

DIGEM 96x24 B5

A1375 Digital Panel Mount
Measuring Instrument

3-349-021-30

05.04



programmable (PR000)



non-programmable (PR001)

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Instructions and Safety Precautions

This instrument has been shipped from the factory in flawless technical safety condition. In order to maintain this condition, and to assure hazard-free operation, the user must observe all instructions and safety precautions included in these operating instructions. If, due to damage, it may be assumed that safe operation is no longer assured, the instrument must be removed from service. This assumption must be made if the instrument demonstrates visible damage. It must be assured that the measuring instrument has been properly configured for its intended purpose prior to initial start-up (correct supply voltage, inputs and outputs). The instrument model and appropriate options are identified on the serial plate. Voltage conducting components may be exposed if covers are opened or parts are removed from the instrument. Balancing, maintenance and repair of an open, live instrument may only be carried out by trained personnel who are aware of the dangers involved.

1 Applications

The PR000 programmable version of this instrument is especially suited for applications which require frequent, on-site adjustments to the display.

The PR001 with permanently set values is best suited for applications for which the keys would only get in the way, and for which no programming is desired.

2 Mounting

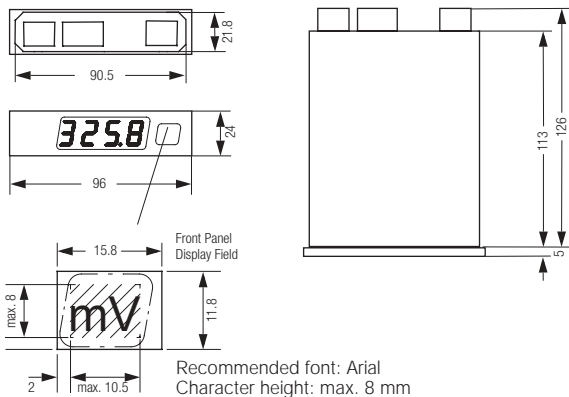
First slide the measuring instrument into the control panel without the mounting clips. The mounting clips are then inserted from the rear into the slots at the side panels provided for this purpose and are pressed against the control panel.



Attention!

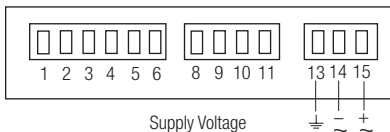
When several instruments are installed at max. component density, it must be assured that the allowable maximum operating temperature of 50° C – intrinsic heat generation included – is not exceeded.

Dimensional Drawing



3 Connector Terminal Assignments

3.1 Supply Voltage



3.2 Measurement Input (depending upon model)

Model	Ranges	Connector Terminal Assignments
DC	V, mV, mA	
AC	V, mA	
AC, True RMS	200 V, 700 V mA	
DC, with power supply for 2-wire measuring transducer	mA	
Temperature Measurement with Pt100	all	
4-Wire	3-Wire	
AC TRMS	200 mV ... 100 V	

3.3 External Control Inputs



Attention!

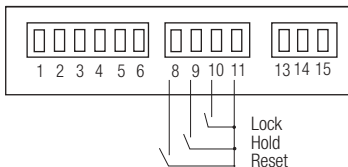
Terminals 8, 9, 10 and 11 are electrically connected to the measurement input. External switches must be electrically isolated from ground in a fashion appropriate for prevailing input potential.

Reset and Instrument Test

The entire display is darkened when terminals 8 and 11 are connected to one another.

Attention: This causes resetting of the microprocessor.

After this connection has been interrupted, a segment test with a duration of about 1 second is performed. The instrument is switched to normal operation after completion of the segment test.



Store Display Value to Memory (Hold)

The current display value can be stored to memory by establishing a connection between terminals 9 and 11 during normal operation in the display mode. This has no influence on the measuring cycle.

Configuration Protection (Lock)

The selected parameters can be protected against possible alteration by establishing a connection between terminals 10 and 11. This function is not required for the PR001 version.

4 Basic Instrument Settings for the PR000

Parameter	Function	Setting Range
bri	Display Brightness	0 ... 7
0 – 20 mA	Measuring Range Matching	
AA	Display Range Lower Limit	
AE	Display Range Upper Limit	
4 – 20 mA	Measuring Range Matching	
AA	Display Range Lower Limit	
AE	Display Range Upper Limit	
Pt100	Measuring Range Matching	
C / F	Display in Degrees Celsius or Fahrenheit	°C / °F
2-4L / 3L	2/4-Wire Connection or 3-Wire Connection	2-4L / 3L
hCA	Hardware Calibration	
ZEr0	Display Range Lower Limit	–1999 ... 9999
SPAn	Display Range Upper Limit	–1999 ... 9999
PCA	Software Calibration	
OFSt	Offset Adjustment	–1999 ... 9999
SCAL	Measurement Value Multiplier	–1.999 ... 9.999

These values are permanently set for the PR001 non-programmable version. The below described programming functions are thus not available with the PR001 version.

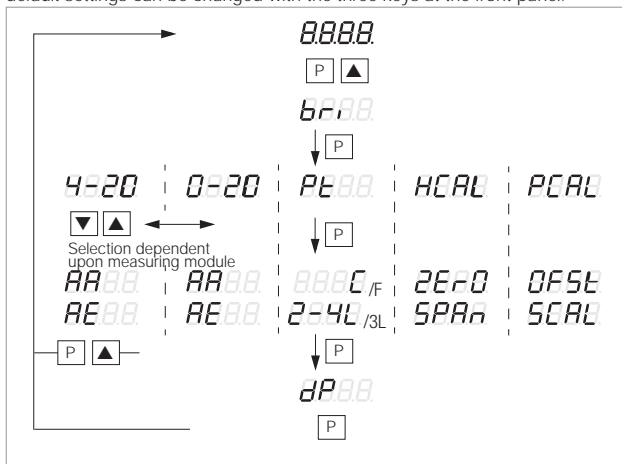
5 Programming the PR000 Version

Enable Programming

Configuration protection must be deactivated in order to enable programming, i.e. the contact between terminals 10 and 11 must be opened. If programming has not been enabled, **Loc** appears at the display when the programming menu is opened.

Programming the Instrument

The instrument has been programmed at the factory in accordance with the data which appear on the serial plate. If programming has been enabled, the default settings can be changed with the three keys at the front panel.



Programming Overview for Basic Instrument Settings (generally disabled)

Press the **P** and **▲** keys simultaneously in order to open the programming menu. The parameter designation and the corresponding value blink alternately. The longer the arrow key is pressed and held, the faster the respective value is changed. The newly selected value is not stored to

memory until the next parameter is called up with the P key. The programming sequence can be interrupted by pressing the P key a second time after the current value has been stored with the P key. Range matching for 0/4 – 20 mA and Pt100 is dependent upon the measuring module and can only be selected if the instrument has been equipped with the corresponding measuring module (see configuration data on serial plate).

5.1 Display Brightness

The "bri" parameter can be used to adjust brightness at the display. Brightness can be adjusted within a range of 0 to 7. Instruments are shipped from the factory with a brightness default setting of 5.

5.2 Measuring Range Matching for 0 – 20 mA and 4 – 20 mA

The parameters AA and AE allow for the entry of a display range without the need for any further balancing.

5.3 Measuring Range Matching for Pt100 Temperature Sensors

This parameter is used to determine whether temperature is displayed in °C or °F, and whether a 3-wire connection or a 2/4-wire connection is used for the temperature sensor.

5.4 Measuring Range Matching with HCAL (hardware calibration)

This selection provides for balancing by means of a calibrator. The input quantities which correspond to the upper and lower measuring range limits must be applied to the measuring instrument during balancing.

First apply the value to the measurement input which corresponds to the measuring range lower limit. Select the ZER0 parameter and enter the value which corresponds to the measuring range lower limit.

Then apply the value to the measurement input which corresponds to the measuring range upper limit. Select the SPAN parameter and enter the value which corresponds to the measuring range upper limit.

Store the selected values to memory with the P key. The measuring instrument automatically determines and stores offset and multiplier values.

Attention: If offset and multiplier values are calculated which do not lie within the setting ranges, ErrP appears at the display and the incorrect value blinks (e.g. SPAN).

5.5 Measuring Range Matching with PCAL (software calibration)

Balancing is carried out without a calibrator for measuring range matching with PCAL by calculating offset and multiplier values. Offset and multiplier values are selected directly in digital format.

Calculating the Offset Value (OFSt)

The offset value is equal to the number of places the display is shifted from the "normal" zero point. The offset value is calculated based upon the following equation without any consideration of decimal point:

$$\text{Offset} = \text{AA} - \frac{\text{SA} \times (\text{AE} - \text{AA})}{\text{SE} - \text{SA}}$$

AA = display range lower limit SA = signal range lower limit (input range lower limit)
AE = display range upper limit SE = signal range upper limit (input range upper limit)

Calculating the Multiplier (SCAL)

The SCAL multiplier is used to match the display range to the input signal range. The multiplier value is calculated with the following equation:

$$\text{SCAL} = \frac{\text{SE}}{2000} \cdot \frac{(\text{AE} - \text{AA})}{(\text{SE} - \text{SA})}$$

Example:

A measuring instrument with the following configuration:

0 ... 10 V signal range corresponds to 0.0 ... + 100.0 display range,
needs to be changed to the following:

2 ... 10 V signal range corresponds to - 10.0 ... + 100.0 display range.

Assuming an original multiplier of 1,000 the following applies:

$$\text{OFSt} = -100 - \frac{2(1000 - (-100))}{10 - 2} = -375$$

$$\text{SCAL} = \frac{10}{2000} \cdot \frac{1000 - (-100)}{10 - 2} = 0.6875$$

SA = 2 V; AA = - 100;

SE = 10 V; AE = +1000;

6 Technical Data

Display

Type	7 segment LED
Display Color	red
Range	-19 99 to 9999
Character Height	14 mm
Polarity	"-" is displayed automatically
Decimal Point	programmable (for model PR000) permanently set (for model PR001)
Overflow Display	----

Input

Depends upon	
Measuring Module	see serial plate
Voltage Module	
Input Impedance	> 1 M Ω for measurement > 2V > 70 k Ω for measurement < 2V
Current Module	
Voltage Drop	max. 2 V
Temperature Module, Pt100	
Sensor Current	2 mA for Pt100

Error Limits

Basic Instrument	
Without Modules	\pm (0.1% of rdg. + 1 digit)
DC Module	\pm (0.1% of rdg. + 2 digits)
Temperature Coefficient	< 80 ppm / K
SMRR	> 35 dB at 50 Hz
CMRR	> 120 dB with ref. to 200.00 mV measuring range at 50 Hz
AC Module (arithmetical)	
Intrinsic Error at 45 to 65 Hz	\pm (0.2% of rdg. + 3 digits)
30 ... 1 kHz	\pm (0.3% of rdg. + 5 digits)
Temperature Coefficient	\pm (0.01% + 0,01 mV) / K

TRUE RMS Module

Intrinsic Error at 45 to 65 Hz	± (0.2% of rdg. + 3 digits)
20 Hz ... 1 kHz	± (0.2% of rdg. + 5 digits)
Crest Factor	6 (additional 0.5% of rdg.)
Temperature Coefficient	± (0.01 % of rdg. + 0.01 mV) / K
Temperature Module, Pt100	
Max. Error	± (0.3% of rdg. + 2 digits)
Temperature Coefficient	< 150 ppm / K
Offset Drift	< 0.1 digit / K

Control Inputs

Instrument Test (Test)	by means of floating contact
Store Display Value (Hold)	by means of floating contact
Disable Programming (Lock)	(for PR000 version only) by means of floating contact

Supply Voltage

	230 / 115 V AC and 90 ... 260 V DC or 24 V AC and 18 V ... 36 V DC
Power Consumption	max. 5 VA

Electrical Safety

Variants	IEC 61010-1: 90 / EN 61010-1: 93
Protection Class	II
Overvoltage Category	II
Fouling Factor	2
Protection	EN 60529/ VDE 0470-1
Front Housing Panel	IP 54
Terminals	IP 20
EMC	
Interference Immunity	EN 50082-2 / IEC 61000-6-2
Interference Emission	EN 50081-2
Operating Voltage	
DC Voltage Module	300 V
AC Voltage Module	600 V
DC/AC Current Module	300 V
Temperature Modules	50 V

Ambient Conditions

Operating Temperature	0 ... 50° C
Storage Temperature	- 20 ... 70° C
Relative Humidity	max. 85%
Utilization Category	DIN 40040: KWG
Resistance to Vibration	IEC 61010-1 / EN 61010-1

Housing

Material	plastic: ABS
Front Panel Dimensions	96 x 24 mm
Panel Cutout Dimensions	92 ^{+0.8} x 22 ^{+0.3} mm
Bezel Height	5 mm
Installation Depth	max. 130 mm incl. plug
Weight	approx. 200 gr. incl. packaging
Terminals	screw terminal blocks
Mounting	plastic mounting clips

Printed in Germany • Subject to change without notice

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