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

Technical Information

# Liquiline CM14

## 4-wire-controller based on digital Memosens technology for pH/ORP, conductivity and oxygen




### Application

Liquiline CM14 is a 4-wire-controller in compact design for installation in panels or cabinets.

### Application

- Wastewater treatment
- Water treatment and drinking water monitoring
- Ion exchanger
- Surface water monitoring

### Your benefits

- Compact instrument in 48 x 96 mm panel mounted housing
- Easy to operate
- Memosens technology
  - Use of precalibrated sensors
  - Safety thanks to active detection of cable break
- Two contacts for limit contactor
- Second current output for temperature

TI494C/07/EN/01.11
71132861

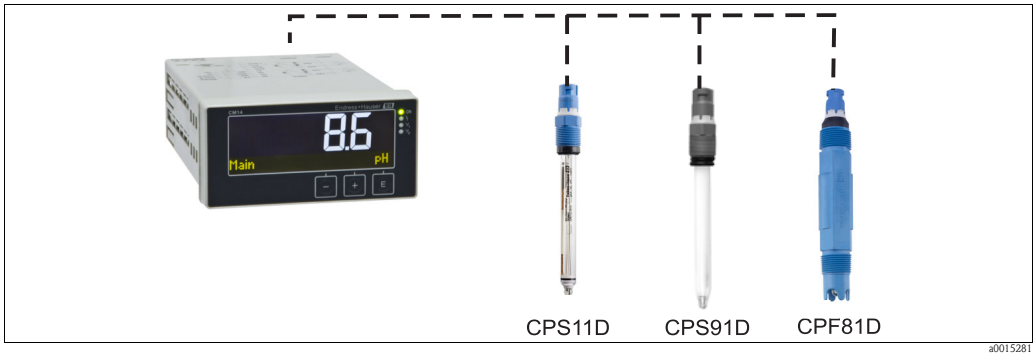
Endress+Hauser
People for Process Automation

# 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 galvanic 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

**pH/ORP measurement**




*pH/ORP measurement with Liquiline CM14*

### Functions of the basic version

Mesaurement of pH and ORP value with glas elctrodes.
This is selected via the menu. The temperature is displayed alternatingly.

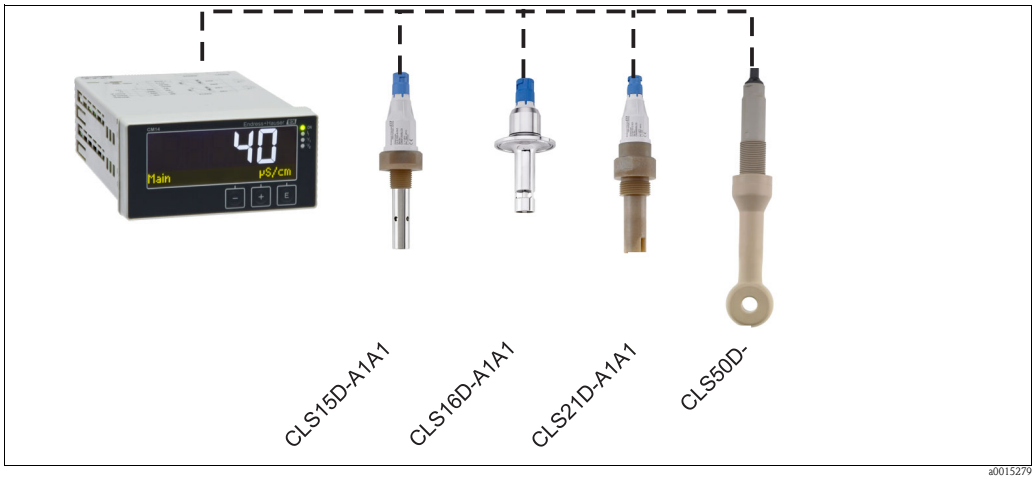
### Process Check System (PCS)

The live check issues an alarm when the sensor signal does not change over a defined period of time. This may be caused by blocking, passivation, separation from the process, etc.

## Conductivity measurement

### Conductive or inductive

Two versions are available for the measurement with conductive (two electrode) sensors or inductive sensors. An inductive sensor is recommended for the measurement of high conductivities, for concentration measurement or adhering media.




a0015279

The measuring range of a measuring point is determined by the connected digital Memosens sensor.

| Sensor | Cell constant | Measuring range |
|---|---|---|
| **CLS15D**-A1A1 | k = 0.01 1/cm | 0.05 µS/cm to 20 µS/cm |
| **CLS15D**-B1A1 | k = 0.1 1/cm | 0.1 µS/cm to 200 µS/cm |
| **CLS16D**-3C1P1 | k = 0.1 1/cm | 0.04 µS/cm to 500 µS/cm |
| **CLS21D**-C1E1 | k = 1.0 1/cm | 10 µS/cm to 20 mS/cm |
| **CLS50D**-AA1B11 | k = 1.98 1/cm | 0.1 mS/cm to 2000 mS/cm |

### Measurement of conductivity or resistivity (conductive)

This is selected via the menu.

### Temperature compensation

The following temperature compensation selections are available:
- Linear
- NaCl curve according to IEC 746
- Ultrapure water NaCl (neutral compensation)
- Ultrapure water HCl (acid compensation, also ammonia)

### Ultrapure water monitoring acc. to USP (United States Pharmacopeia) and EP (European Pharmacopoeia)

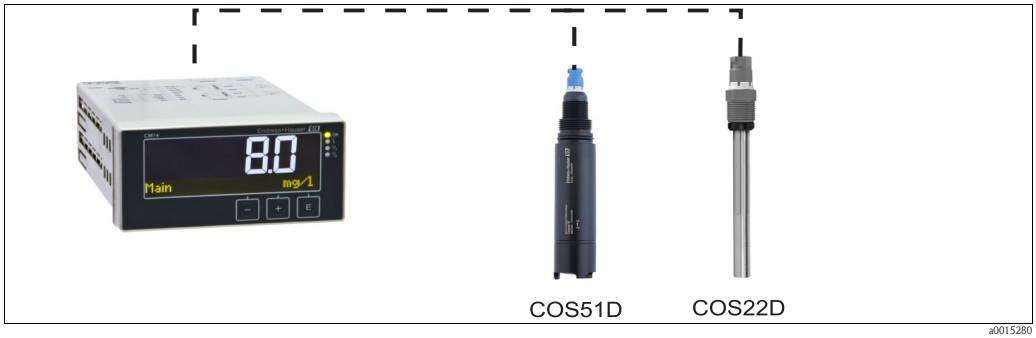
Ultrapure water monitoring according to USP <645> and EP means that the uncompensated conductivity value and the temperature are measured and the results are compared by a table.

The controller comes with the following functions:
- Monitoring of "Water for Injection" (WFI) according to USP and EP
- Monitoring of "Purified Water" (PW) according to EP

## Oxygen measurement

**Measurement of the oxygen content und setting of the sea level**

The oxygen content is displayed in mg/l. The setting of the sea level is performed in m or ft.
This is selected via the menu. The temperature is displayed alternatingly.

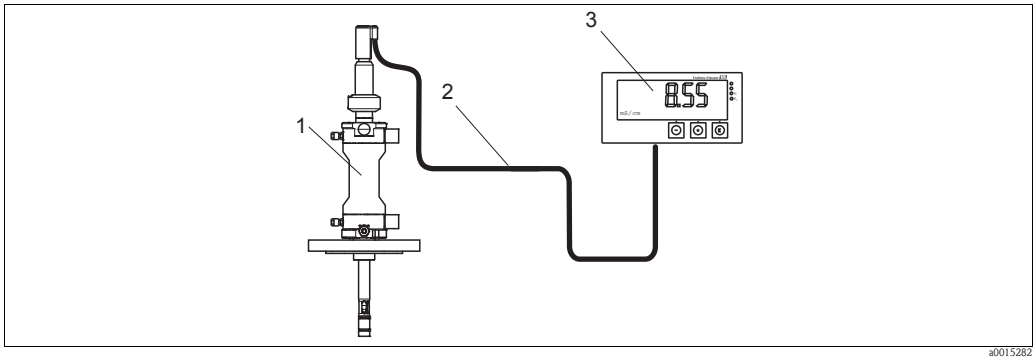



*Oxygen measurement with Liquiline CM14*

| Sensor | Measuring range |
|---|---|
| COS51D | 0.01 to 100 mg/l |
| COS22D-*1 | 0.01 to 60 mg/l |

## Measuring system

A complete measuring system comprises:
- The controller Liquiline CM14
- An assembly with sensor
- A measuring cable




*Example of measuring system with Liquiline CM14*

*1 Assembly with sensor*
*2 Measuring cable*
*3 Controller Liquiline CM14*

# Input

| | |
|---|---|
| **Measuring variables** | —> Documentation of the connected sensor |
| **Measuring range** | —> Documentation of the connected sensor |
| **Input types** | Digital sensor inputs |
| **Cable specification** | **Cable type**<br>Memosens data cable CYK10 or sensor fixed cable, each with cable end sleeves<br>**Cable length**<br>Max. 100 m (330 ft) |

# Output

| | |
|---|---|
| **Output signal** | 2 x 0/4 to 20 mA active, potentially isolated from one another and from the sensor circuit |
| **Load** | Max. 500 Ω |
| **Linearisation/transmission bevaviour** | linear |
| **Alarm output** | The alarm output is designed as "open collector".<br>Current max. 200 mA<br>Voltage max. 30 V DC |

# Current output, active

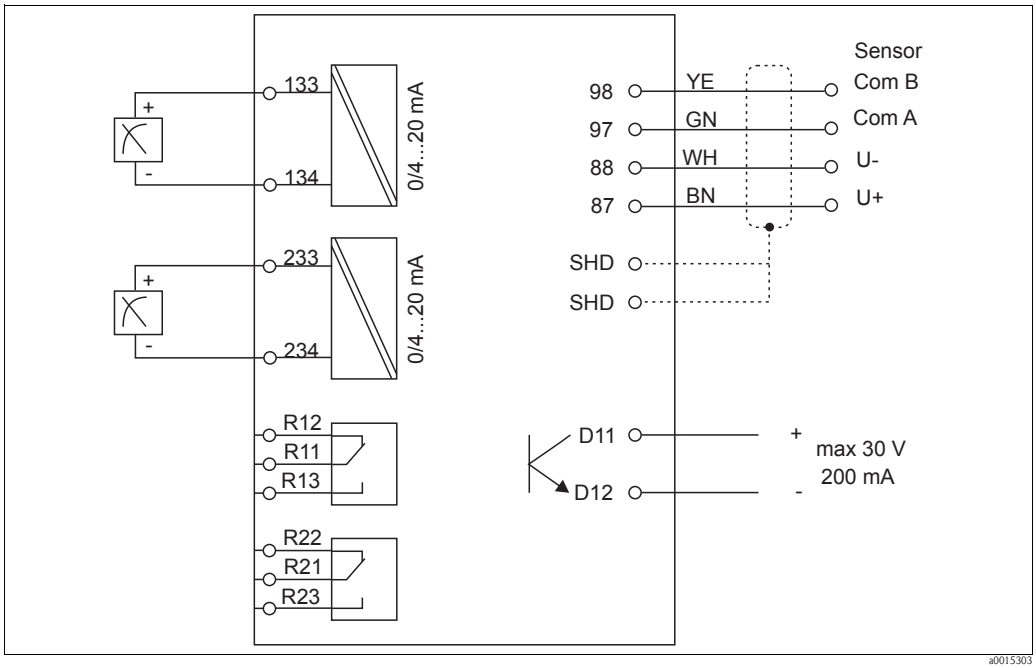
| | |
|---|---|
| **Span** | 0 to 23 mA |
| **Signal characteriziation** | linear |
| **Electrical specification** | **Output voltage**<br>Max. 24 V |
| **Cable specification** | **Cable type**<br>Recommended: shielded cable<br>**Cross section**<br>max. 1.5 $mm^2$ (16 AWG) |

# Relay output

| | |
|---|---|
| **Relay type** | 2 changeover contacts |
| **Switching current** | max. 3 A @ 24 V DC<br>max. 3 A @ 253 V AC<br>min. 100 mW (5 V / 10 mA) |
| **Cable specification** | **Cross section**<br>Max. 2.5 $mm^2$ (14 AWG) |

# Power supply

**Electrical connection**




*Electrical connection of controller*

| Terminal | Description |
|---|---|
| 87 | Connection Memosens cable, brown, sensor power U+ |
| 88 | Connection Memosens cable, white, sensor power U- |
| 97 | Connection Memosens cable, green, Com A |
| 98 | Connection Memosens cable, yellow, Com B |
| SHD | Connection Memosens cable, shield |
| D11 | Connection alarm output, + |
| D12 | Connection alarm output, - |
| L/+ | Connection controller power |
| N/- | |
| ⏚PE | |
| 133 | Connection analog output 1, + |
| 134 | Connection analog output 1, - |
| 233 | Connection analog output 2, + |
| 234 | Connection analog output 2, - |
| R11, R12, R13 | Connection relay 1 |
| R21, R22, R23 | Connection relay 2 |

**Power supply**

Wide range power supply 24 V to 230 V AC/DC (-20 % / +10 %) 50/60 Hz

**Note!**
The controller has no power switch
- A clearly marked mains disconnecting device must be installed in the vicinity of the instrument.
- Protect the controller by an appropriate fuse.

**Power consumption**

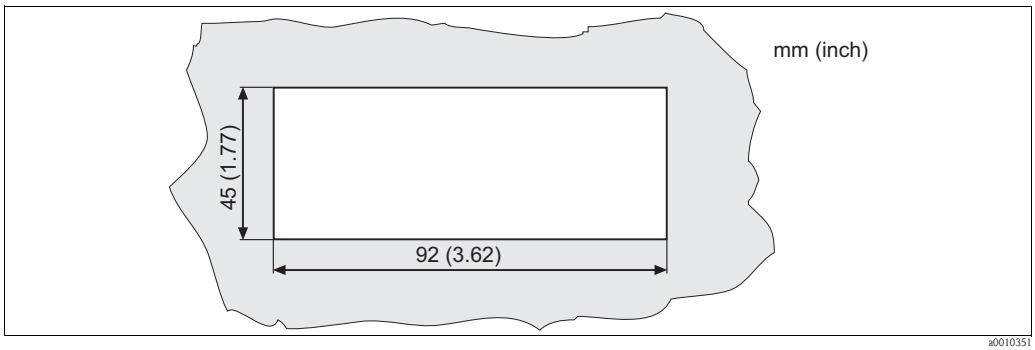
Max. 13.8 VA / 6.6 W

# Performance characteristics

| | |
|---|---|
| **Response time** | **Current output**<br>$t_{90}$ = max. 500 ms for an increase from 4 to 20 mA |
| **Reference temperature** | 25 °C (77 °F) |
| **Measuring error, input** | —> Documentation of the connected sensor |
| **Resolution current output** | > 13 bit |
| **Repeatability** | —> Documentation of the connected sensor |

# Installation conditions

| | |
|---|---|
| **Installation instructions** | **Mounting location**<br>Panel, cutout 92 x 45 mm (3.62 x 1.77 ")<br>Max. panel thickness 26 mm (1")<br>**Mounting orientation**<br>The mounting orientation is determined by the display readability<br>Max. angle of view +/- 45° of the display center axis in each direction. |



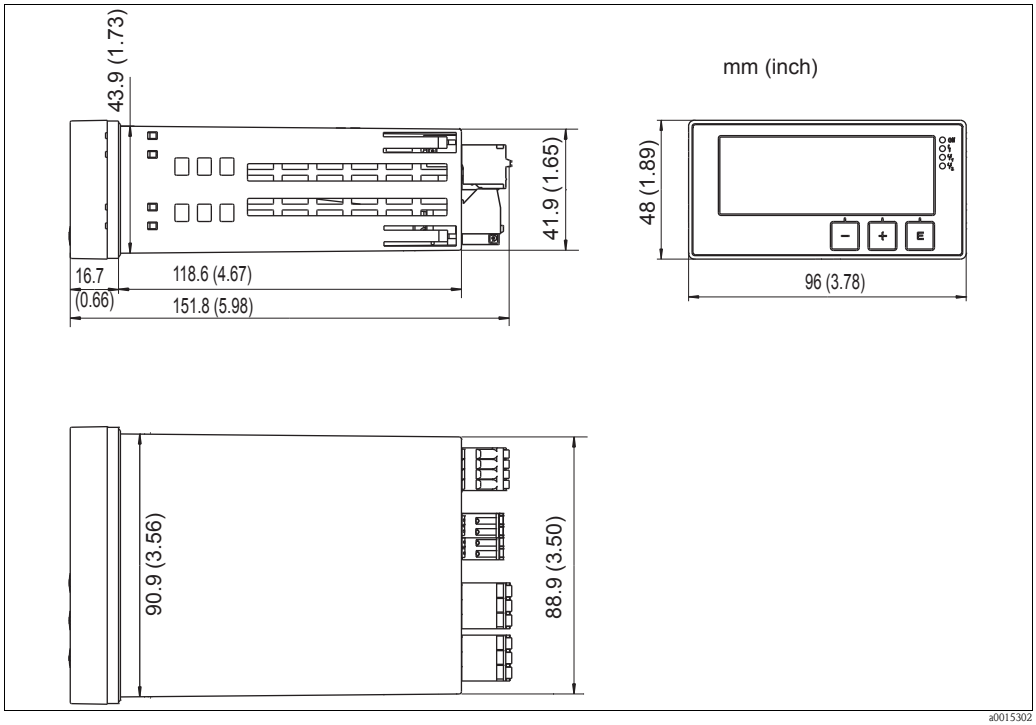

*Panel cutout*

# Environment

| | |
|---|---|
| **Ambient temperature range** | –10 to +60 °C (14 to 140 °F) |
| **Storage temperature range** | –40 to +85 °C (-40 to 185 °F) |
| **Altitude** | <2000 m (6561 ft) above sea level |
| **Electromagnetic compatibility** | Interference emission and interference immunity as per EN 61326-1:2006, class A for industrial use |
| **Ingress protection** | **Front**<br>IP65 / NEMA 4X<br>**Body**<br>Protection against contact IP20 |
| **Relative humidity** | 5 to 85 %, non-condensing |

# Mechanical construction

**Dimensions**

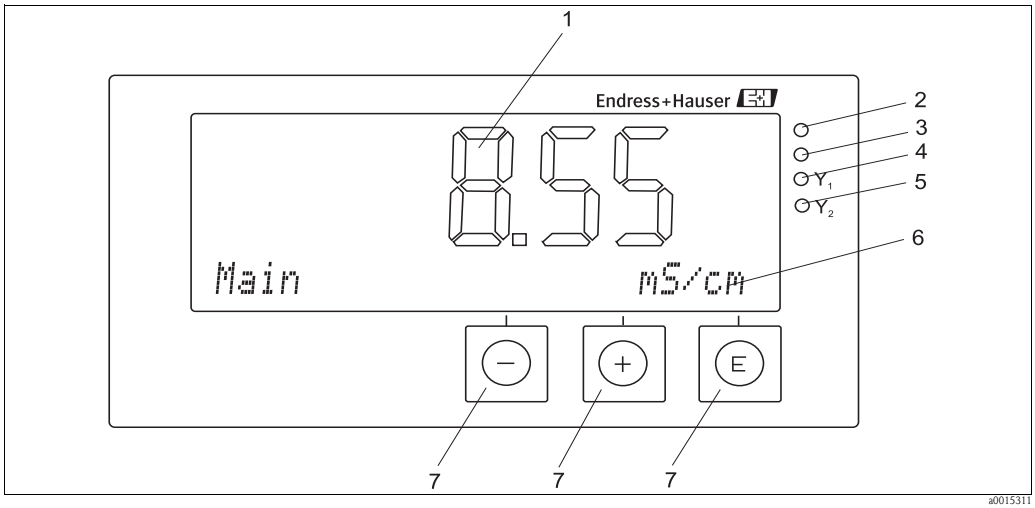



*Dimensions*

| | | |
|---|---|---|
| **Weight** | 0.3 kg (0.66 lbs) | |
| **Materials** | Housing, body: | Polycarbonate |
| | Front membrane: | Polyester, UV resistant |
| **Terminals** | max. 2.5 $mm^2$ (22-14 AWG; torque: 0.4 Nm (3.5 lb in)) | Mains, relays |

# Operability

**Operating elements**




*Display and operating elements*

*1 LC display for measuring values and configuration data*
*2 Status LED power connected*
*3 Status LED alarm function*
*4 Status LED limit contactor relay 1*
*5 Status LED limit contactor relay 2*
*6 Dot matrix display for measuring units and menu positions*
*7 Operating keys*

# Certificates and approvals

**CE mark**

**Declaration of conformity**
The product meets the requirements of the harmonized European standards. It thus complies with the legal requirements of the EC directives.
The manufacturer confirms successful testing of the product by affixing the CE symbol.

# Ordering information

## Product structure

| | Approval | |
|---|---|---|
| | AA | Non-hazardous area |
| | CA | CSA C/US general purpose |

| | | Sensor input | |
|---|---|---|---|
| | | K | Digital, Memosens conductivity conductive |
| | | L | Digital, Memosens conductivity inductive |
| | | M | Digital, Memosens pH, ORP (glass) |
| | | O | Digital, Memosens oxygen amperom. |

| CM14- | | | order code |
|---|---|---|---|

| | Service |
|---|---|
| HC | PWIS free, PWIS = paint- wetting impairment substances |

| | Additional approval |
|---|---|
| LU | UL listed |

| | Marking |
|---|---|
| Z1 | Tagging (TAG), see additional spec. |

**Note!**
To complete your order code, simply add the optional features to the end of order code. If you have any questions, please contact your local sales office.

## Scope of delivery

The scope of delivery comprises:
- Controller CM14 in ordered version
- Installation kit
- Operating instructions

# Accessories

**Measuring cable**

CYK10 Memosens data cable
- For digital sensors with Memosens technology
- Ordering according to product structure, see Technical Information (TI376C/07/en)

**Sensors**

**Glass electrodes pH measurement**

Orbisint CPS11D
- pH electrode for process applications with Memosens technology
- Dirt-repellent PTFE diaphragm
- Ordering acc. to product structure, see Technical Information (TI028C/07/en)

Orbipore CPS91D
- pH sensor with Memosens technology
- With open aperture for media with high dirt load
- Ordering acc. to product structure, see Technical Information (TI375C/07/en)

Orbipac CPF81D
- Compact pH sensor for installation or immersion operation in process water and wastewater
- Ordering acc. to product structure, see Technical Information (TI191C/07/en)

**ORP sensors**

Orbisint CPS12D
- ORP sensor with Memosens technology
- Dirt-repellent PTFE diaphragm
- Ordering acc. to product structure, see Technical Information (TI367C/07/en)

Orbipore CPS92D
- ORP sensor with Memosens technology
- With open aperture for media with high dirt load
- Ordering acc. to product structure, see Technical Information (TI435C/07/en)

Orbipac CPF82D
- Compact ORP sensor for installation or immersion operation in process water and wastewater
- Ordering acc. to product structure, see Technical Information (TI191C/07/en)

**Conductivity sensors, conductive**

Condumax W CLS15D
- For measurement in pure and ultrapure water and in Ex applications
- Ordering according to product structure, see Technical Information TI109C/07/en

Condumax H CLS16D
- Hygienic sensor for measurement in pure and ultrapure water and in Ex applications
- With EHEDG and 3A certificates
- Ordering according to product structure, see Technical Information TI227C/07/en

Condumax W CLS21D
- Two-electrode sensor in fixed cable and plug-in head version
- Ordering according to product structure, see Technical Information TI085C/07/en

**Conductivity sensors, inductive**

Indumax CLS50D
- High-stability inductive conductivity sensor for standard, Ex and high-temperature applications
- Memosens technology
- Order as per product structure, see Technical Information TI182C/07/en

**Oxygen sensors**

Oxymax COS51D
- Amperometric sensor for dissolved oxygen, with Memosens technology
- Ordering acc. to product structure, see Technical Information (TI413C/07/en)

Oxymax H COS22D
- Sterilizable sensor for dissolved oxygen, with Memosens technology
- Ordering acc. to product structure, see Technical Information (TI446C/07/en)

**Instruments International**

Endress+Hauser
Instruments International AG
Kaegenstrasse 2
4153 Reinach
Switzerland

Tel.+41 61 715 81 00
Fax+41 61 715 25 00
www.endress.com
info@ii.endress.com

Endress+Hauser

People for Process Automation

TI494C/07/EN/01.11
71132861
Printed in Germany / FM+SGML 6.0 / DT