

Compact pH Electrode *PuriSys CPF 201*

Compact electrode for pH measurement in pure and ultrapure water



Application

- Boiler feed water
- Power plant applications
- Pharmaceutical water for injection (WFI)

Your benefits

- 316 SS low flow assembly:
 - stable pH reading
 - elimination of flow dependency errors
- Simple, maintenance-free replacement electrode
- Temperature compensation
- TOP 68 quick disconnect, water tight connector
- Patented porous PTFE reference junction
- Easy installation



Function and system design

Measuring principle

pH measurement

The pH value is used as a unit of measurement for the acidity or alkalinity of a liquid medium. The membrane glass of the electrode supplies an electrochemical potential which is dependent upon the pH value of the medium. This potential is generated by the selective penetration of H^+ ions through the outer layer of the membrane. An electrochemical boundary layer with an electric potential forms at this point. An integrated Ag/AgCl reference system serves as reference electrode.

The transmitter converts the measured voltage into the corresponding pH value using the Nernst equation.

Important properties PuriSys CPF 201

• Reference system

The CPF 201 electrode has a porous Teflon reference junction in a double reference chamber for long life in all high purity water applications.

• Temperature compensation

In addition, a Pt 100 or Pt 1000 temperature sensor is embedded in the pH glass bulb stem for quick temperature response.

• Easy connection

The electrode is connected via the water-proof plug-in system TOP 68.

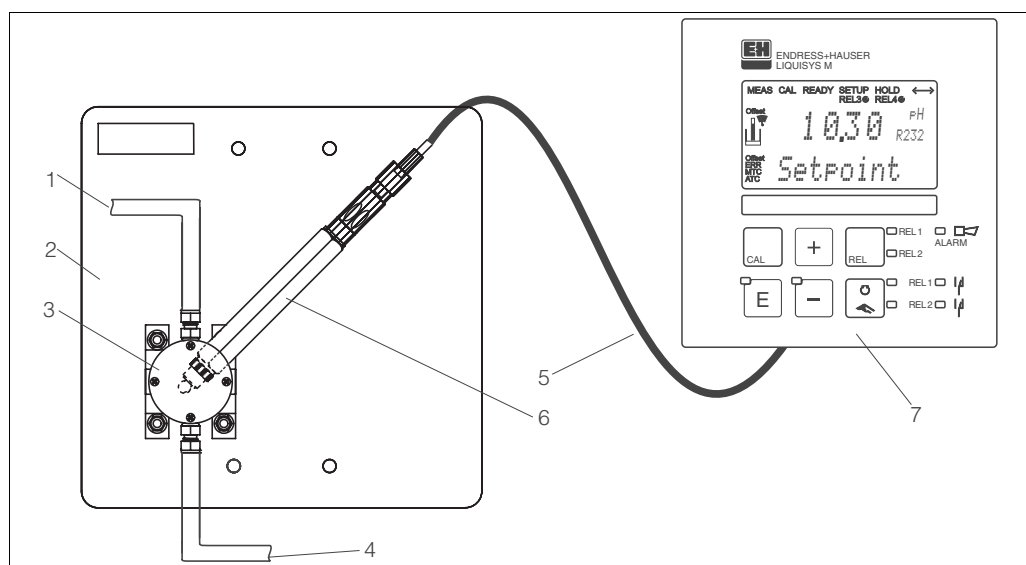
• Flow assembly

The flow cell has been designed to dissipate static electrical charges inherent in flowing water with low conductivity. The flow assembly design minimizes trapped particles and contaminants.

Measuring system

The complete measuring system comprises:

- PuriSys CPF 201 electrode with stainless steel body
- PuriSys CPF 201 stainless steel flow assembly with compression fitting on inlet and outlet
- CPK 9 measuring cable (not included in scope of delivery)
- Transmitter, e.g. Liquisys M CPM 223, Mycom S CPM 153 (not included in scope of delivery)



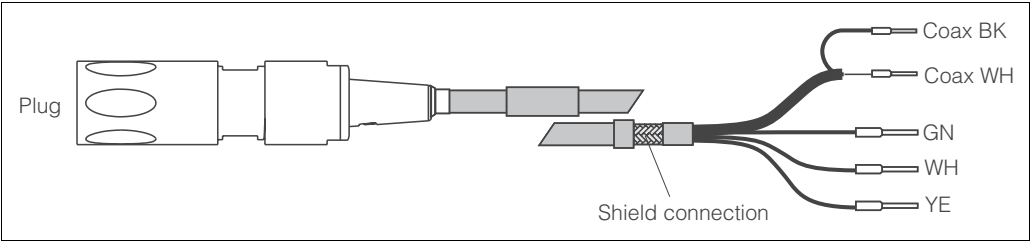
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Measuring system example

- 1 Outlet
- 2 PVC mounting plate for electrical isolation
- 3 PuriSys CPF 201 flow assembly
- 4 Inlet
- 5 CPK 9 measuring cable
- 6 PuriSys CPF 201 electrode
- 7 Liquisys M CPM 223 transmitter

Input

Measured values	pH value Temperature	
Measuring range	pH value Temperature	0 ... 14 pH 2 ... 75 °C / 36 ... 167 °F
Response time	$t_{90} < 10\text{ s}$	
Cable specifications	The CPF 201 electrode is connected to the measuring transmitter using the CPK 9 measuring cable (version without potential matching line).	



Wiring of CPK 9 to transmitter

Cable		Transmitter			
CPK 9		Liquisys M CPM 223 / 253		Mycom S CPM 153	
Pin	Function	Terminal	Function	Terminal	Function
Coax BK	Reference	Ref	Reference	Ref	Reference
Coax WH	pH	pH	pH	pH	pH
GN	Temp. (Pt 100)	11	TC	11	TC
WH	Temp. (Pt 100)	12	TC common	13	TC common
YE	Temp. (Pt 100)	13	TC	12	TC
Shield	EMC protection	S	Shield	Shield connection / Pg thread	Shield

Installation

Calibration

When installing a new CPF 201 electrode, perform a two-point calibration using pH 4 and 7 buffer solutions to establish that the electrode and the transmitter are functional together. To do so, refer to the operating instructions of the transmitter.

Rinse the electrode thoroughly with ultra-pure water to remove all traces of the buffer solutions prior to inserting the electrode into the flow assembly.

Since the pH variation in ultra-pure water is very small, routine one-point calibration of the CPF 201 electrode is performed by comparative sample measurement according to the ASTM test method. When performing sample measurements take note of the following:

- The sample chamber and the sample line must avoid exposure of the ultra-pure water to the atmosphere.
 - Ultra-pure water is highly unbuffered and the slightest amount of contamination can change the pH value significantly. Specifically, ultra-pure water rapidly absorbs CO₂ gas from the atmosphere which lowers the pH value of the sample.
 - The sample may contain volatile substances that will rapidly dissipate when exposed to the atmosphere.
- The sample to be measured should be at the same temperature as the medium stream because ultra-pure water has a significant temperature coefficient.
- To obtain repeatable measurement results, the flow rate of the sample chamber must be stabilised. Also, the pressure must be stable.

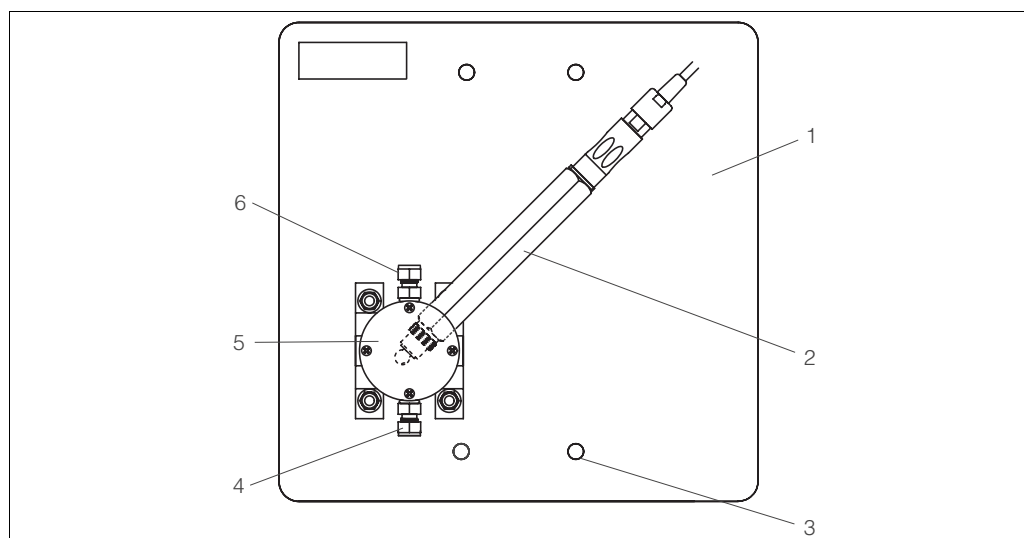
Installation instructions

The electrode is threaded into the flow assembly and hand-tightened.

When mounting the flow assembly, make sure that the inlet and outlet ports are vertical with the inlet on the bottom. In this fashion, the electrode mounting hole will be at the top right. This will ensure that bubbles in the water stream will not collect and interfere with the measurements.

The supplied PVC mounting plate for electrical isolation ensures a noiseless pH reading.

To mount the PVC mounting plate on posts or pipes, use the mounting brackets included in the package.



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Installation in the flow cell

1 PVC mounting plate

2 CPF 201 electrode

3 Mounting holes (brackets for post mounting included in scope of delivery)

4 Inlet port

5 Flow assembly

6 Outlet port

Environment

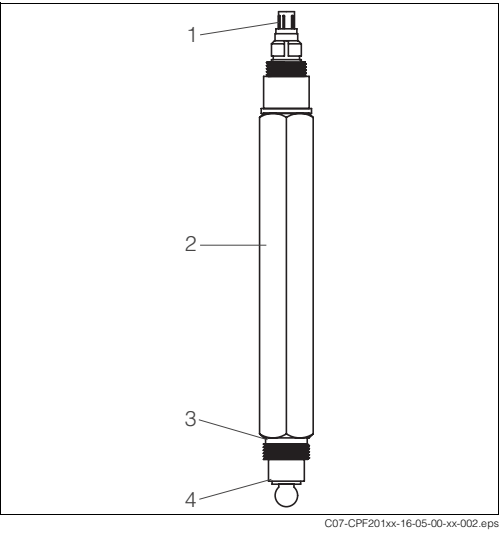
Ingress protection	IP 68 (1m / 3.28 ft water column, 50 °C / 122 °F, 168 h) / NEMA 6 (TOP 68 plug-in system)
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Process

Process temperature	max. 75 °C / 167 °F
Process pressure	max. 3.45 bar / 50 psi
Medium conductivity	< 100 µS/cm
Drift	< 0.02 pH/week at 0.5 µS/cm at 25 °C / 77 °F
Flow rate	50 ... 250 ml/min Optimum: 150 ml/min The flow rate must be stable to obtain accurate measurement results.

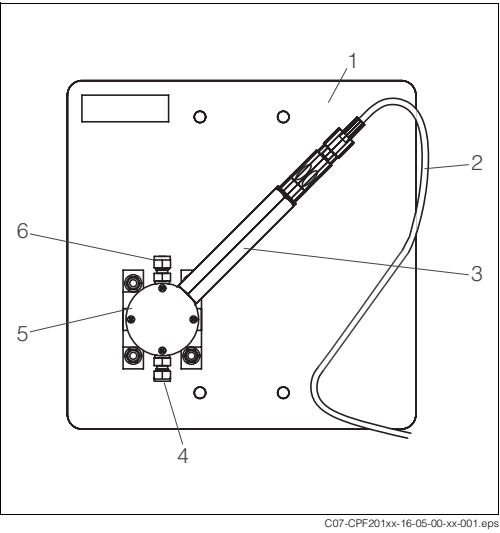
Mechanical construction

Design, dimensions



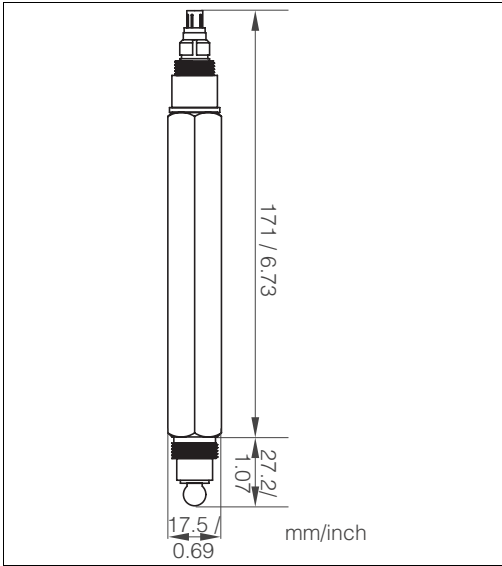
CPF 201 electrode design

- 1 TOP 68 connector
- 2 Stainless steel body
- 3 O-ring
- 4 Teflon reference junction and pH glass bulb



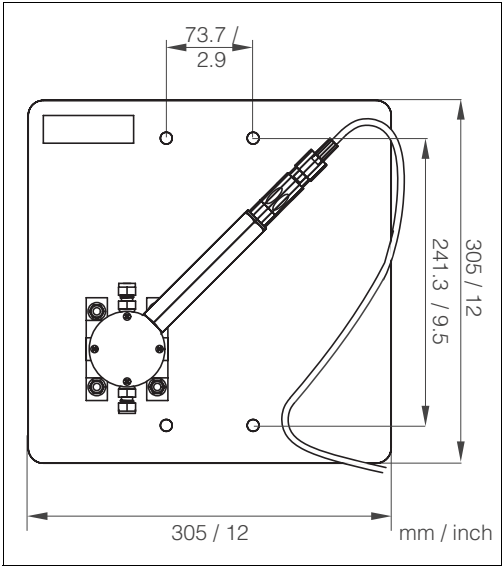
CPF 201 on-line unit design

- 1 PVC mounting plate
- 2 CPK 9 measuring cable
- 3 CPF 201 electrode
- 4 Inlet port
- 5 Flow cell
- 6 Outlet port



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CPF 201 electrode dimensions



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CPF 201 on-line unit dimensions

Weight	Electrode:	approx. 213 g
	Complete on-line unit incl. mounting brackets:	approx. 2275 g
Materials	Electrode shaft	stainless steel SS 316, Viton®
	Reference junction	Teflon®
	Glass bulb	pH membrane glass
	Reference system	KCl/AgCl
	Flow assembly	stainless steel SS 316, Viton®
	Inlet / outlet ports	stainless steel SS 316
Process connection	OD 6 mm stainless steel compression fitting 1/4" stainless steel compression fitting	
Temperature sensor	Pt 100 RTD, Pt 1000 RTD	
Cable connection	TOP 68 plug-in system	

Certificates and approvals

Test report	Design according to ASTM standard D 5128, "Standard Test Method for On-Line pH Measurement of Water of Low Conductivity"
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Ordering information

Product structure				Process adaption	
		A	Compression fitting, OD 6 mm, 316L		
		B	Compression fitting, ¼", 316L		
		C	Replacement electrode		
				Electrode type / temperature compensation	
			1	Integrated Pt 100	
			2	Integrated Pt 1000	
				Cable connection	
				A	TOP 68, no cable
	CPF 201-				complete order code

Scope of delivery

The scope of delivery includes:

- 1 CPF 201 electrode
- 1 flow assembly
- 1 PVC mounting plate incl. mounting brackets
- Technical Information TI 366C/07/en

Accessories

Measuring cable

- ☐ Measuring cable CPK 9 (version without PM)
for electrodes with TOP 68 plug-in head
ordering by product structure, see Technical Information TI 118C/07/en

Buffer solutions

Technical buffer solutions, accuracy 0.02 pH, acc. to NIST/DIN

- ☐ pH 4.0 red, 100 ml (0.026 US gal.), order no. CPY 2-0
☐ pH 4.0 red, 1000 ml (0.264 US gal.), order no. CPY 2-1
☐ pH 7.0 green, 100 ml (0.026 US gal.), order no. CPY 2-2
☐ pH 7.0 green, 1000 ml (0.264 US gal.), order no. CPY 2-3

Technical buffer solutions for single use, accuracy 0.02 pH, acc. to NIST/DIN

- ☐ pH 4.0 20 x 20 ml (0.005 US gal.), order no. CPY 2-D
☐ pH 7.0 20 x 20 ml (0.005 US gal.), order no. CPY 2-E

O-rings

- ☐ O-ring set for electrode, TOP 68 plug and flow assembly lid;
order no. 51512789

Flow assembly lid

- ☐ Flow assembly lid including seal and screws;
order no. 51512795

Compression fittings

- ☐ Compression fitting 1/4";
order no. 51512793
☐ Compression fitting OD 6 mm;
order no. 51512792

Mounting plate

- ☐ PVC mounting plate incl. screws and mounting brackets;
order no. 51512788

Documentation

Transmitter

- ☐ Lquisys M CPM 223/253, Technical Information TI 194C/07/en; order no. 51500277
 - ☐ Mycom S CPM 153, Technical Information TI 233C/07/en; oder no. 51503788
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Measuring cable

- ☐ CPK 1-12, Technical Information TI 118C/07/en; order no. 50068526

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