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Endress+Hauser
People for Process Automation

Supplementary documentation

Liquiline CM44x, Liquiline CM44Rx, Liquiline CM44P, Liquiline System CA80xx, Liquistation CSFxx

Data transmission via EtherNet/IP®

Valid for:
Software version 1.11.00

Document: Liquiline CM44x data transmission via EtherNet/IP Guideline

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1 Note

1.1 Using the supplementary documentation

This supplementary document must only be used in conjunction with a Liquiline CM44x, Liquiline CA80xx or Liquistation CSFxx with EtherNet/IP.

This supplementary document is an integral part of the Operating Instructions and provides information on how to use the transmitter with EtherNet/IP.

Additional information is contained in the following Operating Instructions:

Operating Instructions	Product
BA00444C	Liquiline CM44x
BA01225C	Liquiline CM44Rx
BA00443C	Liquistation CSFxx
BA01240C	Liquiline CA80xx
BA01570C	Liquiline CM44P

1.2 Differences to previous versions

From version	New behavior	Previous behavior
1.05.00	Factory setting: DHCP = On, IP = 0.0.0.0	Factory setting: DHCP = Off, IP = 192.168.1.212
1.05.00	HTTP authentication for the Web server Factory setting: enabled	No login required for the Web server
1.06.08	Unit of AI device variables can be adjusted	AI values are transmitted with fixed unit

2 Commissioning

2.1 Network settings

The network settings can be made via local operation or via the Web server. In addition, the network settings can also be made via the Ethernet link and the TCP/IP interface object.

2.1.1 Setup/General Settings/Extended setup/Ethernet

Parameter	Options	Info
Enable	Off On (default)	The Ethernet interface is disabled The Ethernet interface is enabled

2.1.2 Setup/General Settings/Extended setup/Ethernet/Settings

Parameter	Options	Info
Link settings	Auto negotiation 10MBps half duplex 10MBps full duplex 100MBps half duplex 100MBps full duplex	"Automatic negotiation " is the factory setting.
DHCP	Off On (default)	"DHCP" is disabled in the factory setting for devices with a software version earlier than 1.05.00.
IP address	xxx.xxx.xxx.xxx	Please make sure you only enter valid addresses.
Subnet mask	xxx.xxx.xxx.xxx	
Gateway	xxx.xxx.xxx.xxx	
MAC address	xx:xx:xx:xx:xx:xx	The MAC address cannot be changed. The MAC address is printed on the nameplate of the Ethernet module. If the device has been ordered with a pre-installed Ethernet module, you can take the MAC address from the information printed on the inside of the display.
EtherNet/IP Port	44818	Fixed value

Note:
Any changes to the network settings are adopted once the settings are saved (SAVE) to ensure that the network configuration is consistent at all times.

2.2 Integration into a control system

2.2.1 EDS file

The electronic data sheet (EDS) file can be obtained from the following sources:

Internet	http://www.endress.com or http://www.products.endress.com/cm442 or http://www.products.endress.com/csf34 http://www.products.endress.com/csf48 or http://www.products.endress.com/ca80am
Upload from device (File Object)	This function is not supported by all control systems.

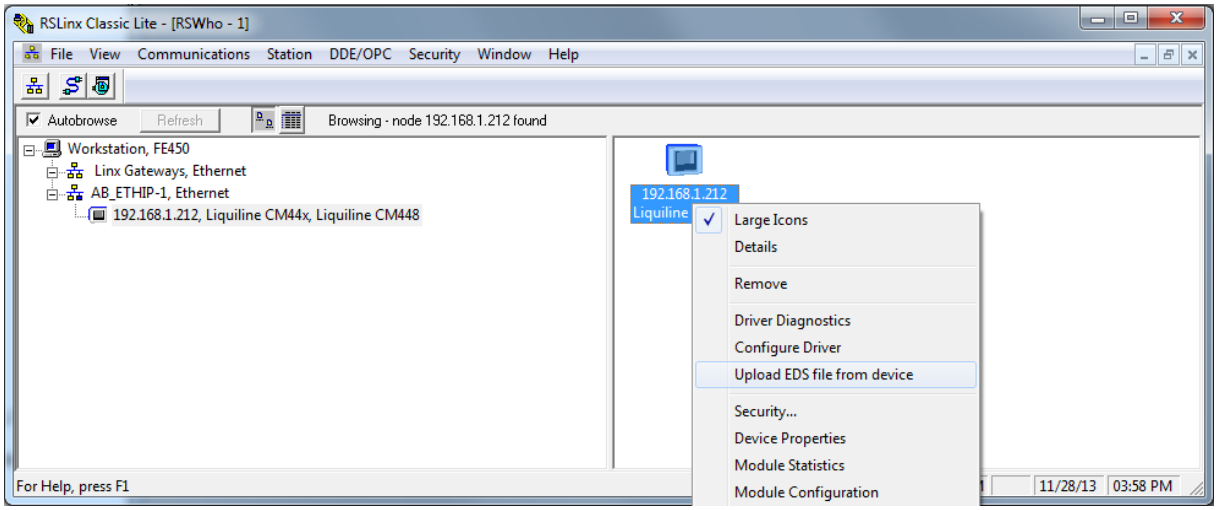
2.3 Integration into a Rockwell Automation control system

2.3.1 RSLinxClassic

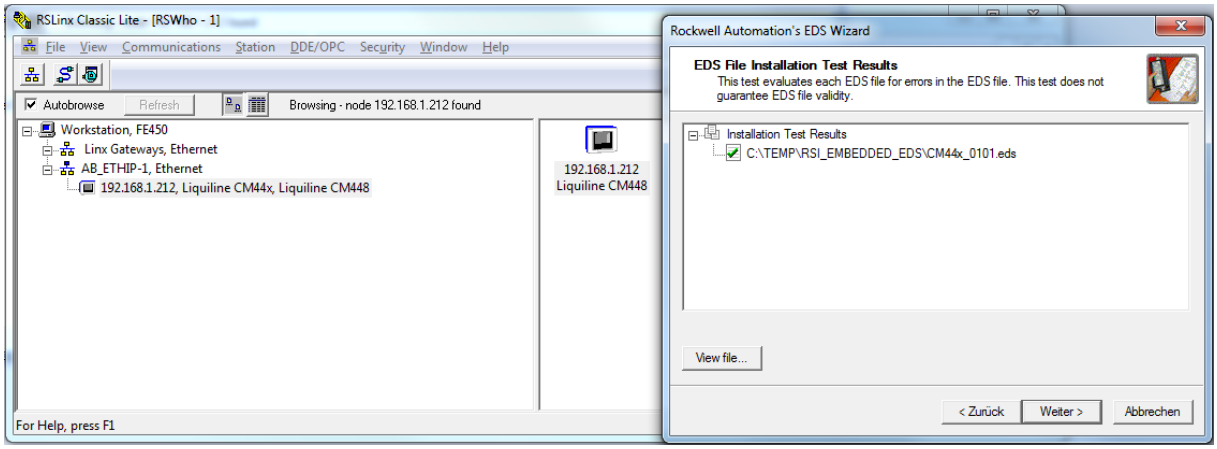
Prerequisite:

You have installed an EtherNet/IP driver in RSLinx. The EtherNet/IP driver is installed via the menu /Communications/ConfigureDriver.

Once the device appears in the Livelist, you can run the "Upload EDS file from device" function from the context menu.



Follow the steps of the EDS wizard and the EDS file is automatically uploaded from the device file object to the Rockwell system environment and is then available in the RSLogix5000 device catalog.



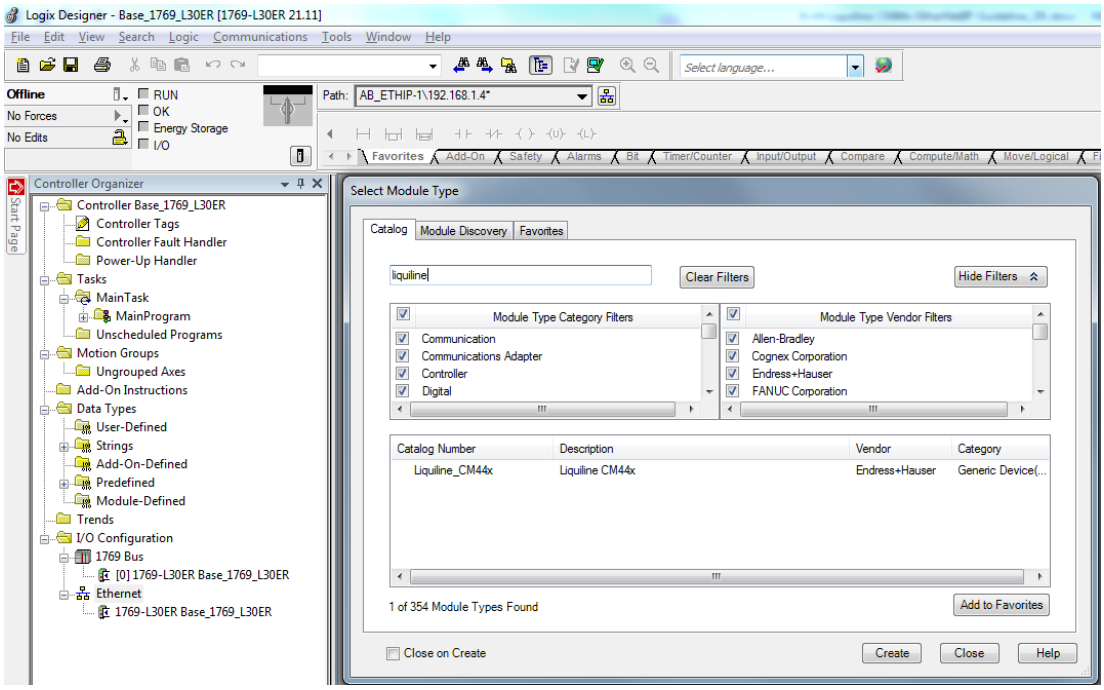
Note: If an AOP is installed at the same time, it has priority over the EDS file. If you have installed an AOP, the EDS file does not appear in the device catalog since the AOP takes over the function of the EDS file.

You can install the EDS file in RSLogix5000 offline at any time. To do so, run the "EDS Hardware Installation Tool Wizard" in the "Tools from RSLogix5000" menu.

2.3.2 RSLogix5000

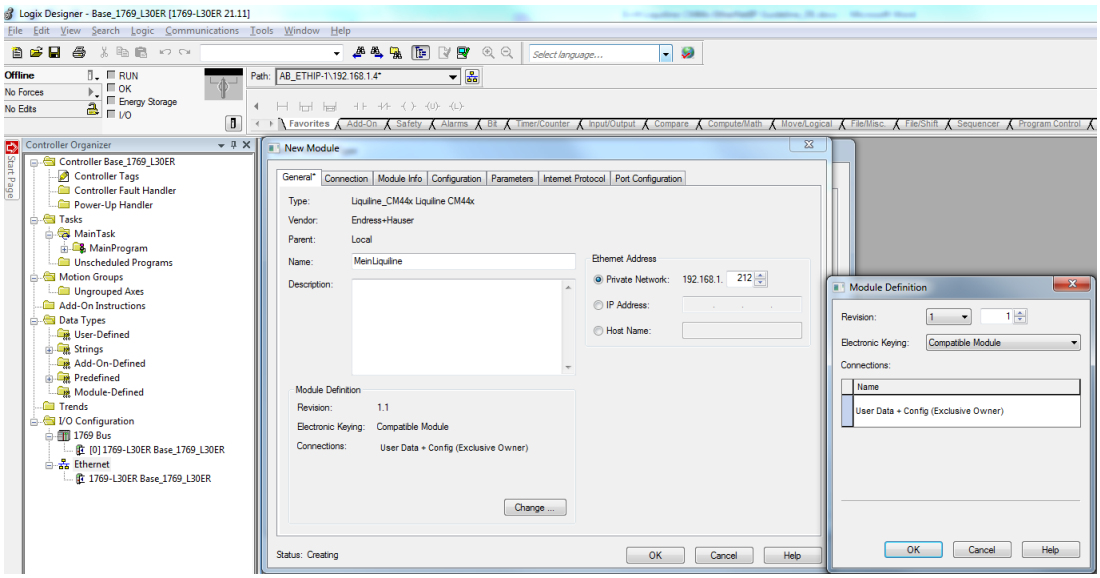
2.3.2.1 Adding a device to the project

Open the device catalog via the menu /File/New Component/New Module/

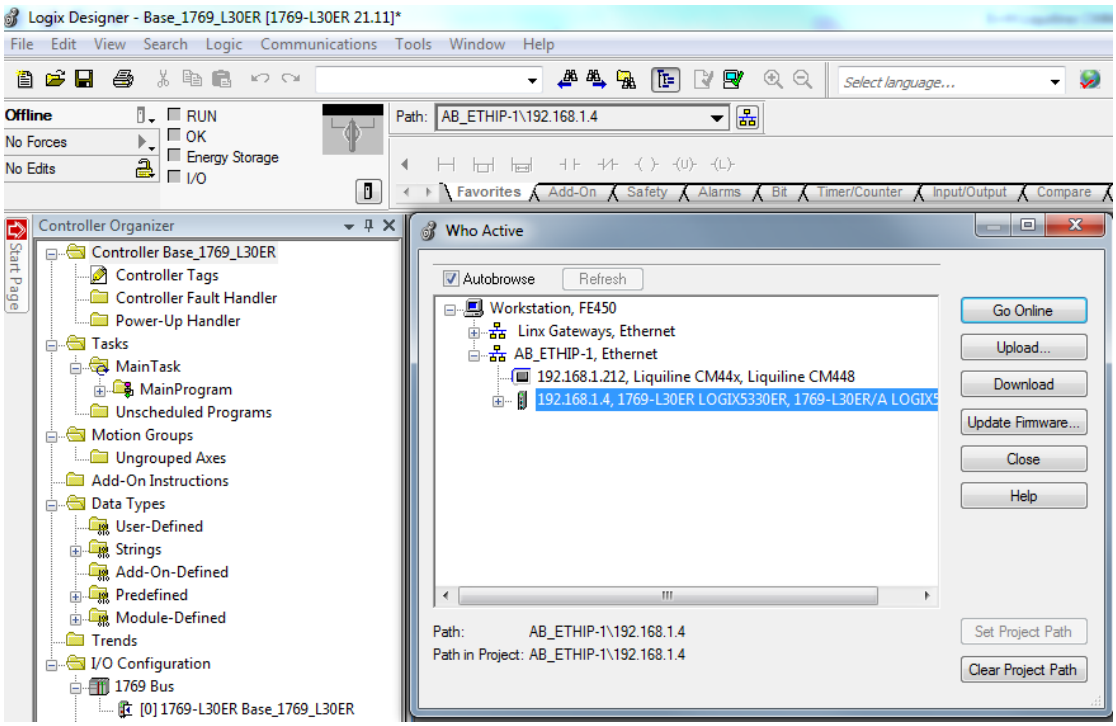


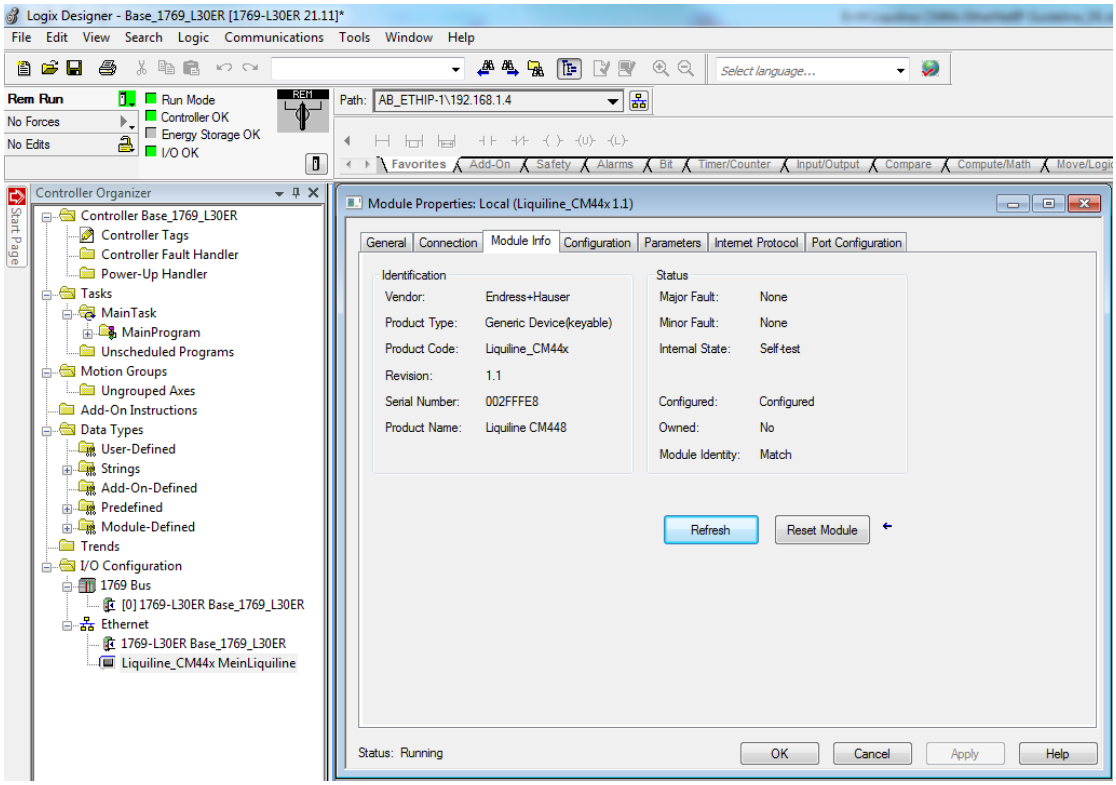
Select "Liquiline CM44x" and click "Create" to add it to the project.

In the screen that follows, enter a name for the device and the device's IP address. Check the connection setting (default: User Data + Config (Exclusive Owner) and change it if necessary.



After downloading, the device appears in the project tree and you can go online with the device.


Logix Designer - Base_1769_L30ER [1769-L30ER 21.11]*
File Edit View Search Logic Communications Tools Window Help
Offline
No Forces
No Edits
RUN
OK
Energy Storage
I/O
Path: AB_ETHIP-1\192.168.1.4
Favorites Add-On Safety Alarms Bit Timer/Counter Input/Output Compare
Controller Organizer
Controller Base_1769_L30ER
Controller Tags
Controller Fault Handler
Power-Up Handler
Tasks
MainTask
MainProgram
Unscheduled Programs
Motion Groups
Ungrouped Axes
Add-On Instructions
Data Types
User-Defined
Strings
Add-On-Defined
Predefined
Module-Defined
Trends
I/O Configuration
1769 Bus
[0] 1769-L30ER Base_1769_L30ER
Who Active
Autobrowse
Refresh
Workstation, FE450
Linx Gateways, Ethernet
AB_ETHIP-1, Ethernet
192.168.1.212, Liquiline CM44x, Liquiline CM448
192.168.1.4, 1769-L30ER LOGIX5330ER, 1769-L30ER/A LOGIX5
Go Online
Upload...
Download
Update Firmware...
Close
Help
Path: AB_ETHIP-1\192.168.1.4
Path in Project: AB_ETHIP-1\192.168.1.4
Set Project Path
Clear Project Path


Logix Designer - Base_1769_L30ER [1769-L30ER 21.11]*
File Edit View Search Logic Communications Tools Window Help
Rem Run
No Forces
No Edits
Run Mode
Controller OK
Energy Storage OK
I/O OK
Path: AB_ETHIP-1\192.168.1.4
Controller Organizer
Controller Base_1769_L30ER
Controller Tags
Controller Fault Handler
Power-Up Handler
Tasks
MainTask
MainProgram
Unscheduled Programs
Motion Groups
Ungrouped Axes
Add-On Instructions
Data Types
User-Defined
Strings
Add-On-Defined
Predefined
Module-Defined
Trends
I/O Configuration
1769 Bus
[0] 1769-L30ER Base_1769_L30ER
Ethernet
1769-L30ER Base_1769_L30ER
Liquiline_CM44x MeinLiquiline
Module Properties: Local (Liquiline_CM44x 1.1)
General Connection Module Info Configuration Parameters Internet Protocol Port Configuration
Identification
Vendor: Endress+Hauser
Product Type: Generic Device(keyable)
Product Code: Liquiline_CM44x
Revision: 1.1
Serial Number: 002FFFE8
Product Name: Liquiline CM448
Status
Major Fault: None
Minor Fault: None
Internal State: Self-test
Configured: Configured
Owned: No
Module Identity: Match
Refresh
Reset Module
Status: Running
OK
Cancel
Apply
Help

3 Operation

3.1 Local operation

3.1.1 Displaying the communication status

The communication symbol ⇆ in the status bar signals access via EtherNet/IP.

Display	Communication	
	EtherNet/IP	Web server
COM – LED	On (yellow)	On (yellow)
Communication symbol ⇆	On (yellow)	On (yellow)

3.1.2 Menu/Diagnostics/System information/Ethernet

Parameter	Options	Info
Enable	Off On (default)	The Ethernet interface is disabled. The Ethernet interface is enabled.
Webserver	Off On (default)	The Web server is disabled. The Web server is enabled.
IP-Address	xxx.xxx.xxx.xxx	
Netmask	xxx.xxx.xxx.xxx	
Gateway	xxx.xxx.xxx.xxx	
MAC-Address	xx:xx:xx:xx:xx:xx	The MAC address cannot be changed. You can find the MAC address printed on the nameplate of the Ethernet module. If the device has been ordered with a pre-installed Ethernet module, you can take the MAC address from the information printed on the inside of the display.
EtherNet/IP port	44818	Fixed value
Webserver TCP Port	80	Fixed value

3.2 Configuration of the EtherNet/IP 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 EtherNet/IP communication. The following device variables are available:

Abbreviation	Name	Info	Example
AI	Analog Input	Device variable that is read from the device	Read measured value
DI	Digital Input	Device variable that is read from the device	Read relay status
AO	Analog Output	Device variable that is written to the device	External controlled variable
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/EtherNetIP	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

Selection of the data sink (actuating values) 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.

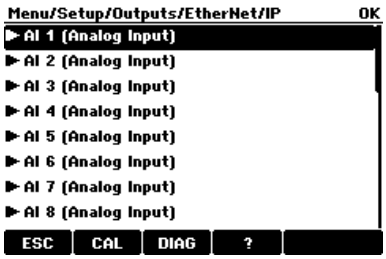
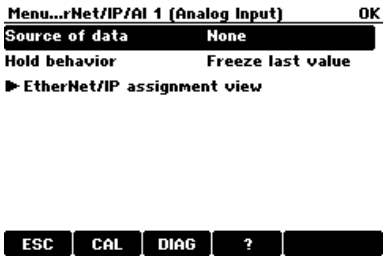
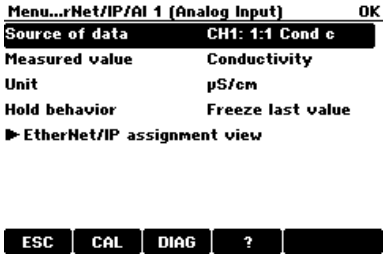
Note that the actuating value is transmitted along with a status via EtherNet/IP. Therefore set the status value to 128 (good).

3.2.1 AI analog values (device → EtherNet/IP)

Path: Menu/Setup/Outputs/EtherNetIP/AI 1 (Analog Input) to 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. For more information and an overview about the available options see main operation manual.
Measured value	Options • None • Depends on the data source Factory setting • None	The measured value that you can choose depends on the option selected under "Source of data". For more information and an overview about the available options see main operation manual.

Function	Options	Info
Unit	Options • Any compatible unit	
Unit text	Textual unit	Visible only for user defined units
Hold behavior	Options • Freeze last value • Status only	Behavior in device or sensor hold state • The last value is hold • A hold does not affect the value

Example		
Step	Action	Result
1	Enter menu /Setup/Outputs/EtherNet/IP	
2	Select an AI device variable, e.g. AI1	
3	Select data source and measurement value Select unit Select hold behavior	

3.2.2 DI digital values (device → EtherNet/IP)

The value mapped to a device variable DI must be configured in the menu:
Menu: /Setup/Outputs/EtherNetIP/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.

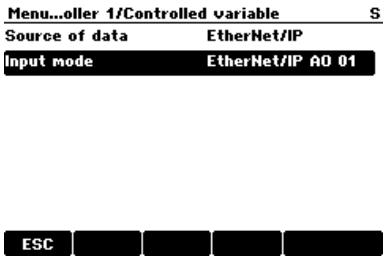
3.2.3 Select analog data sinks for device variables AO

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.

3.2.3.1 Example: Value of controlled variable of PID controller from EtherNet/IP

Menu: /Setup/General Settings/Additional functions/Controller 1/Controlled variable



3.2.3.2 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

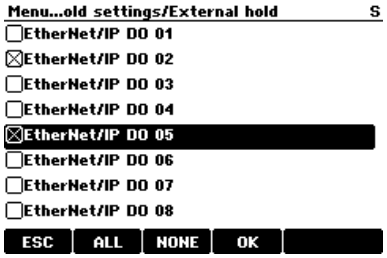
3.2.4 Select digital data sinks for device variables DO

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.

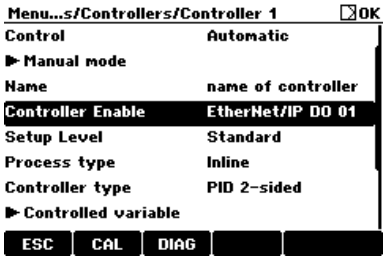
3.2.4.1 Example: Hold over EtherNet/IP

Menu: /Setup/General Settings/Hold Settings/External Hold
Multiple DO signals can be selected. If at least one of these signals is set (1), the hold function is active.



3.2.4.2 Example: Enable or disable PID controller

Menu: /Setup/General Settings/Additional functions/Controller 1/



3.2.4.3 List of data sinks

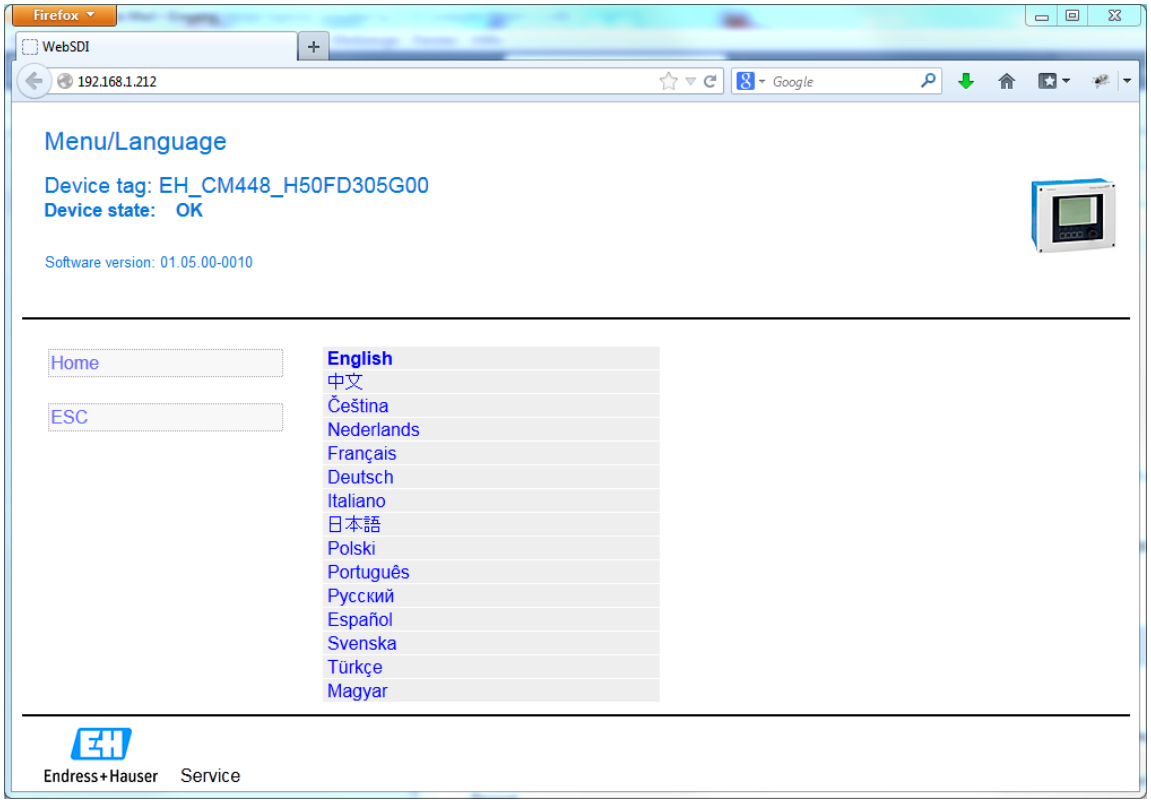
CM44x	CM44P	CSFxx	CA80xx	Menu
x	x	x	x	Setup/Additional functions/Controllers/.../Controller Enable
x	x	x	x	Setup/Additional functions/Cleaning/.../Start signal
x	x	x	x	Setup/General settings/Hold settings/External hold
x	x	x	x	Setup/General settings/Logbooks/Data logbooks/Source of data
x	x	x	x	Setup/Inputs/Sensor/Extended 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

3.3 Web server

3.3.1 Function description

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

All the languages of the local operation system are supported.



3.3.2 Security

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

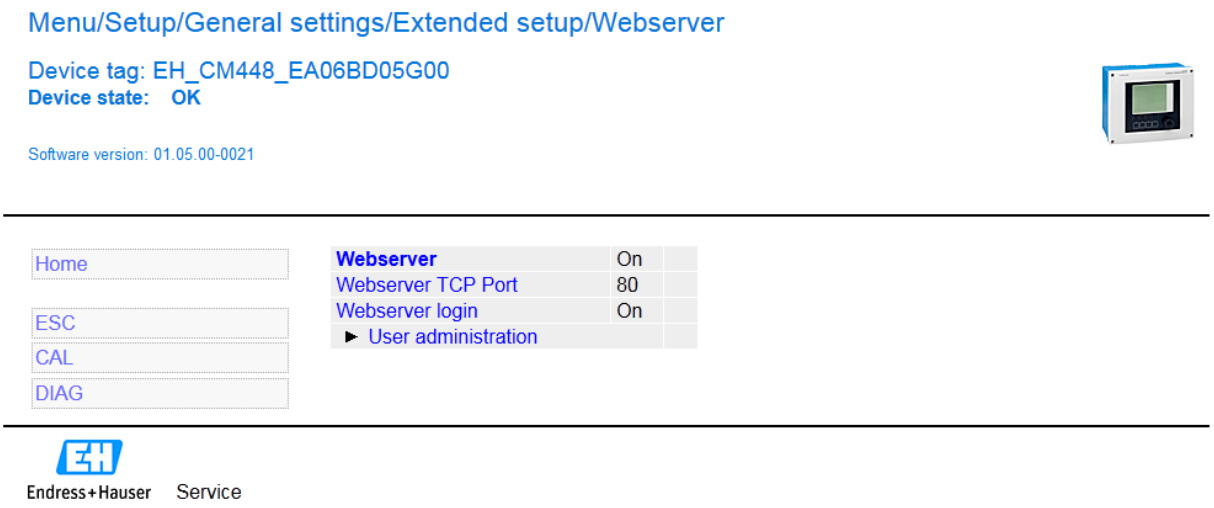
You can disable the Web server via the menu:

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

Furthermore, the Web server can also be disabled via Configuration Assembly 102. This allows you to control access for the Web server via EtherNet/IP.

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

3.3.3 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.

3.3.4 Web server login

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

User name: admin
Password: admin

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

3.3.5 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

3.3.5.1 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.

3.3.5.2 Direct URLs of the logbooks

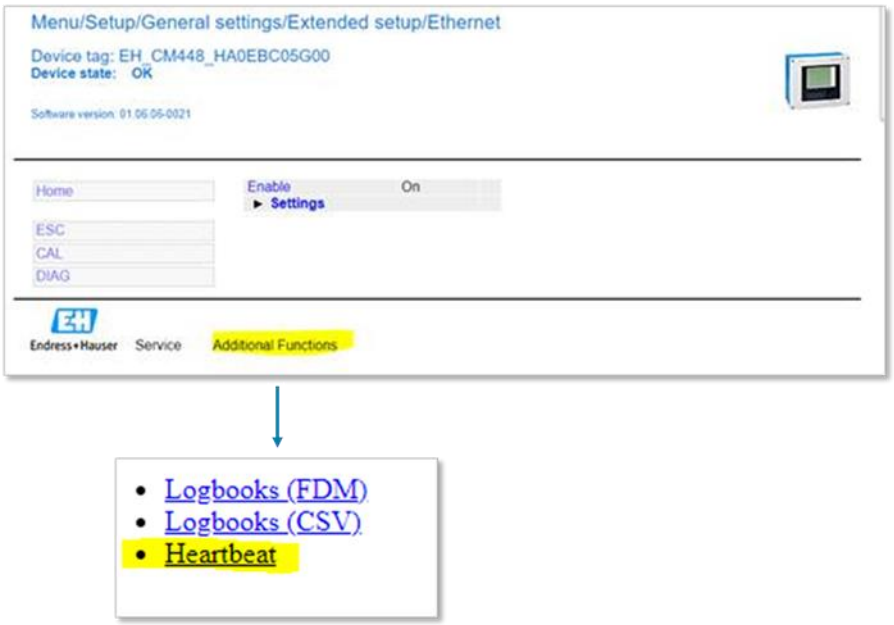
*.csv	*.dat
http://<IP address>/Calibration_logbook.csv	http://<IP address>/Calibration_logbook.dat
http://<IP address>/Diagnostic_logbook.csv	http://<IP address>/Diagnostic_logbook.dat
http://<IP address>/Configuration_logbook.csv	http://<IP address>/Configuration_logbook.dat
http://<IP address>/HW_version_logbook.csv	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.

3.4 Exporting Heartbeat Verification Report

The last Heartbeat Verification Report can be downloaded from:

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



4 Diagnostics and troubleshooting

4.1 General troubleshooting

Problem	Possible cause	Remedial action
The LEDs on the Ethernet module are dark.	The supply voltage does not match the specifications on the nameplate.	Apply the correct supply voltage
The green PWR LED on the Ethernet module is dark.	The PWR LED is lit green once the Ethernet card is fully initialized. If the PWR LED is constantly dark while all the other LEDs are lit, there might be an internal defect in the assembly.	Replace the Ethernet module
No connection via EtherNet/IP	Device plug connected incorrectly	Check pin assignment (especially in the case of an M12 connection)
No connection via EtherNet/IP	The device cannot be reached via the network	Ping the device (in the local network)
No connection via Web server	Web server is disabled	Enable the Web server
No or incomplete display of the contents of the Web server	JavaScript is not enabled	Enable JavaScript
Information not fully displayed in the Web browser	The Web application could not read all the data via the network.	Reload the Web page (refresh)
Measured values via EtherNet/IP have the status 0x04 (Bad:ConfigurationError)	No measured values have been assigned to the device variables (AI, DI).	Assign measured values

4.2 Diagnostic information via light emitting diodes

The following LEDs can be found on the module cover of the Ethernet module:

LED	Name	Color	Meaning
RJ45	LNK/ACT	Green	Off = Connection is not active On = Connection is active Flashing = Data transmission
RJ45	10/100	Yellow	Off = Transmission rate 10 MBps On = Transmission rate 100 MBps
PWR	Power	Green	Supply voltage is applied and the module is initialized
BF	Bus failure	Red	Bus failure
SF	System failure	Red	System failure This LED is lit if at least one diagnostic message with the status "F" (Failure) is active.
COM	Communication	Yellow	Sending or receiving EtherNet/IP or web server message
T	Termination	Yellow	Only RS485 interface: Off = No termination On = Termination is used

4.3 Diagnostic information via Web server

The device status is displayed in the header.

Figure 1 left: device status = ok, right: device status = failure (F)

A complete list of all the active diagnostic messages is provided in the Diagnostics menu.

Previous diagnostic events can be displayed via the diagnostic logbook.

4.4 Diagnostic information via EtherNet/IP

Diagnostic information is cyclically transmitted as part of an IO-connection. The IO-connection consists of an Input assembly, which contains the data transmitted from the device to the plc, and optionally an output assembly which contains data transmitted from the plc to the device.

The Input assembly starts with diagnostic information and is followed by the device variables AI1-16 and DI1-8, which contain the process values.

4.4.1 Input assembly (cyclic data)

The following diagnostic information is transmitted at the beginning of the input assembly:

Input assembly 100	Values	Meaning
Diagnostic code	0 to 999	Diagnostic code
Status signal	0 = Ok 1 = Failure 2 = Function Check 4 = Maintenance 8 = Out of Specification	No error Failure Function check Maintenance required Process condition is out of specification
Channel	0 = Device 1 = Sensor channel 1 2 = Sensor channel 2 3 = Sensor channel 3 4 = Sensor channel 4 5 = Sensor channel 5 6 = Sensor channel 6 7 = Sensor channel 7 8 = Sensor channel 8	Channel number

Each device variable consists of three elements:

- Value
- Status
- Unit (optional)

The status byte provides information about the reliability and the usability (quality) of the value of the particular device variable.

Status		Quality	Sub-status	Meaning
hex	dec			
0x80	128	Good	Ok	The measured value is valid and can be used.
0x40	64	Uncertain	NonSpecific	The reliability of the measured value is limited. Check the diagnostic messages of the device.
0x0C	12	Bad	DeviceFailure	The measured value cannot be used. Check the diagnostic messages of the device.
0x04	4	Bad	ConfigurationError	No data source has been selected. Check the device configuration (Section 3.2)

4.4.2 Output assembly (cyclic data)

Like the device variables of the input assembly, each AO and DO device variable of the Output assembly contains a status. The status is interpreted by the device as described in the following table.

hex	dec	Quality	Meaning
>= 0x80	>= 128	Good	The actuating value is used
< 0x80 >= 0x40	< 128 >= 64	Uncertain	The actuating value is not used.
< 0x40	< 64	Bad	The actuating value is not used.

4.4.3 Explicit messages (acyclic data)

Using the GetAttributeSingle Service you can read out the following information for the device and for each of the connected sensors via attributes from the application objects.

More information about the parameters is provided in the appendix to this document.

The attributes containing diagnosis information are in the common object (chapter 0), and in the sensor object (chapter 0).

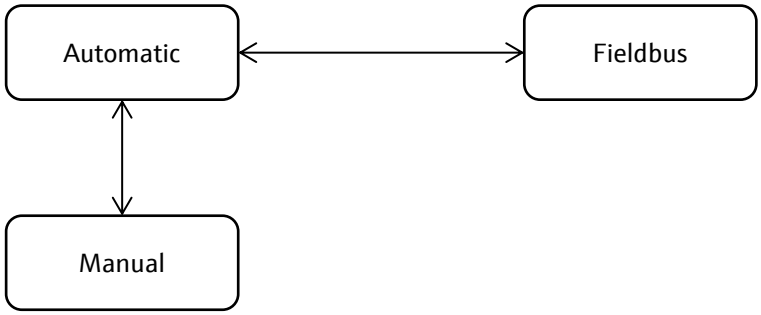
5 Applications

5.1 CA80xx: How to start Measurement, Calibration and Cleaning

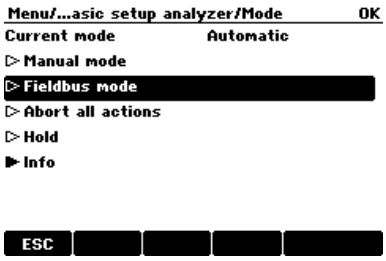
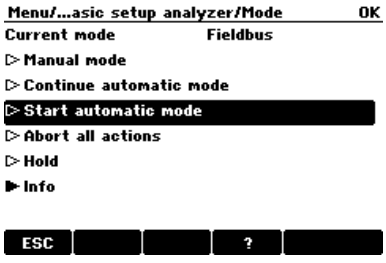
This chapter applies only to the Liquiline CA80xx analyzer.

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

The operation mode “Fieldbus” can be activated either by EtherNet/IP or the device menu.



5.1.1 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.	
2	Activate the “Fieldbus mode”.	

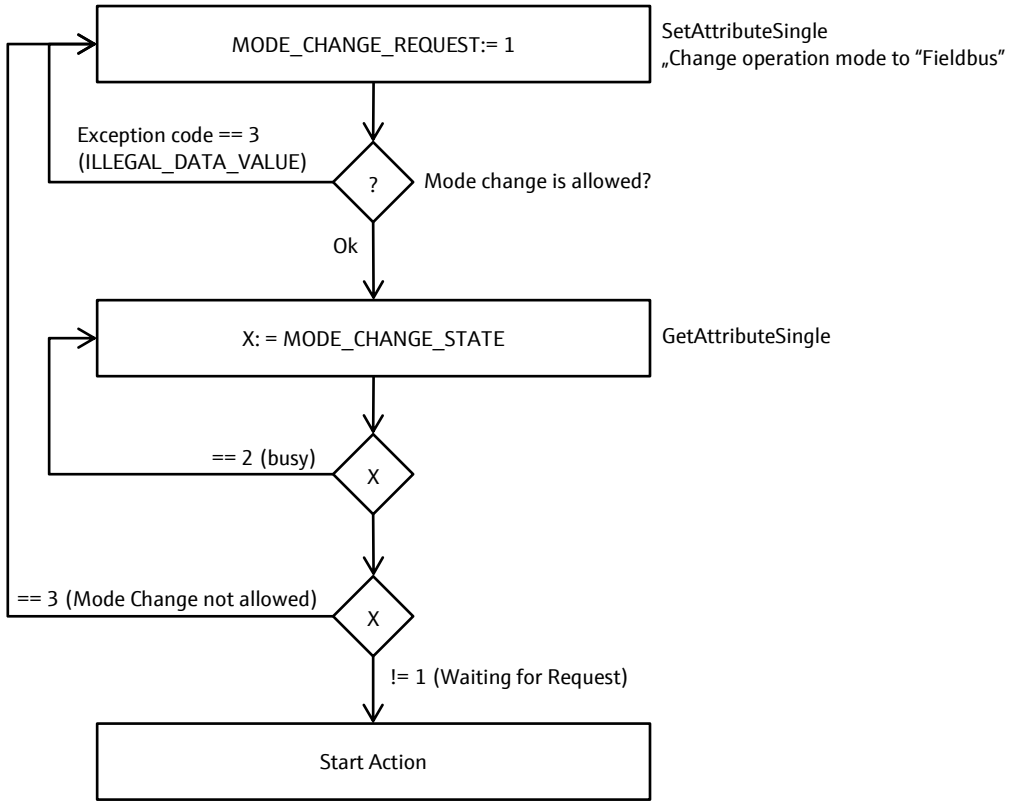
The operation mode can be changed at any time using the device menu. The setting of the device menu has priority over the setting by EtherNet/IP. This is a safety measure to prevent the start of actions over EtherNet/IP while the analyzer is in operation mode “Manual” during maintenance work.

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

5.1.2 Activate “Fieldbus”-mode using EtherNet/IP

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 EtherNet/IP communication, e.g. because it is switched off
- A write access to a register fails and an exception code is returned in the EtherNet/IP reply
- A read access to a register fails and an exception code is returned in the EtherNet/IP reply
- The analyzer is switched temporarily to manual mode during maintenance

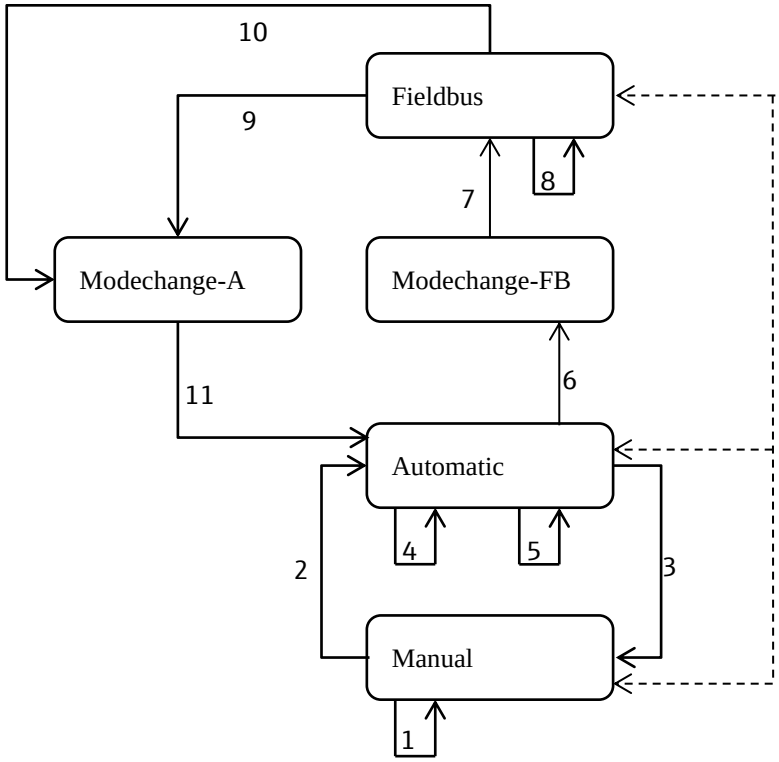


The following examples in Pseudocode show how a program can access the functionality over EtherNet/IP.

```
// 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
```

5.1.3 State machine

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



The mode can be changed by the device menu at any time, e.g. during maintenance work the mode is typically changed to "Manual".

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

5.1.4 How-to execute actions

5.1.4.1 How-to execute a Measurement

The analyzer has to 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 EtherNet/IP 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 EtherNet/IP 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.

5.1.4.2 How-to run a Calibration

The analyzer has to 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 EtherNet/IP 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 EtherNet/IP write requests gets an error response. An error is also, if a measurement shall be executed and another action is running. As the above pseudo code shows, this will be detected as an error.

5.1.4.3 How-to start a Cleaning

The analyzer has to 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 EtherNet/IP 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 EtherNet/IP write requests gets an error response. An error is also, if a measurement shall be executed and another action is running. As the above pseudo code shows, this will be detected as an error.

5.1.4.4 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
```

5.1.4.5 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
  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 EtherNet/IP.

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

5.1.5 EtherNet/IP Attributes

5.1.5.1 Analyzer Manual Actions

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

Object	Analyzer			
Class-Id	313hex			
Instance	1			
Index	Attribute	Data Type	Access	Description
21	ModeChangeRequest	INT	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.
22	AbortActionRequest	INT	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
23	ManualActionRequest	INT	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

5.1.5.2 Analyzer manual actions state

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

Object	Analyzer			
Class-Id	313hex			
Instance	1			
Index	Attribute	Data Type	Access	Description
24	ModeChangeState	INT	R	This parameter reads the status of the mode change. Allowed values: 0: Waiting for Request: The analyzer is waiting for a request. 1: Busy: Writing the parameter “Mode change request” was accepted. Mode change is in progress. 2: Mode Change not allowed: The analyzer is in operation mode that the fieldbus is not allowed to change (like manual mode).
25	ActionRequestState	INT	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. 3: Other activity in progress 32: Current action abort in progress 33: Measurement started 34: Calibration started 35: Cleaning started 36: Reference sample inspection in progress 37: Calibration zero-point in progress 38: Calibration calibration factor in progress 64: Current activity aborted 65: Measurement finished 66: Calibration finished 67: Cleaning finished 68: Reference sampe inspection finished 69: Calibration zero point finished 70: Calibration calibration factor finished 96: Reference sample inspection failed 97: Measurement not successful 98: Calibration not successful 99: Cleaning not successful

				101: Calibration zero point failed 102: Calibration calibration factor failed

5.2 Calibration history of Memosens sensors

Some Memosens sensors (e.g., CLS82E) can store up to 8 historic user calibrations in addition to its factory- and reference calibration data set. The active data set to read is selected by writing attribute CalSelectDataSet. For sensors supporting multiple types of calibration, e.g., a pH/ORP-Sensor has separate calibration memory for pH and ORP. You can select the calibration set with attribute CalSelectDataSetType.

The actual data is read from the assembly instances, see chapter 6.5.2.

6 Tables

6.1 Technical data

Protocols		EtherNet/IP
ODVA certification		Yes
Communication type		Ethernet
Connection		1 RJ45, optional M12 (D-coded)
Device profile		Generic device (product type: 0x2B)
Manufacturer ID		0x049E
Device type ID		0x109C
Baud rates		10/100 MBps
Polarity		Auto-MDI-X
Connections (max.)	CIP	12
	I/O	6
	Explicit message	6
	Multicast	3 consumers
Minimum RPI		100 ms (default)
Maximum RPI		10000 ms
System integration	EtherNet/IP	EDS
	Rockwell	Add-on-Profile Level 3 Faceplate for FactoryTalk SE
Web server		Full operation (1 session) Web server can be switched off
IO data	Input (T→O)	Device status and diagnostic message with highest priority Measured values: • 16 AI (analog input) + Status + Unit • 8 DI (discrete input) + Status
	Output (O→T)	Actuating values: • 4 AO (analog output) + Status + Unit • 8 DO (discrete output) + Status

6.1.1 Connections

User Data + Config (Exclusive Owner)	Assembly instance	Size [byte]
O → T	101	64
T → O	100	168
Configuration	102	8
User Data + Config (Input Only)	Assembly instance	Size [byte]
O → T	199	0
T → O	100	168
Configuration	102	8
User Data (Exclusive Owner)	Assembly instance	Size [byte]
O → T	101	64
T → O	100	168
Configuration	103	0
User Data (Input Only)	Assembly instance	Size [byte]
O → T	199	0
T → O	100	168
Configuration	103	0

6.2 Units

Unit code	Symbol	Name	Standard unit
0xC00	1/K	LfTempCompensation	1/K
0x1A03	nAs	NanoAmpereSeconds	As
0x1A02	µAs	MicroAmpereSeconds	As
0x1A00	As	AmpereSeconds	As
0xC01	ppb	ppb	%
0x1002	ppm	ppm	%
0x1007	%	Percent	%
0x878	%SAT	PercentSaturation	%
0x8E2	1/mm	PerMilliMeter	1/m
0x8E0	1/cm	PerCentiMeter	1/m
0x8E1	1/m	PerMeter	1/m
0xC02	g/kg	GramPerKilogram	g/kg
0xC03	ppmVol	ppmVol	%Vol
0x87C	%Vol	PercentVol	%Vol
0xC04	%/K	PercentPerKelvin	%/K
0xC05	%/µV	PercentPerMicroVolt	%/V
0xC06	%/mV	PercentPerMilliVolt	%/V
0xC07	%/V	PercentPerVolt	%/V
0x1B02	µS	MicroSiemens	S
0x1B01	mS	MilliSiemens	S
0x1B00	S	Siemens	S
0x1C05	pA	PicoAmpere	A
0x1C04	nA	NanoAmpere	A
0x1C03	µA	MicroAmpere	A
0x1C02	mA	MilliAmpere	A
0x1C00	A	Ampere	A
0xC08	nA/(mg/l)	NanoAmperePerMilligramPerLiter	A/(kg/m³)
0xC09	A/(kg/m³)	AmperePerKilogramPerCubicMeter	A/(kg/m³)
0xC0A	A/Pa	AmperePerPascal	A/Pa
0xC0B	pA/hPa	PicoAmperePerHektoPascal	A/Pa
0xC0C	A/hPa	AmperePerHektoPascal	A/Pa
0x1703	°	Degree	°
0xC0D	FNU	Formazine_Nephelometric	FNU
0xC0E	NTU	Nephelometric_Turbidity	FNU
0x1F00	Hz	Hertz	Hz
0x1F07	1/min	OnePerMinute	Hz
0x1F08	1/h	OnePerHour	Hz
0x1F09	1/d	OnePerDay	Hz
0xC0F	KByte	Kilobytes	KByte
0x2203	mm	MilliMeter	m
0x2202	cm	CentiMeter	m
0xC10	dm	DeciMeter	m

Unit code	Symbol	Name	Standard unit
0x2200	m	Meter	m
0x2201	km	KiloMeter	m
0x2F0E	g/ml	GramPerMilliLiter	kg/m³
0x2F11	µg/l	MicroGramPerLiter	kg/m³
0xC11	mg/l	MilliGramPerLiter	kg/m³
0x2F0F	g/l	GramPerLiter	kg/m³
0xC12	kg/l	KiloGramPerLiter	kg/m³
0x2F07	kg/m³	KiloGramPerCubicMeter	kg/m³
0xC13	ppb	ppb_density1	kg/m³
0xC14	ppm	ppm_density1	kg/m³
0xC15	pH	PH	pH
0xC16	mm/s	MilliMeterPerSecond	m/s
0xC17	mm/min	MilliMeterPerMinute	m/s
0xC18	mm/h	MilliMeterPerHour	m/s
0xC19	mm/d	MilliMeterPerDay	m/s
0x1309	Pa	Pascal	Pa
0xC1A	hPa	HectoPascal	Pa
0x1308	mbar	MilliBar	Pa
0xC1B	Pa/A	PascalPerAmpere	Pa/A
0xC1C	PSU	PSU	PSU
0x2801	mΩ	MilliOhm	Ω
0x2800	Ω	Ohm	Ω
0x2806	kΩ	KiloOhm	Ω
0x2807	MΩ	MegaOhm	Ω
0x2808	GΩ	GigaOhm	Ω
0xC1D	rH	rH	rH
0x8DB	µS/mm	MicroSiemensPerMilliMeter	S/m
0x8DF	nS/cm	NanoSiemensPerCentiMeter	S/m
0x8D9	µS/cm	MicroSiemensPerCentiMeter	S/m
0x8DD	mS/cm	MilliSiemensPerCentiMeter	S/m
0x8E3	S/cm	SiemensPerCentiMeter	S/m
0x8DA	µS/m	MicroSiemensPerMeter	S/m
0x8DE	mS/m	MilliSiemensPerMeter	S/m
0x8E4	S/m	SiemensPerMeter	S/m
0x8D6	kS/m	KiloSiemensPerMeter	S/m
0x8D7	MS/m	MegaSiemensPerMeter	S/m
0xC1E	nΩm	NanoOhmMeter	Ωm
0xC1F	µΩm	MicroOhmMeter	Ωm
0xC20	mΩm	MilliOhmMeter	Ωm
0xC21	Ωm	OhmMeter	Ωm
0xC22	kΩm	KiloOhmMeter	Ωm
0xC23	MΩm	MegaOhmMeter	Ωm
0xC24	GΩm	GigaOhmMeter	Ωm
0x2809	Ωcm	OhmCentiMeter	Ωm

Unit code	Symbol	Name	Standard unit
0xC25	kΩcm	KiloOhmCentiMeter	Ωm
0xC26	MΩcm	MegaOhmCentiMeter	Ωm
0x1200	°C	Celsius	°C
0x1202	K	Kelvin	°C
0xC27	°C	DeltaCelsius	°C
0xC28	K	DeltaKelvin	°C
0x1102	µs	MicroSeconds	s
0x1101	ms	MilliSeconds	s
0x1100	s	Seconds	s
0x1103	min	Minutes	s
0x1104	h	Hours	s
0x1105	d	Days	s
0xC29	week(s)	Weeks	s
0xC2A	month(s)	Month	month(s)
0x1406	l/s	LiterPerSecond	m^3/s
0x1405	m^3/s	CubicMeterPerSecond	m^3/s
0x1413	l/min	LiterPerMinute	m^3/s
0x826	m^3/min	CubicMeterPerMinute	m^3/s
0x1414	l/h	LiterPerHour	m^3/s
0x825	m^3/h	CubicMeterPerHour	m^3/s
0x848	l/d	LiterPerDay	m^3/s
0x824	m^3/d	CubicMeterPerDay	m^3/s
0x2D02	µV	MicroVolt	V
0x2D01	mV	MilliVolt	V
0x2D00	V	Volt	V
0xC2B	mV/%	MilliVoltPerPercent	V/%
0xC2C	V/%	VoltPerPercent	V/%
0xC2D	mV/pH	MilliVoltPerPH	V/pH
0xC2E	V/pH	VoltPerPH	V/pH
0x2E03	ml	MilliLiter	m^3
0x2E02	l	Liter	m^3
0x2E01	m^3	CubicMeter	m^3
0x2207	inch	Inch	m
0x2208	ft	Feet	m
0x2209	yd	Yards	m
0x220A	mi	Miles	m
0x2B07	in/s	InchPerSecond	m/s
0xC2F	inch/min	InchPerMinute	m/s
0xC30	inch/h	InchPerHour	m/s
0xC31	inch/d	InchPerDay	m/s
0x1201	°F	Fahrenheit	°C
0xC32	°F	DeltaFahrenheit	°C
0x1408	gps	GallonPerSecond	m^3/s
0x8CE	cfs	CubicFeetPerSecond	m^3/s

Unit code	Symbol	Name	Standard unit
0x84D	mgs	MegaGallonPerSecond	m^3/s
0x1409	gpm	GallonPerMinute	m^3/s
0x1402	cfm	CubicFeetPerMinute	m^3/s
0x84C	mgm	MegaGallonPerMinute	m^3/s
0x140A	gph	GallonPerHour	m^3/s
0x8CD	cfh	CubicFeetPerHour	m^3/s
0x84B	mgh	MegaGallonPerHour	m^3/s
0x827	gpd	GallonPerDay	m^3/s
0x8CC	cfd	CubicFeetPerDay	m^3/s
0x84A	mgd	MegaGallonPerDay	m^3/s
0x2E08	gal	Gallons	m^3
0x2E06	cf	CubicFeet	m^3
0x1601	mol/m^3	MolPerCubicMeter	mol/m^3
0xC33	mol/l	MolPerLiter	mol/m^3
0xC34	%TS	PerCentTS	kg/m^3
0x1307	bar	Bar	Pa
0x2205	nm	NanoMeter	m
0x2B00	m/s	MeterPerSecond	m/s
0x2B06	ft/s	FeetPerSecond	m/s
0xC35	MByte	Megabytes	KByte
0x1006	Byte	Bytes	KByte
0xC36	GByte	Gigabytes	KByte
0xC37	pA/(mg/l)	PicoAmperePerMilligramPerLiter	$A/(kg/m^3)$
0xC38	kg/mol	KiloGramPerMol	kg/mol
0xC39	g/mol	GramPerMol	kg/mol
0xC3D	FTU	Formazine_Turbidity_Unit	FNU
0xC3E	TE/F	Turbidity_Formazine	FNU
0xC3F	ASBC	American_Society_of_Brewing_Chemists	FNU
0xC40	EBC	European_Brewing_Convention	FNU
0xC41	度	Dough	kg/m^3
0xC42	mg/l	MilliGramPerLiterPercent	%
0xC43	AU	AbsorbanceUnit	AU
0xC44	%T	PercentTransmission	%T
0xC45	OD	OpticalDensity	AU
0xC46	ml/min	MilliLiterPerMinute	m^3/s
0xC47	eq	Equivalent	eq
0xC48	eq/m^3	EquivalentPerCubicMeter	eq/m^3
0xC49	eq/l	EquivalentPerLiter	eq/m^3
0xC4A	eq/gal	EquivalentPerGallon	eq/m^3
0xC4B	°C/s	CelsiusPerSecond	°C/s
0xC4C	°C/min	CelsiusPerMinute	°C/s
0xC4D	FAU	FormazineAttenuationUnit	FNU
0xC4E	Ah	AmpereHours	As
0xC4F	m/h	MeterPerHour	m/s

Unit code	Symbol	Name	Standard unit
0xC3A	1/Pa	PerPascal	1/Pa
0xC3B	1/hPa	PerHectoPascal	1/Pa
0xC3C	1/MPa	PerMegaPascal	1/Pa

6.3 Data types

6.3.1 DS01 – Analog process value

Byte	Size	Data type	Name	Info
0	4	REAL	Value	AIxx.Value
5	2	INT	Status	AIxx.Status
7	2	ENGUNIT	Unit	AIxx.Unit

6.3.2 DS02 – Discrete process value

Byte	Size	Data type	Name	Info
0	2	INT	Value	DIxx.Value
2	2	INT	Status	DIxx.Status

6.3.3 STRING (SHORT_STRING according EtherNet/IP specification)

Byte	Size	Data type	Name	Info
0	1	SINT	Length	N: Size of the string in number of characters
1…N	N	SINT	Text	Character string based on ISO-8859-1

6.3.4 DATE

Byte	Size	Data type	Name	Range
0…3	2	WORD	Days since 1972-01-01	0 to 65535

6.3.5 TIME_OF_DAY

Byte	Size	Data type	Name	Range
0…3	4	DWORD	Milliseconds since midnight	0 to 86399999

6.3.6 DURATION

The total duration consists of the partial duration in seconds and the partial duration in days.

Byte	Size	Data type	Name	
0…3	4	UDINT	Seconds	Duration in seconds
4…5	2	UINT	Days	Duration in days

6.4 Status byte

6.4.1 Measured value (device → scanner)

Status		Quality	Sub-status	Meaning
hex	dec			
0x80	128	Good	Ok	The measured value is valid and can be used.
0x40	64	Uncer-tain	NonSpecific	The reliability of the measured value is limited. Check the diagnostic messages of the device.
0x0C	12	Bad	DeviceFailure	The measured value cannot be used. Check the diagnostic messages of the device.
0x04	4	Bad	ConfigurationError	No data source has been selected. Check the device configuration (Section 3.2).

6.4.2 Actuating value (Scanner → Device)

hex	dec	English	German	Meaning
>= 0x80	>= 128	Good	Gut	The actuating value is used.
< 0x80 >= 0x40	< 128 >= 64	Uncertain	Unsicher	The actuating value is not used.
< 0x40	< 64	Bad	Schlecht	The actuating value is not used.

6.5 Device-specific objects

6.5.1 Assembly object, class code = 04h, IO-Assemblies

6.5.1.1 Input assembly, instance = 64h (100dec)

Byte	Size	Type	Name	Info
0	4	DWORD	Status	0 = Connection o.k.
4	2	INT	DiagnoseCode	0 to 999: diagnostics code
6	1	SINT	StatusSignal	Status signal according to Namur NE107 See Section 4.4.1
7	1	SINT	Channel	Channel assignment of diagnostics 0 = device, 1 to 8 = sensor 1 to 8
8	8	DS01	AI01	See Section 3.2.1
16	8	DS01	AI02	
24	8	DS01	AI03	
32	8	DS01	AI04	
40	8	DS01	AI05	
48	8	DS01	AI06	
56	8	DS01	AI07	
64	8	DS01	AI08	
72	8	DS01	AI09	
80	8	DS01	AI10	
88	8	DS01	AI11	
96	8	DS01	AI12	
104	8	DS01	AI13	
112	8	DS01	AI14	
120	8	DS01	AI15	
128	8	DS01	AI16	
136	4	DS02	DI01	See Section 3.2.2
140	4	DS02	DI02	
144	4	DS02	DI03	
148	4	DS02	DI04	
152	4	DS02	DI05	
156	4	DS02	DI06	
160	4	DS02	DI07	
164	4	DS02	DI08	

6.5.1.2 Output assembly, instance = 65h (101dec)

Byte	Size	Type	Name	Info
0	8	DS01	AO01	See Section 0
8	8	DS01	AO02	
16	8	DS01	AO03	
24	8	DS01	AO04	
32	4	DS02	DO01	See Section 0
36	4	DS02	DO02	
40	4	DS02	DO03	
44	4	DS02	DO04	
48	4	DS02	DO05	
52	4	DS02	DO06	
56	4	DS02	DO07	
60	4	DS02	DO08	

6.5.1.3 Configuration assembly, instance = 66h (102dec)

Byte	Size	Type	Name	Info
0	4	DWORD	ConfigHeaderValue	Constant value = 0x00000000
4	1	SINT	Reserved	
5	1	SINT	WebserverEnable	0: Off 1: On (factory setting)
6	1	SINT	Reserved	
7	1	SINT	Reserved	

6.5.2 Assembly object, class code = 04h, Heartbeat (requires activation code)

Without activation code these registers read back with the value 0.

All data within the Heartbeat assemblies is read-only.

The Heartbeat Monitoring assemblies are mapped to deliver additional status information about the sensor in addition to the parameters available in the standard sensor objects. For each sensor channel and sensor type a register block is defined, which can be read with one GetSingleAttribute request to attribute 3 of the choosen instance of the assembly object.

Attributes holding a timestamp have the CIP data type LINT and are encoded as data structure:

Byte	Description
0	Millisecond (0...59999), low byte
1	Millisecond (0...59999), high byte
2	Minute (0...59)
3	Hour (0...59)
4	Day of month (1...31)
5	Month (1...12)
6	Year (0...255) / 0 = 1900
7	Not used

6.5.2.1 Sizes of Heartbeat Assembly Instances for different Software-Versions

Future software version may increase the size of the Heartbeat instance up to a maximum of 400 bytes.

Instance	Sensor	Device Software Version						
		1.06.00+	1.06.04+	1.06.06+	V1.06.08+	V1.10.00+	V1.11.00+	V1.12.00+
		Size of assembly instance in bytes						
111...118	pH	108	108	124	124	132	132	132
119...126	Conductivity	104	104	104	104	104	128	128
127...134	Disinfection	106	164	164	164	164	164	164
135...142	Oxygen	128	128	164	210	210	210	210
143...150	SAC	72	72	76	76	76	76	76
151...158	CUS	63	67	67	67	67	67	67
159...166	ISE	156	156	156	156	156	156	156
167...174	Nitrate	68	68	68	72	72	72	72
175...182	Fluoresence	Not availabe						168

6.5.2.2 Sensor pH, instance = 111 (Sensor 1) to 118 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis appearance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor

Index	Offset	Attribute	Data type	Unit	Description
4	24	DateOfLastCalibration	LINT	None	Date of the last successful calibration of the sensor
5	28	Slope	REAL	V/pH	Slope
6	32	DeltaSlope	REAL	V/pH	Difference of slope between current and last calibration
7	36	ZeroPoint	REAL	pH	Zero point
8	40	DeltaZeroPoint	REAL	pH	Difference of zero point between current and last calibration
9	44	GlassImpedance	REAL	MOhm	Glas impedance
10	48	ReferenceImpedance	REAL	kOhm	Reference impedance
11	52	TemperatureOffset	REAL	K	Temperature offset
12	56	ISFETLeakCurrent	REAL	Ampere	Leakage current
13	60	ExtremeSpecificMin	REAL	None	Min. measured value
14	64	ExtremeTempMin	REAL	°C	Min. measured temperature value
15	68	ExtremeSpecificMax	REAL	None	Max. measured value
16	72	ExtremeTempMax	REAL	°C	Max. measured temperature value
17	76	OpTimeTotal	REAL	s	Operating hours of connected sensor
18	80	OperationAbove80C	REAL	s	Operating time >80°C
19	84	OperationAbove100C	REAL	s	Operating time >100°C
20	88	OperationBelowNeg300mV	REAL	s	Operating time <-300mV (pH)
21	92	OperationAbovePos300mV	REAL	s	Operating time >300mV (pH)
22	94	OpTimeSterilisations	INT	None	Number of sterilisation cycles
23	96	OpTimeCipCycles	INT	None	Number of clean in place cycles
24	98	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
25	99	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
26	100	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU

Index	Offset	Attribute	Data type	Unit	Description
					24: Disinfection 25: Spectrometer 28: Fluorescence
27	104	TemperatureSlope	REAL	None	Temperature slope (2-point temp. calibration)
28	108	CalibBuffer1	REAL	None	The pH value of buffer 1
29	112	CalibBuffer2	REAL	None	The pH value of buffer 2
30	116	CalibBuffer3	REAL	None	The pH value of buffer 3

6.5.2.3 Sensor Conductivity, instance = 119 (Sensor 1) to 126 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastCalibration	LINT	None	Date of the last successful slope calibration of the sensor
5	28	CellConstant	REAL	1/m	Cell constant
6	32	DeltaCellConstant	REAL	1/m	Difference of cell constant between current and last calibration
7	36	TemperatureOffset	REAL	K	Temperature offset
8	40	ExtremeSpecificMin	REAL	S/m	Min. measured value
9	44	ExtremeTempMin	REAL	°C	Min. measured temperature value
10	48	ExtremeSpecificMax	REAL	S/m	Max. measured value
11	52	ExtremeTempMax	REAL	°C	Max. measured temperature value
12	56	OpTimeTotal	REAL	s	Operating hours of connected sensor
13	60	OpTimeBelow5C	REAL	s	Operating time <5°C
14	64	OpTimeAbove80C	REAL	s	Operating time >80°C
15	68	OpTimeAbove100C	REAL	s	Operating time >100°C(Cond 4pol, Cond Entity 2pol, Cond Entity 4pol)
16	72	OpTimeAbove120C	REAL	s	Operating time >120°C(Cond, Cond 4pol, Cond Entity 2pol, Cond Entity 4pol)
17	76	OpTimeAbove125C	REAL	s	Operating time >125°C(Cond i.)
18	80	OpTimeAbove140C	REAL	s	Operating time >140°C(Cond, Cond 4pol, Cond Entity 4pol)
19	84	OpTimeAbove150C	REAL	s	Operating time >150°C(Condi, Cond Entity 2pol)
20	88	OpTimeAbove80CBelow100nSpercm	REAL	s	Operating time <100nS (cond.)
21	90	OpTimeSterilisations	INT	None	Number of sterilisation cycles
22	92	OpTimeCipCycles	INT	None	Number of clean in place cycles
23	94	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
24	95	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
25	96	ActiveSensorType		None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass

Index	Offset	Attribute	Data type	Unit	Description
					4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence
26	100	TemperatureSlope	REAL	None	Temperature slope (2-point temp. calibration)
27	104	CapOpTimeAboveT1	REAL	s	Operating time above temperature T1
28	108	CapOpTimeAboveT2	REAL	s	Operating time above temperature T2
29	112	CapOpTimeAboveT3	REAL	s	Operating time above temperature T3
30	116	CapOpTimeAboveT4	REAL	s	Operating time above temperature T4
31	117	OpTimeThresholdAboveT1	SINT	°C	Threshold in [°C] for operating counter Tenperature1
32	118	OpTimeThresholdAboveT2	SINT	°C	Threshold in [°C] for operating counter Tenperature2
33	119	OpTimeThresholdAboveT3	SINT	°C	Threshold in [°C] for operating counter Tenperature3
34	120	OpTimeThresholdAboveT4	SINT	°C	Threshold in [°!C] for operating counter Tenperature4

6.5.2.4 Sensor Disinfection, instance = 127 (Sensor 1) to 134 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastSlopeCalibration	LINT	None	Date of the last successful slope calibration of the sensor
5	32	DateOfLastZeroPointCalibration	LINT	None	Date of the last successful zero-point calibration of the sensor
6	36	Slope	REAL	A/(kg/m³)	Slope
7	40	DeltaSlope	REAL	A/(kg/m³)	Difference of slope between current and last calibration
8	44	ZeroPoint	REAL	A	Zero point
9	48	DeltaZeroPoint	REAL	A	Difference of zero point between current and last calibration
10	52	TemperatureOffset	REAL	K	Temperature offset
11	56	ChargeCounter	REAL	As	Charge (electrical)
12	60	ExtremeSpecificMin	REAL	None	Min. measured value
13	64	ExtremeTempMin	REAL	°C	Min. measured temperature value
14	68	ExtremeSpecificMax	REAL	None	Max. measured value
15	72	ExtremeTempMax	REAL	°C	Max. measured temperature value

Index	Offset	Attribute	Data type	Unit	Description
16	76	OpTimeTotal	REAL	s	Operating hours of connected sensor
17	80	OpTimeAbove15C	REAL	s	Operating time > 15°C
18	84	OpTimeAbove30C	REAL	s	Operating time > 30°C
19	88	OpTimeAboveMinus20nA	REAL	s	Operating time > -20 nA
20	92	OpTimeAboveMinus100nA	REAL	s	Operating time > -100 nA
21	94	NumberOfCapCalibrations	INT	None	Number of sensor-cap calibrations
22	96	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
23	97	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
24	98	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence
25	100	NumOfCalibrations	INT	None	Number of calibrations
26	102	NumOfSIP	INT	None	Number of sterilisations
27	104	NumOfCIP	INT	None	Number of clean in place cycles
28	106	NumOfAutoclavings	INT	None	Number of autoclavings
29	108	NumOfSIPCap	INT	None	Number of sterilisation cycles for cap
30	110	NumOfCIPCap	INT	None	Number of clean in place cycles for cap
31	112	NumOfAutoclavingsCap	INT	None	Number of autoclavings for cap
32	116	ElectrolyteCapacity	REAL	As	Electrolyte capacity
33	120	OpTimeAboveT3	REAL	s	Operating hours above a temperature of T3
34	124	CapOpTimeTotal	REAL	s	Cap operating hours of connected sensor
35	128	CapOpTimeAboveT1	REAL	s	Cap operating hours above a temperature of T1
36	132	CapOpTimeAboveT2	REAL	s	Cap operating hours above a temperature of T2
37	136	CapOpTimeAboveT3	REAL	s	Cap operating hours above a temperature of T3
38	140	CapOpTimeAboveC1	REAL	s	Cap operating hours raw value above T4
39	144	CapOpTimeAboveC2	REAL	s	Cap operating hours raw value above T5

Index	Offset	Attribute	Data type	Unit	Description
40	145	SensorElement	SINT	None	Sensor element
41	146	OpTimeThresholdAboveT1	SINT	°C	Temperature threshold T1 for operating hours counter
42	147	OpTimeThresholdAboveT2	SINT	°C	Temperature threshold T2 for operating hours counter
43	148	OpTimeThresholdAboveT3	SINT	°C	Temperature threshold T3 for operating hours counter
44	152	OpTimeThresholdAboveC1	REAL	°C	Threshold in [A] for operating counter Current 1
45	156	OpTimeThresholdAboveC2	REAL	°C	Threshold in [A] for operating counter Current 2

6.5.2.5 Sensor Oxygen, instance = 135 (Sensor 1) to 142 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastSlopeCalibration	LINT	None	Date of the last successful calibration of the sensor
5	32	DateOfLastZeroPointCalibration	LINT	None	Date of the last successful zero point calibration of the sensor
6	36	Slope	REAL	%	Slope
7	40	DeltaSlope	REAL	A/Pa	Difference of slope between current and last calibration
8	44	ZeroPoint	REAL	A	Zero point
9	48	DeltaZeroPoint	REAL	A	Difference of zero point between current and last calibration
10	52	TemperatureOffset	REAL	K	Temperature offset
11	56	ChargeCounter	REAL	As	Charge (electrical)
12	60	ExtremeTempMin	REAL	°C	Min. measured temperature value
13	64	ExtremeTempMax	REAL	°C	Max. measured temperature value
14	68	OpTimeTotal	REAL	s	Operating hours of connected sensor
15	72	OpTimeBelow5C	REAL	s	Operating time <5°C (COS61D, COS81D)
16	76	OpTimeAbove5C_Below5C	REAL	s	Operating time >25°C (COS61D), >40°C (COS21D), >5°C(COS51D), >T1 (COS81D)
17	80	OpTimeAbove25C_30C	REAL	s	Operating time >40°C (COS21D), >80°C (COS51D), >30°C (COS51D), >T2 (COS81D)
18	84	OpTimeAbove40C	REAL	s	Operating time >40°C (COS21D), >80°C (COS51D), >30°C (COS51D), >T2 (COS81D)
19	88	OpTimeAbove80C	REAL	s	Operating time >T3 (COS81D), >15nA (COS21D), > 30nA (COS51D)
20	92	OpTimeAbove120C_40C	REAL	s	Operating time >T3 (COS81D), >15nA (COS21D), > 30nA (COS51D)
21	96	OpTimeAbove15nA_30nA	REAL	s	Operating time >50nA (COS21D), > 160nA (COS51D), <5°C
22	100	OpTimeAbove50nA_160nA	REAL	s	Operating time >50nA (COS21D), > 160nA (COS51D), <5°C

Index	Offset	Attribute	Data type	Unit	Description
23	104	OpTimeBelow25us	REAL	s	Operating time <25µs (COS61D)
24	108	OpTimeAbove40us	REAL	s	Operating time >40µs (COS61D)
25	110	OpTimeSterilisations	INT	None	Number of sterilisation cycles
26	112	OpTimeCipCycles	INT	None	Number of clean in place cycles
27	114	NumberOfCalibrations	INT	None	Number of calibrations
28	116	NumberOfCapCalibrations	INT	None	Number of sensor-cap calibrations
29	118	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
30	119	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
31	120	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence
32	124	DO_PAOKsv	REAL	1/Pa	Normalized Ksv of point-at-oxygen calibration
33	128	DO_ZeroKsv	REAL	1/Pa	Normalized Ksv of zero-point calibration
34	132	DO_PAOTau	REAL	s	Normalized τ0 of point-at-oxygen calibration
35	136	DO_ZeroTau	REAL	s	Normalized τ0 of zero-point calibration
36	140	DO_PAOQuality	REAL	%	Calibration quality index of point-at-oxygen calibration
37	144	DO_ZeroQuality	REAL	%	Calibration quality index of zero-point calibration
38	148	DO_SlopeAbs	REAL	A/Pa	Slope
39	152	DO_DeltaSlopeAbs	REAL	A/Pa	Difference of slope between current and last calibration
40	156	DO_FermenterScalingFactor	REAL	None	Fermenter scaling factor
41	157	DO_OpTime_ThresholdT1	SINT	None	Temperature threshold T1 for operating hours counter
42	158	DO_OpTime_ThresholdT2	SINT	None	Temperature threshold T2 for operating hours counter

Index	Offset	Attribute	Data type	Unit	Description
43	159	DO_OpTime_ThresholdT3	SINT	None	Temperature threshold T3 for operating hours counter
44	160	DO_OpTime_ThresholdT4	SINT	None	Temperature threshold T4 for operating hours counter
45	164	DO_OpTime_CAP_Total	REAL	s	Cap Operating hours of connected sensor
46	168	DO_OpTime_CAP_Above_Temperature1	REAL	s	Cap Operating hours above a temperature of T1
47	172	DO_OpTime_CAP_Above_Temperature2	REAL	s	Cap Operating hours above a temperature of T2
48	176	DO_OpTime_CAP_Above_Temperature3	REAL	s	Cap Operating hours above a temperature of T3
49	180	DO_OpTime_CAP_Below_Temperature4	REAL	s	Cap Operating hours below a temperature of T4
50	182	DO_Num_Autoclavings	INT	None	Number of autoclavings
51	184	DO_Num_Of_CAP_CIP	INT	None	Number of clean in place cycles for cap
52	186	DO_Num_Of_CAP_Autoclavings	INT	None	Number of autoclavings for cap
53	187	DO_Num_Of_CAP_SIP	SINT	None	Number of sterilisation cycles for cap
54	188	DO_FermenterScalingActive	BOOL	None	Fermenter scaling active
55	196	DO_Date_Last_Successful_Fermenter_Scaling	LINT	None	Date and time of the last successful fermenter scaling
56	198	DO_Num_Of_PAO_Calibrations	INT	None	Number of point-at-oxygen calibrations
57	200	DO_Num_Of_Zero_Calibrations	INT	None	Number of zero-point calibrations
58	201	DO_Mode_PAO_Calibration	SINT	None	Mode point-at-oxygen calibration Selection: 0: --- 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: Sample calibration 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition 24: 3-point calibration 25: Ext. Reference 26: Int. Reference 27: in water 28: in air
59	202	DO_Mode_Zero_Calibration	SINT	None	Mode zero-point calibration Selection: 0: --- 1: Numeric input 2: 1-point calibration

Index	Offset	Attribute	Data type	Unit	Description
					3: 2-point calibration 4: Multipoint Calibration 5: Table 6: Sample calibration 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition 24: 3-point calibration 25: Ext. Reference 26: Int. Reference 27: in water 28: in air

6.5.2.6 Sensor SAC, instance = 143 (Sensor 1) to 150 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastCalibration	LINT	None	Date of the last successful calibration of the sensor
5	28	CalMainValueOffset	REAL	None	Calibration offset
6	32	RawValueMeasChannel	REAL	1/m	Raw value
7	36	ExtendedSAC	REAL	1/m	no description
8	40	ExtremeTempMin	REAL	°C	Min. measured temperature value
9	44	ExtremeTempMax	REAL	°C	Max. measured temperature value
10	48	OpTimeTotal	REAL	s	Operating hours of connected sensor
11	52	LastFilterChange	REAL	s	Operating time of filter
12	56	FlashCounter	DINT	None	Flash lamp counter
13	58	NumberOfCalibrations	INT	None	Number of calibrations
14	60	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
15	61	UsedModelOrDataSet	SINT	None	Dataset switch for SAK Selection: 0: Factory calib. (default) 1: Dataset1 2: Dataset2 3: Dataset3 4: Dataset4

Index	Offset	Attribute	Data type	Unit	Description
					5: Dataset5 6: Dataset6 7: undefined
16	62	CalMainValueMode	SINT	None	Calibration method Selection: 0: --- 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: Sample calibration 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition 24: 3-point calibration 25: Ext. Reference 26: Int. Reference 27: in water 28: in air
17	63	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
18	64	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence

Index	Offset	Attribute	Data type	Unit	Description
19	68	CH2_SAK_CalMainValueFactor	REAL	None	Calibration factor

6.5.2.7 Sensor CUS, instance = 151 (Sensor 1) to 158 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastCalibration	LINT	None	Date of the last successful calibration of the sensor
5	28	CalMainValueOffset	REAL	None	Calibration offset
6	32	ExtremeTempMin	REAL	°C	Min. measured temperature value
7	36	ExtremeTempMax	REAL	°C	Max. measured temperature value
8	40	OpTimeTotal	REAL	s	Operating hours of connected sensor
9	44	OperationAboveSpecTemp	REAL	s	Operating hours of connected sensor
10	48	OperationBelowSpecTemp	REAL	s	Operating hours of connected sensor
11	50	NumberOfCalibrations	INT	None	Number of calibrations
12	52	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
13	53	UsedModelOrDataSet	SINT	None	Dataset switch for turbidity Selection: 0: Formazine (default) 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 13: Thin sludge 14: PSL 15: Diatomite 16: Dataset6
14	54	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
15	55	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 5: pH ISFET 6: Cond c 7: Cond i 8: ORP 9: TU/TS 10: Nitrate

Index	Offset	Attribute	Data type	Unit	Description
					11: ISE 12: SAC 13: Ultrasonic interface 14: Chlorine 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence
16	59	CH1_CUS_CalMainValueFactor	REAL	None	Calibration factor

6.5.2.8 Sensor ISE, instance = 159 (Sensor 1) to 166 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastCalibrationRsensor	LINT	None	Date of the last successful calibration of the sensor reference slot
5	32	DateOfLastCalibrationCh1sensor	LINT	None	Date of the last successful calibration of the sensor slot 1
6	40	DateOfLastCalibrationCh2sensor	LINT	None	Date of the last successful calibration of the sensor slot 2
7	48	DateOfLastCalibrationCh3sensor	LINT	None	Date of the last successful calibration of the sensor slot 3
8	52	ExtremeSpecificMin	REAL	None	Min. measured value
9	56	ExtremeTempMin	REAL	°C	Min. measured temperature value
10	60	ExtremeSpecificMax	REAL	None	Max. measured value
11	64	ExtremeTempMax	REAL	°C	Max. measured temperature value
12	68	SlopeRsensor	REAL	%	Slope reference slot
13	72	DeltaSlopeRsensor	REAL	%	Difference of slope between current and last calibration reference slot
14	76	ZeroPointRsensor	REAL	None	Zero-point reference slot
15	80	DeltaZeroPointRsensor	REAL	None	Delta zero-point reference slot
16	84	SlopeCh1sensor	REAL	%	Slope slot 1
17	88	DeltaSlopeCh1sensor	REAL	%	Difference of slope between current and last calibration slot 1
18	92	ZeroPointCh1sensor	REAL	None	Zero-point slot 1
19	96	DeltaZeroPointCh1sensor	REAL	None	Delta zero-point slot 1
20	100	SlopeCh2sensor	REAL	%	Slope slot 2
21	104	DeltaSlopeCh2sensor	REAL	%	Difference of slope between current and last calibration slot 2
22	108	ZeroPointCh2sensor	REAL	None	Zero-point slot 2
23	112	DeltaZeroPointCh2sensor	REAL	None	Delta zero-point slot 2
24	116	SlopeCh3sensor	REAL	%	Slope slot 3

Index	Offset	Attribute	Data type	Unit	Description
25	120	DeltaSlopeCh3sensor	REAL	%	Difference of slope between current and last calibration slot 3
26	124	ZeroPointCh3sensor	REAL	None	Zero-point slot 3
27	128	DeltaZeroPointCh3sensor	REAL	None	Delta zero-point slot 3
28	132	OpTimeTotal	REAL	s	Operating hours of connected sensor
29	134	NumberOfCalibrationsRsensor	INT	None	Number of calibrations reference slot
30	136	NumberOfCalibrationsCh1sensor	INT	None	Number of calibrations slot 1
31	138	NumberOfCalibrationsCh2sensor	INT	None	Number of calibrations slot 2
32	140	NumberOfCalibrationsCh3sensor	INT	None	Number of calibrations slot 3
33	142	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
34	143	ElectrodeTypeRsensor	SINT	None	Electrode type reference slot (measured parameter) Selection: 0: disabled (default) 5: pH
35	144	ElectrodeTypeCh1sensor	SINT	None	Electrode type slot 1 (measured parameter) Selection: 0: disabled (default) 1: Nitrate 2: Ammonium 3: Potassium 4: Chloride 5: pH 6: ORP 7: User defined
36	145	ElectrodeTypeCh2sensor	SINT	None	Electrode type slot 2 (measured parameter) Selection: 0: disabled (default) 1: Nitrate 2: Ammonium 3: Potassium 4: Chloride 5: pH 6: ORP 7: User defined
37	146	ElectrodeTypeCh3sensor	SINT	None	Electrode type slot 3 (measured parameter) Selection: 0: disabled (default) 1: Nitrate 2: Ammonium 3: Potassium 4: Chloride 5: pH 6: ORP 7: User defined
38	147	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
39	148	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass

Index	Offset	Attribute	Data type	Unit	Description
					4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence

6.5.2.9 Sensor Nitrate, instance = 167 (Sensor 1) to 174 (Sensor 8)

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastCalibration	LINT	None	Date of the last successful calibration of the sensor
5	28	CalMainValueOffset	REAL	None	Calibration offset
6	32	RawValueMeasChannel	REAL	kg/m³	Raw measurement value
7	36	ExtremeTempMin	REAL	°C	Min. measured temperature value
8	40	ExtremeTempMax	REAL	°C	Max. measured temperature value
9	44	OpTimeTotal	REAL	s	Operating hours of connected sensor
10	48	LastFilterChange	REAL	s	Operating time of filter
11	52	FlashCounter	DINT	None	Flash lamp counter
12	54	NumberOfCalibrations	INT	None	Number of calibrations
13	56	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
14	57	UsedModelOrDataSet	SINT	None	Dataset switch for nitrate Selection: 0: Factory calib. (default) 1: Dataset1 2: Dataset2 3: Dataset3 4: Dataset4 5: Dataset5 6: Dataset6 7: undefined
15	58	CalMainValueMode	SINT	None	Calibration method Selection: 0: --- 1: Numeric input 2: 1-point calibration

Index	Offset	Attribute	Data type	Unit	Description
					3: 2-point calibration 4: Multipoint Calibration 5: Table 6: Sample calibration 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition 24: 3-point calibration 25: Ext. Reference 26: Int. Reference 27: in water 28: in air
16	59	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
17	60	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence
18	64	CalMainValueFactor	REAL	None	Calibration factor

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT	None	Initial-operation date of sensor
4	24	DateOfLastCalibration	LINT	None	Date of the last successful calibration of the sensor
5	28	CalMainValueOffset	REAL	None	Calibration offset
6	32	RawValueMeasChannel	REAL	kg/m³	Raw measurement value
7	36	ExtremeTempMin	REAL	°C	Min. measured temperature value
8	40	ExtremeTempMax	REAL	°C	Max. measured temperature value
9	44	OpTimeTotal	REAL	s	Operating hours of connected sensor
10	48	LastFilterChange	REAL	s	Operating time of filter
11	52	FlashCounter	DINT	None	Flash lamp counter
12	54	NumberOfCalibrations	INT	None	Number of calibrations
13	56	CurrentDiagCode	INT	None	Current sensor-diagnosis : diagnosis code
14	57	UsedModelOrDataSet	SINT	None	Dataset switch for nitrate Selection: 0: Factory calib. (default) 1: Dataset1 2: Dataset2 3: Dataset3 4: Dataset4 5: Dataset5 6: Dataset6 7: undefined
15	58	CalMainValueMode	SINT	None	Calibration method Selection: 0: --- 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: Sample calibration 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition 24: 3-point calibration 25: Ext. Reference 26: Int. Reference 27: in water 28: in air

Index	Offset	Attribute	Data type	Unit	Description
16	59	CurrentDiagNE107Status	SINT	None	Current sensor-diagnosis : status according to NAMUR NE107
17	60	ActiveSensorType	SINT	None	Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence
18	64	CalMainValueFactor	REAL	None	Calibration factor

6.5.2.10 Sensor Fluorescense, instance = 175 (Sensor 1) to 182 (Sensor 8)

Supported with software version 1.12.00 and newer

Index	Offset	Attribute	Data type	Unit	Description
1	0	CurrentDiagTimestampDate	LINT*	None	Current sensor-diagnosis : time of diagnosis apperance
2	8	ManufacturingDate	LINT*	None	Manufacturing date of the sensor
3	16	InitialOperationDate	LINT*	None	Initial-operation date of sensor
4	24	DateOfLastCalibration	LINT*	None	Date of the last successful calibration of the sensor
5	32	CalValidity	LINT*		Last Cal/Adj Date + Alarm Limit
6	40	AdjDataTime	LINT*		Date of the last successful calibration of the sensor
7	44	CalMainValueOffset	REAL		Calibration offset
8	48	ExtremeTempMin	REAL		Min. measured temperature value
9	52	ExtremeTempMax	REAL		Max. measured temperature value
10	56	OpTimeTotal	REAL		Operating hours of connected sensor
11	60	OpTimeAboveTempMax	REAL		Operating hours of connected sensor
12	64	OpTimeBelowTempMin	REAL		Operating hours of connected sensor
13	68	CalMainValueFactor	REAL		Calibration factor
14	72	OpTimeLightsourceDegradation	REAL	%	Lightsource degradation

Index	Offset	Attribute	Data type	Unit	Description
15	76	CalAdjustmentDeviation	REAL	%	Adjustment deviation
16	80	CalObvAirMeasTemperature	REAL	°C	Sensor air Temperature
17	84	CalObvSolidStandardMeasTemperature	REAL	°C	Sensor solid Temperature
18	88	CalObvAirMeasRawValue	REAL		Air measurement
19	92	CalObvAirMeasThreshold	REAL		Air measurement acceptance threshold (constant value)
20	96	CalObvSolidStandardRefVal	REAL		Nominal value of the solid state standard
21	100	CalObvSolidStandardMeasRawVal	REAL		Solid state standard measurement raw value
22	104	CalObvSolidStandardMeasProcessedVal	REAL		Solid state standard measurement
23	108	CalObvSolidStandardMeasLowerThreshold	REAL		Min. acceptance thresholds for the solid state standard measurement
24	112	CalObvSolidStandardMeasUpperThreshold	REAL		Max. acceptance thresholds for the solid state standard measurement
25	116	AdjObvAirMeasTemperature	REAL		Sensor air Temperature
26	120	AdjObvSolidStandardMeasTemperature	REAL		Sensor solid Temperature
27	124	AdjObvAirMeasRawValue	REAL		Air measurement
28	128	AdjObvAirMeasThreshold	REAL		Air measurement acceptance threshold (constant value)
29	132	AdjObvSolidStandardRefVal	REAL		Nominal value of the solid state standard
30	136	AdjObvSolidStandardMeasRawVal	REAL		Solid state standard measurement raw value
31	140	AdjObvSolidStandardMeasProcessedVal	REAL		Solid state standard measurement
32	144	AdjObvSolidStandardMeasLowerThreshold	REAL		Min. acceptance thresholds for the solid state standard measurement
33	148	AdjObvSolidStandardMeasUpperThreshold	REAL		Max. acceptance thresholds for the solid state standard measurement
34	150	NumberOfCalibrations	INT		Number of calibrations
35	152	CurrentDiagCode	INT		Current sensor-diagnosis : diagnosis code
36	153	CurrentDiagNE107Status	SINT		Current sensor-diagnosis : status according to NAMUR NE107
37	154	ActiveSensorType	SINT		Selected sensor type. The selected type has to match with the connected sensor type. Selection: 0: None (default) 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling)

Index	Offset	Attribute	Data type	Unit	Description
					21: TU 22: Inline photometer 23: TU/AU 24: Disinfection 25: Spectrometer 28: Fluorescence
38	155	CalObvDataValid	SINT		Calibration data validity
39	156	CalMethod	SINT		Calibration method Selection: 0: --- 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint calibration 5: Table 6: Sample calibration 7: Zero point 8: Air 100%% rh 9: H2O air-saturated 10: Air variable 11: Zero point sample 12: Slope sample 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input 19: Numeric input zero point 20: Numeric input 21: Factory calib. 22: Test gas calibration 23: Value acquisition 24: 3-point calibration 25: Ext. reference 26: Int. reference 27: in water 28: in air 29: Solid state reference
40	157	CalObvAdjustmentType	SINT		Type of last calibration Selection: 0: Factory 1: Done 2: Unchanged 3: Failed
41	158	CalObvMepcState	SINT		MEPC state as result of last calibration Selection: 0: Not OK 1: OK 2: n/a
42	159	AdjObvDataValid	SINT		Adjustment data validity
43	160	AdjMethod	SINT		Calibration method Selection: 0: --- 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint calibration 5: Table

Index	Offset	Attribute	Data type	Unit	Description
					6: Sample calibration 7: Zero point 8: Air 100%% rh 9: H2O air-saturated 10: Air variable 11: Zero point sample 12: Slope sample 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input 19: Numeric input zero point 20: Numeric input 21: Factory calib. 22: Test gas calibration 23: Value acquisition 24: 3-point calibration 25: Ext. reference 26: Int. reference 27: in water 28: in air 29: Solid state reference

6.5.3 Common object, class code = 0310h, instances = 1

Index	Attribute	R/W	Datentyp	Info
1	DeviceTag	W	STRING	Device description / TAG Range: 0 ... 32 Default: ""
2	TemperatureUnit	W	SINT	Temperature unit Default: 0 Selection: 0: degC 1: degF 2: K
3	WebserverEnable	W	SINT	Webserver activation Default: 1 Selection: 0: Off 1: On
4	FactoryReset	W	SINT	Device reset Default: 0
5	Regulator0Setpoint	W	REAL	Controller : set value for controller 0 Default: 0.0
6	Regulator0PPart	W	REAL	Controller : proportional band (Xp) for controller 0 Minimum: 0.0 Default: 10.0
7	Regulator0IPart	W	REAL	Controller : reset time (Tn) for controller 0 Range: 0.0 ... 9999.0 Default: 0.0
8	Regulator0DPart	W	REAL	Controller : rate time (Tv) for controller 0 Range: 0.0 ... 9999.0 Default: 0.0
9	Regulator1Setpoint	W	REAL	Controller : set value for controller 1 Default: 0.0
10	Regulator1PPart	W	REAL	Controller : proportional band (Xp) for controller 1 Minimum: 0.0 Default: 10.0
11	Regulator1IPart	W	REAL	Controller : reset time (Tn) for controller 1 Range: 0.0 ... 9999.0 Default: 0.0
12	Regulator1DPart	W	REAL	Controller : rate time (Tv) for controller 1 Range: 0.0 ... 9999.0 Default: 0.0
13	DeviceCurrentDiagModul	R	SINT	Most important device-related diagnosis : name of module. The base module uses both Slot 0 and Slot 1. Default: 0 Selection: 0: Slot 0

Index	Attribute	R/W	Datentyp	Info
				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
14	DeviceCurrentDiagPort	R	SINT	Most important device-related diagnosis : connection ID Default: 0
15	DeviceCurrentDiagNE107Status	R	SINT	Most important device-related diagnosis : status according to NAMUR NE107 Default: 0
16	DeviceCurrentDiagCode	R	INT	Most important device-related diagnosis : diagnosis code Default: 0
17	DeviceCurrentDiagTimestampDate	R	DATE	Most important device-related diagnosis : time of diagnosis appearance Default: 0
18	DeviceCurrentDiagTimestampTime	R	TIME_OF_DAY	Most important device-related diagnosis : time of diagnosis appearance Default: 0
19	DeviceNumberAdditionalDiag	R	SINT	Nummber of additional device-related diagnosis messages Default: 0
20	DeviceLastDiagModul	R	SINT	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
21	DeviceLastDiagPort	R	SINT	Past device-diagnosis : port Default: 0
22	DeviceLastDiagNE107Status	R	SINT	Past device-diagnosis : status according to NAMUR NE107 Default: 0
23	DeviceLastDiagCode	R	INT	Past device-diagnosis : diagnosis code Default: 0

Index	Attribute	R/W	Datentyp	Info
24	DeviceLastDiagTimestampDate	R	DATE	Past device-diagnosis : time of diagnosis apperance Default: 0
25	DeviceLastDiagTimestampTime	R	TIME_OF_DAY	Past device-diagnosis : time of diagnosis apperance Default: 0
26	DeviceLastDiagSource	R	SINT	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 preparation
27	DeviceID	R	SINT	Device ID Default: 0 Selection: 0: Liquiline CM442 1: Liquiline CM448 2: reserved 3: Liquistation CSF48 4: reserved 5: reserved 6: Liquiline System CA80 7: Liquistation CSF34 8: reserved 9: Liquiline CM44P
28	Ordercode	R	STRING	Ordercode of the device Range: 0 … 64 Default: ""
29	OrdercodeExt	R	STRING	Extended ordercode of the device Range: 0 … 64 Default: ""
30	OrderCodeExtCurrent	R	STRING	Current extended ordercode of the device Range: 0 … 64 Default: ""
31	SwVersion	R	STRING	Software version of the device Range: 0 … 16 Default: ""
32	BootloaderVersion	R	STRING	Software version of the bootloader Range: 0 … 16 Default: ""
33	Serialnumber	R	STRING	Serial number of the device

Index	Attribute	R/W	Datentyp	Info
				Range: 0 ... 32 Default: ""
34	DisplaySerialNumber	R	STRING	Serial number of the device display Range: 0 ... 32 Default: ""
35	BackplaneSerialNumber	R	STRING	Serial of sub-rack Range: 0 ... 32 Default: ""
36	PowersupplySerialNumber	R	STRING	Serial number of integrated power supply Range: 0 ... 32 Default: ""
37	BasemodulSerialNumber	R	STRING	Serial of base module Range: 0 ... 32 Default: ""
38	ExtModul1SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
39	ExtModul2SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
40	ExtModul3SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
41	ExtModul4SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
42	ExtModul5SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
43	ExtModul6SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
44	ExtModul7SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
45	ExtModul8SerialNumber	R	STRING	Serial number of extension module Range: 0 ... 32 Default: ""
46	AI1Value	R	REAL	Analog process value from device to control system : value Default: 0
47	AI1Status	R	INT	Analog process value from device to control system : state Default: 0

Index	Attribute	R/W	Datentyp	Info
				Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
48	AI1Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
49	AI2Value	R	REAL	Analog process value from device to control system : value Default: 0
50	AI2Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
51	AI2Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
52	AI3Value	R	REAL	Analog process value from device to control system : value Default: 0
53	AI3Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
54	AI3Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
55	AI4Value	R	REAL	Analog process value from device to control system : value Default: 0
56	AI4Status	R	INT	Analog process value from device to control system : state Default: 0 Selection:

Index	Attribute	R/W	Datentyp	Info
				128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
57	AI4Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
58	AI5Value	R	REAL	Analog process value from device to control system : value Default: 0
59	AI5Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
60	AI5Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
61	AI6Value	R	REAL	Analog process value from device to control system : value Default: 0
62	AI6Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
63	AI6Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
64	AI7Value	R	REAL	Analog process value from device to control system : value Default: 0
65	AI7Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok

Index	Attribute	R/W	Datentyp	Info
				64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
66	AI7Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
67	AI8Value	R	REAL	Analog process value from device to control system : value Default: 0
68	AI8Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
69	AI8Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
70	AI9Value	R	REAL	Analog process value from device to control system : value Default: 0
71	AI9Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
72	AI9Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
73	AI10Value	R	REAL	Analog process value from device to control system : value Default: 0
74	AI10Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific

Index	Attribute	R/W	Datentyp	Info
				12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
75	AI10Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
76	AI11Value	R	REAL	Analog process value from device to control system : value Default: 0
77	AI11Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
78	AI11Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
79	AI12Value	R	REAL	Analog process value from device to control system : value Default: 0
80	AI12Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
81	AI12Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
82	AI13Value	R	REAL	Analog process value from device to control system : value Default: 0
83	AI13Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure

Index	Attribute	R/W	Datentyp	Info
				4: Bad:ConfigurationError 0: Bad:NotConnected
84	AI13Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
85	AI14Value	R	REAL	Analog process value from device to control system : value Default: 0
86	AI14Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
87	AI14Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
88	AI15Value	R	REAL	Analog process value from device to control system : value Default: 0
89	AI15Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
90	AI15Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
91	AI16Value	R	REAL	Analog process value from device to control system : value Default: 0
92	AI16Status	R	INT	Analog process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure

Index	Attribute	R/W	Datentyp	Info
				4: Bad:ConfigurationError 0: Bad:NotConnected
93	AI16Unit	R	ENGUNIT	Analog process value from device to control system : unit Default: 0x1000 Selection: → Chapter: units
94	DI1Value	R	INT	Discrete process value from device to control system : value Default: 0
95	DI1Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
96	DI2Value	R	INT	Discrete process value from device to control system : value Default: 0
97	DI2Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
98	DI3Value	R	INT	Discrete process value from device to control system : value Default: 0
99	DI3Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
100	DI4Value	R	INT	Discrete process value from device to control system : value Default: 0
101	DI4Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific

Index	Attribute	R/W	Datentyp	Info
				12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
102	DI5Value	R	INT	Discrete process value from device to control system : value Default: 0
103	DI5Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
104	DI6Value	R	INT	Discrete process value from device to control system : value Default: 0
105	DI6Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
106	DI7Value	R	INT	Discrete process value from device to control system : value Default: 0
107	DI7Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
108	DI8Value	R	INT	Discrete process value from device to control system : value Default: 0
109	DI8Status	R	INT	Discrete process value from device to control system : state Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected

Index	Attribute	R/W	Datentyp	Info
110	CurrentOut1PvValue	R	REAL	Current output : process value Default: 0
111	CurrentOut1PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
112	CurrentOut1PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: → Chapter: units
113	CurrentOut2PvValue	R	REAL	Current output : process value Default: 0
114	CurrentOut2PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
115	CurrentOut2PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: →Chapter: units
116	CurrentOut3PvValue	R	REAL	Current output : process value Default: 0
117	CurrentOut3PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
118	CurrentOut3PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: →Chapter: units
119	CurrentOut4PvValue	R	REAL	Current output : process value Default: 0
120	CurrentOut4PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific

Index	Attribute	R/W	Datentyp	Info
				12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
121	CurrentOut4PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: →Chapter: units
122	CurrentOut5PvValue	R	REAL	Current output : process value Default: 0
123	CurrentOut5PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
124	CurrentOut5PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: →Chapter: units
125	CurrentOut6PvValue	R	REAL	Current output : process value Default: 0
126	CurrentOut6PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
127	CurrentOut6PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: →Chapter: units
128	CurrentOut7PvValue	R	REAL	Current output : process value Default: 0
129	CurrentOut7PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
130	CurrentOut7PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: →Chapter: units

Index	Attribute	R/W	Datentyp	Info
131	CurrentOut8PvValue	R	REAL	Current output : process value Default: 0
132	CurrentOut8PvStatus	R	INT	Current output : state of process value Default: 0 Selection: 128: Good:Ok 64: Uncertain:NonSpecific 12: Bad:DeviceFailure 4: Bad:ConfigurationError 0: Bad:NotConnected
133	CurrentOut8PvUnit	R	ENGUNIT	Current output : unit of process value Default: 0x1000 Selection: →Chapter: units
134	CurrentOut1mAValue	R	REAL	Current output : current Default: 0.0
135	CurrentOut2mAValue	R	REAL	Current output : current Default: 0.0
136	CurrentOut3mAValue	R	REAL	Current output : current Default: 0.0
137	CurrentOut4mAValue	R	REAL	Current output : current Default: 0.0
138	CurrentOut5mAValue	R	REAL	Current output : current Default: 0.0
139	CurrentOut6mAValue	R	REAL	Current output : current Default: 0.0
140	CurrentOut7mAValue	R	REAL	Current output : current Default: 0.0
141	CurrentOut8mAValue	R	REAL	Current output : current Default: 0.0
142	DiagnoseCode	R	INT	Most important device-diagnosis : diagnosis code Default: 0
143	Channel	R	SINT	Most important device-diagnosis : channel ID (0=device) Default: 0
144	StatusSignal	R	SINT	Most important device-diagnosis : status according to NAMUR NE107 Default: 0
145	RtcDateTime	W	LINT	Real-Time Clock Default: 0
146	CleaningActionState1	R	SINT	Current state of the cleaning program.

Index	Attribute	R/W	Datentyp	Info
				Default: 0 Selection: 0: Off 1: Waiting 2: Waiting 3: Pre-rinse 4: Cleaning 5: Postrinsing 6: Failsafe 7: Manual mode 8: Waiting for execution
147	CleaningActionState2	R	SINT	Current state of the cleaning program. Default: 0 Selection: 0: Off 1: Waiting 2: Waiting 3: Pre-rinse 4: Cleaning 5: Postrinsing 6: Failsafe 7: Manual mode 8: Waiting for execution
148	CleaningActionState3	R	SINT	Current state of the cleaning program. Default: 0 Selection: 0: Off 1: Waiting 2: Waiting 3: Pre-rinse 4: Cleaning 5: Postrinsing 6: Failsafe 7: Manual mode 8: Waiting for execution
149	CleaningActionState4	R	SINT	Current state of the cleaning program. Default: 0 Selection: 0: Off 1: Waiting 2: Waiting 3: Pre-rinse 4: Cleaning 5: Postrinsing 6: Failsafe 7: Manual mode 8: Waiting for execution
150	ControlPanelLock	W	BOOL	No description
151	HeartbeatDeviceStatus	W	REAL	Heartbeat status device Default: 0.0
152	HeartbeatDeviceHealthCondition	W	REAL	Heartbeat health device Range: 0.0 ... 100.0 Default: 0.0
153	MaintenanceTimerValue	W	REAL	Heartbeat maintenance timer device Default: 0.0
154	HeartbeatIndexDevice	R	REAL	Heartbeat index device

Index	Attribute	R/W	Datentyp	Info
				Default: 0.0
155	KeyPerfIndicatorDeviceOperatingTimeTotal	R	DURATION	The total operating time since commissioning Default: 1972-01-01-00:00:00.000
156	KeyPerfIndicatorDeviceAvailability	R	REAL	(Operating time - Time in failure) / Operating time * 100 % Default: 100.0
157	KeyPerfIndicatorDeviceOperatingTime	R	LINT	The operating time since reset Default: 0
158	KeyPerfIndicatorDeviceTimeInFailure	R	DURATION	Operating time with NAMUR F status signal Default: 1972-01-01-00:00:00.000
159	KeyPerfIndicatorDeviceNumberOfFailures	R	INT	Number of failure diagnostic messages Default: 0
160	KeyPerfIndicatorDeviceMTBF	R	LINT	Mean time between failures Default: 0
161	KeyPerfIndicatorDeviceMTTR	R	DURATION	Mean time to repair Default: 1972-01-01-00:00:00.000
162	Regulator2Setpoint	W	REAL	Controller : set value for controller 2 Default: 0.0
163	Regulator2PPart	W	REAL	Controller: proportional band (Xp) for controller 2 Minimum: 0.0 Default: 10.0
164	Regulator2IPart	W	REAL	Controller: reset time (Tn) for controller 2 Range: 0.0 ... 9999.0 Default: 0.0
165	Regulator2DPart	W	REAL	Controller: rate time (Tv) for controller 2 Range: 0.0 ... 9999.0 Default: 0.0
166	Regulator3Setpoint	W	REAL	Controller : set value for controller 3 Default: 0.0
167	Regulator3PPart	W	REAL	Controller: proportional band (Xp) for controller 3 Minimum: 0.0 Default: 10.0
168	Regulator3IPart	W	REAL	Controller: reset time (Tn) for controller 3 Range: 0.0 ... 9999.0 Default: 0.0
169	Regulator3DPart	W	REAL	Controller: rate time (Tv) for controller 3 Range: 0.0 ... 9999.0 Default: 0.0

6.5.4 Sensor object, class code = 0311h, instances = 1 to 8

Index	Attribute	R/W	Datentyp	Info
1	SensorEnable	R	SINT	Activation of sensor channel Default: 0 Selection: 0: On 1: Off
2	ActiveSensorType	R	SINT	Selected sensor type. The selected type has to match with the connected sensor type. Default: 0 Selection: 0: None 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 15: E_SensorFSPH1 16: E_SensorFSLC1 17: E_SensorFSLI1 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer
3	ConnectedSensorType	R	SINT	Connected sensor type Default: 0 Selection: 0: None 1: Oxygen (amp.) 2: Oxygen (opt. fixed cable) 3: pH Glass 4: pH/ORP 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 15: E_SensorFSPH1 16: E_SensorFSLC1 17: E_SensorFSLI1 18: pH/ORP 19: Cond c 4-pol 20: Oxygen (opt. Memosens coupling) 21: TU 22: Inline photometer

Index	Attribute	R/W	Datentyp	Info
4	SensorTag	R	STRING	Sensor description/TAG Range: 0 ... 32 Default: ""
5	SensorSerial	R	STRING	Serial number of the sensor Range: 0 ... 16 Default: ""
6	SensorHwVersion	R	STRING	Hardware version of connected sensor Range: 0 ... 16 Default: ""
7	SensorSwVersion	R	STRING	Software version of connected sensor Range: 0 ... 16 Default: ""
8	SensorManufacturer	R	STRING	Manufacturer of the sensor Range: 0 ... 32 Default: ""
9	SensorOrdercode	R	STRING	Ordercode of the sensor Range: 0 ... 32 Default: ""
10	SensorManufacturingDate	R	DATE	Manufacturing date of the sensor Default: 0
11	SensorInitialOperationDate	R	DATE	Initial-operation date of sensor Default: 0
12	SensorExtremeSpecificMin	R	REAL	Min. measured value Default: 0.0
13	SensorExtremeTempMin	R	REAL	Min. measured temperature value Default: 0.0
14	SensorExtremeSpecificMax	R	REAL	Max. measured value Default: 0.0
15	SensorExtremeTempMax	R	REAL	Max. measured temperature value Default: 0.0
16	SensorCurrentDiagSourcetype	R	SINT	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: Mathematic Function 12: Binary Input Module

Index	Attribute	R/W	Datentyp	Info
				13: Binary Output Module 14: Sample preparation
17	SensorCurrentDiagModule	R	SINT	Current sensor-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
18	SensorCurrentDiagPort	R	SINT	Current sensor-diagnosis : port Default: 0
19	SensorCurrentDiagNE107Status	R	SINT	Current sensor-diagnosis : status according to NAMUR NE107 Default: 0
20	SensorCurrentDiagCode	R	INT	Current sensor-diagnosis : diagnosis code Default: 0
21	SensorCurrentDiagTimestampDate	R	DATE	Current sensor-diagnosis : time of diagnosis apperance Default: 0
22	SensorCurrentDiagTimestampTime	R	TIME_OF_DAY	Current sensor-diagnosis : time of diagnosis apperance Default: 0
23	SensorNumberAdditionalDiag	R	SINT	Number of additional active sensor diagnosis Default: 0
24	SensorLastDiagSourcetype	R	SINT	Past 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: Mathematic Function 12: Binary Input Module 13: Binary Output Module 14: Sample preparation
25	SensorLastDiagModule	R	SINT	Past sensor-diagnosis : name of module Default: 0 Selection:

Index	Attribute	R/W	Datentyp	Info
				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
26	SensorLastDiagPort	R	SINT	Past sensor-diagnosis : port Default: 0
27	SensorLastDiagNE107Status	R	SINT	Past sensor-diagnosis : status according to NAMUR NE107 Default: 0
28	SensorLastDiagCode	R	INT	Past sensor-diagnosis : diagnosis code Default: 0
29	SensorLastDiagTimestampDate	R	DATE	Past sensor-diagnosis : time of diagnosis apperance Default: 0
30	SensorLastDiagTimestampTime	R	TIME_OF_DAY	Past sensor-diagnosis : time of diagnosis apperance Default: 0
31	OpTimeTotal	R	REAL	Operating hours of connected sensor Default: 0.0
32	OpTimeAboveSpecTemp	R	REAL	Operating hours above maximal operating temperature Default: 0.0
33	OpTimeBelowSpecTemp	R	REAL	Operating hours below minimal operating temperature Default: 0.0
34	OpTimeLampLife	R	REAL	Operating hours of lamp, uint seconds [s] Default: 0.0
35	OpTimeSterilisations	R	DINT	Number of sterilisation cycles Default: 0
36	OpTimeCipCycles	R	DINT	Number of clean in place cycles Default: 0
37	OpTimeCapCalibrations	R	DINT	Number of sensor-cap calibrations Default: 0
38	OpTimeCapCalibTimer	R	REAL	Calibration timer of sensor cap Default: 0.0
39	OpTimeCapSterilisations	R	SINT	Number of sensor-cap sterilisations Default: 0

Index	Attribute	R/W	Datentyp	Info
40	OpTimeCapFilterChanged	R	REAL	Number of filter changes Default: 0.0
41	SACDataSetSwitch	W	SINT	Dataset switch for SAK Default: 0 Selection: 0: Factory calib. 1: Dataset1 2: Dataset2 3: Dataset3 4: Dataset4 5: Dataset5 6: Dataset6 7: undefined
42	NitrateDataSetSwitch	W	SINT	Dataset switch for nitrate Default: 0 Selection: 0: Factory calib. 1: Dataset1 2: Dataset2 3: Dataset3 4: Dataset4 5: Dataset5 6: Dataset6 7: undefined
43	TurbidityDataSetSwitch	W	SINT	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
44	CalCount0	R	INT	Number of calibrations Default: 0
45	CalCount1	R	INT	Number of calibrations Default: 0
46	CalCount2	R	INT	Number of calibrations Default: 0
47	CalCount3	R	INT	Number of calibrations Default: 0

Index	Attribute	R/W	Datentyp	Info
48	CalDateTime0	R	DATE_AND_TIME	Time stamp of last calibration Default: 1972-01-01-00:00:00
49	CalDateTime1	R	DATE_AND_TIME	Time stamp of last calibration Default: 1972-01-01-00:00:00
50	CalDateTime2	R	DATE_AND_TIME	Time stamp of last calibration Default: 1972-01-01-00:00:00
51	CalDateTime3	R	DATE_AND_TIME	Time stamp of last calibration Default: 1972-01-01-00:00:00
52	CalMethod0	R	SINT	Calibration method of last calibration Default: 0 Selection: 0: None 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: reserved 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition
53	CalMethod1	R	SINT	Calibration method of last calibration Default: 0 Selection: 0: None 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: reserved 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point

Index	Attribute	R/W	Datentyp	Info
				20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition
54	CalMethod2	R	SINT	Calibration method of last calibration Default: 0 Selection: 0: None 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: reserved 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition
55	CalMethod3	R	SINT	Calibration method of last calibration Default: 0 Selection: 0: None 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: reserved 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition
56	CalCountZero	R	INT	Number of zero point calibrations Default: 0

Index	Attribute	R/W	Datentyp	Info
57	CalDateTimeZero	R	DATE_AND_TIME	Time stamp of last zero point calibration Default: 1972-01-01-00:00:00
58	CalMethodZero	R	SINT	Calibration method of last zero point calibration Default: 0 Selection: 0: None 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: reserved 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib. 22: Slope test gas 23: Value acquisition
59	CalCountTemp	R	INT	Number of temperature calibrations Default: 0
60	CalDateTimeTemp	R	DATE_AND_TIME	Time stamp of last temperature calibration Default: 1972-01-01-00:00:00
61	CalMethodTemp	R	SINT	Calibration method of last temperature calibration Default: 0 Selection: 0: None 1: Numeric input 2: 1-point calibration 3: 2-point calibration 4: Multipoint Calibration 5: Table 6: reserved 7: Zero point 8: Slope air 9: Slope H2O 10: Slope variable 11: Zeropoint reference 12: Slope reference 13: Offset 14: Slope 15: with temp. comp 16: without temp. comp 17: Standard addition 18: Numeric input slope 19: Numeric input zero point 20: Numeric input 2-point 21: Factory calib.

Index	Attribute	R/W	Datentyp	Info
				22: Slope test gas 23: Value acquisition
62	InlinePhotometerDataSetSwitch_MC	W	SINT	Dataset switch for Inline Photometer Default: 0 Selection: 0: Dataset 1 1: Dataset 2 2: Dataset 3 3: Dataset 4 4: Dataset 5
63	InlinePhotometerDataSetSwitch_RC	W	SINT	Dataset switch for Inline Photometer Default: 0 Selection: 0: Dataset 1 1: Dataset 2 2: Dataset 3 3: Dataset 4 4: Dataset 5
64	HeartbeatSensorStatus	W	REAL	Heartbeat status sensor Default: 0.0
65	HeartbeatSensorHealthCondition	W	REAL	Heartbeat health sensor Default: 0.0
66	MaintenanceTimerValue	W	REAL	Heartbeat maintenance timer sensor Default: 0.0
67	HeartbeatIndexSensor	R	REAL	Heartbeat index sensor Default: 0.0
68	KeyPerfIndicatorSensorAvailability	R	REAL	(Operating time - Time in failure) / Operating time * 100 % Default: 100.0
69	KeyPerfIndicatorSensorOperatingTime	R	DURATION	The total operating time since commissioning Default: 1972-01-01-00:00:00.000
70	KeyPerfIndicatorSensorTimeInFailure	R	DURATION	Operating time with NAMUR F status signal Default: 1972-01-01-00:00:00.000
71	KeyPerfIndicatorSensorNumberOfFailures	R	INT	Number of failure diagnostic messages Default: 0
72	KeyPerfIndicatorSensorMTBF	R	DURATION	Mean time between failures Default: 1972-01-01-00:00:00.000
73	KeyPerfIndicatorSensorMTTR	R	DURATION	Mean time to repair Default: 1972-01-01-00:00:00.000
74	KeyPerfIndicatorSensorTimeInCalibration	R	DURATION	Operating time with calibration status Default: 1972-01-01-00:00:00.000
75	KeyPerfIndicatorSensorNumberOfCalibrations	R	INT	Number of calibrations and/or adjust-ments Default: 0

Index	Attribute	R/W	Datentyp	Info
76	KeyPerfIndicatorSensorMTBC	R	DURATION	Mean time between calibrations Default: 1972-01-01-00:00:00.000
77	pHCalibTempComp	W	SINT	Select temperature compensation: ATC, MTC or none (if MTC, enter temperature) for calibration. Default: 1 Selection: 0: Off 1: Automatic 2: Manual
78	pHMeasTempComp	W	SINT	Select temperature compensation: ATC, MTC or none (if MTC, enter temperature) during measurement operation. Default: 1 Selection: 0: Off 1: Automatic 2: Manual
79	CondCalibTempComp	W	SINT	As an alternative to the compensated conductivity (Yes) you can also determine the cell constant by calibrating the uncompensated conductivity (No). This setting affects only calibration. Default: 1 Selection: 0: No 1: Yes
80	CondMeasTempComp	W	SINT	As an alternative to the compensated conductivity (Yes) you can also determine the cell constant by calibrating the uncompensated conductivity (No). This setting affects only calibration. Default: 1 Selection: 0: --- 1: Linear 2: NaCl (IEC 746-3) 3: Water ISO7888 (25°C) 4: UPW NaCl 5: UPW HCl 6: %0V 7: %0V 8: %0V 9: %0V 10: Water ISO7888 (20°C)
81	CondCellconstant	W	REAL	Cell constant Range: 0.25 ... 9999.0 Default: 1.0
82	CondInstallfactor	W	REAL	Cell constant Range: 0.1 ... 5.0 Default: 1.0
83	CondMeasTempRef	W	REAL	Temperatur reference Range: -5.0 ... 100.0 Default: 25.0
84	CondMeasAlpha	W	REAL	Alpha value [%/K] Range: 0.0 ... 20.0

Index	Attribute	R/W	Datentyp	Info
				Default: 2.1
85	CalSelectDataSet	W	SINT	Selecta specific data set Selection: 0: Current 1: CurrentCal 2: Calib1 3: Calib2 4: Calib3 5: Calib4 6: Calib5 7: Calib6 8: Calib7 9: Calib8 10: Factory 11: Reference Default: 0
86	CalSelectDataSetType	W	SINT	Select the type of calibration sets that shall be loaded Default: 0 Selection: 0: Settype1 1: Settype2 2: SettypeAll Default: 0
87	CondCalibAlpha	W	REAL	Alpha value [%/K] Range: 0.0 ... 20.0 Default: 2.1
88	CondCalibTempRef	W	REAL	Temperatur reference Range: -5.0 ... 100.0 Default: 25.0
89	CalObvDeviceSerial	R	STRING	Serial of the Transmitter Range: 0 ... 32 Default: ""
90	CalObvSolidStandardSerial	R	STRING	Serial number of the solid state standard Range: 0 ... 32 Default: ""
91	AdjObvDeviceSerial	R	STRING	Serial of the Transmitter Range: 0 ... 32 Default: ""
92	AdjObvSolidStandardSerial	R	STRING	Serial number of the solid state standard Range: 0 ... 32 Default: ""

6.5.5 Sampler object, class code = 0312h, instances = 1

Index	Attribute	R/W	Datentyp	Info
1	RunningProgramName	R	STRING	Program name

Index	Attribute	R/W	Datentyp	Info
				Range: 0 ... 16 Default: ""'
2	ProgramBottlePosition	R	INT	Current bottle position Default: 0
3	ProgramSamplingMode	R	INT	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
4	DatetimeNextSamplingDate	R	DATE	Date and time of next sampling Default: 0
5	DatetimeNextSamplingTime	R	TIME_OF_DAY	Date and time of next sampling Default: 0
6	FlowNextSampling	R	REAL	Dosing volume of last sample taking Default: 0.0
7	ProgramName	R	STRING	Name of current active program Range: 0 ... 16 Default: ""'
8	ProgramState	R	SINT	Program state Default: 0 Selection: 0: Inactive 1: Active 2: Pause 3: Waiting for pause
9	BottleConfiguration	R	INT	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
10	BottleVolumeLeft	R	REAL	Bottle volume

Index	Attribute	R/W	Datentyp	Info
				Range: 0.0001 ... 0.1 Default: 0.03
11	BottleVolumeRight	R	REAL	Bottle volume of the right bottle box Range: 0.0 ... 0.1 Default: 0
12	CurrentBottleFillLevel	R	REAL	Liquid level of selected bottle Minimum: 0.0 Default: 0.0
13	SamplingTechnique	R	SINT	Sampling mode Default: 0 Selection: 0: Peristaltic 1: Vacuum 2: Inline
14	SamplingVolumeVacuum	R	REAL	Dosing volume of vacuum- or inline-sampler Default: 0.0002
15	SamplingState	R	SINT	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
16	ManSamplingVolumePerist	W	REAL	Sample volume of manual sampling with peristaltic pump Minimum: 0.00002 Default: 0.0001
17	ManSamplingBottlePos	W	SINT	Manual sampling bottle position 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 10: Bottle 10 11: Bottle 11

Index	Attribute	R/W	Datentyp	Info
				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 26: Reference run
18	ManSamplingCommand	W	SINT	Manual sampling command Default: 0 Selection: 0: None 1: Start 2: Stop
19	ManSamplingParkPos	W	SINT	Distribution arm park position Default: 1 Selection: 0: None 1: Back
20	LastSamplingStartTime	R	DATE_AND_TIME	Start time of last sampling Default: 1970-01-01-00:00:00
21	CalCountDistLever	R	DINT	Number of distribution lever calibrations Default: 0
22	CalDateTimeDistLever	R	DATE_AND_TIME	Time stamp of last distribution lever calibration Default: 1970-01-01-00:00:00
23	CalCountPeristVolume	R	DINT	Number of peristaltic sampling volume calibrations Default: 0
24	CalDateTimePersitVolume	R	DATE_AND_TIME	Time stamp of last peristaltic sampling volume calibration Default: 1970-01-01-00:00:00
25	CalMethodPeristVolume	R	SINT	Calibration method of last peristaltic sampling volume calibration Default: 0 Selection: 0: None 1: 1-Point 2: 2-Point
26	CalCountTemp2	R	DINT	Number of calibrations of temperature sensor 2 Default: 0
27	CalDateTimeTemp2	R	DATE_AND_TIME	Time stamp of last calibration of temperature sensor 2 Default: 1970-01-01-00:00:00
28	CalCountTemp3	R	DINT	Number of calibrations of temperature sensor 3 Default: 0

Index	Attribute	R/W	Datentyp	Info
29	CalDateTimeTemp3	R	DATE_AND_TIME	Time stamp of last calibration of temperature sensor 3 Default: 1970-01-01-00:00:00

6.5.6 Analyzer object, class code = 0313h, instances = 1

Index	Attribute	R/W	Datentyp	Info
1	MeasValueIndex	W	SINT	Index of selected measurement value in measurement value list Default: 0
2	MeasValueUnit	W	SINT	User selectable measurand unit Default: 1 Selection: 0: g/l 1: mg/l 2: ug/l 3: ppm-dens 4: ppb-dens
3	PowerfailReaction	W	SINT	Powerfail reaction Default: 0 Selection: 0: Last mode 1: Manual mode
4	CalibrationRetries	W	SINT	Number of retries in case of failed calibration Range: 1 ... 3 Default: 2
5	CalibrationFactor	W	REAL	Calibration factor of the photometer Range: 0.1 ... 100.0 Default: 1.00
6	CalibrationFactorDelta	W	REAL	Max. allowed deviation of calibration factor for calibration Range: 1.0 ... 100.0 Default: 10
7	CalibrationFactorMin	W	REAL	Min. allowed calibration factor Minimum: 0.1 Default: 0.5
8	CalibrationFactorMax	W	REAL	Max. allowed calibration factor Default: 2.0
9	CalibrationConcentration	W	REAL	Concentration of the calibration standard Default: 0.0
10	MeasurementOffset	W	REAL	Concentration offset for concentration value calculation Default: 0.0
11	MeasurementDilutionFactor	W	REAL	Dilution factor for concentration value calculation Range: 0.5 ... 100.0 Default: 1.0

Index	Attribute	R/W	Datentyp	Info
12	HwVersionActuator	R	STRING	Hardware version of the device Range: 0 ... 16 Default: ""
13	SwVersionActuator	R	STRING	Software version of the device Range: 0 ... 16 Default: ""
14	Mode	R	INT	Operation mode Default: 0 Selection: 0: Manual 1: Automatic 2: Fieldbus
15	Activity	R	INT	Current activity Default: 0 Selection: 0: None 1: Measurement 2: Calibration 3: Cleaning 6: Emptying 9: Empty hoses 10: Initializing 11: Cleaning up 12: Cleaning sample preparation 13: Dispenser replacement to top 14: Dispenser replacement to bottom 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: Preparing
16	ActivityTime	R	DINT	Remaining time of current activity Default: 0
17	OpTimeFiltermat	R	DINT	Operating time of filter mat Minimum: 0 Default: 0
18	OpTimePeltier	R	DINT	Operating time of peltier element Minimum: 0 Default: 0
19	SampleCollectorType	R	SINT	Type of sample preparation Default: 0

Index	Attribute	R/W	Datentyp	Info
				Selection: 0: None 1: Conductive 2: Capacitive
20	SamplepreparationAvailability	R	SINT	Availability of sample preparation Default: 0 Selection: 0: SP1 1: SP2 2: SP1 + SP2
21	ModeChangeRequest	W	INT	Mode change request Default: 0 Selection: 0: None 1: Enter fieldbus mode 2: Continue automatic mode 3: Restart automatic mode
22	AbortActionRequest	W	INT	Abort current activity Default: 0 Selection: 0: None 1: Abort current action
23	ManualActionRequest	W	INT	Manual activity request Default: 0 Selection: 0: None 1: Start measurement 2: Start calibration 3: Start cleaning
24	ModeChangeState	R	INT	State of mode change request interface (0=ready) Default: 0
25	ActionRequestState	R	INT	Manual action request state. 0 = ready. Default: 0
26	DataMeasListsize	R	INT	Amount of available/selectable measurands Maximum: 8 Default: 0
27	DataMeasList1	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""
28	DataMeasList2	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""
29	DataMeasList3	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""
30	DataMeasList4	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""

Index	Attribute	R/W	Datentyp	Info
31	DataMeasList5	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""
32	DataMeasList6	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""
33	DataMeasList7	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""
34	DataMeasList8	R	STRING	Descriptor of available/selectable measurand Range: 0 ... 16 Default: ""
35	PhotometerHwVersion	R	STRING	Hardware version of photometer Range: 0 ... 16 Default: ""
36	PhotometerSwVersion	R	STRING	Software version of photometer Range: 0 ... 16 Default: ""
37	PhotometerOpTime	R	DINT	Operating hours of photometer Minimum: 0 Default: 0
38	PhotometerTemperature	R	REAL	Temperature of photometer cuvette Default: 25
39	PhotometerRawMeasValue	R	REAL	Raw value of photometer Default: 0.0
40	ProgramMeasTrigger	W	INT	Start condition for measurment Default: 0 Selection: 0: Immediate 1: Date/time 2: Continuous
41	ProgramMeasStartDate	W	DATE	Start of first measurement : date Default: 0
42	ProgramMeasStartTime	W	TIME_OF_DAY	Start of first measurement : time Default: 0
43	ProgramMeasInterval	W	DINT	Interval for measurement Default: 0
44	ProgramCalTrigger	W	INT	Start condition for calibration Default: 2 Selection: 0: Immediate 1: Date/time 2: Disabled

Index	Attribute	R/W	Datentyp	Info
45	ProgramCalStartDate	W	DATE	Start of first calibration : date Default: 0
46	ProgramCalStartTime	W	TIME_OF_DAY	Start of first calibration : time Default: 0
47	ProgramCalInterval	W	DINT	Interval for calibration Default: 0
48	ProgramCleanTrigger	W	INT	Start condition for cleaning Default: 2 Selection: 0: Immediate 1: Date/time 2: Disabled
49	ProgramCleanStartDate	W	DATE	Start of first cleaning : date Default: 0
50	ProgramCleanStartTime	W	TIME_OF_DAY	Start of first cleaning : time Default: 0
51	ProgramCleanInterval	W	DINT	Interval for cleaning Default: 0
52	SamplePreparationInstallationType	R	SINT	SP InstallationType Default: 0 Selection: 0: Others 1: Pressurized pipe sampling
53	CalibrationCount	R	DINT	Number of calibrations Default: 0
54	CalibrationDateTime	R	DATE_AND_TIME	Time stamp of last calibration Default: 1970-01-01-00:00:00
55	CalibrationMethod	R	SINT	Calibration method of last calibration Default: 0 Selection: 0: None 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.
56	SPforFieldbusActivities	W	SINT	Sampling point for fieldbus activities Default: 0 Selection: 0: Sequence of measurements 1: SP1 2: SP2 3: SP3 4: SP4 5: SP5 6: SP6

Index	Attribute	R/W	Datentyp	Info
57	OrdercodeExtCurrent	W	STRING	Current extended ordercode of the device Range: 0 ... 64 Default: ""
58	CalibrationZeroPointDelta	W	REAL	Max. allowed deviation of zero point for calibration Default: 0.0
59	CalibrationZeroPointMin	W	REAL	Min. allowed calibration zero point Default: 0.0
60	CalibrationZeroPointMax	W	REAL	Max. allowed calibration zero point Default: 0.0
61	MultipleCalibrationsCount	W	SINT	Calibration: Number determinations Default: 1
62	MultipleMeasurementsCount	W	SINT	Number measurements Default: 1
63	TurbidSampleMode	R	SINT	Turbid sample mode Default: 1 Selection: 0: Off 1: On 2: Automatic
64	MeasParamActiveText	R	STRING	Measuring parameter Range: 0 ... 32 Default: ""
65	ApplicationCalActive	R	SINT	Application calibration active Default: 0
66	BlankValue	R	REAL	Blank value Default: 0.0
67	CalibrationConcentration	R	REAL	Concentration of the calibration standard Default: 0.0
68	CalibrationFactor	R	REAL	Calibration factor of the photometer Range: 0.1 ... 100.0 Default: 1.00
69	CalibrationFactorDate	R	DATE_AND_TIME	Date of last calibration factor determination Default: 1972-01-01-00:00:00.000
70	CalibrationFactorDateUTC0	R	DATE_AND_TIME	Date of last calibration factor determination Default: 1972-01-01-00:00:00.000
71	CalibrationOffset	R	REAL	Offset Default: 0.0
72	DigestionTemperature	R	REAL	Digestion temperature Default: 0.0

Index	Attribute	R/W	Datentyp	Info
73	DigestionTime	R	DINT	Digestion time Default: 0
74	MeasRangeActiceText	R	STRING	Measuring range Range: 0 ... 32 Default: ""
75	DilutionFactorExternal	R	REAL	External dilution factor Range: 0.5 ... 100.0 Default: 1.0
76	DilutionFactorInternal	R	SINT	Internal dilution factor Default: 1
77	MultipleCalibrationsCount	R	SINT	Calibration: Number determinations Default: 1
78	MultipleMeasurementsCount	R	SINT	Number measurements Default: 1
79	RawValueOTS	R	REAL	Raw value Default: 0.0
80	RawValueStateOTS	R	SINT	Raw value state Default: 0.0
81	RawSampleValue	R	REAL	Sample value Default: 0.0
82	RawSlope	R	REAL	Slope Default: 0.001
83	DataMeasRangeActiveText	R	STRING	Measuring range Range: 0 ... 32 Default: ""
84	ZeropointCal	R	REAL	Zero point Default: 0.0
85	ZeropointCalDate	R	DATE_AND_TIME	Date of last zero point calibration Default: 1972-01-01-00:00:00.000
86	ZeropointCalDateUTC0	R	DATE_AND_TIME	Date of last zero point calibration Default: 1972-01-01-00:00:00.000
87	DataAutoMeasRangeChange	R	SINT	Automatic range switch Default: 0 Selection: 0: Manual 1: Automatic
88	SP1MeasValue	R	REAL	SP1: Measured value Default: 0.0

Index	Attribute	R/W	Datentyp	Info
89	SP1MeasState	R	SINT	SP1: Measured value state Default: 0.0
90	SP1MeasDate	R	DATE	SP1: Date of last measured value Default: 0
91	SP1MeasTime	R	TIME_OF_DAY	SP1: Time of last measured value Default: 0
92	SP1MeasDateAndTimeUTC0	R	DATE_AND_TIME	SP1: Time of last measured value Default: 1972-01-01-00:00:00.000
93	SP1TimeOfSample	R	DATE_AND_TIME	no description Default: 1970-01-01-00:00:00.000
94	SP1TimeOfSampleUTC0	R	DATE_AND_TIME	SP1: Time of last measured value Default: 1972-01-01-00:00:00.000
95	SP2MeasValue	R	REAL	SP2: Measured value Default: 0.0
96	SP2MeasState	R	SINT	SP2: Measured value state Default: 0.0
97	SP2MeasDate	R	DATE	SP2: Date of last measured value Default: 0
98	SP2MeasTime	R	TIME_OF_DAY	SP2: Time of last measured value Default: 0
99	SP2MeasDateAndTimeUTC0	R	DATE_AND_TIME	SP2: Time of last measured value Default: 1972-01-01-00:00:00.000
100	SP2TimeOfSample	R	DATE_AND_TIME	no description Default: 1970-01-01-00:00:00.000
101	SP2TimeOfSampleUTC0	R	DATE_AND_TIME	SP1: Time of last measured value Default: 1972-01-01-00:00:00.000
102	SP3MeasValue	R	REAL	SP3: Measured value Default: 0.0
103	SP3MeasState	R	SINT	SP3: Measured value state Default: 0.0
104	SP3MeasDate	R	DATE	SP3: Date of last measured value Default: 0
105	SP3MeasTime	R	TIME_OF_DAY	SP3: Time of last measured value Default: 0
106	SP3MeasDateAndTimeUTC0	R	DATE_AND_TIME	SP3: Time of last measured value Default: 1972-01-01-00:00:00.000

Index	Attribute	R/W	Datentyp	Info
107	SP3TimeOfSample	R	DATE_AND_TIME	no description Default: 1970-01-01-00:00:00.000
108	SP3TimeOfSampleUTC0	R	DATE_AND_TIME	SP1: Time of last measured value Default: 1972-01-01-00:00:00.000
109	SP4MeasValue	R	REAL	SP4: Measured value Default: 0.0
110	SP4MeasState	R	SINT	SP4: Measured value state Default: 0.0
111	SP4MeasDate	R	DATE	SP4: Date of last measured value Default: 0
112	SP4MeasTime	R	TIME_OF_DAY	SP4: Time of last measured value Default: 0
113	SP4MeasDateAndTimeUTC0	R	DATE_AND_TIME	SP4: Time of last measured value Default: 1972-01-01-00:00:00.000
114	SP4TimeOfSample	R	DATE_AND_TIME	no description Default: 1970-01-01-00:00:00.000
115	SP4TimeOfSampleUTC0	R	DATE_AND_TIME	SP1: Time of last measured value Default: 1972-01-01-00:00:00.000
116	SP5MeasValue	R	REAL	SP5: Measured value Default: 0.0
117	SP5MeasState	R	SINT	SP5: Measured value state Default: 0.0
118	SP5MeasDate	R	DATE	SP5: Date of last measured value Default: 0
119	SP5MeasTime	R	TIME_OF_DAY	SP5: Time of last measured value Default: 0
120	SP5TimeOfSample	R	DATE_AND_TIME	no description Default: 1970-01-01-00:00:00.000
121	SP5MeasDateAndTimeUTC0	R	DATE_AND_TIME	SP5: Time of last measured value Default: 1972-01-01-00:00:00.000
122	SP5TimeOfSampleUTC0	R	DATE_AND_TIME	SP1: Time of last measured value Default: 1972-01-01-00:00:00.000
123	SP6MeasValue	R	REAL	SP6: Measured value Default: 0.0
124	SP6MeasState	R	SINT	SP6: Measured value state Default: 0.0

Index	Attribute	R/W	Datentyp	Info
125	SP6MeasDate	R	DATE	SP6: Date of last measured value Default: 0
126	SP6MeasTime	R	TIME_OF_DAY	SP6: Time of last measured value Default: 0
127	SP6MeasDateAndTimeUTC0	R	DATE_AND_TIME	SP6: Time of last measured value Default: 1972-01-01-00:00:00.000
128	SP6TimeOfSample	R	DATE_AND_TIME	no description Default: 1970-01-01-00:00:00.000
129	SP6TimeOfSampleUTC0	R	DATE_AND_TIME	SP1: Time of last measured value Default: 1972-01-01-00:00:00.000

6.5.7 Sample preparation object, class code = 0314h, instances = 2

Index	Attribute	R/W	Datentyp	Info
1	Ordercode	R	STRING	Ordercode of sample preparation Range: 0 ... 32 Default: ""
2	OrdercodeExt	R	STRING	Extended ordercode of sample preparation Range: 0 ... 32 Default: ""
3	Serial	R	STRING	Serial number of sample preparation Range: 0 ... 16 Default: ""
4	HWversion	R	STRING	Hardware version of sample preparation Range: 0 ... 16 Default: ""
5	SWversion	R	STRING	Software version of sample preparation Range: 0 ... 16 Default: ""
6	Type	R	STRING	Type of sample preparation Range: 0 ... 16 Default: ""
7	ControlMode	R	INT	Operating mode Default: 1 Selection: 0: Local control 1: Remote control
8	State	R	INT	Current state of sample preparation Default: 0 Selection: 0: Inactive 1: Sampling 2: Cleaning

Index	Attribute	R/W	Datentyp	Info
				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 20: Pump backward 21: Cleaning up
9	OpTimeFilter	R	DINT	Operating hours of sample preparation filter Default: 0
10	OpTimeHose	R	DINT	Operating hours of sample preparation hose Default: 0
11	OpTimeMembranepump	R	DINT	Operating hours of sample preparation membrane pump Default: 0
12	AmbientTemperature	R	REAL	Ambient temperature Default: 0.0
13	HousingTemperature	R	REAL	Cabinet temperature Default: 0.0
14	CleaningTrigger	W	INT	Start condition of first sample preparation cleaning Default: 0 Selection: 0: Immediate 1: Date/time 2: Disabled
15	CleaningStartDate	W	DATE	Date of first sample preparation cleanig Default: 0
16	CleaningStartTime	W	TIME_OF_DAY	Time of first sample preparation cleanig Default: 0
17	CleaningInterval	W	DINT	Interval for sample preparation cleaning Default: 0
18	CleaningDuration	W	DINT	Duration of sample preparation cleaning Default: 0
19	TransportTimeMax	W	DINT	Max. transport time of sample preparation Default: 0
20	HeatingTempSetpointTube	W	REAL	Switch on temperature for sample preparation hose heating

Index	Attribute	R/W	Datentyp	Info
				Range: 4.0 ... 10.0 Default: 5.0
21	HeatingTempSetpointHousing	W	REAL	Switch on temperature for outlet sample preparation cabinet heating Range: 4.0 ... 10.0 Default: 5.0
22	HeatingTempSetpointHousingInlet	W	REAL	Switch on temperature for inlet sample preparation cabinet heating Range: 4.0 ... 30.0 Default: 10.0
23	FilterchangeWarnlevel	W	DINT	Warn level for sample prepartion filter change Default: 0
24	HosechangeWarnlevel	W	DINT	Warn level for sample prepartion hose change Default: 0
25	MeasurementInterations	W	INT	Number of consecutive measurements for one channel Range: 0 ... 99 Default: 1
26	SamplePreparationType	R	SINT	Type of sample preparation Default: 0 Selection: 0: 3rd party 1: Inlet 2: Aeration/Outlet 3: Unknown
26	SamplePreparationType	R	SINT	Type of sample preparation Default: 0 Selection: 0: 3rd party 1: Inlet 2: Aeration/Outlet 3: Unknown
27	AmbientTemperatureSensorAvailable	R	SINT	Ambient temperature sensor Default: 1 Selection: 0: Available 1: Not available
28	AnalyzerTubeHeatingAvailable	R	SINT	Hose heating analyzer Default: 1 Selection: 0: Available 1: Not available
29	FilterTubeHeatingAvailable	R	SINT	Hose heating filter Default: 1 Selection: 0: Available 1: Not available
30	HousingHeatingAvailable	R	SINT	Cabinet heating Default: 1 Selection:

Index	Attribute	R/W	Datentyp	Info
				0: Available 1: Not available
31	OperatingMode	R	SINT	Operating mode Default: 0 Selection: 0: Independent 1: Controlled
32	PPSCleaningValveInstalled	R	SINT	Cleaning valve Default: 0 Selection: 0: Not available 1: Available
33	PressurizedAirAvailable	R	SINT	Pressurized air available Default: 0 Selection: 0: Available 1: Not available
34	CleaningDetergentResidenceTime	W	DINT	Cleaner residence time Default: 0
35	CleaningDiscardTimePPS	W	DINT	Pressurized pipe cleaning discard time Range: 0.0 … 1800.0 Default: 180.0
36	CleaningDiscardTime	W	DINT	Cleaning discard time Default: 0
37	CleaningDurationPPS	W	DINT	Pressurized pipe cleaning duration Range: 10.0 … 30.0 Default: 10.0
38	CleaningIntervalPPS	W	DINT	Interval for pressurized pipe cleaning Default: 0
39	CleaningTriggerPPS	W	SINT	Start condition of first pressurized pipe cleaning Default: 0 Selection: 0: On 1: Date/time 2: Off
40	FilterAirCleaningDuration	W	DINT	Filter air cleaning duration Range: 10.0 … 60.0 Default: 30.0
41	FilterAirCleaningInterval	W	DINT	Filter air cleaning interval Default: 0
42	FilterAirCleaningMode	W	DINT	Filter air cleaning mode Default: 0 Selection: 0: On 1: Off

Index	Attribute	R/W	Datentyp	Info
43	FilterChangeActivation	W	DINT	Limit change filter Default: 0 Selection: 0: Off 1: On
44	HoseChangeActivation	W	DINT	Limit change hose Default: 1 Selection: 0: Off 1: On
45	TimeoutSamplingPPS	W	DINT	Timeout no sample (pressurized pipe) Default: 0
46	TimeoutSampling	W	DINT	Timeout no sample Default: 0

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