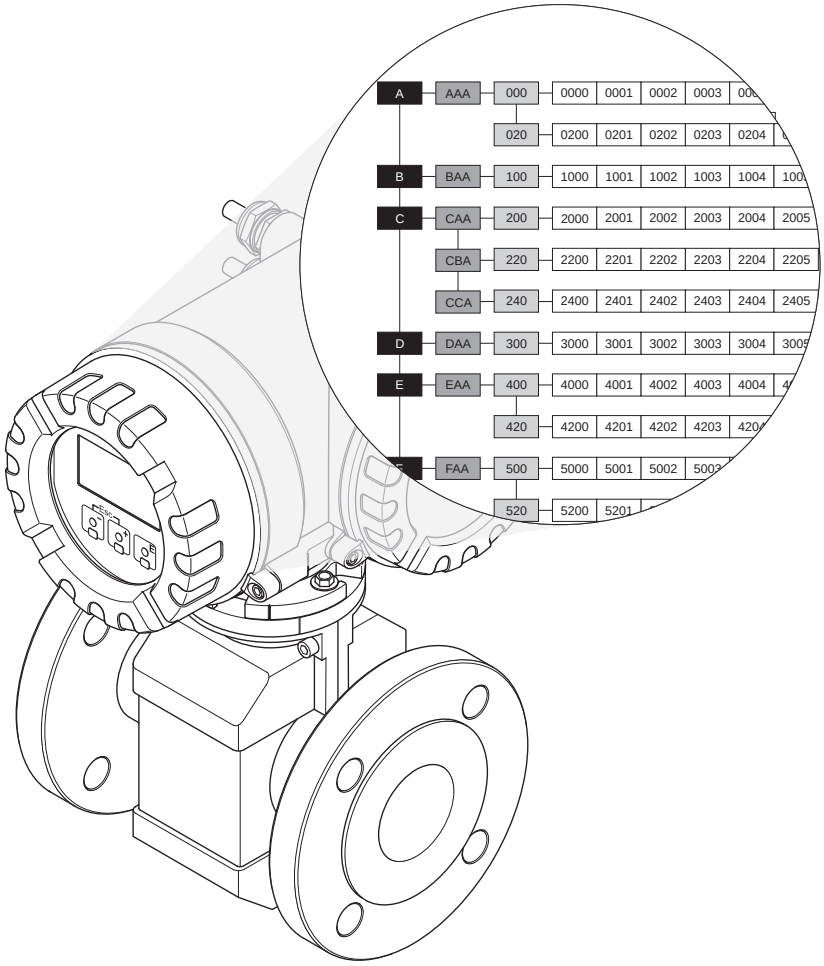
Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Description of Device Functions

Proline Promag 53
PROFIBUS DP/PA

Electromagnetic Flow Measuring System



BA054D/06/en/06.10
71116504

Valid as of version
PROFIBUS DP: V 3.06.XX (Device software)
PROFIBUS PA: V 3.06.XX (Device software)

Endress+Hauser
People for Process Automation

Table of Contents

1 Using this Manual 5

1.1 Using the table of contents to locate a function description 5
1.2 Using the graphic of the function matrix to locate a function description 5
1.3 Using the index of the function matrix to locate a function description 5

2 Function Matrix 6

2.1 General layout of the function matrix 6
2.1.1 Blocks (A, B, C, etc.) 6
2.1.2 Groups (AAA, AEA, CAA, etc.) 6
2.1.3 Function groups (000, 020, 060, etc.) 6
2.1.4 Functions (0000, 0001, 0002, etc.) 6
2.1.5 Codes identifying cells 7
2.2 Illustration of the function descriptions 7
2.3 Maximum number of writes 8
2.4 Display lines on the local display 8
2.5 Available blocks, groups, etc. 8
2.6 Function Matrix 9

3 Block MEASURED VARIABLES 10

3.1 Group MEASURING VALUES 11
3.2 Group SYSTEM UNITS 12
3.2.1 Function group CONFIGURATION 12
3.2.2 Function group ADDITIONAL CONFIGURATION 14
3.3 Group SPECIAL UNITS 15
3.3.1 Function group DENSITY PARAMETER 15

4 Block QUICK SETUP 16

4.1 Setup Commissioning 18
4.2 Quick Setup “Pulsating Flow” 20
4.3 Quick Setup “Batching” 22
4.4 Quick Setup “Communication” 24
4.5 Data backup/transmission 25

5 Block USER INTERFACE 26

5.1 Group CONTROL 27
5.1.1 Function group BASIC CONFIGURATION 27
5.1.2 Function group UNLOCKING/ LOCKING 29
5.1.3 Function group OPERATION 31
5.2 Group MAIN LINE 32
5.2.1 Function group CONFIGURATION 32
5.2.2 Function group MULTIPLEX 34
5.3 Group ADDITIONAL LINE 36
5.3.1 Function group CONFIGURATION 36
5.3.2 Function group MULTIPLEX 38
5.4 Group INFORMATION LINE 40
5.4.1 Function group CONFIGURATION 40
5.4.2 Function group MULTIPLEX 42

6 Block OUTPUTS 44

6.1 Group CURRENT OUTPUT 1 45
6.1.1 Function group CONFIGURATION 45
6.1.2 Function group OPERATION 54
6.1.3 Function group INFORMATION 55
6.2 Group PULSE-/FREQUENCY OUTPUT 1 56
6.2.1 Function group CONFIGURATION 56
6.2.2 Function group OPERATION 76
6.2.3 Function group INFORMATION 79

6.3 Group RELAY OUTPUT (1...2) ... 80
6.3.1 Function group CONFIGURATION ... 80
6.3.2 Function group OPERATION ... 84
6.3.3 Function group INFORMATION ... 86
6.3.4 Information on the response of the relay output ... 87
6.3.5 Switching response of the relay output. ... 88

7 Block INPUTS ... 90

7.1 Group STATUS INPUT ... 91
7.1.1 Function group CONFIGURATION ... 91
7.1.2 Function group OPERATION ... 92
7.1.3 Function group INFORMATION ... 93

8 Block BASIC FUNCTION ... 94

8.1 PROFIBUS DP/PA Group ... 95
8.1.1 CONFIGURATION function group ... 95
8.1.2 FUNCTION BLOCKS function group ... 96
8.1.3 TOTALIZERfunction group ... 98
8.1.4 OPERATION function group ... 101
8.1.5 INFORMATION function group ... 102
8.2 Group PROCESSPARAMETER ... 103
8.2.1 Function group CONFIGURATION ... 103
8.2.2 Function group EPD PARAMETER ... 105
8.2.3 Function group ECC PARAMETER ... 108
8.2.4 Function group ADJUSTMENT ... 110
8.3 Group SYSTEM PARAMETER ... 111
8.3.1 Function group CONFIGURATION ... 111
8.4 Group SENSOR DATA ... 113
8.4.1 Function group CONFIGURATION ... 113
8.4.2 Function group OPERATION ... 115

9 Block SPECIAL FUNCTION ... 117

9.1 Group BATCHING FUNCTION ... 118
9.1.1 Function group CONFIGURATION ... 118
9.1.2 Function group VALVE PARAMETER ... 121
9.1.3 Examples of setting parameters for batching processes ... 123
9.1.4 Function group SUPERVISION ... 126
9.1.5 Function group OPERATION ... 130
9.1.6 Function group INFORMATION ... 132

10 Block SUPERVISION ... 133

10.1 Group SYSTEM ... 134
10.1.1 Function group CONFIGURATION ... 134
10.1.2 Function group OPERATION ... 135
10.2 Group VERSION INFO ... 137
10.2.1 Function group SENSOR ... 137
10.2.2 Function group SENSOR ... 137
10.2.3 Function group AMPLIFIER. ... 138
10.2.4 Function group F-CHIP ... 139
10.2.5 Function group I/O MODULE ... 139
10.2.6 Function groups INPUT /OUTPUT 2...4 ... 140

11 Factory settings ... 141

11.1 SI units (not for USA and Canada) ... 141
11.2 US units (only for USA and Canada) ... 143

12 Index function matrix ... 145

13 Index of key words ... 149

1 Using this Manual

There are various ways of locating the description of a function of your choice in the manual:

1.1 Using the table of contents to locate a function description

The designations of all the cells in the function matrix are listed in the table of contents. You can use these unambiguous designations (such as USER INTERFACE, INPUTS, OUTPUTS, etc.) to choose whichever functions are applicable to a particular set of conditions. The page references show you exactly where to find the detailed descriptions of the functions in question.
The table of contents is on page 3.

1.2 Using the graphic of the function matrix to locate a function description

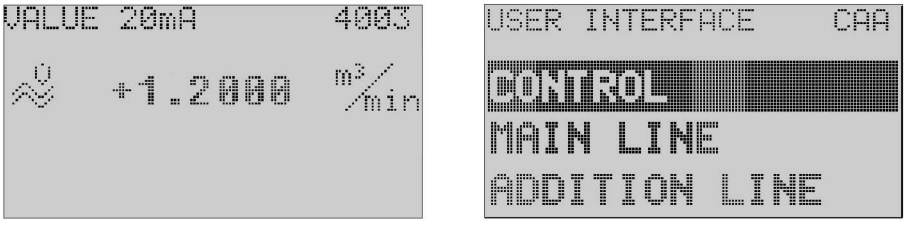
This step-by-step, top-down approach starts with the blocks, the highest level, and factory down through the matrix to the description of the function you need:

1. All blocks available, and their related groups, are illustrated on page 9. Select the block (or the group within the block) which you need for your application and use the page reference to locate the information corresponding to the next level.
2. The page in question contains a graphic showing of the block with all its subordinate groups, function groups and functions. Select the function which you need for your application and use the page reference to locate the detailed function description.

1.3 Using the index of the function matrix to locate a function description

Each “cell” in the function matrix (blocks, groups, function groups, functions) has a unique identifier in the form of a code consisting of one or three letters or a three- or four-digit number. The code identifying a selected “cell” appears at the top right on the local display.

Example:



A0001653-EN

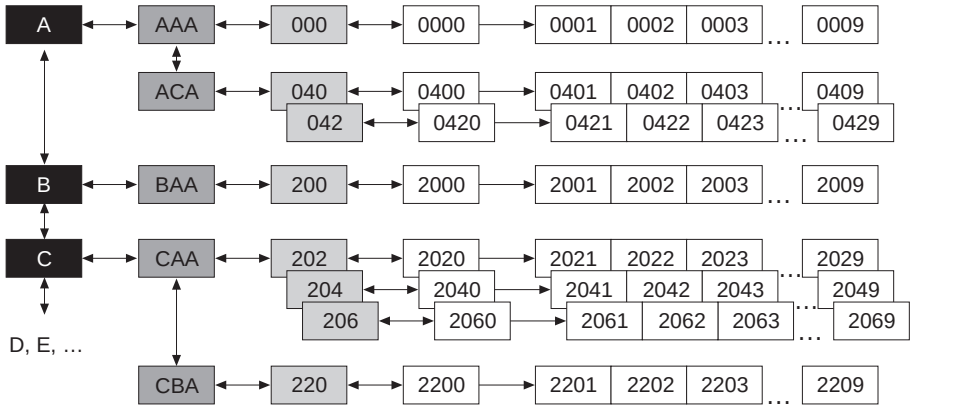
The function matrix index lists the codes for all the available “cells” in alphabetic and consecutive order, complete with the page references for the corresponding functions.
The index to the function matrix is on page 145.

2 Function Matrix

2.1 General layout of the function matrix

The function matrix consists of four levels:

Blocks -> Groups -> Function groups -> Functions



A0000961

2.1.1 Blocks (A, B, C, etc.)

The blocks are the highest-level grouping of the operation options for the device.
The blocks include, for example: MEASURED VARIABLES, QUICK SETUP, USER INTERFACE, TOTALIZER, etc.

2.1.2 Groups (AAA, AEA, CAA, etc.)

A block consists of one or more groups. Each group represents a more detailed selection of the operation options in the higher-order block. The groups in the “USER INTERFACE” block, for example, include: CONTROL, MAIN LINE, ADDITIONAL LINE, etc.

2.1.3 Function groups (000, 020, 060, etc.)

A group consists of one or more function groups. Each function group represents a more detailed selection of the operation options in the higher-order group. Function groups available of group “CONTROL” are for example: BASIC CONFIGURATION, UNLOCKING/LOCKING, OPERATION, etc.

2.1.4 Functions (0000, 0001, 0002, etc.)

Each function group consists of one or more functions. The functions are used to operate and parameterize the device. Numerical values can be entered or parameters selected and saved.
The functions in the “BASIC CONFIGURATION” function group include LANGUAGE, DISPLAY DAMPING, CONTRAST LCD, etc. The procedure for changing the language of the user interface, for example, is as follows:

1. Select the block “USER INTERFACE”.
2. Select the group “CONTROL”.
3. Select the function group “BASIC CONFIGURATION”.
4. Select the function “LANGUAGE” (here you can set the language required).

2.1.5 Codes identifying cells

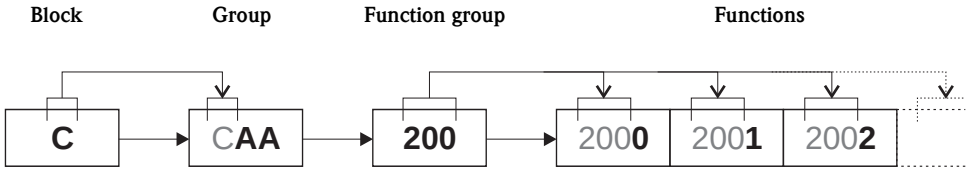
Each cell (block, group, function group and function) in the function matrix has an individual, unique code.

Blocks:
The code is a letter (A, B, C, etc.)

Groups:
The code consists of three letters (AAA, ABA, BAA, etc.).
The first letter matches the block code (i.e. each group in block A has a code starting with an A _ _; the codes of the groups in block B start with a B _ _, etc.). The other two letters are for identifying the group within the respective block.

Function groups:
The code consists of three digits (000, 001, 100, etc.).

Functions:
The code consists of four digits (0000, 0001, 0201, etc.).
The first three digits are the same as the code for the function group.
The last digit in the code is a counter for the functions in the function group, incrementing from 0 to 9 (e.g. function 0005 is the sixth function in group 000).



2.2 Illustration of the function descriptions

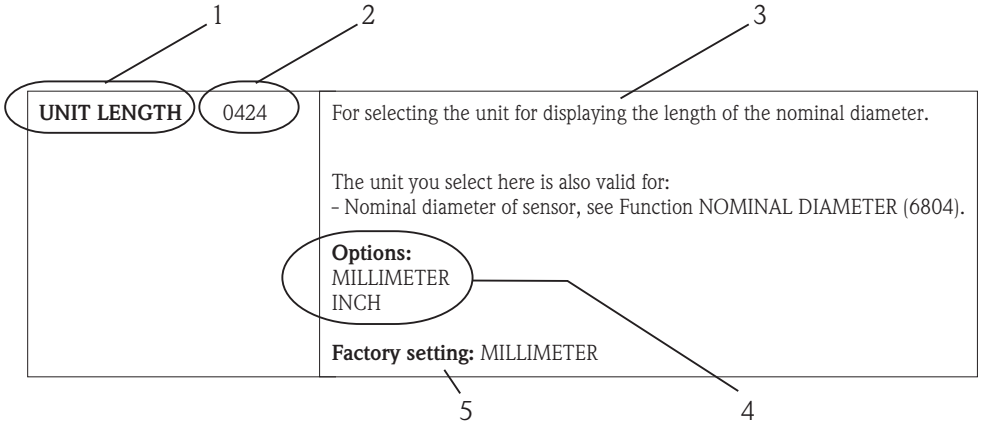


Fig. 1 : Example for the description of a function

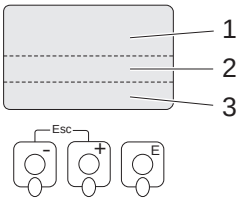
1 Name of the function
2 Number of the function (appears on the local display)
3 Description of the function
4 Selection or entry options or display
5 Factory setting (the measuring device is delivered with this setting/selected option)

2.3 Maximum number of writes

The number of writes to the EEPROM is technically restricted to a maximum of 1 million. Attention must be paid to this limit since, if exceeded, it results in data loss and measuring device failure. For this reason, avoid constantly writing nonvolatile device parameters via the PROFIBUS!

2.4 Display lines on the local display

The local display is split into various display lines.



A0001253

Fig. 2 : Local display
1 Main line
2 Additional line
3 Information line

The values are assigned to the individual lines in the USER INTERFACE block, see page 27.

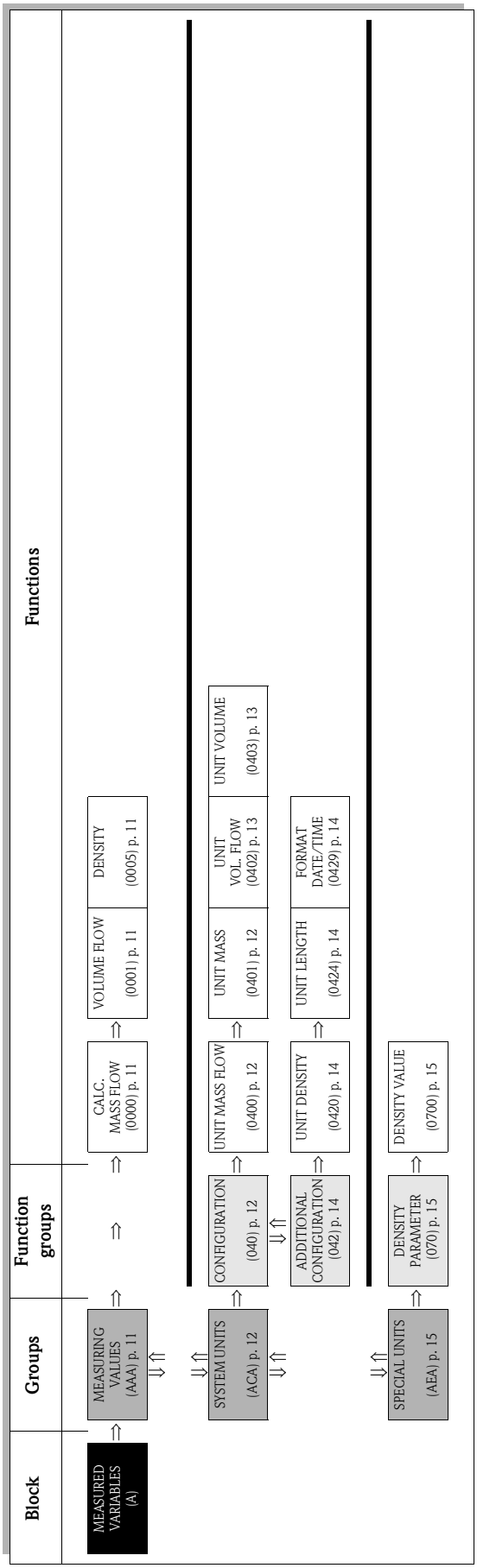
2.5 Available blocks, groups, etc.

Type code of device	Available inputs and outputs							Available blocks, groups, etc.										
											OUTPUTS							
	PROFIBUS PA, Ex i	PROFIBUS DP	Current output	Pulse/Frequency output	Relay output 1	Relay output 2	Status input	MEASURED VARIABLES	QUICK SETUP	USER INTERFACE	Current output	Pulse/Frequency output	Relay output 1	Relay output 2	INPUTS	BASIC FUNCTION	SPECIAL FUNCTION	SUPERVISION
53***-**********F/H	X	–	–	–	–	–	–	X	X	X	–	–	–	–	–	X	–	X
53***-**********J	–	X	–	–	–	–	–	X	X	X	–	–	–	–	–	X	–	X
53***-**********P	–	X	X	X	–	–	X	X	X	X	X	X	–	–	X	X	–	X
53***-**********V	–	X	–	–	X	X	X	X	X	X	–	–	X	X	X	X	X	X

2.6 Function Matrix

BLOCKS		GROUPS			FUNCTION GROUPS
MEASURED VARIABLES (see P. 10)	**A**	MEASURING VALUES	AAA	→	see P. 11
		SYSTEM UNITS	ACA	→	see P. 12
		SPECIAL UNITS	AEA	→	see P. 15
QUICK SETUP (see P. 16)	**B**	Commissioning and application setups		→	see P. 16
USER INTERFACE (see P. 26)	**C**	CONTROL	CAA	→	see P. 27
		MAIN LINE	CCA	→	see P. 32
		ADDITIONAL LINE	CEA	→	see P. 36
		INFORMATION LINE	CGA	→	see P. 40
OUTPUTS (see P. 44)	**E**	CURRENT OUTPUT 1	EAA	→	see P. 45
		PULSE/FREQ. OUTPUT 1	ECA	→	see P. 56
		RELAY OUTPUT 1	EGA	→	see P. 80
		RELAY OUTPUT 2	EGB	→	see P. 80
INPUTS (see P. 90)	**F**	STATUS INPUT	FAA	→	see P. 91
BASIC FUNCTION (see P. 94)	**G**	PROFIBUS DP, GBA / PROFIBUS PA, GCA		→	see P. 95
		PROCESSPARAMETER	GIA	→	see P. 103
		SYSTEM PARAMETER	GLA	→	see P. 111
		SENSOR DATA	GNA	→	see P. 113
SPECIAL FUNCTION (see P. 117)	**H**	BATCHING FUNCTION	HCA	→	see P. 118
SUPERVISION (see P. 133)	**J**	SYSTEM	JAA	→	see P. 134
		VERSION INFO	JCA	→	see P. 137

3 Block MEASURED VARIABLES



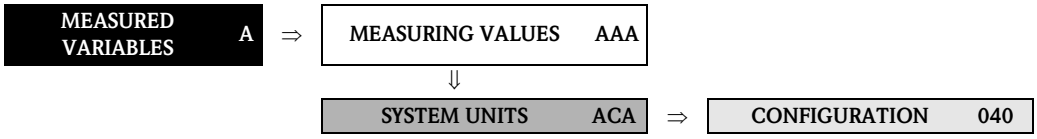
3.1 Group MEASURING VALUES

MEASURED VARIABLES A ⇒ **MEASURING VALUES AAA** ⇒ **Measuring value functions**

Function description MEASURED VARIABLES → MEASURING VALUES → Measuring value functions		
✎ Note! ■ The engineering units of all the measured variables shown here can be set in the "SYSTEM UNITS" group. ■ If the fluid in the pipe flows backwards, a negative sign prefixes the flow reading on the display.		
CALCULATED MASS FLOW	**0000**	The calculated mass flow appears on the display. The mass flow is derived from the measured volume flow and the fixed density. **Display:** 5-digit floating-point number, including unit and sign (e.g. 462.87 kg/h; –731.63 lb/min; etc.)
VOLUME FLOW	**0001**	The volume flow currently measured appears on the display. **Display:** 5-digit floating-point number, including unit and sign (e.g. 5.5445 dm^3/min; 1.4359 m^3/h; –731.63 gal/d; etc.)
DENSITY	**0005**	The fixed density appears on the display. **Display:** 5-digit floating-point number, including unit (corresponding to 0.10000...6.0000 kg/dm^3) e.g. 1.2345 kg/dm^3; 993.5 kg/m^3; 1.0015 SG_20 °C; etc.

3.2 Group SYSTEM UNITS

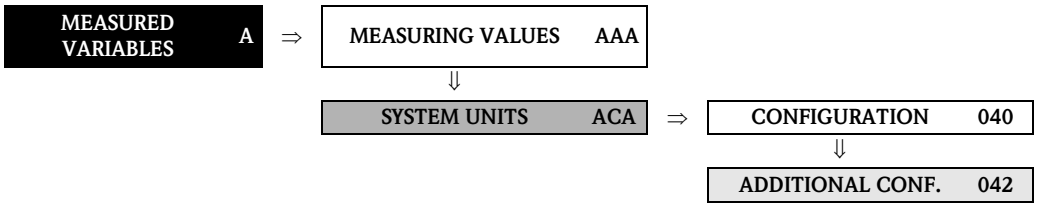
3.2.1 Function group CONFIGURATION



Function description MEASURED VARIABLES → SYSTEM UNITS → CONFIGURATION	
You can select the unit for the measured variable in this function group. ✎ Note! The factory settings for the system units which are described here apply to the local display and may differ from the units which are used to transfer the measured variables to the automation system. However, the UNIT TO BUS function (→ page 101) can be used to set these units to the units currently selected on the local display.	
UNIT MASS FLOW 0400	Use this function to select the unit for displaying the calculated mass flow (mass/time). The mass flow is derived from the fixed (compensated) specific fluid density and the measured volume flow. The unit you select here is also valid for: ▪ Current output ▪ Pulse/frequency output ▪ Relay switch points (limit value for mass flow, flow direction) ▪ Low flow cut off **Options:** Metric: gram → g/s; g/min; g/h; g/day Kilogram → kg/s; kg/min; kg/h; kg/day Metric ton → t/s; t/min; t/h; t/day US: ounce → oz/s; oz/min; oz/h; oz/day pound → lb/s; lb/min; lb/h; lb/day ton → ton/s; ton/min; ton/h; ton/day **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).
UNIT MASS 0401	Use this function to select the unit for displaying the calculated mass. The mass is derived from the preset (compensated) specific fluid density and the measured volume. The unit you select here is also valid for: ▪ Pulse value (e.g. kg/p) **Options:** Metric → g; kg; t US → oz; lb; ton **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.). ✎ Note! The unit of the totalizers is independent of your choice here. The unit for each totalizer is selected separately for the totalizer in question.

Function description MEASURED VARIABLES → SYSTEM UNITS → CONFIGURATION		
UNIT VOLUME FLOW	**0402**	Use this function to select the unit for displaying the volume flow (volume/time). The unit you select here is also valid for: ■ Current output ■ Pulse/frequency output ■ Relay switch points (limit value for volume flow, flow direction) ■ Low flow cut off **Options:** Metric: Cubic centimeter → cm^3/s; cm^3/min; cm^3/h; cm^3/day Cubic decimeter → dm^3/s; dm^3/min; dm^3/h; dm^3/day Cubic meter → m^3/s; m^3/min; m^3/h; m^3/day Milliliter → ml/s; ml/min; Ml/h; ml/day Liter → l/s; l/min; l/h; l/day Hectoliter → hl/s; hl/min; hl/h; hl/day Megaliter → Ml/s; ml/min; Ml/h; ml/day US: Cubic centimeter → cc/s; cc/min; cc/h; cc/day Acre foot → af/s; af/min; af/h; af/day Cubic foot → ft^3/s; ft^3/min; ft^3/h; ft^3/day Fluid ounce → oz f/s; oz f/min; oz f/h; oz f/day Gallon → gal/s; gal/min; gal/h; gal/day Kilo gallon → Kgal/s; Kgal/min; Kgal/h; Kgal/day Million gallon → Mgal/s; Mgal/min; Mgal/h; Mgal/day Barrel (normal fluids: 31.5 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day Barrel (beer: 31.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day Barrel (petrochemicals: 42.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day Barrel (filling tanks: 55.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day Imperial: Gallon → gal/s; gal/min; gal/h; gal/day Mega gallon → Mgal/s; Mgal/min; Mgal/h; Mgal/day Barrel (beer: 36.0 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day Barrel (petrochemicals: 34.97 gal/bbl) → bbl/s; bbl/min; bbl/h; bbl/day **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).
UNIT VOLUME	**0403**	Use this function to select the unit for displaying the volume. The unit you select here is also valid for: ■ Pulse weighting (e.g. m^3/p) **Options:** Metric → cm^3; dm^3; m^3; ml; l; hl; Ml Mega US → cc; af; ft^3; oz f; gal; Kgal; Mgal; bbl (normal fluids); bbl (beer); bbl (petrochemicals); * bbl (filling tanks) Imperial → gal; Mgal; bbl (beer); bbl (petrochemicals) **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.). ✎ Note! The unit of the totalizers is independent of your choice here. The unit for each totalizer is selected separately for the totalizer in question.

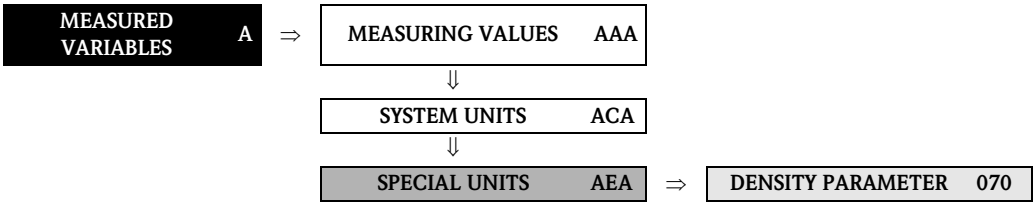
3.2.2 Function group ADDITIONAL CONFIGURATION



Function description MEASURED VARIABLES → SYSTEM UNITS → ADDITIONAL CONFIGURATION	
UNIT DENSITY **0420**	Use this function to select the unit for displaying the fluid density. The unit you select here is also valid for: ■ Fluid density entry **Options:** Metric → g/cm^3; g/cc; g/l; kg/dm^3; kg/l kg/m^3; SD 4 °C, SD 15 °C, SD 20 °C; SG 4 °C, SG 15 °C, SG 20 °C US → lb/ft^3; lb/gal; lb/bbl (normal fluids); lb/bbl (beer); lb/bbl (petrochemicals); lb/bbl (filling tanks) Imperial → lb/gal; lb/bbl (beer); lb/bbl (petrochemicals) **Factory setting:** kg/l (SI units: not for USA and Canada) g/cc (US units: only for USA and Canada) SD = Specific Density, SG = Specific Gravity The specific density is the ratio of fluid density to water density (at water temperature = 4, 15, 20 °C).
UNIT LENGTH **0424**	Use this function to select the unit for displaying the length of the nominal diameter. The unit you select here is also valid for: Nominal diameter of sensor (function NOMINAL DIAMETER (6804) on page 114) **Options:** MILLIMETER INCH **Factory setting:** MILLIMETER (SI units: not for USA and Canada) INCH (US units: only for USA and Canada)
FORMAT DATE/TIME **0429**	Use this function to select the format for the date and the time. The unit you select here is also valid for: Displaying the current calibration date (function CALIBRATION DATE (6800) on page 113) **Options:** DD.MM.YY 24H MM/DD/YY 12H A/P DD.MM.YY 12H A/P MM/DD/YY 24H **Factory setting:** DD.MM.YY 24H (SI units) MM/DD/YY 12H A/P (US units)

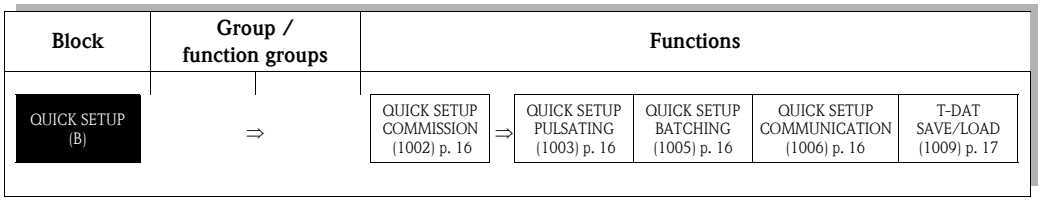
3.3 Group SPECIAL UNITS

3.3.1 Function group DENSITY PARAMETER



Function description MEASURED VARIABLES → SPECIAL UNITS → DENSITY PARAMETER	
DENSITY VALUE **0700**	Use this function to enter a density value preferably at process temperature (or at reference temperature). This density value is used to convert the volume flow to a mass flow. **User input:** 5-digit floating-point number **Factory setting:** 1 [unit] ✎ Note! The appropriate unit is taken from the function UNIT DENSITY (0420), (see page 14).

4 Block QUICK SETUP



Function description
QUICK SETUP

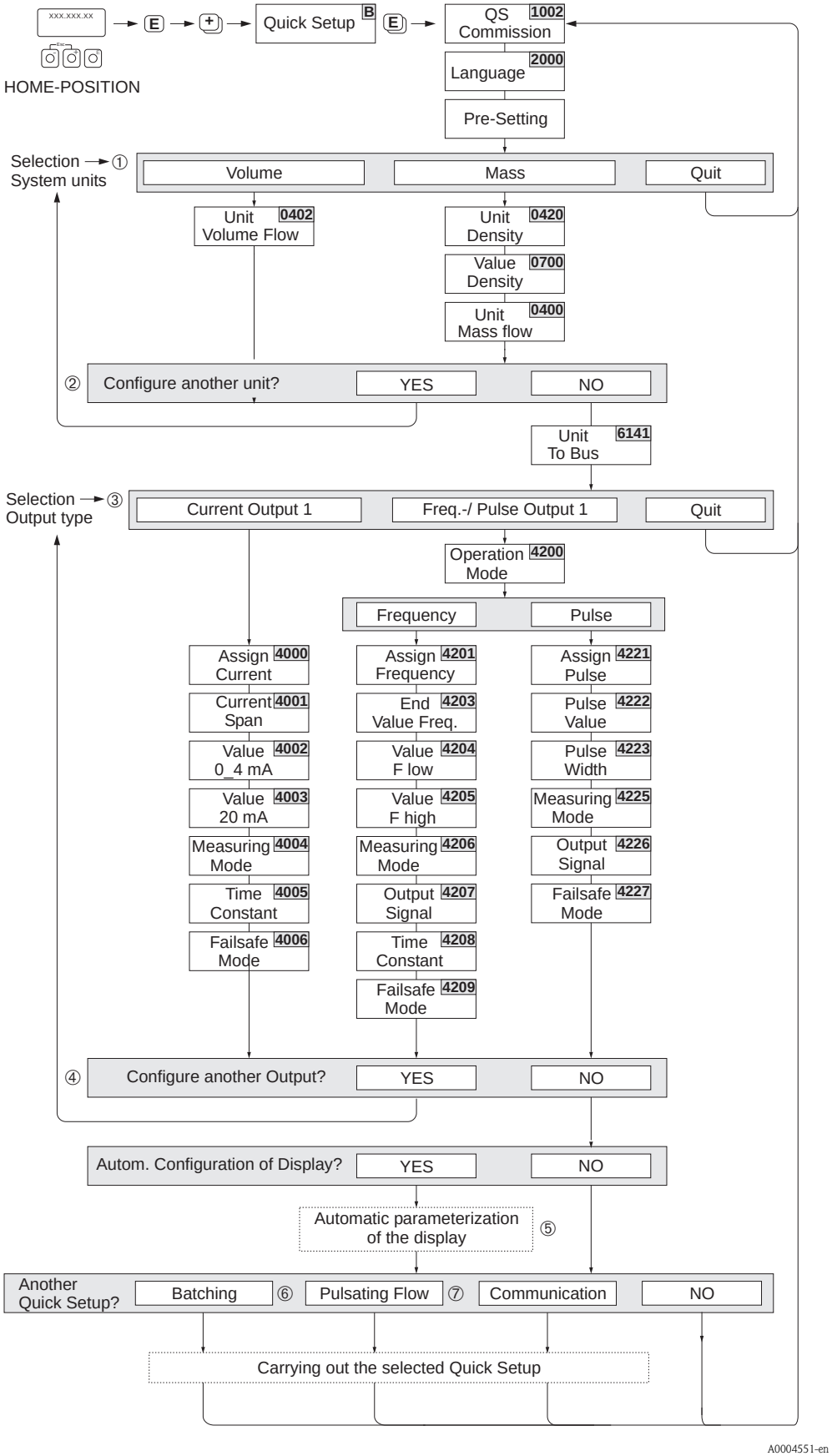
✎ Note!
- The Quick Setups are only available by means of the local display.
- The flowcharts of the various Quick Setups are provided on the pages to follow.
- For more information on the Setup menus, please refer to the Operating Instructions BA053D.

QUICK SETUP COMMISSIONING 1002	For starting the Setup menu. **Options:** NO YES **Factory setting:** NO
QUICK SETUP PULSATING FLOW 1003	✎ Note! Function only available for measuring devices with a current or pulse/frequency output. For starting the Setup menu. **Options:** NO YES **Factory setting:** NO
QUICK SETUP BATCHING 1005	✎ Note! Function is only available with the optional software package BATCHING. For starting the Setup menu. **Options:** NO YES **Factory setting:** NO
QUICK SETUP COMMUNICATION 1006	For starting the Setup menu. **Options:** NO YES **Factory setting:** NO

Function description QUICK SETUP	
T-DAT SAVE/LOAD 1009	Use this function to save the parameter settings / configuration of the **transmitter** in a transmitter DAT (T-DAT), or to load the parameter settings from the T-DAT into the EEPROM (**manual** security function). Application examples: ■ After commissioning, the current measuring point parameters can be saved to the T-DAT as a backup. ■ If the transmitter is replaced for some reason, the data from the T-DAT can be loaded into the new transmitter (EEPROM). **Options:** CANCEL SAVE (from EEPROM to T-DAT) LOAD (from the T-DAT into EEPROM) **Factory setting:** CANCEL ✎ Note! ■ If the target device has an older software version, the message “TRANSM. SW-DAT” is displayed. Then only the “SAVE” function is available. ■ LOAD This function is only possible if the target device has the same software version as, or a more recent software version than, the source device. ■ SAVE This function is always available.

4.1 Setup Commissioning

In the case of measuring devices without a local display, the individual parameters and functions must be configured by means of a configuration program, such as FieldCare from Endress+Hauser.



- The display returns to the cell SETUP COMMISSIONING (1002) if you press the ESC key combination during parameter interrogation. The stored parameters remain valid.

- The “Commissioning” Quick Setup must be carried out before one of the Quick Setups explained below is run.

① Only units not yet configured in the current 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 configured.
“NO” is the only option displayed when no further units are available.

③ The prompt only appears if a current output and/or a pulse/frequency output is available. Only the outputs not yet configured in the current Setup are offered for selection in each cycle.

④ The “YES” option remains visible until all the outputs have been parameterized.
“NO” is the only option displayed when no further outputs are available.

⑤ The “automatic parameterization of the display” option contains the following basic settings/factory settings:

YES: Main line = Volume flow;
Additional line = Totalizer 1;
Information line = Operating/system conditions

NO: The existing (selected) settings remain.

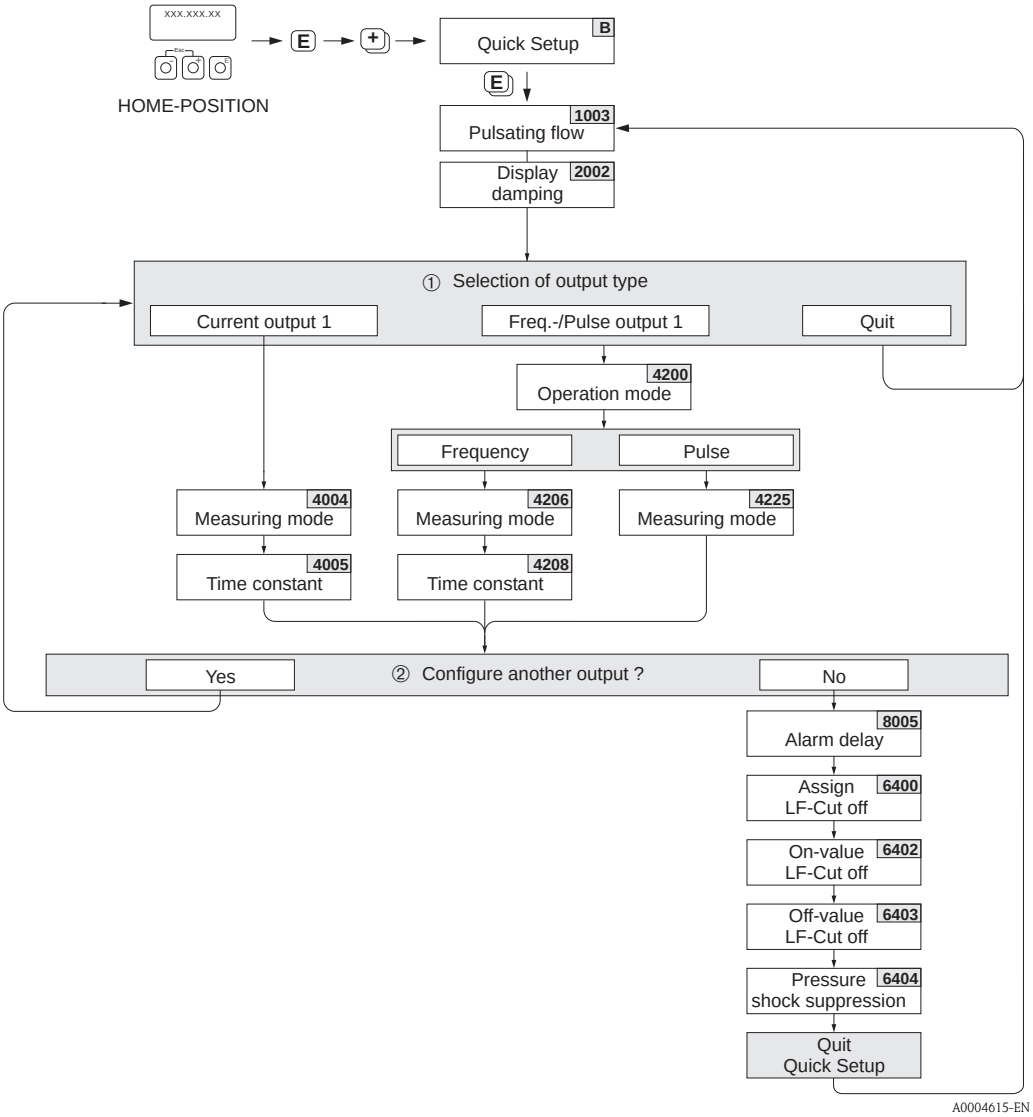
⑥ The QUICK SETUP BATCHING is only available when the optional software package BATCHING is installed.

⑦ The QUICK SETUP PULSATING FLOW is only available when the device has a current or pulse/frequency output.

4.2 Quick Setup “Pulsating Flow”

Note!
The Quick Setup “Pulsating Flow” is only available when the device has a current or pulse/frequency output.
A temporally fluctuating flow rate occurs when using pumps of a construction which necessitates a pulsating pumping action, such as piston, hose, eccentric pumps, etc. Also in the case of these pumps, negative flow rates resulting from the closing volume may occur, or there may be leakage from valves.

Note!
Run the Quick Setup “Commissioning” (s. page 18) before running the Quick Setup “Pulsating flow”.



① Only the output not yet configured in the current Setup is offered for selection in the second cycle.

② The “YES” option remains visible until both outputs have been parameterized.
“NO” is the only option displayed when no further outputs are available.

Settings for the Pulsating flow Setup menu:

Fct. code	Function name	Suggested settings	Description
Call up through the function matrix:			
B	QUICK SETUP	QUICK SETUP PULSATING FLOW	see P. 16
1003	QUICK SETUP PULSATING FLOW	YES	see P. 16
Basic configuration:			
2002	DISPLAY DAMPING	3 s	see P. 27
Select the signal type: CURRENT OUTPUT 1			
4004	MEASURING MODE	PULSATING FLOW	see P. 50
4005	TIME CONSTANT	3 s	see P. 52
Select the signal type: FREQ./PULSE OUTPUT 1 / operating mode: FREQUENCY			
4206	MEASURING MODE	PULSATING FLOW	see P. 60
4208	TIME CONSTANT	0 s	see P. 65
Select the signal type: FREQ./PULSE OUTPUT 1 / operating mode: PULSE			
4225	MEASURING MODE	PULSATING FLOW	see P. 68
Other settings:			
8005	ALARM DELAY	0 s	see P. 134
6400	ASSIGN LOW FLOW CUTOFF	VOLUME FLOW	see P. 103
6402	ON-VALUE LOW FLOW CUTOFF	see table below	see P. 103
6403	OFF-VALUE LOW FLOW CUTOFF	50%	see P. 103
6404	PRESSURE SHOCK SUPPRESSION	0 s	see P. 104

Recommended settings for the function ON-VALUE LOW FLOW CUTOFF (6402):

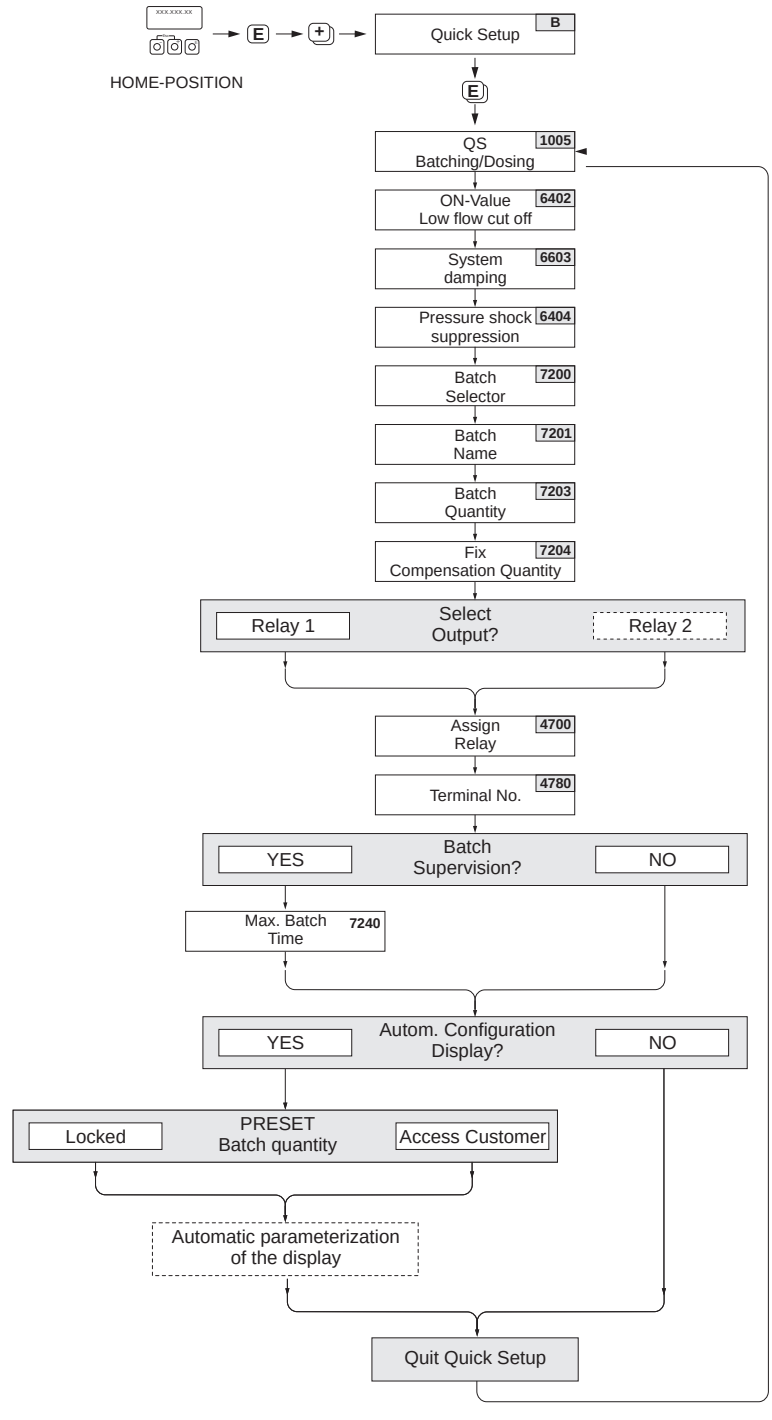
DN [mm]	dm^3/min		US-gal/min
2	0.002	or	0.001
4	0.007	or	0.002
8	0.03	or	0.008
15	0.1	or	0.03
25	0.3	or	0.08
32	0.5	or	0.15
40	0.7	or	0.2
50	1.1	or	0.3
65	2.0	or	0.5
80	3.0	or	0.8
100	4.7	or	1.3

The recommended values correspond to the max. full scale value per DN divided by 1000
(see see Operating Instructions Promag 53 PROFIBUS DP/PA, BA053D/06/en, Chapter “Installation” → nominal diameters and flow rates).

4.3 Quick Setup “Batching”

Note!
This function is available only if the “Batching” add-on is installed in the measuring device (order option). This software can be ordered at a later date as an accessory from Endress+Hauser at a later date (see Operating Instructions).

This Quick Setup guides the user systematically through all the device functions that have to be adjusted and configured for batching operation. These basic settings allow for simple (one-stage) batching processes.
Additional settings, e.g. for multistage batching processes, must be made using the function matrix.



Caution!
Using the Quick Setup “Batching”, certain device parameters are optimally set for discontinuous measurement.
If the measuring device is used again for continuous flow measurement at a later time, we recommend you to rerun the Quick Setup “Commissioning” and/or “Pulsating flow”.

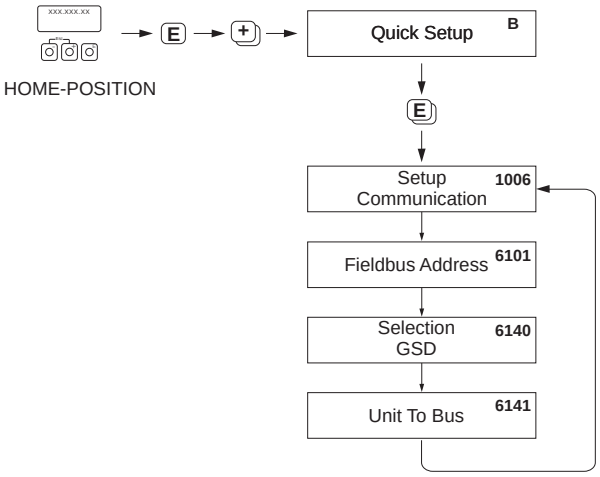
Note!
- Run the Quick Setup “Commissioning” (s. page 18) before running the Quick Setup “Batching”.
- For detailed information on the batching functions see page 117 ff.
- Batching processes may also be controlled directly via the local display. During the Quick Setup a prompt appears for the automatic configuration of the display. This prompt is acknowledged by selecting “YES”.
  This results in the bottom line of the display being allocated special batching functions (START, PRESET, etc.), which can be run locally using the three operating keys (⊞ / ⊟ / Ⓔ). In this way, the measuring device can be fully deployed in the field as a “batch controller”.
- Batching processes may also be controlled directly using the field bus.

Settings for the Batching Setup menu:

Fct. code	Function name	Suggested settings	Description
Call up through the function matrix:			
B	QUICK SETUP	QUICK SETUP BATCHING	see P. 16
1005	QUICK SETUP BATCHING	YES	see P. 16
Settings (functions with a gray background are set automatically):			
6400	ASSIGN LOW FLOW CUTOFF	Volume	see P. 103
6402	ON-VALUE LOW FLOW CUTOFF	Table value	see P. 103
6403	OFF-VALUE LOW FLOW CUTOFF	50%	see P. 103
6603	SYSTEM DAMPING	9 Note! For highly accurate and short batching processes, the “system damping” must be optimized accordingly: Set this to “0”.	see P. 111
6404	PRESSURE SHOCK SUPPRESSION	0 seconds	see P. 104
7200	BATCH SELECTOR	BATCH #1	see P. 118
7202	BATCH NAME	BATCH #1	see P. 118
7201	ASSIGN BATCH VARIABLE	Volume	see P. 119
7203	BATCH QUANTITY	0	see P. 119
7204	FIX COMPENSATION QUANTITY	0	see P. 119
7208	BATCH STAGES	1	see P. 120
7209	INPUT FORMAT	Value input	see P. 120
4700	ASSIGN RELAY	BATCHING VALVE 1	see P. 80
4780	TERMINAL NUMBER	Output (display only)	see P. 86
7220	OPEN VALVE 1	0% or 0 [unit]	see P. 121
7240	MAXIMUM BATCH TIME	0 seconds	see P. 126
7241	MINIMUM BATCH QUANTITY	0 seconds	see P. 127
7242	MAXIMUM BATCH QUANTITY	0 seconds	see P. 128
2200	ASSIGN (Main line)	BATCH NAME	see P. 32
2220	ASSIGN (Multiplex main line)	Off	see P. 34
2400	ASSIGN (Additional line)	BATCH DOWNWARDS	see P. 36
2420	ASSIGN (Multiplex additional line)	Off	see P. 38
2600	ASSIGN (Information line)	BATCHING KEYS	see P. 40
2620	ASSIGN (Multiplex information line)	Off	see P. 42

4.4 Quick Setup “Communication”

To set up the cyclical data transfer, various arrangements must be made between the PROFIBUS master and the device (slave). These arrangements must be taken into account when configuring different functions. Using the Quick Setup “Communication”, these functions can be configured quickly and easily. The different possible parameter settings are explained in greater detail in the following table.



A0002600-EN

Settings for the Communication Setup menu:

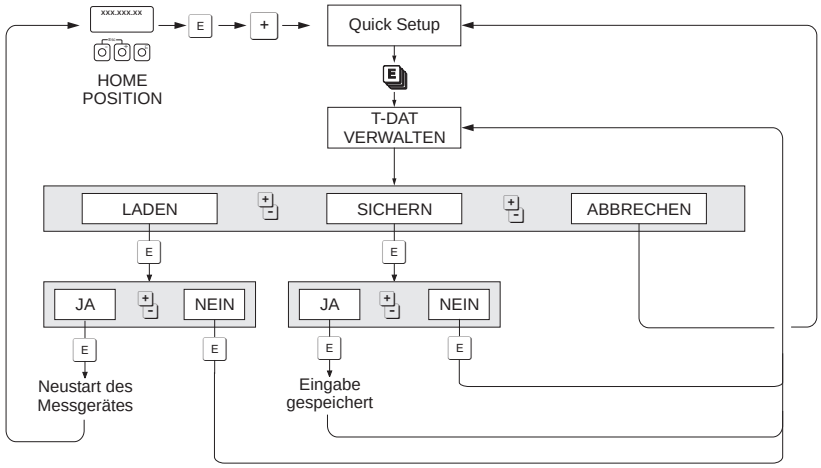
Fct. code	Function name	Suggested settings	Description
Call up through the function matrix:			
B	QUICK SETUP	QUICK SETUP COMMUNICATION	see P. 16
1006	QS-COMMUNICATION	YES	see P. 16
Basic configuration:			
6101	FIELDBUS ADDRESS	Enter device address	see P. 95
6140	SELECTION GSD	MANUFACT. SPEC.	see P. 101
6141	UNIT TO BUS	SET UNITS	see P. 101

4.5 Data backup/transmission

Using the T-DAT SAVE/LOAD function, you can transfer data (device parameters and settings) between the T-DAT (exchangeable memory) and the EEPROM (device storage unit).

This is required in the following instances:
- Creating a backup: current data are transferred from an EEPROM to the T-DAT.
- Replacing a transmitter: current data are copied from an EEPROM to the T-DAT and then transferred to the EEPROM of the new transmitter.
- Duplicating data: current data are copied from an EEPROM to the T-DAT and then transferred to EEPROMs of identical measuring points.

Note!
For information on installing and removing the T-DAT → Operating Manual Proline Promag 53 PROFIBUS PA/DP



Data backup/transmission with T-DAT SAVE/LOAD function

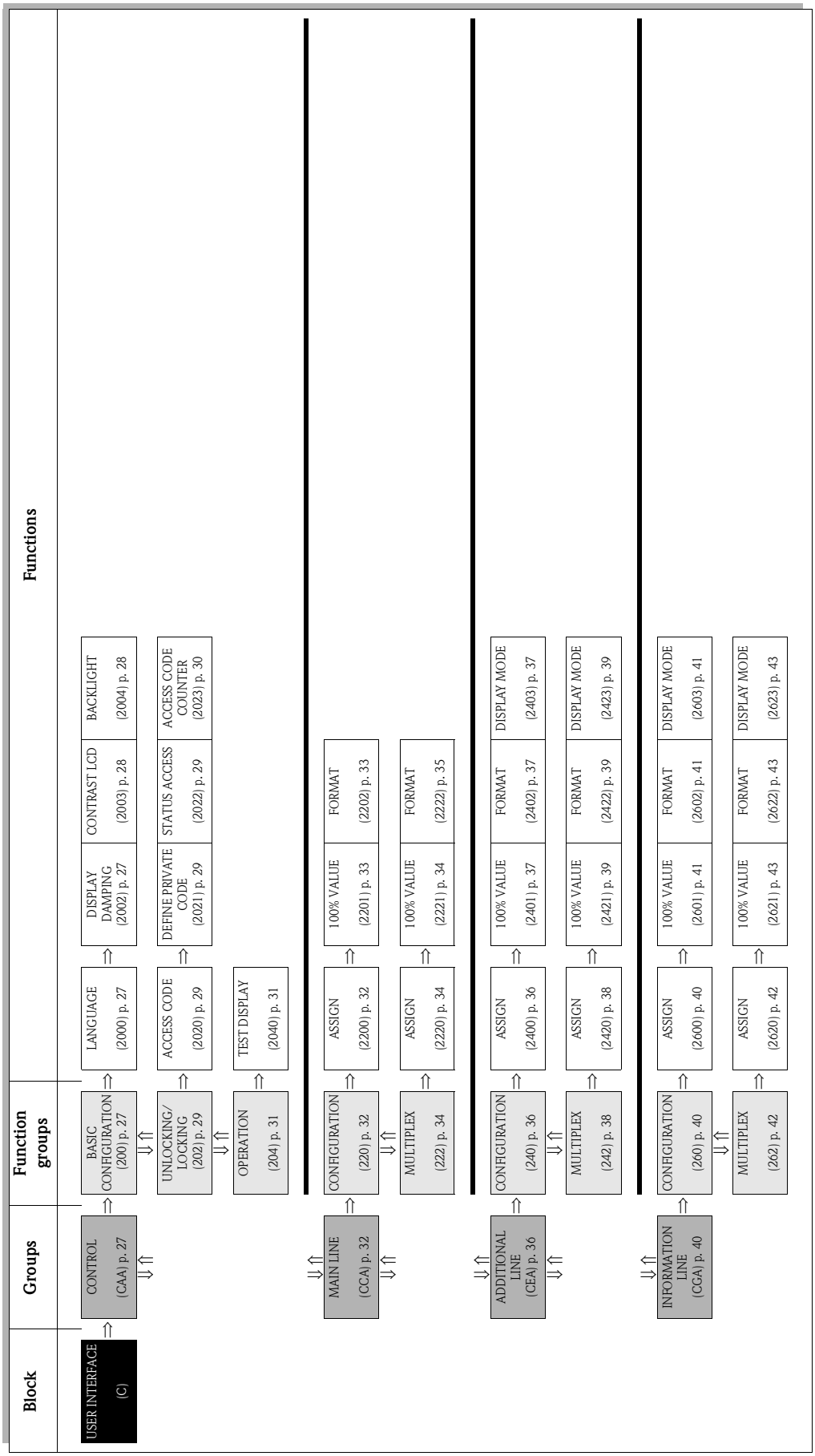
Information on the LOAD and SAVE options available:

LOAD:
Data are transferred from the T-DAT to the EEPROM.

Note!
- Any settings already saved on the EEPROM are deleted.
- This option is only available, if the T-DAT contains valid data.
- This option can only be executed if the software version of the T-DAT is the same or newer than that of the EEPROM. Otherwise, the error message "TRANSM. SW-DAT" appears after restarting and the LOAD function is then no longer available.

SAVE:
Data are transferred from the EEPROM to the T-DAT.

5 Block USER INTERFACE



5.1 Group CONTROL

5.1.1 Function group BASIC CONFIGURATION

USER INTERFACE C ⇒ CONTROL CAA ⇒ BASIC CONFIGURATION 200

Function description USER INTERFACE → CONTROL → BASIC CONFIGURATION	
LANGUAGE 2000	Use this function to select the language for all texts, parameters and messages shown on the local display. ✎ Note! The displayed options depend on the available language group shown in the LANGUAGE GROUP (8226) function. **OPTIONS:** Language group WEST EU / USA: ENGLISH DEUTSCH FRANCAIS ESPANOL ITALIANO NEDERLANDS PORTUGUESE Language group EAST EU / SCAND: ENGLISH NORSK SVENSKA SUOMI POLISH RUSSIAN CZECH Language group ASIA: ENGLISH BAHASA INDONESIA JAPANESE (Silbenschrift) Language group CHINA: ENGLISH CHINESE **Factory setting:** Country-dependent (s. page 142) ✎ Note! ■ If you press the ⊞/⊟ keys at startup, the language defaults to “ENGLISH”. ■ The language group can be changed using the configuration program FieldCare. Please do not hesitate to contact your Endress+Hauser sales office if you have any questions.
DISPLAY DAMPING 2002	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). **User input:** 0...100 seconds **Factory setting:** 3 s ✎ Note! Setting the time constant to zero seconds switches off damping.

Function description USER INTERFACE → CONTROL → BASIC CONFIGURATION		
CONTRAST LCD	**2003**	Use this function to optimize display contrast to suit local operating conditions. **User input:** 10...100% **Factory setting:** 50%
BACKLIGHT	**2004**	Use this function to optimize the backlight to suit local operating conditions. **User input:** 0...100% ✎ Note! Entering the value “0” means that the backlight is “switched off”. The display then no longer emits any light, i.e. the display texts can no longer be read in the dark. **Factory setting:** 50%

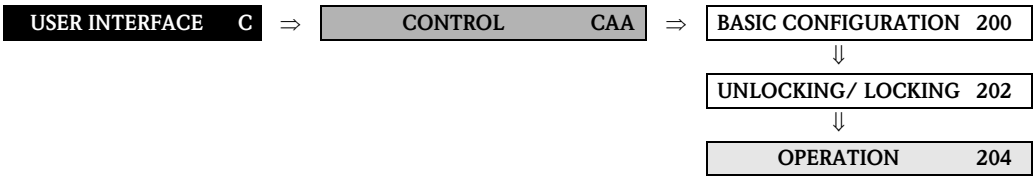
5.1.2 Function group UNLOCKING/ LOCKING

USER INTERFACE C ⇒ CONTROL CAA ⇒ BASIC CONFIGURATION 200
⇓
UNLOCKING/ LOCKING 202

Function description USER INTERFACE → CONTROL → UNLOCKING/ LOCKING	
ACCESS CODE 2020	✎ Note! This function is only relevant for onsite operation and access via an operating program (e.g. FieldCare) and does not affect cyclic data transmission via the PROFIBUS master (Class 1). 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. If you press the ⊞ / ⊟ keys in any function, the measuring system automatically goes to this function and the prompt to enter the code appears on the display (when programming is disabled). You can enable programming by entering your personal code (**factory setting = 53**, see function). **User input:** max. 4-digit number: 0...9999 ✎ Note! ■ Programming is disabled if you do not press a key within 60 seconds following automatic return to the HOME position. ■ You can also disable programming in this function by entering any number (other than the defined private code). ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code.
DEFINE PRIVATE CODE 2021	Use this function to specify a personal code for enabling programming in the function ACCESS CODE. **User input:** 0...9999 (max. 4-digit number) **Factory setting:** 53 ✎ Note! ■ Programming is always enabled with the code “0”. ■ Programming has to be enabled before this code can be changed. When programming is disabled this function is not available, thus preventing others from accessing your personal code.
STATUS ACCESS 2022	Use this function to check the access status for the function matrix. **Display:** ACCESS CUSTOMER (parameterization possible) LOCKED (parameterization disabled)

Function description USER INTERFACE → CONTROL → UNLOCKING/ LOCKING		
ACCESS CODE COUNTER	***2023***	Displays how often the customer code, service code or the digit "0" (code-free) has been entered to gain access to the function matrix. **Display:** max. 7-digit number: 0...9999999 **Factory setting:** 0

5.1.3 Function group OPERATION

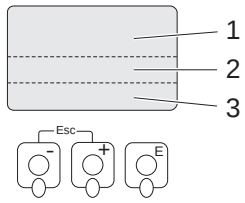


Function description USER INTERFACE → CONTROL → OPERATION	
TEST DISPLAY 2040	Use this function to test the operability of the local display and its pixels. **Options:** OFF ON **Factory setting:** OFF Test sequence: 1. Start the test by selecting ON. 2. All pixels of the main line, additional line and information line are darkened for minimum 0.75 seconds. 3. Main line, additional line and information line show an “8” in each field for minimum 0.75 seconds. 4. Main line, additional line and information line show a “0” in each field for minimum 0.75 seconds. 5. Main line, additional line and information line show nothing (blank display) for minimum 0.75 seconds. When the test completes the local display returns to its initial state and the setting changes to OFF.

5.2 Group MAIN LINE

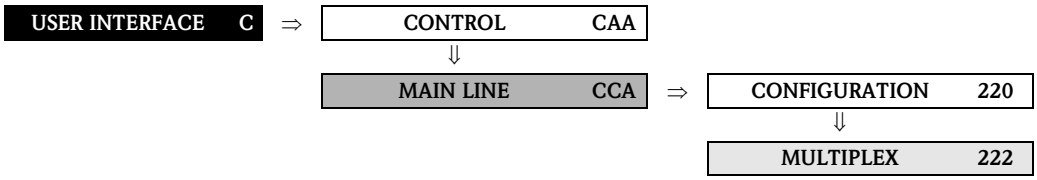
5.2.1 Function group CONFIGURATION

USER INTERFACE C ⇒ CONTROL CAA
⇓
MAIN LINE CCA ⇒ CONFIGURATION 220

Function description USER INTERFACE → MAIN LINE → CONFIGURATION	
 A0001253 1= main line, 2 = additional line, 3 = information line	
ASSIGN **2200**	In this function, a value to be displayed is assigned to the main line (top line in the local display). This value is displayed during normal operation. **Options:** OFF VOLUME FLOW MASS FLOW VOLUME FLOW IN % MASS FLOW IN % ACTUAL CURRENT 1 ACTUAL FREQUENCY 1 AI1 - OUT VALUE AI2 - OUT VALUE AO - DISP. VALUE TOT. 1 OUT VALUE (totalizer 1) TOT. 2 OUT VALUE (totalizer 2) TOT. 3 OUT VALUE (totalizer 3) **Advanced options with optional software package BATCHING:** BATCH NAME (“BATCH # 1” or “BEER 330”, etc.) BATCH QUANTITY (overall quantity to be batched) BATCH COUNTER (batching processes carried out) BATCH SUM (effective total batching quantity) ✎ Note! The options given in the BATCHING software package always refer to the batching selected (“BATCH # 1”, “BATCH # 2”, etc.) in the function BATCH SELECTOR (page 118). Example: If the option BATCH # 1 was selected in the function BATCH SELECTOR (7200), only the values of BATCH # 1 (batch name, batch quantity, etc.) can be displayed. **Factory setting:** VOLUME FLOW

Function description USER INTERFACE → MAIN LINE → CONFIGURATION	
100% VALUE **2201**	✎ Note! This function is only available if VOLUME FLOW IN % or MASS FLOW IN % was selected in the function ASSIGN (2200). Use this function to define the flow value to be shown on the display as the 100% value. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).
FORMAT **2202**	Use this function to define the maximum number of places after the decimal point displayed for the reading in the main line. **Options:** XXXXX. – XXXX.X – XXX.XX – XX.XXX – X.XXXX **Factory setting:** X.XXXX ✎ Note! ■ 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. ■ 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 such instances an arrow appears on the display between the measuring 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.

5.2.2 Function group MULTIPLEX

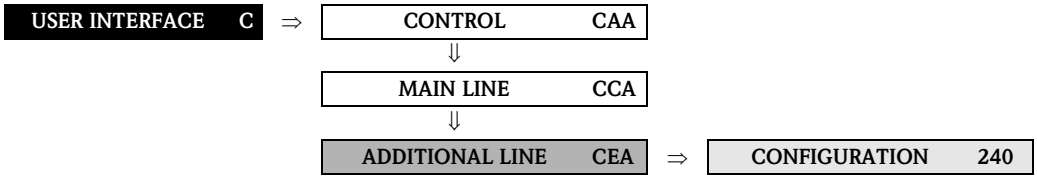


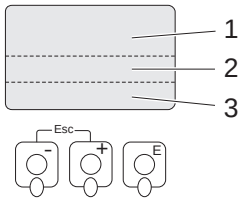
Function description USER INTERFACE → MAIN LINE → MULTIPLEX	
ASSIGN **2220**	Use this function to define the second reading to be displayed in the main line alternately (every 10 seconds) with the value defined in the ASSIGN function (2200). **Options:** OFF VOLUME FLOW MASS FLOW VOLUME FLOW IN % MASS FLOW IN % ACTUAL CURRENT 1 ACTUAL FREQUENCY 1 AI1 - OUT VALUE AI2 - OUT VALUE AO - DISP. VALUE TOT. 1 OUT VALUE (totalizer 1) TOT. 2 OUT VALUE (totalizer 2) TOT. 3 OUT VALUE (totalizer 3) **Advanced options with optional software package BATCHING:** BATCH NAME (“BATCH # 1” or “BEER 330”, etc.) BATCH QUANTITY (overall quantity to be batched) BATCH COUNTER (batching processes carried out) BATCH SUM (effective total batching quantity) ✎ Note! The options given in the BATCHING software package always refer to the batching selected (“BATCH # 1”, “BATCH # 2”, etc.) in the function BATCH SELECTOR (page 118). Example: If the option BATCH # 1 was selected in the function BATCH SELECTOR (7200), only the values of BATCH # 1 (batch name, batch quantity, etc.) can be displayed. **Factory setting:** OFF
100% VALUE **2221**	✎ Note! This function is only available if VOLUME FLOW IN % or MASS FLOW IN % was selected in the function ASSIGN (2220). Use this function to define the flow value to be shown on the display as the 100% value. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).

Function description USER INTERFACE → MAIN LINE → MULTIPLEX		
FORMAT	***2222***	Use this function to define the maximum number of places after the decimal point for the second value displayed in the main line. **Options:** XXXXX. – XXXX.X – XXX.XX – XX.XXX – X.XXXX **Factory setting:** X.XXXX ✎ Note! ■ 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. ■ 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 such instances an arrow appears on the display between the measuring 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.

5.3 Group ADDITIONAL LINE

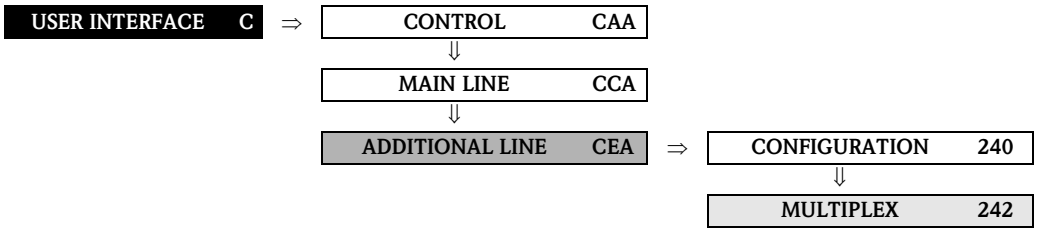
5.3.1 Function group CONFIGURATION



Function description USER INTERFACE → ADDITIONAL LINE → CONFIGURATION	
 A0001253 1= main line, 2 = additional line, 3 = information line	
ASSIGN **2400**	In this function, a value to be displayed is assigned to the additional line (middle line in the local display). This value is displayed during normal operation. **Options:** OFF VOLUME FLOW MASS FLOW VOLUME FLOW IN % MASS FLOW IN % VOLUME FLOW BARGRAPH IN % MASS FLOW BARGRAPH IN % FLOW VELOCITY ACTUAL CURRENT 1 ACTUAL FREQUENCY 1 AI1 - OUT VALUE AI2 - OUT VALUE AO - DISP. VALUE TOT. 1 OUT VALUE (totalizer 1) TOT. 2 OUT VALUE (totalizer 2) TOT. 3 OUT VALUE (totalizer 3) TAG NAME **Advanced options with optional software package BATCHING:** BATCH NAME (“BATCH # 1” or “BEER 330”, etc.) BATCH QUANTITY (overall quantity to be batched) BATCH COUNTER (batching processes carried out) BATCH SUM (effective total batching quantity) BATCH UPWARDS (batching progress upwards) BATCH DOWNWARDS (batching progress downwards) ✎ Note! The options given in the BATCHING software package always refer to the batching selected (“BATCH # 1”, “BATCH # 2”, etc.) in the function BATCH SELECTOR (page 118). Example: If the option BATCH # 1 was selected in the function BATCH SELECTOR (7200), only the values of BATCH # 1 (batch name, batch quantity, etc.) can be displayed. **Factory setting:** TOT. 1 OUT VALUE (totalizer 1)

Function description USER INTERFACE → ADDITIONAL LINE → CONFIGURATION	
100% VALUE **2401**	✎ Note! This function is not available unless one of the following was selected in the function ASSIGN (2400): ■ VOLUME FLOW IN % ■ MASS FLOW IN % ■ VOLUME FLOW BARGRAPH IN % ■ MASS FLOW BARGRAPH IN % Use this function to define the flow value to be shown on the display as the 100% value. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).
FORMAT **2402**	✎ Note! This function is not available unless a number was selected in the function ASSIGN (2400). Use this function to define the maximum number of places after the decimal point displayed for the reading in the additional line. **Options:** XXXXX. – XXXX.X – XXX.XX – XX.XXX – X.XXXX **Factory setting:** X.XXXX ✎ Note! ■ 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. ■ 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 such instances an arrow appears on the display between the measuring 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.
DISPLAY MODE **2403**	✎ Note! This function is only available if VOLUME FLOW BARGRAPH IN % or MASS FLOW BARGRAPH IN % was selected in the function ASSIGN (2400). Use this function to define the format of the bar graph. **Options:** STANDARD (Simple bar graph with 25 / 50 / 75% gradations and integrated sign). A0001258 SYMMETRY (Symmetrical bar graph for positive and negative directions of flow, with –50 / 0 / +50% gradations and integrated sign). A0001259 **Factory setting:** STANDARD

5.3.2 Function group MULTIPLEX

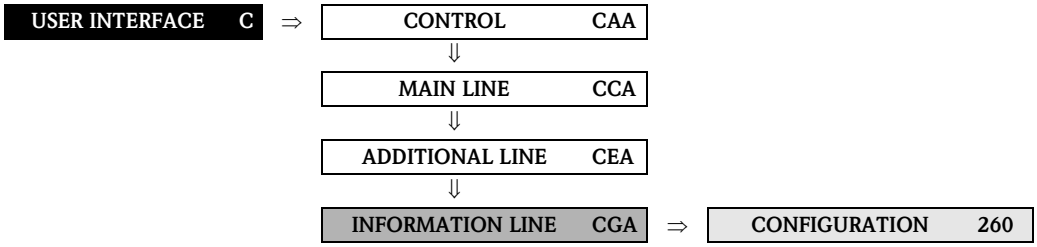


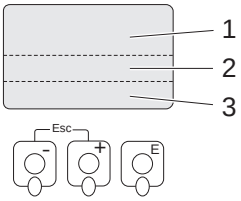
Function description USER INTERFACE → ADDITIONAL LINE → MULTIPLEX		
ASSIGN	**2420**	Use this function to define the second reading to be displayed in the additional line alternately (every 10 seconds) with the value defined in the function ASSIGN (2400). **Options:** OFF VOLUME FLOW MASS FLOW VOLUME FLOW IN % MASS FLOW IN % VOLUME FLOW BARGRAPH IN % MASS FLOW BARGRAPH IN % FLOW VELOCITY ACTUAL CURRENT 1 ACTUAL FREQUENCY 1 AI1 - OUT VALUE AI2 - OUT VALUE AO - DISP. VALUE TOT. 1 OUT VALUE (totalizer 1) TOT. 2 OUT VALUE (totalizer 2) TOT. 3 OUT VALUE (totalizer 3) TAG NAME **Advanced options with optional software package BATCHING:** BATCH NAME (“BATCH # 1” or “BEER 330”, etc.) BATCH QUANTITY (overall quantity to be batched) BATCH COUNTER (batching processes carried out) BATCH SUM (effective total batching quantity) BATCH UPWARDS (batching progress upwards) BATCH DOWNWARDS (batching progress downwards) ✎ Note! The options given in the BATCHING software package always refer to the batching selected (“BATCH # 1”, “BATCH # 2”, etc.) in the function BATCH SELECTOR (page 118). Example: If the option BATCH # 1 was selected in the function BATCH SELECTOR (7200), only the values of BATCH # 1 (batch name, batch quantity, etc.) can be displayed. **Factory setting:** OFF ✎ Note! Multiplex mode is suspended as soon as a fault / notice message is generated. The message in question appears on the display. Once the fault is eliminated, the measuring device resumes operation in Multiplex mode and the error message is no longer displayed on the local display.

Function description USER INTERFACE → ADDITIONAL LINE → MULTIPLEX	
100% VALUE **2421**	✎ Note! This function is not available unless one of the following was selected in the function ASSIGN (2420): ■ VOLUME FLOW IN % ■ MASS FLOW IN % ■ VOLUME FLOW BARGRAPH IN % ■ MASS FLOW BARGRAPH IN % Use this function to define the flow value to be shown on the display as the 100% value. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).
FORMAT **2422**	✎ Note! This function is not available unless a number was selected in the function ASSIGN (2420). Use this function to define the maximum number of places after the decimal point for the second value displayed in the additional line. **Options:** XXXXX. – XXXX.X – XXX.XX – XX.XXX – X.XXXX **Factory setting:** X.XXXX ✎ Note! ■ 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. ■ 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 such instances an arrow appears on the display between the measuring 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.
DISPLAY MODE **2423**	✎ Note! This function is only available if VOLUME FLOW BARGRAPH IN % or MASS FLOW BARGRAPH IN % was selected in the function ASSIGN (2420). Use this function to define the format of the bar graph. **Options:** STANDARD (Simple bar graph with 25 / 50 / 75% gradations and integrated sign). A0001258 SYMMETRY (Symmetrical bar graph for positive and negative directions of flow, with –50 / 0 / +50% gradations and integrated sign). A0001259 **Factory setting:** STANDARD

5.4 Group INFORMATION LINE

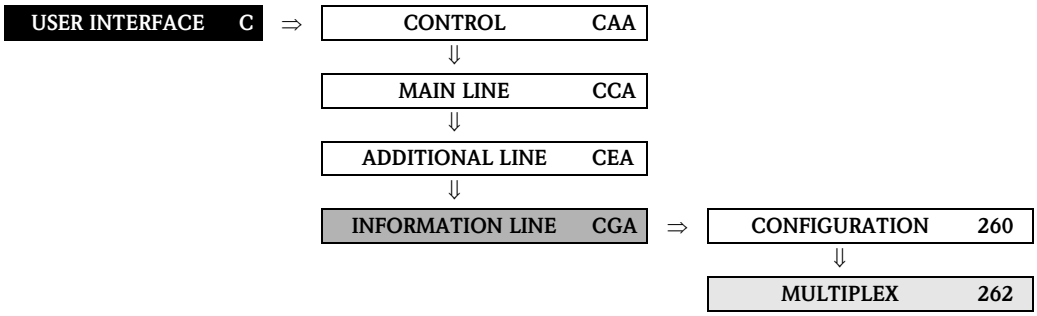
5.4.1 Function group CONFIGURATION



Function description USER INTERFACE ➞ INFORMATION LINE ➞ CONFIGURATION	
	 A0001253 1 = main line, 2 = additional line, 3 = information line
ASSIGN **2600**	In this function, a value to be displayed is assigned to the information line (bottom line in the local display). This value is displayed during normal operation. **Options:** OFF VOLUME FLOW IN % MASS FLOW IN % VOLUME FLOW BARGRAPH IN % MASS FLOW BARGRAPH IN % FLOW VELOCITY ACTUAL CURRENT 1 ACTUAL FREQUENCY 1 AI1 - OUT VALUE AI2 - OUT VALUE AO - DISP. VALUE TOT. 1 OUT VALUE (totalizer 1) TOT. 2 OUT VALUE (totalizer 2) TOT. 3 OUT VALUE (totalizer 3) TAG NAME OPERATING/SYSTEM CONDITIONS DISPLAY FLOW DIRECTION **Advanced options with optional software package BATCHING:** BATCHING KEYS (softkeys on the local display) ✎ Note! ■ If you select the BATCHING OPERATING KEYS, the multiplex display functionality (function ASSIGN (2620), etc.) is not available in the information line. ■ For information on the functional concept of the batching menu, see chapter “Operation” in the see Operating Instructions Promag 53 PROFIBUS DP/PA, BA053D/06/en. **Factory setting:** OPERATING/SYSTEM CONDITIONS

Function description USER INTERFACE → INFORMATION LINE → CONFIGURATION	
100% VALUE **2601**	✎ Note! This function is not available unless one of the following was selected in the function ASSIGN (2600): ■ VOLUME FLOW IN % ■ MASS FLOW IN % ■ VOLUME FLOW BARGRAPH IN % ■ MASS FLOW BARGRAPH IN % Use this function to define the flow value to be shown on the display as the 100% value. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).
FORMAT **2602**	✎ Note! This function is not available unless a number was selected in the function ASSIGN (2600). Use this function to define the maximum number of places after the decimal point displayed for the reading in the information line. **Options:** XXXXX. – XXXX.X – XXX.XX – XX.XXX – X.XXXX **Factory setting:** X.XXXX ✎ Note! ■ 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. ■ 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 such instances an arrow appears on the display between the measuring 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.
DISPLAY MODE **2603**	✎ Note! This function is only available if VOLUME FLOW BARGRAPH IN % or MASS FLOW BARGRAPH IN % was selected in the function ASSIGN (2600). Use this function to define the format of the bar graph. **Options:** STANDARD (Simple bar graph with 25 / 50 / 75% gradations and integrated sign). A0001258 SYMMETRY (Symmetrical bar graph for positive and negative directions of flow, with –50 / 0 / +50% gradations and integrated sign). A0001259 **Factory setting:** STANDARD

5.4.2 Function group MULTIPLEX

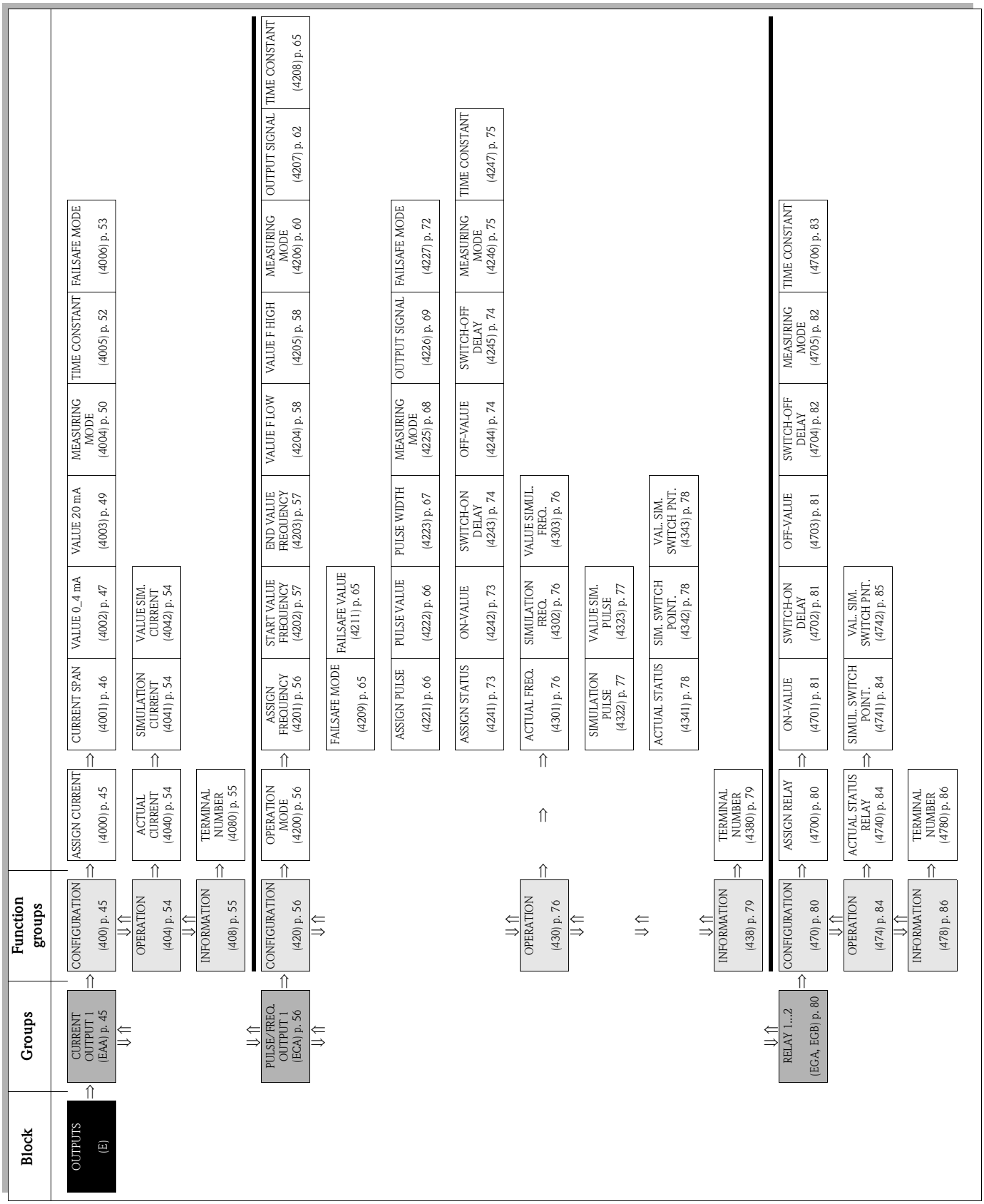


Function description USER INTERFACE → INFORMATION LINE → MULTIPLEX	
✎ Note! If you select BATCHING OPERATING KEYS in the function ASSIGN (2600), the multiplex display functionality is not available in the information line.	
ASSIGN **2620**	Use this function to define the second reading to be displayed in the information line alternately (every 10 seconds) with the value defined in the function ASSIGN (2600). **Options:** OFF VOLUME FLOW IN % MASS FLOW IN % VOLUME FLOW BARGRAPH IN % MASS FLOW BARGRAPH IN % FLOW VELOCITY ACTUAL CURRENT 1 ACTUAL FREQUENCY 1 AI1 - OUT VALUE AI2 - OUT VALUE AO - DISP. VALUE TOT. 1 OUT VALUE (totalizer 1) TOT. 2 OUT VALUE (totalizer 2) TOT. 3 OUT VALUE (totalizer 3) TAG NAME OPERATING/SYSTEM CONDITIONS DISPLAY FLOW DIRECTION **Factory setting:** OFF ✎ Note! Multiplex mode is suspended as soon as a fault / notice message is generated. The message in question appears on the display. Once the fault is eliminated, the measuring device resumes operation in Multiplex mode and the error message is no longer displayed on the local display.

Function description USER INTERFACE → INFORMATION LINE → MULTIPLEX	
100% VALUE **2621**	✎ Note! This function is not available unless one of the following was selected in the function ASSIGN (2620): ■ VOLUME FLOW IN % ■ MASS FLOW IN % ■ VOLUME FLOW BARGRAPH IN % ■ MASS FLOW BARGRAPH IN % Use this function to define the flow value to be shown on the display as the 100% value. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.).
FORMAT **2622**	✎ Note! This function is not available unless a number was selected in the function ASSIGN (2600). Use this function to define the maximum number of places after the decimal point for the second value displayed in the information line. **Options:** XXXXX. – XXXX.X – XXX.XX – XX.XXX – X.XXXX **Factory setting:** X.XXXX ✎ Note! ■ 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. ■ 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 such instances an arrow appears on the display between the measuring 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.
DISPLAY MODE **2623**	✎ Note! This function is only available if VOLUME FLOW BARGRAPH IN % or MASS FLOW BARGRAPH IN % was selected in the function ASSIGN (2620). Use this function to define the format of the bar graph. **Options:** STANDARD (Simple bar graph with 25 / 50 / 75% gradations and integrated sign). A0001258 SYMMETRY (Symmetrical bar graph for positive and negative directions of flow, with –50 / 0 / +50% gradations and integrated sign). A0001258 **Factory setting:** STANDARD

6 Block OUTPUTS

Note!
This block is not available for all devices → page 8 (Available blocks, groups, etc.).



6.1 Group CURRENT OUTPUT 1

6.1.1 Function group CONFIGURATION

OUTPUTS E ⇒ CURRENT OUTPUT 1 EAA ⇒ CONFIGURATION 400

Function description OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)	
ASSIGN CURRENT OUTPUT **4000**	Use this function to assign a measured variable to the current output. **Options:** OFF MASS FLOW VOLUME FLOW **Factory setting:** VOLUME FLOW ✎ Note! If you select OFF, the only function shown in the function group CONFIGURATION (400) is this function, in other words, ASSIGN CURRENT OUTPUT (4000).

Function description

OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)

CURRENT SPAN **4001**

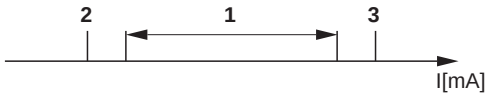
Use this function to define the current span. This selection defines the operational range and the upper and lower signal on alarm. For the current output 1 the option HART can be defined additionally.

Options:
0–20 mA (25 mA)
4–20 mA (25 mA)
0–20 mA
4–20 mA
4–20 mA NAMUR
4–20 mA US

Factory setting:
4–20 mA NAMUR

✎ Note!
When switching the hardware from an active (factory setting) to a passive output signal, select a current span of 4–20 mA (please refer to the Operating Instructions BA053D/06/en).

Current span, operational range and signal on alarm level



a	1	2	3
0-20 mA (25 mA)	0 - 24 mA	0	25
4-20 mA (25 mA)	4 - 24 mA	2	25
0-20 mA	0 - 20.5 mA	0	22
4-20 mA	4 - 20.5 mA	2	22
4-20 mA NAMUR	3.8 - 20.5 mA	3.5	22.6
4-20 mA US	3.9 - 20.8 mA	3.75	22.6

A0002959

a Current span
1 Operational range (measuring information)
2 Lower signal on alarm level
3 Upper signal on alarm level

✎ Note!
- If the measured value is outside the measuring range (as defined in the functions VALUE 0_4 mA (4002) and VALUE 20 mA (4003), a notice message is generated (#351...354, current span).
- In case of a fault the behavior of the current output is according to the selected option in the function FAILSAFE MODE (4006).

Function description

OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)

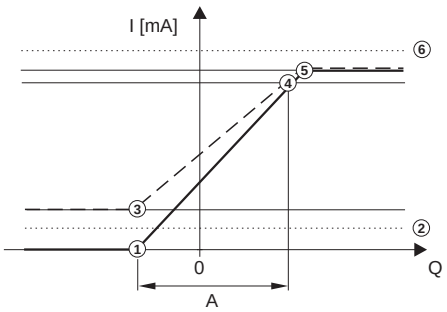
VALUE 0_4 mA **4002**

Use this function to assign the 0/4 mA current a value.
The value can be higher or lower than the value assigned to 20 mA (function VALUE 20 mA (4003)). Positive and negative values are permissible, depending on the measured variable in question (e.g. volume flow).

Example:
4 mA assigned value = –250 l/h
20 mA assigned value = +750 l/h
Calculated current value = 8 mA (at zero flow)

Note that values with different signs cannot be entered for 0/4 mA and 20 mA (function 4003) if SYMMETRY is the setting selected for the MEASURING MODE function (4004). In this case, the message "INPUT RANGE EXCEEDED" appears on the display.

Example for STANDARD measuring mode:



A0001223

① = *Initial value (0...20 mA)*
② = *Lower signal on alarm level: depends on the setting in the function CURRENT SPAN*
③ = *Initial value (4...20 mA): depends on the setting in the function CURRENT SPAN*
④ = *Full scale value (0/4...20 mA): depends on the setting in the function CURRENT SPAN*
⑤ = *Maximum current value: depends on the setting in the function CURRENT SPAN*
⑥ = *Failsafe mode (upper signal on alarm level): depends on the setting in the functions CURRENT SPAN (s. page 46) and FAILSAFE MODE, (s. page 53)*
A = Measuring range (the minimum measuring range has to exceed the value that correlates with a flow velocity of 0.3 m/s)

User input:
5-digit floating-point number, with sign

Factory setting:
0 [unit]

✎ Note!
- The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400), (see page 13 or page 12).

☞ Caution!
The current output responds differently, depending on the parameters set in the various functions. Some examples of parameter settings and their effect on the current output are given in the following section.

(continued on next page)

Function description

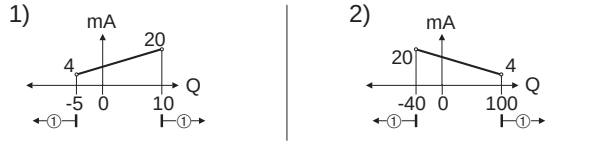
OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)

VALUE 0_4 mA **4002**
(continued)

Parameter setting example A:
1. VALUE 0_4 mA (4002) = not equal to zero flow (e.g. -5 m^3/h)
   VALUE 20 mA (4003) = not equal to zero flow (e.g. 10 m^3/h) or
2. VALUE 0_4 mA (4002) = not equal to zero flow (e.g. 100 m^3/h)
   VALUE 20 mA (4003) = not equal to zero flow (e.g. –40 m^3/h)

and
MEASURING MODE (4004) = STANDARD

When you enter the values for 0/4 mA and 20 mA, the working range of the measuring device is defined. If the effective flow drops below or exceeds this working range
(see ①), a fault/notice message is generated (#351-354, current range) and the current output responds in accordance with the parameter settings in the function FAILSAFE MODE (4006).

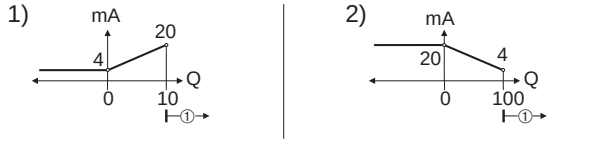


A0001262

Parameter setting example B:
1. VALUE 0_4 mA (4002) = equal to zero flow (e.g. 0 m^3/h)
   VALUE 20 mA (4003) = not equal to zero flow (e.g. 10 m^3/h) or
2. VALUE 0_4 mA (4002) = not equal to zero flow (e.g. 100 m^3/h)
   VALUE 20 mA (4003) = equal to zero flow (e.g. 0 m^3/h)

and
MEASURING MODE (4004) = STANDARD

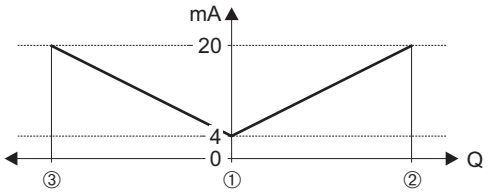
When you enter the values for 0/4 mA and 20 mA, the working range of the measuring device is defined. One of the two values here is configured as zero flow (e.g. 0 m^3/h).
If the effective flow drops below or exceeds the value parameterized as the zero flow, no fault/notice message is generated and the current output retains its value. If the effective flow drops below or exceeds the other value, a fault/notice message is generated (#351-354, current range) and the current output responds in accordance with the parameter settings in the function FAILSAFE MODE (4006).



A0001264

Deliberately only one flow direction is output with this setting and flow values in the other flow direction are suppressed.

Parameter setting example C:
MEASURING MODE (4004) = SYMMETRY
The current output signal is independent of the direction of flow (absolute amount of the measured variable). The 0_4 mA VALUE ① and the 20 mA VALUE ② must have the same sign (+ or -). The "20 mA VALUE" ③ (e.g. backflow) corresponds to the mirrored 20 mA VALUE ② (e.g. flow).



A0001249

ASSIGN RELAY (4700) = FLOW DIRECTION
With this setting e.g. the flow direction output via a switching contact can be made.

Parameter setting example D:
MEASURING MODE (4004) = PULSATING FLOW → page 50 ff.

Function description OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)	
VALUE 20 mA **4003**	Use this function to assign the 20 mA current a value. The value can be higher or lower than the value assigned to 0/4 mA (function VALUE 0_4 mA (4002), see page 47). Positive and negative values are permissible, depending on the measured variable in question (e.g. volume flow). Example: 4 mA assigned value = –250 l/h 20 mA assigned value = +750 l/h Calculated current value = 8 mA (at zero flow) Note that values with different signs cannot be entered for 0/4 mA (function 4002) and 20 mA, if SYMMETRY is the setting selected in the function MEASURING MODE (4004). In this case, the message “INPUT RANGE EXCEEDED” appears. Example for STANDARD measuring mode → page 47 **User input:** 5-digit floating-point number, with sign **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.). ✎ Note! ■ The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400). ☝ Caution! It is very important to read and comply with the information in the function VALUE 0_4 mA (under “☝ Caution”; Examples of parameter settings) on page 47.

Function description

OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)

MEASURING MODE **4004**

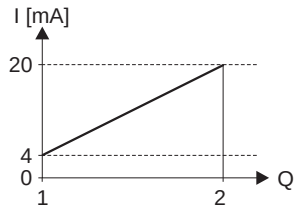
Use this function to define the measuring mode for the current output.

Options:
STANDARD
SYMMETRY
PULSATING FLOW

Factory setting:
STANDARD

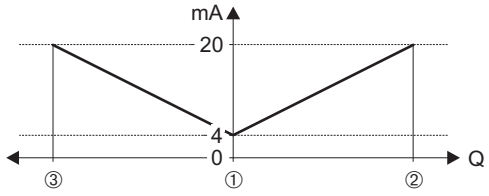
Description of the individual options:

- STANDARD The current output signal is proportional to the measured variable. The flow components outside the scaled measuring range (defined by the 0_4 mA VALUE ① and the 20 mA VALUE ②) are taken into account as follows for signal output.
  - If one of the values is defined as equal to the zero flow (e.g. VALUE 0_4 mA = 0 m^3/h), no message is given if this value is exceeded or not achieved and the current output retains its value (4 mA in the example). If the other value is exceeded or not achieved, the message "CURRENT OUTPUT AT FULL SCALE VALUE" appears and the current output responds in accordance with the parameter setting in the function FAILSAFE MODE (4006).
  - If both values defined are not equal to the zero flow (for example VALUE 0_4 mA= –5 m^3/h; VALUE 20 mA = 10m^3/h), the message "CURRENT OUTPUT AT FULL SCALE VALUE" appears if the measuring range is exceeded or not achieved and the current output responds in accordance with the parameter setting in the function FAILSAFE MODE (4006).



A0001248

- SYMMETRY
  The current output signal is independent of the direction of flow (absolute amount of the measured variable). The 0_4 mA VALUE ① and the 20 mA VALUE ② must have the same sign (+ or -). The "20 mA VALUE" ③ (e.g. backflow) corresponds to the mirrored 20 mA VALUE ② (e.g. flow).

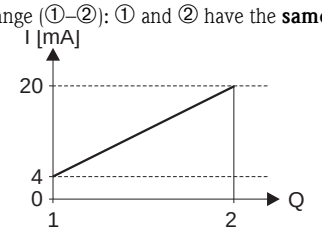
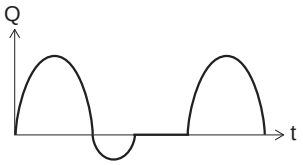
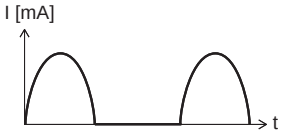
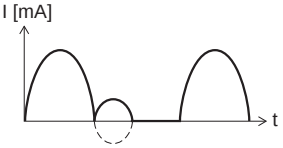
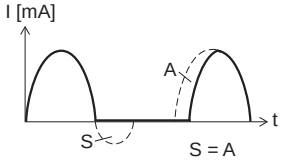


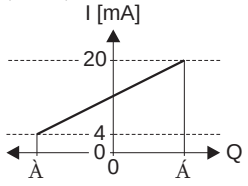
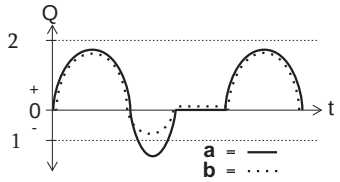
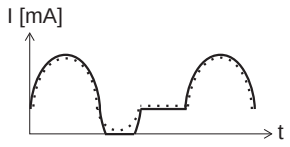
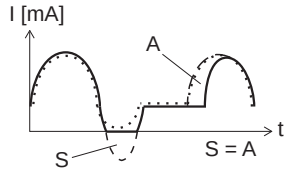
A0001249

✎ Note!

- The direction of flow can be output via the configurable relay or status outputs.
- SYMMETRY cannot be selected unless the values in the VALUE 0_4 mA (4002) and VALUE 20 mA (4003) functions have the same sign or one of the values is zero. If the values have different signs, SYMMETRY cannot be selected and an "ASSIGNMENT NOT POSSIBLE" message is displayed.

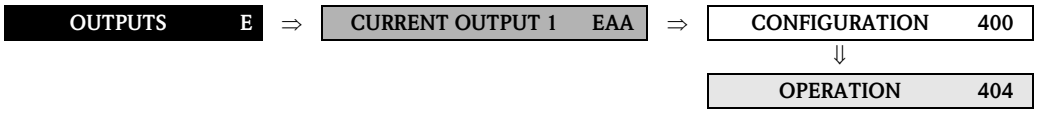
(continued on next page)

Function description OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)	
MEASURING MODE **4004** (continued)	■ PULSATING FLOW If flow is characterized by severe fluctuations as is the case, for example, with reciprocating pumps, flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 seconds. If the buffered data cannot be processed within approx. 60 seconds, a fault/notice message appears. Under certain plant conditions, flow values can aggregate in the buffer, for example in the case of prolonged and unwanted fluid backflow. However, this buffer is reset in all relevant programming adjustments which affect the current output.
Detailed explanations and information	**How the current output responds under the following postulated conditions:** 1. Defined measuring range (①–②): ① and ② have the **same** sign  A0001248 and the following flow behavior:  A0001265 ■ STANDARD The current output signal is proportional to the measured variable. The flow components outside the scaled measuring range are not taken into account for signal output.  A0001267 ■ SYMMETRY The current output signal is independent of the direction of flow.  A0001268 ■ PULSATING FLOW Flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 seconds.  A0001269 (continued on next page)

Function description OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)	
Detailed explanations and information (continued)	2. Defined measuring range (①–②): ① and ② do **not** have the **same** sign.  A0001272 Flow a (—) outside, b (- -) within the measuring range.  A0001273 ■ STANDARD a (—): The flow components outside the scaled measuring range cannot be taken into account for signal output. A fault message is generated (# 351...354, current range) and the current output responds in accordance with the parameter settings in the function FAILSAFE MODE (4006). b (- -): The current output signal is proportional to the measured variable assigned.  A0001274 ■ SYMMETRY This option is not available under these circumstances because the 0_4 mA value and the 20 mA value have different signs. ■ PULSATING FLOW Flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 seconds.  A0001275
TIME CONSTANT 4005	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). **User input:** fixed-point number 0.01...100.00 s **Factory setting:** 3.00 s

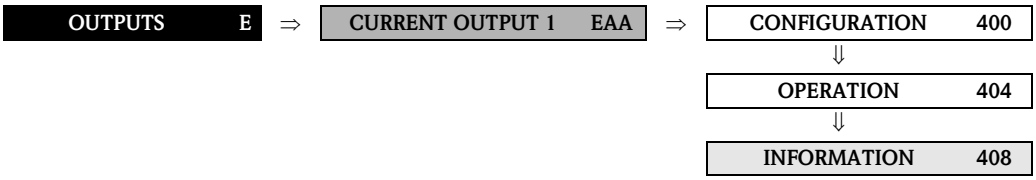
Function description OUTPUTS → CURRENT OUTPUT 1 → CONFIGURATION (only with PROFIBUS DP)	
FAILSAFE MODE **4006**	For safety reasons it is advisable to ensure that the current output assumes a predefined state in the event of a fault. The setting you select here affects only the current output. It has no effect on other outputs and the display (e.g. totalizers). **Options:** MIN. CURRENT The current output adopts the value of the lower signal on alarm level (as defined in the function CURRENT SPAN (4001, page 46). MAX. CURRENT The current output adopts the value of the upper signal on alarm level (as defined in the function CURRENT SPAN (4001, page 46). HOLD VALUE (**not recommended**) Measuring value output is based on the last measuring value saved before the error occurred . ACTUAL VALUE Measuring value output is based on the current flow measurement. The fault is ignored. **Factory setting:** MIN. CURRENT

6.1.2 Function group OPERATION



Function description OUTPUTS → CURRENT OUTPUT 1 → OPERATION (only with PROFIBUS DP)	
ACTUAL CURRENT 4040	Use this function to view the computed actual value of the output current. **Display:** 0.00...25.00 mA
SIMULATION CURRENT 4041	Use this function to activate simulation of the current output. **Options:** OFF ON **Factory setting:** OFF ✎ Note! ▪ The "SIMULATION CURRENT OUTPUT" message indicates that simulation is active. ▪ The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the other outputs. ☝ Caution! The setting is not saved in the event of a power failure.
VALUE SIMULATION CURRENT 4042	✎ Note! The function is not visible unless the SIMULATION CURRENT function (4041) is active (= ON). Use this function to define a freely selectable value (e.g. 12 mA) to be output at the current output. This value is used to test downstream devices and the measuring device itself. **User input:** 0.00...25.00 mA **Factory setting:** 0.00 mA ☝ Caution! The setting is not saved in the event of a power failure.

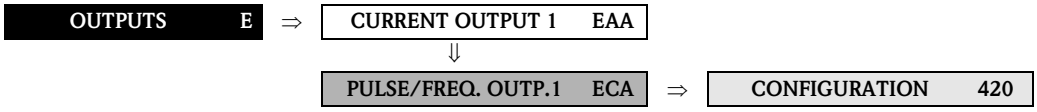
6.1.3 Function group INFORMATION



Function description OUTPUTS → CURRENT OUTPUT 1 → INFORMATION (only with PROFIBUS DP)		
TERMINAL NUMBER	**4080**	Use this function to display the numbers of the terminals (in the connection compartment) which are used by the current output. **Display:** 20 (+) / 21 (–)

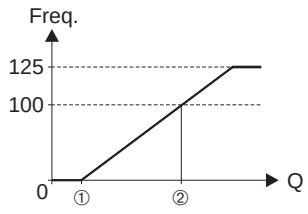
6.2 Group PULSE-/FREQUENCY OUTPUT 1

6.2.1 Function group CONFIGURATION



Function description OUTPUTS ➞ PULSE-/FREQUENCY OUTPUT 1 ➞ CONFIGURATION (GENERAL / FREQUENCY) (only with PROFIBUS DP)	
OPERATION MODE 4200	Use this function to configure the output as a pulse output, frequency output or status output. The functions available in this function group vary, depending on which option you select here. **Options:** PULSE FREQUENCY STATUS **Factory setting:** PULSE
ASSIGN FREQUENCY 4201	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). Use this function to assign a measured variable to the frequency output. **Options:** OFF MASS FLOW VOLUME FLOW **Factory setting:** VOLUME FLOW ✎ Note! If you select OFF, the only function shown in the CONFIGURATION function group is this function, in other words ASSIGN FREQUENCY (4201).

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY) (only with PROFIBUS DP)	
START VALUE FREQUENCY **4202**	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). Use this function to define an initial frequency for the frequency output. You define the associated measuring value of the measuring range in the VALUE F LOW function (4204) described on page 58. **User input:** 5-digit fixed-point number: 0...10000 Hz **Factory setting:** 0 Hz Example: ■ VALUE F LOW = 0 l/h, initial frequency = 0 Hz: i.e. a frequency of 0 Hz is output at a flow of 0 l/h. ■ VALUE F LOW = 1 l/h, initial frequency = 10 Hz: i.e. a frequency of 10 Hz is output at a flow of 1 l/h.
END VALUE FREQUENCY **4203**	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). Use this function to define a full scale frequency for the frequency output. You define the associated measuring value of the measuring range in the VALUE F HIGH function (4205) described on page 58. **User input:** 5-digit fixed-point number 2...10000 Hz **Factory setting:** 10000 Hz Example: ■ VALUE F HIGH = 1000 l/h, full scale value frequency = 1000 Hz: i.e. a frequency of 1000 Hz is output at a flow of 1000 l/h. ■ VALUE F HIGH = 3600 l/h, full scale value frequency = 1000 Hz: i.e. a frequency of 1000 Hz is output at a flow of 3600 l/h. ✎ Note! 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.

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY) (only with PROFIBUS DP)	
VALUE F LOW 4204	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). Use this function to assign a variable to the start value frequency (4202). The value can be higher or lower than the value assigned to the VALUE F HIGH. Positive and negative values are permissible, depending on the measured variable in question (e.g. volume flow). You define a measuring range by defining the VALUE F LOW and VALUE F HIGH values. **User input:** 5-digit floating-point number **Factory setting:** 0 [unit] ✎ Note! ▪ For graphic illustration of VALUE F LOW see function VALUE F HIGH. ▪ The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400), (see page 13 or page 12).
VALUE F HIGH 4205	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). Use this function to assign a variable to the end value frequency (4203). The value can be higher or lower than the value assigned to the VALUE F LOW. Positive and negative values are permissible, depending on the measured variable in question (e.g. volume flow). You define a measuring range by defining the VALUE F LOW and VALUE F HIGH values. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.). ✎ Note! Note that values with different signs cannot be entered for VALUE F LOW and VALUE F HIGH, if SYMMETRY is the setting selected for the MEASURING MODE function (4206). In this case, the message “INPUT RANGE EXCEEDED” appears on the display.  A0001279 ① = *Value-f min.* ② = *Value-f high* (continued on next page)

Function description

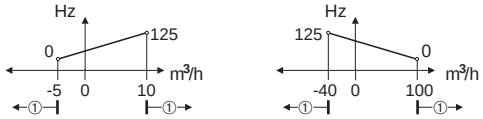
OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY)
(only with PROFIBUS DP)

VALUE F HIGH **4205**
(continued)

Parameter setting example 1:
1. VALUE F LOW (4204) = not equal to zero flow (e.g. -5 m^3/h)
   VALUE F HIGH (4205) = not equal to zero flow (e.g. 10 m^3/h) or
2. VALUE F LOW (4204) = not equal to zero flow (e.g. 100 m^3/h)
   VALUE F HIGH (4205) = not equal to zero flow (e.g. 40 m^3/h)

and MEASURING MODE (4004) = STANDARD

When you enter the values for VALUE F LOW and VALUE F HIGH the working range of the measuring device is defined. If the effective flow drops below or exceeds this working range (see ①), a fault or notice message is generated (#355-358, frequency area) and the frequency output responds in accordance with the parameter settings in the function FAILSAFE MODE (4209).).

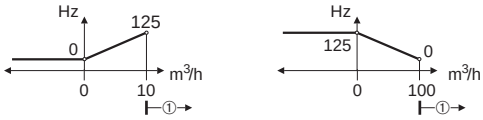


a0001276

Parameter setting example 2:
1. VALUE F LOW (4204) = not equal to zero flow (e.g. 0 m^3/h)
   VALUE F HIGH (4205) = not equal to zero flow (e.g. 10 m^3/h) or
2. VALUE F LOW (4204) = not equal to zero flow (e.g. 100 m^3/h)
   VALUE F HIGH (4205) = not equal to zero flow (e.g. 0 m^3/h)

and MEASURING MODE (4004) = STANDARD

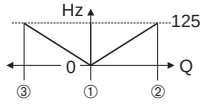
When you enter the values for VALUE F LOW and VALUE F HIGH the working range of the measuring device is defined. In doing so, one of the two values is parameterized as zero flow (e.g. 0 m^3/h).
If the effective flow drops below or exceeds the value parameterized as the zero flow, no fault/notice message is generated and the frequency output retains its value.
If the effective flow drops below or exceeds the other value, a fault/notice message is generated (#355-358, frequency area) and the frequency output responds in accordance with the parameters set in the function FAILSAFE MODE (4209).



A0001277

Deliberately only one flow direction is output with this setting and flow values in the other flow direction are suppressed.

Parameter setting example 3:
MEASURING MODE (4206) = SYMMETRY
The frequency output signal is independent of the direction of flow (absolute amount of the measured variable). The VALUE F LOW ① and VALUE F HIGH ② must have the same sign (+ or -). The "VALUE F HIGH" ③ (e.g. backflow) corresponds to the mirrored VALUE F HIGH ② (e.g. flow).



A0001278

ASSIGN RELAY (4700) = FLOW DIRECTION
With this setting e.g. the flow direction output via a switching contact can be made.

Parameter setting example 4:
MEASURING MODE (4004) = PULSATING FLOW → page 50 ff.

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY)
(only with PROFIBUS DP)

MEASURING MODE **4206**

✎ Note!
This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200).

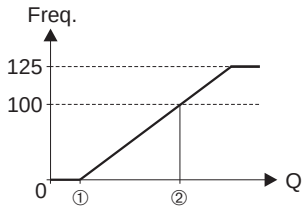
Use this function to define the measuring mode for the frequency output.

Options:
STANDARD
SYMMETRY
PULSATING FLOW

Factory setting:
STANDARD

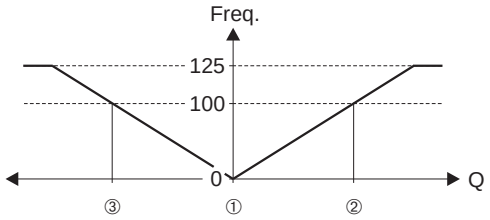
Description of the individual options:

- STANDARD
  The frequency output signal is proportional to the measured variable. The flow components outside the scaled measuring range (defined by the VALUE F LOW. ① and VALUE F HIGH. ②) are not taken into account for signal output.
  – If one of the values is defined as equal to the zero flow (e.g. VALUE F LOW = 0 m^3/h), no message is given if this value is exceeded or not achieved and the frequency output retains its value (0 Hz in the example). If the other value is exceeded or not achieved, the message "FREQUENCY OUTPUT AT FULL SCALE VALUE" appears and the frequency output responds in accordance with the parameter setting in the function FAILSAFE MODE (4209).
  – If both values defined are not equal to the zero flow (for example VALUE F LOW= –5 m^3/h; VALUE F HIGH10m^3/h), the message "FREQUENCY OUTPUT AT FULL SCALE VALUE" appears if the measuring range is exceeded or not achieved and the frequency output responds in accordance with the parameter settings in the function FAILSAFE MODE (4209).



A0001279

- SYMMETRY
  The frequency output signal is independent of the direction of flow (absolute amount of the measured variable). The VALUE F LOW ① and VALUE F HIGH ② must have the same sign (+ or –). The VALUE F HIGH ③ (e.g. backflow) corresponds to the mirrored VALUE F HIGH ② (e.g. forward flow).



A0001280

✎ Note!

- The direction of flow can be output via the configurable relay or status outputs.
- SYMMETRY cannot be selected unless the values in the VALUE F LOW (4204) and VALUE F HIGH (4205) functions have the same sign or one of the values is zero. If the values have different signs, SYMMETRY cannot be selected and an "ASSIGNMENT NOT POSSIBLE" message is displayed.

(continued on next page)

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY) (only with PROFIBUS DP)		
MEASURING MODE (continued)	**4206**	■ PULSATING FLOW If flow is characterized by severe fluctuations as is the case, for example, with reciprocating pumps, flow components outside the measuring range are buffered, balanced and output after a maximum delay of 60 seconds. If the buffered data cannot be processed within approx. 60 seconds, a fault/notice message appears. Under certain plant conditions, flow values can aggregate in the buffer, for example in the case of prolonged and unwanted fluid backflow. However, this buffer is reset in all relevant programming adjustments which affect the frequency output.

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY)
(only with PROFIBUS DP)

OUTPUT SIGNAL 4207

✎ Note!
Function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200).

For selecting the output configuration of the frequency output.

Options:
PASSIVE - POSITIVE
PASSIVE - NEGATIVE
ACTIVE - POSITIVE
ACTIVE - NEGATIVE

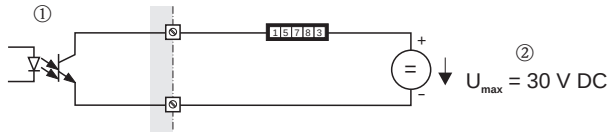
Factory setting: PASSIVE - POSITIVE

Explanation
- PASSIVE = power is supplied to the frequency output by means of an external power supply.
- ACTIVE = power is supplied to the frequency output by means of the device-internal power supply.

Configuring the output signal level (POSITIVE or NEGATIVE) determines the quiescent behavior (at zero flow) of the frequency output.
The internal transistor is activated as follows:
- If POSITIVE is selected, the internal transistor is activated with a **positive** signal level.
- If NEGATIVE is selected, the internal transistor is activated with a **negative** signal level (0 V).

✎ Note!
With the passive output configuration, the output signal levels of the frequency output depend on the external circuit (see examples).

Example for passive output circuit (PASSIVE)
If PASSIVE is selected, the frequency output is configured as an open collector.

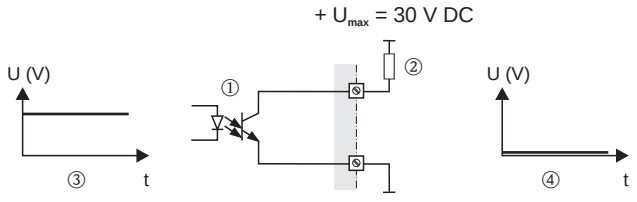


A0001225

① = *Open Collector*
② = *External power supply*

✎ Note!
For continuous currents up to 25 mA (I_{max} = 250 mA / 20 ms).

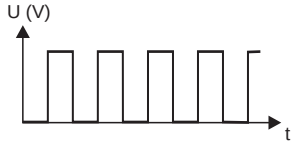
Example for output configuration PASSIVE-POSITIVE:
Output configuration with an external pull-up resistance.
In the quiescent state (at zero flow), the output signal level at the terminals is 0 V.



A0004687

① = *Open Collector*
② = *Pull-Up-Resistance*
③ = *Transistor activation in "POSITIVE" quiescent state (at zero flow)*
④ = *Output signal level in quiescent state (at zero flow)*

In the operating status (flow present), the output signal level changes from 0 V to a positive voltage level.



A0001975

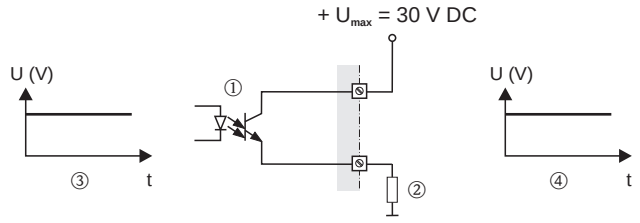
(continued on next page)

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY)
(only with PROFIBUS DP)

OUTPUT SIGNAL **4207**
(continued)

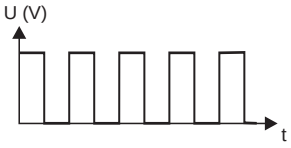
Example for output configuration PASSIVE-POSITIVE:
Output configuration with an external pull-down resistance.
In the quiescent state (at zero flow), a positive voltage level is measured via the pull-down resistance.



A0004689

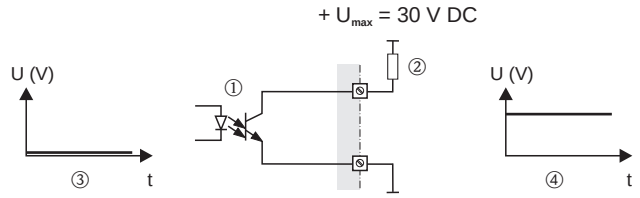
① = *Open Collector*
② = *Pull-Down-Resistance*
③ = *Transistor activation in "POSITIVE" quiescent state (at zero flow)*
④ = *Output signal level in quiescent state (at zero flow)*

In the operating status (flow present), the output signal level changes from a positive voltage level to 0 V.



A0001981

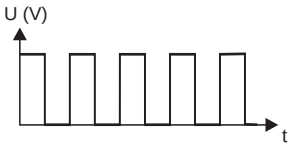
Example for output configuration PASSIVE-NEGATIVE:
Output configuration with an external pull-up resistance.
In the quiescent state (at zero flow), the output signal level at the terminals is at a positive voltage level.



A0004690

① = *Open Collector*
② = *Pull-Up-Resistance*
③ = *Transistor activation in "NEGATIVE" quiescent state (at zero flow)*
④ = *Output signal level in quiescent state (at zero flow)*

In the operating status (flow present), the output signal level changes from a positive voltage level to 0 V.



A0001981

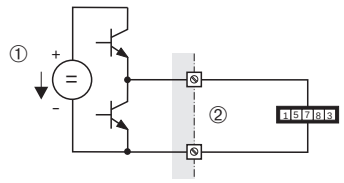
(continued on next page)

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY)
(only with PROFIBUS DP)

OUTPUT SIGNAL **4207**
(continued)

Example for active output circuit (ACTIVE):
With an active circuit, the internal power supply is 24 V.
The frequency output is short-circuit proof.



A0004691

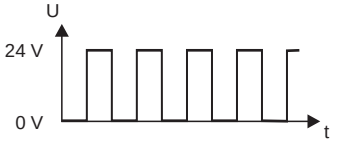
① = *24 V DC internal power supply*
② = *Short-circuit proof output*

The signal levels are to be seen as analogous to the passive circuit.

The following applies for the output configuration **ACTIVE-POSITIVE**:
In the quiescent state (at zero flow), the output signal level at the terminals is 0 V.

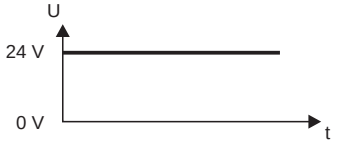
A0004694

In the operating status (flow present), the output signal level changes from 0 V to a positive voltage level.



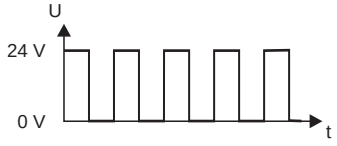
A0004692

The following applies for the output configuration **ACTIVE-NEGATIVE**:
In the quiescent state (at zero flow), the output signal level at the terminals is at a positive voltage level.



A0006493

In the operating status (flow present), the output signal level changes from a positive voltage level to 0 V.



A0004710

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (FREQUENCY) (only with PROFIBUS DP)	
TIME CONSTANT 4208	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). 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). **User input:** fixed-point number 0.00...100.00 s **Factory setting:** 0.00 s
FAILSAFE MODE 4209	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). For safety reasons it is advisable to ensure that the frequency output assumes a predefined state in the event of a fault. The setting you select here affects only the frequency output. It has no effect on other outputs and the display (e.g. totalizers). **Options:** FALLBACK VALUE Output is 0 Hz. FAILSAFE VALUE Output is the frequency specified in the FAILSAFE VALUE function (4211). HOLD VALUE Measuring value output is based on the last measuring value saved before the error occurred . ACTUAL VALUE Measuring value output is based on the current flow measurement. The fault is ignored. **Factory setting:** FALLBACK VALUE
FAILSAFE VALUE 4211	✎ Note! This function is not available unless FREQUENCY was selected in the OPERATION MODE function (4200) and FAILSAFE VALUE was selected in the FAILSAFE MODE function (4209). Use this function to define the frequency that the measuring device outputs in the event of an error. **User input:** max. 5-digit number: 0...12500 Hz **Factory setting:** 12500 Hz

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (PULSE) (only with PROFIBUS DP)	
ASSIGN PULSE 4221	✎ Note! This function is not available unless the PULSE setting was selected in the OPERATION MODE function (4200). Use this function to assign a measured variable to the pulse output. **Options:** OFF MASS FLOW VOLUME FLOW **Factory setting:** VOLUME FLOW ✎ Note! If you select OFF, the only function shown in the CONFIGURATION function group is this function, in other words ASSIGN PULSE (4221).
PULSE VALUE 4222	✎ Note! This function is not available unless the PULSE setting was selected in the OPERATION MODE function (4200). Use this function to define the flow at which a pulse is triggered. These pulses can be totalled by an external totalizer, and the total flow quantity since measuring started can be registered in this way. **User input:** 5-digit floating-point number [unit] **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.). ✎ Note! The appropriate unit is taken from the function UNIT VOLUME (0403) or UNIT MASS (0401), (see page 13 or page 12).

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (PULSE)
(only with PROFIBUS DP)

PULSE WIDTH **4223**

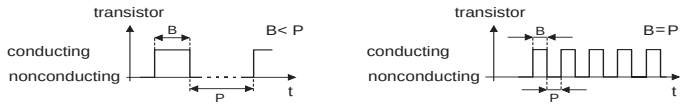
✎ Note!
This function is not available unless the PULSE setting was selected in the OPERATION MODE function (4200).

Use this function to enter the pulse width of the output pulse.

User input:
0.05...2000 ms

Factory setting:
100 ms

Pulse output is **always** with the pulse width (B) entered in this function. The pauses (P) between the individual pulses are automatically configured. However, they must at least correspond to the pulse width (B = P).



A0001233

B = Pulse width entered (the illustration applies to positive pulses)
P= Intervals between the individual pulses

✎ Note!
When entering the pulse width, select a value that can still be processed by an external totalizer (e.g. mechanical totalizer, PLC, etc.).

☝ Caution!
If the pulse number or frequency resulting from the pulse value entered, (see function PULSE VALUE (4222) on page 66) and from the current flow is too large to maintain the pulse width selected (the interval P is smaller than the pulse width B entered), a system error message (# 359...362, pulse memory) is generated after buffering/balancing has occurred.

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (PULSE) (only with PROFIBUS DP)	
MEASURING MODE **4225**	✎ Note! This function is not available unless the PULSE setting was selected in the OPERATION MODE function (4200). Use this function to define the measuring mode for the pulse output. **Options:** STANDARD Only positive flow components are totalled. Negative components are not taken into account. SYMMETRY Positive and negative flow components are taken into account. ✎ Note! The direction of flow can be output via the relay output. PULSATING FLOW If flow is characterized by severe fluctuations as is the case, for example, with reciprocating pumps, the positive and negative flow components are totalled, with the signs taken into account (e.g. –10 l and +25 l = 15 l). Flow components outside the maximum pulse number per second (value/width) are buffered, balanced and output after a maximum delay of 60 seconds. If the buffered data cannot be processed within approx. 60 seconds, a fault/notice message appears. Under certain plant conditions, flow values can aggregate in the buffer, for example in the case of prolonged and unwanted fluid backflow. However, this buffer is reset in all relevant programming adjustments which affect the pulse output. STANDARD REVERSE Only negative flow components are totalled. Positive components are not taken into account. **Factory setting:** STANDARD

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (PULSE)
(only with PROFIBUS DP)

OUTPUT SIGNAL 4226

✎ Note!
Function is not available unless the PULSE setting was selected in the OPERATION MODE (4200) function.

For selecting the output configuration of the pulse output.

Options:
PASSIVE - POSITIVE
PASSIVE - NEGATIVE
ACTIVE - POSITIVE
ACTIVE - NEGATIVE

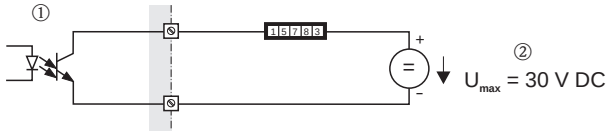
Factory setting: PASSIVE - POSITIVE

Explanation
- PASSIVE = power is supplied to the pulse output by means of an external power supply.
- ACTIVE = power is supplied to the pulse output by means of the device-internal power supply.

Configuring the output signal level (POSITIVE or NEGATIVE) determines the quiescent behavior (at zero flow) of the pulse output.
The internal transistor is activated as follows:
- If POSITIVE is selected, the internal transistor is activated with a **positive** signal level.
- If NEGATIVE is selected, the internal transistor is activated with a **negative** signal level (0 V).

✎ Note!
With the passive output configuration, the output signal levels of the pulse output depend on the external circuit (see examples).

Example for passive output circuit (PASSIVE)
If PASSIVE is selected, the pulse output is configured as an open collector.

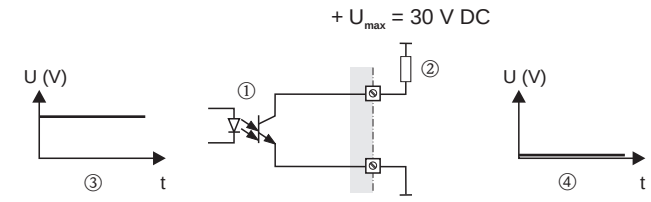


A0001225

① = *Open Collector*
② = *External power supply*

✎ Note!
For continuous currents up to 25 mA (I_{max} = 250 mA / 20 ms).

Example for output configuration PASSIVE-POSITIVE:
Output configuration with an external pull-up resistance.
In the quiescent state (at zero flow), the output signal level at the terminals is 0 V.



A0004687

① = *Open Collector*
② = *Pull-Up-Resistance*
③ = *Transistor activation in "POSITIVE" quiescent state (at zero flow)*
④ = *Output signal level in quiescent state (at zero flow)*

In the operating status (flow present), the output signal level changes from 0 V to a positive voltage level.

A0001975

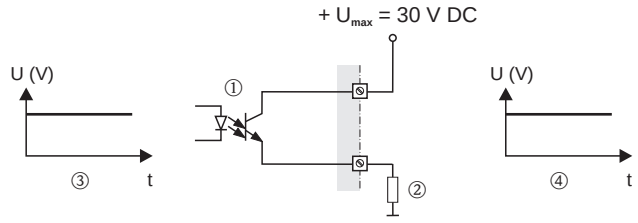
(continued on next page)

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (PULSE)
(only with PROFIBUS DP)

OUTPUT SIGNAL 4226
(continued)

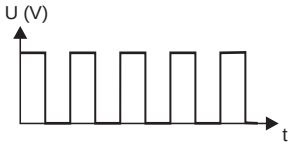
Example for output configuration PASSIVE-POSITIVE:
Output configuration with an external pull-down resistance.
In the quiescent state (at zero flow), a positive voltage level is measured via the pull-down resistance.



A0004689

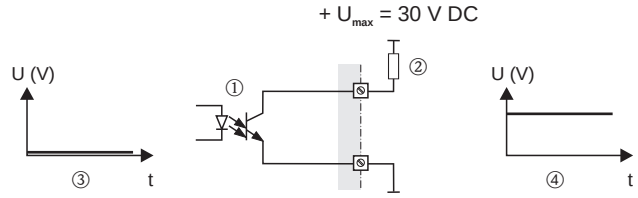
① = *Open Collector*
② = *Pull-Down-Resistance*
③ = *Transistor activation in "POSITIVE" quiescent state (at zero flow)*
④ = *Output signal level in quiescent state (at zero flow)*

In the operating status (flow present), the output signal level changes from a positive voltage level to 0 V.



A0001981

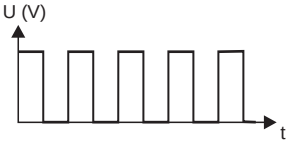
Example for output configuration PASSIVE-NEGATIVE:
Output configuration with an external pull-up resistance.
In the quiescent state (at zero flow), the output signal level at the terminals is at a positive voltage level.



A0004690

① = *Open Collector*
② = *Pull-Up-Resistance*
③ = *Transistor activation in "NEGATIVE" quiescent state (at zero flow)*
④ = *Output signal level in quiescent state (at zero flow)*

In the operating status (flow present), the output signal level changes from a positive voltage level to 0 V.



A0001981

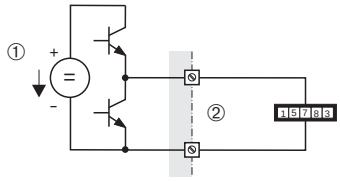
(continued on next page)

Function description

OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (PULSE)
(only with PROFIBUS DP)

OUTPUT SIGNAL **4226**
(continued)

Example for active output circuit (ACTIVE):
With an active circuit, the internal power supply is 24 V.
The pulse output is short-circuit proof.



A0004691

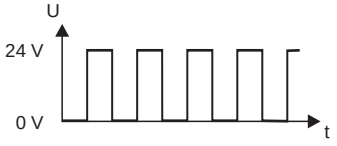
① = *24 V DC internal power supply*
② = *Short-circuit proof output*

The signal levels are to be seen as analogous to the passive circuit.

The following applies for the output configuration **ACTIVE-POSITIVE**:
In the quiescent state (at zero flow), the output signal level at the terminals is 0 V.

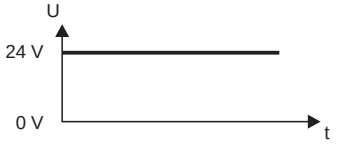
A0004694

In the operating status (flow present), the output signal level changes from 0 V to a positive voltage level.



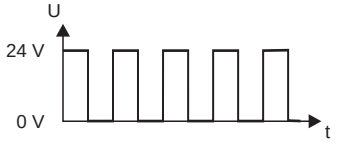
A0004692

The following applies for the output configuration **ACTIVE-NEGATIVE**:
In the quiescent state (at zero flow), the output signal level at the terminals is at a positive voltage level.



A0004693

In the operating status (flow present), the output signal level changes from a positive voltage level to 0 V.

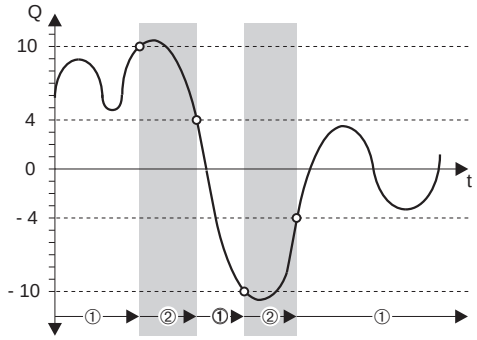


A0004710

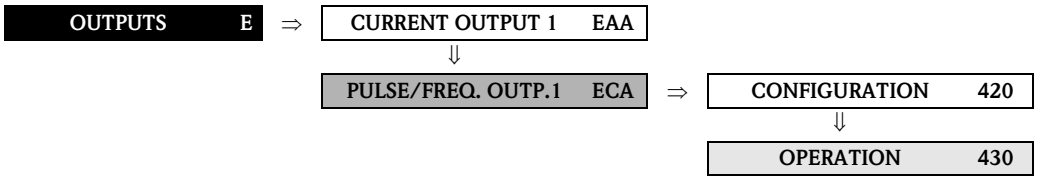
Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (PULSE) (only with PROFIBUS DP)	
FAILSAFE MODE 4227	✎ Note! This function is not available unless the PULSE setting was selected in the OPERATION MODE function (4200). For safety reasons it is advisable to ensure that the pulse output assumes a predefined state in the event of a fault. The setting you select here affects only the pulse output. It has no effect on other outputs and the display (e.g. totalizers). **Options:** FALLBACK VALUE Output is 0 pulse. ACTUAL VALUE Measuring value output is based on the current flow measurement. The fault is ignored. **Factory setting:** FALL BACK VALUE

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (STATUS) (only with PROFIBUS DP)	
ASSIGN STATUS 4241	✎ Note! This function is not available unless the STATUS setting was selected in the OPERATION MODE function (4200). Use this function to assign a switching function to the status output. **Options:** OFF ON (operation) FAULT MESSAGE NOTICE MESSAGE FAULT MESSAGE or NOTICE MESSAGE EPD or OED (Empty Pipe Detection / Open Electrode Detection, only if active) FLOW DIRECTION MASS FLOW LIMIT VALUE VOLUME FLOW LIMIT VALUE **Factory setting:** FAULT MESSAGE ✎ Note! ■ The behavior of the status output is a normally closed behavior, in other words the output is closed (transistor conductive) when normal, error-free measuring is in progress. – The following apply as “normal, error-free” measurements: Flow direction = forward; limit values = not exceeded; no empty or partially filled measuring tube (EPD/OED); no fault or notice message present. – For switching behavior such as relay output, s. page 87 ■ If you select OFF, the only function shown in the CONFIGURATION function group is this function, in other words ASSIGN STATUS (4241).
ON-VALUE 4242	✎ Note! This function is not available unless STATUS was selected in the OPERATION MODE function (4200) and LIMIT VALUE or FLOW DIRECTION was selected in the ASSIGN STATUS function (4241). Use this function to assign a value to the switch-on point (activation of the status output). The value can be equal to, higher than or lower than the switch-off point. Positive or negative values are permissible, depending on the measured variable in question (e.g. volume flow). **User input:** 5-digit floating-point number [unit] **Factory setting:** 0 [unit] ✎ Note! ■ The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400). ■ Only the switch-on point is available for flow direction output (no switch-off point). If you enter a value not equal to the zero flow (e.g. 5), the difference between the zero flow and the value entered corresponds to half the switching hysteresis.

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (STATUS) (only with PROFIBUS DP)	
SWITCH-ON DELAY 4243	✎ Note! This function is not available unless STATUS was selected in the OPERATION MODE function (4200) and LIMIT VALUE or FLOW DIRECTION was selected in the ASSIGN STATUS function (4241). Use this function to specify a delay (0...100 seconds) for switching on the status output (i.e. signal changes from 0 to 1). The delay starts when the limit value is reached. The status output does switch when the delay has timed out and the switch-on condition has been valid over the delay time. **User input:** fixed-point number: 0.0...100.0 s **Factory setting:** 0.0 s
OFF-VALUE 4244	✎ Note! This function is not available unless STATUS was selected in the OPERATION MODE function (4200) and LIMIT VALUE was selected in the ASSIGN STATUS function (4241). Use this function to assign a value to the switch-off point (deactivation of the status output). The value can be equal to, higher than or lower than the switch-on point. Positive and negative values are permissible, depending on the measured variable in question (e.g. volume flow). **User input:** 5-digit floating-point number [unit] **Factory setting:** 0 [unit] ✎ Note! ■ The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400). ■ If SYMMETRY is selected in the function MEASURING MODE (4246) and values with different signs are entered for the switch-on and switch-off points, the notice message “INPUT RANGE EXCEEDED” appears.
SWITCH-OFF DELAY 4245	✎ Note! This function is not available unless the STATUS setting was selected in the OPERATION MODE function (4200). Use this function to define a delay (0...100 seconds) for switching off the status output (i.e. signal changes from 1 to 0). The delay starts when the limit value is reached. The status output does switch when the delay has timed out and the switch condition has been valid over the delay time. **User input:** fixed-point number 0.0...100.0 s **Factory setting:** 0.0 s

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → CONFIGURATION (STATUS) (only with PROFIBUS DP)	
MEASURING MODE **4246**	✎ Note! This function is not available unless STATUS was selected in the function OPERATION MODE (4200) and the status output was assigned a limit value. Use this function to define the measuring mode for the status output. **Options:** STANDARD The status output signal switches at the defined switch points. SYMMETRY The status output signal switches at the defined switch points, irrespective of the sign. If you define a switch 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). **Factory setting:** STANDARD Example for the SYMMETRY measuring mode: Switch-on point Q = 4, switch-off point: Q = 10 ① = Status output switched on (conductive) ② = Status output switched off (nonconductive)  A0001247 ✎ Note! ■ SYMMETRY cannot be selected unless the values in the ON-VALUE (4242) and OFF-VALUE (4244) functions have the same sign or one of the values is zero. ■ If the values have different signs, SYMMETRY cannot be selected and an “ASSIGNMENT NOT POSSIBLE” message is displayed.
TIME CONSTANT **4247**	✎ Note! This function is not available unless the STATUS setting was selected in the OPERATION MODE function (4200). Use this function to enter a time constant defining how the measuring signal reacts to severely fluctuating measured variables, either very quickly (enter a low time constant) or with damping (enter a high time constant). Damping acts on the measuring signal before the switch status changes, and consequently before switch-on or switch-off delay is activated. The purpose of damping, therefore, is to prevent the status output changing state continuously in response to fluctuations in flow. **User input:** fixed-point number 0.00...100.00 s **Factory setting:** 0.00 s

6.2.2 Function group OPERATION

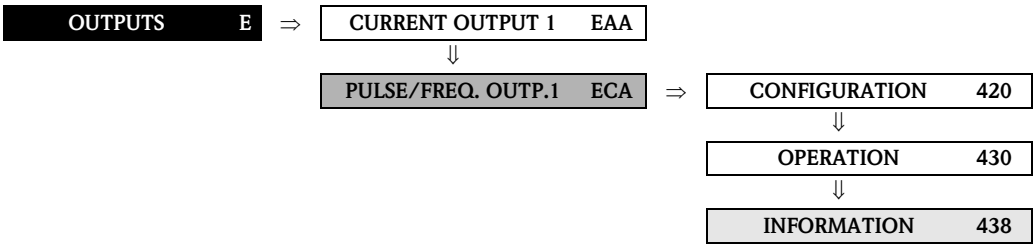


Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → OPERATION (FREQUENCY) (only with PROFIBUS DP)	
ACTUAL FREQUENCY **4301**	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). Use this function to view the computed value of the output frequency. **Display:** 0...12500 Hz
SIMULATION FREQUENCY **4302**	✎ Note! This function is not available unless the FREQUENCY setting was selected in the OPERATION MODE function (4200). Use this function to activate simulation of the frequency output. **Options:** OFF ON **Factory setting:** OFF ✎ Note! ■ The "SIMULATION FREQUENCY OUTPUT" message indicates that simulation is active. ■ The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the other outputs. ☝ Caution! The setting is not saved in the event of a power failure.
VALUE SIMULATION FREQUENCY **4303**	✎ Note! This function is not available unless FREQUENCY was selected in the OPERATION MODE function (4200) and the SIMULATION FREQUENCY function (4302) is active (= ON). 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 measuring device itself. **User input:** 0...12500 Hz **Factory setting:** 0 Hz ☝ Caution! The setting is not saved in the event of a power failure.

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → OPERATION (PULSE) (only with PROFIBUS DP)	
SIMULATION PULSE **4322**	✎ Note! This function is not available unless the PULSE option was selected in the OPERATION MODE function. Use this function to activate simulation of the pulse output. **Options:** OFF COUNTDOWN The pulses specified in the VALUE SIMULATION PULSE function are output. CONTINUOUSLY Pulses are continuously output with the pulse width specified in the PULSE WIDTH function. Simulation is started once the CONTINUOUSLY option is confirmed with the E key. ✎ Note! Simulation is started by confirming the CONTINUOUSLY option with the E key. The simulation can be switched off again via the SIMULATION PULSE function. **Factory setting:** OFF ✎ Note! ■ The notice message #631 “SIM. PULSE” indicates that simulation is active. ■ The on/off ratio is 1:1 for both types of simulation. ■ The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the other outputs. ☝ Caution! The setting is not saved in the event of a power failure.
VALUE SIMULATION PULSE **4323**	✎ Note! This function is not available unless the COUNTDOWN option was selected in the SIMULATION PULSE function. Use this function to specify the number of pulses (e.g. 50) which are output during the simulation. This value is used to test downstream devices and the measuring device itself. The pulses are output with the pulse width specified in the PULSE WIDTH function. The on/off ratio is 1:1. Simulation is started once the specified value is confirmed with the E key. The display remains at 0 if the specified pulses have been output. **User input:** 0...10'000 **Factory setting:** 0 ✎ Note! Simulation is started by confirming the simulation value with the E key. The simulation can be switched off again via the SIMULATION PULSE function. ☝ Caution! The setting is not saved in the event of a power failure.

Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → OPERATION (PULSE) (only with PROFIBUS DP)	
ACTUAL STATUS 4341	✎ Note! This function is not available unless the STATUS setting was selected in the OPERATION MODE function (4200). Use this function to check the current status of the status output. **Display:** NOT CONDUCTIVE CONDUCTIVE
SIMULATION SWITCH POINT 4342	✎ Note! This function is not available unless the STATUS setting was selected in the OPERATION MODE function (4200). Use this function to activate simulation of the status output. **Options:** OFF ON **Factory setting:** OFF ✎ Note! ▪ The "SIMULATION STATUS OUTPUT" message indicates that simulation is active. ▪ The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the other outputs. ☝ Caution! The setting is not saved in the event of a power failure.
VALUE SIMULATION SWITCH POINT 4343	✎ Note! This function is not available unless STATUS was selected in the OPERATION MODE function (4200) and the SIMULATION SWITCH POINT function (4342) is active (= ON). 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 measuring device itself. **Options:** NOT CONDUCTIVE CONDUCTIVE **Factory setting:** NOT CONDUCTIVE ☝ Caution! The setting is not saved in the event of a power failure.

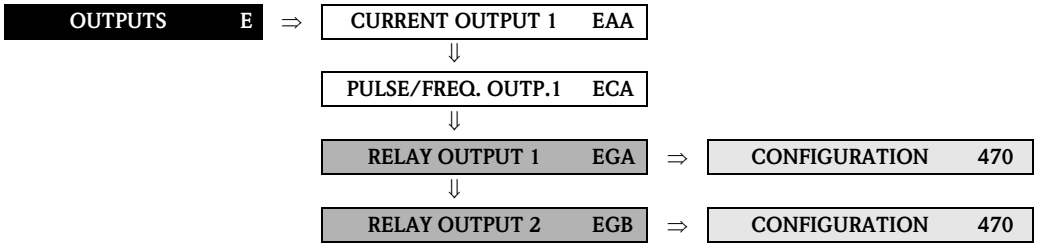
6.2.3 Function group INFORMATION



Function description OUTPUTS → PULSE-/FREQUENCY OUTPUT 1 → INFORMATION (only with PROFIBUS DP)	
TERMINAL NUMBER **4380**	Use this function to display the numbers of the terminals (in the connection compartment) which are used by the pulse/frequency output. **Display:** 22 (+) / 23 (–)

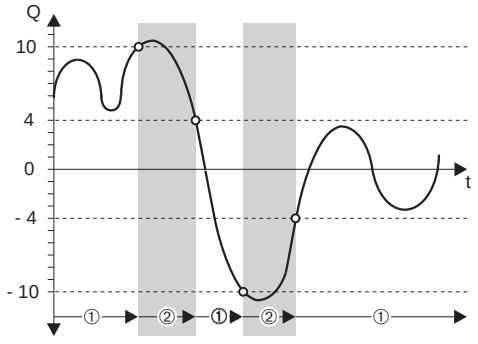
6.3 Group RELAY OUTPUT (1...2)

6.3.1 Function group CONFIGURATION



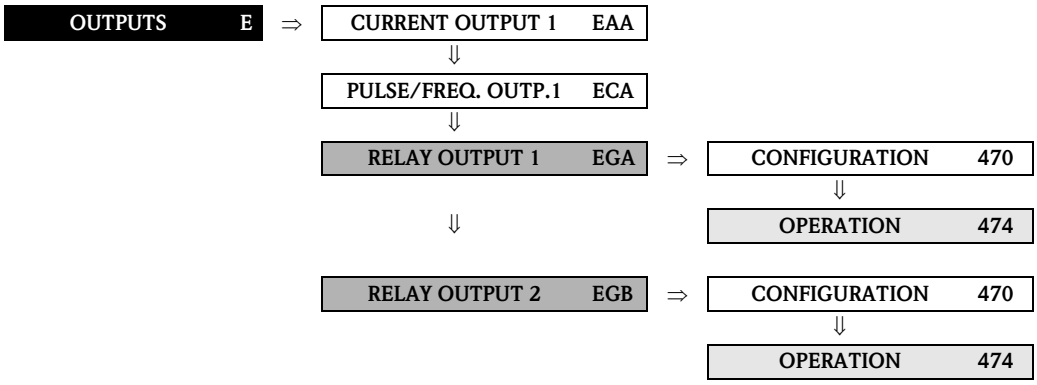
Function description OUTPUTS → RELAY OUTPUT (1...2) → CONFIGURATION (only with PROFIBUS DP)	
ASSIGN RELAY 4700	Use this function to assign a switching function to the relay output. **Options:** OFF ON (operation) FAULT MESSAGE NOTICE MESSAGE FAULT MESSAGE or NOTICE MESSAGE EPD or OED (Empty Pipe Detection / Open Electrode Detection, only if active) FLOW DIRECTION MASS FLOW LIMIT VALUE VOLUME FLOW LIMIT VALUE **Advanced options with optional software package BATCHING:** BATCH VALVE 1 (e.g. to control valve 1) BATCH VALVE 2 (e.g. to control valve 2) BATCH RUNNING > BATCH TIME >< BATCH QUANTITIES (< min. / > max. batching quantity) PROGRESS NOTE (batching end approaching) ✎ Note! ■ The batching valves defined in the function BATCH STAGES (7208) are the only available selection (max. 2). ■ Only the monitoring functions (7240...7243), which have a value not equal to zero, are available for selection. **Factory setting:** FAULT MESSAGE ✎ Note! ■ It is very important to read and comply with the information on the switching characteristics of the relay output (see page 87). ■ It is advisable to configure at least one relay output as a fault output and define the outputs' response to error. ■ Relay output 1 is configured as a normally open (NO or make) contact and relay output 2 as a normally closed (NC or break) contact by default. It can be reconfigured by means of a jumper on the relay module (see Operating Instructions Promag 53 PROFIBUS DP/PA, BA053D/06/en). ■ If you select OFF, the only function shown in the CONFIGURATION function group is this function (4700).

Function description OUTPUTS → RELAY OUTPUT (1...2) → CONFIGURATION (only with PROFIBUS DP)	
ON-VALUE 4701	✎ Note! This function is not available unless LIMIT VALUE or FLOW DIRECTION was selected in the function ASSIGN RELAY (4700). Use this function to assign a value to the switch-on point (relay output pulls up). The value can be equal to, higher than or lower than the switch-off point. Positive or negative values are permissible, depending on the measured variable in question (e.g. volume flow). **User input:** 5-digit floating-point number [unit] **Factory setting:** 0 [unit] ✎ Note! ■ The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400). ■ Only the switch-on point is available for flow direction output (no switch-off point). If you enter a value not equal to the zero flow (e.g. 5), the difference between the zero flow and the value entered corresponds to half the switching hysteresis.
SWITCH-ON DELAY 4702	✎ Note! This function is not available unless LIMIT VALUE or FLOW DIRECTION was selected in the function ASSIGN RELAY (4700). Use this function to define a delay (0 ... 100 seconds) for pull-up (i.e. signal changes from 0 to 1) of the relay output. The delay starts when the limit value is reached. The relay output does switch when the delay has timed out and the switch condition has been valid throughout the delay time. **User input:** fixed-point number 0.0...100.0 s **Factory setting:** 0.0 s
OFF-VALUE 4703	✎ Note! This function is not available unless LIMIT VALUE was selected in the ASSIGN RELAY function (4700). Use this function to assign a value to the switch-off point (relay drops out). The value can be equal to, higher than or lower than the switch-on point. Positive or negative values are permissible, depending on the measured variable in question (e.g. volume flow). **User input:** 5-digit floating-point number [unit] **Factory setting:** 0 [unit] ✎ Note! ■ The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400). ■ If SYMMETRY is selected in the function MEASURING MODE (4705) and values with different signs are entered for the switch-on and switch-off points, the notice message “INPUT RANGE EXCEEDED” appears.

Function description OUTPUTS → RELAY OUTPUT (1...2) → CONFIGURATION (only with PROFIBUS DP)	
SWITCH-OFF DELAY **4704**	✎ Note! This function is not available unless LIMIT VALUE was selected in the ASSIGN RELAY function (4700). Use this function to define a delay (0 ... 100 seconds) for dropout (i.e. signal changes from 1 to 0) of the relay output. The delay starts when the limit value is reached. The relay output does switch when the delay has timed out and the switch condition has been valid throughout the delay time. **User input:** fixed-point number 0.0...100.0 s **Factory setting:** 0.0 s
MEASURING MODE **4705**	✎ Note! This function is not visible unless a limit value was assigned to the relay output. Use this function to define the measuring mode for the relay output. **Options:** STANDARD The relay output signal switches at the defined switch points. SYMMETRY The relay output signal switches at the defined switch points, irrespective of the sign. If you define a switch point with a positive sign, the relay output switches as soon as the value is reached in the negative direction (negative sign), (see illustration). **Factory setting:** STANDARD Example for the SYMMETRY measuring mode: Switch-on point Q = 4 Switch-off point Q = 10 ① = Relay energized ② = Relay de-energized  A0001247 ✎ Note! ■ SYMMETRY cannot be selected unless the values in the ON-VALUE (4701) and OFF-VALUE (4703) functions have the same sign or one of the values is zero. ■ If the values have different signs, SYMMETRY cannot be selected and an "ASSIGNMENT NOT POSSIBLE" message is displayed.

Function description OUTPUTS → RELAY OUTPUT (1...2) → CONFIGURATION (only with PROFIBUS DP)	
TIME CONSTANT 4706	Use this function to enter a time constant defining how the measuring signal reacts to severely fluctuating measured variables, either very quickly (enter a low time constant) or with damping (enter a high time constant). Damping acts on the measuring signal before the switch status changes, and consequently before switch-on or switch-off delay is activated. The purpose of damping, therefore, is to prevent the relay output changing state continuously in response to fluctuations in flow. **User input:** fixed-point number 0.00...100.00 s **Factory setting:** 0.00 s

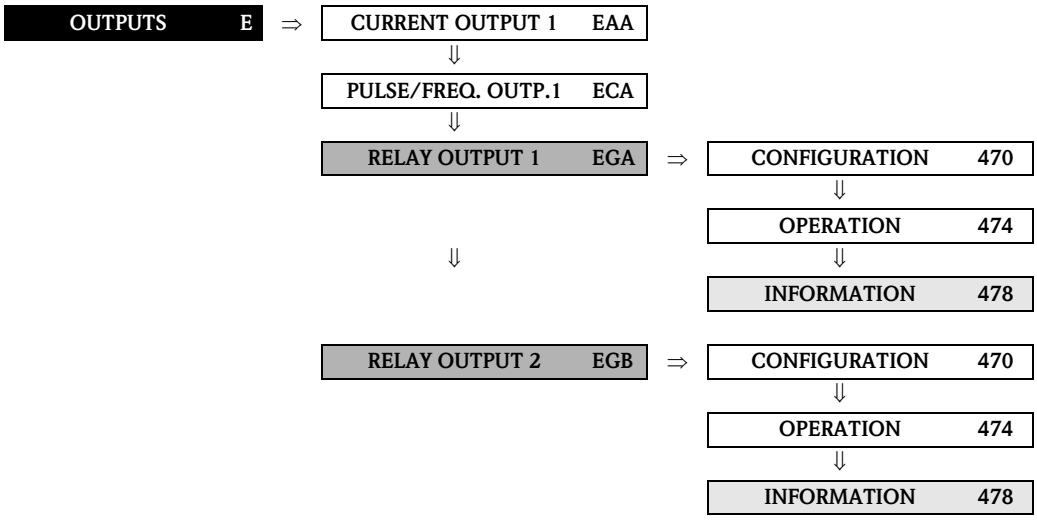
6.3.2 Function group OPERATION



Function description OUTPUTS → RELAY OUTPUT (1...2) → OPERATION (only with PROFIBUS DP)	
ACTUAL STATUS RELAY **4740**	Use this function to check the current status of the relay output. A jumper on the contact side defines the relay output as a normally open (NO or make) or normally closed (NC or break) contact (see see Operating Instructions Promag 53 PROFIBUS DP/PA, BA053D/06/en). **Display:** BREAK CONTACT OPEN BREAK CONTACT CLOSED MAKE CONTACT OPEN MAKE CONTACT CLOSED
SIMULATION SWITCH POINT **4741**	Use this function to activate simulation of the relay output. **Options:** OFF ON **Factory setting:** OFF ✎ Note! ■ The “SIMULATION RELAY” message indicates that simulation is active. ■ The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the other outputs. ☝ Caution! The setting is not saved in the event of a power failure.

Function description OUTPUTS → RELAY OUTPUT (1...2) → OPERATION (only with PROFIBUS DP)	
VALUE SIMULATION SWITCH POINT **4742**	✎ Note! The function is not visible unless the SIMULATION SWITCH POINT function (4741) is active (= ON). Use this function to define the status of the relay output during the simulation. This value is used to test downstream devices and the measuring device itself. Depending on the relay configuration (as make or break contact) the following selections are available. **Options:** Relay output configured as normally open (make) contact: BREAK CONTACT OPEN BREAK CONTACT CLOSED Relay output configured as normally closed (break) contact: MAKE CONTACT OPEN MAKE CONTACT CLOSED ☝ Caution! The setting is not saved in the event of a power failure.

6.3.3 Function group INFORMATION

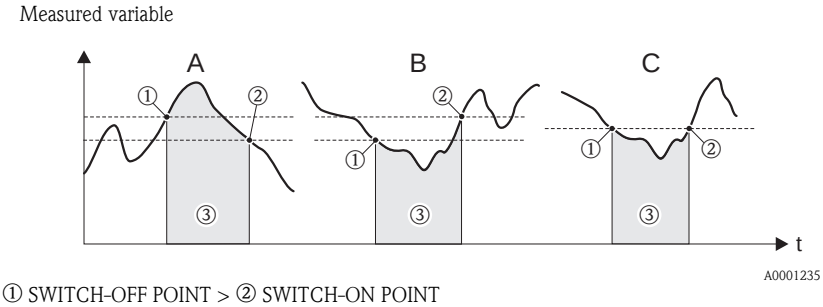


Function description OUTPUTS → RELAY OUTPUT (1...2) → INFORMATION (only with PROFIBUS DP)	
TERMINAL NUMBER **4780**	Use this function to display the numbers of the terminals (in the connection compartment) which are used by the relay output. **Display:** 22 (+) / 23 (–) → RELAY OUTPUT 1 20 (+) / 21 (–) → RELAY OUTPUT 2

6.3.4 Information on the response of the relay output

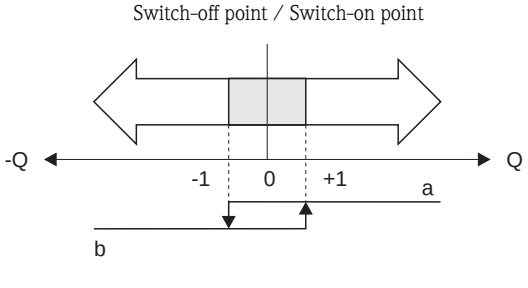
General
If you have configured the relay output signal for "LIMIT VALUE" or "FLOW DIRECTION", you can define the requisite switch points in the ON-VALUE and OFF-VALUE functions. When the measured variable in question reaches one of these predefined values, the relay output switches as shown in the illustrations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

Relay output configured for "limit value"
The relay output signal switches as soon as the measured variable undershoots or overshoots a defined switch point.
Application: Monitoring flow or process-related boundary conditions.



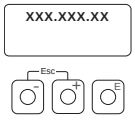
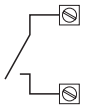
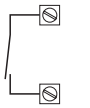
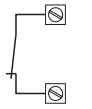
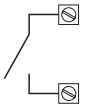
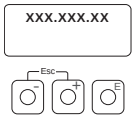
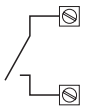
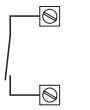
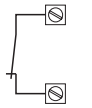
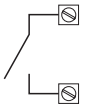
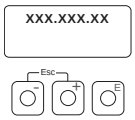
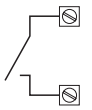
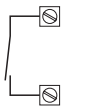
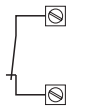
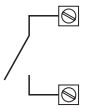
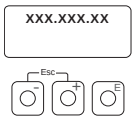
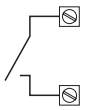
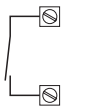
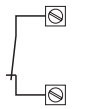
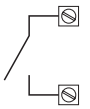
A = Maximum safety → ① SWITCH-OFF POINT > ② SWITCH-ON POINT
B = Minimum safety → ① SWITCH-OFF POINT < ② SWITCH-ON POINT
C = Minimum safety → ① SWITCH-OFF POINT = ② SWITCH-ON POINT (this configuration is to avoid)
③ = Relay de-energized

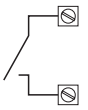
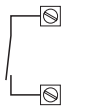
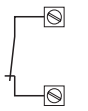
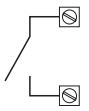
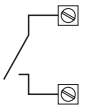
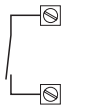
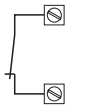
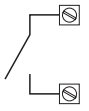
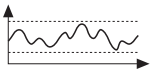
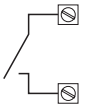
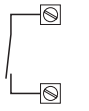
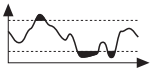
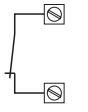
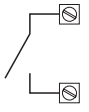
Relay output configured for "flow direction"
The value you entered in the function ON-VALUE defines the switch point for the positive and negative directions of flow.
If, for example, the switch point you define is = 1 m^3/h, the relay drops out at –1 m^3/h and pulls up at +1 m^3/h. Set the switch point 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 higher than or equal to the low flow cut off rate.



a = Relay energized
b = Relay de-energized

6.3.5 Switching response of the relay output

Function	State		Relay coil	Contact*	
				NC	NO
ON (operation)	System in measuring mode	 A0001052	energized	 A0001239	 A0001237
	System not in measuring mode (power supply failed)	A0001291	de-energized	 A0001240	 A0001238
Fault message	System OK	 A0001052	energized	 A0001239	 A0001237
	(System or process error) Fault → Response to error Outputs /INPUTS	A0001291	de-energized	 A0001240	 A0001238
Notice message	System OK	 A0001052	energized	 A0001239	 A0001237
	(System or process error) Fault → Continuation of measuring	A0001291	de-energized	 A0001240	 A0001238
Fault message or Notice message	System OK	 A0001052	energized	 A0001239	 A0001237
	(System or process error) Fault → Response to error or Note → Continuation of measuring	A0001291	de-energized	 A0001240	 A0001238

Function	State	Relay coil	Contact*	
			NC	NO
Empty pipe detection (EPD) / Open electrode detection (OED)	Measuring tube full A0001292	energized	 A0001239	 A0001237
	Measuring tube partially filled /empty measuring tube A0001293	de-energized	 A0001240	 A0001238
Flow direction	forward A0001241	energized	 A0001239	 A0001237
	reverse A0001242	de-energized	 A0001240	 A0001238
Limit value – Volume flow	Limit value **not** overshot or undershot  A0001243	energized	 A0001239	 A0001237
	Limit value overshot or undershot  A0001244	de-energized	 A0001240	 A0001238

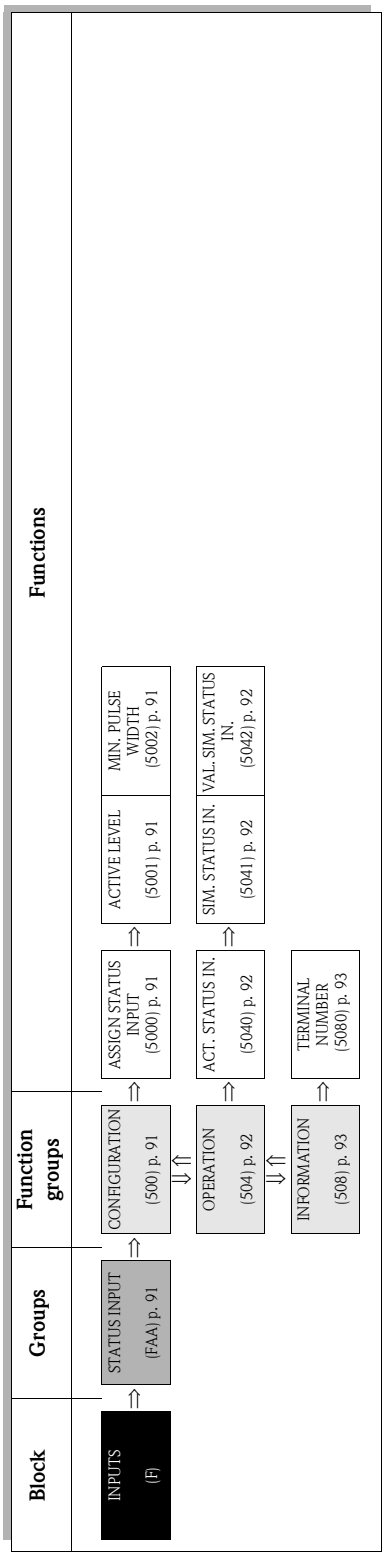
* Terminal numbers in accordance with the TERMINAL NUMBER function (4780) on page 86.

✎ Note!
If the measuring device has two relays, the factory setting is:
- Relay 1 → normally open contact (NO)
- Relay 2 → normally closed contact (NC)

☝ Caution!
When using the optional software package BATCHING, it is advisable for the contacts (either normally open or normally closed contacts) to have the same switching response for all relay outputs used.

7 Block INPUTS

Note!
This block is not available for all devices → page 8 (Available blocks, groups, etc.).



7.1 Group STATUS INPUT

7.1.1 Function group CONFIGURATION

INPUTS F ⇒ STATUS INPUT FAA ⇒ CONFIGURATION 500

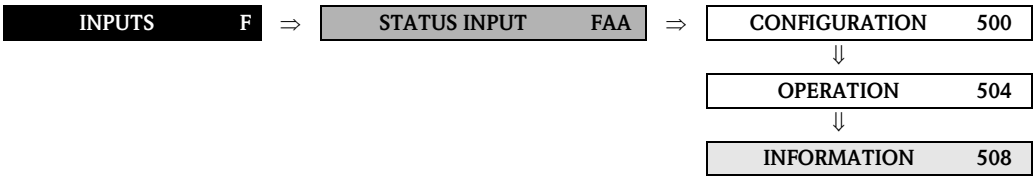
Function description INPUTS → STATUS INPUT → CONFIGURATION (only with PROFIBUS DP)	
ASSIGN STATUS INPUT **5000**	Use this function to assign a switching function to the status input. **Options:** OFF POSITIVE ZERO RETURN **Advanced options with optional software package BATCHING:** RUN BATCHING (start/stop) HOLD BATCHING (stop/continue) RESET BATCH SUM (resetting total quantity / total quantity totalizers) **Factory setting:** OFF Caution! Positive zero return is active as long as the level is available at the status input (continuous signal). All other assignments react to a change in level (pulse) at the status input.
ACTIVE LEVEL **5001**	Use this function to define whether the assigned switch function is released or sustained when the signal level is present (HIGH) or not present (LOW). **Options:** HIGH LOW **Factory setting:** HIGH
MINIMUM PULSE WIDTH **5002**	Use this function to define a minimum pulse width which the input pulse must achieve in order to trigger the selected switching function (see ASSIGN STATUS INPUT function (5000)). **User input:** 20...100 ms **Factory setting:** 50 ms

7.1.2 Function group OPERATION

INPUTS F ⇒ STATUS INPUT FAA ⇒ CONFIGURATION 500
⇓
OPERATION 504

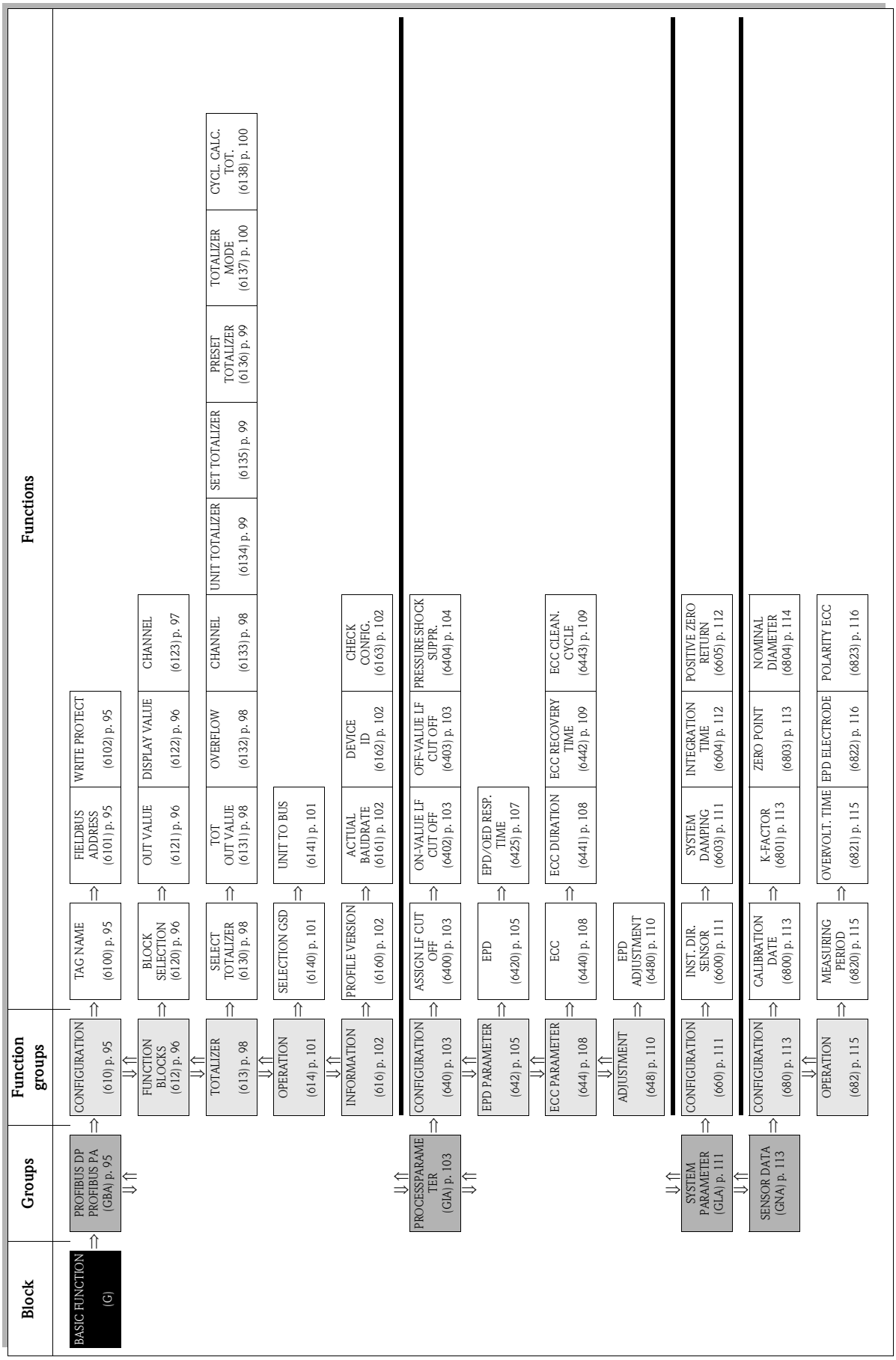
Function description INPUTS ➞ STATUS INPUT ➞ OPERATION (only with PROFIBUS DP)	
ACTUAL STATUS INPUT **5040**	Use this function to view the current level of the status input. **Display:** HIGH LOW
SIMULATION STATUS INPUT **5041**	Use this function to simulate the status input, i.e. to trigger the function (see function ASSIGN STATUS INPUT on page 91) assigned to the status input. **Options:** OFF ON **Factory setting:** OFF ✎ Note! ▪ The "SIMULATION STATUS INPUT" message indicates that simulation is active. ▪ The measuring device continues to measure while simulation is in progress, i.e. the current measured values are output correctly via the other outputs. ☝ Caution! The setting is not saved in the event of a power failure.
VALUE SIMULATION STATUS INPUT **5042**	✎ Note! The function is not visible unless the SIMULATION STATUS INPUT function (5041) is active (= ON). Use this function to define the level to be assumed at the status output during the simulation. This value is used to test downstream devices and the measuring device itself. **Options:** HIGH LOW **Factory setting:** LOW ☝ Caution! The setting is not saved in the event of a power failure.

7.1.3 Function group INFORMATION



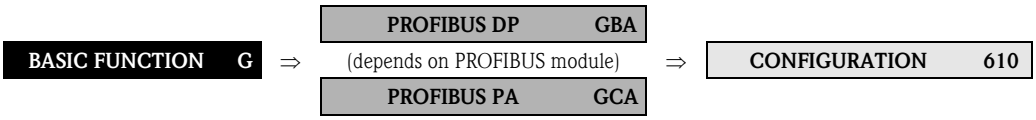
Function description INPUTS → STATUS INPUT → INFORMATION (only with PROFIBUS DP)		
TERMINAL NUMBER	**5080**	Use this function to display the numbers of the terminals (in the connection compartment) which are used by the status input. **Display:** *24 (+) / 25 (–)*

8 Block BASIC FUNCTION



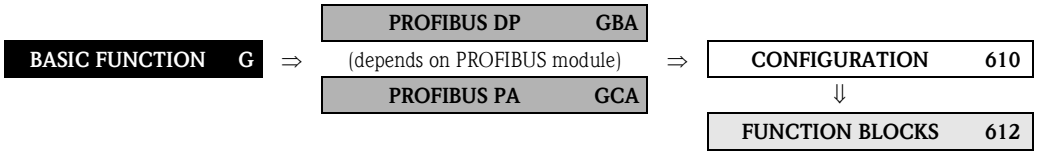
8.1 PROFIBUS DP/PA Group

8.1.1 CONFIGURATION function group



Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → CONFIGURATION		
TAG NAME	**6100**	For entering a tag name for the measuring device. You can edit and read this tag name via the local display or an operating program (e.g. FieldCare). **User input:** max. 16-character text, permissible: A–Z, 0–9, +, –, punctuation marks **Factory setting:** "_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _" (No text)
BUS ADDRESS	**6101**	For entering the device address. **User input:** 0...126 **Factory setting:** 126
WRITE PROTECT	**6102**	Indicates whether write access to the device via PROFIBUS (acyclical data transfer, e.g. via FieldCare) is possible. **Display:** OFF → Write access via PROFIBUS (acyclical data transfer) possible ON → Write access via PROFIBUS (acyclical data transfer) blocked **Factory setting:** OFF ✎ Note! Hardware write protection is activated and deactivated by means of a jumper on the I/O module (see Operating Instructions BA053D).

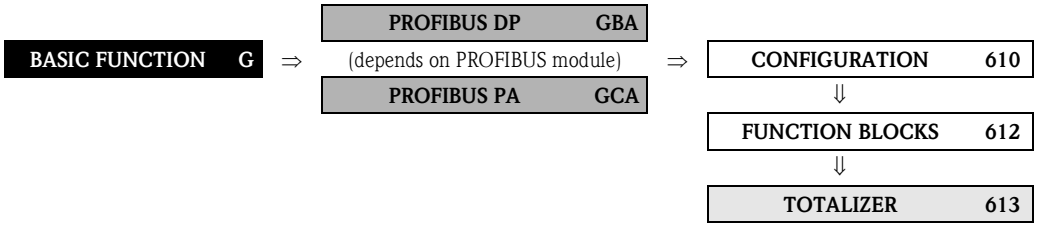
8.1.2 FUNCTION BLOCKS function group



Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → FUNCTION BLOCKS	
BLOCK SELECTION 6120	Select a PROFIBUS function block. If analog input is selected, the current measured value is displayed in the OUT VALUE function (6121). If the analog output is selected, the current measured value is displayed in the DISPLAY VALUE function (6122). **Options:** ANALOG INPUT 1 ANALOG INPUT 2 ANALOG OUTPUT 1 **Factory setting:** ANALOG INPUT 1 ✎ Note! If PROFILE-GSD was selected in the SELECTION GSD (6140) function, only the selection appears in this function: ▪ ANALOG INPUT 1
OUT VALUE 6121	✎ Note! This function is not available unless one of the following was selected in the BLOCK SELECTION (6120) function: ▪ ANALOG INPUT 1 ▪ ANALOG INPUT 2 Display of the measured variable (module AI) which is cyclically transferred to the PROFIBUS master (Class 1), incl. unit and status.
DISPLAY VALUE 6122	✎ Note! This function is not available unless the ANALOG OUTPUT 1 option was selected in the BLOCK SELECTION 6120 function. Display of the measured variable (DISPLAY_VALUE module) which is cyclically transferred from the PROFIBUS master (Class 1) to the measuring device, incl. unit and status.

Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → FUNCTION BLOCKS		
CHANNEL	**6123**	✎ Note! ■ This function is not available unless one of the following was selected in the BLOCK SELECTION (6120) function: – ANALOG INPUT 1 – ANALOG INPUT 2 Assigning a measured variable for the analog input selected in the BLOCK SELECTION (6120) function. **Options:** MASS FLOW VOLUME FLOW **Advanced options with optional software package BATCHING:** BATCH UPWARDS BATCH DOWNWARDS BATCH COUNTER BATCH SUM BATCHING TIME **Factory setting:** Dependent on the option selected in the BLOCK SELECTION (6120) function. For: ■ ANALOG INPUT 1 → Factory setting = VOLUME FLOW ■ ANALOG INPUT 2 → Factory setting = MASS FLOW

8.1.3 TOTALIZERfunction group

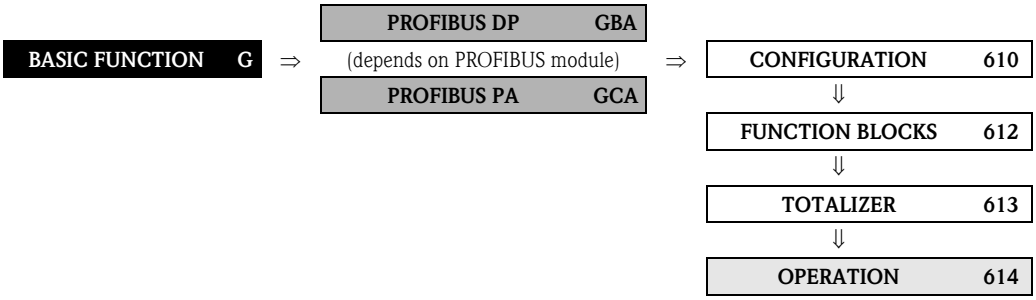


Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → TOTALIZER		
SELECT TOTALIZER	**6130**	This function is used to select a totalizer. **Options:** TOTALIZER 1 TOTALIZER 2 TOTALIZER 3 **Factory setting:** TOTALIZER 1 ✎ Note! If PROFILE-GSD was selected in the SELECTION GSD (6140) function, only the TOTALIZER 1 selection appears in this function.
✎ Note! The function descriptions below apply to totalizers 1...3; the totalizers are independently configurable.		
TOTALIZER OUT VALUE	**6131**	The current totalizer value, incl. unit and status, appears in this function. **Display:** max. 7-digit floating-point number, including sign and unit (e.g. 15467.04 m^3; -4925.631 kg)
OVERFLOW	**6132**	This function shows the totalizer's overflow aggregated since measuring began. Total flow quantity is represented by a floating-point number consisting of max. 7 digits. You can use this function to view higher numerical values (>9,999,999) as overflows. The effective quantity is thus the total of OVERFLOW plus the value returned by the TOTALIZER OUT VALUE (6131) function. Example: Reading for 2 overflows: 2 E7 (= 20,000,000). The value displayed in the TOTALIZER OUT VALUE (6131) function = 196,845.7 m^3 Effective total quantity = 20,196,845.7 m^3 **Display:** integer with exponent, including sign and unit, e.g. 2 E7
CHANNEL	**6133**	Use this function to assign a measured variable to the totalizer in question. **Options:** OFF MASS FLOW VOLUME FLOW **Factory setting:** VOLUME FLOW

Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → TOTALIZER		
UNIT TOTALIZER	**6134**	This function is used to determine the unit of the totalizer. The selection is dependent on the measured variable selected in the CHANNEL (6133) function. **Options: (for VOLUME FLOW assignment):** Metric → cm^3; dm^3; m^3; ml; l; hl; Ml Mega US → ccc; af; ft^3; oz f; gal; Kgal; Mgal; bbl (normal fluids); bbl (beer); bbl (petrochemicals); bbl (filling tanks) Imperial → gal; Mgal; bbl (beer); bbl (petrochemicals) **Factory setting:** m^3 **Options: (for MASS FLOW assignment):** Metric → g; kg; t US → oz; lb; ton **Factory setting:** kg
SET TOTALIZER	**6135**	This function is used to assign different statuses to the totalizer. **Options:** TOTALIZE The measured variable selected in the CHANNEL (6133) function is totalled. RESET Resets the totalizer to zero. PRESET The totalizer is reset to the value defined in the PRESET TOTALIZER (6136) function. ✎ Note! If RESET or PRESET is selected, the totalizer is reset to zero or to the preset value. However, it is not stopped. In other words, it immediately continues to total from the value in question. To stop the totalizer, the HOLD VALUE option must be selected in the TOTALIZER MODE (6137) function. **Factory setting:** TOTALIZE
PRESET TOTALIZER	**6136**	This function is used to define a (start) value for the totalizer. This value is taken from the totalizer only if the PRESET option has been selected in the SET TOTALIZER (6135) function. **User input:** –9999999...9999999 **Factory setting:** 0

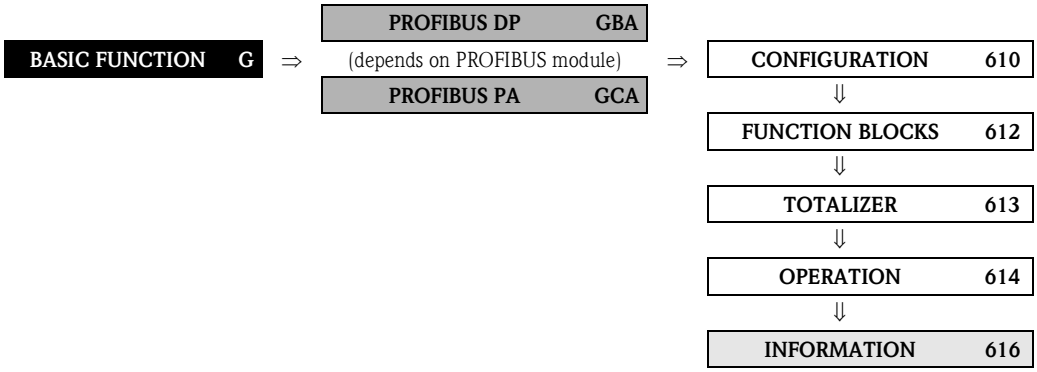
Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → TOTALIZER	
TOTALIZER MODE 6137	Use this function to define how the flow components are to be totalled by the totalizer. **Options:** BALANCE Positive and negative flow components. The positive and negative flow components are balanced. In other words, net flow in the flow direction is registered. POSITIVE (forward) Positive flow components only NEGATIVE (backwards) Negative flow components only HOLD VALUE The totalizer stops at the last value. No more flow components are totalled. **Factory setting:** BALANCE ✎ Note! To ensure that the positive and negative flow components (BALANCE) or only the negative flow components (NEGATIVE) are balanced correctly, the BIDIRECTIONAL option must be selected in the MEASURING MODE function (6601) (s. page 111).
CYCL. CALC. TOT. 6138	This function is used to determine if the totalizers 1...3 on the local display and in the operating program (e.g. FieldCare) are updated. **Options:** ON Totalizers are always updated. OFF Totalizers are updated only if the relevant totalizer function block (TOTAL module or function) is configured for cyclical data transfer. **Factory setting:** ON ✎ Note! Particularly in the case of time-critical applications, optimization can be carried out on totalizer function blocks which are not needed. To do this, the “OFF” option must be selected in this function. It is very important when selecting the “OFF” option that the totalizers on the local display and in the operating program (e.g. FieldCare) are no longer updated.

8.1.4 OPERATION function group



Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → OPERATION		
SELECTION GSD	**6140**	Selection of operating mode (GSD file), which is used for cyclical communication with the PROFIBUS Master (Class 1). **Options:** MANUFACT. SPEC. → the device is operated with the complete range of device functionality. MANUFACT V2.0 → the device is used as a replacement device for the previous model Promag 33 (compatibility mode). PROFILE-GSD → the device is operated in PROFIBUS Profile mode. **Factory setting:** MANUFACT. SPEC. ✎ Note! When configuring PROFIBUS in a network, ensure that the correct device data base file (GSD file) for the selected mode of operation is used (see Operating Instructions Promag 53 (PROFIBUS DP/PA), BA053D.
UNIT TO BUS	**6141**	If this function is run, the cyclically transferred measured variables (module AI) are transferred to the PROFIBUS master (Class 1) with the system units configured in the device. **Options:** OFF SET UNITS (the transfer is started by activating the E key) ☝ Caution! Activating this function may result in a sudden change in the measured variables (module AI) transferred to the PROFIBUS master (Class 1), which may in turn effect subsequent adjustments.

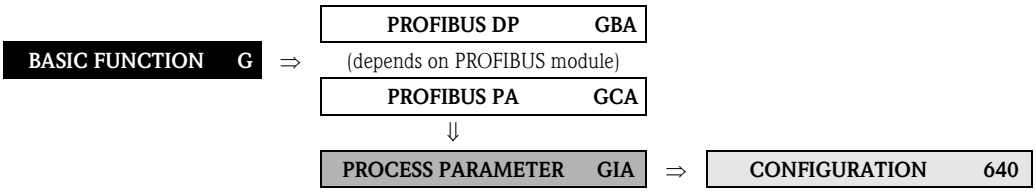
8.1.5 INFORMATION function group

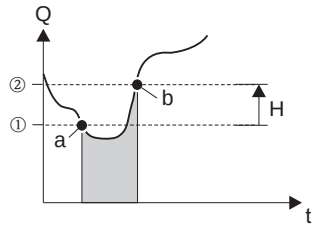


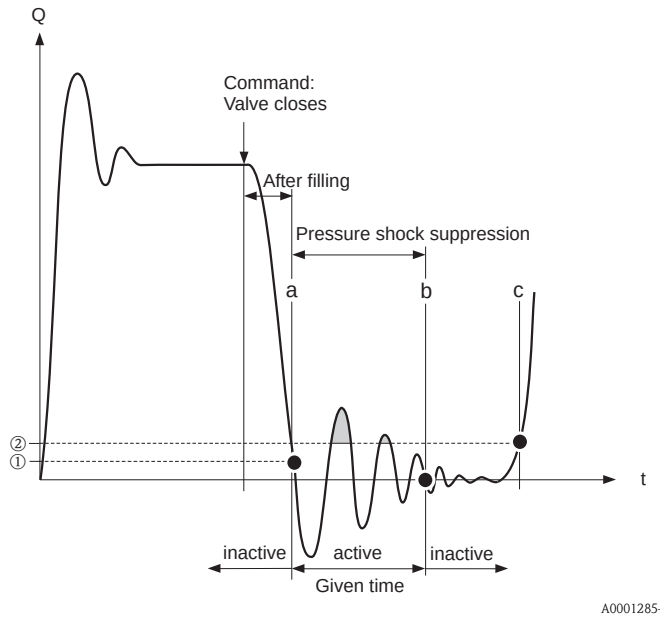
Function description BASIC FUNCTION → PROFIBUS DP/PROFIBUS PA → INFORMATION		
PROFILE VERSION	**6160**	This function is used to display the PROFIBUS profile version.
ACTUAL BAUDRATE	**6161**	This function is used to display the data transmission rate at which the device communicates.
DEVICE ID	**6162**	Displays PROFIBUS device ID. The display is dependent on the option selected in the SELECTION GSD (6140) function. **Display:** If MANUFACT. SPEC. is selected: ■ for a PROFIBUS DP communication output = 1526 Hex ■ for a PROFIBUS PA communication output = 1527 Hex If the MANUFACT V2.0 option is selected: ■ for a PROFIBUS DP communication output = 1511 Hex ■ for a PROFIBUS PA communication output = 1505 Hex If PROFILE-GSD is selected: ■ for a PROFIBUS DP communication output = 9741 Hex ■ for a PROFIBUS PA communication output = 9741 Hex
CHECK CONFIGURATION	**6163**	Indicates if the configuration for the PROFIBUS master (Class 1) cyclical data transfer was accepted by the device. **Display:** ACCEPTED (configuration accepted) NOT ACCEPTED (configuration not accepted)

8.2 Group PROCESSPARAMETER

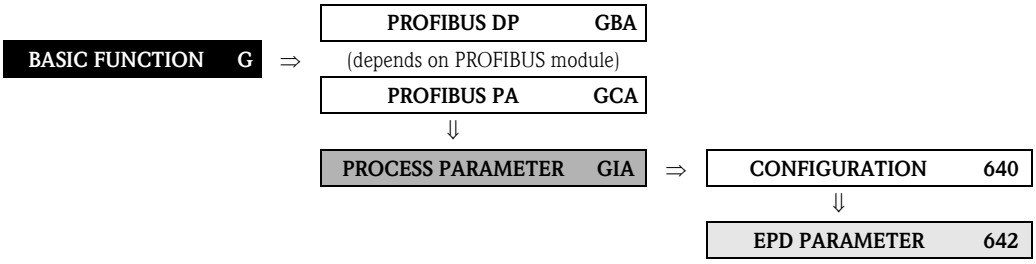
8.2.1 Function group CONFIGURATION



Function description BASIC FUNCTION → PROCESSPARAMETER → CONFIGURATION	
ASSIGN LOW FLOW CUTOFF **6400**	Use this function to assign the switch point for the low flow cut off. **Options:** OFF MASS FLOW VOLUME FLOW **Factory setting:** VOLUME FLOW
ON-VALUE LOW FLOW CUTOFF **6402**	Use this function to enter the switch-on point for low flow cut off. Low flow cut off is active if the value entered is not equal to 0. The sign of the flow value is highlighted on the display to indicate that low flow cut off is active. **User input:** 5-digit floating-point number [unit] **Factory setting:** Depends on nominal diameter and country (s. page 141 ff.). ✎ Note! The appropriate unit is taken from the function UNIT VOLUME FLOW (0402) or UNIT MASS FLOW (0400) (see page 13 or page 12).
OFF-VALUE LOW FLOW CUTOFF **6403**	Use this function to enter the switch-off (b) point for low flow cut off. Enter the switch-off point as a positive hysteresis (H) from the switch-on point (a). **User input:** Integer 0...100% **Factory setting:** 50%  A0003882 ① = *switch-on point,* ② = *switch-off point* *a* *low flow cutoff is switched on* *b* *low flow cutoff is switched off (a + a · H)* *H* *Hysteresis value: 0…100%* ■ *low flow cutoff active* *Q* *Flow*

Function description BASIC FUNCTION → PROCESSPARAMETER → CONFIGURATION	
PRESSURE SHOCK SUPPRESSION **6404**	The closure of a valve can cause brief but severe movements of the fluid in the piping system, movements which the measuring system registers. The pulses totalled in this way result in a totalizer reading error, particularly in the case of batching processes. For this reason, the measuring device is equipped with pressure shock suppression (= short-term signal suppression) which can eliminate system-related “disruptions”. ✎ Note! Note that pressure shock suppression cannot be used unless the low flow cut off is active (see ON-VALUE LOW FLOW CUTOFF function on page 103). Use this function to define the time span for active pressure shock suppression. Activation of the pressure shock suppression Pressure shock suppression is activated once the flow falls below the switch-on point of the low flow cut off (see point **a** in graphic). While pressure shock suppression is active, the following conditions apply: ■ Current output → outputs the current corresponding to zero flow. ■ Pulse-/Freq.-output → outputs the frequency corresponding to zero flow. ■ Flow reading on display 0. ■ Totalizer reading → the totalizers are pegged at the last correct value. ■ Transfer of measured value PROFIBUS → 0. Deactivation of the pressure shock suppression The pressure shock suppression is deactivated after the time interval, set in this function, has passed (see point **b** in graphic). ✎ Note! The current flow value is displayed and output, when the time interval for the pressure shock suppression has passed and the flow exceeds the switch-off point of the low flow cut off (see point **c** in graphic).  *① = switsch-off point (low flow), ② = switch-on point (low flow)* *a Activated if on-value of low flow is not reached* *b Deactivated once the predefined time period has elapsed* *c Flow values are taken into account when calculating the pulses* *Suppressed values* *Q Flow* **User input:** max. 4-digit number, incl. unit: 0.00 to 100.0 s **Factory setting:** 0.00 s

8.2.2 Function group EPD PARAMETER

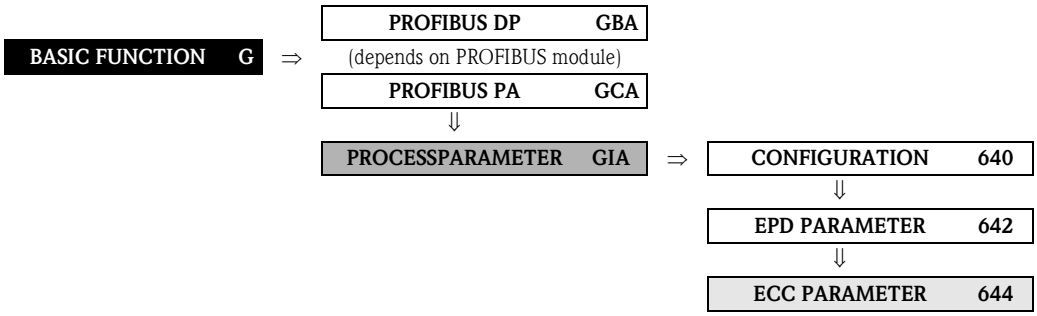


Function description BASIC FUNCTION → PROCESSPARAMETER → EPD PARAMETER		
EPD	**6420**	Flow cannot be measured correctly unless the measuring pipe is completely full. This status can be monitored at all times with the Empty Pipe Detection function. Use this function to activate Empty Pipe Detection (EPD) or Open Electrode Detection (OED). ■ EPD = Empty Pipe Detection (with the help of an EPD electrode) ■ OED = Open Electrode Detection (empty pipe detection with the help of the measuring electrodes, if the sensor is not equipped with an EPD electrode or the orientation is not suitable for using EPD). **Options:** OFF – ON SPECIAL – OED – ON STANDARD OFF (neither EPD nor OED are active) ON SPECIAL (for DN <400 only): Switching on the Empty Pipe Detection (EPD) for devices in remote version (transmitter and sensor are installed separately). OED: Switching on the Open Electrode Detection (OED). ON STANDARD: Switching on the Empty Pipe Detection (EPD) for: – Devices in compact version (transmitter and sensor form a single mechanical unit). – Applications where a facing and coating of the fluid on the measuring tube line and measuring electrode accrues. **Factory setting:** OFF ✎ Note! ■ The options ON STANDARD and ON SPECIAL are not available unless the sensor is equipped with an EPD electrode. ■ The default setting for the EPD/OED functions when the device is delivered is OFF. The functions must be activated as required. ■ The devices are calibrated at the factory with water (approx. 500 µS/cm). If the conductivity of certain fluids deviates from this reference, empty pipe/full pipe adjustment must be performed again on site (see function EPD ADJUSTMENT on page 110). ■ The adjustment coefficients must be valid before you can switch on the EPD or OED. If these coefficients are not available, the function EPD ADJUSTMENT is displayed (s. page 110). ■ If there are problems with the adjustment, the following error messages appear on the screen: – ADJUSTMENT FULL = EMPTY: The adjustment values for empty pipe and full pipe are identical. In such instances, empty pipe adjustment/full pipe adjustment **must** be carried out **again**. – ADJUSTMENT NOT OK: Adjustment is not possible as the fluid conductivity values are outside the permitted range. (continued on next page)

Function description BASIC FUNCTION → PROCESSPARAMETER → EPD PARAMETER		
EPD (continued)	**6420**	**Notes on empty pipe detection (EPD and OED)** ■ Flow cannot be measured correctly unless the measuring pipe is completely full. This status can be monitored at all times by means of the EPD/OED. ■ An empty or partially filled pipe is a process error. A default factory setting defines that a fault message is issued and that this process error has an effect on the outputs. ■ The EPD/OED process error can be output via the configurable relay or status outputs. ■ A plausibility check of the adjustment values will only be executed by activating the empty pipe detection. If an empty or full pipe adjustment is performed during the empty pipe detection is active, the empty pipe detection has to be de- and again activated, after finishing the adjustment, to start the plausibility check. **Response to partially filled pipes** If the EPD/OED is switched on and responds to a partially filled or empty pipe, the notice message "EMPTY PIPE" appears on the display. If the pipe is partially empty and the EPD/OED is **not** switched on, the response can vary in identically configured systems: ■ Flow reading fluctuates ■ Zero flow ■ Excessively high flow values **Notes on open electrode detection (OED)** Open Electrode Detection (OED) functions like the Empty Pipe Detection (EPD). In contrast to the EPD where the measuring device must be equipped with a separate (optional) electrode, the OED detects partial filling by means of the two measuring electrodes which are present as standard (fluid no longer covers the measuring electrodes). Open electrode detection can also be used if: ■ the sensor is not installed in the optimal position for using EPD (optimal = installed horizontally). ■ the sensor is not equipped with an additional (optional) EPD electrode. ✎ Note! ■ Cable connection length: When mounting a remote version, please observe the maximum permissible cable length of 15 metres in order to keep the OED function. ■ OED empty pipe adjustment: To achieve the best results for the open electrode detection, it is important to have the electrodes surface as dry as possible (no liquid film) while the empty-pipe adjustment is being made. Even during normal operation, the OED function is only secured if there is no longer any liquid film present on the electrodes when the measuring pipe is empty.

Function description BASIC FUNCTION → PROCESSPARAMETER → EPD PARAMETER		
EPD RESPONSE TIME	**6425**	✎ Note! This function is not available unless ON STANDARD, ON SPECIAL or OED was selected in the EPD function (6420). 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. The setting defined here is used by the active empty pipe detection (EPD) or open electrode detection (OED). **User input:** fixed-point number: 1.0...100 s **Factory setting:** 1.0 s ✎ Note! OED detection time: The recognition of open electrodes is, in contrast to the empty pipe detection (EPD), very slow reacting (delay at least 25 seconds) and is only activated after an additional delay from the programmed response time! We recommend in most applications to use the empty pipe detection (EPD) which is an optimal solution for detecting partly filled measuring tubes.

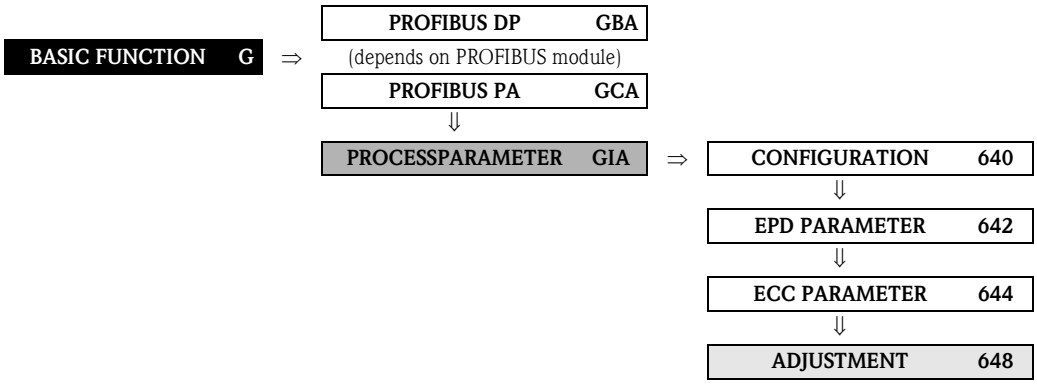
8.2.3 Function group ECC PARAMETER



Function description BASIC FUNCTION → PROCESSPARAMETER → ECC PARAMETER	
ECC **6440**	✎ Note! This function is not available unless the measuring device is equipped with an (optional) electrode cleaning function. Use this function to activate cyclical electrode cleaning (ECC). **Options:** ON (only with the optional electrode cleaning function ECC) OFF **Factory setting:** ON (only if the optional electrode cleaning function ECC is available) **Notes on electrode cleaning (ECC)** Conductive deposits on the electrodes and on the walls of the measuring tube (e.g. magnetite) can falsify measurement values. The Electrode Cleaning Circuitry (ECC) was developed to prevent such conductive deposits accreting in the vicinity of the electrodes. ECC functions as described above for all available electrode materials except tantalum. If tantalum is used as the electrode material, the ECC protects the electrode surface only against oxidation. ☝ Caution! If the ECC is switched off for a prolonged period in applications with conductive deposits, a layer forms inside the measuring tube and this can falsify measurement values. If the layer is allowed to accrete beyond a certain level, it might no longer be possible to remove it by switching on the ECC. If this happens the measuring tube must be cleaned and the layer removed.
ECC DURATION **6441**	✎ Note! This function is not available unless the measuring device is equipped with the optional electrode cleaning function (ECC). Use this function to specify the electrode cleaning duration. **User input:** fixed-point number: 0.01...30.0 s **Factory setting:** 2.0 s

Function description BASIC FUNCTION → PROCESSPARAMETER → ECC PARAMETER	
ECC RECOVERY TIME **6442**	✎ Note! This function is not available unless the measuring device is equipped with the optional electrode cleaning function (ECC). Use this function to specify the recovery time for which the last flow value measured prior to cleaning is retained. A recovery time is necessary as the signal outputs can fluctuate after electrode cleaning on account of electrochemical interference voltages. **User input:** max. 3-digit number: 1...600 s **Factory setting:** 5 s ☝ Caution! The last value measured prior to cleaning is output for the duration of the recovery time (max. 600 s). This in turn means that the measuring system does not register changes in flow, e.g. stoppage, during this time span.
ECC CLEANING CYCLE **6443**	✎ Note! This function is not available unless the measuring device is equipped with the optional electrode cleaning function (ECC). Use this function to specify the cleaning cycle for electrode cleaning. **User input:** Integer: 30...10080 min **Factory setting:** 40 min

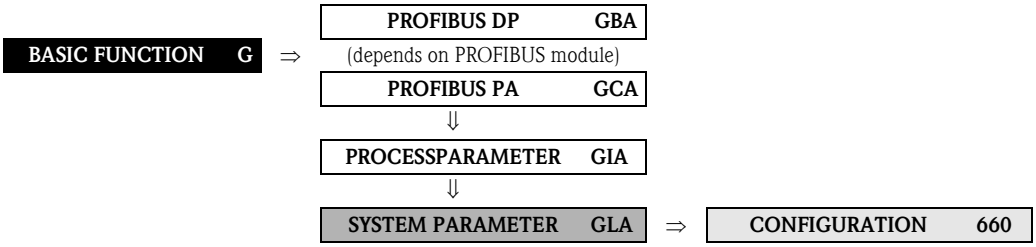
8.2.4 Function group ADJUSTMENT



Function description BASIC FUNCTION → PROCESSPARAMETER → ADJUSTMENT	
EPD ADJUSTMENT 6480	Use this function to activate the EPD/OED adjustment for an empty or full measuring tube. ✎ Note! A detailed description and other helpful hints for the empty-pipe/full-pipe adjustment procedure can be found on page 105. **Options:** OFF FULL PIPE ADJUST EMPTY PIPE ADJUST OED FULL ADJUST OED EMPTY ADJUST **Factory setting:** OFF **Procedure for EPD or OED empty-pipe / full-pipe adjustment** 1. Empty the piping. In case of an EPD adjustment, the wall of the measuring tube should be wetted with fluid for the adjustment procedure but this is not the case with an OED adjustment! 2. Start empty-pipe adjustment: Select “EMPTY PIPE ADJUST” or “OED EMPTY ADJUST” and press [E] to confirm. 3. After empty-pipe adjustment, fill the piping with fluid. 4. Start full-pipe adjustment: Select “FULL PIPE ADJUST” or “OED FULL ADJUST” and press [E] to confirm. 5. Having completed the adjustment, select the setting “OFF” and exit the function by pressing [E] . 6. Now select the EPD function (s. page 105). Switch on Empty Pipe Detection by selecting the following settings: – EPD → Select ON STANDARD or ON SPECIAL and press [E] to confirm. – OED → Select OED and confirm with [E] . ☞ Caution! The adjustment coefficients must be valid before you can activate the EPD/OED function. If adjustment is incorrect the following messages might appear on the display: – FULL = EMPTY The adjustment values for empty pipe and full pipe are identical. In cases of this nature you must repeat empty-pipe or full-pipe adjustment again! – ADJUSTMENT NOT OK Adjustment is not possible because the fluid’s conductivity is out of range.

8.3 Group SYSTEM PARAMETER

8.3.1 Function group CONFIGURATION

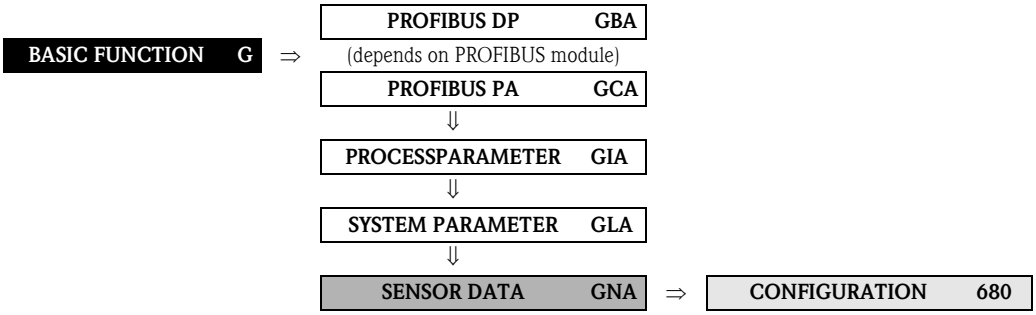


Function description BASIC FUNCTION → SYSTEM PARAMETER → CONFIGURATION		
INSTALLATION DIRECTION SENSOR	**6600**	Use this function to reverse the sign of the flow direction, if necessary. **Options:** NORMAL (flow as indicated by the arrow) INVERSE (flow opposite to direction indicated by the arrow) **Factory setting:** NORMAL ✎ Note! Ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor (nameplate).
MEASURING MODE	**6601**	Determines how the flow components are recorded by the device. **Options:** UNIDIRECTIONAL (only positive flow components) BIDIRECTIONAL (positive and negative flow components) **Factory setting:** UNIDIRECTIONAL
SYSTEM DAMPING	**6603**	Use this function to set the filter depth of the digital filter. The sensitivity of the flow measurement signal can be reduced with respect to interference peaks (e.g. in the event of a high solid content, gas bubbles in the fluid etc.). The system reaction time decreases with an increasing filter setting. **User input:** 0...15 **Factory setting:** 9 ✎ Note! The system damping acts on all functions and outputs of the measuring device.

Function description BASIC FUNCTION → SYSTEM PARAMETER → CONFIGURATION		
INTEGRATION TIME	**6604**	Use this function to set the integration time. Under normal circumstances it is not necessary to change the factory settings. **User input:** 3.3...65 ms **Factory setting:** 20 ms at 50 Hz → power supply frequency (e.g. Europe) 16.7 ms at 60 Hz → power supply frequency (e.g. USA) ☝ Caution! The integration time must not be selected with a greater value than the measuring period (6820). ✎ Note! The integration time defines the duration of internal totalling of the induced voltage in the fluid (measured by the measuring electrode), i.e. the time in which the measuring device records the true flow (afterwards the magnetic field for the next integration is created from the opposite pole).
POSITIVE ZERO RETURN	**6605**	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 function and outputs of the measuring device. **Options:** OFF ON → Signal output is set to the "ZERO FLOW" value. **Factory setting:** OFF ✎ Note! Positive zero return may **not** be activated for batching processes with the optional software package BATCHING.

8.4 Group SENSOR DATA

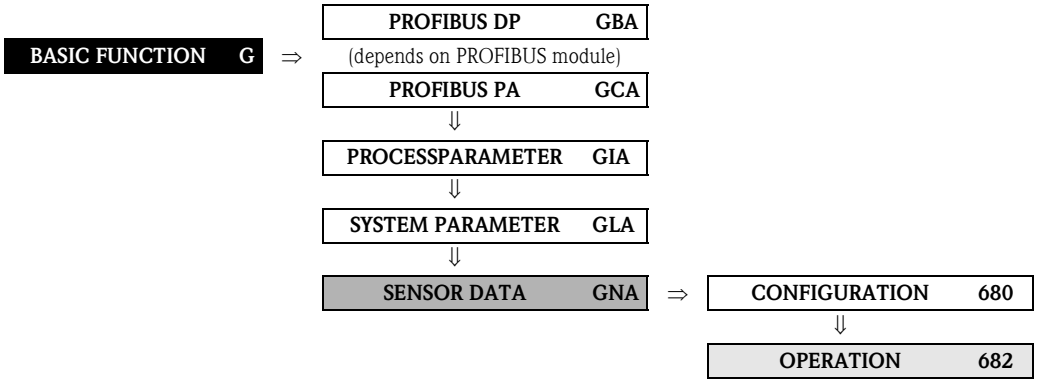
8.4.1 Function group CONFIGURATION



Function description BASIC FUNCTION → SENSOR DATA → CONFIGURATION	
All sensor data (calibration factors, zero (point) and nominal diameter) are set at the factory and saved on the S-DAT sensor memory chip. Caution! Under normal circumstances you should not change the following parameter settings, because changes affect numerous functions of the entire measuring facility in general and the accuracy of the measuring system in particular. For this reason, the functions described below cannot be changed even when you enter your personal code. Contact the Endress+Hauser service organization if you have any questions about these functions. Note! The individual values of the functions are also provided on the sensor nameplate.	
CALIBRATION DATE **6800**	Use this function to view the current calibration date and time for the sensor. **User interface:** Calibration date and time **Factory setting:** Calibration date and time of the current calibration. Note! The calibration date and time format is defined in the FORMAT DATE/TIME function, → Seite 14.
K-FACTOR **6801**	Use this function to display the current calibration factor (positive flow direction) for the sensor. The calibration factor is determined and set at the factory. **Display:** 5-digit fixed-point number: 0.5000...2.0000 **Factory setting:** Depends on nominal diameter and calibration
ZERO POINT **6803**	This function shows the current zero-point correction value for the sensor. Zero-point correction is determined and set at the factory. **Display:** max. 4-digit number: –1000...+1000 **Factory setting:** Depends on nominal diameter and calibration

Function description BASIC FUNCTION → SENSOR DATA → CONFIGURATION		
NOMINAL DIAMETER	**6804**	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. **Display:** 2...2000 mm or 1/12...78" **Factory setting:** Depends on the size of the sensor

8.4.2 Function group OPERATION

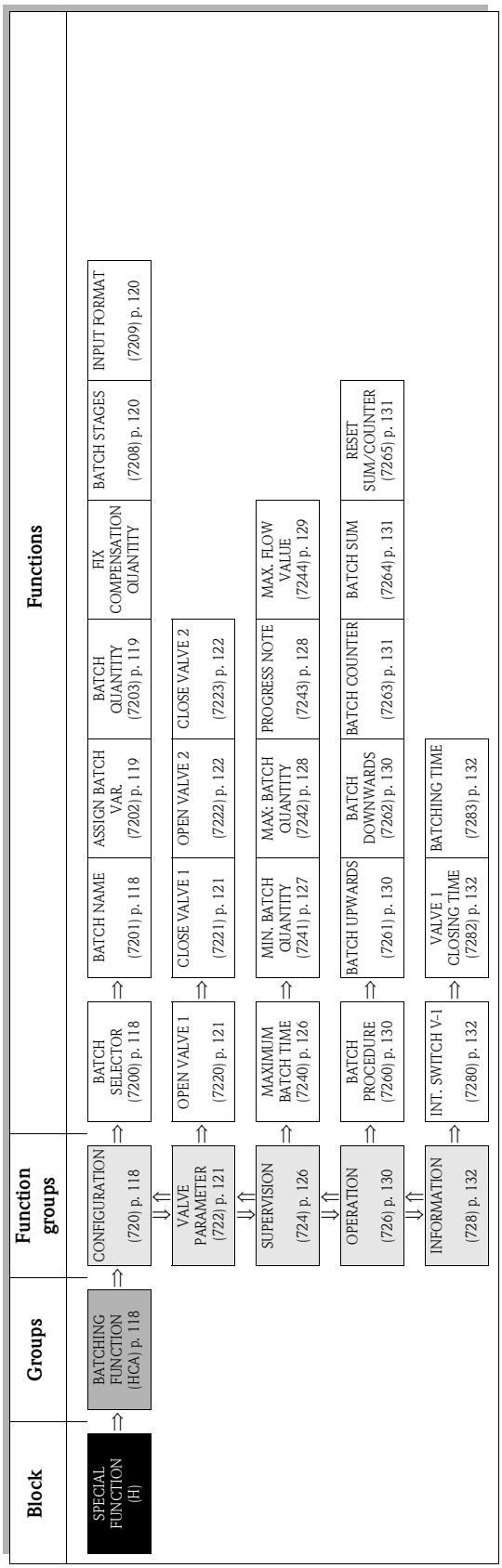


Function description BASIC FUNCTION → SENSOR DATA → OPERATION	
All sensor data (measuring period, overvoltage time etc.) are set at the factory and saved on the S-DAT sensor memory chip.	
MEASURING PERIOD 6820	Use this function to set the time for a full measuring period. The duration of the measuring period is calculated from the rise time of the magnetic field, the brief recovery time, the integration time (which can be set) and the empty pipe detection time. **User input:** 0.0...1000 ms **Factory setting:** Depends on nominal diameter ✎ Note! The system checks the time entered and sets the measuring period which is actually used internally to a plausible value. If you enter 0 ms, the system automatically computes the shortest time.
☝ Caution! Under normal circumstances you should not change the following parameter settings, because changes affect numerous functions of the entire measuring facility in general and the accuracy of the measuring system in particular. For this reason, the functions described below cannot be changed even when you enter your personal code. Contact the Endress+Hauser service organization if you have any questions about these functions.	
OVERVOLTAGE TIME 6821	Use this function to specify the time in which overvoltage is applied to the coil circuit in order to build up the magnetic field as fast as possible. The overvoltage time is adjusted automatically while measuring is in progress. The overvoltage time depends on the sensor type and the nominal diameter and is set at the factory. **Display:** 4-digit floating-point number 0.0...100.0 ms **Factory setting:** Depends on nominal diameter

Function description BASIC FUNCTION → SENSOR DATA → OPERATION	
EPD ELECTRODE **6822**	Use this function to check whether the sensor is equipped with an EPD electrode. **Display:** YES NO **Factory setting:** YES → Electrode fitted as standard
POLARITY ECC **6823**	✎ Note! This function is not available unless the measuring device is equipped with an (optional) electrode cleaning function. Use this function to display the actual current polarity for optional electrode cleaning (ECC). Electrode cleaning uses either a positive or negative current, depending on the electrode material. The measuring device automatically selects the correct polarity on the basis of the electrode-material data stored in the S-DAT. **Display:** POSITIVE → for electrodes made of: 1.4435, alloy C-22, platinum, titanium NEGATIVE → for electrodes made of: tantalum ☝ Caution! If the incorrect current is applied to the electrodes, the electrode material is destroyed.

9 Block SPECIAL FUNCTION

Note!
This block is not available for all devices → page 8 (Available blocks, groups, etc.).



9.1 Group BATCHING FUNCTION

9.1.1 Function group CONFIGURATION

SPECIAL FUNCTION H ⇒ BATCHING FUNCTION HCA ⇒ CONFIGURATION 720

Function description SPECIAL FUNCTION → BATCHING FUNCTION → CONFIGURATION (only with PROFIBUS DP)	
BATCH SELECTOR 7200	Use this function to select a batching specification. There are six different batching specifications available by means of which different batchings can be defined. **Options:** BATCH # 1 (or the name which was defined for batching specification 1 in the function BATCH NAME (7201). BATCH # 2 (or the name which was defined for batching specification 2 in the function BATCH NAME (7201). BATCH # 3 (or the name which was defined for batching specification 3 in the function BATCH NAME (7201). BATCH # 4 (or the name which was defined for batching specification 4 in the function BATCH NAME (7201). BATCH # 5 (or the name which was defined for batching specification 5 in the function BATCH NAME (7201). BATCH # 6 (or the name which was defined for batching specification 6 in the function BATCH NAME (7201). **Factory setting:** BATCH #1 ✎ Note! ■ By selecting a batching specification and its related settings (explained below), up to 6 different batchings can be preconfigured and selected as necessary. ■ All the following functions in this function group, as well as the functions in the function groups VALVE PARAMETER (722) and SUPERVISION (724) are assigned to the batching specification selected here. ■ All the settings in the following functions of this function group are valid only for the batching specification selected in the function BATCH SELECTOR (7200). In other words, the entry or option is assigned to the batching specification currently selected (e.g. in the factory setting BATCH # 1).
BATCH NAME 7201	Use this function to assign a specific name to the batching specification. **User input:** max. 8-character text, permissible: A–Z, 0–9 **Factory setting:** Name of batching specification (depends on selection in the function BATCH SELECTOR (7200), e.g. “BATCH # 1”). ✎ Note! Once an entry has been made (e.g. “BEER 33”), the batch name (BEER 33) appears in the home position when selecting the quantity, and the name of the batching specification (“e.g. BATCH # 1”) no longer appears.

Function description SPECIAL FUNCTION → BATCHING FUNCTION → CONFIGURATION (only with PROFIBUS DP)	
ASSIGN BATCH VARIABLE **7202**	Use this function to assign a batching variable to the batching specification. **Options:** OFF VOLUME FLOW MASS FLOW **Factory setting:** OFF ✎ Note! ■ The possible assignments of the display functions are automatically extended. Once a batching variable has been selected (MASS or VOLUME), you can locally define the application-specific function of the minus key (start-stop-continue) and the plus key (stop-batching name/quantity) in the information line by means of the "batching menu" assignment. In this way, a direct batching control station is made available locally at the measuring device by means of the user interface and the controls. ■ Select OFF if the BATCHING functionality is no longer to be used. All settings related to the function (e.g. switching contact assigned to the relay output) must be assigned to another functionality.
BATCH QUANTITY **7203**	Use this function to define the quantity to be batched. **User input:** 5-digit floating-point number: 0...max. value (depends on nominal diameter) [unit] **Factory setting:** 0 [unit] ✎ Note! ■ The appropriate unit is taken from the function group SYSTEM UNITS (ACA), (see page 12). ■ When the batching quantity entered here is achieved, valve 1 closes (see function CLOSE VALVE 1 (7221) on page 121).
FIX COMPENSATION QUANTITY **7204**	Use this function to specify a positive or negative compensation quantity. The compensation quantity balances out a **constant**, system-related incorrect quantity. This can be caused, for example, by a pump over-running or by the closing time of a valve. The compensation quantity is determined by the system operator. A negative compensation quantity must be specified for overbatching and a positive compensation quantity for underbatching. ✎ Note! The compensation quantity affects batching quantity only and does not affect the after run compensation. **User input:** Floating-point number with sign (depends on nominal diameter) **Factory setting:** 0 [unit] ✎ Note! ■ If the entry range is not sufficient for the compensation quantity, the batching quantity may have to be adjusted. ■ The appropriate unit is taken from the function group SYSTEM UNITS (ACA), (see page 12).

Function description SPECIAL FUNCTION → BATCHING FUNCTION → CONFIGURATION (only with PROFIBUS DP)	
BATCH STAGES **7208**	Use this function to define the number of batching stages. Batching can be carried out in several stages, e.g. 2-stage batching with fast and precise batching. **Options:** 1-stage (1 valve or 1-stage batching) 2-stage (2 valves or 2-stage batching) **Factory setting:** 1-stage (1 valve or 1-stage batching) ✎ Note! ■ The batching stage selection (number of valves) is directly dependent on the configuration of the outputs. For 2-stage batching two relay outputs must be available in the measuring device. ■ The functions available in the function group VALVE PARAMETER (page 121) are dependent on the number of batching stages (number of valves) selected in this function.
INPUT FORMAT **7209**	Use this function to define the entry format of the quantities for the switch points of the valves. **Options:** VALUE–INPUT (e.g. 10 [unit]) %-INPUT (e.g. 80 [%]) **Factory setting:** VALUE–INPUT ✎ Note! The entry format selected in this function is also used in the function groups VALVE PARAMETER (page 121) and SUPERVISION (page 126).

9.1.2 Function group VALVE PARAMETER

SPECIAL FUNCTION H ⇒ BATCHING FUNCTION HCA ⇒ CONFIGURATION 720
⇓
VALVE PARAMETER 722

Function description SPECIAL FUNCTION → BATCHING FUNCTION → VALVE PARAMETER (only with PROFIBUS DP)	
The parameters for the switching contacts of up to 2 valves can be set in the following functions. The number of switching contacts (valves) available, and thus their settings in this group, is defined in the function BATCH STAGES (7208). ✎ Note! The following functions are only available if at least one batch stage has been selected in the function BATCH SELECTOR (7200).	
OPEN VALVE 1 7220	Use this function to specify the quantity value at which contact 1 opens. This is used as a switch point for valve 1 to output via an assigned output. The quantity value is entered as a % or as an absolute value, depending on the option selected in the function INPUT FORMAT (7209). **User input:** 0...max. value or 0...100% (related to the batching quantity) **Factory setting:** 0 [unit] or 0 [%] ✎ Note! ■ Dynamic tracking for %-data: If the value is entered as a %, this %-value always refers to the batching quantity (e.g. 70% of a batching quantity of 10 liters = 7 liters). If the BATCH QUANTITY (7203) is adjusted (reduced/increased), the effective quantity switch point is automatically and dynamically adjusted (e.g. taking 70% and changing the batching quantity from 10 to 20 liters, the quantity switch point is adjusted from 7 liters to 14 liters). ■ Dynamic tracking for value-data: If you enter value-input, this value is "absolute" for batching quantities that do not change (e.g. always 7 liters for a batching quantity of 10 liters). If the batching quantity (7203) is adjusted (reduced/increased), the quantity switch point is automatically and dynamically adjusted/tracked (e.g. with a new batching quantity changing from 10 to 20 liters, the quantity switch point is adjusted from 7 liters to 14 liters). In other words, the existing value data is tracked as a percentage of the altered batching quantity.
CLOSE VALVE 1 7221	Use this function to display the quantity value at which contact 1 (valve 1) closes. The quantity value is displayed either as a % or as an absolute value, depending on the option selected in the function INPUT FORMAT (7209). **Display:** Value or 100% (corresponds to the batching quantity) **Factory setting:** 0 [unit] or 0 [%] ✎ Note! The switching contact for valve 1 is the "main contact", i.e. the closing function of valve 1 is firmly assigned to the batching quantity entered (see function BATCH QUANTITY (7203) on page 119). In this way, function CLOSE VALVE 1 is also the basis for calculating the after run quantity.

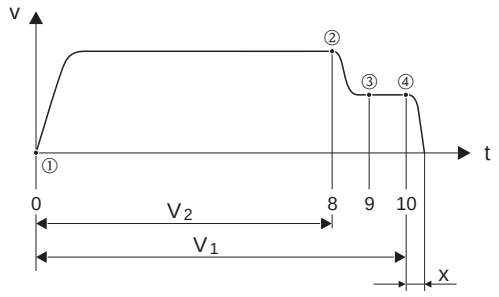
Function description SPECIAL FUNCTION → BATCHING FUNCTION → VALVE PARAMETER (only with PROFIBUS DP)	
OPEN VALVE 2 **7222**	Use this function to specify the quantity value at which contact 2 opens. This is used as a switch point for valve 2 to output via an assigned output. The quantity value is entered as a % or as an absolute value, depending on the option selected in the function INPUT FORMAT (7209). **User input:** 0...max. value or 0...100% (related to the batching quantity) **Factory setting:** 0 [unit] or 0 [%] ✎ Note! ▪ Dynamic tracking for %-data: If the value is entered as a %, this %-value always refers to the batching quantity (e.g. 70% of a batching quantity of 10 liters = 7 liters). If the BATCH QUANTITY (7203) is adjusted (reduced/increased), the effective quantity switch point is automatically and dynamically adjusted (e.g. taking 70% and changing the batching quantity from 10 to 20 liters, the quantity switch point is adjusted from 7 liters to 14 liters). ▪ Dynamic tracking for value-data: If you enter value-input, this value is "absolute" for batching quantities that do not change (e.g. always 7 liters for a batching quantity of 10 liters). If the batching quantity (7203) is adjusted (reduced/increased), the quantity switch point is automatically and dynamically adjusted/tracked (e.g. with a new batching quantity changing from 10 to 20 liters, the quantity switch point is adjusted from 7 liters to 14 liters). In other words, the existing value data is tracked as a percentage of the altered batching quantity.
CLOSE VALVE 2 **7223**	Use this function to specify the quantity value at which contact 2 closes. This is used as a switch point for valve 2 to output via an assigned output. The quantity value is entered as a % or as an absolute value, depending on the option selected in the function INPUT FORMAT (7209). **User input:** 0...max. value or 0...100% (related to the batching quantity) **Factory setting:** 0 [unit] or 0 [%] ✎ Note! ▪ Dynamic tracking for %-data: If the value is entered as a %, this %-value always refers to the batching quantity (e.g. 70% of a batching quantity of 10 liters = 7 liters). If the BATCH QUANTITY (7203) is adjusted (reduced/increased), the effective quantity switch point is automatically and dynamically adjusted (e.g. taking 70% and changing the batching quantity from 10 to 20 liters, the quantity switch point is adjusted from 7 liters to 14 liters). ▪ Dynamic tracking for value-data: If you enter value-input, this value is "absolute" for batching quantities that do not change (e.g. always 7 liters for a batching quantity of 10 liters). If the batching quantity (7203) is adjusted (reduced/increased), the quantity switch point is automatically and dynamically adjusted/tracked (e.g. with a new batching quantity changing from 10 to 20 liters, the quantity switch point is adjusted from 7 liters to 14 liters). In other words, the existing value data is tracked as a percentage of the altered batching quantity.

9.1.3 Examples of setting parameters for batching processes

The two examples in the next section clearly show the effect of different entries and options in the function group.

Example 1
The first example explains the parameter setting of various functions for carrying out batching and illustrates how functions are affected when the batching quantity is changed.

The following batching is to take place:
- 2-stage batching with a batching quantity of 10 liters in total.
- Coarse batching quantity of 8 liters. Valve 2 opens at the start of the batching and closes when 8 liters is achieved.
- Fine batching of 2 liters. Valve 1 opens at the start of the batching and closes (automatically) when the batching quantity (10 liters) is achieved.
- Once 9 liters have been batched a batching progress message should be generated.
- Value-input should be entered.



A0004670

v = Flow velocity [m/s]
t = Time
V_1 = Valve 1 open
V_2 = Valve 2 open
① = Start batching/coarse batching, valves 1 (7220) and 2 (7222) open
② = Valve 2 (7223) closes, coarse batching quantity achieved
③ = Batching progress message (7243)
④ = Valve 1 closes (7221), end of batching
x = After run quantity

The following parameter settings must be made:
- Select the unit for batching:
  Function UNIT VOLUME (0403) page 13 = l (liter)
- Select the measured variable for batching:
  Function ASSIGN BATCH VARIABLE (7202) page 119 = VOLUME FLOW
- Enter the batching quantity:
  Function BATCH QUANTITY (7203) page 119 = 10 [liters]
- Select the entry format:
  Function BATCH STAGES (7208) page 120 = 2-stage
- Select the entry format:
  Function INPUT FORMAT (7209) page 120 = VALUE-INPUT
- Quantity data for when the first valve should open:
  Function OPEN VALVE 1 (7220) page 121 = 0 [liters]
  (valve 1 closes automatically when the batching quantity is achieved = 10 [liters], display in function CLOSE VALVE 1 (7221) page 121)
- Quantity data for when the second valve should open:
  Function OPEN VALVE 2 (7224) page 122 = 0 [liters]

– Quantity data for when the second valve should close:
  Function CLOSE VALVE 2 (7223) page 122 = 8 [liters]
– Quantity data for when the message should be generated:
  Function PROGRESS NOTE (7243) page 128 = 9 [liters]

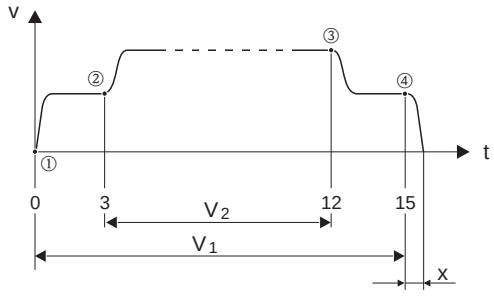
Example 1 a
Batching specifications identical to those in example 1, however the new batching quantity is 20 liters and the message should be generated once 18 liters are batched.

The following parameters must be set **manually** :
– Enter the new batching quantity:
  Function BATCH QUANTITY (7203) page 119 = 20 [liters]
– New quantity data for when the message should be generated:
  Function PROGRESS NOTE (7243) page 128 = 18 [liters]

The following functions are **automatically** adjusted to suit the new batching quantity:
– Function OPEN VALVE 1 = 0 [liters]
– Function OPEN VALVE 2 = 0 [liters]
– Function CLOSE VALVE 2 = 16 [liters]

Example 2
The second example explains the parameter settings of the various functions for batching with the entry format in % for the switch points of the valves.

The following batching is to take place:
- 2-stage batching with a batching quantity of 15 liters in total.
- Coarse batching quantity from 3 to 12 liters. Valve 2 opens when 20% (3 liters) of the batching quantity is achieved and closes once 80% (12 liters) is achieved.
- Valve 1 opens at the start of the batching and closes (automatically) when the batching quantity (15 liters) is achieved.
- %-data should be entered.



A0004684

v = Flow velocity [m/s]
t = Time
V_1 = Valve 1 open
V_2 = Valve 2 open
① = Start batching, valve 1 (7220) opens
② = Valve 2 (7222) opens, coarse batching quantity starts
③ = Valve 2 (7223) closes, coarse batching quantity achieved
④ = Valve 1 (7221) closes, end of batching
x = After run quantity

The following parameter settings must be made:
- Select the unit for batching:
  Function UNIT VOLUME (0403) page 13 = l (liter)
- Select the measured variable for batching:
  Function ASSIGN BATCH VARIABLE (7202) page 119 = VOLUME FLOW
- Enter the batching quantity:
  Function BATCH QUANTITY (7203) page 119 = 15 [liters]
- Select the entry format:
  Function BATCH STAGES (7208) page 120 = 2-stage
- Select the entry format:
  Function INPUT FORMAT (7209) page 120 = %-DATA
- Percentage data for when the first valve should open:
  Function OPEN VALVE 1 (7220) page 121 = 0 [%]
  (valve 1 closes automatically when the batching quantity is achieved = 15 [liters],
  display in function CLOSE VALVE 1 (7221) page 121)
- Percentage data for when the second valve should open:
  Function OPEN VALVE 2 (7224) page 122 = 20 [%], corresponds to 3 liters
- Percentage data for when the second valve should close:
  Function CLOSE VALVE 2 (7223) page 122 = 80 [%], corresponds to 12 liters

Example 2 a
Batching specifications identical to those in example 1, however the new batching quantity is 45 liters.

The following parameters must be set **manually**:
Enter the new batching quantity:
Function BATCH QUANTITY (7203) page 119 = 45 [liters]

The following functions are **automatically** adjusted to suit the new batching quantity:
- Function OPEN VALVE 1 = 0 [%]
- Function OPEN VALVE 2 = 20 [%] corresponds to 9 liters
- Function CLOSE VALVE 2 = 80 [%] corresponds to 36 liters

9.1.4 Function group SUPERVISION

SPECIAL FUNCTION H ⇒ BATCHING FUNCTION HCA ⇒ CONFIGURATION 720
⇓
VALVE PARAMETER 722
⇓
SUPERVISION 724

Function description SPECIAL FUNCTION → BATCHING FUNCTION → SUPERVISION (only with PROFIBUS DP)	
MAXIMUM BATCH TIME 7240	Use this function to specify a maximum batching time. All valves close once the specified batching time elapses (see functions CLOSE VALVE 1...2, see page 121 ff.). This function can be used for safety reasons, for example, to ensure all batching valves close in the event of a system fault. **User input:** 0...30000 s **Factory setting:** 0 s (= deactivated) Caution! ■ When the batching quantity is adjusted (reduced/increased), (see function BATCH QUANTITY (7203) on page 119), automatic adjustment does not take place i.e. this value must be determined again and reentered (see also fault message # 471 in the Operating Instructions Promag 53, PROFIBUS DP/PA, BA053D/06/en/, Troubleshooting Chapter). ■ Batching (START) is not possible when the fault message is active! Note! ■ The function is not active if you enter 0 s (factory setting). This means that the batching valves are not closed by means of this function. ■ A fault message is assigned to the function. This fault message can be acknowledged prematurely: – By modifying a batching function. – By selecting RESET in the “BATCH PROCEDURE” parameter – Via PROFIBUS communication ■ This function can be output via the switch output.

Function description SPECIAL FUNCTION → BATCHING FUNCTION → SUPERVISION (only with PROFIBUS DP)	
MINIMUM BATCH QUANTITY **7241**	Use this function to specify a minimum batching quantity. A message is generated if the minimum batching quantity was not achieved by the time batching ends (e.g. if after run mode is active). The quantity value is entered as a % or as an absolute value, depending on the option selected in the function INPUT FORMAT (7209). **Application:** Message stating that underbatching is present (e.g. the contents of the containers does not correspond to the quantity declared). **User input:** 0...max. value or 0...100% (related to the batching quantity) **Factory setting:** 0 [unit] (= deactivated) Caution! ■ When the batching quantity is adjusted (reduced/increased), (see function BATCH QUANTITY (7203) on page 119) automatic adjustment does not take place, i.e. this value must be determined again and reentered (see also fault message # 472 in the Operating Instructions Promag 53, PROFIBUS DP/PA, BA053D/06/en/, Troubleshooting Chapter). ■ Batching (START) is not possible when the fault message is active! Note! ■ The function is not active if you enter 0 s (factory setting). ■ A fault message is assigned to the function. This fault message can be acknowledged prematurely: – By modifying a batching function. – By selecting RESET in the “BATCH PROCEDURE” parameter – Via PROFIBUS communication ■ This function can be output via the switch output.

Function description SPECIAL FUNCTION → BATCHING FUNCTION → SUPERVISION (only with PROFIBUS DP)	
MAXIMUM BATCH QUANTITY 7242	Use this function to specify a maximum batching quantity. If the maximum batching quantity is exceeded during batching, all valves are closed, batching is stopped and a message is generated. The quantity value is entered as a % or as an absolute value, depending on the option selected in the function INPUT FORMAT (7209). **Application:** To avoid overbatching and thus prevent critical situations caused by fluid overflow arising in the plant, (e.g. plant standstill caused by safety level switches being triggered, contamination, product loss, etc.). **User input:** 0...2 x max. value or 0...200% (related to the batching quantity) **Factory setting:** 0 [unit] (= deactivated) Caution! ■ When the batching quantity is adjusted (reduced/increased), (see function BATCH QUANTITY (7203) on page 119) automatic adjustment does not take place, i.e. this value must be determined again and reentered (see also fault message # 472 in the Operating Instructions Promag 53, PROFIBUS DP/PA, BA053D/06/en/, Troubleshooting Chapter). ■ Batching (START) is not possible when the fault message is active! Note! ■ The function is not active if you enter 0 s (factory setting). ■ A fault message is assigned to the function. This fault message can be acknowledged prematurely: – By modifying a batching function. – By selecting RESET in the “BATCH PROCEDURE” parameter – Via PROFIBUS communication ■ This function can be output via the switch output.
PROGRESS NOTE 7243	Use this function to define a batching quantity at which a message should be generated. When the specified batching quantity is achieved, the message is generated and signalled via the output. The quantity value is entered as a % or as an absolute value, depending on the option selected in the function INPUT FORMAT (7209). **Application:** For longer batching processes when preparing or taking measures related to production (e.g. preparing to replace container, etc.). **User input:** 0...max. value or 0...100% (related to the batching quantity) **Factory setting:** 0 [unit] (= deactivated) Caution! When the batching quantity is adjusted (reduced/increased), (see function BATCH QUANTITY (7203) on page 119) there is no automatic adjustment, i.e. this value must be determined again and reentered, (see also notice message # 473 in the Operating Instructions Promag 53, PROFIBUS DP/PA, BA053D/06/en/, Troubleshooting Chapter). Note! ■ The function is not active if you enter 0 (factory setting). ■ This function can be output via the switch output. ■ The batching progress message remains active until batching ends.

Function description SPECIAL FUNCTION → BATCHING FUNCTION → SUPERVISION (only with PROFIBUS DP)	
MAX. FLOW VALUE **7244**	A maximum flow value can be specified in this function. The batching process is aborted and all the valves are closed if the specified flow value is overshot. **Application:** This function can be used for safety reasons, for example, to ensure all batching valves close in the event of a system fault. **User input:** 5-digit floating-point number **Factory setting:** 0 [unit] (= deactivated) ✎ Note! ■ The appropriate unit is taken depending on the process variable selected in the ASSIGN BATCH VARIABLE (7202) parameter and the unit configured in the SYSTEM UNITS group. ■ The function is not active if you enter 0 (factory setting). ■ If the batching process is aborted because the specified flow value was overshot, the BATCH COUNTER parameter (7263) is not incremented. ■ The error message #474 > MAX. FLOW is output if the maximum flow is overshot. This fault message can be acknowledged prematurely: – By modifying a batching function. – By selecting RESET in the “BATCH PROCEDURE” parameter – Via PROFIBUS communication

9.1.5 Function group OPERATION

SPECIAL FUNCTION H ⇒ BATCHING FUNCTION HCA ⇒ CONFIGURATION 720
⇓
VALVE PARAMETER 722
⇓
SUPERVISION 724
⇓
OPERATION 726

Function description SPECIAL FUNCTION → BATCHING FUNCTION → OPERATION (only with PROFIBUS DP)	
BATCH PROCEDURE 7260	Use this function to control a batching process. The batching can be started manually or a batching already running can be interrupted or stopped at any time. **Options:** STOP (Stop batching) START (Start batching) HOLD (Interrupt batching) GO ON (Continue batching) **Factory setting:** STOP ✎ Note! ■ This function can also be controlled using the status input (see ASSIGN STATUS INPUT function (5000) on page 91) or using PROFIBUS communication. ■ If the information line has been assigned to BATCHING MENU (see page 40), the application-specific functions of the minus key (START-STOP) and the plus key (HOLD-GO ON / PRESET) are defined locally. In this way, a direct batching control station is available locally at the measuring device by means of the user interface (not access-protected). ■ In the event of a fault: – during the batching process, the batching is cancelled (STOP) and the local display alternates between displaying the batching menu and the fault message. ■ If the positive zero return is activated (see page 112): – during the batching process, the batching is cancelled (STOP). – during a pause in the batching (option PAUSE), the batching cannot be restarted (see also notice messages # 571 and # 572 in the Operating Instructions Promag 53, PROFIBUS DP/PA, BA053D/06/en/, Troubleshooting Chapter).
BATCH UPWARDS 7261	In this function the batching progress can be read upwards, i.e. **starting from 0** the quantity displayed increases until the batching process is complete or the amount specified in the BATCH QUANTITY (7203) function is reached. **Display:** Floating-point number incl. unit
BATCH DOWNWARDS 7262	In this function the batching progress can be read downwards, i.e. **starting from the batching quantity (BATCH QUANTITY (7203))** the quantity displayed decreases until the batching process is complete. **Display:** Floating-point number incl. unit

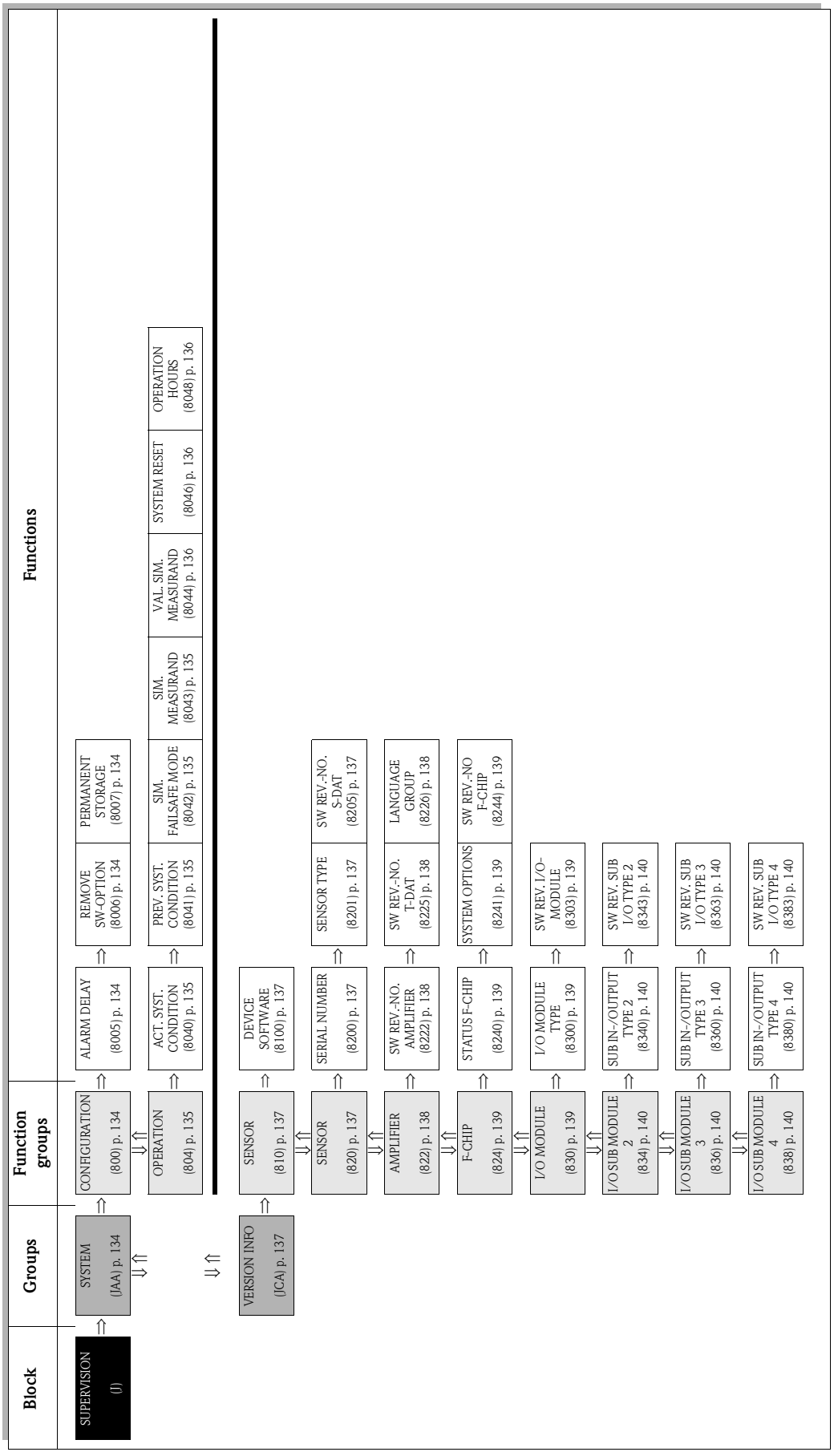
Function description SPECIAL FUNCTION → BATCHING FUNCTION → OPERATION (only with PROFIBUS DP)	
BATCH COUNTER 7263	Use this function to display the number of batchings carried out. **Display:** max. 7-digit floating-point number **Factory setting:** 0 ✎ Note! ■ The batching quantity totalizer can be reset to 0 via the function RESET SUM/COUNTER (7265). ■ This function is reset to 0 (zero) if a different batching specification is selected in the function BATCH SELECTOR (7200).
BATCH SUM 7264	Use this function to display the effective overall total of all the batchings carried out. **Display:** max. 7-digit floating-point number [unit] **Factory setting:** 0 [unit] ✎ Note! ■ For example, in 2-stage batching the effective overall total is calculated from the coarse batching quantity and fine batching quantity. ■ The total batching quantity can be reset to 0 via the function RESET SUM/COUNTER (7265). ■ This function is reset to 0 (zero) if a different batching specification is selected in the function BATCH SELECTOR (7200).
RESET SUM/COUNTER 7265	Use this function to reset the batch counter and the batch sum to zero. **User input:** NO YES **Factory setting:** NO ✎ Note! The batch counter and the batch sum can also be reset via the batching menu (information line on the local display) or using PROFIBUS communication.

9.1.6 Function group INFORMATION

SPECIAL FUNCTION H ⇒ BATCHING FUNCTION HCA ⇒ CONFIGURATION 720
⇓
VALVE PARAMETER 722
⇓
SUPERVISION 724
⇓
OPERATION 726
⇓
INFORMATION 728

Function description SPECIAL FUNCTION → BATCHING FUNCTION → INFORMATION (only with PROFIBUS DP)	
VALVE 1 INTERNAL SWITCH POINT 7280	Use this function to display the **internal** switch point of valve 1 (see function CLOSE VALVE 1 on page 121). The displayed value takes into account the fix compensation quantity. **Display:** max. 7-digit floating-point number [unit] ✎ Note! The appropriate unit is taken from the function group SYSTEM UNITS (ACA), (see page 12).
VALVE 1 CLOSING TIME 7282	Use this function to display the valve closing time calculated **internally**. **Display:** max. 7-digit floating-point number [ms] ✎ Note! ■ The valve closing time is the period between the switch point of valve 1 and the first undershooting of the low flow cut off. ■ The data can only be taken as a general trend as the accuracy of the time value is directly dependent on the measuring period.
BATCHING TIME 7283	Displays the batching time for the current or completed batch process. Starting at 0 seconds, the time displayed increases until the batch process is completed. **Application:** The batching time refers to the batch quantity determined in the BATCH SUM function for the current or last batch process. **Display:** max. 7-digit floating-point number ✎ Note! ■ Behavior when controlling the batching process by means of the BATCH PROCEDURE function: – STOP → BATCHING TIME is not reset and remains at the current value. – START → BATCHING TIME is reset and starts at 0. – HOLD → BATCHING TIME is not reset and remains at the current value. – GO ON → BATCHING TIME is not reset and continues updating based on the last time value. ■ The BATCHING TIME is also updated during the batching process

10 Block SUPERVISION



10.1 Group SYSTEM

10.1.1 Function group CONFIGURATION

SUPERVISION J ⇒ SYSTEM JAA ⇒ CONFIGURATION 800

Function description SUPERVISION → SYSTEM → CONFIGURATION	
ALARM DELAY **8005**	Use this function to define a time span in which the criteria for a fault have to be satisfied without interruption before a fault or notice message is generated. Depending on the setting and the type of fault, this suppression acts on: ■ Display ■ Relay output ■ Current output ■ Pulse/frequency output ■ PROFIBUS DP/PA **User input:** 0...100 s (in steps of one second) **Factory setting:** 0 s ☞ Caution! If this function is activated fault and notice messages are delayed by the time corresponding to the setting before being transmitted 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 may not be suppressed, a value of 0 seconds must be entered here.
REMOVE SW-OPTION **8006**	✎ Note! This function is only available if: ■ The F-CHIP software options were saved beforehand ■ The F-CHIP is **not** located on the I/O board of the measuring device Deletes all F-CHIP software options, such as batching, etc. The measuring device is restarted after the software options have been deleted. **Options:** NO YES **Factory setting:** NO ☞ Caution! If process variables which are only available via the F-CHIP software options are assigned to the local display or the outputs, these have to be reconfigured.
PERMANENT STORAGE **8007**	This function indicates whether permanent storage of all parameters in the EEPROM has been switched on or off. **Display:** 0 = OFF 1 = ON **Factory setting:** ON

10.1.2 Function group OPERATION

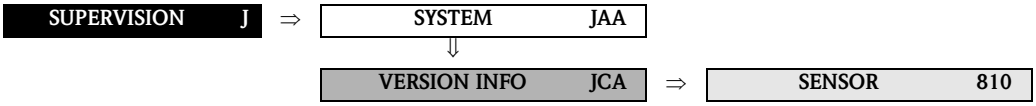
SUPERVISION J ⇒ SYSTEM JAA ⇒ CONFIGURATION 800
⇓
OPERATION 804

Function description SUPERVISION → SYSTEM → OPERATION		
ACTUAL SYSTEM CONDITION	**8040**	Use this function to check the present system condition. **Display:** "SYSTEM OK" or the fault / notice message with the highest priority.
PREVIOUS SYSTEM CONDITION	**8041**	Use this function to view the fifteen most recent fault and notice messages since measuring last started. **Display:** The 15 most recent fault or notice messages.
SIMULATION FAILSAFE MODE	**8042**	Use this function to set all inputs and outputs to their defined failsafe modes, in order to check whether they respond correctly. During this time, the message "SIMULATION FAILSAFE MODE" appears on the display. **Options:** ON OFF **Factory setting:** OFF ✎ Note! The failsafe mode of the PROFIBUS function blocks must be defined in the appropriate Analog Input function block or Totalizer function block.
SIMULATION MEASURAND	**8043**	Use this function to set all inputs, outputs and totalizers to their defined flow-response modes, in order to check whether they respond correctly. During this time, the message "SIMULATION MEASURAND" appears on the display. **Options:** OFF MASS FLOW VOLUME FLOW **Factory setting:** OFF ☝ Caution! ■ The measuring device cannot be used for measuring while this simulation is in progress. ■ The setting is not saved in the event of a power failure.

Function description SUPERVISION → SYSTEM → OPERATION		
VALUE SIMULATION MEASURAND	**8044**	✎ Note! The function is not visible unless the SIMULATION MEASURAND function (8043) is active. Use this function to specify a selectable value (e.g. 12 m^3/s). This is used to test the associated functions in the device itself and downstream signal loops. **User input:** 5-digit floating-point number [unit] **Factory setting:** 0 [unit] ☝ Caution! ■ The setting is not saved in the event of a power failure. ■ The appropriate unit is taken from the function group SYSTEM UNITS (ACA), (see page 12).
SYSTEM RESET	**8046**	Use this function to perform a reset of the measuring system. **Options:** NO RESTART SYSTEM (restart without interrupting power supply) **Factory setting:** NO
OPERATION HOURS	**8048**	The hours of operation of the device appear on the display. **Display:** Depends on the number of hours of operation elapsed: Hours of operation < 10 hours → display format = 0:00:00 (hr:min:sec) Hours of operation 10...10,000 hours → display format = 0000:00 (hr:min) Hours of operation > 10,000 hours → display format = 000000 (hr)

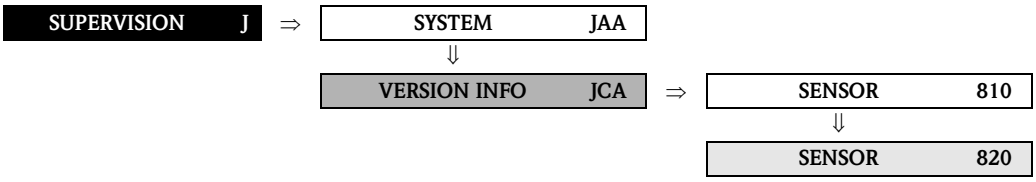
10.2 Group VERSION INFO

10.2.1 Function group SENSOR



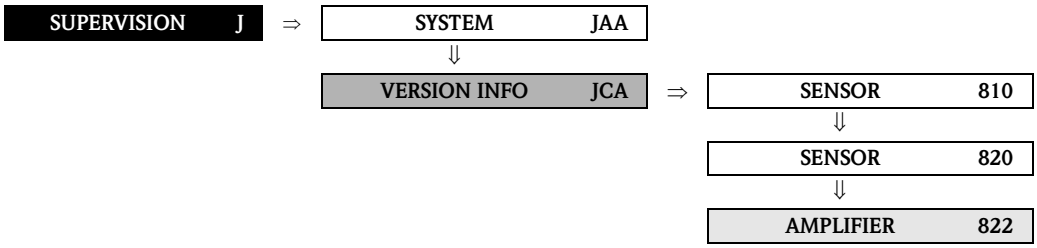
Function description SUPERVISION → VERSION INFO → SENSOR		
DEVICE SOFTWARE	**8100**	Displays the current device software version.

10.2.2 Function group SENSOR



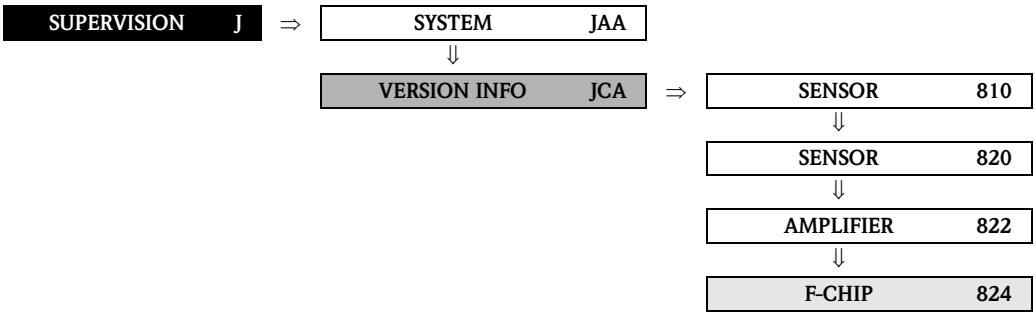
Function description SUPERVISION → VERSION INFO → SENSOR		
SERIAL NUMBER	**8200**	Use this function to view the serial number of the sensor.
SENSOR TYPE	**8201**	Use this function to view the sensor type.
SW REV.-NO. S-DAT	**8205**	Use this function to view the software revision number of the software used to create the content of the S-DAT.

10.2.3 Function group AMPLIFIER



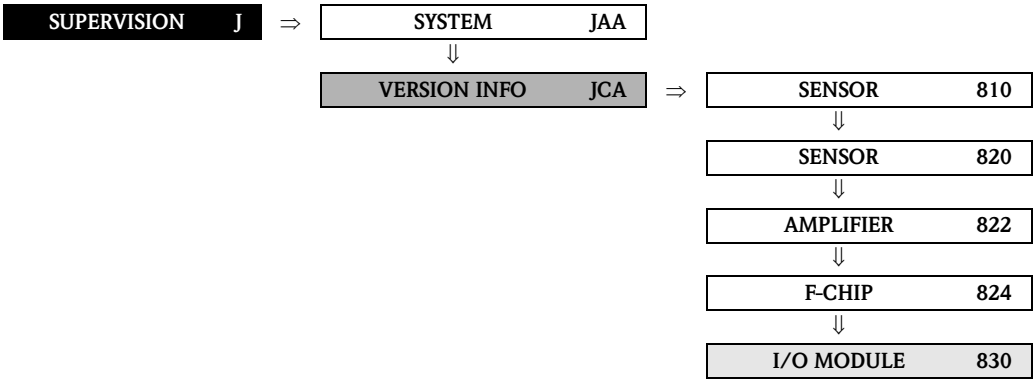
Function description SUPERVISION → VERSION INFO → AMPLIFIER		
SW REV.-NO. AMPLIFIER	**8222**	Use this function to view the software revision number of the amplifier.
SW REV.-NO. T-DAT	**8225**	Use this function to view the software revision number of the software used to create the content of the T-DAT.
LANGUAGE GROUP	**8226**	Displays the installed language group. **Display:** TYPE UNKNOWN WEST EU / USA EAST EU / SCAND. ASIA CHINA ✎ Note! ■ The language options of the available language group are displayed in the LANGUAGE (2000) function. ■ The language group can be changed using the configuration program FieldCare. Please do not hesitate to contact your Endress+Hauser sales office if you have any questions.

10.2.4 Function group F-CHIP



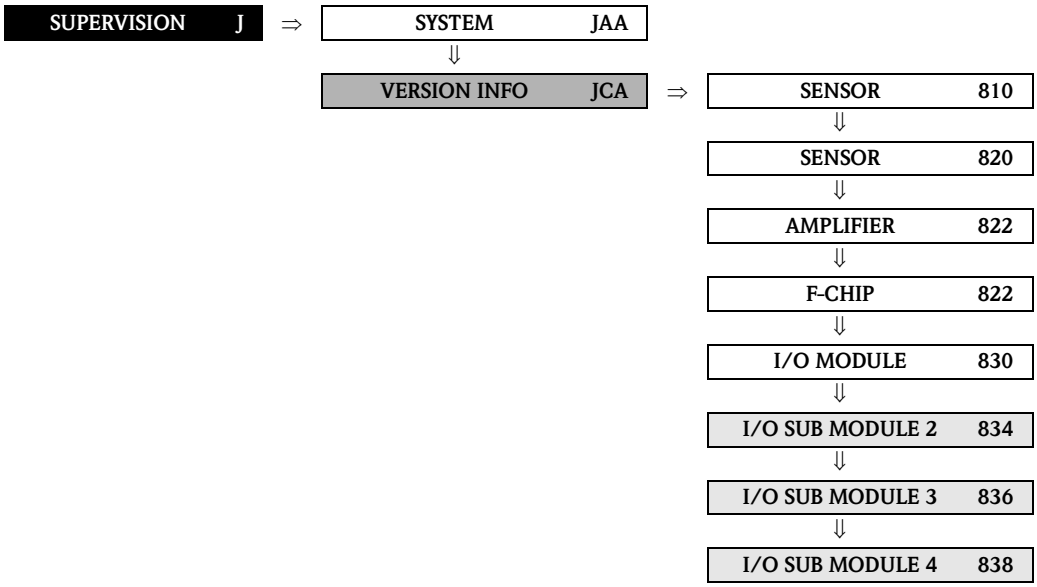
Function description SUPERVISION → VERSION INFO → F-CHIP	
STATUS F-CHIP 8240	Use this function to check whether an F-CHIP is installed and which software options are available.
SYSTEM OPTIONS 8241	✎ Note! This function is not available unless the measuring device is equipped an F-CHIP. The software options available in the measuring device appear on the display.
SW REV.-NO F-CHIP 8244	✎ Note! This function is not available unless the measuring device is equipped an F-CHIP. Use this function to view the software revision number of the F-CHIP.

10.2.5 Function group I/O MODULE



Function description SUPERVISION → VERSION INFO → I/O MODULE	
I/O MODULE TYPE 8300	Displays the configuration of the I/O module.
SW REV. I/O-MODULE 8303	Use this function to view the software revision number of the I/O module.

10.2.6 Function groups INPUT /OUTPUT 2...4



Function description SUPERVISION → VERSION INFO → IN-/OUTPUT 2...4	
SUB IN-/OUTPUT TYPE **2 = 8340** **3 = 8360** **4 = 8380**	Use this function to view the configuration complete with terminal numbers.
SW REV. NO. SUB IN-/OUTPUT TYPE **2 = 8343** **3 = 8363** **4 = 8383**	Use this function to view the software revision number of the corresponding submodule.

11 Factory settings

11.1 SI units (not for USA and Canada)

Low flow cut off, full scale value, pulse value

Nominal diameter		Low flow cut off (approx. v = 0.04 m/s)		Full scale value (approx. v = 2.5 m/s)		Pulse value (approx. 2 pulse/s at 2.5 m/s)	
[mm]	[inch]		Volume		Volume		Vol.
2	1/12"	0.01	dm³/min	0..5	dm³/min	0.005	dm³
4	5/32"	0.05	dm³/min	2	dm³/min	0.025	dm³
8	5/16"	0.1	dm³/min	8	dm³/min	0.10	dm³
15	1/2"	0.5	dm³/min	25	dm³/min	0.20	dm³
25	1"	1	dm³/min	75	dm³/min	0.50	dm³
32	1 1/4"	2	dm³/min	125	dm³/min	1.00	dm³
40	1 1/2"	3	dm³/min	200	dm³/min	1.50	dm³
50	2"	5	dm³/min	300	dm³/min	2.50	dm³
65	2 1/2"	8	dm³/min	500	dm³/min	5.00	dm³
80	3"	12	dm³/min	750	dm³/min	5.00	dm³
100	4"	20	dm³/min	1200	dm³/min	10.00	dm³
125	5"	30	dm³/min	1850	dm³/min	15.00	dm³
150	6"	2.5	m³/h	150	m³/h	0.025	m³
200	8"	5.0	m³/h	300	m³/h	0.05	m³
250	10"	7.5	m³/h	500	m³/h	0.05	m³
300	12"	10	m³/h	750	m³/h	0.10	m³
350	14"	15	m³/h	1000	m³/h	0.10	m³
375	15"	20	m³/h	1200	m³/h	0.15	m³
400	16"	20	m³/h	1200	m³/h	0.15	m³
450	18"	25	m³/h	1500	m³/h	0.25	m³
500	20"	30	m³/h	2000	m³/h	0.25	m³
600	24"	40	m³/h	2500	m³/h	0.30	m³
700	28"	50	m³/h	3500	m³/h	0.50	m³
–	30"	60	m³/h	4000	m³/h	0.50	m³
800	32"	75	m³/h	4500	m³/h	0.75	m³
900	36"	100	m³/h	6000	m³/h	0.75	m³
1000	40"	125	m³/h	7000	m³/h	1.00	m³
–	42"	125	m³/h	8000	m³/h	1.00	m³
1200	48"	150	m³/h	10000	m³/h	1.50	m³
–	54"	200	m³/h	13000	m³/h	1.50	m³
1400	–	225	m³/h	14000	m³/h	2.00	m³
–	60"	250	m³/h	16000	m³/h	2.00	m³
1600	–	300	m³/h	18000	m³/h	2.50	m³
–	66"	325	m³/h	20500	m³/h	2.50	m³
1800	72"	350	m³/h	23000	m³/h	3.00	m³
–	78"	450	m³/h	28500	m³/h	3.50	m³
2000	–	450	m³/h	28500	m³/h	3.50	m³

Language

Country	Language
Australia	English
Belgium	English
China	Chinese
Denmark	English
Germany	Deutsch
England	English
Finland	Suomi
France	Francais
Netherlands	Nederlands
Hong Kong	English
India	English
Indonesia	Bahasa Indonesia
Instruments International	English
Italy	Italiano
Japan	Japanese
Malaysia	English
Norway	Norsk
Poland	Polish
Portugal	Portuguese
Austria	Deutsch
Russia	Russian
Sweden	Svenska
Switzerland	Deutsch
Singapore	English
Spain	Espanol
South Africa	English
Thailand	English
Czech Republic	Czech
Hungary	English

Density, length, temperature

	Unit
Density	kg/l
Length	mm
Temperature	°C

11.2 US units (only for USA and Canada)

Low flow cut off, full scale value, pulse value

Nominal diameter		Low flow cut off (approx. v = 0.04 m/s)		Full scale value (approx. v = 2.5 m/s)		Pulse value (approx. 2 pulse/s at 2.5 m/s	
[inch]	[mm]		Volumen		Volumen		Vol.
1/12"	2	0.002	gal/min	0.1	gal/min	0.001	gal
5/32"	4	0.008	gal/min	0.5	gal/min	0.005	gal
5/16"	8	0.025	gal/min	2	gal/min	0.02	gal
1/2"	15	0.10	gal/min	6	gal/min	0.05	gal
1"	25	0.25	gal/min	18	gal/min	0.20	gal
1 1/4"	32	0.50	gal/min	30	gal/min	0.20	gal
1 1/2"	40	0.75	gal/min	50	gal/min	0.50	gal
2"	50	1.25	gal/min	75	gal/min	0.50	gal
2 1/2"	65	2.0	gal/min	130	gal/min	1	gal
3"	80	2.5	gal/min	200	gal/min	2	gal
4"	100	4.0	gal/min	300	gal/min	2	gal
5"	125	7.0	gal/min	450	gal/min	5	gal
6"	150	12	gal/min	600	gal/min	5	gal
8"	200	15	gal/min	1200	gal/min	10	gal
10"	250	30	gal/min	1500	gal/min	15	gal
12"	300	45	gal/min	2400	gal/min	25	gal
14"	350	60	gal/min	3600	gal/min	30	gal
15"	375	60	gal/min	4800	gal/min	50	gal
16"	400	60	gal/min	4800	gal/min	50	gal
18"	450	90	gal/min	6000	gal/min	50	gal
20"	500	120	gal/min	7500	gal/min	75	gal
24"	600	180	gal/min	10500	gal/min	100	gal
28"	700	210	gal/min	13500	gal/min	125	gal
30"	–	270	gal/min	16500	gal/min	150	gal
32"	800	300	gal/min	19500	gal/min	200	gal
36"	900	360	gal/min	24000	gal/min	225	gal
40"	1000	480	gal/min	30000	gal/min	250	gal
42"	–	600	gal/min	33000	gal/min	250	gal
48"	1200	600	gal/min	42000	gal/min	400	gal
54"	–	1.3	Mgal/d	75	Mgal/d	0.0005	Mgal
–	1400	1.3	Mgal/d	85	Mgal/d	0.0005	Mgal
60"	–	1.3	Mgal/d	95	Mgal/d	0.0005	Mgal
–	1600	1.7	Mgal/d	110	Mgal/d	0.0008	Mgal
66"	–	2.2	Mgal/d	120	Mgal/d	0.0008	Mgal
72"	1800	2.6	Mgal/d	140	Mgal/d	0.0008	Mgal
78"	–	3.0	Mgal/d	175	Mgal/d	0.001	Mgal
–	2000	3.0	Mgal/d	175	Mgal/d	0.001	Mgal

Language, density, length, temperature

	Unit
Language	English
Density	g/cc
Length	inch
Temperature	°F

12 Index function matrix

Blocks

A = MEASURED VARIABLES 10
B = QUICK SETUP 16
C = USER INTERFACE 26
E = OUTPUT 44
F = INPUT 90
G = BASIC FUNCTION 94
H = SPECIAL FUNCTION 117
J = SUPERVISION 133

Groups

AAA = MEASURING VALUES 11
ACA = SYSTEM UNITS 12
CAA = CONTROL 27
CCA = MAIN LINE 32
CEA = ADDITIONAL LINE 36
CGA = INFORMATION LINE 40
EAA = CURRENT OUTPUT 1 45
EAB = CURRENT OUTPUT 2 45
ECA = PULSE/FREQUENCY OUTPUT 1 56
ECB = PULSE/FREQUENCY OUTPUT 2 56
EGA = RELAY OUTPUT 1 80
EGB = RELAY OUTPUT 2 80
FAA = STATUS INPUT 91
GBA = PROFIBUS DP 95
GCA = PROFIBUS PA 95
GIA = PROCESS PARAMETER 103
GLA = SYSTEM PARAMETER 111
GNA = SENSOR DATA 113
HCA = BATCHING FUNCTION 118
JAA = SYSTEM 134
JCA = VERSION INFO 137

Function groups

040 = CONFIGURATION 12
042 = ADDITIONAL CONFIGURATION 14
070 = DENSITY PARAMETER 15
200 = BASIC CONFIGURATION 27
202 = UNLOCKING/LOCKING 29
204 = OPERATION 31
220 = CONFIGURATION 32
222 = MULTIPLEX 34
240 = CONFIGURATION 36
242 = MULTIPLEX 38
260 = CONFIGURATION 40
262 = MULTIPLEX 42
400 = CONFIGURATION 45
404 = OPERATION 54
408 = INFORMATION 55
420 = CONFIGURATION 56
430 = OPERATION 76
438 = INFORMATION 79
470 = CONFIGURATION 80
474 = OPERATION 84
478 = INFORMATION 86
500 = CONFIGURATION 91
504 = OPERATION 92
508 = INFORMATION 93
610 = CONFIGURATION 95
612 = FUNCTION BLOCKS 96
613 = TOTALIZER 98
614 = OPERATION 101
616 = INFORMATION 102
640 = CONFIGURATION 103
642 = EPD PARAMETER 105
644 = ECC PARAMETER 108
648 = ADJUSTMENT 110
660 = CONFIGURATION 111
680 = CONFIGURATION 113
682 = OPERATION 115
720 = CONFIGURATION 118
722 = VALVE PARAMETER 121
724 = SUPERVISION 126
726 = OPERATION 130
728 = INFORMATION 132
800 = CONFIGURATION 134
804 = OPERATION 135
810 = DEVICE 137
820 = SENSOR 137
822 = AMPLIFIER 138
824 = F-CHIP 139
830 = I/O MODULE 139
834 = INPUT/OUTPUT 2 140
836 = INPUT/OUTPUT 3 140
838 = INPUT/OUTPUT 4 140

Functions 0...

0000= CALCULATED MASS FLOW 11
0001 = VOLUME FLOW 11
0005 = DENSITY 11
0400 = UNIT MASS FLOW 12
0401 = UNIT MASS 12
0402 = UNIT VOLUME FLOW 13
0403 = UNIT VOLUME 13
0420 = UNIT DENSITY 14
0424 = UNIT LENGTH 14
0429 = FORMAT DATE/TIME 14
0700 = DENSITY VALUE 15

Functions 1...

1002 = QUICK SETUP COMMISSION 16
1003 = QUICK SETUP PULS. FLOW 16
1005 = QUICK SETUP BATCHING/DOSING 16
1006 = QS COMMUNICATION 16
1009 = T DAT SAVE/LOAD 17

Functions 2...

2000 = LANGUAGE 27
2002 = DISPLAY DAMPING 27
2003 = CONTRAST LCD 28
2004 = BACKLIGHT 28
2020 = ACCESS CODE 29
2021 = DEFINE PRIVATE CODE 29
2022 = STATUS ACCESS 29
2023 = ACCESS CODE COUNTER 30
2040 = TEST DISPLAY 31
2200 = ASSIGN 32
2201 = 100% VALUE 33
2202 = FORMAT 33
2220 = ASSIGN 34
2221 = 100% VALUE 34
2222 = FORMAT 35
2400 = ASSIGN 36
2401 = 100% VALUE 37
2402 = FORMAT 37
2403 = DISPLAY MODE 37
2420 = ASSIGN 38
2421 = 100% VALUE 39
2422 = FORMAT 39
2423 = DISPLAY MODE 39
2600 = ASSIGN 40
2601 = 100% VALUE 41
2602 = FORMAT 41
2603 = DISPLAY MODE 41
2620 = ASSIGN 42
2621 = 100% VALUE 43
2622 = FORMAT 43
2623 = DISPLAY MODE 43

Functions 4...

4000 = ASSIGN CURRENT OUTPUT 45
4001 = CURRENT SPAN 46
4002 = VALUE 0_4 mA 47, 48
4003 = VALUE 20 mA 49
4004 = MEASURING MODE 50, 51
4005 = TIME CONSTANT 52
4006 = FAILSAFE MODE 53
4040 = ACTUAL CURRENT 54
4041 = SIMULATION CURRENT 54
4042 = VALUE SIMULATION CURRENT 54
4080 = TERMINAL NUMBER 55
4200 = OPERATION MODE 56
4201 = ASSIGN FREQUENCY 56
4202 = START VALUE FREQUENCY 57
4203 = END VALUE FREQUENCY 57
4204 = VALUE F LOW 58
4205 = VALUE-F HIGH 58
4206 = MEASURING MODE 60
4207 = OUTPUT SIGNAL 62
4208 = TIME CONSTANT 65
4209 = FAILSAFE MODE 65
4211 = FAILSAFE VALUE 65
4221 = ASSIGN PULSE 66
4222 = PULSE VALUE 66
4223 = PULSE WIDTH 67
4225 = MEASURING MODE 68
4226 = OUTPUT SIGNAL 69
4227 = FAILSAFE MODE 72
4241 = ASSIGN STATUS 73
4242 = ON VALUE 73
4243 = SWITCH-ON DELAY 74
4244 = OFF-VALUE 74
4245 = SWITCH-OFF DELAY 74
4246 = MEASURING MODE 75
4247 = TIME CONSTANT 75
4301 = ACTUAL FREQUENCY 76
4302 = SIMULATION FREQUENCY 76
4303 = VALUE SIMULATION FREQUENCY 76
4322 = SIMULATION PULSE 77
4323 = VALUE SIMULATION PULSE 77
4341 = ACTUAL STATUS 78
4342 = SIMULATION SWITCH POINT 78
4343 = VALUE SIMULATION SWITCH POINT 78
4380 = TERMINAL NUMBER 79
4700 = ASSIGN RELAY 80
4701 = ON-VALUE 81
4702 = SWITCH-ON DELAY 81
4703 = OFF-VALUE 81
4704 = SWITCH-OFF DELAY 82
4705 = MEASURING MODE 82
4706 = TIME CONSTANT 83
4740 = ACTUAL STATUS RELAY 84
4741 = SIMULATION SWITCH POINT 84
4742 = VALUE SIMULATION SWITCH POINT 85
4780 = TERMINAL NUMBER 86

Functions 5...

5000 = ASSIGN STATUS INPUT 91
5001 = ACTIVE LEVEL 91
5002 = MINIMUM PULSE WIDTH 91
5040 = ACTUAL STATUS INPUT 92
5041 = SIMULATION STATUS INPUT 92
5042 = VALUE SIMULATION STATUS INPUT 92
5080 = TERMINAL NUMBER 93

Functions 6...

6100 = TAG NAME 95
6101 = FIELDBUS ADDRESS 95
6120 = BLOCK SELECTION 96
6121 = OUT VALUE 96
6122 = DISPLAY VALUE 96
6123 = CHANNEL 97
6130 = SELECT TOTALIZER 98
6131 = TOTALIZER OUT VALUE 98
6132 = OVERFLOW 98
6133 = CHANNEL 98
6134 = UNIT TOTALIZER 99
6135 = SET TOTALIZER 99
6136 = PRESET TOTALIZER 99
6137 = TOTALIZER MODE 100
6138 = CYCL. CALC. TOT. 100
6140 = SELECTION GSD 101
6141 = UNIT TO BUS 101
6160 = PROFILE VERSION 102
6161 = ACTUAL BAUDRATE 102
6162 = DEVICE ID 102
6163 = CHECK CONFIGURATION 102
6307 = WRITE PROTECT 95
6400 = ASSIGN LOW FLOW CUTOFF 103
6402 = ON-VALUE LOW FLOW CUTOFF 103
6403 = OFF-VALUE LOW FLOW CUTOFF 103
6404 = PRESSURE SHOCK SUPPRESSION 104
6420 = EMPTY PIPE DETECTION (EPD) 105
6425 = EPD RESPONSE TIME 107
6440 = ECC 108
6441 = ECC DURATION 108
6442 = ECC RECOVERY TIME 109
6443 = ECC CLEANING CYCLE 109
6481 = EPD ADJUSTMENT 110
6600 = INSTALLATION DIRECTION SENSOR 111
6601 = MEASURING MODE 111
6603 = SYSTEM DAMPING 111
6604 = INTEGRATION TIME 112
6605 = POSITIVE ZERO RETURN 112
6800 = CALIBRATION DATE 113
6801 = K-FACTOR 113
6803 = ZERO POINT 113
6804 = NOMINAL DIAMETER 114
6820 = MEASURING PERIOD 115
6821 = OVERVOLTAGE TIME 115
6822 = EPD ELECTRODE 116
6823 = POLARITY ECC 116

Functions 7...

7200 = BATCH SELECTOR 118
7201 = BATCH NAME 118
7202 = ASSIGN BATCH VARIABLE 119
7203 = BATCH QUANTITY 119
7204 = FIX COMPENSATION QUANTITY 119
7208 = BATCH STAGES 120
7209 = INPUT FORMAT 120
7220 = OPEN VALVE 1 121
7221 = CLOSE VALVE 1 121
7222 = OPEN VALVE 2 122
7223 = CLOSE VALVE 2 122
7240 = MAXIMUM BATCHING TIME 126
7241 = MINIMUM BATCHING QUANTITY 127
7242 = MAXIMUM BATCHING QUANTITY 128
7243 = PROGRESS NOTE 128
7244 = MAX. FLOW 129
7260 = BATCH PROCEDURE 130
7261 = BATCH UPWARDS 130
7262 = BATCH DOWNWARDS 130
7263 = BATCH COUNTER 131
7264 = BATCH SUM 131
7265= RESET TOTAL SUM/COUNTER 131
7280 = INTERNAL SWITCH POINT VALVE 1 132
7282 = CLOSING TIME VALVE 1 132
7282= BATCHING TIME 132

Functions 8...

8005 = ALARM DELAY 134
8006 = REMOVE SW-OPTION 134
8007 = PERMANENT STORAGE 134
8040 = ACTUAL SYSTEM CONDITION 135
8041 = PREVIOUS SYSTEM CONDITIONS 135
8042 = SIMULATION FAILSAFE MODE 135
8043 = SIMULATION MEASURAND 135
8044 = VALUE SIMULATION MEASURAND 136
8046 = SYSTEM RESET 136
8048 = OPERATION HOURS 136
8100 = DEVICE SOFTWARE 137
8200 = SERIAL NUMBER 137
8201 = SENSOR TYPE 137
8205 = SOFTWARE REV. NO. S-DAT 137
8222 = SOFTWARE REV. NO. AMPLIFIER 138
8225 = SOFTWARE REV. NO. T-DAT 138
8226 = LANGUAGE GROUP 138
8240 = STATUS F-CHIP 139
8241 = SYSTEM OPTION 139
8244 = SOFTWARE REV. NO. F-CHIP 139
8300 = I/O MODULE TYPE 139
8303 = SOFTWARE REV. NO. I/O MODULE 139
8340 = SUB IN-/OUTPUT TYPE 2 140
8343 = SW REV. NO. SUB IN-/OUTPUT TYPE 2 140
8360 = SUB IN-/OUTPUT TYPE 3 140
8363 = SW REV. NO. SUB IN-/OUTPUT TYPE 3 140
8380 = SUB IN-/OUTPUT TYPE 4 140
8383 = SW REV. NO. SUB IN-/OUTPUT TYPE 4 140

13 Index of key words

A

Active level (status input) 91
Actual
  Current (current output) 54
  Frequency 76
  Relay output 84
  Status input 92
  Status (pulse/frequency output) 78
Actual system condition 135
Additional configuration (system units) 14
Additional line
  Configuration 36
  Multiplex 38
Adjustment EPD/EED 110
Alarm delay 134
Amplifier (version info) 138
Assign
  Additional line 36
  Additional line (Multiplex) 38
  Current output 45
  Frequency (pulse/frequency output) 56
  Information line 40
  Information line (Multiplex) 42
  Low flow cutoff 103
  Main line 32
  Main line (Multiplex) 34
  Pulse output 66
  Relay (relay output) 80
  Status input 91
  Status (pulse/frequency output) 73
Assign Batch variable 119
Available functions 8

B

Basic configuration (user interface) 27
Basic function 94
Batch Counter 131
Batch Name 118
Batch Procedure 130
Batch quantity 119
  Downwards 130
  Upwards 130
Batch Selector 118
Batch Stages 120
Batch Sum 131
Batching function, configuration 118
Batching time 132
Block
  Basic function 94
  Display 26
  Inputs 90
  Measured variables 10
  Outputs 44
  Quick Setup 16
  Special function 117
  Supervision 133
Block selection 96
Block Supervision 133

C

Calibration Date 113
Channel
  Function blocks 97
  Totalizer 98
Check configuration 102
Close
  Valve 1 121
  Valve 2 122
Closing time Valve 1 132
Code
  Access 29
  Define private code 29
Commission 16
Compensation Quantity (fixed) 119
Configuration
  Additional line 36
  Batching function 118
  Current output 45
  Information line 40
  Main line 32
  Process parameter 103
  PROFIBUS DP/PA 95
  Pulse/frequency output 56
  Relay output 80
  Sensor data 113
  Status input 91
  System 134
  System parameter 111
  System units 12
Contrast LCD 28
Control
  Operation 31
  Unlocking/Locking 29
Current output
  Configuration 45
  Current span 46
  Information 55
  Operation 54
Cycl. Calc. Totalizer 100

D

Damping
- Display ... 27
- Relay, time constants ... 83
- Status output, time constants ... 75
- System, reaction time ... 111

Define private code ... 29
Density
- Density parameter (introduction) ... 15
- Density value (display) ... 11
- Density value (input) ... 15

Device ID ... 102
Device Software ... 137
Display ... 26
- Contrast LCD ... 28
- Display test ... 31
- Language selection ... 27
- Light (backlight) ... 28
- see display

Display lines of local operation ... 8
Display mode
- Additional line ... 37
- Additional line (Multiplex) ... 39
- Information line ... 41
- Information line (Multiplex) ... 43

Display value ... 96

E

Electrode cleaning
- see ECC

Electrode cleaning (ECC) ... 108
- Cleaning cycle ... 109
- Duration ... 108
- Parameter ... 108
- Polarity ... 116
- Recovery time ... 109

Empty pipe detection (EPD/OED)
- Empty/Full pipe adjustment ... 110
- EPD electrode ... 116
- General information ... 105, 106
- Response time ... 107
- Switching on/off ... 105, 106

End value frequency ... 57
EPD
- see Empty Pipe Detection (EPD/OED)

F

Factory settings ... 141
Failsafe mode
- Current output ... 53
- Frequency output ... 65
- Pulse output ... 72

Failsafe value ... 65
F-CHIP (version info) ... 139
Fieldbus address ... 95
Fix compensation quantity ... 119
Flow value ... 129
Format
- Additional line ... 37
- Additional line (Multiplex) ... 39
- Information line ... 41
- Information line (Multiplex) ... 43
- Main line ... 33
- Main line (Multiplex) ... 35

Format Date/Time ... 14
Function group
- Additional configuration (system units) ... 14
- Adjustment ... 110
- Amplifier ... 138
- Basic configuration (user interface) ... 27
- Configuration
  - Additional line ... 36
  - Batching function ... 118
  - Current output ... 45
  - Information line ... 40
  - Main line ... 32
  - Operation ... 115
  - Process parameter ... 103
  - PROFIBUS DP/PA ... 95
  - Pulse/Frequency output ... 56
  - Relay output ... 80
  - Sensor data ... 113
  - Status input ... 91
  - System ... 134
  - System parameter ... 111
  - System units ... 12
- Density parameter ... 15
- Device ... 137
- ECC parameter ... 108
- EPD parameter ... 105
- F-CHIP ... 139
- FUNCTION BLOCKS ... 96
- Information ... 102
  - Batching function ... 132
  - Current output ... 55
  - Pulse/Frequency output ... 79
  - Relay output ... 86
  - Status input ... 93
- Input/output (2...4) ... 140
- I/O Module ... 139
- Multiplex
  - Additional line ... 38
  - Information line ... 42
  - Main line ... 34
- Operation ... 101
  - Batching function ... 130
  - Current output ... 54
  - Display ... 31
  - Pulse/frequency output ... 76
  - Relay output ... 84
  - Status input ... 92
  - System ... 135
- Sensor ... 137

Function group (continued)
Supervision
Batching function 126
Totalizer (PROFIBUS DP/PA) 98
Unlocking/Locking (user interface) 29
Valve parameter
Batching function 121
Function Matrix
General layout 6
Identification code 7
Overview 9

G

Group
Additional line 36
Batching function 118
Control (User interface) 27
Current output 45
Information line 40
Main line 32
Measuring values 11
Process parameter 96
PROFIBUS DP/PA 95
Pulse/frequency output 56
Relay output 80
Sensor data 113
Special units 15
Status input 91
System 134
System parameter 111
System units 12
Version info 137

I

Illustration of function description 7
Information
Batching function 132
Current output 55
Pulse/frequency output 79
Relay output 86
Status input 93
Information line
Configuration 40
Multiplex 42
Input format 120
Inputs 90
Input/output 2...4 (version info) 140
Installation direction sensor 111
Integration time 112
Internal switch point valve 1 132

K

K-Factor 113

L

Language
Factory settings (country) 142
Language group (display) 138
Options 27
LCD contrast 28
Local operation (display lines) 8
Low flow cutoff 103

M

Main line
Configuration 32
Multiplex 34
Mass flow (calculated) 11
Maximum 129
Maximum Batching quantity 128
Maximum Batching time 126
Measured variables (block A) 10
Measuring mode
Current output 50, 51
Frequency (pulse/frequency output) 60, 61
Pulse output 68
Relay output 82
Status (pulse/frequency output) 75
Measuring period, sensor 115
Measuring values 11
Minimum Batching quantity 127
Minimum Pulse width 91
Monitoring, batching function 126
Multiplex
Additional line 38
Information line 42
Main line 34

N

Nominal diameter 114

O

OED (Open Electrode Detection)
see Empty Pipe Detection (EPD/OED) 105, 106
Off value
Low flow cutoff 103
Relay output 81
Status (pulse/frequency output) 74
On value
Low flow cutoff 103
Relay output 81
Status (pulse/frequency output) 73
Open

Operation
Basic configuration 27
Batching function 130
Current output 54
Display 31
Pulse/frequency output 76
Relay output 84
Sensor data 115
Status input 92
System 135
Operation hours 136
Operation mode
Pulse/frequency output 56
Options
Totalizer 98
OUT Value 96
Output signal
Frequency output 62, 63, 64
Pulse output 69, 70, 71
Outputs 44
Overflow 98
Overvoltage time field coils 115

P

Permanent Storage 134
Polarity ECC 116
Positive zero return 112
Preset Totalizer 99
Pressure shock suppression 104
Previous system condition 135
Process parameter
Adjustment 110
Configuration 103
ECC parameter 108
EPD parameter 105
PROFIBUS DP/PA 95
Profile version 102
Progress note 128
Pulsating flow 16
Pulse value 66
Pulse Width 67
Pulse/frequency output
Configuration 56
Information 79
Operation 76

Q

Quick Setup
Batching/Dosing 16
Commission 16
Communication 16
Pulsating flow 16
Quick Setup (Block B) 16

R

Relay output
Configuration 80
General 87
Information 86
Operation 84
Switching response 88
Remove SW-option 134
Reset
System 136
Total sum/counter 131

S

Selection GSD 101
Sensor
Configuration 113
Installation direction sensor 111
K-Factor 113
Measuring period 115
Operating data 115
Overvoltage time 115
see sensor
Version info 137
Zero point 113
Sensor (version info) 137
Serial number sensor 137
Set Totalizer 99
Simulation
Current (current output) 54
Failsafe mode 135
Frequency 76
Measured variable 135
Pulse 77
Relay output switch point 84
Status input 92
Switch point status (pulse/frequency output) 78
Software revision number
Amplifier 138
F-CHIP 139
I/O Module 139
S-DAT 137
T-DAT 138
Special units
Arbitrary unit 15
Density parameter 15
Start value frequency 57
Status access 29
Status F-CHIP 139
Status input
Configuration 91
Information 93
Operation 92
Switching response of the relay output 88
Switch-off delay
Relay output 82
Status (pulse/frequency output) 74
Switch-on delay
Relay output 81
Status (pulse/frequency output) 74

System
Configuration 134
Damping 111
Operation 135
Operation hours 134, 136
Reset 136
System condition
Actual 135
Previous 135
System option (additional software) 139
System parameters, configuration 111
System units
Additional configuration 14
Configuration 12

T

Tag Name 95
T-DAT Save/Load 17
Terminal number
Current output 55
Pulse/frequency output 79
Relay output 86
Status input 93
Test display 31
Time constant
Current output 52
Frequency output 65
Relay output 83
Status (pulse/frequency output) 75
Totalizer Mode 100
Totalizer out value 98
Totalizer unit 99
Type
Input/output 2...4 140
Type I/O Module 139

U

Unit
Density 14
Length 14
Mass 12
Mass flow 12
Volume 13
Volume flow 13
Unlocking/Locking (user interface) 29

V

Value F High 58, 59
Value F Low 58
Value simulation
Current (current output) 54
Frequency 76
Measured variable 136
Pulse 77
Relay output switch point 85
Status input 92
Switch point status (pulse/frequency output) 78
Value 0_4 mA
Current output 47, 48
Value 20 mA
Current output 49
Valve parameter, batching function 121
Version info
Amplifier 138
F-CHIP 139
Input/output 2...4 140
I/O Module 139
Sensor 137
Volume flow 11

W

Write protect 95

Z

Zero point 113

Numbers

100% value flow
Additional line 37
Additional line (Multiplex) 39
Information line 41
Information line (Multiplex) 43
Main line 33
Main line (Multiplex) 34

www.endress.com/worldwide

Endress+Hauser

People for Process Automation

BA054D/06/en/06.10
71116504
FM+SGML6.0