überreicht durch / presented by :
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Productivity-Panelmeter PR 9648

Speed - flow - synchronism - slip - passing time - revolution per time

Features

- LED-display, 14.2mm red
- Display range ±99999 digit
- 0 ... 3 decimal points programmable
- 2 digital inputs for summation, difference, ratio and product measurement
- Hold-input
- Integrated transmitter-supply 24 / 8V DC
- Max. 4 outputs, SPDT relay or transistor
- Display conversion programmable
- Isolated analog output, 0/4 ... 20mA and 0/2 ... 10V DC
- Front protection IP65

DIN 96x48mm

General

The Productivity Panelmeter PR9648 analyses impulse rates, representing a speed, flow, passing time or revolutions per time. The displayed values therefore always refer to a determined time unit and represent productivity. There are extensive functions programmable (see page 6). Since impulses and unit of a displayed value can take any relation, the device offers extensive conversion possibilities.

Short information

Programming	Parameters are programmed via front-side membrane keypad
Transmitter-supply	The integrated transmitter supply allows direct connection of pnp initiators, light barriers, mechanical switch contacts, proximity switches, rotary encoder (24V DC) and Namur initiators (8V DC).
Input prescaler	An input prescaler has separate programming function for input A and B.
Display conversion	A separate programmable divisor and factor makes the display adaptable as required.
Alarm outputs	Switching performance of the alarm outputs is programmable as minimum or maximum function.
Analog output	Proportional to the display value an isolated analog output signal 0 ... 20mA / 0 ... 10V DC or 4 ... 20mA / 2 ... 10V DC can be generated. Start value and end value are programmable. Output changed automatically from current signal to voltage signal, depending on burden.
Hold-function	Display freezes by control input level 24V DC or voltage free contact (see page 3).

Ihr kompetenter Ansprechpartner / Your competent contact partner : * seit 1958 *
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Technical data

Power supply

Supply voltage	:	230V AC ±10%; 115V AC ±10%; 24V AC ±10% or 24V DC ±15%
Power consumption	:	max. 3.5VA, with analog output 5VA
Operating temperature	:	-10 ... +55°C
Rated voltage	:	250V~ acc. to VDE 0110 between input / output / supply voltage Degree of pollution 2, over-voltage category III
Test voltage	:	4kV-, between input / output / supply voltage
CE - conformity	:	EN55022, EN60555, IEC1000-4-3/4/5/11/13

Input

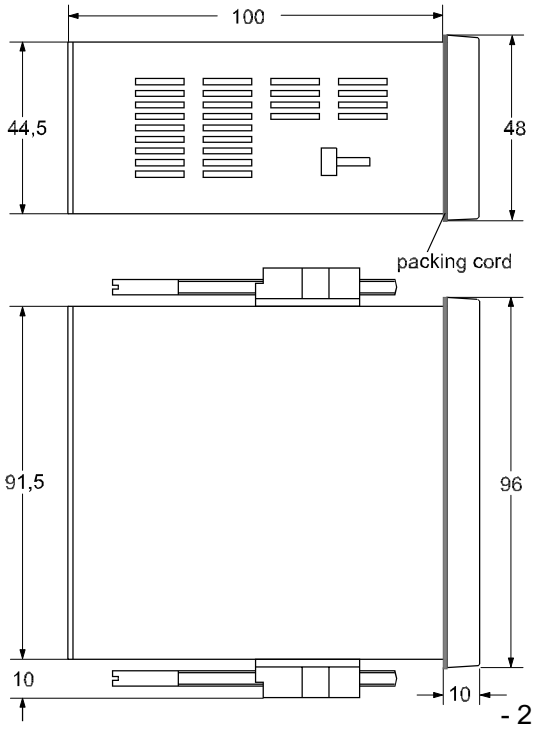
pnp input	:	Ri = 6.3kΩ level: < 4V low; > 8.5V high; Hysteresis > 2.5V, max. 35V DC
Namur input	:	Ri appr. 1kΩ (<4mA) level: < 1mA low; >2.2mA high; Hysteresis > 0.5mA max. 35V DC
Impulse frequency	:	Input A or B = 0.1Hz ... 15kHz, A and B together = 0.1Hz ... 8kHz, switch contact = 0.1Hz ... 30Hz, 2-channel rotary encoder = 0.1Hz ... 10kHz;
Min. Impulse width	:	Electronic impulse 50µs, switch contact 5ms
Time base	:	Seconds, minutes or hours
Accuracy	:	≤ 0.003% ±1 Digit
Transmitter supply	:	8V DC (Namur), 24V DC (pnp), Ri appr. 150Ω, max. 50mA (max. 25mA with 4 relay outputs)

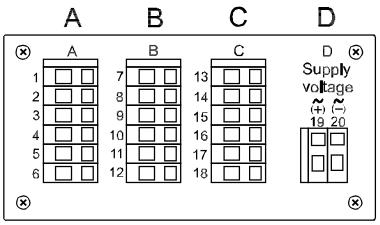
Display	:	LED red, 14.2mm
Display range	:	-99999 ... 99999 digit with leading zero suppression
Parameter display	:	LED 2-digit red, 7mm (parameter - and output indicator)

Output

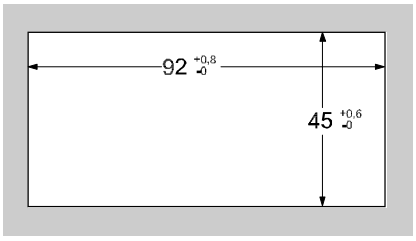
Relay	:	SPDT <250V AC<250VA<2A, <300V DC<50W<2A
Transistor	:	max. 35V AC/DC / 100mA, with short circuit protection
Analog output	:	0/4 ... 20mA burden ≤500Ω; 0/2 ... 10V burden >500Ω, isolated Automatic output changing (burden dependent)
-Accuracy	:	0.1%; TK 0.01%/K
Panel case	:	DIN96x48mm Material PA6-GF; UL94V-0
Dimensions	:	Front 96x48mm, mounting depth 100mm,
Weight	:	max. 390g
Electrical connection	:	Clamp terminals, 2mm² single wire, 1mm² flexible wire, AWG14
Protection	:	Front IP65, terminals IP20, finger safe acc. BGV A2 (old VBG4)

Dimensions





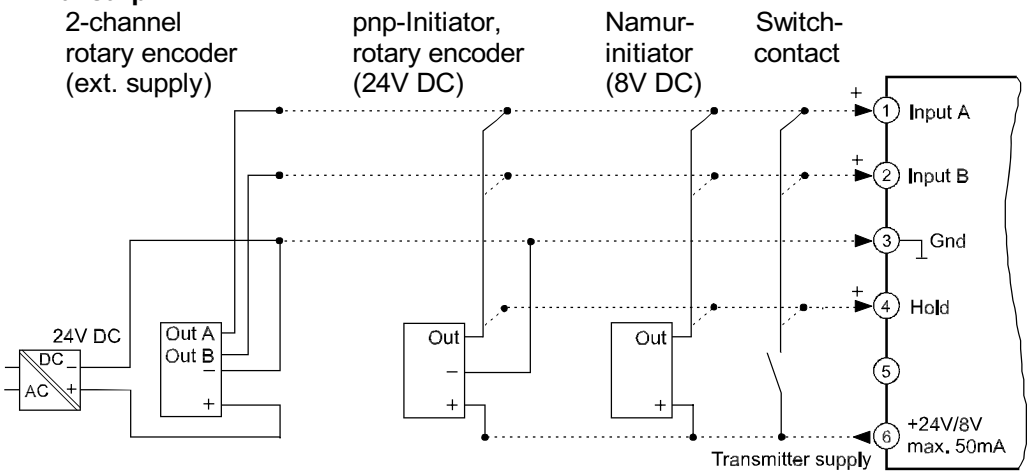
Position terminal strips



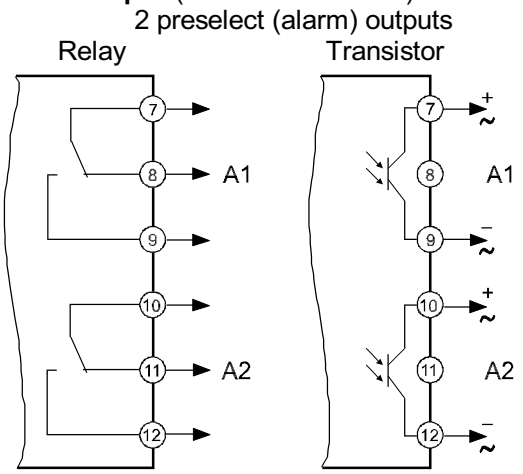
Panel cut-out
acc. to DIN 43700-96x48mm

Connection diagrams

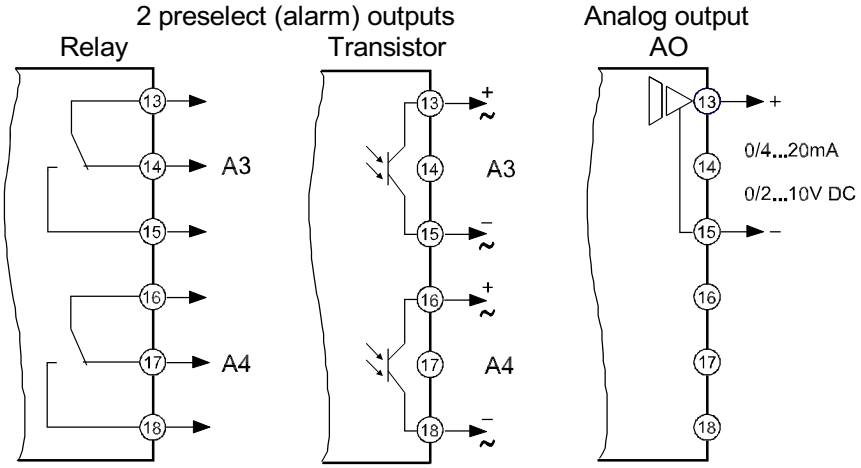
Terminal strip A



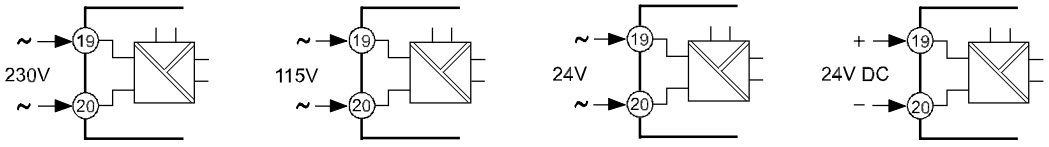
Terminal strip B (varies with version)



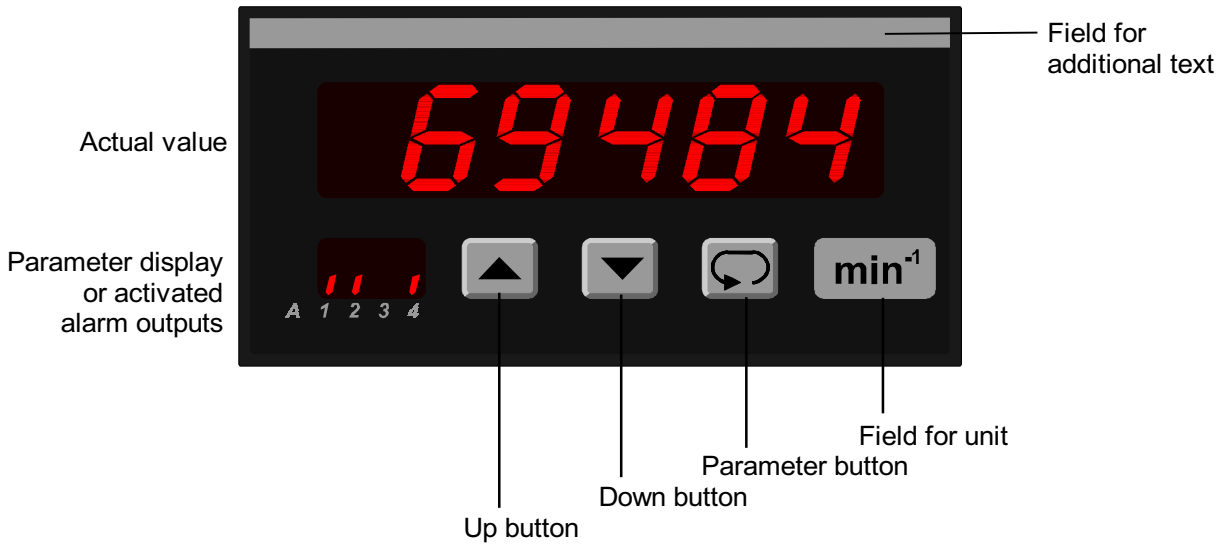
Terminal strip C (varies with version)



Terminal strip D (varies with version)



Controls and indicators



Description

Operation of the device is arranged in 2 levels. The requested parameter can be called by button. Selection within a parameter or entering data, use buttons and . Parameters are stored zero-voltage safe in the EEPROM.
Button combinations:

+ one parameter back.
+ setting parameter to zero or minimum value.

After turn on the supply voltage, the device is working in the **Working level**. Set points of preselect (alarm) outputs can be selected.
Activating the button for more than 2 seconds, the program is jumping into the **Configuration level**. Now all parameters, defining the function of the device can be programmed. These maybe the measuring input, input configuration, conversion of the displayed value, switching performance of alarm outputs and the analog output signal.
After finishing the configuration or when longer than 2 minutes no button was pushed, the program jumps back to the working level. Leaving the configuration level is possible at any time when pushing the button for 2 seconds.

Error messages:

PE	Reading this message in the parameter display, parameter failure has been occurred. The display flashes. When pushing one of the buttons the error code will be deleted and the device is running with factory settings. Configuration and function of the device must be checked. If error occurs again, please ship the device to factory for repair service.
Loc	Programming lock active ⇒ see configuration page 9
oF	Overflow

Start-up note:
Before the device can be used, it must be configured for the intended use.

⇒ see page 6

Notes to representation

Parameter only shown when configurated

Parameter is only shown when installed in the device (see order code)

Note: All parameters can be called if they are not blocked by other programmed parameters and if they are available. Factory settings are shown in *[ ]*.

Working level

Button	Display	Description	*[Factory settings]*
	4123	Actual value Output indication (only if installed and activated).	
	8450 PP	Display peak reading Reset with the buttons ▲ or ▼, or at every power off.	
	15 nP	Display valley reading Reset with buttons ▲ or ▼, or at every power off.	
	2125 A1.	Setpoint output A1 Setting possible from -99999 ... 99999 digit with buttons ▲ and ▼.	*[0]*
	125 A2.	Setpoint output A2 Setting possible from -99999 ... 99999 digit with buttons ▲ and ▼. **Note:** Setpoint of the alarm outputs A1to A4 are identical.	*[0]*

Configuration level

Button	Display	description	*[Factory settings]*
press 2 sec.	4123	Working level	
	A-b	Function: input configuration A-b = A up, B down A u.b = A up, B up 90° id = rotary encoder br A = ratio or passing time (⇒ see page 11) A-br b = proportional deviation (A-b) / bx100 b-Ar b = proportional deviation (b-A) / bx100 Selection with buttons ▲ and ▼.	*[A-b]*
	Lo	Inputfrequency Lo ≤ 30 Hz, for switch contacts Hi ≤ 15 kHz, for electronic outputs Selection with buttons ▲ and ▼.	*[Lo]*
	1	Prescaler input A Setting possible from 1 ... 9999 digit with buttons ▲ and ▼. (only every nth impulse is counted)	*[1]*
	1	Prescaler input B Setting possible from 1 ... 9999 digit with buttons ▲ and ▼. (only every nth impulse is counted)	*[1]*
	oFF	Constant input B oFF = no function -99999 ... oFF ... 99999 Setting possible from -99999 ... 99999 digit with buttons ▲ and ▼. Input B is deactivated. Input signal will be replaced by Constant Cb This constant enables to measure e.g. the slippage of a motor, the deviation from a reference value or the passing time in a continuos heater.	*[oFF]*
	U=24	Transmitter supply / Input level U = 24 = 24V DC for pnp-initiators U = 8 = 8V DC for Namur-initiators (* with ext. 5V supply also suitable for TTL-signals) tESt only for factory settings Selection with buttons ▲ and ▼.	*[U = 24]*

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Button	Display	Description	*[Factory settings]*
↓	SEC tb	Time base hr = hour (h^{-1}) MMin = minutes (min^{-1}) SEC = seconds (s^{-1}) Selection with buttons ▲ and ▼ .	*[SEC]*
↻			
↓	1.0 rt	Refresh time (displayed time) Setting possible from 0.1 ... 9.9 sec. with buttons ▲ and ▼ . Maximum display accuracy with will be reached : rt ≥ (max. display time in digit) x 0.000024 s Example: max. display value 1200.0 rt = 12000 x 0.000024 = 0.288s ⇒ rt ≥ **0.3 s** **Note:** At minimum 2 impulses must run the input within one refresh cycle (refresh time)	*[1.0]*
↻			
↓	0 dP	Decimal point position Auto (floating point) .000 .00 .0 0. Selection with buttons ▲ and ▼ .	*[0.]*
↻			
↓	oFF F.	Digital filter oFF on Selection with buttons ▲ and ▼ .	*[oFF]*
↻			
↓	1 d	Divisor for display Setting possible from 1 ... 9999 digit with buttons ▲ and ▼ .	*[1]*
↻			
↓	1 F	Factor for display Setting possible from 1 ... 9999 digit buttons ▲ and ▼ .	*[1]*
↻			
↓	oFF S.	Negative sign oFF no sign for measuring value and parameter on with sign; the output activation referring belongs to the sign; (depending on direction of movement) Selection with buttons ▲ and ▼ .	*[oFF]*
↻			

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Button	Display	Description	*[Factory settings]*
↓	oFF A1	Switching performance output A1 oFF = no action onL (min) = continuous contact: on-off onJ (max) = continuous contact: off-on Selection with buttons ▲ and ▼.	*[oFF]*
↻			
↓	2125 A1.	Setpoint output A1 Setting possible from -99999 ... 99999 digit with buttons ▲ and ▼. Decimal points only displayed if a fixed decimal point was programmed	*[0]*
↻			
↓	oFF A2	Switching performance output A2 oFF = no action onL (min) = continuous contact: on-off onJ (max; = continuous contact: off-on Selection with buttons ▲ and ▼.	*[oFF]*
↻			
↓	125 A2.	Setpoint output A2 Setting possible from -99999 ... 99999 digit with buttons ▲ and ▼. Decimal points only shown if a fixed decimal point was programmed. **Note:** Switching performance and setpoint of the outputs A1 bis A4 are identical.	*[0]*
↻			
↓	1 HY	Common Hysteresis for outputs A1 ... A4. Setting possible from 1 ... 9999 digit with buttons ▲ and ▼. Decimal points only shown if a fixed decimal point was programmed. Parameter only shown if at minimum 1 output is activated.	*[1]*
↻			

Continue
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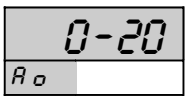
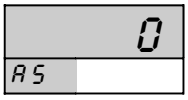
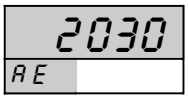
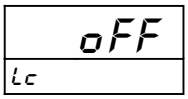
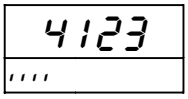
Button	Display	Description	*[Factory settings]*
↓		Analog output 0 - 20 mA (0 - 10 V DC) 4 - 20 mA (2 - 10 V DC). The changing from current to voltage output is load-dependent (≤ 500Ω = current output, > 500Ω = voltage output). Selection with buttons ▲ and ▼.	*[0 - 20]*
↻			
↓		Start value for analog output Setting possible from -99999 ... 99999 digit with buttons ▲ and ▼. Decimal point only shown if programmed.	*[0]*
↻			
↓		End value for analog output Setting possible from -99999 ... 99999 digit with buttons ▲ and ▼. With fixed decimal point programming the difference between start- and end value must be at minimum 4000 digit to get the maximum display resolution. With floating point, Auto parameter AS und AE changing automatically for best resolution. If the start value AS > end value AE, the output works with decreasing characteristic. Decimal points only shown if a fixed decimal point was programmed	*[0]*
↻			
↓		Program lockout oFF = no lock Conf. = configuration level locked ALL = all parameters locked CAL = only with analog output (only for factory settings) Selection with buttons ▲ and ▼.	*[oFF]*
↻			
		Return to the working level	

Measurement of passing time

Normally display value will increase with input impulse sequence. But when measuring passing time it will be just reversed. The more pulses per time will run the input the less will be the passing time.

For measuring passing time following parameters are important:

1. Function: Input configuration
   Fu ⇒ brA (must be selected)

2. Constant Input B
   Cb ⇒ Total number of impulses for one passing cycle. If this value >99999 Digit, input must be adapted by prescaler input A.

$$Cb = \frac{\text{Impulse for 1 passing cycle}}{dA} \leq 99999 \text{ digit}$$

3. Prescaler input A
   dA ⇒ enter smallest possible value to get the maximum display range

4. Time base
   tb ⇒ select time base

   Note: If Cb < 10000 digit, it will be necessary for accuracy measurement to change following parameters:
   a. tb change time base up (e.g. from **s** in **min**)
   b. Cb multiply with factor 60
   If the result >99999, parameter dA must be adapted (see point 2.)

5. Refresh time
   rt ⇒ Within the refresh interval at least 2 input impulses must run the input.

Example

Calculating the passing time of a continuos drying oven, in minutes with one decimal point.

Following data are present:

Length of oven	30m
Distance per one resolution of the measuring shaft	0.1m
Number of impulses per one resolution of the measuring shaft	500
Time base	min
Decimal point position	0.0
Sensor type	pnp-initiator

The maximum impulses for one passing cycle at input A

$$\frac{500 \text{ impulses}}{0.1\text{m}} \text{ x } 30\text{m} = 150000 \text{ impulses}$$

The maximum value for Cb (with selected decimal point 0.0) could be entered is 9999.9.

$$Cb = \frac{150000}{dA} \leq 99999 \text{ Digit}$$

If the parameter dA is selected to value 20, the result as shown:

$$Cb = \frac{150000}{20} = 7500.0 = (75000 \text{ Digit})$$

Configuration for this measuring task

Fu	brA
dA	20
db	1
cb	7500.0
In	U = 24
tb	MM.n
rt	1
dP	.0
F1	oFF
d	1
F	1
S1	oFF

Order code

PR9648 - 1. ☐ - 2. ☐ - 3. ☐ - 4. ☐ - 5. ☐ - 6. ☐ - 7. ☐

1. Terminal strip A

1	configurable impulse inputs, integrated transmitter supply, programmable display conversion, hold-input	

2. Terminal strip B

00	not installed	
2R	2 preselect (alarm) outputs	relay
2T	2 preselect (alarm) outputs	transistor

3. Terminal strip C

00	not installed	
2R	2 preselect (alarm) outputs	relay
2T	2 preselect (alarm) outputs	transistor
AO	analog output	0/4 ... 20mA and 0/2 ... 10V DC, isolated

4. Terminal strip D supply voltage

0	230V 50/60Hz	±10%
1	115V 50/60Hz	±10%
4	24V 50/60Hz	±10%
5	24V DC	±15%

5. Option

05	without option
01	min-and max-peak -hold

6. Unit (appears on the unit field)

7. Additional text (appears on the face plate in the field for additional text max. 3mm x 90mm HxW)