EMCO 4-electrode Conductivity Sensor
series 611

APPLICATIONS
The EMCO conductivity sensor is designed to monitor very high and very low conductivity in process solutions.

INDUSTRIES
Power plants, conventional and nuclear. Pulp & Paper. Oil & Gas industry. General food and Beverage industries. And other liquid handling industries.

CONSTRUCTION
The 4-electrode sensor principle employs two current and two voltage electrodes.
The two current electrodes apply an alternating voltage and induce a constant current loop.
The two voltage electrodes measure a voltage drop depending on the conductivity of the fluid.
The alternation eliminates the effect of polarization.
4 Electrode sensors are therefore not sensitive to contamination and have a much wider measurement range.
The electrodes are internal for use in smaller pipes and for lower conductivity ranges. Series 621 is for larger pipes and vessels.

Temperature compensation
The ionic activities increase highly with increasing temperature. In average the conductivity changes 2%/°C.
Conductivity measurements are all referred to reference temperature of 25 °C.
In industrial processes the temperature often changes therefore temperature compensation is necessary. The built-in temperature sensor is very accurate with a low response time.

Our many years in instrument design guarantees a roughed design, but still allows the possibility to solve customers’ special requirements. A selection of electrode and sensors element materials is available to suit the specific application.
PRINCIPLE OF MEASUREMENT

Electrical conductivity is the ability of a liquid to carry a current. The conductivity is equal to the conductance of the liquid times the cell constant. The conductance is the reciprocal of the electrical resistance of the liquid measured. The cell constant is equal to the distance between the electrodes divided by the effective area of the electrodes.

Cell constant
The cell constant is equal to the distance in cm between the electrodes divided by the effective area in cm² of the electrodes. The applicable value of the cell constant depends on the conductivity of the solution being measured. Low conductivity requires low cell constant and high conductivity requires high cell constant.

Factory determined cell constant ensures highest accuracy. The cell constant is marked on the sensor. The dedicated analyzer is programmed with this specific cell constant ensuring the highest accuracy.

FEATURES

Easy to install  I  Applicable for high temperature and pressure  I  Rugged design  I  Wide selection of materials and mounting options  I  Resistant to scaling.

TECHNICAL SPECIFICATION

Measuring range : 0,2 μS/cm to 1000 mS/cm.
Material. electrodes : Stainless steel AISI 316, other materials on request.
Other materials on request.
Material. electrode holder : PTFE.
Process connection : 1” external thread BSP or NPT, 1” or 1¼” internal thread BSP P or NPSM.
Seal ring (between sensor and process) : PTFE.
Installation lengths : 130 mm (standard), 350 to 3500 mm see coding for selection.
Pressure : Max 30 bar-g, higher pressure on request.
Temperature : Max 200°C.
Temperature element : Pt1000 Class A
Cell constant : individually determined, value is marked on sensor body.
Uncertainty : 1 % per decade.
Protection class : IP 67.
Electrical connection : 9 pin connector, or fixed cable.
CALIBRATION

The sensors can be calibrated in one or several points documented at reference temperature of 25°C

DOCUMENTATION

Dimensional drawing
Material certificate according to EN 10204-3.1
Pressure test certificate
Calibration certificate
Instruction manual

OVERALL DIMENSIONS

Dimensions in mm

ACCESSORIES

With our fully equipped machine shop including welding EMCO Controls can supply mechanical parts including flow tubes, by-pass systems etc.

QUALITY ASSURANCE

EMCO Controls is certified according to ISO 9001- 2008, Pressure Equipment Directive PED Module H, and welding quality certificate to EN 3834-2.
SENSOR CODING

1. Type 611

2. Mounting
   1” BSP ext. code 2BE
   1” NPT ext. code 2NE
   1” BSP int. code 2BI
   1” NPT int. code 2NI
   1 ¼” BSP int. code 3BI
   1 ¼” NPT int. code 3NI

3. Electrode type
   Internal code 1

4. Electrode material
   Stainless steel 316 code 316
   Other, please specify

5. Sensor body
   316/PTFE code 3P
   Other, please specify

6. Length, insertion
   130 mm code 013
   350 mm code 035
   500 mm code 050
   1000 mm code 100
   1500 mm code 150

7. Cable connection
   connector code C
   fixed code F

8. Cable length
   5 meter code 05
   10 meter code 10
   20 meter code 20
   30 meter code 30

Example

Conductivity sensor with 1” BSP internal thread, internal electrodes in stainless steel 316, sensor body in AISI 316 and PTFE and installation length 132 mm, cable connector, 5-meter cable length has following code:

611-2BI-1-316-3P-013-C-05