CE

ESTERS ELEKTRONIK

Operating Instructions 15094e

Programmable 5 Digit Process Display Transmitter with Display/Alarm Control PMO 2105/4105 for I/U/R

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 2105	96 x 48	120	14	$92^{(+0,8)}$ x $45^{(+0,6)}$	5
PMO 4105	144 x 72	162	20	$137,2^{(\pm 0,5)}$ x $66^{(\pm 0,5)}$	5

II STANDARD FUNCTIONS

PMO 2105/4105 have following standard functions:

Option for PMO 2005/4005	PMO 2105/4105
S91	Peak value storage
S97	Cancellation of parameter disabling
S101	Linearization of a slope with 10 steps
S1	Transducer supply 15 V DC/50 mA
S177	Dimmed display

Following functions are new:

a) 5 digits
b) Digital input for
   - start/stop
   - Display test
   - Blanking
c) Display brightness in 7 steps
d) Average value 1 - 20 s
e) Individual setting of hysteresis for each limit value
f) If the hardware for a certain function is not available, e.g. transducer output the input function is disabled
g) Circuit break alarm

III TECHNICAL DATA

Measuring ranges	± 2 mA, ± 20 mA ± 200 mV, ± 2 V, ± 20 V, ± 200 V DC (Option R = 0…200 Ω, 0…2 kΩ)
Resolution	11 µV at 200 mV measuring range
Programmable Display Range	-19999…+99999
Decimal point	programmable
Accuracy	± 0,05 % f.s.d. ± 1 digit at 23 °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“ at 10 % overrange
Underrange - display and measuring range	„ur“ at 10 % underrange
ERROR display	Calibration data is lost; the device must be returned to service department for calibration.
Status display	„-------“ Input is disabled „……“ Interruption of input by pressing F „P……“ Input has been completed and the parameter is stored in the EEPROM „---“ Circuit break at 4…20 mA minimum operation value <0,12 mA
Power supply	230/115 V AC ± 10 % 47…63 Hz through internal jumper
Current consumption	6 VA
Ambient temperature	0…55 ° C
Storage temperature	-10...+70 °C
Protection	Front to IP 64 acc. DIN 40050
Connection	Plugable terminals 1,5 mm^2
Transducer supply	2 and 3 wire transducers 15 V DC /50 mA
Operation control	Watchdog
Isolation group	A to VDE 0110 built in condition
Relative humidity	≤ 75 % annual mean, seldom and slight dew

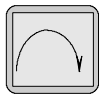
Options

N2	Power supply 24 V AC ± 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,
U	Analog output, galvanically isolated 0(2)…10 V DC, max. load 2 kΩ, Accuracy 0,1 %, resolution 12 bit, Circuit break analog output >11 V

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
S2	Strain gauge differential pressure sensor, constant current 1 mA
S3	Strain gauge differential pressure sensor, supply 10 V DC, 50 mA
S4	Power supply for 2 and 3 wire sensor 24 V DC, 50 mA
R	Resistance measurement 0…200/0...2000 Ω, constant current 1 mA
SM	black front frame

IV OPERATION

Function key
for confguration



Scroll key

Enter key
for storing
the displayed value

The keys have following functions in the measuring mode:

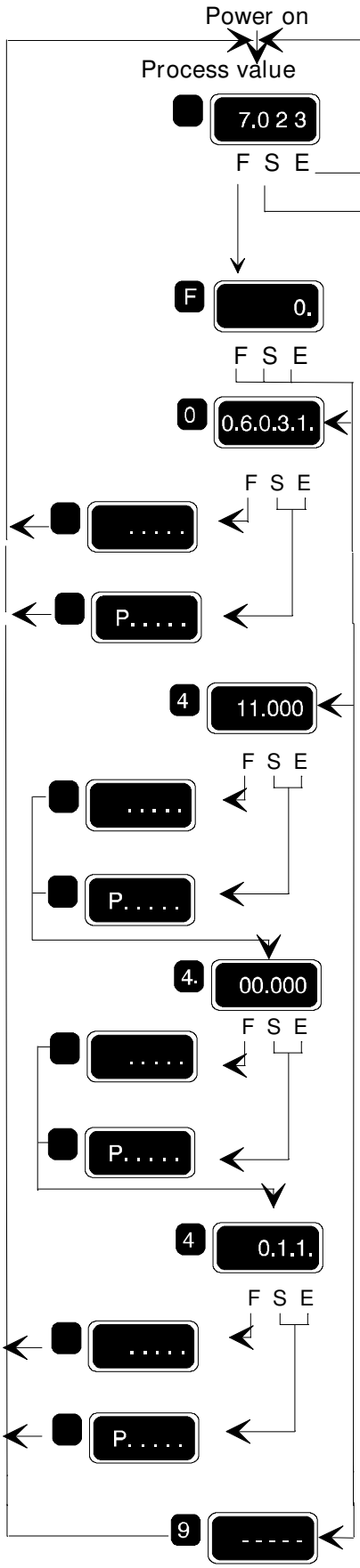
F	Start configuration procedure
Scroll (S)	Display of minimum peak value as long as key is pressed.
Enter (E)	Display of maximum peak value as long as key is pressed.
Scroll and F	Cancel minimum peak value (first Scroll, then also the F)
Enter and F	Cancel maximum peak value (first Enter, then also the F)
Scroll and Enter	Display of device type (PMO 2105) 2 s and display test (8.8.8.8.8.) 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 2105/4105), 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

The device is configured using the front panel keys.

All function levels 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.

Attention
Please observe

For higher accuracy, the display scaling may be performed with a variable number of digits behind the decimal point. However, the current measurement value displayed with the number of digits behind decimal point is selected in function 0. Especially after a change of input, it must be observed that the decimal point is set correctly while scaling. Overrange is indicated by „or“

CONFIGURATION ON DELIVERY

Measuring range program number	1		
Measuring range	-19,999 - 20,000		
Display range	-19,999 - 20,000		
Decimal point	3		
Limit value 1(option G2), switching mode	10,000, 0/1/1		
Limit value 2(option G2), switching mode	11,000, 0/1/1		
Limit value 3(option G3), switching mode	12,000, 0/1/1		
Hysteresis	00,000		
Measuring rate	0		
Scaling of analog output (option I/U) lower value	00,000		
Scaling of analog output (option I/U) upper value	20,000		
Analog outputs	0/0		
Display intensity	5		
Digital input	0		
Device address (option SR 85)	0	00 =	manual operation
		01-99	operation through interface

Function 0
Basic setting

0.

0.5.0.3.1.

Measuring range 0...5

0 = +/- 2 mA 1 = +/- 20 mA (internal jumper B) Standard
2 = +/- 200 mV (internal jumper A)
3 = +/- 2 V 4 = +/- 20 V 5 = +/- 200 V (jumper B) Standard

6 = 4 - 20 mA with circuit break control

Decimal point of
Process value 0...4

0 = no decimal point XXXXX.
1 = decimal point before 1. digit XXXX.X
2 = decimal point before 2. digit XXX.XX
3 = decimal point before 3. digit XX.XXX
4 = decimal point before 4. digit X.XXXX

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
(Invertion of 0, 1, 2).

Function 1
Scaling of Measurement range

1.

-19.999

20.000

1. Parameter - Measurement signal initial value -19999...20000
2. Parameter - Measurement signal ultimate value -19999...20000
The decimal point is determined through measurement range function (F0)

Function 2
Scaling of process value display

2.

-19.999

20.000

1. Parameter - Initial value -19999...99999 (floating point)
2. Parameter - ultimate value -19999...99999 (floating point)

Function 3 **1. Limit Value**

Switching point -19999 ...99999 floating point

Switching point of hysteresis 0..99999 floating point

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**

Switching point -19999 ...99999 floating point

Switching point of hysteresis 0..99999 floating point

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)

Switching point -19999 ...99999 floating point

Switching point of hysteresis 0..99999 floating point

Type of limit value

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

6 **0 0 0 0.0** Initial value (related to standard measuring mode) -19999…99999 floating point

6. **2 0.0 0 0** Ultimate value (related to standard measuring mode) 0...99999 floating point

6 **0.0.** Initial value for output and filter

0= Initial value 0 mA/0 V output
1= Initial value 4 mA/2 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 **0 0** 00…99 (00 = inactive)

Function 7 Setting linearization data

Function 8 -

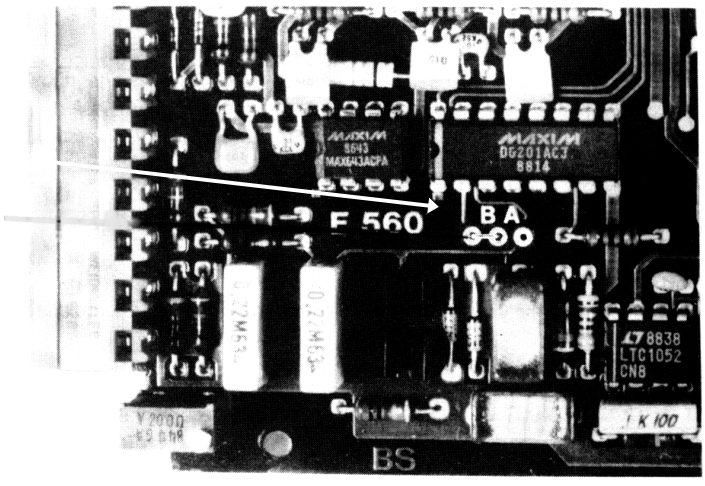
Function 9 -

Please note The second parameter is displayed with a decimal point in the function display. The third parameter is distinguished by the display format.

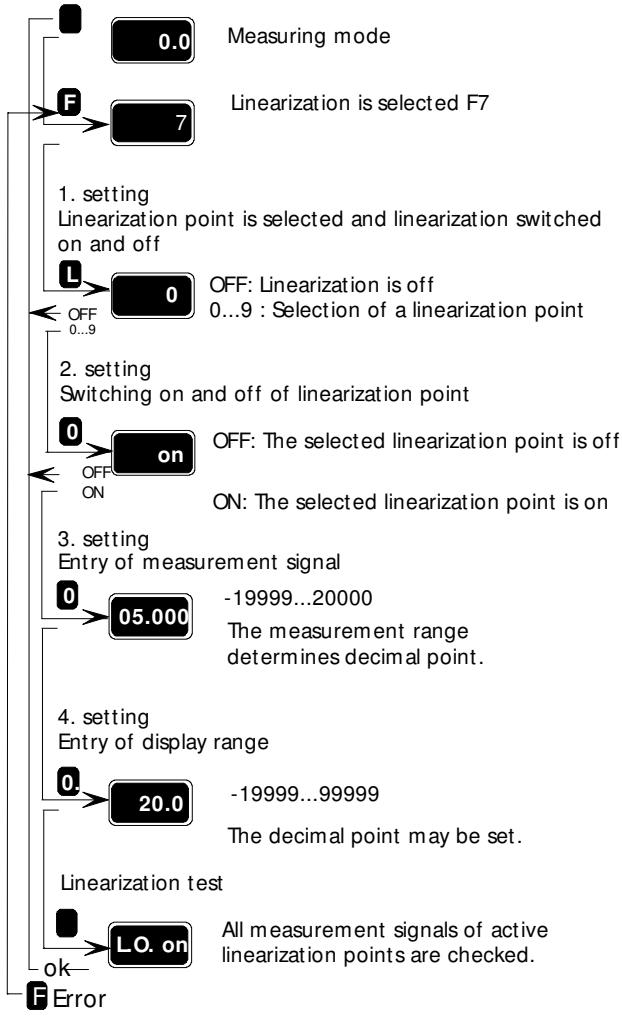
Status display: „_____“ input has been disabled
„…..“ input has been interrupted by pressing F.
„P.....“ input has been completed and is stored in the EEPROM.
„---“ circuit break input 4…20 mA (alternatively output through limit values G1, G2, G3)

Measuring range 200 mV

Measuring range 0…200 mV is selected through metal jumper B to A on p.c.b. E560.



FUNCTION F7
LINEARIZATION OF MEASUREMENT VALUES



If the measurement value should not be linear to the measurement range, the values may be adjusted accordingly. Up to 10 signals with appropriate display values may be set. They are called linearization points and are arranged from 0 to 9. Function 7 - linearization is performed after measurement range setting in function 1. The signals lie within initial and end of the measurement range as scaled under function F1.

The characteristic curve - rising or falling - is determined by the measurement signals. The characteristic curve of the process values (F2 + F7) may be falling or rising (both are possible).

After a linearization point has been set, the signals of the active linearization points will be checked by the PMO. The check will also be performed after rescaling of the measurement range if the linearization function is active. This test is indicated in the process value display and may be interrupted by pressing F in order to correct a linearization point.

Possible errors:

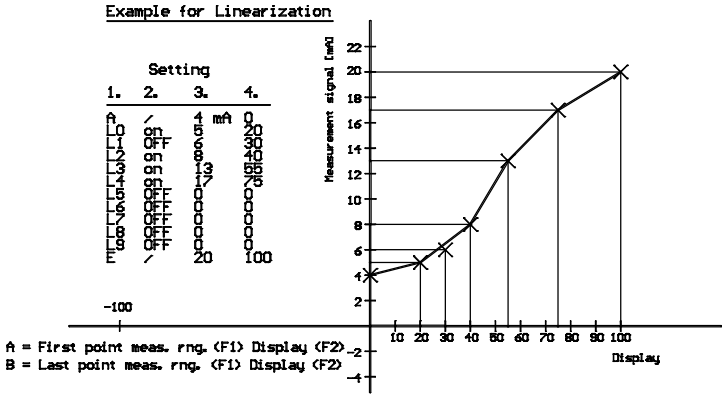
- The linearization point is not within the measurement range.
- The measurement signal in a rising measurement range scaling is the same or smaller than the previous linearization point.
- The measurement signal in a falling measurement range scaling is the same or larger than the previous linearization point

The linearization is inactive when the device leaves our factory. (F7 1. setting = off). Measurement signals and display are set to 0.

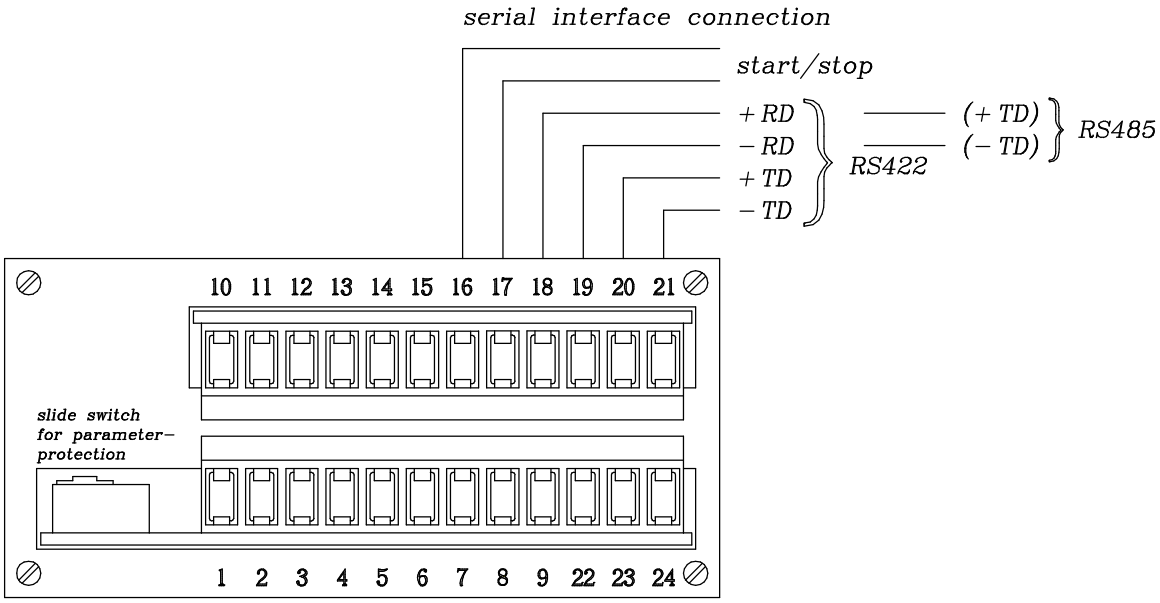
All settings 2 - 4 relate to the point selected under the 1. setting.

Example for Linearization

	Setting		
1.	2.	3.	4.
A	/	4 mA	0
L0	on	5	20
L1	OFF	6	30
L2	on	8	40
L3	on	13	55
L4	on	17	75
L5	OFF	0	0
L6	OFF	0	0
L7	OFF	0	0
L8	OFF	0	0
L9	OFF	0	0
E	/	20	100

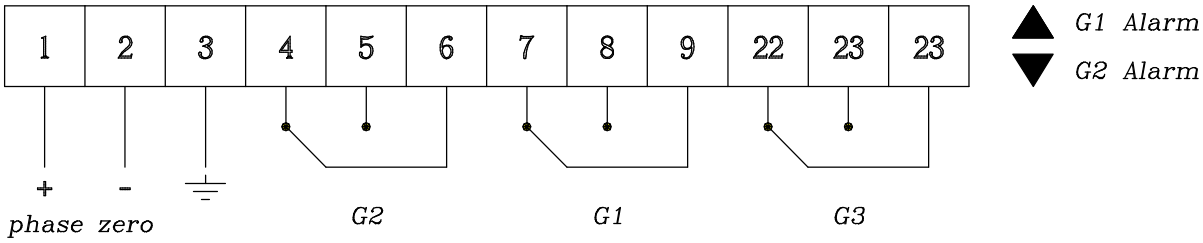


TERMINAL ARRANGEMENT PMO 2105/4105

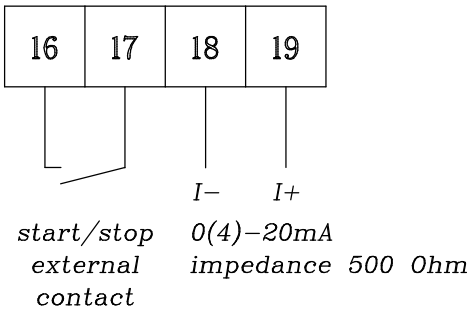


Terminals 18−21 are used for either the serial interface or the analogue output.

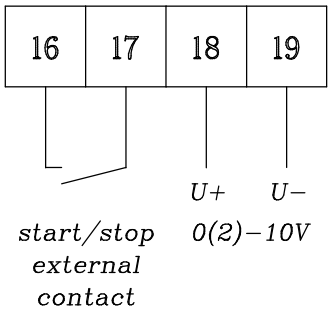
I Power Supply and Relay Output



II Current Output/Display Hold



III Voltage Output/Display Hold



Attention
Connections
Please observe that for faultless operation only plugs/terminals of the same color may be plugged.

Esters Elektronik GmbH, Hafenrandstr. 14, D 63741 Aschaffenburg, Phone: +49 6021-45807-0, Fax: +49 6021-45807-20,
E-Mail: esters@esters.de, Internet: www.esters.de