Condensed Instructions

IFC 020 K
IFC 020 F
IFC 020 E

Signal converters for electromagnetic flowmeters

Contents

1 Electrical connection: Power 1/1-1/8
2 Electrical connection: Outputs 2/1-2/4
3 Start-up 3/1
4 Operator control of signal converter 4/1-4/4

PLEASE NOTE
These concise instructions do not include the following: device description, technical data, standards, approvals, etc., nor conditions pertaining to product liability and warranty. The operator is, however, obligated to take note of these sections in the detailed Installation and Operating Instructions.
**Part A  System installation and start-up**

1. **Electrical connection: power supply**

1.1 **Important installation notes** PLEASE NOTE !

1.1.1 **Location**
- **Electrical connection in accordance with VDE 0100** "Regulations governing heavy-current installations with line voltages up to 1000 V" or **equivalent national regulations.**
- **Do not cross or loop cables inside the terminal compartment.**
- **Use separate cable entries** (see below) for power supply, field current cables, signal lines, outputs and inputs.
- **Protect flowmeters or switchgear cabinets with built-in devices from direct sunlight.**
  - Fit a sunshade if necessary.
- **When installed in switchgear cabinets, signal converters must be adequately cooled,** e.g. use fans or heat exchangers.
- **Do not expose signal converters to intense vibration.**

1.1.2 **Only for separate systems/signal converters (F- and E versions)**
- **Keep distance between primary head and signal converter** as short as possible.
  - Refer to Sect. 1.3.4 for maximum permissible length of signal and field current cables.
- **Use the supplied Krohne signal cable A** (Type DS), standard length 10 m (33 ft).
- **Always calibrate primary head and signal converter together.** Therefore, when installing, ensure **primary constant GKL is identical**; refer to instrument nameplate for the primary head. If the GKL is not identical, set the signal converter to the GKL of the primary head. Refer also to Sections 4.
- **Dimensions of signal converter;** refer to Section 10.4.

1.1.3 **Cable entries (K- and F- versions)**

**Number of cable entries:**
- 2 for the compact flowmeters
- 4 for the separate IFC 020 F signal converter

**NOTE:** Ensure gaskets are fitted correctly and maintain the following max. torques!

1. **Max. torques for PG 13.5, 1/2" NPT or 1/2" PF adapters:** 4 Nm / 2.8 ft x lbf

2. **Max. torques for PG 13.5 only:** 3 Nm / 2.1 ft x lbf

3. **Gasket**

A) **PG 13.5 cable entries**
These cable entries may only be used for flexible electrical cables if the relevant electrical regulations so allow, e.g. National Electric Code (NEC).
Do not fix rigid metal conduits (IMC) or flexible plastic conduits to the PG 13.5 cable entries, refer to “Point B, C” below (1/2" NPT or PF adapters).

B) **1/2" NPT adapters**
C) **1/2" PF adapters**
For most North American systems the regulations require that electrical conductors be laid in conduits, particularly where power voltages > 100 V AC are concerned.
In such cases, use the 1/2" NPT or 1/2" PF adapters to which flexible plastic conduits can be screwed. **Do not use rigid metal conduits (IMC)!**
Lay conduits such that no moisture can penetrate into the converter housing.
Should there be risk of any condensation water forming, fill the cross-section of the conduit around the cables at these adapters with a suitable sealing compound.
PLEASE NOTE !

- **Rated values:** The flowmeter housings protecting the electronic equipment from dust and moisture must always be kept closed. The selected creepage distances and clearances have been dimensioned in conformity with VDE 0110 and IEC 664 for contamination category 2. Supply circuits and output circuits are designed to meet the standards of overvoltage class II.

- **Safety isolation:** the flowmeters (signal converters) must be provided with an isolating facility.

### 1. AC Version

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>230/240 V AC (200 - 260 V AC)</td>
<td>switch-selectable to</td>
</tr>
<tr>
<td>115/120 V AC (100 - 130 V AC)</td>
<td>100 V AC (85 - 110 V AC)</td>
</tr>
</tbody>
</table>

- **Note information on instrument nameplate:** supply voltage and frequency

- The **PE protective ground conductor** for the power supply **must be connected** to the separate U-clamp terminal in the terminal compartment of the signal converter. For exceptions (compact systems), refer to installation instructions for the primary head.

### 2. AC Version

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 V AC (170 - 220 V AC)</td>
<td>switch-selectable to</td>
</tr>
</tbody>
</table>

- **Connection diagrams** for electrical connection between primary head and signal converter: refer to Section 1.3.5 and 1.3.6.

### DC Version (in preparation for IFC 020 E)

- **Note information on instrument nameplate:** supply voltage and frequency.

- For measurement reasons, connect an **FE functional ground conductor** to the separate U-clamp terminal in the terminal compartment of the signal converter.

- If connected to a functional extra-low voltage source (24 V AC / DC, 48 V AC), provide for **protective separation (PELV)** in conformity with VDE 0100 / VDE 0106 or IEC 364 / IEC 536, or equivalent national regulations.

- **Connection diagrams** for power supply and electrical connection between primary head and signal converter: refer to Section 1.3.6.

### Connection to power (K- and F- versions only)

**Power fuse F1**

- **Power fuse F1**
- **Power supply**
- **U-clamp terminal**

AC: 100 – 240 V
DC: 24 V

- PE protective conductor
- FE functional ground conductor

For internal use only

For electrical connection of the IFC 020 E power supply see Section 1.3.6, connection diagrams III to VI.
1.3 Electrical connection of separate primary heads (F- and E- versions)

1.3.1 General remarks on signal lines A and B and field current line C

Proper operation of the equipment is ensured when Krohne signal lines A and B are used with foil screen and magnetic shield.

- Signal lines must be firmly installed.
- Shields are connected via stranded drain wires.
- Underwater or underground routing is possible.
- Insulating material flame-retardant to IEC 332.1 / VDE 0742.
- Low-halogen, unplasticized signal lines which remain flexible at low temperatures.

**Signal line A (type DS) with double shielding**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stranded drain wire, 1st shield, 1.5 mm² or AWG 14</td>
</tr>
<tr>
<td>2</td>
<td>Insulation</td>
</tr>
<tr>
<td>3</td>
<td>Stranded wire 0.5 mm² or AWG 20 (3.1 red/3.2 white)</td>
</tr>
<tr>
<td>4</td>
<td>Special foil, 1st shield</td>
</tr>
<tr>
<td>5</td>
<td>Insulation</td>
</tr>
<tr>
<td>6</td>
<td>Mu-metal foil, 2nd shield</td>
</tr>
<tr>
<td>7</td>
<td>Stranded drain wire, 2nd shield, 0.5 mm² or AWG 20</td>
</tr>
<tr>
<td>8</td>
<td>Outer sheath</td>
</tr>
</tbody>
</table>

**Signal line B (type BTS) with triple shielding (bootstrap line), for IFC 020 E only**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dummy glider wire</td>
</tr>
<tr>
<td>2</td>
<td>Insulation (2.1 red/2.2 white)</td>
</tr>
<tr>
<td>3</td>
<td>Special foil, 1st shield (3.1/3.2)</td>
</tr>
<tr>
<td>4</td>
<td>Insulation (4.1/4.2)</td>
</tr>
<tr>
<td>5</td>
<td>Stranded wire 0.5 mm² or AWG 20 (5.1 red/5.2 white)</td>
</tr>
<tr>
<td>6</td>
<td>Stranded drain wire, 1st shield, 0.5 mm² or AWG 20 (6.1/6.2)</td>
</tr>
<tr>
<td>7</td>
<td>Special foil, 2nd shield</td>
</tr>
<tr>
<td>8</td>
<td>Stranded drain wire, 2nd shield, 1.5 mm² or AWG 14</td>
</tr>
<tr>
<td>9</td>
<td>Insulation</td>
</tr>
<tr>
<td>10</td>
<td>Mu-metal foil, 3rd shield</td>
</tr>
<tr>
<td>11</td>
<td>Stranded drain wire, 3rd shield, 0.5 mm² or AWG 20</td>
</tr>
<tr>
<td>12</td>
<td>Outer sheath</td>
</tr>
</tbody>
</table>

**Field current line C (single shielding with IFC 020 F)**

Line 2 x 0.75 mm² (18 AWG) Cu, 2 x 1.5 mm² (14 AWG) Cu or 2 x 2.5 mm² (12 AWG) Cu single shielding (Cu = copper cross section)

The cross section depends on the required cable length, see table in Section 1.3.4.

1.3.2 Grounding of primary head

- All flowmeters must be properly grounded.
- The grounding conductor should not transmit any interference voltages.
- Do not ground any other electrical device together with this conductor.
- The primary head is connected to ground by means of an **FE functional ground conductor**.
- Special information on grounding various primary heads is contained in the separate **installation instructions for primary heads**.
- These instructions also contain detailed descriptions on how to use grounding rings and how to install primary heads in metal or plastic pipes or internally coated pipelines.
Please note the different lengths given in the table for signal converter and primary head.

<table>
<thead>
<tr>
<th>Length (mm)</th>
<th>Converter</th>
<th>Primary head</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IFC 020 F + E</td>
<td>only IFC 020 E</td>
</tr>
<tr>
<td>Signal cable A</td>
<td>Signal cable B</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>55 (2.17)</td>
<td>70 (2.76)</td>
</tr>
<tr>
<td>b</td>
<td>10 (0.39)</td>
<td>50 (1.97)</td>
</tr>
<tr>
<td>c</td>
<td>15 (0.59)</td>
<td>25 (0.98)</td>
</tr>
<tr>
<td>d</td>
<td>8 (0.31)</td>
<td>8 (0.31)</td>
</tr>
<tr>
<td>e</td>
<td>–</td>
<td>50 (1.97)</td>
</tr>
<tr>
<td>f</td>
<td>–</td>
<td>8 (0.31)</td>
</tr>
</tbody>
</table>

**Customer-supplied materials**

- W Insulation tubing (PVC), Ø 2.0 - 2.5 mm (dia. 1"
- X Heat-shrinkable tubing or cable sleeve
- Y Wire end sleeve to DIN 41 228: E 1.5-8
- Z Wire end sleeve to DIN 41 228: E 0.5-8

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**Signal cable A** (Type DS) double shielding, for primary head and IFC 020 E

**Signal cable A** (Type DS) double shielding, for IFC 020 F

For cable fixation in signal converter housing IFC 020 F

see illustration in section 10.4

External shielding of signal cable A (Type DS)

Wrap stranded drain wire (7) around the mu-metal foil (6) and clamp under the shield terminal in the signal converter terminal box (see also diagram in Sect. 1.3.5).

**Signal line B** (Type BTS) with triple shielding (bootstrap), for IFC 020 E

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1.3.4 Cable lengths (max. distance between signal converter and primary head)

**Abbreviations and explanatory notes**
used in the following tables, diagrams and connection diagrams

A Signal cable A (type DS), with double shielding, see diagram A for max. length
B Signal line B (type BTS) with triple shielding, max. length see diagram B (IFC 020 E only)
C Field current cable min. cross-section ($A_F$) and max. length, (with single shielding for IFC 020 F), see Table
D High-temperature silicone cable, $3 \times 1.5 \text{ mm}^2$ (14 AWG) Cu, (with single shielding, max. length 5 m (16 ft))
E High-temperature silicone cable, $2 \times 1.5 \text{ mm}^2$ (14 AWG) Cu, max. length 5 m (16 ft)
AF Cross section of field current line C in Cu, see table
L Cable length
κ Electrical conductivity of the process liquid
ZD Intermediate connection box required in connection with cables D and E for primary heads ALTOFLUX IFS 4000 F, PROFIFLUX IFS 5000 F and VARIFLUX IFS 6000 F in cases where process temperatures exceed 150 °C (302 °F)

**Recommended length of signal cable A (Type DS) and B (Type BTS)**
(Signal cable B, Type BTS, for IFC 020 E only)

<table>
<thead>
<tr>
<th>Primary head</th>
<th>Meter size</th>
<th>Signal cable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DN mm</td>
<td>inch</td>
</tr>
<tr>
<td>AQUAFLOX F</td>
<td>10 - 1000</td>
<td>3/8 - 40</td>
</tr>
<tr>
<td>ECOFLUX IFS 1000 F</td>
<td>10 - 15</td>
<td>3/8 - 1/2</td>
</tr>
<tr>
<td></td>
<td>25 - 150</td>
<td>1 - 6</td>
</tr>
<tr>
<td>ALTOFLUX IFS 2000 F</td>
<td>150 - 250</td>
<td>6 - 10</td>
</tr>
<tr>
<td>ALTOFLUX IFS 4000 F</td>
<td>10 - 150</td>
<td>3/8 - 6</td>
</tr>
<tr>
<td></td>
<td>200 - 1000</td>
<td>8 - 40</td>
</tr>
<tr>
<td>PROFIFLUX IFS 5000 F</td>
<td>2.5 - 15</td>
<td>1/10 - 1/2</td>
</tr>
<tr>
<td></td>
<td>25 - 100</td>
<td>1 - 4</td>
</tr>
<tr>
<td>VARIFLUX IFS 6000 F</td>
<td>2.5 - 15</td>
<td>1/10 - 1/2</td>
</tr>
<tr>
<td></td>
<td>25 - 80</td>
<td>1 - 3</td>
</tr>
<tr>
<td>ALTOFLUX M 900</td>
<td>10 - 300</td>
<td>3/8 - 12</td>
</tr>
</tbody>
</table>

**Diagram A**

**Diagram B (for IFC 020 E only)**

Field current cable C: (for IFC 020 F single shielding!)

<table>
<thead>
<tr>
<th>Length</th>
<th>Cross section $A_F$ (Cu), minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 150 m</td>
<td>$2 \times 0.75 \text{ mm}^2$ Cu / $2 \times 18$ AWG</td>
</tr>
<tr>
<td>150 - 300 m</td>
<td>$2 \times 1.50 \text{ mm}^2$ Cu / $2 \times 14$ AWG</td>
</tr>
<tr>
<td>300 - 600 m</td>
<td>$2 \times 2.50 \text{ mm}^2$ Cu / $2 \times 12$ AWG</td>
</tr>
</tbody>
</table>
Important information on connection diagrams  

**PLEASE NOTE!**

- The figures in brackets indicate the stranded drain wires for the shields, see cross-sectional drawing of signal cable in Section 1.3.1.

- **Electrical connection to VDE 0100** "Regulations governing heavy-current installations with line voltages up to 1000 V" or equivalent national regulations.

- **PE** = protective conductor  
  **FE** = functional ground conductor

### Connection diagrams I and II (IFC 020 F signal converter and primary head) 1.3.5

#### I Process temperature < 150°C (302°F)

**IFC 020 F**

1. Signal cable A (Type DS)
2. Shield terminal for shielded signal cable
3. Field power cable
4. Shield terminal for shielded field power cable
5. Housing wall, signal converter
6. Cable entries

#### II Process temperature > 150°C (302°F)

**IFC 020 F**

1. Signal cable A (Type DS)
2. Shield terminal for shielded signal cable
3. Field power cable
4. Shield terminal for shielded field power cable
5. Housing wall, signal converter
6. Cable entries

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### 1.3.6 Connection diagrams III to VI (IFC 020 E signal converter and primary head)

#### Important information on connection diagrams  PLEASE NOTE!

- The figures in brackets indicate the stranded drain wires for the shields (see cross-sectional drawing of signal cable in Section 1.3.1).
- **Electrical connection to VDE 0100** "Regulations governing heavy-current installations with line voltages up to 1000 V" **or equivalent national regulations**.
- **24 V DC power supply** (in preparation): Functional extra-low voltage with protective separation in conformity with VDE 0100, Part 410 or equivalent national regulations.
- **For IFC 020 E, please note:** The internal bridges marked with * are needed for power supply > 100 V AC only.
- **PE** = Protective conductor  **FE** = Functional ground conductor

### Process temperature < 150°C (302°F)

<table>
<thead>
<tr>
<th>III</th>
<th>Signal cable A (type DS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram III" /></td>
<td><strong>IFC 020 E</strong></td>
</tr>
<tr>
<td>IV</td>
<td>Signal cable B (type BTS)</td>
</tr>
<tr>
<td><img src="image" alt="Diagram IV" /></td>
<td><strong>IFC 020 E</strong></td>
</tr>
</tbody>
</table>

---

### 图片说明

- **Diagram III**: Signal cable A (type DS) for IFC 020 E signal converter and primary head. It shows connections for process temperature < 150°C (302°F).
- **Diagram IV**: Signal cable B (type BTS) for IFC 020 E signal converter and primary head. It also shows connections for process temperature < 150°C (302°F).
Process temperature > 150°C (302°F)

**V** Signal cable A (type DS)

**VI** Signal cable B (type BTS)

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**IFC 020 E**

### Signal cable A (type DS)

- **Primary head**
- **Primary head**

### Signal cable B (type BTS)

- **Primary head**
- **Primary head**

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1/8
2 Electrical connection of outputs and inputs

2.1 Current output I

- The current output is galvanically isolated from all input and output circuits.
- Factory-set data and functions can be noted down in Sect. 5.16. Please also refer to Sect. 3.2 “Factory settings”.
- Typical current output
  
  ![Diagram of current output](image)
  
  - All operating data and functions can be set: Operation see section 4 and 5.6 function 1.05.
  - The current output can also be used as an internal voltage source for the outputs. $U_{int} = 15 \text{ V DC}$ $I = 23 \text{ mA}$ when operated without receiver instruments at the current output $I = 3 \text{ mA}$ when operated with receiver instruments at the current output
  - Connection diagrams, see Sect. 2.4: diagrams 1 2 4 6
  - For Connection and operation with HART®-interface see section 6.1.

2.2 Pulse output P and status output S

- The pulse and status outputs are galvanically isolated from the current output and all input circuits.
- Factory-set data and functions can be noted down in Sect. 5.16. Please also refer to Sect. 3.2 “Factory settings”.
- Typical pulse and status outputs
  
  ![Diagram of pulse and status outputs](image)
  
  - All operating data and functions can be set: Operation see section 4 and 5.7 function 1.06 and 1.07.
  - The pulse and status outputs can be operated in the active or passive mode.
  - Active mode: The current output is the internal voltage source, connection of electronic totalizers (EC)
  - Passive mode: External DC or AC voltage source required, connection of electronic (EC) or electromechanical (EMC) totalizers
  - Digital pulse division, interpulse period is non-uniform. Therefore, if frequency meters or cycle counters are connected, allow for minimum counting interval:
    
    \[
    \text{gate time, counter} \leq \frac{1000}{P_{100\%} [\text{Hz}]} 
    \]
  - Connection diagrams see Sect. 2.4: diagrams - pulse output 3 4
    
    diagrams - status output 5 6
### Characteristics of the status outputs

<table>
<thead>
<tr>
<th></th>
<th>Switch open</th>
<th>Switch closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF (switched off)</td>
<td>Off (switched off)</td>
<td>without function</td>
</tr>
<tr>
<td>ON (e.g. operation indicator)</td>
<td>Power supply OFF</td>
<td>Power supply ON</td>
</tr>
<tr>
<td>F/R INDICATOR (F/R mode)</td>
<td>Forward flow</td>
<td>Reverse flow</td>
</tr>
<tr>
<td>TRIP POINT (Limit switch)</td>
<td>Inactive</td>
<td>Active</td>
</tr>
<tr>
<td>ALL ERRORS (all errors)</td>
<td>Errors</td>
<td>No errors</td>
</tr>
<tr>
<td>FATAL ERRORS (fatal errors only)</td>
<td>Errors</td>
<td>No errors</td>
</tr>
</tbody>
</table>

**Control input E (with IFC 020 E only) 2.3**

- The control inputs are galvanically isolated from the current output and all input circuits.
- Setting data and functions can be noted down in section 5.16.
  Please also refer to Sect. 3.2 “Factory settings”.
- Typical current input E

![Connection diagram](#)

- All operating data and functions can be set:
  Operation see section 4 and 5.18 Fct. 1.08.
- The control inputs must be operated in the passive mode.

### Function of the control inputs

<table>
<thead>
<tr>
<th>Function</th>
<th>Function description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>switched off</td>
</tr>
<tr>
<td>TOTAL.RESET</td>
<td>reset totalizer(s)</td>
</tr>
<tr>
<td>ERROR.RESET</td>
<td>delete error messages</td>
</tr>
<tr>
<td>OUTP. HOLD</td>
<td>hold value of outputs</td>
</tr>
</tbody>
</table>

**Connection diagram**, see Sect. 2.4: diagram 7
## 2.4 Input / output connection diagrams

### Terminal identification

<table>
<thead>
<tr>
<th>Letter</th>
<th>Description</th>
<th>Code</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>X2 IFC 020 E separated, 19&quot; plug-in unit, connection</td>
<td></td>
<td>RS 485</td>
</tr>
<tr>
<td>F</td>
<td>IFC 020 F separated, field housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>IFC 020 K compact</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### I Current output

- **Active mode**
  - The current output supplies the power for operation of the outputs and inputs.

- **Passive mode**
  - External power source required for operation of the outputs and inputs.

### P Pulse output

### S Status output

### C Control input (IFC 020 E only)

### RS 485 Interface

### Active mode

For connection and operation of the HART® interface, see section 6.1. Burden (load) at HART® operation ranges between min. 250 Ω and max. 500 Ω.

### Passive mode

#### Pulse output P_{passive}

- for electronic (EC) or electromechanical (EMC) totalizers

#### Pulse output P_{active} (and current output I_{active})

- for electronic (EC) totalizers with and without current output I

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2/3
### Status output $S_{\text{passive}}$

<table>
<thead>
<tr>
<th>$d_{14}$</th>
<th>$d_{12}$</th>
<th>$z_{6}$</th>
<th>$z_{4}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S$</td>
<td>$P$</td>
<td>$P$</td>
<td></td>
</tr>
</tbody>
</table>

$U_{\text{ext}} \leq 30 \, \text{V DC}/\leq 24 \, \text{V AC}$

$I_{\text{max}} \leq 150 \, \text{mA}$

(incl. pulse output P)

### Control input $E_{\text{passive}}$

(IFC 020 E only)

$U_{\text{ext}} \leq 30 \, \text{V DC}/\leq 24 \, \text{V AC}$

$I_{\text{max}} \leq 6 \, \text{mA}$

### Status output $S_{\text{active}}$

with and without current output I

### RS 485 Interface

For connection and operation of the Krohne RS 485 Interface, see section 6.2.

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## Error messages in measuring mode 2.5

The following list gives all errors that can occur during process flow measurement. Errors shown in display when “YES” set in Fct. 1.04 DISPLAY, subfunction “DISP. MSG.”.

<table>
<thead>
<tr>
<th>Error messages</th>
<th>Description of error</th>
<th>Error clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE INT.</td>
<td>Power failure Note: no counting during power failure</td>
<td>Cancel error in RESET/QUIT. menu Reset totalizer if necessary.</td>
</tr>
<tr>
<td>CUR. OUTP. I</td>
<td>Current output overranged. (Flow &gt; measuring rage)</td>
<td>Check and if necessary correct instrument parameters. After elimination of cause, error message deleted automatically.</td>
</tr>
<tr>
<td>PULSOUTP. P</td>
<td>Pulse output overranged. Note: totalizer deviation possible.</td>
<td>Check and if necessary correct instrument parameters. After elimination of cause, error message deleted automatically.</td>
</tr>
<tr>
<td>TOTALIZER</td>
<td>Totalizer has been reset</td>
<td>Cancel error message in RESET/QUIT. menu, see section 4.6.</td>
</tr>
<tr>
<td>ADC</td>
<td>Analog / digital converter overranged</td>
<td>Error message deleted automatically after elimination of cause.</td>
</tr>
<tr>
<td>FATAL. ERROR</td>
<td>Fatal error, all outputs set to “min. values”</td>
<td>Please consult factory.</td>
</tr>
</tbody>
</table>
3 Start-up

3.1 Power-on and measurement

• Before powering the system, please check that it has been correctly installed according to Sect. 1 and 2.
• The flowmeter is delivered ready for operational use. All operating data have been factory set in accordance with your specifications. Please refer to Sect. 3.2 “factory settings”.
• Power the unit, and the flowmeter will immediately start process flow measurement.
• When powered, the display shows in succession: START UP and READY. This is followed by display of the current flow rate and/or the current totalizer count on either a continuous or alternating basis, depending on the setting under Fct. 1.04.
• Refer to Sect. 4 and 5 for operator control of the “display version”.

3.2 Factory setting

All operating data are factory set according to your order specifications.

If you have not made any particular specifications at the time of ordering, the instruments will be delivered with the standard parameters and functions listed in the Table below.

To facilitate easy and rapid initial start-up, current output and pulse output are set to process flow measurement in “2 flow directions”, so that the current flowrate is displayed and the volumetric flow counted independent of the flow direction. On instruments equipped with a display, measured values may possibly be shown with a “ – ” sign.

This factory setting for the current and pulse outputs may possibly lead to measuring errors, particularly in the case of volume flow counting:

for example, if pumps are switched off and a “backflow” occurs which is not within the range of the low-flow cutoff (SMU), or if separate displays and counts are required for both flow directions.

To avoid faulty measurements, therefore, it may be necessary to change the factory setting of some or all of the following functions:

– low-flow cutoff SMU, Fct. 1.03, Sect. 5.3
– current output I, Fct. 1.05, Sect. 5.6
– pulse output P, Fct. 1.06, Sect. 5.7
– display (option), Fct. 1.04, Sect. 5.4

Operation see Section 4 and 5.

Standard factory settings

<table>
<thead>
<tr>
<th>Function</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.01 Full-scale range $Q_{100%}$</td>
<td>see nameplate</td>
</tr>
<tr>
<td>1.02 Time constant</td>
<td>3 s, for I, S and display</td>
</tr>
<tr>
<td>1.03 Low-flow cutoff SMU</td>
<td>ON: 1 % OFF: 2 %</td>
</tr>
<tr>
<td>1.04 Display (option) flow rate totalizer(s)</td>
<td>m³/hr or US Gal/min m³ or US Gal</td>
</tr>
<tr>
<td>1.05 Current output I function range error message</td>
<td>2 directions 4 - 20 mA 22 mA</td>
</tr>
<tr>
<td>1.06 Pulse output P function pulse value pulse width</td>
<td>2 directions 1 pulse/s 50 ms</td>
</tr>
<tr>
<td>1.07 Status output S</td>
<td>flow directions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.08 Control input</td>
<td>off</td>
</tr>
<tr>
<td>3.01 Language for display only</td>
<td>English</td>
</tr>
<tr>
<td>3.02 Flowmeter diameter flow direction (see arrow on primary head)</td>
<td>see nameplate + direction</td>
</tr>
<tr>
<td>3.04 Entry code</td>
<td>no</td>
</tr>
<tr>
<td>3.05 User unit</td>
<td>Liter/hr or US MGal/day</td>
</tr>
<tr>
<td>3.06 Application</td>
<td>steady</td>
</tr>
<tr>
<td>3.07 Measuring point</td>
<td>Altimeter</td>
</tr>
<tr>
<td>3.08 Communication interface</td>
<td>off</td>
</tr>
</tbody>
</table>
Teil B  IFC 020 / D  Signal converter

Operation of the signal converter

Krohne operator control concept

1.00  OPERATION

2.00  TEST

3.00  INSTALL.

Menu column

Function column

Data column

1.01  FULL SCALE
1.02  TIMECONST.
1.03  L.F. CUTOFF
1.04  DISPLAY
1.05  CUR. OUTP. I
1.06  PULS. OUTP. P
1.07  STATUS. S
1.08  CONTROL E
2.01  TEST Q
2.02  HARDW. INFO
3.01  LANGUAGE
3.02  FLOWMETER
3.03  ZERO SET
3.04  ENTRY CODE
3.05  USER UNIT
3.06  APPLICATION
3.07  MES. POINT
3.08  COM

Direction of movement:

Measuring mode

When this display appears, press following keys:

→ → → ↓↓↓ ↑↑↑

see Sect. 4.4
### 4.2 Table of settable functions

<table>
<thead>
<tr>
<th>Fct.</th>
<th>Text</th>
<th>Description and settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>OPERATION</td>
<td>Operations menu</td>
</tr>
</tbody>
</table>
| 1.01 | FULL SCALE | Full-scale range for flowrate $Q_{100\%}$
Select unit
- **m³/hr**
- **Liter/Sec**
- **US.Gal/min**
- user unit, factory set is “Liter/hr” or “US MGal/day” (see Fct. 3.05)

**Press → key to transfer to number setting.**

**Setting ranges**
The ranges are dependent on the meter size (DN) and the flow velocity (v):
$$Q_{\text{min}} = \frac{\pi}{4} \text{DN}^2 \times v_{\text{min}}$$
$$Q_{\text{max}} = \frac{\pi}{4} \text{DN}^2 \times v_{\text{max}}$$

Nom. dia./meter size | $v_{\text{min}} = 0.3 \text{ m/s (1 ft/s)}$ | $v_{\text{max}} = 12 \text{ m/s (40 ft/s)}$
---|---|---
*DN 2.5–1000 / 1/10”–40”* | 0.0053 – 33 900 m³/hr | 0.0237 – 152 000 US.Gal/min

**Press ↵ key to return to Fct. 1.01 FULL SCALE.**

---

→ **VALUE P** | Pulse value (Fct. 1.06 “VALUE P”) has been changed.
With the “old” pulse values the output frequency (F) would have been exceeded or not reached.

$P_{\text{min}} = \frac{F_{\text{min}}}{Q_{100\%}}$

$P_{\text{max}} = \frac{F_{\text{max}}}{Q_{100\%}}$

Check new values!

---

1.02 | TIMECONST. | Time constant

Select:
- **ALL** (applies to display and all outputs)
- **ONLY I+S** (only display, current and status outputs)

**Press ↵ key to transfer to number setting.**

**Range:**
- **0.2 – 99.9 Sec**

**Press ↵ key to return to Fct. 1.02 TIMECONST.**

---

1.03 | L.F.CUTOFF | Low-flow cutoff (SMU)

• **OFF** (fixed values: ON = 0.1% / OFF = 0.2% at 100Hz and 1000Hz, see Fct. 106, 1% resp. 2%)

• **PERCENT** (variable values)  
  ON \hspace{1cm} OFF
  
  \begin{align*}
  1 – 19\% & \quad 2 – 20\%
  \end{align*}

**Press → key to transfer to number setting.**

**Note:** Cutoff “off” value must be greater than cutoff “on” value.

**Press ↵ key to return to Fct. 1.03 L.F. CUTOFF.**

---

1.04 | DISPLAY | Display functions

→ **DISP.FLOW** | Select flow display

- **NO DISP.**• user unit, factory set is “Liter/hr” or “US MGal/day” (see Fct. 3.05)
- **m³/hr**
- **Liter/Sec**
- **BARGRAPH** (value and bargraph display in %)
- **US.Gal/min**

**Press ↵ key to transfer to subfunction “DISP. TOTAL.”.**

→ **DISP.TOTAL.** | Select totalizer display

- **NO DISP.** (totalizer switched off but not displayed)
- **OFF** (totalizer switched off)
- **+TOTAL**  
  • **−TOTAL**  
  • **±TOTAL**  
  • **SUM (Σ)**
- **ALL** (single totalizer or all)

**Press ↵ key to transfer to display unit**

- **m³**
- **Liter**
- **US.Gal**

**Press → key to transfer to format setting.**

**Format setting**

- **Auto** (exponent notation)
  
  \begin{align*}
  # . \hspace{1cm} ###### . ###
  \end{align*}

**Press ↵ key to transfer to subfunction “DISP.MSG”.**

→ **DISP.MSG.** | Additional messages required in measuring mode?

- **NO**
- **YES** (cyclic change with displays of measured values)

**Press ↵ key to return to Fct. 1.04 DISPLAY.**
<table>
<thead>
<tr>
<th>Fct.</th>
<th>Text</th>
<th>Description and settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.05</td>
<td>CURRENT I</td>
<td>Current output I</td>
</tr>
<tr>
<td>→ FUNCT. I</td>
<td>Select function for current output I</td>
<td></td>
</tr>
<tr>
<td>• OFF (switched off)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 DIR. (1 flow direction)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 2 DIR. (forward/reverse flow, F/R flow measurement)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓, transfer to subfunction “RANGE I”;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ RANGE I</td>
<td>Select measuring range</td>
<td></td>
</tr>
<tr>
<td>• 0 - 20 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 4 - 20 mA (fixed ranges)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• mA (user-defined range)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ I_{0%} - I_{100%} ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ 0 - 16 \text{ mA} ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ 4 - 20 \text{ mA} ]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \text{Value } I_{0%} &lt; I_{100%}! )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To transfer to number setting, press key → !</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓ to transfer to subfunction “I ERROR”;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ I ERROR</td>
<td>Select error value</td>
<td></td>
</tr>
<tr>
<td>• 22 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 0.0 to ( I_{0%} ) mA (variable, see above if ( I_{0%} &gt; 1 \text{ mA} ))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To transfer to number setting, press key → !</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓ to revert to Fct. 1.05 CURRENT I.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.06</td>
<td>PULS B1</td>
<td>Pulse output B1 (see Fct. 3.07 HARDWARE)</td>
</tr>
<tr>
<td>→ FUNCT. P</td>
<td>Select function for pulse output P</td>
<td></td>
</tr>
<tr>
<td>• OFF (switched off)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 DIR. (1 flow direction)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 2 DIR. (forward/reverse flow, F/R flow measurement)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓ to transfer to subfunction “SELECT P”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ SELECT P</td>
<td>Select pulse type</td>
<td></td>
</tr>
<tr>
<td>• 100 HZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• PULSE/VOL. (pulses per unit volume, flowrate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1000 HZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• PULSE/TIME (pulses per unit time for 100% flowrate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓ to transfer to subfunction “PULSWIDTH”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With selection 100 HZ and 1000 HZ, return to Fct.1.06 pulsoutput P (pulswidth 50% cyclic).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ PULSWIDTH</td>
<td>Select pulse width</td>
<td></td>
</tr>
<tr>
<td>• 50 msec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 100 msec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 200 msec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 500 msec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓ to transfer to subfunction “VALUE P”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ VALUE P</td>
<td>Set pulse value per unit volume (appears only when “PULSE/VOL.” set under “SELECT P” above)</td>
<td></td>
</tr>
<tr>
<td>• xxxx PulS/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• xxxx PulS/Liter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• xxxx PulS/US.Gal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• xxxx PulS/ user-defined unit, factory-set is “Liter” or “US M.Gal” (see Fct. 3.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting range “xxxx” is dependent on the pulse width and the full-scale range: ( P_{\text{min}} = F_{\text{min}} / Q_{100%}, P_{\text{max}} = F_{\text{max}} / Q_{100%} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓ to return to Fct. 1.06 “PULS. OUTPUT P”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>→ VALUE P</td>
<td>Set pulse value per unit time (appears only when “PULSE/TIME” set under “SELECT P” above)</td>
<td></td>
</tr>
<tr>
<td>• xxxx PulSe/Sec (=Hz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• xxxx PulSe/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• xxxx PulSe/hr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• xxxx PulSe/user-defined unit, factory-set is “hr” (see Fct. 3.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting range “xxxx” is dependent on the pulse width, see above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press key ↓ to return to Fct. 1.06 “PULS. OUTPUT P”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.07</td>
<td>STATUS. S</td>
<td>Status output S</td>
</tr>
<tr>
<td>• ALL ERROR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FATAL ERROR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• OFF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• F/R INDIC. (F/R indication for forward/reverse measurement)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• TRIP. POINT Setting range: 002 - 115 PERCENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• EMPTY PIPE (appears only when this option is installed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press ↓ key to transfer to number setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press ↓ key to return to Fct. 1.07 “STATUS. S”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.08</td>
<td>CONTROL E (IFC 020 E only)</td>
<td>Control input E (IFC 020 E only)</td>
</tr>
<tr>
<td>• OFF (switched off)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• OUTP. ZERO (set outputs to “min.values”)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• TOTAL. RESET (reset totalizers)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• ERROR. RESET(delete error messages)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Press ↓ key to return Fct. 1.08 “Control E”.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fct.</td>
<td>Text</td>
<td>Description and settings</td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>2.00</td>
<td>TEST</td>
<td>Testmenu</td>
</tr>
</tbody>
</table>
| 2.01 | TEST Q | Test measuring range Q  
Precautionary query  
• SURE NO Press ‹ key to return to Fct. 2.01 “TEST Q”.  
• SURE YES Press › key, then use ↑ key to select value: -110 / -100 / -50 / -10 / 0 / +10 / +50 / +100 / +110 PCT.  
of set full-scale range \(Q_{100\%}\).  
Displayed value present at outputs I and P.  
Press › key to return to Fct. 2.01 “TEST Q”.

| 2.02 | HARDW. INFO | Hardware information and error status  
Before consulting factory, please note down all 6 codes.  
→ MODUL ADC X . X X X X X . X  
Y Y Y Y Y Y Y Y Y Y  
Press ‹ key to transfer to “MODUL IO”.  
→ MODUL IO X . X X X X X . X  
Y Y Y Y Y Y Y Y Y Y  
Press ‹ key to transfer to “MODUL DISP.”.  
→ MODUL DISP. X . X X X X X . X  
Y Y Y Y Y Y Y Y Y Y  
Press ‹ key to transfer to “MODUL RS”  
→ MODUL RS X . X X X X X . X  
Y Y Y Y Y Y Y Y Y Y  
Press ‹ key to return to Fct. 2.02 “HARDW. INFO”.

<table>
<thead>
<tr>
<th>3.00</th>
<th>INSTALL.</th>
<th>Installation menu</th>
</tr>
</thead>
</table>
| 3.01 | LANGUAGE | Select language for display texts  
• GB / USA (English)  
• F (French)  
• D (German)  
• others on request  
Press ‹ key to return to Fct. 3.01 “LANGUAGE”.

| 3.02 | FLOWMETER | Set data for primary head  
→ DIAMETER | Select size from meter size table  
• DN 2.5 - 1000 mm equivalent to 1/10 - 40 inch  
Select with ↑ key.  
Press ‹ key to transfer to subfunction “FULL SCALE”.

→ FULL SCALE | Full-scale range for flow \(Q_{100\%}\)  
To set, refer to Fct. 1.01 “FULL SCALE” above.  
Press ‹ key to transfer to subfunction “GK VALUE”.

→ VALUE P | Pulse value (Fct. 1.06 “VALUE P”) has been changed.  
With the “old” pulse values the output frequency (F) would have been exceeded or not reached.  
\(P_{\text{min}} = \frac{F_{\text{min}}}{Q_{100\%}}\)  
\(P_{\text{max}} = \frac{F_{\text{max}}}{Q_{100\%}}\)  
Check new values!

→ GK VALUE | Primary head - Set primary constant GK  
see primary head nameplate.  
Range:  
• 1.0000 - 9.9999  
Press ‹ key to transfer to subfunction “FIELD. FREQ.”.

→ FIELD FREQ. | Magnetic field frequency  
Values: 1/6 and 1/18 of power frequency, see nameplate.  
Press ‹ key to transfer to subfunction “FLOW DIR.”;  
DC units only: to transfer to subfunction “LINE FREQ.”.

→ LINE FREQ. | Normal line frequency in your country  
Please note: This function is only provided for units with DC power supply to suppress line-frequency interference.  
Values: 50 Hz and 60 Hz  
Press ‹ key to transfer to subfunction “FLOW DIR.”.

→ FLOW DIR. | Define flow direction (in F/R mode: forward flow).  
Set according to direction of arrow on primary head:  
• + DIR.  
• – DIR.  
Select using ↑ key  
Press ‹ key to return to Fct. 3.02 “FLOWMETER”.

4/4  
Condensed instructions IFC 020
<table>
<thead>
<tr>
<th>Fct.</th>
<th>Text</th>
<th>Description and settings</th>
</tr>
</thead>
</table>
| 3.03 | ZERO SET | Zero calibration  
**Note:** Carry out only at "0" flow and with completely filled measuring tube!  
**Precautionary query**  
• CALIB. NO Press \( \downarrow \) key to return to Fct. 3.03 “ZERO SET”.  
• CALIB. YES Press \( \downarrow \) key to start calibration.  
Duration approx. 15-90 seconds, (depends on frequency of magnetic field) current flowrate displayed in the selected unit (see Fct. 1.04 “DISP. FLOW”).  
A “WARNING” sign appears when flowrate \( \geq 0 \); acknowledge by pressing \( \downarrow \) key.  
• STORE NO (do not store new zero value)  
• STORE YES (store new zero value)  
Press \( \downarrow \) key to return to Fct. 3.03 “ZERO SET”. |
| 3.04 | ENTRY CODE | Entry code required to enter setting mode?  
• NO (= entry with \( \rightarrow \) only)  
• YES (= entry with \( \rightarrow \) and Code 1: \( \rightarrow \rightarrow \rightarrow \downarrow \downarrow \uparrow \uparrow \uparrow \) )  
Press \( \downarrow \) key to return to Fct. 3.04 “ENTRY CODE”. |
| 3.05 | USER UNIT | Set any required unit for flowrate and counting  
→ TEXT VOL. | Set text for required flowrate unit (max. 5 characters)  
Factory-set: “Liter” or “MGal”.  
Characters assignable to each place:  
• A-Z, a-z, 0-9, or “ – ” (= blank character).  
Press \( \downarrow \) key to transfer to subfunction “FACT. VOL.”  
→ FACT. VOL. | Set conversion factor \((F_M)\) for volume  
Factory set “1.00000E+3” for “Liter” or “2.64172E-4” for “US MGal” (exponent notation, here: \( 1 \times 10^3 \) or \( 2.64172 \times 10^{-4} \)).  
Factor \( F_M = \) volume per \( 1m^3 \).  
Setting range  
• 1.00000 E-9 to 9.99999 E+9 (= 10^9 to 10^9)  
Press \( \downarrow \) key to transfer to subfunction “TEXT TIME”.  
→ TEXT TIME | Set text for required time unit (max. 3 characters)  
Factory-set: “hr” (=hour).  
Characters assignable to each place:  
• A-Z, a-z, 0-9, or “ – ” (= blank character).  
Press \( \downarrow \) key to transfer to subfunction “FACT. TIME”  
→ FACT. TIME | Set conversion factor \((F_T)\) for time  
Factory set: “3.60000 E+3” for “hour” or “8.64000 E+4” for “day” (exponent notation, here: \( 3.6 \times 10^3 \) or \( 8.64 \times 10^4 \)).  
Set factor \( F_T \) in seconds.  
Setting range  
• 1.00000 E-9 to 9.99999 E+9 (= 10^-9 to 10^9)  
Press \( \downarrow \) key to return to Fct. 3.05 “USER UNIT”. |
| 3.06 | APPLICAT. | Set overload point for A/D converter  
→ FLOW | • STEADY (150% of \( Q_{100\%} \))  
• PULSATING (1000% of \( Q_{100\%} \))  
Press \( \downarrow \) key to return to Fct. 3.06 “APPLICAT.”, |
| 3.07 | MEASURING POINT | Set measuring point no.  
Factory setting: ALTIMETER  
Characters assignable to each place:  
• A-Z, a-z, 0-9, or “ – ” (= blank character).  
Press \( \downarrow \) key to return to Fct. 3.07 “MEASURING POINT” |
| 3.08 | COM | Set communication interface  
• OFF (switched off)  
• HART (HART-interface switched on)  
• KROHNE (RS 485 interface switched on)  
• Address: “HART” 00-15 / “KROHNE” 000-239  
• BAUD RATE: -1200 -2400 -4800 -9600 -19200 (appears with selection “KROHNE”)  
Press \( \downarrow \) key to return to Fct. 3.08 “COM”. |