Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Topcal S CPC300

Fully Automatic Measuring, Cleaning and Calibration System in Ex and Non-Ex Areas

Application
The automatic pH/redox measuring, cleaning and calibration system Topcal S CPC300 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
- High measuring quality:
  - optimum reproducibility of measurement results
  - low tolerances in calibration
- Very high degree of safety:
  - system status messages with feedback to the control desk
  - in-process cleaning/calibrating, no need to remove electrode
  - automatic cleaning on detection of electrode contamination
- High availability:
  - long electrode life due to measuring cycle
  - off-line set-up (optional): very simple set-up on PC
  - DAT module: very simple copying of set-up in other devices
- Rapid amortisation:
  - favourable procurement price
  - low maintenance costs due to fully automatic cleaning and calibration functions
  - simple installation due to modular design
- Approved for Ex applications
- Communication via PROFIBUS-PA (Profile 3.0) and HART

TI 236C/07/en/04.04
No. 51504330

Endress+Hauser
People for Process Automation

Functions and system design

The cleaning and calibration system Topcal S CPC300 consists of the following components:

- Control unit CPG300,
- Transmitter Mycom S CPM153,
- Multihose with assembly hose clip,
- Buffer solutions and cleaner bottles
- Power supply/control cable CPG300 / CPM153,
- 3 level sensors, complete with cables and hoses for buffer solutions and cleaner bottles
- Pressure reduction valve with manometer
- Water filter

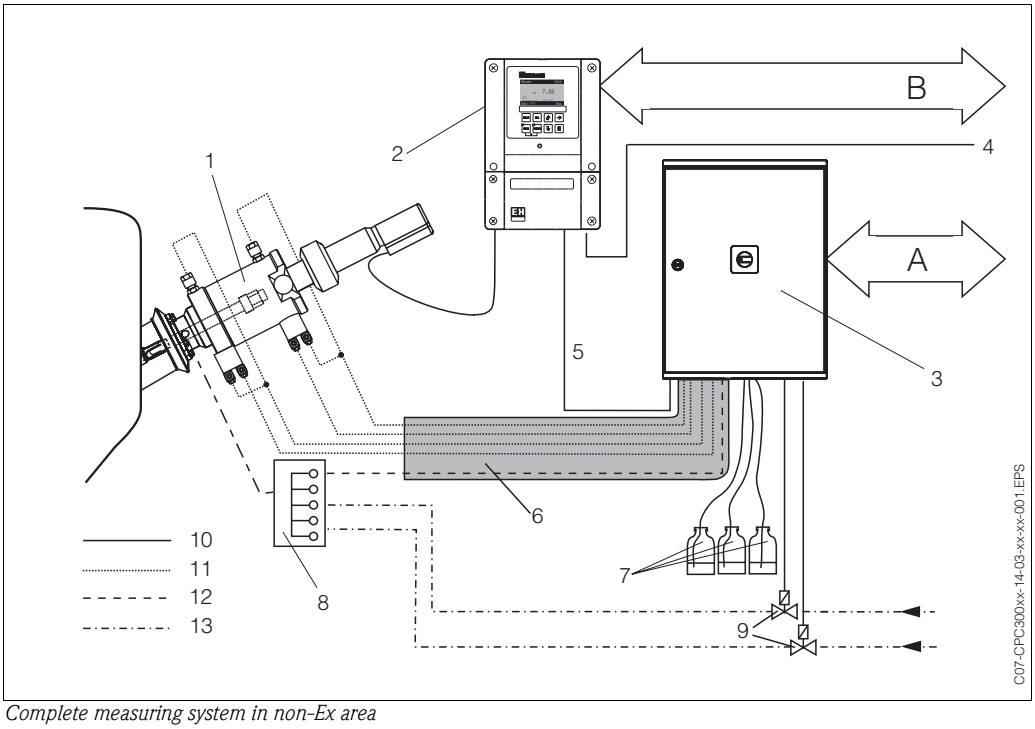
Control unit CPG300
The control unit CPG300 converts the commands of the CPM153 into pneumatic signals and sends feedback signals such as assembly position, canister level and monitoring signals for compressed air and water. The buffer solutions and cleaners are conveyed to the assembly by a pump. The pump and hoses are cleaned with water and air after every calibration cycle.
Optionally, you can have up to two additional, freely configurable output contacts. They can be used tocontrol pneumatic valves in explosion hazardous zones or solenoid valves in non-hazardous zone to convey hot or aggressive media.

Transmitter CPM153
The CPM153 is the central unit of the measuring system. It processes the measured variables, acts as communications centre and controls processes. The CPM153 controls processes in the CPG300 via an interface and processes its feedback signals.

The CPC300 system is supplied complete with hoses and liquid level control. In the Ex version, the CPC300 is powered via the power supply/control cable from the CPM153; in the non-Ex version, the CPC300 has its own power supply connection.

Measuring system

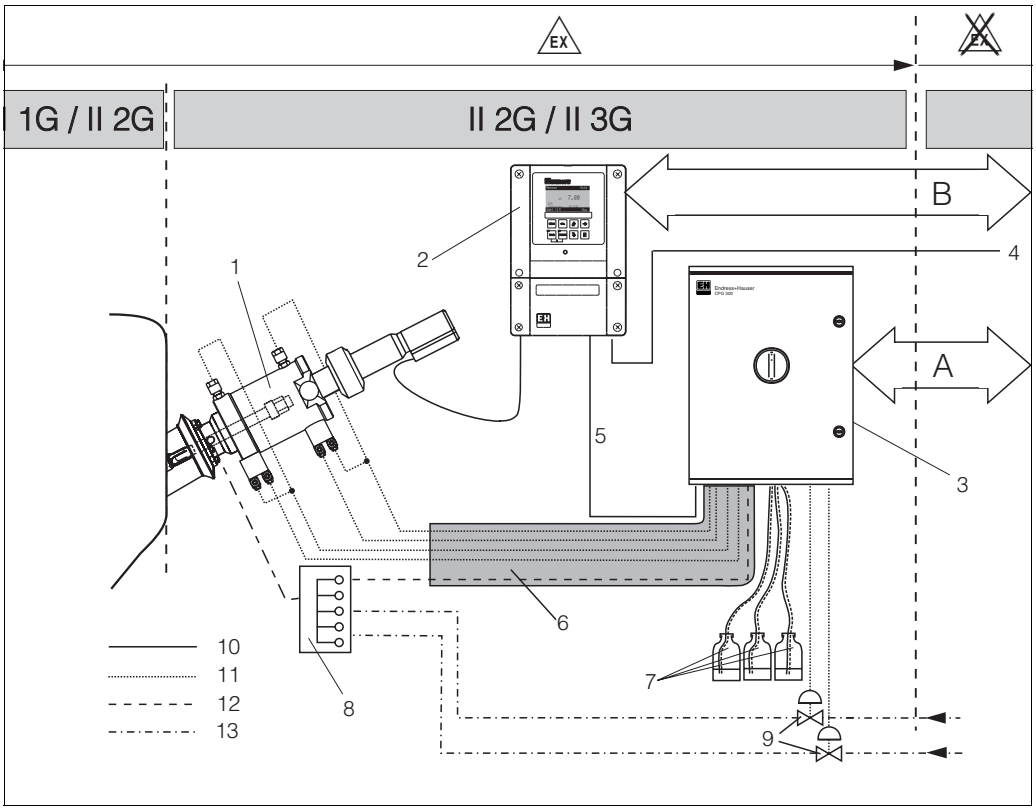
A complete measuring system consists of the following components:
- Topcal S CPC300
- pneumatically-driven retractable assembly (e.g. Cleanfit series) with pneumatic or inductive limit switches
- pH electrode
- electrode cable
- buffer solutions and cleaning agent
- rinse block (optional; for media which are controlled via additional valves).



Complete measuring system in non-Ex area
1 Retractable assembly Cleanfit CPA475
2 Transmitter CPM153
3 Control unit CPG300
4 Power supply for Mycom S CPM153
5 Power supply / control cable
6 Multihose
7 Bottles for cleaning agent, buffer solutions
8 Rinse block CPR40 with integrated non-return valves (optional)
12 Buffer / cleaner from the control unit

A Message and control signals: assembly position, programme status, move assembly, programme stop
B Hold input, six relay contacts, two current outputs 0/4 ... 20 mA

Customer supplies:
9 Additional valves
10 Electrical wiring
11 Compressed air
13 Pressurised superheated steam / water / other cleaning agents (optional)



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Complete measuring system in Ex area
1 Retractable assembly Cleanfit CPA475
2 Transmitter CPM153
3 Control unit CPG300
4 Power supply for Mycom S CPM153
5 Power supply / control cable
6 Multihose
7 Bottles for cleaning agent, buffer solutions
8 Rinse block CPR40 with integrated non-return valves (optional)
12 Buffer / cleaner from the control unit

A A: Message and control signals: assembly position, programme status, move assembly, programme stop
B B: Hold input, six relay contacts, two current outputs 0/4 ... 20 mA

Customer supplies:
9 Additional valves
10 Electrical wiring
11 Compressed air
13 Pressurised superheated steam / water / other cleaning agents (optional)

Operating modes

For configuration, select the appropriate cleaning/calibration programme for your measuring point from the stored programmes in the instrument. You can freely adapt the cleaning or calibration 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 or calibrated.
- External control: Programmes can be started via an external process control system.

Cleaning / calibration programmes

You have a choice of eight programmes in total.
- Programmes Clean, Clean C, Clean S, Clean CS, Clean Int: permanently assigned to one function. The cleaning times or repeat cycles are freely selectable.
- Programmes User 1...3: user-definable. A simple way of programming is to copy and adapt predefined programmes into user programmes.

In the order Code **"Control of external valves"** you have the option to control up to two external valves. The "Sterilisation" and "Sealing water"* functions are **only** released on devices fitted with the control function for additional external valves. You can have unlimited use of additional external valves as required in the freely definable user programmes. For example, for superheated steam, a second cleaner, cooling air, organic cleaner etc.

We recommend to use the rinse block CPR40 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"). t

Function → Program ↓	Cleaning	Calibration	Sterilisation	Sealing water*	Steril. and seal. water
Clean (= cleaning)	¬	–	–	Control for 1 valve required	–
Clean C (= cleaning + calibration)	¬	¬	–	Control for 1 valve required	–
Clean S (= cleaning + sterilisation)	¬	–	Control for 1 valve required	–	Control for 2 valves required
Clean CS (= cleaning + calibration + sterilisation	¬	¬	Control for 1 valve required	–	Control for 2 valves required
Clean Int (= cleaning interval)	¬	–	–	Control for 1 valve required	Control for 2 valves required
User 1	¬	¬	Up to 2 additional external valves can be used as required e.g. for superheated steam, organic cleaner, 2nd cleaner, cooling air. Device control for 1 or 2 valves is required.		
User 2	¬	¬			
User 3	¬	¬			

***Sealing water**
In processes with fibrous or adhesive media, assemblies with ball valves e.g. Cleanfit CPA473 or Cleanfit CPA475 are fitted to block the medium. 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. For this to work, the sealing water pressure must 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.

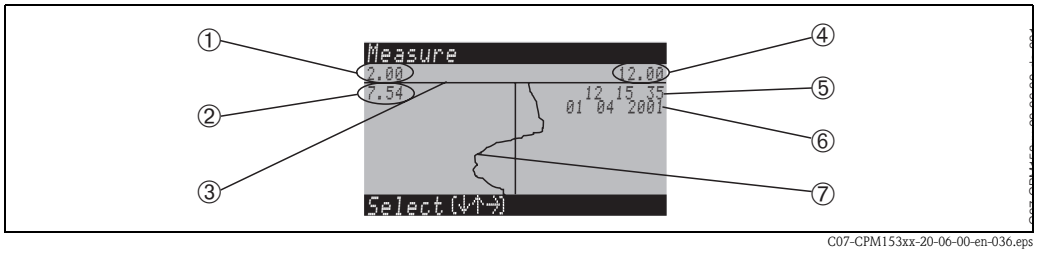
SCC (Sensor Condition Check)
This function monitors the electrode status or the degree of electrode ageing. The status is displayed in the messages "electrode ok", "low wear" or "replace electrode". The electrode status is updated after each calibration. The "schlecht" message outputs an error message (maintenance requirement).

SCS (Sensor Check System)
The Sensor Check System indicates deviations from the normal range in pH-glass resistance and reference resistance. It means that an incorrect measurement may be made due to blocking or damage to the pH electrode.

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 or blocking of the electrode.

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 log
You can record two freely selectable parameters using the integrated data logs 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.



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Example for data log 1 (for one parameter, 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 CPC300:
- 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 modulation), PFM (pulse frequency modulation)
  – 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 CPC300 system and
- copy your settings to other CPM153 transmitters which have identical hardware functionality.

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

Off-line set-up using the PC tool Parawin (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 CPM153 and transfer the entire configuration to the transmitter (= complete transmitter set-up).

Then you can set up other transmitters with the same configuration.

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 (3 ➔ 2 ➔ 1).

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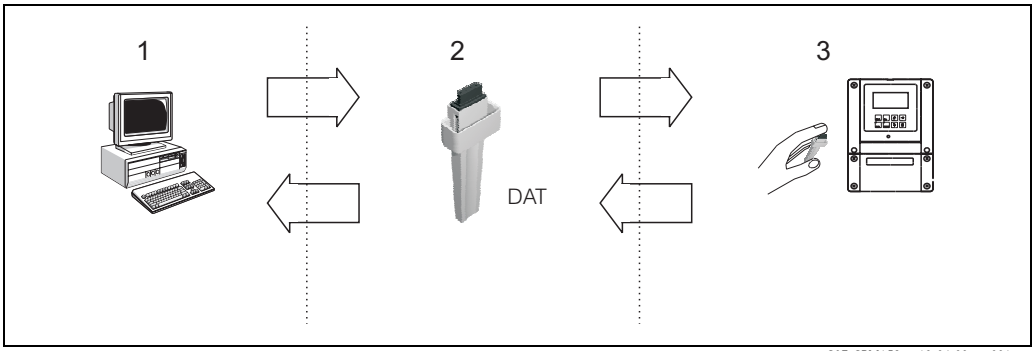

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Refer to the graphic on page 24 for information on the the Parawin user interface.

Calibration

Accurate calibration

The instrument allows all field-tested calibration possibilities:

- Automatic calibration through buffer self-recognition
  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 (Ex) 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 / -58 ... +302 °F
	Reference temperature	25°C / 77 °F (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
	(Ex) *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 ISFET sensor: 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 / -58 ... +302 °F NTC: –20 ... +100 °C / -4 ... 212 °F
	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

CPG300:

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 CPG300	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 "Active open" / "Active closed" 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 CPG300 and the resistance input (term. 21/22)

The remaining circuits are galvanically isolated from each other.

CPG300:

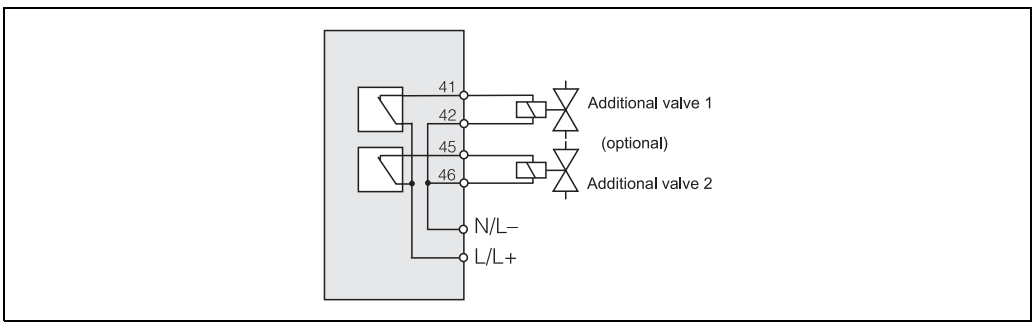
Digital outputs

Output voltage	30 V
Output current	100 mA
Output power	750 mW

Control for external valves (Non-Ex)

Switched mains voltage:

Max. current	I_{max} = 3 A
Max. power	P_{max} = 750 VA



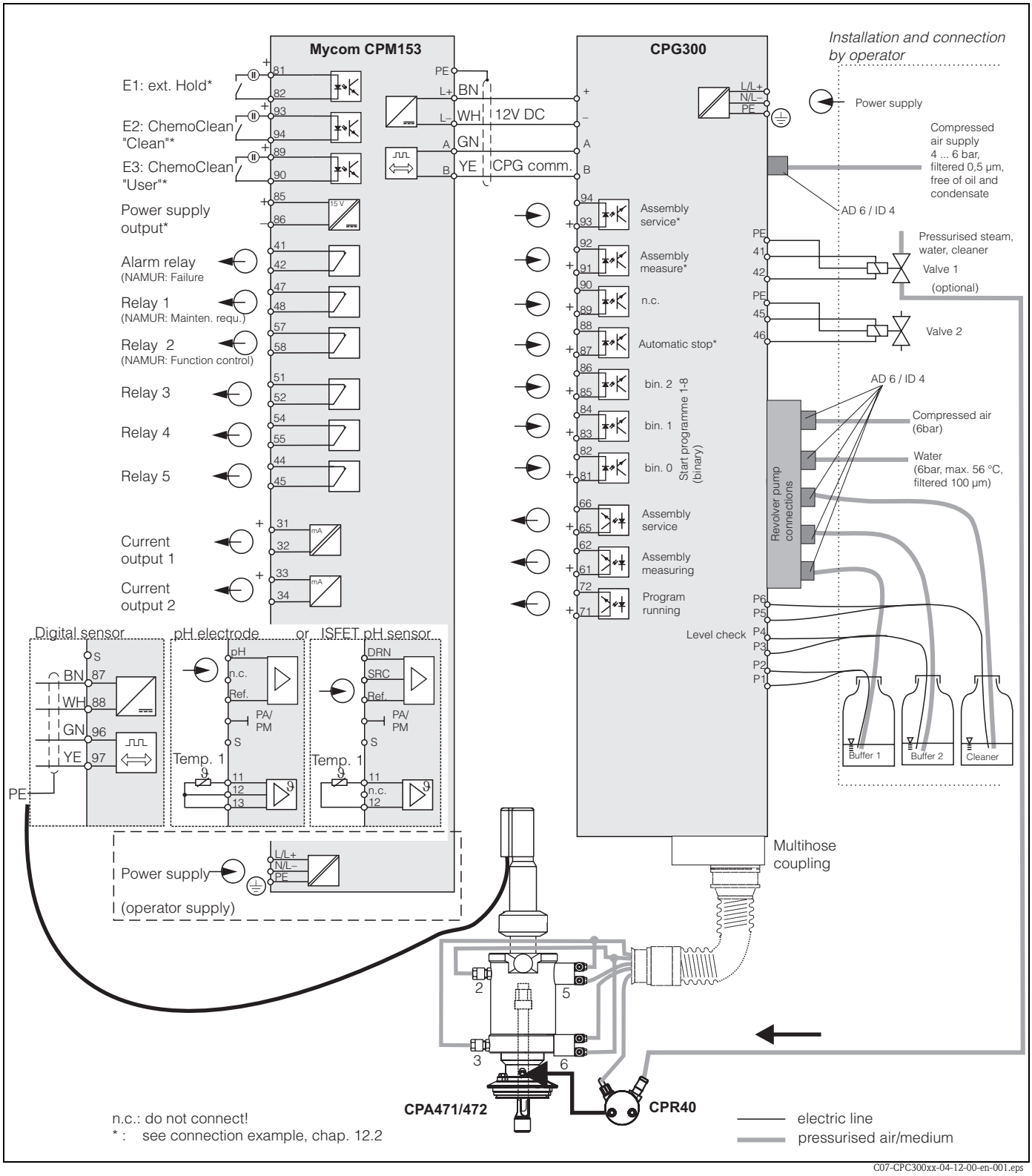
Switched mains voltage to control additional external valves

⟨Ex⟩ *: Switched compressed air output.*

Pressure	*as p_0*

Electrical connection

Connection diagram **Non-Ex area**



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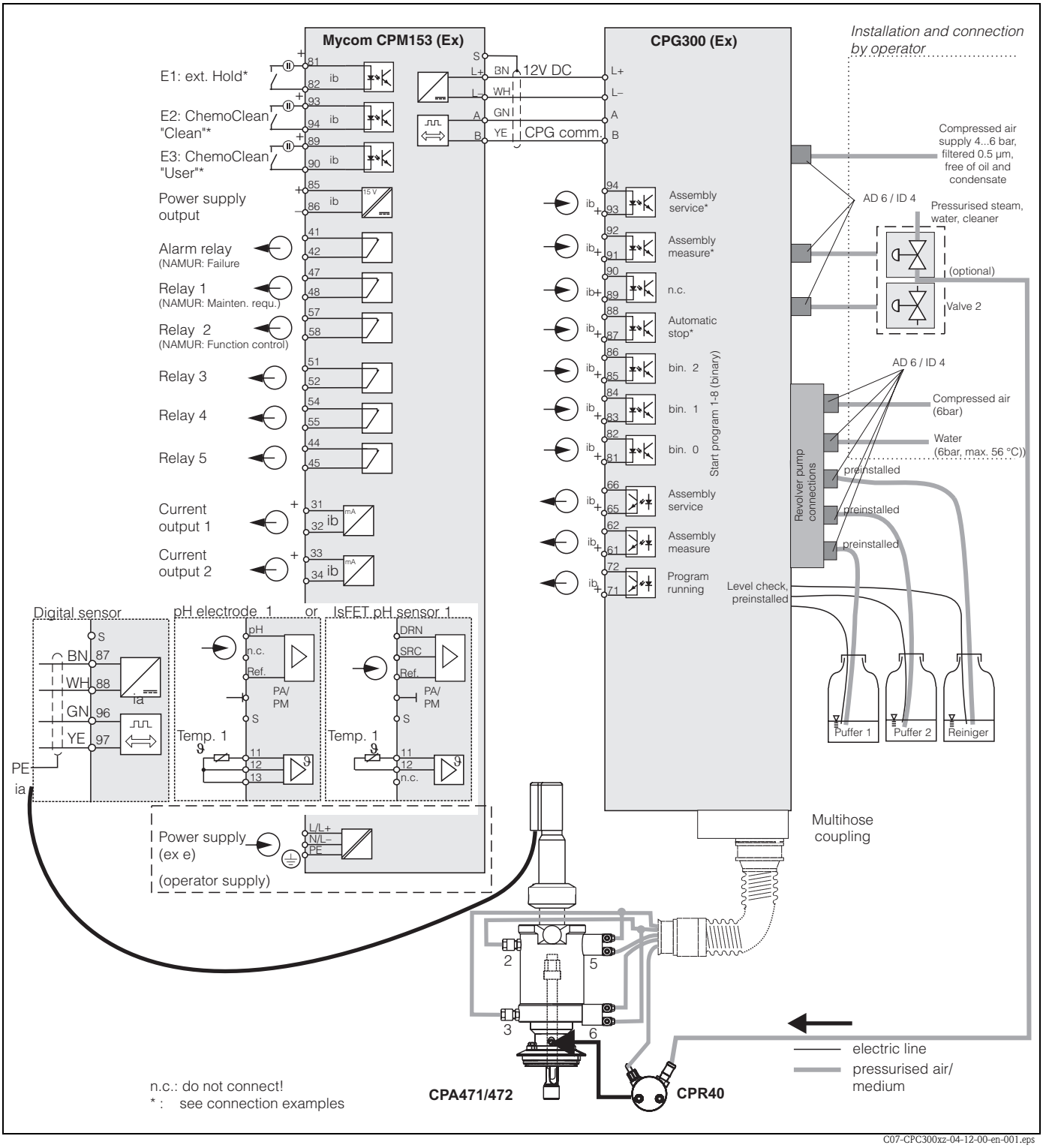
Ex area


Mycom CPM153 (Ex)
CPG300 (Ex)
Installation and connection by operator
E1: ext. Hold*
E2: ChemoClean "Clean"*
E3: ChemoClean "User"*
Power supply output
Alarm relay (NAMUR: Failure
Relay 1 (NAMUR: Mainten. requ.)
Relay 2 (NAMUR: Function control)
Relay 3
Relay 4
Relay 5
Current output 1
Current output 2
12V DC
CPG comm.
Assembly service*
Assembly measure*
n.c.
Automatic stop*
bin. 2
bin. 1
bin. 0
Start program 1-8 (binary)
Assembly service
Assembly measure
Program running
Level check, preinstalled
Compressed air supply 4...6 bar, filtered 0.5 µm, free of oil and condensate
AD 6 / ID 4
Pressurised steam, water, cleaner
(optional)
Valve 2
Compressed air (6bar)
Water (6bar, max. 56 °C))
preinstalled
Revolver pump connections
Puffer 1
Puffer 2
Reiniger
Digital sensor
pH electrode 1
or
IsFET pH sensor 1
Temp. 1
PA/ PM
Power supply (ex e)
(operator supply)
Multihose coupling
CPA471/472
CPR40
electric line
pressurised air/ medium
n.c.: do not connect!
* : see connection examples
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Contacts CPM153

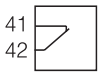
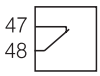
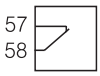
In the transmitter Mycom S CPM153, there are six relays available which you can configure using the software.

The **Chemoclean**® spray cleaning system with the injector CYR10 automatically cleans the electrode. It is controlled by two contacts.

The "Active open" / "Active closed" 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 	Alarm	Alarm
RELAY 1 	Warning when maintenance required	Controller or Chemoclean
RELAY 2 	Function control	Controller or Chemoclean

Electrical connection data

CPM153:

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 mm²
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*

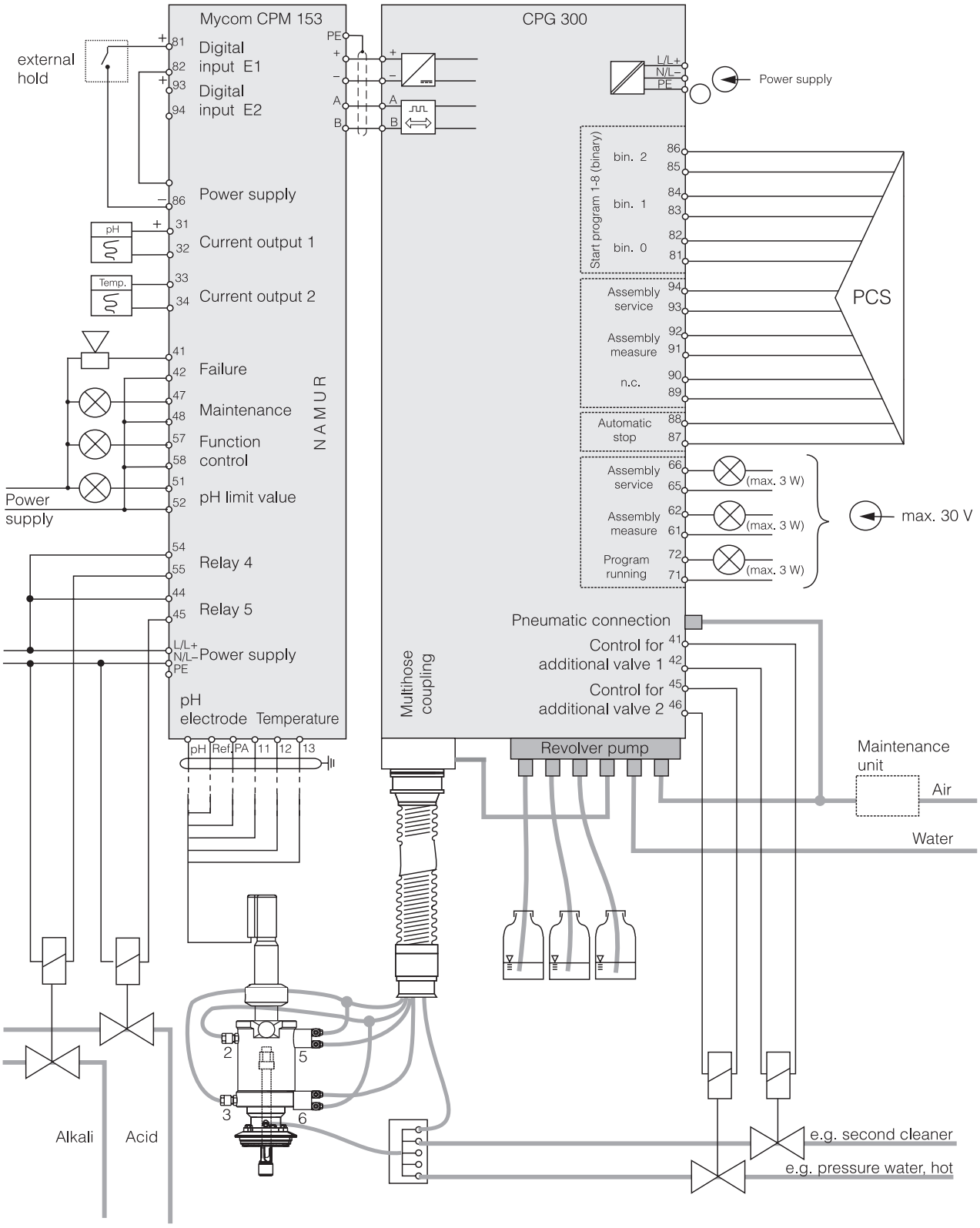
CPG300:

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 mm²

CPG300 (Ex): ⟨Ex⟩ *: The devices in Ex version are powered by the transmitter CPM153 (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 PCS, assembly status display



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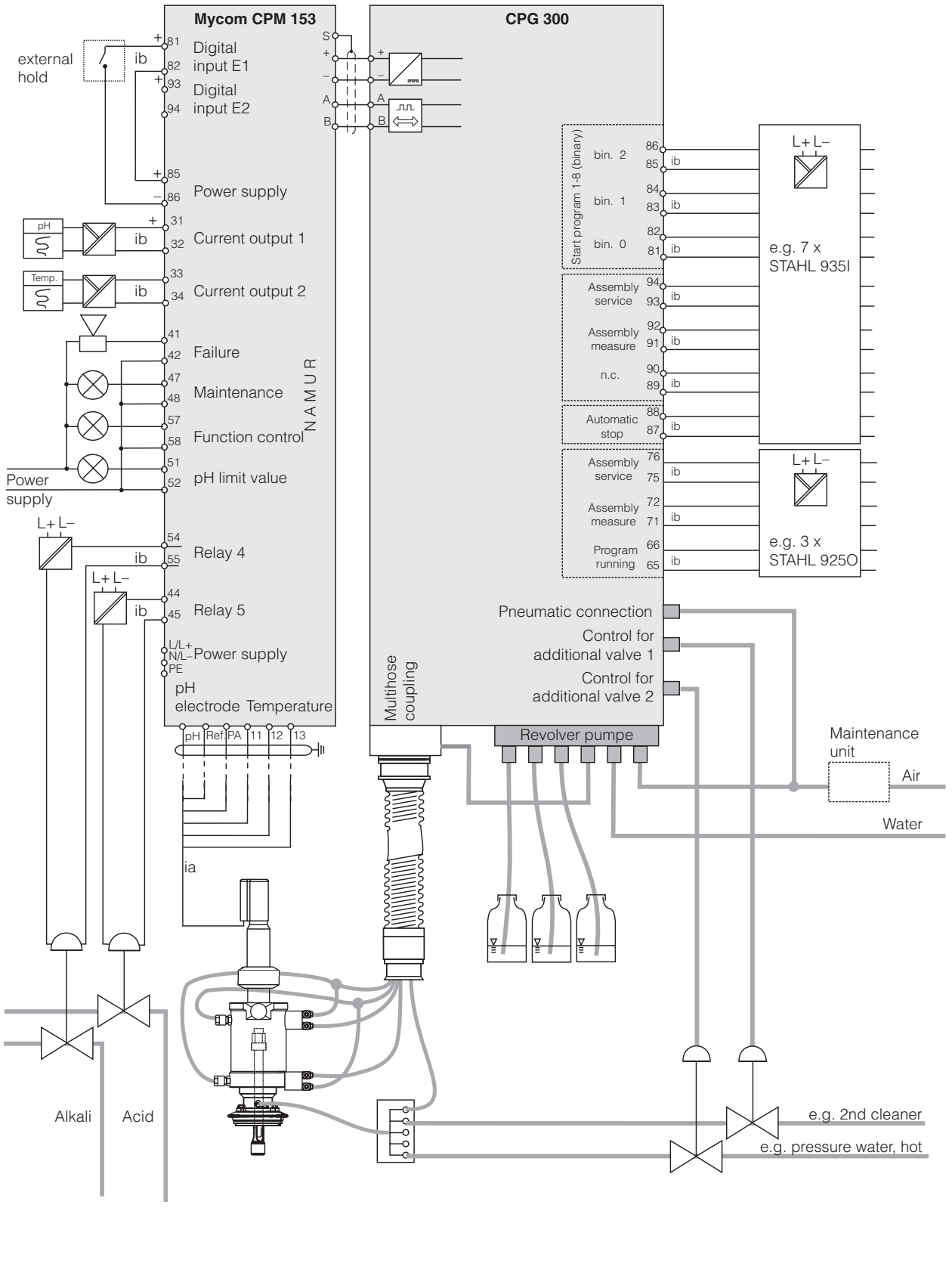
Ex, double-sided neutralisation with equipment for two additional valves, rinse block, connected digital inputs and outputs



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

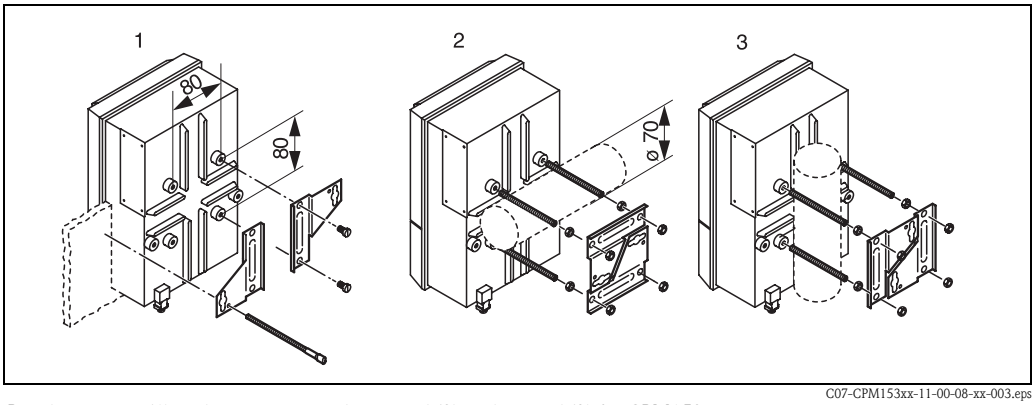
Installation instructions

- Always install the transmitter and the control unit so that the cable entries always point downwards.

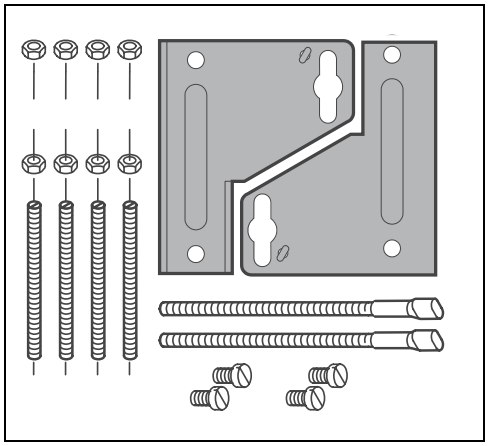
The components can be installed using the following methods:

Device	Wall mounting	Post/ pipe installation	Panel mounting
Control unit CPG300	Mounting kit contained in scope of supply. Refer to figure below.	Not applicable	Not applicable
CPM153, 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.
CPM153, 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 CPM153 is normally installed as a panel-mounted unit.
- The transmitter CPM153 can be fixed to a vertical or horizontal pipe using the supplied mounting kit. For outdoor installation, a weather protection cover CYY101 is required. It can be fitted to the field unit using all kinds of fixtures (refer to "Accessories").



Panel mounting (1) and post mounting horizontal (2) and vertical (3) for CPM153



Mounting the transmitter in panels or on posts CPM153 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 CYY101 weather protection cover 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

Pump (transport of buffer / cleaner from CPG300 to assembly):

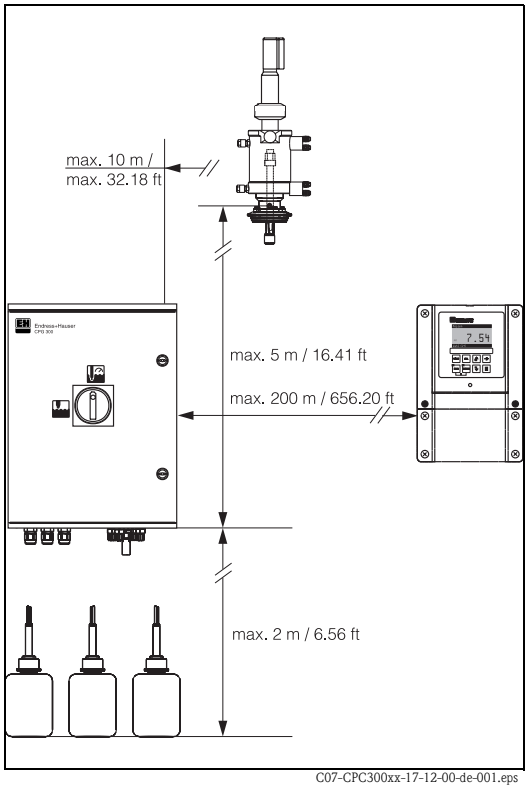
Note!

The maximum hose length amounts to 10 m / 32.81 ft. You should meet following dimensions:

Maximum discharge height	5 m / 16.41 ft.
Maximum horizontal discharge range	10 m / 32.81 ft
Pressure resistance of internal components	up to 7 bar / 101.5 psi

Buffer / Cleaner bottles:

Maximum suction height	2 m / 6.56 ft.
Dimensions	5 litre / 1.32 US gal. bottles (19x23x14 cm / 0.75 x 0.91 x 0.55 inches)



Ambient conditions

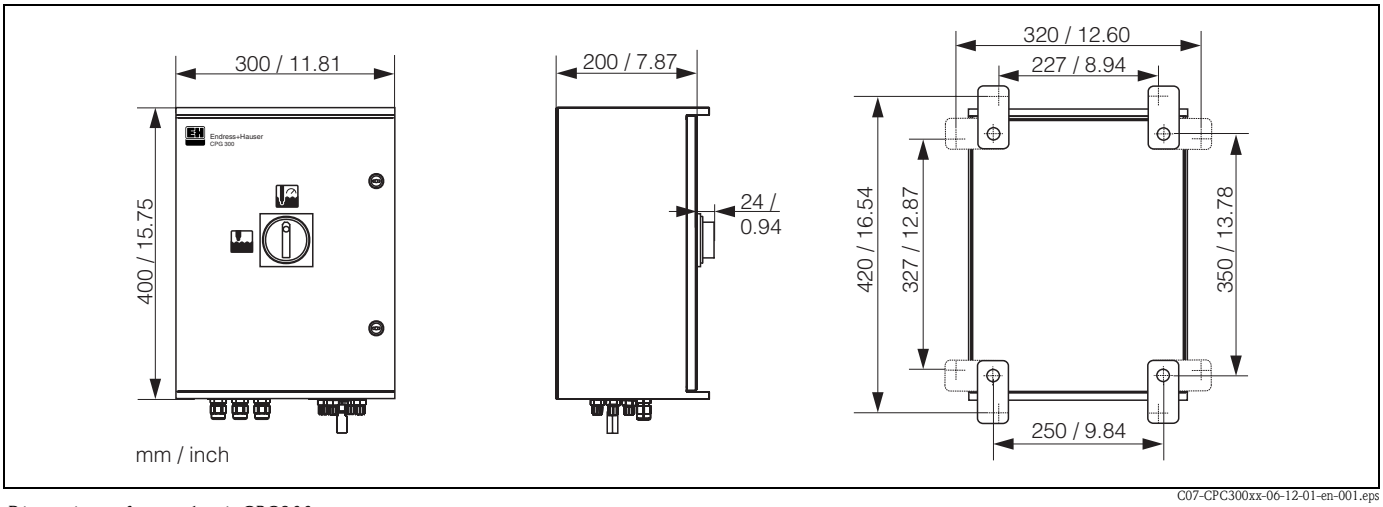
Ambient temperature	–10 ... +55°C / 14 ... 131 °F (Ex: –10 ... +50°C / 14 ... 122 °F)
Ambient temperature limit	–20 ... +60°C / -4 ... +140 °F (Ex: –10 ... +50°C / 14 ... 122 °F)
Storage and transport temperature	–30 ... +80°C / -22 ... +176 °F
Relative humidity	10 ... 95%, non-condensing
Ingress protection	CPM153: IP 65 CPG300: 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: 08/1998.

Process conditions

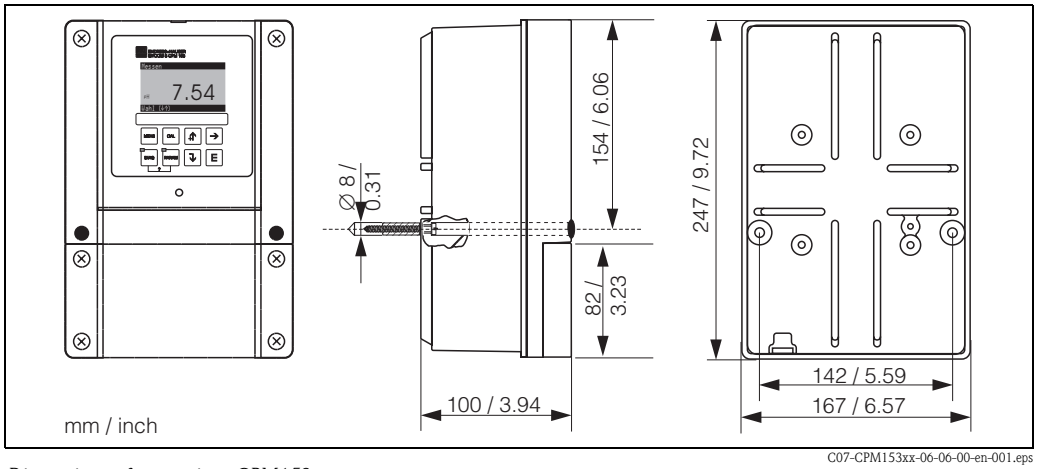
Temperature range of media conveyed	–5 ... +50°C / 23 ... 122 °F
Pressure of media conveyed	Acids, bases, hot media, organic solvents and cleaners with fat dissolving agents must not be conveyed via the internal revolver pump of the CPG300 control unit. They must be fed separately into the assembly's rinse chamber. If you want to convey the above mentioned media, proceed as follows: ■ Use a Topcal with control for external valves (order version: CPC300-x(1-4)xxxxxxxx) in combination with a CPR40 rinse block. ■ Convey the pressurised media via external valves and via the CPR40 rinse block into the assembly's rinse chamber (see figures on page 3 or page 4). Media and external valves are supplied by the customer.

Mechanical construction

Design / dimensions



Dimensions of control unit CPG300



Dimensions of transmitter CPM153.

Weight	CPG300:	approx. 20 kg / 44.1 lb.	CPM153:	max. 6 kg / 13.2 lb.	

Materials	CPM153	Housing	GD-AlSi 12 (Mg content 0.05%), plastic-coated
		Front membrane	Polyester, UV-resistant
	CPG300	Housing	Ex and non-Ex: polyester GF
		Hoses	PU, PTFE (in contact with medium conveyed)
		Pump	EPDM, PP, PVC, glass, Hastelloy C4, Viton® (in contact with medium conveyed)

Caution!
Acids, bases, hot media, organic solvents and cleaners with fat dissolving agents must not be conveyed via the internal revolver pump of the CPG300 control unit. They must be fed separately into the assembly's rinse chamber.

See also section "Pressure of media conveyed" on page 21.

Display and operating interface

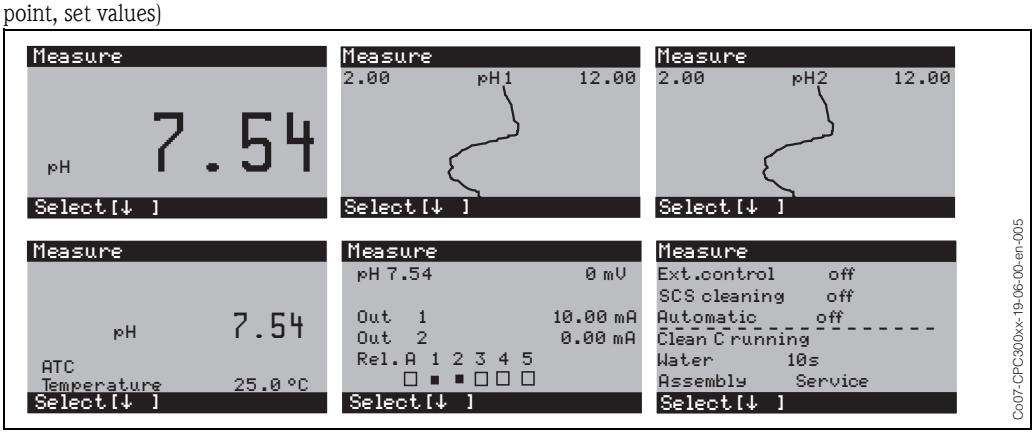
You can set up the complete measuring point with using the operating panel on the transmitter CPM153 or using the off-line set-up function in the PC tool.
If you are using several devices, you can copy the entire set-up of one device to another device using the DAT module.

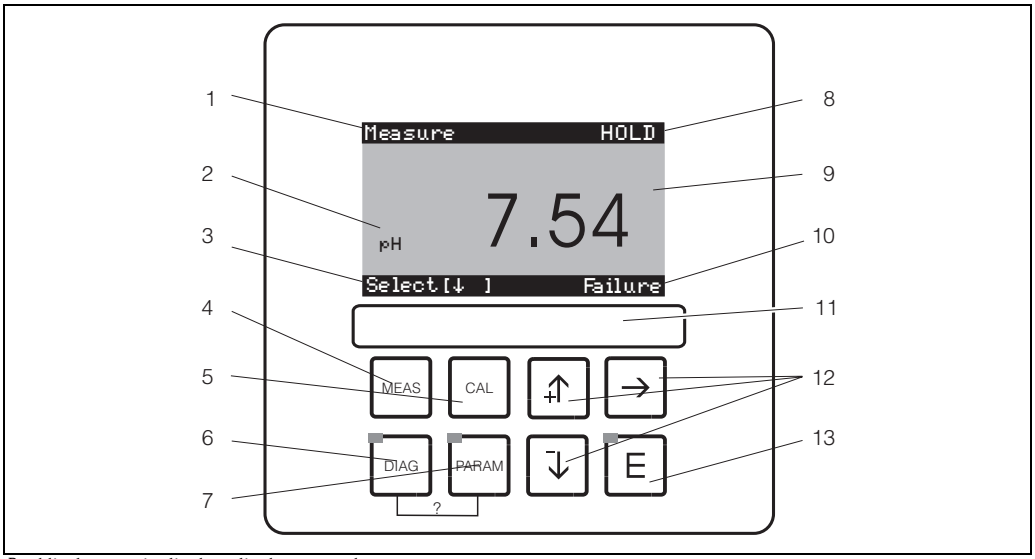
Display elements CPM153

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 CPG300, control parameters (set-point, set values)





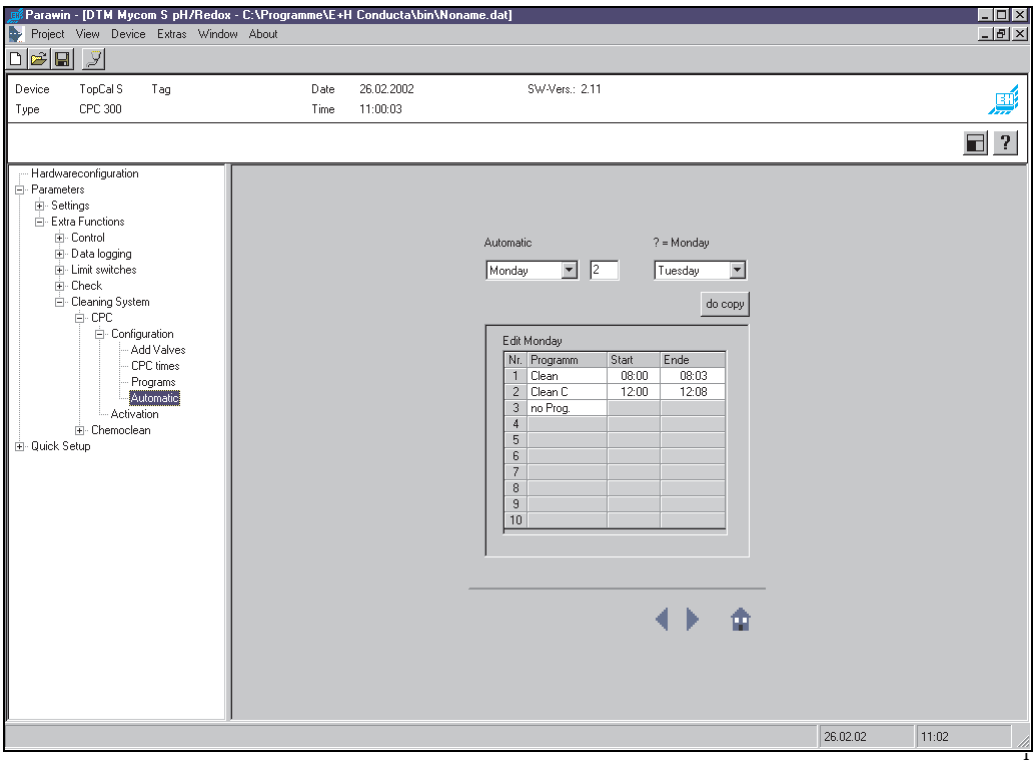
Backlit dot matrix display, display example
1 Current menu option
2 Current measured variable
3 Select: arrow keys for scrolling through the menu/through the measuring menus, "E" to browse down
4 "HOLD", when Hold is active
5 Display of measured value
6 NAMUR error message
7 "Meas" (Measuring mode) key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

Operating elements CPM153

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 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.
The calibration function is assumed in this complete system by the fully automatic cleaning function of the CPG300.

Off-line configuration user interface using Parawin (Accessories)



1

he 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 RS 232 interface on the PC. The data can then be transferred to the transmitter.

Certificates and approvals

CE symbol

The Topcal S system complies with the statutory requirements of the harmonised EC directives. Endress+Hauser confirms the successful testing of the system by affixing the CE 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 Topcal S CPC300

Scope of delivery of basic equipment:
Control unit CPG300, transmitter Mycom S CPM153 with 6 relays and DAT module, multihose (5 m), hose clip, 2 bottles with buffer solutions, 1 empty bottle, bottle hoses (2 m), power supply cable CPM153 – CPC300 (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									
		3	Control for 2 external valves, non-Ex									
		4	Control for 2 external valves, Ex									
				Measurement input Mycom S CPM153								
				1	1 measuring circuit for glass electrodes pH/redox and temperature							
				2	1 measuring circuit for glass electrodes / ISFET sensors pH/redox and temperature							
				5	1 measuring circuit for digital pH sensors (Memosens), pH and temperature							
						Measurement output Mycom S CPM153						
						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 CYC300
												9 Special version acc. to customer specifications
												Configuration
												A Factory settings
CPC300-												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 CPM153)
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 CPM153.
Order No.: 50064975

Assemblies

Type	Properties	Applications
Cleanfit CPA471 / 472 / 473 / 474 / 475	Retractable assembly for manual or pneumatic operation. Cleaning and calibrating the electrode is possible under process conditions. CPA475: 3A approval, application pending with EHEDG. Technical Information: CPA471: TI 217C/07/en, Order No.: 51502596 CPA472: TI 223C/07/en, Order No.: 51502645 CPA473: TI 344C/07/en, Order No.: 51510923 CPA474: TI 345C/07/en, Order No.: 51510925 CPA475: TI 240C/07/en, Order No.: 51505599	■ Process industry (471, 472, 473 / 474) ■ Food, pharmaceutical applications (475) ■ Biotechnology (475)

pH/redox electrodes

Type	Properties	Applications
Orbisint CPS11/11D/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 and TI 367C07/en, 51513586	■ Process industry ■ Industrial wastewater ■ Detoxification (cyanide, chrome) ■ Neutralisation
Ceraliquid CPS41/42/43	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 CPS71/71D/72	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 and TI 374C/07/en, 51513591	■ Process industry ■ Food processing ■ Water treatment
Orbipore CPS91/91D	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 CPS471	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
Tophit CPS441	Sterilisable ISFET sensor for media with low conductivity, with liquid KCL electrolyte Technical Information TI 352C/07/en, 51506565	■ General process engineering ■ Ultra-pure water ■ Boiler feed water
Tophit CPS491	ISFET sensor with open aperture Technical Information TI 377C/07/en, 51513174	■ Chemical processes ■ Heavily soiled media

Connection accessories

- pH cable CPK1: For pH/redox electrodes without temperature sensor, with GSA plug-in head. Extension with cable CYK71 possible. Order No. of CYK71: 50085333
- pH cable CPK9: For pH/redox electrodes with integrated temperature sensor and TOP68 plug-in head (version ESA, ESS). Extension with cable CYK71 possible.
- pH cable CPK12: For ISFET pH sensors and pH/redox electrodes with integrated temperature sensor and TOP68 plug-in head. Extension with cable CYK12 possible.
- Memosens data cable CYK10: For digital pH sensors with Memosens technology. Extension with cable CYK81 possible. Order No. of CYK81: 51502543.
- 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
- Junction box RM: Junction box for extending measuring cable connection between digital sensor with Memosens technology and transmitter, 2 cable glands Pg 13.5, ingress protection IP 65.
  Order No.: 51500832

Buffer solutions

Type	Characteristic value / contents	Applications
CPY2	pH 4.0, red, contents: 5000 ml; Order No.: CPY2-A pH 7.0, green, contents: 5000 ml; Order No.: CPY2-B	pH calibration (reference temperature 25°C)
CPY3	+225 mV, pH 7.0, contents 5000 ml; Order No.: CPY3-6 +475 mV, pH 0.0, contents: 5000 ml; Order No.:CPY3-7	Redox calibration (measured at 25°C with PtAg or AgCl measuring chain)

Rinse connection adapter

Rinse connection adapter CPR40 for the transport of cleaning agents for use with retractable assemblies.

Spray cleaning system

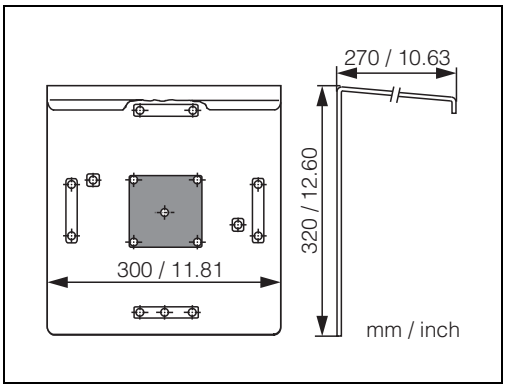
CYR10 / CYR20 Chemoclean Spray Cleaning System for the transport of cleaning agents or acids for use with retractable assemblies.

Weather protection cover CYY101

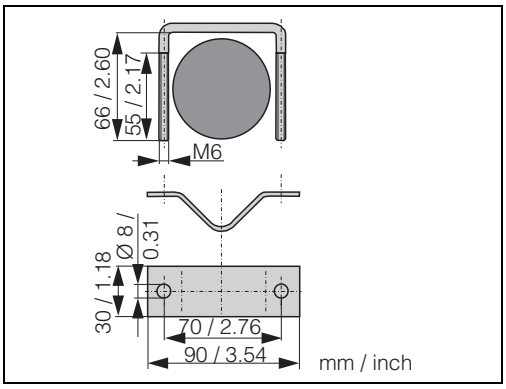
For installing the transmitter outdoors, the weather protection cover CYY101 is required.
Order No.: CYY101-A

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 CYY101

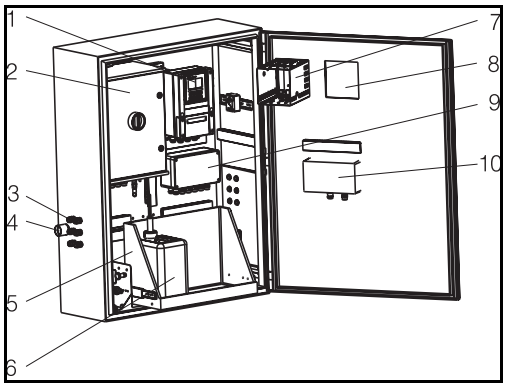


Round post fixture for CYY101

Housing CYC300

Housing for Topcal S CPC300, with rack for buffer and cleaner solutions. Operating panel with alarm LED and lock for programme start and assembly drive. For Ex and Non-Ex applications. Material: plastic or stainless steel.

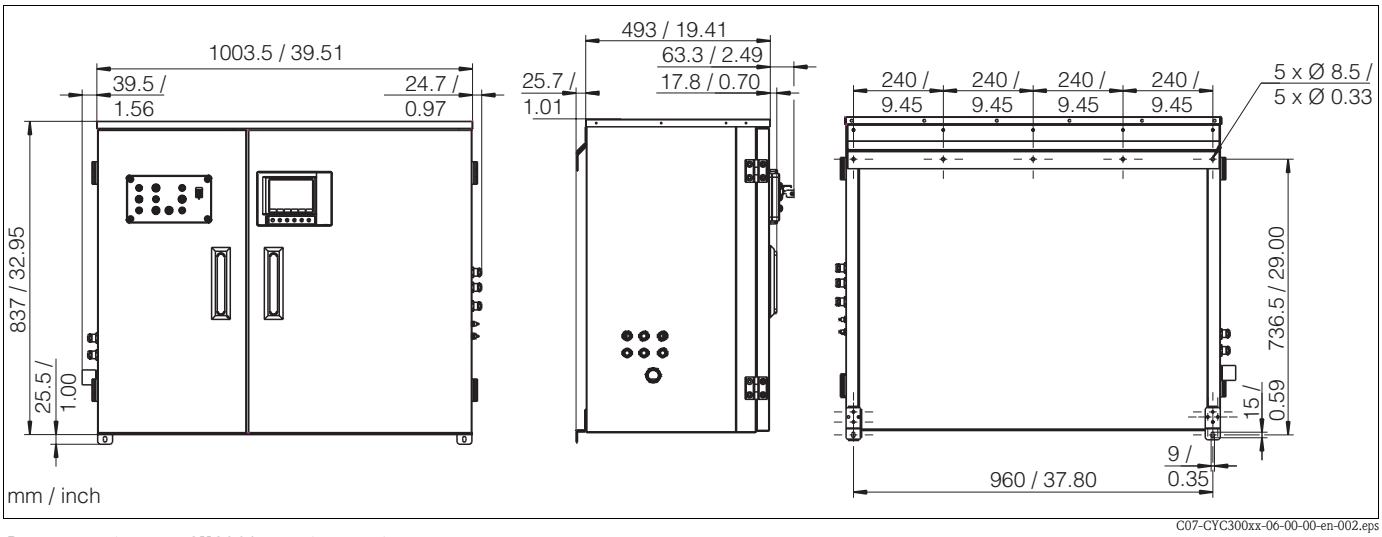
- Plastic version: Window for Mycom S and Memograph S
- Stainless steel version without Memograph S: Window for Mycom S
- Stainless steel version with Memograph S: Window for Memograph S



C07-CYC300xx-09-00-06-xx-001.eps

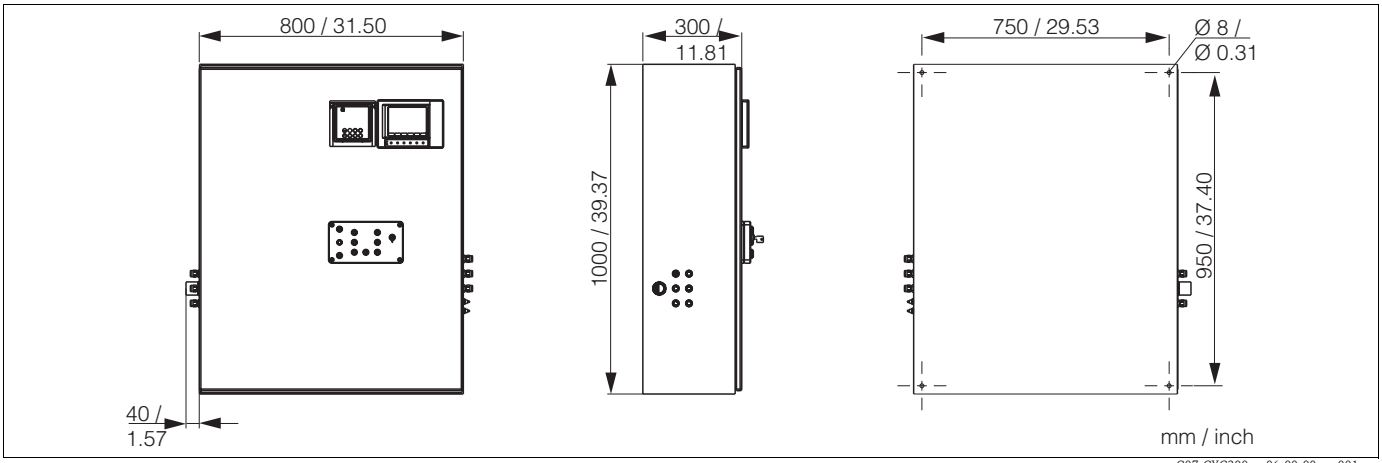
Housing CYC300

1 Mycom S CPM153
2 Topcal S CPC300
3 Pg cable glands
4 Multihose gland
5 Rack
6 Buffer and cleaner solutions
7 Memograph S
8 Window for display
9 Programme control unit
10 Operating panel



C07-CYC300xx-06-00-00-en-002.eps

Dimensions housing CYC300, stainless steel version



C07-CYC300xx-06-00-00-en-001.eps

Dimensions of housing CYC300, plastic version

Product structure
Housing CYC300

	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 CI. 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					
			B	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, CPC300 not mounted		
						2	order item of associated CPC		
							Options		
							1	Basic version	
CYC300-									complete order code

Operating panel for CPC300

Operating panel with alarm LED and key switch, used to start programmes and move the assembly.
Order No. 51512891

Supplementary documentation

- Operating Instructions Topcal S CPC300, BA 236C/07/en, Order No. 51504337
- 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 CPM153, TI 233C/07/en, Order No. 51503788
- Technical Information Cleanfit CPA471, TI 217C/07/en, Order No. 51502595
- Technical Information Cleanfit CPA472, TI 223C/07/en, Order No. 51502644
- Technical Information Cleanfit CPA473, TI 344C/07/en, Order No. 51510923
- Technical Information Cleanfit CPA474, TI 345C/07/en, Order No. 51510925
- Technical Information Cleanfit CPA475, TI 240C/07/en, Order No. 51505598
- Technical Information Orbisint CPS11/11D, TI 028C/07/en, Order No. 50052557
- Technical Information Orbisint CPS12/13, TI 367C/07/en, Order No. 51513586
- Technical Information Ceraliquid CPS41/42/43, TI 079C/07/en, Order No. 50058726
- Technical Information Ceragel CPS71/CPS71D, TI 245C/07/en, Order No. 51505837
- Technical Information Ceragel CPS72, TI 374/07/en, Order No. 51513591
- Technical Information Orbipore CPS91/91D, TI 375C/07/en, Order No. 51513127
- Technical Information Tophit CPS471, TI 283C/07/en, Order No. 51506687
- Technical Information Tophit CPS441, TI 352C/07/en, Order No. 51506565
- Technical Information Tophit CPS491, TI 377C/07/en, Order No. 51513174
- Technical Information CPK1-12, TI 118C/07/en, Order No. 50068525
- Technical Information CPR40, TI 342C/07/en, Order No. 51510059
- Technical Information CYR10 / 20, TI 046C/07/en, Order No. 50014223

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