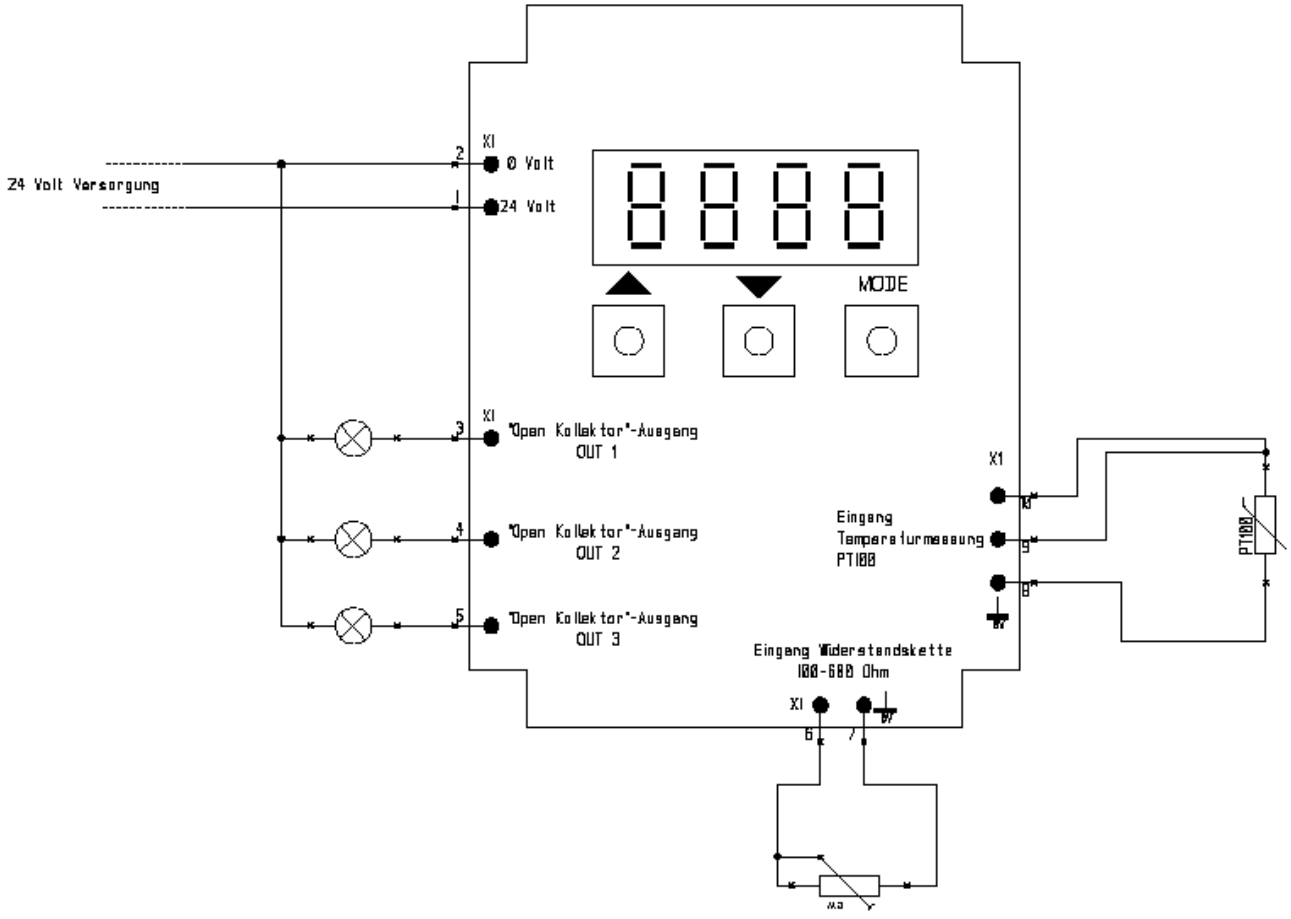
Contents

1 Introduction

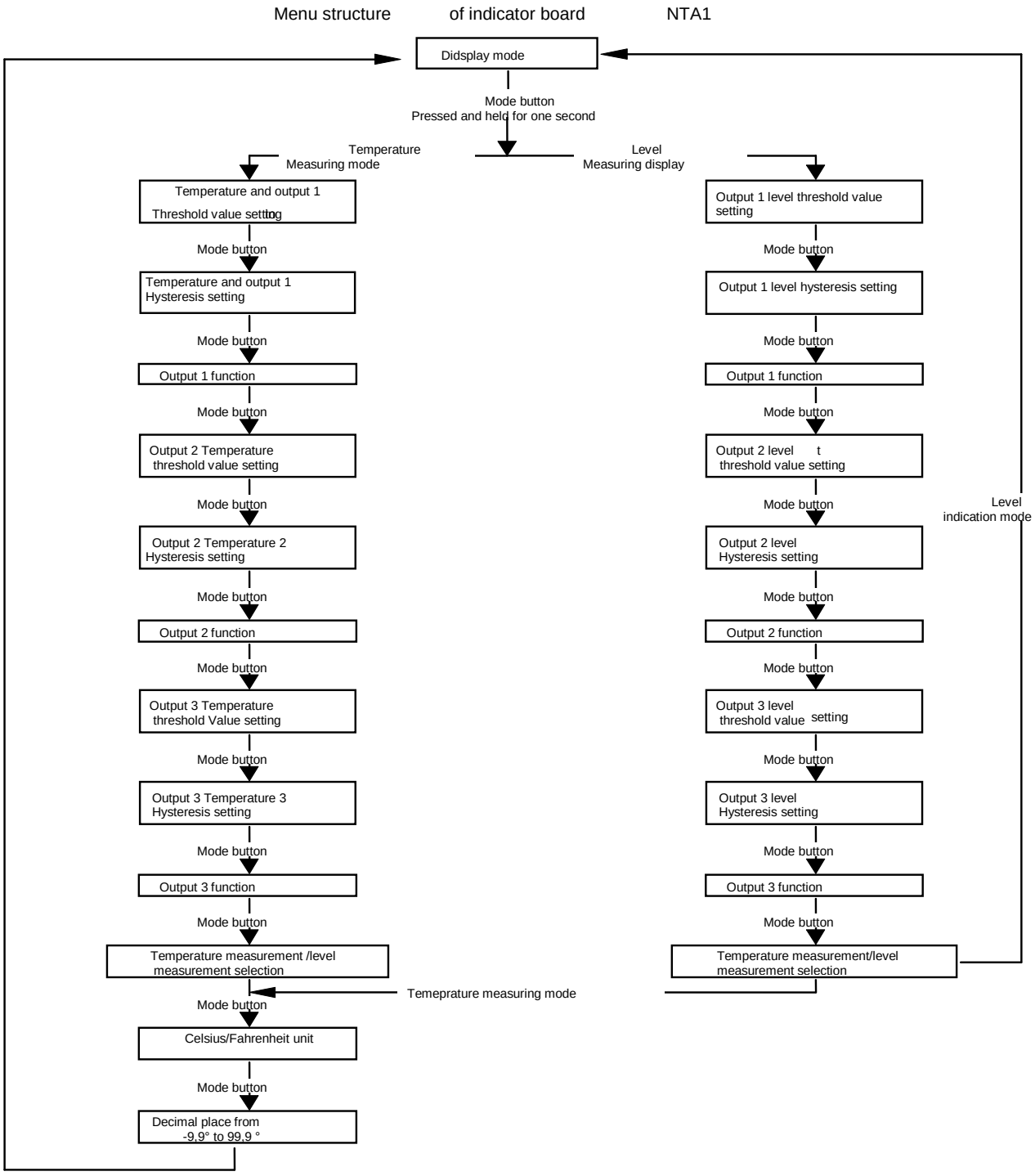
The NTA 1 indicator board is used to display a temperature that is measured by means of a Pt 100 sensor or to display a liquid level measured by a resistance chain. The display is by means of a four-digit seven-segment display. Three switches thresholds can be set at each of which an output can be switched. A hysteresis and the polarity of the respective output can also be set. The set values are permanently stored in an internal EEPROM of the processor. If the permissible input range for the temperature or the full level is overshot or undershot, the outputs are switched off. The assembly is supplied by 24V. The power consumption is approximately 30mA.

2 Terminal diagram



3 Menu

3.1 Menu structure



3.2 Control buttons

The necessary settings for the operation of assemblies are made by means of three buttons.

3.2.1 Mode button:

Pressing the mode button for more than one second obtains the menu. Each time the button is pressed again a further menu item is obtained. The menu can be quit by running through all the menu items or by pressing and holding the mode button for two seconds.

3.2.2 UP button

Input values can be increased by means of the UP button. Depending on the menu item, a change can be made between different functions. If the UP and DOWN buttons are pressed simultaneously and held for three seconds, the calibration function is obtained. Calibration is possible only by means of a special calibration unit. A calibration without the calibration unit connected leads to incorrect measurements by the indicator board.

3.2.3 DOWN button

Input values can be increased by means of the DOWN button. Depending on the menu item, a change can be made between different functions. If the UP and DOWN buttons are pressed simultaneously and held for three seconds, the calibration function is obtained. Calibration is possible only by means of a special calibration unit. A calibration without the calibration unit connected leads to incorrect measurements by the indicator board.

3.2.4 Menu items

Depending on whether the assembly is functioning as a level measuring device or a temperature measuring device, other points are selected in the menu. When set as a level measuring device, the switching points of the level measuring device are set. When operating as a temperature measuring device the temperature switching points are set. When in temperature measuring mode, the indicator unit of the display and the switching points can be switched between degrees Fahrenheit and degrees Celsius. The resolution of the display can be switched to 0.5 degrees or degrees for the -9.9 to +99.9range.

The menu is automatically quit after 45 seconds without saving the current settings if no other button is operated. It is also possible to quit by pressing and holding the mode button for two seconds.

3.3 Temperature display

3.3.1 Output 1 temperature switching point

Pressing and holding the mode button for one second obtains the first menu item for setting the switching points for output 1. The seven-segment display shows the parameter " t1" alternating with the set value. The switching points for output 1 can be set by using the UP and DOWN buttons. The switching point can be set in increments of 1 degree in the 00 to 1000 Celsius range or of 320 Fahrenheit to 2120 Fahrenheit range

If the mode button is pressed to obtain the next menu item, the set value is permanently stored in the internal EEPROM memory of the processor.

3.3.2 Output 1 Hysteresis

The menu item is used to set the hysteresis of the output. The parameter "H1" is displayed alternating with the set value. The hysteresis value of the output is set by using the UP and DOWN buttons. The setting is made in degree increments in the 0 to 10 range. The effect of the hysteresis is that in the event of a drop in temperature the output does not switch until a value that is less than the set switching point by the amount of the hysteresis is achieved. The switching point on increasing temperature is not affected by the hysteresis. Pressing the mode button stores the set value and the settings menu for changing the output function is selected.

3.3.3 Output 1 function

The switching outputs of the indicator board are designed as "open collector" outputs. If the outputs are active they switch the 24V supply to the switch output.

Whether the output is switched on or off in the event of an overshoot of the switching point can be set by means of the menu item. The abbreviated display "F1" for output 1 function is shown in the display and the value "on" or "off" as the parameter. If "on" is selected, the output switches to +24V if the switching point is overshot. If "off" is set, the 24V at the output is switched off in the event of an overshoot of the switching value.

The next menu item can again be obtained by pressing the mode switch. The previously set value is then saved.

3.3.4 Output 2 temperature switching point

The switching point of output 2 is also set as for output 1. In the display " t2 " for switching point 2 is displayed alternating with the set switching threshold. The value is set using the UP, DOWN buttons. The set value is saved and the next menu item selected by using the mode switch.

3.3.5 Output 2 hysteresis

The seven-segment display shows this set point “H2" is displayed alternating with the set value. In this case also, the set value can be changed by the UP or DOWN buttons. Pressing the mode button obtains the menu for the function setting of the output and permanently saves the set value at the same time.

3.3.6 Output 2 function

F2 is shown alternating with the set parameter. The “ on " for switching on the output in the event of an overshoot of the set switching point or the “ off " parameter for switching off the output in the event of an overshoot of the threshold value is set by means of the UP, DOWN buttons.

Pressing the mode button changes to the next menu item and saves the previously set value at the same time.

3.3.7 Output 3 temperature switching point

The parameter “ t3 " for output 3 switching point is shown alternating with the set value of the switching point. This can be changed using the UP and DOWN buttons. Pressing the mode key saves the setting and changes to the next menu item.

3.3.8 Output 3 Hysteresis

The “ H3 " parameter is shown alternating with the set value. This can be changed as required by using the UP and DOWN buttons. Pressing the mode switch saves the setting and changes to the next menu item.

3.3.9 Output 3 function

F3 is shown alternating with the set parameter. The “ on " parameter for switching on the output in the event of an overshoot of the said switching point or the “ off " for switching off the output in the event of an overshoot of the switching value is set by means of the UP and DOWN buttons.

Pressing the mode button changes to the next menu item and at the same time saves the previously set value.

3.3.10 Indicator board function

The seven-segment display shows “FUNC" for the function of the indicator board alternating with the settable parameter. If the assembly is used for temperature display, the “temp" is selected using the DOWN button.

The “Fill" parameter is selected for a level indication.
Pressing the mode button saves the setting. If the level indication is selected as a function, the menu is exited or further settings can be made, depending on which function is selected for the assembly.

3.3.11 Unit changeover

The temperature indicator can be switched between Fahrenheit and Celsius. This selection is made by using the UP and DOWN buttons. Pressing the mode switch saves the setting and selects the next menu item.

3.3.12 Display changeover

The range between -9.and 99.9 can be displayed with or without the decimal point value. If a decimal point value is used, the resolution is 0.5 degrees. Selection is by means of the UP and DOWN buttons. Pressing the mode button exits the menu.

3.4 Level indication

3.4.1 Setting the end values

The level indication can operate in a range of from 100 Ohm to 600 Ohm. The end points on the percentage display can be matched to the transmitter used by means of a learn function. To do so, press the MODE and DOWN buttons and hold for two seconds. “LO" is shown alternating with the measured resistance value in the seven-segment display. Move to the bottom position for the zero percent of the measuring strip. When a stable reading is indicated, press the mode button to assign this value to the zero percent point on the display, at the same time pressing the mode button in the setting mode to move to the 100 percent point. When a stable reading is obtained in the display after moving to the top end point, press the mode button again to assign and save this value. This completes the setting procedure.

3.4.2 Output 1 level switching point

Pressing the mode button in the level display mode for at least one second obtains the menu item for setting the switching point for output 1. The seven-segment display shows the “L1" parameter alternating with the set value.

The switching points for output 1 can be set using the UP and DOWN buttons. The switching point can be set in increments of 1 percent in the range of from 0 to 100 percent. Pressing the mode button to select the next menu item permanently saves the set value in the internal EEPROM memory of the processor.

3.4.3 Output 1 Hysteresis

The “HL1" parameter is shown alternating with the set value. The hysteresis value of the output is set by using the UP and DOWN buttons. The setting is made as a percentage in the 0 to 10 range. The effect of the hysteresis is that on a reducing level the output switches back by a value lower than the hysteresis. Pressing the mode button saves the set value and selects the setting menu to change the output function.

3.4.4 Output 1 function

The switching outputs of the indicator board are designed as “open collector" outputs. If the outputs are active, they switch the 24V supply to the switch output.

Whether the output is switched on or off in the event of an overshoot of the switching point can be set by means of the menu item. The abbreviated display “F1" for output 1 function is shown in the display and the value “on" or “off" as the parameter. If “on" is selected, the output switches to +24V if the switching point is overshot. If “off" is set, the 24V at the output is switched off in the event of an overshoot of the switching value.

The next menu item can again be obtained by pressing the mode switch. The previously set value is then saved.

3.4.5 Output 2 level switching point 2

The switching point of output 2 is also set as for output 1. In the display, “ L2 " for switching point 2 is shown alternating with the set switching threshold. The value is set using the UP, DOWN buttons. The set value is saved and the next menu item selected by using the mode switch.

3.4.6 Hysteresis Ausgang 2

The seven-segment display shows this set point “HL2" alternating with the set value. In this case also, the set value can be changed by the UP or DOWN buttons. Pressing the mode button obtains the menu for the function setting of the output and permanently saves the set value at the same time.

3.4.7 Output 2 function

F2 is shown alternating with set parameter. The “ on " for switching on the output in the event of an overshoot of the set switching point or the “off " parameter for switching off the output in the event of an overshoot of the threshold value is set by means of the UP, DOWN buttons.

Pressing the mode button changes to the next menu item and saves the previously set value at the same time.

3.4.10 Output 3 function

F3 is shown alternating with the set parameter. The “ on " for switching on the output in the event of an overshoot of the set switching point or the “off “ parameter for switching off the output in the event of an overshoot of the threshold value is set using the UP and DOWN buttons. Pressing the mode switch changes to the next menu item and at the same time saves the previously set value

3.4.11 Indicator board function

The seven-segment displays shows “FUNC" for the function of the indicator board alternating with the settable parameter. If the assembly is used for temperature indication, the “temp" is selected using the DOWN button. For level indication, the “Fill" parameter value is selected.

Pressing the mode button saves the setting. Depending on which function was selected for the assembly, the menu is exited or further settings can be undertaken. Point 4.2.11 to point 4.2.12

3.5 Parameter overview

Parameter	Range	Basic setting	Display
Output 1 temperature switching threshold	-50°C-200°C/ -58°F-392°F	21°C	t1/ Value
Output 1 switching threshold hysteresis	0K-10K/ 0°F-10°F	1K	H1/ Value
Output 1 function	on/off	on	F1 /on_off
Output 2 temperature switching threshold	-50°C-200°C/ -58°F-392°F	22°C	t2/ Value
Output 2 switching threshold hysteresis	0K-10K/ 0°F-10°F	1K	H2/ Value
Output 2 function	on/off	on	F2 /on_off
Output 3 temperature switching threshold	-50°C-200°C/ -58°F-392°F	23°C	t3/ Value
Output 3 switching threshold hysteresis	0K-10K/ 0°F-10°F	1K	H3/ Value
Output 3 function	on/off	off	F3 /on_off
Indicator board mode	Level/ Temperature	Temperature	Fill/ Temperature
Temperature measuring unit	°Fahrenheit/° Celsius	°Celsius	unit/°F_°C
Display format from –9,9° to 99,9°	Without a decimal point value/with a decimal point value	Without a decimal point value	disp/1C_0.5C
Output 1 level switching threshold	0%-100%	20%	L1/ Value
Output 1 switching threshold hysteresis	0-10	5%	HL1/ Value
Output 1 function	on/off	on	F1/on_off
Output 2 level switching threshold	0%-100%	30%	L2/ Value
Output 2 switching threshold hysteresis	0-10	5%	HL2/ Value
Output 2 function	on/off	on	F2/on_off
Output 3 level switching threshold	0%-100%	80%	L3/ Value
Output 3 switching level hysteresis	0-10	5%	HL3/ Value
Output 3 function	on/off	off	F3/on_off

3.6 Technical data

Operating voltage	20V - 28V DC
Current consumption	ca. 30 mA
Switching outputs	3x „open collector“
Switching currents	max. 1A
Output polarity	Configurable
Temperature switching thresholds	-50°C-200°C/ -58°F-392°F
Temperature hysteresis (below the switching threshold)	0-10K /0-10°F
Level switching threshold	0-100%
Level hysteresis (below the switching threshold)	0-10%
Temperature measuring range (Pt 100)	-50°C to 200°C / -58°F to 392°F
Accuracy of temperature measurement	+/- 1,5 K
Switch-off of outputs	< -100°C / > 205°
Resistance chain measuring range	0-100%
Accuracy of resistance measurement	1%
Switch-off of outputs	< 30Ohm / > 450Ohm