Technical Information

Topcal S CPC310

Automation of pH/ORP measurements

Fully automated measuring, cleaning and calibration system in the hazardous and non-hazardous area

Application

Topcal S is a fully automated measuring, cleaning and calibration system for pH and ORP measurement in the following fields:

- Process industry
- Wastewater treatment
- Food industry
- Pharmaceutical industry

Your benefits

- Very high degree of safety:
  - In-process cleaning/calibration, no electrode removal necessary
  - System status messages with feedback to the control desk

- Industry-proven double-membrane pumps for conveying buffer solutions and cleaner
- High quality of measurement
  - Optimum measurement result reproducibility
- High availability
  - Long electrode life due to measuring cycle
  - Offline configuration (optional): very simple set-up on PC
- Short amortization times
  - Low maintenance costs thanks to fully automated cleaning and calibration
- Low maintenance effort even for heavily polluted and aggressive media
- Communication via PROFIBUS PA (Profile 3.0) and HART
- Memosens technology

Endress+Hauser

People for Process Automation

Function and system design

Measuring principle

CPG310 control unit

The control unit CPG310 converts the commands of the CPM153 into pneumatic signals and sends feedback signals such as assembly position, canister level and monitoring signals for compressed air. The buffer solutions and cleaner are conveyed to the assembly by pumps. The control unit also has two user-configurable output contacts. These can be used to control pneumatic valves to convey hot or aggressive media (including steam), for instance.
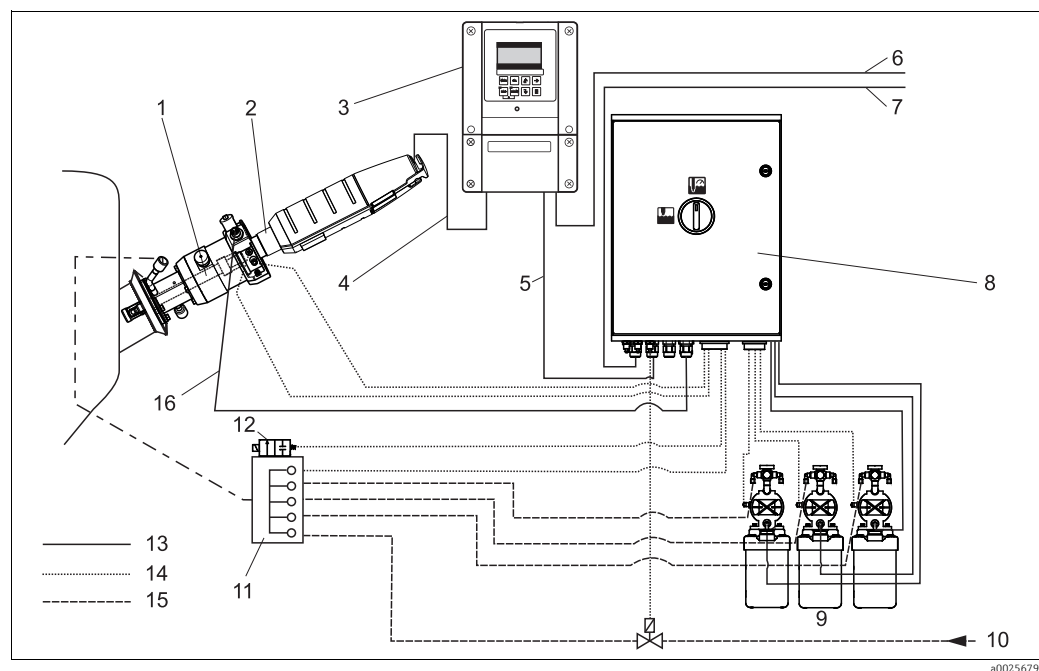
Mycom S CPM153 transmitter

The transmitter CPM153 is the central unit of the measuring point. It processes the measured variables, acts as the communications center and controls processes. The transmitter controls the processes in the CPG310 via an interface and processes its feedback signals.
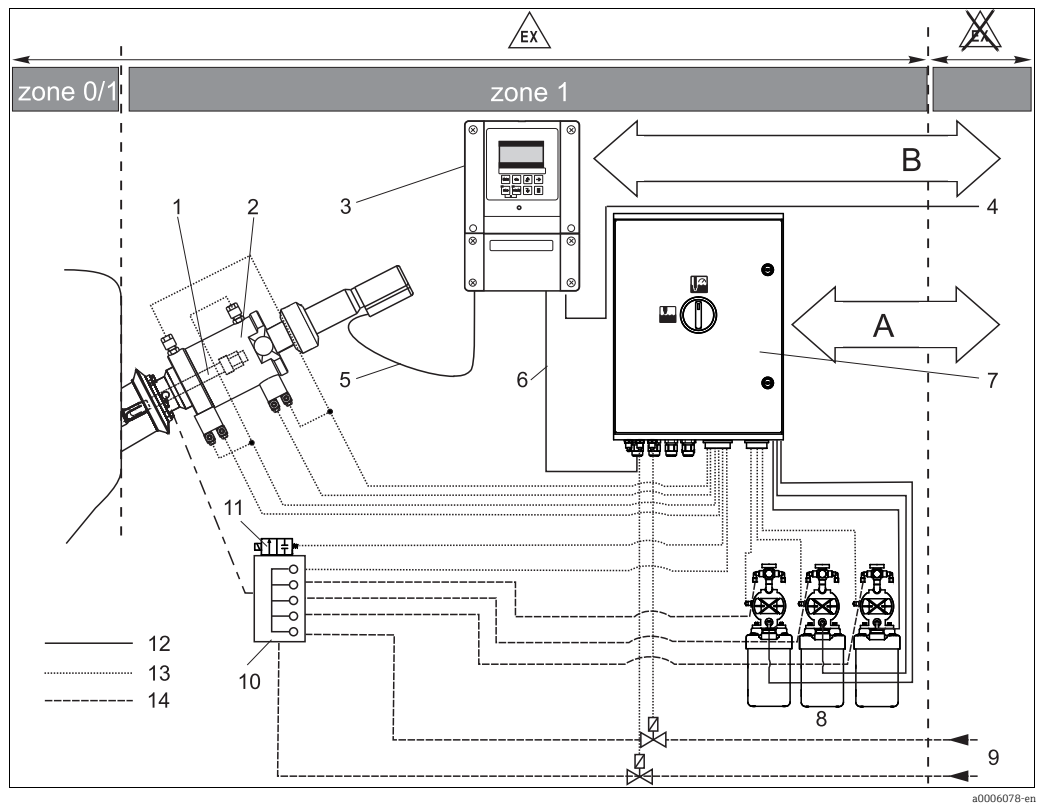
Measuring system

A complete measuring system consists of the following components:
- Topcal S CPC310 including
  - CPG310 control unit
  - Mycom S CPM153 transmitter
  - Rinsing block
  - Pumps to convey buffer solutions and cleaners
- Pneumatically driven retractable assembly (e.g. CleanFit series) with pneumatic or inductive limit switches
- pH/ORP sensor
- Measuring cables
- Buffer solutions and cleaning agent

Complete measuring system (non-hazardous area)

1	*pH/ORP sensor*	*9*	*Unit for conveying cleaning and buffer solutions*
2	*Cleanfit assembly CPA875*	*10*	*Superheated steam/water/cleaning agent (optional)*
3	*Mycom S CPM153 transmitter*	*11*	*Rinsing block*
4	*pH measuring cable*	*12*	*Rinse water valve*
5	*Communication/power supply cable*	*13*	*Electric cable*
6	*Power supply for Mycom S CPM153*	*14*	*Compressed air line*
7	*Power supply for CPG310 control unit*	*15*	*Media (cleaner, buffer, superheated steam etc.)*
8	*CPG310 control unit*	*16*	*Signal cable (limit position switch feedback signal)*

Complete measuring system (hazardous area)

A	Status and control signals: assembly position, move the assembly, program stop		
B	Hold input, six relay contacts, two 0/4 to 20 mA current outputs		
1	pH/ORP sensor	8	Unit for conveying cleaning and buffer solutions
2	Cleanfit assembly CPA47x	9	Superheated steam/water/cleaning agent (optional)
3	Mycom S CPM153-G transmitter	10	Rinsing block
4	Power supply for Mycom S CPM153-G	11	Rinse water valve
5	pH measuring cable	12	Electric cable
6	Communication/power supply cable	13	Compressed air
7	CPG310-G control unit	14	Media (cleaner, buffer, superheated steam etc.)

Measuring system connections	You require the following connections to set up the complete measuring system:

Electrical power supply

Mycom S CPM153:

Non-hazardous area:	100 to 230 V AC or 24 V AC/DC (depending on version)
Hazardous area:	100 to 230 V AC or 24 V AC/DC (depending on version)

CPG310 control unit:

Non-hazardous area:	100 to 230 V AC or 24 V AC/DC (depending on version)
Hazardous area:	Power supply via Mycom S

Compressed air

Specification:	4 to 6 bar (58 to 87 psi), filtered, 50 µm, free from oil and condensate
Connection:	Bulkhead gland OD 6 mm (0.24"), connection to CPG310 control unit via pressure reduction valve supplied

Rinse water

Specification:	Tap water, 3 to 6 bar (43.5 to 87 psi), filtered, 100 µm
Connection:	Bulkhead gland OD 6 mm (0.24"), connection to rinsing block via water filter supplied

Assembly

Process connection:	As per the assembly version ordered, see Operating Instructions for assembly

Rinsing block

Connection to assembly rinse chamber:	G¼ or NPT ¼" external thread (depending on version)

A detailed description of how to connect the necessary pipes and cables is provided in the Operating Instructions for Topcal S CPC310.

Cleaning/calibration programs	The following cleaning and calibration programs are available in Topcal S:

- Clean: Predefined program for cleaning the sensor
- Clean S: Predefined program for sterilizing the sensor
- Clean C: Predefined program for cleaning and calibrating the sensor
- Clean CS: Predefined program for cleaning, calibrating and sterilizing the sensor
- User 3: Predefined program to check the system quickly
- User 1/2: Free program slots without predefined program steps

You can configure all the programs as you wish to adapt them optimally to your needs and requirements. The predefined programs help users quickly configure the device.
In the programs, you can use external additional valves as required, e.g. for superheated steam, cooling air, organic cleaners etc.

Controlling the cleaning and calibration programs

You can choose from the following ways to control cleaning and calibration programs:
- Automatic:
  Weekly program that automatically starts the configured cleaning or calibration programs for every weekday. You can freely select the programs in question for every weekday.
- Cleaning:
  Select the cleaning or calibration program that is started in the event of an SCS alarm or as per configured error messages.
- Emergency program:
  Select the cleaning or calibration program that is automatically started after a power failure, compressed air failure, water failure or communication failure.
- Ext. control:
  The cleaning and calibration programs can be started externally by means of a process control system.

Interval program

With this program, you can start any cleaning or calibration program in a set time frame (max. 1 day) at defined intervals.

Validation function

You can use the validation function to check whether there is a deviation between the target and actual value of your measurement and whether calibration is necessary.

Back pressure water

You can activate the supply of back pressure water with this function. In processes where the medium is fibrous or tends to form buildup, assemblies with a ball valve for shutting off the medium are used e.g. Cleanfit P CPA473 or CPA474. To keep the rinse chamber free of medium, the back pressure water valve opens automatically before the assembly moves out of the process. The counterpressure in the rinse chamber caused by the back pressure water prevents the ingress of medium into the chamber. The back pressure water pressure must then be greater than the pressure of the medium.

Other functions	**Memosens**

Memosens

Memosens makes your measuring point safer and more reliable:
- Non-contact, digital signal transmission enables optimum galvanic isolation
- No contact corrosion
- Completely watertight
- Predictive maintenance with recording of sensor data, e.g.:
  – Total operating hours
  – Operating hours at very high and very low pH values
  – Operating hours at high temperatures
  – Number of steam sterilizations
  – Sensor condition

Quick Setup

To the first measured value in just 1 minute

The measuring point is ready for operation as soon as you have configured the few parameters in the Quick Setup menu. The first measured value is displayed reliably.

SCC (= Sensor Condition Check)

This function monitors the electrode status or the degree of electrode aging. The status is indicated by the messages "Electrode OK", "Low wear" or "Replace electrode". The electrode status is updated after each calibration. If the "Replace electrode" message appears, an error message is also displayed.

SCS (= Sensor Check System)

The SCS detects glass breakage in the case of conventional glass electrodes and leaks in the case of ISFET sensors.
In the case of analog sensors with a symmetrically high impedance connection, the Sensor Check System also displays the pH glass resistance or the reference resistance, thereby indicating the possibility of an incorrect measurement due to blocking or damage to the pH electrode.

**PCS (= Process Check System)**

This function checks the measuring signal for stagnation. If the measuring signal does not change over a specific period (several measured values), an alarm is triggered. This may be caused by fouling, blocking or similar.

Logbooks

There are several logbooks available: The last 30 entries are saved to an error logbook, an operation logbook and a calibration logbook. You can retrieve the entries by specifying a date and time.

Data logger

You can record two arbitrary parameters using the integrated data loggers and then view them in real time. You can retrieve the last 500 measured values using date and time. In this way, you can graphically display the process flow. This is a quick way of checking the process and provides a good possibility of optimizing pH control.
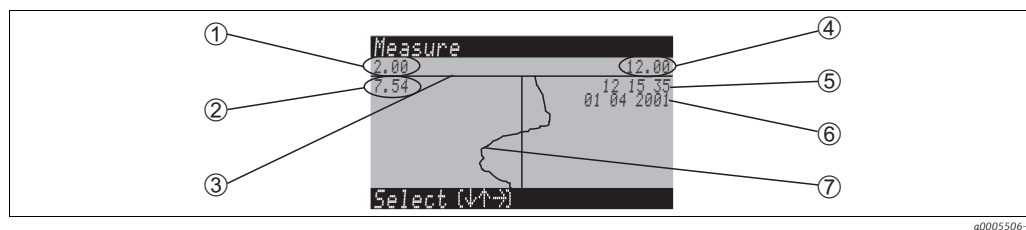
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Example for data logger 1 (for parameter 1, pH is selected here)

1	Minimum display range (choose as low as −2 pH)	5	Time when the measured value was recorded
2	Measured value for current position of the scroll bar	6	Date of this measured value
3	Scroll bar	7	Measured value curve
4	Maximum display range (choose as high as +16 pH)		

Simple to control

The follow controller functions are implemented in the Mycom:
- Limit value contact: Two-point controller with hysteresis for simple temperature control, for example
- PID controller:
  - for one and two-sided processes
  - with freely adjustable P, I and D components
  - includes configurable range-dependent gain (segmented curve)
  - distinction between batch and flow processes.
- Manipulated variable output
  The manipulated variable can be output as a binary signal via the relays or via the current output:
  - Binary signal via relay as PWM (pulse length), PFM (pulse frequency)
  - Current output (0/4 to 20 mA): Analog signal to control the positioner (for one or two actuator drives)

DAT module

The DAT module is a memory device (EEPROM) which is inserted in the connection compartment of the Mycom S.

Using the DAT module, you can:
- *Save* the complete settings, including the program settings, and the logbooks and the data of the data logger of a transmitter, and
- *Copy* the complete settings to other Mycom S transmitters which have identical hardware functionality.

This considerably reduces the effort to install or service several measuring points.

Offline configuration with Parawin (option)

Using the PC tool **Parawin**, you can:

1. Configure the whole measuring point on the PC in the familiar Windows environment and

2. Save the settings to the DAT module.

3. Install the DAT module in a Mycom and transfer the entire configuration to the transmitter (= complete transmitter set-up). Then you can set up other transmitters with the same configuration.

4. Similarly, you can use the DAT to read out logbooks and data loggers from the transmitter for documentation purposes and save them to your computer. You can then display the data logger data in graphic form on your PC.

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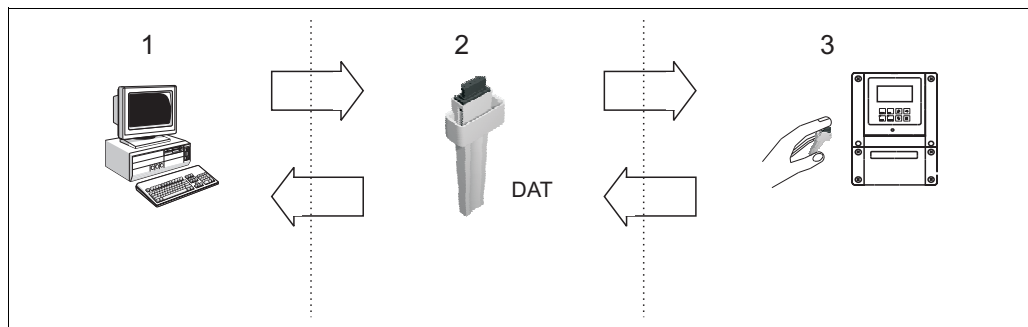
Offline configuration with Parawin (1 - 2 -3) ⇒ Mycom

Offline data backup (3 -2 -1) ⇐ Mycom

An additional adapter (RS232 <-> USB) is required to use the Parawin option. This is available as an accessory (see the "Accessories" section).

Calibration and measurement	Calibration options: • Automatic calibration with automatic buffer recognition The buffer tables, e.g. tables according to DIN, Endress+Hauser, Merck and Riedel de Haën/ Ingold, are saved in the device. Further buffer tables can also be programmed. During calibration, the device automatically recognizes the buffer value. • Manual calibration When calibrating manually, you can conduct either a two-point calibration (zero point and slope) or a single-point calibration, i.e. zero point calibration of the pH electrode. • Numeric calibration (data input) The electrode data (zero point and slope) are entered using the keypad. • Calibration data automatically accepted in the case of digital sensors with Memosens technology • Calibration logbook The data of the last 30 calibrations, along with the date and time, are saved to a list. Accuracy thanks to: • Medium temperature compensation This allows high-accuracy measurement over wide temperature ranges. With this type of compensation, the influence of temperature on the pH of the medium is compensated. • Isothermic intersection compensation This allows high-accuracy measurement even in the event of temperature fluctuations. Compensates the deviation between electrode zero point and isothermic intersection point.

Input

	Mycom S CPM153
Measured variable	pH (analog sensors or sensors with Memosens technology) ORP (analog or digital sensors) Temperature
Measuring range	pH: −2 to 16 pH ORP: −1500 to +1500 mV / -300 to +300 % Temperature: -50 to +200 °C (-58 to +392 °F)
Input impedance	$> 10^{12}\ \Omega$ (ar rated nominal operating conditions, analog measured value transmission)
Sensor circuit input current	$< 1.6 \cdot 10^{-12}$ A (at rated operating conditions)

Sensor circuit Ex connection data

⟨Ex⟩ Sensor circuit with type of protection EEx ia IIC (optional). This circuit can also be connected to sensors of category 1G (zone 0).

Maximum output voltage U_O:	12.6 V DC
Maximum output current I_O:	130 mA
Maximum output power P_O:	198 mW
Maximum external capacitance C_O:	50 nF (with ISFET sensors 150 nF)
Maximum external inductance L_O:	100 µH

Sensor circuit cable specification

Cable length (analog):	Max. 50 m (164 ft.)
Cable length (digital):	Max. 100 m (328 ft.)

Current inputs 1 / 2 (passive, optional)

Signal range:	4 to 20 mA
Input voltage range:	6 to 30 V

⟨Ex⟩ Intrinsically safe current inputs for connection of intrinsically safe electric circuits with type of protection EEx ia IIC or EEx ib IIC (optional).

Maximum input voltage U_i:	30 V DC
Maximum input current I_i:	100 mA
Maximum input power P_i:	3 W
Maximum internal capacitance C_i:	1.1 nF
Maximum internal inductance L_i:	24 µH

Resistance input (active, optional, non-hazardous only)

Resistance ranges (can be switched by software)	0 to 1 kΩ 0 to 10 kΩ

Digital inputs E1-E3

Input voltage:	10 to 50 V
Internal resistance:	R_i = 5 kΩ

⟨Ex⟩ Intrinsically safe optoelectronic coupler interfaces for connection of intrinsically safe electric circuits with type of protection EEx ia IIC or EEx ib IIC

Maximum input voltage U_i:	30 V DC
Maximum internal capacitance C_i:	negligible
Maximum internal inductance L_i:	negligible

CPG310 control unit

Digital inputs		
	Input voltage:	10 to 40 V
	Internal resistance:	R_i = 5 kΩ
	Minimum switching signal duration:	500 ms

⟨Ex⟩ Intrinsically safe optoelectronic coupler interfaces for connection of intrinsically safe electric circuits with type of protection EEx ia IIC or EEx ib IIC.

Maximum input voltage U_i:	30 V DC
Maximum internal capacitance C_i:	negligible
Maximum internal inductance L_i:	negligible

Cable specification for inductive limit position switches	Cable length:	Max. 100 m (328 ft.)

Output

Mycom S CPM153

Output signal	0/4 to 20 mA

Signal on alarm	2.4 or 22 mA in the event of an error

Load of active current output	Max. 600 Ω (depends on operating voltage)

Output distribution		
	pH:	Adjustable, 0 to 18 pH
	ORP:	
	Absolute:	Adjustable, 300 to 3000 mV
	Relative:	Adjustable, 0 to 600 %
	Temperature:	Adjustable, 17 to 200 °C (62.6 to 392 °F)

Passive current output	Operating voltage range:	6 to 30 V

Ex connection data

⟨Ex⟩ Intrinsically safe current circuits for connection with intrinsically safe electric circuits with type of protection EEx ib IIC.

Maximum input voltage U_i:	30 V DC
Maximum input current I_i:	100 mA
Maximum input power P_i:	750 mW
Maximum internal capacitance C_i:	negligible
Maximum internal inductance L_i:	negligible

Overvoltage protection	As per EN 61000?4?5:1995

Auxiliary voltage output (for digital inputs E1 - E3)

Output voltage:	15 V DC
Output current:	Max. 9 mA

⟨Ex⟩ Intrinsically safe current output circuit with type of protection EEx ib IIC.

Maximum output voltage U_O:	15.8 V DC
Maximum output current I_O:	71 mA
Maximum output power P_O:	1.13 W
Maximum external capacitance C_O:	50 nF
Maximum external inductance L_O:	100 μH

Interface to CPG310	Power supply:	
	Output voltage:	11.5 to 18 V DC
	Output current:	Max. 60 mA
	Communication:	RS 485

⟨Ex⟩ Intrinsically safe current output circuit with type of protection EEx ib. IIC.

Contact outputs	Switching voltage:	Max. 250 V AC / 125 V DC
	Switching current:	Max. 3 A
	Switching power:	Max. 750 VA
	Operating life:	$\geq$ 5 million switching cycles

⟨Ex⟩ Intrinsically safe relay contact circuits for connection of intrinsically safe electric circuits with type of protection EEx ia IIC or EEx ib IIC.

Maximum input voltage U_i:	30 V DC
Maximum input current I_i:	100 mA
Maximum input power P_i:	3 W
Maximum internal capacitance C_i:	1.1 nF
Maximum internal inductance L_i:	24 µH

Controller	Function (adjustable):	Pulse-length controller (PWM)
		Pulse-frequency controller (PFM)
		Three-point stepping controller (3-point step)
		Analog (via current output)

Controller behavior:	P / PI / PID
Control gain K_R:	0.01 to 20.00
Integral action time T_n:	0.0 ... 999.9 min
Derivative action time T_v:	0.0 ... 999.9 min
Max. frequency with pulse-frequency controller:	120 min^{-1}
Period length for pulse-length controller:	1 to 999.9 s
Minimum switch-on period for pulse-length controller:	0.4 s

Limit value and alarm functions	Set point settings:	?2.00 to 16.00 pH
	Hysteresis for switching contacts:	
	pH:	0.1 to 18 pH
	ORP absolute:	10 to 100 mV
	ORP relative:	1 to 3000%
	Alarm delay:	0 to 6000 s

Galvanic isolation	The following are on the same potential:
	• Current output 1 and auxiliary voltage
	• Current output 2 and resistance input

All other circuits are galvanically isolated from one another.

CPG310 control unit

Digital outputs	Optoelectronic coupler, max. switching voltage:	30 V DC
	Max. switching current:	100 mA
	Max. switching power:	3 W

⟨Ex⟩ Intrinsically safe optoelectronic coupler control outputs for connection of intrinsically safe electric circuits with type of protection EEx ia IIC or EEx ib IIC.

Maximum input voltage U_i:	30 V DC
Maximum input current strength I_i:	100 mA
Maximum input power P_i:	1 W
Maximum internal capacitance C_i:	negligible
Maximum internal inductance L_i:	negligible

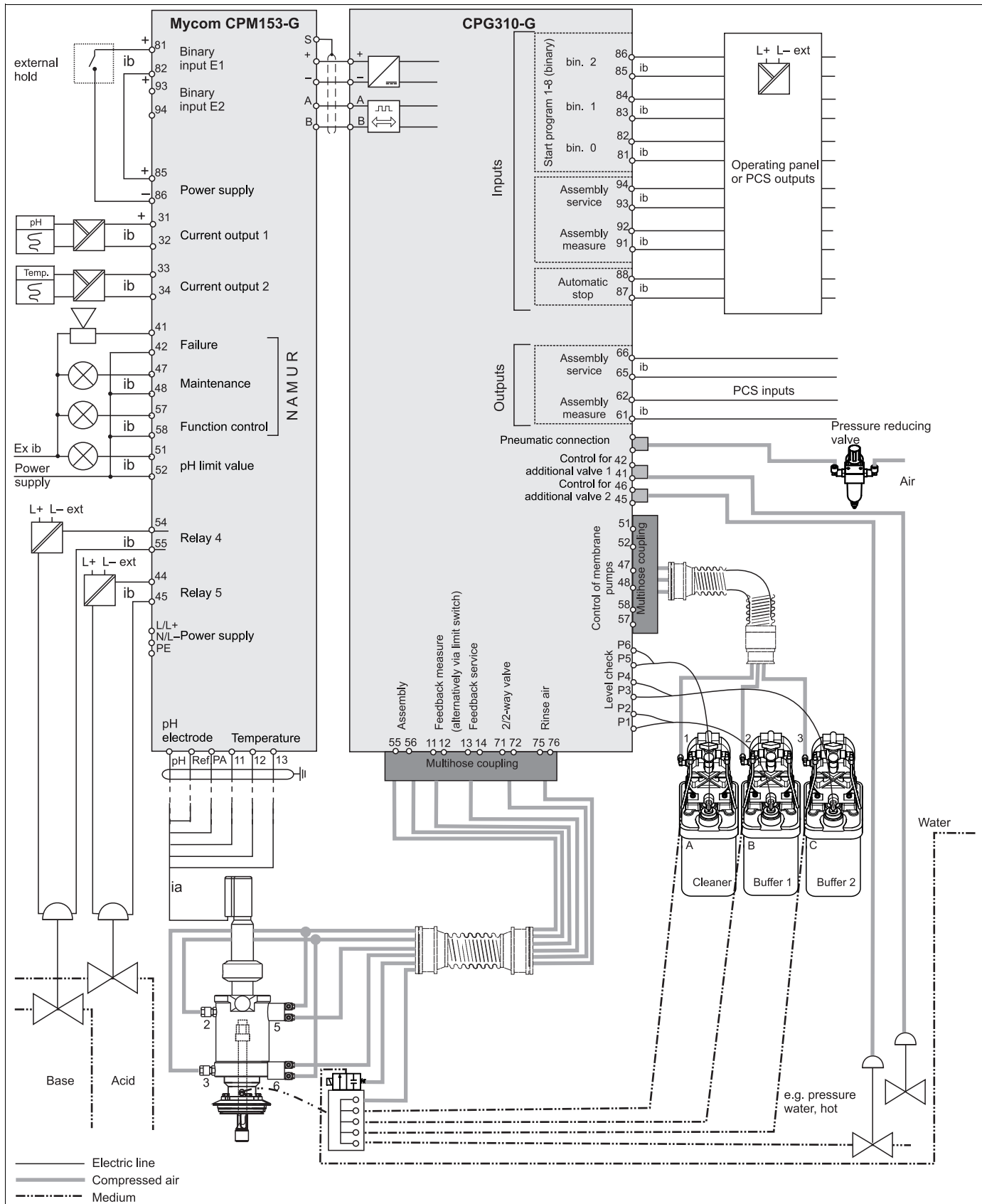| Control for external valves	**Switched compressed air output:**	
	Max. pressure:	Like supply pressure

Power supply

Electrical connection
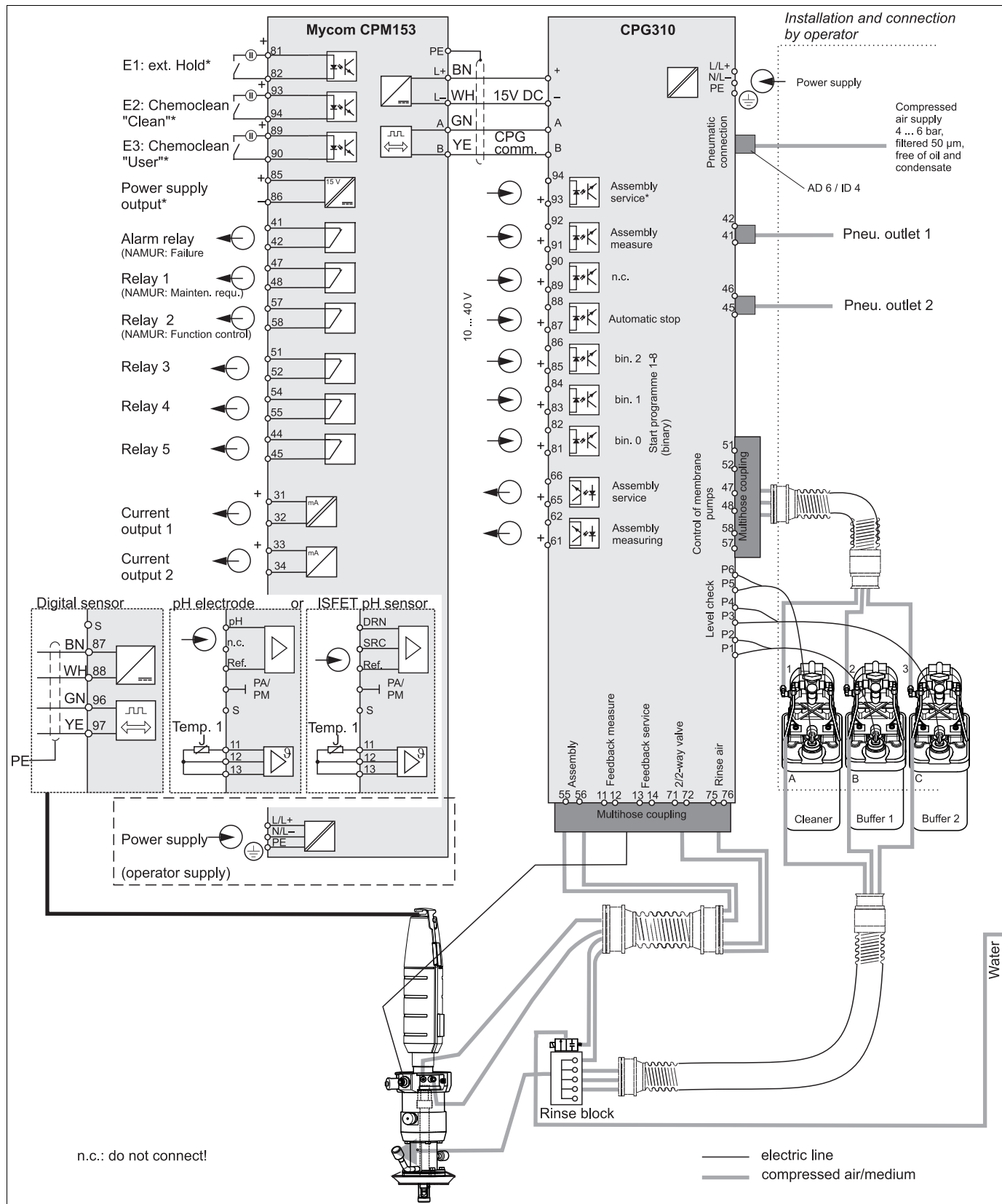

Connecting in the non-hazardous area

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Connecting in the hazardous area

Mycom S CPM153

Supply voltage	Version CPM153-xxxx**0**xxxx Version CPM153-xxxx**8**xxxx	100 to 230 V AC +10/?15 % 24 V AC/DC +20/-15 %

Cable specifications	Max. cable cross-section:	2.5 mm^2 (≘14 AWG)

Power consumption   Max. 10 VA

Separation voltage between galvanically isolated circuits   276 V$_{rms}$

Interface connection data

Mycom S has an alarm contact and five additional contacts.
You can assign functions to the contacts available via the software. The NC/NO contact type can also be switched by software.
You can assign up to three relays to the controllers.

When using the NAMUR assignment (based on the recommendations of the interest group for process control technology in the chemical and pharmaceutical industry), the functions are specified for the relays as follows:

Relay	Assignment NAMUR on	Assignment NAMUR off	Terminal
ALARM	Failure	Alarm	41 42
RELAY 1	Warning if maintenance required	Can be assigned as required	47 48
RELAY 2	Function check	Can be assigned as required	57 58

Frequency   47 to 64 Hz

Ex connection data

⟨Ex⟩ Connection data for 12V power supply
Maximum output voltage U_O: 18.5 V
Maximum output current I_O: 100 mA
Maximum output power P_O: 1.53 W
Maximum external capacitance C_O: 150 nF
Maximum external inductance L_O: 150 µH

CPG310 control unit

Supply voltage	Version CPC310-xxxxx**0**xxxxx Version CPC310-xxxxx**1**xxxxx Version CPC310-xxxxx**8**xxxxx	230 V AC +10/-15 % 110 to 115 V AC +10/?15 % 24 V AC/DC +20/-15 %
Cable specification	Max. cable cross-section:	2.5 mm^2 ($\congeq$14 AWG)
Power consumption	max. 12 VA	
Separation voltage between galvanically isolated circuits	276 V$_{rms}$	
Frequency	47 to 64 Hz	
Ex connection data	$\langle Ex \rangle$	The hazardous area device versions are powered by the CPM153 transmitter (see the data above).

Performance characteristics

| Reference temperature	25 ℃ (77 ℉), can be set with medium temperature compensation	
Measured value resolution	pH: ORP: Temperature:	0.01 pH 1 mV / 1% 0.1 K

Maximum measured error[1]	Display
	    pH:
	    ORP:
	    Temperature
	Current outputs:
	
	Current inputs:
	Resistance input:
		
		Max. 0.2 % of measuring range scope
		max. 1 mV
		max. 0.5 K
		Max. 0.2 % of current range end value in addition to deviation of display
		Max. 1 % of measuring range scope
		Max. 1 % of measuring range scope

Repeatability	Max. 0.1 % of measuring range	
Zero point offset range	pH: ORP:	?2 to +16 pH -200 to +200 mV
Slope adjustment	pH:	5 to 99 mV / pH
Offset	ORP: Temperature:	±120 mV ±5 K
Assignment for ORP relative	Adjustable, Δ for 100% = 150 to 2000 mV	

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1) According to IEC 746-1, at rated operating conditions

Installation

Installation instructions for CPM153

Wall mounting

- Make sure the maximum permitted ambient temperature range is observed (-20 to +60 °C (-4 to +140 °F)). Install the device in a shady location. Avoid direct sunlight.
- Mount the wall-mount housing in such a way that the cable entries always point downwards.
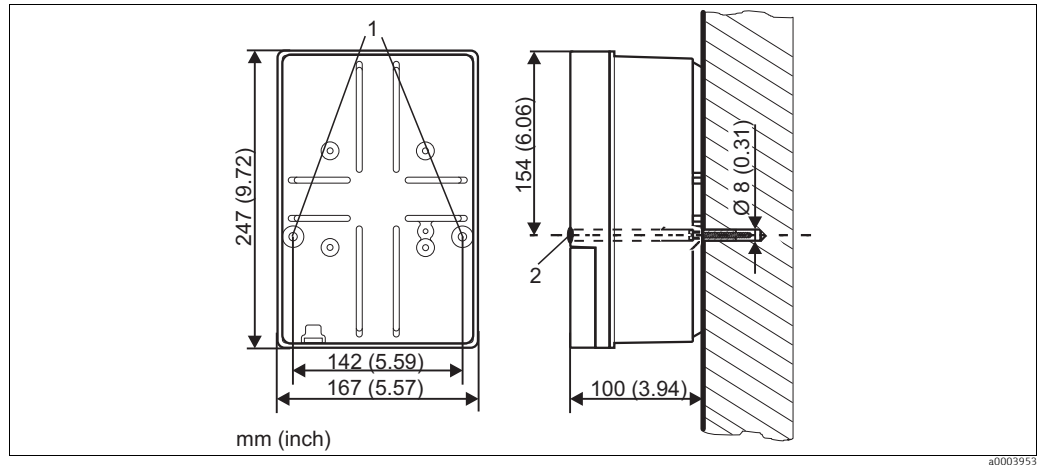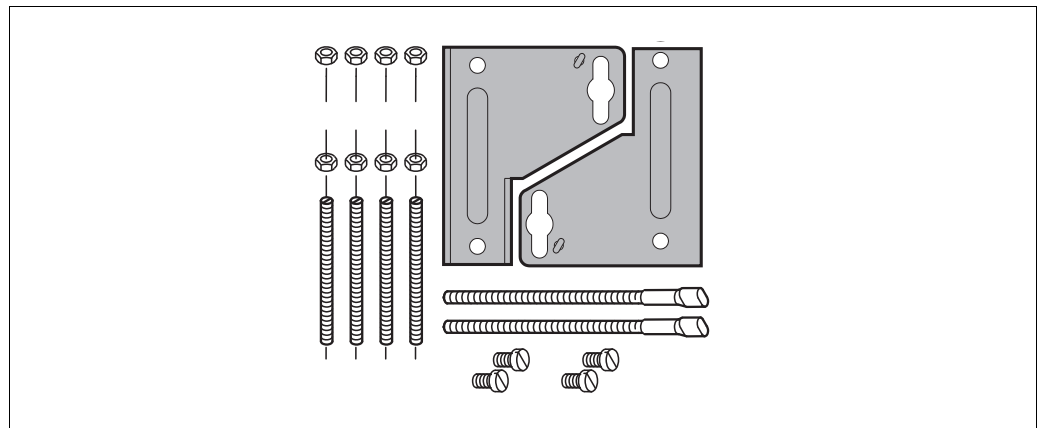
Dimensions for wall mounting, securing screw: Ø 6 mm (0.24"), wall plug: Ø 8 mm (0.31")

1   Mounting bore holes
2   Plastic caps

Post mounting and panel mounting

ℹ️ You need a post mounting kit to secure the field device to horizontal and vertical posts or pipes (max. Ø 60 mm / 2.36"). This is available as an accessory (see the "Accessories" section).

Mounting kit

Mount the parts of the mounting kit on the back of the device as illustrated in the graphic below.
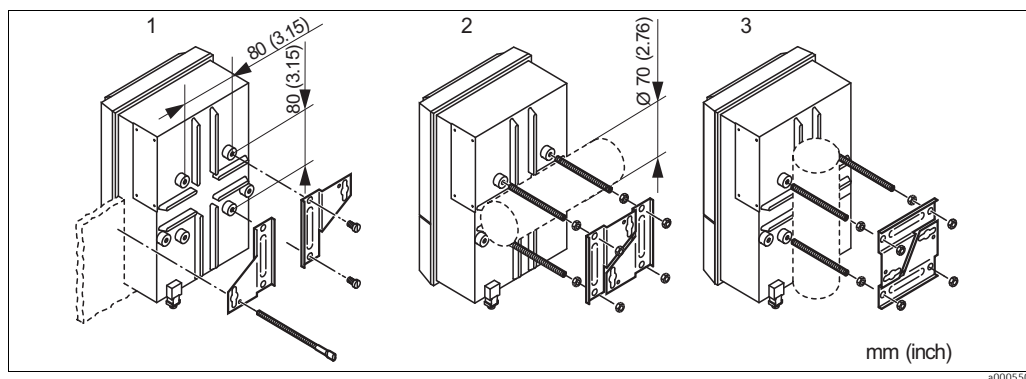
Panel mounting:
 If you want to mount the device on the front of an air-tight panel, you must also use a flat seal (see "Accessories").

Required cutout for mounting:	161 x 241 mm (6.34" x 9.49")
Installation depth:	134 mm (5.28")

Post mounting:

Pipe diameter:	Max. 70 mm (2.76")

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Panel mounting and post mounting

1   Panel mounting
2   Post mounting, horizontal
3   Post mounting, vertical

NOTICE

Climatic influences (rain, snow, direct sunlight etc.)

Function impairment and even total transmitter failure

▸   Always use the weather protection cover (accessory) when mounting the device outdoors.

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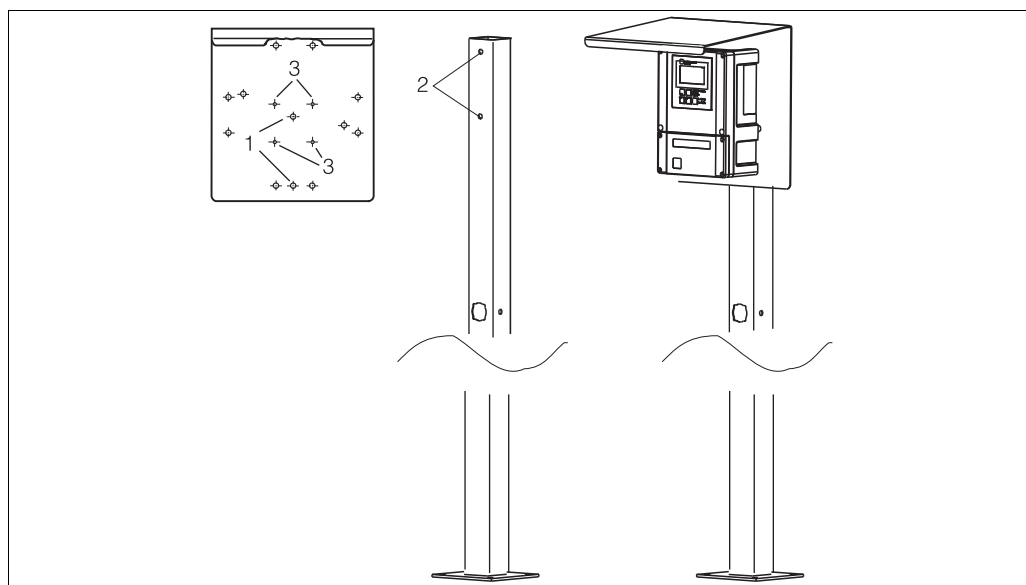
Secured to post with weather protection cover

1   Bore holes for mounting on upright post
2   Bore holes for securing the weather protection cover
3   Bore holes for mounting the transmitter

Installation instructions for CPG310

Wall mounting
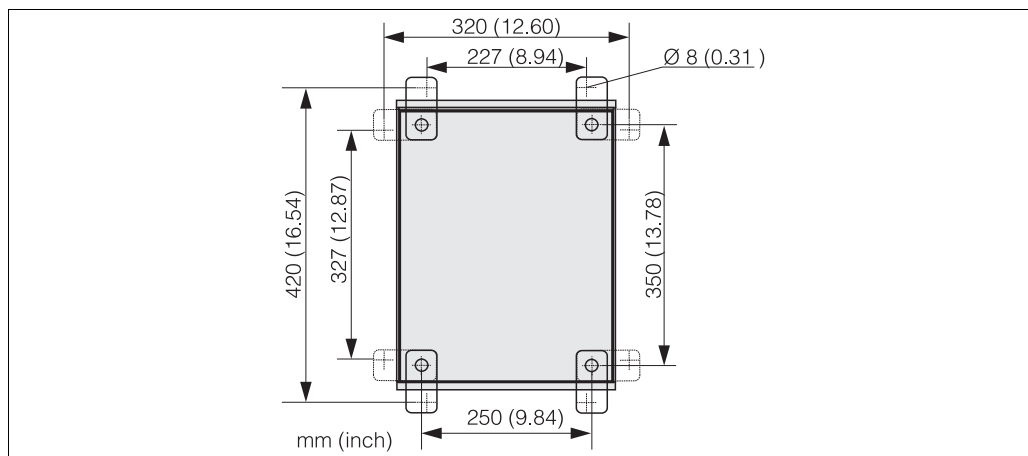
Dimensions for wall mounting with wall securing kit (part of scope of delivery)

Proceed as follows to wall-mount the unit:

1. Please note that the maximum suction height for buffer and cleaner is 2.5 m (8.2 ft.) when using the standard multihoses supplied. Bore the holes as per the graphic above.

2. Screw the elements of the wall securing set supplied to the rear wall of the housing.

3. Secure the housing to the wall without any inclination.

Maximum length of lines and hoses

The graphic below illustrates the maximum distances between the system components.
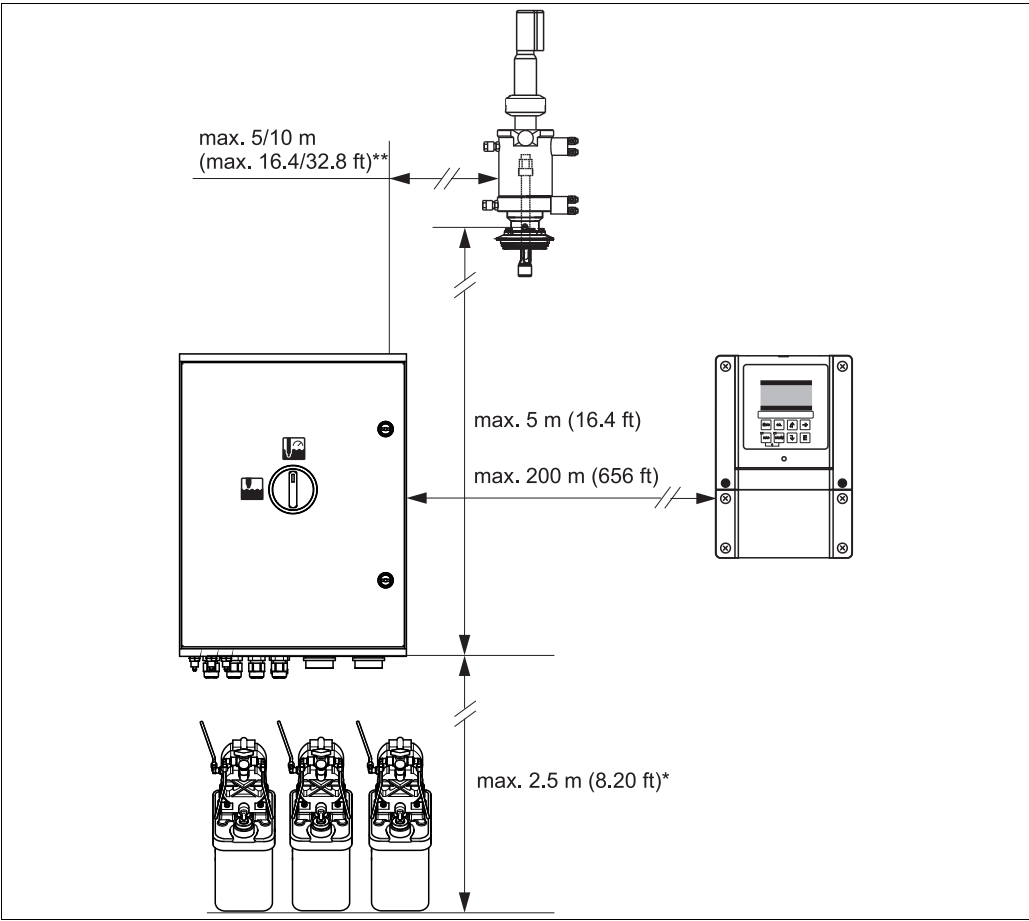
Maximum spacing for Topcal S CPC310 system components

*   when using the multihoses supplied as standard
**   depending on the multihose version ordered*

Environment

Ambient temperature range	-10 to +55 ℃ (+14 to +131 ℉) -10 to +50 ℃ (+14 to +122 ℉) (Ex)
Ambient temperature limits	−20 to +60 ℃ (-4 to +140 ℉) -10 to +50 ℃ (+14 to +122 ℉) (Ex)
Storage temperature	−30 to +80 ℃ (?22 to +176 ℉)
Electromagnetic compatibility	Interference emission to EN 61326: 1997 / A1:1998; Class B equipment (residential environments) Interference emission to EN 61326: 1997 / A1:1998; Appendix A (industry)

Degree of protection	**CPM153**
	IP 65
	CPG310
	IP 54

Relative humidity	10 to 95%, non-condensating

Safety requirements	Complies with general safety requirements acc. to EN 61010. Complies with NAMUR Recommendations NE 21: 08/1998.

Mechanical construction

Design/dimensions   **CPM153**

cxm153?dim.cdr
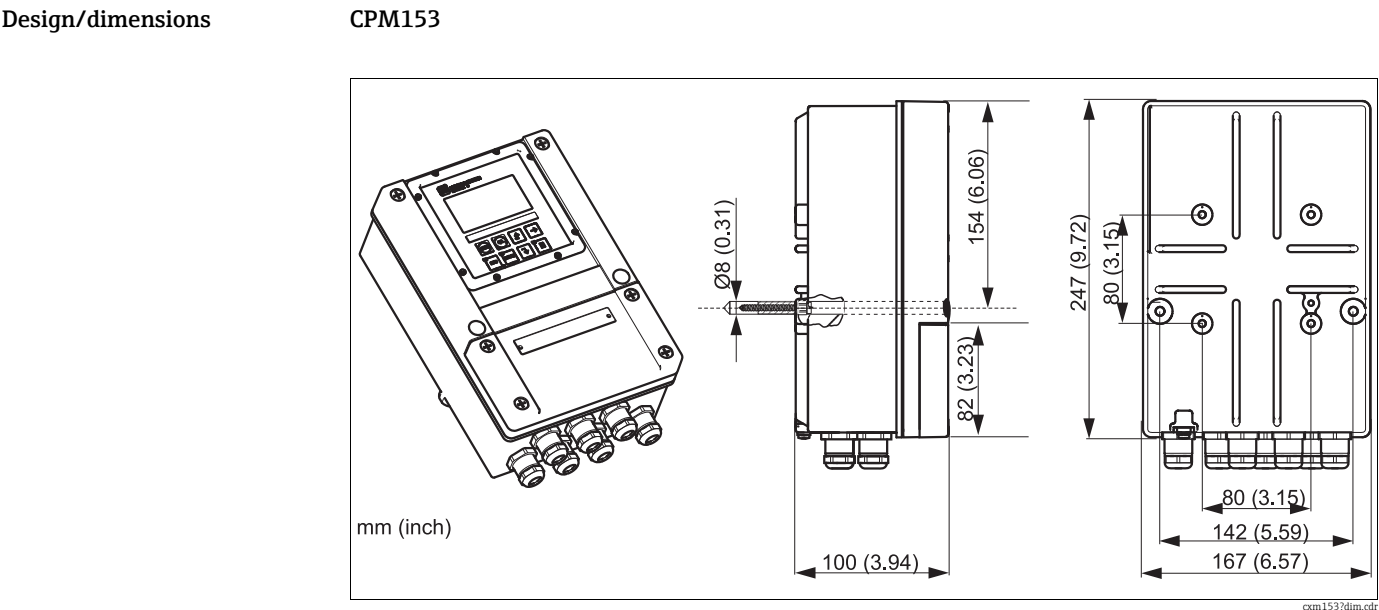
Dimensions of Mycom S

CPG310
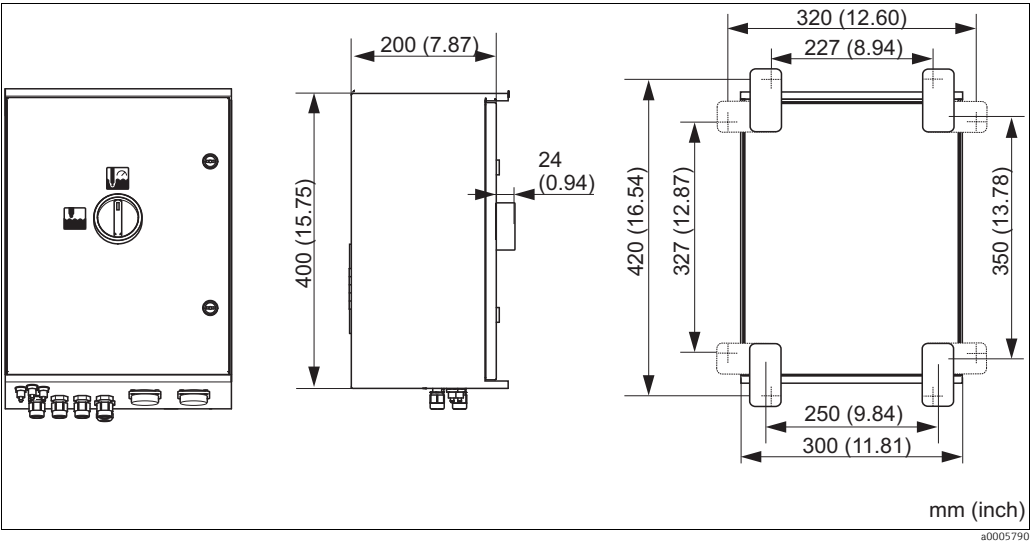
Dimensions of CPG310 control unit

a0005790

Weight	**CPM153**
	Max. 6 kg (13.23 lbs)
	CPG310
	Approx. 15 kg (33.1 lbs)

Materials

CPM153

| Housing: | GD-AlSi 12 (Mg content 0.05%), plastic-coated |
| Front: | Polyester, UV-resistant |

CPG310

Housing:	Polyester GF
Hoses:	PU, PTFE (wetted)
Pump:	PP, PVDF (wetted)
Level probes:	Polypropylene
Canister:	HDPE

ℹ️ Never fill the canisters with organic cleaner.

Operability

CPM153 display elements and operating elements

Backlit LC display with dot matrix, 128 x 64 dots
The display shows the current measured value and the temperature simultaneously, providing you with the most important process data at a glance. Text information in the Configuration menu helps users configure the device parameters.

a0004120-en

1	*Current menu*	*8*	*HOLD displayed if HOLD active*
2	*Current parameter*	*9*	*Current primary value*
3	*Navigation row: arrows for scrolling; "E" for scrolling on; notice for canceling*	*10*	*"Failure", "Warning" displayed if the NAMUR contacts are active*
4	*Measuring mode key*	*11*	*Labeling field*
5	*Calibration key*	*12*	*Arrow keys for selecting and entering*
6	*Diagnosis menu key*	*13*	*Enter key*
7	*Parameterization menu key*		

Operating functions

There are four main menus available for device operation:

- Measure
- Parameterization
- Calibration
- Diagnosis

Here, the submenus are displayed in plain text and selected elements are displayed in reverse video. Selections are made using the arrow keys, which are also used to edit the numeric values.

Access codes

Functions can be protected by four-digit access codes to protect the transmitter against unintentional and undesired changes to the configuration and the calibration data. Access is categorized into the following levels:

- Display level (can be accessed without a code)
  The complete menu can be viewed. The configuration cannot be altered. No calibration is possible. On this level, only the control parameters for new processes can be changed in the "DIAG" menu branch.
- Maintenance level (can be protected by the maintenance code)
  Calibration is possible with this code.
  The temperature compensation menu item can be used with this code. The factory functions and the internal data can be viewed.
- Specialist level (can be protected by the specialist access code)
  All menus can be modified.

ℹ️ All the functions are freely accessible provided no codes have been defined.

Offline configuration with Parawin (option)[2]

The Parawin PC tool provides you with a tool for configuring your measuring point offline at the PC using a simple and self-explanatory menu structure (see the sample window below). Write the configuration to the DAT module using the RS232 interface on the PC. The module can then be plugged into the transmitter.

The adapter (RS232 <-> USB) is available as an accessory.

a0005509
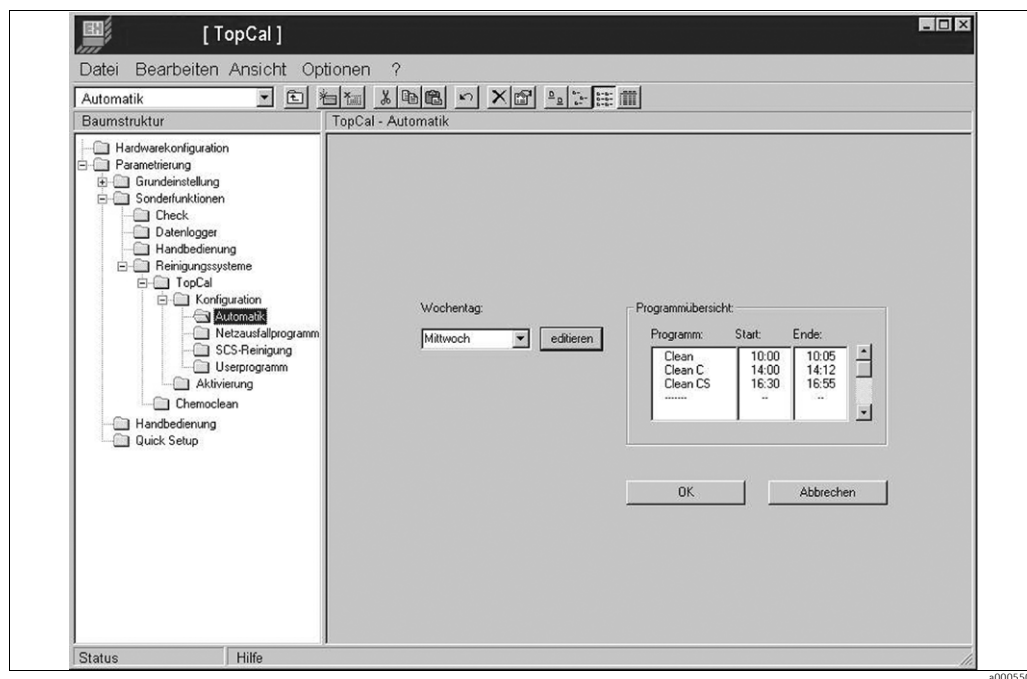
Parawin menu structure

Certificates and approvals

CE mark

Declaration of conformity
The product meets the statutory requirements of the harmonized European standards. The manufacturer confirms the product complies with the standards by affixing to it the CE mark.

Ex approval

Depending on the version ordered:
- ATEX II (1) 2G, EEx em ia/ib IIC T4
- EC system approval

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2)   Available as of September 2006

Ordering information

Ordering instructions

Compile the order code for the Topcal system as follows:

1. Select the desired approval.
2. What material should the rinsing block and O-ring be made of?
3. Select the sensor input and measurement output.
4. Which type of power supply is required?
5. Select the language for the menu.
6. Define the cable entries and the option for the multihose.
7. Which assemblies (CPA47x or CPA87x) should Topcal be configured for?

Product page

You can create a valid and complete order code on the Internet with the Configurator tool.

Enter the following address in the browser to access the product page:
www.endress.com/cpc310

Product Configurator

You can find the navigation area on the right-hand side of the product page.

1. Under "Device support", click "Configure the selected product".
   ↳ The Configurator opens in a separate window.
2. Configure the device according to your requirements by selecting all the options.
   ↳ This provides you with a complete and valid order code.
3. Export the order code as a PDF or Excel file. To do so, click the corresponding button at the top section of the window.

Scope of delivery

The scope of delivery of the system comprises:
- 1 Mycom S CPM153 transmitter including post mounting kit
- 1 CPG310 control unit
- 1 rinsing block with securing clamps for assembly
- 4 multihoses
- 2 technical buffer solutions pH 4.00 and 7.00
- 3 double-membrane pumps for conveying cleaner and buffer with canisters
- 1 communication/power supply cable CPG310 / Mycom S CPM153
- 3 level probes, complete with CPG310 cable to canisters
- 1 pressure reduction valve with pressure gauge
- 1 water filter
- 1 Teflon connection hose
- 1 device identification card
- 1 set of Operating Instructions in English
- Accessories where applicable

Accessories

Offline configuration	• Parawin
	Graphic PC program for offline configuration of the measuring point at the PC. You can switch the language via software. Required operating system: Windows NT/95/98/2000.
	Offline configuration consists of:
	  • One DAT module
	  • DAT interface (RS 232)
	  • Software
	Order No.: 51507563 (Topclean S / Mycom S)

Additional adapter	RS232 <-> USB adapter Order No.: 71200843
DAT module	• Additional memory module for saving or copying configuration, data logs and logbooks; Order No.: 51507175
Flat seal	• Flat seal for front-panel airtight panel mounting of Mycom S; Order No.: 50064975
Assemblies	Cleanfit CPA871 • Flexible retractable process assembly for water, wastewater and the chemical industry • Order according to product structure, www.products.endress.com/cpa871 • Technical Information TI01191C/07/EN Cleanfit CPA875 • Retractable process assembly for sterile and hygienic applications • Order according to product structure, www.products.endress.com/cpa875 • Technical Information TI01168C/07/EN Cleanfit P CPA472, version CPA472-xxxxxx3/4 • Compact plastic retractable assembly for installation in tanks and pipes, for manual or pneumatically remote-controlled operation • Order according to product structure, www.products.endress.com/cpa472 • Technical Information TI00223C/07/EN Cleanfit P CPA472D, version CPA472-xxxxxxx3/4/5 • Retractable assembly for pH/ORP measurement in tanks and pipes, manual or pneumatic operation, heavy-duty version made from heavy-duty materials • Order according to product structure, www.products.endress.com/cpa472d • Technical Information TI00403C/07/EN Cleanfit P CPA473 • Stainless steel retractable process assembly with ball valve shutoff for very reliable separation of the process medium from the environment • Order according to product structure, www.products.endress.com/cpa473 • Technical Information TI00344C/07/EN Cleanfit P CPA474 • Plastic retractable process assembly with ball valve shutoff for very reliable separation of the process medium from the environment • Order according to product structure, www.products.endress.com/cpa474 • Technical Information TI00345C/07/EN

Sensors

Glass electrodes

Orbisint CPS11/CPS11D
- pH electrode for process engineering
- With dirt-repellent PTFE junction
- Order according to product structure, www.products.endress.com/cps11 or www.products.endress.com/cps11d
- Technical Information TI00028C/07/EN

Orbisint CPS12/CPS12D
- ORP electrode for process engineering
- With dirt-repellent PTFE junction
- Order according to product structure, www.products.endress.com/cps12 or www.products.endress.com/cps12d
- Technical Information TI00367C/07/EN

Memosens CPS31D
- pH electrode with Memosens technology for drinking water and swimming pool water
- Gel-filled reference system with ceramic junction
- Order according to product structure, www.products.endress.com/cps31d
- Technical Information TI00030C/07/EN

Ceratex CPS31
- pH electrode for drinking water and swimming pool water
- Gel-filled reference system with ceramic junction
- Order according to product structure, www.products.endress.com/cps31
- Technical Information TI00030C/07/EN

Ceraliquid CPS41/CPS41D
- pH electrode with ceramic junction and KCl liquid electrolyte
- Order according to product structure, www.products.endress.com/cps41 or www.products.endress.com/cps41d
- Technical Information TI00079C/07/EN

Ceraliquid CPS42/CPS42D
- ORP electrode with ceramic junction and KCl liquid electrolyte
- Order according to product structure, www.products.endress.com/cps42 or www.products.endress.com/cps42d
- Technical Information TI00373C/07/EN

Ceragel CPS71/CPS71D
- pH electrode with poison-resistant reference with ion trap
- Order according to product structure, www.products.endress.com/cps71 or www.products.endress.com/cps71d
- Technical Information TI00245C/07/EN

Ceragel CPS72/CPS72D
- ORP electrode with poison-resistant reference with ion trap
- Order according to product structure, www.products.endress.com/cps72 or www.products.endress.com/cps72d
- Technical Information TI00374C/07/EN

Orbipore CPS91/CPS91D
- pH electrode with open aperture diaphragm for media with a high dirt load
- Order according to product structure, www.products.endress.com/cps91 or www.products.endress.com/cps91d
- Technical Information TI00375C/07/EN

Orbipore CPS92/CPS92D
- ORP electrode with open aperture diaphragm for media with a high dirt load
- Order according to product structure, www.products.endress.com/cps92 or www.products.endress.com/cps92d
- Technical Information TI00435C/07/EN

ISFET sensors

Tophit CPS471/CPS471D
- Sterilizable and autoclavable ISFET sensor for food and pharmaceutics, process engineering, water treatment and biotechnology
- Order according to product structure, www.products.endress.com/cps471 or www.products.endress.com/cps471d
- Technical Information TI00283C/07/EN

Tophit CPS441/CPS441D
- Sterilizable ISFET sensor for low-conductivity media, with liquid KCl electrolyte
- Order according to product structure, www.products.endress.com/cps441 or www.products.endress.com/cps441d
- Technical Information TI00352C/07/EN

Tophit CPS491/CPS491D
- ISFET sensor with open aperture diaphragm for media with high dirt load
- Order according to product structure, www.products.endress.com/cps491 or www.products.endress.com/cps491d
- Technical Information TI00377C/07/EN

|	
Testing tool	Memocheck Sim CYP03D - Testing tool for analytical measuring point - Sensor simulation and error simulation - Order according to product structure, www.products.endress.com/cyp03d - Technical Information TI00481C/07/EN

Connection accessories	CPK1 measuring cable
	- For pH/ORP electrodes with GSA plug-in head
	- Order according to product structure, see Technical Information TI00501C/07/EN
	
	CPK9 measuring cable
	- For pH/ORP electrodes with TOP68 plug-in head, for high-temperature and high-pressure applications, IP 68
	- Order according to product structure, see Technical Information TI00501C/07/EN
	
	CPK12 measuring cable
	- For ISFET sensors and pH/ORP electrodes with TOP68 plug-in head
	- Order according to product structure, see Technical Information TI00501C/07/EN
	
	CYK10 Memosens data cable
	- For digital sensors with Memosens technology
	- Order according to product structure, www.products.endress.com/cyk10
	- Technical Information TI00118C/07/EN
	
	CYK12 measuring cable
	- Unterminated cable for extending sensor cables CPK1, CPK9 and CPK12
	- Coax and 5 pilot wires
	- Material sold by the meter, order numbers:
	  - Non?hazardous area version, black: 51506598
	  - Hazardous area version, blue: 51506616
	
	CYK81 measuring cable
	- Unterminated cable for extending sensor cables (e.g. Memosens, CUS31/CUS41)
	- 2 x 2 cores, twisted with shield and PVC sheath ($2 \times 2 \times 0.5\ mm^2$ + shield)
	- Material sold by the meter, Order No. 51502543
	
	- Junction box VBE, Ex zone?0
	  For connecting up to 3 individual wires from Ex?zone 0 sensors
	  Order No. 50003993

Mounting accessories

CYY101 weather protection cover for field devices, absolutely essential if operating the unit outdoors
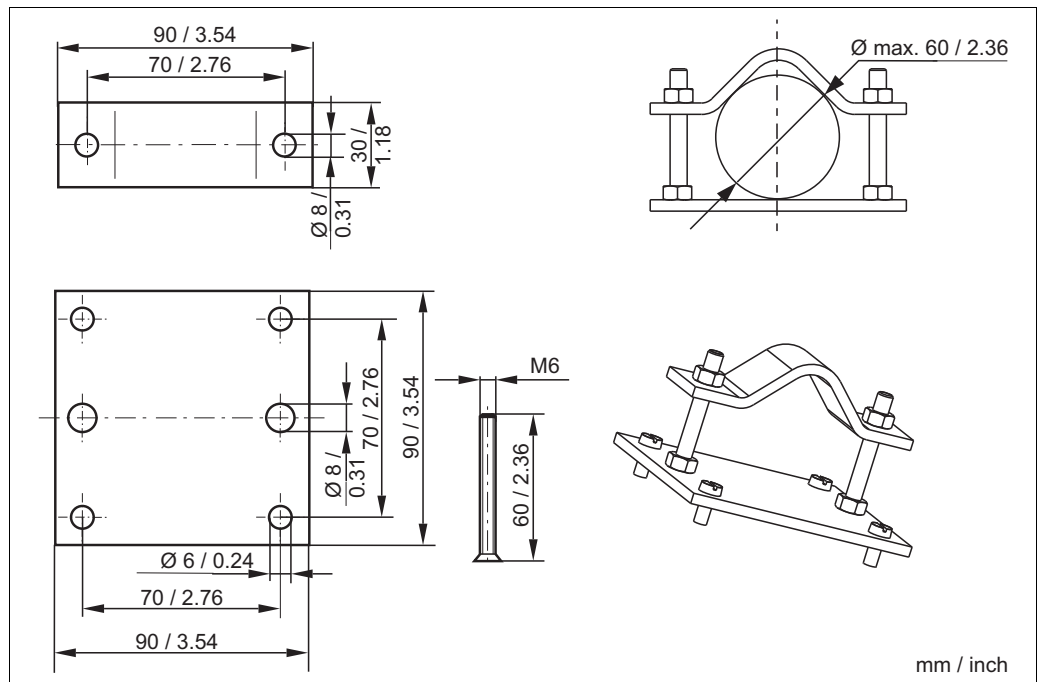- Material: stainless steel 1.4301 (AISI 304)
- Order No. CYY101?A
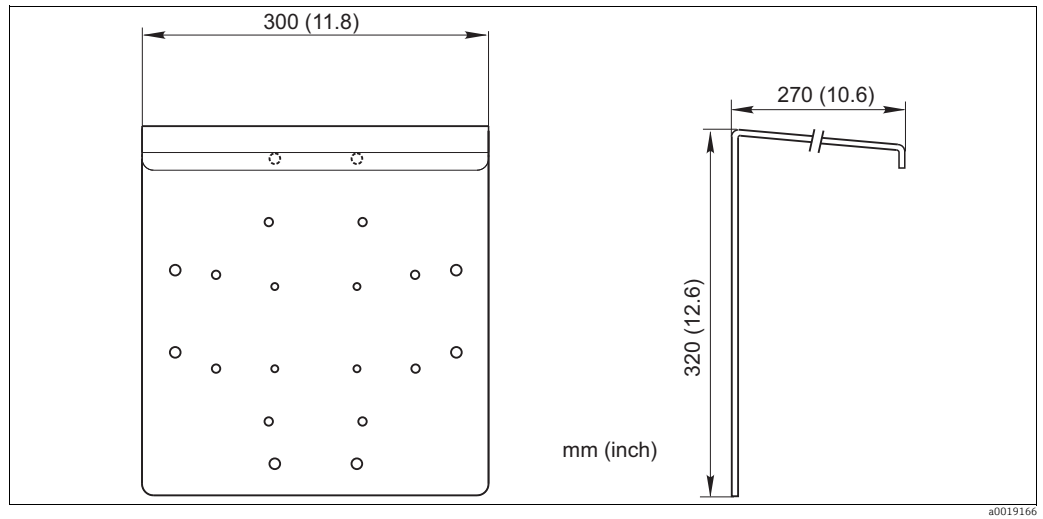
Weather protection cover for field devices

Post mounting kit
- To secure the field device to horizontal and vertical posts or pipes
  (Ø max. 60 mm (2.36"))
- Material: stainless steel 1.4301
- Order No. 50086842

Mounting kit for securing to pipes and posts

Buffer solutions	**High-quality buffer solutions from Endress+Hauser - CPY20**

Solutions which are traced by the DAkkS-accredited Endress+Hauser buffer laboratory (DAkkS = German Accreditation Body) to a primary reference material of the PTB and to standard reference material of the National Institute of Standards and Technology (NIST) in accordance with DIN 19266 are used as secondary reference buffer solutions.
Order according to product structure, www.products.endress.com/cpy20

Technical ORP buffer solutions
- +220 mV, pH 7, 250 ml; Order No. CPY3-4
- +468 mV, pH 0.1, 250 ml; Order No. CPY3-5

CYC310 protective enclosure

Enclosure for Topcal S CPC310, with removable rack for buffer and cleaner. Operating panel with alarm LED and locking to start the programs and move the assembly. For hazardous and non-hazardous applications.
Degree of protection: IP54

Material: Plastic or stainless steel.
- Plastic version: Viewing window for Mycom S and Memograph S
- Stainless steel version without Memograph: Viewing window for Mycom S
- Stainless steel version with Memograph: Viewing window for Memograph S
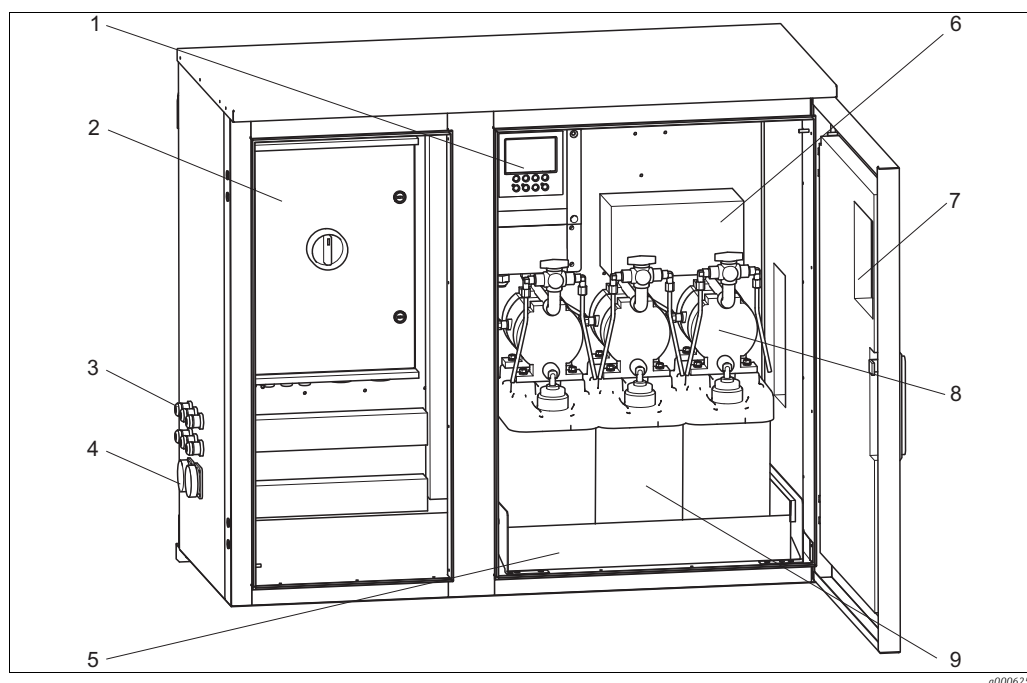
a0006254

Interior view of CYC310 protective enclosure, stainless steel version

1	Mycom S CPM153	6	Junction box
2	Control unit	7	Viewing window for display
3	Cable glands	8	Membrane pumps for conveying buffer and
4	Multihose feedthroughs	9	cleaner
5	Rack		Buffer and cleaning solutions
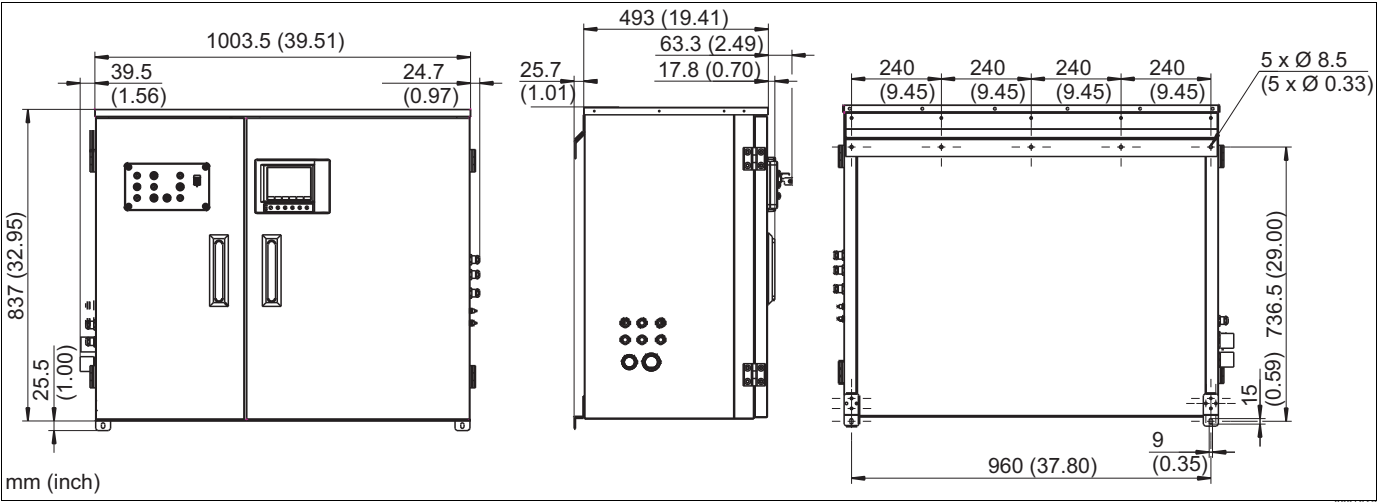
Dimensions of enclosure CYC310, stainless steel version
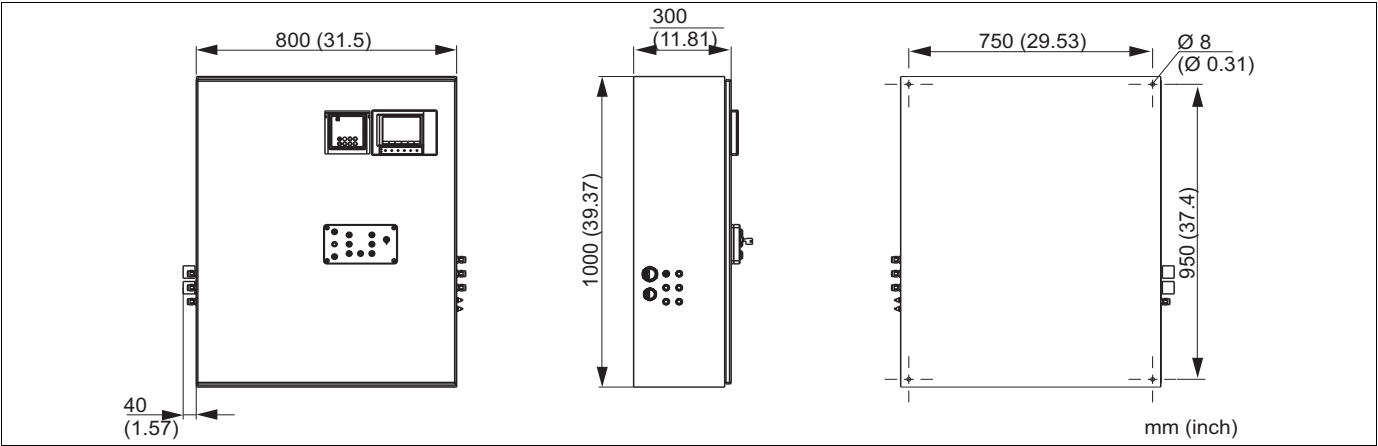
Dimensions of enclosure CYC310, plastic version

Ordering information

	Certificates							
	A	Basic features: Non?Ex						
	G	With ATEX approval, ATEX II (1) 2G EEx, em ib[ia] IIC T4						
		Power supply						
		1	230 V AC					
		2	110 to 115 V AC					
		3	24 V AC / DC					
			Materials					
			A	Plastic				
			B	Stainless steel 1.4301 (AISI 304)				
				Heating				
				1	Without electric heating			
				2	With electrical heating			
					Data logging			
					A	Without Memograph		
					B	With Memograph		
						Assignment		
						1	Empty housing, CPC310 not mounted	
						2	Order position of the associated CPC310	
							Options	
							1	Basic version
CYC310-								complete order code

Operating panel

Operating panel with alarm LED and key switch to start the programs and move the assembly.
Order No.: 51512891
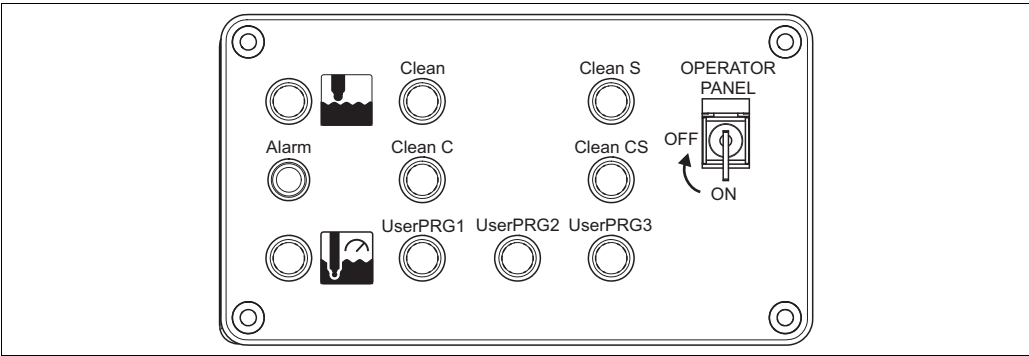
a0006249

Operating panel

www.addresses.endress.com

Endress+Hauser [E+H]

People for Process Automation