Technical
Information
TI 113C/07/e

Conductivity measuring cells
CLS 51

Electrodeless, inductive conductivity measuring cell

Areas of application

These conductivity measuring cells are intended specifically for use in the food and pharmaceutical industries. They are injection-moulded out of a plastic material (PEEK) which is suitable for food applications and distinguished by high resistance to chemicals and corrosion by acids and alkalis.
The measuring range of the CLS 51 series measuring cells lies between 100 µs/cm and 1000 mS/cm.
Typical applications are:
- Concentration control
- Phase separation of product/water and product/product mixtures in pipe systems
- Monitoring and control of bottle cleaning systems
- Product monitoring in breweries, dairies and the beverage industry
- CIP system control

The measuring cells have an electronic signal processing feature and are used in conjunction with the Mycom CLM 121/151 instrument.

Benefits at a glance
- Electrodeless, inductive measuring principle is insensitive to electrode soiling and polarisation
- Jointless design without crevices is suitable for food applications and hygienics
- Can be installed directly in product pipes
- Hydrodynamic design assures low flow resistance
- Maintenance-free due to inductive, non-contact measurement
- Special temperature sensor arrangement assures very fast temperature response
- Reliable measurement due to continuous plausibility checking
- Easy in-line installation is guaranteed using standard adapters
- Minimal installation – only one measuring cable is needed for signal transmission and sensor power supply
- Cable lengths of up to 100 m
- Ingress protection to IP 67

Quality made by
Endress+Hauser

ISO 9001

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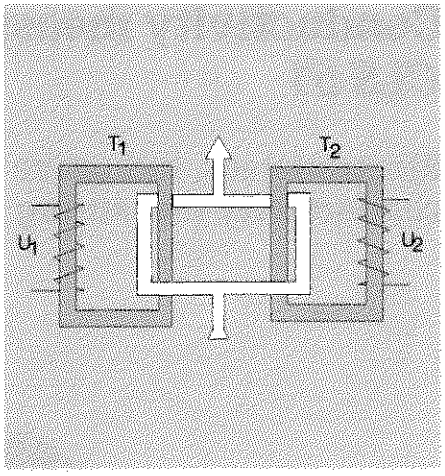
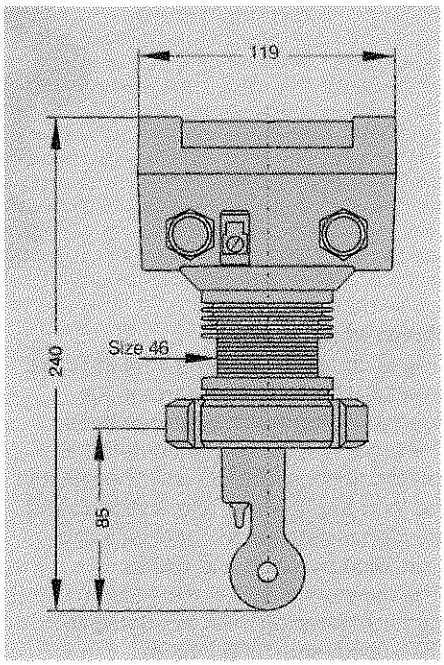
Operating principle



Measuring principle
The medium to be measured acts as the liquid conductor that couples the magnetic fields of two magnetically separated induction coils. The excitation coil generates a continuous magnetic alternating field that induces an electric voltage in the liquid. The ions present in the liquid enable a current flow which increases proportionately to ion concentrations (conductivity). The resulting current induced in the receiving coil is signalled to the measuring instrument and serves as a measure of conductivity.
This measuring principle has the following advantages:

- No electrodes, therefore no polarisation
- Accurate measurement in media or solutions with a tendency to sediment

Measuring cell design



Sensor CLS 51
with dairy fitting
DN 50, DIN 11851

The sensor, injection-moulded from highly chemically, mechanically and thermally resistant PEEK (polyether ether ketone), does not have joints or crevices and is therefore biologically safe.
The material PEEK meets the requirements of the relevant German regulations and those of the American Food and Drug Association (FDA).
The sensor shaft contains the two induction coils and a Pt 100 temperature sensor.
The temperature sensor is in direct thermal contact with the medium via the thermal conductivity socket. This assures extremely fast temperature response (t_{90} < 15 s).
The use of special components and materials makes the measuring cell suitable for continuous exposure to temperatures of + 80 °C and brief exposure to + 130 °C for sterilisation.

Chemical resistance table

Excerpt from chemical resistance tables for PEEK and V4A

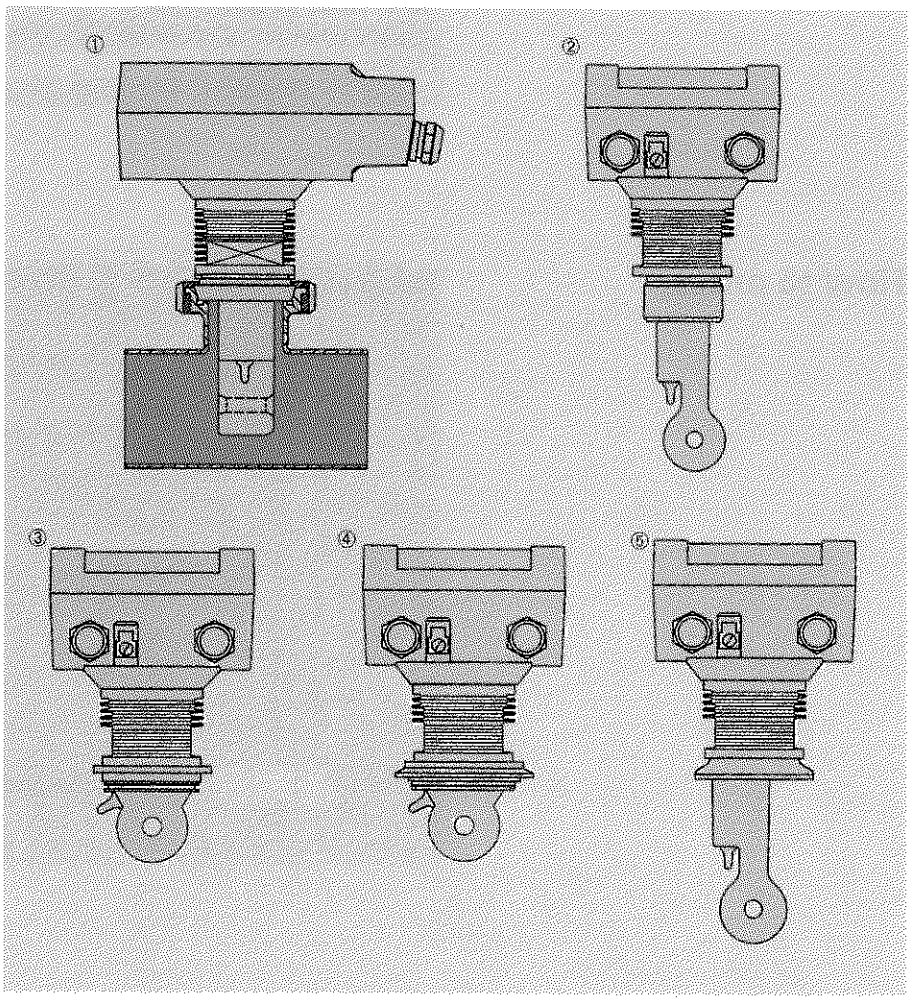
Legend:
+ resistant
– not resistant

Chemical attack			Resistance	
Medium	Concentr. (%)	Temp. (C°)	V4A	PEEK
Nitric acid HNO_3	5	20	+	+
		60	+	+
	up to 40	20	+	+
		60	+	–
Phosphoric acid H_3PO_4	up to 10	20	+	+
		60	+	+
Sodium hydroxide solution NaOH	3	20	+	+
		50	+	+
		80	+	+

Installation variants

In order to use the conductivity measuring cell in areas with extreme demands on hygiene, it is available in different designs for all commonly used mounting variants:

- Dairy fitting DN 50, DIN 11 851
- 2" clamp fitting
- G 1 1/2" internal thread
- Varivent connection DN 50 – DN 80
- APV connection DN 50 – DN 80

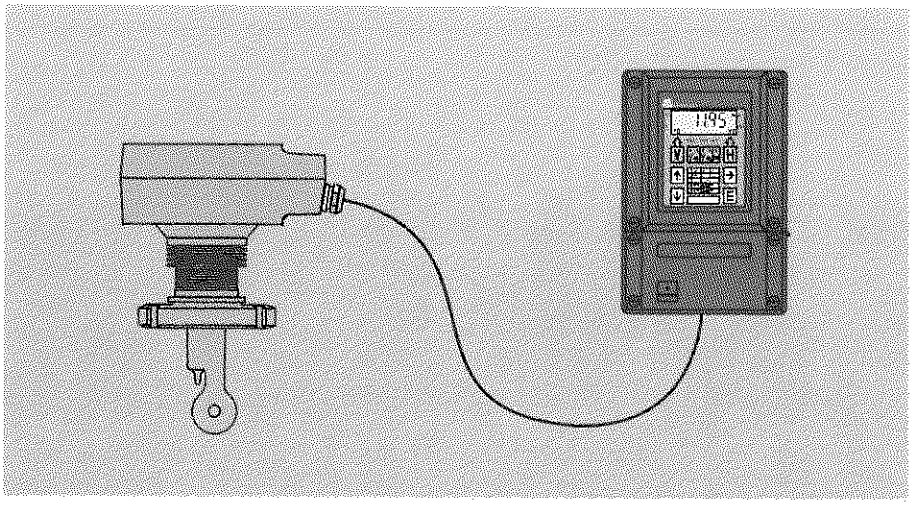


Cell versions:

① Dairy fitting DN 50, DIN 11851
② G 1 ½" internal thread
③ APV connection DN 50-DN 80
④ Varivent connection DN 50-DN 80
⑤ 2" clamp fitting

Electrical connection

The measuring cell is used in conjunction with the Mycon CLM 121/151 (ID variant). This measuring transmitter is available for panel installation and in a field housing (see TI 023C). The measuring cable is connected via terminals; commercially available, shielded 7-wire measuring cable (7 x 0.5 mm^2) can be used, e.g. measuring cable OMK from Endress + Hauser. The maximum cable length is 100 metres.



Technical data

Material of measuring cell	PEEK
Thermal conductivity socket	stainless steel (1.4571)
Process temperature/short-term peak temp.	–5 ... +80 °C/130 °C
Temperature sensor	Pt 100
Pressure	max. 16 bar (20 °C)
Tubing cross section required	
Dairy fitting, clamp fitting, G 1 1/2"	min. DN 65
APV, Varivent connections	min. DN 50
Ingress protection (DIN 40 050)	IP 67
Electrical connection	measuring cable, 7 x 0.5 mm^2, screened
	1 x Pg 16

How to order

Measuring cell CLS 51

Design
F1 Measuring cell with built-in electronics

Connection variant
MV 1 Dairy fitting DN 50, DIN 11 851
CS 1 2" clamp fitting
GE 1 G 1 1/2" internal thread
VA 1 Varivent connection
AP 1 APV connection

Material/seal of thermal conductivity socket
A Stainless steel / EPDM

CLS 51- [ ][ ][ ] ⇐ **complete order code**

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