on power-supply. (Pin = 504)

error messages:

- Er 1 = sensor short circuit
- Er 2 = sensor break
- Er 3 = over-current for 0/4-20 mA
- Er 4 = thermocouple poled wrong
- Er 8/9 = error in unit
- Err = general error
- EEEE = sensor values too high
- EEE = sensor values too low

Operation: P<sub>r</sub>1 / 2 inputs 0-10 V or 0/4-20 mA, each 1 limit value

Operation with pushbuttons:



LEDs on type plate show corresponding in- output.

up/down at the same time sets values on zero.

code-reset = 2 s set while switching on power-supply. (Pin = 504)

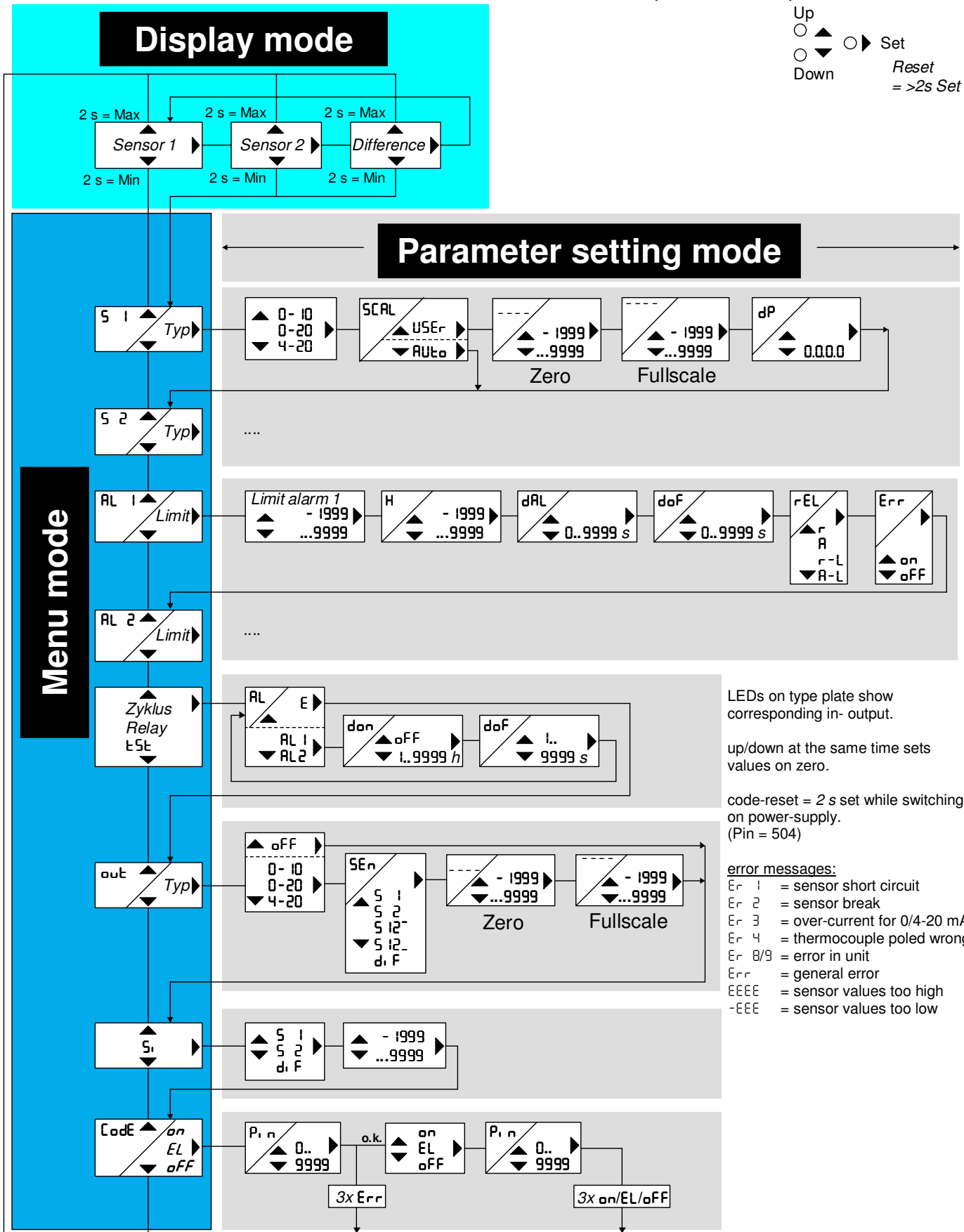
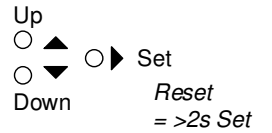
error messages:

- Er 1 = sensor short circuit
- Er 2 = sensor break
- Er 3 = over-current for 0/4-20 mA
- Er 4 = thermocouple poled wrong
- Er 8/9 = error in unit
- Err = general error
- EEEE = sensor values too high
- EEE = sensor values too low



Operation: P<sub>r</sub>B / 2 inputs 0-10 V or 0/4-20 mA, difference 5 2 minus 5 1

Operation with pushbuttons:



LEDs on type plate show corresponding in- output.

up/down at the same time sets values on zero.

code-reset = 2 s set while switching on power-supply. (Pin = 504)

error messages:

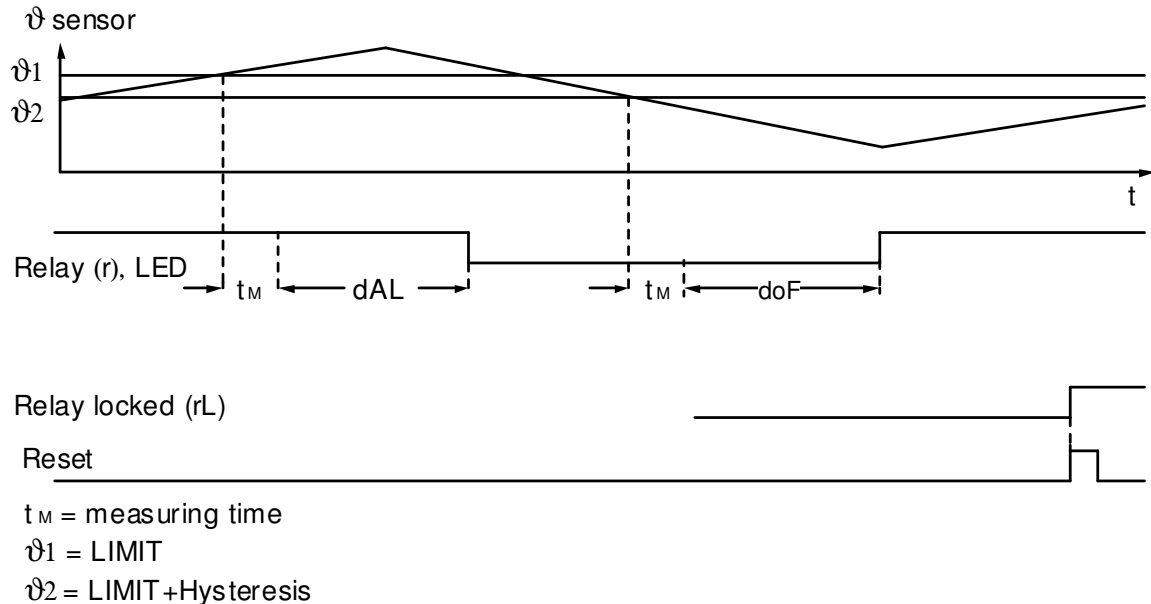
- Er 1 = sensor short circuit
- Er 2 = sensor break
- Er 3 = over-current for 0/4-20 mA
- Er 4 = thermocouple poled wrong
- Er B/9 = error in unit
- Err = general error
- EEEE = sensor values too high
- EEE = sensor values too low

## Operation: P<sub>r</sub>9 / 2 temperature sensors, 2 limit values MIN / MAX

At MAX-limit the warmest sensor switches the relay, at MIN the coldest.

Operation see program P<sub>r</sub>2

### Action chart:



### Reaction time of the unit – measuring time $t_M$

The reaction time of the unit depends on the number of the connected sensors and the measuring function. If the temperature is changing constantly, the measuring time  $t_M$  is about 2 s. If the temperature is changing rapidly, e.g. through simulation of the temperature with an external potentiometer, the measuring time  $t_M$  is about 4 ... 6 s. In case of sensor error the measuring time  $t_M$  raises to 7...10 s.

## Factory setting:

In case of programme change all parameters are set back upon factory setting.

| Menu-item       | Parameter                | Value               |                   |       |                   |       |        |                   |        | User data |
|-----------------|--------------------------|---------------------|-------------------|-------|-------------------|-------|--------|-------------------|--------|-----------|
|                 |                          | Pr 1                | Pr 2/9            | Pr 3  | Pr 4              | Pr 5  | Pr 6   | Pr 7              | Pr 8   |           |
| Sensor 1<br>5 1 | Sensor type              | 100                 | 100               | 100   | 100               | 100   | 0- 10  | 0- 10             | 0- 10  |           |
|                 | LR (Cable compensation)  | 3-L                 | 3-L               | 3-L   | 3-L               | 3-L   | -      | -                 | -      |           |
|                 | comp (Compensation, th.) | int                 | int               | int   | int               | int   | -      | -                 | -      |           |
|                 | SCAL (Scaling)           | -                   | -                 | -     | -                 | -     | AUto   | AUto              | AUto   |           |
|                 | USER ---- (Zero)         | -                   | -                 | -     | -                 | -     | -      | -                 | -      |           |
|                 | USER - - - - (Fullscale) | -                   | -                 | -     | -                 | -     | -      | -                 | -      |           |
|                 | USER dP (Decimal point)  | -                   | -                 | -     | -                 | -     | -      | -                 | -      |           |
| Sensor 2<br>5 2 | Sensor type              | -                   | 100               | -     | 100               | 100   | -      | 0- 10             | 0- 10  |           |
|                 | LR (Cable compensation)  | -                   | 3-L               | -     | 3-L               | 3-L   | -      | -                 | -      |           |
|                 | comp (Compensation, th.) | -                   | int               | -     | int               | int   | -      | -                 | -      |           |
|                 | SCAL (Scaling)           | -                   | -                 | -     | -                 | -     | -      | AUto              | AUto   |           |
|                 | USER ---- (Zero)         | -                   | -                 | -     | -                 | -     | -      | -                 | -      |           |
|                 | USER - - - - (Fullscale) | -                   | -                 | -     | -                 | -     | -      | -                 | -      |           |
|                 | USER dP (Decimal point)  | -                   | -                 | -     | -                 | -     | -      | -                 | -      |           |
| Alarm 1<br>AL 1 | Limit 1 (day)            | 100.0               | 100.0             | 20.0  | 20.0              | 10.0  | 1.000  | 1.000             | 1.000  |           |
|                 | ALn1 (night)             | -                   | -                 | 15.0  | 15.0              | -     | -      | -                 | -      |           |
|                 | H (Hysteresis)           | -2.0                | -2.0              | -2.0  | -2.0              | -2.0  | -0.020 | -0.020            | -0.020 |           |
|                 | dAL (Alarm-delay)        | 0                   | 0                 | 0     | 0                 | 0     | 0      | 0                 | 0      |           |
|                 | doF (Delay-Alarm off)    | 0                   | 0                 | 0     | 0                 | 0     | 0      | 0                 | 0      |           |
|                 | rEL (Relais function)    | r                   | r                 | r     | r                 | r     | r      | r                 | r      |           |
|                 | Err (Sensor-Error)       | on                  | on                | on    | on                | on    | on     | on                | on     |           |
| Alarm 2<br>AL 2 | Limit 2 (day)            | 150.0               | 100.0             | 20.0  | 20.0              | 10.0  | 1.000  | 1.000             | 1.000  |           |
|                 | ALn2 (night)             | -                   | -                 | 15.0  | 15.0              | -     | -      | -                 | -      |           |
|                 | H (Hysteresis)           | -2.0                | -2.0              | -2.0  | -2.0              | -2.0  | -0.020 | -0.020            | -0.020 |           |
|                 | dAL (Alarm-delay)        | 0                   | 0                 | 0     | 0                 | 0     | 0      | 0                 | 0      |           |
|                 | doF (Delay-Alarm off)    | 0                   | 0                 | 0     | 0                 | 0     | 0      | 0                 | 0      |           |
|                 | rEL (Relais function)    | r                   | r                 | r     | r                 | r     | r      | r                 | r      |           |
|                 | Err (Sensor-Error)       | on                  | on                | on    | on                | on    | on     | on                | on     |           |
| tSt             | AL 1                     | don (Test time)     | oFF               | oFF   | oFF               | oFF   | oFF    | oFF               | oFF    |           |
|                 |                          | doF (Test duration) |                   |       |                   |       |        |                   |        |           |
|                 | AL 2                     | don (Test time)     | oFF               | oFF   | oFF               | oFF   | oFF    | oFF               | oFF    |           |
|                 |                          | doF (Test duration) |                   |       |                   |       |        |                   |        |           |
| out             | Type                     | 0- 10               | 0- 10             | 0- 10 | 0- 10             | 0- 10 | 0- 10  | 0- 10             | 0- 10  |           |
|                 | SEN (Sensor)             | -                   | 5 12 <sup>-</sup> | -     | 5 12 <sup>-</sup> | d, F  | -      | 5 12 <sup>-</sup> | d, F   |           |
|                 | ---- (Zero)              | 0.0                 | 0.0               | 0.0   | 0.0               | 0.0   | 0.000  | 0.000             | 0.000  |           |
|                 | ==== (Fullscale)         | 200.0               | 200.0             | 200.0 | 200.0             | 200.0 | 9.999  | 9.999             | 9.999  |           |
| CodE            | on / oFF                 | oFF                 | oFF               | oFF   | oFF               | oFF   | oFF    | oFF               | oFF    |           |
|                 | Pin                      | 504                 | 504               | 504   | 504               | 504   | 504    | 504               | 504    |           |

## Error search and measures

- Display  
 EEEE sensor break or temperature too high  
 -EEE sensor interruption or temperature too low
- Unit cannot be programmed – Code lock  
 The code lock gives protection against unauthorized manipulation of the unit. When code lock is activated the parameters can not be changed. The pin can be set by the user.  
 Pin unknown? Make code-reset: When switching in supply-voltage keep pushed button „Set“ for **2 s**.  
 Display indicates: "8888"; "CodE"; "oFF"; "8888" release button „Set“.  
 Code = oFF, Pin = 504.
- Indicated temperature does not correspond to the sensor temperature  
 Check connected sensor type  
 Check cable resistance
- Display indicates „Er 1 or Er 2“  
 Er 1 Sensor short circuit  
 Er 2 Sensor interruption, (4-20 mA input: current below 3,8 mA)  
 Er 3 Current input > 25 mA at the 0/4-20 mA input; measuring input is switched to high impedance  
 Er 4 Thermocouple input voltage too negative, check polarity  
 Er 8 and Er 9 are internal faults of the device. Switch off- and on the power-supply, eventually reset parameters upon factory preset.  
 If after that there still is an error indicated, the unit must be sent to the factory for repair.
- Indication of the software version: select display mode and push button „Set“ for 10 s.

## Technical data

|                                 |  |            |
|---------------------------------|--|------------|
| <u>Rated supply voltage Us:</u> | AC/DC 24 – 240 V, 0 / 50 / 60 Hz < 3 W < 5 VA    |            |
| Tolerance                       | DC 20, 4 - 297 V, AC 20 - 264 V                  |            |
| <u>Relais output:</u>           | 2 x 1 change-over contacts (CO)                  |            |
| Switching voltage               | max. AC 415 V                                    |            |
| Switching current               | max. 5 A   |            |
| Switching capacity              | max. 1250 VA (ohmic load)<br>max.48 W at DC 24 V |            |
| Reduction factor for cos φ 0,7  | 0,5  |            |
| UL electrical ratings:          | 3 A Resistive, 240 VAC<br>D300 1 A 240 VAC       |            |
| Nominal operational current Ie: |  |            |
| AC15                            | Ie = 1 A   | Ue = 400 V |
|                                 | Ie = 2 A   | Ue = 250 V |
| DC13                            | Ie = 2 A   | Ue = 24 V  |
|                                 | Ie = 0,2 A                                       | Ue = 125 V |
|                                 | Ie = 0,1 A                                       | Ue = 250 V |
| Recommended fuses for contacts  | T 3,15 A (gL)                                    |            |
| Expected life mechanical        | 1 x 10 <sup>7</sup> Switching cycles             |            |

Expected life electrical                      1 x 10<sup>5</sup> Switching cycles at AC 250 V / 5 A  
 2 x 10<sup>5</sup> Switching cycles at 250 V / 3 A  
 6 x 10<sup>5</sup> Switching cycles at AC 250 V / 1 A

Test conditions                                      EN 50178 / EN 60 947

Rated impulse voltage                      4000 V  
 Overvoltage category                      III  
 Contamination level                      3  
 Rated insulation voltage Ui                250 V  
 On-time    100 %  
 Maximum ambient temperature            -20 °C ... +60 °C  
     EN 60068-2-1 Dry Heat  
 EMV – interference resistance            EN 61000-6-2  
 EMV – emitted interference              EN 61000-6-3  
 Vibration resistance EN 60068-2-6      2...25 Hz ±1,6 mm  
     25 ... 150 Hz 5 g

Sensor connection:

Measuring cycle/Measuring time t<sub>M</sub>      < 2,5 s  
     < 5 s in case of changes > 5 K or < 1 K  
     < 15 s in case of sensor error

The times depend on quantity and nature of the connected sensors.

Pt 100, Pt 1000 according to EN 60751:

| Sensor  | Measuring range °C |     | Short circuit Ohm | Break Ohm | Sensor resistance + line resistance |
|---------|--------------------|-----|-------------------|-----------|-------------------------------------|
|         | min                | max | <                 | >         | max                                 |
| Pt 100  | -199               | 860 | 15                | 400       | 500                                 |
| Pt 1000 | -199               | 860 | 150               | 4000      | 4100                                |
| KTY 83  | -55                | 175 | 150               | 4000      | 4100                                |
| KTY 84  | -40                | 150 | 150               | 4000      | 4100                                |

Tolerance    ±0,2 % of measured value ±0,5 K (KTY ±5 K)  
 Sensor current                                    ≤0,8 mA  
 Temperature drift                                <0,04 °C/K

Thermocouples according to EN 60 584, DIN 43 710:

| Type | Measuring range °C |      | Precision           |
|------|--------------------|------|---------------------|
|      | min                | max  |                     |
| B    | 0                  | 1820 | ±2 °C<br>T > 300 °C |
| E    | -270               | 1000 | ±1 °C               |
| J    | -210               | 1200 | ±1 °C               |
| K    | -200               | 1372 | ±2 °C               |
| L    | -200               | 900  | ±1 °C               |
| N    | -270               | 1300 | ±2 °C               |
| R    | -50                | 1770 | ±2 °C               |
| S    | -50                | 1770 | ±2 °C               |
| T    | -270               | 400  | ±1 °C               |

Temperature drift < 0,01 % / K  
 Measuring error of the sensor wire +0,25  $\mu$ V /  $\Omega$   
 Reference junction  $\pm 1$   $^{\circ}$ C

Voltage- / Current input

|           | Input resistance | Maximum Input signal | Precision (from FullScale) |
|-----------|------------------|----------------------|----------------------------|
| 0 – 10 V  | 13 k $\Omega$    | 20 V                 | 0,1 %                      |
| 0/4-20 mA | 22 $\Omega$      | 25 mA * 20 V         | 0,5 %                      |

\* if input currents are > 25 mA the input resistance is switched to 13 k $\Omega$  and the error  $\epsilon_{r3}$  is indicated. Error reset: break circuit.

Temperature drift < 0,02 %/K

Input Y1-Y2: 18 V / 3 mA Switching threshold approx. 9 V

Analogue output:  
 Voltage output 0-10 V max. 10 mA Precision 0,1 % of FullScale  
 Temperature drift < 0,01 %/K

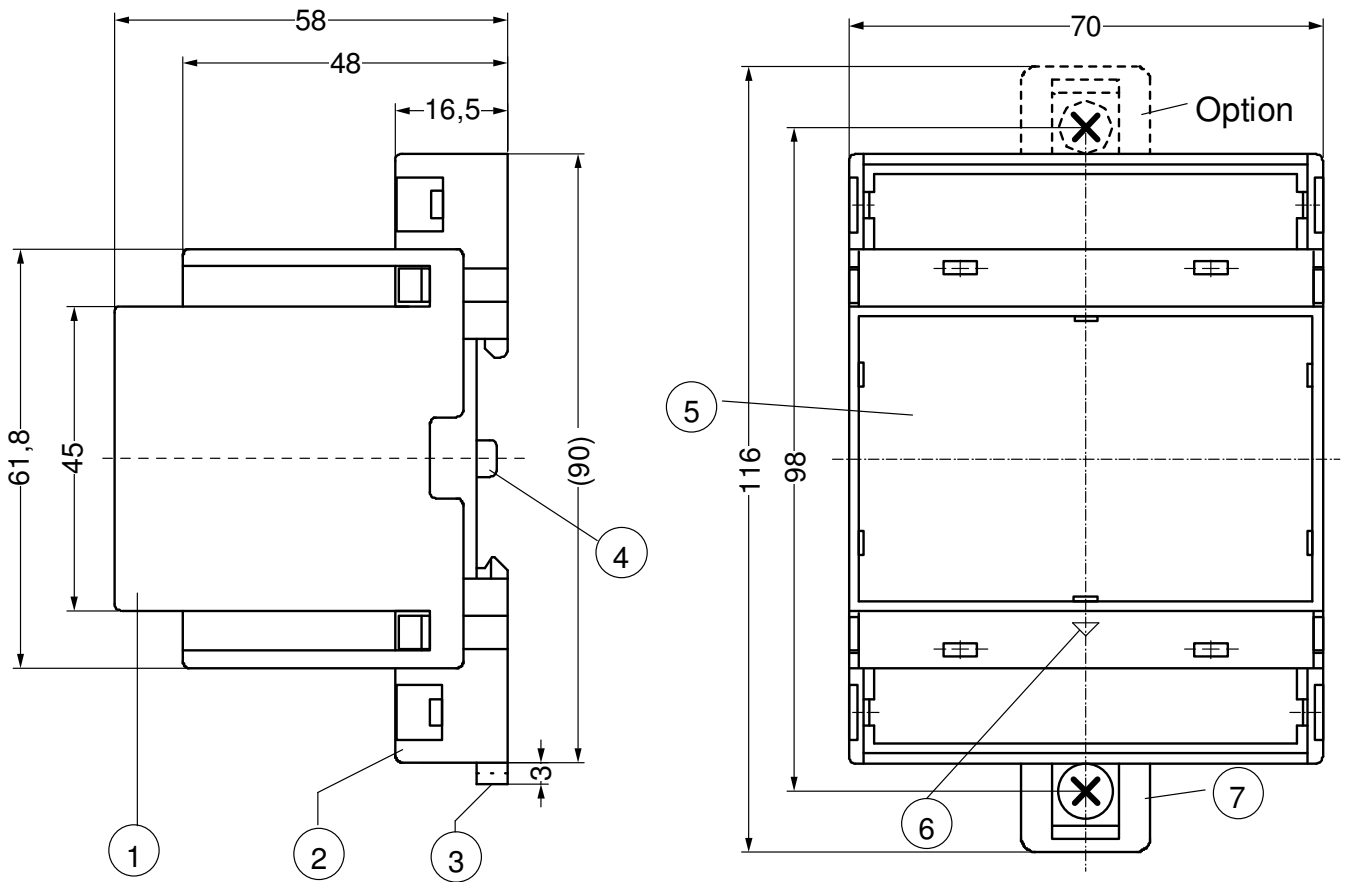
Current output 0/4-20 mA max. 500  $\Omega$  Precision 0,15 % of FullScale  
 Temperature drift < 0,015 %/K  
 Error from impedance (250  $\Omega$  - impedance)/250  $\Omega$  \* 0,15 % of current

If error short circuit  $E_{r1}$  0 V or 0 mA is put out.  
 For all other faults 10 V or 20 mA is put out.

Housing: Design V4, switchgear mounting  
 Mounting height 55 mm  
 Width 4 TE  
 Dimensions (width x height x depth) 70 x 90 x 58 mm  
 Wire connection, one wire each 1 x 1,5 mm<sup>2</sup>  
 Stranded wire with insulated ferrules each 1 x 1,0 mm<sup>2</sup>  
 Protection class housing IP 30  
 Protection class terminal IP 20  
 Installation Snap mounting on mounting rail 35 mm according to EN 60 715 or with screws M 4 (additional bar in scope of delivery)  
 Weight approx. 200 g

**Subject to technical changes**

# Housing Design V4:      Dimensions in mm



- 1      Cover
- 2      Base
- 3      Bar for snap mounting
- 4      Latch for sealing
- 5      Front panel
- 6      Position downward
- 7      For fixing to wall with screws, Ø 4,2 mm.

This and other operating manuals, as far as available also in other languages, you find on our homepage:  
[www.ziehl.com](http://www.ziehl.com)