Nitrate 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
Nitrate 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 Nitrate Ion Electrode is a combination electrode with a sensing element made of a PVC membrane containing an ion exchanger and a double junction reference electrode. The nitrate Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of nitrate ions in the measured solution. The typical output is 50mV 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 Nitrate Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. These analyzers will measure nitrate ions from 0.1 ppm to 14,000 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

The Nitrate Ion Electrode is an ion exchange sensor that is selective for nitrate ions but many anions also interact with the sensing membrane. Chlorate, iodide, cyanide and chlorite ions all strongly interfere with the measurement. Bromide, bisulfide and nitrite interact at 20 to 40:1 with chloride, carbonate and bicarbonate interacting 250 to 500:1. The chloride ion is very common in water and with 250 chloride ions generating the same signal as 1 nitrate ion, care must be taken in low level measurements, Chloride Compensation is available on the T80 dual channel analyzer.

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.

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

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Specifications

Model S80 Nitrate Sensors

Combination electrode cartridge with a PVC/ion xchgr 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

Nitrate: 0.1 ppm to 14,000 ppm (3-11 pH)
7 x 10^{-6} molar to 1 molar NO_3

Temperature Range

0° C to 40° C (32° F to 104° F)

Pressure Range

0 - 50 psig (0 - 3.5 barg)

Response Time

T90 in 10 seconds

Electrode Life

3 to 6 months

Interfering ions

ClO4, ClO3, I, CN, Br, NO2, HS, HCO3, CO3, Cl,

Wetted Materials

Radel, epoxy, PVC, 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
S80-00-0002-0100-080	S80 Nitrate, NO_3^- insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-080	S80 Nitrate, NO_3^- insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-080	S80 Nitrate, NO_3^- Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-080	S80 Nitrate, NO_3^- 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
2005086.VIT	Nitrate Ion Electrode, Radel body, double junction Teflon Ref, 0.1 ppm -14,000 ppm, 0°-80°C
2010451	Nitrate Ion Calibration Solution, 1 ppm, 500 ml
2010465	Nitrate Ion Calibration Solution, 10 ppm, 500 ml
2010452	Nitrate Ion Calibration Solution, 100 ppm, 500 ml
S80-00-0002-0100-075	S80 Chloride, Cl^- insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable with Potassium electrode (for Chloride Ion compensated measurement)
2005008.VIT	Chloride Ion Electrode, Radel body, double junction Teflon Ref, 2 ppm -35,000 ppm, 0°-80°C

Specifications subject to change without notice.

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CERTIFIED ISO9001 QUALITY SYSTEM