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Endress+Hauser
People for Process Automation

Supplementary documentation

Liquiline CM44x, Liquiline CM44xR, Liquiline CM44P, Liquiline System CA80xx, Liquistation CSFxx

Data transmission via PROFIBUS DP®

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Document: Data transmission via PROFIBUS DP

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1 Note

1.1 About this manual

This supplementary document must only be used in conjunction with a field device Liquiline CM44x PROFIBUS DP, an analyzer Liquiline System CA80xx PROFIBUS DP or a sampler Liquistation CSFxx PROFIBUS DP.
This supplementary document is an integral part of the Operating Instruction and extends it with additional information for use with PROFIBUS DP.

Additional information is contained in the following Operating Instructions:

Operating Instructions	BA00444C
Operating Instructions	BA01225C
Operating Instructions	BA00443C
Operating Instructions	BA01240C
Operating Instructions	BA01570C

This document is aimed at individuals who are integrating the device into a PROFIBUS DP network. It is assumed that the reader has fundamental knowledge of PROFIBUS technology and the PA profile.

Additional information about PROFIBUS technology and the PA profile is available, for example, in the following document:

PROFIBUS® DP/PA Guidelines for Planning and Commissioning: Field Communication

You can download a soft copy of these guidelines from our website free of charge.

Furthermore, various guidelines on the installation and commissioning of a PROFIBUS network are available from the PROFIBUS User Organization (PI) at www.profibus.com.

1.2 Abbreviations

PI	PROFIBUS International (www.profibus.com)
n.a.	Not applicable
NaN	Not a Number (IEEE-754, 7Fh A0h 00h 00h)
ENP	Electronic name plate
I&M	Identification & Maintenance
AI	Analog Input (PA Profile function block)
DI	Discrete Input (PA Profile function block)
AO	Analog Output (PA Profile function block)
DO	Discrete Output (PA Profile function block)

2 Installation and wiring

Installation and wiring are described in detail in the operating instructions of each product.

In addition, please also follow the installation guide supplied by the PROFIBUS User Organization. An electronic copy can be downloaded free of charge from the PROFIBUS website.
http://www.profibus.com/downloads/installation-guide/

3 Commissioning

3.1 Note

The device starts once the supply voltage is applied. This process can take up to 2 minutes depending on the device configuration. PROFIBUS communication with the device is not possible during the start-up process.
When the PROFIBUS interface is ready for operation, this is signaled by the (green) PWR LED on the 485 modules. This occurs, at the very latest, 10 to 30 seconds after the measuring screen has been displayed.

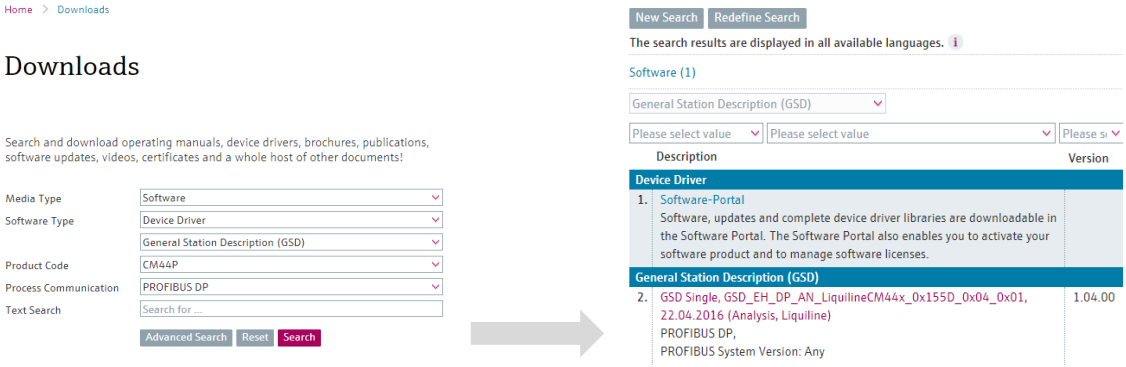
The 485 module provides the option of enabling bus termination via a 4-pin DIL slide switch. Here, the downstream PROFIBUS devices are not separated from the PROFIBUS-DP segment. The 485-module must be removed to activate the bus termination. If the 485 module is installed and supplied with voltage, the bus termination state is indicated by the T LED (yellow).

The user does not assign the process values to the function blocks via the channel parameters of the function blocks. The channel parameters have fixed values and are permanently linked to an IO Transducer Block. This IO transducer contains a device variable for each function block. The process values that are copied to these device variables are selected by the user via the device menu (onsite operation or Web server). This selection is not possible using PDM DD or DTM.

The process values are transmitted with their base unit. The unit can be changed to a unit that is compatible with the base unit via the PDM DD or via the DTM in the IO Transducer Block. It is not possible to change the unit of the PROFIBUS device variables via the device menu.

3.2 GSD file

The GSD file can be obtained from www.endress.com:



The following manufacturer-specific GSD files are available:

EH0155D.GSD	Liquiline CM44x	Multichannel transmitter
EH0155C.GSD	Liquistation CSFxx	Water sampling station
EH0155E.GSD	Liquiline CA80xx	Analyzer station

Alternatively, you can use the following PA profile GSD from www.profibus.com:

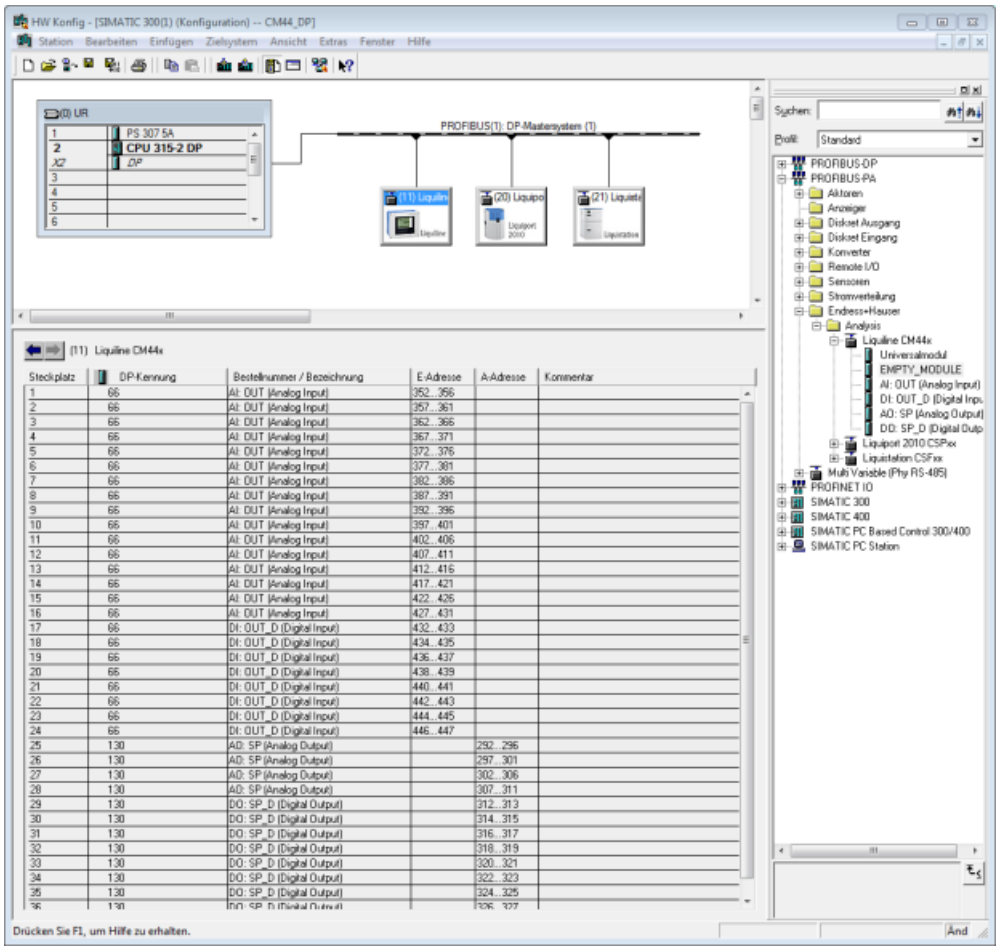
pa039760.gsd	Multi Variable (Phy RS-485)	Liquiline CM44x and Liquistation support these modules: EMPTY_MODULE, Analog Input (AI), SP, SP_D, OUT_D

We recommend you use the manufacturer-specific GSD file as it is optimally adapted to the properties of the device.

3.2.1 Using the GSD file

The GSD file transmits the maximum number of modules during cyclic data exchange by default. You can remove not needed modules by replacing them with an “EMPTY_MODULE” in each case.

The arrangement and sequence of the modules may not be changed. The device checks the arrangement of the modules when establishing the connection. A change in the arrangement results in a configuration error in the diagnostic response. (Diagnostic telegram: Cfg_Fault).



3.2.2 Ident number

The active ident number defines the GSD file used to operate the device.

The following ident numbers are supported. A GSD file is assigned to each ident number.
The supported ident number is defined by the IDENTNUMBER_SELECTOR parameter in the Physical Block which can have the following values:

Identnumber_Selector	Identnumber	Selection	GSD file
= 128	*	Automatic (factory setting)	Automatic
= 0	9760	PA profile 3.02 (multi variable)	pa039760.gsd
= 1 or = 129	155C	Manufacturer specific (Liquistation CSFxx)	EH01155C.gsd
= 1 or = 128	155D	Manufacturer specific (Liquiline CM44x)	EH01155D.gsd
= 1 or = 131	155E	Manufacturer specific (Liquiline CA80xx)	EH01155E.gsd

The Ident_Number_Selector parameter is set to “Automatic” by default: the device adapts to the used GSD file if the file uses one of the listed ident numbers.

If you want to ensure that the device only works with a specific GSD file, you can change the IDENTNUMBER_SELECTOR parameter to the ident number for this GSD file. This parameter is in the Physical Block and can also be configured via the Device menu.

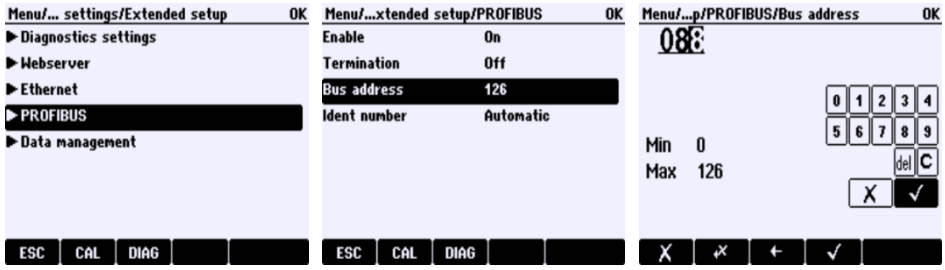
3.3 PROFIBUS address

- Each PROFIBUS device needs a unique address. Valid addresses are in the range between 0 and 126.
- The devices are delivered with software addressing. Address 126 has a special meaning and should be changed during commissioning.
- Addresses 0 to 2 are normally used for PROFIBUS masters.
- Hardware addressing has priority over software addressing.
- Hardware addressing is enabled if a valid address is configured using the DIL switches.
- A change to the DIL switches takes effect after 10 seconds.

The following ways to configure the PROFIBUS address are supported:

1. DIL switch on 485 modules — Hardware addressing
2. Device menu — Software addressing
3. By PROFIBUS (Set_Slave_Address) — Software addressing

Example: Setting the address via the Device menu:



3.4 Miscellaneous

This section describes selected parameters that can be of interest in the context of commissioning.

3.4.1 Hardware write protection

If the write protection switch on the 485 module is set to ON, PROFIBUS write access via acyclic DPV1 communication is not possible. Cyclic DPV0 communication is not affected by the hardware write protection.

3.4.2 Locking local operation

Local operation of the device via PROFIBUS can be locked via the LOCAL_OP_ENA parameter in the Physical Block. A key symbol on the device display indicates that local operation is actively locked. Device locking is temporarily disabled if the device does not detect any PROFIBUS communication for at least 30 seconds.

0: Off: Local operation is locked.
1: On: Local operation is permitted. This is the default setting.

3.4.3 Reset

Writing the FACTORY_RESET parameter in the Physical Block can trigger a device restart. The following reset commands are supported:

1: Reset to factory defaults and restart. The bus address is not changed.
2506: Restart. The device settings are not changed.
2712: The bus address is changed to the default value 126. The No_Add_Chg_Flag of Set_Slave_Add service is cleared. The other device settings are not changed.

3.5 Local Operation: Menu

Menu item	Parameter	Access	Selection	Description
Diagnostics/System information/PROFIBUS	Termination	Read	On/off	
	Bus Address	Read	0 to 126	
	Ident number	Read	Active ident number see above.	
	Baud rate	Read	Recognized PROFIBUS DP data transmission rate	
	DPV0 state	Read	Wait for param	The device is waiting for the parameterization telegram
			Wait for config	The device is waiting for the configuration telegram
			Data exchange	The device is exchanging data with the PROFIBUS master
	DPV0 fault	Read	No fault	
			Param fault	The parameterization telegram is faulty.
			Config fault	The configuration telegram is faulty.
			Param & config fault	The parameterization and configuration telegrams are faulty.
	DPV0 master addr	Read	0..255	Address of the PROFIBUS master
	DPV0 WDT [ms]	Read	0..65535	Active watchdog time
Setup/General Settings/Extended setup/PROFIBUS	Enable	Write	Off	PROFIBUS protocol can be disabled.
			On	
	Termination	Read	Off	Bus termination status that is indicated by the T LED.
			On	
	Bus Address	Write	0..126	Read only if the address is set via hardware.
	Ident number	Write	Automatic	Adapts to GSD file
			PA profile 3.02 (9760)	PA Profile operation mode using the PA Profile GSD file.
			Manufacturer specific	The manufacturer specific GSD file is used.
Setup/Outputs/PROFIBUS			See next section	
Setup/Outputs/PROFIBUS assignment view			Displays the active assignment between device variables (function blocks) and measured values.	

3.5.1 Configuration of the PROFIBUS output: device variables

The device platform is based on a modular multi-channel, plug & play sensor concept.
Therefore, there is no general relationship between the sensor measured value and a device variable. The device variable acts as a kind of place holder for measured values or actuating values that can be transmitted via PROFIBUS communication. The following device variables are available:

Abbreviation	Name	Info	Example
AI	Analog Input	Device variable that is read by the device	Read measured value
DI	Digital Input	Device variable that is read by the device	Read relay status
AO	Analog Output	Device variable that is written to the device	Setpoint
DO	Digital Output	Device variable that is written to the device	Start cleaning

Selection of the data source (process value) for the AI and DI function block:

Step	Menu	Action
1	Menu: Setup/Outputs/PROFIBUS	Select the AI or DI Block
2	.../AIx or DIx/Source of data	Select a sensor, for example
3	.../Aix or Dix/Measured value	Select a measured value, for example

Selection of the data sink (process value) for the AO and DO function blocks:

The device variables are selected in the menu of the function that uses the actuating value. You can select an AO or DO device variable as the data source for the individual function.

Note that the actuating value is transmitted along with a status via PROFIBUS. The device only accepts the actuating value if its status has the value 128 (good), e.g. if DO1 is used as trigger for cleaning a sensor set value of DO1 to 1 and Status of DO1 to 128.

3.5.2 AI - Analog input (device → PROFIBUS)

The cyclic value with data type DS-101 is provided to PROFIBUS as output from a PA-Profile AI function block.

Path: Menu/Setup/Outputs/Profibus/AI 1 (Analog Input) ... AI 16 (Analog Input)

Function	Options	Info
Source of data	Options • None • Any data source Factory setting • None	The data sources presented for selection depend on your device version. You can choose from all the sensors connected to the inputs, controllers as well as mathematic functions and current inputs.
Measured value	Options • None • Depends on data source Factory setting • None	The measured value that you can choose depends on the option selected under "Source of data".

3.5.3 DI - digital input (device → PROFIBUS)

The cyclic value with data type DS-102 is provided to PROFIBUS as output from a PA-Profile DI function block.

Path: Menu/Setup/Outputs/Profibus/DI 1 (Digital Input) ... DI 8 (Digital Input)

Function	Options	Info
Function	Options • Off • Source value • Diagnostics Factory setting • Off	
If Function = Source value:		
Source of data	Options • None • Limit switches • Alarm relay • Relay • Binary inputs Factory setting • None	The data sources presented for selection depend on your device configuration. For more information see operating manual.
If Function = Diagnostics:		
Operating mode	Options • as assigned • Namur M • Namur S • Namur C • Namur F Factory setting • as assigned	For more information see operating manual.
Hold behavior	Options • Freeze • None Factory setting • None	For more information see operating manual.

3.5.4 AO - Analog output (device ← PROFIBUS)

The cyclic value from PROFIBUS with data type DS-101 is provided to an PA-Profile AO function block and subsequently to a device variable AO.

The value mapped to a device variable AO must be configured in the menu of the component using the device variable as input. A device variable AO is used to transmit an analog value to the measuring device instead of using a 4...20 mA current input of the measuring device.

A device variable AO correspond to a current input and has the same connection possibilities.

3.5.4.1 List of data sinks

CM44x	CM44P	CSFxx	CA80xx	Menu
x	x	x	x	Setup/Additional functions/Limit switches/.../Source of data
x	x	x	x	Setup/Additional functions/Controllers/.../Controlled variable/Source of data
x	x	x	x	Setup/General settings/Logbooks/Data logbooks/Source of data
x	x	x	x	Display/User definable screens/.../Source of data
x	x	x	x	Setup/Inputs/Conductivity/Temperature source

3.5.5 DO - Digital output (device ← PROFIBUS)

The cyclic value from PROFIBUS with data type DS-102 is provided to an PA-Profile DO function block and subsequently to a device variable AO.

The value mapped to a device variable DO must be configured in the menu of the component using the device variable as input. A device variable DO is used to transmit an analog value to the measuring device instead of using a binary input of the measuring device.

A device variable DO correspond to a binary input and has the same connection possibilities.

3.5.5.1 List of data sinks

CM44x	CM44P	CSFxx	CA80xx	Menu
x	x	x	x	Setup/Additional functions/Controllers/.../Controller Enable
x	x	x	x	Setup/Additional functions/Cleaning/.../Start signal
x	x	x	x	Setup/General settings/Hold settings/External hold
x	x	x	x	Setup/General settings/Logbooks/Data logbooks/Source of data
x	x	x	x	Setup/Inputs/Sensor/Extended setup/External hold/Source
x	x	x	x	Display/User definable screens/.../Source of data
x	x	x	x	Setup/Additional functions/Diagnostic modules
x	x	x	x	Setup/Inputs/Oxygen/Extended setup/Input pressure
x	x	x	x	Setup/Additional functions/Mathematical functions/MF X/Formula
x	x	x	x	Setup/Additional functions/Measuring range switch/MRS set X
	x			Setup/Inputs/Photometer/Lamp control input
	x			Setup/Inputs/Photometer/Extended Setup/Ext. dataset control
		x		Sample-Program/Programsetup/Advanced/Startcondition
		x		Sample-Program/Programsetup/Advanced/Startsignal
		x		Sample-Program/Programsetup/Advanced/Stopcondition
		x		Sample-Program/Programsetup/Advanced/Stopsignal
		x		Sample-Program/Advanced/Subprogramsetup/Samplemode
		x		Sample-Program/Advanced/Subprogramsetup/Samplesignal
		x		Sample-Program/Advanced/Subprogramsetup/Bottle change
		x		Sample-Program/Advanced/Subprogramsetup/Change signal
		x		Sample-Program/Advanced/Subprogramsetup/Change signal
		x		Sample-Program/Advanced/Subprg.setup/Subprogram-Activation
		x		Sample-Program/Advanced/Subprogramsetup/Activationsignal

3.5.6 Status

Each process value is linked to a status that provides information about the validity, and thereby the usability, of the process value. The status coding follows the definition of the PA profile 3.02 for Condensed Status.

Note:

Check the quality to determine whether the process value can be used. A status >= 128 indicates a usable value.

HEX	DEC	Quality	Sub status	Limits	Description
00	0	Bad	Non-specific	OK	This status is only used by proxies to indicate that a device is not communicating.
23	35	Bad	Passivated	OK	This status is set by the device if a process value has not been configured or cannot be made available for other reasons. No diagnostic events are reported via the Slave_Diag service.
24	36	Bad	Maintenance Alarm	OK	The value cannot be used because of an error.
25	37	Bad		LO_LIM	
26	38	Bad		HI_LIM	
27	39	Bad		CONSTANT	
28	40	Bad	Process related	OK	The value cannot be used because of an issue that can be attributed to the process.
29	41	Bad		LO_LIM	
2A	42	Bad		HI_LIM	
2B	43	Bad		CONSTANT	
3C	60	Bad	Function Check	OK	The value cannot be used because of user intervention (e.g. calibration).
3D	61	Bad		LO_LIM	
3E	62	Bad		HI_LIM	
3F	63	Bad		CONSTANT	
4B	75	Uncertain	Substitute set	OK	A substitute value is configured and is used. This status is set by the fail-safe logic of a function block.
4F	79	Uncertain	Initial value	OK	Initial value if a measured value is not available.
68	104	Uncertain	Maintenance demanded	OK	The usability of the value depends on the application and must be assessed by the user.
69	105	Uncertain		LO_LIM	
6A	106	Uncertain		HI_LIM	
6B	107	Uncertain		CONSTANT	
73	115	Uncertain	Simulated value, Start	OK	Signals the start of the simulation of the output value of a function block.

HEX	DEC	Quality	Sub status	Limits	Description
74	116	Uncertain	Simulated value, End	OK	Signals the end of the simulation of the output value of a function block. The status remains active up to 10 seconds after the end of the simulation. The value cannot be used while the status is active.
75	117	Uncertain		LO_LIM	
76	118	Uncertain		HI_LIM	
77	119	Uncertain		CONSTANT	
78	120	Uncertain	Process related	OK	The process conditions are outside the operating range of the device. The value can have a limited quality or accuracy.
79	121	Uncertain		LO_LIM	
7A	122	Uncertain		HI_LIM	
7B	123	Uncertain		CONSTANT	
80	128	Good		OK	
81	129	Good		LO_LIM	
82	130	Good		HI_LIM	
83	131	Good		CONSTANT	
84	132	Good	Update event	OK	The value can be used. The function block triggered an update event, i.e. a parameter of the block with a static storage class has been changed.
85	133	Good		LO_LIM	
86	134	Good		HI_LIM	
87	135	Good		CONSTANT	
88	136	Good	Active advisory	OK	The value can be used, and the block has an active alarm, e.g. if the OUT value of an AI Block exceeds the HI_LIM.
89	137	Good		LO_LIM	
8A	138	Good		HI_LIM	
8B	139	Good		CONSTANT	
8C	140	Good	Active critical	OK	The value can be used, and the block has an active alarm.
8D	141	Good		LO_LIM	
8E	142	Good		HI_LIM	
8F	143	Good		CONSTANT	
A0	160	Good	Initiate fail safe	OK	
A1	161	Good		LO_LIM	
A2	162	Good		HI_LIM	
A3	163	Good		CONSTANT	
A4	164	Good	Maintenance required	OK	
A5	165	Good		LO_LIM	
A6	166	Good		HI_LIM	
A7	167	Good		CONSTANT	
A8	168	Good	Maintenance demanded	OK	

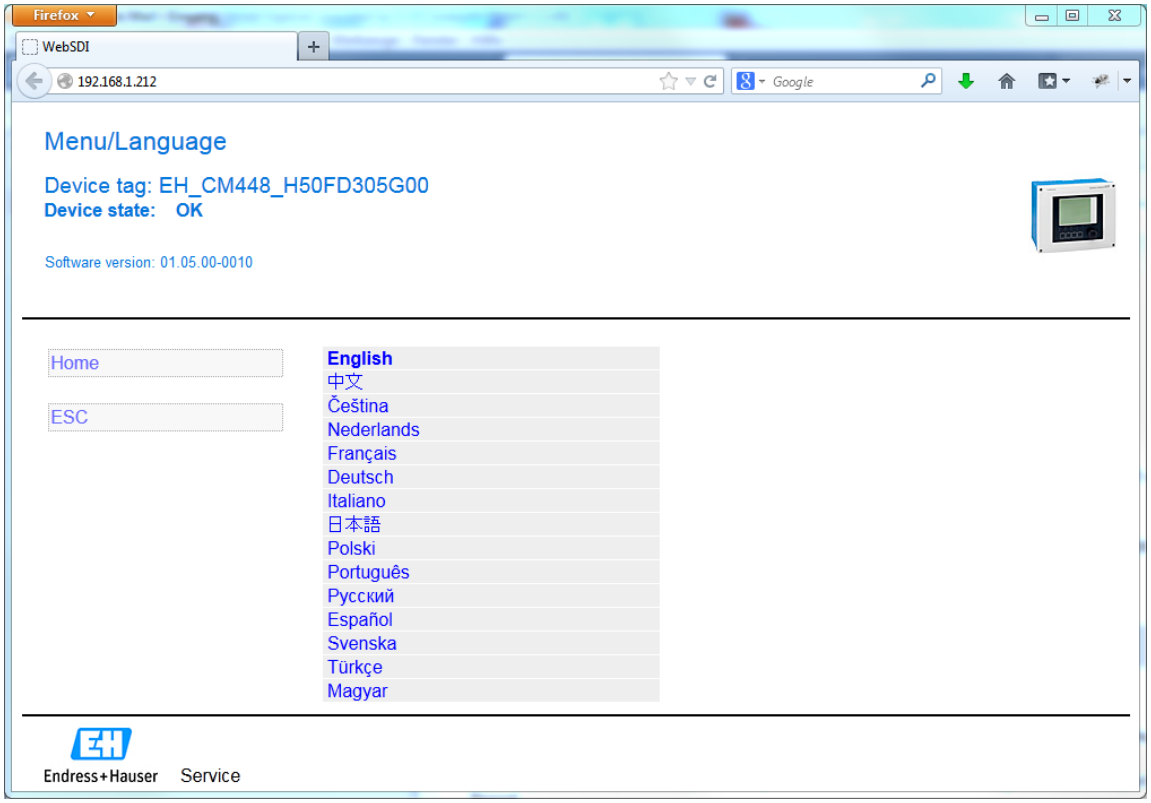
HEX	DEC	Quality	Sub status	Limits	Description
A9	169	Good		LO_LIM	
AA	170	Good		HI_LIM	
AB	171	Good		CONSTANT	
BC	188	Good	Function check	OK	The value can be used. The device is setting this status when the measurement value simulation is active.
BD	189	Good		LO_LIM	
BE	190	Good		HI_LIM	
BF	191	Good		CONSTANT	

3.6 Web server

3.6.1 Function description

You can remotely access local device operation via the integrated Web server.

All the languages of the local operation system are supported.



3.6.2 Security

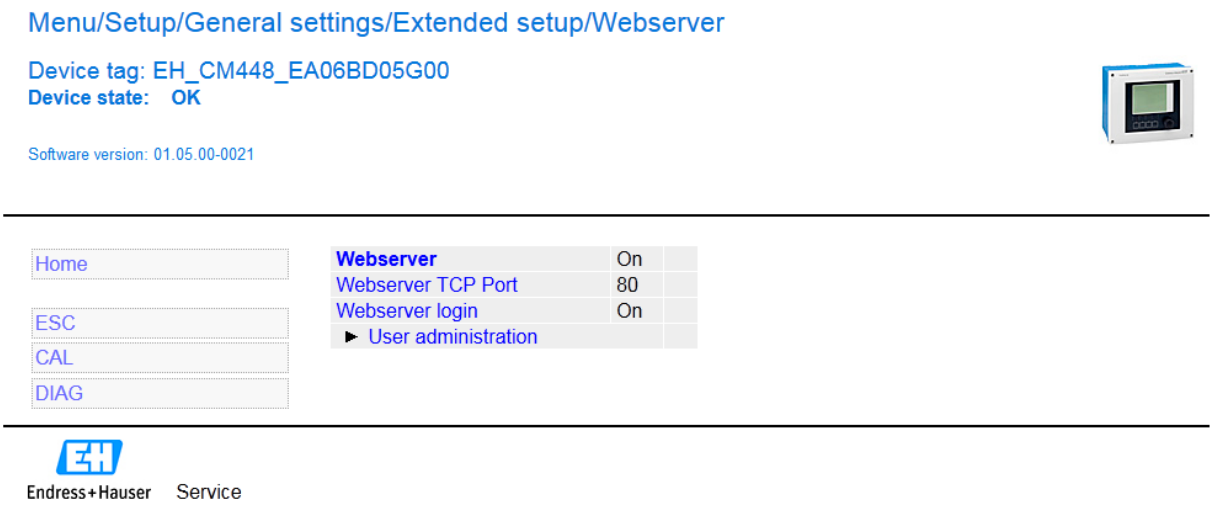
Please note that communication via the HTTP protocol is not encrypted.

You can disable the Web server via the menu:

Setup/General settings/Extended setup/Webserver → Webserver (on/off)

A factory default reset resets the access data to the default login.

3.6.3 Web server settings



Parameter	Options	Info
Web server	On (default) Off	When the Web server is disabled it is not possible to access the Web server via any interface (Ethernet, CDI or DTM).
Web server TCP port	80	Fixed value
Web server login	On (default) Off	
User administration	Wizard	You can change the user name and/or the user password. You require the access data that are currently valid to change the name/password.

3.6.4 Web server login

The following access data are pre-programmed into the device when the device is delivered:

Username: admin
Password: admin

Please note that communication via the HTTP protocol is not encrypted. The username and the password are transmitted as non-encrypted information.

3.6.5 Exporting the logbooks

The logbooks can be exported via the Web server and saved to a PC. Open a Web browser and enter one of the following URLs to get to an overview page.

http://<IP address>/logbooks_csv.fhtml	This file format can be read with any text editor or can be imported into Microsoft Excel, for instance. Separator: ";"
http://<IP address>/logbooks_fdm.fhtml	This data format can be imported into the Endress+Hauser Field Data Manager Software. http://www.endress.com/MS20

3.6.5.1 Web server login

Device software version 1.05.00 and higher supports login to the Web server using HTTP authentication. The user must be logged in to view the logbook overview. The individual logbooks can be downloaded directly without the need to log in beforehand.

3.6.5.2 Direct URLs of the logbooks

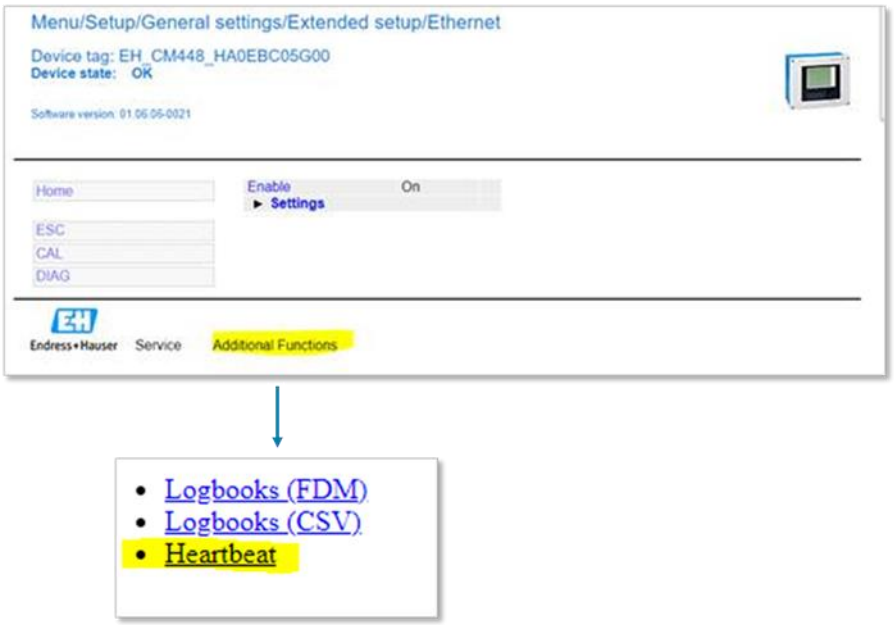
*.csv	*.dat
http://<IP address>/Calibration_logbook.csv	http://<IP address>/Calibration_logbook.dat
http://<IP address>/Diagnostic_logbook.csv	http://<IP address>/Diagnostic_logbook.dat
http://<IP address>/Configuration_logbook.csv	http://<IP address>/Configuration_logbook.dat
http://<IP address>/HW_version_logbook.csv	http://<IP address>/HW_version_logbook.dat
http://<IP address>/Version_logbook.csv	http://<IP address>/Version_logbook.dat
http://<IP address>/Data0_logbook.csv	http://<IP address>/Data0_logbook.dat
http://<IP address>/Data1_logbook.csv	http://<IP address>/Data1_logbook.dat
http://<IP address>/Data2_logbook.csv	http://<IP address>/Data2_logbook.dat
http://<IP address>/Data3_logbook.csv	http://<IP address>/Data3_logbook.dat
http://<IP address>/Data4_logbook.csv	http://<IP address>/Data4_logbook.dat
http://<IP address>/Data5_logbook.csv	http://<IP address>/Data5_logbook.dat
http://<IP address>/Data6_logbook.csv	http://<IP address>/Data6_logbook.dat
http://<IP address>/Data7_logbook.csv	http://<IP address>/Data7_logbook.dat

The *.dat format can be used for data import into the Endress+Hauser Field Data Manager Software.

3.7 Exporting Heartbeat Verification Report

The last Heartbeat Verification Report can be downloaded from:

http://<IP-Adresse>/heartbeat.fhtml



4 Diagnostics

Diagnostic information for the device is provided through various mechanisms:

- LEDs of the 485-module
- Diagnostic telegram (DPV0)
- Parameter (DPV1)
- Status byte of cyclically transmitted process values

4.1 LED displays

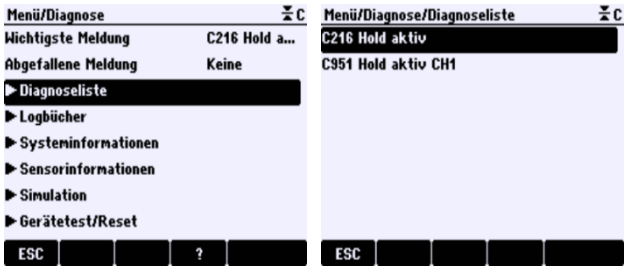
LED	Name	State	Description
PWR	Power	off	Not operational, during initialization
		green	Operational, PROFIBUS communication is possible
BF	Bus failure	off	
		red	No communication
		red, flashing	Diagnostics telegram reports Prm_Fault or Cfg_Fault
SF	System failure	off	
		red	Diagnostics telegram: EXT_DIAG = 1 is set. This bit is set if at least 1 diagnostic with the status "F" (Failure) is active.
COM	Communication	yellow	PROFIBUS request received (LED remains active for 1 second)
T	Termination	off	Bus termination is switched off.
		yellow	Bus termination is switched on.

PWR	BF	SF	Description	Remedy
off	off	off	No power supply or initialization	Check the power supply, check the diagnostics list.
on	off	on	NE107 status signal = F (Failure)	Check the diagnostics list.
on	on	off	No communication	Wrong address: Slave is not configured.
on	on	on	No communication NE107 status signal = F (Failure)	Wrong address: Slave is not configured. Check the diagnostics list.
on	flashing	off	Prm_Fault or Cfg_Fault	Check the configuration of the GSD file.
on	flashing	on	Prm_Fault or Cfg_Fault NE107 status signal = F (Failure)	Check the configuration of the GSD file. Check the diagnostics list.

4.2 Diagnostics parameters (DPV1)

The device displays the active diagnostic messages in a diagnostic list in the device menu. The diagnostic messages are ordered by priority.

Example:



The diagnostic with the highest priority for the device and for each of the sensor channels (up to eight) is mapped to PROFIBUS parameters. In addition to the active diagnostic message with the highest priority, the last withdrawn diagnostic message is also mapped to PROFIBUS parameters.
The device related diagnostic is assigned to the Physical Block. The sensor related diagnostics are assigned to the sensor transducer X pertaining to the channel.

<table>
<tr><th>Parameter Mnemonic</th><th colspan="4">Description</th></tr>
<tr><td>DIAGNOSIS</td><td colspan="4"></td></tr>
<tr><td rowspan="14">DIAGNOSIS_EXTENSION</td><td colspan="4">This parameter shows which sensors have active diagnose.
Diagnose which is not connected to a sensor sets the Bit “General”.</td></tr>
<tr><td>Byte</td><td>Bit</td><td>Message</td><td>Detailed information</td></tr>
<tr><td>0</td><td>0</td><td>Sensor Channel 0</td><td>Sensor-Transducer 0</td></tr>
<tr><td>0</td><td>1</td><td>Sensor Channel 1</td><td>Sensor-Transducer 1</td></tr>
<tr><td>0</td><td>2</td><td>Sensor Channel 2</td><td>Sensor-Transducer 2</td></tr>
<tr><td>0</td><td>3</td><td>Sensor Channel 3</td><td>Sensor-Transducer 3</td></tr>
<tr><td>0</td><td>4</td><td>Sensor Channel 4</td><td>Sensor-Transducer 4</td></tr>
<tr><td>0</td><td>5</td><td>Sensor Channel 5</td><td>Sensor-Transducer 5</td></tr>
<tr><td>0</td><td>6</td><td>Sensor Channel 6</td><td>Sensor-Transducer 6</td></tr>
<tr><td>0</td><td>7</td><td>Sensor Channel 7</td><td>Sensor-Transducer 7</td></tr>
<tr><td>1</td><td>0</td><td>General</td><td>Physical Block</td></tr>
<tr><td>1</td><td>1..7</td><td>Reserved</td><td></td></tr>
<tr><td>2..5</td><td></td><td>Reserved</td><td></td></tr>
<tr><td>CURRENT_DIAG_SOURCETYPE</td><td colspan="4">Source/Component which has diagnostics</td></tr>
<tr><td>CURRENT_DIAG_MODUL</td><td colspan="4">Module slot which reports this diagnostic</td></tr>
<tr><td>CURRENT_DIAG_PORT</td><td colspan="4">Port-Number at the module which reports this diagnostic</td></tr>
<tr><td>CURRENT_DIAG_NE107_STATUS</td><td colspan="4">Status signal according NAMUR NE107</td></tr>
<tr><td>CURRENT_DIAG_CODE</td><td colspan="4">Diagnostic code</td></tr>
<tr><td>CURRENT_DIAG_TIMESTAMP</td><td colspan="4">Timestamp</td></tr>
<tr><td>NUMBER_ADDITIONAL_DIAG</td><td colspan="4">Number of additional diagnostics events with lower priority</td></tr>
<tr><td>LAST_DIAG_SOURCETYPE</td><td colspan="4">Past withdrawn diagnostic CURRENT_DIAG_TYPE</td></tr>
<tr><td>LAST_DIAG_MODUL</td><td colspan="4">Past withdrawn diagnostic CURRENT_DIAG_MODUL</td></tr>
<tr><td>LAST_DIAG_PORT</td><td colspan="4">Past withdrawn diagnostic CURRENT_DIAG_PORT</td></tr>
<tr><td>LAST_DIAG_NE107_STATUS</td><td colspan="4">Past withdrawn diagnostic CURRENT_DIAG_CLASS</td></tr>
<tr><td>LAST_DIAG_CODE</td><td colspan="4">Past withdrawn diagnostic CURRENT_DIAG_CODE</td></tr>
<tr><td>LAST_DIAG_TIMESTAMP</td><td colspan="4">Past withdrawn diagnostic CURRENT_DIAG_OVERFLOW</td></tr>
</table>

5 PROFIBUS telegrams

5.1 Configuration telegram

Octet	Name	Bit	Name	Description
1	Station_status	0..2	Reserved	
		3	WD_On	Watchdog active
		4	Freeze_Req	Freeze active
		5	Sync_Req	Sync active
		6	Unlock_Req	Unlock (has higher priority than Lock)
		7	Lock_Req	Lock
2	*WD_Fact_1*			*$T_{Watchdog}$ = 10 ms * WD_Fact_1 * WD_Fact_2* *After $T_{Watchdog}$ without communication the measuring devices detects a communication loss and leaves the data exchange with PROFIBUS.*
3	WD_Fact_2			
4	TSDR			Defines the time in T_{Bit} the slave has to wait until sending a reply to any request from a DP master. The value must be less than specified in the GSD for the selected baud rate.
5	Identnumber		High byte	CM44x = 15_h, CSFxx = 15_h
6	Identnumber		Low byte	CM44x = $5D_h$, CSFxx = $5C_h$
7	Group_Ident	0	Group 1	
		1	Group 2	
		2	Group 3	
		3	Group 4	
		4	Group 5	
		5	Group 6	
		6	Group 7	
		7	Group 8	
8	DPV1_Status_1			Fixed at 0x00
9	DPV1_Status_2			Fixed at 0x00
10	DPV1_Status_3			Fixed at 0x00
11				Fixed at 0x05
12				Fixed at 0x41
13				Fixed at 0x00
14				Fixed at 0x00
15				Fixed at 0x01
16				Fixed at 0xE1
...				Fixed at 0x00
240				Fixed at 0x00

Typically, the configuration telegram is configured by the tool (e.g. TIA-Portal). The information of this chapter is only needed in case the configuration telegram needs to be constructed programmatically.

The configuration-telegram has this structure, when using the GSD file with a maximum configuration:

		Cfg_Data		Function Block
Slot	**GSD modules**	**Index**	**String**	**Menu/Setup/Outputs/PROFIBUS**
1	AI: OUT (Analog Input)	0	0x42,0x84,0x81,0x81,	AI01 (Analog Input)
2	AI: OUT (Analog Input)	4	0x42,0x84,0x81,0x81,	AI02 (Analog Input)
3	AI: OUT (Analog Input)	8	0x42,0x84,0x81,0x81,	AI03 (Analog Input)
4	AI: OUT (Analog Input)	12	0x42,0x84,0x81,0x81,	AI04 (Analog Input)
5	AI: OUT (Analog Input)	16	0x42,0x84,0x81,0x81,	AI05 (Analog Input)
6	AI: OUT (Analog Input)	20	0x42,0x84,0x81,0x81,	AI06 (Analog Input)
7	AI: OUT (Analog Input)	24	0x42,0x84,0x81,0x81,	AI07 (Analog Input)
8	AI: OUT (Analog Input)	28	0x42,0x84,0x81,0x81,	AI08 (Analog Input)
9	AI: OUT (Analog Input)	32	0x42,0x84,0x81,0x81,	AI09 (Analog Input)
10	AI: OUT (Analog Input)	36	0x42,0x84,0x81,0x81,	AI10 (Analog Input)
11	AI: OUT (Analog Input)	40	0x42,0x84,0x81,0x81,	AI11 (Analog Input)
12	AI: OUT (Analog Input)	44	0x42,0x84,0x81,0x81,	AI12 (Analog Input)
13	AI: OUT (Analog Input)	48	0x42,0x84,0x81,0x81,	AI13 (Analog Input)
14	AI: OUT (Analog Input)	52	0x42,0x84,0x81,0x81,	AI14 (Analog Input)
15	AI: OUT (Analog Input)	56	0x42,0x84,0x81,0x81,	AI15 (Analog Input)
16	AI: OUT (Analog Input)	60	0x42,0x84,0x81,0x81,	AI16 (Analog Input)
17	DI: OUT_D (Digital Input)	64	0x42,0x81,0x83,0x81,	DI01 (Digital Input)
18	DI: OUT_D (Digital Input)	68	0x42,0x81,0x83,0x81,	DI02 (Digital Input)
19	DI: OUT_D (Digital Input)	72	0x42,0x81,0x83,0x81,	DI03 (Digital Input)
20	DI: OUT_D (Digital Input)	76	0x42,0x81,0x83,0x81,	DI04 (Digital Input)
21	DI: OUT_D (Digital Input)	80	0x42,0x81,0x83,0x81,	DI05 (Digital Input)
22	DI: OUT_D (Digital Input)	84	0x42,0x81,0x83,0x81,	DI06 (Digital Input)
23	DI: OUT_D (Digital Input)	88	0x42,0x81,0x83,0x81,	DI07 (Digital Input)
24	DI: OUT_D (Digital Input)	92	0x42,0x81,0x83,0x81,	DI08 (Digital Input)
25	AO: SP (Analog Output)	96	0x82,0x84,0x82,0x82,	AO01 (Analog Output)
26	AO: SP (Analog Output)	100	0x82,0x84,0x82,0x82,	AO02 (Analog Output)
27	AO: SP (Analog Output)	104	0x82,0x84,0x82,0x82,	AO03 (Analog Output)
28	AO: SP (Analog Output)	108	0x82,0x84,0x82,0x82,	AO04 (Analog Output)
29	DO: SP_D (Digital Output)	112	0x82,0x81,0x84,0x82,	DO01 (Digital Output)
30	DO: SP_D (Digital Output)	116	0x82,0x81,0x84,0x82,	DO02 (Digital Output)
31	DO: SP_D (Digital Output)	120	0x82,0x81,0x84,0x82,	DO03 (Digital Output)
32	DO: SP_D (Digital Output)	124	0x82,0x81,0x84,0x82,	DO04 (Digital Output)
33	DO: SP_D (Digital Output)	130	0x82,0x81,0x84,0x82,	DO05 (Digital Output)
34	DO: SP_D (Digital Output)	134	0x82,0x81,0x84,0x82,	DO06 (Digital Output)
35	DO: SP_D (Digital Output)	138	0x82,0x81,0x84,0x82,	DO07 (Digital Output)
36	DO: SP_D (Digital Output)	142	0x82,0x81,0x84,0x82	DO08 (Digital Output)

You can reduce the volume of data transmitted cyclically via PROFIBUS by replacing individual modules by a place holder module "EMPTY_MODULE". The place holder module has the string "0x00".

Note:
Retaining the maximum configuration has the advantage that you can connect additional measured values to the AI Blocks at any time via the Device menu and transmit these values without having to change the PROFIBUS configuration.

5.2 Diagnosis response telegram (DPV0)

A PROFIBUS slave reports a changed diagnose state in cyclic data exchange by sending a high priority data telegram. This triggers a Diagnosis request telegram from the PROFIBUS master, which is return replied with the following telegram.

Octet	Name	Bit	Name	Description
1	Station_status_1	0	Station_Non_Existent	Station does not exist
		1	Station_Not_Ready	Slave is not ready for data exchange
		2	Cfg_Fault	Error in the configuration telegram
		3	Ext_Diag	Extended diagnostics occurs in the telegram = 1: Severity = Alarm (Failure / Maintenance Alarm); = 0: Severity = Ok or Status/Warning
		4	Not_Supported	The requested function is not supported by the slave.
		5	Invalid_Slave_Response	Invalid response from slave (is set by the master)
		6	Prm_Fault	Error in parameterization telegram
		7	Master_Lock	Slave is locked by another master
2	Station_status_2	0	Prm_Req	Slave must be parameterized again
		1	Stat_Diag	Static diagnostics
		2	--	Fixed at 1
		3	WD_On	Watchdog on
		4	Freeze_Mode	Freeze command received
		5	Sync_Mode	Sync command received
		6	--	Fixed at 0
		7	Deactivated	Slave is disabled (is set by the master)
3	Station_status_3	0..6	--	Fixed at 0

Octet	Name	Bit	Name	Description
		7	Ext_Diag_Overflow	Slave has more diagnostics information than can be contained in the telegram.
4	Diag_Master_Add			Address of the master after parameterization Default is 255 (FFh)
5	Ident_Number_High			Ident number high byte
6	Ident_Number_Low			Ident number low byte
7	Header_Octet			Fixed at 0x80
8	Status_Type			Fixed at 0x80
9	Slot_Number			Fixed at 0
10	Specifier	0..1		1 = Status is coming 2 = Status is going
	Status_Type	2..7		Fixed at 0xFE
11	Diagnosis [0]			Fixed at 0
12	Diagnosis [1]	0..2	--	Fixed at 0
		3	DIA_WARMSTART	The device has been rebooted.
		4	DIA_COLDSTART	The device has been reset to its factory settings.
		5	DIA_MAINTENANCE NE107: Maintenance Required	The device still measures correctly. Immediate measures are not necessary. However, proper maintenance efforts would prevent a possible malfunction in the future.
		6	--	Fixed 0
		7	IDENT_NUMBER_VIOLATION	The ident number does not match the parameter IDENT_NUMBER_SELECTOR in the Physical Block.
13	Diagnosis [2]	0	DIA_MAINTENANCE_ALARM NE107: Failure	The measured value of the affected channel is no longer reliable. The cause of the problem is to be found in the measuring point. Any controller connected should be set to
		1	DIA_MAINTENANCE_DEMANDED	Fixed at 0
		2	DIA_FUNCTION_CHECK NE107: Function Check	Maintenance work is being performed on the device. Wait until the work has been completed.

Octet	Name	Bit	Name	Description
		3	DIA_INV_PRO_COND NE107: Out of Specification	The measuring point is being operated outside specifications. Operation is still possible. However, you run the risk of increased wear, shorter operating life or lower accuracy levels. The cause of the problem is to be found outside the measuring point.
		4..7	--	Fixed at 0
14	Diagnosis [3]	0..6	--	Fixed at 0
		7	EXTENSION_AVAILABLE	Fixed at 0

6 Plant asset management (PAM)

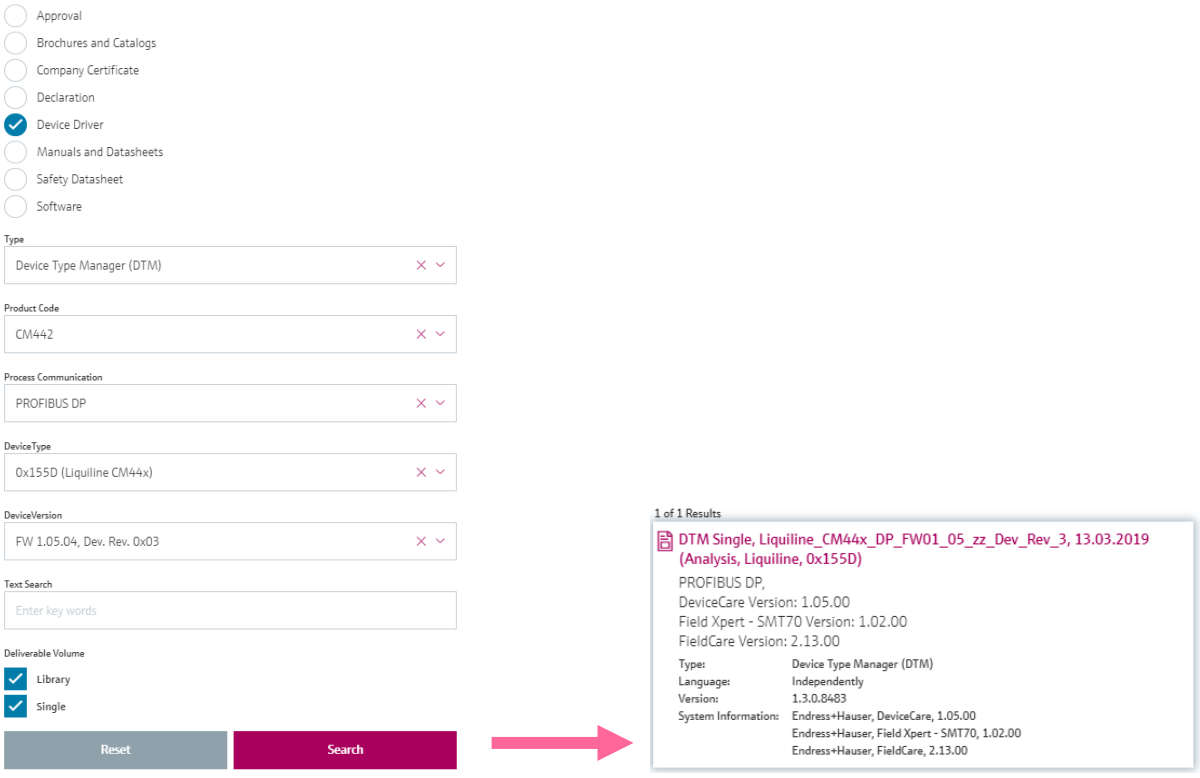
The following device drivers are available to integrate the device into the process automation system.

PAM Tool	Technology	Functionality
Simatic PDM®	EDD	Configuration of the PA Profile function blocks Display the available measured values Display diagnostic and service-related functionalities Upload/download of the contained parameters
Fieldcare®	FDT/DTM	Configuration of the PA Profile function blocks Display the available measured values Display diagnostic and service-related functionalities Upload/download of the parameters in the DTM
Web server	Browser	Full configuration of the device, Export logbooks and Heartbeat Reports

Note:
Device operation is only possible to a limited extent via the DD or the DTM. Full access to the Device menu is supported via the integrated Web server. You can connect to the Web server via the Ethernet interface of the 485-module or via the service interface of the device.
To access the Web server via the service interface you require the CDI (FXA291) DTM which is part of the Service DTM Library. You can find more information about the Web server in the Web server guideline.
The function to upload or download the device parameterization is limited to the parameters contained in the DD or DTM. On the device, complete device parameterization backup and restore is possible using an SD card.

6.1 How to acquire the PDM DD or DTM

The PDM DD can be downloaded from our homepage via the following link:
https://www.endress.com/en/downloads



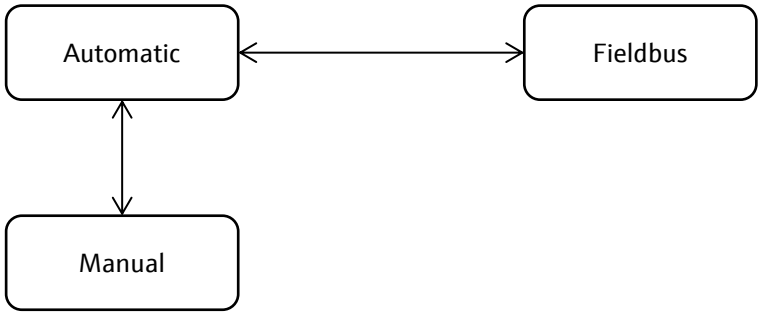
7 Applications

7.1 CA80xx: How to start Measurement, Calibration and Cleaning

This chapter applies only to the Liquiline CA80xx analyzer.

The actions “Measurement”, “Calibration” and “Cleaning” can be controlled by PRFOIBUS DP while the analyzer is in the operation mode “Fieldbus”.

The operation mode “Fieldbus” can be activated either by PROFIBUS DP or the device menu.



7.1.1 Activate “Fieldbus”-mode using the device menu

Step	Action	Result
1	Press the soft key “MODE” to enter the menu in which the operation mode can be selected.	Menu/...asic setup analyzer/Mode OK Current mode Automatic ▷ Manual mode ▷ Fieldbus mode ▷ Abort all actions ▷ Hold ▶ Info ESC
2	Activate the “Fieldbus mode”.	Menu/...asic setup analyzer/Mode OK Current mode Fieldbus ▷ Manual mode ▷ Continue automatic mode ▷ Start automatic mode ▷ Abort all actions ▷ Hold ▶ Info ESC ?

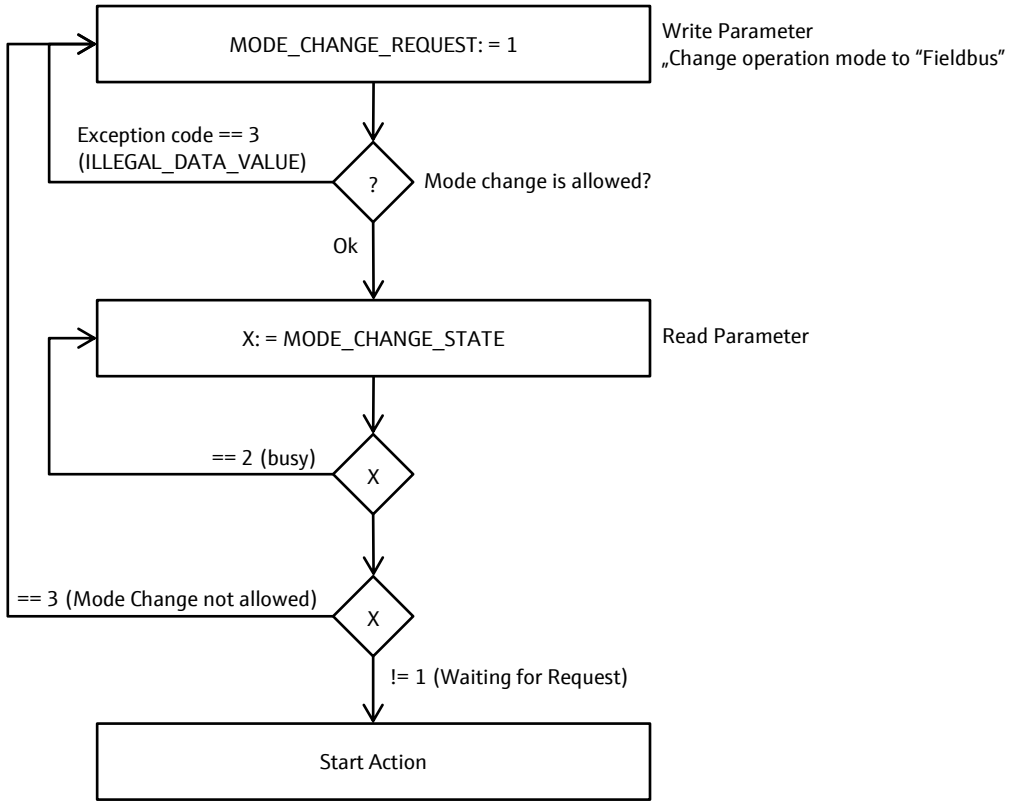
The operation mode can be changed at any time using the device menu. The setting of the device menu has priority over the setting by PROFIBUS DP. This is a safety measure to prevent the start of actions over PROFIBUS DP while the analyzer is in operation mode “Manual” during maintenance work.

Important:
A change from “Manual” directly to “Fieldbus” is now allowed by PROFIBUS DP. PROFIBUS DP can only change the operation mode from “Automatic” to “Fieldbus”.

7.1.2 Activate “Fieldbus”-mode using PROFIBUS DP

The following diagram shows an example sequence without error handling. The application program should at least consider the following additional cases:

- The analyzer is not reachable by PROFIBUS DP communication, e.g. because it is switched off
- A write access to a register fails and an exception code is returned in the PROFIBUS DP reply
- A read access to a register fails and an exception code is returned in the PROFIBUS DP reply
- The analyzer is switched temporarily to manual mode during maintenance

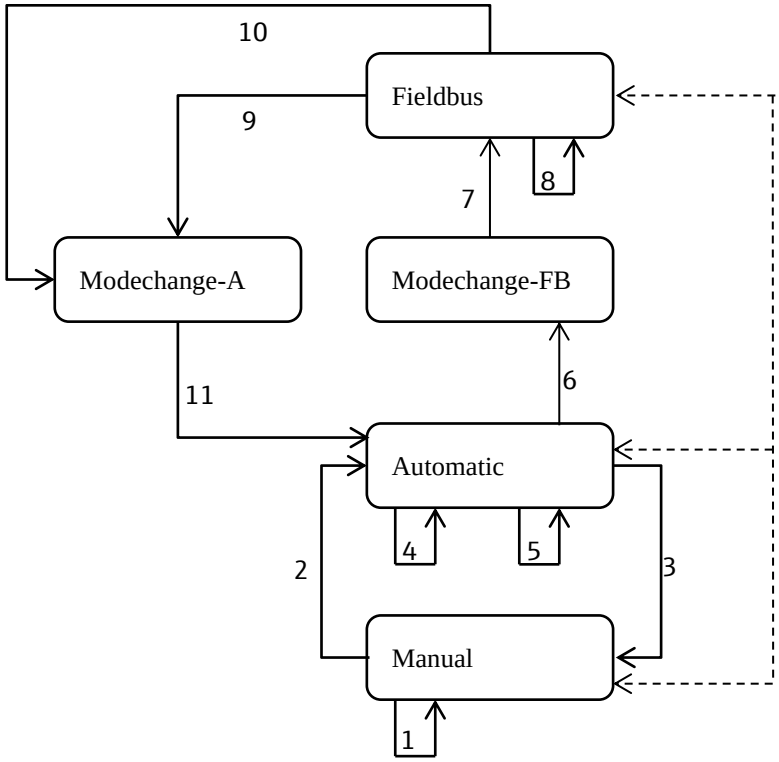


The following examples in Pseudocode show how a program can access the functionality over PROFIBUS DP.

```
// Example program (Pseudocode)
Write ModeChangeRequest “Fieldbus”
IF Write access returns error
   Abort procedure with error
DO
   Read ModeChangeStatus
WHILE ModeChangeStatus is “Busy”
IF ModeChangeStatus is NOT “WaitingForRequest”
   Abort procedure with error
// now fieldbus mode is active
```

7.1.3 State machine

The following state diagram describes the operation mode and state transitions.



Important:
A change of the operation mode does not interrupt a pending action. A new action can only be started after the pending action has finished or is aborted.

#	Current state	Condition → Action	Next state
1	Manual	→ MODE_CHANGE_STATE:=3, ACTION_REQUEST_STATE:=2	Manual
2	Manual	Mode Automatic → MODE_CHANGE_STATE:=1, ACTION_REQUEST_STATE:=2	Automatic
3	Automatic	Mode Manual → MODE_CHANGE_STATE:=3, ACTION_REQUEST_STATE:=2	Manual
4	Automatic	MODE_CHANGE_REQUEST:=0 → MODE_CHANGE_STATUS:=1, ACTION_REQUEST_STATE:=2	Automatic
5	Automatic	MODE_CHANGE_REQUEST:=1 and mode change is not possible → MODE_CHANGE_STATE:=3, ACTION_REQUEST_STATE:=2	Automatic
6	Automatic	MODE_CHANGE_REQUEST:=1 and mode change is accepted → MODE_CHANGE_STATUS:=2, ACTION_REQUEST_STATE:=2	Modechange -FB
7	Modechange-FB	Mode change finished → ACTION_REQUEST_STATE:=1, ACTION_REQUEST_STATE:=0	Fieldbus
8	Feldbus	See “Fieldbus status machine”	Fieldbus
9	Feldbus	MODE_CHANGE_REQUEST:=2 → MODE_CHANGE_STATUS:=2	Modechange -A
10	Feldbus	MODE_CHANGE_REQUEST:=3 → MODE_CHANGE_STATE:=1, ACTION_REQUEST_STATE:=2, Time-controlled programs are restarted with the current time.	Modechange -A
11	Modechange -A	Mode changed finished → MODE_CHANGE_STATE:=1, ACTION_REQUEST_STATE:=2	Automatic

7.1.4 How-to execute actions

7.1.4.1 How-to execute a Measurement

The analyzer must be in the operation mode “Fieldbus” to start an action. The current operation mode can be verified by pressing the soft-key labeled “MODE” at the device menu or by reading the PROFIBUS DP register MANUAL_CHANGE_STATUS.

```
// execute a measurement
Write AnalyzerRequest “Measurement”
IF Write access returns error
   Abort procedure with error
DO
   Read FunctionExecutionStatus
WHILE FunctionExecutionStatus is “Busy” OR
     FunctionExecutionStatus is “MeasurementInProgress”
IF FunctionExecutionStatus is NOT “MeasurementFinished”
   Abort procedure with error
// now measurement was successfully executed
```

If the user locally switches to manual or automatic the PROFIBUS DP write requests gets an error response. An error is also, if a measurement shall be executed and another action is running (e.g. a calibration). As the above pseudo code shows, this will be detected as an error.

7.1.4.2 How-to run a Calibration

The analyzer must be in the operation mode “Fieldbus” to start an action. The current operation mode can be verified by pressing the soft-key labeled “MODE” at the device menu or by reading the PROFIBUS DP register MANUAL_CHANGE_STATUS.

```
// execute a calibration
Write AnalyzerRequest “Calibration”
IF Write access returns error
   Abort procedure with error
DO
   Read FunctionExecutionStatus
WHILE FunctionExecutionStatus is “Busy” OR
     FunctionExecutionStatus is “CalibrationInProgress”
IF FunctionExecutionStatus is NOT “CalibrationFinished”
   Abort procedure with error
// now calibration was successfully executed
```

If the user locally switches to manual or automatic the PROFIBUS DP write requests gets an error response. An error is also, if a calibration shall be executed and another action is running. As the above pseudo code shows, this will be detected as an error.

7.1.4.3 How-to start a Cleaning

The analyzer must be in the operation mode “Fieldbus” to start an action. The current operation mode can be verified by pressing the soft-key labeled “MODE” at the device menu or by reading the PROFIBUS DP register MANUAL_CHANGE_STATUS.

```
// execute a cleaning
Write AnalyzerRequest “Cleaning”
IF Write access returns error
```

```
   Abort procedure with error
DO
   Read FunctionExecutionStatus
WHILE FunctionExecutionStatus is “Busy” OR
     FunctionExecutionStatus is “CleaningInProgress”
IF FunctionExecutionStatus is NOT “CleaningFinished”
   Abort procedure with error
// now cleaning was successfully executed
```

If the user locally switches to manual or automatic the PROFIBUS DP write requests gets an error response. An error is also, if a cleaning shall be executed and another action is running. As the above pseudo code shows, this will be detected as an error.

7.1.4.4 How-to abort an action

```
// “Abort” can be executed at any time
Write CommonRequest “AbortOfCurrentActivity”
IF Write access returns error
   Abort procedure with error
DO
   Read FunctionExecutionStatus
WHILE FunctionExecutionStatus is “AbortOfCurrentActivityInProgress”
IF FunctionExecutionStatus is NOT “AbortOfCurrentActivityFinished”
   Abort procedure with error
```

7.1.4.5 Error evaluation

The examples in the former chapters show how to detect an error. How to handle an error may dependent from the cause of error.

Two errors can occur:

1. Write access fails and returns fieldbus specific error codes. In most cases the analyzer is in a state where it cannot execute the desired function. This can be checked by reading the parameters “OperationMode” and “FunctionExecutionStatus”.

2. The parameter “FunctionExecutionStatus” has not the expected value. Since the PLC has already read the function execution status, it can rely on this value to check the cause of error, e.g.:
    a. Other function is running or even finished or failed. So, another user accessed the analyzer and started this function.
    b. The desired function failed. In most times a failure is signaled by a diagnosis that can be read via fieldbus specific mechanism, e.g. diagnosis parameters. Remark: The user shall be aware that the diagnosis may not reflect the function error because other diagnosis events might be triggered. All diagnosis events are logged.

Example for a simple error handling is to wait until device is available again:

```
DO

     Write ModeChangeRequest “Fieldbus”
   WHILE Write access returns error
   DO
     Read ModeChangeStatus
   WHILE ModeChangeStatus is “Busy”
WHILE ModeChangeStatus is NOT “WaitingForRequest”
```

DO
  Write ResetRequest “ResetOfStatus”
WHILE Write access returns error

Of course, such a simple error handling will generate some traffic on PROFIBUS DP.

This procedure is also recommended on startup of a PLC program. To limit traffic on fieldbus, it is enough to read or write the fieldbus every 15 seconds or even less frequently.

7.1.4.6 Analyzer Manual Actions

The following parameters are available to switch into fieldbus mode, which enables the remote control over PROFIBUS DP function, and to start an action and read back its progress.

Slot	Index	Attribute	Data Type	Access	Description
36	149	ModeChangeRequest (MODE_CHANGE_REQUEST)	UINT8	R/W	This parameter is used to control the active operation mode and can be written with the following values. 0: None 1: Enter fieldbus mode. The CA80xx changes from automatic mode to fieldbus mode. 2. Continue automatic mode: The CA80xx changes from fieldbus mode to automatic mode continuing with the time schedule as it was calculated when entering automatic mode, the first time. 3. Restart automatic mode: The system changes from fieldbus mode to automatic mode and restarts the time schedule with the current time as starting point.
36	153	AbortActionRequest (COMMON_REQUEST)	UINT8	R/W	The parameter is used to abort the current activity and can be written with the following values: 0: None 1: Abort current action
36	155	ManualActionRequest (ANALYZER_REQUEST)	UINT8	R/W	This parameter is used to start an action and can be written with the following values: 0: None 1: Start measurement 2: Start calibration 3: Start cleaning

7.1.4.7 Analyzer manual actions state

The parameters in the register block “Analyzer manual actions state” are used to read the status of the status machine.

Slot	Index	Attribute	Data Type	Access	Description
36	152	ModeChangeState (MODE_CHANGE_REQUEST_STATUS)	UINT8	R	This parameter reads the status of the mode change. Allowed values: 1: Waiting for Request: The analyzer is waiting for a request. 2: Busy: Writing the parameter “Mode change request” was accepted. Mode change is in progress. 3: Mode Change not allowed: The analyzer is in operation mode that the fieldbus is not allowed to change (like manual mode).
36	159	ActionRequestState (ACTIVITY_REQUEST_STATUS)	UINT8	R	This parameter reads the status of processing the requested <function> (Measurement, Calibration or Cleaning). Allowed values: 0: Ready to start action No procedure is running. This state is entered, if the analyzer enters fieldbus mode, while nothing is running that disturbs the start of any function via fieldbus. 1: Action request accepted The request was accepted, but the requested function is not started yet. 2: Fieldbus not active The analyzer is not in fieldbus mode and cannot accept action requests. 32: Current action abort in progress 33: Measurement started 34: Calibration started 35: Cleaning started 64: Current activity aborted 65: Measurement finished 66: Calibration finished 67: Cleaning finished 97: Measurement not successful 98: Calibration not successful 99: Cleaning not successful

8 Tables

8.1 Technical data

This section provides you with an overview of the PROFIBUS functionality of the product. Additional information is available in the Technical Information TI00444C.

8.1.1 PROFIBUS DP

Signal encoding	EIA/TIA-485, PROFIBUS-DP-compliant as per IEC61158 / IEC61784
Data transmission rate	9.6 kBd / 19.2 kBd / 45.45 kBd / 93.75 kBd / 187.5 kBd / 500 kBd / 1.5 MBd / 3 MBd / 6 MBd / 12 MBd
Galvanic isolation	Yes
Connector	Spring terminal (max. 1.5 mm), plug jumpered internally (T-function), optional M12
Bus termination	Internal slide switch with LED display

8.1.2 PA Profile 3.02

Manufacturer ID	0x11
Device type (CM44x)	0x155D (manufacturer-specific) 0x9760 (profile for multivariable PA devices)
Device type (CSFxx)	0x155C (manufacturer-specific) 0x9760 (profile for multivariable PA devices)
PA profile	3.02
GSD	www.products.endress.com/profibus Device Integration Manager (DIM)
Output variables	16 AI blocks 8 DI blocks
Input variables	4 AO blocks 8 DO blocks
Status	Condensed status
Supported features	1 MSCY0 connection (cyclic communication, master class 1 to slave) 1 MSAC1 connection (acylic communication, master class 1 to slave) MSAC2 connections (acyclic communication, master class 2 to slave) Device lock: The device can be locked via the hardware or software. Addressing with DIL switches or via software GSD, PDM DD, DTM
Special points to note	The data sources and data sinks for the function blocks are configured via the Device menu. The channel parameters of the function blocks are set to fixed values. In standard configurations, the base unit of the process value is the unit of the process values.

8.2 Data Types

8.2.1 DS-37: Mode structure

This data structure consists of elements for actual, permitted and normal modes.

E	Element Name	Data Type	Size	Description
1	Actual	Unsigned8	1	The block output is calculated using the input from the TB in case of an input FB and using a set point value provided by a host or an operator through an interface device in case of an output FB. For PB and TB this mode indicates that their block functions can work.
2	Permitted	Unsigned8	1	Defines the modes which are allowed for an instance of the block.
3	Normal	Unsigned8	1	This is the mode which the block uses during normal operation conditions.

8.2.2 DS-42: Alarm Summary structure

This data structure consists of data that summarize 16 alarms.

E	Element Name	Data Type	Size	Description
1	Current	OctetString	2	
2	Unacknowledged	OctetString	2	
3	Unreported	OctetString	2	
4	Disabled	OctetString	2	

8.2.3 DS-50: Simulation - Floating Point structure

This data structure consists of the Simulation parameters.

E	Element Name	Data Type	Size	Description
1	Simulate_Status	Unsigned8	1	Status written by an operator to simulate the Transducer Block value status.
2	Simulate_Value	Float	4	Value written by an operator to simulate the Transducer Block value.
3	Simulate_Enabled	Unsigned8	1	Switch to enable or disable simulation. 0: Disabled 1: Enabled

8.2.4 DS-60: Result structure

E	Element Name	Data Type	Size	Description
1	PV	Float	4	Process value
2	Measurement_Status	Unsigned8	1	Status
3	PV_Time	BinaryDate	7	Not used. Reads 0.

8.2.5 DS-61: Measurement Range structure

This data structure contains the structure of the measurement range.

E	Element Name	Data Type	Size	Description
1	Begin_of_Range	Float	4	The engineering unit is the same as the unit of the measurement value.
2	End_of_Range	Float	4	The engineering unit is the same as the unit of the measurement value.

8.2.6 DS-67: Batch structure

This data structure contains the structure of the Batch parameter.

E	Element Name	Data Type	Size	Description
1	Batch_ID	Unsigned32	4	Identifies a certain batch to allow assignment of equipment-related information (e.g. faults, alarms ...) to the batch.
2	Rup	Unsigned16	2	No. of Recipe Unit Procedure or of Unit: Identifies the active Control Recipe Unit Procedure or the related Unit (e.g. reactor, centrifuge, drier).
3	Operation	Unsigned16	2	No. of Recipe Operation: Identifies the active Control Recipe Operation.
4	Phase	Unsigned16	2	No. of Recipe Phase: Identifies the active Control Recipe Phase.

8.2.7 DS-68: Feature structure

This data structure consists of 2 elements describing the supported and currently enabled features.

E	Element Name	Data Type	Size	Description
1	Supported	OctetString	4	Fixed to 1: Condensed status
2	Enabled	OctetString	4	Fixed to 1: Condensed status

8.2.8 DS-101: Value & Status (Floating Point structure)

This data structure consists of the values and the state of the Floating-Point parameters. These parameters can be inputs or outputs.

E	Element Name	Data Type	Size	Description
1	Value	Float	4	floating point value (IEEE754)
2	Status	Unsigned8	1	Status, see chapter 3.5.6

8.2.9 DS-102: Value & Status (Discrete structure)

This data structure consists of the value and state of the discrete value parameters.

E	Element Name	Data Type	Size	Description
1	Value	Unsigned8	1	Discrete value: 0 or 1
2	Status	Unsigned8	1	Status, see chapter3.5.6

8.2.10 DATE_AND_TIME

DATE_AND_TIME Data length = 7 bytes (4 registers)									
Byte	Bit								Description
	7	6	5	4	3	2	1	0	
0	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	0 … 59999 ms
1	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	
2	0	0	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	0 … 59 min
3	S	0	0	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	Bits 0 to 4: 0 … 23 h S=0: standard time, S=1: summertime
4	2^{2}	2^{1}	2^{0}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	Bits 6 to 8: 1…7 day of week (1=Monday, 7=Sunday) Bits 1 to 5: 1…31 day of month
5	0	0	0	0	2^{3}	2^{2}	2^{1}	2^{0}	Month (1…12)
6	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	Year (0…255) / 0 = 1900
7	Padding								

8.2.11 DURATION

DURATION Data length = 7 bytes (4 registers)									
Byte	Bit								Description
	7	6	5	4	3	2	1	0	
0	2^{31}	2^{30}	2^{29}	2^{28}	2^{27}	2^{26}	2^{25}	2^{24}	Number of milliseconds (of one day)
1	2^{23}	2^{22}	2^{21}	2^{20}	2^{19}	2^{18}	2^{17}	2^{16}	
2	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	
3	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	
4	2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^{9}	2^{8}	Number of days
5	2^{7}	2^{6}	2^{5}	2^{4}	2^{3}	2^{2}	2^{1}	2^{0}	

8.3 Units

Unit code	Symbol	Name	Standard unit
1000	K	Kelvin	℃
1001	℃	Celsius	℃
1002	℉	Fahrenheit	℃
1005	°	Degree	°
1010	m	Meter	m
1011	km	KiloMeter	m
1012	cm	CentiMeter	m
1013	mm	MilliMeter	m
1015	nm	NanoMeter	m
1018	ft	Feet	m
1019	inch	Inch	m
1020	yd	Yards	m
1021	mi	Miles	m
1034	m³	CubicMeter	m³
1038	l	Liter	m³
1040	ml	MilliLiter	m³
1043	cf	CubicFeet	m³
1048	gal	Gallons	m³
1054	s	Seconds	s
1056	ms	MilliSeconds	s
1057	µs	MicroSeconds	s
1058	min	Minutes	s
1059	h	Hours	s
1060	d	Days	s
1061	m/s	MeterPerSecond	m/s
1062	mm/s	MilliMeterPerSecond	m/s
1063	m/h	MeterPerHour	m/s
1066	in/s	InchPerSecond	m/s
1067	ft/s	FeetPerSecond	m/s
1069	inch/min	InchPerMinute	m/s
1072	inch/h	InchPerHour	m/s
1077	Hz	Hertz	Hz
1083	1/min	OnePerMinute	Hz
1097	kg/m³	KiloGramPerCubicMeter	kg/m³
1103	kg/l	KiloGramPerLiter	kg/m³
1104	g/ml	GramPerMilliLiter	kg/m³
1105	g/l	GramPerLiter	kg/m³
1130	Pa	Pascal	Pa
1136	hPa	HectoPascal	Pa
1137	bar	Bar	Pa
1138	mbar	MilliBar	Pa
1209	A	Ampere	A
1211	mA	MilliAmpere	A
1212	µA	MicroAmpere	A
1213	nA	NanoAmpere	A
1214	pA	PicoAmpere	A
1221	Ah	AmpereHours	As
1240	V	Volt	V
1243	mV	MilliVolt	V
1244	µV	MicroVolt	V
1281	Ω	Ohm	Ω
1282	GΩ	GigaOhm	Ω
1283	MΩ	MegaOhm	Ω
1284	kΩ	KiloOhm	Ω
1285	mΩ	MilliOhm	Ω
1287	S	Siemens	S
1289	mS	MilliSiemens	S
1290	µS	MicroSiemens	S
1291	Ωm	OhmMeter	Ωm
1292	GΩm	GigaOhmMeter	Ωm
1293	MΩm	MegaOhmMeter	Ωm
1294	kΩm	KiloOhmMeter	Ωm

Unit code	Symbol	Name	Standard unit
1295	Ωcm	OhmCentiMeter	Ωm
1296	mΩm	MilliOhmMeter	Ωm
1297	µΩm	MicroOhmMeter	Ωm
1298	nΩm	NanoOhmMeter	Ωm
1299	S/m	SiemensPerMeter	S/m
1300	MS/m	MegaSiemensPerMeter	S/m
1301	kS/m	KiloSiemensPerMeter	S/m
1302	mS/cm	MilliSiemensPerCentiMeter	S/m
1303	µS/mm	MicroSiemensPerMilliMeter	S/m
1342	%	Percent	%
1347	m^3/s	CubicMeterPerSecond	m^3/s
1348	m^3/min	CubicMeterPerMinute	m^3/s
1349	m^3/h	CubicMeterPerHour	m^3/s
1350	m^3/d	CubicMeterPerDay	m^3/s
1351	l/s	LiterPerSecond	m^3/s
1352	l/min	LiterPerMinute	m^3/s
1353	l/h	LiterPerHour	m^3/s
1354	l/d	LiterPerDay	m^3/s
1356	cfs	CubicFeetPerSecond	m^3/s
1357	cfm	CubicFeetPerMinute	m^3/s
1358	cfh	CubicFeetPerHour	m^3/s
1359	cfd	CubicFeetPerDay	m^3/s
1362	gps	GallonPerSecond	m^3/s
1363	gpm	GallonPerMinute	m^3/s
1364	gph	GallonPerHour	m^3/s
1365	gpd	GallonPerDay	m^3/s
1366	mgd	MegaGallonPerDay	m^3/s
1388	kg/mol	KiloGramPerMol	kg/mol
1389	g/mol	GramPerMol	kg/mol
1397	mol/m^3	MolPerCubicMeter	mol/m^3
1399	mol/l	MolPerLiter	mol/m^3
1422	pH	PH	pH
1423	ppm	ppm	%
1424	ppb	ppb	%
1451	mgs	MegaGallonPerSecond	m^3/s
1455	mgm	MegaGallonPerMinute	m^3/s
1459	mgh	MegaGallonPerHour	m^3/s
1551	S/cm	SiemensPerCentiMeter	S/m
1552	µS/cm	MicroSiemensPerCentiMeter	S/m
1553	mS/m	MilliSiemensPerMeter	S/m
1554	µS/m	MicroSiemensPerMeter	S/m
1555	MΩcm	MegaOhmCentiMeter	Ωm
1556	kΩcm	KiloOhmCentiMeter	Ωm
1558	mg/l	MilliGramPerLiter	kg/m^3
1559	µg/l	MicroGramPerLiter	kg/m^3
1560	%SAT	PercentSaturation	%
1562	%Vol	PercentVol	%Vol
1563	ml/min	MilliLiterPerMinute	m^3/s
34000	K	DeltaKelvin	˚C
34001	˚C	DeltaCelsius	˚C
34002	˚F	DeltaFahrenheit	˚C
34003	%/K	PercentPerKelvin	%/K
34004	1/K	LfTempCompensation	1/K
34005	1/m	PerMeter	1/m
34006	V/pH	VoltPerPH	V/pH
34007	%/V	PercentPerVolt	%/V
34008	V/%	VoltPerPercent	V/%
34009	Pa/A	PascalPerAmpere	Pa/A
34010	A/Pa	AmperePerPascal	A/Pa
34011	month(s)	Month	month(s)
34012	$A/(kg/m^3)$	AmperePerKilogramPerCubicMeter	$A/(kg/m^3)$
34013	FNU	Formazine_Nephelometric	FNU
34014	rH	rH	rH
34015	g/kg	GramPerKilogram	g/kg
34016	PSU	PSU	PSU

Unit code	Symbol	Name	Standard unit
34017	KByte	Kilobytes	KByte
34018	å°¦	Dough	kg/m³
34019	nA/(mg/l)	NanoAmperePerMilligramPerLiter	A/(kg/m³)
34020	pA/(mg/l)	PicoAmperePerMilligramPerLiter	A/(kg/m³)
34021	EBC	European_Brewing_Convention	FNU
34022	ASBC	American_Society_of_Brewing_Chemists	FNU
34023	TE/F	Turbidity_Formazine	FNU
34024	FTU	Formazine_Turbidity_Unit	FNU
34025	mg/l	MilliGramPerLiterPercent	%
34026	AU	AbsorbanceUnit	AU
34027	%T	PercentTransmission	%T
34028	OD	OpticalDensity	AU
34030	eq	Equivalent	eq
34031	eq/m³	EquivalentPerCubicMeter	eq/m³
34032	eq/l	EquivalentPerLiter	eq/m³
34033	eq/gal	EquivalentPerGallon	eq/m³
34034	ppm	ppm_density1	kg/m³
34035	ppb	ppb_density1	kg/m³
34036	1/Pa	PerPascal	1/Pa
34037	°C/s	CelsiusPerSecond	°C/s
34038	°C/min	CelsiusPerMinute	°C/s
34039	FAU	FormazineAttenuationUnit	FNU
34040	As	AmpereSeconds	As
34041	mV/pH	MilliVoltPerPH	V/pH
34042	NTU	Nephelometric_Turbidity	FNU
34043	1/cm	PerCentiMeter	1/m
34044	1/hPa	PerHectoPascal	1/Pa
34045	1/MPa	PerMegaPascal	1/Pa
34046	1/mm	PerMilliMeter	1/m
34047	pA/hPa	PicoAmperePerHektoPascal	A/Pa
34048	µAs	MicroAmpereSeconds	As
34049	week(s)	Weeks	s
34050	inch/d	InchPerDay	m/s
34051	mm/d	MilliMeterPerDay	m/s
34052	mm/h	MilliMeterPerHour	m/s
34053	mm/min	MilliMeterPerMinute	m/s
34054	mV/%	MilliVoltPerPercent	V/%
34055	nAs	NanoAmpereSeconds	As
34056	nS/cm	NanoSiemensPerCentiMeter	S/m
34057	1/d	OnePerDay	Hz
34058	1/h	OnePerHour	Hz
34059	%/µV	PercentPerMicroVolt	%/V
34060	%/mV	PercentPerMilliVolt	%/V
34061	%TS	PerCentTS	kg/m³
34062	ppmVol	ppmVol	%Vol
34063	MByte	Megabytes	KByte
34064	GByte	Gigabytes	KByte
34065	dm	DeciMeter	m
34066	Byte	Bytes	KByte
34067	A/hPa	AmperePerHektoPascal	A/Pa

9 Parameter tables

9.1.1 Physical Block, Slot 0

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
17	ST_REV	R	UNSIGNED	2	X		The revision level of the static data associated with the block. The Static Revision No. is changed by the device each time data is written to the static parameter.
18	TAG_DESC	R/W	VISIBLESTRING	32	X		*Device tag* The TAG of the device. A recommended use is as a unique label for a field device in the plant. Default: TX:DeviceTAGDefault
19	STRATEGY	R/W	UNSIGNED	2	X		The strategy field can be used to help group blocks. These data are not checked or processed by the block.
20	ALERT_KEY	R/W	UNSIGNED	1	X		The alert parameter (0 - 255) has a user-assigned value which may be used in sorting alarms or events generated by a block.
21	TARGET_MODE	R/W	UNSIGNED	1	X		Defines the target mode of the block. Selection: 0: None 1: Remote output (ROUT) 2: Remote cascade (RCAS) 4: Cascade (CAS) 8: AUTO 16: MAN 32: Local override (LO) 64: Initialization manual (IMan) 128: Out of Service (O/S)
22	MODE_BLK	R	DS37	3			This parameter contains the current mode, the permitted and normal mode of the block.
23	ALARM_SUM	R	DS42	8			This parameter contains the current states of the block alarms.
24	SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of the device
25	HARDWARE_REVISION	R	VISIBLESTRING	16			Hardware version of the device
26	DEVICE_MAN_ID	R	UNSIGNED	2			Identification code of the manufacturer of the field device. Endress+Hauser hast the manufacurer-id 17.
27	DEVICE_ID	R	VISIBLESTRING	16			Manufacturer specific identification of the device.

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
28	DEVICE_SER_NUM	R	VISIBLESTRING	16			*Serial number* Serial number of the device
29	DIAGNOSIS	R	OCTETSTRING	4			Detailed status information about the field device's operating condition. Health of device (not process). Coded bit-by-bit. More than one message possible at once.
30	DIAGNOSIS_EXTENSION	R	OCTETSTRING	6			Additional manufacturer-specific information of the device, coded bit-by-bit. More than one message possible at once.
31	DIAGNOSIS_MASK	R	OCTETSTRING	4			Definition of supported DIAGNOSIS information-bits. Diagnosis Mask: Definition of supported Diagnosis information bits. Selection: 0: not supported 1: supported
32	DIAGNOSIS_MASK_EXTENSION	R	OCTETSTRING	6			Definition of supported Diagnosis extension bits.
33	DEVICE_CERTIFICATION	R	VISIBLESTRING	32			Not supported
34	WRITE_LOCKING	R	UNSIGNED	2			Not supported
35	FACTORY_RESET	R/W	UNSIGNED	2			Command for setting device for default value. Selection: 0: No function 1: Factory reset 2506: Warm start 2712: Reset Address to '126'
36	DESCRIPTOR	R/W	VISIBLESTRING	32	X		Text that is associated with the Field Device. This text can be used by the user in any way. There is no specific recommended use.
37	DEVICE_MESSAGE	R/W	VISIBLESTRING	32	X		Text that is associated with the Field Device. This text can be used by the user in any way. There is no recommended use.
38	DEVICE_INSTAL_DATE	R/W	VISIBLESTRING	16	X		Date, on which the device was installed.
39	LOCAL_OP_ENA	R/W	UNSIGNED	1			If communication fails for a time greater 30 sec, local operation will be enabled automatically. Selection: 0: Disabled 1: Enabled Default: false
40	IDENT_NUMBER_SELECTOR	R/W	UNSIGNED	1	X		*Ident number* Each PROFIBUS-DP device has an Ident_Number provided by the PNO. The user is able to chose one of both using this parameter. Default: 0 Selection:

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							0: Automatic 1: PA-Profile 3.02 (9760) 2: Liquiline CM44x (155D) 3: Liquistation CSFxx (155C) 4: Liquiport CSPxx (155E) 5: Manufacturer specific 6: Liquiline System CA80
41	HW_WRITE_PROTECTION	R	UNSIGNED	1			Indicates the position of a write blocking mechanism which can not be modified by remote access (DIP-Switch Pos. 9). 0: Unprotected 1: Protected
42	FEATURE	R	DS68	8			Not used
43	COND_STATUS_DIAG	R/W	UNSIGNED	1	X		Defines the general method how the whole device handles status and diagnostics. Selection: 1: Condensed status and diagnosis information
64	CURRENT_ERROR	R	UNSIGNED	2			This parameter contains the device specific three digit diagnostic code. When more than one error is active the error with the highest priority is available in this parameter. Default: 0
69	LAST_ERROR	R	UNSIGNED	2			This parameter contains the error/warning code that disappeared last. Default: 0
74	DEVICE_BUS_ADDRESS	R	UNSIGNED	1	X		*Bus address* Default: 126 Range: 0.0 .. 126.0
75	PROFILE_REVISION	R	OCTETSTRING	32			Implemented PA Profile revision.
76	CLEAR_LAST_ERROR	R/W	UNSIGNED	1			Writing the parameter clears the last diagnostic code in CURRENT_ERROR Default: 0 Selection: 0: No 1: Yes
77	IDENT_NUMBER	R	UNSIGNED	2	X		Active PROFIBUS Identnumber in decimal notation. Default: 0
83	ORDER_CODE	R	VISIBLESTRING	32			*Order code*
85	ENP_VERSION	R	VISIBLESTRING	16			*ENP version* Version of the ENP (electronic name plate).

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
86	EXTENTED_ORDER_CODE	R	VISIBLESTRING	60	X		*Current order code ext.* Current extended ordercode of the device
87	DEVICE_DIAGNOSIS	R	OCTETSTRING	58			Not used
88	SERVICE_LOCKING	R/W	UNSIGNED	2	X		Not used
92	DPV0_MASTER	R	UNSIGNED	1			Default: 255
93	DPV0_WATCHDOG_TIMEOUT	R	UNSIGNED	4			Default: 0
94	BUS_ADDRESS_SW_HW	R	UNSIGNED	1			Default: true
95	DPV0_FAULT	R	UNSIGNED	1			Default: 0 Selection: 0: No fault 1: Param fault 2: Config fault 3: Param & config fault
96	BAUDRATE	R	UNSIGNED	1			Default: 0 Selection: 0: Not detected 1: 9.6 kBit/s 2: 19.2 kBit/s 3: 31.25 kBit/s 4: 45.45 kBit/s 5: 93.75 kBit/s 6: 187.5 kBit/s 7: 500 kBit/s 8: 1.5 MBit/s 9: 3 MBit/s 10: 6 MBit/s 11: 12 MBit/s
97	DPV0_STATE	R	UNSIGNED	1			State of PROFIBUS DP state machine Default: 0 Selection: 0: Wait for param 1: Wait for config 2: Data exchange

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
98	EXECUTION_INTERVAL	R	UNSIGNED	2	X		Internal use
99	GLOBAL_STATUS	R	UNSIGNED	1			Overall status signal of the device and the connected sensors. Selection: 0: Ok 1: F = Failure 2: C = Function check 4: M = Maintenance required 8: S = Out of specification
100	CURRENT_DIAG_SOURCETYPE	R	UNSIGNED8	1			Current sensor-diagnosis : component Default: 0 Selection: 0: General 1: Temperature Input 2: Binary Input 3: Binary Output 4: Current Input 5: Current Output 6: Relay 7: Memosens Sensor 8: PID Controller 9: Cleaning 10: Limit switch 11: Mathematical functions 12: Binary Input Module 13: Binary Output Module 14: Sample point
101	CURRENT_DIAG_MODUL	R	UNSIGNED	1			Most important device-related diagnosis : connection ID Default: 0 Selection: 0: Slot 1 1: Slot 1 2: Slot 2 3: Slot 3 4: Slot 4 5: Slot 5 6: Slot 6 7: Slot 7 8: Sampler 9: Software 10: Analyzer

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
102	CURRENT_DIAG_PORT	R	UNSIGNED	1			Most important device-related diagnosis : connection ID Default: 0
103	CURRENT_DIAG_NE107_STATUS	R	UNSIGNED	1			Most important device-related diagnosis : status according to NAMUR NE107 Default: 0
105	CURRENT_DIAG_TIMESTAMP	R	DATE_AND_TIME	7			Most important device-related diagnosis : time of diagnosis appearance Default: 0
106	NUMBER_ADDITIONAL_DIAG	R	UNSIGNED	1			Nummber of additional device-related diagnosis messages Default: 0
107	LAST_DIAG_SOURCETYPE	R	UNSIGNED8	1			Past device-diagnosis : component Default: 0 Selection: 0: General 1: Temperature input 2: Binary input 3: Binary output 4: Current input 5: Current output 6: Relay 7: Memosens sensor 8: Controller 9: Cleaning 10: Limit switch 11: Mathematic function 12: Binary input module 13: Binary output module 14: Sample point
108	LAST_DIAG_MODUL	R	UNSIGNED	1			Past device-diagnosis : name of module Default: 0 Selection: 0: Slot 1 1: Slot 1 2: Slot 2 3: Slot 3 4: Slot 4 5: Slot 5 6: Slot 6 7: Slot 7 8: Sampler 9: Software 10: Analyzer

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
109	LAST_DIAG_PORT	R	UNSIGNED	1			Past device-diagnosis: port Default: 0
110	LAST_DIAG_NE107_STATUS	R	UNSIGNED	1			Past device-diagnosis : status according to NAMUR NE107 Default: 0
112	LAST_DIAG_TIMESTAMP	R	DATE_AND_TIME	7			Past device-diagnosis : time of diagnosis apperance Default: 0
132	DISPLAY_SER_NUM	R	VISIBLESTRING	16			Serial number of the device display
133	POWER_SUPPLY_SER_NUM	R	VISIBLESTRING	16			Serial number of integrated power supply
134	CPU_SER_NUM	R	VISIBLESTRING	16			Serial of sub-rack
135	BASE_MODUL_SER_NUM	R	VISIBLESTRING	16			Serial of base module
136	FMSY1_MODUL_SER_NUM	R	VISIBLESTRING	16			Serial number of 'FXAB1' module
137	EXTENSION_MODUL_1_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
138	EXTENSION_MODUL_2_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
139	EXTENSION_MODUL_3_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
140	EXTENSION_MODUL_4_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
141	EXTENSION_MODUL_5_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
142	EXTENSION_MODUL_6_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
143	EXTENSION_MODUL_7_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
144	EXTENSION_MODUL_8_SER_NUM	R	VISIBLESTRING	16			Serial number of extension module
145	SENSOR_1_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
146	SENSOR_2_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
147	SENSOR_3_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
148	SENSOR_4_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
149	SENSOR_5_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
150	SENSOR_6_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
151	SENSOR_7_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
152	SENSOR_8_SER_NUM	R	VISIBLESTRING	16			Serial number of the sensor
153	SENSOR_1_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor
154	SENSOR_2_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
155	SENSOR_3_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor
156	SENSOR_4_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor
157	SENSOR_5_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor
158	SENSOR_6_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor
159	SENSOR_7_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor
160	SENSOR_8_SOFTWARE_REVISION	R	VISIBLESTRING	16			Software version of connected sensor
171	UDL_FEATURE	R	UNSIGNED	2			Internal use
172	UDL_REVISION	R	UNSIGNED	2			Internal use
173	UDL_OP_CODE	R/W	UNSIGNED	2			Internal use
174	UDL_STATUS	R	UNSIGNED	2			Internal use Default: 33111
175	UDL_VERI_DELAY	R	UNSIGNED	2	X		Internal use
176	UTC_ZONE	R	UNSIGNED	1	X		*Time zone* Default: 14 Selection: 0: Baker Island 1: Midway Island, Samoa 2: Hawaii 3: Alaska 4: Los Angeles, Vancouver 5: Denver, Phoenix 6: Chicago, Mexico City 7: New York, Toronto 8: Caracas, La Paz 9: Newfoundland 10: Buenos Aires, Brasilia 11: Mid Atlantic 12: Kap Verde 13: London, Lisbon 14: --- 15: Berlin, Rome, Paris 16: Athens, Cairo, Kiew 17: Kuwait, Moscow 18: Abu Dhabi, Tiflis 19: Kabul 20: Islamabad, Karatsch 21: New Delhi

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							22: Kathmandu 23: Astana, Dhaka 24: Pyinmana, CoconutIsland 25: Bankok, Jakarta 26: Singapur, Peking 27: Seoul, Tokio 28: Adelaide, Darwin 29: Brisbane, Canberra 30: Magadan, Salomon Islands 31: Norfolk Island 32: Auckland, Wellington 33: Chatham Islands 34: Nuku Alofa 35: Christmas Island
177	DAYLIGHT_SAVING_ACTIVE	R	UNSIGNED8	1	X		Summertime Selection: 0: Normal time 1: Summer time Default: false
178	BUS_ADDRESS_LOCKED	R	UNSIGNED8	1			Internal use Default: false
179	BUS_TERMINATION	R	UNSIGNED	1			State of bus termination Default: 0 Selection: 0: Off 1: On
180	PROFIBUS_ENABLED	R	UNSIGNED	1	X		*Fieldbus enable* Default: 1 Selection: 0: Off 1: On
181	DEVICE_ID_NUM	R	UNSIGNED	1			Manufacturer specific identification of the device. Default: 0 Selection: 0: Liquiline CM442 1: Liquiline CM448 2: Liquiport CSP44 3: Liquistation CSF48 4: Liquistation CSF22 5: Liquistation CSF33

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							6: Liquiline System CA80 7: Liquistation CSF34 8: Liquistation CSF39 9: Liquiline CM44P
182	INTERNAL_PARAMETER_1	R	OCTETSTRING	16	X		Internal use
183	ORDER_CODE_AS_DELIVERED	R	VISIBLESTRING	60			*Orig. order code ext.*
184	RTC_DATETIME	R	DATE_AND_TIME	7			*Date/Time*
185	RTC_SETDATETIME	R/W	DATE_AND_TIME	7			*Date/Time* Real-Time Clock Default: 2009-01-01T12:00:00
186	REV_COUNTER_IM0	R	UNSIGNED	2	X		Not supported
212	HEARTBEAT_DEVICE_STATUS	R	DS60	12		%	Heartbeat status device
213	HEARTBEAT_DEVICE_STATUS_UNIT	R	UNSIGNED	2			
214	HEARTBEAT_DEVICE_STATUS_RANGE	R	DS61	8			
215	HEARTBEAT_DEVICE_HEALTH_CONDITION	R	DS60	12		%	Heartbeat health device
216	HEARTBEAT_DEVICE_HEALTH_CONDITION_UNIT	R	UNSIGNED	2			
217	HEARTBEAT_DEVICE_HEALTH_CONDITION_RANGE	R	DS61	8			
218	MAINTENANCE_TIMER_VALUE	R	DS60	12		%	Heartbeat maintenance timer device
219	MAINTENANCE_TIMER_VALUE_UNIT	R	UNSIGNED	2			
220	MAINTENANCE_TIMER_VALUE_RANGE	R	DS61	8			
221	HEARTBEAT_INDEX_DEVICE	R	DS60	12		%	Heartbeat index device
222	HEARTBEAT_INDEX_DEVICE_UNIT	R	UNSIGNED	2			
223	HEARTBEAT_INDEX_DEVICE_RANGE	R	DS61	8			
224	KEY_PERF_INDICATOR_DEVICE_OPERATING_TIME_TOTAL	R	DURATION	6	X		The total operating time since commissioning
225	KEY_PERF_INDICATOR_DEVICE_AVAILABILITY	R	FLOAT32	4		%	(Operating time - Time in failure) / Operating time * 100 % Default: 100.0
226	KEY_PERF_INDICATOR_DEVICE_OPERATING_TIME	R	DURATION	6	X		The operating time since reset
227	KEY_PERF_INDICATOR_DEVICE_TIME_IN_FAILURE	R	DURATION	6	X		Operating time with NAMUR F status signal
228	KEY_PERF_INDICATOR_DEVICE_NUMBER_OF_FAILURES	R	UNSIGNED	2	X		Number of failure diagnostic messages Default: 0
229	KEY_PERF_INDICATOR_DEVICE_MTBF	R	DURATION	6			Mean time between failures

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
230	KEY_PERF_INDICATOR_DEVICE_MTTR	R	DURATION	6			Mean time to repair

9.1.2 Funktionblocks

9.1.2.1 Analog Input (AI1-16), Slot 1-16

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
17	ST_REV	R	UNSIGNED	2	X		The revision level of the static data associated with the block. The Static Revision No. is changed by the device each time data is written to the static parameter.
18	TAG_DESC	R/W	VISIBLESTRING	32	X		Text; can be used in any way.
19	STRATEGY	R/W	UNSIGNED	2	X		The strategy field can be used to help group blocks. These data are not checked or processed by the block.
20	ALERT_KEY	R/W	UNSIGNED	1	X		The alert parameter (0 - 255) has a user-assigned value which may be used in sorting alarms or events generated by a block.
21	TARGET_MODE	R/W	UNSIGNED	1	X		Defines the target mode of the block. Selection: 0: None 1: Remote output (ROUT) 2: Remote cascade (RCAS) 4: Cascade (CAS) 8: AUTO 16: MAN 32: Local override (LO) 64: Initialization manual (IMan) 128: Out of Service (O/S)
22	MODE_BLK	R	DS37	3			This parameter contains the current mode, the permitted and normal mode of the block.
23	ALARM_SUM	R	DS42	8			This parameter contains the current states of the block alarms.
24	BATCH	R/W	DS67	10	X		This parameter is intended to be used in Batch applications in line with IEC 61512 Part1.
26	OUT	R	DS101	5			The Function Block parameter OUT contains the current measurement value in a vendor specific or configuration adjusted engineering unit and the belonging state in AUTO MODE. The Function Block parameter OUT contains the value and status set by an operator in MAN MODE.
27	PV_SCALE	R/W	DS61	8	X		This parameter contains the time constant for the rise time of the output up to a value of 63.21% resulting from a jump at the filter input. The engineering unit of this parameter is always seconds.
28	OUT_SCALE	R/W	DS36	11	X		Scale of the Process Variable. \n The Function Block parameter OUT_SCALE contains the values of the lower limit and upper limit effective range, the code number of the engineering unit of Process Variable and the number of digits on the right hand side of the decimal point.
29	LIN_TYPE	R/W	UNSIGNED	1	X		Selects the type of linearization. The selection LINEAR means no linearization. Selection: 0: Linear

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
30	CHANNEL	R/W	UNSIGNED	2	X		The number of the hardware channel that is connected to this function block. It defines the associated transducer block.
32	PV_FTIME	R/W	FLOAT32	4	X		Time in seconds from detection of failure of the actual used set point to the action of the block if the condition still exists.
33	FSAFE_TYPE	R/W	UNSIGNED	1	X		Fail safe mode: Defines reaction of device if failure of the actual used setpoint is still detected after 'Fail safe time' or if the status of the actual used setpoint is 'Initiate fail safe'. Selection: 0: Default value is used as output value. 1: Storing last valid Output Value. 2: The calculated output value is incorrect.
34	FSAFE_VALUE	R/W	FLOAT32	4	X		Default value for the OUT parameter, if sensor or sensor electronic fault is detected. The unit of this parameter is the same as the OUT one.
35	ALARM_HYS	R/W	FLOAT32	4	X		Hysteresis expressed in the engineering units of the output value scale. An alarm occurs when a value exceeds an upper limit. The alarm's status remains true until the value drops below the limit minus the alarm hysteresis. The directions are reversed for low limit detection. The hysteresis is also used for the warnings.
37	HI_HI_LIM	R/W	FLOAT32	4	X		The setting for the upper alarm limit in engineering units.
39	HI_LIM	R/W	FLOAT32	4	X		The setting for the upper warning limit in engineering units.
41	LO_LIM	R/W	FLOAT32	4	X		The setting for the lower warning limit in engineering units.
43	LO_LO_LIM	R/W	FLOAT32	4	X		The setting for the lower alarm limit in engineering units.
50	SIMULATE	R/W	DS50	6	X		For commissioning and test purposes the input value from the Transducer Block in the Analog Input Function Block AI-FB can be modified. That means that the Transducer and AI-FB will be disconnected.
51	OUT_UNIT_TEXT	R/W	OCTETSTRING	16			Not supported

9.1.2.2 Discrete Input (DI1-8), Slot 17-24

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
17	ST_REV	R	UNSIGNED	2	X		The revision level of the static data associated with the block. The Static Revision No. is changed by the device each time data is written to the static parameter.
18	TAG_DESC	R/W	VISIBLESTRING	32	X		Text; can be used in any way.
19	STRATEGY	R/W	UNSIGNED	2	X		The strategy field can be used to help group blocks. These data are not checked or processed by the block.
20	ALERT_KEY	R/W	UNSIGNED	1	X		The alert parameter (0 - 255) has a user-assigned value which may be used in sorting alarms or events generated by a block.
21	TARGET_MODE	R/W	UNSIGNED	1	X		Defines the target mode of the block. Selection: 0: None

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							1: Remote output (ROUT) 2: Remote cascade (RCAS) 4: Cascade (CAS) 8: AUTO 16: MAN 32: Local override (LO) 64: Initialization manual (IMan) 128: Out of Service (O/S)
22	MODE_BLK	R	DS37	3			This parameter contains the current mode, the permitted and normal mode of the block.
23	ALARM_SUM	R	DS42	8			This parameter contains the current states of the block alarms.
24	BATCH	R/W	DS67	10	X		This parameter is intended to be used in Batch applications in line with IEC 61512 Part1.
26	OUT_D	R	DS102	2			OUT_D is the output of the Function Block. The value is specified by the operator in MODE Man.
30	CHANNEL	R/W	UNSIGNED	2	X		Reference to the active Transducer Block which provides the measurement value to the Function Block.
31	INVERT	R/W	UNSIGNED	1	X		Indicates whether the input value of the PV_D should be logically inverted before it is stored in the OUT_D. Selection: 0: Not inverted 1: Inverted
36	FSAFE_TYPE	R/W	UNSIGNED	1	X		Fail safe mode: Defines reaction of device if failure of the actual used setpoint is still detected after 'Fail safe time' or if the status of the actual used setpoint is 'Initiate fail safe'. Selection: 0: Default value is used as output value. 1: Storing last valid Output Value. 2: The calculated output value is incorrect.
37	FSAFE_VALUE_D	R/W	UNSIGNED	1	X		Default value for the OUT_D parameter, if a sensor or sensor electronic fault is detected. The unit of this parameter is the same like the OUT_D one.
40	SIMULATE_D	R/W	DS51	3	X		For commissioning and test purposes the input value from the Transducer Block in the Discrete Input Function Block DI-FB can be modified.

9.1.2.3 Analog Output (AO1-4), Slot 25-28

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
17	ST_REV	R	UNSIGNED	2	X		The revision level of the static data associated with the block. The Static Revision No. is changed by the device each time data is written to the static parameter.
18	TAG_DESC	R/W	VISIBLESTRING	32	X		Text; can be used in any way.
19	STRATEGY	R/W	UNSIGNED	2	X		The strategy field can be used to help group blocks. These data are not checked or processed by the block.

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
20	ALERT_KEY	R/W	UNSIGNED	1	X		The alert parameter (0 - 255) has a user-assigned value which may be used in sorting alarms or events generated by a block.
21	TARGET_MODE	R/W	UNSIGNED	1	X		Defines the target mode of the block. Selection: 0: None 1: Remote output (ROUT) 2: Remote cascade (RCAS) 4: Cascade (CAS) 8: AUTO 16: MAN 32: Local override (LO) 64: Initialization manual (IMan) 128: Out of Service (O/S)
22	MODE_BLK	R	DS37	3			This parameter contains the current mode, the permitted and normal mode of the block.
23	ALARM_SUM	R	DS42	8			Not used
24	BATCH	R/W	DS67	10	X		This parameter is intended to be used in Batch applications in line with IEC 61512 Part1.
25	SP	R/W	DS101	5			Setpoint
27	PV_SCALE	R/W	DS36	11	X		Conversion of the PV in engineering units to PV in percent as the input value of the Function Block. It consists of the high and low scale values, engineering unit code, and number of digits to the right of the decimal point.
28	READBACK	R	DS101	5			Not used
30	RCAS_IN	R	DS101	5			Not used
37	IN_CHANNEL	R/W	UNSIGNED	2	X		Reference to the active Transducer Block and its parameter.
38	OUT_CHANNEL	R/W	UNSIGNED	2	X		Reference to the active Transducer Block and its parameter which consumes the output value of this function block.
39	FSAFE_TIME	R/W	FLOAT32	4	X		Time in seconds from detection of failure of the actual used set point to the action of the block if the condition still exists.
40	FSAFE_TYPE	R/W	UNSIGNED	1	X		Defines reaction of device if communication fault is still detected after fail safe time. Selection: 0: Fail Safe Value is used as control regulator input 1: Storing last valid setpoint. 2: Actuator goes to fail-safe position
41	FSAFE_VALUE	R/W	FLOAT32	4	X		Default Value for the setpoint input if communication fault is detected.
43	RCAS_OUT	R	DS101	5			Not supported
47	POS_D	R	DS102	2			Not used
48	SETP_DEVIATION	R	FLOAT32	4			Not supported
49	CHECK_BACK	R	OCTETSTRING	3			Not used

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
50	CHECK_BACK_MASK	R	OCTETSTRING	3			Not used
51	SIMULATE	R/W	DS50	6	X		Simulation Value: For commissioning and maintenance reasons, it is possible to simulate the Readback by defining the value and the status. That means that the Transducer Block and the Function Block will be disconnected.
52	INCREASE_CLOSE	R/W	UNSIGNED	1	X		Not used
53	OUT	R/W	DS101	5			This parameter is the process variable of the analog output block in engineering units in AUTO and RCas mode and is the value specified by the operator/engineer in Man and LO mode.
54	OUT_SCALE	R/W	DS36	11	X		Conversion of the OUT of the Function Block in percent to OUT in engineering units as the output value of the Function Block. The high and low scale values, engineering unit code, and the number of digits to the right of the decimal point

9.1.2.4 Discrete Output (DO1-8), Slot 29-36

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
17	ST_REV	R	UNSIGNED	2	X		The revision level of the static data associated with the block. The Static Revision No. is changed by the device each time data is written to the static parameter.
18	TAG_DESC	R/W	VISIBLESTRING	32	X		Text; can be used in any way.
19	STRATEGY	R/W	UNSIGNED	2	X		The strategy field can be used to help group blocks. These data are not checked or processed by the block.
20	ALERT_KEY	R/W	UNSIGNED	1	X		The alert parameter (0 - 255) has a user-assigned value which may be used in sorting alarms or events generated by a block.
21	TARGET_MODE	R/W	UNSIGNED	1	X		Defines the target mode of the block. Selection: 0: None 1: Remote output (ROUT) 2: Remote cascade (RCAS) 4: Cascade (CAS) 8: AUTO 16: MAN 32: Local override (LO) 64: Initialization manual (IMan) 128: Out of Service (O/S)
22	MODE_BLK	R	DS37	3			This parameter contains the current mode, the permitted and normal mode of the block.
23	ALARM_SUM	R	DS42	8			Not used
24	BATCH	R/W	DS67	10	X		This parameter is intended to be used in Batch applications in line with IEC 61512 Part1.
25	SP_D	R/W	DS102	2			Set point of Function Block used in MODE AUTO.
26	OUT_D	R/W	DS102	2			This parameter is the process variable of the discrete output block in AUTO.

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
28	READBACK_D	R	DS102	2			Not used
30	RCAS_IN_D	R	DS102	2			Not used
33	IN_CHANNEL	R/W	UNSIGNED	2	X		Reference to the active Transducer Block and its parameter which consumes the output value of this function block.
34	INVERT	R/W	UNSIGNED	1	X		Indicates whether the setpoint should be inverted before it is stored.
35	FSAFE_TIME	R/W	FLOAT32	4			Time in seconds from detection of failure of the actual used set point to the action of the block if the condition still exists.
36	FSAFE_TYPE	R/W	UNSIGNED	1			Fail safe mode: Defines reaction of device if failure of the actual used setpoint is still detected after 'Fail safe time' or if the status of the actual used setpoint is 'Initiate fail safe'. Selection: 0: Default value is used as output value. 1: Storing last valid Output Value. 2: The calculated output value is incorrect.
37	FSAFE_VAL_D	R/W	UNSIGNED	1	X		Default value for the OUT parameter, if sensor or sensor electronic fault is detected. The unit of this parameter is the same as the OUT one.
38	RCAS_OUT_D	R	DS102	2			Not used
40	SIMULATE_D	R/W	DS51	3	X		For commissioning and maintenance reasons, it is possible to simulate the READBACK by defining the value and the status.
49	CHECK_BACK	R	OCTETSTRING	3			Not used
50	CHECK_BACK_MASK	R	OCTETSTRING	3			Not used
51	OUT_CHANNEL	R/W	UNSIGNED	2	X		Reference to the active Transducer Block and its parameter which provides the postioning value for the final control element.

9.1.3 Transducerblocks

9.1.3.1 I/O, Slot 33

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
78	OUT_01	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
79	OUT_01_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
80	OUT_01_RANGE	R	DS61	8	X		Range of process value OUT.
81	OUT_01_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
82	OUT_02	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
83	OUT_02_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
84	OUT_02_RANGE	R	DS61	8	X		Range of process value OUT.
85	OUT_02_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
86	OUT_03	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
87	OUT_03_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
88	OUT_03_RANGE	R	DS61	8	X		Range of process value OUT.
89	OUT_03_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
90	OUT_04	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
91	OUT_04_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
92	OUT_04_RANGE	R	DS61	8	X		Range of process value OUT.
93	OUT_04_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
94	OUT_05	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
95	OUT_05_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
96	OUT_05_RANGE	R	DS61	8	X		Range of process value OUT.
97	OUT_05_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
98	OUT_06	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
99	OUT_06_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
100	OUT_06_RANGE	R	DS61	8	X		Range of process value OUT.
101	OUT_06_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
102	OUT_07	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
103	OUT_07_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
104	OUT_07_RANGE	R	DS61	8	X		Range of process value OUT.
105	OUT_07_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
106	OUT_08	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
107	OUT_08_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
108	OUT_08_RANGE	R	DS61	8	X		Range of process value OUT.
109	OUT_08_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
110	OUT_09	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
111	OUT_09_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
112	OUT_09_RANGE	R	DS61	8	X		Range of process value OUT.
113	OUT_09_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
114	OUT_10	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
115	OUT_10_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
116	OUT_10_RANGE	R	DS61	8	X		Range of process value OUT.
117	OUT_10_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
118	OUT_11	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
119	OUT_11_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
120	OUT_11_RANGE	R	DS61	8	X		Range of process value OUT.
121	OUT_11_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
122	OUT_12	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
123	OUT_12_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
124	OUT_12_RANGE	R	DS61	8	X		Range of process value OUT.
125	OUT_12_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
126	OUT_13	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
127	OUT_13_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
128	OUT_13_RANGE	R	DS61	8	X		Range of process value OUT.
129	OUT_13_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
130	OUT_14	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
131	OUT_14_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
132	OUT_14_RANGE	R	DS61	8	X		Range of process value OUT.
133	OUT_14_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
134	OUT_15	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
135	OUT_15_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
136	OUT_15_RANGE	R	DS61	8	X		Range of process value OUT.
137	OUT_15_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
138	OUT_16	R	DS60	12			Measurement value of sensor or other analog value. This parameter is connected to the Analog Input Function Block (AI) with the same number.
139	OUT_16_UNIT	R	UNSIGNED	2	X		Engineering unit of process value OUT.
140	OUT_16_RANGE	R	DS61	8	X		Range of process value OUT.
141	OUT_16_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
142	OUT_D_01	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.
143	OUT_D_01_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
144	OUT_D_02	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.
145	OUT_D_02_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
146	OUT_D_03	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
147	OUT_D_03_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
148	OUT_D_04	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.
149	OUT_D_04_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
150	OUT_D_05	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.
151	OUT_D_05_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
152	OUT_D_06	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.
153	OUT_D_06_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
154	OUT_D_07	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.
155	OUT_D_07_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
156	OUT_D_08	R	DS102	2			Discrete process value, e.g. state of relay output. This parameter is connected to the Digital Input Function Block (DI) with the same number.
157	OUT_D_08_DESCR	R	VISIBLESTRING	60			Description of the data source for the value.
158	SP_01	R/W	DS101	5			Analog setpoint. This parameter is connected to an Analog Output Function Block (AO) with the same number.
159	SP_01_UNIT	R	UNSIGNED	2	X		Engineering unit of the setpoint SP.
160	SP_01_RANGE	R	DS61	8	X		Range (min, max) of the setpoint SP.
161	SP_01_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
162	SP_02	R/W	DS101	5			Analog setpoint. This parameter is connected to an Analog Output Function Block (AO) with the same number.
163	SP_02_UNIT	R	UNSIGNED	2	X		Engineering unit of the setpoint SP.
164	SP_02_RANGE	R	DS61	8	X		Range (min, max) of the setpoint SP.
165	SP_02_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
166	SP_03	R/W	DS101	5			Analog setpoint. This parameter is connected to an Analog Output Function Block (AO) with the same number.
167	SP_03_UNIT	R	UNSIGNED	2	X		Engineering unit of the setpoint SP.
168	SP_03_RANGE	R	DS61	8	X		Range (min, max) of the setpoint SP.
169	SP_03_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
170	SP_04	R/W	DS101	5			Analog setpoint. This parameter is connected to an Analog Output Function Block (AO) with the same number.
171	SP_04_UNIT	R	UNSIGNED	2	X		Engineering unit of the setpoint SP.

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
172	SP_04_RANGE	R	DS61	8	X		Range (min, max) of the setpoint SP.
173	SP_04_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
174	SP_D_01	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
175	SP_D_01_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
176	SP_D_02	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
177	SP_D_02_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
178	SP_D_03	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
179	SP_D_03_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
180	SP_D_04	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
181	SP_D_04_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
182	SP_D_05	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
183	SP_D_05_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
184	SP_D_06	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
185	SP_D_06_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
186	SP_D_07	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
187	SP_D_07_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.
188	SP_D_08	R/W	DS102	2			Discrete setpoint. Values >=1 are interpreted as 1. This parameter is connected to a Discrete Output Function Block (DO) with the same number.
189	SP_D_08_DESCR	R/W	VISIBLESTRING	32	X		User defined description of the data sink for the value.

9.1.3.2 Sensor 1-8, Slot 1-8

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
78	SENSOR_ENABLE	R	UNSIGNED	1	X		*Port activation state* Activation of sensor channel Default: 0 Selection: 0: On 1: Off
79	ACTIVE_SENSOR_TYPE	R/W	UNSIGNED	1	X		*Sensor type* Selected sensor type. The selected type has to match with the connected sensor type. Default: 0 Selection: 0: --- 1: Oxygen (amp.) 2: Oxygen (opt.) 3: pH Glass 5: pH ISFET 6: Cond c 7: Cond i 8: ORP 9: TU/TS 10: Nitrate 11: ISE 12: SAC 13: Ultrasonic interface 14: Chlorine (CCS142D) 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt.) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer
80	CONNECTED_SENSOR_TYPE	R	UNSIGNED	1	X		*Sensor type* Connected sensor type Default: 0 Selection: 0: --- 1: Oxygen (amp.) 2: Oxygen (opt.)

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							3: pH Glass 5: pH ISFET 6: Cond c 7: Cond i 8: ORP 9: TU/TS 10: Nitrate 11: ISE 12: SAC 13: Ultrasonic interface 14: Chlorine (CCS142D) 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt.) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer
81	SENSOR_TAG	R	VISIBLESTRING	32			*Tag* Sensor description/TAG
82	SENSOR_SERIAL	R	VISIBLESTRING	16			*Serial number* Serial number of the sensor
83	SENSOR_HW_VERSION	R	VISIBLESTRING	16			*Hardware version* Hardware version of connected sensor
84	SENSOR_SW_VERSION	R	VISIBLESTRING	16			*Software version* Software version of connected sensor
85	CURRENT_DIAG_SOURCETYPE	R	UNSIGNED8	1			Default: 0 Selection: 0: General 1: Temperature Input 2: Binary Input 3: Binary Output 4: Current Input 5: Current Output 6: Relay 7: Memosens Sensor 8: PID Controller 9: Cleaning

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							10: Limit switch 11: Binary formula result 12: Binary Input Module 13: Binary Output Module 14: Sample point
86	CURRENT_DIAG_MODUL	R	UNSIGNED	1			Default: 0 Selection: 0: Slot 1 1: Slot 1 2: Slot 2 3: Slot 3 4: Slot 4 5: Slot 5 6: Slot 6 7: Slot 7 8: Sampler 9: Software 10: Analyzer
87	CURRENT_DIAG_PORT	R	UNSIGNED	1			Default: 0
88	CURRENT_DIAG_NE107_STATUS	R	UNSIGNED	1			Default: 0
89	CURRENT_DIAG_CODE	R	UNSIGNED	2			Current sensor-diagnosis : diagnosis code Default: 0
90	CURRENT_DIAG_TIMESTAMP	R	DATE_AND_TIME	7			Default: 0
91	NUMBER_ADDITIONAL_DIAG	R	UNSIGNED	1			Default: 0
92	LAST_DIAG_SOURCETYPE	R	UNSIGNED8	1			Default: 0 Selection: 0: General 1: Temperature Input 2: Binary Input 3: Binary Output 4: Current Input 5: Current Output 6: Relay

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							7: Memosens Sensor 8: PID Controller 9: Cleaning 10: Limit switch 11: Binary formula result 12: Binary Input Module 13: Binary Output Module 14: Sample preparation
93	LAST_DIAG_MODUL	R	UNSIGNED	1			Default: 0 Selection: 0: Slot 1 1: Slot 1 2: Slot 2 3: Slot 3 4: Slot 4 5: Slot 5 6: Slot 6 7: Slot 7 8: Sampler 9: Software 10: Analyzer
94	LAST_DIAG_PORT	R	UNSIGNED	1			Default: 0
95	LAST_DIAG_NE107_STATUS	R	UNSIGNED	1			Default: 0
96	LAST_DIAG_CODE	R	UNSIGNED	2			Past sensor-diagnosis: diagnosis code Default: 0
97	LAST_DIAG_TIMESTAMP	R	DATE_AND_TIME	7			Default: 0
98	OP_TIME_TOTAL	R	FLOAT32	4		*s* h	Operating hours of connected sensor Default: 0.0
99	OP_TIME_ABOVE_SPEC_TEMP	R	FLOAT32	4		*s* h	Operating hours above maximal operating temperature Default: 0.0
100	OP_TIME_BELOW_SPEC_TEMP	R	FLOAT32	4		*s* h	Operating hours below minimal operating temperature Default: 0.0
101	OP_TIME_LAMP_LIFE	R	FLOAT32	4			Operating hours of lamp, uint seconds [s] Default: 0.0

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
102	OP_TIME_STERILISATIONS	R	UNSIGNED	2			Number of sterilisation cycles Default: 0
103	OP_TIME_CIP_CYCLES	R	UNSIGNED	2			Number of clean in place cycles Default: 0
104	OP_TIME_CAP_CALIBRATIONS	R	UNSIGNED	2			Number of sensor-cap calibrations Default: 0
105	OP_TIME_CAP_CALIB_TIMER	R	FLOAT32	4		s h	Calibration timer of sensor cap Default: 0.0
106	OP_TIME_CAP_STERILISATIONS	R	UNSIGNED	1			Number of sensor-cap sterilisations Default: 0
107	OP_TIME_CAP_FILTER_CHANGED	R	FLOAT32	4			Number of filter changes Default: 0.0
108	CAL_COUNT_0	R	UNSIGNED	2			Number of calibrations Default: 0
109	CAL_COUNT_1	R	UNSIGNED	2			Number of calibrations, 2nd parameter of multiparameter sensor Default: 0
110	CAL_COUNT_2	R	UNSIGNED	2			Number of calibrations, 3rd parameter of multiparameter sensor Default: 0
111	CAL_COUNT_3	R	UNSIGNED	2			Number of calibrations, 4th parameter of multiparameter sensor Default: 0
112	CAL_DATETIME_0	R	DATE_AND_TIME	7			Time stamp of last calibration
113	CAL_DATETIME_1	R	DATE_AND_TIME	7			Time stamp of last calibration, 2nd parameter of multiparameter sensor
114	CAL_DATETIME_2	R	DATE_AND_TIME	7			Time stamp of last calibration, 3rd parameter of multiparameter sensor
115	CAL_DATETIME_3	R	DATE_AND_TIME	7			Time stamp of last calibration, 4th parameter of multiparameter sensor
116	CAL_COUNT_ZERO	R	UNSIGNED	2			Number of zero point calibrations Default: 0
117	CAL_DATETIME_ZERO	R	DATE_AND_TIME	7			Time stamp of last zero point calibration
118	CAL_COUNT_TEMP	R	UNSIGNED	2			Number of temperature calibrations Default: 0
119	CAL_DATETIME_TEMP	R	DATE_AND_TIME	7			Time stamp of last temperature calibration

9.1.3.3 Sensor Heartbeat 1-8, Slot 25-32

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
158	HEARTBEAT_SENSOR_STATUS_CHx	R	DS60	12		%	Heartbeat status sensor
159	HEARTBEAT_SENSOR_STATUS_CHx_UNIT	R	UNSIGNED	2			
160	HEARTBEAT_SENSOR_STATUS_CHx_RANGE	R	DS61	8			
161	HEARTBEAT_SENSOR_HEALTH_CONDITION_CHx	R	DS60	12		%	Heartbeat health sensor
162	HEARTBEAT_SENSOR_HEALTH_CONDITION_CHx_UNIT	R	UNSIGNED	2			
163	HEARTBEAT_SENSOR_HEALTH_CONDITION_CHx_RANGE	R	DS61	8			
164	MAINTENANCE_TIMER_VALUE_CHx	R	DS60	12		%	Heartbeat maintenance timer sensor
165	MAINTENANCE_TIMER_VALUE_CHx_UNIT	R	UNSIGNED	2			
166	MAINTENANCE_TIMER_VALUE_CHx_RANGE	R	DS61	8			
167	HEARTBEAT_INDEX_SENSOR_CHx	R	DS60	12		%	Heartbeat index sensor
168	HEARTBEAT_INDEX_SENSOR_CHx_UNIT	R	UNSIGNED	2			
169	HEARTBEAT_INDEX_SENSOR_CHx_RANGE	R	DS61	8			
170	KEY_PERF_INDICATOR_SENSOR_AVAILABILITY_CHx	R	FLOAT32	4		%	(Operating time - Time in failure) / Operating time * 100 % Default: 100.0
171	KEY_PERF_INDICATOR_SENSOR_OPERATING_TIME_CHx	R	DURATION	6	X		The total operating time since commissioning
172	KEY_PERF_INDICATOR_SENSOR_TIME_IN_FAILURE_CHx	R	DURATION	6	X		Operating time with NAMUR F status signal
173	KEY_PERF_INDICATOR_SENSOR_NUMBER_OF_FAILURES_CHx	R	UNSIGNED	2	X		Number of failure diagnostic messages Default: 0
174	KEY_PERF_INDICATOR_SENSOR_MTBF_CHx	R	DURATION	6			Mean time between failures
175	KEY_PERF_INDICATOR_SENSOR_MTTR_CHx	R	DURATION	6			Mean time to repair
176	KEY_PERF_INDICATOR_SENSOR_TIME_IN_CALIBRATION_CHx	R	DURATION	6	X		Operating time with calibration status
177	KEY_PERF_INDICATOR_SENSOR_NUMBER_OF_CALIBRATIONS_CHx	R	UNSIGNED	2	X		Number of calibrations and/or adjust-ments Default: 0
178	KEY_PERF_INDICATOR_SENSOR_MTBC_CHx	R	DURATION	6			Mean time between calibrations

9.1.3.4 Conductivity 1-8, Slot 9-16

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
128	COND_MEAS_PARAM	R/W	UNSIGNED	1	X		*Operating mode* Default: 0 Selection: 0: Conductivity 1: Concentration 2: Resistance 3: TDS
144	COND_CELL_CONSTANT	R	FLOAT32	4			Cell constant Default: 0.0

9.1.3.5 Turbidity 1-8, Slot 17-24

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
173	TURBIDITY_SWITCHDATASET	R/W	UNSIGNED	1			*Application* Dataset switch for turbidity Default: 0 Selection: 0: Formazine 1: Kaolin 2: SiO2 3: TiO2 4: Excess sludge 5: Digested sludge 6: Activated sludge 7: Dataset1 8: Dataset2 9: Dataset3 10: Dataset4 11: Dataset5 12: undefined 13: Thin sludge 14: PSL 15: Diatomite 16: Dataset6 17: Absorbance 18: ThinSludge 19: EBC

Index	Parameter name	Access	Data Type	Bytes	Persistent	Units	Description
							20: Milk 21: Apha 22: EBCColor 23: OEM Dataset 1 24: OEM Dataset 2 25: OEM Dataset 3 26: OEM Dataset 4 27: OEM Dataset 5 28: OEM Dataset 6 29: Product loss 30: Sludge 31: Auto sludge 32: Dataset7 33: Dataset8 34: Sludge, general
174	TURBIDITY_CAL_FACTOR	R	FLOAT32	4			*Factor* Calibration factor Default: 0.0
175	TURBIDITY_CAL_OFFSET	R	FLOAT32	4			Calibration offset Default: 0.0

9.1.3.6 ISE 1-8, Slot 25-32

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
79	ISE_MEAS_MODE_ELECTRODE_1	R/W	UNSIGNED8	1	X		Measured variable slot 2 Default: 0 Selection: 0: unused 1: NH4-N 2: NH4 3: NO3-N 4: NO3 9: K 10: Cl 11: pH 12: mV 13: %0V
80	ISE_MEAS_MODE_ELECTRODE_2	R/W	UNSIGNED8	1	X		Measured variable slot 3 Default: 0

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							Selection: 0: unused 1: NH4-N 2: NH4 3: NO3-N 4: NO3 9: K 10: Cl 11: pH 12: mV 13: %0V
81	ISE_MEAS_MODE_ELECTRODE_3	R/W	UNSIGNED8	1	X		Measured variable slot 4 Default: 0 Selection: 0: unused 1: NH4-N 2: NH4 3: NO3-N 4: NO3 9: K 10: Cl 11: pH 12: mV 13: %0V
121	ISE_SLOPE_0	R	FLOAT	4			Slope reference slot Default: 0.0
122	ISE_SLOPE_1	R	FLOAT	4			Slope slot 1 Default: 0.0
123	ISE_SLOPE_2	R	FLOAT	4			Slope slot 2 Default: 0.0
124	ISE_SLOPE_3	R	FLOAT	4			Slope slot 3 Default: 0.0
125	ISE_ZEROPOINT_0	R	FLOAT	4			Zero point reference slot Default: 0.0
126	ISE_ZEROPOINT_1	R	FLOAT	4			Zero point slot 1 Default: 0.0
127	ISE_ZEROPOINT_2	R	FLOAT	4			Zero point slot 2 Default: 0.0

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
128	ISE_ZEROPOINT_3	R	FLOAT	4			Zero point slot 3 Default: 0.0
129	ISE_MEAS_TYPE_ELECTRODE_0	R	UNSIGNED8	1	X		Electrode slot 1 Electrode type reference slot (measured parameter) Default: 0 Selection: 0: disabled 5: pH
130	ISE_MEAS_TYPE_ELECTRODE_1	R	UNSIGNED8	1	X		Electrode slot 2 Electrode type slot 1 (measured parameter) Default: 0 Selection: 0: disabled 1: Nitrate 2: Ammonium 3: Potassium 4: Chloride 5: pH 6: ORP 7: %0V
131	ISE_MEAS_TYPE_ELECTRODE_2	R	UNSIGNED8	1	X		Electrode slot 3 Electrode type slot 2 (measured parameter) Default: 0 Selection: 0: disabled 1: Nitrate 2: Ammonium 3: Potassium 4: Chloride 5: pH 6: ORP 7: %0V
132	ISE_MEAS_TYPE_ELECTRODE_3	R	UNSIGNED8	1	X		Electrode slot 4 Electrode type slot 3 (measured parameter) Default: 0 Selection: 0: disabled 1: Nitrate 2: Ammonium 3: Potassium 4: Chloride

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							5: pH 6: ORP 7: %0V

9.1.3.7 Desinfection 1-8, Slot 17-24

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
138	DESINFECTION_SLOPE	R	FLOAT	4		A/(kg/m³) pA/(mg/l) nA/(mg/l)	Slope Default: -0.0000001
139	DESINFECTION_ZERO_POINT	R	FLOAT	4		A nA	Zero point Default: -0.000000002

9.1.3.8 Oxygen 1-8, Slot 9-16

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
180	OXYGEN_SLOPE	R	FLOAT	4	X	%	*Current slope* Default: 100.0
181	OXYGEN_ZERO_POINT	R	FLOAT	4	X	*A* nA	*Current zero point* Default: 0.0
182	OXYGEN_INFO_PAO_KSV	R	FLOAT	4			Ksv (point at oxygen) Default: 0.0
183	OXYGEN_INFO_ZERO_KSV	R	FLOAT	4			Ksv (zero point) Default: 0.0
184	OXYGEN_INFO_PAO_TAU	R	FLOAT	4			Tau (point at oxygen) Default: 0.0
185	OXYGEN_INFO_ZERO_TAU	R	FLOAT	4			Tau (zero point) Default: 0.0
186	OXYGEN_INFO_PAO_QUALITY	R	FLOAT	4			Calibration quality (point at oxygen) Default: 0.0
187	OXYGEN_INFO_ZERO_QUALITY	R	FLOAT	4			Calibration quality (zero point) Default: 0.0
188	OXYGEN_INFO_SLOPE_ABS	R	FLOAT	4			Slope absolute Default: 0.0

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
189	OXYGEN_INFO_FERMENTER_SCALING_FACTOR	R	FLOAT	4			Fermenter scaling factor Default: 0.0

9.1.3.9 pH 1-8, Slot 9-16

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
102	SLOPE	R	FLOAT	4		*V/pH* mV/pH	Slope Default: 0.05916
103	ZERO_POINT	R	FLOAT	4		*pH*	Zero point Default: 7.0

9.1.3.10 Regulator 1-2, Slot 34-35

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
78	CONTROL_MODE	R	UNSIGNED8	1	X		*Controller type* Default: 1 Selection: 0: PID 1-sided 1: PID 2-sided
88	SETPOINT	R/W	FLOAT	4	X		*Setpoint* Controller : set value for controller 0 Default: 0.0
89	P_PART	R/W	FLOAT	4	X		*Xp* Controller : proportional band (Xp) for controller 1 Default: 10.0 Minimum: 0.0
90	I_PART	R/W	FLOAT	4	X	*s*	*Tn* Controller : reset time (Tn) for controller 1 Default: 0.0 Range: 0.0 .. 9999.0
91	D_PART	R/W	FLOAT	4	X	*s*	*Tv* Controller: rate time (Tv) for controller 1 Default: 0.0 Range: 0.0 .. 9999.0

9.1.3.11 Nitrate 1-8, Slot 9-16

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
105	SAC_SWITCHDATASET	R/W	UNSIGNED8	1			*Application* Default: 0 Selection: 0: Factory calib. 1: Dataset1 2: Dataset2 3: Dataset3 4: Dataset4 5: Dataset5 6: Dataset6 7: undefined
106	SAC_UVT10_DAMPED	R	DS60	12		%	
107	SAC_UVT10_DAMPED_UNIT	R/W	UNSIGNED16	2	X		
108	SAC_UBT10_DAMPED_RANGE	R	DS61	8			
109	SAC_CAL_FACTOR	R	FLOAT	4			*Factor* Calibration factor Default: 0.0
110	SAC_CAL_OFFSET	R	FLOAT	4			Calibration offset Default: 0.0

9.1.3.12 SAC 1-8, Slot 17-25

Index	Parameter	Access	Data Type	Size	Persistent	Units	Description
35	SAC_SWITCHDATASET	R/W	UNSIGNED8		X		*Application* Default: 0 Selection: 0: Factory calib. 1: Dataset1 2: Dataset2 3: Dataset3 4: Dataset4 5: Dataset5 6: Dataset6 7: undefined

9.1.3.13 Sludge Level 1-8, Slot 17-25

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
198	UIS_TURBIDITY_MEAS	R/W	UNSIGNED8	1	X		*Turbidity measurement* Default: 1 Selection: 0: Off 1: On

9.1.3.14 Photometer 1-8, Slot 48-55 (only Liquiline CM44P)

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
93	PEM_MEAS_DATASET_MC	R/W	UNSIGNED8	1			*Dataset* Default: 0 Selection: 0: Dataset 1 1: Dataset 2 2: Dataset 3 3: Dataset 4 4: Dataset 5
94	PEM_MEAS_DATASET_RC	R	UNSIGNED8	1			*Dataset* Default: 0 Selection: 0: Dataset 1 1: Dataset 2 2: Dataset 3 3: Dataset 4 4: Dataset 5

9.1.3.15 Sampler, Slot 7 (only Liquistation CSFxx)

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
158	RUNNING_PROGRAM_NAME	R	VISIBLESTRING	16			*Program name:* Program name
159	PROGRAM_NAME	R	VISIBLESTRING	16			*Program name* Name of current active program Default: TX:Program
160	PROGRAM_STATE	R	UNSIGNED8	1			*Program status* Program state Default: 0 Selection: 0: Inactive

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							1: Active 2: Pause 3: Waiting for pause
161	PROGRAM_BOTTLE_POSITION	R	UNSIGNED8	1	X		Current bottle position Default: 0 Range: 0.0 .. 25.0
162	BOTTLE_CONFIGURATION	R/W	UNSIGNED8	1	X		*Current bottle configuration* Bottle assignement Default: 0 Selection: 0: 1x - PE Direct distribution 1: 2x - PE Direct distribution 2: 4x - PE Direct distribution 3: 4x - Glass Direct distribution 4: 12x - PE Direct distribution 5: 12x - PE/Glass Plate distribution 6: 24x - PE Direct distribution 7: 24x - PE/Glass Plate distribution 8: 6x+1x - PE/Glass Plate distribution 9: 6x+2x - PE+PE Plate distribution 10: 6x+2x - PE+Glass Plate distribution 11: 12x+1x - PE/Glass Plate distribution 12: 12x+2x - PE+PE Plate distribution 13: 12x+2x - PE+Glass Plate distribution 14: 12x+6x - PE Direct distribution 15: 12x+6x - PE/Glass Plate distribution 16: 4x - Glass Schott GLS80 Direct distribution
163	PROGRAM_SAMPLING_MODE	R	UNSIGNED8	1			Mode of sampling Default: 0 Selection: 0: Time paced CTCV 1: Flow paced VTCV 2: Time/flow paced CTVV 3: Single sample 4: Sampling table 5: External signal 6: Manual 7: %0V
164	DATETIME_NEXT_SAMPLING	R	DATE_AND_TIME	7			 Default: 2000-01-01T00:00:00 Range: 946684800.0 .. 4102444799.0
165	FLOW_NEXT_SAMPLING	R	FLOAT	4			Date and time of next sampling Default: 0.0

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
166	SAMPLING_STATE	R	UNSIGNED8	1			*Action message* Sampling progress Default: 0 Selection: 0: Waiting 1: Reference run 2: Dist. arm positioned 3: Purge process 4: Suction process 5: Medium detected 6: Dose process 7: sampling Ok 8: sampling nOk 9: Sampling delay 10: Sampling 11: Pre rinsing 12: Post rinsing 13: Launch bottle 14: Sample bottling 15: Emptying bottle 16: Rinsing bottle 17: Draining bottle
167	MAN_SAMPLING_COMMAND	R/W	UNSIGNED8	1			Manual sampling command Default: 0 Selection: 0: --- 1: Start 2: Stop
168	MAN_SAMPLING_VOLUME_PERIST	R/W	FLOAT	4	X	m^3 ml	*Sample volume* Default: 0.0001 Minimum: 2e-05
169	MAN_SAMPLING_BOTTLE_POS	R/W	UNSIGNED8	1			*Free bottles* Default: 0 Selection: 0: Front 1: Bottle 1 2: Bottle 2 3: Bottle 3 4: Bottle 4 5: Bottle 5 6: Bottle 6 7: Bottle 7 8: Bottle 8 9: Bottle 9

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							10: Bottle 10 11: Bottle 11 12: Bottle 12 13: Bottle 13 14: Bottle 14 15: Bottle 15 16: Bottle 16 17: Bottle 17 18: Bottle 18 19: Bottle 19 20: Bottle 20 21: Bottle 21 22: Bottle 22 23: Bottle 23 24: Bottle 24 25: Back
170	SAMPLING_VOLUME_VACUUM	R/W	FLOAT	4	X	m^3 ml	*Dosing volume* Dosing volume of vacuum- or inline-sampler Default: 0.0002
171	BOTTLE_VOLUME_LEFT	R/W	FLOAT	4	X	m^3 ml	*Bottle volume left* Bottle volume Default: 0.03 Range: 0.0001 .. 0.1
172	BOTTLE_VOLUME_RIGHT	R/W	FLOAT	4	X	m^3 ml	*Bottle volume right* Bottle volume of the right bottle box Default: 0 Range: 0.0 .. 0.1
173	CURRENT_BOTTLE_FILL_LEVEL	R	FLOAT	4		m^3 ml	Sampling mode Default: 0.0 Minimum: 0.0
174	SAMPLING_TECHNIQUE	R	UNSIGNED8	1			*Sampling device* Sampling mode Default: 0 Selection: 0: Peristaltic 1: Vacuum 2: Inline
175	MANUAL_SAMPLING_PARK_POS	R/W	UNSIGNED8	1	X		*Distribution parking* Distribution arm park position Default: 1 Selection: 0: --- 1: Back

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
176	LAST_SAMPLING_START_TIME	R	DATE_AND_TIME	7			Start time of last sampling Default: 1970-01-01T00:00:00
177	CAL_COUNT_DISTLEVER	R	UNSIGNED32	4	X		Number of distribution lever calibrations Default: 0
178	CAL_DATETIME_DISTLEVER	R	DATE_AND_TIME	7	X		Time stamp of last distribution lever calibration Default: 1970-01-01T00:00:00
179	CAL_COUNT_PERISTVOLUME	R	UNSIGNED32	4	X		Number of peristaltic sampling volume calibrations Default: 0
180	CAL_DATETIME_PERISTVOLUME	R	DATE_AND_TIME	7	X		Default: 1970-01-01T00:00:00
181	CAL_METHOD_PERISTVOLUME	R	UNSIGNED8	1	X		Default: 0 Selection: 0: --- 1: 1-point calibration 2: 2-point calibration

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Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
116	ACTUATORMODULE_INFO_HW_VERSION	R	VISIBLESTRING	16			Hardware version of the device
117	ACTUATORMODULE_INFO_SW_VERSION	R	VISIBLESTRING	16			Software version of the device
118	PHOTOMETER_INFO_HW_VERSION	R	VISIBLESTRING	16			*Hardware version* Hardware version of photometer
119	PHOTOMETER_INFO_SW_VERSION	R	VISIBLESTRING	16			*Software version* Software version of photometer
120	MODE	R	UNSIGNED8	1	X		*Mode* Operation mode Default: 0 Selection: 0: Manual 1: Automatic 2: Fieldbus
121	CURRENT_ACTIVITY	R	UNSIGNED8	1			Current activity Default: 0 Selection: 0: --- 1: Measurement %0V 2: Calibration 3: Cleaning 4: --- 5: ---

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							6: Emptying SC 7: --- 8: --- 9: Empty hoses 10: Initializing 11: Cleaning up 12: Cleaning sample preparation 13: Dispenser replacem. 14: Dispenser replacem. 15: Testing liquidmanager actuator 16: Bottle insertion 17: Bottle removal 18: Open valves 19: Close valves 20: Rinse reagents 21: Rinse with water 22: Commissioning 23: Empty reactor 24: Empty dosing unit 25: Empty dilution module 26: Rinse analyzer 27: Reactor heating test 28: Reactor pressure test 29: Custom 30: Rinsing 31: Rinsing 32: Rinsing 33: Rinsing 34: Preparing 35: Service function 1 36: Service function 2 37: Service function 3 38: Service function 4 39: Service function 5 40: Dispenser test 41: Dispenser test 42: Grab sample meas. 43: Reference sample inspection 44: Reference sample inspection 45: Photometer calibration 46: Photometer test 47: Factory Calibration
122	CURRENT_ACTIVITY_REMAINING_TIME	R	DURATION	6			Remaining time of current activity

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
123	PHOTOMETER_TEMPERATURE	R	FLOAT	4		℃ ℉ K	*Temperature* Temperature of photometer cuvette Default: 25
124	OPHOURS_PHOTOMETER	R	FLOAT	4		*s* h	*Operating time photometer* Default: 0.0 Minimum: 0.0
125	OPHOURS_FILTER_MAT	R	FLOAT	4	X	*s* d	*Operating time filter mats* Operating time of filter mat Default: 0.0 Minimum: 0.0
126	OPHOURS_PELTIER	R	FLOAT	4	X	*s* d	*Operating time cooling module* Operating time of peltier element Default: 0.0 Minimum: 0.0
127	POWER_FAIL_REACTION	R/W	UNSIGNED8	1	X		*After power failure* Powerfail reaction Default: 0 Selection: 0: Last mode 1: Manual mode
128	SAMPLE_COLLECTOR_SENSOR	R	UNSIGNED8	1			Type of sample preparation Default: 0 Selection: 0: None 1: Conductive 2: Capacitive 3: Flow rate
129	ACTIVE_SAMPLINGPOINT	R	UNSIGNED8	1			Active channel Default: 0 Selection: 0: SP1 1: SP2 2: SP3 3: SP4 4: SP5 5: SP6 6: ---
130	MEASURED_VALUE_UNIT	R/W	UNSIGNED8	1	X		*Unit* User selectable measurand unit
131	MEASURED_VALUE_ACTIVE_INX	R/W	UNSIGNED8	1			Index of selected measurement value in measurement value list

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
132	MEASURED_VALUE_LIST_SIZE	R	UNSIGNED8	1			Amount of available/selectable measurands Default: 0 Maximum: 8.0
133	MEASURED_VALUE_LIST_01	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
134	MEASURED_VALUE_LIST_02	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
135	MEASURED_VALUE_LIST_03	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
136	MEASURED_VALUE_LIST_04	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
137	MEASURED_VALUE_LIST_05	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
138	MEASURED_VALUE_LIST_06	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
139	MEASURED_VALUE_LIST_07	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
140	MEASURED_VALUE_LIST_08	R	VISIBLESTRING	16			Descriptor of available/selectable measurand
141	MEASUREMENT_DILUTION_FACTOR	R/W	FLOAT	4	X		*External dilution factor* External dilution factor Default: 1.0 Range: 0.5 .. 100.0
142	MEASUREMENT_OFFSET	R	FLOAT	4	X	*kg/m³* g/l mg/l µg/l ppm ppb	*Offset* Concentration offset for concentration value calculation Default: 0.0
143	CALIBRATION_RETRIES	R/W	UNSIGNED8	1	X		*Calibration trials* Number of retries in case of failed calibration Default: 2 Range: 1.0 .. 3.0
144	CALIBRATION_FACTOR	R	FLOAT	4			*Calibration factor* Calibration factor of the photometer Default: 1.00 Range: 0.1 .. 100.0
145	CALIBRATION_CONCENTRATION	R/W	FLOAT	4	X	*kg/m³* g/l mg/l µg/l ppm ppb	*Concentration* Concentration of the calibration standard Default: 0.0
146	CALIBRATION_FACTOR_DELTA	R/W	FLOAT	4	X	%	*Deviation cal. factor* Max. allowed deviation of calibration factor for calibration Default: 10
147	CALIBRATION_FACTOR_MAX	R/W	FLOAT	4	X		*Limit cal. factor max.* Max. allowed calibration factor Default: 2.0

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
148	CALIBRATION_FACTOR_MIN	R/W	FLOAT	4	X		*Limit cal. factor min.* Min. allowed calibration factor Default: 0.5
149	MODE_CHANGE_REQUEST	R/W	UNSIGNED8	1			Mode change request Default: 0 Selection: 0: None 1: Enter fieldbus mode 2: Continue automatic mode 3: Restart automatic mode
150	MODE_CHANGE_REQUEST_REV_HIDDEN	R	UNSIGNED8	1			Default: 0
151	MODE_CHANGE_PROCESSED_REV_HIDDEN	R	UNSIGNED8	1			Default: 0
152	MODE_CHANGE_REQUEST_STATUS	R	UNSIGNED8	1			Status of the manual request to change the operating mode 0 = Ready to change the operating mode 1 = Device busy 2 = Change of operating mode not allowed
153	COMMON_REQUEST	R/W	UNSIGNED8	1			Abort current activity 0: Idle 1: Abort current activity Default: 0 Selection: 0: None 1: Abort current action
154	COMMON_REQUEST_REV_HIDDEN	R	UNSIGNED8	1			Internal use Default: 0
155	ANALYZER_REQUEST	R/W	UNSIGNED8	1			Manual activity request Default: 0 Selection: 0: None 1: Start measurement 2: Start calibration 3: Start cleaning 4: Start Reference Sample Inspection
156	ANALYZER_REQUEST_REV_HIDDEN	R	UNSIGNED8	1			Internal use Default: 0
157	ACTIVITY_PROCESSED_REV_HIDDEN	R	UNSIGNED8	1			Internal use Default: 0
158	ACTIVITY_STATE_HIDDEN	R	UNSIGNED8	1			Internal use Default: 0 Selection:

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							0: -- unnamed -- 1: -- unnamed -- 2: -- unnamed -- 3: -- unnamed -- 4: -- unnamed --
159	ACTIVITY_REQUEST_STATUS	R	UNSIGNED8	1			Status of the manual request to start an activity 0: Ready to start an activity 1: Activity is being executed 2: Fieldbus mode not active 32: Current activity is canceled 33: Measurement started 34: Calibration started 35: Cleaning started 64: Current activity was canceled 65: Measurement finished 66: Calibration finished 67: Cleaning finished 97: Measurement failed 98: Calibration failed 98: Cleaning failed
160	RESET_REQUEST	R/W	UNSIGNED8	1			Abort current activity 0: Idle 1: Abort current activity
161	PHOTOMETER_RAW_VALUE	R	DS60	12			Raw value of photometer
162	PHOTOMETER_RAW_VALUE_UNIT	R	UNSIGNED16	2			
163	PHOTOMETER_RAW_VALUE_RANGE	R	DS61	8			
164	SAMPLEPREPARATIONS_INSTALLATIONTYPE	R	UNSIGNED8	1	X		*Installation type* SP InstallationType Default: 0 Selection: 0: Others 1: Pressurized pipe sampling 2: Inlet pipe sampling
165	MEASPARAM_ACTIVE_TEXT	R	VISIBLESTRING	32	X		*Measuring parameter* Measuring parameter
166	MEASRANGE_ACTIVE_TEXT	R	VISIBLESTRING	32	X		*Measuring range* Measuring range
167	AUTOMEAS_RANGE_CHANGE	R	UNSIGNED8	1	X		*Range switch* Automatic range switch Default: 0 Selection: 0: Manual 1: Automatic

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
168	CALIBRATION_ZEROPOINT_DELTA	R/W	FLOAT	4	X	*kg/m³* g/l mg/l µg/l ppm ppb	*Deviation zero point* Max. allowed deviation of zero point for calibration Default: 0.0
169	CALIBRATION_ZEROPOINT_MAX	R/W	FLOAT	4	X	*kg/m³* g/l mg/l µg/l ppm ppb	*Limit zero-point min.* Min. allowed calibration zero point Default: 0.0
170	CALIBRATION_ZEROPOINT_MIN	R/W	FLOAT	4	X	*kg/m³* g/l mg/l µg/l ppm ppb	*Limit zero-point max.* Max. allowed calibration zero point Default: 0.0
171	CAL_COUNTER	R	UNSIGNED32	4	X		Number of calibrations Default: 0
172	CAL_DATETIME	R	DATE_AND_TIME	7	X		Time stamp of last calibration Default: 1970-01-01T00:00:00
173	CAL_METHOD	R	UNSIGNED8	1	X		Calibration method of last calibration Default: 0 Selection: 0: --- 1: Zero point 2: Cal. factor 3: 2-point calibration 4: Application calibration 5: Numeric input zero point 6: Numeric input cal. factor 7: Numeric input appl. cal.
174	TURBID_SAMPLE_MODE	R	UNSIGNED8	1	X		*Turbid sample mode* Turbid sample mode Default: 1 Selection: 0: Off 1: On 2: Automatic
175	SP_FOR_FIELDBUS_ACTIVITIES	R/W	UNSIGNED8	1	X		*Channel* Sampling point for fieldbus activities Default: 0

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							Selection: 0: Sequence of measurements 1: SP1 2: SP2 3: SP3 4: SP4 5: SP5 6: SP6
176	SP0_OUT	R	DS60	12		*kg/m³* g/l mg/l µg/l ppm ppb	SP1: Measured value
177	SP0_OUT_UNIT	R	UNSIGNED16	2			
178	SP0_OUT_RANGE	R	DS61	8			
179	SP1_OUT	R	DS60	12		*kg/m³* g/l mg/l µg/l ppm ppb	SP2: Measured value
180	SP1_OUT_UNIT	R	UNSIGNED16	2			
181	SP1_OUT_RANGE	R	DS61	8			
182	SP2_OUT	R	DS60	12		*kg/m³* g/l mg/l µg/l ppm ppb	SP3: Measured value
183	SP2_OUT_UNIT	R	UNSIGNED16	2			
184	SP2_OUT_RANGE	R	DS61	8			
185	SP3_OUT	R	DS60	12		*kg/m³* g/l mg/l µg/l ppm ppb	SP4: Measured value
186	SP3_OUT_UNIT	R	UNSIGNED16	2			
187	SP3_OUT_RANGE	R	DS61	8			
188	SP4_OUT	R	DS60	12		*kg/m³* g/l mg/l	SP5: Measured value

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
						µg/l ppm ppb	
189	SP4_OUT_UNIT	R	UNSIGNED16	2			
190	SP4_OUT_RANGE	R	DS61	8			
191	SP5_OUT	R	DS60	12		*kg/m³* g/l mg/l µg/l ppm ppb	SP6: Measured value
192	SP5_OUT_UNIT	R	UNSIGNED16	2			
193	SP5_OUT_RANGE	R	DS61	8			
194	SP0_TIME_OF_SAMPLE	R	DATE_AND_TIME	7			Time of take sample Default: 1970-01-01T00:00:00
195	SP1_TIME_OF_SAMPLE	R	DATE_AND_TIME	7			Time of take sample Default: 1970-01-01T00:00:00
196	SP2_TIME_OF_SAMPLE	R	DATE_AND_TIME	7			Time of take sample Default: 1970-01-01T00:00:00
197	SP3_TIME_OF_SAMPLE	R	DATE_AND_TIME	7			Time of take sample Default: 1970-01-01T00:00:00
198	SP4_TIME_OF_SAMPLE	R	DATE_AND_TIME	7			Time of take sample Default: 1970-01-01T00:00:00
199	SP5_TIME_OF_SAMPLE	R	DATE_AND_TIME	7			Time of take sample Default: 1970-01-01T00:00:00

9.1.3.17 Analyzer Program, Slot 36 (only Liquiline CA80xx)

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
78	MEASUREMENT_TRIGGER	R/W	UNSIGNED8	1	X		*Start condition* Start condition for measurment Default: 0 Selection: 0: Immediate 1: Date/time 2: Continuous
79	MEASUREMENT_STARTDATE	R/W	DATE_AND_TIME	3	X		*Date* Start of first measurement: date Default: 1970-01-01T00:00:00
80	MEASUREMENT_STARTTIME	R/W	DATE_AND_TIME	6	X		*Time* Start of first measurement: time

							Default: 1970-01-01T00:00:00 Maximum: 86399.0
81	MEASUREMENT_INTERVAL	R/W	DURATION	6	X		*Measuring interval* Interval for measurement Default: 1970-01-01T00:30:00
82	CALIBRATION_TRIGGER	R/W	UNSIGNED8	1	X		*Time 1. calibration* Start condition for calibration Default: 2 Selection: 0: Immediate 1: Date/time 2: Disabled
83	CALIBRATION_STARTDATE	R/W	DATE_AND_TIME	3	X		*Date* Start of first calibration: date Default: 1970-01-01T00:00:00
84	CALIBRATION_STARTTIME	R/W	DATE_AND_TIME	6	X		*Time* Start of first calibration: time Default: 1970-01-01T00:00:00 Maximum: 86399.0
85	CALIBRATION_INTERVAL	R/W	DURATION	6	X		*Calibration interval* Interval for calibration Default: 1970-01-03T00:00:00
86	CLEAN_ANALYZER_TRIGGER	R/W	UNSIGNED8	1	X		*Time 1. cleaning* Start condition for cleaning Default: 2 Selection: 0: Immediate 1: Date/time 2: Disabled
87	CLEAN_ANALYZER_STARTDATE	R/W	DATE_AND_TIME	3	X		*Date* Start of first cleaning: date Default: 1970-01-01T00:00:00
88	CLEAN_ANALYZER_STARTTIME	R/W	DATE_AND_TIME	6	X		*Time* Start of first cleaning: time Default: 1970-01-01T00:00:00 Maximum: 86399.0
89	CLEAN_ANALYZER_INTERVAL	R/W	DURATION	6	X		*Cleaning interval* Interval for cleaning Default: 1970-01-03T00:00:00

9.1.3.18 Sample preparation 1-2, Slot 34-35 (only Liquiline CA80xx)

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
128	SP_INFO_TYPE	R	VISIBLESTRING	16			*SP type* Type of sample preparation
129	SP_INFO_HW_VERSION	R	VISIBLESTRING	16			*Hardware version* Hardware version of sample preparation
130	SP_INFO_SW_VERSION	R	VISIBLESTRING	16			*Software version* Software version of sample preparation
131	SP_INFO_SERIAL	R	VISIBLESTRING	16			*Serial number* Serial number of sample preparation
132	SP_INFO_ORDER_CODE	R	VISIBLESTRING	32			*Order code* Ordercode of sample preparation
133	SP_INFO_ORDER_CODE_EXTENDED	R	VISIBLESTRING	32			*Orig. order code ext.* Extended ordercode of sample preparation
134	CONTROL_MODE	R	UNSIGNED8	1	X		*SP control mode* Operating mode Default: 1 Selection: 0: Local control 1: Remote control
135	CURRENT_STATE	R	UNSIGNED8	1			Current state of sample preparation Default: 0 Selection: 0: Inactive 1: Sampling 2: Cleaning 3: Flush with air 4: Flush with cleaner 5: Flush filter 6: Flush with air 7: Flush with cleaner 8: Flush with air 9: Flush with cleaner 10: Cleaning up 11: Cleaning up 12: Cleaning up 13: Cleaning up 14: Flush with air 15: Flush with cleaner 16: Flush with air 17: Flush with cleaner 18: Flush filter 19: Sampling

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							20: Pump backward 21: Cleaning up 22: Flush filter
136	MEMOSENS_CONTROL_MODE	R	UNSIGNED8	1	X		*Memosens control mode* Operating mode Default: 0 Selection: 0: Independent 1: Controlled
137	OPHOURS_FILTER	R	DURATION	6			*Operating time filter* Operating hours of sample preparation filter Default: 1970-01-01T00:00:00 Minimum: 0.0
138	OPHOURS_HOSE	R	DURATION	6			*Operating time pump tubing* Operating hours of sample preparation hose Default: 1970-01-01T00:00:00 Minimum: 0.0
139	OPHOURS_MEMBRANE_PUMP	R	DURATION	6			*Operating time membrane pump* Operating hours of sample preparation membrane pump Default: 1970-01-01T00:00:00 Minimum: 0.0
140	HOUSING_HEATING_AVAILABLE	R	UNSIGNED8	1			*SP housing heating available* Cabinet heating Default: 1 Selection: 0: Available 1: Not available
141	FILTER_TUBE_HEATING_AVAILABLE	R	UNSIGNED8	1			*SP filter tube heating available* Hose heating filter Default: 1 Selection: 0: Available 1: Not available
142	ANALYZER_TUBE_HEATING_AVAILABLE	R	UNSIGNED8	1			*SP analyzer tube heating available* Hose heating analyzer Default: 1 Selection: 0: Available 1: Not available
143	AMBIENT_TEMPERATURE_SENSOR_AVAILABLE	R	UNSIGNED8	1			*SP ambient temperature sensor available* Ambient temperature sensor Default: 1 Selection:

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							0: Available 1: Not available
144	MEASUREMENT_ITERATIONS	R/W	UNSIGNED8	1			
145	CLEANING_TRIGGER	R/W	UNSIGNED8	1	X		*Start condition* Start condition of first sample preparation cleaning Default: 0 Selection: 0: Immediate 1: Date/time 2: Disabled
146	CLEANING_STARTDATE	R/W	DATE_AND_TIME	3	X		*Date* Date of first sample preparation cleanig Default: 1970-01-01T00:00:00
147	CLEANING_STARTTIME	R/W	DATE_AND_TIME	6	X		*Time* Time of first sample preparation cleanig Default: 1970-01-01T00:00:00 Maximum: 86399.0
148	CLEANING_INTERVAL	R/W	DURATION	6	X		*Cleaning interval* Interval for sample preparation cleaning Default: 1970-01-02T00:00:00 Range: 3600.0 .. 7776000.0
149	CLEANING_DURATION	R/W	DURATION	6	X		*Residence time* Duration of sample preparation cleaning Default: 1970-01-01T00:01:00 Range: 30.0 .. 1200.0
150	MAXIMUM_TRANSPORT_TIME	R/W	DURATION	6			*Max. transport time* Max. transport time of sample preparation Default: 1970-01-01T00:15:00 Range: 10.0 .. 3600.0
151	HOUSING_HEATING_TRIGGER_TEMPERATURE	R/W	FLOAT	4	X	℃ ℉ K	*Start temperature* Switch on temperature for outlet sample preparation cabinet heating Default: 5.0 Range: 4.0 .. 10.0
152	HOUSING_HEATING_TRIGGER_TEMPERATURE_INLET_SP	R/W	FLOAT	4	X	℃ ℉ K	*Start temperature* Switch on temperature for inlet sample preparation cabinet heating Default: 10.0 Range: 4.0 .. 30.0
153	TUBE_HEATING_TRIGGER_TEMPERATURE	R/W	FLOAT	4	X	℃ ℉ K	*Start temperature* Switch on temperature for sample preparation hose heating

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
							Default: 5.0 Range: 4.0 .. 10.0
154	TIMEOUT_SAMPLING	R/W	DURATION	6	X		*Sampling timeout* Timeout no sample Default: 1970-01-01T00:05:00 Range: 180.0 .. 1800.0
155	TIMEOUT_SAMPLING_PPS	R/W	DURATION	6	X		*Sampling timeout* Timeout no sample (pressurized pipe) Default: 1970-01-01T00:01:00 Range: 10.0 .. 1800.0
156	FILTER_CHANGE_WARN_LEVEL	R/W	DURATION	6	X		*Warning limit* Warn level for sample prepartion filter change Default: 1970-03-02T00:00:00 Range: 86400.0 .. 8553600.0
157	FILTER_CHANGE_ACTIVATION	R/W	UNSIGNED8	1	X		*Function* Limit change filter Default: 0 Selection: 0: Off 1: On
158	HOSE_CHANGE_WARN_LEVEL	R/W	DURATION	6	X		*Warning limit* Warn level for sample prepartion hose change Default: 1970-03-02T00:00:00 Range: 86400.0 .. 8553600.0
159	HOSE_CHANGE_ACTIVATION	R/W	UNSIGNED8	1	X		*Function* Limit change hose Default: 1 Selection: 0: Off 1: On
160	HOUSING_TEMPERATURE	R	DS60	12		°C °F K	Cabinet temperature
161	HOUSING_TEMPERATURE_UNIT	R	UNSIGNED16	2			
162	HOUSING_TEMPERATURE_RANGE	R	DS61	8			
163	AMBIENT_TEMPERATURE	R	DS60	12		°C °F K	Ambient temperature
164	AMBIENT_TEMPERATURE_UNIT	R	UNSIGNED16	2			
165	AMBIENT_TEMPERATURE_RANGE	R	DS61	8			
166	OUT_ANALYZER	R	DS60	12			
167	OUT_ANALYZER_UNIT	R	UNSIGNED16	2			
168	OUT_ANALYZER_RANGE	R	DS61	8			

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
169	ACTIVITY_REQUEST	R/W	UNSIGNED8	1			Default: 0 Selection: 0: -- unnamed --
170	ACTIVITY_REQUEST_REV_HIDDEN	R	UNSIGNED8	1			Default: 0
171	CLEANING_DISCARD_TIME	R/W	DURATION	6	X		*Cleaning discard time* Cleaning discard time Default: 1970-01-01T00:01:30 Range: 30.0 .. 180.0
172	SAMPLEPREPARATION_TYPE	R	UNSIGNED8	1	X		Type of sample preparation Default: 0 Selection: 0: 3rd party 1: Inlet 2: Aeration/Outlet 3: Unknown
173	PRESSURIZED_AIR_AVAILABLE	R	UNSIGNED8	1			*SP pressurized air available* Pressurized air available Default: 0 Selection: 0: Available 1: Not available
174	FILTER_AIRCLEANING_DURATION	R/W	DURATION	6	X	*s*	*Filter air cleaning duration* Filter air cleaning duration Default: 30.0 Range: 1.0 .. 60.0
175	FILTER_AIRCLEANING_INTERVAL	R/W	DURATION	6	X		*Filter air cleaning interval* Filter air cleaning interval Default: 1970-01-01T02:00:00 Range: 1800.0 .. 14400.0
176	FILTER_AIRCLEANING_MODE	R/W	UNSIGNED8	1	X		*Filter air cleaning mode* Filter air cleaning mode Default: 0 Selection: 0: On 1: Off
177	PPS_CLEANING_VALVE_INSTALLED	R	UNSIGNED8	1	X		*Cleaning valve* Cleaning valve Default: 0 Selection: 0: Not available 1: Available

Index	Parameter name	Access	Data Type	Size	Persistent	Units	Description
178	PPS_CLEANING_DURATION	R/W	DURATION	6	X	*s*	*Pressurized pipe cleaning duration* Pressurized pipe cleaning duration Default: 10.0 Range: 10.0 .. 30.0
179	PPS_CLEANING_DISCARD_TIME	R/W	DURATION	6	X	*s*	*Pressurized pipe cleaning discard time* Pressurized pipe cleaning discard time Default: 180.0 Range: 0.0 .. 1800.0
180	PPS_CLEANING_INTERVAL	R/W	DURATION	6	X		*Cleaning interval* Interval for pressurized pipe cleaning Default: 1970-01-01T00:30:00 Range: 600.0 .. 7200.0
181	PPS_CLEANING_TRIGGER	R/W	UNSIGNED8	1	X		*Start condition* Start condition of first pressurized pipe cleaning Default: 0 Selection: 0: On 1: Date/time 2: Off
182	PPS_CLEANING_DETERGENT_RESIDENCE_TIME	R/W	DURATION	6	X		*Cleaner residence time* Cleaner residence time Default: 1970-01-01T00:01:00 Range: 30.0 .. 1200.0

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