

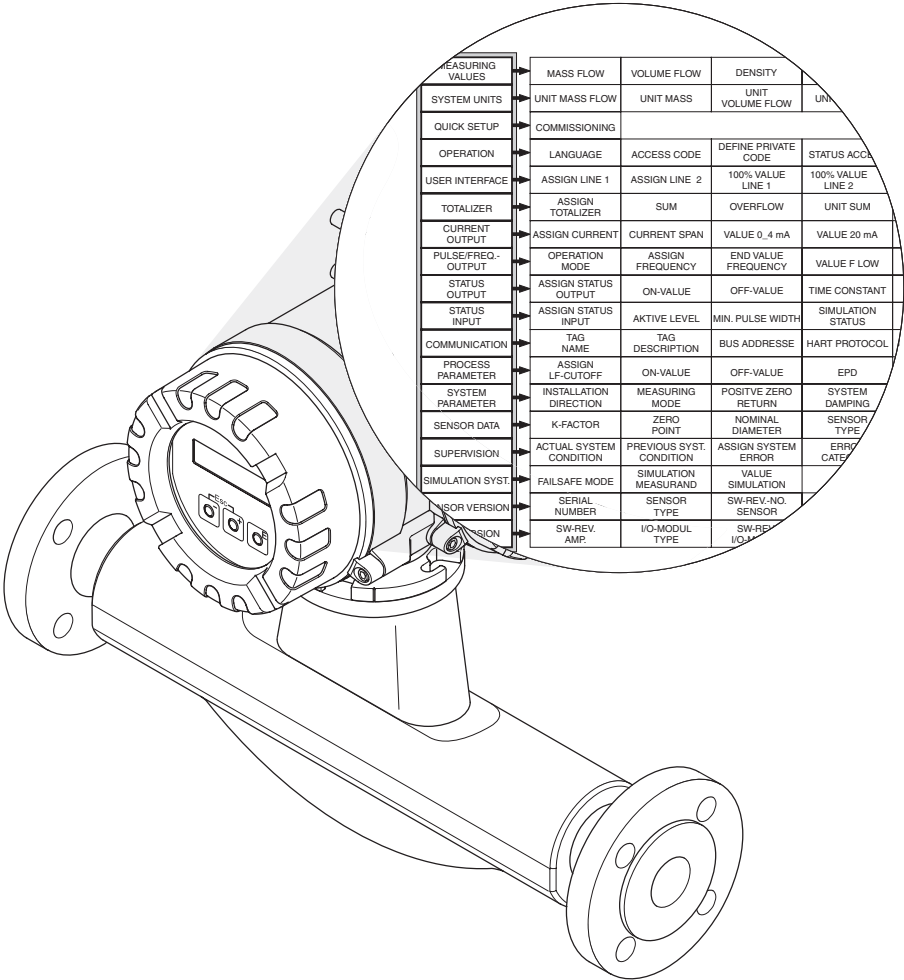
Valid as of software version:  
V 1.02.XX (amplifier)  
V 1.02.XX (communication)

# PROline promass 80

## Coriolis Mass Flow Mesuring System



### Description of Device Functions





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S-DAT™

Registered trademark of Endress+Hauser Flowtec AG, Reinach, CH

# 1 Function matrix PROline Promass 80

## 1.1 The function matrix: layout and use

The function matrix is a two-level construct: the groups form one level, functions the other.

The groups are the highest-level grouping of the control options for the measuring device.

Each group comprises a number of functions.

You select a group in order to access the individual functions for controlling or parameterizing the measuring device.

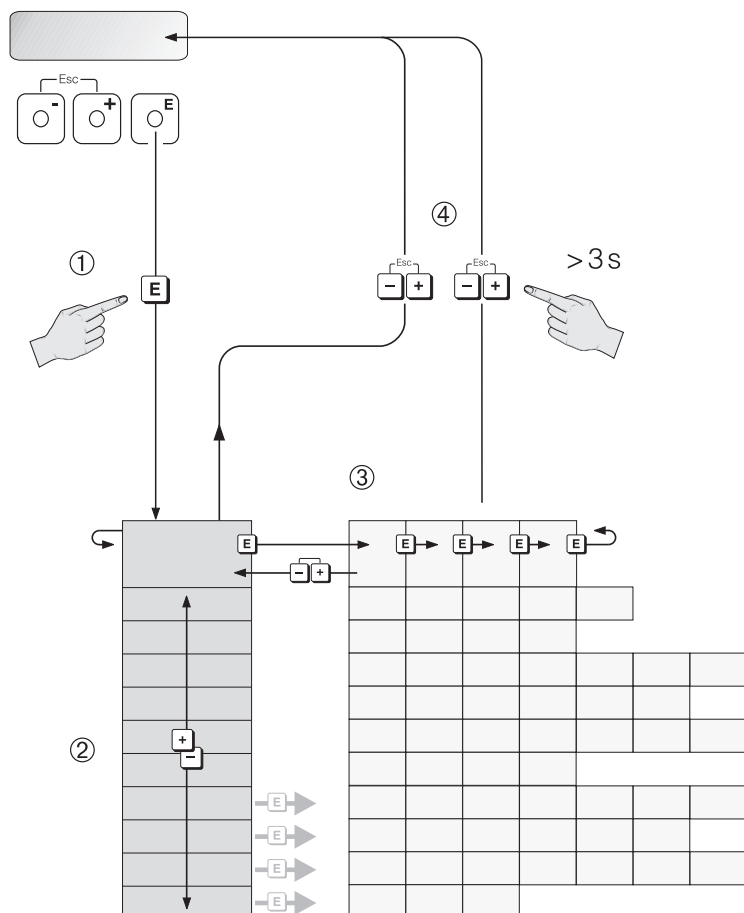
You will find an overview of the groups in the table of contents on Page 3 and in the graphical representation of the function matrix on Page 7.

You will also find an overview of the functions on Page 7, complete with the page references of the detailed function descriptions.

The descriptions of the individual functions start on Page 8.

Example of how to parameterize a function (in this case changing the language for the user interface):

- ① Entry into the function matrix (E-key).
- ② Select the OPERATION group.
- ③ Select the LANGUAGE function, change the setting from ENGLISH to DEUTSCH and save (all texts displayed on the user interface appear in German).
- ④ Exit the function matrix (ESC > 3 seconds).





## 1.2 Graphical illustration of the function matrix

|                             |                                |                                 |                                  |                              |                              |                               |                              |                              |
|-----------------------------|--------------------------------|---------------------------------|----------------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|
| MEASURING VALUES<br>(p. 8)  | MASS FLOW<br>(p. 8)            | VOLUME FLOW<br>(p. 8)           | DENSITY<br>(p. 8)                | TEMPERATURE<br>(p. 8)        |                              |                               |                              |                              |
| SYSTEM UNITS<br>(p. 9)      | UNIT MASS FLOW<br>(p. 9)       | UNIT MASS<br>(p. 9)             | UNIT VOLUME FLOW<br>(p. 10)      | UNIT VOLUME<br>(p. 10)       | UNIT DENSITY<br>(p. 11)      | UNIT TEMPERATURE<br>(p. 11)   | UNIT LENGTH<br>(p. 11)       | UNIT PRESSURE<br>(p. 11)     |
| QUICK SETUP<br>(p. 12)      | SETUP COMMISSION<br>(p. 12)    |                                 |                                  |                              |                              |                               |                              |                              |
| OPERATION<br>(p. 14)        | LANGUAGE<br>(p. 14)            | ACCESS CODE<br>(p. 14)          | DEF. PRIVATE CODE<br>(p. 14)     | STATUS ACCESS<br>(p. 14)     |                              |                               |                              |                              |
| USER INTERFACE<br>(p. 15)   | ASSIGN LINE 1<br>(p. 15)       | ASSIGN LINE 2<br>(p. 15)        | 100% VALUE<br>(p. 15)            | 100% VALUE<br>(p. 16)        | FORMAT<br>(p. 16)            | DISPLAY DAMPING<br>(p. 16)    | CONTRAST LCD<br>(p. 16)      | TEST DISPLAY<br>(p. 17)      |
| TOTALIZER<br>(p. 18)        | ASSIGN TOTALIZER<br>(p. 18)    | SUM<br>(p. 18)                  | OVERFLOW<br>(p. 18)              | UNIT TOTALIZER<br>(p. 18)    | RESET TOTAL.<br>(p. 19)      | FAILSAFE MODE<br>(p. 19)      |                              |                              |
| CURRENT OUTPUT<br>(p. 20)   | ASSIGN CURRENT<br>(p. 20)      | CURRENT SPAN<br>(p. 20)         | VALUE 0.4 mA<br>(p. 21)          | VALUE 20 mA<br>(p. 21)       | TIME CONSTANT<br>(p. 23)     | FAILSAFE MODE<br>(p. 23)      | ACTUAL CURRENT<br>(p. 23)    | SIMULATION CURR.<br>(p. 24)  |
| PULSE/FREQ. OUT.<br>(p. 25) | OPERATION MODE<br>(p. 25)      | ASSIGN FREQUENCY<br>(p. 25)     | END VALUE FREQ.<br>(p. 25)       | VALUE F LOW<br>(p. 26)       | VALUE F HIGH<br>(p. 26)      | OUTPUT SIGNAL<br>(p. 28)      | TIME CONSTANT<br>(p. 28)     | FAILSAFE MODE<br>(p. 28)     |
|                             |                                |                                 |                                  | SIMULATION FREQ.<br>(p. 30)  | VALUE SIM. FREQ.<br>(p. 30)  | ASSIGN PULSE<br>(p. 30)       | PULSE VALUE<br>(p. 31)       | FAILSAFE MODE<br>(p. 32)     |
| STATUS OUTPUT<br>(p. 33)    | ASSIGN STATUS<br>(p. 33)       |                                 | ON-VALUE<br>(p. 33)              | OFF-VALUE<br>(p. 33)         | ACTUAL STATUS<br>(p. 34)     | SIM. SWITCH POINT<br>(p. 34)  |                              |                              |
| STATUS INPUT<br>(p. 37)     | ASSIGN STATUS IN<br>(p. 37)    |                                 | ACTIVE LEVEL<br>(p. 37)          | MIN. PULSE WIDTH<br>(p. 37)  | SIM. STATUS IN<br>(p. 37)    | VAL. SIM. STAT. IN<br>(p. 38) |                              |                              |
| COMMUNICATION<br>(p. 39)    | TAG NAME<br>(p. 39)            | TAG DESCRIPTION<br>(p. 39)      | BUS ADDRESS<br>(p. 39)           | HART PROTOCOL<br>(p. 39)     | WRITE PROTECTION<br>(p. 39)  | MANUFACTURER ID<br>(p. 39)    |                              |                              |
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| SYSTEM PARAMETER<br>(p. 44) | INSTL. DIR. SENSOR<br>(p. 44)  | MEASURING MODE<br>(p. 44)       | POS. ZERO RETURN<br>(p. 46)      | DENSITY DAMPING<br>(p. 46)   | FLOW DAMPING<br>(p. 46)      |                               |                              |                              |
| SENSOR DATA<br>(p. 47)      | K-FACTOR<br>(p. 47)            | ZERO POINT<br>(p. 47)           | NOMINAL DIAMETER<br>(p. 47)      | TEMP. COEF. KM<br>(p. 47)    | TEMP. COEF. KM 2<br>(p. 47)  | TEMP. COEF. KT<br>(p. 47)     | CAL. COEF. KD 1<br>(p. 47)   | CAL. COEF. KD 2<br>(p. 47)   |
|                             |                                |                                 |                                  | DENSITY COEF. C 2<br>(p. 48) | DENSITY COEF. C 3<br>(p. 48) | DENSITY COEF. C 4<br>(p. 48)  | DENSITY COEF. C 5<br>(p. 48) | MAX. TEMP. CARR.<br>(p. 48)  |
| SUPERVISION<br>(p. 49)      | ACTUAL SYS. COND.<br>(p. 49)   | PREV. SYS. COND.<br>(p. 49)     | ASSIGN SYS. ERROR<br>(p. 49)     | ERROR CATEGORY<br>(p. 49)    | ASSIGN PROC. ERR.<br>(p. 49) | ERROR CATEGORY<br>(p. 50)     | ALARM DELAY<br>(p. 50)       | SYSTEM RESET<br>(p. 50)      |
| SIMULAT. SYSTEM<br>(p. 51)  | SIM. FAILSAFE MODE<br>(p. 51)  |                                 | SIM. MEASURAND<br>(p. 51)        | VALUE SIM. MEAS.<br>(p. 51)  |                              |                               |                              |                              |
| SENSOR VERSION<br>(p. 52)   | SERIAL NUMBER<br>(p. 52)       | SENSOR TYPE<br>(p. 52)          |                                  | SW-REV. S-DAT<br>(p. 52)     |                              |                               |                              |                              |
| AMP. HW VERSION<br>(p. 52)  | SW-REV. AMP.<br>(p. 52)        | I/O MODUL TYPE<br>(p. 52)       |                                  | SW-REV. I/O<br>(p. 52)       |                              |                               |                              |                              |

## 2 Group MEASURING VALUES

| Function description MEASURING VALUES                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p> Note!</p> <ul style="list-style-type: none"> <li>The engineering unit of the measured variable shown here can be set in the "SYSTEM UNITS" group (see Page 9).</li> <li>If the fluid in the pipe flows backwards, a negative sign prefixes the flow reading on the display.</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                         |
| <b>MASS FLOW</b>                                                                                                                                                                                                                                                                                                                                                            | <p>In this function, the currently measured mass flow appears on the display.</p> <p><b>Display shows:</b><br/>5-digit floating-point number, including unit and sign<br/>(e.g. 462.87 kg/h; -731.63 lb/min; etc.)</p>                                                                                                                                                  |
| <b>VOLUME FLOW</b>                                                                                                                                                                                                                                                                                                                                                          | <p>In this function, the currently measured volumetric flow appears on the display. The volumetric flow is derived from the measured mass flowrate and the density of the fluid measured.</p> <p><b>Display shows:</b><br/>5-digit floating-point number, including unit and sign<br/>(e.g. 5.5445 dm<sup>3</sup>/min; 1.4359 m<sup>3</sup>/h; -731.63 gal/d; etc.)</p> |
| <b>DENSITY</b>                                                                                                                                                                                                                                                                                                                                                              | <p>In this function, the currently measured density or the specific gravity appears on the display.</p> <p><b>Display shows:</b><br/>5-digit fixed-point number, including unit<br/>(e.g. 1.2345 kg/dm<sup>3</sup>; 993.5 kg/dm<sup>3</sup>; 1.0015 SG_20 °C; etc.)</p>                                                                                                 |
| <b>TEMPERATURE</b>                                                                                                                                                                                                                                                                                                                                                          | <p>In this function, the currently measured temperature appears on the display.</p> <p><b>Display shows:</b><br/>5-digit floating-point number, including unit and sign<br/>(e.g. -23.4 °C; 160.0 °F; 295.4 K; etc.)</p>                                                                                                                                                |

### 3 Group SYSTEM UNITS

| Function description SYSTEM UNITS                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| You can select the unit for the measured variable in this function group. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>UNIT MASS FLOW</b>                                                     | <p>Use this function to select the unit for displaying the mass flow (mass/time).</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• Current output</li> <li>• Frequency output</li> <li>• Switching points (limit value for mass flow, flow direction)</li> <li>• Low flow cut off</li> </ul> <p><b>Options:</b><br/> Metric:<br/> gram → g/s; g/min; g/h; g/day<br/> kilogram → kg/s; kg/min; kg/h; kg/day<br/> Metric ton → t/s; t/min; t/h; t/day</p> <p>US:<br/> ounce → oz/s; oz/min; oz/h; oz/day<br/> pound → lb/s; lb/min; lb/h; lb/day<br/> ton → ton/s; ton/min; ton/h; ton/day</p> <p><b>Factory setting:</b><br/> Country dependent (kg/h or US lb/day)</p> |
| <b>UNIT MASS</b>                                                          | <p>Use this function to select the unit for displaying the mass.</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• Pulse value (e.g. kg/p)</li> </ul> <p><b>Options:</b><br/> Metric → g; kg; t</p> <p>US → oz; lb; ton</p> <p><b>Factory setting:</b><br/> Country dependent (kg or US lb)</p> <p> <b>Note!</b><br/> The unit for the totalizer is independent of your choice here, it is selected separately in the TOTALIZER group (see Page 18).</p>                                                                                                                             |

| Function description SYSTEM UNITS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>UNIT VOLUME FLOW</b>           | <p>Use this function to select the unit for the volume flow.</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• Current output</li> <li>• Frequency output</li> <li>• Switching points (limit value for volume flow, flow direction)</li> <li>• Low flow cut off</li> </ul> <p><b>Options:</b></p> <p>Metric:</p> <p>Cubic centimeter → cm<sup>3</sup>/s; cm<sup>3</sup>/min; cm<sup>3</sup>/h; cm<sup>3</sup>/day</p> <p>Cubic decimeter → dm<sup>3</sup>/s; dm<sup>3</sup>/min; dm<sup>3</sup>/h; dm<sup>3</sup>/day</p> <p>Cubic meter → m<sup>3</sup>/s; m<sup>3</sup>/min; m<sup>3</sup>/h; m<sup>3</sup>/day</p> <p>Milliliter → ml/s; ml/min; ml/h; ml/day</p> <p>Liter → l/s; l/min; l/h; l/day</p> <p>Hectoliter → hl/s; hl/min; hl/h; hl/day</p> <p>Megaliter → Ml/s; Ml/min; Ml/h; Ml/day</p> <p>US:</p> <p>Cubic centimeter → cc/s; cc/min; cc/h; cc/day</p> <p>Acre foot → af/s; af/min; af/h; af/day</p> <p>Cubic foot → ft<sup>3</sup>/s; ft<sup>3</sup>/min; ft<sup>3</sup>/h; ft<sup>3</sup>/day</p> <p>Fluid ounce → oz f/s; oz f/min; oz f/h; oz f/day</p> <p>Gallon → gal/s; gal/min; gal/h; gal/day</p> <p>Million gallon → Mgal/s; Mgal/min; Mgal/h; Mgal/day</p> <p>Barrel (normal fluids: 31.5 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day</p> <p>Barrel (beer: 31.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day</p> <p>Barrel (petrochemicals: 42.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day</p> <p>Barrel (filling tanks: 55.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day</p> <p>Imperial:</p> <p>Gallon → gal/s; gal/min; gal/h; gal/day</p> <p>Mega gallon → Mgal/s; Mgal/min; Mgal/h; Mgal/day</p> <p>Barrel (beer: 36.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day</p> <p>Barrel (petrochemicals: 42.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day</p> <p><b>Factory setting:</b></p> <p>Country dependent (m<sup>3</sup>/h or US Mgal/day)</p> |
| <b>UNIT VOLUME</b>                | <p>Use this function to select the unit for the volume.</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• Pulse value (e.g. m<sup>3</sup>/p)</li> </ul> <p><b>Options:</b></p> <p>Metric → cm<sup>3</sup>; dm<sup>3</sup>; m<sup>3</sup>; ml; l; hl; Ml</p> <p>US → cc; af; ft<sup>3</sup>; oz f; gal; Mgal; bbl (normal fluids); bbl (beer); bbl (petrochemicals); bbl (filling tanks)</p> <p>Imperial → gal; Mgal; bbl (beer); bbl (petrochemicals)</p> <p><b>Factory setting:</b></p> <p>Country dependent (m<sup>3</sup> or US Mgal)</p> <p> <b>Note!</b></p> <p>The unit for the totalizer is independent of your choice here, it is selected separately in the TOTALIZER group (see Page 18).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

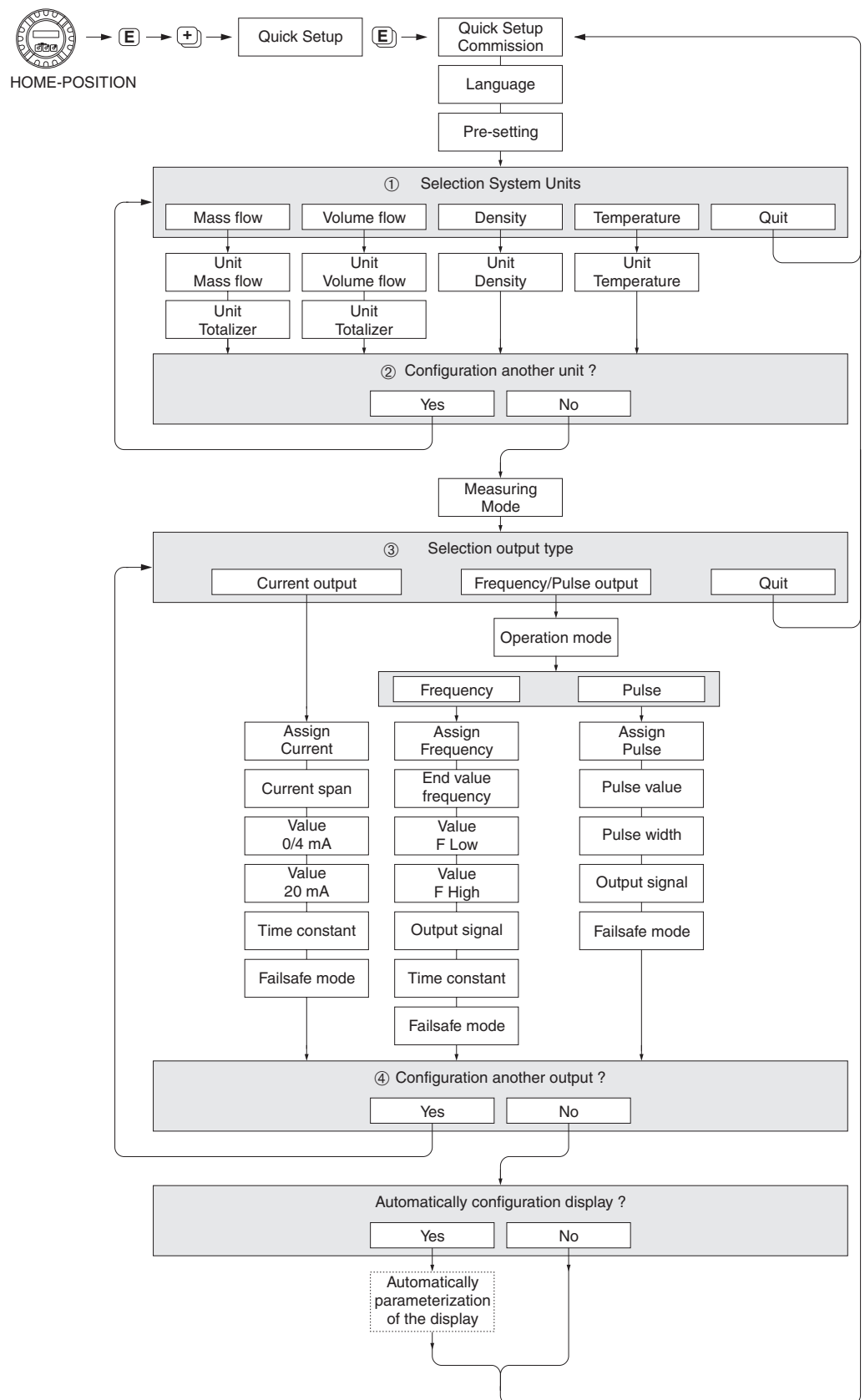
| Function description SYSTEM UNITS |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>UNIT DENSITY</b>               | <p>Use this function to select the unit for displaying the fluid density.</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• Current output</li> <li>• Frequency output</li> <li>• Switching points</li> <li>• Density adjustment value</li> <li>• Density response value for EPD</li> </ul> <p><b>Options:</b><br/> Metric → g/cm<sup>3</sup>; g/cc; kg/dm<sup>3</sup>; kg/l; kg/m<sup>3</sup>; SD 4 °C, SD 15 °C, SD 20 °C;<br/> SG 4 °C, SG 15 °C, SG 20 °C</p> <p>US → lb/ft<sup>3</sup>; lb/gal; lb/bbl (normal fluids); lb/bbl (beer); lb/bbl (petrochemicals); lb/bbl (filling tanks)</p> <p>Imperial → lb/gal; lb/bbl (beer); lb/bbl (petrochemicals)</p> <p><b>Factory setting:</b><br/> kg/l</p> <p>SD = Specific Density, SG = Specific Gravity<br/> The specific density is the ratio of fluid density to water<br/> (at water temperature = 4, 15, 20 °C)</p> |
| <b>UNIT TEMPERATURE</b>           | <p>Use this function to select the unit for displaying the temperature.</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• Current output</li> <li>• Frequency output</li> <li>• Switching points</li> </ul> <p><b>Options:</b><br/> °C (CELSIUS)<br/> K (KELVIN)<br/> °F (FAHRENHEIT)<br/> R (RANKINE)</p> <p><b>Factory setting:</b><br/> °C (CELSIUS)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>UNIT LENGTH</b>                | <p>Use this function to select the unit for the unit of length for nominal diameter.</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• nominal diameter of the sensor (see the NOMINAL DIAMETER function on Page 47).</li> </ul> <p><b>Options:</b><br/> MILLIMETER<br/> INCH</p> <p><b>Factory setting:</b><br/> Country dependent (MILLIMETER or INCH)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>UNIT PRESSURE</b>              | <p>Use this function to select the unit for pressure.</p> <p>The unit you select here is also valid for:</p> <ul style="list-style-type: none"> <li>• Specified pressure (see function DRUCK auf Page 43)</li> </ul> <p><b>Option:</b><br/> BAR G<br/> PSI G<br/> BAR A<br/> PSI A</p> <p><b>Factory setting:</b><br/> BAR G</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

# 4 Group QUICK SETUP

| Function description QUICK SETUP |                                                                                                                                       |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| QUICK SETUP<br>COMMISSION        | Use this function to start the Setup menu for commissioning.<br><br><b>Options:</b><br>NO<br>YES<br><br><b>Factory setting:</b><br>NO |



- Note:
- The display returns to the QUICK SETUP COMMISSION cell if you press the ESC key combination during programming of a parameter.
  - ① Only units not yet configured in the current Quick Setup are offered for selection in each cycle. The unit for mass and volume is derived from the corresponding flow unit.
  - ② The “YES” option remains visible until all the units have been parameterised. “NO” is the only option displayed when no further units are available.
  - ③ Only the outputs not yet configured in the current Quick Setup are offered for selection in each cycle.
  - ④ The “YES” option remains visible until all the outputs have been parameterised. “NO” is the only option displayed when no further outputs are available.



## 5 Group OPERATION

| Function description OPERATION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>LANGUAGE</b>                | <p>Use this function to select the language for all texts, parameters and messages shown on the local display.</p> <p><b>Options:</b><br/>           ENGLISH<br/>           DEUTSCH<br/>           FRANCAIS<br/>           ESPANOL<br/>           ITALIANO<br/>           JAPANESE (syllabary)</p> <p> <b>Note!</b><br/>           If you press the  keys simultaneously during startup, the language defaults to "ENGLISH".</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>ACCESS CODE</b>             | <p>All data of the measuring system are protected against inadvertent change. Programming is disabled and the settings cannot be changed until a code is entered in this function.</p> <p>If you press the  key in any function the measuring system automatically goes to this function and the prompt to enter the code appears on the display (programming disabled).</p> <p>You can enable programming by entering the personal code<br/> <b>(Factory setting = 80, see the DEFINE PRIVATE CODE function)</b></p> <p><b>User input:</b><br/>           max. 4-digit number: 0...9999</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• The programming levels are disabled if you do not press a key within 60 seconds following return to the HOME position.</li> <li>• You can also disable programming in this function by entering any number (other than the defined private code).</li> <li>• The Endress+Hauser service organization can be of assistance if you lose your personal code.</li> </ul> |
| <b>DEFINE PRIVATE CODE</b>     | <p>Use this function to define a personal code number for enabling programming.</p> <p><b>User input:</b><br/>           max. 4-digit number: 0...9999</p> <p><b>Factory setting:</b><br/>           80</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• If you define the personal code number = 0, the programming is always enabled.</li> <li>• Programming has to be enabled before this code can be changed. When programming is disabled the function can't be changed, this precaution prevents others from changing your personal code without your knowledge and consent.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>STATUS ACCESS</b>           | <p>Use this function to check the access status for the function matrix.</p> <p><b>Display shows:</b><br/>           ACCESS CUSTOMER (Parameterization enabled)<br/>           LOCKED (Parameterization disabled)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## 6 Group USER INTERFACE

| Function description USER INTERFACE |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ASSIGN LINE 1</b>                | <p>Use this function to define the display value assigned to the main line (the upper line of the local display) for display during normal measuring operation.</p> <p><b>Options:</b><br/>           OFF<br/>           MASS FLOW<br/>           MASS FLOW IN %<br/>           VOLUME FLOW<br/>           VOLUME FLOW IN %<br/>           DENSITY<br/>           TEMPERATURE</p> <p><b>Factory setting:</b><br/>           MASS FLOW</p>                                                                                                                                                                                                                                                    |
| <b>ASSIGN LINE 2</b>                | <p>Use this function to define the display value assigned to the additional line (the bottom line of the local display) for display during normal measuring operation.</p> <p><b>Options:</b><br/>           OFF<br/>           MASS FLOW<br/>           MASS FLOW IN %<br/>           VOLUME FLOW<br/>           VOLUME FLOW IN %<br/>           DENSITY<br/>           TEMPERATURE<br/>           TOTALIZER<br/>           TAG NAME<br/>           OPERATION/SYSTEM CONDITION<br/>           DISPLAY FLOW DIRECTION<br/>           MASS FLOW BARGRAPH IN %<br/>           VOLUME FLOW BARGRAPH IN %</p> <p><b>Factory setting:</b><br/>           TOTALIZER</p>                            |
| <b>100% VALUE</b><br>(Line 1)       | <p> <b>Note!</b><br/>           This function is not available unless MASS FLOW IN % or VOLUME FLOW IN % was selected in the ASSIGN LINE 1 function.</p> <p>Use this function to define the flow value to be shown on the display as the 100% value of the variable assigned to line 1.</p> <p><b>User input:</b><br/>           5-digit floating-point number</p> <p><b>Factory setting:</b></p> <ul style="list-style-type: none"> <li>• 10 kg/s (if MASS FLOW IN % or MASS FLOW BARGRAPH IN % is selected)</li> <li>• 10 l/s (if VOLUME FLOW IN % or VOLUME FLOW BARGRAPH IN % is selected)</li> </ul> |

| Function description USER INTERFACE |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>100% VALUE</b><br>(Line 2)       | <p> <b>Note!</b><br/>This function is not available unless MASS FLOW IN %, MASS FLOW BARGRAPH IN %, VOLUME FLOW IN % or VOLUME FLOW BARGRAPH IN % was selected in the ASSIGN LINE 2 function.</p> <p>Use this function to define the flow value to be shown on the display as the 100% value of the variable assigned to line 2.</p> <p><b>User input:</b><br/>5-digit floating-point number</p> <p><b>Factory setting:</b></p> <ul style="list-style-type: none"> <li>• 10 kg/s (if MASS FLOW IN % or MASS FLOW BARGRAPH IN % is selected)</li> <li>• 10 l/s (if VOLUME FLOW IN % or VOLUME FLOW BARGRAPH IN % is selected)</li> </ul>                                                                                                                                                                                                                                                |
| <b>FORMAT</b>                       | <p>Use this function to define the maximum number of places after the decimal point displayed for the reading in the main line.</p> <p><b>Options:</b><br/>XXXXX. - XXXX.X - XXX.XX - XX.XXX -X.XXXX</p> <p><b>Factory setting:</b><br/>X.XXXX</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• Note that this setting only affects the reading as it appears on the display, it has no influence on the accuracy of the system's calculations.</li> <li>• The places after the decimal point as computed by the measuring device cannot always be displayed, depending on this setting and the engineering unit. In these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.</li> </ul> |
| <b>DISPLAY DAMPING</b>              | <p>Use this function to enter a time constant defining how the display reacts to severely fluctuating flow variables, either very quickly (enter a low time constant) or with damping (enter a high time constant).</p> <p><b>User input:</b><br/>0...100 s</p> <p><b>Factory setting:</b><br/>1 s</p> <p> <b>Note!</b><br/>Setting the time constant to zero seconds switches off damping.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>CONTRAST LCD</b>                 | <p>Use this function to optimize display contrast to suit local operating conditions.</p> <p><b>User input:</b><br/>10...100%</p> <p><b>Factory setting:</b><br/>50%</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Function description USER INTERFACE |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEST DISPLAY                        | <p>Use this function to test the operability of the local display and its pixels.</p> <p><b>Options:</b><br/>OFF<br/>ON</p> <p><b>Factory setting:</b><br/>OFF</p> <p>Test sequence:</p> <ol style="list-style-type: none"><li>1. Start the test by selecting ON.</li><li>2. All pixels of the main line and additional line are darkened for minimum 0.75 second.</li><li>3. Main line and additional line show an "8" in each field for minimum 0.75 second.</li><li>4. Main line and additional line show a "0" in each field for minimum 0.75 second.</li><li>5. Main line and additional line show nothing (blank display) for minimum 0.75 second.</li><li>6. When the test completes the local display returns to its initial state and the setting changes to OFF.</li></ol> |

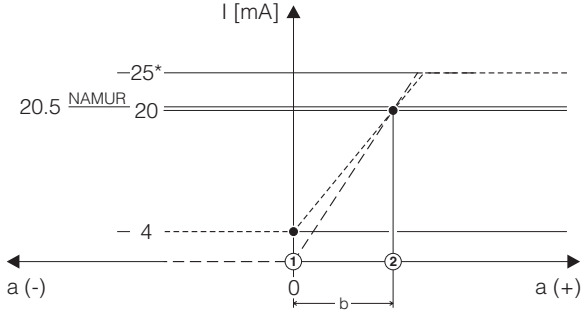
## 7 Group TOTALIZER

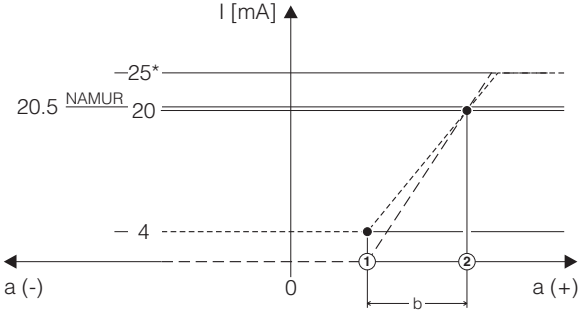
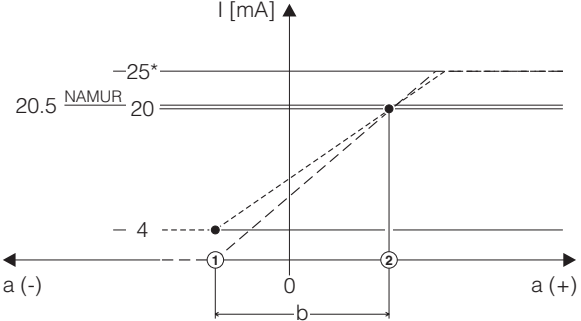
| Function description TOTALIZER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ASSIGN TOTALIZER</b>        | <p>Use this function to assign a measured variable to the totalizer.</p> <p><b>Options:</b><br/>MASS FLOW<br/>VOLUME FLOW</p> <p><b>Factory setting:</b><br/>MASS FLOW</p> <p> <b>Note!</b><br/>The totalizer is reset to "0" as soon as the selection is changed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>SUM</b>                     | <p>Use this function to view the total for the totalizer measured variable aggregated since measuring commenced. The value can be positive or negative.</p> <p><b>Display shows:</b><br/>max. 7-digit floating-point number, including sign and unit (e.g. 15467.04 kg)</p> <p> <b>Note!</b><br/>The totalizer response to faults is defined in the FAILSAFE MODE function (see Page 19).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>OVERFLOW</b>                | <p>Use this function to view the overflow for the totalizer aggregated since measuring commenced.</p> <p>Total flow quantity is represented by a floating decimal point number consisting of max. 7 digits. You can use this function to view higher numerical values (&gt;9,999,999) as overflows. The effective quantity is thus the total of OVERFLOW plus the value returned by the SUM function.</p> <p>Example:<br/>Reading for 2 overflows: 2 E7 kg (= 20,000,000 kg)<br/>The value returned by the SUM function = 196,845.7 kg<br/>Effective total quantity = 20,196,845.7 kg</p> <p><b>Display shows:</b><br/>Integer with exponent, including sign and unit, e.g. 2 E7 kg</p>                                                                                                                                                                                                                                                                             |
| <b>UNIT TOTALIZER</b>          | <p>Use this function to define the unit for the totalizer measured variable, as selected beforehand.</p> <p><b>Options (for the MASS FLOW assignment):</b><br/>Metric → g; kg; t<br/>US → oz; lb; ton</p> <p><b>Factory setting:</b><br/>Depends on nominal diameter and country,<br/>[value] / [g ...kg or US oz...US ton]<br/>corresponding to the totalizer unit factory setting (see Page 53 ff.)</p> <p><b>Options (for the VOLUME FLOW assignment):</b><br/>Metric → cm<sup>3</sup>; dm<sup>3</sup>; m<sup>3</sup>; ml; l; hl; Ml</p> <p>US → cc; af; ft<sup>3</sup>; oz f; gal; Mgal; bbl (normal fluids); bbl (beer); bbl (petrochemicals); bbl (filling tanks)</p> <p>Imperial → gal; Mgal; bbl (beer); bbl (petrochemicals)</p> <p><b>Factory setting:</b><br/>Depends on nominal diameter and country,<br/>[value] / [dm<sup>3</sup> ...m<sup>3</sup> or US gal...US Mgal]<br/>corresponding to the totalizer unit factory setting (see Page 53 ff.)</p> |

| Function description TOTALIZER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RESET TOTALIZER                | <p>Use this function to reset the sum and the overflow of the totalizer to zero (= RESET).</p> <p><b>Options:</b><br/>NO<br/>YES</p> <p><b>Factory setting:</b><br/>NO</p> <p> <b>Note!</b><br/>If the device has a status input and is appropriately configured, a reset for the totalizer can also be triggered by a pulse.</p>                                                                                                                               |
| FAILSAFE MODE                  | <p>Use this function to define the totalizer response to fault.</p> <p><b>Options:</b><br/>STOP<br/>The totalizer is paused until the fault is rectified. The totalizer stops at the last value prior to the occurrence of the error.</p> <p>ACTUAL VALUE<br/>The totalizer continues to count is based on the current flow measured value. The fault is ignored.</p> <p>HOLD VALUE<br/>The totalizer continues to count the flow is based on the last valid flow value (before the fault occurred).</p> <p><b>Factory setting:</b><br/>STOP</p> |

8 Group CURRENT OUTPUT

| Function description CURRENT OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ASSIGN CURRENT                      | <p>Use this function to assign a measured variable to the current output.</p> <p><b>Options:</b><br/>OFF<br/>MASS FLOW<br/>VOLUME FLOW<br/>DENSITY<br/>TEMPERATURE</p> <p><b>Factory setting:</b><br/>MASS FLOW</p> <p> <b>Note!</b><br/>If you select OFF, the only function shown in this group is these (ASSIGN CURRENT) function.</p>                                                                                                                                                                                                                                                                  |
| CURRENT SPAN                        | <p>Use this function to define the current range. You can configure the current output either in accordance with the NAMUR recommendation (max. 20.5 mA) or for a maximum drive of 25 mA.</p> <p><b>Options:</b><br/>NAMUR-compliant:<br/>0-20 mA<br/>4-20 mA<br/>4-20 mA HART</p> <p>not NAMUR-compliant:<br/>0-20 mA (25 mA)<br/>4-20 mA (25 mA)<br/>4-20 mA (25 mA) HART</p> <p><b>Factory setting:</b><br/>4-20 mA HART</p> <p> <b>Note!</b><br/>Select a 4-20 mA current range for switchover from an active to a passive output signal (see BA 057D/06/en "Promass 80 Operating Instruction").</p> |

| Function description CURRENT OUTPUT                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VALUE 0_4 mA                                            | <div><div> Note!</div><div>This function is not available unless the DENSITY or TEMPERATURE option was selected in the ASSIGN CURRENT function.</div><div>Use this function to assign a value to the 0/4 mA current, (see “Setting the span by means of the 0_4 mA and 20 mA value” on Page 21).</div><div><b>Option:</b><br/>5-digit floating-point number (with sign for the TEMPERATURE measured variable)</div><div><b>Factory setting:</b><br/>0.5 [kg/l] or -50 [°C]</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| VALUE 20 mA                                             | <div><div>Use this function to assign a value to the 20 mA current, (see “Setting the span by means of the 0_4 mA and 20 mA value” on Page 21).</div><div><b>Option:</b><br/>5-digit floating-point number (with sign for the MASS FLOW, VOLUME FLOW and TEMPERATURE measured variables)</div><div><b>Factory setting:</b><br/>Depends on nominal diameter [kg/h] or 2 [kg/l] or 200 [°C]</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Setting the span by means of the 0_4 mA and 20 mA value | <div><div>The span for the measured variable selected in the ASSIGN CURRENT function is specified via the VALUE 0_4 mA and VALUE 20 mA functions.</div><div>The span is defined differently, depending on the measured variable selected:</div><div><b>MASS FLOW and VOLUME FLOW</b><ul style="list-style-type: none"><li>• The VALUE 0_4 mA function is not available; the value for the zero flow (0 kg/h or 0m³/h) is assigned to the 0/4 mA current.</li><li>• The flow value for the 20 mA current is defined in the VALUE 20 mA function, (input range -99999 to +99999). The appropriate unit is taken from the UNIT MASS FLOW or UNIT VOLUME FLOW function.</li></ul></div><div>Example (for standard measuring mode):</div><div></div><div>25* = max. current<br/>① = Flow value at which a current of 0 or 4 mA should be output (preset, cannot be edited).<br/>② = Flow value at which a current of 20 mA should be output (entry in VALUE 20 mA function).<br/>a = Flow<br/>b = Span</div><div>(Continued on next page)</div></div> |

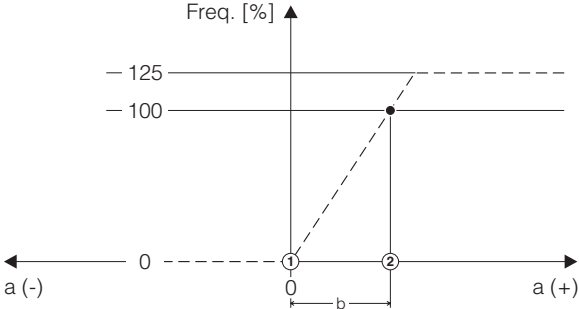
| Function description CURRENT OUTPUT                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Setting the span by means of the 0_4 mA and 20 mA value (contd) | <div><div><div><b>DENSITY</b><ul style="list-style-type: none"><li>The density value for the 0/4 mA current is defined in the VALUE 0_4 mA function, (input range 0.0000 to +99999). The appropriate unit is taken from the UNIT DENSITY function.</li><li>The density value for the 20 mA current is defined in the VALUE 20 mA function, (input range 0.0000 to +99999). The appropriate unit is taken from the UNIT DENSITY function.</li></ul><p>Example (for standard measuring mode):</p><p>25* = max. current<br/>① = Density value at which a current of 0 or 4 mA should be output (entry in VALUE 0_4 mA function).<br/>② = Density value at which a current of 20 mA should be output (entry in VALUE 20 mA function).<br/>a = Density<br/>b = Span</p></div><div><div><b>TEMPERATURE</b><ul style="list-style-type: none"><li>The temperature value for the 0/4 mA current is defined in the VALUE 0_4 mA function, (input range -99999 to +99999). The appropriate unit is taken from the UNIT TEMPERATURE function.</li><li>The temperature value for the 20 mA current is defined in the VALUE 20 mA function, (input range -99999 to +99999). The appropriate unit is taken from the UNIT TEMPERATURE function.</li></ul><p> <b>Note!</b><br/>Values with different signs <b>cannot</b> be entered for the 0_4 mA and 20 mA values if SYMMETRY is the option selected in the MEASURING MODE function, (see Page 44), The message "INPUT RANGE EXCEEDED" appears on the display.</p><p>Example (for standard measuring mode):</p><p>25* = max. current<br/>① = Temperature value at which a current of 0 or 4 mA should be output (entry in VALUE 0_4 mA function).<br/>② = Temperature value at which a current of 20 mA should be output (entry in VALUE 20 mA function).<br/>a = Temperature<br/>b = Span</p></div></div></div></div> |

| Function description CURRENT OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TIME CONSTANT</b>                | <p>Use this function to enter a time constant defining how the current output signal reacts to severely fluctuating measured variables, either very quickly (enter a low time constant) or with damping (enter a high time constant).</p> <p><b>User input:</b><br/>Fixed-point number 0.01...100.00 s</p> <p><b>Factory setting:</b><br/>1.00 s</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>FAILSAFE MODE</b>                | <p>For reasons of safety it is advisable to ensure that the current output assumes a predefined state in the event of a fault. The setting you select here affects only the current output. It has no effect on other outputs and the display (e.g. totalizer).</p> <p><b>Options:</b></p> <p>MIN. CURRENT<br/>Depending on the setting selected in the CURRENT SPAN function (see Page 20). If the current range is:<br/> 0-20 mA (25 mA) → Output current = 0 mA<br/> 4-20 mA (25 mA) → Output current = 2 mA<br/> 4-20 mA (25 mA) HART → Output current = 2 mA<br/> 0-20 mA (NAMUR) → Output current = 0 mA<br/> 4-20 mA (NAMUR) → Output current = 2 mA<br/> 4-20 mA HART (NAMUR) → Output current = 2 mA</p> <p>MAX. CURRENT<br/>Depending on the setting selected in the CURRENT SPAN function (see Page 20). If the current range is:<br/> 0-20 mA (25 mA) → Output current = 25 mA<br/> 4-20 mA (25 mA) → Output current = 25 mA<br/> 4-20 mA (25 mA) HART → Output current = 25 mA<br/> 0-20 mA (NAMUR) → Output current = 22 mA<br/> 4-20 mA (NAMUR) → Output current = 22 mA<br/> 4-20 mA HART (NAMUR) → Output current = 22 mA</p> <p>HOLD VALUE<br/>Measured value output is based on the last measured value saved before the fault occurred.</p> <p>ACTUAL VALUE<br/>Measured value output is based on the current flow measurement. The fault is ignored.</p> <p><b>Factory setting:</b><br/>MIN. CURRENT</p> |
| <b>ACTUAL CURRENT</b>               | <p>Use this function to view the computed value of the output current.</p> <p><b>Display shows:</b><br/>0.00...25.00 mA</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

| Function description CURRENT OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SIMULATION CURRENT                  | <p>Use this function to activate simulation of the current output.</p> <p><b>Options:</b><br/>OFF<br/>ON</p> <p><b>Factory setting:</b><br/>OFF</p> <p> Note!</p> <ul style="list-style-type: none"><li>• The "SIMULATION CURRENT OUTPUT" message indicates that simulation is active.</li><li>• The measuring device continues to measure while simulation is in progress, i.e. the actual measured values are output correctly via the other outputs.</li></ul> <p> Caution:<br/>The setting is not saved if the power supply fails.</p> |
| VALUE SIMULATION CURRENT            | <p> Note!</p> <p>This function is not available unless the SIMULATION CURRENT function is active (= ON).<br/>Use this function to define a selectable value (e.g. 12 mA) to be output at the current output. This value is used to test downstream devices and the flow-meter itself.</p> <p><b>User input:</b><br/>floating-point number: 0.00...25.00 mA</p> <p><b>Factory setting:</b><br/>0.00 mA</p> <p> Caution:<br/>The setting is not saved if the power supply fails.</p>                                                       |

## 9 Group PULSE/FREQUENCY OUTPUT

| Function description PULSE/FREQUENCY OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OPERATION MODE</b>                       | <p>Use this function to configure the output as a pulse or frequency output. The functions available in this function group vary, depending on which option you select here.</p> <p><b>Options:</b><br/>PULSE<br/>FREQUENCY</p> <p><b>Factory setting:</b><br/>PULSE</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>ASSIGN FREQUENCY</b>                     | <p> <b>Note!</b><br/>This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function.</p> <p>Use this function to assign a measured variable to the frequency output.</p> <p><b>Options:</b><br/>OFF<br/>MASS FLOW<br/>VOLUME FLOW<br/>DENSITY<br/>TEMPERATURE</p> <p><b>Factory setting:</b><br/>MASS FLOW</p> <p> <b>Note!</b><br/>If you select OFF, the only functions shown in this function group are ASSIGN FREQUENCY and OPERATION MODE.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>END VALUE FREQUENCY</b>                  | <p> <b>Note!</b><br/>This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function.</p> <p>Use this function to define a full scale frequency for the frequency output. You define the associated measured value of the measuring range in the VALUE F HIGH function described on Page 26.</p> <p><b>User input:</b><br/>4-digit fixed-point number: 2...1000 Hz</p> <p><b>Factory setting:</b><br/>1000 Hz</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• VALUE F HIGH = 1000 kg/h, full scale frequency = 1000 Hz: i.e. a frequency of 1000 Hz is output at a flow of 1000 kg/h.</li> <li>• VALUE F HIGH = 3600 kg/h, full scale frequency = 1000 Hz: i.e. a frequency of 1000 Hz is output at a flow of 3600 kg/h.</li> </ul> <p> <b>Note!</b><br/>In the FREQUENCY operating mode the output signal is symmetrical (on/off ratio = 1:1). At low frequencies the pulse duration is limited to a maximum of 2 seconds, i.e. the on/off ratio is no longer symmetrical.</p> |

| Function description PULSE/FREQUENCY OUTPUT              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VALUE F LOW                                              | <div><div> Note!</div><div>This function is not available unless the DENSITY or TEMPERATURE option was selected in the ASSIGN FREQUENCY function.</div><div>Use this function to assign a value to the start value frequency (0 Hz), (see "Setting the span by means of the f-min. and f-max. value" on Page 26).</div><div><b>Option:</b><br/>5-digit floating-point number (with sign for the TEMPERATURE measured variable)</div><div><b>Factory setting:</b><br/>0.5 [kg/l] or -50 [°C]</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| VALUE F HIGH                                             | <div><div>Use this function to assign a value to the END VALUE FREQUENCY, (see "Setting the span by means of the f-min. and f-max. value" on Page 26).</div><div><b>Option:</b><br/>5-digit floating-point number (with sign for the MASS FLOW, VOLUME FLOW and TEMPERATURE measured variables)</div><div><b>Factory setting:</b><br/>Depends on nominal diameter [kg/h] or 2 [kg/l] or 200 [°C]</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Setting the span by means of the f-min. and f-max. value | <div><div>The span for the measured variable selected in the ASSIGN FREQUENCY function is specified via the VALUE F LOW and VALUE F HIGH functions.</div><div>The span is defined differently, depending on the measured variable selected:</div><div><b>MASS FLOW and VOLUME FLOW</b></div><div><ul style="list-style-type: none"><li>• The VALUE F LOW function is not available; the value for the zero flow (0 kg/h or 0m³/h) is assigned to the start value frequency.</li><li>• The flow value for the end value frequency is defined in the VALUE F HIGH function, (input range -99999 to +99999). The appropriate unit is taken from the UNIT MASS FLOW or UNIT VOLUME FLOW function.</li></ul></div><div>Example (for standard measuring mode):</div><div></div><div><div>① = Flow value at which a frequency of 0 Hz should be output (preset, cannot be edited).</div><div>② = Flow value at which the, in the function END VALUE FREQUENCY defined, frequency should be output (entry in VALUE F HIGH function).</div><div>a = Flow</div><div>b = Span</div></div><div>(Continued on next page)</div></div> |

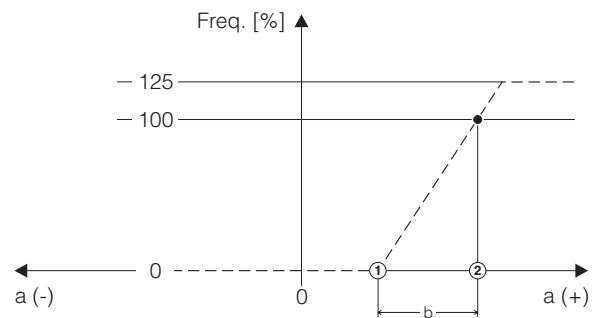
### Function description PULSE/FREQUENCY OUTPUT

Setting the span by means of the f-min. and f-max. value (contd)

## DENSITY

- The density value for the start value frequency is defined in the VALUE F LOW function, (input range 0.0000 to +99999).  
The appropriate unit is taken from the UNIT DENSITY function.
- The density value for the end value frequency is defined in the VALUE F HIGH function, (input range 0.0000 to +99999).  
The appropriate unit is taken from the UNIT DENSITY function.

Example (for standard measuring mode):



① = Density value at which a frequency of 0 Hz should be output (entry in VALUE F LOW function).

② = Density value at which the, in the function END VALUE FREQUENCY defined, frequency should be output (entry in VALUE F HIGH function).

a = Density

$$b = \text{Span}$$

## TEMPERATURE

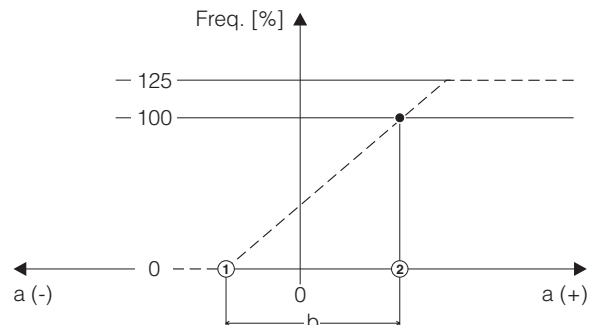
- The temperature value for the 0/4 mA current is defined in the VALUE F LOW function, (input range –99999 to +99999). The appropriate unit is taken from the UNIT TEMPERATURE function.
- The temperature value for the 20 mA current is defined in the VALUE F HIGH function, (input range –99999 to +99999). The appropriate unit is taken from the UNIT TEMPERATURE function.



Note!

Values with different signs **cannot** be entered for the VALUE F LOW and VALUE F HIGH if SYMMETRY is the option selected in the MEASURING MODE function (see Page 44). The message "INPUT RANGE EXCEEDED" appears on the display.

Example (for standard measuring mode):

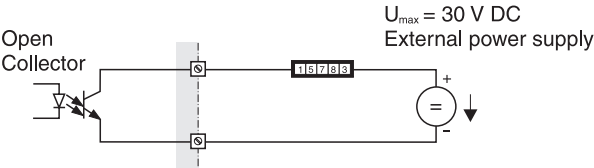
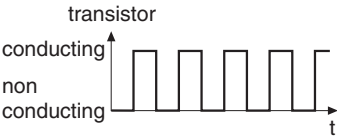
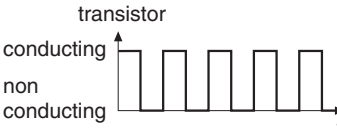


① = Temperature value at which a frequency of 0 Hz should be output (entry in VALUE F LOW function).

② = Temperature value at which the, in the function END VALUE FREQUENCY defined, frequency should be output (entry in VALUE F HIGH function).

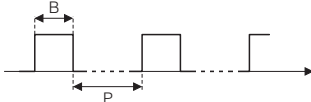
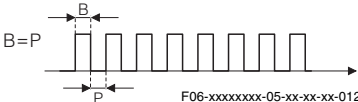
a = Temperature

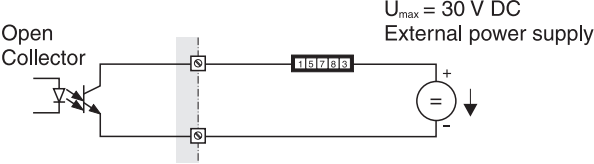
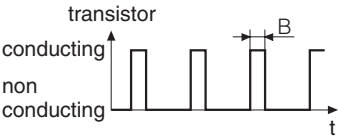
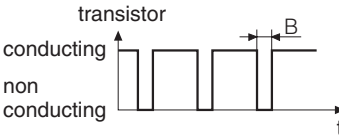
b = Span

| Function description PULSE/FREQUENCY OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUTPUT SIGNAL                               | <div><div><div>Note!</div><div><p>This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function.</p><p>Use this function to select the polarity of the frequency signal.</p><p><b>Options:</b><br/>PASSIVE - POSITIVE<br/>PASSIVE - NEGATIVE</p><p><b>Factory setting:</b><br/>PASSIVE - POSITIVE</p><p><b>PASSIVE:</b></p><div><div><div>Open Collector</div><div></div></div><div><div>Note!</div><div><p>For continuous currents up to 25 mA (<math>I_{\max} = 250 \text{ mA} / 20 \text{ ms}</math>)</p></div></div></div><div><div><div>PASSIVE-POSITIVE</div><div><div>transistor</div><div></div></div><div><div>PASSIVE-NEGATIVE</div><div><div>transistor</div><div></div></div></div></div></div></div></div></div> |
| TIME CONSTANT                               | <div><div><div>Note!</div><div><p>This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function.</p><p>Use this function to enter a time constant defining how the frequency output signal reacts to severely fluctuating measured variables, either very quickly (enter a low time constant) or with damping (enter a high time constant).</p><p><b>User input:</b><br/>floating-point number: 0.00...100.00 s</p><p><b>Factory setting:</b><br/>0.00 s</p></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| Function description PULSE/FREQUENCY OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FAILSAFE MODE</b>                        | <p> <b>Note!</b><br/>This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function.</p> <p>For reasons of safety it is advisable to ensure that the frequency output assumes a predefined state in the event of a fault. Use this function to define this state. The setting you select here affects only the frequency output. It has no effect on other outputs and the display (e.g. totalizer).</p> <p><b>Options:</b><br/>FALLBACK VALUE<br/>Output is 0 Hz.</p> <p>FAILSAFE LEVEL<br/>Output is the frequency specified in the FAILSAFE VALUE function.</p> <p>HOLD VALUE<br/>Measured value output is based on the last measured value saved before the fault occurred.</p> <p>ACTUAL VALUE<br/>Measured value output is based on the current flow measurement. The fault is ignored.</p> <p><b>Factory setting:</b><br/>FALLBACK VALUE</p> |
| <b>FAILSAFE VALUE</b>                       | <p> <b>Note!</b><br/>This function is not available unless FREQUENCY was selected in the OPERATION MODE function and FAILSAFE LEVEL was selected in the FAILSAFE MODE function.</p> <p>Use this function to define frequency that the measuring device outputs in the event of an fault.</p> <p><b>User input:</b><br/>max. 4-digit number: 0...1250 Hz</p> <p><b>Factory setting:</b><br/>1250 Hz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>ACTUAL FREQUENCY</b>                     | <p> <b>Note!</b><br/>This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function.</p> <p>Use this function to view the computed value of the output frequency.</p> <p><b>Display shows:</b><br/>0...1250 Hz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Function description PULSE/FREQUENCY OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SIMULATION FREQUENCY</b>                 | <p> <b>Note!</b><br/>This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function.</p> <p>Use this function to activate simulation of the frequency output.</p> <p><b>Options:</b><br/>OFF<br/>ON</p> <p><b>Factory setting:</b><br/>OFF</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• The "SIMULATION FREQUENCY OUTPUT" message indicates that simulation is active.</li> <li>• The measuring device continues to measure while simulation is in progress, i.e. the currently measured values are output correctly via the other outputs.</li> </ul> <p> <b>Caution:</b><br/>The setting is not saved if the power supply fails.</p> |
| <b>VALUE SIMULATION FREQUENCY</b>           | <p> <b>Note!</b><br/>This function is not available unless FREQUENCY was selected in the OPERATION MODE function and the VALUE SIMULATION FREQUENCY function is active (= ON).</p> <p>Use this function to define a selectable frequency value (e.g. 500 Hz) to be output at the frequency output. This value is used to test downstream devices and the flowmeter itself.</p> <p><b>User input:</b><br/>0...1250 Hz</p> <p><b>Factory setting:</b><br/>0 Hz</p> <p> <b>Caution:</b><br/>The setting is not saved if the power supply fails.</p>                                                                                                                                                                                                                                    |
| <b>ASSIGN PULSE</b>                         | <p> <b>Note!</b><br/>This function is not available unless the PULSE setting was selected in the OPERATION MODE function.</p> <p>Use this function to assign a measured variable to the pulse output.</p> <p><b>Options:</b><br/>OFF<br/>MASS FLOW<br/>VOLUME FLOW</p> <p><b>Factory setting:</b><br/>MASS FLOW</p> <p> <b>Note!</b><br/>If you select OFF, the only functions shown in this function group are ASSIGN PULSE and OPERATION MODE.</p>                                                                                                                                                                                                                                                                                                                              |

| Function description PULSE/FREQUENCY OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PULSE VALUE                                 | <div><div>Note!</div><p>This function is not available unless the PULSE setting was selected in the OPERATION MODE function.</p><p>Use this function to define the flow at which a pulse is triggered. These pulses can be totaled by an external totalizer, and the total flow quantity since measuring started can be registered in this way.</p><p><b>User input:</b><br/>5-digit floating-point number</p><p><b>Factory setting:</b><br/>Depends on nominal diameter and country,<br/>[value] [dm<sup>3</sup> ...m<sup>3</sup> or US gal...US Mgal] / pulses<br/>corresponding to the factory setting for the pulses value (see Page 53 ff.)</p><div><div>Note!</div><p>The appropriate unit is taken from the corresponding UNIT function in the group SYSTEM UNITS (see Page 9).</p></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| PULSE WIDTH                                 | <div><div>Note!</div><p>This function is not available unless the PULSE setting was selected in the OPERATION MODE function.</p><p>Use this function to enter the maximum pulse width of the output pulses.</p><p><b>User input:</b><br/>0.5...2000 ms</p><p><b>Factory setting:</b><br/>100 ms</p><p>Pulse output is <b>always</b> with the pulse width (B) entered in this function. The intervals (P) between the individual pulses are automatically configured. However, they must at least correspond to the pulse width (B = P).</p><div><div><div>B &lt; P</div></div><div><div>B = P</div></div></div><p>F06-xxxxxxx-05-xx-xx-xx-012</p><p>B = Pulse width entered (the illustration applies to positive pulses)<br/>P= Intervals between the individual pulses</p><div><div>Note!</div><p>When entering the pulse width, select a value that can still be processed by an external totalizer (e.g. mechanical totalizer, PLC, etc.).</p><div><div>Caution:</div><p>If the pulse number or frequency resulting from the pulse value entered, (see function PULSE VALUE on Page 31), and from the current flow is too large to maintain the pulse width selected (interval P is smaller than the pulse width B entered), a system error message (pulse memory) is generated after buffering/ balancing time.</p></div></div></div> |

| Function description PULSE/FREQUENCY OUTPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUTPUT SIGNAL                               | <div><div>Note!</div><div><p>This function is not available unless the PULSE setting was selected in the OPERATION MODE function.</p><p>Use this function to configure the output in such a way that it for example matches an external totalizer. According to the application, the direction of the pulses can be selected here.</p><p><b>Options:</b><br/>PASSIVE - POSITIVE<br/>PASSIVE - NEGATIVE</p><p><b>Factory setting:</b><br/>PASSIVE - POSITIVE</p><p><b>PASSIVE:</b></p><div><div><div>Open Collector</div><div></div></div><div><div>Note!</div><div><p>For continuous currents up to 25 mA (<math>I_{max} = 250 \text{ mA} / 20 \text{ ms}</math>)</p></div></div><div><div><div>PASSIVE-POSITIVE</div><div>pulses</div><div><div>transistor</div><div></div><div>B = Pulse width</div></div><div><div>PASSIVE-NEGATIVE</div><div>pulses</div><div><div>transistor</div><div></div></div></div></div></div></div></div></div> |
| FAILSAFE MODE                               | <div><div>Note!</div><div><p>This function is not available unless the PULSE setting was selected in the OPERATION MODE function.</p><p>For reasons of safety it is advisable to ensure that the pulse output assumes a predefined state in the event of a fault. Use this function to define this state. The setting you select here affects only the pulse output. It has no effect on other outputs and the display (e.g. totalizer).</p><p><b>Options:</b><br/>FALLBACK VALUE<br/>Output is 0 pulse.</p><p>HOLD VALUE<br/>Measured value output is based on the last measured value saved before the fault occurred.</p><p>ACTUAL VALUE<br/>Measured value output is based on the current flow measurement. The fault is ignored.</p><p><b>Factory setting:</b><br/>FALLBACK VALUE</p></div></div>                                                                                                                                                                                                                                                                                                                                                                                                  |

## 10 Group STATUS OUTPUT

| Function description STATUS OUTPUT                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This group is not available unless the measuring device is fitted with a status output. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ASSIGN STATUS</b>                                                                    | <p>Use this function to assign a switching function to the status output.</p> <p><b>Options:</b><br/> OFF<br/> ON (operation)<br/> FAULT MESSAGE<br/> NOTICE MESSAGE<br/> FAULT MESSAGE or NOTICE MESSAGE<br/> EMPTY PIPE DETECTION (only if function is active)<br/> FLOW DIRECTION<br/> LIMIT MASS FLOW<br/> LIMIT VOLUME FLOW<br/> LIMIT DENSITY<br/> LIMIT TEMPERATURE</p> <p><b>Factory setting:</b><br/> FAULT MESSAGE</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>The behaviour of the status output is of the quiescent-current type, in other words the output is closed (transistor conductive) when normal, error-free measuring is in progress.</li> <li>Please read and comply with the information on the switching characteristics of the status output (see Page 35, 36).</li> <li>If you select OFF, the only function shown in this function group is this function, in other words ASSIGN STATUS.</li> </ul> |
| <b>ON-VALUE</b>                                                                         | <p> <b>Note!</b></p> <p>This function is not available unless LIMIT MASS FLOW, LIMIT VOLUME FLOW, LIMIT TEMPERATURE, LIMIT DENSITY or FLOW DIRECTION was selected in the ASSIGN STATUS function.</p> <p>Use this function to assign a value to the switch-on point (status output conductive). The value can be greater or less than the switch-off point. Positive and negative values are permissible.</p> <p><b>User input:</b><br/> 5-digit floating-point number</p> <p><b>Factory setting:</b><br/> 0 [kg/h] or 0 [m<sup>3</sup>/h] or 2 [kg/l] or 200 [°C]</p>                                                                                                                                                                                                                                                                                                                                                                             |
| <b>OFF-VALUE</b>                                                                        | <p> <b>Note!</b></p> <p>This function is not available unless LIMIT MASS FLOW, LIMIT VOLUME FLOW, LIMIT TEMPERATURE, LIMIT DENSITY was selected in the ASSIGN STATUS function.</p> <p>Use this function to assign a value to the switch-off point (status output not conductive). The value can be greater or less than the switch-on point. Positive and negative values are permissible.</p> <p><b>User input:</b><br/> 5-digit floating-point number</p> <p><b>Factory setting:</b><br/> 0 [kg/h] or 0 [m<sup>3</sup>/h] or 2 [kg/l] or 200 [°C]</p>                                                                                                                                                                                                                                                                                                                                                                                           |

| Function description STATUS OUTPUT   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TIME CONSTANT</b>                 | <p>Use this function to enter a time constant defining how the status output reacts to severely fluctuating measured variables, either very quickly (enter a low time constant) or with damping (enter a high time constant). The purpose of damping, therefore, is to prevent the status output changing state continuously in response to fluctuations in flow.</p> <p><b>User input:</b><br/>5-digit floating-point number: 0.00...100.00 s</p> <p><b>Factory setting:</b><br/>0.00 s</p>                                                                                                                                                                                                                                     |
| <b>ACTUAL STATUS</b>                 | <p>Use this function to check the current status of the status output.</p> <p><b>Display shows:</b><br/>NOT CONDUCTIVE<br/>CONDUCTIVE</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>SIMULATION SWITCH POINT</b>       | <p>Use this function to activate simulation of the status output.</p> <p><b>Options:</b><br/>OFF<br/>ON</p> <p><b>Factory setting:</b><br/>OFF</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• The "SIMULATION STATUS OUTPUT" message indicates that simulation is active.</li> <li>• The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the other outputs.</li> </ul> <p> <b>Caution:</b><br/>The setting is not saved if the power supply fails.</p> |
| <b>VALUE SIMULATION SWITCH POINT</b> | <p> <b>Note!</b><br/>This function is not available unless the ON setting was selected in the SIMULATION SWITCH POINT function.</p> <p>Use this function to define the switching response of the status output during the simulation. This value is used to test downstream devices and the flow-meter itself.</p> <p><b>User input:</b><br/>NOT CONDUCTIVE<br/>CONDUCTIVE</p> <p><b>Factory setting:</b><br/>NOT CONDUCTIVE</p> <p> <b>Caution:</b><br/>The setting is not saved if the power supply fails.</p>                                           |

## 10.1 Information on the response of the status output

### General

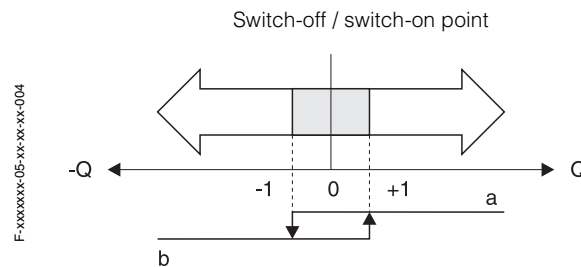
If you have configured the status output for "LIMIT" or "FLOW DIRECTION", you can define the requisite switching points in the ON-VALUE and OFF-VALUE functions. When the measured variable in question reaches one of these predefined values, the status output signal switches as shown in the illustrations below.

### Status output configured for direction of flow

The value you entered in the ON-VALUE function defines the switching points for the positive and negative directions of flow.

If, for example, the switching point you define is  $\pm 1$  kg/h, the status output is not conductive at  $-1$  kg/h and is conductive at  $+1$  kg/h. Set the switching point to 0 if your process calls for direct switchover (no switching hysteresis).

If low flow cut off is used, it is advisable to set hysteresis to a value greater than or equal to the low flow cut off rate.



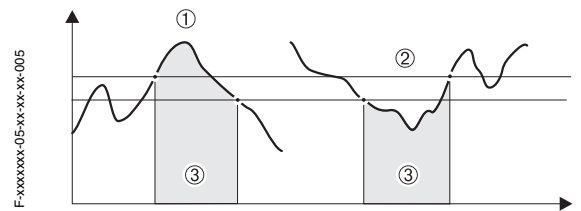
a = Status output conductive

b = Status output not conductive

### Status output configured for limit value

The status output signal switches as soon as the measured variable falls below or exceeds a defined switching point. Application: Monitoring flow or process-related boundary conditions.

Measured variable

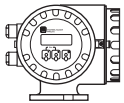
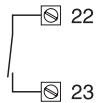
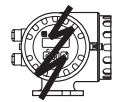
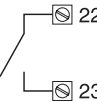
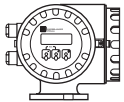
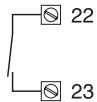
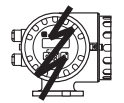
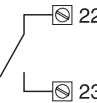
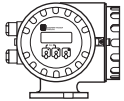
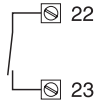
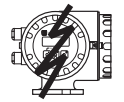
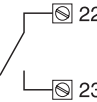
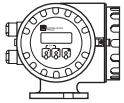
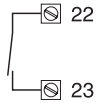
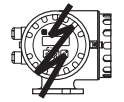
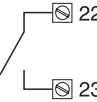
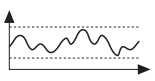
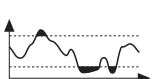


① =  $ON \leq OFF-VALUE$  (maximum safety)

② =  $ON > OFF-VALUE$  (minimum safety)

③ = Status output off (not conductive)

## 10.2 Switching action of the status output

| Function                                                                         | State                                                                                                                                                                              | Open Collector (Transistor)                                                                             |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>ON (operation)</b>                                                            | System in measuring mode<br>                                                                     | conductive<br>       |
|                                                                                  | System not in measuring mode (power supply failure)<br>                                          | not conductive<br>   |
| <b>Fault message</b>                                                             | System OK<br>                                                                                    | conductive<br>       |
|                                                                                  | (System or process error)<br>Fault → Error response of outputs, inputs and totalizer<br>         | not conductive<br>   |
| <b>Notice message</b>                                                            | System OK<br>                                                                                    | conductive<br>       |
|                                                                                  | (System or process error)<br>Fault → Continuation of measuring<br>                              | not conductive<br>  |
| <b>Fault message or Notice message</b>                                           | System OK<br>                                                                                  | conductive<br>     |
|                                                                                  | (System or process error)<br>Fault → Response to error or Info → Continuation of measuring<br> | not conductive<br> |
| <b>Empty pipe detection (EPD)</b>                                                | Fluid density above response level, e.g. full measuring tube<br>                               | conductive<br>     |
|                                                                                  | Fluid density below response level, e.g. empty measuring tube<br>                              | not conductive<br> |
| <b>Flow direction</b>                                                            | forward<br>                                                                                    | conductive<br>     |
|                                                                                  | reverse<br>                                                                                    | not conductive<br> |
| <b>Limit value</b><br>• mass flow<br>• volume flow<br>• density<br>• temperature | Limit value not overshoot or undershot<br>                                                     | conductive<br>     |
|                                                                                  | Limit value overshoot or undershot<br>                                                         | not conductive<br> |

# 11 Group STATUS INPUT

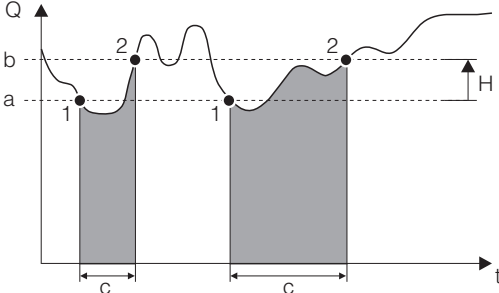
| Function description STATUS INPUT                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This group is not available unless the measuring device is fitted with a status input I/O module. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>ASSIGN STATUS INPUT</b>                                                                        | <p>Use this function to assign a switching function to the status input.</p> <p><b>Options:</b><br/> OFF<br/> RESET TOTALIZER<br/> POSITIVE ZERO RETURN<br/> ZEROPOINT ADJUSTMENT</p> <p><b>Factory setting:</b><br/> OFF</p> <p> <b>Note!</b><br/> Positive zero return is active as long as the active level is available at the status input (continuous signal). All other assignments react to a change in level (pulse) at the status input.</p>                                                                                                                                                                                                                                                                                                             |
| <b>ACTIVE LEVEL</b>                                                                               | <p>Use this function to define whether the assigned function (see ASSIGN STATUS INPUT function) is released when the signal level is present (HIGH) or not present (LOW).</p> <p><b>Options:</b><br/> HIGH<br/> LOW</p> <p><b>Factory setting:</b><br/> HIGH</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>MINIMUM PULSE WIDTH</b>                                                                        | <p>Use this function to define a minimum width which the input pulse must achieve in order to trigger the defined switching function.</p> <p><b>User input:</b><br/> 20...100 ms</p> <p><b>Factory setting:</b><br/> 50 ms</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>SIMULATION STATUS INPUT</b>                                                                    | <p>Use this function to activate simulation of the status input, in other words to trigger the function assigned to the status input (see the ASSIGN STATUS INPUT function on Page 33).</p> <p><b>Options:</b><br/> OFF<br/> ON</p> <p><b>Factory setting:</b><br/> OFF</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• The "SIMULATION STATUS INPUT" message indicates that simulation is active.</li> <li>• The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the outputs.</li> </ul> <p> <b>Caution:</b><br/> The setting is not saved if the power supply fails.</p> |

| Function description STATUS INPUT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VALUE SIMULATION<br>STATUS INPUT  | <div> <b>Note!</b><br/>This function is not available unless the ON setting was selected in the SIMULATION STATUS INPUT function.</div> <div>Use this function to select the level to be assumed at the status input during the simulation.</div> <div><b>Options:</b><br/>HIGH<br/>LOW</div> <div><b>Factory setting:</b><br/>LOW</div> <div> <b>Caution:</b><br/>The setting is not saved if the power supply fails.</div> |

## 12 Group COMMUNICATION

| Function description COMMUNICATION |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TAG NAME</b>                    | <p>Use this function to enter a tag name for the measuring device. You can edit and read this tag name at the local display or via the HART protocol.</p> <p><b>User input:</b><br/>max. 8-character text, permissible: A-Z, 0-9, +,-, punctuation marks</p> <p><b>Factory setting:</b><br/>" _ _ _ _ _ " (without text)</p>                                                                                      |
| <b>TAG DESCRIPTION</b>             | <p>Use this function to enter a tag description for the measuring device. You can edit and read this tag description at the local display or via the HART protocol.</p> <p><b>User input:</b><br/>max. 16-character text, permissible: A-Z, 0-9, +,-, punctuation marks</p> <p><b>Factory setting:</b><br/>" _ _ _ _ _ " (without text)</p>                                                                       |
| <b>BUS ADDRESS</b>                 | <p>Use this function to define the address for the exchange of data with the HART protocol.</p> <p><b>User input:</b><br/>0...15</p> <p><b>Factory setting:</b><br/>0</p> <p> <b>Note!</b><br/>Addresses 1...15: a constant 4 mA current is applied.</p>                                                                       |
| <b>HART PROTOCOL</b>               | <p>Use this function to display if the HART protocol is active.</p> <p><b>Anzeige:</b><br/>OFF = HART protocol not aktive<br/>ON = HART protocol aktive</p> <p> <b>Note!</b><br/>The HART protocol can be activated with the selection 4-20 mA HART resp. 4-20 mA (25 mA) HART in the CURRENT SPAN function (see Page 20).</p> |
| <b>WRITE PROTECTION</b>            | <p>Use this function to check whether the measuring device can be write accessed.</p> <p><b>Display shows:</b><br/>OFF = Data exchange is possible<br/>ON = Data exchange disabled (an activation is at present not available)</p> <p><b>Factory setting:</b><br/>OFF</p>                                                                                                                                         |
| <b>MANUFACTURER ID</b>             | <p>Use this function to view the manufacturer ID in decimal numerical format.</p> <p><b>Display shows:</b><br/>17 = (<math>\cong</math> 11 hex) for Endress+Hauser</p>                                                                                                                                                                                                                                            |
| <b>DEVICE ID</b>                   | <p>Use this function to view the device ID in hexadecimal numerical format.</p> <p><b>Display shows:</b><br/>50 = (<math>\cong</math> 80 dez) for Promass 80</p>                                                                                                                                                                                                                                                  |

13 Group PROCESS PARAMETER

| Function description PROCESS PARAMETER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ASSIGN LOW FLOW CUT OFF                | <p>Use this function to assign the switching point for the low flow cut off.</p> <p><b>Options:</b><br/>OFF<br/>MASS FLOW<br/>VOLUME FLOW</p> <p><b>Factory setting:</b><br/>MASS FLOW</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ON VALUE LOW FLOW CUT OFF              | <p>Use this function to assign the on value for the low flow cut off.<br/>Low flow cut off is active if the setting is a value not equal to 0. The sign of the flow value is highlighted on the display to indicate that low flow cut off is active.</p> <p><b>User input:</b><br/>5-digit floating-point number</p> <p><b>Factory setting:</b><br/>depends on nominal diameter</p> <p> <b>Note!</b><br/>The appropriate unit is taken from the corresponding UNIT function in the group SYSTEM UNITS (see Page 9).</p>                                                             |
| OFF VALUE LOW FLOW CUT OFF             | <p>Use this function to enter the switch-off point for low flow cut off.<br/>Enter the switch-off point as a positive hysteresis value from the switch-on point.</p> <p><b>User input:</b><br/>Integer 0...100%</p> <p><b>Factory setting:</b><br/>50%</p> <p>Example:</p> <div></div> <p>Q = Flow [volume/time]<br/>t = Time<br/>H = Hysteresis<br/>a = ON VALUE LOW FLOW CUT OFF = 200 g/h<br/>b = OFF VALUE LOW FLOW CUT OFF = 10%<br/>c = Low flow cut off active<br/>1 = Low flow cut off is switched on at 200 g/h<br/>2 = Low flow cut off is switched off at 220 g/h</p> |

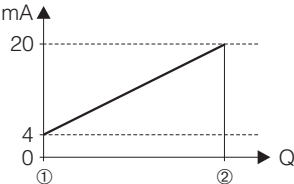
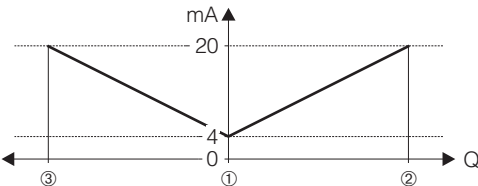
F06-80xxxxx-05-xx-xx-xx-007

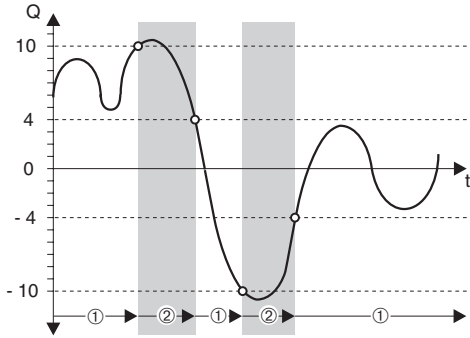
| Function description PROCESS PARAMETER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EMPTY PIPE DETECTION (EPD)</b>      | <p>Use this function to activate the empty pipe detection (EPD). With empty measuring tubes the density of the fluid falls below a specified value (see EPD VALUE LOW function).</p> <p><b>Options:</b><br/>OFF<br/>ON</p> <p><b>Factory setting:</b><br/>OFF</p> <p> <b>Caution:</b></p> <ul style="list-style-type: none"> <li>Select a correspondingly low EPD VALUE LOW so that the difference to the effective density of the fluid is sufficiently large enough. This ensures that totally empty measuring tubes and not partially filled ones are detected.</li> <li>For gas measurement we strongly recommend to switch off empty pipe detection.</li> </ul> |
| <b>EPD VALUE LOW</b>                   | <p> <b>Note!</b><br/>This function is not available unless the ON selection was selected in the EMPTY PIPE DETECTION (EPD) function.</p> <p>Use this function to set an lower threshold for the measured density value, in order to detect possible problems in the process indicated by too low density.</p> <p><b>User input:</b><br/>5-digit floating-point number</p> <p><b>Factory setting:</b><br/>0.2000 g/cc</p>                                                                                                                                                                                                                                             |
| <b>EPD VALUE HIGH</b>                  | <p> <b>Note!</b><br/>This function is not available unless the ON selection was selected in the EMPTY PIPE DETECTION (EPD) function.</p> <p>Use this function to set an upper threshold for the measured density value.</p> <p><b>User input:</b><br/>5-digit floating-point number</p> <p><b>Factory setting:</b><br/>6.0000 g/cc</p>                                                                                                                                                                                                                                                                                                                             |
| <b>EPD RESPONSE TIME</b>               | <p>Use this function to enter the time span for which the criteria for an empty pipe have to be satisfied without interruption before a notice message or fault message is generated.</p> <p><b>User input:</b><br/>fixed-point number: 1.0...60.0 s</p> <p><b>Factory setting:</b><br/>1.0 s</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Function description PROCESS PARAMETER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ZERO POINT ADJUST</b>               | <p>This function enables a zero point adjustment to be automatically carried out. The new zero point determined by the measuring system is adopted by the ZERO POINT function (see Page 47).</p> <p><b>Options:</b><br/>CANCEL<br/>START</p> <p><b>Factory setting:</b><br/>CANCEL</p> <p> <b>Caution:</b><br/>Before carrying out the calibration, please refer to BA 057D/06/en "Promass 80 Operating Instructions" where a detailed description of the zero point adjustment is given.</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• Programming is locked during zero point adjustment and the display shows: "ZERO ADJUST RUNNING".</li> <li>• If the zero point adjustment is not possible, e.g. with a flow velocity &gt; 0.1 m/s, or has been cancelled, then the alarm message "ZERO ADJUST NOT POSSIBLE" is shown on the display.</li> <li>• If the Promass 80 measuring electronics are fitted with a status input, then the zero point can also be activated by using this input.</li> <li>• After Zero point adjustment is completed, the new zero point can be called up with the  key. If the  key is pressed again, you return to the ZERO POINT ADJUST function.</li> </ul> |
| <b>DENSITY SET VALUE</b>               | <p>In this function, enter the density set value of the particular fluid for which you want to carry out a field density adjustment.</p> <p><b>User input:</b><br/>5 digit floating-point number, incl. units (corresponding to 0.1...5.9999 kg/l)</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>• The preset density entered here should not vary from the actual fluid density by a more than <math>\pm 10\%</math>.</li> <li>• The appropriate unit is taken from the corresponding UNIT function in the group SYSTEM UNITS (see Page 9).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>MEASURE FLUID</b>                   | <p>In this function the actual density of the fluid is measured for the density adjustment.</p> <p><b>Options:</b><br/>CANCEL<br/>START</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Function description PROCESS PARAMETER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DENSITY ADJUST</b>                  | <p>With this function a density adjustment can be carried out on site. The density set value will thus be recalculated and stored. This ensures that the values dependent on density calculations (e.g. volume flow) are as accurate as possible.</p> <p> <b>Caution:</b><br/>Before carrying out a density adjustment, please refer to BA 057D/06/en "Promass 80 Operating Instructions" where a detailed description of the density adjustment is given.</p> <p> <b>Note!</b><br/>The density adjustment can be executed if:</p> <ul style="list-style-type: none"> <li>• The sensor does not accurately measure the density which the operator expects based on laboratory trials.</li> <li>• The characteristics of the fluid are outside the measuring points set at the factory or reference conditions under which the flowmeter has been calibrated.</li> <li>• The plant is used solely for measuring a fluid whose density is to be determined very accurately under constant conditions.</li> </ul> <p><b>User input:</b><br/>CANCEL<br/>DENSITY ADJUST</p> <p><b>Factory setting:</b><br/>CANCEL</p> |
| <b>RESTORE ORIGINAL</b>                | <p>With this function the original density coefficient determined at the factory are restored.</p> <p><b>Options:</b><br/>NO<br/>YES</p> <p><b>Factory setting:</b><br/>NO</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>PRESSURE MODE</b>                   | <p>Use this function to configure an automatic pressure correction. In this way, the effect of a pressure deviation between the calibration and process pressures on the measured error for mass flow is compensated for, (see also Operating Instructions <i>PROline promass 80</i>, BA 057D/06/en, Accuracy Chapter).</p> <p><b>Options:</b><br/>OFF<br/>FIX (A fixed process pressure for pressure correction is specified)</p> <p><b>Factory setting:</b><br/>OFF</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>PRESSURE</b>                        | <p> <b>Note!</b><br/>This function is not available unless FIX was selected in the PRESSURE MODE function.</p> <p>Use this function to enter the value for the process pressure which should be used during pressure correction.</p> <p><b>User input:</b><br/>7-digit floating-point number</p> <p><b>Factory setting:</b><br/>0 bar g</p> <p> <b>Note!</b><br/>The appropriate unit is taken from the function group SYSTEM UNITS (see Page 9).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

14 Group SYSTEM PARAMETER

| Function description SYSTEM PARAMETER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| INSTALLATION<br>DIRECTION SENSOR      | <p>Use this function to reverse the sign of the measured variable, if necessary.</p> <p><b>Options:</b><br/>NORMAL (flow as indicated by the arrow)<br/>INVERSE (flow opposite to direction indicated by the arrow)</p> <p><b>Factory setting:</b><br/>NORMAL</p> <p> <b>Note!</b><br/>Ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor (nameplate).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| MEASURING MODE                        | <p>Use this function to define the measuring mode for all outputs and the internal totalizer.</p> <p><b>Options:</b><br/>STANDARD<br/>SYMMETRY</p> <p><b>Factory setting:</b><br/>STANDARD</p> <p>The responses of the individual outputs and the internal totalizer in each of the measuring modes are described in detail below:</p> <p><b>Current and frequency output</b><br/>STANDARD<br/>The output signals of the current and frequency output are proportional to the measured variable.<br/>The flow components outside the scaled measuring range (between VALUE 0_4 mA or VALUE F LOW ① and the VALUE 20 mA or VALUE F HIGH ②) are not taken into account for signal output, but a message "CURRENT RANGE AT FULL SCALE VALUE" or "FREQUENCY RANGE AT FULL SCALE VALUE" is issued.</p> <p>Example for current output:</p>  <p>SYMMETRY<br/>The output signals of the current and frequency output are independent of the direction of flow (absolute amount of the measured variable). The "VALUE 20 mA" or "VALUE F HIGH" ③ (e.g. backflow) corresponds to the mirrored VALUE 20 mA or VALUE F HIGH ② (e.g. flow).</p> <p>Example for current output:</p>  |

| Function description SYSTEM PARAMETER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MEASURING MODE<br>(Continuation)      | <p><b>Pulse output</b></p> <p><b>STANDARD</b><br/>Only positive flow components are totaled. Negative components are not taken into account.</p> <p><b>SYMMETRY</b><br/>Positive and negative flow components are taken into account.</p> <p> <b>Note!</b><br/>The direction of flow can be output via the configurable status output.</p> <p><b>Status output</b></p> <p> <b>Note!</b><br/>Only if in the ASSIGN STATUS function the LIMIT option is selected.</p> <p><b>STANDARD</b><br/>The status output signal switches at the defined switching points.</p> <p><b>SYMMETRY</b><br/>The status output signal switches at the defined switching points, irrespective of the sign. In other words, if you define a switching point with a positive sign the status output signal switches as soon as the value is reached in the negative direction (negative sign) (see illustration).</p> <p>Example for the SYMMETRY measuring mode:</p> <p>Switch-on point: Q = 4<br/>Switch-off point: Q = 10</p> <p>① = Status output switched on (conductive)<br/>② = Status output switched off (non-conductive)</p> <div><p>The graph shows a fluctuating flow signal Q over time t. The y-axis ranges from -10 to 10 with major ticks at -10, -4, 0, 4, and 10. The x-axis represents time t. Two horizontal dashed lines are drawn at Q=4 and Q=10. Two vertical shaded gray regions represent the status output being 'on' (conductive). The first shaded region starts when Q reaches 4 and ends when Q reaches 10. The second shaded region starts when Q reaches -4 and ends when Q reaches -10. Below the x-axis, a sequence of arrows indicates the status output state: ① (on) for the first shaded region, ② (off) for the first unshaded region, ① (on) for the second shaded region, ② (off) for the second unshaded region, and ① (on) for the final unshaded region.</p></div> <p><b>Totalizer</b></p> <p><b>STANDARD</b><br/>Only positive flow components are totaled. Negative components are not taken into account.</p> <p><b>SYMMETRY</b><br/>The positive and negative flow components are balanced. In other words, net flow in the flow direction is registered.</p> |

| Function description SYSTEM PARAMETER |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>POSITIVE ZERO RETURN</b>           | <p>Use this function to interrupt evaluation of measured variables. This is necessary when a piping system is being cleaned, for example. This setting acts on all functions and outputs of the measuring device.</p> <p><b>Options:</b><br/> OFF<br/> ON (signal output is set to zero flow value, temperature and density are output normally)</p> <p><b>Factory setting:</b><br/> OFF</p>                                                                                                                                      |
| <b>DENSITY DAMPING</b>                | <p>The density filter allows the sensitivity of the density measuring signal to be lowered with respect to variations in the density of the fluid, e.g. with inhomogeneous liquids.</p> <p><b>User input:</b><br/> max. 5-digit number, including unit: 0.00...100.00 s</p> <p><b>Factory setting:</b><br/> 0.00 s</p> <p> <b>Note!</b><br/> The damping acts on all functions and outputs of the measuring device.</p>                          |
| <b>FLOW DAMPING</b>                   | <p>Using the interference blanking (= time constant for exponential filter) the sensitivity of the flow measurement signal can be reduced with respect to transient flows and interference peaks; e.g. with fluid containing solids or gas bubbles, etc.</p> <p><b>User input:</b><br/> 0...100 s</p> <p><b>Factory setting:</b><br/> 0 s</p> <p> <b>Note!</b><br/> The damping acts on all functions and outputs of the measuring device.</p> |

## 15 Group SENSOR DATA

| Function description SENSOR DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>All sensor data, including calibration factor, zero point, nominal diameter, etc. are set at the factory. All the sensor's parameter settings are saved on the S-DAT™ memory chip.</p> <p> <b>Caution:</b><br/>Under normal circumstances you should not change these parameter settings, because changes affect numerous functions of the entire measuring facility in general, and the accuracy of the measuring system in particular. Consequently, most of the functions described below can be accessed only by entering a special <b>service code</b>, which is not the same as your private code number.</p> <p>Contact the E+H service organization if you have any questions about these functions.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>K-FACTOR</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>This function shows the current calibration factor for the sensor.</p> <p><b>Factory setting:</b><br/>depends on nominal diameter and calibration</p> <p> <b>Note!</b><br/>If the service code is used to call this function, this value can be edited.</p>                                                                 |
| <b>ZERO POINT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>This function shows the current zero-point correction value for the sensor. The zero-point correction factor is calculated and set at the factory.</p> <p><b>User input:</b><br/>max. 5-digit number: -99999...+99999</p> <p><b>Factory setting:</b><br/>depends on calibration</p>                                                                                                                          |
| <b>NOMINAL DIAMETER</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>This function shows the nominal diameter for the sensor. The nominal diameter depends on the size of the sensor and is set at the factory.</p> <p><b>Factory setting:</b><br/>depends on the size of the sensor</p> <p> <b>Note!</b><br/>If the service code is used to call this function, this value can be edited.</p> |
| <b>TEMPERATURE COEFFICIENT KM</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | This function shows the temperatur coefficient KM.                                                                                                                                                                                                                                                                                                                                                              |
| <b>TEMPERATURE COEFFICIENT KM 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | This function shows the temperatur coefficient KM 2.                                                                                                                                                                                                                                                                                                                                                            |
| <b>TEMPERATURE COEFFICIENT KT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | This function shows the temperatur coefficient KT.                                                                                                                                                                                                                                                                                                                                                              |
| <b>CALIBRATION COEFFICIENT KD 1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | This function shows the calibration coefficient KD 1.                                                                                                                                                                                                                                                                                                                                                           |
| <b>CALIBRATION COEFFICIENT KD 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | This function shows the calibration coefficient KD 2.                                                                                                                                                                                                                                                                                                                                                           |

| Function description SENSOR DATA        |                                                                                                                                                                                                                                                  |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>DENSITY COEFFICIENT C 0</b>          | <p>This function shows the actual density coefficient C 0.</p> <p> Caution:<br/>A density adjustment can alter the calibration value of this coefficient.</p>   |
| <b>DENSITY COEFFICIENT C 1</b>          | <p>This function shows the actual density coefficient C 1.</p> <p> Caution:<br/>A density adjustment can alter the calibration value of this coefficient.</p>   |
| <b>DENSITY COEFFICIENT C 2</b>          | <p>This function shows the actual density coefficient C 2.</p> <p> Caution:<br/>A density adjustment can alter the calibration value of this coefficient.</p>   |
| <b>DENSITY COEFFICIENT C 3</b>          | <p>This function shows the actual density coefficient C 3.</p> <p> Caution:<br/>A density adjustment can alter the calibration value of this coefficient.</p>   |
| <b>DENSITY COEFFICIENT C 4</b>          | <p>This function shows the actual density coefficient C 4.</p> <p> Caution:<br/>A density adjustment can alter the calibration value of this coefficient.</p> |
| <b>DENSITY COEFFICIENT C 5</b>          | <p>This function shows the actual density coefficient C 5.</p> <p> Caution:<br/>A density adjustment can alter the calibration value of this coefficient.</p> |
| <b>MINIMAL TEMPERATURE MEASURED</b>     | <p>Display of the lowest fluid temperature measured.</p>                                                                                                                                                                                         |
| <b>MAXIMAL TEMPERATURE MEASURED</b>     | <p>Display of the highest fluid temperature measured.</p>                                                                                                                                                                                        |
| <b>MINIMAL TEMPERATURE CARRIER TUBE</b> | <p>Display of the lowest carrier tube temperature measured.</p>                                                                                                                                                                                  |
| <b>MAXIMAL TEMPERATURE CARRIER TUBE</b> | <p>Display of the highest carrier tube temperature measured.</p>                                                                                                                                                                                 |

## 16 Group SUPERVISION

| Function description SUPERVISION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ACTUAL SYSTEM CONDITION</b>   | <p>Use this function to check the current system status.</p> <p><b>Display shows:</b><br/>"SYSTEM OK" or the fault / notice message with the highest priority.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>PREVIOUS SYSTEM CONDITION</b> | <p>Use this function to view the fifteen most recent fault and notice messages since measuring last started.</p> <p><b>Display shows:</b><br/>The 15 most recent fault or notice messages.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>ASSIGN SYSTEM ERROR</b>       | <p>Use this function to view all system messages and the associated error categories (fault message or notice message). If you select a single system fault you can change its error category.</p> <p><b>Display shows:</b><br/>List of system errors</p> <p> Note!</p> <ul style="list-style-type: none"> <li>• Press the  key twice to call the ERROR CATEGORY function.</li> <li>• Use the  key combination or select CANCEL in the system error list to exit the function.</li> </ul>                                            |
| <b>ERROR CATEGORY</b>            | <p>Use this function to define whether a system fault triggers a notice message or a fault message. If you select "FAULT MESSAGES", all outputs respond to a fault in accordance with their defined error response patterns.</p> <p><b>Options:</b><br/>NOTICE MESSAGES (display only)<br/>FAULT MESSAGES (outputs and display)</p> <p> Note!</p> <ul style="list-style-type: none"> <li>• Press the  key twice to call the ASSIGN SYSTEM ERROR function.</li> <li>• Use the  key combination to exit the function.</li> </ul> |
| <b>ASSIGN PROCESS ERROR</b>      | <p>Use this function to view all process errors and the associated error categories (fault message or notice message). If you select a single process error you can change its error category.</p> <p><b>Display shows:</b><br/>List of process errors</p> <p> Note!</p> <ul style="list-style-type: none"> <li>• Press the  key twice to call the ERROR CATEGORY function.</li> <li>• Use the  key combination or select CANCEL in the process error list to exit the function.</li> </ul>                                    |

| Function description SUPERVISION |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ERROR CATEGORY</b>            | <p>Use this function to define whether a process error triggers a notice message or a fault message. If you select "FAULT MESSAGES", all outputs respond to a fault in accordance with their defined error response patterns.</p> <p><b>Options:</b><br/>           NOTICE MESSAGES (display only)<br/>           FAULT MESSAGES (outputs and display)</p> <p> <b>Note!</b></p> <ul style="list-style-type: none"> <li>Press the  key twice to call the ASSIGN PROCESS ERROR function.</li> <li>Use the  key combination to exit the function.</li> </ul>                                                                                                                                                                                                                                                                                                  |
| <b>ALARM DELAY</b>               | <p>Use this function to define a time span for which the criteria for an error have to be satisfied without interruption before an error or notice message is generated.</p> <p>Depending on the setting and the type of fault, this suppression acts on:</p> <ul style="list-style-type: none"> <li>Displa</li> <li>Current output</li> <li>Frequency output</li> <li>Status output</li> </ul> <p><b>User input:</b><br/>           0...100 s (in steps of one second)</p> <p><b>Factory setting:</b><br/>           0 s</p> <p> <b>Caution:</b><br/>           If this function is activated fault and notice messages are delayed by the time corresponding to the setting before being forwarded to the higher-order controller (process controller, etc.). It is therefore imperative to check in advance in order to make sure whether a delay of this nature could affect the safety requirements of the process. If fault and notice messages cannot be suppressed, a value of 0 seconds must be entered here.</p> |
| <b>SYSTEM RESET</b>              | <p>Use this function to perform a reset of the measuring system.</p> <p><b>Options:</b><br/>           NO<br/>           RESTART SYSTEM (restart without interrupting line supply)</p> <p><b>Factory setting:</b><br/>           NO</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>TROUBLESHOOTING</b>           | <p>Use this function to rectify errors in the EEPROM (Error message AMP SW-EEPROM, # 012). The EEPROM is divided into a number of blocks. Only blocks which an error has occurred are shown. Select the block in question and press the  key to clear the error.</p> <p> <b>Note!</b><br/>           When you clear an error in a block, the parameters of the block you select are reset to their factory settings.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

## 17 Group SIMULATION SYSTEM

| Function description SIMULATION SYSTEM |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SIMULATION FAILSAFE MODE</b>        | <p>Use this function to set all inputs, outputs and totalizer to their defined fault response modes, in order to check whether they respond correctly. During this time, the words "SIMULATION FAILSAFE MODE" appear on the display.</p> <p><b>Options:</b><br/>OFF<br/>ON</p> <p><b>Factory setting:</b><br/>OFF</p>                                                                                                                                                                                                                                                                                                                                                              |
| <b>SIMULATION MEASURAND</b>            | <p>Use this function to set all inputs, outputs and totalizer to their defined flow-response modes, in order to check whether they respond correctly. During this time, the words "SIMULATION MEASURAND" appear on the display.</p> <p><b>Options:</b><br/>OFF<br/>MASS FLOW<br/>VOLUME FLOW<br/>DENSITY<br/>TEMPERATURE</p> <p><b>Factory setting:</b><br/>OFF</p> <p> Caution:</p> <ul style="list-style-type: none"> <li>• The measuring device cannot be used for measuring while this simulation is in progress.</li> <li>• The setting is not saved if the power supply fails.</li> </ul> |
| <b>VALUE SIMULATION MEASURAND</b>      | <p> Note!<br/>This function is not available unless the SIMULATION MEASURAND function is active.</p> <p>Use this function to define a selectable value (e.g. 12 kg/s). This value is used to test downstream devices and the flowmeter itself.</p> <p><b>User input:</b><br/>5-digit floating-point number</p> <p><b>Factory setting:</b><br/>0</p> <p> Caution:<br/>The setting is not saved if the power supply fails.</p>                                                                                 |

18    Group SENSOR VERSION

| Function description SENSOR VERSION |                                                                      |
|-------------------------------------|----------------------------------------------------------------------|
| SERIAL NUMBER                       | Use this function to view the serial number of the sensor.           |
| SENSOR TYPE                         | Use this function to view the sensor type (e.g. Promass F).          |
| SOFTWARE REVISION NUMBER S-DAT      | Use this function to view the software revision number of the S-DAT. |

19    Group AMPLIFIER VERSION

| Function description AMPLIFIER VERSION |                                                                           |
|----------------------------------------|---------------------------------------------------------------------------|
| SOFTWARE REVISION NUMBER AMPLIFIER     | Use this function to view the software revision number of the amplifier.  |
| I/O MODUL TYPE                         | Use this function to view the I/O type (input/output type).               |
| SOFTWARE REVISION NUMBER I/O           | Use this function to view the software revision number of the I/O module. |

## 20 Factory settings

### 20.1 SI units (not for USA and Canada)

#### 20.1.1 Low flow cut off, full scale value, pulse value

| Nominal diameter<br>[mm] | Low flow cut off<br>(approx. $v = 0.04$ m/s) |      | Full scale value<br>(approx. $v = 2$ m/s) |      | Pulse value<br>(approx. 2 pulse/s at 2 m/s) |      |
|--------------------------|----------------------------------------------|------|-------------------------------------------|------|---------------------------------------------|------|
| 1                        | 0.08                                         | kg/h | 4                                         | kg/h | 0.001                                       | kg/p |
| 2                        | 0.40                                         | kg/h | 20                                        | kg/h | 0.010                                       | kg/p |
| 4                        | 1.80                                         | kg/h | 90                                        | kg/h | 0.010                                       | kg/p |
| 8                        | 8.00                                         | kg/h | 400                                       | kg/h | 0.100                                       | kg/p |
| 15                       | 26.00                                        | kg/h | 1300                                      | kg/h | 0.100                                       | kg/p |
| 15 FB                    | 72.00                                        | kg/h | 3600                                      | kg/h | 1.000                                       | kg/p |
| 25                       | 72.00                                        | kg/h | 3600                                      | kg/h | 1.000                                       | kg/p |
| 25 FB                    | 180.00                                       | kg/h | 9000                                      | kg/h | 1.000                                       | kg/p |
| 40                       | 180.00                                       | kg/h | 9000                                      | kg/h | 1.000                                       | kg/p |
| 40 FB                    | 300.00                                       | kg/h | 15000                                     | kg/h | 10.000                                      | kg/p |
| 50                       | 300.00                                       | kg/h | 15000                                     | kg/h | 10.000                                      | kg/p |
| 80                       | 720.00                                       | kg/h | 36000                                     | kg/h | 10.000                                      | kg/p |
| 100                      | 1200.00                                      | kg/h | 60000                                     | kg/h | 10.000                                      | kg/p |

\* DN 15, 25, 40 "FB" = Full bore versions Promass I

#### 20.1.2 Language

| Country                   | Language   |
|---------------------------|------------|
| Australia                 | English    |
| Austria                   | Deutsch    |
| Belgium                   | Francais   |
| Denmark                   | Dansk      |
| Finland                   | Suomi      |
| France                    | Francais   |
| Germany                   | Deutsch    |
| Great Britain             | English    |
| Hong Kong                 | English    |
| Hungary                   | English    |
| India                     | English    |
| Instruments International | English    |
| Italy                     | Italiano   |
| Japan                     | Japanese   |
| Malaysia                  | English    |
| Netherland                | Nederlands |
| Norway                    | Norsk      |
| Singapore                 | English    |
| South Africa              | English    |
| Spain                     | Espanol    |
| Sweden                    | Svenska    |
| Switzerland               | Deutsch    |
| Thailand                  | English    |

#### 20.1.3 Density, length, temperature

|             | Unit |
|-------------|------|
| Density     | kg/l |
| Length      | mm   |
| Temperature | °C   |

## 20.2 US units (only for USA and Canada)

### 20.2.1 Low flow cut off, full scale value, pulse value

| Nominal diameter<br>[mm]                            | Low flow cut off<br>(approx. v = 0.04 m/s) |        | Full scale value<br>(approx. v = 2 m/s) |        | Pulse value<br>(approx. 2 pulse/s at 2 m/s) |      |
|-----------------------------------------------------|--------------------------------------------|--------|-----------------------------------------|--------|---------------------------------------------|------|
| 1                                                   | 0.003                                      | lb/min | 0.15                                    | lb/min | 0.002                                       | lb/p |
| 2                                                   | 0.015                                      | lb/min | 0.75                                    | lb/min | 0.020                                       | lb/p |
| 4                                                   | 0.066                                      | lb/min | 3.30                                    | lb/min | 0.020                                       | lb/p |
| 8                                                   | 0.300                                      | lb/min | 15.00                                   | lb/min | 0.200                                       | lb/p |
| 15                                                  | 1.000                                      | lb/min | 50.00                                   | lb/min | 0.200                                       | lb/p |
| 15 FB                                               | 2.600                                      | lb/min | 130.00                                  | lb/min | 2.000                                       | lb/p |
| 25                                                  | 2.600                                      | lb/min | 130.00                                  | lb/min | 2.000                                       | lb/p |
| 25 FB                                               | 6.600                                      | lb/min | 330.00                                  | lb/min | 2.000                                       | lb/p |
| 40                                                  | 6.600                                      | lb/min | 330.00                                  | lb/min | 2.000                                       | lb/p |
| 40 FB                                               | 11.000                                     | lb/min | 550.00                                  | lb/min | 20.000                                      | lb/p |
| 50                                                  | 11.000                                     | lb/min | 550.00                                  | lb/min | 20.000                                      | lb/p |
| 80                                                  | 26.000                                     | lb/min | 1300.00                                 | lb/min | 20.000                                      | lb/p |
| 100                                                 | 44.000                                     | lb/min | 2200.00                                 | lb/min | 20.000                                      | lb/p |
| * DN 15, 25, 40 "FB" = Full bore versions Promass I |                                            |        |                                         |        |                                             |      |

### 20.2.2 Language, density, length, temperature

|             | Unit    |
|-------------|---------|
| Language    | English |
| Density     | g/cc    |
| Length      | INCH    |
| Temperature | °F      |

## 21 Index of key words

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