

Operating instructions 15195e

Programmable 5 Digit Process Display Temperature Transmitter with Display/Alarm Control PMO 2101/4101 for WTH/THE

I DIMENSIONS

	Front frame W x H in mm	Depth behind panel in mm	Display height in mm	Panel Cutout W x H in mm	Digits
PMO 2101	96 x 48	120	14	92 ^(+0,8) x 45 ^(+0,6)	5
PMO 4101	144 x 72	162	20	137,2 ^(±0,5) x 66 ^(±0,5)	5

II STANDARD FUNCTIONS

PMO 2101/4101 have following standard functions:

Option for PMO 2001/4001	PMO 2101/4101
S91	Peak value storage
S97	Cancellation of parameter disabling
S177	Dimmed display

Following functions are new:

- Digital input for
 - Start/stop
 - Display test
 - Blanking
- Display brightness in 7 steps
- Average value 1 - 20 s
- Individual setting of hysteresis for each limit value
- If the hardware for a certain function is not available, e.g. transducer output the input function is disabled
- More thermocouples/sensors: B, E, N, T, U and Ni 100
- TCBO - adjustable limit alarm relay

III TECHNICAL DATA

R.T.D.	Element	Display range in °C	Measurement error (%) f.s.d. at TV = 23 °C	Temperature drift	Norm	
	Pt 100 2-, 3-, 4 wire	-200...850 or	-200,0...850,0	0,05 ± 1 digit	0,01 °C/°C	DIN/IEC 751
	Ni 100 2-, 3-, 4 wire	-60...240 or	-60,0...240,0	0,05 ± 1 digit	0,01 °C/°C	DIN 43760
	Thermoelemente					
	Ni-CrNi, Type K	-200...1370 or	-200,0...1370,0	0,1 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	Fe-CuNi, Type L	-200...900 or	-200,0...900,0	0,1 ± 1 digit	0,01 °C/°C	DIN 43710
	Fe-CuNi, Type J	-200...1000 or	-200,0...1000,0	0,1 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	PtRh90/10%-Pt, Type S	0...1750		0,1 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	PtRh87/13%-Pt, Type R	0...1590		0,1 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	PtPtRh70/30%-Pt94/6%, Type B	40...1800		0,3 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	NiCr-CuNi, Type E	400...1800 or	-270,0...1000,0	0,1 ± 1 digit	0,01 °C/°C	DIN/IEC 584
		-270...1000 or	-200,0...1000,0	0,2 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	NiCrSi-NiSi, Type N	-270...1300 or	-270,0...1300,0	0,1 ± 1 digit	0,01 °C/°C	DIN/IEC 584
		-270...400 or	-200,0...1300,0	0,2 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	Cu-CuNi, Type T	-270...400 or	-270,0...400,0	0,2 ± 1 digit	0,01 °C/°C	DIN/IEC 584
		-200...400 or	-200,0...400,0	0,1 ± 1 digit	0,01 °C/°C	DIN/IEC 584
	Cu-CuNi, Type U	-200...400 or	-200,0...400,0	0,1 ± 1 digit	0,01 °C/°C	DIN 43710

Internal resistance	max. 100 Ω
Input impedance	470 k Ω
Cold junction compensation	internal 0 ...45 °C, external 0...99 °C
Measuring rate	3 measurements/s
Averaging	1 s from 3 measurements up to 20 s from 60 measurements
Overrange - display and measuring range	„or“
Underrange - display and measuring range	„ur“
ERROR and status display	„—“ Input is disabled „.....“ Interruption of input by pressing F „P.....“ Input has been completed and the parameter is stored in the EEPROM „— — —“ Thermocouple burnout „ . .“ Terminal temperature is measured after configuration of F0, F1 on devices with input thermocouple and internal compensation „Error“ - Calibration data is lost; the device must be returned to service department for calibration.
Power supply	230/115 V AC \pm 10 % 47...63 Hz through internal jumper
Current consumption	6 VA

Options

N2	Power supply 24 V AC \pm 10 % 47... 63 Hz, 6 VA, galvanically separated from measurement input and analog output, Test voltage 1,5 kV acc. VDE 0100, section 410
N3	Power supply 18 - 30 V DC galvanically separated from measurement input and analog output, Test voltage 1,5 kV acc. VDE 0100, section 410
I	Analog output, galvanically isolated 0(4)...20 mA, load 500 Ω , Accuracy 0,1 %, resolution 12 bit)/Circuit break > 22 mA,
G2	2 independent limit values, galvanically isolated switching contacts, 250 V, 1 A 50 W, n.o.c. or n.c.c., hysteresis programmable for each channel
G3	third limit value, galvanically isolated switching contacts, 125 V AC/0,4 A 30 V=2 A, n.o.c. or n.c.c., hysteresis programmable
gr	green LED (indicated value)
SR85	RS 485 interface, galvanically isolated, max. 31 units, initialization 9600 baud, 8 bit, 1 Stop bit, no parity
SM	black front frame

IV OPERATION



Function key
for configuration



Scroll key



Enter key
for storing
the displayed value

The keys have following functions in the measuring mode:

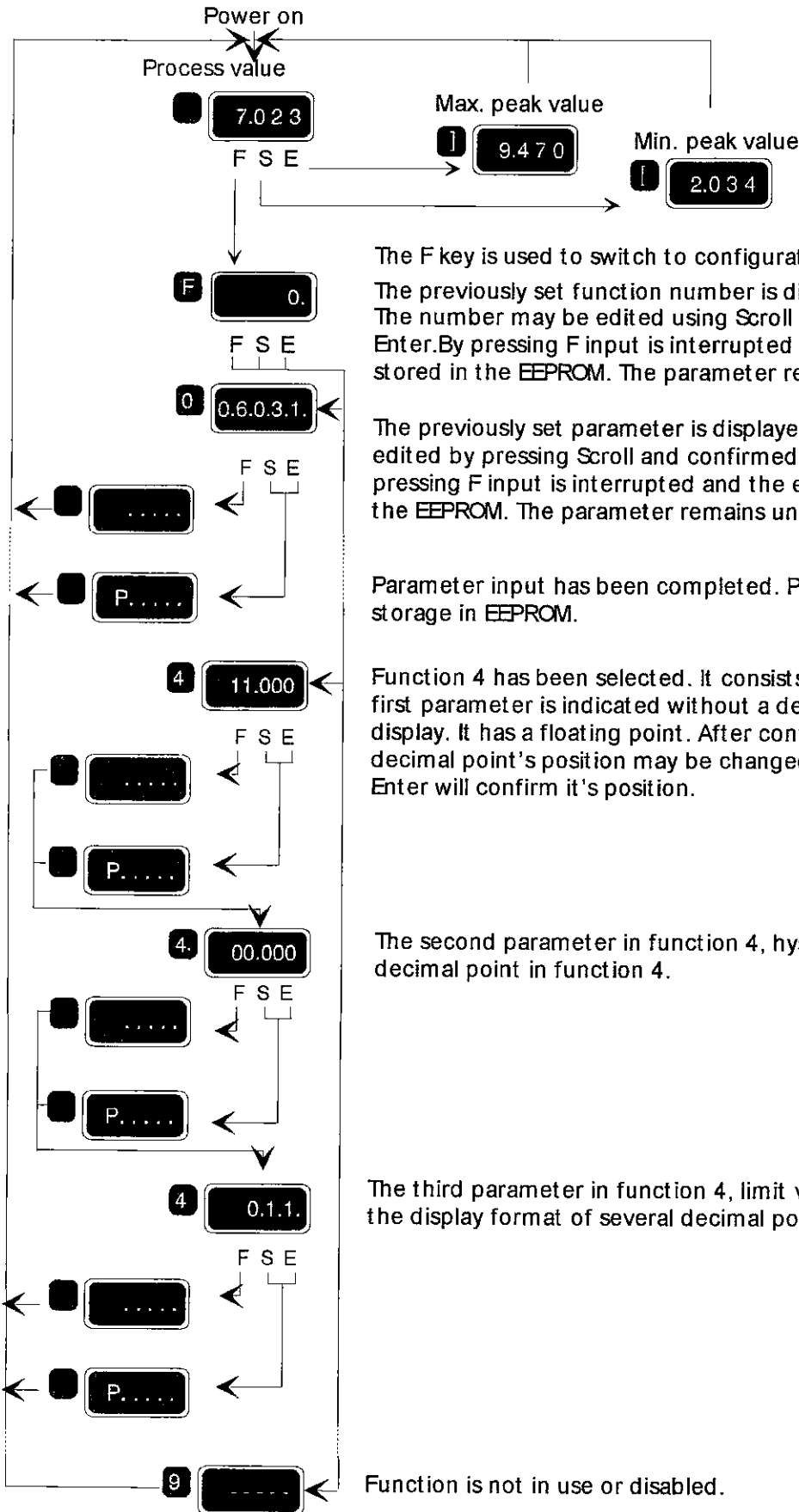
F	Start configuration procedure
Scroll (S)	Display of minimum peak value as long as key is pressed.
Enter (E)	Display of maximum peak value as long as key is pressed.
Scroll and F	Cancel minimum peak value (first Scroll, then also F)
Enter and F	Cancel maximum peak value (first Enter, then also F)
Scroll and Enter	Display of device type (PMO 2101) 2 s and display test (8.8.8.8.) as long as both keys are pressed

The keys have following functions in the configuration mode:

F (F)	Interruption of input or reset to previous function number
Scroll (S)	Edit blinking digit
Enter (E)	Confirm blinking digit

If parameter input is disabled (slide switch to the right, rear side of PMO 2101/4101), configuration can only be started using F if for at least one limit value (1. switching point) the parameter input is not disabled (3. Parameter). All disabled functions cannot be edited.

GENERAL VIEW OF OPERATION



The F key is used to switch to configuration.

The previously set function number is displayed blinking. The number may be edited using Scroll and confirmed with Enter. By pressing F input is interrupted and the edited digit is not stored in the EEPROM. The parameter remains unchanged.

The previously set parameter is displayed blinking. The digit may be edited by pressing Scroll and confirmed by pressing Enter. By pressing F input is interrupted and the edited digit is not stored in the EEPROM. The parameter remains unchanged.

Parameter input has been completed. P in the display confirms storage in EEPROM.

Function 4 has been selected. It consists of three parameters. The first parameter is indicated without a decimal point in the function display. It has a floating point. After confirming the last digit, the decimal point's position may be changed through Scroll. Pressing Enter will confirm it's position.

The second parameter in function 4, hysteresis, is indicated by a decimal point in function 4.

The third parameter in function 4, limit values, is indicated by the display format of several decimal points.

Function is not in use or disabled.

V CONFIGURATION

Function 0
Basic setting

0.

0.5.0.3.1.

Measuring range 0...F

- | | |
|-------------------|-------------------|
| 0 = Pt 100 2 wire | 8 = THE Type B |
| 1 = Pt 100 3 wire | 9 = THE Type E |
| 2 = Pt 100 4 wire | A = THE Type N |
| 3 = THE Type K | b = THE Type N |
| 4 = THE Type L | C = THE Type U |
| 5 = THE Type J | d = Ni 100 2 wire |
| 6 = THE Type S | E = Ni 100 3 wire |
| 7 = THE Type R | F = Ni 100 4 wire |

Decimal point
Process value 0...1

- 0 = no decimal point XXXXX
1 = decimal point before 1. digit XXXX.X

Measurement rate/Average
0...7

- 0 = 0,3 s - No average
1 = 1 s - Average from 3 measurements
2 = 2 s - Average from 6 measurements
3 = 3 s - Average from 9 measurements
4 = 4 s - Average from 12 measurements
5 = 5 s - Average from 15 measurements
6 = 10 s - Average from 30 measurements
7 = 20 s - Average from 60 measurements

Display intensity
0...6

- 0 = dimmest display
6 = brightest display

Digital input
0...5

- 0 or 3 = Display, limit values, analog output „freeze“
1 or 4 = Display test (all digits are displayed)
2 or 5 = blanking (display very dim)
0, 1, 2 = Function is processed if digital terminals are connected
3, 4, 5 = Function is processed if digital terminals are open
(Inversion of 0, 1, 2).

Function 1
Thermocouple
compensation and
TCBO

1.

0 0.1.0

TCBO 0; 1
Compensation 0;1
external compensation
0...99 °C

- 0 = off; 1 = on
0 = internal; 1 = external
There is no compensation for T/C B if the temperature is under 40 °C.

Function 2
Line balancing Pt 100

2.

0.1

1. Manual line balancing (Function display 2)
The stored line resistance is indicated and may be edited by Scroll and Enter. Automatic line balancing is initiated by pressing F.

2. Automatic line balancing (Function display 2)
Short circuit sensor and line. PMO indicates the resistance value. Press Enter. The value is stored and the balancing completed. Pressing F will interrupt the process. Remove short circuit when line balance is finished.

Function 3**1. Limit Value**

3 **1 0 . 0 0 0 . 0** Switching point -19999 ...99999 floating point

3 **0 0 0 0 0 . 0** Switching point of hysteresis 0..99999 floating point

3 **0 . 1 . 1 .** Type of limit value

0= n.c.c. (contact is opened in case of alarm LED is on in normal operating condition)
 1=n.o.c. (contact is closed in case of alarm, LED is on in case of alarm)

0= MIN-Alarm (Alarm if value falls below switching point)
 1= MAX-Alarm (Alarm if value is exceeded)
 2 = Circuit break control

0= inactive, no limit value control, relay in normal operating condition
 1= active
 2= active, value may be edited although parameter input is disabled

Function 4**2. Limit Value**

4 **1 1 0 0 0 . 0** Switching point -19999 ...99999 floating point

4 **0 0 0 0 0 . 0** Switching point of hysteresis 0..99999 floating point

4 **0 . 1 . 1 .** Type of limit value - for details refer to limit value 1

Function 5**3. Limit Value**

(only available for devices with option G3, programmable without display)

5 **1 2 0 0 0 . 0** Switching point -19999 ...99999 floating point

5 **0 0 0 0 0 . 0** Switching point of hysteresis 0..99999 floating point

5 **0 0 . 1 . 1 .** Type of limit value

Function 6
**Current/Voltage output
(only available for devices with options I/U1)**

6 Initial value (related to standard measuring mode -19999...99999 floating point)

6. Ultimate value (related to standard measuring mode) 0...99999 floating point

6 Initial value for output and filter

0= Initial value 0 mA/0 V output
 1= Initial value 4 mA/2 V output

0= without averaging filter approx. 3 s updating time
 1= with averaging filter, update in relation to measuring rate selected under function 0

Function 6
**Interface address
(only available for devices with option SR85)**

6 00...99 (00 = inactive)

Function 7
Sensor compensation

7 Compensation of sensor error.
 -19999...99999 °C floating point (when 0 is set there is no compensation)
 The corrected value is added to the process value.

Function 8 -

Function 9 -

The device is configured using the front panel keys.

All function levels 0 - 9 are called up by pressing F. Input may be interrupted or individual parameters may be skipped by pressing F. The parameters may only be entered if the hardware has been installed (e. G. no setting of analog output if neither option I nor U are included). Functions 3 and 4 may be used to set the alarm display although G2 as an option is not contained.

Configuration on delivery

Measuring range	THE, Type K
Decimal point	one digit before decimal point
Measuring rate	0,3 s, no average
Display intensity	brightest setting
Digital input	Display, limit values and analog output „freeze“
TCBO	Off
T/C compensation	external 0°C
Pt 100, Ni100 2 wire line resistance	0,1 Ω
1. limit value	100 °C, no hysteresis, n.c.c., max.alarm, inactive
2. limit value	110 °C, no hysteresis, n.c.c., max.alarm, inactive
3. limit value	120 °C, no hysteresis, n.c.c., max.alarm, inactive
Current/voltage output	0...400 °C, 0...20 mA/10 V
Sensor compensation	0 °C (no compensation)

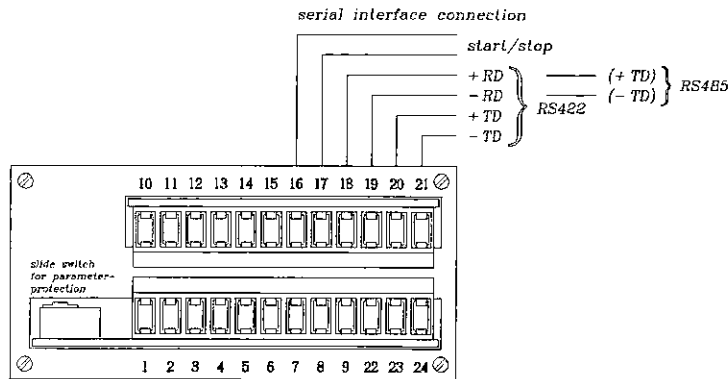
MINIMUM AND MAXIMUM PEAK VALUE STORAGE

The lowest process value is automatically stored in the „Min“ peak value storage. It may be indicated by pressing Scroll. „[-“ appears in the function display.

The highest process value is automatically stored in the „Min“ peak value storage. It may be indicated by pressing Scroll. „]“ appears in the function display.

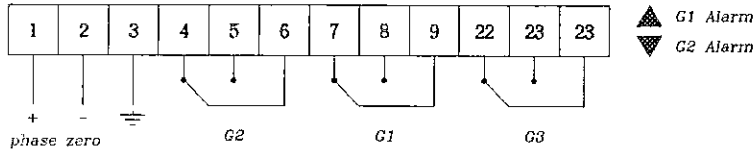
The stored values may be deleted by pressing F and Scroll or ENTER at the same time.

VI CONNECTION DIAGRAM PMO 2101/PMO 4101

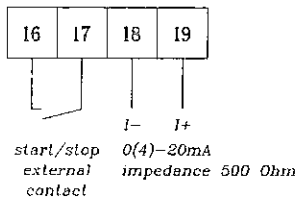


Terminals 18-21 are used for either the serial interface or the analogue output.

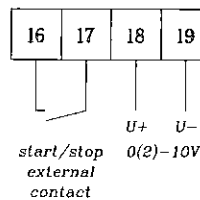
I Power Supply and Relay output



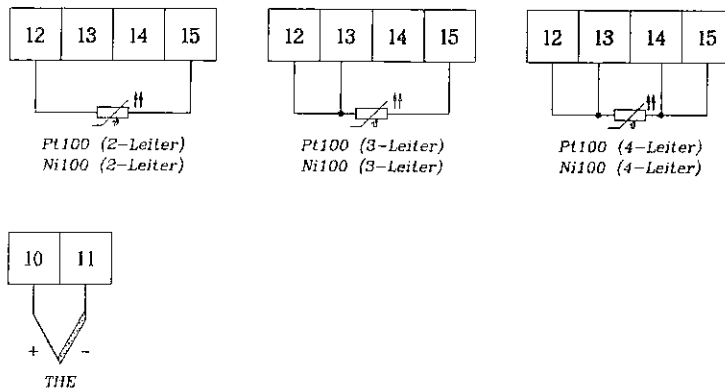
II Current Output/Display Hold



III Voltage Output/Display Hold



IV Sensor Inputs



Attention

Connections

Please observe that for faultless operation only plugs/terminals of the same color are plugged.