Technical Information
TI 242C/07/en/09.03
No. 51505748

SmarTec T
CLD 633
Conductivity Measurement

Compact conductivity transmitter with inductive sensor and integrated temperature compensation

The compact transmitter SmarTec T CLD 633 is used for inductive conductivity measurement in liquids of medium to high conductivity, e.g. for process monitoring in galvanics. The transmitter can be used in temperature ranges of up to 70 °C.

Applications
- Water treatment
  - Galvanics
  - Photographic processes
  - Humidifiers and separators
- Cleaning plants
  - Vehicle systems
  - Rinsing processes
- Alkali monitoring
  - Tanning
  - Mordant preparation

Features and benefits
- Large measuring range between 0.2 ... 1000 mS/cm
- 9 selectable current output ranges
- Easy installation due to small size
- Temperature compensation through integrated temperature sensor Pt 100
- Sensor resistant to polarisation and soiling

Quality made by Endress+Hauser

ISO 9001

Endress+Hauser

The Power of Know How

Safety instructions

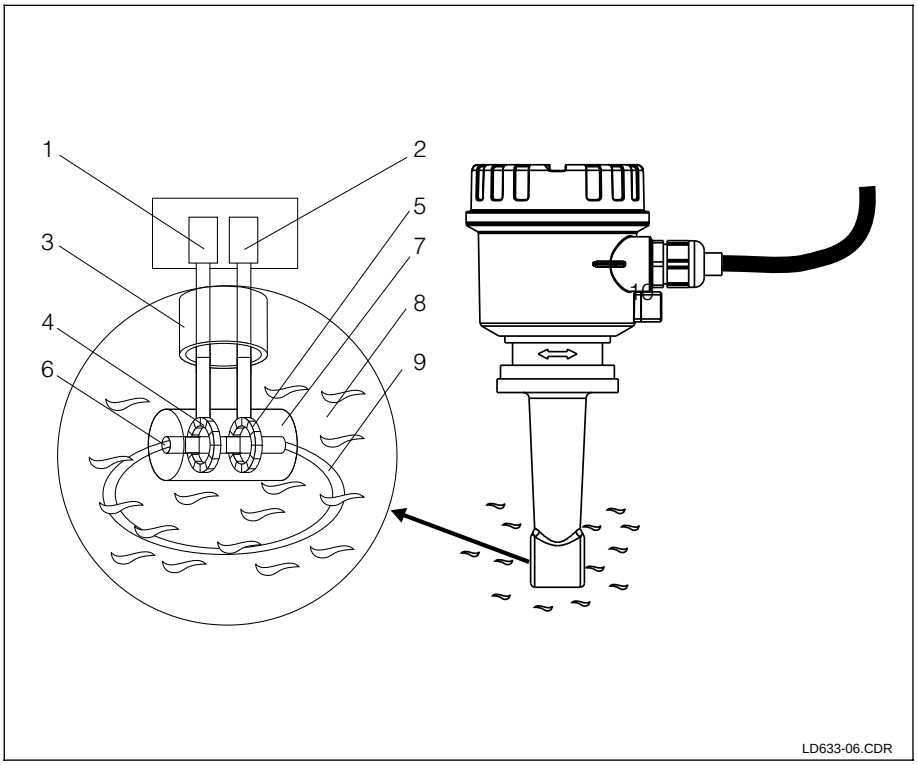
Warning!
This symbol alerts you to hazards which could cause serious injuries as well as damage to the instrument if ignored.

Caution:
This symbol alerts you to possible faults which could arise from incorrect operation. They could cause damage to the instrument if ignored.

Note:
This symbol indicates important items of information.

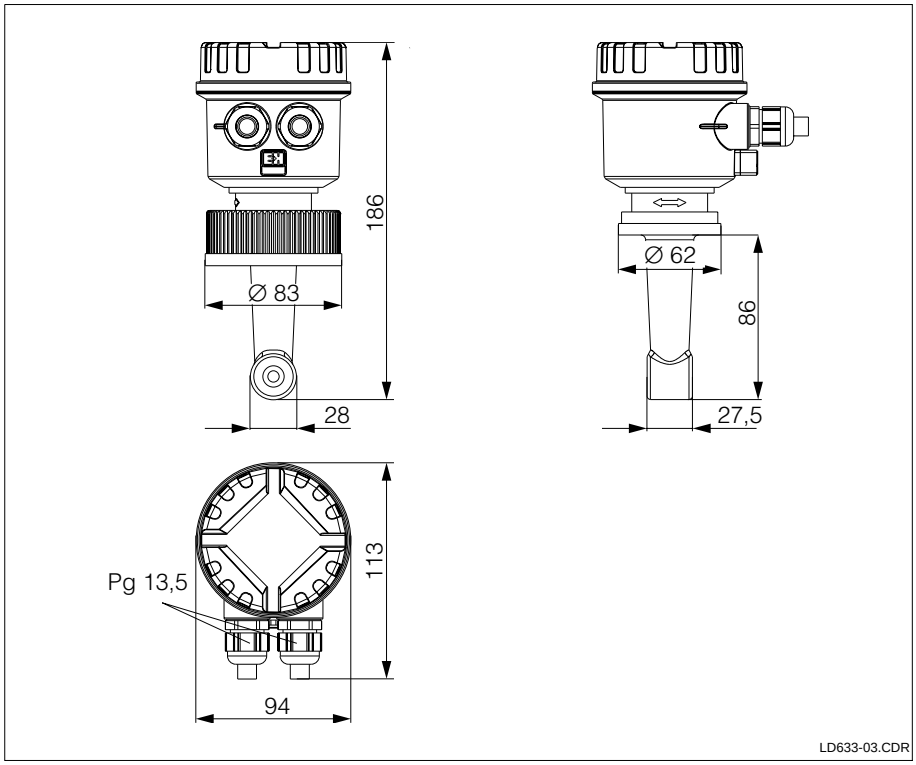
Functions and system design

The transmitter coil of the sensor creates an alternating magnetic field which induces an electrical current in the medium. The ions present in the medium form a current flow which creates a magnetic field in the receiver coil. The inductive current in the receiver coil is a measure of the medium's conductivity.



1 Oscillator
2 Receiver and signal processing
3 Cable
4 Primary winding
5 Secondary winding
6 Borehole
7 Sensor housing
8 Measuring medium
9 Induced current

Dimensions



Dimensions
CLD 633

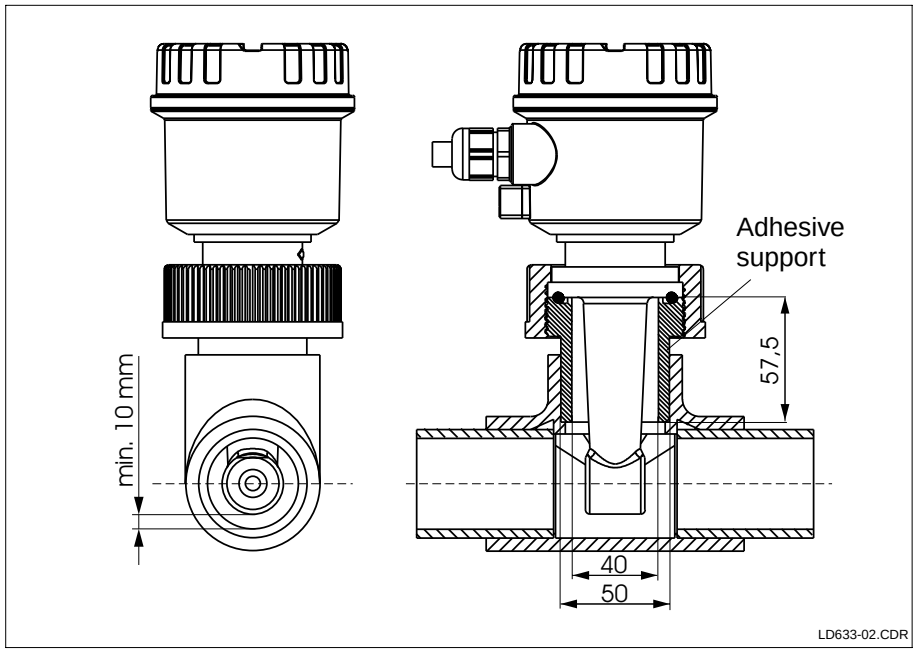
Installation

The compact device SmarTec T CLD 633 can be installed very easily:

- Place the device with the sensor in the opening of the piping carrying the medium or in the tank.
- Observe the minimum distance of 10 mm from the pipe wall.
- Orientate the instrument in a way that the double arrow marks the flow direction. Then the sensor opening is aligned in flow direction.
- Tighten the coupling nut (2 ¼ “).
- A PVC adhesive support DN 40 with corresponding 2 ¼ “ outer thread is available as an accessory (see Accessories). Stick the support into the intended sleeve, whilst keeping to the guidelines of the manufacturer. After the adhesive has dried, install the device as described above.

Warning!

- Make sure your installation is straight. Avoid cross-threading to ensure the stability of the measuring point in pressurised processes.



Pipe installation
CLD 633
with PVC
adhesive
support DN 40
(Accessory)

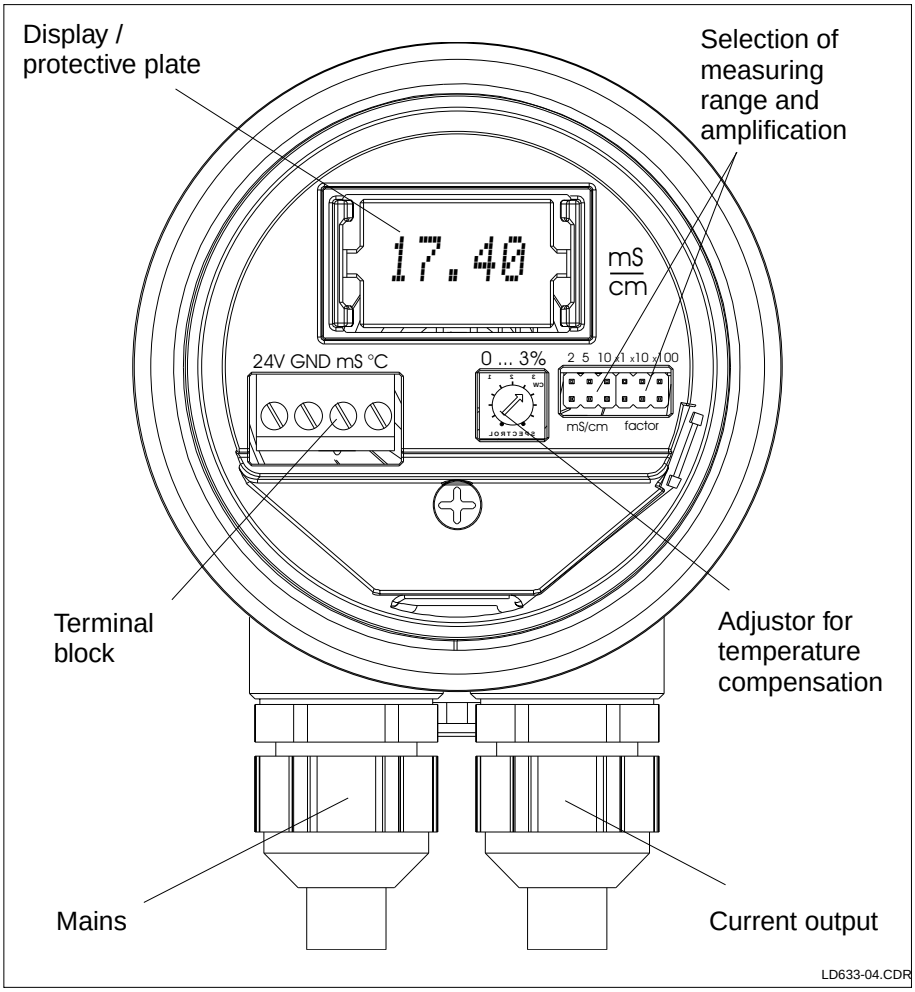
Electrical connection

Proceed as follows to make the electrical connection of the device:

- Insert the mains supply cable through the left-hand cable gland.
- Apply the 24 V supply voltage to terminals 24 V and GND.
- Insert the current output cable through the right-hand cable gland.
- Apply the conductivity current output to terminal mS.
- Apply the temperature current output to terminal °C.
- Apply both current outputs with earth to the terminal GND.

Caution!

- For wiring, use only screened cables.



Electrical connection CLD 633

Start-up

Adjusting the current output for conductivity:
For improved measuring range resolution, the current output range 4 ... 20 mA for conductivity can be adjusted with 2 jumpers on the right-hand side of the operating panel.

Select the measuring ranges as follows:

Measuring range [mS/cm]	0... 2	0...5	0...10	Factor 1	Factor 10	Factor 100
Contact pair	2	5	10	x 1	x 10	x 100

Example:
The measuring range 0 ... 200 mS/cm is set by placing the jumper on contacts 2 and x 100.
The temperature current output is preset to the range 0 ... 150 °C.

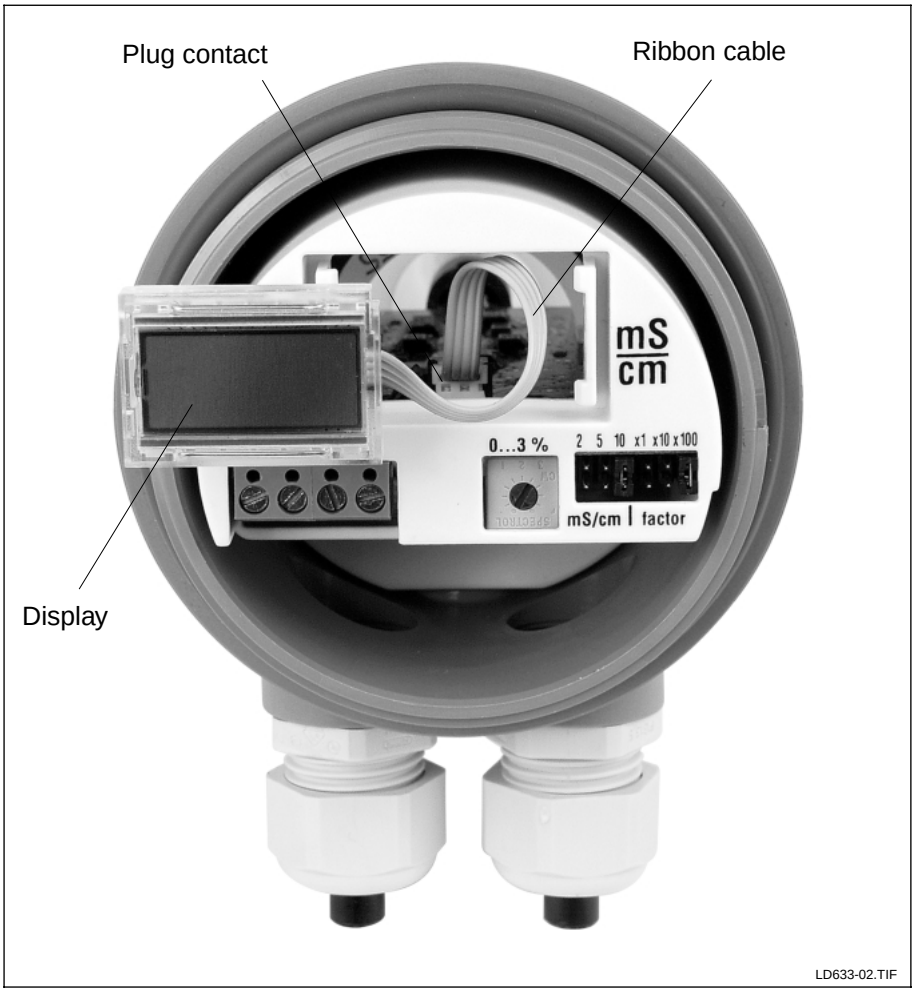
Adjusting the temperature compensation:
Increasing the process temperature increases the conductivity of the measuring medium. Conversely, conductivity falls as the process temperature falls. This effect can be compensated with the medium temperature measured by the installed sensor.

To adjust the compensation, proceed as follows:
- Immerse the sensor in the measuring medium.
- Turn the temperature compensation adjustor left until stop (position 0 %). This switches off the compensation.
- The medium temperature must have reached the desired reference temperature (e.g. 25 °C).
- Note the conductivity value on the display.
- Bring the sample of the measuring medium to a medium process temperature.
- Turn the compensation adjustor slowly to set the display to the noted value.

Display installation

Optionally, devices such as version GE2PP0 which do not have a display can be subsequently retrofitted with a display unit. For this, you can order a display kit (see Accessories). To install the display, proceed as follows:

- Unscrew the screw cap of the housing.
- Use a screwdriver to carefully break open the protective plate (see Figure Electrical connection, page 4).
- Plug in the display plug connector and screw the display into the holder. The ribbon cable connected must be pointing to the mS/cm symbol.
- Screw the enclosed sight glass cover on.



Display design
CLD 633

Note:
The moving bar shows the continuous measurement. It provides continuous function control at a glance even with little changes in process conditions.

Maintenance

The compact device SmarTec T CLD 633 requires very little maintenance due to its practical flow design. To maintain reliable measurement, please remove coatings on sensor in coating media at regular intervals.

Note:
Coatings can usually be prevented by installing the sensor in flowing media.

Technical data

General data

Manufacturer	Endress+Hauser
Product designation	SmarTec T CLD 633

Mechanical construction

Dimensions (L x B)	186 x 113 mm
Cable gland	2 x Pg 13.5
Weight	approx. 0.5 kg
Measured value display	LC display, one line

Materials

Housing	PBT
Sensor	PP

Input parameters

Measuring range	0.2 ... 1000 mS/cm (compensated) (uncompensated max. 1250 mS/cm)
Display measuring error	≤ 5% of measured value
Display resolution	at least ± 40 µS/cm
Repeatability	≤0.5% of measured value
Temperature sensor	Pt 100
Temperature compensation	0 ... 70 °C

Output parameters

Current range conductivity	4 ... 20 mA, 9 selectable steps
Current range temperature	4 ... 20 mA, 0 ... 150 °C
Load	max. 500 Ω
Resolution	0.1% of measuring range
Measuring error	≤2% of current output range

Electrical connection data

Power supply	24 VDC
Power consumption	5 W

Process conditions

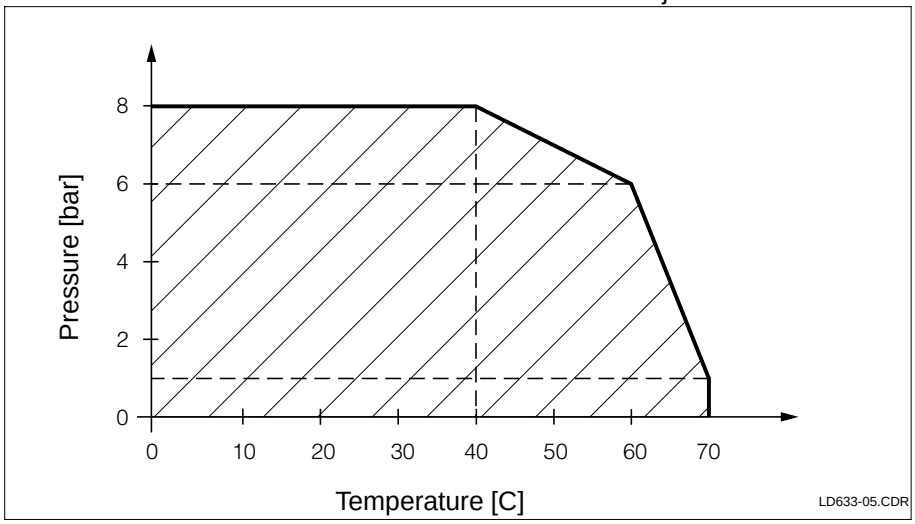
Operating temperature range	0 ... +70 °C
Operating pressure range	8 bar / 40 °C, 1 bar / 70 °C

Ambient conditions

Storage temperature	–10 ... +50 °C
Ingress protection	IP 65
Electromagnetic compatibility	Interference emission and immunity acc. to EN 61326:1997 / A1:1998

Subject to modification.

Pressure-temperature chart



Pressure/ temperature chart

Accessories

- Adhesive support PVC DN 40 with O-ring
  Order No.: 51506592
- Display kit
  consisting of display and sight glass cover
  Order No.: 51506593
- Flow assembly Flow Fit CUA 250
  Technical Information TI 096C/07/en
  Order No.: 50063827

Product structure

Conductivity transmitter SmarTec T CLD 633

Process connection
GE2 Coupling nut 2 ¼ " , PVC, DN 40
GE5 Coupling nut 2 ¼ " , PP, DN 40

Sensor coat
PP Sensor coat made of PP

Display
0 without display
1 with display

CLD 633- [ ] [ ] [ ] **Complete order code**

Use the product structure to identify your device on the nameplate.

ENDRESS+HAUSER
SMARTEC T conductivity ind./ Leitfähigkeit ind.

order code / Best.Nr.: CLD 633-GE2PP0
serial no. / Ser.-Nr.: 123456 Codes: /

measuring range / Messbereich: 0.2 ... 1000 mS/cm

output 1 / Ausgang 1: 4 ... 20 mA (range selectable)
output 2 / Ausgang 2: 4 ... 20 mA (0 ... 150 °C)
mains / Netz : 24 V DC 5W

prot. class / Schutzart : IP65
ambient temp. / Umgebungstemperatur : –10 ... +50 °C
operating temp. / Prozesstemperatur : 0 ... +70 °C

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TI 242C/07/en/09.03
Printed in Germany / DT / CV5 (51505748)