Technical Information

Smartec S CLD132

Measuring system with inductive sensor for conductivity and concentration measurement in the food industry

Application
- Product monitoring in breweries, dairies and the beverage industry
- CIP system control
- Phase separation of product/water and product/product mixtures in pipe systems
- Alkali and acid concentration control in remaking
- Monitoring and control of bottle cleaning systems

Your benefits
- Transmitter housing made of stainless steel
- Sensor made of highly resistant plastic (PEEK)
- Sterilizable sensor
- High measuring reliability due to extensive self-monitoring functions
- Insensitive to polarisation and soiling
- Versions with ultrafast temperature response ($t_{90} < 5\, \text{s}$) available
- Sensor versions for all process connections used in hygienic applications
- Various operating possibilities:
  - Keys
  - HART® hand-held terminal
  - PROFIBUS PA/DP
  - PC with Commuwin II software
- Large two-line display allows simultaneous display of measured value and temperature
- Standard version extendable by function extension with remote parameter set switching (measuring range switching)
Function and system design

Measuring principle

Inductive conductivity measurement

A generator (1) generates an alternating magnetic field in the primary coil (2) which induces a current in the medium (3). The strength of the induced current depends on the conductivity and thus the ion concentration of the medium. The current flow in the medium generates another magnetic field in the secondary coil (4). The resulting current induced in the coil is measured by the receiver (5) and processed to determine the conductivity.

Inductive conductivity measurement

1  Generator
2  Primary coil
3  Current flow in the medium
4  Secondary coil
5  Receiver

Benefits of inductive conductivity measurement

- No electrodes, therefore no polarization
- Accurate measurement in media or solutions with a high soiling degree and a tendency to deposition
- Complete galvanic separation of measurement and medium

Important properties of Smartec S CLD132

- **Hygiene**
  The sensor, injection-moulded from highly chemically, mechanically and thermally resistant PEEK (polyether ether keton), does not have joints or crevices and is therefore hygienically safe.

- **Temperature measurement**
  - For applications requiring quick temperature measurement (e.g. CIP return, phase separation at various temperatures), the Pt 100 temperature sensor is installed in a stainless-steel thermal conductivity socket that is sealed by a Chemraz O-ring. This ensures extremely fast temperature response times (t90 < 5 s).
  - For high-load applications, particularly for alternating thermal load due to very frequent sterilisation cycles or temperature shocks, the Pt 100 temperature sensor is embedded in the PEEK sensor body thus eliminating the need for a seal. This ensures a long service life.
  This sensor version can also be applied at underpressure.

- **Temperature compensation**
  Smartec S CLD132 offers the following types of temperature compensation:
  - Linear compensation with freely selectable temperature coefficient α
  - Compensation according to IEC 746-3 for NaCl
  - Compensation with freely programmable coefficient table with 10 elements maximum

- **Process temperature**
  The use of special components and materials makes the sensor suitable for continuous exposure to temperatures of +125°C (257°F). Short-time (max. 30 min.), it will work at +140°C (284°F) for sterilization.

- **Concentration measurement**
  The transmitter can be switched from conductivity operating mode to concentration operating mode. The concentration operating mode provides one freely programmable as well as various predefined concentration curves, especially for common CIP solutions. This enables a direct display of the concentration in %.

- **Remote parameter set switching**
  Smartec S CLD132 can be ordered with remote parameter set switching (measuring range switching, MRS) enabling you:
  - to cover a wide measuring range
  - to adjust temperature compensation when changing the product
  - to switch between concentration curves.
**Measuring system**

A complete measuring system comprises:
- the Smartec S CLD132 transmitter
- the CLS52 conductivity sensor with integrated temperature sensor and fixed cable
- the CLD132 compact version with integrated CLS52 conductivity sensor

Optional for the separate version: CLK5 extension cable, VBM junction box, mounting kit for pipe mounting

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**Input**

**Measured variables**
- Conductivity
- Concentration
- Temperature

**Measuring range**
- Conductivity: recommended range: 100 μS/cm ... 2000 mS/cm (uncompensated)
- Concentration:
  - NaOH: 0 ... 15 %
  - HNO₃: 0 ... 25 %
  - H₂SO₄: 0 ... 30 %
  - H₃PO₄: 0 ... 15 %
- User 1 (... 4): (4 tables available in versions with remote parameter set switching)
- Temperature: -35 to +250 °C [-31 to +482 °F]

**Sensor cable**
- max. cable length 55 m / 180 ft with CLK5 cable (separate version)

**Binary inputs 1 and 2**
- Voltage: 10 to 50 V DC
- Current consumption: max. 10 mA at 50 V
## Output

### Output signal
- **Conductivity:** 0 / 4 to 20 mA, galvanically isolated
- **Temperature:** (optional second current output)

### Signal on alarm
- 2.4 mA or 22 mA error current

### Load
- max. 500 Ω

### Output range
- **Conductivity:** adjustable
- **Temperature:** adjustable

### Signal resolution
- max. 700 digits/mA

### Separation voltage
- max. 350 VRMS / 500 V DC

### Minimum distance of output signal
- **Conductivity:**
  - Measured value 0 ... 19.99 μS/cm: 2 μS/cm
  - Measured value 20 ... 199 μS/cm: 20 μS/cm
  - Measured value 200 ... 1999 μS/cm: 200 μS/cm
  - Measured value 0 ... 19.99 mS/cm: 2 mS/cm
  - Measured value 20 ... 200 mS/cm: 20 mS/cm
  - Measured value 200 ... 2000 mS/cm: 200 mS/cm
- **Concentration:** no minimum distance
- **Temperature:** 15°C (59°F)

### Overvoltage protection
- acc. to EN 61000-4-5:1995

### Auxiliary voltage output
- **Output voltage:** 15 V ± 0.6 V
- **Output current:** max. 10 mA

### Contact outputs
- **Switching current with ohmic load (cos φ = 1):** max. 2 A
- **Switching current with inductive load (cos φ = 0.4):** max. 2 A
- **Switching voltage:** max. 250 V AC, 30 V DC
- **Switching power with ohmic load (cos φ = 1):** max. 500 VA AC, 60 W DC
- **Switching power with inductive load (cos φ = 0.4):** max. 500 VA AC

### Limit contactor
- **Pickup / dropout delay:** 0 to 2000 s
- (versions with remote parameter set switching only)

### Alarm
- **Function (switchable):** steady / fleeting contact
- **Alarm delay:** 0 to 2000 s (min)
Power supply

Electrical connection

- **A**: Signal output 1 conductivity
- **B**: Signal output 2 temperature
- **C**: Auxiliary power output
- **D**: Binary input 2 (MRS 1+2)
- **E**: Binary input 1 (hold / MRS 3+4)
- **F**: Conductivity sensor
- **G**: Temperature sensor
- **H**: Alarm (contact position: no current)
- **I**: Power supply
- **MRS**: Remote parameter set switching (measuring range switching)

Sensor connection

The conductivity sensor of the separate version is connected using the shielded multi-core fixed cable. Use the junction box VBM and the CLK5 extension cable (see Accessories) to extend the cable length.
Supply voltage
Depending on ordered version:
100 / 115 / 230 V AC +10 / -15 %, 48 to 62 Hz
24 V AC/DC +20 / -15 %

Cable entries

<table>
<thead>
<tr>
<th>Terminal assignments of cable glands on Smartec S CLD132</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Separate version</td>
</tr>
<tr>
<td>B Compact version</td>
</tr>
<tr>
<td>1 Plug, analog output, binary input</td>
</tr>
<tr>
<td>2 Cable gland for alarm contact</td>
</tr>
<tr>
<td>3 Cable gland for power supply</td>
</tr>
<tr>
<td>4 Housing ground</td>
</tr>
<tr>
<td>5 Pressure comp. element PCE (Goretex® filter)</td>
</tr>
<tr>
<td>6 Cable gland for sensor connection, Pg 9</td>
</tr>
</tbody>
</table>

Power consumption
max. 7.5 VA

Mains fuse
Fine-wire fuse, medium time lag, 250 V / 3.15 A

Performance characteristics

Measured value resolution
Temperature: 0.1°C (0.18°F)

Temperature response time
\[ t_{90} < 5 \text{ s} \]
\[ t_{90} < 3.5 \text{ min} \]
versions with stainless steel socket (CLD132-********1/2)
versions with encapsulated Pt 100 (CLD132-********6/7)

Measured error of the sensor
\[ \text{Conductivity:} \]
\[ -5 \text{ to } +100 \degree C (23 \text{ to } 212 \degree F) \]
\[ -10 \mu S/cm + 0.5 \% \text{ of measured value} \]
\[ -100 \degree C (> 212\degree F) \]
\[ +30 \mu S/cm + 0.5 \% \text{ of measured value} \]
Temperature: Pt 100 class A acc. to IEC 751

Measured error of the transmitter
\[ \text{Conductivity:} \]
\[ \text{Display:} \]
\[ \text{Conductivity signal output:} \]
\[ \text{max. 0.5 \% of measured value} \pm 4 \text{ digits} \]
\[ \text{max. 0.75 \% of current output range} \]
\[ \text{Temperature} \]
\[ \text{Display:} \]
\[ \text{Temperature signal output:} \]
\[ \text{max. 0.6 \% of measuring range} \]
\[ \text{max. 0.75 \% of current output range} \]

Repeatability
\[ \text{Conductivity:} \]
\[ \text{max. 0.2 \% of measured value} \pm 2 \text{ digits} \]

a) acc. to IEC 60746 part 1, at nominal operating conditions
Cell constant  
5.9 cm\(^{-1}\)

Measuring frequency (oscillator)  
2 kHz

Temperature compensation  
Range: –10 to +150 °C (14 to 302 °F)
Compensation types:
- none
- linear with freely selectable temperature coefficient \(\alpha\)
- one freely programmable coefficient table (four tables available in versions with remote parameter set switching)
- NaCl acc. to IEC 746-3
Minimum distance for table:
1 K

Reference temperature  
25°C (77°F)

Temperature offset  
adjustable, ± 5°C (9°F), for temperature display adjustment

### Installation

**Installation instructions**

In narrow installation conditions, the ion flow in the medium is affected by the pipe walls. This effect is compensated by the so-called installation factor. The installation factor can be entered in the transmitter or the cell constant can be corrected by multiplication with the installation factor to ensure correct measurement.

The value of the installation factor depends on the diameter and the conductivity of the pipe as well as the sensor’s distance from the wall.

If the distance from the wall is sufficient (\(a > 15 \text{ mm} / 0.6”\), from DN 65 / 2.5”), it is not necessary to consider the installation factor (\(f = 1.00\)).

If the distance from the wall is smaller, the installation factor increases in case of electrically insulating pipes (\(f > 1\)) and decreases in case of electrically conductive pipes (\(f < 1\)).

The installation factor can be measured using calibration solutions or it can be approximately determined from the diagram below.

<table>
<thead>
<tr>
<th>(f)</th>
<th>0.20</th>
<th>0.39</th>
<th>0.59</th>
<th>0.79</th>
<th>0.98</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) [inch]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Relationship between installation factor \(f\) and distance from wall \(a\)

1. Electrically conductive pipe wall
2. Insulating pipe wall

Endress+Hauser
Air set

To compensate residual coupling in the cable and between the two sensor coils, you must perform a zero calibration in air ("air set") before installing the sensor.

Mounting CLD132 separate version

CLD132 wall mounting

CLD132 mounting on pipes (Ø 60 mm / 2.36") using the pipe mounting kit (see Accessories)
Mounting CLD132 compact version

Dimensions of CLD132 compact version
* depending on ordered process connection

Orientation of CLD132 compact version
A  Horizontal flow
B  Vertical flow
1  Orientation arrow
2  Flow direction

Note!
The housing can be rotated against the sensor to allow comfortable viewing of the display in any mounting position.
Environment

**Ambient temperature**
0 to +55°C (32 to 131°F)

**Ambient temperature limits**
-10 to +70°C / 14 to 158°F (remote version)
-10 to +55°C / 14 to 131°F (compact version)
See figure "Permissible temperature ranges of Smartec S CLD132" on page 11.

**Storage temperature**
-25 to +70°C (-13 to 158°F)

**Electromagnetic compatibility**

**Ingress protection**
IP 67

**Relative humidity**
10 to 95%, non-condensing

**Vibration resistance acc. to IEC 60770-1 and IEC 61298-3**
- Oscillation frequency: 10 to 500 Hz
- Deflection (peak value): 0.15 mm (0.01")
- Acceleration (peak value): 19.6 m/s² (64 ft/s²)

**Impact resistance**
Display window: 9 J

Process

**Process temperature**
- CLS52 sensor with remote version: max. 125°C (257°F) at 70°C (158°F) ambient temperature
- Compact version: max. 125°C (257°F) at 35°C (95°F) ambient temperature
- max. 55°C (131°F) at 55°C (131°F) ambient temperature

**Sterilization**
- CLS52 sensor with remote version: 140°C (284°F) at 70°C (158°F) ambient temperature, 4 bar (58 psi), max. 30 min
- Compact version: 140°C (284°F) at 35°C (95°F) ambient temperature, 4 bar (58 psi), max. 30 min

**Process pressure**
max. 16 bar (90°C) / 232 psi (194°F)
no underpressure allowed with versions with stainless steel socket (CLD132********1, CLD132********2)
Permissible temperature ranges of Smartec S CLD132

A CLS52 sensor with remote version
B Compact version
C Short-term for sterilization (< 30 min)

Pressure-temperature load curve of CLS52 sensor

Permissible pressure and temperature ranges of CLS52 sensor
A short-term for sterilization (< 30 min)
## Mechanical construction

### Dimensions

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote transmitter with mounting plate</td>
<td>L x W x D: 225 x 142 x 109 mm (8.86 x 5.59 x 4.29&quot;)</td>
</tr>
<tr>
<td>Compact transmitter</td>
<td>L x W x D: 225 x 142 x 242 mm (8.86 x 5.59 x 9.53&quot;)</td>
</tr>
<tr>
<td>MV1, CS1, GE1, SMS versions</td>
<td>L x W x D: 225 x 142 x 180 mm (8.86 x 5.59 x 7.09&quot;)</td>
</tr>
<tr>
<td>VA1, AP1 versions</td>
<td></td>
</tr>
</tbody>
</table>

### Weight

<table>
<thead>
<tr>
<th>Type</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote version:</td>
<td>approx. 2.5 kg (5.5 lb.)</td>
</tr>
<tr>
<td>Transmitter:</td>
<td>depending on version, approx. 400 to 800 g (0.9 to 1.8 lb.)</td>
</tr>
<tr>
<td>CLS52 sensor</td>
<td>approx. 3 kg (6.6 lb.)</td>
</tr>
<tr>
<td>Compact version with CLS52 sensor</td>
<td></td>
</tr>
</tbody>
</table>

### Materials of the sensor (in contact with medium)

<table>
<thead>
<tr>
<th>Sensor</th>
<th>PEEK-GF20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varivent flange, APF flange:</td>
<td></td>
</tr>
<tr>
<td>Flange:</td>
<td>stainless steel 1.4435 (AISI 316L)</td>
</tr>
<tr>
<td>Seal:</td>
<td>EPDM</td>
</tr>
<tr>
<td>Metall temperature sensor socket:</td>
<td>stainless steel 1.4435 (AISI 316L)</td>
</tr>
<tr>
<td>Seal:</td>
<td>Chemraz®</td>
</tr>
</tbody>
</table>

### Materials of the transmitter

| Housing:                        | stainless steel 1.4301         |
| Front window:                   | polycarbonate                  |

### Chemical durability of the sensor

<table>
<thead>
<tr>
<th>Medium</th>
<th>Concentration</th>
<th>PEEK</th>
<th>1.4435 (AISI 316L)</th>
<th>Chemraz</th>
<th>EPDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caustic soda NaOH</td>
<td>0 ... 10 %</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 90 °C / 68 ... 194 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
</tr>
<tr>
<td></td>
<td>0 ... 50 %</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 90 °C / 68 ... 194 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 60 °C / 68 ... 140 °F</td>
</tr>
<tr>
<td>Nitric acid HNO₃</td>
<td>0 ... 10 %</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 °C / 68 °F</td>
</tr>
<tr>
<td></td>
<td>0 ... 25 %</td>
<td>20 ... 40 °C / 68 ... 104 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>not suitable</td>
</tr>
<tr>
<td>Phosphoric acid H₃PO₄</td>
<td>0 ... 10 %</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 80 °C / 68 ... 176 °F</td>
</tr>
<tr>
<td></td>
<td>0 ... 30 %</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 85 °C / 68 ... 185 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 80 °C / 68 ... 176 °F</td>
</tr>
<tr>
<td>Sulphuric acid H₂SO₄</td>
<td>0 ... 2.5 %</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 70 °C / 68 ... 158 °F</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 30 °C / 68 ... 86 °F</td>
</tr>
<tr>
<td></td>
<td>0 ... 30 %</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>not suitable</td>
<td>20 ... 100 °C / 68 ... 212 °F</td>
<td>20 ... 30 °C / 68 ... 86 °F</td>
</tr>
</tbody>
</table>

1) slight affect possible

No responsibility is taken for the correctness of this information.
Process connections

- Dairy fitting DN 50 (DIN 11851)
- 2" SMS
- G 1½ internal thread
- 2" Clamp connection (ISO 2852)
- Varivent Connection DN 40 ... DN 125
- APV connection DN 40 ... DN 100

Expansion bellows

G 1½ thread

mm (inch)
Process connections of CLS52 conductivity sensor

Note!

- **Clamp connection**
  Sensors with clamp connections can be fixed using sheet metal brackets or solid brackets. Sheet metal brackets have a lower dimensional stability, uneven bearing surfaces causing point loads and sometimes sharp edges that can damage the clamp. We **strongly** recommend to always use solid brackets because of their higher dimensional stability. Solid brackets may be applied over the total pressure-temperature range (see diagram on page 11).

- **Threaded connection**
  Sensors with threaded connections are supplied with expansion bellows (compensator) to be able to align them in flow direction. The two O-rings (Viton) of the expansion bellows have no sealing function and are not in contact with medium. The process is usually sealed off by PTFE tape on the G 1½ thread.
Human interface

Display and operating elements

1. LC display showing measured values and configuration data
2. Four operating keys for calibration and instrument configuration
3. Field for user labeling
4. LED indicator for alarm function

Operation

You have the following options of operating Smartec S CLD132:

- **Local operation via operating keys**
  The four keys are located underneath the housing cover. For operation, open the housing cover by removing the four screws.

- **Via HART® interface**
  - HART hand-held terminal
  - PC with HART modem and the Communwin II software

- **Via PROFIBUS PA/DP using a PC with a corresponding interface and the Communwin II software or via programmable logical controller (PLC)**
Calibration and configuration functions

All calibration and configuration functions are arranged in a logical menu structure. The individual parameters can only be modified after entering the access code. The current position within the menu structure is displayed.

Overview of the Smartec S CLD132 menu, showing all options that can be installed

* Menus not available in standard version
### Ordering information

#### Product structure

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Compact version</td>
</tr>
<tr>
<td>S</td>
<td>Remote transmitter, cable length 20 m / 65.62 ft</td>
</tr>
<tr>
<td>W</td>
<td>Remote transmitter, cable length 5 m / 16.41 ft</td>
</tr>
<tr>
<td>X</td>
<td>Remote transmitter, cable length 10 m / 32.81 ft</td>
</tr>
</tbody>
</table>

#### Process connection

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV1</td>
<td>Dairy fitting DN 50 (acc. to DIN 11851)</td>
</tr>
<tr>
<td>CS1</td>
<td>Clamp connection 2&quot; (acc. to ISO 2852)</td>
</tr>
<tr>
<td>GE1</td>
<td>Internal thread G 1 ½</td>
</tr>
<tr>
<td>VA1</td>
<td>Varivent connection DN 40 ... 125</td>
</tr>
<tr>
<td>AP1</td>
<td>APV connection DN 40 ... 100</td>
</tr>
<tr>
<td>SMS</td>
<td>SMS connection 2&quot;</td>
</tr>
</tbody>
</table>

#### Cable entry

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cable gland Pg 13.5</td>
</tr>
<tr>
<td>3</td>
<td>Cable gland M 20 x 1.5</td>
</tr>
<tr>
<td>5</td>
<td>Conduit adapter NPT ½ &quot;</td>
</tr>
</tbody>
</table>

#### Power supply

<table>
<thead>
<tr>
<th>No.</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>230 V AC</td>
</tr>
<tr>
<td>1</td>
<td>115 V AC</td>
</tr>
<tr>
<td>5</td>
<td>100 V AC</td>
</tr>
<tr>
<td>8</td>
<td>24 V AC / DC</td>
</tr>
</tbody>
</table>

#### Current output / communication

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Current output conductivity, without communication</td>
</tr>
<tr>
<td>AB</td>
<td>Current output conductivity and temperature, without communication</td>
</tr>
<tr>
<td>HA</td>
<td>HART, current output conductivity</td>
</tr>
<tr>
<td>HB</td>
<td>HART, current output conductivity and temperature</td>
</tr>
<tr>
<td>PE</td>
<td>PROFIBUS-PA, no current output</td>
</tr>
<tr>
<td>PF</td>
<td>PROFIBUS-PA, M 12 connector, no current output</td>
</tr>
<tr>
<td>PP</td>
<td>PROFIBUS-DP, no current output</td>
</tr>
</tbody>
</table>

#### Additional features

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic version with fast temperature measurement</td>
</tr>
<tr>
<td>2</td>
<td>Remote parameter set switching with fast temperature measurement</td>
</tr>
<tr>
<td>6</td>
<td>Basic version with encapsulated Pt 100 for high loads</td>
</tr>
<tr>
<td>7</td>
<td>Remote parameter set switching with encapsulated Pt 100 for high loads</td>
</tr>
</tbody>
</table>

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**Scope of delivery**

The scope of delivery of the compact version includes:
- Smartec S CLD132 compact measuring system with integrated sensor
- Terminal strip set
- Expansion bellows (-*GE1***** versions only)
- Operating Instructions BA 207C/07/en
- Versions with HART communication only:
  - Operating Instructions Field communication with HART, BA 212C/07/en
- Versions with PROFIBUS interface only:
  - Operating Instructions Field communication with PROFIBUS, BA 213C/07/en
  - M12 connector [-******PF* versions only]

The scope of delivery of the remote version includes:
- Smartec S CLD132 transmitter
- CLS52 inductive sensor with fixed cable
- Terminal strip set
- Expansion bellows (-*GE1***** versions only)
- Operating Instructions BA 207C/07/en
- Versions with HART communication only:
  - Operating Instructions Field communication with HART, BA 212C/07/en
- Versions with PROFIBUS interface only:
  - Operating Instructions Field communication with PROFIBUS, BA 213C/07/en
  - M12 connector [-******PF* versions only]
Basic version and function extensions

<table>
<thead>
<tr>
<th>Functions of the basic version</th>
<th>Options and their functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Measurement</td>
<td>• Second current output for temperature (hardware option)</td>
</tr>
<tr>
<td>• Calibration of cell constant</td>
<td>• HART communication</td>
</tr>
<tr>
<td>• Calibration of residual coupling</td>
<td>• PROFIBUS communication</td>
</tr>
<tr>
<td>• Calibration of installation factor</td>
<td></td>
</tr>
<tr>
<td>• Read instrument parameters</td>
<td></td>
</tr>
<tr>
<td>• Linear current output</td>
<td></td>
</tr>
<tr>
<td>• Current output simulation</td>
<td></td>
</tr>
<tr>
<td>• Service functions</td>
<td></td>
</tr>
<tr>
<td>• Temperature compensation selectable (e.g. 1 free coefficient table)</td>
<td></td>
</tr>
<tr>
<td>• Concentration measurement selectable (4 defined curves, 1 free table)</td>
<td></td>
</tr>
<tr>
<td>• Relay as alarm contact</td>
<td></td>
</tr>
</tbody>
</table>

Accessories

Cable extension

Extension cable CLK5
for inductive conductivity sensors, for extension via the VBM junction box, sold by the meter;
order no.: 50085473

Junction box VBM
for extension of measuring cable connection between sensor and instrument, material cast aluminium,
ingress protection IP 65;
order no.: 50003987

Note!
The desiccant bag must be checked and replaced at regular intervals which depend on ambient conditions
in order to prevent inaccurate measurement due to moisture bridges in the measuring line.

Dimensions of VBM junction box

Desiccant bag with color indicator for VBM junction box;
order no. 50000671
Pipe mounting kit
Mounting kit for installation of Smartec S CLD132 on horizontal or vertical pipes and posts (max. Ø 60 mm / 2.36"), material stainless steel 1.4301;
order no.: 50062121

Software upgrade
Software upgrade
Remote parameter set switching (measuring range switching, MRS) and determination of temperature coefficient;
order no.: 51501643
Serial number of instrument must be specified with order.

Optoscope
Optoscope
Interface between transmitter and PC / laptop for service purposes.
The Windows software "Scopeware" required for the PC or laptop is supplied with the Optoscope. The Optoscope is supplied in a sturdy plastic case with all the accessories required.
Order no. 51500650

Calibration solutions
Precision solutions, traceable to SRM (standard reference material) by NIST, for qualified calibration of conductivity measurement systems according to ISO 9000, with temperature table

<table>
<thead>
<tr>
<th>Product</th>
<th>Conductivity (μS/cm)</th>
<th>Volume (ml / US.gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLY11-B</td>
<td>149.6</td>
<td>500 / 0.13</td>
</tr>
<tr>
<td>CLY11-C</td>
<td>1.406</td>
<td>500 / 0.13</td>
</tr>
<tr>
<td>CLY11-D</td>
<td>12.64</td>
<td>500 / 0.13</td>
</tr>
<tr>
<td>CLY11-E</td>
<td>107.0</td>
<td>500 / 0.13</td>
</tr>
</tbody>
</table>

Order nos.: 50081903, 50081904, 50081905, 50081906

Related products
Indumax H CLS52
Inductive conductivity sensor with fast response time and hygienic design;
with integrated temperature sensor.
Order according to product structure, see Technical Information TI 167C/24/ae.
One Indumax H CLS52 is included in the Smartec S CLD132 scope of delivery.