Temperature controller

1 Functional description

The TRM500 is a versatile temperature controller with switching current up to 30 A. The device has a universal input for a wide range of resistance thermometers and thermocouples as well as a digital input. It is provided with a relay output, an alarm output, a DC logic output. The outputs can be configured for different tasks (see Appendix A). The controller can be quickly configured by using three keys.

Functions:

– On-Off or PID control (see Fig. 1)
– Manual control
– 20 mm, 4 digit display
– 10 mm, 4 digit display
– Digital input filter with an adjustable time constant
– Custom 2-point linearization
– Digital input (remote start/stop or setpoint change) (see Appendix D)
– Temperature range alarm
– Auxiliary alarm output
– Additional logic output (SSR)
– Configurable outputs (see Appendix A)
– Autotuning function (see Appendix C)
– Cold junction compensation
– Input calibration (see Appendix E)
– 9 status LEDs

2 Safety precautions

DANGER ***Do not use the device where it is subjected to flammable or explosive gas.***

WARNING ***Make sure that the device is fully disconnected from auxiliary power before starting any commissioning or repair work.***

WARNING ***Connect the power supply only after the wiring has been completed.***

3 Specifications

Table 1 General data

Power supply	230 (96…264) V AC; 50 (47...63) Hz
Power consumption, max.	5 VA
Resistance thermometer	Pt50, Pt100, Pt500, Pt1000, Ni100, Ni500, Ni1000
Accuracy	0.25%
Connection circuit	2-, 3-, 4-wire
Sampling time for 3-wire	0.3 s
Sampling time for 2- / 4-wire	0.2 s
Lead resistance, max.	15 ohm
Reference junction	internal
Thermocouple	B, J, K, L, N, R, S, T
Accuracy	0.50%
Sampling time	0.2 s
Lead resistance, max.	100 ohm
Digital input	potential free contact
ON max. resistance	70 ohm
OFF min. resistance	1000 ohm
Outputs	
OUT1 (relay)	30A / 250 V AC (resistive) 20A / 30 V DC
OUT2 (relay)	5A / 250 V AC (resistive) 3A / 30 V DC
OUT3 (SSR)	0/5 V, 25-40 mA
Dimensions	96 x 48 x 100 mm
IP Code	front IP54, rear IP20
Ambient temperature	-20…+50 °C
Humidity	up to 80% (non-condensing)
Weight	approx. 160 g

Table 2 Sensor types

Sensor	Parameter	Measuring range, °C
Pt50	P50	–100…+850
Pt100	P100	–100…+850
Pt500	P500	–100…+850
Pt1000	P1E3	–100…+300
Ni100	n100	–60…+180
Ni500	n500	–60…+180
Ni1000	n1E3	–60...+180
K	tP.K	–100…+1300
J	tP.J	–100…+1200
L	tP.L	-100…+800
N	tP.n	–100…+1300
T	tP.t	–100…+400
S	tP.S	0…+1750
R	tP.r	0…+1750
B	tP.b	+200…+1800

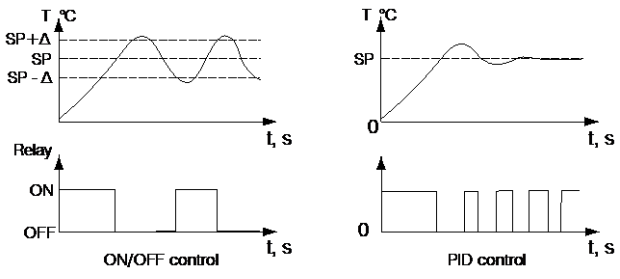


Fig. 1 Control

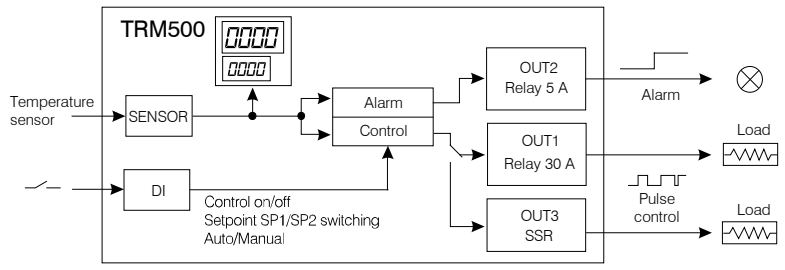


Fig. 2 Block diagram

4 Installation and electrical wiring

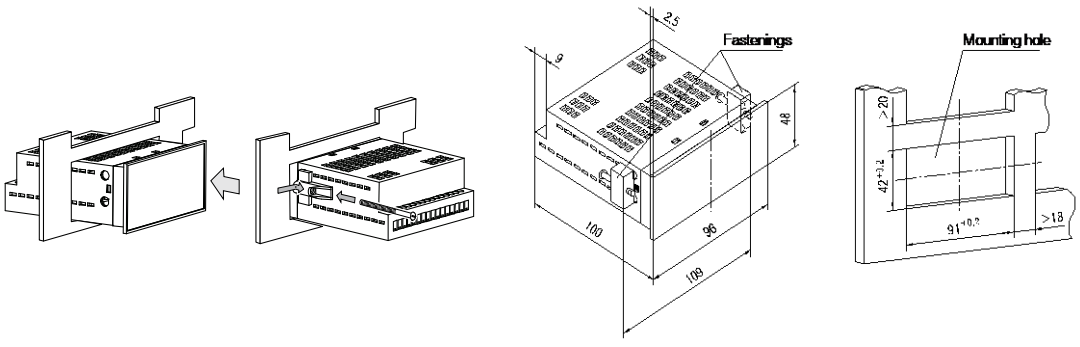


Fig. 3 Mounting and dimensions

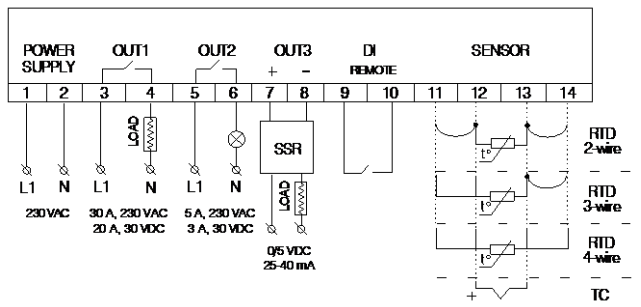


Fig. 4 Electrical wiring

The maximum wire size is 0,75 mm².

5 Maintenance

Technical maintenance should be performed on the device at least every six months by maintenance personnel and comprising the following tasks:

– Removing dust, dirt and foreign matter from the housing.
– Checking mounting of device
– Checking connections

The safety guidelines in Section 2 must be observed when performing maintenance.

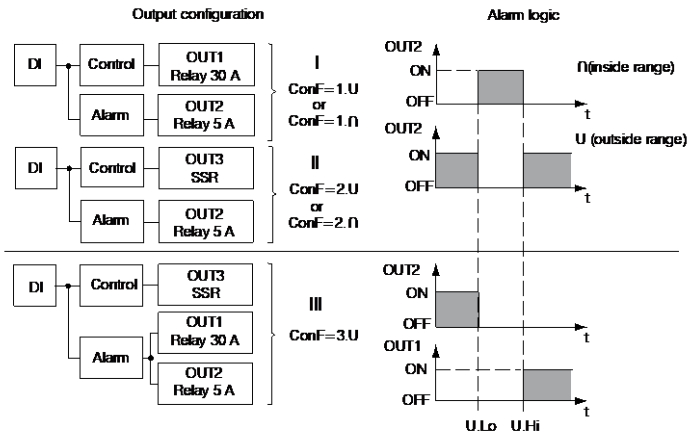
6 Transportation and storage

The device must be transported in closed transport boxes.
Protective measures against shocks, vibrations and humidity must be observed.
Storage temperature range -30…+60 °C.
There may be no chemically active substances in the air.

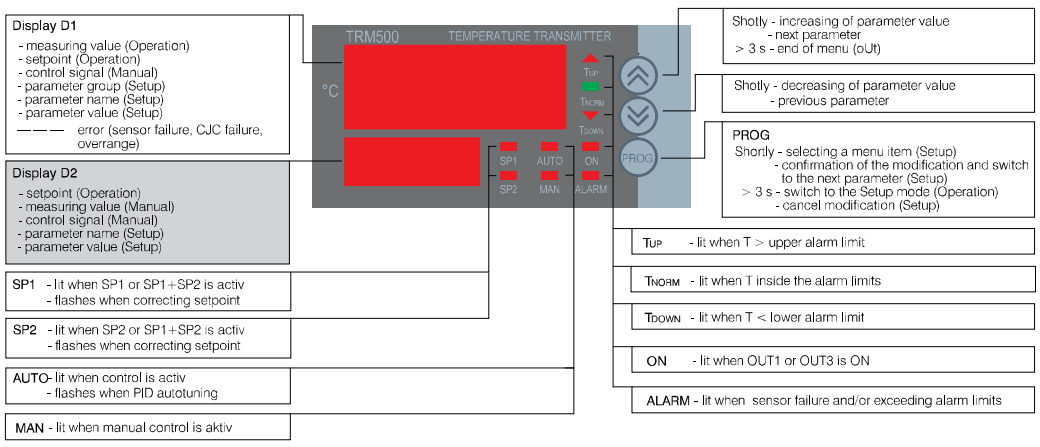
7 Package content

– Temperature controller TRM500	1
– User manual	1

Appendix A. Output configuration



Appendix B. Displays and control elements



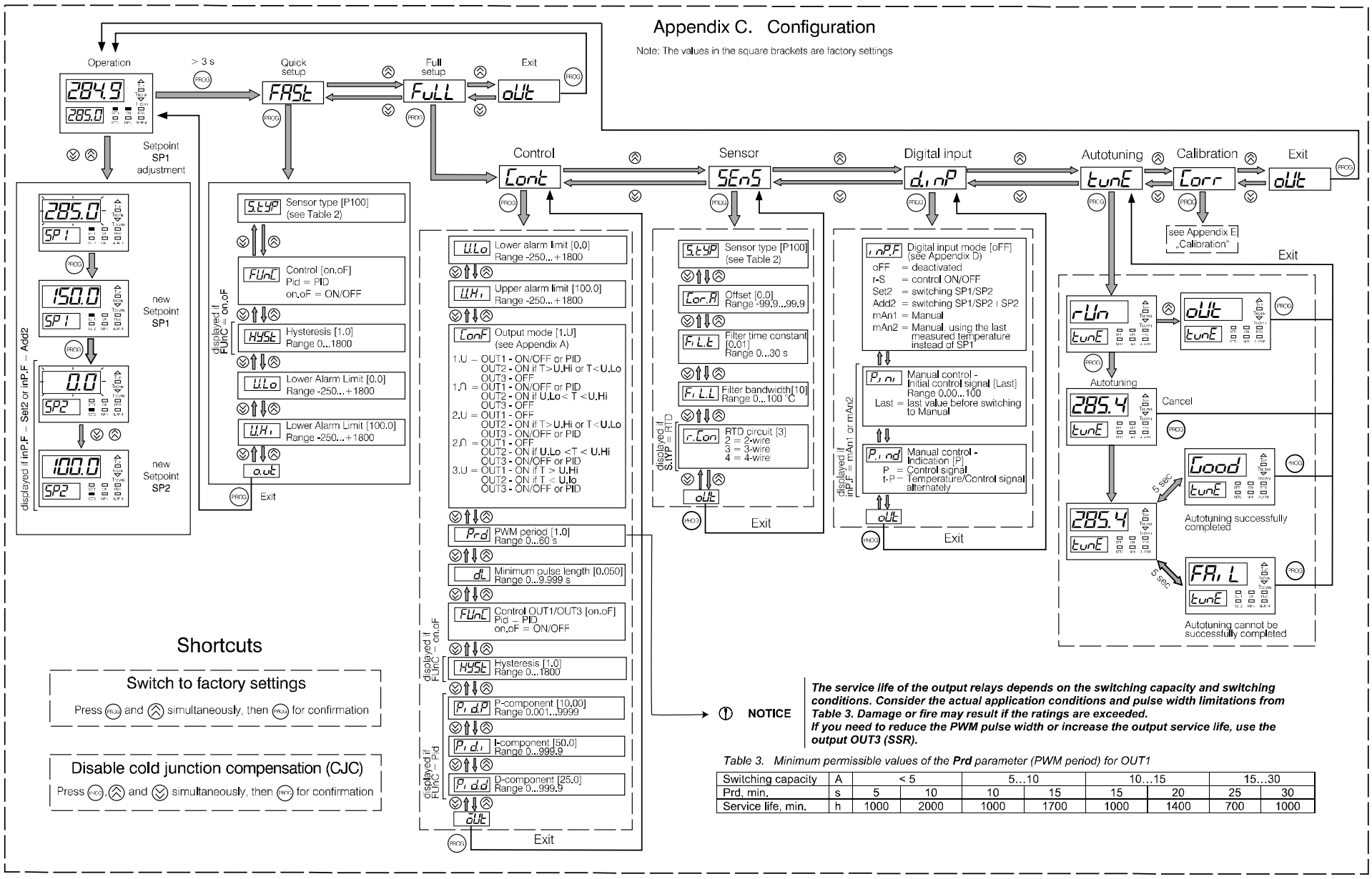
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Appendix C. Configuration

Note: The values in the square brackets are factory settings



Shortcuts

Switch to factory settings

Press PROG and ▲ simultaneously, then PROG for confirmation

Disable cold junction compensation (CJC)

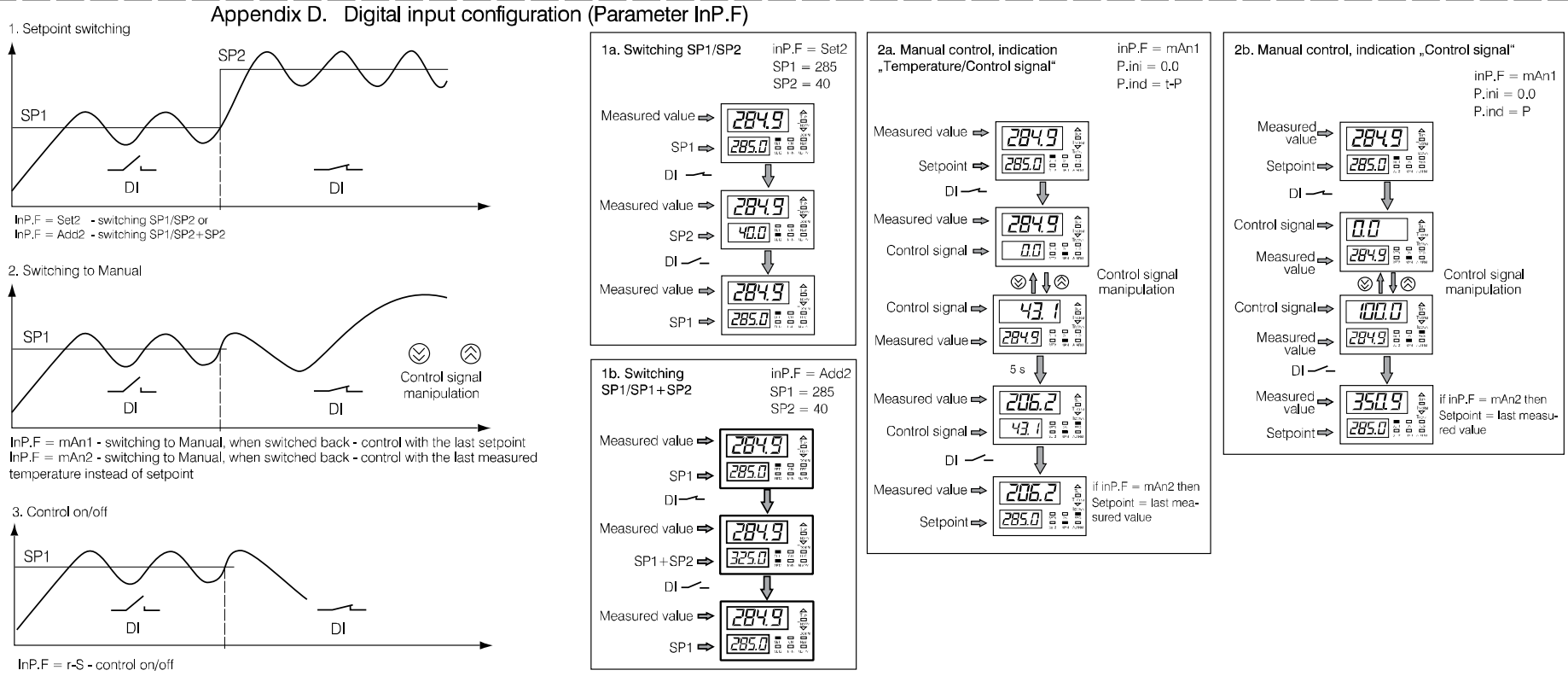
Press PROG, ▲ and ▼ simultaneously, then PROG for confirmation

NOTICE ***The service life of the output relays depends on the switching capacity and switching conditions. Consider the actual application conditions and pulse width limitations from Table 3. Damage or fire may result if the ratings are exceeded. If you need to reduce the PWM pulse width or increase the output service life, use the output OUT3 (SSR).***

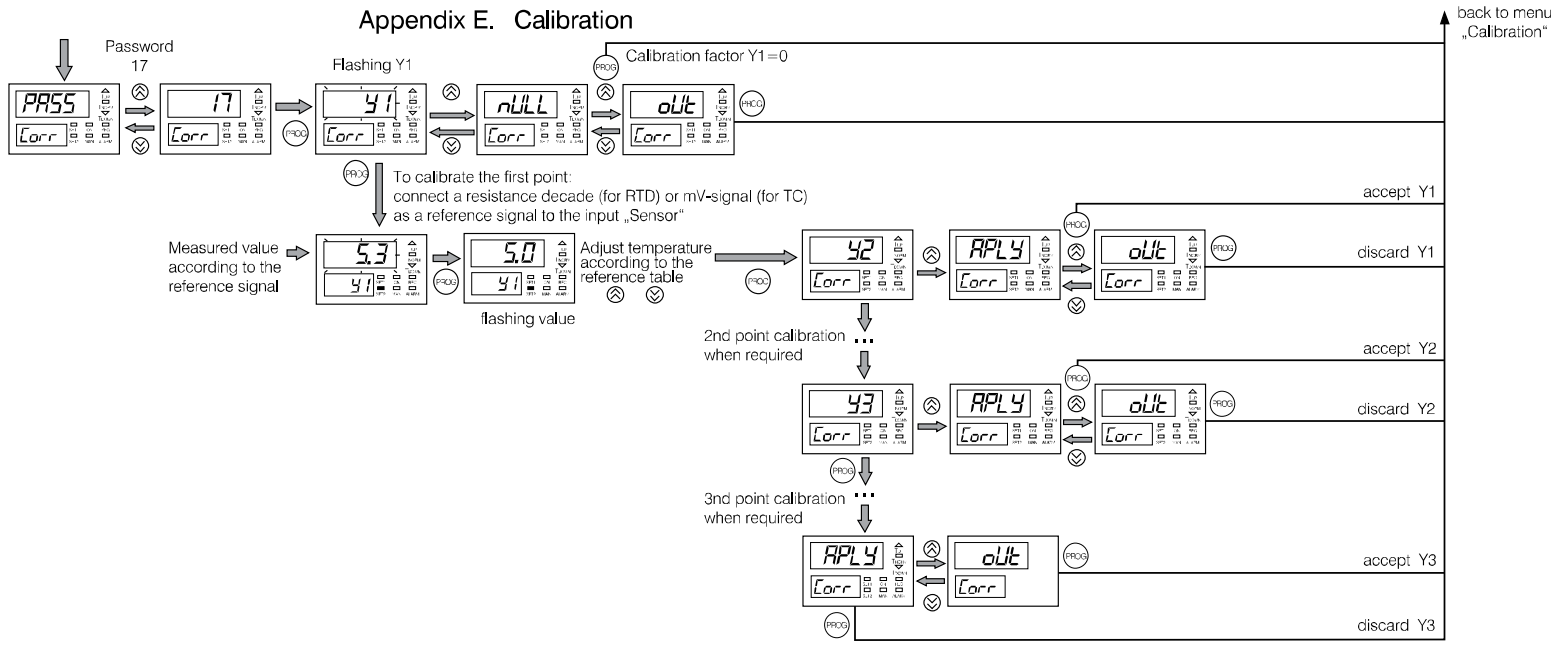
*Table 3. Minimum permissible values of the **Prd** parameter (PWM period) for OUT1*

Switching capacity	A	< 5		5…10		10…15		15…30	
Prd, min.	s	5	10	10	15	15	20	25	30
Service life, min.	h	1000	2000	1000	1700	1000	1400	700	1000

Appendix D. Digital input configuration (Parameter InP.F)



Appendix E. Calibration



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