

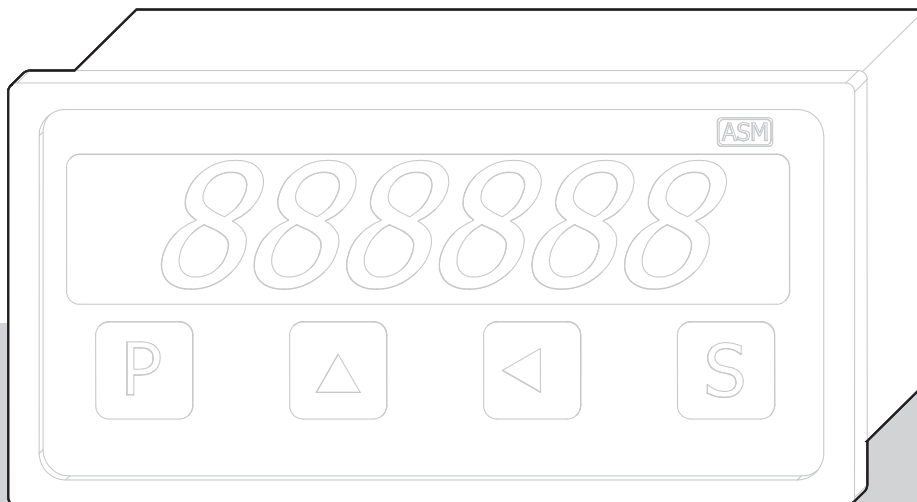
# prodis<sup>®</sup> ADC

아날로그 위치, 각도 및 경사 센서용 디지털 공정 측정기

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**Installation and operation manual**

**EN**



Please read carefully before installation and operation!

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# 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

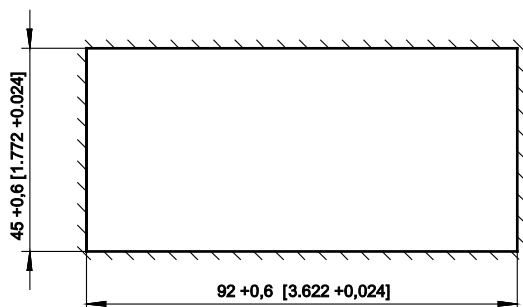
Check the device immediately for shipment damages. In case of any damage or equipment not operating appropriately, please contact the producer.

### Shipment content

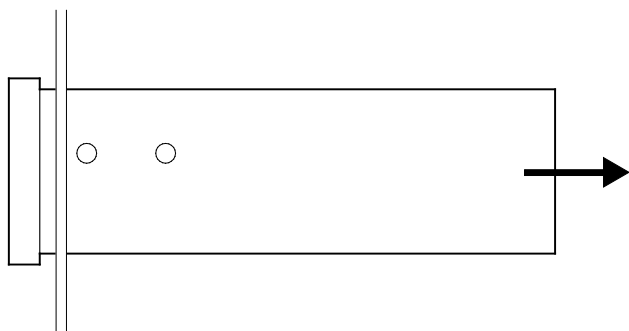
- Process meter
- Operation instructions

## 3 Installation and initial operation

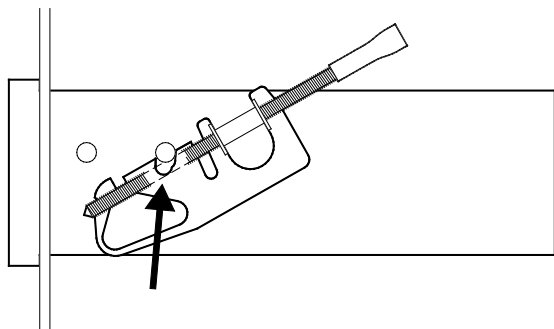
### 3.1 Mechanical installation



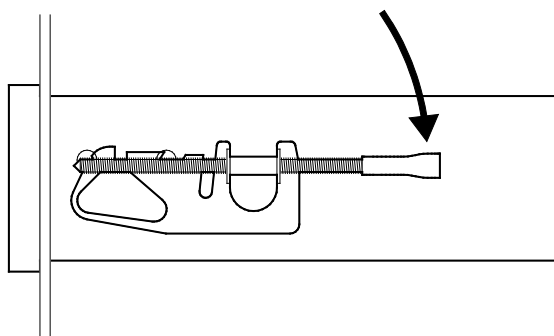
Cutout according to DIN 43700  
Maximum material thickness: 5 mm [.197]



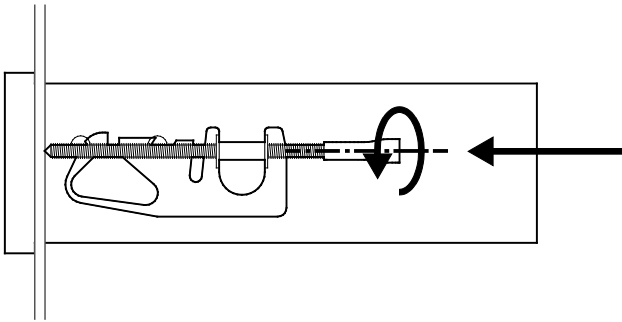
1. Push the device into the front panel cutout as far as it will go.



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®-ADC는 아날로그 위치 센서와 함께 사용하여 각도 및 변위를 표시하도록 설계되었습니다. 고해상도 A/D 변환기는 전압 또는 전류 출력을 제공하는 센서 신호를 처리합니다. 이 계측기는 사전 설정된 시작/종료 범위 내의 값 또는 인치, 밀리미터 또는 도 단위의 값을 표시하도록 프로그래밍할 수 있습니다. 두 개의 제어 단자를 사용하여 영점 조정 기능 또는 프로그래밍 잠금 기능을 활성화할 수 있습니다. 센서 여자 전원은 계측기에서 공급됩니다. 4개의 멤브레인 키를 사용하여 모든 매개변수를 특수 용도에 맞게 프로그래밍할 수 있습니다. 4개의 NPN 오픈 컬렉터 출력을 갖춘 옵션 비교기 기능이 제공되며, 이 중 2개는 릴레이 출력을 지원합니다.

## Specifications

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

## Programmable parameters / value range

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

## Interface RS-232

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

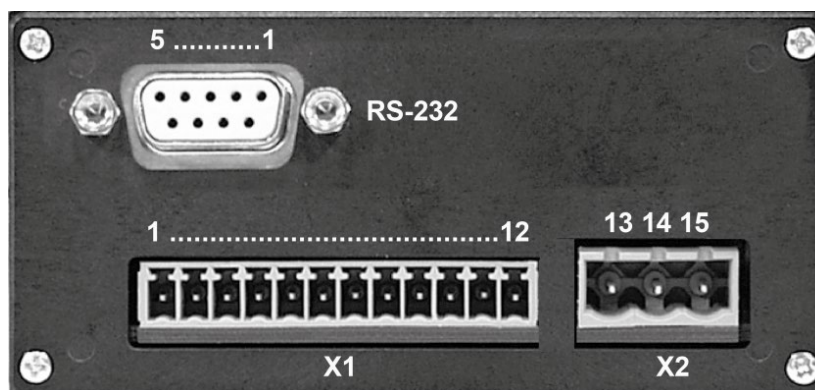


### Wiring basic unit without comparator output

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		13
Excitation 0 V (GND)		14
PD-ADC-230VAC Excitation		13, 15
Protective ground		14

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

### Rear view without comparator output

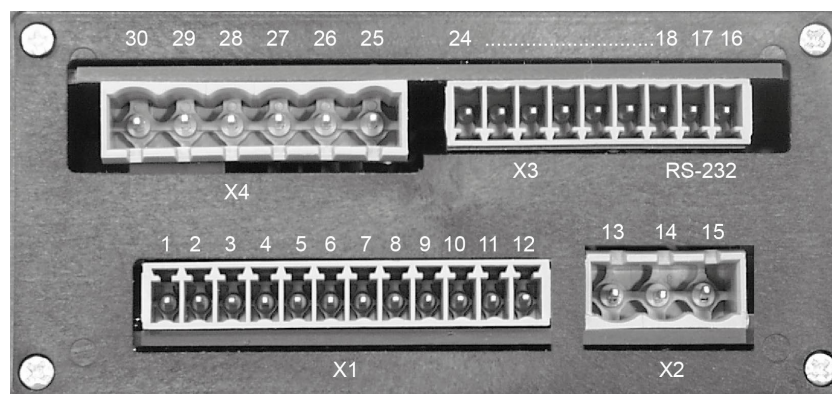


### Wiring basic unit with comparator output

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		13
Excitation 0 V (GND)		14
PD-ADC-230VAC Excitation		13, 15
Protective ground		14

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

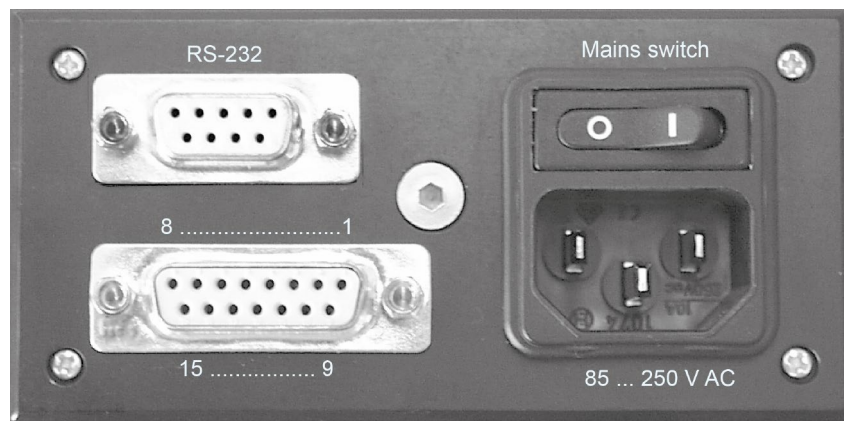
### Rear view with comparator output (option „REL2“)



### Comparator function (option)

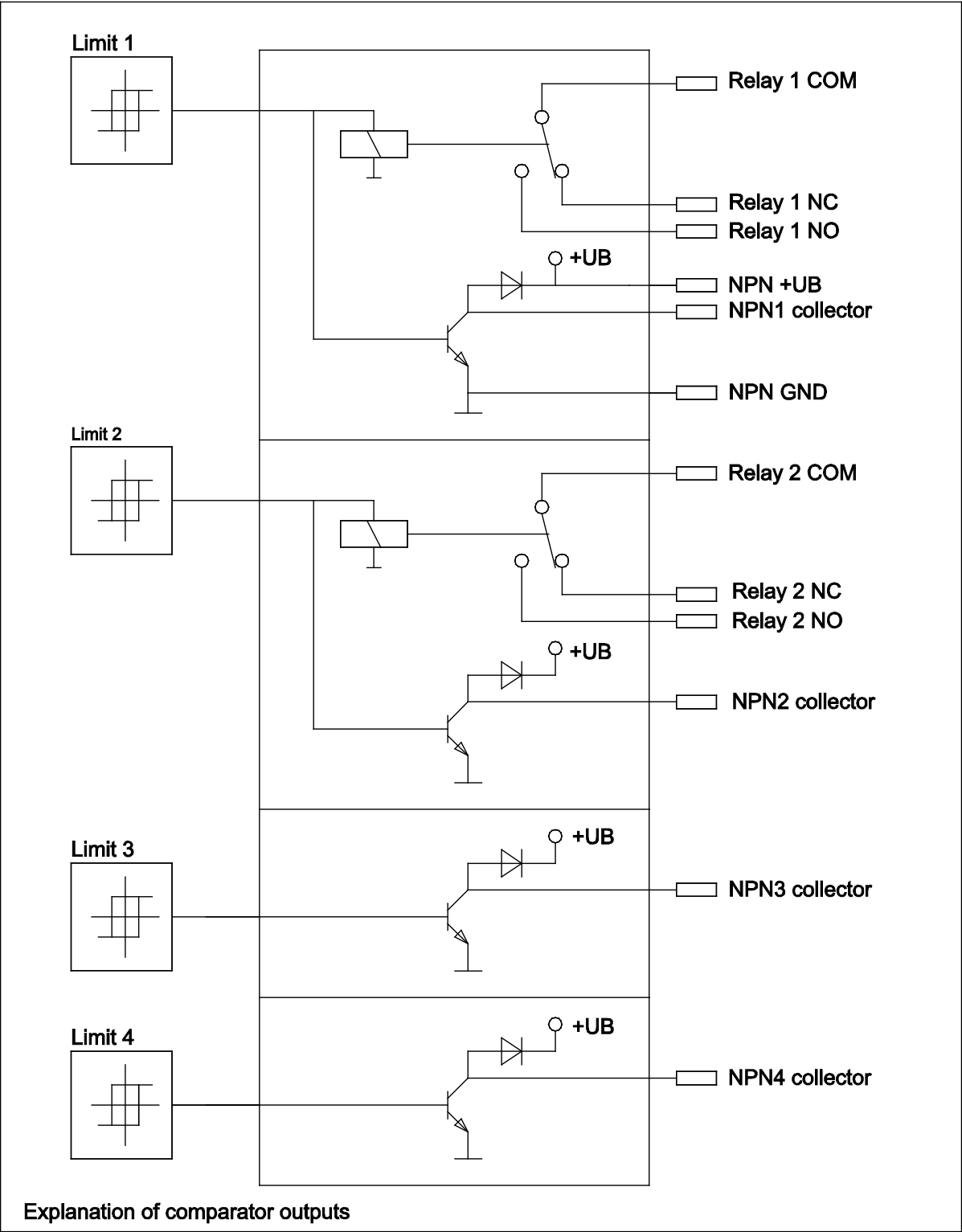
Comparator	Comparator output				
	NPN collector	Connector X3 Pin no.	Relay	Connector X4 Pin no.	LED
Comparator 1	NPN1	20	Relay 1		LED1
			NO	25	
			NC	27	
			Common	26	
Comparator 2	NPN2	21	Relay 2		LED2
			NO	28	
			NC	30	
			Common	29	
Comparator 3	NPN3	22			
Comparator 4	NPN4	23			
	NPN GND	24			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

### Desktop version (option „DT“)



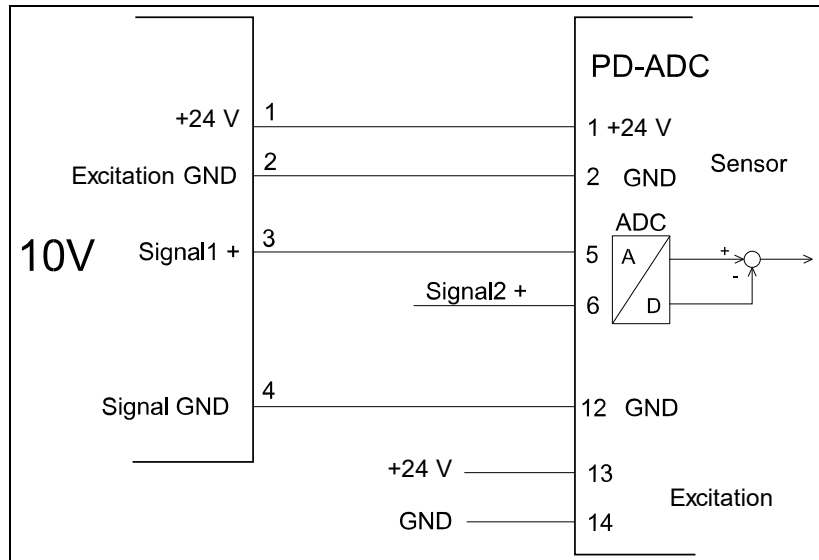
Wiring of connector X1 see table “Wiring basic unit”.

Comparator outputs (diagram)

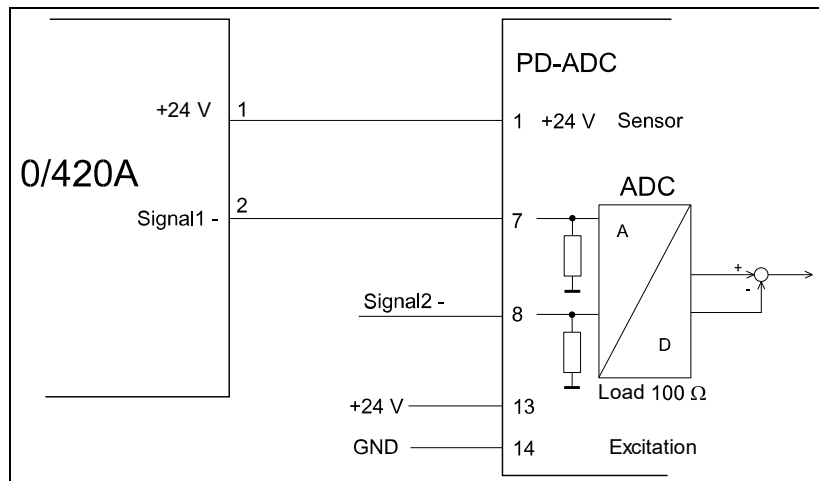


## Examples of signal wiring

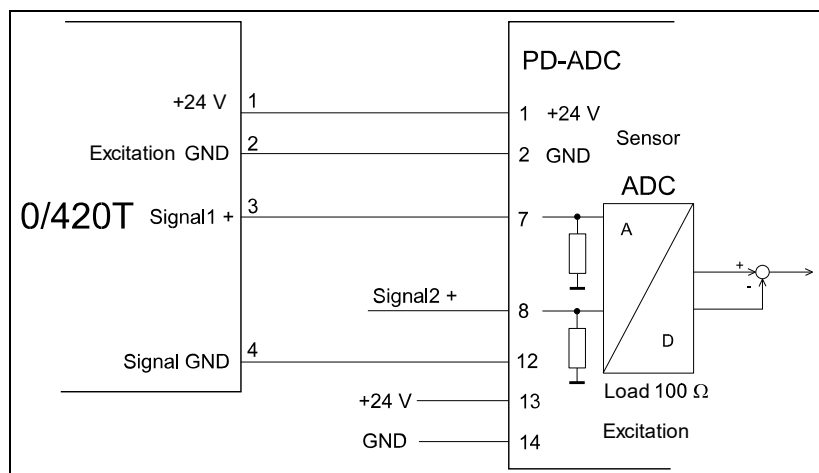
**$U_B = 24\text{ V}$**       **0 ... 10 V**  
**0.5 ... 10 V**  
**0.5 ... 4.5 V**



**$U_B = 24\text{ V}$**       **4 ... 20 mA**  
**2 wire**

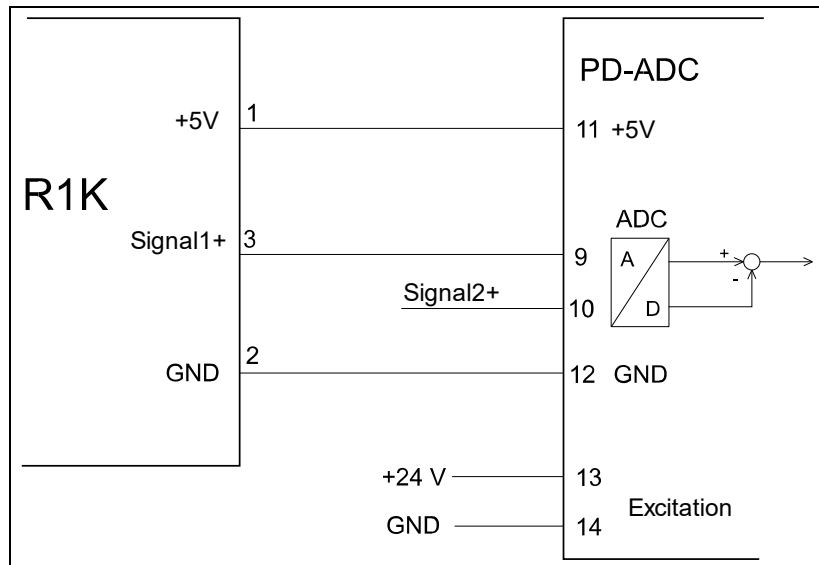


**$U_B = 24\text{ V}$**       **0/4 ... 20 mA**  
**3 wire**



$U_B = 5\text{ V}$

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



-  Key to control the programming menus
-  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

 +  means: hold the key  and press 

## Explanation and operation of the functions









### Parameter settings

The parameter settings are effected in a programming menu.

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



### Operation of the functions – chart

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

\* 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 = 0 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 measurement 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)  $E \times L$  (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:  $nP = 0.756 \times 1.250 = 0.945$ , 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:  $nP = 0.756 \times 1.250 = 0.945$ , start value: 0, end value: 4921, decimal point between the second and third position from the right hand side.

예시 C: 사용 범위가 90도이고 출력 저항이 R1K인 각도 센서, 감도: 2.846 mV/V/도,  
원하는 표시 범위: 0 ... 90도.

설정:  $nP = 0.002846 \times 90 = 0.25614$ , 시작 값: 0, 끝 값: 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 taught 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®:	"I"
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

<b>NOTICE</b>
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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

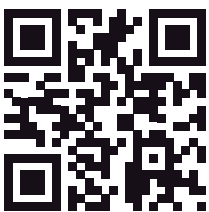
Disposal of the device according to applicable government regulations.







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