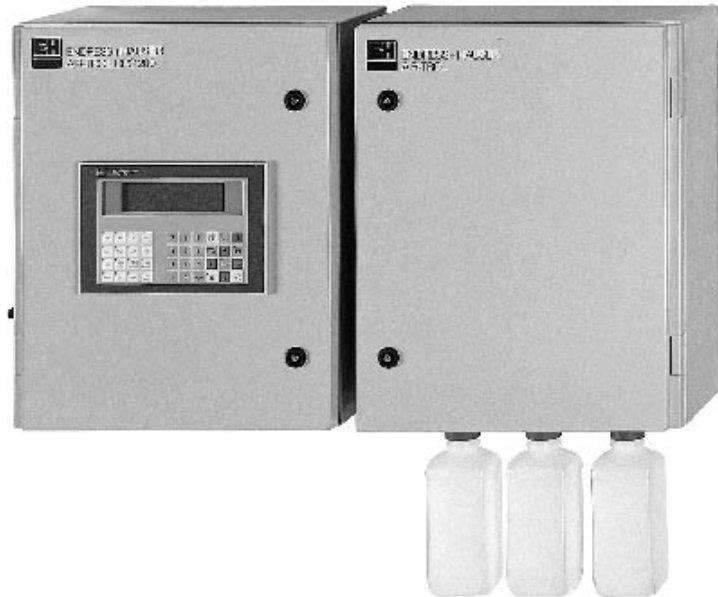


# Automation of pH Measurement *airtrol CPC 200 / CPC 210*

## Automatic measurement, cleaning and calibration system for pH electrodes in retractable Proffit assemblies



### Areas of application

pH measuring points require frequent maintenance depending on the application. Maintenance generally encompasses electrode cleaning, pH measurement checking and calibration. These tasks can be automated by the Airtrol, which extends electrode life and increases accuracy. The Airtrol system is particularly suitable for high-accuracy measurement in the food industry, for the rough conditions that exist in the raw materials industry and for chemical production monitoring.

### Description

The pH electrode is installed in a retractable Proffit assembly. For maintenance purposes, the electrode can be withdrawn from the medium without interrupting the process. The Airtrol system supplies water, cleaning agent and buffer solutions to the rinse chamber in the assembly and therefore to the electrode.

The availability of the buffer solutions, water and compressed air is continually monitored. An alarm is signalled if a problem is detected, e. g. an empty buffer bottle or sensor error. All important parameters can be set by the user as required. The individual processes can be initiated via timers, contact inputs, a digital interface (PROFIBUS) or by hand.

### Benefits at a glance

- Automatic calibration reduces maintenance costs. Buffer solution reservoirs and feed pumps are included in the system.
- Quick sensor check and automatic sensor cleaning reduce operating costs.
- Plain text displays for user guidance simplify operation.
- Self-monitoring with alarm messages assures simple operation.
- Interval measurement for extended electrode service life.



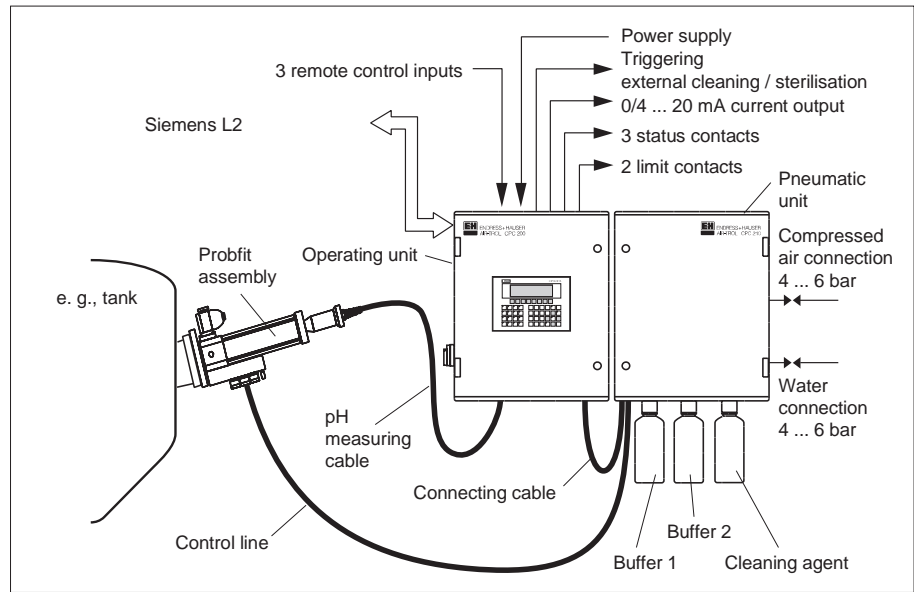
# System structure

Each measuring point comprises the operating unit CPC 200 and the pneumatic unit CPC 210. The pneumatic unit includes all the control valves required, the buffer and cleaning solution pumps plus the monitoring devices needed to monitor these media.

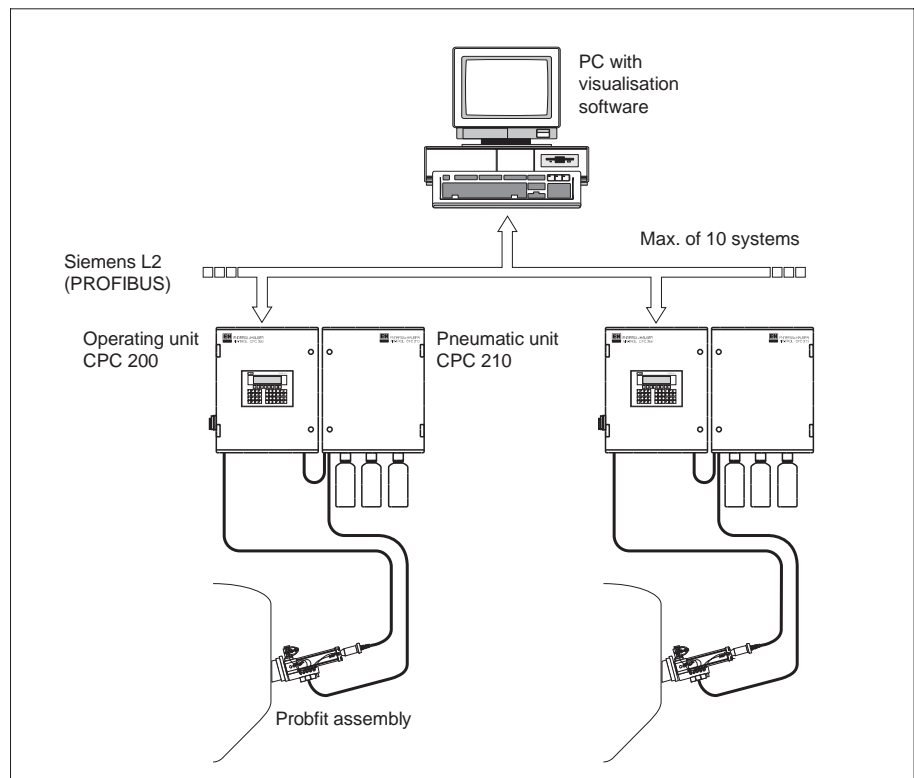
The pneumatic unit is controlled by the control unit CPC 200. The measuring point is operated via the integrated control panel.

The operating unit CPC 200 is equipped with the Mycom transmitter for pH and temperature measurement. This measuring instrument has a pH current output and relay contacts for user-definable limits. The connected pH electrodes are continuously monitored by the integrated SCS sensor check system.

A network of up to 10 systems can be built up via Profibus. For visualisation there is a separate PC software available.



Single system



Network of up to 10 systems

# Function sequences

## Example: Calibration

- pH electrode is retracted (service position)
- Water rinse
- Cleaning
- Water rinse
- Blow-drying
- Buffer 1
- After stabilisation: calibration value 1
- Water rinse
- Blow-drying
- Buffer 2
- After stabilisation: calibration value 2
- Water rinse
- Sterilization
- Electrode is returned to medium

## Example: HOSS (quick sensor test)

- pH electrode is retracted (service position)
- Water rinse
- Cleaning
- Water rinse
- Blow-drying
- Buffer 1
- Setpoint comparison
- Water rinse
- Blow-drying
- Buffer 2
- Setpoint comparison
- Water rinse
- Sterilization
- Electrode is returned to medium

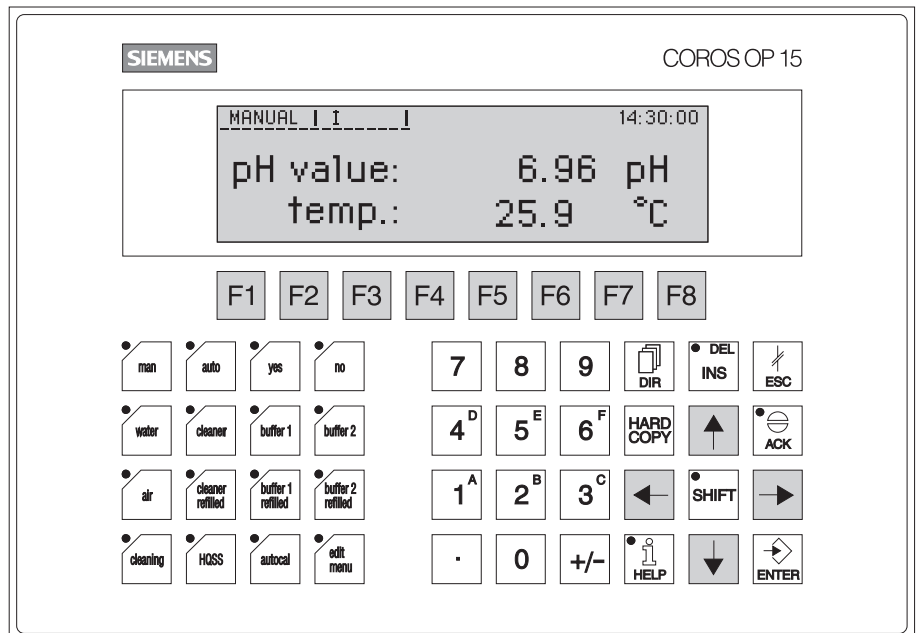
## Example: Cleaning

- pH electrode is retracted (service position)
- Water rinse
- Cleaning
- Water rinse
- Sterilization
- Electrode is returned to medium

The pH measurement is switched to "hold" during maintenance activities, i. e. the measured value and control are frozen.  
The "hold" state may be disabled with a delay when measuring operation resumes.

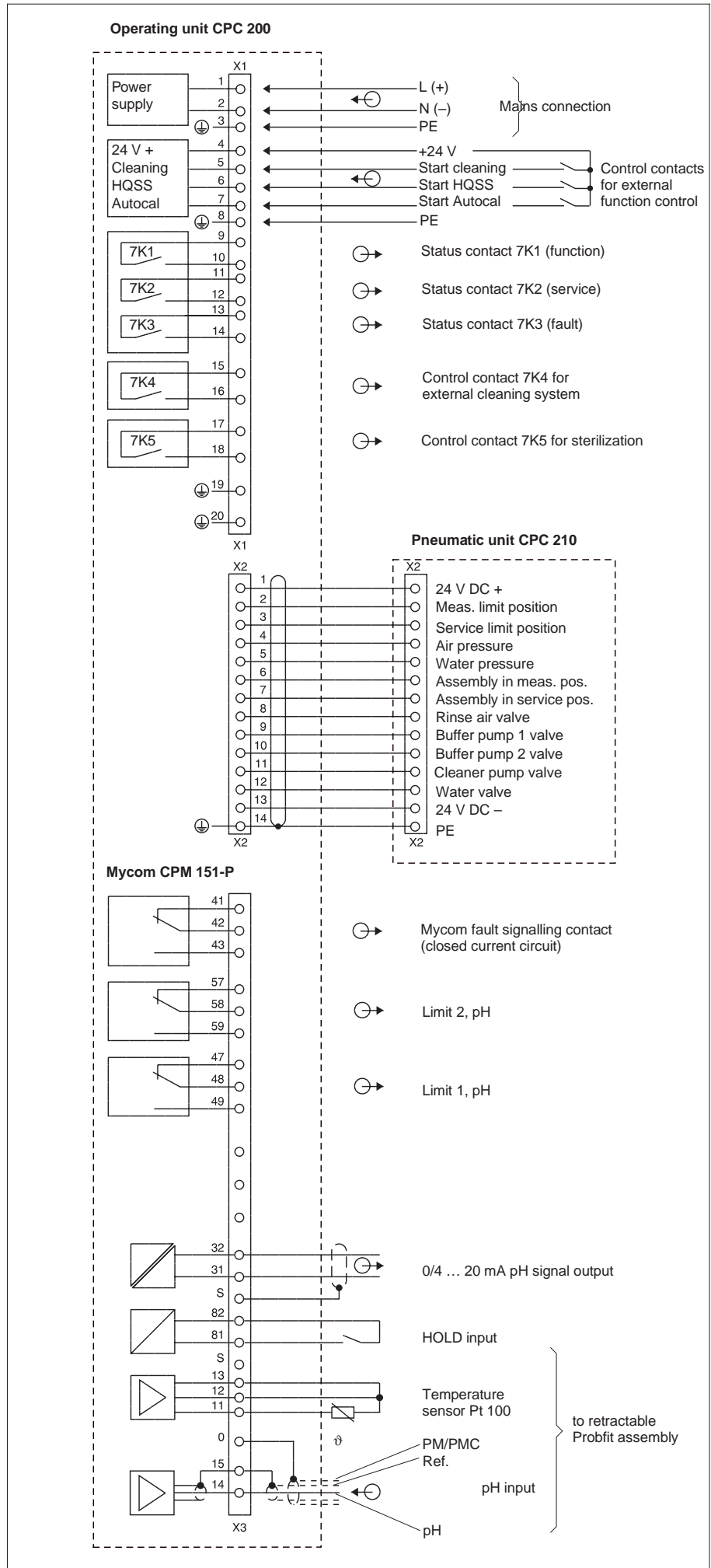
The Airtrol is operated via a menu system. The four-line plain text display (German or English language) makes operation without operating instructions possible due to extensive online help.

The function keys are equipped with LEDs that indicate which key is operable at a given point in time. The keys are labelled in German or English.



Operating panel of Airtrol CPC 200 with function and control keys

# Electrical connection



Connection diagram of Airtrol CPC 200 / 210, Mycom CPM 151-P and pH retractable assembly

**Note:**  
The operating unit CPC 200 is connected to the pneumatic control unit CPC 210 via a shielded 14-wire standard cable (0.5 mm<sup>2</sup>). 5 m of this cable are included in the scope of delivery.

## Operating modes

The Airtrol functions can be initiated automatically (timer-controlled), by hand, via remote control (contact inputs) or via the PROFIBUS.

If one of the automatic functions is being performed, this is indicated on the display and also signalled via status contact 7K1.

### Automatic mode

- Timer-controlled cleaning
- Timer-controlled quick sensor test (HQSS)
- Timer-controlled automatic calibration (Autocal)

### Siemens L2 (PROFIBUS)

- Start cleaning
- Start calibration
- Start quick sensor test (HQSS)
- Read error messages
- Read measured values

### Manual mode

- Start cleaning
- Start calibration
- Start quick sensor test (HQSS)
- Feed buffer and cleaning agent to the electrode
- Rinse with water
- Blow dry with air

### Remote control

- Start cleaning
- Start calibration
- Start quick sensor test (HQSS)
- Start cleaning/wait position

The assembly remains in the service position following execution of the cleaning function.

The electrode is only returned to the medium to be measured when the control contact is opened.

## Pneumatic unit

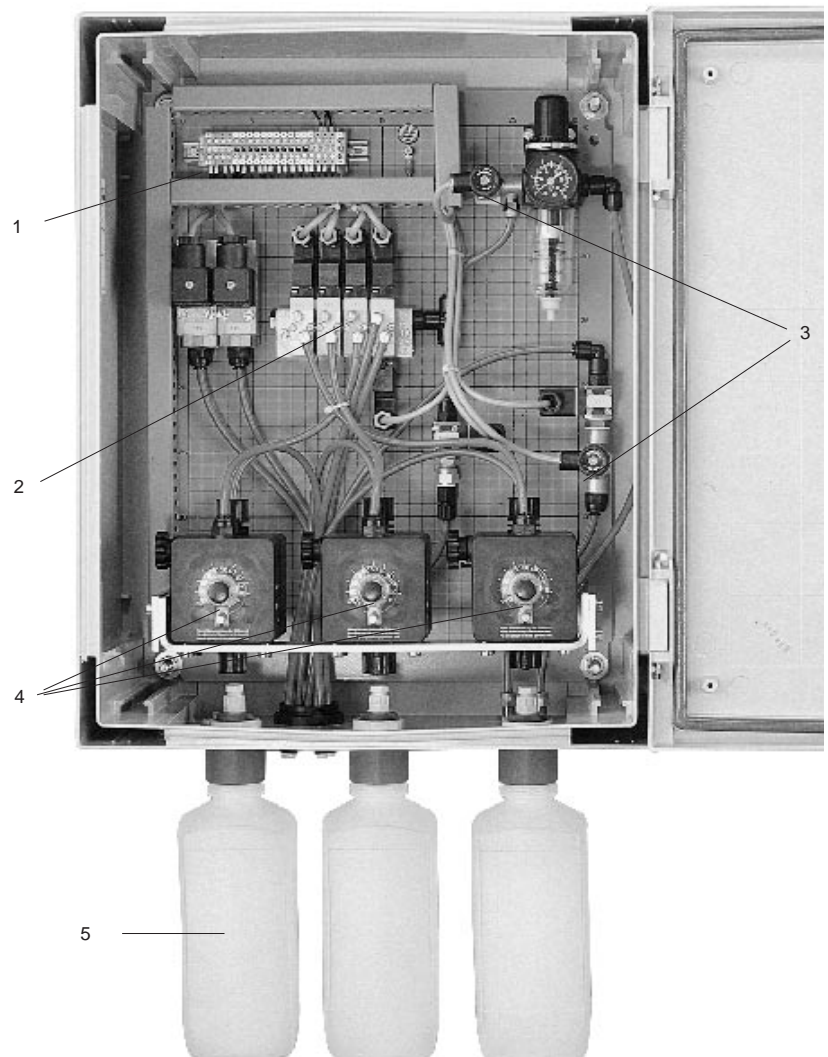
The pneumatic unit CPC 210 comprises all the pneumatic and hydraulic components required for automatic operation of the pH measuring point:

- the buffer and cleaner feed pumps
- the compressed air and water monitoring functions

- a pressure reducer

- all control valves

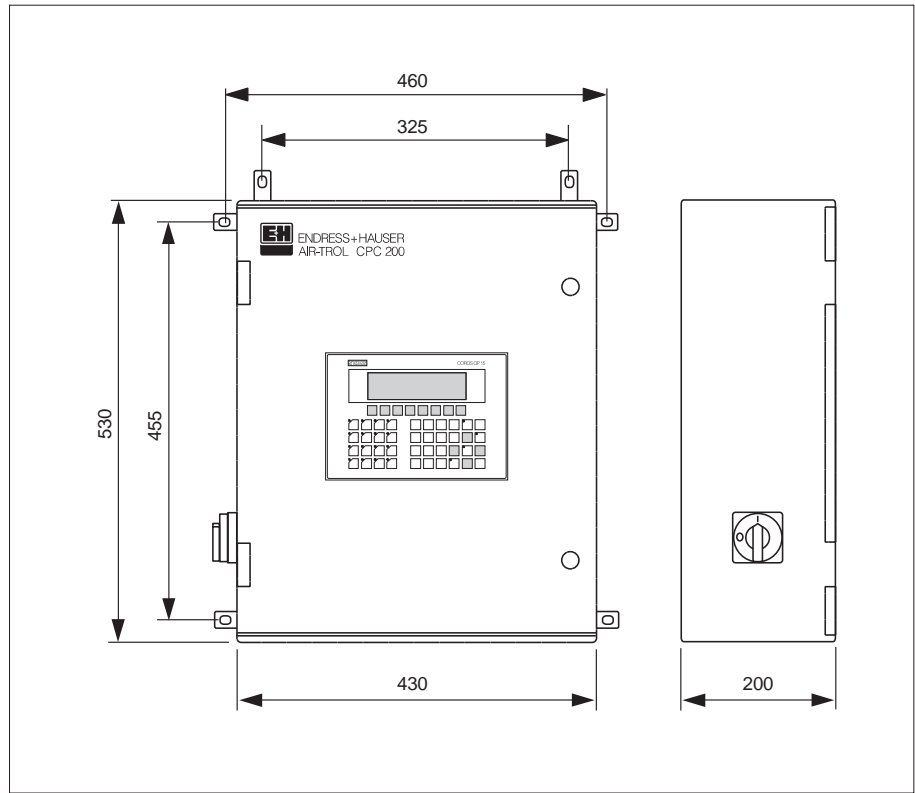
The pneumatic unit is supplied with 5 m of multiple hose for connection to the Probit assembly.



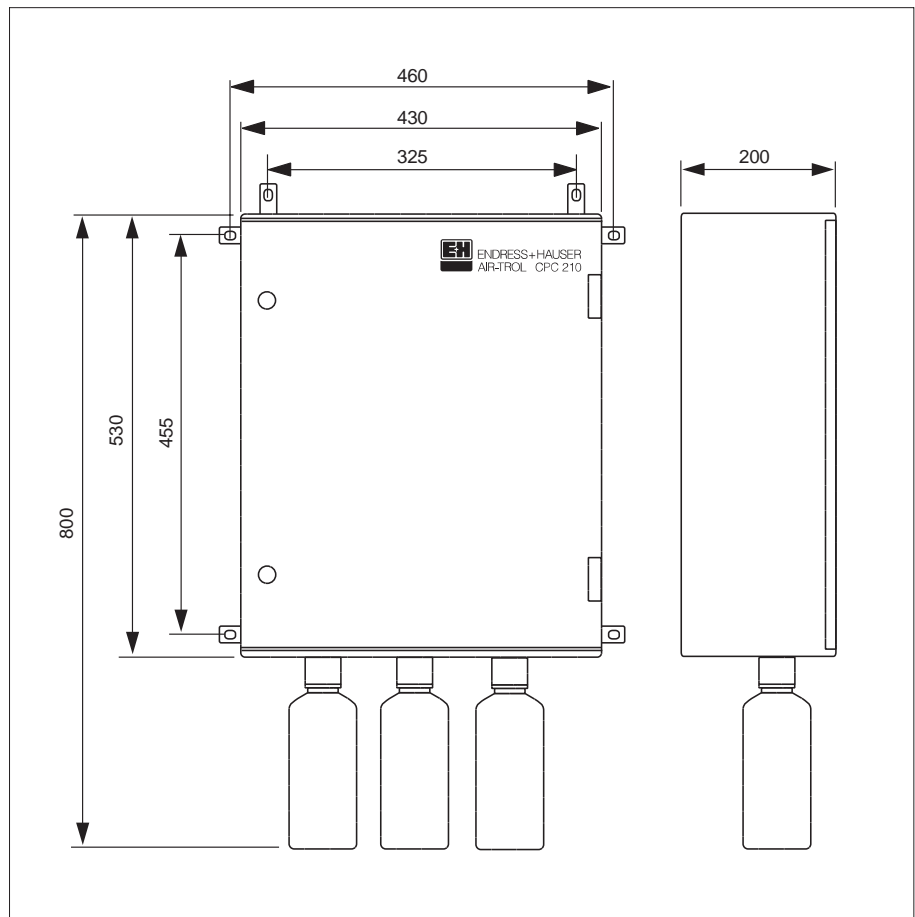
Pneumatic unit  
CPC 210

- 1 Terminal strip X2
- 2 Pneumatic valves
- 3 Pressure control device
- 4 Pumps
- 5 Buffer solutions and cleaning agent

# Installation



Dimensions CPC 200



Dimensions CPC 210

## Technical data

### pH measurement

pH measuring range	0.00 ... 14.00
Measured value resolution	0.01 pH
Zero shift range	+5.5 ... +9.5 pH
Automatic temperature compensation range	-15 ... +150 °C
Reference temperature	25 °C
Slope adjustment	38 ... 65 mV/pH
pH signal input	optionally symmetrical high-impedance or asymmetrical high-impedance, $2 \times 0.5 \times 10^{12} \Omega$
Temperature sensor	Pt 100, 3-wire arrangement
Signal output	0 / 4 ... 20 mA, galvanically separated
pH signal transmission range	adjustable, $\Delta 2$ ... $\Delta 14$ pH
Load	max. 600 $\Omega$
Separation voltage	650 Vp-p

### Sensor Check System SCS

Limit for error message

pH measuring chain resistance	$\leq 2 \text{ M}\Omega$
Connection capacitance	$\geq 2 \text{ nF}$

### Limits / controllers, alarm, interference

Contact outputs (X1; status contacts Airtrol)	3 × max. 250 V AC / 300 V DC, max. 5 A, max. 2000 VA / 35 W
pH error message (X3; Mycom)	1 × max. 250 V AC / 3 A / 500 VA
Limits / controllers (X3; Mycom)	2 contact outputs
Limit contactor function	pulse-length or pulse-frequency controller
Controller response	P / PI / PID
Function type	MIN or MAX (direct / inverted)
Set point adjustment	2 × 0 ... 100% of MR
Hysteresis for limit contacts	1 ... 10% of MR
Contact delay	pickup / dropout 0 ... 6000 s
Contact load	max. 250 V AC, max. 3 A, max. 500 VA

### General technical data

Display	LCD, 4-line text display
Ambient temperature – nominal operating range	0 ... 40 °C
Relative humidity	10 ... 90%
Ingress protection	IP 54
Dimensions (H × W × D)	530 × 430 × 200 mm
Total weight	
CPC 200	19.5 kg
CPC 210	17.5 kg

### Electrical data

AC voltage for CPC 200	24, 115, 230 V AC, 50 ... 60 Hz (+6 / -10%)
DC voltage for CPC 200	max. 20 ... 30 V
DC voltage for CPC 210	24 V DC (internal)
Power consumption	max. 60 VA
Terminal cross section	max. 2.5 mm <sup>2</sup>
Connecting cable between CPC 200 and CPC 210	14 × 0.5 mm <sup>2</sup> , 5 m (included in scope of delivery)

### Medium connections

Water connection	bulkhead gland, ID 4 / OD 6
Water quality	city water, free of solids
Water pressure	4 ... 6 bar
Compressed air connection	bulkhead gland, ID 4 / OD 6
Air quality	oil and water-free (instrument-quality air); filtered to 5 $\mu\text{m}$
Air pressure	4 ... 6 bar
Air flow requirement	max. 20 l/min
Multiple pneumatics/assembly hose connection	standard 5 m (incl. in scope of delivery)

Subject to modification.

## How to order

### Airtrol CPC 200 operating unit

**Power supply**

- 0 230 V AC, 50 / 60 Hz
- 1 115 V AC, 50 / 60 Hz
- 3 24 V AC, 50 / 60 Hz
- 8 24 V DC
- 9 Special version

**Version**

- D German language version
- E English language version

**Equipment**

- A Standard equipment
- Y Special equipment

CPC 200 – 

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 ← complete order code

### Airtrol CPC 210 pneumatic unit

**Equipment**

- A Standard equipment
- Y Special equipment

CPC 210 – 

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 ← complete order code

## Accessories

- |                                                                                                                |                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> <b>Retractable assemblies</b><br>Probit CPA 463 assembly<br>Probit CPA 463 S assembly | <input type="checkbox"/> <b>pH electrodes</b><br>CPS 11-2AA5TSA<br>CPS 11-2BA5TSA                                     |
| <input type="checkbox"/> <b>pH measuring cable</b><br>CPK 7                                                    | <input type="checkbox"/> <b>Buffer solutions</b><br>Buffer solution pH 7.0 CPY 2-3<br>Buffer solution pH 4.01 CPY 2-1 |

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**Endress + Hauser**

Nothing beats know-how

