Technical
Information
TI 119C/07/e

Waste water monitoring station *systec CE 25*

Weather-proof measuring station for continuous measurement and registration of waste water parameters featuring fully automatic waste water sampling

Combination suspension assembly

Areas of application
The SYSTEC waste water monitoring station is suitable for installation both indoors and outdoors. It includes the components required for waste water monitoring:
- Measuring instruments
- Registration units
- Sampling device

Communal area:
- Sewage plant inlet section
- Process optimisation
- Computation of waste water charges for different originators

Industrial area:
- Breweries
- Beverage industry
- Pulp manufacturing
- Dairies
- Fish farming

Environmental protection:
- Water monitoring
- Seep water monitoring (e.g., waste disposal sites)

Benefits at a glance
- Continuous measurement of important parameters: pH, temperature, conductivity, redox, turbidity, oxygen, flow rate
- Uniform operating concept
- Sampling programmable by volume, time or event
- Documentation with maximum value recording, statistical evaluation and daily report for operator log
- Weather-resistant, double-walled, insulated stainless steel thermostatically controlled cabinet assures safe operation under all weather conditions
- Reliable operation due to comprehensive monitoring functions
- Can be equipped with an RS 485 interface

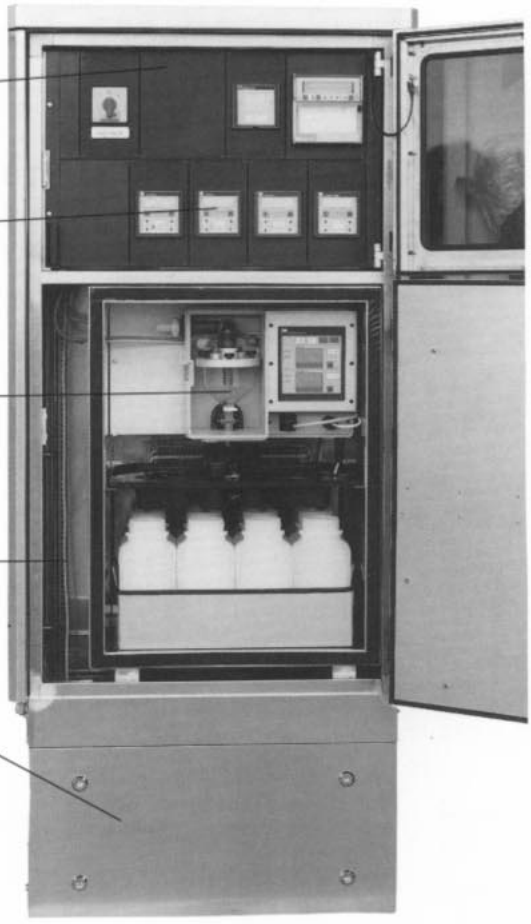
Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser

Nothing beats know-how

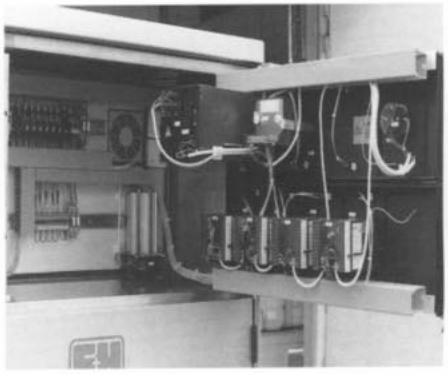
Design



Basic construction
The double-wall design of the measuring cabinet guarantees high rigidity, and the stainless steel (1.4301) material used throughout makes the cabinet highly corrosion-resistant.
The base with its removable lateral parts can also be retrofitted.

Cleaning is helped by the simple, clear arrangement and easy accessibility of all measuring cabinet sections.
Safe by design:
The entire electrical system is housed in the upper section, preventing water and cleanser running downward and contacting electrical components (terminal boxes, etc.).

Electronics section
The electronic components are clearly arranged in the upper cabinet section. A heater and cooling fan keep the cabinet at the correct temperature to assure optimal reliability and maximum service life of all components.
Areas reserved at the front and wiring levels are prepared for convenient installation of additional devices, such as a modem or PLC, etc.



Sampling section
The majority of the electricity consumed by sampling devices is due to cooling. The sampling section of the CE 25 station is located in an encapsulated, double-wall insulated special steel box. This achieves a multiple insulation effect in conjunction with the double outer wall of the cabinet which is particularly important in hot environments or when directly exposed to solar radiation. Moreover, it helps reduce operating costs. The thermostat-controlled heating and cooling system allows accurate temperature adjustment (factory adjustment according to DIN 38 402: 4 °C).

Measured value acquisition

Combination suspension assembly for measurement of: pH, temperature, conductivity, oxygen and turbidity

External measured value acquisition
The measuring transmitters required for measurement are installed in the measuring station CE 25 and ready to operate. The individual components needed for measured value acquisition can be adapted to the specific requirements and conditions of the measuring site, e.g. for measurement

- in a channel,
- in a tank,
- in a pipeline,
- under pressure,
- with automatic cleaning

Float assembly with oxygen measuring electrode

The range of products offered by Endress+Hauser, the largest manufacturer of analytical measuring products for industrial applications, comprises a wide selection of process-oriented sensors and assemblies.

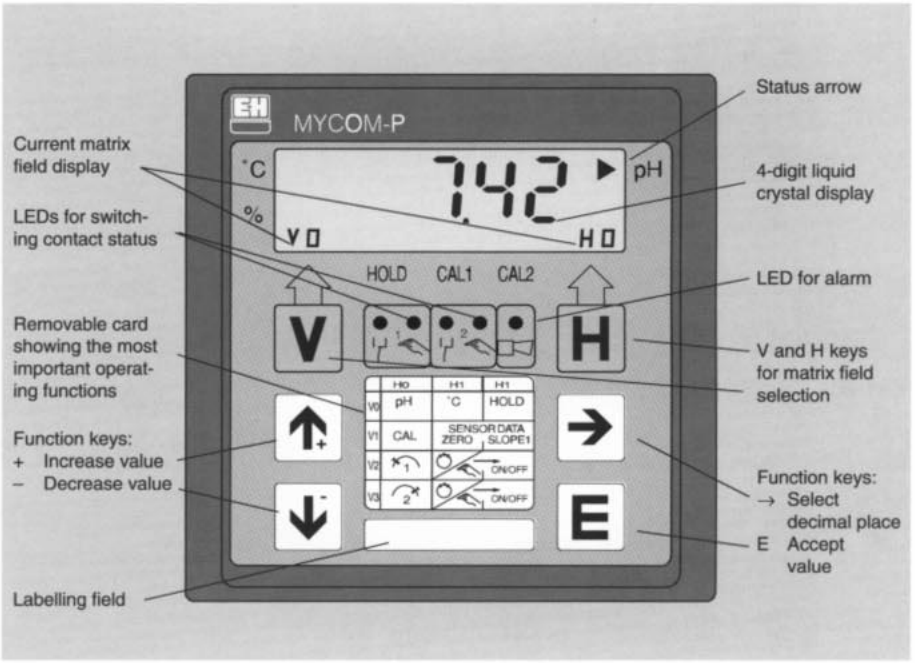
Float with cradle-mounted immersion assembly, e.g. for pH/temperature/ conductivity measurement

Our application consultants will be glad to assist you in choosing the optimal location(s) for measured value acquisition and in selecting the required sensors, holders or process assemblies.

Measured value processing, evaluation and monitoring

Reliability
The measuring transmitters evaluating the signals are independent, autonomous units. The failure of one unit does not cause the complete measuring system to fail.
The comprehensive monitoring functions implemented in the CE 25 measuring station set new standards for reliability.

In addition to general, system-related checks, the individual measurements are checked by self-monitoring functions much like those we offer for sophisticated process measurement applications. This increases the operational reliability and credibility of the measurement and can be extremely important for safety and environmental protection.



Common features of all measurements:
State-of-the-art microprocessor-based measuring transmitters from the Mycom series

- Large liquid crystal measured value display
- Status and switching status indicators
- Error diagnosis system
- Galvanically separated 0/4 ... 20 mA measuring signal output
- Hold function for calibration and cleaning
- Serial RS 485 interface
- Interference resistance according to NAMUR/IEC 801
- Matrix operating concept

pH and temperature measuring system
The pH measuring transmitter Mycom CPM is equipped with a separate temperature current output. A type XT 150 display unit with two adjustable limit contacts is used for temperature and monitoring. The additional XT 150 for temperature display and monitoring not needed if the pH measuring transmitter with the serial RS 485 interface is used.

Obligatory:
The Sensor Check System detects cracks and fractures on the electrode

Monitoring

- Electrode status detection with slope and zero evaluation
- SCS = Sensor Check System detects electrode defects such as cracks, breakage, cable defects

The electrode status data can be read on the instrument or via the interface.

Sampling

Oxygen measuring system
- ☐ Amperometric three-electrode measuring principle, membrane-covered, with potentiostat (self-checking reference system)
- ☐ No zero calibration
- ☐ One-point calibration at the press of a button
- ☐ Automatic temperature and air pressure compensation
- ☐ No zero current
- ☐ Safe membrane replacement via a bayonet lock

Monitoring
- Self-monitoring of sensor functions (e.g., membrane breakage)

Turbidity measurement
- ☐ 90-degree scattered light method according to ISO 7027/DIN 38404
- ☐ Automatic zero adjustment
- ☐ Input sensitivity is automatically adapted

Air bubbles can render the turbidity measurement inaccurate. The CE 25 station prevents this in two ways:
- Optimal arrangement of turbidity sensor in the upper part of the vertical pipe section. The time of the air bubbles dwell in the sensor area is minimal due to medium flow and the bubbles' buoyancy
- An intelligent plausibility evaluation of the measuring signal detects and suppresses air bubble effects

Data registration Data transmission

Supplementary measurements
If the parameters listed above do not cover all your individual requirements, Endress + Hauser offer a wide range of supplementary measuring and control equipment that can be integrated in the measuring station at the factory according to your order. For example:

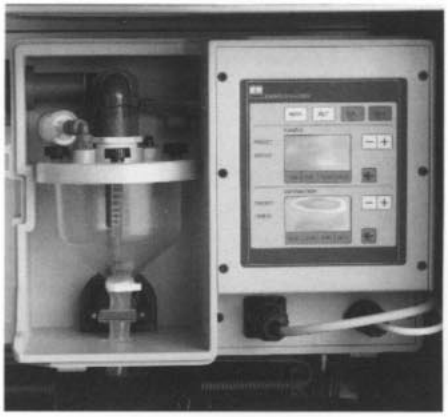
- ☐ Fill level
- ☐ Flow
- ☐ Dissolved chlorine
- ☐ Pressure
- ☐ Temperature
- ☐ Humidity
- ☐ Gas detection
- ☐ Controllers

Example for flow
For example: Prosonic FMU 861 Ultrasound measuring transmitter for flow measurement in open channels or at measuring weirs with level registration accurate to the millimetre. The linearisation curves of all commonly used standard channels and weirs are programmed and can be recalled. The flow volume is added up and indicated on the built-in volume flow counter.

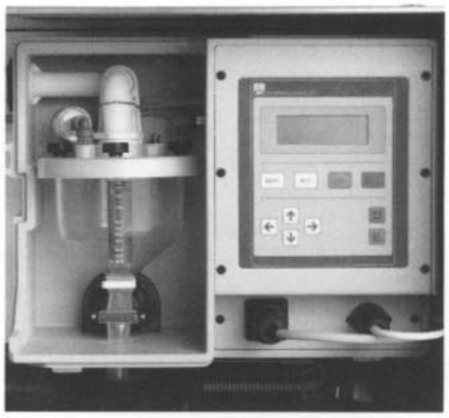
Further benefits:
- Creep volume suppression
- Separate storm water indication on external counters
- Volume-dependent control of sampling device

Measured value processing, evaluation and monitoring

Sampling
The sampling system consists of the functional unit **Liqui-Box a** with a distribution unit and bottle holder.
Benefits at a glance:
- ☐ Manual sampling of fluids by pressing a button
- ☐ Automatic sampling controlled by time/volume or event
- ☐ Vacuum principle
- ☐ Pump does not contact fluids
- ☐ Dual protection in metering system Large cross section tubing, minimal risk of clogging



If special demands are placed on sampling, a sampling device **Liqui-Box d** with an extended performance spectrum is available. This control features numerous user-programmable functions and can even be adapted to individual conditions by custom software.
Additional characteristics of the Liqui-Box d:
- Volume-proportional sampling via 4 ... 20 mA current input
- 6 switchable sampling programs
- 3 programmable alarm and status signalling relays
- Programmable control inputs
- Plain-text operator guidance



Measured value registration
Registration and logging can be covered by a wide range of printers and recorders from the Endress+Hauser delivery program, e.g. the three- or six-channel colour recorder **Mega-Log TN** featuring a star-shaped colour print mechanism and underlaid "safety line" that continues recording when the colour pens are used up. But the Mega-Log offers much more, e.g.:
- ☐ Evaluation of analogue signals for minimum, maximum and mean values via selectable time periods and periodic printing

The **Memo-Log** data manager registers and stores four analogue measured values on a memory card. This data is additionally evaluated for MIN/MAX and mean value at selectable intervals. Two counter inputs on the Memo-Log permit malfunction logging, e.g. pump failure, clogging or group alarm.
- Credit card-size memory card according to PCMCIA standard
- With RS 485/422 interface
- Measured data evaluation and archiving on a standard PC with a reading device

Data registration
Data transmission

Data transmission

The data transmission method to be chosen depends on several factors:

- Local conditions
- Amount of data to be transmitted
- Transmission speed
- Reliability of transmission

The Systec CE 25 measuring station supports several different transmission methods to cover individual needs.

Current signals, contacts

The simplest way to transfer measuring signals and system status is to lay individual cables for analogue current signals and floating signal contacts. The floating signal contacts and high-performance current outputs (max. load: 600 ohm) guarantee high transmission quality.

Serial data transmission with RS 485

The RS 485 interface offers elegant, high-performance data transmission. The maximum line length is 1 km. A shielded cable with 3 wires is required. All measuring transmitters equipped with an RS 485 interface can be connectected directly.

Alarm and other status signalling contacts can be connected to the RS 485 using an interface card. Another advantage of this interface is that it is not restricted to measured value transfer but also permits all instrument parameters to be read and - provided they are variables - changed (examples: measuring ranges, limits, etc.).

Remote waste water monitoring

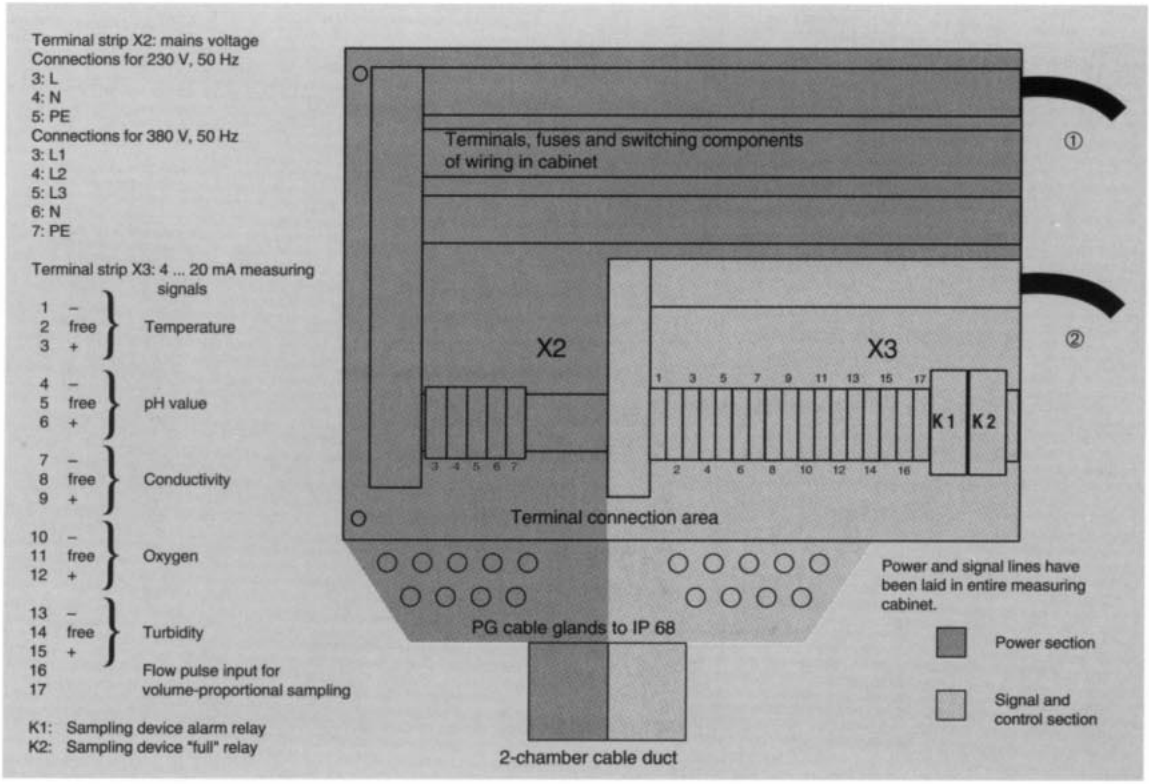
Data transmission is of particular interest for remote locations, especially in water quality monitoring. These applications are best covered by the remote waste water monitoring system. All measured values and system status are acquired and stored by the remote monitoring CPU in the measuring station. The remote monitoring system then transmits the data to the PC in the control room at adjustable intervals. The type of data transmission is universal and can be adapted to local conditions. Possible transfer media area:

- Dedicated line
- Telephone line plus modem
- Mobile radio telephone network

Electrical connections

The measuring cabinet is completely wired internally. All the connections, fuse protection and wiring for the recorder and measuring systems are in place. All built-in units are protected by means of disconnector fuse terminals with a signal lamp.

Measuring signals, limit contacts and other signals are available directly at the measuring transmitters' plug-in screw terminal strips.



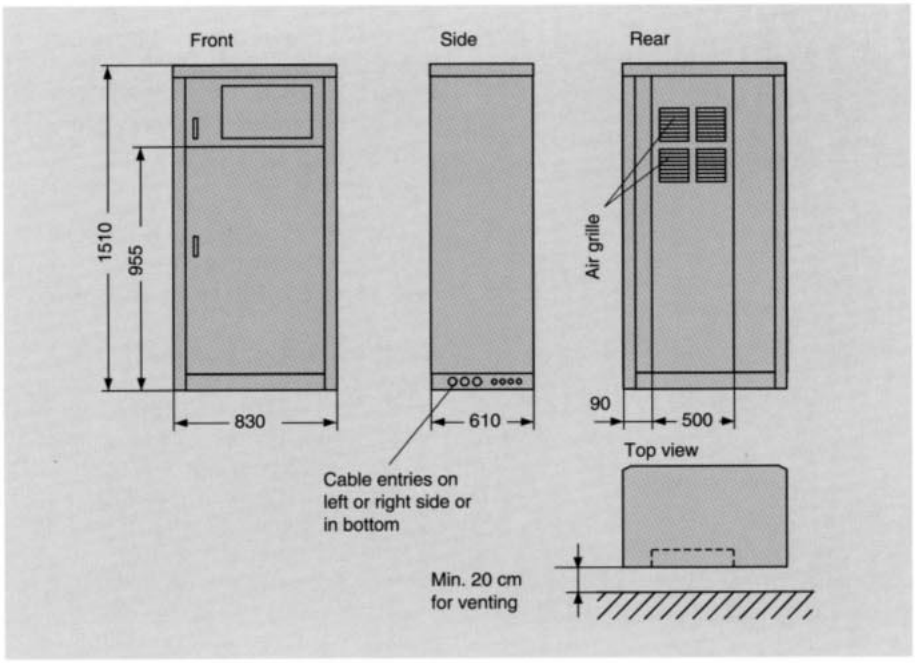
Arrangement of components and terminals on the mounting plate in the electronics section. The drawing shows the fully equipped unit.

Outlets towards front swing frame:

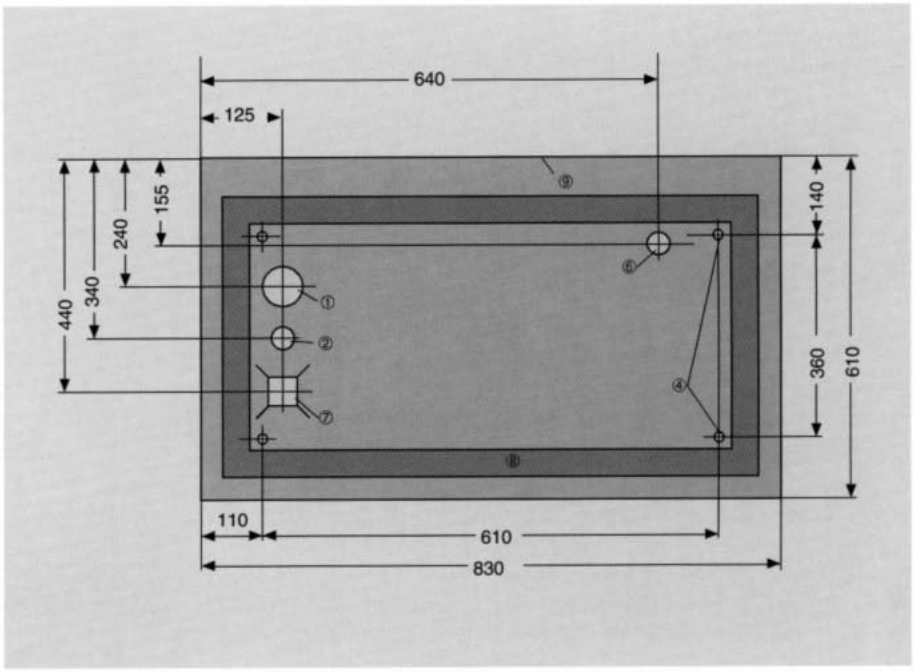
① Power section

② Control and signal section

Dimensions
Installation



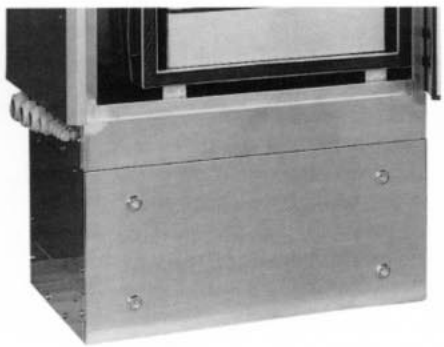
Dimension diagram



Drawing of base

① Measuring water inlet and outlet
② Best position for cable entry from below
③ Fresh water supply line
④ Positions for threaded bolts (M8 x 20) or plugs (M8, 4x)
⑤ Pump installation area
⑥ Condensed water line from above (cooling unit) Lay hose to drain if required
⑦ Cleaning water drain
⑧ Seal base of switch cabinet towards foundation during installation
⑨ External dimensions of cabinet

The drawing of the base shows practical locations for the drain, cable and tubing entries. Of course, cables and hoses can also be passed through the removable sheet metal blanks provided for this purpose on the right and left sides of the base.
Water spills in the wet section during cleaning and calibration work are normal. In order to make sure this water can run off freely, the place of installation chosen for the measuring station should have a drain with the required gradient. If such a drain exists, the wet section can be hosed off and cleaned.



Technical data

Application	waste water in neutral range
	coarse particles must be prevented from entering the sampling system by selecting a suitable location or by installing a coarse filter
Installation	outdoors or in rooms free of aggressive vapours but not in locations subject to explosion hazard!
Protective cabinet	special steel V2A (1.4301), double-walled
Temperature range, ingress protection	–20 °C ... +50 °C, IP54
Voltage supply	400 V/230 V/115 V 50 Hz
Power consumption	
Instruments	max. 163 W
Heaters	max. 260 W
Cooling unit	max. 300 W
Total power consumption	max. 723 W
Electronics section	in separate upper part of cabinet, insulated and sealed, fully conditioned by heater and cooling fan; swing frame with measuring instruments and operating elements
Fuse protection	r.c.c.b., all instruments are separately protected
Option	overvoltage protection for voltage supply/current signals
Measuring instruments	separate, independent measuring lines; intelligent microprocessor-based measuring transmitters, Mycom series
Safety functions	error diagnosis system
Measuring signal output	4 ... 20 mA, galvanically separated
Hold function	for calibration and cleaning
Measured value display	7-segment LCD, 4 digits, height = 10 mm
Status indication	LEDs, red or red/green
pH measuring range	0.00 ... 14.00, can be spread as required
pH resolution	0.01 pH
Redox measuring range	0 ... ± 1000 mV
Conductivity measuring range	0..2.0 µS/cm; 0 ... 1000 mS/cm
O_2 display range	0 ... 20 mg/l, 0 ... 200 % SAT
O_2 resolution	< 0.5 % of upper range value
Turbidity display range	selectable within 0 ... 999.9 ppm or 0 ... 4000 NTU
Turbidity resolution	< 0.5 % of upper range value
Flow measurement	Prosonic FMU 861
Connectable sensors	one Prosonic FDU 8 ... (nom. meas. range 5 ... 25 m)
Analogue outputs	4 ... 20 mA, switchable to 0 ... 20 mA, R_{Lmax} 600 Ω
Registration	6-channel: Megalog type TN-H1AAA00A6111111
or Memo-Log type	4-channel: RD10-HAA 1A1111C0
Memory card	256 kByte SRAM according to PCMCIA and JEIDA 4.x
Storage period	max. 6 years
Sampling section	encapsulated, double wall V2A with add. 30 mm insulation
Temperature control	factory setting: 4 °C (adjustable between –5 °C and 28 °C) automatic defrosting of cooling system
Sampling	liqui-box functional unit
Function	intelligent microprocessor-based sampling control for manual, timed, volume and event-controlled sampling
Sample distribution	rotary cock with distribution pan 12 receptacles, each holding 2.5 l (made of PE), convertible to 1 x 30 l, 4 x 10 l, 24 x 1 l
Dosing	volume per sample adjustable from 20 ml to 350 ml

Subject to changes in engineering

Checklist for project planning

Electrical
- Power consumption: max. 723 W
- Meas. signals are available at terminals as 4 ... 20 mA current signals
- Limit and alarm contacts are provided by the instruments in question

Physical
- Weight: max. 200 kg
- Plan in a drain for cleaning water drainage as shown in the drawing of the base

Hydraulic
- Protect sampling line from freezing
- Sampling hose should not form a siphon trap; run sampling hose through side wall if necessary

Permissible media
- pH of water samples should be between pH4 and pH12; more aggressive media may cause corrosion on cabinet

Environmental
- Install weather protection cover when mounted outdoors
- Front should preferably face north (to assure optimal readability of indicators)

How to order

Waste water measuring station Systec CE 25

Sampler
- M Sampler with 1 30 l PE container
- N Sampler with 4 10 l PE bottles
- O Sampler with 12 2.5 l PE bottles
- P Sampler with 24 1 l PE bottles
- D Sampler Liqui-Box d with 12 2.5 l PE bottles
- Y Special version

pH and temperature measurement
- 1 No pH value and temperature measurement
- 3 pH and temperature measuring transmitter
- 5 pH and temperature measuring transmitter with RS 485
- 7 pH and temperature measuring transmitter with signal lightning protection
- 9 Special version

Conductivity measurement
- 1 No conductivity measurement
- 3 Conductivity measuring transmitter
- 5 Conductivity measuring transmitter with RS 485
- 7 Conductivity measuring transmitter with signal lightning protection
- 9 Special version

Redox measurement
- 1 No redox measurement
- 3 Redox measuring transmitter
- 5 Redox measuring transmitter with RS 485
- 7 Redox measuring transmitter with signal lightning protection
- 9 Special version

Oxygen measurement
- 1 No oxygen measurement
- 3 Oxygen measuring transmitter
- 5 O_2 measuring transmitter with RS 485
- 7 O_2 measuring transmitter with signal lightning protection
- 9 Special version

Turbidity measurement
- 1 No turbidity measurement
- 3 Turbidity measuring transmitter
- 5 Turbidity measuring transmitter with RS 485
- 7 Turbidity measuring transmitter with signal lightning protection
- 9 Special version

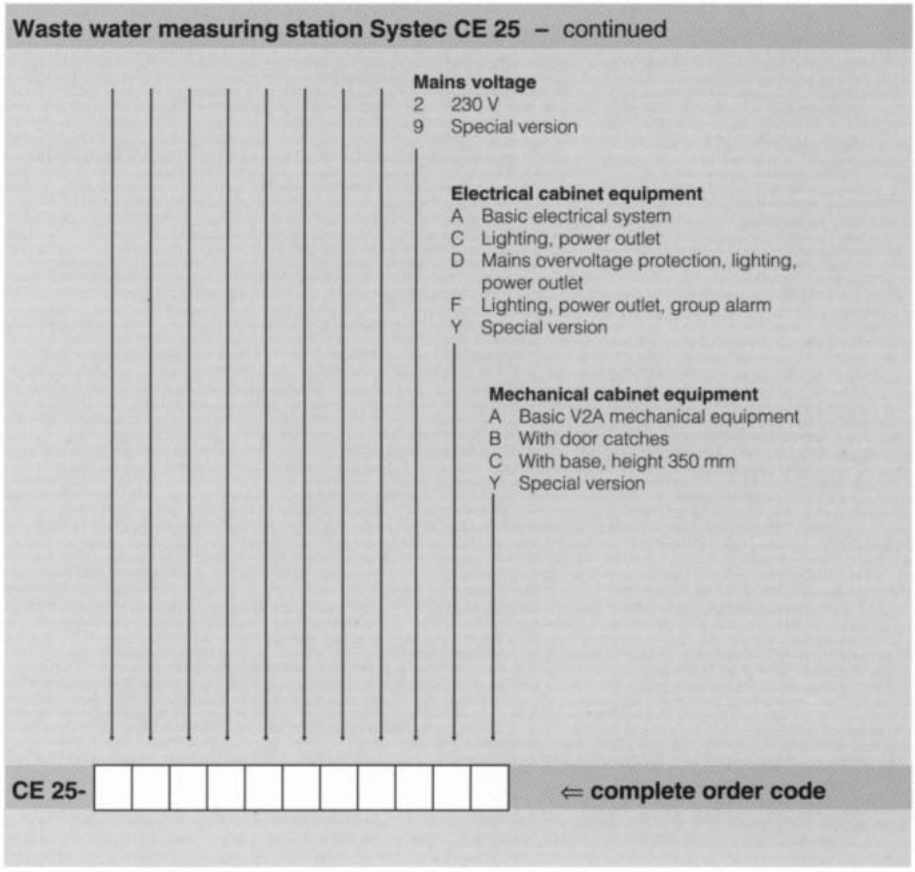
Additional measurements
- 1 No additional measurements
- 2 Pulse counter for volume registration
- 3 Prosonic flow-rate meter
- 4 Mounting position prepared for 144 x 144 mm unit
- 5 Installation of measuring transmitter provided (DIN dimensions of 96 x 96 or 144 x 144 mm)
- 9 Special version

Registration
- A External registration
- B Event printer Primo Event
- D 3-channel recorder (pH, T, conductivity)
- E 6-channel recorder
- F Mounting position prepared for 144 x 144 mm unit
- G 4-channel memory card recorder
- Y Special version

CE 25- ☐☐☐☐☐☐☐☐☐☐☐ ⇐ **complete order code**

How to order

Waste water measuring station Systec CE 25 – continued



Notes on ordering system

Sampling device:

☐ Unless specified otherwise, the options include the "Liqui-Box-a" sampling control

All measurements:

☐ Complete meas.: The measuring cabinet contains all components required for measurement: sensor, assembly, cables, measuring transmitters installed and ready to operate

☐ Meas. transmitter: This option is intended for operation with external sensors (e.g., directly installed in tank, channel, water) and only includes the completely pre-wired measuring transmitter

pH and temperature measurement

☐ Equipment: pH and temperature measuring transmitter Mycom with 4 ... 20 mA outputs
pH indication on measuring transmitter
Temperature indication on a separate XT 150 display unit

☐ If ordered with RS 485, the measuring transmitter does not have the 2nd current output for temperature.
The separate temperature display unit XT 150 is also omitted.

The **group alarm** option provides general information on the function of the entire measuring station. Several faults and monitoring functions are signalled via a single floating break contact, the group alarm contact:

- Fault signalling contacts from all instruments
- Faults in sampling system

Additional monitoring functions can be added to the measuring station. For example:

- Door switch (vandalism)
- Safety monitoring functions
- Temperature monitoring (frost protection, heating)

Accessories

☐ **Weather protection cover**
For additional protection when station is installed outdoors
Material: stainless steel

☐ **Combination suspension assembly CPA-TSP 3160**
Data:
Ordering designation:
Combination suspension assembly
Length: approx. 1 m
Diameter: 20 cm
Weight: max. 8 kg
This compact immersion assembly can hold up to 5 measuring sensors:
1 x pH electrode, shaft length 120 mm
1 x temperature or redox electrode, shaft length 120 mm
1 x oxygen sensor, e.g. COS 3
1 x turbidity sensor, e.g. CUS 1
1 x conductivity meas. cell CLS-TSP 3160

☐ **Sampler filter** ①
Order no. 500 662 12
Coarse particle filter at sampler intake, with ¾" hose connector for sampler intake hose
Mesh: 1 mm
Dimensions: Ø 4 cm x 11 cm
Materials: PVC, stainless steel 1.4301

☐ **Intake hose** ②
Order no. 500 662 14
For sampler, spiral reinforcement, ¾"

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