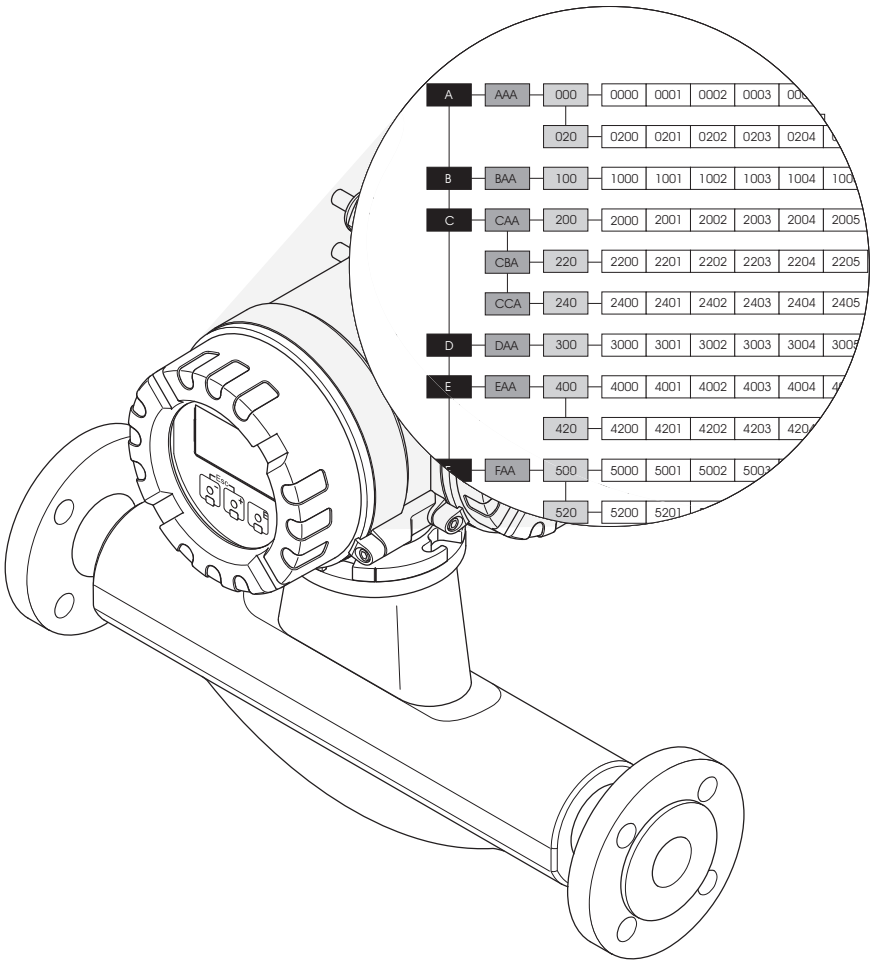
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Description of Device Functions

Proline Promass 80 PROFIBUS PA

Coriolis Mass Flow Measuring System



BA073D/06/en/06.10
71116472
Valid as of version:
V 3.06.XX (device software)

Endress+Hauser
People for Process Automation

Table of contents

1 Function matrix

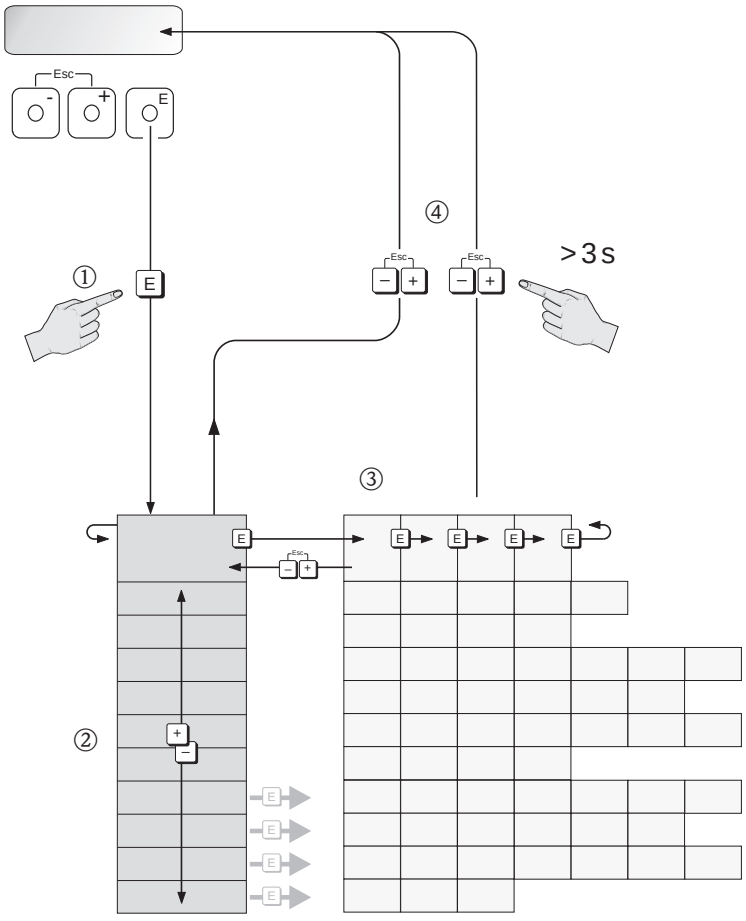
1.1 Layout and operation of the function matrix

The function matrix consists of two levels – the groups and the groups' functions. The groups are the highest-level grouping of the operation options for the device. A number of functions are assigned to every group. By selecting the group, you can access the functions in which the operation or configuration of the device takes place.

An overview of all the groups available is provided in the Table of Contents on Page 3 and in the graphic illustration of the function matrix on Page 6.

Page 6 also provides you with an overview of all the functions available with cross-references to the exact function description. The individual functions are described as of Page 7.

Example for configuring a function (changing the display language from German to English):
① Enter the function matrix (E key).
② Select the OPERATION group.
③ Select the LANGUAGE function, then change the option from DEUTSCH to ENGLISH and save (the display text now appears in English).
④ Exit the function matrix (ESC > 3 seconds).



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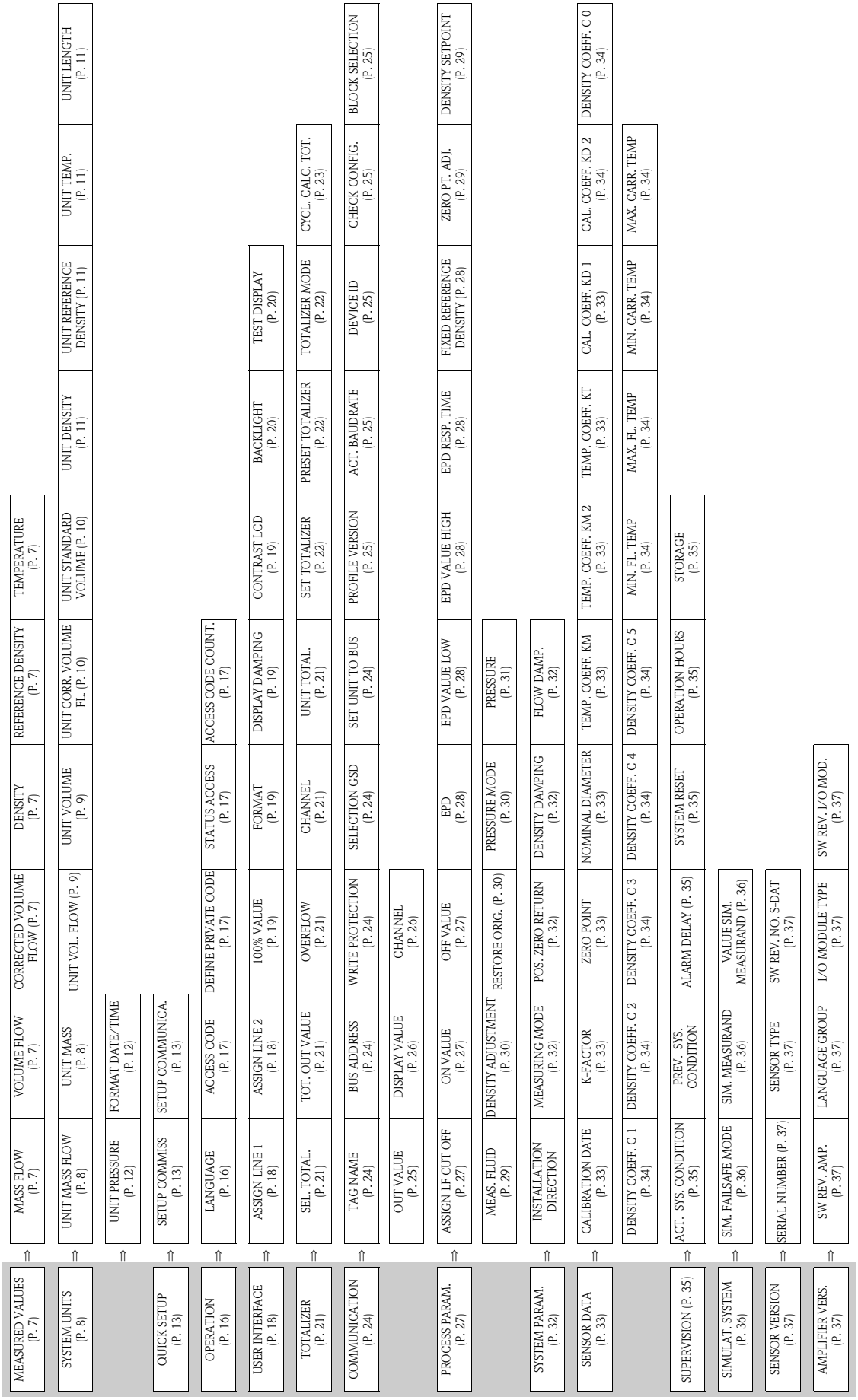
1.2 Illustration of the function matrix



2 Group MEASURED VALUES

Function description MEASURED VALUES	
✎ Note! ■ The engineering unit of the measured variable displayed 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	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	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	The calculated corrected volume flow appears on the display. The corrected volume flow is derived from the measured mass flow and the reference density (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	The currently measured density or its specific gravity appears on the display. **Display:** 5-digit floating-point number, including unit, corresponding to 0.1000 to 6.0000 kg/dm^3 (e.g. 1.2345 kg/dm^3; 993.5 kg/m^3; 1.0015 SG_20 °C; etc.)
REFERENCE DENSITY	The density of the fluid at reference temperature appears on the display. The reference density can either be measured or specified via the FIXED REFERENCE DENSITY function (see Page 28). **Display:** 5-digit floating point number, incl. unit, corresponding to 0.1000 to 6.0000 kg/dm^3 (e.g. 1.2345 kg/dm^3; 993.5 kg/m^3; 1.0015 SG_20 °C; etc.)
TEMPERATURE	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 Group SYSTEM UNITS

Function description SYSTEM UNITS	
You can select the unit for the measured variable in this function group.	
UNIT MASS FLOW	For selecting the unit for displaying the mass flow (mass/time). The unit you select here is also valid for: ■ Low flow **Options:** Metric: Gram → g/s; g/min; g/h; g/day Kilogram → kg/s; kg/min; kg/h; kg/day Metric ton → t/s; t/min; t/h; t/day US: Ounce → oz/s; oz/min; oz/h; oz/day Pound → lb/s; lb/min; lb/h; lb/day Ton → ton/s; ton/min; ton/h; ton/day **Factory setting:** Depends on country (kg/h or USlb/min)
UNIT MASS	For selecting 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.

Function description SYSTEM UNITS	
UNIT VOLUME FLOW	For selecting the unit for displaying the volume flow (volume/time). The unit you select here is also valid for: ■ Low flow **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 Kilogallon → 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	For selecting 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.

Function description SYSTEM UNITS	
UNIT CORRECTED VOLUME FLOW	For selecting the unit for displaying the corrected volume flow (corrected volume/time). The unit you select here is also valid for: ■ Low flow **Options:** Metric: Nl/s Nl/min Nl/h Nl/day Nm³/s Nm³/min Nm³/h Nm³/day US: Sm³/s Sm³/min Sm³/h Sm³/day Scf/s Scf/min Scf/h Scf/day **Factory setting:** Nm³/h
UNIT CORRECTED VOLUME	For selecting the unit for displaying the corrected volume. **Options:** Metric: Nm³ Nl US: Sm³ Scf **Factory setting:** Nm³ ✎ 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 SYSTEM UNITS	
UNIT DENSITY	For selecting the unit for displaying the fluid density. The unit you select here is also valid for: ■ 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)
UNIT REFERENCE DENSITY	For selecting the unit for displaying the reference density. The unit you select here is also valid for: ■ Fixed reference density (for calculation of corrected volume flow) **Options:** Metric: kg/Nm³ kg/Nl US: g/Scc kg/Sm³ lb/Scf **Factory setting:** kg/Nl
UNIT TEMPERATURE	For selecting the unit for displaying the temperature. The unit you select here is also valid for: ■ Reference temperature (for corrected vol. measurement with measured reference density) **Options:** °C (Celsius) K (Kelvin) °F (Fahrenheit) R (Rankine) **Factory setting:** °C (Celsius)
UNIT LENGTH	For selecting the unit for displaying the length of the nominal diameter. The unit you select here is also valid for: ■ Nominal diameter of sensor (NOMINAL DIAMETER function on Page 33) **Options:** MILLIMETER INCH **Factory setting:** Depends on country (MILLIMETER or INCH)

Function description SYSTEM UNITS	
UNIT PRESSURE	For selecting the unit for displaying the pressure. The unit you select here is also valid for: ■ Specified pressure (PRESSURE function on Page 31) **Options:** bara barg psia psig **Factory setting:** barg
FORMAT DATE/TIME	Use this function to select the format for the date and the time. The unit you select here is also valid for: Displaying the current calibration date (function CALIBRATION DATE on Page 33) **Options:** DD.MM.YY 24H MM/DD/YY 12H A/P DD.MM.YY 12H A/P MM/DD/YY 24H **Factory setting:** DD.MM.YY 24H (SI units) MM/DD/YY 12H A/P (US units)

4 Group QUICK SETUP

QUICK SETUP function description	
✎ Note! ■ The Quick Setups are only available by means of the local display. ■ Flowcharts of the various Quick Setups can be found on the following pages. ■ More information on the setups can be found in Operating Instructions BA072D.	
QUICK SETUP COMMISSIONING	For starting the Setup menu. **Options:** YES NO **Factory setting:** NO
QUICK SETUP COMMUNICATION	For starting the Setup menu. **Options:** YES NO **Factory setting:** NO

4.1 Quick Setup “Commissioning”

Note!
The display returns to the QUICK SETUP COMMISSIONING cell if you press the ⊡ key combination during parameter interrogation.

① The “DELIVERY SETTINGS” option sets every selected unit to the factory setting.
The “ACTUAL SETTINGS” option accepts the units you set beforehand.

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: line 1= mass flow; line 2 = totalizer 1
NO: The existing (selected) settings remain.

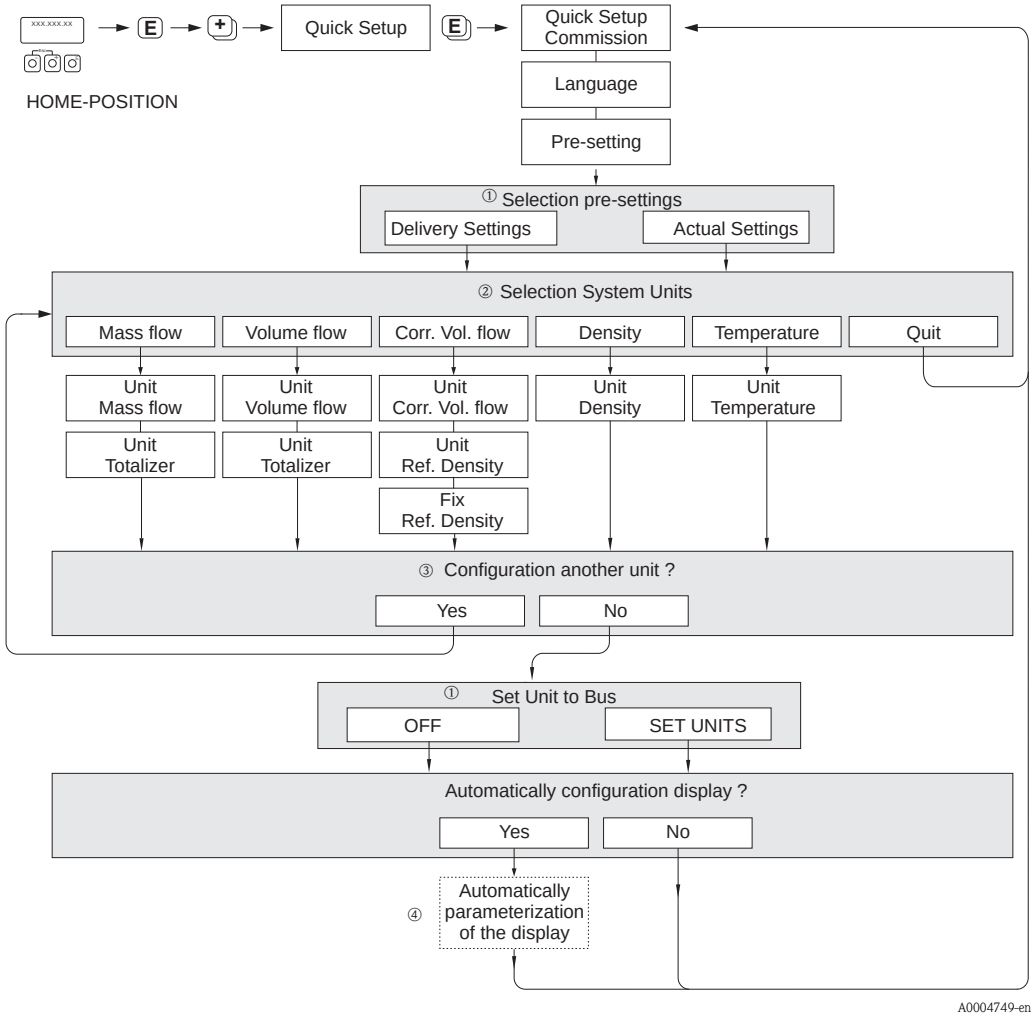


Fig. 1: Quick Setup Commissioning.

4.2 Quick Setup “Communication”

To establish cyclic data transfer, various arrangements between the PROFIBUS master and the slave are required which have to be taken into consideration when configuring various functions. These functions can be configured quickly and easily by means of the "Communication" Quick Setup.

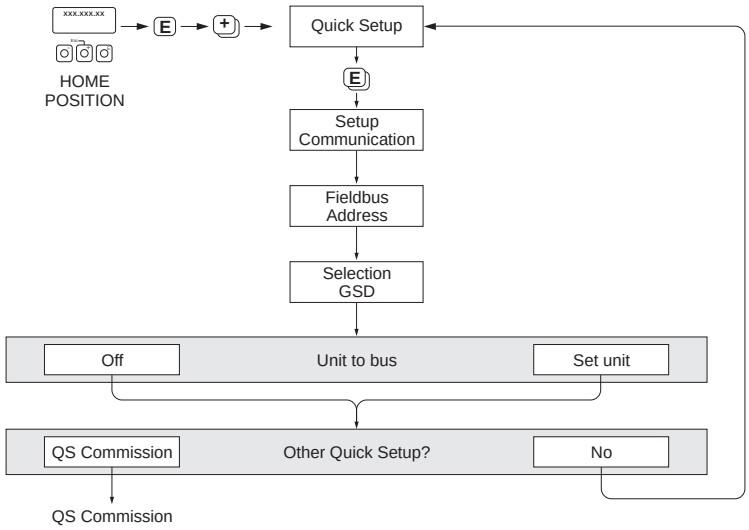


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Fig. 2: Quick Setup Communication.

5 Group OPERATION

Function description OPERATION	
LANGUAGE	For selecting the desired language for all texts, parameters and messages shown on the local display. ✎ Note! The displayed options depend on the available language group which is indicated in the LANGUAGE GROUP function → Page 37. **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) **Factory setting:** Depends on country (s. Page 38 ff.) ✎ Note! ■ If you press the ⊞ keys simultaneously at startup, the language defaults to "ENGLISH". ■ You can change the language group via the configuration software FielCare. Please do not hesitate to contact your Endress+Hauser sales office if you have any questions.

Function description OPERATION	
ACCESS CODE	✎ Note! This function is only relevant for local operation and accessing via an operating program (e.g. FieldCare) and does not affect cyclic data transmission via the PROFIBUS master (Class 1). All data of the measuring system are protected against inadvertent change. Programming is disabled and the settings cannot be changed until a code is entered in this function. If you press the ⊞ operating elements 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 = 80**, see DEFINE PRIVATE CODE function on Page 17). **User input:** max. 4-digit number: 0 to 9999 ✎ Note! ■ Programming is disabled if you do not press a key within 60 seconds following automatic return to the HOME position. ■ You can also disable programming in this function by entering any number (other than the defined private code). ■ The Endress+Hauser service organization can be of assistance if you mislay your personal code.
DEFINE PRIVATE CODE	For specifying a personal code to enable programming. **User input:** 0 to 9999 (max. 4-digit number) **Factory setting:** 80 ✎ Note! ■ Programming is always enabled with the code “0”. ■ Programming has to be enabled before this code can be changed. When programming is disabled this function is not available, thus preventing others from accessing your personal code.
STATUS ACCESS	Use this function to display the status of access to the function matrix. **Display:** ACCESS CUSTOMER (parameterization possible) LOCKED (parameterization disabled)
ACCESS CODE COUNTER	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

6 Group USER INTERFACE

Function description USER INTERFACE	
ASSIGN LINE 1	For selecting the display value for the main line (top line of the local display). **Options:** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % DENSITY TEMPERATURE TOTALIZER 1 CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % REFERENCE DENSITY TEMPERATURE AI1 - OUT VALUE AI2 - OUT VALUE AI3 - OUT VALUE AI4 - OUT VALUE AO - DISP. VALUE TOT. OUT VALUE 1 (Totalizer 1) TOT. OUT VALUE 2 (Totalizer 2) **Factory setting:** MASS FLOW
ASSIGN LINE 2	For selecting the display value for the additional line (bottom line of the local display). **Options:** OFF MASS FLOW MASS FLOW IN % VOLUME FLOW VOLUME FLOW IN % DENSITY TEMPERATURE TOTALIZER 1 TAG NAME OPERATING/SYSTEM CONDITIONS FLOW DIRECTION READING MASS FLOW BARGRAPH IN % VOLUME FLOW BARGRAPH IN % CORRECTED VOLUME FLOW CORRECTED VOLUME FLOW IN % CORRECTED VOLUME FLOW BARGRAPH IN % REFERENCE DENSITY AI1 - OUT VALUE AI2 - OUT VALUE AI3 - OUT VALUE AI4 - OUT VALUE AO - DISP. VALUE TOT. OUT VALUE 1 (Totalizer 1) TOT. OUT VALUE 2 (Totalizer 2) **Factory setting:** TOT. OUT VALUE 1 (Totalizer 1)

Function description USER INTERFACE	
100% VALUE	✎ Note! This function is not available unless the VOLUME FLOW IN % or VOLUME FLOW BAR GRAPH IN % option was selected in the ASSIGN LINE 1 or ASSIGN LINE 2 function. For specifying the flow value to be shown on the display as the 100% value. **User input:** 5-digit floating-point number **Factory setting:** Depends on nominal diameter and country (s. Page 38 ff.).
FORMAT	For selecting the number of places displayed after the decimal point for the display value on the main line. **Options:** XXXXX. – XXXX.X – XXX.XX – XX.XXX – X.XXXX **Factory setting:** X.XXXX ✎ Note! ■ Note that this setting only affects the reading as it appears on the display, it has no influence on the accuracy of the system's calculations. ■ The places after the decimal point as computed by the measuring device cannot always be displayed, depending on this setting and the engineering unit. In such instances an arrow appears on the display between the measuring value and the engineering unit (e.g. 1.2 → l/h), indicating that the measuring system is computing with more decimal places than can be shown on the display.
DISPLAY DAMPING	For entering a time constant used to define 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:** 3 s ✎ Note! Setting the time constant to zero seconds switches off damping.
CONTRAST LCD	For setting the display contrast to suit local operating conditions. **User input:** 10 to 100% **Factory setting:** 50%

Function description USER INTERFACE	
BACKLIGHT	For setting the background illumination 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%
TEST DISPLAY	For testing 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 and additional line are darkened for minimum 0.75 sec. 3. The main line and additional line show an “8” in each field for minimum 0.75 sec. 4. The main line and additional line show a “0” in each field for minimum 0.75 sec. 5. The main line and additional line show nothing (blank display) for minimum 0.75 sec. When the test is completed, the local display returns to its initial state and the setting changes to “OFF”.

7 Group TOTALIZER

Function description TOTALIZER	
SELECT TOTALIZER	Use this function to select a totalizer. **Options:** TOTALIZER 1 TOTALIZER 2 **Factory setting:** TOTALIZER 1 ✎ Note! If the option PROFILE-GSD was selected in the SELECTION GSD function the only option available in this function is TOTALIZER 1.
✎ Note! The function descriptions below apply to totalizers 1 to 2. The totalizers are independently configurable.	
TOTALIZER OUT VALUE 1	The current totalizer value, including the unit, appears on the display. **Display:** Floating-point number, incl. unit and sign
OVERFLOW	The total for the totalizer's overflow aggregated since measuring commenced appears on the display. Total flow quantity is represented by a floating-point number consisting of max. 6 digits. You can use this function to view higher numerical values as overflows (>999999). The effective quantity is thus the total of the OVERFLOW function plus the value returned by the TOTALIZER OUT VALUE 1 function. Example: Reading after 2 overflows: 2 E7 (= 2000000). The value displayed in the "TOTALIZER OUT VALUE 1" function = 96845.7 dm^3 Effective total quantity = 2096845.7 dm^3 **Display:** Integer with exponent, including sign, e.g. 2 E7
CHANNEL	Assignment of the measured variable (volume flow) to the totalizer. **Options:** OFF MASS FLOW VOLUME FLOW **Factory setting:** MASS FLOW ✎ Note! The totalizer is reset to “0” as soon as the selection is changed.
UNIT TOTALIZER	For selecting the unit of the totalizer. **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

Function description TOTALIZER	
SET TOTALIZER	Control of the totalizer. **Options:** TOTALIZE Totalizes the measured variable selected in the CHANNEL function. RESET Reset the totalizer to 0. PRESET The totalizer is set to the value defined in the PRESET TOTALIZER function. ✎ Note! Note that selecting RESET or PRESET resets the totalizer to 0 or sets it to the preset value respectively, but does not stop the totalizer. This means that it immediately recommences totaling from the new setting. To stop the totalizer, the HOLD VALUE option has to be selected in the TOTALIZER MODE function. **Factory setting:** TOTALIZE
PRESET TOTALIZER	For specifying a (start) value. ✎ Note! This value is not accepted by the totalizer unless the PRESET option is selected in the SET TOTALIZER function. **User input:** –99999 to 99999 **Factory setting:** 0
TOTALIZER MODE	For selecting the operating mode of the totalizer. **Options:** BALANCE Positive and negative flow components. The positive and negative flow components are balanced. In other words, net flow in the flow direction is registered. POSITIVE (forward) Positive flow components only. NEGATIVE (reverse) Negative flow components only HOLD VALUE The totalizer stays at the last value. No further flow components are totaled. **Factory setting:** BALANCE ✎ Note! For the calculation of the positive and negative flow components (BALANCE) or the negative flow components only (NEGATIVE) to be carried out correctly, the BIDIRECTIONAL option must be selected in the MEASURING MODE function → Page 32.

Function description TOTALIZER	
CYCL. CALC. TOT.	Use this function to define whether the totalizers 1 are updated on the local display and in the operating program (e.g. FieldCare). **Options:** ON Totalizers are always updated OFF Totalizers are only updated if the corresponding totalizer function block (TOTAL module or function) has been configured for cyclic data transmission. **Factory setting:** ON ✎ Note! Especially when conducting time-critical applications, optimization can be carried out for unnecessary totalizer function blocks. For this purpose, OFF must be selected in this function. When doing this, ensure that the totalizer is no longer updated on the local display and in the operating program (e.g. FieldCare) when selecting OFF.

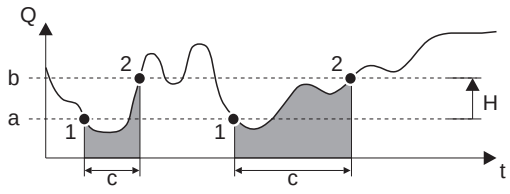
8 Group COMMUNICATION

Function description COMMUNICATION	
TAG NAME	Use this function to assign a tag name to the measuring device. You can edit and read this tag name at the local display or by means of an operating program (e.g. FieldCare). **User input:** max. 16-character text, permissible: A-Z, 0-9, +,-, punctuation marks **Factory setting:** "_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _" (without text)
BUS ADDRESS	For entering the device address. **User input:** 0 to 126 **Factory setting:** 126
WRITE PROTECTION	Indicates whether it is possible to write-access the device via PROFIBUS (acyclic data transmission, e.g. via "FieldCare" operating program). **Display:** OFF → Write access via PROFIBUS (acyclic data transmission) possible ON → Write access via PROFIBUS (acyclic data transmission) disabled **Factory setting:**OFF ✎ Note! Write protection is activated and deactivated by means of a jumper on the I/O module (see Operating Instructions BA063D).
SELECTION GSD	✎ Note! During the configuration phase, every PROFIBUS device must verify an ID number assigned by the PNO. Along with this device-specific ID number there are also PROFILE ID numbers that also have to be accepted in the configuration phase for the purposes of interchangeability between devices of different make. In this case the device might, under certain circumstances, reduce the functionality for cyclic data to a profile-defined scope. Use this function to select the configuration behavior of the measuring device. **Options:** MANUFACT.SPEC PROFILE GSD **Factory setting:** MANUFACT.SPEC
SET UNIT TO BUS	Use this function to enable the transmission of the set system units to the automation system. The set system units are transmitted to the automation system by pressing the 🖫 key. **Options:** SET UNITS (transmission is started by pressing the 🖫 key) ✎ Note! When transmitting, the scaling of the OUT value in the Analog Input Block is automatically scaled to the set system unit and the OUT unit (output unit) is displayed in the OUT_UNIT parameter. The preset system units are listed in the Operating Instructions Proline Promass 80 PROFIBUS PA, BA 072D/06/en. ☝ Caution! Activating this function can cause the output value OUT to change suddenly; this, in turn, can affect subsequent control routines.

Function description COMMUNICATION	
PROFILE VERSION	Use this function to display the profile version. **Display:** 3.0
ACTUAL BAUDRATE	Use this function to display the data transmission rate, set in the automation system, at which the device communicates.
DEVICE ID	Use this function to display the manufacturer-specific device ID. **Display:** 0x1528 (= 1528 Hex) ✎ Note! If the PROFILE GSD option was selected in the SELECTION GSD function, (see Page 24), the PROFILE ID = 0x9742 (= 9742 Hex) is displayed in this function.
CHECK CONFIGURATION	Use this function to see whether the configuration for cyclic data exchange of a Class 1 master has been accepted in Promass 80. **Display:** ACCEPTED (configuration accepted) NOT ACCEPTED (configuration not accepted)
BLOCK SELECTION	For selecting the PROFIBUS function block. If you select the Analog Input, the current measured value is displayed in the OUT VALUE function. If you select the Analog Output, the current measured value is displayed in the DISPLAY VALUE function. **Options:** ANALOG INPUT 1 ANALOG INPUT 2 ANALOG INPUT 3 ANALOG INPUT 4 ANALOG OUTPUT 1 **Factory setting:** ANALOG INPUT 1 ✎ Note! If the PROFILE GSD option was selected in the SELECTION GSD function, the only options that appear in this function are: ■ ANALOG INPUT 1 ■ ANALOG INPUT 2 ■ ANALOG INPUT 3
OUT VALUE	✎ Note! This function is not available unless one of the following was selected in the BLOCK SELECTION function: ■ ANALOG INPUT 1 ■ ANALOG INPUT 2 ■ ANALOG INPUT 3 ■ ANALOG INPUT 4 This function shows the measured variable (AI module), incl. unit and status, cyclically transmitted **to** the PROFIBUS master (Class 1).

Function description COMMUNICATION	
DISPLAY VALUE	✎ Note! This function is not available unless ANALOG OUTPUT 1 was selected in the BLOCK SELECTION function. The measured variable (DISPLAY_VALUE module) cyclically transmitted **from** the PROFIBUS master (Class 1) to the device appears on the display, including the unit and status.
CHANNEL	✎ Note! This function is not available unless one of the following options was selected in the BLOCK SELECTION function: – ANALOG INPUT 1 – ANALOG INPUT 2 – ANALOG INPUT 3 – ANALOG INPUT 4 Use this function to assign a measured variable to the particular Analog Input function block 1 to 4. **Options:** MASS FLOW VOLUME FLOW CORRECTED VOLUME FLOW DENSITY REFERENCE DENSITY TEMPERATURE

9 Group PROCESS PARAMETER

Function description PROCESS PARAMETER	
ASSIGN LOW FLOW CUT OFF	Use this function to assign the switch point for low flow cutoff. **Options:** OFF MASS FLOW VOLUME FLOW CORRECTED VOLUME FLOW **Factory setting:** MASS FLOW
ON-VALUE LOW FLOW CUT OFF	Use this function to enter the switch-on point for low flow cutoff. Low flow cutoff is active if the value entered is not equal to 0. The sign of the flow value is highlighted on the display to indicate that low flow cutoff is active. **User input:** 5-digit floating-point number **Factory setting:** 0 [kg/h] or 0 [m^3/h] ✎ Note! The appropriate unit is taken from the SYSTEM UNITS function group (see Page 8).
OFF-VALUE LOW FLOW CUT OFF	Use this function to enter the switch-off point for low flow cutoff. Enter the switch-off point as a positive hysteresis from the switch-on point. **User input:** Integer 0 to 100% **Factory setting:** 50% Example:  A0001245 Q = Flow [volume/time] t = Time a = ON-VALUE LOW FLOW CUT OFF, e.g. 200 g/h b = OFF-VALUE LOW FLOW CUT OFF, e.g. 10% c = Low flow cutoff active 1 = Low flow cutoff is switched on, here e.g. at 200 g/h 2 = Low flow cutoff is switched off, here e.g. at 220 g/h H = Hysteresis

Function description PROCESS PARAMETER	
EMPTY PIPE DETECTION (EPD)	Use this function to activate the empty pipe detection (EPD). With empty measuring tubes, the measured density of the fluid falls below the value specified in the EPD VALUE LOW function. **Options:** OFF ON **Factory setting:** Liquid: ON Gas: OFF Caution! ■ Select a correspondingly low value for the EPD VALUE LOW 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 due to the low gas densities.
EPD VALUE LOW	Note! This function is not available unless the ON option was selected in the EPD function. Use this function to specify a lower threshold value (limit value) for the measured density as problems can occur in the process if the density is too low. **User input:** 5-digit floating-point number **Factory setting:** 0.2000 g/cc
EPD VALUE HIGH	Note! This function is not available unless the ON option was selected in the EPD function. Use this function to specify an upper threshold value (limit value) for the measured density. **User input:** 5-digit floating-point number **Factory setting:** 6.0000 g/cc
EPD RESPONSE TIME	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 60.0 s **Factory setting:** 1.0 s
FIXED REFERENCE DENSITY	Use this function to enter a fixed value for the reference density with which the corrected volume flow or corrected volume is calculated. **User input:** 5-digit floating-point number **Factory setting:** 1 kg/Nl

Function description PROCESS PARAMETER	
ZERO POINT ADJUSTMENT	Use this function to automatically start zero point adjustment. The new zero point determined by the measuring system is adopted by the ZERO POINT function (see Page 33). **Options:** CANCEL START **Factory setting:** CANCEL Caution! Before carrying this out, please refer to the Operating Instructions Proline Promass 80 PROFIBUS PA, BA 072D/06/en for a detailed description of the procedure for zero point adjustment. Note! ■ Programming is disabled during zero point adjustment. The message “ZERO ADJUST RUNNING” appears on the display. ■ If the zero point adjustment is not possible (e.g. if v > 0.1 m/s) or has been canceled, the alarm message “ZERO ADJUST NOT POSSIBLE” appears on the display. ■ On completion of the zero point adjustment, the new zero point can be displayed with the key. If the key is pressed a second time, you return to the ZERO POINT ADJUSTMENT function.
DENSITY SETPOINT	Use this function to enter the density setpoint value of the fluid for which you want to carry out field density adjustment. **User input:** 5-digit floating point number, incl. unit, (corresponds to 0.1 to 5.9999 kg/l) Note! ■ The target density value entered here should not vary from the current fluid density by more than ±10%. ■ The appropriate unit is taken from the SYSTEM UNITS function group (see Page 8).
MEASURE FLUID	Use this function to measure the current density of the fluid for density adjustment. **Options:** CANCEL START

Function description PROCESS PARAMETER	
DENSITY ADJUSTMENT	Use this function to carry out density adjustment on site. The density adjustment values will thus be recalculated and then stored in the measuring system. This ensures that the values dependent on density calculations (e.g. volume flow) are as accurate as possible. ☞ Caution! Before carrying this out, please refer to the Operating Instructions Proline Promass 80 PROFIBUS PA, BA 072D/06/en for a detailed description of the procedure for density adjustment. ✎ Note! Density adjustment can be carried out if: ■ The sensor does not exactly measure the density which the operator expects based on laboratory trials. ■ The characteristics of the fluid are outside the measuring points set at the factory or reference conditions under which the flowmeter has been calibrated. ■ The system is used solely for measuring a fluid whose density is to be determined very accurately under constant conditions. **Options:** CANCEL DENSITY ADJUSTMENT **Factory setting:** CANCEL
RESTORE ORIGINAL	With this function the original density coefficients determined at the factory are restored. **Options:** NO YES **Factory setting:** NO
PRESSURE MODE	Use this function to configure 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 Operating Instructions Proline Promass 80 PROFIBUS PA, BA 072D/06/en, "Performance characteristics" section). **Options:** OFF FIX (the process pressure can be specified in the PRESSURE function). **Factory setting:** OFF

Function description PROCESS PARAMETER	
PRESSURE	✎ Note! This function is not available unless the FIX option was selected in the PRESSURE MODE 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 UNIT PRESSURE function (see Page 12).

10 Group SYSTEM PARAMETER

Function description SYSTEM PARAMETER	
INSTALLATION DIRECTION SENSOR	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
MEASURING MODE	Select how flow components should be recorded by the measuring device. **Options:** UNIDIRECTIONAL (only the positive flow components) BIDIRECTIONAL (the positive and negative flow components) **Factory setting:** UNIDIRECTIONAL
POSITIVE ZERO RETURN	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
DENSITY DAMPING	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. **User input:** Max. 5-digit number, including unit: 0.00 to 100.00 s **Factory setting:** Liquid: 0.00 s Gas: 0.25 s ✎ Note! The damping acts on all functions and outputs of the measuring device.
FLOW DAMPING	Setting for the filter depth of the digital filter configured. This reduces the sensitivity of the measuring signal to interference peaks (e.g. in the event of high solids content, gas bubbles in the fluid, etc.). The reaction time of the measuring system increases with every increase in the filter setting. **User input:** 0 to 100 s **Factory setting:** 0 s ✎ Note! The damping acts on all functions and outputs of the measuring device.

11 Group SENSOR DATA

Function description SENSOR DATA	
All sensor data (calibration factor, zero point, nominal diameter etc.) 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.	
CALIBRATION DATE	Use this function to view the current calibration date and time for the sensor. **User interface:** Calibration date and time **Factory setting:** Calibration date and time of the current calibration. Note! The calibration date and time format is defined in the FORMAT DATE TIME function, on Page 12.
K-FACTOR	Use this function to display the current calibration factor for the sensor. **Factory setting:** Depends on nominal diameter and calibration. Note! If the function is called via the service code, this value can be edited.
ZERO POINT	Use this function to display 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	This function shows the nominal diameter for the sensor. **Factory setting:** Depends on the size of the sensor Note! If the function is called via the service code, this value can be edited.
TEMPERATURE COEFFICIENT KM	Use this function to display the temperature coefficient KM.
TEMPERATURE COEFFICIENT KM 2	Use this function to display the temperature coefficient KM 2.
TEMPERATURE COEFFICIENT KT	Use this function to display the temperature coefficient KT.
CALIBRATION COEFFICIENT KD 1	Use this function to display the calibration coefficient KD 1.
CALIBRATION COEFFICIENT KD 2	Use this function to display the calibration coefficient KD 2.

Function description SENSOR DATA	
DENSITY COEFFICIENT C0	Use this function to display the current density coefficient C 0. Caution! A field density adjustment can alter the value of the density coefficient.
DENSITY COEFFICIENT C1	Use this function to display the current density coefficient C 1. Caution! A field density adjustment can alter the value of the density coefficient.
DENSITY COEFFICIENT C2	Use this function to display the current density coefficient C 2. Caution! A field density adjustment can alter the value of the density coefficient.
DENSITY COEFFICIENT C3	Use this function to display the current density coefficient C 3. Caution! A field density adjustment can alter the value of the density coefficient.
DENSITY COEFFICIENT C4	Use this function to display the current density coefficient C 4. Caution! A field density adjustment can alter the value of the density coefficient.
DENSITY COEFFICIENT C5	Use this function to display the current density coefficient C 5. Caution! A field density adjustment can alter the value of the density coefficient.
MINIMUM FLUID TEMPERATURE	Use this function to display the lowest fluid temperature measured.
MAXIMUM FLUID TEMPERATURE	Use this function to display the highest fluid temperature measured.
MINIMUM CARRIER TUBE TEMPERATURE	Use this function to display the lowest carrier tube temperature measured.
MAXIMUM CARRIER TUBE TEMPERATURE	Use this function to display the highest carrier tube temperature measured.

12 Group SUPERVISION

Function description SUPERVISION	
ACTUAL SYSTEM CONDITION	Use this function to display the current system condition. **Display:** "SYSTEM OK" or the fault / notice message with the highest priority.
PREVIOUS SYSTEM CONDITIONS	Use this function to view the fifteen most recent fault and notice messages since measuring last started. **Display:** The 15 most recent fault or notice messages.
ALARM DELAY	Use this function to enter 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 fault, this suppression acts on: ■ Display ■ PROFIBUS PA **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.
SYSTEM RESET	Use this function to reset the measuring system. **Options:** NO RESTART SYSTEM (restart without interrupting power supply) **Factory setting:** NO
OPERATION HOURS	The hours of operation of the device appear on the display. **Display:** Depends on the number of hours of operation elapsed: Hours of operation < 10 hours → display format = 0:00:00 (hr:min:sec) Hours of operation 10 to 10,000 hours → display format = 0000:00 (hr:min) Hours of operation > 10,000 hours → display format = 000000 (hr)
STORAGE	Displays whether permanent storage of all the parameters in the EEPROM is switched on or off. **Display:** OFF ON **Factory setting:** ON

13 Group SIMULATION SYSTEM

Function description SIMULATION SYSTEM	
SIMULATION FAILSAFE MODE	Use this function to set all inputs, outputs and the totalizer to their defined error-response modes, in order to check whether they respond correctly. During this time, the message "SIMULATION FAILSAFE MODE" appears on the display. **Options:** OFF ON **Factory setting:** OFF
SIMULATION MEASURAND	Use this function to set all inputs, outputs and the totalizer to their defined flow-response modes, in order to check whether they respond correctly. During this time, the message "SIMULATION MEASURAND" appears on the display. **Options:** OFF MASS FLOW VOLUME FLOW 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 in the event of a power failure.
VALUE SIMULATION MEASURAND	Note! This function is not available unless the SIMULATION MEASURAND function is active. Use this function to specify a selectable value (e.g. 12 kg/s). This value is used to test downstream devices and the measuring device itself. **User input:** 5-digit floating-point number **Factory setting:** 0 kg/h (MASS FLOW) 0 m^3/h (VOLUME FLOW) 0 Nm^3/h(CORRECTED VOLUME FLOW) 0 kg/l(DENSITY) 0 kg/NI(REFERENCE DENSITY) 0 °C(TEMPERATURE) Caution! The setting is not saved in the event of a power failure.

14 Group SENSOR VERSION

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

15 Group AMPLIFIER VERSION

Function description AMPLIFIER VERSION	
SOFTWARE REVISION NUMBER AMPLIFIER	Use this function to view the software revision number of the amplifier.
LANGUAGE GROUP	Use this function to view the language group. 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 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.
I/O MODULE TYPE	Use this function to display the I/O module type.
SOFTWARE REVISION NUMBER I/O MODULE	Use this function to view the software revision number of the I/O module.

16 Factory settings

16.1 SI units (not for USA and Canada)

16.1.1 Low flow cutoff, full scale 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						

16.1.2 Low flow cutoff, full scale 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						

16.1.3 Language

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

16.1.4 Density, length, temperature

	Unit
Density	kg/l
Length	mm
Temperature	° C

16.2 US units (only for USA and Canada)

16.2.1 Low flow, full scale 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						

16.2.2 Low flow, full scale 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						

16.2.3 Language, density, length, temperature

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

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