Technical Information
Liquisys M CPM223/253
pH/ORP Measurement

Transmitter for analog and digital glass and ISFET sensors

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
  - Manual contact control and user-defined alarm configuration
  - Calibration plausibility check

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

Endress+Hauser
People for Process Automation

Function and system design

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 Up to two 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.

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.

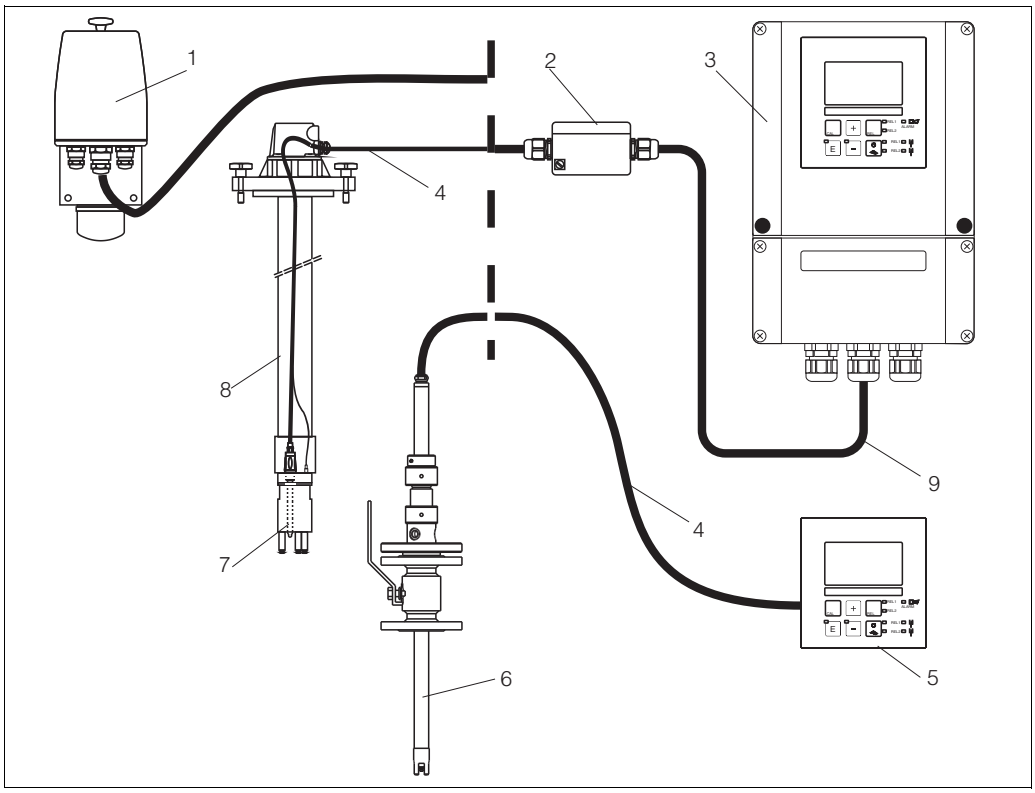
Current input

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

Input

Measured variables

pH (analog or digital sensors)
ORP
Temperature

Measuring range

pH:	–2 to 16
ORP:	–1500 to +1500 mV / 0 to 100 %
Temperature:	
Pt 100	-50 to +150 °C (-58 to +302 °F)
Pt 1000 (versions IS / PS)	-50 to +150 °C (-58 to +302 °F)
NTC 30K (versions IS / PS)	-20 to +100 °C (-4 to +212 °F)

Input resistance

> 10^{12} Ω (for nominal operating conditions) for standard sensors

Cable specification

Length of cable (analog):	max. 50 m (164 ft)
Length of cable (digital):	max. 100 m (328 ft)

Binary inputs

Voltage:	10 to 50 V
Power consumption:	max. 10 mA

Current input

4 to 20 mA, galvanically separated

Load: 260 Ω at 20 mA (voltage drop 5.2 V)

Output

Output signal

0/4 to 20 mA, galvanically separated, active

Output signal via fieldbus

HART	
Signal coding	Frequency Shift Keying (FSK) + 0.5 mA via current output signal
Data transfer rate	1200 Baud
Galvanic isolation	yes

PROFIBUS PA	
Signal coding	Manchester Bus Powered (MBP)
Data transfer rate	31.25 kBit/s, voltage mode
Galvanic isolation	yes (IO-Module)

PROFIBUS DP	
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)

Signal on alarm

2.4 or 22 mA

Load

maximum 500 Ω

Output range

pH:	adjustable, min. Δ 1 pH
ORP:	
absolute:	adjustable, min. Δ 50 mV
relative:	fixed, 0 to 100 %
Temperature:	adjustable, Δ 10 to Δ 100 % of upper range value

Resolution

max. 700 digits/mA

Min. distance for 0 / 4 to 20 mA signal

10% of measuring range

Isolation voltage

max. 350 V_{RMS}/500 V DC

Overvoltage protection

according to EN 61000-4-5

Auxiliary voltage output

Output voltage:	15 V ± 0.6
Output current:	max. 10 mA

Contact outputs

Switching current with ohmic load (cos φ = 1):	max. 2 A
Switching current with inductive load (cos φ = 0.4):	max. 2 A
Switching voltage:	max. 250 V AC, 30 V DC
Switching power with ohmic load (cos φ = 1):	max. 500 VA AC, 60 W DC
Switching power with inductive load (cos φ = 0.4):	max. 500 VA AC, 60 W DC

Limit contactor

Pickup/dropout delay:	0 to 2000 s

Controller

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^{-1}
Basic load:	0 to 40% of max. set value

Alarm

Function (selectable):	latching / momentary contact
Alarm threshold adjustment range:	pH / temperature: complete measuring range
Alarm delay:	0 to 2000 s 0 to 2000 min

Protocol specific data

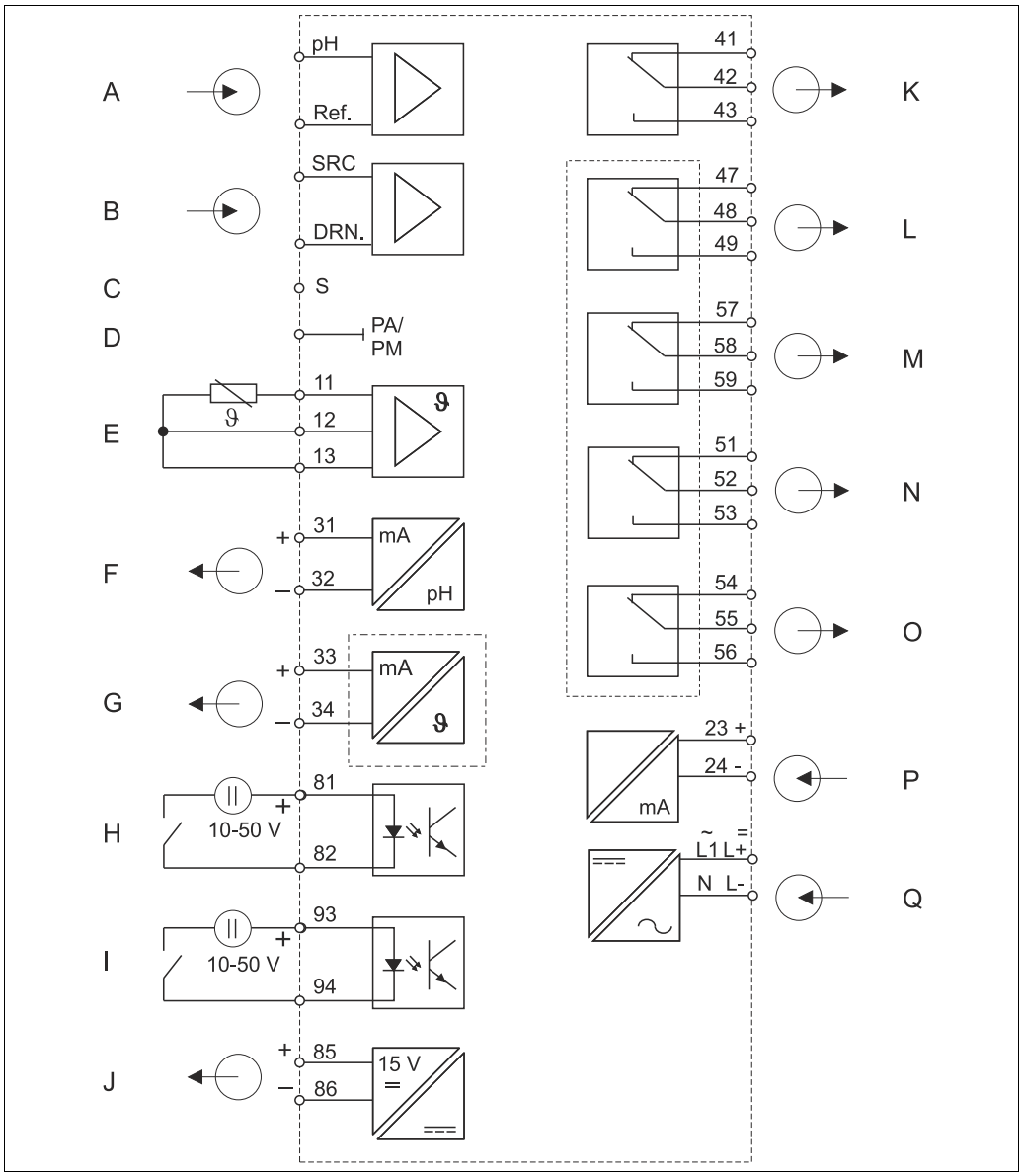
HART	
Manufacturer ID	11_h
Device type code	0091_h
Transmitter specific revision	0001_h
HART specification	5.0
DD files	www.products.endress.com/hart
Load HART	250 Ω
Device variables	None (dynamic variables PV, SV, only)
Features supported	-

PROFIBUS PA	
Manufacturer ID	11_h
Ident number	1516_h
Device revision	11_h
Profile version	2.0
GSD files	www.products.endress.com/profibus
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.

PROFIBUS DP	
Manufacturer ID	11_h
Ident number	1520_h
Profile version	2.0
GSD files	www.products.endress.com/profibus
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

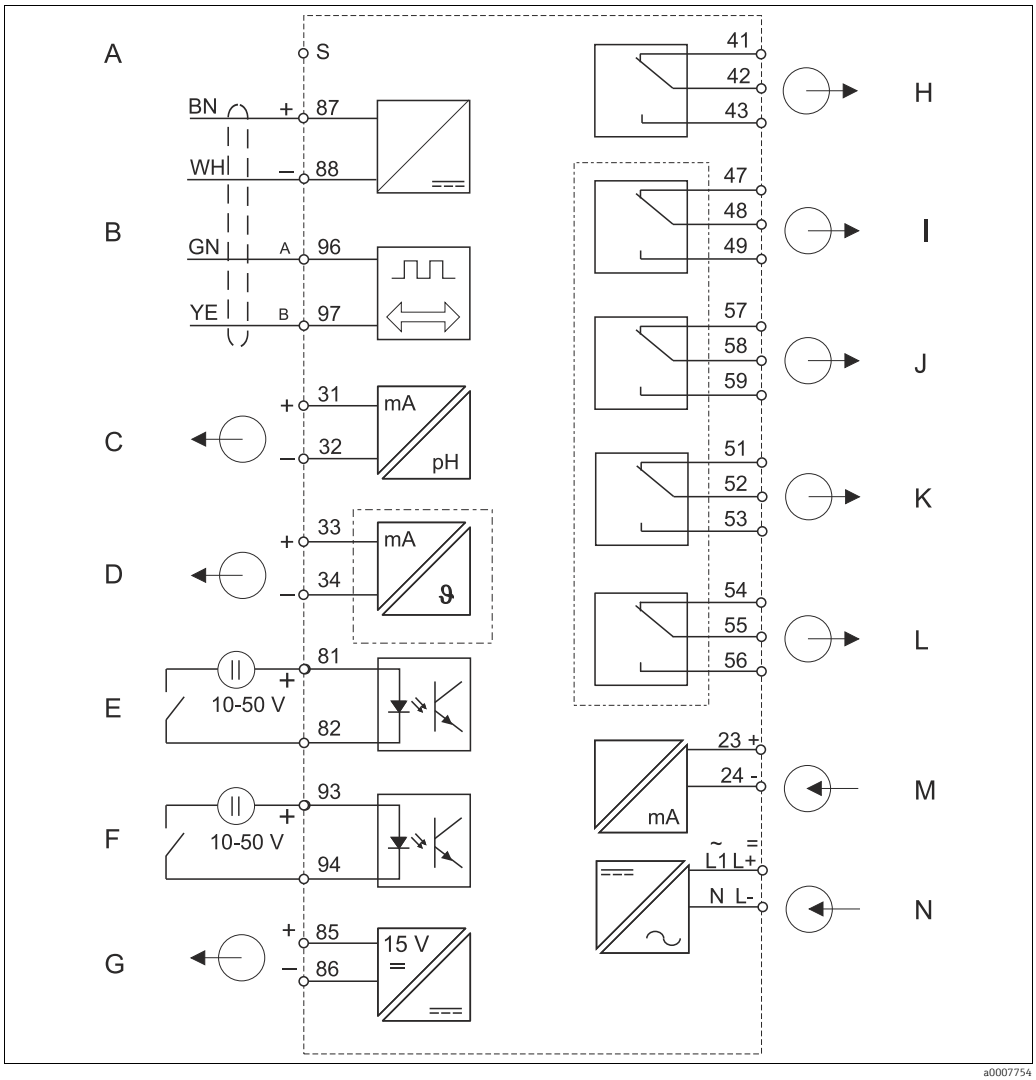
Electrical connection of analog sensors



Electrical connection Liquisysy 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*
H	*controller*
I	*Binary input 1 (Hold)*
	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*

Electrical connection of Memosens sensors

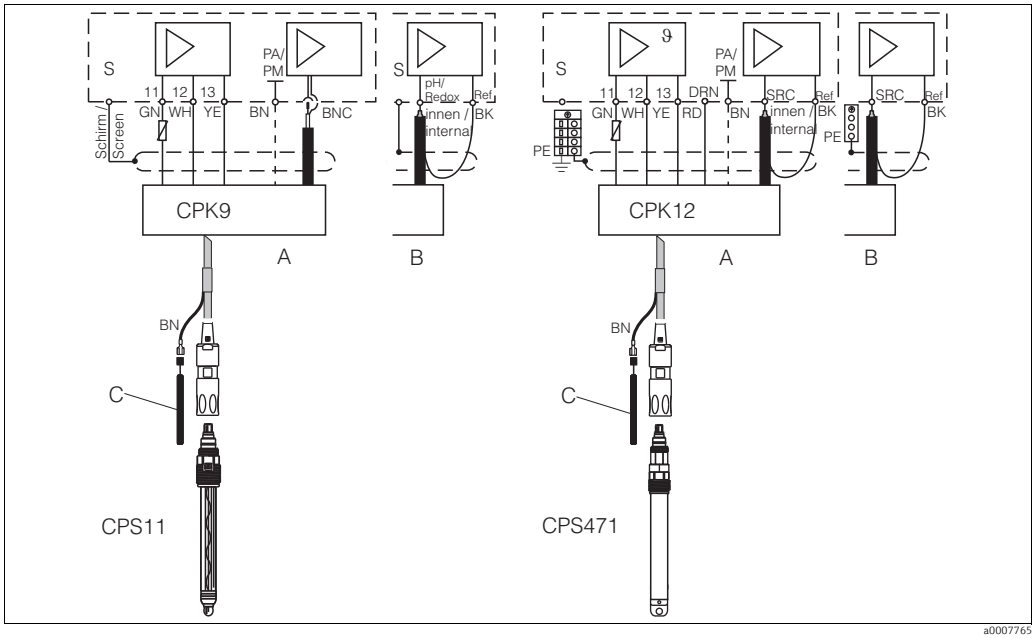


Transmitter electrical connection with Memosens technology

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

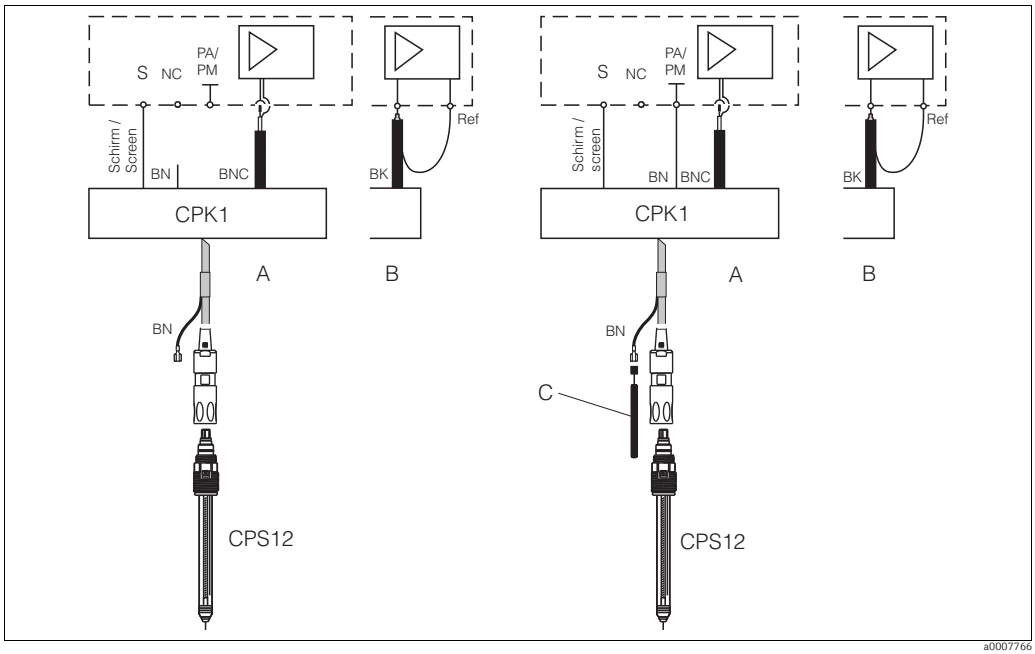
Sensor cable

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.



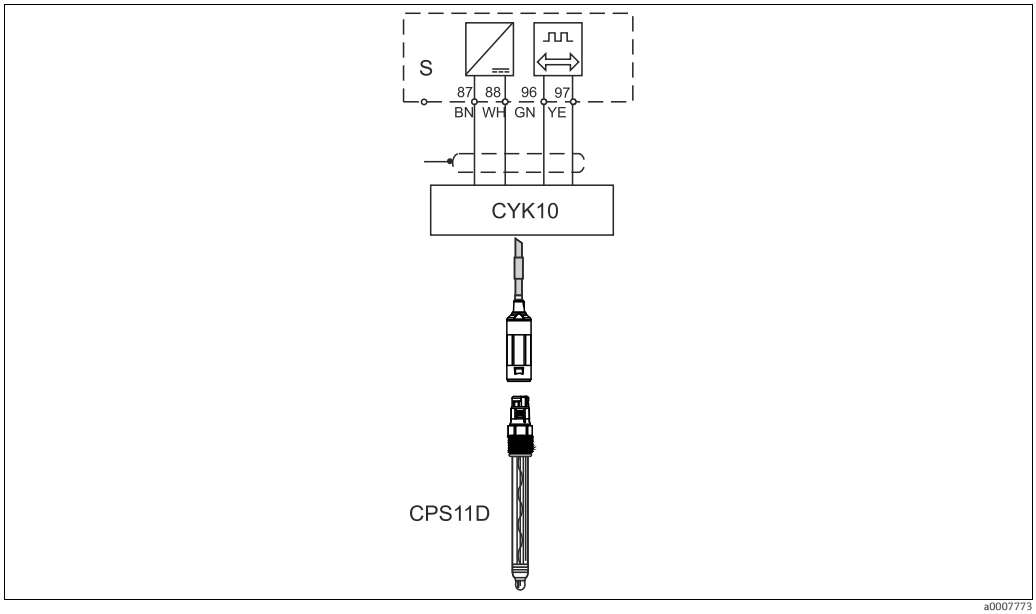
Connection CPS11 with CPK9 and CPS471 with CPK12 to Liquisys M

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

Supply voltage

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

Supply via fieldbus

HART	
Supply voltage	n/a, active current outputs
Integrated reverse voltage protection	n/a, active current outputs

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

PROFIBUS DP	
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

Circuit breaker

NOTICE

The device does not have a power switch

- You must provide a protected circuit breaker in the vicinity of the device.
- This must be a switch or a power-circuit breaker and you must label it as the circuit breaker for the device.
- At the supply point, the power supply for the 24 V versions must be isolated from dangerous live cables by double or reinforced insulation.

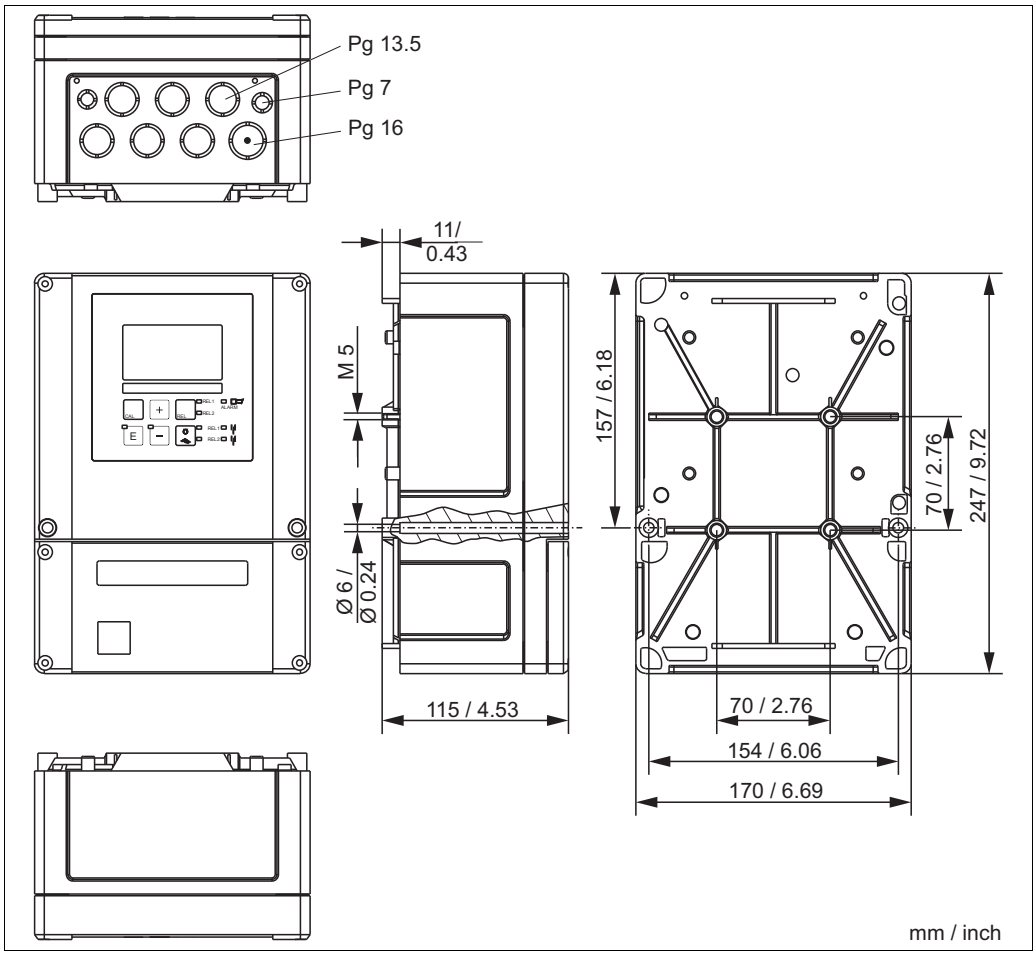
Performance characteristics

Reference temperature	25 °C (77 °F)	
Resolution	pH:	0.01 pH
	ORP:	1 mV/0.1 %
	Temperature:	0.1 °C
Maximum measured error[1)]	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
Repeatability[1)]	pH:	max. 0.2 % of measuring range
	ORP:	max. 0.2 % of measuring range
Zero point	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
Slope	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)
Offset	pH:	±2 pH
	ORP:	±120 mV/±50 %
	Temperature:	±5 °C

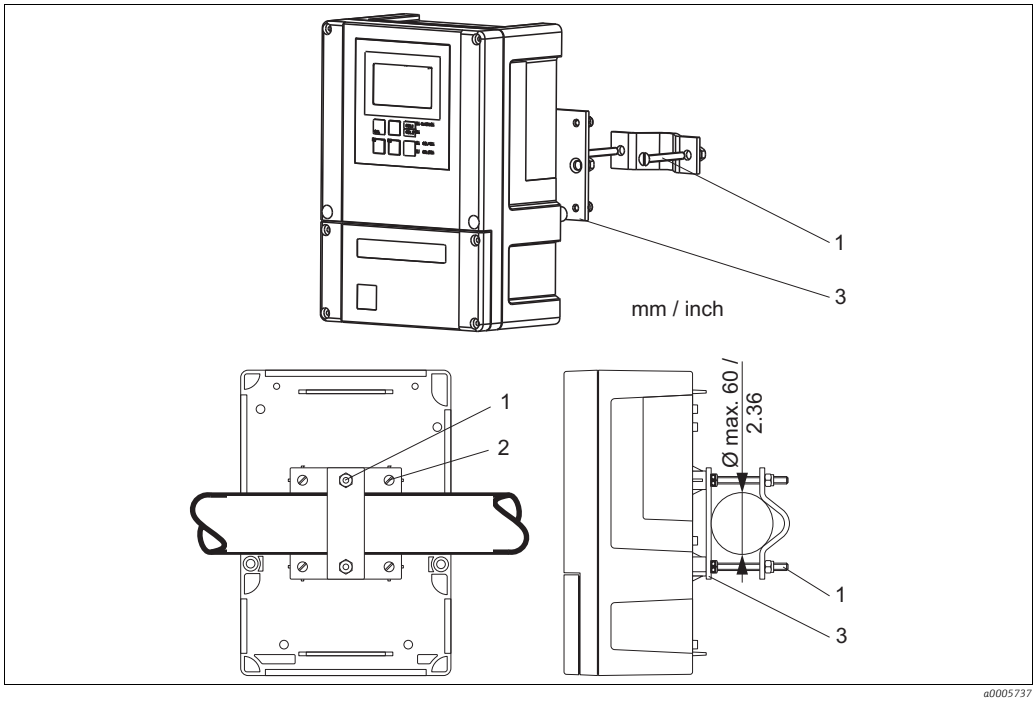
1) acc. to IEC 746-1, for nominal operating conditions

Installation

Installation instructions

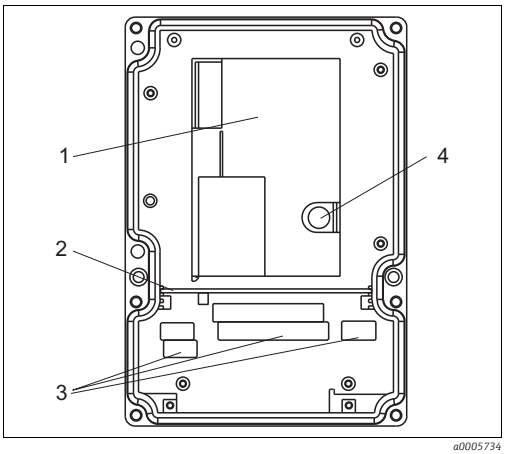


Field instrument



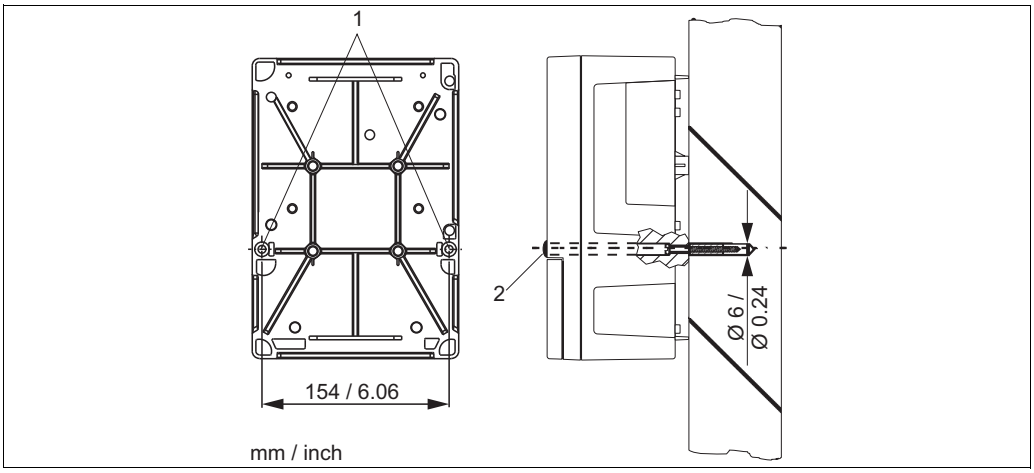
Mounting on pipes

1 - 3 Mounting screws and mounting plate



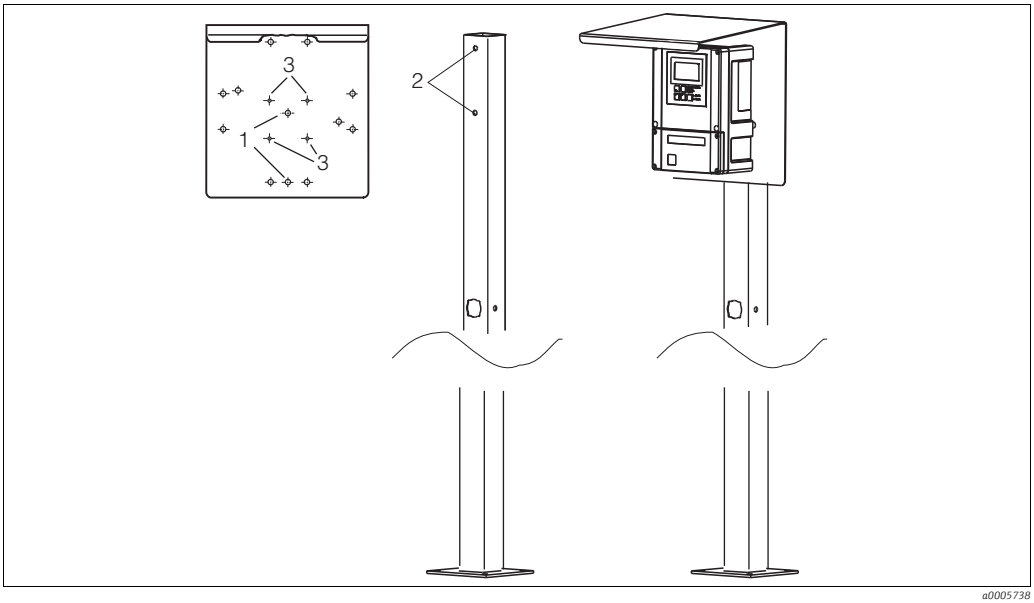
1 *Removable electronics box*
2 *Partition plate*
3 *Terminal blocks*
4 *Fuse*

View into the field instrument



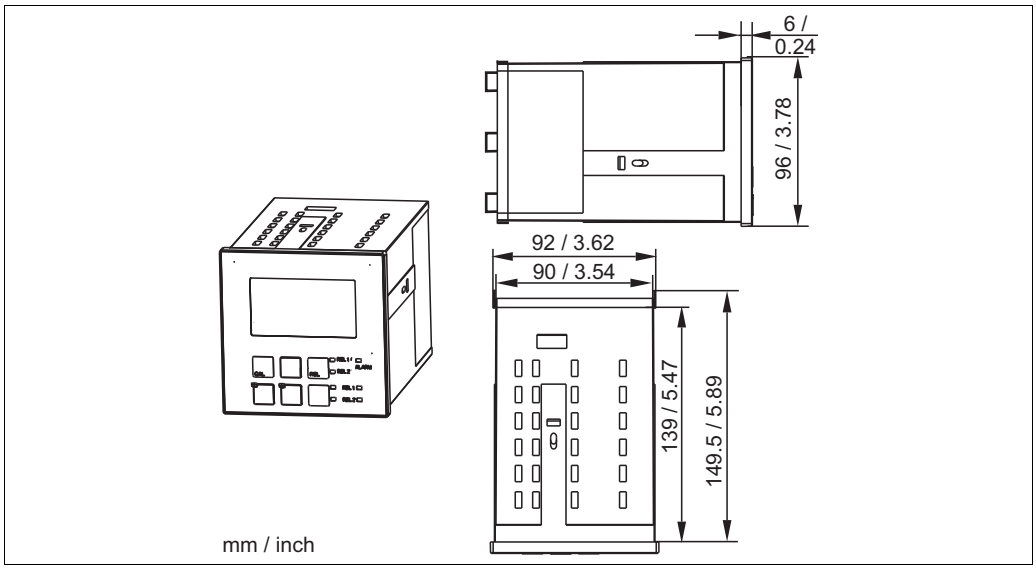
Wall mounting of the field instrument

1 Mounting holes
2 Protecting cap

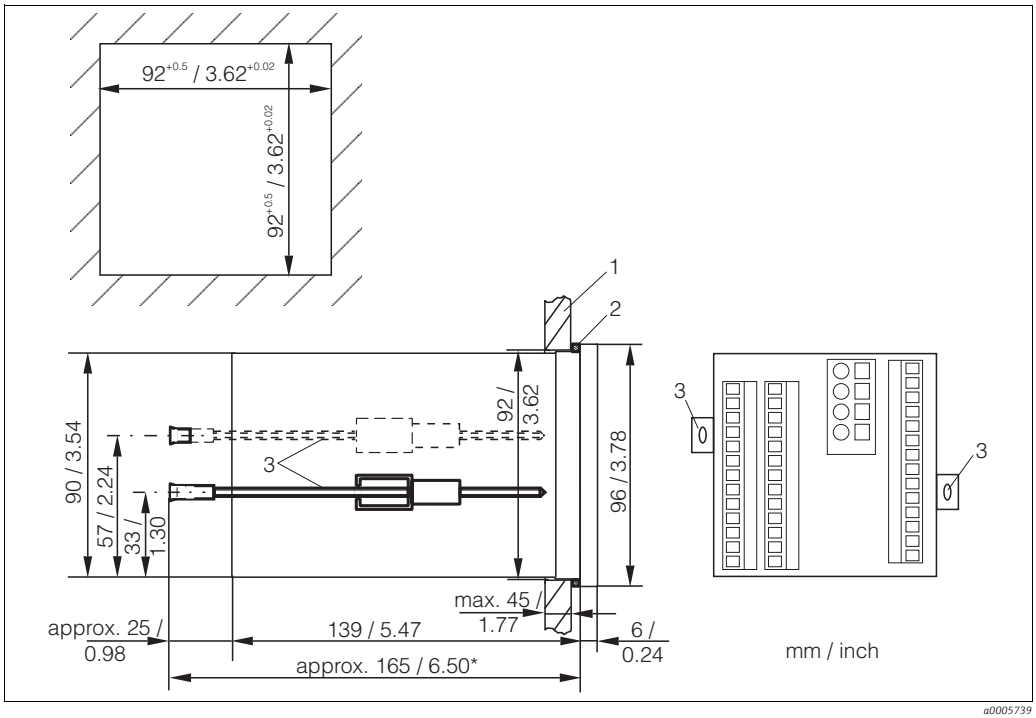


Mounting of the field instrument with mounting post and weather protection cover

1 - 3 Mounting holes



Dimensions panel-mounted instrument



Installation of the panel-mounted instrument

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

Environment

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

Mechanical construction

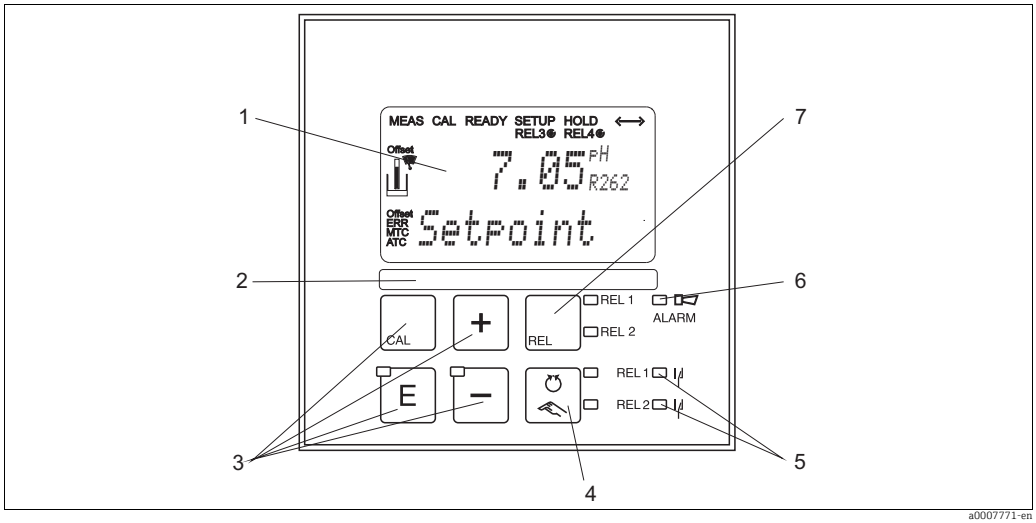
Dimensions	Panel mounted instrument: Field instrument:	96 x 96 x 145 mm (3.78 x 3.78 x 5.71 inches) Mounting depth: approx. 165 mm (6.50") 247 x 170 x 115 mm (9.72 x 6.69 x 4.53 inches)
Weight	Panel mounted instrument: Field instrument:	max. 0.7 kg (1.5 lb) max. 2.3 kg (5.1 lb)
Material	Housing of panel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

CSA general purpose

CSA General Purpose
The products listed below are eligible to bear the CSA Mark shown with adjacent indicators "C" and "US":

Version	Approval
CPM253-..2... CPM253-..3... CPM253-..7...	CSA Mark for Canada and USA
CPM223-..2... CPM223-..3... CPM223-..7...	CSA Mark for Canada and USA

Ordering information

Order code

Enter the following address into your browser to access the relevant product page:
www.products.endress.com/cpm223 or
www.products.endress.com/cpm253

1. You can choose from the following options on the product page located on the right:

Product page function
:: Add to product list
:: Price & order information
:: Compare this product
:: Configure this product

2. Click "Configure this product".
3. The configurator opens in a separate window. You can now configure your device and receive the complete order code that applies for the device.
4. Afterwards, export the order code as a PDF or Excel file. To do so, click the appropriate button at the top of the page.

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
0	230 V AC
1	115 V AC
2	230 V AC; CSA Gen. Purp.
3	115 V AC; CSA Gen. Purp.
5	100 V AC
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 to 20 mA input + 2 relays (limit/P(ID)/timer)
25	1 x 4 to 20 mA input + 4 relays (limit/P(ID)/Chemoclean) **(not with PROFIBUS DP)**
26	1 x 4 to 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[2)]

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 BA00194C/07/EN
- 1 Operating Instructions
- versions with HART communication:
  1 Operating Instructions Field Communication with HART, BA00208C/07/EN
- versions with PROFIBUS communication:
  1 Operating Instructions Field Communication with PROFIBUS PA/DP, BA00209C/07/EN

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 BA00194C/07/EN
- 1 Operating Instructions
- versions with HART communication:
  1 Operating Instructions Field Communication with HART, BA00208C/07/EN
- versions with PROFIBUS communication:
  1 Operating Instructions Field Communication with PROFIBUS PA/DP, BA00209C/07/EN

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

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 per product structure (--> Online configurator, www.products.endress.com/cps11 or www.products.endress.com/cps11d)
- Technical Information TI00028C/07/EN

Orbisint CPS12/CPS12D
- ORP electrode for process applications
- With dirt-repellent PTFE diaphragm
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps12 or www.products.endress.com/cps12d)
- Technical Information TI00367C/07/EN

Ceraliquid CPS41/CPS41D
- pH sensor
- With ceramics diaphragm and liquid KCl electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps41 or www.products.endress.com/cps41d)
- Technical Information TI00079C/07/EN

Ceraliquid CPS42/CPS42D
- ORP electrode
- With ceramics diaphragm and liquid KCl electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps42 or www.products.endress.com/cps42d)
- Technical Information TI00373C/07/EN

Ceragel CPS71/CPS71D
- pH sensor
- With double chamber reference system and integrated bridge electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps71 or www.products.endress.com/cps71d)
- Technical Information TI00245C/07/EN

Ceragel CPS72/CPS72D
- ORP electrode
- With double chamber reference system and integrated bridge electrolyte
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps72 or www.products.endress.com/cps72d)
- Technical Information TI00374C/07/EN

Orbipore CPS91/CPS91D
- pH sensor
- With open aperture for media with high dirt load
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps91 or www.products.endress.com/cps91d)
- Technical Information TI00375C/07/EN

Orbipore CPS92/CPS92D
- ORP sensor
- With open aperture for media with high dirt load
- Ordering per product structure (--> Online configurator, www.products.endress.com/cps92 or www.products.endress.com/cps92d)
- Technical Information TI00435C/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, www.products.endress.com/cps471
- Technical Information TI00283C/07/EN

Tophit CPS441
- Sterilizable ISFET sensor for media with low conductivity
- With liquid KCl electrolyte
- Ordering acc. to product structure, www.products.endress.com/cps441
- Technical Information TI00352C/07/EN

Tophit CPS491
- ISFET sensor with open aperture for media with high dirt load
- Ordering acc. to product structure, www.products.endress.com/cps491
- Technical Information TI00377C/07/EN

Connection accessories

CPK9 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 (TI00118C/07/EN)

CPK1 measuring cable
- For pH/ORP electrodes with GSA plug-in head
- Ordering acc. to product structure, see Technical Information (TI00118C/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 (TI00118C/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 (TI00118C/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 CI.I Div. 1 AEx ia IIC T6/T4
	S	CSA IS CI.I 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

CYK10-				complete order code

CYK81 measuring cable
- Nonterminated cable for extending the sensor cables (e.g. Memosens)
- 2x2 wires, twisted with shield and PVC sheath (2 x 2 x 0.5 mm^2 + shield)
- Goods sold by meter, order no.: 51502543

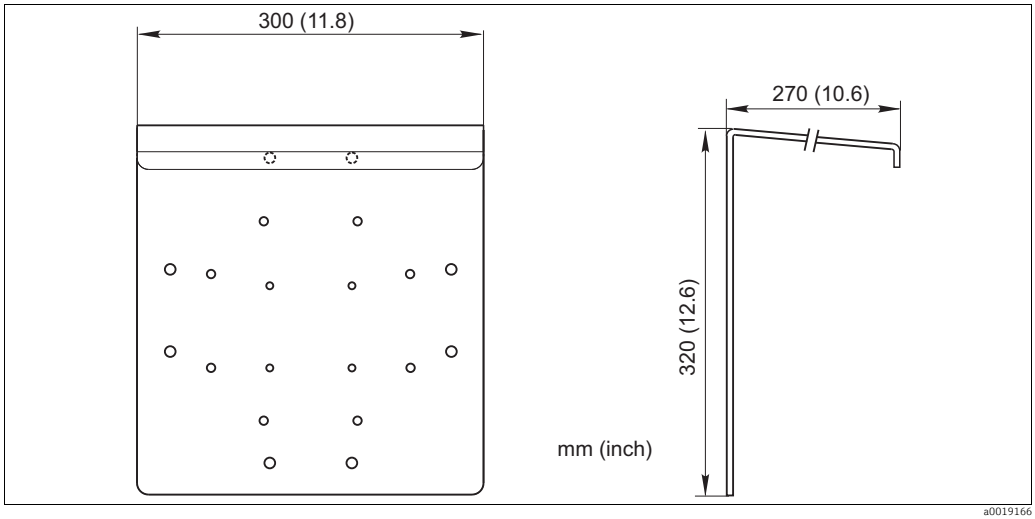
Junction box VBM
- For cable extension
- 10 terminals
- Cable entries: 2 x Pg 13.5 or 2 x NPT ½"
- Material: aluminum
- Ingress protection: IP 65 (≙ NEMA 4X)
- Order numbers:
  - cable entries Pg 13.5: 50003987
  - cable entries NPT ½": 51500177

Junction box VBA
- For cable extension of pH/ORP sensors
- 10 terminals, protection class: IP 65 (≙ 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

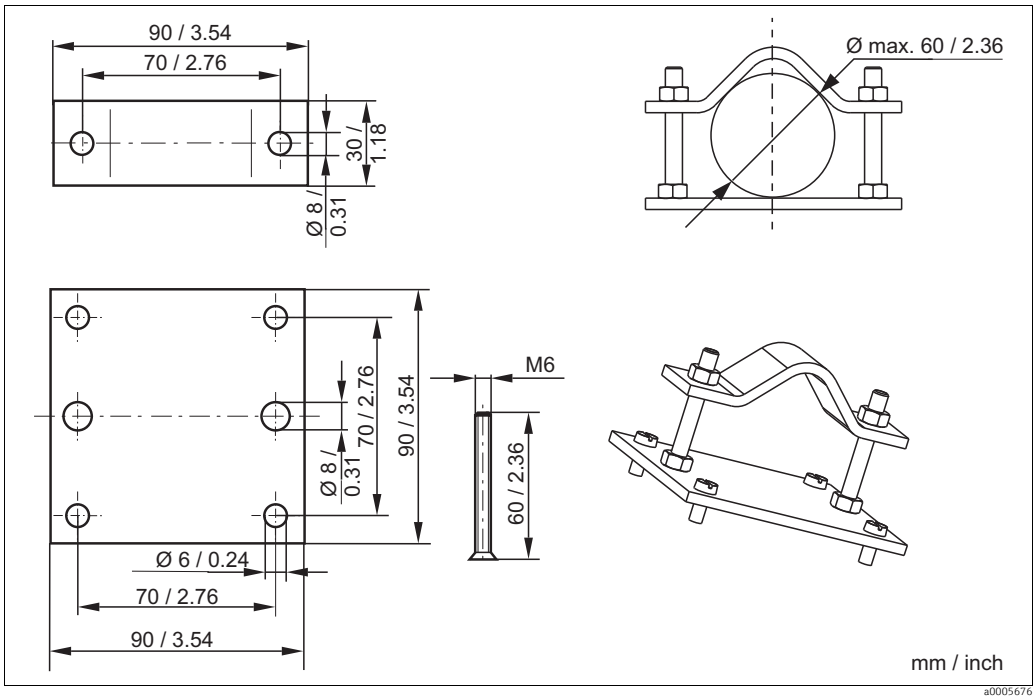
Mounting accessories

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



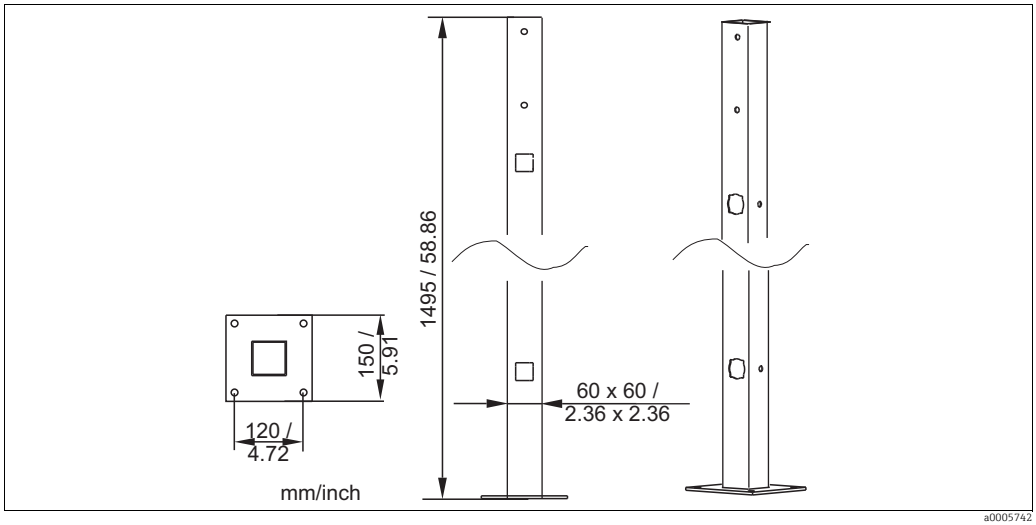
Weather protection cover for field devices

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 ± 0.02 pH)				
	C	pH 4.00 (accuracy ± 0.02 pH)				
	E	pH 7.00 (accuracy ± 0.02 pH)				
	G	pH 9.00 (accuracy ± 0.02 pH)				
	I	pH 9.20 (accuracy ± 0.02 pH)				
	K	pH 10.00 (accuracy ± 0.05 pH)				
	M	pH 12.00 (accuracy ± 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 to 100 °C (14 to 212 °F), 100 ml (3.4 fl.oz.), order no. CPY4-1
- 3.0 mol, T = -10 to 100 °C (14 to 212 °F), 1000 ml (34 fl.oz.), order no. CPY4-2
- 1.5 mol, T = -30 to 100 °C (-22 to 266 °F), 100 ml (3.4 fl.oz.), order no. CPY4-3
- 1.5 mol, T = -30 to 100 °C (-22 to 266 °F), 1000 ml (34 fl.oz.), order no. CPY4-4

www.addresses.endress.com

Endress+Hauser

People for Process Automation