Technical
Information
TI 163C/07/en

Conductivity Calibration Set for Ultrapure Water Applications *concal*

Complete, factory-calibrated conductivity measuring set with certificate for comparative measurement in ultrapure water applications up to 20 µS/cm

Ultrapure water is used in sensitive areas of the pharmaceutical and food-stuffs industries and in process engineering. Verification and calibration of process conductivity measurement is obligatory for these applications.

Since calibration solutions with very low conductivity are unstable, there is no standardisation for conductivities below 74 µS.
With the ConCal system, Endress+Hauser are now offering a reference unit that permits the calibration of process measuring instruments by means of a certified comparison measurement.

Areas of application

- Calibration of quality-relevant process measurements in the ultrapure water range up to 20 µS/cm
- Checking of in-line measurements in the process, e.g. after inspections or interruptions in operation
- Checking of conductivity measuring equipment primarily in the pharmaceutical and food industries
- Checking and calibration for product quality assurance, e.g. in semiconductor production or other technically sensitive areas

Benefits at a glance

- Factory calibration traceable to SRM by NIST and DKD
- Conforms to international standards: Procedure for factory calibration of ConCal system according to ASTM 5391-93
- Practical flow assembly with adjusting and monitoring functions according to ASTM 5391
- Bypass arrangement permits calibration without removal of flow measuring cell

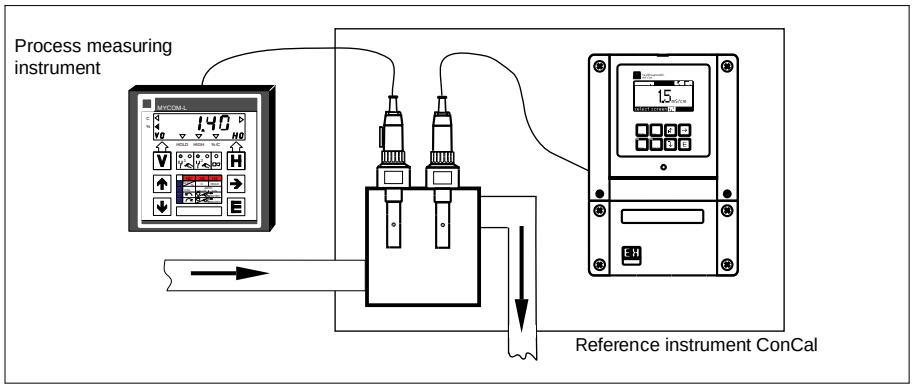
Quality made by
Endress+Hauser

ISO 9001

Endress+Hauser

Nothing beats know-how

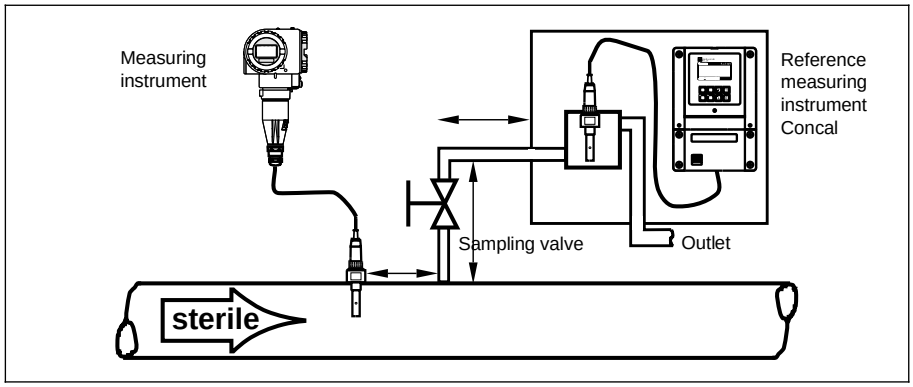
Measurement setup



Setup for parallel comparison measurement

Direct comparison measurement:
The flow assembly included with the calibration set is equipped with two mounting positions for conductivity measuring cells with 1/2" NPT threads. Direct comparison measurement in the same location is an ideal solution because all parameters are identical:

- temperature
- absolutely identical medium
- flow conditions



Setup for bypass comparison measurement

Bypass comparison measurement:
For reasons of hygiene it is not possible in all cases to remove the measuring cell from the process. Instead, the comparison measurement can be performed in a bypass. If this arrangement is to be used, the water composition and temperature at the process and comparison measuring points must be identical.

Prerequisites for this are:

- Short hose connection
- Wait for flow assembly to adapt to process temperature
- Representative sample withdrawal near measuring point

Flow assembly

A special measuring cell with a flow assembly has been developed for the ConCal calibration set. Thanks to precision factory adjustment, the measuring conditions are accurately defined.

Flow assembly with reference measuring cell

Bubble trap

To prevent inaccurate conductivity measurement, the fluid must be bubble-free. Degassing may occur where the fluid is relaxed, i.e. also in the bypass arrangement described above. This, in particular, is taken into account by the calibration assembly in the ConCal case: When using the bypass setting of the assembly, the second cell mounting position is used as a hydrocyclone. The fluid is fed tangentially, causing a turbulence that permits the bubbles to escape through a vent opening at the top. The measuring water passes to the measuring chamber through a lateral hole in the bottom of the cyclone.

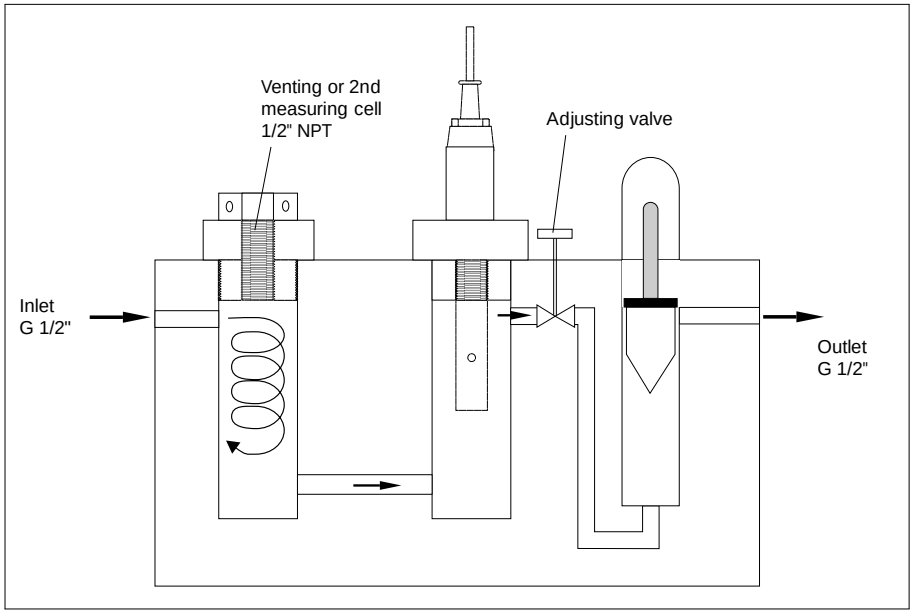
Note: The lines may contain bubbles because there is no exclusion of air when the connection is established.

Controlled conditions with flow monitoring

ASTM 5391 determines that a minimum flow rate specified by the manufacturer of the measuring cell must be guaranteed. This also applies to calibration with Concal.
The calibration assembly in the Concal case has been designed to conform to the applicable conductivity calibration standards:

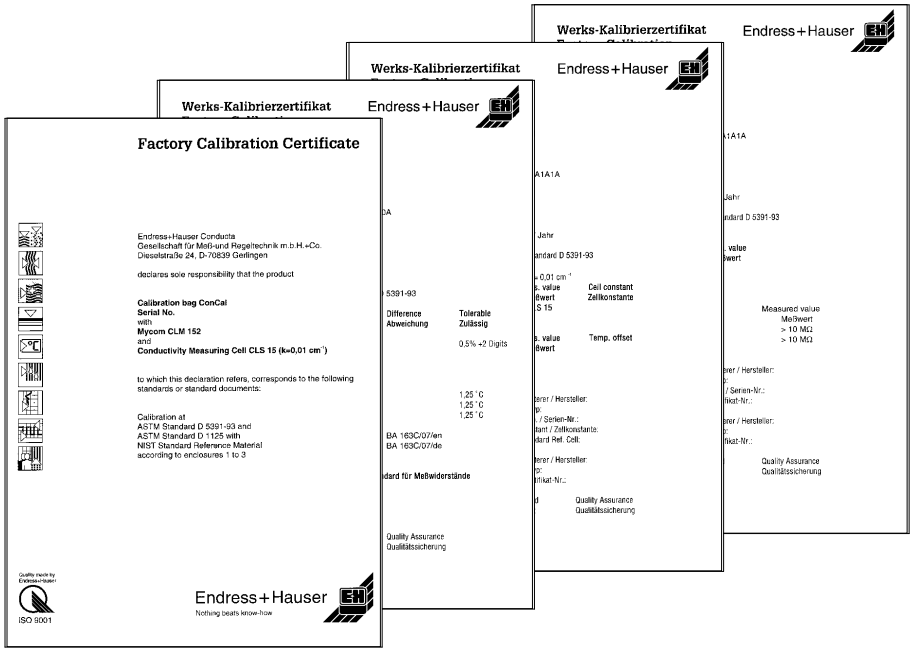
- Bubble trap (for bypass measurement)
- Rotameter flow monitoring
- Temperature resistance up to 100 °C
- Flow adjustment by means of adjusting valve

Connection



Connections for bypass arrangement

Certificates



Supplied individual calibration certificates for Concal components

Technical data

Dimensions of case (LxWxH)	520 x 340 x 165 mm
Weight	10 kg
Reference measuring instrument used	Mycom CLM 152
Measuring range	µS/cm or MΩ*cm; adjustable
Cable length	5 m
Reference measuring cell used	CLS 15
Voltage supply	230V 50Hz / 115V 50Hz
Fluid temperature range	0 – 100 °C
Flow assembly	
Mounting positions	1 to 2 for 1/2" NPT thread
Temperature range	0 – 100°C
Pressure	max. 6 bar
Minimum flow	30 l/h
Material	PVDF
Connections	
Inlet	G 1/2"
Outlet	G 1/2"
Venting	1/2" NPT
Error calculation	
Adjustment of reference unit at 149 µS/cm	
Error limit of calibration solution	0.5%
Max deviation of display range of reference unit conductivity instrument at 149 µS/cm	0.2%
Adjustment of ConCal at approx. 5 µS/cm	
Max. deviation of display range of reference unit conductivity instrument at 20 kΩ (5 µS/cm)	0.6%
Max. deviation of display range of ConCal conductivity instrument at 20 kΩ (5 µS/cm)	0.6%
Sum of all errors	Σ = 1.9%
Change in CLS 21 cell constant in conductivity range between 149 µS/cm and 5 µS/cm is not considered	

Subject to modifications.

How to order

Conductivity calibration set ConCal

Power supply 230 V AC	Order no. 50083777
Power supply 230 V AC	Order no. 50083778

Accessories/ services

☐ Recalibration
The ConCal calibration set should be calibrated at regular intervals which depend on frequency and conditions of use.
Recommended interval: 1 year.
Factory calibration by Endress+Hauser is recommended.

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