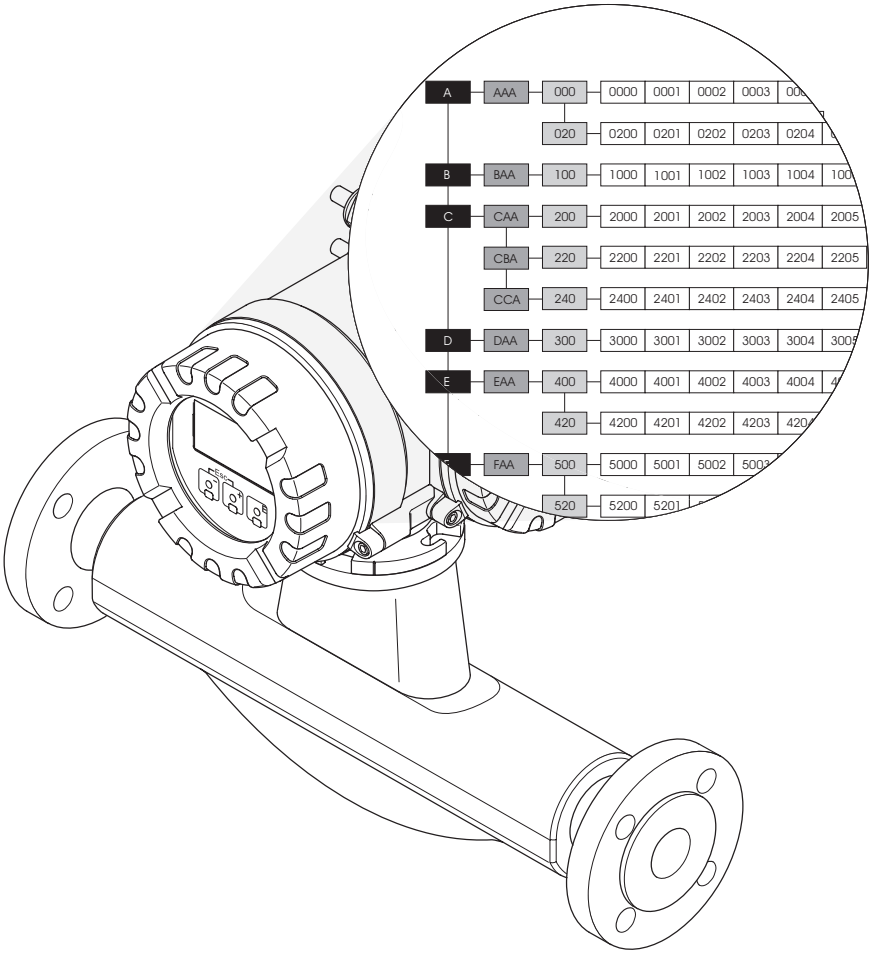
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Description of Device Functions

Proline Promass 83 FOUNDATION Fieldbus

Coriolis Mass Flow Measuring System

Fieldbus™ Foundation



BA066D/06/en/11.08
71085228
Valid as of version:
V 2.00.XX (Device software)

Endress+Hauser

People for Process Automation

Operation Proline Promass 83 FOUNDATION Fieldbus

Table of contents for local operation

1 Notes on 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 MEASURED VARIABLES, USER INTERFACE, TOTALIZER, 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

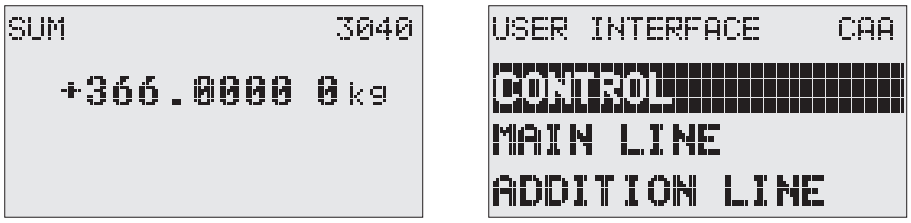
This step-by-step, top-down approach starts with the blocks, the highest level, and factory down through the matrix to the description of the function you need:

1. All available blocks and their corresponding subgroups are shown on page 8. 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:



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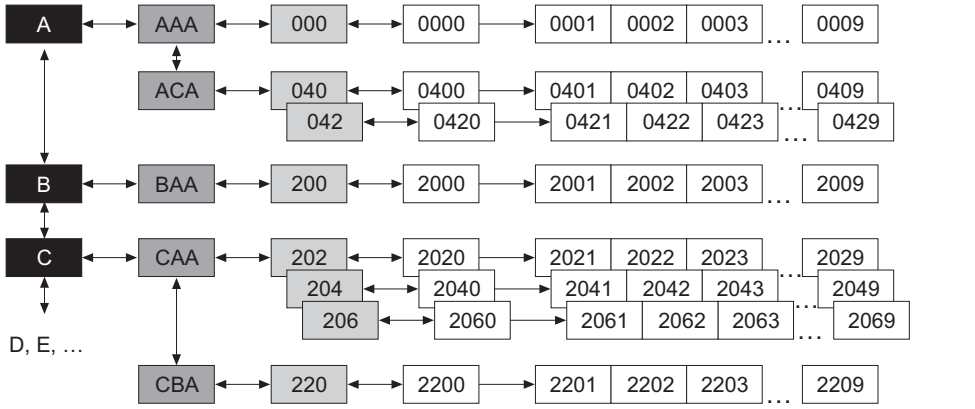
The function matrix index lists the codes for all the available "cells" in alphabetic and consecutive order, complete with the page references for the corresponding functions. The index to the function matrix is on page 95.

2 Function matrix

2.1 General layout of the function matrix

The function matrix consists of four levels:

Blocks → Groups → Function groups → Functions



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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, ADDITION 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. The function groups in the CONTROL group, for example, include: BASIC CONFIGURATION, UN-/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 USER INTERFACE block
2. Select the CONTROL group
3. Select the BASIC CONFIGURATION function group
4. Select the LANGUAGE function (this is where the language can be selected).

2.1.5 Codes identifying cells

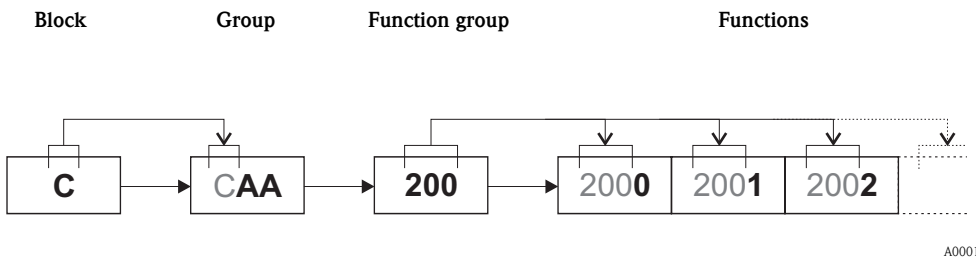
Each cell (block, group, function group and function) in the function matrix has an individual, unique code.

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", in other words A _ _; the codes of the groups in block B start with a "B", in other words B_ _ , and so on). 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).



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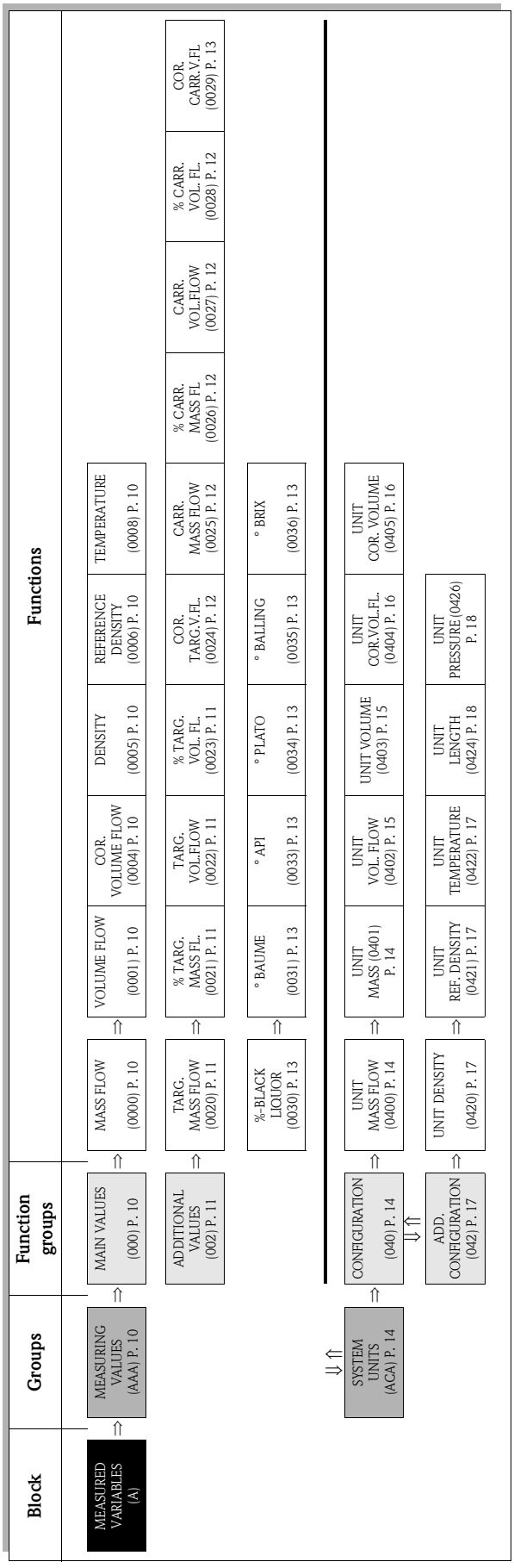
2.2 Function matrix Proline Promass 83

BLOCKS		GROUPS			FUNCTION GROUPS
MEASURED VARIABLES (→ Page 9)	**A**	MEASURING VALUES	AAA	→	page 10
		SYSTEM UNITS	ACA	→	page 14
		SPECIAL UNITS	AEA	→	page 14
QUICK SETUP (→ Page 9)	**B**	Commissioning and application setups		→	page 84
USER INTERFACE (→ Page 23)	**C**	CONTROL	CAA	→	page 24
		MAIN LINE	CCA	→	page 28
		ADDITION LINE	CEA	→	page 32
		INFORMATION LINE	CGA	→	page 38
TOTALIZER (→ Page 44)	**D**	TOTALIZERS (1 to 3)	DAA, -B, -C	→	page 45
		HANDLING TOTALIZER	DJA	→	page 48
BASIC FUNCTION (→ Page 49)	**G**	FOUNDATION FIELDBUS	GGA	→	page 50
		PROCESS PARAMETER	GIA	→	page 53
		SYSTEM PARAMETER	GLA	→	page 61
		SENSOR DATA	GNA	→	page 62
SPECIAL FUNCTION (→ Page 66)	**H**	DENSITY FUNCTIONS	HAA	→	page 67
		ADVANCED DIAGNOSTICS	HEA	→	page 73
SUPERVISION (→ Page 84)	**J**	SYSTEM	JAA	→	page 85
		VERSION INFO	JCA	→	page 88

3 Block MEASURED VARIABLES



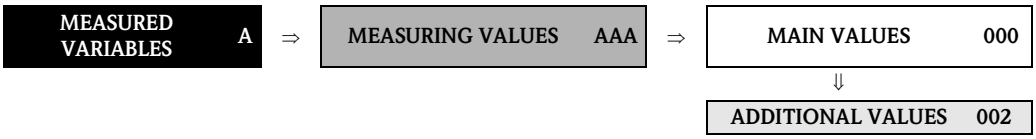
3.1 Group MEASURING VALUES

3.1.1 Function group MAIN VALUES

MEASURED VARIABLES A ⇒ MEASURING VALUES AAA ⇒ MAIN VALUES 000

Function description MEASURED VARIABLES → MEASURING VALUES → MAIN VALUES	
✎ 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.	
MASS FLOW (0000)	The currently measured mass flow appears on the display. **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 calculated volume flow appears on the display. The volume flow is derived from the measured mass flow and the measured density of the fluid. **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.)
CORRECTED VOLUME FLOW (0004)	The calculated corrected volume flow appears on the display. The calculated corrected volume flow is derived from the measured mass flow and the reference density of the fluid (density at reference temperature, measured or fixed entry). **Display:** 5-digit floating-point number, including unit and sign (e.g. 1.3549 Nm^3/h; 7.9846 scm/day; etc.)
DENSITY (0005)	The currently measured density or its specific gravity appears on the display. **Display:** 5-digit floating point number, including unit (e.g. 1.2345 kg/dm^3; 993.5 kg/m^3; 1.0015 SG_20 °C; etc.)
REFERENCE DENSITY (0006)	The density of the fluid, at reference temperature, appears on the display. The reference density can be calculated with the measured density or specified by means of the FIXED REF. DENSITY function (6461). **Display:** 5-digit floating point number, including unit (e.g. 1.2345 kg/dm^3; 993.5 kg/m^3; 1.0015 SG_20 °C; etc.)
TEMPERATURE (0008)	The currently measured temperature appears on the display. **Display:** Max. 4-digit fixed-point number, including unit and sign (e.g. –23.4 °C; 160.0 °F; 295.4 K; etc.)

3.1.2 Function group ADDITIONAL VALUES



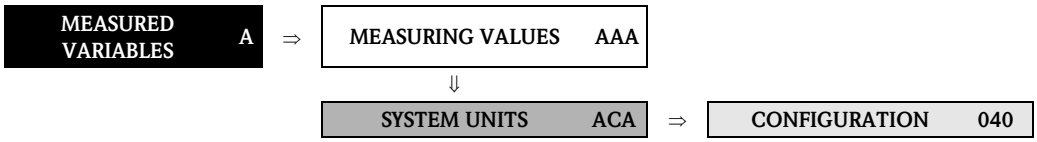
Function description MEASURED VARIABLES → MEASURING VALUES → ADDITIONAL VALUES	
TARGET MASS FLOW (0020)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7021) the option % MASS 2D or % MASS 3D. Use this function to display the currently measured mass flow of the target fluid. Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
% TARGET MASS FLOW (0021)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7021) the option % MASS 2D or % MASS 3D. In this function, the currently measured mass flow of the target fluid is displayed as a % (of the overall mass flow). Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
TARGET VOLUME FLOW (0022)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7010) the option % VOLUME 2D or % VOLUME 3D. In this function, the currently measured volume flow of the target fluid is displayed. Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
% TARGET VOLUME FLOW (0023)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7010) the option % VOLUME 2D or % VOLUME 3D. Use this function to display the currently measured volume flow of the target fluid as a % (of the overall volume flow). Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign

Function description MEASURED VARIABLES → MEASURING VALUES → ADDITIONAL VALUES	
CORRECTED TARGET VOLUME FLOW (0024)	✎ Note! This function is not available unless % MASS / % VOLUME was selected in the DENSITY FUNCTION function (7000). Use this function to display the currently measured corrected volume flow of the target fluid. Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
CARRIER MASS FLOW (0025)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7021) the option % MASS 2D or % MASS 3D. Use this function to display the currently measured mass flow of the carrier fluid. Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
% CARRIER MASS FLOW (0026)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7021) the option % MASS 2D or % MASS 3D. Use this function to display the currently measured mass flow of the carrier fluid as a % (of the overall mass flow). Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
CARRIER VOLUME FLOW (0027)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7021) the option % VOLUME 2D or % VOLUME 3D. Use this function to display the currently measured volume flow of the carrier fluid. Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
% CARRIER VOLUME FLOW (0028)	✎ Note! This function is not available unless one of the following was selected: ■ In the DENSITY FUNCTION function (7000): – % MASS / % VOLUME – FLEXIBLE and in the MODE function (7021) the option % VOLUME 2D or % VOLUME 3D. Use this function to display the currently measured volume flow of the carrier fluid as a % (of the overall mass flow). Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign

Function description MEASURED VARIABLES → MEASURING VALUES → ADDITIONAL VALUES	
CORRECTED CARRIER VOLUME FLOW (0029)	✎ Note! This function is not available unless % MASS / % VOLUME was selected in the DENSITY FUNCTION function (7000). Use this function to display the currently measured corrected volume flow of the carrier fluid. Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
%-BLACK LIQUOR (0030)	✎ Note! This function is not available unless %-BLACK LIQUOR was selected in the DENSITY FUNCTION function (7000). The concentration in %-BLACK LIQUOR is displayed. **Display:** 5-digit floating-point number, incl. units
° BAUME (0031)	✎ Note! This function is not available unless °BAUME was selected in the DENSITY FUNCTION function (7000). The concentration in °BAUME is displayed. **Display:** 5-digit floating-point number, incl. units
° API (0033)	✎ Note! This function is not available unless °API was selected in the DENSITY FUNCTION function (7000). The concentration in °API is displayed. **Display:** 5-digit floating-point number, incl. units
° PLATO (0034)	✎ Note! This function is not available unless °PLATO was selected in the DENSITY FUNCTION function (7000). The concentration in °PLATO is displayed. **Display:** 5-digit floating-point number, incl. units
° BALLING (0035)	✎ Note! This function is not available unless °BALLING was selected in the DENSITY FUNCTION function (7000). The concentration in °BALLING is displayed. **Display:** 5-digit floating-point number, incl. units
° BRIX (0036)	✎ Note! This function is not available unless °BRIX was selected in the DENSITY FUNCTION function (7000). The concentration in °BRIX is displayed. **Display:** 5-digit floating-point number, incl. units

3.2 Group SYSTEM UNITS

3.2.1 Function group CONFIGURATION

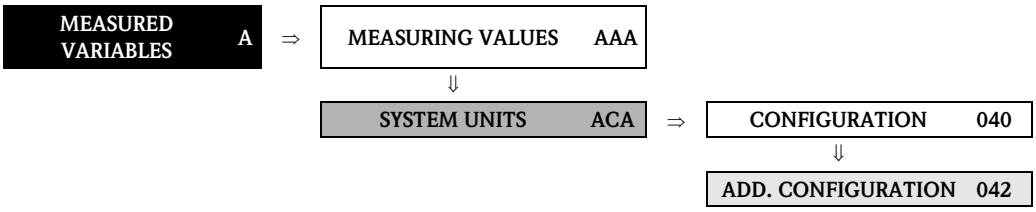


Function description MEASURED VARIABLES → SYSTEM UNITS → CONFIGURATION	
You can select the units for measured variables in this function group. ✎ Note! The units selected here have no effect on the fieldbus. They are only used for the local display and for assigned instrument functions.	
UNIT MASS FLOW (0400)	Use this function to select the unit for displaying the mass flow (mass/time). The unit you select here is also valid for: ▪ Switching 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 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 country (kg/h or US-lb/min)
UNIT MASS (0401)	Use this function to select the unit for displaying the mass. The unit you select here is also valid for: ▪ Pulse weighting (e.g. kg/p) **Options:** Metric → g; kg; t US → oz; lb; ton **Factory setting:** Depends on country (kg or US-lb) ✎ 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: ■ Switching 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 country (m^3/h or US-Mgal/day)
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:** m^3 ✎ 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 CORRECTED VOLUME FLOW (0404)	Use this function to select the unit for displaying the corrected volume flow (corrected volume/time). The unit you select here is also valid for: ■ Switching points (limit value for corrected volume flow, flow direction) ■ Low flow cut off **Options:** Metric → Nl/s; Nl/min; Nl/h; Nl/day; Nm^3/s; Nm^3/min; Nm^3/h; Nm^3/day US → Sm^3/s; Sm^3/min; Sm^3/h; Sm^3/day; Scf/s; Scf/min; Scf/h; Scf/day **Factory setting:** Nm^3/h
UNIT CORRECTED VOLUME (0405)	Use this function to select the unit for displaying the corrected volume. The unit you select here is also valid for: ■ Pulse weighting (e.g. Nm^3/p) **Options:** Metric → Nm^3; Nl US → Sm^3; Scf **Factory setting:** Nm^3 ✎ 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	
✎ Note! The units selected here have no effect on the fieldbus. They are only used for the local display and for assigned instrument functions.	
UNIT DENSITY (0420)	Use this function to select the unit for displaying the fluid density. The unit you select here is also valid for: ■ Switching points (limit value for density) ■ Density response value for EPD ■ Density adjustment value **Options:** Metric → g/cm^3; g/cc; 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 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 REFERENCE DENSITY (0421)	Use this function to select the unit for displaying the reference density. The unit you select here is also valid for: ■ Switching points (limit value for density) ■ Fixed reference density (for calculation of corrected volume flow) **Options:** Metric → kg/Nm^3; kg/Nl US → g/Scc; kg/Sm^3; lb/Scf **Factory setting:** kg/Nl
UNIT TEMPERATURE (0422)	Use this function to select the unit for displaying the temperature. The unit you select here is also valid for: ■ Switching points (limit value for temperature) ■ Reference temperature (for corrected volume measurement with measured reference density) **Options:** °C (Celsius) K (Kelvin) °F (Fahrenheit) R (Rankine) **Factory setting:** °C

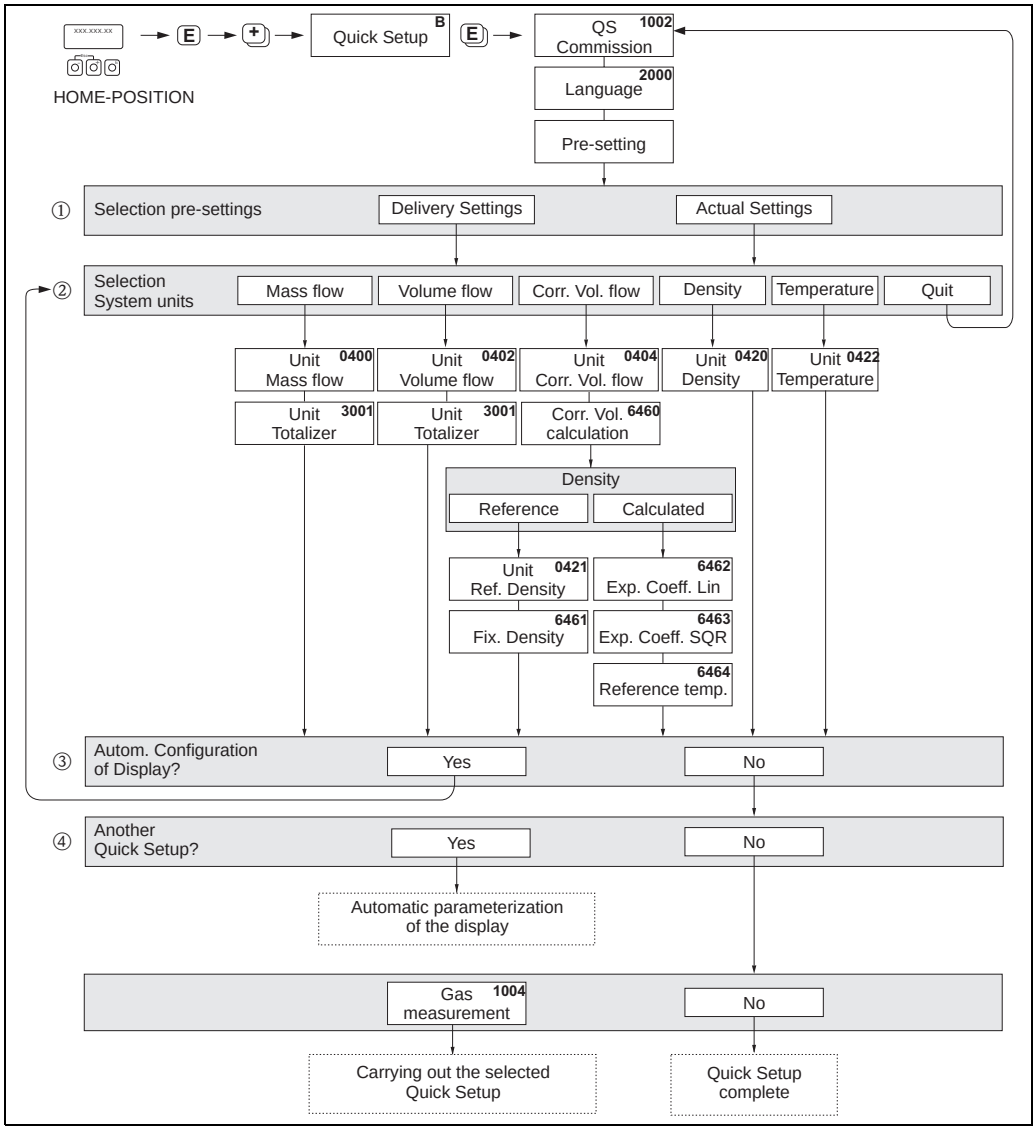
Function description MEASURED VARIABLES → SYSTEM UNITS → ADDITIONAL CONFIGURATION	
UNIT LENGTH (0424)	Use this function to select the unit for displaying the length of the nominal diameter. The unit you select here is valid for: ■ Nominal diameter of the sensor (→ NOMINAL DIAMETER function (6804)) **Options:** MILLIMETER INCH **Factory setting:** MILLIMETER
UNIT PRESSURE (0426)	Use this function to select the unit for pressure. The unit you select here is valid for: ■ Specified pressure (→ PRESSURE function (6501)) **Options:** bar a bar g psi a psi g **Factory setting:** bar g

4 Block QUICK SETUP

Block	Group	Function groups	Functions
QUICK SETUP (B)	⇒	⇒	QS COMMISS. (1002) P. 19 ⇒ QS-GAS MEASURE (1004) P. 19 | T-DAT SAVE/LOAD (1009) P. 19

Function description QUICK SETUP	
QUICK SETUP COMMISSIONING (1002)	Use this function to start the Setup menu for commissioning. **Options:** YES NO **Factory setting:** NO ✎ Note! You will find a flowchart of the COMMISSIONING setup menu on page 20. For more information on Setup menus, please refer to the Operating Instructions for Proline Promass 83, BA065D/06/en.
QUICK SETUP GAS MEASUREMENT (1004)	Use this function to start the application-specific Setup menu for the gas measurement. **Options:** YES NO **Factory setting:** NO ✎ Note! You will find a flowchart of the GAS MEASUREMENT setup menu on page 21. For more information on Setup menus, please refer to the Operating Instructions Proline Promass 83, BA065D/06/en.
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 safety 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 during startup. Then only the SAVE function is available. ■ LOAD This option 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 option is always available.

4.1 Quick Setup "Commissioning"



① Selecting DELIVERY SETTINGS returns each selected unit to the factory setting.
Selecting ACTUAL SETTING applies the units you have set previously.

② Only units not yet configured in the current Setup are offered for selection in each cycle. The unit for mass, volume and corrected volume is derived from the corresponding flow unit.

③ The YES option remains visible until all the units have been configured.
NO is the only option displayed when no further units are available.

④ The "automatic parameterization of the display" option contains the following basic settings/ factory settings:

YES Main line = Mass flow
Additional line = Totalizer 1
Information line = Operating/system condition

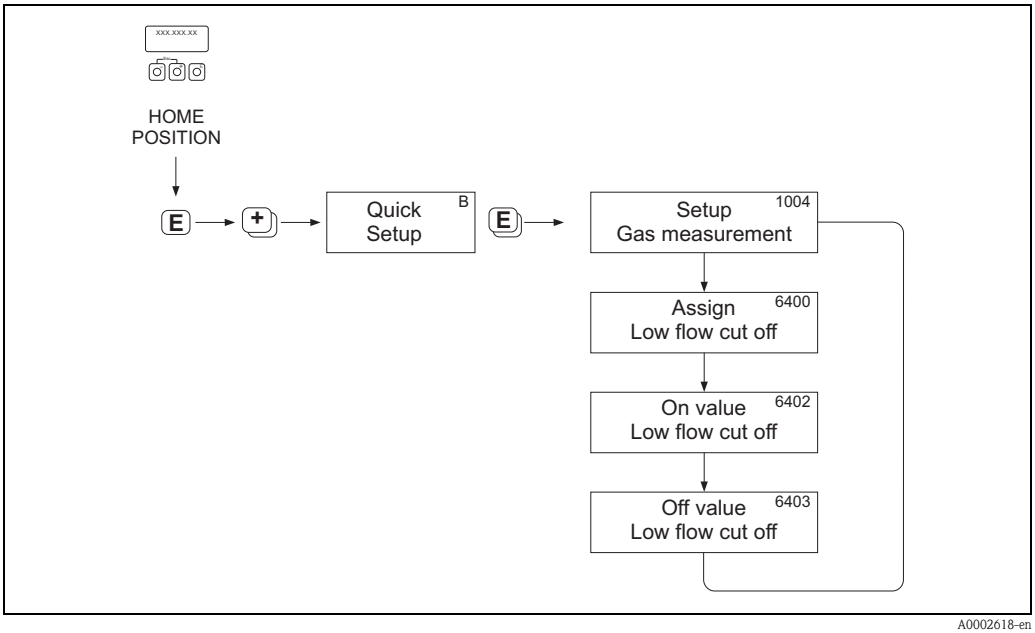
NO The existing (selected) settings remain.

✎ Note!

- The display returns to the cell QUICK SETUP COMMISSIONING (1002) if you press the ⊡+⊡ key combination during parameter interrogation. The stored parameters remain valid.
- The system units selected via the Quick Setup are only valid for displaying on the local display and for parameters in the Transducer Blocks. They have no effect on the process variables which are transmitted via the FOUNDATION Fieldbus.

4.2 Quick Setup "Gas Measurement"

Note!
The procedure is described in detail in the Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D/06/en.



A0002618-en

Settings for the Gas Measurement Setup menu:

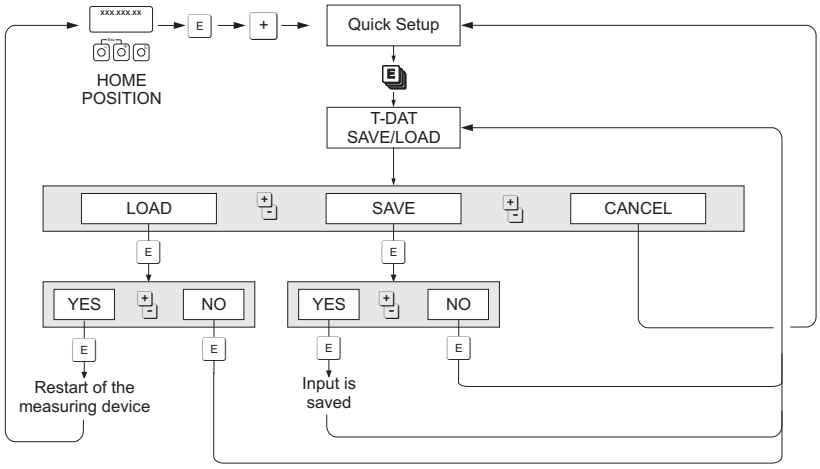
Fct. code	Function name	Suggested settings	Description
Call up through the function matrix:			
B	QUICK SETUP	QS-GAS MEASURE	→ Page 19
1004	QS-GAS MEASURE	YES	→ Page 19
Basic configuration:			
6420	EMPTY PIPE DETECTION	No entry possible, the selection changes automatically to OFF.	→ Page 55
6400	ASSIGN LOW FLOW CUT OFF	For gas measurement we recommend to switch off the low flow cut off. OFF	→ Page 53
6402	ON-VALUE LOW FLOW CUT OFF	If you do not switch off the low flow cut off: 0.0000	→ Page 53
6403	OFF-VALUE LOW FLOW CUT OFF	If you do not switch off the low flow cut off: 50%	→ Page 53

4.3 Data back-up/transfer

You can use the T-DAT SAVE/LOAD function to transfer data (device parameters and settings) between the T-DAT (removable memory) and the EEPROM (device memory).

This is required for the following applications:
- Creating a backup: current data are transmitted from an EEPROM to the T-DAT.
- Replacing a transmitter: current data are copied from an EEPROM to the T-DAT, then transmitted to the EEPROM of the new transmitter.
- Duplicating data: current data are copied from an EEPROM to the T-DAT, then transmitted to EEPROMs of identical measuring points.

Note!
Installing and removing the T-DAT → Operating Instructions of the Promass 83 (BA065D)



Data storage/transmission with T-DAT SAVE/LOAD

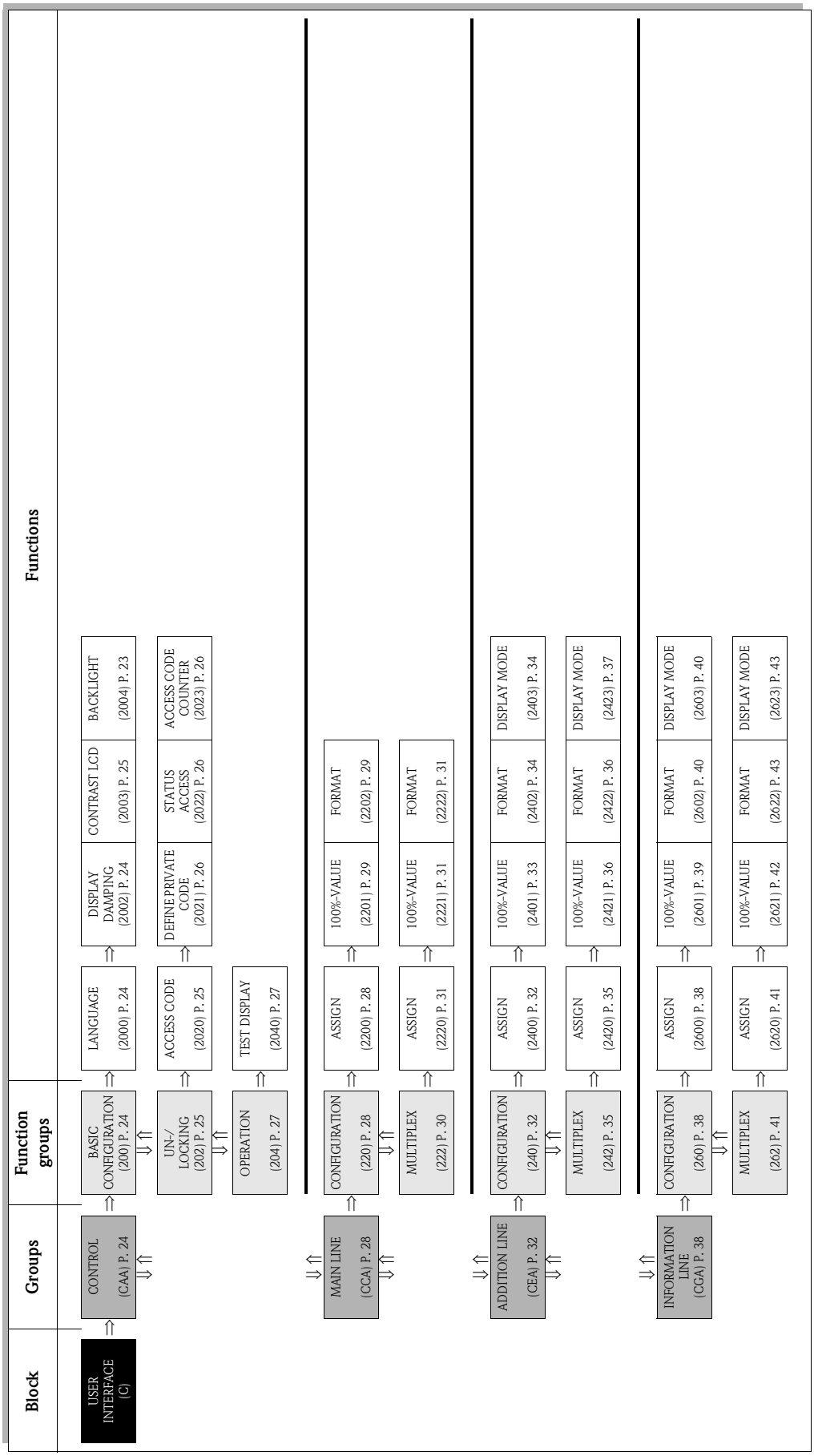
Notes on the LOAD and SAVE options:

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

Note!
- Previously saved settings on the EEPROM are deleted.
- This selection is available only if the T-DAT contains valid data.
- This selection can be made only 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 the restart and the LOAD function is subsequently no longer available.

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

5 Block USER INTERFACE



5.1 Group CONTROL

5.1.1 Function group BASIC CONFIGURATION

USER INTERFACE ⇒ 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 (syllabary) Language group CHINA: ENGLISH CHINESE **Factory setting:** Depends on country → Page 91 ff. ✎ Note! ■ If you press the ⊞/⊟ keys at startup, the language defaults to "ENGLISH". ■ You can change the language group via the configuration software 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 to 100 seconds **Factory setting:** 1 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 to 100% **Factory setting:** 50%
BACKLIGHT (2004)	Use this function to optimize the backlight to suit local operating conditions. **User input:** 0 to 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)	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 = 83, see function DEFINE PRIVATE CODE (2021)). **User input:** Max. 4-digit number: 0 to 9999 ✎ Note! ■ The programming levels are 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. ■ In this function, access to programming is only valid for local configuration. If functions or parameters are to be changed via the fieldbus, programming must be enabled separately in the parameter "Access - code" (→ Page 117).

Function description USER INTERFACE → CONTROL → UNLOCKING/LOCKING	
DEFINE PRIVATE CODE (2021)	Use this function to specify a personal code for enabling programming in the function ACCESS CODE. **User input:** 0 to 9999 (max. 4-digit number) **Factory setting:** 83 ✎ Note! ■ If the code number is "0", programming is always enabled. ■ 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 enabled) LOCKED (parameterization disabled)
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 to 9999999 **Factory setting:** 0

5.1.3 Function group OPERATION

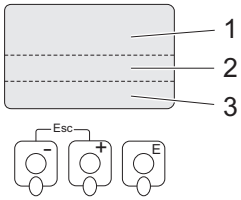
USER INTERFACE C ⇒ CONTROL CAA ⇒ BASIC CONFIGURATION 200
⇓
UNLOCKING/LOCKING 202
⇓
OPERATION 204

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 second. 3. Main line, additional line and information line show an "8" in each field for minimum 0.75 second. 4. Main line, additional line and information line show a "0" in each field for minimum 0.75 second. 5. Main line, additional line and information line show nothing (blank display) for minimum 0.75 second. When the test completes the local display returns to its initial state and the setting changes to OFF.

5.2 Group MAIN LINE

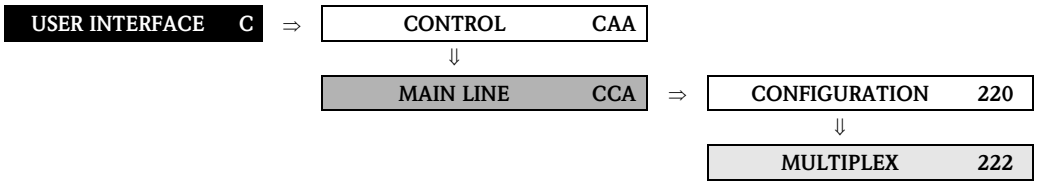
5.2.1 Function group CONFIGURATION

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 (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS_IN VALUE (external set point) PID - OUT VALUE (manipulated variable) **Factory setting:** MASS FLOW (Continued on next page)

Function description USER INTERFACE → MAIN LINE → CONFIGURATION	
ASSIGN (continued)	**Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX **Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION
100%-VALUE **(2201)**	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2200): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW 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 → Page 91 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.

5.2.2 Function group MULTIPLEX

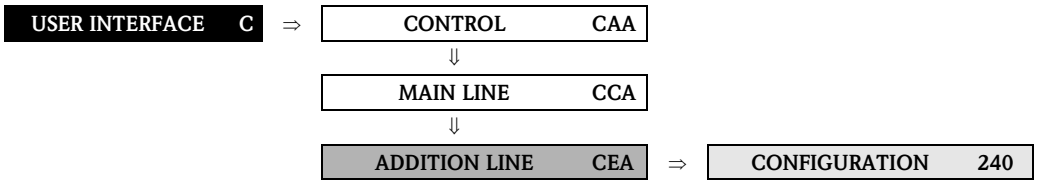


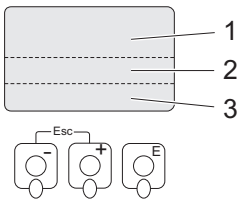
Function description USER INTERFACE → MAIN LINE → MULTIPLEX	
ASSIGN (2220)	Use this function to define the second reading to be displayed in the main line alternately (every 10 seconds) with the value defined in the ASSIGN function (2200). **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS_IN VALUE (external set point) PID - OUT VALUE (manipulated variable) **Factory setting:** OFF **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX (Continued on next page)

Function description USER INTERFACE → MAIN LINE → MULTIPLEX	
ASSIGN (continued)	**Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION
100%-VALUE **(2221)**	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2220): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW 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 → Page 91 ff.
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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.

5.3 Group ADDITION LINE

5.3.1 Function group CONFIGURATION

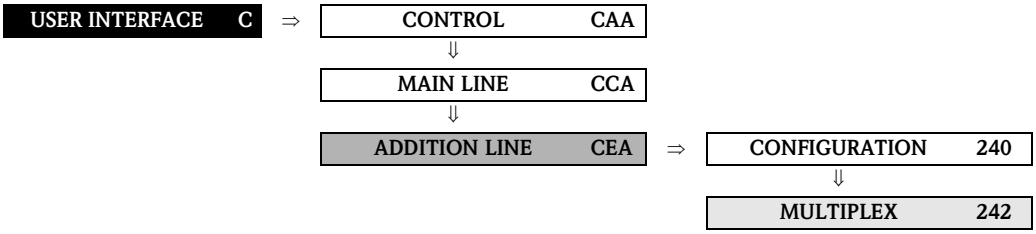


Function description USER INTERFACE → ADDITION LINE → CONFIGURATION	
 A0001253 1 = main line, 2 = additional line, 3 = information line	
ASSIGN (2400)	In this function, a value to be displayed is assigned to the additional line (middle line in the local display). This value is displayed during normal operation. **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % TOTALIZER (1 to 3) AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS_IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** TOTALIZER 1 (Continued on next page)

Function description USER INTERFACE → ADDITION LINE → CONFIGURATION	
ASSIGN (continued)	**Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX **Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION
100%-VALUE **(2401)**	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2400): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH 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 → Page 91 ff.

Function description USER INTERFACE → ADDITION LINE → CONFIGURATION	
FORMAT (2402)	✎ Note! This function is not available unless a number was selected in the ASSIGN function (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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.
DISPLAY MODE (2403)	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2400): ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % 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



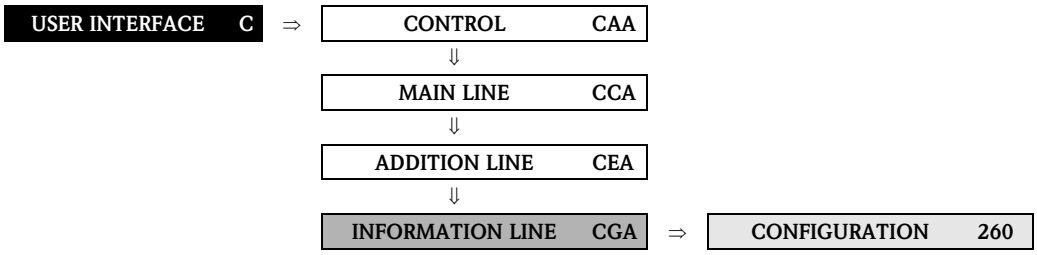
Function description USER INTERFACE → ADDITION LINE → MULTIPLEX	
ASSIGN (2420)	Use this function to define the second reading to be displayed in the additional line alternately (every 10 seconds) with the value defined in the ASSIGN function (2400). **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % TOTALIZER (1 to 3) AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS_IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** OFF **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX (Continued on next page)

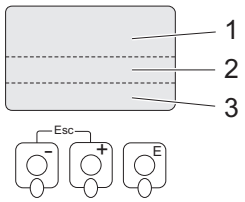
Function description USER INTERFACE → ADDITION LINE → MULTIPLEX	
ASSIGN (continued)	**Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION ✎ Note! Multiplex mode is suspended as soon as a fault/notice message is generated. The message in question appears on the display. ■ Fault message (identified by a lightning icon): Multiplex mode is resumed as soon as the fault is no longer active. ■ Notice message (identified by an exclamation mark): Multiplex mode is resumed as soon as the notice message is no longer active.
100%-VALUE **(2421)**	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2420): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH 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 → Page 91 ff.
FORMAT **(2422)**	✎ Note! This function is not available unless a number was selected in the ASSIGN function (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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.

Function description USER INTERFACE → ADDITION LINE → MULTIPLEX	
DISPLAY MODE (2423)	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2420): ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % 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

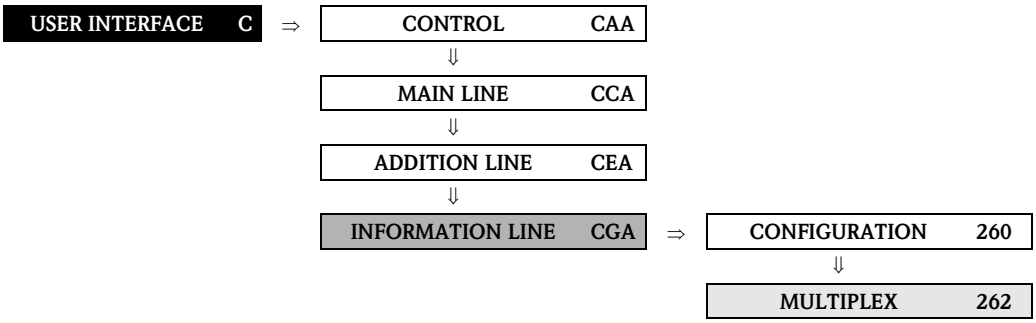


Function description USER INTERFACE → INFORMATION LINE → CONFIGURATION	
 A0001253 1 = main line, 2 = additional line, 3 = information line	
ASSIGN (2600)	In this function, a value to be displayed is assigned to the information line (bottom line in the local display). This value is displayed during normal operation. **Options:** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % TOTALIZER (1 to 3) OPERATING/SYSTEM CONDITIONS FLOW DIRECTION READING AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS_IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** OPERATING/SYSTEM CONDITIONS (Continued on next page)

Function description USER INTERFACE → INFORMATION LINE → CONFIGURATION	
ASSIGN (continued)	**Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX **Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION
100%-VALUE **(2601)**	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2600): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH 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 → Page 91 ff.

Function description USER INTERFACE → INFORMATION LINE → CONFIGURATION	
FORMAT (2602)	✎ Note! This function is not available unless a number was selected in the ASSIGN function (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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.
DISPLAY MODE (2603)	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2600): ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % 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

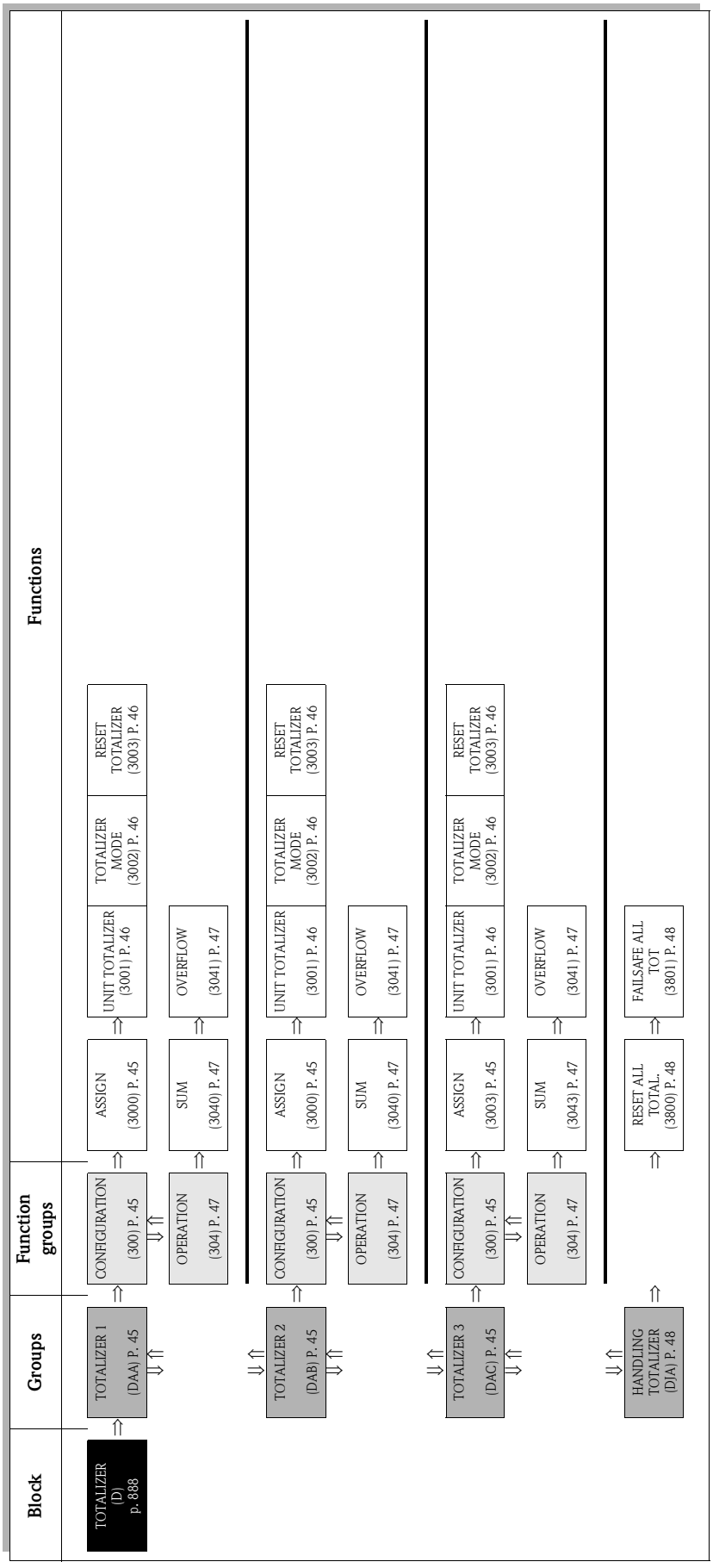


Function description USER INTERFACE → INFORMATION LINE → MULTIPLEX	
ASSIGN (2620)	Use this function to define the second reading to be displayed in the information line alternately (every 10 seconds) with the value defined in the ASSIGN function (2600). **Options:** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % TOTALIZER (1 to 3) OPERATING/SYSTEM CONDITION FLOW DIRECTION READING AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS_IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** OFF (Continued on next page)

Function description USER INTERFACE → INFORMATION LINE → MULTIPLEX	
ASSIGN (2620) (Continued)	**Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX **Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION ✎ Note! Multiplex mode is suspended as soon as a fault/notice message is generated. The message in question appears on the display. ■ Fault message (identified by a lightning icon): Multiplex mode is resumed as soon as the fault is no longer active. ■ Notice message (identified by an exclamation mark): Multiplex mode is resumed as soon as the notice message is no longer active.
100%-VALUE (2621)	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2620): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH 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 → Page 91 ff.

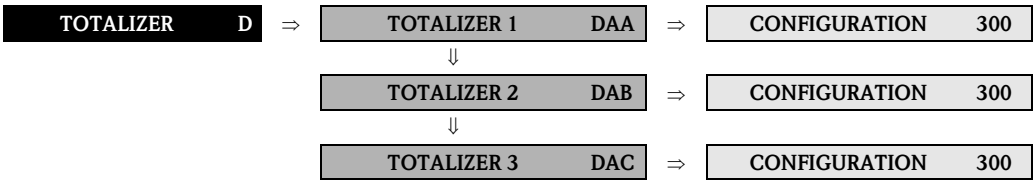
Function description USER INTERFACE → INFORMATION LINE → MULTIPLEX	
FORMAT (2622)	✎ Note! This function is not available unless a number was selected in the ASSIGN function (2620). Use this function to define the maximum number of places after the decimal point for the second value displayed in the information 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.
DISPLAY MODE (2623)	✎ Note! This function is not available unless one of the following was selected in the ASSIGN function (2620): ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % 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

6 Block TOTALIZER



6.1 Group TOTALIZERS (1 to 3)

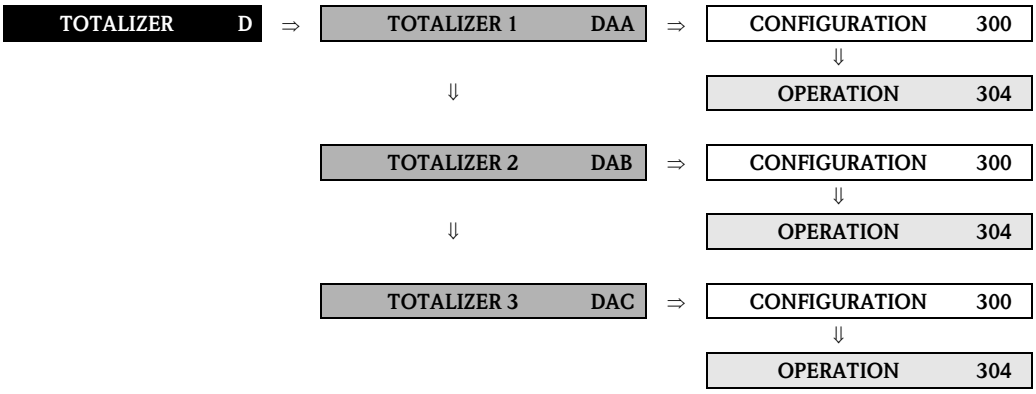
6.1.1 Function group CONFIGURATION



Function description TOTALIZER → TOTALIZERS (1 to 3) → CONFIGURATION	
The function descriptions below apply to totalizers 1 to 3; the totalizers are independently configurable.	
ASSIGN (3000)	Use this function to assign a measured variable to the totalizer. **Options (standard):** OFF MASS FLOW VOLUME FLOW CORRECTED VOLUME FLOW **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW **Factory setting:** MASS FLOW ✎ Note! ■ The totalizer is reset to "0" as soon as the selection is changed. ■ If you select OFF, the ASSIGN function (3000) is the only function shown in the CONFIGURATION function group of the totalizer in question.

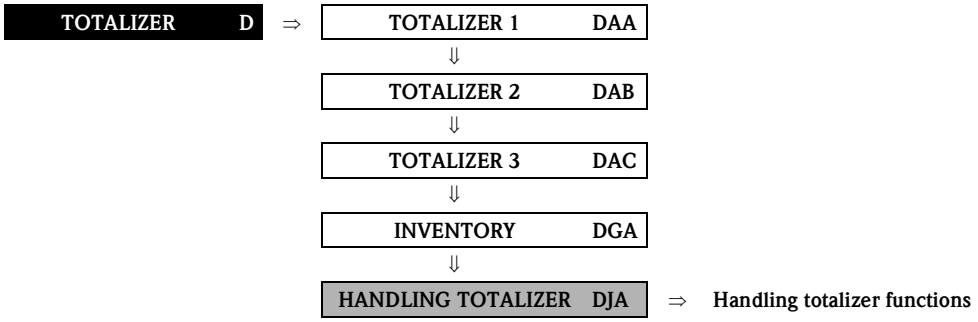
Function description TOTALIZER → TOTALIZERS (1 to 3) → CONFIGURATION	
UNIT TOTALIZER (3001)	Use this function to define the unit for the totalizer's measured variable, as selected beforehand. **Options (for the MASS FLOW assignment):** Metric → g; kg; t US → oz; lb; ton **Factory setting:** kg **Options (for the VOLUME FLOW assignment):** 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:** m^3 **Options (for the CORRECTED VOLUME FLOW assignment):** Metric → Nl; Nm^3 US → Sm^3; Scf **Factory setting:** Nm^3 ✎ Note! The unit selected here has no effect on the fieldbus. It is only used for the local display and for assigned instrument functions.
TOTALIZER MODE (3002)	Use this function to define how the flow components are to be totaled 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. FORWARD Only positive flow components REVERSE Negative flow components only **Factory setting:** Totalizer 1 = BALANCE Totalizer 2 = FORWARD Totalizer 3 = REVERSE
RESET TOTALIZERS (3003)	Use this function to reset the sum and the overflow of the totalizer to zero. **Options:** NO YES **Factory setting:** NO

6.1.2 Function group OPERATION



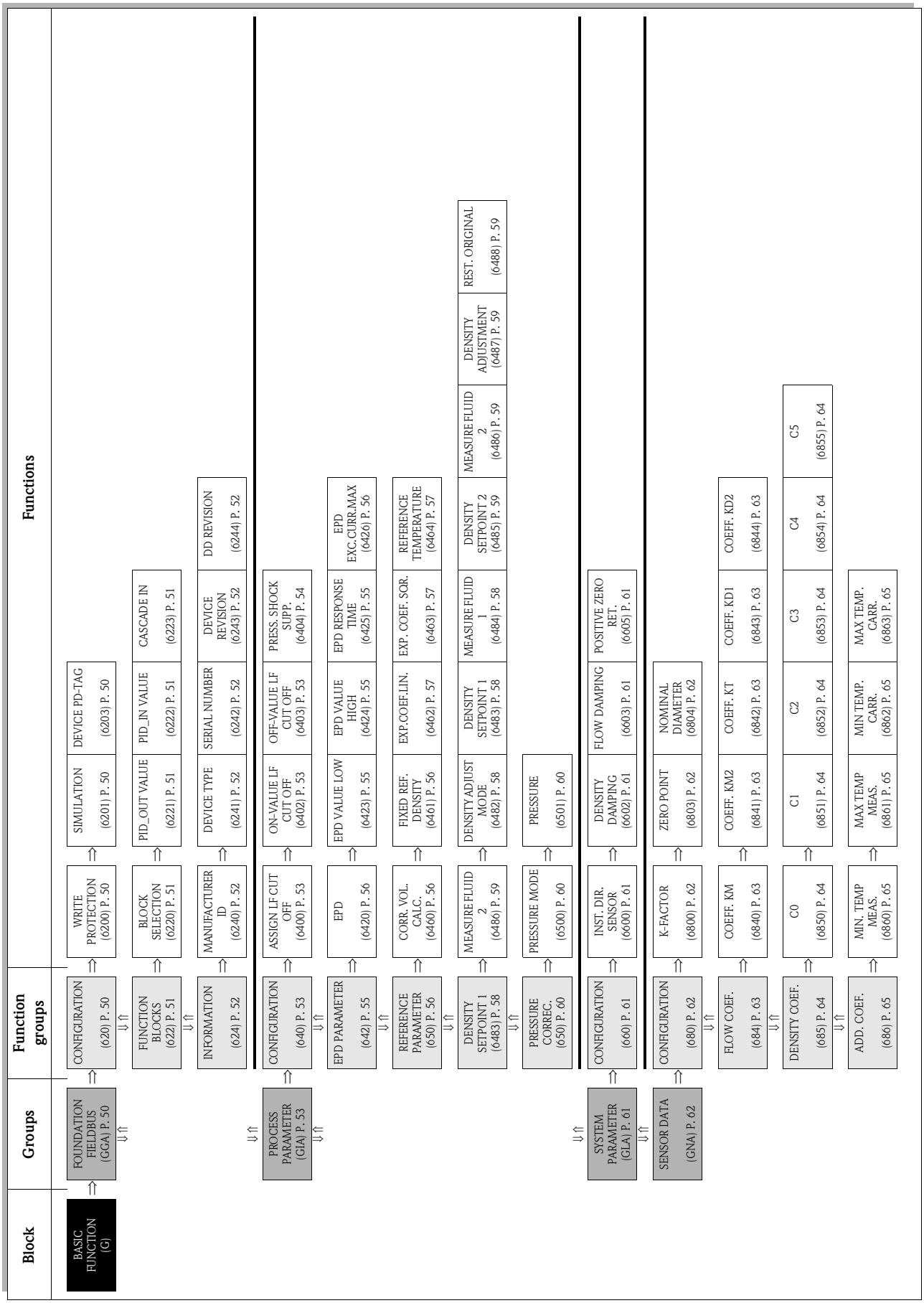
Function description TOTALIZER → TOTALIZERS (1 to 3) → OPERATION	
The function descriptions below apply to totalizers 1 to 3; the totalizers are independently configurable.	
SUM (3040)	Use this function to view the total for the totalizer's measured variable aggregated since measuring commenced. The value can be positive or negative, depending on the setting selected in the TOTALIZER MODE function (3002), and the direction of flow. **Display:** Max. 7-digit floating-point number, including unit and sign (e.g. 15467.04 m^3; –4925.631 kg) ✎ Note! ■ The effect of the setting in the TOTALIZER MODE function (3002) is as follows: – If the setting is BALANCE, the totalizer balances flow in the positive and negative directions. – If the setting is FORWARD, the totalizer registers only flow in the positive direction. – If the setting is REVERSE, the totalizer registers only flow in the negative direction. ■ The totalizers' response to faults is defined in the FAILSAFE MODE function (3801).
OVERFLOW (3041)	Use this function to view the overflow for the totalizer aggregated since measuring commenced. 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 (>9999999) as overflows. The effective quantity is thus the total of OVERFLOW plus the value returned by the SUM function. Example: Reading for 2 overflows: 2 10^7 kg (= 20000000 kg) The value returned by the SUM function = 196845.7 kg Effective total quantity = 20196845.7 kg **Display:** Integer with exponent, including sign and unit, e.g. 2 10^7kg

6.2 Group HANDLING TOTALIZER



Function description TOTALIZER → HANDLING TOTALIZER → Handling totalizer functions	
RESET ALL TOTALIZERS (3800)	Use this function to reset the totals (including all overflows) of the totalizers (1 to 3) to zero (= RESET). **Options:** NO YES **Factory setting:** NO
FAILSAFE MODE (3801)	Use this function to define the common response of all totalizers (1 to 3) in case of error. **Options:** STOP The totalizers are paused until the fault is rectified. ACTUAL VALUE The totalizers continue to count based on the current flow measured value. The fault is ignored. HOLD VALUE The totalizers continue to count the flow based on the last valid flow value (before the fault occurred). **Factory setting:** STOP

7 Block BASIC FUNCTION



7.1 Group FOUNDATION FIELDBUS

7.1.1 Function group CONFIGURATION

BASIC FUNCTION G ⇒ **FOUNDATION FIELDBUS GGA** ⇒ **CONFIGURATION 620**

Function description BASIC FUNCTION → FOUNDATION FIELDBUS → CONFIGURATION	
WRITE PROTECT (6200)	Use this function to check whether the measuring device can be write accessed via the fieldbus. **Display:** OFF Write access via FOUNDATION Fieldbus possible ON Write protection via FOUNDATION Fieldbus blocked **Factory setting:** OFF ✎ Note! Hardware write protection is activated and deactivated by means of a jumper on the I/O board (see Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus BA 065D/06/en).
SIMULATION (6201)	Use this function to check whether a simulation in the Analog Input function block is possible. **Display:** OFF Simulation in the Analog Input and Discrete Output function block is **not** possible. ON Simulation in the Analog Input and Discrete Output function block is possible. **Factory setting:** ON ✎ Note! ■ The simulation mode is activated and deactivated by means of a jumper on the I/O board (see Operating Instruction Proline Promass 83 FOUNDATION Fieldbus BA065D/06/en). ■ The status of the simulation mode is also shown in the parameter BLOCK_ERR of the Resource Block.
DEVICE PD-TAG (6203)	Use this function to enter a tag name for the measuring device. **User input:** Max. 32-character text, permissible: A-Z, 0-9, +,-, punctuation marks **Factory setting:** E+H_PROMASS_83_XXXXXXXXXXX

7.1.2 Function group FUNCTION BLOCKS

BASIC FUNCTION G ⇒ FOUNDATION FIELDBUS GGA ⇒ CONFIGURATION 620
⇓
FUNCTION BLOCKS 622

Function description BASIC FUNCTION → FOUNDATION FIELDBUS → FUNCTION BLOCKS	
BLOCK SELECTION (6220)	In this function, a function block can be selected, whose value and status is shown in the following functions. **Options:** ANALOG INPUT 1 to 8 PID **Factory setting:** ANALOG INPUT 1
OUT VALUE (6221)	Displays the output value OUT, incl. unit and status of the Analog Input or PID function block selected in the function BLOCK SELECTION (6220).
IN VALUE (6222)	✎ Note! This function is not available unless the PID option was selected in the BLOCK SELECTION (6220) function. **Display:** Displays the controlled variable IN, incl. unit and status of the Analog Input or PID function block selected in the function BLOCK SELECTION (6220).
CASCADE_IN VALUE (6223)	✎ Note! This function is not available unless the PID option was selected in the BLOCK SELECTION (6220) function. **Display:** Displays an analog set value, incl. units and status, taken over from an external function block.

7.1.3 Function group INFORMATION

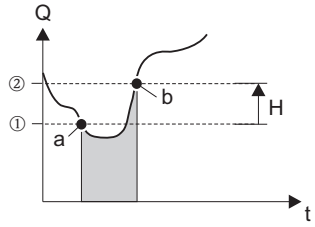
BASIC FUNCTION G ⇒ FOUNDATION FIELDBUS GGA ⇒ CONFIGURATION 620
⇓
FUNCTION BLOCKS 622
⇓
INFORMATION 624

Function description BASIC FUNCTION → FOUNDATION FIELDBUS → INFORMATION	
MANUFACTURER ID (6240)	Use this function to view the manufacturer ID in decimal numerical format. **Display:** 452B48 (hex) for Endress+Hauser
DEVICE TYPE (6241)	Use this function to view the device ID in hexadecimal numerical format. **Display:** 1051 (hex) for Promass 83 FOUNDATION Fieldbus
SERIAL NUMBER (6242)	Use this function to view the serial number. **Display:** 11-digit number
DEVICE REVISION (6243)	Use this function to view the device revision number. **Display:** 1 ✎ Note! The information displayed here helps ensure that the correct system files (DD = Device Description) are used for integration into the host system. The system files can be downloaded from the Internet free of charge (www.endress.com). Example: Information displayed in the DEVICE REVISION function (6243) → 03 Information displayed in the DD REVISION function (6244) → 01 Device description files required (DD) → 0301.sym / 0301.ffo
DD REVISION (6244)	Use this function to view the revision number of the Device Description. **Display:** 1 ✎ Note! The information displayed here helps ensure that the correct system files (DD = Device Description) are used for integration into the host system. The system files can be downloaded from the Internet free of charge (www.endress.com). Example: Information displayed in the DEVICE REVISION function (6243) → 03 Information displayed in the DD REVISION function (6244) → 01 Device description files required (DD) → 0301.sym / 0301.ffo

7.2 Group PROCESS PARAMETER

7.2.1 Function group CONFIGURATION

BASIC FUNCTION G ⇒ **FOUNDATION FIELDBUS GGA**
⇓
PROCESS PARAMETER GIA ⇒ **CONFIGURATION 640**

Function description BASIC FUNCTION → PROCESS PARAMETER → CONFIGURATION	
ASSIGN LOW FLOW CUT OFF (6400)	Use this function to assign the switching point for low flow cut off. **Options:** OFF MASS FLOW VOLUME FLOW CORRECTED VOLUME FLOW **Factory setting:** MASS FLOW
ON-VALUE LOW FLOW CUT OFF (6402)	Use this function to assign a value to the switch-on point for low flow cut off. Low flow cut off is active if the setting is a value not equal to 0. The sign of the flow value is highlighted on the display to indicate that low flow cut off is active. **User input:** 5-digit floating-point number, (unit) **Factory setting:** Depends on nominal diameter and country → Page 91 ff. ✎ Note! The appropriate unit is taken from the function group SYSTEM UNITS (→ Page 14).
OFF-VALUE LOW FLOW CUT OFF (6403)	Use this function to enter the off-value **(b)** for low flow cut off. Enter the off-value as a positive hysteresis (**H**) from the on-value (**a**). **User input:** Integer 0 to 100% **Factory setting:** 50%  A0003882 ① = *On-value,* ② = *Off-value* *a* *Low flow cut off is switched on* *b* *Low flow cut off is switched off (a + a · H)* *H* *Hysteresis value: 0 to 100%* ■ *Low flow cut off active* *Q* *Flow*

Function description

BASIC FUNCTION → PROCESS PARAMETER → 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 totaled in this way result in a totalizer reading error, particularly in the case of filling 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 CUT OFF function (6402)).

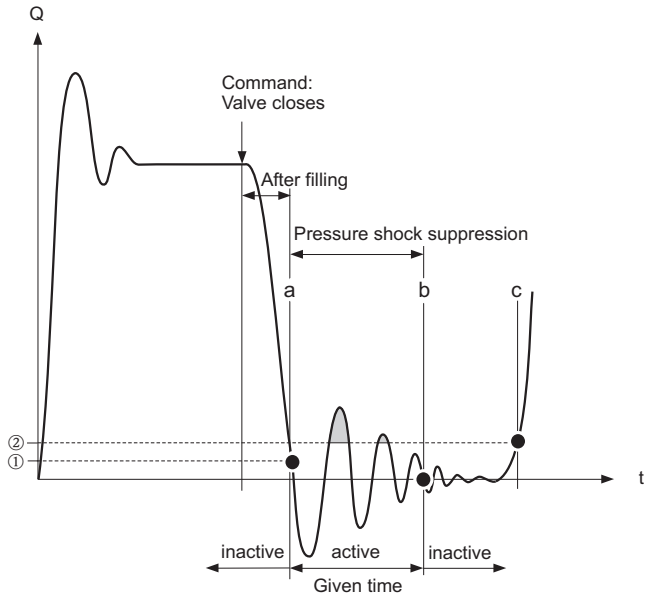
Use this function to define the time span for active pressure shock suppression.

Activation of the pressure shock suppression
Pressure shock suppression is activated after the flow falls below the ON-VALUE for the low flow cut off (see point **a** in graphic).

While pressure shock suppression is active, the following conditions apply:
- Flow reading on display → 0
- Totalizer reading → the totalizers are pegged at the last correct value.

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 actual flow value is displayed and output when the time interval for pressure shock suppression has passed and the flow exceeds the OFF-VALUE for the low flow cut off (see point **c** in graphic).



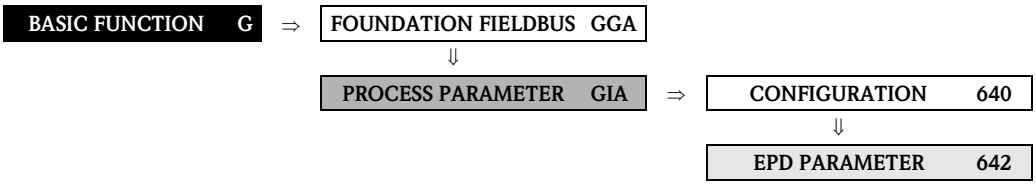
A0001285-EN

① = on value (low flow cut off), ② = off value (low flow cut off)
a Activated when the on-value for low flow cut off is undershot
b Deactivated once the time specified expires
c Flow values are taken into account again for 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

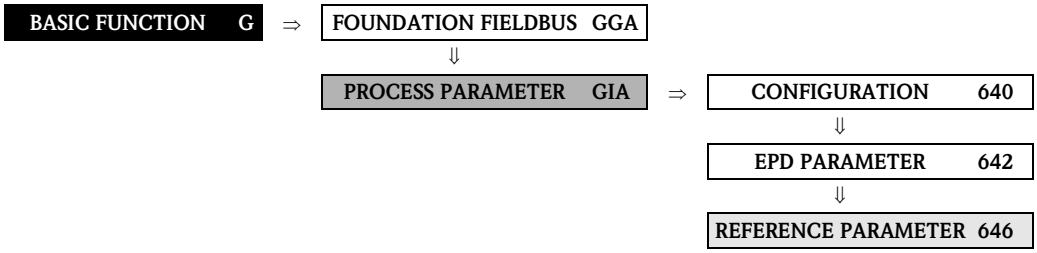
7.2.2 Function group EPD PARAMETER



Function description BASIC FUNCTION → PROCESS PARAMETER → EPD PARAMETER	
EMPTY PIPE DETECTION (6420)	Use this function to activate the empty pipe detection (EPD). With empty measuring tubes the density of the fluid falls below the value specified in the function EPD VALUE LOW. **Options:** OFF ON **Factory setting:** Liquid: ON Gas: OFF ☝ Caution! ■ Select a correspondingly low EPD response value in the EPD VALUE LOW function so that the difference to the effective density of the fluid is sufficiently large. This ensures that totally empty measuring tubes and not partially filled ones are detected. ■ For gas measurement, we strongly recommend you switch off empty pipe detection.
EPD VALUE LOW (6423)	✎ Note! This function is not available unless the ON selection was selected in the EMPTY PIPE DETECTION function. Use this function to specify a lower threshold value (limit value) for the measured density as process problems can occur if the density is too low. **User input:** 5-digit floating-point number **Factory setting:** 0.2000 kg/l
EPD VALUE HIGH (6424)	✎ Note! This function is not available unless the ON selection was selected in the EMPTY PIPE DETECTION function. Use this function to set an upper threshold for the measured density value. **User input:** 5-digit floating-point number **Factory setting:** 6.0000 kg/l
EPD RESPONSE TIME (6425)	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. **User input:** Fixed point number: 1.0 to 100.0 s **Factory setting:** 1.0 s

Function description BASIC FUNCTION → PROCESS PARAMETER → EPD PARAMETER	
EPD EXCITATION CURRENT MAXIMUM (6426)	Use this function to activate the empty pipe detection (EPD). In the event of inhomogeneous fluids or air bubbles, the excitation current of the measuring pipes increases. If the excitation current set in this function is exceeded, error message #700 is output similar to the functions "EPD VALUE LOW (6423)" and "EPD VALUE HIGH (6424)". **User input:** 5-digit floating-point number **Factory setting:** 100.00 mA (deactivated) ✎ Note! The function is not activated until a value under 100 mA is input. Entering the value 100 mA deactivates the function.

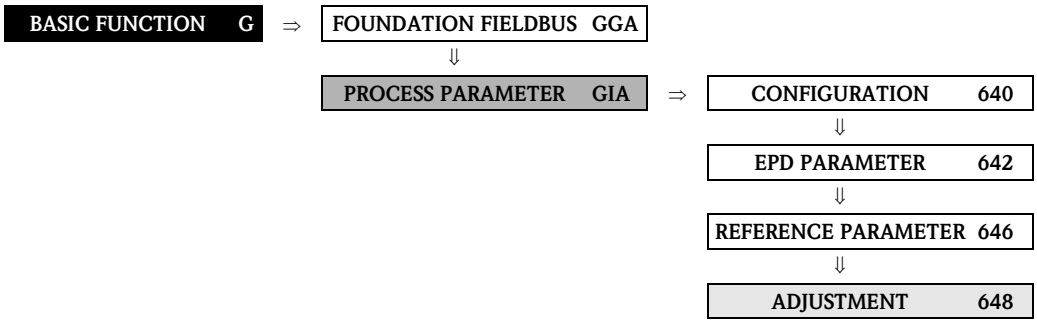
7.2.3 Function group REFERENCE PARAMETER



Function description BASIC FUNCTION → PROCESS PARAMETER → REFERENCE PARAMETER	
CORRECTED VOLUME CALCULATION (6460)	This function is used to set the reference density for calculating the corrected volume flow. **Options:** FIXED REFERENCE DENSITY CALCULATED REFERENCE DENSITY **Factory setting:** CALCULATED REFERENCE DENSITY
FIXED REFERENCE DENSITY (6461)	✎ Note! This function is not available unless the FIXED REFERENCE DENSITY setting was selected in the CORRECTED VOLUME CALCULATION function (6460). In this function, a fixed value for the reference density can be entered, with which the corrected volume flow or corrected volume is calculated. **User input:** 5-digit floating-point number **Factory setting:** 1.0000 kg/Nl

Function description BASIC FUNCTION → PROCESS PARAMETER → REFERENCE PARAMETER	
EXPANSION COEFFICIENT (6462)	✎ Note! This function is not available unless the CALCULATED REFERENCE DENSITY setting was selected in the CORRECTED VOLUME CALCULATION function (6460). For calculating temperature-compensated density functions, an expansion coefficient specific to the fluid is required which you can enter in this function (see VALUE REF.-TEMP. (6464) function). **User input:** 5-digit floating-point number **Factory setting:** 0.5000 e^{-3} [1/K]
EXPANSION COEFFICIENT SQUARE (6463)	Use this function to enter a square expansion coefficient if the temperature compensation follows a nonlinear behavior (see VALUE REF-TEMP. function (6464)). **User input:** 5-digit floating-point number **Factory setting:** 0 e^{-6} [1/K^2]
REFERENCE TEMPERATURE (6464)	✎ Note! This function is not available unless the CALCULATED REFERENCE DENSITY setting was selected in the CORRECTED VOLUME CALCULATION function (6460). For entering the reference temperature for calculating the corrected volume flow, the corrected volume and the reference density. **User input:** 5-digit floating-point number **Factory setting:** 20.000 °C The reference density is calculated as follows: $\rho_N = \rho \cdot (1 + \alpha \Delta t + \beta \Delta t^2)$; where $\Delta t = t - t_N$ ρ_N = Reference density ρ = Currently measured fluid density (measuring value) t = Currently measured medium temperature (measuring value) t_N = Reference temperature for calculating reference density (e.g. 20 °C) α = Volumetric expansion coefficient of the fluid. Unit = [1/K]; K = Kelvin β = Square volumetric expansion coefficient of the fluid. Unit = [1/K^2]

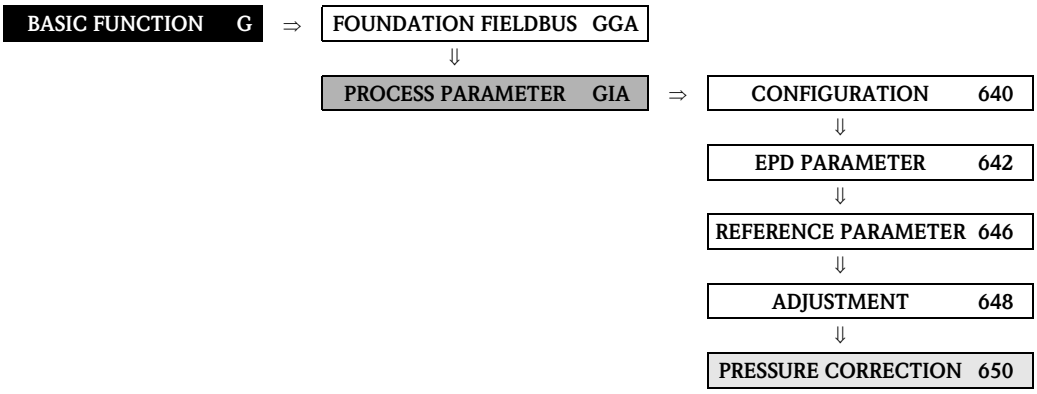
7.2.4 Function group ADJUSTMENT



Function description BASIC FUNCTION → PROCESS PARAMETER → ADJUSTMENT	
ZERO ADJUST **(6480)**	This function enables a zero point adjustment to be automatically carried out. The new zero point determined by the measuring system is adopted by the ZERO POINT function (6803). **Options:** CANCEL START **Factory setting:** CANCEL ☝ Caution! Before carrying out an adjustment, please refer to the Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D/06/en, where a detailed description of zero point adjustment is given. ✎ Note! ■ Programming is locked during zero point adjustment. The message "ZERO ADJUST RUNNING" appears on the display. ■ If the zero point adjustment is not possible, e.g. with a flow velocity > 0.1 m/s, or has been canceled, then the alarm message "ZERO ADJUST NOT POSSIBLE" is shown on the display. This error is communicated to the subsequent function blocks via the status UNCERTAIN for the process variables.
DENSITY ADJUST MODE **(6482)**	Use this function to select whether a 1-point or a 2-point density adjustment should be carried out. **Options:** CANCEL 1-POINT 2-POINT
DENSITY SETPOINT 1 **(6483)**	Use this function to enter the density setpoint value for the first fluid for which you want to carry out field density adjustment. **User input:** 5-digit floating-point number, incl. units ✎ Note! ■ The preset density entered here should not vary from the actual fluid density by a more than ±10%. ■ The appropriate unit is taken from the SYSTEM UNITS group (→ Page 14).
MEASURE FLUID 1 **(6484)**	In this function the actual density of the first fluid is measured for density adjustment. **Options:** CANCEL START

Function description BASIC FUNCTION → PROCESS PARAMETER → ADJUSTMENT	
DENSITY SETPOINT 2 (6485)	Use this function to enter the density setpoint value for the second fluid for which you want to carry out field density adjustment. **User input:** 5-digit floating-point number, incl. units ✎ Note! ■ The preset density entered here should not vary from the actual fluid density by a more than ±10%. ■ The difference between the density setpoint values must be at least 0.2 kg/l. ■ The appropriate unit is taken from the SYSTEM UNITS group (→ Page 14).
MEASURE FLUID 2 (6486)	In this function the current density of the second fluid is measured for density adjustment. **Options:** CANCEL START
DENSITY ADJUSTMENT (6487)	With this function a density adjustment can be carried out on site. The density adjustment values will thus be recalculated and stored. This ensures that the values dependent on density calculations (e.g. volume flow) are as accurate as possible. ✎ Note! Before carrying out a density adjustment, please refer to BA059D/06/en "Proline Promass 83 FOUNDATION Fieldbus Operating Instructions" where a detailed description of the density adjustment is given. **Options:** CANCEL DENSITY ADJUST **Factory setting:** CANCEL
RESTORE ORIGINAL (6488)	With this function the original density coefficients determined at the factory are restored. **Options:** NO YES **Factory setting:** NO

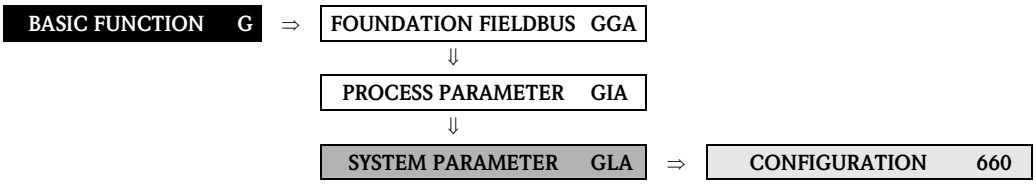
7.2.5 Function group PRESSURE CORRECTION



Function description BASIC FUNCTION → PROCESS PARAMETER → PRESSURE CORRECTION	
PRESSURE MODE (6500)	Use this function to configure an automatic pressure correction. In this way, the effect of a pressure deviation between the calibration and process pressures on the measured error for mass flow is compensated for, (see also Operating Instructions BA065D, Accuracy Chapter). **Options:** OFF FIX A fixed process pressure for pressure correction is specified (see PRESSURE function (6501)). **Factory setting:** OFF
PRESSURE (6501)	✎ Note! This function is not available unless the FIX option was selected in the PRESSURE MODE (6500) function. Use this function to enter the value for the process pressure which should be used during pressure correction. **User input:** 7-digit floating-point number **Factory setting:** 0 bar g ✎ Note! The appropriate unit is taken from the function group SYSTEM UNITS (→ Page 14).

7.3 Group SYSTEM PARAMETER

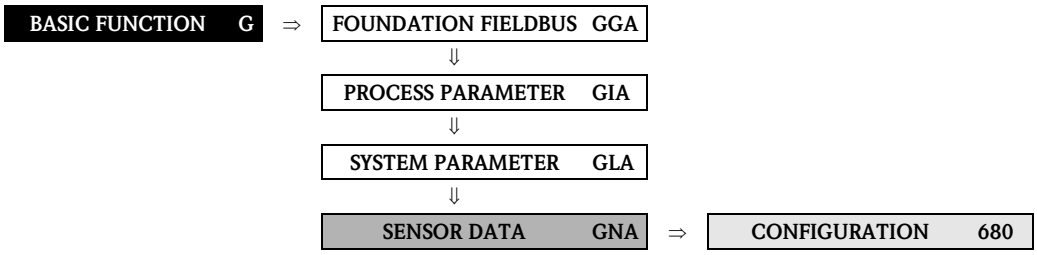
7.3.1 Function group CONFIGURATION



Function description BASIC FUNCTION → SYSTEM PARAMETER → CONFIGURATION	
INSTALLATION DIRECTION SENSOR (6600)	Use this function to reverse the sign of the flow measured variable, if necessary. ✎ Note! Ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor (nameplate). **Options:** NORMAL (flow as indicated by the arrow) INVERSE (flow opposite to direction indicated by the arrow) **Factory setting:** NORMAL
DENSITY DAMPING (6602)	The density filter allows the sensitivity of the density measuring signal to be lowered with respect to variations in the density of the fluid, e.g. with inhomogeneous liquids. The damping acts on all functions of the measuring device. **User input:** Max. 5-digit number, incl. unit: 0.00 to 100.00 s **Factory setting:** 0.00 s
FLOW DAMPING (6603)	Setting 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 reaction time of the measuring device increases with every increase in the filter setting. The damping acts on all functions and outputs of the measuring device. **User input:** 0 to 100 s **Factory setting:** Liquid: 0.0 s Gas: 0.25 s
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 functions and outputs of the measuring device. **Options:** OFF ON (signal output is set to the ZERO FLOW value, temperature and density are still output) **Factory setting:** OFF ✎ Note! An active positive zero return is communicated to the subsequent function blocks via the status UNCERTAIN for the process variables.

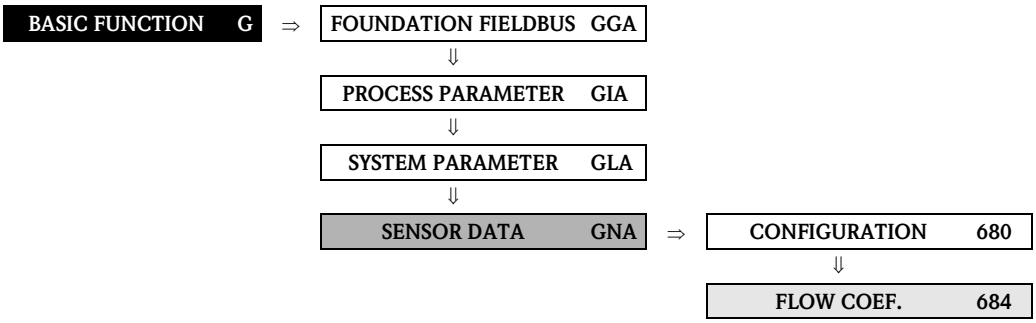
7.4 Group SENSOR DATA

7.4.1 Function group CONFIGURATION



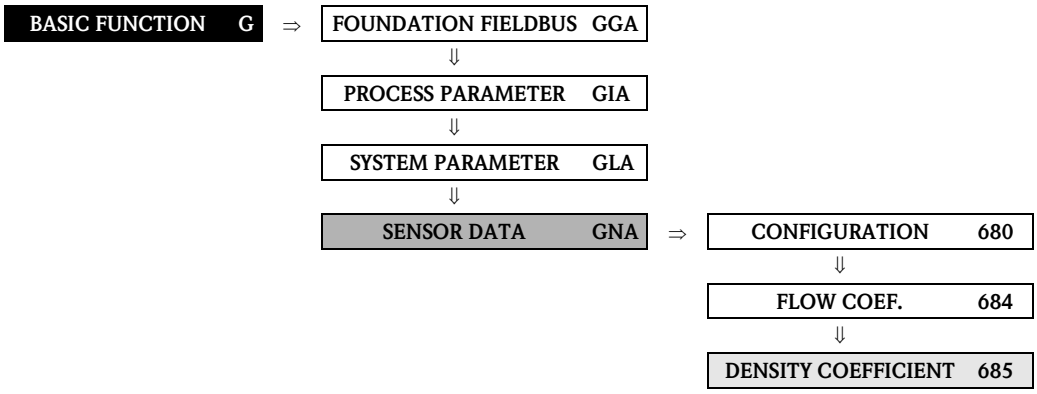
Function description BASIC FUNCTION → SENSOR DATA → CONFIGURATION	
All sensor data (calibration factor, zero point and nominal diameter) are set at the factory and saved on the S-DAT sensor memory chip. ☝ Caution! Under normal circumstances you should not change the following parameter settings, because 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.	
K-FACTOR **(6800)**	This function shows the current calibration factor for the sensor. **Factory setting:** Depends on nominal diameter and calibration.
ZERO POINT **(6803)**	This function shows the current zero-point correction value for the sensor. **User input:** Max. 5-digit number: –99999 to +99999 **Factory setting:** Depends on calibration
NOMINAL DIAMETER **(6804)**	This function shows the nominal diameter for the sensor. **Factory setting:** Depends on nominal diameter

7.4.2 Function group FLOW COEFFICIENT



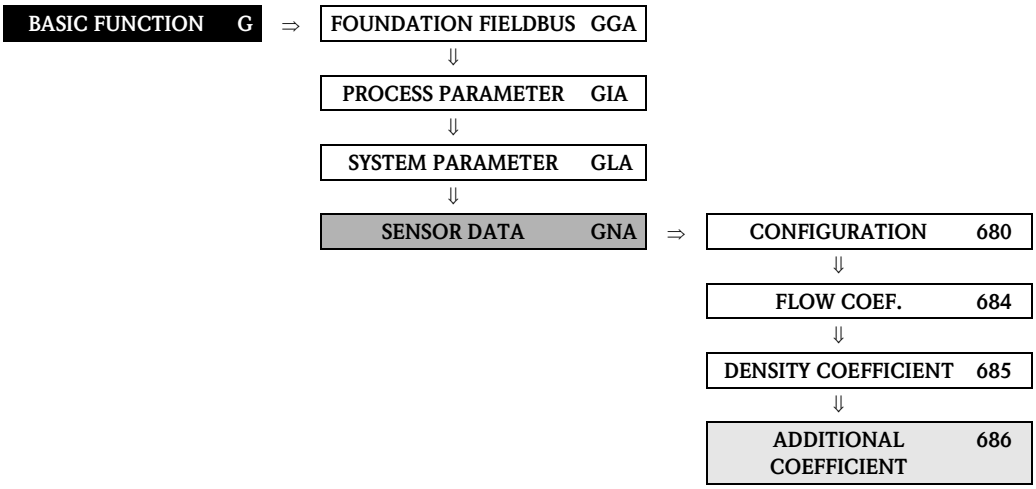
Function description BASIC FUNCTION → SENSOR DATA → FLOW COEFFICIENT	
All flow coefficients are set at the factory. All the sensor's parameter settings are saved on the S-DAT memory chip. Contact the Endress+Hauser service organization if you have any questions about these functions.	
TEMPERATURE COEFFICIENT KM (6840)	This function shows the temperature coefficient KM.
TEMPERATURE COEFFICIENT KM2 (6841)	This function shows the temperature coefficient KM2.
TEMPERATURE COEFFICIENT KT (6842)	This function shows the temperature coefficient KT.
CALIBRATION COEFFICIENT KD1 (6843)	This function shows the calibration coefficient KD1.
CALIBRATION COEFFICIENT KD2 (6844)	This function shows the calibration coefficient KD2.

7.4.3 Function group DENSITY COEFFICIENT



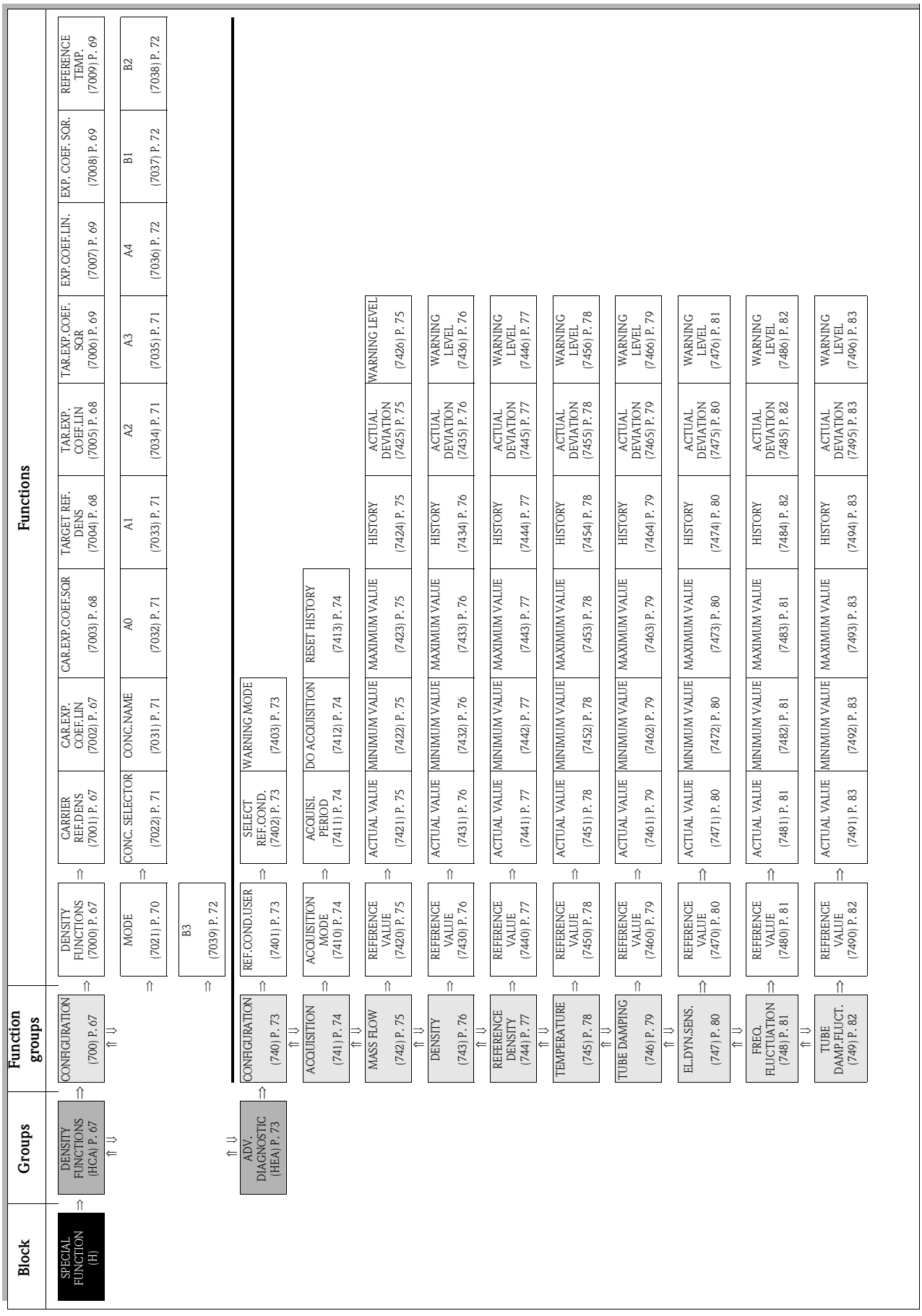
Function description BASIC FUNCTION → SENSOR DATA → DENSITY COEFFICIENT	
All density coefficients are set at the factory. All the sensor's parameter settings are saved on the S-DAT memory chip. Contact the Endress+Hauser service organization if you have any questions about these functions.	
DENSITY COEFFICIENT C0 (6850)	This function shows the actual density coefficient C0. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
DENSITY COEFFICIENT C1 (6851)	This function shows the actual density coefficient C1. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
DENSITY COEFFICIENT C2 (6852)	This function shows the actual density coefficient C2. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
DENSITY COEFFICIENT C3 (6853)	This function shows the actual density coefficient C3. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
DENSITY COEFFICIENT C4 (6854)	This function shows the actual density coefficient C4. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
DENSITY COEFFICIENT C5 (6855)	This function shows the actual density coefficient C5. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.

7.4.4 Function group ADDITIONAL COEFFICIENT



Function description BASIC FUNCTION → SENSOR DATA → ADDITIONAL COEFFICIENT	
All sensor data are set at the factory. All the sensor's parameter settings are saved on the S-DAT memory chip. ☝ Caution! These functions are used for displaying device parameters only and consequently cannot be accessed. Contact the Endress+Hauser service organization if you have any questions about these functions.	
MINIMAL TEMPERATURE MEASURED (6860)	The lowest fluid temperature measured appears on the display.
MAXIMAL TEMPERATURE MEASURED (6861)	The highest fluid temperature measured appears on the display.
MINIMAL TEMPERATURE CARRIER TUBE (6862)	The lowest carrier tube temperature measured appears on the display. ✎ Note! This function is not available for the Promass E measuring device.
MAXIMUM TEMPERATURE CARRIER TUBE (6863)	The highest carrier tube temperature measured appears on the display. ✎ Note! This function is not available for the Promass E measuring device.

8 Block SPECIAL FUNCTION



8.1 Group DENSITY FUNCTIONS

8.1.1 Function group CONFIGURATION

SPECIAL FUNCTION H ⇒ DENSITY FUNCTIONS HAA ⇒ CONFIGURATION 700

Function description SPECIAL FUNCTION → DENSITY FUNCTIONS → CONFIGURATION	
DENSITY FUNCTION (7000)	Use this function to select the desired density function which is used to calculate special density values or the percentage proportion of components in two-phase fluids. **User input:** OFF % MASS / % VOLUME %-BLACK LIQUOR ° BAUME > 1 SG ° BAUME < 1 SG ° API ° PLATO ° BALLING ° BRIX FLEXIBLE **Factory setting:** OFF
REFERENCE DENSITY CARRIER FLUID (7001)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this function to enter the reference density (density at reference temperature) of the carrier fluid. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, incl. units **Factory setting:** 1.0000 kg/l ✎ Note! ■ Carrier fluid = transporting liquid, (e.g. water) Target fluid = material transported (e.g. lime powder) ■ The appropriate unit is taken from the UNIT REFERENCE DENSITY function (0421).
EXPANSION COEFFICIENT LINEAR CARRIER FLUID (7002)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this function to enter the fluid-specific linear expansion coefficient for the carrier fluid for linear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.5000 e^{-3} [1/K]

Function description SPECIAL FUNCTION → DENSITY FUNCTIONS → CONFIGURATION	
SQUARE EXPANSION COEFFICIENT CARRIER FLUID (7003)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this function to enter the fluid-specific square expansion coefficient for the carrier fluid for nonlinear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.0000 e^{-6} [1/K^2]
REFERENCE DENSITY TARGET FLUID (7004)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this function to enter the reference density (density at reference temperature) of the carrier fluid. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, incl. units **Factory setting:** 1.0000 kg/l ✎ Note! ■ Carrier fluid = transporting liquid, (e.g. water) Target fluid = material transported (e.g. lime powder) ■ The appropriate unit is taken from the UNIT REFERENCE DENSITY function (0421).
EXPANSION COEFFICIENT LINEAR TARGET FLUID (7005)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this function to enter the fluid-specific linear expansion coefficient for the carrier fluid for linear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.5000 e^{-3} [1/K]

Function description SPECIAL FUNCTION → DENSITY FUNCTIONS → CONFIGURATION	
SQUARE EXPANSION COEFFICIENT TARGET FLUID (7006)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this function to enter the fluid-specific square expansion coefficient for the carrier fluid for nonlinear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.0000 e^{-6} [1/K^2]
LINEAR EXPANSION COEFFICIENT (7007)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ ° BAUME < 1 SG ■ ° BAUME > 1 SG ■ ° API ■ ° PLATO ■ ° BALLING ■ ° BRIX Use this function to enter the fluid-specific linear expansion coefficient (for linear temperature curves), to calculate the temperature-compensated density functions. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.5000 e^{-3} [1/K]
SQUARE EXPANSION COEFFICIENT (7008)	✎ Note! This function is not available unless one of the following was selected in the DENSITY FUNCTION function (7000): ■ ° BAUME < 1 SG ■ ° BAUME > 1 SG ■ ° API ■ ° PLATO ■ ° BALLING ■ ° BRIX Use this function to enter the fluid-specific square expansion coefficient (for nonlinear temperature curves), to calculate the temperature-compensated density functions. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.0000 e^{-6} [1/K^2]
REFERENCE TEMPERATURE (7009)	✎ Note! This function is only available if OFF, °BRIX or FLEXIBLE was **not** selected in the function DENSITY FUNCTION (7000). Use this function to enter the reference temperature for the density functions and for calculating the corrected volume flow and the corrected volume. **User input:** 4-digit fixed-point number, including unit and sign **Factory setting:** 20 °C

Function description SPECIAL FUNCTION → DENSITY FUNCTIONS → CONFIGURATION	
MODE (7021)	✎ Note! This function is not available unless the FLEXIBLE setting was selected in the DENSITY FUNCTION function (7000). Use this function to select a user-specific method of calculating the concentration of the density and temperature measured. In order to use this function, the following values are required: ■ Concentration (see formula) ■ Currently measured density ■ Currently measured temperature The concentration is calculated from the density and temperature as follows: $K = A0 + A1 \cdot \rho + A2 \cdot \rho^2 + A3 \cdot \rho^3 + A4 \cdot \rho^4 + B1 \cdot T + B2 \cdot T^2 + B3 \cdot T^3$ K = Concentration ρ = Currently measured density A0 = Value from function COEFFICIENT A0 (7032) A1 = Value from function COEFFICIENT A1 (7033) A2 = Value from function COEFFICIENT A2 (7034) A3 = Value from function COEFFICIENT A3 (7035) A4 = Value from function COEFFICIENT A4 (7036) B1 = Value from function COEFFICIENT B1 (7037) B2 = Value from function COEFFICIENT B2 (7038) B3 = Value from function COEFFICIENT B3 (7039) T = Currently measured temperature in °C **Options:** % MASS 3D % VOLUME 3D % MASS 2D % VOLUME 2D **Factory setting:** % MASS 3D ✎ Note! The relationship between the individual values (concentration, density and temperature) can also be determined by Endress+Hauser e.g. via a coefficient calculation program and be transmitted to the measuring device.

Function description SPECIAL FUNCTION → DENSITY FUNCTIONS → CONFIGURATION	
CONCENTRATION SELECTOR (7022)	Use this function to select a concentration specification. There are four different concentration specifications available, via which various concentrations can be defined. **Options:** CONC. # 1 (or the name that has been defined in the function CONCENTRATION NAME (7031) for concentration specification 1) CONC. # 2 (or the name that has been defined in the function CONCENTRATION NAME (7031) for concentration specification 2) CONC. # 3 (or the name that has been defined in the function CONCENTRATION NAME (7031) for concentration specification 3) CONC. # 4 (or the name that has been defined in the function CONCENTRATION NAME (7031) for concentration specification 4) **Factory setting:** CONC. # 1 ✎ Note! ■ By selecting a concentration specification and the (subsequent) relevant settings, up to 4 different concentrations can be preconfigured and selected when needed. ■ All settings in the subsequent functions of this function group are each only valid for the concentration specification selected in the function CONCENTRATION SELECTOR (7022). In other words, the entry or option is assigned to the concentration specification currently selected (e.g. in the factory setting CONC. # 1).
CONCENTRATION NAME (7031)	Use this function to assign a specific name to the concentration specification. **User input:** Max. 8-character text, permissible: A-Z, 0-9 **Factory setting:** Name of concentration specification (depends on selection in the function CONCENTRATION SELECTOR (7022), e.g. CONC. # 1).
COEFFICIENT A0 (7032)	Coefficient A0 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
COEFFICIENT A1 (7033)	Coefficient A1 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
COEFFICIENT A2 (7034)	Coefficient A2 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
COEFFICIENT A3 (7035)	Coefficient A3 entry. **User input:** 5-digit floating-point number **Factory setting:** 0

Function description SPECIAL FUNCTION → DENSITY FUNCTIONS → CONFIGURATION	
COEFFICIENT A4 (7036)	Coefficient A4 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
COEFFICIENT B1 (7037)	✎ Note! This function only appears if the % MASS 3D or % VOLUME 3D option was selected in the MODE function (7021). Coefficient B1 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
COEFFICIENT B2 (7038)	✎ Note! This function only appears if the % MASS 3D or % VOLUME 3D option was selected in the MODE function (7021). Coefficient B2 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
COEFFICIENT B3 (7039)	✎ Note! This function only appears if the % MASS 3D or % VOLUME 3D option was selected in the MODE function (7021). Coefficient B3 entry. **User input:** 5-digit floating-point number **Factory setting:** 0

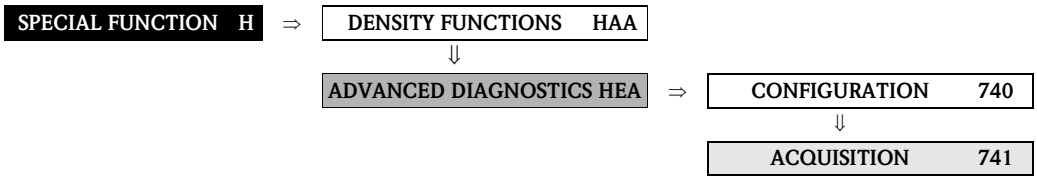
8.2 Group ADVANCED DIAGNOSTICS

8.2.1 Function group CONFIGURATION

SPECIAL FUNCTION H ⇒ DENSITY FUNCTIONS HAA
⇓
ADVANCED DIAGNOSTICS HEA ⇒ CONFIGURATION 740

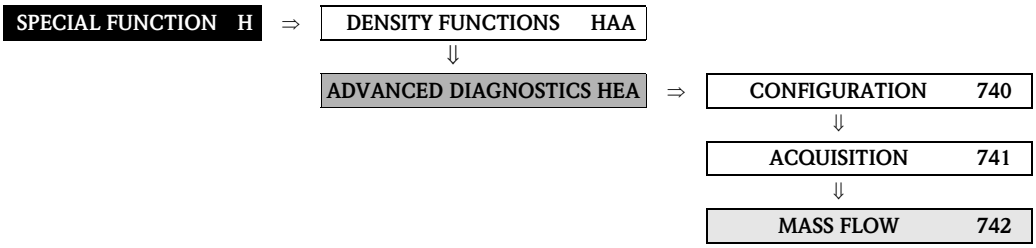
Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → CONFIGURATION	
REFERENCE CONDITION USER (7401)	Use this function to start determining the user reference status. The following values are determined: ■ MASS FLOW ■ DENSITY ■ REFERENCE DENSITY ■ TEMPERATURE ■ TUBE DAMPING ■ ELECTRODYNAMIC SENSORS ■ OPERATING FREQUENCY FLUCTUATION ■ TUBE DAMPING FLUCTUATION **Options:** CANCEL START **Factory setting:** CANCEL
SELECT REFERENCE CONDITION (7402)	Use this function to select the reference status which should be used to compare the advanced diagnostics parameters (see function ACQUISITION MODE (7410)). **Options:** FACTORY USER **Factory setting:** FACTORY
WARNING MODE (7403)	Use this function to determine whether a warning should be generated when there is a deviation between the reference status (FACTORY or USER, see function SELECT REFERENCE CONDITION (7402)) and the current measuring values. The values of the following functions are compared to the reference status : ■ MASS FLOW (7421) ■ DENSITY (7431) ■ REFERENCE DENSITY (7441) ■ TEMPERATURE (7451) ■ TUBE DAMPING (7461) ■ ELECTRODYNAMIC SENSORS (7471) ■ OPERATING FREQUENCY FLUCTUATION (7481) ■ TUBE DAMPING FLUCTUATION (7491) **Options:** OFF ON **Factory setting:** OFF

8.2.2 Function group ACQUISITION



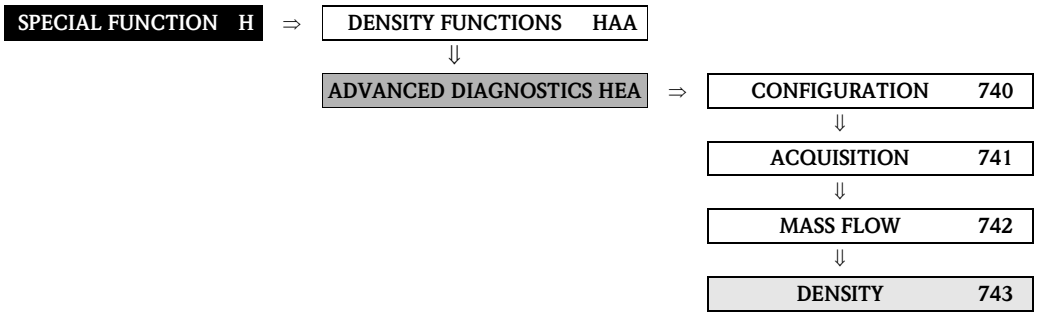
Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → ACQUISITION	
ACQUISITION MODE (7410)	Use this function to specify whether the advanced diagnostics parameters should be determined on a periodical or single-shot basis. **Options:** OFF PERIODICAL SINGLE SHOT **Factory setting:** OFF ✎ Note! See the Chapter on "Commissioning" in the Operating Instructions Proline Promass 83, BA065D/06/en for more information on advanced diagnostics.
ACQUISITION PERIOD (7411)	✎ Note! This function is not available unless PERIODICAL was selected in the ACQUISITION MODE function (7410). Use this function to specify the time interval after which the advanced diagnostics parameters should be recorded. The time interval starts with the confirmation of the input. **User input:** 0 to 99999 s **Factory setting:** 3600 s ✎ Note! A reference status must be defined prior to determining the diagnosis parameters, (→ SELECT REFERENCE CONDITION function (7402)).
DO ACQUISITION (7412)	✎ Note! This function is not available unless SINGLE SHOT was selected in the ACQUISITION MODE function (7410). Use this function to start determining the advanced diagnostics parameters on a single–shot basis. **Options:** CANCEL START **Factory setting:** CANCEL ✎ Note! A reference status must be defined prior to determining the diagnosis parameters, (→ SELECT REFERENCE CONDITION function (7402)).
RESET HISTORY (7413)	Use this function to delete all history values. **Options:** NO YES **Factory setting:** NO

8.2.3 Function group MASS FLOW



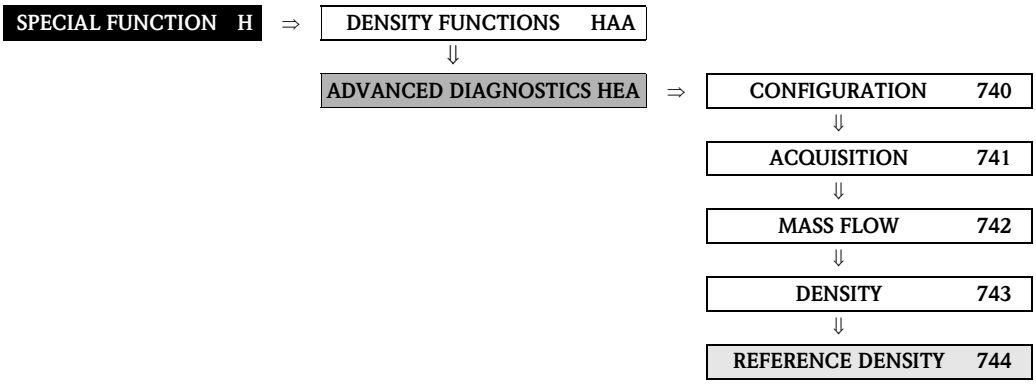
Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → MASS FLOW	
✎ Note! The appropriate unit is taken from the UNIT MASS FLOW function (0400).	
REFERENCE VALUE MASS FLOW (7420)	The reference value for the mass flow appears on the display. **Display:** 5-digit floating-point number, including unit and sign
MASS FLOW (7421)	The measured mass flow appears on the display. **Display:** 5-digit floating-point number, including unit and sign
MINIMUM MASS FLOW (7422)	The lowest mass flow value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
MAXIMUM MASS FLOW (7423)	The highest mass flow value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
HISTORY MASS FLOW (7424)	The last ten mass flow values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, including unit and sign
DEVIATION MASS FLOW (7425)	This function displays the deviation between the measured mass flow and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number, including unit and sign
WARNING LEVEL (7426)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for the mass flow. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [mass flow unit] **Factory setting:** 90000 kg/h

8.2.4 Function group DENSITY



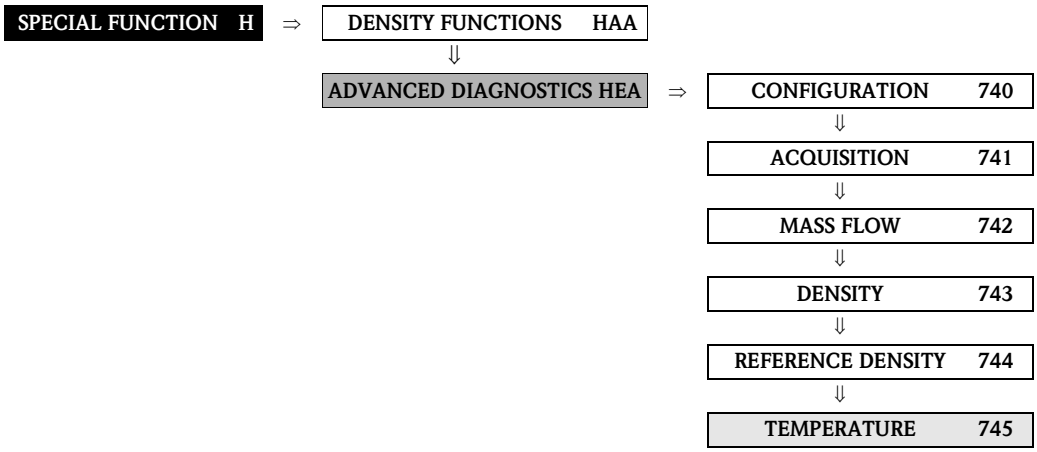
Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → DENSITY	
✎ Note! The appropriate unit is taken from the UNIT DENSITY function (0420).	
REFERENCE VALUE DENSITY (7430)	The reference value for the density appears on the display. **Display:** 5-digit floating-point number, incl. units
DENSITY (7431)	The measured density appears on the display. **Display:** 5-digit floating-point number, incl. units
MINIMUM DENSITY (7432)	The lowest density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
MAXIMUM DENSITY (7433)	The highest density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
HISTORY DENSITY (7434)	The last ten density values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, incl. units
DEVIATION DENSITY (7435)	This function displays the deviation between the measured density and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number, incl. units
WARNING LEVEL (7436)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for the density. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [%] **Factory setting:** 100%

8.2.5 Function group REFERENCE DENSITY



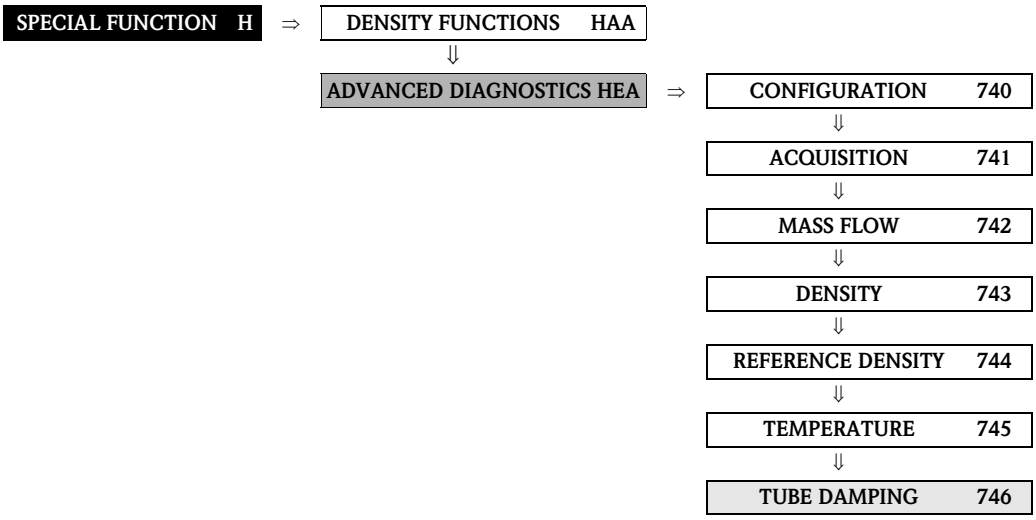
Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → REFERENCE DENSITY	
✎ Note! The appropriate unit is taken from the function UNIT REFERENCE DENSITY (0421) (→ Page 17).	
REFERENCE VALUE REFERENCE DENSITY (7440)	The reference value for the reference density appears on the display. **Display:** 5-digit floating-point number, incl. units
REFERENCE DENSITY (7441)	The measured reference density appears on the display. **Display:** 5-digit floating-point number, incl. units
MINIMUM REFERENCE DENSITY (7442)	The lowest reference density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
MAXIMUM REFERENCE DENSITY (7443)	The highest reference density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
HISTORY REFERENCE DENSITY (7444)	The last ten reference density values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, incl. units
DEVIATION REFERENCE DENSITY (7445)	This function displays the deviation between the measured reference density and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number, incl. units
WARNING LEVEL (7446)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for the reference density. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [%] **Factory setting:** 100%

8.2.6 Function group TEMPERATURE



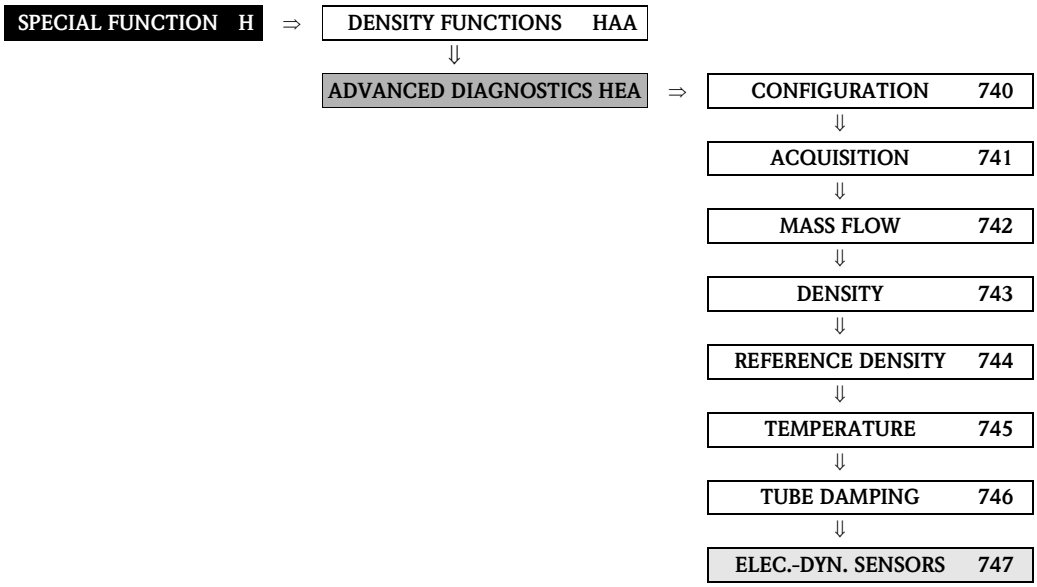
Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → TEMPERATURE	
✎ Note! The appropriate unit is taken from the UNIT TEMPERATURE function (0422).	
REFERENCE VALUE TEMPERATURE (7450)	The reference value for the temperature appears on the display. **Display:** 5-digit floating-point number, including unit and sign
TEMPERATURE (7451)	The currently measured temperature appears on the display. **Display:** 5-digit floating-point number, including unit and sign
MINIMUM TEMPERATURE (7452)	The lowest temperature value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
MAXIMUM TEMPERATURE (7453)	The highest temperature value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
HISTORY TEMPERATURE (7454)	The last ten temperature values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, including unit and sign
DEVIATION TEMPERATURE (7455)	This function displays the deviation between the currently measured temperature and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number, including unit and sign
WARNING LEVEL (7456)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for the temperature. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 °C **Factory setting:** 100 °C

8.2.7 Function group TUBE DAMPING



Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → TUBE DAMPING	
REFERENCE VALUE TUBE DAMPING (7460)	The reference value for tube damping appears on the display. **Display:** 5-digit floating-point number
TUBE DAMPING (7461)	The measured tube damping appears on the display. **Display:** 5-digit floating-point number
MINIMUM TUBE DAMPING (7462)	The lowest tube damping value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
MAXIMUM TUBE DAMPING (7463)	The highest tube damping value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
HISTORY TUBE DAMPING (7464)	The last ten tube damping values since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
DEVIATION TUBE DAMPING (7465)	This function displays the deviation between the measured tube damping and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number
WARNING LEVEL (7466)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for tube damping. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999% **Factory setting:** 1000%

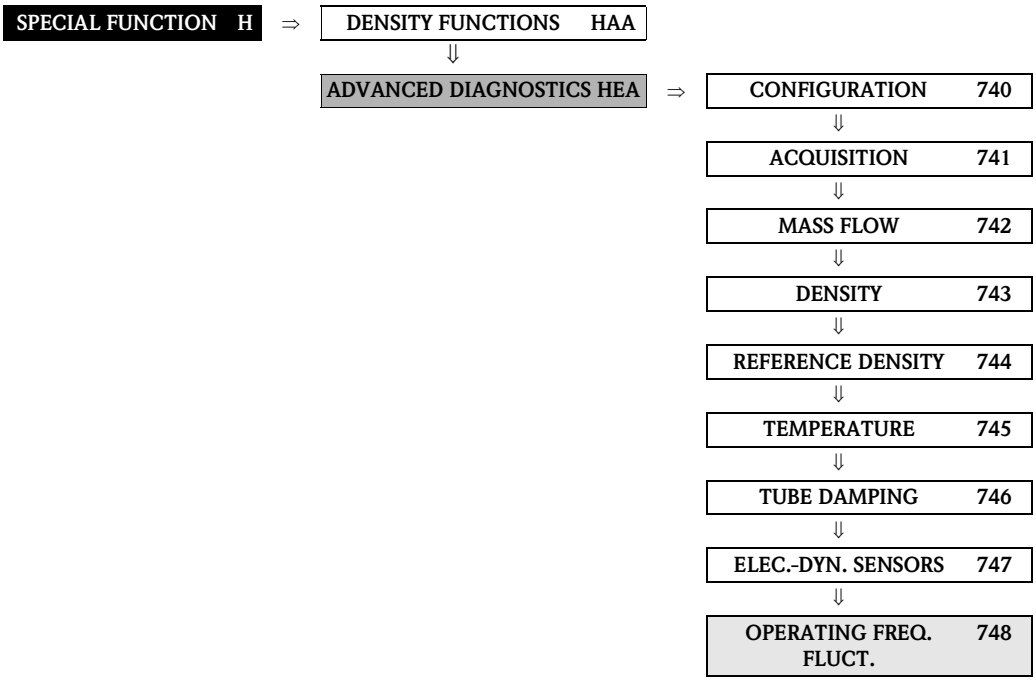
8.2.8 Function group ELECTRODYNAMIC SENSORS



Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → ELECTRODYNAMIC SENSORS	
REFERENCE VALUE ELECTRODYNAMIC SENSORS (7470)	The reference value for the electrodynamic sensors appears on the display. **Display:** 5-digit floating-point number
ELECTRODYNAMIC SENSORS (7471)	The measuring values for the electrodynamic sensors appear on the display. **Display:** 5-digit floating-point number
MINIMUM ELECTRODYNAMIC SENSORS (7472)	The lowest value of the electrodynamic sensors since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
MAXIMUM ELECTRODYNAMIC SENSORS (7473)	The highest value of the electrodynamic sensors since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
HISTORY ELECTRODYNAMIC SENSOR (7474)	The last ten values of the electrodynamic sensors since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number
DEVIATION ELECTRODYNAMIC SENSOR (7475)	This function displays the deviation between the measured values for the electrodynamic sensors and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number

Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → ELECTRODYNAMIC SENSORS	
WARNING LEVEL (7476)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for the electrodynamic sensors. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999% **Factory setting:** 100%

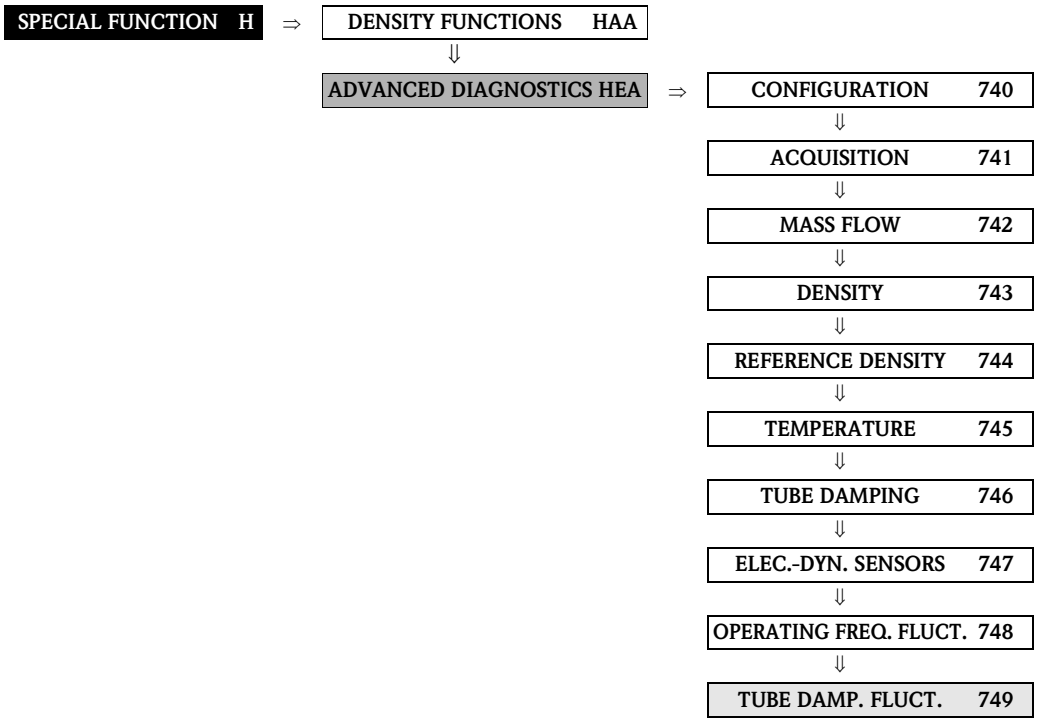
8.2.9 Function group OPERATING FREQUENCY FLUCTUATION



Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → OPERATING FREQUENCY FLUCTUATION	
REFERENCE VALUE OPERATING FREQUENCY FLUCTUATION (7480)	The reference value for the fluctuation of the operating frequency appears on the display. **Display:** 5-digit floating-point number, Hz
OPERATING FREQUENCY FLUCTUATION (7481)	The measured fluctuation of the operating frequency appears on the display. **Display:** 5-digit floating-point number, Hz
MINIMUM OPERATING FREQUENCY FLUCTUATION (7482)	The lowest value of the operating frequency fluctuation since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, Hz
MAXIMUM OPERATING FREQUENCY FLUCTUATION (7483)	The highest value of the operating frequency fluctuation since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, Hz

Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → OPERATING FREQUENCY FLUCTUATION	
HISTORY OPERATING FREQUENCY FLUCTUATION (7484)	The last ten values of the operating frequency fluctuation since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, Hz
DEVIATION OPERATING FREQUENCY FLUCTUATION (7485)	This function displays the deviation between the measured fluctuation of the operating frequency and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number, Hz
WARNING LEVEL (7486)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for the operating frequency fluctuation. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 Hz **Factory setting:** 1000 Hz

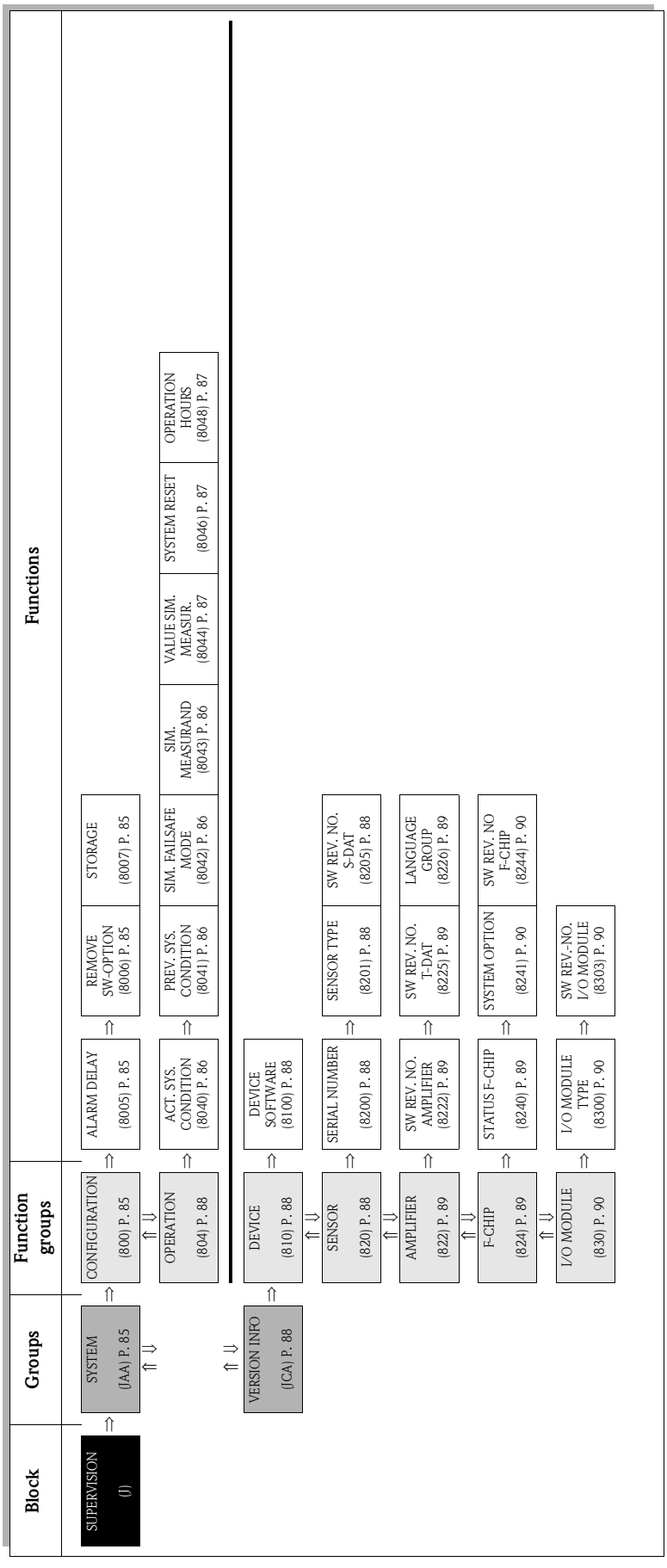
8.2.10 Function group TUBE DAMPING FLUCTUATION



Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → TUBE DAMPING FLUCTUATION	
REFERENCE VALUE TUBE DAMPING FLUCTUATION (7490)	The reference value for the fluctuation of the tube damping appears on the display. **Display:** 5-digit floating-point number

Function description SPECIAL FUNCTION → ADVANCED DIAGNOSTICS → TUBE DAMPING FLUCTUATION	
TUBE DAMPING FLUCTUATION (7491)	The measured fluctuation of the tube damping appears on the display. **Display:** 5-digit floating-point number
MINIMUM TUBE DAMPING FLUCTUATION (7492)	The lowest value of the tube damping since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
MAXIMUM TUBE DAMPING FLUCTUATION (7493)	The highest value of the tube damping fluctuation since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
HISTORY TUBE DAMPING FLUCTUATION (7494)	The last ten values of the tube damping fluctuation since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number
DEVIATION TUBE DAMPING FLUCTUATION (7495)	This function displays the deviation between the measured fluctuation of the tube damping and the reference values (FACTORY or USER) selected in the function SELECT REFERENCE CONDITION (7402). **Display:** 5-digit floating-point number
WARNING LEVEL (7496)	✎ Note! This function is not available unless ON was selected in the WARNING MODE function (7403). Use this function to specify a limit value for the tube damping fluctuation. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 **Factory setting:** 1000

9 Block SUPERVISION



9.1 Group SYSTEM

9.1.1 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 for which the criteria for an error have to be satisfied without interruption before a fault or notice message is generated. Depending on the setting and the type of error, this suppression acts on: ■ Display ■ FOUNDATION Fieldbus **User input:** 0 to 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, density functions, etc. **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. If reconfiguration does not take place, the local display and the totalizer are set to the factory setting and the outputs are set to OFF.
PERMANENT STORAGE (8007)	This function indicates whether automatic, permanent storage of parameter changes in the EEPROM is switched on or off. **Display:** OFF ON **Factory setting:** ON ☝ Caution! ■ The selection for this function can only be changed by the Endress+Hauser service organization. ■ If OFF is selected, all parameter changes are not permanently stored in the EEPROM. This means that these parameter changes are no longer available after a power failure. In these instances, the device starts with the parameter configurations last stored in the EEPROM.

9.1.2 Function group OPERATION

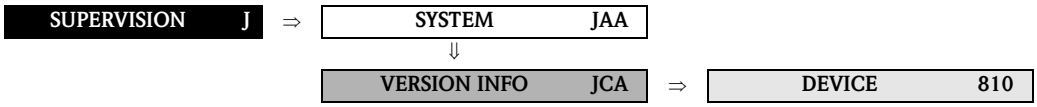
SUPERVISION J ⇒ SYSTEM JAA ⇒ CONFIGURATION 800
⇓
OPERATION 804

Function description SUPERVISION → SYSTEM → OPERATION	
ACTUAL SYSTEM CONDITION (8040)	Use this function to check the present system status. **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 error and notice messages since measuring last started. **Display:** The 15 most recent error or notice messages.
SIMULATION FAILSAFE MODE (8042)	Use this function to set all inputs, outputs and totalizers to their defined failsafe modes, in order to check whether they respond correctly. During this time, the words "SIMULATION FAILSAFE MODE" appear on the display. **Options:** ON OFF **Factory setting:** OFF ✎ Note! With the fieldbus, an active simulation is relayed to downstream function blocks or higher-level process control systems by means of the status "UNCERTAIN" of the output value OUT (AI 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 words "SIMULATION MEASURAND" appear on the display. **Options:** OFF MASS FLOW VOLUME FLOW CORRECTED VOLUME FLOW DENSITY REFERENCE DENSITY TEMPERATURE **Factory setting:** OFF ☝ Caution! ■ The measuring device cannot be used for measuring while this simulation is in progress. ■ The setting is not saved if the power supply fails. ✎ Note! ■ An active simulation of the measurand is communicated to the subsequent function blocks via the status "UNCERTAIN" for the process variables. ■ The simulation is independent of the position of the jumper for the simulation mode on the I/O board.

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 define 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 if the power supply fails. ■ The appropriate unit is taken from the SYSTEM UNITS group (ACA) (→ Page 14).
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)	Use this function to read the operating hours of the measuring device. **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 to 10000 hours ⟶ display format = 0000:00 (hr:min) Hours of operation > 10000 hours ⟶ display format = 000000 (hr)

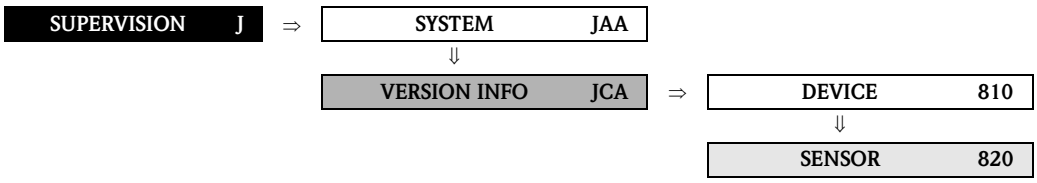
9.2 Group VERSION INFO

9.2.1 Function group DEVICE



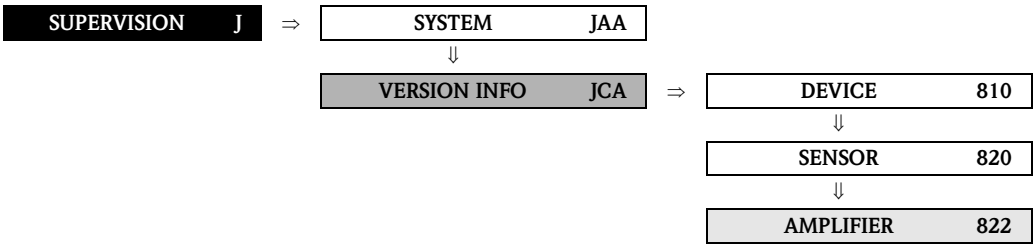
Function description SUPERVISION → VERSION INFO → DEVICE	
DEVICE SOFTWARE (8100)	Displays the current device software version.

9.2.2 Function group SENSOR



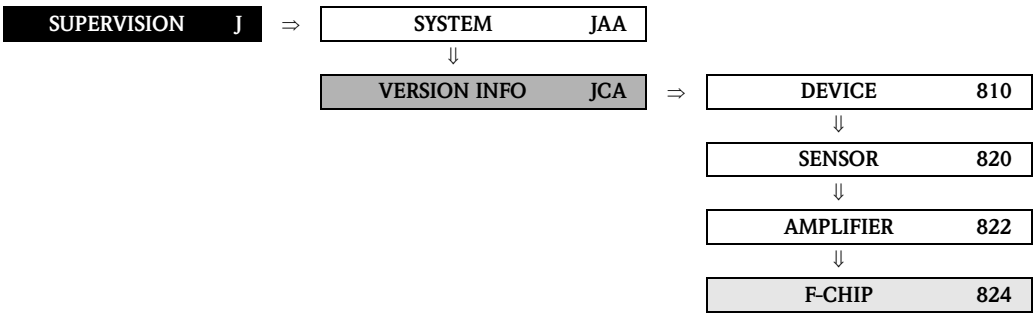
Function description SUPERVISION → VERSION INFO → SENSOR	
SERIAL NUMBER (8200)	Use this function to view the serial number of the sensor.
SENSOR TYPE (8201)	Use this function to view the sensor type (e.g. Promass F).
SOFTWARE REVISION NUMBER S-DAT (8205)	Use this function to view the software revision number of the software used to create the content of the S-DAT.

9.2.3 Function group AMPLIFIER



Function description SUPERVISION → VERSION INFO → AMPLIFIER	
SOFTWARE REVISION NUMBER AMPLIFIER (8222)	Use this function to view the software revision number of the amplifier.
SOFTWARE REVISION NUMBER T-DAT (8225)	Use this parameter to view the software revision number of the software used to create the content of the T-DAT.
LANGUAGE GROUP (8226)	Use this function to view the language group installed. The following language groups can be ordered: WEST EU / USA, EAST EU / SCAND., ASIA , CHINA. **Display:** available language group ✎ Note! ■ The language options of the available language group are displayed in the LANGUAGE (2000) function. ■ You can change the language group via the configuration software FieldCare. Please do not hesitate to contact your Endress+Hauser sales office if you have any questions.

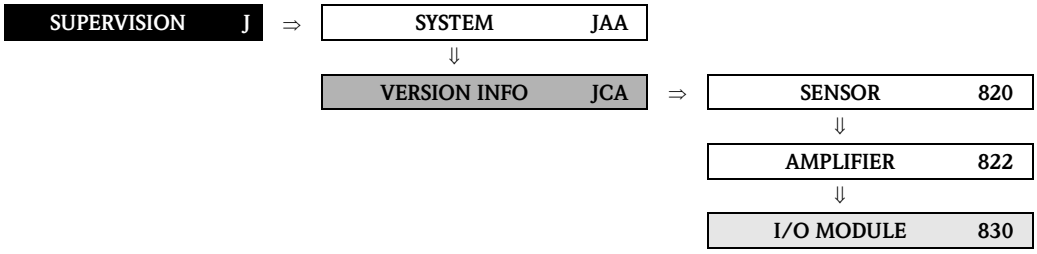
9.2.4 Function group F-CHIP



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.

Function description SUPERVISION → VERSION INFO → F-CHIP	
SYSTEM OPTION (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. **Display:** NO ENTRY (= no SW options available) ADVANCED DIAGNOSTICS DENSITY FUNCTIONS
SOFTWARE REVISION NUMBER F-CHIP (8244)	✎ Note! The F-CHIP must be available in order to access this function. Use this function to view the software revision number of the F-CHIP.

9.2.5 Function group I/O MODULE



Function description SUPERVISION → VERSION INFO → I/O MODULE	
I/O MODULE TYPE (8300)	Use this function to view the configuration of the I/O module complete with terminal numbers.
SOFTWARE REVISION NUMBER I/O MODULE (8303)	Use this function to view the software revision number of the I/O module.

10 Factory settings

10.1 SI units (not for USA and Canada)

10.1.1 Low flow cut off, full scale value, pulse value – Liquid

Nom. diameter [mm]	Low flow cut off (approx. v = 0.04 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.08	kg/h	4	kg/h	0.001	kg/p
2	0.40	kg/h	20	kg/h	0.010	kg/p
4	1.80	kg/h	90	kg/h	0.010	kg/p
8	8.00	kg/h	400	kg/h	0.100	kg/p
15	26.00	kg/h	1300	kg/h	0.100	kg/p
15 FB	72.00	kg/h	3600	kg/h	1.000	kg/p
25	72.00	kg/h	3600	kg/h	1.000	kg/p
25 FB	180.00	kg/h	9000	kg/h	1.000	kg/p
40	180.00	kg/h	9000	kg/h	1.000	kg/p
40 FB	300.00	kg/h	15000	kg/h	10.000	kg/p
50	300.00	kg/h	15000	kg/h	10.000	kg/p
50 FB	720.00	kg/h	36000	kg/h	10.000	kg/p
80	720.00	kg/h	36000	kg/h	10.000	kg/p
100	1200.00	kg/h	60000	kg/h	10.000	kg/p
150	2600.00	kg/h	130000	kg/h	100.000	kg/p
250	7200.00	kg/h	360000	kg/h	100.000	kg/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

10.1.2 Low flow cut off, full scale value, pulse value – Gas

Nom. diameter [mm]	Low flow cut off (approx. v = 0.01 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.02	kg/h	4	kg/h	0.001	kg/p
2	0.10	kg/h	20	kg/h	0.010	kg/p
4	0.45	kg/h	90	kg/h	0.010	kg/p
8	2.00	kg/h	400	kg/h	0.100	kg/p
15	6.50	kg/h	1300	kg/h	0.100	kg/p
15 FB	18.00	kg/h	3600	kg/h	1.000	kg/p
25	18.00	kg/h	3600	kg/h	1.000	kg/p
25 FB	45.00	kg/h	9000	kg/h	1.000	kg/p
40	45.00	kg/h	9000	kg/h	1.000	kg/p
40 FB	75.00	kg/h	15000	kg/h	10.000	kg/p
50	75.00	kg/h	15000	kg/h	10.000	kg/p
50 FB	180.00	kg/h	36000	kg/h	10.000	kg/p
80	180.00	kg/h	36000	kg/h	10.000	kg/p
100	300.00	kg/h	60000	kg/h	10.000	kg/p
150	650.00	kg/h	130000	kg/h	100.000	kg/p
250	1800.00	kg/h	360000	kg/h	100.000	kg/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

10.1.3 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

10.1.4 Density, length, temperature

	Unit
Density	kg/l
Length	mm
Temperature	° C

10.2 US units (only for USA and Canada)

10.2.1 Low flow cut off, full scale value, pulse value – Liquid

Nominal diameter [mm]	Low flow cut off (approx. v = 0.04 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.003	lb/min	0.15	lb/min	0.002	lb/p
2	0.015	lb/min	0.75	lb/min	0.020	lb/p
4	0.066	lb/min	3.30	lb/min	0.020	lb/p
8	0.300	lb/min	15.00	lb/min	0.200	lb/p
15	1.000	lb/min	50.00	lb/min	0.200	lb/p
15 FB	2.600	lb/min	130.00	lb/min	2.000	lb/p
25	2.600	lb/min	130.00	lb/min	2.000	lb/p
25 FB	6.600	lb/min	330.00	lb/min	2.000	lb/p
40	6.600	lb/min	330.00	lb/min	2.000	lb/p
40 FB	11.000	lb/min	550.00	lb/min	20.000	lb/p
50	11.000	lb/min	550.00	lb/min	20.000	lb/p
50 FB	26.000	lb/min	1300.00	lb/min	20.000	lb/p
80	26.000	lb/min	1300.00	lb/min	20.000	lb/p
100	44.000	lb/min	2200.00	lb/min	20.000	lb/p
150	95.000	lb/min	4800.00	lb/min	200.000	lb/p
250	260.00	lb/min	13000.00	lb/min	200.000	lb/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

10.2.2 Low flow cut off, full scale value, pulse value – Gas

Nominal diameter [mm]	Low flow cut off (approx. v = 0.01 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.001	lb/min	0.15	lb/min	0.002	lb/p
2	0.004	lb/min	0.75	lb/min	0.020	lb/p
4	0.046	lb/min	3.30	lb/min	0.020	lb/p
8	0.075	lb/min	15.00	lb/min	0.200	lb/p
15	0.250	lb/min	50.00	lb/min	0.200	lb/p
15 FB	0.650	lb/min	130.00	lb/min	2.000	lb/p
25	0.650	lb/min	130.00	lb/min	2.000	lb/p
25 FB	1.650	lb/min	330.00	lb/min	2.000	lb/p
40	1.650	lb/min	330.00	lb/min	2.000	lb/p
40 FB	2.750	lb/min	550.00	lb/min	20.000	lb/p
50	2.750	lb/min	550.00	lb/min	20.000	lb/p
50 FB	6.500	lb/min	1300.00	lb/min	20.000	lb/p
80	6.500	lb/min	1300.00	lb/min	20.000	lb/p
100	11.000	lb/min	2200.00	lb/min	20.000	lb/p
150	23.750	lb/min	4800.00	lb/min	200.000	lb/p
250	65.000	lb/min	13000.00	lb/min	200.000	lb/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

10.2.3 Language, density, length, temperature

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

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Table of contents for FOUNDATION Fieldbus

1 Operation via FOUNDATION Fieldbus

1.1 Block model

In the FOUNDATION Fieldbus all the device parameters are categorized according to their functional properties and task and are generally assigned to three different blocks. A block may be regarded as a container in which parameters and the associated functionalities are contained. A FOUNDATION Fieldbus device has the following block types:

- A Resource Block
  The Resource Block contains all the device-specific characteristics of the device.

- One or more Transducer Blocks (transmission blocks)
  The Transducer Block contains all the measuring technology and device-specific parameters of the device. The measurement principles (e.g. flow, temperature) are depicted in the Transducer Blocks in accordance with the FOUNDATION Fieldbus specification.

- One or more function blocks
  Function blocks contain the automation functions of the device. We distinguish between different function blocks, e.g. Analog Input function block, Analog Output function block, PID function block (PID controller), etc. Each of these function blocks is used to process different application functions.

Different automation tasks can be realized depending on the arrangement and connection of the individual blocks. In addition to these blocks, a field device may have any number of further blocks, e.g. several Analog Input function blocks if more than one process variable is available from the field device.

The Promass 83 FOUNDATION Fieldbus has the following blocks:

- One Resource Block

- Seven Transducer Blocks

- Fourteen function blocks consisting of:
  – Eight Analog Input function blocks
  – One Discrete Output function block
  – One PID function block
  – One Arithmetic function block
  – One Input Selector function block
  – One Signal Characterizer function block
  – One Integrator function block

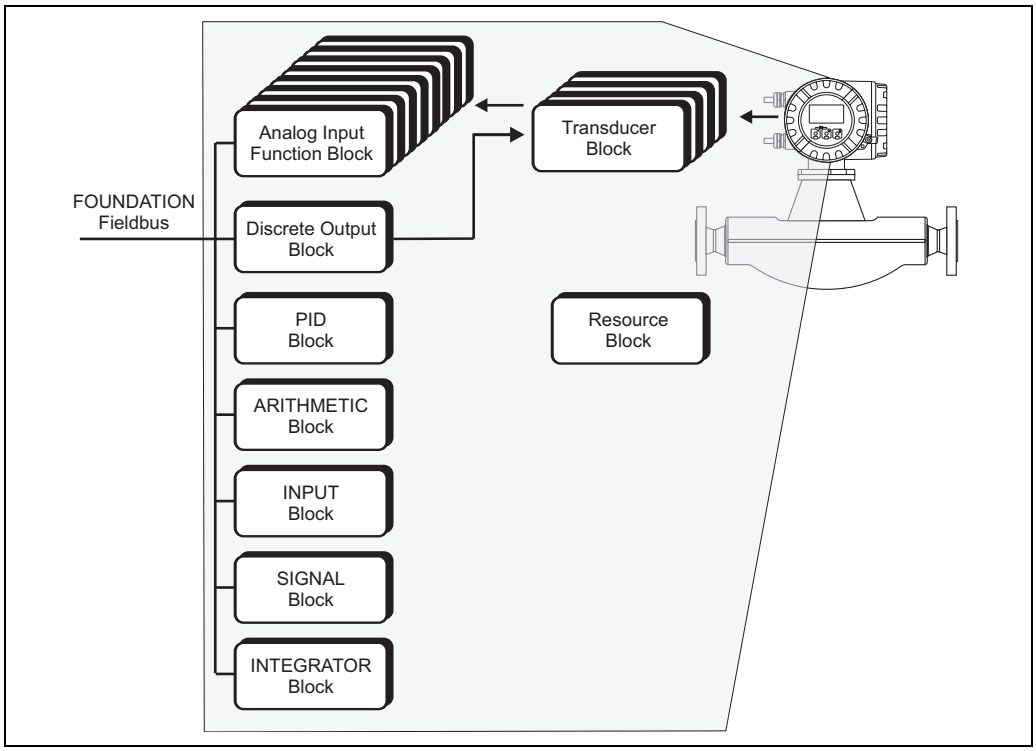

Fig. 1 : Promass 83 FOUNDATION Fieldbus blocks

The sensor signal is first prepared specifically for the flow in the measuring block **(the Transducer Block)**. The process variables are then passed to the **Analog Input function blocks** for technical processing (e.g. scaling, limit value processing).

The process variables go through the complete function block algorithm and are available to other function blocks, e.g. the PID block, as a starting variable for connecting the desired application function.

Using the **Discrete Output function block (DO)**, various actions and functions in the Device Functions Proline Promass 83 FOUNDATION Fieldbus can be initiated and controlled via FOUNDATION Fieldbus.

✎ Note!
Additional function blocks such as the PID, Arithmetic, Input Selector, Signal Characterizer and Integrator function block are described in the "FOUNDATION Fieldbus Overview" (BA013S) Operating Instructions (available at: → www.endress.com → download).

2 Resource Block

A Resource Block contains all the data that uniquely identifies and characterizes the field device. It is an electronic version of a nameplate on the field device. Parameters of the Resource Block include device type, device name, manufacturer ID, serial number, etc.

A further task of the Resource Blocks is the management of overall parameters and functions that have an influence on the execution of the remaining blocks in the field device. The Resource Block is thus the central unit that also checks the device status and thereby influences or controls the operability of the other blocks and thus also of the device. Since the Resource Block has no block input and block output data, it cannot be linked with other blocks.

The most important functions and parameters of the Resource Block are listed below; you will find an overview of all the available parameters starting on page 111.

2.1 Selecting the operating mode

The operating mode is configured via the MODE_BLK parameter group. The Resource Block supports the following operating modes:

- AUTO (automatic mode)
- OOS (out of service)

✎ Note!
The block status OOS is also shown via the parameter BLOCK_ERR.In operating mode OOS, if write protection is not enabled, you can access all the write parameters without restriction.

2.2 Block status

The current operating status of the Resource Block is shown in the parameter RS_STATE.

The Resource Block can take on the following states:

- STANDBY — The Resource Block is in the OOS mode. It is not possible to execute the remaining blocks.
- ONLINE LINKING — The connections configured between the function blocks have not yet been linked.
- ONLINE — Normal operating status, the Resource Block is in the AUTO operating mode. The configured connections between the function blocks have been established.

2.3 Write protection and simulation

Write protection of the device parameters and simulation in the Analog Input and Discrete Output Function Block can be locked or unlocked via a jumper setting on the FOUNDATION Fieldbus I/O board (→ Operating Instructions, Proline Promass 83 FOUNDATION Fieldbus, BA065D).

The parameter WRITE_LOCK shows the status of the hardware write protection. The following statuses are possible:

- LOCKED — Device data cannot be modified via the FOUNDATION Fieldbus interface.
- NOT LOCKED — Device data can be modified via the FOUNDATION Fieldbus interface.

The parameter BLOCK_ERR indicates whether a simulation is possible in the Analog Input and Discrete Output function block.

- Simulation Active — Simulation possible in the Analog Input function block via the SIMULATE parameter and in the Discrete Output function block via the SIMULATE_D parameter.

2.4 Alarm detection and processing

Process alarms provide information on particular block statuses and block events. The status of the process alarms is communicated to the fieldbus host system via the parameter BLOCK_ALM. The parameter ACK_OPTION specifies whether an alarm must be acknowledged via the fieldbus host system.

The following process alarms are generated by the Resource Block:

Block process alarms
The following block process alarms of the Resource Block are shown via the parameter BLOCK_ALM:
- OUT OF SERVICE
- SIMULATE ACTVE

Write protection process alarm
If write protection is disabled on the FOUNDATION Fieldbus I/O board, then prior to communicating the change of status to the fieldbus host system the alarm priority specified in the parameter WRITE_PRI is checked. The alarm priority specifies the action taken when the write protection alarm WRITE_ALM is enabled.

Note!
- If the option of a process alarm has **not** been enabled in the parameter ACK_OPTION, this process alarm only has to be acknowledged in the parameter BLOCK_ALM.
- The parameter ALARM_SUM shows the current status of all the process alarms.

2.5 Resource Block parameters

The following table shows the Endress+Hauser-specific parameters of the Resource Block.

Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

Resource Block		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Sensor - Serial Number	read only	Use this function to view the sensor serial number.
Amp. - HW Rev.Number	read only	Use this parameter to view the hardware revision number of the amplifier.
Amp. - HW Identification	read only	Use this parameter to view the hardware ID number of the amplifier.
Amp. - SW Rev.Number	read only	Use this function to view the software revision number of the amplifier.
Amp. - SW Identification	read only	Use this function to view the software ID number of the amplifier.
Amp. - Prod.-Number	read only	Use this parameter to view the production number of the amplifier.
Amp. - SW-Rev.No. T-DAT	read only	Use this parameter to view the software revision number of the software used to create the content of the T-DAT.
Amp. - Language Group	read only	Use this function to view the language group.
I/O - Type	read only	Use this function to view the I/O module type.
I/O - HW Rev.Number	read only	Use this function to view the hardware revision number of the I/O module.
I/O - HW Identification	read only	Use this parameter to view the hardware ID number of the I/O module.
I/O - SW Rev.Number	read only	Use this function to view the software revision number of the I/O module.
I/O - SW Identification	read only	Use this parameter to view the software ID number of the I/O module.
I/O - Prod.Number	read only	Use this function to view the production number of the I/O module.
Device Software	read only	Use this function to view the device software version.

3 Transducer Block

The Transducer Blocks contain all the measurement- and device-specific parameters of the flowmeter. All the settings directly connected with the flow measurement/application are made here. They form the interface between the sensor-specific measured value preprocessing and the Analog Input function blocks required for automation.

A Transducer Block allows you to influence the input and output values of a function block. The parameters of a Transducer Block include information on the sensor type, sensor configuration, physical units, calibration, damping, diagnosis, etc. as well as the device-specific parameters. The device-specific parameters and functions are split into several Transducer Blocks, each covering different task areas.

"Flow" Transducer Block/base index 1400:
This block contains all the flow-specific parameters and functions, e.g. calibration functions, sensor data, etc. → Page 116

"Diagnosis" Transducer Block/base index 1600:
This block contains all the parameters for system diagnosis, e.g. current system status etc.
→ Page 116

"Display" Transducer Block/base index 1800:
This block contains all the parameters for configuring the local display
→ Page 137

"Totalizer" Transducer Block/base index 1900:
This block contains all the parameters for configuring the totalizers
→ Page 154

"Calculated Density" Transducer Block/base index 2000:
This block contains all the parameters for configuring density measurement
→ Page 154

"Viscosity" Transducer Block/base index 2100:
This block contains all the parameters for configuring viscosity measurement
→ Page 154

"Advanced Diagnostics" Transducer Block/base index 2200:
This block contains all the parameters for configuring advanced diagnostics
→ Page 154

3.1 Signal processing

The following figure shows the internal structure of the individual Transducer Blocks:

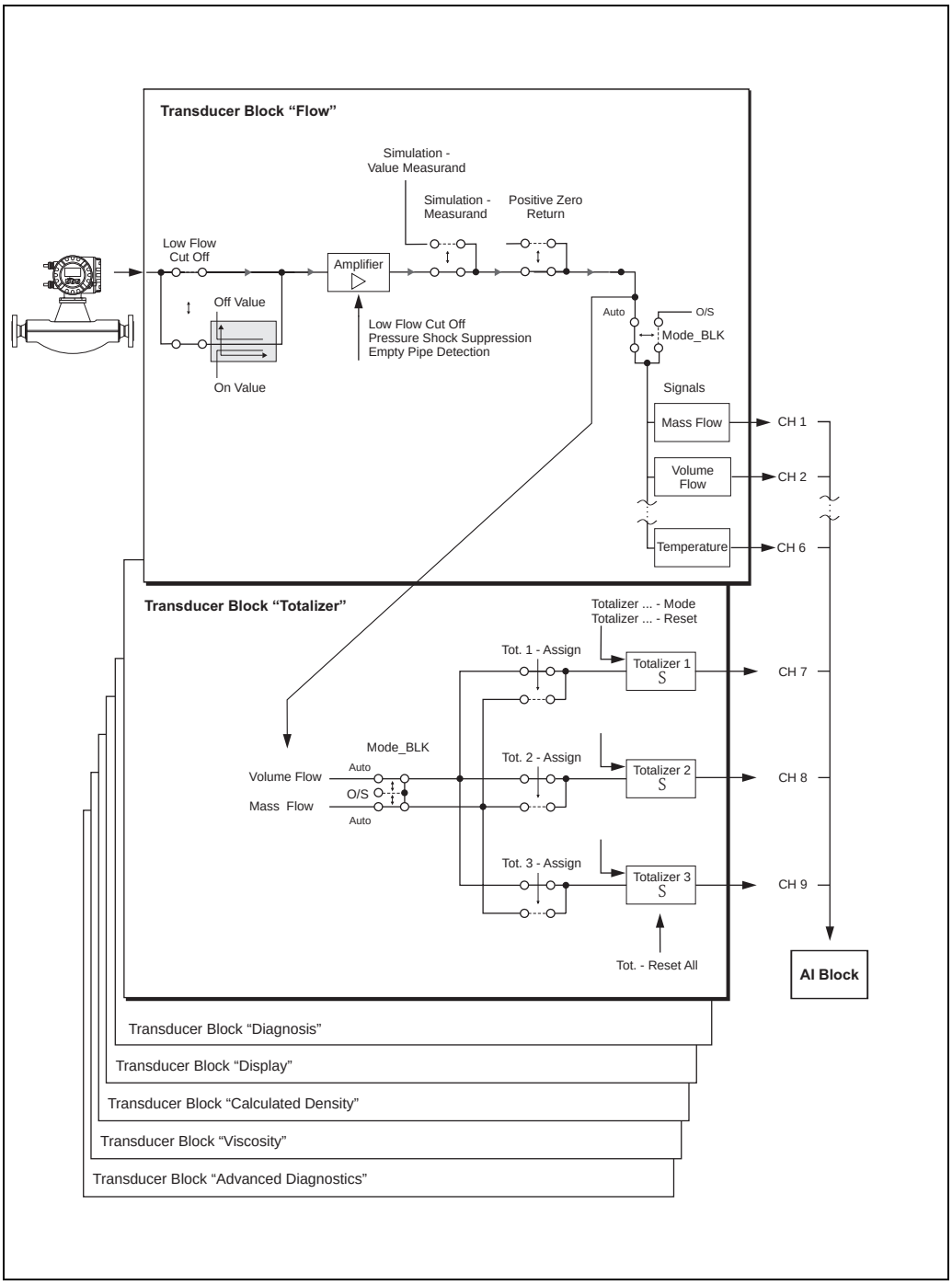

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Fig. 2 : Internal structure of the individual Transducer Blocks

The Transducer Block receives several signals from the sensor as input values (mass, density, temperature). Other process variables (volume, standard volume) are derived from these signals. The input signals further processed via an amplifier.

A low flow cut off allows you to hide measurement inaccuracies in the low-flow sector. The parameter "Low Flow Cut Off - On-Value" (→ Page 121) allows you to define a limit value. If the measured flow value is below this limit value then the output value of 0 is output.

The parameter "Simulation - Value Measurand" (→ Page 132) allows you to specify a simulation value for the Transducer Block in order to test assigned parameters in the device and subsequent function blocks.

In addition, the parameter "System Parameter - Positive Zero Return" (→ Page 130) allows you to switch the measured value to "Zero Flow". This is necessary when a piping system is being cleaned, for example.

Output variables (process variables) that are made available by the Transducer Blocks → chapter 3.2.1, Output Variable Block.

A process variable, e.g. mass flow, volume flow, etc., can be assigned to the individual totalizers. Each totalizer can be manually reset using the parameter Totalizer (1 - 3) Reset.

The most important functions and parameters of the Transducer Blocks are listed below. You will find an overview of all the available parameters starting on page 116.

3.2 Important functions and parameters of the Transducer Blocks

3.2.1 Block output values

The Transducer Blocks make the following output variables (process variables) available. The CHANNEL parameter in the Analog Input function block is used to assign which process variable is read in and processed in the downstream Analog Input function block.

✎ Note!
The "Diagnosis" and "Display" Transducer Blocks do not have any output variables.

Block	Process variable	Channel parameter (AI Block)
"Flow" Transducer Block	Mass flow	1
	Volume flow	2
	Corrected volume flow	3
	Density	4
	Reference density	5
	Temperature	6
"Totalizer" Transducer Block	Totalizer 1	7
	Totalizer 2	8
	Totalizer 3	9
The following measured variables are available if the "Concentration measurement" add-on is installed in the measuring device (order option).		
"Concentration" Transducer Block	Target fluid mass flow	40
	% Target mass flow	41
	Target volume flow	42
	% Target volume flow	43
	Corrected target volume flow	44
	Carrier mass flow	45
	% Carrier mass flow	46
	Carrier volume flow	47
	% Carrier volume flow	48
	Corrected Carrier volume flow	49
	% Black liquor	41

	° Baume	50
	° API	
	° Plato	
	° Balling	
	° Brix	
The following measured variables are available if the "Viscosity" add-on is installed in the measuring device (order option)		
"Viscosity" Transducer Block	Dynamic viscosity	90
	Kinematic viscosity	91
	Temperature-compensated dynamic viscosity	92
	Temperature-compensated kinematic viscosity	93
The following measured variables are available if the "Advanced diagnostics" add-on is installed in the measuring device (order option)		
"Advanced Diagnostics" Transducer Block	Mass flow deviation	71
	Density deviation	71
	Reference density deviation	72
	Temperature deviation	73
	Tube damping deviation	74
	Electrodynamic sensor deviation	75
	Operating frequency fluctuation deviation	76
	Tube damping fluctuation deviation	77

3.2.2 Selecting the operating mode

The operating mode is configured via the MODE_BLK parameter group. The Transducer Blocks support the following operating modes:

- AUTO (automatic mode)
- OOS (out of service)

✎ Note!

- The block status OOS is also shown via the parameter BLOCK_ERR. In operating mode OOS, if write protection is not enabled and the release code is entered, you can access all the write parameters without restriction.
- The following applies for the "Flow" and "Totalizer" Transducer Blocks: In the "OOS" operating mode, the process variables are updated but the status of the output value OUT (AI Block) changes to "BAD".
- If problems occur during the configuration of the function blocks → See Operating Instructions Proline Promass 83 FOUNDATION Fieldbus (BA065D), "Troubleshooting" section.

3.2.3 Alarm detection and processing

The Transducer Blocks do not generate any process alarms. The status of the process variables is evaluated in the subsequent Analog Input function blocks. If the Analog Input function block does not receive an input value that can be evaluated from the Transducer Blocks, then a process alarm is generated. This process alarm is displayed in the BLOCK_ERR parameter of the Analog Input function block (BLOCK_ERR = Input Failure).

The parameter BLOCK_ERR of the "Diagnosis" Transducer Block displays the device error that produced the input value that could not be evaluated and thus triggered the process alarm in the Analog Input function block.

In addition, the active device error is displayed via the "Diagnosis" Transducer Block in the "Diag. - Act.Sys.Condition" parameter (→ Page 134).

For more information on rectifying errors → See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus (BA065D), "Troubleshooting" section.

3.2.4 Diagnosis

The status of the device is displayed via the following parameters specified in the FOUNDATION Fieldbus specification:

- BLOCK_ERR
- Transducer Error

Detailed information on the current device status is displayed via the "Diagnosis" Transducer Block in the manufacturer-specific parameter "Diag. - Act.Sys.Condition" (→ Page 134).

For more information on rectifying errors → See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus (BA065D), "Troubleshooting" section.

3.2.5 Accessing the device-specific parameters

To access the device-specific parameters the following requirements must be met:

1. Hardware write protection must be deactivated → See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus (BA065D).
2. The correct code must be entered in the parameter "Access - Code" via the corresponding Transducer Block.

3.3 "Flow" Transducer Block parameters

The following table shows the Endress+Hauser-specific parameters of the "Flow" Transducer Block. These can only be changed after entering a release code in the "Access - Code" parameter.

Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

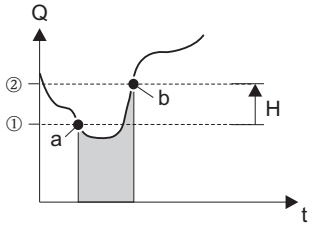
"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Access - Code	AUTO - OOS	All data of the measuring system are protected against inadvertent change. Only when the code has been entered in this parameter can the manufacturer-specific parameters be programmed and the device configuration modified. You can enable programming by entering: ■ Code 83 (factory setting) ■ Personal code ("Access - Def.Private Code" parameter → Page 138) **User input:** Max. 4-digit number: 0 to 9999 ✎ Note! ■ If the hardware write protection is enabled then access to the manufacturer-specific parameters is blocked even if the right code is entered. ■ You can disable programming again by entering any number (other than the release code) in this parameter. ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code. ■ Certain parameters are not accessible unless a special service code is entered. This service code is known only to the Endress+Hauser service organization. Please contact your Endress+Hauser service center if you require clarification.
Access - Status	read only	Use this parameter to check the access status for the parameter matrix. **Display:** LOCKED (parameterization disabled) ACCESS CUSTOMER (parameterization enabled) ACCESS SERVICE (parameterization enabled)
System Value - Mass Flow	read only	Use this parameter to view the mass flow currently measured. **Display:** 5-digit floating-point number, including unit and sign (e.g. 462.87 kg/h; –731.63 lb/min; etc.)
System Unit - Mass Flow	AUTO - OOS	Use this parameter to select the unit for the mass flow (mass/time). The unit you select here is also valid for: ■ Simulation ■ Low flow cut off **Options:** Metric: Gram → g/s; g/min; g/h; g/day Kilogram → kg/s; kg/min; kg/h; kg/day 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 → Page 196 ff. ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.

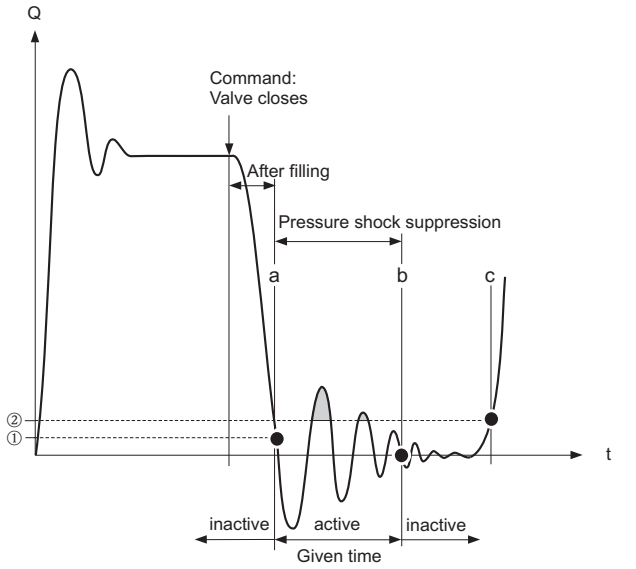
"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Value - Volume Flow	read only	Use this parameter to view the volume flow.The volume flow is derived from the measured mass flow and the measured density of the fluid. **Display:** 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.)
System Unit - Volume Flow	AUTO - OOS	Use this parameter to select the unit for the volume flow (volume/time). The unit you select here is also valid for: ■ Simulation ■ 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 → Page 196 ff. ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.
System Value - Corr.Volume Flow	read only	The calculated corrected volume flow appears on the display. The calculated corrected volume flow is derived from the measured mass flow and the reference density of the fluid (density at reference temperature, measured or fixed entry). **Display:** 5-digit floating-point number, including unit and sign (e.g. 1.3549 Nm^3/h; 7.9846 scm/day; etc.)

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Unit - Corr.Volume Flow	AUTO - OOS	Use this parameter to select the unit for the corrected volume flow (corrected volume/time). The unit you select here is also valid for: ■ Simulation ■ Low flow cut off **Options:** Metric: Standard liter → Nl/s; Nl/min; Nl/h; Nl/day Standard cubic meter → Nm^3/s; Nm^3/min; Nm^3/h; Nm^3/day US: Standard cubic meter → Sm^3/s; Sm^3/min; Sm^3/h; Sm^3/day Standard cubic foot → Scf^3/s; Scf^3/min; Scf^3/h; Scf^3/day **Factory setting:** Nm^3/h ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.
System Value - Density	read only	The currently measured density or its specific gravity appears on the display. **Display:** 5-digit floating point number, including unit (e.g. 1.2345 kg/dm^3; 993.5 kg/m^3; 1.0015 SG_20 °C; etc.)
System Unit - Density	AUTO - OOS	Use this parameter to select the unit for the fluid density. The unit you select here is also valid for: ■ Simulation ■ Density response value for EPD ■ Density adjustment value **Options:** Metric → g/cm^3; g/cc; 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; g/l 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 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). ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.
System Value - Ref. Density	read only	The density of the fluid, at reference temperature, appears on the display. The reference density can be measured or specified via the "Ref.Param. - Fixed Ref.Density" parameter. **Display:** 5-digit floating point number, including unit (e.g. 1.2345 kg/dm^3; 993.5 kg/m^3; 1.0015 SG_20 °C; etc.)

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Unit - Ref. Density	AUTO - OOS	Use this parameter to select the unit for the reference density. The unit you select here is also valid for: ■ Simulation ■ Fixed reference density (for calculation of corrected volume flow) **Options:** Metric → kg/Nm^3; kg/Nl US → g/Scc; kg/Sm^3; lb/Scf **Factory setting:** kg/Nl ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.
System Value Temperature	read only	The currently measured temperature appears on the display. **Display:** Max. 4-digit fixed-point number, including unit and sign (e.g. -23.4 °C; 160.0 °F; 295.4 K; etc.)
System Unit Temperature	AUTO - OOS	Use this parameter to select the unit for the temperature. The unit you select here is valid for: ■ Simulation ■ Reference temperature (for corrected volume measurement with measured reference density) **Options:** °C (Celsius) K (Kelvin) °F (Fahrenheit) R (Rankine) **Factory setting:** °C ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.
System Unit - Length	AUTO - OOS	Use this parameter to select the unit for the temperature. The unit you select here is also valid for: ■ Simulation ■ Nominal diameter of the sensor **Options:** MILLIMETER INCH **Factory setting:** MILLIMETER ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Unit - Pressure	AUTO - OOS	Use this parameter to select the unit for pressure. The unit you select here is also valid for: ■ Simulation ■ Specified pressure **Options:** bar a bar g psi a psi g **Factory setting:** bar g ✎ Note! The unit selected here has no influence on the transmitted process variable to the Analog Input function block.
Low Flow Cut Off - Assign	AUTO - OOS	Use this parameter to assign the switching point for low flow cut off. **Options:** OFF MASS FLOW VOLUME FLOW COR. VOLUME FLOW **Factory setting:** MASS FLOW
Low Flow Cut Off - On-Value	AUTO - OOS	Use this parameter to assign a value to the switch-on point for low flow cut off. Low flow cut off is active if the setting is a value not equal to 0. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country → Page 196 ff. ✎ Note! With low flow cut off active, the status condition of the process variable changes to UNCERTAIN.
Low Flow Cut Off - Unit	read only	Displays the unit of the low flow cut off. ✎ Note! Depending on the process variable selected, the unit is taken from the corresponding parameter "System Unit - Mass Flow", "System Unit - Volume Flow" or "System Unit - Cor. Volume Flow".

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Low Flow Cut Off - Off-Value	AUTO - OOS	Use this function to enter the off-value (**b**) for low flow cut off. Enter the off-value as a positive hysteresis (**H**) from the on-value (**a**). **User input:** Integer 0 to 100% **Factory setting:** 50%  A0003882 *① = On-value, ② = Off-value* *a* *Low flow cut off is switched on* *b* *Low flow cut off is switched off (a + a · H)* *H* *Hysteresis value: 0 to 100%* ■ *Low flow cut off active* *Q* *Flow*
Process - Pressure Shock Suppression	AUTO - OOS	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 totaled in this way result in a totalizer reading error, particularly in the case of filling 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 parameter "Low Flow Cut Off - On-Value" → Page 121). Use this parameter to define the time span for active pressure shock suppression. (Continued on next page)

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Process - Pressure Shock Suppression (continued)	AUTO - OOS	**Activation of the pressure shock suppression** Pressure shock suppression is activated after the flow falls below the ON-VALUE for the low flow cut off (see point **a** in graphic). While pressure shock suppression is active, the following conditions apply: ■ Flow reading on display → 0 ■ Totalizer reading → the totalizers are pegged at the last correct value. **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 actual flow value is displayed and output when the time interval for pressure shock suppression has passed and the flow exceeds the OFF-VALUE for the low flow cut off (see point **c** in graphic).  A0001285-EN *① = On-value (low flow cut off), ② = Off-value (low flow cut off)* *a Activated when the on-value for low flow cut off is undershot* *b Deactivated once the time specified expires* *c Flow values are taken into account again for 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

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Sys. - Permanent Storage	read only	This parameter indicates whether automatic, permanent storage of parameter changes in the EEPROM is switched on or off. **Display:** OFF ON **Factory setting:** ON ☞ Caution! ■ The option selected in this function can only be changed by the Endress+Hauser service organization. ■ If OFF is selected, all parameter changes are not permanently stored in the EEPROM. This means that these parameter changes are no longer available after a power failure. In these instances, the device starts with the parameter configurations last stored in the EEPROM.
EPD - Empty Pipe Detection	AUTO - OOS	Use this parameter to activate the empty pipe detection (EPD). With empty measuring tubes the density of the fluid falls below the specified value in the "EPD - Low Value" parameter. **Options:** OFF ON **Factory setting:** Liquid: OFF Gas: ON ☞ Caution! ■ Select a correspondingly low EPD response value in the "EPD - Low Value" parameter so that the difference to the effective density of the fluid is sufficiently large. This ensures that totally empty measuring tubes and not partially filled ones are detected. ■ For gas measurement, we strongly recommend you switch off empty pipe detection.
EPD - Low Value	AUTO - OOS	Use this parameter to specify a lower threshold value (limit value) for the measured density as process problems can occur if the density is too low. **User input:** 5-digit floating-point number **Factory setting:** 0.2000
EPD - High Value	AUTO - OOS	Use this parameter to set an upper threshold for the measured density value. **User input:** 5-digit floating-point number **Factory setting:** 6.0000
EPD - Unit	read only	Displays the unit of the empty pipe detection (EPD). ✎ Note! The unit is taken from the parameter "System Unit - Density" (→ Page 119).

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
EPD - Response time	AUTO - OOS	Use this parameter 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. **User input:** Fixed point number: 1.0 to 100.0 s **Factory setting:** 1.0 s
EPD - Exc.Curr.Max	AUTO - OOS	Use this parameter to activate the empty pipe detection (EPD). In the event of inhomogeneous fluids or air bubbles, the excitation current of the measuring pipes increases. If the excitation current set in this function is exceeded, error message #700 is output in the "Diag. -Act.Sys.Condition" parameter (→ Page 134) in the same way as the "EPD - Low Value" and "EPD High Value" parameter. **User input:** 5-digit floating-point number **Factory setting:** 100.00 mA (deactivated) ✎ Note! The function is not activated until a value under 100 mA is input. Entering the value 100 mA deactivates the function.
Ref.Param. - Corr. Vol.Calculation	AUTO - OOS	This parameter is used to set the reference density for calculating the corrected volume flow. **Options:** CALC. REF. DENSITY FIX. REF. DENSITY **Factory setting:** CALC. REF. DENSITY
Ref.Param. - Fixed Ref.Density	AUTO - OOS	✎ Note! The entry is not active unless the FIX REF. DENSITY option was selected in the parameter "Reference Param. - Cor. Volume Calc.". In this parameter, a fixed value for the reference density can be entered, with which the corrected volume flow or corrected volume is calculated. **User input:** 5-digit floating-point number **Factory setting:** 1.0000 kg/Nl
Ref.Param. - Fixed Ref.Density Unit	AUTO - OOS	Displays the unit used for the standard density in the calculation of corrected volume flow. ✎ Note! The unit is taken from the parameter "System Unit - Reference Density" (→ Page 132).

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Ref.Param. - Exp. Coeff.Lin.	AUTO - OOS	✎ Note! The entry is not active unless the CALC. REF. DENSITY option was selected in the parameter "Reference Param. - Cor. Volume Calc.". For calculating temperature-compensated density functions, an expansion coefficient specific to the fluid is required which you can enter in this parameter. **User input:** 5-digit floating-point number **Factory setting:** 0.5000 e^{-3} [1/K]
Ref.Param. - Exp.Coeff.Square	AUTO - OOS	Use this parameter to enter a squarely expansion coefficient, if the temperature compensation follows a nonlinear behavior. **User input:** 5-digit floating-point number **Factory setting:** 0 e^{-6} [1/K^2]
Ref.Param. - Ref. Temperature	AUTO - OOS	✎ Note! This parameter is not active unless the CALC. REF. DENSITY option was selected in the parameter "Ref.Param. - Corr. Vol.Calculation". For entering the reference temperature for calculating the corrected volume flow, the corrected volume and the reference density. **Options:** 5-digit floating-point number **Factory setting:** 20.000 The reference density is calculated as follows: $\rho_N = \rho \cdot (1 + \alpha \Delta t + \beta \Delta t^2)$; where $\Delta t = t - t_N$ ρ_N = Reference density ρ = Currently measured density (Promass measured value) t = Currently measured fluid temperature (Promass measured value) t_N = Reference temperature at which the reference density should be calculated (e.g. 20 °C) α = Volumetric expansion coefficient of the fluid in question, unit = [1/K]; K = Kelvin β = Quadratic volumetric expansion coefficient of the fluid in question, unit = [1/K^2]
Reference Param. - Ref. Temperature Unit	AUTO - OOS	Displays the unit used for the temperature in the calculation of corrected volume flow. ✎ Note! The unit is taken from the parameter "System Unit - Temperature" (→ Page 120).

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Adj. - Zeropoint Adjustment	AUTO - OOS	This parameter enables a zero point adjustment to be automatically carried out. The new zero point determined by the measuring system is adopted by the "Sensor Data - Zeropoint" parameter (→ Page 130). **User input:** CANCEL START **Factory setting:** CANCEL Caution! Before carrying out an adjustment, please refer to BA065D/06/en "Promass 83 FOUNDATION Fieldbus" Operating Instructions where a detailed description of the zero point adjustment is given. Note! ■ Programming is locked during zero point adjustment. ■ If zero point adjustment is not possible (e.g. if v > 0.1 m/s) or has been aborted, error message #731 is displayed in the "Diag. - Act.Sys.Condition" parameter (→ Page 134). The status of the parameter is passed on to subsequent function blocks via the status condition UNCERTAIN of the process variable. ■ The zero point adjustment can, also using cyclic scheduled data transmission, be controlled or initiated via the Discrete Output function block.
Adj. - Dense.Set.Value 1	AUTO - OOS	Use this parameter to select whether a 1-point or a 2-point density adjustment should be carried out. **Options:** CANCEL 1-POINT 2-POINT
Adj. - Dense.Set.Value 1	AUTO - OOS	In this parameter, enter the density set value of the fluid for which you want to carry out a field density adjustment. **User input:** 5-digit floating-point number Note! The preset density entered here should not vary from the actual fluid density by a more than ±10%.
Adj. - Dens.Unit	read only	Use this parameter to view the unit for the fluid density. **Display:** Metric → g/cm^3; g/cc; 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)
Adj. - Meas.Fluid 1	AUTO - OOS	In this parameter the actual density of the fluid is measured for the density adjustment. **Options:** CANCEL START

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Adj. - Dens. Adjustment	AUTO - OOS	With this parameter a density adjustment can be carried out. The density adjustment values will thus be recalculated and stored. This ensures that the values dependent on density calculations (e.g. mass flow) are as accurate as possible. ✎ Note! Before carrying out a density adjustment, please refer to BA059D/06/en "Promass 83 FOUNDATION Fieldbus Operating Instructions" where a detailed description of the density adjustment is given. **Options:** CANCEL START **Factory setting:** CANCEL
Adj. - Dense.Set.Value 2	AUTO - OOS	Use this parameter to enter the density setpoint value for the second fluid for which you want to carry out field density adjustment. **User input:** 5-digit floating-point number, incl. units ✎ Note! ■ The preset density entered here should not vary from the actual fluid density by a more than ±10%. ■ The difference between the density setpoint values must be at least 0.2 kg/l. ■ The associated unit is taken from the "System Units" parameter group.
Adj. - Meas.Fluid 2	AUTO - OOS	In this parameter the current density of the second fluid is measured for density adjustment. **Options:** CANCEL START
Adj. - Restore Original	AUTO - OOS	With this parameter the original density coefficients determined at the factory are restored. **Options:** NO YES **Factory setting:** NO
Press.Corr. - Pressure Mode	AUTO - OOS	Use this parameter to configure an automatic pressure correction. In this way, the effect of a pressure deviation between the calibration and process pressures on the measured error for mass flow is compensated for, (see also Operating Instructions BA065D, Accuracy Chapter). **Options:** OFF FIX (A fixed process pressure for pressure correction is specified → "Press.Corr. - Pressure" parameter) **Factory setting:** OFF

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Press.Corr. - Pressure	AUTO - OOS	✎ Note! The entry is not active unless the FIX option was selected in the "Press.Corr. - Pressure Mode" parameter. Use this parameter to enter the value for the process pressure which should be used during pressure correction. **User input:** 7-digit floating-point number **Factory setting:** 0 bar g ✎ Note! The associated unit is taken from the "System Units" parameter group.
Sys. - Install. Direction Sensor	AUTO - OOS	Use this parameter to reverse the sign of the flow quantity, if necessary. ✎ Note! Ascertain the actual direction of fluid flow with reference to the direction indicated by the arrow on the sensor (nameplate). **Options:** NORMAL (flow as indicated by the arrow) INVERSE (flow opposite to direction indicated by the arrow) **Factory setting:** NORMAL
Sys. - Density Damping	AUTO - OOS	The density filter allows the sensitivity of the density measuring signal to be lowered with respect to variations in the density of the fluid, e.g. with inhomogeneous liquids. The damping acts on all parameters and outputs of the measuring device. **User input:** Max. 5-digit number, including unit: 0.00 to 100.00 s **Factory setting:** 0.00 s
Sys. - Flow Damping	AUTO - OOS	Setting 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 reaction time of the measuring device increases with every increase in the filter setting. The damping acts on all parameters and outputs of the measuring device. **User input:** 0 to 100 s **Factory setting:** Liquid: 0.0 s Gas: 0.25 s

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Sys. - Positive Zero Return	AUTO - OOS	Use this parameter to interrupt evaluation of measured variables. This is necessary when a piping system is being cleaned, for example. This setting acts on all parameter and outputs of the measuring device. **Options:** OFF ON (signal output is set to the ZERO FLOW value, temperature and density are output normally) **Factory setting:** OFF ✎ Note! ■ The active positive zero return is passed on to subsequent function blocks via the status condition (UNCERTAIN) of the process variable. ■ Interruption of the processing of measured values can, also using cyclic scheduled data transmission, be controlled or initiated via the Discrete Output function block.
Sensor Data - K-Factor	read only	This parameter shows the current calibration factor for the sensor. **Factory setting:** Depends on nominal diameter and calibration. ✎ Note! If the service code is used to call this parameter, this value can be edited.
Sensor Data - Zeropoint	read only	This parameter shows the current zero-point correction value for the sensor. **Display:** Max. 5-digit number: –99999 to +99999 **Factory setting:** Depends on calibration.
Sensor Data - Nominal Diameter	read only	This function shows the nominal diameter for the sensor. **Factory setting:** Depends on nominal diameter ✎ Note! If the service code is used to call this parameter, this value can be edited.
Sensor Data - Temp. Coeff. KM	read only	This function shows the temperature coefficient KM.
Sensor Data - Temp. Coeff. KM2	read only	This function shows the temperature coefficient KM2.
Sensor Data - Temp. Coeff. KT	read only	This function shows the temperature coefficient KT.
Sensor Data - Cal. Coeff. KD1	read only	This function shows the calibration coefficient KD1.
Sensor Data - Cal. Coeff. KD2	read only	This function shows the calibration coefficient KD2.

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Sensor Data - Density Coeff. C0	read only	This function shows the actual density coefficient C0. ✎ Note! If the service code is used to call this parameter, this value can be edited. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
Sensor Data - Density Coeff. C1	read only	This function shows the actual density coefficient C1. ✎ Note! If the service code is used to call this parameter, this value can be edited. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
Sensor Data - Density Coeff. C2	**read only**	This function shows the actual density coefficient C2. ✎ Note! If the service code is used to call this parameter, this value can be edited. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
Sensor Data - Density Coeff. C3	read only	This function shows the actual density coefficient C3. ✎ Note! If the service code is used to call this parameter, this value can be edited. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
Sensor Data - Density Coeff. C4	read only	This function shows the actual density coefficient C4. ✎ Note! If the service code is used to call this parameter, this value can be edited. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
Sensor Data - Density Coeff. C5	read only	This function shows the actual density coefficient C5. ✎ Note! If the service code is used to call this parameter, this value can be edited. ☝ Caution! A density adjustment can alter the calibration value of this coefficient.
Sensor Data - Min. Temp.Measured	read only	The lowest fluid temperature measured appears on the display.
Sensor Data - Max. Temp.Measured	read only	The highest fluid temperature measured appears on the display.

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Sensor Data - Min. Temp.Carrier	read only	The lowest carrier tube temperature measured appears on the display. ✎ Note! This function is not available for the Promass E measuring device.
Sensor Data - Max. Temp.Carrier	read only	The highest carrier tube temperature measured appears on the display. ✎ Note! This function is not available for the Promass E measuring device.
Sensor Data - Temp.Unit	read only	Displays the unit of the temperature. ✎ Note! The unit is taken from the parameter "System Unit - Temperature" (→ Page 120).
Simulation - Measurand	AUTO - OOS	Use this parameter 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 words "SIMULATION MEASURAND" appear on the display. **Options:** OFF MASSFLOW VOLUMEFLOW COR. VOLUMEFLOW DENSITY REFERENCE DENSITY TEMPERATURE **Factory setting:** OFF ✎ Note! The active simulation mode is passed on to subsequent function blocks via the status condition (UNCERTAIN) of the process variable. ☞ Caution! ■ The measuring device cannot be used for measuring while this simulation is in progress. ■ The setting is not saved if the power supply fails.
Simulation - Value Measurand	AUTO - OOS	✎ Note! The entry is not active unless a measured variable was selected in the "Simulation - Measurand" parameter. Use this parameter to define a selectable value (e.g. 12 m^3/s). This is used to test the associated parameters in the flowmeter itself and downstream function blocks. **User input:** 5-digit floating-point number **Factory setting:** 0 [unit] ☞ Caution! The setting is not saved if the power supply fails.

"Flow" Transducer Block / base index 1400:		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Simulation - Unit	read only	Displays the unit used for the simulation. ✎ Note! Depending on the selection in the parameter "Simulation - Measurand", the unit is taken over from the corresponding parameter "System Unit -".
Simulation - Unit	read only	The current unit for the simulation value in the "Simulation - Measurand Value" parameter appears on the display. ✎ Note! The unit can be selected in the "System Unit - Volume Flow" or "System Unit - Mass Flow" parameter (→ Page 117 ff.).
Sensor - Type	read only	Use this parameter to view the sensor type (e.g. Promass F).
Sensor - HW Rev.Number	read only	Use this parameter to view the hardware revision number of the sensor.
Sensor - SW Rev.No.S-DAT	read only	Use this function to view the software revision number of the software used to create the content of the S-DAT.
Sensor - HW Identification	read only	This parameter is only used for service purposes.
Sensor - Prod.Number	read only	This parameter is only used for service purposes.
Service - Osc.Frequency	read only	This parameter is only used for service purposes.
Service - Excitation Current	AUTO - OOS	This parameter is only used for service purposes.
Service - Carrier Tube Temperature	AUTO - OOS	This parameter is only used for service purposes.
Service - Monitoring Mode	AUTO - OOS	This parameter is only used for service purposes.
Service - Monitoring Osc.Amplitude	AUTO - OOS	This parameter is only used for service purposes.
Service - Monitoring Gain Amplifier	AUTO - OOS	This parameter is only used for service purposes.
Service - Monitoring Interval	AUTO - OOS	This parameter is only used for service purposes.
Service - Gas Mode	AUTO - OOS	This parameter is only used for service purposes.
Service - Gas Type	AUTO - OOS	This parameter is only used for service purposes.
Service - Sonic Velocity	AUTO - OOS	This parameter is only used for service purposes.
Service - Temp.Coeff.Sonic Velocity	AUTO - OOS	This parameter is only used for service purposes.
Amp. Device Type	read only	This parameter is only used for service purposes.

3.4 "Diagnosis" Transducer Block parameters

The following table shows the Endress+Hauser-specific parameters of the "Diagnosis" Transducer Block. These can only be changed after entering a release code in the "Access - Code" parameter.

✎ Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

"Diagnosis" Transducer Block/base index 1600		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Diag. - Act. Sys. Condition	read only	Displays the current system status. ✎ Note! A precise error description as well as notes on remedying errors can be found in the Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus (BA065D).
Diag. - Prev. Sys. Condition	read only	Displays the last error message that occurred.
Access - Code	AUTO - OOS	All data of the measuring system are protected against inadvertent change. Only when the code has been entered in this parameter can the manufacturer-specific parameters be programmed and the device configuration modified. You can enable programming by entering: ■ Code 83 (factory setting) ■ Personal code (→ Page 138) **User input:** Max. 4-digit number (0 to 9999) ✎ Note! ■ If the write protection is enabled then access to the manufacturer-specific parameters is blocked even if the right code is entered. Write protection can be activated and deactivated by means of jumpers on the I/O board (→ See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D). ■ You can disable programming again by entering any number (other than the release code) in this parameter. ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code. ■ Certain parameters are not accessible unless a special service code is entered. This service code is known only to the Endress+Hauser service organization. Please contact your Endress+Hauser service center if you require clarification. ■ The entry made here does not affect the local display. Programming via the function matrix thus has to be enabled separately.
Access - Status	read only	Use this parameter to display the current status of the possibilities for accessing the manufacturer-specific parameters of the device. **Display:** ■ LOCKED (parameterization disabled) ■ ACCESS CUSTOMER (parameterization enabled) ■ ACCESS SERVICE (parameterization enabled, access to service level)

"Diagnosis" Transducer Block/base index 1600		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Sys. - Alarm Delay	AUTO - OOS	Use this function to define a time span for which the criteria for an error have to be satisfied without interruption before a fault or notice message is generated. Depending on the setting and the type of error, this suppression acts on: ■ Display ■ Output Blocks (AI Blocks), FOUNDATION Fieldbus interface **User input:** 0 to 100 s (in steps of one second) **Factory setting:** 0 s ☝ Caution! If this parameter is used, fault and notice messages are delayed by the time corresponding to the setting before being forwarded to the downstream function blocks or the fieldbus host system. 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.
Sys. - Sim. Failsafe Mode	AUTO - OOS	Use this parameter to set the Analog Input and Totalizer function blocks to their defined failsafe modes, in order to check whether they respond correctly. The failsafe mode of the totalizers is defined via the "Tot. - Failsafe All" parameter (→ Page 157). **Options:** OFF ON **Factory setting:** OFF ✎ Note! Active simulation mode is relayed to downstream function blocks or higher-level process control systems by means of the status "UNCERTAIN" of the output value OUT (AI Block).
Sys. - Reset	AUTO - OOS	Use this parameter to perform a reset of the measuring system. **Options:** NO RESTART SYSTEM (restart without interrupting power supply) ORIGINAL TRANSMITTER DATA **Factory setting:** NO
Sys. - Operation Time	read only	The total operating time since the flowmeter was commissioned appears on the display (in seconds).
Sys. - Time Since Reset	read only	This parameter is only used for service purposes.

"Diagnosis" Transducer Block/base index 1600		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Sys. - T-DAT Save/Load	AUTO - OOS	Use this parameter 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** backup 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 during startup. Then only the SAVE option is available. ■ LOAD This option is only possible: – If the target device has the same software version as, or a more recent software version than, the source device or – If the T-DAT contains valid data that can be called up. ■ SAVE This option is always available.
Amp. Device Type	**read only**	This parameter is only used for service purposes.

3.5 "Display" Transducer Block parameters

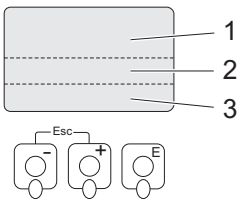
The following table shows the Endress+Hauser-specific parameters of the "Display" Transducer Block. These can only be changed after entering a release code in the "Access - Code" parameter.

✎ Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Access - Code	AUTO - OOS	All data of the measuring system are protected against inadvertent change. Only when the code has been entered in this parameter can the manufacturer-specific parameters be programmed and the device configuration modified. You can enable programming by entering: ■ Code 83 (factory setting) ■ Personal code (→ Page 138) **User input:** Max. 4-digit number (0 to 9999) ✎ Note! ■ If the write protection is enabled then access to the manufacturer-specific parameters is blocked even if the right code is entered. Write protection can be activated and deactivated by means of jumpers on the I/O board (→ See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus). ■ You can disable programming again by entering any number (other than the release code) in this parameter. ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code. ■ Certain parameters are not accessible unless a special service code is entered. This service code is known only to the Endress+Hauser service organization. Please contact your Endress+Hauser service center if you require clarification. ■ The entry made here does not affect the local display. Programming via the function matrix thus has to be enabled separately.
Access - Status	read only	Use this parameter to display the current status of the possibilities for accessing the manufacturer-specific parameters of the device. **Display:** ■ LOCKED (parameterization disabled) ■ ACCESS CUSTOMER (parameterization enabled) ■ ACCESS SERVICE (parameterization enabled, access to service level)
Access - Code Counter	read only	Displays how often the customer code, service code or the digit "0" (code-free) has been entered to gain access to the measuring device. **Display:** Max. 7-digit number: 0 to 9999999 **Factory setting:** 0

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Access - Def.Private Code	AUTO - OOS	Use this function to enter a personal code to enable configuration. This applies both to manufacturer-specific parameters in the Transducer Blocks and to operating via the local display. **User input:** 0 to 9999 (max. 4-digit number) **Factory setting:** 83 ✎ Note! ■ If the code number is "0", programming is always enabled. ■ Parameter configuration has to be enabled before this code can be changed.
Config. - Language	AUTO - OOS	Use this parameter to select the language for all texts, parameters and messages shown on the local display. ✎ Note! The displayed options depend on the language group available which is shown in the "Amp. - Language Group" parameter. **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 (syllabary) Language group CHINA: ENGLISH CHINESE **Factory setting:** Depends on country → Page 196 ff. ✎ Note! You can change the language group via the configuration software FieldCare. Please do not hesitate to contact your Endress+Hauser sales office if you have any questions.

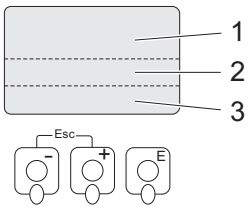
"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Config. - Display Damping	AUTO - OOS	Use this parameter to enter a time constant defining how the display reacts to severely fluctuating flow variables, either very quickly (enter a low time constant) or with damping (enter a high time constant). **User input:** 0 to 100 seconds **Factory setting:** 1 s ✎ Note! Setting the time constant to zero seconds switches off damping.
Config. - Contrast LCD	AUTO - OOS	Use this parameter to optimize display contrast to suit local operating conditions. **User input:** 10 to 100% **Factory setting:** 50%
Config. - Backlight	AUTO - OOS	Use this parameter to optimize the backlight to suit local operating conditions. **User input:** 0 to 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%
Operation - Test Display	AUTO - OOS	Use this parameter to test the operability of the local display and its pixels. **Options:** ON OFF **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 second. 3. Main line, additional line and information line show an "8" in each field for minimum 0.75 second. 4. Main line, additional line and information line show a "0" in each field for minimum 0.75 second. 5. Main line, additional line and information line show nothing (blank display) for minimum 0.75 second. When the test is completed, the local display returns to its initial state.

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
1 = Main line 2 = Additional line 3 = Info line		 A0001253
Main Line - Assign	AUTO - OOS	In this parameter, 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 (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS IN VALUE (external set point) PID - OUT VALUE (manipulated variable) **Factory setting:** MASS FLOW **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX (Continued on next page)

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Main Line - Assign (continued)		**Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION
Main Line - 100%-Value	AUTO - OOS	The entry is not active unless one of the following was selected in the parameter "Main Line - Assign": ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % Use this parameter 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 → Page 196 ff. ✎ Note! The appropriate unit is taken from the corresponding parameter ("System Unit - Mass Flow", "System Unit - Volume Flow", or "System Unit - Corrected Volume Flow"). (→ Page 117 ff.).
Main Line - Format	AUTO - OOS	Use this parameter 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Main Line Mux - Assign	AUTO - OOS	Use this parameter to define the second reading to be displayed in the main line alternately (every 10 seconds) with the value defined in the parameter "Main - Line Assign". **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS IN VALUE (external set point) PID - OUT VALUE (manipulated variable) **Factory setting:** OFF **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX **Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Main Line Mux - 100%-Value	AUTO - OOS	✎ Note! The entry is not active unless one of the following was selected in the parameter "Main Line Mux - Assign": ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % Use this parameter 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 → Page 196 ff. ✎ Note! The appropriate unit is taken from the corresponding parameter ("System Unit - Mass Flow", "System Unit - Volume Flow", or "System Unit - Corrected Volume Flow"). (→ Page 117 ff.).
Main Line Mux - Format	AUTO - OOS	Use this parameter 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.

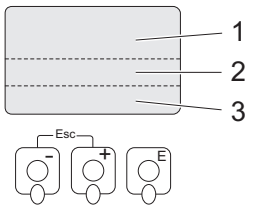
"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
1 = Main line **2 = Additional line** 3 = Info line		 A0001253
Add. Line - Assign	AUTO - OOS	Use this parameter to define the display value assigned to the additional line (the middle line of the local display) during normal measuring operation. **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** TOTALIZER 1 **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX (Continued on next page)

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Add. Line - Assign (continued)		**Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION
Add. Line - 100%-Value	AUTO - OOS	✎ Note! The entry is not active unless one of the following was selected in the parameter "Add. Line - Assign": ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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 → Page 196 ff. ✎ Note! The appropriate unit is taken from the corresponding parameter ("System Unit - Mass Flow", "System Unit - Volume Flow", or "System Unit - Corrected Volume Flow"). (→ Page 117 ff.).
Add. Line - Format	AUTO - OOS	✎ Note! The option is not active unless a number was selected in the parameter "Add. Line - Assign". Use this parameter 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Add. Line - Display Mode	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Add. Line - Assign": ▪ MASS FLOW BAR GRAPH IN % ▪ VOLUME FLOW BAR GRAPH IN % ▪ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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
Add. Line Mux - Assign	AUTO - OOS	Use this parameter to define the second reading to be displayed in the additional line alternately (every 10 seconds) with the value defined in the parameter "Add. Line - Assign" (→ Page 144). **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** OFF (Continued on next page)

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Add. Line Mux - Assign (continued)		**Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX **Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION ✎ Note! Multiplex mode is suspended as soon as a fault or notice message is generated. The corresponding error message appears in the parameter "Diag. - Act.Sys.Condition" (→ Page 134). The measuring device resumes Multiplex operation when the fault is rectified.
Add. Line Mux - 100%-Value	AUTO - OOS	✎ Note! The entry is not active unless one of the following was selected in the parameter "Add. Line Mux - Assign": ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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 → Page 196 ff. ✎ Note! The appropriate unit is taken from the corresponding parameter ("System Unit - Mass Flow", "System Unit - Volume Flow", or "System Unit - Corrected Volume Flow"). (→ Page 117 ff.).

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Add. Line Mux - Format	AUTO - OOS	✎ Note! The option is not active unless a number was selected in the parameter "Add. Line Mux - Assign" (→ Page 146). Use this parameter 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.
Add. Line Mux - Display Mode	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Add. Line Mux - Assign" (→ Page 146). ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
1 = Main line 2 = Additional line **3 = Info line**		 A0001253
Info Line - Assign	AUTO - OOS	Use this parameter to define the display value assigned to the information line (the bottom line of the local display) during normal measuring operation. **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % OPERATION SYSTEM CONDITION DISPLAY FLOW DIRECTION AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** OPERATION SYSTEM CONDITION **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX (Continued on next page)

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Info Line - Assign (continued)		**Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION ✎ Note! Multiplex mode is suspended as soon as a fault or notice message is generated. The corresponding error message appears in the parameter "Diag. - Act.Sys.Condition" (→ Page 134). The measuring device resumes Multiplex operation when the fault is rectified.
Info Line - 100%-Value	AUTO - OOS	✎ Note! The entry is not active unless one of the following was selected in the parameter "Info Line - Assign" (→ Page 149): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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 → Page 196 ff. ✎ Note! The appropriate unit is taken from the corresponding parameter ("System Unit - Mass Flow", "System Unit - Volume Flow", or "System Unit - Corrected Volume Flow"). (→ Page 117 ff.).
Info Line - Format	AUTO - OOS	✎ Note! The option is not active unless a number was selected in the parameter "Info Line - Assign" (→ Page 149). Use this parameter 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Info Line - Display Mode	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Info Line - Assign" (→ Page 149): ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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
Info Line Mux - Assign	AUTO - OOS	Use this parameter to define the second reading to be displayed in the information line alternately (every 10 seconds) with the value defined in the parameter "Info Line - Assign" (→ Page 149). **Options (standard):** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % DENSITY REFERENCE DENSITY TEMPERATURE TOTALIZER (1 to 3) MASS FLOW BAR GRAPH IN % VOLUME FLOW BAR GRAPH IN % CORRECTED VOLUME FLOW BAR GRAPH IN % OPERATION SYSTEM CONDITION DISPLAY FLOW DIRECTION AI (1 to 8) - OUT VALUE PID - IN VALUE (controlled variable) PID - CAS IN VALUE (external set point) PID - OUT VALUE (manipulated variable) DEVICE PD-TAG **Factory setting:** OFF (Continued on next page)

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Info Line Mux - Assign (continued)		**Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW % TARGET MASS FLOW TARGET VOLUME FLOW % TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW % CARRIER MASS FLOW CARRIER VOLUME FLOW % CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW % BLACK LIQUOR ° BAUME ° API ° PLATO ° BALLING ° BRIX **Advanced options with optional software package ADVANCED DIAGNOSTICS:** MASS FLOW DEVIATION DENSITY DEVIATION REFERENCE DENSITY DEVIATION TEMPERATURE DEVIATION TUBE DAMPING DEVIATION ELECTRODYNAMIC SENSOR DEVIATION OPERATING FREQUENCY FLUCTUATION DEVIATION TUBE DAMPING FLUCTUATION DEVIATION ✎ Note! Multiplex mode is suspended as soon as a fault or notice message is generated. The corresponding error message appears in the parameter "Diag. - Act.Sys.Condition" (→ Page 134). The measuring device resumes Multiplex operation when the fault is rectified.
Info Line Mux - 100%-Value	AUTO - OOS	✎ Note! The entry is not active unless one of the following was selected in the parameter "Info Line Mux - Assign" (→ Page 151): ■ MASS FLOW IN % ■ VOLUME FLOW IN % ■ CORRECTED VOLUME FLOW IN % ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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 → Page 196 ff. ✎ Note! The appropriate unit is taken from the corresponding parameter ("System Unit - Mass Flow", "System Unit - Volume Flow", or "System Unit - Corrected Volume Flow"). (→ Page 117 ff.).

"Display" Transducer Block/base index 1800		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Info Line Mux - Format	AUTO - OOS	✎ Note! The option is not active unless a number was selected in the parameter "Info Line Mux - Assign" (→ Page 151). Use this parameter 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 these instances an arrow appears on the display between the measured value and the engineering unit (e.g. 1.2 → kg/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.
Info Line Mux - Display Mode	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Info Line Mux - Assign" (→ Page 151): ■ MASS FLOW BAR GRAPH IN % ■ VOLUME FLOW BAR GRAPH IN % ■ CORRECTED VOLUME FLOW BAR GRAPH IN % Use this parameter 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
Amp. Device Type	**read only**	This parameter is only used for service purposes.

3.6 "Totalizer" Transducer Block parameters

The following table shows the Endress+Hauser-specific parameters of the "Totalizer" Transducer Block. These can only be changed after entering a release code in the "Access - Code" parameter.

✎ Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

"Totalizer" Transducer Block/base index 1900		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Access - Code	AUTO - OOS	All data of the measuring system are protected against inadvertent change. Only when the code has been entered in this parameter can the manufacturer-specific parameters be programmed and the device configuration modified. You can enable programming by entering: ■ Code 83 (factory setting) ■ Personal code (→ Page 138) **User input:** Max. 4-digit number (0 to 9999) ✎ Note! ■ If the write protection is enabled then access to the manufacturer-specific parameters is blocked even if the right code is entered. Write protection can be activated and deactivated by means of jumpers on the I/O board (→ See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D). ■ You can disable programming again by entering any number (other than the release code) in this parameter. ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code. ■ Certain parameters are not accessible unless a special service code is entered. This service code is known only to the Endress+Hauser service organization. Please contact your Endress+Hauser service center if you require clarification. ■ The entry made here does not affect the local display. Programming via the function matrix thus has to be enabled separately.
Access - Status	read only	Use this parameter to display the current status of the possibilities for accessing the manufacturer-specific parameters of the device. **Display:** ■ LOCKED (parameterization disabled) ■ ACCESS CUSTOMER (parameterization enabled) ■ ACCESS SERVICE (parameterization enabled, access to service level)

"Totalizer" Transducer Block/base index 1900		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Tot. 1 to 3 - Sum	AUTO - OOS	Use this parameter to view the total for the totalizer's measured variable aggregated since measuring commenced. The value can be positive or negative, depending on the setting selected in the parameter "Tot. 1 to 3 - Mode" (→ Page 156) and the direction of flow. **Display:** Max. 7-digit floating-point number, including unit and sign (e.g. 15467.04 m^3; –4925.631 kg) ✎ Note! ■ The effect of the setting in the parameter "Tot. 1 to 3 - Mode" is as follows: – If the setting is BALANCE, the totalizer balances flow in the positive and negative directions. – If the setting is FORWARD, the totalizer registers only flow in the positive direction. – If the setting is REVERSE, the totalizer registers only flow in the negative direction. ■ The totalizers' response to faults is defined in the parameter "Tot. - Failsafe All".
Tot. 1 to 3 - Unit	AUTO - OOS	Use this parameter to define the unit for the totalizer's measured variable, as selected beforehand. **Options: (for the MASS FLOW assignment):** Metric → g; kg; t US → oz; lb; ton **Factory setting:** Depends on nominal diameter and country → Page 196 ff. **Options (for the VOLUME FLOW assignment):** 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 → Page 196 ff. ✎ Note! The unit selected here does not have any effect on the desired volume unit which should be transmitted by means of the FOUNDATION Fieldbus interface. This setting is made separately by means of the corresponding AI Block in the XD_SCALE parameter group.

"Totalizer" Transducer Block/base index 1900		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Tot. 1 to 3 - Assign	AUTO - OOS	Use this parameter to assign a measured variable to the totalizer. **Options:** OFF MASS FLOW VOLUME FLOW CORRECTED VOLUME FLOW **Factory setting:** MASS FLOW **Advanced options with optional software package CONCENTRATION:** TARGET MASS FLOW TARGET VOLUME FLOW CORRECTED TARGET VOLUME FLOW CARRIER MASS FLOW CARRIER VOLUME FLOW CORRECTED CARRIER VOLUME FLOW ✎ Note! The totalizer is reset to "0" as soon as the selection is changed.
Tot. 1 to 3 - Mode	AUTO - OOS	Use this parameter to define how the flow components are to be totaled 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. FORWARD Positive flow components only. REVERSE Negative flow components only. **Factory setting:** Totalizer 1 = BALANCE Totalizer 2 = FORWARD Totalizer 3 = REVERSE
Tot. 1 to 3 - Reset	AUTO - OOS	Reset the totalizer ("Tot. 1…3 - Sum" parameter) to zero. **Options:** NO YES **Factory setting:** NO ✎ Note! Also using cyclic data transmission, totalizer resetting can be controlled or initiated via the Discrete Output function block.

"Totalizer" Transducer Block/base index 1900		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Tot. - Reset All	AUTO - OOS	Reset all totalizers simultaneously to zero ("Tot. 1 to 3 - Sum" parameter). **Options:** NO YES **Factory setting:** NO ✎ Note! Also using cyclic data transmission, totalizer resetting can be controlled or initiated via the Discrete Output function block.
Tot. - Failsafe All	AUTO - OOS	Use this parameter to define the common response of all totalizers (1 to 3) in case of error. **Options:** STOP The totalizers are paused until the fault is rectified. ACTUAL VALUE The totalizers continue to count based on the current flow measured value. The fault is ignored. HOLD VALUE The totalizers continue to count the flow based on the last valid flow value (before the fault occurred). **Factory setting:** STOP
Amp. Device Type	**read only**	This parameter is only used for service purposes.

3.7 "Calculated Density" Transducer Block parameters

✎ Note!
The parameters of the "Calculated Density" Transducer Block are ready for use and can be configured if the "Concentration measurement" add-on is installed in the measuring device (order option). Otherwise the value "NaN" (not-a-number) or "Not licensed" is displayed in a parameter.

The following table shows the Endress+Hauser-specific parameters of the "Calculated Density" Transducer Block. These can only be changed after entering a release code in the "Access - Code" parameter.

✎ Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Access - Code	AUTO - OOS	All data of the measuring system are protected against inadvertent change. Only when the code has been entered in this parameter can the manufacturer-specific parameters be programmed and the device configuration modified. You can enable programming by entering: ■ Code 83 (factory setting) ■ Personal code (→ Page 138) **User input:** Max. 4-digit number (0 to 9999) ✎ Note! ■ If the write protection is enabled then access to the manufacturer-specific parameters is blocked even if the right code is entered. Write protection can be activated and deactivated by means of jumpers on the I/O board (→ See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D). ■ You can disable programming again by entering any number (other than the release code) in this parameter. ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code. ■ Certain parameters are not accessible unless a special service code is entered. This service code is known only to the Endress+Hauser service organization. Please contact your Endress+Hauser service center if you require clarification. ■ The entry made here does not affect the local display. Programming via the function matrix thus has to be enabled separately.
Access - Status	read only	Use this parameter to display the current status of the possibilities for accessing the manufacturer-specific parameters of the device. **Display:** ■ LOCKED (parameterization disabled) ■ ACCESS CUSTOMER (parameterization enabled) ■ ACCESS SERVICE (parameterization enabled, access to service level)

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Value - Target Mass Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % MASS 2D or % MASS 3D option in the "Dens. - Mode" parameter (→ Page 166). Use this parameter to display the currently measured mass flow of the target fluid. Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
System Value - Perc.Target Mass Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % MASS 2D or % MASS 3D option in the "Dens. - Mode" parameter (→ Page 166). In this parameter, the currently measured mass flow of the target fluid is displayed as a % (of the overall mass flow). Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
System Unit - Mass Flow	AUTO - OOS	Use this parameter to select the unit for displaying the mass. **Options:** Metric → g; kg; t US → oz; lb; ton **Factory setting:** Depends on country (kg or US-lb) ✎ 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.
System Value - Target Volume Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % MASS 2D or % MASS 3D option in the "Dens. - Mode" parameter (→ Page 166). Use this parameter to display the currently measured mass flow of the target fluid. Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Value - Perc.Target Volume Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % VOLUME 2D or % VOLUME 3D option in the "Dens. - Mode" parameter (→ Page 166). In this parameter, the currently measured volume flow of the target fluid is displayed as a % (of the overall volume flow). Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
System Unit - Volume Flow	AUTO - OOS	Use this parameter to select the unit for displaying the volume. **Options:** Metric → cm^3; dm^3; m^3; ml; l; hl; Ml Mega US → cc; af; ft3; 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 ✎ 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.
System Value - Corr. Target Volume Flow	read only	✎ Note! The option is not active unless the % MASS / % VOLUME option was selected in the "Dens. - Function" parameter (→ Page 163). Use this parameter to display the currently measured corrected volume flow of the target fluid. Target fluid = carried material (e.g. lime powder). **Display:** 5-digit floating-point number, including unit and sign
System Unit - Corr.Volume Flow	AUTO - OOS	Use this parameter to select the unit for displaying the corrected volume. **Options:** Metric → Nm^3; Nl US → Sm^3; Scf **Factory setting:** Nm^3 ✎ 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.

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Value - Carrier Mass Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % MASS 2D or % MASS 3D option in the "Dens. - Mode" parameter (→ Page 166). Use this parameter to display the currently measured mass flow of the carrier fluid. Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
System Value - Perc.Carrier Mass Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % MASS 2D or % MASS 3D option in the "Dens. - Mode" parameter (→ Page 166). In this parameter, the currently measured mass flow of the carrier fluid is displayed as a % (of the overall mass flow). Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
System Unit - Mass Flow	AUTO - OOS	Use this parameter to select the unit for displaying the mass. **Options:** Metric → g; kg; t US → oz; lb; ton **Factory setting:** Depends on country (kg or US-lb) ✎ 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.
System Value - Carrier Volume Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % VOLUME 2D or % VOLUME 3D option in the "Dens. - Mode" parameter (→ Page 166). Use this parameter to display the currently measured volume flow of the carrier fluid. Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Value - Perc.Carrier Volume Flow	read only	✎ Note! The option is not active unless one of the following was selected: ■ In the "Dens. - Function" parameter (→ Page 163) – % MASS / % VOLUME – FLEXIBLE and the % VOLUME 2D or % VOLUME 3D option in the "Dens. - Mode" parameter (→ Page 166). In this parameter, the currently measured volume flow of the carrier fluid is displayed as a % (of the overall mass flow). Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
System Unit Volume Flow	AUTO - OOS	Use this parameter to select the unit for displaying the volume. **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:** m^3 ✎ 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.
System Value - Corr.Carrier Volume Flow	read only	✎ Note! The option is not active unless the % MASS / % VOLUME option was selected in the "Dens. - Function" parameter (→ Page 163). Use this parameter to display the currently measured corrected volume flow of the carrier fluid. Carrier fluid = transporting liquid (e.g. water). **Display:** 5-digit floating-point number, including unit and sign
System Value - Spec.Density	read only	Displays the concentration in the unit which was defined in the "Dens. - Function" parameter (→ Page 163) **Display:** 5-digit floating-point number, incl. units
System Value - Spec.Density Others	read only	✎ Note! This option is not available unless FLEXIBLE was selected in the parameter "Dens. - Function" (→ Page 163). Displays the concentration in the unit which was defined in the "Dens. - Mode" parameter (→ Page 166). **Display:** 5-digit floating-point number, incl. units

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Dens. - Function	AUTO - OOS	Use this parameter to select the desired density function which is used to calculate special density values or the percentage proportion of components in two-phase fluids. **User input:** OFF % MASS / % VOLUME %-BLACK LIQUOR ° BAUME > 1 SG ° BAUME < 1 SG ° API ° PLATO ° BALLING ° BRIX FLEXIBLE **Factory setting:** OFF
Dens. - Ref.Density Carrier Fluid	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this function to enter the reference density (density at reference temp.) of the carrier fluid. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, incl. units **Factory setting:** 1.0000 kg/l ✎ Note! ■ Carrier fluid = transporting liquid, (e.g. water) Target fluid = material transported (e.g. lime powder) ■ The appropriate unit is taken from the function UNIT REFERENCE DENSITY (0421) (→ Page 120).
Dens. - Lin.Exp.Coef. Carrier	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this parameter to enter the fluid-specific linear expansion coefficient for the carrier fluid for linear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.5000 e^{-3} [1/K]

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Dens. - Sqr.Exp.Coef. Carrier	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this parameter to enter the fluid-specific square expansion coefficient for the carrier fluid for **non** linear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.0000 e^{-6} [1/K^2]
Dens. - Ref.Density Target Fluid	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this parameter to enter the reference density (density at reference temperature) of the carrier fluid. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, incl. units **Factory setting:** 1.0000 kg/l ✎ Note! ■ Carrier fluid = transporting liquid, (e.g. water) Target fluid = material transported (e.g. lime powder) ■ The appropriate unit is taken from the function UNIT REFERENCE DENSITY (0421) (→ Page 120).
Dens. - Lin.Exp.Coef.Target	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this parameter to enter the fluid-specific linear expansion coefficient for the carrier fluid for linear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.5000 e^{-3} [1/K]

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Dens. - Sqr.Exp.Coef.Target	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ % MASS / % VOLUME ■ %-BLACK LIQUOR Use this parameter to enter the fluid-specific square expansion coefficient for the carrier fluid for **non** linear temperature curves. This value is required for temperature-compensated calculation of the target fluid content in a two-phase fluid. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.0000 e^{-6} [1/K^2]
Dens. - Lin.Exp.Coef.	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ ° BAUME < 1 SG ■ ° BAUME > 1 SG ■ ° API ■ ° PLATO ■ ° BALLING ■ ° BRIX Use this parameter to enter the fluid-specific linear expansion coefficient (for linear temperature curves) to calculate the temperature-compensated density functions. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.5000 e^{-3} [1/K]
Dens. - Sqr.Exp.Coef.	AUTO - OOS	✎ Note! The option is not active unless one of the following was selected in the parameter "Dens. - Function" (→ Page 163): ■ ° BAUME < 1 SG ■ ° BAUME > 1 SG ■ ° API ■ ° PLATO ■ ° BALLING ■ ° BRIX Use this parameter to enter the fluid-specific square expansion coefficient (for nonlinear temperature curves) to calculate the temperature-compensated density functions. **User input:** 5-digit floating-point number, including unit and sign **Factory setting:** 0.0000 e^{-6} [1/K^2]

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Dens. - Ref.Temperature	AUTO - OOS	✎ Note! The option is only active if the OFF, °BRIX or FLEXIBLE option was **not** selected in the "Dens. - Function" parameter (→ Page 163). Use this parameter to enter the reference temperature for the density functions. **User input:** 4-digit fixed-point number, including unit and sign **Factory setting:** 20 °C
Dens.- -Mode	AUTO - OOS	✎ Note! The option is not active unless FLEXIBLE was selected in the parameter "Dens. - Function" (→ Page 163). Use this parameter to select a user-specific method of calculating the concentration of the density and temperature measured. In order to use this function, the following values are required: ▪ Concentration (see formula) ▪ Currently measured density ▪ Currently measured temperature The concentration is calculated from the density and temperature as follows: $K = A0 + A1 \cdot \rho + A2 \cdot \rho^2 + A3 \cdot \rho^3 + A4 \cdot \rho^4 + B1 \cdot T + B2 \cdot T^2 + B3 \cdot T^3$ K = Concentration ρ = Currently measured density A0 = Value from Dens. - A0 parameter A1 = Value from Dens. - A1 parameter A2 = Value from Dens. - A2 parameter A3 = Value from Dens. - A3 parameter A4 = Value from Dens. - A4 parameter B1 = Value from Dens. - B1 parameter B2 = Value from Dens. - B2 parameter B3 = Value from Dens. - B3 parameter T = Currently measured temperature in °C **Options:** % MASS 3D % VOLUME 3D % MASS 2D % VOLUME 2D **Factory setting:** % MASS 3D ✎ Note! The relationship between the individual values (concentration, density and temperature) can also be determined by Endress+Hauser e.g. via a coefficient calculation program and be transmitted to the measuring device.

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Dens. - Concentration Selector	AUTO - OOS	Use this parameter to select a concentration specification. There are four different concentration specifications available, via which various concentrations can be defined. **Options:** CONC. # 1 (or the name that has been defined in the parameter "Dens. - Concentration Name" for concentration specification 1) CONC. # 2 (or the name that has been defined in the parameter "Dens. - Concentration Name" for concentration specification 2) CONC. # 3 (or the name that has been defined in the parameter "Dens. - Concentration Name" for concentration specification 3) CONC. # 4 (or the name that has been defined in the parameter "Dens. - Concentration Name" for concentration specification 4) **Factory setting:** CONC. # 1 ✎ Note! ■ By selecting a concentration specification and the (subsequent) relevant settings, up to 4 different concentrations can be preconfigured and selected when needed. ■ All settings in the subsequent parameters are each only valid for the concentration specification selected in the parameter "Dens. - Concentration Selector".In other words, the entry or option is assigned to the concentration specification currently selected (e.g. in the factory setting CONC. # 1).
Dens. - Concentration Name	AUTO - OOS	Use this parameter to assign a specific name to the concentration specification. **User input:** Max. 8-character text, permissible: A-Z, 0-9 **Factory setting:** Name of concentration specification (depends on selection in the parameter "Dens. - Concentration Selector", e.g. "CONC. # 1").
Dens. - A0	read only	Coefficient A0 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
Dens. - A1	read only	Coefficient A1 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
Dens. - A2	read only	Coefficient A2 entry. **User input:** 5-digit floating-point number **Factory setting:** 0

"Calculated Density" Transducer Block/base index 2000		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Dens. - A3	read only	Coefficient A3 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
Dens. - A4	read only	Coefficient A4 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
Dens. - B1	read only	✎ Note! The option is not active unless the % MASS 3D or % VOLUME 3D option was selected in the parameter "Dens. - Mode" (→ Page 166). Coefficient B1 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
Dens. - B2	read only	✎ Note! The option is not active unless the % MASS 3D or % VOLUME 3D option was selected in the parameter "Dens. - Mode" (→ Page 166). Coefficient B2 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
Dens. - B3	read only	✎ Note! The option is not active unless the % MASS 3D or % VOLUME 3D option was selected in the parameter "Dens. - Mode" (→ Page 166). Coefficient B3 entry. **User input:** 5-digit floating-point number **Factory setting:** 0
Amp. Device Type	read only	This parameter is only used for service purposes.

3.8 "Viscosity" Transducer Block parameters

✎ Note!
- The parameters of the "Viscosity" Transducer Block are ready for use and can be configured if the "Viscosity" add-on is installed in the measuring device (order option). Otherwise the value "NaN" (not-a-number) or "Not licensed" is displayed in a parameter.
- This order option is only available for **Proline Promass 83I**.

The following table shows the Endress+Hauser-specific parameters of the "Viscosity" Transducer Block. These can only be changed after entering a release code in the "Access - Code" parameter.

✎ Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

"Viscosity" Transducer Block/base index 2100		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Access - Code	AUTO - OOS	All data of the measuring system are protected against inadvertent change. Only when the code has been entered in this parameter can the manufacturer-specific parameters be programmed and the device configuration modified. You can enable programming by entering: ■ Code 83 (factory setting) ■ Personal code (→ Page 138) **User input:** Max. 4-digit number (0 to 9999) ✎ Note! ■ If the write protection is enabled then access to the manufacturer-specific parameters is blocked even if the right code is entered. Write protection can be activated and deactivated by means of jumpers on the I/O board (→ See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D). ■ You can disable programming again by entering any number (other than the release code) in this parameter. ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code. ■ Certain parameters are not accessible unless a special service code is entered. This service code is known only to the Endress+Hauser service organization. Please contact your Endress+Hauser service center if you require clarification. ■ The entry made here does not affect the local display. Programming via the function matrix thus has to be enabled separately.
Access - Status	read only	Use this parameter to display the current status of the possibilities for accessing the manufacturer-specific parameters of the device. **Display:** ■ LOCKED (parameterization disabled) ■ ACCESS CUSTOMER (parameterization enabled) ■ ACCESS SERVICE (parameterization enabled, access to service level)
Visc. - Dyn.Viscosity	read only	Use this function to view the dynamic viscosity. **Display:** 5-digit floating-point number, incl. unit. (e.g. 462.87 cP; 731.63 mPa·s etc.)

"Viscosity" Transducer Block/base index 2100		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Visc. - Kin.Viscosity	read only	Use this function to view the calculated kinematic viscosity. **Display:** 5-digit floating-point number, incl. unit. (e.g. 5.5445 mm^2/s; 1.4359 cSt)
Visc. - Temp.Comp.Dyn. Viscosity	read only	Use this function to view the temperature-compensated dynamic viscosity. **Display:** 5-digit floating-point number, incl. unit. (e.g. 462.87 cP; 731.63 mPa·s etc.)
Visc. - Temp.Kin. Viscosity	read only	Use this function to view the temperature-compensated kinematic viscosity. **Display:** 5-digit floating-point number, incl. unit. (e.g. 5.5445 mm^2/s; 1.4359 cSt)
Visc. - Unit Dyn. Viscosity	AUTO - OOS	For selecting the unit required and displayed for measuring the dyn. viscosity. **Options:** ■ Pa·s ■ mPa·s ■ P ■ cP **Factory setting:** cP
Visc. - Unit Kin. Viscosity	AUTO - OOS	For selecting the unit required and displayed for measuring the kinem. viscosity. **Options:** ■ m^2/s ■ mm^2/s ■ St ■ cSt **Factory setting:** cSt
Visc. - Temp.Comp.Model	AUTO - OOS	Use this function to select a formula model for temperature compensation. Depending on the thermal behavior, you can select the model that most accurately depicts the function → See Special Documentation on viscosity measurement for Proline Promass 83I, SD102D. **Options:** Power law Exponential Polynomial **Factory setting:** Polynomial
Visc. - Ref.Temperature	AUTO - OOS	Use this function to enter the reference temperature which should act as the reference point. **User input:** 7-digit floating-point number **Factory setting:** 0 **Reference quantity:** °C

"Viscosity" Transducer Block/base index 2100		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Visc. - X1	AUTO - OOS	Use this function to enter the compensation coefficient X1 (calculation → See Special Documentation on viscosity measurement for Proline Promass 83I, SD102D). **User input:** 7-digit floating-point number **Factory setting:** 0
Visc. - X2	AUTO - OOS	Use this function to enter the compensation coefficient X2 (calculation → See Special Documentation on viscosity measurement for Proline Promass 83I, SD102D). **User input:** 7-digit floating-point number **Factory setting:** 0
Visc. - Y1	AUTO - OOS	This parameter is only used for service purposes.
Amp. Device Type	read only	This parameter is only used for service purposes.

3.9 "Advanced Diagnostics" Transducer Block parameters

✎ Note!
The parameters of the "Advanced Diagnostics" Transducer Block are ready for use and can be configured if the "Advanced Diagnostics" add-on is installed in the measuring device (order option). Otherwise the value "NaN" (not-a-number) or "Not licensed" is displayed in a parameter.

The following table shows the Endress+Hauser-specific parameters of the "Advanced Diagnostics" Transducer Block. These can only be changed after entering a release code in the "Access - Code" parameter.

✎ Note!
FOUNDATION Fieldbus parameters are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Access - Code	AUTO - OOS	All data of the measuring system are protected against inadvertent change. Only when the code has been entered in this parameter can the manufacturer-specific parameters be programmed and the device configuration modified. You can enable programming by entering: ■ Code 83 (factory setting) ■ Personal code (→ Page 138) **User input:** Max. 4-digit number (0 to 9999) ✎ Note! ■ If the write protection is enabled then access to the manufacturer-specific parameters is blocked even if the right code is entered. Write protection can be activated and deactivated by means of jumpers on the I/O board (→ See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D). ■ You can disable programming again by entering any number (other than the release code) in this parameter. ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code. ■ Certain parameters are not accessible unless a special service code is entered. This service code is known only to the Endress+Hauser service organization. Please contact your Endress+Hauser service center if you require clarification. ■ The entry made here does not affect the local display. Programming via the function matrix thus has to be enabled separately.
Access - Status	read only	Use this parameter to display the current status of the possibilities for accessing the manufacturer-specific parameters of the device. **Display:** ■ LOCKED (parameterization disabled) ■ ACCESS CUSTOMER (parameterization enabled) ■ ACCESS SERVICE (parameterization enabled, access to service level)

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Adv. - Ref.Cond.User	AUTO - OOS	Use this parameter to start determining the user reference status. The following values are determined: ■ MASS FLOW ■ DENSITY ■ REFERENCE DENSITY ■ TEMPERATURE ■ TUBE DAMPING ■ ELECTRODYNAMIC SENSORS ■ OPERATING FREQUENCY FLUCTUATION ■ TUBE DAMPING FLUCTUATION **Options:** CANCEL START **Factory setting:** CANCEL
Adv. - Select Ref.Condition	AUTO - OOS	Use this parameter to select the reference status which should be used to compare the advanced diagnostics parameters (see parameter "Adv. - Acquisition Mode" → Page 174). **Options:** FACTORY USER **Factory setting:** FACTORY
Adv. - Warning Mode	AUTO - OOS	Use this parameter to determine whether a warning should be generated when there is a deviation between the reference status (FACTORY or USER, see parameter "Adv. - Select Ref.Condition") and the current measuring values. The values of the following parameters are compared to the reference status : ■ Mass Flow - Actual Value (→ Page 175) ■ Density - Actual Value (→ Page 176) ■ Ref.Density - Actual Value (→ Page 177) ■ Temperature - Actual Value (→ Page 178) ■ Tube Damping - Actual Value (→ Page 179) ■ El.Dyn.Sens. - Actual Value (→ Page 180) ■ Freq.Fluct. - Actual Value (→ Page 181) ■ Tube Damp.Fluct. - Actual Value (→ Page 182) **Options:** OFF ON **Factory setting:** ON

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Adv. - Acquisition Mode	AUTO - OOS	Use this parameter to specify whether the advanced diagnostics parameters should be determined on a periodical or single-shot basis. **Options:** OFF PERIODICAL SINGLE SHOT **Factory setting:** OFF ✎ Note! See the Chapter on "Commissioning" in the Operating Instructions Proline Promass 83, BA 065D/06/en for more information on advanced diagnostics.
Adv. - Acquisition Period	AUTO - OOS	✎ Note! This option is not active unless PERIODICAL was selected in the parameter "Adv. - Acquisition Mode". Use this parameter to specify the time interval after which the advanced diagnostics parameters should be recorded. The time interval starts with the confirmation of the input. **User input:** 0 to 99999 s **Factory setting:** 3600 s ✎ Note! A reference status must be defined prior to determining the diagnosis parameters, see parameter "Adv. - Select Ref.Condition".
Adv. - Acquisition Do	AUTO - OOS	✎ Note! This option is not active unless SINGLE SHOT was selected in the parameter "Adv. - Acquisition Mode". Use this parameter to start determining the advanced diagnostics parameters on a single-shot basis. **Options:** CANCEL START **Factory setting:** CANCEL ✎ Note! A reference status must be defined prior to determining the diagnosis parameters, see parameter "Adv. - Select Ref.Condition".
Adv. - Reset History	AUTO - OOS	Use this function to delete all history values. **Options:** NO YES **Factory setting:** NO
Mass Flow - Ref.Value Factory	read only	The reference value for the mass flow appears on the display. **Display:** 5-digit floating-point number, including unit and sign

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
System Unit - Mass Flow	AUTO - OOS	Use this function to select the unit for displaying the mass. **Options:** Metric → g; kg; t US → oz; lb; ton **Factory setting:** Depends on country (kg or US-lb) ✎ 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.
Mass Flow - Ref.Value User	read only	The reference value for the mass flow appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Mass Flow - Actual Value	read only	The measured mass flow appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Mass Flow - Min.Value	read only	The lowest mass flow value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Mass Flow - Max.Value	read only	The highest mass flow value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Mass Flow - History 1…10	read only	The last ten mass flow values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, including unit and sign
Mass Flow - Deviation	read only	This function displays the deviation between the measured mass flow and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number, including unit and sign
Mass Flow - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this parameter to specify a limit value for the mass flow. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [mass flow unit] **Factory setting:** 90000 kg/h

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Density - Ref.Value Factory	read only	The reference value for the density appears on the display. **Display:** 5-digit floating-point number, incl. units
System Unit Density	AUTO - OOS	Use this parameter to select the unit for displaying the density. The unit you select here is also valid for: ■ Simulation ■ Density response value for EPD ■ Density adjustment value **Options:** Metric → g/cm³; g/cc; kg/dm³; kg/l; kg/m³; SD 4 °C, SD 15 °C, SD 20 °C; SG 4 °C, SG 15 °C, SG 20 °C US → lb/ft³; 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 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).
Density - Ref.Value User	read only	The reference value for the density appears on the display. **Display:** 5-digit floating-point number, incl. units
Density - Actual Value	read only	The measured density appears on the display. **Display:** 5-digit floating-point number, incl. units
Density - Min.Value	read only	The lowest density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
Density - Max.Value	read only	The highest density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
Density - History 1…10	read only	The last ten density values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, incl. units
Density - Deviation	read only	This function displays the deviation between the measured density and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number, incl. units

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Density - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this function to specify a limit value for the density. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [%] **Factory setting:** 100%
Ref.Density - Ref.Value Factory	read only	The reference value for the reference density appears on the display. **Display:** 5-digit floating-point number, incl. units
System Unit - Ref.Density	AUTO - OOS	Use this parameter to select the unit for displaying the reference density. The unit you select here is also valid for: ■ Simulation ■ Fixed reference density (for calculation of corrected volume flow) **Options:** Metric → kg/Nm^3; kg/Nl US → g/Scc; kg/Sm^3; lb/Scf **Factory setting:** kg/Nl
Ref.Density - Ref.Value User	read only	The reference value for the reference density appears on the display. **Display:** 5-digit floating-point number, incl. units
Ref.Density - Actual Value	read only	The measured reference density appears on the display. **Display:** 5-digit floating-point number, incl. units
Ref.Density - Min. Value	read only	The lowest reference density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
Ref.Density - Max.Value	read only	The highest reference density value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, incl. units
Ref.Density - History 1…10	read only	The last ten reference density values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, incl. units
Ref.Density - Deviation	read only	This function displays the deviation between the measured reference density and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number, incl. units

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Ref.Density - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this parameter to specify a limit value for the reference density. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [%] **Factory setting:** 100%
Temperature - Ref.Value Factory	read only	The reference value for the temperature appears on the display. **Display:** 5-digit floating-point number, including unit and sign
System Unit Temperature	AUTO - OOS	Use this function to select the unit for displaying the temperature. The unit you select here is also valid for: ■ Simulation ■ Reference temperature (for corrected volume measurement with measured reference density) **Options:** °C (Celsius) K (Kelvin) °F (Fahrenheit) R (Rankine) **Factory setting:** °C
Temperature - Ref.Value User	read only	The reference value for the temperature appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Temperature - Actual Value	read only	The currently measured temperature appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Temperature - Min.Value	read only	The lowest temperature value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Temperature - Max.Value	read only	The highest temperature value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, including unit and sign
Temperature - History 1…10	read only	The last ten temperature values since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, including unit and sign

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Temperature - Deviation	read only	This function displays the deviation between the measured temperature and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number, including unit and sign
Temperature - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this parameter to specify a limit value for the temperature. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 °C **Factory setting:** 100 °C
Tube Damping - Ref.Value Factory	read only	The reference value for tube damping appears on the display. **Display:** 5-digit floating-point number
Tube Damping - Ref.Value User	AUTO - OOS	The reference value for tube damping appears on the display. **Display:** 5-digit floating-point number
Tube Damping - Actual Value	read only	The measured tube damping appears on the display. **Display:** 5-digit floating-point number
Tube Damping - Min.Value	read only	The lowest tube damping value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
Tube Damping - Max.Value	read only	The highest tube damping value since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
Tube Damping - History 1…10	read only	The last ten tube damping values since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
Tube Damping - Deviation	read only	This function displays the deviation between the measured tube damping and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Tube Damping - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this parameter to specify a limit value for tube damping. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [%] **Factory setting:** 1000%
El.Dyn.Sens. - Ref.Value Factory	read only	The reference value for the electrodynamic sensors appears on the display. **Display:** 5-digit floating-point number
El.Dyn.Sens. - Ref.Value User	read only	The reference value for the electrodynamic sensors appears on the display. **Display:** 5-digit floating-point number
El.Dyn.Sens. - Actual Value	read only	The measuring values for the electrodynamic sensors appear on the display. **Display:** 5-digit floating-point number
El.Dyn.Sens. - Min. Value	read only	The lowest value of the electrodynamic sensors since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
El.Dyn.Sens. - Max.Value	read only	The highest value of the electrodynamic sensors since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
El.Dyn.Sens. - History 1…10	read only	The last ten values of the electrodynamic sensors since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number
El.Dyn.Sens. - Deviation	read only	This function displays the deviation between the measured values for the electrodynamic sensors and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
El.Dyn.Sens. - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this parameter to specify a limit value for the electrodynamic sensors. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 [%] **Factory setting:** 100%
Freq.Fluct. - Ref.Value Factory	read only	The reference value for the fluctuation of the operating frequency appears on the display. **Display:** 5-digit floating-point number, Hz
Freq.Fluct. - Ref.Value User	read only	The reference value for the fluctuation of the operating frequency appears on the display. **Display:** 5-digit floating-point number, Hz
Freq.Fluct. - Actual Value	read only	The measured fluctuation of the operating frequency appears on the display. **Display:** 5-digit floating-point number, Hz
Freq.Fluct. - Min.Value	read only	The lowest value of the operating frequency fluctuation since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, Hz
Freq.Fluct. - Max.Value	read only	The highest value of the operating frequency fluctuation since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number, Hz
Freq.Fluct. - History 1…10	read only	The last ten values of the operating frequency fluctuation since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number, Hz
Freq.Fluct. - Deviation	read only	This function displays the deviation between the measured fluctuation in operating frequency and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number, Hz
Freq.Fluct. - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this function to specify a limit value for the operating frequency fluctuation. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 Hz **Factory setting:** 1000 Hz

"Advanced Diagnostics" Transducer Block/base index 2200		
Parameter	**Write access with operating mode (MODE_BLK)**	**Description**
Tube Damp.Fluct. - Ref.Value Factory	read only	The reference value for the fluctuation of the tube damping appears on the display. **Display:** 5-digit floating-point number
Tube Damp.Fluct. - Ref.Value User	read only	The reference value for the fluctuation of the tube damping appears on the display. **Display:** 5-digit floating-point number
Tube Damp.Fluct. - Actual Value	read only	The measured fluctuation of the tube damping appears on the display. **Display:** 5-digit floating-point number
Tube Damp.Fluct. - Min.Value	read only	The lowest value of the tube damping since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
Tube Damp.Fluct. - Max.Value	read only	The highest value of the tube damping fluctuation since the saved values were last reset appears on the display. **Display:** 5-digit floating-point number
Tube Damp.Fluct. - History 1…10	read only	The last ten values of the tube damping fluctuation since the saved values were last reset appear on the display. **Display:** 5-digit floating-point number
Tube Damp.Fluct. - Deviation	read only	This function displays the deviation between the measured fluctuation in tube damping and the reference values selected in the parameter "Adv. - Select Ref.Condition" (FACTORY or USER) → Page 173. **Display:** 5-digit floating-point number
Tube Damp.Fluct. - Warning Level	AUTO - OOS	✎ Note! This option is not active unless ON was selected in the parameter "Adv. - Warning Mode". Use this parameter to specify a limit value for tube damping fluctuation. A notice message is generated if the limit value is exceeded. **User input:** 0 to 99999 **Factory setting:** 1000
Amp. Device Type	read only	This parameter is only used for service purposes.

4 Function blocks

The function blocks contain the basic automation functions of the field device. We distinguish between different function blocks, e.g. Analog Input function block, PID function block (PID controller), etc.

Each of these function blocks is used to execute different application functions. This means that local control functions, for example, can be carried out directly in the field, and device errors such as amplifier errors are reported to the automation system automatically.

The function blocks process the input values in accordance with their specific algorithm and their internally available parameters. They generate output values that are made available to other function blocks for further processing by linking the individual function blocks with each other.

5 Analog Input function block

In the Analog Input function block (AI) the process variables from the Transducer Block are prepared for the subsequent automation functions (e.g. scaling, limit value processing). The automation function is defined by the connections of the outputs.

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OUT = output value and output status of the Analog Input function block

5.1 Signal processing

The figure shows the internal structure of the Analog Input function blocks available:

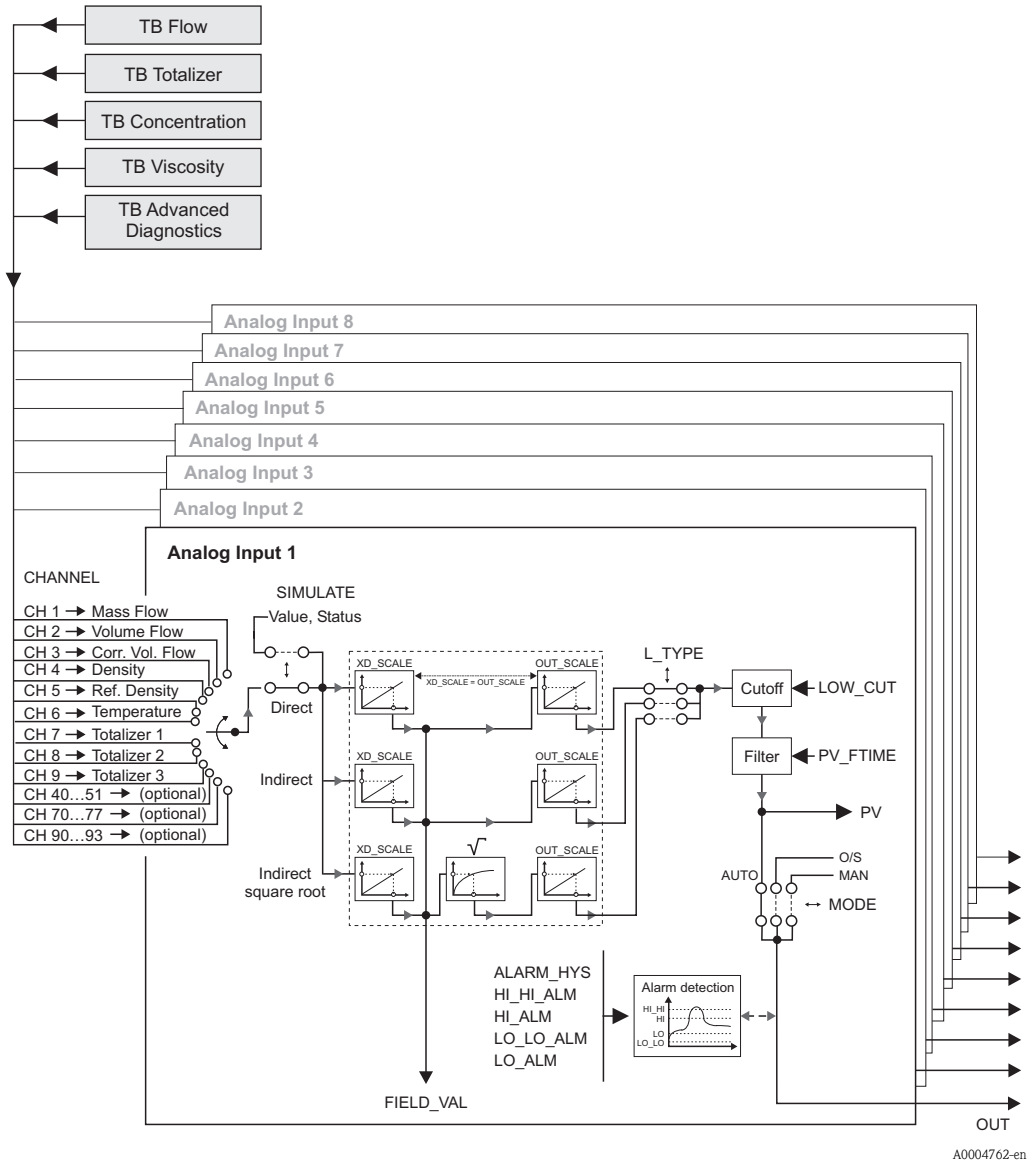

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Fig. 3 : Internal structure of the individual Analog Input function blocks

The Analog Input function blocks receive their input values from the **Transducer Blocks**.
The parameter CHANNEL is used to select which input value is to be processed in an **Analog Input function block**.

Factory-based configuration of the Transducer Blocks → Page 114 ff.

The parameter group SIMULATE allows you to replace the input value with a simulation value and to activate simulation. By specifying the status and the simulation value the reaction of the complete Analog Input function block can be tested.

✎ Note!
The simulation mode is activated by means of jumpers on the I/O board (→ See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus, BA065D).

The parameter L_TYPE is used to select the linearization type of the input or simulation value:

- Direct signal conversion
  The value is forwarded without conversion (XD_SCALE = OUT_SCALE). Select this option if the input value is already in the physical unit you want.

- Indirect signal conversion
  With this setting the measured value from the Transducer Block (input value) is re-scaled linearly via the input scaling XD_SCALE to the desired output range OUT_SCALE (further information on rescaling of the input value can be found on → Page 188).

- Indirect signal conversion with square root
  With this setting the measured value from the Transducer Block (input value) is re-scaled via the parameter group XD_SCALE and recalculated using a square root function. It is then rescaled again to the desired output range via the parameter group OUT_SCALE.

The parameter LOW_CUT allows a limit value to be specified for the low flow cut off. The low flow cut off is activated via the parameter IO_OPTS. If the converted primary value (PV) is below the limit value then it is set to a value of "Zero".

In the parameter PV_FTIME a filter time can be specified for filtering the converted primary value (PV). If a time of 0 seconds is specified then no filtration takes place.

The parameter group MODE_BLK is used to select the operating mode of the Analog Input function block. If the operating mode MAN (manual) is selected then the output value OUT can be specified directly.

The output value OUT is compared with warning and alarm limits (e.g. HI_LIM, LO_LO_LIM, etc.) that can be entered via various parameters. If one of these limit values is violated then a limit value process alarm (e.g. HI_ALM, LO_LO_ALM, etc.) is triggered.

5.2 Important functions and parameters of the Analog Input function blocks

The most important functions and parameters of the Analog Input function blocks are listed below.

✎ Note!
All the FOUNDATION Fieldbus parameters available are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

5.2.1 Selecting the operating mode

The operating mode is configured via the MODE_
BLK parameter group. The Analog Input function block supports the following operating modes:
- AUTO (automatic mode)
- MAN (manual mode)
- OOS (out of service)

✎ Note!
The block status OOS is also shown via the parameter BLOCK_ERR. In operating mode OOS, if write protection is not enabled, you can access all the write parameters without restriction.

5.2.2 Assignment of the process variable

The Promass 83 FOUNDATION Fieldbus has eight Analog Input function blocks. The process variables of the Transducer Block that are to be processed are assigned via the parameter CHANNEL.

Factory-based configuration of the Transducer Blocks → Page 114 ff.

5.2.3 Linearization types

In an Analog Input function block, the input value of a Transducer Block can be linearized using the parameter L_TYPE. The following types of linearization are available:

- Direct
  With this setting the measured value from the Transducer Block (input value) bypasses the linearization function and is looped unchanged with the same unit through the Analog Input function block.

- Indirect
  With this setting the measured value from the Transducer Block (input value) is re-scaled linearly via the input scaling XD_SCALE to the desired output range OUT_SCALE.

- Indirect Square Root
  With this setting the measured value from the Transducer Block (input value) is re-scaled via the parameter group XD_SCALE and recalculated using an evolution function. It is then rescaled again to the desired output range via the parameter group OUT_SCALE.

5.2.4 Selection of units

A change in the unit for a process variable is defined in the relevant Analog Input function block, in the parameter group XD_SCALE via the element UNIT.

If an unsuitable unit is selected, the function block changes to the OOS mode (out of service).

Note!
- If the "Direct" type of linearization was selected via the L_TYPE parameter, the setting of the XD_SCALE and OUT_SCALE parameter groups must be identical; otherwise, the function block remains in the OOS operating mode and the "BLOCK CONFIG ERROR" block error is displayed in the BLOCK_ERROR parameter.
- The system units selected in the Transducer Blocks in question do not have any effect on the setting of the system units in the Analog Input function block. The units are specified independently of one another and must be configured separately. The unit selected in the Transducer Blocks is only used for the local display, EPD adjustment, low flow cut off and for simulation.

5.2.5 Status of the output value OUT

The status of the parameter group OUT communicates to the subsequent function blocks the status of the Analog Input function block and the validity of the output value OUT. The following status values can be displayed:

- GOOD_NON_CASCADE
  The output value OUT is valid and can be used for further processing.

- UNCERTAIN
  The output value OUT can only be used for further processing to a limited extent. The status tells the downstream function blocks that a "notice message" is present in the device, e.g. arising from active positive zero return or simulation.

- BAD
  The output value OUT is invalid. The following causes are possible:
  – The Analog Input function block is in the OOS operating mode.
  – The Resource Block is in operating mode OOS.
  – The "Flow" or "Totalizer" Transducer Block is in the OOS operating mode. The Analog Input function block can only process the input value of the Transducer Block in question if the operating mode is set to AUTO.
  – A "fault message" is present in the device arising from a critical device error, e.g. an electronics module defect.

Note!
- The status of the device (block error) is displayed by means of the BLOCK_ERR parameter.
- Detailed information on the current device status is displayed via the "Diagnosis" Transducer Block in the parameter "Diag. - Act.Sys.Condition". A list of all the error messages, including remedial measures, can be found in the Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus (BA065D).

5.2.6 Simulation of input/output

Parameters of the Analog Input function block allow simulation of the input and output of the function block:

1. Simulation of the input of the Analog Input function block:
   The parameter group SIMULATE can be used to specify the input value (measured value and status). Since the simulation value runs through the entire function block, all the parameter settings of the block can be checked.

✎ Note!
If simulation is blocked by the jumper on the I/O board then simulation mode cannot be activated in the parameter SIMULATE. In the Resource Block, the parameter BLOCK_ERROR shows whether simulation of the Analog Input function block is possible.

2. Simulation of the output of the Analog Input function block:
   Set the operating mode in the parameter group MODE_BLK to MAN and specify the desired output value directly in the parameter OUT.

5.2.7 Diagnosis

The status of the device is displayed via the BLOCK_ERR parameter specified in the FOUNDATION Fieldbus specification.

Detailed information on the current device status is displayed via the "Diagnosis" Transducer Block in the manufacturer-specific parameter "Diag. - Act.Sys.Condition" (→ Page 134).

For more information on rectifying errors → See Operating Instructions for Proline Promass 83 FOUNDATION Fieldbus (BA065D), "Troubleshooting" section.

5.2.8 Rescaling the input value

In the Analog Input function block the input value or input range can be scaled in accordance with the automation requirements.

Example:
- The system unit in the Transducer Block is kg/h.
- The measurement range of the sensor is 0 to 30 kg/h.
- The output range to the process control system should be 0 to 100%.

The Analog Input function block must be configured as follows:
- Parameter CHANNEL
  Select: CHANNEL → 1 = Mass flow

- Parameter L_TYPE
  Select: L_TYPE = Indirect
  The process variable "Volume flow" from the "Flow" Transducer Block is rescaled linearly in the AI Block via input scaling XD_SCALE to the desired output range OUT_SCALE.

- Parameter group XD_SCALE

XD_SCALE 0 %	=	0
XD_SCALE 100 %	=	30
XD_SCALE UNIT	=	kg/h

- Parameter group OUT_SCALE

OUT_SCALE 0 %	=	0
OUT_SCALE 100 %	=	100
OUT_SCALE UNIT	=	%

The result is that with an input value of, for example, 15 kg/h a value of 50% is output via the parameter OUT.

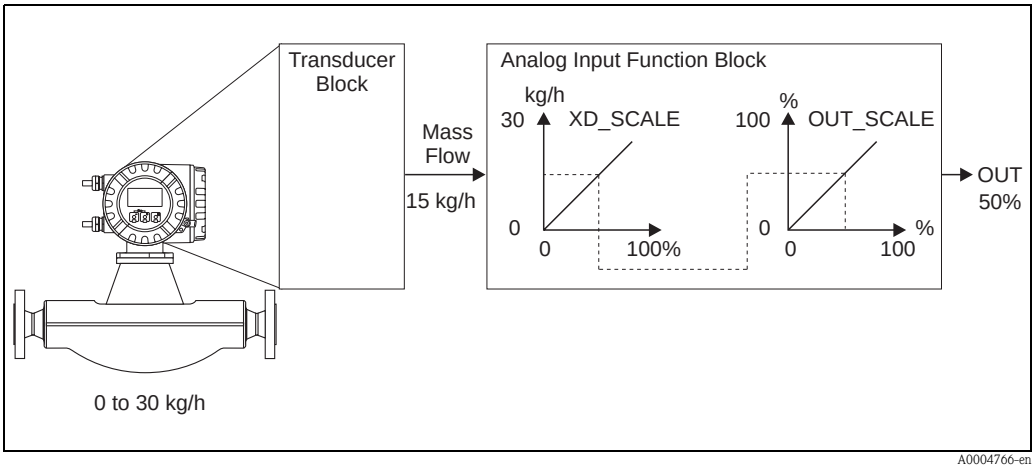


Fig. 4 : Rescaling the input value (example)

5.2.9 Limit values

The limit values are based on the output value OUT. If the output value OUT exceeds or does not reach the defined limit values then an alarm is sent to the fieldbus host system via the limit value process alarms. The following limit values can be defined:
- HI_HI_LIM (upper alarm limit)
- HI_LIM (upper pre-warning limit)
- LO_LO_LIM (lower alarm limit)
- LO_LIM (lower pre-warning limit)

5.2.10 Alarm detection and processing

Process alarms provide information on particular block statuses and block events. The status of the process alarms is communicated to the fieldbus host system via the parameter BLOCK_ALM. The parameter ACK_OPTION specifies whether an alarm must be acknowledged via the fieldbus host system.

The following process alarms are generated by the Analog Input function block:

Block process alarms
A block process alarm is triggered via the BLOCK_ERR parameter. The parameter BLOCK_ALM is used to show the block process alarms and communicate them to the fieldbus host system. The following process alarms can be generated by the Analog Input function block:
- SIMULATE ACTIVE
- INPUT FAILURE
- OUT OF SERVICE
- BLOCK CONFIG ERROR

If the option of the process alarm (BLOCK ALM) has **not** been enabled in the parameter ACK_OPTION, the process alarms must be acknowledged in the parameter BLOCK_ALM.

Limit value process alarms
If a limit value is infringed then the priority specified for the limit value alarm will be checked before the limit value violation is communicated to the fieldbus host system. The priority that specifies the action in the event of an active limit value violation is determined by the following parameters:
- HI_HI_PRI (upper alarm limit)
- HI_PRI (upper pre-warning limit)
- LO_LO_PRI (lower alarm limit)
- LO_PRI (lower pre-warning limit)

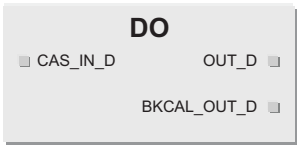
The status of the limit value process alarms is communicated to the fieldbus host system via the following parameters:
- HI_HI_ALM (upper alarm limit)
- HI_ALM (upper pre-warning limit)
- LO_LO_ALMI (lower alarm limit)
- LO_ALM (lower pre-warning limit)

If the option of a limit value process alarm has **not** been enabled in the parameter ACK_OPTION then this must be acknowledged directly in its parameter (see list).

Note!
The parameter ALARM_SUM shows the current status of all the process alarms.

6 Discrete Output function block

The Discrete Output function block (DO, Discrete Output) processes a discrete setpoint value received from an upstream function block or higher level process control system, with which various instrument functions (e.g. zero point adjustment or totalizer reset) can be initiated in the subsequent Transducer Block.



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CAS_IN _D = Remote setpoint value from another function block
OUT_D = Discrete output value and status
BKCAL_OUT_D = Discrete output value and status required by BKCAL_IN_D input of another block for

6.1 Signal processing

The figure shows the internal structure of the Discrete Output function blocks Promass 83 FOUNDATION Fieldbus:

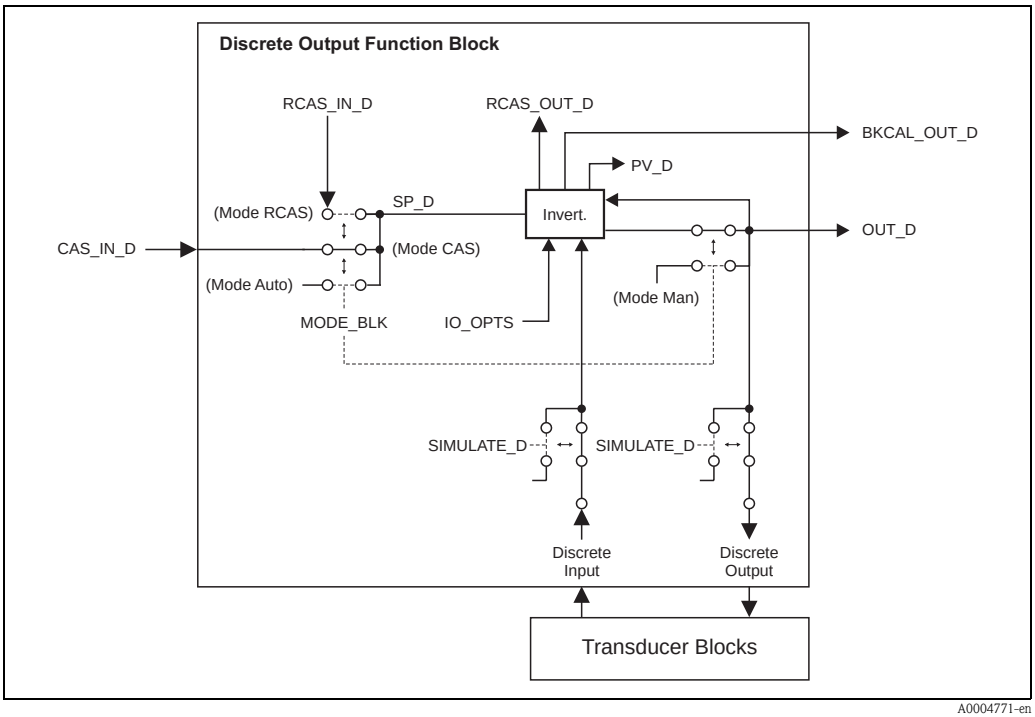

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Fig. 5 : Signal processing in the Discrete Output function block

In the CAS operating mode (cascade operation), the **Discrete Output function block** receives, via the function block input CAS_IN_D, a discrete signal from an upstream function block. This signal controls the setpoint value (parameter SP_D) of the function block, and after internal calculation is sent as an output signal (parameter OUT_D) to the Transducer Block for control of instrument functions (e.g. zero point adjustment). The output value and status of the **Discrete Output function block** is communicated to the upstream block via the output BKCAL_OUT_D.

Signal processing in the RCAS operating mode (remote cascade operation) is largely identical to the CAS operating mode. However, in this operating mode, control of the parameter SP_D does not take place via an upstream function block but through a fieldbus host system. The output value and status

of the Discrete Output function block is communicated to the process control system as an answer message via parameter RCAS_OUT_D.

In the AUTO operating mode (automatic operation), the set point value (parameter SP_D) is prescribed directly in the Discrete Output function block. In this case, the parameter CAS_IN_D is not taken into consideration in the internal calculation.

In the MAN operating mode (HAND), the output value (parameter OUT_D) can be prescribed directly in the Discrete Output function block. No internal calculation takes place.

6.2 Important functions and parameters of the Discrete Output function block

The most important functions and parameters of the Discrete Output function block are listed below.

Note!
All the FOUNDATION Fieldbus parameters available are described in the Operating Instructions "FOUNDATION Fieldbus Overview" (BA013S) (available at: → www.endress.com → download).

6.2.1 Selecting the operating mode

The operating mode is configured via the MODE_BLK parameter group. The Discrete Output function block supports the following operating modes:
- AUTO
- MAN
- CAS
- RCAS
- OOS

6.2.2 Safety behavior

There is a safety default available (fault state) for the Discrete Output function block. This is activated when a fault condition (of the corresponding valid set point value) exists longer than defined in the parameter FSTATE_TIME, or when the parameter SET_FSTATE in the Resource Block is activated. The safety operation is determined via the parameters FSTATE_TIME, FSTATE_VAL_D, and IO_OPTS.

6.2.3 Assignment between the Discrete Output function block and the Transducer Block

The assignment or connection between the Discrete Output function block and the Transducer Block takes place in the Discrete Output function block via the parameter CHANNEL.

→ Parameter CHANNEL → 16 (= Discrete Output function block)

6.2.4 Values for the parameters CAS_IN_D, RCAS_IN_D, OUT_D, and SP_D

Via the Discrete Output function block, different instrument functions in the Transducer Block can be initiated via manufacturer-specific, fixed set point values from an upstream function block.

Here it must be observed that the desired function is only then executed when a status change from the value 0 (Discrete state 0) to the corresponding function value (following table) takes place. The value 0 always serves as the starting point for the corresponding control of instrument functions. A status change from a value not equal to zero to another value has no effect.

Input assignment of the CAS_IN_D, RCAS_IN_D, OUT_D, SP_D parameters

Status changes			Action
Discrete state 0	→	Discrete state 1	Reserved
Discrete state 0	→	Discrete state 2	Positive zero return: ON
Discrete state 0	→	Discrete state 3	Positive zero return: OFF
Discrete state 0	→	Discrete state 4	Reserved
Discrete state 0	→	Discrete state 5	Reserved
Discrete state 0	→	Discrete state 6	Reserved
Discrete state 0	→	Discrete state 7	Reset totalizers 1, 2, 3
Discrete state 0	→	Discrete state 8	Reset totalizer 1
Discrete state 0	→	Discrete state 9	Reset totalizer 2
Discrete state 0	→	Discrete state 10	Reset totalizer 3
Discrete state 0	→	Discrete state 27	Permanent storage: OFF
Discrete state 0	→	Discrete state 28	Permanent storage: ON
The following measured variables are available if the "Concentration measurement" add-on is installed in the measuring device (order option)			
Discrete state 0	→	Discrete state 60	Select concentration specification 1
Discrete state 0	→	Discrete state 61	Select concentration specification 2
Discrete state 0	→	Discrete state 62	Select concentration specification 3
Discrete state 0	→	Discrete state 63	Select concentration specification 4
The following measured variables are available if the "Advanced diagnostics" add-on is installed in the measuring device (order option)			
Discrete state 0	→	Discrete state 25	Advanced diagnostics: Warning mode off
Discrete state 0	→	Discrete state 26	Advanced diagnostics: Warning mode on
Discrete state 0	→	Discrete state 70	Start determining user reference status
Discrete state 0	→	Discrete state 71	Reserved
Discrete state 0	→	Discrete state 72	Reserved
Discrete state 0	→	Discrete state 73	Reserved
Discrete state 0	→	Discrete state 74	Acquisition mode: off
Discrete state 0	→	Discrete state 75	Acquisition mode: periodic
Discrete state 0	→	Discrete state 76	Acquisition mode: single shot
Discrete state 0	→	Discrete state 77	Acquisition mode: reset history
Discrete state 0	→	Discrete state 78	Start manual determination of diag. parameter

Example for controlling positive zero return via the Discrete Output function block.
The following example shows how positive zero return can be activated or deactivated via the Discrete Output function block during a cleaning procedure.

1. In the first step, the connection between the Discrete Output function block and the Transducer Block must be established. Here, the value 16 must be assigned to the parameter CHANNEL in the Discrete Output function block.

   → Parameter CHANNEL → 16 (= Discrete Output function block)

2. In the CAS operating mode, the Discrete Output function block processes the set point value specified at the input CAS_IN_D by the upstream function block and transfers it to the Transducer Block.

   Activating positive zero return
   With a starting value of 0 (Discrete state 0), positive zero return is activated by a status change from 0 to 2 at input CAS_IN_D.

   Deactivating the positive zero return
   Positive zero return can only then be deactivated when the input value at CAS_IN_D has first been set to output value 0 (Discrete state 0). Only then can positive zero return be deactivated through a status change from 0 to 2 at input CAS_IN_D.

7 Additional function blocks

Note!
Additional function blocks such as the PID, Arithmetic, Input Selector, Signal Characterizer and Integrator function block are described in the "FOUNDATION Fieldbus Overview" (BA013S) Operating Instructions (available at: → www.endress.com → download).

8 Factory settings

8.1 SI units (not for USA and Canada)

8.1.1 Low flow cut off, full scale value, pulse value – Liquid

Nom. diameter [mm]	Low flow cut off (approx. v = 0.04 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.08	kg/h	4	kg/h	0.001	kg/p
2	0.40	kg/h	20	kg/h	0.010	kg/p
4	1.80	kg/h	90	kg/h	0.010	kg/p
8	8.00	kg/h	400	kg/h	0.100	kg/p
15	26.00	kg/h	1300	kg/h	0.100	kg/p
15 FB	72.00	kg/h	3600	kg/h	1.000	kg/p
25	72.00	kg/h	3600	kg/h	1.000	kg/p
25 FB	180.00	kg/h	9000	kg/h	1.000	kg/p
40	180.00	kg/h	9000	kg/h	1.000	kg/p
40 FB	300.00	kg/h	15000	kg/h	10.000	kg/p
50	300.00	kg/h	15000	kg/h	10.000	kg/p
50 FB	720.00	kg/h	36000	kg/h	10.000	kg/p
80	720.00	kg/h	36000	kg/h	10.000	kg/p
100	1200.00	kg/h	60000	kg/h	10.000	kg/p
150	2600.00	kg/h	130000	kg/h	100.000	kg/p
250	7200.00	kg/h	360000	kg/h	100.000	kg/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

8.1.2 Low flow cut off, full scale value, pulse value – Gas

Nom. diameter [mm]	Low flow cut off (approx. v = 0.01 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.02	kg/h	4	kg/h	0.001	kg/p
2	0.10	kg/h	20	kg/h	0.010	kg/p
4	0.45	kg/h	90	kg/h	0.010	kg/p
8	2.00	kg/h	400	kg/h	0.100	kg/p
15	6.50	kg/h	1300	kg/h	0.100	kg/p
15 FB	18.00	kg/h	3600	kg/h	1.000	kg/p
25	18.00	kg/h	3600	kg/h	1.000	kg/p
25 FB	45.00	kg/h	9000	kg/h	1.000	kg/p
40	45.00	kg/h	9000	kg/h	1.000	kg/p
40 FB	75.00	kg/h	15000	kg/h	10.000	kg/p
50	75.00	kg/h	15000	kg/h	10.000	kg/p
50 FB	180.00	kg/h	36000	kg/h	10.000	kg/p
80	180.00	kg/h	36000	kg/h	10.000	kg/p
100	300.00	kg/h	60000	kg/h	10.000	kg/p
150	650.00	kg/h	130000	kg/h	100.000	kg/p
250	1800.00	kg/h	360000	kg/h	100.000	kg/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

8.1.3 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

8.1.4 Density, length, temperature

	Unit
Density	kg/l
Length	mm
Temperature	° C

8.2 US units (only for USA and Canada)

8.2.1 Low flow cut off, full scale value, pulse value – Liquid

Nominal diameter [mm]	Low flow cut off (approx. v = 0.04 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.003	lb/min	0.15	lb/min	0.002	lb/p
2	0.015	lb/min	0.75	lb/min	0.020	lb/p
4	0.066	lb/min	3.30	lb/min	0.020	lb/p
8	0.300	lb/min	15.00	lb/min	0.200	lb/p
15	1.000	lb/min	50.00	lb/min	0.200	lb/p
15 FB	2.600	lb/min	130.00	lb/min	2.000	lb/p
25	2.600	lb/min	130.00	lb/min	2.000	lb/p
25 FB	6.600	lb/min	330.00	lb/min	2.000	lb/p
40	6.600	lb/min	330.00	lb/min	2.000	lb/p
40 FB	11.000	lb/min	550.00	lb/min	20.000	lb/p
50	11.000	lb/min	550.00	lb/min	20.000	lb/p
50 FB	26.000	lb/min	1300.00	lb/min	20.000	lb/p
80	26.000	lb/min	1300.00	lb/min	20.000	lb/p
100	44.000	lb/min	2200.00	lb/min	20.000	lb/p
150	95.000	lb/min	4800.00	lb/min	200.000	lb/p
250	260.00	lb/min	13000.00	lb/min	200.000	lb/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

8.2.2 Low flow cut off, full scale value, pulse value – Gas

Nominal diameter [mm]	Low flow cut off (approx. v = 0.01 m/s)		Full scale value (approx. v = 2 m/s)		Pulse value (approx. 2 pulse/s at 2 m/s)	
1	0.001	lb/min	0.15	lb/min	0.002	lb/p
2	0.004	lb/min	0.75	lb/min	0.020	lb/p
4	0.046	lb/min	3.30	lb/min	0.020	lb/p
8	0.075	lb/min	15.00	lb/min	0.200	lb/p
15	0.250	lb/min	50.00	lb/min	0.200	lb/p
15 FB	0.650	lb/min	130.00	lb/min	2.000	lb/p
25	0.650	lb/min	130.00	lb/min	2.000	lb/p
25 FB	1.650	lb/min	330.00	lb/min	2.000	lb/p
40	1.650	lb/min	330.00	lb/min	2.000	lb/p
40 FB	2.750	lb/min	550.00	lb/min	20.000	lb/p
50	2.750	lb/min	550.00	lb/min	20.000	lb/p
50 FB	6.500	lb/min	1300.00	lb/min	20.000	lb/p
80	6.500	lb/min	1300.00	lb/min	20.000	lb/p
100	11.000	lb/min	2200.00	lb/min	20.000	lb/p
150	23.750	lb/min	4800.00	lb/min	200.000	lb/p
250	65.000	lb/min	13000.00	lb/min	200.000	lb/p
DN 15, 25, 40, 50 “FB” = Full bore versions Promass I						

8.2.3 Language, density, length, temperature

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

9 Index FOUNDATION Fieldbus

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U

V

W

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