Technical Information
TI 347C/07/en/07.03
51511754

Conductivity Measurement
CLM 280

Battery-driven pocket meter for conductivity and resistance measurement

Application

CLM 280 is a compact pocket meter for measuring conductivity and specific resistance. CLM 280 is suitable for conductivity, resistance and salinity measurement in the following fields of application:

- Wastewater treatment plants
- Drinking and surface water
- Laboratory and field measurement

Your benefits

- Comfortable operation:
  - Clear multi-function display with user guidance
- Freely selectable temperatur compensation:
  - Automatic non-linear temperature compensation with built-in NTC 30 temperature sensor
  - No temperature compensation
  - Switchable reference temperature
- Automatic measuring range switching (AutoRange function)
- Safe and cost-effective operation:
  - Long service life with four commonly used 1.5 V batteries: approx. 3000 h
  - Automatic power-down
  - Dust and water-proof housing (IP 66)
  - 3-year warranty for the measuring instrument

Quality made by Endress+Hauser

ISO 9001

Endress+Hauser

The Power of Know How

Function and system design

Measuring principle

Conductive conductivity measurement
The conductivity of liquids is measured with a four-pole measuring system.
The electric resistance or its reciprocal value, the conductance G, is measured according to Ohm's law. The specific conductivity κ is determined using the cell constant k which is dependent on the sensor geometry.

Measuring system

A complete measuring system comprises:
- CLM 280 pocket meter
- four-electrode conductivity sensor CLS 381 with built-in NTC 30 temperature sensor, 1.5 m (4.9 ft) fixed cable and a water-proof DIN plug
- plastic bowl 50 ml for sampling
- stand used as sensor holder

Input

Measured variables

Conductivity, spec. resistance, salinity, temperature

Measuring ranges

Conductivity	0.0 ... 500 mS/cm (automatic range switching)
Spec. resistance	0.00 ... 1999 MΩ•cm (automatic range switching)
Salinity	0.0 ... 70.0
Temperature	–5 ... 105 °C (23 ... 221 °F)

Power supply

Sensor connection

via fixed cable

Supply voltage

Batteries	4 x 1,5 V alkali-manganese batteries, type AA
Service life	approx. 3000 h

Performance characteristics

Reference temperature	20 °C or 25 °C (68 °F or 77 °F), switchable		
Measured value resolution	Conductivity	0.0 ... 199.9 µS/cm	0.1 µS/cm
		0 ... 1999 µS/cm	1 µS/cm
		0.00 ... 19.99 mS/cm	0.01 mS/cm
		0.0 ... 199.9 µS/cm	0.1 mS/cm
		0 ... 1999 mS/cm	1 mS/cm
	Spec. resistance	0.00 ... 19.99 MΩ•cm	0.01 MΩ•cm
		0.0 ... 199.9 MΩ•cm	0.1 MΩ•cm
		0 ... 1999 MΩ•cm	1 MΩ•cm
	Salinity	0.0 ... 70.0	0.1
	Temperature	–5.0 ... 105.0 °C (23 ... 221 °F)	±0.1 K
Measured error[a]	Conductivity	±0.5% of measured value ±1 digit	
	Spec. resistance	±0.5% of measured value ±1 digit	
	Salinity	±0.1% of measured value at 5 ... 25°C (41 ... 77 °F) ±1 digit	
		±0.2% of measured value at 25 ... 30 °C (77 ... 86 °F) ±1 digit	
	Temperature	±0.1 K of measured value ±1 digit	
Temperature compensation	no temperature compensation non-linear temperature compensation acc. to EN 27 888 with selectable reference temperature		
Cell constant	0.475 cm^{-1} (factory setting) 0.100 cm^{-1} 0.875 cm^{-1}		

Environment

Storage temperature	–25 ... +55 °C (-13 ... 131 °F)
Relative humidity	< 100%
Climate class	2
Ingress protection	IP 66
Electrical protection class	III
Electromagnetic compatibility	Interference emission and interference immunity according to DIN EN 50081-1 / 50081-2

Process

Process temperature	–5 ... 105 °C (23 ... 221 °F)
Process pressure	max. 2 bar (29 psi)

a) according to DIN IEC 746 part 1, at nominal operating conditions

Mechanical construction

Dimensions

CLM 280 pocket meter	H x W x D:	172 x 80 x 37 mm (6.8 x 3.2 x 1.5")
CLS 381 sensor	L x Ø:	120 x Ø 15 mm (4.7 x Ø 0.6") (shaft) 162.5 x Ø 15 mm (6.4 x Ø 0.6") (total length)
Immersion depth sensor		min. 36 mm (1.4") max. 162.5 mm (6.4") (+ cable length) at T < 80 °C (176 °F) max. 120 mm (4.7") at T= 80 ... 100 °C (176 ... 212 °F)
Case	H x W x D:	115 x 355 x 305 mm (4.5 x 14.0 x 12.0")

Weight

CLM 280 pocket meter	approx. 0.4 kg (0.9 lb.)
CLS 381 sensor	approx. 0.2 kg (0.4 lb.)
Case (total weight)	approx. 2.3 kg (5.1 lb.)

Materials

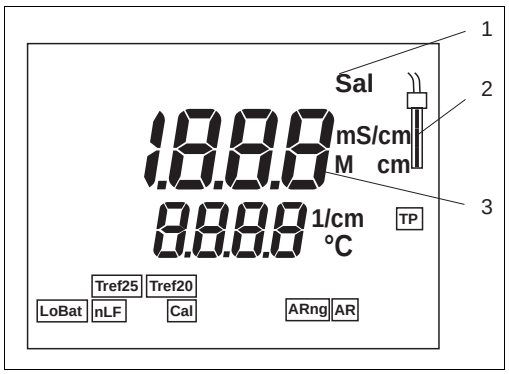
CLM 280 pocket meter	Housing:	PP
	Keys:	silicon
CLS 381 sensor	Sensor shaft:	epoxy resin
	Measuring surface:	graphite
	Thermistor housing:	graphite
	Temperature sensor:	zirconium

Measured value display

LC display, two lines

Human interface

Display elements



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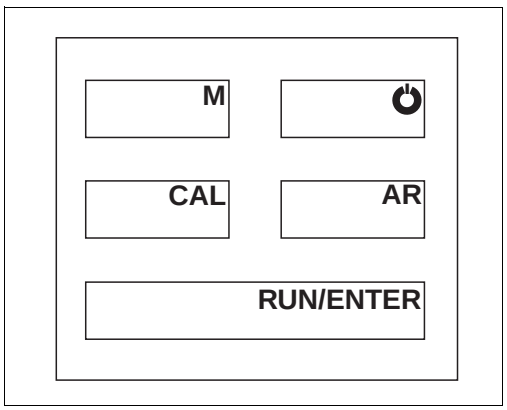
LC display

1	*Status display*
2	*Sensor symbol*
3	*Measured value display*
TP	*Function and temperature display*
LoBat	*Battery status display*
TRef25	*Reference temperature 25 °C (77 °F)*
TRef20	*Reference temperature 20 °C (68 °F)*
nLF	*Non-linear temperature compensation*
Cal	*Calibration function*
ARng	*AutoRange function*
AR	*AutoRead function*

Operating elements



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Key assignment

O	*Start instrument*
AR	*AutoRead function (Hold function)*
RUN/ ENTER	*Start AutoRead measurement, configuration, confirm measured value*
CAL	*Start calibration*
M	*Select measuring mode (conductivity, resistance, salinity) or switch to measuring mode*

Certificates and approvals

CE approval

Declaration of conformity
The product meets the legal requirements of the harmonised European standards. Endress+Hauser confirms compliance with the standards by affixing the CE symbol.

Ordering information

Order number

Conductivity pocket meter CLM 280
Order no.: 51510539

Scope of delivery

Scope of delivery

The measuring set comprises:
- 1 CLM 280 pocket meter
- 1 four-electrode conductivity sensor CLS 381 with built-in NTC 30 temperature sensor, 1.5 m (4.9 ft) fixed cable and a water-proof DIN plug
- 1 plastic bottle with 0.01 mol/l KCl standard solution, 50 ml (1.413 mS/cm at 25 °C (77 °F))
- 1 plastic bowl 50 ml
- 1 stand used as sensor holder
- 4 alkali-manganese batteries 1.5 V
- 1 solid plastic case made from PP with integrated measuring point and separate pocket for sensor and accessories
- 1 Operating Instructions BA 347C/07/b4

Accessories and spare parts

Sensors

❑ Conductivity sensor CLS 381 with built-in NTC 30 temperature sensor, 1.5 m (4.9 ft) fixed cable and a water-proof DIN plug. Application range 0 ... 2000 mS/cm, –5 ... 105 °C (23 ... 221 °F)
Order no.: 50081032

Calibration solutions

❑ Calibration solution CLY 11-C with 1.406 mS/cm. Precision solution, traceable to SRM (standard reference material) by NIST, accuracy ± 0.5 %. Refill bottle with 500 ml.
Order no.: 50081904

Supplementary documentation

❑ Pocket meter CLM 280, Operating Instructions BA 347C/07/b4, Order no.: 51510872

Endress+Hauser GmbH+Co. KG
Instruments International
P.O. Box 2222
D-79574 Weil am Rhein
Germany

Tel. (07621) 975-02
Tx 773926
Fax (07621) 975 345
e-mail: info@ii.endress.com

Internet:
http://www.endress.com

Endress+Hauser
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