



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Operating Instructions

PROFIBUS-PA/-DP

Field Communication for Liquisys M CXM223/253

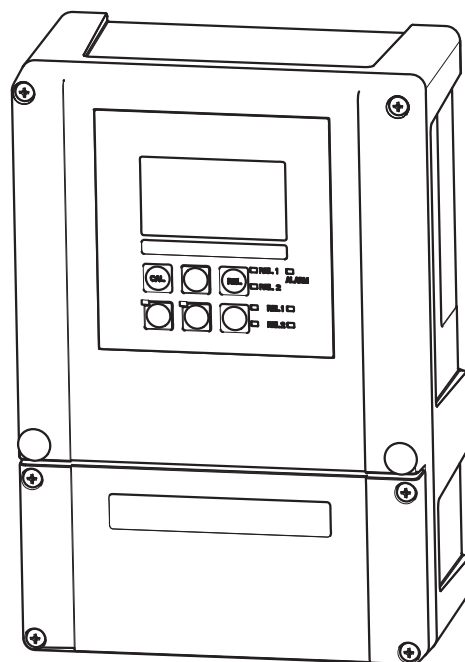
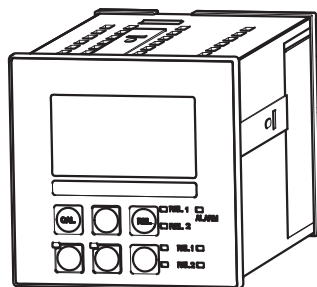


Table of contents

1	Safety instructions	4
1.1	Designated use	4
1.2	Installation, commissioning and operation	4
1.3	Operational safety	4
1.4	Notes on safety icons and symbols	5
2	Installation	6
2.1	System equipment	6
2.2	Post-installation check	7
3	Wiring	8
3.1	Electrical connection PA instrument	8
3.2	Electrical connection DP instrument	11
3.3	Post-connection check	13
4	Operation	14
4.1	Display and operating elements	14
4.2	Operation via FieldCare	14
5	Commissioning	15
5.1	Function check	15
5.2	Setting of device address	15
5.3	Device data and type files	17
6	Communication	19
6.1	Cyclical data exchange (Data_Exchange)	19
6.2	Acyclical data exchange	21
7	Accessories	36
8	Technical data	38
8.1	Output PROFIBUS-PA	38
8.2	Output PROFIBUS-DP	38
8.3	Display and user interface	38
8.4	Standards and guidelines	38
	Index	39

1 Safety instructions

1.1 Designated use

These operating instructions were designed specifically for use with transmitters of the family Liquisys CXM223/253. They contain specific information for instruments with the PROFIBUS-PA interface (**Process Field Bus – Process Automation**) or the PROFIBUS-DP interface (**Process Field Bus – Decentralized Peripherals**).

PROFIBUS is an open field bus standard according to IEC 61158 / IEC 61784. It has been created specifically for process control purposes and permits connection of several measuring instruments to a bus line. The transmission method according to IEC 61158-2 guarantees safe signal transmission.

The PROFIBUS-PA interface permits operation of the instrument from the PC:

- via FieldCare (Plant-Asset-Management-Tool)

Any other use than the one described here compromises the safety of persons and the entire measuring system and is not permitted.

The manufacturer is not liable for damage caused by improper or non-designated use.

1.2 Installation, commissioning and operation

Please note the following items:

- Installation, commissioning, operation and maintenance of the measuring system must only be carried out by trained technical personnel.
Trained personnel must be authorized for the specified activities by the system operator.
- Electrical connection must only be carried out by a certified electrician.
- Technical personnel must have read and understood these Operating Instructions and must adhere to them.
- Before commissioning the entire measuring point, check all the connections. Ensure that electrical cables and hose connections are not damaged.
- Do not operate damaged products and secure them against unintentional commissioning.
Mark the damaged product as being defective.
- Measuring point faults may only be rectified by authorized and specially trained personnel.
- If faults can not be rectified, the products must be taken out of service and secured against unintentional commissioning.
- Repairs not described in these Operating Instructions may only be carried out at the manufacturer's or by the service organization.

1.3 Operational safety

The transmitter has been designed and tested according to the state of the art and left the factory in perfect functioning order.

Relevant regulations and European standards have been met.

As the user, you are responsible for complying with the following safety conditions:

- Explosion protection regulations
- Installation instructions
- Local prevailing standards and regulations.

Ex systems have an additional Ex documentation which is part of the Operating Instructions (see also chapter "Scope of delivery").

Electromagnetic compatibility

With regard to electromagnetic compatibility, this device has been tested in accordance with the applicable European standards for industrial applications.

The electromagnetic compatibility indicated only applies to a device that has been connected in accordance with the instructions in these Operating Instructions.

1.4 Notes on safety icons and symbols

1.4.1 Safety icons



Warning!

This symbol alerts you to hazards that can cause serious damage to the instrument or to persons if ignored.



Caution!

This symbol alerts you to possible faults which could arise from incorrect operation. They could cause damage to the instrument if ignored.



Note!

This symbol indicates important items of information.

1.4.2 Electrical symbols



Direct Current (DC)

A terminal at which DC is applied or through which DC flows.



Alternating Current (AC)

A terminal at which (sine-form) AC is applied or through which AC flows.



Ground connecting

A terminal which, from the user's point of view, is already grounded using a grounding system.



Protective ground terminal

A terminal which must be grounded before other connections may be set up.



Alarm relay



Input



Output



DC voltage source



Temperature sensor

2 Installation

2.1 System equipment

A complete system architecture comprises:

- Transmitter Liquisys M CXM223 or CXM253
- Segment coupler (PA only)
- PROFIBUS terminating resistor
- Cabling incl. bus distributor
- either
 - PC with FieldCare
 - Programmable logic controller (PLC)

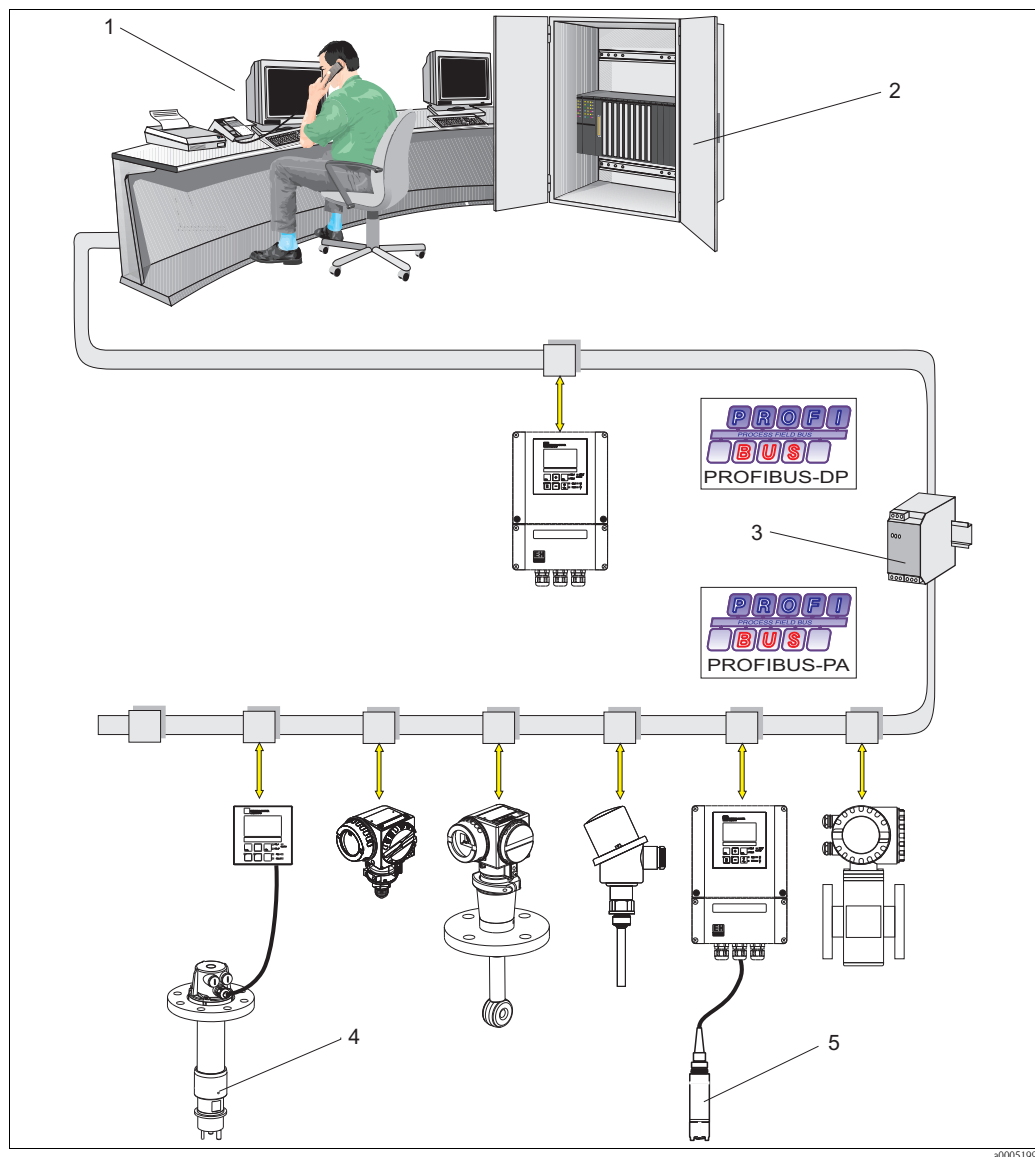


Fig. 1: Measuring system with PROFIBUS interface

- 1 PC with FieldCare
- 2 PLC
- 3 Segment coupler
- 4 e.g. Liquisys M CPM223 with CPA140
- 5 e.g. Liquisys M COM253 with COS61

The maximum number of transmitters in a bus segment is determined by their power consumption, the bus coupler output and the required bus length.



Note!

For detailed information on function and connection of a PROFIBUS system, please refer to Technical Information TI260F/00/en.

2.2 Post-installation check

- After installation, check the transmitter for damage.
- Check whether the transmitter is protected against moisture and direct sunlight (e.g. by the weather protection cover).

3 Wiring



Warning!

- The electrical connection must only be carried out by a certified electrician.
- Technical personnel must have read and understood the instructions in this manual and must adhere to them.
- Ensure that there is no voltage at the power cable before beginning the connection work.

3.1 Electrical connection PA instrument

3.1.1 Bus cable connection to field instrument

The bus cable connection to the field instrument can be performed with or without M12 plug. Connect the bus cable as follows:

1. Unscrew the four Phillips screws and remove the instrument cover.
2. Thread the cable through the opened cable entry into the connection compartment.
3. Connect the wires of the bus cable to the terminal block according to the figure below. Polarity reversal of the connections PA+ and PA- does not affect operation.
4. Tighten the cable entry.

Bus cable connection to CPM253 / CLM253 inductive / COM253 / CUM253 / CCM253

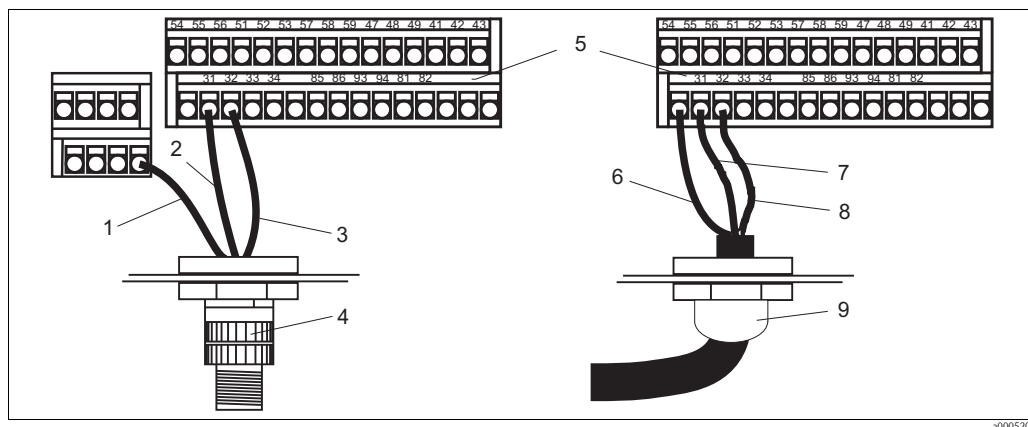


Fig. 2: Bus cable connection to field instrument

- | | | | |
|---|---------------------------|---|----------------|
| 1 | Screen (black) | 6 | Screen |
| 2 | PA+ (brown) | 7 | PA+ |
| 3 | PA- (blue) | 8 | PA- |
| 4 | M12 plug | 9 | Pg cable gland |
| 5 | Connection terminal block | | |

Bus cable connection to CLM253 conductive:

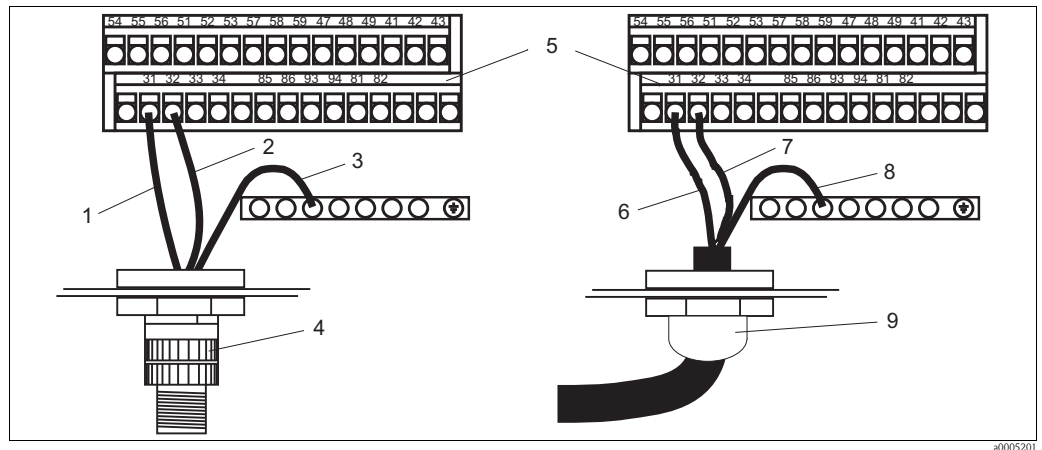


Fig. 3: Bus cable connection to field instrument CLM253 conductive

- | | | | |
|---|---------------------------|---|----------------|
| 1 | PA+ (brown) | 6 | PA+ |
| 2 | PA- (blue) | 7 | PA- |
| 3 | Screen (black) | 8 | Screen |
| 4 | M12 plug | 9 | Pg cable gland |
| 5 | Connection terminal block | | |

Connection of several field instruments:

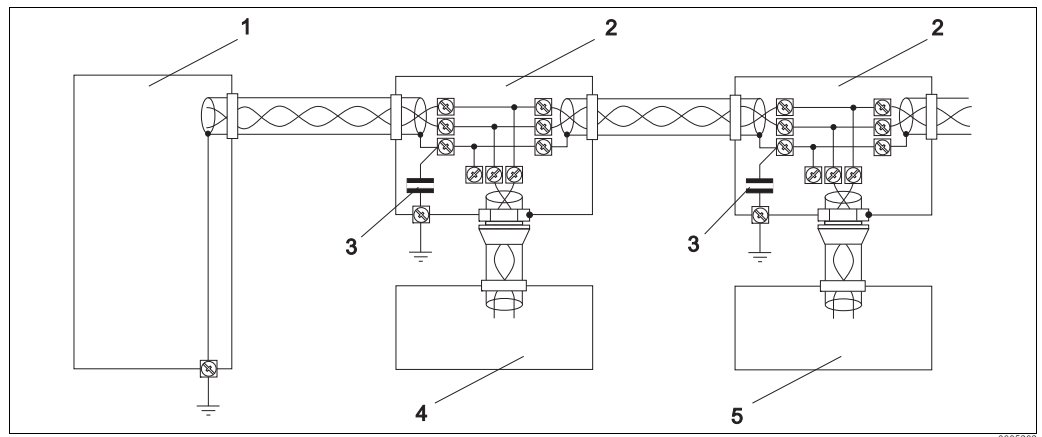


Fig. 4: Connection of several field instruments

- | | | | |
|---|-------------------------------------|---|--------------------|
| 1 | Supply instrument / segment coupler | 4 | Field instrument 1 |
| 2 | Connection box | 5 | Field instrument 2 |
| 3 | Capacitor max. 10 nF/250 V AC | | |

3.1.2 Bus cable connection to panel-mounted instrument

Connect the bus cable directly to the terminalblock on the rear of the instrument.

Connection to CPM223 / CLM223 inductive /
COM223 / CUM223 / CCM223

Connection to CLM223 conductive

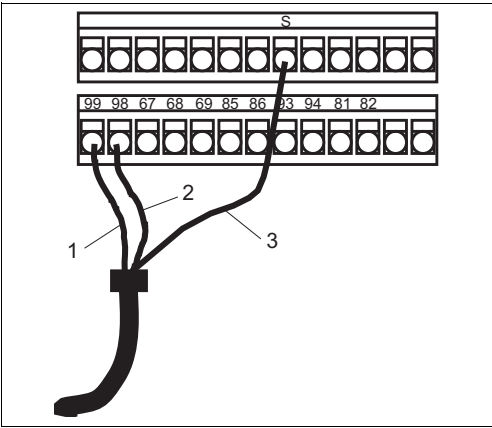


Fig. 5: Bus cable connection

- 1 PA+
- 2 PA-
- 3 Screen

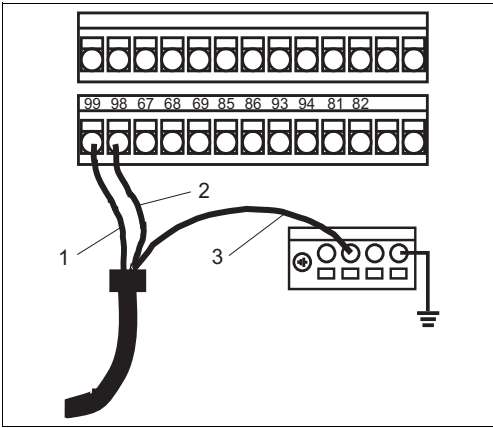


Fig. 6: Bus cable connection CLM223 conductive

- 1 PA+
- 2 PA-
- 3 Screen
- 4 Ground connection block



Note!
Please connect the ground connection block to the protective ground.

Connection of several panel-mounted instruments

For the connection of several panel-mounted instruments to the bus cable, the connection lines must be bridged according to the figure below:

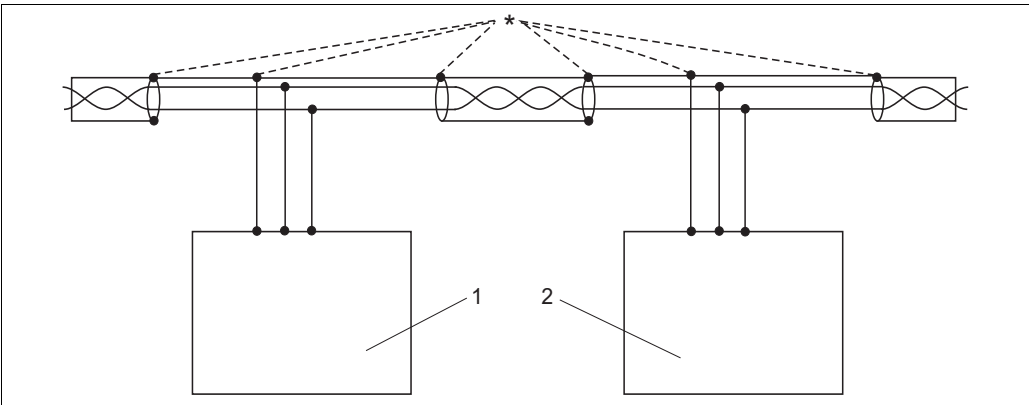


Fig. 7: Connection of several panel mounted instruments

- * Connect and ground screens
- 1 Panel-mounted instrument 1
- 2 Panel-mounted instrument 2

Bus termination

Each PROFIBUS PA bus segment must be terminated with a passive bus termination on each end. Bus termination for PROFIBUS BA and DP are different.

3.2 Electrical connection DP instrument

3.2.1 Bus cable connection to field instrument

Connection to CPM253 / CLM253 inductive /
COM253 / CUM253 / CCM253

Connection to CLM253 conductive

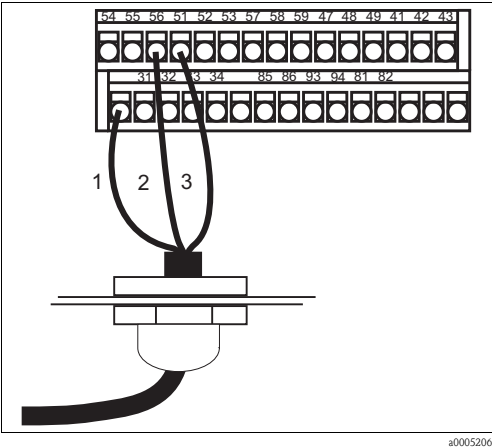


Fig. 8: Bus cable connection

- 1 Screen
- 2 DP B (terminal 56 or 52)
- 3 DP A (terminal 51 or 53)

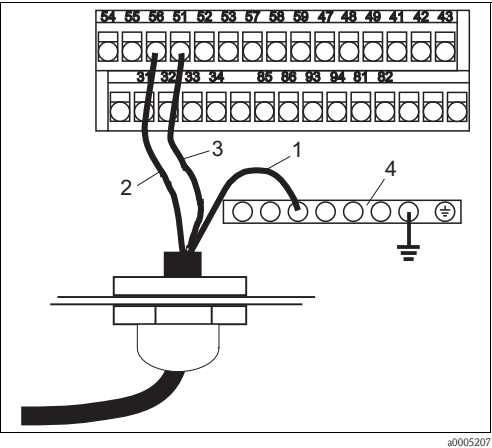


Fig. 9: Bus cable connection CLM253 conductive

- 1 DP B (terminal 56 or 52)
- 2 DP A (terminal 51 or 53)
- 3 Screen
- 4 Grounding rail



Note!

Please connect the grounding rail to the protective ground.
On the printed circuit board of the field instrument the terminal 56 is connected with terminal 52 and terminal 51 is connected with terminal 53. The terminals 54 and 55 are designed to connect an external bus termination only. They are protected by a non replaceable fuse.

Terminal	RS 485 signal	PROFIBUS line	Color*
56 or 52	RxD/TxD - P	B	red
51 or 53	RxD/TxD - N	A	green
54	+5 V		
55	GND		

Bus termination

Each PROFIBUS DP bus segment must be terminated with an active bus termination on each end.
Bus termination for PROFIBUS BA and DP are different.

3.2.2 Bus cable connection panel-mounted instrument

The bus cable is connected to a D-Sub connector. The connector is integrated into the rear frame.

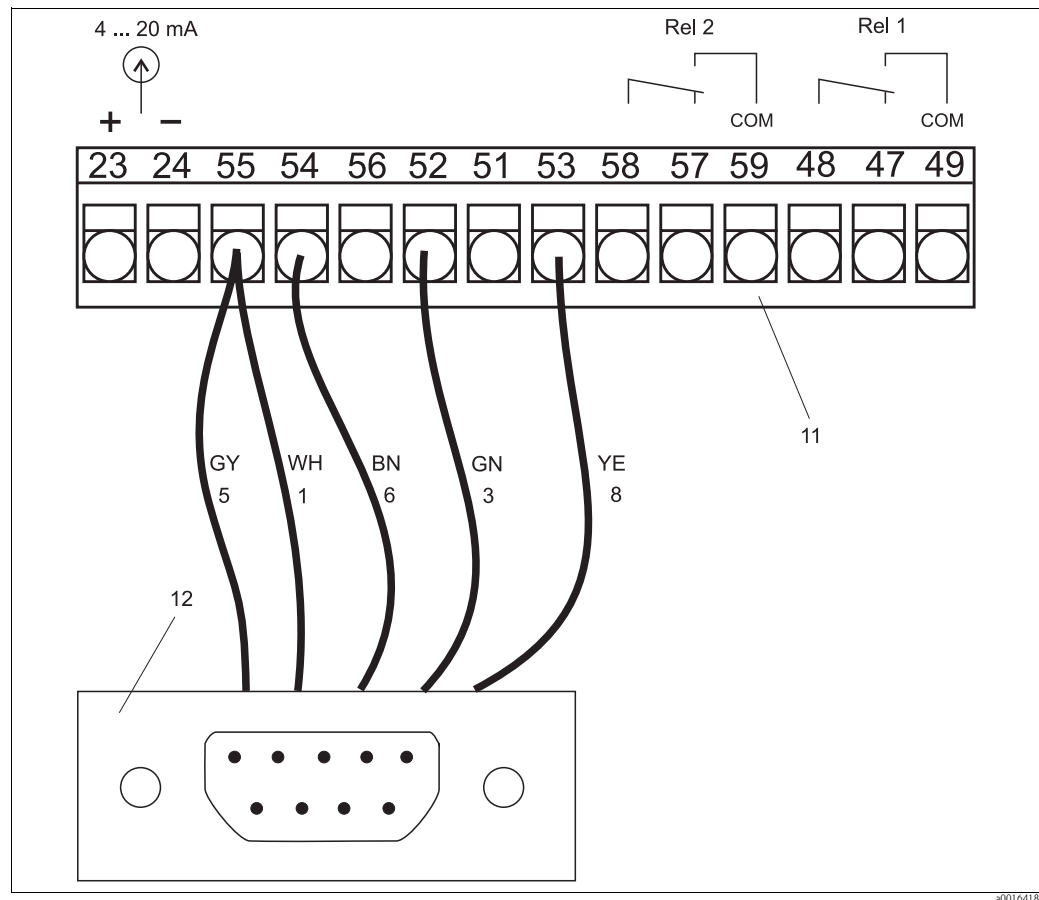


Fig. 10: Bus cable connection

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- 3 DP B, green, D-Sub pin 3
- 8 DP A, yellow, D-Sub pin 8
- 6 + 5 V, brown, D-Subpin 6
- 5 GND, grey, D-Sub pin 5

- 1 Screen, white, D-Sub pin 1
- 11 Connection terminal block
- 12 D-Sub plug connection

Bus termination

Each PROFIBUS DP bus segment must be terminated with an active bus termination on each end. Bus termination for PROFIBUS BA and DP are different.

3.2.3 Connection of several panel-mounted instruments

For the connection of several panel-mounted instruments to the bus cable, the connection lines must be bridged according to the figure below:

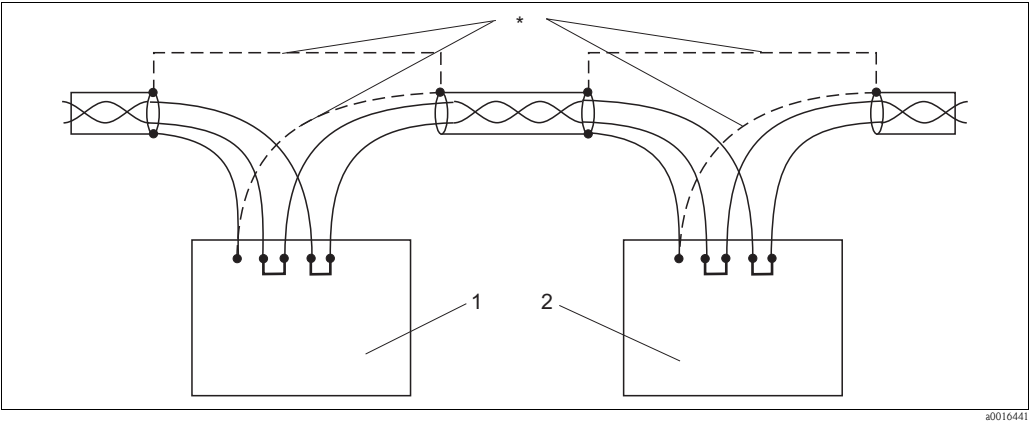


Fig. 11: Connection of several panel mounted instruments

- * Connect and ground screens
- 1 Panel-mounted instrument 1
- 2 Panel-mounted instrument 2

Bus termination

Each PROFIBUS DP bus segment must be terminated with an active bus termination on each end. Bus termination for PROFIBUS BA and DP are different.

3.3 Post-connection check

After the electrical connection, carry out the following checks:

Device condition and specifications	Notes
Are the transmitter and cables damaged on the outside?	Visual inspection

Electrical connection	Notes
Are the mounted cables strain relieved?	
Cable run without loops and cross-overs?	
Are the signal lines correctly connected in accordance with the wiring diagram?	
Are all screw terminals tightened?	
Are all cable entries installed, tightened and sealed?	

4 Operation

4.1 Display and operating elements

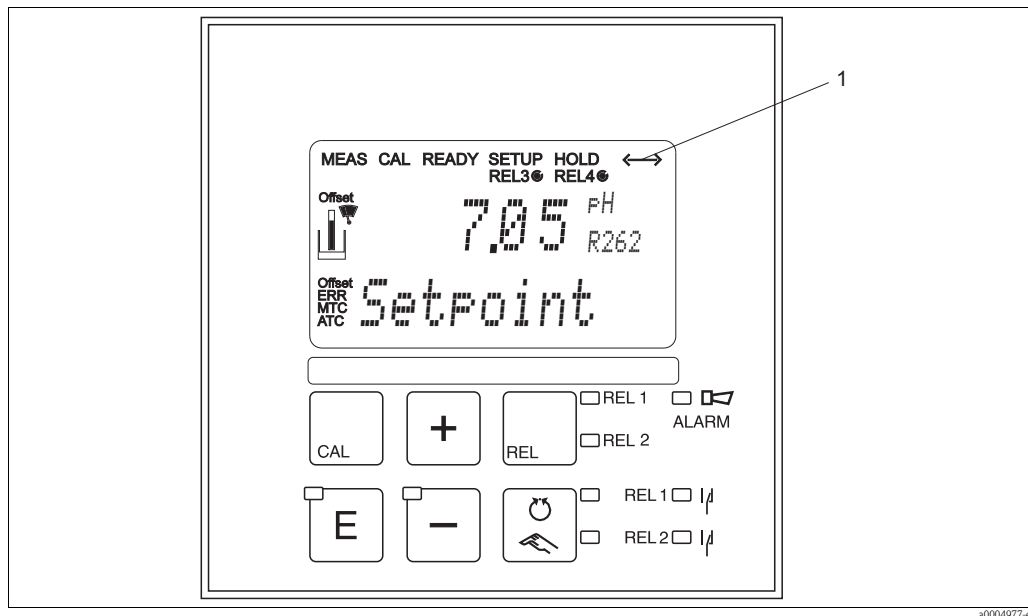


Fig. 12: Operating elements

1 Display symbol for active communication via PROFIBUS interface

For the description of the keys and the other symbols please refer to the standard operating instructions.

4.2 Operation via FieldCare

FieldCare is Endress+Hauser's FDT based Plant Asset Management Tool. It can configure all intelligent field devices in your plant and supports you in managing them. By using status information, it also provides a simple but effective means of checking their health.

- Supports Ethernet, HART, PROFIBUS, and FOUNDATION Fieldbus etc.
- Operates all Endress+Hauser devices
- Integrates third-party devices such as actuators, I/O systems and sensors supporting the FDT standard
- Ensures full functionality for all devices with DTMs
- Offers generic profile operation for third-party fieldbus devices that do not have a vendor DTM



Note!

For information on FieldCare installation see the operating instructions "Getting started" BA027S/04/a4.

5 Commissioning

5.1 Function check

Safety risks for staff and incorrect operation of the device. Check that all connections have been established correctly in accordance with the wiring diagram. Make sure that the supply voltage matches the voltage indicated on the nameplate.

5.2 Setting of device address

The addresses of all PROFIBUS devices must be set. An incorrect address setting will prevent detection of the measuring instrument by the control system.

All instruments are set to address 126 at the factory. This address can be used to test the function of the instrument and for connection to a PROFIBUS network. Subsequently, this address must be changed to connect additional devices.

The device address can be set via:

- Field operation
- PROFIBUS communication
- DIL switch at the instrument



Note!

- Valid device address range: 0 to 126.
- Each address may only be assigned once in a PROFIBUS network.
- The double arrow in the display indicates communication via PROFIBUS.

Setting the device address via field operation (software setting)

The address can only be set via software if DIL switch 8 is set to software position. DIL switch 8 is set to software position at the factory. The figure on the right shows the default setting of the switch (DIL switch 8 = ON = software position).

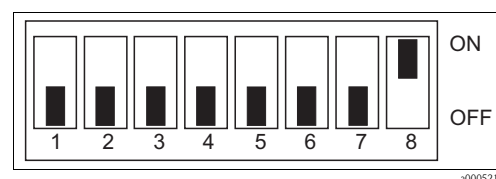
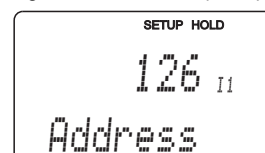


Fig. 13: DIL switch factory setting

The device address is set via keys in the menu field I1 of the function group INTERFACE.



Setting the device address via PROFIBUS communication

The device address is set via the Set_Slave_Adr service.

Setting the device address via DIL switch (hardware setting)

The DIL switch is located at the electronics module above the display. To set the device address, proceed as follows:

1. Field instrument
 - Unscrew the four Phillips screws and remove the instrument cover. The electronics module with DIL switch is located in the instrument cover.
2. Panel-mounted instrument
 - The DIL switch is accessible through a break in the instrument above the display.
3. Set the device address (0 ... 126) at switches 1 to 7.
Example: $18 = 2 + 16$ (switch 2 and switch 5 = ON)
4. Set DIL switch 8 to "OFF".
5. For field instrument, close the instrument cover again.

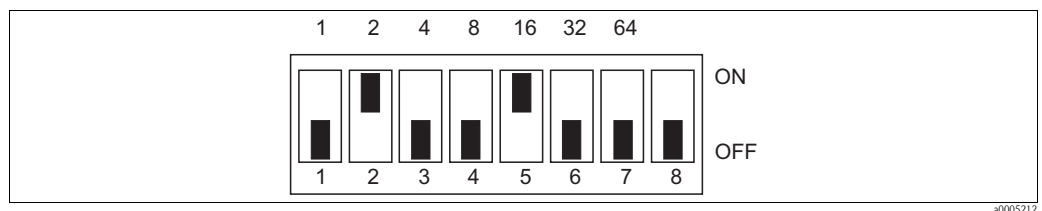


Fig. 14: DIL switch for hardware setting of the device address (example: address = 18)

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5.3 Device data and type files

The device data base (GSD) is required to configure a PROFIBUS-DP network. The GSD (a simple text file) describes e. g., which data transfer rate is supported by the device or which digital information in which format the PLC receives from the device.

Each device is assigned an ID number by the PROFIBUS user organization (PNO). The name of the device data base (GSD) is derived from this ID number.



Note!

For Endress+Hauser devices the ID number always starts with "15XX".

Name of device	ID no.	GSD*	Type file	Bitmaps
Liquisys M-PA CLM223/253-xx3	1515 Hex	EH_1515.gsd EH_x1515.gsd	EH_1515x.200	EH1515_d.bmp EH1515_n.bmp EH1515_s.bmp
Liquisys M-PA CPM223/253-xx3	1516 Hex	EH_1516.gsd EH_x1516.gsd	EH_1516x.200	EH1516_d.bmp EH1516_n.bmp EH1516_s.bmp
Liquisys M-PA CUM223/253-xx3	1517 Hex	EH_1517.gsd EH_x1517.gsd	EH_1517x.200	EH1517_d.bmp EH1517_n.bmp EH1517_s.bmp
Liquisys M-PA COM223/253-xx3	1518 Hex	EH_1518.gsd EH_x1518.gsd	EH_1518x.200	EH1518_d.bmp EH1518_n.bmp EH1518_s.bmp
Liquisys M-PA CCM223/253-xx3	1519 Hex	EH_1519.gsd EH_x1519.gsd	EH_1519x.200	EH1519_d.bmp EH1519_n.bmp EH1519_s.bmp
Liquisys M-DP CLM223/253-xx4	1521 Hex	EH_1521.gsd EH_x1521.gsd	EH_1521x.200	EH1521_d.bmp EH1521_n.bmp EH1521_s.bmp
Liquisys M-DP CPM223/253-xx4	1520 Hex	EH_1520.gsd EH_x1520.gsd	EH_1520x.200	EH1520_d.bmp EH1520_n.bmp EH1520_s.bmp
Liquisys M-DP CUM223/253-xx4	151f Hex	EH_151f.gsd EH_x151f.gsd	EH_151fx.200	EH151f_d.bmp EH151f_n.bmp EH151f_s.bmp
Liquisys M-DP COM223/253-xx4	151e Hex	EH_151e.gsd EH_x151e.gsd	EH_151ex.200	EH151e_d.bmp EH151e_n.bmp EH151e_s.bmp
Liquisys M-DP CCM223/253-xx4	151d Hex	EH_151d.gsd EH_x151d.gsd	EH_151dx.200	EH151d_d.bmp EH151d_n.bmp EH151d_s.bmp

- * Filenames without "x" contain the standard identifier format
 Filenames with "*" contain the extended identifier format

The GSD files for all Endress+Hauser devices can be obtained from the following sources:

- Via the Internet:
 - E+H: <http://www.endress.com>
 - PNO: <http://www.profibus.com>
- On CD-ROM from E+H; order no. 56003894

Contents of the download file and of CD-ROM:

- All Endress+Hauser GSD files
- All Endress+Hauser bitmap files
- Useful information on the devices

Working with the GSD / type files

The GSD files must be copied to a specific subdirectory of the PROFIBUS-DP configuration software of your PLC.

Example:

Siemens S7-300/400 PLC with configuration software Siemens STEP 7

- Copy the GSD files to the subdirectory:
... \siemens\step7\s7data\gsd
- The bitmap files also belong to the GSDs. These bitmap files are used to display the measuring points in image form. Load the bitmap files to the directory:
... \siemens\step7\s7data\nsbmp

If you are using configuration software other than that referred to above, ask your PLC manufacturer which directory you should use.

6 Communication

6.1 Cyclical data exchange (Data_Exchange)

The Data_Exchange service enables a PLC to read input data from the Liquisys M CXM223/253 transmitter. The cyclical data message for the maximum configuration of the Liquisys M CXM223/253 is as follows:

Maximum configuration Liquisys M CXM223/253

Input data index	Data	Access	Data format/ remarks	Unit (factory setting)
0,1,2,3	Main parameter	read	32-bit floating point number (IEEE-754)	CPM223/253: pH; mV; % CLM223/253: mS/cm; %, MΩ CUM223/253: FNU; ppm; g/l; % COM223/253: mg/l; % SAT CCM223/253: mg/l
4	Main parameter status	read	See status codes	-
5,6,7,8	Temperature	read	32-bit floating point number (IEEE-754)	°C
9	Temperature status	read	See status codes	-
10,11,12,13	pH/ORP	read	32-bit floating point number (IEEE-754)	pH or mV (dep. on operating mode)
14	pH/ORP status	read	See status codes	-

PROFIBUS processes data in hexadecimal code and converts them into 4 byte (each 8 bit, 4x8=32 bit).

In accordance with IEEE 754, a number has three components:

- Sign (S)
The sign requires exactly 1 bit and has the values 0 (+) or 1 (-).
bit 7 of the 1st byte of a 32-bit floating-point number defines the sign.
- Exponent
The exponent is composed of bits 6 to 0 of the 1st byte plus bit 7 of the 2nd byte (= 8 bit).
- Mantissa
The remaining 23 bits are used for the mantissa.

Formula (IEEE 754):	Value	=	$(-1)^{\text{VZ}} * 2^{(\text{Exponent} - 127)} * (1 + \text{Mantissa})$
Example:	40 F0 00 00	=	0 10000001 1110000 00000000 00000000
	(hexadecimal)		Byte 1 Byte 2 Byte 3 Byte 4
	Value	=	$(-1)^0 * 2^{(129 - 127)} * (1 + 2^{-1} + 2^{-2} + 2^{-3})$
		=	$1 * 2^2 * (1 + 0.5 + 0.25 + 0.125)$
		=	$1 * 4 * 1.875$
		=	7.5

Status codes for main parameter (pH, conductivity, turbidity, oxygen, chlorine) and temperature

If you do not wish to use all cyclical data provided by the Liquisys M CXM223/253, then you can eliminate cyclical data blocks from the cyclical message with the aid of the device configuration data string (Chk_Cfg) using the PLC software. You should only activate those datablocks which are actually processed by the system. This will improve the data throughput of a PROFIBUS network. On the Liquisys M CXM 223/253 transmitter, two data blocks can be activated for cyclical data exchange. The following table shows the configuration data needed for this (h means that the number is a hexadecimal number). The shortened identifier 94h can also be used. The extended format is to be preferred, however, because it includes additional information for data interpretation.

Liquisys M CXM223/253 configuration data

Cyclical data block	Sequence in Chk_Cfg	Extended format data block active	Short format active	Data block inactive
Main parameter	1	42h, 84h, 08h, 05h	94h	00h
Temperature	2	42h, 84h, 08h, 05h	94h	00h
pH/ORP with CCM223/253	3	42h, 84h, 08h, 05h	94h	00h

The following configurations are useful for the data blocks available with the Liquisys M CXM223/253:

Activated data blocks	Configuration data string (Chk_Cfg)	Length (Chk_Cfg)
Main parameter with status + temperature with status	42h, 84h, 08h, 05h, 42h, 84h, 08h, 05h alternatively: 94h, 94h	8 bytes (2 bytes)
Main parameter with status	42h, 84h, 08h, 05h, (00h) alternatively: 94h (00h)	4 ... 5 bytes (1 ... 2 bytes)
Temperature with status	00h, 42h, 84h, 08h, 05h alternatively: 00h, 94h	5 bytes (2 bytes)
pH/ORP with CCM223/253	42h, 84h, 08h, 05h	4 bytes

Data blocks that are not activated must be identified by a zero as a placeholder in the configuration data string if other configuration data follow. Zeros at the end of the configuration data may be omitted.

6.2 Acyclical data exchange

Acyclical data transmission is used to transfer parameters during commissioning, during maintenance or to display other measured variables that are not contained in the user data traffic. The software of the Liquisys M CXM 223/253 transmitter includes the so-called physical block containing instrument-specific information, such as measuring point designation (tag), software version, etc., and a block with manufacturer-specific data used for instrument operation. Generally, a distinction is made between Class 1 and Class 2 master connections. The Liquisys M transmitter only supports Class 2 master connections.

- Two Class 2 masters are permitted with Liquisys M. This means that two Class 2 masters can access Liquisys M at the same time. However, you must make certain that they do not both attempt to *write* to the same data. Otherwise the data consistency can no longer be guaranteed.
- When a Class 2 master reads parameters, it sends a request telegram to the transmitter specifying the device address, the slot/index and the expected record length. The transmitter answers with the requested record if the record exists and has the correct length (byte).
- When a Class 2 master writes parameters, it transmits the address of the transmitter, the slot/index, length information (byte) and the record. The transmitter acknowledges this write job after completion. A Class 2 master can access the blocks mentioned above.

The device management and physical block are identical for all parameters measured. Please refer to the following tables for the index (all parameters are located in slot 1).

6.2.1 Slot / index list for device management and physical block

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Device Management					
Directory Object Header		1 / 0	12	UNSIGNED16	R
Composite List Directory Entries		1 / 1	24	UNSIGNED16	R
Physical Block Parameter					
PB Block Object		1 / 14	20	DS-32	R
PB Static Revision		1 / 15	2	UNSIGNED16	R
PB Tag Description	VAH0	1 / 16	32	OSTRING	R / W
PB Strategy		1 / 17	2	UNSIGNED16	R / W
PB Alert Key		1 / 18	1	UNSIGNED8	R / W
PB Target Mode		1 / 19	1	UNSIGNED8	R / W
PB Mode Block		1 / 20	3	DS-37	R
PB Alarm Summary		1 / 21	8	DS-42	R
PB Software Revision		1 / 22	16	OSTRING	R
PB Hardware Revision		1 / 23	16	OSTRING	R
PB Device Manufacturer ID		1 / 24	2	UNSIGNED16	R
PB Device ID		1 / 25	16	OSTRING	R
PB Device Serial Number		1 / 26	16	OSTRING	R
PB Diagnosis		1 / 27	4	OSTRING	R
PB Diagnosis Extension		1 / 28	6	OSTRING	R
PB Diagnosis Mask		1 / 29	4	OSTRING	R
PB Diagnosis Extension		1 / 30	6	OSTRING	R
PB Device Certification		1 / 31	16	OSTRING	R / W
PB Security Locking		1 / 32	2	UNSIGNED16	R / W
PB Factory Reset		1 / 33	2	UNSIGNED16	R / W
PB Descriptor		1 / 44	32	OSTRING	R / W
PB Device Message		1 / 45	32	OSTRING	R / W
PB Device Installation Date		1 / 46	8	OSTRING	R / W
PB Actual Error Code	V8H0	1 / 62	2	UNSIGNED16	R
PB UpDown Features Supported		1 / 64	1	OSTRING	R
PB UpDown Control Parameter		1 / 65	1	UNSIGNED8	W
PB UpDown Parameter		1 / 66	20	UPDOWNDATA	R / W
PB Device Bus Address	VAH1	1 / 67	1	SIGNED8	R
PB Device & Software Number		1 / 68	2	UNSIGNED16	R
PB View_1		1 / 74	17	OSTRING	R

6.2.2 Slot / index list for pH / ORP

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Manufacturer-specific Block					
Block object		1 / 100	20	DS-32	R
Main measured value	V0H0	1 / 108	4	FLOAT	R
Measured temperature value	V0H1	1 / 109	4	FLOAT	R
Operating mode	V0H2	1 / 110	1	UNSIGNED8	R / W
Connection type	V0H3	1 / 111	1	UNSIGNED8	R / W
Electrode type	V0H5	1 / 112	1	UNSIGNED8	R / W
Measured value damping	V0H6	1 / 113	1	UNSIGNED8	R / W
Measured value in mV	V1H7	1 / 114	4	FLOAT	R
Current measured value / offset	V0H8	1 / 115	4	FLOAT	R / W
Calculated offset	V0H9	1 / 116	4	FLOAT	R
Temperature compensation type	V1H0	1 / 117	1	UNSIGNED8	R / W
Entry of MTC temperature	V1H1	1 / 118	4	FLOAT	R / W
Temp. compensation for calibration	V1H2	1 / 119	1	UNSIGNED8	R / W
Entry of process temperature	V1H8	1 / 120	4	FLOAT	R / W
Entry of temperature offset	V1H9	1 / 121	4	FLOAT	R / W
Beg. of meas. (bar graph)	V2H3	1 / 122	4	FLOAT	R
End of meas. (bar graph)	V2H4	1 / 123	4	FLOAT	R
Contact selection	V3H0	1 / 124	1	UNSIGNED8	R / W
Contact configuration	V3H1	1 / 125	1	UNSIGNED8	R / W
Switch contact on or off	V3H2	1 / 126	1	UNSIGNED8	R / W
Switch-on point (LC)	V4H0	1 / 127	4	FLOAT	R / W
Switch-off point (LC)	V4H1	1 / 128	4	FLOAT	R / W
Pickup delay (LC)	V4H2	1 / 129	2	UNSIGNED16	R / W
Dropout delay (LC)	V4H3	1 / 130	2	UNSIGNED16	R / W
Alarm threshold (LC)	V4H4	1 / 131	4	FLOAT	R / W
Setpoint (PID / neutra)	V4H0	1 / 132	4	FLOAT	R / W
Control gain K _p (PID / neutra)	V4H1	1 / 133	4	FLOAT	R / W
Integral action time T _n (PID / neutra)	V4H2	1 / 134	4	FLOAT	R / W
Derivative action time T _v (PID / neutra)	V4H3	1 / 135	4	FLOAT	R / W
Control characteristic (PID)	V4H4	1 / 136	1	UNSIGNED8	R / W
Operating mode of controller (PID / neutra)	V4H5	1 / 137	1	UNSIGNED8	R / W
Pulse period (PID / neutra)	V4H6	1 / 138	4	FLOAT	R / W
Pulse frequency (PID / neutra)	V4H7	1 / 139	2	UNSIGNED16	R / W
Minimum ON time (PID / neutra)	V4H8	1 / 140	4	FLOAT	R / W
Rinse time (timer)	V4H0	1 / 141	2	UNSIGNED16	R / W
Pause time (timer)	V4H1	1 / 142	2	UNSIGNED16	R / W
Minimum pause time (timer)	V4H2	1 / 143	2	UNSIGNED16	R / W
Start pulse (cleaning)	V4H0	1 / 144	1	UNSIGNED8	R / W
Pre-rinse time (cleaning)	V4H1	1 / 145	2	UNSIGNED16	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Cleaning time (cleaning)	V4H2	1 / 145	2	UNSIGNED16	R / W
Post-rinse time (cleaning)	V4H3	1 / 147	2	UNSIGNED16	R / W
Repeat cycles (cleaning)	V4H4	1 / 148	1	UNSIGNED8	R / W
Pause time (cleaning)	V4H5	1 / 149	2	UNSIGNED16	R / W
Minimum pause time (cleaning)	V4H6	1 / 150	2	UNSIGNED16	R / W
Economy (cleaning)	V4H7	1 / 151	1	UNSIGNED8	R / W
SCS alarm measuring electrode	V6H0	1 / 160	1	UNSIGNED8	R / W
SCS alarm reference electrode	V6H1	1 / 161	1	UNSIGNED8	R / W
SCS alarm threshold	V6H2	1 / 162	4	FLOAT	R / W
PCS alarm	V6H3	1 / 163	1	UNSIGNED8	R / W
Alarm contact type	V8H1	1 / 164	1	UNSIGNED8	R / W
Unit alarm delay	V8H2	1 / 165	1	UNSIGNED8	R / W
Alarm delay	V8H3	1 / 166	2	UNSIGNED16	R / W
Error number selection	V8H4	1 / 167	1	UNSIGNED8	R / W
Error status	V8H5	1 / 168	1	UNSIGNED8	R
Alarm contact effective	V8H6	1 / 169	1	UNSIGNED8	R / W
Cleaning trigger	V8H8	1 / 170	1	UNSIGNED8	R / W
Release code	V8H9	1 / 171	2	UNSIGNED16	R / W
Hold configuration	V9H0	1 / 172	1	UNSIGNED8	R / W
Hold dwell period	V9H1	1 / 173	2	UNSIGNED16	R / W
Plus package released	V9H2	1 / 174	1	UNSIGNED8	R
Chemoclean released	V9H3	1 / 175	1	UNSIGNED8	R
Reset of instrument	V9H4	1 / 176	1	UNSIGNED8	R / W
Software version	VAH2	1 / 177	2	UNSIGNED16	R
Number of relays		1 / 178	1	UNSIGNED8	R
Temperature sensor	V0H4	1 / 152	1	UNSIGNED8	R / W
Measuring frequency	V0H7	1 / 153	1	UNSIGNED8	R / W
Transmitter type		1 / 154	4	UNSIGNED8	R
Limit contact status	V4H5	1 / 155	1		R
Serial number	VAH3	1 / 188	1	OSTRING	R
Basic load	V4H9	1 / 189	1	UNSIGNED8	R / W
Controller type	V5H8/V4H8	1 / 198	2	UNSIGNED8	R / W
Set current input active	V5H0	1 / 199	1	UNSIGNED8	R / W
Current input off delay	V5H1	1 / 200	1	UNSIGNED16	R / W
Current input on delay	V5H2	1 / 201	1	UNSIGNED16	R / W
Current input switch-off point	V5H3	1 / 202	1	UNSIGNED8	R / W
Current input switch-off direction	V5H4	1 / 203	2	UNSIGNED8	R / W
Current input feedforward control	V5H5	1 / 204	1	UNSIGNED8	R / W
Current input gain	V5H6	1 / 205	2	UNSIGNED8	R / W
Current input available		1 / 206	1	UNSIGNED8	R
Alarm threshold monitoring	V7H1	1 / 207	1	UNSIGNED8	R / W
Alarm delay	V7H2	1 / 208	1	UNSIGNED16	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Lower alarm threshold	V7H3	1 / 209	2	FLOAT	R / W
Upper alarm threshold	V7H4	1 / 210	1	FLOAT	R / W
Process monitoring	V7H5	1 / 211	1	UNSIGNED8	R / W
Max. period lower limit exceeded	V7H6	1 / 212	1	UNSIGNED16	R / W
Max. period upper limit exceeded	V7H7	1 / 213	2	UNSIGNED16	R / W
Limit of process monitoring	V7H8	1 / 214	1	FLOAT	R / W

6.2.3 Slot / index list for conductivity

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Manufacturer-specific Block					
Block object		1 / 100	20	DS-32	R
Main measured value	V0H0	1 / 108	4	FLOAT	R
Measured temperature value	V0H1	1 / 109	4	FLOAT	R
Operating mode	V0H2	1 / 110	1	UNSIGNED8	R / W
Display unit conc.	V0H3	1 / 111	1	UNSIGNED8	R / W
Display format	V0H4	1 / 112	1	UNSIGNED8	R / W
Display unit cd. / res.	V0H5	1 / 113	1	UNSIGNED8	R / W
Measured value damping	V0H6	1 / 114	1	UNSIGNED8	R / W
Uncompensated meas. value	V0H7	1 / 115	4	FLOAT	R / W
Temperature sensor	V1H0	1 / 116	1	UNSIGNED8	R / W
Temperature compensation type	V1H1	1 / 117	1	UNSIGNED8	R / W
Temperature coefficient alpha	V1H2	1 / 118	4	FLOAT	R / W
Process temperature	V1H3	1 / 119	4	FLOAT	R / W
Cell constant	V1H4	1 / 120	4	FLOAT	R / W
Cable resistance	V1H5	1 / 121	4	FLOAT	R / W
Entry of process temperature	V1H8	1 / 122	4	FLOAT	R / W
Entry of temperature offset	V1H9	1 / 123	4	FLOAT	R / W
Beg. of meas. (bar graph)		1 / 124	4	FLOAT	R
End of meas. (bar graph)		1 / 125	4	FLOAT	R
Contact selection	V3H0	1 / 126	1	UNSIGNED8	R / W
Contact configuration	V3H1	1 / 127	1	UNSIGNED8	R / W
Switch contact on or off	V3H2	1 / 128	1	UNSIGNED8	R / W
Switch-on point (LC)	V4H0	1 / 129	4	FLOAT	R / W
Switch-off point (LC)	V4H1	1 / 130	4	FLOAT	R / W
Pickup delay (LC)	V4H2	1 / 131	2	UNSIGNED16	R / W
Dropout delay (LC)	V4H3	1 / 132	2	UNSIGNED16	R / W
Alarm threshold (LC)	V4H4	1 / 133	4	FLOAT	R / W
Setpoint (PID / neutra)	V4H0	1 / 134	4	FLOAT	R / W
Control gain Kp (PID / neutra)	V4H1	1 / 135	4	FLOAT	R / W
Integral action time Tn (PID / neutra)	V4H2	1 / 136	4	FLOAT	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Derivative action time Tv (PID / neutra)	V4H3	1 / 137	4	FLOAT	R / W
Control characteristic (PID)	V4H4	1 / 138	1	UNSIGNED8	R / W
Operating mode of controller (PID / neutra)	V4H5	1 / 139	1	UNSIGNED8	R / W
Pulse period (PID / neutra)	V4H6	1 / 140	4	FLOAT	R / W
Pulse frequency (PID / neutra)	V4H7	1 / 141	2	UNSIGNED16	R / W
Minimum ON time (PID / neutra)	V4H8	1 / 142	4	FLOAT	R / W
Rinse time (timer)	V4H0	1 / 143	2	UNSIGNED16	R / W
Pause time (timer)	V4H1	1 / 144	2	UNSIGNED16	R / W
Minimum pause time (timer)	V4H2	1 / 145	2	UNSIGNED16	R / W
Start pulse (cleaning)	V4H0	1 / 146	1	UNSIGNED8	R / W
Pre-rinse time (cleaning)	V4H1	1 / 147	2	UNSIGNED16	R / W
Cleaning time (cleaning)	V4H2	1 / 148	2	UNSIGNED16	R / W
Post-rinse time (cleaning)	V4H3	1 / 149	2	UNSIGNED16	R / W
Repeat cycles (cleaning)	V4H4	1 / 150	1	UNSIGNED8	R / W
Pause time (cleaning)	V4H5	1 / 151	2	UNSIGNED16	R / W
Minimum pause time (cleaning)	V4H6	1 / 152	2	UNSIGNED16	R / W
Economy (cleaning)	V4H7	1 / 153	1	UNSIGNED8	R / W
Active concentration curve	V5H0	1 / 154	1	UNSIGNED8	R / W
Edit table (conc)	V5H1	1 / 155	1	UNSIGNED8	R / W
Table option (conc)	V5H2	1 / 156	1	UNSIGNED8	R / W
Number of value pairs (conc)	V5H3	1 / 157	1	UNSIGNED8	R / W
Selection of value pair (conc)	V5H4	1 / 158	1	UNSIGNED8	R / W
Uncomp. cd. value (conc)	V5H5	1 / 159	4	FLOAT	R / W
Concentration value (conc)	V5H6	1 / 160	4	FLOAT	R / W
Temperature value (conc)	V5H7	1 / 161	4	FLOAT	R / W
Table status (conc)	V5H8	1 / 162	1	UNSIGNED8	R / W
Table option (alpha)	V6H0	1 / 163	1	UNSIGNED8	R / W
Number of table value pairs (alpha)	V6H1	1 / 164	1	UNSIGNED8	R / W
Selection of table value pair (alpha)	V6H2	1 / 165	1	UNSIGNED8	R / W
Temperature value (alpha)	V6H3	1 / 166	4	FLOAT	R / W
Temperature coefficient (alpha)	V6H4	1 / 167	4	FLOAT	R / W
Table status (alpha)	V6H5	1 / 168	1	UNSIGNED8	R / W
Polarisation detection (cond)	V7H0	1 / 169	1	UNSIGNED8	R / W
Limit contact status	V4H5	1 / 170	1	UNSIGNED8	R
Alarm contact type	V8H1	1 / 171	1	UNSIGNED8	R / W
Unit of alarm delay	V8H2	1 / 172	1	UNSIGNED8	R / W
Alarm delay	V8H3	1 / 173	2	UNSIGNED16	R / W
Error number selection	V8H4	1 / 174	1	UNSIGNED8	R / W
Error status	V8H5	1 / 175	1	UNSIGNED8	R
Alarm contact effective	V8H6	1 / 176	1	UNSIGNED8	R / W
Cleaning trigger	V8H8	1 / 177	1	UNSIGNED8	R / W
Release code	V8H9	1 / 178	2	UNSIGNED16	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Hold configuration	VAH5	1 / 179	1	UNSIGNED8	R / W
Hold dwell period	VAH6	1 / 180	2	UNSIGNED16	R / W
Plus package released	VAH7	1 / 181	1	UNSIGNED8	R
Chemoclean released	V9H7	1 / 182	1	UNSIGNED8	R
Reset of instrument	V9H8	1 / 183	1	UNSIGNED8	R / W
Software version	V9H3	1 / 184	2	UNSIGNED16	R
Number of relays		1 / 185	1	UNSIGNED8	R
Installation factor	V1H6	1 / 186	4	FLOAT	R
Reference temperature	V1H3	1 / 187	4	FLOAT	R / W
Serial number	VAH3	1 / 188	11	OSTRING	R
Basic load	V4H9	1 / 189	1	UNSIGNED8	R / W
Alarm threshold monitoring	V7H1	1 / 190	1	UNSIGNED8	R / W
Alarm delay	V7H2	1 / 191	2	UNSIGNED16	R / W
Lower alarm threshold	V7H3	1 / 192	4	FLOAT	R / W
Upper alarm threshold	V7H4	1 / 193	4	FLOAT	R / W
Process monitoring	V7H5	1 / 194	1	UNSIGNED8	R / W
Max. period lower limit exceeded	V7H6	1 / 195	2	UNSIGNED16	R / W
Max. period upper limit exceeded	V7H7	1 / 196	2	UNSIGNED16	R / W
Limit of process monitoring	V7H8	1 / 197	4	FLOAT	R / W
Controller type		1 / 198	1	UNSIGNED8	R / W
Current input available		1 / 199	1	UNSIGNED8	R
Set current input active	V9H0	1 / 200	1	UNSIGNED8	R / W
Current input off delay	V9H1	1 / 201	2	UNSIGNED16	R / W
Current input on delay	V9H2	1 / 202	2	UNSIGNED16	R / W
Current input switch-off point	V9H3	1 / 203	1	UNSIGNED8	R / W
Current input switch-off direction	V9H4	1 / 204	1	UNSIGNED8	R / W
Current input feedforward control	V9H5	1 / 205	1	UNSIGNED8	R / W
Current input gain	V9H6	1 / 206	1	UNSIGNED8	R / W

6.2.4 Slot / index list for turbidity

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Manufacturer-specific Block					
Block object		1 / 100	20	DS-32	R
Main measured value	V0H0	1 / 108	4	FLOAT	R
Measured temperature value	V0H1	1 / 109	4	FLOAT	R
Operating mode	V0H2	1 / 110	1	UNSIGNED8	R / W
Display unit	V0H3	1 / 111	1	UNSIGNED8	R / W
Display format	V0H4	1 / 112	1	UNSIGNED8	R / W
Sensor type	V0H5	1 / 113	1	UNSIGNED8	R / W
Measured value damping	V0H6	1 / 114	1	UNSIGNED8	R / W
Measured value in FNU	V0H7	1 / 115	4	FLOAT	R
Current measured value / offset	V0H8	1 / 116	4	FLOAT	R / W
Calculated offset	V0H9	1 / 117	4	FLOAT	R
Wiper on/off	V1H0	1 / 118	1	UNSIGNED8	R / W
Wiping time	V1H1	1 / 119	2	UNSIGNED16	R / W
Pause time	V1H2	1 / 120	2	UNSIGNED16	R / W
Calibration data set	V1H3	1 / 121	1	UNSIGNED8	R / W
Copy calibration data set	V1H4	1 / 122	1	UNSIGNED8	R / W
Installation adaption	V1H5	1 / 123	1	UNSIGNED8	R / W
Entry of process temperature	V1H8	1 / 124	4	FLOAT	R / W
Entry of temperature offset	V1H9	1 / 125	4	FLOAT	R / W
Beg. of meas. (bar graph)		1 / 126	4	FLOAT	R
End of meas. (bar graph)		1 / 127	4	FLOAT	R
Contact selection	V3H0	1 / 128	1	UNSIGNED8	R / W
Contact configuration	V3H1	1 / 129	1	UNSIGNED8	R / W
Switch contact on or off	V3H2	1 / 130	1	UNSIGNED8	R / W
Switch-on point (LC)	V4H0	1 / 131	4	FLOAT	R / W
Switch-off point (LC)	V4H1	1 / 132	4	FLOAT	R / W
Pickup delay (LC)	V4H2	1 / 133	2	UNSIGNED16	R / W
Dropout delay (LC)	V4H3	1 / 134	2	UNSIGNED16	R / W
Alarm threshold (LC)	V4H4	1 / 135	4	FLOAT	R / W
Setpoint (PID / neutra)	V4H0	1 / 136	4	FLOAT	R / W
Control gain Kp (PID / neutra)	V4H1	1 / 137	4	FLOAT	R / W
Integral action time Tn (PID / neutra)	V4H2	1 / 138	4	FLOAT	R / W
Derivative action time Tv (PID / neutra)	V4H3	1 / 139	4	FLOAT	R / W
Control characteristic (PID)	V4H4	1 / 140	1	UNSIGNED8	R / W
Operating mode of controller (PID / neutra)	V4H5	1 / 141	1	UNSIGNED8	R / W
Pulse period (PID / neutra)	V4H6	1 / 142	4	FLOAT	R / W
Pulse frequency (PID / neutra)	V4H7	1 / 143	2	UNSIGNED16	R / W
Minimum ON time (PID / neutra)	V4H8	1 / 144	4	FLOAT	R / W
Rinse time (timer)	V4H0	1 / 145	2	UNSIGNED16	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Pause time (timer)	V4H1	1 / 146	2	UNSIGNED16	R / W
Minimum pause time (timer)	V4H2	1 / 147	2	UNSIGNED16	R / W
Start pulse (cleaning)	V4H0	1 / 148	1	UNSIGNED8	R / W
Pre-rinse time (cleaning)	V4H1	1 / 149	2	UNSIGNED16	R / W
Cleaning time (cleaning)	V4H2	1 / 150	2	UNSIGNED16	R / W
Post-rinse time (cleaning)	V4H3	1 / 151	2	UNSIGNED16	R / W
Repeat cycles (cleaning)	V4H4	1 / 152	1	UNSIGNED8	R / W
Pause time (cleaning)	V4H5	1 / 153	2	UNSIGNED16	R / W
Minimum pause time (cleaning)	V4H6	1 / 154	2	UNSIGNED16	R / W
Economy (cleaning)	V4H7	1 / 155	1	UNSIGNED8	R / W
Active concentration curve	V5H0	1 / 156	1	UNSIGNED8	R / W
Edit table (conc)	V5H1	1 / 157	1	UNSIGNED8	R / W
Table option (conc)	V5H2	1 / 158	1	UNSIGNED8	R / W
Number of value pairs (conc)	V5H3	1 / 159	1	UNSIGNED8	R / W
Selection of value pair (conc)	V5H4	1 / 160	1	UNSIGNED8	R / W
Entry of turbidity value (conc)	V5H5	1 / 161	4	FLOAT	R / W
Concentration value (conc)	V5H6	1 / 162	4	FLOAT	R / W
Table status (conc)	V5H7	1 / 163	1	UNSIGNED8	R / W
Gas bubble barrier	V1H6	1 / 164	2	UNSIGNED8	R / W
Alarm contact type	V8H1	1 / 165	1	UNSIGNED8	R / W
Unit of alarm delay	V8H2	1 / 166	1	UNSIGNED8	R / W
Alarm delay	V8H3	1 / 167	2	UNSIGNED16	R / W
Error number selection	V8H4	1 / 168	1	UNSIGNED8	R / W
Error status	V8H5	1 / 169	1	UNSIGNED8	R
Alarm contact effective	V8H6	1 / 170	1	UNSIGNED8	R / W
Cleaning trigger	V8H8	1 / 171	1	UNSIGNED8	R / W
Release code	V8H9	1 / 172	2	UNSIGNED16	R / W
Hold configuration	V9H0	1 / 173	1	UNSIGNED8	R / W
Hold dwell period	V9H1	1 / 174	2	UNSIGNED16	R / W
Plus package released	V9H2	1 / 175	1	UNSIGNED8	R
Chemoclean released	V9H3	1 / 176	1	UNSIGNED8	R
Reset of instrument	V9H4	1 / 177	1	UNSIGNED8	R / W
Software version	VAH2	1 / 178	2	UNSIGNED16	R
Number of relays		1 / 179	1	UNSIGNED8	R
Limit contact status	V1H3	1 / 180	1	UNSIGNED8	R
Serial number	VAH3	1 / 188	11	OSTRING	R
Basic load	V4H9	1 / 189	1	UNSIGNED8	R / W
Controller type		1 / 198	1	UNSIGNED8	R / W
Alarm threshold monitoring	V7H1	1 / 199	1	UNSIGNED8	R / W
Alarm delay	V7H2	1 / 200	2	UNSIGNED16	R / W
Lower alarm threshold	V7H3	1 / 201	4	FLOAT	R / W
Upper alarm threshold	V7H4	1 / 202	4	FLOAT	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Process monitoring	V7H5	1 / 203	1	UNSIGNED8	R / W
Max. period lower limit exceeded	V7H6	1 / 204	2	UNSIGNED16	R / W
Max. period upper limit exceeded	V7H7	1 / 205	2	UNSIGNED16	R / W
Limit of process monitoring	V7H8	1 / 206	4	FLOAT	R / W
Current input available		1 / 208	1	UNSIGNED8	R
Set current input active	V9H0	1 / 209	1	UNSIGNED8	R / W
Current input off delay	V9H1	1 / 210	2	UNSIGNED16	R / W
Current input on delay	V9H2	1 / 211	2	UNSIGNED16	R / W
Current input switch-off point	V9H3	1 / 212	1	UNSIGNED8	R / W
Current input switch-off direction	V9H4	1 / 213	1	UNSIGNED8	R / W
Current input feedforward control	V9H5	1 / 214	1	UNSIGNED8	R / W
Current input gain	V9H6	1 / 215	1	UNSIGNED8	R / W

6.2.5 Slot / index list for oxygen

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Manufacturer-specific Block					
Block object		1 / 100	20	DS-32	R
Main measured value	V0H0	1 / 108	4	FLOAT	R
Measured temperature value	V0H1	1 / 109	4	FLOAT	R
Operating mode	V0H2	1 / 110	1	UNSIGNED8	R / W
Pressure compensation	V0H4	1 / 111	1	UNSIGNED8	R / W
Altitude	V0H5	1 / 112	2	UNSIGNED16	R / W
Measured value damping	V0H7	1 / 113	1	UNSIGNED8	R / W
Sensor current in nA	V0H8	1 / 114	4	FLOAT	R
Salinity	V1H0	1 / 115	4	FLOAT	R / W
Entry of process temperature	V1H8	1 / 116	4	FLOAT	R / W
Entry of temperature offset	V1H9	1 / 117	4	FLOAT	R / W
Beg. of meas. (bar graph)		1 / 118	4	FLOAT	R
End of meas. (bar graph)		1 / 119	4	FLOAT	R
Contact selection	V3H0	1 / 120	1	UNSIGNED8	R / W
Contact configuration	V3H1	1 / 121	1	UNSIGNED8	R / W
Switch contact on or off	V3H2	1 / 122	1	UNSIGNED8	R / W
Switch-on point (LC)	V4H0	1 / 123	4	FLOAT	R / W
Switch-off point (LC)	V4H1	1 / 124	4	FLOAT	R / W
Pickup delay (LC)	V4H2	1 / 125	2	UNSIGNED16	R / W
Dropout delay (LC)	V4H3	1 / 126	2	UNSIGNED16	R / W
Alarm threshold (LC)	V4H4	1 / 127	4	FLOAT	R / W
Setpoint (PID / neutra)	V4H0	1 / 128	4	FLOAT	R / W
Control gain Kp (PID / neutra)	V4H1	1 / 129	4	FLOAT	R / W
Integral action time Tn (PID / neutra)	V4H2	1 / 130	4	FLOAT	R / W
Derivative action time Tv (PID / neutra)	V4H3	1 / 131	4	FLOAT	R / W
Control characteristic (PID)	V4H4	1 / 132	1	UNSIGNED8	R / W
Operating mode of controller (PID / neutra)	V4H5	1 / 133	1	UNSIGNED8	R / W
Pulse period (PID / neutra)	V4H6	1 / 134	4	FLOAT	R / W
Pulse frequency (PID / neutra)	V4H7	1 / 135	2	UNSIGNED16	R / W
Minimum ON time (PID / neutra)	V4H8	1 / 136	4	FLOAT	R / W
Rinse time (timer)	V4H0	1 / 137	2	UNSIGNED16	R / W
Pause time (timer)	V4H1	1 / 138	2	UNSIGNED16	R / W
Minimum pause time (timer)	V4H2	1 / 139	2	UNSIGNED16	R / W
Start pulse (cleaning)	V4H0	1 / 140	1	UNSIGNED8	R / W
Pre-rinse time (cleaning)	V4H1	1 / 141	2	UNSIGNED16	R / W
Cleaning time (cleaning)	V4H2	1 / 142	2	UNSIGNED16	R / W
Post-rinse time (cleaning)	V4H3	1 / 143	2	UNSIGNED16	R / W
Repeat cycles (cleaning)	V4H4	1 / 144	1	UNSIGNED8	R / W
Pause time (cleaning)	V4H5	1 / 145	2	UNSIGNED16	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Minimum pause time (cleaning)	V4H6	1 / 146	2	UNSIGNED16	R / W
Economy (cleaning)	V4H7	1 / 147	1	UNSIGNED8	R / W
Alarm threshold monitoring	V7H0	1 / 148	1	UNSIGNED8	R / W
Alarm delay	V7H1	1 / 149	2	UNSIGNED16	R / W
Lower alarm threshold	V7H2	1 / 150	4	FLOAT	R / W
Upper alarm threshold	V7H3	1 / 151	4	FLOAT	R / W
Process monitoring	V7H4	1 / 152	1	UNSIGNED8	R / W
Max. period lower limit exceeded	V7H5	1 / 153	2	UNSIGNED16	R / W
Max. period upper limit exceeded	V7H6	1 / 154	2	UNSIGNED16	R / W
Limit value of process monitoring	V7H7	1 / 155	4	FLOAT	R / W
Alarm contact type	V8H1	1 / 156	1	UNSIGNED8	R / W
Unit of alarm delay	V8H2	1 / 157	1	UNSIGNED8	R / W
Alarm delay	V8H3	1 / 158	2	UNSIGNED16	R / W
Error number selection	V8H4	1 / 159	1	UNSIGNED8	R / W
Error status	V8H5	1 / 160	1	UNSIGNED8	R
Alarm contact effective	V8H6	1 / 161	1	UNSIGNED8	R / W
Cleaning trigger	V8H8	1 / 162	1	UNSIGNED8	R / W
Release code	V8H9	1 / 163	2	UNSIGNED16	R / W
Hold configuration	V9H0	1 / 164	1	UNSIGNED8	R / W
Hold dwell period	V9H1	1 / 165	2	UNSIGNED16	R / W
Plus package released	V9H2	1 / 166	1	UNSIGNED8	R
Chemoclean released	V9H3	1 / 167	1	UNSIGNED8	R
Reset of instrument	V9H4	1 / 168	1	UNSIGNED8	R / W
Software version	V9H3	1 / 169	2	UNSIGNED16	R
Number of relays		1 / 170	1	UNSIGNED8	R
Range switching	V0H6	1 / 171	1	UNSIGNED8	R / W
Pressure measurement available		1 / 172	1	UNSIGNED8	R
Limit contact status	V4H5	1 / 173	1	UNSIGNED8	R
Serial number	VAH3	1 / 188	11	OSTRING	R
Basic load	V4H9	1 / 189	1	UNSIGNED8	R / W
Unit of measured value	V0H3	1 / 190	1	UNSIGNED8	R / W
Controller type		1 / 198	1	UNSIGNED8	R / W
Set current input active	V9H0	1 / 199	1	UNSIGNED8	R / W
Current input off delay	V9H1	1 / 200	2	UNSIGNED16	R / W
Current input on delay	V9H2	1 / 201	2	UNSIGNED16	R / W
Current input switch-off point	V9H3	1 / 202	1	UNSIGNED8	R / W
Current input switch-off direction	V9H4	1 / 203	1	UNSIGNED8	R / W
Current input feedforward control	V9H5	1 / 204	1	UNSIGNED8	R / W
Current input gain	V9H6	1 / 205	1	UNSIGNED8	R / W
Current input available		1 / 206	1	UNSIGNED8	R

6.2.6 Slot / index list for chlorine

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Manufacturer Specific Block					
Block object		1 / 100	20	DS-32	R
Main measured value	V0H0	1 / 108	4	FLOAT	R
Measured temperature value	V0H1	1 / 109	4	FLOAT	R
Measured value pH / ORP	V0H2	1 / 110	4	FLOAT	R
Type of sensor	V0H3	1 / 111	1	UNSIGNED8	R / W
Controller switch-off	V0H5	1 / 112	1	UNSIGNED8	R / W
Controller switch-on delay	V0H6	1 / 113	2	UNSIGNED16	R / W
Controller switch-off delay	V0H7	1 / 114	2	UNSIGNED16	R / W
Selection of digital input 1	V0H8	1 / 115	1	UNSIGNED8	R / W
Measured value damping	V0H9	1 / 116	1	UNSIGNED8	R
Operating mode pH / ORP	V1H0	1 / 117	1	UNSIGNED8	R / W
pH compensation	V1H8	1 / 118	1	UNSIGNED8	R / W
Manual pH compensation	V1H2	1 / 119	4	FLOAT	R / W
Entry of process temperature	V1H8	1 / 120	4	FLOAT	R / W
Entry of temperature offset	V1H9	1 / 121	4	FLOAT	R / W
Contact selection	V3H0	1 / 122	1	UNSIGNED8	R / W
Contact configuration	V3H1	1 / 123	1	UNSIGNED8	R / W
Switch contact on or off	V3H2	1 / 124	1	UNSIGNED8	R / W
Switch-on point (LC)	V4H0	1 / 125	4	FLOAT	R / W
Switch-off point (LC)	V4H1	1 / 126	4	FLOAT	R / W
Pickup delay (LC)	V4H2	1 / 127	2	UNSIGNED16	R / W
Dropout delay (LC)	V4H3	1 / 128	2	UNSIGNED16	R / W
Alarm threshold (LC)	V4H4	1 / 129	4	FLOAT	R / W
Setpoint (PID / neutra)	V4H0	1 / 130	4	FLOAT	R / W
Control gain Kp (PID / neutra)	V4H1	1 / 131	4	FLOAT	R / W
Integral action time Tn (PID / neutra)	V4H2	1 / 132	4	FLOAT	R / W
Derivative action time Tv (PID / neutra)	V4H3	1 / 133	4	FLOAT	R / W
Control characteristic (PID)	V4H4	1 / 134	1	UNSIGNED8	R / W
Operating mode of controller (PID / neutra)	V4H5	1 / 135	1	UNSIGNED8	R / W
Pulse period (PID / neutra)	V4H6	1 / 136	4	FLOAT	R / W
Pulse frequency (PID / neutra)	V4H7	1 / 137	2	UNSIGNED16	R / W
Minimum ON time (PID / neutra)	V4H8	1 / 138	4	FLOAT	R / W
Rinse time (timer)	V4H0	1 / 139	2	UNSIGNED16	R / W
Pause time (timer)	V4H1	1 / 140	2	UNSIGNED16	R / W
Minimum pause time (timer)	V4H2	1 / 141	2	UNSIGNED16	R / W
Start pulse (cleaning)	V4H0	1 / 142	1	UNSIGNED8	R / W
Pre-rinse time (cleaning)	V4H1	1 / 143	2	UNSIGNED16	R / W
Cleaning time (cleaning)	V4H2	1 / 144	2	UNSIGNED16	R / W
Post-rinse time (cleaning)	V4H3	1 / 145	2	UNSIGNED16	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Repeat cycles (cleaning)	V4H4	1 / 146	1	UNSIGNED8	R / W
Pause time (cleaning)	V4H5	1 / 147	2	UNSIGNED16	R / W
Minimum pause time (cleaning)	V4H6	1 / 148	2	UNSIGNED16	R / W
Economy (cleaning)	V4H7	1 / 149	1	UNSIGNED8	R / W
Selection of monitoring parameters	V7H0	1 / 150	1	UNSIGNED8	R / W
Alarm threshold monitoring	V7H1	1 / 151	1	UNSIGNED8	R / W
Alarm delay	V7H2	1 / 152	2	UNSIGNED16	R / W
Lower alarm threshold	V7H3	1 / 153	4	FLOAT	R / W
Upper alarm threshold	V7H4	1 / 154	4	FLOAT	R / W
Process monitoring	V7H5	1 / 155	1	UNSIGNED8	R / W
Max. period lower limit exceeded	V7H6	1 / 156	2	UNSIGNED16	R / W
Max. period upper limit exceeded	V7H7	1 / 157	2	UNSIGNED16	R / W
Limit value of process monitoring	V7H8	1 / 158	4	FLOAT	R / W
Alarm contact type	V8H1	1 / 159	1	UNSIGNED8	R / W
Unit of alarm delay	V8H2	1 / 160	1	UNSIGNED8	R / W
Alarm delay	V8H3	1 / 161	2	UNSIGNED16	R / W
Error number selection	V8H4	1 / 162	1	UNSIGNED8	R / W
Error status	V8H5	1 / 163	1	UNSIGNED8	R
Alarm contact effective	V8H6	1 / 164	1	UNSIGNED8	R / W
Cleaning trigger	V8H8	1 / 165	1	UNSIGNED8	R / W
Release code	V8H9	1 / 166	2	UNSIGNED16	R / W
Hold configuration	V9H0	1 / 167	1	UNSIGNED8	R / W
Hold dwell period	V9H1	1 / 168	2	UNSIGNED16	R / W
Plus package released	V9H2	1 / 169	1	UNSIGNED8	R
Chemoclean released	V9H3	1 / 170	1	UNSIGNED8	R
Reset of instrument	V9H4	1 / 171	1	UNSIGNED8	R / W
Software version	VAH2	1 / 172	2	UNSIGNED16	R
Hardware version		1 / 173	1	UNSIGNED8	R
Number of relays		1 / 174	1	UNSIGNED8	R
Motor run time (3-pt. step controller)	V4H5	1 / 176	2	UNSIGNED16	R / W
Neutral zone (3-pt. step controller)	V4H6	1 / 177	2	UNSIGNED16	R / W
Current input available		1 / 175	1	UNSIGNED8	R
Set current input active	V5H0	1 / 178	1	UNSIGNED8	R / W
Current input off delay	V5H1	1 / 179	2	UNSIGNED16	R / W
Current input on delay	V5H2	1 / 180	2	UNSIGNED16	R / W
Current input switch-off point	V5H3	1 / 181	1	UNSIGNED8	R / W
Current input switch-off direction	V5H4	1 / 182	1	UNSIGNED8	R / W
Current input feedforward control	V5H5	1 / 183	1	UNSIGNED8	R / W
Current input gain	V5H6	1 / 184	1	UNSIGNED8	R / W
Limit contact status	V4H5	1 / 185	1	UNSIGNED8	R / W
Serial number	VAH3	1 / 188	14	OSTRING	R
Basic load	V4H9	1 / 189	1	UNSIGNED8	R / W

Parameter	Matrix (Standard)	Slot/ Index	Size in Byte (Record)	Type	Read/ Write
Display unit	V0H4	1 / 190	1	UNSIGNED8	R / W
Controller type	V5H9/V4H8	1 / 198	1	UNSIGNED8	R / W

7 Accessories

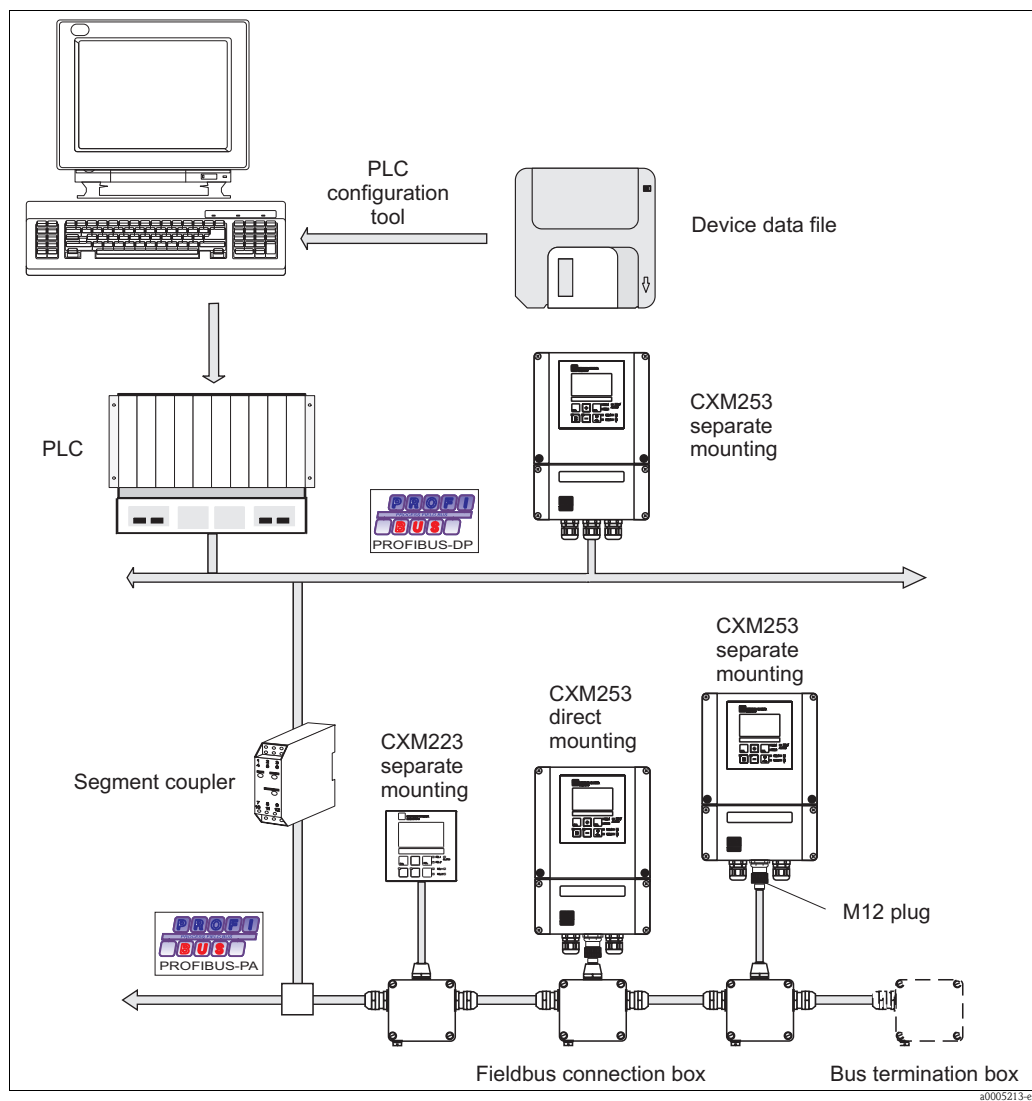


Fig. 15: Instrumentation overview Liquisys M CXM2x3

- Four-pole metal plug for mounting to the transmitter
For connection to the connection box or to a cable socket. Cable length 150 mm (5.90").
order no. 51502184

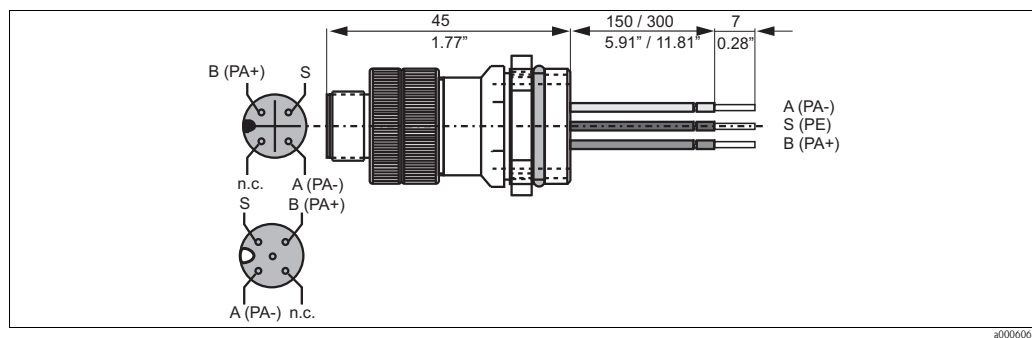


Fig. 16: *M-12 plug with socket*

- PROFIBUS connection box
For direct mounting to the transmitter.
Aluminum housing, IP 67, with four-pole plug connector and bus termination, two cable threads Pg 9.
order no. 017 481-0130
- PROFIBUS connection box with grounding capacitor
as above, additional internal grounding capacitor.
order no. 017 481-0110

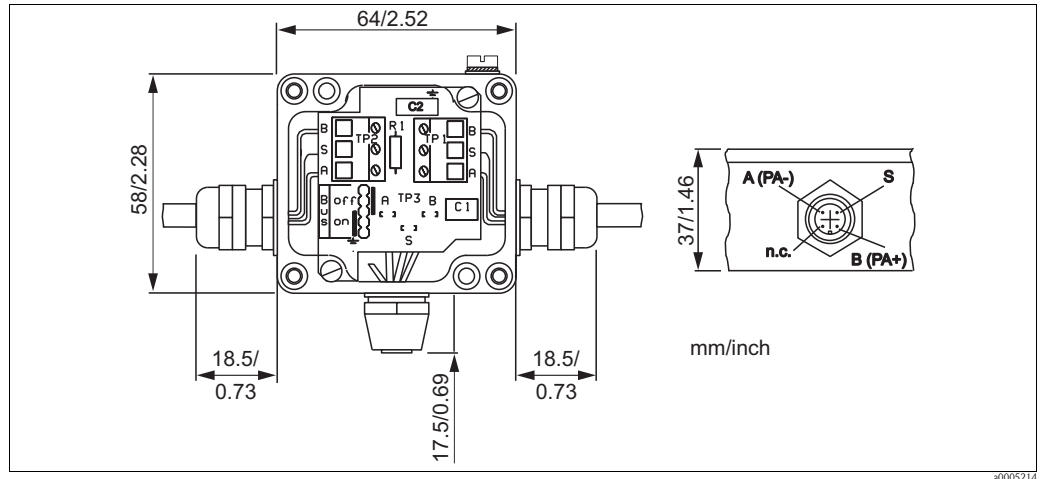


Fig. 17: Fieldbus connection box for PA

- Metal Y-adapter with two cable glands Pg 13.5.
order no. 51502183
- Ready-made cable with M12 plug and M12 coupling of hard PU and nickel-plated brass threads.
IP 67, screen connected to the thread, PVC sheath, twisted and screened conductor pair 2/18 AWG, temperature range $-40 \dots +70 \text{ }^{\circ}\text{C}$ ($-40 \dots +178 \text{ }^{\circ}\text{F}$).
 - Cable length 1 m (3.28 ft), order no. 52001025
 - Cable length 2 m (6.56 ft), order no. 52001040
 - Cable length 5 m (16.41 ft), order no. 52001041
 - Cable length 10 m (32.81 ft), order no. 52001042
- FieldCare
Tool for Plant Asset Management
Supports Ethernet, HART, PROFIBUS, FOUNDATION Fieldbus
FieldCare Standard, order no. SFE551-xxxx
FieldCare Professional, order no. SFE552-xxxx

8 Technical data

8.1 Output PROFIBUS-PA

Output signal	PROFIBUS-PA acc. to IEC 61158-2, IEC 61158-2, Profile PA 2.0	
PA function	Slave	
Transfer rate	31.25 kbps	
Signal coding	Manchester II	
Response time of slave	approx. 20 ms	
Failure signal	Signal:	Status bit is set, last valid measured value is maintained.
	Display:	Error code
Physical layer	IEC 61158-2	
Bus voltage	9 to 32 V	
Current consumption of bus	10 mA ± 1 mA	

8.2 Output PROFIBUS-DP

Output signal	PROFIBUS-DP acc. to IEC 61158-2, Profile PA 2.0	
DP function	Slave	
Transfer rate	9.6 kbps 19.2 kbps, 93.75 kbps, 187.5 kbps, 500 kbps, 1.5 Mbps	
Signal coding	NRZ code	
Failure signal	Signal:	Status bit is set, last valid measured value is maintained
	Display:	Error code
Physical layer	RS 485	

8.3 Display and user interface

Field operation	via  ,  ,  ,  keys
PC operation	via PROFIBUS with FieldCare
Bus address	Setting via DIL switch or via operating menu or via Set Slave Adr service
Communication interface	PROFIBUS-PA/-DP

8.4 Standards and guidelines

PROFIBUS	IEC 61158, IEC 61784
PROFIBUS-DP	IEC 61158, IEC 61784 PNO guidelines for PROFIBUS-DP
PROFIBUS-PA	IEC 61158, IEC 61784 PNO guidelines for PROFIBUS-PA
Physical layer	IEC 61158-2; IEC 61158-2, RS 485

Index

A

Acyclical data exchange.....	21
Address.....	15

B

Binary code.....	19
Bus cable connection	
Field instrument DP.....	11
Field instrument PA.....	8
Panel-mounted instrument DP.....	12
Panel-mounted instrument PA.....	10

C

Commissioning.....	4
Communication.....	19
Connection	
PA instrument.....	8
Cyclical data exchange.....	19

D

Data exchange	
Acyclical.....	21
Cyclical.....	19
Designated use.....	4
Device address.....	15
Device data file.....	17
Device management	
Slot / index list.....	22
Display.....	14

E

Electrical icons.....	5
Electromagnetic compatibility.....	4

F

FieldCare.....	14
Floating-point number.....	19
Function check.....	15

H

Hexadecimal code.....	19
-----------------------	----

I

Icons	
Electrical.....	5
IEEE 754.....	19
Installation.....	4

O

Operation.....	4, 14
FieldCare.....	14
Operational safety.....	4
Output	
DP.....	38
PA.....	38

P

Physical block	
Slot / index list.....	22
Post connection check.....	13
Post-installation check.....	7

S

Safety instructions.....	4
Set device address.....	15
Slot / index list	
Chlorine.....	33
Conductivity.....	25
Device management.....	22
Oxygen.....	31
pH / ORP.....	23
Physical block.....	22
Turbidity.....	28
Standards and guidelines.....	38
System equipment.....	6

T

Type files.....	17
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