Technical
Information
TI 173C/07/en

pH/Redox Measurement
mypro CPM 431

Two-wire transmitter for pH and redox with HART® communication for use in the Ex and non-Ex areas

Areas of application
The analytical measuring transmitter MyPro CPM 431 is intended for highly reliable 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. Major areas of application include:

- Ex area
- Chemical and petrochemical industries
- Pharmaceutical industry
- Power plants
- Water conditioning
- Waste water treatment

Benefits at a glance
- 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 analytical transmitter available
- Ultrasimple installation and versatile mounting; display and housing can be rotated
- Convenient operation via keypad, hand-held HART® terminal or Commuwin II
- Keypad is protected underneath cover
- Two-level locking function protects configuration and calibration data

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Quality made by
Endress+Hauser

ISO 9001

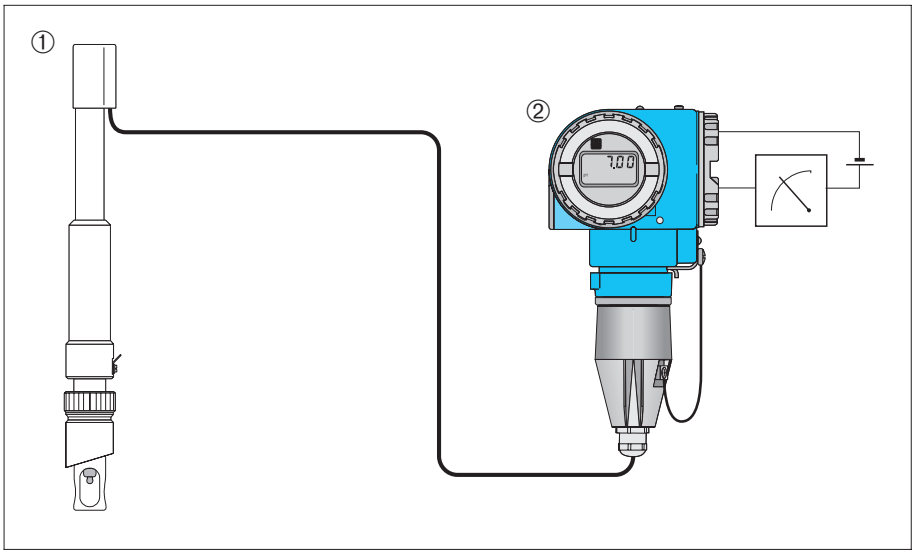
Endress+Hauser

Nothing beats know-how

Measuring system

A measuring system generally comprises

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

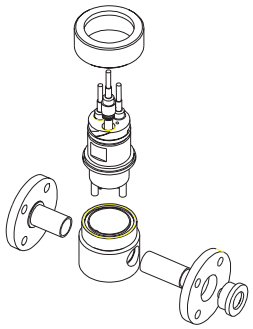
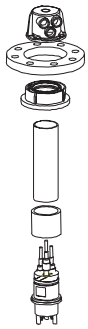
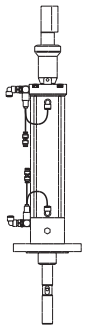


Example of a measuring system:

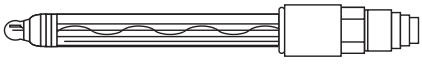
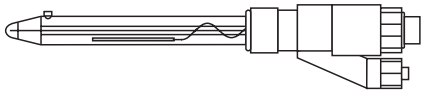
① Process assembly Probfit CPA 440

② MyPro CPM 431

Assemblies / sensors

Flow assembly	Immersion assembly	Process assembly
 CPA 240	 CPA 140	 CPA 463S
Materials: • PVDF • Special steel	Materials: • PVDF • Special steel	Materials: • PVDF • PEEK • Special steel • Hastelloy

Examples of assemblies for various applications

Orbisint	Ceraliquid
 CPS 11	 CPS 41
For universal usage, easy to clean and soiling-resistant due to PTFE diaphragm, for pressures of up to 6 bar, conductivity > 50 µS/cm	Electrodes with ceramic diaphragm and liquid KCl electrolyte, usable with counterpressures of up to 8 bar

Examples of pH/redox electrodes with and without integrated Pt 100

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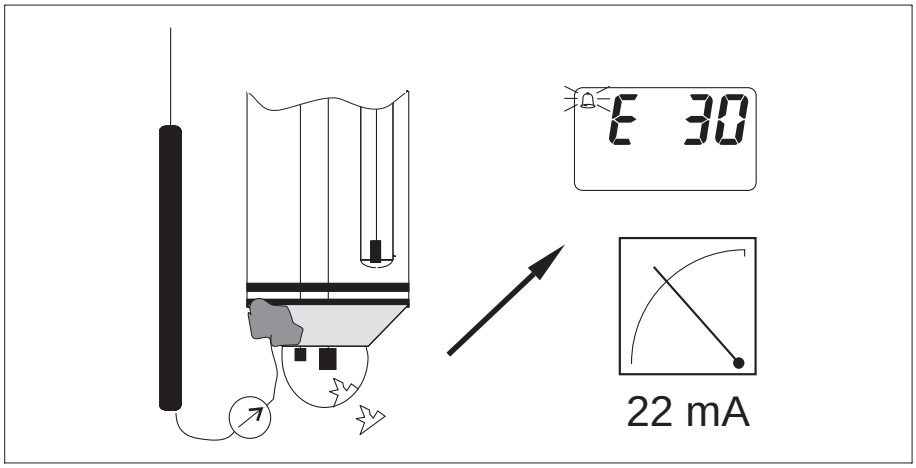
General information

Self-diagnosis
The MyPro CPM 431 continually checks the operational reliability of the measuring point. It can identify 28 possible problem causes in 4 different error classes:
1. Failure
2. Service required
3. Malfunction
4. 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).

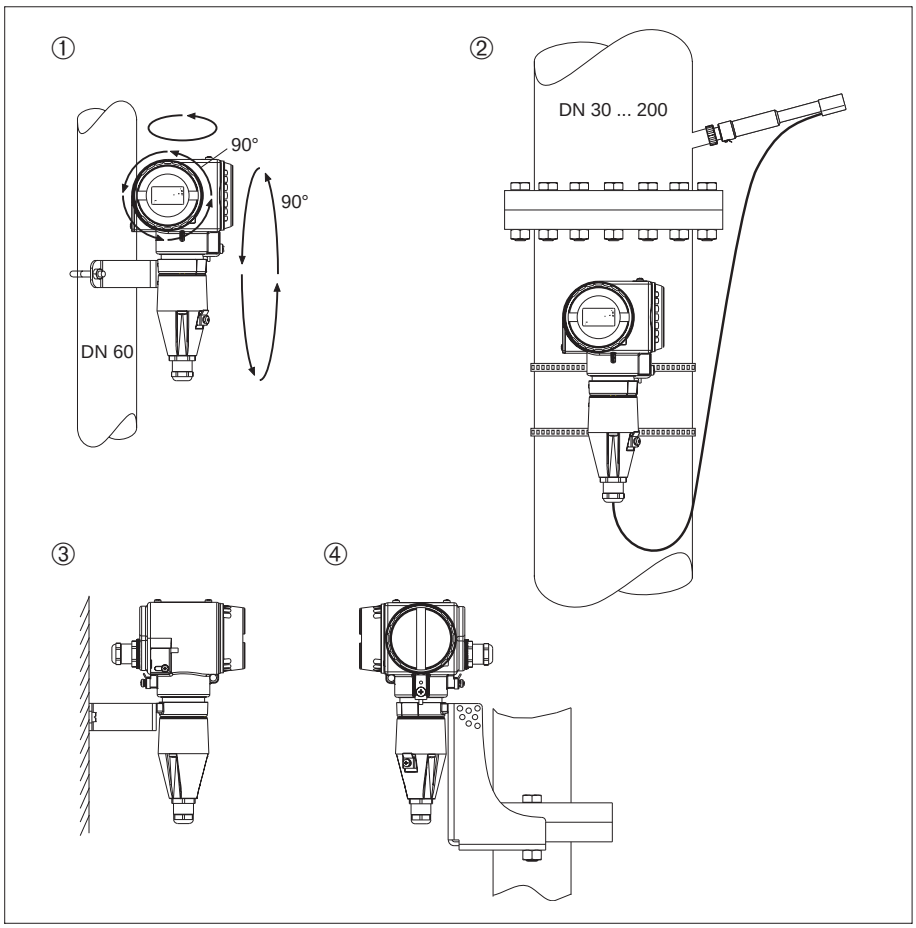
Electrode monitoring SCS
The Sensor Check System SCS monitors the pH and the reference electrodes for inaccurate measurement and total failure. The SCS detects:
- Breakage of electrode glass
- Fine shorts in pH measuring circuit, also bridges due to moisture or soiling at terminals
- Soiling or blocking of reference electrode

Two monitoring 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)



Electrode monitoring with SCS

Mounting options



① Mounting on DN 60 pipe. Instrument can be rotated in different axes (LCD in 90° steps)

② Flexible pipe mounting DN 30 ... 200

③ Wall mounting

④ Installation on assembly with flange mounting bracket

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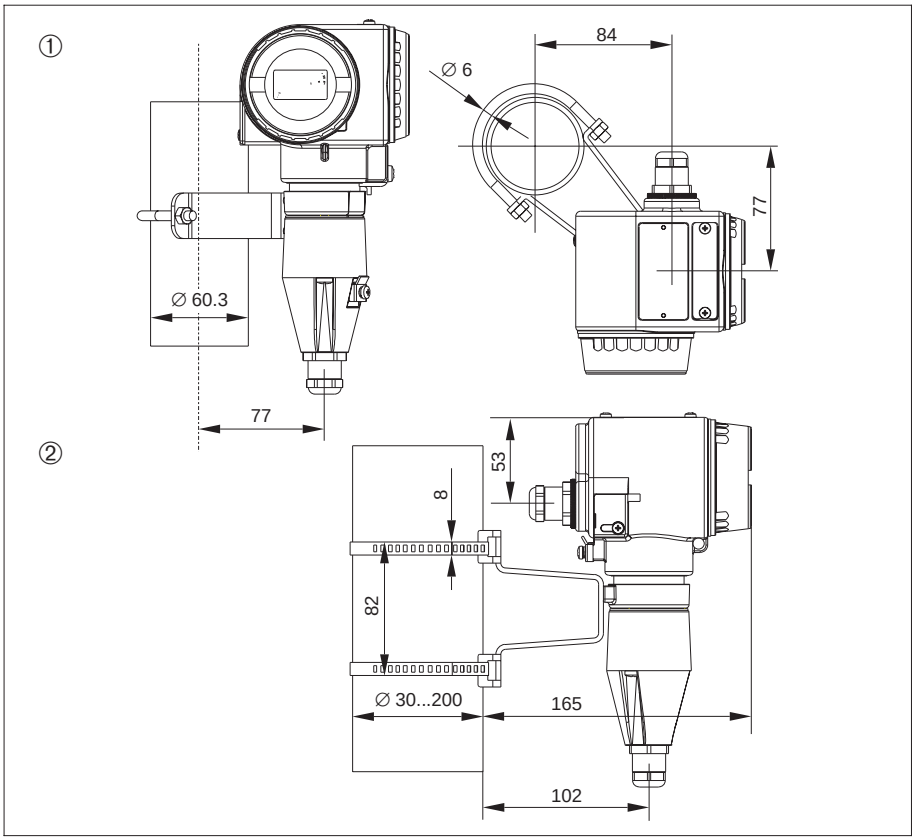
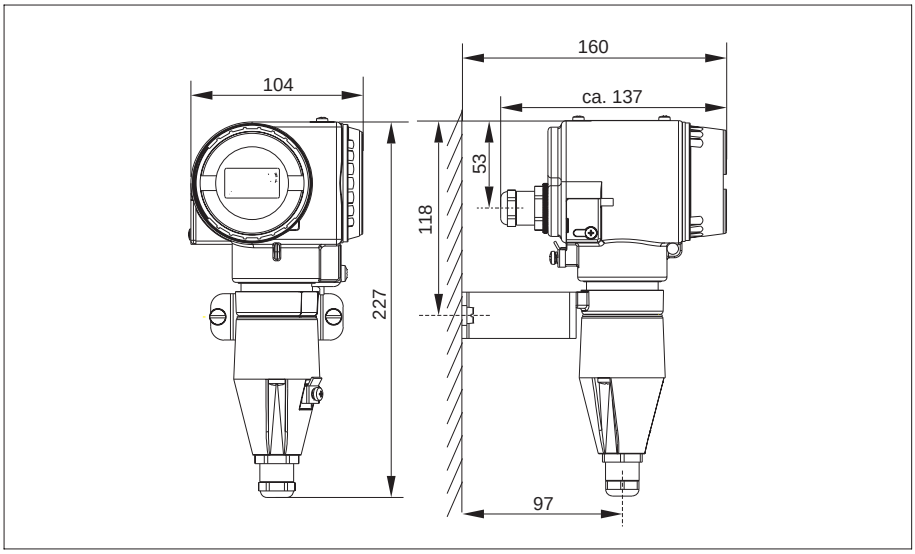
Mounting / dimensions

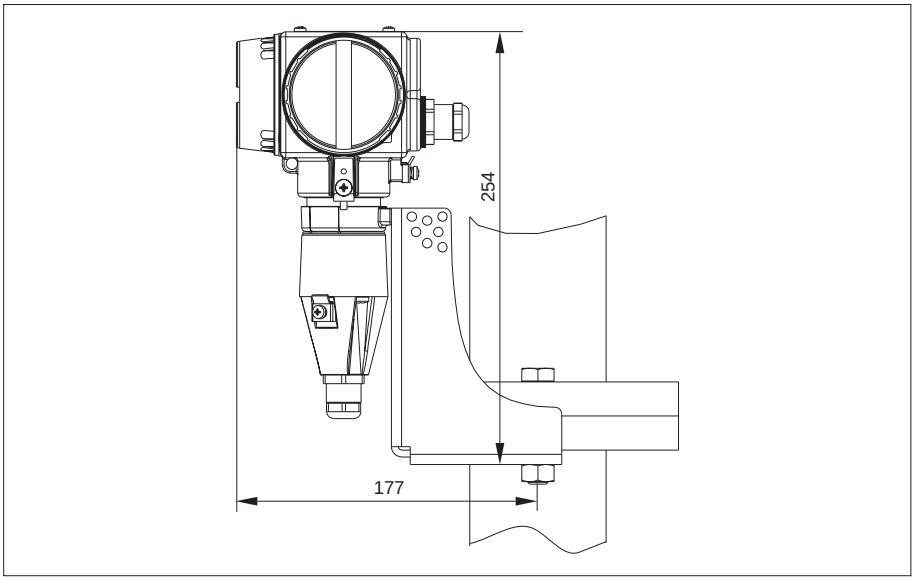


① Pipe mounting DN 60

② Pipe mounting DN 30 ... 200

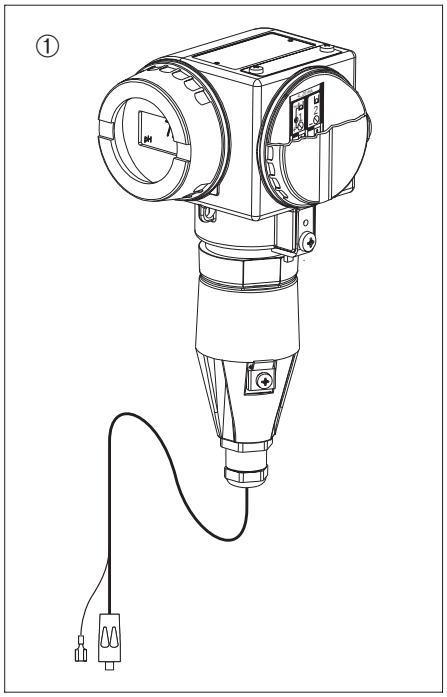


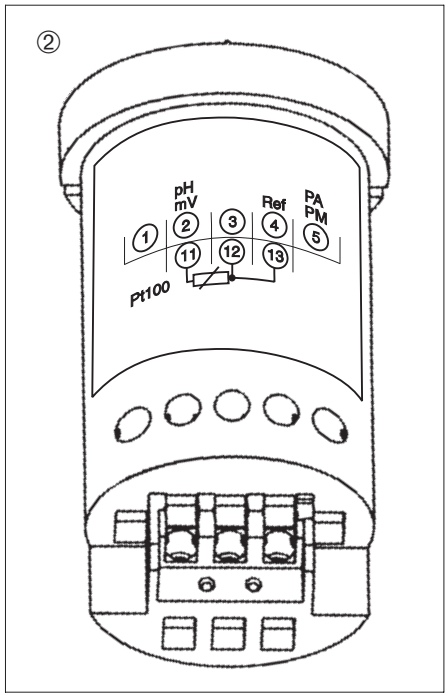
Wall mounting



Installation with flange mounting bracket

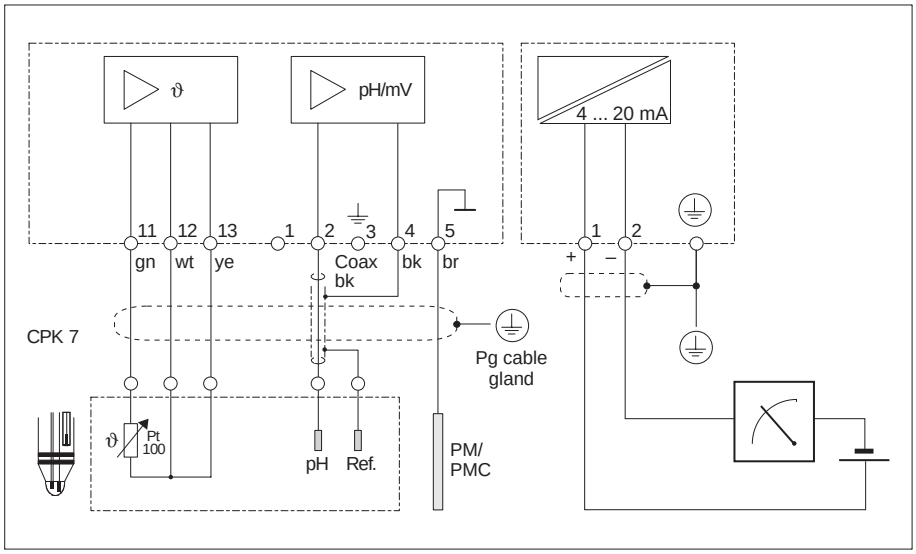
Electrical connection



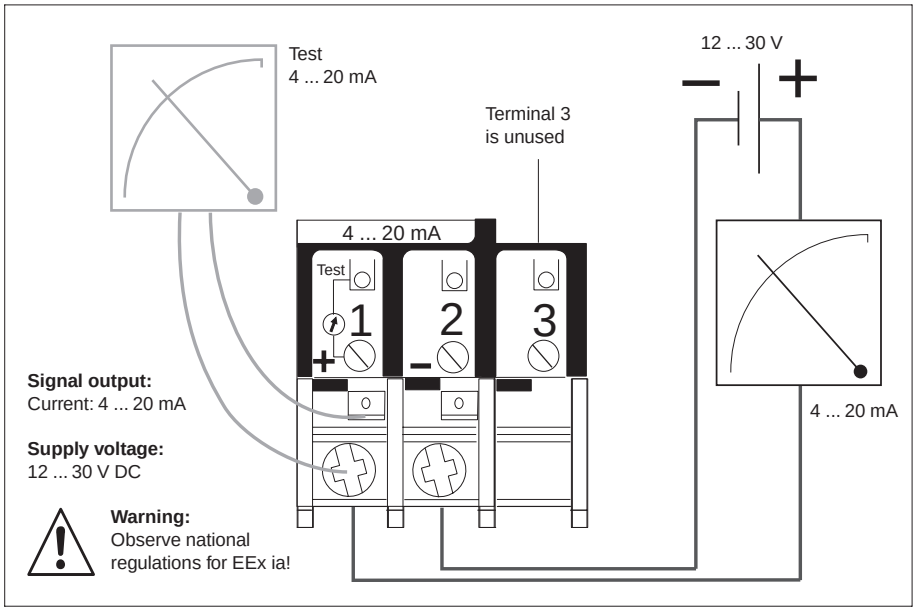


① Sensor connection

② Connection space for sensor cable



Connection diagram for symmetrical high-impedance measurement with potential matching conductor (PMC)



Supply voltage / signal output connection

Operation

Menu-guided operation

The functions of the MyPro CPM 431 are arranged at two different levels:

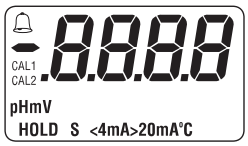
Operating level 1
- Viewing of current settings (secondary parameters) ⊕
- Error diagnosis (diagnostic parameters) ⊖
- Current output settings (parameter settings) Ⓕ
- Calibration Ⓒ

Operating level 2
- All other settings are located at this level, e.g. selection of pH and redox measurement.

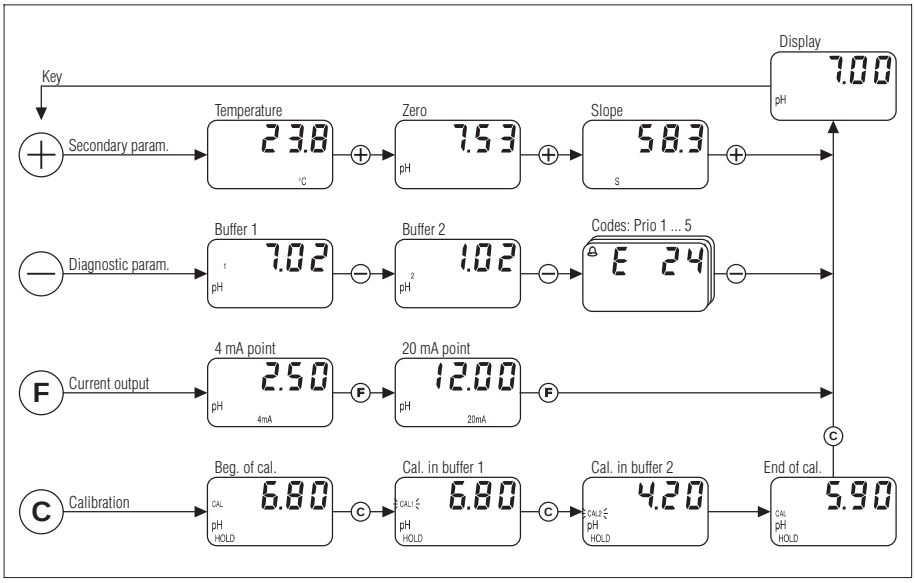
(See MyPro CPM 431 operating instructions for description.)

Display

The high-contrast liquid crystal display locks in at several angles to guarantee optimal readability in different mounting positions.



Display (original size)

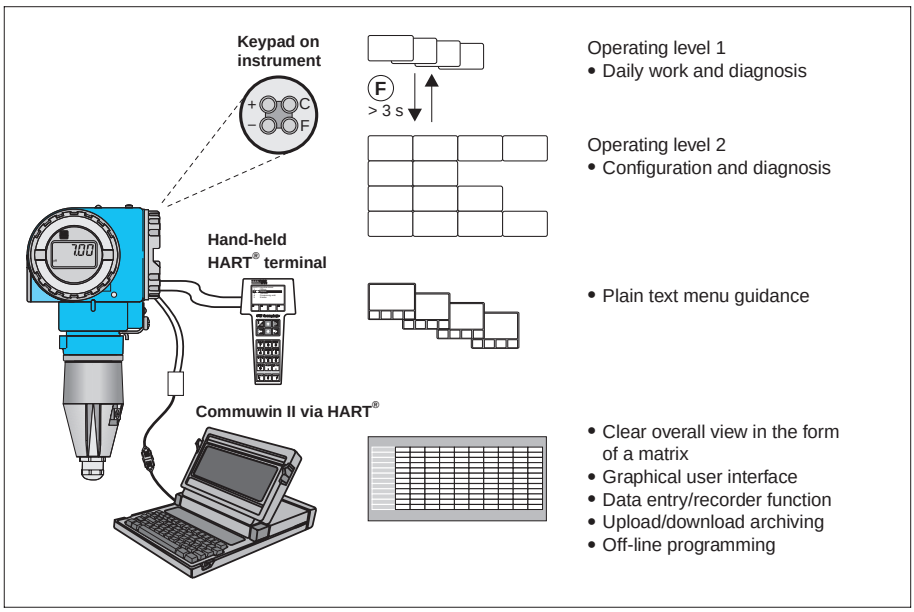


Operating level 1

Note:
- If no key is pressed for 30 s in the »secondary parameters« and »diagnostic parameters« menus, the instrument automatically reverts to the measured value display.
- The »calibration« menu sequence is shown in a simplified manner using automatic calibration as an example.

Operation via HART® interface

In addition to field operation, the instrument can be operated via its HART® interface with
- a hand-held HART® terminal or
- Commuwin II (graphical user interface).



Operation of MyPro CPM 431 via:
- keys on instrument
- hand-held HART® terminal
- Commuwin II

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Technical data

pH measurement

Measuring range (MR)	pH –2.00 ... +16.00
Measured value resolution	pH 0.01
Deviation of indication[1]	max. 0.2 % of MR
Reproducibility[1]	max. 0.1 % of MR
Zero shift range	glass electrode 7.0: pH +5.7 ... +8.3 glass electrode 4.6: pH +3.32 ... +5.92 antimony electrode: pH –1.0 ... +3.0
Automatic temperature compensation range	–20 ... +150 °C
Reference temperature	25 °C
Slope adaptation	glass electrode 4.6 and 7.0: 45 ... 65 mV/pH antimony electrode: 25 ... 65 mV/pH

pH signal input

Input resistance (nominal operating conditions)	> 1×10^{12} Ω
Input current (nominal operating conditions)	< 1.6×10^{-12} A

pH signal output

Current range	4 ... 20 mA
Measurement deviation[1]	max. 0.1 % of upper current range value
Load (depending on operating voltage and load)	max. 600 Ω
Output range	adjustable, Δ 2.0 ... Δ 18 pH (error message if Δ < 2)

Redox measurement

Measuring range (MR)	–1500 ... +1500 mV
Measured value resolution	1 mV
Deviation of indication[1]	max. 0.2 % of MR
Reproducibility[1]	max. 0.1 % of MR
Electrode offset	±200 mV

Redox signal input

Input resistance (nominal operating conditions)	> 1×10^{12} Ω
Input current (nominal operating conditions)	< 1.6×10^{-12} A

Redox signal output

Current range	4 ... 20 mA
Measurement deviation[1]	max. 0.1 % of upper current range value
Load	max. 600 Ω
Output range	adjustable, Δ 200 mV ... Δ 3000 mV

Temperature measurement

Temperature sensor	Pt 100 (3-wire connection)
Measuring range (MR)	–20 ... +150 °C
Measured value resolution	0.1 °C
Deviation of indication[1]	1 °C
Reproducibility[1]	max. 0.1 % of MR
Temperature offset (Pt 100 calibration)	±20 °C

Electrical data and connections

Aux. energy, DC (without / with HART® transfer)	+12 ... +30 V / +13.5 ... +30 V
Power consumption	max. 700 mW
Signal output	4 ... 20 mA, potential separated from sensor circuit
Error current signal output	22 mA ± 0.5 mA
HART® transfer: load	230 ... 1100 Ω
HART® transfer: signal output	0.8 ... 1.2 mA (peak to peak)
Terminals, max. cable cross section	2.5 mm², PE 4 mm²

General technical data

Measured value display	liquid crystal display (LCD)
Electromagnetic compatibility (EMC)	emitted interference acc. to EN 50081-2: 1992, immunity to interference acc. to EN 50082-2: 1995
Ambient temperature (nominal operating cond.)	–10 ... +55 °C
Relative humidity (nominal operating conditions)	10 ... 95 %, non-condensing
Ambient temperature (limit operating conditions)	–20 ... +60 °C (Ex: –20 ... +55 °C)
Storage and transport temperature	–25 ... +80 °C
Max. cable length	50 m without SCS, 20 m with SCS

Ex version

Intrinsically safe power 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; to PE = 5.3 nF

Intrinsically safe sensor circuit, protection type EEx ia IIC T4

Max. output voltage U_o	±5.4 V (10.8 V)
Max. output current I_o	320 mA
Max. output power P_o	200 mW
Max. external inductance L_o	100 µH
Max. external capacitance C_o	100 nF

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Technical data (continued)

Physical data

Dimensions (H × W × D)	223 × 103 × 137 mm
Weight	max. 1.25 kg
Protection type	IP 65
Material of housing	GD-AlSi 10 Mg, plastic-coated

[1]acc. to DIN IEC 746 part 1, nominal operating conditions

How to order

pH/redox measuring transmitter MyPro CPM 431

Certificate type
A Variant for non-Ex area
G Cenelec EEx ia/ib IIC T4

Power supply cable entry
1 Cable gland Pg 13.5
3 Cable entry M20 × 1.5
5 Cable entry NPT ½"
7 Cable entry G ½"

Electronics, communication, display
A 4 ... 20 mA, HART®, no display
B 4 ... 20 mA, HART®, liquid crystal display

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

Factory parameter configuration
P pH, measuring range pH –2 ... 16
R Redox, measuring range ±1500 mV

Cable, sensor connection
A Without cable
B With 1 m cable, GSA connector (without Pt 100)
C With 1 m cable, TSA connector (with Pt 100; pH only)
D With 2 m cable, GSA connector (without Pt 100)
E With 2 m cable, TSA connector (with Pt 100; pH only)

CPM 431- [ ][ ][ ][ ][ ][ ] **complete order code**

Accessories

- ❏ pH buffer solution pH 4.0
  CPY2-0 (100 ml), CPY2-1 (1000 ml)
- ❏ pH buffer solution pH 7.0
  CPY2-2 (100 ml), CPY2-3 (1000 ml)
- ❏ pH buffer solution pH 9.2
  CPY2-4 (100 ml), CPY2-5 (1000 ml)
- ❏ Redox buffer sol. +220 mV, pH 7.0
  CPY3-0 (100 ml)

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