



Level



Pressure



Flow



Temperature

Liquid  
Analysis

Registration

Systems  
Components

Services



Solutions

## Technical Information

# Liquisys M CPM223/253

pH/ORP Measurement

Transmitter for analog and digital glass and ISFET sensors



The modular design of the Liquisys M CPM223/253 allows easy adaption of the transmitter to a variety of customer requirements. Starting with the basic version for "measurement and alarm generation", the transmitter can be equipped with additional software and hardware modules for special applications. These modules can also be retrofitted as required.

### Application

- Effluent treatment
- Neutralization
- Detoxication (electroplating)
- Water treatment
- Water monitoring

### Your benefits

- Memosens technology
- Field or panel-mounted housing
- Universal application
- Simple handling
  - Logically arranged menu structure
  - Large two-line display
  - Ultrasimple two-point calibration
- Safe operation
  - Overvoltage (lightning) protection
  - Direct access for manual contact control
  - Calibration plausibility check
  - User-defined alarm configuration

The basic unit can be extended with:

- Additional 2 or 4 contacts for use as:
  - Limit contacts (also for temperature)
  - P(ID) controller
  - Timer for simple rinse processes
  - Complete cleaning with Chemoclean
  - Current input
- Plus package:
  - User defined current output characteristics
  - Automatic cleaning trigger on alarm or limit violation
  - Sensor Check System for pH glass and reference
  - Live check of sensor
  - Special neutralization controller
- HART or PROFIBUS-PA/-DP
- 2nd current output for temperature, pH/ORP or continuous controller

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## Function and system design

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### Features of the basic version

#### pH and ORP value measurement

This is selected via the menu. During measurement, the value measured can be displayed in the other measuring mode (e.g. pH - mV or ORP % - ORP mV). The temperature is displayed at the same time or, if desired, not shown at all.

#### Calibration

pH electrodes are normally calibrated with the same pH values. Therefore the transmitter presents the settings from the **previous** calibration as defaults for the next calibration. If the buffer solutions are interchanged by accident (e.g. pH 4 buffer first, then pH 7 buffer instead of pH 7 first and then pH 4) the **plausibility check** ensures that the calibration is accepted anyway.

#### Configuration

Different alarms are required depending on application and operator. Therefore the transmitter permits independent **configuration of the alarm contact and error current** for each individual error. Unnecessary or undesirable alarms can be suppressed in this manner. **Up to four contacts** can be used as limit contacts (also for temperature) to implement a P(ID) controller or for cleaning functions.

Direct **manual operation of the contacts** (bypassing the menu) provides quick access to limit, control or cleaning contacts, permitting speedy correction of deviations.

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### Additional functions of the plus package

#### Current output

In order to output wide measuring ranges while still achieving a high resolution in specific ranges, the **current output** can be configured as required via a table. This permits **bilinear** or **quasi-logarithmic** curves, etc.

#### Sensor-Check-System (SCS)

The sensor check system alerts to deviations of the pH glass impedance or reference impedance (analog sensors only) from the normal range, thus indicating possible failure due to pH electrode blocking or damage. In addition, the SCS detects glass breakage of glass electrodes and leakages of ISFET sensors.

#### Live-check

The live check issues an alarm when the sensor signal does not change over a defined period of time. This may be caused by blocking, passivation, separation from the process, etc.

#### Neutralization controller

A special control response that cannot be handled adequately by a P(ID) controller is required to neutralize solutions. For this reason, the transmitter provides a special neutralization controller function by combining two P(ID) controllers.

#### Current input

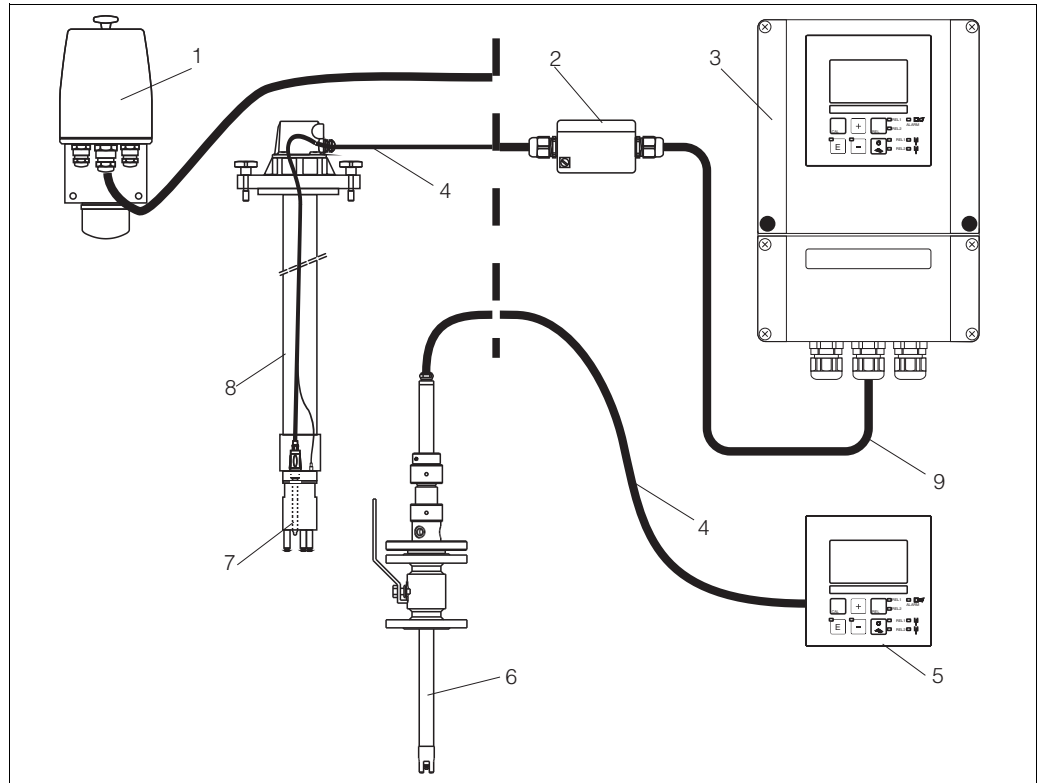
The current input of the transmitter allows two different applications: controller shut-down in case of lower flow rate violation or total failure in the main flow as well as feedforward control. Both functions are also combinable.

**Measuring system**

A complete measuring systems comprises:

- The transmitter Liquisys M CPM223 or CPM253
- A pH/ORP electrode with or without an integrated temperature sensor
- An immersible, flow or retractable assembly
- A measuring cable(e.g. CPK9)

Options: extension cable, junction box VBA or VBM



Complete measuring system Liquisys M CPM223/253

- |   |                           |   |  |
|---|---------------------------|---|--|
| 1 | Flow assembly CPA250      | 6 | Retractable assembly Cleanfit W CPA450 |
| 2 | Junction box VBA          | 7 | Electrode, e.g. Orbisint CPS11         |
| 3 | Liquisys M CPM253         | 8 | Immersion assembly CPA111              |
| 4 | Measuring cable e.g. CPK9 | 9 | Extension cable                        |
| 5 | Liquisys M CPM223         |   |  |

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## Input

|                            |   |  |
|----------------------------|---|--|
| <b>Measured variables</b>  | pH (analog or digital sensors)<br>ORP<br>Temperature  |  |
| <b>Measuring range</b>     | pH:<br>ORP:<br>Temperature:<br>Pt 100<br>Pt 1000 (versions IS / PS)<br>NTC 30K (versions IS / PS) | -2 to 16<br>-1500 to +1500 mV / 0 to 100 %<br>-50 to +150 °C (-58 to +302 °F)<br>-50 to +150 °C (-58 to +302 °F)<br>-20 to +100 °C (-4 to +212 °F) |
| <b>Input resistance</b>    | > 10 <sup>12</sup> Ω (for nominal operating conditions) for standard sensors                      |  |
| <b>Cable specification</b> | Length of cable (analog):<br>Length of cable (digital):   | max. 50 m (164 ft)<br>max. 100 m (328 ft)  |
| <b>Binary inputs</b>       | Voltage:<br>Power consumption:  | 10 to 50 V<br>max. 10 mA   |
| <b>Current input</b>       | 4 to 20 mA, galvanically separated<br>Load: 260 Ω at 20 mA (voltage drop 5.2 V)                   |  |

## Output

|                        |   |  |
|------------------------|---|--|
| <b>Output signal</b>   | 0/4 to 20 mA, galvanically separated, active                    |  |
| <b>HART</b>            |   |  |
| Signal coding          | Frequency Shift Keying (FSK) + 0.5 mA via current output signal |  |
| Data transfer rate     | 1200 Baud   |  |
| Galvanic isolation     | yes   |  |
| <b>PROFIBUS PA</b>     |   |  |
| Signal coding          | Manchester Bus Powered (MBP)                                    |  |
| Data transfer rate     | 31.25 kBit/s, voltage mode                                      |  |
| Galvanic isolation     | yes (IO-Module)   |  |
| <b>PROFIBUS DP</b>     |   |  |
| Signal coding          | RS485   |  |
| Data transfer rate     | 9.6 kBd, 19.2 kBd, 93.75 kBd, 187.5 kBd, 500 kBd, 1.5 MBd       |  |
| Galvanic isolation     | yes (IO-Module)   |  |
| <b>Signal on alarm</b> | 2.4 or 22 mA  |  |
| <b>Load</b>            | maximum 500 Ω   |  |

|  |  |  |
|--|--|--|
| <b>Output range</b>                            | pH:  | adjustable, min. $\Delta$ 1 pH                                 |
|  | ORP:   |  |
|  | absolute:  | adjustable, min. $\Delta$ 50 mV                                |
|  | relative:  | fixed, 0 to 100 %  |
|  | Temperature:   | adjustable, $\Delta$ 10 to $\Delta$ 100 % of upper range value |
| <b>Resolution</b>                              | max. 700 digits/mA   |  |
| <b>Min. distance for 0 / 4 to 20 mA signal</b> | 10% of measuring range                                       |  |
| <b>Isolation voltage</b>                       | max. 350 V <sub>RMS</sub> /500 V DC                          |  |
| <b>Overvoltage protection</b>                  | according to EN 61000-4-5                                    |  |
| <b>Auxiliary voltage output</b>                | Output voltage:  | 15 V $\pm$ 0.6   |
|  | Output current:  | max. 10 mA   |
| <b>Contact outputs</b>                         | Switching current with ohmic load (cos $\varphi$ = 1):       | max. 2 A   |
|  | Switching current with inductive load (cos $\varphi$ = 0.4): | max. 2 A   |
|  | Switching voltage:   | max. 250 V AC, 30 V DC   |
|  | Switching power with ohmic load (cos $\varphi$ = 1):         | max. 500 VA AC, 60 W DC  |
|  | Switching power with inductive load (cos $\varphi$ = 0.4):   | max. 500 VA AC, 60 W DC  |
| <b>Limit contactor</b>                         | Pickup/dropout delay:  | 0 to 2000 s  |
| <b>Controller</b>                              | Function (adjustable):                                       | pulse length/pulse frequency controller                        |
|  | Controller response:   | PID  |
|  | Control gain $K_p$ :   | 0.01 to 20.00  |
|  | Integral action time $T_n$ :                                 | 0.0 to 999.9 min   |
|  | Derivative action time $T_v$ :                               | 0.0 to 999.9 min   |
|  | Period for pulse length controller:                          | 0.5 to 999.9 s   |
|  | Frequency for pulse frequency controller:                    | 60 to 180 min <sup>-1</sup>                                    |
| Basic load:                                    | 0 to 40% of max. set value                                   |  |
| <b>Alarm</b>                                   | Function (selectable):                                       | latching / momentary contact                                   |
|  | Alarm threshold adjustment range:                            | pH / temperature: complete measuring range                     |
|  | Alarm delay:   | 0 to 2000 s<br>0 to 2000 min                                   |

## Protocol specific data

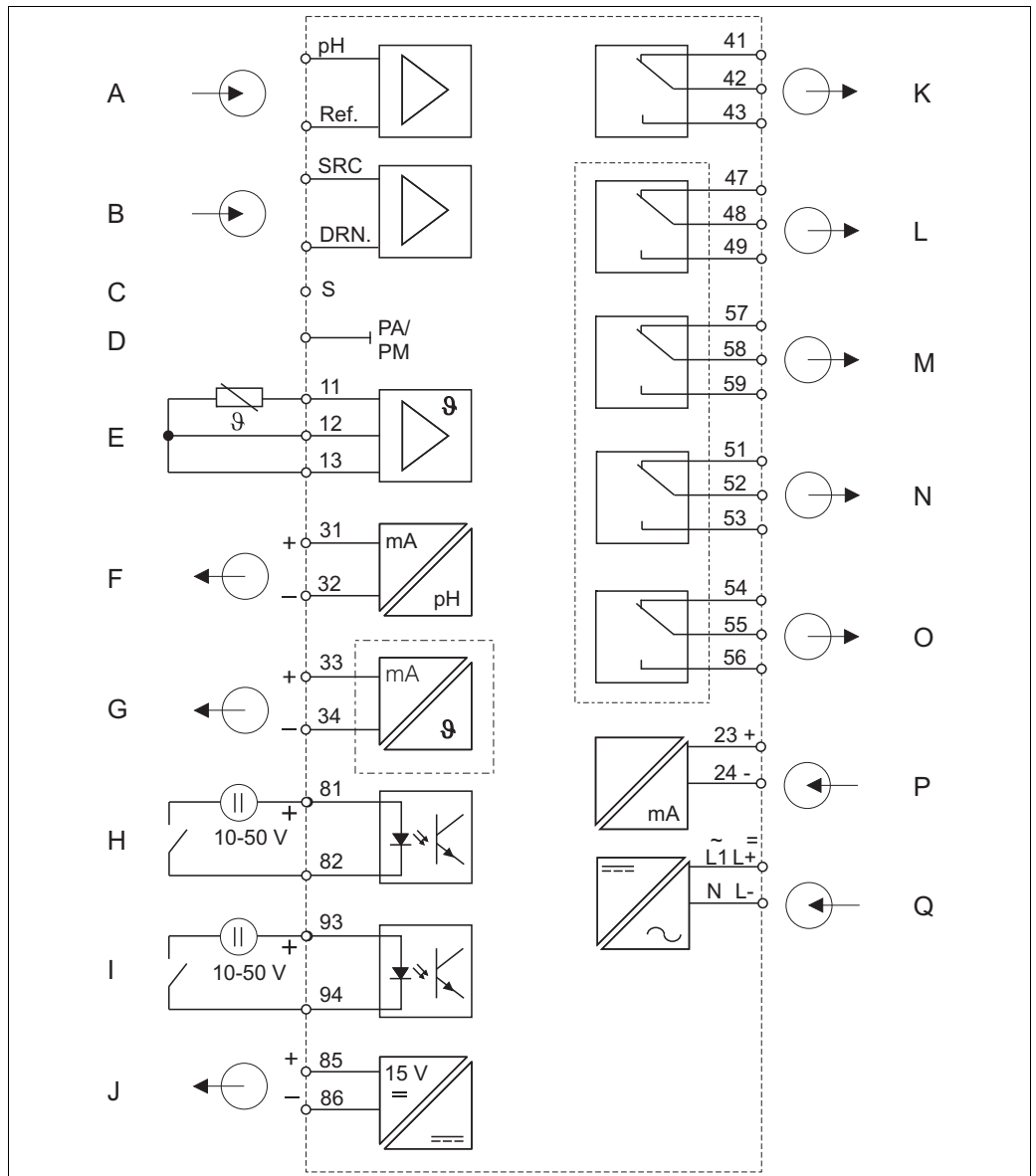
| <b>HART</b>                   |  |
|-------------------------------|--|
| Manufacturer ID               | 11 <sub>h</sub>  |
| Device type code              | 0091 <sub>h</sub>  |
| Transmitter specific revision | 0001 <sub>h</sub>  |
| HART specification            | 5.0  |
| DD files                      | <a href="http://www.products.endress.com/profibus">www.products.endress.com/profibus</a> |
| Load HART                     | 250 Ω  |
| Device variables              | None (dynamic variables PV, SV, only)  |
| Features supported            | -  |

| <b>PROFIBUS PA</b> |  |
|--------------------|--|
| Manufacturer ID    | 11 <sub>h</sub>  |
| Ident number       | 1516 <sub>h</sub>  |
| Device revision    | 11 <sub>h</sub>  |
| Profile version    | 2.0  |
| GSD files          | <a href="http://www.products.endress.com/profibus">www.products.endress.com/profibus</a> |
| GSD file version   |  |
| Output values      | Main value, temperature value  |
| Input values       | Display value of PLC   |
| Features supported | Device locking: The device can be locked by hardware or software.                        |

| <b>PROFIBUS DP</b> |  |
|--------------------|--|
| Manufacturer ID    | 11 <sub>h</sub>  |
| Ident number       | 1520 <sub>h</sub>  |
| Profile version    | 2.0  |
| GSD files          | <a href="http://www.products.endress.com/profibus">www.products.endress.com/profibus</a> |
| GSD file version   |  |
| Output values      | Main value, temperature value  |
| Input values       | Display value of PLC   |
| Features supported | Device locking: The device can be locked by hardware or software.                        |

## Power supply

### Electrical connection of analog sensors



Electrical connection Liquisys M

A Standard sensor

B ISFET sensor

C Outer screen connection for glass electrodes

D Potential matching

E Temperature sensor

F Signal output 1 pH/ORP

G Signal output 2 temperature, pH/ORP or controller P

H Binary input 1 (Hold)

I Binary input 2 (Chemoclean)

J Auxiliary voltage output

K Alarm (contact position currentless)

L Relay 1 (contact position currentless)

M Relay 2 (contact position currentless)

N Relay 3 (contact position currentless)

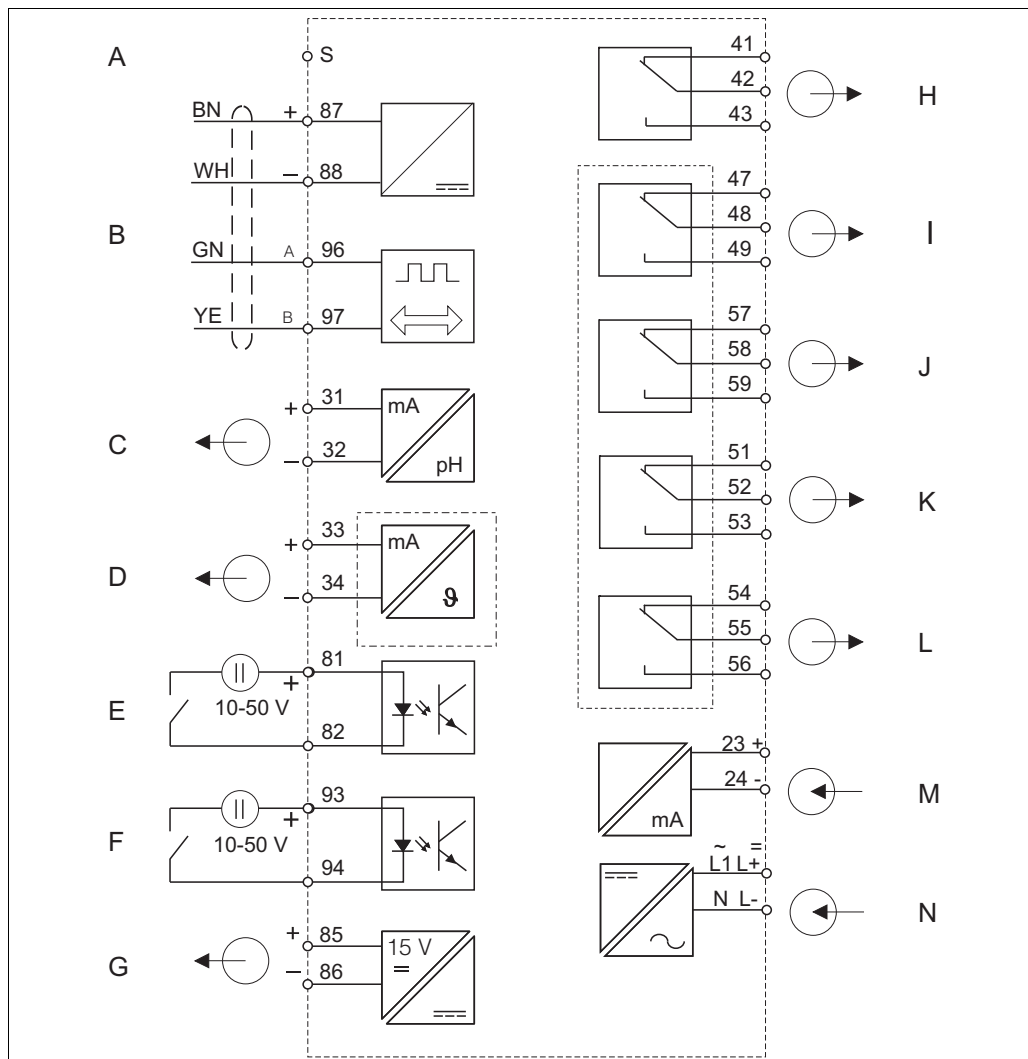
O Relay 4 (contact position currentless)

P Current input 4 to 20 mA

Q Power supply

#0007753

## Electrical connection of Memosens sensors



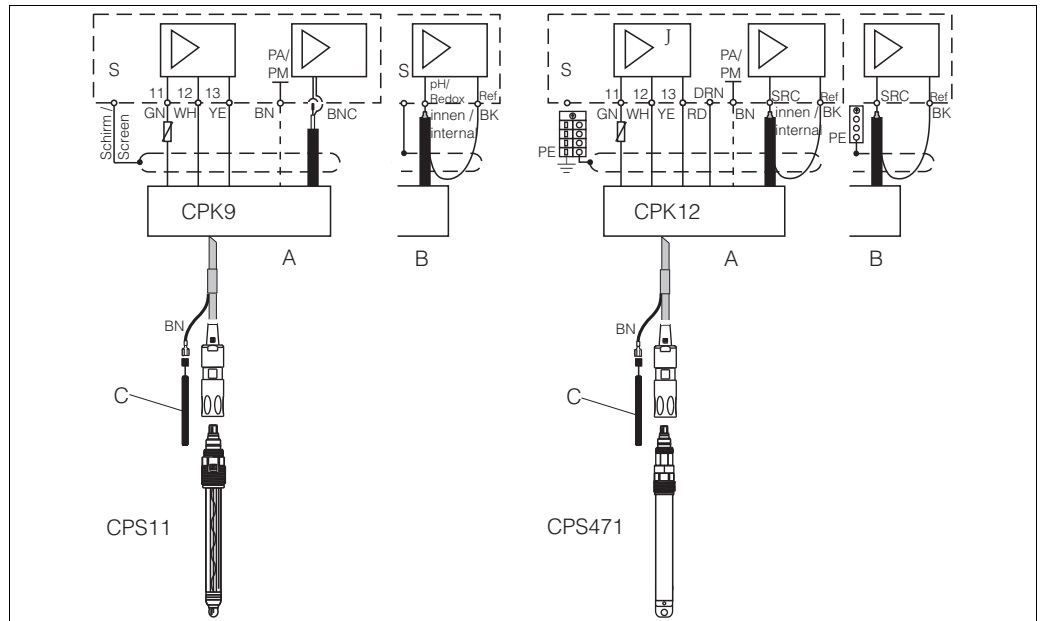
Transmitter electrical connection with Memosens technology

- |   |   |   |  |
|---|---|---|--|
| A | Screen  | H | Alarm (contact position currentless)   |
| B | Sensor  | I | Relay 1 (contact position currentless) |
| C | Signal output 1 pH/redox                            | J | Relay 2 (contact position currentless) |
| D | Signal output 2 temperature, pH/redox or controller | K | Relay 3 (contact position currentless) |
| E | Binary input 1 (Hold)                               | L | Relay 4 (contact position currentless) |
| F | Binary input 2 (Chemoclean)                         | M | Current input 4 to 20 mA               |
| G | Auxiliary voltage output                            | N | Power supply                           |



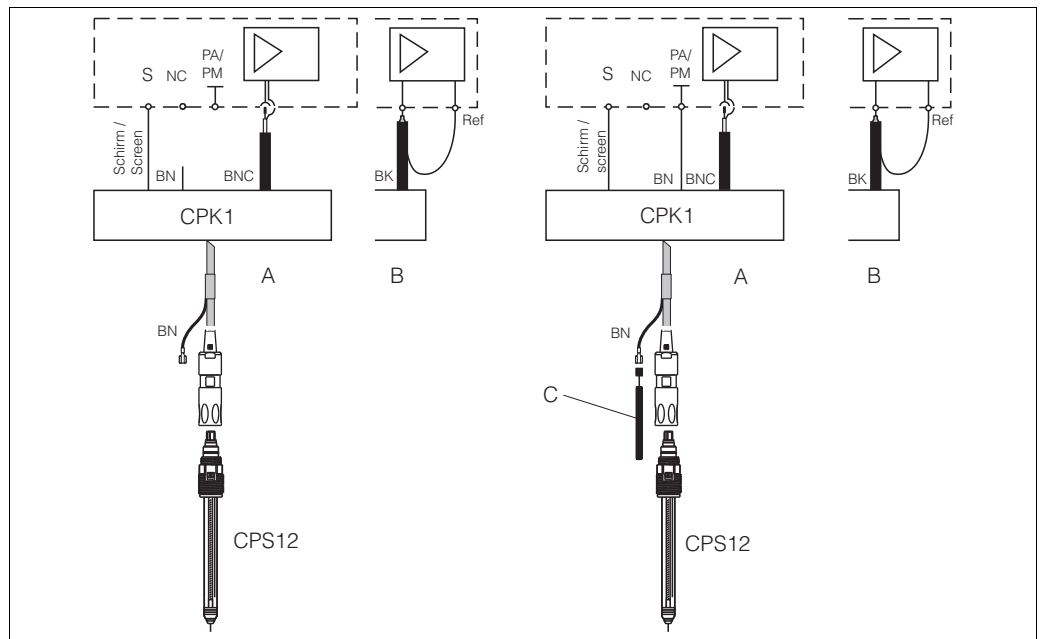
**Sensor cable**

The pH and ORP electrodes are connected using special terminated and shielded multicore cables. The measuring cable can be extended with a junction box and an extension cable. Termination instructions are supplied with the measuring cable.



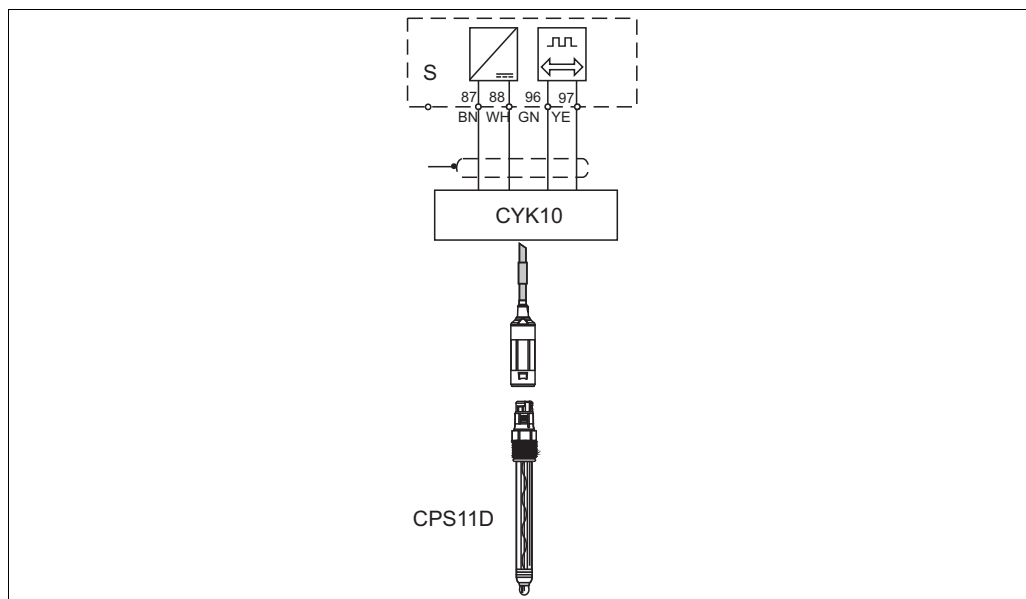
Connection CPS11 with CPK9 and CPS471 with CPK12 to Liquisys M

- A Panel-mounted instrument
- B Field instrument
- C Potential matching PM for symmetrical connection



Unsymmetrical and symmetrical connection of ORP electrodes to Liquisys M

- A Panel-mounted instrument
- B Field instrument
- C Potential matching PM for symmetrical connection



Connection of digital sensor CPS11D with CYK10

40007773

**Supply voltage** Depending on ordered version:  
 100/115/230 V AC +10/-15 %, 48 to 62 Hz  
 24 V AC/DC +20/-15 %

**Fieldbus connection**

| <b>HART</b>                           |                             |
|---------------------------------------|-----------------------------|
| Supply voltage                        | n/a, active current outputs |
| Integrated reverse voltage protection | n/a, active current outputs |

| <b>PROFIBUS PA</b>                         |                        |
|--|------------------------|
| Supply voltage                             | 9 V to 32 V, max. 35 V |
| Polarity sensitive                         | no                     |
| FISCO/FNICO compliant acc. to IEC 60079-27 | no                     |

| <b>PROFIBUS DP</b>                         |                        |
|--|------------------------|
| Supply voltage                             | 9 V to 32 V, max. 35 V |
| Polarity sensitive                         | n/a                    |
| FISCO/FNICO compliant acc. to IEC 60079-27 | no                     |

**Power consumption** max. 7.5 VA

**Mains protection** Fine-wire fuse, medium-slow blow 250 V/3.15 A

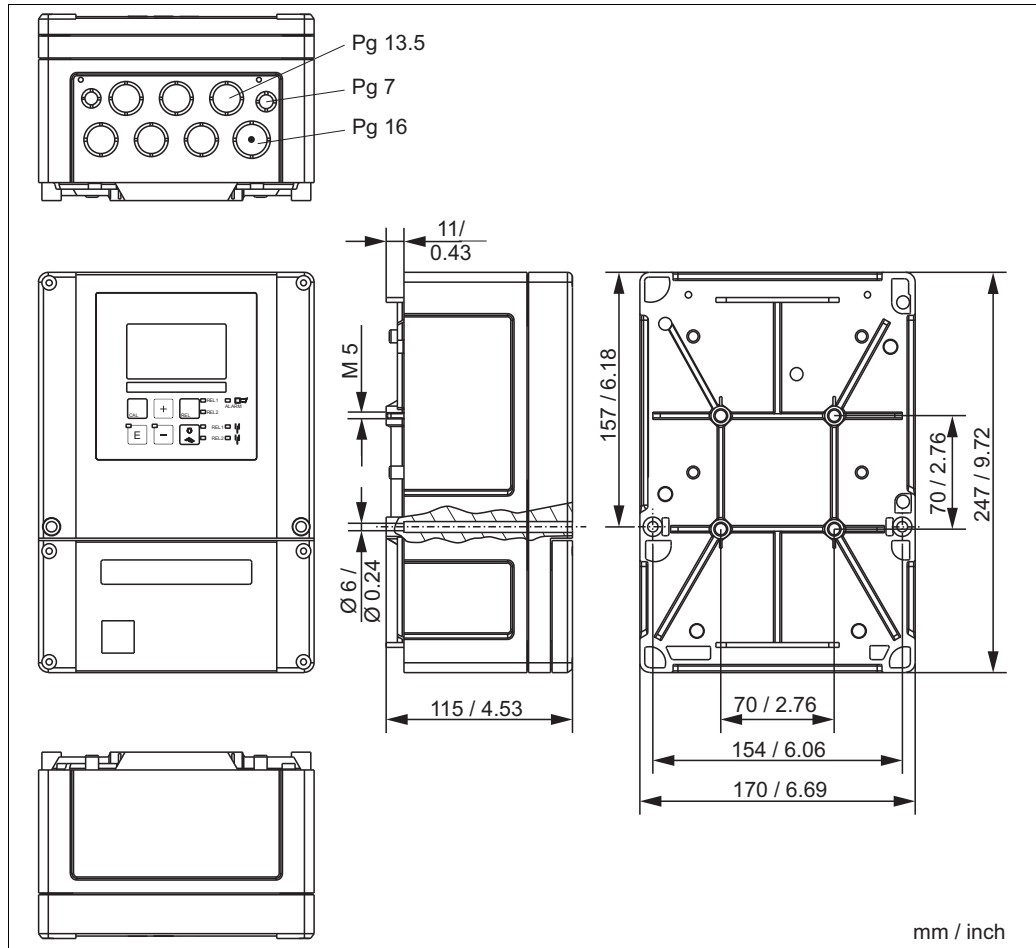
## Performance characteristics

|  |               |  |
|--|---------------|--|
| <b>Reference temperature</b>               | 25 °C (77 °F) |  |
| <b>Resolution</b>                          | pH:           | 0.01 pH                                    |
|  | ORP:          | 1 mV/0.1 %                                 |
|  | Temperature:  | 0.1 °C                                     |
| <b>Maximum measured error<sup>1)</sup></b> | Display       |  |
|  | pH:           | max. 0.5 % of measuring range              |
|  | ORP:          | max. 0.5 % of measuring range              |
|  | Temperature:  | max. 1.0 % of measuring range              |
|  | Signal output |  |
|  | pH:           | max. 0.75 % of measuring range             |
|  | ORP:          | max. 0.75 % of measuring range             |
|  | Temperature:  | max. 1.25 % of measuring range             |
| <b>Repeatability<sup>1)</sup></b>          | pH:           | max. 0.2 % of measuring range              |
|  | ORP:          | max. 0.2 % of measuring range              |
| <b>Zero point</b>                          | Glass:        | pH 5.0 to 9.0 (nominal pH 7.00)            |
|  | Antimon:      | pH -1.0 to 3.0 (nominal pH 1.00)           |
|  | ISFET:        | -500 to +500 mV                            |
| <b>Slope</b>                               | Glass:        | 38.00 to 65.00 mV/pH (nominal 59.16 mV/pH) |
|  | Antimon:      | 25.00 to 65.00 mV/pH (nominal 59.16 mV/pH) |
|  | ISFET:        | 38.00 to 65.00 mV/pH (nominal 59.16 mV/pH) |
| <b>Offset</b>                              | pH:           | ±2 pH                                      |
|  | ORP:          | ±120 mV/±50 %                              |
|  | Temperature:  | ±5 °C                                      |

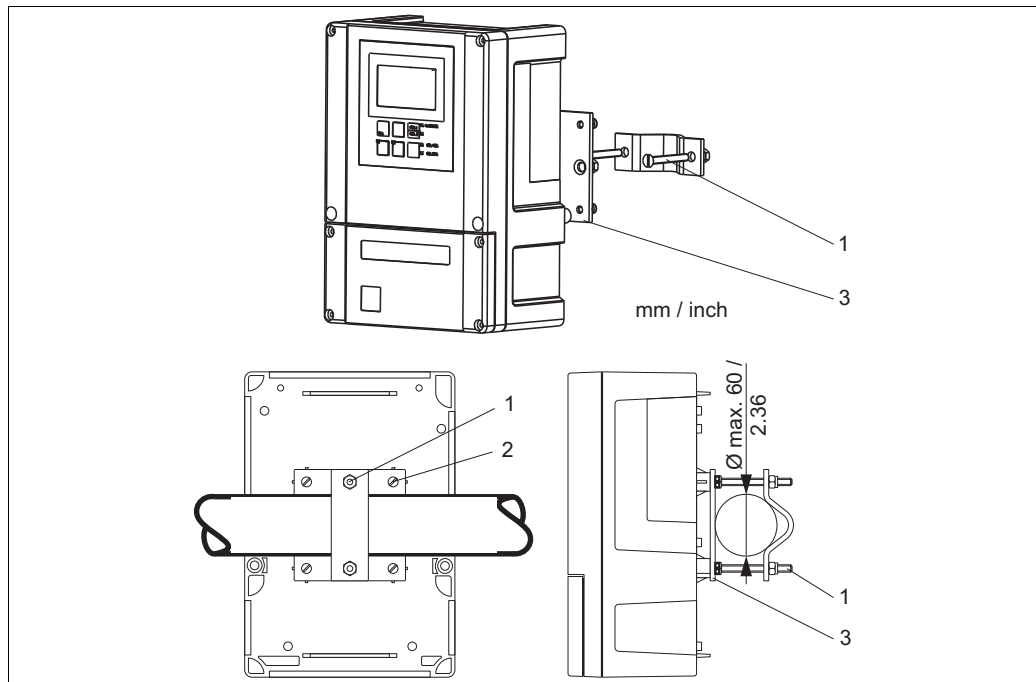
1) acc. to IEC 746-1, for nominal operating conditions

# Installation

## Installation instructions

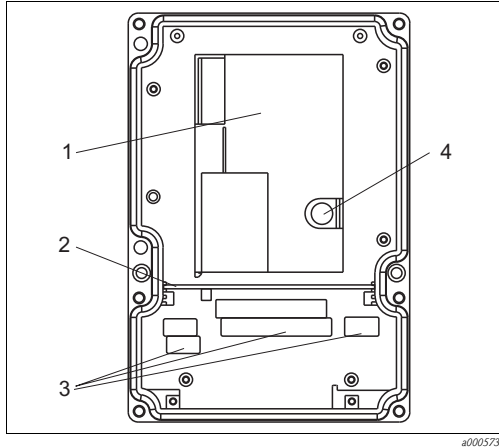


Field instrument



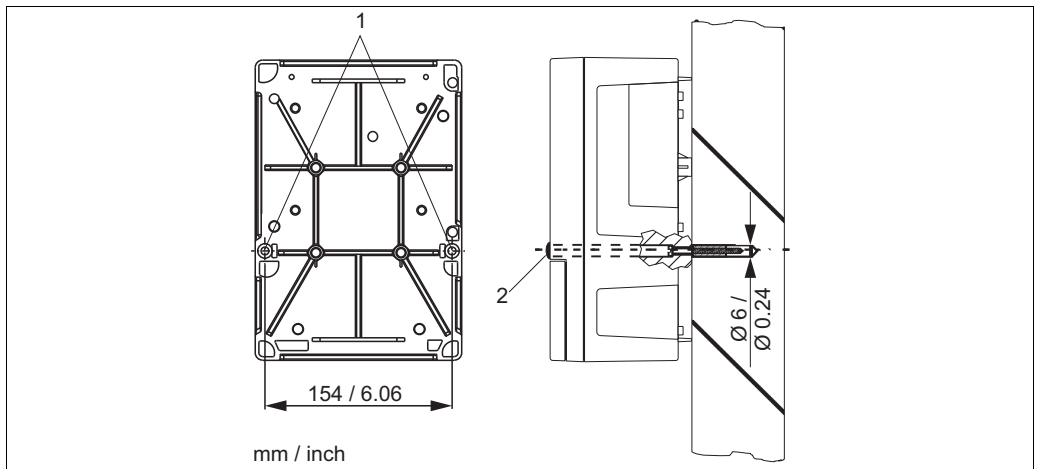
Mounting on pipes

1 - 3 Mounting screws and mounting plate



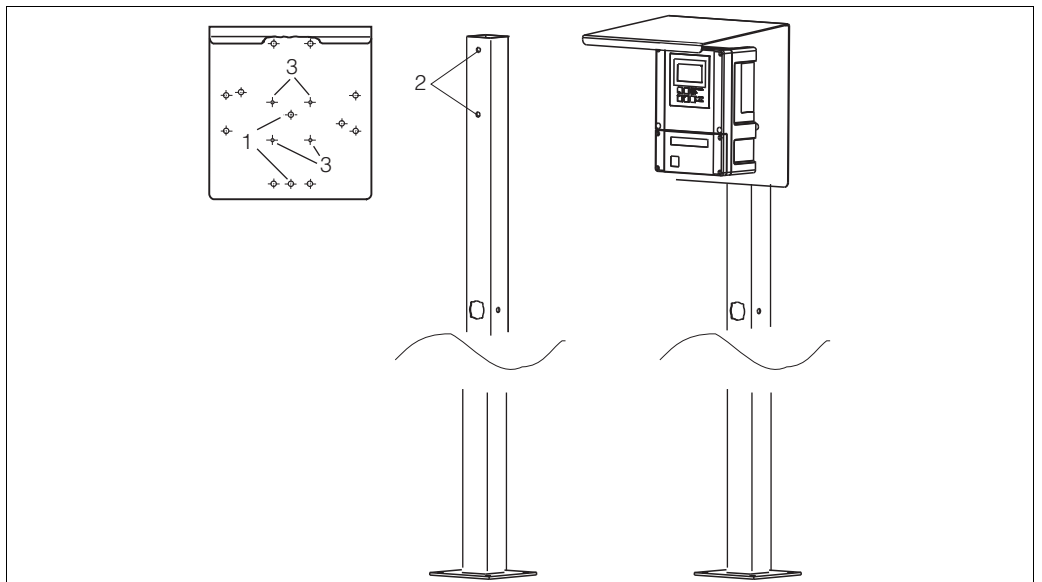
- 1 Removable electronics box
- 2 Partition plate
- 3 Terminal blocks
- 4 Fuse

View into the field instrument



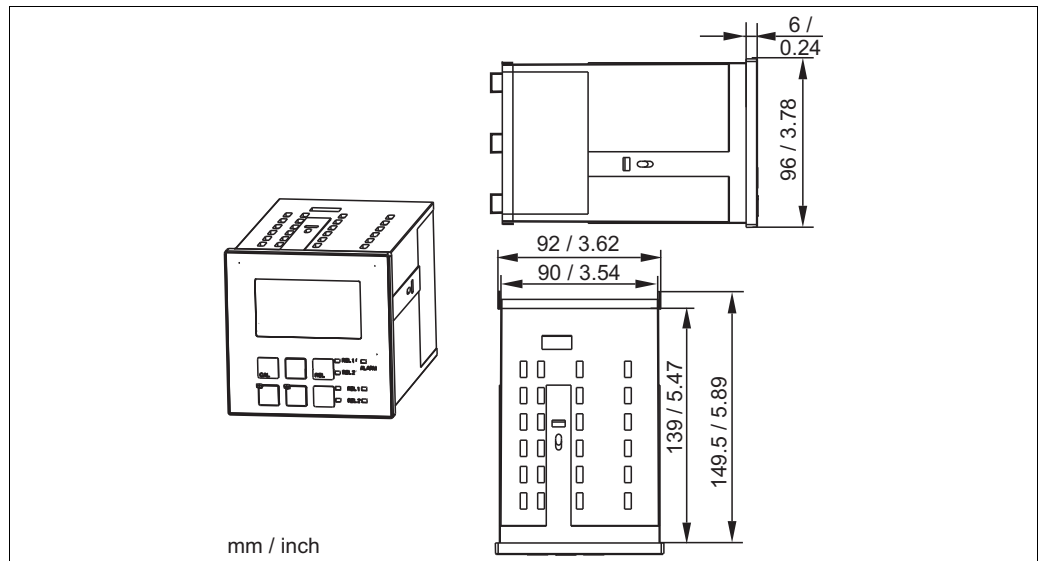
Wall mounting of the field instrument

- 1 Mounting holes
- 2 Protecting cap



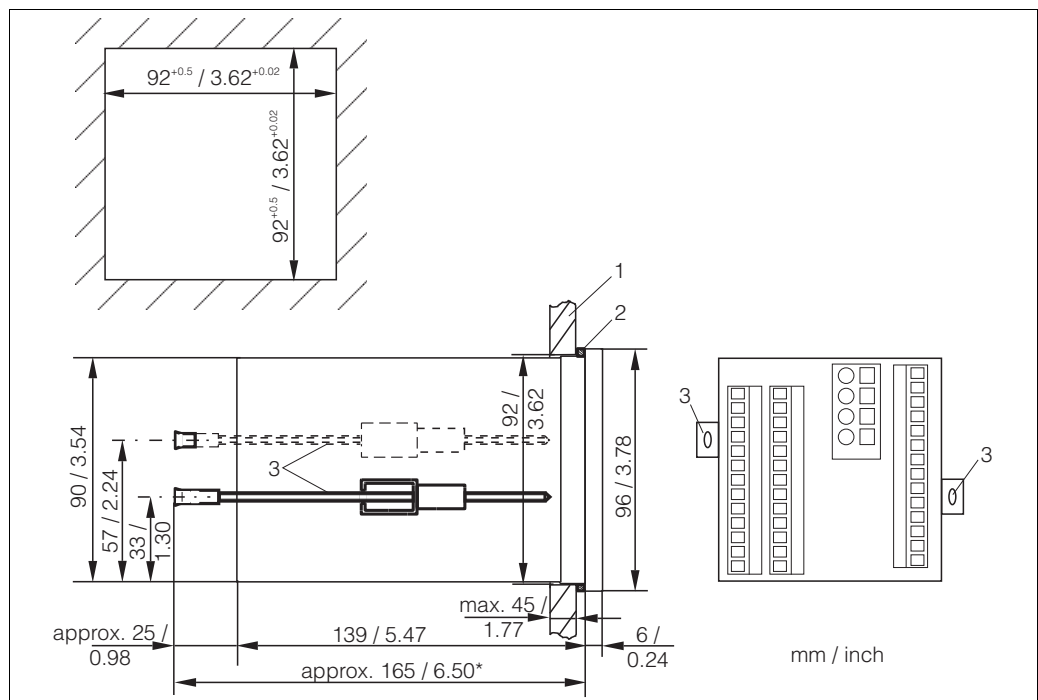
Mounting of the field instrument with mounting post and weather protection cover

- 1 - 3 Mounting holes



Dimensions panel-mounted instrument

40005735



Installation of the panel-mounted instrument

- 1 Wall of control cabinet
- 2 Gasket
- 3 Tensioning screws
- \* Required installation depth

40005739

## Environment

|                                      |   |   |
|--------------------------------------|---|---|
| <b>Ambient temperature</b>           | -10 to +55 °C (+14 to +131 °F)  |   |
| <b>Storage temperature</b>           | -25 to +65 °C (-13 to +149 °F)  |   |
| <b>Electromagnetic compatibility</b> | Interference emission and interference immunity as per EN 61326-1:2006, EN 61326-2-3:2006     |   |
| <b>Ingress protection</b>            | Panel mounted instrument:<br>Field instrument:  | IP 54 (front), IP 30 (housing)<br>IP 65 / tightness acc. to NEMA 4X |
| <b>Electrical safety</b>             | according EN/IEC 61010-1:2001, Installation Category II, for use up to 2000 m above sea level |   |
| <b>CSA</b>                           | Apparatus with CSA General Purpose Approval are certified for indoor use.                     |   |
| <b>Relative humidity</b>             | 10 to 95%, non-condensing   |   |
| <b>Pollution degree</b>              | The product is suitable for pollution degree 2.   |   |

## Mechanical construction

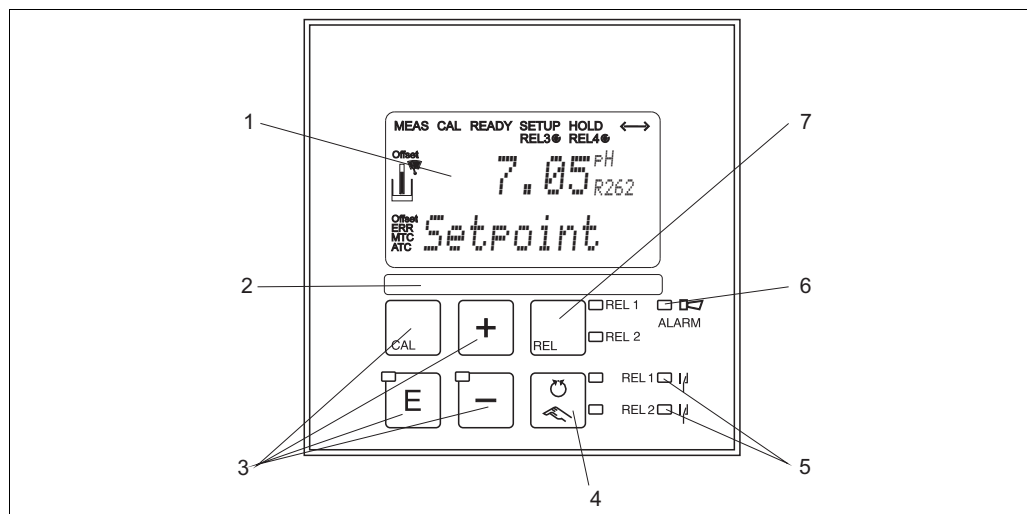
|                   |   |  |
|-------------------|---|--|
| <b>Dimensions</b> | Panel mounted instrument:<br>Field instrument:                            | 96 x 96 x 145 mm (3.78 x 3.78 x 5.71 inches)<br>Mounting depth: approx. 165 mm (6.50")<br>247 x 170 x 115 mm (9.72 x 6.69 x 4.53 inches) |
| <b>Weight</b>     | Panel mounted instrument:<br>Field instrument:                            | max. 0.7 kg (1.5 lb)<br>max. 2.3 kg (5.1 lb)   |
| <b>Materials</b>  | Housing of panel mounted instrument:<br>Field housing:<br>Front membrane: | Polycarbonate<br>ABS PC FR<br>Polyester, UV-resistant  |
| <b>Terminals</b>  | Cross section   | 2.5 mm <sup>2</sup> (14 AWG)   |

## Operability

### Operating concept

All instrument control functions are arranged in a logical menu structure. Following access code entry, the individual parameters can be easily selected and modified as needed.

### Display elements



#### Operating elements

- 1 LC display for display of measured values, configuration data and current menu field
- 2 Field for user labeling
- 3 4 main control keys for calibration and instrument configuration
- 4 Key for switching between automatic/manual operation
- 5 LED indicators for switched limit outputs
- 6 LED indicator for alarm function
- 7 Display of active contact and key for relay switching in manual mode

The display simultaneously shows the current measured value and the temperature - the essential process data. Brief information texts in the configuration menu provide assistance with parameter configuration.

## Certificates and approvals

### CE symbol

#### Declaration of conformity

The product meets the requirements of the harmonized European standards. It thus complies with the legal requirements of the EC directives.

The manufacturer confirms successful testing of the product by affixing the CE symbol.

### Ex approval for zone 2

Application of transmitter as related electrical equipment in non-hazardous area or in simple pressurized apparatus; application of sensor in hazardous area zone 2

C.M2.3-..4...

ATEX II (3)G (Ex nL) IIC

C.M223-..6...

C.M253-..A...

### CSA general purpose

C.M2.3-..2...

C.M2.3-..3...

C.M2.3-..7...



## Ordering information

### Product structure

|         |  | Sensor input, software   |                     |
|---------|--|--|---------------------|
| IS      |  | pH (glass/ISFET) / ORP; Plus package   |                     |
| MR      |  | pH (digital sensor); pH (glass/ISFET)/ORP; basic version                         |                     |
| MS      |  | pH (digital sensor); pH (glass/ISFET)/ORP; Plus package                          |                     |
| PR      |  | pH (glass)/ORP; basic version  |                     |
| PS      |  | pH (glass)/ORP; Plus package   |                     |
|         |  | Power supply, approval   |                     |
| A       |  | 24 V AC/DC; ATEX II (3)G (Ex nL) IIC (CPM253 only)                               |                     |
| 0       |  | 230 V AC   |                     |
| 1       |  | 115 V AC   |                     |
| 2       |  | 230 V AC; CSA Gen. Purp.   |                     |
| 3       |  | 115 V AC; CSA Gen. Purp.   |                     |
| 4       |  | 230 V AC; ATEX II (3)G [Ex nL] IIC   |                     |
| 5       |  | 100 V AC   |                     |
| 6       |  | 24 V AC/DC; ATEX II (3)G [Ex nL] IIC (CPM223 only)                               |                     |
| 7       |  | 24 V AC; CSA Gen. Purp.  |                     |
| 8       |  | 24 V AC/DC   |                     |
|         |  | Output   |                     |
| 0       |  | 1 x 20 mA, primary value   |                     |
| 1       |  | 2 x 20 mA, primary value + secondary value                                       |                     |
| 3       |  | PROFIBUS PA  |                     |
| 4       |  | PROFIBUS DP  |                     |
| 5       |  | 1 x 20 mA, primary value, HART   |                     |
| 6       |  | 2 x 20 mA, primary value, HART + secondary value                                 |                     |
|         |  | Additional contacts  |                     |
| 05      |  | not selected   |                     |
| 10      |  | 2 relays (limit/P(ID)/timer)   |                     |
| 15      |  | 4 relays (limit/P(ID)/Chemoclean) (not with PROFIBUS DP)                         |                     |
| 16      |  | 4 relays (limit/P(ID)/timer) (not with PROFIBUS DP)                              |                     |
| 20      |  | 1 x 4 ... 20 mA input + 2 relays (limit/P(ID)/timer)                             |                     |
| 25      |  | 1 x 4 ... 20 mA input + 4 relays (limit/P(ID)/Chemoclean) (not with PROFIBUS DP) |                     |
| 26      |  | 1 x 4 ... 20 mA input + 4 relays (limit/P(ID)/timer) (not with PROFIBUS DP)      |                     |
|         |  | Additional features (CPM223 only)  |                     |
| PRL     |  | Protective layer   |                     |
|         |  | Marking  |                     |
| 1       |  | Tagging (Tag), see additional spec.  |                     |
| CPM253- |  |  |                     |
|         |  |  | complete order code |
| CPM223- |  |  |                     |

### Additional functions of the Plus package

- Current output table to cover large areas with varying resolution
- Monitoring of sensor and process for safe operation
- Neutralization controller to keep pH value constant by dosing acid and alkali
- Automatic cleaning function start<sup>2)</sup>

2) In combination with "Additional contacts" only, see product structure

**Scope of delivery**

The delivery of the field instrument includes:

- 1 transmitter CPM253
- 1 plug-in screw terminal
- 1 cable gland Pg 7
- 1 cable gland Pg 16 reduced
- 2 cable glands Pg 13.5
- 1 Operating Instructions BA194C/07/EN
- versions with HART communication:
  - 1 Operating Instructions Field Communication with HART, BA208C/07/EN
- versions with PROFIBUS communication:
  - 1 Operating Instructions Field Communication with PROFIBUS PA/DP, BA209C/07/EN
- versions with explosion protection for hazardous area zone II (ATEX II 3G):
  - Safety Instructions for use in explosion-hazardous areas, XA194C/07/A3

The delivery of the panel mounted instrument includes:

- 1 transmitter CPM223
- 1 set of plug-in screw terminals
- 2 tensioning screws
- 1 BNC-plug (solder-free)
- 1 Operating Instructions BA194C/07/EN
- versions with HART communication:
  - 1 Operating Instructions Field Communication with HART, BA208C/07/EN
- versions with PROFIBUS communication:
  - 1 Operating Instructions Field Communication with PROFIBUS PA/DP, BA209C/07/EN
- versions with explosion protection for hazardous area zone II (ATEX II 3G):
  - Safety Instructions for use in explosion-hazardous areas, XA194C/07/A3

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## Accessories

**Sensors****Glass sensors**

Orbisint CPS11/CPS11D

- pH sensor for process applications
- Optional SIL version for connection to SIL approved transmitters
- With dirt-repellent PTFE diaphragm
- Ordering acc. to product structure, see Technical Information (TI028C/07/en)

Orbisint CPS12/CPS12D

- ORP electrode for process applications
- With dirt-repellent PTFE diaphragm
- Ordering acc. to product structure, see Technical Information (TI367C/07/en)

Ceraliquid CPS41/CPS41D

- pH sensor
- With ceramics diaphragm and liquid KCl electrolyte
- Ordering acc. to product structure, see Technical Information (TI079C/07/en)

Ceraliquid CPS42/CPS42D

- ORP electrode
- With ceramics diaphragm and liquid KCl electrolyte
- Ordering acc. to product structure, see Technical Information (TI373C/07/en)

Ceragel CPS71/CPS71D

- pH sensor
- With double chamber reference system and integrated bridge electrolyte
- Ordering acc. to product structure, see Technical Information (TI245C/07/en)

Ceragel CPS72/CPS72D

- ORP electrode
- With double chamber reference system and integrated bridge electrolyte
- Ordering acc. to product structure, see Technical Information (TI374C/07/en)

Orbipore CPS91/CPS91D

- pH sensor
- With open aperture for media with high dirt load
- Ordering acc. to product structure, see Technical Information (TI375C/07/en)

Orbipore CPS92/CPS92D

- ORP sensor
- With open aperture for media with high dirt load
- Ordering acc. to product structure, see Technical Information (TI435C/07/en)

**ISFET sensors**

Tophit CPS471

- Sterilizable and autoclavable ISFET sensor
- For food and pharmaceuticals, process technology, water treatment and biotechnology;
- Ordering acc. to product structure, see Technical Information (TI283C/07/en)

Tophit CPS441

- Sterilizable ISFET sensor for media with low conductivity
- With liquid KCl electrolyte
- Ordering acc. to product structure, see Technical Information (TI352C/07/en)

Tophit CPS491

- ISFET sensor with open aperture for media with high dirt load
- Ordering acc. to product structure, see Technical Information (TI377C/07/en)

**Connection accessories**

CPK9 special measuring cable

- For sensors with TOP68 plug-in head, for high-temperature and high-pressure applications, IP 68
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

CPK1 special measuring cable

- For pH/ORP electrodes with GSA plug-in head
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

CPK2 special measuring cable

- For pH/ORP electrodes with GSA plug-in head, with three sensor plugs
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

CPK12 special measuring cable

- For pH/ORP glass electrodes and ISFET sensors with TOP68 plug-in head
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

CYK10 Data cable for digital sensors

- For digital pH sensors with Memosens technology
- Ordering according to product structure, see below

| Certificates  |                                |
|---------------|--------------------------------|
| A             | Standard, non Ex               |
| G             | ATEX II 1G EEx ia IIC T6/T4    |
| O             | FM CLI Div. 1 AEx ia IIC T6/T4 |
| S             | CSA IS CLI Ex ia IIC T6/T4     |
| Cable length  |                                |
| 03            | Cable length: 3 m / 9.84 ft    |
| 05            | Cable length: 5 m / 16.41 ft   |
| 10            | Cable length: 10 m / 32.81 ft  |
| 15            | Cable length: 15 m / 49.22 ft  |
| 20            | Cable length: 20 m / 65.62 ft  |
| 25            | Cable length: 25 m / 82.03 ft  |
| 88            | ... m length                   |
| 89            | ... ft length                  |
| Ready-made    |                                |
| 1             | Wire terminals                 |
| <b>CYK10-</b> | complete order code            |

## CYK81 measuring cable

- Non-terminated measuring cable for extension of sensor cables of e.g. Memosens sensors, CUS31/CUS41
- 2 wires, twisted pair with shield and PVC-sheath ( $2 \times 2 \times 0.5 \text{ mm}^2 + \text{shield}$ )
- Sold by the meter, order no.: 51502543

## Junction box VBM

- For cable extension
- 10 terminals
- Cable entries: 2 x Pg 13.5 or 2 x NPT 1/2"
- Material: aluminum
- Ingress protection: IP 65 ( $\cong$  NEMA 4X)
- Order numbers:
  - cable entries Pg 13.5: 50003987
  - cable entries NPT 1/2": 51500177

## Junction box VBA

- For cable extension of pH/ORP sensors
- 10 terminals, protection class: IP 65 ( $\cong$  NEMA 4X)
- Cable entries: 2 x Pg 13.5, 2 x Pg 16
- Material: polycarbonate
- Order no.: 50005276

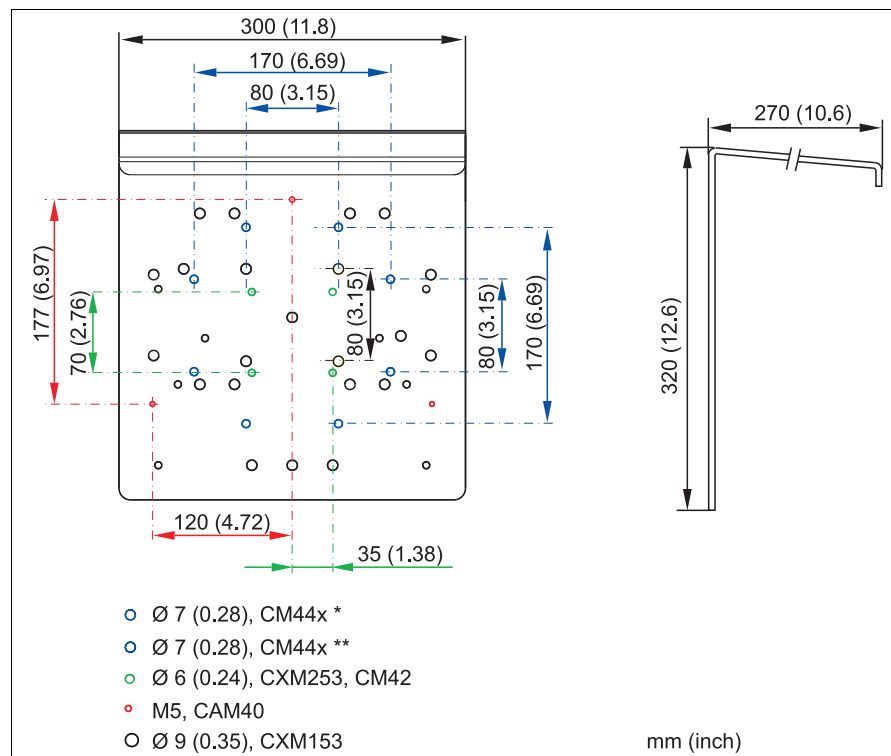
## Junction box RM

- For cable extension (e.g. for Memosens sensors)
- 5 terminals
- Cable entries: 2 x Pg 13.5
- Material: PC
- Ingress protection: IP 65
- Order no.: 51500832

## Mounting accessories

## CYY101 weather protection cover for field devices, absolutely essential if operating the unit outdoors

- Material: stainless steel 1.4031 (AISI 304)
- Order No. CYY101-A



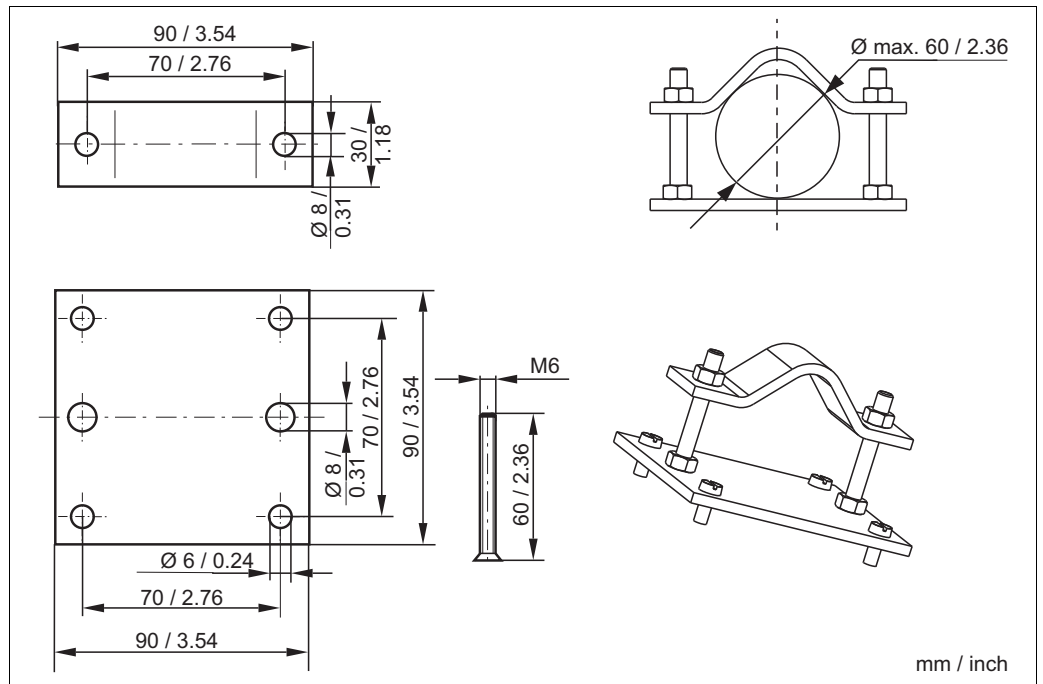
Weather protection cover for field devices

\* Wall and post mounting

\*\* Rail mounting

Post mounting kit

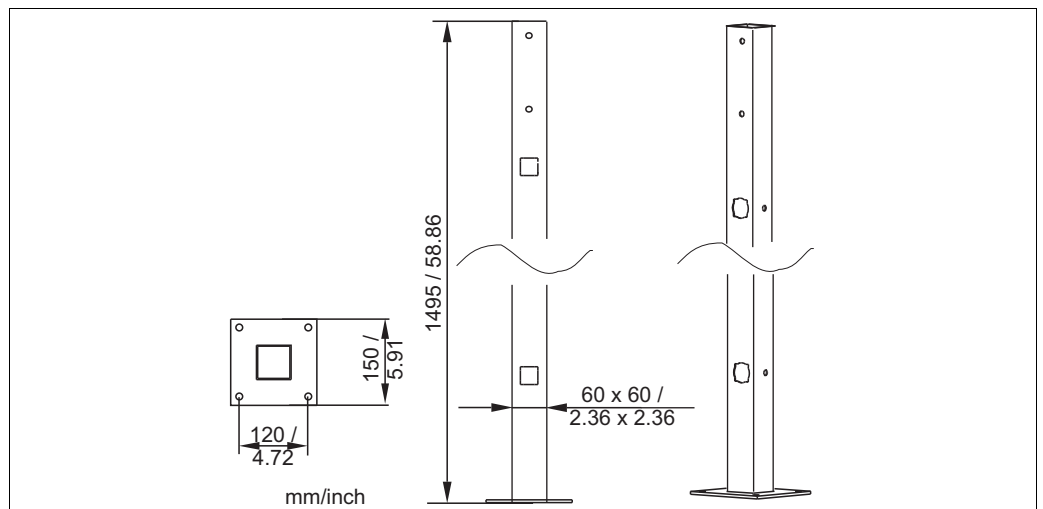
- For mounting of field housing on horizontal or vertical pipes (Ø max. 60 mm (2.36"))
- Material: stainless steel 1.4301
- order no. 50086842



Post mounting kit

CYY102 universal post

- Square pipe for mounting transmitters
- Material: stainless steel 1.4301 (AISI 304)
- Order No. CYY102-A



Universal post

**Buffer solutions***High-quality buffer solutions of Endress+Hauser - CPY20*

The secondary buffer solutions have been referenced to primary reference material of the PTB (German Federal Physico-technical Institute) and to standard reference material of NIST (National Institute of Standards and Technology) according to DIN 19266 by a DKD (German Calibration Service) accredited laboratory.

| pH value |                                   |
|----------|-----------------------------------|
| A        | pH 2.00 (accuracy $\pm$ 0.02 pH)  |
| C        | pH 4.00 (accuracy $\pm$ 0.02 pH)  |
| E        | pH 7.00 (accuracy $\pm$ 0.02 pH)  |
| G        | pH 9.00 (accuracy $\pm$ 0.02 pH)  |
| I        | pH 9.20 (accuracy $\pm$ 0.02 pH)  |
| K        | pH 10.00 (accuracy $\pm$ 0.05 pH) |
| M        | pH 12.00 (accuracy $\pm$ 0.05 pH) |

| Quantity |  |
|----------|--|
| 01       | 20 x 18 ml (0.68 fl.oz) only buffer solutions pH 4.00 and 7.00 |
| 02       | 250 ml (8.45 fl.oz)  |
| 10       | 1000 ml (0.26 US gal)  |
| 50       | 5000 ml (1.32 US gal) canister for Topcal S                    |

| Certificates |                             |
|--------------|-----------------------------|
| A            | Buffer analysis certificate |

| Version |          |
|---------|----------|
| 1       | Standard |

|        |  |  |  |  |                     |
|--------|--|--|--|--|---------------------|
| CPY20- |  |  |  |  | complete order code |
|--------|--|--|--|--|---------------------|

Technical buffer solutions for ORP electrodes

- +220 mV, pH 7.0, 100 ml (3.4 fl.oz.); order no. CPY3-0
- +468 mV, pH 0.1, 100 ml (3.4 fl.oz.); order no. CPY3-1

KCl-electrolyte solutions for liquid filled electrodes

- 3.0 mol, T = -10 ... 100 °C (14 ... 212 °F), 100 ml (3.4 fl.oz.), order no. CPY4-1
- 3.0 mol, T = -10 ... 100 °C (14 ... 212 °F), 1000 ml (34 fl.oz.), order no. CPY4-2
- 1.5 mol, T = -30 ... 100 °C (-22 ... 266 °F), 100 ml (3.4 fl.oz.), order no. CPY4-3
- 1.5 mol, T = -30 ... 100 °C (-22 ... 266 °F), 1000 ml (34 fl.oz.), order no. CPY4-4

**Optoscope**

Optoscope

- Interface between transmitter and PC / laptop for service purposes.
- The Windows software "Scopeware" required for the PC or laptop is supplied with the Optoscope. The Optoscope is supplied in a sturdy plastic case with all the accessories required.
- Order no. 51500650



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