

## Digital remote display for Flow Meter DM /DE

# Universal meter UZ

Indication of the quantity consumed in m<sup>3</sup>

### Features

- LED-Display 14.2mm red
- Indicating range -99999 ... 999999
- 0 ... 3 Decimal points programmable
- Up- and down counter function
- 2 digital inputs for summation and subtraction
- Integrated transmitter-supply 24 / 8V DC
- Auto-reset or external reset
- 2 preset outputs SPDT relay (optional),
- Display conversion programmable
- Isolated analog output
- 0/4 ... 20mA and 0/2 ... 10V DC (optional)
- Front protection IP65



### General

The universal meter UZ has been designed for process engineering and automation environments. All parameters can be programmed. The counter can be used wherever quantities or processes must be measured, displayed and controlled or regulated.

### 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.                                                                                                                                                                                         |
| Preset outputs     | Preset outputs can be programmed as continuous contact or pulse contact. Switching performance is programmable as minimum or maximum function.                                                                                                                              |
| Analog output      | Proportional to input pulses 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. |



## Connection diagrams

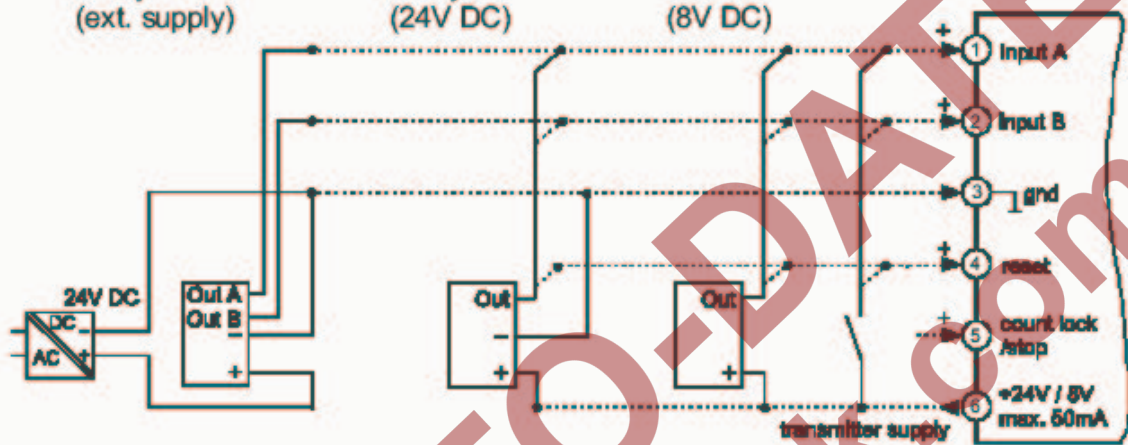
### Terminal strip A

2-channel  
rotary encoder  
(ext. supply)

PNP-initiator,  
rotary encoder  
(24V DC)

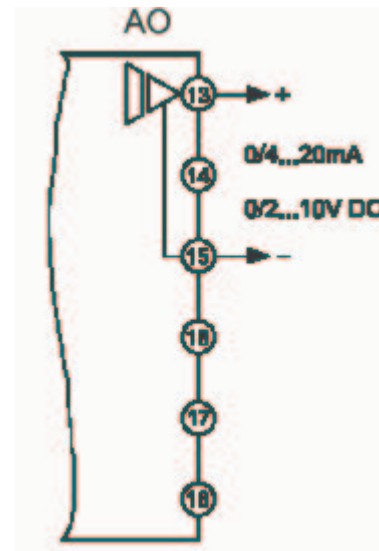
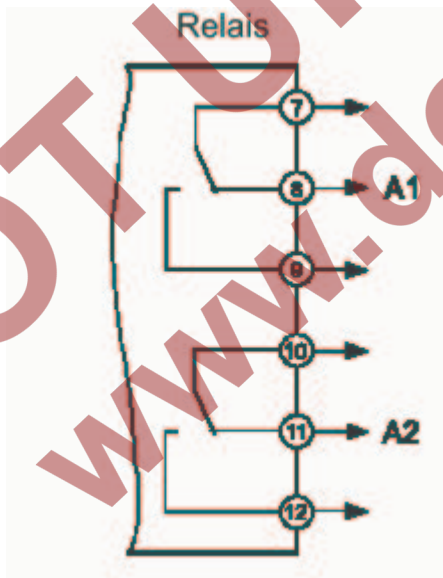
Namur-  
initiator  
(8V DC)

switch-  
contact

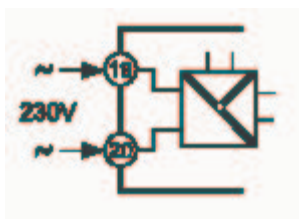


Terminal strip B (**varies with version**)  
2 preselect (alarm) outputs

Terminal strip C (**varies with version**)  
Analog output



Terminal strip D Supply voltage



## 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 preset 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 counter can be programmed. These maybe the measuring input, input configuration, conversion of the displayed value, switching performance of preset 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:

**P E** 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 counter is running with factory settings. Configuration and function of the counter must be checked. If error occurs again, please ship the counter to factory for repair service.

**Loc** Programming lock active ⇒ see configuration page 9

**of** Overflow ⇒ also see page 11

**Start-up note:**

Before the device can be used, it must be configured for the intended use.

⇒ see page 6

**Notes to representation**

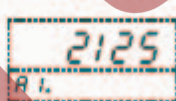
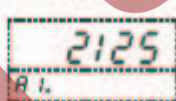
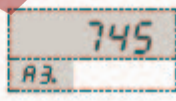
Parameter only shown when configured



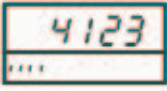
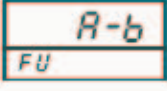
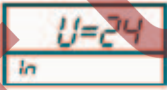
Parameter is only shown when installed in the device (see order code)

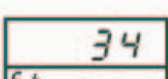
Note: All parameters can be called if they are not blocked by other programmed parameters and if they are available. Factory settings are shown in [ 0 ].

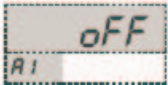
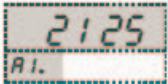
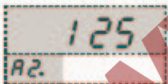
**Working level**

| Button                                                                              | Display                                                                             | Description                                                                                                                                                                                                                                                       | [ Factory setting ] |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
|  |  | Count value                                                                                                                                                                                                                                                       |                     |
|  |  | Output indication<br>(only if installed and activated).                                                                                                                                                                                                           |                     |
|  |  | Setpoint output A1<br>Setting possible from -99999 ... 999999 digit<br>with buttons  and  . | [ 0 ]               |
|  |  | Setpoint output A2<br>Setting possible from -99999 ... 999999 digit<br>with buttons  and  . | [ 0 ]               |
|  |  | Setpoint output A3<br>Setting possible from -99999 ... 999999 digit<br>with buttons  and  . | [ 0 ]               |
|  |  | Setpoint output A4<br>Setting possible from -99999 ... 999999 digit<br>with buttons  and  . | [ 0 ]               |

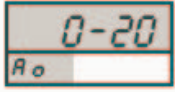
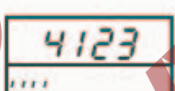
## Configuration Level

| Button                                                                                                  | Display                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                | [Factory setting] |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <br>press<br>2 seconds |    | Operating level                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
|                        |    | Function: input configuration A and B; count direction<br>$R-b$ = A up, B down<br>$R-b\ db$ = A up, B down, for switching contacts<br>$R\ u\ b$ = A up, B up<br>$R\ u\ b\ db$ = A up, B up, for switching contacts<br>$g\ 0\ 0\ 1\ d$ = rotary encoder<br>Selection with buttons  and  . | [R-b]             |
|                        |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
|                        |    | Prescaler input A<br>Setting possible from 1...9999 digit with buttons  and  .<br>(Only every n <sup>th</sup> pulse is counted)                                                                                                                                                      | [1]               |
|                        |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
|                       |   | Prescaler input B<br>Setting possible from 1...9999 digit with buttons  and  .<br>(Only every n <sup>th</sup> pulse is counted)                                                                                                                                                    | [1]               |
|                      |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
|                      |  | Transmitter supply / input level<br>$U = 24$ = 24V DC for pnp-initiators<br>$U = 8$ = 8V DC for Namur-initiators*<br>(*with ext. 5V supply also suitable for TTL signals)<br>$t\ E\ 5\ t$ = only for factory settings.<br>Selection with buttons  and  .                             | [U=24]            |
|                      |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
|                      |  | Count value for power-on<br>$r\ E\ 5\ E\ t$ = load start value (5 t) (see page 7)<br>$r\ E\ 5\ t\ o\ r$ = count value is stored if power fails<br>Selection with buttons  and  .                                                                                                     | [rESEt]           |
|                      |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
|                      |  | Decimal point position<br>$.000$<br>$.00$<br>$.0$<br>$0.$<br>Selection with buttons  and  .                                                                                                                                                                                          | [0.]              |
|                      |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |
| continue<br>page 7                                                                                      |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                   |

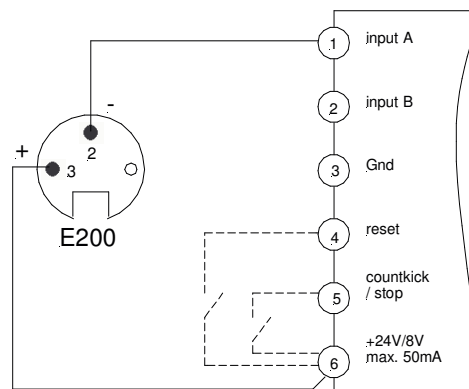
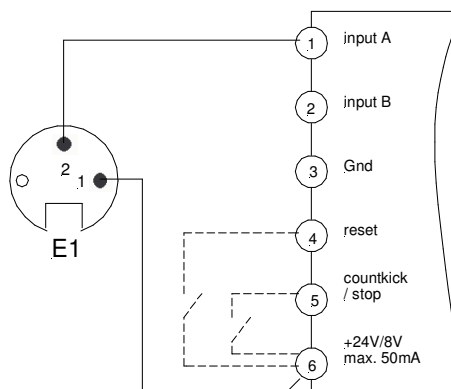
| Button                                                                              | Display                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | [ Factory settings ] |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|    |    | Divisor for display<br>Setting possible from 1 ... 9999 digit, with buttons  and  .<br>⇒ also see page 11                                                                                                                                                                                                                                                | [ 1 ]                |
|    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |
|    |    | Factor for display<br>Setting possible from 1 ... 9999 digit, with buttons  and  .<br>⇒ also see page 11                                                                                                                                                                                                                                                 | [ 1 ]                |
|    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |
|    |    | Start value<br>Count value after reset.<br>Setting possible from -99999 ... 999999 digit, with buttons  and  .                                                                                                                                                                                                                                           | [ 0 ]                |
|    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |
|  |  | End value<br>oFF: the counter operates as totalizing counter in the full range range.<br>When reaching the value -99999 or 999999 the counter stops.<br>In the case of overflow the display flashes.<br>on: the counter operates as ring counter between start value St and end value En (see following parameter)<br>Selection with buttons  and  . | [ oFF ]              |
|  |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |
|  |  | Count value for internal reset<br>Setting possible from -99999 ... 999999 digit with buttons  and  .                                                                                                                                                                                                                                                 | [ 999999 ]           |
|  |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |
| continue page 8                                                                     |                                                                                     | <b>Note:</b> Parameter is only displayed if En = on and occupied setpoint preset of output A1.                                                                                                                                                                                                                                                                                                                                                                                                                                 |                      |

| Button | Display                                                                             | Description                                                                                                                                                                                                                                                                         | [ Factory settings ] |
|--------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| ↓      |    | Switching performance preselect (alarm) output A1<br>OFF = no output<br>on L (min) = continuous contact: on-off<br>on U (max) = continuous contact: off-on<br>on n (max) = pulse contact: off-on-off<br>on u (min) = pulse contact: on-off-on<br>Selection with buttons ▲ and ▼.    | [ OFF ]              |
| ↺      |                                                                                     |                                                                                                                                                                                                                                                                                     |                      |
| ↓      |    | Setpoint output A1<br>Setting possible from -99999 ... 999999 digit, with buttons ▲ and ▼.                                                                                                                                                                                          | [ 0 ]                |
| ↺      |                                                                                     |                                                                                                                                                                                                                                                                                     |                      |
| ↓      |    | Switching time output A1 [sec].<br>Setting possible from 0.01 ... 99.99 s, with buttons ▲ and ▼.                                                                                                                                                                                    | [ 1.00 ]             |
| ↺      |                                                                                     |                                                                                                                                                                                                                                                                                     |                      |
| ↓      |  | Switching performance of preselect (alarm) output A2<br>OFF = no output<br>on L (min) = continuous contact: on-off<br>on U (max) = continuous contact: off-on<br>on n (max) = pulse contact: off-on-off<br>on u (min) = pulse contact: on-off-on<br>Selection with buttons ▲ and ▼. | [ OFF ]              |
| ↺      |                                                                                     |                                                                                                                                                                                                                                                                                     |                      |
| ↓      |  | Setpoint output A2<br>Setting possible from -99999 ... 999999 digit, with buttons ▲ and ▼.                                                                                                                                                                                          | [ 0 ]                |
| ↺      |                                                                                     |                                                                                                                                                                                                                                                                                     |                      |
| ↓      |  | Switching time output A2 in sec.<br>Setting possible from 0.01 ... 99.99 s, with buttons ▲ and ▼.                                                                                                                                                                                   | [ 1.00 ]             |
| ↺      |                                                                                     |                                                                                                                                                                                                                                                                                     |                      |
|        |                                                                                     | <b>Note:</b> Switching performance, setpoint and switching time of the preselect outputs A1 to A4 are identical.                                                                                                                                                                    |                      |

continue  
page 9

| Button                                                                              | Display                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                            | [ Factory settings ] |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
|    |    | Analog output<br>0-20 mA (0-10 V DC)<br>4-20 mA (2-10 V DC).<br>Changing from current to voltage output is load-dependent<br>( $\leq 500\Omega$ = current output, $> 500\Omega$ = voltage output).<br>Selection with buttons  and  . | [ 0-20 ]             |
|    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                        |                      |
|    |    | Start value for the analog output<br>Setting possible from -99999 ... 999999 digit, with buttons  and  .                                                                                                                             | [ 0 ]                |
|    |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                        |                      |
|    |    | End value for the analog output<br>Setting possible from -99999 ... 999999 digit, with buttons  and  .                                                                                                                              | [ 0 ]                |
|   |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                        |                      |
|  |  | Program lockout.<br>OFF = no lock<br>CONF = configuration level locked<br>ALL = all parameters locked<br>CAL = only with analog output ( only for factory settings)<br>Selection with buttons  and  .                            | [ OFF ]              |
|  |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                        |                      |
|                                                                                     |  | Return to the working level (count value)                                                                                                                                                                                                                                                                                                                                                              |                      |

### Connection diagrams for flow meter DM/DE



## Example of programming for Flow Meter DM/DE

Conection on pulser E1 or E 200

**Table 1**

| Parameter                | Designation / Display | Input                                             |
|--------------------------|-----------------------|---------------------------------------------------|
| Input configuration      | FU                    | A-b or A u. B                                     |
| Prescaler input A        | dA                    | 1                                                 |
| Prescaler input B        | db                    | 1                                                 |
| Transmitter supply       | In                    | U = 24 V or<br>U = 8 V for Sensor of Namur (E200) |
| Count value for power-on | Po                    | rEStor                                            |
| Decimal point position   | dp                    | .0                                                |
| Divisor for display      | d                     | 1 at E1 ( E200 see Table 2)                       |
| Factor for display       | F                     | 1 at E1 ( E200 see Table 2)                       |
| Start value              | St.                   | 0                                                 |
| End value                | En                    | off                                               |

|                                                   |     |  |
|---------------------------------------------------|-----|--|
| Switching performance preselect (alarm) output A1 | AI  |  |
| Setpoint output A1                                | AI. |  |
| Switching performance preselect (alarm) output A2 | A2  |  |
| Setpoint output A2                                | A2. |  |
| Analog output                                     | Ao  |  |
| Start value for the analog output                 | AS  |  |
| End value for the analog output                   | AE  |  |

|                 |    |             |
|-----------------|----|-------------|
| Program lockout | LC | as required |
|-----------------|----|-------------|

Differing from the above table, by connection on pulse generator E200 of the flow meter, are input following parameter:

**Table 2**

| Parameter           | Designation / Display | cp-value of the flow meter (Imp./m <sup>3</sup> ) |     |     |       |
|---------------------|-----------------------|---------------------------------------------------|-----|-----|-------|
|                     |                       | 5000                                              | 500 | 250 | 187,5 |
| Prescaler input A   | dA                    | 1                                                 | 1   | 1   | 1     |
| Prescaler input B   | db                    | 1                                                 | 1   | 1   | 1     |
| Divisor for display | d                     | 5000                                              | 500 | 250 | 1875  |
| Factor for display  | F                     | 1                                                 | 1   | 1   | 10    |

## Display adjustment from universal meter and flow meter

Procedure:

For the configuration of the universal counter, you have to put at parameter „Start value“ ( page 7) the present value of the flow meter.

If the configuration is finished, the clamps 4 and 6 on terminal strip A , are interconnected transient. Afte the reset, the input value appears on the display.

## Display conversion

For some settings of the divisor (**d**) and factor (**f**) it is possible that the meter will not cover the possible display range of the unit (0-999999). The following formula relationship applies:

$$\text{Maximum display range} = \frac{8 \times 10^6 \times \text{factor (F)}}{\text{Divisor (d)}} \quad \text{should be } > 999999$$

If this check produces a value of less than 999999, the meter will only be able to count to this display value. The problem can be avoided if the scaler **d A** or **d b** is included in the configuration.

Example:

In a measuring device the flow rate is to be recorded in m<sup>3</sup>, and displayed without any decimal places. The sensor used supplies one pulse every 0.084 m<sup>3</sup>.

To program the display conversion this sensor constant must first be converted into a fraction. This is as follows:

$$\text{Sensor contact} = \frac{\text{Factor (F)} = 84}{\text{Divisor (d)} = 1000}$$

Therefore the value 84 must be entered for the factor **F** and 1000 for the divisor **d**. However, if we now check the maximum display range, we obtain the following:

$$\text{Maximum display range} = \frac{8 \times 10^6 \times 84}{1000} = 672000$$

This means that the meter can only display up to a maximum value of 672000 at which point it will stop. If this is inadequate it is possible to transfer part of the divisor to the scaler **d A** or **d b**. In this case, if the divisor **d** were to be reduced to 500 the maximum display range would be > 999999, so that the unit could be used to the full extent.

The procedure for this is as follows:

The divisor **d** is set to 500 and the scaler **d A** or **d b** (depending on which input is used) is set to 2.

These settings produce the following:

$$\text{Maximum display range} = \frac{8 \times 10^6 \times 84}{500} = 1344000$$

This means that the display conversion is now configured perfectly for this application.

We reserve the right to make technical modifications in the interests of progress.

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