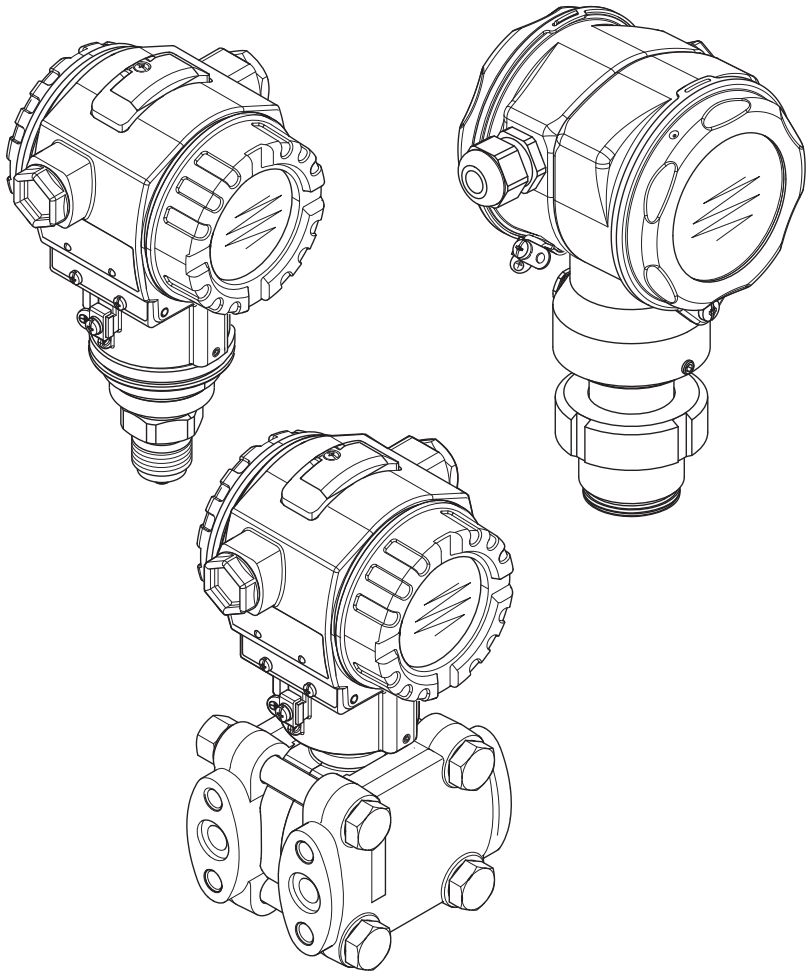
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Operating Instructions – Description of Instrument Functions

Cerabar S PMC71, PMP71/75
Deltabar S FMD77, FMD78, PMD75
Deltapilot S FMB70

Process pressure / Differential pressure, Flow / Hydrostatic

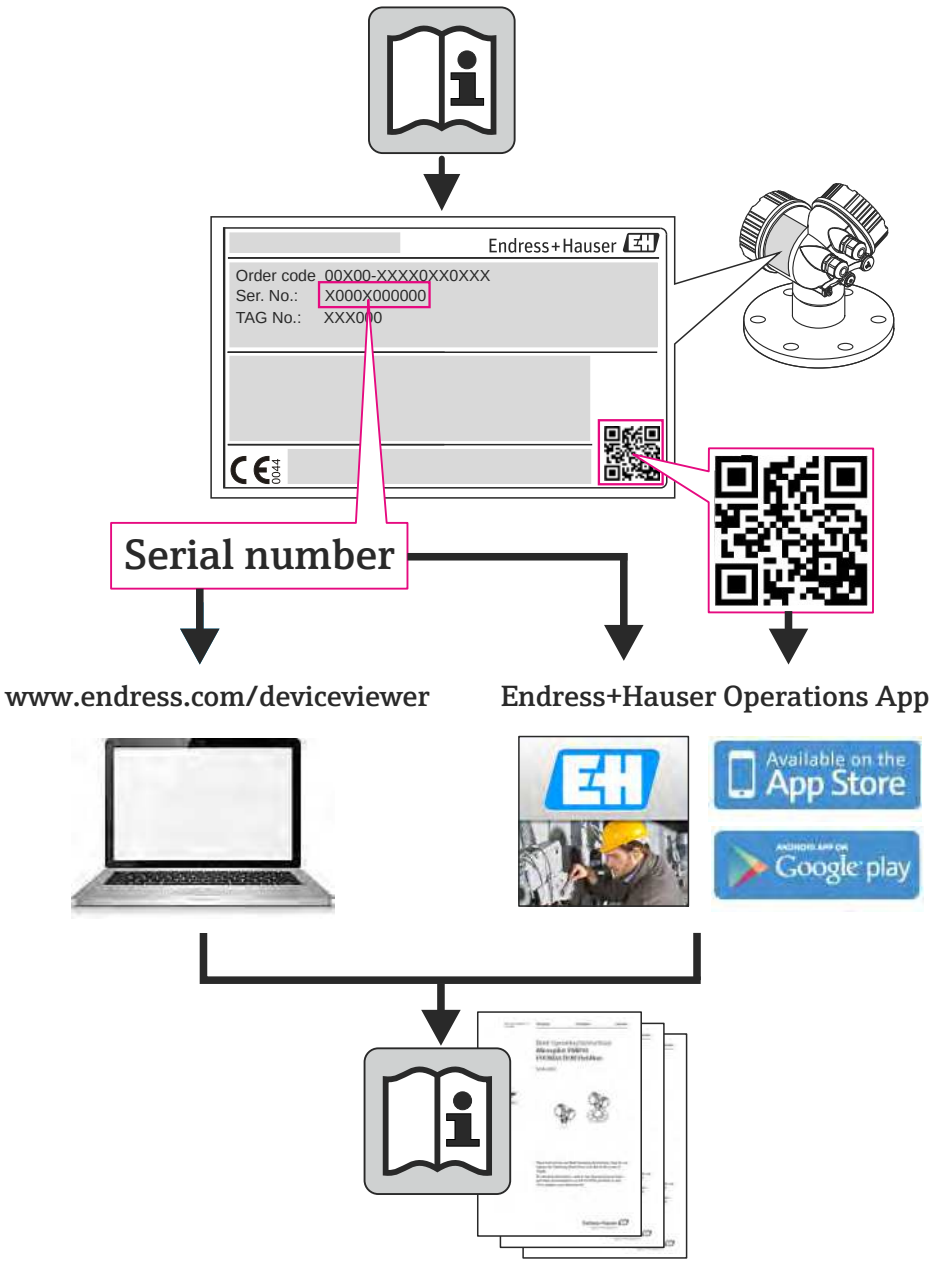
HART COMMUNICATION PROTOCOL



BA00274P/00/EN/17.14
71270402

valid from Software version:
02.20.zz

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1 Notes on use

Section 7 describes all the parameters in order of how they appear in the menu. Sections 4 to 6 provide typical examples of configuration.

Sections 1.1 to 1.3 describe ways of finding a certain parameter description more easily.

1.1 Finding parameter description using ID numbers

Each parameter is shown on the on-site display with a unique identification number (ID). Section 2 lists all the parameters in numerical order. The page reference/link takes you to the parameter in question.
In the Operating program, additional parameters and, to an extent, other parameters are displayed. These parameters are not listed in Section 2. You can find these parameters by means of the index.
→ See also Section 1.3.

1.2 Finding function group using graphic representation

All the function groups are shown in table form in Section 3. The page reference/link takes you to the function group in question. In Section 7, all the parameters of a function group are compiled in a table.

1.3 Finding parameter description using parameter names (index)

The index lists all the parameters in alphabetical order. The page reference/link takes you to the parameter in question.

2 Finding parameter description using ID numbers

ID number	Parameter name	Description, see page
001	DENSITY UNIT – Level Selection "Level Easy Pressure"	64 or 97
003	HEIGHT UNIT	64
004	FULL CALIB. – QUICK SETUP	51
004	FULL CALIB. – Level Selection "Level Easy Pressure"	61
004	FULL CALIB. – Level Selection "Level Easy Height"	65
005	FULL PRESSURE	61
006	FULL HEIGHT	66
007	ADJUST DENSITY – Level Selection "Level Easy Height"	64 or 97
008	CALIBRATION MODE – Level Selection "Level Easy Pressure"	60
008	CALIBRATION MODE – Level Selection "Level Easy Height"	64
009	EMPTY HEIGHT	65
010	EMPTY CALIB. – QUICK SETUP	50
010	EMPTY CALIB. – Level Selection "Level Easy Pressure"	60 or 61
010	EMPTY CALIB. – Level Selection "Level Easy Height"	65
011	EMPTY PRESSURE	61
012	SET URV – Level Selection "Level Easy Pressure"	61
012	SET URV – Level Selection "Level Easy Height"	66
013	SET LRV – Level Selection "Level Easy Pressure"	61
013	SET LRV – Level Selection "Level Easy Height"	66
014	DOWNLOAD SELECT	126
015	FULL PRESSURE	See [1)]
016	EMPTY PRESSURE	See [1]
017	FULL CALIB.	See [1]
018	EMPTY CALIB.	See [1]
020	LEVEL SELECTION	46
021	SET LRV	See [1]
022	SET URV	See [1]
023	OUTPUT UNIT – Level Selection "Level Easy Pressure"	60
023	OUTPUT UNIT – Level Selection "Level Easy Height"	64
025	PROCESS DENSITY – Level Selection "Level Easy Pressure"	97
036	PREAMBLE NUMBER	115
042	CURR. TRIM 20mA	131
043	OFFSET 4mA TRIM	131
044	OFFSET 20mA TRIM	131
045	CURR. TRIM 4mA	131
046	ALARM STATUS	128
047	ENTER RESET CODE	126
048	INSERT PIN No	126
050	LEVEL BEFORE LIN	123
055	CUST. TAG NUMBER	117
060	PRESS. ENG. UNIT	56, 59, 63, 67 or 92
075	CUSTOMER UNIT P	56, 59, 63, 68 or 92
079	LANGUAGE	44
245	SET LRV – "Pressure" measuring mode	48 or 56
246	SET URV – "Pressure" measuring mode	48 or 57
247	DAMPING VALUE	48, 51, 53, 57, 61, 66, 77, 81, 90 or 95
250	SENSOR SER. No.	119
251	Pmin SENS. DAMAGE	120
252	Pmax SENS. DAMAGE	120
254	OUTPUT CURRENT	111
264	SOFTWARE VERSION	117
266	HARDWARE REV.	117
270	SIM. CURRENT	128
271	HART MESSAGE	116
272	ADDITIONAL INFO.	117
301	PRESSURE – "Pressure" measuring mode	122
	PRESSURE – "Level" measuring mode	122
	PRESSURE – "Flow" measuring mode	123
305	LONG TAG NUMBER	117

1) See Safety Manual SD00189P for Deltabar S, SD00190P for Cerabar S and SD00213P for Deltapilot S.

ID number	Parameter name	Description, see page
309	GET LRV	57
310	GET URV	57
311	MAX. FLOW	52 or 95
313	UNIT VOLUME – "Linear" level type	71 or 75
	UNIT VOLUME – "Pressure Linearized" level type	79
	UNIT VOLUME – "Height Linearized" level type	84
314	EMPTY CALIB. – QUICK SETUP	50
	EMPTY CALIB. – "Linear" level type	73
	EMPTY CALIB. – "Height Linearized" level type	87
315	FULL CALIB. – QUICK SETUP	51
	FULL CALIB. – "Pressure Linearized" level type	74
	FULL CALIB. – "Height Linearized" level type	87
316	ADJUST DENSITY – "Linear" level type	74
	ADJUST DENSITY – "Height Linearized" level type	88
	ADJUST DENSITY– "Level" extended setup	97
317	CUST. UNIT FACT. P	56, 68 or 93
318	TEMP. ENG. UNIT – "Pressure" measuring mode	96
	TEMP. ENG. UNIT – "Level" measuring mode	97
	TEMP. ENG. UNIT – "Flow" measuring mode	99
319	CALIB. OFFSET	54
323	SET. L. FL. CUT-OFF	99
329	FACT. U. U. TOTAL. 1	108
330	FACT. U. U. TOTAL. 2	109
331	RESET TOTALIZER1	109
332	Pmin ALARM WINDOW	130
333	Pmax ALARM WINDOW	130
334	Tmin ALARM WINDOW	130
335	Tmax ALARM WINDOW	130
336	ALARM DELAY	129
339	DISPLAY CONTRAST	111
342	SET MAX. ALARM	113
343	SET MIN. CURRENT	113
345	BUS ADDRESS	115
350	DEVICE DESIGN.	117
351	DEVICE TYPE, Deltabar S	115
352	CONFIG RECORDER	117
354	DEVICE SERIAL No	117
357	PCB TEMPERATURE	117
358	ALLOWED MIN. TEMP	117
359	ALLOWED MAX. TEMP	117
360	MAT. PROC. CONN. +	118
361	MAT. PROC. CONN. -	118
362	SEAL TYPE	118
363	DIP STATUS	117
365	MAT. MEMBRANE	120
366	FILLING FLUID	120
367	SENSOR TEMP.	122 or 123
368	Tmin SENSOR	120
369	Tmax SENSOR	120
370	TANK CONTENT	123
375	SUPPRESSED FLOW	123
378	MEAS. VAL. TREND	122 or 123
380	COUNTER:P > Pmax	124
382	RESET PEAKHOLD	125
383	MAX. MEAS. PRESS.	124
386	ELECTR. SERIAL No	117
388	OUTPUT FAIL MODE	112
389	MEASURING MODE	45
390	LINEAR/SQROOT	113
391	UNIT FLOW	93
392	CALIBRATION MODE – "Linear" level type	73
	CALIBRATION MODE – "Height Linearized" level type	87
397	LIN. EDIT MODE	101
398	TOTALIZER 1 UNIT – "Volume p. cond." flow type	108
399	TOTALIZER 2 UNIT – "Volume p. cond." flow type	109
400	NEG. FLOW TOT. 1	108
401	ACK. ALARM MODE	128

ID number	Parameter name	Description, see page
404	COUNTER:T > Tmax	124
409	OPERATING HOURS	126
413	SIMULATION MODE	127
414	SIM. PRESSURE	127
416	NEG. FLOW TOT. 2	109
419	MENU DESCRIPTOR	110
423	ALTERNATE DATA	110
432	MANUFACTOR ID	116
434	CORRECTED PRESS. – "Pressure" measuring mode	122
	CORRECTED PRESS. – "Level" measuring mode	122
	CORRECTED PRESS. – "Flow" measuring mode	123
442	LOW FLOW CUT-OFF	99
467	COUNTER:P < Pmin	124
469	MIN. MEAS. PRESS.	124
471	MAX. MEAS. TEMP.	124
472	COUNTER:T < Tmin	124
474	MIN. MEAS. TEMP.	124
476	SIM. ERROR NO.	128
480	ALARM DISPL. TIME	129
481	HART DATE	116
482	PROC. CONN. TYPE	118
484	PRESS. SENS LOLIM	119
485	PRESS. SENS HILIM	119
487	SENS H/WARE REV	120
488	PCB COUNT:T > Tmax	124
490	PCB MAX. TEMP.	124
492	PCB COUNT:T < Tmin	124
494	PCB MIN. TEMP.	124
500	ACK. ALARM	129
052	CURRENT MODE	115
549	MEASURING TABLE (display)	103
549	EDITOR TABLE, LINE-NUMB (enter values)	102
550	EDITOR TABLE, X-VAL. (enter values)	102
551	EDITOR TABLE, Y-VAL. (enter values)	102, 102
563	POS. INPUT VALUE	48, 50 or 54
564	LAST DIAG. CODE	128
570	Pmax PROC. CONN.	117
571	MASS FLOW UNIT	94
581	SENSOR MEAS.TYPE	120
584	SENSOR PRESSURE – "Pressure" measuring mode	122
	SENSOR PRESSURE – "Level" measuring mode	122
	SENSOR PRESSURE – "Flow" measuring mode	123
585	HART VERSION	114
591	MINIMUM SPAN	119
595	SELECT ALARMTYPE	129
597	ALT. CURR. OUTPUT	113
600	SELECT ALARMTYPE	129
603	RESET ALL ALARMS	129
607	CUST. UNIT FACT. V – "Linear" level type	72
	CUST. UNIT FACT. V – "Pressure Linearized" level type	79
	CUST. UNIT FACT. V – "Height Linearized" level type	85
608	CUSTOMER UNIT V – "Linear" level type	71
	CUSTOMER UNIT V – "Pressure Linearized" level type	79
	CUSTOMER UNIT V – "Height Linearized" level type	85
609	CUST. UNIT FACT. F	95
610	CUSTOMER UNIT F	94
627	TOT. 1 USER UNIT	108
628	TOT. 2 USER UNIT	109
634	MAX PRESS. FLOW	53 or 95
637	SET LRV – "Flow" extended setup	99
638	SET URV – "Flow" extended setup	100
639	SIM.FLOW VALUE	127
640	FLOW-MEAS. TYPE	93
652	TOTALIZER 1	124
655	TOTAL. 1 OVERFLOW	124
657	TOTALIZER 2	124
658	TOTAL. 2 OVERFLOW	124
660	STD. FLOW UNIT	94

661	NORM FLOW UNIT	93

ID number	**Parameter name**	**Description, see page**
662	TOTALIZER 1 UNIT – "Mass" flow type	108
663	TOTALIZER 2 UNIT – "Mass" flow type	109
664	TOTALIZER 1 UNIT – "Gas. std. conditions" flow type	108
665	TOTALIZER 2 UNIT – "Gas. std. conditions" flow type	109
666	TOTALIZER 1 UNIT – "Gas. norm conditions" flow type	108
667	TOTALIZER 2 UNIT – "Gas. norm conditions" flow type	109
679	MEASURED VALUE – "Pressure"	121
	MEASURED VALUE – "Level"	122
	MEASURED VALUE – "Flow"	123
685	POS. ZERO ADJUST	48, 50, 52 or 54
688	MAIN DATA FORMAT	110
694	CURR. CHARACT. – "Pressure"	112
695	CURR. CHARACT. – "Flow"	112
696	CURR. CHARACT. – "Height"	112
699	DEVICE REVISION	115
703	CUST. UNIT FACT. M – "Linear" level type	73
	CUST. UNIT FACT. M – "Pressure Linearized" level type	80
	CUST. UNIT FACT. M – "Height Linearized" level type	86
704	CUSTOMER UNIT M – "Linear" level type	72
	CUSTOMER UNIT M – "Pressure Linearized" level type	80
	CUSTOMER UNIT M – "Height Linearized" level type	86
705	CUST. UNIT FACT. H – "Linear" level type	71 or 76
	CUST. UNIT FACT. H – "Height Linearized" level type	84 or 89
706	CUSTOMER UNIT H – "Linear" level type	70 or 76
	CUSTOMER UNIT H – "Height Linearized" level type	84 or 89
708	HEIGHT UNIT – "Linear" level type	70 or 76
	HEIGHT UNIT – "Height Linearized" level type	83 or 88
709	MASS UNIT – "Linear" level type	72
	MASS UNIT – "Pressure Linearized" level type	80
	MASS UNIT – "Height Linearized" level type	85
710	EMPTY PRESSURE – "Linear" level type	74
	EMPTY PRESSURE – "Height Linearized" level type	87
711	FULL PRESSURE – "Linear" level type	74
	FULL PRESSURE – "Height Linearized" level type	87
712	LEVEL MAX	86
713	TANK CONTENT MAX	101
714	SIM. LEVEL	127
715	SIM. TANK CONT.	128
717	MEASURING TABLE (selection)	103
718	LEVEL MODE	68
719	SET LRV – "Level" basic setup	77
720	SET URV – "Level" basic setup	77
755	LEVEL MIN	86
759	TANK CONTENT MIN	101
760	ASSIGN CURRENT	113
761	HYDR. PRESS MAX.	81
762	SET LRV – "Level" extended setup	98
763	SET URV – "Level" extended setup	98
764	CURR. CHARACT. – "Tank content"	112
770	EDITOR TABLE (continue entry)	103
775	HYDR. PRESS MIN.	80
802	DEVICE TYPE, Cerabar S	115
804	LIN. MEASURAND	70
805	LINd. MEASURAND	79
806	COMB. MEASURAND	83
808	TABLE SELECTION	101
809	EDITOR TABLE (select table)	102
810	ADJUSTED DENSITY – "Linear" level type	74
	ADJUSTED DENSITY – "Height Linearized" level type	87
811	PROCESS DENSITY	97
812	DENSITY UNIT – "Linear" level type	74
	DENSITY UNIT – "Height Linearized" level type	88
813	100 % POINT – "Linear" level type	77
	100 % POINT – "Height Linearized" level type	89

ID number	Parameter name	Description, see page
814	ZERO POSITION – "Linear" level type ZERO POSITION – "Height Linearized" level type	77 90
815	TANK DESCRIPTION	103
831	HistoROM AVAIL.	126
832	HistoROM CONTROL	127
836	SAFETY LOCKSTATE SAFETY LOCK	See [1)]
838	SAFETY PASSWORD	See [1]
840	DIGIT SETS	111
841	DIGIT SETS	See [1]
844	ACK. ALARM MODE	See [1]
845	MEASURING MODE	See [1]
847	CALIB. OFFSET	See [1]
848	MAX. FLOW	See [1]
849	MAX PRESS. FLOW	See [1]
850	LOW FLOW CUT-OFF	See [1]
851	SET. L. FL. CUT-OFF	See [1]
852	SET LRV	See [1]
853	SET URV	See [1]
854	LINEAR/SQROOT.	See [1]
855	DAMPING VALUE	See [1]
856	CONF. PASSWORD	See [1]
858	TANK VOLUME	75
859	TANK HEIGHT	76
875	CURRENT OUTPUT	See [1]

1) See Safety Manual SD00189P for Deltabar S, SD00190P for Cerabar S and SD00213P for Deltapilot S.

3 Graphic representation of function groups

Note!
The "Flow" measuring mode is only available for the Deltabar S differential pressure transmitter. The groups marked with "*" are only displayed for Deltabar S.

1st selection level	2nd selection level (groups)	Function groups	Description, see page
LANGUAGE	LANGUAGE (079)		→ 44
MEASURING MODE	MEASURING MODE (389)		→ 45
QUICK SETUP pressure			→ 47
QUICK SETUP level			→ 49
QUICK SETUP flow*			→ 52
OPERATING MENU (555)	→ SETTINGS (557)	→ POSITION ADJUSTMENT	→ 53
		→ BASIC SETUP pressure	→ 55
		→ BASIC SETUP level, "Level Easy Pressure"	→ 58
		→ BASIC SETUP level, "Level Easy Height"	→ 62
		→ BASIC SETUP level, "Level Easy Standard"	→ 67
		→ BASIC SETUP flow*	→ 91
		→ EXTENDED SETUP pressure	→ 96
		→ EXTENDED SETUP level	→ 96
		→ EXTENDED SETUP flow*	→ 98
		→ LINEARISATION – on-site display	→ 100
		→ LINEARISATION – Digital communication	→ 104
		→ TOTALIZER SETUP *	→ 107
	→ SAFETY CONFIRM.		→ See [1]
	→ DISPLAY (558)		→ 110
	→ OUTPUT (559)		→ 111
	→ TRANSMITTER INFO (560)	→ HART DATA	→ 114
		→ TRANSMITTER DATA	→ 117
		→ PROCESS CONNECTION	→ 117
		→ SENSOR DATA	→ 119
	→ PROCESSINFO (561)	→ PROCESS VALUES pressure	→ 121
		→ PROCESS VALUES level	→ 122
		→ PROCESS VALUES flow*	→ 123
		→ PEAK HOLD INDICATOR	→ 124
	→ OPERATING		→ 126
	→ DIAGNOSTICS (562)	→ SIMULATION	→ 127
		→ MESSAGES	→ 128
		→ USER LIMITS	→ 130
	→ SERVICE (561)	→ SYSTEM 2	→ 131

1) See Safety Manual SD00189P for Deltabar S, SD00190P for Cerabar S and for SD00213P Deltapilot S.

4 Pressure measurement

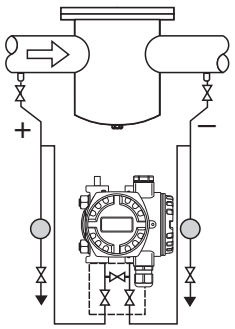
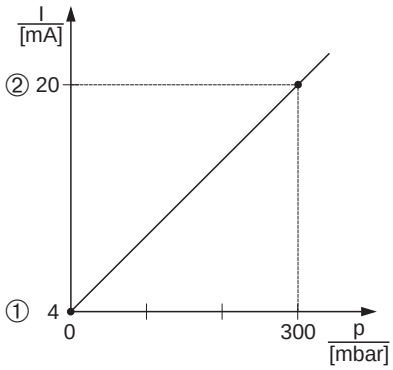
4.1 Calibration with reference pressure

Example:
In this example, a device with a 500 mbar (7.5 psi) sensor is configured for the 0...+300 mbar (4.5 psi)measuring range, i.e. 0 mbar and 300 mbar (4.5 psi) are assigned to the 4 mA value and 20 mA value respectively.

Prerequisite:
- The pressure values 0 mbar and 300 mbar (4.5 psi) can be specified. The device is already installed, for example.

Note!
- See also Operating Instructions Deltabar S (BA00270P), Section 6.6 "Differential pressure measurement", Cerabar S (BA00271P), Section 6.4 "Pressure measurement" or Deltapilot S (BA00332P), Section 6.5 "Pressure measurement".
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 55, Table 7: BASIC SETUP.
- For a description of further relevant parameters, see
  – Page 96, Table 15: EXTENDED SETUP
  – Page 121, Table 25: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description	
1	Deltabar S: before configuring the device for your application, the pressure piping must be cleaned and filled with fluid. See Operating Instructions BA00270P, Section 6.6.	 P01-PMD75xxx-19-xx-xx-xx-000
2	Carry out position adjustment if necessary. See Page 53, Table 6: POSITION ADJUSTMENT.	
3	If necessary, select the "Pressure" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE	
4	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP	 P01-xxxxxxxx-05-xx-xx-xx-010 *Fig. 1: Calibration with reference pressure* *1 See table, step 6.* *2 See table, step 7.*
5	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.	
6	The pressure for the lower range value (4 mA value) is present at the device, here 0 mbar for example.	
	Select GET LRV parameter.	
	Confirm value present. The pressure value present is assigned to the lower current value (4 mA).	
7	The pressure for the upper range value (20 mA value) is present at the device, here 300 mbar (4.5 psi) for example.	
	Select GET URV parameter.	
	Confirm value present. The pressure value present is assigned to the upper current value (20 mA).	
8	Result: The measuring range is set for 0...+300 mbar (4.5 psi).	

Note!
- You can also specify a customer-specific unit. See parameter description for PRESS. ENG. UNIT (→ Page 56).

4.2 Calibration without reference pressure

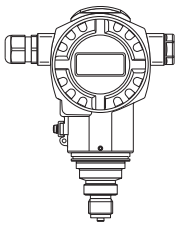
Example:
In this example, a device with a 400 mbar (6 psi) sensor is configured for the 0...+300 mbar (4.5 psi) measuring range, i.e. 0 mbar and 300 mbar (4.5 psi) are assigned to the 4 mA value and 20 mA value respectively.

Prerequisite:
- This is a theoretical calibration, i.e. the pressure values for the lower range and upper range value are known.

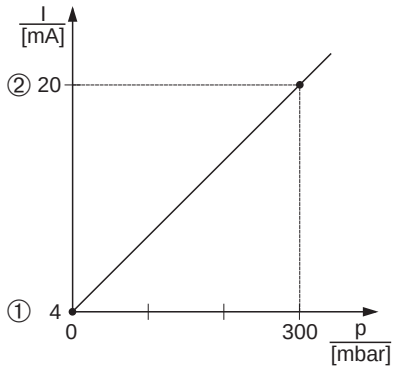
Note!
- See also Operating Instructions Deltabar S (BA00270P), Section 6.6 "Differential pressure measurement", Cerabar S (BA00271P), Section 6.4 "Pressure measurement" or Deltapilot S (BA00332P), Section 6.5 "Pressure measurement".
- Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero. → To perform a position adjustment see also Page 53, Table 6: Position adjustment.
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 55, Table 7: BASIC SETUP.
- For a description of further relevant parameters, see
  – Page 96, Table 15: EXTENDED SETUP
  – Page 121, Table 27: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	If necessary, select the "Pressure" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE
2	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP
3	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
4	Select SET LRV parameter.
	Enter value, here 0 mbar, for the SET LRV parameter and confirm. This pressure value is assigned to the lower current value (4 mA).
5	Select SET URV parameter.
	Enter value, here 300 mbar (4.5 psi), for the SET URV parameter and confirm. This pressure value is assigned to the upper current value (20 mA).
6	Result: The measuring range is set for 0...+300 mbar (4.5 psi).



P01-PMP71xxx-19-xx-xx-xx-000



P01-xxxxxxxx-05-xx-xx-xx-010

Fig. 2: Calibration without reference pressure

1 See table, step 4.
2 See table, step 5.

Note!
- You can also perform calibration without reference pressure by means of the QUICK SETUP menu. → See Page 47 ff, Table 3: QUICK SETUP menu.
- You can also specify a customer-specific unit. See parameter description for PRESS. ENG. UNIT (→ Page 56).

5 Level measurement

5.1 Overview of level measurement

Measuring task	LEVEL SELECTION/ LEVEL MODE	Measured variable options	Description	Comment	Measured value display
The measured variable is in direct proportion to the measured pressure. Calibration is performed by entering two pressure-level value pairs.	LEVEL SELECTION: Level Easy Pressure	Via OUTPUT UNIT parameter: %, level, volume or mass units.	– Calibration with reference pressure – wet calibration, see Page 15, Section 5.2.1 – Calibration without reference pressure – dry calibration, see Page 17, Section 5.2.2	– Incorrect entries are possible – SIL mode possible – Customised units are not possible	The measured value display and the LEVEL BEFORE LIN parameter show the measured value.
The measured variable is in direct proportion to the measured pressure. Calibration is performed by entering the density and two height-level value pairs.	LEVEL SELECTION: Level Easy Height	Via OUTPUT UNIT parameter: %, level, volume or mass units.	– Calibration with reference pressure – wet calibration, see Page 19, Section 5.3.1 – Calibration without reference pressure – dry calibration, see Page 22, Section 5.3.2	– Incorrect entries are possible – SIL mode not possible – Customised units are not possible	The measured value display and the LEVEL BEFORE LIN parameter show the measured value.
The measured variable is in direct proportion to the measured pressure.	LEVEL SELECTION: Level standard/ LEVEL MODE: Linear	Via LIN. MEASURAND parameter: – % (Level) – Level – Volume – Mass	– Calibration with reference pressure – wet calibration, see Page 24, Section 5.4.1 – Calibration without reference pressure – dry calibration, see Page 26, Section 5.4.2	– Incorrect entries are rejected by the device – SIL mode not possible – Customised level, volume and mass units are possible	The measured value display and the LEVEL BEFORE LIN parameter show the measured value.
The measured variable is not in direct proportion to the measured pressure as, for example, with containers with a conical outlet. A linearisation table must be entered for the calibration.	LEVEL SELECTION: Level standard/ LEVEL MODE: Pressure Linearized	Via LINd MEASURAND parameter: – Pressure + % – Pressure + Volume – Pressure + Mass	– Calibration with reference pressure: semiautomatic entry of linearisation table, see Page 28, Section 5.5.1 – Calibration without reference pressure: manual entry of linearisation table, see Page 31, Section 5.5.2	– Incorrect entries are rejected by the device – SIL mode not possible – Customised level, volume and mass units are possible	The measured value display and the TANK CONTENT parameter show the measured value.
– Two measured variables are required or – The container shape is given by value pairs, such as height and volume. The 1st measured variable %-height or height must be in direct proportion to the measured pressure. The 2nd measured variable volume, mass or % must not be in direct proportion to the measured pressure. A linearisation table must be entered for the 2nd measured variable. The 2nd measured variable is assigned to the 1st measured variable by means of this table.	LEVEL SELECTION: Level standard/ LEVEL MODE: Height Linearized	Via COMB. MEASURAND parameter: – Height + Volume – Height + Mass – Height + % – %-Height + Volume – %-Height + Mass – %-Height + %	– Calibration with reference pressure: wet calibration and semiautomatic entry of linearisation table, see Page 33, Section 5.6.1 – Calibration without reference pressure: dry calibration and manual entry of linearisation table, see Page 37, Section 5.6.2	– Incorrect entries are rejected by the device – SIL mode not possible – Customised level, volume and mass units are possible	The measured value display and the TANK CONTENT parameter show the 2nd measured value (volume, mass or %). The LEVEL BEFORE LIN parameter displays the 1st measured value (%-height or height).

5.2 "Level Easy Pressure" level selection

5.2.1 Calibration with reference pressure – wet calibration

Example:
In this example, the level in a tank should be measured in m. The maximum level is 3 m (9.8 ft). The pressure range is set to 0 to 300 mbar (4.5 psi).

Prerequisite:
- The measured variable is in direct proportion to the pressure.
- The tank can be filled or emptied.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- The values entered for EMPTY CALIB./FULL CALIB. and SET LRV/SET URV must have a minimum interval of 1% for the "Level Easy Pressure" level mode. The value will be rejected with a warning message if the values are too close together. Further limit values are not checked; i.e. the values entered must be appropriate for the sensor and the measuring task so that the measuring device can measure correctly.
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 58, Table 8: LEVEL SELECTION "Level Easy Pressure"
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	Deltabar S: Before you configure the device for your application, the pressure piping must be cleaned and filled with medium. See Operating Instructions BA00270P, Section 6.5.1
2	Carry out position adjustment if necessary. See Page 53, Table 6: POSITION ADJUSTMENT.
3	If necessary, select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP→ MEASURING MODE
4	If necessary, select "Level Easy Pressure" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION

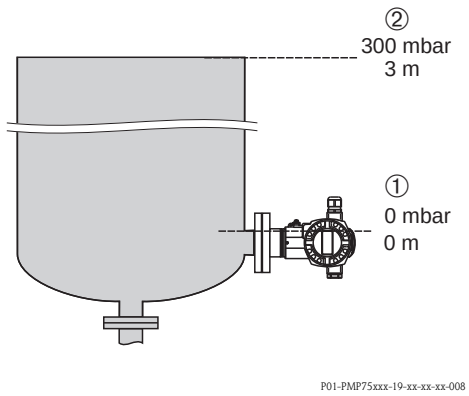
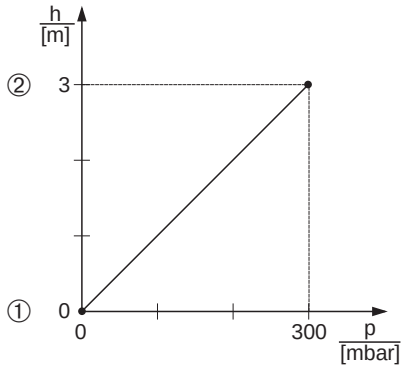


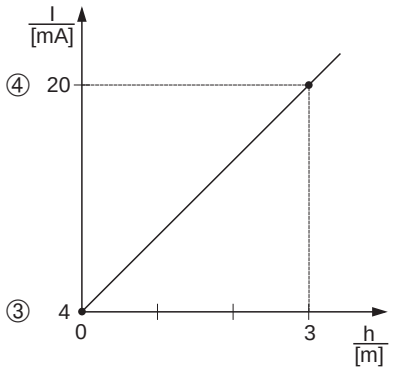
Fig. 3: Calibration with reference pressure – wet calibration

1 See Table, Step 9.
2 See Table, Step 10.

	Description
5	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP
6	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
7	Select a level unit via the OUTPUT UNIT parameter, here m for example.
8	Select the "Wet" option by means of the CALIBRATION MODE parameter.
9	Hydrostatic pressure for the lower calibration point is present at the device, here 0 mbar for example.
	Select EMPTY CALIB. parameter.
	Enter the level value, here 0 m for example. Confirm the value to assign the pressure value present to the lower level value. ✎ Note! To accept the value displayed you must first switch to the Edit mode (see the "Editing values" section) and then press the "E" button to save the value.
10	Hydrostatic pressure for the upper calibration point is present at the device, here 300 mbar (4.5 psi) for example.
	Select FULL CALIB. parameter.
	Enter the level value, here 3 m (9.8 ft) for example. Confirm the value to assign the pressure value present to the upper level value. ✎ Note! To accept the value displayed you must first switch to the Edit mode (see the "Editing values" section) and then press the "E" button to save the value.
11	Set the value for the lower current value (4 mA) by means of the SET LRV parameter.
12	Set the value for the upper current value (20 mA) by means of the SET URV parameter.
13	Result: The measuring range is set for 0 to 3 m (9.8 ft).



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Fig. 4: Calibration with reference pressure – wet calibration

1 See Table, Step 9.
2 See Table, Step 10.
3 See Table, Step 11.
4 See Table, Step 12.

✎ Note!

1. You can also perform calibration with reference pressure by means of the QUICK SETUP menu. → See Page 49 ff, Table 4: QUICK SETUP menu.
2. For this level mode, the measured variables %, level, volume and mass are available. → See also parameter description for OUTPUT UNIT, Page 60.
3. For operation using the on-site display, the parameters EMPTY CALIB. (→ Page 61) and FULL CALIB. (→ Page 61) also show the respective pressure present at the device. For operation using Digital communication, the pressure present at the device is displayed in the PROCESS VALUES group (menu path: OPERATING MENU→ PROCESSINFO → PROCESS VALUES).

5.2.2 Calibration without reference pressure – dry calibration

Example:
In this example, the volume in a tank should be measured in litres.The maximum volume of 1000 litres (264 US gal) corresponds to a pressure of 450 mbar (6.75 psi). The minimum volume of 0 litres corresponds to a pressure of 50 mbar (0.75 psi), as the device is mounted below the level lower range value. The device is mounted below the level lower range value.

Prerequisite:
- The measured variable is in direct proportion to the pressure.
- This is a theoretical calibration i.e. the pressure and volume values for the lower and upper calibration point must be known.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- The values entered for EMPTY CALIB./FULL CALIB. and SET LRV/SET URV must have a minimum interval of 1% for the "Level Easy Pressure" level mode. The value will be rejected with a warning message if the values are too close together. Further limit values are not checked; i.e. the values entered must be appropriate for the sensor and the measuring task so that the measuring device can measure correctly.
- Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero. → To perform a position adjustment see also Page 53, Table 6: Position adjustment.
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 58, Table 8: LEVEL SELECTION "Level Easy Pressure"
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	Select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP→ MEASURING MODE
2	If necessary, select "Level Easy Pressure" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION
3	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP

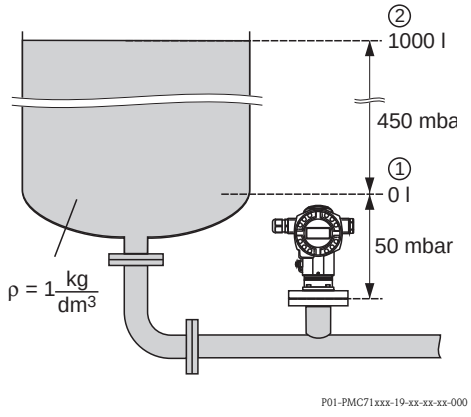
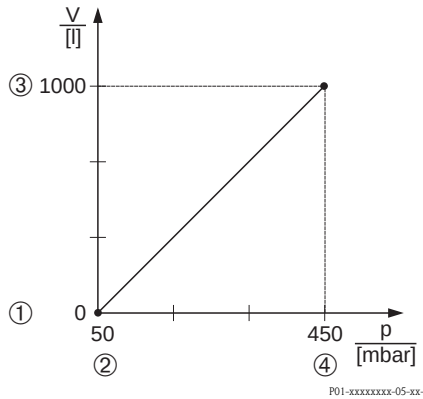


Fig. 5: Calibration without reference pressure – dry calibration

1 See Table, Steps 7 and 8.
2 See Table, Steps 9 and 10.

	Description
4	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
5	Select a volume unit via the OUTPUT UNIT parameter, here l (litres) for example..
6	Select the "Dry" option by means of the CALIBRATION MODE parameter.
7	Enter the volume value for the lower calibration point via the EMPTY CALIB. parameter, here 0 l for example.
8	Enter the pressure value for the lower calibration point via the EMPTY PRESSURE parameter, here 50 mbar (0.75 psi) for example.
9	Enter the volume value for the upper calibration point via the FULL CALIB. parameter, here 1000 l (264 gal) for example.
10	Enter the pressure value for the upper calibration point via the FULL PRESSURE parameter, here 450 mbar (6.75 psi) for example.
11	Set the value for the lower current value (4 mA) by means of the SET LRV parameter.
12	Set the value for the upper current value (20 mA) by means of the SET URV parameter.
13	Result: The measuring range is set for 0 to 1000 l (264 gal).



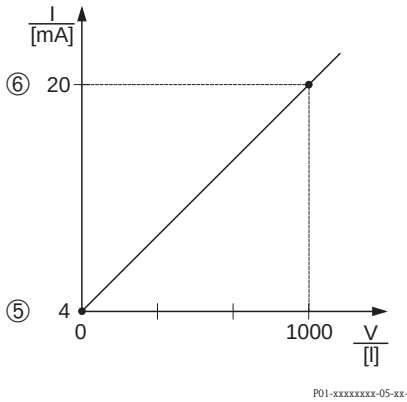


Fig. 6: Calibration with reference pressure – wet calibration

1 See Table, Step 7.
2 See Table, Step 8.
3 See Table, Step 9.
4 See Table, Step 10.
5 See Table, Step 11.
6 See Table, Step 12.

Note!

1. For this level mode, the measured variables %, level, volume and mass are available. → See also parameter description for OUTPUT UNIT, Page 60.

5.3 "Level Easy Height" level selection

5.3.1 Calibration with reference pressure – wet calibration

Example:
In this example, the volume in a tank should be measured in litres. The maximum volume of 1000 litres (264 US gal) corresponds to a level of 4.5 m (15 ft). The minimum volume of 0 litres corresponds to a level of 0.5 m (1.6 ft), as the device is mounted below the level lower range value. The density of the medium is 1 kg/dm^3.

Prerequisite:
- The measured variable is in direct proportion to the pressure.
- The tank can be filled or emptied.



Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- The values entered for EMPTY CALIB./FULL CALIB., EMPTY PRESSURE/FULL PRESSURE, EMPTY HEIGHT/FULL HEIGHT and SET LRV/SET URV must have a minimum interval of 1% for the "Level Easy Height" level mode. The value will be rejected with a warning message if the values are too close together. Further limit values are not checked; i.e. the values entered must be appropriate for the sensor and the measuring task so that the measuring device can measure correctly.
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 62, Table 9: LEVEL SELECTION "Level Easy Height"
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.



Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	Deltabar S: Before you configure the device for your application, the pressure piping must be cleaned and filled with medium. See Operating Instructions BA00270P, Section 6.5.1
2	Carry out position adjustment if necessary. See Page 53, Table 6: POSITION ADJUSTMENT.
3	Select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP→ MEASURING MODE
4	If necessary, select the "Level Easy Height" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION
5	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP

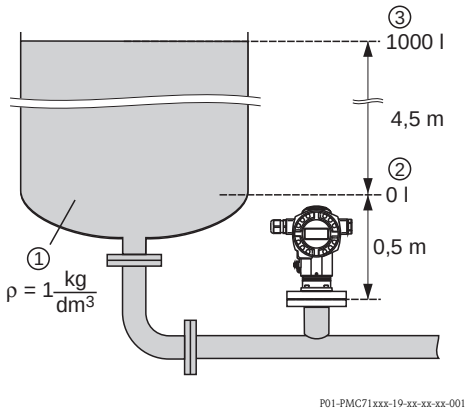


Fig. 7: Calibration with reference pressure – wet calibration

1 See Table, Steps 10 and 11.
2 See Table, Step 12.
3 See Table, Step 13.

	Description
6	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
7	Select a volume unit via the OUTPUT UNIT parameter, here l (litres) for example..
8	Select a height unit via the HEIGHT UNIT parameter, here m for example.
9	Select the "Wet" option via the CALIBRATION MODE parameter.
10	Select a density unit via the DENSITY UNIT parameter, here kg/dm^3 for example.
11	Enter the density of the fluid using the ADJUST DENSITY parameter, here kg/dm^3 for example.
12	Enter the volume value for the lower calibration point via the EMPTY CALIB. parameter, here 0 l for example. (The currently measured hydrostatic pressure is displayed as height, here 0.5 m (1.6 ft) for example.) Note! To accept the value displayed you must first switch to the Edit mode (see the "Editing values" section) and then press the "E" button to save the value.
13	Enter the volume value for the upper calibration point via the FULL CALIB. parameter, here 1000 l (264 US gal) for example. (The currently measured hydrostatic pressure is displayed as height, here 4.5 m (15 ft) for example.) Note! To accept the value displayed you must first switch to the Edit mode (see the "Editing values" section) and then press the "E" button to save the value.
14	Set the value for the lower current value (4 mA) by means of the SET LRV parameter.
15	Set the value for the upper current value (20 mA) by means of the SET URV parameter.
16	Result: The measuring range is set for 0 to 1000 l (264 US gal).

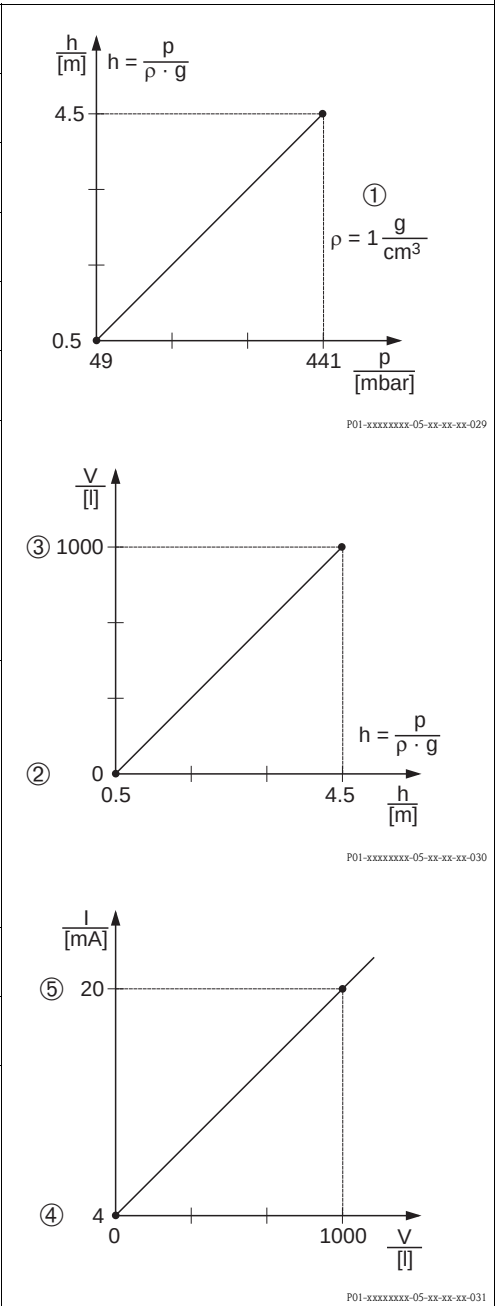


Fig. 8: Calibration with reference pressure – wet calibration

1 See Table, Steps 10 and 11.
2 See Table, Step 12.
3 See Table, Step 13.
4 See Table, Step 14.
5 See Table, Step 15.

Note!

1. For this level mode, the measured variables %, level, volume and mass are available. → See also parameter description for OUTPUT UNIT, Page 64.

5.3.2 Calibration without reference pressure – dry calibration

Example:
In this example, the volume in a tank should be measured in litres. The maximum volume is 1000 l (264 US gal), and the maximum height is 4.5 m (15 ft). The minimum volume of 0 litres corresponds to a level of 0.5 m (1.6 ft), as the device is mounted below the level lower range value. The density of the fluid is 1 kg/dm^3.

Prerequisite:
- The measured variable is in direct proportion to the pressure.
- This is a theoretical calibration i.e. the height and volume values for the lower and upper calibration point must be known.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- The values entered for EMPTY CALIB./FULL CALIB., EMPTY PRESSURE/FULL PRESSURE, EMPTY HEIGHT/FULL HEIGHT and SET LRV/SET URV must have a minimum interval of 1% for the "Level Easy Height" level mode. The value will be rejected with a warning message if the values are too close together. Further limit values are not checked; i.e. the values entered must be appropriate for the sensor and the measuring task so that the measuring device can measure correctly.
- Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero. → To perform a position adjustment see also Page , Table 6: Position adjustment.
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 62, Table 9: LEVEL SELECTION "Level Easy Height"
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	Select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP→ MEASURING MODE
2	If necessary, select "Level Easy Height" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION
3	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP

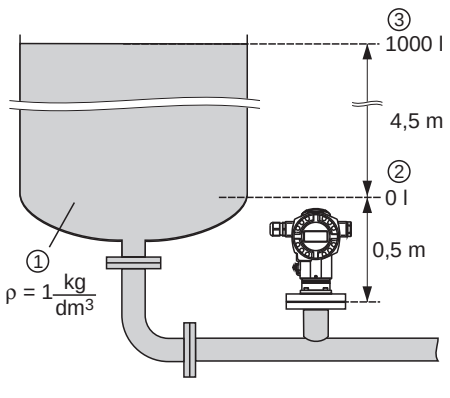
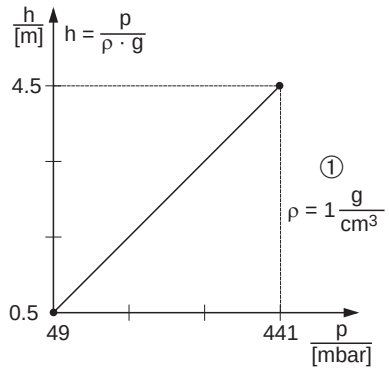


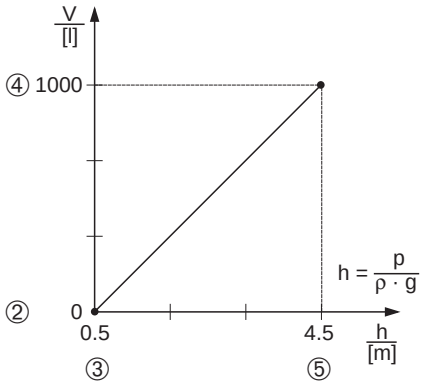
Fig. 9: Calibration without reference pressure – dry calibration

1 See Table, Steps 8 and 9.
2 See Table, Steps 10 and 11.
3 See Table, Steps 12 and 13.

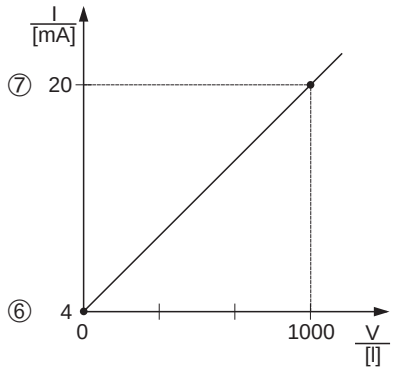
	Description
4	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
5	Select a volume unit via the OUTPUT UNIT parameter, here l (litres) for example.
6	Select a height unit via the HEIGHT UNIT parameter, here m for example.
7	Select the "Dry" option via the CALIBRATION MODE parameter.
8	Select a density unit via the DENSITY UNIT parameter, here kg/dm^3 for example.
9	Enter the density of the fluid using the ADJUST DENSITY parameter, here kg/dm^3 for example.
10	Enter the volume value for the lower calibration point via the EMPTY CALIB. parameter, here 0 l for example.
11	Enter the height value for the lower calibration point via the EMPTY HEIGHT parameter, here 0.5 m (1.6 ft) for example.
12	Enter the volume value for the upper calibration point via the FULL CALIB. parameter, here 1000 l (litres) (264 US gal) for example.
13	Enter the height value for the upper calibration point via the FULL HEIGHT parameter, here 4.5 m (15 ft) for example.
14	Set the value for the lower current value (4 mA) by means of the SET LRV parameter.
15	Set the value for the upper current value (20 mA) by means of the SET URV parameter.
16	Result: The measuring range is set for 0 to 1000 l (litres) (264 US gal).



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P01-xxxxxxxx-05-xx-xx-xx-033

Fig. 10: Calibration with reference pressure – wet calibration

1 See Table, Steps 8 and 9.
2 See Table, Step 10.
3 See Table, Step 11.
4 See Table, Step 12.
5 See Table, Step 13.
6 See Table, Step 14.
7 See Table, Step 15.

Note!

1. For this level mode, the measured variables %, level, volume and mass are available. → See also parameter description for OUTPUT UNIT, Page 64.

5.4 "Level Standard" level selection, "Linear" level type

5.4.1 Calibration with reference pressure – wet calibration

Example:
In this example, the level in a tank should be measured in m. The maximum level is 3 m (9.8 ft). The pressure range is set to 0 to 300 mbar (4.5 psi).

Prerequisite:
- The measured variable is in direct proportion to the pressure.
- The tank can be filled or emptied.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 67, Table 10: BASIC SETUP
  – Page 70, Table 11: BASIC SETUP – "Linear" level type.
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	Deltabar S: before configuring the device for your application, the pressure piping must be cleaned and the device filled with fluid. See Operating Instructions BA00270P, Section 6.5.1
2	Carry out position adjustment if necessary. See Page 53, Table 6: POSITION ADJUSTMENT.
3	If necessary, select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE
4	If necessary, select "Level Standard" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION

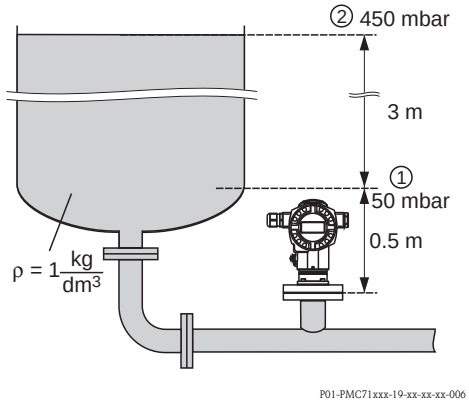


Fig. 11: Calibration with reference pressure – wet calibration

1 See table, step 11.
2 See table, step 12.

	Description
5	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP
6	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
7	Select the "Linear" option by means of the LEVEL MODE parameter.
8	Select the "Level" option by means of the LIN. MEASURAND parameter.
9	Select a level unit via the HEIGHT UNIT parameter, here m for example.
10	Select the "Wet" option by means of the CALIBRATION MODE parameter.
11	The pressure for the lower calibration point is present at the device, here 0 mbar for example.
	Select EMPTY CALIB. parameter.
	Enter the level value, here 0 m for example. Confirm the value to assign the pressure value present to the lower level value.
12	The pressure for the upper calibration point is present at the device, here 450 mbar (6.75 psi) for example.
	Select FULL CALIB. parameter.
	Enter the level value, here 3 m (9.8 ft) for example. Confirm the value to assign the pressure value present to the upper level value.
13	Set the value for the lower current value (4 mA) by means of the SET LRV parameter.
14	Set the value for the upper current value (20 mA) by means of the SET URV parameter.
15	Result: The measuring range is set for 0...3 m (9.8 ft).

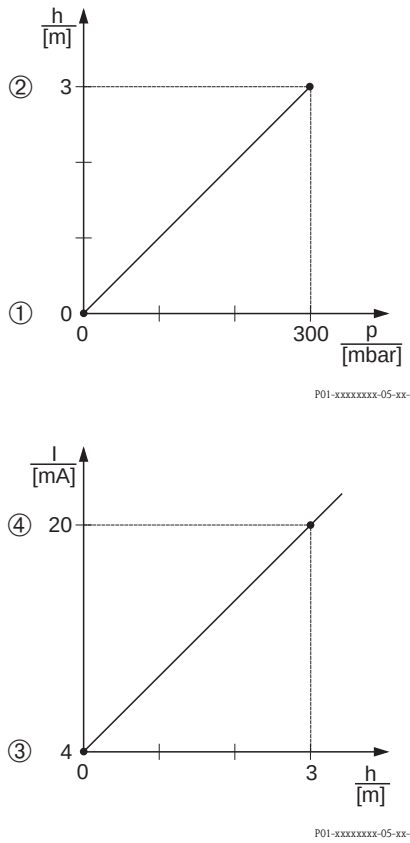


Fig. 12: Calibration with reference pressure – wet calibration

1 See table, step 11.
2 See table, step 12.
3 See table, step 13.
4 See table, step 14.

Note!

1. You can also perform calibration with reference pressure by means of the QUICK SETUP menu. → See Page 49 ff, Table 4: QUICK SETUP menu.
2. You can also specify customer-specific units. See parameter description for PRESS. ENG. UNIT (→ Page 67), HEIGHT UNIT (→ Page 70), UNIT VOLUME (→ Page 71) and MASS UNIT (→ Page 72).
3. For this level type, the measured variables %, level, volume and mass are available. → See Page 70 ff.
4. The EMPTY PRESSURE (→ Page 74) and FULL PRESSURE (→ Page 74) parameters display the pressure values belonging to the EMPTY CALIB. and FULL CALIB. parameters.

5.4.2 Calibration without reference pressure – dry calibration

Example:
In this example, the volume in a tank should be measured in m^3. The maximum volume is 5 m^3 and the maximum height 4 m (13 ft). The density of the fluid is 1 kg/dm^3. The device is mounted below the level lower range value.

Prerequisite:
- The measured variable is in direct proportion to the pressure.
- This is a theoretical calibration, i.e. the tank volume, tank height and density of the fluid are known.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero. → To perform a position adjustment see also Page , Table 6: Position adjustment.
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 67, Table 10: BASIC SETUP
  – Page 70, Table 11: BASIC SETUP – "Linear" level type.
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 26: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	Select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE
2	If necessary, select "Level Standard" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION
3	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP

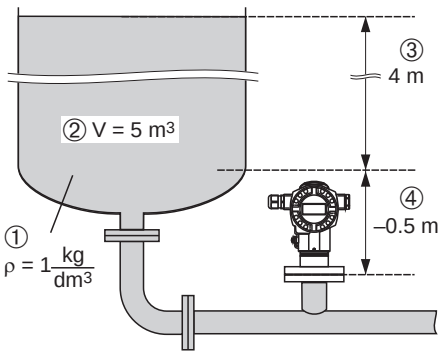


Fig. 13: Calibration without reference pressure – dry calibration

1 See table, step 9.
2 See table, step 10.
3 See table, step 11.
4 See table, step 12.

	Description
4	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
5	Select the "Linear" option by means of the LEVEL MODE parameter.
6	Select the "Volume" option by means of the LIN. MEASURAND parameter.
7	Select a volume unit via the UNIT VOLUME parameter, here m^3 for example.
8	Select the "Dry" option by means of the CALIBRATION MODE parameter. See also the following note, point 3.
9	Enter the value for density via the ADJUST DENSITY parameter, here 1 kg/dm^3 for example.
10	Enter the tank volume via the TANK VOLUME parameter, here 5 m^3 for example.
11	Enter the tank height via the TANK HEIGHT parameter, here 4 m (13 ft) for example.
12	Enter the level offset via the ZERO POSITION parameter, here –0.5 m (-1,6 ft) for example.
13	Set the value for the lower current value (4 mA) by means of the SET LRV parameter.
14	Set the value for the upper current value (20 mA) by means of the SET URV parameter.
15	Result: The measuring range is set for 0...5 m^3.

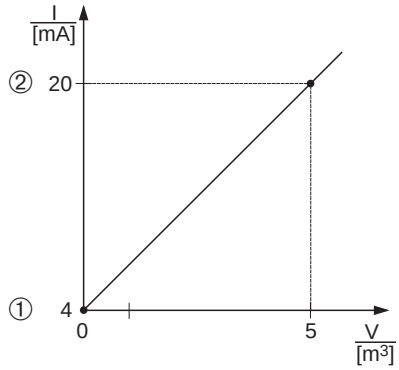


Fig. 14: Current output calibration

5 See table, step 13.
6 See table, step 14.

Note!

1. For this level type, the measured variables %, level, volume and mass are available.
→ See Page 70 ff.
2. You can also specify customer-specific units. See parameter description for PRESS. ENG. UNIT (→ Page 67), HEIGHT UNIT (→ Page 70), UNIT VOLUME (→ Page 71) and MASS UNIT (→ Page 72).
3. A level value is assigned to the lower and upper current value by means of the SET LRV (→ Page 77) and SET URV (→ Page 77) parameters respectively. Once you have selected the "Dry" calibration mode, the error message A711 "LRV or URV out of edit limits" can appear. The error message goes out as soon as level values which are within the editing limits are entered for the SET LRV and SET URV parameters.
By means of the ENTER RESET CODE parameter (→ Page 126), you can use the code 2710 to automatically set the SET LRV and SET URV parameters to level values which are within the editing limits.

5.5 "Level Standard" level selection, "Pressure Linearized" level type

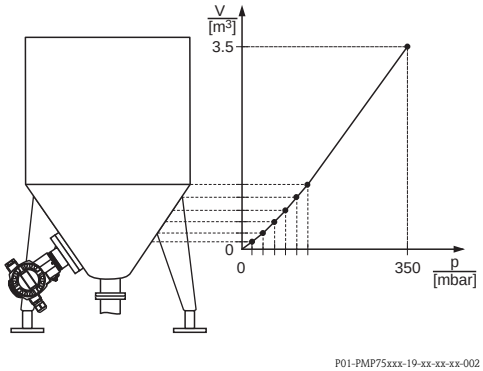
5.5.1 Semiautomatic entry of the linearisation table

Example:
In this example, the volume in a tank with a conical outlet should be measured in m^3.

Prerequisite:
- The tank can be filled. The linearisation characteristic must rise continuously.
- A minimum gap of 0.5 % of the distance between two points must be maintained. Spans for the "Pressure linearized" option: HYDR. PRESS MAX. – HYDR. PRESS MIN.; TANK CONTENT MAX. – TANK CONTENT MIN. Spans for the "Height linearized" option: LEVEL MAX – LEVEL MIN; TANK CONTENT MAX. – TANK CONTENT MIN.

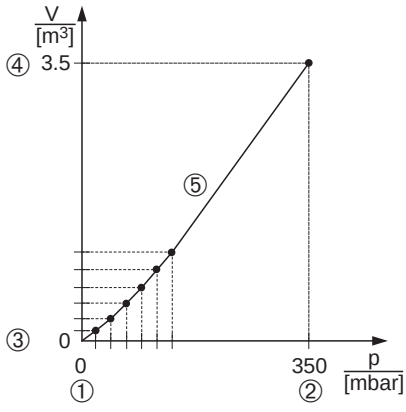
Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 67, Table 10: BASIC SETUP
  – Page 78, Table 11: BASIC SETUP – "Pressure Linearized" level type
  – Page 100, Table 18: LINEARISATION – on-site operation
  – Page 104, Table 19: LINEARISATION – Digital communication.
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 26: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description	
1	Deltabar S: before configuring the device for your application, the pressure piping must be cleaned and filled with fluid. See Operating Instructions BA00270P, Section 6.5.1.	
2	Carry out position adjustment if necessary. See Page 53, Table 6: POSITION ADJUSTMENT.	
	Carry out basic setup:	
3	If necessary, select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE	
4	If necessary, select "Level Standard" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION	

	Description	
5	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP	
6	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.	
7	Select the "Pressure Linearized" option by means of the LEVEL MODE parameter. See also the following note, point 3.	
8	Select the "Volume" option by means of the LINd. MEASURAND parameter.	
9	Select a volume unit via the UNIT VOLUME parameter, here m^3 for example.	
10	Select HYDR. PRESS MIN. parameter.	
	Enter the minimum hydrostatic pressure to be expected, here 0 mbar for example.	
11	Select HYDR. PRESS MAX .	
	Enter the maximum hydrostatic pressure to be expected.	
	Carry out linearisation:	
12	Change the function group: Menu path: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION	
13	Select TANK CONTENT MIN parameter.	
	Specify the minimum tank contents to be expected, here 0 m^3 for example.	
14	Select TANK CONTENT MAX parameter.	
	Specify the maximum tank contents to be expected, here 3.5 m^3 for example.	
15	On-site display: Select the "Editor table" option by means of the TABLE SELECTION parameter.	
16	Select the "Semiautomatic" option by means of the LIN. EDIT MODE parameter.	
17	Select the "New table" option by means of the EDITOR TABLE parameter.	

	Description	
18	Enter linearisation table (min. 2 points, max. 32 points).	
	Fill the tank to the height of the 1st point.	
	LINE-NUMB: confirm value displayed.	
	X-VAL.: the hydrostatic pressure present is displayed. On-site display, Digital communication: The X-VAL. displayed is saved by confirming the Y-value. See following line, Y-VAL. HART handheld terminal: Confirm X-VAL. displayed.	
	Y-VAL.: enter the volume value, here 0 m^3 for example, and confirm the value.	
19	On-site display: If you want to enter another point for the linearisation table, select the "Next point" option and enter the point as described in step 18. If you want to finish entering the values and activate the linearisation table, select the "Accept input table" option. Digital communication: You can enter further points for the linearisation table as explained in step 18. Once all the points have been entered, the table must be activated by means of the TAB. ACTIVATE parameter.	
19	Result: The linearisation table has been entered.	



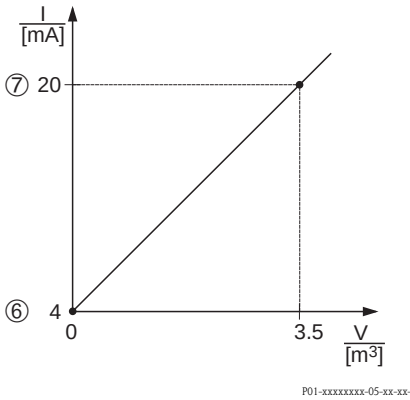


Fig. 15: Semiautomatic entry of the linearisation table

1 See table, step 10.
2 See table, step 11.
3 See table, step 13.
4 See table, step 14.
5 See table, steps 15 – 19.
6 See the following note, point 4.
7 See the following note, point 4

Note!

1. For this level type, the measured variables %, volume and mass are available.
→ See Page 78 ff.
2. You can also specify customer-specific units. See parameter description for PRESS. ENG. UNIT (→ Page 67), HEIGHT UNIT (→ Page 79), UNIT VOLUME (→ Page 79) and MASS UNIT (→ Page 80).

3. Once you have selected the "Pressure Linearized" level type, the warning message "W710 Set span too small. Not allowed." can appear. At this stage the linearisation table already consists of two points as standard. It could be the case that the 2nd value, and thus the highest X-VAL. of the linearisation table, is smaller than the minimum span permitted (→ MINIMUM SPAN, Page 119). The message goes out as soon as the highest X-VAL. is larger than the minimum span.
4. A level value is assigned to both the lower and upper current value with the SET LRV (→ Page 98) and SET URV (→ Page 98) parameters. If you enter values for TANK CONTENT MIN (→ Page 101 or 104) and TANK CONTENT MAX (→ Page 101 or 105), the SET LRV and SET URV parameters are also changed. If you want to assign values other than those for TANK CONTENT MIN and TANK CONTENT MAX to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

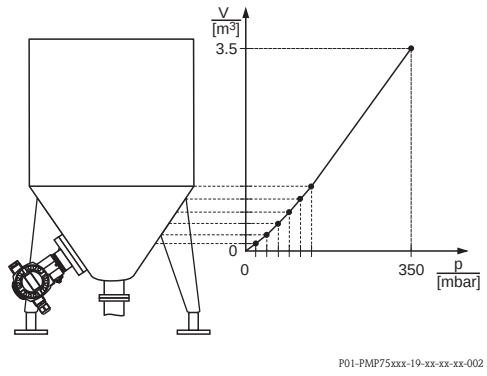
5.5.2 Manual entry of the linearisation table

Example:
In this example, the volume in a tank with a conical outlet should be measured in m^3.

Prerequisite:
- This is a theoretical calibration, i.e. the points for the linearisation table are known.
- A minimum gap of 0.5 % of the distance between two points must be maintained. Spans for the "Pressure linearized" option: HYDR. PRESS MAX. – HYDR. PRESS MIN.; TANK CONTENT MAX. – TANK CONTENT MIN. Spans for the "Height linearized" option: LEVEL MAX – LEVEL MIN; TANK CONTENT MAX. – TANK CONTENT MIN.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 67, Table 10: BASIC SETUP
  – Page 78, Table 12: BASIC SETUP – "Pressure Linearized" level type
  – Page 100, Table 18: LINEARISATION – on-site operation
  – Page 104, Table 19: LINEARISATION – Digital communication.
- For a description of further relevant parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description	
1	Perform basic setup as per Section 5.3.1, steps 2 to 10.	
	Carry out linearisation:	
2	Change the function group: Menu path: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION	
3	Select TANK CONTENT MIN parameter .	
	Specify the minimum tank contents to be expected, here 0 m^3 for example.	
4	Select TANK CONTENT MAX parameter .	
	Specify the maximum tank contents to be expected, here 3.5 m^3 for example.	

	Description
5	On-site display: Select the "Editor table" option by means of the TABLE SELECTION parameter.
6	Select the "Manual" option by means of the LIN. EDIT MODE parameter.
7	Select the "New table" option by means of the EDITOR TABLE parameter.
8	Enter linearisation table (min. 2 points, max. 32 points).
	LINE-NUMB: confirm value displayed.
	X-VAL.: enter the pressure value and confirm.
	Y-VAL.: enter the volume value, here 0 m^3 for example, and confirm.
9	On-site display If you want to enter another point for the linearisation table, select the "Next point" option and enter the point as described in step 8. If you want to finish entering the values and activate the linearisation table, select the "Accept input table" option. Digital communication: You can enter further points for the linearisation table as explained in step 8. Once all the points have been entered, the table must be activated by means of the TAB. ACTIVATE parameter.
10	Result: The linearisation table has been entered.

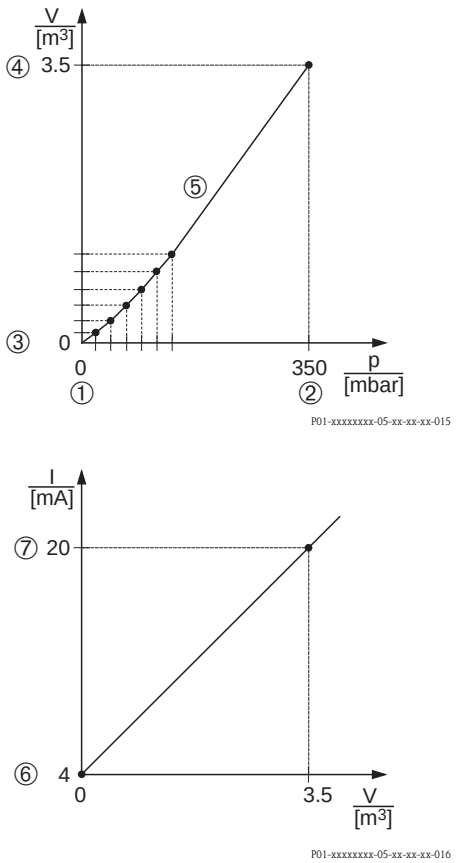


Fig. 16: Manual entry of the linearisation table

1 See Section 5.3.1, table, step 9.
2 See Section 5.3.1, table, step 10.
3 See table, step 3.
4 See table, step 4.
5 See table, steps 5 – 9.
6 See the following note, point 4.
7 See the following note, point 4.

Note!

1. For this level type, the measured variables %, volume and mass are available.
→ See Page 78 ff.
2. You can also specify customer-specific units. See parameter description for PRESS. ENG. UNIT (→ Page 67), HEIGHT UNIT (→ Page 79), UNIT VOLUME (→ Page 79) and MASS UNIT (→ Page 80).
3. Once you have selected the "Pressure Linearized" level type, the warning message "W710 Set span too small. Not allowed." can appear. At this stage the linearisation table already consists of two points as standard. It could be the case that the 2nd value, and thus the highest X-VAL. of the linearisation table, is smaller than the minimum span permitted (→ MINIMUM SPAN, Page 119). The message goes out as soon as the highest X-VAL. is larger than the minimum span.
4. A level value is assigned to both the lower and upper current value with the SET LRV (→ Page 98) and SET URV (→ Page 98) parameters. If you enter values for TANK CONTENT MIN (→ Page 101 or 104) and TANK CONTENT MAX (→ Page 101 or 105), the SET LRV and SET URV parameters are also changed. If you want to assign values other than those for TANK CONTENT MIN and TANK CONTENT MAX to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

5.6 "Level Standard" level selection, "Height Linearized" level type

5.6.1 Wet calibration and semiautomatic entry of the linearisation table

Example:
In this example, the height and the volume should be measured at the same time.

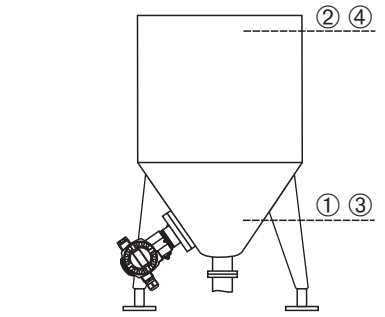
Prerequisite:
- The tank can be filled. The linearisation characteristic must rise continuously.
- A minimum gap of 0.5 % of the distance between two points must be maintained. Spans for the "Pressure linearized" option: HYDR. PRESS MAX. – HYDR. PRESS MIN.; TANK CONTENT MAX. – TANK CONTENT MIN. Spans for the "Height linearized" option: LEVEL MAX – LEVEL MIN; TANK CONTENT MAX. – TANK CONTENT MIN.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 53, Table 6: POSITION ADJUSTMENT
  – Page 67, Table 10: BASIC SETUP
  – Page 83, Table 13: BASIC SETUP – "Height Linearized" level type
  – Page 100, Table 18: LINEARISATION – on-site operation
  – Page 104, Table 19: LINEARISATION – Digital communication.
- For a description of further parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.

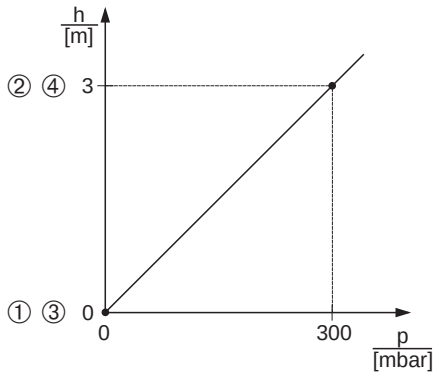
Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description	
1	Deltabar S: before configuring the device for your application, the pressure piping must be cleaned and filled with fluid. See Operating Instructions BA00270P, Section 6.5.1	
2	Carry out position adjustment if necessary. See Page 53, Table 6: POSITION ADJUSTMENT.	
	Perform calibration for the 1st measured variable:	
3	If necessary, select the "Level" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE	
4	If necessary, select "Level Standard" level mode using the LEVEL SELECTION parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE "Level" → LEVEL SELECTION Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE "Level" → LEVEL SELECTION	

	Description
5	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION →OPERATING MENU → SETTINGS → BASIC SETUP
6	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
7	Select the "Height Linearized" option by means of the LEVEL MODE parameter.
8	Select the "Height + Volume" option by means of the COMB. MEASURAND parameter.
9	Select the unit for the 1st measured value via the HEIGHT UNIT parameter, here m for example.
10	Select the unit for the 2nd measured variable via the UNIT VOLUME parameter, here m3 for example.
11	Select LEVEL MIN parameter.
	Enter the minimum level to be expected, here 0 m for example.
12	Select LEVEL MAX parameter.
	Enter the maximum level to be expected, here 3 m (9.8 ft) for example.
13	Select the "Wet" option via the CALIBRATION MODE parameter (calibration mode for the 1st measured variable).
14	The pressure for the lower calibration point is present at the device, here 0 mbar for example.
	Select EMPTY CALIB. parameter.
	Enter the level value, here 0 m for example. Confirm the value to assign the pressure value present to the lower level value.
15	The pressure for the upper calibration point is present at the device, here 300 mbar (4.5 psi) for example.
	Select FULL CALIB. parameter.
	Enter the level value, here 3 m (9.8 ft) for example. Confirm the value to assign the pressure value present to the upper level value.
16	Result: The calibration for the 1st measured variable is carried out.



P01-PMP75xxx-19-xx-xx-xx-004



P01-xxxxxxxx-05-xx-xx-xx-017

Fig. 17: Calibrating the 1st measured variable

1 See table, step 11.
2 See table, step 12.
3 See table, step 14.
4 See Table, step 15.

	Description
	Perform linearisation (calibration for the 2nd measured variable)
17	Change the function group. Menu path: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION
18	Select TANK CONTENT MIN parameter.
	Specify the minimum tank contents to be expected, here 0 m^3 for example.
19	Select TANK CONTENT MAX parameter.
	Specify the maximum tank contents to be expected, here 5 m^3 for example.
20	On-site display: Select the "Editor table" option by means of the TABLE SELECTION parameter.
21	Select the "Semiautomatic" option by means of the LIN. EDIT MODE parameter.
22	Select the "New table" option by means of the EDITOR TABLE parameter.
23	Enter linearisation table (min. 2 points, max. 32 points).
	Fill the tank to the height of the 1st point.
	LINE-NUMB: confirm value displayed.
	X-VAL.: the hydrostatic pressure present is measured and converted to the corresponding level and displayed. On-site display, Digital communication: The X-VAL. displayed is saved by confirming the Y-value. See following line, Y-VAL. HART handheld terminal: Confirm X-VAL. displayed.
	Y-VAL.: enter the volume value, here 0 m^3 for example, and confirm the value.
24	On-site display If you want to enter another point for the linearisation table, select the "Next point" option and enter the point as described in step 23. If you want to finish entering the values and activate the linearisation table, select the "Accept input table" option. Digital communication: You can enter further points for the linearisation table as explained in step 23. Once all the points have been entered, the table must be activated by means of the TAB. ACTIVATE parameter.
25	Result: – The linearisation table has been entered. – The measured value display and the TANK CONTENT parameter display the 2nd measured value (here the volume). – The LEVEL BEFORE LIN parameter displays the 1st measured value (here the height). See also the following note, point 5.

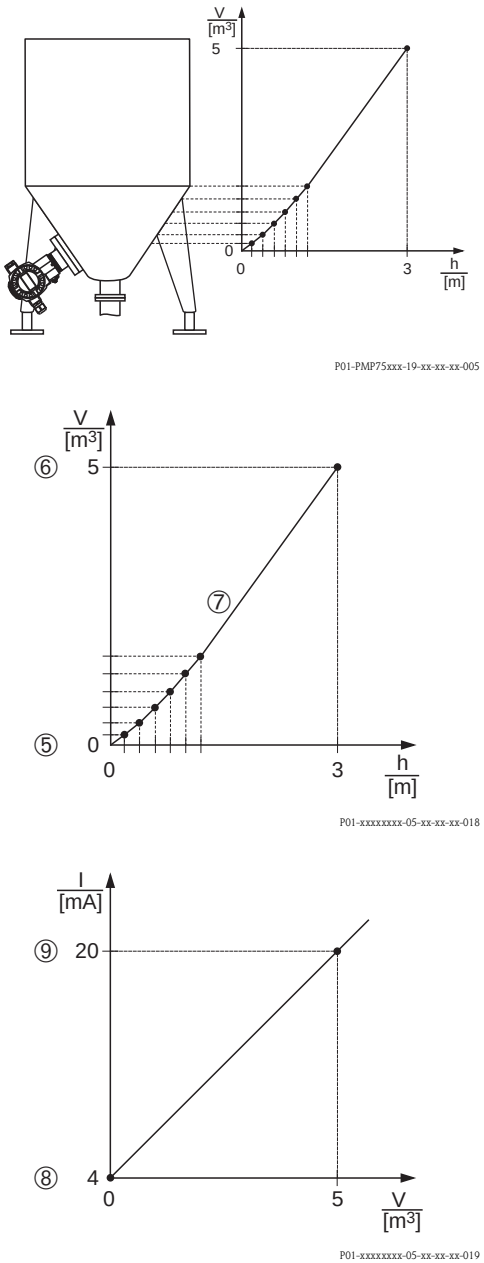


Fig. 18: Calibrating the 2nd measured variable

5 See table, step 18.
6 See table, step 19.
7 See table, steps 20 – 24.
8 See the following note, point 4.
9 See the following note, point 4.

Note!

1. For this level type, the measured variables "Height + %", "Height + Volume", "Height + Mass", "%-Height + %", "%-Height + Volume" and "%-Height + Mass" are available. → See Page 79 ff.
2. You can also specify customer-specific units. See parameter description for PRESS. ENG. UNIT (→ Page 67), HEIGHT UNIT (→ Page 83), UNIT VOLUME (→ Page 84) and MASS UNIT (→ Page 85).
3. Once you have selected the "Pressure Linearized" level type, the warning message "W710 Set span too small. Not allowed." can appear. At this stage the linearisation table already consists of two points as standard. It could be the case that the 2nd value, and thus the highest X-VAL. of the linearisation table, is smaller than the minimum span permitted (→ MINIMUM SPAN, Page 119). The message goes out as soon as the highest X-VAL. is larger than the minimum span.
4. A level value is assigned to both the lower and upper current value with the SET LRV (→ Page 98) and SET URV (→ Page 98) parameters.
   You can use the ASSIGN CURRENT parameter (→ Page 113) to specify whether the current output should depict the 1st or 2nd measured variable. Depending on the setting of the ASSIGN CURRENT parameter, enter the following values for SET LRV and SET URV:
   – ASSIGN CURRENT = tank content (factory setting) ⇒ %-value, volume value or mass value
   – ASSIGNMENT = height ⇒ level value

   The following applies for the setting ASSIGN CURRENT "Tank content":
   If you enter values for TANK CONTENT MIN (→ Page 101 or 104) and TANK CONTENT MAX (→ Page 101 or 105), the SET LRV and SET URV parameters are also changed. If you want to assign values other than those for TANK CONTENT MIN and TANK CONTENT MAX to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

   The following applies for the setting ASSIGN CURRENT "Height":
   If you enter values for LEVEL MIN (→ Page 86) and LEVEL MAX (→ Page 86), the SET LRV and SET URV parameters are also changed. If you want to assign values other than those for LEVEL MIN and LEVEL MAX to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

5. You can use the MENU DESCRIPTOR parameter (→ Page 110) to specify which measured value should be displayed on the on-site display.

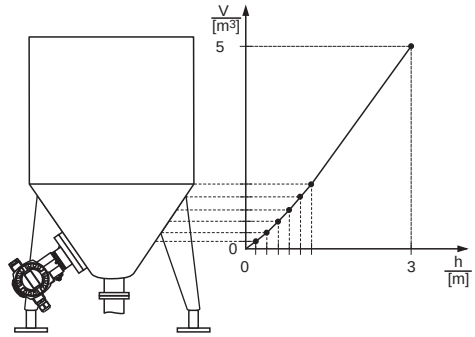
5.6.2 Dry calibration and manual entry of the linearisation table

Example:
In this example, the height and the volume should be measured at the same time.

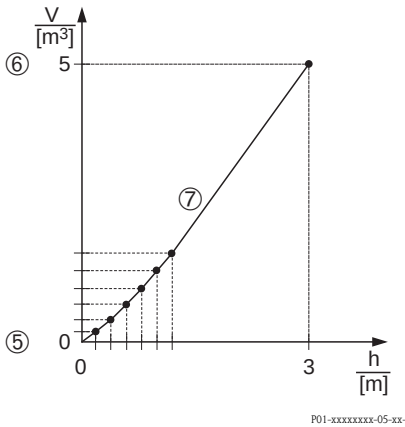
Prerequisite:
- This is a theoretical calibration, i.e. the points for the linearisation table are known.
- A minimum gap of 0.5 % of the distance between two points must be maintained. Spans for the "Pressure linearized" option: HYDR. PRESS MAX. – HYDR. PRESS MIN.; TANK CONTENT MAX. – TANK CONTENT MIN. Spans for the "Height linearized" option: LEVEL MAX – LEVEL MIN; TANK CONTENT MAX. – TANK CONTENT MIN.

Note!
- See also Operating Instructions for Deltabar S (BA00270P) or Cerabar S (BA00271P), Section 6.5 "Level measurement" or Deltapilot S (BA00332P), Section 6.4 "Level measurement".
- For a description of the parameters mentioned, see
  – Page 45, Table 2: MEASURING MODE
  – Page 67, Table 10: BASIC SETUP
  – Page 83, Table 12: BASIC SETUP – "Height Linearized" level type
  – Page 100, Table 18: LINEARISATION – on-site operation
  – Page 104, Table 19: LINEARISATION – Digital communication.
- For a description of further parameters, see
  – Page 96, Table 16: EXTENDED SETUP
  – Page 122, Table 28: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description	
	Perform calibration for the 1st measured variable:	
1	Perform calibration as per Section 5.4.1, steps 3 to 12.	
2	Select the "Dry" option via the CALIBRATION MODE parameter (calibration mode for the 1st measured variable).	
3	Enter the density of the fluid via the ADJUST DENSITY parameter, here 1 kg/dm³ for example.	
4	If necessary, enter a level offset via the ZERO POSITION parameter, here 0 m for example.	
5	Result: The calibration for the 1st measured variable is carried out.	

	Description
	Perform linearisation (calibration for the 2nd measured variable)
6	Change the function group. Menu path: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION
7	Select TANK CONTENT MIN parameter.
	Specify the minimum tank contents to be expected, here 0 m^3 for example.
8	Select TANK CONTENT MAX parameter.
	Specify the maximum tank contents to be expected, here 5 m^3 for example.
9	On-site display: Select the "Editor table" option by means of the TABLE SELECTION parameter.
10	Select the "Manual" option by means of the LIN. EDIT MODE parameter.
11	Select the "New table" option by means of the EDITOR TABLE parameter.
12	Enter linearisation table (min. 2 points, max. 32 points).
	LINE-NUMB: confirm value displayed.
	X-VAL.: enter the height value and confirm.
	Y-VAL.: enter the volume value, here 0 m^3 for example, and confirm.
13	On-site display If you want to enter another point for the linearisation table, select the "Next point" option and enter the point as described in step 12. If you want to finish entering the values and activate the linearisation table, select the "Accept input table" option. Digital communication: You can enter further points for the linearisation table as explained in step 12. Once all the points have been entered, the table must be activated by means of the TAB. ACTIVATE parameter.
14	Result: – The linearisation table has been entered. – The measured value display and the TANK CONTENT parameter display the 2nd measured value (here the volume). – The LEVEL BEFORE LIN parameter displays the 1st measured value (here the height). See also the following note, point 5.



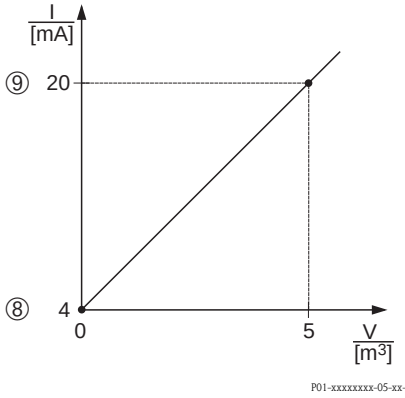


Fig. 19: Calibrating the 2nd measured variable

5 See table, step 7.
6 See table, step 8.
7 See table, steps 9 – 13.
8 See the following note, point 4.
9 See the following note, point 4.

Note!

1. For this level type, the measured variables "Height + %", "Height + Volume", "Height + Mass", "%-Height + %", "%-Height + Volume" and "%-Height + Mass" are available. → See Page 79 ff.
2. You can also specify customer-specific units. See parameter description for PRESS. ENG. UNIT (→ Page 67), HEIGHT UNIT (→ Page 83), UNIT VOLUME (→ Page 84) and MASS UNIT (→ Page 85).
3. Once you have selected the "Pressure Linearized" level type, the warning message "W710 Set span too small. Not allowed." can appear. At this stage the linearisation table already consists of two points as standard. It could be the case that the 2nd value, and thus the highest X-VAL. of the linearisation table, is smaller than the minimum span permitted (→ MINIMUM SPAN, Page 119). The message goes out as soon as the highest X-VAL. is larger than the minimum span.

4. A level value is assigned to both the lower and upper current value with the SET LRV (→ Page 98) and SET URV (→ Page 98) parameters.
   You can use the ASSIGN CURRENT parameter (→ Page 113) to specify whether the current output should depict the 1st or 2nd measured variable. Depending on the setting of the ASSIGN CURRENT parameter, enter the following values for SET LRV and SET URV:
   – ASSIGN CURRENT = tank content (factory setting) ⇒ %- value, volume value or mass value
   – ASSIGNMENT = height ⇒ level value

   The following applies for the setting ASSIGN CURRENT "Tank content":
   If you enter values for TANK CONTENT MIN (→ Page 101 or 104) and TANK CONTENT MAX (→ Page 101 or 105), the SET LRV and SET URV parameters are also changed. If you want to assign values other than those for TANK CONTENT MIN and TANK CONTENT MAX to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

   The following applies for the setting ASSIGN CURRENT "Height":
   If you enter values for LEVEL MIN (→ Page 86) and LEVEL MAX (→ Page 86), the SET LRV and SET URV parameters are also changed. If you want to assign values other than those for LEVEL MIN and LEVEL MAX to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

5. You can use the MENU DESCRIPTOR parameter (→ Page 110) to specify which measured value should be displayed on the on-site display.

6 Flow measurement

6.1 Calibration

Example:
In this example, a volume flow should be measured in m^3/s.

Note!
- The "Flow measurement" measuring mode is only available for the Deltabar S differential pressure transmitter.
- See also Operating Instructions BA00270P Deltabar S, Section 6.4 "Flow measurement".
- For a description of the parameters mentioned, see
  - Page 45, Table 2: MEASURING MODE
  - Page 53, Table 6: POSITION ADJUSTMENT
  - Page 91 ff, Table 12: BASIC SETUP
  - Page 98 ff, Table 15: EXTENDED SETUP.
- For a description of further parameters, see
  - Page 98, Table 15: EXTENDED SETUP
  - Page 123, Table 29: PROCESS VALUES.

Warning!
If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured.

	Description
1	Before configuring the device for your application, the pressure piping must be cleaned and the device filled with fluid. See Operating Instructions BA00270P, Section 6.4.1.
2	Carry out position adjustment if necessary. See Page 53, Table 6: POSITION ADJUSTMENT.
3	If necessary, select the "Flow" measuring mode via the MEASURING MODE parameter. On-site display: Menu path: GROUP SELECTION → MEASURING MODE Digital communication: Menu path: OPERATING MENU → SETTINGS → BASIC SETUP → MEASURING MODE
4	On-site display: Select BASIC SETUP function group. Menu path: GROUP SELECTION → OPERATING MENU → SETTINGS → BASIC SETUP
5	Select a pressure unit via the PRESS. ENG. UNIT parameter, here mbar for example.
6	Select the "Volume p. cond." option by means of the FLOW-MEAS. TYPE parameter.
7	Select a flow unit via the UNIT FLOW parameter, here m^3/h for example.
8	Select MAX. FLOW parameter. Enter the maximum flow value of the primary element, here 6000 m^3/h for example. See also layout sheet of primary element.
9	Select MAX PRESS. FLOW parameter. Enter the maximum pressure, here 400 mbar (6 psi) for example. See also layout sheet of primary element.
10	Result: The device is configured for flow measurement.

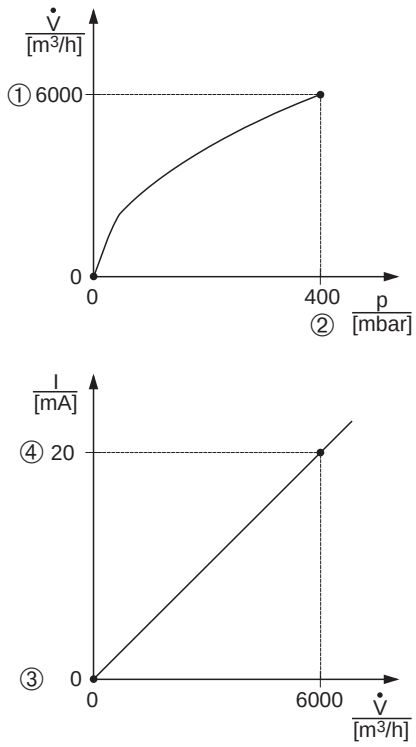


Fig. 20: Flow measurement calibration

1 See table, step 8.
2 See table, step 9.
3 See the following note, point 4.
4 See the following note, point 4.

Note!

1. You can also perform calibration by means of the QUICK SETUP menu. → See Page 52 ff, Table 5: QUICK SETUP menu.
2. Using the FLOW-MEAS. TYPE parameter, you can choose between the following flow types:
   – Volume p. cond. (volume under operating conditions)
   – Gas norm. cond. (norm volume under norm conditions in Europe: 1013.25 mbar and 273.15 K (0°C))
   – Gas std. cond. (standard volume under standard conditions in USA: 1013.25 mbar (14.7 psi) and 288. 15 K (15°C/59°F))
   – Mass
3. Depending on the flow type selected, you can choose between various units. You can also specify a customer-specific unit.
   See parameter description for PRESS. ENG. UNIT (→ Page 92), UNIT FLOW (→ Page 93), NORM FLOW UNIT (→ Page 93), STD. FLOW UNIT (→ Page 94) and MASS FLOW UNIT (→ Page 94).
4. A flow value or a pressure value is assigned to both the lower and upper current value with the SET LRV (→ Page 99) and SET URV (→ Page 100) parameters.

You can use the LINEAR/SQROOT parameter (→ Page 113) to specify whether the current output should depict the linear pressure signal or the Flow (square root) flow signal. Depending on the setting of the LINEAR/SQROOT parameter, enter the following values for SET LRV and SET URV:
– LINEAR/SQROOT = Flow (square root) (factory setting) ⇒ flow value
– LINEAR/SQROOT = Differential pres. ⇒ pressure value

The following applies for the setting LINEAR/SQROOT "Flow (square root)":
As per the factory settings, the lower current value is set to equal zero and the upper current value is set to the MAX. FLOW value. If you enter a value for MAX. FLOW, the SET URV parameter is also changed. If you want to assign values other than zero and MAX. FLOW to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

The following applies for the setting LINEAR/SQROOT "Differential pres.":
As per the factory settings, the lower current value is set to equal zero and the upper current value is set to the MAX. PRESS. FLOW value. If you enter a value for MAX PRESS. FLOW, the SET URV parameter is also changed. If you want to assign values other than zero and MAX PRESS. FLOW to the lower and upper current values, the desired values must be entered for SET LRV and SET URV.

5. In the lower measuring range, small flow quantities (creepages) can lead to large measured value fluctuations. You can activate low flow cut-off via the LOW FLOW CUT-OFF parameter (→ Page 99).

6.2 Totalizers

Example:
In this example, the volume flow should be totalised and displayed in the unit m^3E^3. Negative flows should be added to the flow rate.

Note!
- For a description of the parameters mentioned, see
  – Page 107 ff, Table 18: TOTALIZER SETUP
  – Page 123 ff, Table 29: PROCESS VALUES
- Totalizer 1 can be reset. Totalizer 2 cannot be reset.

	Description
1	Calibrate the device as per Section 6.1.
2	Change the function group: (GROUP SELECTION →) OPERATING MENU → SETTINGS → TOTALIZER SETUP
3	Select a flow unit via the TOTALIZER 1 UNIT parameter, here m^3 E^3 for example.
4	Use the NEG. FLOW TOT. 1 parameter to specify the totalising mode for negative flows, here the "Positive" option for example.
5	Reset totalizer 1 to zero via the RESET TOTALIZER parameter.
6	Result: The TOTALIZER 1 and TOTAL. 1 OVERFLOW parameters display the totalised volume flow.

Note!
- You can also specify a customer-specific unit. → See parameter description for TOTALIZER 1 UNIT (→ Page 108) and TOTALIZER 2 UNIT (→ Page 109).
- The TOTALIZER 1 and TOTAL. 1 OVERFLOW parameters display the totalised flow value of the first totalizer. The TOTALIZER 2 and TOTAL. 2 OVERFLOW parameters display the totalised flow value of the second totalizer. → See Page 123 ff, PROCESS VALUES function group.
- You can use the MENU DESCRIPTOR parameter (→ Page 110) to specify which measured value should be displayed on the on-site display.

7 Description of parameters

Note!
- The following tables list all the parameters as per the menu structure. Each table corresponds to a function group in the menu tree. The overall menu structure is illustrated in Section 9.1.
- The menu structure for on-site operation and the digital communication are slightly different. The differences mainly affect the MEASURING MODE and LANGUAGE parameters and the LINEARISATION function group.
- In the operating program or HART handheld terminal, additional parameters are displayed. These parameters are marked accordingly.
- The menu path is indicated in the header of each table. You can use this path to get to the parameters in question.
- The menu has a different structure depending on the measuring mode selected. This means that some function groups are only displayed for one measuring mode, e.g. the "LINEARISATION" function group for the "Level" measuring mode. If certain requirements have to be met for a function group, these are listed in the first row of the table.
- Some parameters are only displayed if other parameters are appropriately configured. For example, the EMPTY CALIB. parameter is not displayed in the Quick Setup menu ("Level" measuring mode) unless the "Linear" option was selected for the LEVEL MODE parameter and the "Wet" option was selected for the CALIBRATION MODE parameter. There is a comment in the parameter description here stating: Note: prerequisite: LEVEL MODE = Linear and CALIBRATION MODE = Wet.
- Parameter names are written in upper case in the text.
- In the "Parameter name" column, the unique identification number (ID) of the parameter is indicated in brackets. This ID only appears on the on-site display.

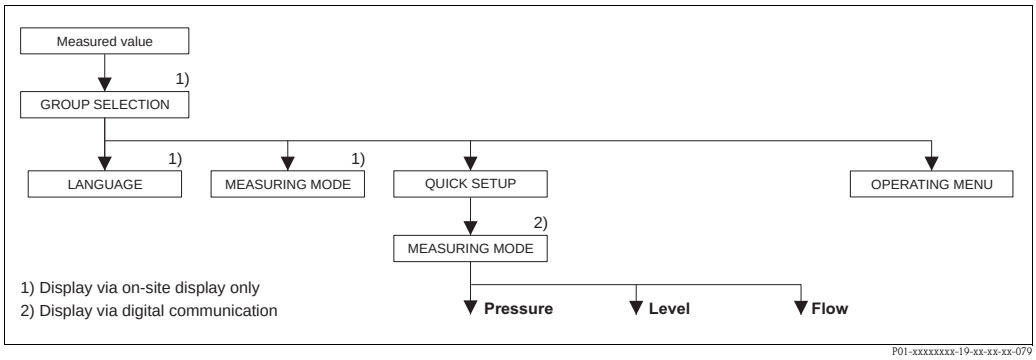


Fig. 21: 1st selection level in menu, LANGUAGE (→ see Page 44, Table 1) and MEASURING MODE (→ see Page 45, Table 2)

Table 1: GROUP SELECTION → LANGUAGE – on-site operation	
Parameter name	**Description**
LANGUAGE (079) Selection	Select the menu language for the on-site display. Note! ■ In the operating program and in the HART handheld terminal, the LANGUAGE parameter is arranged in the DISPLAY function group. ■ Select the menu language for FieldCare via the "Options" menu → "Settings" → "Language" tab → "Tool language" field. **Factory setting:** English

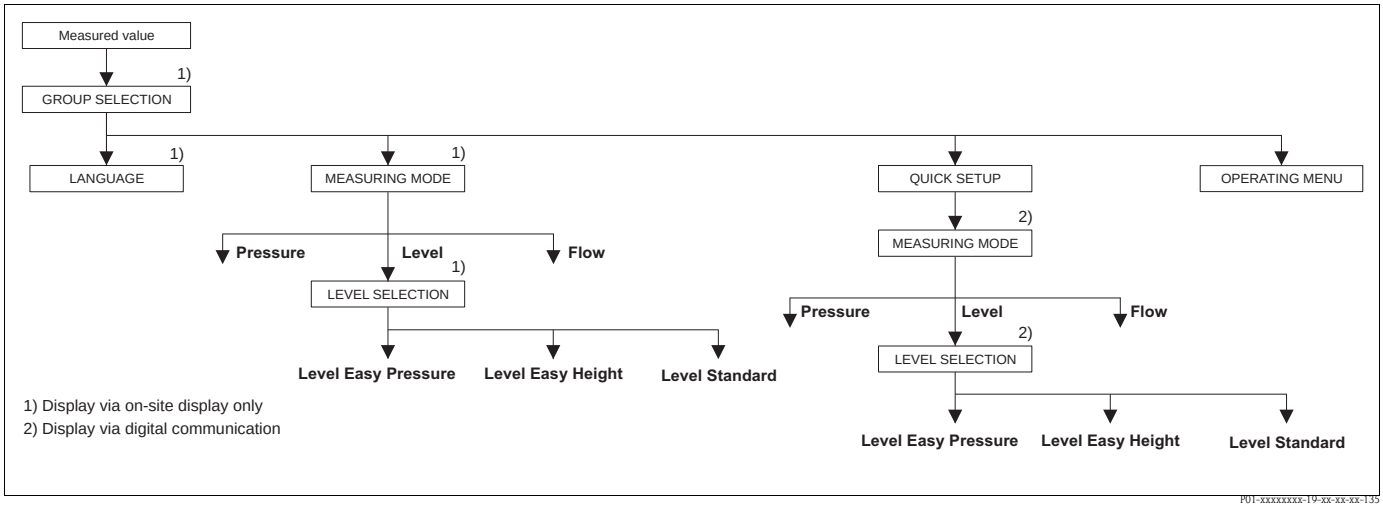


Fig. 22: "Level" measuring mode, LEVEL SELECTION parameter

Table 2: GROUP SELECTION → MEASURING MODE – on-site operation	
Parameter name	**Description**
MEASURING MODE (389) Selection	Select the measuring mode. The operating menu is structured according to the selected measuring mode. Note! ■ The MEASURING MODE parameter is displayed in the operating program and in the HART handheld terminal in the QUICK SETUP menus and in the BASIC SETUP function group (OPERATING MENU → SETTINGS → BASIC SETUP). Warning! If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured. **Options:** ■ Pressure ■ Level ■ Deltabar S: Flow **Factory setting:** ■ Cerabar S and Deltabar S: Pressure ■ Deltapilot S: Level

Table 2: GROUP SELECTION → MEASURING MODE – on-site operation	
Parameter name	**Description**
LEVEL SELECTION (020) Options	Select level mode. **Prerequisite:** ■ MEASURING MODE = Level ✎ Note! ■ In the "Level Easy Pressure" and "Level Easy Height" level modes, the values entered are not tested as extensively as in the "Level Standard" level mode. The values entered for EMPTY CALIB./FULL CALIB., EMPTY PRESSURE/FULL PRESSURE, EMPTY HEIGHT/FULL HEIGHT and SET LRV/SET URV must have a minimum interval of 1% for the "Level Easy Pressure" and "Level Easy Height" level modes. The value will be rejected with a warning message if the values are too close together. Further limit values are not checked; i.e. the values entered must be appropriate for the sensor and the measuring task so that the measuring device can measure correctly. → For an overview of the different level modes and types, see Page 14, Section 5.1 "Overview of level measurement". ■ The "Level Easy Pressure" and "Level Easy Height" level modes encompass fewer parameters than the "Level Standard" mode and are used for quick and easy configuration of a level application. ■ Customer-specific units of fill level, volume and mass or a linearization table may only be entered in the "Level Standard" level mode. ■ Where the device is intended for use as a subsystem in a safety function (SIL), a "Device configuration with enhanced parameter security" (SAFETY CONFIRM.) is only possible for the "Level" operating mode in the "Level Easy Pressure" level mode. All parameters previously entered are checked after a password is entered. Once the "Level Easy Height" or "Level Standard" has been selected, the configuration will first have to be reset to the ex-works setting using the RESET parameter (menu path: (GROUP SELECTION →) OPERATING MENU → OPERATION) using the reset code "7864". → For additional information, see the Safety Manual for Deltabar S (SD00189), Cerabar S (SD00190) or Deltapilot S (SD00213P). **Options:** ■ Level Easy Pressure Specify two pressure-level value pairs for this level mode. The pressure measured value is converted directly to the unit which is selected via the OUTPUT UNIT parameter (→ Page 60). Two calibration modes, "Wet" and "Dry", are available. – Wet calibration takes place by filling and emptying the container. In the case of two different levels, the level, volume, mass or percentage value entered is assigned to the pressure measured at this point in time. – Dry calibration is a theoretical calibration. For this calibration, specify two pressure-level value pairs via the EMPTY CALIB., EMPTY PRESSURE, FULL CALIB. and FULL PRESSURE parameters. → Parameter descriptions see Page 61 ff. ■ Level Easy Height For this level mode, specify a height unit, density and two height-level value pairs. The pressure measured value is converted to a height value using the density entered and the height unit. Two calibration modes, "Wet" and "Dry", are available. – Wet calibration takes place by filling and emptying the container. In the case of two different levels, the level, volume, mass or percentage value entered is assigned to the converted height value. – Dry calibration is a theoretical calibration. For this calibration, specify two height-level value pairs via the EMPTY CALIB., EMPTY HEIGHT, FULL CALIB. and FULL HEIGHT parameters. → Parameter descriptions see Page 65 ff. ■ Level standard Once you have selected this level mode, you can use the LEVEL MODE parameter (→ Page 68) to choose between "Linear", "Pressure Linearized" and "Height Linearized". **Factory setting:** Level Easy Pressure
→ For LEVEL SELECTION = "Level Easy Pressure" see Page 58, Table 8. → For LEVEL SELECTION = "Level Easy Height" see Page 62, Table 9. → For LEVEL SELECTION = "Level standard" see Page 67, Table 10.	

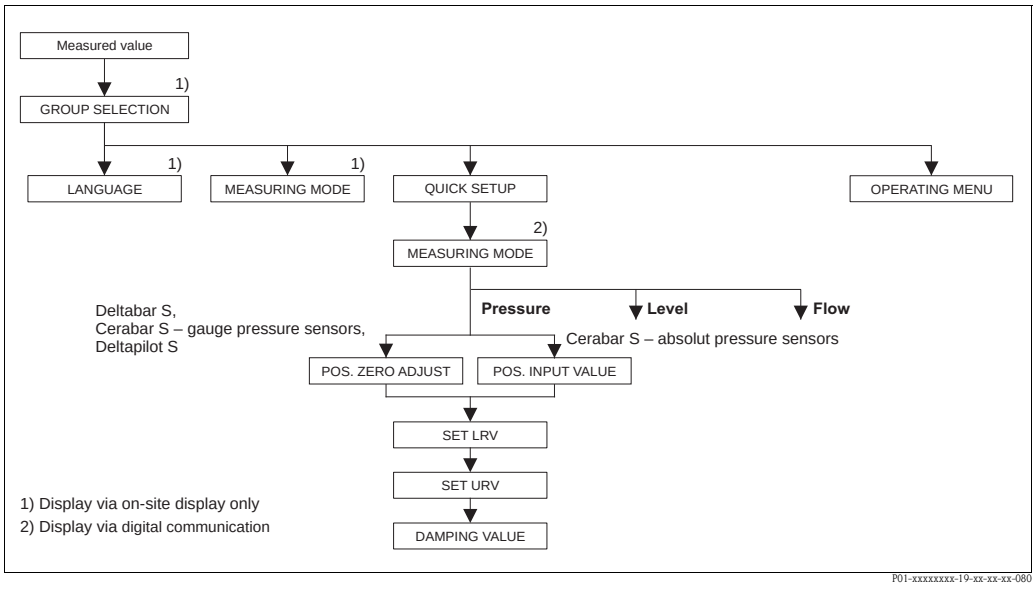


Fig. 23: Quick Setup menu for the "Pressure" measuring mode

Table 3: (GROUP SELECTION →) QUICK SETUP "Pressure"	
Parameter name	**Description**
This menu displays the most important parameters for the "Pressure" measuring mode. **Prerequisite:** ■ MEASURING MODE = Pressure (→ see also Page 45). **Note:** See also – Page 55 ff, Table 7: BASIC SETUP – Page 96, Table 15: EXTENDED SETUP – Page 121 ff, Table 27: PROCESS VALUES – Page 11 ff, Section 4 "Pressure measurement".	
MEASURING MODE Selection	Select the measuring mode. The operating menu is structured according to the selected measuring mode. ⚠ Warning! If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured. **Prerequisite:** ■ Digital communication **Options:** ■ Pressure ■ Level ■ Deltabar S: Flow **Factory setting:** ■ Cerabar S and Deltabar S: Pressure ■ Deltapilot S: Level

Table 3: (GROUP SELECTION →) QUICK SETUP "Pressure"	
Parameter name	**Description**
POS. ZERO ADJUST (685) Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. Due to the orientation of the device, there may be a shift in the measured value, i.e. for example, when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero. **Example:** – MEASURED VALUE = 2.2 mbar (0.033 psi) – Correct the MEASURED VALUE via the POS. ZERO ADJUST parameter with the "Confirm" option. This means that you are assigning the value 0.0 to the pressure present. – MEASURED VALUE (after pos. zero adjust) = 0.0 mbar – The current value is also corrected. The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. **Prerequisite:** ■ This parameter is displayed for Deltabar S, Cerabar S with gauge pressure sensor and Deltapilot S. **Options:** ■ Abort ■ Confirm **Factory setting:** 0.0
POS. INPUT VALUE (563) Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. To correct the pressure difference, you need a reference measurement value (e. g. from a reference device). Due to the orientation of the device, there may be a shift in the measured value, i.e. for example, when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero or the desired value. **Example:** – MEASURED VALUE = 0.5 mbar (0.0075 psi) – For the POS. INPUT VALUE parameter, specify the desired set point for the MEASURED VALUE, e.g. 2 mbar. (MEASURED VALUE$_{new}$ = POS. INPUT VALUE) – MEASURED VALUE (after entry for POS. INPUT VALUE) = 2.0 mbar (0.03 psi) – The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. CALIB. OFFSET = MEASURED VALUE $_{old}$ – POS. INPUT VALUE, here: CALIB. OFFSET = 0.5 mbar (0.0075 psi) – 2.0 mbar (0.03 psi) = – 1.5 mbar (0.0225 psi)) – The current value is also corrected. **Prerequisite:** ■ This parameter is displayed for Cerabar S with absolute pressure sensors. **Factory setting:** 0.0
SET LRV (245) Entry	Set lower range value – without reference pressure. Enter pressure value for the lower current value (4 mA). **Factory setting:** 0.0 or as per order specifications
SET URV (246) Entry	Set upper range value – without reference pressure. Enter pressure value for the upper current value (20 mA). **Factory setting:** High sensor limit (→ see PRESS. SENS HILIM, Page 119) or as per order specifications
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

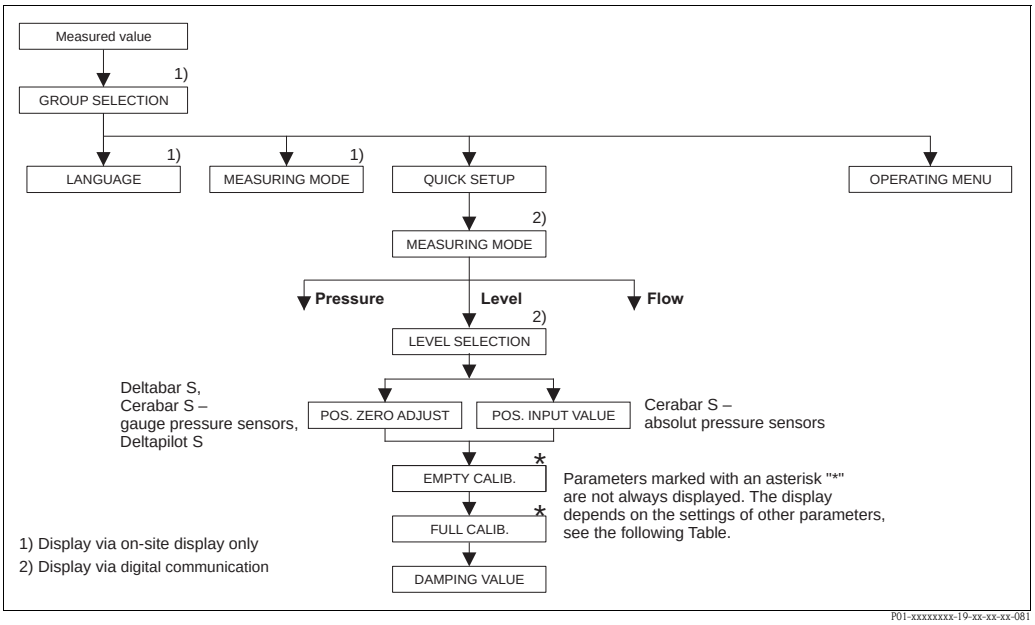


Fig. 24: Quick Setup menu for the "Level" measuring mode

Table 4: (GROUP SELECTION →) QUICK SETUP "Level"	
Parameter name	**Description**
This menu displays the most important parameters for the "Level" measuring mode. **Prerequisite**: ■ MEASURING MODE = Level (→ see also Page 45). **Note:** See also – Page 67 ff, Tables 10 to 13: BASIC SETUP – Page 96 ff, Table 16: EXTENDED SETUP – Page 100 ff, Table 18: LINEARISATION – on-site operation – Page 104 ff, Table 19: LINEARISATION – Digital communication – Page 122 ff, Table 28: PROCESS VALUES – Page 14 ff, Section 5 "Level measurement".	
MEASURING MODE Selection	Select the measuring mode. The operating menu is structured according to the selected measuring mode. ⚠ Warning! If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured. **Prerequisite:** ■ Digital communication **Options**: ■ Pressure ■ Level ■ Deltabar S: Flow **Factory setting:** ■ Cerabar S and Deltabar S: Pressure ■ Deltapilot S: Level
LEVEL SELECTION (020) Options	Select level mode. → Parameter description, see Page 46. **Factory setting:** Level Easy Pressure

Table 4: (GROUP SELECTION →) QUICK SETUP "Level"	
Parameter name	**Description**
POS. ZERO ADJUST (685) Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero. **Example:** – MEASURED VALUE = 2.2 mbar (0.033 psi) – Correct the MEASURED VALUE via the POS. ZERO ADJUST parameter with the "Confirm" option. This means that you are assigning the value 0.0 to the pressure present. – MEASURED VALUE (after pos. zero adjust) = 0.0 mbar – The current value is also corrected. The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. **Prerequisite:** ■ This parameter is displayed for Deltabar S, Cerabar S with gauge pressure sensor and Deltapilot S. **Options:** ■ Abort ■ Confirm **Factory setting:** 0.0
POS. INPUT VALUE (563) Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. To correct the pressure difference, you need a reference measurement value (e. g. from a reference device). Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero or the desired value. **Example:** – MEASURED VALUE = 0.5 mbar (0.0075 psi) – For the POS. INPUT VALUE parameter, specify the desired set point for the MEASURED VALUE, e.g. 2.0 mbar (0.03 psi). (MEASURED VALUE $_{new}$ = POS. INPUT VALUE) – MEASURED VALUE (after entry for POS. INPUT VALUE) = 2.0 mbar (0.03 psi) – The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. CALIB. OFFSET = MEASURED VALUE$_{old}$ – POS. INPUT VALUE, here: CALIB. OFFSET = 0.5 mbar (0.0075 psi) – 2.0 mbar (0.03 psi) = – 1.5 mbar (0.0225 psi)) – The current value is also corrected. **Prerequisite:** ■ This parameter is displayed for Cerabar S with absolute pressure sensors. **Factory setting:** 0.0
EMPTY CALIB. (314)/(010) Entry	Enter level value for the lower calibration point (container empty). The container is either empty or part full. By entering a value for this parameter, you are assigning a level value to the pressure present at the device. **Prerequisite:** ■ LEVEL SELECTION = Level Easy Pressure (→ see also Page 46), CALIBRATION MODE = Wet (→ see also Page 60) ■ LEVEL SELECTION = Level Standard (→ see also Page), LEVEL MODE = Linear (→ see also Page 68), CALIBRATION MODE = Wet (→ see also Page 73) ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 0.0

Table 4: (GROUP SELECTION →) QUICK SETUP "Level"	
Parameter name	**Description**
FULL CALIB. (315)/(004) Entry	Enter level value for the upper calibration point (container full). The container is either completely or almost full. By entering a value for this parameter, you are assigning a level value to the pressure present at the device. **Prerequisite:** ■ LEVEL SELECTION = Level Easy Pressure (→ see also Page 46), CALIBRATION MODE = Wet (→ see also Page 60) ■ LEVEL SELECTION = Level Standard, LEVEL MODE = Linear (→ see also Page 68), CALIBRATION MODE = Wet (→ see also Page 73) ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 100.0
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

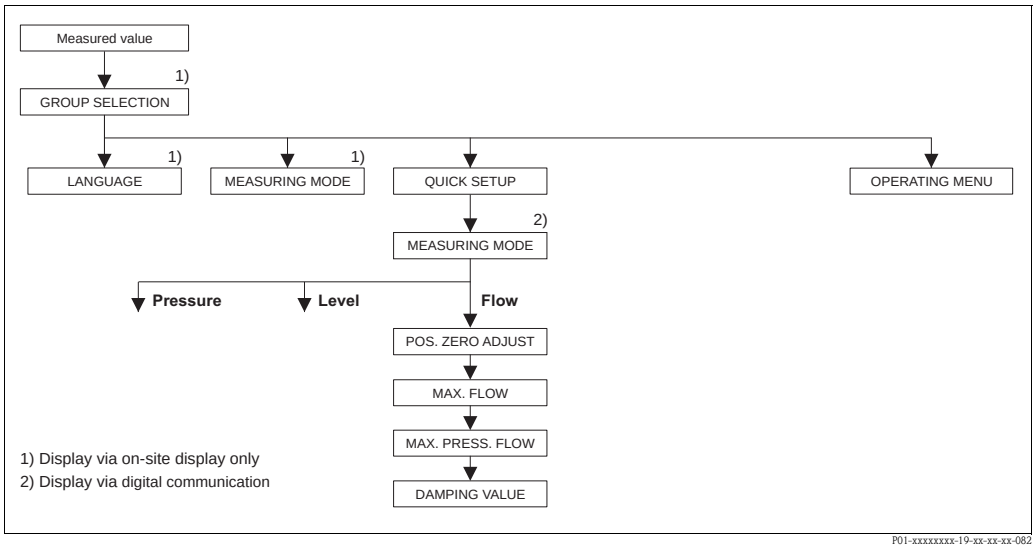


Fig. 25: Quick Setup menu, "Flow" measuring mode

Table 5: (GROUP SELECTION →) QUICK SETUP "Flow"	
Parameter name	**Description**
This menu displays the most important parameters for the "Flow" measuring mode. **Prerequisite**: ■ Deltabar S differential pressure transmitter ■ MEASURING MODE = Flow (→ see also Page 45). **Note:** See also – Page 91, Table 14: BASIC SETUP – Page 98, Table 17: EXTENDED SETUP – Page 107, Table 20: TOTALIZER SETUP – Page 40 ff, Section 6 "Flow measurement".	
MEASURING MODE Selection	Select the measuring mode. The operating menu is structured according to the selected measuring mode. ⚠ Warning! If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured. **Prerequisites:** ■ Digital communication **Options**: ■ Pressure ■ Level ■ Deltabar S: Flow **Factory setting:** ■ Cerabar S and Deltabar S: Pressure ■ Deltapilot S: Level
POS. ZERO ADJUST (685) Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. (A reference pressure is present at the device.) Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the MEASURED VALUE parameter does not display zero. **Example:** – MEASURED VALUE = 2.2 mbar (0,033 psi) – Correct the MEASURED VALUE via the POS. ZERO ADJUST parameter with the "Confirm" option. This means that you are assigning the value 0.0 to the pressure present. – MEASURED VALUE (after pos. zero adjust) = 0.0 mbar – The current value is also corrected. The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. **Selection:** ■ Abort ■ Confirm **Factory setting:** 0.0
MAX. FLOW (311) Entry	Enter maximum flow of primary element. See also layout sheet of primary element. The maximum flow is assigned to the maximum pressure which you enter via MAX PRESS. FLOW. ✎ Note! Use the LINEAR/SQROOT parameter (→ Page 113) to specify the current signal for the "Flow" measuring mode. The following applies for the "Flow (square root)" setting: If you enter a new value for MAX. FLOW, the value for SET URV is also changed. Use SET URV to assign a flow to the upper current value. If you want to assign the upper current value a value other than that for MAX. FLOW, you must enter the desired value for SET URV. (→ SET URV, Page 100). **Factory setting:** 1.0

Table 5: (GROUP SELECTION →) QUICK SETUP "Flow"	
Parameter name	**Description**
MAX PRESS. FLOW (634) Entry	Enter maximum pressure of primary element. → See layout sheet of primary element. This value is assigned to the maximum flow value (→ see MAX. FLOW). ✎ Note! Use the LINEAR/SQROOT parameter (→ Page 113) to specify the current signal for the "Flow" measuring mode. The following applies for the "Differential pres." setting: If you enter a new value for MAX PRESS. FLOW, the value for SET URV is also changed. Use SET URV to assign a pressure value to the upper current value. If you want to assign the upper current value a value other than that for MAX PRESS. FLOW, you must enter the desired value for SET URV. (→ SET URV, Page 100). **Factory setting:** High sensor limit (→ See PRESS. SENS HILIM, Page 119)
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

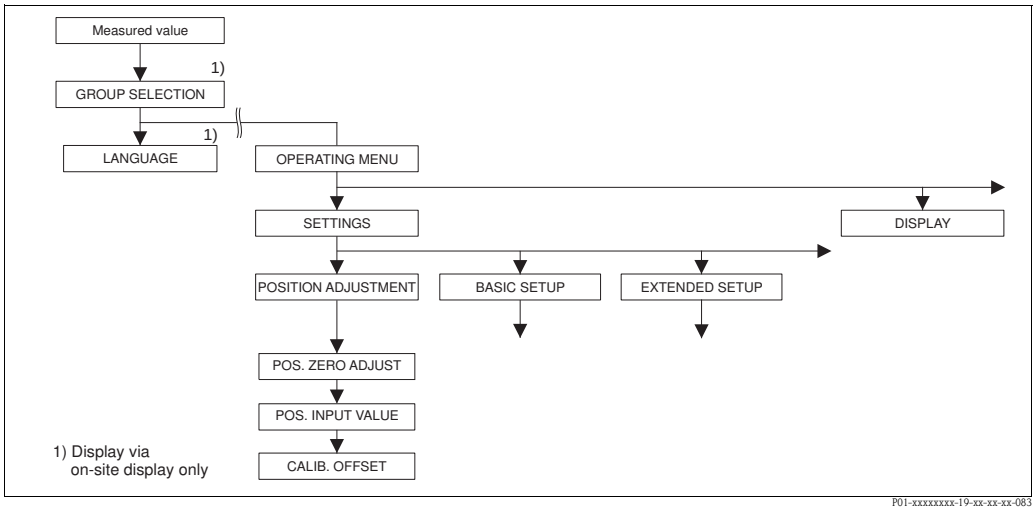


Fig. 26: POSITION ADJUSTMENT function group

Table 6: (GROUP SELECTION →) OPERATING MENU → SETTINGS → POSITION ADJUSTMENT	
Parameter name	**Description**
Due to the orientation of the device, there may be a shift in the measured value, i.e. when the container is empty or partly filled, the measured value does not display zero. Deltabar S and Cerabar S offer three different ways of performing a position adjustment. Recommendation: ■ The pressure difference between zero (set point) and the measured pressure need not be known. – POS. ZERO ADJUST: Deltabar S or Cerabar S with gauge pressure sensor or Deltapilot S. – POS. INPUT VALUE: Cerabar S with absolute pressure sensor. ■ The pressure difference between zero (set point) and the measured pressure is known. – CALIB. OFFSET: Deltabar S, Cerabar S with gauge pressure sensor, Cerabar S with absolute pressure sensor or Deltapilot S.	

Table 6: (GROUP SELECTION →) OPERATING MENU → SETTINGS → POSITION ADJUSTMENT	
Parameter name	**Description**
POS. ZERO ADJUST (685) Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. **Example:** – MEASURED VALUE = 2.2 mbar (0.033 psi) – Correct the MEASURED VALUE via the POS. ZERO ADJUST parameter with the "Confirm" option. This means that you are assigning the value 0.0 to the pressure present. – MEASURED VALUE (after pos. zero adjust) = 0.0 mbar – The current value is also corrected. The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. **Selection:** ■ Abort ■ Confirm **Factory setting:** 0.0
POS. INPUT VALUE (563) Entry	Position adjustment – the pressure difference between zero (set point) and the measured pressure need not be known. To correct the pressure difference, you need a reference measurement value (e. g. from a reference device). **Example:** – MEASURED VALUE = 0.5 mbar (0.0075 psi) – For the POS. INPUT VALUE parameter, specify the desired set point for the MEASURED VALUE, e.g. 2.0 mbar (0.03 psi). (MEASURED $VALUE_{new}$ = POS. INPUT VALUE) – MEASURED VALUE (after entry for POS. INPUT VALUE) = 2.0 mbar (0.03 psi) – The CALIB. OFFSET parameter displays the resulting pressure difference (offset) by which the MEASURED VALUE was corrected. CALIB. OFFSET = MEASURED $VALUE_{old}$ – POS. INPUT VALUE, here: CALIB. OFFSET = 0.5 mbar (0.0075 psi) – 2.0 mbar (0.03 psi) = – 1.5 mbar (0.0225 psi)) – The current value is also corrected. **Factory setting:** 0.0
CALIB. OFFSET (319) Entry	Position adjustment - the pressure difference between zero (set point) and the measured pressure is known. **Example:** – MEASURED VALUE = 2.2 mbar (0.033 psi) – Via the CALIB. OFFSET parameter, enter the value by which the MEASURED VALUE should be corrected. To correct the MEASURED VALUE to 0.0 mbar, you must enter the value 2.2 here. (MEASURED $VALUE_{new}$ = MEASURED $VALUE_{old}$ – CALIB. OFFSET) – MEASURED VALUE (after entry for calib. offset) = 0.0 mbar – The current value is also corrected. **Factory setting:** 0.0

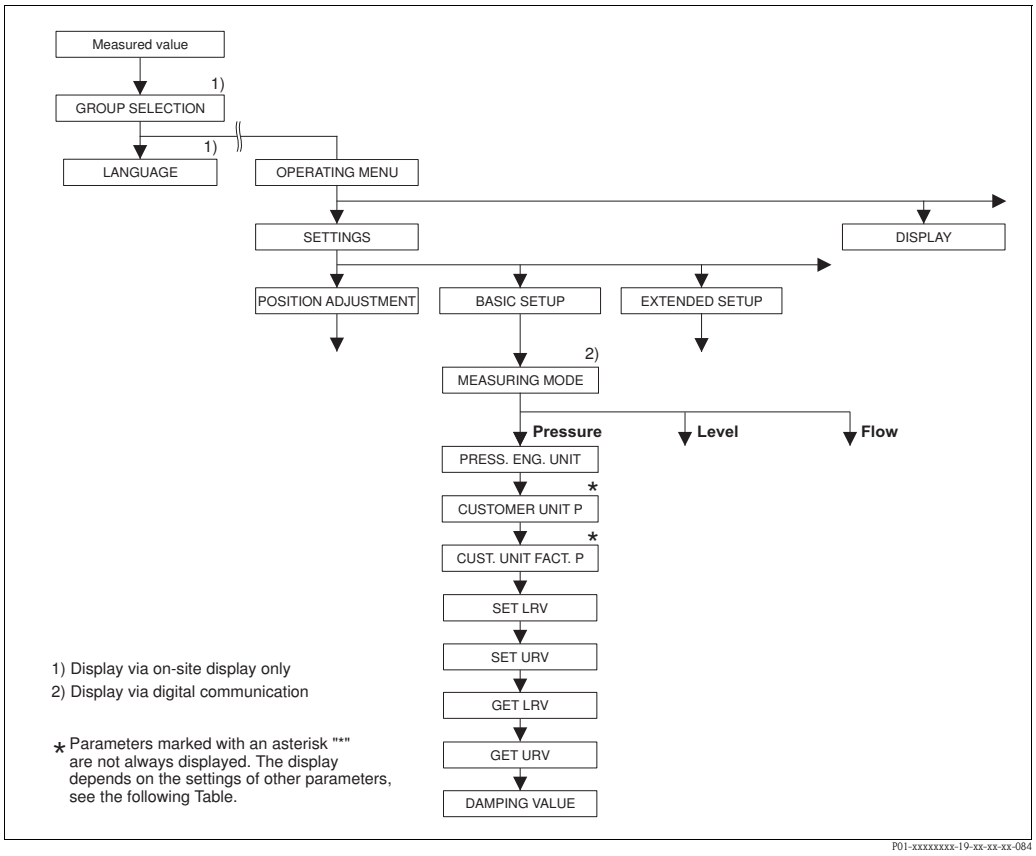


Fig. 27: BASIC SETUP function group for the "Pressure" measuring mode

Table 7: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Pressure"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Pressure (→ see also Page 45). **Note:** See also – Page 47, Table 3: QUICK SETUP – Page 96, Table 15: EXTENDED SETUP – Page 121 ff, Table 27: PROCESS VALUES – Page 11 ff, Section 4 "Pressure measurement".	
MEASURING MODE Selection	Select the measuring mode. The operating menu is structured according to the selected measuring mode. ⚠ Warning! If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured. **Prerequisite:** ■ Digital communication **Options:** ■ Pressure ■ Level ■ Deltabar S: Flow **Factory setting:** ■ Cerabar S and Deltabar S: Pressure ■ Deltapilot S: Level

Table 7: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Pressure"	
Parameter name	**Description**
PRESS. ENG. UNIT (060) Selection	Select pressure unit. If a new pressure unit is selected, all pressure-specific parameters are converted and displayed with the new unit. **Options:** ■ mbar, bar ■ mmH2O, mH2O, inH2O, ftH2O [1)] ■ Pa, hPa, kPa, MPa ■ psi ■ mmHg, inHg [2)] ■ Torr ■ g/cm^2, kg/cm^2 ■ lb/ft^2 ■ atm ■ gf/cm^2, kgf/cm^2 ■ User unit, → See also the following parameter description for CUSTOMER UNIT P and CUST. UNIT FACT. P. 1) The conversion factor of the pressure units refers to a reference temperature of 4 °C (39.2 °F). 2) The conversion factor of the pressure units refers to a reference temperature of 0 °C (32 °F). **Factory setting:** Depends on the sensor nominal measuring range mbar or bar or as per order specifications
CUSTOMER UNIT P (075) Entry	Enter text (unit) for customer-specific pressure unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT P parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –
CUST. UNIT FACT. P (317) Entry	Enter conversion factor for a customer-specific pressure unit. The conversion factor must be entered in relation to the SI unit "Pa". → See also CUSTOMER UNIT P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE =10000 Pa ≙ 1 PU – Entry CUSTOMER UNIT P: PU – Entry CUST. UNIT FACT. P: 0.0001 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0
SET LRV (245) Entry	Set lower range value – without reference pressure. Enter pressure value for the lower current value (4 mA). **Factory setting:** 0.0 or as per order specifications

Table 7: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Pressure"	
Parameter name	**Description**
SET URV (246) Entry	Set upper range value – without reference pressure. Enter pressure value for the upper current value (20 mA). **Factory setting:** High sensor limit (→ See PRESS. SENS HILIM, Page 119)
GET LRV (309) Entry	Set lower range value – reference pressure is present at device. The pressure for the lower current value (4 mA) is present at device. With the "Confirm" option, you assign the lower current value to the pressure value present. On-site display: the pressure value present is displayed in the bottom line. **Options:** ■ Abort ■ Confirm
GET URV (310) Entry	Set upper range value – reference pressure is present at device. The pressure for the upper current value (20 mA) is present at device. With the "Confirm" option, you assign the upper current value to the pressure value present. On-site display: the pressure value present is displayed in the bottom line. **Options:** ■ Abort ■ Confirm
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

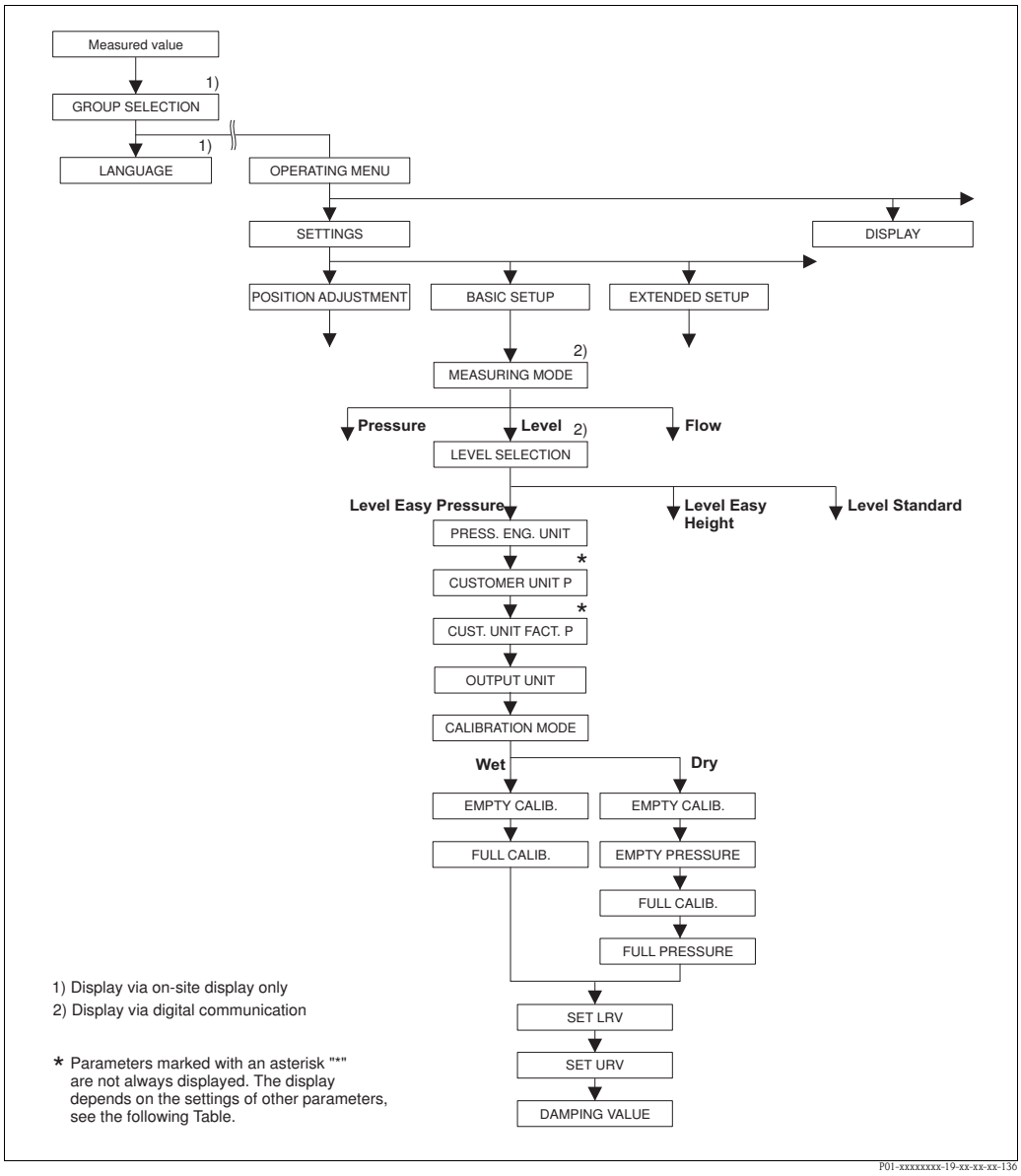


Fig. 28: BASIC SETUP function group for the "Level" measuring mode and "Level Easy Pressure" level selection

Table 8: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Pressure"

The following parameters are displayed if you have selected the "Level Easy Pressure" option for the LEVEL SELECTION parameter. Specify two pressure-level value pairs for this level mode. Two calibration modes, "Wet" and "Dry", are available.

Prerequisite:

- MEASURING MODE = Level (→ see also Page 45.)
- LEVEL SELECTION = Level Easy Pressure (→ See also Page 46.)

Table 8: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Pressure"	
PRESS. ENG. UNIT (060) Selection	Select pressure unit. If a new pressure unit is selected, all pressure-specific parameters are converted and displayed with the new unit. **Options:** ■ mbar, bar ■ mmH2O, mH2O, inH2O, ftH2O [1)] ■ Pa, hPa, kPa, MPa ■ psi ■ mmHg, inHg [2)] ■ Torr ■ g/cm^2, kg/cm^2 ■ lb/ft^2 ■ atm ■ gf/cm^2, kgf/cm^2 ■ User unit, → See also the following parameter description for CUSTOMER UNIT P and CUST. UNIT FACT. P. 1) The conversion factor of the pressure units refers to a reference temperature of 4 °C (39.2 °F). 2) The conversion factor of the pressure units refers to a reference temperature of 0 °C (32 °F). **Factory setting:** Depends on the sensor nominal measuring range mbar or bar or as per order specifications
CUSTOMER UNIT P (075) Entry	Enter text (unit) for customer-specific pressure unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT P parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –
CUST. UNIT FACT. P (317) Entry	Enter conversion factor for a customer-specific pressure unit. The conversion factor must be entered in relation to the SI unit "Pa". → See also CUSTOMER UNIT P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE =10000 Pa ≙ 1 PU – Entry CUSTOMER UNIT P: PU – Entry CUST. UNIT FACT. P: 0.0001 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0

Table 8: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Pressure"	
OUTPUT UNIT (023) Selection	Select unit for measured value display and MEASURED VALUE parameter (→ Page 122). ✎ Note! The selected unit is used only to describe the measured value. This means that when selecting a new output unit, the measured value is not converted. Example: ■ current measured value: 0.3 ft ■ new output unit: m ■ new measured value: 0.3 m (9.8 ft) **Options** ■ % ■ mm, cm, dm, m ■ ft, inch ■ cm^3, dm^3, m^3,m^3 E^3 ■ l, hl ■ ft^3, ft^3 E^3 ■ gal, bbl, Igal ■ g, kg, t ■ lb, ton, oz **Factory setting:** %
CALIBRATION MODE (008) Selection	Select calibration mode. **Options:** ■ Wet Wet calibration takes place by filling and emptying the container. In the case of two different levels, the level, volume, mass or percentage value entered is assigned to the pressure measured at this point in time. (→ See also this table, parameter descriptions for EMPTY CALIB. and FULL CALIB.) ■ Dry Dry calibration is a theoretical calibration. For this calibration, specify two pressure-level value pairs via the following parameters: EMPTY CALIB., EMPTY PRESSURE, FULL CALIB. and FULL PRESSURE. **Factory setting:** Wet
EMPTY CALIB. (010) Entry	Enter level, volume, mass or percentage value for the lower calibration point (container empty). The container is either empty or part full. By entering a value for this parameter, you assign a level, volume, mass or percentage value to the pressure present at the device. The unit is selected via the OUTPUT UNIT parameter (→ Page 60). **Prerequisite:** ■ CALIBRATION MODE = Wet ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 0.0
FULL CALIB. (004) Entry	Enter height, volume or mass value for the upper calibration point (container full). The container is either completely or almost full. By entering a value for this parameter, you assign a height, volume or mass value to the pressure present at the device. The unit is selected via the OUTPUT UNIT parameter (→ Page 60). **Prerequisite:** ■ CALIBRATION MODE = Wet ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 100.0

Table 8: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Pressure"	
EMPTY CALIB. (010) Entry	Enter level, volume, mass or percentage value for the lower calibration point (container empty). The values entered for the EMPTY CALIB. and EMPTY PRESSURE parameters form the pressure-level value pair for the lower calibration point. The unit is selected via the OUTPUT UNIT parameter (→ Page 60). **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** 0.0
EMPTY PRESSURE (011) Entry	Enter pressure value for the lower calibration point (container empty). → See also EMPTY CALIB. **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** 0.0
FULL CALIB. (004) Entry	Enter height, volume, mass or percentage value for the upper calibration point (container full). The values entered for the FULL CALIB. and FULL PRESSURE parameters form the pressure-level value pair for the upper calibration point. The unit is selected via the OUTPUT UNIT parameter (→ Page 60). **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** 100.0
FULL PRESSURE (005) Entry	Enter pressure value for the upper calibration point (container full). → See also FULL CALIB. **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** 100.0
SET LRV (013) Entry	Enter value for the lower current value (4 mA). The unit is selected via the OUTPUT UNIT parameter (→ Page 60). **Factory setting:** 0.0
SET URV (012) Entry	Enter value for the upper current value (20 mA). The unit is selected via the OUTPUT UNIT parameter (→ Page 60). **Factory setting:** 100.0
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0 to 999.0 s **Factory setting:** 2.0 s or as per order specifications

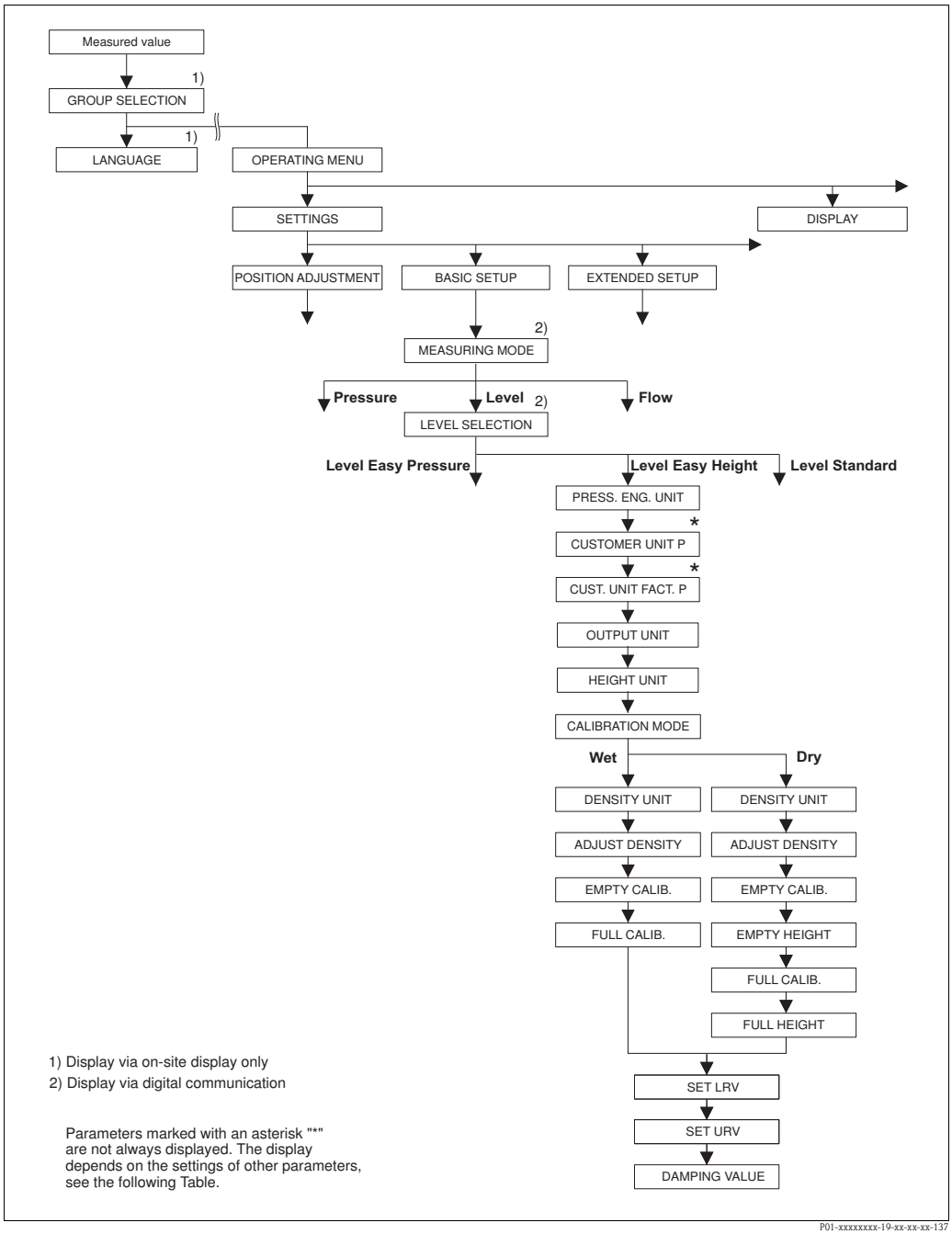


Fig. 29: BASIC SETUP function group for "Level" measuring mode and "Level Easy Height" level selection

Table 9: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Height"

The following parameters are displayed if you have selected the "Level Easy Height" option for the LEVEL SELECTION parameter. For this level mode, specify a height unit, density and two height-level value pairs. The pressure measured value is converted to a height value using the density entered and the height. Two calibration modes, "Wet" and "Dry", are available.

Prerequisite:

- MEASURING MODE = Level (→ see also Page 45.)
- LEVEL SELECTION = Level Easy Height (→ See also Page 46.)

Table 9: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Height"	
PRESS. ENG. UNIT (060) Options	Select pressure unit. If a new pressure unit is selected, all pressure-specific parameters are converted and displayed with the new unit. **Options:** ■ mbar, bar ■ mmH2O, mH2O, inH2O, ftH2O [1)] ■ Pa, hPa, kPa, MPa ■ psi ■ mmHg, inHg [2)] ■ Torr ■ g/cm^2, kg/cm^2 ■ lb/ft^2 ■ atm ■ gf/cm^2, kgf/cm^2 ■ User unit, → See also the following parameter description for CUSTOMER UNIT P and CUST. UNIT FACT. P. 1) The conversion factor of the pressure units refers to a reference temperature of 4 °C (39.2 °F). 2) The conversion factor of the pressure units refers to a reference temperature of 0 °C (32 °F). **Factory setting:** Depends on the sensor nominal measuring range mbar or bar or as per order specifications
CUSTOMER UNIT P (075) Entry	Enter text (unit) for customised pressure unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customised unit is displayed only in the CUSTOMER UNIT P parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –
CUST. UNIT FACT. P (317) Entry	Enter conversion factor for a customer-specific pressure unit. The conversion factor must be entered in relation to the SI unit "Pa". → See also CUSTOMER UNIT P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE =10000 Pa ≙ 1 PU – Entry CUSTOMER UNIT P: PU – Entry CUST. UNIT FACT. P: 0.0001 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0

Table 9: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Height"	
OUTPUT UNIT (023) Options	Select unit for measured value display and MEASURED VALUE parameter (→ Page 122). ✎ Note! The selected unit is used only to describe the measured value. This means that when selecting a new output unit, the measured value is not converted. Example: ■ current measured value: 0.3 ft ■ new output unit: m ■ new measured value: 0.3 m (9.8 ft) **Options:** ■ % ■ mm, cm, dm, m ■ ft, inch ■ cm^3, dm^3, m^3,m^3 E^3 ■ l, hl ■ ft^3, ft^3 E^3 ■ gal, bbl, Igal ■ g, kg, t ■ lb, ton, oz **Factory setting:** %
HEIGHT UNIT (003) Options	Select height unit. The measured pressure is converted to the chosen height unit using the DENSITY UNIT and ADJUST DENSITY parameters. **Options:** ■ mm ■ cm ■ dm ■ m ■ inch ■ ft **Factory setting:** m
CALIBRATION MODE (008) Options	Select calibration mode. **Options:** ■ Wet Wet calibration takes place by filling and emptying the container. The measured pressure is converted to the chosen height unit using the HEIGHT UNIT, DENSITY UNIT and ADJUST DENSITY parameters. In the case of two different levels, the level, volume, mass or percentage value entered is assigned to the converted height value. ■ Dry Dry calibration is a theoretical calibration. For this calibration, specify two height-level value pairs via the EMPTY CALIB., EMPTY HEIGHT, FULL CALIB. and FULL HEIGHT parameters. **Factory setting:** Dry
DENSITY UNIT (001) Options	Select density unit. The measured pressure is converted to a height using the HEIGHT UNIT, DENSITY UNIT and ADJUST DENSITY parameters. **Options:** ■ g/cm^3 ■ kg/dm^3 ■ kg/m^3 ■ US lb/in^3 ■ US lb/ft^3 **Factory setting:** kg/dm^3
ADJUST DENSITY (007) Entry	Enter density of fluid. The measured pressure is converted to a height using the HEIGHT UNIT, DENSITY UNIT and ADJUST DENSITY parameters. **Factory setting:** 1.0

Table 9: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Height"	
EMPTY CALIB. (010) Entry	Enter level, volume, mass or percentage value for the lower calibration point (container empty). The container is either empty or part full. The measured pressure is converted to a height value using the HEIGHT UNIT, DENSITY UNIT and ADJUST DENSITY parameters and displayed. Using the parameter EMPTY CALIB., you assign a level, volume, mass or percentage value to the height value. The unit is selected via the OUTPUT UNIT parameter (→ Page 64). **Prerequisite:** ■ CALIBRATION MODE = Wet ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 0.0
FULL CALIB. (004) Entry	Enter level, volume, mass or percentage value for the upper calibration point (container full). The container is either completely or almost full. Using the parameters HEIGHT UNIT, DENSITY UNIT and ADJUST DENSITY, the measured pressure is converted to a height value and displayed. Using the parameter FULL CALIB., you assign a level, volume, mass or percentage value to the height value. The unit is selected via the OUTPUT UNIT parameter (→ Page 64). **Prerequisite:** ■ CALIBRATION MODE = Wet ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 100.0
EMPTY CALIB. (010) Entry	Enter level, volume, mass or percentage value for the lower calibration point (container empty). The values entered for the EMPTY CALIB. and EMPTY HEIGHT parameters form the height-level value pair for the lower calibration point. The unit is selected via the OUTPUT UNIT parameter (→ Page 64). **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** 0.0
EMPTY HEIGHT (009) Entry	Height value for the lower calibration point (container empty). The unit is selected via the HEIGHT UNIT parameter (→ Page 64). → See also EMPTY CALIB. **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** Upper range limit (URL) coverted to an height unit
FULL CALIB. (004) Entry	Enter level, volume, mass or percentage value for the upper calibration point (container full). The values entered for the FULL CALIB. and FULL HEIGHT parameters form the height-level value pair for the upper calibration point. The unit is selected via the OUTPUT UNIT parameter (→ Page 64). **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** 100.0

Table 9: (GROUP SELECTION→) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL SELECTION "Level Easy Height"	
FULL HEIGHT (006) Entry	Enter height value for the upper calibration point (container full). The unit is selected via the HEIGHT UNIT parameter (→ Page 64). → See also FULL CALIB. **Prerequisite:** ■ CALIBRATION MODE = Dry **Factory setting:** 0.0
SET LRV (013) Entry	Enter level, volume, mass or percentage value for the lower current value (4 mA). The unit is selected via the OUTPUT UNIT parameter (→ Page 64). **Factory setting:** 0.0
SET URV (012) Entry	Enter level, volume, mass or percentage value for the upper current value (20 mA). The unit is selected via the OUTPUT UNIT parameter (→ Page 64). **Factory setting:** 100.0
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0 to 999.0 s **Factory setting:** 2.0 s or as per order specifications

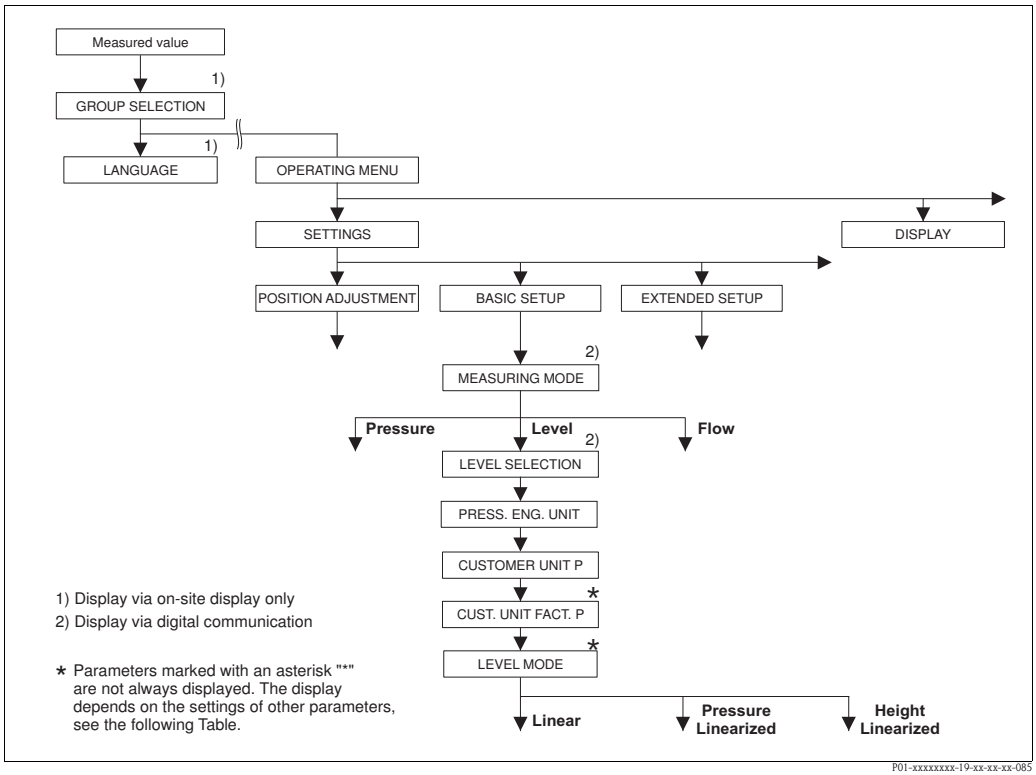


Fig. 30: BASIC SETUP function group for the "Level" measuring mode, depending on the setting for the LEVEL MODE parameter
→ See Page 69, Fig. 31 for LEVEL MODE = Linear,
→ See Page 78, Fig. 33 for LEVEL MODE = Pressure Linearized,
→ See Page 82, Fig. 34 for LEVEL MODE = Height Linearized

Table 10: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = level (→ see also Page 45). **Note:** See also – Page 70 ff, Tables 11 to 13: BASIC SETUP – contd. – Page 96 ff, Table 16: EXTENDED SETUP – Page 100 ff, Table 18: LINEARISATION – on-site operation – Page 104 ff, Table 19: LINEARISATION – Digital communication – Page 122 ff, Table 28: PROCESS VALUES – Page 14 ff, Section 5 "Level measurement".	
MEASURING MODE Selection	Select the measuring mode. The operating menu is structured according to the selected measuring mode. ⚠ Warning! If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured. **Prerequisite:** ■ Digital communication **Options**: ■ Pressure ■ Level ■ Deltabar S: Flow **Factory setting:** Pressure
PRESS. ENG. UNIT (060) Selection	Select pressure unit. If a new pressure unit is selected, all pressure-specific parameters are converted and displayed with the new unit. **Options:** ■ mbar, bar ■ mmH2O, mH2O, inH2O, ftH2O [1)] ■ Pa, hPa, kPa, MPa ■ psi ■ mmHg, inHg [2)] ■ Torr ■ g/cm^2, kg/cm^2 ■ lb/ft^2 ■ atm ■ gf/cm^2, kgf/cm^2 ■ User unit, → See also the following parameter description for CUSTOMER UNIT P and CUST. UNIT FACT. P. 1) The conversion factor of the pressure units refers to a reference temperature of 4 °C (39.2 °F). 2) The conversion factor of the pressure units refers to a reference temperature of 0 °C (32 °F). **Factory setting:** Depends on the sensor nominal measuring range mbar or bar or as per order specifications

Table 10: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level"	
Parameter name	**Description**
CUSTOMER UNIT P (075) Entry	Enter text (unit) for customer-specific pressure unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT P parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –
CUST. UNIT FACT. P (317) Entry	Enter conversion factor for a customer-specific pressure unit. The conversion factor must be entered in relation to the SI unit "Pa". → See also CUSTOMER UNIT P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE =10000 Pa ≙ 1 PU – Entry CUSTOMER UNIT P: PU – Entry CUST. UNIT FACT. P: 0.0001 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0
LEVEL MODE (718) Selection	Select level type. **Options:** ■ Linear: the measured variable (level, volume, mass or %) is in direct proportion to the measured pressure. → See also Page 70 ff, Table 9. ■ Pressure Linearized: the measured variable (volume, mass or %) is not in direct proportion to the measured pressure such as in the case of containers with a conical outlet. For the calibration, enter a linearisation table with at least 2 and not more than 32 points. → See also Page 78 ff, Table 10. ■ Height Linearized: select this level type if you require two measured variables or if the container shape is given with value pairs, e.g. height and volume. The following combinations are possible: – Height + Volume – Height + Mass – Height + % – %-Height + Volume – %-Height + Mass – %-Height + % Perform two calibrations for this level type. First for the measured variable height or %-height like for the "Linear" option and then for the measured variable volume, mass or % like for the "Pressure Linearized" option. → See also Page 83 ff, Table 11. **Factory setting:** Linear
→ For LEVEL MODE = Linear, see Page 70, Table 9. → For LEVEL MODE = Pressure Linearized, see Page 78, Table 10. → For LEVEL MODE = Height Linearized, see Page 83, Table 11.	

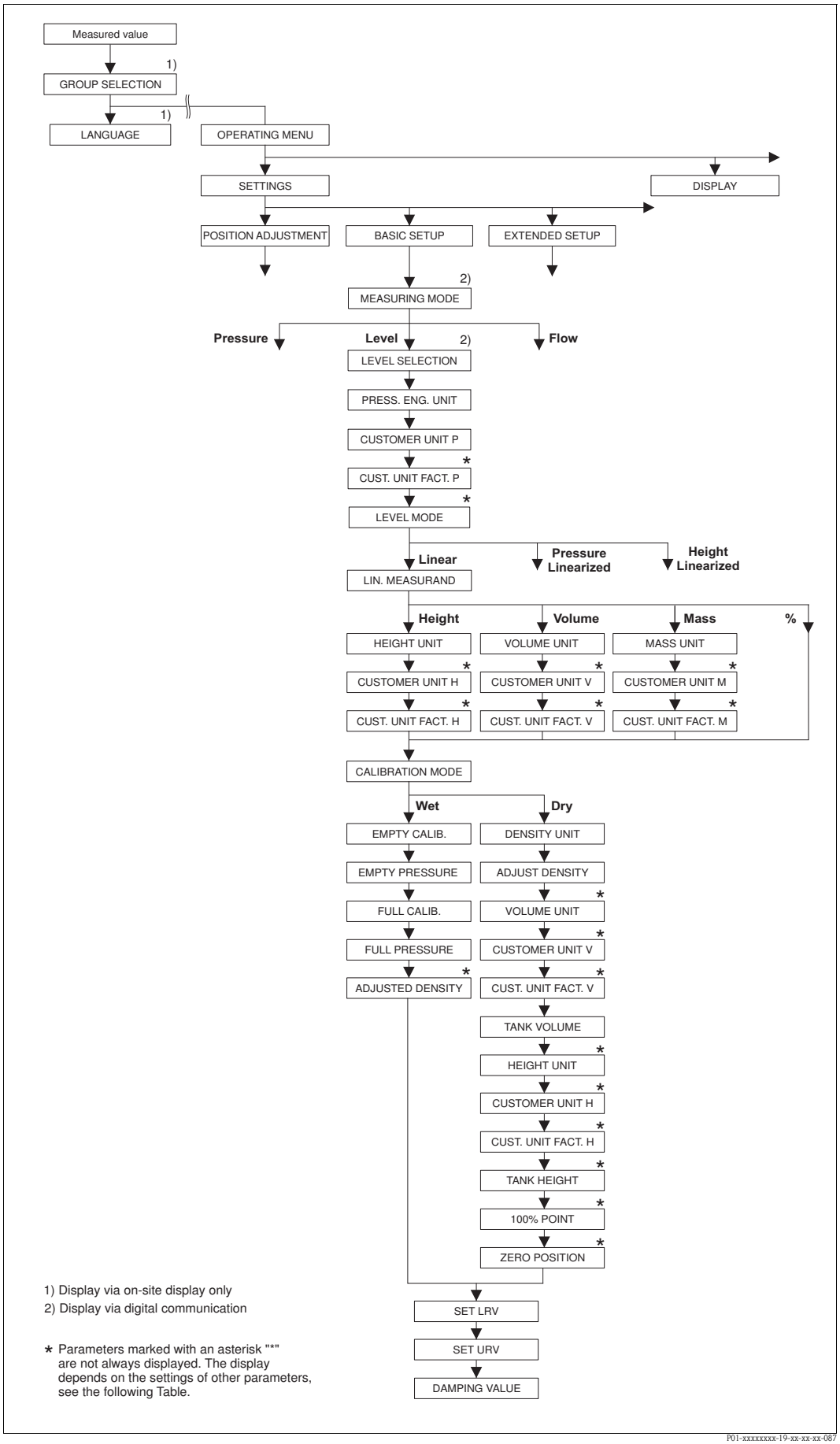


Fig. 31: BASIC SETUP function group for the "Level" measuring mode and "Linear" level type

Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
The following parameters are displayed if you selected the "Linear" option for the LEVEL MODE parameter. For this level type, the measured variable (level, volume, mass or %) is in direct proportion to the measured pressure. **Prerequisite**: ■ MEASURING MODE = Level (→ see also Page 45). ■ LEVEL SELECTION = Level Standard (→ see also Page 46). ■ LEVEL MODE = Linear (→ see also Page 68). **Note:** See also – Page 67 ff, Table 10: BASIC SETUP – general – Page 96 ff, Table 16: EXTENDED SETUP – Page 122 ff, Table 28: PROCESS VALUES – Page 14 ff, Section 5 "Level measurement".	
LIN. MEASURAND (804) Selection	Select measured variable. **Options:** ■ Level ■ Volume ■ Mass ■ % (Level) **Factory setting:** % (Level)
HEIGHT UNIT (708) Selection	Select level unit. **Prerequisite:** ■ LIN. MEASURAND = Level **Options:** ■ mm ■ cm ■ dm ■ m ■ inch ■ ft ■ User unit, → see also the following parameter description for CUSTOMER UNIT H and CUST. UNIT FACT. H. **Factory setting:** m
CUSTOMER UNIT H (706) Entry	Enter text (unit) for customer-specific level unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. H. **Prerequisite:** ■ LIN. MEASURAND = Level, HEIGHT UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT H parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –

Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
CUST. UNIT FACT. H (705) Entry	Enter conversion factor for a customer-specific level unit. The conversion factor must be entered in relation to the SI unit "m". → See also CUSTOMER UNIT H. **Prerequisite:** ■ LIN. MEASURAND = Level, HEIGHT UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE = 0.5 m (1.6 ft) ≙ 1 PU – Entry CUSTOMER UNIT H: PU – Entry CUST. UNIT FACT. H: 2 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0
UNIT VOLUME (313) Selection	Select volume unit. **Prerequisite:** ■ LIN. MEASURAND = Volume **Options:** ■ l ■ hl ■ cm^3 ■ dm^3 ■ m^3 ■ m^3 E^3 ■ ft ■ ft^3 E^3 ■ gal ■ Igal ■ bbl ■ User unit, → see also the following parameter description for CUSTOMER UNIT V and CUST. UNIT FACT. V. **Factory setting:** m^3
CUSTOMER UNIT V (608) Entry	Enter text (unit) for customer-specific volume unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. V **Prerequisite:** ■ LIN. MEASURAND = Volume, UNIT VOLUME = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT H parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –

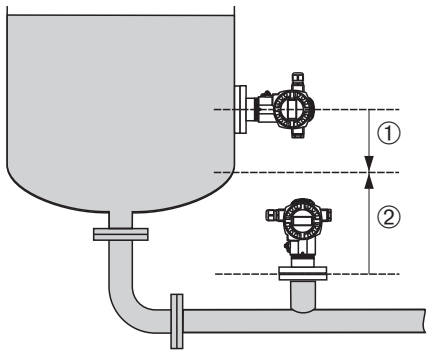
Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
CUST. UNIT FACT. V (607) Entry	Enter conversion factor for a customer-specific volume unit. The conversion factor must be entered in relation to the SI unit "m^3". → See also CUSTOMER UNIT V. **Prerequisite:** ■ LIN. MEASURAND = Volume, UNIT VOLUME = User unit **Example:** – You want the measured value to be displayed in "buckets". – MEASURED VALUE = 0.01 m3 ≙ 1 bucket – Entry CUSTOMER UNIT V: bucket – Entry CUST. UNIT FACT. V: 100 – Result: MEASURED VALUE = 1 bucket **Factory setting:** 1.0
MASS UNIT (709) Selection	Select mass unit. **Prerequisite:** ■ LIN. MEASURAND = Mass **Options:** ■ g ■ kg ■ t ■ oz ■ lb ■ ton ■ User unit, → see also the following parameter description for CUSTOMER UNIT M and CUST. UNIT FACT. M. **Factory setting:** kg
CUSTOMER UNIT M (704) Entry	Enter text (unit) for customer-specific mass unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. M. **Prerequisite:** ■ LIN. MEASURAND = Mass, MASS UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT M parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _

Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
CUST. UNIT FACT. M (703) Entry	Enter conversion factor for a customer-specific mass unit. The conversion factor must be entered in relation to the SI unit "kg". → See also CUSTOMER UNIT M. **Prerequisite:** ■ LIN. MEASURAND = Mass, MASS UNIT = User unit **Example:** – You want the measured value to be displayed in "buckets". – MEASURED VALUE = 10 kg ≙ 1 bucket – Entry CUSTOMER UNIT M: bucket – Entry CUST. UNIT FACT. M: 0.1 – Result: MEASURED VALUE = 1 bucket **Factory setting:** 1.0
CALIBRATION MODE (392) Selection	Select calibration mode. **Options:** ■ Wet Wet calibration takes place by filling and emptying the container. This calibration mode requires two pressure-level value pairs to be entered. In the case of two different levels, the level value is entered and the pressure measured at this moment is assigned to the level value. → See also the following parameter description for EMPTY CALIB., EMPTY PRESSURE, FULL CALIB. and FULL PRESSURE. ■ Dry Dry calibration is a theoretical calibration which you can carry out even if the device is not mounted or the container is empty. – For the "Level" measured variable, the density of the fluid (→ see Page 74, ADJUST DENSITY) must be entered. – For the "Volume" measured variable, the density of the fluid and the tank volume and tank height must be entered (→ see Page 74, ADJUST DENSITY, TANK VOLUME and TANK HEIGHT). – For the "Mass" measured variable, the tank volume and the tank height must be entered (→ see Page 75, TANK VOLUME and TANK HEIGHT). The density must also be entered in the case of a zero point shift (level offset) (→ see Page 74, ADJUST DENSITY). – For the "%" measured variable, the density of the fluid must be entered and a level assigned to the 100 % point (→ see Page 74 and 77, ADJUST DENSITY and 100% POINT). If the measurement should not start at the mounting location of the device, a level offset must be entered (→ see Page 77, ZERO POSITION). ✎ Note! LIN. MEASURAND: "% (Level)", "Mass" and "Volume": If the change to dry calibration is made after a wet calibration, the density must be entered correctly using the ADJUST DENSITY and DENSITY PROCESS parameter before changing the calibration mode. → See also Page 97. **Factory setting:** Wet
EMPTY CALIB. (314) Entry	Enter level value for the lower calibration point (container empty). The container is either empty or part full. By entering a value for this parameter, you are assigning a level value to the pressure present at the device. → See also EMPTY PRESSURE. **Prerequisite:** ■ CALIBRATION MODE = Wet ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 0.0

Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
EMPTY PRESSURE (710) Display	Displays the pressure value for the lower calibration point (container empty). → See also EMPTY CALIB. **Prerequisite:** ■ CALIBRATION MODE = Wet **Factory setting:** 0.0
FULL CALIB. (315) Entry	Enter level value for the upper calibration point (container full). The container is either completely or almost full. By entering a value for this parameter, you are assigning a level value to the pressure present at the device. → See also FULL PRESSURE. **Prerequisite:** ■ CALIBRATION MODE = Wet ✎ Note! For this parameter, the on-site display shows the level value to be entered and the pressure present at the device. In order for the level value to be saved together with the pressure present at the device, the entry field for the level value must first be activated using the "+"- or "–" key before confirming with the "E" key. This applies also if the level value is to remain unchanged. **Factory setting:** 100.0
FULL PRESSURE (711) Display	Displays the pressure value for the upper calibration point (container full). → See also FULL CALIB. **Prerequisite:** ■ CALIBRATION MODE = Wet **Factory setting:** High sensor limit (→ see PRESS. SENS HILIM, Page 119)
ADJUSTED DENSITY (810) Display	Displays the density calculated from the upper and lower level point. **Prerequisite:** ■ CALIBRATION MODE = Wet, LIN. MEASURAND = Level
DENSITY UNIT (812) Selection	Select density unit. **Prerequisite:** ■ LIN. MEASURAND = Level, CALIBRATION MODE = Dry ■ LIN. MEASURAND = % (Level), CALIBRATION MODE = Dry ■ LIN. MEASURAND = Volume, CALIBRATION MODE = Dry ■ LIN. MEASURAND = Mass, CALIBRATION MODE = Dry **Options:** ■ g/cm^3 ■ kg/dm^3 ■ kg/m^3 ■ US lb/in^3 ■ US lb/ft^3 **Factory setting:** kg/dm^3
ADJUST DENSITY (316) Entry	Enter density of fluid. **Prerequisite:** ■ LIN. MEASURAND = Level, CALIBRATION MODE = Dry ■ LIN. MEASURAND = % (Level), CALIBRATION MODE = Dry ■ LIN. MEASURAND = Volume, CALIBRATION MODE = Dry ■ LIN. MEASURAND = Mass, CALIBRATION MODE = Dry **Factory setting:** 1000.0

Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
UNIT VOLUME (313) Selection	Select volume unit. **Prerequisite:** ■ LIN. MEASURAND = Volume **Options:** ■ l ■ hl ■ cm^3 ■ dm^3 ■ m^3 ■ m^3 E^3 ■ ft ■ ft^3 E^3 ■ gal ■ Igal ■ bbl ■ User unit, → see also the following parameter description for CUSTOMER UNIT V and CUST. UNIT FACT. V. **Factory setting:** m^3
CUSTOMER UNIT V (608) Entry	Enter text (unit) for customer-specific volume unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. V **Prerequisite:** ■ LIN. MEASURAND = Volume, UNIT VOLUME = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT H parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
CUST. UNIT FACT. V (607) Entry	Enter conversion factor for a customer-specific volume unit. The conversion factor must be entered in relation to the SI unit "m^3". → See also CUSTOMER UNIT V. **Prerequisite:** ■ LIN. MEASURAND = Volume, UNIT VOLUME = User unit **Example:** – You want the measured value to be displayed in "buckets". – MEASURED VALUE = 0.01 m3 ≙ 1 bucket – Entry CUSTOMER UNIT V: bucket – Entry CUST. UNIT FACT. V: 100 – Result: MEASURED VALUE = 1 bucket **Factory setting:** 1.0
TANK VOLUME (858) Entry	Enter tank volume. **Prerequisite:** ■ LIN. MEASURAND = Volume, CALIBRATION MODE = Dry ■ LIN. MEASURAND = Mass, CALIBRATION MODE = Dry **Factory setting:** 1.0 m^3

Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
HEIGHT UNIT (708) Selection	Select level unit. **Prerequisite:** ■ LIN. MEASURAND = % (Level), CALIBRATION MODE = Dry **Options:** ■ mm ■ dm ■ cm ■ m ■ inch ■ ft ■ User unit, → see also the following parameter description for CUSTOMER UNIT H and CUST. UNIT FACT. H. **Factory setting:** m
CUSTOMER UNIT H (706) Entry	Enter text (unit) for customer-specific level unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. H. **Prerequisite:** ■ LIN. MEASURAND = % (Level), CALIBRATION MODE = Dry, HEIGHT UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT H parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
CUST. UNIT FACT. H (705) Entry	Enter conversion factor for a customer-specific level unit. The conversion factor must be entered in relation to the SI unit "m". → See also CUSTOMER UNIT H. **Prerequisite:** ■ LIN. MEASURAND = % (Level), CALIBRATION MODE = Dry, HEIGHT UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE = 0.5 m (1.6 ft) ≙ 1 PU – Entry CUSTOMER UNIT H: PU – Entry CUST. UNIT FACT. H: 2 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0
TANK HEIGHT (859) Entry	Enter tank height. **Prerequisite:** ■ LIN. MEASURAND = Volume, CALIBRATION MODE = Dry ■ LIN. MEASURAND = Mass, CALIBRATION MODE = Dry **Factory setting:** 1.0 m

Table 11: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Linear"	
Parameter name	**Description**
100% POINT (813) Entry	Enter level value for 100% point. **Prerequisite:** ▪ LIN. MEASURAND = % (Level), CALIBRATION MODE = Dry **Example:** – The 100 %-point should correspond to 4 m (13 ft). – Select the "m" unit via the HEIGHT UNIT parameter. – Enter the value "4" for this parameter (100% POINT). **Factory setting:** 1.0
ZERO POSITION (814) Entry	Enter value for level offset. If the measurement should not start at the mounting location of the device, e.g. for containers with a sump, carry out zero point shift (level offset). **Prerequisite:** ▪ CALIBRATION MODE = Dry **Factory setting:** 0.0  P01-PMP75xxx-19-xx-xx-xx-001 *Fig. 32: Zero point shift* *1 Device is mounted above the level lower range value: a positive value has to be entered for ZERO POSITION.* *2 Device is mounted below the level lower range value: a negative value has to be entered for ZERO POSITION.*
SET LRV (719) Entry	Enter level value for the lower current value (4 mA). **Factory setting:** 0.0
SET URV (720) Entry	Enter level value for the upper current value (20 mA). **Factory setting:** 100.0
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

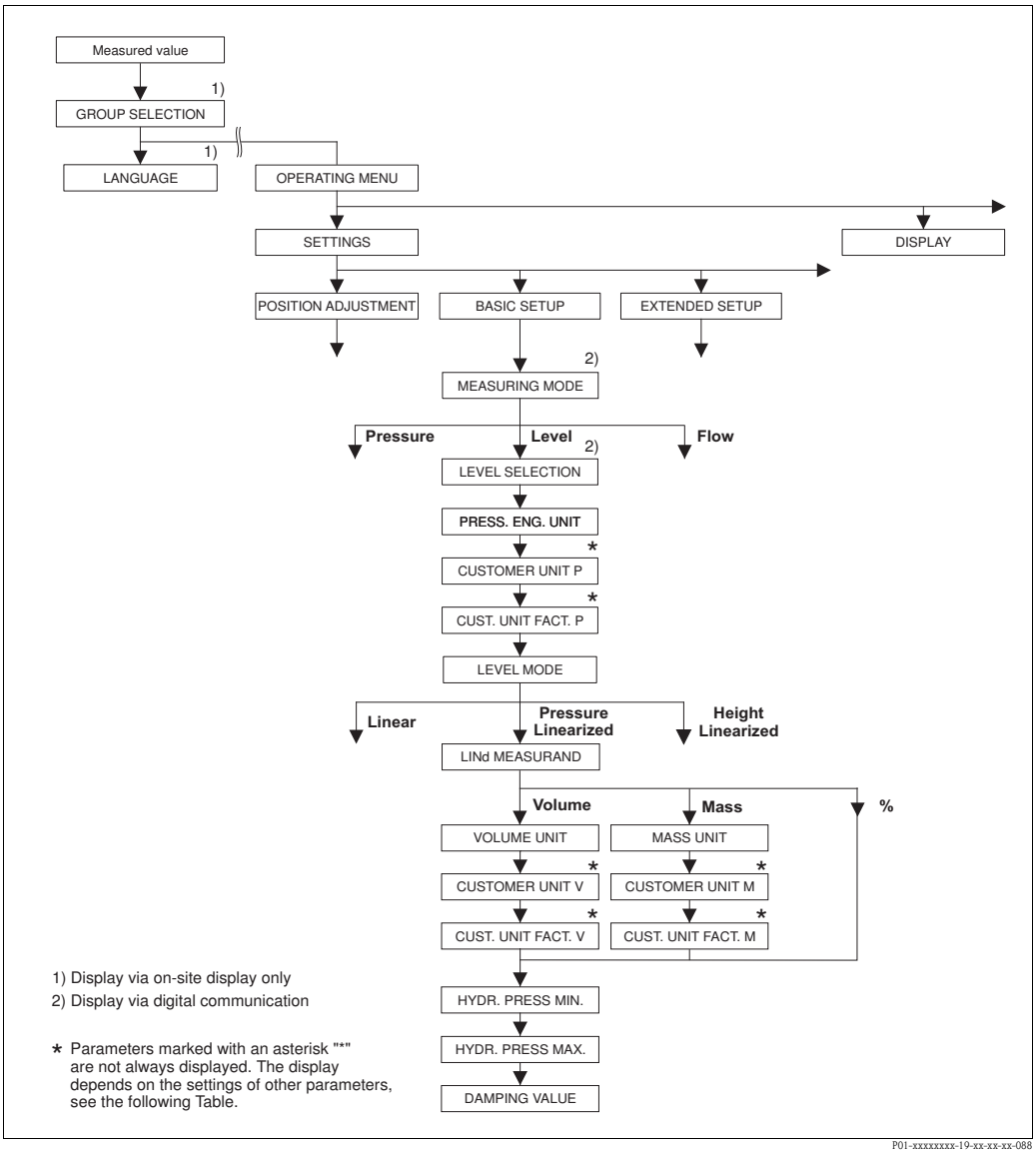


Fig. 33: BASIC SETUP function group for the "Level" measuring mode and the "Pressure Linearized" level type, continue calibration with LINEARISATION function group
→ See Page 100 ff for on-site operation and Page 104 ff for operation with digital communication.

Table 12: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Pressure Linearized"

Parameter name	Description

The following parameters are displayed if you selected the "Pressure Linearized" option for the LEVEL MODE parameter. For this level type, the measured variable (volume, mass or %) is not in direct proportion to the measured pressure. For the calibration, enter a linearisation table with at least 2 and not more than 32 points.

Prerequisite:
- MEASURING MODE = Level (→ see also Page 45).
- LEVEL SELECTION = Level Standard (→ see also Page 46).
- LEVEL MODE = Pressure Linearized (→ see also Page 68).

Note:
See also
– Page 67 ff, Table 10: BASIC SETUP – general
– Page 96 ff, Table 16: EXTENDED SETUP
– Page 100 ff, Table 18: LINEARISATION – on-site operation
– Page 104 ff, Table 19: LINEARISATION – Digital communication
– Page 122 ff, Table 28: PROCESS VALUES
– Page 14 ff, Section 5 "Level measurement".

Table 12: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Pressure Linearized"	
Parameter name	**Description**
LINd. MEASURAND (805) Selection	Select measured variable. **Options:** ■ Pressure and Volume ■ Pressure and Mass ■ Pressure and % **Factory setting:** Pressure and %
UNIT VOLUME (313) Selection	Select volume unit. **Prerequisite:** ■ LINd. MEASURAND = Pressure and Volume **Options:** ■ l ■ hl ■ cm^3 ■ dm^3 ■ m^3 ■ m^3 E^3 ■ ft ■ ft^3 E^3 ■ gal ■ Igal ■ bbl ■ User unit, → see also the following parameter description for CUSTOMER UNIT V and CUST. UNIT FACT. V. **Factory setting:** m^3
CUSTOMER UNIT V (608) Entry	Enter text (unit) for customer-specific volume unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. V **Prerequisite:** ■ LINd. MEASURAND = Pressure and Volume, UNIT VOLUME = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT V parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –
CUST. UNIT FACT. V (607) Entry	Enter conversion factor for a customer-specific volume unit. The conversion factor must be entered in relation to the SI unit "m^3". → See also CUSTOMER UNIT V. **Prerequisite:** ■ LINd. MEASURAND = Pressure and Volume, UNIT VOLUME = User unit **Example:** – You want the measured value to be displayed in "buckets". – MEASURED VALUE = 0.01 m3 ≙ 1 bucket – Entry CUSTOMER UNIT V: bucket – Entry CUST. UNIT FACT. V: 100 – Result: MEASURED VALUE = 1 bucket **Factory setting:** 1.0

Table 12: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Pressure Linearized"	
Parameter name	**Description**
MASS UNIT (709) Selection	Select mass unit. **Prerequisite:** ■ LINd. MEASURAND = Pressure and Mass **Options:** ■ g ■ kg ■ t ■ oz ■ lb ■ ton ■ User unit, → see also the following parameter description for CUSTOMER UNIT M and CUST. UNIT FACT. M. **Factory setting:** kg
CUSTOMER UNIT M (704) Entry	Enter text (unit) for customer-specific mass unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. M. **Prerequisite:** ■ LINd. MEASURAND = Pressure and Mass, MASS UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT M parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
CUST. UNIT FACT. M (703) Entry	Enter conversion factor for a customer-specific mass unit. The conversion factor must be entered in relation to the SI unit "kg". → See also CUSTOMER UNIT M. **Prerequisite:** ■ LINd. MEASURAND = Pressure and Mass, MASS UNIT = User unit **Example:** – You want the measured value to be displayed in "buckets". – MEASURED VALUE = 10 kg ≙ 1 bucket – Entry CUSTOMER UNIT M: bucket – Entry CUST. UNIT FACT. M: 0.1 – Result: MEASURED VALUE = 1 bucket **Factory setting:** 1.0
HYDR. PRESS MIN. (775) Entry	Enter the minimum hydrostatic pressure to be expected. The input limits for the calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the minimum hydrostatic pressure to be expected, the more accurate the measurement result. **Factory setting:** 0.0

Table 12: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Pressure Linearized"	
Parameter name	**Description**
HYDR. PRESS MAX. (761) Entry	Enter the maximum hydrostatic pressure to be expected. The input limits for the calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the maximum hydrostatic pressure to be expected, the more accurate the measurement result. **Factory setting:** High sensor limit (→ See PRESS. SENS HILIM, Page 119)
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

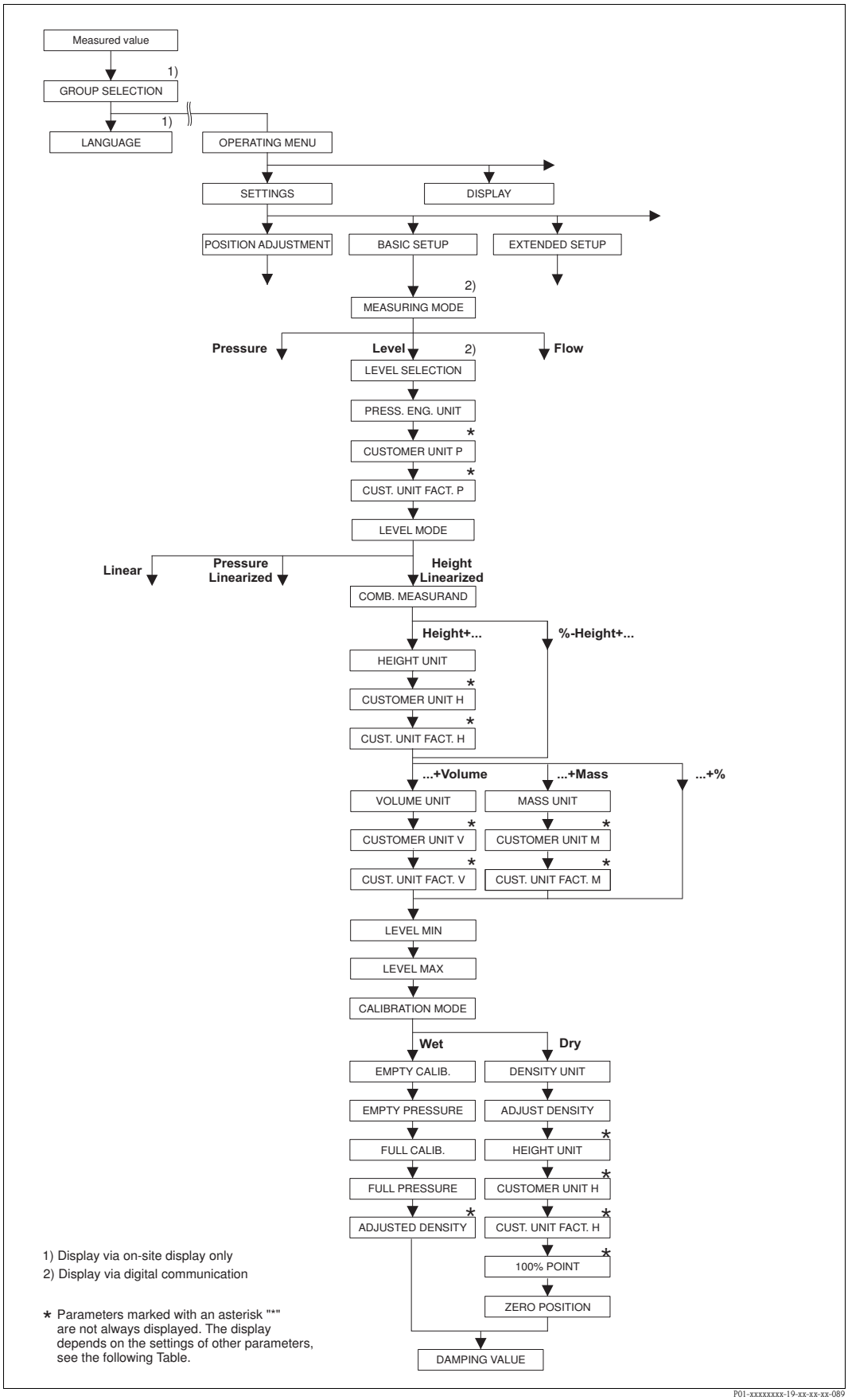


Fig. 34: BASIC SETUP function group for the "Level" measuring mode and the "Height Linearized" level type, continue calibration with LINEARISATION function group → See Page 100 ff for on-site operation and Page 104 ff for operation with digital communication.

Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
The following parameters are displayed if you selected the "Height Linearized" option for the LEVEL MODE parameter. Select this level type if you require two measured variables or if the container shape is given with value pairs, e.g. height and volume. The following combinations are possible: ■ Height + Volume ■ Height + Mass ■ Height + % ■ %-Height + Volume ■ %-Height + Mass ■ %-Height + % The 1st measured variable (%-Height or Height) must be in direct proportion to the measured pressure. The 2nd measured variable (Volume, Mass or %) must not be in direct proportion. A linearisation table must be entered for the 2nd measured variable. The 2nd measured variable is assigned to the 1st measured variable by means of this table. **Prerequisite**: ■ MEASURING MODE = Level (→ see also Page 45). ■ LEVEL SELECTION = Level Standard (→ see also Page 46). ■ LEVEL MODE = Height Linearized (→ see also Page 68). **Note:** See also – Page 67 ff, Table 10: BASIC SETUP – general – Page 96 ff, Table 16: EXTENDED SETUP – Page 100 ff, Table 18: LINEARISATION – on-site operation – Page 104 ff, Table 19: LINEARISATION – Digital communication – Page 122 ff, Table 28: PROCESS VALUES – Page 14 ff, Section 5 "Level measurement".	
COMB. MEASURAND (806) Selection	Select measured variable. **Options:** ■ Height and Volume ■ Height and Mass ■ Height and % ■ %-Height and Volume ■ %-Height and Mass ■ %-Height and % **Factory setting:** %-Height and %
HEIGHT UNIT (708) Selection	Select level unit for the 1st measured variable. **Prerequisite:** ■ COMB. MEASURAND = Height and Volume, Height and Mass or Height and % **Options:** ■ mm ■ dm ■ cm ■ m ■ inch ■ ft ■ User unit, → see also the following parameter description for CUSTOMER UNIT H and CUST. UNIT FACT. H. **Factory setting:** m

Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
CUSTOMER UNIT H (706) Entry	Enter text (unit) for customer-specific level unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. H. **Prerequisite:** ■ COMB. MEASURAND = Height and Volume, HEIGHT UNIT = User unit ■ COMB. MEASURAND = Height and Mass, HEIGHT UNIT = User unit ■ COMB. MEASURAND = Height and %, HEIGHT UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT H parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
CUST. UNIT FACT. H (705) Entry	Enter conversion factor for a customer-specific level unit. The conversion factor must be entered in relation to the SI unit "m". → See also CUSTOMER UNIT H. **Prerequisite:** ■ COMB. MEASURAND = Height and Volume, HEIGHT UNIT = User unit ■ COMB. MEASURAND = Height and Mass, HEIGHT UNIT = User unit ■ COMB. MEASURAND = Height and %, HEIGHT UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE = 0.5 m (1,6 ft) ≙ 1 PU – Entry CUSTOMER UNIT H: PU – Entry CUST. UNIT FACT. H: 2 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0
UNIT VOLUME (313) Selection	Select the volume unit for the 2nd measured value. **Prerequisite:** ■ COMB. MEASURAND = Height and Volume or %-Height and Volume **Options:** ■ l ■ hl ■ cm^3 ■ dm^3 ■ m^3 ■ m^3 E^3 ■ ft ■ ft^3 E^3 ■ gal ■ Igal ■ bbl ■ User unit, → see also the following parameter description for CUSTOMER UNIT V and CUST. UNIT FACT. V. **Factory setting:** m^3

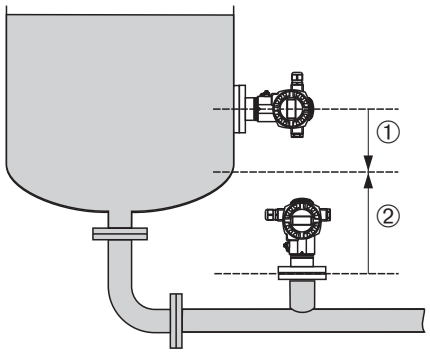
Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
CUSTOMER UNIT V (608) Entry	Enter text (unit) for customer-specific volume unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. V **Prerequisite:** ■ COMB. MEASURAND = Height and Volume, HEIGHT UNIT = User unit ■ COMB. MEASURAND = %-Height and Volume, HEIGHT UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT V parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
CUST. UNIT FACT. V (607) Entry	Enter conversion factor for a customer-specific volume unit. The conversion factor must be entered in relation to the SI unit "m^3". → See also CUSTOMER UNIT V. **Prerequisite:** ■ COMB. MEASURAND = Height and Volume, HEIGHT UNIT = User unit ■ COMB. MEASURAND = %-Height and Volume, HEIGHT UNIT = User unit **Example:** – You want the measured value to be displayed in "buckets". – MEASURED VALUE = 0.01 m3 ≙ 1 bucket – Entry CUSTOMER UNIT V: bucket – Entry CUST. UNIT FACT. V: 100 – Result: MEASURED VALUE = 1 bucket **Factory setting:** 1.0
MASS UNIT (709) Selection	Select the mass unit for the 2nd measured value. **Prerequisite:** ■ COMB. MEASURAND = Height and Mass or %-Height and Mass **Options:** ■ g ■ kg ■ t ■ oz ■ lb ■ ton ■ User unit, → see also the following parameter description for CUSTOMER UNIT M and CUST. UNIT FACT. M. **Factory setting:** kg

Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
CUSTOMER UNIT M (704) Entry	Enter text (unit) for customer-specific mass unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. M. **Prerequisite:** ■ COMB. MEASURAND = Height and Mass, MASS UNIT = User unit ■ COMB. MEASURAND = %-Height and Mass, MASS UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT M parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
CUST. UNIT FACT. M (703) Entry	Enter conversion factor for a customer-specific mass unit. The conversion factor must be entered in relation to the SI unit "kg". → See also CUSTOMER UNIT M. **Prerequisite:** ■ COMB. MEASURAND = Height and Mass, MASS UNIT = User unit ■ COMB. MEASURAND = %-Height and Mass, MASS UNIT = User unit **Example:** – You want the measured value to be displayed in "buckets". – MEASURED VALUE = 10 kg ≙ 1 bucket – Entry CUSTOMER UNIT M: bucket – Entry CUST. UNIT FACT. M: 0.1 – Result: MEASURED VALUE = 1 bucket **Factory setting:** 1.0
LEVEL MIN (755) Entry	Enter the minimum level to be expected. The input limits for the calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the minimum level to be expected, the more accurate the measurement result. ✎ Note! ■ The following applies for the setting LEVEL MODE "Height Linearized" and ASSIGN CURRENT "Linear": If you enter a new value for LEVEL MIN, the value for SET LRV is also changed. Use SET LRV to assign a height to the lower current value. If you want to assign the lower current value a value other than that for LEVEL MIN, you must enter the desired value for SET LRV. (→ SET LRV, Page 98 and ASSIGN CURRENT, Page 113) **Factory setting:** 0.0
LEVEL MAX (712) Entry	Enter the maximum level to be expected. The input limits for the calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the maximum level to be expected, the more accurate the measurement result. ✎ Note! ■ The following applies for the setting LEVEL MODE "Height Linearized" and ASSIGN CURRENT "Linear": If you enter a new value for LEVEL MAX, the value for SET URV is also changed. Use SET URV to assign a height to the upper current value. If you want to assign the upper current value a value other than that for LEVEL MAX, you must enter the desired value for SET URV. (→ SET URV, Page 98 and ASSIGN CURRENT, Page 113) **Factory setting:** 100.0

Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
CALIBRATION MODE (392) Selection	Select the calibration mode for the calibration of the 1st measured variable. **Options:** ■ Wet Wet calibration takes place by filling the container. This calibration mode requires two pressure-level value pairs to be entered. In the case of two different levels, the level value is entered and the pressure measured at this moment is assigned to the level value. → See also the following parameter description for EMPTY CALIB., EMPTY PRESSURE, FULL CALIB. and FULL PRESSURE. ■ Dry Dry calibration is a theoretical calibration which you can carry out even if the device is not mounted or the container is empty. – For the "Level" measured variable, the density of the fluid (→ see Page 88, ADJUST DENSITY) must be entered. – For the "%" measured variable, the density of the fluid must be entered and a level assigned to the 100 % point (→ see Page 88, ADJUST DENSITY and 100% POINT). If the measurement should not start at the mounting location of the device, a level offset must be entered (→ see Page 90, ZERO POSITION). ✎ Note! If the change to dry calibration is made after a wet calibration, the density must be entered correctly using the ADJUST DENSITY and DENSITY PROCESS parameter before changing the calibration mode. → See also Page 97. **Factory setting:** Wet
EMPTY CALIB. (314) Entry	Enter level value for the lower calibration point (container empty). The container is either empty or part full. By entering a value for this parameter, you are assigning a level value to the pressure present at the device. → See also EMPTY PRESSURE. **Prerequisite:** ■ CALIBRATION MODE = Wet **Factory setting:** 0.0
EMPTY PRESSURE (710) Display	Displays the pressure value for the lower calibration point (container empty). → See also EMPTY CALIB. **Prerequisite:** ■ CALIBRATION MODE = Wet
FULL CALIB. (315) Entry	Enter level value for the upper calibration point (container full). The container is either completely or almost full. By entering a value for this parameter, you are assigning a level value to the pressure present at the device. → See also FULL PRESSURE. **Prerequisite:** ■ CALIBRATION MODE = Wet **Factory setting:** 100.0
FULL PRESSURE (711) Display	Displays the pressure value for the upper calibration point (container full). → See also FULL CALIB. **Prerequisite:** ■ CALIBRATION MODE = Wet **Factory setting:** High sensor limit (→ see PRESS. SENS HILIM, Page 119)
ADJUSTED DENSITY (810) Display	Displays the density calculated from the upper and lower level point. **Prerequisite:** ■ COMB. MEASURAND = Height and Volume, CALIBRATION MODE = Wet ■ COMB. MEASURAND = Height and Mass, CALIBRATION MODE = Wet ■ COMB. MEASURAND = Height and %, CALIBRATION MODE = Wet

Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
DENSITY UNIT (812) Selection	Select density unit. **Prerequisite:** ■ COMB. MEASURAND = %-Height and %, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height and Volume, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height and Mass, CALIBRATION MODE = Dry ■ COMB. MEASURAND = Height and %, CALIBRATION MODE = Dry ■ COMB. MEASURAND = Height and Volume, CALIBRATION MODE = Dry ■ COMB. MEASURAND = Height and Mass, CALIBRATION MODE = Dry **Options:** ■ g/cm^3 ■ kg/dm^3 ■ kg/m^3 ■ US lb/in^3 ■ US lb/ft^3 **Factory setting:** kg/dm^3
ADJUST DENSITY (316) Entry	Enter density of fluid. **Prerequisite:** ■ COMB. MEASURAND = %-Height and %, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height and Volume, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height and Mass, CALIBRATION MODE = Dry ■ COMB. MEASURAND = Height and %, CALIBRATION MODE = Dry ■ COMB. MEASURAND = Height and Volume, CALIBRATION MODE = Dry ■ COMB. MEASURAND = Height and Mass, CALIBRATION MODE = Dry **Factory setting:** 1.0
HEIGHT UNIT (708) Selection	Select level unit. **Prerequisite:** ■ COMB. MEASURAND = %-Height and Volume, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height and Mass, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height + %, CALIBRATION MODE = Dry **Options:** ■ mm ■ dm ■ cm ■ m ■ inch ■ ft ■ User unit, → see also the following parameter description for CUSTOMER UNIT H and CUST. UNIT FACT. H. **Factory setting:** m

Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
CUSTOMER UNIT H (706) Entry	Enter text (unit) for customer-specific level unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. H. **Prerequisite:** ■ COMB. MEASURAND = %-Height and Volume, CALIBRATION MODE = Dry, HEIGHT UNIT = User unit ■ COMB. MEASURAND = %-Height and Mass, CALIBRATION MODE = Dry, HEIGHT UNIT = User unit ■ COMB. MEASURAND = %-Height and %, CALIBRATION MODE = Dry, HEIGHT UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT H parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
CUST. UNIT FACT. H (705) Entry	Enter conversion factor for a customer-specific level unit. The conversion factor must be entered in relation to the SI unit "m". → See also CUSTOMER UNIT H. **Prerequisite:** ■ COMB. MEASURAND = %-Height and Volume, CALIBRATION MODE = Dry, HEIGHT UNIT = User unit ■ COMB. MEASURAND = %-Height and Mass, CALIBRATION MODE = Dry, HEIGHT UNIT = User unit ■ COMB. MEASURAND = %-Height and %, CALIBRATION MODE = Dry, HEIGHT UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE = 0.5 m (1.6 ft) ≙ 1 PU – Entry CUSTOMER UNIT H: PU – Entry CUST. UNIT FACT. H: 2 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0
100% POINT (813) Entry	Enter level value for 100% point. **Prerequisite:** ■ COMB. MEASURAND = %-Height and Volume, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height and Mass, CALIBRATION MODE = Dry ■ COMB. MEASURAND = %-Height + %, CALIBRATION MODE = Dry **Example:** – The 100 %-point should correspond to 4 m (13 ft). – Select the "m" unit via the HEIGHT UNIT parameter. – Enter the value "4" for this parameter (100% POINT). **Factory setting:** 1.0

Table 13: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Level", LEVEL MODE "Height Linearized"	
Parameter name	**Description**
ZERO POSITION (814) Entry	Enter value for level offset. If the measurement should not start at the mounting location of the device, e.g. for containers with a sump, carry out zero point shift (level offset). **Prerequisite:** ■ CALIBRATION MODE = Dry  P01-PMP75xxx-19-xx-xx-xx-001 *Fig. 35: Zero point shift* *1 Device is mounted above the level lower range value: a positive value has to be entered for ZERO POSITION.* *2 Device is mounted below the level lower range value: a negative value has to be entered for ZERO POSITION.* **Factory setting:** 0.0
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

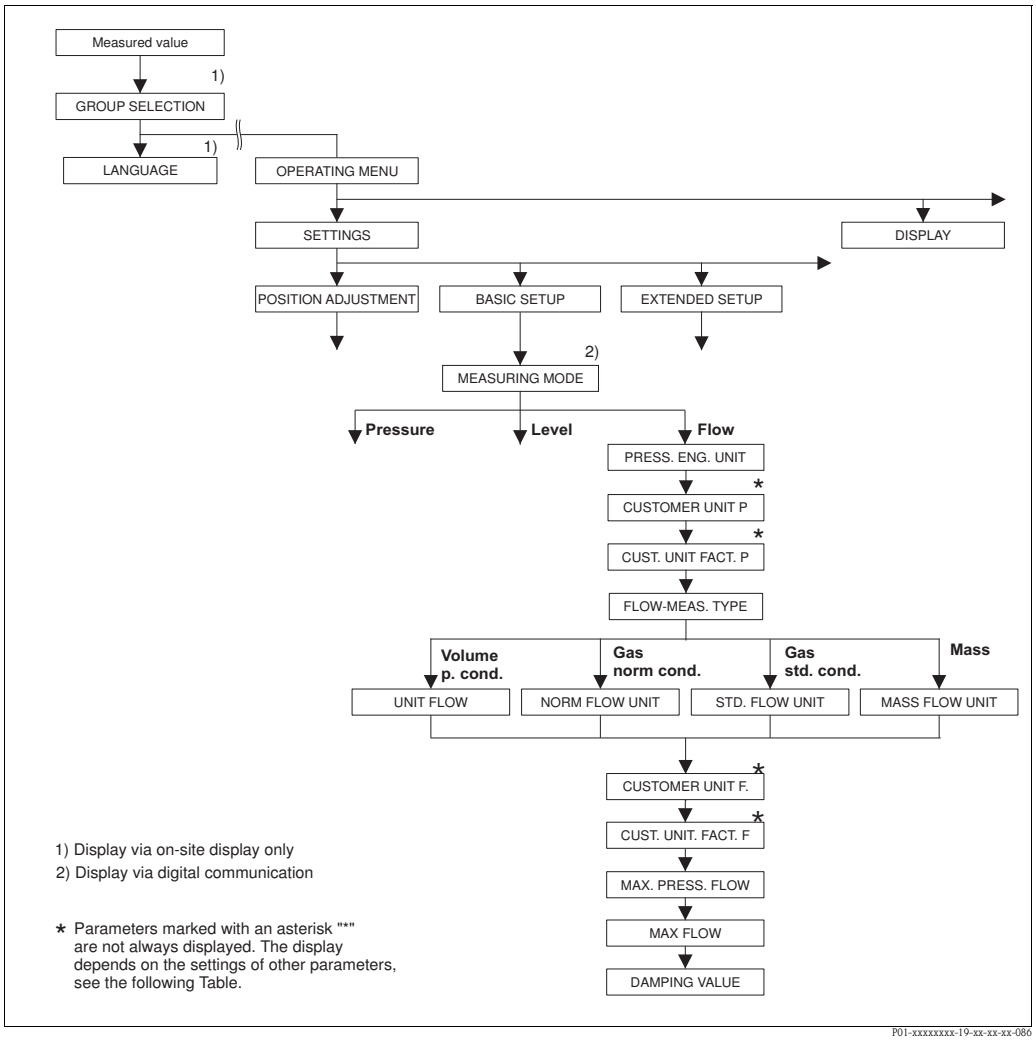


Fig. 36: BASIC SETUP function group for the "Flow" measuring mode

Table 14: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Flow"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Flow (→ see also Page 45). **Note:** See also – Page 52, Table 5: QUICK SETUP – Page 98, Table 15: EXTENDED SETUP – Page 107, Table 18: TOTALIZER SETUP – Page 123, Table 27: PROCESS VALUES. – Page 40 ff, Section 6 "Flow measurement".	

Table 14: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Flow"	
Parameter name	**Description**
MEASURING MODE Selection	Select the measuring mode. The operating menu is structured according to the selected measuring mode. ⚠ Warning! If the measuring mode is changed, the span setting (URV) must be verified in the "Calibration" → "Basic Setup" operating menu and, if necessary, reconfigured. **Prerequisite:** ■ Digital communication **Options:** ■ Pressure ■ Level ■ Deltabar S: Flow **Factory setting:** ■ Cerabar S and Deltabar S: Pressure ■ Deltapilot S: Level
PRESS. ENG. UNIT (060) Selection	Select pressure unit. If a new pressure unit is selected, all pressure-specific parameters are converted and displayed with the new unit. **Options:** ■ mbar, bar ■ mmH2O, mH2O, inH2O, ftH2O [1)] ■ Pa, hPa, kPa, MPa ■ psi ■ mmHg, inHg [2)] ■ Torr ■ g/cm^2, kg/cm^2 ■ lb/ft^2 ■ atm ■ gf/cm^2, kgf/cm^2 ■ User unit, → See also the following parameter description for CUSTOMER UNIT P and CUST. UNIT FACT. P. 1) The conversion factor of the pressure units refers to a reference temperature of 4 °C (39.2 °F). 2) The conversion factor of the pressure units refers to a reference temperature of 0 °C (32 °F). **Factory setting:** Depends on the sensor nominal measuring range mbar or bar or as per order specifications
CUSTOMER UNIT P (075) Entry	Enter text (unit) for customer-specific pressure unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT P parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** – – – – – – – –

Table 14: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Flow"	
Parameter name	**Description**
CUST. UNIT FACT. P (317) Entry	Enter conversion factor for a customer-specific pressure unit. The conversion factor must be entered in relation to the SI unit "Pa". → See also CUSTOMER UNIT P. **Prerequisite:** ■ PRESS. ENG. UNIT = User unit **Example:** – You want the measured value to be displayed in "PU" (PU: packing unit). – MEASURED VALUE =10000 Pa ≙ 1 PU – Entry CUSTOMER UNIT P: PU – Entry CUST. UNIT FACT. P: 0.0001 – Result: MEASURED VALUE = 1 PU **Factory setting:** 1.0
FLOW-MEAS. TYPE (640) Selection	Select the flow type. **Options:** ■ Volume p. cond. (volume under operating conditions) ■ Gas norm. cond. (norm volume under norm conditions in Europe: 1013.25 mbar and 273.15 K (0°C)) ■ Gas std. cond. (standard volume under standard conditions in USA: 1013.25 mbar (14.7 psi) and 288.15 K (15°C/59°F)) ■ Mass (mass under operating conditions) **Factory setting:** Volume p. cond.
UNIT FLOW (391) Selection	Select volume flow unit. When a new flow unit is selected, all flow-specific parameters are converted and displayed with the new unit within a flow mode (FLOW-MEAS. TYPE). When the flow mode is changed, conversion is not possible. **Prerequisite:** ■ FLOW-MEAS. TYPE = Volume p. cond. **Options:** ■ m3/s, m3/min, m3/h, m3/day ■ l/s, l/min, l/h ■ hl/s, hl/min, hl/day ■ ft3/s, ft3/min, ft3/h, ft3/day ■ ACFS, ACFM, ACFH, ACFD ■ ozf/s, ozf/min ■ US Gal/s, US Gal/min, US Gal/h, US Gal/day ■ Imp. Gal/s, Imp. Gal/min, Imp. Gal/h ■ bbl/s, bbl/min, bbl/h, bbl/day ■ User unit, → see also this table, parameter description for CUSTOMER UNIT F and CUST. UNIT FACT. F **Factory setting:** m^3/s
NORM FLOW UNIT (661) Selection	Select norm volume flow unit. When a new flow unit is selected, all flow-specific parameters are converted and displayed with the new unit within a flow mode (FLOW-MEAS. TYPE). When the flow mode is changed, conversion is not possible. **Prerequisite:** ■ FLOW-MEAS. TYPE = Gas norm conditions **Options:** ■ Nm3/s, Nm3/min, Nm3/h, Nm3/day ■ User unit, → see also this table, parameter description for CUSTOMER UNIT F and CUST. UNIT FACT. F **Factory setting:** Nm^3/s

Table 14: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Flow"	
Parameter name	**Description**
STD. FLOW UNIT (660) Selection	Select standard volume flow unit. When a new flow unit is selected, all flow-specific parameters are converted and displayed with the new unit within a flow mode (FLOW-MEAS. TYPE). When the flow mode is changed, conversion is not possible. **Prerequisite:** ■ FLOW-MEAS. TYPE = Gas std. conditions **Options:** ■ Sm3/s, Sm3/min, Sm3/h, Sm3/day ■ SCFS, SCFM, SCFH, SCFD ■ User unit, → see also this table, parameter description for CUSTOMER UNIT F and CUST. UNIT FACT. F **Factory setting:** Sm^3/s
MASS FLOW UNIT (571) Selection	Select mass flow unit. When a new flow unit is selected, all flow-specific parameters are converted and displayed with the new unit within a flow mode (FLOW-MEAS. TYPE). When the flow mode is changed, conversion is not possible. **Prerequisite:** ■ FLOW-MEAS. TYPE = Mass **Options:** ■ g/s, kg/s, kg/min, kg/min, kg/h ■ t/s, t/min, t/h, t/day ■ oz/s, oz/min ■ lb/s, lb/min, lb/h ■ ton/s, ton/min, ton/h, ton/day ■ User unit, → see also the following parameter description for CUSTOMER UNIT F and CUST. UNIT FACT. F **Factory setting:** kg/s
CUSTOMER UNIT F (610) Entry	Enter text (unit) for customer-specific flow unit. You can enter a maximum of eight alphanumeric characters here. → See also CUST. UNIT FACT. F. **Prerequisite:** ■ UNIT FLOW = User unit ■ NORM FLOW UNIT = User unit ■ STD. FLOW UNIT = User unit ■ MASS FLOW UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the CUSTOMER UNIT F parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _

Table 14: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP "Flow"	
Parameter name	**Description**
CUST. UNIT FACT. F (609) Entry	Enter conversion factor for a customer-specific flow unit. The conversion factor must be entered in relation to an appropriate SI unit, e.g. m^3/s for the "Volume p. cond." flow mode. → See also CUSTOMER UNIT F. **Prerequisite:** ■ UNIT FLOW = User unit ■ NORM FLOW UNIT = User unit ■ STD. FLOW UNIT = User unit ■ MASS FLOW UNIT = User unit **Example:** – You want the measured value to be displayed in "bucket/h". – MEASURED VALUE =0.01 m3/s ≙ 3600 bucket/h – Entry CUSTOMER UNIT F: bucket/h – Entry CUST. UNIT FACT. F: 360000 – Result: MEASURED VALUE = 3600 bucket/h **Factory setting:** 1.0
MAX. FLOW (311) Entry	Enter maximum flow of primary element. → See also layout sheet of primary element. The maximum flow is assigned to the maximum pressure which you enter via MAX PRESS. FLOW. ✎ Note! Use the LINEAR/SQROOT parameter (→ Page 113) to specify the current signal for the "Flow" measuring mode. The following applies for the "Flow (square root)" setting: If you enter a new value for MAX. FLOW, the value for SET URV is also changed. Use SET URV to assign a flow to the upper current value. If you want to assign the upper current value a value other than that for MAX. FLOW, you must enter the desired value for SET URV. (→ SET URV, Page 100). **Factory setting:** 1.0
MAX PRESS. FLOW (634) Entry	Enter maximum pressure of primary element. → See layout sheet of primary element. This value is assigned to the maximum flow value (→ see MAX. FLOW). ✎ Note! Use the LINEAR/SQROOT parameter (→ Page 113) to specify the current signal for the "Flow" measuring mode. The following applies for the "Differential pres." setting: If you enter a new value for MAX PRESS. FLOW, the value for SET URV is also changed. Use SET URV to assign a pressure value to the upper current value. If you want to assign the upper current value a value other than that for MAX PRESS. FLOW, you must enter the desired value for SET URV. (→ SET URV, Page 100). **Factory setting:** High sensor limit (→ see PRESS. SENS HILIM, Page 119)
DAMPING VALUE (247) Entry	Enter damping time (time constant τ). The damping affects the speed at which all subsequent elements, such as the on-site display, measured value and current output react to a change in the pressure. **Input range:** 0.0...999.0 s **Factory setting:** 2.0 s or as per order specifications

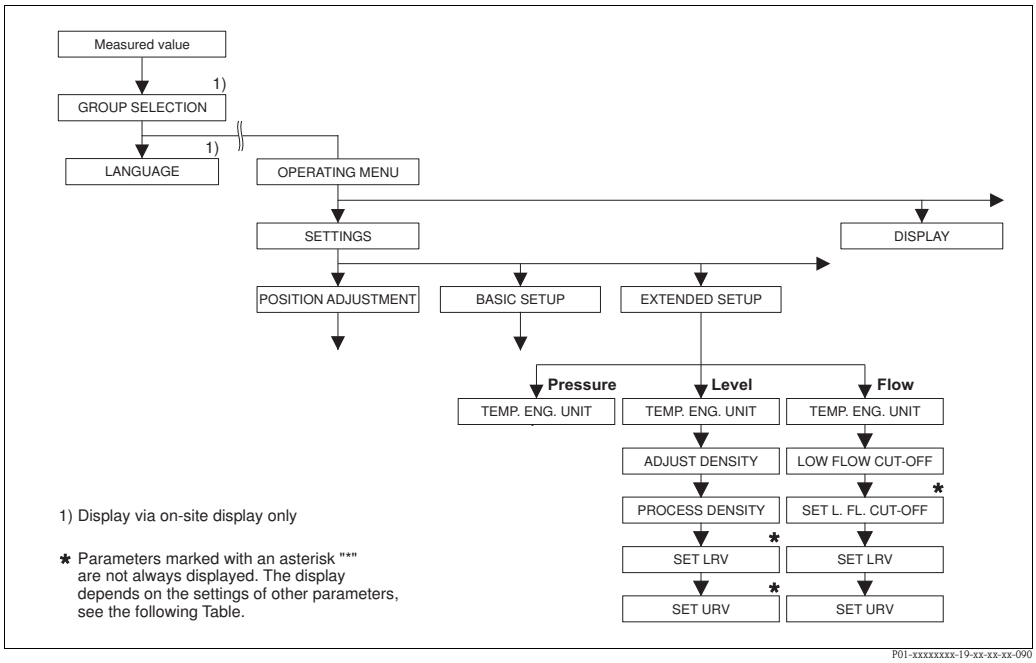


Fig. 37: EXTENDED SETUP function group
→ For the "Pressure" measuring mode, see Page 96, Table 15
→ For the "Level" measuring mode, see Page 96, Table 16
→ For the "Flow" measuring mode, see Page 98, Table 17

Table 15: (GROUP SELECTION →) OPERATING MENU → SETTINGS → EXTENDED SETUP "Pressure"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Pressure (→ see also Page 45). **Note:** ■ See also Page 11 ff, Section 4 "Pressure measurement".	
TEMP. ENG. UNIT (318) Selection	Select the unit for the temperature measured values. → See also PCB TEMPERATURE (Page 117) and SENSOR TEMP. (Page 122). **Options:** ■ °C ■ °F ■ K ■ R **Factory setting:** °C

Table 16: (GROUP SELECTION →) OPERATING MENU → SETTINGS → EXTENDED SETUP "Level"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Level (→ see also Page 45). **Note:** ■ See also Page 14 ff, Section 5 "Level measurement".	

Table 16: (GROUP SELECTION →) OPERATING MENU → SETTINGS → EXTENDED SETUP "Level"	
Parameter name	**Description**
TEMP. ENG. UNIT (318) Selection	Select the unit for the temperature measured values. → See also PCB TEMPERATURE (Page 117) and SENSOR TEMP. (Page 122). **Options:** ■ °C ■ °F ■ K ■ R **Factory setting:** °C
DENSITY UNIT (001)/(812) Options	Select density unit. **Options:** ■ g/cm^3 ■ kg/dm^3 ■ kg/m^3 ■ US lb/in^3 ■ US lb/ft^3 **Factory setting:** kg/dm^3
ADJUST DENSITY (007)/(316) Entry	Enter density of fluid. ✎ Note! LIN. MEASURAND: "% (Level)", "Mass" and "Volume" and MEASUAND KOMB.: If a change to dry calibration is made after a wet calibration using the CALIBRATION MODE parameter (→ Page 73 or 87), the density for this parameter must be entered correctly before changing the calibration mode. In the event that the pressure falls with increasing levels (LIN. MEASURED: Volume), such as in the case of a residual volume measurement, a negative value shall be entered for this parameter. **Factory setting:** 1.0
PROCESS DENSITY (025)/(811) Entry	Enter a new density value for density correction. The calibration was carried out with the medium water, for example. Now the container is to be used for another fluid with another density. The calibration is corrected appropriately by entering the new density value in the PROCESS DENSITY parameter. ✎ Note! LIN. MEASURAND: "% (Level)", "Mass" and "Volume" and MEASUAND KOMB.: If a change to dry calibration is made after a wet calibration using the CALIBRATION MODE parameter (→ Page 73 or 87), the density for this parameter must be entered correctly before changing the calibration mode. In the event that the pressure falls with increasing levels (LIN. MEASURED: Volume), such as in the case of a residual volume measurement, a negative value shall be entered for this parameter. **Factory setting:** 1.0

Table 16: (GROUP SELECTION →) OPERATING MENU → SETTINGS → EXTENDED SETUP "Level"	
Parameter name	**Description**
SET LRV (762) Entry	Enter value for the lower current value (4 mA). **Prerequisite:** ■ LEVEL MODE = Pressure Linearized or Height Linearized ✎ Note! ■ For the LEVEL MODE "Height Linearized", you can use the ASSIGN CURRENT parameter (→ Page 113) to specify whether the current output should depict the 1st or 2nd measured variable (height or tank content). Depending on the setting of the ASSIGN CURRENT parameter, enter the following value for SET LRV: – ASSIGN CURRENT = tank content (factory setting) ⇒ %- value, volume value or mass value – ASSIGN CURRENT = height ⇒ level value The following applies for the LEVEL MODE "Pressure Linearized" or LEVEL MODE "Height Linearized" + ASSIGN CURRENT "Tank content": ■ If you enter a new value for TANK CONTENT MIN, the value for SET LRV is also changed. If you want to assign the lower current value a value other than that for TANK CONTENT MIN, you must enter the desired value for SET LRV. (→ TANK CONTENT MIN, Page 101 or 104.) The following applies for the LEVEL MODE "Height Linearized" + ASSIGN CURRENT "Height": ■ If you enter a new value for LEVEL MIN, the value for SET LRV is also changed. If you want to assign the lower current value a value other than that for LEVEL MIN, you must enter the desired value for SET LRV. (→ LEVEL MIN, Page 86.) **Factory setting:** 0.0
SET URV (763) Entry	Enter value for the upper current value (20 mA). **Prerequisite:** ■ LEVEL MODE = Pressure Linearized or Height Linearized ✎ Note! ■ For the LEVEL MODE "Height Linearized", you can use the ASSIGN CURRENT parameter (→ Page 113) to specify whether the current output should depict the 1st or 2nd measured variable (height or tank content). Depending on the setting of the ASSIGN CURRENT parameter, enter the following value for SET URV: – ASSIGN CURRENT = tank content (factory setting) ⇒ %- value, volume value or mass value – ASSIGN CURRENT = height ⇒ level value The following applies for the LEVEL MODE "Pressure Linearized" or LEVEL MODE "Height Linearized" + ASSIGN CURRENT "Tank content": ■ If you enter a new value for TANK CONTENT MAX, the value for SET URV is also changed. If you want to assign the upper current value a value other than that for TANK CONTENT MAX, you must enter the desired value for SET URV. (→ TANK CONTENT MAX, Page 101 or 105.) The following applies for the LEVEL MODE "Height Linearized" + ASSIGN CURRENT "Height": ■ If you enter a new value for LEVEL MAX, the value for SET URV is also changed. If you want to assign the lower current value a value other than that for LEVEL MAX, you must enter the desired value for SET URV. (→ LEVEL MAX, Page 86.) **Factory setting:** 100.0

Table 17: (GROUP SELECTION →) OPERATING MENU → SETTINGS → EXTENDED SETUP "Flow"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Flow (→ see also Page 45). **Note:** ■ See also Page 40 ff, Section 6 "Flow measurement".	

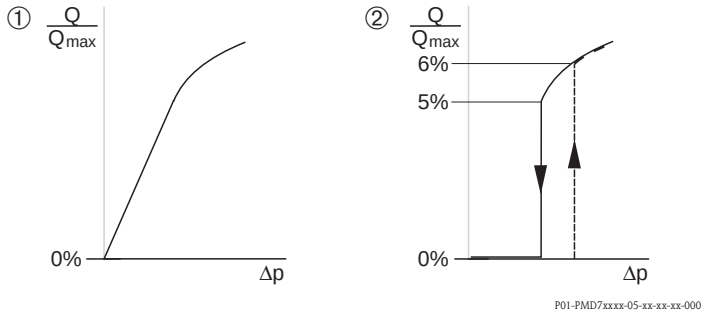
Table 17: (GROUP SELECTION →) OPERATING MENU → SETTINGS → EXTENDED SETUP "Flow"	
Parameter name	**Description**
TEMP. ENG. UNIT (318) Selection	Select the unit for the temperature measured value. → See also PCB TEMPERATURE (Page 117) and SENSOR TEMP. (Page 123). **Options:** ■ °C ■ °F ■ K ■ R **Factory setting:** °C
LOW FLOW CUT-OFF (442) Selection	Switches "low flow cut-off" function on and off. In the lower measuring range, small flow quantities (creepages) can lead to large measured value fluctuations. Switching on this function stops these flow quantities from being recorded. → See also SET. L. FL. CUT-OFF. **Options:** ■ Off ■ On **Factory setting:** Off
SET. L. FL. CUT-OFF (323) Entry	Enter switch-off point of low flow cut-off. The hysteresis between the switch-on point and the switch-off point is always 1 % of the end flow value. → See also LOW FLOW CUT-OFF. **Prerequisite:** ■ LOW FLOW CUT-OFF = on **Input range:** Switch-off point: 0...50 % of end flow value (→ MAX. FLOW).  **Factory setting:** 5 % (of end flow value)
SET LRV (637) Entry	Depending on the setting in the LINEAR/SQROOT parameter (→ Page 113), enter a flow value or a pressure value for the lower current value (4 mA) here. ■ LINEAR/SQROOT = Flow (square root) (factory setting) ⇒ flow value ■ LINEAR/SQROOT = Differential pres. ⇒ pressure value **Factory setting:** 0

Table 17: (GROUP SELECTION →) OPERATING MENU → SETTINGS → EXTENDED SETUP "Flow"	
Parameter name	**Description**
SET URV (638) Entry	Depending on the setting in the LINEAR/SQROOT parameter (→ Page 113), enter a flow value or a pressure value for the upper current value (20 mA) here. ■ LINEAR/SQROOT = Flow (square root) (factory setting) ⇒ flow value ■ LINEAR/SQROOT = Differential pres. ⇒ pressure value The following applies for the setting LINEAR/SQROOT "Flow (square root)": ■ If you enter a new value for MAX. FLOW, the value for SET URV is also changed. If you want to assign the upper current value a value other than that for MAX. FLOW, you must enter the desired value for SET URV. (→ MAX. FLOW, Page 95). The following applies for the setting LINEAR/SQROOT "Differential pres.": ■ If you enter a new value for MAX PRESS. FLOW, the SET URV value is also changed. If you want to assign the upper current value a value other than that for MAX PRESS. FLOW, you must enter the desired value for SET URV. (→ MAX PRESS. FLOW, Page 95). **Factory setting:** MAX. FLOW

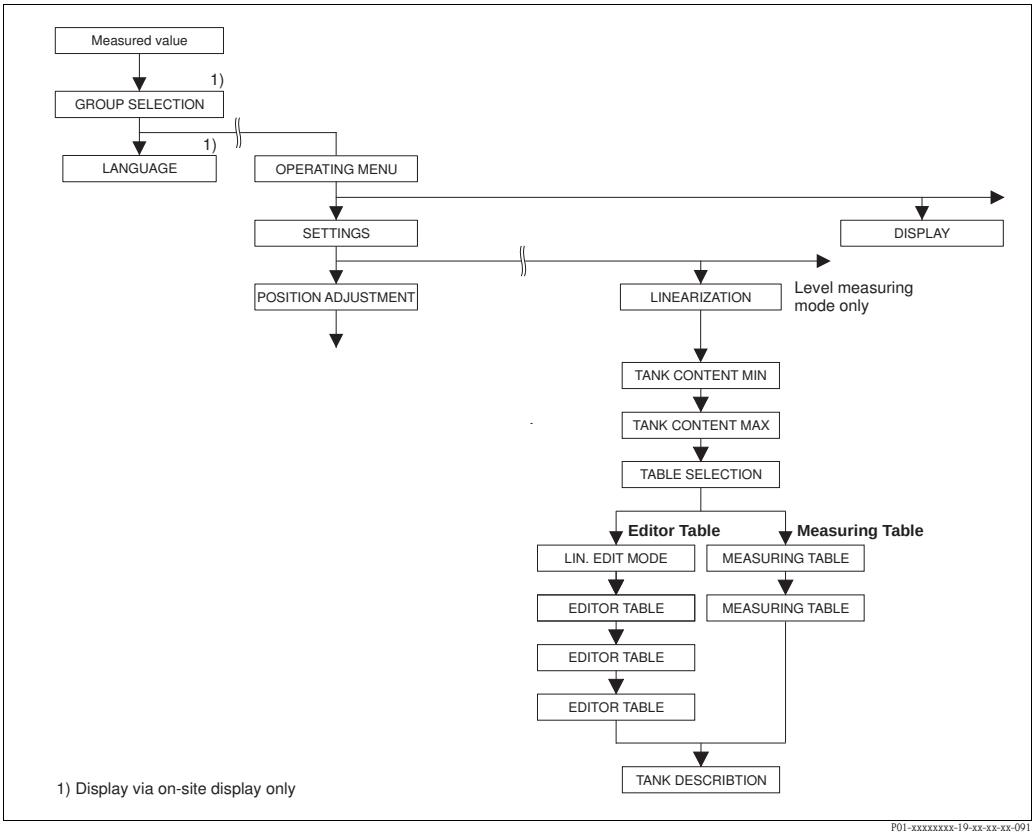


Fig. 38: LINEARISATION function group for on-site operation

Table 18: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – on-site operation	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Level (→ see also Page 45). ■ LEVEL MODE = Pressure Linearized or Height Linearized (→ see also Page 68). **Note:** – See also Page 14 ff, Section 5 "Level measurement".	

Table 18: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – on-site operation	
Parameter name	**Description**
TANK CONTENT MIN (759) Entry	Enter the minimum tank contents to be expected. The input limits for the calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the minimum tank content to be expected, the more accurate the measurement result. ✎ Note! ■ If you enter a new value for TANK CONTENT MIN, the value for SET LRV is also changed. Use SET LRV to assign a %-value, volume value or mass value to the lower current value. If you want to assign the lower current value a value other than that for TANK CONTENT MIN, you must enter the desired value for SET LRV. (→ SET LRV, Page 98). ■ For the setting LEVEL MODE "Height Linearized" and ASSIGN CURRENT "Linear", the TANK CONTENT MIN parameter does not affect the SET LRV parameter. (→ SET LRV, Page 98 and ASSIGN CURRENT, Page 113) **Factory setting:** 0.0
TANK CONTENT MAX (713) Entry	Enter the maximum tank contents to be expected. The input limits for the subsequent calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the maximum tank content to be expected, the more accurate the measurement result. ✎ Note! ■ If you enter a new value for TANK CONTENT MAX, the value for SET URV is also changed. Use SET URV to assign a %-value, volume value or mass value to the upper current value. If you want to assign the upper current value a value other than that for TANK CONTENT MAX, you must enter the desired value for SET URV. (→ SET URV, Page 98.) ■ For the setting LEVEL MODE "Height Linearized" and ASSIGN CURRENT "Linear", the TANK CONTENT MAX parameter does not affect the SET URV parameter. (→ SET URV, Page 98 and ASSIGN CURRENT, Page 113) **Factory setting:** 100.0
TABLE SELECTION (808) Selection	Select table. The device works with a measuring and an editor table. The measuring table is used to calculate the measured value. To make sure measuring also runs properly when entering a new table, there is another table, the editor table, for entering new values. **Options:** ■ View meas. table ■ Editor table **Factory setting:** View meas. table
LIN. EDIT MODE (397) Selection	Select the entry mode for the linearisation table. **Prerequisite:** ■ TABLE SELECTION = Editor table **Options:** ■ Manual: the container neither has to be filled nor emptied for this entry mode. Enter the value pairs for the linearisation table. ■ Semiautomatic: the container is filled or emptied in stages in this entry mode. The device automatically records the hydrostatic pressure. The associated volume, mass or %-value is entered. **Factory setting:** Manual

Table 18: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – on-site operation	
Parameter name	**Description**
EDITOR TABLE (809) Selection	Select table. **Prerequisite:** ■ TABLE SELECTION = editor table **Options:** ■ New table: enter new linearisation table. ■ Edit measure table: The measuring table is loaded as an editor table so that changes can be made. → See also TAB. SELECTION ■ Continue edit: Edit an editor table that already exists. → See also TABLE EDITOR (770) **Factory setting:** New table
EDITOR TABLE Entry ("Semiautomatic" edit mode) – LINE-NUMB (549) – Y-VAL. (551)	Enter table in the "Semiautomatic" editing mode. A linearisation table must have at least 2 points and may not have more than 32 points. A point consists of LINE-NUMB, X-VAL. and Y-VAL. For this editing mode, the container is filled or emptied in stages. **Example:** Enter point for LEVEL MODE = Pressure Linearized – LINE-NUMB: confirm value displayed. – Y-VAL.: depending on the setting in the LINd. MEASURAND parameter, enter the volume, mass or % value. – X-VAL.: the hydrostatic pressure present is displayed and saved by confirming the Y-value. **Example:** Enter point for LEVEL MODE = Height Linearized – LINE-NUMB: confirm value displayed. – Y-VAL.: depending on the setting in the COMB. MEASURAND parameter, enter the volume, mass or % value. – X-VAL.: the hydrostatic pressure present is measured. Depending on the setting in the COMB. MEASURAND parameter, the measured pressure is converted to a level unit or a % and displayed. The value is saved by confirming the Y-value. **Factory setting:** LINE-NUMB = 1, X-VAL. = 0.0, Y-VAL. = 0.0
EDITOR TABLE Entry ("manual" edit mode) – LINE-NUMB (549) – Y-VAL. (551) – X-VAL. (550)	Enter table in the "manual" editing mode. A linearisation table must have at least 2 points and may not have more than 32 points. A point consists of a line number, X-value and Y-value. The container neither has to be filled nor emptied for this editing mode. **Example:** Enter point for LEVEL MODE = Pressure Linearized – LINE-NUMB: confirm value displayed. – X-VAL.: enter pressure value. – Y-VAL.: depending on the setting in the LINd. MEASURAND parameter, enter the related volume, mass or % value. **Example:** Enter point for LEVEL MODE = Height Linearized – LINE-NUMB: confirm value displayed. – X-VAL.: the hydrostatic pressure present is measured. Depending on the setting in the COMB. MEASURAND parameter, enter a level value or % value. – Y-VAL.: depending on the setting in the COMB. MEASURAND parameter, enter the related volume, mass or % value. **Factory setting:** LINE-NUMB = 1, X-VAL. = 0.0, Y-VAL. = 0.0

Table 18: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – on-site operation	
Parameter name	**Description**
EDITOR TABLE (770) Options	Select the function for the editor table. **Options:** ■ Next point: enter next point. ■ Last input point: jump back to previous point to correct a mistake for example. ■ Accept input table: save editor table as measuring table. This overwrites the old measuring table. ■ Abort: save values entered up to this point for the editor table and display next parameter. The editor table is not activated as a measuring table. ■ Insert point: see example below. ■ Delete point: the current point is deleted. See example below. **Example:** Add point, in this case between the 4th and 5th point for example – Select point 5 via the EDITOR TABLE/LINE NUMB parameter. – Confirm current X and Y values with Enter. – Using the TABLE EDITOR (770) parameter, select the option "Insert point". – Point 5 is displayed for the TABLE EDITOR/LINE NUMB parameter. New values for the X-VAL and Y-VAL parameters. **Example:** delete point, in this case the 5th point for example – Select point 5 via the EDITOR TABLE/LINE NUMB parameter. – Using the TABLE EDITOR (770) parameter, select the option "Delete point". – The 5th point is deleted. All of the following points are pushed up one number i.e. following deletion, the 6th point becomes Point 5. **Factory setting:** Next point
MEASURING TABLE (549) Display	A point of the linearisation table saved (measuring table) appears on the display The parameter first displays the first point of the linearisation table. By entering a line number, you can directly display the corresponding point in the linearisation table.
MEASURING TABLE (717) Selection	Select the function for the measuring table. **Options:** ■ Next point: view next point of the measuring table. ■ Last input point: view previous point of the measuring table. ■ Abort: cancel measuring table display. Display next parameter. **Factory setting:** Next point
TANK DESCRIPTION (815) Entry	Enter tank description. (max. 32 alphanumeric characters) **Factory setting:** _

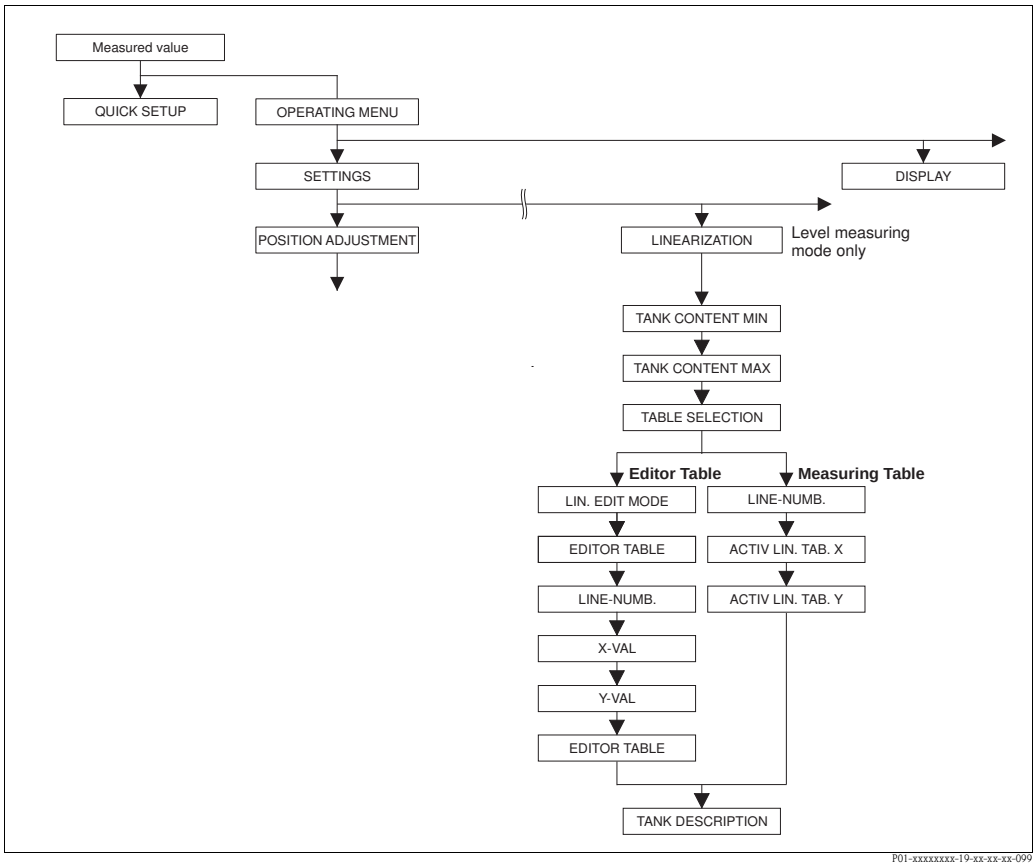


Fig. 39: LINEARISATION function group for digital communication

Table 19: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – Digital communication	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Level (→ see also Page 45). ■ LEVEL MODE = Pressure Linearized or Height Linearized (→ see also Page 68). **Note:** – See also Page 14 ff, Section 5 "Level measurement".	
TANK CONTENT MIN Entry	Enter the minimum tank contents to be expected. The input limits for the calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the minimum tank content to be expected, the more accurate the measurement result. Note! ■ If you enter a new value for TANK CONTENT MIN, the value for SET LRV is also changed. Use SET LRV to assign a %-value, volume value or mass value to the lower current value. If you want to assign the lower current value a value other than that for TANK CONTENT MIN, you must enter the desired value for SET LRV. (→ SET LRV, Page 98). ■ For the setting LEVEL MODE "Height Linearized" and ASSIGN CURRENT "Linear", the TANK CONTENT MIN parameter does not affect the SET LRV parameter. (→ SET LRV, Page 98 and ASSIGN CURRENT, Page 113) **Factory setting:** 0.0

Table 19: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – Digital communication	
Parameter name	**Description**
TANK CONTENT MAX Entry	Enter the maximum tank contents to be expected. The input limits for the subsequent calibration (editing limits) are derived from the value entered. The closer the value entered corresponds to the maximum tank content to be expected, the more accurate the measurement result. ✎ Note! ■ If you enter a new value for TANK CONTENT MAX, the value for SET URV is also changed. Use SET URV to assign a %-value, volume value or mass value to the upper current value. If you want to assign the upper current value a value other than that for TANK CONTENT MAX, you must enter the desired value for SET URV. (→ SET URV, Page 98.) ■ For the setting LEVEL MODE "Height Linearized" and ASSIGN CURRENT "Linear", the TANK CONTENT MAX parameter does not affect the SET URV parameter. (→ SET URV, Page 98 and ASSIGN CURRENT, Page 113) **Factory setting:** 100.0
TABLE SELECTION Selection	Select table. The device works with a measuring and an editor table. The measuring table is used to calculate the measured value. To make sure measuring also runs properly when entering a new table, there is another table, the editor table, for entering new values. **Options:** ■ View meas. table ■ Editor table **Factory setting:** View meas. table
LIN. EDIT MODE Selection	Select the entry mode for the linearisation table. **Prerequisite:** ■ TABLE SELECTION = Editor table **Options:** ■ Manual: The container neither has to be filled nor emptied for this entry mode. Enter the value pairs for the linearisation table. ■ Semiautomatic: the container is filled or emptied in stages in this entry mode. The device automatically records the hydrostatic pressure. The associated volume, mass or %-value is entered. **Factory setting:** Manual
EDITOR TABLE Selection	Select table. **Prerequisite:** ■ TABLE SELECTION = Editor table **Options:** ■ New table: Enter new linearisation table. ■ View meas. table: View saved linearisation table and change points if necessary. ■ Continue edit: Edit a linearisation table that already exists. ✎ Note! Operating program: ■ If you select the "View meas. table" option, the saved measuring table is loaded in the operating priogram. Use the "Lin.-Tab." window to view the entire table, change values if necessary and write the modified table to the device. ■ If you change a value via the X-VAL. or Y-VAL. parameters, the table in the "Lin.-Tab." window is not updated. To view the table saved in the device, this table must first be read out of the device. **Factory setting:** New table

Table 19: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – Digital communication	
Parameter name	**Description**
LINE-NUMB Entry	Enter the line number for the linearisation table. A linearisation table must have at least 2 points and may not have more than 32 points. ■ TABLE SELECTION = View meas. table Via this parameter you can select the point of the linearisation table which should be displayed. ■ TABLE SELECTION = Editor table Enter a point via the LINE-NUMB, X-VAL. and Y-VAL. parameters. → See also this table, parameter description for LIN. EDIT MODE, X-VAL. ("Manual" entry mode), X-VAL. ("Semiautomatic" entry mode) and Y-VAL. ✎ Note! In the operating program, you can enter a complete linearisation table in one go via the "Lin.-Tab." window.
X-VAL. ("Manual" entry mode) Entry	Enter the pressure value for the linearisation table. → See also LIN. EDIT MODE, LINE-NUMB and Y-VAL. **Prerequisite:** ■ TABLE SELECTION = Editor table
X-VAL. ("Semiautomatic" entry mode) Display	In the "Semiautomatic" entry mode, the container is filled or emptied in stages. The X-VAL. displays the measured hydrostatic pressure. **Prerequisite:** ■ TABLE SELECTION = Editor table **Operating program** The X-VAL. is saved by confirming the Y-value. **HART Handheld** Confirm X-VAL. displayed. → See also LIN. EDIT MODE, LINE-NUMB and Y-VAL.
Y-VAL. Entry	Enter the volume, mass or %-value belonging to the X-VAL. for the linearisation table. **Prerequisite:** ■ TABLE SELECTION = Editor table Depending on the setting in the LINd. MEASURAND or COMB. MEASURAND parameters, enter a volume, mass or %-value here. → See also this table, parameter description for LIN. EDIT MODE, LINE-NUMB, X-VAL. ("Manual" entry mode), X-VAL. ("Semiautomatic" entry mode).
EDITOR TABLE Options	Select the function for the editor table. **Prerequisite:** ■ TABLE SELECTION = Editor table **Options:** ■ Next point: without function ■ Last input point: without function ■ Accept input table: save editor table as measuring table. This overwrites the old measuring table. ■ Abort: save values entered up to this point for the editor table and display next parameter. The editor table is not activated as a measuring table. ■ Insert point: see example below. ■ Delete point: the current point is deleted. See example below. **Example:** Add point, in this case between the 4th and 5th point for example – Select point 5 via the LINE NUMB parameter. – Using the TABLE EDITOR parameter, select the option "Insert point". – Point 5 is displayed for the LINE NUMB parameter. New values for the X-VAL and Y-VAL parameters. **Example:** delete point, in this case the 5th point for example – Select point 5 via the LINE NUMB parameter. – Using the TABLE EDITOR parameter, select the option "Delete point". – The 5th point is deleted. All of the following points are pushed up one number i.e. following deletion, the 6th point becomes Point 5. **Factory setting:** Next point

Table 19: (GROUP SELECTION →) OPERATING MENU → SETTINGS → LINEARISATION – Digital communication	
Parameter name	**Description**
ACTIV LIN. TAB. X Display	An X-value of the linearisation table already saved appears on the display You can select a point of the linearisation table via the LINE-NUMB parameter. **Prerequisite:** ■ TABLE SELECTION = View meas. table ✎ Note! In the operating program, you can view the entire saved table in the "Tables" window.
ACTIV LIN. TAB. Y Display	A Y-value of the linearisation table already saved appears on the display You can select a point of the linearisation table via the LINE-NUMB parameter. **Prerequisite:** ■ TABLE SELECTION = View meas. table ✎ Note! In the operating program, you can view the entire saved table in the "Tables" window.
TANK DESCRIPTION Entry	Enter tank description. (max. 32 alphanumeric characters) **Factory setting:** _

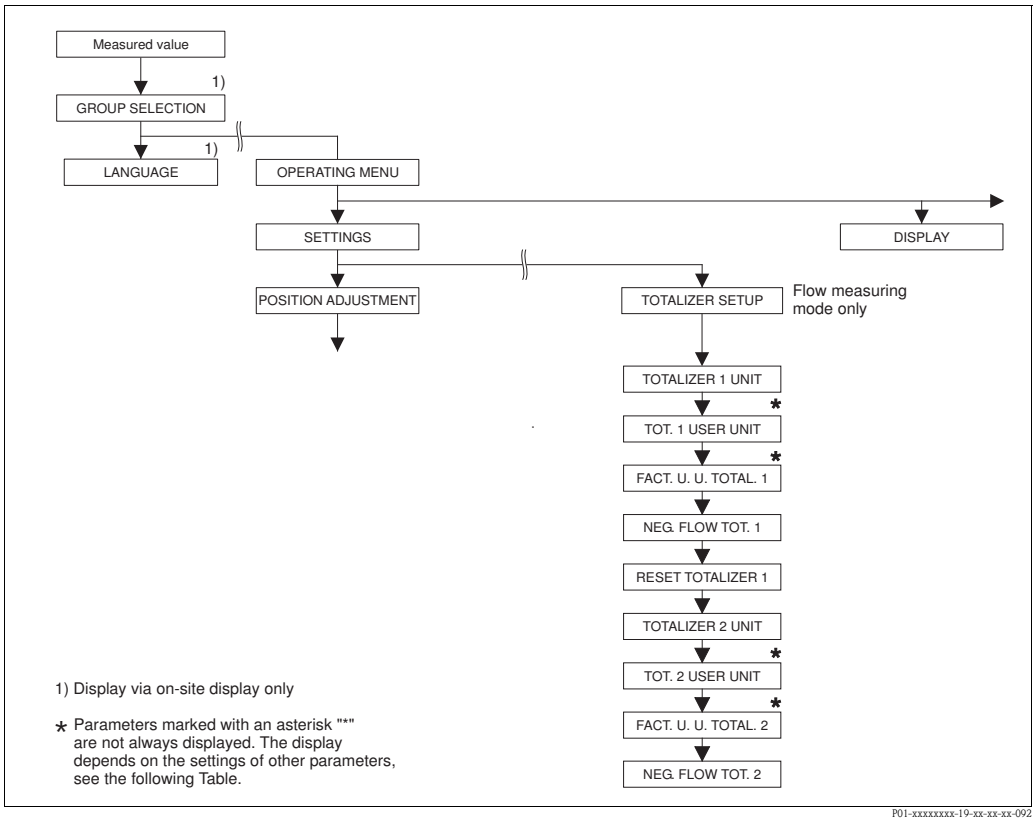


Fig. 40: TOTALIZER SETUP function group

Table 20: (GROUP SELECTION →) OPERATING MENU → SETTINGS → TOTALIZER SETUP	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Flow (→ see also Page 45). **Note:** ■ See also Page 40 ff, Section 6 "Flow measurement".	

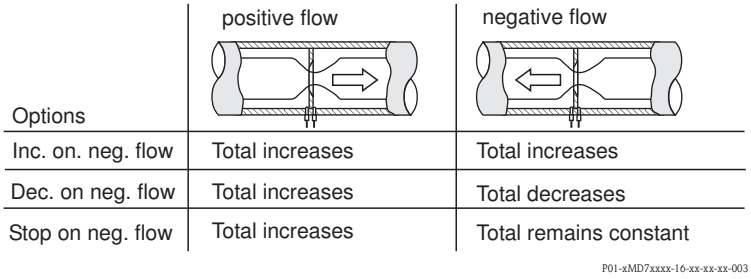
Table 20: (GROUP SELECTION →) OPERATING MENU → SETTINGS → TOTALIZER SETUP	
Parameter name	**Description**
TOTALIZER 1 UNIT (398), (666), (664), (662) Selection	Select unit for totalizer 1. Depending on the setting in the FLOW-MEAS. TYPE parameter (→ Page 93) this parameter offers a list of volume, norm volume, standard volume and mass units. When a new volume or mass unit is selected, totalizer-specific parameters are converted and displayed with the new unit within a unit group. When the flow mode is changed, the totalizer value is not converted. The 3-digit ID number on the on-site display depends on the FLOW-MEAS. TYPE selected: – (398): FLOW-MEAS. TYPE "Volume p. cond." – (662): FLOW-MEAS. TYPE "Mass" – (664): FLOW-MEAS. TYPE "Gas. std. cond." – (666): FLOW-MEAS. TYPE "Gas. norm conditions" **Factory setting:** m^3
TOT. 1 USER UNIT (627) Entry	Enter text (unit) for customer-specific unit for totalizer 1. You can enter a maximum of eight alphanumeric characters here. → See also FACT. U. U. TOTAL. 1. **Prerequisite:** ■ TOTALIZER 1 UNIT = User unit ✎ Note! Only the first five characters are shown on the on-site display. For example, if "crates" is specified as the customer-specific unit, "crate" is displayed. If the unit contains a slash, up to eight characters can be shown on the on-site display. The maximum number of characters in the counter is again limited to five. For example, if "crates/m2" is specified as the customer-specific unit, "crate/m2" is displayed. In the FieldCare, all eight characters are displayed. In the HART handheld terminal, the customer-specific unit is only displayed in the TOT. 1 USER UNIT parameter. The measured value is displayed with the additional text "User Unit". **Factory setting:** _ _ _ _ _ _ _ _
FACT. U. U. TOTAL. 1 (329) Entry	Enter conversion factor for a customer-specific unit for totalizer 1. The conversion factor must be entered in relation to an appropriate SI unit, e.g. m^3 for the "Volume p. cond." FLOW-MEAS. TYPE. → See also TOT. 1 USER UNIT. **Prerequisite:** ■ TOTALIZER 1 UNIT = User unit **Example:** You want the measured value to be displayed in "buckets". – MEASURED VALUE =1 m3 ≙ 100 buckets – Entry TOT. 1 USER UNIT: bucket – Entry FACT. U. U. TOTAL. 1: 100 – Result: MEASURED VALUE = 100 buckets **Factory setting:** 1.0
NEG. FLOW TOT. 1 (400) Selection	Specify way of counting negative flows for totalizer 1.  P01-xMD7xxxx-16-xx-xx-xx-003 **Factory setting:** Inc. on neg. flow

Table 20: (GROUP SELECTION →) OPERATING MENU → SETTINGS → TOTALIZER SETUP	
Parameter name	**Description**
RESET TOTALIZER1 (331) Selection	You reset totalizer 1 to zero with this parameter. **Options:** ■ Abort (do not reset) ■ Reset **Factory setting:** Abort
TOTALIZER 2 UNIT (399), (663), (665), (667) Selection	Select unit for totalizer 2. → See also TOTAL 1. ENG. UNIT. The 3-digit ID number on the on-site display depends on the FLOW-MEAS. TYPE selected: – (399): FLOW-MEAS. TYPE "Volume p. cond." – (663): FLOW-MEAS. TYPE "Mass" – (665): FLOW-MEAS. TYPE "Gas. std. cond." – (667): FLOW-MEAS. TYPE "Gas. norm conditions" **Factory setting:** m^3
TOT. 2 USER UNIT (628) Entry	Enter text (unit) for customer-specific unit for totalizer 2. → See also TOT. 1 USER UNIT. **Prerequisite:** ■ TOTALIZER 2 UNIT = User unit **Factory setting:** _ _ _ _ _ _ _ _
FACT. U. U. TOTAL. 2 (330) Selection	Enter conversion factor for a customer-specific unit for totalizer 2. → See also FACT. U. U. TOTAL. 1. **Prerequisite:** ■ TOTALIZER 2 UNIT = User unit **Factory setting:** 1.0
NEG. FLOW TOT. 2 (416) Selection	Specify way of counting negative flows for totalizer 2. → See NEG. FLOW TOT. 1. **Factory setting:** Positive

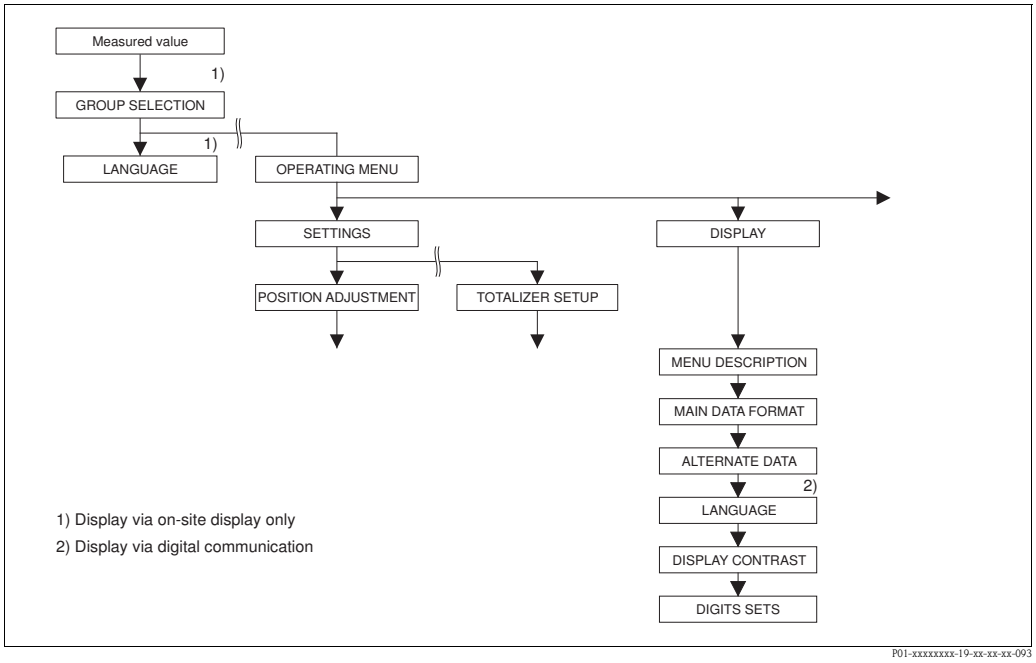


Fig. 41: DISPLAY group

Table 21: (GROUP SELECTION →) OPERATING MENU → DISPLAY	
Parameter name	**Description**
MENU DESCRIPTOR (419) Selection	Specify contents for the main line of the on-site display in the measuring mode. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.1 "On-site display". **Options:** ■ Main measured value (PV) ■ Main measured value (%) ■ Pressure ■ Flow ■ Level ■ Tank content ■ Current ■ Temperature ■ Error number ■ Totalizer 1 ■ Totalizer 2 The selection depends on the measuring mode chosen. **Factory setting:** Main measured value (PV)
MAIN DATA FORMAT (688) Selection	Specifies the number of places after the decimal point for the value displayed in the main line. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or (BA00332P) Deltapilot S, Section 5.1 "On-site display". **Options:** ■ Auto ■ x.x ■ x.xx ■ x.xxx ■ x.xxxx ■ x.xxxxx **Factory setting:** Auto
ALTERNATE DATA (423) Selection	Switch on "Alternating display" mode. In this display mode, the on-site display alternates between the following measured values depending on the measuring mode selected. – Pressure: Main measured value (PV), Pressure, Temperature and Current – Level Standard: Main measured value (PV), Pressure, Level, Tank content, Temperature and Current – Level Easy: Main measured value (PV), Pressure, Temperature and Current – Flow: Main measured value (PV), Pressure, Flow, Temperature, Current, Totalizer 1 and Totalizer 2 **Options:** ■ Off ■ On **Factory setting:** Off
LANGUAGE Selection	Select the menu language for the on-site display. ✎ Note! ■ For on-site operation, the LANGUAGE parameter is arranged directly under GROUP SELECTION (menu path: GROUP SELECTION → LANGUAGE, see also Page 44). ■ Select the menu language for FieldCare via the "Options" menu → "Settings" → "Language" tab → "Tool language" field. **Factory setting**: English

Table 21: (GROUP SELECTION →) OPERATING MENU → DISPLAY	
Parameter name	**Description**
DISPLAY CONTRAST (339) Entry	Adjust contrast of on-site display. You specify the contrast of the display with a number. Changes are only accepted as single steps, i.e. to change the value from "8" to "4", you need to save four times. You can also adjust the contrast of the display by means of the keys on the electronic insert or at the device. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.2.3 "Function of operating keys". **Input range:** 4...13, 4: contrast weaker (brighter), 13: contrast stronger (darker). **Factory setting:** 8
DIGITS SETS (840) Display	This parameter is used to check the correct display of characters and digits on the user interface. If the characters and digits are displayed correctly, this parameter displays the string "0123456789.-".

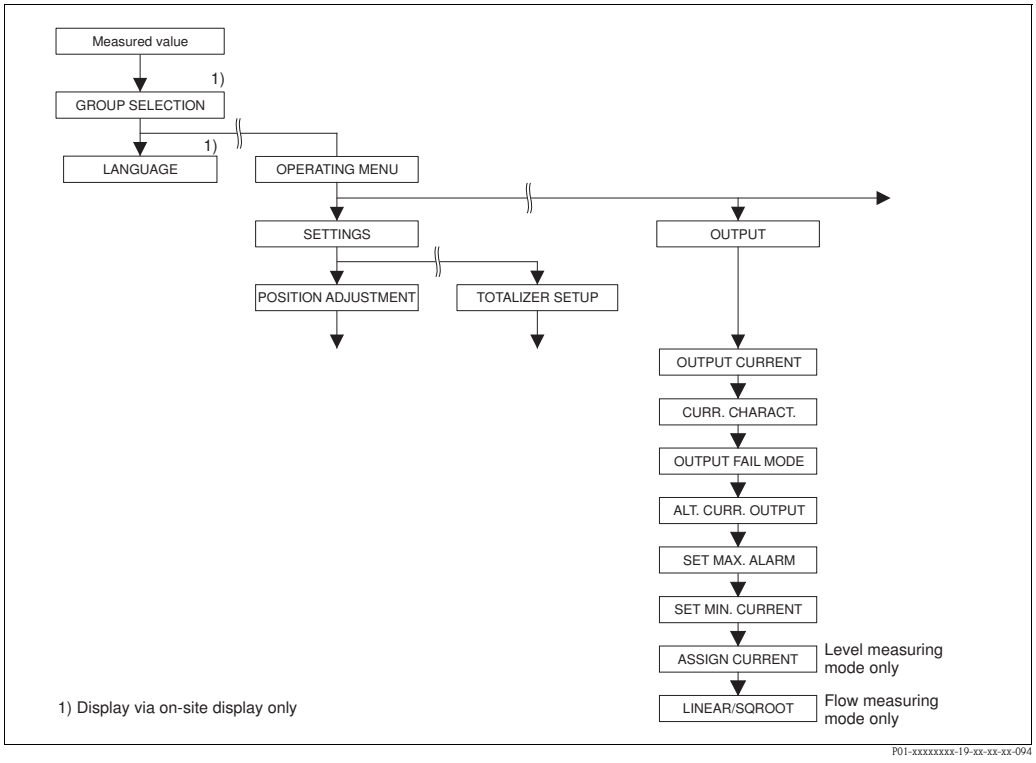


Fig. 42: OUTPUT group

Table 22: (GROUP SELECTION →) OPERATING MENU → OUTPUT	
Parameter name	**Description**
OUTPUT CURRENT (254) Display	Displays the current current value.

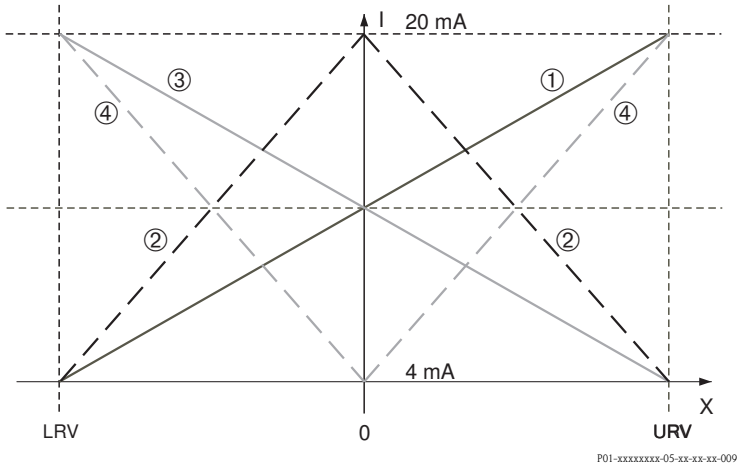
Table 22: (GROUP SELECTION →) OPERATING MENU → OUTPUT	
Parameter name	**Description**
CURR. CHARACT. (694), (695), (696), (764) Selection	Select curve of current output. **Options:**  *Fig. 43: Illustration of current output curves* *1 Linear: lower range value = 4 mA, upper range value = 20 mA* *2 Bi-linear: lower range value = 4 mA, centre or zero = 20 mA, upper range value = 4 mA* *3 Linear inverse: lower range value = 20 mA, upper range value = 4 mA* *4 Bi-linear inverse: lower range value = 20 mA, centre or zero = 4 mA, upper range value = 20 mA* *LRV Lower range value* *URV Upper range value* *I Current* *X Measured value (Pressure/Level/Flow)* *The "CURR. CHARACT." function refers to the operating mode previously selected.* The 3-digit ID number on the on-site display depends on the MEASURING MODE selected: – (694): MEASURING MODE "Pressure" or MEASURING MODE "Flow" with the setting for LINEAR/SQROOT "Differential pres. – (695): MEASURING MODE "Flow" with the setting LINEAR/SQROOT "Flow (square root)" – (696): MEASURING MODE "Level", LEVEL MODE "Linear" or "Pressure Linearized" and LEVEL MODE "Height Linearized" with the setting for ASSIGN CURRENT "Level" – (764): MEASURING MODE "Level", LEVEL MODE "Height Linearized" with the setting for ASSIGN CURRENT "Tank content" **Factory setting:** Linear
OUTPUT FAIL MODE (388) Entry	Select the current value in the event of an alarm. In the event of an alarm, the current and the bargraph assume the current value specified with this parameter. **Options:** ■ Max. alarm (110%): can be set between 21...23 mA ■ Hold meas. value: last measured value is kept. ■ Min. alarm (–10%): 3.6 mA → See also this table SET MAX. ALARM and Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 8.2.1. "Setting current output for alarm". **Factory setting:** Max. alarm 110% (22 mA)

Table 22: (GROUP SELECTION →) OPERATING MENU → OUTPUT	
Parameter name	**Description**
ALT. CURR. OUTPUT (597) Selection	Set current output if sensor limits undershot or overshot. **Options:** ■ Normal: the current output assumes the value set via the OUTPUT FAIL MODE and SET MAX. ALARM parameters. ■ Special: – Lower sensor limit undershot (E120): Current output = 3.6 mA – Upper sensor limit overshot (E115): current output assumes the value set via the SET MAX. ALARM parameter. Attention : when using the case "special", the behavior is limited to an over/ underpressure in a range LRL -10%, URL +10%. **Factory setting:** Normal
SET MAX. ALARM (342) Entry	Enter current value for maximum alarm current. → See also OUTPUT FAIL MODE. **Input range:** 21...23 mA **Factory setting:** 22 mA
SET MIN. CURRENT (343) Entry	Enter lower current limit. Some switching units sometimes do not accept currents less than 4.0 mA. **Options:** ■ 3.8 mA ■ 4.0 mA **Factory setting:** 3.8 mA
ASSIGN CURRENT (760) Selection	Specify current signal for the "Level" measuring mode. See also SET LRV (→ Page 98) and SET URV (→ Page 98). **Prerequisite:** ■ MEASURING MODE = Level, LEVEL MODE = Height Linearized **Options:** ■ Height ■ Tank content **Factory setting:** Tank content
LINEAR/SQROOT (390) Selection	Specify current signal for the "Flow" measuring mode. See also SET LRV (→ Page 99) and SET URV (→ Page 100). **Prerequisite:** ■ MEASURING MODE = Flow **Options:** ■ Differential pres.: the linear pressure signal is used for the current output. ■ Flow (square root): the root flow signal is used for the current output. The "Flow (square root)" current signal is indicated on the on-site display with a root symbol. **Factory setting:** Flow (square root)

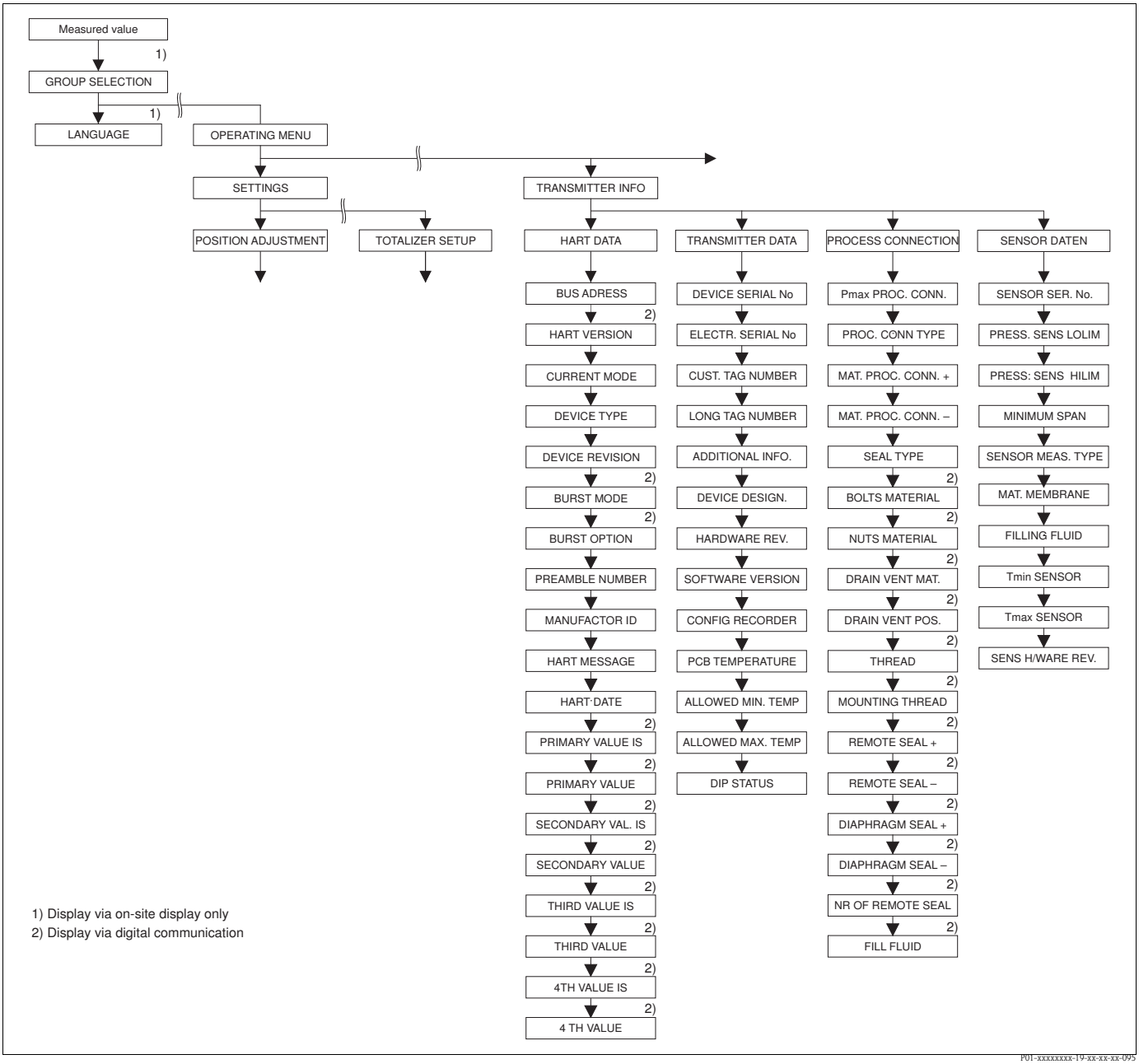


Fig. 44: TRANSMITTER INFO group
→ For the HART DATA function group, see Page 114, Table 23
→ For the TRANSMITTER DATA function group, see Page 117, Table 24
→ For the PROCESS CONNECTION function group, see Page 117, Table 25
→ For the SENSOR DATA function group, see Page 119, Table 26

Table 23: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → HART DATA	
Parameter name	**Description**
HART VERSION (585) Display	Displays the HART Version.

Table 23: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → HART DATA	
Parameter name	**Description**
CURRENT MODE (052) Selection	Set the current mode for HART communication. **Selection via on-site display and FieldCare:** ■ Signaling Measured value transmission by the current value ■ Fixed Fixed current 4.0 mA (multidrop mode) (Measured value transmission only via HART digital communication) **Factory setting:** Signaling **Selection via HART Handheld Terminal:** ■ enabled Measured value transmission by the current value ■ disabled Fixed current 4.0 mA (multidrop mode) (Measured value transmission only via HART digital communication) **Factory setting:** enabled
BUS ADDRESS (345) Entry	Enter the address for the exchange of data with the HART protocol. (HART 5.0: range 0 to 15, wherein if the address = 0 this produces the "Signaling" setting; HART 6.0/7.0: range 0 to 63) **Factory setting:** 0
DEVICE TYPE (351) Display	Displays the device type in decimal numerical format, here Deltabar S: 23 The extended device type is a composition of the manufacturer number (17) and the device type (23). **Prerequisite:** ■ Deltabar S differential pressure transmitter
DEVICE TYPE (802) Display	Displays the device type in decimal numerical format, here Cerabar S: 24 The extended device type is a composition of the manufacturer number (17) and the device type (24). **Prerequisite:** ■ Pressure transmitter Cerabar S
DEVICE TYPE (002) Display	Displays the device type in decimal numerical format, here Deltapilot S: 26 The extended device type is a composition of the manufacturer number (17) and the device type (26). **Prerequisite:** ■ Pressure transmitter Deltapilot S
DEVICE REVISION (699) Display	Displays the device revision
BURST MODE Selection	Switches "Burst Mode" function on and off. **Selection:** ■ On ■ Off **Prerequisite:** ■ Digital communication
BURST OPTION Entry	Use this parameter to specify which command is sent to the master. **Voraussetzung:** ■ Digital communication **Factory setting:** 3 (HART commando 3)
PREAMBLE NUMBER (036) Entry	Enter the number of preambles in the HART protocol. (Synchronisation of the modem modules along a transmission path, each modem module could "swallow" a byte – at least 2 bytes must arrive.) **Input range:** 2...20 **Factory setting:** 5

Table 23: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → HART DATA	
Parameter name	**Description**
MANUFACTOR ID (432) Display	Displays the manufacturer number in a decimal numerical format. Here: 17 Endress+Hauser
HART MESSAGE (271) Entry	Enter message (max. 32 alphanumeric characters). On command from the master, this message is sent via the HART protocol. **Factory setting:** _ or as per order specifications
HART DATE (481) Entry	Enter the date of the last configuration change. **Factory setting:** DD.MM.YY (date of final test)
PRIMARY VALUE IS Display	This parameter displays the following measured value depending on the measuring mode selected: – Measuring mode "Pressure": PRESSURE – "Level" measuring mode, "Linear" or "Pressure Linearized" level type: LEVEL BEFORE LIN – Measuring mode "Level", level type "Height Linearized": TANK CONTENT – Measuring mode "Flow": SUPPRESSED FLOW → See also PRIMARY VALUE. **Prerequisite:** ■ Digital communication
PRIMARY VALUE Display	Displays the primary value. → See also PRIMARY VALUE IS. **Prerequisite:** ■ Digital communication
SECONDARY VAL. IS	Select second process value. You can choose between the following process values depending on the measuring mode selected: – PRESSURE – CORRECTED PRESS. – SENSOR PRESSURE – SENSOR TEMP. – PCB TEMPERATURE – SUPPRESSED FLOW – TOTALIZER 1 – TOTALIZER 2 – LEVEL BEFORE LIN – TANK CONTENT **Prerequisite:** ■ Digital communication
SECONDARY VALUE	Display second process value. → See also SECONDARY VAL. IS. **Prerequisite:** ■ Digital communication
THIRD VALUE IS	Select third process value. → See also SECONDARY VAL. IS. **Prerequisite:** ■ Digital communication
THIRD VALUE	Display third process value. → See also SECONDARY VAL. IS. **Prerequisite:** ■ Digital communication
4TH VALUE IS	Select fourth process value. → See also SECONDARY VAL. IS. **Prerequisite:** ■ Digital communication
4TH VALUE	Display fourth process value. → See also SECONDARY VAL. IS. **Prerequisite:** ■ Digital communication

Table 24: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → TRANSMITTER DATA	
Parameter name	**Description**
DEVICE SERIAL No (354) Display	Displays the serial number of the device (11 alphanumeric characters).
ELECTR. SERIAL No (386) Display	Displays the serial number of the main electronics (11 alphanumeric characters).
CUST. TAG NUMBER (055) Entry	Enter TAG number (max. 8 alphanumeric characters). **Factory setting:** _ _ _ _ _ _ _ _ or as per order specifications
LONG TAG NUMBER (305) Entry	Enter TAG number (max. 32 alphanumeric characters). **Factory setting:** _ or as per order specifications
ADDITIONAL INFO. (272) Entry	Enter tag description (max. 16 alphanumeric characters). **Factory setting:** _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ or as per order specifications
DEVICE DESIGN. (350) Display	Displays the device designation and order code.
HARDWARE REV. (266) Display	Displays the revision number of the main electronics e.g.: V02.00
SOFTWARE VERSION (264) Display	Displays the software version e.g.: V02.10
CONFIG RECORDER (352) Display	Displays the configuration counter. This counter is increased by one with each change to a parameter or group. The counter counts to 65535 and then starts again at zero. Changes in the parameters of the DISPLAY function group do not increase the counter.
PCB TEMPERATURE (357) Display	Displays the measured temperature of the main electronics.
ALLOWED MIN. TEMP (358) Display	Displays the lower temperature limit of the main electronics.
ALLOWED MAX. TEMP (359) Display	Displays the upper temperature limit of the main electronics.
DIP STATUS (363) Display	Displays the status of DIP switch 1 on the electronic insert. You can lock or unlock parameters relevant to the measured value with DIP switch 1. If operation is locked by means of the INSERT PIN No. parameter, you can only unlock operation again by means of this parameter. (→ INSERT PIN NO, see Page 126.) → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.9 "Locking/unlocking operation". **Display:** ■ On (locking switched on) ■ Off (locking switched off) **Factory setting:** Off (locking switched off)

Table 25: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → PROCESS CONNECTION	
Parameter name	**Description**
Pmax PROC. CONN. (570) Entry	For entering and displaying the maximum permitted pressure of the process connection. **Factory setting:** In accordance with nameplate data (→ see also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 2.1.1 nameplate)

Table 25: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → PROCESS CONNECTION	
Parameter name	**Description**
PROC. CONN. TYPE (482) Selection	For selecting and displaying the process connection type. **Options:** ■ Not used ■ Unknown ■ Special ■ Oval flange ■ Thread female ■ Thread male ■ Flange ■ Remote seal
MAT. PROC. CONN. + (360) Selection	For selecting and displaying the material of the process connection (P+). → See also parameter description for MAT. PROC. CONN. - **Options:** ■ Not used ■ Unknown ■ Special ■ Steel ■ 304 st. steel ■ 316 st. steel ■ Alloy C ■ Monel ■ Tantalum ■ Titanium ■ PTFE (Teflon) ■ 316L st. steel ■ PVC ■ Inconel ■ PVDF ■ ECTFE **Factory setting:** As per order specifications
MAT. PROC. CONN. - (361) Selection	For selecting and displaying the material of the process connection (P–). → See also parameter description for MAT. PROC. CONN. + **Prerequisite:** ■ Deltabar S differential pressure transmitter
SEAL TYPE (362) Selection	For selecting and displaying the material of the process seal. **Options:** ■ Not used ■ Unknown ■ Special ■ FKM Viton ■ NBR ■ EPDM ■ Urethane ■ IIR ■ Kalrez ■ FKM Viton oxyg ■ CR ■ MVQ ■ PTFE glass ■ PTFE graphite ■ PTFE oxygen ■ Copper ■ Copper f. oxygen **Factory setting:** As per order specifications
BOLTS MATERIAL	For selecting and displaying the material of the bolts. **Prerequisite:** ■ Digital communication

Table 25: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → PROCESS CONNECTION	
Parameter name	**Description**
NUTS MATERIAL	For selecting and displaying the material of the nuts. **Prerequisite:** ■ Digital communication
DRAIN VENT MAT.	For selecting and displaying the material of the vent valves. **Prerequisite:** ■ Digital communication
DRAIN VENT POS.	For selecting and displaying the position of the vent valves. **Prerequisite:** ■ Digital communication
THREAD	For selecting and displaying the process connection thread. **Prerequisite:** ■ Digital communication
MOUNTING THREAD	For selecting and displaying the ways of securing the device. **Prerequisite:** ■ Digital communication
REMOTE SEAL +	For selecting and displaying the diaphragm seal type on the positive side. **Prerequisite:** ■ Digital communication
REMOTE SEAL –	For selecting and displaying the diaphragm seal type on the negative side. **Prerequisite:** ■ Digital communication
DIAPHRAG. MAT. +	For selecting and displaying the material of the process isolating diaphragm on the positive side. **Prerequisite:** ■ Digital communication
DIAPHRAG. MAT. –	For selecting and displaying the material of the process isolating diaphragm on the negative side. **Prerequisite:** ■ Digital communication
NR OF REMOTE SEAL	For selecting and displaying the number of diaphragm seals. **Prerequisite:** ■ Digital communication
FILL FLUID	For selecting and displaying the diaphragm seal fill fluid. **Prerequisite:** ■ Digital communication

Table 26: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → SENSOR DATA (all measuring modes)	
Parameter name	**Description**
SENSOR SER. No. (250) Display	Displays the serial number of the sensor (11 alphanumeric characters).
PRESS. SENS LOLIM (484) Display	Displays the lower measuring limit of the sensor.
PRESS. SENS HILIM (485) Display	Displays the upper measuring limit of the sensor.
MINIMUM SPAN (591) Display	Displays the smallest possible span.

Table 26: (GROUP SELECTION →) OPERATING MENU → TRANSMITTER INFO → SENSOR DATA (all measuring modes)	
Parameter name	**Description**
SENSOR MEAS.TYPE (581) Display	Displays the sensor type. ■ Deltabar S = differential ■ Cerabar S with gauge pressure sensor = relative ■ Cerabar S with absolute pressure sensor = absolute ■ Deltapilot S = relative
Pmin SENS. DAMAGE (251) Display	Displays the minimum permissible absolute pressure of the sensor (vacuum-proofing).
Pmax SENS. DAMAGE (252) Display	Displays the maximum permissible absolute pressure of the sensor (overpressure-proofing).
MAT. MEMBRANE (365) Display	Displays the material of the process isolating diaphragm. **Factory setting:** As per version in the order code → For Deltabar S, see Technical Information TI00382P, for Cerabar S, see Technical Information TI00383P or for Deltapilot S, see Technical Information TI00416P, "Ordering information" section.
FILLING FLUID (366) Display	Displays the filling fluid.
Tmin SENSOR (368) Display	Displays the lower nominal temperature limit of the sensor.
Tmax SENSOR (369) Display	Displays the upper nominal temperature limit of the sensor.
SENS H/WARE REV (487) Display	Displays the revision number of the sensor hardware. e.g.: 1

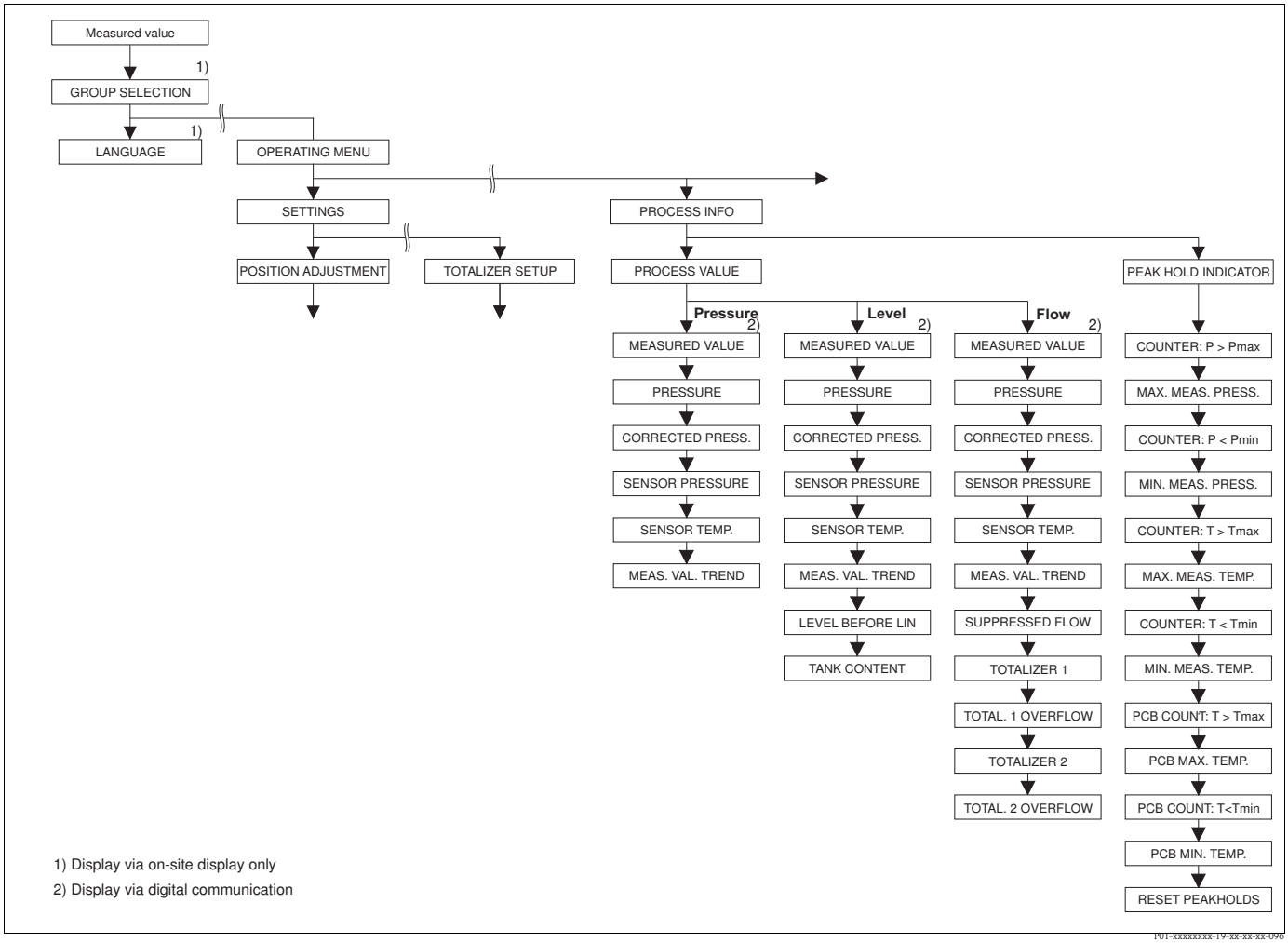


Fig. 45: PROCESSINFO group
→ For the PROCESS VALUES function group, "Pressure" measuring mode, see Page 121, Table 27
→ For the PROCESS VALUES function group, "Level" measuring mode, see Page 122, Table 28
→ For the PROCESS VALUES function group, "Flow" measuring mode, see Page 123, Table 29
→ For the PEAK HOLD INDICATOR function group, see Page 124, Table 30

Table 27: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PROCESS VALUES "Pressure"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = pressure (→ see also Page 45).	
MEASURED VALUE (679)	Displays the measured value In the "Pressure" measuring mode, this value corresponds to the PRESSURE parameter. **Prerequisite:** ■ Digital communication **On-site operation:** ■ For on-site operation, the MEASURED VALUE parameter is displayed on the 1st level.

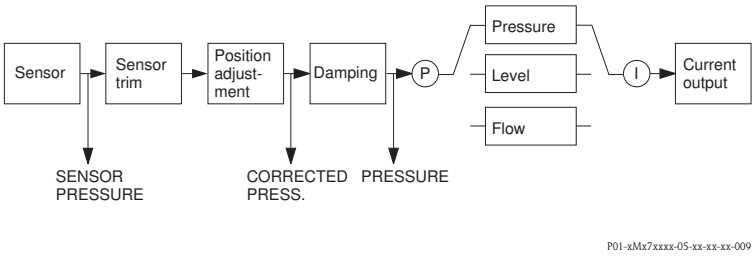
Table 27: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PROCESS VALUES "Pressure"	
Parameter name	**Description**
PRESSURE (301) Display	Displays the measured pressure after sensor recalibration, position adjustment and damping. This value corresponds to the MEASURED VALUE parameter in the "Pressure" measuring mode.  P01-xMx7xxxx-05-xx-xx-xx-009
CORRECTED PRESS. (434) Display	Displays the measured pressure after sensor trim and position adjustment and before damping. → See also PRESSURE diagram.
SENSOR PRESSURE (584) Display	Displays the measured pressure before sensor trim, position adjustment and damping. → See also PRESSURE diagram.
SENSOR TEMP. (367) Display	Displays the temperature currently measured in the sensor. This temperature can deviate from the process temperature.
MEAS. VAL. TREND (378) Display	Displays the trend of the pressure measured value. Possibilities: increasing, decreasing, constant

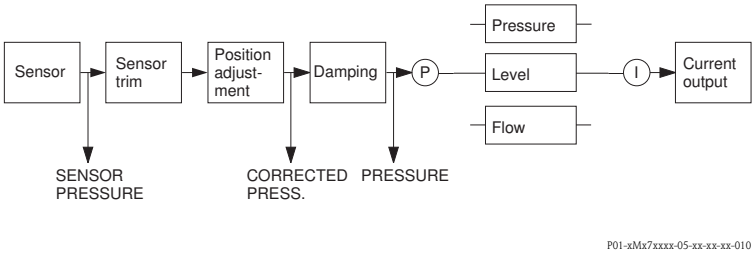
Table 28: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PROCESS VALUES "Level"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Level (→ see also Page 45).	
MEASURED VALUE (679)	Displays the measured value In the "Level" measuring mode with "Linear" or "Pressure Linearized" level type, this value corresponds to the LEVEL BEFORE LIN parameter In the "Level" measuring mode with "Height Linearized" level type, this value corresponds to the TANK CONTENT parameter. **Prerequisite:** ■ Digital communication **On-site operation:** ■ For on-site operation, the MEASURED VALUE parameter is displayed on the 1st level.
PRESSURE (301) Display	Displays the measured pressure after sensor recalibration, position adjustment and damping. This value corresponds to the MEASURED VALUE parameter in the "Pressure" measuring mode.  P01-xMx7xxxx-05-xx-xx-xx-010
CORRECTED PRESS. (434) Display	Displays the measured pressure after sensor trim and position adjustment and before damping. → See also PRESSURE diagram.
SENSOR PRESSURE (584) Display	Displays the measured pressure before sensor trim, position adjustment and damping. → See also PRESSURE diagram.
SENSOR TEMP. (367) Display	Displays the temperature currently measured in the sensor. This temperature can deviate from the process temperature.

Table 28: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PROCESS VALUES "Level"	
Parameter name	**Description**
MEAS. VAL. TREND (378) Display	Displays the trend of the pressure measured value. Possibilities: increasing, decreasing, constant
LEVEL BEFORE LIN (050) Display	Displays the level value prior to linearisation. **Prerequisite:** ■ LEVEL MODE = Linear or Height Linearized Depending on the setting for the LIN. MEASURAND or COMB. MEASURAND parameter, this parameter displays the current level in % or in a unit of level.
TANK CONTENT (370) Display	Displays the level value after linearisation. **Prerequisite:** ■ LEVEL MODE = Pressure Linearized or Height Linearized Depending on the settings for the LINd. MEASURAND or COMB. MEASURAND parameter, the current tank content is displayed in % or in a unit of volume or mass. This value corresponds to the MEASURED VALUE.

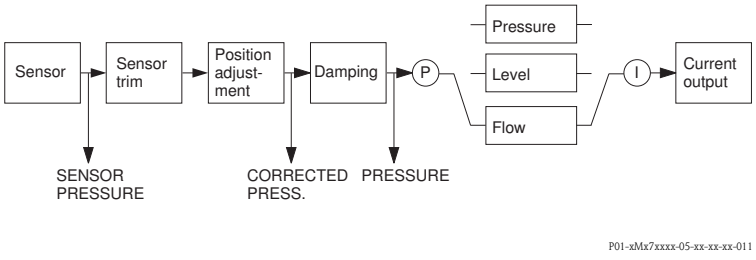
Table 29: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PROCESS VALUES "Flow"	
Parameter name	**Description**
Prerequisite: ■ MEASURING MODE = Flow (→ see also Page 45).	
MEASURED VALUE (679)	Displays the measured value In the "Flow" measuring mode, this value corresponds to the SUPPRESSED FLOW parameter. **Prerequisite:** ■ Digital communication **On-site operation:** ■ For on-site operation, the MEASURED VALUE parameter is displayed on the 1st level.
PRESSURE (301) Display	Displays the measured pressure after sensor recalibration, position adjustment and damping. This value corresponds to the MEASURED VALUE parameter in the "Pressure" measuring mode. 
CORRECTED PRESS. (434) Display	Displays the measured pressure after sensor trim and position adjustment and before damping. → See also PRESSURE diagram.
SENSOR PRESSURE (584) Display	Displays the measured pressure before sensor trim, position adjustment and damping. → See also PRESSURE diagram.
SENSOR TEMP. (367) Display	Displays the temperature currently measured in the sensor. This temperature can deviate from the process temperature.
MEAS. VAL. TREND (378) Display	Displays the trend of the pressure measured value. Possibilities: increasing, decreasing, constant
SUPPRESSED FLOW (375) Display	Displays the current flow. Depending on the flow mode selected (→ FLOW-MEAS. TYPE), a volume flow, mass flow, standard volume flow or corrected volume flow is displayed.

Table 29: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PROCESS VALUES "Flow"	
Parameter name	**Description**
TOTALIZER 1 (652) Display	Displays the total flow value of totalizer 1. You can reset the value with the RESET TOTALIZER 1 parameter. The TOTAL. 1 OVERFLOW parameter displays the overflow. **Example:** The value 123456789 m^3 is displayed as follows: – TOTALIZER 1: 3456789 m^3 – TOTAL. 1 OVERFLOW: 12 E7
TOTAL. 1 OVERFLOW (655) Display	Displays the overflow value of totalizer 1. → See also TOTALIZER 1.
TOTALIZER 2 (657) Display	Displays the total flow value of totalizer 2. You cannot reset totalizer 2. The TOTAL. 2 OVERFLOW parameter displays the overflow. → See also example for TOTALIZER 1.
TOTAL. 2 OVERFLOW (658) Display	Displays the overflow value of totalizer 2. → See also TOTALIZER 2 and example for TOTALIZER 1.

Table 30: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PEAK HOLD INDICATOR	
Parameter name	**Description**
COUNTER:P > Pmax (380) Display	Displays the overpressure counter of the sensor The limit value is: upper nominal pressure limit of sensor + 10 % of upper nominal pressure limit of sensor. You can reset this counter by means of the RESET PEAKHOLD parameter.
MAX. MEAS. PRESS. (383) Display	Displays the largest measured pressure value (peak hold indicator). You can reset this indicator by means of the RESET PEAKHOLD parameter.
COUNTER P < Pmin (467) Display	Displays the vacuum pressure counter of the sensor The limit value is: lower nominal pressure limit of sensor – 10 % of upper nominal pressure limit of sensor. You can reset this counter by means of the RESET PEAKHOLD parameter.
MIN. MEAS. PRESS. (469) Display	Displays the smallest measured pressure value (peak hold indicator). You can reset this indicator by means of the RESET PEAKHOLD parameter.
COUNTER:T > Tmax (404) Display	Displays the number of times the specified temperature range of the sensor has been overshot. You can reset this counter by means of the RESET PEAKHOLD parameter.
MAX. MEAS. TEMP. (471) Display	Displays the largest measured temperature in the sensor (peak hold indicator). You can reset this indicator by means of the RESET PEAKHOLD parameter.
COUNTER:T < Tmin (472) Display	Displays the number of times the specified temperature range of the sensor has been undershot. You can reset this counter by means of the RESET PEAKHOLD parameter.
MIN. MEAS. TEMP. (474) Display	Displays the smallest measured temperature in the sensor (peak hold indicator). You can reset this indicator by means of the RESET PEAKHOLD parameter.
PCB COUNT:T > Tmax (488) Display	Displays the number of times the specified temperature range of the electronics has been overshot.
PCB MAX. TEMP. (490) Display	Displays the largest electronics temperature measured.
PCB COUNT:T < Tmin (492) Display	Displays the number of times the specified temperature range of the electronics has been undershot.
PCB MIN. TEMP. (494) Display	Displays the smallest electronics temperature measured.

Table 30: (GROUP SELECTION →) OPERATING MENU → PROCESSINFO → PEAK HOLD INDICATOR	
Parameter name	**Description**
RESET PEAKHOLD (382) Selection	This parameter lists all the peak hold indicator parameters that can be reset. You can select the peak hold indicators you want to reset. **Options:** ■ None ■ Max. pressure ■ Min. pressure ■ Pmax history ■ Pmin history ■ Max. temp. ■ Min. temp. ■ Tmax history ■ Tmin history ■ Reset all **Factory setting:** None

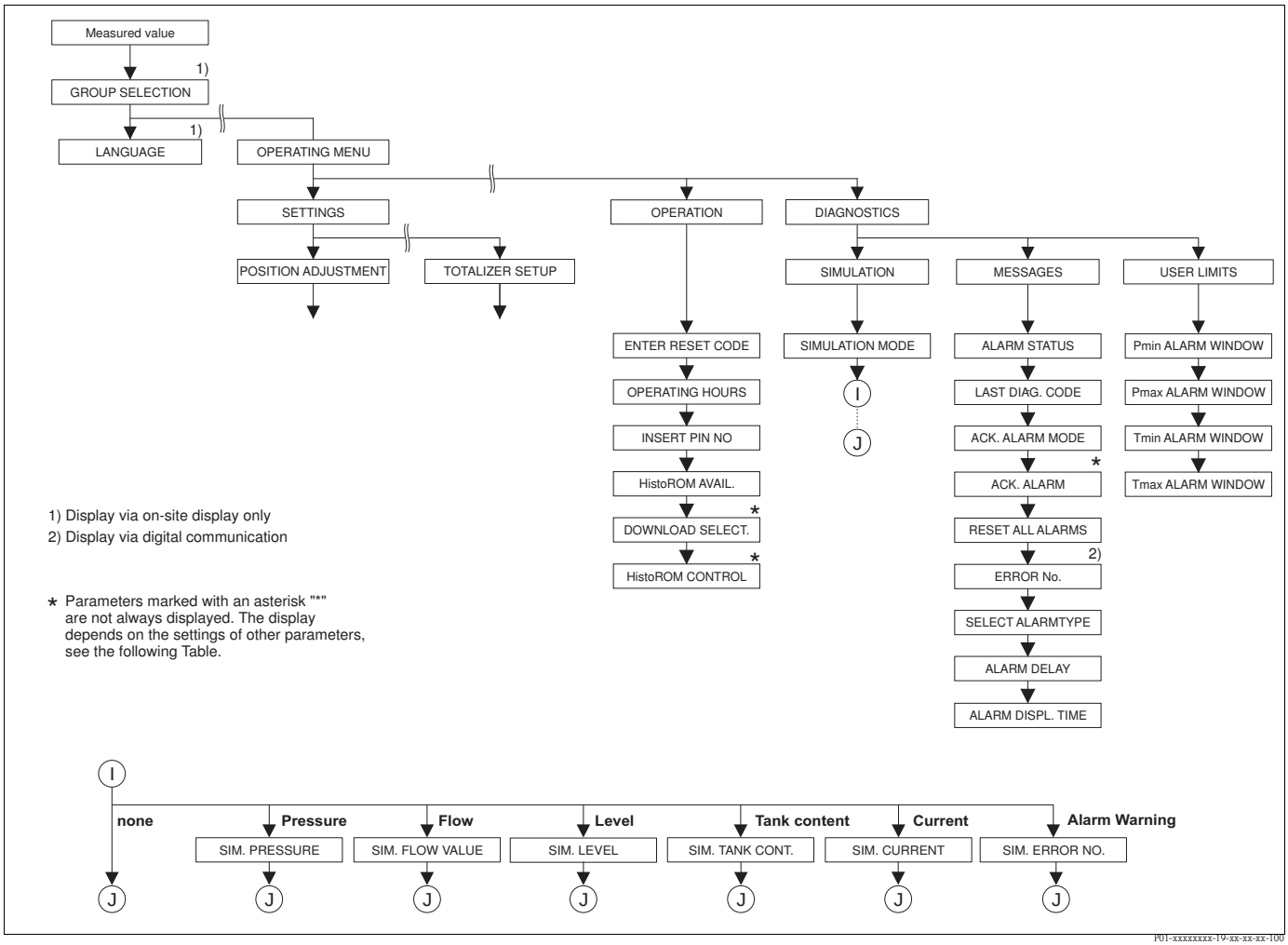


Fig. 46: OPERATING and DIAGNOSTICS group
→ For the OPERATING group, see Page 126, Table 31
→ For the SIMULATION function group, see Page 127, Table 32
→ For the MESSAGES function group, see Page 128, Table 33
→ For the USER LIMITS function group, see Page 130, Table 34

Table 31: (GROUP SELECTION →) OPERATING MENU → OPERATING	
Parameter name	**Description**
ENTER RESET CODE (047) Entry	Reset parameters completely or partially to factory values or delivery status. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.10 "Factory setting" (reset). **Factory setting:** 0
OPERATING HOURS (409) Display	Displays the hours of operation. This parameter cannot be reset.
INSERT PIN NO (048) Entry	For entering a code to lock or unlock operation. Note! ■ The -symbol on the on-site display indicates that operation is locked. Parameters which refer to how the display appears, e.g. LANGUAGE and DISPLAY CONTRAST can still be altered. ■ If operation is locked by means of the DIP-switch, you can only unlock operation again by means of the DIP-switch. If operation is locked by means of the on-site display or remote operation e.g. FieldCare, you can unlock operation again by means of the on-site display or using remote operation. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.9 "Locking/unlocking operation". **Options:** ■ Lock: enter a number between 0...9999 which is ≠100. ■ Unlock: enter the number 100. **Factory setting:** 100
HistoROM AVAIL. (831) Display	Indicates whether the optional HistoROM®/M-DAT memory module is connected to the electronic insert. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.5 "HistoROM®/M-DAT (optional)". **Options:** ■ Yes (HistoROM®/M-DAT is attached to the electronic insert) ■ No (HistoROM®/M-DAT is not attached to the electronic insert)
DOWNLOAD SELECT (014) Options	Select download function from HistoROM to device. The selection has no effect on an upload from the device to the HistoROM. **Prerequisite:** ■ A HistoROM®/M-DAT is attached to the electronic insert (HistoROM AVAIL. = yes) **Options:** ■ Configuration copy: For this option, all parameters apart from the DEVICE SERIAL No, DEVICE DESIGN., CUST. TAG NUMBER, LONG TAG NUMBER, ADDITIONAL INFO., BUS ADDRESS, CURRENT MODE and the parameters of the POSITION ADJUSTMENT and PROCESS CONNECTION group are overwritten. ■ Device replacement: With this option, all parameters except for DEVICE SERIAL No, DEVICE DESIGN. and the parameters of the POSITION ADJUSTMENT and PROCESS CONNECTION group are overwritten. ■ Electronics replace: With this option, all parameters except for the parameters of the POSITION ADJUSTMENT group are overwritten. **Factory setting:** Copy config. (if HistoROM®/M-DAT is attached to the electronic insert)

Table 31: (GROUP SELECTION →) OPERATING MENU → OPERATING	
Parameter name	**Description**
HistoROM CONTROL (832) Selection	For selecting the direction for copying the data. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.5. "HistoROM®/M-DAT (optional)". **Prerequisite:** ■ A HistoROM®/M-DAT is attached to the electronic insert (HistoROM AVAIL. = yes) **Options:** ■ Abort ■ HistoROM → Device ■ Device → HistoROM **Factory setting:** Abort (if HistoROM®/M-DAT is connected to the electronic insert)

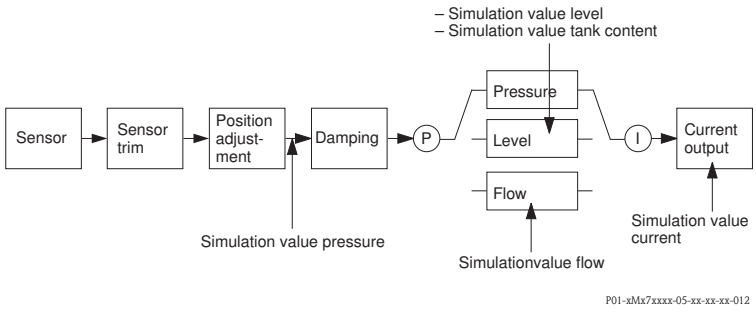
Table 32: (GROUP SELECTION →) OPERATING MENU → DIAGNOSTICS → SIMULATION	
Parameter name	**Description**
SIMULATION MODE (413) Selection	Switch on simulation and select simulation type. Any simulation running is switched off if the measuring mode or level type is changed. **Options**: ■ None ■ Pressure, → see also this table parameter description for SIM. PRESSURE ■ Flow (only differential pressure transmitter), → see also this table parameter description for SIM. FLOW VALUE ■ Level, → see also this table parameter description for SIM. LEVEL ■ Tank content, → see also this table parameter description for SIM. TANK CONT. ■ Current, → see also this table parameter description for SIM. CURRENT Note: The "Flow" measuring mode has to be selected in the LINEAR/SQROOT parameter to ensure the current output corresponds to the simulated flow value. ■ Alarm/warning, , → see also this table parameter description for SIM. ERROR NO.  **Factory setting:** None
SIM. PRESSURE (414) Entry	Enter simulation value. → See also SIMULATION MODE. **Prerequisite:** ■ SIMULATION MODE = Pressure **Factory setting:** Current pressure measured value
SIM. FLOW VALUE (639) Entry	Enter simulation value. → See also SIMULATION MODE. **Prerequisite:** ■ MEASURING MODE = Pressure and SIMULATION MODE = Flow ■ MEASURING MODE = Flow and SIMULATION MODE = Flow

Table 32: (GROUP SELECTION →) OPERATING MENU → DIAGNOSTICS → SIMULATION	
Parameter name	**Description**
SIM. LEVEL (714) Entry	Enter simulation value. → See also SIMULATION MODE. **Prerequisite:** ■ MEASURING MODE = Level and SIMULATION MODE = Level
SIM. TANK CONT. (715) Entry	Enter simulation value. → See also SIMULATION MODE. **Prerequisites:** ■ MEASURING MODE = Level, LEVEL MODE = Pressure Linearized and SIMULATION MODE = Tank content ■ MEASURING MODE = Level, LEVEL MODE = Height Linearized and SIMULATION MODE = Tank content
SIM. CURRENT (270) Entry	Enter simulation value. → See also SIMULATION MODE. **Prerequisite:** ■ SIMULATION MODE = Current value **Factory setting:** Current current value
SIM. ERROR NO. (476) Entry	⚠ Warning! The SIMULATION parameter overwrites fault states (alarm/warning) that are actually present. When the simulation is ended, the fault states (alarm/warning) still persist but are no longer displayed! When the device is restarted it returns to its fault state. Enter message number. → See also SIMULATION MODE. → See also these Operating Instructions, Section 8.1 "Messages", "Code" table column. **Prerequisite:** ■ SIMULATION MODE = Alarm/Warning **Factory setting:** 613 (simulation active)

Table 33: (GROUP SELECTION →) OPERATING MENU → DIAGNOSTICS → MESSAGES	
Parameter name	**Description**
ALARM STATUS (046) Display	Displays the current messages present. → See also these Operating Instructions, Section 8.1. "Messages" and Section 8.3 "Confirming messages". **On-site display** ■ The measured value display shows the message with the highest priority. ■ The ALARM STATUS parameter shows all the messages in descending order of priority. You can scroll through all the messages present with the ⊞ or ⊟ key. **Operating program** ■ The "Status" field and the ALARM STATUS parameter show the message with the highest priority.
LAST DIAG. CODE (564) Display	Displays the last messages that occurred and were eliminated. ✎ Note! ■ On-site display: you can scroll through the last 15 messages with the ⊞ or ⊟ key. ■ Digital communication: the last message appears on the display. ■ Use the RESET ALL ALARMS parameter to delete the messages listed in the LAST DIAG. CODE parameter.
ACK. ALARM MODE (401) Selection	Switch on acknowledge alarm mode. → See also ACK. ALARM. **Options:** ■ On ■ Off **Factory setting:** Off

Table 33: (GROUP SELECTION →) OPERATING MENU → DIAGNOSTICS → MESSAGES	
Parameter name	**Description**
ACK. ALARM (500) Selection	Acknowledge alarm. **Prerequisite:** ■ ACK. ALARM MODE = on **Options:** ■ Abort ■ Confirm The cause of the alarm must be eliminated, the message must be acknowledged via the ACK. ALARM parameter and, where applicable, the ALARM DISPL. TIME (→ Page 129) has to have elapsed before the device starts measuring again following an alarm. → See also these Operating Instructions, Section 8.3 "Confirming messages". **Factory setting:** Abort
RESET ALL ALARMS (603) Selection	Use this parameter to reset all the messages of the LAST DIAG. CODE parameter. **Options:** ■ Abort ■ Confirm **Factory setting:** Abort
ERROR No. Entry	For "Error"-type messages, you can decide whether the device should behave as in the event of an alarm (A) or as in the event of a warning (W). Enter the corresponding message number for this parameter. → See also SELECT ALARMTYPE. → See also these Operating Instructions, Section 8.1 "Messages" and Section 8.2 "Response of outputs to errors". **Prerequisite:** ■ Digital communication
SELECT ALARMTYPE (595) – Entry (600) – Selection	For "Error"-type messages, you can decide whether the device should behave as in the event of an alarm (A) or as in the event of a warning (W). → See also ERROR No. → See also these Operating Instructions, Section 8.2 "Response of outputs to errors". **Options**: ■ Alarm (A): output current assumes a defined value. ■ Warning (W): device continues measuring **On-site operation:** 1. Enter the corresponding message number for ERROR No. field. 2. Select "Alarm" or "Warning" option. **Digital communication:** 1. Enter the corresponding message number via the ERROR No. parameter. 2. Use the SELECT ALARMTYPE parameter to select the "Alarm" or "Warning" option.
ALARM DELAY (336) Entry	Enter alarm response time for all "Error" messages. ✎ Note! There is no alarm if the cause of the error is eliminated within the alarm delay time. **Input range:** 0...100 s **Factory setting:** 0.0 s
ALARM DISPL. TIME (480) Entry	Enter alarm display time for all "Error" messages. Once the cause of the error is rectified, the alarm display time starts running. ✎ Note! The following applies if the setting for ACK. ALARM MODE = on: If an alarm appears and the alarm display time elapses before the alarm has been acknowledged, the message will be cleared once it has been acknowledged. → See also these Operating Instructions, Section 8.3 "Confirming messages". **Input range:** 0...999.9 s **Factory setting:** 0.0 s

Table 34: (GROUP SELECTION →) OPERATING MENU → DIAGNOSTICS → USER LIMITS	
Parameter name	**Description**
Pmin ALARM WINDOW (332) Entry	Customer-specific process monitoring – enter lower pressure limit. You can use the SELECT ALARMTYPE parameter to enter how the device responds if the operating pressure undershoots the specified value. → See also these Operating Instructions, Section 8.1 "Messages", table, Code E730 and Section 8.2. "Response of outputs to errors". **Factory setting:** Low sensor limit ■1.1 (→ For the low sensor limit, see PRESS. SENS LOLIM.)
Pmax ALARM WINDOW (333) Entry	Customer-specific process monitoring – enter upper pressure limit. You can use the SELECT ALARMTYPE parameter to enter how the device responds if the operating pressure undershoots the specified value. → See also these Operating Instructions, Section 8.1 "Messages", table, Code E731 and Section 8.2. "Response of outputs to errors". **Factory setting:** High sensor limit ■1.1 (→ For the high sensor limit, see PRESS. SENS HILIM.)
Tmin ALARM WINDOW (334) Entry	Customer-specific process monitoring – enter lower temperature limit. You can use the SELECT ALARMTYPE parameter to enter how the device responds if the operating pressure undershoots the specified value. → See also these Operating Instructions, Section 8.1 "Messages", table, Code E732 and Section 8.2. "Response of outputs to errors". **Factory setting:** Lower sensor temperature application limit – 10 K (→ For the lower temperature application limit, see Tmin SENSOR)
Tmax ALARM WINDOW (335) Entry	Customer-specific process monitoring – enter upper temperature limit. You can use the SELECT ALARMTYPE parameter to enter how the device responds if the operating pressure undershoots the specified value. → See also these Operating Instructions, Section 8.1 "Messages", table, Code E733 and Section 8.2. "Response of outputs to errors". **Factory setting:** Upper sensor temperature application limit +10 K (→ For the upper temperature application limit, see Tmax SENSOR)

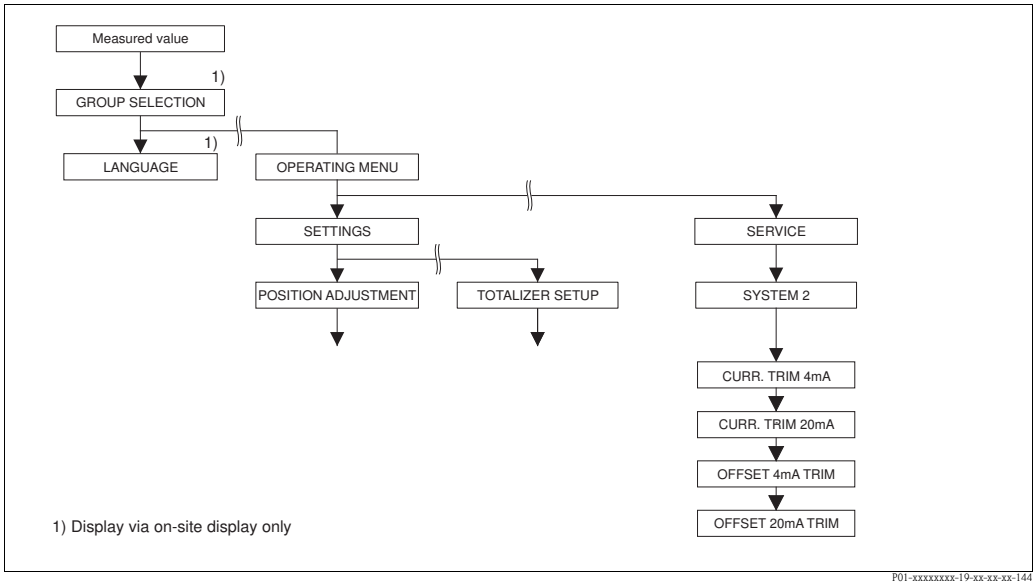


Fig. 47: SYSTEM 2 group

Table 35: (GROUP SELECTION →) OPERATING MENU → SERVICE → SYSTEM 2	
Parametername	**Beschreibung**
CURR. TRIM 4mA (045) Entry	Enter current value for the lower point (4 mA) of the current output trim line. You can adapt the current output to the transmission conditions with this parameter and CURR. TRIM 20mA. Perform current trim for the lower point as follows: 1. Select SIMULATION group. (Menu path: (GROUP SELECTION) → OPERATING MENU → DIAGNOSTICS → SIMULATION) 2. Select option "Current" via SIMULATION parameter. 3. Enter "4 mA" for SIM. CURRENT parameter. 4. Select SYSTEM 2 group. (Menu path: (GROUP SELECTION) → OPERATING MENU → SERVICE) 5. Enter the current value measured with the switching unit for the CURR. TRIM 4mA parameter. **Input range:** Measured current ±0.2 mA **Factory setting:** 4 mA
CURR. TRIM 20mA (042) Entry	Enter current value for the upper point (20 mA) of the current output trim line. You can adapt the current output to the transmission conditions with this parameter and CURR. TRIM 4mA. Perform current trim for the upper point as follows: 1. Select SIMULATION group. (Menu path: (GROUP SELECTION) → OPERATING MENU → DIAGNOSTICS → SIMULATION) 2. Select option "Current" via SIMULATION parameter. 3. Enter "20 mA" for SIM. CURRENT parameter. 4. Select SYSTEM 2 group. (Menu path: (GROUP SELECTION) → OPERATING MENU → SERVICE) 5. Enter the current value measured with the switching unit for the CURR. TRIM 20mA parameter. **Input range:** Measured current ±0.2 mA **Factory setting:** 20 mA
OFFSET 4mA TRIM (043) Display	Displays the difference between 4 mA and the value entered for the CURRENT TRIM 4mA parameter. **Factory setting:** 0
OFFSET 20mA TRIM (044) Display	Displays the difference between 20 mA and the value entered for the CURRENT TRIM 20mA parameter. **Factory setting:** 0

8 Trouble-shooting

8.1 Messages

The following table lists all the possible messages that can occur.
The device differentiates between the error types "Alarm", "Warning" and "Error". You may specify whether the instrument should react as if for an "Alarm" or "Warning" for "Error" messages.
→ See "Error type/NA 64" column and parameter descriptions for ERROR No. and SELECT ALARMTYPE (→ Page 129).

In addition, the "Error type/NA 64" column classifies the messages in accordance with NAMUR Recommendation NA 64:
- Break down: indicated with "B"
- Maintenance need: indicated with "C" (check request)
- Function check: indicated with "I" (in service)

Error message display on the on-site display:
- The measured value display shows the message with the highest priority. → See "Priority" column.
- The ALARM STATUS (→ Page 128) parameter shows all the messages present in descending order of priority. You can scroll through all the messages present with the ⊟-key or ⊞-key.

Message display via the digital communication:
- The ALARM STATUS (→ Page 128) parameter shows the message with the highest priority. → See "Priority" column.

Note!
- If the device detects a defect in the on-site display during initialization, special error messages are generated. → For the error messages, see Page 139, Section 8.1.1 "On-site display error messages".
- For support and further information, please contact Endress+Hauser Service.
- → See also Section 8.4, 8.5 and 8.6.

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Prio rity
101 (A101)	Alarm B	Failure (F)	B>Sensor electronic EEPROM error	– Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). This message normally only appears briefly. – Sensor defect.	– Wait a few minutes. – Restart the device. Perform reset (Code 62). – Block off electromagnetic effects or eliminate source of disturbance. – Replace sensor.	17
102 (W102)	Warning C	Maintenance request (M)	C>Checksum error in EEPROM: peakhold segment	– Main electronics defect. Correct measurement can continue as long as you do not need the peak hold indicator function.	– Replace main electronics.	53
106 (W106)	Warning C	Funktion check (C)	C>Downloading - please wait	– Downloading.	– Wait for download to complete.	52

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Priority
110 (A110)	Alarm B	Failure (F)	B>Checksum error in EEPROM: configuration segment	– The supply voltage is disconnected when writing. – Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Main electronics defect.	– Reestablish supply voltage. Perform reset (Code 7864) if necessary. Carry out calibration again. – Block off electromagnetic effects or eliminate sources of disturbance. – Replace main electronics.	6
113 (A113)	Alarm B	Failure (F)	B>ROM failure in transmitter electronic	– Main electronics defect.	– Replace main electronics.	1
115 (E115)	Error B factory setting: Warning C	Out of specification (S)	B>Sensor overpressure	– Overpressure present. – Sensor defect.	– Reduce pressure until message disappears. – Replace sensor.	29
116 (W116)	Warning C	Maintenance request (M)	C>Download error, repeat download	– The file is defect. – During the download, the data are not correctly transmitted to the processor, e.g. because of open cable connections, spikes (ripple) on the supply voltage or electromagnetic effects.	– Use another file. – Check cable connection PC – transmitter. – Block off electromagnetic effects or eliminate sources of disturbance. – Perform reset (Code 7864) and carry out calibration again. – Repeat download.	36
120 (E120)	Error B factory setting: Warning C	Out of specification (S)	B>Sensor low pressure	– Pressure too low. – Sensor defect.	– Increase pressure until message disappears. – Replace sensor.	30
121 (A121)	Alarm B	Failure (F)	B>Checksum error in factory segment of EEPROM	– Main electronics defect.	– Replace main electronics.	5
122 (A122)	Alarm B	Failure (F)	B>Sensor not connected	– Cable connection sensor –main electronics disconnected. – Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Main electronics defect. – Sensor defect.	– Check cable connection and repair if necessary. – Block off electromagnetic effects or eliminate source of disturbance. – Replace main electronics. – Replace sensor.	13
130 (A130)	Alarm B	Failure (F)	B>EEPROM is defect.	– Main electronics defect.	– Replace main electronics.	10
131 (A131)	Alarm B	Failure (F)	B>Checksum error in EEPROM: min/max segment	– Main electronics defect.	– Replace main electronics.	9
132 (A132)	Alarm B	Failure (F)	B>Checksum error in totalizer EEPROM	– Main electronics defect.	– Replace main electronics.	7
133 (A133)	Alarm B	Failure (F)	B>Checksum error in History EEPROM	– An error occurred when writing. – Main electronics defect.	– Perform reset (Code 7864) and carry out calibration again. – Replace electronics.	8
602 (W602)	Warning C	Funktion check (C)	C>Linearisation curve not monotone	– The linearisation table is not monotonic increasing or decreasing.	– Add to linearisation table or perform linearisation again.	57

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Priority
604 (W604)	Warning C	Funktion check (C)	C>Linearisation table not valid. Less than 2 points or points too close	✎ Note! From software version "02.10.xx" onwards, there is no min. span for the Y-points.		
				– The linearisation table consists of less than 2 points.	– Add to linearisation table. If necessary, perform linearisation again.	58
				– At least 2 points in the linearisation table are too close together. A minimum gap of 0.5 % of the distance between two points must be maintained. Spans for the "Pressure linearized" option: HYDR. PRESS MAX. – HYDR. PRESS MIN.; TANK CONTENT MAX. – TANK CONTENT MIN. Spans for the "Height linearized" option: LEVEL MAX – LEVEL MIN; TANK CONTENT MAX. – TANK CONTENT MIN.	– Correct linearisation table and accept again.	
613 (W613)	Warning I	Funktion check (C)	I>Simulation is active	– Simulation is switched on, i.e. the device is not measuring at present.	– Switch off simulation.	60
620 (E620)	Error C Factory setting: Warning C	Out of specification (S)	C>Current output out of range	The current is outside the permitted range 3.8 to 20.5 mA. – The pressure applied is outside the set measuring range (but within the sensor range).	– Check pressure applied, reconfigure measuring range if necessary (→ See also these Operating Instructions, chapter 4 to 6.) – Perform reset (Code 7864) and carry out calibration again.	49
				– Loose connection at sensor cable	– Wait a short period of time and tighten the connection, or avoid loose connection.	
700 (W700)	Warning C	Maintenance request (M)	C>Last configuration not stored	– An error occurred when writing or reading configuration data or the power supply was disconnected.	– Perform reset (Code 7864) and carry out calibration again.	54
				– Main electronics defect.	– Replace main electronics.	
701 (W701)	Warning C	Funktion check (C)	C>Measuring chain config. exceeds sensor range	– The calibration carried out would result in the sensor nominal operating range being undershot or overshot.	– Carry out calibration again.	50
702 (W702)	Warning C	Maintenance request (M)	C>HistoROM data not consistent.	– Data were not written correctly to the HistoROM, e.g. if the HistoROM was detached during the writing process.	– Repeat upload. – Perform reset (Code 7864) and carry out calibration again.	55
				– HistoROM does not have any data.	– Copy suitable data to the HistoROM. (→ See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S) or BA00332P (Deltapilot S), Section 5.5.1 "Copying configuration data".)	
703 (A703)	Alarm B	Failure (F)	B>Measurement error	– Fault in the main electronics.	– Briefly disconnect device from the power supply.	22
				– Main electronics defect.	– Replace main electronics.	

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Priority
704 (A704)	Alarm B	Funktion check (C)	B>Measurement error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	12
705 (A705)	Alarm B	Failure (F)	B>Measurement error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	21
706 (W706)	Warning C	Maintenance request (M)	C>Configuration in HistoROM and device not identical	– Configuration (parameters) in the HistoROM and in the device is not identical.	– Copy data from the device to the HistoROM. – Copy data from the HistoROM to the device. The message remains if the HistoROM and the device have different software versions. The message goes out if you copy the data from the device to the HistoROM. – Device reset codes such as 7864 do not have any effect on the HistoROM. That means that if you do a reset, the configurations in the HistoROM and in the device may not be the same. → See also Operating Instructions BA00270P (Deltabar S), BA00271P (Cerabar S), BA00332P (Deltapilot S) Section 5.5.1 "Copying configuration data".	59
707 (A707)	Alarm B	Funktion check (C)	B>X-VAL. of lin. table out of edit limits.	– At least one X-VALUE in the linearisation table is either below the value for HYDR. PRESS MIN. or MIN. LEVEL or above the value for HYDR. PRESS. MAX. or LEVEL MAX.	– Carry out calibration again. (→ See also these Operating Instructions, chapter 5.)	38
710 (W710)	Warning C	Funktion check (C)	B>Set span too small. Not allowed.	– Values for calibration (e.g. lower range value and upper range value) are too close together. – The sensor was replaced and the customer-specific configuration does not suit the sensor. – Unsuitable download carried out.	– Adjust calibration to suit sensor. (→ See also Page 119, parameter description MINIMUM SPAN.) – Adjust calibration to suit sensor. – Replace sensor with a suitable sensor. – Check configuration and perform download again.	51
711 (A711)	Alarm B	Funktion check (C)	B>LRV or URV out of edit limits	– Lower range value and/or upper range value undershoot or overshoot the sensor range limits. – The sensor was replaced and the customer-specific configuration does not suit the sensor. – Unsuitable download carried out.	– Reconfigure lower range value and/or upper range value to suit the sensor. Pay attention to position factor. – Reconfigure lower range value and/or upper range value to suit the sensor. Pay attention to position factor. – Replace sensor with a suitable sensor. – Check configuration and perform download again.	37
713 (A713)	Alarm B	Funktion check (C)	B>100% POINT level out of edit limits	– The sensor was replaced.	– Carry out calibration again.	39

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Priority
715 (E715)	Error C Factory setting: Warning C	Out of specification (S)	C>Sensor over temperature	– The temperature measured in the sensor is greater than the upper nominal temperature of the sensor. (→ See also Page 120, parameter description Tmax SENSOR.) – Unsuitable download carried out.	– Reduce process temperature/ ambient temperature. – Check configuration and perform download again.	32
716 (E716)	Error B Factory setting: Alarm B	Failure (F)	B>Process isolating diaphragm broken	– Sensor defect.	– Replace sensor. – Reduce pressure.	24
717 (E717)	Error C Factory setting: Warning C	Out of specification (S)	C>Transmitter over temperature	– The temperature measured in the electronics is greater than the upper nominal temperature of the electronics (+88 °C). – Unsuitable download carried out.	– Reduce ambient temperature. – Check configuration and perform download again.	34
718 (E718)	Error C Factory setting: Warning C	Out of specification (S)	C>Transmitter under temperature	– The temperature measured in the electronics is smaller than the lower nominal temperature of the electronics (–43 °C). – Unsuitable download carried out.	– Increase ambient temperature. Insulate device if necessary. – Check configuration and perform download again.	35
719 (A719)	Alarm B	Funktion check (C)	B>Y-VAL of lin. table out of edit limits	– At least on Y-VALUE in the linearisation table is below the MIN. TANK CONTANT or above the MAX. TANK CONTENT.	– Carry out calibration again. (→ See also Operating Instructions BA00274P, chapter 5 or these Operating Instructions, Page 2.)	40
720 (E720)	Error C Factory setting: Warning C	Out of specification (S)	C>Sensor under temperature	– The temperature measured in the sensor is smaller than the lower nominal temperature of the sensor. (→ See also Page 120, parameter description Tmin SENSOR.) – Unsuitable download carried out. – Loose connection at sensor cable	– Increase process temperature/ ambient temperature. – Check configuration and perform download again. – Wait a short period of time and tighten the connection, or avoid loose connection.	33
721 (A721)	Alarm B	Funktion check (C)	B>ZERO POSITION level out of edit limits	– LEVEL MIN or LEVEL MAX has been changed.	– Perform reset (Code 2710) and carry out calibration again.	41
722 (A722)	Alarm B	Funktion check (C)	B>EMPTY CALIB. or FULL CALIB. out of edit limits	– LEVEL MIN or LEVEL MAX has been changed.	– Perform reset (Code 2710) and carry out calibration again.	42
723 (A723)	Alarm B	Funktion check (C)	B>MAX. FLOW out of edit limits	– FLOW-MEAS. TYPE has been changed.	– Carry out calibration again.	43

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Priority
725 (A725)	Alarm B	Failure (F)	B>Sensor connection error, cycle disturbance	– Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Setscrew loose. – Sensor or main electronics defect.	– Block off electromagnetic effects or eliminate source of disturbance. – Retighten setscrew with 1 Nm (0,74 lbf ft) (see chapter "Rotating the housing" in BA00270P (Deltabar S), BA00271P (Cerabar S), BA00332P (Deltapilot S). – Replace sensor or main electronics.	25
726 (E726)	Error C Factory setting: Warning C	Out of specification (S)	C>Sensor temperature error - overrange	– Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Process temperature is outside permitted range. – Sensor defect.	– Block off electromagnetic effects or eliminate source of disturbance. – Check temperature present, reduce or increase if necessary. – If the process temperature is within the permitted range, replace sensor.	31
727 (E727)	Error C Factory setting: Warning C	Out of specification (S)	C>Sensor pressure error - overrange	– Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Pressure is outside permitted range. – Sensor defect.	– Block off electromagnetic effects or eliminate source of disturbance. – Check pressure present, reduce or increase if necessary. – If the pressure is within the permitted range, replace sensor.	28
728 (A728)	Alarm B	Failure (F)	B>RAM error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	2
729 (A729)	Alarm B	Failure (F)	B>RAM error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	3
730 (E730)	Error C Factory setting: Warning C	Out of specification (S)	C>LRV user limits exceeded	– Pressure measured value has undershot the value specified for the Pmin ALARM WINDOW parameter. – Loose connection at sensor cable	– Check system/pressure measured value. – Change value for Pmin ALARM WINDOW if necessary. (→ See also Page 130, parameter description Pmin ALARM WINDOW.) – Wait a short period of time and tighten the connection, or avoid loose connection.	46

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Prio rity
731 (E731)	Error C Factory setting: Warning C	Out of specification (S)	C>URV user limits exceeded	– Pressure measured value has overshot the value specified for the Pmax ALARM WINDOW parameter.	– Check system/pressure measured value. – Change value for Pmax ALARM WINDOW if necessary. (→ See also Page 130, parameter description Pmax ALARM WINDOW.)	45
		Out of specification (S)		– Loose connection at sensor cable	– Wait a short period of time and tighten the connection, or avoid loose connection.	
732 (E732)	Error C Factory setting: Warning C		C>LRV Temp. User limits exceeded	– Temperature measured value has undershot the value specified for the Tmin ALARM WINDOW parameter.	– Check system/temperature measured value. – Change value for Tmin ALARM WINDOW if necessary. (→ See also Page 130, parameter description Tmin ALARM WINDOW.)	48
733 (E733)	Error C Factory setting: Warning C	Out of specification (S)	C>URV Temp. User limits exceeded	– Temperature measured value has overshot the value specified for the Tmax ALARM WINDOW parameter.	– Check system/temperature measured value. – Change value for Tmax ALARM WINDOW if necessary. (→ See also Page 130, parameter description Tmax ALARM WINDOW.)	47
736 (A736)	Alarm B	Failure (F)	B>RAM error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	4
737 (A737)	Alarm B	Failure (F)	B>Measurement error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	20
738 (A738)	Alarm B	Failure (F)	B>Measurement error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	19
739 (A739)	Alarm B	Failure (F)	B>Measurement error	– Fault in the main electronics. – Main electronics defect.	– Briefly disconnect device from the power supply. – Replace main electronics.	23
740 (E740)	Error C Factory setting: Warning C	Maintenance request (M)	C>Calculation overflow, bad configuration	– Level measuring mode: the measured pressure has undershot the value for HYDR. PRESS. MIN. or overshot the value for HYDR. PRESS MAX. – Level measuring mode: The measured level did not reach the LEVEL MIN value or exceeded the LEVEL MAX value. – Flow measuring mode: the measured pressure has undershot the value for MAX. PRESS FLOW.	– Check configuration and carry out calibration again if necessary. – Select a device with a suitable measuring range. – Check configuration and carry out calibration again if necessary. (→ See also parameter description LEVEL MIN., Page 86.) – Check configuration and carry out calibration again if necessary. – Select a device with a suitable measuring range.	27
741 (A741)	Alarm B	Funktion check (C)	B>TANK HEIGHT out of edit limits	– LEVEL MIN or LEVEL MAX has been changed.	– Perform reset (Code 2710) and carry out calibration again.	44

Code	Error type/ NA 64	Corresponds NE 107	Message/description	Cause	Measure	Prio rity
742 (A742)	Alarm B	Failure (F)	B>Sensor connection error (upload)	– Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). This message normally only appears briefly. – Cable connection sensor – main electronics disconnected. – Sensor defect.	– Wait a few minutes. – Perform reset (Code 7864) and carry out calibration again. – Check cable connection and repair if necessary. – Replace sensor.	18
743 (E743)	Alarm B	Failure (F)	B>Electronic PCB error during initialisation	– This message normally only appears briefly. – Main electronics defect.	– Wait a few minutes. – Restart the device. Perform reset (Code 62). – Replace main electronics.	14
744 (A744)	Alarm B	Failure (F)	B>Main electronic PCB error	– Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Main electronics defect.	– Restart the device. Perform reset (Code 62). – Block off electromagnetic effects or eliminate source of disturbance. – Replace main electronics.	11
745 (W745)	Warning C	Maintenance request (M)	C>Sensor data unknown	– Sensor does not suit the device (electronic sensor nameplate). Device continues measuring.	– Replace sensor with a suitable sensor.	56
746 (W746)	Warning C	Funktion check (C)	C>Sensor connection error - initialising	– Electromagnetic effects are greater than specifications in the technical data. This message normally only appears briefly. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Overpressure or low pressure present.	– Wait a few minutes. – Restart the device. Perform reset (Code 7864). – Block off electromagnetic effects or eliminate source of disturbance. – Reduce or increase pressure.	26
747 (A747)	Alarm B	Failure (F)	B>Sensor software not compatible to electronics	– Sensor does not suit the device (electronic sensor nameplate).	– Replace sensor with a suitable sensor.	16
748 (A748)	Alarm B	Failure (F)	B>Memory failure in signal processor	– Electromagnetic effects are greater than specifications in the technical data. → See Technical Information TI00382P (Deltabar S), TI00383P (Cerabar S) or TI00416P (Deltapilot S). – Main electronics defect.	– Block off electromagnetic effects or eliminate source of disturbance. – Replace main electronics.	15

8.1.1 On-site display error messages

If the device detects a defect in the on-site display during initialization, the following error messages can be displayed:

Message	Measure
Initialization, VU Electr. Defect A110	Exchange on-site display.
Initialization, VU Electr. Defect A114	
Initialization, VU Electr. Defect A281	
Initialization, VU Checksum Err. A110	
Initialization, VU Checksum Err. A112	
Initialization, VU Checksum Err. A171	

8.2 Response of outputs to errors

The device differentiates between the error types Alarm, Warning and Error.
→ See also Section 8.1 "Messages" und Page 111 ff, Table 20: OUTPUT and Page 111 ff, Table 31: MESSAGES the following table and Page 132, Section 8.1 "Messages".

Output	**A (Alarm)**	**W (Warning)**	**E (Error: Alarm/Warning)**
Current output	Assumes the value specified via the OUTPUT FAIL MODE[1)], ALT. CURR. OUTPUT[1] and SET MAX. ALARM[1] parameter. → See also the following section "Configuring current output for an alarm".	Device continues measuring.	For this error, you can enter whether the device should react as in the event of an alarm or as in the event of a warning. See corresponding "Alarm" or "Warning" column. (→ See also these Operating Instructions, parameter description SELECT ALARM TYPE.)
Bargraph (on-site display)	The bargraph adopts the value defined by the OUTPUT FAIL MODE [1] parameter.	The bargraph adopts the value which corresponds to the current value.	→ See this table, column "Alarm" or "Warning".
On-site display	– The measured value and message are displayed alternately – Measured value display: ↯ -symbol is permanently displayed. Message display – 3-digit number such as A122 and description	– The measured value and message are displayed alternately – Measured value display: ↯ -symbol flashes. Message display: – 3-digit number such as W613 and description	– The measured value and message are displayed alternately – Measured value display: see corresponding "Alarm" or "Warning" column Message display: – 3-digit number such as E731 and description
Remote operation (Digital communication)	In the case of an alarm, the ALARM STATUS[2)] parameter displays a 3-digit number such as 122 for "Sensor not connected".	In the case of a warning, the ALARM STATUS[2] parameter displays a 3-digit number such as 613 for "Simulation is active".	In the case of an error, the ALARM STATUS[2] parameter displays a 3-digit number such as 731 for "URV user limits exceeded".

1) Menu path: (GROUP SELECTION →) OPERATING MENU → OUTPUT

2) Menu path: (GROUP SELECTION →) OPERATING MENU → MESSAGES

8.3 Confirming messages

Depending on the settings for the ALARM DISPL. TIME (→ Page 129) and ACK. ALARM MODE (→ Page 128) parameters, the following measures should be taken to clear a message:

Settings [1]	Measures
– ALARM DISPL. TIME = 0 s – ACK. ALARM MODE = off	– Rectify cause of the message (see also Section 8.1).
– ALARM DISPL. TIME > 0 s – ACK. ALARM MODE = off	– Rectify cause of the message (see also Section 8.1). – Wait for the alarm display time to elapse.
– ALARM DISPL. TIME = 0 s – ACK. ALARM MODE = on	– Rectify cause of the message (see also Section 8.1). – Confirm message using ACK. ALARM parameter.
– ALARM DISPL. TIME > 0 s – ACK. ALARM MODE = on	– Rectify cause of the message (see also Section 8.1). – Confirm message using ACK. ALARM parameter. – Wait for the alarm display time to elapse. If a message appears and the alarm display time elapses before the message has been acknowledged, the message will be cleared once it has been acknowledged.

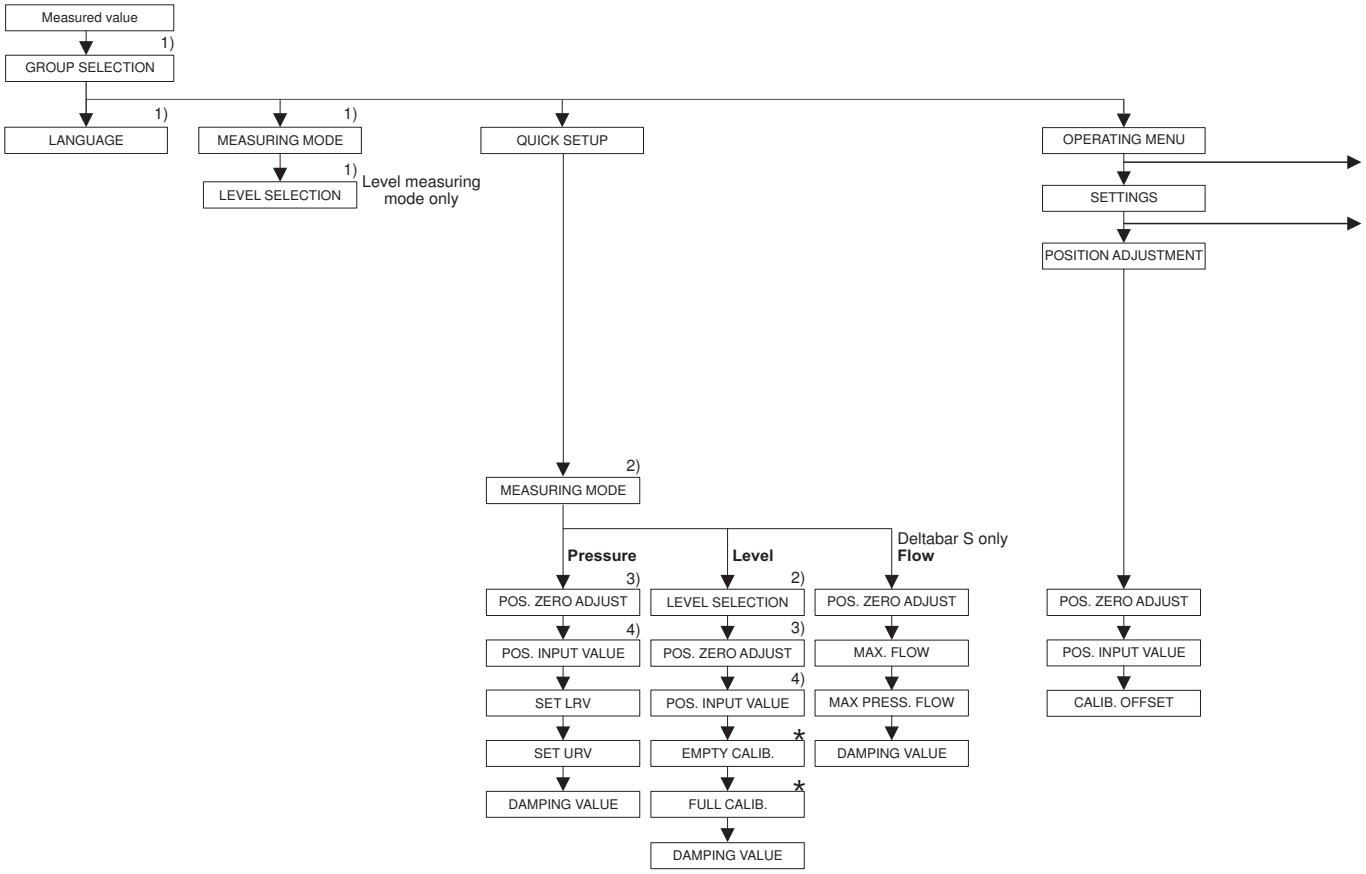
1) Menu path for ALARM DISPL. TIME and ACK. ALARM MODE: (GROUP SELECTION →) OPERATING MENU → DIAGNOSTICS → MESSAGES

If the on-site display displays a message, you can delete it with the E-key.
If there are several messages, the on-site display shows the message which has the highest priority (see also Section 8.1). Once you have deleted this message using the E-key, the message with the next highest priority is displayed. You can use the E-key to delete each message, one after the other. The ALARM STATUS parameter continues to display all the messages present.

9 Appendix

9.1 Operating menu for on-site display, Digital communication

Note!
- The entire menu is depicted on the following pages.
- The menu has a different structure depending on the measuring mode selected. This means that some function groups are only displayed for one measuring mode, e.g. "LINEARISATION" function group for the Level measuring mode (Menu path: (GROUP SELECTION →) OPERATING MENU → SETTINGS → BASIC SETUP).
- In addition, there are also parameters that are only displayed if other parameters are appropriately configured. For example the Customer Unit P parameter is only displayed if the "User unit" option was selected for the PRESS. ENG. UNIT parameter. These parameters are indicated with a "*".
- For a description of the parameters, please refer to chapter 7 "Description of parameters". The exact dependency of individual parameters on one another is explained here.



1) Display via on-site display only

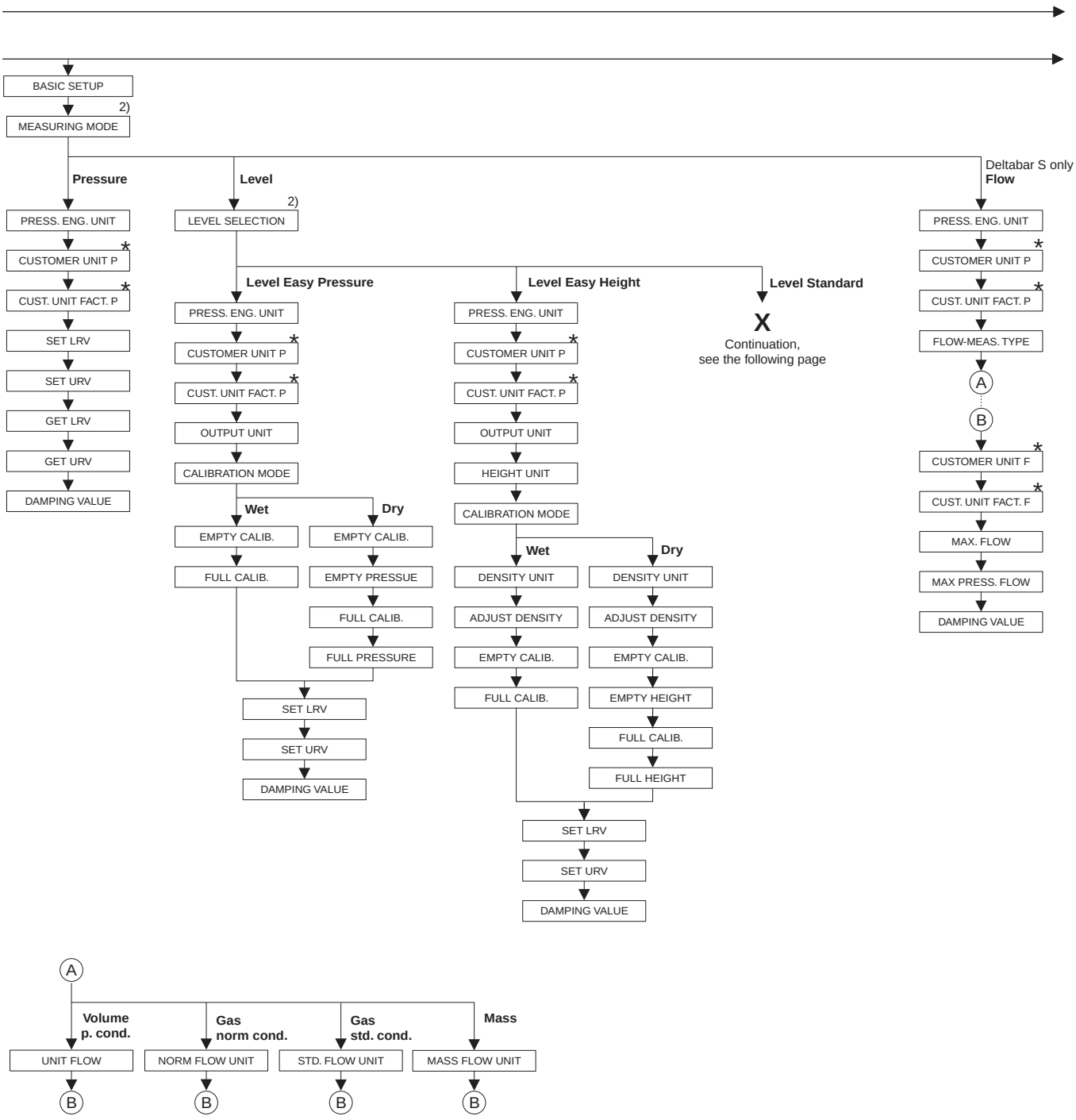
2) Display via digital communication

3) Cerabar S with gauge pressure sensor, Deltabar S or Deltapilot S

4) Cerabar S with absolut pressure sensor

* There are parameters that are only displayed if other parameters are appropriately configured.
For example the CUSTOMER UNIT P parameter is only displayed if the "User unit" option was selected for the PRESS. ENG. UNIT parameter.
These parameters are indicated with a "*".

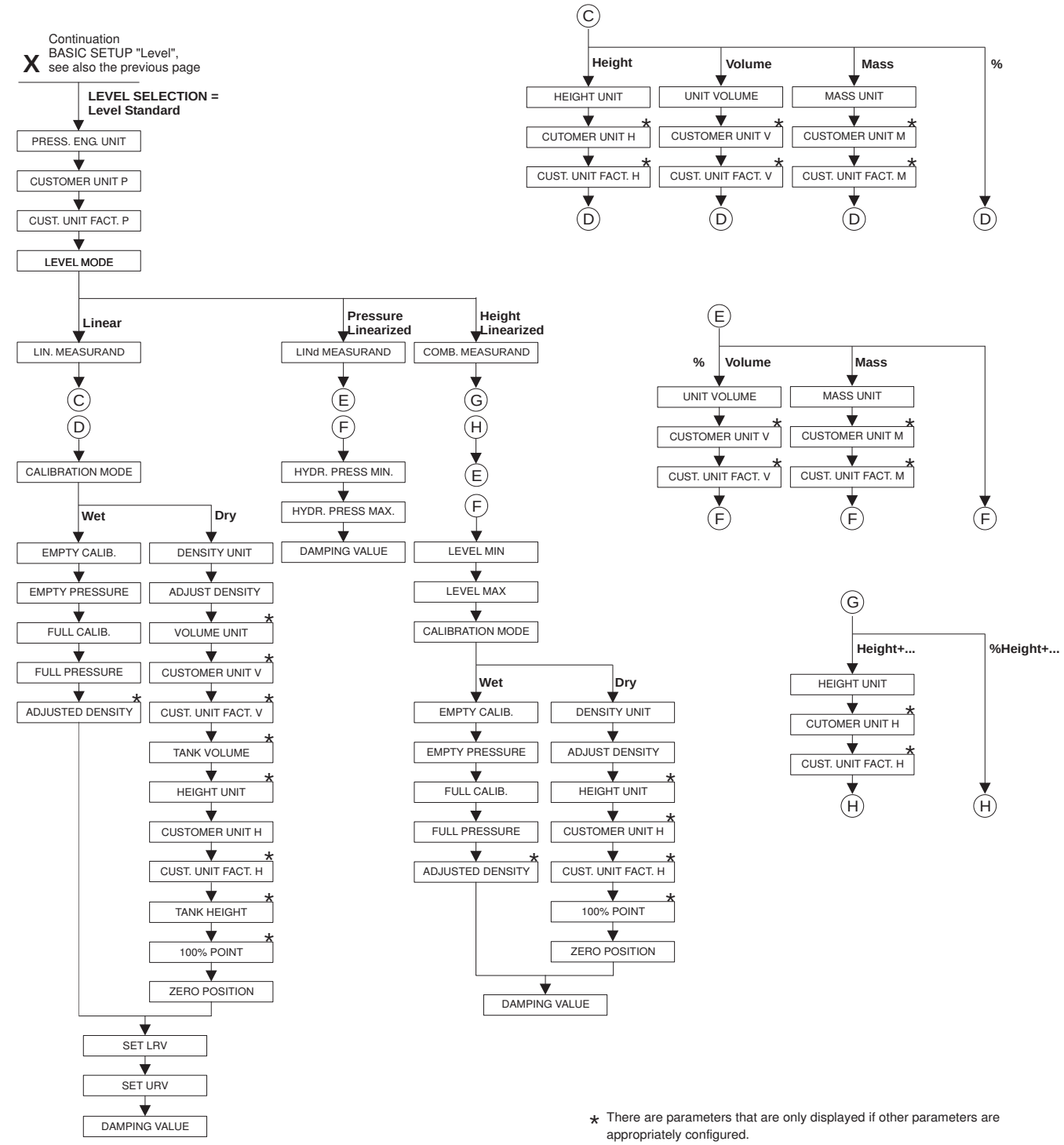
P01-xxxxxxxx-19-xx-xx-xx-138



2) Display via digital communication

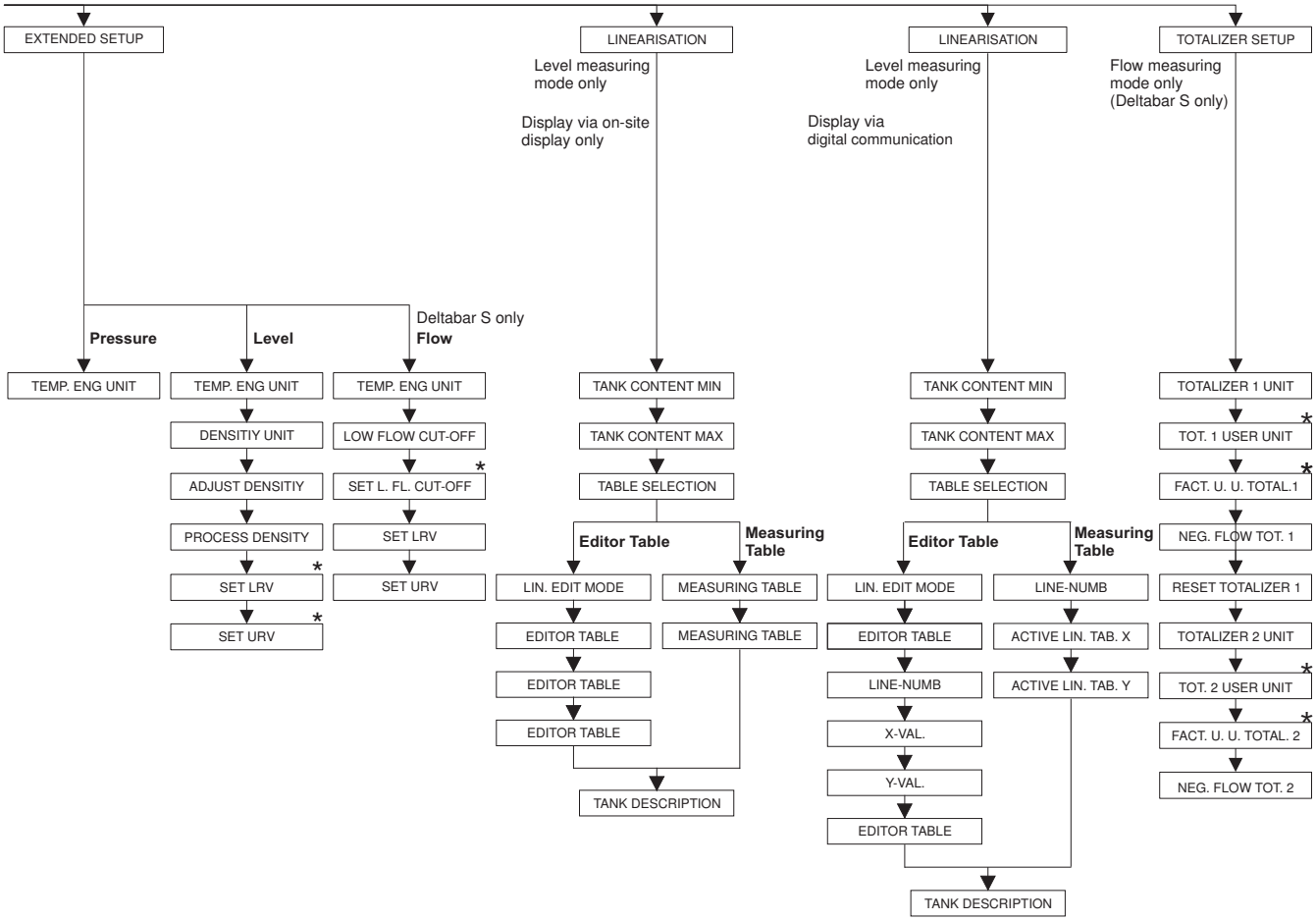
* There are parameters that are only displayed if other parameters are appropriately configured.
For example the CUSTOMER UNIT P parameter is only displayed if the "User unit" option was selected for the PRESS. ENG. UNIT parameter.
These parameters are indicated with a "*".

P01-xxxxxxxx-19-xx-xx-xx-139



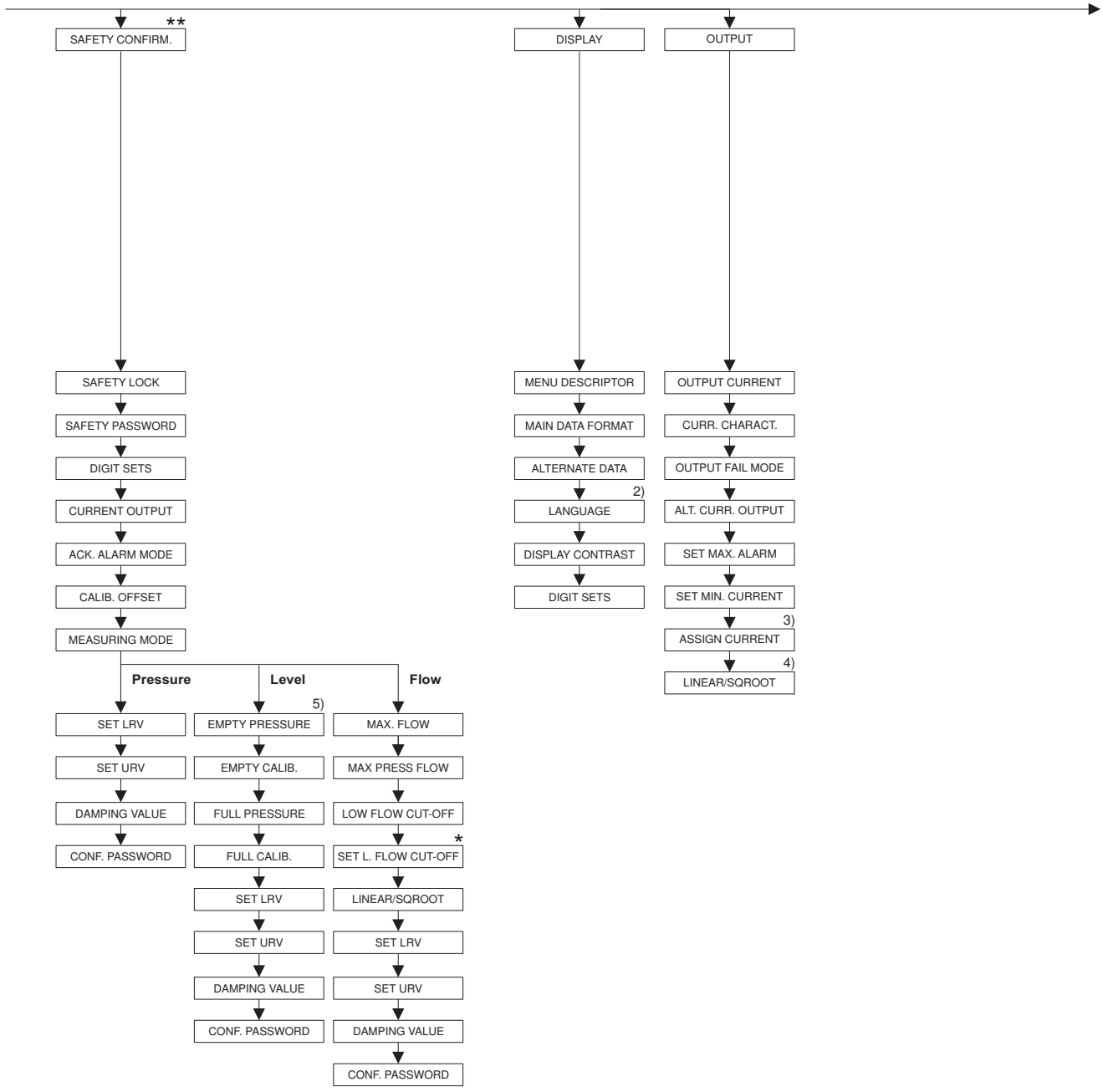
* There are parameters that are only displayed if other parameters are appropriately configured.
For example the CUST. UNIT FACT. H parameter is only displayed if the "User unit" option was selected for the HEIGHT UNIT parameter. These parameters are indicated with a "*".

P01-xxxxxxxx-19-xx-xx-xx-140



* There are parameters that are only displayed if other parameters are appropriately configured.
For example the TOT. 1 USER UNIT parameter is only displayed if the "User unit" option was selected for the TOTALIZER 1 UNIT parameter.
These parameters are indicated with a "*".

P01-xxxxxxxx-19-xx-xx-xx-101



2) Display via digital communication

3) Level measuring mode only

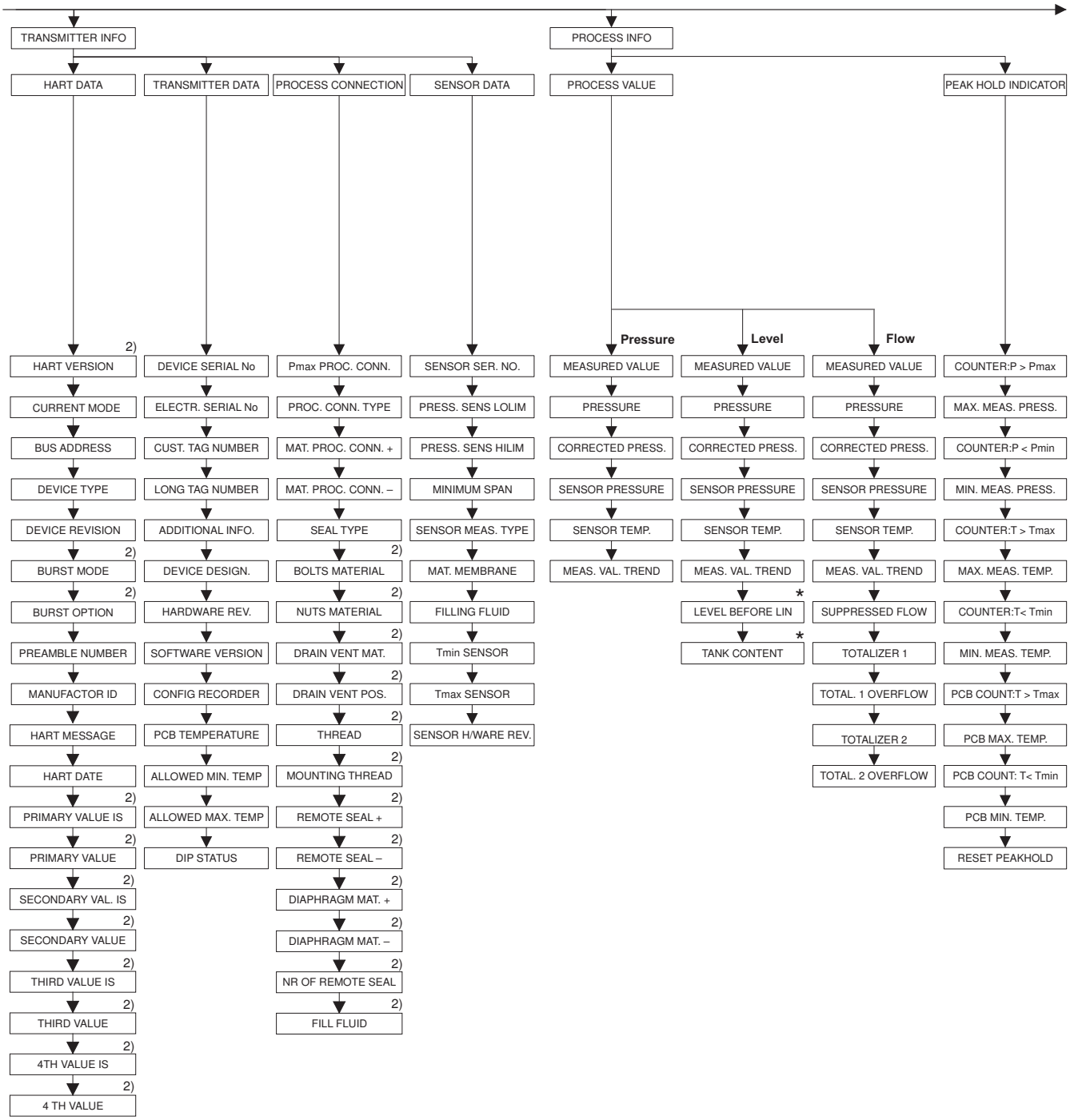
4) Flow measuring mode only

5) only LEVEL SELECTION = Level Easy Pressure

* There are parameters that are only displayed if other parameters are appropriately configured.
These parameters are indicated with a "*".

** See Safety Manual SD190P for Cerabar S, SD189P for Deltabar S or SD213P for Deltapilot S.

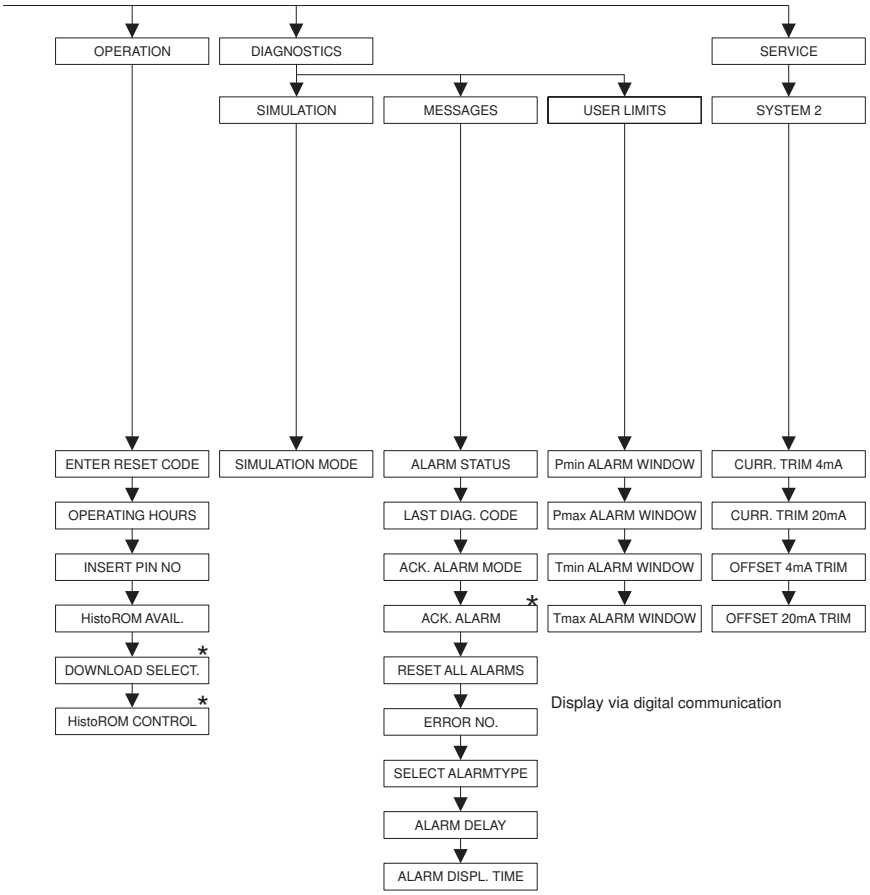
P01-xxxxxxxx-19-xx-xx-xx-141

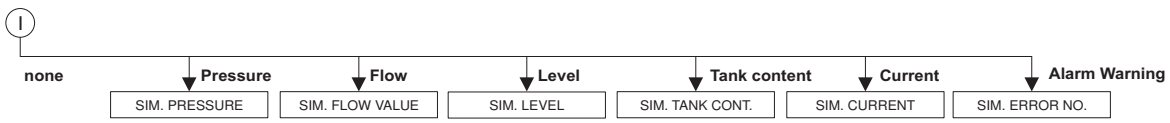


2) Display via digital communication

* There are parameters that are only displayed if other parameters are appropriately configured.
These parameters are indicated with a "*".

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