Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Operating instructions

CE4

Measurement station

BA160R/09/en/13.10
51006364

Endress+Hauser

People for Process Automation

Short overview

For quick and simple commissioning.

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1 Safety instructions

Safe and secure use of this measurement station can only be ensured if these operating instructions are read and the safety notes are followed.

1.1 Correct use

The measurement station is designed for automatic online measurement of liquids, not abrasive media. The station independently and continuously feeds the media to be measured using either a built-in pump or a pump supplied on site. The resulting measurements are displayed on the individual transmitters. The measured values can also be displayed on a built-in paperless recorder or they can be transmitted to a control system using various transmission systems. The built-in ASP-Station 2000 water sampler takes samples from the measurement point in line with the programme set up.

– The measurement station must not be installed in hazardous areas.
– The manufacturer cannot be held responsible for any damage caused by incorrect use of the measurement station. Rebuilding of the station and constructive changes must not be done.

1.2 Installation, commissioning, operation

This measurement station has been designed and built for safe operation using state-of-the-art technology and in line with the necessary regulations and EU guidelines. If the measurement station is misused or used in an inappropriate manner, could be dangerous.
Mechanical and electrical installation, commissioning and maintenance of the measurement station must only be carried out by skilled and trained personnel. Skilled personnel must have read, understood and followed these operating instructions. The entries regarding the electrical connections (see Chap. 4 "Wiring") must be followed to the letter. The measurement station must only operated by trained personnel.

Warning!
Before opening the electronic compartment:
- No commissioning without earth/ground protection connection! If faults cannot be cured then the measurement station must be removed from operation and protected against unintentional operation. Always isolate the station from the mains power (main switch) before opening the electronic compartment (opening the swing frame).

1.3 Operational safety

The measurement system complies with the general safety requirements laid down in the EN 61010-1, Protection class I, over voltage category II.
CE mark according to the directives 89/336/EWG (EMC) and 73/237/EWG (low voltage directives).

Technical advancement
The manufacturer reserves the right to improve or update the technical detail without any special notification. For details on improvements or additions to these instructions, please contact your E+H sales office or agent.

1.4 Returns

Before units are returned to Endress+Hauser for repair, the following must be taken care of:

- The unit should always be accompanied by a completed 'Safety Regulation Form'. Only then can Endress+Hauser transport, check and repair the returned unit.
- If required place a special handling recommendation form with the returned unit, e.g. a safety data note to EN 91/155/EWG.
- Remove all materials soiling the unit. Please take special note of the gasket cut-outs and rims into which solids can seep. This is especially important if the medium measured could constitute a health hazard, e.g. flammable, poisonous, corrosive, carcinogenic, etc.

Note!
A **copyable sample** of the 'Safety Regulation Form' can be found at the end of these instructions.

Caution!
- Do not return a unit if it is deemed impossible to remove all hazardous materials, e.g. material seepage in scratches or media diffused by the plastic.
- Costs incurred for disposal due to lack of cleaning of the unit or for personal injury (corrosion burns etc.) will be invoiced to the user.

It is always recommended to protect the unit correctly when returning it e.g. in case of repairs. Optimum protection is given by the original packaging. Repairs must only be carried out by the Endress+Hauser service personnel. For the nearest service department, see the addresses at the rear of this manual.

Note!
When returning the unit for repair please enclose a note detailing the fault and the application.

1.5 Safety pictograms and symbols

The safety hints in these operating instructions are indicated by the following symbols:

Caution!
This symbol means activities or sequences that, if done incorrectly, could lead to faulty operation or destruction of the unit.

Warning!
This symbol means activities or sequences that, if done incorrectly, could lead to serious personal injury, to a safety risk or destruction of the unit.

Note!
This symbol means activities or sequences that, if done incorrectly, could have an indirect influence on the unit's operation or could cause an unforeseen unit reaction.

2 Identification

2.1 Device designation

2.1.1 Legend plate

Compare the legend plate on the unit with the following figure:

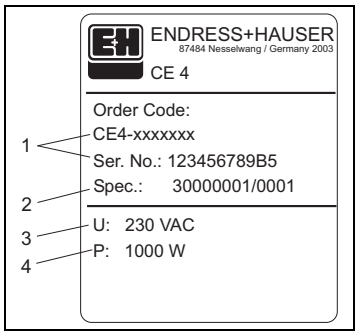


Fig. 1: Legend plate entries for the measurement station (example)

Pos. 1: Order code and series number for the measurement station
Pos. 2: Commission number
Pos. 3: Power supply
Pos. 4: Power consumption

2.2 Delivery

Please check the consignment for complete delivery by comparing the delivery note and your order:
- Unit type and model from the legend plate
- Operating instructions (see sections 5, 6, 7, 8 in the ring binder)
- Measurement station accessories (see chapter 8 "Accessories")

The measurement station is built either exactly to the order code or tailored to customer requirements. This means that each unit delivered will be different:

- Analysis system
- ASP-Station 2000 water sampler
- CE 4 operating instructions
- ASP-Station 2000 operating instructions
- CE 4 technical instructions
- Operating instructions and certificates for the individual units and components fitted
- Accessories that have been ordered under the same order number

2.2.1 Identification lists

The identification list for this measurement station can be found in section 1 in the ring binder. In this section, all individual components are listed including order code and unit numbers.

2.3 Certificates and approvals

This measurement station has been designed, built and tested for safe operation using state-of-the-art technology and has left our factory in a safe operational condition. All necessary and available certificates, test reports and approvals are included (see section 11 in the ring binder).

3 Mechanical installation

3.1 Delivery, transport, storage

3.1.1 Delivery

- Is the packaging or content damaged?
- If damaged, contact the transport company.

3.1.2 Transport to measurement point

The measurement station is delivered mounted on a palette. In order to avoid transport damage, the station is fixed to the pallet in a number of positions. The palette can be transported using a fork lift truck or crane (min. loading 500 kg) (see Fig. 2 Pos. A and B). The built-in pump is separately bolted down on the pallet.
The measurement station must be transported upright and secured to prevent tipping over. Avoid shocks.

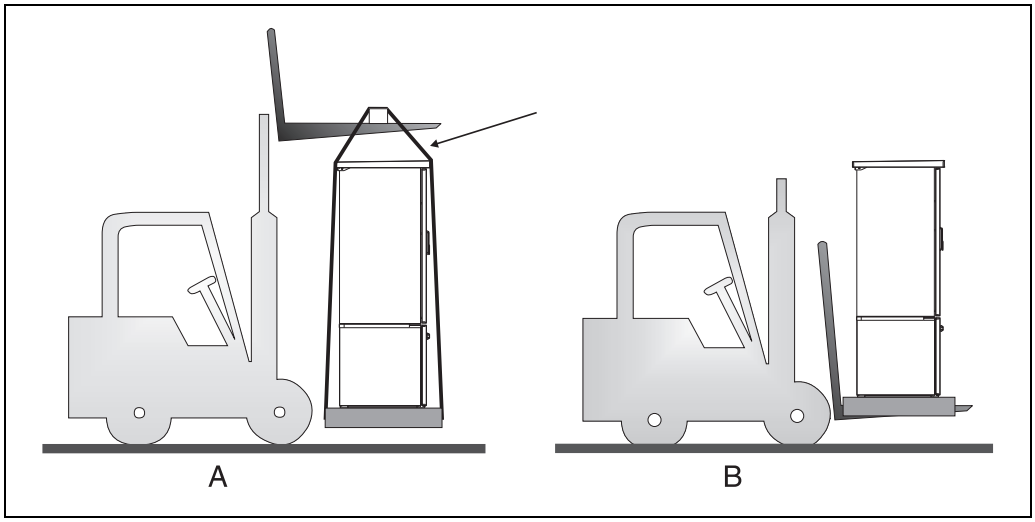


Fig. 2: Transport to installation point

Pos. A: Lifting the measurement station with a crane. Fitting correct lifting tackle (see arrow).
Pos. B: Lifting the measurement station using a fork lift truck.

3.1.3 Storage

If the system is to be stored for a longer period (>4 weeks) the following must be taken care to avoid damage to the unit:

- Completely empty and clean the measurement station. New units are delivered completely empty
- pH sensor must be stored in the delivered calibration beaker filled with a pH 7 buffer solution
- When using a peristaltic pump, the pump hose must be removed and stored according to the respective operating instructions (Section 8 in the ring binder)

3.2 Installation conditions

- The permitted ambient temperature (see chapter "Technical data") must not be exceeded both on installation and operation.
- A solid foundation must be available. For dimensions see the foundation plan (→ Chap. 3.2.3)
- Install vertical and level
- Outside installation: Avoid direct sunlight on the front of the unit. If required, fit a sun protection system (all-weather roof)
- If the water in and outflow pipework is installed in the open air, these should be protected from frost
- Because the analysis component has to be continuously rinsed with water, it must be guaranteed that there is always enough water available at the sampling point so that dry running of the system is avoided (e.g. small weir etc.)
  The feed hose should therefore be fixed as required

  ☝ Caution!
  Dry running and sand grains/particles can shorten the life span of the eccentric pump.

- The outflow hoses must be installed falling away from the unit and with free outlet
- When using the manual or automatic cleaning system, an isolation valve and pressure reducer must be installed on site

3.2.1 Material resistance of the analysis pipework

The analysis system consists of a PVC pipework system and due to its material composition is suitable for drinking water and beverages.

General chemical resistance

Resistant: Acids and bases
Non-resistant: Aromatic solvents

Application limits for pressure and temperature

(25-year values with calculated safety factor)
Type used: PVC-PN10

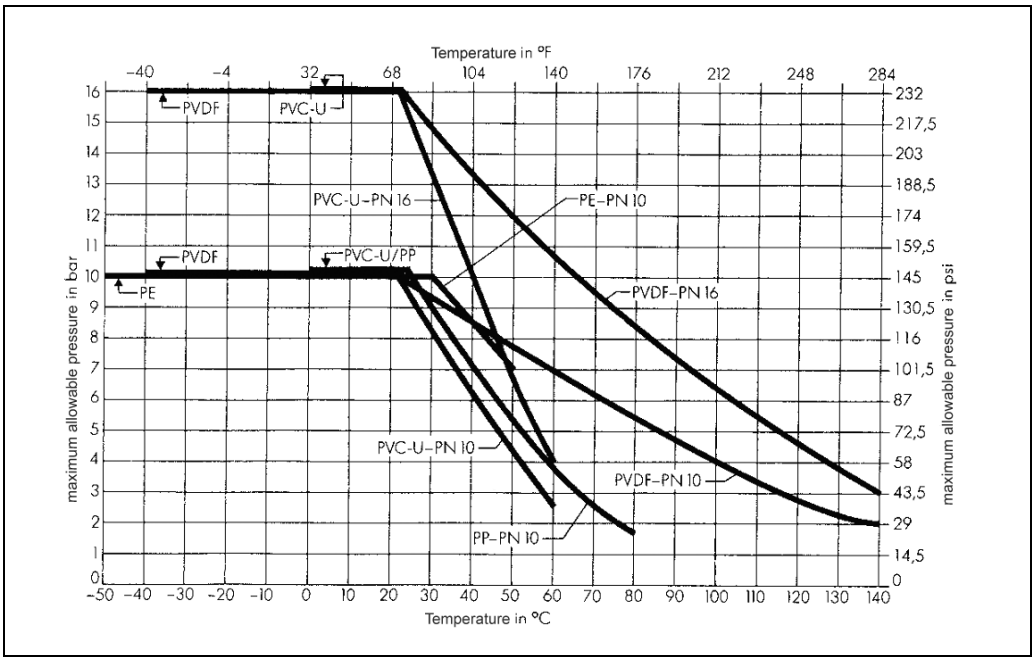


Fig. 3: Application limits pressure and temperature (Source: Georg Fischer +GF+ pipework systems for industry and supply, 1st edition 1996, Page 5.04)

3.2.2 Dimensions

The dimensions for the measurement station can be found in chapter "Technical data".

3.2.3 Installation point/foundation plan

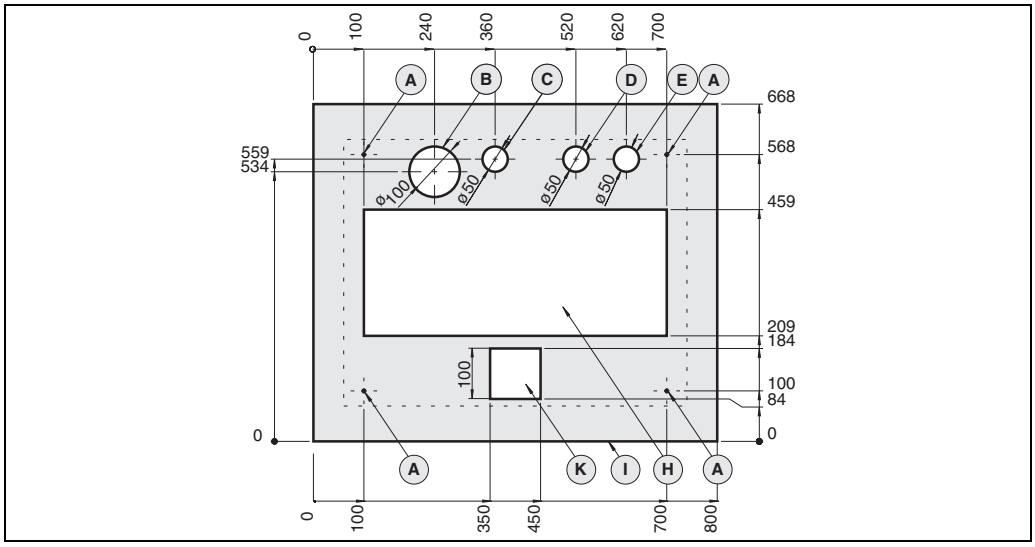


Fig. 4: Foundation drawing without water sampler

Pos. A: M8x20 rawl bolts or M8 rawl plugs
Pos. B: In and outflow hoses for the measurement liquid
Pos. C: Water supply
Pos. D: Power cables
Pos. E: Signal cables
Pos. H: Feed pump installation area
Pos. I: Cabinet base
Pos. K: Overflow shaft

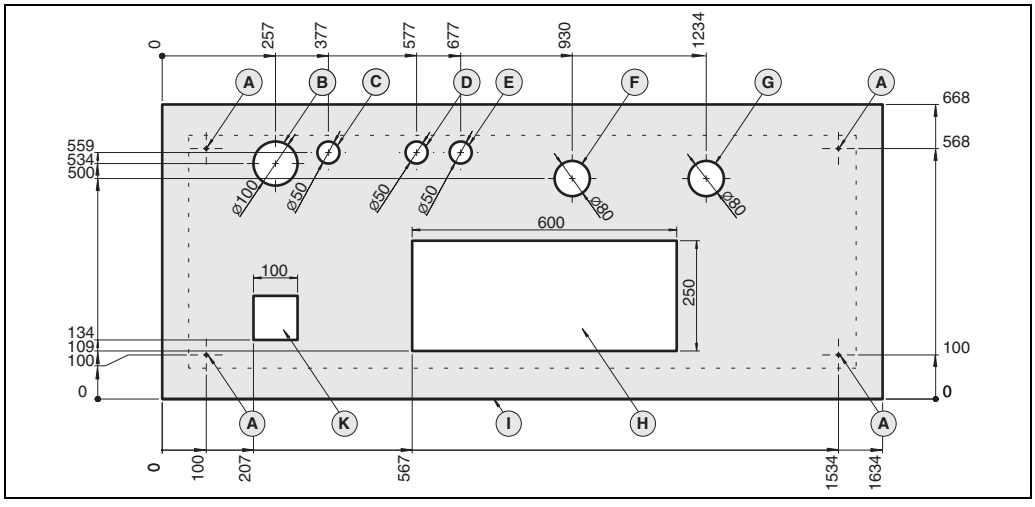


Fig. 5: Foundation drawing with water sampler

Pos. A: M8x20 rawl bolts or M8 rawl plugs
Pos. B: In and outflow hoses for the measurement liquid
Pos. C: Water supply
Pos. D: Power cables
Pos. E: Signal cables
Pos. F: Water sampler suction hose
Pos. G: Water sampler overflow and condensation water
Pos. H: Feed pump installation area
Pos. I: Cabinet base
Pos. K: Overflow shaft

3.2.4 Installation point/hose installation

Installation hint

Sampling point

- Medium removal for the pump and the sampling system must be taken from representative point in the channel, i.e. not on the edge of the channel and not in the sump or floor of the channel. A point offering a homogeneous mixture should be selected.
- There should always be enough medium available at the sampling point so that the a good head of water is always available.
- Suction hose is immersed by using a weight (see "Accessories").

Sampling hose installation

The sampling hose must always be installed with a downward slope from the measurement station to the sampling point. Depending on the application, some hoses may require frost protection.

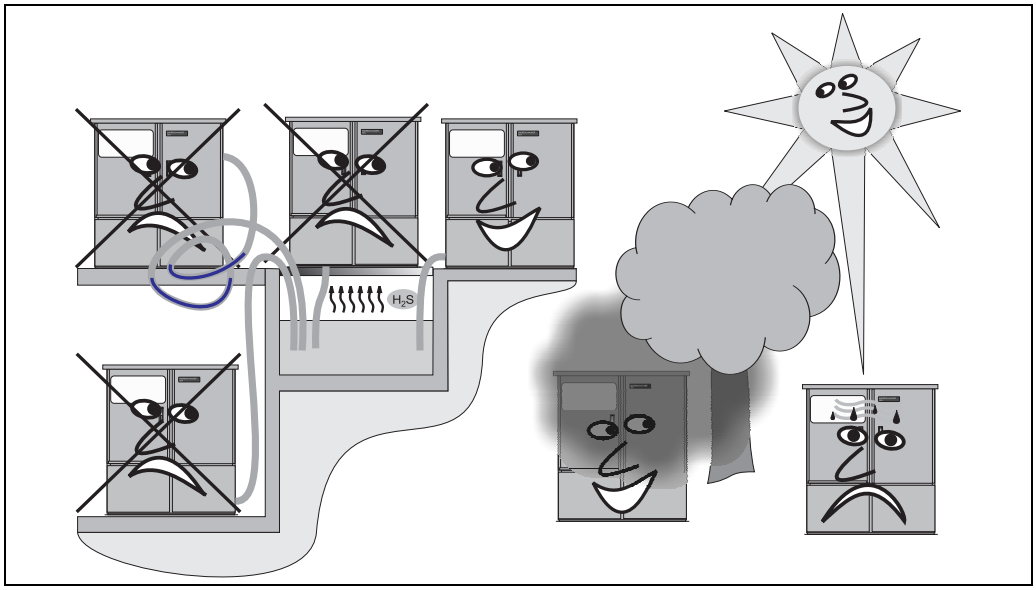


Fig. 6: Sampling hose installation

3.3 Mechanical installation

3.3.1 Tooling

The following tools are required to install the measurement station:

- Electric drill with 12 mm concrete bit
- M8 (4x) V2A rawl bolts
- M8 (4x) V2A nuts and U washers
- 13 AF ring spanner
- Screwdriver for power/signal terminals
- Philips screwdriver

3.3.2 Installation of the measurement station

Caution!
- Make sure that the unit is isolated from the mains power when installing or removing the system.

Follow the next steps when fitting the measurement station on the foundation:

1. Using the foundation plan as a template, set the rawl bolts or rawl plugs for fixing the station onto the foundation (→ Chap. 3.2.3).
2. Place the measurement station onto the hardened foundation. Please note that the pump is fixed separately to the pallet!
3. Screw the measurement station tightly to the foundation using the nuts and washers (Attention: only use V2A stainless steel parts).
4. Anchor the pump tightly to the foundation.
5. Connect the suction pipe, outflow pipe, water sampler suction hose, condensation water overflow, water sampler overflow and the fresh water pipe.
6. Complete the electrical connection (see chapter 4.1)

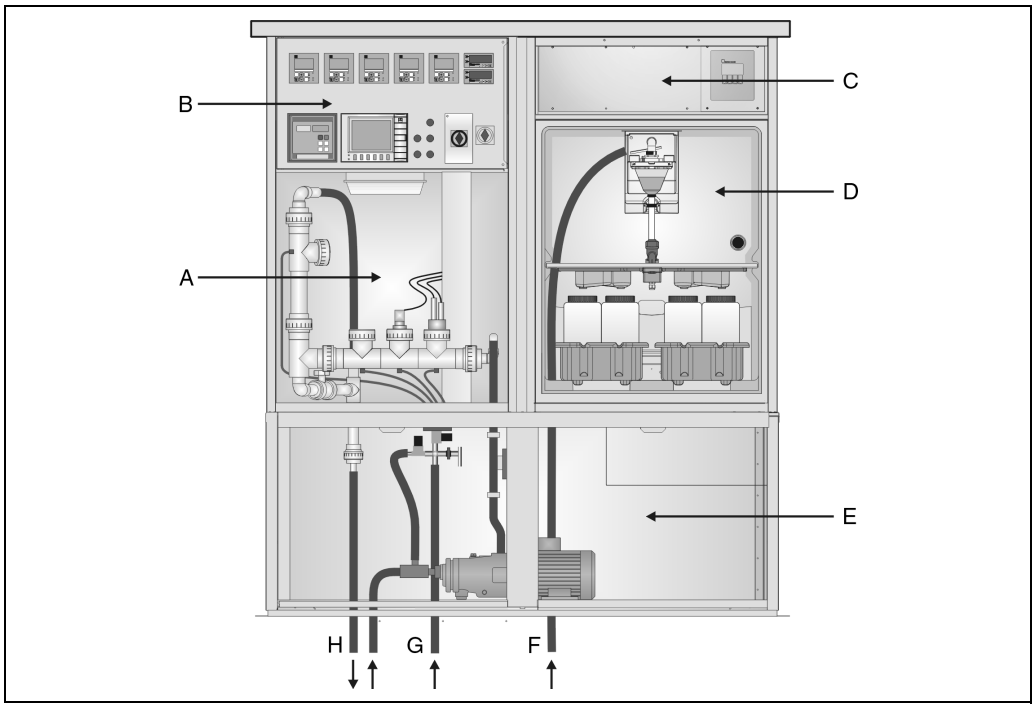


Fig. 7: CE4 measurement station connection schematic

Pos. A: Analysis pipework
Pos. B: Electrical compartment with swing frame
Pos. C: Water sampler electronic compartment
Pos. D: Water sampler wet compartment
Pos. E: Base/pump room
Pos. F: Water sampler suction hose
Pos. G: Water supply/fresh water supply
Pos. H: In and outflow hose

3.4 Check installation

Once the unit has been installed, run the following checks:

Unit condition and specification	Hints
Is the measurement station damaged?	Visual check
Is the rinse water pipe correctly installed and has it been tested for leaks?	–
Have the hoses been installed correctly? (no possibility of dry operation) Have the hose jubilee clips been tightened?	–

4 Electrical connection

4.1 Wiring the measurement station

Caution!
Do not install/wire the measurement station under live power conditions. Non- compliance can lead to damage of the electronics.

In order to wire the measurement station follow these steps:

1. Loosen the 2 fixing screws on the electronic compartment, open the swing frame.
2. Connect mains power as shown in the electrical connection diagram in the ring binder section 3.
3. Connect the signal cables as shown in the connection schematic in section 3 in the ring binder.
4. Close the swing frame and tighten the fixing screws.

4.1.1 Connecting mains power

Caution!
- Before connecting mains power compare this with the power supply on the legend plate.

4.2 Screening and potential compensation

When installing please take note of the following:
If screened cables are to be used then the screen on the output (output signal 4 - 20mA) and the sensor connection end must have the same potential!
It is recommended to use screened cable with a low Ohm earth/ground connection on plants where strong electromagnetic fields could be present. Sensor cables installed outside are recommended to be screened as a precaution against the danger of
lightening strikes!

4.3 Ingress protection

- Analysis compartment and base IP 44
- Water sampler controller IP 65
- Water sampler electronic compartment IP 43
- Water sampler IP 54

4.4 Checking the connections

Once the measurement station has been electrically connected, run the following checks:

Unit condition and specification	Hints
Are the measurement station or cables damaged ?	Visual check
Electrical connections	
Does the power supply correspond with that on the legend plate?	See legend plate
Are all terminals tightly fixed in their correct position? Is the coding on the individual terminal correct?	–
Are the power supply and signal cables correctly connected?	See connection schematic for the station
Have all terminal screws been tightened?	–

5 Operation

Note!
The operation of individual components can be found in the respective operating instructions in sections 5, 6, 7 and 8 in the ring binder.

5.1 Communication and data security

The measured data cables from individual measurement transmitter signals are wired to the terminals in the electronic compartment as standard 4 – 20mA signals.

5.1.1 Data storage

For data logging, Endress+Hauser can offer a number of different recording and data acquisition devices (e.g. Ecograph or Memograph).

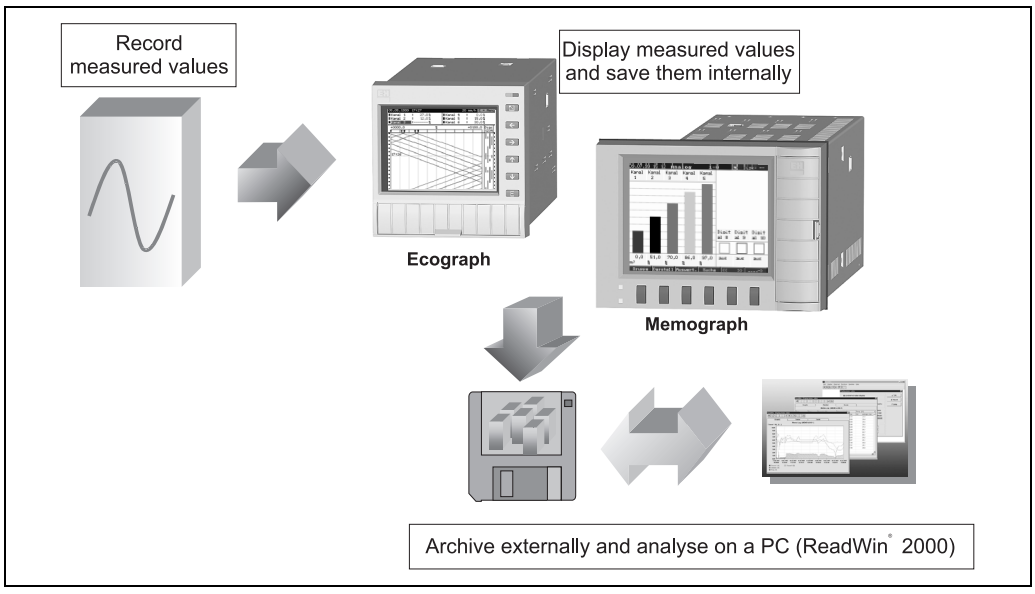


Fig. 8: Recorders from Endress+Hauser for data storage in the CE 4 measurement station

Memo-Graph	Eco-Graph	Eco-Graph A
Paperless recorder for electronic recording of digital and analogue input signals. Memo-Graph plots signal sequences, monitors alarm set points, analyses measurement points, stores the recorded data internally and archives this on diskette, ATA flash memory cards or PC.	Paperless recorder for electronic recording of digital and analogue input signals. Eco-Graph records measured value sequences, quantities, operating times, monitors alarm set points and stores this data both internally and on a diskette.	Functions of this device are the same as the Eco-Graph, additionally: counter inputs, quantity integration and the generation of intermediate, daily, monthly and yearly reports.
■ Multi-channel: 8 or 16 universal, 37 digital inputs, 4 mathematics channels and 8 combinations for the digital inputs. ■ Maintenance-free: No wear and tear – no paper and pens. ■ Universal: Free selection of signal display mode. ■ Secure: Complete data security concept. ■ Reliable: Alarm set point and self monitoring functions. ■ Informative: Event search, automatic signal analysis. ■ Practical: Easily read grouping for individual channels. ■ Communicative: Interfaces for set-up and data transmission.	■ Electronic recording replaces dotting and strip chart recorders, saves on consumables. ■ Universal inputs measure all signals, guarantees universal application possibilities. ■ Quick Setup and integrated operating instructions enables set-up in minutes, saves time. ■ FLASH memory, reliable archiving even on power failure.	
8 to 16 analogue inputs, 8 maths channels	3 to 6 analogue inputs	
Max. 37 digital inputs	4 digital inputs	
Communication		
RS232, RS485, PROFIBUS, Modem	RS232, RS485	

Data transmission

- RS232/RS485:
  Data transmission of the measured values using the RS232 or RS485 serial interface of the Memo-Graph or Eco-Graph. This is done with the assistance of a 9 pin SUB D plug and socket connection.
- PROFIBUS:
  Measured value and device set-up transmission using PROFIBUS-DP; connection is made by means of an IFAK Profibus coupler.
- Modem:
  Measured value and alarm violation transmission from the Memo-Graph paperless recorder fitted with Tele-alarm software and Siemens terminal TC35 GSM modem. The message can be transmitted directly to a PC or as an SMS to a cell telephone.

6 Commissioning

6.1 Installation check

If all the following questions can be answered with a YES, then the unit can be commissioned. If an answer is NO, then please read the necessary corresponding chapter:

General	Hint
Has the measurement station been mounted on the foundation correctly?	→ Chap. 3
Are the in outflow hoses connected correctly and have they been protected against tension?	→ Chap. 3
Has the water supply been correctly connected and has it been protected against tension?	→ Chap. 3
Are the water hoses undamaged?	Visual check
Are the electrical cables undamaged?	Visual check
Are the electrical connection cables correctly tightened?	Visual check
Is the power supply correct (230 V or 400 V)?	Compare legend plate and power supply

6.2 Commissioning the measurement station

There are two different types of commissioning of the system- initial commissioning and re commissioning. We recommend the use of an Endress+Hauser service engineer for the initial commissioning process.

6.2.1 Initial commissioning

Initial commissioning means the measurement station has not been in use since it was delivered by the manufacturer or the downtime of the system is greater than 4 weeks. In order to guarantee safe and reliable operation, please follow these steps:

1. Before commissioning the main isolator and earth trip (identified as -1F1) function must be checked by a qualified electrician.
2. In order to commission the system step by step, each individual fuse switch should be activated one after the other. Please take note of the respective device operating manuals when commissioning the devices (see sections 5, 6, 7, 8 in the ring binder).

Initial commissioning:

- Install the in and outflow hoses as well as the water sampler suction hose (see chapter 3.3.2).
- Remove the protective covers on the sensor (only on pH sensors).
- Sensors must be calibrated on site, take note of the respective sensor operating instructions! (section 5 in the ring binder). Calibration of the turbidity sensor is not necessary.
- Check the set-up of the individual transmitters, if necessary redo. See the respective transmitter operating instructions (section 5 in the ring binder).
- Make sure that all screws, clamps and jubilee clips are tight.
- Connect main power supply (see chapter 4).
- Make sure that the power supply is correct e.g. 230 V! (Connection schematic section 3 in the ring binder, or legend plate).
- Fill the pump with clear water (pump operating manual, section 8).
- Define and activate the water sampler programme.

6.2.2 Recommissioning

Recommissioning is required when the measurement station is to be made operational after a short time offline (<= 4 weeks). Follow these instructions if the system is to operate safely and reliably:

- Make sure that all water connections and internal screw connections are tight
- Run a visual control of the electronic compartment making sure that there are no loose connections
- Check the sensors and if required, recalibrate. Take note of the respective sensor operating instructions! (Section 5 in the ring binder)
- Define and activate the water sampler programme

6.3 Device set-up

In order to set up the water sampler programme, read chapters 6.3 to 6.6 in the 'ASP-Station 2000' operating instructions (**BA080r09**) .

7 Maintenance and cleaning

The intervals when the sensors need to be monitored and cleaned are mainly dependent on the features of the medium that is to be measured. It is therefore recommended that during the initial time after commissioning that the sensors are regularly monitored for soiling. This will then make it easier to set sensible maintenance intervals.

Note!
Please take note of chapter 7 "Maintenance" in the ASP-Station 2000 operating manual.

7.1 Manual cleaning of the measurement system

When the measurement station has been operational for longer time periods it is possible that the internal pipework system becomes dirty. This cannot be removed by the self cleaning function of the unit. Therefore, depending on the application it may be necessary to run a complete pipework cleaning sequence at least every 3 to 6 months.

1. Switch the pump off (motor starter in the swing frame).
2. Open the outflow valve.
3. Open the overthrow nuts on the sensors.
4. Carefully remove the sensors – avoid contact with them!
5. Open the inflow and outflow connection to the pipework system. Check the condition of the jubilee clips and hoses for reuse.
6. Loosen the fixing clamps and remove the pipework system.
7. Loosen the screwed fitting on the pipework. These can be very tight so use a pipe clamp (oil filter spanner) to loosen them.
8. Clean all pipe elements using bottle brush and water jet.
9. Rebuild all elements, hand tighten all overthrow nuts. Make sure that everything fits perfectly if necessary use grease suitable for PVC!
10. Switch the pump on (motor starter in the swing frame).

7.2 Sensor control and cleaning

1. Switch the pump off (motor starter in the swing frame).
2. Open the outflow valve (PVC).
3. Open the overthrow nuts on the sensors.
4. Carefully remove the sensor holders, avoid contact with them!
5. Clean the sensors carefully using sponge and potable water.
6. Clean the holders and overthrow nut threads.
7. Replace sensor holder. Take note of the position of the turbidity sensor! (key pin).
8. Hand tighten all overthrow nuts. Make sure that everything fits perfectly. If necessary use grease suitable for PVC!
9. Close the outflow valve (PVC).
10. Switch the pump on (motor starter in the swing frame).
11. Observe the measured values. Are all measurements indicating plausible values? If not the sensors should be recalibrated. The calibration procedure is described in the respective individual operating instructions (section 5 in the ring binder).

7.3 Operating the cleaning system

Depending on the device configuration the following possibilities are available for manual or automatic cleaning of the pipework:

7.3.1 Manual cleaning using fresh water

When using the manual cleaning process the analysis pipework is rinsed, the suction hoses are purged and the sensors are cleaned using a sprayhead and clean water. The control of the cleaning system is done by manually operating a ball valve. the pump must be switched off when purging the suction hoses.

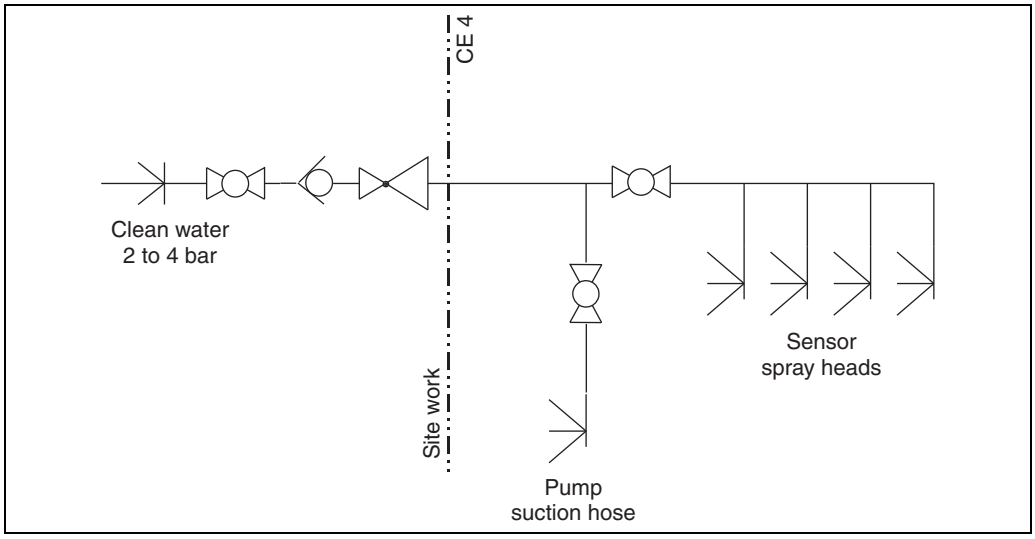


Fig. 9: Connection schematic for manual cleaning using clear water

7.3.2 Automatic fresh water cleaning system

Cleans the analysis pipework, purge the suction hose and cleans the sensors using a spay head and clean water. Control is provided by a small integrated
controller. The cleaning cycles and length can be individually set up (→ Chap. 7.3.4).
The cleaning sequence can also be started manually (pushbutton on the swing frame).
If the sensors are to be cleaned manually, then the pump must be switched on.

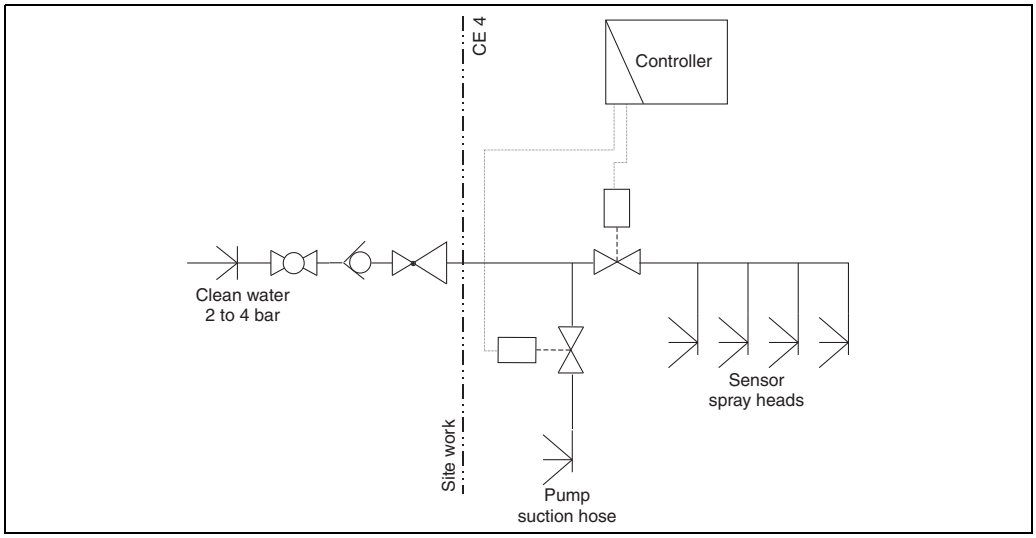


Fig. 10: Connection schematic for automatic cleaning using clean water

If an automatic rinse system is available and the pump is switched on, the complete pipework system including sensors can be rinsed in preset time cycles using water from the local supply. Rinse cycle and time for hose and sensors must be matched to suit individual application and can be individually set up. Individual set-up points are available using numbered "Block numbers" (e.g. B01=Sensor rinse interval set up
position). For controller set-up → Chap. 7.3.4

Suction hose rinse:

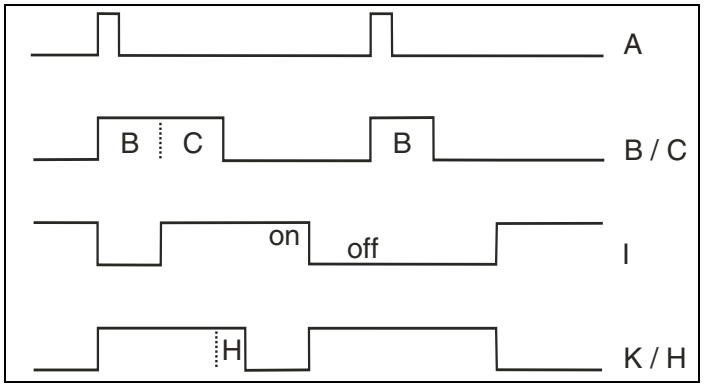


Fig. 11: Time cycles for automatic suction hose rinse

Sensor rinse:

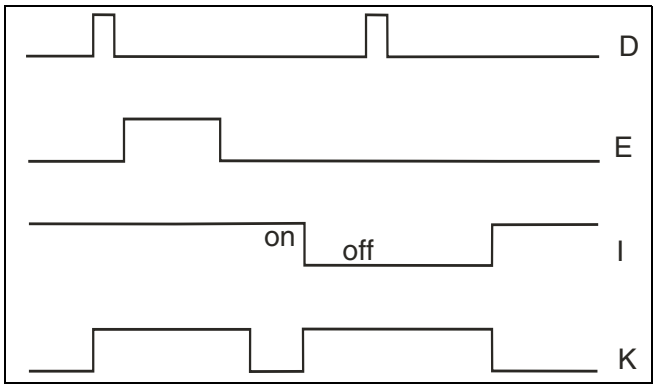


Fig. 12: Time cycles for automatic sensor rinse

Pos.	Function	Set up address	Time interval	Factory default
A	Start hose rinse	B01	(0...99h)	24h
B	Hose rinse time	B02	(0...99s)	45s
C	pump rinse time	B03	(0...99s)	30s
D	Start sensor rinse	B04	(0...99h)	18h
E	Sensor rinse time	B05	(0...99s)	60s
H	Hold time after suction hose rinse	B08	(0...99s)	20s
I	Pump status			
K	Hold (transmitter)			

7.3.3 Automatic cleaning system "Chemo-Clean"

Cleans the analysis pipework, purge the suction hose and cleans the sensors using a spay head and clean water and chemical cleaning media using the "Chemo-Clean" system. The user selects the cleaning medium (detergent) for the application. The cleaning system control provided using an integrated mini-controller (→ Chap. 7.3.4). The detergent feed control is carried out by the Chemo-Clean CYR10 injector (see CYR10 operating manual in section 7 in the ring binder).
The cleaning sequence can also be started manually (pushbutton on the swing frame).
If the sensors are to be cleaned manually, then the pump must be switched on.

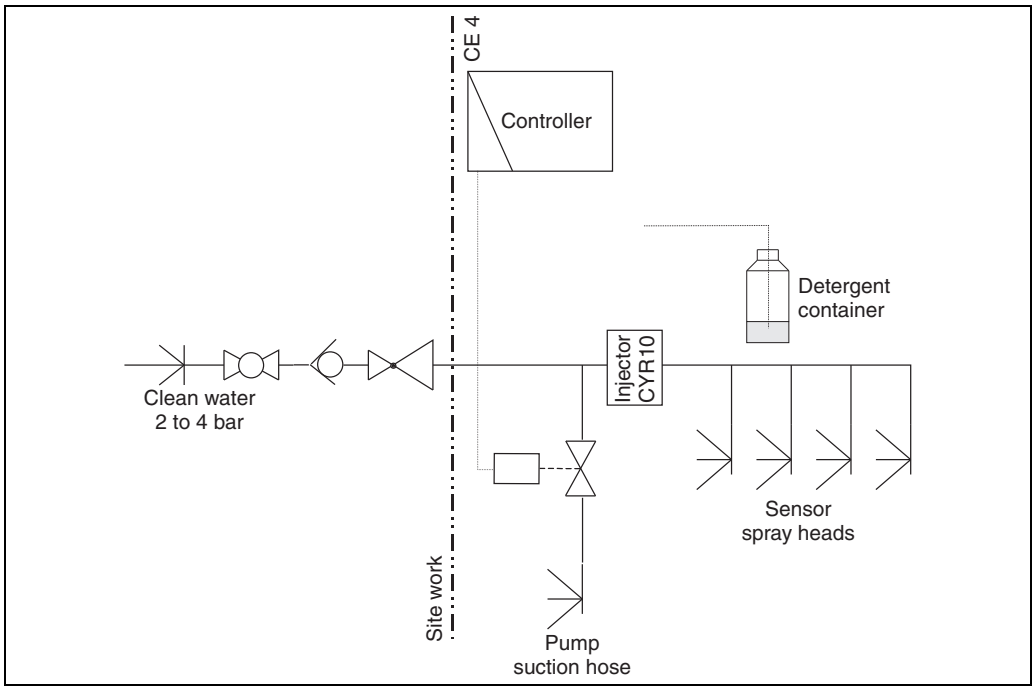


Fig. 13: Connection schematic for automatic cleaning using "Chemo-Clean"

Suction hose rinse:

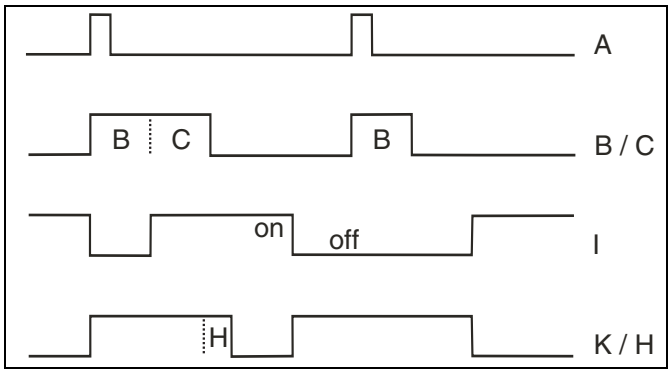


Fig. 14: Time cycles for automatic suction hose rinse using "Chemo-Clean"

Sensor rinse:

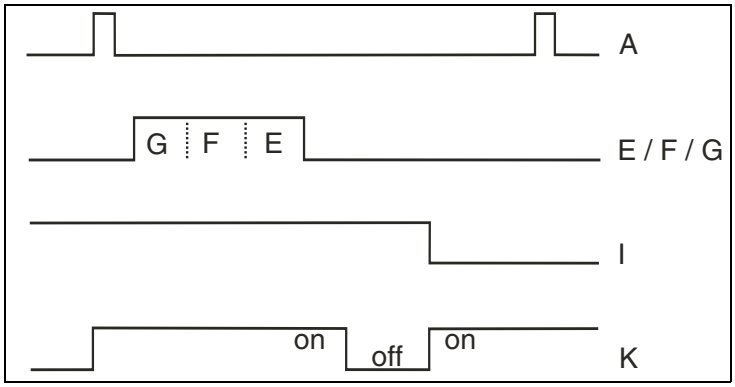


Fig. 15: Time cycles for automatic sensor rinse using "Chemo-Clean"

Pos.	Function	Set up address	Time interval	Factory default
A	Start hose rinse	B01	(0...99h)	24h
B	Hose rinse time	B02	(0...99s)	45s
C	Pump rinse time	B03	(0...99s)	30s
D	Start sensor rinse	B04	(0...99h)	18h
E	Post rinse	B05	(0...99s)	10s
F	Clean (detergent)	B06	(0...99s)	30s
G	Pre-rinse	B07	(0...99s)	10s
H	Hold time after suction hose rinse	B08	(0...99s)	20s
I	Pump status			
K	Hold (transmitter)			

7.3.4 Cleaning system control

The mini-controller LOGO from Siemens takes on the following functions:

- Automatic clean water rinsing system (→ Chap. 7.3.2) and
- automatic cleaning system "Chemo-Clean" (→ Chap. 7.3.3)

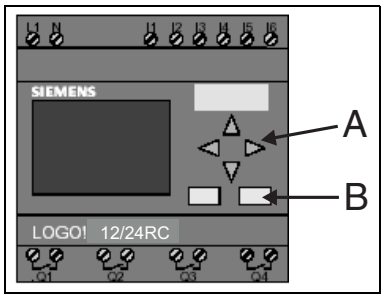


Fig. 16: SIEMENS mini-controller "LOGO! 12/24RC"

Pos. A: Operating keys "Up" "Down", "Left", "Right"
Pos. B: Operating keys "ESC", "OK"

The controller default programme is dependent on the cleaning system ordered. This means that the programme can be immediately started by using the "**Cleaning ON/OFF**" switch (found in the swing frame), and the system will then operate using the factory default set-up times.

Controller main menu

LOGO! starts the programme and indicates the following display:

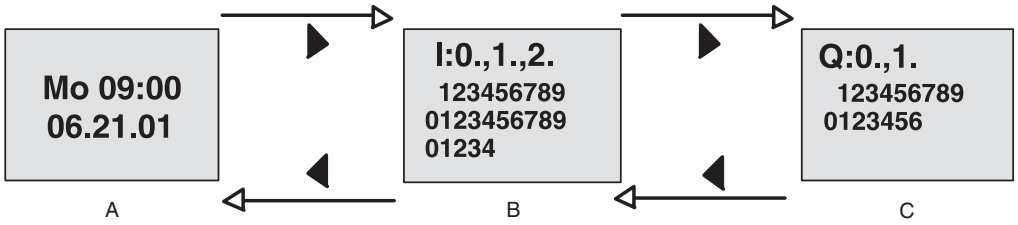


Fig. 17: Display field from the LOGO in RUN

Pos. A: Date and time
Pos. B: Input condition
Pos. C: Output condition

A. Date and time on the display:

This display flashes until the date and time are set.

B. Indication of the inputs on the display:

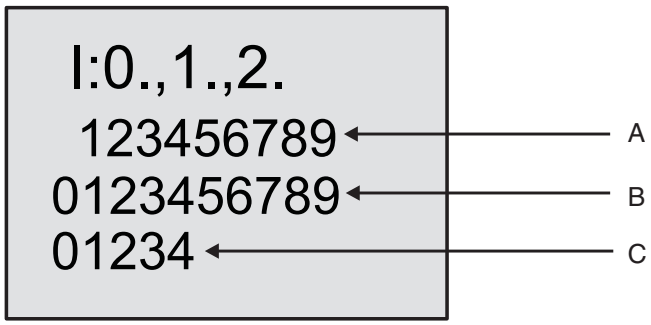


Fig. 18: Indication of the inputs on the display

Pos. A: Inputs I1 to I9
Pos. B: Inputs I10 to I19
Pos. C: Inputs I20 to I24

C. Indication of the outputs on the display:

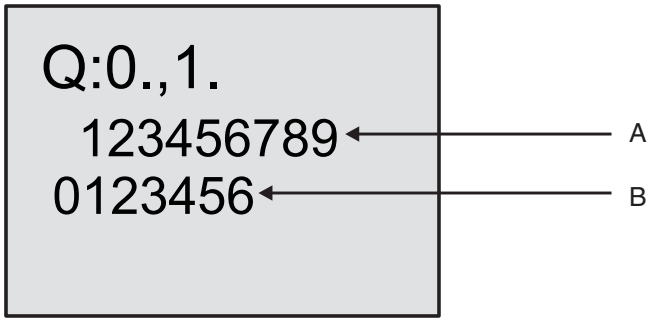


Fig. 19: Indication of the outputs on the display

Pos. A: Outputs Q1 to Q9
Pos. B: Outputs Q10 to Q16

Controller set-up menu

The LOGO controller recognises 2 operating modes: STOP and RUN.

How to stop the programme
In order to stop the programme continue as shown:

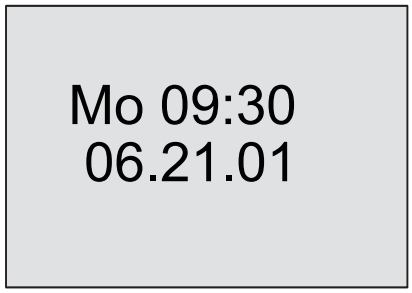


Fig. 20: ...Operate 'ESC', in order to move within the set-up menu

LOGO! changes the operating mode Set Parameters and displays the set-up menu:

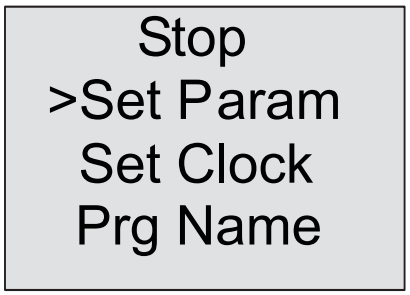
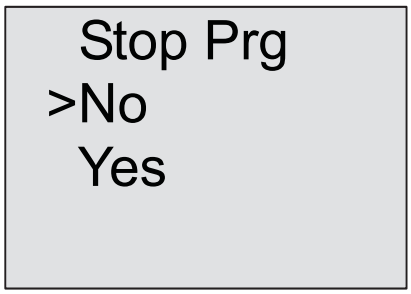


Fig. 21: set-up menu

Using this menu point the programme can be stopped and then changed into the operating mode set in the main menu. Follow these steps:

1. Move the '>' to '**Stop**': Keys ↑ or ↓
2. Accept '**Stop**': Key '**OK**'

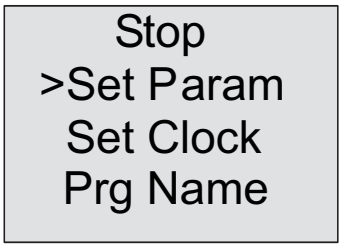


3. Move the '>' to 'Yes': Keys ↑ or ↓
4. Accept '**Yes**': Key '**OK**'

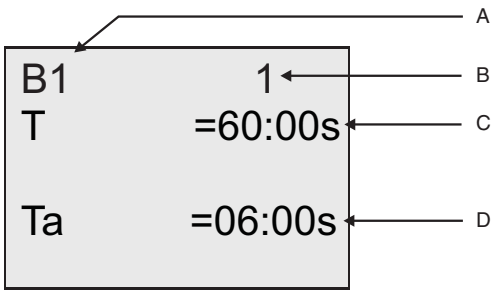
Change to the set-up operating mode

In order to change a specific parameter continue as follows:
In order to change from 'Continuous operation' of the controller into the operating mode 'Set', operate the '**ESC**' key.

1. Select the option 'Set Param' in the set-up menu: Keys ↑ or ↓



2. Operate the 'OK' key. LOGO! displays the first parameter.



Pos. A: Block number
Pos. B: Display number on functions when using more than one display (not relevant here)
Pos. C: The preset value of the parameter T (time)
Pos. D: Actual value
'ESC' leads to a return to the set-up menu without changes.

3. Select the required parameter: Keys ↑ or ↓.
4. If a parameter is to be changed then select that parameter and operate the '**OK**' key.
5. Using the keys ← or → ´the cursor can be moved to the point in the parameter that is to be changed. Using the keys ↑ or ↓ the value can be changed.
6. Accept the new set-up using the '**OK**' key.
7. Return to 'Continuous operation' by operating the '**ESC**' key twice.

Function	Set up position	Time interval	Factory default
Start hose rinse	B01	(0...99h)	24h
Hose rinse time	B02	(0...99s)	45s
Pump rinse time	B03	(0...99s)	30s
Start sensor rinse	B04	(0...99h)	18h
Post rinse	B05	(0...99s)	10s
Clean (detergent)	B06	(0...99s)	30s
Pre-rinse	B07	(0...99s)	10s
Hold time after suction hose rinse	B08	(0...99s)	20s
Pump status			
Hold (transmitter)			

LOGO! switch to RUN

LOGO! can be switched to RUN using the main menu.

1. Return to main menu: '**ESC**' key
2. Move '**>**' to '**Start**': Keys ↑ or ↓
3. Accept 'Start': '**OK**' key

7.4 Maintenance plan

A maintenance plan template that can be filled out can be found in section 10 in the ring binder.

8 Accessories

The measurement station is constructed using a number of individual instruments. An itemised parts list is made for each measurement station and placed in the device ring binder. This means that the user can swiftly identify individual items. The parts list can be found in section 3 in the ring binder.
However it is recommended that the user holds the most important consumables and parts subject to wear and tear on stock. In order to make the correct decision the storage time and conditions for these parts must be considered, e.g. pH sensors etc.

8.1 Accessories for the measurement station

Order code	Accessory
51006353	PVC inflow hose, 25 mm internal diameter, sold by the metre
51006362	CE4 measurement station hose end weight for suction hose, 25 mm internal diameter
50031919	Soft PVC outflow hose, 32x5 (internal) webbed, sold by the metre
51004674	Stainless steel hanger for TAGs 25x100

9 Fault-finding

9.1 Fault-finding instructions

Should the measurement station indicate a fault after commissioning or during operation always start fault finding by following the checklists. The user is led to the possible fault and its solution by means of simple questions.

9.2 Process fault messages

Fault message	Possible cause	Solution
'Dry run' lamp illuminated	■ No medium available	■ Dry run protection system is active. Check the suction hose and hose end for blockages
'Overpressure' lamp illuminated	■ Pipe work overpressure monitor active. Blockage in the pipework after the pump	■ Remove the blockage in the pipework

Fault message	Possible cause	Solution
Cumulative alarm active	■ No medium available	■ Dry run protection active. Check suction hose and hose end for blockages
	■ Motor overload switches pump off	■ Check pump motor, check pump for blockages
	■ Measurement fault	■ See operating manual for individual units (sections 5, 6, 7, 8 in the ring binder)
	■ Water sampler fault	■ See water sampler op. manual (section 6 in the ring binder)
	■ Pipework overpressure monitor active. Blockage in pipework after pump	■ Remove blockage in pipework
	■ Power supply missing	■ Call skilled electrician
	■ Main isolator, fused switch active	■ Call skilled electrician
	■ Pump hose breakage monitor (peristaltic pump) active	■ See peristaltic pump op. manual (section 8 in the ring binder)
Fault code in the display of one of the installed devices	■ Fault on the installed device	■ See op. manual for the respective device (sections 5, 6, 7, 8 in the ring binder)

9.3 Process faults without messages

Fault	Possible cause	Solution
No function	■ No power supply	■ Call skilled electrician
	■ Main isolator, fused switches tripped	
Pump does not run or runs only intermittently	■ Dry run protection active	■ No medium available
	■ Thermal overload or short circuit on the motor	■ Call skilled electrician
Feed rate of the eccentric pump reduces	■ Suction hose is partially blocked	■ Check suction part and pipes and if required clean or change
	■ Stator and rotor are worn	■ See op. manual for the eccentric pump (section 8 in the ring binder)

Fault	Possible cause	Solution
Cleaning system does not operate	■ No water available	■ Check water connection
	■ No voltage on the controller	■ Check electrical connections, see electrical connection schematic in section 3 in the ring binder
	■ Cleaning system not switched on	■ Set selector switch "Rinse ON/ OFF" in swing frame to "ON"
	■ Pipework over pressure monitor active. Blockage in the pipework after the pump	■ Remove blockage from pipework
	■ No medium available	■ Dry run protection is active. Check suction hose and hose end for blockages
	■ Pump does not run	■ Check pump motor, check pump for blockages; pump is not switched on

9.4 Spare parts

The measurement station is constructed using a number of individual instruments. An itemised parts list is made for each measurement station and placed in the device ring binder. This means that the user can quickly identify individual items.
The parts list can be found in section 3 in the ring binder.
However, it is recommended that the user holds the most important consumables and parts subject to wear and tear on stock (see maintenance plan in section 10 in the ring binder). In order to make the correct decision the storage time and conditions must be considered, e.g. pH sensors etc.

9.5 Returns

Before returning any device to Endress+Hauser for repair, the following must be taken care of:

- The device should always be accompanied by a completed 'Safety Regulation Form'. Only then can Endress+Hauser transport, check and repair the returned device.
- If required place a special handling recommendation form with the returned device, e.g. a safety data note to EN 91/155/EWG.
- Remove all materials soiling the device. Please take special note of the gasket cut-outs and rims into which solids can seep. This is especially important if the medium measured could constitute a health hazard, e.g. flammable, poisonous, corrosive, carcinogenic, etc.

Note!
A **copyable sample** of the 'Safety Regulation Form' can be found at the end of these instructions.

Caution!
- Do not return a device if it is deemed impossible to remove all hazardous materials, e.g. material seepage in scratches or media diffused by the plastic.
- Costs incurred for disposal due to lack of cleaning of the device or for personal injury (corrosion, burns etc.) will be invoiced to the user.

It is always recommended to protect the device correctly when returning it e.g. in case of repairs. Optimum protection is given by the original packaging. Repairs must only be carried out by the Endress+Hauser service personnel. For the nearest service department, see the addresses on the web site at www.endress.com/worldwide.

Note!
When returning the device for repair, please enclose a note detailing the fault and the application.

9.6 Disposal

The device contains electronic components and must be disposed as electronic waste. Please take note of the corresponding national recycling and disposal regulations.

10 Technical Data

10.1 Inputs

10.1.1 Measurement type and range

Endress+Hauser Sensor type	Measurement	Ranges
pH sensor CPS11	pH value and temperature	pH: 1 to 12 temperature: -15 to 80 °C
Redox sensor CPS12	Redox potential	-1000 mV to +1000 mV
Conductivity sensor CLS21	Conductivity	10 µS/cm to 20 mS/cm
Oxygen sensor COS41	Dissolved oxygen	0.05 mg/l to 20.0 mg/l
Turbidity sensor CUS41	Turbidity	0.00 to 9999 FNU 0.00 to 9000 ppm 0.0 to 300.0 g/l 0.0 to 200.0 %
Turbidity sensor CUS31	Turbidity for drinking water applications	0.000 to 9999 FNU 0.00 to 3000 ppm 0.0 to 3.0 g/l 0.0 to 200.0 %
Optionally:		
Nitrate sensor CNS70 and nitrate transmitter CNM750	Nitrate	0 to 25 mg/l_N 25 to 50 mg/l_N
SAC sensor CSS70 and SAC transmitter CSM750	Spectral Absorption Coefficient (SAC)	0.3 to 50 m^{-1} 15 to 700 m^{-1}
Chlorine sensor CCS140/141 and armature CCA250	Chlorine	▪ Chlorine sensor CCS140: 0.05 to 20 mg Cl_2/l ▪ Chlorine sensor CCS141: 0.01 to 5.0 mg Cl_2/l

10.2 Outputs

10.2.1 Output signal

Liquisys M transmitter
Current output 4 to 20 mA

ASP Station 2000 water sampler
3 relay outputs max. 250 V/3 A

Alarm output
Fault event outputs using a potential free contact (cumulative alarm)

10.3 Power supply

10.3.1 Electrical connection

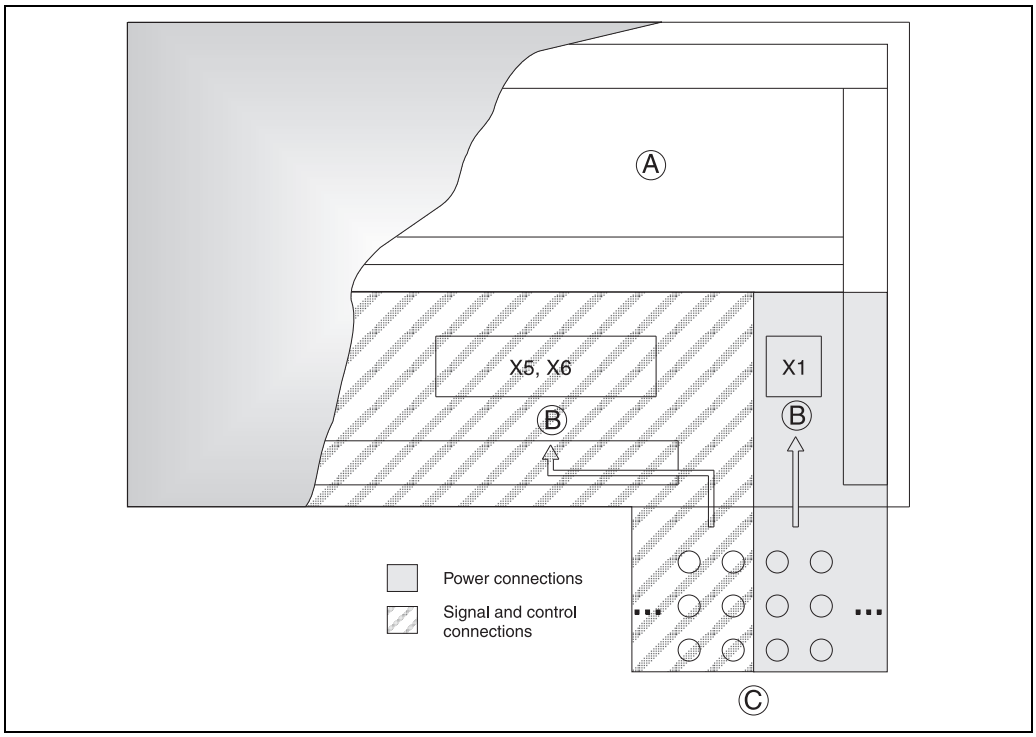


Fig. 22: Fig 3: Measurement station terminal connections - Installation plate in the electronic compartment

Pos. A: Terminals, fuses and switch components for the internal wiring.
Pos. B: Terminal connection area
- *Terminal strip X1:*
  Power inputs (e.g. power supply for an external pump)
  Mains power connection 230 V AC / 50 Hz or 400 V AC / 50 Hz
- *Terminal strip X5:*
  Digital signal inputs or outputs (e.g. cumulative alarm, water sampler)
- *Terminal strip X6:*
  Analogue signal inputs or outputs (e.g. 0/4 to 20 mA measured signal)

Pos. C: PG cable entries IP68

10.3.2 Supply voltage

230 V, 50 Hz / 400 V, 50 Hz

10.3.3 Cable entries

Cables are fed into the electronic compartment using the installed cable channel.

- 2 x cable gland M32
- 2 x cable gland M25
- 2 x cable gland M20
- 2 x cable gland M16

Cable entries can be installed in the left hand side or right hand side of the unit base.

10.3.4 Cable specification

- Power supply e.g.: NYY-J 3 core, max. 4.5 mm
- Analogue and signal cables e.g.: LiYY 10 x 0.34 mm
- Interface RS485 e.g.: LiYCY 2 x 0.25 mm

10.3.5 Power consumption (complete system)

Total 1500 W

10.4 Operating conditions

10.4.1 Environment

Ambient temperature range

-20 to 40 °C

Storage temperature

-20 to 60 °C

Protection degree

(See Chapter 4.3)

Electromagnetic compatibility (EMC)

All active electronic devices in the measurement station are CE marked in accordance with the EMC regulations. All Endress+Hauser devices in the measurement station fulfil the requirements laid down in the IEC 61326.

10.4.2 Process

Medium temperature

0 to 40 °C

Medium

Liquid, flowing media. Free from abrasive solids.

Process pressure

- Sampler pressureless: The water sampler is not designed for use in pressurised systems!
- Analysis pipework: 0 to 6 bar at max. 25 °C medium temperature!

10.4.3 Pump data

Eccentric pump

max. suction height: 5 m
max. suction length: 15 m

Peristaltic pump

max. suction height: 7 m
max. suction length: 30 m

10.5 Mechanical construction

10.5.1 Design dimensions

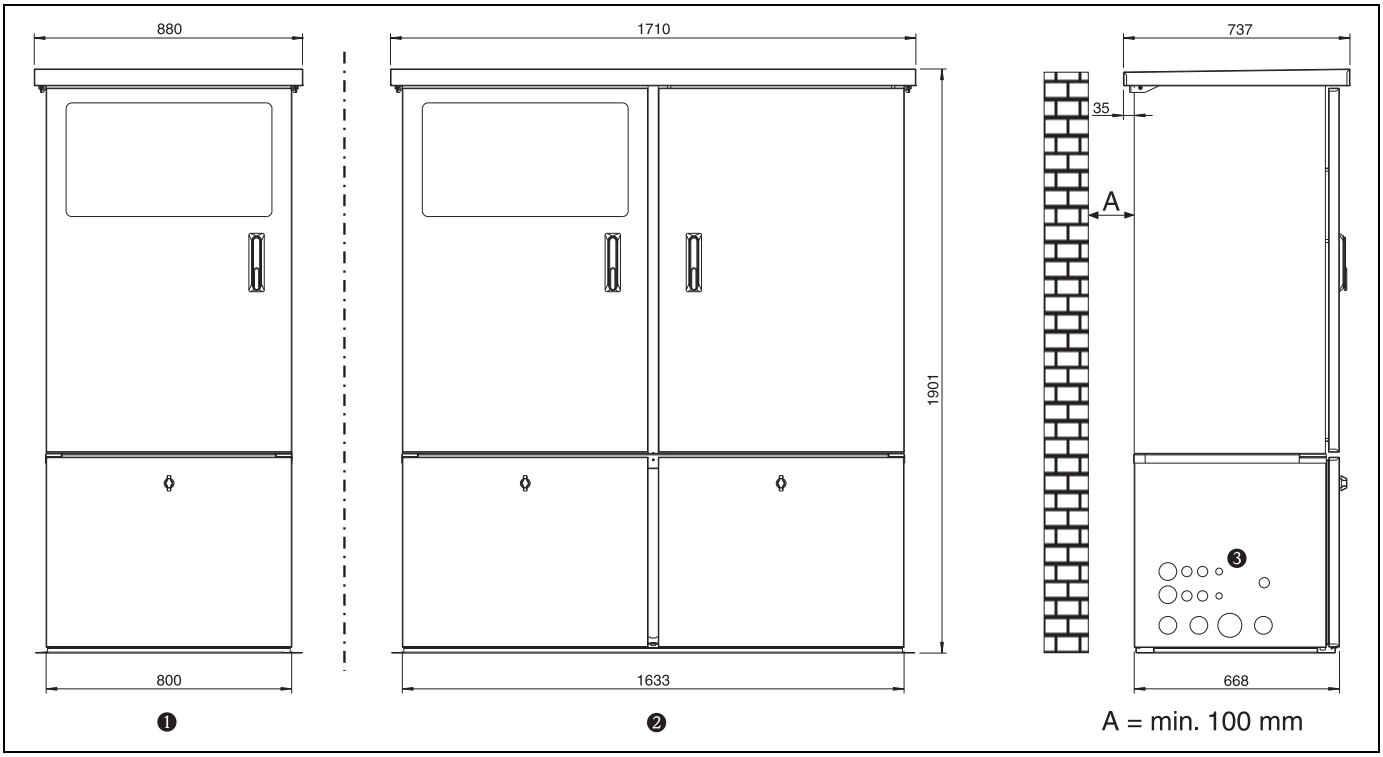


Fig. 23: Fig 8: Dimensions in mm
- *A min. 100 mm wall space for ventilation; approx. 450 mm additional free space above*
- *Pos. 1: without water sampler*
- *Pos. 2: with water sampler*
- *Pos. 3: Cable entry and hose connection as option - see product structure*

10.5.2 Weight (complete system)

- Total: 400 kg
- Analysis cabinet without water sampler: approx. 210 kg

10.5.3 Materials

Module	Component	Material
Water sampler	Cabinet	SS 304 H
	Inner shell, distribution pan	PS
	Insulation	PU CO_2 foamed
	Suction hose, dosing tube	PVC
	Hose connection, dosing chamber cover	PP, POM, PA
	Conductivity switch sensors	304 H
	Dosing chamber	PMMA
	Outflow hose, pneumatic hoses, air manager gasket	Silicon
	Distribution tap	PP
	Distribution tap cover, bottles	PE
	Air manager housing	PC
	Vacuum pump head	Anodised aluminium
	Vacuum pump membrane	EPDM
Analysis compartment	Cabinet	SS 304 H
	Pipework, outflow hose	PVC
	Inflow hose	NBR

Module	Component	Material
Eccentric pump	Housing Motor Connections Rotor Stator	GG 25 Varnished steel PP St. steel 1.4021 / ASI 420 Nitrile
Peristaltic pump	Housing Motor/drive Connections Hose Lubrication	Aluminium Varnished steel Stainless steel NR (natural rubber) Glycerine
Base, roof	Sheet steel Insulation	SS 304 H PU CO_2 foamed

10.6 Certificates and approvals

10.6.1 CE mark

The device fulfils the legal requirements laid down in the EC directives. Endress+Hauser confirms a successful test of the device by adding the CE mark.

10.6.2 Additional standards and guidelines

- IEC 60529:
  Housing protection (IP code)
- IEC 61010-1:
  Safety requirements for electrical measurement, control and laboratory devices (Endress+Hauser units)
- EN 61326 (IEC 61326):
  Electromagnetic compatibility (EMC requirements)
- IEC 60204-1
  Electrical installation of machinery (safety requirements for the control panel)
- 89/336/EWG
  EMC regulations
- 73/237/EWG
  Low voltage regulations

10.7 Additional documentation

- Brochure Field of activities 'Water samplers and Measurement stations (FA013C/09/en)
- Transmitter Liquisys M (TI194C/07/en)
- Operating instructions ASP Station 2000 (BA080R/09/c4)
- Technical Information:
  ASP Station 2000 (TI059R/09/en)
  Visual Data Manager Memograph M (TI133R/09/en)
  Paperless Recorder Ecograph T (TI115R/09/en)
  Measuring station CE4 (TI102R/09/en)

Index

Declaration of Contamination
Erklärung zur Kontamination

Endress+Hauser
People for Process Automation

Because of legal regulations and for the safety of our employees and operating equipment, we need the "declaration of contamination", with your signature, before your order can be handled. Please make absolutely sure to include it with the shipping documents, or – even better – attach it to the outside of the packaging.
Aufgrund der gesetzlichen Vorschriften und zum Schutz unserer Mitarbeiter und Betriebseinrichtungen, benötigen wir die unterschriebene "Erklärung zur Kontamination", bevor Ihr Auftrag bearbeitet werden kann. Legen Sie diese unbedingt den Versandpapieren bei oder bringen Sie sie idealerweise außen an der Verpackung an.

Type of instrument / sensor
Geräte-/Sensortyp _____

Serial number
Seriennummer _____

Process data/ *Prozessdaten*

Temperature / *Temperatur* _____ [°C] Pressure / *Druck* _____ [Pa]

Conductivity / *Leitfähigkeit* _____ [S] Viscosity / *Viskosität* _____ [mm^2/s]

Medium and warnings
Warnhinweise zum Medium

	Medium /concentration *Medium /Konzentration*	Identification CAS No.	flammable *entzündlich*	toxic *giftig*	corrosive *ätzend*	harmful/ irritant *gesundheits-schädlich/ reizend*	other * *sonstiges**	harmless *unbedenklich*
Process medium *Medium im Prozess*								
Medium for process cleaning *Medium zur Prozessreinigung*								
Returned part cleaned with *Medium zur Endreinigung*								

* explosive; oxidising; dangerous for the environment; biological risk; radioactive
* *explosiv; brandfördernd; umweltgefährlich; biogefährlich; radioaktiv*

Please tick should one of the above be applicable, include security sheet and, if necessary, special handling instructions.
Zutreffendes ankreuzen; trifft einer der Warnhinweise zu, Sicherheitsdatenblatt und ggf. spezielle Handhabungsvorschriften beilegen.

Reason for return / *Grund zur Rücksendung* _____

_____

_____

Company data / *Angaben zum Absender*

Company / *Firma* _____ Contact person / *Ansprechpartner* _____

_____ Department / *Abteilung* _____

Address / *Adresse* Phone number/ *Telefon* _____

_____ Fax / E-Mail _____

_____ Your order No. / *Ihre Auftragsnr.* _____

We hereby certify that the returned parts have been carefully cleaned. To the best of our knowledge they are free from any residues in dangerous quantities.
Hiermit bestätigen wir, dass die zurückgesandten Teile sorgfältig gereinigt wurden, und nach unserem Wissen frei von Rückständen in gefahrbringender Menge sind.

_____ _____

(place, date / *Ort, Datum*) (Company stamp and legally binding signature)
(Firmenstempel und rechtsverbindliche Unterschrift)

www.endress.com/worldwide

Endress+Hauser

People for Process Automation

BA160R/09/en/13.10
51006364
FM+SGML6.0 ProMoDo