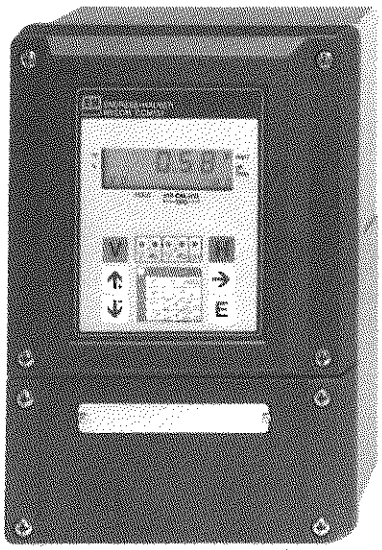
Technical
Information
TI 067C/07/e

Free chlorine/chlorine dioxide pH/temperature measurement *mycom CCM 121/151*

Microprocessor-based chlorine transmitter with controller and limit contacter

Mycom CCM 121, panel-mounted housing, IP 54



Mycom CCM 151, field-mounted housing
with separate connection compartment, IP 65

Areas of application

The Mycom CCM 121/151 are microprocessor-based measuring and control instruments used to determine free chlorine and chlorine dioxide content and pH value. State-of-the-art engineering allows simple adaptation to all measuring tasks encountered in the industry.
The high-quality controller section handles even complicated processes in order to ensure sufficient disinfectant concentration at all times.

The transmitter is available in a panel-mounted or field-mounted housing (ingress protection to IP 65).

Areas of application include:

- Water treatment
- Drinking water
- Cooling water
- Reverse osmosis
- Gas washers
- Food industry
- Beverage industry

Benefits at a glance

- Matrix user interface ensures quick and simple access to any operating function
- Second current output switchable for pH or temperature
- pH compensation of sensor signal (hypochlorous acid, HOCl) is used to determine total free chlorine or residual chlorine
- Four different measuring sensors can be connected to one instrument version
- Flow alarm can be evaluated separately
- Operation with only 6 keys
- Commissioned settings are protected against unauthorized adjustment by means of an access code
- Red/green LEDs on front panel indicate the controller switching status
- 4-digit liquid crystal display for measured value and status indication
- Hold function can be remote-controlled
- Digital interface available in 2 variants (RS 232-C, RS 485)
- The most important operating functions are shown on the front panel

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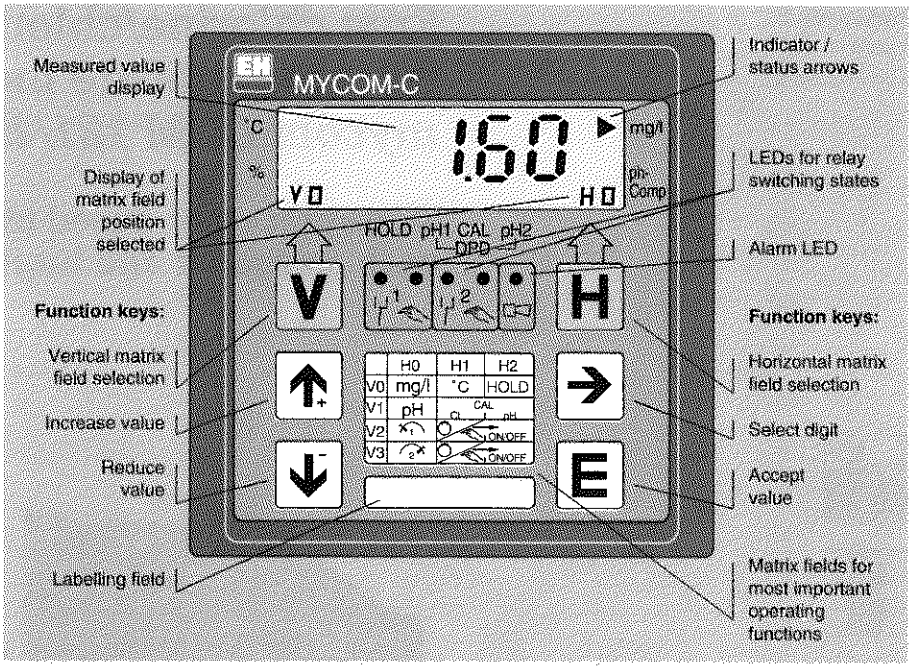
Measuring system



A complete measuring and control system comprises:
- a CCS 140 / CCS 141 or CCS 240 / CCS 241 sensor
- an optional pH electrode
- the flow assembly CCA 250
- the Mycom CCM 121/151 instrument
- the downstream actuators, such as solenoid valves or dosing pumps

Options in addition to the chlorine/ chlorine dioxide signal output (0/4 ... 20 mA) include a 2nd current output (0/4 ... 20 mA) for temperature or pH value (switchable) and digital interfaces (RS 232-C, RS 485).
All common supply voltages from 24 to 240 V AC and 24 V DC are available.

Hold function

The hold function is advantageous for some operating conditions (e.g., maintenance or calibration). It "freezes" the signal output to its current value and suspends the limit and control functions.

The hold function can be activated in three different ways:
- in conjunction with specific instrument functions, e.g. calibration
- by selecting the corresponding matrix field
- by an external control command, e.g. during sensor maintenance

Multifunction display

The liquid crystal display indicates the current measured value and the present vertical and horizontal positions in the operating matrix. Status arrows indicate the present measured quantity (e.g. mg/l, pH comp., °C, %) and any unit function currently activated, such as HOLD or CAL (calibration).

pH compensation of chlorine sensor signal

The membrane-covered amperometric sensor CCS 140 or CCS 141 selectively detects the portion of hypochlorous acid (HOCl) present in the medium to be measured (free, active chlorine). As the diagram shows, HOCl dissociates depending on the pH value by forming hypochlorite ions (OCl^-). For this reason, chlorine measurement for pH > 6 consistently supplies values lower than those which would correspond to the total free chlorine or residual chlorine (HOCl + OCl^-).
However, the total free chlorine concentration (residual chlorine) is of interest in many industrial and drinking water applications. This total value is calculated and displayed by the automatic pH compensation function (option), and is available as an output signal. The compensation can be switched off for normal measuring operation, i.e. when HOCl detection is sufficient. Chlorine dioxide does not dissociate in the application range, i.e. pH compensation is not needed.

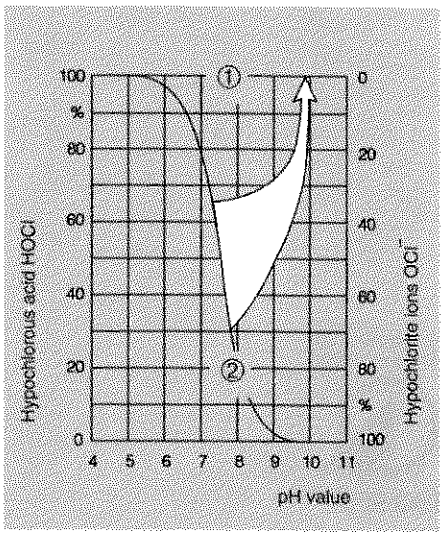


Figure on right:
Principle of pH compensation. When this function is enabled, display value and chlorine output are referred to pH 5 (100%) independent of the current pH value.

Note:
Measured value
① with
② without pH compensation

General information

User-friendly chlorine measurement
A number of sensor data, such as the nominal measuring range of the chlorine or chlorine dioxide sensor connected, slope, residual zero (compensatable), current measuring cell current, etc., can be read whenever required, e.g. for purposes of service and verification.
The DPD calibration monitoring function issues an error message if excessive differences between two consecutive calibration values are detected. This is usually an indication of a calibration error.

A flow alarm which can be separately evaluated provides protection, e.g. against overdosing, if the flow in the measuring water circuit drops below the minimum flow rate of 30 l/h.

All CCS 140 (N) and CCS 141 chlorine sensors and the chlorine dioxide sensors CCS 240 and CCS 241 may be connected to the same Mycom version. The input sensitivity is switched internally, and the range of the connected cell is displayed.

Controller functions
Instruments equipped with additional switching contacts can be configured for the following controller functions:

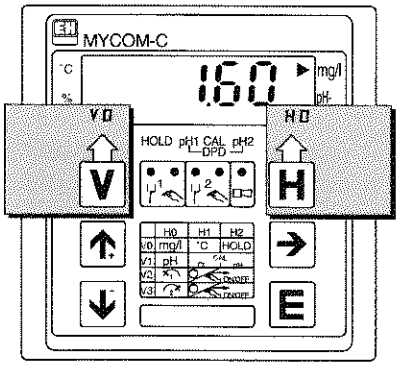
- Limit monitor

- Proportional controller
  - Pulse-length controller: P, PI, PID
  - Pulse-frequency contr.: P, PI, PID
  - 3-point step controller: PD, PT1

Matrix user interface
The operating functions of the instrument are arranged in a matrix in which every function is assigned to one position in a 10 x 10 field matrix. The individual functions are selected using the V (vertical) and H (horizontal) keys. There are field types, e.g.:
- Read fields for:
  chlorine, chlorine dioxide, pH and temperature values and sensor data
- Operating fields for:
  calibration, hold ON/OFF, alarm threshold for DPD-CAL
- Commissioning fields for:
  controller data, zero compensation, output assignment, pH buffer value entry, 2nd current output switching (pH/temperature), pH compensation ON/OFF

Operation without instructions
The operation of the instrument is made easier by the representation of the matrix fields on the front panel. The 12 most important functions are shown. This permits the transmitter to be largely operated without additional instructions.

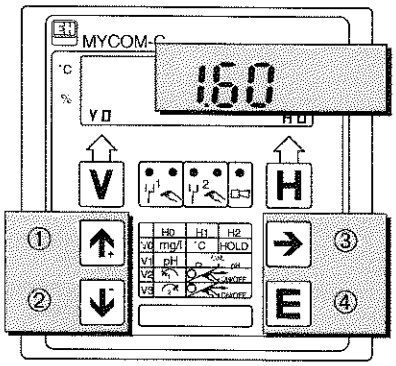
Digital interface (option)
All functions of the matrix user interface can also be activated via the instrument's digital interface.
One of the following bidirectional interfaces can be installed as an option:
- RS 232-C
- RS 485



Matrix position V / H

V key:
selection of matrix field
V0 to V9

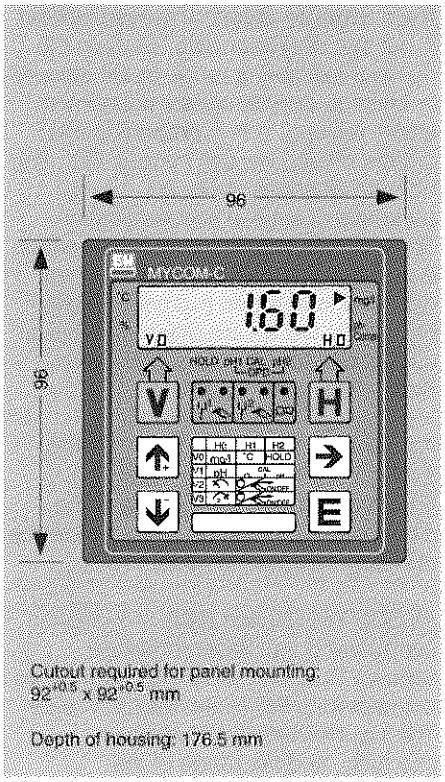
H key:
selection of matrix field
H0 to H9



Value range display and entry

Press these keys to enter / select functions:
① "Increase value"
② "Decrease value"
③ – "Cursor function"
  – "Start editing"
  – "Recall after E"
④ "Accept value"

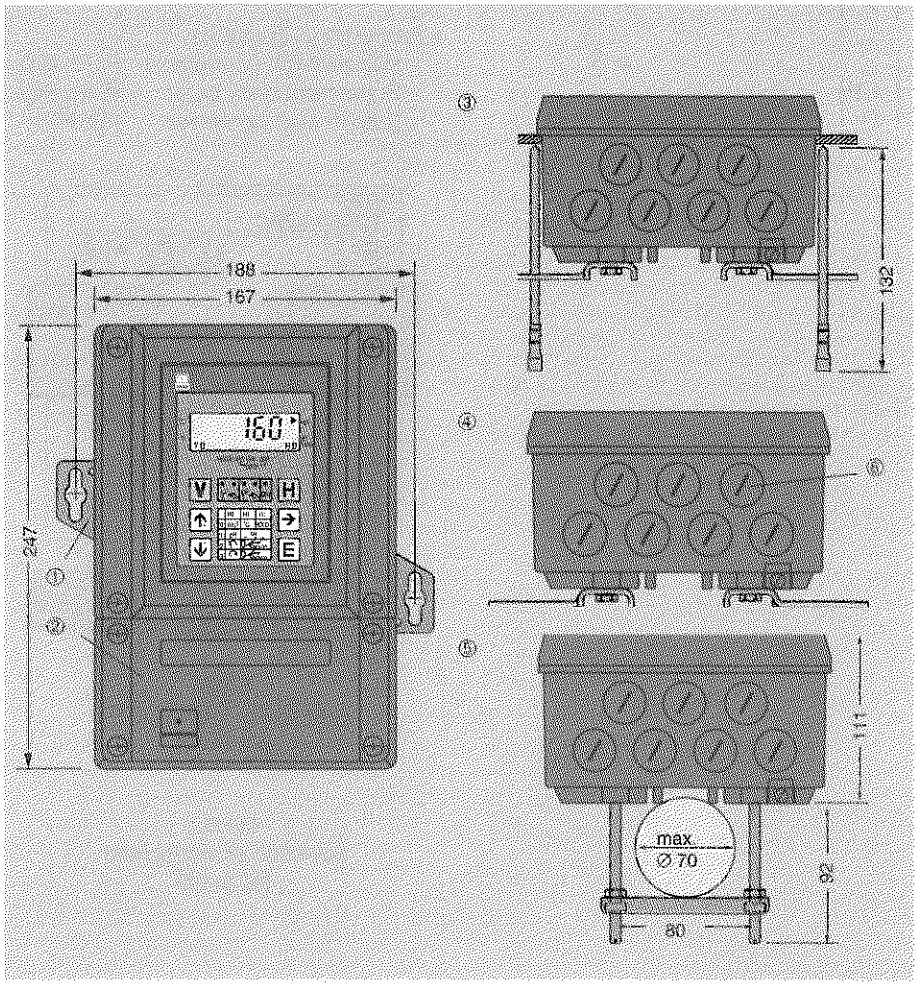
Dimensions



Mycom CCM 121
Dimensions of housing for panel installation
Weight: 1.1 kg
Ingress protection: IP 54 (front)

Cutout required for panel mounting:
$92^{+0.5}$ x $92^{+0.5}$ mm

Depth of housing: 176.5 mm



Mycom CCM 151
Dimensions

① Brackets for wall installation
② Separate connection compartment with cover

Back of housing with mounting brackets for:

③ Panel mounting
④ Wall mounting
⑤ Post mounting for attachment to vertical or horizontal tubing
⑥ Screw plugs for Pg 13.5

Note:
All fastening elements are supplied with the instrument as part of the housing mounting kit.

Special features CCM 151

Areas of application

The new Mycom 151 series allows applications in very demanding environments.

The smart and impact-resistant metal housing with its chemical-resistant surface is particularly suitable for field installation.

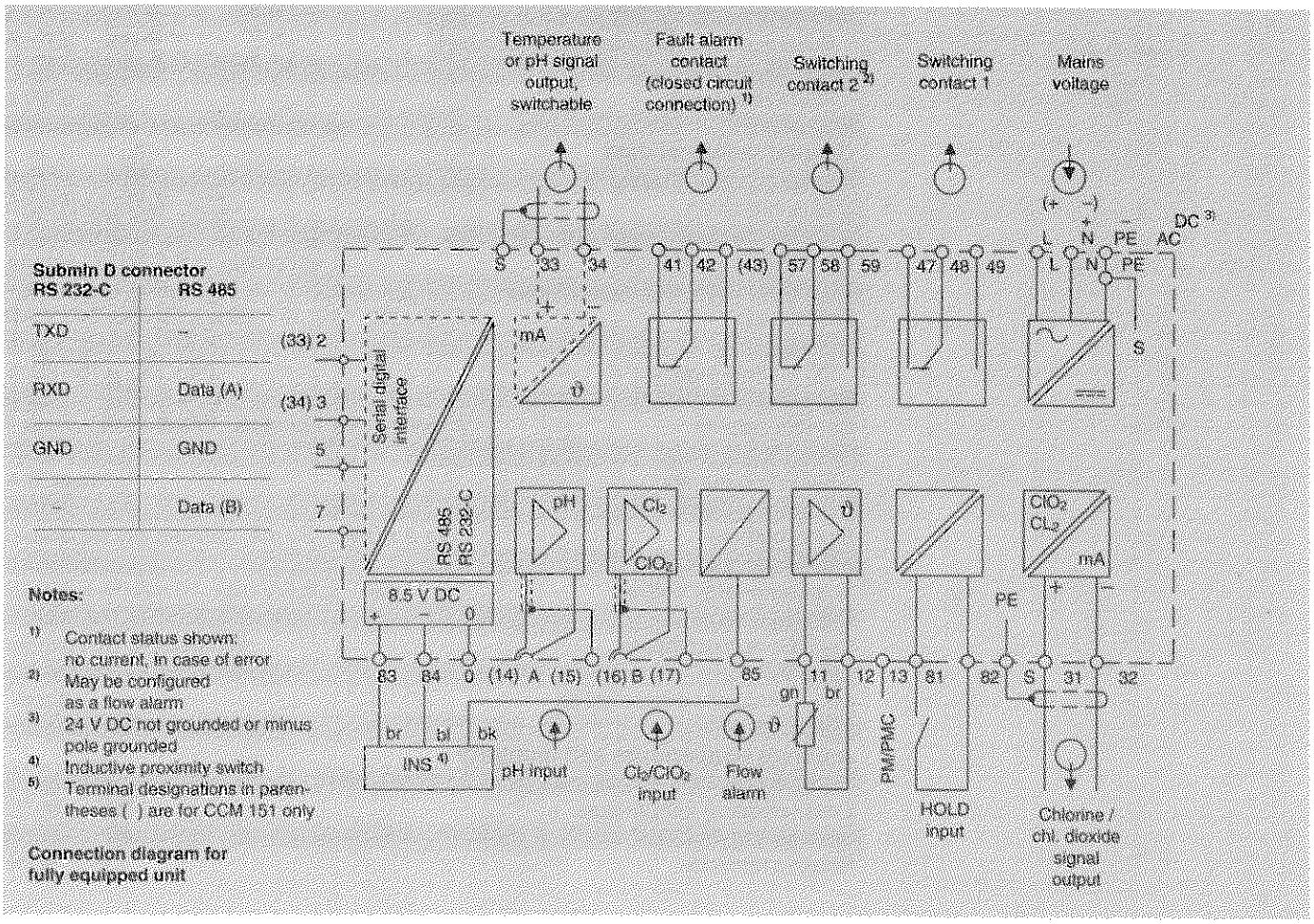
The instrument is equally suitable for panel, wall or post mounting, either as a single measuring station or as one module within a series of units.

Accessories for field applications, such as the upright post and weather protection cover, assure adaptability to a wide range of field conditions.

Benefits at a glance

- Splash-proof metal housing guarantees:
  - high mechanical stability
  - total resistance to electromagnetic interference
- PU surface is resistant ot the effects of oil, dirt, chemicals and all weather conditions
- Seven threaded holes for Pg 13.5 cable glands
- Ingress protection IP 65
- Separate connection compartment ensures:
  - simple connection of wires
  - protection of instrument electronics is maintained during termination
- Installation options:
  - panel mounting
  - wall mounting
  - post mounting
- No extra cost for mounting components since the instrument is supplied with a comprehensive housing mounting kit
- Instrument and operating functions are identical to all other instruments from the Mycom 121 and 141 families

Electrical connection



Connection diagram for fully equipped unit

Electrical data

Cl_2/ClO_2 measurement	
Meas. range (MR)	0 ... 5 mg/l for CCS 141/241; 0 ... 20 mg/l for CCS 140/240
Polarization voltage	–20/–100 mV for Cl_2, +120 mV for ClO_2
Temperature compensation of measured value in range	2 ... 45 °C
Reference temperature	25 °C
Signal output range	
for CCS 140/240	adjustable from Δ 1 ... Δ 20 mg/l
for CCS 141/241	adjustable from Δ 0.2 ... Δ 5 mg/l
Signal output current range	0/4 ... 20 mA
Load	max. 600 Ω
One-point calibration	using DPD method
Indication/current output error of measurement (DIN IEC 746)	0.2 %/0.5 %
pH measurement	
Measuring range	3.50 ... 9.50 pH
Measured value resolution	0.01 pH
Zero shift range	7 ±1.5 pH
Slope adjustment	38 ... 65 mV/pH
pH signal input	sym. high-impedance 2 x 0.5 x 10^{12} Ω
pH signal output range	4.00 ... 9.00 pH ≙ 0/4 ... 20 mA
Temperature measurement	
Measurement input	NTC, 10 KΩ at 25 °C
Measuring range	–20.0 ... +70 °C
Temperature signal output range	adjustable, Δ 10 ... Δ 90 K
Indication error of measurement (output)	0.3 K (0.5 K)
Signal output current range (switchable between pH/temp.)	0/4 ... 20 mA
Load	max. 400 Ω
Limit, controller and fault signaling functions for chlorine/chlorine dioxide	
Function	limit contacter, switchable as a pulse-length, pulse-frequency or 3-point step controller
Controller response	P/PI/PID, PD/PT1 metering interval control (intermittent contact output)
Limit contacter/two-point controller	2 contact outputs
Type of function	MIN or MAX (direct/inverted)
Setpoint adjustment	0 ... 100 % of MR (in absolute values)
Hysteresis for limit contacts	max. 2,5 % of MR (in absolute values)
Contact delay	pickup/dropout
Delay time	0 ... 6000 s
Interval operation of limit contact	
Pulse = duration of interval (adjustable)	0.5 ... 30 min
Alarm threshold	max. 30 % of MR (in absolute values)
Alarm delay time	0 ... 6000 s
Flow alarm	configurable via 2nd relay contact
General technical data	
Measured value display	7-segment LCD, 4 digits, height = 10 mm
Status indication	LEDs, red or red/green
Interference suppression (DIN VDE 0871, IEC, CISPR11, EN 55011)	limit class B
Interference resistance	according to IEC 801 or Namur
Electrical data and connections	
Mains supply	24, 48, 100, 110, 127, 200, 220, 230, 240 V AC
Frequency	50 ... 60 Hz, ± 6 %
DC voltage supply	24 V DC, +15/–20 %
Power consumption	12 VA
Contact outputs	2 changeover contacts, 1 floating NO contact
Switching voltage	max. 250 V AC
Switching current	max. 3 A
Switching power	max. 500 VA
Signal outputs	1 or 2 x 0/4 ... 20 mA, galvanically separated
Separating voltage	650 Vp-p
Auxiliary energy output	max. ± 8.5 V/max. 10 mA (R_i = 400 Ω)
Digital interface	optionally RS 232-C or RS 485
Cl_2/ClO_2 and pH inputs	female BNC connectors
Terminals	terminal blocks, removable
Max. conductor cross section	4 mm^2
Digital interface	9-pin submin D connector
Ambient temperature and humidity	
Nominal operating temperature for CCM 121/CCM 151	0 ... 50 °C/–10 ... +55 °C
Limit operating temperature	–20 ... +60 °C
Storage and transport	–25 ... +85 °C
Relative humidity	10 ... 90 %

Physical data

Dimensions

Mycom CCM 121 (panel-mounted housing)	96 x 96 x 176.5 mm (HxWxD)
Mycom CCM 151 (field-mounted housing)	247 x 167 x 111 mm (HxWxD)

Weights

Mycom CCM 121	1.1 kg
Mycom CCM 151	3.5 kg

Materials

Housing CCM 121	polycarbonate
Front CCM 121	polyester
Field housing CCM 151	aluminium

Ingress protection

Mycom CCM 121 (front)	IP 54
Mycom CCM 151	IP 65

Supplementary documentation

Technical Information

☐ Sensors for free chlorine CCS 140 and CCS 141	TI 058C/07/e
☐ Sensors for chlorine dioxide CCS 240 and CCS 241	TI 114C/07/e
☐ Flow assembly for free chlorine/chlorine dioxide CCA 250	TI 062C/07/e
☐ Compact chlorine measuring station CCE 1/CCE 3	TI 014C/07/e
☐ Microprocessor photometer CCM 181	TI 121C/07/e

How to order

Mycom CCM 121/151

Housing
121 Panel-mounted instrument, 96 x 96 mm, ingress protection IP 54 (front)
151 Field-mounted housing, aluminium, PU-coated, IP 65, with terminals

Version
1 With fault alarm contact
2 With fault alarm contact and 1 limit contact
3 With fault alarm contact and 2 limit contacts
4 With fault alarm contact and 3-point step controller
9 Special version

Chlorine measuring range
0 0 – 200 µg/l with CCS 141 or CCS 241
1 0 – 500 µg/l with CCS 141 or CCS 241
2 0 – 2 mg/l with CCS 140 or CCS 240
3 0 – 10 mg/l with CCS 140 or CCS 240
9 Special version

pH measuring range
A Without pH compensation of Cl_2 signal
B With pH compensation of Cl_2 signal in range of 4 – 9 pH, symmetrical with PMC
Y Special version

Mains supply
0 230 V, 50 / 60 Hz
1 110 V, 50 / 60 Hz
2 200 V, 50 / 60 Hz
3 24 V, 50 / 60 Hz
4 48 V, 50 / 60 Hz
5 100 V, 50 / 60 Hz
6 127 V, 50 / 60 Hz
7 240 V, 50 / 60 Hz
8 24 V, direct current

Current outputs
0 0 / 4 ... 20 mA for chlorine or chlorine dioxide
1 Two 0 / 4 ... 20 mA outputs for Cl_2/ClO_2 and temperature or pH value (switchable)
3 0 / 4 ... 20 mA for chlorine or chlorine dioxide With additional RS 232-C interface
4 0 / 4 ... 20 mA for chlorine or chlorine dioxide with additional RS 485 interface
9 Special version

CCM [ ] - [ ][ ][ ][ ][ ] ⇐ **complete order code**

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TI 067C/07/e/08.94
Printed in Germany / DT (125 339 - 1000)