



PRODIS®-ADC

Digital Process Meter

for analog position sensors

Instruction Manual



Please read carefully before installation and operation!

PRODIS®-ADC

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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% _{pp} ; 85-250 V AC, 50-60 Hz/180 mA max.
	Sensor excitation	24 V DC/300 mA; 5 V/10 mA
	Input	Two channels, each for: Voltage 10V; U1; U2; U3; max. 24V Current I1, load 100 Ω, I _{max} <30 mA Voltage divider R _{min} =500 Ω, 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 NPN	250 V AC/5 A, 30 V DC/5 A 24 V max./50 mA to GND
	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	EN 61010-1:2010
	EMC	EN 61326-1:2013

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Safety instructions



Do not use PRODISE[®]-ADC process meters in safety critical applications where malfunction or total failure of the sensor may cause danger for man or machine.

For safety related applications additional mechanisms (devices) are necessary to maintain safety and to avoid damage.

Disregard of this advice releases the manufacturer from product liability.

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.

Danger of Destruction!

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.

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Description

The process meter PRODIS®-ADC is designed for use with analog position sensors to display angles and displacements. A high-resolution analog/digital converter can process two input signals of each 0 ... 10 V, 0.5 ... 10 V, 0/4 ... 20 mA or voltage divider. Thus the difference of two measurement signals can be measured.

To display mass units like inch, mm or degrees between given start and end values the meter can be scaled by the user. Via two control inputs the functions Tare and Display Hold can be activated.

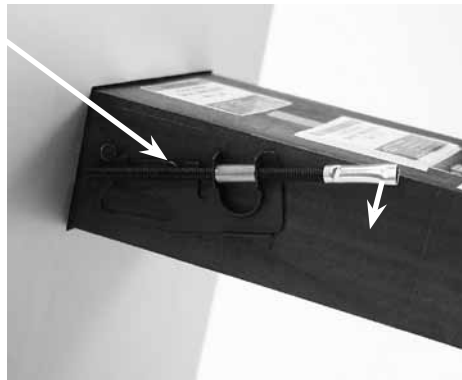
The sensor excitation voltage is supplied from the meter. With four membrane keys the parameters for signal processing, scaling and comparator function can be programmed. Optional comparator function with two relays and four NPN open-collector outputs are available.

Mechanical mounting

Mounting clamps



Hook in the rear notch and push the end down until the front notch is locked



Turn the set screw with a slotted screwdriver until stop at the front plate.



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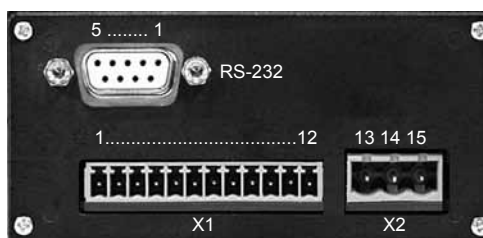
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Wiring basic unit	Signals	Connector X1 pin no.	Connector X2 pin no.
	Sensor excitation +U _B 24 V	1	
	Sensor excitation 0 V (GND)	2	
	Control input terminal 1: tare function	3	
	Control input terminal 2: Freeze, Key lock, Data send	4	
	Voltage input terminal 0 ... 10 V, channel 1	5	
	Voltage input terminal 0 ... 10 V, channel 2	6	
	Current input terminal 0/4 ... 20 mA, channel 1	7	
	Current input terminal 0/4 ... 20 mA, channel 2	8	
	Voltage divider input terminal, channel 1	9	
	Voltage divider input terminal, channel 2	10	
	Sensor excitation, R1K +U _B = 5V	11	
	GND	12	
	PD-ADC-24VDC (* see footer)		
	Excitation +24 V		13
	Excitation 0 V (GND)		14
	PD-ADC-230VAC (* see footer)		
	Excitation		13, 15
	Protective ground		14

(*) Check the meter excitation: PD-ADC-**24VDC**-X-X: 24 V DC meter excitation
PD-ADC-**230VAC**-X-X: 230 V AC meter excitation

Rear view without
comparator function

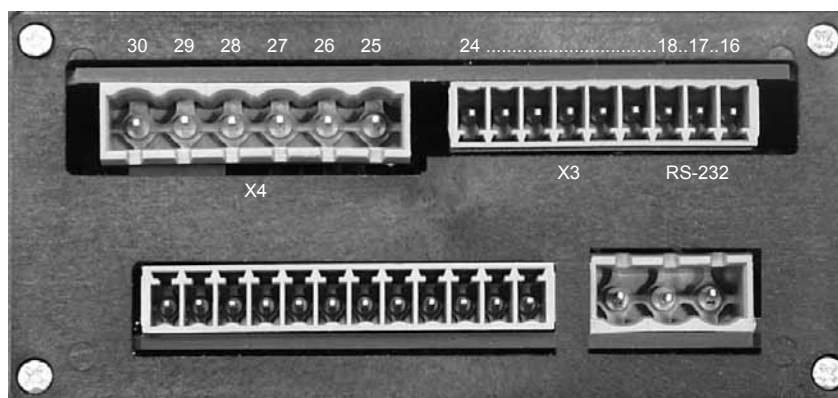


RS-232 interface (w/o comparator function)	Level	RS-232: ± 8 V, galvanically isolated
	Data format	1 start bit, 8 data bits, 1 stop bit, no parity
	Transmission rate	9600 Baud
	Signals	D-Sub, Pin No.
(with comparator function)	TxD	2
	RxD	3
	GND	5
	Signals	Connector X3, Pin No.
(with comparator function)	TxD	17
	RxD	16
	GND	18

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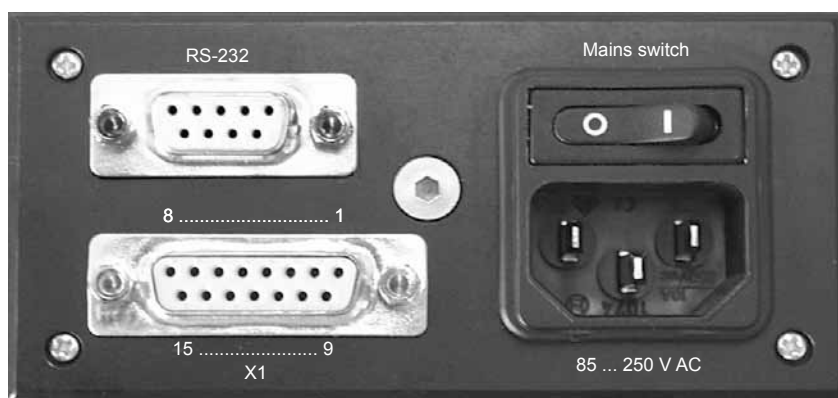


Rear view with
comparator Output



Comparator function (option)	Compara- tor	Comparator output				LED
		NPN Collector	Connector X3 pin no.	Relay	Connector X4 pin no.	
	Compara- tor 1	NPN1	20	Relay 1 NO NC Common	25 27 26	LED1
	Compara- tor 2	NPN2	21	Relay 2 NO NC Common	28 30 29	LED2
	Compara- tor 3	NPN3	22			
	Compara- tor 4	NPN4	23			
		NPN GND NPN U _B (+24V)	24 19			

Desktop version
(option)

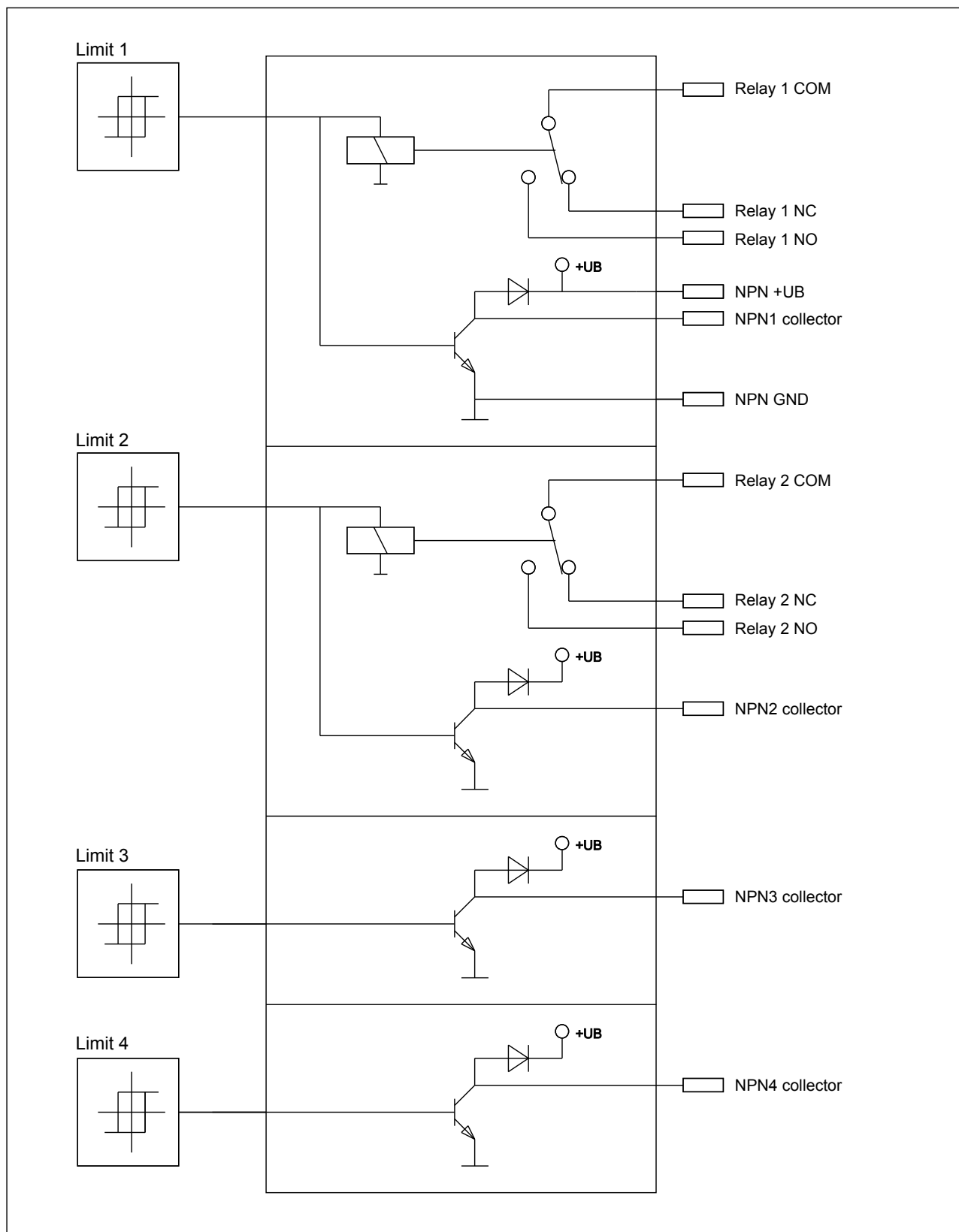


Wiring of connector X1 see table at page 5.

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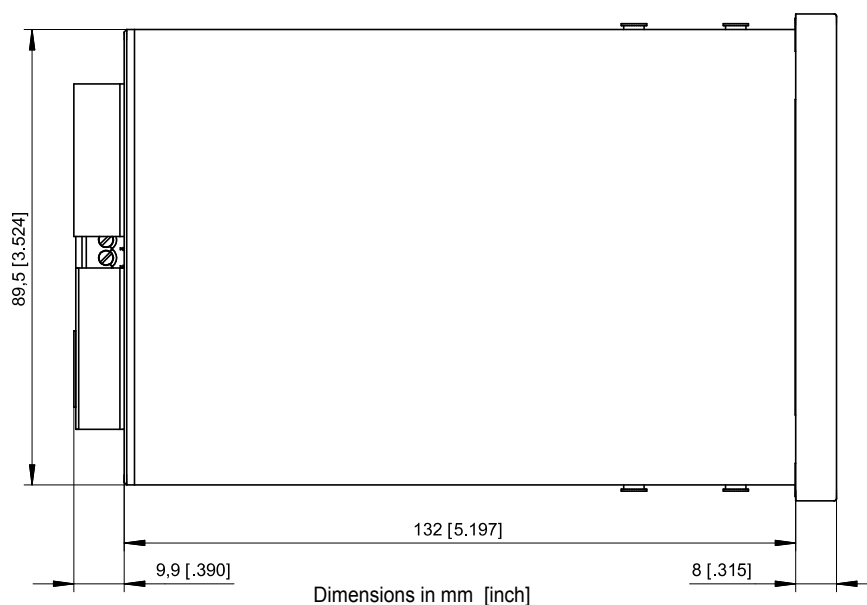
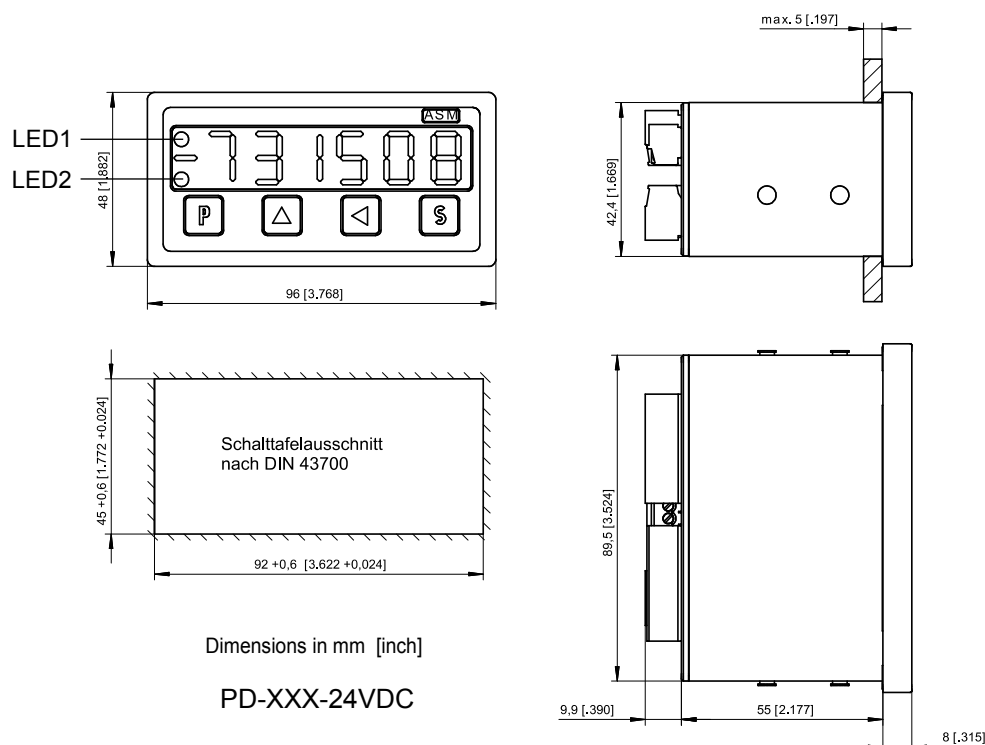
Comparator **outputs** **(diagram)**



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Outline drawing



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Operation



Check all lines, connections and excitation voltages before switching on the equipment!

When the 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®-INC is in the normal mode.

Operation keys and display

Explanation of the operation keys and display elements:



P : Key to control the programming menus

▲ : Multifunction keys
◀ for parameter settings

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

Note:

P + **S** means: hold key **P** and press **S** .

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Explanation and operation of the functions

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 right hand 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: $nP = 0.765 \times 1.250 = 0.945$, 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: $nP = 0.765 \times 1.250 = 0.945$, 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: $nP = 0.002846 \times 90 = 0.25614$, start value: 0, end value: 90.

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.

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Explanation and operation of the functions (continuation)

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. The teach-in procedure will be released via the programming menu with $t-In = E$. Set the input signal to the first value and then press . Then set the input signal to the second value and press . To avoid unintentional changes with $t-In = A$ the teach-in scaling remains active, however, the teach-in procedure itself is disabled.

Explanation of the menu settings

Selection of the measurement signal:

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

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

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Explanation and operation of the functions

(continuation)

Parameter settings

The Parameter settings are effected in a programming menu.

- + 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

Submenus	Parameter	Display	Value range	Factory setting
+	Channel select	<i>Ch</i>	1, 2, 1-2 (difference)	1
	Measurement signal	<i>SIG</i>	U, U2, U3, I42, I02, R	U
	Decimal point	<i>dp</i>	1 aus 5, AUS (off)	AUS (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, 19.2	9.6
	Control input 2	<i>Cntr</i>	1 ... 4	1
	Averaging filter	<i>FIL</i>	0 ... 128	0
 	Tare function on	flashing decimal point		0
	Offset	<i>oFFSEt</i>	-999999 ... +999999	0
+	Limit value	<i>rELx</i>	+/- 999.999	+999.999
	Hysteresis	<i>Hµ rELx</i>	+/- 999.999	1
	Operating direction	<i>rx</i>	oEF (nc), SCH	SCH (no)
+ + Power on*	Reset to factory default settings	000000 for 2 s		

* Disconnect device from excitation, wait 5 seconds, press and together and hold. Connect excitation, the display shows "000000", then release + .

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Control inputs 1 and 2

Functions TARE, 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.

Description of the functions

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 frontside.

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	SEND	The displayed value will be sent via the RS-232 interface
Cntr: 4	SEND-CYC	The displayed value will be sent periodically every 10 ms via RS-232

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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

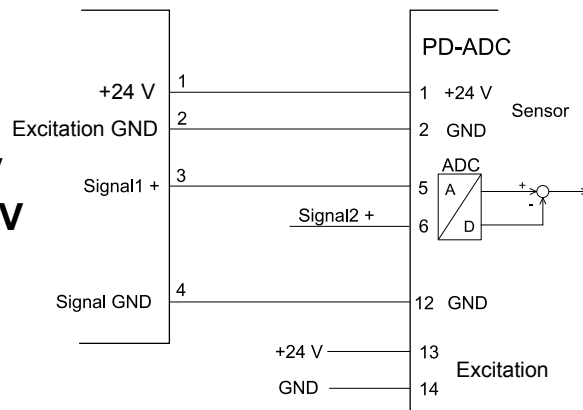
Max. 50/s approx.

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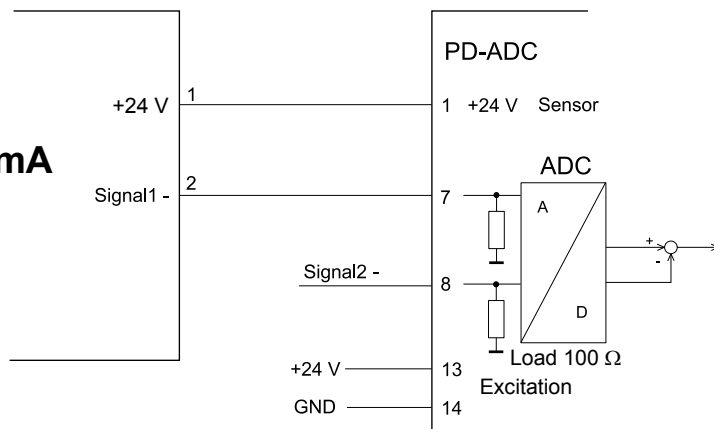


Examples for signal wiring

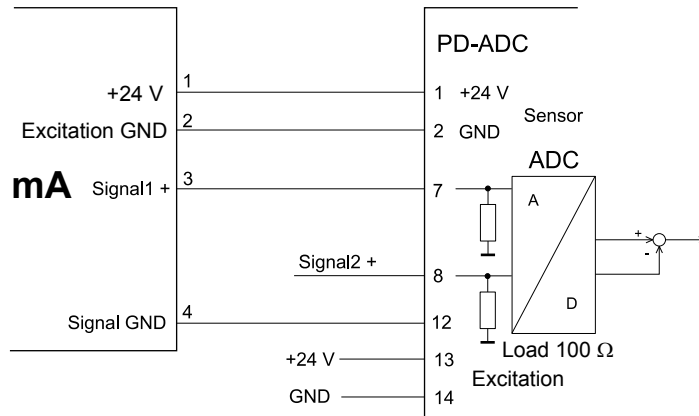
$U_B = 24\text{ V}$ **0 ... 10 V**
 0.5 ... 10V



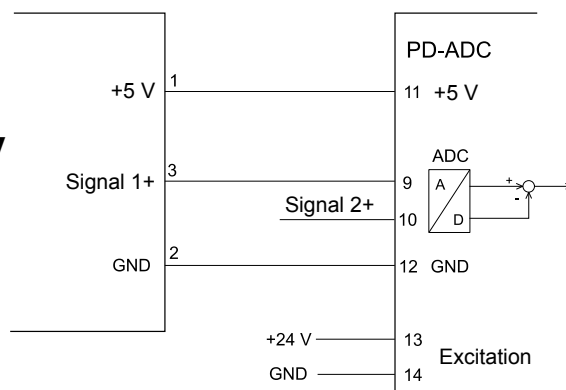
$U_B = 24\text{ V}$ **4 ... 20 mA**



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



$U_B = 5\text{ V}$ **0.5 ... 4.5 V**
 R1K



EU Declaration of Conformity



The Process Meter

Manufacturer: ASM GmbH
Am Bleichbach 18-24
85452 Moosinning / Germany

Model: **PRODIS®-ADC**
Options: -24VDC, -230VAC, -REL2

complies with the following standards and directives:

Security: Low voltage directive: 2014/35/EU
Harmonised standards: EN 61010-1:2010

EMC: EMC directive: 2014/30/EU
Harmonised standards: EN 61326-1:2013

Note: When using the comparator option -REL2/NPN4 ensure that the connected circuit complies also with the EMC directive.

Moosinning, 22nd February 2016

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