



# Operating Instructions for Ultrasonic Flowmeter/ -Monitor/ -Counter/ -Dosing Unit

**Model: DUK**



Display rotatable in 90° steps via software



KofiCom Interface set

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## 2. Note

### 2.1 General

Before unpacking and commissioning the device, the operating instructions and the “General Safety Instructions” document must be read and followed carefully. The general safety instructions, the operating instructions, the data sheet as well as approvals and further information can be downloaded via the QR code on the device or under the respective product on [www.kobold.com](http://www.kobold.com).

Due to technical changes, the device documentation available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email ([info.de@kobold.com](mailto:info.de@kobold.com)) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form.

Operating instructions, data sheet, approvals and further information via the QR code on the device or via [www.kobold.com](http://www.kobold.com)

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 device should be used only when the entire machine fulfils the EU machinery directive.

### 2.2 Hazard warnings

The following instructions are intended to ensure your personal safety and to prevent damage to the product described or connected devices. Safety instructions and warnings to prevent danger to the life and health of users or maintenance personnel, or to prevent damage to property, are highlighted in this documentation using the symbols defined here. *The symbols and terms used have the following meaning in the documentation itself:*

| Symbol                                                                                      | Explanation                                                                                                                                                        | Symbol                                                                                         | Explanation                                                                                              |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <br>Note | Is important information about the product, the handling of the product or the respective part of the documentation to which particular attention should be drawn. | <br>Caution | Means that minor personal injury or minor property damage may occur if proper precautions are not taken. |

| Symbol                                                                                       | Explanation                                                                                                          | Symbol                                                                                       | Explanation                                                     |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| <br>Warning | Indicates that serious personal injury or substantial property damage may occur if proper precautions are not taken. | <br>Danger  | Means that death can occur if proper precautions are not taken. |
| <br>Warning | Attention: Hot surface!                                                                                              | <br>Warning | Warning: Dangerous electrical voltage                           |

### 2.3 As per PED 2014/68/EU

In acc. with Article 4, Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.

## 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:

- Ultrasonic Flowmeter/ -Monitor/ -Counter/ -Dosing Unit      model: DUK

## 4. Intended Use

Any use of the device, which exceeds the manufacturer's specifications, 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

### 5.1 General

The new KOBOLD type DUK flow meters are used for the measurement, monitoring, metering and dosing of low viscosity aqueous fluids.

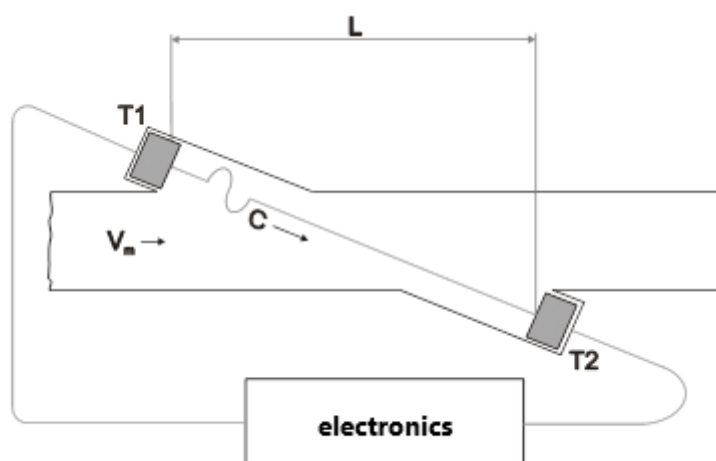
The devices work on the principle of the difference in running times.

This is based on the fact that ultrasonic waves in a medium are influenced by the speed of flow.

Two sensors mounted opposite one another in the pipeline function simultaneously as transmitter and receiver of ultrasound signals.

If there is no flow, then the running times of both signals are identical. If the medium is flowing, then the running time of the signal against the flow is longer than that with the flow.

The running time difference, which is determined by a microprocessor, is proportional to the speed of flow.



The devices can be equipped with a switching output, a frequency output or an analogue output. A universal compact electronics model C3T0 is also available, which contains two outputs that can be configured as required by the customer.

## 6. Mechanical Connection

### 6.1 Check operating conditions

- flow rate
- max. operating pressure
- max. operating temperature

In general, the DUK is subjected to the same loads as the piping into which it is installed. The DUK should therefore be kept free from extreme loads, such as pressure surges with strong, dynamic pipe movements, vibrations in the proximity of centrifugal pumps, high temperature media, flooding etc.

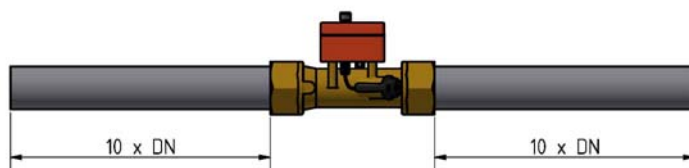
### 6.2 Installation

- Remove all packing materials and transport retainers and ensure that no such materials remain in the device.
- It can be installed in vertical, horizontal or rising pipes. Flow in direction of the arrow.
- Avoid pressure and tensile load.
- Mounting the inlet and outlet pipe in a distance of 50 mm from the connections.
- Avoid valves or large reduction on the inlet section (this increases the inaccuracy of measurements).
- Check the leak tightness of the connections.
- Air bubbles in the flowing medium can disrupt the measuring function or reduce measuring accuracy

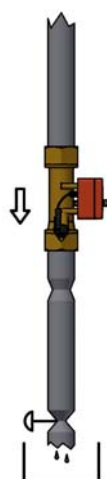
|                                                                                     |                                                                                              |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  | <p><b>Danger!</b> Opening the screw ring of the C3T electronics will void the guarantee.</p> |
| <p>Note</p>                                                                         |                                                                                              |

- The electronic display can be rotated in 90° steps via software. See chapter 5.3 of the C3T0 operating instructions.

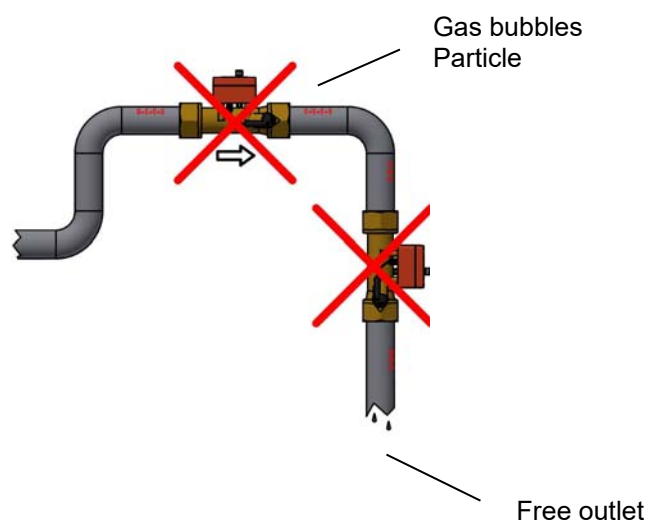
## In-/Outlet Runs



## Mounting from top to bottom



## avoid these installation areas



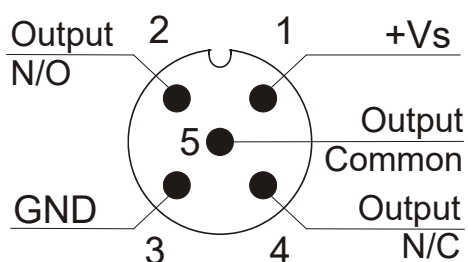
## 7. Electrical Connection

### 7.1 General

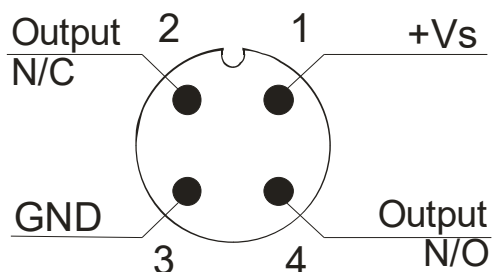
|                                                                                              |                                                                                                                              |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <br>Warning | <p>Attention! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit.</p> |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|

- Make sure that the supply wires are de-energised.
- Connect the supply voltage and the output signal to the plug PIN's as stated below.
- We recommend the use of wires with cross sectional area of min. 0,25 mm<sup>2</sup>.

### 7.2 DUK-...S300

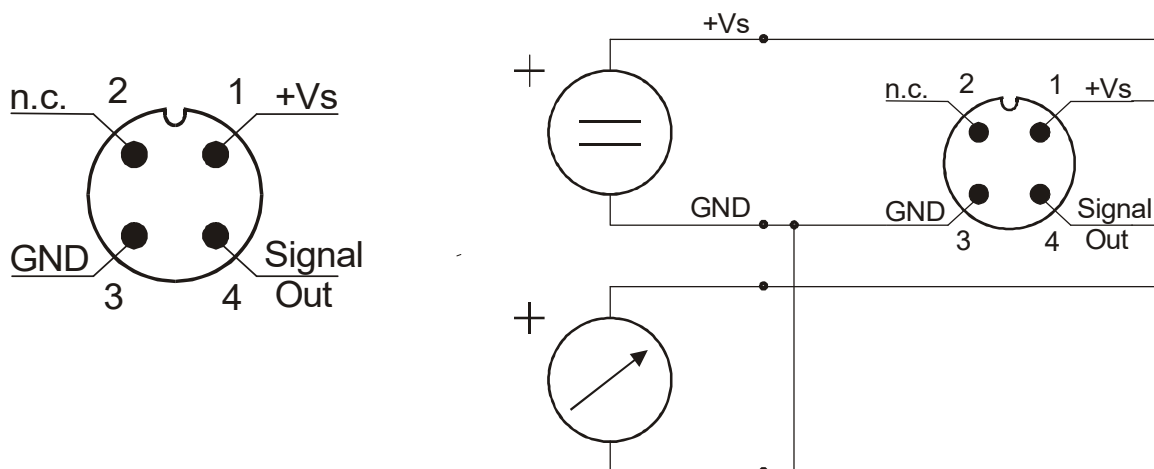


### 7.3 DUK-...S30D

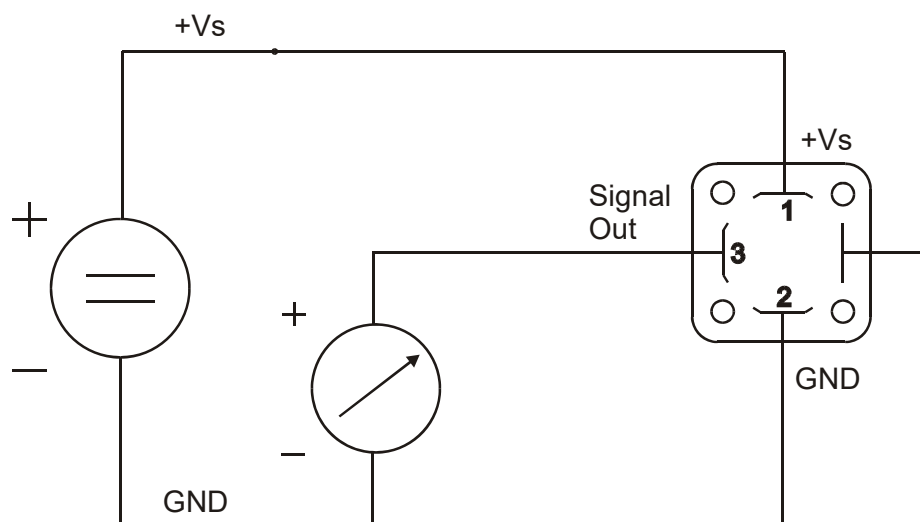


## 7.4 DUK-...F3x0; DUK-...L3x3

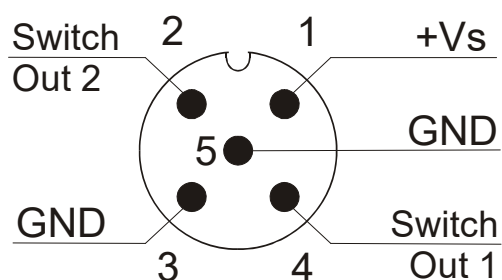
### Connection example DUK-...L3x3



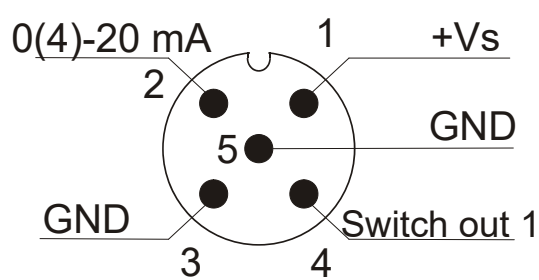
## 7.5 DUK-...L443



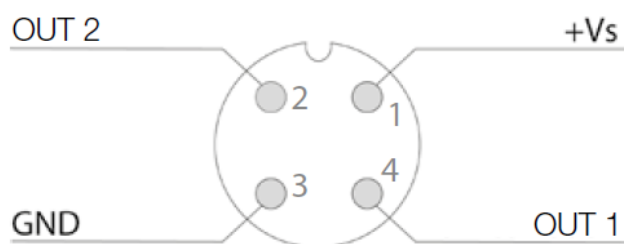
## 7.6 DUK-...C30..



## 7.7 DUK-...C34..



## 7.8 DUK-...C3T0..



## 7.9 DUK-...Ex4R, DUK-...Gx4R

### Cable connection

| Wire number | DUK-...E14R<br>Counter electronics |
|-------------|------------------------------------|
| 1           | +24 V <sub>DC</sub>                |
| 2           | GND                                |
| 3           | (0) 4-20 mA                        |
| 4           | GND                                |
| 5           | n. c.                              |
| 6           | Reset part quantity                |
| 7           | Relay S1                           |
| 8           | Relay S1                           |
| 9           | Relay S2                           |
| 10          | Relay S2                           |

| Wire number | DUK-...G14R<br>Dosing electronics |
|-------------|-----------------------------------|
| 1           | +24 V <sub>DC</sub>               |
| 2           | GND                               |
| 3           | (0) 4-20 mA                       |
| 4           | GND                               |
| 5           | Control 1*                        |
| 6           | Control 2*                        |
| 7           | Relay S1                          |
| 8           | Relay S1                          |
| 9           | Relay S2                          |
| 10          | Relay S2                          |

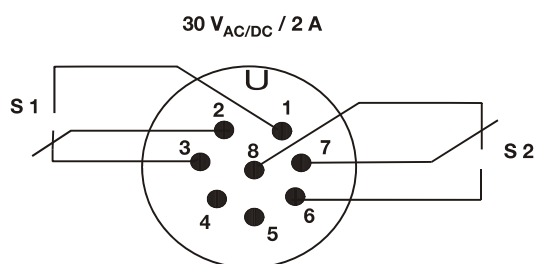
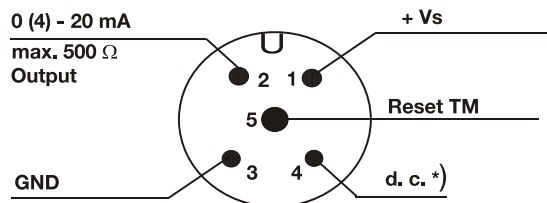
\*Control 1<->GND: Start-dosing

Control 2<->GND: Stop-dosing

Control 1 <-> Control 2 <-> GND: Reset-dosing

## Plug connection

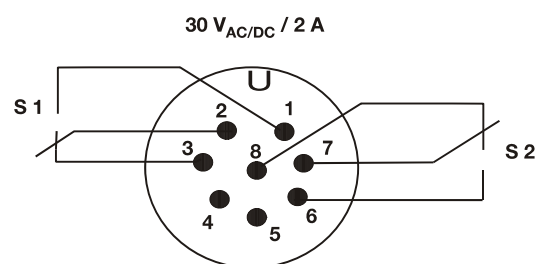
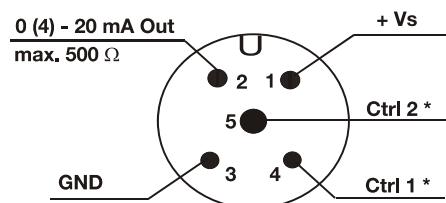
### -E34 R



\*) Do not connect!

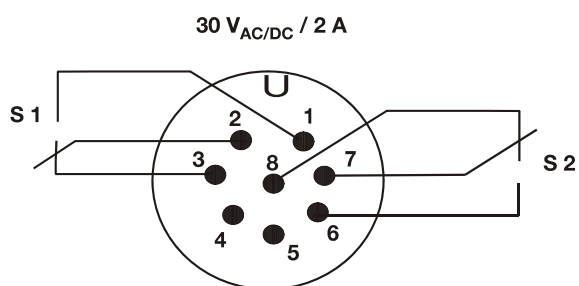
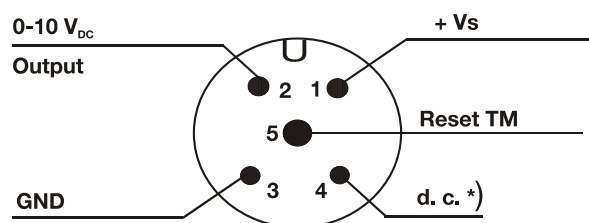
TM : subset

### -G34 R

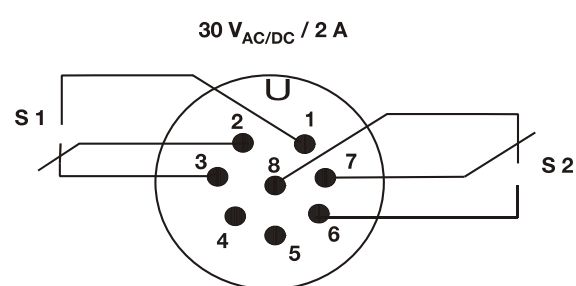
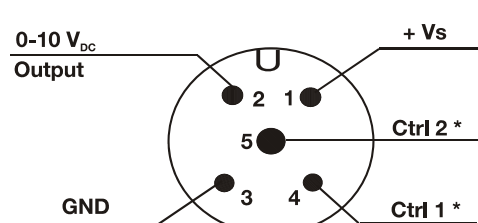


\*Control 1<->GND: Start-Dosing  
Control 2<->GND: Stop-Dosing  
Control 1 <-> Control 2 <-> GND: Reset-Dosing

### -E31 R



### -G31 R



## 8. Operation

The units are preset and after electrical connection ready for operation.

### 8.1 Switch point setting DUK-...S300, DUK-...S30D

| Switch setting | Switch point                |
|----------------|-----------------------------|
| 0              | Switch function deactivated |
| 1              | 10 % of f.s.                |
| 2              | 20 % of f.s.                |
| 3              | 30 % of f.s.                |
| 4              | 40 % of f.s.                |
| 5              | 50 % of f.s.                |
| 6              | 60 % of f.s.                |
| 7              | 70 % of f.s.                |
| 8              | 80 % of f.s.                |
| 9              | 90 % of f.s.                |

Flow above switch point: DUO-LED green

Flow below switch point: DUO-LED red

### 8.2 Counter electronic DUK-...Ex4R

Operating please see Operating Instructions ZED-Z

### 8.3 Dosing electronic DUK-...Gx4R

Operating please see Operating Instructions ZED-D

### 8.4 Use of media other than water (only option -C3T0)

The DUK-...C3T0 is able to measure viscous media up to a maximum viscosity of 68 mm<sup>2</sup>/s. However, this must be a homogeneous Newtonian liquid, but not necessarily based on water. The DUK-...C3T0 is factory set with a data set for water. If another medium is to be used, the KOFICOM-IFMU order option and the free MEDIATOR Tool software are required to exchange the data set.

MEDIATOR Tool contains the data records of common media and is regularly expanded with media data. Upon request, customer-specific data sets can be created upon submission of the relevant data.

The MEDIATOR Tool software can be downloaded free of charge from the Kobold homepage: [www.kobold.com/qr/DUK](http://www.kobold.com/qr/DUK)

## 9. Adjustment – Compact Electronics DUK-...C3T0

The operation and setting of the electronics option -C3T0 is described in the operating manual supplement for C3T0.

## 10. Device status - compact electronics DUK-...C3T0

| display text   | error type                                               | display color | description                                                                                                           | debugging                                                                         |
|----------------|----------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Meas Error     | functional limitation                                    | orange        | Measuring tube not or only partially filled or stationary air bubbles in front of the transducers                     | Fill the measuring tube completely with medium or Flush out air bubbles           |
| Temo overrun   | Limitation of measurement accuracy                       | yellow        | The measuring range of the temperature measurement has been exceeded                                                  | If necessary, reduce medium temperature                                           |
| Temp underrun  | Limitation of measurement accuracy                       | Yellow        | The measuring range of the temperature measurement is undershot                                                       | Increase medium temperature if necessary                                          |
| Temp sensor    | device error                                             | Red           | Defect in the temperature sensor measuring circuit                                                                    | Repair necessary at the manufacturer                                              |
| Medium warning | Warning - qualitative limitation of the flow measurement | orange        | Large fluctuations in measured values caused by poor flow conditions in the inlet/outlet or air bubbles in the medium | Adhere to inlet and outlet distances, avoid / eliminate air bubbles in the medium |
| N VM error     | device error                                             | red           | Read error internal data memory                                                                                       | Repair by the manufacturer is necessary if the problem occurs repeatedly          |
| Signal warning | Warning - qualitative limitation of the flow measurement | orange        | Significant signal attenuation by the medium                                                                          | Use a suitable medium or eliminate sound-absorbing components in the medium       |

## 11. Adjustment – Compact Electronics DUK-...C3..

Connect the compact electronics according to previous connection diagram and supply with the indicated power supply.

**After power on, the measuring range (end value) will be shown for 3 seconds.**

### 11.1 Button function

In the standard mode (measuring mode)

-  : Press 3 sec. → Setup mode
-  : Switch point/Window point

In the set-up mode

-  : Next Step
-  : Change Value

**Any time**

**3 sec** 

or do not press  
a button for 20 sec

↓

**Standard mode**

### 11.2 Settings

The following values can be changed in the compact electronic:

|                                                       | Scale range                            | Factory setting |
|-------------------------------------------------------|----------------------------------------|-----------------|
| Switch point ( <b>SPo</b> , <b>SP1</b> , <b>SP2</b> ) | 0...999                                | 0,00            |
| Hysteresis ( <b>HYS</b> )                             | -199...0                               | -0,00           |
| Window point (duo point) ( <b>duo</b> )               | Switch point ...999                    | --- (inactive)  |
| Contact-type ( <b>Con</b> , <b>Co1</b> , <b>Co2</b> ) | (no),(nc) or frequency ( <b>Fr</b> )** | <b>no</b>       |
| Start current ( <b>S-C</b> )*                         | 000...999                              | 000             |
| End current ( <b>E-C</b> )*                           | 000...999                              | FS              |
| Start current selection ( <b>SCS</b> )                | 0-- (0 mA), 4-- (4 mA)                 | 4 mA            |
| Change Code ( <b>CCo</b> )                            | 000...999                              | 000             |

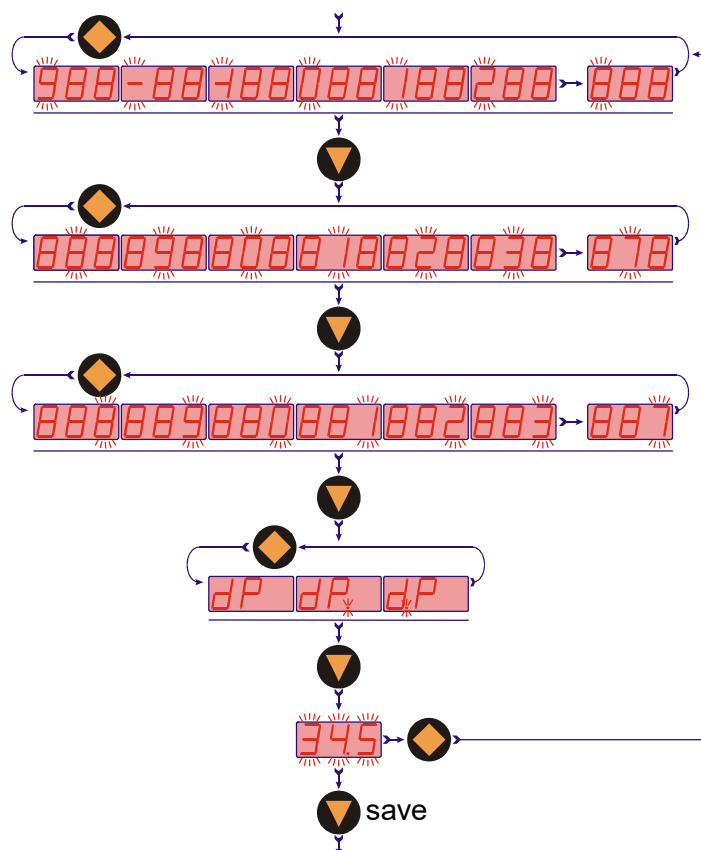
\* Start- and end value of flow relating to 0/4-20 mA

\*\* **not calibrated**, frequency at f.s. approx. 500 -600Hz

## 11.3 Value setting

From the main menu item (for example: switch point, "SPo"), press the "◆" button to set the value. The flow chart below illustrates the universal routine for changing individual parameters.

[From the main menu item]



1. Adjust position

2. Adjust position

3. Adjust position

Adjust decimal point

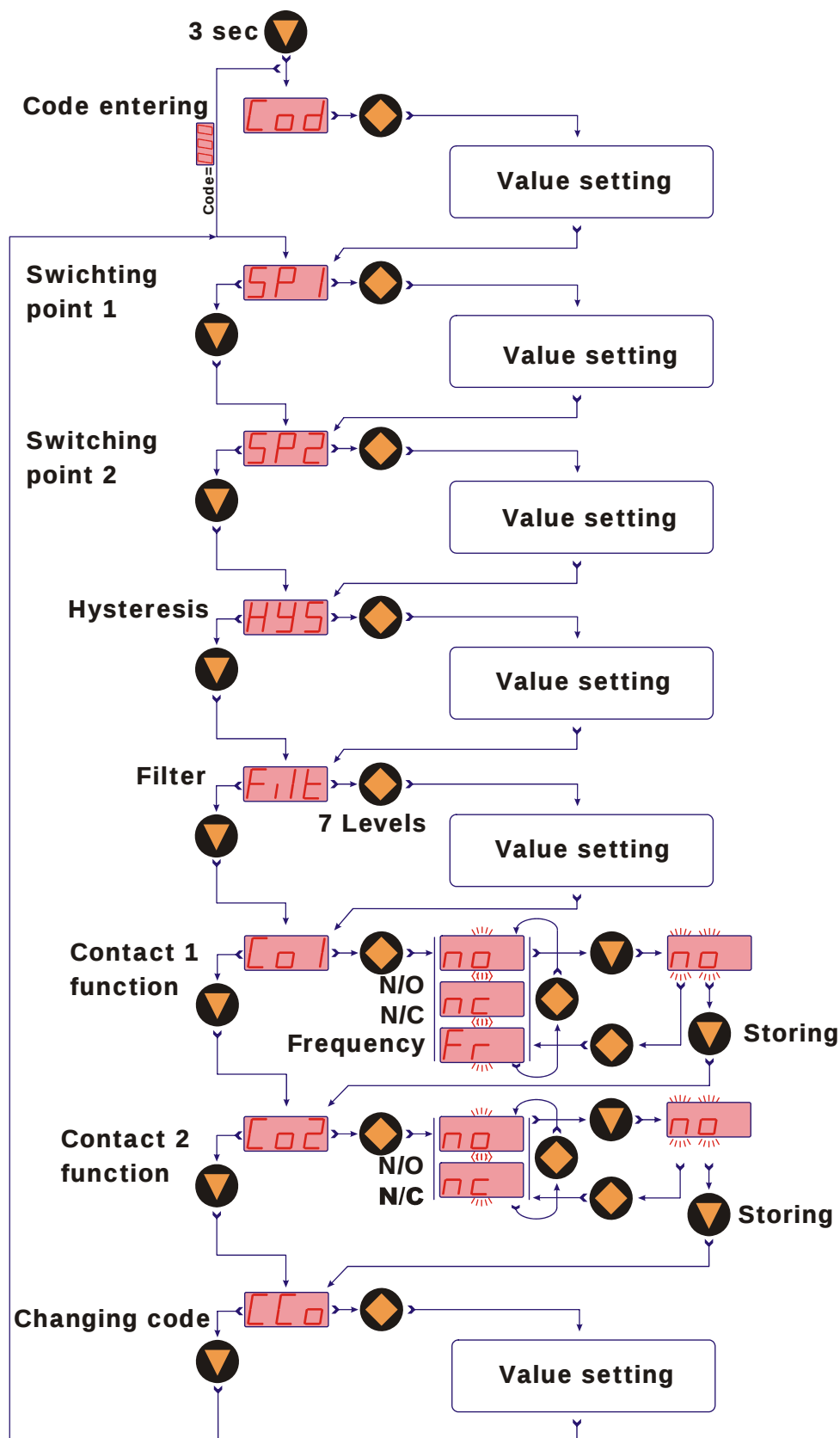
Save selected value  
or  
enter new value.

[To the next main menu

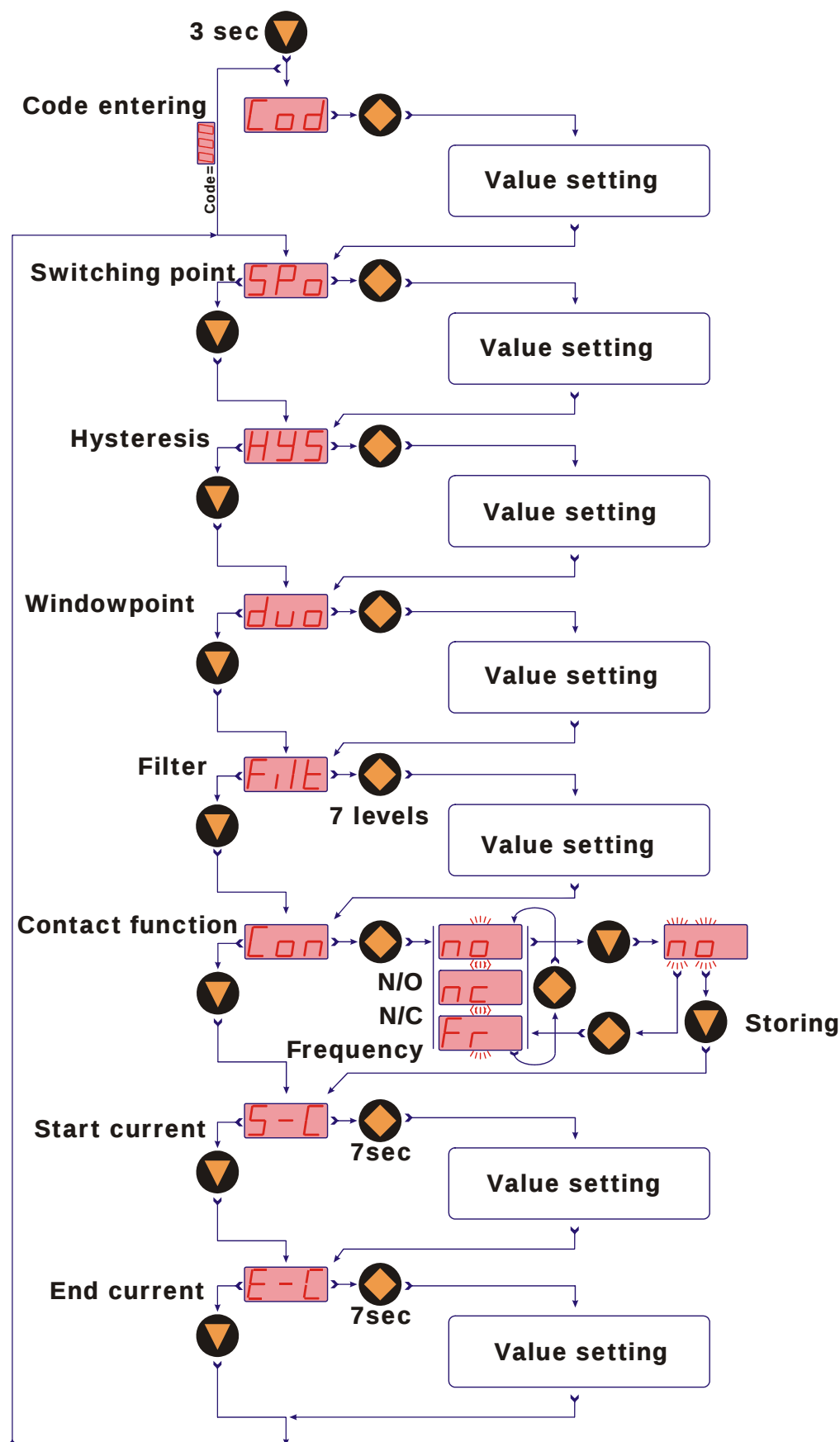
item]

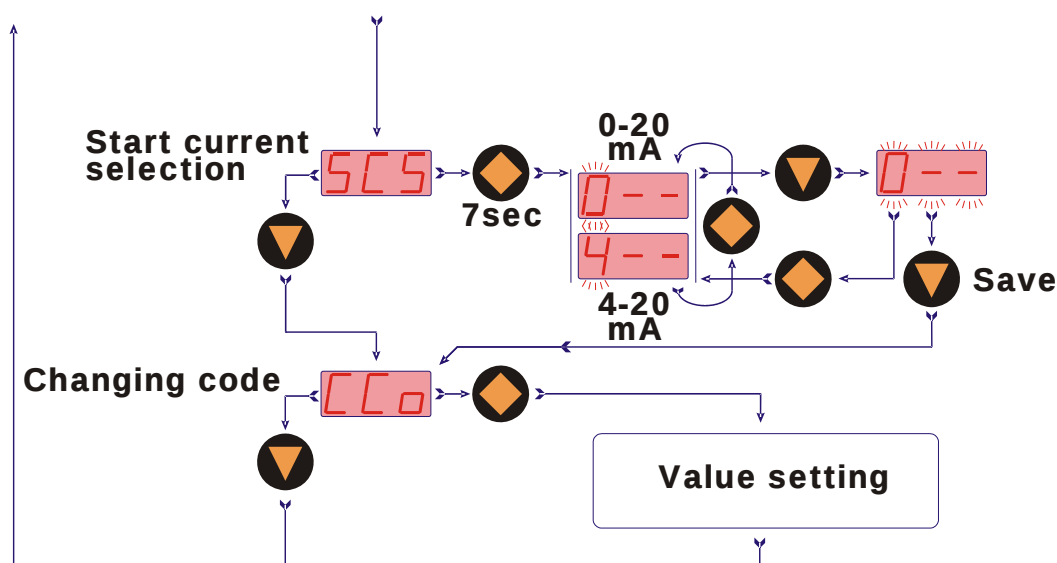
## 11.4 Set-up mode

Compact electronics DUK-...C30..



## Compact electronics DUK-...C34





## 11.5 Main menu items

### 11.5.1 Switching point

The switching point is entered in the menu item "**Spo, SP1, SP2**". A setting value between 000 and 999 can be selected. This value can also include a decimal point. The decimal point can be set at two points (e.g. 10.0 or 1.00). If the display value exceeds the set switch point, the electronic is activated and is signalled by a lightning LED.

If the hysteresis is equal to zero and the window point is de-activated, the electronic switches back whenever the indicated value falls below the switching point.

### 11.5.2 Hysteresis

After the setting of the switching point, the hysteresis can be entered as a negative value in the "**HYS**" menu. The standard hysteresis value is zero. In operation condition this can lead to ambiguous switching behaviour, if the reading fluctuates around the switching point or window point. In this case, increasing the hysteresis can put things right. The hysteresis relates to the switching point and the window point (switching point minus hysteresis; window point plus hysteresis).

**Example:** Switch point 100 L/min; Hysteresis: -2.5 L/min

The electronics switches when 100 L/min is exceeded and switches back when the reading under-runs below 97.5 L/min.

## 11.5.3 Window point (duo-point)

As well as the switching point, it is also to define a "**duo**" (duo-point), the window point. This must be higher than the switching point. By using the window point and the switching point it is possible to monitor the measurement value in a certain range. The switching point limits the measurement range to smaller values and the window point to larger values.

|                                                      |                                                                                                                                                                                                                                                                             |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div data-bbox="252 524 379 640"> <p>NOTE</p> </div> | <p>If the window point (duo-point) is less than or equal to the switching point, an error report (Er4) will be indicated on the display and its value is deleted and its function is invalid (in the case that the window point and switching point out of adjustment).</p> |
| <p>Note</p>                                          |                                                                                                                                                                                                                                                                             |

The value is set in the same way as the switch point.  
The window point is needed for process, in which monitoring of a certain measurement range is necessary.

**Example:** Switching point: 100 L/min; window point: 150 L/min;  
hysteresis: -1 L/min

The electronic switches when 100 L/min is exceeded. If the measured value remains between 99 L/min (100-1) and 151 L/min (150+1), the contact will also remain in active switching condition (LED on). If it exceeds 151 L/min or is below 99 L/min the electronic switches back.

### Switching behaviour

The following diagram clarifies the switching behaviour of the electronics. The contact closes (contact type: no) when exceeding below the switching point or when it under-runs the window point. It only opens again if the window point plus hysteresis is exceeded or if it drops below the switching point minus hysteresis. An **LED** indicates the switching condition of the switching point.

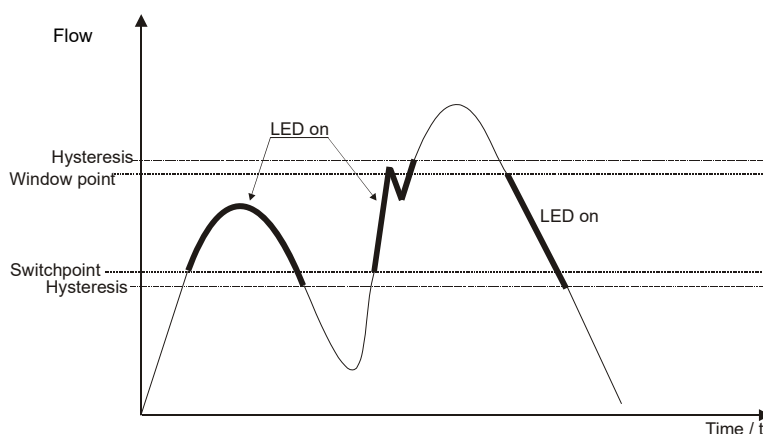
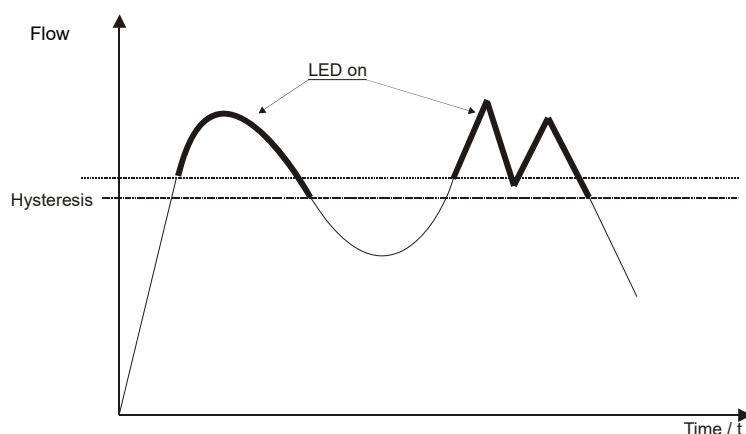
## 11.5.4 Filter

The filter function "**Filt**" forms a running average from the measured values. The following values can be set (see section 8; set up):

1 / 2 / 4 / 8 / 16 / 32 / 64

They correspond to the number of samples used in the running average. The filter value determines the dynamic behaviour of the display value. The larger the adjusted value, the slower the display response. With a filter value of "1" the filter is switched off, i.e. the display value is equal to the unfiltered measured value.

The integrated step function detector reacts to a change of value corresponding to approx. 6.25% of the full scale value. As soon as a step function signal is detected, the instantaneous measured value is directly indicated in the display.



### 11.5.5 Contact type

The function of the transistor switching output is set in menu item **"Con, Co1 or Co2"**. The switching function switches from

**no - N/O contact to**

**nc - N/C to**

**Fr – frequency** (only Con and Co1)

and back.

N/O contact: contact closes when switch point is exceeded

N/C contact: contact opens when switch point is exceeded

Frequency: frequency output is proportional to flow value

### 11.5.6 Current output

The current output is selected in menu items

**"S-C" Start current indicated value < > 0(4) mA**

**"E-C" End current indicated value < > 20 mA**

**"SCS" Start current selection (0-20 mA or 4-20 mA).**

The indicated value at which 0(4) mA flow is entered in menu item start current.

The indicated value at which 20 mA flow is entered in menu item end current.

## 11.5.7 Change code

The change code option "**CCo**" secures the unit against unauthorised tampering. If the code is different from 000, the user must input the code immediately after entering the adjustment mode.

## 12. Maintenance

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The measurement device requires no maintenance if the measurement medium does not cause deposits. In order to avoid problems, we recommend the installation of a filter, such as the magnetic filter, e.g. model MFR.

If it is necessary to clean the sensor, the sensor can be rinsed with a suitable liquid. Fibre parts or large particles can be carefully removed with a cleaning cloth or similar.

Work on the electronics can only be performed by the factory, or the warranty is otherwise voided.

## **13. Technical Information**

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Operating instructions, data sheet, approvals and further information via the QR code on the device or via [www.kobold.com](http://www.kobold.com)

## **14. Order Codes**

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Operating instructions, data sheet, approvals and further information via the QR code on the device or via [www.kobold.com](http://www.kobold.com)

## **15. Dimensions**

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Operating instructions, data sheet, approvals and further information via the QR code on the device or via [www.kobold.com](http://www.kobold.com)

## **16. Disposal**

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See “General Safety Instructions” - via the QR code on the device or via [www.kobold.com](http://www.kobold.com)

## 17. IO-Link – compact electronics DUK-...C3T0

### 17.1 IO-Link function

The DUK-XXXXXC3T0 flow meter has an IO-Link communication interface as standard. The process and diagnostic data can be accessed directly via this interface and the device can be parameterized.

Output 1 is factory configured for IO-Link function. If the IO-Link communication mode is active, the "IOLINK" symbol in the status display for the outputs is displayed in green. The settings menu remains locked when the IOLINK mode is active and is not accessible.

To ensure that the IO-Link device can be operated correctly on the connected IO-Link master, it is necessary to install the device description file that matches the device.

The device description files (IODD) are available in the IODDfinder database at [ioddfinder.io-link.com](http://ioddfinder.io-link.com).

| Product-Typ   | Device-ID<br>[hex] | Device-ID<br>[dec] |
|---------------|--------------------|--------------------|
| DUK-XXXXXC3T0 | 040200             | 262656             |

If the device is operated on an IO-Link master with port class A, only a maximum output current of 50 mA may be drawn from output 2 (OUT2) (current or binary output), otherwise the IO-Link master will be overloaded and it can malfunctions occur.

|                                                                                                               |                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div data-bbox="252 1350 379 1464"> <p>NOTE</p> </div> <div data-bbox="252 1503 325 1534"> <p>Note</p> </div> | <p>If a measured value is invalid due to an error status (NaN), the corresponding process value is output with the value "0". In this case, the device status and the events must also be taken into account.</p> |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 18. Appendix - Compact electronics DUK-...C3T0

### 18.1 IO-Link process data structure

Process data length: 10 bytes

| Byte number | Data        | Bit counter | Format   | Factor | Range                              | Value |
|-------------|-------------|-------------|----------|--------|------------------------------------|-------|
| 0 - 3       | Flow        | 32 Bit      | FloatT   |        | $\pm 1,4 \cdot 10^{-45} \dots \pm$ | L/min |
| 4 - 7       | Volume      | 32 Bit      | FloatT   |        | $\pm 1,4 \cdot 10^{-45} \dots \pm$ | L     |
| 8 - 9       | Temperature | 12 Bit      | IntegerT | 1/10   | $\pm 204,8$                        | °C    |
|             | reserved    | 1 Bit       | BooleanT |        |                                    |       |
|             | reserved    | 1 Bit       | BooleanT |        |                                    |       |
|             | Status OUT1 | 1 Bit       | BooleanT |        |                                    |       |
|             | Status OUT2 | 1 Bit       | BooleanT |        |                                    |       |

| Flow (32 Bit, FloatT) |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |
|-----------------------|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|
| 0                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Byte 0                |   |   |   |   |   |   |   | Byte 1 |   |   |   |   |   |   |   | Byte 2 |   |   |   |   |   |   |   | Byte 3 |   |   |   |   |   |   |   |

| Volume (32 Bit, FloatT) |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|
| 0                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Byte 4                  |   |   |   |   |   |   |   | Byte 5 |   |   |   |   |   |   |   | Byte 6 |   |   |   |   |   |   |   | Byte 7 |   |   |   |   |   |   |   |

| Temperature (12 Bit, IntegerT) |   |   |   |   |   |   |   |        |   |   |   |   |   |   |   |
|--------------------------------|---|---|---|---|---|---|---|--------|---|---|---|---|---|---|---|
| 0                              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Byte 8                         |   |   |   |   |   |   |   | Byte 9 |   |   |   |   |   |   |   |

As long as a diagnostic status of the "Error" type is active for the flow or temperature process values, the corresponding transferred process values are invalid. The process values are only valid if the diagnostic status is deactivated accordingly.

## 18.2IO-Link diagnostic information

| Event Code [hex] | Event Code [dec] | Name                               | Device Status | Type    | Definition                                        |
|------------------|------------------|------------------------------------|---------------|---------|---------------------------------------------------|
| 0x7710           | 30480            | Short Circuit                      |               | Error   | check installation                                |
| 0x8C10           | 35856            | Process Variable Range Overrun     |               | Warning | process data uncertain                            |
| 0x8C20           | 35872            | Measurement Range Overrun          |               | Error   | check application                                 |
| 0x8C30           | 35888            | Process Variable Range Underrun    |               | Warning | process data uncertain                            |
| 0x1838           | 6200             | 1. Test Event For Protocol Testing |               | Error   | first test event                                  |
| 0x1839           | 6201             | 2. Test Event For Protocol Testing |               | Error   | second test event                                 |
| 0x183A           | 6202             | NVM Error                          | 4             | Error   | non-volatile memory is corrupt                    |
| 0x183B           | 6203             | Subslave Lost                      |               | Error   | communication to subslave interrupted             |
| 0x183C           | 6204             | Subslave Not Found                 | 4             | Error   | cummunication to subslave couldn't be established |
| 0x183D           | 6205             | Counter Overflow                   | 2             | Error   | volume or partvolume counter overflowed           |
| 0x183E           | 6206             | Simulation Active                  |               | Warning | indicates that one of the simulations is running  |
| 0x183F           | 6207             | Flow MRE Overrun                   |               | Warning | measuring range overrun                           |
| 0x1840           | 6208             | Flow MRS Underrun                  |               | Warning | measuring range underrun                          |
| 0x1841           | 6209             | Flow Overflow Overrun              | 2             | Warning | overflow range overrun                            |
| 0x1842           | 6210             | Flow Underflow Underrun            | 2             | Warning | underflow range underrun                          |
| 0x1847           | 6215             | Temperature MRE Overrun            |               | Warning | measuring range overrun                           |
| 0x1848           | 6216             | Temperature MRS Underrun           |               | Warning | measuring range underrun                          |
| 0x1849           | 6217             | Temperature Overflow Overrun       | 2             | Warning | overflow range overrun                            |

| Event Code [hex] | Event Code [dec] | Name                           | Device Status | Type    | Definition                               |
|------------------|------------------|--------------------------------|---------------|---------|------------------------------------------|
| 0x184A           | 6218             | Temperature Underflow Underrun | 2             | Warning | underflow range underrun                 |
| 0x185F           | 6239             | Meas Error                     | 3             | Warning | ultrasonic measurement out of range      |
| 0x1860           | 6240             | Temp Overrun                   | 1             | Warning | SOS Temperature over range               |
| 0x1861           | 6241             | Temp Underrun                  | 1             | Warning | SOS Temperature under range              |
| 0x1862           | 6242             | Temp Sensor                    | 1             | Warning | PT1000 Temperature sensor broken wire    |
| 0x1863           | 6243             | Medium Warning                 | 3             | Warning | Too many jumps in ultrasonic measurement |
| 0x1864           | 6244             | NVM Error                      | 1             | Warning | Checksum of NVM is wrong                 |
| 0x1865           | 6245             | Signal Warning                 | 3             | Warning | Ultrasonic signal is very attenuated     |

### 18.3 IO-Link system command table

| Command (hex) | Command (hex) | Command name                 |
|---------------|---------------|------------------------------|
| 82            | 130           | Restore factory settings     |
| A0            | 160           | Reset MinMax Flow            |
| A1            | 161           | unused                       |
| A2            | 162           | Reset MinMax Temperature     |
| A3            | 163           | Reset Part Volume Counter    |
| A4            | 164           | unused                       |
| A5            | 165           | unused                       |
| A6            | 166           | unused                       |
| A7            | 167           | unused                       |
| A8            | 168           | Start Simulation Flow        |
| A9            | 169           | unused                       |
| AA            | 170           | Start Simulation Temperature |
| AB            | 171           | Start Simulation Part Volume |
| AC            | 172           | unused                       |
| AD            | 173           | unused                       |
| AE            | 174           | unused                       |
| AF            | 175           | unused                       |
| B0            | 176           | Stop Simulation Flow         |
| B1            | 177           | unused                       |
| B2            | 178           | Stop Simulation Temperature  |
| B3            | 179           | Stop Simulation Part Volume  |
| B4            | 180           | unused                       |
| B5            | 181           | unused                       |
| B6            | 182           | unused                       |
| B7            | 183           | unused                       |
| B8            | 184           | Events Handling ON           |
| B9            | 185           | Events Handling OFF          |

## 18.4IO-Link ISDU parameter table

Parameters that relate to the measured values of flow, temperature or volume must be entered in the basic units and, if necessary, converted beforehand. The basic units are:

Flow: **L/min**

Temperature: **°C**

Volume: **Liter**

### Units conversion table

| Category: <b>Flow</b> |                               |                                  |
|-----------------------|-------------------------------|----------------------------------|
| Unit                  | Description                   | Conversion                       |
| L/m                   | Liter per minute (basic unit) | -                                |
| L/h                   | Liter per hour                | 1 L/h = 0.0167 L/m               |
| mL/m                  | Milliliter per minute         | 1 mL/m = 0.001 L/m               |
| m <sup>3</sup> /h     | Cubic meters per hour         | 1 m <sup>3</sup> /h = 16.667 L/m |
| gal/m                 | US gallons per minute         | 1 gal/m = 3.7854 L/m             |
| gal/h                 | US gallons per hour           | 1 gal/h = 0.06309 L/m            |
| galk/m                | UK gallons per minute         | 1 galk/m = 4.54609 L/m           |
| galk/h                | UK gallons per hour           | 1 galk/h = 0.07577 L/m           |
| L/s                   | Liters per second             | 1 L/s = 60 L/m                   |
| mL/s                  | Milliliters per second        | 1 mL/s = 0.0000167 L/m           |
| USER                  | User unit                     | 1 user unit = USER * L/m         |

| Category: <b>Temperature</b> |                            |                                          |
|------------------------------|----------------------------|------------------------------------------|
| Unit                         | Description                | Conversion                               |
| °C                           | DegreeCelsius (basic unit) | -                                        |
| °F                           | Degree Fahrenheit          | $x\text{ °C} = (32 + x * 1,8)\text{ °F}$ |
| USER                         | User unit                  | 1 user unit = USER * °C                  |

| Category: <b>Volume</b> |                    |                           |
|-------------------------|--------------------|---------------------------|
| Unit                    | Description        | Conversion                |
| L                       | Liter (basic unit) | -                         |
| mL                      | Milliliter         | 1 mL = 0.001 L            |
| m <sup>3</sup>          | Cubic meters       | 1 m <sup>3</sup> = 1000 L |
| galUS                   | US gallons         | 1 galUS = 3.7854 L        |
| galUK                   | UK gallons         | 1 galk = 4.54609 L        |
| barrel                  | Barrel (US)        | 1 barrel = 158.99 L       |
| USER                    | User unit          | 1 user unit = USER * L    |

| Index [hex]                                                | Object Name          | Definition                                                                                                   | Default value                          | Max Value                                                                        | Min Value | Length [Bytes] | Data Type               | Access |
|------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------|-----------|----------------|-------------------------|--------|
| <b>System</b>                                              |                      |                                                                                                              |                                        |                                                                                  |           |                |                         |        |
| 0x0002                                                     | SystemCommand        | See Table "Comand Codes"                                                                                     |                                        |                                                                                  |           | 1              | UIntegerT               | W      |
| <b>Product Identification (Vendor specific parameters)</b> |                      |                                                                                                              |                                        |                                                                                  |           |                |                         |        |
| 0x0010                                                     | VendorName           |                                                                                                              | Kobold Messring                        |                                                                                  |           | max. 20        | StringT                 | R      |
| 0x0011                                                     | VendorText           |                                                                                                              | www.kobold.com                         |                                                                                  |           | max. 32        | StringT                 | R      |
| 0x0012                                                     | ProductName          |                                                                                                              | DUK-XXXXXC3T0                          |                                                                                  |           | max. 16        | StringT                 | R      |
| 0x0013                                                     | ProductID            |                                                                                                              | DUK-XXXXXC3T0                          |                                                                                  |           | max. 16        | StringT                 | R      |
| 0x0014                                                     | ProductText          |                                                                                                              | DUK-C3T0                               |                                                                                  |           | max. 32        | StringT                 | R      |
| 0x0015                                                     | Serialnumber         | only read parameter                                                                                          | only read parameter                    |                                                                                  |           | max. 8         | StringT                 | R      |
| 0x0016                                                     | HardwareRevision     |                                                                                                              |                                        |                                                                                  |           | max. 8         | StringT                 | R      |
| 0x0017                                                     | FirmwareRevision     | Firmware Revision is constant in FW                                                                          | Firmware Revision is constant in FW    |                                                                                  |           | max. 8         | StringT                 | R      |
| 0x0018                                                     | ApplicationDeviceTag | tag name is from user configurable                                                                           | tag name is from user configurable     |                                                                                  |           | 32             | StringT                 | R/W    |
| 0x0019                                                     | FunctionTag          | function tag is from user configurable                                                                       | function tag is from user configurable |                                                                                  |           | 32             | StringT                 | R/W    |
| 0x0020                                                     | LocationTag          | location tag is from user configurable                                                                       | location tag is from user configurable |                                                                                  |           | 32             | StringT                 | R/W    |
| <b>Device Status Information</b>                           |                      |                                                                                                              |                                        |                                                                                  |           |                |                         |        |
| 0x0024                                                     | DeviceStatus         | 0 - Device OK<br>1 - Maintenance required<br>2 - Out of specification<br>3 - Functional check<br>4 - Failure |                                        |                                                                                  |           | 1              | UIntegerT               | R      |
| 0x0025                                                     | DetaildDeviceStatus  |                                                                                                              |                                        |                                                                                  |           | max. 20        | ArrayT of OctetStringT3 | R      |
| <b>Display Configuration</b>                               |                      |                                                                                                              |                                        |                                                                                  |           |                |                         |        |
| 0x0100                                                     | DisplayOrientation   | Orientation of display                                                                                       | 1                                      | (1) - Landscape<br>(2) - Portrait Flip<br>(3) - Landscape Flip<br>(4) - Portrait |           | 1              | UIntegerT               | R/W    |
| 0x0103                                                     | DisplayLayout        | Single or dual layout                                                                                        | 1                                      | (1) - single<br>(2) - dual                                                       |           | 1              | UIntegerT               | R/W    |
| 0x0104                                                     | UpperDisplay         | Source for the upper display                                                                                 | 0                                      | (1) - Flow<br>(2) - Volume<br>(3) - Temperature<br>(4) - Part Volume             |           | 1              | UIntegerT               | R/W    |

| Index [hex]                                                                                                             | Object Name                      | Definition                                                                   | Default value | Max Value                                                            | Min Value | Length [Bytes] | Data Type | Access |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------|-----------|----------------|-----------|--------|
| 0x0105                                                                                                                  | LowerDisplay                     | Source for the lower display                                                 | 2             | (1) - Flow<br>(2) - Volume<br>(3) - Temperature<br>(4) - Part Volume |           | 1              | UIntegerT | R/W    |
| 0x0106                                                                                                                  | DisplayRefreshTime               | Refresh intervall for the display [s]                                        | 0,5           | (1) - Off<br>(2) - Value<br>(3) - MinMax                             |           | 4              | FloatT    | R/W    |
| 0x010A                                                                                                                  | LeftHotkeyFunction               | Function for left hotkey                                                     | 0             | (1) - Off<br>(2) - Value<br>(3) - MinMax                             |           | 1              | UIntegerT | R/W    |
| 0x010B                                                                                                                  | RightHotkeyFunction              | Function for right hotkey                                                    | 0             | (1) - Flow<br>(2) - Volume<br>(3) - Temperature<br>(4) - Part Volume |           | 1              | UIntegerT | R/W    |
| 0x010C                                                                                                                  | LeftHotkeySource                 | Source for the left hotkey                                                   | 0             | (1) - Flow<br>(2) - Volume<br>(3) - Temperature<br>(4) - Part Volume |           | 1              | UIntegerT | R/W    |
| 0x010D                                                                                                                  | RightHotkeySource                | Source for the right hotkey                                                  | 0             | (1) - low<br>(2) - middle<br>(3) - high                              |           | 1              | UIntegerT | R/W    |
| 0x010E                                                                                                                  | SensitivityOpticalKeys           | Sensitivity for the optical keys                                             | 0             |                                                                      |           | 1              | UIntegerT | R/W    |
| 0x010F                                                                                                                  | AutomaticMenuLeave               | Automatic menu leave if the timeout [s] is hit.<br>0 = timeout not active    | 0             | 60                                                                   | 0         | 1              | UIntegerT | R/W    |
| <b>Output 1 (In IO-Link mode output 1 can be parameterized individual, operating mode can only be changed manually)</b> |                                  |                                                                              |               |                                                                      |           |                |           |        |
| 0x0112                                                                                                                  | OUT2AlarmFunction                | Limit or window function for the alarm output                                | 0             | (1) - Limit<br>(2) - Window                                          |           | 1              | UIntegerT | R/W    |
| 0x0113                                                                                                                  | OUT2AlarmOutputType              | Alarmoutput NPN, PNP or Pushpull                                             | 0             | (1) - NPN<br>(2) - PNP<br>(3) - PushPull                             |           | 1              | UIntegerT | R/W    |
| 0x0114                                                                                                                  | OUT2AlarmSwitchFunction          | Alarmoutput normally opened or closed                                        | 0             | (1) - normally opened<br>(2) - normally closed                       |           | 1              | UIntegerT | R/W    |
| 0x0115                                                                                                                  | OUT2AlarmThreshold [LPM/°C]      | Threshold for the alarmoutput                                                | 1,0           | MRE                                                                  | MRS       | 4              | FloatT    | R/W    |
| 0x0119                                                                                                                  | OUT2AlarmLowerThreshold [LPM/°C] | Threshold for the alarmoutput used by the windowfunction                     | 1,0           | OUT2AlarmThreshold                                                   | MRS       | 4              | FloatT    | R/W    |
| 0x011D                                                                                                                  | OUT2AlarmHysteresis [LPM/°C]     | Switching hysteresis for the alarmoutput                                     | 1,0           | (MRE-MRS)                                                            | 0,0       | 4              | FloatT    | R/W    |
| 0x0121                                                                                                                  | OUT2AlarmSuppressionFactor       | How many times the threshold must be hit in order to switch the alarm output | 0             | 60                                                                   | 0         | 1              | UIntegerT | R/W    |
| 0x0122                                                                                                                  | OUT2AlarmSuppressionDirection    | for which direction the suppression factor is used                           | 0             | (1) - Up<br>(2) - Down<br>(3) - Both                                 |           | 1              | UIntegerT | R/W    |

| Index [hex] | Object Name              | Definition                                                                                                                                            | Default value | Max Value                                                                                   | Min Value          | Length [Bytes] | Data Type | Access |
|-------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------|--------------------|----------------|-----------|--------|
| 0x0124      | OUT2AnalogNamurStandard  | If enabled (1) the analog output conforms with the NAMUR Standard NE42. If disabled (0) the analog output stays in his equivalent range (e.g. 4-20mA) | 1             | (1) - NAMUR disabled<br>(2) - NAMUR enabled                                                 |                    | 1              | UIntegerT | R/W    |
| 0x0125      | OUT2AnalogValue0mA       | The value from the slot used for the 0mA scaling point [LPM/°C]                                                                                       | 0,0           | OUT2AnalogValue20mA                                                                         | MRS                | 4              | FloatT    | R/W    |
| 0x0129      | OUT2AnalogValue4mA       | The value from the slot used for the 4mA scaling point [LPM/°C]                                                                                       | 0,0           | OUT2AnalogValue20mA                                                                         | MRS                | 4              | FloatT    | R/W    |
| 0x012D      | OUT2AnalogValue20mA      | The value from the slot used for the 20mA scaling point [LPM/°C]                                                                                      | 100,0         | MRE                                                                                         | OUT2AnalogValue0mA | 4              | FloatT    | R/W    |
| 0x0131      | OUT2AnalogValue0V        | The value from the slot used for the 0V scaling point [LPM/°C]                                                                                        | 0,0           | OUT2AnalogValue10V                                                                          | MRS                | 4              | FloatT    | R/W    |
| 0x0135      | OUT2AnalogValue2V        | The value from the slot used for the 2V scaling point [LPM/°C]                                                                                        | 0,0           | OUT2AnalogValue10V                                                                          | MRS                | 4              | FloatT    | R/W    |
| 0x0139      | OUT2AnalogValue10V       | The value from the slot used for the 10V scaling point [LPM/°C]                                                                                       | 100,0         | MRE                                                                                         | OUT2AnalogValue0V  | 4              | FloatT    | R/W    |
| 0x0150      | OUT2PulseVolume          | The volume represented by one pulse [L]                                                                                                               | 1,0           | 999,9                                                                                       | 0,000001           | 4              | FloatT    | R/W    |
| 0x0154      | OUT2PulseVolumeUnit      | Unit used for the pulse output                                                                                                                        | 1             | (1) - USER<br>(2) - L<br>(3) - mL<br>(3) - m3<br>(4) - galUS<br>(5) - galUK<br>(6) - Barrel |                    | 1              | UIntegerT | R/W    |
| 0x0155      | OUT2PulseVolumeUnit User | User Unit used for the pulse output                                                                                                                   | 1,0           | 9999,9                                                                                      | 0,001              | 4              | FloatT    | R/W    |
| 0x0159      | OUT2PulseWidth           | The width of each pulse [ms]                                                                                                                          | 1             | 20000                                                                                       | 1                  | 2              | UIntegerT | R/W    |
| 0x015B      | OUT2FrequencyatFS        | The max. frequency for the output [Hz]                                                                                                                | 500           | 1000                                                                                        | 50                 | 2              | UIntegerT | R/W    |
| 0x015D      | OUT2FrequencyOverflow    | The overflow frequency of the max frequency [%]                                                                                                       | 1             | 100                                                                                         | 0                  | 1              | UIntegerT | R/W    |
| 0x015E      | OUT2FrequencyValue0Hz    | The value from the slot used for the 0Hz scaling point [LPM/°C]                                                                                       | 0,0           | OUT2FrequencyValueMaxHz                                                                     | MRS                | 4              | FloatT    | R/W    |

| Index [hex]     | Object Name                      | Definition                                                                                                                                          | Default value | Max Value                                                                                                                                          | Min Value              | Length [Bytes] | Data Type | Access |
|-----------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|-----------|--------|
| 0x0162          | OUT2FrequencyValueMaxHz          | The value from the slot used for the max Hz scaling point [LPM/°C]                                                                                  | 100,0         | MRE                                                                                                                                                | OUT2FrequencyValue0 Hz | 4              | FloatT    | R/W    |
| 0x0166          | OUT1CtrlFunction                 | Controlinputfunction -> Off or Memoryreset                                                                                                          | 0             | 1                                                                                                                                                  | 0                      | 1              | UIntegerT | R/W    |
| <b>Output 2</b> |                                  |                                                                                                                                                     |               |                                                                                                                                                    |                        |                |           |        |
| 0x0177          | OUT2Source                       | Source for the output                                                                                                                               | 0             | (1) - Flow<br>(2) - Volume<br>(3) - Temperature<br>(4) - Part Volume                                                                               |                        | 1              | UIntegerT | R/W    |
| 0x0178          | OUT2Type                         | Configuration of the output -> 0-20mA, Pulse, Frequency, etc.                                                                                       | 0             | (1) - disabled<br>(2) - Alarm Output<br>(2) - 4-20mA<br>(3) - 0-20mA<br>(4) - 2-10V<br>(5) - 0-10V<br>(6) - Pulse Output<br>(7) - Frequency Output |                        | 1              | UIntegerT | R/W    |
| 0x0179          | OUT2AlarmFunction                | Limit or window function for the alarm output                                                                                                       | 0             | (1) - Limit<br>(2) - Window                                                                                                                        |                        | 1              | UIntegerT | R/W    |
| 0x017A          | OUT2AlarmOutputType              | Alarmoutput NPN, PNP or Pushpull                                                                                                                    | 0             | (1) - NPN<br>(2) - PNP<br>(3) - PushPull                                                                                                           |                        | 1              | UIntegerT | R/W    |
| 0x017B          | OUT2AlarmSwitchFunction          | Alarmoutput normally opened or closed                                                                                                               | 0             | (1) - normally opened<br>(2) - normally closed                                                                                                     |                        | 1              | UIntegerT | R/W    |
| 0x017C          | OUT2AlarmThreshold [LPM/°C]      | Threshold for the alarmoutput                                                                                                                       | 1,0           | MRE                                                                                                                                                | MRS                    | 4              | FloatT    | R/W    |
| 0x0180          | OUT2AlarmLowerThreshold [LPM/°C] | Threshold for the alarmoutput used by the windowfunction                                                                                            | 1,0           | OUT2AlarmThreshold                                                                                                                                 | MRS                    | 4              | FloatT    | R/W    |
| 0x0184          | OUT2AlarmHysteresis [LPM/°C]     | Switching hysteresis for the alarmoutput                                                                                                            | 1,0           | (MRE-MRS)                                                                                                                                          | 0,0                    | 4              | FloatT    | R/W    |
| 0x0188          | OUT2AlarmSuppressionFactor       | How many times the threshold must be hit in order to switch the alarm output                                                                        | 0             | 60                                                                                                                                                 | 0                      | 1              | UIntegerT | R/W    |
| 0x0189          | OUT2AlarmSuppressionDirection    | for which direction the suppression factor is used                                                                                                  | 0             | (1) - Up<br>(2) - Down<br>(3) - Both                                                                                                               |                        | 1              | UIntegerT | R/W    |
| 0x018B          | OUT2AnalogNamurStandard          | If enabled (1) the analogoutput conforms with the NAMUR Standard NE42. If disabled (0) the analogoutput stays in his equivalent range (e.g. 4-20mA) | 1             | (1) - NAMUR disabled<br>(2) - NAMUR enabled                                                                                                        |                        | 1              | UIntegerT | R/W    |

| Index [hex] | Object Name              | Definition                                                         | Default value | Max Value                                                                                   | Min Value             | Length [Bytes] | Data Type | Access |
|-------------|--------------------------|--------------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------|-----------------------|----------------|-----------|--------|
| 0x018C      | OUT2AnalogValue0mA       | The value from the slot used for the 0mA scaling point [LPM/°C]    | 0,0           | OUT2Analog Value20mA                                                                        | MRS                   | 4              | FloatT    | R/W    |
| 0x0190      | OUT2AnalogValue4mA       | The value from the slot used for the 4mA scaling point [LPM/°C]    | 0,0           | OUT2Analog Value20mA                                                                        | MRS                   | 4              | FloatT    | R/W    |
| 0x0194      | OUT2AnalogValue20mA      | The value from the slot used for the 20mA scaling point [LPM/°C]   | 100,0         | MRE                                                                                         | OUT2Analog Value0mA   | 4              | FloatT    | R/W    |
| 0x0198      | OUT2AnalogValue0V        | The value from the slot used for the 0V scaling point [LPM/°C]     | 0,0           | OUT2Analog Value10V                                                                         | MRS                   | 4              | FloatT    | R/W    |
| 0x019C      | OUT2AnalogValue2V        | The value from the slot used for the 2V scaling point [LPM/°C]     | 0,0           | OUT2Analog Value10V                                                                         | MRS                   | 4              | FloatT    | R/W    |
| 0x01A0      | OUT2AnalogValue10V       | The value from the slot used for the 10V scaling point [LPM/°C]    | 100,0         | MRE                                                                                         | OUT2Analog Value0V    | 4              | FloatT    | R/W    |
| 0x01B7      | OUT2PulseVolume          | The volume represented by one pulse [L]                            | 1,0           | 999,9                                                                                       | 0,000001              | 4              | FloatT    | R/W    |
| 0x01BB      | OUT2PulseVolumeUnit      | Unit used for the pulse output                                     | 1             | (1) - USER<br>(2) - L<br>(3) - mL<br>(3) - m3<br>(4) - galUS<br>(5) - galUK<br>(6) - Barrel |                       | 1              | UIntegerT | R/W    |
| 0x01BC      | OUT2PulseVolumeUnit User | User Unit used for the pulse output                                | 1,0           | 9999,9                                                                                      | 0,001                 | 4              | FloatT    | R/W    |
| 0x01C0      | OUT2PulseWidth           | The width of each pulse [ms]                                       | 1             | 20000                                                                                       | 1                     | 2              | UIntegerT | R/W    |
| 0x01C2      | OUT2FrequencyatFS        | The max. frequency for the output [Hz]                             | 500           | 1000                                                                                        | 50                    | 2              | UIntegerT | R/W    |
| 0x01C4      | OUT2FrequencyOverflow    | The overflow frequency of the max frequency [%]                    | 1             | 100                                                                                         | 0                     | 1              | UIntegerT | R/W    |
| 0x01C5      | OUT2FrequencyValue0Hz    | The value from the slot used for the 0Hz scaling point [LPM/°C]    | 0,0           | OUT2FrequencyValueMaxHz                                                                     | MRS                   | 4              | FloatT    | R/W    |
| 0x01C9      | OUT2FrequencyValueMaxHz  | The value from the slot used for the max Hz scaling point [LPM/°C] | 100,0         | MRE                                                                                         | OUT2FrequencyValue0Hz | 4              | FloatT    | R/W    |

| Index [hex]    | Object Name                  | Definition                                                                              | Default value  | Max Value                                                                                                                                                        | Min Value          | Length [Bytes] | Data Type | Access |
|----------------|------------------------------|-----------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------|-----------|--------|
| <b>Dosing</b>  |                              |                                                                                         |                |                                                                                                                                                                  |                    |                |           |        |
| 0x01DE         | DosingValue                  | Dosingvalue [L]                                                                         | 0,0            | 9999,9                                                                                                                                                           | 0,0                | 4              | FloatT    | R/W    |
| 0x01E2         | DosingCorrectionValue        | Correction value which is added to the dosing value for the complete dosing counter [L] | 0,0            | Dosing Value                                                                                                                                                     | minus Dosing Value | 4              | FloatT    | R/W    |
| 0x01E6         | DosingUnit                   | Unit used for the dosing function                                                       | 1              | (1) - USER<br>(2) - L<br>(3) - mL<br>(3) - m3<br>(4) - galUS<br>(5) - galUK<br>(6) - Barrel                                                                      |                    | 1              | UIntegerT | R/W    |
| 0x01E7         | DosingUnitUser               | User Unit used for the dosing function                                                  | 1,0            | 9999,9                                                                                                                                                           | 0,001              | 4              | FloatT    | R/W    |
| 0x01EB         | DosingTimeout                | Timeout [s] for no flow                                                                 | 0,5            | 10,0                                                                                                                                                             | 0,5                | 4              | FloatT    | R/W    |
| 0x01EF         | DosingCounter                | Saved dosing volume counter stats                                                       | 0,0            | 999999,0                                                                                                                                                         | -999999,0          | 4              | FloatT    | R      |
| <b>Service</b> |                              |                                                                                         |                |                                                                                                                                                                  |                    |                |           |        |
| 0x01F3         | ServiceUserPassword          | Password for user service menu and main menu                                            | 0              | 99999                                                                                                                                                            | 0                  | 4              | UIntegerT | R/W    |
| 0x01F7         | ServiceUserMenuLocked        | Whether main menu is locked or not                                                      | 0              | (1) - not locked<br>(2) - locked                                                                                                                                 |                    | 1              | UIntegerT | R/W    |
| 0x01F8         | SimulationAutoStop           | Auto stop for Simulation after time [min]                                               | 10             | 31                                                                                                                                                               | 1                  | 1              | UIntegerT | R/W    |
| <b>Misc</b>    |                              |                                                                                         |                |                                                                                                                                                                  |                    |                |           |        |
| 0x01FA         | LanguageSelection            | Language selection                                                                      | 0              | (1) - English<br>(2) - German<br>(3) - French<br>(4) - Spanish                                                                                                   |                    | 1              | UIntegerT | R/W    |
| 0x028A         | OperatingHoursCount          | Operating hours counter                                                                 | 0              | 4294967296                                                                                                                                                       | 0                  | 4              | UIntegerT | R      |
| 0x028F         | ProductionProductVariantName | Product Variant Name                                                                    | XXX-XXXXXXXXXX |                                                                                                                                                                  |                    | 16             | StringT   | R      |
| 0x029F         | ProductionProductTypeKey     | Product Type Key                                                                        | XXX-XXXXXXXXXX |                                                                                                                                                                  |                    | 16             | StringT   | R      |
| <b>Flow</b>    |                              |                                                                                         |                |                                                                                                                                                                  |                    |                |           |        |
| 0x02F5         | CutOff                       | Cut off for flow value [LPM]                                                            | 0,0            | MRE                                                                                                                                                              | 0.0                | 4              | FloatT    | R/W    |
| 0x02F9         | Unit                         | Unit used for flow                                                                      | 1              | (1) - USER<br>(2) - L/m<br>(3) - mL/m<br>(4) - L/h<br>(4) - m3/h<br>(5) - galUS/m<br>(6) - galUS/h<br>(7) - galUK/m<br>(8) - galUK/h<br>(9) - L/s<br>(10) - mL/s |                    | 1              | UIntegerT | R/W    |

| Index [hex]        | Object Name        | Definition                                                   | Default value | Max Value                                                                                   | Min Value | Length [Bytes] | Data Type | Access |
|--------------------|--------------------|--------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------|-----------|----------------|-----------|--------|
| 0x02FA             | UserUnit           | User Unit used for flow                                      | 1,0           | 9999,9                                                                                      | 0,001     | 4              | FloatT    | R/W    |
| 0x0313             | SimMode            | Mode of the Simulation:<br>Static, Triangle or Monotonic     | 0             | (1) - Static<br>(2) - Triangle<br>(3) - Monotonic                                           |           | 1              | UIntegerT | R/W    |
| 0x0314             | SimStartValue      | Value to start with the simulation [LPM]                     | 0,0           | 99999,99                                                                                    | -99999,99 | 4              | FloatT    | R/W    |
| 0x0318             | SimIncrementValue  | Incrementation value of the simulation [LPM]                 | 10,0          | 99999,99                                                                                    | -99999,99 | 4              | FloatT    | R/W    |
| 0x031C             | SimNumberIntervals | Number of intervals to simulation                            | 20            | 65000                                                                                       | 1         | 2              | UIntegerT | R/W    |
| 0x031E             | SimTimingIntervals | Timing in ms between intervals                               | 50            | 50000                                                                                       | 10        | 2              | UIntegerT | R/W    |
| 0x0320             | ValueInSiUnit      | Saved flow value in SI unit [LPM]                            | 0,0           | 999999,0                                                                                    | -999999,0 | 4              | FloatT    | R      |
| 0x0324             | MinValueInSiUnit   | Saved min flow value in SI unit [LPM]                        | 0,0           | 999999,0                                                                                    | -999999,0 | 4              | FloatT    | R      |
| 0x0328             | MaxValueInSiUnit   | Saved max flow value in SI unit [LPM]                        | 0,0           | 999999,0                                                                                    | -999999,0 | 4              | FloatT    | R      |
| <b>Volume</b>      |                    |                                                              |               |                                                                                             |           |                |           |        |
| 0x0358             | CountingType       | counting type for a volume slot -> absolute or bidirectional | 0             | (1) - absolute<br>(2) - bidirectional                                                       |           | 1              | UIntegerT | R/W    |
| 0x035D             | Unit               | Unit used for volume                                         | 1             | (1) - USER<br>(2) - L<br>(3) - mL<br>(3) - m3<br>(4) - galUS<br>(5) - galUK<br>(6) - Barrel |           | 1              | UIntegerT | R/W    |
| 0x035E             | UserUnit           | User Unit used for volume                                    | 1,0           | 9999,9                                                                                      | 0,001     | 4              | FloatT    | R/W    |
| 0x0384             | ValueInSiUnit      | Saved volume value in SI unit                                | 0,0           | 999999,0                                                                                    | -999999,0 | 4              | FloatT    | R      |
| <b>Temperature</b> |                    |                                                              |               |                                                                                             |           |                |           |        |
| 0x03C1             | Unit               | Unit used for temperature                                    | 1             | (0) - USER<br>(1) - °C<br>(2) - °F                                                          |           | 1              | UIntegerT | R/W    |
| 0x03C2             | UserUnit           | User Unit used for temperature [°C]                          | 1,0           | 9999,9                                                                                      | 0,001     | 4              | FloatT    | R/W    |
| 0x03DB             | SimMode            | Mode of the Simulation:<br>Static, Triangle or Monotonic     | 0             | (1) - Static<br>(2) - Triangle<br>(3) - Monotonic                                           |           | 1              | UIntegerT | R/W    |
| 0x03DC             | SimStartValue      | Value to start with the simulation [°C]                      | 0,0           | 99999,99                                                                                    | -99999,99 | 4              | FloatT    | R/W    |
| 0x03E0             | SimIncrementValue  | Incrementation value of the simulation [°C]                  | 10,0          | 99999,99                                                                                    | -99999,99 | 4              | FloatT    | R/W    |
| 0x03E4             | SimNumberIntervals | Number of intervals to simulation                            | 20            | 65000                                                                                       | 1         | 2              | UIntegerT | R/W    |
| 0x03E6             | SimTimingIntervals | Timing in ms between intervals [ms]                          | 50            | 50000                                                                                       | 10        | 2              | UIntegerT | R/W    |

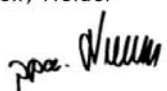
| Index [hex]        | Object Name        | Definition                                                   | Default value | Max Value                                                                                  | Min Value | Length [Bytes] | Data Type | Access |
|--------------------|--------------------|--------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------|-----------|----------------|-----------|--------|
| 0x03E8             | ValueInSiUnit      | Saved temperature value in SI unit [°C]                      | 0,0           | 999999,0                                                                                   | -999999,0 | 4              | FloatT    | R      |
| 0x03EC             | MinValueInSiUnit   | Saved min temperature value in SI unit [°C]                  | 0,0           | 999999,0                                                                                   | -999999,0 | 4              | FloatT    | R      |
| 0x03F0             | MaxValueInSiUnit   | Saved max temperature value in SI unit [°C]                  | 0,0           | 999999,0                                                                                   | -999999,0 | 4              | FloatT    | R      |
| <b>Part Volume</b> |                    |                                                              |               |                                                                                            |           |                |           |        |
| 0x0420             | CountingType       | counting type for a volume slot -> absolute or bidirectional | 0             | (1) - absolute<br>(2) - bidirectional                                                      |           | 1              | UIntegerT | R/W    |
| 0x0425             | Unit               | Unit used for part volume                                    | 1             | (1) - USER<br>(2) - L<br>(3) - mL<br>(3)- m3<br>(4) - galUS<br>(5) - galUK<br>(6) - Barrel |           | 1              | UIntegerT | R/W    |
| 0x0426             | UserUnit           | User Unit used for part volume                               | 1,0           | 9999,9                                                                                     | 0,001     | 4              | FloatT    | R/W    |
| 0x043F             | SimMode            | Mode of the Simulation: Static, Triangle or Monotonic        | 0             | (1) - Static<br>(2) - Triangle<br>(3) - Monotonic                                          |           | 1              | UIntegerT | R/W    |
| 0x0440             | SimStartValue      | Value to start with the simulation                           | 0,0           | 99999,99                                                                                   | -99999,99 | 4              | FloatT    | R/W    |
| 0x0444             | SimIncrementValue  | Incrementation value of the simulation                       | 10,0          | 99999,99                                                                                   | -99999,99 | 4              | FloatT    | R/W    |
| 0x0448             | SimNumberIntervals | Number of intervals to simulation                            | 20            | 65000                                                                                      | 1         | 2              | UIntegerT | R/W    |
| 0x044A             | SimTimingIntervals | Timinig in ms between intervals                              | 50            | 50000                                                                                      | 10        | 2              | UIntegerT | R/W    |
| 0x044C             | ValueInSiUnit      | Saved part volume value in SI unit                           | 0,0           | 999999,0                                                                                   | -999999,0 | 4              | FloatT    | R      |

## Legend:

MRE - Measuring Range End

MRS - Measuring Range Start

## 19. Manufacturer's declaration

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                     |                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                     |  |
| <b>MANUFACTURER'S DECLARATION<br/>OF CONFORMITY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                     |                                                                                     |
| <p><b>We:</b></p> <p><b>Kobold Messring GmbH</b><br/>         Nordring 22-24<br/>         65719 Hofheim<br/>         Germany</p>                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                     |                                                                                     |
| <p><b>declare under our own responsibility that the product(s):</b></p> <p>DUK-*****C3T0      IO-Link Device</p>                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                     |                                                                                     |
| <p><b>to which this declaration refers conform to:</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> IO-Link Interface and System Specification, V1.1.3, June 2019 (NOTE 1,2)</li> <li><input checked="" type="checkbox"/> IO Device Description, V1.1.3, January 2021</li> <li><input checked="" type="checkbox"/> Additional conformance to Device Profiles<br/>(If checked refer to Part A on page 2)</li> <li><input type="checkbox"/> Conformance exceptions<br/>(If checked refer to Part B on page 2)</li> </ul> |                                                                                                                                                                                     |                                                                                     |
| <p><b>The conformity tests are documented in the test report(s):</b></p> <p><i>IO-Link_Device_Test_Report_DUK-C3T0_220905.pdf</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                     |                                                                                     |
| <p><b>Issued at Hofheim, 25.11.2022</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                     |                                                                                     |
| <p><b>Authorized signatory</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                     |                                                                                     |
| <p><b>Name:</b> Hans Volz</p> <p><b>Title:</b> General Manager</p> <p><b>Signature:</b> </p>                                                                                                                                                                                                                                                                                                                                                                          | <p><b>Name:</b> Manfred Wenzel</p> <p><b>Title:</b> Proxy Holder</p> <p><b>Signature:</b> </p> |                                                                                     |
| <small>Reproduction and all distribution without written authorization prohibited</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                     |                                                                                     |
| <small>NOTE 1 Relevant Test specification is V1.1.3, January 2021</small><br><small>NOTE 2 Additional validity in Package 2020 and Corrigendum</small>                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                     | <small>MD-Version: V1.1.3 / 2022-01</small>                                         |

**Part A - Additional conformance to Device Profiles**

|                                     | Specification                                                                   |
|-------------------------------------|---------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | IO-Link Common Profile Specification, V1.1, Dec. 2021                           |
| <input type="checkbox"/>            | IO-Link Profile BLOB Transfer & Firmware Update Specification, V1.1, Sept. 2019 |
| <input type="checkbox"/>            | IO-Link Smart Sensors 2 <sup>nd</sup> Edition Specification, V1.1, Sept. 2021   |

**Part B - Conformance exceptions**

| We herewith declare the following deviations to the related specifications | Reason |
|----------------------------------------------------------------------------|--------|
| none                                                                       | -      |

## 20. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Nordring 22-24, 65719 Hofheim, Germany, declare under our sole responsibility that the product:

**Ultrasonic Flowmeter/ -Monitor/ -Counter/ -Dosing Unit      Model: DUK-...**

to which this declaration relates is in conformity with the following EU directives stated below:

|                    |                                |
|--------------------|--------------------------------|
| <b>2011/65/EU</b>  | <b>RoHS</b> (category 9)       |
| <b>2015/863/EU</b> | Delegated Directive (RoHS III) |

Also, the following standards are fulfilled:

### **EN IEC 63000:2018**

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

Additional for L/F/S electronics options and K/E/G electronics compact:

### **EN IEC 61326-1:2021**

Electrical equipment for measurement, control and laboratory use – EMC requirements - Part 1: General requirements, Industrial area  
For electronics options L3/F3 and S3: Measurement of the immunity to interference from the HF field up to 1 GHz

|                   |                      |
|-------------------|----------------------|
| <b>2014/30/EU</b> | <b>EMC Directive</b> |
|-------------------|----------------------|

Additional for electronics option C3T0 and C30/C34 electronics:

### **EN IEC 61326-1:2021**

Electrical equipment for measurement, control and laboratory use – EMC requirements - Part 1: General requirements, Industrial area

|                   |                      |
|-------------------|----------------------|
| <b>2014/30/EU</b> | <b>EMC Directive</b> |
|-------------------|----------------------|

Hofheim, 10 October 2023



H. Volz  
General Manager

J. Burke  
Compliance Manager

## 21. UK Declaration of Conformity

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We, KOBOLD Messring GmbH, Nordring 22-24, 65719 Hofheim, Germany, declare under our sole responsibility that the product:

**Ultrasonic Flowmeter/ -Monitor/ -Counter/ -Dosing Unit      Model: DUK-...**

to which this declaration relates is in conformity with the following UK directives stated below:

**S.I. 2012/3032**      The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Also, the following standards are fulfilled:

**BS EN IEC 63000:2018**

Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Additional for L/F/S electronics options and K/E/G electronics compact:

**BS EN IEC 61326-1:2021**

Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements, Industrial area, Measurement of the immunity to interference from the HF field up to 1 GHz

**S.I. 2016/1091      Electromagnetic Compatibility Regulations 2016**

Additional for electronics option C3T0 and C30/C34 electronics:

**BS EN IEC 61326-1:2021**

Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements, Industrial area

**S.I. 2016/1091      Electromagnetic Compatibility Regulations 2016**

Hofheim, 10 October 2023



H. Volz  
General Manager

J. Burke  
Compliance Manager