Automation of pH/Redox Measurements
TopClean S CPC 30

Automatic Measuring and Cleaning System in Ex and Non-Ex areas

Applications

The automatic pH/redox measuring and cleaning system TopClean S CPC 30 combines a very high degree of safety, highly precise measurement results and very low maintenance requirements.
It is the optimum choice for heavily polluted and aggressive media as well as for high-accuracy measurement tasks, for e.g.

- Food industry
- Pharmaceutical industry
- Process industry
- Water treatment
- Ex applications

Your benefits

- Very high degree of safety:
  - System status messages with feed-back to the control desk
  - In-process electrode cleaning, no electrode removal necessary
  - Automatic cleaning on detection of electrode fouling
- High availability:
  - Long electrode life due to measuring cycle
  - Offline configuration: Very simple set-up on PC
  - DAT module: very simple copying of set-up to other devices
- Short amortisation times:
  - Low procurement price
  - Low maintenance costs through automatic cleaning of electrode
  - Low installation effort through modular design
- Approved for Ex applications
- Communication via PROFIBUS-PA and HART

Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser
The Power of Know How

Functions and system design

The cleaning system TopClean S CPC 30 consists of the following components:
- Control unit CPG 30
- Transmitter Mycom S CPM 153
- Injector CYR 10
- Multihose with assembly hose clip
- Power supply/control cable CPG 30 / Mycom S CPM 153 (5 m)
- Control lines CPG 30 / Injector CYR 10 (3 m).

Control unit CPG 30

The control unit CPG 30 converts the commands of the CPM 153 into pneumatic signals and sends feedback signals such as assembly position and monitoring signals for compressed air and water. The injector CYR 10 doses water and cleaning agent to clean the electrode. The transmitter CPM 153 has five contacts and an alarm contact. Optionally, you can obtain an extra freely-configurable output contact for the control unit CPG 30. This can be used to control pneumatic values in explosion hazardous zones or solenoid valves in non-hazardous zones to convey hot or aggressive media.
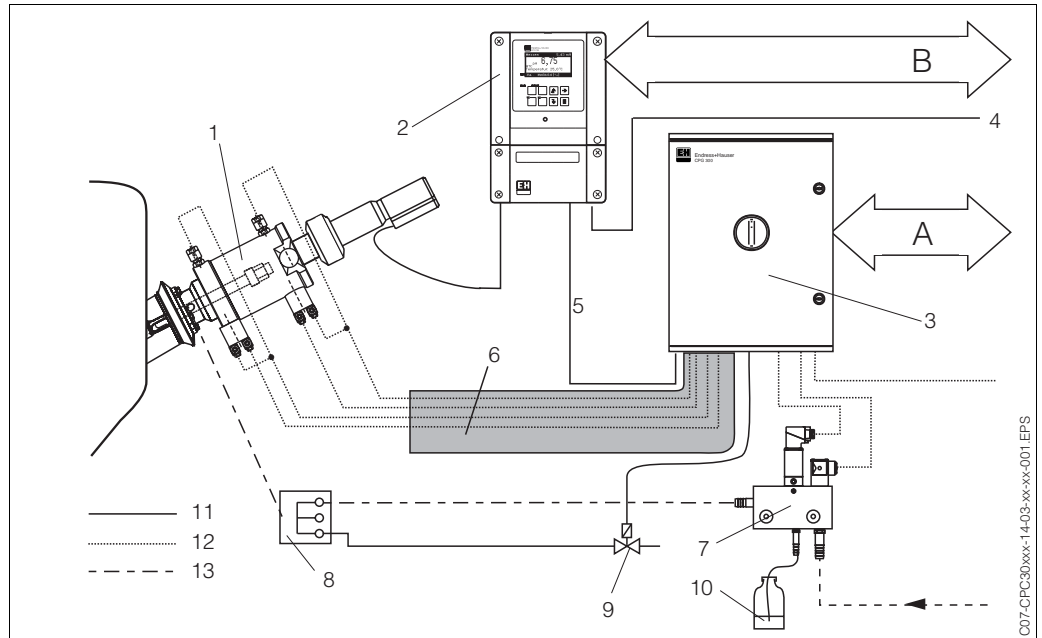
Transmitter Mycom S CPM 153

The CPM 153 is the central unit of the measuring point. It processes the measured variables, acts as communications centre and controls processes. The CPM 153 controls processes in the CPG 30 via an interface and processes its feedback signals.

In the Ex version, the CPC 30 is powered via the power supply/control cable from the CPM 153; in the non-Ex version, the CPC 30 has its own power supply connection.

Measuring system

A complete measuring system consists of the following components:
- TopClean S CPC 30
- Pneumatically driven retractable assembly (e.g. CleanFit or ProbFit series) with pneumatic ot inductive limit switches
- pH/redox electrode
- Electrode cable
- Cleaning agent with hoses
- RinseRinse block (for media which are controlled by additional valves)
- Hoses for injector CYR 10 / retractable assembly

Complete measuring system in non-Ex area
1: Retractable assembly CleanFit CPA 475 with pH / redox electrode
2: Transmitter Mycom S CPM 153
3: Control unit CPG 30
4: Power supply for Mycom S CPM 153
5: Power supply / control cable
6: Multihose
7: Injector CYR 10
8: RinseRinse block CPR 40 (optional)
A: Message and control signals: assembly position, program status, move assembly, program stop
B: Hold input, six relay contacts, two current outputs 0/4 ... 20 mA

Customer supplies:
9: Additional valve
10: Cleaning solution
11: Electrical wiring
12: Compressed air
13: Liquids / cleaning mixture

Complete measuring system in Ex area
1: Retractable assembly CleanFit CPA 475 with pH / redox electrode
2: Transmitter Mycom S CPM 153
3: Control unit CPG 30
4: Power supply for Mycom S CPM 153
5: Power supply / control cable
6: Multihose
7: Injector CYR 10
8: Rinse block CPR 40 (optional)
A: Message and control signals: assembly position, program status, move assembly, program stop
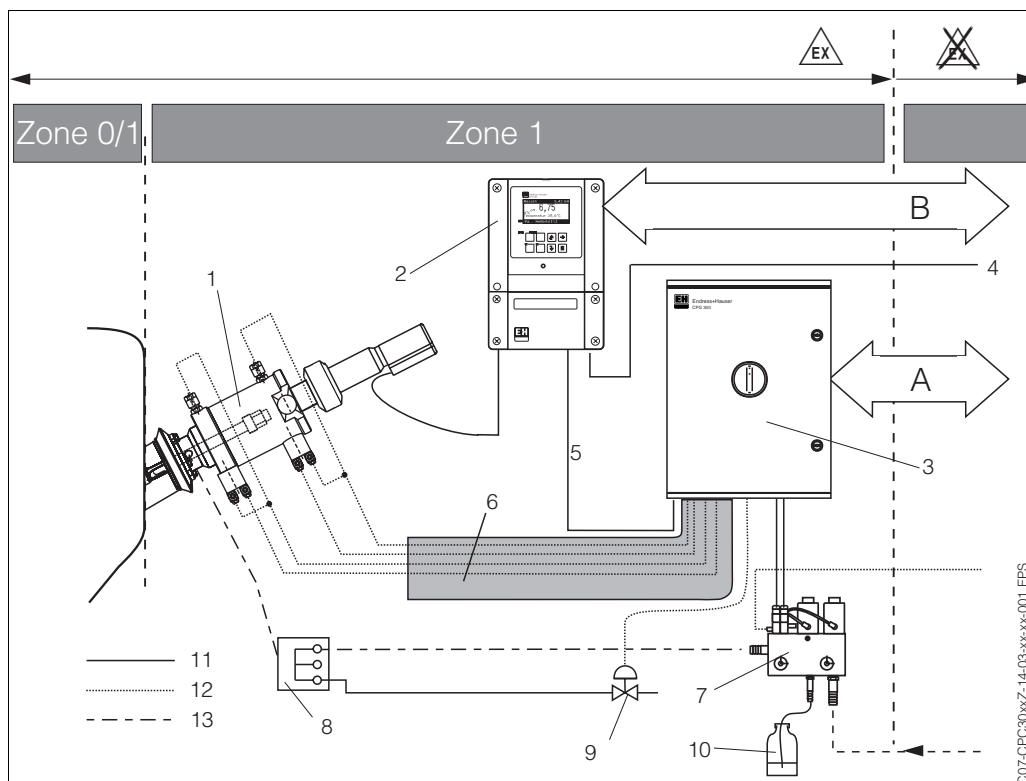*B: Hold input, six relay contacts, two current outputs 0/4 ... 20 mA*

Customer supplies:
9: Additional valve
10: Cleaning solution
11: Electrical wiring
12: Compressed air
13: Liquids / cleaning mixture

Operating modes

For configuration, select the appropriate cleaning programme for your measuring point from the stored programmes in the instrument. You can freely adapt the cleaning programmes to your requirements or deactivate them as necessary.

You can choose between the following functions:
- *Automatic*: Freely programmeable weekly programme, separately for every week day with freely selectable interval lengths.
- *Cleaning:* Selection of cleaning programmes.
- *User programme:* Selection and configuration of customer-specific cleaning programme
- *Power failure programme:* In the event of a failure of the power supply or the communication, the system is automatically cleaned.
- *External control:* Programmes can be started via an external process control system.

Cleaning programs

You have a choice of six programs in total.
- Programs Programme Clean, Clean S, Clean Int: These programs have a set procedure. The cleaning times or repeat cycles are freely seelctable.
- Programs User 1 ... 3: User-definable. A simple way of programming is to copy predefined programs to user programs and adapt them.

Select the control for one external additional valve for your device under Order Code item **"External valve control"**. The "sterilisation" or "sealing water"* functions are **only** enabled on devices fitted with a control function for additional external valves. You can freely use additional external valves as required in the freely definable user programs. For example, for pressurised media such as superheated steam, a second cleaner, cooling air, organic cleaner etc.

We recommend to use the rinse block CPR 40 for all the media, which shall be controlled by the additional valves.In any case, you have to convey hot and aggressive media via the additional valves and the rinse block (see "Materials").

Function → Program ↓	Cleaning	Sterilisation	Sealing water*
Clean (= cleaning)	✓	–	Control for 1 valve required
Clean S (= cleaning + sterilisation)	✓	Control for 1 valve required	–
Clean Int (= cleaning interval)	✓	–	Control for 1 valve required

User 1	✓	1 extra external valve can be used as required, e.g. for superheated steam or organic cleaner. Device control for 1 valve is required.
User 2	✓	
User 3	✓	

*Sealing water
In processes with fibrous or adhesive media, assemblies with ball valves are fitted to block the medium, e.g. CleanFit CPA 473 or CleanFit CPA 475. To keep the rinse chamber free of medium, the sealing water valve opens automatically before the assembly emerges from the process. The counterpressure in the rinse chamber caused by the sealing water prevents the ingress of medium into the chamber. The sealing water pressure must then be greater than the pressure of the medium.

Other functions

Quick setup

This function configures the measuring point quickly and simply with the necessary basic settings, so that you can begin measuring immediately.

SCC (= Sensor Condition Check)

This function monitors the state of the electrodes or the degree of electrode ageing. The status is displayed in the messages »good«, »medium« or »bad« . The electrode status is updated after each calibration. The »bad« message outputs an error message (maintenance requirement).

SCS (= Sensor Check System)

The Sensor Check System informs you of deviations in pH glass resistance or the difference between the reference resistance and the normal range. It means that an incorrect measurement may be made due to blocking or damage to the pH electrode. Automatic cleaning can be triggered by such a signal.

PCS (= Process Check System)

This function checks the measuring signal for deviations. If the measuring signal does not change over a specific period (1 hr, 2 hr, 4 hr), an alarm is triggered. This may be caused by soiling, 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 freely selectable parameters using the integrated data loggers and then view the results graphically 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 optimising pH control.
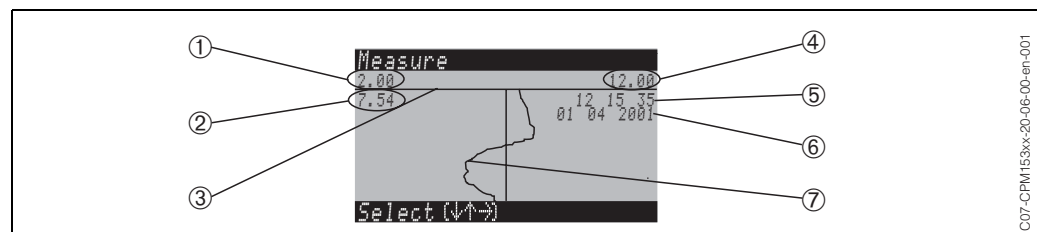
Example for data logger (for Parameter 1, pH is selected here)

1: Minimum display range (selectable to –2 pH)

2: The measured value which is found on the scroll bar (3)

3: Scroll bar

4: Maximum display range (selectable to +16 pH)

5: Time when this measured value was recorded

6: Date of this measured value

7: Measured value curve

Simple to control
The follow control functions are used in the CPC 30 :
- 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 (kinked curve)
  - Distinction between batch and flow (in-line) processes.
- Manipulated variable output
  The manipulated variable can be output as a binary signal via relays or as a continuous signal via the current output:
  - binary signal via relay as PWM (pulse length proportional), PFM (pulse frequency proportional) or dynamic PWM
  - Current output (0/4 ... 20 mA): Analogue signal to control the actuator (for one or two actuator drives / "single" or "split range")

DAT module
The DAT module is a memory device (EEPROM) which is inserted in the terminal compartment of the transmitter. Using the DAT module, you can
- *save* complete settings, logbooks and the data loggers of the CPC 30 system and
- *copy* your settings to other CPM 153 transmitters which have identical hardware functionality.
This considerably reduces the effort to install or service several measuring points.

Offline set-up using the PC tool Parawin (see "Accessories")
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 CPM 153 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.
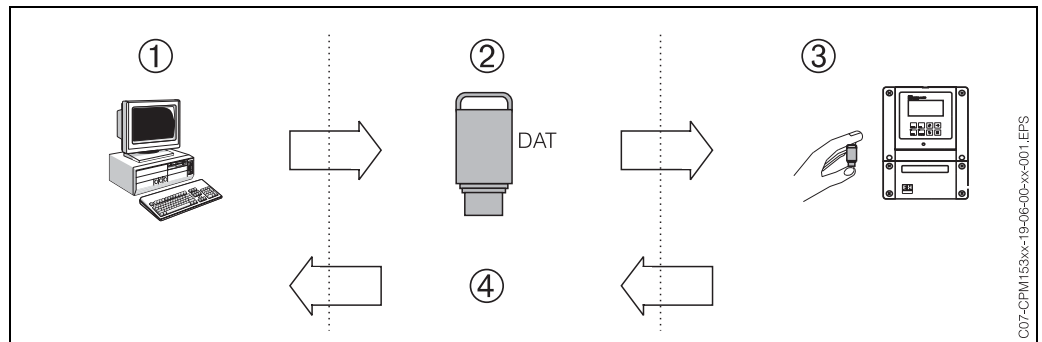
Refer to the graphic on page 24 for information on the Parawin user interface.

Calibration

Accurate calibration

The instrument allows all field-tested calibration possibilities:
- Buffer self-recognition at manual calibration
  The buffer tables, e.g. to DIN, Endress + Hauser, Merck and Riedel de Haën/ Ingold, are saved in the instrument. Further buffer tables can also be programmed. During calibration, the instrument automatically recognises 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 logbook
  The data of the last 30 calibrations are saved to a list with date and time.

Accurate measurement
- Medium temperature compensation (alpha value compensation)
  This allows high-accuracy measurement over wide temperature ranges. In this type of compensation, the temperature influence on the medium is self-compensated.
- Isothermic intersection compensation
  This allows high-accuracy measurement even at temperature fluctuations. Compensates the deviation between electrode zero point and isothermic intersection point.

Input

✎ Note!
The limit values for Ex version are specified separately, marked with $\langle\!\langle Ex \rangle\!\rangle$ and displayed in *italics*.

Measured variables	pH, redox, temperature	
pH	Measuring range	–2.00 ... +16.00
	Measured value resolution	pH 0.01
	Zero point offset range	pH –2 ... +16
	Range of automatic temperature compensation	–50 ... +150°C
	Reference temperature	25°C (settable with medium temperature compensation)
	Slope adjustment	25 ... 65 mV / pH
	Input resistance under nominal operating conditions	$> 1 \cdot 10^{12}\,\Omega$
	Input current under nominal operating conditions	$< 1.6 \cdot 10^{-12}\,A$
Redox	Measuring range	–1500 ... +1500 mV –3000 ... +3000%
	Measured value resolution	0.1 mV
	Zero point offset range	+200 ... –200 mV
	Assignment with % display	Settable, Δ for 100% = 150 ...2000 mV
	Electrode offset	±120 mV
	Input resistance under nominal operating conditions	$> 1 \cdot 10^{12}\,\Omega$
	Input current under nominal operating conditions	$< 1.6 \cdot 10^{-12}\,A$
	$\langle\!\langle Ex \rangle\!\rangle$ *Sensor output circuit with type of protection EEx ia IIC. This circuit can be connected to sensors of category 1G (zone 0) as well.*	
	Maximum output voltage U_0	DC 12.6 V
	Maximum output current I_0	130 mA
	Maximum output P_0	198 mW
	Maximum outer capacity C_0	50 nF (with pH sensor CPS 401 IsFET: 150 nF)
	Maximum outer inductivity L_0	100 µH
Temperature	Temperature sensor	Pt 100 (three-wire circuit) Pt 1000 NTC 30
	Measuring range (can also be displayed in °F)	–50 ... +150 °C NTC: –20 ... +100 °C
	Measured value resolution	0.1 K
	Temperature Offset	± 5K

Current inputs 1 / 2 (passive, optional, terminals 21/22, 23/24)	Signal range	4 ... 20 mA
	Measured error[1]	max. 1% of measuring range
	Input voltage range	6 ... 30 V
	⟨Ex⟩ *Intrinsically safe current inputs for connection with intrinscally safe electric circuits with type of protection EEx ia IIC or EEx ib IIC.*	
	Maximum input voltage U_i	DC 30 V
	Maximum input current I_i	100 mA
	Maximum input power P_i	3 W
	Maximum inner capacity C_i	1.1 nF
	Maximum inner inductivity L_i	24 µH

Resistance input (active, optional, only with non-Ex)	Resistance ranges (switchable using software)	0 ... 1 kΩ 0 ... 10 kΩ
	Measured error[1]	max. 1% of measuring range

Digital inputs E1-E3	Input voltage	10 ... 40 V
	Internal resistance	$R_i = 5$ kΩ
	⟨Ex⟩ *Intrinsically safe optoelectronic coupler for connection with intrinsically safe electric circuits with type of protection EEx ia IIC or EEx ib IIC.*	
	Maximum input voltage U_i	DC 30 V
	Maximum inner capacity C_i	negligible
	Maximum inner inductivity L_i	negligible

[1]: *acc. to IEC 746-1, under nominal operating conditions*

CPG 30:

Digital inputs	Input voltage	10 ... 40 V
	Internal resistance	$R_i = 5$ kΩ
	Minimum duration of start signal	500 ms

Output

Output signal	pH, redox, temperature	

Current outputs (terminals 31/32, 33/34)	Current range	0 / 4 ... 20 mA
	Error current	2.4 mA or 22 mA
	Measured error[1]	max. 0.2 % of current range end value
	Output distribution, settable	pH: Δ1.8 ... 18 pH Redox: Δ300 ... 3000 mV Temperature: Δ17 ... 170 K
	Active current output (only non-Ex): Load	max. 600 Ω
	Passive current output: Input voltage range	6 ... 30 V
	⟨Ex⟩ *Intrinsically safe current circuits for connection with intrinscally safe electric circuits with type of protection EEx ib IIC.*	
	Maximum input voltage U_i	DC 30 V
	Maximum input current I_i	100 mA
	Maximum input power P_i	750 mW
	Maximum inner capacity C_i	negligible
	Maximum inner inductivity L_i	negligible

Auxiliary voltage output (for digital inputs E1-E3)	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_0	DC 15,8 V
	Maximum output current I_0	71 mA
	Maximum output P_0	1.13 W
	Maximum outer capacity C_0	50 nF
	Maximum outer inductivity L_0	100 µH

Interface to CPG 30	Power supply:	Output voltage	11.5 ... 18 V
		Output current	max. 60 mA
	Communication	(only internal)	RS 485
	⟨Ex⟩ *Intrinsically safe current output circuit with type of protection EEx ib IIC.*		

Limit value and alarm functions	Setpoint adjustments	pH –2.00 ... 16.00
	Hysteresis for switch contacts	pH: 0.1 ... 18 Redox absolute: 10 ... 100 mV Redox relative: 1 ... 3000%
	Error delay	0 ... 6000 s

Relay contacts	The NC/NO contact type can be set by software.	
	Switching voltage	max. 250 V AC / 125 V DC
	Switching current	max. 3 A
	Switching power	max. 750 VA
	Life span	≥ 5 million switching cycles
	With the maximum settable frequency in PFM	120 min^{-1}
	With the maximum settable period length in PWM	1 ... 999.9s
	With PWM minimum switch-on period	0.4 s

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

Maximum input voltage U_i	DC 30 V
Maximum input current I_i	100 mA
Maximum input power P_i	3 W
Maximum inner capacity C_i	1.1 nF
Maximum inner inductivity L_i	24 µH

[1]: acc. to IEC 746-1, under nominal operating conditions

Galvanic isolation	At the same potential are: • Current output 1 and the auxiliary energy supply output (term. 85/86) • Current output 2, connection to interface CPG 30 and the resistance input (term. 21/22) The remaining circuits are galvanically isolated from each other.

CPG 30:	Output voltage	30 V
Digital outputs	Output current	100 mA
	Output power	750 mW

Control for an external valve and CYR 10 (non-Ex)	Switched mains voltage:	
	Max. current	$I_{max} = 3 \text{ A}$
	Max. power	$P_{max} = 750 \text{ VA}$

Switched mains voltage to control the additional external valve

Control for external valve (Ex)	pneumatic

Control for CYR 10Z (Ex)	Switched voltage:	12 V
	Max. current	$I_{max} = 3 \text{ mA}$
	Max. power	$P_{max} = 10 \text{ mW}$

Electrical connection

Connection diagram   **Non-Ex area**

Installation and connection by operator

Mycom CPM 153

Digital input E1* (Hold) — 81, 82
Digital input E2* — 93, 94

S, L+, L, A, B — BN 12V DC, WH, GN, YE CPG comm. — L+, L−, A, B

Power supply output* — 85, 86 — 15 V

Alarm relay (NAMUR: Failure) — 41, 42

Relay 1 (NAMUR: Mainten. requ.) — 47, 48

Relay 2 (NAMUR: Function control) — 57, 58

Relay 3 — 51, 52

Relay 4 — 54, 55

Relay 5 — 44, 45

Current output 1 — + 31, 32 — mA

Current output 2 — + 33, 34 — mA

pH electrode   or
pH, n.c., Ref., PA/PM, S, Temp. — 11, 12, 13

IsFET pH sensor
DRN, SRC, Ref., PA/PM, S, Temp. — 11, 12, n.c.

Power supply (operator supply) — L/L+, N/L−, PE

CPG 30

Power supply — L/L+, N/L−, PE

Compressed air supply 4...6 bar, filtered 0.5 µm, free of oil and condensate

AD 6 / ID 4

94, 93 — Assembly service*
92, 91 — Assembly measure*
90, 89 — n.c.
88, 87 — Automatic stop*
86, 85 — bin. 2
84, 83 — bin. 1
82, 81 — bin. 0
Start program 1-8 (binary)

66, 65 — Assembly service
62, 61 — Assembly measure
72, 71 — Program running

41, 42 — Valve (optional)

48, 47, 52, 51

Injector CYR 10

Multihose coupling

Pipe disconnector (customer supplied)

Motive water 2...12 bar

Cleaner

n.c.: do not connect!
*: see connection examples

C07-CPC30xxx-04-12-00-en-001.EPS

: refer to wiring examples on page 17

Ex area

Mycom CPM 153 (Ex)

CPG 30 (Ex)

Installation and connection by operator

Digital input E1

ib

81
82

Digital input E2

ib

93
94

S
L+   BN   12V DC   L+
L−   WH   L−
A   GN   A
B   YE CPG comm. B

Power supply output

ib   15 V

+
86

Compressed air supply 4...6 bar, filtered 0.5 μm, free of oil and condensate

AD 6 / ID 4

Alarm relay

41
42

94
93   ib   Assembly service*

Relay 1

47
48

92
91   ib   Assembly measure*

Relay 2

57
58

90
89   ib   n.c.

Relay 3

51
52

88
87   ib   Automatic stop*

Relay 4

54
55

86
85   ib   bin. 2

Relay 5

44
45

84
83   ib   bin. 1

Valve (optional)

Start program 1-8 (binary)

82
81   ib   bin. 0

Current output 1

+
31
32   ib   mA

76
75   ib   Assembly service

Current output 2

+
33
34   ib   mA

72
71   ib   Assembly measure

66
65   ib   Program running

pH electrode 1   or   IsFET pH sensor 1

pH
Ref.
n.c.
n.c.

n.c.
Ref.
Src
Drn

Compressed air supply 4...6 bar, filtered 0.5 μm, free of oil and condensate

ia

S   PA/PM
Temp. 1

11
12
13

S   PA/PM
Temp. 1

11
12
n.c.

51
52
47
48

Power supply (ex e)
(operator supply)

L/L+
N/L−
PE

Multihose

Injector CYR 10Z-E12/ -F12

Pipe disconnector (customer supplied)

Motive water 2...12 bar

Cleaner

C07-CPC30xxZ-04-12-00-en-001.EPS

Contacts CPM 153

In the transmitter Mycom S CPM 153, there are six relays available which you can configure using the software.

The **ChemoClean**® spray cleaning system with the injector CYR 10 automatically cleans the electrode. It is controlled by two contacts.

The NC/NO contact type can be switched by software.

✎ Note!
- If you use NAMUR contacts (acc. to recommendations of the community of interest process control engineering of the chemical and pharmaceutical industry), the contacts are set to the relays as follows:
  – Failure to "ALARM"
  – Maintenance required to "RELAY 1" and
  – Function control to "RELAY 2".

- You can assign up to three relays to the controller, dependent on the instrument version.

Selection by software	NAMUR on	NAMUR off
ALARM 41 42	Alarm	Alarm
RELAY 1 47 48	Warning when maintenance required	Controller or ChemoClean
RELAY 2 57 58	Function control	Controller or ChemoClean

Electrical connection data

Mycom S CPM 153:

Power supply	230 V AC +10/–15% 24 V AC/DC +20/–15%
Frequency	47 ... 64 Hz
Power consumption	max. 10 VA
Separation voltage between galvanically isolated circuits	276 V_{rms}
Terminals, max. cable cross-sectional area	2.5 mm^2
⟨Ex⟩ *Connection data for 12V 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 capacity C_O	*150 nF*
Maximum external inductivity I_O	*150 µH*

CPG 30:

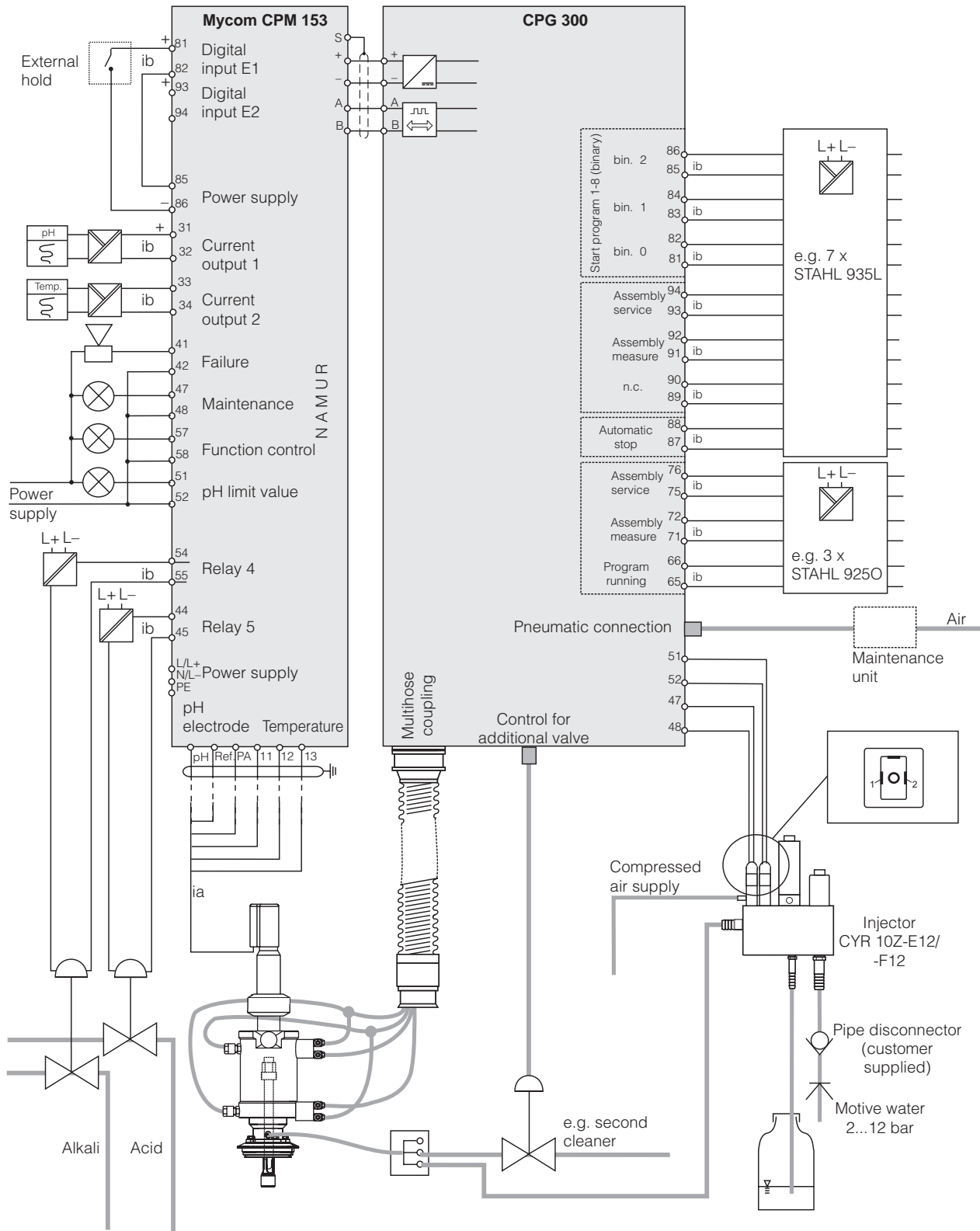|	
Power supply	230 V AC +10/–15% 24 V AC/DC +20/–15%
Frequency	47 ... 64 Hz
Power consumption	max. 12 VA
Separation voltage between galvanically isolated circuits	276 V_{rms}
Terminals, max. cable cross-sectional area	2.5 mm^2

CPG 30 (Ex)   ⟨Ex⟩ : *The devices in Ex version are powered from the transmitter CPM 153 (refer above for data).*

Connection examples

Non-Ex, double-sided neutralisation, pH limit value, NAMUR pin assignment, pH and temperature at current outputs, two additional valves, external control using PLS, assembly status display
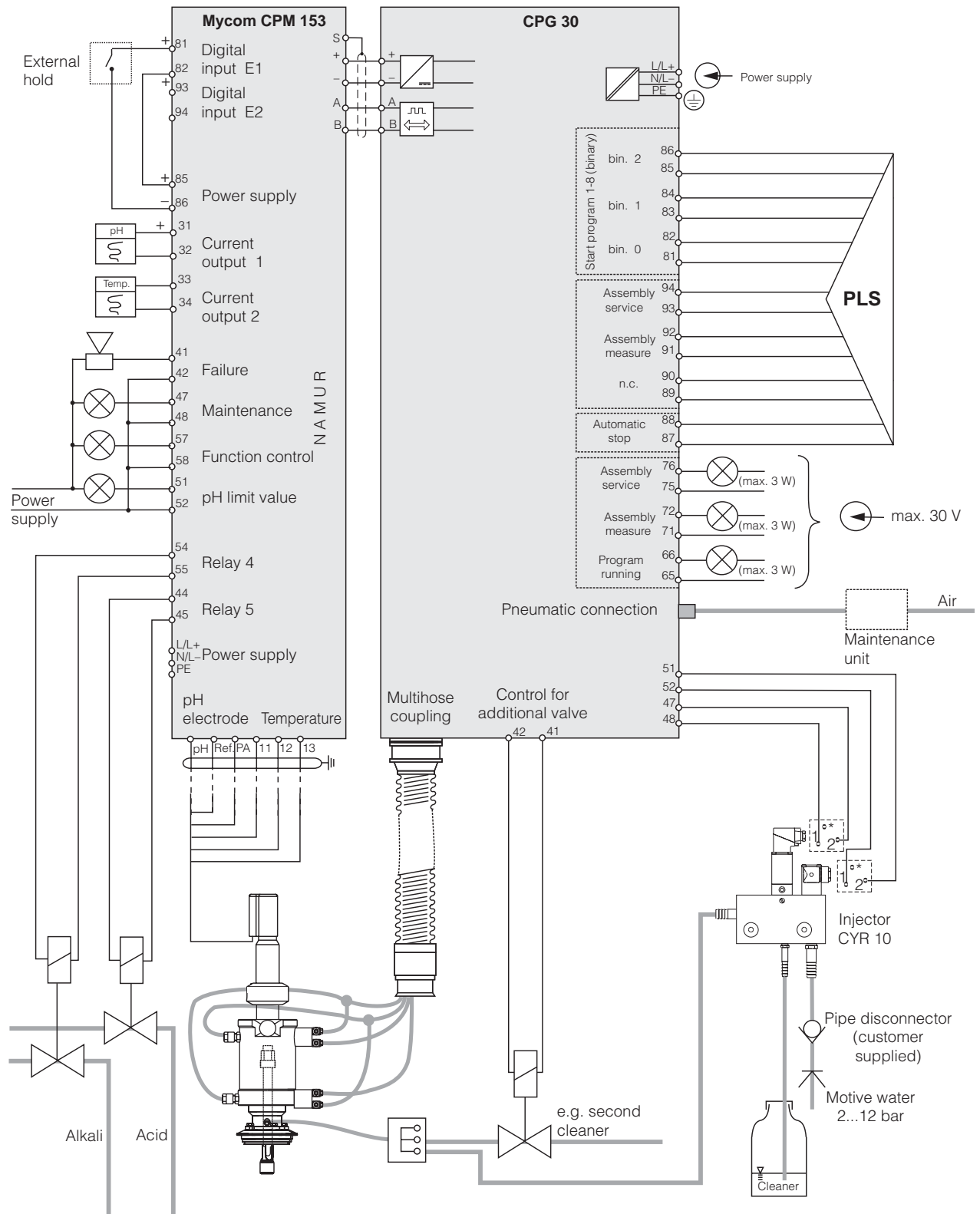
Ex, double-sided neutralisation with equipment for two additional valves, rinse block, connected digital inputs and outputs

Mycom CPM 153

CPG 300

External hold

ib

+ 81 Digital input E1
82

+ 93 Digital input E2
94

85
− 86 Power supply

pH
+ 31
ib 32 Current output 1

Temp.
33
ib 34 Current output 2

41
42 Failure

47
48 Maintenance

57
58 Function control

51
52 pH limit value

Power supply

N A M U R

L+ L−

54
ib 55 Relay 4

L+ L−

44
ib 45 Relay 5

L/L+
N/L− Power supply
PE

pH electrode   Temperature

pH Ref. PA 11 12 13

ia

Alkali   Acid

S
+
−
A
B

+
−
A
B

Start program 1-8 (binary)

bin. 2 86
85 ib
bin. 1 84
83 ib
82
bin. 0 81 ib

Assembly service 94
93 ib
Assembly measure 92
91 ib
n.c. 90
89 ib

Automatic stop 88
87 ib

Assembly service 76
75 ib
Assembly measure 72
71 ib
Program running 66
65 ib

L+ L−

e.g. 7 x STAHL 935L

L+ L−

e.g. 3 x STAHL 925O

Pneumatic connection

51
52
47
48

Multihose coupling

Control for additional valve

e.g. second cleaner

Air

Maintenance unit

Compressed air supply

Injector CYR 10Z-E12/ -F12

Pipe disconnector (customer supplied)

Motive water 2...12 bar

C07-CPC30/xZ-04-12-00-en-002.EPS

Performance characteristics

Measured value resolution	pH: 0.01 Redox: 1 mV / 1% Temperature: 0.1 K
Measurement deviation[1] display	pH: max. 0.2% of measuring range Redox: 1 mV Temperature: max. 0.5 K
Measured error[1]	max. 0.2% of current range end value
Repeatability[1]	max. 0.1% of measuring range

[1]: acc. to IEC 746-1, under nominal operating conditions

Installation conditions

Installation instructions

- Always install the transmitter and the control unit so that the cable entries always point downwards.
  The components can be installed using the following methods:

Device	Wall mounting	Post/ pipe installation	Panel mounting
Control unit CPG 30	Mounting kit contained in scope of supply. Refer to figure below.	not applicable	not applicable
CPM 153, covered	Required: 2 screws ø 6 mm 2 rawl plugs ø 8 mm	Mounting kit contained in scope of supply. Refer to figure below.	Mounting kit contained in scope of supply. Refer to figure below.
CPM 153, outdoors	If installed outdoors, weather protection cover CYY102-A required	Weather protection cover CYY102-A and two round post fixtures required	not usual

- The transmitter CPM 153 is normally installed as a panel-mounted unit.
- The transmitter CPM 153 can be fixed to a vertical or horizontal pipe using the supplied mounting kit. For outdoor installation, a weather protection cover CYY 101 is required. It can be fitted to the field unit using all kinds of fixtures (refer to "Accessories").
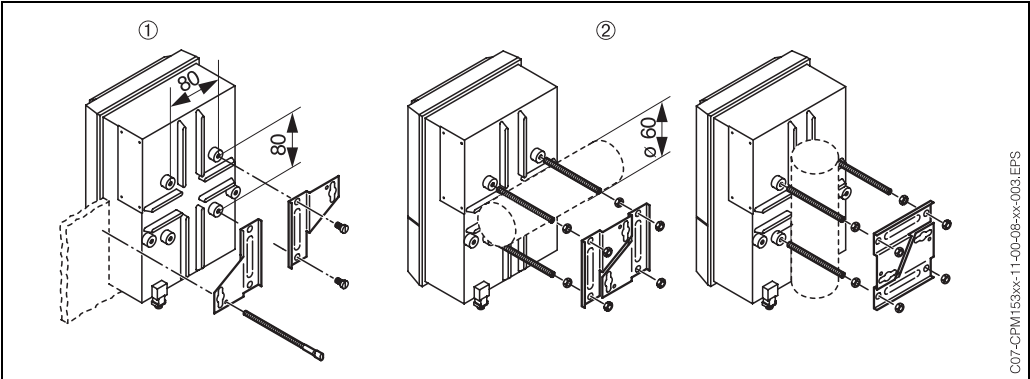
Panel mounting ① and post mounting ② for CPM 153
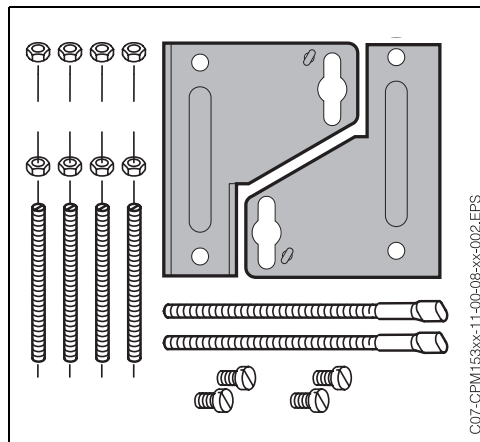
Mounting the transmitter in panels or on posts CPM 153 using supplied mounting kit (see left).

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 installation cutout for panel mounting: $161^{+0.5}$ x $241^{+0.5}$ mm.

The installation depth is approx. 134 mm.

The maximum pipe diameter is 60 mm.

For outdoor use, the weather protection cover CYY 101 is required. This is available as an accessory.

Water and compressed air connections

Water	4 ... 6 bar, filtered 100 µm, max. 56°C
Compressed air	4 ... 6 bar, filtered 0.5 µm, free from oil and condensate
Screw unions	bulkhead gland AD 6 / ID 4

Injector CYR 10:

|	
max. suction height concentrated cleaner	3 m
Motive water volume	min. 2 l/min. max. 10 l/min.
Motive water pressure	2 ... 12 bar
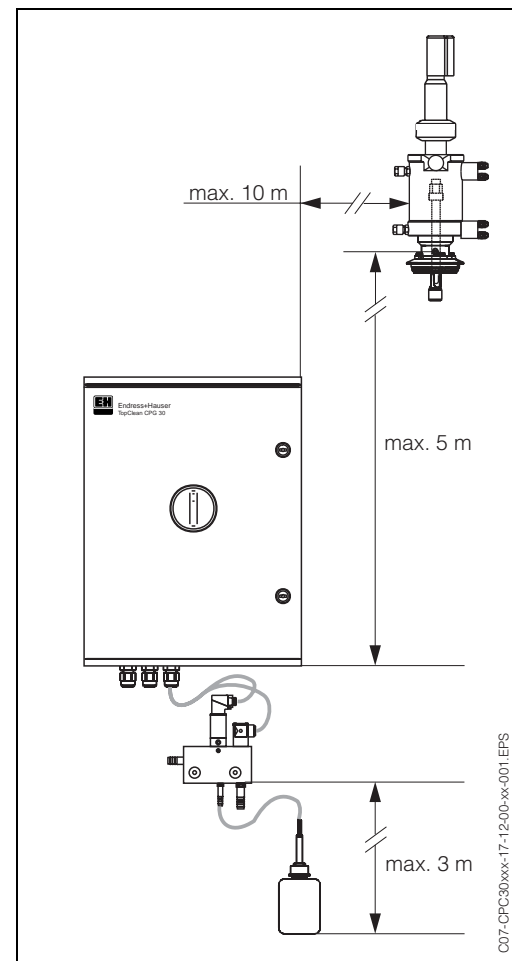
Ambient conditions

Ambient temperature	−10 ... +55°C (Ex: −10 ... +50°C)
Ambient temperature limit	−20 ... +60°C (Ex: −10 ... +50°C)
Storage and transport temperature	−30 ... +80°C
Relative humidity	10 ... 95%, non-condensing
Ingress protection	CPM 153: IP 65 CPG 30: IP 54
Electromagnetic compatibility	Interference emission and interference immunity to EN 61326: 1997 / A1:1998
Safety requirements	Complies with general safety requirements acc. to EN 61010. Complies with NAMUR Recommendations NE 21.

Process conditions

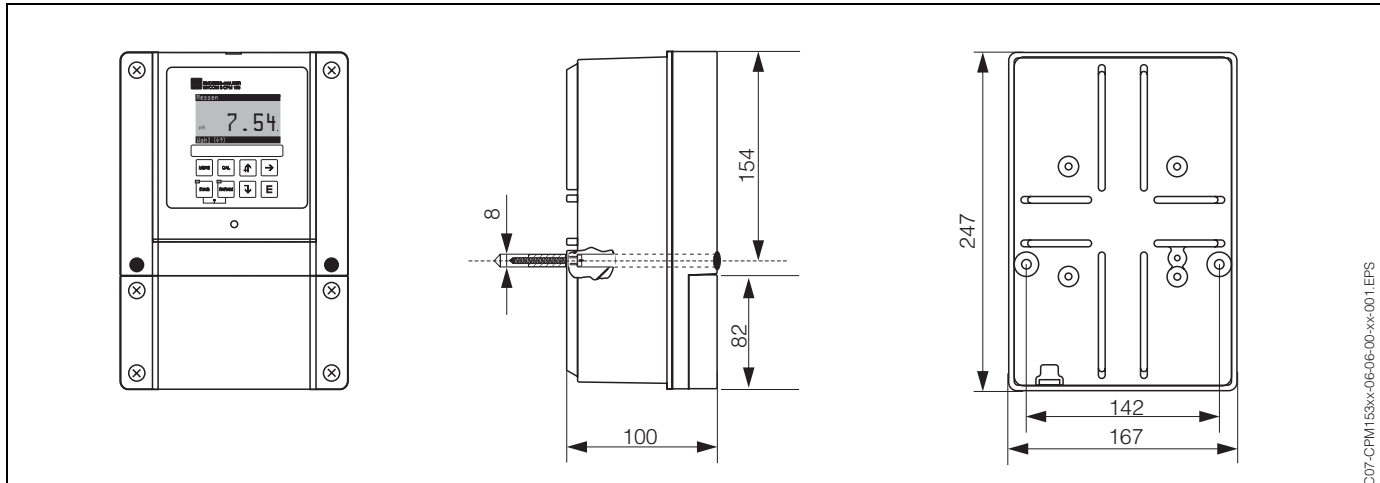|	
Temperature range media conveyed	max. 60°C
Pressure of media conveyed	Aggressive or hot media which are conveyed via additional valves (optional) must not be conveyed by the injector CYR 10 of the CPC 30 system. Use the rinse block CPR 40 for that.

Mechanical construction

Design / dimensions
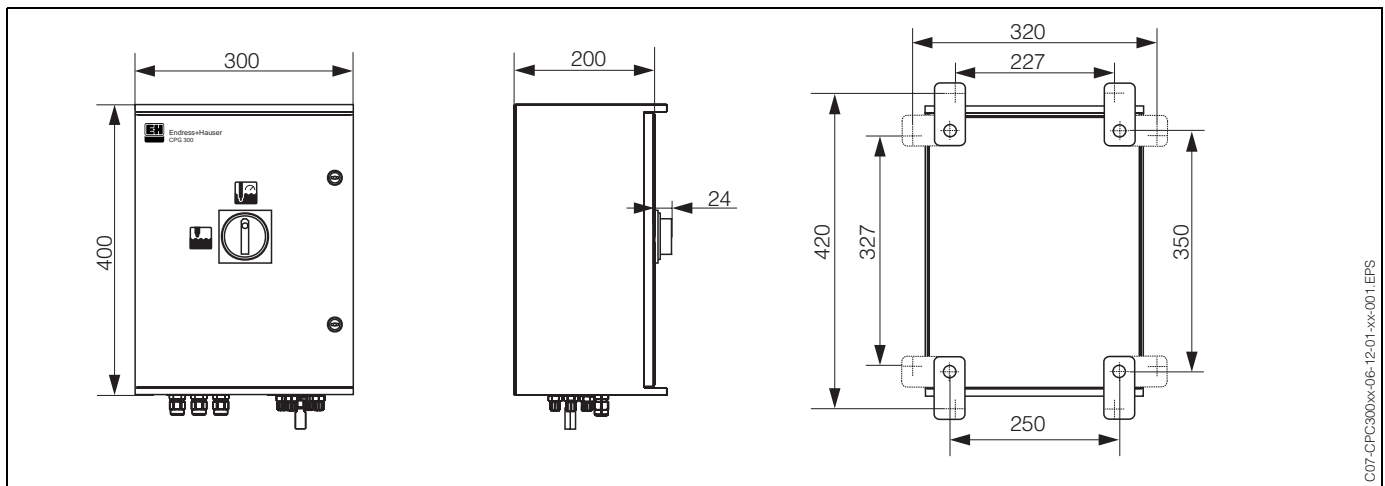
Dimensions of control unit CPG 30

Dimensions of transmitter CPM 153

Weight	CPG 30:	approx. 20 kg		CPM 153: max. 6 kg

Materials	CPM 153	Housing	GD-AlSi 12 (Mg content 0.05%), plastic-coated
		Front	Polyester, UV-resistant
	CPG 30	Housing	Ex and non-Ex: Polyester GF
	Injector CYR 10	Housing	PVC (in contact with medium)

Display and operating interface

You can set up the complete measuring point with using the operating panel on the transmitter CPM 153 or using the offline set-up function in the PC tool.
If you are using several devices, you can copy the entire set-up of one device to another deivce using the DAT module.
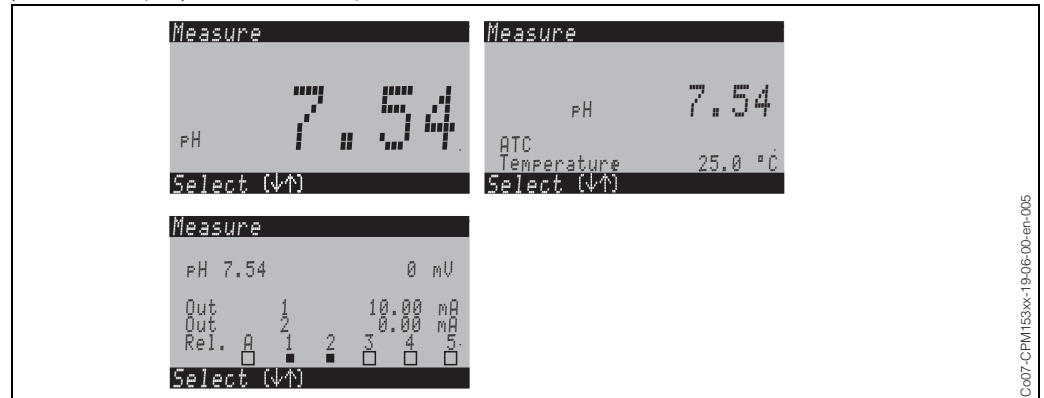
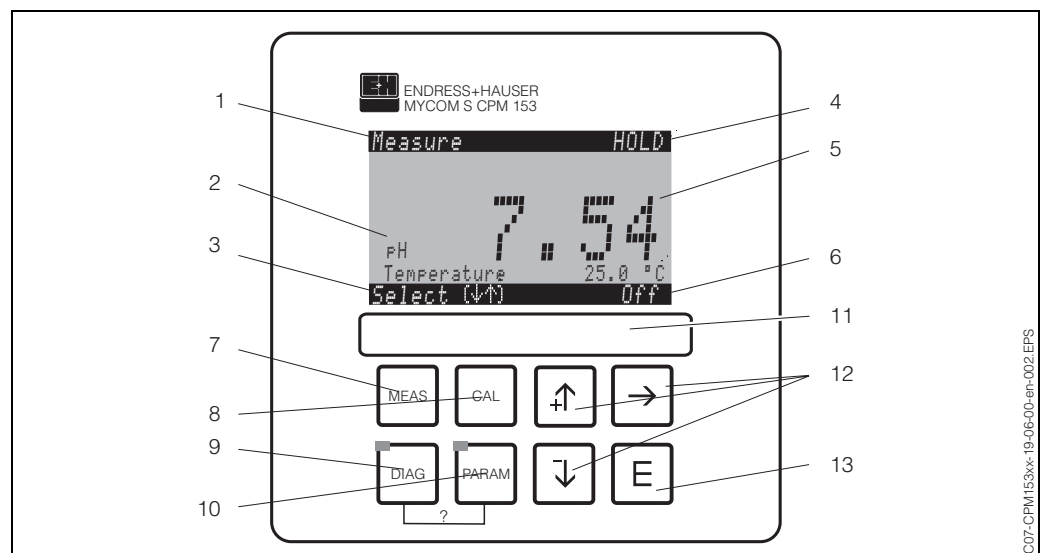| **Display elements Mycom S CPM 153** | Backlit LC display with dot matrix, 128 x 64 dots |

Display possibilities:

One circuit instrument:
pH/redox value, temperature, current outputs 1 and 2, contact states, status CPG 30, control parameters (setpoint, set values)

Backlit dot matrix display, display exampe
1: Current measured variable
2: Current menu option
3: Measured variable
4: Select: arrow keys for scrolling through the menu/through the measuring menus, »E« to browse down
5: "Meas" (Measuring mode) key
6: "Cal" (Calibration) key
7: "Diag" (Diagnosis menu) key
8: "Param" (Parameter entry menu) key
9: ENTER key
10: Scroll keys
11: Labelling strip
12: Display of measured value
*?: Press DIAG and PARAM together to open the Help page*

Operating elements Mycom S CPM 153

There are 4 main menus available for instrument operation:
- Measurement ("MEAS")
- Configuration ("PARAM")
- Calibration ("CAL") and
- Diagnostics ("DIAG").

Press the "MEAS", "PARAM", "CAL" and "DIAG" keys to switch to the appropriate selection menu. Here, the possible options 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.

Offline configuration user interface using Parawin (Accessories)
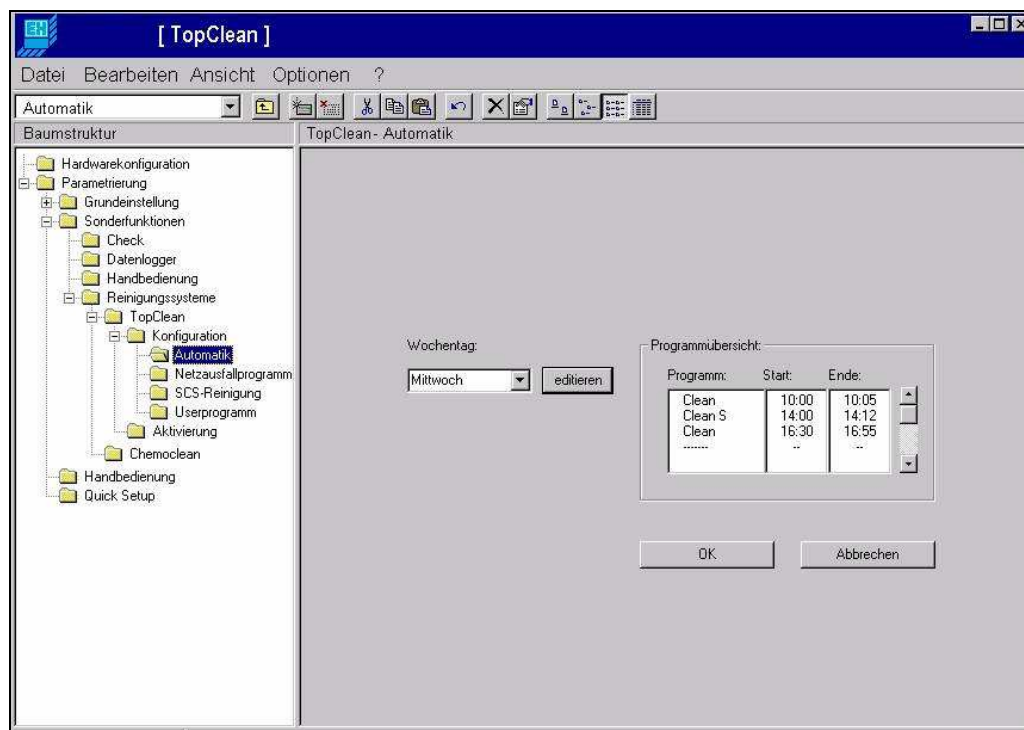
The PC tool Parawin provides you with a tool for configuring your measuring point on a PC using a simple and self-explanatory menu structure (an example window can be seen above). Write the configuration to the DAT module using the RS232 interface on the PC. The data can then be transferred to the transmitter.

Certificates and approvals

CE symbol

The TopClean S system complies with the statutory requirements of the harmonised EC directives. Endress+Hauser confirms the successful testing of the system by affixing the C€ symbol.

Ex approvals

- ATEX II (1) 2G EEx em ib[ia] IIC T4
- FM NI Class I, Division 2, Groups A, B, C, D; sensor IS Class I Division 1, Groups A, B, C, D
  FM DIP Class II, III, Division 1, Groups E, F, G; sensor IS Class I Division 1, Groups A, B, C, D
- FM NI Class I, Division 2, Groups A, B, C, D
  FM DIP Class II, III, Division 1, Groups E, F, G
- CSA Class I, Division 2; sensor IS Class I Division 1
- TIIS
- EC system approval

Ordering information

Product structure for the complete system TopClean S CPC 30

Scope of delivery of basic equipment:
Control unit CPG 30, transmitter Mycom S CPM 153 with 6 relays and DAT module, injector CYR 10, multihose (5 m), hose clip, power supply cable CPM 153 – CPC (5 m)

	Approvals
A	Basic equipment: non-Ex
G	With ATEX approval II (1) 2G EEx em ib[ia] IIC T4
O	With FM approval Cl. I, Div. 2, with NI input and output circuits, sensor IS Cl. I Div. 1
P	With FM approval Cl. I, Div. 2, with NI input and output circuits
S	With CSA approval Cl. I, Div. 2, with NI input and output circuits, sensor IS Cl. I Div. 1
T	With TIIS approval

	Control for external valves
0	Basic equipment: no control for external valves
1	Control for 1 external valve, non-Ex
2	Control for 1 external valve, Ex

	Measurement input Mycom S CPM 153
1	1 measuring circuit for glass electrodes pH/redox and temperature
2	1 measuring circuits for glass electrodes / IsFET sensors pH/redox and temperature

	Measurement output Mycom S CPM 153
A	2 current outputs 0/4 ... 20 mA, passive (Ex and non-Ex)
B	2 current outputs 0/4 ... 20 mA, active (non-Ex)
C	HART with 2 current outputs 0/4 ... 20 mA, passive
D	HART with 2 current outputs 0/4 ... 20 mA, active
E	PROFIBUS-PA, without current outputs

	Power supply
0	230 V AC
1	100 ... 115 V AC
8	24 V AC / DC

	Language versions
A	E / D
B	E / F
C	E / I
D	E / ES
E	E / NL
F	E / J

	Cable connection
0	Cable glands M 20 x 1.5
1	Cable glands NPT ½"
3	Cable glands M 20 x 1,5, PROFIBUS-PA M12 plug
4	Cable glands NPT 1/2", PROFIBUS-PA M12 plug

	Length of multihose
0	5 m
1	with electrical heating, 5 m
2	with electrical heating, 10 m
8	10 m

	Additional features
0	Standard version
1	Preparation for housing CYC 300
9	Special version acc. to customer specifications

	Configuration
A	Factory settings

CPC 30-										Complete order code

Accessories

Offline configuration with Parawin	The Parawin tool provides you with a graphic PC operating program for configuring your measuring point at the PC using a simple and self-explanatory menu structure. Write the configuration to the DAT module using the RS232 interface on the PC. The module can then be plugged into the transmitter. You can switch the language via software. The offline configuration system consists of a DAT module, the software and a DAT interface (RS 232). Required operating sytem: Windows NT/95/98/2000. Order No.: 51507133 (only Mycom S CPM 153) Order No.: 51507563 (TopCal S, TopClean S / Mycom S)
DAT module	Additional memory device for *saving/copying* complete settings, logbooks and the data loggers. Order No.: 51507175
Flat seal	Flat seal for air-tight panel mounting of the transmitter CPM 153. Order No.: 50064975

Assemblies

Type	Properties	Applications
CleanFit CPA 471 / 472 / 473 / 474 / 475	Retractable assembly for manual or pneumatic operation. Cleaning and calibrating the electrode is possible under process conditions. CPA 475: 3A approval, application pending with EHEDG. Technical Information: CPA 471: TI 217C/07/en, Order No.: 51502596 CPA 472: TI 223C/07/en, Order No.: 51502645 CPA 473: TI 344C/07/en, Order No.: 51510923 CPA 474: TI 345C/07/en, Order No.: 51510925 CPA 475: TI 240C/07/en, Order No.: 51505599	• Process industry (471, 472, 473 / 474) • Food, pharmaceutical applications (475) • Biotechnology (475)

pH/redox electrode

Type	Properties	Applications
OrbiSint CPS 11/12/13	Universally applicable, very easy to clean and insensitive to soiling due to PTFE diaphragm, pressures up to 6 bar, conductivity > 50 µS/cm Technical Information TI 028C/07/en, 50054649	• Process industry • Industrial wastewater • Detoxification (cyanide, chrome) • Neutralisation
CeraLiquid CPS 41/42/43	Electrodes with ceramic diaphragms and KCl liquid electrolyte, use with counterpressure, explosion-proof up to 8 bar Technical Information TI 079C/07/en, 50059346	• Process industry • Ultrapure water • Boiler feed water • Detoxification (cyanide)
CeraGel CPS 71	Gel electrode with double-chamber reference system. Long-term stability, short response time, very long toxic path, resistant to alternating temperature and pressure cycles Technical Information TI 245C/07/en, 51505837	• Process industry • Food processing • Water treatment
OrbiPore CPS 91	Gel electrode with open aperture diaphragm for heavily soiled media. Resistant to pressure and concentration fluctuations. Pressures up to 13 bar. Technical Information TI 375C/07/en, 51513127	• Process industry • Industrial wastewater
TopHit CPS 471	Rupture-proof pH sensor based on IsFET technology. Short response time, very high resistance to alternating temperature cycles, sterilisable, almost no acid or alkaline errors Technical Information TI 283C/07/en, 51506685	• Process industry • Food, pharmaceutical applications • Water treatment • Biotechnology

|	
Connection accessories	• *CPK 1*: Version with pilot wire and additional outer screen, sheathed in PVC, ø 7.2 mm. Extension with cable CYK 71 possible. Order No.: of CYK 71: 50085333 • *CPK 9*: For pH/redox electrodes with integrated temperature sensor and TOP68 plug-in head (version ESA, ESS). Extension with cable CYK 71 possible. • *CPK 12*: For IsFET pH sensors and pH/redox electrodes with integrated temperature sensor and TOP68 plug-in head. Extension with cable CYK 12 possible. • *Junction box VBE:* For Ex area Zone 0. Order No.: 50003993 • *Junction box VBM:* Junction box for extending measuring cable connection between electrode and transmitter. Two screw unions for e. g. combination electrode. Material: aluminium casting, ingress protection IP 65. Order No. 50003987 • *Junction box VBA:* Junction box for extending measuring cable connection between electrode and transmitter. Four screw unions for e. g. separate reference electrode. Material: aluminium casting, ingress protection IP 65. Order No. 50003987
Rinse connection adapter	Rinse connection adapter CPR 40 for the transport of cleaning agents for use with retractable assemblies.
Spray cleaning system	CYR 10 / CYR 20 ChemoClean Spray Cleaning System for the transport of cleaning agents or acids for use with retractable assemblies.
Weather protection cover CYY 101	For installing the transmitter outdoors, the weather protection cover CYY 101 is required. Order No.: CYY101-A
Round post fixture for weather protection cover	To fix the weather protection cover to vertical or horizontal posts with diameters of up to 60 mm. Order No.: 50062121
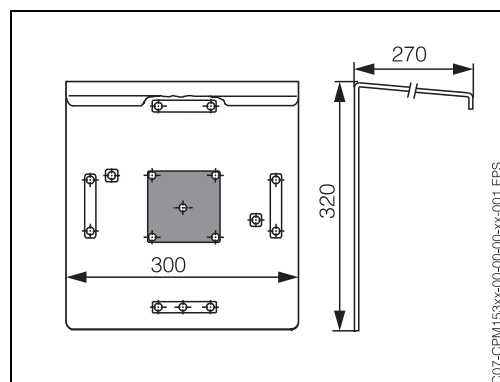
Weather protection cover CYY 101
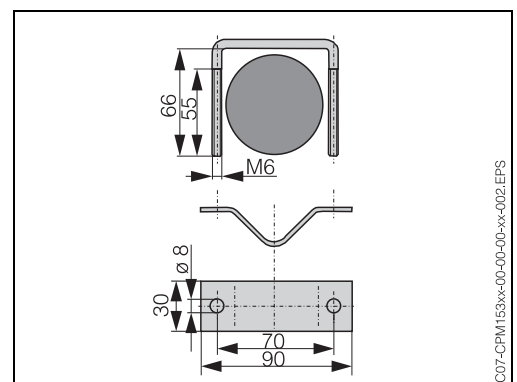
Round post fixture for CYY 101

Housing CYC 300   Housing for TopClean S CPC 30, with rack for buffer and cleaner solutions. Operating panel with alarm LED and lock for programme start and assembly drive. Window for Mycom S or Memo-Graph S. For Ex and Non-Ex applications. Material: plastic or stainless steel.
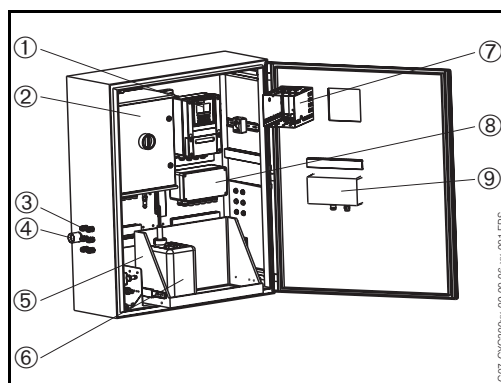
1 Mycom S CPM 153
2 TopClean S CPC 30
3 Pg cable glands
4 Multihose gland
5 Rack
6 Buffer and cleaner solutions
7 MemoGraph S
8 Programme control unit
9 Operating panel
(Order operating panel separately:
Order No.: 51512891)

Housing CYC 300
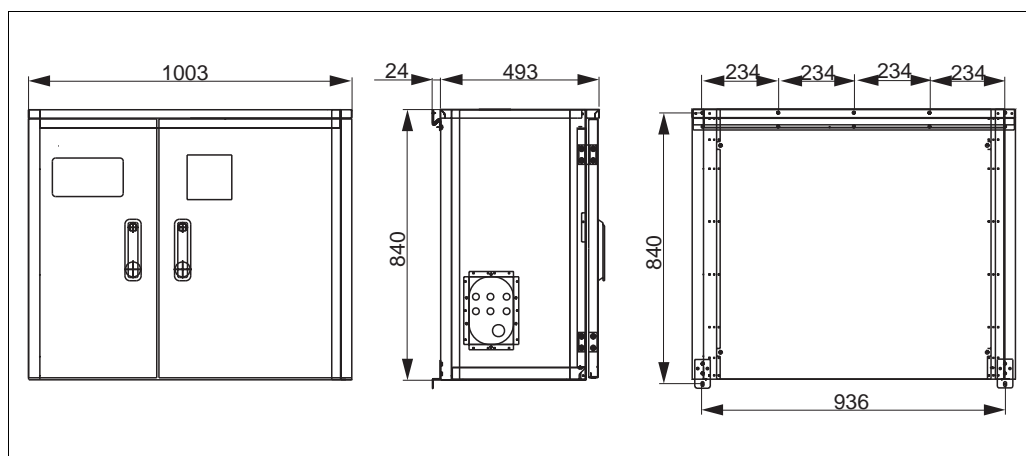
Dimensions housing CYC 300, stainless steel version

Dimensions of housing CYC 300, plastic version

**Product structure
Housing CYC 300**

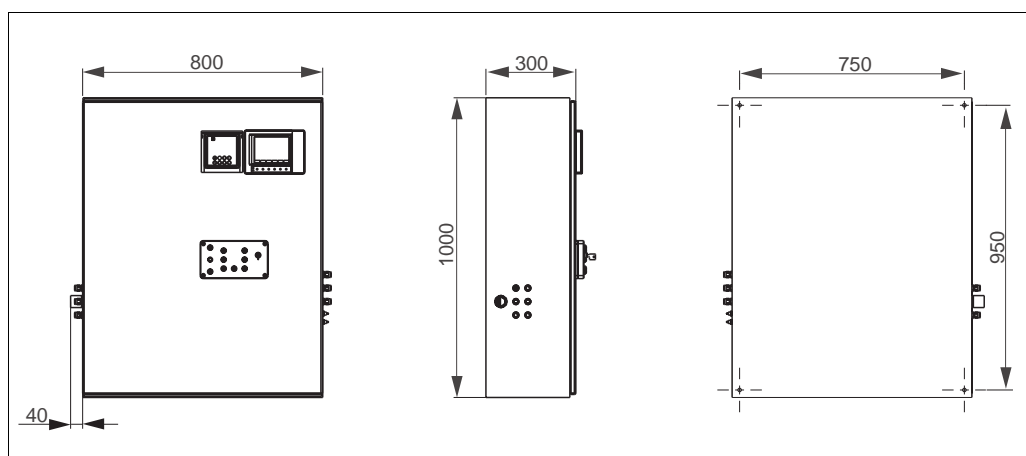|								Certificates
	A							no approval
	G							with ATEX approval II (1) 2G EEx em ib[ia] IIC
	O							with FM approval Cl. I, Div. 2, with NI input and output circuits, sensor IS Cl. I Div. 1
	P							with FM approval Cl. I, Div. 2, with NI input and output circuits
	S							with CSA approval Cl. I, Div. 2, with NI input and output circuits, sensor IS Cl. I Div. 1
	T							with TIIS approval
								Power supply
		1						230 V AC
		2						110-115 V AC
		3						24 V AC / DC
								Materials
			A					Plastic
			G					Stainless steel 1.4301 (AISI 304)
								Heating
				1				no electrical heating
				2				with electrical heating
								Data recording
					A			no MemoGraph S
					B			with MemoGraph S
								Allocation
						1		empty housing, CPC 30 not mounted
						2		order item of associated CPC
								Options
							1	Basic version
CYC 300-								complete order code

Supplementary documentation

Supplementary documentation

- ❏ Operating Instructions TopClean S CPC 30, BA 235C/07/en, Order No. 51504339
- ❏ Operating Instructions PROFIBUS-PA, BA 298C/07/en, Order No. 51507116
- ❏ Operating Instructions HART, BA 301C/07/en, Order No. 51507114
- ❏ Ex Safety Instructions, XA 236C/07/a3, Order No. 51506729
- ❏ Technical Information Mycom S CPM 153, TI 233C/07/en, Order No. 51503788
- ❏ Technical Information CleanFit CPA 471, TI 217C/07/en, Order No. 51502595
- ❏ Technical Information CleanFit CPA 472, TI 223C/07/en, Order No. 51502644
- ❏ Technical Information CleanFit CPA 473, TI 344C/07/en, Order No. 51510923
- ❏ Technical Information CleanFit CPA 474, TI 345C/07/en, Order No. 51510925
- ❏ Technical Information CleanFit CPA 475, TI 240C/07/en, Order No. 51505598
- ❏ Technical Information OrbiSint CPS 11/12/13, TI 028C/07/en, Order No. 50052557
- ❏ Technical Information CeraLiquid CPS 41/42/43, TI 079C/07/en, Order No. 50058726
- ❏ Technical Information CeraGel CPS 71, TI 245C/07/en, Order No. 51505837
- ❏ Technical Information OrbiPore CPS 91, TI 375C/07/en, Order No. 51513127
- ❏ Technical Information TopHit CPS 471, TI 283C/07/en, Order No. 51506687
- ❏ Technical Information CPK 1-12, TI 118C/07/en, Order No. 50068525
- ❏ Technical Information CPR 40, TI 342C/07/en, Order No. 51510059
- ❏ Technical Information CYR 10 / 20, TI 046C/07/en, Order No. 50014223

Subject to modification

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The Power of Know How