
UM 3301

Digital Display

for analogue input signals

instruction manual



Warranty

For delivered products our "Allgemeine Lieferungs- und Zahlungsbedingungen" are effective. In no event we or our suppliers shall be liable for any other damages whatsoever (including, without limitation, damages for loss of business profits, business interruption or other pecuniary loss) arising out of or inability to use this product.

All our products are warranted against defective material and workmanship for a period of two (2) years from date of delivery. If it is necessary to return the product to us, the sender is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit. This warranty does not apply to defects resulting from action of the buyer, such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorized modification.

Safety instructions

When delivered the instrument has been tested to meet all functions described. Before installing the instrument please read the mounting and servicing instructions. We have no liability or responsibility to customer or any other person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by equipment or software sold or furnished by us. Read the installation instruction carefully. No liability will be assumed for any damage caused by improper installation.

Inspect the instrument module carton for obvious damage. Be sure there are no shipping and handling damages on the module before processing. Do not apply power to the instrument if it has damages.

The warranty does not apply to defects resulting from action of buyer, such as mishandling, improper interfacing, operation outside of design limits, improper repair or unauthorized modifications.

Explanation of symbols



Caution



Attention



Instruction



Hint

Caution:	Dangerous!
Attention:	Will cause damage
Instruction:	If not noticed, trouble may occur.
Hint:	Useful hints for better operation.

Trademarks

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1. Description

The digital panel meter model **UM 3301** is an universal instrument for measuring analog input signals listed below:

- Voltage 0-10V
- Current 0-20 mA/4-20 mA

4 function buttons on the front side; three of them are programmable. More software functions are:

- Scaling
- Free setting of decimal point
- Display test
- Taring
- MAX/MIN storage
- Auto-Reset for MAX/MIN storage
- Digital filter

2. Mounting

2.1. Place of operation

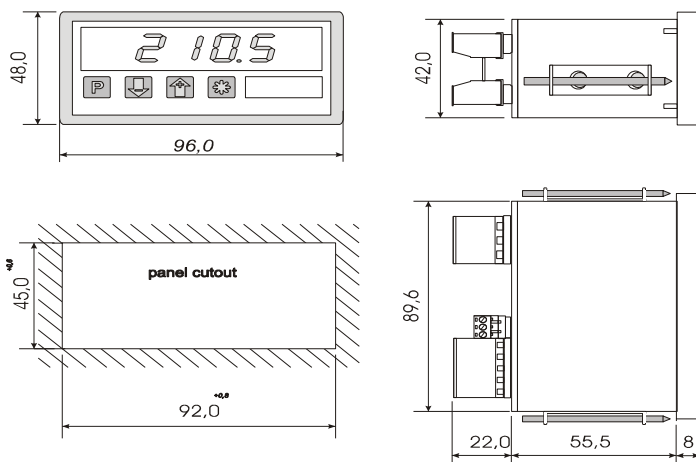
Attention must be payed to the protection against humidity, dust and high temperatures at the place of operation.

2.2. Mounting of the display

2.2.1. Panel for switchboard

Insert the case into the panel cutout ($92,0^{+0,8} \times 45,0^{+0,6}$ mm) from the front.

Tighten the screws alternately, using enough pressure to get good retention and sealing at the panel.



3. Electrical Connection

3.1. General Instructions



- It is forbidden to plug or unplug connectors with voltage applied
- Attach input and output wires to the connectors only without voltages applied
- Cords must be provided with sleeves
- Attention must be paid that the power supply voltage applied will agree with voltage noticed at the Type plate.
- The instrument has no power-on switch, so it will be in operation as soon as

3.2. Hints against noisy environment

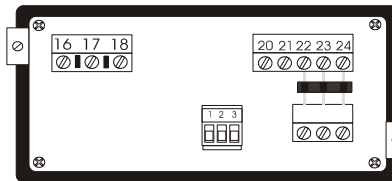
All inputs and outputs are protected against noisy environment and high voltage spikes. Nevertheless the location should be selected to ensure that no capacitive or inductive interference can have an effect on the instrument or the connection lines.

It is advisable:

- To use shielded cables.
- The wiring of shields and ground (OV) should be star-shaped.
- The distance to interference sources should be as long as possible. If necessary, protective screen or metal enclosures must be provided.
- Coils of relays must be supplied with filters.
- Parallel wiring of input signals and AC power lines should be avoided.

3.3. Connection and pin assignment

All inputs and outputs are connectors designed as plug-in screw terminals.

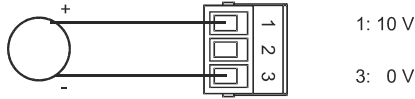


Pin assignment:

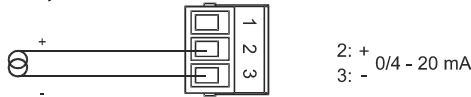
1	Signal input voltage	16	AC supply voltage
2	Signal input current	17	AC supply voltage
3	Signal ground	18	Ground
4-6	Don't use!	20	DC supply voltage (+)
22-24	Don't use	21	DC supply voltage (-)

3.4. Connection of signal inputs

3.4.1. Signal input 0 - 10 V

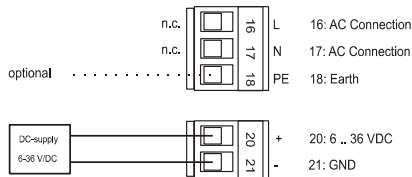


3.4.2. Signal input 0 - 20 mA, 4 - 20 mA



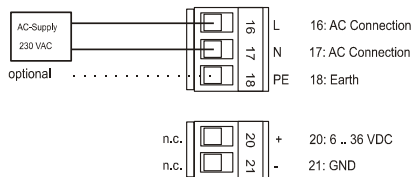
3.4.3. Connection of power supply voltage DC

Attention! Only one power supply may be connected at a time



3.4.4. Connection of power supply voltage AC

Attention! Only one power supply may be connected at a time



4. Start up



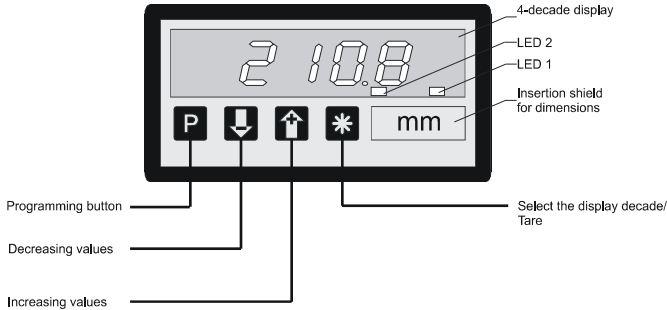
Attention must be paid that the power supply voltage applied will agree with the voltage noticed at the type plate.



When delivered, the instrument is programmed with a standard configuration (default configuration). According to his measuring task, the customer can change the standard configuration by programming.

Attention: When the instrument is built-in in a machine and the customer wants to change the configuration, attention must be paid, that no damage will occur to the machine!

5. Functions of the buttons and LEDs



LED 1	LED 2	Bedeutung
	dark	The displayed value is not tared
	yellow-orange lights	The displayed value is tared
green/flashes		Programming mode is activated

6. Modes

The operation and the programming of the panel meter is organized in several states:

- Operation level
- Access-code level
- Programm level

6.1. Operation level

In the state "operation level" the measured value is read, calculated and displayed. Dependent on the programming of the parameter 0-11 (function of key „*“), 0-12 (function of key „+“) and 0-13 (function of key „-“) , following key-functions are available in the operation level:

Programmed Parameter in 0-11, 0-12 or 0-13	Function by pressing
0	no function
1	Reset the MIN/MAX value
2	Taring
3	Clear tara value
4	Display measured value
5	Display average value
6	Display MAX value
7	Display MIN value
8	Display test

6.2. Access code level

The state "access-code level" becomes active by pressing the pushbutton „P“ during the state "operation level". The display shows "c000". During the state "access-code level" the normal functions of the instrument are active. The active decade is flashing.

<i>Taste</i>	<i>Funktion</i>
P	Confirm of the displayed access-code
+	Increase the access-code
-	Decrease the access-code
*	Change the decade

6.3. Programming level

The state "program level" becomes active by entering the right access-code. The access-code must be confirmed by pressing the pushbutton „P“. The programming is organized in following steps:

- Selection of a programming level
- Selection of a parameter
- Change of the selected parameter

<i>Taste</i>	<i>Funktion</i>
P	Selecting and confirming of parameters
+	Increasing - the parameter number - the decade of the parameter
-	Decrease - the parameter number - the decade of the parameter
*	Change the decade of the parameter

7. Programming

The Programming is organized in several different steps.

Access to the selection of the programming levels

- Pressing pushbutton „P“; access-code level will be activated
- The display shows “c000”
- Changing the access-code by pressing the pushbutton „+“ or „-“ and confirm the changed access-code by pressing the pushbutton „P”

If the entered access-code is not correct, the instrument will jump back to the state “operation level”.

7.1. Changing or controlling the parameters

Activating the programming routine

- Pressing pushbutton „P”
- LED 3 flashes green
- The display shows “c000”
- Changing the access-code by pressing the pushbutton „+“ or „-“ confirm access-code by pressing the pushbutton „P”
- The display shows “0-00”

Leaving the programming routine

- Pressing the pushbutton or until the display shows “PEnd”
- Confirm the display “PEnd” by pressing the pushbutton
- LED 3 is off
- The active state of the panel meter is “operation level”

Selection of a Parameter

- Select the parameter with the „+“ or „-“ button
- Confirm the selected parameter with the „P” button
- The display shows the current value of the parameter

Change and confirm the selected parameter

- Change the parameter with the „+“ or „-“ button
- Confirm the parameter with the „P” button
- the display shows the programming level and the number of the parameter
e.g.: „0-05” ==> Parameter 5 of the programming level 0
e.g.: „0-08” ==> Parameter 8 of the programming level 0

7.2. Programming level for configuration 0-00

Parameter	Description	Setting range	Default
0-00	Input range 0 -> Voltage 0 bis 10 V 1 -> Current 0 to 20 mA 2 -> Current 4 to 20 mA	0 .. 2	0
0-01	User calibration Minimum input signal	0.00 .. 10.00 V 0.00 .. 20.00 mA 4.00 .. 20.00 mA	Min
0-02	User calibration Display value for minimum input signal	-999 .. 9999	like 0-01
0-03	User calibration Maximum input signal	0.00 .. 10.00 V 0.00 .. 20.00 mA 4.00 .. 20.00 mA	Max
0-04	User calibration Display value for maximum input signal	-999 .. 9999	like 0-03
0-05	Decimal point 0 -> XXXX 1 -> XXX.X 2 -> XX.XX 3 -> X.XXX	0 .. 3	2
0-06	Data source for Display 0 -> Direct measured value 1 -> Average value 2 -> Maximum value 3 -> Minimum value	0 .. 3	0
0-07	Configuration of digit 1 0 -> Anzeige in 1er-Schritten 1 -> Anzeige in 2er-Schritten 2 -> Anzeige in 5er-Schritten 3 -> Anzeige in 10er-Schritten	0 .. 3	0
0-08	Filtering 0, 1 -> No averaging X -> Number of the averaging cycles	0 .. 255	0
0-09	Data source for the MIN/MAX value 0 -> Direct measured value 1 -> Averaging value	0 .. 1	0
0-10	Reset time for the MIN/MAX value 0 -> No automatically reset x -> Reset time in seconds	0 .. 100	0

<i>Parameter</i>	<i>Description</i>	<i>Setting range</i>	<i>Default</i>
0-11	Function of the push button „*“ 0 -> No function 1 -> Reset MIN/MAX value 2 -> Taring 3 -> Clear tara value 4 -> Display direct measured value 5 -> Display averaging value 6 -> Display maximum value 7 -> Display minimum value 8 -> Display test	0 .. 8	0
0-12	Function of the push button „+“ 0 -> No function 1 -> Reset MIN/MAX value 2 -> Taring 3 -> Clear tara value 4 -> Display direct measured value 5 -> Display averaging value 6 -> Display maximum value 7 -> Display minimum value 8 -> Display test	0 .. 8	0
0-13	Function of the push button „-“ 0 -> No function 1 -> Reset MIN/MAX value 2 -> Taring 3 -> Clear tara value 4 -> Display direct measured value 5 -> Display averaging value 6 -> Display maximum value 7 -> Display minimum value 8 -> Display test	0 .. 8	0
0-14	Access code	0 .. 999	0
0End	Leaving programming level 0-00		

7.2.1. Scaling the display range

Overflow and underflow is indicated as follows:

In the case of an **overflow** the display shows the following: „nnnn“; this occurs if

- the input signal exceeds the permissible maximum around more than 0,5V or 1 mA;
e.g. input voltage >10,5 V or input current >21 mA.
- the display range exceeds the possible maximum. (> 9999)

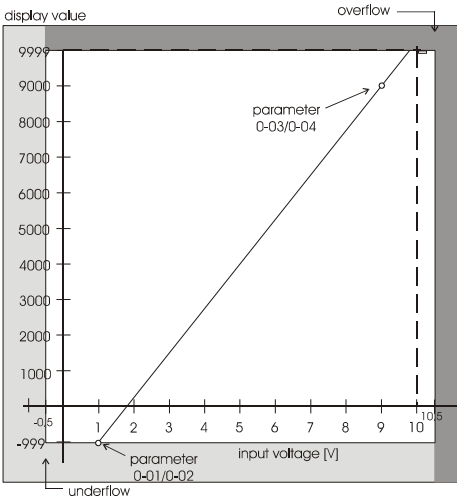
An **underflow** is displayed as „uuuu“; this occurs if

- the input signal exceeds the permissible minimum around more than 0,5V or 1 mA;
- e.g. input voltage < -0,5V or input current < -1 mA or 3mA.
- the display range exceeds the possible minimum. (< -999)
- the parameter PO-03 has the value 3 (decimal point after the first decade: X.XXX) (in this case is the display of negative values is not possible) and the displayed value would be below 0.000.

The display values for the minimum and the maximum input signal and the minimum and the maximum signal value is set in the parameters 0-01, 0-02, 0-03 and 0-04.

Example:

Input range: +1 V to +9 V, display range: -999 bis +9000



Step	Param.	Value
1.	0-00	0
2.	0-01	01.00
3.	0-02	-999
4.	0-03	09.00
5.	0-04	9000
6.	0-End	

7.2.2. Maximum-, Minimum value detection

The panel meter has a maximum-, minimum value detection as a standard function. The minimum and maximum memory can be used at the same time. The current values can be displayed via the push buttons on the front side of the panel meter. The reset of the MIN/MAX memories can be done via the push buttons on the front side. It is also possible to reset the values after a programmable storage time.

As source for the MIN/MAX detection the direct measured value or the averaging value can be used. (Parameter 0-09=0/1)

Reset the maximum and minimum values:

- automatically by the programmed memory reset time (parameter 0-10)
- by pressing the „*“ button if parameter 0-11 = 1
- by pressing the „+“ button if parameter 0-12 = 1
- by pressing the „-“ button if parameter 0-13 = 1
- by leaving the programming routine
- by switching on the device

Display the maximum and minimum value

- by programming the MIN/MAX value as data source of the display (parameter 0-06 = 2/3)
- by pressing the „*“ button if parameter 0-11 = 6/7
- by pressing the „+“ button if parameter 0-12 = 6/7
- by pressing the „-“ button if parameter 0-13 = 6/7

7.2.3. Averaging

To smooth the displaying of an noisy analog input signal the panel meter has a floating averaging. The value in parameter 0-08 sets the number of measurements that will be used to calculate the average value. For the calculation the method of the floating average is used; that means the measure rate will not be changed but the average value of the last x measurements will be displayed. The final value is reached through an e-function. The time constant is calculated with the formula as follows:

$$\text{Time constant} = \frac{\text{Number of measurements}}{\text{Measurements per second}}$$

If the input signal is a step function, 99,3 % of the final measurement value will be reached within 5 time constants.

To display the averaging value it has to be programmed as the source for the display.
(parameter 0-06 = 1)

7.2.4. Taring

By activating the tara function, the input value will be taken over into the tara memory. The tara value is subtracted from the input value. The tara value will be saved into an EEPROM and is still available after power-off.

Activating the tara function

- by pressing the „*” button if parameter 0-11 = 2
- by pressing the „+” button if parameter 0-12 = 2
- by pressing the „-” button if parameter 0-13 = 2

LED 2 is on while the tared value is displayed

Clear the tara function:

- by pressing the „*” button if parameter 0-11 = 3
- by pressing the „+” button if parameter 0-12 = 3
- by pressing the „-” button if parameter 0-13 = 3

LED 2 is off and the untared value is displayed

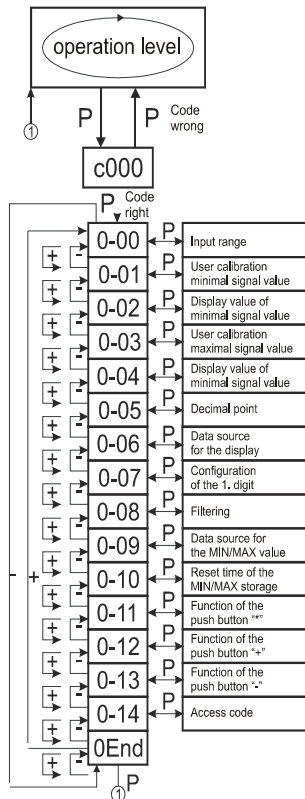
7.2.5. Display test

If the display test is activated all segments of the display will be lighted on. The display shows “8.8.8.8”

Activating the display test by:

- by pressing the „*” button if parameter 0-11 = 8
- by pressing the „+” button if parameter 0-12 = 8
- by pressing the „-” button if parameter 0-13 = 8

7.3. Programming quick reference



8. Main reset

The main reset is performed by pressing a key combination at the front of the panel meter. By doing this all parameters are setting to the default value. During the main reset the display shows "Init.". Perform the main reset by pressing the pushbuttons "←", "·" and "P" and at the same time during 10 seconds.

9. Technical Specifications**A/D-Converter**

Resolution : 12 Bit

Input RangesVoltage : 0 to 10 V, $\pm 0,05$ %, ± 1 DigitImpedance : $> 50 \text{ k}\Omega$ Current : 0/4 to 20 mA, $\pm 0,05$ %, ± 1 DigitImpedance : $10 \text{ }\Omega$ **Conversion rate**

: 5 /s

Display

: 4 decades, 14 mm, red

Decimal point programmable

preliminary zero suppression

- sign at negative values

Operation, keyboard design

: front membrane with push buttons

Power supply

: 6 to 36 V DC (isolated)

Power consumption

: max. 65 mA

Case

: 96 x 48 x 63,5 mm

Depth : < 72 mm (incl. screw terminal)

Front protection : IP 54

Connectors protection : IP 20

CE

: 2014/30/EU, 2014/35/EU,

2011/65/EU+2015/863

Operation temperature

: 0 to 60 °C

Storage temperature

: -20 to 70 °C

Humidity: < 80 %, not condensing**Field of application**

: class 2

overvoltage protection II

Weight

: ca. 250 g

10. Ordering information

UM 3301 -	0	0	x	0	x	
						Housing
						0 Switchboard
						Reserved
						Front design
						0 Reserved
						1 Jessen-ERMA Logo
						2 No Logo
						Reserved
						Reserved

Jessen-ERMA-Electronic UG
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