Silver Ion Sensors

ELECTRO-CHEMICAL DEVICES

Features	Benefits
• Model S80 Universal Style Sensors	• Insertion, Immersion or Valve Retractable Service
• Multiple materials of construction	• 316 Stainless Steel, Titanium, Hastelloy
• Integral Signal Conditioner	• Noise free transmission
• Replaceable Electrode Cartridge	• Simple and Economical Service
• Dual Channel Analyzers, pH/pION, pION/pION	• Mix and Match your choice of measurements

Model S80 Sensors
Silver Ion Sensors

Description

The Model S80 universal sensors provide a stable and economical platform for the in line measurement of pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity or Resistivity. The Model S80 is an insertion or immersion style sensor for use in pipe Tees or on the end of a Stand Pipe for immersion into a tank or pond. The Model S80 is also available as a valve retractable design allowing insertion or removal of the sensor into a pipe without interrupting the process flow. Both sensor designs use easily replaceable electrode cartridges. ECD offers several ion selective electrode cartridges suitable for continuous online measurement.

The Silver Ion Electrode is a combination electrode with a silver sulfide (AgS) solid state pressed crystal sensing element and a double junction reference electrode. The Silver Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free silver ions in the measured solution. The typical output is 54mV to 60mV per decade of change in concentration. The speed of response varies from a few seconds in concentrated solutions up to a few minutes in the lower ppm ranges. The Silver Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. These analyzers will measure silver from 0.01 ppm to 108,000 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

All silver sulfide based solid state ion electrodes are poisoned by mercury ions in solution. Mercury must be absent from the measured solution. Polishing the sensor with the supplied polishing strips will restore the function if a mercury amalgam forms on the electrode. In ammonia-free basic solutions, silver reacts with hydroxide ions to form a precipitate of Ag_2O, silver oxide. This can be avoided by keeping solutions slightly acidic, the pH of silver solutions should be below pH 8 for low ppm measurements.

The sensor is calibrated using two standard solutions differing in concentration by a factor of 10, i.e. 10 ppm and 100 ppm. The calibration sets the slope of the electrode, mV/decade, and the zero potential for the sensor.

In many cases the process solution's ionic strength, temperature and pH value will differ widely from the calibration solution. These factors will affect the zero potential of the chloride sensor causing an offset, but they will typically not affect the slope. To eliminate the offset perform a standardization, a single point in-line calibration. Once the sensor has stabilized in the process solution take a grab sample from the process and determine the silver ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

Specifications

Model S80 Silver Sensors
Combination electrode cartridge with a silver sulfide measurement cell and a double junction, KNO_3/KCl /AgCl, reference electrode, signal conditioner, ATC

Electrode Slope
54 ± 5 mV per decade of concentration change

Measurement Range
Silver: 0.01 to 108,000 ppm (2-12 pH)
10^{-7} molar to 1 molar

Temperature Range
0° C to 80° C (32° F to 176° F)

Pressure Range
0 - 50 psig (0 - 3.5 barg)

Response Time
T90 in 10 seconds

Electrode Life
6 to 12 months

Interfering ions
none, mercury must be absent

Wetted Materials
Radel, epoxy, AgS, PTFE, 316 SS, Viton O-Ring

Process Connections
S80 Insertion: ¾" MNPT compression fitting
S80 Valve Retractable: 1" MNPT Ball Valve

Model T80 Transmitter
General purpose, ½ DIN, NEMA 4X, 110/220 VAC, 24 VDC or 4-20 mA loop powered, CE Marking, single or dual channel, (1) or (2) 4-20 mA outputs, optional (3) Alarm Relays 250 VAC 3 amp, MODBUS RTU (standard) or HART 7, Auto ranging display, ppb → ppm → ppthousand

Part No.	Model and Product Description
S80-00-0002-0100-083	S80 Silver, Ag^+ insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-083	S80 Silver, Ag^+ insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-083	S80 Silver, Ag^+ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-083	S80 Silver, Ag^+ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 30 ft cable
T80-10-21-00-1	Model T80 Single Channel Transmitterr, 110/220 VAC, (1) 4-20 mA outputs, (3) Alarm Relays, UM
T80-11-21-20-1	Model T80 Dual Channel Transmitterr, 110/220 VAC, (2) 4-20 mA outputs, (3) Alarm Relays, UM

Part No.	Spare Parts and Accessories Description
2005016.VIT	Silver Ion Electrode, Radel body, double junction Teflon Ref, 0.01 -108,000 ppm, 0°-80°C
2010461	Silver Ion Calibration Solution, 10 ppm, 500 ml
2010462	Silver Ion Calibration Solution, 100 ppm, 500 ml
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes

Specifications subject to change without notice.

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