Technical Information

Liquiline CM442/CM444/CM448

Multiparameter transmitter with a maximum of eight measuring channels based on digital Memosens technology

Application

Liquiline CM442/CM444/CM448 is an extensible multiparameter controller for monitoring and controlling processes in industry and the environmental sector. Depending on the version ordered, up to 8 digital sensors with Memosens technology can be connected. The measuring signals can be linked by means of the mathematical function and new measured values calculated (e.g. pH calculation based on differential conductivity measurement).

Furthermore, up to eight 0/4 to 20 mA analog outputs are available. Digital Fieldbuses (HART, PROFIBUS, Modbus) and the integrated web server offer additional options for connecting to process control systems. A cleaning function, controller and alarm relay can be selected.

Optional current inputs are available for processing measured values from other devices, e.g. flow or level.

The rugged plastic version is tailored to the following non-hazardous area applications:

- Water and wastewater
- Power stations
- Chemical industry
- Other industrial applications

Your benefits

- Maximum process safety thanks to:
  - Simple and transparent menu guidance via a graphic display
  - Standardized intuitive operating concept for all the devices of the new Liquiline, sampler and analyzer platform
- Fast commissioning thanks to:
  - Memosens: use of lab-calibrated sensors thanks to plug-and-play capabilities
  - Preconfigured Liquiline transmitter
  - Easy to expand and adapt system to meet new requirements
- Minimum inventory:
  - Cross-platform, modular concept (e.g. identical modules irrespective of parameters)
  - Integration into Fieldcare and W@M facilitates effective asset management
# Table of contents

<table>
<thead>
<tr>
<th>Function and system design</th>
<th>Performance characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Memosens technology</td>
<td>Response time</td>
</tr>
<tr>
<td>Modular design</td>
<td>Reference temperature</td>
</tr>
<tr>
<td>Display</td>
<td>Maximum measured error of sensor inputs</td>
</tr>
<tr>
<td>Measuring system</td>
<td>Maximum measured error of sensor inputs and outputs</td>
</tr>
<tr>
<td>Device architecture</td>
<td>Resolution of current inputs and outputs</td>
</tr>
<tr>
<td>Communication and data processing</td>
<td>Repeatability</td>
</tr>
<tr>
<td>Serviceability</td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Input</td>
<td>12</td>
</tr>
<tr>
<td>Measured variables</td>
<td></td>
</tr>
<tr>
<td>Measuring ranges</td>
<td></td>
</tr>
<tr>
<td>Input types</td>
<td></td>
</tr>
<tr>
<td>Input signal</td>
<td></td>
</tr>
<tr>
<td>Current input, passive</td>
<td></td>
</tr>
<tr>
<td>Cable specification</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>13</td>
</tr>
<tr>
<td>Output signal</td>
<td></td>
</tr>
<tr>
<td>Signal on alarm</td>
<td></td>
</tr>
<tr>
<td>Load</td>
<td></td>
</tr>
<tr>
<td>Linearization/transmission behavior</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Current outputs, active</td>
<td>14</td>
</tr>
<tr>
<td>Span</td>
<td></td>
</tr>
<tr>
<td>Signal characteristic</td>
<td></td>
</tr>
<tr>
<td>Electrical specification</td>
<td></td>
</tr>
<tr>
<td>Cable specification</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Relay outputs</td>
<td>14</td>
</tr>
<tr>
<td>Electrical specification</td>
<td></td>
</tr>
<tr>
<td>Cable specification</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Protocol-specific data</td>
<td></td>
</tr>
<tr>
<td>HART</td>
<td></td>
</tr>
<tr>
<td>PROFIBUS DP</td>
<td></td>
</tr>
<tr>
<td>Modbus RS485</td>
<td></td>
</tr>
<tr>
<td>Modbus TCP</td>
<td></td>
</tr>
<tr>
<td>Web server</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Energy supply</td>
<td>17</td>
</tr>
<tr>
<td>Supply voltage</td>
<td></td>
</tr>
<tr>
<td>Fieldbus connection</td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td></td>
</tr>
<tr>
<td>Fuse</td>
<td></td>
</tr>
<tr>
<td>Cable entry</td>
<td></td>
</tr>
<tr>
<td>Cable specification</td>
<td></td>
</tr>
<tr>
<td>Electrical connection</td>
<td></td>
</tr>
<tr>
<td>Connecting optional modules</td>
<td></td>
</tr>
<tr>
<td>Protective ground connection</td>
<td></td>
</tr>
<tr>
<td>Sensor connection</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>17</td>
<td>17</td>
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<tr>
<td>17</td>
<td>17</td>
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<td>18</td>
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<tr>
<td>20</td>
<td>21</td>
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<td>22</td>
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<td>24</td>
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<td>24</td>
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<tr>
<td>24</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Installation</td>
<td>24</td>
</tr>
<tr>
<td>Mounting plate</td>
<td></td>
</tr>
<tr>
<td>Weather protection cover</td>
<td></td>
</tr>
<tr>
<td>Installation instructions</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>27</td>
</tr>
<tr>
<td>Ambient temperature range</td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td></td>
</tr>
<tr>
<td>Electromagnetic compatibility</td>
<td></td>
</tr>
<tr>
<td>Pollution degree</td>
<td></td>
</tr>
<tr>
<td>Pressure compensation to environment</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Mechanical construction</td>
<td>28</td>
</tr>
<tr>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Operability</td>
<td>29</td>
</tr>
<tr>
<td>Operating concept</td>
<td></td>
</tr>
<tr>
<td>Local operation</td>
<td></td>
</tr>
<tr>
<td>Remote operation</td>
<td></td>
</tr>
<tr>
<td>Language groups</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td>Ordering information</td>
<td>32</td>
</tr>
<tr>
<td>Product structure</td>
<td></td>
</tr>
<tr>
<td>Scope of delivery</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Certificates and approvals</td>
<td>32</td>
</tr>
<tr>
<td>CE mark</td>
<td></td>
</tr>
<tr>
<td>cCSAus</td>
<td></td>
</tr>
<tr>
<td>FM/CSA</td>
<td></td>
</tr>
<tr>
<td>MCERTS</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Accessories</td>
<td>33</td>
</tr>
<tr>
<td>Weather protection cover</td>
<td></td>
</tr>
<tr>
<td>Post mounting kit</td>
<td></td>
</tr>
<tr>
<td>Measuring cable</td>
<td></td>
</tr>
<tr>
<td>Sensors</td>
<td></td>
</tr>
<tr>
<td>Additional functionality</td>
<td></td>
</tr>
<tr>
<td>Other accessories</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>37</td>
<td>37</td>
</tr>
</tbody>
</table>
Function and system design

**Memosens technology**

Memosens makes your measuring point safer and more reliable:

- Non-contact, digital signal transmission enables optimum galvanic isolation
- No contact corrosion
- Completely watertight
- Laboratory sensor calibration possible, thus increasing measured value availability
- Predictive maintenance thanks to recording of sensor data, e.g.:
  - Total hours of operation
  - Hours of operation with very high or very low measured values
  - Hours of operation with high temperatures
  - Number of steam sterilizations
  - Sensor condition

**Modular design**

The modular transmitter design means it can be easily adapted to suit your needs:

- Retrofit extension modules for new or extended range of functions, e.g. current outputs, relays and digital communication
- Upgrade to maximum of eight-channel measurement
- Optional: M12 sensor connector for connecting any kind of Memosens sensor

**Display**

Graphic display:

- Back light with switch-off function
- Red display background for alarms alerts users to errors
- Transflective display technology for maximum contrast even in bright environments
- User-definable measuring menus mean you can always keep track of the values that are important for your application.
- Load curve display
Measuring system

The following overview shows examples of the design and layout of a measuring system. Other sensors and assemblies can be ordered for conditions specific to your application (→ www.endress.com/products).

**Measuring point**
A complete measuring system consists of:
- Liquiline transmitter
- Sensors with Memosens technology
- Assemblies to suit the sensors used
- Post or rail mounting (optional)
- Weather protection cover (optional)

**pH value or ORP**
- pH measurement in drinking water
  - Retractable assembly Cleanfit CPA471
  - Sensor Orbitsint CPS11D
  - Measuring cable CYK10
  → graphic
- ORP in drinking water
  - Immersion assembly Dipfit CYA112
  - Sensor Orbitsint CPS12D
  - Measuring cable CYK10

**Conductivity**
- Inductive conductivity measurement in wastewater treatment
  - Immersion assembly Dipfit CLA111
  - Sensor Indumax CLS50D with fixed cable
- Conductive conductivity measurement in power plant cooling water
  - Immersion assembly Dipfit CLA111
  - Sensor Condumax CLS15D

**Oxygen**
- Oxygen in aeration basins
  - Immersion assembly Dipfit CYA112
  - Holder CYH112
  - Sensor – COS61D (optical) with fixed cable,
  – COS51D (amperometric) cable CYK10

**Nitrate and SAC**
- Nitrate in wastewater
  - Sensor CAS51D-**A2 with fixed cable
  - Assembly CYA112
  - Holder CYH112
- SAC in the wastewater treatment outlet
  - Sensor CAS51D-**2C2 with fixed cable
  - Assembly CYA112
  - Holder CYH112

**Chlorine**
- Chlorine (and pH) in drinking water
  - Sensor CCS142D
  - Sensor CPS11D
  - Measuring cable CYK10
  - Flow assembly CCA250
- Chlorine in effluent
  - Sensor CAS40D with fixed cable
  - Holder CYH112

**Turbidity and interface**
- Turbidity in industrial water
  - Sensor Turbimax CUS51D with fixed cable
  - Assembly Flowfit CUA250
  - Spray head CUR3 (optional)
- Interface in the primary clarifier
  - Sensor Turbimax CUS71D
  - Assembly CYA112
  - Holder CYH112

**Ion selective electrodes**
- Ammonium and nitrate measurement in the aeration basin
  - Sensor CAS40D with fixed cable
  - Holder CYH112

If mounting outdoors, always use the weather protection cover (see "Accessories") to protect the transmitter against weather conditions.
Device architecture

Slot and port assignment

The electronic components are modular in design:
- There are several points available to connect electronic modules. They are known as "slots".
- The slots are numbered consecutively in the housing. Slots 0 and 1 are always reserved for the basic module.
- Each electronic module has one or more input(s) and output(s) or relays, collectively termed "ports" here.
- The ports are numbered consecutively for each electronic module and are automatically detected by the software.
- Outputs and relays are named according to their function, e.g., "current output", and are displayed with the slot and port numbers in ascending order.
  - Example: "Current output 2:1" means Slot 2 (e.g., module AOR) : Port 1 (current output 1 of module AOR)
- Inputs are assigned to measuring channels in ascending order "Slot:Port number".
  - Example: "CH1: 1:1 pH glass" means Channel 1 (CH1) is slot 1 (basic module) : Port 1 (input 1) and a pH glass sensor is connected to it.
- The unique terminal name can be explained as follows:
  - Slot no. : Port no. : Terminal

Electronic components ex works

Depending on the version ordered, the device is supplied with a number of electronic modules, which are assigned in a specific sequence in ascending order to slots 0 to 7.
- If you do not have a particular module, the next moves up automatically:
  - The basic module (which is always present) always occupies slots 0 and 1.
  - Fieldbus module 485
  - Memosens input module 2DS (DS = digital sensor)
  - Current input module 2AI (AI = analog input)
  - Current output module 4AO or 2AO (AO = analog output)
  - Relay modules AOR, 4R or 2R (AOR = analog output + relay, R = relay)
- Modules with 4 ports are connected before modules of the same type with 2 ports.
You must be aware of the type of modules and the number of them supplied with the device you have ordered to determine the delivery status of your Liquiline.

- **Basic module**
  - Is always present and there is only ever one.

- **Fieldbus module**
  - Optional and there can only be one.

- **Input modules**
  - Must be clearly assigned to the number of optional inputs ordered.
  - Examples:
    - 2 current inputs = module 2AI
    - 4 Memosens inputs = basic module with 2 inputs + module 2DS with 2 further inputs

- **Current outputs and relays**
  - Various module combinations can exist.
  - The following table will help you find out which modules you get depending on the type and number of outputs.

<table>
<thead>
<tr>
<th>Current outputs</th>
<th>Relay 0</th>
<th>Relay 2</th>
<th>Relay 4</th>
<th>Relay 6</th>
<th>Relay 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>-</td>
<td>1 x 2R</td>
<td>1 x 4R</td>
<td>1 x 4R + 1 x 2R</td>
<td>2 x 4R</td>
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<tr>
<td>4</td>
<td>1 x 2AO</td>
<td>1 x AOR</td>
<td>1 x 2AO + 1 x 4R</td>
<td>1 x AOR + 1 x 4R</td>
<td>2 x 4AO + 2 x 4R</td>
</tr>
<tr>
<td>6</td>
<td>1 x 4AO</td>
<td>1 x 4AO + 1 x 2R</td>
<td>1 x 4AO + 1 x 4R</td>
<td>1 x 4AO + 1 x 4R + 1 x 2R</td>
<td>4 x 4AO + 2 x 4R</td>
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<td>8</td>
<td>1 x 4AO + 1 x 2AO</td>
<td>1 x 4AO + 1 x 2AO + 1 x 2R</td>
<td>1 x 4AO + 1 x 2AO + 1 x 4R</td>
<td>1 x 4AO + 1 x 2AO + 1 x 4R + 1 x 2R</td>
<td>4 x 4AO + 2 x 4AO + 2 x 4R</td>
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</table>

- Sum up the number of modules and sort them according to the specified sequence. This will give you the slot assignment for your device.

**Example for creating a terminal diagram:**

Device with 4 inputs for digital sensors, 4 current outputs and 4 relays
- Basic module BASE-E (contains 2 sensor inputs, 2 current outputs)
- Module 2DS (2 sensor inputs)
- Module 2AO (2 current outputs)
- Module 4R (4 relays)
Liquiline CM442/CM444/CM448

Block diagram CM442

1  Current output 1:1, + HART (optional)
2  Current outputs (2 x optional)
3  2 x Memosens input (1 x optional)
4  PROFIBUS DP/Modbus/Ethernet (optional)
5  2 x current input (optional)
6  Power supply
7  Service interface
8  Power supply, fixed cable sensors
9  Alarm relay
10 2 or 4 x relays (optional)
Block diagram CM444

1. Current output 1:1 + HART (both optional)
2. Max. 7 x current output (optional)
3. Memosens input (2 x standard + 2 x optional)
4. PROFINET DP/Modbus/Ethernet (optional)
5. 2 x current input (optional)
6. Power supply
7. Service interface
8. Power supply, fixed cable sensors
9. Alarm relay
10. 2 or 4 x relays (optional)
Block diagram CM448

1  Current output 1:1 + HART (both optional)
2  Max. 7 x current output (optional)
3  Max. 8 x Memosens input (of which 2 x optional)
4  PROFIBUS DP/Modbus/Ethernet (optional)
6  Power supply
7  Service interface
8  Power supply, fixed cable sensors
9  Alarm relay
10  2 or 4 x relays (optional)
Communication and data processing

Types of communication:
- Fieldbuses
  - HART
  - PROFIBUS DP (Profile 3.02)
  - Modbus TCP or RS485
- Configuration via Ethernet

Only one type of Fieldbus communication can ever be active. The last activation code entered decides which bus is used.

Extension module 485 and current outputs
For communication types PROFIBUS DP, Modbus and Ethernet:
- CM442:
  Current outputs cannot be used in parallel. Any existing current outputs are deactivated with the installation of 485.
- CM444/CM448:
  Max. of 2 current outputs can be used in parallel.

Bus termination on the device
- Via slide switch at bus module 485
- Displayed via LED “T” on bus module 485

Serviceability

Data logger function
- Adjustable scan time: 1 to 3600 s (6 h)
- Data logbooks:
  - Max. 8 data logbooks
  - 150,000 entries per logbook
  - Graphic display (load curves) or numerical list
- Calibration logbook: max. 75 entries
- Hardware version logbook:
  - Hardware configuration and modifications
  - Max. 125 entries
- Version logbook:
  - E.g. software updates
  - Max. 50 entries
- Operation logbook: max. 250 entries
- Diagnostics logbook: max. 250 entries

FieldCare and Field Data Manager

FieldCare
Configuration and asset management software based on FDT/DTM technology
- Complete device configuration when connected via FXA291 and service interface
- Access to a number of configuration parameters and identification, measuring and diagnostic data when connected via HART modem
- Logbooks can be downloaded in CSV format or binary format for "Field Data Manager" software
Field Data Manager
Visualization software and database for measuring, calibration and configuration data
- SQL database which is protected against manipulation
- Functions to import, save and print out logbooks
- Load curves to display measured values

SD card
The exchangeable storage medium enables:
- Quick and easy software updates and upgrades
- Data storage of internal device memory (e.g. logs)
- Transfer of complete configurations to a device with an identical setup (backup function)
- Transfer of configurations without the TAG and bus address to devices with an identical setup (copy function)

Endress+Hauser offers industry-approved SD cards as accessories. These memory cards provide maximum data security and integrity.
Other SD cards can also be used. However, Endress+Hauser does not accept any responsibility for the data security of such cards.

Virtual process values (mathematical functions)
In addition to "real" process values, which are provided by connected physical sensors or analog inputs, mathematical functions can be used to calculate a maximum of 6 "virtual" process values.

The "virtual" process values can be:
- Output via a current output or a Fieldbus
- Used as a regulating control variable
- Assigned as a measured variable to a limit contactor
- Used as a measured variable to trigger cleaning
- Displayed in user-defined measuring menus.

The following mathematical functions are possible:
- pH calculation based on two conductivity values acc. to VGB 405 RL, e.g. in boiler feed water
- Difference between two measured values from different sources, e.g. for membrane monitoring
- Differential conductivity, e.g. monitoring the efficiency of ion exchangers
- Degassed conductivity, e.g. for process controls in power plants
- Redundancy for monitoring two or three redundantly measuring sensors
- rH calculation based on the measured values of a pH and an ORP sensor
Reliability

Data security
All settings, logbooks etc. are stored in a non-volatile memory to ensure that the data are retained even in the event of a disruption to the power supply.

Sensor Check System (SCS)
The Sensor Check System (SCS) monitors the high impedance of the pH glass. An alarm is issued if a minimum impedance value is undershot or a maximum impedance is exceeded.

- Glass breakage is the main reason for a drop in high impedance values.
- The reasons for increasing impedance values include:
  - Dry sensor
  - Worn pH glass membrane.

Process Check System (PCS)
The process check system (PCS) checks the measuring signal for stagnation. An alarm is triggered if the measuring signal does not change over a specific period (several measured values).

The main causes of stagnating measured values are:

- Contaminated sensor, or sensor outside of medium
- Sensor failure
- Process error (e.g. through control system)

Self-monitoring functions

Current inputs and outputs
Current inputs are deactivated in the event of overcurrent and reactivated once the overcurrent stops. The current outputs are read to check if the value corresponds to the setpoint.

Board monitoring
Board voltages and board temperature are monitored.

Input

Measured variables

--> Documentation of the connected sensor

Measuring ranges

--> Documentation of the connected sensor

Input types

- Digital sensor inputs
- Analog current inputs (optional)

Input signal

Depending on version

- Max. 8 x binary sensor signal
- 2 x 0/4 to 20 mA (optional), passive, potentially isolated from one another and from the sensor inputs

Current input, passive

Span

> 0 to 20 mA

Signal characteristic

Linear

Internal resistance

Non-linear

Test voltage

500 V
Cable specification

Cable type
Memosens data cable CYK10 or sensor fixed cable, each with cable end sleeves or M12 round-pin connector

Cable length
Max. 100 m (330 ft)

Output

Output signal
Depending on version:
- 1 to 8 x 0/4 to 20 mA, active, potentially isolated from one another and from the sensor circuits
- Thereof one current output with optional HART communication (exclusively via current output 1:1)

HART
Signal coding | FSK ± 0.5 mA above current signal
---|---
Data transmission rate | 1200 baud
Galvanic isolation | Yes
Load (communication resistance) | 250 Ω

PROFIBUS DP/RS485
Signal coding | EIA/TIA-485, PROFIBUS DP-compliant acc. to IEC 61158
---|---
Data transmission rate | 9.6 kBit, 19.2 kBit, 45.45 kBit, 93.75 kBit, 187.5 kBit, 500 kBit, 1.5 MBd, 6 MBd, 12 MBd
Galvanic isolation | Yes
Connectors | Spring-cage terminal (max. 1.5 mm) bridged internally in the connector (T function), M12 optional
Bus termination | Internal slide switch with LED display

Modbus RS485
Signal coding | EIA/TIA-485
---|---
Data transmission rate | 2,400, 4,800, 9,600, 19,200, 38,400, 57,600 and 115,200 baud
Galvanic isolation | Yes
Connectors | Spring-cage terminal (max. 1.5 mm) bridged internally in the connector (T function), M12 optional
Bus termination | Internal slide switch with LED display

Ethernet and Modbus TCP
Signal coding | IEEE 802.3 (Ethernet)
---|---
Data transmission rate | 10/100 Mb/s
Galvanic isolation | Yes
Connection | RJ45, M12 optional
IP address | DHCP or configuration using menu
Signal on alarm

- Adjustable, as per NAMUR Recommendation NE 43
  - In measuring range 0 to 20 mA (HART is not available with this measuring range):
    - Error current from 0 to 23 mA
  - In measuring range 4 to 20 mA:
    - Error current from 2.4 to 23 mA
  - Factory setting for error current for both measuring ranges: 21.5 mA

Load

- Max. 500 Ω

Linearization/transmission behavior

- Linear

Current outputs, active

Span

- 0 to 23 mA
- 2.4 to 23 mA for HART communication

Signal characteristic

- Linear

Electrical specification

- Output voltage
  - Max. 24 V

- Test voltage
  - 500 V

Cable specification

- Cable type
  - Recommended: shielded cable

- Cross-section
  - Max. 2.5 mm² (14 AWG)

Relay outputs

Electrical specification

- Relay types
  - 1 single-pin changeover contact (alarm relay)
  - 2 or 4 single-pin changeover contacts (optional with extension modules)

Relay switching capacity

<table>
<thead>
<tr>
<th>Basic module (alarm relay)</th>
<th>Switching voltage</th>
<th>Load (max.)</th>
<th>Switching cycles (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>230 V AC, cosϕ = 0.8 to 1</td>
<td>0.1 A</td>
<td>700,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5 A</td>
<td>450,000</td>
</tr>
<tr>
<td></td>
<td>115 V AC, cosϕ = 0.8 to 1</td>
<td>0.1 A</td>
<td>1,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5 A</td>
<td>650,000</td>
</tr>
<tr>
<td></td>
<td>24 V DC, L/R = 0 to 1 ms</td>
<td>0.1 A</td>
<td>500,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5 A</td>
<td>350,000</td>
</tr>
</tbody>
</table>
Minimum load (typical)
- Min. 100 mA with 5 V DC
- Min. 1 mA with 24 V DC
- Min. 5 mA with 24 V AC
- Min. 1 mA with 230 V AC

Cable specification
Cross-section
Max. 2.5 mm² (14 AWG)

Protocol-specific data

### HART

<table>
<thead>
<tr>
<th>Manufacturer ID</th>
<th>11h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device type</td>
<td>119Cn (CM44x), 119Dn (CSFxx)</td>
</tr>
<tr>
<td>Device revision</td>
<td>001h</td>
</tr>
<tr>
<td>HART version</td>
<td>7.2</td>
</tr>
<tr>
<td>Device description files (DD/DTM)</td>
<td><a href="http://www.endress.com">www.endress.com</a> Device Integration Manager (DIM)</td>
</tr>
<tr>
<td>Device variables</td>
<td>16 configured by the user and 16 pre-defined, dynamic variables PV, SV, TV, QV</td>
</tr>
<tr>
<td>Supported features</td>
<td>FDM DD, AMS DD, DTM, FieldXpert DD</td>
</tr>
</tbody>
</table>
### PROFIBUS DP

<table>
<thead>
<tr>
<th>Manufacturer ID</th>
<th>11&lt;sub&gt;h&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device type</td>
<td>155D&lt;sub&gt;h&lt;/sub&gt; (CM44x), 155C&lt;sub&gt;h&lt;/sub&gt; (CSFxx)</td>
</tr>
<tr>
<td>Profile version</td>
<td>3.02</td>
</tr>
<tr>
<td>GSD files</td>
<td><a href="http://www.products.endress.com/profibus">www.products.endress.com/profibus</a></td>
</tr>
<tr>
<td>Device Integration Manager DIM</td>
<td></td>
</tr>
<tr>
<td>Output variables</td>
<td>16 AI blocks, 8 DI blocks</td>
</tr>
<tr>
<td>Input variables</td>
<td>8 AO blocks, 4 DO blocks</td>
</tr>
</tbody>
</table>

**Supported features**
- 1 MSCY0 connection (cyclical communication, master class 1 to slave)
- 1 MSAC1 connection (acyclical communication, master class 1 to slave)
- 2 MSAC2 connections (acyclical communication, master class 2 to slave)
- Device lock: The device can be locked using the hardware or software.
- Addressing using DIL switches or software
- GSD, PDM DD, DTM

### Modbus RS485

<table>
<thead>
<tr>
<th>Protocol</th>
<th>RTU/ASCII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function codes</td>
<td>03, 04, 06, 08, 16, 23</td>
</tr>
<tr>
<td>Broadcast support for function codes</td>
<td>06, 16, 23</td>
</tr>
<tr>
<td>Output data</td>
<td>16 measured values (value, unit, status), 8 digital values (value, status)</td>
</tr>
<tr>
<td>Input data</td>
<td>4 setpoints (value, unit, status), 4 digital values (value, status), diagnostic information</td>
</tr>
</tbody>
</table>

**Supported features**
- Address can be configured using switch or software

### Modbus TCP

<table>
<thead>
<tr>
<th>TCP port</th>
<th>502</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP connections</td>
<td>3</td>
</tr>
<tr>
<td>Protocol</td>
<td>RTU</td>
</tr>
<tr>
<td>Function codes</td>
<td>03, 04, 06, 08, 16, 23</td>
</tr>
<tr>
<td>Broadcast support for function codes</td>
<td>06, 16, 23</td>
</tr>
<tr>
<td>Output data</td>
<td>16 measured values (value, unit, status), 8 digital values (value, status)</td>
</tr>
<tr>
<td>Input data</td>
<td>4 setpoints (value, unit, status), 6 digital values (value, status), diagnostic information</td>
</tr>
</tbody>
</table>

**Supported features**
- Address can be configured using DHCP or software

### Web server

The web server enables full access to the device configuration, measured values, diagnostic messages, logbooks and service data via standard WiFi/WLAN/LAN/GSM or 3G router with a user-defined IP address.

<table>
<thead>
<tr>
<th>TCP port</th>
<th>80</th>
</tr>
</thead>
</table>

**Supported features**
- Remote-controlled device configuration
- Save/restore device configuration
- Logbook export (file formats: CSV, FDM)
- Access to web server via DTM or Internet Explorer
Power supply

Supply voltage

CM442
Depending on version:
100 to 230 V AC ± 15 %, 50/60 Hz
24 V AC/DC +20/-15 %, 50/60 Hz

CM444 and CM448
100 to 230 V AC ± 15 %, 50/60 Hz

NOTICE
The device does not have a mains switch.
► The customer must provide a protected circuit breaker in the vicinity of the device.
► This must be a switch or a power-circuit breaker and must be labeled as the circuit breaker for the device.
► At the supply point, the power supply for the 24 V versions must be isolated from dangerous live cables by double or reinforced insulation.

Fieldbus connection

CM442
Depending on supply voltage
• 100 to 230 V AC and 24 V AC:
  Max. 55 VA
• 24 V DC:
  Max. 22 W

CM444 and CM448
Max. 73 VA

Fuse

CM442
5x20 mm, 250 V, 4.0 A, slow-blow (T4.0A)

CM444 and CM448
Fuse not exchangeable

Cable entry

<table>
<thead>
<tr>
<th>Identification of the cable entry on housing base</th>
<th>Suitable gland</th>
</tr>
</thead>
<tbody>
<tr>
<td>B, C, H, I, 1-8</td>
<td>M16x1.5 mm/NPT3/8&quot;/G3/8</td>
</tr>
<tr>
<td>A, D, F, G</td>
<td>M20x1.5 mm/NPT1/2&quot;/G1/2</td>
</tr>
<tr>
<td>E</td>
<td>Socket RJ45</td>
</tr>
<tr>
<td>*</td>
<td>M12x1.5 mm</td>
</tr>
</tbody>
</table>

Recommended assignment of cable entries

1-8  Sensors 1-8
A    Energy supply
B    RS485 Out
C    Ethernet 2
D,F,G Current outputs and inputs, relays
H    Ethernet 1
I    RS485 In
E    Do not use
## Cable specification

<table>
<thead>
<tr>
<th>Cable gland</th>
<th>Permitted cable diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16x1.5 mm</td>
<td>4 to 8 mm (0.16 to 0.32&quot;)</td>
</tr>
<tr>
<td>M12x1.5 mm</td>
<td>2 to 5 mm (0.08 to 0.20&quot;)</td>
</tr>
<tr>
<td>M20x1.5 mm</td>
<td>6 to 12 mm (0.24 to 0.48&quot;)</td>
</tr>
<tr>
<td>NPT3/8&quot;</td>
<td>4 to 8 mm (0.16 to 0.32&quot;)</td>
</tr>
<tr>
<td>G3/8</td>
<td>4 to 8 mm (0.16 to 0.32&quot;)</td>
</tr>
<tr>
<td>NPT1/2&quot;</td>
<td>6 to 12 mm (0.24 to 0.48&quot;)</td>
</tr>
<tr>
<td>G1/2</td>
<td>7 to 12 mm (0.28 to 0.48&quot;)</td>
</tr>
</tbody>
</table>

## Electrical connection

### Basic module

1. Power supply for digital fixed cable sensors with Memosens protocol
2. SD card slot
3. Slot for display cable 1)
4. Service interface
5. Connections for 2 Memosens sensors
6. Current outputs
7. Power connection
8. Fuse
9. Alarm relay connection

1) Internal device connection. Do not disconnect the plug!
Connecting supply voltage for CM442

Connecting power supply on the BASE-H or -L

H  Power unit 100 to 230 VAC
L  Power unit 24 VAC or 24 VDC

Overall wiring diagram for BASE-H or -L

Connecting supply voltage for CM444 and CM448

Connecting power supply with BASE-E
A  Internal supply cable
B  Extension power supply unit

Overall wiring diagram for BASE-E and extension power supply unit
Connecting optional modules

With extension modules you can purchase additional functions for your device.

**NOTICE**

Unacceptable hardware combinations (due to conflicts in power supply)

Incorrect measurements or total failure of the measuring point as a result of heat build-up or overloading

► If you are planning to extend your controller, make sure the resulting hardware combination is permitted (Configurator on www.products.endress.com/cm442 or .../cm444 or .../CM448).

► Please note that if you are extending CM442 to CM444 or CM448, you must additionally fit an extension power supply unit and an extension backplane. You must then also use basic module BASE-E.

► Please contact your Endress+Hauser sales center should you have any questions.

<table>
<thead>
<tr>
<th>Module name</th>
<th>AOR</th>
<th>2R</th>
<th>4R</th>
<th>2DS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 x 0/4 to 20 mA analog outputs</td>
<td>2 relays</td>
<td>4 relays</td>
<td>2 digital sensor inputs</td>
<td></td>
</tr>
<tr>
<td>2 relays</td>
<td>Order no. 71125375</td>
<td>Order no. 71125376</td>
<td>2 power supply systems for digital sensors</td>
<td></td>
</tr>
<tr>
<td>Order no. 71111053</td>
<td></td>
<td></td>
<td>Order no. 71135631</td>
<td></td>
</tr>
</tbody>
</table>

- 2 digital sensor inputs
- 2 power supply systems for digital sensors
- Order no. 71135631
PROFIBUS DP (module 485)
Contacts A - A', B - B' and C - C' are bridged in the connector. This ensures that PROFIBUS communication is not interrupted if the connector is disconnected.

Protective ground connection

1. Cable mounting rail
2. Threaded bolt (protective ground connection, central grounding point)
3. Additional threaded bolts for ground connections
4. Cable clamps (fixing and grounding the sensor cables)
Sensor connection

<table>
<thead>
<tr>
<th>Sensor types</th>
<th>Sensor cables</th>
<th>Sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital sensors <em>without</em></td>
<td>CYK10 with plug-in connection and inductive signal transmission</td>
<td>pH sensors, ORP sensors, Combi sensors, Amperometric oxygen sensors, Conductive conductivity sensors, Chlorine sensors</td>
</tr>
<tr>
<td>additional power supply</td>
<td>Fixed cable</td>
<td></td>
</tr>
<tr>
<td>Digital sensors <em>with</em></td>
<td>Fixed cable</td>
<td>Turbidity sensors, Sludge level sensors, Sensors for measuring the spectral absorption coefficient (SAC), Nitrate sensors, Optical oxygen sensors, Ion-sensitive sensors</td>
</tr>
<tr>
<td>additional power supply</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connection methods

1. Sensor cable connected directly to the terminal connector of the sensor module 2DS or of the basic module L, H or E

2. Optional: plug connection of the sensor cable connected to the M12 sensor socket on the underside of the device. With this type of connection, the device is already wired at the factory.

1. Sensor cable connected directly

![Sensor connections diagram](image)
2. Connection via M12 plug-in connection

Device versions with a pre-installed M12 socket are ready-wired upon delivery. Install an M12 socket, which is available as an accessory, in a suitable cable gland opening in the base of the housing, and connect the cables to the Memosens terminals of the sensor or basic module as per the wiring diagram (→ ).

Connecting the sensor

► Connect the sensor cable plug (pos. 1) directly to the M12 socket.

Please note the following for these device versions:
- The internal device wiring is always the same regardless of what kind of sensor you connect to the M12 socket (plug&play).
- The signal and power supply cables are assigned in the sensor plug-in head in such a way that the PK and GY power supply cables are either used (e.g. optical sensors) or not (e.g. pH or ORP sensors).
Performance characteristics

<table>
<thead>
<tr>
<th>Response time</th>
<th>Current outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( t_{90} ) = max. 500 ms for an increase from 0 to 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>( t_{90} ) = max. 330 ms for an increase from 0 to 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 °C (77 °F)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum measured error of sensor inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \rightarrow ) Documentation of the connected sensor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum measured error of current inputs and outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical measured errors:</td>
</tr>
<tr>
<td>&lt; 20 µA (with current values &lt; 4 mA)</td>
</tr>
<tr>
<td>&lt; 50 µA (with current values 4 to 20 mA)</td>
</tr>
<tr>
<td>at 25 °C (77 °F) each</td>
</tr>
<tr>
<td>Additional measured error depending on the temperature:</td>
</tr>
<tr>
<td>&lt; 1.5 µA/K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resolution of current inputs and outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 µA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Repeatability</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \rightarrow ) Documentation of the connected sensor</td>
</tr>
</tbody>
</table>

Installation

Mounting plate

![Mounting plate diagram](image-url)
Weather protection cover

Endress+Hauser 25
Weather protection cover

Installation instructions

You require the post mounting kit (optional) to mount the unit on a pipe, post or railing (square or circular, span range 20 to 61 mm (0.79 to 2.40')).

Post mounting

1 Weather protection cover (optional)
2 Post mounting plate (post mounting kit)
3 Spring washers, nuts (post mounting kit)
4 Pipe clamps (post mounting kit)
5 Spring washers, nuts (post mounting kit)
6 Pipe or railing (circular/square)
7 Mounting plate
8 Threaded rods (post mounting kit)
Rail mounting

Mount the controller in such a way that the wall support surface is at least the size of the rear housing panel.

Wall mounting

Mount the controller in such a way that the wall support surface is at least the size of the rear housing panel.

1) The size of the drill holes depends on the wall plugs used. The wall plugs and screws must be provided by the customer.
## Environment

<table>
<thead>
<tr>
<th>Parameter</th>
<th>CM442</th>
<th>CM444</th>
<th>CM448</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature range</td>
<td>–20 to 60 °C (0 to 140 °F)</td>
<td>–20 to 55 °C (0 to 130 °F)</td>
<td>–20 to 55 °C (0 to 130 °F) in general, with the exception of the packages listed under the 2nd bullet point</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>–20 to 50 °C (0 to 120 °F) for the following packages:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<em><strong>6AA</strong></em>***+...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<em><strong>8A4</strong></em>***+...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<em><strong>8A5</strong></em>***+...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<strong>28A3</strong>****+...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<strong>38A3</strong>****+...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<strong>48A3</strong>****+...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<strong>58A3</strong>****+...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>– CM448-<strong>68A3</strong>****+...</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>–40 to 80 °C (–40 to 175 °F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative humidity</td>
<td>10 to 95%,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>not condensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 66/67, leak-tightness and corrosion resistance in accordance with NEMA TYPE 4X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Environmental tests</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vibration test based on DIN EN 60068-2, October 2008</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vibration test based on DIN EN 60654-3, August 1998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post or pipe mounting</td>
<td>Frequency range</td>
<td>10 to 500 Hz [sinusoidal]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amplitude</td>
<td>10 to 57.5 Hz: 0.15 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>57.5 to 500 Hz: 2 g [1]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test duration</td>
<td>10 frequency cycles/ spatial axis, in 3 spatial axes (1 oct./min)</td>
<td></td>
</tr>
<tr>
<td>Wall mounting</td>
<td>Frequency range</td>
<td>10 to 150 Hz [sinusoidal]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amplitude</td>
<td>10 to 12.9 Hz: 0.75 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.9 to 150 Hz: 0.5 g [1]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test duration</td>
<td>10 frequency cycles/ spatial axis, in 3 spatial axes (1 oct./min)</td>
<td></td>
</tr>
</tbody>
</table>

[1] g ... gravitational acceleration (1 g is approximately 9.81 m/s²)

## Electromagnetic compatibility

Interference emission and interference immunity as per EN 61326-1: 2006, class A for industry

## Pollution degree

The product is suitable for pollution degree 4.

## Pressure compensation to environment

Filter made of GORE-TEX used as pressure compensation element
Ensures pressure compensation to environment and guarantees IP protection.
### Mechanical construction

#### Dimensions

![Dimensions of field housing](image)

#### Weight

Approx. 2.1 kg (4.63 lbs), depending on the version

#### Material

<table>
<thead>
<tr>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower housing section</td>
<td>PC-FR</td>
</tr>
<tr>
<td>Display cover</td>
<td>PC-FR</td>
</tr>
<tr>
<td>Display film and soft keys</td>
<td>PE</td>
</tr>
<tr>
<td>Housing seal</td>
<td>EPDM</td>
</tr>
<tr>
<td>Module side panels</td>
<td>PC-FR</td>
</tr>
<tr>
<td>Module covers</td>
<td>PBT GF30 FR</td>
</tr>
<tr>
<td>Cable mounting rail</td>
<td>PBT GF30 FR, stainless steel 1.4301 (AISI304)</td>
</tr>
<tr>
<td>Clamps</td>
<td>Stainless steel 1.4301 (AISI304)</td>
</tr>
<tr>
<td>Screws</td>
<td>Stainless steel 1.4301 (AISI304)</td>
</tr>
</tbody>
</table>
Operability

Operating concept

The simple and structured operating concept sets new standards:
- Intuitive operation with the navigator and soft keys
- Fast configuration of application-specific measurement options
- Easy configuration and diagnosis thanks to plain-text display
- All languages that can be ordered are available in every device

Local operation

Human interface

Overview of operation

1 Display (with red display background in alarm condition)
2 Navigator (jog/shuttle function)
3 Soft keys (function depends on menu)
Remote operation

Via HART (e.g. using HART modem and FieldCare)

1. Device module Base-L, -H or -E: current output 1 with HART
2. HART modem to connect to PC, e.g. Commubox FXA191 (RS232) or FXA195\(^1\) (USB)
3. HART handheld terminal

Via PROFIBUS DP

PROFIBUS DP

\[ T \quad \text{T erminating resistor} \]

\(^1\) Switch position "on" (replaces resistance)
Via Modbus RS485

Modbus Master / Gateway

- Modbus RS485 (RTU, ASCII)
- FieldCare
- FXA291
- CM442 / CM444 / CM448
- CSF48
- Ethernet
- FieldCare / Webserver

Via Ethernet/Web server/Modbus TCP

- Modbus TCP client
- FieldCare / Webserver
- Modbus TCP and/or Ethernet

Language groups
The language selected in the product structure is the operating language preset at the factory. All other languages can be selected using the menu.

- English (US)
- German
- French
- Spanish
- Italian
- Dutch
- Portuguese
- Polish
- Russian
- Turkish
- Chinese (Simplified, PR China)
- Japanese
- Czech
Ordering information

Product structure
You can create a valid and complete order code using the Endress + Hauser Configurator tool on the Internet. Enter the following addresses in your browser to access the relevant product page:

www.products.endress.com/cm442
www.products.endress.com/cm444
www.products.endress.com/cm448

1. The following options are available on the right-hand side of the page:

<table>
<thead>
<tr>
<th>Product page function</th>
</tr>
</thead>
<tbody>
<tr>
<td>:: Add to product list</td>
</tr>
<tr>
<td>:: Price &amp; order information</td>
</tr>
<tr>
<td>:: Compare this product</td>
</tr>
<tr>
<td>:: Configure this product</td>
</tr>
</tbody>
</table>

2. Select "Configure this product".
3. A new window opens with the Configurator. Using this tool, you can configure your device and you will receive a valid and complete order code for this.
4. Then export the order code as a PDF or as an Excel file selecting from the buttons provided at the top of the page.

Scope of delivery

- 1 controller in the version ordered
- 1 mounting plate
- 1 wiring label (attached at the factory to the inside of the display cover)
- 1 CD with Operating Instructions
- 1 printed copy of the "Commissioning" section of the Operating Instructions in the language ordered

Certificates and approvals

CE mark

Declaration of Conformity
The product meets the requirements of the harmonized European standards. As such, it complies with the legal specifications of the EC directives. The manufacturer confirms successful testing of the product by affixing to it the CE mark.

cCSAus
The product complies with "CLASS 2252 05 - Process Control Equipment" and "CLASS 2252 85 - Process Control Equipment - Certified to US Standards" requirements.

FM/CSA
CM442 only
FM/CSA Cl. 1, Div. 2

MCERTS
Application made for CM442
Accessories

The most important accessories that could be delivered at the time this document went to print are listed below.
For information on accessories that are not listed here, please contact your local service or sales representation.

Weather protection cover
CYY101 weather protection cover for field devices, absolutely essential if operating the unit outdoors
- Material: stainless steel 1.4031 (AISI 304)
- Order No. CYY101-A

Post mounting kit
Post mounting kit CM44x
- For securing the field housing to horizontal and vertical posts and pipes
- Order no. 71096920

Measuring cable
Memosens data cable
CYK10
- For digital sensors with Memosens technology
  - pH, redox, oxygen (amperometric), chlorine, conductivity (conductive)
  - Order as per product structure (→ online Configurator, www.products.endress.com/cyk10)
Memosens data cable
CYK11
- Extension cable for digital sensors with Memosens protocol
  - Order as per product structure (→ online Configurator, www.products.endress.com/cyk11)

Sensors

Glass electrodes
Orbisint CPS11D
- pH sensor with Memosens technology
- Dirt-repellent PTFE diaphragm
  - Order as per product structure (→ online Configurator, www.products.endress.com/cps11d)
  - Technical Information TI028C/07/EN
Ceraliquid CPS41D
- pH sensor with Memosens technology
- Ceramic diaphragm and KCl liquid electrolyte
  - Order as per product structure (→ online Configurator, www.products.endress.com/cps41d)
  - Technical Information TI079C/07/EN
Ceragel CPS71D
- pH sensor with Memosens technology
- Double-chamber reference system and integrated bridge electrolyte
  - Order as per product structure (→ online Configurator, www.products.endress.com/cps71d)
  - Technical Information TI245C/07/EN
Orbipore CPS91D
- pH sensor with Memosens technology
- Open aperture diaphragm for media with a high dirt load
  - Order as per product structure (→ online Configurator, www.products.endress.com/cps91d)
  - Technical Information TI375C/07/EN
Orbipac CPF81D
- Compact pH sensor for installation or immersion operation in process water and wastewater
  - Order as per product structure (→ online Configurator, www.products.endress.com/cpf81d)
  - Technical Information TI191C/07/EN

Pfaudler electrodes
Ceramax CPS341D
- pH electrode with pH-sensitive enamel
  - Meets highest demands of measuring accuracy, pressure, temperature, sterility and durability
  - Order as per product structure (→ online Configurator, www.products.endress.com/cps341d)
  - Technical Information TI480C/07/EN
**ORP sensors**

Orbisint CPS12D
- ORP sensor with Memosens technology
- Dirt-repellent PTFE diaphragm;
- Order as per product structure (→ online Configurator, www.products.endress.com/cps12d)
- Technical Information TI367C/07/EN

Ceraliquid CPS42D
- ORP sensor with Memosens technology
- Ceramic diaphragm and KCl liquid electrolyte
- Order as per product structure (→ online Configurator, www.products.endress.com/cps42d)
- Technical Information TI373C/07/EN

Ceragel CPS72D
- ORP sensor with Memosens technology
- Double-chamber reference system and integrated bridge electrolyte;
- Order as per product structure (→ online Configurator, www.products.endress.com/cps72d)
- Technical Information TI374C/07/EN

Orbipac CPF82D
- Compact ORP sensor for installation or immersion operation in process water and wastewater
- Order as per product structure (→ online Configurator, www.products.endress.com/cpf82d)
- Technical Information TI191C/07/EN

Orbipore CPS92D
- ORP sensor with Memosens technology
- Open aperture diaphragm for media with a high dirt load
- Order as per product structure (→ online Configurator, www.products.endress.com/cps92d)
- Technical Information TI435C/07/EN

**pH ISFET sensors**

Tophit CPS471D
- Sterilizable and autoclavable ISFET sensor with Memosens technology
- For the food and pharmaceutical industries, process engineering, water treatment and biotechnology
- Order as per product structure (→ online Configurator, www.products.endress.com/cps471d)
- Technical Information TI283C/07/EN

Tophit CPS441D
- Sterilizable ISFET sensor with Memosens technology
- For media with low conductivity, with liquid KCl electrolyte
- Order as per product structure (→ online Configurator, www.products.endress.com/cps441d)
- Technical Information TI352C/07/EN

Tophit CPS491D
- ISFET sensor with Memosens technology
- Open aperture diaphragm for media with high dirt load
- Order as per product structure (→ online Configurator, www.products.endress.com/cps491d)
- Technical Information TI377C/07/EN

**Inductive conductivity sensors**

Indumax CLS50D
- High-stability inductive conductivity sensor for standard, Ex and high-temperature applications
- Memosens protocol
- Order as per product structure (→ online Configurator, www.products.endress.com/cls50d)
- Technical Information TI182C/07/EN

**Conductive conductivity sensors**

Condumax CLS15D
- Conductive conductivity sensor for measurement in pure and ultrapure water and in Ex applications
- Order as per product structure (→ online Configurator, www.products.endress.com/cls15d)
- Technical Information TI109C/07/EN
Liquiline CM442/CM444/CM448

Condumax CLS16D
- Hygienic conductivity sensor for measurement in pure and ultrapure water and in Ex applications
- With EHEDG and 3A certificates
- Order as per product structure (→ online Configurator, www.products.endress.com/cls16d)
- Technical Information TI227C/07/EN

Condumax CLS21D
- Two-electrode sensor in fixed cable and plug-in head version
- Order as per product structure (→ online Configurator, www.products.endress.com/cls21d)
- Technical Information TI085C/07/EN

Oxygen sensors
Oxymax COS51D
- Amperometric sensor for dissolved oxygen, with Memosens technology
- Order as per product structure (→ online Configurator, www.products.endress.com/cos51d)
- Technical Information TI413C/07/EN

Oxymax COS61D
- Optical oxygen sensor for drinking water and industrial water measurement
- Measuring principle: quenching
- Memosens protocol
- Material: stainless steel 1.4571 (AISI 316Ti)
- Order as per product structure (→ online Configurator, www.products.endress.com/cos61d)
- Technical Information TI387C/07/EN

Oxymax COS22D
- Sterilizable sensor for dissolved oxygen
- Order as per product structure (→ online Configurator, www.products.endress.com/cos22d)
- Technical Information TI446C/07/EN

Chlorine sensors
CCS142D
- Membrane-covered amperometric sensor for free chlorine
- Memosens technology
- Measuring range 0.01 to 20 mg/l
- Order as per product structure (→ online Configurator, www.products.endress.com/ccs142d)
- Technical Information TI419C/07/EN

Ion selective sensors
ISEmax CAS40D
- Ion selective sensors
- Order as per product structure (→ online Configurator, www.products.endress.com/cas40d)
- Technical Information TI491C/07/EN

Turbidity sensors
Turbimax CUS51D
- For nephelometric measurements of turbidity and solids in wastewater
- 4-beam scattered light method
- With Memosens protocol
- Order as per product structure (→ online Configurator, www.products.endress.com/cus51d)
- Technical Information TI461C/07/EN

SAC and nitrate sensors
Viomax CAS51D
- SAC and nitrate measurement in drinking water and wastewater
- With Memosens protocol
- Order as per product structure (→ online Configurator, www.products.endress.com/cas51d)
- Technical Information TI459C/07/EN
**Interface measurement**

Turbimax CUS71D
- Immersion sensor for interface measurement
- Ultrasonic interface sensor
- Order as per product structure (→ online Configurator, www.products.endress.com/cus71d)
- Technical Information TI490C/07/EN

**Additional functionality**

**Hardware extension modules**

Kit CM442/CM444/CM448/CSF48: extension module AOR
- 2 x relay, 2 x 0/4 to 20 mA analog output
- Order no. 71111053

Kit CM442/CM444/CM448/CSF48: extension module 2R
- 2 x relay
- Order no. 71125375

Kit CM442/CM444/CM448/CSF48: extension module 4R
- 4 x relay
- Order no. 71125376

Kit CM442/CM444/CM448/CSF48: extension module 2AO
- 2 x 0/4 to 20 mA analog output
- Order no. 71135632

Kit CM444/CM448/CSF48: extension module 4AO
- 4 x analog output 0/4 to 20 mA
- Order no. 71135633

Kit CM444/CM448/CSF48: extension module 2DS
- 2 x digital sensor, Memosens
- Order no. 71135631

Kit CM442/CM444/CM448/CSF48: extension module 2AI
- 2 x 0/4 to 20 mA analog input
- Order no. 71135639

Kit CM442/CM444/CM448/CSF48: extension module 485
- Ethernet configuration
- Can be extended to PROFINET DP or Modbus RS485 or Modbus TCP using activation code
- Order no. 71135634

Upgrade kit CM442/CM444/CM448/CSF48
- Extension module 485
- PROFIBUS DP (+ Ethernet configuration)
- Order no. 71140888

Upgrade kit CM442/CM444/CM448/CSF48
- Extension module 485
- Modbus RS485 (+ Ethernet configuration)
- Order no. 71140889

Upgrade kit CM442/CM444/CM448/CSF48
- Extension module 485
- Modbus TCP (+ Ethernet configuration)
- Order no. 71140890

Kit CM442: upgrade kit to CM444/CM448
- Extension power supply unit and backplane
- Basic module BASE-E
- Order no. 71135644
Software and activation codes
SD card with Liquiline firmware
- Industrial Flash Drive, 1 GB
- Order no. 71127100
Activation code for digital HART communication
- Order no. 71128428
Activation code for PROFIBUS DP
- Order no. 71135635
Activation code for Modbus RS485
- Order no. 71135636
Activation code for Modbus TCP
- Order no. 71135637
Kit CM442: activation code for 2nd digital sensor input
- Order no. 71114663
Kit CM444/CM448: upgrade code for 2 x 0/4 to 20 mA for BASE-E
- Order no. 71140891

Other accessories
SD card
SD card
- Industrial Flash Drive, 1 GB
- Order no. 71110815

Cable glands
Kit CM44x: gland M
- Set, 6 pieces
- Order no. 71101768
Kit CM44x: gland NPT
- Set, 6 pieces
- Order no. 71101770
Kit CM44x: gland G
- Set, 6 pieces
- Order no. 71101771
Kit CM44x: dummy plug for cable gland
- Set, 6 pieces
- Order no. 71104942

M12 socket and cable junction
Kit CM42/CM442/CM444/CM448: external CDI socket
- Socket with terminated connecting cables and counter nut
- Order no. 51517507
Kit CM442/CM444/CM448/CSF48: M12 socket for digital sensors
- Pre-terminated
- Order no. 71107456
Kit CM442/CM444/CM448/CSF48: M12 socket for PROFIBUS DP/Modbus RS485
- B-coded, pre-terminated
- Order no. 71140892
Kit CM442/CM444/CM448/CSF48: M12 socket for Ethernet
- D-coded, pre-terminated
- Order no. 71140893
Kit CM442/CM444/CM448/CSF48: RJ45 socket for Ethernet
- Pre-terminated
- Order no. 71140895
Cable junction with Velcro strip
- 4 pieces, for sensor cable
- Order no. 71092051