Technical Information
TI 173C/07/it/06.02
50088309

pH/Redox Measurement
MyPro CPM 431

Two-wire transmitter for pH and redox with Hart® and PROFIBUS-PA communication for use in Ex and non-Ex areas

Application

MyPro CPM 431 is a transmitter for pH or redox measurement in all areas of process control and engineering. Compact design and versatile mounting options make MyPro a perfect match for any industrial environment:

- Ex applications
- Chemical and petrochemical industries
- Pharmaceutical industry
- Power plants
- Water conditioning
- Wastewater treatment.

Your benefits

- High reliability is guaranteed by:
  – comprehensive self-monitoring functions
  – Sensor Check System SCS for pH and reference electrodes
- Versatility:
  Switchable between pH and redox
- Compact design:
  Smallest intelligent transmitter available
- Simple installation and versatile mounting; display and housing can be rotated
- Convenient operation via:
  – Keypad
  – Hand-held Hart® terminal
  – Commuwin II
  – PROFIBUS-PA
- Keypad is protected underneath cover
- Two-level locking function protects configuration and calibration data

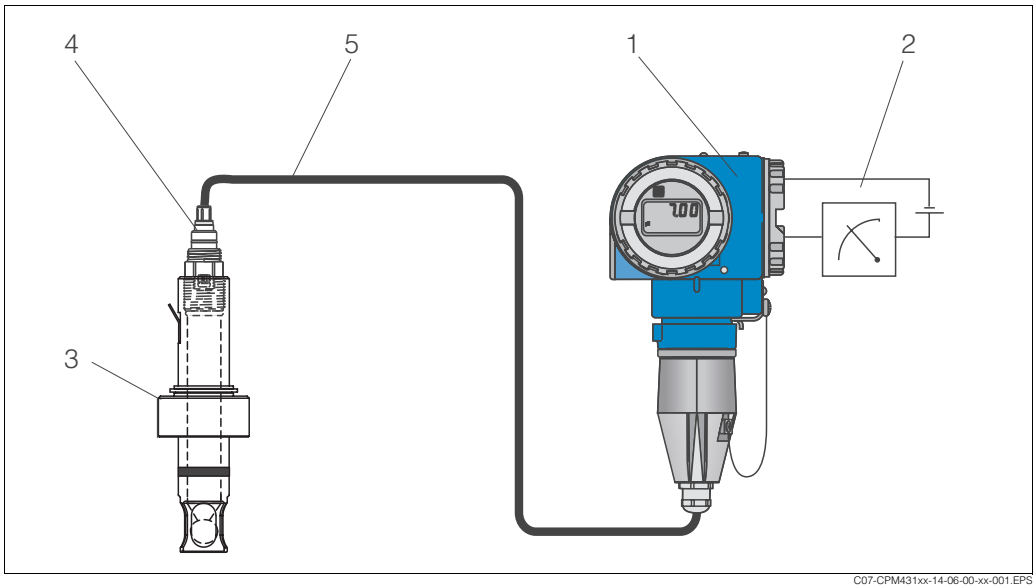
Quality made by Endress+Hauser
ISO 9001

Endress+Hauser
The Power of Know How

Function and system design

Measuring system

In general a measuring system comprises:
- an electrode with an integrated temperature sensor Pt 100
- an assembly for electrode installation in a pipeline or tank
- the corresponding measuring cable and
- the transmitter MyPro CPM 431.



Example of a measuring system

1 MyPro CPM 431
2 Supply and signal circuit, optionally with Hart® or PROFIBUS-PA
3 Process assembly UniFit H CPA 442
4 Glass electrode CeraGel P CPS 71
5 Special measuring cable CPK 9

Self-diagnostics

MyPro continually checks the operational safety of the measuring point.

It can identify 28 possible problem causes from these fields:
- Failure
- Service required
- Malfunction
- Warning

Errors are signalled in the field via the display and simultaneously via the Hart® interface, and optionally via an error current signal (22 mA).

Electrode monitoring SCS

The Sensor Check System SCS monitors the pH and the reference electrodes for inaccurate measurement and total failure.

SCS detects:
- Breakage of electrode glass
- Fine shorts in pH measuring circuit, also bridges due to moisture or soiling at terminals
- Soiling or blocking of reference electrode

The following methods are employed:
- pH electrode resistance monitoring (alarm in case the impedance drops below a minimum threshold)
- Monitoring of reference electrode impedance (an alarm is issued when the defined threshold is exceeded).

Input

Measured variable

pH, Redox, temperature

Measuring range

pH:	–2 ... 16
Redox:	–1500 ... +1500 mV
Temperature:	–20 ... +150 °C

Input resistance

> 10^{12} Ω (at nominal operating conditions)

Input current

< 1.6 x 10^{-12} A (at nominal operating conditions)

Ex version Hart®

⟨Ex⟩ *Intrinsically safe supply and signal circuit, protection type EEx ib IIC T4*

Max. input voltage:	U_i = 30 V
Max. input current:	I_i = 100 mA
Max. input power:	P_i = 750 mW
Max. internal inductance:	L_i = 200 µH
Max. internal capacitance:	C_i = negligible
Capacitance to PE:	5.3 nF

Ex version PROFIBUS-PA

⟨Ex⟩ *For connection to a supply circuit, protection type EEx ia IIC or EEx ib IIC*

Max. input voltage:	U_i = 24 V
Max. input power:	P_i = 1.2 W
or	
Max. input voltage:	U_i ≤ 17.5 V

for connection to intrinsically safe PROFIBUS systems, specified by a supply voltage ≤ 17.5 V according to the FISCO model.

Cable specification

Without SCS:	max. cable length 50 m
With SCS:	max. cable length 20 m

Output

Output signal

4 ... 20 mA, potential separated from sensor circuit
0.8 ... 1.2 mA peak to peak (Hart® only)

Signal on alarm

22 ± 0.5 mA

Load

max. 600 Ω (depending on operating voltage and load)
230 ... 1100 Ω (Hart® only)

Transmission behavior

pH:	adjustable, Δ 2.0 ... Δ 18 (error message if Δ < 2)
Redox:	adjustable, Δ 200 ... Δ 3000 mV

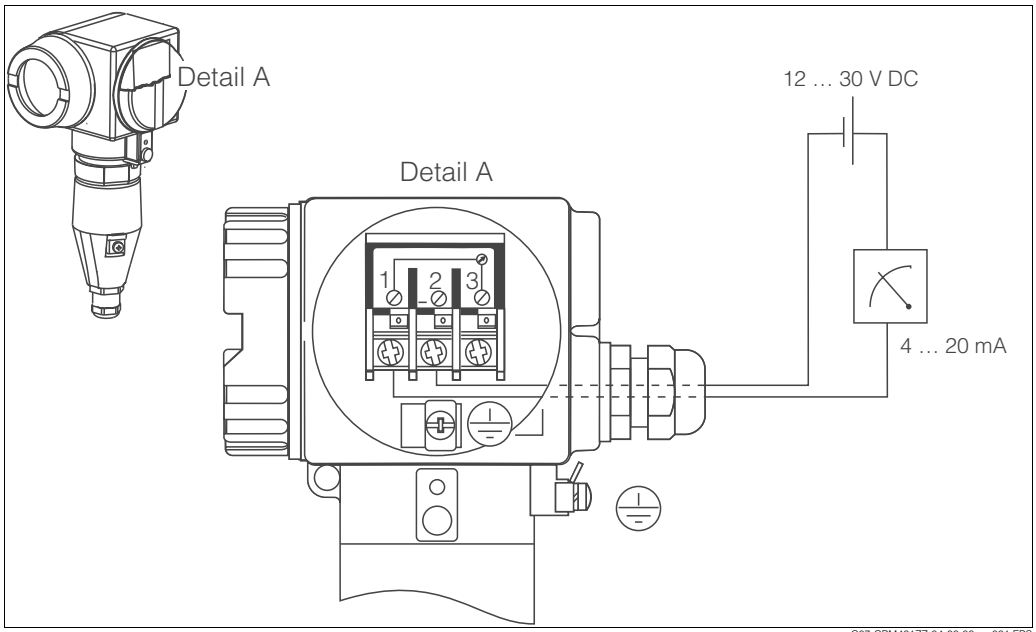
Ex version

⟨Ex⟩ *Intrinsically safe sensor circuit, protection type EEx ia IIC T4*

Max. Output voltage:	U_0 = 12.6 V
Max. Output current:	I_0 = 37 mA
Max. Output power:	P_0 = 117 mW
Max. external inductance:	L_0 = 100 µH
Max. external capacitance:	C_0 = 50 nF

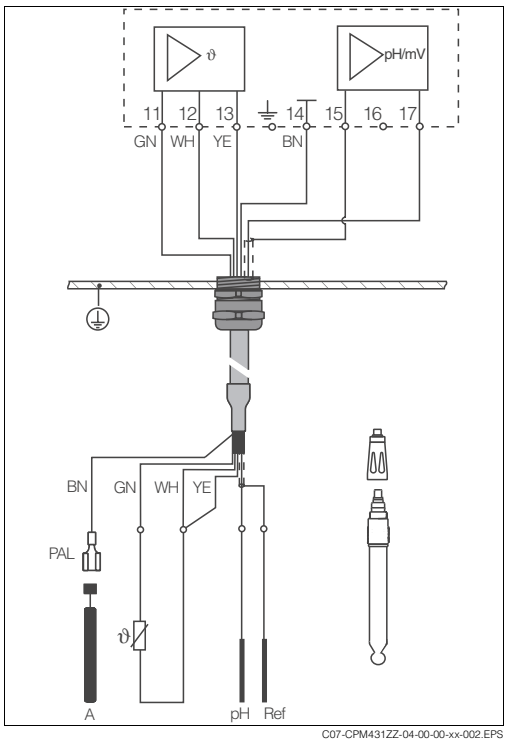
Power supply

Electrical connection



Electrical connection CPM 431, terminal 3 not connected

Electrode connection



Connection scheme CPM 431

Connection options:
- Symmetrical measurement with PMC (with potential matching pin A)
- Asymmetrical measurement without PMC (with potential matching pin A)

A = potential matching pin

Supply voltage

Without Hart®:	12 ... 30 V DC
With Hart®:	13.5 ... 30 V DC

Cable specification

max. cable profile: 2.5 mm^2, PE 4 mm

Power consumption

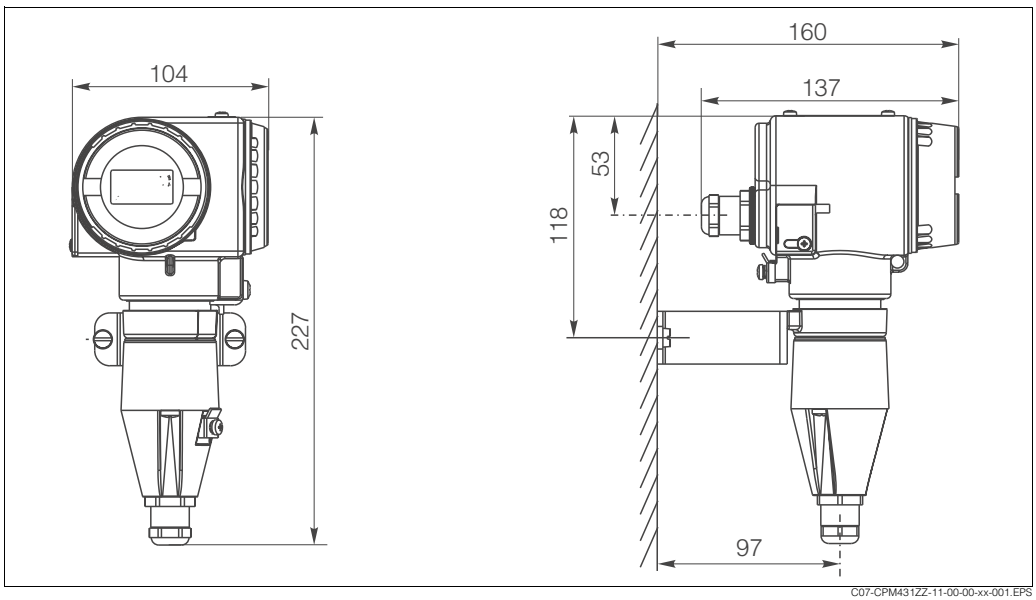
max. 700 mW

Performance characteristics

Reference temperature	25 °C	
Measured value resolution	pH: Redox: Temperature:	0.01 pH 1 mV 0.1 °C
Maximum measured error[a]	pH: Redox: Temperature:	max. 0.2% of measuring range max. 0.2% of measuring range max. 1 °C
Repeatability[a]	pH: Redox: Temperature:	≤ 0.1% of measuring range ≤ 0.1% of measuring range ≤ 0.1% of measuring range
Zero drift range	Glass electrode 7.0: Glass electrode 4.6: Antimony electrode:	pH 5.7 ... 8.3 pH 3.32 ... 5.92 pH –1.0 ... 3.0
Slope adaption	Glass electrode 4.6 and 7.0: Antimony electrode:	45 ... 65 mV/pH 25 ... 65 mV/pH
Electrode offset redox	±200 mV	
Temperature compensation range	–20 ... +150 °C	
Temperature offset	±20 °C	

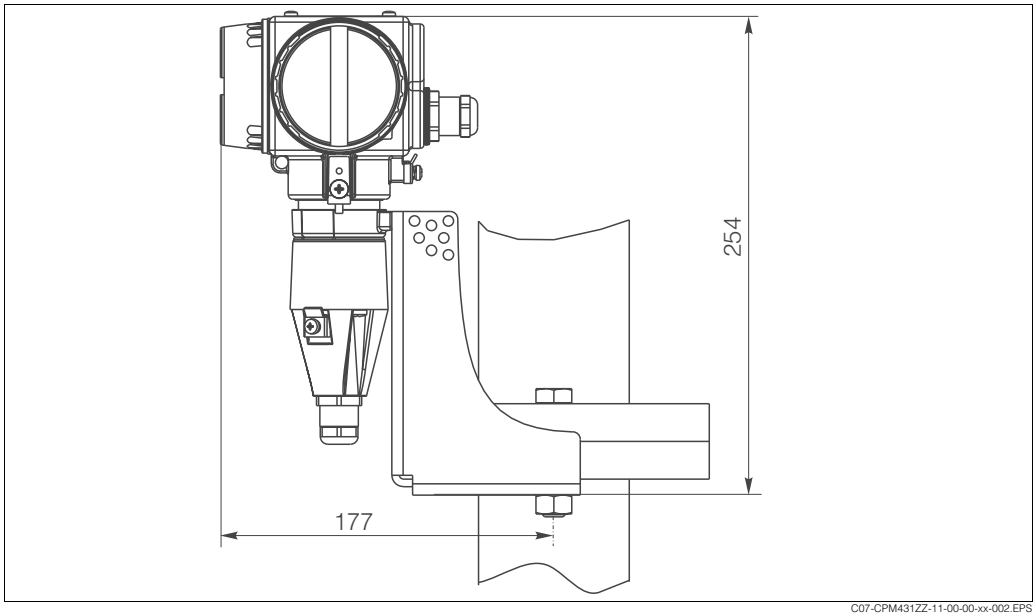
Installation

Installation instructions

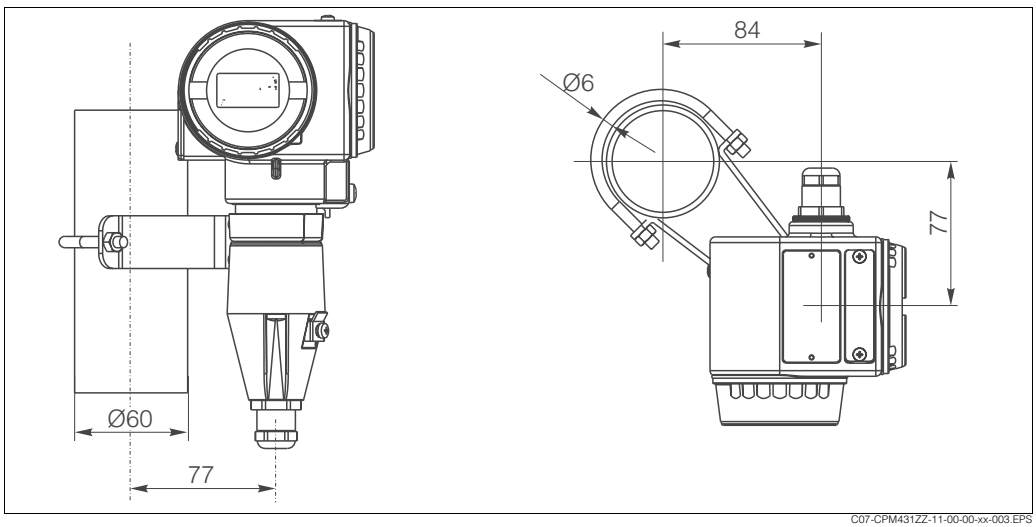


CPM 431: wall mounting

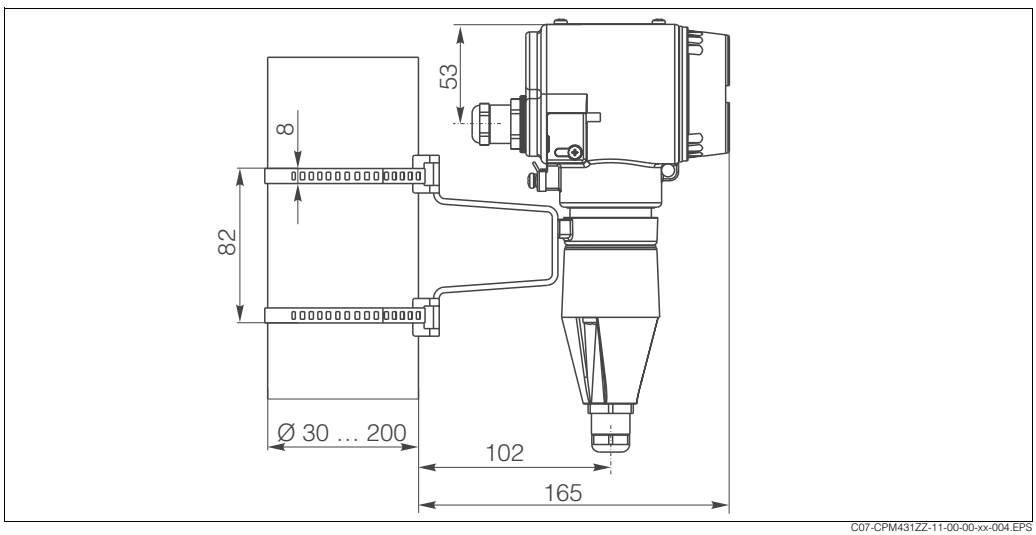
a) acc. to DIN IEC 746 part 1, at nominal operating conditions



CPM 431: flange mounting bracket (with CPM431-xxx4xx in scope of delivery)

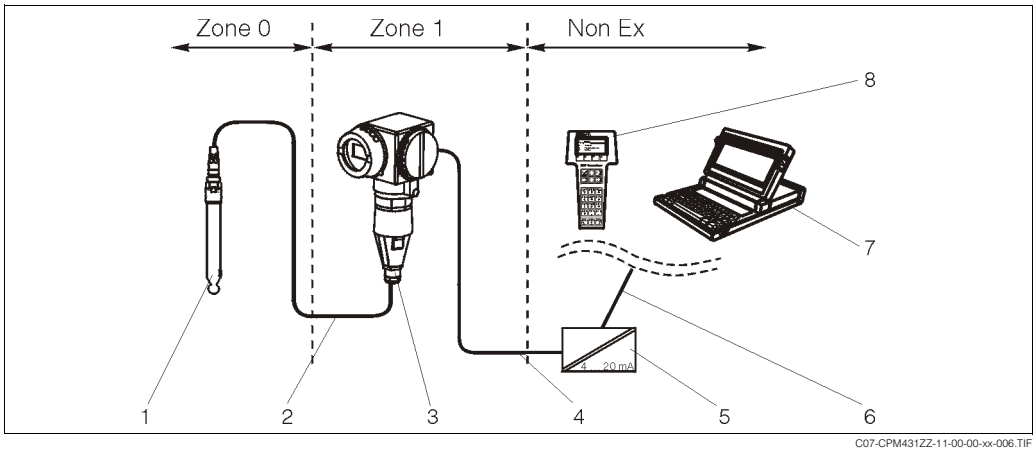


CPM 431: pipe mounting (pipe DN 60)



CPM 431: pipe mounting (pipe DN 30 ... 200)

Installation in Ex environment



Measuring system in Ex environment

1 Sensor in Ex version, e.g. CPS 71G
2 Intrinsically safe sensor circuit EEx ia
3 MyPro CPM 431
4 Supply and signal circuit EEx ib (4... 20 mA)
5 Active barrier, e.g. preline RN 221
6 Signal line for Hart® / PROFIBUS (0/4 ... 20 mA)
7 Commuwin II via Hart® or PROFIBUS-PA
8 Hand-held Hart® terminal

Environment

Ambient temperature range	–10 ... +55 °C
Ambient temperature limit	–20 ... +60 °C (non-Ex version) –15 ... +55 °C (Ex version)
Storage temperature	–25 ... +80 °C
Electromagnetic compatibility	Interference emission and interference immunity acc. to EN 61326: 1997 / A1: 1998
Ingress protection	IP 65
Relative humidity	10 ... 95%, non-condensing

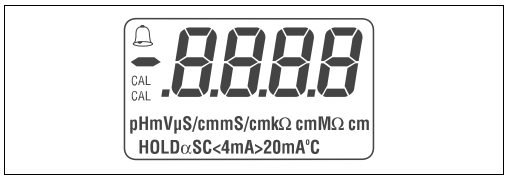
Mechanical construction

Dimensions	H x W x D: 227 x 104 x137 mm
Weight	max. 1.25 kg
Materials	Housing: GD-AlSi 10 Mg, plastic-coated

Human interface

Display elements

LC display, rotable



C07-CPM431ZZ-19-00-00-xx-001.EPS

Display MyPro

Operating elements

Operation via keypad of MyPro (A)

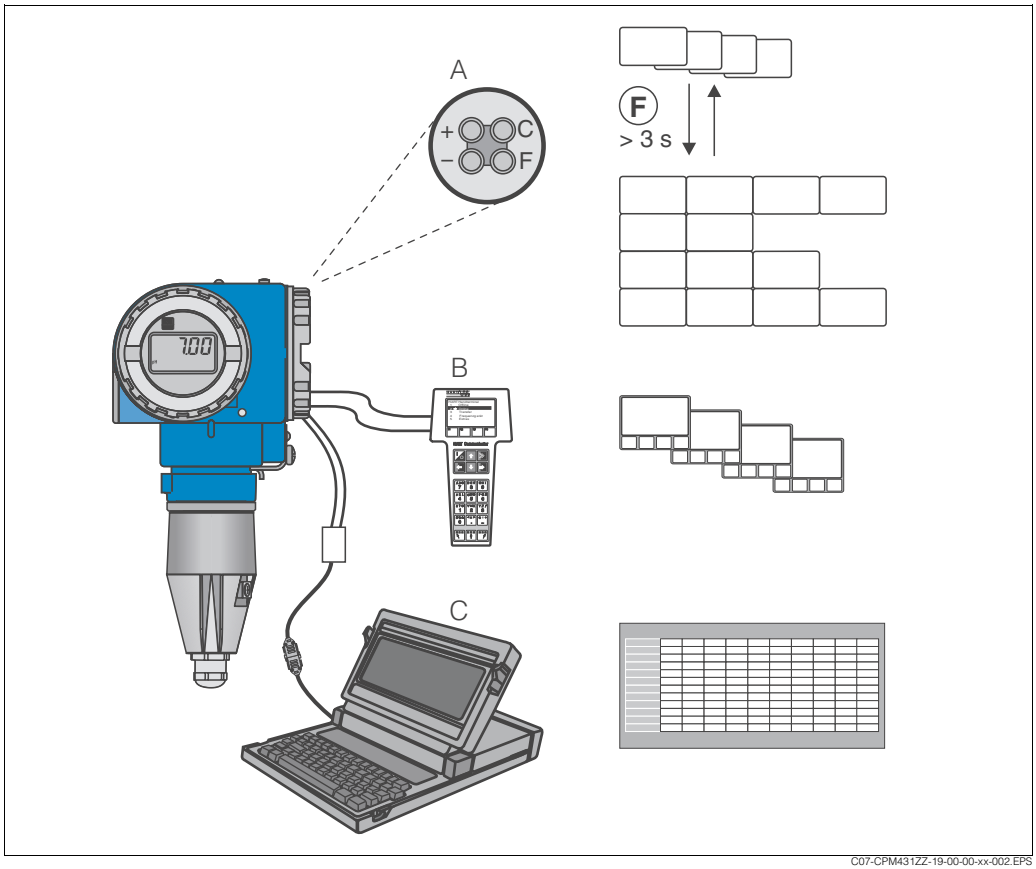
There are two levels for operation:

- Level 1:
  - Viewing of active settings
  - Error diagnostics
  - Current output settings
  - Calibration
- Level 2:
  - other parameters, e.g. switching between measured variables

Operation via Hart® or PROFIBUS-PA (B and C)

- Hand-held terminal (Hart® only)
  - Plain text menu guidance
- Operation via Commuwin II (Hart® and PROFIBUS communication)
  - Clear overall view in the form of a matrix
  - Grafic user interface
  - Documentation
  - Offline-programming

Overview operation



Operation of MyPro

A Operation via keypad
B Operation via hand-held Hart® terminal
C Operation via Commuwin II via Hart® or PROFIBUS-PA

Certificates and approvals

CE approval

Declaration of conformity
The product meets the legal requirements of the harmonised European standards. Endress+Hauser confirms compliance with the standards by affixing the CE symbol.

Ex approval

- CSA IS NI Cl.I, II, III, Div. 1&2, Group A-G
- FM IS NI Cl.I, II, III, Div. 1&2, Group A-G
- EEx ia/ib IIC T4, ATEX II (1)2G

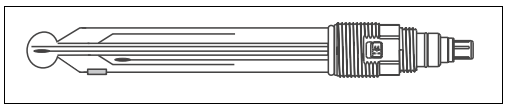
Ordering information

Product structure

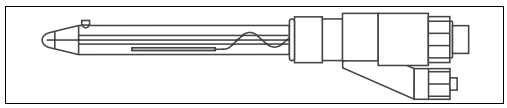
Type of certificate							
A	Variant for non-Ex area						
H	EEx ia/ib IIC T4, ATEX II (1)2G						
O	FM IS NI C1.I, II, III, Div. 1&2, Group A-G						
S	CSA IS NI C1.I, II, III, Div. 1&2, Group A-G						
Y	Special version acc. to customer's specification						
	Power supply cable entry						
	1	Cable gland Pg 13,5					
	3	Cable entry M 20 x 1,5					
	5	Cable entry NPT ½"					
	7	Cable entry G ½					
	8	PROFIBUS-PA M12 plug					
	9	Special version acc. to customer's specification					
		Electronics, communication, display					
		A	4 ... 20 mA, Hart®, without display				
		B	4 ... 20 mA, Hart®, LC display				
		C	PROFIBUS-PA, without display				
		D	PROFIBUS-PA, LC display				
		Y	Special version acc. to customer's specification				
			Accessories				
			1	No accessories			
			2	For wall and pipe mounting DN 60			
			3	For wall and pipe mounting DN 30 ... DN 200			
			4	With flange mounting bracket			
			9	Special version acc. to customer's specification			
				Factory parameter configuration			
				P	pH, measuring range pH -2 ... 16		
				R	Redox, measuring range ±1500 mV		
				Y	Special version acc. to customer's specification		
					Cable, sensor connection		
					A	Without cable	
					B	With 1m cable, GSA plug-in (without Pt 100)	
					D	With 2 m cable, GSA plug-in (without Pt 100)	
					F	With 2 m cable, TOP 68 / ESA / HDA plug-in	
					G	With 1 m cable, TOP 68 / ESA / HDA plug-in	
					K	With Y-form cable gland, without cable	
CPM 431-							complete order code

Accessories

Sensors



CeraGel P CPS 71

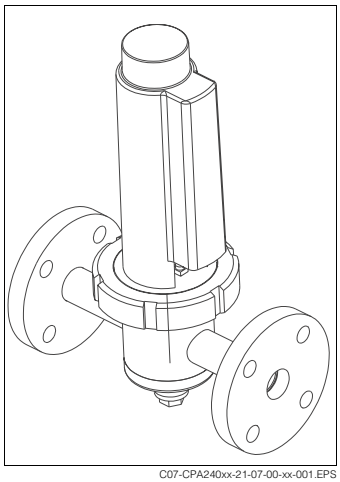


CeraLiquid P CPS 41

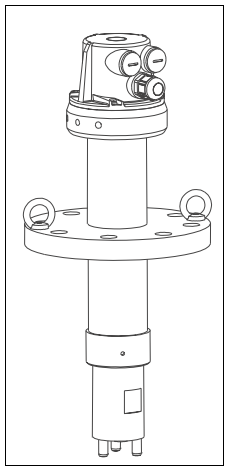
- ❑ CeraGel P CPS 71,
  pH/redox electrode with double chamber reference system and integrated bridge electrolyte;
  Ordering depending on specification, s. Technical Information
- ❑ CeraLiquid P CPS 41,
  pH/redox electrode with ceramic diaphragm and liquid KCl electrolyte;
  Ordering depending on specification, s. Technical Information

Note!
All sensors are available as Ex sensors.

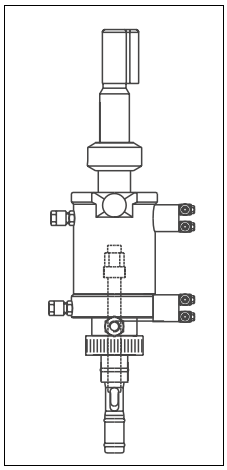
Assemblies



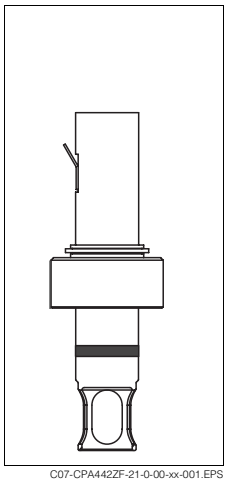
FlowFit P CPA 240



DipFit P CPA 140



CleanFit P CPA 471



UniFit H CPA 442

- ❑ FlowFit P CPA 240,
  Flow assembly for processes with high requirements of PVDF or stainless steel
- ❑ DipFit P CPA 140,
  Immersion assembly with flange connection for processes with high requirements
- ❑ CleanFit P CPA 471,
  Compact retractable assembly for installation in tanks and pipelines
- ❑ UniFit H CPA 442,
  Process assembly for foodstuffs, biotechnology and chemicals with EHEDG and 3A certificate

Special measuring cable

- ❑ CPK 1, for electrodes with GSA plug-in head
- ❑ CPK 9, for electrodes with ESA or HDA plug-in head

Buffer solutions

- ❑ pH buffer solution pH 4.0 100 ml; order no. CPY2-0
- ❑ pH buffer solution pH 4.0 1000 ml; order no. CPY2-1
- ❑ pH buffer solution pH 7.0 100 ml; order no. CPY2-2
- ❑ pH buffer solution pH 7.0 1000 ml; order no. CPY2-3
- ❑ pH buffer solution pH 9.2 100 ml; order no. CPY2-4
- ❑ pH buffer solution pH 9.2 1000 ml; order no. CPY2-5
- ❑ Redox buffer solution +220 mV, pH 7.0 100 ml; order no. CPY3-0

Active barrier with power supply

- ❑ preline RN 221 (non-Ex)
- ❑ preline RN 221 Z (Ex)

Documentation

- ❑ CeraGel P CPS 71/72, Technical Information, TI 245C/07/en; order no. 51505837
- ❑ CeraLiquid P CPS 41/42/43, Technical Information TI 079C/07/en; order no. 50059346
- ❑ FlowFit P CPA 240, Technical Information TI 179C/07/en; order no. 50088970
- ❑ UniFit H CPA 442, Technical Information TI 306C/07/en; order no. 51507254
- ❑ DipFit P CPA 140, Technical Information TI 178C/07/en; order no. 50088968
- ❑ CleanFit P CPA 471, Technical Information TI 217C/07/en; order no. 51502596
- ❑ pH measuring cable CPK 1-12, Technical Information TI 118C/07/en; order no. 50068526
- ❑ Active barrier preline RN221, Technical Information TI 073R/09/en; order no. 51001410

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