

Operating Instructions for Dosing Electronic

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



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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 EWG-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.

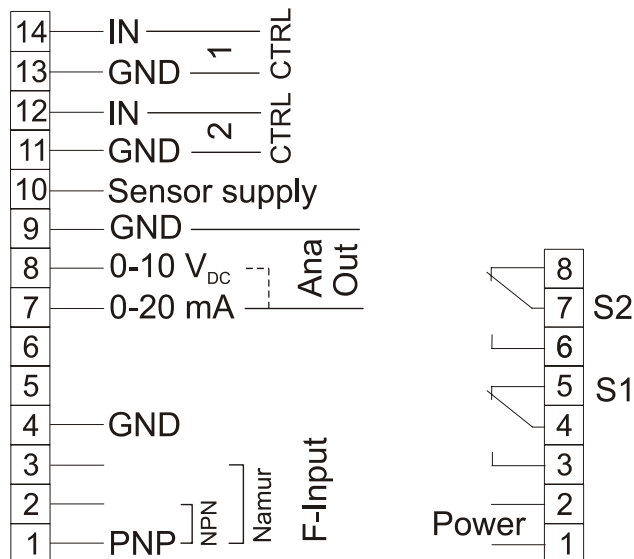
Range of functions

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

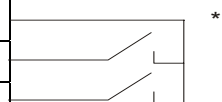
6.1 ZED-D, DRB-...GxxR, DPE-...GxxR fieldhousing and control panel installation



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

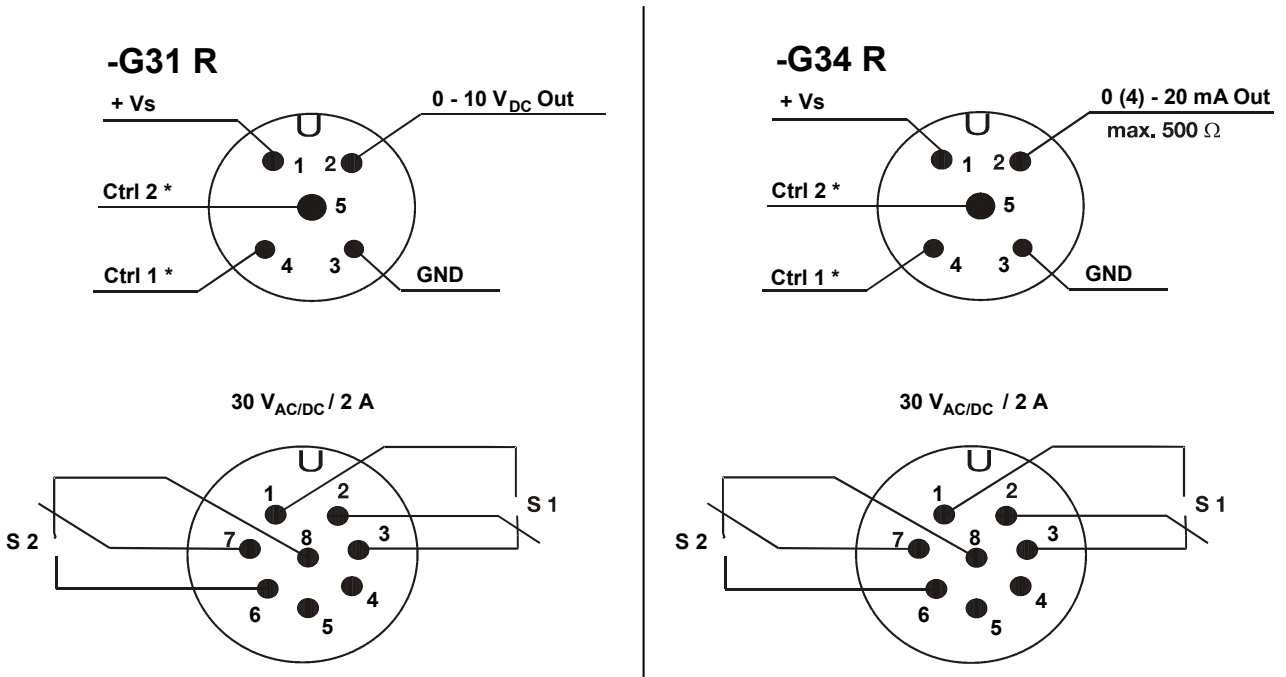
6.2 DF-...DLxxx, Model-...GxxR cable connection

Wire number	DF Dosing electronics
1	+24 V _{DC}
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

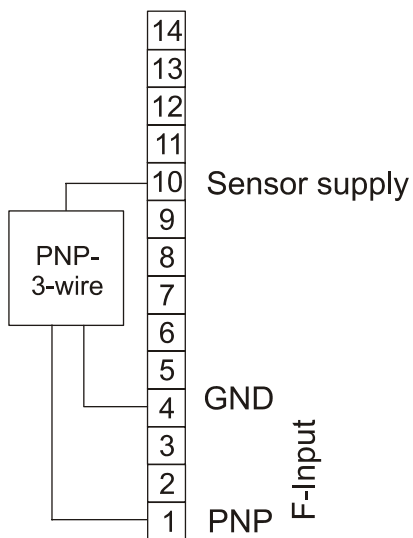
6.3 Model-...GxxR plug connection



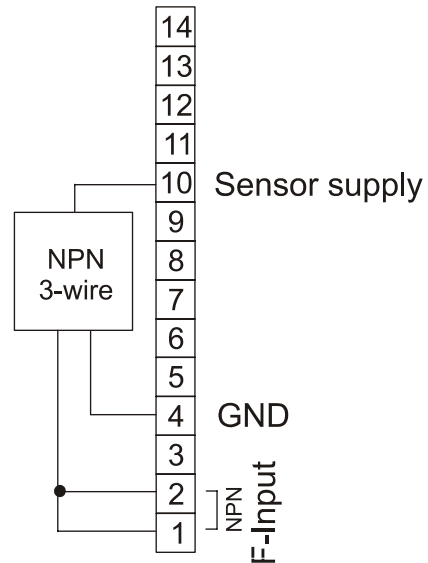
- *) Ctrl 1 -- GND => Start
- Ctrl 2 -- GND => Stop
- Ctrl 1 -- Ctrl 2 -- GND => Reset Dosing

6.4 Connection example

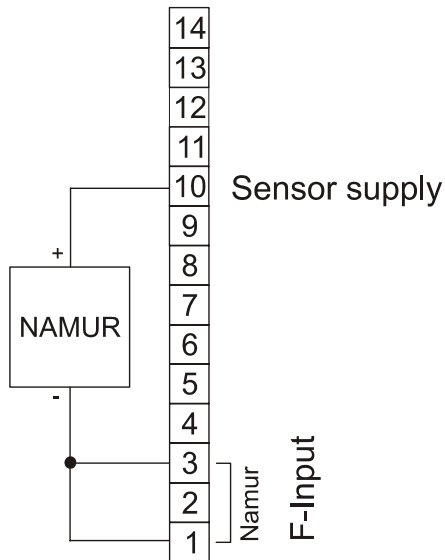
PNP-Sensor



NPN-Sensor



NAMUR-Sensor



Connecting diagram

Transmitter UMF-2

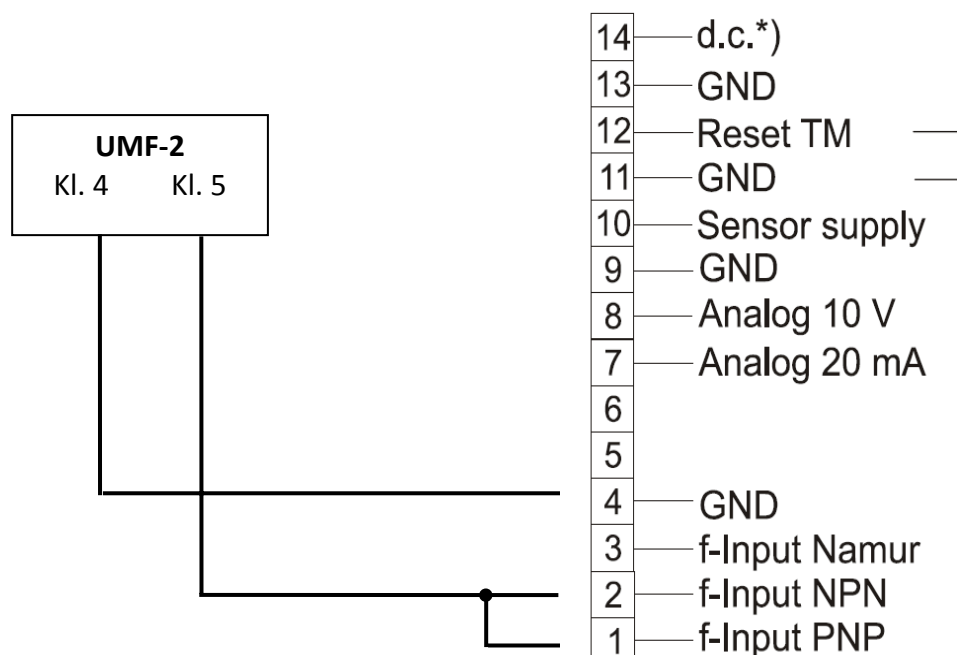
Connecting diagram for pulse output of transmitter UMF-2 to external dosing / counter electronic ZED-D / ZED-Z.

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



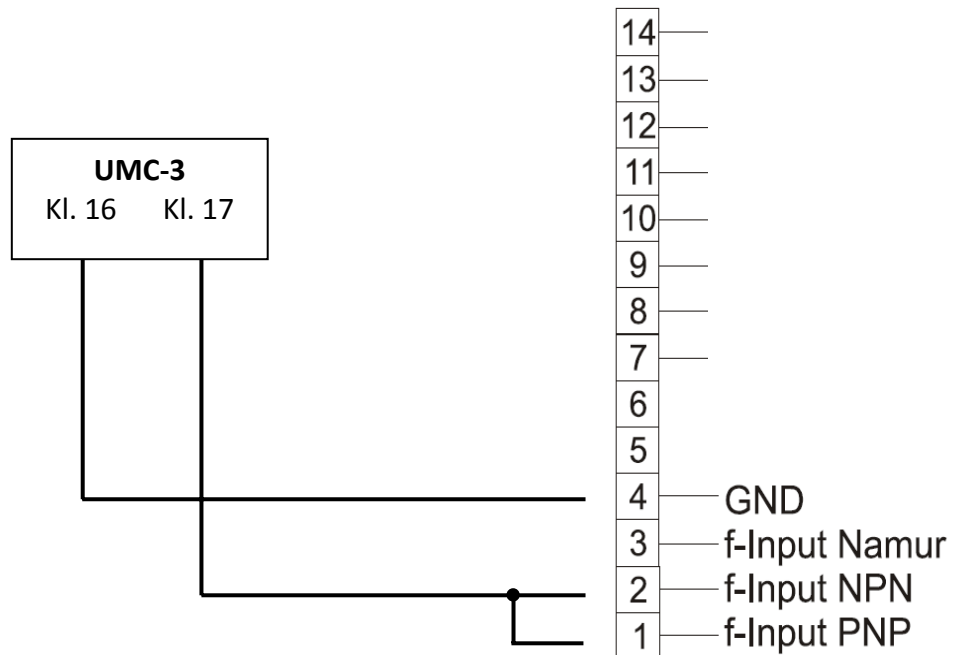
ZED-D

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.



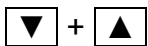
The parameter can only be changed, if the security code has been entered correctly! The message „locked“ will appear if the input has not been activated.

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, m³/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. ... m³/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.

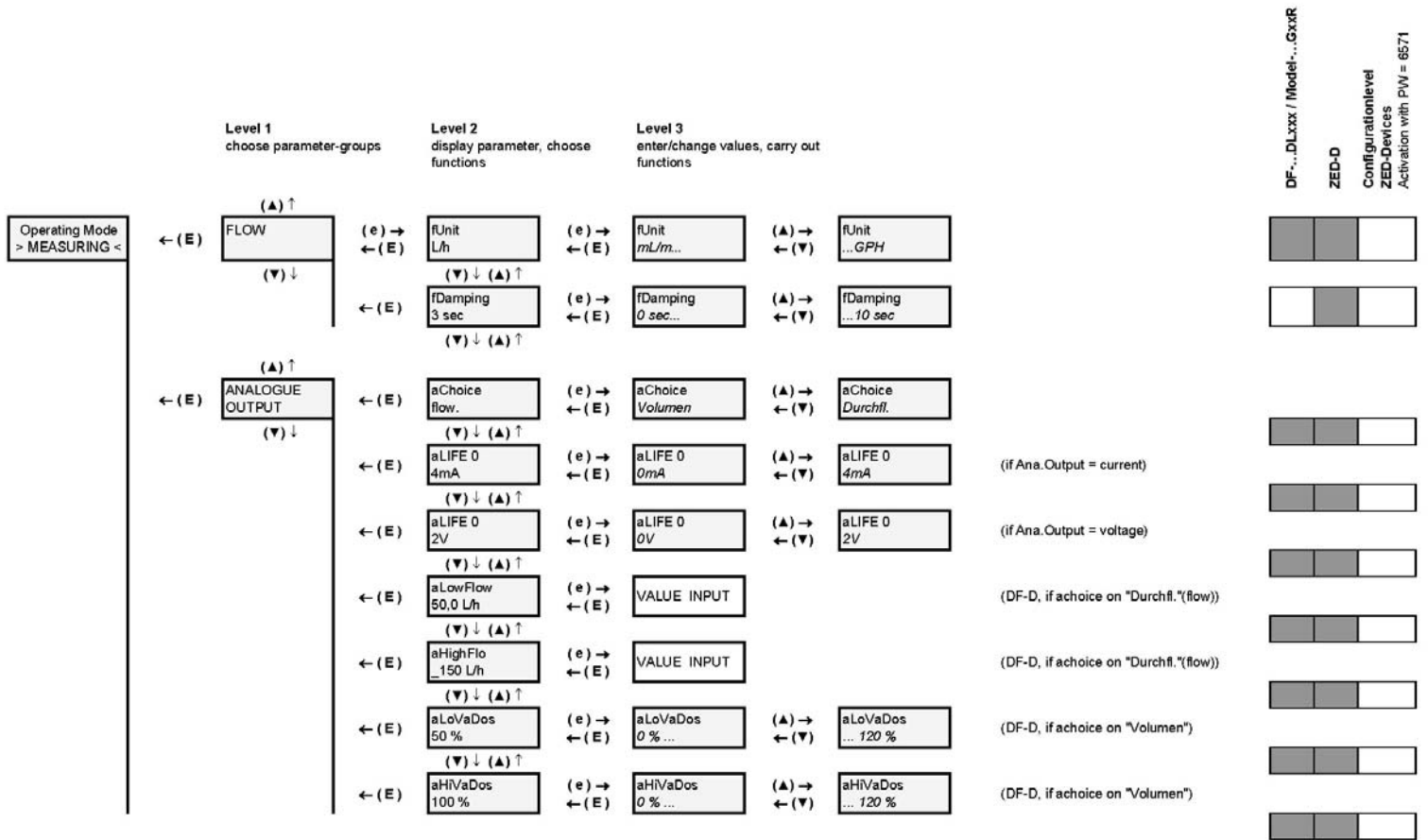
7.4 General Settings

	Level 1 choose parameter-groups	Level 2 display parameter, choose functions	Level 3 enter/change values, carry out functions	DF-...DLxxx / Model-...Gxxx	ZED-D	Configurationlevel ZED-Devices Activation with PW = 6571
Operating Mode > MEASURING <	(E) → ← (E) GENERAL ADJUSTM. (▼) ↓	(e) → Language german ← (E) (▼) ↓ (▲) ↑	(e) → Language english ← (E) (▲) → (▼) ↓	Language german	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) fUnitFS m3/h (▼) ↓ (▲) ↑	(e) → FUnitFS mL/m... ← (E) (▲) → (▼) ↓	fUnitFS ...GPH	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) fValueFS 2700m3/h (▼) ↓ (▲) ↑	(e) → VALUE INPUT ← (E)	VALUE INPUT	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) fMinVal 100.0 L/m (▼) ↓ (▲) ↑	(e) → VALUE INPUT ← (E)	VALUE INPUT	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) fPls/rev 3 (▼) ↓ (▲) ↑	(e) → fPls/rev 0... ← (E) (▲) → (▼) ↓	fPls/rev ...10	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) fJumpVD 5% (▼) ↓ (▲) ↑	(e) → fJumpVD 1% ... ← (E) (▲) → (▼) ↓	fJumpVD ... 20 %	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) fOverfV 100 % (▼) ↓ (▲) ↑	(e) → fOverfV 100 % ... ← (E) (▲) → (▼) ↓	fOverfV ... 200 %	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) fFactor factory (▼) ↓ (▲) ↑	(e) → fFactor customer ← (E) (▲) → (▼) ↓	fFactor factory	<input type="checkbox"/>	<input type="checkbox"/>
		← (E) UserUnit 115,6271 (▼) ↓ (▲) ↑	(e) → VALUE INPUT ← (E)	VALUE INPUT	<input type="checkbox"/>	<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 ³ /m, m ³ /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 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 Necessary for long-term period averaging if the readings per revolution vary. 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. Attenuation does not function if the switch value is 0%.
fOverfV	Flow overflow value (overflow)	Value in %, basis is fValueFS and fUnitFS. If exceeded, an M100 report is generated and faded in, alternating with the flow indicator. 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. (only for devices Model DF-...DLxxx and Model-...GxxR)
UserUnit.	Special volume unit	Customer-specific special unit UU. 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.

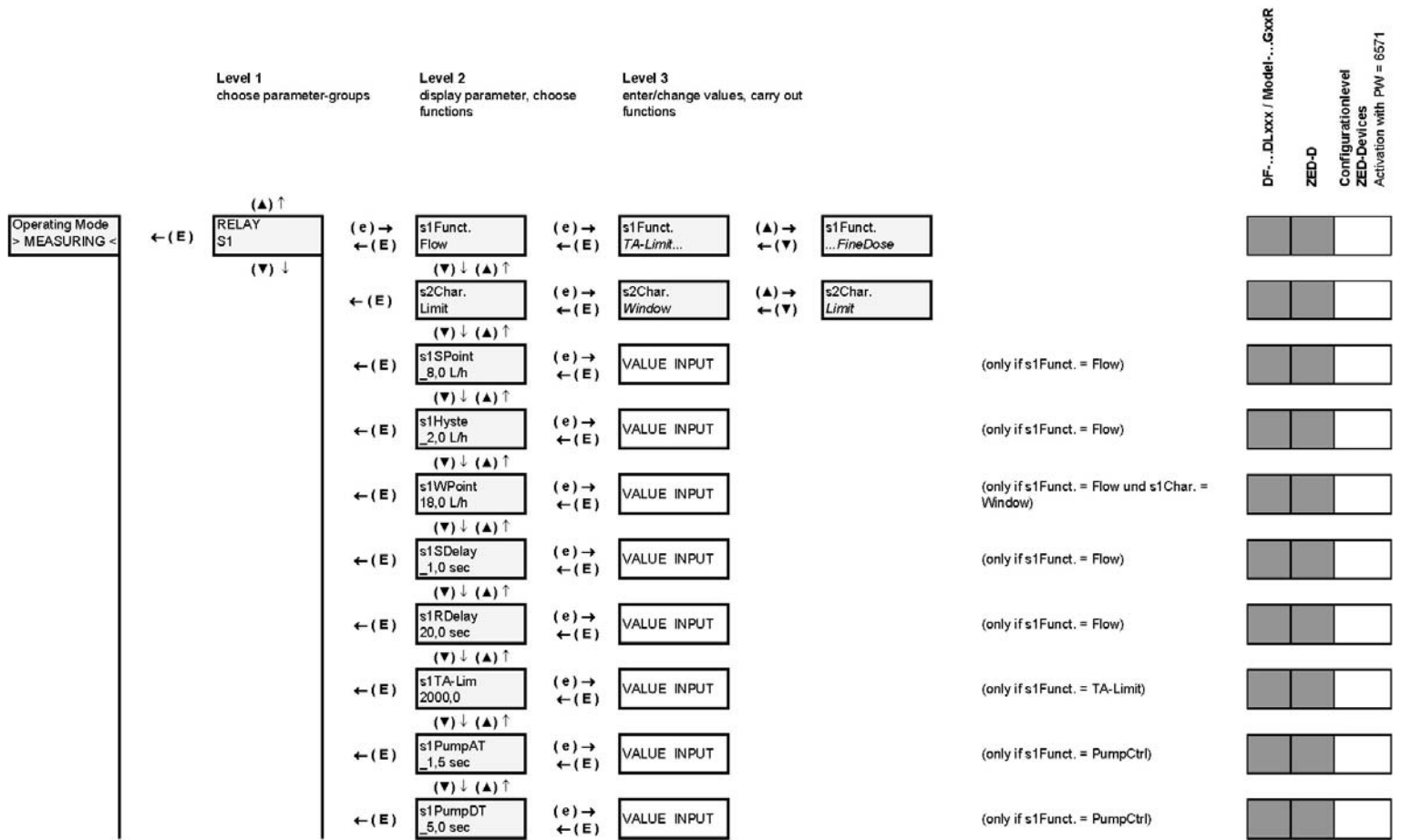
7.5 Flow and analogue output



FLOW		
Menu Item	Parameter / Function	Explanation / Values / Other
fUnit	Unit of flow indicator	mL/s, mL/m, L/s, L/m, L/h, m ³ /m, m ³ /h, GPM, GPH, UU/s, UU/m, UU/h
fDamping	Attenuation of reading fluctuations in the flow indicator	The attenuation pacifies the flow indicator. 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).

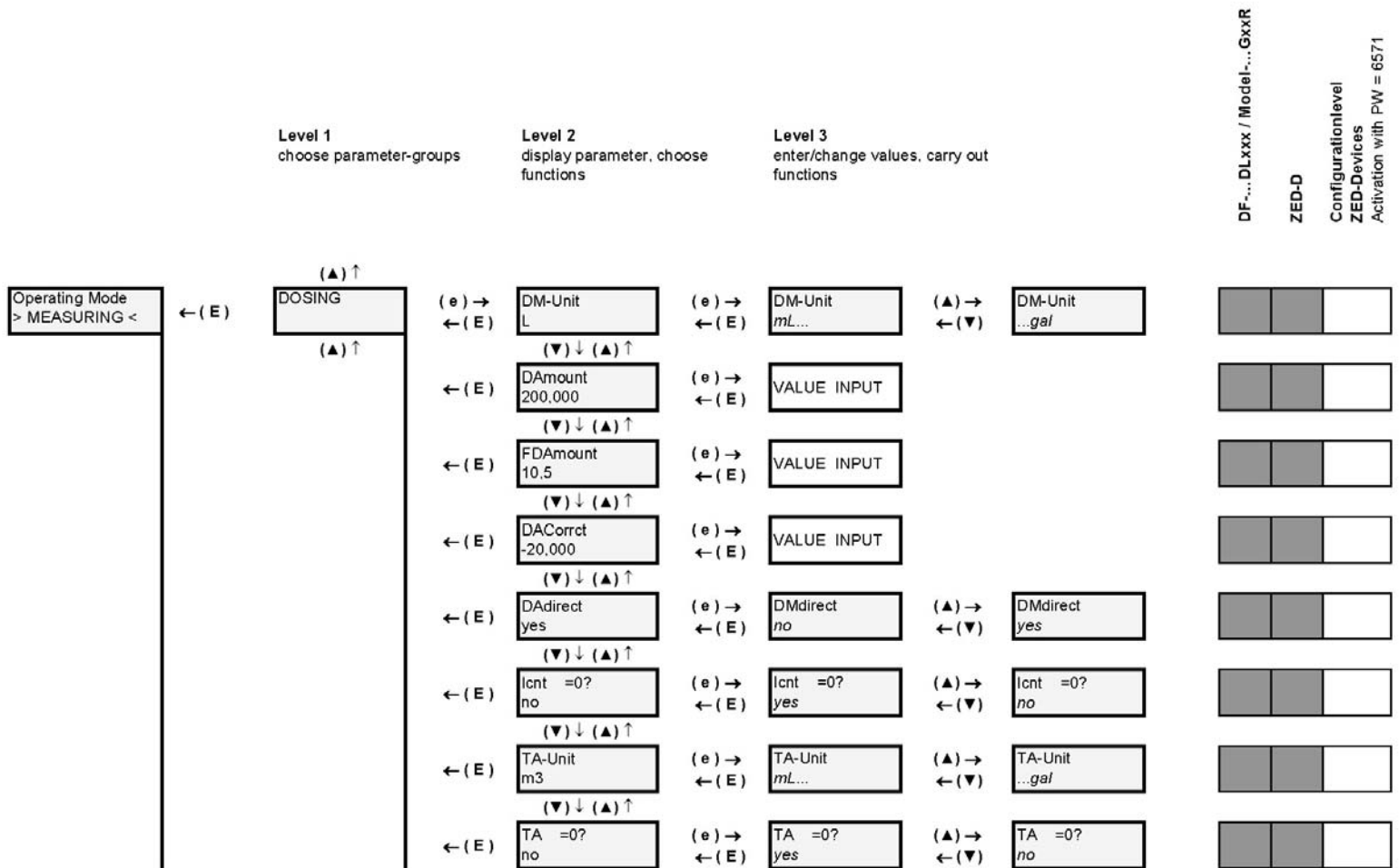
ANALOGUE OUTPUT		
Menu Item	Parameter / Function	Explanation / Values / Other
aChoice	Selection of analogue source	Flow: gauged analogue value of flow measurement Volume: current volume in percentage of dosage
aLIFE 0	Select Life Zero	Offset at power output: 0 mA or 4 mA at 0-10 V $\hat{=}$ 0 mA \rightarrow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

7.6 Relay output



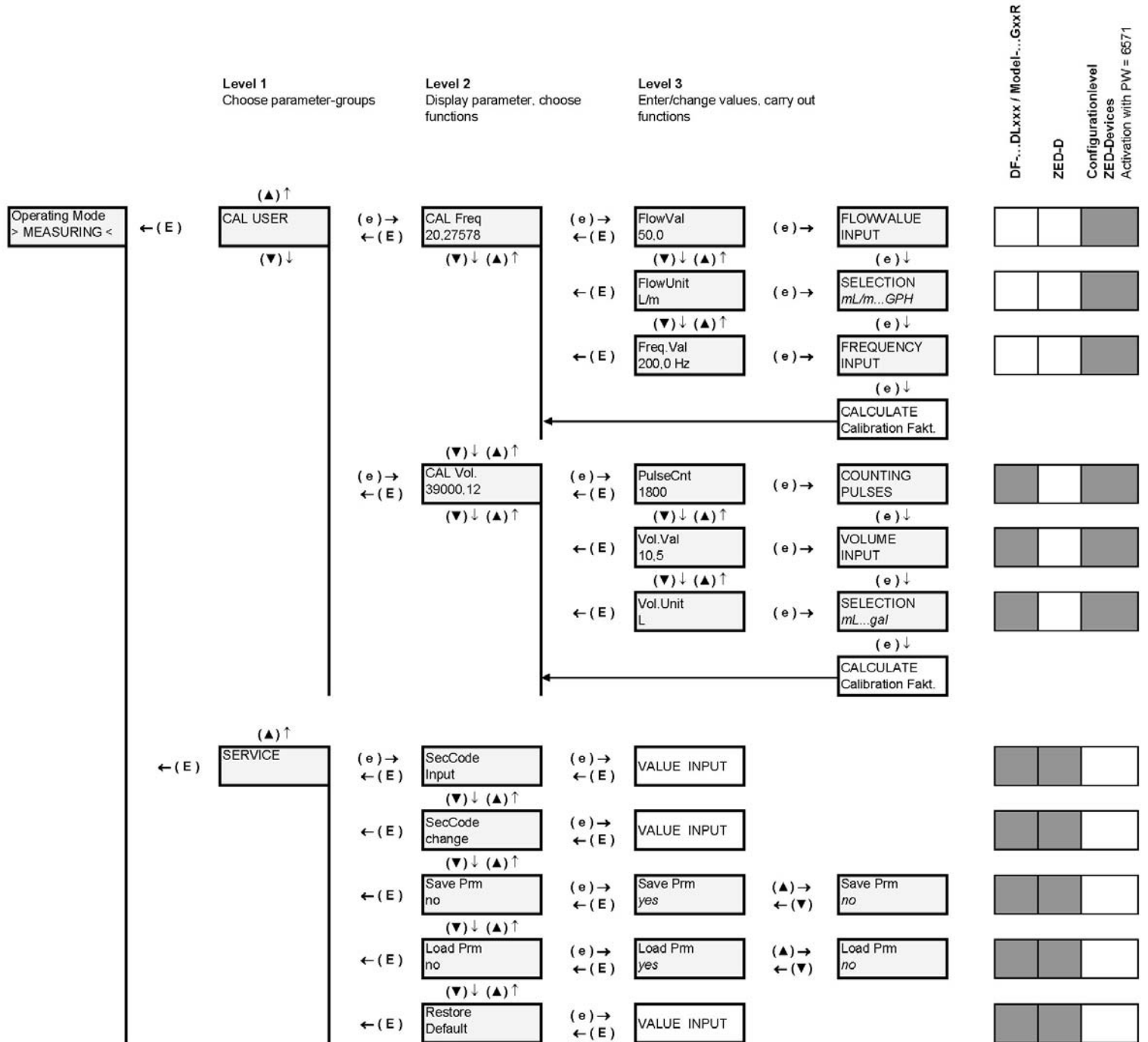
RELAY S1		
Menu Item	Parameter / Function	Explanation / Values / Other
s1Funct	Relay1 Function selection	Flow: Monitoring of an adjustable flow value (s1SPunkt). GM Limit: Monitoring of an adjustable total volume (s1TA-Lim). PumpCtrl: Dosage pump control. FineDose: Fine dosage valve control. see → 8.0 Relay functions
s1Char.	Relay1 Switch characteristic	Limit: Monitoring a reading (s1Spunkt). Window: Monitoring an adjustable measuring range (s1Spunkt...s1WPoint). (only if s1Funct. is set to Flow)
s1SPunkt	Relay1 Switchpoint	Reading is in the same units as the flow indicator. (only if s1Funct. is set to Flow)
s1Hyste	Relay1 Hysteresis	Reading is in the same units as the flow indicator. (only if s1Funct. is set to Flow)
s1WPoint	Relay1 Windowpoint	Reading is in the same units as the flow indicator. (only if s1Funct. is set to Flow und s1Char. auf Window)
s1SDelay.	Relay1 Switch delay	Value input is always in the following format Range: _0,0...99,9 sec (only if s1Funct. is set to Flow)
s1RDelay.	Relay1 Reset delay	Value input is always in the following format Range: _0,0...99,9 sec (only if s1Funct. is set to Flow)
s1TA-Lim	Relay1 Total volume limit value	Reading is in the same units as the total volume unit in dosage unit menu group. (only if s1Funct. is set to GM Limit)
s1PumpAT	Relay1 Pump control lead time	Reading determines pump lead time (Rel 1) before dosage begins Range = _0,0...99,9 sec (only if s1Funct. is set to PumpCtrl) see → 8.2 Pump control
s1PumpDT	Relay1 Pump control coast down time	Reading determines pump coast down time (Rel 1) after end of dosage Range = _0,0...99,9 sec (only if s1Funct. is set to PumpCtrl) see → 8.2 Pump control

7.7 Dosing



DOSAGE UNIT		
Menu Item	Parameter / Function	Explanation / Values / Other
DM-Unit	Unit of dosage	Unit of dosage quantity mL, L, m ³ , gal, mgal, UU (User Unit, see → UserUnit.)
DAmount	Dose	Numerical value of dosage quantity
FDAmount	Fine dose	Numerical value of the fine dosage Unit set as in DM-Unit . For activating of fine dosage, the function Fine dose must be setted in the menu group RELAYS1 , under the menu item S1FUNKT . (Function see → 8.1 Dosage)
DACorrcr	Correction quantity	Numerical value of correction quantity Unit set as in DM-Unit . 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. 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. (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. Start of input by simultaneously pressing of (> 3sec) the (+)- and the (-)- keys. Unit set as in DM-Unit . yes: Direct input of the dosage activated by keys (default). 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. yes: Interval counter = 0 no: no action
TA-Unit	Total quantity display Unit	Total quantity display unit mL, L, m ³ , gal, mgal, UU (User Unit, see → UserUnit.)
TA =0?	Set total quantity display to 0	The total quantity meter counts the total flow quantity (also the non-dosed flow). yes: Total quantity meter = 0 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 CAL Freq The bottom line always shows the current pulse value of the User calibration.</p> <p>Calibration process:</p> <ul style="list-style-type: none"> a) FlowVal Enter nominal flow value of the sensor. > (e) press > b) FlowUnit Enter unit for flow value. > (e) press > c) Freq.Val Enter nominal frequency > finish with (e). <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 CAL Vol. The bottom line always shows the current pulse value of the User calibration..</p> <p>Calibration process:</p> <ul style="list-style-type: none"> a) PulseCnt measures number of impulses (e) press > start counter (impulses are counted) > (e) press > stops counter. b) Vol.Val Enter measured volume value > (e) press. c) Vol.Unit Enter unit for volume value > finish with (e). <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 setted to **USER** calibration.**

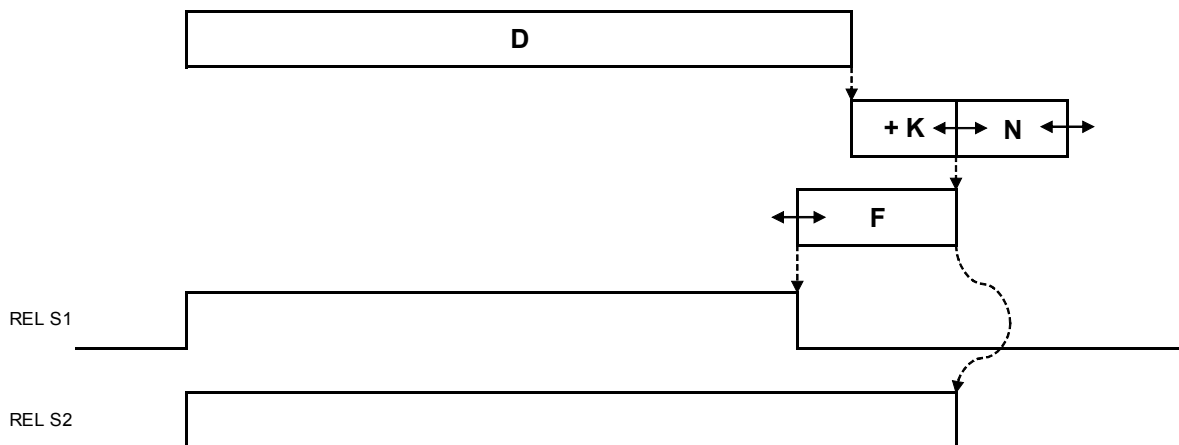
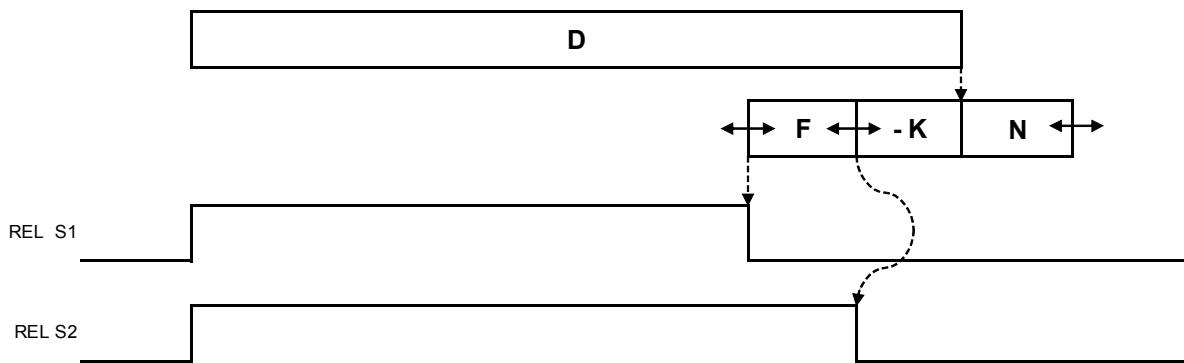
SERVICE		
Menu Item	Parameter / Function	Explanation / Values / Other
SecCode Input	Enter security code.	Input of 4-digit security code and enablement of the parameter change. The following passwords have been defined: 3461 – General menu release 6571 – Activates the device-specific parameters (only ZED devices)
SecCode change	Change security code	Define or change security code for the first time or change. 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. 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 ≤ 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
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

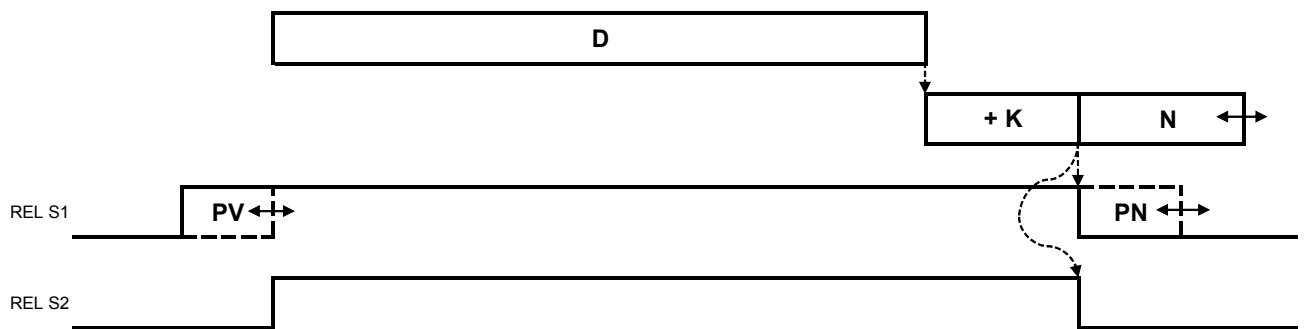
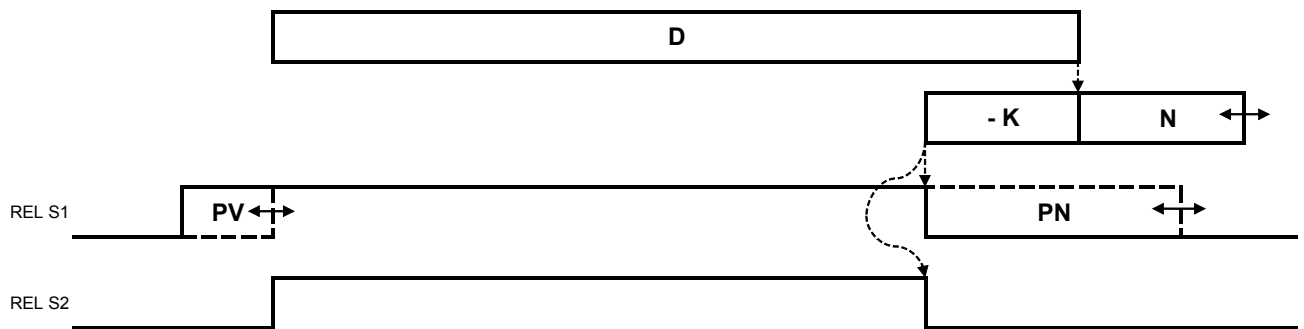
8. Relay Functions

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



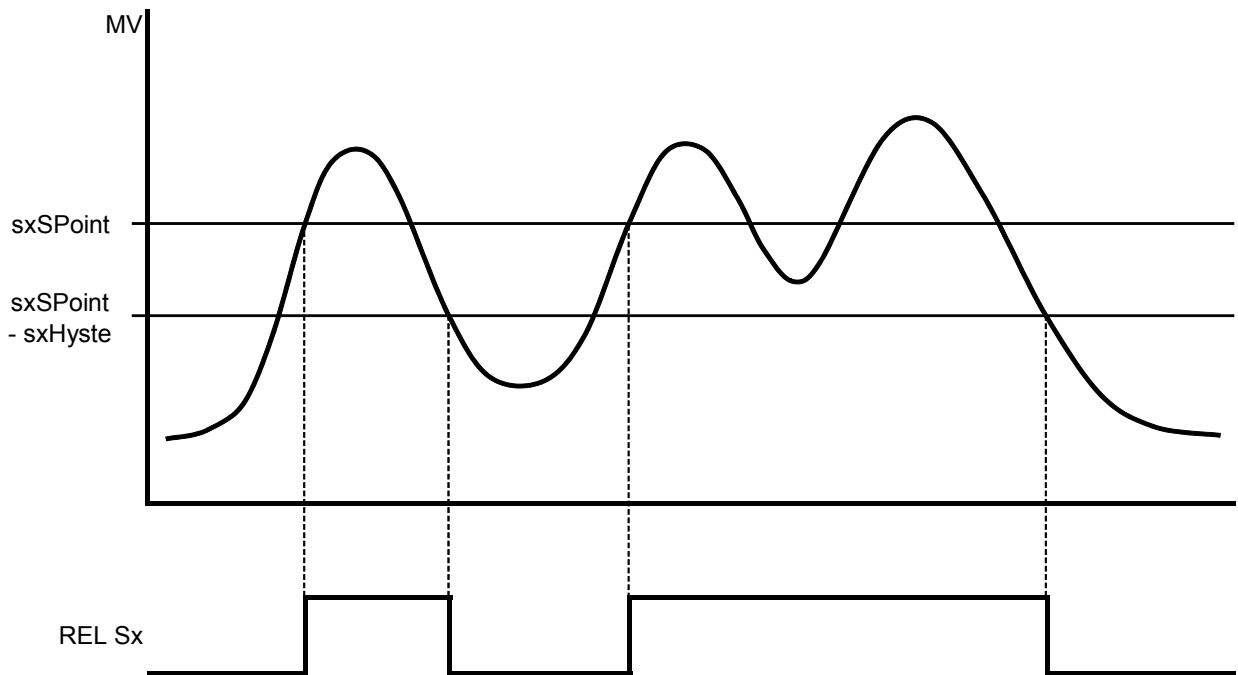
- D - DAmount dosing amount
- F - FDAmount fine dosing amount
- K - DMCorrct correction amount (if negative)
- +K - DACorrct correction amount (if positive)
- N - follow-up amount

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

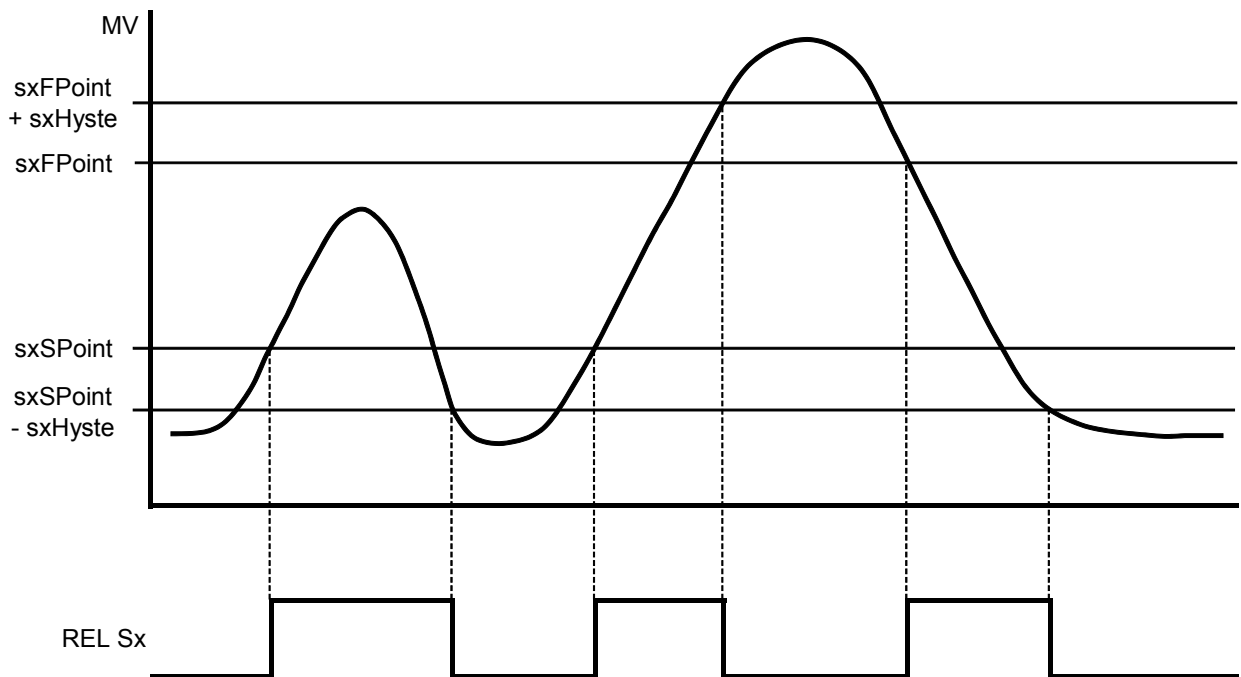


- D - DAmount dosing amount
- K - DACorrct correction amount (if negative)
- +K - DACorrct correction amount (if positive)
- PV - s1PumpAT pump flow
- PN - s1PumpDT pump backlash
- N - follow-up amount

8.3 Switching characteristic limit value



8.4 Switching characteristic window



9. Technical Information

Display:	2 x 8-digit alphanumeric, LCD module, illuminated
Display rate:	1 s ⁻¹
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 ³ /m, m ³ /h, GPM, GPH, user unit per h/min/s selectable
Quantity meter:	8-digit
Dosage:	5-digit
Quantity units:	mL, L, m ³ , gal, mgal, user unit selectable
Measurement input:	0.2...2000 Hz (5...24 V _{DC}), TTL, PNP, NPN, 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 or in the Teach-In procedure (level calibration)
Control inputs:	start, stop, reset function
Relay outputs:	2 x changer max. 250 V _{AC/DC} / 2 A max. 5 A / 1000 VA
Voltage supply:	24 V _{DC} ±20 %, approx. 80 mA or 90...250 V _{AC} / max. 3 VA
Analogue output:	0(4)-20 mA Load: max. 500 Ω (300 Ω at AC-Supply) or 0-10 V (Load: >100 kΩ)
Apparent power:	15 V (at 24 V _{DC}) / max. 50 mA 12 V (AC-supply) / max. 50 mA
Ambient temp.:	-20...+70 °C
Dimensions:	96 x 96 x 109 mm (LxWxD) incl. screw clamp (control panel installat.) 117 x 117 x 127 mm (LxWxD) (field casing)
Aperture size:	92 ^{+0.8} x 92 ^{+0.8} mm (control panel installation)
Casing material:	fibreglass reinforced Noryl, (control panel installation) powder coated aluminium/PA 66 (field casing)
Protection type:	IP 40 on front clamp IP 00 (control panel installation) IP 65 (field casing)
Mounting:	mounting clip Form B (DIN 43 835) (control panel installation) wall and pipe mounting (field casing)
Connection:	plug-in terminal strip (control panel installation) cable connection (field casing)
Weight:	approx. 360 g (control panel installat.) approx. 1240 g (field casing)

10. Order Codes

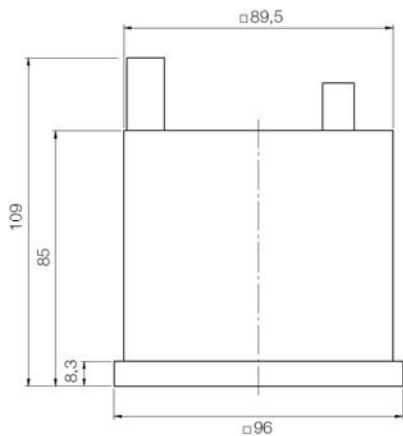
(Order example: **ZED-DF10 KS 4R P**)

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

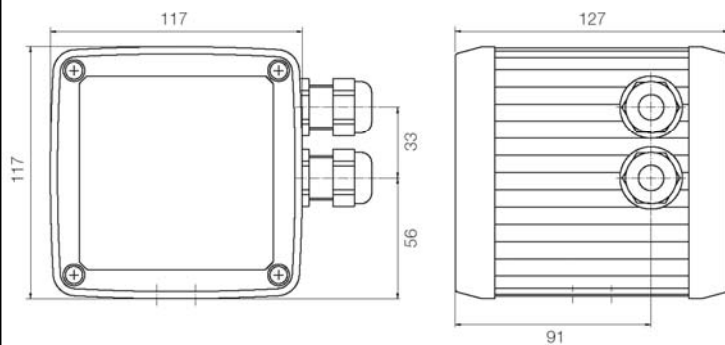
The order details of a ZED electronic in combination with a flow sensor can be found in the data sheet of the measuring device.

11. Dimensions

ZED-D Control panel installation (casing P)



ZED-D field housing



12. Declaration of Conformance

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 2006-10

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

DIN EN 61010-1 2002-08

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

EN 60529, DIN VDE 0470-1 1992-11

Protection type housing (IP-Code)

Also the following EWG guidelines are fulfilled:

2004/108EC

EMC Directive

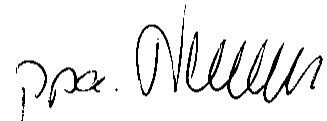
2006/95 EC

Low Voltage Directive

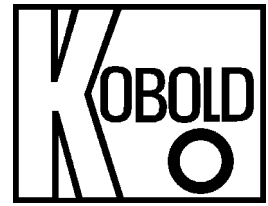
Hofheim, 12. Nov. 2007



H. Peters
General Manager



M. Wenzel
Proxy Holder



Operating Instructions for Flow Monitor

**Model: DF-...Hxx3K
DF-...IHx3K
DF-...KLxxx
DF-...DLxxx
DF-...ZLxxx**



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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 EWG-machine guidelines.

PED 97/23/EG

In acc. with Article 3 Paragraph (3), "Sound Engineering Practice", of the PED 97/23/EC no CE mark.

	Pipe	
	Table 8 Group 1 dangerous fluids	Table 9 Group 2 no dangerous fluids
All DF-models except DF-xxG(H)R32 DF-xxG(H)R40	Art. 3, § 3	Art. 3, § 3
DF-xxGR32../DF-xxGR40	not deliverable	Art. 3, § 3
DF-xxHR32../DF-xxHR40..	Kat. II	Art. 3, § 3
DF-xxHF50..	Kat II	Art. 3, § 3

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:

- Sensor housing with mounted connection box or electronics
- Operating Instructions

4. Regulation Use

The units of model DF are used for measurement of liquid flow. Only low viscosity fluids which are chemically compatible with the materials used in the sensor housing are allowed to be measured. If using higher viscosity media, large measuring errors can occur. Long threads can lead to the seizure of the rotor. Likewise, ferritic particles can build up on the rotating vane and lead to faulty operation or destruction of the rotor. If in doubt, please contact the supplier.

Material Combinations

	Standard version					High-pressure version	
Material combination	I	II	IIB ¹⁾	III	IV ¹⁾	VI ¹⁾	VII ¹⁾
Order code	..A..	..B..	..C..	..D..	..E..	..G..	..H..
Connection types	Pipe thread	Pipe thread	Pipe thread	Pipe thread	Pipe thread flange	Pipe thread	Pipe thread flange
Case	Trogamide	Polysulfone	Poly-propylene	Brass nickel-plated	St.St. ⁴⁾	Brass nickel-plated	St.St. ⁴⁾
Cover	Trogamide	Polysulfone	Poly-propylene	Polysulfone	Polysulfone	Brass nickel-plated	St.St. ⁴⁾
Connection	Brass nickel-plated	St.St. ⁴⁾	Poly-propylene	Brass nickel-plated	St.St. ⁴⁾	Brass nickel-plated	St.St. ⁴⁾
Locking pins	Brass	Brass	Brass	Brass	-	-	-
O-rings	NBR	FPM	FPM	NBR	FPM	NBR	FPM
Vane	POM	PTFE	PTFE	POM	PTFE	POM	PTFE
Axle ³⁾	St.St. ⁴⁾	St.St. ⁴⁾	ceramics	St.St. ⁴⁾	St.St. ⁴⁾	St.St. ⁴⁾	St.St. ⁴⁾
Bearing ³⁾	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
Screen	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾	PTFE ²⁾
Max. operating pressure	10 bar	10 bar	6 bar	16 bar	16 bar	100 bar	100 bar flange PN 40
Max. operating temperature	60 °C	80 °C	80 °C	80 °C	80 °C	80 °C	80 °C

1) Connection cannot be rotated 2) St. St. for model DF 0.5 3) Special version upon request 4) St.St.1.4571

5. Operating Principle

KOBOLD measuring sensors are available with pipe thread or flange connections; standard or high-pressure versions are optional. The standard version is delivered with a standard front cover from solid, transparent plastic, which allows the flow to be optically inspected. The rotary motion of the shining red vane can be clearly seen. Faults such as power failure or rotor blockage can thus be quickly detected in situ. In addition to their use as measuring and monitoring systems, the devices can also be used as flow indicators.

The standard front cover is replaced by a metal plate on the high-pressure version (up to 100 bar with the threaded version). The devices can be installed in any position. However, the flow must always be in the direction of the arrow, and the front panel of the device must be arranged in the vertical plane. The fluidic housing must be full with liquid. Additional inlet or outlet pipes are not required. The large radial clearance between vane and housing wall renders the measuring sensor insensitive to dirt. Depending on the version, the connection fittings can be rotated and are bearing mounted. Switching electronics or vane front may be rotated at will for ease of viewing (while in service).

The KOBOLD measuring sensors are also available without a compact electronic. The linear flow proportional pulse signal provided by the sensor can be controlled by customer own electronics. The customer is able to integrate the sensor directly into the electronics with the OEM-version (implement EMC-immunity) and can therefore save costs and material.

6. Mechanical Connection

Before installation

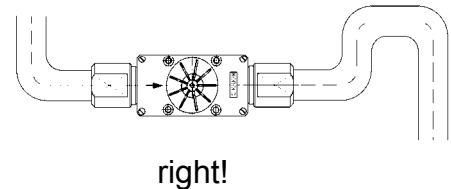
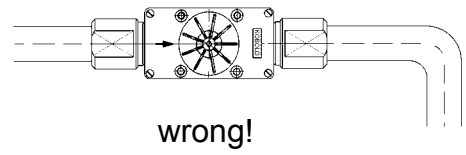
- Please make sure that the actual flow throughput matches the flow range of the instrument. The flow range may be read from the label.



Warning! If the measuring range is exceeded by more than 20%, bearing damage may occur.

- Please make sure that the allowable maximum operating pressure and operating temperature of the instruments are not exceeded.
- Make sure that the electrical supply to the instrument conforms to the equipment operating data (see label).
- Remove all transport packing and make sure that no packing material is left in the instrument.
- The instrument may be installed in any position. However, the flow must always take place in the direction of the arrow, while the front face of the instrument must always be in the vertical plane.

- It must be ensured that the instrument housing is continuously filled with the flow medium, especially for flows from top to bottom. No straight runs are necessary at inlet and outlet.
- Sealing of the connection threads should be carried out with PTFE tape or similar.
- During installation of the instrument, it must be checked that no stress is applied to the connections. We recommend that the inlet and outlet pipes are mechanically fixed approximately 50 mm from each instrument connection.
- When using Material Combination V (PTFE) the instrument connections may not be rotated.
- Check that the connection thread to pipe is fully sealed.



Warning! The threaded connections of the instrument must be tightened with a suitable sized open ended spanner. Otherwise, the housing may be stressed which could lead to breakage of the equipment.

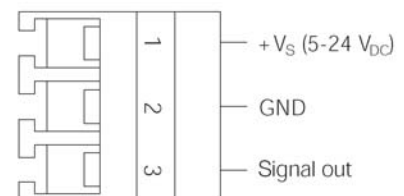
7. Electrical Connection

7.1 DF-...Hxx3K, DF-...IHx3K



Attention! Make sure that the voltage value of your instrument is between 5 and 24 V_{DC}.

- Make sure that the supply wires are de-energised.
- Connect the 3-pole connection clamp in accordance with the wiring diagram.



Cable Connection

red = +V_S
 blue = GND
 yellow = Signal out



Attention! Incorrect wiring will lead to damage of the unit's electronics.

7.2 DF-...KLxxx, DF-...ZLxxx, DF-...DLxxx



Attention! Make sure that the voltage value of your instrument is 24 V_{DC}.

- Make sure that the supply wires are de-energised.
- Connect the wires in accordance with the wiring diagram.

Wire number	ZED-...KLxxx	ZED-...ZLxxx	ZED-...DLxxx
1	+24 V _{DC}	+24 V _{DC}	+24 V _{DC}
2	GND	GND	GND
3	4-20 mA	4-20 mA	4-20 mA
4	GND	GND	GND
5	d.c. *)	d.c. *)	Ctrl 1 *)
6	d.c. *)	Reset TM *)	Ctrl 2 *)
7	relay S1 N/O	relay S1 N/O	relay S1 N/O
8	relay S1 COM	relay S1 COM	relay S1 COM
9	relay S2 N/O	relay S2 N/O	relay S2 N/O
10	relay S2 COM	relay S2 COM	relay S2 COM

*) d.c. = Don't connect wire!

Reset TM = Reset part quantity

Ctrl 1 -- GND => Start

Ctrl 2 -- GND => Stop

Ctrl 1 -- Ctrl 2 -- GND => Reset dosage



Attention! Incorrect wiring will lead to damage of the unit's electronics.

8. Mechanical Commissioning

To avoid pressure surges, the flow medium should be slowly introduced into the instrument.



Attention! Pressure surges from solenoid valves, ball valves or similar may result in damage to the instrument (water hammer). In the operating condition it must be checked that the instrument housing is continuously filled with the flow medium.

Large air bubbles in the instrument housing can lead to measuring errors or destruction of the bearings.

9. Operation

DF-...KLxxx

See Operating Instructions ZED-K

DF-...ZLxxx

See Operating Instructions ZED-Z

DF-...DLxxx

See Operating Instructions ZED-D

10. Maintenance

The DF-..HN.. and DF-..HP.. instrument is maintenance-free for measured media without contamination,. Since the paddlewheel contains magnets, any ferritic particles present in the medium may lead to problems. In order to avoid such problems, we recommend the installation of a magnet filter (e.g. the magnet filter, model MF-R). Should cleaning of the instrument become necessary, the housing cover may easily be removed to provide access to the interior. Any work on the electronics may only be undertaken by the supplier; otherwise the warranty will become invalid.

11. Technical Information

Measuring accuracy:	2.5% of f. s.
Medium temperature:	-20 to +80 °C (0...60 °C Material Comb.: I)
Protection type:	IP 65

Frequency output (OEM) no CE (DF-...IHO3K, DF-...IHP3K)

Power supply:	5-24 V _{DC}
Supply current:	approx. 5 mA
Signal amplitude high:	approx. power supply
Signal amplitude low:	= 0.2 V
Output loss:	max. 2.5 mW
Electrical connection:	approx. 80 mm cable
Pulse output:	NPN, open collector, max. 15 mA, not symmetric

Frequency output (DF-...Hxx3K)

Power supply:	5-24 V _{DC}
Supply current:	approx. 5 mA
Signal amplitude high:	approx. power supply
Signal amplitude low:	= 0.2 V
Output loss:	max. 2.5 mW
Electrical connection:	PC-connection box with cable connection
Pulse output:	NPN or PNP, open collector, max. 15 mA, not symmetric
Special versions:	high temperature version, DIN-plug connection

K-Electronics

Display:	double-spaced display, illuminated flow value with selectable units and bargraph display
Power supply:	24 V _{DC} ±20 %
Current consumption:	approx. 100 mA
Electrical connection:	10 wire cable connection
Analogue output:	(0)4...20 mA selectable Load: 0...500 Ω or 0-10 V _{DC} , Load: >100 kΩ
Switching output:	2 relays, max. 30 V / 2 A
Control elements:	via 3 keys
Functions:	MIN/MAX memory, flow monitor, language settings, password protection

Counter-Electronics

Display:	2 x 8-digit LCD module, illuminated, total, part and flow quantity; units of measurement selectable
Quantity meter:	8-digit
Power supply:	24 V _{DC} ±20%
Current consumption:	approx. 100 mA
Electrical connection:	10-pole cable connection
Analogue output:	0(4)...20 mA selectable Load: 0...500 Ω or 0-10 V _{DC} , Load: >100 kΩ
Relay outputs:	2 relays, max. 30 V / 2 A
Control elements:	via 4 keys
Functions:	Reset, MIN/MAX-memory, flow monitor, monitoring of part and total quantities, language

Dosage-Electronics

Display:	2 x 8-digit LCD module, illuminated dosage, total and flow quantity, units of measurement are selectable
Quantity meter:	8-digit
Dosage:	5-digit
Power supply:	24 V _{DC} ±20 %
Current consumption:	approx. 100 mA
Electrical connection:	10-pole cable connection
Analogue output:	0(4)...20 mA selectable Load: 0...500 Ω or 0...10 VDC, Load >100 kΩ
Relay outputs:	2 relays, max. 30 V / 2 A
Control elements:	via 4 keys
Function:	dosage (relay S2), start, stop, reset, fine dosage, correction quantity, flow monitor, total volume monitoring, language

12. Ordering Codes

Flow rate L/min	Model	Material combination (see transducer)	Connection sizes IG or flange DIN 2527, PN40	Electronics	Power supply
0,08...0,5 0,2...1,4 0,2...2,5 0,3...2,6 0,4...5,0 0,25...6,0 0,5...12,0 1,00...12,5 1,00...24,0 2,00...48,0 2,5...60,0 5,00...120 40,0...160	DF-05 DF-14 DF-25 DF-26 DF-50 DF-06 DF-12 DF-13 DF-24 DF-48 DF-60 DF-H2 DF-H6	A = Trogamide/ brass B = PSO/ VA C = PP D = Brass E = St. St. G = Brass, 100 bar H = St. St., 100 bar	R06 = G 1/8 R08 = G 1/4 R10 = G 3/8 R15 = G 1/2 R20 = G 3/4 R25 = G 1 R32 = G 1 1/4 R40 = G 1 1/2 F15 = DN 15 F25 = DN 25 F40 = DN 40 F50 = DN 50	KLK3 = Digital display, switching and analogue output, 24 V _{DC} 1.5 m cable connection KLL3 = Digital display, switching and analogue output, 24 V _{DC} cable connection (Please specify length in clear text.) ZLK3 = Counter electronic, digital display, 24 V _{DC} , 1.5 m cable connection ZLL3 = Counter electronic, 24 V _{DC} , cable connection (Please specify length in clear text.) DLK3 = Dosing electronics, 24 V _{DC} , 1.5 m cable connection DLL3 = Dosing electronic, 24 V _{DC} , cable connection (Please specify length in clear text.)	4 = (0)4-20 mA 1 = 0-10 V

* Flange connection for material combination stainless steel E or H only.

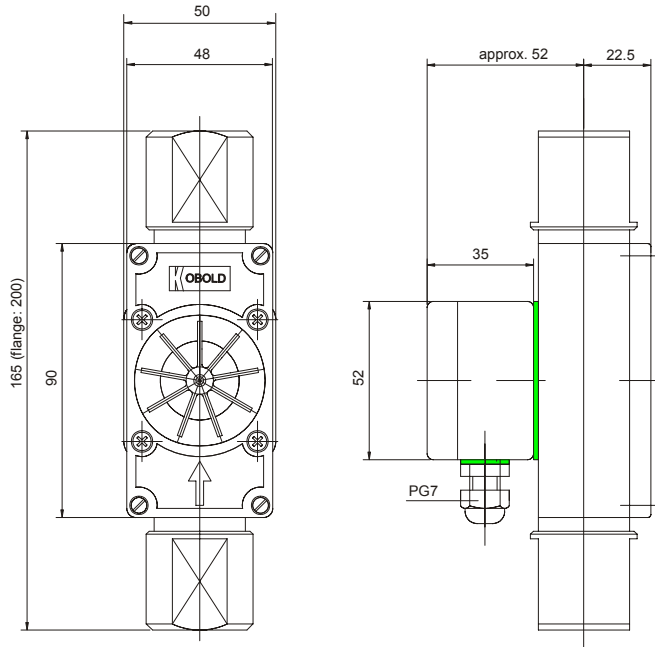
13. Recommended Spare Parts

Rotating vane	1.1) PTFE	1.2) POM	1.3) PTFE with saphire bearing
Axle / bearing	2.1) St. St./PTFE	2.2) Ceramic/PTFE	2.3) Saphire/Saphire (only for 1.3)
Cover for sensor housing	3.1) Trogamide	3.2) Polysulfone	
Cover for electronic housing.	4.1) NBR		
O-rings	5.1) NBR	5.2) FPM	

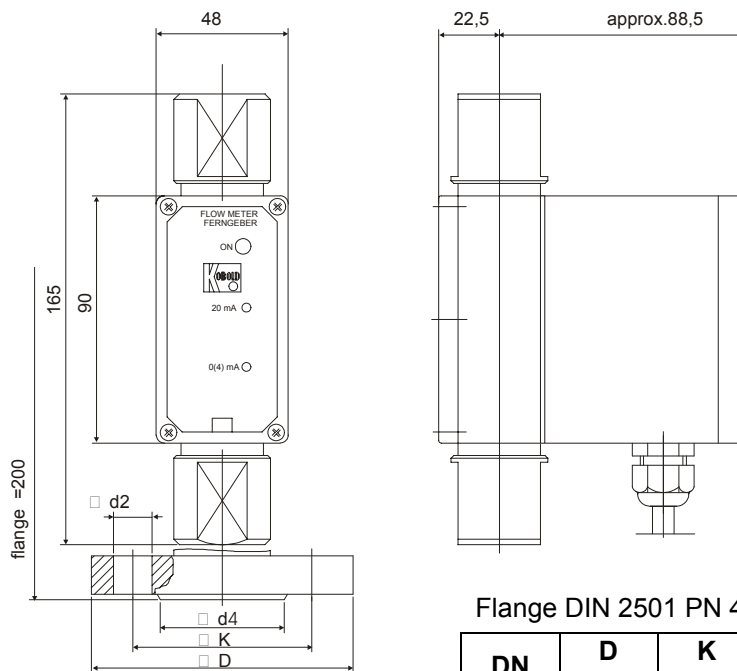
Please specify serial number when ordering spare parts.

14. Dimensions

14.1 DF-...IHx3K, DF-...Hxx3K



14.2 DF-...KLxxx, DF-...ZLxxx, DF-...DLxxx



Flange DIN 2501 PN 40

DN	D [mm]	K [mm]	d4 [mm]	d2 [mm]	Screw quantity
15	95	65	45	14	4
25	115	85	68	14	4
40	150	110	88	18	4
50	165	125	102	18	4

15. Declaration of Conformance

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

Flow Transmitter Model: DF-..HN.. and DF-..HP..

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

EN 61000-6-4 08-2002

Electromagnetic compatibility (EMC) - Emission standard for industrial environments

EN 61000-4-2 12-2001

Electromagnetic compatibility (EMC) - Testing and measurement techniques - Electrostatic discharge immunity test - Level 2

EN 61000-4-4 07-2005

Electromagnetic compatibility (EMC) - Testing and measurement techniques - Electrical fast transient/burst immunity test – Level 2

EN 61010 08-2002

Safety requirements for electrical equipment for measuring control and laboratory use

Also the following EWG guidelines are satisfied:

89/336 EWG

73/23 EWG

97/23/EC PED

Category II, Table 8, pipe, liquids

Group 1 dangerous fluids

Module D, mark CE0098

notified body: Germanischer Lloyd Germany

Hofheim, 13. June 2008



H. Peters
General Manager



M. Wenzel
Proxy Holder

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

Flow Meter	Model: DF-...KLxxx
Flow Counter	Model: DF-...ZLxxx
Dosing Unit	Model: DF-...DLxxx

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

EN 61326: 1997 **+A1: 1998** **+A2: 2001**
Electrical equipment for measurement, control and laboratory use

- Noise immunity: according EN 61326/A1 Amendment A table A.1
Criteria: according table 2, continuous not monitored operation
- Generic emission standard: according EN 61326/A1
Limit values: according table 4, equipment of class B

DIN EN 61010-11 1993

Safety requirements for electrical equipment for measuring control and laboratory use

Also the following EEC guidelines are satisfied:

2004/108/EC	EMC Directive
2006/95/EC	Low Voltage Directive

97/23/EC PED
Category II, Table 8, pipe, liquids
Group 1 dangerous fluids
Module D, mark CE0098
notified body: Germanischer Lloyd Germany

Hofheim, 13. June 2008



H. Peters
General Manager



M. Wenzel
Proxy Holder