

# Operating Instructions for Evaluation Electronics

**Model: ZED-K  
and DF-...KLxxx**



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## 2. Note

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Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

## 3. Instrument Inspection

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Instruments are inspected before shipping and sent out in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

### **Scope of delivery:**

The standard delivery includes:

- Electronics for measuring and monitoring      model: ZED-K and DF-...KLxxx
- Operating Instructions

## 4. Regulation Use

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Any use of the Evaluation Electronics, model: ZED-K and DF-..KLxxx, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

## 5. Operating Principle

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The evaluation unit changes the frequency signal of the pickup into a flow reading and into a scalable analogue signal.

The top display line of the double-spaced display shows the flow value with measuring unit and the bottom line a bargraph indicator proportional to the measuring value.

The two relays with floating output changeover contacts continuously monitor the flow values. Switching point, hysteresis, a window point, and switch on or off delay can be set separately for each relay. The switching points can also be set directly by using the control keys without having to change over into the menu. A red LED indicates the switching status.

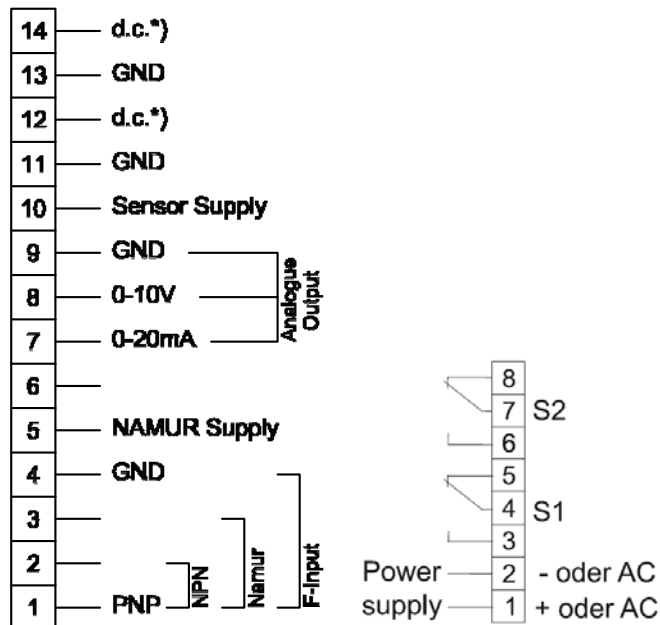
The analogue output is optionally available as current output with 0(4)...20 mA or as voltage output with 0...10 V. The menu languages can be switched between German or English. If used where the flow readings change rapidly, the display can be pacified and the analogue reading averaged by switching on some software.

A MIN/MAX reading memory determines the extreme readings of the flow. The display of the readings and the resetting are achieved by using the keys without having to change into the menu. Resetting by using the keys can also be blocked.

The set parameters can be protected against unauthorized alteration by using a password function.

## 6. Electrical Connection

### 6.1 ZED-K field housing and control panel installation



\*) Don't connect the clamp!

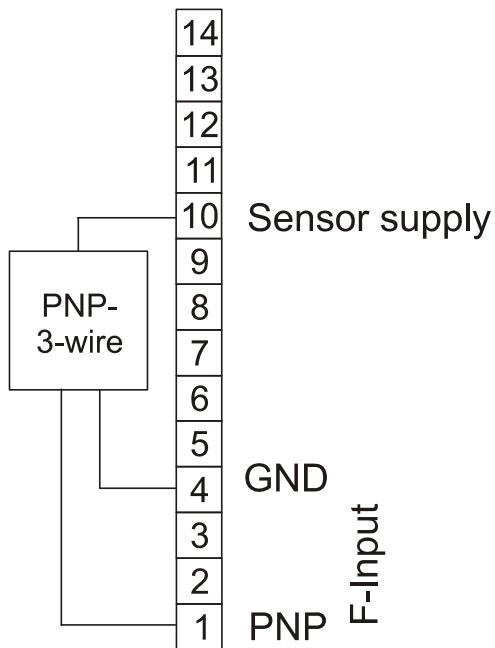
### 6.2 DF-...KLxxx, cable connection

| Wire number | ZED-K electronics   |
|-------------|---------------------|
| 1           | +24 V <sub>DC</sub> |
| 2           | GND                 |
| 3           | 4-20 mA / 0-10 V    |
| 4           | GND                 |
| 5           | S1 N/O              |
| 6           | S1 COM              |
| 7           | S1 N/C              |
| 8           | S2 N/O              |
| 9           | S2 COM              |
| 10          | S2 N/C              |

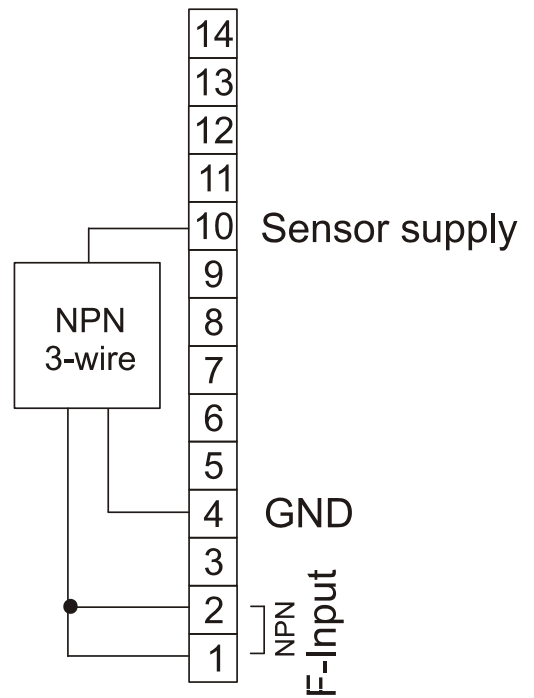
\*) Don't connect the wire!

## 6.3 Connection example

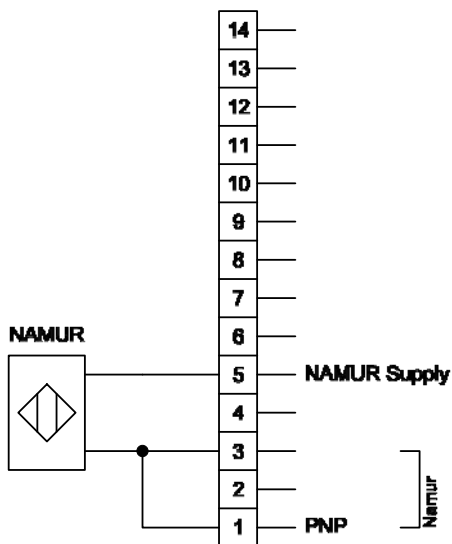
### PNP-Sensor



### NPN-Sensor



### Namur-Sensor



## 7. Operation and Menu Structure

### 7.1 General

Only the menu items of which the lines are marked in the selection matrix (in the right position) in grey colour, are available in the respective instrument version.

*Italic* written values in the menu structure are blinking in the display, if they have been chosen for any input.



The parameter can only be changed, if the security code has been entered correctly! The message „locked“ will appear if the input has not been activated.

### 7.2 Function of the control keys

Operating mode >Measure< :



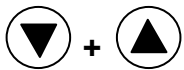
- Press briefly: → a) Display total quantity, then  
Display corresponding scale unit or  
→ b) Reset status reports.
- Press for 3 sec: → Switch to operating mode >**Parameterise**<.



- Press briefly: → Display min. flow value (MIN value memory).
- Press for 3 sec: → Enter switching point for Relay S1 **s1SPPoint**  
(only if parameter **SPdirect** is set to “yes”).



- Press briefly: → Display max. flow value (MAX value memory).
- Press for 3 sec: → Enter switching point for Relay S2 **s2SPPoint**  
(only when parameter **SPdirect** is switched to “yes”).



Press for 3 sec: → Sets min. and max. value memory to flow value  
(only when parameter **fMMReDir** is switched to “yes”).

## Operating mode >Parameterize<:



- Press briefly: → a) Open parameter group or  
→ b) Change parameter (go lower in menu level) or  
→ c) Adopt value input.
- Press for 3 sec: → Abort input and go back one menu level.



- Press briefly: → a) Select parameter group or parameter or  
→ b) Reduce selected number by 1 or  
→ c) Select list value (e.g.... L/m, L/h, m<sup>3</sup>/m, ...).



- Press briefly: → a) Select parameter group or parameter or  
→ b) Increase selected number by 1 or  
→ c) Select list value (e.g.... m<sup>3</sup>/m, L/h, L/m, ...).



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**Note:** If no button is pressed for 20 seconds during parameterising, the instrument automatically switches back into >measuring< mode.

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## 7.3 Character explanation for main menu








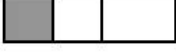


( e ) - Button  press shortly.

( E ) - Button  press and hold for approx. 3 seconds.

( ▼ ) - Button  press shortly.

( ▲ ) - Button  press shortly.

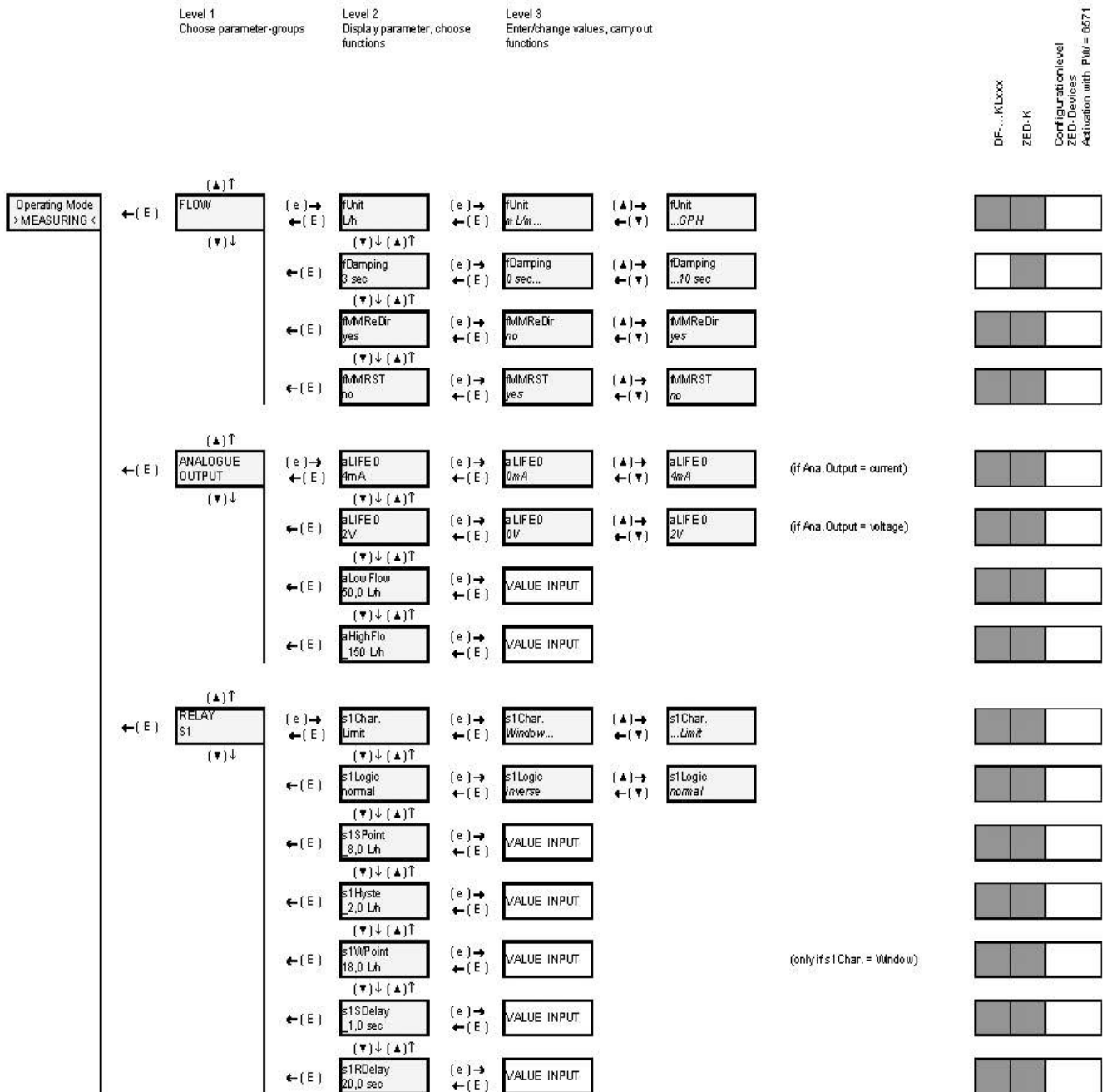
## 7.4 General settings

|                                 | Level 1<br>Choose parameter-groups              | Level 2<br>Display parameter, choose functions                               | Level 3<br>Enter/change values, carry out functions                       | DF...K.Lxxx<br>ZED-K<br>Configurationlevel<br>ZED-Devices<br>Activation with PWV = 6571 |
|---------------------------------|-------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Operating Mode<br>> MEASURING < | ( E ) → GENERAL<br>← ( E ) ADJUSTM.<br>( ▼ ) ↓  | ( e ) → Language<br>← ( E ) german<br>( ▼ ) ↓ ( ▲ ) ↑                        | ( e ) → Language<br>← ( E ) english<br>( ▲ ) → Language<br>← ( ▼ ) german |    |
|                                 | ← ( E ) fUnitFS<br>m3/h<br>( ▼ ) ↓ ( ▲ ) ↑      | ( e ) → FUnitFS<br>← ( E ) mL/m...<br>( ▲ ) → fUnitFS<br>← ( ▼ ) ... GPH     |                                                                           |    |
|                                 | ← ( E ) fValueFS<br>2700m3/h<br>( ▼ ) ↓ ( ▲ ) ↑ | ( e ) → VALUE INPUT<br>← ( E ) VALUE INPUT                                   |                                                                           |    |
|                                 | ← ( E ) fMinVal<br>100.0 L/m<br>( ▼ ) ↓ ( ▲ ) ↑ | ( e ) → VALUE INPUT<br>← ( E ) VALUE INPUT                                   |                                                                           |    |
|                                 | ← ( E ) fPls/rev<br>3<br>( ▼ ) ↓ ( ▲ ) ↑        | ( e ) → fPls/rev<br>← ( E ) 0...<br>( ▲ ) → fPls/rev<br>← ( ▼ ) ... 10       |                                                                           |    |
|                                 | ← ( E ) fJumpVD<br>5 %<br>( ▼ ) ↓ ( ▲ ) ↑       | ( e ) → fJumpVD<br>← ( E ) 1 % ...<br>( ▲ ) → fJumpVD<br>← ( ▼ ) ... 20 %    |                                                                           |    |
|                                 | ← ( E ) fOverfV<br>100 %<br>( ▼ ) ↓ ( ▲ ) ↑     | ( e ) → fOverfV<br>← ( E ) 100 % ...<br>( ▲ ) → fOverfV<br>← ( ▼ ) ... 200 % |                                                                           |    |
|                                 | ← ( E ) fFactor<br>factory<br>( ▼ ) ↓ ( ▲ ) ↑   | ( e ) → fFactor<br>← ( E ) customer<br>( ▲ ) → fFactor<br>← ( ▼ ) factory    |                                                                           |    |
|                                 | ← ( E ) UserUnit<br>115,6271<br>( ▼ ) ↓ ( ▲ ) ↑ | ( e ) → VALUE INPUT<br>← ( E ) VALUE INPUT                                   |                                                                           |    |
|                                 | ← ( E ) SPdirect<br>yes<br>( ▼ ) ↓ ( ▲ ) ↑      | ( e ) → SP direct<br>← ( E ) no<br>( ▲ ) → SPdirect<br>← ( ▼ ) yes           |                                                                           |    |

| GENERAL SETTINGS |                                                    |                                                                                                                                                                                                                    |
|------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item        | Parameter / Function                               | Explanation / Values / Other                                                                                                                                                                                       |
| Language         | Select menu language                               | German or English                                                                                                                                                                                                  |
| fUnitFS *        | Measuring unit for flow measurement                | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m, m <sup>3</sup> /h, GPM, GPH, UU/s, UU/m, UU/h                                                                                                                        |
| fValueFS *       | Maximum measuring range value for flow measurement | Range = 0,00...99,9..._100...9999                                                                                                                                                                                  |
| fMinVal *        | Minimum measuring range value for flow measurement | Basis is fValueFS and fUnitFS<br>If the level drops below this, the flow indicator goes to 0.                                                                                                                      |
| fPIs/rev*        | Impulse per sensor wheel revolution                | Number of impulses per revolution of the sensor wheel or the like<br>Necessary for long-term period averaging if the readings per revolution vary.<br>The function is switched off when the input value is 1.      |
| fJumpVD*         | Flow switch value for attenuation cut-off          | Value in %, basis is fValueFS and fUnitFS.<br>Attenuation does not function if the switch value is 0%.                                                                                                             |
| fOverflV *       | Flow overflow value (overflow)                     | Value in %, basis is fValueFS and fUnitFS.<br>If exceeded, an M100 report is generated and faded in, alternating with the flow indicator.<br>The report is saved and can be reset by briefly pressing the PGM key. |
| fFactor          | Select pulse ration                                | Selection of works calibration or user calibration.<br>(only for devices Model DF-...ZLxxx and Model-...ExxR)                                                                                                      |
| UserUnit.        | Special volume unit                                | Customer-specific special unit UU.<br>The value entered corresponds to the number of litres of the special unit, e.g. in the case of the unit <i>Barrel</i> the factor would for example be 115.6271.              |
| SPdirect         | Activation of direct input switching point         | yes: Direct input of switching points s1SPoint and s2SPoint is possible using the keys (default).<br>no: The switching points can only be set in the menu .                                                        |

\*) Only for ZED devices: Device-specific parameter, is only visible after activation in the **SecCode** menu item in the **SERVICE** menu group, and can be changed.

## 7.5 Flow, analogue output and relay S1



## FLOW

| Menu Item | Parameter / Function                                                         | Explanation / Values / Other                                                                                                                                                                                                                  |
|-----------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| fUnit     | Unit of flow indicator                                                       | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m, m <sup>3</sup> /h, GPM, GPH, UU/s, UU/m, UU/h                                                                                                                                                   |
| fDamping  | Attenuation of reading fluctuations in the flow indicator                    | The attenuation pacifies the flow indicator.<br>The attenuation value is the approximate equivalent of the setting time of the display value to c. 90% of a measured value jump in seconds.<br>(Parameter is blocked at DF-...ZLxxx devices). |
| fMMReDir  | Reset the Min/Max flow value directly using the keys, without using the menu | yes: direct resetting of the Min/Max value memory by simultaneously pressing (3 sec) the (+) and (-) keys (default).<br>no: memory reset only possible with fMMRST.                                                                           |
| fMMRST    | Reset the Min/Max flow value memory of the flow indicator                    | yes: Resets Min / Max value memory for the flow indicator<br>no: No action.                                                                                                                                                                   |

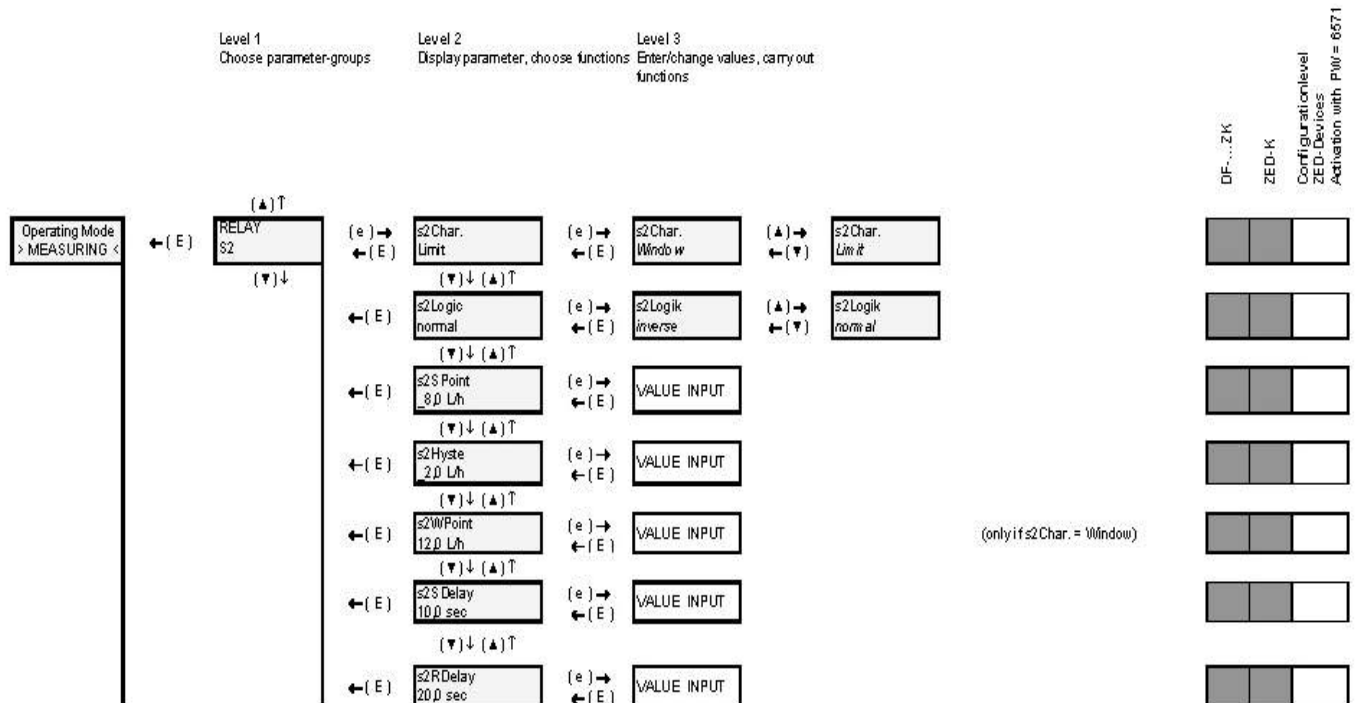
## ANALOGUE OUTPUT

| Menu Item | Parameter / Function            | Explanation / Values / Other                                                                              |
|-----------|---------------------------------|-----------------------------------------------------------------------------------------------------------|
| aLIFE 0   | Select Life Zero                | Offset at power output: 0 mA or 4 mA<br>at 0-10 V $\pm$ 0 mA $\rightarrow$ 0 V and 4 mA $\rightarrow$ 2 V |
| aLowFlow  | Flow reading at 0/4 mA or 0/2 V | Lower flow reading of gauged output range, value has the same unit as the flow indicator                  |
| aHighFlo  | Flow reading at 20 mA or 10 V   | Upper flow reading of gauged output range, value has the same unit as the flow indicator                  |

## RELAY S1

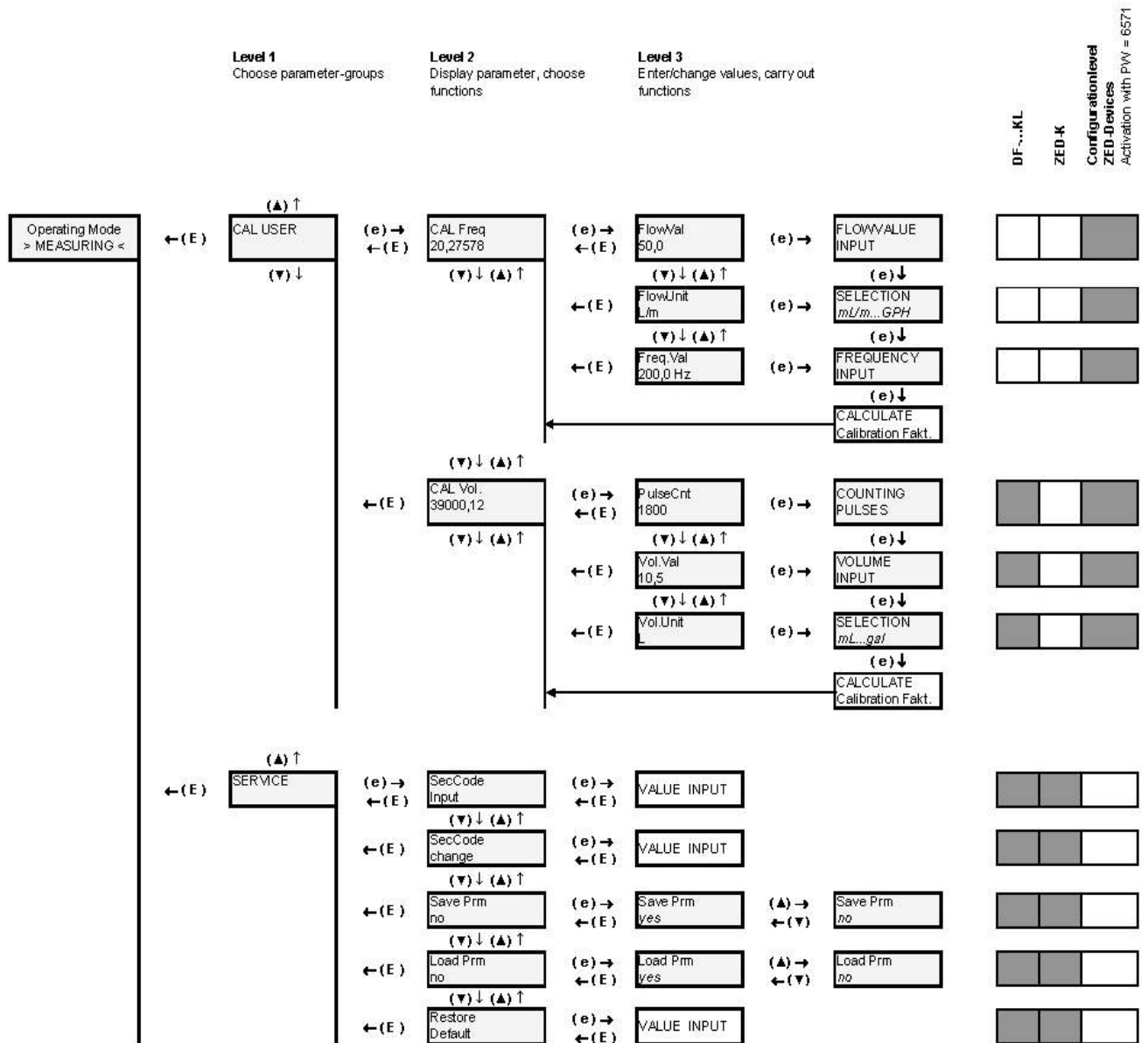
| Menu Item | Parameter / Function         | Explanation / Values / Other                                                                                               |
|-----------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| s1Char.   | Relay1 Switch characteristic | Limit: Monitoring a reading (s1SPoint).<br>Window: Monitoring an adjustable measuring range (s1SPoint...s1Fpunkt).         |
| s1Logic   | Relay1 Switch logic          | normal: Relay 1 activated when the limit value is exceeded.<br>invers: Relay 1 drops out when the limit value is exceeded. |
| s1SPoint  | Relay1 Switchpoint           | Reading is in the same units as the flow indicator.                                                                        |
| s1Hyste   | Relay1 Hysteresis            | Reading is in the same units as the flow indicator.                                                                        |
| s1FPoint  | Relay1 Windowpoint           | Reading is in the same units as the flow indicator.<br>(only if <b>s1Char.</b> is set to <b>Window</b> )                   |
| s1SDelay  | Relay1 Switch delay          | Delays the switching of the relay when the limit value is exceeded.<br>Range: _ 0,0...99,9 sec                             |
| s1RDelay  | Relay1 Reset delay           | Delays the switching of the relay when the limit value is undershot.<br>Range: _ 0,0...99,9 sec                            |

## 7.6 Relay S2



| RELAY S2  |                              |                                                                                                                            |
|-----------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Menu Item | Parameter / Function         | Explanation / Values / Other                                                                                               |
| s2Char.   | Relay2 Switch characteristic | Limit: Monitoring a reading (s2SPoint).<br>Window: Monitoring an adjustable measuring range (s2SPoint...s12punkt).         |
| s2Logic   | Relay2 Switch logic          | normal: Relay 2 activated when the limit value is exceeded.<br>invers: Relay 2 drops out when the limit value is exceeded. |
| s2SPoint  | Relay2 Switchpoint           | Reading is in the same units as the flow indicator.                                                                        |
| s2Hyste   | Relay2 Hysteresis            | Reading is in the same units as the flow indicator.                                                                        |
| s2FWPoint | Relay2 Window point          | Reading is in the same units as the flow indicator.<br>(only if <b>s2Char.</b> is set to <b>Window</b> )                   |
| s2SDelay  | Relay2 Switch delay          | Delays the switching of the relay when the limit value is exceeded.<br>Range: _ 0,0...99,9 sec                             |
| s2RDelay  | Relay2 Reset delay           | Delays the switching of the relay when the limit value is undershot.<br>Range: _ 0,0...99,9 sec                            |

## 7.7 User alignment and service-settings



| USER CALIBRATION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item        | Function / Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>CAL Freq*</b> | <p>Calibrate by entering frequency and flow.</p> <p>In the menu item <b>CAL Freq</b> the bottom line always shows the current pulse value of the User calibration.</p> <p>Calibration process:</p> <ul style="list-style-type: none"> <li>a) <b>FlowVal</b> Enter nominal flow value of the sensor. &gt; (e) press &gt;</li> <li>b) <b>FlowUnit</b> Enter unit for flow value. &gt; (e) press &gt;</li> <li>c) <b>Freq.Val.</b> Enter nominal frequency &gt; finish with (e).</li> </ul> <p>The new pulse value of the User calibration is calculated from these three values and saved as user calibration for the flow measurement, e.g. 20.2757 pls./litre.</p>                                                                                            |
| <b>CAL Vol.</b>  | <p>Calibration process using impulse counting and volume input (cc procedure).</p> <p>In the menu item <b>CAL Vol.</b> the bottom line always shows the current pulse value of the User calibration.</p> <p>Calibration process:</p> <ul style="list-style-type: none"> <li>a) <b>PulseCnt</b> measures number of impulses<br/>(e) press &gt; start counter (impulses are counted) &gt; (e) press &gt; stops counter.</li> <li>b) <b>Vol.Val</b> Enter measured volume value &gt; (e) press.</li> <li>c) <b>Vol.Unit</b> Enter unit for volume value &gt; finish with (e).</li> </ul> <p>The pulse value of the User calibration is calculated from these three values and is saved as the user calibration for the flow measurement, e.g. 3900,5 pls./L.</p> |

\*) CAL Freq – Only possible with ZED devices.





**Note:** With ZED devices it is necessary to enable the device-specific parameter input in the menu item **SecCode** in the menu **SERVICE** in order to activate the **CAL-USER** function.



**Note:** If the new pulse ratio will be used for measurement, than the menu item **fFaktor** in the menu group **General Settings** must be setted to **USER** calibration.

| SERVICE                |                                 |                                                                                                                                                                                                                                                             |
|------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item              | Function                        | Explanation / Values / Other                                                                                                                                                                                                                                |
| <b>SecCode Input</b>   | Enter security code             | Input of 4-digit security code and enablement of the parameter change.<br><br>The following codes have been defined:<br><br>3461 – General menu release<br>6571 – Activates the device-specific parameters (only ZED and measuring unit as compact version) |
| <b>SecCode change</b>  | Change security code            | Define or change security code for the first time or change.<br>If no code ( = 0000) has been set, then the parameter values set are unsecured!                                                                                                             |
| <b>Save Prm</b>        | Save parameter record           | Save current settings                                                                                                                                                                                                                                       |
| <b>Load Prm</b>        | Load parameter record           | Restore saved settings (reload).                                                                                                                                                                                                                            |
| <b>Restore Default</b> | Reset to works default settings | Load initial setting with password 2541.<br><br>ATTENTION: For ZED-devices the device-specific parameters will be overwritten. An adjustment provided by the customer will be lost in the process.                                                          |

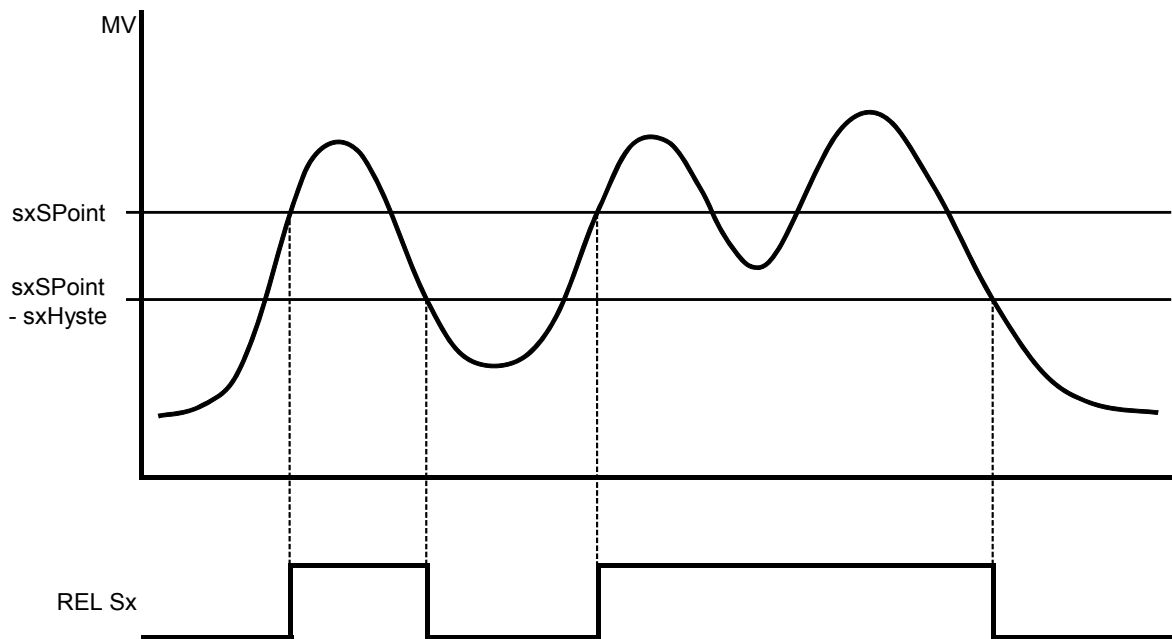
## 7.8 Error report

| Error code   | Reason                                                                               | Reset                                                                                                                                                                                                       |
|--------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>E102</b>  | User unit may not be $\leq 0$                                                        | Correct parameter                                                                                                                                                                                           |
| <b>E142</b>  | Distance between upper and lower analogue value too small (based on the actual flow) | Correct parameter                                                                                                                                                                                           |
| <b>E 161</b> | Value is greater than maximum measuring range value.                                 | Correct parameter                                                                                                                                                                                           |
| <b>E162</b>  | Hysteresis too large                                                                 | Correct parameter                                                                                                                                                                                           |
| <b>E 163</b> | Window point is lower than switching point.                                          | Correct parameter                                                                                                                                                                                           |
| <b>E242</b>  | Frequency must be between 0,2 and 2000 Hz                                            | Correct parameter                                                                                                                                                                                           |
| <b>E245</b>  | Calculated pulse value out of valid range                                            | Correct parameter                                                                                                                                                                                           |
| <b>E300</b>  | Error memory value of totalising/part counter                                        | Keep  +  pressed about 20 seconds |
| <b>M100</b>  | Overflow                                                                             | Acknowledge with PGM button                                                                                                                                                                                 |
| <b>####</b>  | Value does not fit in the display                                                    | Choose suitable measuring unit                                                                                                                                                                              |

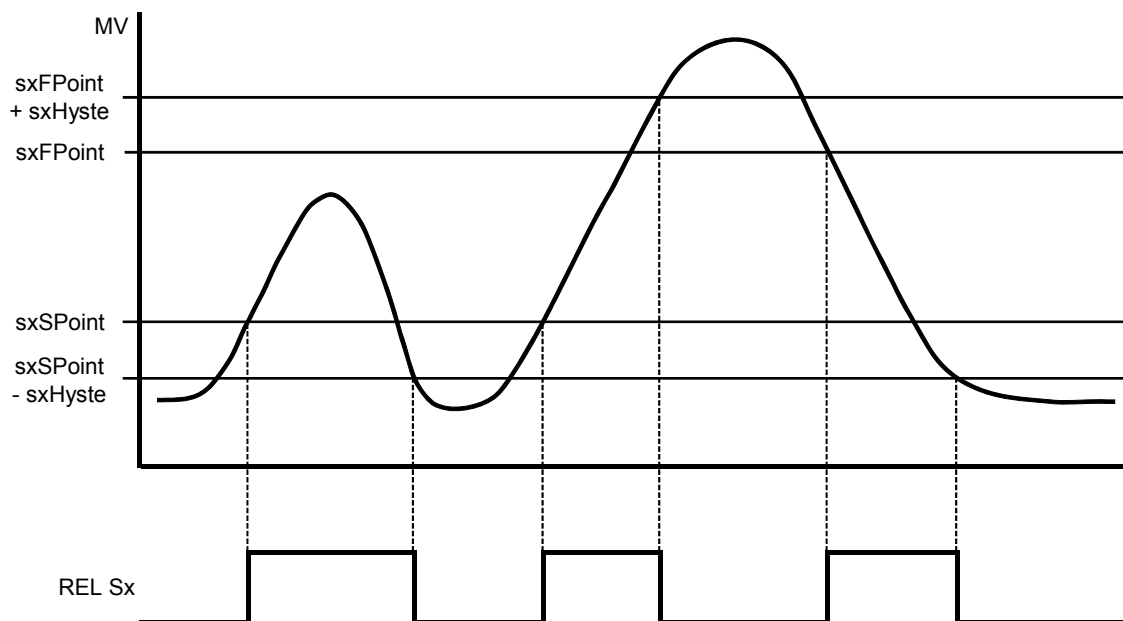


## 8. Relay Functions

### 8.1 Switching characteristic limit value



### 8.2 Switching characteristic window



## 9. Technical Information

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|                       |                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------|
| Display:              | 2 x 8-digit alphanumeric, LCD module, illuminated                                                                       |
| Display rate:         | 1 s <sup>-1</sup>                                                                                                       |
| Flow display:         | 3- or 4-digit (XX.X, X.XX or XXXX)                                                                                      |
| Flow units:           | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m, m <sup>3</sup> /h, GPM (US), GPH (US), user unit per h/min/s selectable   |
| Measurement input:    | 0.2...2000 Hz (5...24 V <sub>DC</sub> ), TTL, PNP, NPN, Namur                                                           |
| Parameter input:      | menu controlled, German or English                                                                                      |
| Parameter protection: | 4-digit password                                                                                                        |
| Control elements:     | 3 keys                                                                                                                  |
| Customer comparison:  | by entering frequency and measured value or in the Teach-In procedure (level calibration)                               |
| Control input:        | reset-function                                                                                                          |
| Relay outputs:        | 2 x changer (2 x N/O contact DF-...KL)<br>max. 250 V <sub>AC/DC</sub><br>5 A / 1000 VA                                  |
| Voltage supply:       | 24 V <sub>DC</sub> ± 20 %, approx. 80 mA or<br>90...250 V <sub>AC</sub> / max. 3 VA                                     |
| Analogue output:      | 0(4)-20 mA<br>Load: max. 500 Ω (300 Ω at AC-supply)<br>or 0-10 V (Load: > 100kΩ)                                        |
| Sensor supply:        | 23 V (at 24 V <sub>DC</sub> ) / max. 50 mA<br>24 V (AC-supply) / max. 50 mA                                             |
| NAMUR supply:         | 8.2 V <sub>DC</sub>                                                                                                     |
| Ambient temp.:        | -20...+70 °C                                                                                                            |
| Dimensions:           | 96 x 96 x 109 mm (LxWxD) incl.<br>screw clamp (control panel installation)<br>117 x 117 x 127 mm (LxWxD) (field casing) |
| Aperture size:        | 92 <sup>+0.8</sup> x 92 <sup>+0.8</sup> mm (control panel installation)                                                 |
| Casing material:      | fibreglass reinforced Noryl,<br>(control panel installation)<br>powder coated aluminium/PA 66<br>(field casing)         |
| Protection type:      | IP 40 on front<br>clamp IP 00 (control panel installation)<br>IP 65 (field casing)                                      |
| Mounting:             | with mounting clip Form B (DIN 43 835)<br>(control panel installation)<br>wall and pipe mounting (field casing)         |
| Connection:           | plug-in terminal strip (control panel installation)<br>cable connection (field casing)                                  |
| Weight:               | approx. 360 g (control panel installation)<br>approx. 1240 g (field casing)                                             |

## 10. Order Codes

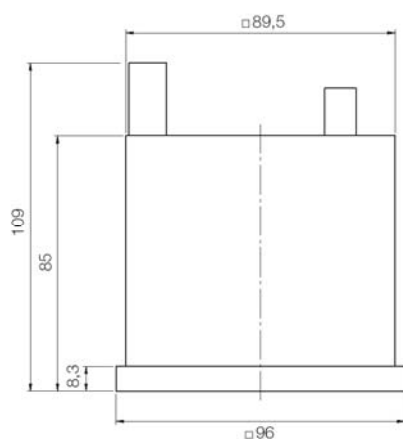
(Order example: ZED-ZF10 KS 4R P)

| Supply                 | Model    | Electrical connection                                                                                                 | Analogue output                                   | Casing                                                                                                                                                                                                                                      |
|------------------------|----------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 90-250 V <sub>AC</sub> | ZED-KF10 | <b>KS</b> = terminal strip<br>(control panel installation)<br><br><b>MS</b> = cable connection<br>M 18 (field casing) | <b>4R</b> = 0(A)-20 mA<br><br><b>1 R</b> = 0-10 V | <b>P</b> = control panel installation<br>96x96 mm<br><br><b>F</b> = field casing 116 x116 mm<br><br><b>S</b> = field casing with<br>wall mounting,<br>infinitely variable pivotable<br><br><b>R</b> = field casing with 2"-pipe<br>mounting |
| 24 V <sub>DC</sub>     | ZED-KF13 |                                                                                                                       |                                                   |                                                                                                                                                                                                                                             |

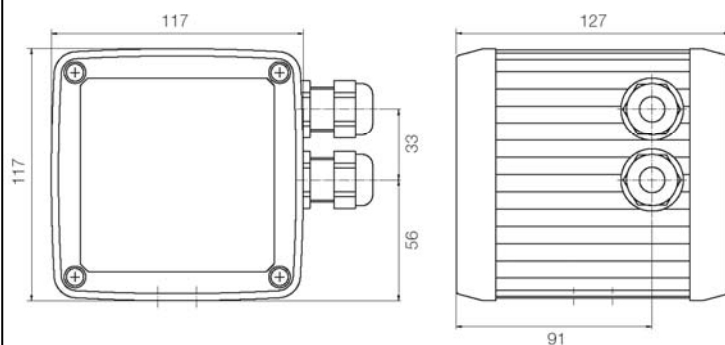
The order details of a ZED electronics in combination with a flow sensor can be found in the data sheet of the measuring device.

## 11. Dimensions

ZED-K control panel installation (casing P)



ZED-K field housing



## 12. Declaration of Conformance

---

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Evaluation Electronics      Model: ZED-K and model: DF-...KLxxx**

to which this declaration relates is in conformity with the standards noted below:

**EN 61326-1:2013-07**

Electrical equipment for control and instrumentation technology and laboratory use – EMC-requirements (industrial area)

**EN 61010-1:2011-07**

Safety requirements for electrical measuring-, control- and laboratory instruments.

**EN 60529:2014-09**

Protection type housing (IP-Code)

Also the following EC guidelines are fulfilled:

**2004/108EC**

EMC Directive

**2006/95 EC**

Low Voltage Directive

**2011/65/EC**

**RoHS** (category 9) industrial monitoring and control instruments, compliant, no CE-marking for the transitional period until 2017

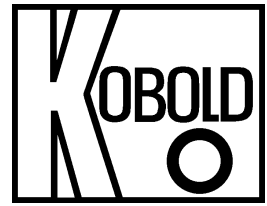
Hofheim, 15. Apr. 2015



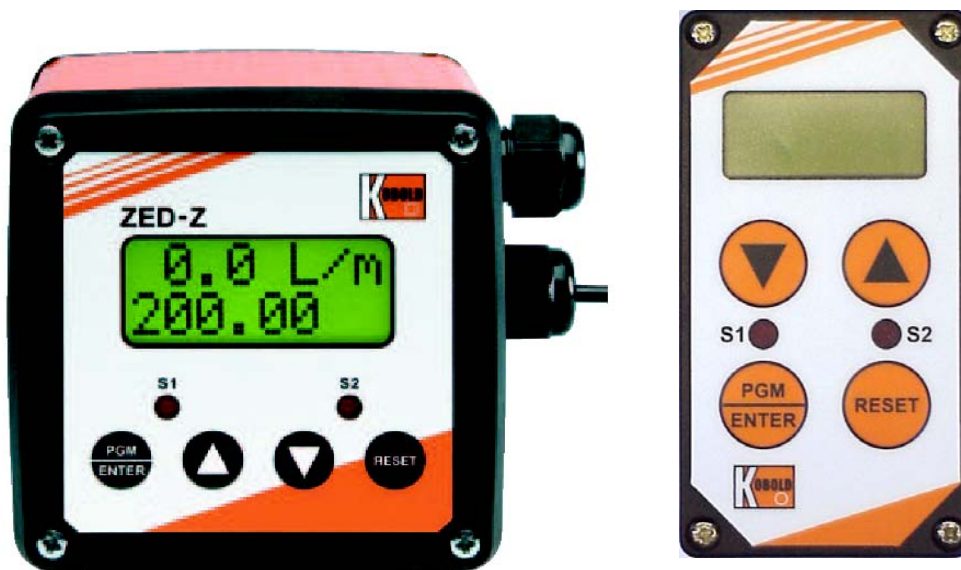
H. Peters  
General Manager



M. Wenzel  
Proxy Holder



**Operating Instructions**  
**for**  
**Counter Electronic**  
**Model: ZED-Z**  
**or DF-...ZLxxx**  
**or *Model-...ExxR***



## 1. Contents

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E-Mail: info.de@kobold.com  
Internet: www.kobold.com

## **2. Note**

---

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

## **3. Instrument Inspection**

---

Instruments are inspected before shipping and sent out in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

**Scope of delivery:**

The standard delivery includes:

- Counter Electronic model: ZED-Z or flowmeter incl. Counter Electronic
- Operating Instructions

## **4. Regulation Use**

---

Any use of the Counter Electronic, model: ZED-Z, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

## 5. Operating Principle

---

The evaluation unit changes the frequency signal of the pickup into a 3(4)-digit flow reading with selectable measurement unit (top display line), and into a scalable analogue signal. The flow quantity is added up in a part quantity meter and a total quantity meter and then displayed in the bottom line of the screen. The quantity meter's units of measurement are selectable.

The two relays with floating output changeover contacts continuously monitor if the freely adjustable limits are exceeded or fallen short of. Here, it is possible to choose between threshold value and window monitoring.

Switching point, hysteresis, a window point, and switch on or off delay can be set separately for each relay. The switching points can also be set directly by using the control keys without having to change over into the menu. Alternatively, it is also possible to monitor the quantity meter to see if it is exceeded. A red LED indicates with the switching status.

The analogue output is optionally available as current output with 0(4)...20 mA or as voltage output with 0...10 V. The Parameter names can be shown in the menu in German or English. If used where the flow readings change rapidly, the display can be pacified and the analogue reading averaged by switching on some software. When using analogue output 0 – 10 V the customer must put a jumper between the terminals 7 and 8.

A MIN/MAX reading memory determines the extreme readings of the flow. The display of the readings and the resetting are achieved by using the keys without having to change into the menu. Resetting by using the keys can also be blocked. If the maximum set flow (exceeded range) is exceeded, it will be shown on the display.

The set parameters can be protected against unauthorized alteration by using a password function.

### Range of functions

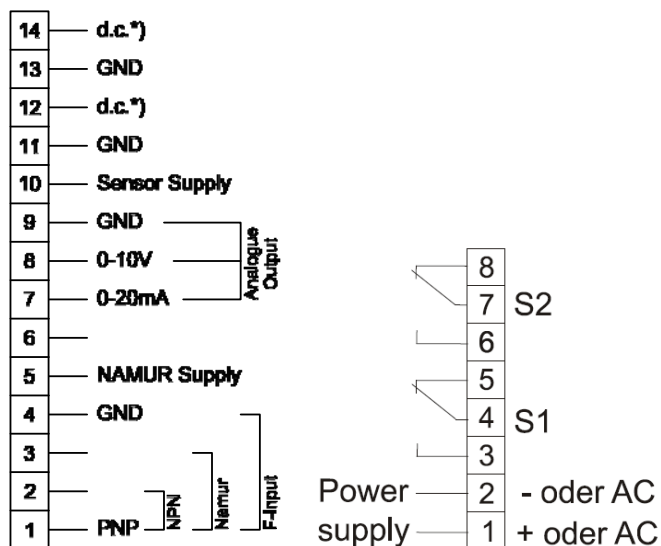
Quantity meter and flow meter with digital display, switch and analogue output:

- Measurement and display total, part and flow quantities
- Free scaling using input of frequency and measured value
- Control input for part quantity reset
- 2 switching outputs, freely programmable as flow monitor or for monitoring the part and total quantity
- Analogue output 0(4)-20 mA oder 0-10 V
- MIN/MAX memory



## 6. Electrical Connection

### 6.1 ZED-Z, DRB-...ExxR, DPE-...ExxR field housing and control panel installation

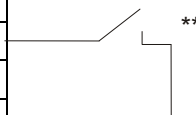


\*) Don't connect terminal!

\*\*\*) Reset TM – GND => reset part quantity counter

### 6.2 DF-...ZLxxx, Model-...ExxR cable connection

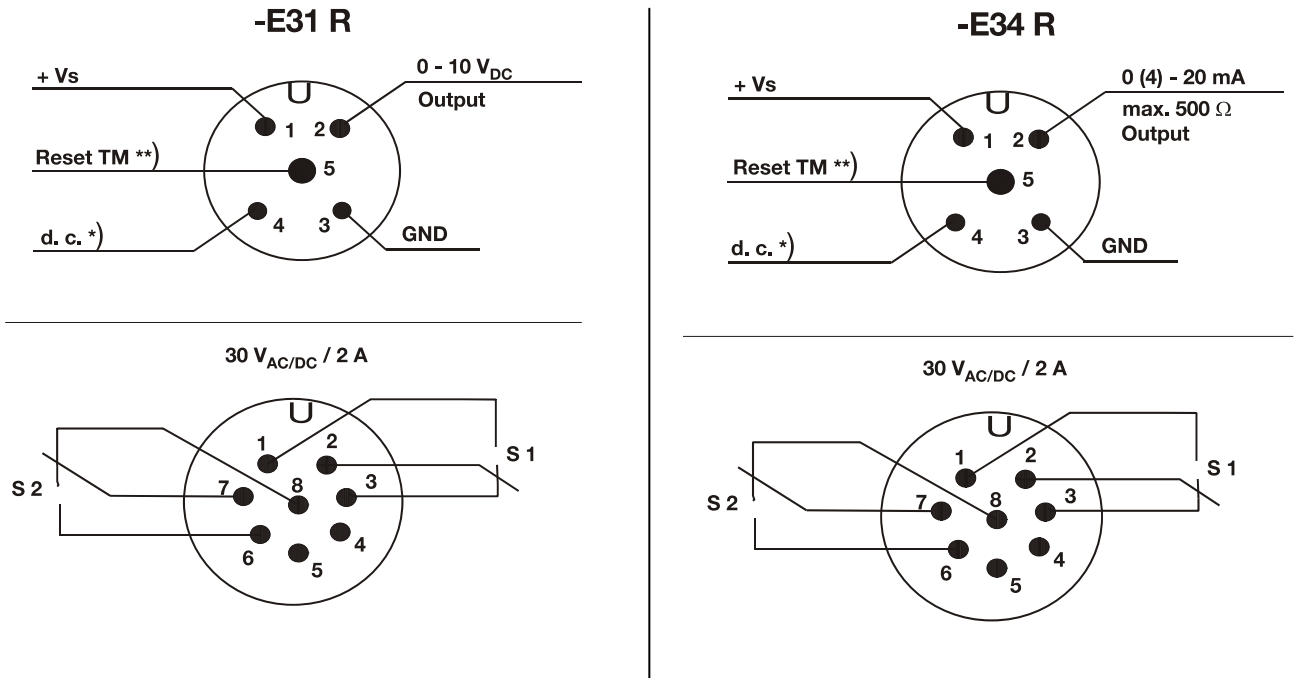
| Wire number | ZED-Counter electronics |
|-------------|-------------------------|
| 1           | +24 V <sub>DC</sub>     |
| 2           | GND                     |
| 3           | 4-20 mA / 0-10 V        |
| 4           | GND                     |
| 5           | d.c. *)                 |
| 6           | Reset TM                |
| 7           | Relay S1 N/O            |
| 8           | Relay S1 COM            |
| 9           | Relay S2 N/O            |
| 10          | Relay S2 COM            |



\*) Don't connect terminal!

\*\*\*) Reset TM – GND => reset part quantity counter

## 6.3 Model-...ExxR cable connection + plug connection

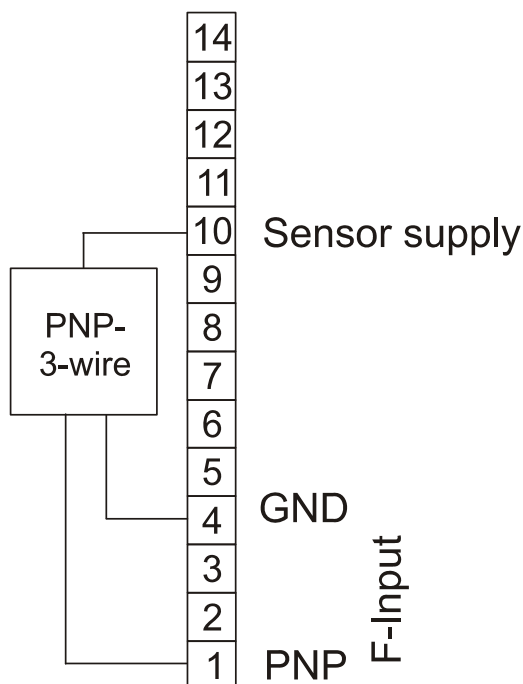


\*) Don't connect contact !

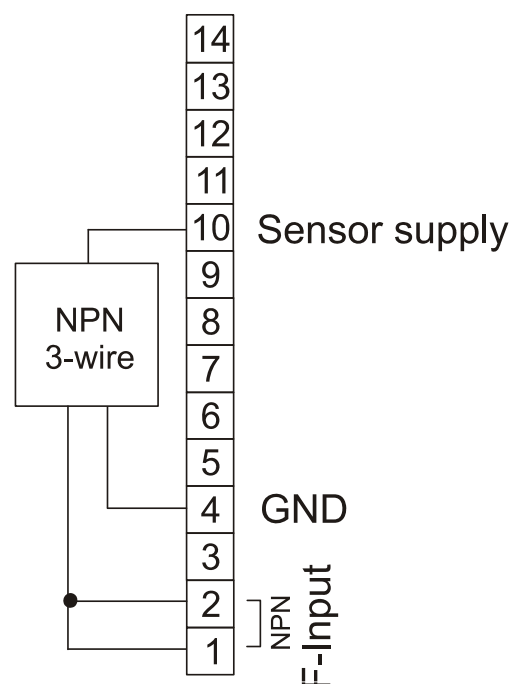
\*\*\*) Reset TM – GND => reset part quantity counter

## 6.4 Connection example

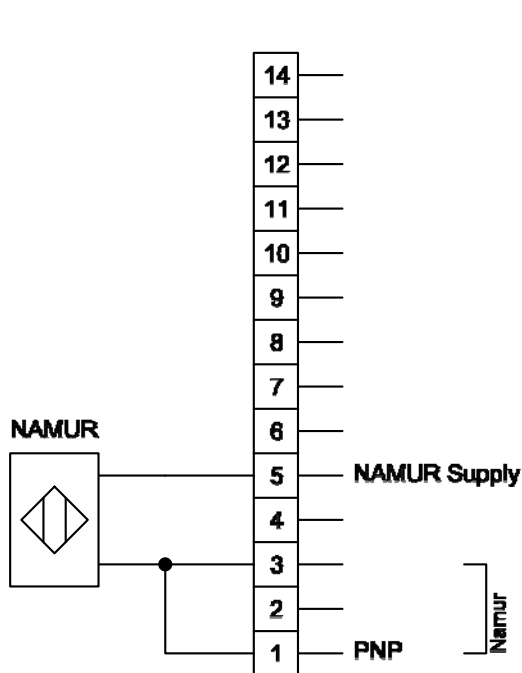
PNP-Sensor



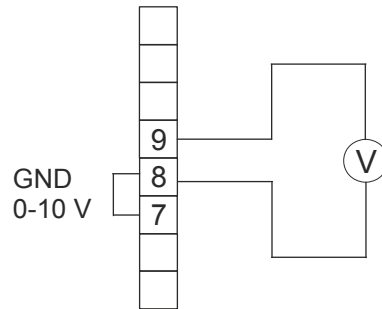
NPN-Sensor



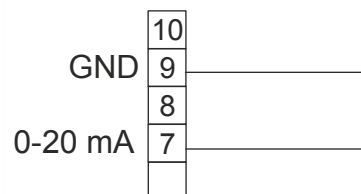
NAMUR-Sensor



analogue output 0-10 V



analogue output 0-20 mA



## 7. Operation / Configuration / Adjustments

### 7.1 General

Only the menu items which lines are marked in the selection matrix in grey colour, are available in the respective instrument version.

***Italic*** written values are blinking in the display, if they have been chosen for any input.



The parameter can only be changed, if the security code has been entered correctly! The message „locked“ will appear if the input has not been activated.

## 7.2 Function of the control keys

Operating mode >Measure< :

### PGM/ENTER

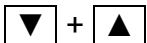
- Press briefly: → a) Display total quantity, then  
Display corresponding scale unit or  
→ b) Reset status reports.
- Press for 3 sec: → Switch to operating mode >Parameterize<.



- - Press briefly: → Display min. flow value.
- Press for 3 sec: → Enter switching point for Relay S1 **s1SPPoint**  
(only if parameter **SPdirect** is set to “yes”).
- .



- - Press briefly: → Display max. flow value.
- Press for 3 sec: → Enter switching point for Relay S2 **s2SPPoint**  
(only when parameter **SPdirect** is switched to “yes”).



- Press for 3 sec: → Sets min. and max. value memory to flow value  
(only when parameter **fMMReDir** is switched to “yes”).

### RESET

- Press for 3 sec: → Sets the part quantity counter to 0.

**Operating mode >Parameterize<:****PGM/ENTER**

- Press briefly:     → a) Open parameter group or  
                          → b) Change parameter (go lower in menu level) or  
                          → c) Adopt value input.
- Press for 3 sec:   → Abort input (ESC) and go back one  
                          menu level.



- Press briefly:     → a) Select parameter group or parameter or  
                          → b) Reduce selected number by 1 or  
                          → c) Select list value (e.g.... L/m, L/h, m<sup>3</sup>/m, ...).



- Press briefly:     → a) Select parameter group or parameter or  
                          → b) Increase selected number by 1 or  
                          → c) Select list value (e.g.... m<sup>3</sup>/m, L/h, L/m, ...).



**RESET**

- No function in this mode.



**Note: If no button is pressed for 20 seconds during parameterising, the instrument automatically switches back into >measuring< mode.**

**7.3 Character explanation for main menu**

- ( e ) - Button **PGM/ENTER** press shortly.
- ( E ) - Button **PGM/ENTER** press and hold for approx. 3 seconds.
- ( ▼ ) - Button  press shortly.
- ( ▲ ) - Button  press shortly.

## 7.4 General Settings

|                                 | Level 1<br>Choose parameter-groups          | Level 2<br>Display parameter, choose functions   | Level 3<br>Enter/change values, carry out functions             | DF-...ZLxxx / Model-...ExxR<br>ZED-Z<br>Configurationlevel<br>ZED-Devices<br>Activation with PW = 6571 |
|---------------------------------|---------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Operating Mode<br>> MEASURING < | (E) →<br>← (E) GENERAL<br>ADJUSTM.<br>(▼) ↓ | (e) →<br>← (E) Language<br>german<br>(▼) ↓ (▲) ↑ | (e) →<br>← (E) Language<br>english<br>(▲) →<br>← (▼) german     | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) fUnitFS<br>m3/h<br>(▼) ↓ (▲) ↑             | (e) →<br>← (E) FUnitFS<br>mL/m...<br>(▲) →<br>← (▼) ...GPH      | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) fValueFS<br>2700m3/h<br>(▼) ↓ (▲) ↑        | (e) →<br>← (E) VALUE INPUT                                      | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) fMinVal<br>100.0 L/m<br>(▼) ↓ (▲) ↑        | (e) →<br>← (E) VALUE INPUT                                      | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) fPls/rev<br>3<br>(▼) ↓ (▲) ↑               | (e) →<br>← (E) fPls/rev<br>0...<br>(▲) →<br>← (▼) ...10         | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) fJumpVD<br>5 %<br>(▼) ↓ (▲) ↑              | (e) →<br>← (E) fJumpVD<br>? % ...<br>(▲) →<br>← (▼) ... 20 %    | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) fOverfV<br>100 %<br>(▼) ↓ (▲) ↑            | (e) →<br>← (E) fOverfV<br>100 % ...<br>(▲) →<br>← (▼) ... 200 % | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) fFactor<br>factory<br>(▼) ↓ (▲) ↑          | (e) →<br>← (E) fFactor<br>customer<br>(▲) →<br>← (▼) factory    | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) UserUnit<br>115.6271<br>(▼) ↓ (▲) ↑        | (e) →<br>← (E) VALUE INPUT                                      | <input type="checkbox"/>                                                                               |
|                                 |                                             | ← (E) SPdirect<br>yes<br>(▼) ↓ (▲) ↑             | (e) →<br>← (E) SPdirect<br>no<br>(▲) →<br>← (▼) yes             | <input type="checkbox"/>                                                                               |

| GENERAL SETTINGS |                                                    |                                                                                                                                                                                                                    |
|------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item        | Parameter / Function                               | Explanation / Values / Other                                                                                                                                                                                       |
| Language         | Select menu language                               | German or English                                                                                                                                                                                                  |
| fUnitFS *        | Measuring unit for flow measurement                | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m, m <sup>3</sup> /h, GPM, GPH, UU/s, UU/m, UU/h                                                                                                                        |
| fValueFS *       | Maximum measuring range value for flow measurement | Range = 0,00...99,9..._100...9999                                                                                                                                                                                  |
| fMinVal *        | Minimum measuring range value for flow measurement | Basis is fValueFS and fUnitFS<br>If the level drops below this, the flow indicator goes to 0.                                                                                                                      |
| fPIs/rev*        | Impulse per sensor wheel revolution                | Number of impulses per revolution of the sensor wheel or the like<br>Necessary for long-term period averaging if the readings per revolution vary.<br>The function is switched off when the input value is 1.      |
| fJumpVD*         | Flow switch value for attenuation cut-off          | Value in %, basis is fValueFS and fUnitFS.<br>Attenuation does not function if the switch value is 0%.                                                                                                             |
| fOverfIV *       | Flow overflow value (overflow)                     | Value in %, basis is fValueFS and fUnitFS.<br>If exceeded, an M100 report is generated and faded in, alternating with the flow indicator.<br>The report is saved and can be reset by briefly pressing the PGM key. |
| fFactor          | Select pulse ration                                | Selection of works calibration or user calibration.<br>(only for devices Model DF-...ZLxx and Model-...ExxR)                                                                                                       |
| UserUnit.        | Special volume unit                                | Customer-specific special unit UU.<br>The value entered corresponds to the number of litres of the special unit, e.g. in the case of the unit <i>Barrel</i> the factor would for example be 115.6271.              |
| SPdirect         | Activation of direct input switching point         | yes: Direct input of switching points s1SPoint and s2SPoint is possible using the keys (default).<br>no: The switching points can only be set in the menu .                                                        |

\*) Only for ZED devices: Device-specific parameter, is only visible after activation in the **SecCode** menu item in the **SERVICE** menu group, and can be changed.

## 7.5 Flow, analogue output and relay 1

|                                 | Level 1<br>Choose parameter-groups         | Level 2<br>Display parameter, choose functions | Level 3<br>Enter/change values, carry out functions |                                                   | DF-...ZLxxx / Model-...ExM | ZED-Z | Configuration level<br>ZED-Devices<br>Activation with PW = 6571 |
|---------------------------------|--------------------------------------------|------------------------------------------------|-----------------------------------------------------|---------------------------------------------------|----------------------------|-------|-----------------------------------------------------------------|
| Operating Mode<br>> MEASURING < | (▲) ↑<br>← (E) FLOW<br>(▼) ↓               | (e) → fUnit<br>← (E) L/h                       | (e) → fUnit<br>← (E) mL/m...                        | (▲) → fUnit<br>← (▼) ...GPH                       |                            |       |                                                                 |
|                                 |                                            | ← (E) fDamping<br>3 sec                        | (e) → fDamping<br>← (E) 0 sec...                    | (▲) → fDamping<br>← (▼) ...10 sec                 |                            |       |                                                                 |
|                                 |                                            | ← (E) fMMReDir<br>yes                          | (e) → fMMReDir<br>← (E) no                          | (▲) → fMMReDir<br>← (▼) yes                       |                            |       |                                                                 |
|                                 |                                            | ← (E) fMMRST<br>no                             | (e) → fMMRST<br>← (E) yes                           | (▲) → fMMRST<br>← (▼) no                          |                            |       |                                                                 |
|                                 | (▲) ↑<br>← (E) ANALOGUE<br>OUTPUT<br>(▼) ↓ | (e) → aLIFE 0<br>← (E) 4mA                     | (e) → aLIFE 0<br>← (E) 0mA                          | (▲) → aLIFE 0<br>← (▼) 4mA                        | (if Ana. Output = current) |       |                                                                 |
|                                 |                                            | ← (E) aLIFE 0<br>2V                            | (e) → aLIFE 0<br>← (E) 2V                           | (▲) → aLIFE 0<br>← (▼) 2V                         | (if Ana. Output = voltage) |       |                                                                 |
|                                 |                                            | ← (E) aLowFlow<br>50,0 L/h                     | (e) → VALUE INPUT<br>← (E)                          |                                                   |                            |       |                                                                 |
|                                 |                                            | ← (E) aHighFlo<br>_150 L/h                     | (e) → VALUE INPUT<br>← (E)                          |                                                   |                            |       |                                                                 |
|                                 | (▲) ↑<br>← (E) RELAY<br>S1<br>(▼) ↓        | (e) → s1Funct.<br>← (E) Flow                   | (e) → s1Funct.<br>← (E) PA-Limit...                 | (▲) → s1Funct.<br>← (▼) ...TA-Limit               |                            |       |                                                                 |
|                                 |                                            | ← (E) s1Char.<br>Limit                         | (e) → s1Char.<br>← (E) Window...                    | (▲) → s1Char.<br>← (▼) ...Limit                   | (only if s1Funct. = Flow)  |       |                                                                 |
|                                 |                                            | ← (E) s1Logic<br>normal                        | (e) → s1Logic<br>← (E) inverse                      | (▲) → s1Logic<br>← (▼) normal                     |                            |       |                                                                 |
|                                 |                                            | ← (E) s1SPoint<br>8,0 L/h                      | (e) → VALUE INPUT<br>← (E)                          |                                                   | (only if s1Funct. = Flow)  |       |                                                                 |
| ← (E) s1Hyste<br>_2,0 L/h       |                                            | (e) → VALUE INPUT<br>← (E)                     |                                                     | (only if s1Funct. = Flow)                         |                            |       |                                                                 |
| ← (E) s1WPPoint<br>18,0 L/h     |                                            | (e) → VALUE INPUT<br>← (E)                     |                                                     | (only if s1Funct. = Flow und s1Char.<br>= Window) |                            |       |                                                                 |
| ← (E) s1SDelay<br>_1,0 sec      |                                            | (e) → VALUE INPUT<br>← (E)                     |                                                     | (only if s1Funct. = Flow)                         |                            |       |                                                                 |
| ← (E) s1RDelay<br>20,0 sec      |                                            | (e) → VALUE INPUT<br>← (E)                     |                                                     | (only if s1Funct. = Flow)                         |                            |       |                                                                 |
| ← (E) s1PA-Lim<br>100,0         |                                            | (e) → VALUE INPUT<br>← (E)                     |                                                     | (only if s1Funct. = PA-Lim)                       |                            |       |                                                                 |
| ← (E) s1TA-Lim<br>2000,0        |                                            | (e) → VALUE INPUT<br>← (E)                     |                                                     | (only if s1Funct. = TA-Lim)                       |                            |       |                                                                 |



| FLOW      |                                                                               |                                                                                                                                                                                                                                               |
|-----------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item | Parameter / Function                                                          | Explanation / Values / Other                                                                                                                                                                                                                  |
| fUnit     | Unit of flow indicator                                                        | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m, m <sup>3</sup> /h, GPM, GPH, UU/s, UU/m, UU/h                                                                                                                                                   |
| fDamping  | Attenuation of reading fluctuations in the flow indicator                     | The attenuation pacifies the flow indicator.<br>The attenuation value is the approximate equivalent of the setting time of the display value to c. 90% of a measured value jump in seconds.<br>(Parameter is blocked at DF-...ZLxxx devices). |
| fMMReDir  | Resets the Min/Max flow value directly using the keys, without using the menu | yes: direct resetting of the Min/Max value memory by simultaneously pressing (3 sec) the (+) and (-) keys (default).<br>no: memory reset only possible with fMMRST.                                                                           |
| fMMRST    | Resets the Min/Max flow value memory of the flow indicator                    | yes: Resets Min / Max value memory for the flow<br>no: No action.                                                                                                                                                                             |

| ANALOGUE OUTPUT |                                 |                                                                                                              |
|-----------------|---------------------------------|--------------------------------------------------------------------------------------------------------------|
| Menu Item       | Parameter / Function            | Explanation / Values / Other                                                                                 |
| aLIFE 0         | Select Life Zero                | Offset at power output: 0 mA or 4 mA<br>at 0-10 V $\Delta$ 0 mA $\rightarrow$ 0 V and 4 mA $\rightarrow$ 2 V |
| aLowFlow        | Flow reading at 0/4 mA or 0/2 V | Lower flow reading of gauged output range, value has the same unit as the flow indicator                     |
| aHighFlo        | Flow reading at 20 mA or 10 V   | Upper flow reading of gauged output range, value has the same unit as the flow indicator                     |

| RELAY S1        |                                 |                                                                                                                                                                                                                               |
|-----------------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item       | Parameter / Function            | Explanation / Values / Other                                                                                                                                                                                                  |
| <b>s1Funct.</b> | Relay1 Function selection       | Flow.: Monitoring of an adjustable flow value (s1SPoint).<br>TA Limit: Monitoring of an adjustable total volume (s1TA-Lim).<br>PA-Limit: Monitoring of an adjustable part volume (s1PA-Lim).<br><br>see → 8.0 Relay functions |
| <b>s1Char.</b>  | Relay1 Switch characteristic    | Limit: Monitoring a reading (s1SPoint).<br>Window: Monitoring an adjustable measuring range (s1SPoint...s1Fpunkt).<br><br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                    |
| <b>s1Logic</b>  | Relay1 Switch logic             | normal: Relay 1 activated when the limit value is exceeded.<br>invers: Relay 1 drops out when the limit value is exceeded.                                                                                                    |
| <b>s1SPoint</b> | Relay1 Switchpoint              | Reading is in the same units as the flow indicator.<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                                                                       |
| <b>s1Hyste</b>  | Relay1 Hysteresis               | Reading is in the same units as the flow indicator.<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                                                                       |
| <b>s1FPoint</b> | Relay1 Windowpoint              | Reading is in the same units as the flow indicator.<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> und <b>s1Char.</b> auf <b>Window</b> )                                                                                  |
| <b>s1SDelay</b> | Relay1 Switch delay             | Delays the switching of the relay when the limit value is exceeded.<br>Range: 0,0...99,9 sec<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                              |
| <b>s1RDelay</b> | Relay1 Reset delay              | Delays the switching of the relay when the limit value is undershot.<br>Range: 0,0...99,9 sec<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                             |
| <b>s1PA-Lim</b> | Relay1 Part volume limit value  | Limit value for monitoring the part volume counter.<br>Reading is in the same units as the part volume unit (PA-Unit.) in counter menu group.<br>(only if <b>s1Funct.</b> Is set to <b>GM Limit</b> )                         |
| <b>s1TA-Lim</b> | Relay1 Total volume limit value | Limit value for monitoring the total volume counter.<br>Reading is in the same units as the total volume unit (TA-Unit) in counter menu group.<br>(only if <b>s1Funct.</b> Is set to <b>TA Limit</b> )                        |

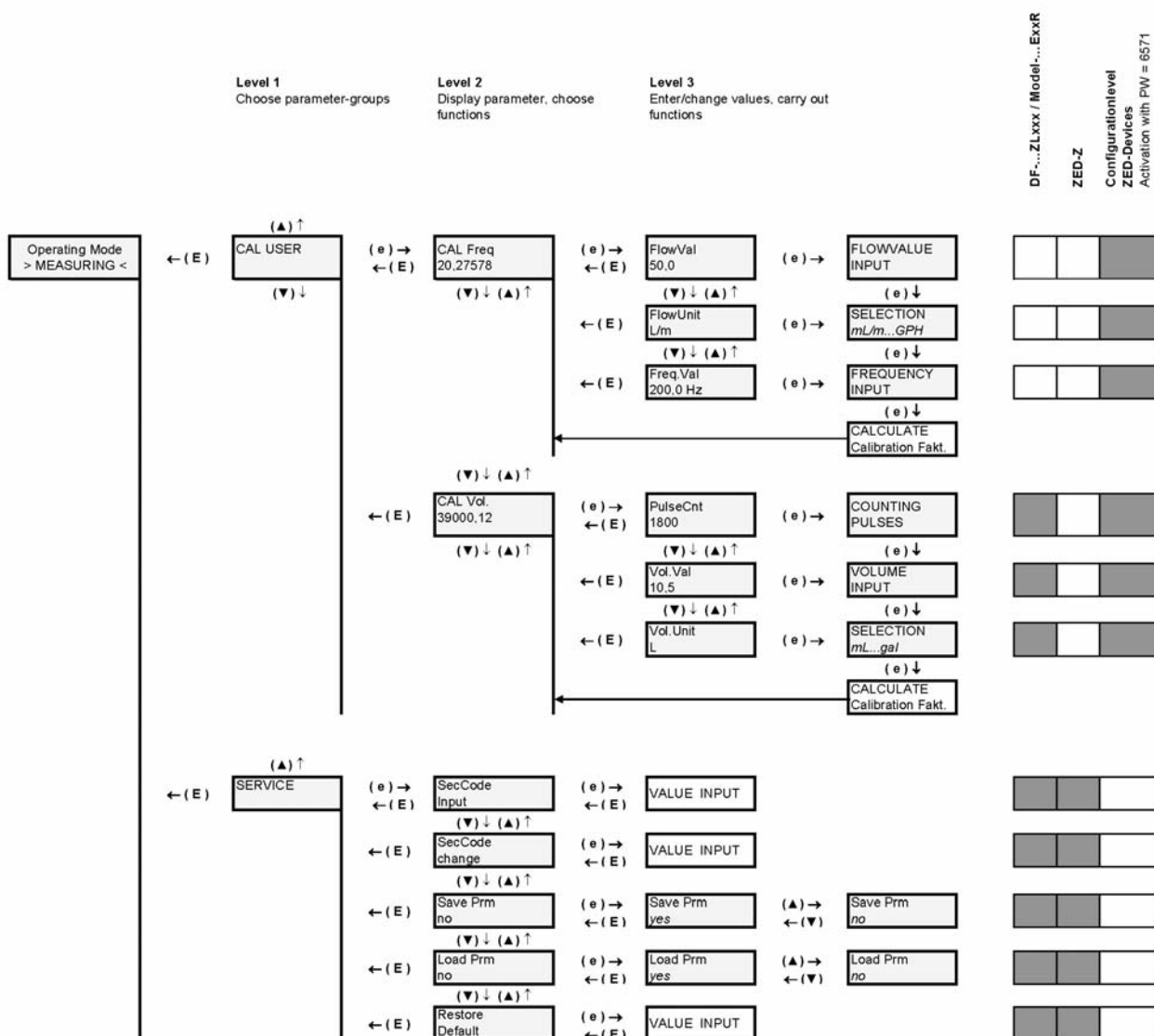
## 7.6 Relay 2 and volume counter

|                                 | Level 1<br>Choose parameter-groups | Level 2<br>Display parameter, choose functions | Level 3<br>Enter/change values, carry out functions |                            | DF...ZLxxx / Model...Extr                      | ZED-Z | Configurationlevel<br>ZED-Devices<br>Activation with PW = 6571 |  |
|---------------------------------|------------------------------------|------------------------------------------------|-----------------------------------------------------|----------------------------|------------------------------------------------|-------|----------------------------------------------------------------|--|
| Operating Mode<br>> MEASURING < | ← (E) RELAY S2<br>(▲) ↑<br>(▼) ↓   | (e) → s2Funct. Flow                            | (e) → s2Funct. PA-Limit...                          | (▲) → s2Funct. ...TA-Limit |                                                |       |                                                                |  |
|                                 |                                    | ← (E) s2Char. Limit                            | (e) → s2Char. Window                                | (▲) → s2Char. Limit        | (only if s2Funct. = Flow)                      |       |                                                                |  |
|                                 |                                    | ← (E) s2Logic normal                           | (e) → s2Logik inverse                               | (▲) → s2Logik normal       |                                                |       |                                                                |  |
|                                 |                                    | ← (E) s2SPoint 8,0 L/h                         | (e) → VALUE INPUT                                   |                            | (only if s2Funct. = Flow)                      |       |                                                                |  |
|                                 |                                    | ← (E) s2Hyste 2,0 L/h                          | (e) → VALUE INPUT                                   |                            | (only if s2Funct. = Flow)                      |       |                                                                |  |
|                                 |                                    | ← (E) s2WPoint 12,0 L/h                        | (e) → VALUE INPUT                                   |                            | (only if s2Funct. = Flow and s2Char. = Window) |       |                                                                |  |
|                                 |                                    | ← (E) s2SDelay 10,0 sec                        | (e) → VALUE INPUT                                   |                            | (only if s2Funct. = Flow)                      |       |                                                                |  |
|                                 |                                    | ← (E) s2RDelay 20,0 sec                        | (e) → VALUE INPUT                                   |                            | (only if s2Funct. = Flow)                      |       |                                                                |  |
|                                 |                                    | ← (E) s2PA-Lim 100,0                           | (e) → VALUE INPUT                                   |                            | (only if s2Funct. = PA-Lim)                    |       |                                                                |  |
|                                 |                                    | ← (E) s2TA-Lim 2000,0                          | (e) → VALUE INPUT                                   |                            | (only if s2Funct. = TA-Lim)                    |       |                                                                |  |
|                                 |                                    | ← (E) VOLUME COUNTER<br>(▲) ↑<br>(▼) ↓         | (e) → PA-Unit L                                     | (e) → PA-Unit mL...        | (▲) → PA-Unit ...gal                           |       |                                                                |  |
|                                 |                                    |                                                | ← (E) PA =0? no                                     | (e) → PA =0? yes           | (▲) → PA =0? no                                |       |                                                                |  |
|                                 |                                    |                                                | ← (E) PA0Dirct yes                                  | (e) → PA0dirct no          | (▲) → PA0dirct yes                             |       |                                                                |  |
|                                 |                                    |                                                | ← (E) TA-Unit m³                                    | (e) → TA-Unit mL...        | (▲) → TA-Unit ...gal                           |       |                                                                |  |
|                                 |                                    |                                                | ← (E) TA =0? no                                     | (e) → TA =0? yes           | (▲) → TA =0? no                                |       |                                                                |  |

| RELAY S2  |                                 |                                                                                                                                                                                                                               |
|-----------|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item | Parameter / Function            | Explanation / Values / Other                                                                                                                                                                                                  |
| s2Funct.  | Relay2 Function selection       | Flow : Monitoring of an adjustable flow value (s2SPoint).<br>TA-Limit: Monitoring of an adjustable total volume (s2TA-Lim).<br>PA-Limit: Monitoring of an adjustable part volume (s2PA-Lim).<br><br>see → 8.0 Relay functions |
| s2Char.   | Relay2 Switch characteristic    | Limit: Monitoring a reading (s2SPoint).<br>Window: Monitoring an adjustable measuring range (s2SPoint...s12punkt).<br><br>(only if <b>s2Funct.</b> is set to <b>Flow</b> )                                                    |
| s2Logic   | Relay2 Switch logic             | normal: Relay 2 activated when the limit value is exceeded.<br>invers: Relay 2 drops out when the limit value is exceeded.                                                                                                    |
| s2SPoint  | Relay2 Switchpoint              | Reading is in the same units as the flow indicator.<br>(only if <b>s2Funct.</b> is set to <b>Flow</b> )                                                                                                                       |
| s2Hyste   | Relay2 Hysteresis               | Reading is in the same units as the flow indicator.<br>(only if <b>s2Funct.</b> is set to <b>Flow</b> )                                                                                                                       |
| s2FPoint  | Relay2 Windowpoint              | Reading is in the same units as the flow indicator.<br>(only if <b>s2Funct.</b> is set to <b>Flow</b> ) and <b>s2Char.</b> is set to <b>Window</b> )                                                                          |
| s2SDelay  | Relay2 Switch delay             | Delays the switching of the relay when the limit value is exceeded.<br>Range: 0,0...99,9 sec<br>(only if <b>s2Funct.</b> is set to <b>Flow</b> )                                                                              |
| s2RDelay  | Relay2 Reset delay              | Delays the switching of the relay when the limit value is undershot.<br>Range: 0,0...99,9 sec<br>(only if <b>s2Funct.</b> is set to <b>Flow</b> )                                                                             |
| s2PA-Lim  | Relay2 Part volume limit value  | Limit for monitoring the part volume counter.<br>Reading is in the same units as the part volume units (PA-Unit.)<br>in the counter menu group.<br>(only if <b>s2Funct.</b> is set to <b>PA-Limit</b> )                       |
| s2TA-Lim  | Relay2 Total volume limit value | Limit for monitoring the total volume counter.<br>Reading is in the same units as the total volume units (TA-Unit) in the counter menu group.<br>(only if <b>s2Funct.</b> is set to <b>TA-Limit</b> )                         |

| VOLUME COUNTER |                                                                          |                                                        |
|----------------|--------------------------------------------------------------------------|--------------------------------------------------------|
| Menu Item      | Parameter / Function                                                     | Explanation / Values / Other                           |
| PA-Unit.       | Units on the part volume indicator                                       | mL, L, m <sup>3</sup> , gal, mgal, UU                  |
| PA =0?         | Set part volume counter to 0                                             | yes: Part volume counter is set to 0<br>no: No action  |
| PA0direct      | 0-setting option of the part volume counter released using the reset key | yes: Released (default)<br>no: Blocked                 |
| TA-Unit        | Measuring units on the total volume indicator                            | mL, L, m <sup>3</sup> , gal, mgal, UU                  |
| TA =0?         | Set total volume counter to 0                                            | yes: Total volume counter is set to 0<br>no: No action |

## 7.7 User alignment and Service-Settings



| USER CALIBRATION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item        | Function / Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>CAL Freq*</b> | <p>Calibrate by entering frequency and flow.</p> <p>In the menu item <b>CAL Freq</b> the bottom line always shows the current pulse value of the User calibration.</p> <p>Calibration process:</p> <ol style="list-style-type: none"> <li><b>FlowVal</b> Enter nominal flow value of the sensor. &gt; (e) press &gt;</li> <li><b>FlowUnit</b> Enter unit for flow value. &gt; (e) press &gt;</li> <li><b>Freq.Val.</b> Enter nominal frequency &gt; finish with (e).</li> </ol> <p>The new pulse value of the User calibration is calculated from these three values and saved as user calibration for the flow measurement, e.g. 20.2757 pls./litre.</p>                                                                                            |
| <b>CAL Vol.</b>  | <p>Calibration process using impulse counting and volume input (cc procedure).</p> <p>In the menu item <b>CAL Vol.</b> the bottom line always shows the current pulse value of the User calibration.</p> <p>Calibration process:</p> <ol style="list-style-type: none"> <li><b>PulseCnt</b> measures number of impulses<br/>(e) press &gt; start counter (impulses are counted) &gt; (e) press &gt; stops counter.</li> <li><b>Vol.Val</b> Enter measured volume value &gt; (e) press.</li> <li><b>Vol.Unit</b> Enter unit for volume value &gt; finish with (e).</li> </ol> <p>The pulse value of the User calibration is calculated from these three values and is saved as the user calibration for the flow measurement, e.g. 3900,5 pls./L.</p> |

\*) CAL Freq – Only possible with ZED devices.





**Note: With ZED devices it is necessary to enable the device-specific parameter input in the menu item **SecCode** in the menu **SERVICE** in order to activate the **USER-ABGLEICH** function.**



**Note: If the new pulse ratio will be used for measurement, than the menu item **fFaktor** in the menu group **General Settings** must be setted to **USER** calibration.**

| SERVICE                |                                 |                                                                                                                                                                                                                                             |
|------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item              | Function                        | Explanation / Values / Other                                                                                                                                                                                                                |
| <b>SecCode Input</b>   | Enter security code             | Input of 4-digit security code and enablement of the parameter change.<br><br>The following passwords have been defined:<br><br>3461 – General menu release<br>6571 – Activates the device-specific parameters (only ZED und Model-devices) |
| <b>SecCode change</b>  | Change security code            | Define or change security code for the first time or change.<br>If no code ( = 0000) has been set, then the parameter values set are unsecured!                                                                                             |
| <b>Save Prm</b>        | Save parameter record           | Save current settings                                                                                                                                                                                                                       |
| <b>Load Prm</b>        | Load parameter record           | Restore saved settings (reload).                                                                                                                                                                                                            |
| <b>Restore Default</b> | Reset to works default settings | Load initial setting with password 2541.<br><br>The function is blocked when the sensor has been factory-calibrated (only Model-devices).                                                                                                   |

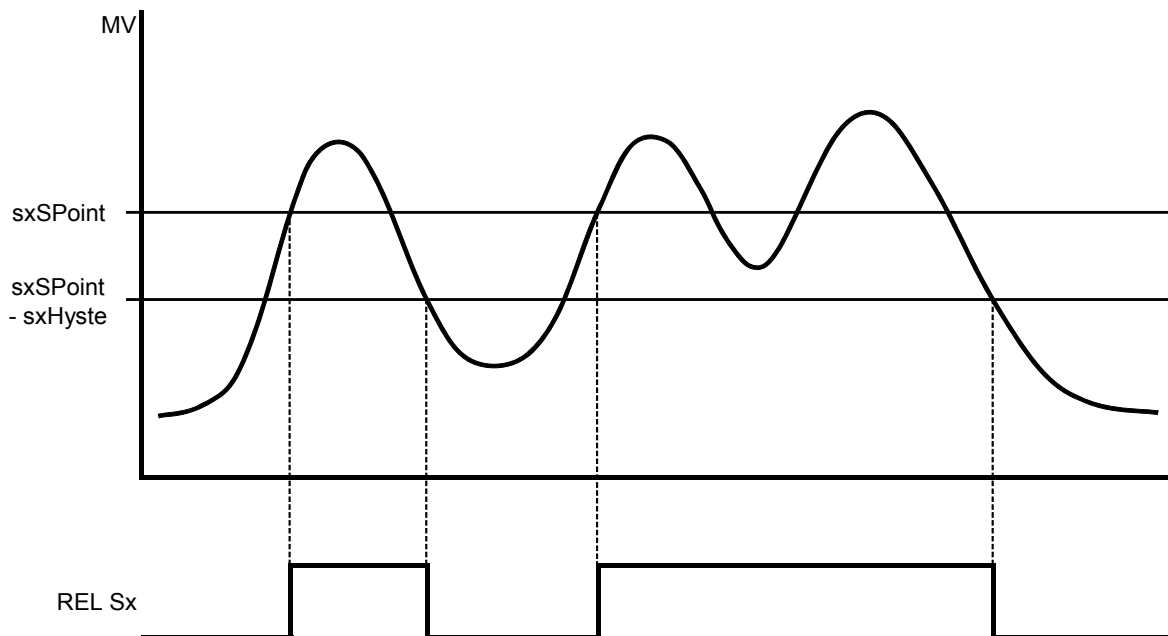
## 7.8 Error report

| Error code | Reason                                                                                 | Reset                                                                                                                                                                                               |
|------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E102       | UU User unit may not be $\leq 0$                                                       | Correct parameter                                                                                                                                                                                   |
| E142       | Distance between upper and lower analogue value too small (based on the actual flow)   | Correct parameter                                                                                                                                                                                   |
| E143       | Distance between upper and lower analogue value too small (based on the dosing amount) | Correct parameter                                                                                                                                                                                   |
| E 161      | Value is greater than maximum measuring range value.                                   | Correct parameter                                                                                                                                                                                   |
| E162       | Hysteresis too large                                                                   | Correct parameter                                                                                                                                                                                   |
| E 163      | Window point is lower than switching point.                                            | Correct parameter                                                                                                                                                                                   |
| E242       | Frequency must be between 0,2 and 2000 Hz                                              | Correct parameter                                                                                                                                                                                   |
| E245       | Calculated pulse value out of valid range                                              | Correct parameter                                                                                                                                                                                   |
| E300       | Error memory value of totalising/part counter                                          | Keep  +  pressed about 20 seconds |
| M100       | Overflow                                                                               | Acknowledge with PGM button                                                                                                                                                                         |
| ####       | Value does not fit in the display                                                      | Choose suitable measuring unit                                                                                                                                                                      |

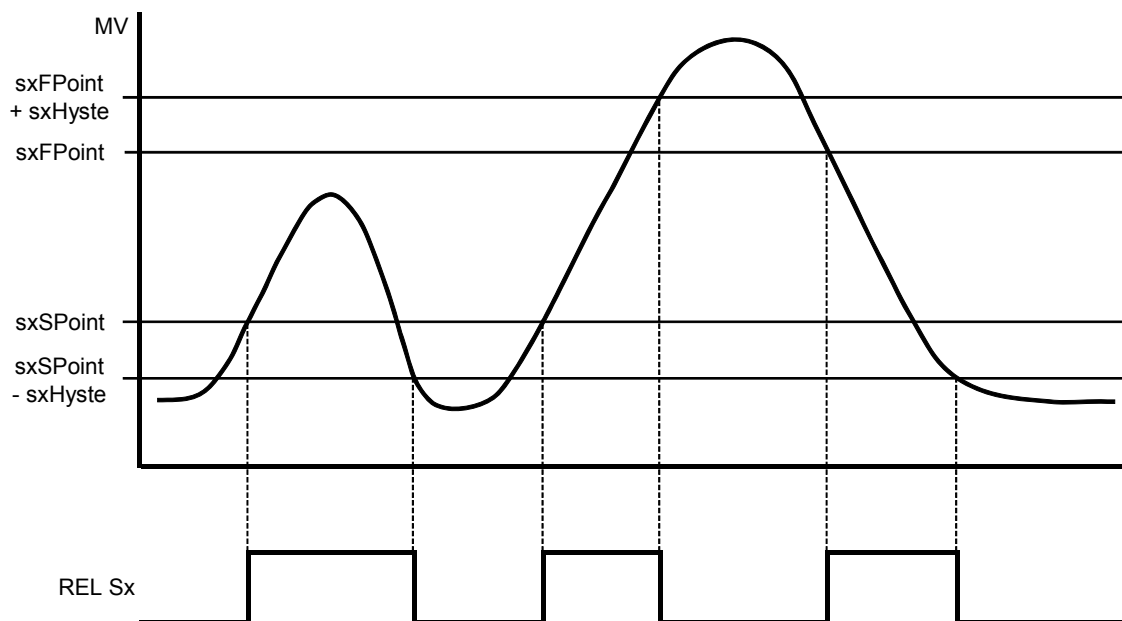


## 8. Relay Functions

### 8.1 Switching characteristic limit value



### 8.2 Switching characteristic window



## 9. Technical Information

---

|                       |                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------|
| Display:              | 2 x 8-digit alphanumeric,<br>LCD module, illuminated                                                                    |
| Display rate:         | 1 s <sup>-1</sup>                                                                                                       |
| Flow display:         | 3- or 4-digit (XX.X, X.XX or XXXX)                                                                                      |
| Flow units:           | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m,<br>m <sup>3</sup> /h, GPM, GPH, user unit per h/min/s<br>selectable       |
| Quantity meter:       | 8-digit                                                                                                                 |
| Quantity units:       | mL, L, m <sup>3</sup> , gal, mgal, user unit selectable                                                                 |
| Measurement input:    | 0.2...2000 Hz (5...24 V <sub>DC</sub> ), TTL, PNP, NPN,<br>Namur                                                        |
| Parameter input:      | menu controlled, German or English                                                                                      |
| Parameter protection: | 4-digit password                                                                                                        |
| Control elements:     | 4 keys                                                                                                                  |
| Custom. comparison:   | by entering the frequency and measured value<br>Or in the Teach-In procedure (level calibration)                        |
| Control input:        | reset function                                                                                                          |
| Relay outputs:        | 2 x changer<br>max. 250 V <sub>AC/DC</sub><br>max. 5 A / 1000 VA                                                        |
| Voltage supply:       | 24 V <sub>DC</sub> ± 20 %, approx. 80 mA or<br>90...250 V <sub>AC</sub> / max. 3 VA                                     |
| Analogue output:      | 0(4)-20 mA<br>Load: max. 500 Ω (300 Ω at AC-Supply)<br>or 0-10 V (Load: > 100kΩ)                                        |
| Sensor supply:        | 23 V (at 24 V <sub>DC</sub> ) / max. 50 mA<br>24 V (AC-supply) / max. 50 mA                                             |
| NAMUR supply:         | 8.2 V <sub>DC</sub>                                                                                                     |
| Ambient temp.:        | -20...+70 °C                                                                                                            |
| Dimensions:           | 96 x 96 x 109 mm (LxWxD) incl.<br>screw clamp (control panel installation)<br>117 x 117 x 127 mm (LxWxD) (field casing) |
| Aperture size:        | 92 <sup>+0.8</sup> x 92 <sup>+0.8</sup> mm (control panel installation)                                                 |
| Casing material:      | fibreglass reinforced Noryl,<br>(control panel installation)<br>powder coated aluminium/PA 66 (field casing)            |
| Protection type:      | IP 40 on front<br>clamp IP 00 (control panel installation)<br>IP 65 (field casing)                                      |
| Mounting:             | mounting clip Form B (DIN 43 835)<br>(control panel installation)<br>wall and pipe mounting (field casing)              |
| Connection:           | plug-in terminal strip (control panel installation)<br>cable connection (field casing)                                  |
| Weight:               | approx. 360 g (control panel installat.)<br>approx. 1240 g (field casing)                                               |

## 10. Order Codes

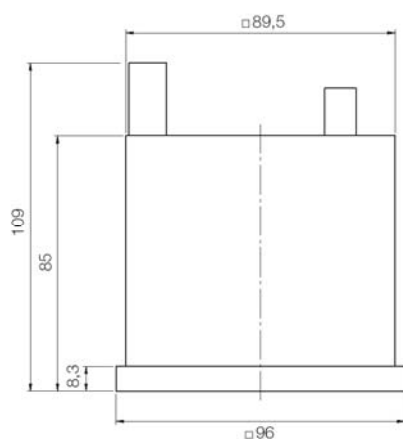
(Order example: ZED-ZF10 KS 4R P)

| Supply                 | Model    | Electrical connection                                                                                                | Analogue output                                   | Casing                                                                                                                                                                                                                                |
|------------------------|----------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 90-250 V <sub>AC</sub> | ZED-ZF10 | <b>KS</b> = terminal strip<br>(control panel installation)<br><br><b>MS</b> = cable connection<br>M 18 (Feldgehäuse) | <b>4R</b> = 0(A)-20 mA<br><br><b>1 R</b> = 0-10 V | <b>P</b> = control panel installation<br>96x96 mm<br><br><b>F</b> = field casing 116 x116 mm<br><br><b>S</b> = field casing with<br>wall mount,<br>infinitely variable pivotable<br><br><b>R</b> = field casing with pipe<br>mounting |
| 24 V <sub>DC</sub>     | ZED-ZF13 |                                                                                                                      |                                                   |                                                                                                                                                                                                                                       |

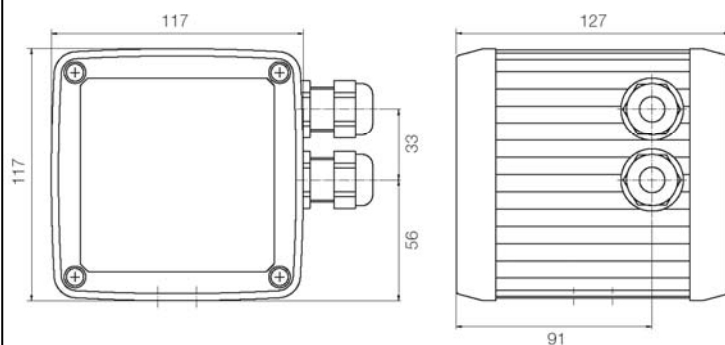
The order details of a ZED electronic in combination with a flow sensor can be found in the data sheet of the measuring device.

## 11. Dimensions

ZED-Z Control panel installation (casing P)



ZED-Z field housing



## 12. Declaration of Conformance

---

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Counter Electronic Model: ZED-Z**

to which this declaration relates is in conformity with the standards noted below:

**EN 61326-1:2013-07**

Electrical equipment for control and instrumentation technology and laboratory use – EMC-requirements (industrial area)

**EN 61010-1:2011-07**

Safety requirements for electrical measuring-, control- and laboratory instruments.

**EN 60529:2014-09**

Protection type housing (IP-Code)

Also the following EC guidelines are fulfilled:

**2004/108 EC**

EMC Directive

**2006/95 EC**

Low Voltage Directive

**2011/65/EC**

**RoHS** (category 9) industrial monitoring and control instruments, compliant, no CE-marking for the transitional period until 2017

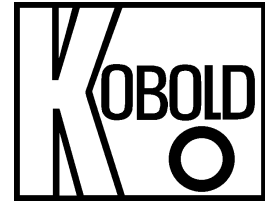
Hofheim, 15. Apr. 2015



H. Peters  
General Manager



M. Wenzel  
Proxy Holder



# Operating Instructions for Dosing Electronic

**Model: ZED-D**  
**or DF-...DLxxx**  
**or *Model-...GxxR***



## 1. Contents

---

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### Manufactured and sold by:

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D-65719 Hofheim  
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Fax: +49(0)6192-23398  
E-Mail: [info.de@kobold.com](mailto:info.de@kobold.com)  
Internet: [www.kobold.com](http://www.kobold.com)

## 2. Note

---

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

## 3. Instrument Inspection

---

Instruments are inspected before shipping and sent out in perfect condition.

Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

### **Scope of delivery:**

The standard delivery includes:

- Dosing Electronic model: ZED-D
- Operating Instructions

## 4. Regulation Use

---

Any use of the Dosing Electronic, model: ZED-D, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

## 5. Operating Principle

---

The evaluation unit changes the frequency signal of the pickup into a 3(4)-digit flow reading with adjustable scale (topline of display), and a scalable analogue signal. The dosage is displayed in the bottom line of the display. The unit of measurement can be selected.

Included are two relays with floated output changeover contacts for various functions. The relay (S1) can be used to execute the flow monitoring, total volume monitoring, fine dosage or the pump control.

When the flow is being continuously monitored, it checks if the freely adjustable limits are exceeded or fallen short of. A choice can be made between threshold value and window monitoring. Switching point, hysteresis, window point, and switch-on or switch-off delay can be set as desired. If monitoring of the total volume is selected, a check is made to see if the adjustable quantity limit is exceeded.

The dosage relay (S2) switches on when the dosage process starts, and then switches off again, once the dosage has flowed through. The dosage process can be interrupted by using the Start/Stop switch. By taking a correction quantity into account, it is possible to take any special features or conditions of the system into account. By entering a fine dosage, the bypass valve can be controlled with the relay (S1). A red LED indicates the relay's switching status.

The Analogue output is available as a current output with 0(4)...20 mA or a voltage output with 0...10 V. The parameter names in the menu can be displayed in either German or English. If used where the flow readings change rapidly, the display can be pacified and the analogue reading averaged by switching on some software. If the maximum set flow (exceeded range) is exceeded, it will be shown on the display. The set parameters can be protected against unauthorised alteration using a password function.

### Range of functions

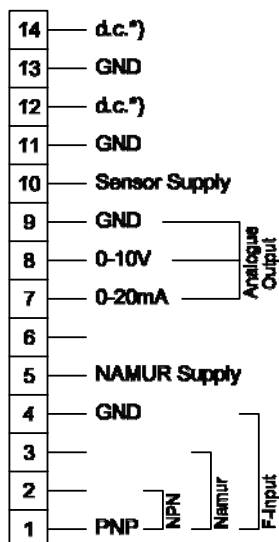
Dosage and flow meter with digital display, switch and analogue output:

- Measurement and display of dosage, total and flow Quantities
- Free scaling using Teach-In or input of frequency and measured value
- Interval counter (number of dosing processes)
- 2 control inputs
- 1 dosage output
- 1 switching output, freely programmable as flow monitor or for monitoring the total quantity
- Analogue output 0(4)-20 mA or 0-10 V



## 6. Electrical Connection

### 6.1 ZED-D, DRB-...GxxR, DPE-...GxxR fieldhousing and control panel installation



- \*) Ctrl 1 -- GND => Start
- Ctrl 2 -- GND => Stop
- Ctrl 1 -- Ctrl 2 -- GND => Reset Dosing

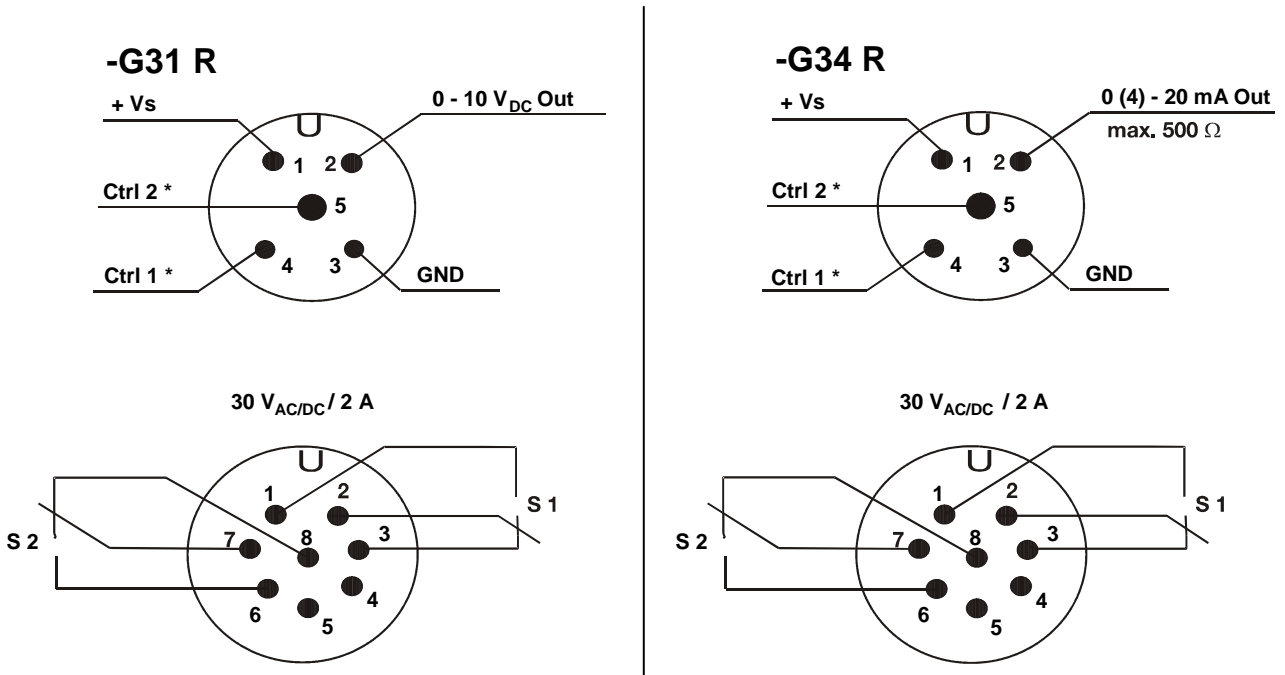
### 6.2 DF-...DLxxx, Model-...GxxR cable connection

| Wire number | DF Dosing electronics |
|-------------|-----------------------|
| 1           | +24 V <sub>DC</sub>   |
| 2           | GND                   |
| 3           | 4-20 mA / 0-10 V      |
| 4           | GND                   |
| 5           | Ctrl 1 *)             |
| 6           | Ctrl 2 *)             |
| 7           | Relay S1 N/O          |
| 8           | Relay S1 COM          |
| 9           | Relay S2 N/O          |
| 10          | Relay S2 COM          |



- \*) Ctrl 1 -- GND => Start
- Ctrl 2 -- GND => Stop
- Ctrl 1 -- Ctrl 2 -- GND => Reset Dosing

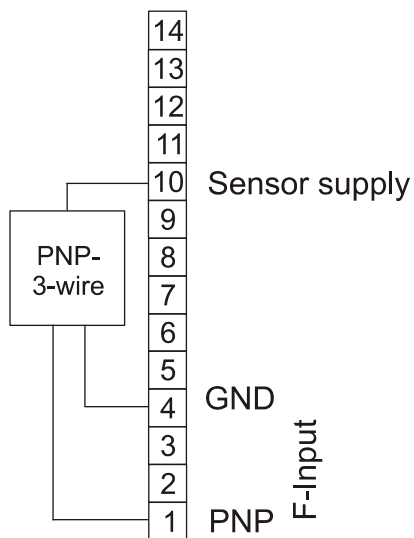
## 6.3 Model-...GxxR plug connection



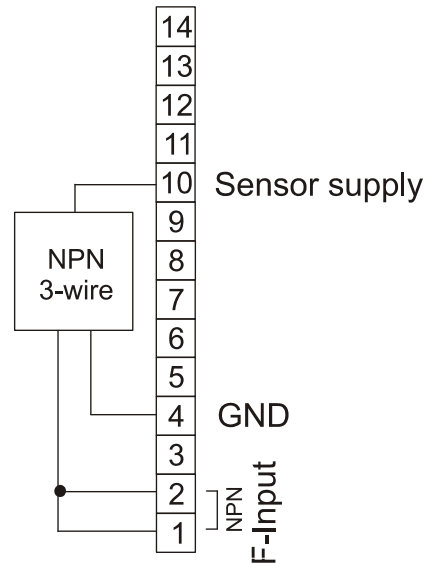
- \*) Ctrl 1 -- GND => Start
- Ctrl 2 -- GND => Stop
- Ctrl 1 -- Ctrl 2 -- GND => Reset Dosing

## 6.4 Connection example

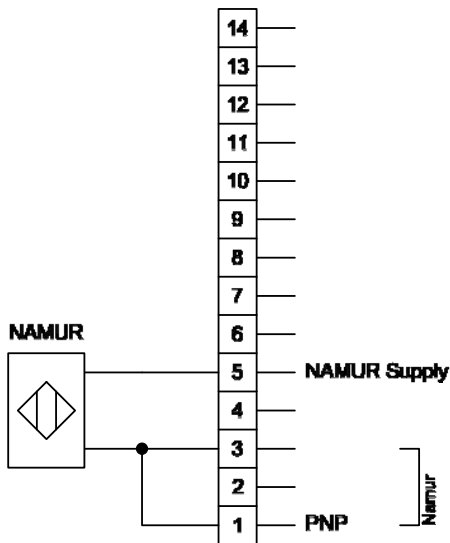
### PNP-Sensor



### NPN-Sensor



## NAMUR-Sensor



### Connecting diagram

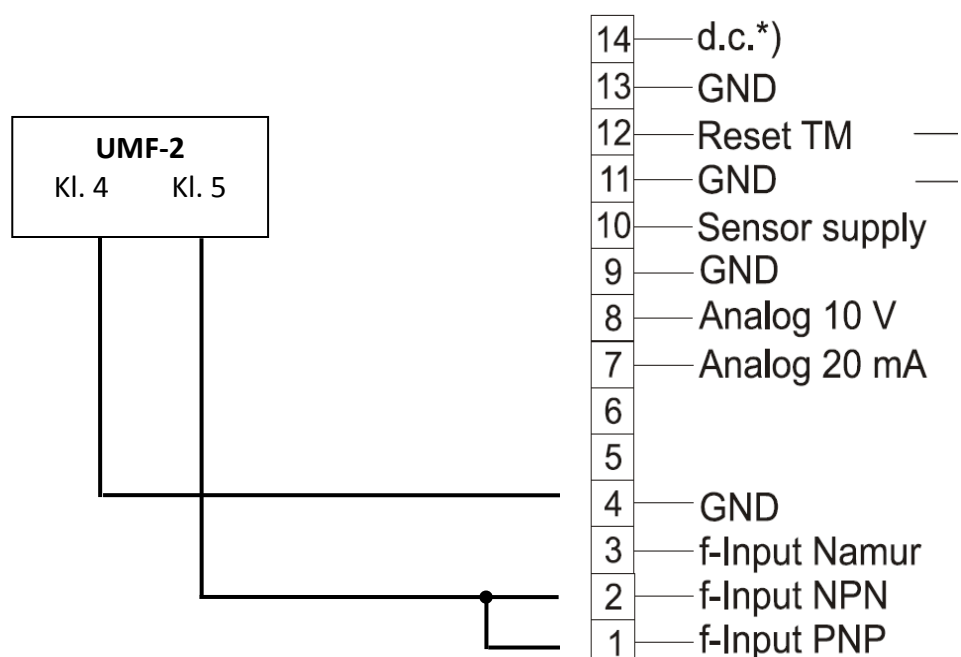
#### Transmitter UMF-2

Connecting diagram for pulse output of transmitter UMF-2 to external dosing / counter electronic ZED-D / ZED-Z.  
Connecting type: „NPN“

**Important:** The pulse output of UMF-2 transmitter must be set to “frequency out” mode!

#### UMF-2 frequency output

#### ZED-D / ZED-, npn-input



# ZED-D

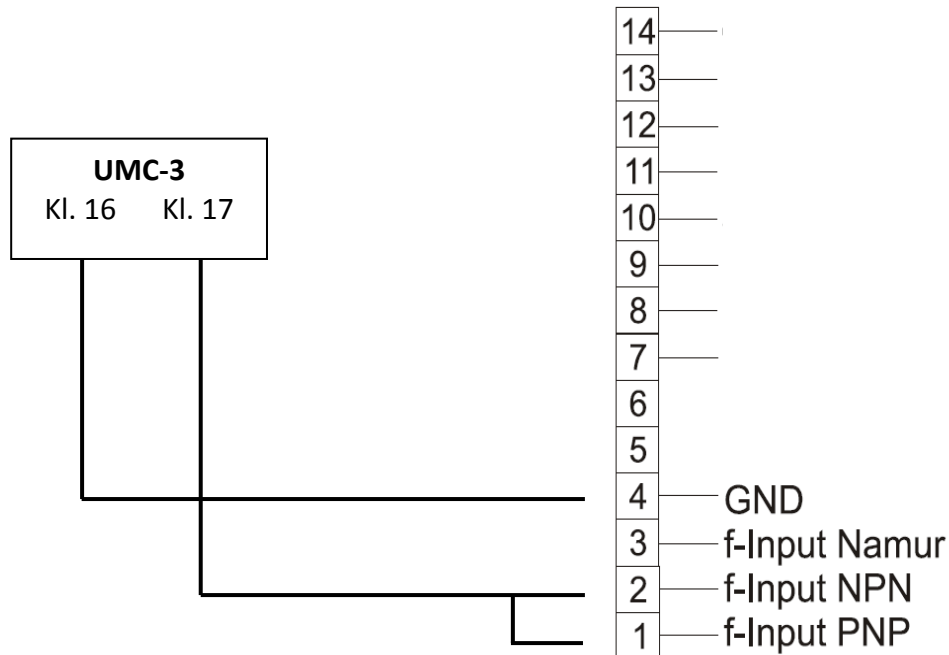
---

## Transmitter UMC-3

**Important:** The pulse output of UMF-2 transmitter must be set to “frequency out” mode!

UMC-3 pulse output

ZED-D / ZED-, npn-input



## 7. Operation / Configuration / Adjustments

---

### 7.1 General

Only the menu items which lines are marked in the selection matrix in grey colour, are available in the respective instrument version.

***Italic*** written values are blinking in the display, if they have been chosen for any input.



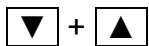
The parameter can only be changed, if the security code has been entered correctly! The message „locked“ will appear if the input has not been activated.

## 7.2 Function of the control keys

### Operating mode >Measure< :

#### **PGM/ENTER**

- Press briefly 1x: → a) Display dosage interval counter or  
→ b) Reset status reports.
- Press briefly 2x: → Display current total quantity, then  
→ Display corresponding scale unit.
- Press for 3 sec: → Switch to operating mode >Parameterize<



- Press for 3 sec: → Enter dosage  
(only if parameter **DMdirect** is switched to “yes”).

#### **START/STOP**

- Press briefly: → a) Start dosage process.  
→ b) Interrupt dosage process.
- Press for 3 sec: → Initialising and then poss. abortion of dosage operation.

### Operating mode >Parameterize< :

#### **PGM/ENTER**

- Press briefly: → a) Open parameter group or  
→ b) Change parameter (go lower in menu level) or  
→ c) Adopt value input.
- Press for 3 sec: → Abort input (ESC) and go back one  
menu level.



- Press briefly: → a) Select parameter group or parameter or
- b) Reduce digit position (when entering of numerical value) or
- c) Select list value (e.g. ... L/m, L/h, m<sup>3</sup>/m, ...).



- Press briefly: → a) Select parameter group or parameter or
- b) Increase digit position (when entering of numerical value) or
- c) Select list value (e.g. ... m<sup>3</sup>/m, L/h, L/m, ...).

## **START/STOP**

- No function in >Parameterize< operating mode.



**Note: If no button is pressed for 20 seconds during parameterising, the instrument automatically switches back into >measuring< mode.**

## 7.3 Character explanation for main menu

- ( e ) - Button **PGM/ENTER** press shortly.
- ( E ) - Button **PGM/ENTER** press and hold for approx. 3 seconds.
- ( ▼ ) - Button **▼** press shortly.
- ( ▲ ) - Button **▲** press shortly.

## 7.4 General Settings

DF-...DLxxx / Model-...GxxR

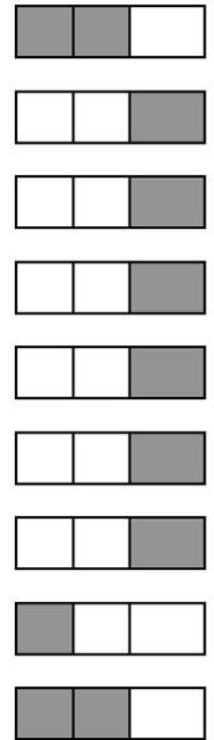
ZED-D

Configuration level  
ZED-Devices  
Activation with PW = 6571

Level 1  
choose parameter-groups

Level 2  
display parameter, choose  
functions

Level 3  
enter/change values, carry out  
functions



Operating Mode  
> MEASURING <

(E) → GENERAL  
← (E) ADJUSTM.  
(▼) ↓

(e) → Language  
← (E) german  
(▼) ↓ (▲) ↑  
← (E) fUnitFS  
m3/h  
(▼) ↓ (▲) ↑  
← (E) fValueFS  
2700m3/h  
(▼) ↓ (▲) ↑  
← (E) fMinVal  
100.0 L/m  
(▼) ↓ (▲) ↑  
← (E) fPls/rev  
3  
(▼) ↓ (▲) ↑  
← (E) fJumpVD  
5 %  
(▼) ↓ (▲) ↑  
← (E) fOverfIV  
100 %  
(▼) ↓ (▲) ↑  
← (E) fFactor  
factory  
(▼) ↓ (▲) ↑  
← (E) UserUnit  
115,6271  
(▼) ↓ (▲) ↑

(e) → Language  
← (E) english  
(e) → FUnitFS  
← (E) mL/m...  
(e) → VALUE INPUT  
← (E) VALUE INPUT  
(e) → fPls/rev  
← (E) 0...  
(e) → fJumpVD  
← (E) 1 % ...  
(e) → fOverfIV  
← (E) 100 % ...  
(e) → fFactor  
← (E) customer  
(e) → VALUE INPUT  
← (E) VALUE INPUT

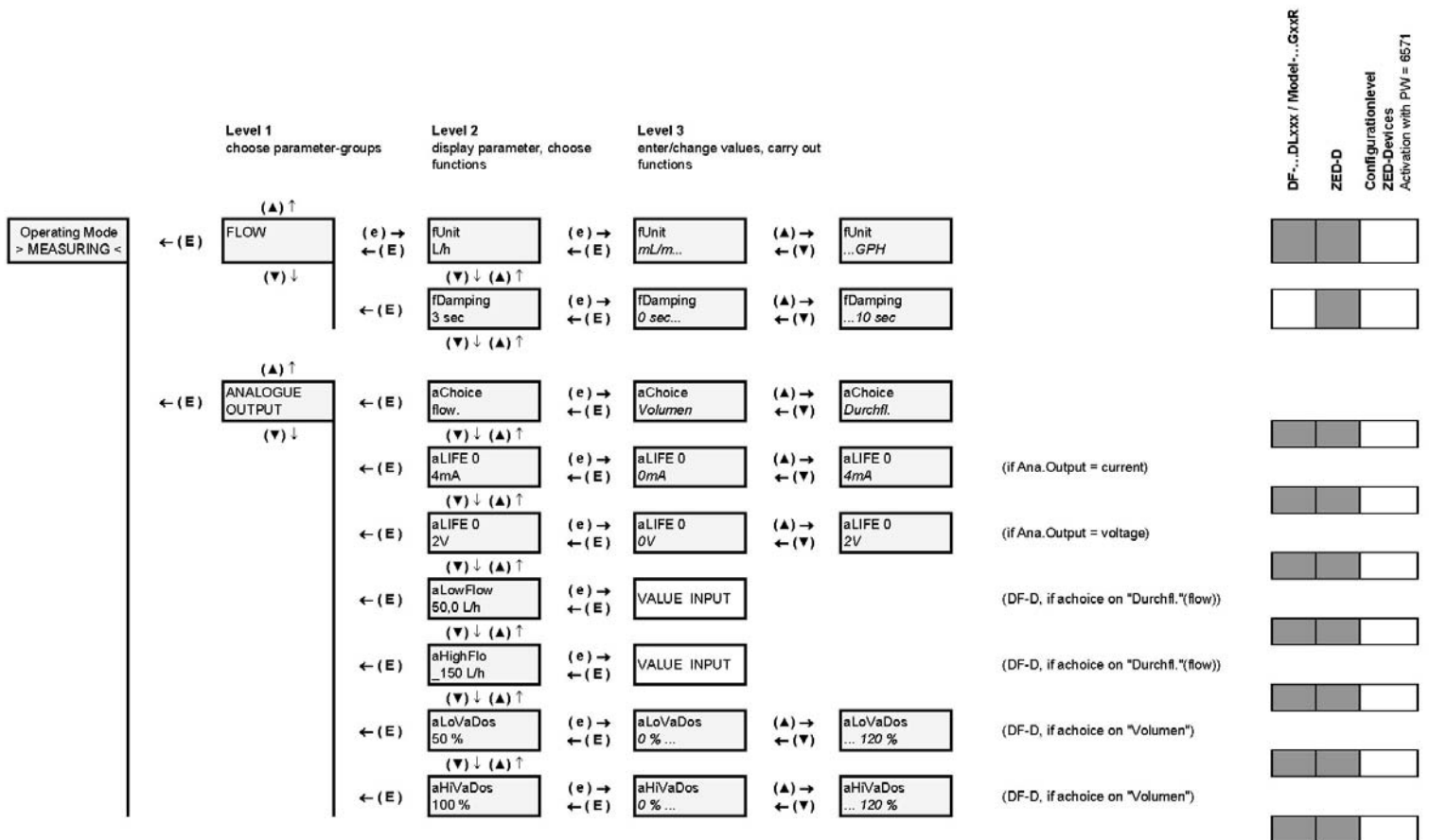
(▲) → Language  
← (▼) german  
(▲) → fUnitFS  
← (▼) ...GPH  
(▲) → fPls/rev  
← (▼) ...10  
(▲) → fJumpVD  
← (▼) ... 20 %  
(▲) → fOverfIV  
← (▼) ... 200 %  
(▲) → fFactor  
← (▼) factory

| GENERAL SETTINGS |                                                    |                                                                                                                                                                                                                    |
|------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item        | Parameter / Function                               | Explanation / Values / Other                                                                                                                                                                                       |
| Language         | Select menu language                               | German or English                                                                                                                                                                                                  |
| fUnitFS *        | Measuring unit for flow measurement                | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m, m <sup>3</sup> /h, GPM, GPH, UU/s, UU/m, UU/h                                                                                                                        |
| fValueFS *       | Maximum measuring range value for flow measurement | Range = 0,00...99,9..._100...9999                                                                                                                                                                                  |
| fMinVal *        | Minimum measuring range value for flow measurement | Basis is fValueFS and fUnitFS<br>If the level drops below this, the flow indicator goes to 0.                                                                                                                      |
| fPls/rev*        | Impulse per sensor wheel revolution                | Number of impulses per revolution of the sensor wheel or the like<br>Necessary for long-term period averaging if the readings per revolution vary.<br>The function is switched off when the input value is 1.      |
| fJumpVD *        | Flow switch value for attenuation cut-off          | Value in %, basis is fValueFS and fUnitFS.<br>Attenuation does not function if the switch value is 0%.                                                                                                             |
| fOverflV         | Flow overflow value (overflow)                     | Value in %, basis is fValueFS and fUnitFS.<br>If exceeded, an M100 report is generated and faded in, alternating with the flow indicator.<br>The report is saved and can be reset by briefly pressing the PGM key. |
| fFactor          | Select pulse ration                                | Selection of works calibration or user calibration.<br>(only for devices Model DF-...DLxxx and Model-...GxxR)                                                                                                      |
| UserUnit.        | Special volume unit                                | Customer-specific special unit UU.<br>The value entered corresponds to the number of litres of the special unit, e.g. in the case of the unit <i>Barrel</i> the factor would for example be 115.6271.              |

\*) Only for ZED devices: Device-specific parameter, is only visible after activation in the **SecCode** menu item in the **SERVICE** menu group, and can be changed.



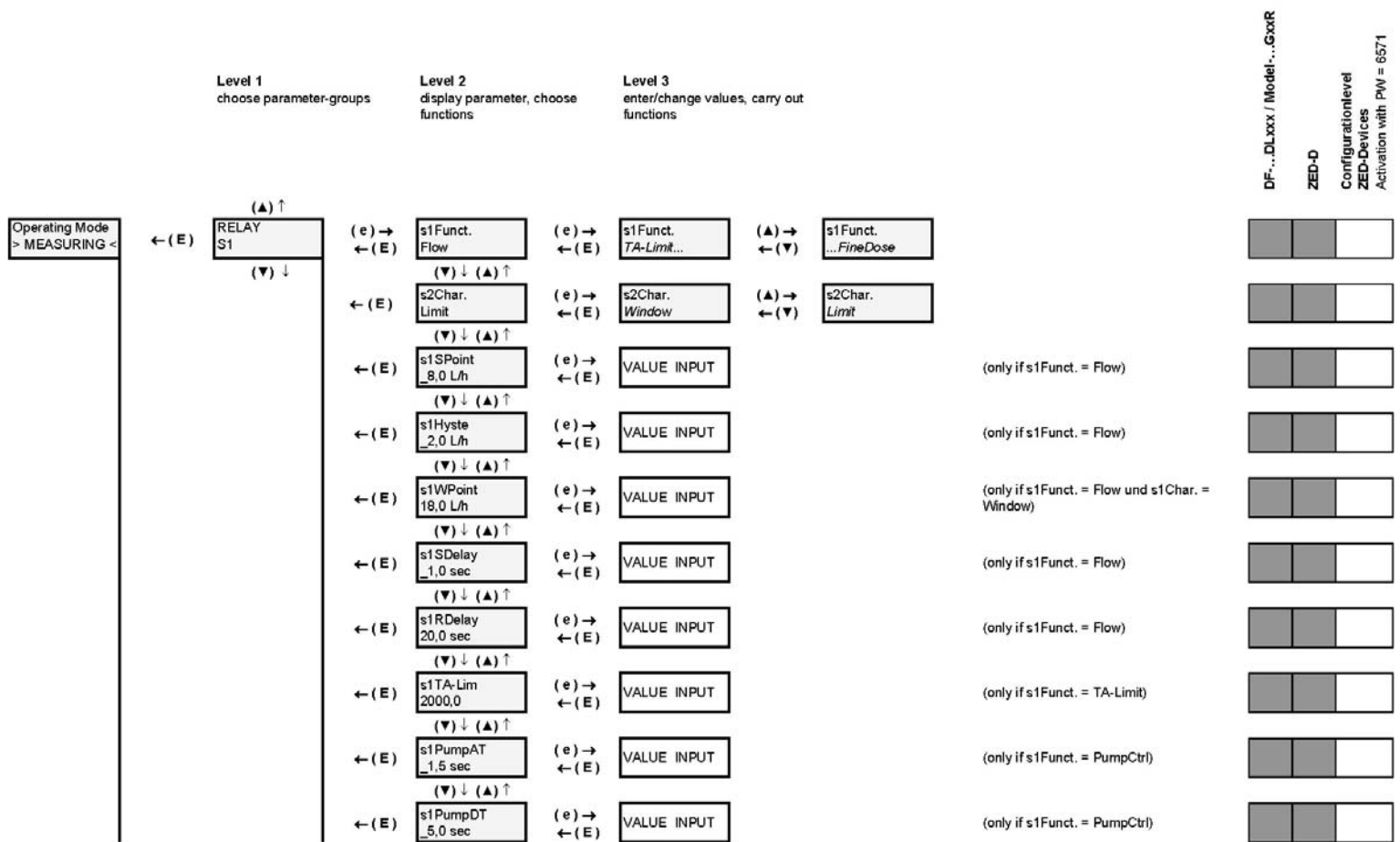
## 7.5 Flow and analogue output



| FLOW      |                                                           |                                                                                                                                                                                                                                             |
|-----------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item | Parameter / Function                                      | Explanation / Values / Other                                                                                                                                                                                                                |
| fUnit     | Unit of flow indicator                                    | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m, m <sup>3</sup> /h, GPM, GPH, UU/s, UU/m, UU/h                                                                                                                                                 |
| fDamping  | Attenuation of reading fluctuations in the flow indicator | The attenuation pacifies the flow indicator.<br>The attenuation value is the approximate equivalent of the setting time of the display value to c. 90 % of a measured value jump in seconds. (Parameter is blocked at DF-...DLxxx devices). |

| ANALOGUE OUTPUT |                                          |                                                                                                                                                                                                                                             |
|-----------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item       | Parameter / Function                     | Explanation / Values / Other                                                                                                                                                                                                                |
| aChoice         | Selection of analogue source             | Flow: gauged analogue value of flow measurement<br>Volume: current volume in percentage of dosage                                                                                                                                           |
| aLIFE 0         | Select Life Zero                         | Offset at power output: 0 mA or 4 mA<br>at 0-10 V $\Delta$ 0 mA $\rightarrow$ 0 V and 4 mA $\rightarrow$ 2 V                                                                                                                                |
| aLowFlow        | Flow reading at 0/4 mA or 0/2 V          | Lower flow reading of gauged output range, value has the same unit as the flow indicator, (only if <b>aChoice</b> is set to <b>Flow</b> )                                                                                                   |
| aHighFlo        | Flow reading at 20 mA or 10 V            | Upper flow reading of gauged output range, value has the same unit as the flow indicator, (only if <b>aChoice</b> is set to <b>Flow</b> )                                                                                                   |
| aLoVaDos        | Percentage the dosage at 0/4 mA or 0/2 V | Lower volume value of gauged output range.<br>- Range: 0...120 %<br>- The difference  aHiVaDos – aLoVaDos  may not be less than 10 %.<br>- aLoVaDos > aHiVaDos is also possible.<br><br>(only if <b>aChoice</b> is set to <b>Volume</b> )   |
| aHiVaDos        | Percentage the dosage at 20 mA or 10 V   | Upper volume reading of gauged output range.<br>- Range: 0...120 %<br>- The difference  aHiVaDos – aLoVaDos  may not be less than 10 %.<br>- aLoVaDos > aHiVaDos is also possible.<br><br>(only if <b>aChoice</b> is set to <b>Volume</b> ) |

## 7.6 Relay output



| RELAY S1  |                                     |                                                                                                                                                                                                                                       |
|-----------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item | Parameter / Function                | Explanation / Values / Other                                                                                                                                                                                                          |
| s1Funct   | Relay1 Function selection           | Flow: Monitoring of an adjustable flow value (s1SPunkt).<br>GM Limit: Monitoring of an adjustable total volume (s1TA-Lim).<br>PumpCtrl: Dosage pump control.<br>FineDose: Fine dosage valve control.<br><br>see → 8.0 Relay functions |
| s1Char.   | Relay1 Switch characteristic        | Limit: Monitoring a reading (s1Spunkt).<br>Window: Monitoring an adjustable measuring range (s1Spunkt...s1WPoint).<br><br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                            |
| s1SPunkt  | Relay1 Switchpoint                  | Reading is in the same units as the flow indicator.<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                                                                               |
| s1Hyste   | Relay1 Hysteresis                   | Reading is in the same units as the flow indicator.<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                                                                               |
| s1WPoint  | Relay1 Windowpoint                  | Reading is in the same units as the flow indicator.<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> und <b>s1Char.</b> auf <b>Window</b> )                                                                                          |
| s1SDelay. | Relay1 Switch delay                 | Value input is always in the following format<br>Range: _ 0.0...99.9 sec<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                                                          |
| s1RDelay. | Relay1 Reset delay                  | Value input is always in the following format<br>Range: _ 0.0...99.9 sec<br>(only if <b>s1Funct.</b> is set to <b>Flow</b> )                                                                                                          |
| s1TA-Lim  | Relay1 Total volume limit value     | Reading is in the same units as the total volume unit in dosage unit menu group.<br>(only if <b>s1Funct.</b> is set to <b>GM Limit</b> )                                                                                              |
| s1PumpAT  | Relay1 Pump control lead time       | Reading determines pump lead time (Rel 1) before dosage begins<br>Range = _ 0.0...99.9 sec<br>(only if <b>s1Funct.</b> is set to <b>PumpCtrl</b> )<br><br>see → 8.2 Pump control                                                      |
| s1PumpDT  | Relay1 Pump control coast down time | Reading determines pump coast down time (Rel 1) after end of dosage<br>Range = _ 0.0...99.9 sec<br>(only if <b>s1Funct.</b> is set to <b>PumpCtrl</b> )<br><br>see → 8.2 Pump control                                                 |

## 7.7 Dosing

**Level 1**  
choose parameter-groups

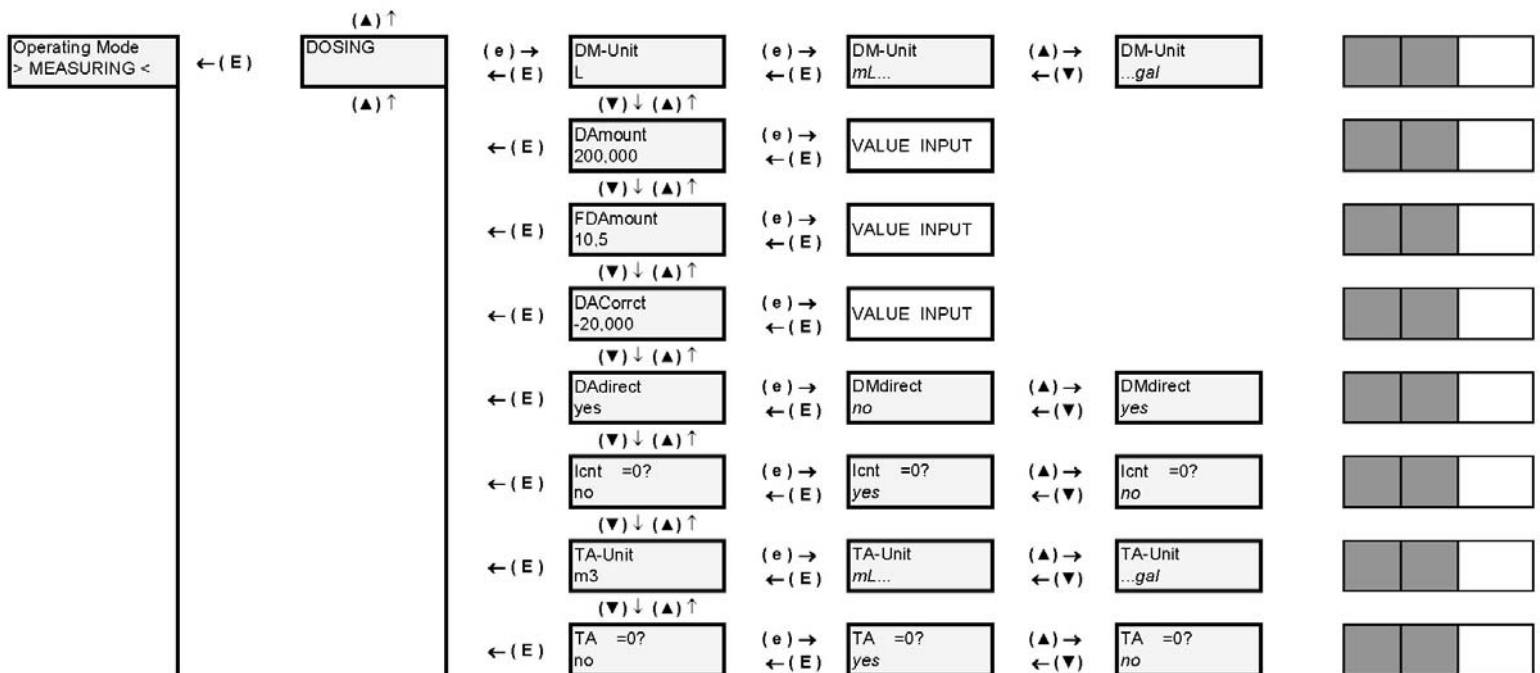
**Level 2**  
display parameter, choose functions

**Level 3**  
enter/change values, carry out functions

DF-...DLxxx / Model-...GxxR

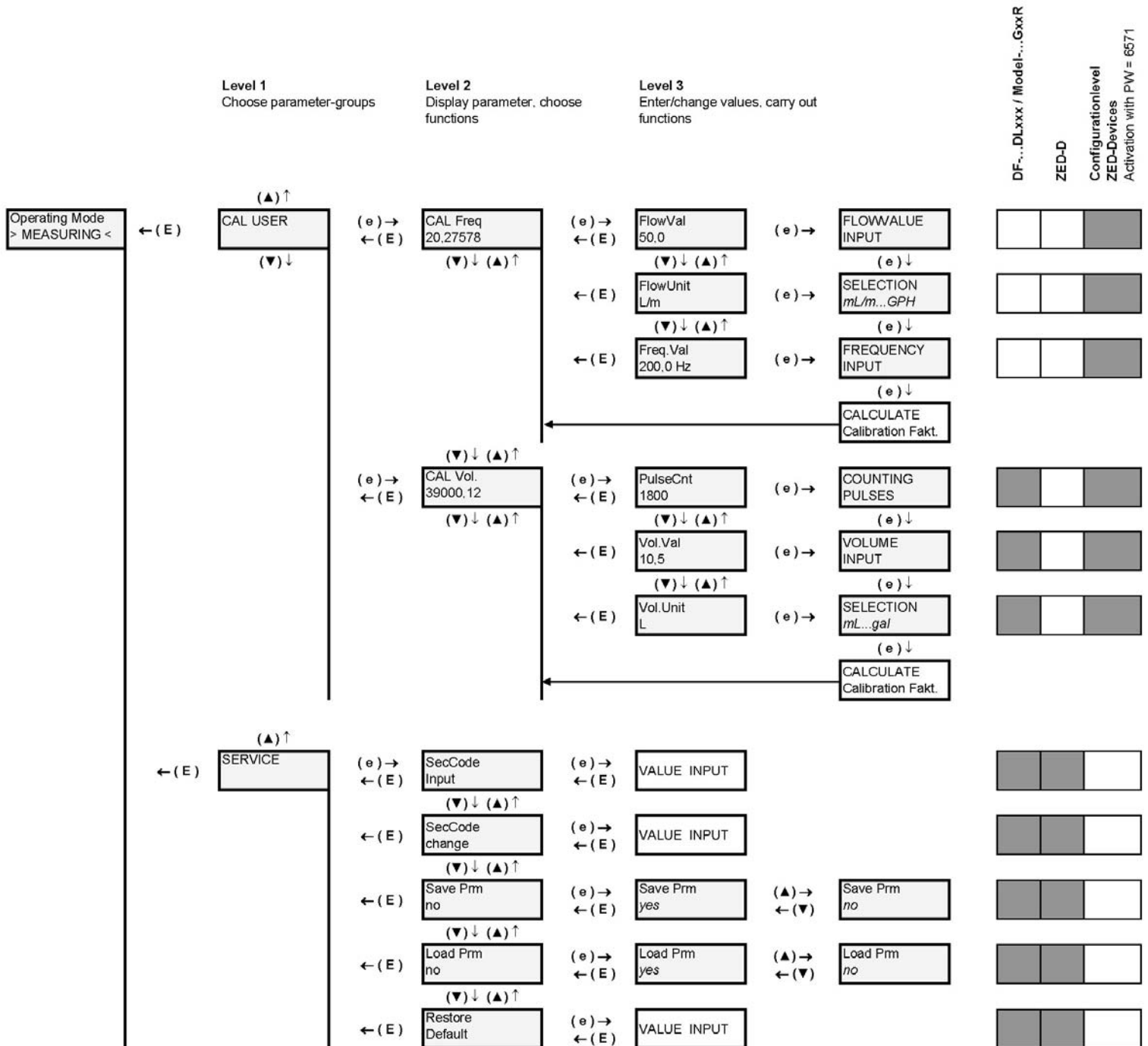
ZED-D

Configurationlevel  
ZED-Devices  
Activation with PW = 6571



| DOSAGE UNIT |                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item   | Parameter / Function            | Explanation / Values / Other                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| DM-Unit     | Unit of dosage                  | Unit of dosage quantity<br>mL, L, m <sup>3</sup> , gal, mgal, UU (User Unit, see → <b>UserUnit.</b> )                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| DAmount     | Dose                            | Numerical value of dosage quantity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FDAmount    | Fine dose                       | Numerical value of the fine dosage<br>Unit set as in <b>DM-Unit.</b><br>For activating of fine dosage, the function <b>Fine dose</b> must be setted in the menu group <b>RELAYS1</b> , under the menu item <b>S1FUNKT</b> .<br><br>(Function see → 8.1 Dosage)                                                                                                                                                                                                                                                                                                   |
| DACorrct    | Correction quantity             | Numerical value of correction quantity<br>Unit set as in <b>DM-Unit.</b><br><br>A negative reading causes the dosage relay S2 to switch off before the zero reading on the dosage meter is reached. Any coast-down quantity needed can be corrected with this entry.<br><br>A positive reading causes the dosage to be increased by the appropriate constant amount. The dosage relay S2 only switches the dosage meter off once the reading has exceeded the 0 value. Any quantity lacking can be corrected with this entry.<br><br>(Function see → 8.1 Dosage) |
| DMdirect    | Dosage – direct input           | Activation of direct dosage via the (E), (+)- und (–)- keys, without having to go into the menu.<br><br>Start of input by simultaneously pressing of (> 3sec) the (+)- and the (–)- keys.<br><br>Unit set as in <b>DM-Unit.</b><br><br>yes: Direct input of the dosage activated by keys (default).<br>no: Input of dosage only possible in the menu.                                                                                                                                                                                                            |
| ICNT =0?    | Set interval counter to 0       | The interval counter only counts dosage processes that have been carried out completely.<br><br>yes: Interval counter = 0<br>no: no action                                                                                                                                                                                                                                                                                                                                                                                                                       |
| TA-Unit     | Total quantity display Unit     | Total quantity display unit<br>mL, L, m <sup>3</sup> , gal, mgal, UU (User Unit, see → <b>UserUnit.</b> )                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| TA =0?      | Set total quantity display to 0 | The total quantity meter counts the total flow quantity (also the non-dosed flow).<br><br>yes: Total quantity meter = 0<br>no: No action                                                                                                                                                                                                                                                                                                                                                                                                                         |

## 7.8 User alignment and Service-Settings



| USER CALIBRATION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Menu Item        | Function / Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| CAL Freq*        | <p>Calibrate by entering frequency and flow.</p> <p>In the menu item <b>CAL Freq</b> The bottom line always shows the current pulse value of the User calibration.</p> <p>Calibration process:</p> <ol style="list-style-type: none"> <li><b>FlowVal</b> Enter nominal flow value of the sensor. &gt; (e) press &gt;</li> <li><b>FlowUnit</b> Enter unit for flow value. &gt; (e) press &gt;</li> <li><b>Freq.Val</b> Enter nominal frequency &gt; finish with (e).</li> </ol> <p>The new pulse value of the User calibration. is calculated from the three values and saved as user calibration for the flow measurement. e.g. 20.2757 pls/litre.</p>                                                                                              |
| CAL Vol.         | <p>Calibration process using impulse counting and volume input (cc procedure).</p> <p>In the menu item <b>CAL Vol.</b> The bottom line always shows the current pulse value of the User calibration..</p> <p>Calibration process:</p> <ol style="list-style-type: none"> <li><b>PulseCnt</b> measures number of impulses<br/>(e) press &gt; start counter (impulses are counted) &gt; (e) press &gt; stops counter.</li> <li><b>Vol.Val</b> Enter measured volume value &gt; (e) press.</li> <li><b>Vol.Unit</b> Enter unit for volume value &gt; finish with (e).</li> </ol> <p>The pulse value of the User calibration.is calculated from the three values and is saved as the user calibration for the flow measurement. e.g. 3900,5 pls./L.</p> |

\*) CAL Freq – Only possible with ZED devices.



**Note: With ZED devices it is necessary to enable the device-specific parameter input in the menu Item **SecCode** in the menu **SERVICE** in order to activate the **CAL USER** function.**





**Note: If the new pulse ratio will be used for measurement, than the menu item **fFaktor** in the menu group **General Settings** must be set to **USER** calibration.**



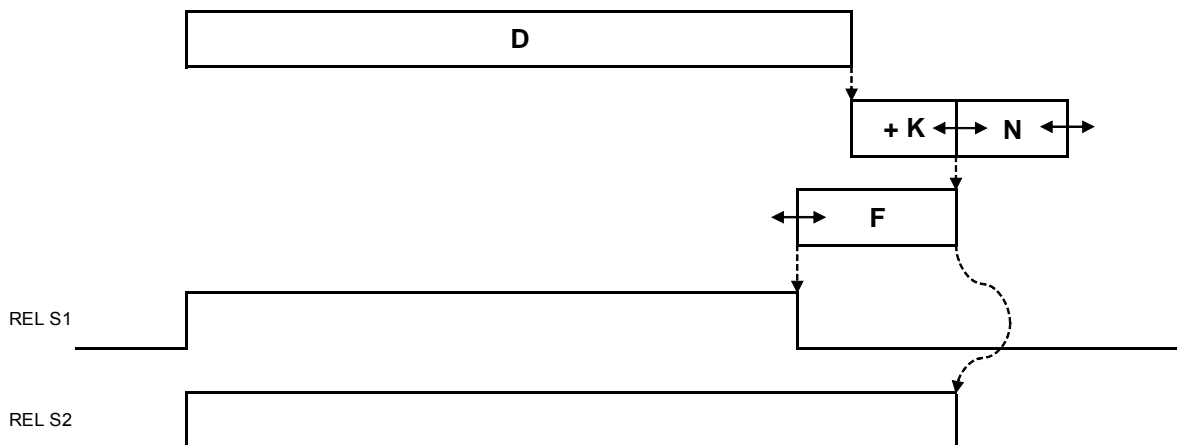
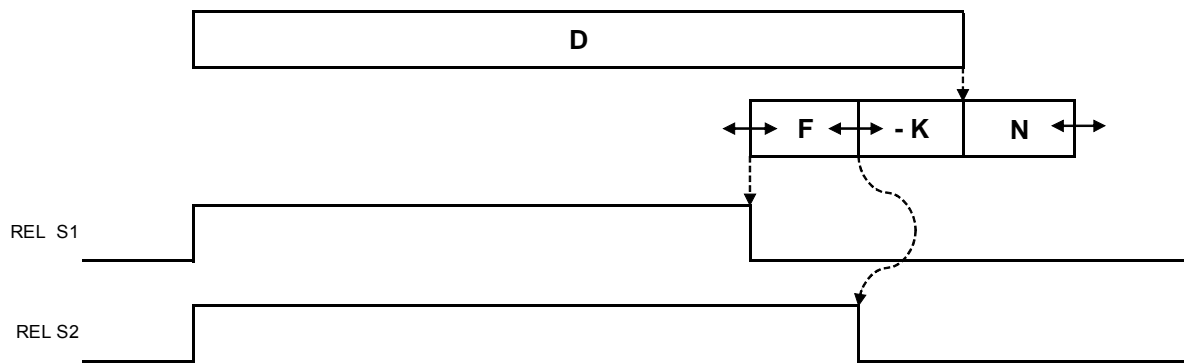
| <b>SERVICE</b>   |                                 |                                                                                                                                                                                                                                   |
|------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Menu Item</b> | <b>Parameter / Function</b>     | <b>Explanation / Values / Other</b>                                                                                                                                                                                               |
| SecCode Input    | Enter security code.            | Input of 4-digit security code and enablement of the parameter change.<br><br>The following passwords have been defined:<br><br>3461 – General menu release<br>6571 – Activates the device-specific parameters (only ZED devices) |
| SecCode change   | Change security code            | Define or change security code for the first time or change.<br>If no code ( = 0000) has been set, then the parameter values set are unsecured!                                                                                   |
| Save Prm         | Save parameter record           | Save current settings                                                                                                                                                                                                             |
| Load Prm         | Load parameter record           | Restore saved settings (reload).                                                                                                                                                                                                  |
| Restore Default  | Reset to works default settings | Load initial setting with password 2541.<br><br>The function is blocked when the sensor has been factory-calibrated (only ZED devices).                                                                                           |

## 7.9 Error report

| Error code | Reason                                                                                                | Reset                                                                                                                                                                                                   |
|------------|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E102       | UU User unit may not be $\leq 0$                                                                      | Correct parameter                                                                                                                                                                                       |
| E142       | Distance between upper and lower analogue value too small (based on the actual flow)                  | Correct parameter                                                                                                                                                                                       |
| E143       | Distance between upper and lower analogue value too small (based on the dosing amount)                | Correct parameter                                                                                                                                                                                       |
| E 161      | Value is greater than maximum measuring range value.                                                  | Correct parameter                                                                                                                                                                                       |
| E162       | Hysteresis too large                                                                                  | Correct parameter                                                                                                                                                                                       |
| E 163      | Window point is lower than switching point.                                                           | Correct parameter                                                                                                                                                                                       |
| E 222      | If correction quantity is negative than the dose is lesser/equal to fine dose + correction quantity.  | Correct parameter                                                                                                                                                                                       |
| E 223      | If correction quantity is positive than the dose is greater/equal to fine dose + correction quantity. | Correct parameter                                                                                                                                                                                       |
| E242       | Frequency must be between 0,2 and 2000 Hz                                                             | Correct parameter                                                                                                                                                                                       |
| E245       | Calculated pulse value out of valid range                                                             | Correct parameter                                                                                                                                                                                       |
| E300       | Error memory value of totalising/part counter                                                         | Keep  +  pressed about 20 seconds |
| M100       | Overflow (M103 has priority)                                                                          | Acknowledge with PGM button                                                                                                                                                                             |
| M103       | Overflow while dosing                                                                                 | Acknowledge with PGM button                                                                                                                                                                             |
| ####       | Value does not fit in the display                                                                     | Choose suitable measuring unit                                                                                                                                                                          |

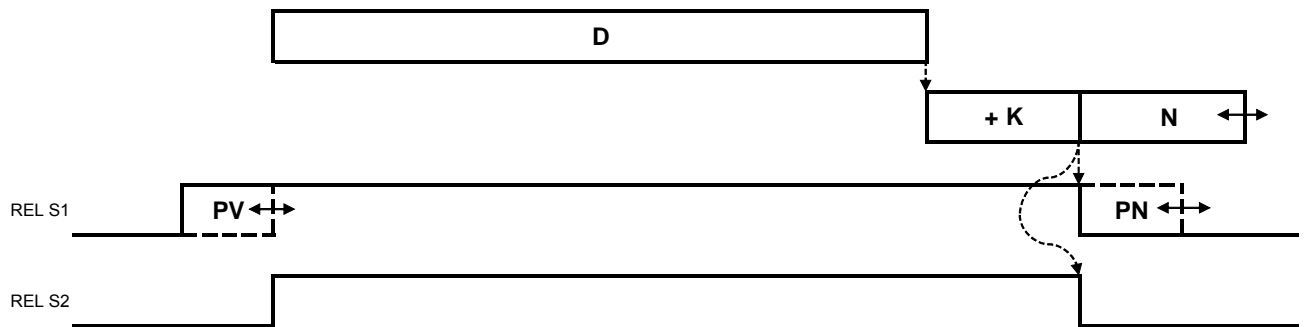
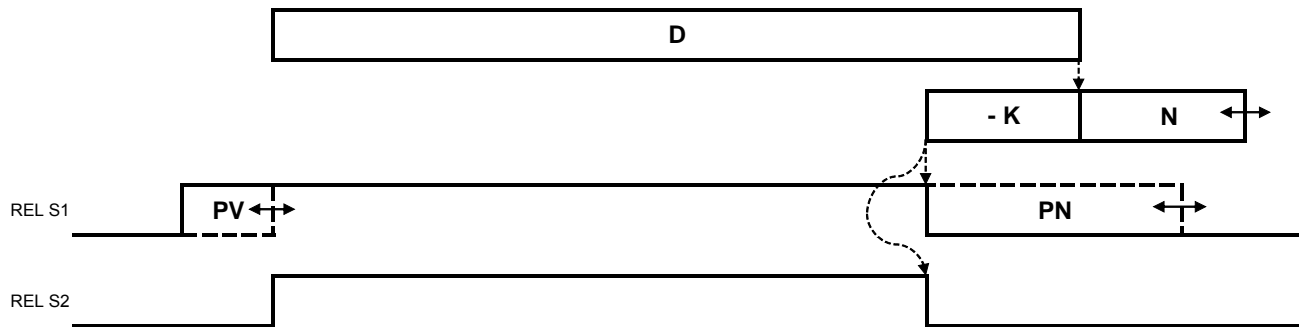
## 8. Relay Functions

### 8.1 Dosing (REL S1) with correction amount & fine dosing (REL 2)



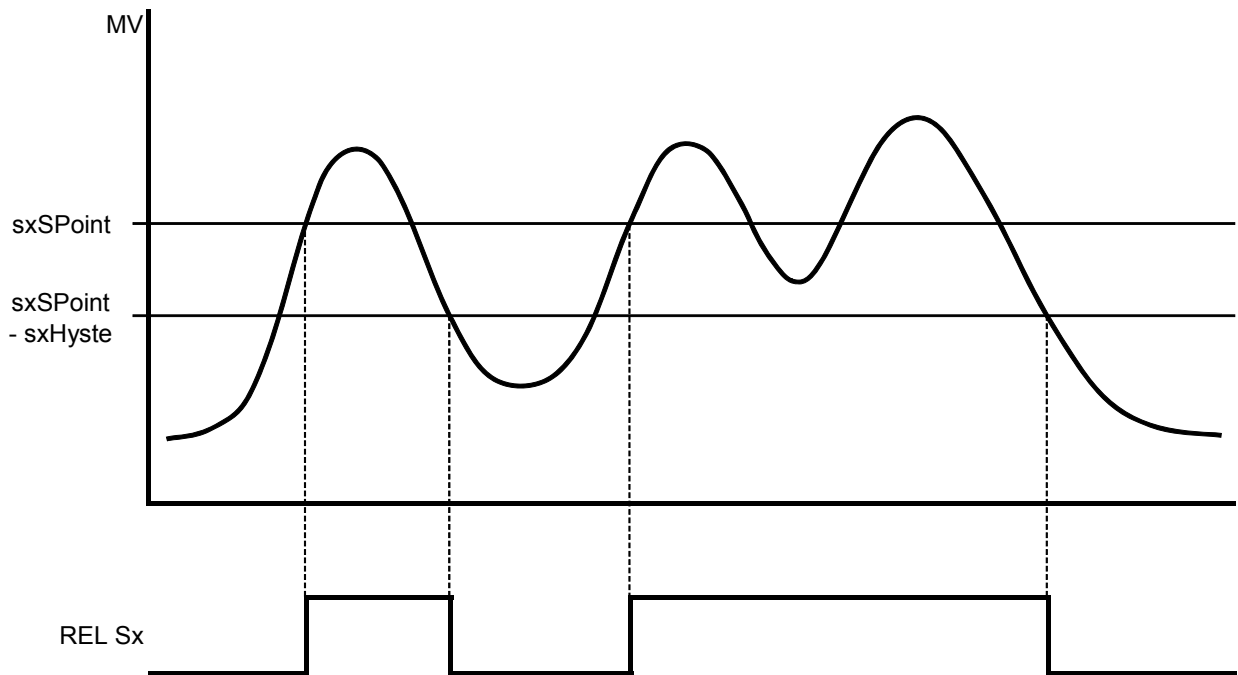
- D - DAmount      dosing amount
- F - FDAmount     fine dosing amount
- K - DMCorrct    correction amount (if negative)
- +K - DACorrct    correction amount (if positive)
- N -                follow-up amount

## 8.2 Dosing (REL S2) & Pump control (REL S1)

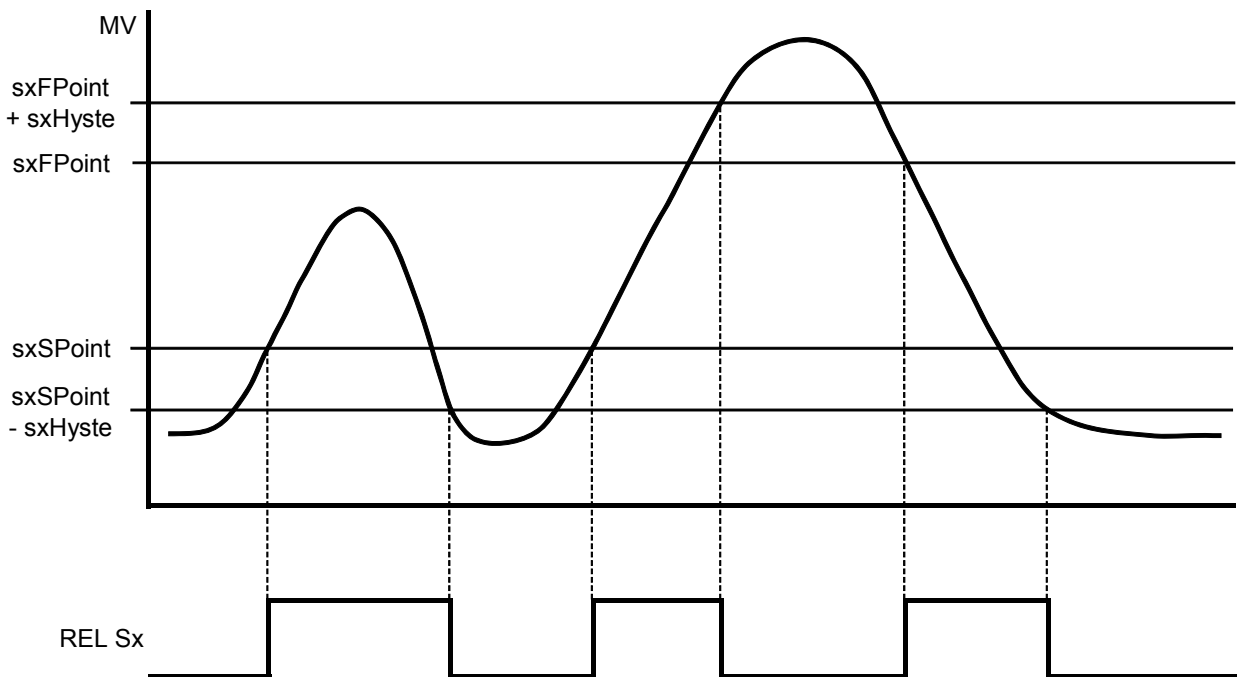


- D - DAmount      dosing amount
- K - DACorrct    correction amount (if negative)
- +K - DACorrct    correction amount (if positive)
- PV - s1PumpAT    pump flow
- PN - s1PumpDT    pump backlash
- N -                follow-up amount

### 8.3 Switching characteristic limit value



### 8.4 Switching characteristic window



## 9. Technical Information

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|                       |                                                                                                                       |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------|
| Display:              | 2 x 8-digit alphanumeric,<br>LCD module, illuminated                                                                  |
| Display rate:         | 1 s <sup>-1</sup>                                                                                                     |
| Flow display:         | 3- or 4-digit (XX.X, X.XX or XXXX)                                                                                    |
| Flow units:           | mL/s, mL/m, L/s, L/m, L/h, m <sup>3</sup> /m,<br>m <sup>3</sup> /h, GPM, GPH, user unit per h/min/s selectable        |
| Quantity meter:       | 8-digit                                                                                                               |
| Dosage:               | 5-digit                                                                                                               |
| Quantity units:       | mL, L, m <sup>3</sup> , gal, mgal, user unit selectable                                                               |
| Measurement input:    | 0.2...2000 Hz (5...24 V <sub>DC</sub> ), TTL, PNP, NPN,<br>Namur                                                      |
| Parameter input:      | menu controlled, German or English                                                                                    |
| Parameter protection: | 4-digit password                                                                                                      |
| Control elements:     | 4 keys                                                                                                                |
| Custom. comparison:   | by entering the frequency and measured<br>or in the Teach-In procedure (level calibration)                            |
| Control inputs:       | start, stop, reset function                                                                                           |
| Relay outputs:        | 2 x changer<br>max. 250 V <sub>AC/DC</sub> /2 A<br>max. 5 A / 1000 VA                                                 |
| Voltage supply:       | 24 V <sub>DC</sub> ±20 %, approx. 80 mA or<br>90...250 V <sub>AC</sub> / max. 3 VA                                    |
| Analogue output:      | 0(4)-20 mA<br>Load: max. 500 Ω (300 Ω at AC-Supply)<br>or 0-10 V (Load: >100 kΩ)                                      |
| Sensor supply:        | 23 V (at 24 V <sub>DC</sub> ) / max. 50 mA<br>24 V (AC-supply) / max. 50 mA                                           |
| NAMUR supply:         | 8.2 V <sub>DC</sub>                                                                                                   |
| Ambient temp.:        | -20...+70 °C                                                                                                          |
| Dimensions:           | 96 x 96 x 109 mm (LxWxD) incl.<br>screw clamp (control panel installat.)<br>117 x 117 x 127 mm (LxWxD) (field casing) |
| Aperture size:        | 92 <sup>+0.8</sup> x 92 <sup>+0.8</sup> mm<br>(control panel installation)                                            |
| Casing material:      | fibreglass reinforced Noryl,<br>(control panel installation)<br>powder coated aluminium/PA 66 (field casing)          |
| Protection type:      | IP 40 on front<br>clamp IP 00 (control panel installation)<br>IP 65 (field casing)                                    |
| Mounting:             | mounting clip Form B (DIN 43 835)<br>(control panel installation)<br>wall and pipe mounting (field casing)            |
| Connection:           | plug-in terminal strip (control panel installation)<br>cable connection (field casing)                                |
| Weight:               | approx. 360 g (control panel installat.)<br>approx. 1240 g (field casing)                                             |

## 10. Order Codes

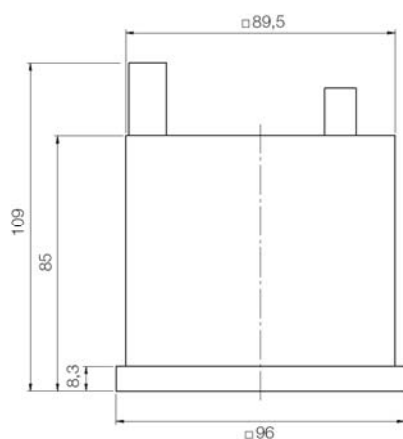
(Order example: ZED-DF10 KS 4R P)

| Supply                 | Model    | Electrical connection                                                                                                | Analogue output                                   | Casing                                                                                                                                                                       |
|------------------------|----------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 90-250 V <sub>AC</sub> | ZED-DF10 | <b>KS</b> = terminal strip<br>(control panel installation)<br><br><b>MS</b> = cable connection<br>M 18 (Feldgehäuse) | <b>4R</b> = 0(A)-20 mA<br><br><b>1 R</b> = 0-10 V | <b>P</b> = control panel installation<br>96x96 mm                                                                                                                            |
| 24 V <sub>DC</sub>     | ZED-DF13 |                                                                                                                      |                                                   | <b>F</b> = field casing 116 x116 mm<br><br><b>S</b> = field casing with<br>wall mount,<br>infinitely variable pivotable<br><br><b>R</b> = field casing with pipe<br>mounting |

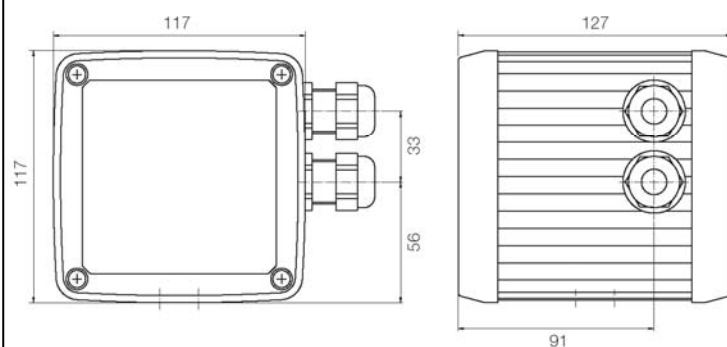
The order details of a ZED electronic in combination with a flow sensor can be found in the data sheet of the measuring device.

## 11. Dimensions

ZED-D Control panel installation (casing P)



ZED-D field housing



## 12. Declaration of Conformance

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We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Dosing Electronic Model: ZED-D**

to which this declaration relates is in conformity with the standards noted below:

**EN 61326-1:2013-07**

Electrical equipment for control and instrumentation technology and laboratory use – EMC-requirements (industrial area)

**EN 61010-1:2011-07**

Safety requirements for electrical measuring-, control- and laboratory instruments.

**EN 60529:2014-09**

Protection type housing (IP-Code)

Also the following EC guidelines are fulfilled:

**2004/108EC**

EMC Directive

**2006/95 EC**

Low Voltage Directive

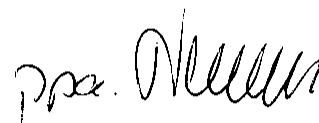
**2011/65/EC**

**RoHS** (category 9) industrial monitoring and control instruments, compliant, no CE-marking for the transitional period until 2017

Hofheim, 15. Apr. 2015



H. Peters  
General Manager



M. Wenzel  
Proxy Holder