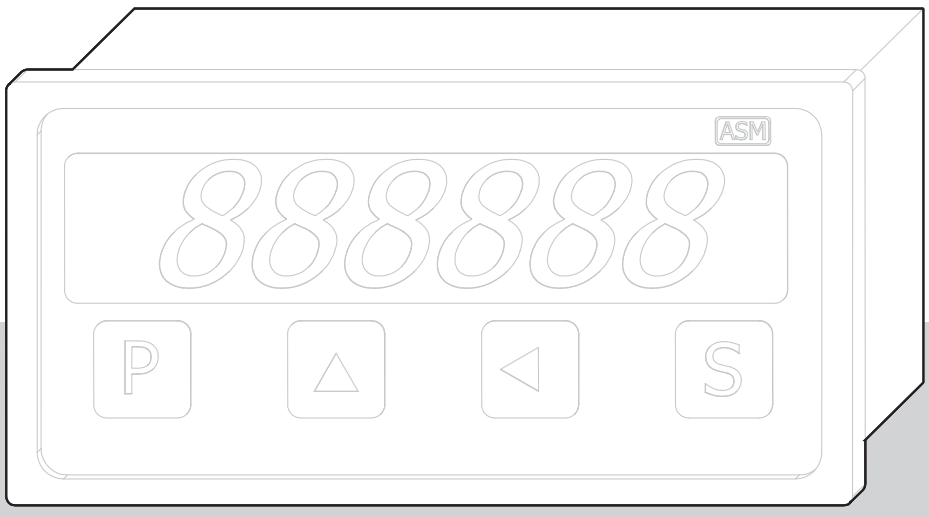
perfect in sensors.

prodis® ADC

Digital Process Meter for analog position, angle and inclination sensors

Installation and operation manual **EN**



Please read carefully before installation and operation!

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1 Safety instructions 4
1.1 Signal words and symbols 4
1.2 Intended use 5

2 Transport and storage 5

3 Installation and initial operation 6
3.1 Mechanical installation 6
3.2 Electrical connection 7
3.3 Startup 14

4 Operation 15

5 Maintenance and disposal 21
5.1 Maintenance and service 21
5.2 Disposal 21

1 Safety instructions

1.1 Signal words and symbols



WARNING, Risk of Injury:
Indicates a potentially hazardous situation, which, if not avoided, can result in serious injury or property damage.

⚠ DANGER

WARNING, Risk of Personal Injury or Death:
Indicates a situation that can result in serious personal injury or death if not properly avoided.

⚠ WARNING

WARNING, Risk of Personal Injury or Death:
Indicates a situation that can result in moderate personal injury or death if not properly avoided.

⚠ CAUTION

WARNING, Risk of Personal Injury:
Indicates a situation that can result in minor personal injury if not properly avoided.

NOTICE

WARNING, Risk of Property Damage:
Indicates a situation that can result in minor to major property damage if not properly avoided.

Product liability

- Disregarding the following instructions may result in malfunction, damage to property and personal injury and releases the manufacturer from product liability.

Safety regulations

- National safety regulations must be observed!

1.2 Intended use

The Process Meters of the prodis® series are optimized for to the sensor signals of the ASM sensors. Data can be transferred to the PC via the RS-232 interface. The optionally available relay outputs enable the monitoring of limit values and the control of machine processes. Use the unit as intended by operating within its specified technical data and ambient conditions.

The installation and operating instructions supplied with the unit must be observed. The data sheet of the respective Process Meter is part of this instruction manual. If not yet available, it may be requested by stating the respective model name.

2 Transport and storage

Observe storage and transport temperatures according to the operating temperature (see data sheet).

Max. rel. humidity 80%, condensation must be excluded.

The device must be secured against slipping and tipping during transport.

Shipment damages

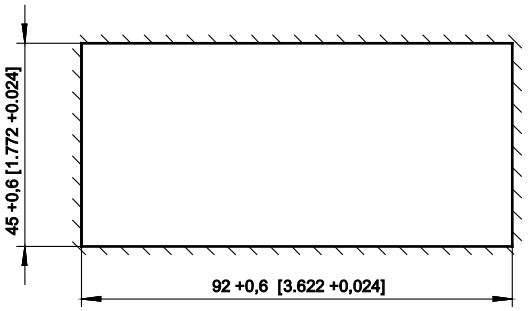
Check the device immediately for shipment damages. In case of any damage or equipment not operating appropriately, please contact the producer.

Shipment content

- Process meter
- Operation instructions

3 Installation and initial operation

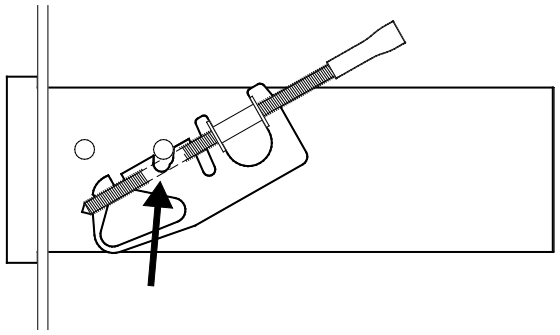
3.1 Mechanical installation



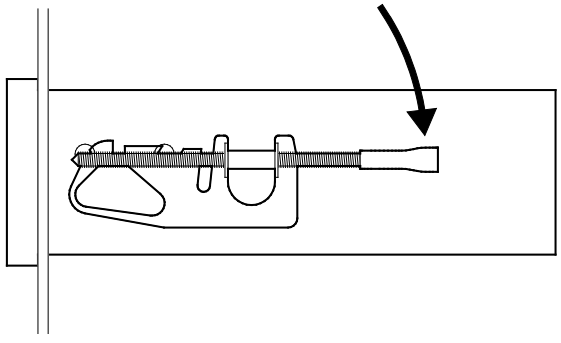
Cutout according to DIN 43700
Maximum material thickness: 5 mm [.197]



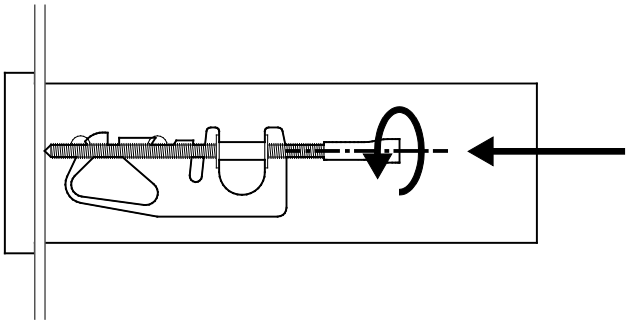
1. Push the device into the front panel cutout as far as it will go.



2. Hook the mounting clamp to the rear notch.



3. Push down the end of the mounting clamp until the front notch is locked.



4. Turn the set screw with a blade screwdriver to the stop on the front plate.

3.2 Electrical connection

NOTICE

Damage to or destruction of the process meter due to excessive operating voltage or mounting errors

- The meter must be operated only within values specified in the data sheet.
- Connection to power supply must be performed in accordance with safety instructions for electrical facilities and performed only by trained staff.
- The inputs of the process meter must not be connected to current sources with more than 30 mA max.
- It has to be guaranteed that the excitation voltage agrees with the indicated value on the type label.
- Do not open the process meter.

Description and specifications

prodis ®-ADC is designed for use with analog position sensors to display angles and displacements. A high resolution A/D converter processes signals from sensors with voltage or current output. The meter is programmable to display values within preset start/end range or values in units as inches, mm or degrees. A tare function or programming lock can be activated with two control terminals. Sensor excitation is supplied by the meter. With four membrane keys all parameters can be programmed for the special applications. Optional comparator functions with 4 NPN open-collector output are available, additional 2 of them have relay output.

Specifications

Display	6-digit, 7-segment LED, height 14 mm, decimal point programmable
Counting rate	1 ... 25/s programmable
Measurement accuracy	±0,05 % f.s.
Excitation voltage/current	24 V DC ±10%/150 mA, residual ripple 1%SS; 85-250 V AC, 50-60 Hz/180 mA max.
Sensor excitation	24 V DC/300 mA / voltage divider 5 V, 10 mA
Input	Two channels each for: Voltage: 0 ... 10 V; 0.5 … 4.5 V, 0.5 … 10 V, max. 24V, Input resistance: 20kΩ Current: 0...20 mA, 3 wires; 4 … 20 mA 2 wires/3 wires Load 100 Ω, I_{max}<30 mA Voltage divider R_{min}=500Ω, 0 … 5 V One input or the difference between both inputs can be chosen by programming.
Control input	2 control inputs 24 V, active low
Comparator output (option)	Relay: 250 V AC/5 A, 30 V DC/5 A NPN: 24 V max./50 mA to GND
Options	Comparator Desktop version
Connection	Terminal strip 12 pole, excitation 3 pole
Temperature coefficient	±20 x 10^{-6} / °C
Operating temperature	-10...+40 °C
Storage temperature	-20...+85 °C
Weight	24 V DC: approx. 250 g 230 V AC: approx. 400 g
Protection class	Front IP60, rear IP40
Humidity	Max. 80 % R. H., non-condensing
Safety of equipment	Directive 2014/35/EU: EN 61010-1:2010
EMC	Directive 2014/30/EU: EN 61326-1:2013

Programmable parameters / value range

Value range offset	-999999 to +999999
Divisor, multiplier	0 to 999999
Other programmable parameters	Decimal point position, display brightness
Control input terminals	Key lock, display value hold, tare function

Interface RS-232

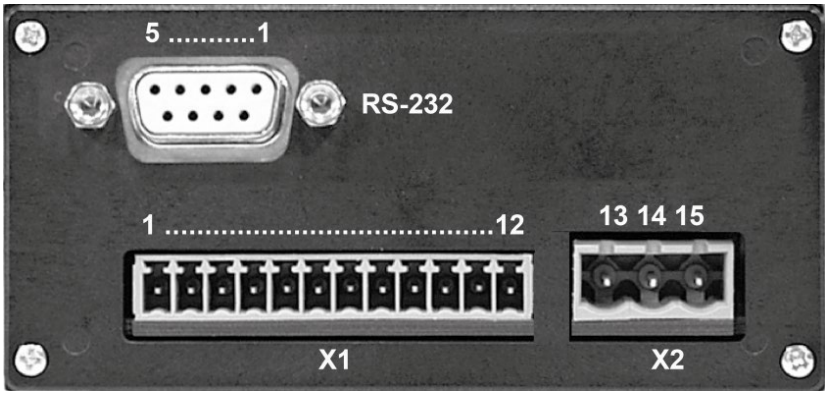
Level	RS-232: ±8 V, galvanically isolated
Data format	1 start bit, 8 data bits, 1 stop bit, no parity
Transmission rate	9600 Baud

Wiring basic unit without comparator output

Signals	Connector X1 Pin no.	Connector X2 Pin no.
Sensor excitation +UB 24 V	1	
Sensor excitation 0 V (GND)	2	
Control input terminal 1: tare function	3	
Control input terminal 2: programming lock	4	
Voltage input terminal (e.g. 0 ... 10 V), channel 1	5	
Voltage input terminal (e.g. 0 ... 10 V), channel 2	6	
Current input terminal (e.g. 0 ... 20 mA), channel 1	7	
Current input terminal (e.g. 0 ... 20 mA), channel 2	8	
Voltage divider input terminal, channel 1	9	
Voltage divider input terminal, channel 2	10	
Reference voltage 5 V for voltage divider	11	
GND	12	
PD-ADC-24VDC Excitation +24 V Excitation 0 V (GND)		 13 14
PD-ADC-230VAC Excitation Protective ground		 13, 15 14

Signals	D-Sub, pin no.
TxD	2
RxD	3
GND	5

Rear view without comparator output

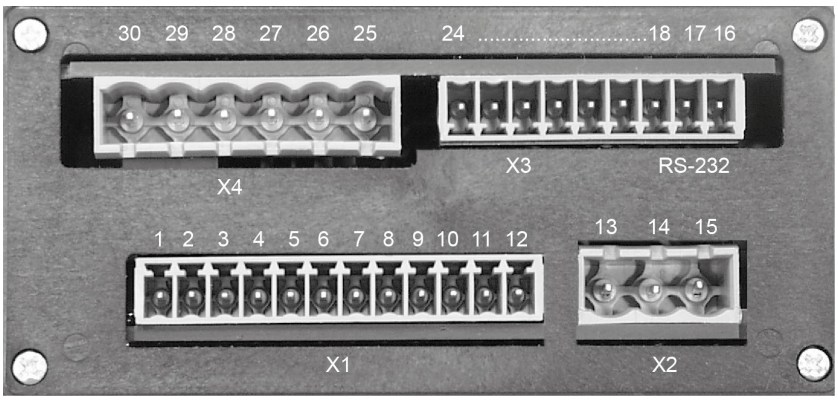


Wiring basic unit with comparator output

Signals	Connector X1 Pin no.	Connector X2 Pin no.
Sensor excitation +UB 24 V	1	
Sensor excitation 0 V (GND)	2	
Control input terminal 1: tare function	3	
Control input terminal 2: programming lock	4	
Voltage input terminal (e.g. 0 ... 10 V), channel 1	5	
Voltage input terminal (e.g. 0 ... 10 V), channel 2	6	
Current input terminal (e.g. 4 ... 20 mA), channel 1	7	
Current input terminal (e.g. 4 ... 20 mA), channel 2	8	
Voltage divider input terminal, channel 1	9	
Voltage divider input terminal, channel 2	10	
Reference voltage 5 V for voltage divider	11	
GND	12	
PD-ADC-24VDC Excitation +24 V Excitation 0 V (GND)		 13 14
PD-ADC-230VAC Excitation Protective ground		 13, 15 14

Signals	Connector X3 Pin no.
TxD	17
RxD	16
GND	18

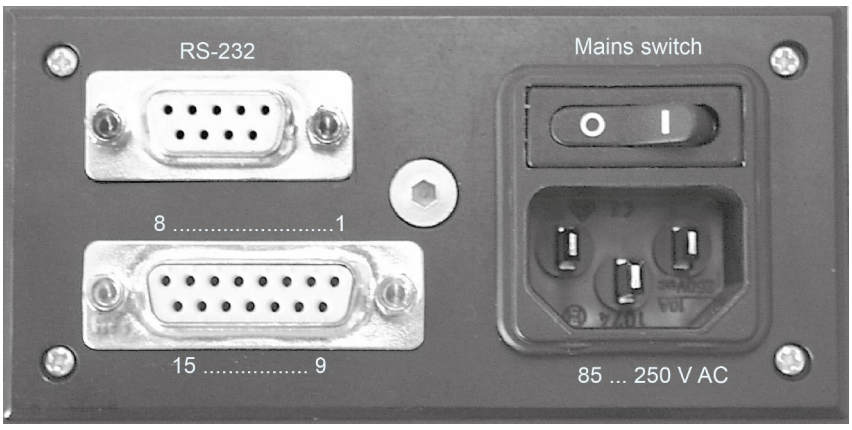
Rear view with comparator output (option „REL2“)



Comparator function (option)

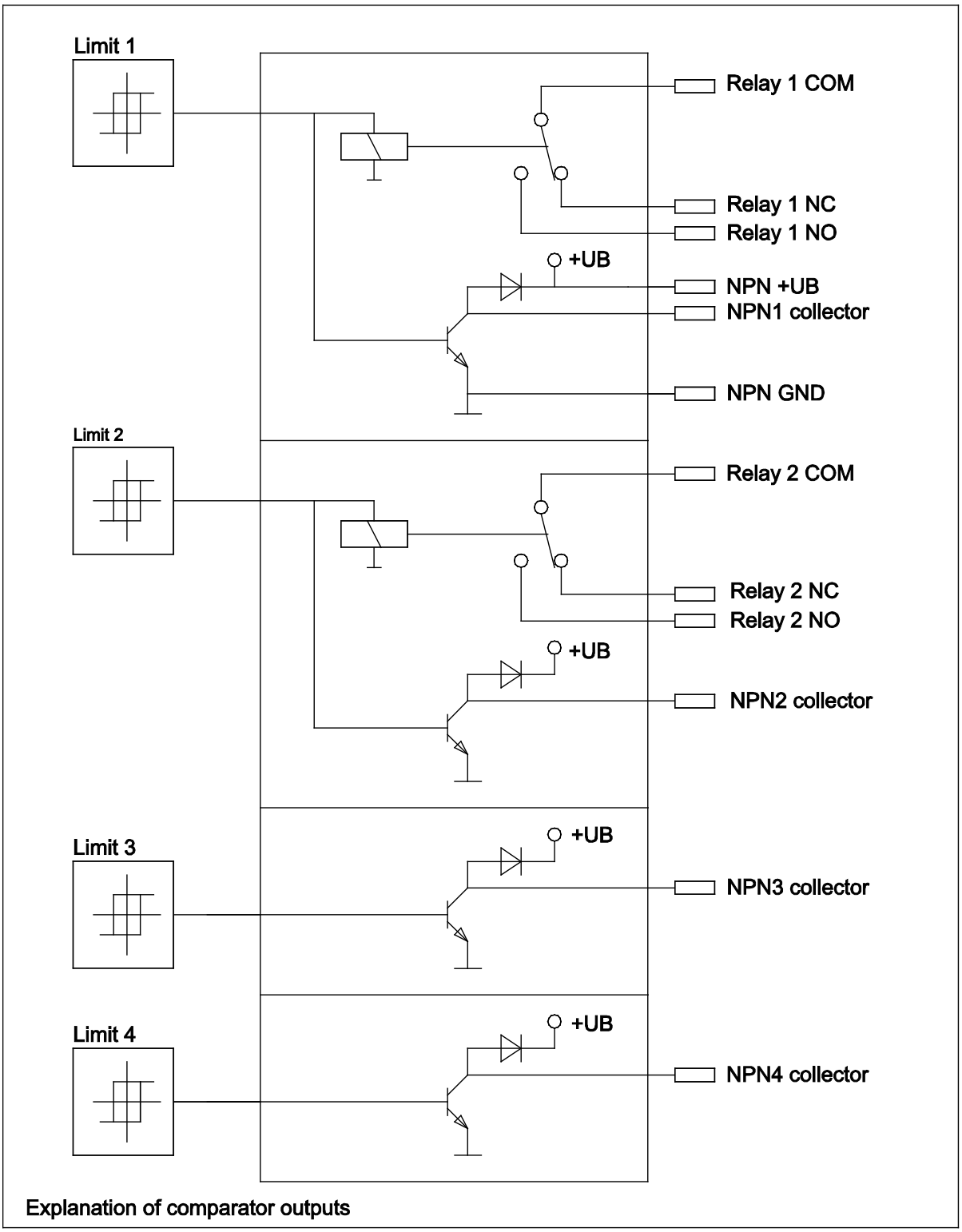
Comparator	Comparator output				
	NPN collector	**Connector X3 Pin no.**	**Relay**	**Connector X4 Pin no.**	**LED**
Comparator 1	NPN1	20	Relay 1 NO NC Common	 25 27 26	LED1
Comparator 2	NPN2	21	Relay 2 NO NC Common	 28 30 29	LED2
Comparator 3	NPN3	22			
Comparator 4	NPN4	23			
	NPN GND NPN U_B (+24V)	24 19			

Desktop version (option „DT")



Wiring of connector X1 see table "Wiring basic unit".

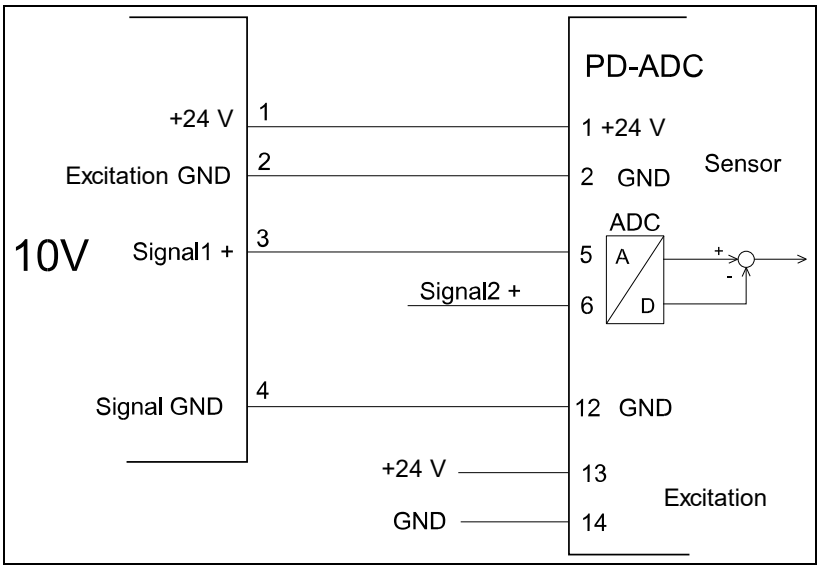
Comparator outputs (diagram)



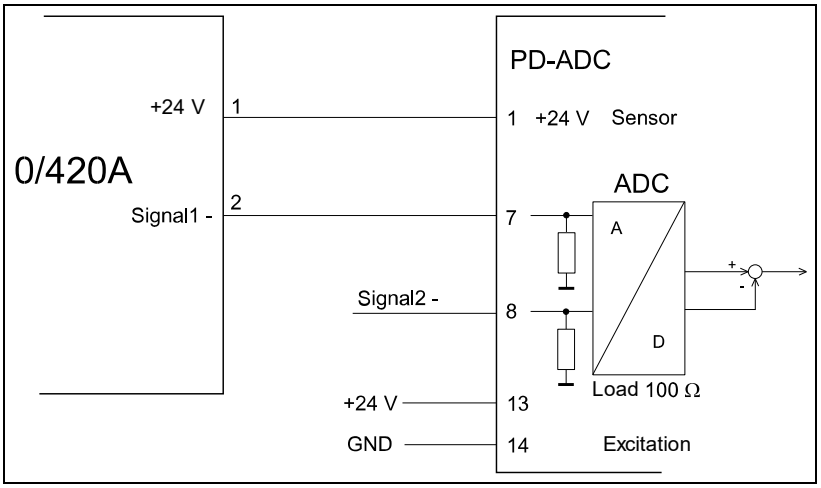
Explanation of comparator outputs

Examples of signal wiring

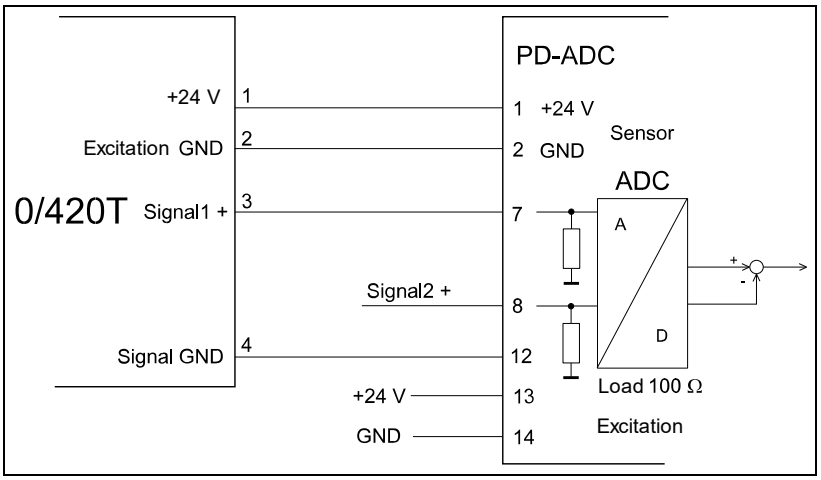
U_B = 24 V **0 ... 10 V**
0.5 ... 10 V
0.5 ... 4.5 V



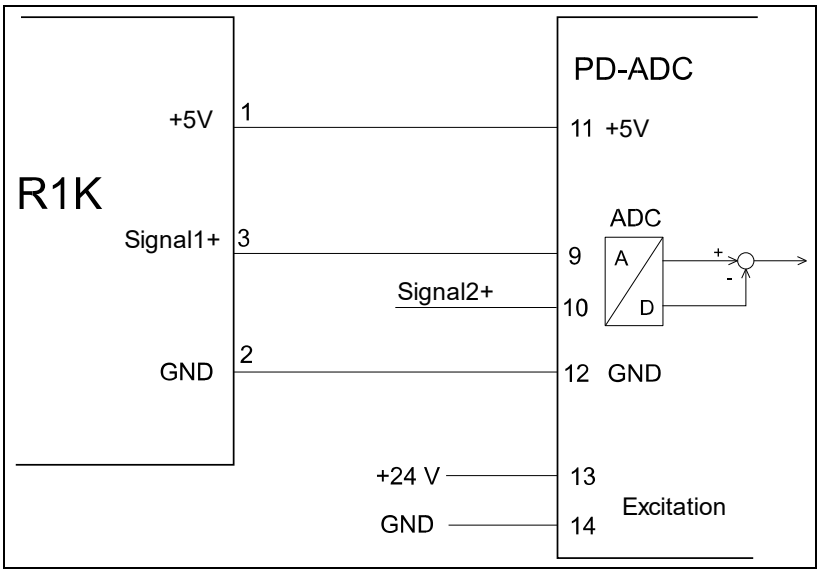
U_B = 24 V **4 ... 20 mA**
2 wire



U_B = 24 V **0/4 ... 20 mA**
3 wire



U_B = 5 V **0.5 ... 4.5 V**
R1K



3.3 Startup

When the process meter is switched on, a short self-test sequence will start with all LED segments on and then the version of the process meter will be displayed. After that procedure prodis®-ADC is in the normal mode.

4 Operation

Operation keys and display



P Key to control the programming menus

S Multifunction key to reset the display and to store the parameters in a non-volatile memory

◀ Multifunction key for parameter settings

▲ Multifunction key for parameter settings

NOTICE P + S means: hold the key P and press S

Explanation and operation of the functions

Parameter settings

The parameter settings are effected in a programming menu.

Key / key combination	Function
P + S	Activate programming mode
▲ , ◀	Change the parameter by decimal steps
◀ + S	Reset activated parameter
◀ + ▲	Change the sign of signed parameters
S	Store in non-volatile memory
P	Proceed and return to normal mode
	New settings become effective immediately

Operation of the functions – chart

Submenus	Parameter	Display	Value range	Factory setting
P + S	Channel select	*Ch*	1, 2, 1-2 (difference)	1
	Measurement signal	*SIG*	U, U2, U3, U6, I42, I02, r	U
	Decimal point	*dp*	1 from 5, OFF	OFF
	Activate tare function	*tAr*	OFF, ON	OFF
	Activate teach-In function	*t-In*	O, A, E	O
	Display start value	*bEG*	±999999	0
	Display end value	*End*	±999999	10000
	Utilization factor Rxk	*nP*	0 ... 0.99999	0.999
	Measurement rate 1/s	*rAtE*	1 ... 25	16
	Display brightness	*db*	1 ... 15	15
	Baud rate	*bA*	4.8, 9.6 ...115.2	9.6
	Control input 2	*Cntr*	1 ... 4	1
	Averaging filter	*FIL*	0, 1, 2, 4, 8 ... 128	0
S	Tare function on	*flashing decimal point*		0
◀	Offset	*oFFSEt*	-999999 ... +999999	000000
P ▲	Limit value	*rELx*	+/- 999.999	+999.999
	Hysteresis	*Hμ rELx*	+/- 999.999	1
	Operating direction	*rx*	oEF, SCH	SCH
▲ + ◀ + power on*	Reset to factory default settings	*000000 for 2 s*		

* Disconnect device from excitation, wait 5 seconds, press both arrow keys together and hold. Connect excitation, the display shows “000000”, then release both arrow keys.

Explanation of the menu settings

Selection of the measurement signal:

SIG = U	voltage signal 0…10 V
SIG = U2	voltage signal 0.5 … 10 V
SIG = U3	voltage signal 0 … 5 V
SIG = U6	voltage signal 0.5 … 4.5 V
SIG = I42	current signal 4 … 20 mA
SIG = I02	current signal 0 … 20 mA
SIG = r	potentiometric measurement signal

Teach-in scaling:

t-In = O	Teach-in scaling inactive
t-In = A	Teach-in scaling active, teach-in procedure inactive
t-In = E	Teach-in scaling active, teach-in procedure active

Scaling for maesurement input signals 0...10 V, 0/4...20 mA

The input of the start and end value for the displayed value range 0...10 V resp. 0/4...20 mA will be made by the menu positions “start value” and “end value”.

Example: Sensor with a measurement range of 2000 mm and a output signal of 4...20 mA, wanted display range 0 … 2000.0

Setting: SIG: I42, start value: 0, end value: 20 000, decimal point between the first and second position from the righthand side.

Scaling for position sensors with potentiometric signal

An utilization factor *nP* considers measurement range limits and individual sensitivity of the potentiometer. The display range is set by start and end value. *nP* will be calculated as a product of (sensitivity) E x L (measurement range), both specifications can be taken from the type label. When the sensor has been changed the re-calibration of the meter is very easy by changing *nP*.

Example A: Linear sensor with a measurement range of 1250 mm and output R1K, sensitivity: 0,756 mV/V/mm, wanted display: 0 … 1250.0 mm.

Setting: nP = 0.765 x 1.250 = 0.945, start value: 0, end value: 12500, decimal point between the first and second position from the right hand side.

Example B: as A, but wanted display range: 0 … 49.21 inch.

Setting: nP = 0.765 x 1.250 = 0.945, start value: 0, end value: 4921, decimal point between the second and third position from the right hand side.

Example C: angle sensor with a used range of 90 degrees and output R1K, sensitivity: 2.846 mV/V/degree, wanted display range: 0 … 90 degrees.

Setting: nP = 0.002846 x 90 = 0.25614, start value: 0, end value: 90.

Tare function, Offset function, Teach-In function

Tare function

Activated by the front button **S** or via the control input the display of the meter will be set to the offset value, the decimal point is flashing while the tare function is active. Pressing the button **S** again deactivates the tare function.

Offset function

The offset function allows to set and change the offset value of the meter directly in the normal mode.

Teach-in scaling with start value and end value

A display value range is assigned to a measurement range by teach-in. The display value range is defined by start and end value (bEG, ENd).

The teach-in procedure of start and end value shall be performed with the following steps:

1. In the programming menu choose *t-In* = E for releasing the teach-in procedure and then exit menu.
2. Set the start position and press ▲ .
3. Set the end position and press ◄ .
4. Go to the programming menu again and set *t-In* = A. Thereby the teach-in procedure will be completed and the teached scaling is active.

Control inputs 1 and 2
Functions TARA, FREEZE, KEY-LOCK, DATA-SEND

These functions can be activated by two control inputs. The activation of an input is made by connecting the input with GND. An open input or a connection with 24 V sets the function of the control input to inactive.

Control input 1, TARE function

The activation of the Tare function sets the display value to zero resp. to the offset value from the offset menu input. The TARE compensation will be held as long as the control input 1 is active. An active control input 1 avoids any tare operation with the **S** key at the meter front side.

Control input 2, functions FREEZE, KEY-LOCK, DATA-SEND

The used function of the control input 2 is set in the setting menu with the “Cntr” menu:

Cntr: 1	FREEZE	Display “freeze”
Cntr: 2	KEY-LOCK	Programming blocked
Cntr: 3	DATA SEND	The displayed value will be sent via the RS-232 interface
Cntr: 4	DATA SEND CYC	The displayed value will be sent periodically every 10 ms via RS-232

RS-232 Interface

Transmission of a position value

Send to prodis®:	“r”
Response of prodis®:	CR, sign, n5, n4, n3, n2, n1, n0 with ni: ASCII characters, leading digits filled with “0” Sign: positive sign = Space “ “

Tare function On/Off

Send to prodis® :	“n”
prodis® function:	Tare function on/off

Data format
1 start bit, 8 data bits, 1 stop bit, no parity
Baud rate: programmable

Net transmission rate
Max. 50/s approx.

5 Maintenance and disposal

5.1 Maintenance and service

NOTICE

The prodis® process meters do not contain any components that can be repaired by the customer

- Do not open the housing.
- The prodis® process meter must not be modified.

Deinstallation

Disconnect electrical connections. Loosen fixing screws.

5.2 Disposal

Disposal of the device according to applicable government regulations.

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