



### HCA1 Chlorine Plus Test Kit

- Measures Free and Total Chlorine
- USEPA, DIN and ISO compliant Test Method
- Photometric measurement using a 525 nm LED
- 4 ml sample cell uses 60% less chemical per test
- Easy to use, Fast and Accurate
- Waterproof rating IP67
- 0 - 11 ppm range



### H10C Handheld Conductivity, Salinity, TDS & Temp

- Large LCD Display with Backlight
- Displays Conductivity, Salinity or TDS and Temp.
- 4 wire Conductivity Electrode with TC
- Calibration stored in nonvolatile memory
- Adjustable TDS and Temp. Coefficients

### H10 Handheld pH/ORP & Temperature Meter

- Large LCD Display with Backlight
- Displays pH or mV and Temperature
- Resolution of 0.1 mV in ORP or Ion Mode
- Automatic or Manual Temp. Compensation
- Automatic Buffer Recognition
- Calibration stored in nonvolatile memory



### L20 Laboratory Conductivity, TDS & Temp Meter

- Large LCD Display with Backlight
- Displays Conductivity or TDS and Temperature
- 2 wire Conductivity Electrodes with TC
- Calibration stored in nonvolatile memory
- Accepts 4 Cell Constants for improved accuracy

### L20 Laboratory pH/ORP & Temperature Meter

- Large LCD Display with Backlight
- Displays pH or mV and Temperature
- Resolution of 0.1 mV in ORP or Ion Mode
- Automatic or Manual Temp. Compensation
- Automatic Buffer Recognition
- Calibration stored in nonvolatile memory

Specifications subject to change without notice.

Represented by:

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SF Cat D1916



## ECD Analytical

Your Liquid  
Measurement Expert

## Field Proven Industrial Analytical Solutions for the Water Industries

## About Us

Electro-Chemical Devices (ECD) is a manufacturer of liquid analytical process instrumentation. Founded in 1977, ECD has been in business for over 35 years and has built its industry leading reputation by its commitment to our customers through this basic approach: Provide quality products, develop technical innovations and provide responsive, knowledgeable service.

Our products and services are used in some of the most demanding applications and industries, such as: Chemical, Food & Beverage, Oil & Gas, Mining, Power Generation, Pulp & Paper, Semi-conductor, Steel, Water and Wastewater. Understanding the demands of these applications, we have developed our products with unique features and technical advantages that are focused on quality, reliability, ease of use and maintenance resulting in lowering the total cost of ownership.

## Where Liquid Processes are Critical... ECD has the Application Specific Analyzers



Field Proven Analytical Solutions for....

- Water and Waste Water Management
- Power Generation Industries
- Drinking Water - Food & Beverage
- Semiconductor Water Treatment
- Petro-Chemical Refineries
- Pulp & Paper - Metals & Mining
- Aerospace - Military



## Complete Line of Industrial Liquid Analytical Solutions



### Solve

ECD Sensors are long lived with easily replaceable electrode cartridges that reduce maintenance time, cost and waste. There are unique field proven electrode formulations and designs for specific applications.



### Measure

ECD standard industrial products have design flexibility with materials and configurations for your specific installation requirements.



### Control

ECD products are offered as complete panel mounted products, stand alone batch analyzers, or transmitters with remote sensors.



### Support

We are here to help you to solve your requirements with our ECD support team of Chemists, Application Engineers, Service and Customer Service Specialists, and our worldwide network of trained local Sales Representatives.



# Model T80 and X80

Universal Transmitters and Analyzers

# Model S80 Intelligent Sensors

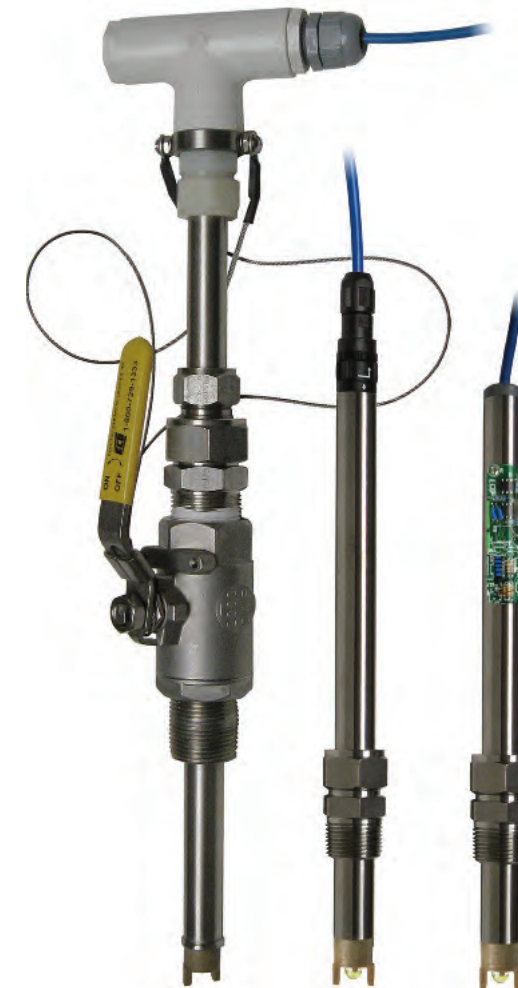
pH, ORP, pION, Dissolved Oxygen, Conductivity, Resistivity



Model T80  
General Purpose



Model X80  
Hazardous Location



- **Intelligent Sensor Design with digital communication**
- **Multiple Measurement Parameters**
- **Application Specific Electrode Cartridges**
- **Easily replaceable, long lived Electrode Cartridge**
- **Insertion, Immersion and Valve Retractable Designs**
- **Various Industrial Grade materials of construction**

## Plug and Play selection with any S80 Sensor

pH, ORP, pION, Dissolved Oxygen, Conductivity, Resistivity, Turbidity, Suspended Solids, Free Chlorine, Total Chlorine, Chlorine Dioxide

### Capabilities

Single or Dual Channel, Digital Protocol with interactive channel calculations

### Power

Loop, 24 VDC, 100-240 VAC

### Communication

4-20 mA, MODBUS RTU, optional HART®7 communication

### Outputs

3 SPDT form 1C relays, user configurable as Hi/Lo Alarm, Fault or Timer



**pH Selections:** General Purpose (GP), High Temperature Cycling (HT CYCLE), High Purity Water (HPW), Non-Conductive Solutions (SUGAR), High Temperature (HT), Scrubber (SCRUB), Sulfide Resistant (SULF RES), Abrasive Slurry (SLUR), Solvent Resistant (SOLV RES), Fluoride Resistant (FLRD RES) **ORP Selections:** General Purpose (ORP), High Range (ORP-HR) **Dissolved Oxygen Selections:** General Purpose (GP-DO), Thick Membrane (TK-DO), Protected Membrane (FC-DO), part per billion (ppb-DO) **Ion Selections:** Ammonia (NH3), Ammonium (NH4), Bromide (BR), Cadmium (CD), Calcium (CA), Chloride (CL), Cyanide (CN), Cupric (CU), Fluoride (FL), Lead (PB), Nitrate (NO3), Nitrite (NO2), Potassium (K), Silver (AG), Sodium (NA), Sulfide (S)





## FC80 Free Chlorine, TC80 Total Chlorine, DC80 Dechlorination CD80 Chlorine Dioxide Analyzers

- No Reagents Required
- Compliant with EPA Method 334.0
- Automatic Flow Control and Large Flow Tubes eliminates clogs
- Panel Mounted System Plumb and Play Design
- Dual Measurements (2) 4 to 20 mA output, MODBUS RTU or HART communication, (3) Alarm Relays, 24 VDC or 110/220 AC Power.
- Auto Spray Cleaning Option

## Chlorine Analyzers

## TRITON® DO82 Optical Dissolved Oxygen Analyzer

- Fluorescence Quenching Optical Dissolved Oxygen Analyzer
- Intelligent Sensor with Stored Calibration Data
- ULTRA Long Life Membrane Cap provides years of service
- Membrane Cap is Easily Replaceable no need to return the sensor for factory repair
- Waterproof Fixed or Detachable Cable
- Immersion and flow through assemblies,
- Automatic spray cleaning systems.
- Interfaces with T80 Transmitter or C22 Controller



## Optical Dissolved Oxygen



## S80 Conductivity and S80 Resistivity Sensors

- Measurement range: Resistivity 0.00-50.00 meg-ohms  
Conductivity 50  $\mu$ S – 50 mS  
Inductive Conductivity 100  $\mu$ S – 1000 mS
- Temperature range: -20° – 130°C (inductive 0° – 80°C)
- Wetted Materials: 316L SS, PEEK, VITON
- Intelligent Sensor: Stores Identity and Calibration Information
- Insertion/Submersion with adjustable gland fittings and Valve Retractable Designs
- Wide Variety of Materials of Construction
- Inductive Conductivity with 3/4" entry
- Compatible with T80 Transmitter

## Conductivity/Resistivity

## TRITON® DO90 ppb Dissolved Oxygen Sensor

- 316L Stainless Steel Body and Flowcell
- Easily Replaceable Electrode Cartridge
- Galvanic, Lead Silver measurement
- Long maintenance interval
- Easy calibration, 0 ppb Sulfite Solution and Air
- Intelligent Sensor with Stored Calibration Data
- Compatible with T80 Transmitter



## ppb Dissolved Oxygen



## TRITON® TR86 Turbidity and Suspended Solids Sensor

- Compatible with T80 Transmitter
- Single or dual Channel
- Front Mounted or Side Mounted Optics
- Immersion, Flow Through or Valve Retractable installation
- NTU, FNU, mg/l, ppm or % Solids readout
- Intelligent Sensor with Stored Calibration Data
- Available in Three Ranges, 0-1000, 0-2000 and 0-4000 NTU

## Turbidity and Suspended Solids



## CA6 Colorimetric Analyzers - Aluminum, Ammonia, Chlorine, Chloride, Chromium VI, Copper, Cyanide, Hardness, Iron, Manganese, Nickel, Nitrate, Nitrite, Phosphate, Total Phosphate, Silica, Sulfate, Zinc

- On-line sequential sampling analyzer
- Epoxy Powder Coated Cold Rolled Steel Cabinet
- Wall Mounted standard, Bench top stand is optional
- User friendly touchscreen menu structure
- Easy configuration of cycle times and auto calibration cycles
- 4-20 mA output with two Alarm Relays, Hi/Lo Alarm, Loss of Sample, Low Reagent
- 30 Day data logging, download CSV file to USB data port

## Colorimetric Analyzer

## HYDRA Ammonium Analyzer and HYDRA Nitrate Analyzer

- Reliable ISE Technology
- Ammonium as Nitrogen, NH<sub>4</sub><sup>+</sup>-N
- Measurements, NH<sub>4</sub>, K, pH, Temp
- Auto Compensation for K<sup>+</sup> interference and pH
- Nitrate as Nitrogen, NO<sub>3</sub>-N
- Measurements, NO<sub>3</sub>, Cl, Temp, NH<sub>4</sub> or pH optional
- Auto Compensation for Chloride interference
- Rugged PVC design
- Integral Spray Cleaner



## Ammonium and Nitrate

## SMS22 Sulfide Ion Monitoring System

- Sequential Sampling Measurement System, conditions, measures, neutralizes, drains and rinses
- pH Adjusted and Compensated Measurement the sample is optimized for the sulfide ion that only exists at high pH values
- ISE based provides a wide measurement range, 20 ppb to 500 ppm
- Economical, easily replaceable electrode cartridges
- Sample Neutralized After Measurement the highly caustic sample pH is reduced to a safe level near pH 8
- Easily adjustable from 2 samples per hour to 10 samples per hour.
- Low Reagent Consumption



## Sulfide Ion Analyzer

# Liquid Analytical Instrumentation for Process Control



**ELECTRO-CHEMICAL DEVICES**

pH  
ORP  
Turbidity  
Specific Ion  
Conductivity  
Water Analyzers  
Dissolved Oxygen

## ***INDUSTRIAL APPLICATIONS***

Petro-Chemical Processing  
Biotech & Pharmaceutical  
Waste Water Treatment  
Chemical Processing  
Power Generation  
Food & Beverage  
Semi-Conductor  
Industrial Water  
Drinking Water

**Electro-Chemical Devices (ECD)**, not only provides you access to a broad product line of application specific instruments and sensors .... you are also supported by a company with years of successful installations and application experience. This industry knowledge has been incorporated into each instrument and sensor design we manufacture. The following guide is a partial list and provides as an overview to various industrial applications that utilize ECD's products for a solution. Contact ECD and our worldwide sales representatives to solve your measurement requirements.

the liquid  
analytical  
instrument  
experts  
since 1977

## Waste Water Treatment

Application	Measurements	Recommended Products
Incoming Sample	<b>pH, ORP AC10 Spray Cleaner</b>	Biofilm coating - use the AC10 spray cleaner, T80, S80 sensor with 2005145 pH electrode
Primary Clarifier	<b>Turbidity, Ammonium</b>	Turbidity - Triton®TR8 - High Range Ammonium Measurement - HYDRA NH4-N
Biological Treatment (Aeration Basin)	<b>Dissolved Oxygen, pH, Ammonium, Nitrate, Suspended Solids AC10 Spray Cleaner</b>	Dissolved Oxygen - Triton®DO8 with AC10 pH Measurement - T80 or C22 with S10 pH Sensor with 2005145 pH electrode Ammonium - Model HYDRA NH4-N Analyzer with AC10, Nitrate - Model HYDRA NO3-N Analyzer Suspended Solids - Triton®TR8, High Range
Secondary Clarifier	<b>Suspended Solids, Nitrate, Phosphate</b>	Activated Sludge Return-Triton®TR8-High Range Effluent from overflow or centrifuge Triton®TR8 Nitrate-HYDRA NO3-N, CA-6 Phosphate
Sludge Thickening	<b>Suspended Solids</b>	Sludge to Digester - Triton®TR8 - High Range Effluent from overflow - Triton®TR8
Sludge Digester	<b>Suspended Solids, pH, ORP</b>	Feed from Sludge Thickening - Triton®TR8, High range pH & ORP Sensors Model S10
Denitrification	<b>Nitrate</b>	Nitrate - Model HYDRA NO3-N Analyzer with AC10
Chlorination and Dechlorination	<b>Free Chlorine, Total Chlorine</b>	FCA-22 Free Chlorine Analyzer TCA-22 Total Chlorine Analyzer
Effluent	<b>pH, ORP, Conductivity, Dissolved Oxygen, Turbidity, Colorimetric</b>	pH & ORP Sensors Model S80 with T80 or C22 Toroidal Conductivity S10 Sensors with T80 or C22 Dissolved Oxygen-Triton®DO80, CA-6 Total Nitrogen, CA-6 Total Phosphorus Turbidity, suspended solids, Triton®TR8

## S80, S10 & S17 Sensors

Multiple individual measurement parameters in the same mechanical configuration - **pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity**. Features Include: application specific, replaceable electrode cartridges, Various process fittings with adjustable insertion lengths, Industrial housing materials for compatibility with process fluid.



### Petro-Chemical Processing

Application	Measurements	Recommended Products
Sour water/gas	<b>pH</b>	Sulfides poison electrodes - use T28 PHS10/17 and 2005130
Overhead crude	<b>pH</b>	Oil coating and sulfides - use T28 and PHS10/17 and 2005130
Waste Water Treatment	<b>pH, ORP, Turbidity Dissolved Oxygen, pION</b>	Coating and scaling - use T28 and PHS10/17 and 2005145, ORP for sulfide removal Turbidity - Triton®TR8 - High Range / Low Range Dissolved Oxygen - Triton®DO8 or S10 Sensor
Cooling Towers	<b>pH, ORP, Conductivity Cooling Tower Control Free Chlorine</b>	Biofilm coating - use AC10 spray cleaner, T28, S10 and 2005145 pH, 2005067 ORP and Toroidal Model 2122 Cooling Tower Controller, FCA-22 for oxidant control

### Food and Beverage

Application	Measurements	Recommended Products
Concentration Control	<b>Conductivity</b>	For Highly Conductive Solutions use a T23 and a KYNAR toroidal sensor.
Waste Water Treatment	<b>pH, Ammonium Dissolved Oxygen</b>	Oily and Coating use a T23 with an S10/17 sensor and 2005145 electrode. Triton®DO8 dissolved oxygen, HYDRA NH4-N
CIP Control	<b>pH, Conductivity, Resistivity</b>	Two conductivity measurements on the C22, Toroidal for the wash cycle and resistivity for the rinse cycle.
Food Processing Sanitation, Vegetable or Fruit Rinse Wash Water	<b>Chlorine Dioxide Free Chlorine</b>	Use Model CDA-22 Chlorine Dioxide Analyzer The CDA-22 design avoids dirty rinse water from easily fouling or clogging the analyzer or if chlorine is used the FCA-22 will replace the CDA-22



## Turbidity and Suspended Solids

The Triton®TR8 uses the nephelometric method for determining the turbidity of the sample. This method directs a light beam into the sample where it is scattered by suspended particles. The light is measured at an angle of 90°. The sensor uses a long lived near infrared LED source, has self monitoring diagnostics, and Factory Calibration stored in its memory that assures trouble free service.

### Electronics and Semi Conductor

Application	Measurements	Recommended Products
Concentration Control	<b>Conductivity</b>	For Highly Conductive Solutions use a T80 and a S80 toroidal sensor
Rinsing	<b>pH, Resistivity</b>	The solutions are getting more dilute use T80 and S80resistivity, also possible pH neutralizations
Waste Treatment	<b>pH, ORP Dissolved Oxygen pION</b>	Possible Copper Ion, Fluoride Ion measurements, coating issues use a T80, S80 pH, ORP, pIon and dissolved oxygen sensors
De-ionized Water	<b>pH, Resistivity CA6 Colorimetric</b>	Resistivity is the control parameter, use T80 and S80resistivity, pH is a check, use S80 PH 2005145, CA6 for Silica break through on resin bed
Resin Regeneration	<b>Conductivity Resistivity</b>	Two measurements on the C22, Toroidal on the wash and resistivity on the rinse cycle.

### Metals and Mining

Application	Measurements	Recommended Products
Chrome Reduction	<b>pH, ORP</b>	Easy application, but aggressive. Use T80 with S80 PH sensor with 2005130 electrode.
Cyanide Destruction	<b>pH, ORP</b>	Potential poisoning of the electrode. Use T80 with S80 PH sensor with 2005130 electrode.
Waste Water Treatment for Steel Manufacturing	<b>pH CA6 Colorimetric Analyzer</b>	Oily coatings use a T80 with an S80 sensor and 2005169 electrode. CA6 for monitoring metals content of effluent.
Flotation Separations	<b>pH</b>	Mineral coating, use AC10 spray cleaner and C22 with PHS10 sensor with 2005169 electrode
Chemical Concentration	<b>Conductivity pION</b>	Highly conductive, use T28 and a S10 KYNAR Torodial sensor
Rinse applications	<b>pH, Conductivity</b>	Wide pH swings, use T80 transmitter S80 PH and 2005145 electrode



## Transmitters and Controllers

ECD manufactures a family of transmitters and controllers for multiple measurement parameters. The T80 Universal Transmitter is a loop powered 4 to 20 mA general purpose instrument. The Model T28 is a loop powered transmitter for use in hazardous locations. The C22 controller is a programmable instrument with numerous control functions.



### Pulp and Paper

Application	Measurements	Recommended Products
Liquor Recovery	<b>pH, Conductivity</b>	Caustic and corrosive use T28, Titanium PHS17, 2005130 and 1" Toroidal
Head Box (Paper)	<b>pH</b>	The T80 with a S80 PH and 2005145 for variable insertion length and easy cleaning
Filtrate	<b>Turbidity</b>	Monitor cloudy filtrate and white water with high dry content - Triton®TR8
Pulp Stock	<b>pH, Conductivity</b>	Aggressive and Coating use T28 and PHS17 with 2005160 and Toroidal for conductivity

### Chemical Processing

Application	Measurements	Recommended Products
Neutralizations	<b>pH</b>	Typically aggressive - use T28, PHS10/17 & 2005169
Concentration Control	<b>ORP, Conductivity</b>	Highly conductive - use T28 and KYNAR Toroidal P/N CS10/17
Waste Water Treatment	<b>pH, ORP, Turbidity Dissolved Oxygen Free &amp; Total Chlorine pION</b>	Potential coating problems - use T80 and S80 PH and 2005145 electrode Turbidity - Triton®TR8 - High Range / Low Range Dissolved Oxygen - Triton®DO80 or S10 Sensor FCA-22 Free Chlorine Analyzer TCA-22 Total Chlorine Analyzer
Gas Scrubbers	<b>pH, ORP, Conductivity</b>	Caustic and corrosive - use T28, PHS17 and 2005130 pH and 2005067 for ORP.
Cooling Towers	<b>pH, ORP, Conductivity Cooling Tower Control</b>	Biofilm coating - use AC-10 spray cleaner on pH and ORP, C22 with 2 PHS10s and 2005145 pH, 2005067 ORP electrodes. T80 with S80 Toroidal. Model 2122 Cooling Tower Controller



## Sanitizer and Water Analyzers

ECD manufactures several panel mounted analyzers that allow installation and commissioning to be completed in just a few simple steps. The disinfectant/sanitizer line of analyzers includes: the Model FCA-22 Free Chlorine Analyzer, TCA-22 Total Chlorine Analyzer, CDA-22 Chlorine Dioxide Analyzer and DCA-23 Seawater Chlorination/Dechlorination Analyzer.

### Biotech & Pharmaceutical

Application	Measurements	Recommended Products
Product recovery	<b>pH Conductivity</b>	Solvents and high salt concentrations use T28 PHS10/17 with 2005169 and Toroidal sensor
Waste Treatment	<b>pH, ORP Dissolved Oxygen</b>	Oil coating and sulfides - use T28 and PHS10/17 and 2005130
High Purity Water	<b>pH, Resistivity CA6 Colorimetric</b>	Resistivity is the control parameter, use T80 and S80 resistivity, pH is a check, use T80 and S80 PH, CA6 for SiO <sub>2</sub> break through in resin beds
Resin regeneration	<b>Conductivity Resistivity</b>	Two measurements on the C22, Toroidal on the wash and Resistivity on the rinse cycle.
Fermentation and Cell Culture	<b>pH, ORP Dissolved Oxygen</b>	SE Series Sterilizable/Autoclavable electrodes pH, ORP and DO and SF Series electrode fittings

### Drinking Water

Application	Measurements	Recommended Products
Intake Water	<b>Chlorine Dioxide</b>	Use the CDA-22 Chlorine Dioxide Analyzer for color and odor control
Filtration	<b>pH Turbidity</b>	pH adjustment use T80 with S80 sensor and 2005145 electrode. Turbidity for filter backwash, use the Triton®TR8, Measure turbidity after filtration with Triton®TR8
Contact Tank	<b>pH Free &amp; Total Chlorine Fluoride Ion</b>	For final pH adjust use T80 with S80 sensor and 2005145 electrode Monitor Chlorination, FCA-22, Monitor Chloramine, TCA-22 Analyzer Measure Fluoride Ion with T80 and S80 pION
Seawater Desalination	<b>Chlorination Dechlorination</b>	The DCA-23 is designed to monitor the Total Residual Oxidant and the pH of seawater and determine the equivalent chlorine concentration, to protect the RO membranes

## Dissolved Oxygen Measurement

The ECD Triton®DO80 optical dissolved oxygen sensor combines the high technology of Fluorescence Quenching with a rugged, easy to install design, ideal for aeration applications. The Triton®DO9 amperometric DO sensor with auto polarization voltage optimization and 316 SS flow cell is ideal for the low level ppb measurements typical in boiler water.



### Power Generation

Application	Measurements	Recommended Products
Boiler Water	<b>pH, Conductivity, Resistivity, pION, ppb DO, Boiler Blowdown System</b>	Each boiler will have 4-6 measurements typically on a water panel, conductivity, resistivity, DO and pH, Use 2 channel C-22 with S10 or T80 with S80. The Model 61 Boiler Blowdown System; rack mounted sludge trap and sample cooler with conductivity
De-mineralizers	<b>pH, Conductivity, Resistivity</b>	Noisy and expect shorter electrode life, use T80 and S80 PH sensor with 2005145 electrode
Resin Regeneration	<b>Conductivity Resistivity</b>	Two measurements with the C22, Toroidal on the wash and resistivity on the rinse cycle.
Cooling Towers	<b>pH, ORP, pION, Cooling Tower Control System, Free &amp; Total Chlorine</b>	Biofilm coating is the problem use a spray cleaner with the C22 and PHS10 with 2005145 electrode Model 2122 Cooling Tower Control System for pH and conductivity to control acid or base feed Model FCA-22 Free Chlorine Analyzer Model TCA-22 Total Chlorine Analyzer
Gas Scrubbers	<b>pH, ORP Conductivity</b>	Coating with lime needing regular cleaning use T80 with S80 PH and 2005160 electrode

### Aquaculture - Environmental

Application	Measurements	Recommended Products
Fish Farming	<b>Dissolved Oxygen</b>	The Triton®DO80 to maintain the oxygen for optimal growing conditions.
Aquatic Parks and Aquariums	<b>pH, ORP, pION Free Chlorine</b>	The T80 or C22 with S10/17/80 ORP sensor to control ozonation to improve water clarity, The FCA-22 Free Chlorine Analyzer for water sanitation at Aquatic Parks Monitor low level chlorine to protect sea life
Environmental Monitoring	<b>pH, ORP, pION Nitrate, Ammonium</b>	Monitor Streams, rivers, ponds, lakes, etc. Use T80 and S80 pION to monitor specific ions. The Hydra Analyzer to monitor Nitrate or Ammonium ions from agricultural runoff.

# Industrial Applications



Model CA-6

The Model CA-6 Analyzers are a family of on-line sequential sampling colorimetric analyzers. These easy to use analyzers can perform most colorimetric analysis that use less than 4 reagents. 1-4 Analyzer channels



The HYDRA Nutrient Analyzers are designed for monitoring nitrification and denitrification processes in a waste water treatment plant. The HYDRA-NH4 measures ammonium and the HYDRA-NO3, nitrate ion.



Model T80

The Model T80 Universal transmitter provides simplicity in a powerful package. This 24 VDC loop powered, 4-20 mA transmitter can measure pH, ORP, pION, Dissolved Oxygen, Conductivity or Resistivity.



Easy to use, plumb and play designs for measuring Chlorine. The FCA-22 for Free Chlorine, the TCA-22 for Total Chlorine and the CDA-22 for Chlorine Dioxide. Amperometric designs that require no reagents.



Model T28

The Model T28 microprocessor based two wire transmitter is FM and CSA approved for Class I, II, and III Division I Groups A through G environments allowing installation in intrinsically safe and explosion proof applications.



The Triton®TR8 is a nephelometric turbidity analyzer designed for use in water and wastewater. There are two versions, a Low Range for FNU values < 500 and a High Range for turbidities up to the % solids range.



C22 Controller

The C22 controller features a Multi-Bus architecture that allows up to (4) inputs and (4) 4-20 mA outputs and (8) field configurable SPDT relays, PID, PWM, timers and logic gates all in a 1/2 DIN NEMA 4X controller.



The Model 61 Automatic Boiler Blowdown Control System from ECD provides a reliable solution for the continuous control of the surface blowdown rate for commercial and industrial boilers.



Triton®DO80/DO9

The TRITON® DO80 optical dissolved oxygen sensor combines high technology in a rugged reliable design for aerated water, while the TRITON®DO9 ppb dissolved oxygen sensor excels in boiler water.



The Model 2122 Cooling Tower Control System (CTCS) from ECD is an integrated system designed to control the acid feed, blow down and inhibitor/biocide feed to a Cooling Tower.



S80 / S10 / S17

The ECD sensors are 3/4" O.D. with signal conditioner, temperature and replaceable sensing electrodes. Ball Valve Retractable and insertion, submersion designs are available in 316 SS, Titanium and Hastelloy C.



The rugged SE Series pH electrodes and SF Series fittings are in-situ steam sterilizable or autoclavable. The pH electrodes are a sealed gel filled design and the 316 SS fittings meet the EHEDG criteria.

Specifications subject to change without notice.

**Represented by:**

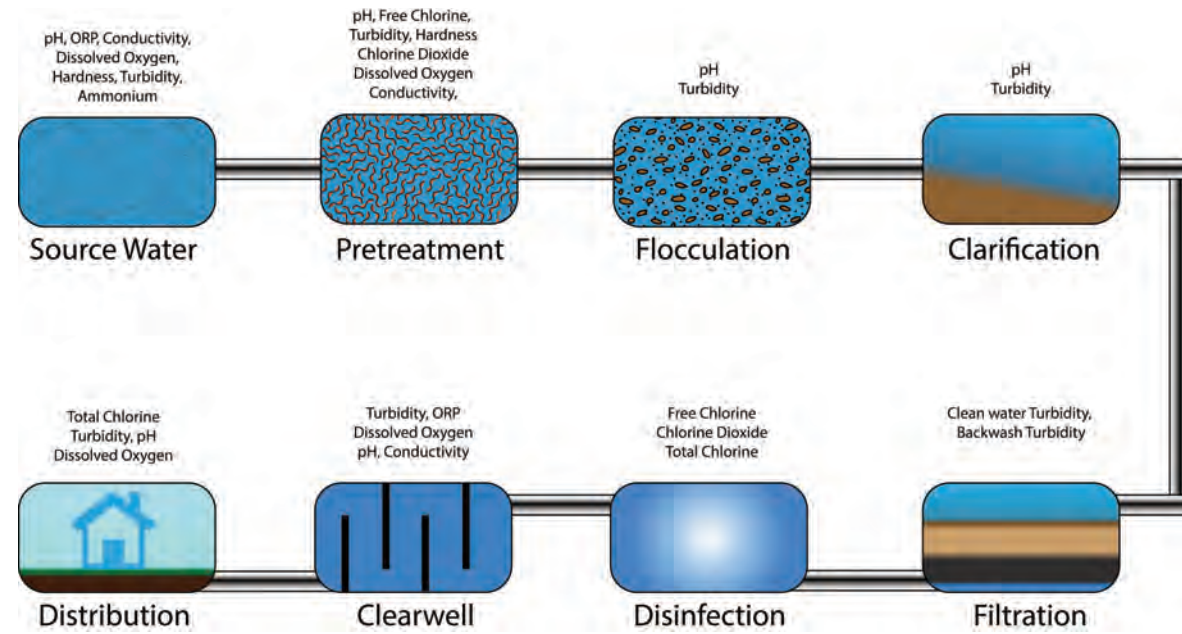
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# Drinking Water Plant Measurements



ECD Product Solutions	Model T80 Transmitter	Model S80 pH Sensors	Model S80 ORP Sensors	Model S80 Conductivity Sensors	Model FC80 Free Chlorine Analyzer	Model TC80 Total Chlorine Analyzer	Model CD80 Chlorine Dioxide Analyzer	Model CA6 Colorimetric Analyzer	Model DO82 ppm DO Sensors	Model TR86 Turbidity Sensors
Source water pH										
Source Water Conductivity										
Source Water ORP										
Source Water Dissolved Oxygen										
Source Water Turbidity										
Source Water Hardness										
Source Water Ammonia										
Pretreatment pH										
Pretreatment Conductivity										
Pretreatment Free Chlorine										
Pretreatment Chlorine Dioxide										
Pretreatment Turbidity										
Pretreatment Dissolved Oxygen										
Floc and Clarification pH										
Floc and Clarification Turbidity										
Filtration Clean water Turbidity										
Filtration Backwash Turbidity										
Disinfection Free Chlorine										
Disinfection Total Chlorine										
Disinfection Chlorine Dioxide										
Clearwell pH										
Clearwell ORP										
Clearwell Turbidity										
Clearwell Dissolved Oxygen										
Clearwell Conductivity										
Distribution pH										
Distribution Total Chlorine										
Distribution Dissolved Oxygen										
Distribution Turbidity										



**ELECTRO-CHEMICAL DEVICES**

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Liquid Analytical Instrumentation  
 for the Drinking Water Industries

## Accurate and Reliable Process Measurement

- pH
- ORP
- Conductivity
- Chlorine Dioxide
- Free Chlorine
- Total Chlorine
- Dissolved Oxygen
- Turbidity
- Suspended Solids
- Ammonia
- Hardness



**ELECTRO-CHEMICAL DEVICES**



# Source Water

The water may come from ground water or surface waters. Well water is low in organic materials but may have iron, manganese, excessive hardness and sulfides present. Surface waters are passed through a screen to remove leaves and fish but other materials are still present algae, organic matter, silt and ammonia from agricultural runoff.

### Measurements:

- Turbidity
- Dissolved Oxygen
- pH
- Conductivity
- ORP
- Hardness
- Ammonium



T80 Universal pH, ORP, ION, Conductivity, Resistivity transmitter



S80 ORP Sensors



S80 Conductivity Sensors



S80 pH Sensors



Free or Total Chlorine Analyzers



CA6 Colorimetric Hardness Analyzer



TRITON DO82 ppm Dissolved Oxygen



TRITON TR86 Turbidity



# Pretreatment

Raw water is oxidized with chlorine, chlorine dioxide or ozone to remove the metals and sulfides, kill disease causing organisms and algae. Aeration may be used to remove odors from sulfides and volatile organic compounds. The water may be pretreated using lime/sodium softening to remove excessive hardness. The pH is adjusted slightly acidic to optimize flocculation.

### Measurements:

- Free Chlorine
- Chlorine Dioxide
- pH
- Turbidity
- Conductivity
- Dissolved Oxygen
- Hardness



# Distribution

Water distribution systems consist of pipes, storage tanks, pumps and other physical features that deliver water from water treatment plant to the customer's connection. The pH is monitored to limit corrosion, total chlorine is measured to assure a residual disinfectant is present and the Turbidity and Dissolved Oxygen are monitored as general indicators of overall water quality.

### Measurements:

- Total Chlorine
- Turbidity
- Dissolved Oxygen
- pH



# Flocculation Clarification

Alum, aluminum sulfate and/or ferric sulfates or ferric chlorides are rapidly mixed in the turbid water to destabilize the particles and cause them to clump together and form a floc. The water is then slowly mixed to grow the floc until the particles are large enough to settle in a clarifier. The clear water is drawn off and sent to filtration. The settled sludge is sent to disposal.

### Measurements:

- pH
- Turbidity



# Clearwell

A clearwell is a large storage tank that holds treated drinking water for a several hours before it is distributed. The clearwell collects filtered water once the pH and chlorine levels have been adjusted to optimum levels. The clearwell also provides adequate contact time for disinfection before the water leaves the plant.

### Measurements:

- Turbidity
- Dissolved Oxygen
- pH
- Conductivity
- ORP



# Filtration

The most commonly used filter type is a dual-media filter comprised of sand and anthracite. The majority of particles removed are trapped in the upper layers of the filter. The filters are backwashed to reduce the head loss, back pressure, by removing most but not all of the trapped particles from the sand. The filter is most effective with a small amount of particles trapped in the media.

### Measurements:

- Turbidity, Clean water
- Turbidity, Backwash



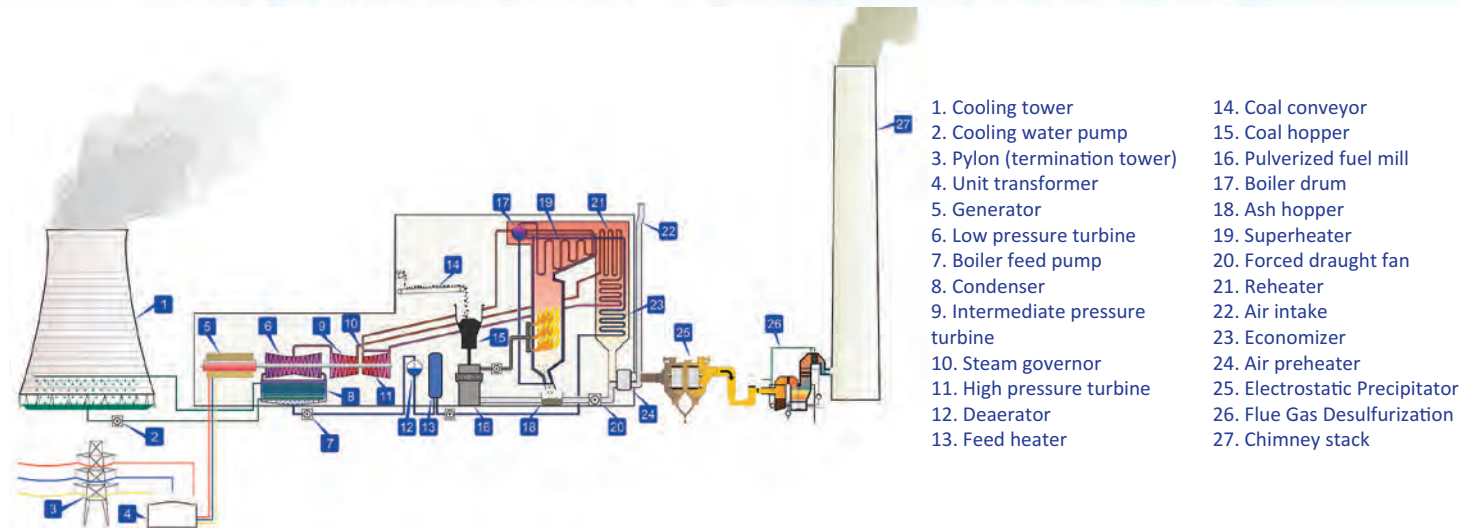
# Secondary Disinfection

To protect drinking water from disease causing organisms water suppliers add a disinfectant, such as chlorine and/or chloramine, to drinking water. Public water systems using surface water or ground water under the direct influence of surface water are required to maintain a detectable disinfectant residual in the distribution system. Chloramine provides this residual, while not as strong an oxidizer as chlorine it has increased stability.

### Measurements:

- Free Chlorine
- Chlorine Dioxide
- Total Chlorine

# Liquid Analytical Instrumentation for the Power Generation Industries



ECD Product Solutions	Model T80 Transmitter Single Channel	Model T80 Transmitter Two Channel	Model S80 pH Sensors	Model S80 Conductivity sensors	Model FC80 Free Chlorine Analyzer	Model TC80 Total Chlorine Analyzer	Model CA6 Colorimetric Analyzer	Model DO90 ppb DO Analyzer	Model DO82 ppm DO Analyzer	Model TR86 Turbidity Analyzer
Makeup water pH										
Makeup Water Conductivity										
Makeup Water Free Chlorine										
Makeup Water Total Chlorine										
Makeup Water Conductivity % rejection										
Makeup Water Silica										
Condensate Dissolved Oxygen, ppb										
Condensate pH										
Condensate Conductivity										
Condensate Cation Conductivity										
Condensate Silica										
Feedwater Dissolved Oxygen, ppb										
Feedwater Conductivity										
Feedwater pH										
Feedwater Cation Conductivity										
Boiler Water Dissolved Oxygen, ppb										
Boiler Water pH										
Boiler Water Conductivity										
Boiler Water Cation Conductivity										
Boiler Water Silica										
Cooling Water pH										
Cooling Water Conductivity										
Cooling Water Free Chlorine										
FGD Scrubber pH										
Effluent pH										
Effluent Conductivity										
Effluent Total Chlorine										
Effluent Dissolved Oxygen										
Effluent Turbidity										



## Accurate and Reliable Process Measurement

- pH
- ORP
- Conductivity
- Resistivity
- Free Chlorine
- Total Chlorine
- Dissolved Oxygen
- Phosphate
- Ammonia
- Silica



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## Makeup Water

Raw water is chlorinated, to prevent microbial growth in Pretreatment and then dechlorinated. The water may be pretreated by reverse osmosis, lime softening or sodium softening to remove excessive hardness. It is finally demineralized using Ion exchange resins, typically in Cationic, Anionic and Mixed Bed exchangers.

### Measurements:

- Free Chlorine • Total chlorine • pH
- Conductivity • Resistivity • Silica
- Dual conductivity, % rejection

## Condensate

Steam is condensed to water and collects in the hotwell. Leaks in the Condenser tubes can introduce impurities, gasses and corrosive salts from the cooling water. Leaks must be detected quickly to avoid damage to the boiler. Impurities are removed by the condensate polishers and the purified water is blended with the Make Up water to become Feedwater.

### Measurements:

- Dissolved Oxygen, ppb level
- Cation conductivity • Conductivity
- High Purity pH • Silica

## Feed Water

The Feedwater is preheated, deaerated and sent to the Economizer and Boiler. The water quality requirements of the boiler must be met at this stage to assure the boiler efficiency and steam quality. Impurities in the feedwater may cause corrosion in the boiler piping and will increase the rate of blowdown.

### Measurements:

- Dissolved Oxygen, ppb level
- Cation conductivity
- Conductivity • High Purity pH

## Boiler Water

The boiler converts water into steam. Steam is separated from water in a drum boiler, and any contaminants are concentrated in the water as the steam is generated. These impurities are removed by Blowdown. High concentrations of dissolved solids can form deposits on the heater tubes lowering the efficiency or corroding the super heater tubes. Steam quality also suffers allowing solids carryover that will deposit on the turbines.

### Measurements:

- High Purity pH • Silica • Conductivity
- Cation conductivity
- Dissolved Oxygen, ppb level

## Condenser

Hot Water ↓

↑ Cold Water

## Cooling Tower

The cooling tower uses evaporative cooling to provide the Condenser and other heat exchangers with cooling water. The pH of the water is monitored to minimize scaling and corrosion. The blowdown is controlled by conductivity.

### Measurements:

- pH • Conductivity
- Free and/or Total Chlorine

## HP/LP Turbines

## Effluent

Water from cooling tower blowdown, resin bed regeneration and any other water that cannot be reused must be treated to the environmental standards before being released from the plant

### Measurements:

- pH • Conductivity • Total Chlorine
- Dissolved Oxygen • Turbidity

## Superheater

## Scrubbers

Flue gas desulfurization removes sulfur dioxide, SO<sub>2</sub>, an acid rain gas from the flue gas. A suspension of limestone is sprayed into the flue gas, the SO<sub>2</sub> reacts with the limestone and air to precipitate gypsum which is separated and sold.

### Measurements:

- pH

Steam  
Blowdown



### Industrial Analytical Measurement Designed for Power Plants

- **S80 High Purity Water pH Sensor** - designed for long life and quick easy electrode replacement.



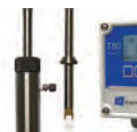
no need to replace the complete sensor -- just the HPW electrode

- **FC80/TC80 "Reagentless" Chlorine Analyzers** - simple installation and low maintenance



no costly reagents needed -- lowers overall running cost

- **Triton DO90 ppB Dissolved Oxygen Analyzer** - SST flow cell with quick easy electrode replacement



Like the HPW pH sensor -- quick easy electrode replacement



T80 Universal pH, ORP, ION, Conductivity, Resistivity transmitter



CSX2 Conductivity Resistivity Sensor



S80 High Purity pH Sensors



S80 Conductivity Sensors



FC80 or TC80 Chlorine Analyzers



TRITON TR86 Turbidity



TRITON DO90 ppb Dissolved Oxygen



CA6 Colorimetric Silica Analyzer



## ECD Is The Smart Choice For Your Plant



### PRIMARY | SECONDARY | TERTIARY

ECD is the smart choice in liquid analytical instrumentation for municipal wastewater treatment plant applications. Our measurement solutions combine highly intelligent transmitters with rugged low maintenance sensors to deliver precision accuracy, low maintenance and long life for a low total lifecycle cost.

### ECD Analyzer/Sensor Solutions

Wastewater Parameter	T80 Universal Transmitter	C22 Multi Channel Controller	S80 pH Sensor	S80 ORP Sensor	S80 Conductivity Sensor	DO82 Dissolved Oxygen Sensor	TR8 Suspended Solids Analyzer	HYDRA NH4-N Ammonium Analyzer	HYDRA NO3-N Nitrate Analyzer	CA6 Colorimetric Analyzer	TR6 Turbidity Analyzer	FC80 Free Chlorine Analyzer	TC80 Total Chlorine Analyzer	AC10 Spray Cleaner System
1 pH	●		●											●
2 ORP	●			●										●
3 Conductivity	●				●									●
4 Total Suspended Solids							●							●
5 Dissolved Oxygen	●					●								●
6 Ammonium (NH4-N)		●						●						●
7 Nitrate (NO3-N)		●							●					●
8 Total Phosphorus/Phosphate										●				●
9 Turbidity											●			●
10 Free Chlorine(residual)												●		
11 Total Chlorine													●	

## Electro-Chemical Devices (ECD) is a manufacturer of liquid analytical process instrumentation.



Founded in 1977, ECD has been in business for over 35 years and has built its industry leading reputation by its commitment to our customers through this basic approach: Provide quality products, develop technical innovations and provide responsive, knowledgeable service. Technical innovation is the key to ECD's instrumentation and sensors. From the company's start, ECD developed the industry's first 2-wire loop powered conductivity transmitters then the next generation of microprocessor-based multi-channel transmitters and controllers. The Sentinel Product Line features sensor diagnostics that predict when the sensor will need replacement. Today's innovations include the universal transmitters and controllers with digital sensors.

The analyzers configure themselves to the input parameter, unplug a pH sensor from the T80 transmitter and attach a conductivity sensor and the transmitter automatically changes from a pH transmitter into a conductivity transmitter.

Our products and services are used in some of the most demanding applications and industries, such as: Chemical, Food & Beverage, Oil & Gas, Mining, Power Generation, Pulp & Paper, Semiconductor, Steel, Water and Wastewater.

Understanding the demands of these applications, we have developed our products with unique features and technical advantages that are focused on quality, reliability, ease of use and maintenance resulting in lowering the total cost of ownership.

Over many years of experience, ECD has developed a wide range of industrial sensors using a modular plug-in design. Each configuration provides an application specific solution to the measurement of pH, ORP, pION, Dissolved Oxygen, Turbidity and Conductivity. Our technical staff and trained sales representative organization is there to help provide technical guidance for a successful application.

### ELECTRO-CHEMICAL DEVICES

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 www.ecdi.com

## Liquid Analytical Instrumentation for Wastewater Treatment Plants

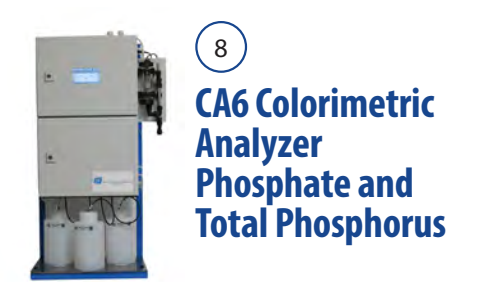
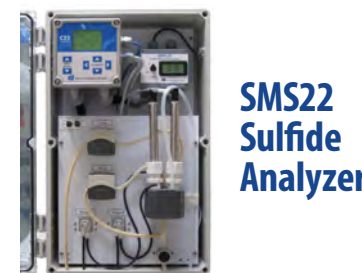
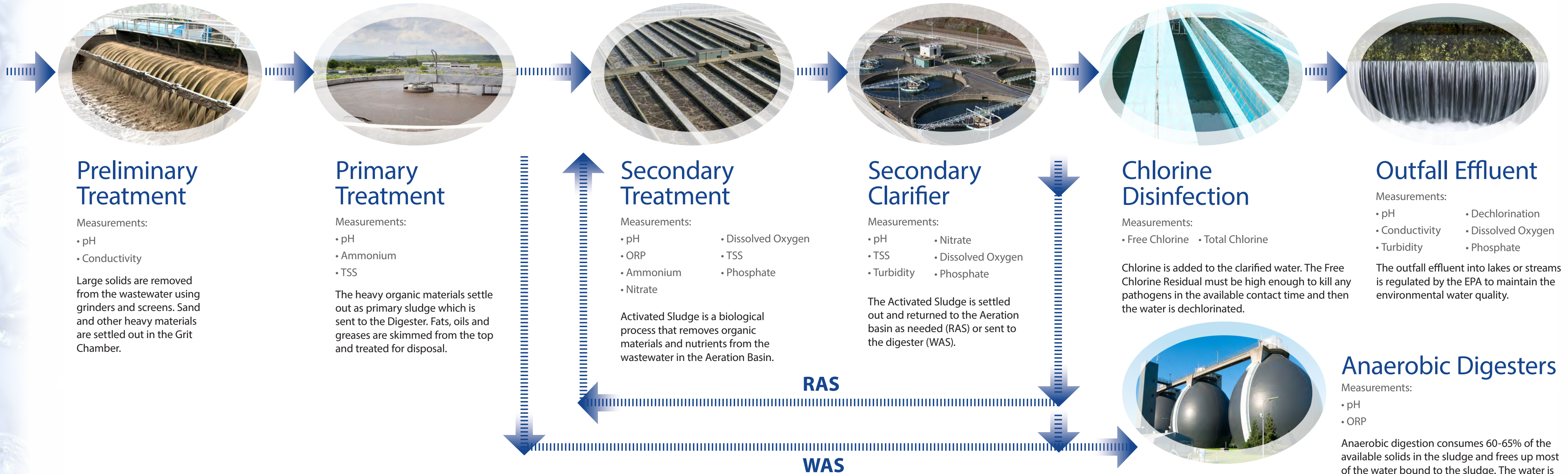


### Accurate and Reliable Process Measurement

- pH
- ORP
- Conductivity
- Ammonium (NH4-N)
- Nitrate(NO3-N)
- Dissolved Oxygen
- Total Suspended Solids
- Turbidity
- Free Chlorine
- Total Chlorine
- Total Phosphorus/Phosphate



# ECD Solutions To Wastewater Treatment Plant Measurements



# Specifications

## Input Specification

Digital protocol, all ECD S80 sensors, Liquid, Gas, Process sensors (Optional analog to digital input board for mV sensors)

## Input Ranges

pH -1.00 – 15.00 pH  
 ORP -1500 - +1500 mV  
 pION 000.1 – 999.9, Auto

Ranging: ppb ↔ ppm  
 ↔ppthousand

Dissolved Oxygen 000.1 – 999.9 Auto  
 Ranging: ppm,ppm, % SAT, mg/L

Conductivity 0.055 μS – 2.00S Auto  
 Ranging: μS, mS, S

Resistivity 0.001 - 20.00 meg-ohms  
 Turbidity 000.0 - 4000NTU Auto

Ranging: NTU, FNU, mg/L, ppm, % Solids  
 Temperature -30°C - 140°C

## Accuracy

pH 0.02 pH  
 ORP ± 1 mV  
 pION Specific for ion type  
 Dissolved Oxygen 2% of calibrated range  
 Conductivity 2% of calibrated range  
 Resistivity 2% of calibrated range  
 Turbidity 4% of calibrated range  
 Temperature ± 0.3°C

## Enclosure

Polycarbonate, NEMA 4X, weatherproof, ½ DIN, (L xWx D) 5.7" X 5.7" X 3.5" (14.4cm X 14.4cm X 9.0cm)

## Environmental Conditions

Ambient Temperature -20°C - 70°C  
 Storage Temperature -30°C - 85°C  
 Relative Humidity 0 – 90% NC

## Display

128 x 64 pixels (2.75" x 1.5") LCD, Black/Grey background on loop powered instruments, Blue/White background LED backlight on 100-240 VAC and 24 VDC

powered instruments

## Input Power

Code -0 Loop powered, 24 VDC, 600 Ω maximum load (18-36VDC @ 35 mW minimum)

Code -1 24 VDC (18-36 VDC @ 250 mW minimum)

Code -2 100-240 VAC, 50/60 Hz, 4W

## Outputs

**4-20 mA output** (standard), Fault Condition: 3.5 mA, 22 mA or none

**Modbus RTU** (standard)

**HART®** (optional)

**Alarm Relays** (Optional) Three (3) SPDT, form 1C, 250 VAC, 3 Amp resistive maximum relays, user configurable as Hi/Lo or Fault alarms

## Shipping

Size 8" x 8" x 5"(20.5 x 20.5 x 12.7 cm)  
 Weight 1.6 lbs. (0.75 kg)

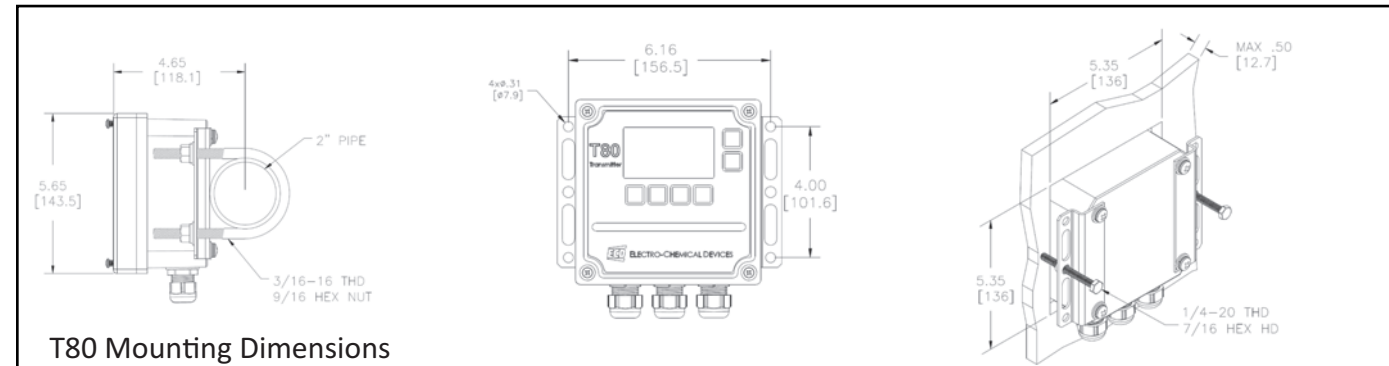


# Transmitters & Control

## Model T80 Universal Transmitter



Measure pH, ORP, Specific Ion, Dissolved Oxygen, Turbidity, Conductivity or Resistivity with **Model S80 Intelligent Sensors**



Model T80- Transmitter Part Number Guide							
Ch 1 Inputs	1	S80 Sensor, pH, ORP, pION, Conductivity, Resistivity and galvanic Dissolved Oxygen					
	2	TRITON®Optical DO and TRITON® ppb DO Sensors					
	6	TR6 Turbidity Sensors					
	Ch 2 Inputs	0	No Input for Channel 2				
		1	S80 Sensor, pH, ORP, pION, Conductivity, Resistivity and galvanic Dissolved Oxygen				
	Power Supply	2	TRITON®Optical DO and TRITON® ppb DO Sensors				
		-0	Loop Powered Transmitter				
	Alarm Relays	-1	24 VDC Powered Transmitter				
		-2	100/240 VAC, 50/60Hz, 4W powered Transmitter				
		0	No Relays				
Output	1	(3) formC 250 V 3A relays					
	0	4-20 mA output and MODBUS RTU					
	1	HART®					
	2	2 x 4-20 mA with MODBUS RTU					
Mounting Hardware	-00	No Mounting Hardware					
	-01	Universal Mount					
	-02	Panel Mount					
	-03	Handrail Mount					
	-04	Sunshield Vertical Rail Mount					
-05	Sunshield Horizontal Rail 1						
Model T80-	1	1	-0	0	1	-01	

Specifications subject to change without notice.

Represented by:

### Electro-Chemical Devices

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 email: sales@ecdi.com  
 web: www.ecdi.com



**ELECTRO-CHEMICAL DEVICES**

# Model T80 Universal Transmitter

## The ECD 6 Point Advantage

- 1 Universal Transmitter:** single or dual channel, measures pH, ORP, DO, Specific Ion, Turbidity, Conductivity or Resistivity
- 2 Graphic LCD Display:** Easy to Read Graphical and Numerical Information
- 3 Simple Menu Structure:** Intuitive, Easy to navigate and Configure
- 4 Use with ECD Digital Intelligent Sensors** that are factory calibrated sensors and store data
- 5 4-20 mA output with MODBUS RTU and Alarm Relays:** Flexible configurations for all applications
- 6 HART® communication**

## Description

The ECD Model T80 Universal Transmitter is a single or dual channel transmitter designed for the continuous measurement of pH, ORP, pION, Dissolved Oxygen, Turbidity, Conductivity or Resistivity in a general purpose industrial environment. The Model T80 transmitter digitally communicates with any ECD Model S80 Intelligent Sensor, automatically configuring the transmitter's menus and display screens to the measured parameter. The same transmitter can be used for any of the measurements, i.e. plug an S80 Conductivity Sensor into a Model T80 pH transmitter and it will automatically reconfigure into a conductivity transmitter. There is no longer any need to inventory multiple instrument types, the one Model T80 transmitter will automatically configure to any of the listed measurements.

### SENSORS

The Model S80 Intelligent Sensors facilitate two way communication with the Model T80 transmitters. The type of sensor, identity and serial number are stored in the sensor's memory along with calibration registers. The Model S80 sensors are calibrated at the factory so they are ready to use when connected to a Model T80 transmitter. The Model S80 sensors are waterproof and submersible with all internal components epoxy encapsulated inside the 3/4" O.D. housing. The Model S80 sensors use the same field proven, easily replaceable electrodes as the Model S10 and S17 sensors saving time and money. A digital converter option is available for the Model T80 transmitter to allow the use of non-digital sensors. The digital converter is only available on line powered instruments.

### DISPLAY

The Model T80 Transmitter features a large easily viewed LCD display. Loop powered instruments have Black lettering on a Grey background, while 100-240 VAC and 24 VDC powered instruments have Blue lettering on a White background when the LED backlight is on. The Model T80 display is easily switched between the single and dual channel display modes. It has three



# Model T80 Universal Transmitter

Main Display screens; the Data Screen, the Millivolt Screen and the Graphical Display screen. The Data Screen displays the measurement type, the measured value with units, the % milliamp output of the 4-20 mA channel and the temperature. The mV Screen displays the measurement type, the raw millivolt signal from the sensor, the % milliamp output of the 4-20 mA channel and the temperature. The Graphical Screens display the measurement type, the measured value with units and a graphical representation of the % milliamp output. Three graphical styles are available; a Trend line, a Bar graph or a Gauge. The status of alarm relays, energized/de-energized is displayed on transmitters with relays.

### MENUS

Menu navigation is accomplished using membrane switch buttons. Soft keys display the function associated with each button. Pressing any of the buttons twice within 2 seconds activates the Model T80 soft key menus. The primary selections are the Calibration menu, Configuration menu, Info Screens and Simulate menu.

### CALIBRATION

Model S80 sensors come precalibrated from the factory. Field calibrations are easily performed with the Model T80. The Calibration menu includes the Auto Cal function, a two point calibration, the Standardize function, a single point calibration or the Manual Calibration, where previously determined Offset and Slope values are entered manually into the Model T80 transmitter.

### CONFIGURATION

The Configuration menus allow the Model T80 transmitter's Display and Output functions and the Model S80 sensor's characteristics to be configured or adjusted. Display screens include the Hold function, Graphical Display Style, Back Light and Contrast adjustments, Labels/Tags for naming the transmitter, Password Protection and a Factory Default reset. Output screens include setting the addresses for MODBUS or HART® outputs, setting the 4-20 mA Range and fault settings and configuring the Alarm Relays.

### INFO

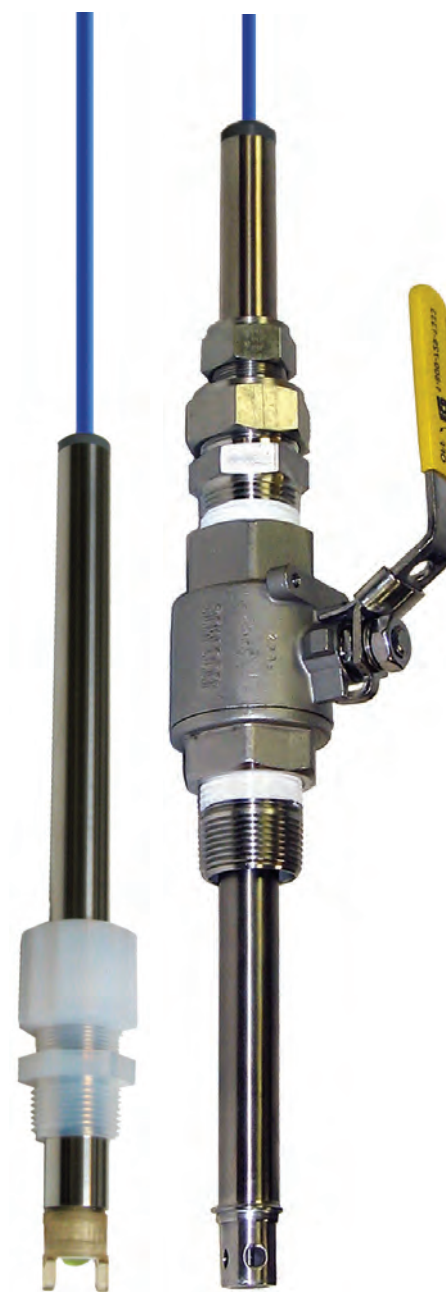
The Info screens provide Transmitter and Sensor Information. The transmitter screens display the Name, Power, Serial#, Firmware version and the output configuration. The sensor screens display the Name, Part #, Serial # and stored Calibration data.

### SIMULATE

The Simulate Menu allows the input and output signals to be simulated. The outputs are easily tested by entering a 4-20 mA output value or energizing and de-energizing a relay. The Ramp function cycles the signal across the configured 4-20 mA range, i.e. the transmitter generates a signal from 0 pH to 14 pH and back to 0 pH activating relays and generating a 4-20 mA output. The cycle time and the duration are adjustable allowing sufficient time for an individual to walk to the control room to verify the output.

### POWER SUPPLY and OUTPUTS

The Model T80 transmitter is available as a loop powered (single channel only), a 24 VDC or a 100/240 VAC powered transmitter. The loop powered version is available with an optional HART® output. The line powered instruments have one 4-20 mA output per channel and MODBUS RTU. Available options include HART® communication and an Alarm Relay package. The (3) relays can be configured as Alarm (set point) relays, timer activated relays or Fault relays.



## Model C22 Controller



Measure pH, ORP, Specific Ion, Dissolved Oxygen, Turbidity, Chlorine, Conductivity and Resistivity with S10, S17, TR6 or various Chlorine Sensors



**ELECTRO-CHEMICAL DEVICES**

# Model C22 Controller

## Features

- Choice of multiple measurement parameters
- Multi-Channel Capability
- SENTINEL Diagnostics
- Isolated Outputs
- Auto Buffer Calibration
- Dual Channel Comparisons
- Graphical Display
- Multiple Mounting Configurations

## Benefits

- Measure pH, ORP, pIon, Conductivity, Resistivity, Dissolved Oxygen, Turbidity
- Lower cost with multi sensor operation
- Predictive “insitu” sensor diagnostics reduces down time and maintenance
- Protects system inputs and outputs
- Ease of Maintenance
- Improved Accuracy and Data
- Allows Viewing of Historical Data
- Pipe, Wall, Handrail, or Panel Installation choices

## Description

The Model C22 multi-channel controller/monitor provides simplicity in a powerful package. The Model C22 allows for incredible flexibility in the selection of inputs and outputs. From a simple single input design with one output to a multiple input system with linear outputs, PID control outputs and relays for alarm or control functions.

The Multi-Bus Architecture allows up to four sensor inputs, six outputs and eight relays to be configured into the C22 Controller. The choice of process measurements includes pH, ORP, pION, Dissolved Oxygen, Conductivity including % Concentration and Resistivity. External analog inputs and other events can also be integrated into the C22’s measurement parameters.

The Graphical Display mode allows any of the resident parameters, inputs, outputs, control or temperature to be displayed with user defined ranges of sensitivity and time. In addition to the enhanced visualization of the process or control dynamics, the graphical display also facilitates reliable calibrations and diagnostic capabilities.



**Multi-Channel and Sensor Options**

pH, ORP, pION



**SENTINEL**  
“pre-pHault”  
Sensor Diagnostics

## Model C22 Controller

The SENTINEL is a “next generation” sensor technology. By utilizing the SENTINEL reference electrode diagnostic the user can visually monitor the reference electrode’s degradation due to depletion of electrolyte or process contamination. The Pre-pHault indication is clearly displayed as a bar graph on the main menu. The bar increases in size as the electrode degrades and begins flashing when the sensor needs replacing. This feature allows the electrode to be replaced before it fails eliminating any unforeseen downtime.

**Multi-Channel Comparison** of measurements or inputs can improve the accuracy or usability of the measured parameter. Many ions are affected by changes in the pH of a solution, chlorine and fluoride are two commonly measured examples. Accurate measurements are only possible if both parameters are measured and the appropriate compensation algorithms are processed. Differential conductivity measurements are also common in filtration and reverse osmosis applications, with % rejection across the membrane being the desired output. The Model C22’s processing power can easily handle these or other custom measurements.

The **2.5”X 1.75” Backlit LCD Home Menu** displays the measured parameter, engineering units, % output and temperature for each measurement. Four menus provide access to all of the C22’s functions. The Buffer menu provides for calibration and sensor standardization. The Set Up menu allows access to the setpoints, ranges and other channel related features. The Status menu displays raw sensor input data. The Configuration menu assigns parameters to the relays, 4-20 outputs and control functions. Each menu can be password protected.

The **Model C22** is a line powered instrument, 110/220 VAC, and can also be powered with 24 VDC. The polycarbonate NEMA 4X enclosure is the convenient ½ DIN size that can be panel mounted, pipe or handrail mounted. The 4-20 mA outputs are isolated; up to four of the outputs can be current outputs with two as PID control outputs. The field configurable SPDT relays are rated for 230VAC/5A or 30VDC/5A resistive maximum.

pH	7.00
_ 50.0%	23.8°C
Cond	750.0 µS
25.0%	24.1°C

### Isolated Outputs

Up to 4 independent  
4 to 20 mA signals  
and 2 PID outputs

#### Assignable to:

PV #1 or PV #2  
Temperature  
SENTINEL Diagnostic  
Differential  
Average  
Ratio



### Relays

Up to (8) SPDT relays  
with Clocks and Timers  
Pulse Width Modulation  
230VAC/30VDC/5A

# Model C22 Controller

## Specifications

### Measurement Range

pH:	-2 to 14.5 pH
ORP:	-1000 to 1000 mV
Specific Ion:	0.1 to 1000 ppb, ppm, ppt
Dissolved O2:	0 to 40 ppm, mg/l or % saturation
Conductivity:	0 to 2 Siemens
Resistivity:	0 to 2 meg-ohms 0 to 20 meg-ohms
Turbidity:	0 to 250 NTU 0 to 500 NTU 0 to 1000 NTU 0 to 4000 NTU

### Display

Menu driven 2.5" X 1.75" backlit Super-twist LCD, The main menu displays ;

- (1) Process Variable Identity,
- (2) Process Value and Engineering Units,
- (3) Percent 4-20 mA Output,
- (4) Temperature in °C or °F

### Operating Temperature

-20° C to 70° C (-4° F to 158° F)

### Temperature Compensation

Automatic with RTD, -30°C to 140°C (-22°F to 284°F ) Accuracy within +/- 0.1° C from 0° to 100°C (32°F to 212°F ).

### Outputs

4-20 mA or 20-4 mA, linear and expandable. Up to a maximum of four outputs and two PID outputs.

RS232, RS485

Optional USB Datalogger

### Input Power

110/220 VAC @ 50-60Hz, Optional +24 VDC nominal @ 0.25A

### Relay Ratings (optional)

Up to (8) SPDT, 230VDC / 5A or 30 VDC/5A resistive maximum.

### Max Loop Impedance

800 ohms @ 24 VDC for 4-20 mA approximately 800 ohms on additional outputs.

### Accuracy

+/- 0.10% of full scale

### Linearity

+/- 0.05% of full scale

### Sensitivity

+/- 0.05% of full scale

### Repeatability

+/- 0.1%

### Response Time

T90 in 1 second

### Noise Rejection 50/60 Hz

Greater than 70 db

### Input / Output Isolation

Maximum 300 volts between process input and any 4-20 mA output. No Isolation between inputs on multiple channel instruments.

### Control Functions

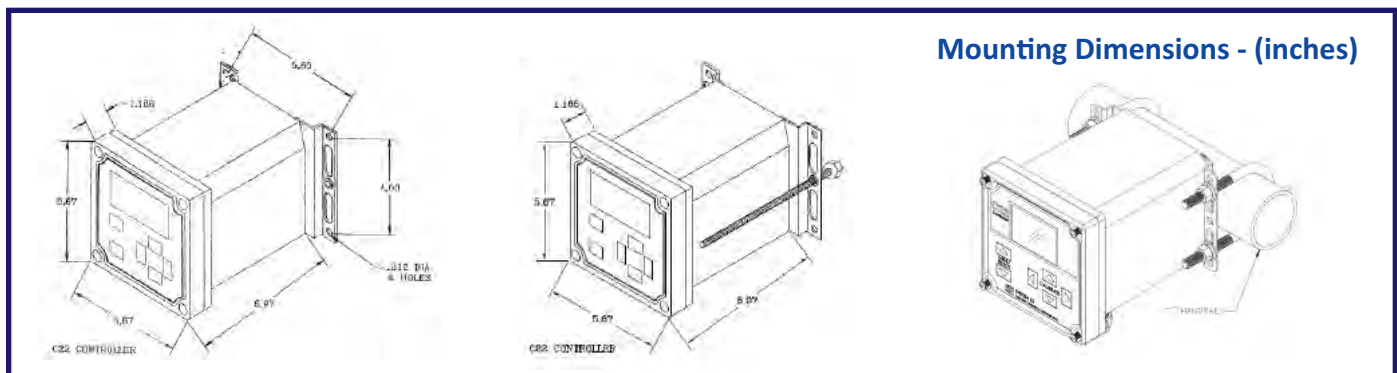
PID, PWM, Timers and programmable AND/OR logic functions

### Enclosure

NEMA 4X, weatherproof, ½ DIN, (L x W x D) 5.7" X 5.7" X 7.0" (14.4cm X 14.4cm X 17.8cm)

### Shipping Weight

4 lbs (1.85kg)



Specifications subject to change without notice.

### Represented by:

## Electro-Chemical Devices

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Anaheim, California, USA 92807

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+1-800-729-1333

Fax: +1-714-695-0057

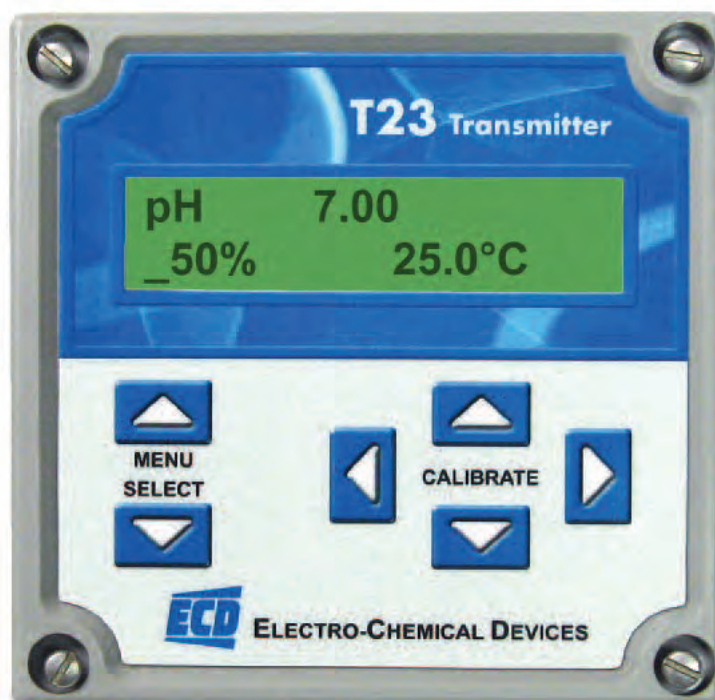
email: sales@ecdi.com

web: www.ecdi.com





## Model T23 Transmitter



Measure pH, ORP, Specific Ion, Dissolved Oxygen,  
Conductivity or Resistivity with  
**Model S10 or S17 Sensors**



**ELECTRO-CHEMICAL DEVICES**

# Model T23 Transmitter

## Features

- Choice of multiple measurement parameters
- Two Channel Capability
- SENTINEL Diagnostics
- Isolated Outputs
- Auto Buffer Calibration
- 24 VDC loop-powered or 110/220 VAC power option
- Multiple Mounting Configurations

## Benefits

- Measure pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity, and Resistivity
- Lower cost with multiple sensor operation
- Predictive sensor diagnostics reduces down time
- Protects overall system inputs and outputs
- Ease of Maintenance
- Minimize wiring & overall installation cost
- Pipe, Wall, Handrail, or Panel Installation choices

## Description

The **Model T23** two-wire transmitter provides simplicity in a powerful package. A choice of measurement parameters include: pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity and Resistivity.

**MULTI-CHANNEL CAPABILITY** allows the Model T23 to accept up to two sensor inputs, each having temperature compensation, and provides up to three selected outputs. Any combination of pH, ORP, Specific Ion, or Dissolved Oxygen can be accepted as an input. (Conductivity or Resistivity transmitters are only available as single channel units)

The **SENTINEL** is the next generation sensor technology. By utilizing the “SENTINEL” sensor reference diagnostics, the user can easily monitor the reference electrode’s degradation due to depletion or process contamination. The “prephault” indication is clearly displayed as a bar graph on the main process menu (or as an optional output). The bar graph will flash when it is time to replace an electrode. This feature allows just in time delivery of the consumable component of the sensor, eliminating unforeseen downtime.



**Multi-Channel and Multiple Sensor Options**

pH, ORP, pION



**SENTINEL “prephault” Sensor Diagnostics**

# Model T23 Transmitter

The **AUTO BUFFER CALIBRATION** feature allows the user to perform buffer calibrations that are stored in memory for future reference. After the buffer points have been initially stored in memory, activate calibration and insert the sensor into standard solutions. Wait for the sensor reading to stabilize and save the data. There are no buffer value adjustments to make.

The simplicity of the T23 transmitter allows **one person** to quickly perform calibrations through the power of the micro processor. All configuration and calibration functions are easily performed via the membrane key pad eliminating the need for any mechanical potentiometer adjustments. The membrane keys allow for easy calibrations while insuring NEMA 4X environmental integrity.

**ISOLATED OUTPUTS** are standard with the Model T23. The Model T23 accepts signals from various ECD sensors, processes the information and provides up to three fully isolated 4-20mA or 20–4mA outputs. The outputs are expandable and reversible.

**OPTIONAL OUTPUTS** are available with the Model T23, including a three-mode proportional control output for any measured parameter. Other outputs available are differential, average and ratio outputs. An additional relay option provides (two) 5 amp relays that can be used as alarm or control set points.

**POWER REQUIREMENT** of the Model T23 is typically 24 VDC loop-powered with an optional 110/220 VAC power supply. In case of power interruption, the calibration and configuration data are retained in the EEPROM memory.

**CONDUCTIVITY TRANSMITTERS-** If an application requirement includes resistivity, conductivity, or specific concentration measurement, the Model T23 Transmitter will provide a new level of simplicity and reliability. Built in sensor diagnostics indicate the validity of the sensor measurement with each calibration. Sensor models are available for both magnetic and contacting type sensors. Common applications include: sulfuric acid, TDS, sodium hydroxide, boiler blow-down, cooling tower water control and leak detection.

### T23 Displays with Measurement Parameters

<b>DO Display</b> DO 8.4 ppm 44.6% 25.0°C	<b>ORP Display</b> ORP 500.0 25.0% 25.0°C
<b>pH Display</b> pH 7.00 50.0% 25.0°C	<b>pION Display</b> F- 10.0 ppm 10.0% 25.0°C
<b>Conductivity Display</b> CD 5.00 mS 50.0% 25.0°C	<b>Resistivity Display</b> RS 18.00 M 50.0% 25.0°C

### Calibration

- Auto Buffer Cal
- One Person Cal

### Isolated Outputs

- Up to 3 independent 4 to 20 mA signals

### Optional Outputs

- PID Control
- Temperature
- SENTINEL Diagnostics
- Differential
- Average
- Ratio
- (Two) 5 Amp Relays

### +24 VDC, 4 to 20 mA Loop Powered

### Options

- Internal 110/220 VAC power supply

# Model T23 Transmitter

## Specifications

### Measurement Range

pH: -2 to 14.5 pH  
ORP: -1000 to 1000 mV  
Specific Ion: 1 to 1000 ppb,  
ppm, ppt  
Dissolved O2: 0 to 40 ppm, mg/l  
or % saturation  
Conductivity: 0 to 2 Siemens  
Resistivity: 0 to 2 meg-ohms  
0 to 20 meg-ohms

### Display

Menu driven, 32 character alphanumeric, Supertwist LCD, The main menu simultaneously displays; (1) Process Identity, (2) Process Value and Engineering Units, (3) Percent Output, (4) Temperature in °C or °F.

### Operating Temperature

-20° C to 70° C (-4° F to 158° F)

### Temperature Compensation

Automatic with RTD, -30°C to 140°C (-22°F to 284°F) Accuracy within +/- 0.1° C from 0° to 100°C (32°F to 212°F).

### Output

4-20 mA or 20-4 mA, linear and expandable. Up to a maximum of three outputs.

Optional USB Datalogger

### Input Power

+24 VDC nominal (13.5 to 50 VDC)  
Optional 110/220 VAC @ 50-60Hz

### Relay Ratings (optional)

5A @ 250VAC / 5A @ 30 VDC  
resistive max. (2) SPDT

**Max Loop Impedance** 525 ohms @ 24 VDC for 4-20 mA compliance on primary output; approximately 800 ohms on secondary outputs.

### Accuracy

+/- 0.10% of full scale

### Linearity

+/- 0.05% of full scale

### Sensitivity

+/- 1.0 mV

### Repeatability

+/- 1.0 mV

### Response Time

T90 in 1 second

### Noise Rejection 50/60 Hz

Greater than 70 db

### Input / Output Isolation

Maximum 300 volts between process input and any 4-20 mA output (single and multiple channel outputs). No Isolation between inputs on multiple channel instruments.

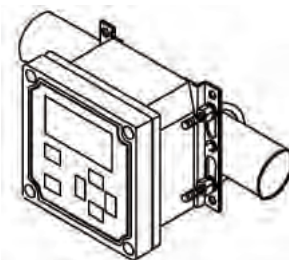
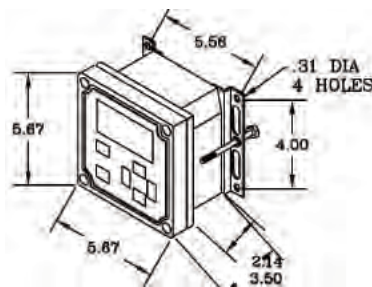
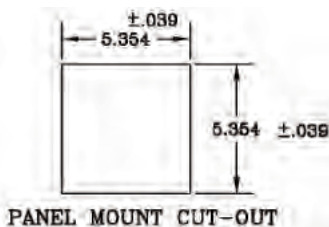
### Enclosure

NEMA 4X, weatherproof, ½ DIN, (L x W x D) 5.7" X 5.7" X 3.0" (14.4cm X 14.4cm X 8.9cm)

### Shipping Weight

1.6 lbs (0.7kg)

## Mounting Dimensions - (inches)



Specifications subject to change without notice.

### Represented by:

## Electro-Chemical Devices

1500 North Kellogg Dr.  
Anaheim, California, USA 92807

Phone: +1-714-695-0051

+1-800-729-1333

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email: sales@ecdi.com

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**ELECTRO-CHEMICAL  
DEVICES, INC.**



Class I, II, & III Division I  
Groups A through G



**T r a n s m i t t e r  
M o d e l T 2 8**

*Bringing Simplicity To A Solution*

# Model T28

## STATE-OF-THE-ART TECHNOLOGY...

The Model T28 microprocessor-based two-wire transmitter provides ergonomic simplicity housed in a powerfully designed package! A choice of measurement parameters include pH, ORP, specific Ion, Dissolved Oxygen, Conductivity or Resistivity.

## MICROPROCESSOR DESIGN

The microprocessor based design of the T28 transmitter provides enumerable benefits. A "state of the art" circuit board design eliminates the need for a battery backup by retaining the calibration and selected data in the event of unexpected power outages. Incorporating a manual output mode enables the user to select and hold a 4-20 mA value preventing pump or recorder actuation during calibration. A "back to factory" default allows the transmitter to be returned to the programmed parameters as originally configured at ECD's manufacturing facility.

## VERSATILE DIGITAL DISPLAY

A 24-character supertwist alphanumeric Liquid Crystal Display (LCD) is used for operational and diagnostic menus. The LCD module can be rotated to accommodate a variety of installation/viewing angles. The contrast is adjustable for different intensities to enhance day/night visibility. The main menu displays the process identification, variables (in engineering units), % output and temperature in degrees Celsius or Fahrenheit.

## HAZARDOUS LOCATIONS

The T28 transmitter is FM and CSA approved for intrinsically safe and explosion proof applications. This allows the transmitter to be installed into class I, II, and III, Division I Groups A through G hazardous environments.

## ENCLOSURE

The T28 is enclosed in a 300 series stainless steel - NEMA 7C housing. The enclosure incorporates sealed and isolated wiring and electronics compartments. A universal style mounting bracket allows for easy wall or pipe mounting utilizing the same hardware. ECD's compact electronic transmitter module can be easily unplugged from the housing for bench calibration or additional diagnostic routines.

### pH DISPLAY

pH 7.00  
\_ 50.0% 25.0C

### ORP DISPLAY

ORP -500.0  
\_ 25.0% 25.0C

### DO DISPLAY

DO 8.4 ppm  
\_ 44.6% 25.0C

### RESISTIVITY DISPLAY

RS 18.00 M  
\_ 50.0% 25.0C

### CONDUCTIVITY DISPLAY

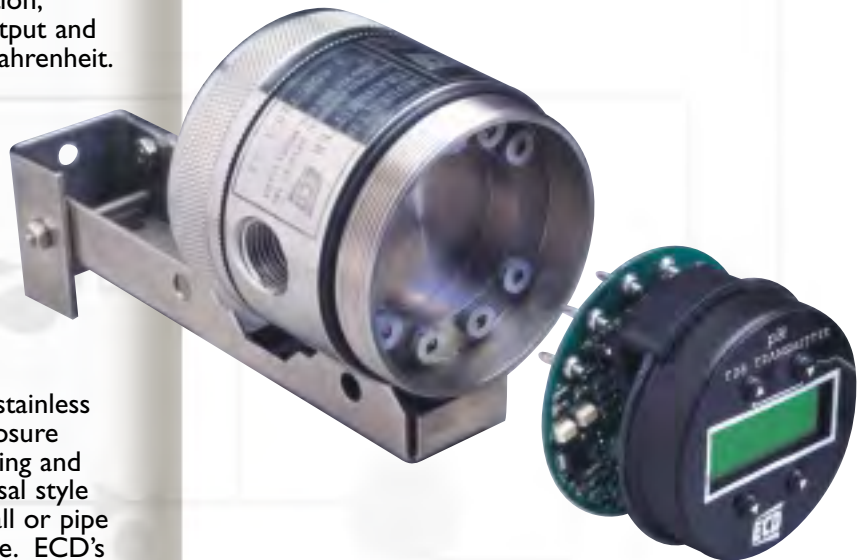
Cd 5.00 mS  
\_ 50.0% 25.0C

### ION DISPLAY

S-- 10.0 ppm  
\_ 10.0% 25.0C



Class I, II, & III Division I  
Groups A through G



# Process Transmitter

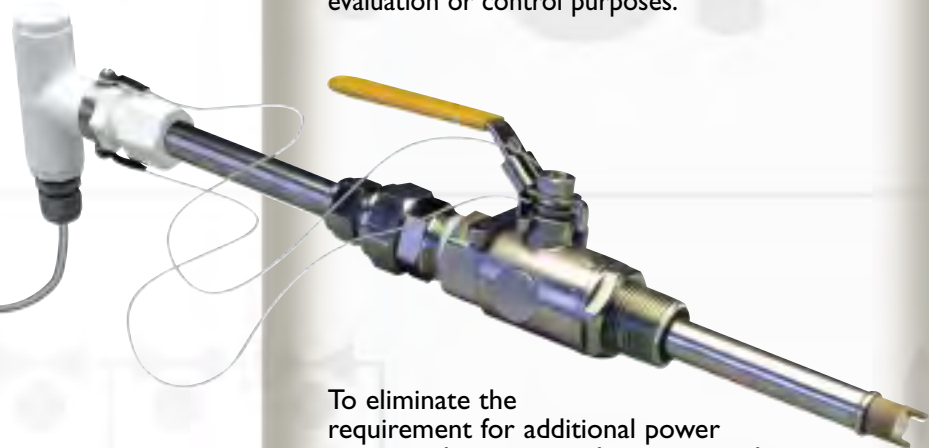


## CONDUCTIVITY TRANSMITTERS

All calibrations and selected parameters of the T28 transmitter are performed with an ECD magnetic screwdriver via magnetic influence keys accessed through the T28's front viewing window. This eliminates the need to open the T28 enclosure to atmosphere thereby exposing the electronics to a potentially hazardous environment. The temperature readout is field configurable to read in degrees Celsius or Fahrenheit. Diagnostic data for determining sensor degradation can be quickly accessed for instant review by the operator.

## ISOLATED 4-20 MA OUTPUT

The T28 provides isolated 4-20 mA current signals to a receiver, controller, or recorder for evaluation or control purposes.



To eliminate the requirement for additional power wiring and power-signal separation, the 4-20 mA signal is transmitted on the same two wires as the 24 dc supply voltage. Hence, the creation of a highly stable, noise free signal allowing the transmitter to be located up to 3 miles from the power source. The effects of ground loops are virtually eliminated by the incorporation of transformer input-output isolation that provides a common mode voltage rejection greater than 60 db.

# T28 Specifications

## MEASURING PARAMETERS & RANGES

### PH

-2.00 pH to 15.00 pH, fully expandable and reversible, standard

### ORP

+1000 to -1000 mV, fully expandable and reversible, standard. (+2000 to -2000 mV optional)

### SPECIFIC ION

Auto Ranging from ppb through parts/thousand. Concentration range 1 to 999.00 of the Molar calibration range or 0.1 to 9,999 ppm, (5 decades)

### DISSOLVED OXYGEN (DO)

0 to 200% saturation or 0 to 20 ppm, full expandable and reversible.

### CONDUCTIVITY

1 microsiemen to 1.5 siemens

### RESISTIVITY

0 to 2 megohms  
0 to 20 megohms  
0 to 50 megohms

### TEMPERATURE

-30°C to +140°C

## Output

4-20 mA or 20-4 mA, linear, field expandable and reversible.

## Power

(with zero loop impedance)

Recommended 24 VDC  
Maximum 50 VDC  
Minimum 14 VDC  
Maximum Loop Impedance (@ 24 VDC) 500 ohms for 4-20 mA compliance

## Temperature Compensation

Automatic, -30 to +140°C, RTD. Accuracy within +/- 1% over a 0°C - 100°C span.

## Input/Output Isolation

Maximum 300 volts between process input and 4-20 mA output.

## Memory

Non-Volatile, EEPROM.

## Power Supply (optional)

115 VAC, 50/60 Hz, 0.5 amp.  
UL Approved, Unfused and encapsulated, mounts inside wiring chamber of T28

## Operating Temperature

-4°F to +158°F (-20°C to +70°C)

## Display

Menu driven, 24 character alphanumeric, Supertwist, High Temp LCD. Internally rotates +/- 180° for best viewing angle. The main menu simultaneously displays:

Process identity  
Process value (in engineering units)  
Current output (0 to 100%)  
Temperature in °C or °F

## Enclosure

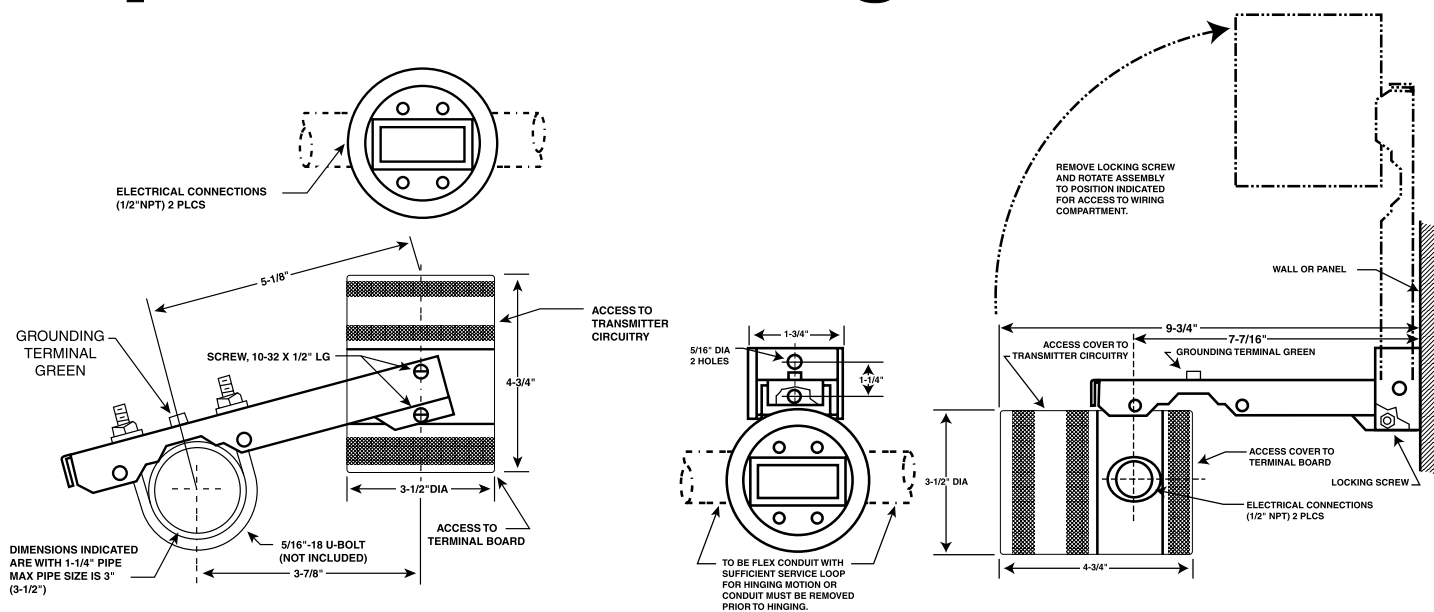
FM and CSA approved EXPLOSION PROOF for use in class I, Division I, Groups C through G with proper sealing fittings. 300 series Stainless Steel NEMA 7C Electronics; FM approved Intrinsically safe for use in Class I, II, and III Division I, Groups A through G. Diameter X Length (8.7 cm X 12.5 cm).

## Weight

Standard T28: 6.5 lbs. (2.95 kg)  
Shipping Weight: 7.5 lbs. (3.4 kg)

\*50°C for FM/CS L.S. Rating

# Pipe/Wall Mounting Dimensions





1

2

3

4

5

6

# Sensors and Electrodes

## Model S80 Intelligent Sensors



Measure pH, ORP, Specific Ion, Dissolved Oxygen,  
Turbidity, Conductivity or Resistivity with  
**Model T80 Universal Transmitter**



**ELECTRO-CHEMICAL DEVICES**



**Electro-Chemical Devices** offers a complete line of liquid analytical sensors: pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity. The technical advantage of the Model S80 Intelligent Sensors are the 6 points of design flexibility to configure a sensor that best fits your application.




## 6 Point Advantage

- 1 Intelligent sensor design with digital communication**  
Calibration data is stored in the sensor allowing field installation of a pre-calibrated sensor. Detachable cable option simplifies the installation of pre-calibrated sensors.
- 2 Multiple individual measurement parameters** in the same mechanical configuration- pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity
- 3** Readily available **application specific electrode cartridges**. Many unique pH electrode design formulations and materials of construction which are field proven and selected for long life and accuracy.
- 4** Long life **replaceable electrode cartridges** lower the over all operating cost.
- 5** **Submersible and Retractable Sensors** Various process fittings with adjustable insertion lengths - threaded fittings, sanitary fittings, flanges and valve retractable fittings.
- 6** **Industrial housing materials for compatibility with process fluid**. Stainless Steel, Titanium, Hastelloy C-22, Polypropylene or PVDF (Kynar™). Standard 10" or 17" lengths additional lengths available.



# Model S80 Intelligent Sensors



**ECD Model S80 Sensor Overview** - The intelligent sensor choice to fit your application. The S80 sensors have two Universal Sensor Designs; Insertion/Submersion or Valve Retractable with flaired end to prevent blow out. The standard Model S80 sensors have a rugged  $\frac{3}{4}$ " O.D. 316 stainless steel body with a 10 ft. cable or an optional waterproof detachable cable assembly.

## S80 Sensor

### Insertion/Submersion

The S80 Sensor uses a  $\frac{3}{4}$ " MNPT compression fitting as the process connection. This allows a variable insertion length to accommodate installation in pipe tees, flow cells, or through tank walls. If the fitting is reversed the sensor can be installed in a stand pipe for submersion into a tank.

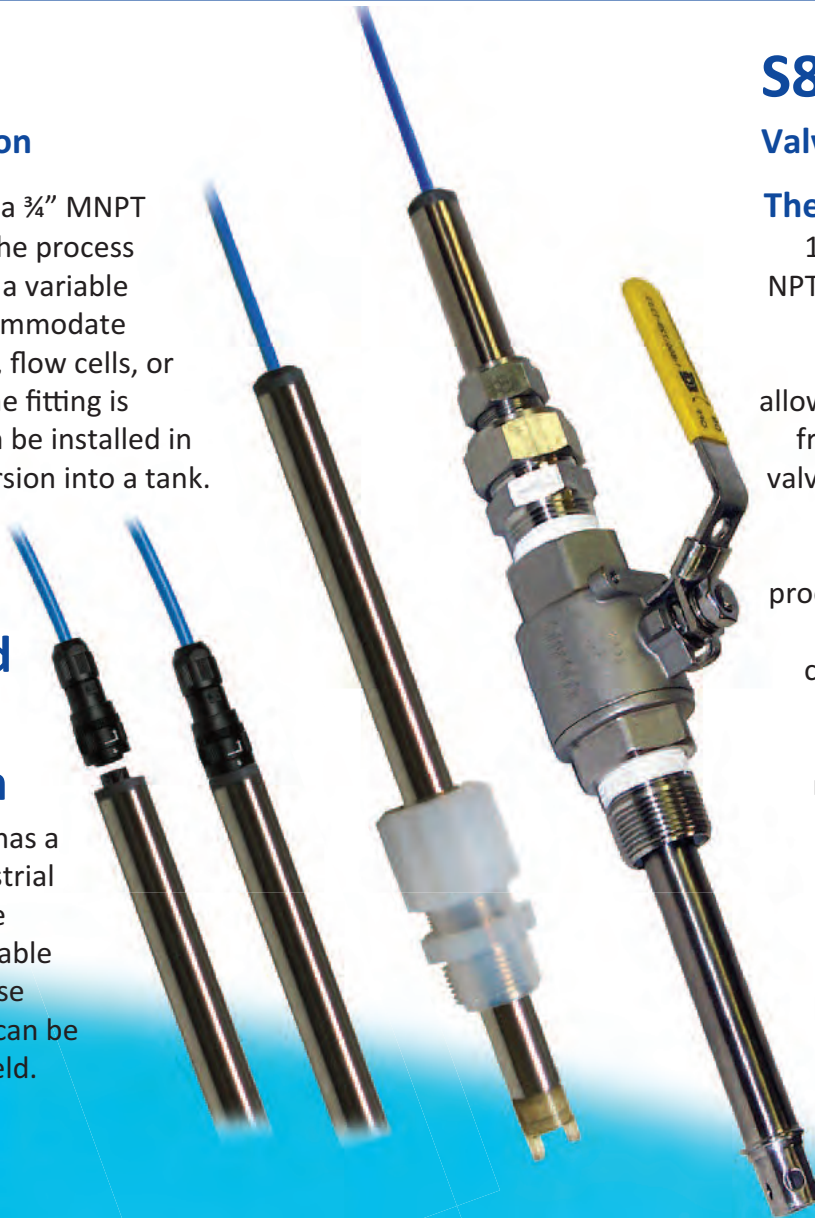
## Pre-Calibrated Detachable Sensor Option

this detachable sensor has a rugged IP68 rated industrial connector. Just a simple quarter turn locks the cable connector in place. These Pre-Calibrated sensors can be easily installed in the field.

## S80 Sensor

### Valve Retractable

The S80 Sensor uses a 1" ball valve with a 1" NPT process connection. Loosening the rear compression fitting allows the sensor to slide freely through the ball valve for either insertion into the process or retraction from the process. Once retracted, the ball valve can be closed and the sensor removed for maintenance or replacement without shutting down the process line.



# pH and ORP Electrodes

The **Model S80 Intelligent Sensors** use **replaceable electrode cartridges** to provide application specific solutions for the most demanding pH measurements.

- Radel (PES) or PEEK construction
- Single tine, double tine or full crown style pH bulb protection.
- Spherical bulbs (best response), hemispherical bulbs (more durable) or a slightly radiused flat surface (easily cleaned)
- Platinum tip ORP electrodes.
- Double or Triple junction reference cells
- Porous Teflon® and ceramic junctions with various reference electrolytes.

One of these three widely used pH electrode cartridges will satisfy most installations, Consult our technical support staff for additional configurations.

## 6 Point Advantage



**2005145** – This **General Purpose Electrode** has a two tine Radel body, double junction reference and slightly radiused pH bulb. While suitable for higher temperatures it is optimized for fast and stable readings in ambient temperature applications. Neutralizations, waste effluent monitoring, rinse applications and potable water are just a few of the suggested applications.



**2005157** – This **High Temperature Electrode** has a two tine PEEK body, triple junction reference and hemispherical pH bulb. This electrode is designed for the process control or neutralization of most mineral acids and bases in applications up to 130°C. The triple junction design is resistant to sulfide ion poisoning making it ideal for use in petroleum refineries and metal processing plants.



**2005066** – This **Chemically Resistant Electrode** has a two tine PEEK body, double junction reference and slightly radiused pH bulb. The PEEK body is suitable for use in most aggressive solvents, oxidizing solutions and acids or bases. This electrode is optimized for a harsh chemical environment and is suitable for service up to 130°C. Chemical separations and solvent recovery in the CPI and pharmaceutical industries along with chlorine production and flotation in mining are suggested applications.



**2005167** – This **ORP (Oxidation Reduction Potential) Electrode** has a two tine PEEK body, double junction reference and a platinum tip. This general purpose sensor can be used for monitoring the oxidant level of cooling towers, swimming pools, aquariums or the de-chlorination of waste water. Metal finishing and mining also provide applications such as cyanide destruction and monitoring chrome plating baths.

# Specific Ion & Dissolved Oxygen Electrodes

**Ion selective electrodes** are not limited to laboratory use; some are suitable for continuous online measurement. ECD offers Specific Ion Electrode cartridges to measure the various ions listed below. Specific Ion electrodes measure the activity (concentration) of the ion in solution, the “free” ion, not a complexed version. Cyanide, Fluoride and Sulfide ions only exist in a specific pH range as free ions and outside this pH range some percentage of the total concentration is complexed as H(X) which is not seen by the sensor. These measurements can be pH compensated using the dual channel transmitter or controller with a pH sensor to determine the total ion concentration. Most plon sensors are subject to interfering ion errors. A positive interference caused by similar ions in the solution. Consult with the factory on all new installations to determine the suitability of the measurement.

## Specific Ion (plon) Electrodes

Part#	Type	Measurement Range	pH Range	Temperature Range
2005083	Ammonium	0.05 - 18,000 ppm	2-10 pH	0°-40°C
2005062	Bromide	1 - 80,000 ppm	2 - 12pH	0°-50°C
2005140	Cadmium	0.1 - 11,200 ppm	3 - 9 pH	0°-80°C
2005143	Calcium	0.1 - 40,000 ppm	2.5 - 10 pH	0°-40°C
2005008	Chloride	2 - 35,000 ppm	2 - 12 pH	0°-50°C
2005142	Cyanide	0.1 - 260 ppm	11 - 13 pH	0°-80°C
2005058	Cupric	1.0 ppb -6,300 ppm	2 - 6 pH	0°-80°C
2005163	Fluoride	0.02 - 2,000 ppm	5 - 8 pH	0°-80°C
2005141	Lead	2.0 - 20,700 ppm	4 - 8 pH	0°-80°C
2005086	Nitrate	0.1 - 1000 ppm	2 - 12 pH	0°-40°C
2005161	Nitrite	0.5 - 500 ppm	4.5 - 8 pH	0°-40°C
2005034	Potassium	0.1 - 40,000 ppm	2 - 12 pH	0°-40°C
2005031	Sodium	0.2 - 23,000 ppm	2 - 14 pH	0°-80°C
2005122	Sulfide	0.01 - 32,000 ppm	11 - 14 pH	0°-80°C
2005016	Silver	0.1 - 107,000 ppm	2 - 14 pH	0°-80°C



## Dissolved Oxygen Electrodes

**The ECD Dissolved Oxygen** electrodes are galvanic cells with a lead anode, silver cathode and either the quick response 2 mil or rugged 5 mil Teflon membrane. The electrode is ready to use as received, there are no solutions or membranes to install before the electrode can be used. The membrane is protected by a double tine PEEK body allowing for easy cleaning. Designed for ppm level measurements it is ideal for environmental water measurements and aerobic waste treatment.

Part#	Type	Range	Pressure Range	Temperature Range
2005622 (2 mil)	Dissolved or Gaseous Oxygen	0 - 20 ppm (mg/L) 250% Saturation	0 - 50 psig	-5° - 80°C
2005623 (5 mil)	Dissolved or Gaseous Oxygen	0 - 20 ppm (mg/L) 250% Saturation	0 - 50 psig	-5° - 80°C



# Conductivity Measurements

Two technologies are used to measure Conductivity. **Contacting Conductivity** is an impedance measurement made between two metal contacts in the solution. **Inductive Conductivity** is a non-contacting measurement made between two toroidal coils inside the sensor that are inductively coupled through the solution's conductivity. Inductive sensors excel in the higher conductivity ranges and where coating is a problem. The chemically resistant PVDF (KYNAR) body is excellent for corrosive environments. Contacting sensors can measure from very low conductivities, (resistivity measurements) to very high conductivities but they are subject to coating and corrosion issues, conditions where the inductive sensors excel. The Contacting Conductivity S80 sensors come in three ranges, Low Range, 0.5 $\mu$ S – 50 $\mu$ S, High Range, 50 $\mu$ S – 50mS and Resistivity, 0 – 20M $\Omega$ . Inductive Sensors measure from 50 mS to 1000 mS.

## 6 Point Advantage

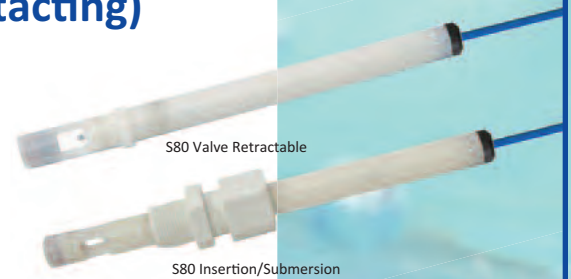
### Conductivity and Resistivity Sensors

The **Model S80 Conductivity** sensor is available in two ranges, a Low Range sensor for measurements from 0.05 $\mu$ S to 50 $\mu$ S and a High Range sensor for measurements from 50 $\mu$ S to 50mS. The **Model S80 Resistivity** sensor measures from 0 - 20 M $\Omega$ . The design of the inner electrode defines the measurement range of the sensor. The Open Style with its large surface area inner electrode and short path length is best for resistivity and low conductivity measurements while the Closed Style is best suited to high conductivity measurements. The standard wetted materials are 316 Stainless Steel, PEEK insulators and VITON o-rings.



### Inductive Conductivity Sensors - (non-contacting)

The **Model S80 Inductive** sensors have a 3/4" diameter PVDF body. These sensors are ideal for measuring high conductivity solutions and % concentration measurements. Since the toroidal electrodes are inside the PVDF body, the inductive sensors are ideal for any application that coats or corrodes the electrode of the standard contacting conductivity sensors. The measurement range of the inductive sensor is from 50 mS to 1000 mS.



### High Temperature/Pressure Sensors

The **CSX2** High Temperature- High Pressure sensor is designed for service to 200°C and 250 psig, 400 psig at 100°C. This insertion style 3/4" MNPT, 316 stainless steel sensor has PEEK insulators and is available with or without an integral signal conditioner. An aluminum junction box is mounted on the rear of the sensor that contains a terminal block and optional signal conditioner. The junction box is rated Class I, Div I, Groups C & D, Class II, Groups E, F and G hazardous locations. It is an ideal choice for boiler control applications, blowdown control, condensate monitoring, leak detection on heat exchangers, and steam purity measurements.



The proper installation and calibration of an analytical loop is critical for a successful measurement. Using the flow of the sample in an insertion application to maximize the cleaning potential can be as simple as changing the size of the Pipe Tee, changing the insertion depth or using an ECD Flow Cell with a spray cleaning port in the most difficult applications. Spray Cleaning heads are also available for immersion applications where the sample velocity is much lower and fouling is more common. Valve retractable units allow the sensor to be removed, serviced and installed without shutting down the sample flow in a pipe or emptying a tank. A compression gland fitting seals the sensor into a ball valve, loosening the gland fitting allows the sensor to be retracted through the ball valve which is then closed, isolating the process solution, before removing the sensor for service. Materials of construction for the Valves, Glands, Flanges and Immersion Assemblies vary from PVC, PVDF and polypropylene plastics to 316 SS, Titanium and Hastelloy C-22. Contact our application specialists for the most cost effective solution to your application.

## Calibration Solutions



All of the S80 sensors require periodic calibration and ECD offers a full range of calibration solutions. For pH applications we offer pH 4.00, 7.00 and 10.00 buffers. ORP calibrations can be accomplished with a +465 mV ferric-ferrous solution or by adding quinhydrone to pH 4 and pH 7 buffer solutions creating +267 mV ORP and +90 mV ORP respectively. Specific ion calibration solutions are standardly 10 ppm and 100 ppm although any value can be formulated at no extra cost. Conductivity solutions are made with KCl and Deionized water, values from 10  $\mu$ S to 500 mS are available. Solutions to simulate % acid or % caustic are labelled as the actual solution, i.e. 4% NaOH, even though the solution is made from KCl with an equivalent conductivity providing a safe and accurate calibration system.

## Fittings and Flow cells



The Model S80 sensors are offered with a wide array of fittings, flow cells, immersion assemblies and valve retraction assemblies.  $\frac{3}{4}$ " MNPT compression fittings are available for S80 insertion into pipe Tees or flow cells and when reversed, for coupling with Stand Pipes for immersion applications. Flow cells of PVC, PVDF or 316 SS have  $\frac{3}{8}$ " or  $\frac{1}{2}$ " FNPT ports on a 2" O.D. by 5" body. 316 SS Sanitary 3A Flanges and 150# Flanges can be adapted for insertion or valve retractable service. Contact our Technical support staff for other configurations.

## Model T80 Universal Transmitters



The ECD Model T80 transmitter is a single or dual channel transmitter for the measurement of pH, ORP, pION, Conductivity, Resistivity, Dissolved Oxygen and Turbidity. The Model T80 transmitter digitally communicates with any ECD intelligent S80 digital sensor, automatically configuring the transmitter's menus and display screens to the measured parameter. The ECD S80 digital sensors facilitate two way communication with the Model T80 transmitters. The type of sensor, identity and serial number are stored in the sensor's memory along with calibration registers. Ordering pH, ORP or pION sensors with the SENTINEL option automatically activates the "Remaining Life" diagnostic shown in the picture.

## S80

All Sensors

### Dimensions:

**S80 Insertion** - 3/4" OD x 10" Length

**S80 Valve Retractable** - 3/4" OD x 17"

### Cable Length:

10 ft. standard, optional lengths in 10 ft increments, optional Detachable cable connection

### Housing Materials:

Standard: 316 Stainless Steel

Optional: Titanium (T), grade 2

Hastelloy C-22 (H),

PVDF (K)

Polypropylene (P)

### O-Ring Materials:

Standard: Viton® (VIT)

Optional: Ethylene Propylene (EPR),

VITON® 75 (VIT75)

Kalrez® (KLZ)

CV75 (CV)

### Process Connections:

#### S80 Insertion/Immersion

-75 3/4" 316 SS gland fitting with nylon ferrule

-75HT 3/4" 316 SS gland fitting with Teflon® ferrule

-75SF 3/4" 316 SS gland fitting with stainless steel ferrule

-75TFE 3/4" Teflon® gland fitting with Teflon™ ferrule

-100P 1" Polypropylene gland fitting for Polypropylene housing only

#### S80 Valve Retractable

-VSS 1" 316 SS valve retraction assembly

-VSSE 1" 316 SS valve retraction assembly for Inductive sensors

-VKY 1" PVDF valve retraction assembly

-VPP 1" Polypropylene Valve Retraction assembly

## PHS80

pH measurement

### Measurement Range:

0-14 pH

### Temperature Range:

0° - 90° C

### Optional HT version:

0° - 140° C

### Pressure Range:

0 - 100 psig @ 90° C

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C

## MVS80

ORP & Specific Ion

### Measurement Range:

ORP: -2000 mV to 2000 mV

plon: Sensor Specific, ppb, ppm&ppt

### Temperature Range:

ORP -0° - 90° C, plon Sensor Specific

### Pressure Range:

0 - 100 psig @ 90° C

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C

## DOS80

Dissolved Oxygen

### Measurement Range:

0-20 ppm, 0-150% SAT

### Temperature Range:

0° - 90° C

### Pressure Range:

0 - 65 psig @ 90° C

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C

## CS<sup>80</sup>/RS80

Conductivity/Resistivity

### Measurement Ranges:

Conductivity: 0.5µS to 50 mS

Resistivity: 0 - 20 MΩ

### Temperature Range:

-5° to 100° C

### Optional HT version:

-5° to 150° C

### Pressure Range:

CS/RS80 0 - 100 psig

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C, 100K thermistor

## CS80

Inductive Conductivity

### Measurement Ranges:

50 mS to 1000 mS

### Temperature Range:

-5° to 100° C

### Pressure Range:

0 - 100 psig

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C, 100K thermistor

### Body material:

KYNAR (PVDF)

## CSX2 Series

High Temperature Conductivity

### Measurement Ranges:

1.0µS to 50mS

### Temperature Range:

0° to 200° C

### Pressure Range:

0 -250 psig ( 400psig @100° C)

### Temperature Compensation:

Automatic 0° - 200° C

Accuracy ± 0.2° C, 10K ohm platinum RTD

### Wetted Materials:

316 SS and PEEK

### Shipping Weight:

S80 (10") 2.5 lbs (1.2 kg)

S80 (17") 2.75 lbs (1.25 kg)

S80-VSS 5.8 lbs (2.65 kg)

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

1500 North Kellogg Dr.

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# SENTINEL Pre-pHault Diagnostic

## The ECD **6** Point Advantage

- 1 Unique Visual Sensor Life Indicator allows scheduled maintenance**
- 2 Output the Diagnostic Signal to avoid unscheduled down time**
- 3 Intelligent Pre-Calibrated Digital Sensors eliminate the need for field calibrations**
- 4 Application Specific Electrode Cartridges, pH, ORP and Specific Ion**
- 5 Submersible and Retractable Sensor Designs with various process fittings and lengths**
- 6 Various Industrial Housing Materials, 316 SS, Ti, Hastelloy provide process compatibility**

**ECD** ELECTRO-CHEMICAL DEVICES



## Description

The SENTINEL feature allows the Model T80 transmitter to provide Pre-pHault diagnostic information about the accuracy of a pH, ORP or plon measurement. The SENTINEL displays a filled triangular gauge that decreases proportionally to the degradation of the reference electrode, a filled gauge indicates a properly functioning measurement while the emptying gauge indicates the remaining life of the electrode. This Pre-pHault diagnostic alerts the user to potential problems and the remaining life before the measurement fails.

Model S80 sensors for the measurement of pH, ORP and the various plons use replaceable electrode cartridges specific for the measured parameter. These electrode cartridges have a measurement cell (pH glass electrode, platinum ring or ion selective membrane) and a reference cell. The reference cell is designed to produce a standard potential independent of the solution it is immersed in. While this style of electrode is typically trouble free, there are conditions that lead to failure. Diffusion through the porous liquid junction decreases the concentration of the potassium chloride inside the electrode as the electrode ages. The decreasing concentration of potassium chloride changes the potential of the cell which shows up as a drift in the measured value. Diffusion also allows chemicals in the process to infiltrate into the electrode. If these chemicals can react with silver then the electrode will become poisoned and a large offset voltage will be generated destroying the accuracy of the measurement.

The SENTINEL addresses these issues by including an additional sleeved silver element into the reference cell. When the electrode cartridge is new, both silver elements are at the same potential but as the electrode ages or becomes poisoned the bare element changes its potential in response to the electrolyte depletion or poisoning. The SENTINEL monitors the potential difference between the two elements and displays the value as a gauge of the electrodes remaining life. The protected silver element is still producing the correct potential but it is in danger of failing due to the changing environment inside the reference cell. This Pre-pHault indication notifies the user of the potential electrode failure before the measurement actually fails.

When a Model S80 SENTINEL sensor is connected to a T80 transmitter the SENTINEL functions are displayed. The Pre-pHault diagnostic is displayed on one of the Model T80s main screens along with the process variable, % 4-20 mA output and temperature. The diagnostic value can be assigned to an optional alarm relay and/or a secondary 4-20 mA output or monitored through HART® communication. The mV limit value for the diagnostic is user configurable with a default setting of 60 mV.

The Model S80 SENTINEL sensor uses Diagnostic electrodes designated by Part#'s 20053XX, These electrodes use a triaxial connector with a PV connection (pH, ORP, Ion), Reference connection and Diagnostic connection.

# SENTINEL Pre-pHault Diagnostic

## Model S80 Intelligent Sensor Part Number Configurator

For other configurations contact the Sales team at the factory

Model	Type	Style	Mat & Length	Connection	Detachable	Cable	T Handle	Valve Oring
S80-	5 Diagnostic, pH, ORP, plon	0 Insertion	00 316 SS 10"	00 No fitting	0 not detachable	0 none	0 no T handle	0 Viton or none
		1 Valve Retract	01 316 SS 17"	01 ¾" 316 SS Gland	1 Axial Detachable cable	1 10'	1 T w Lanyard	5 VIT 75
			10 Titanium 10"	04 ¾" Haste Gland		2 20'	2 T w poly fitting	6 EPR
			11 Titanium 17"	05 ¾" Titan Gland	2 Right Angle Detachable cable	3 30'		7 Kalrez
			20 Hastelloy 10"	06 ¾" Polypr Gland		4 40'		9 CV75
			21 Hastelloy 17"	07 ¾" Kynar Gland		5 50'		
				30 1" 316 SS Valve				
				33 1" Haste Valve				
				34 1" Titan Valve				
				40 1" Kynar Valve				
				42 1" Polypr Valve				
S80 -	5	0 -	00	01 -	1	1	0	0

## Diagnostic Electrodes Selection Guide

Part No.	Parts and Accessories Description
<b>pH Electrode Cartridges</b>	
2005345	Diag, General Purpose, RADEL body, dbl jct TFE Ref, Flat pH glass, -10°-90°C
2005346	Diag, GP, PEEK body, dbl jct ceramic Ref, Flat pH glass, -10°-90°C
2005349	Diag, High Temperature, PEEK body, dbl jct TFE Ref, Hemi pH glass, 0°-130°C
2005360	Diag, Chemical Resistant, PEEK body, triple jct TFE Ref, Flat pH glass, 0°-130°C
2005330	Diag, Sulfide Resistant, PEEK body, triple jct TFE Ref, Hemi pH glass, 0°-130°C
2005348	Diag, Solvent Resistant, PEEK body, dbl jct TFE Ref, Flat pH glass, -10°-90°C
2005303	Diag, Fluoride resistant, PEEK body, Rugged pH glass, dbl jct TFE Ref, -10°-90°C
<b>ORP (REDOX) Electrode Cartridges</b>	
2005328	Diagnostic, Platinum ORP, PEEK body, dbl jct TFE Ref, -10-80°C
<b>Ion Electrode Cartridges</b>	
2005383	Diag, Ammonium, RADEL body, dbl jct TEF Ref, 0.05-18,000 ppm, 0°-40°C
2005362	Diag, Bromide, RADEL body, dbl jct TEF Ref, 1-80,000 ppm, 0°-80°C
2005340	Diag, Cadmium, RADEL body, dbl jct TEF Ref, 0.1-11,200 ppm, 0°-80°C
2005343	Diag, Calcium, RADEL body, dbl jct TEF Ref, 0.1-40,000 ppm, 0°-40°C
2005308	Diag, Chloride, RADEL body, dbl jct TEF Ref, 2-30,000 ppm, 0°-80°C
2005358	Diag, Copper, RADEL body, dbl jct TEF Ref, 1 ppb-6,300 ppm, 0°-80°C
2005342	Diag, Cyanide, RADEL body, dbl jct TEF Ref, 0.1-260 ppm, 0°-80°C
2005363	Diag, Fluoride, PEEK body, dbl jct TEF Ref, 0.02-2,000 ppm, 0°-80°C
2005341	Diag, Lead, PEEK body, dbl jct TEF Ref, 2.0-20,700 ppm, 0°-80°C
2005386	Diag, Nitrate, RADEL body, dbl jct TEF Ref, 0.1-14,000 ppm, 0°-40°C
2005334	Diag, Potassium, RADEL body, dbl jct TEF Ref, 0.1-40,000 ppm, 0°-40°C
2005331	Diag, Sodium, RADEL body, dbl jct TEF Ref, 0.2-23,000 ppm, 0°-80°C
2005322	Diag, Sulfide, RADEL body, dbl jct TEF Ref, 0.01-32,000 ppm, 0°-80°C
2005316	Diag, Silver, RADEL body, dbl jct TEF Ref, 0.1-107,000 ppm, 0°-80°C



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## Model S10 & S17 Sensors



pH, ORP, Specific Ion, Dissolved Oxygen,  
Conductivity & Resistivity Measurement



**ELECTRO-CHEMICAL DEVICES**

**Electro-Chemical Devices** offers a complete line of liquid analytical sensors - pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity. The ECD technically advantage has 6 points of design flexibility to configure the sensor to best fit your application.



## the **ECD** 6 Point Advantage

- 1** **Multiple individual measurement parameters** in the same mechanical configuration- pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity
- 2** Readily available **application specific sensor cartridges**. Many unique pH electrode design formulations and materials of construction which are field proven and selected for long life and accuracy.
- 3** Long life **replaceable sensor cartridges** lowers the overall operating cost. Optional **SENTINEL "PrepHault"** sensor life indicator.
- 4** **Various process fittings with adjustable insertion lengths** - 3/4" NPT compression fitting, sanitary fitting, and valve retractable fittings.
- 5** **Industrial housing materials for compatibility with process fluid**. Stainless Steel, Titanium, Hastelloy, Polypropylene or PVDF (Kynar™). Standard 10" or 17" optional custom lengths.
- 6** **Built-in electronic signal conditioning** for noise-free signal transmission.



# S10 & S17 Sensors

**S10 & S17 Sensor Overview** - The ECD sensor family consists of two Universal Sensor Designs, the Model S10, an immersion or insertion sensor and the Model S17 a valve retractable sensor. The fully rebuildable S10 and S17 sensors have a rugged 316 stainless steel body that includes a sensing element, a temperature module and a signal conditioner for the process variable with cabling. Measurement cartridges for pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity and Resistivity are available. The S10/S17 built-in electronic signal conditioner minimizes the influence of extraneous noise allowing the sensor to be located hundreds of feet from the instrument. Housings are available in 316 Stainless Steel (standard), Titanium, Hastelloy, Polypropylene, or PVDF and also in optional custom lengths.

## S10 Sensor

**The S10 Sensor** uses a  $\frac{3}{4}$ " MNPT compression fitting as the process connection. This allows a variable insertion length to accommodate installation in pipe tees, flow cells, or through tank walls and if the fitting is reversed the sensor can be installed in a pipe for submersion in a tank.



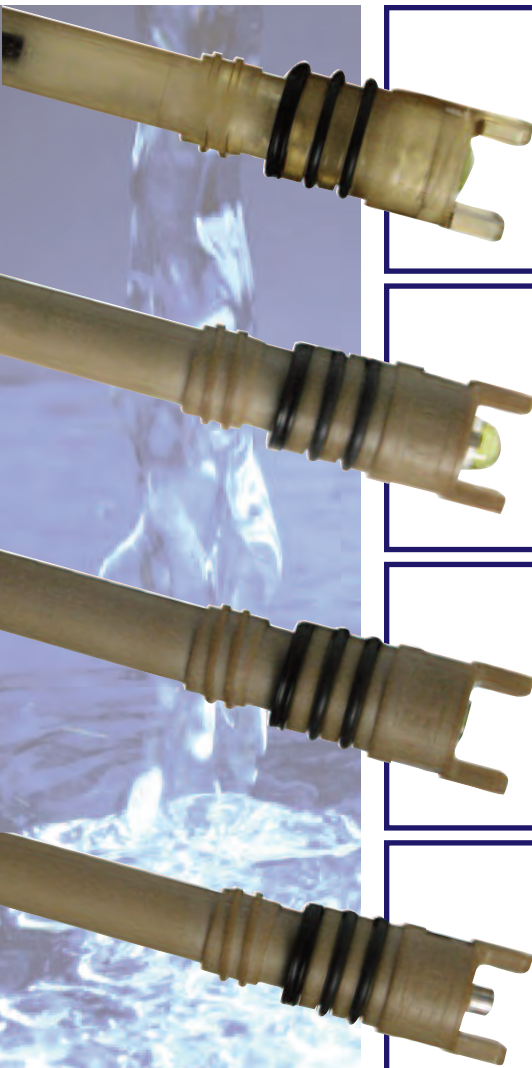
**The S17 Sensor** uses a 1" MNPT ball valve, 1" x  $\frac{3}{4}$ " reducer and a  $\frac{3}{4}$ " MNPT compression fitting as the process connection. Loosening the compression fitting allows the sensor to slide freely through the ball valve for either insertion into the process or retraction from the process. Once retracted, the ball valve can be closed and the sensor removed for maintenance or replacement without shutting down the process line.

## S17 Sensor

# pH and ORP Electrode Cartridges

The S10 and S17 sensors use **replaceable electrode cartridges** to provide application specific solutions for the most demanding pH measurements. Available in either Radel (PES) or PEEK construction with full crown, double or single tine style pH bulb protection. Various pH glass formulations are available for General Purpose, High Temperature or Aggressive Chemical applications. These formulations are blown into spherical bulbs (best response), hemispherical bulbs (more durable) or a slightly radiused flat surface (easily cleaned) to address the process conditions. A Platinum tip replaces the pH glass bulb on ORP electrodes. The reference electrodes have double or triple junction reference cells with porous Teflon® and ceramic junctions and various electrolytes. This vast array of possibilities will solve most application problems - we have refined this offering to three widely used electrodes for most installations- consult our technical support staff for other unique electrode configurations.

the **ECD** **6** Point Advantage



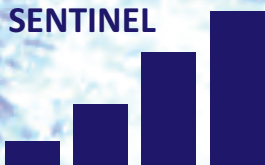
**2005145** – This **General Purpose Electrode** has a two tine Radel body, double junction reference and slightly radiused pH bulb. While suitable for higher temperatures it is optimized for fast and stable readings in ambient temperature applications. Neutralizations, waste effluent monitoring, rinse applications and potable water are just a few of the suggested applica-

**2005157** – This **High Temperature Electrode** has a two tine PEEK body, triple junction reference and hemispherical pH bulb. This electrode is designed for the process control or neutralization of most mineral acids and bases in applications up to 130°C. The triple junction design is resistant to sulfide ion poisoning making it ideal for use in petroleum refineries and metal processing plants.

**2005066** – This **Chemically Resistant Electrode** has a two tine PEEK body, double junction reference and slightly radiused pH bulb. The PEEK body is suitable for use in most aggressive solvents, oxidizing solutions and acids or bases. This electrode is optimized for a harsh chemical environment and is suitable for service up to 130°C. Chemical separations and solvent recovery in the CPI and pharmaceutical industries along with chlorine production and flotation in mining are suggested applications.

**2005167** – This **ORP (Oxidation Reduction Potential) Electrode** has a two tine Radel body, double junction reference and a platinum tip. This general purpose sensor can be used for monitoring the oxidant level of cooling towers, swimming pools, aquariums or the de-chlorination of waste water. Metal finishing and mining also provide applications such as cyanide destruction and monitoring chrome plating baths.

## SENTINEL



All reference electrodes degrade over time, some become poisoned, some depleted of electrolyte, and both cases cause the measurement to drift. **SENTINEL** is a feature that monitors the reference electrode potential and displays the drift graphically and/or with a 4-20 mA output providing a predictive maintenance alert before there is a problem. The **SENTINEL** option is available on all mV based sensors, pH, ORP and Specific Ion.

# Specific Ion (pION) & Dissolved Oxygen (DO) Electrode Cartridges

**Ion selective electrodes** are not limited to laboratory use; some are suitable for continuous online measurement. ECD offers Specific Ion Electrode cartridges to measure Bromide, Chloride, Cyanide, Fluoride, Sulfide, Calcium, Potassium and Sodium ions. Specific Ion electrodes measure the activity (concentration) of the ion in solution, the “free” ion, not a complexed version. Cyanide, Fluoride and Sulfide ions only exist in a specific pH range as free ions and outside this pH range some percentage of the total concentration is complexed as H(X) which cannot be seen by the sensor. These measurements can be pH compensated using the dual channel C22 Controller and a pH sensor to determine the total ion concentration. The other sensors may be subject to interferences caused by competing ions in the solution. Consult with the factory on all new installations.

## Specific Ion (pION) Electrode Cartridges

Part#	Type	Measurement Range	pH Range	Temperature Range
2005083	Ammonium	0.05 - 18,000 ppm	2-10 pH	0°-40°C
2005062	Bromide	1 - 80,000 ppm	2 - 12pH	0°-50°C
2005043	Calcium	0.1 - 40,000 ppm	2.5 - 10 pH	0°-40°C
2005008	Chloride	2 - 35,000 ppm	2 - 12 pH	0°-50°C
2005042	Cyanide	0.1 - 260 ppm	11 - 13 pH	0°-80°C
2005058	Cupric	1.0 ppb -6,300 ppm	2 - 6 pH	0°-80°C
2005063	Fluoride	0.02 - 2,000 ppm	5 - 8 pH	0°-80°C
2005086	Nitrate	0.1 - 1000 ppm	2 - 12 pH	0°-40°C
2005034	Potassium	0.1 - 40,000 ppm	2 - 12 pH	0°-40°C
2005031	Sodium	0.2 - 23,000 ppm	2 - 14 pH	0°-80°C
2005022	Sulfide	0.01 - 32,000 ppm	11 - 14 pH	0°-80°C
2005022	Silver	0.1 - 107,000 ppm	2 - 14 pH	0°-80°C



## Dissolved Oxygen Electrode Cartridge

The ECD dissolved oxygen electrode is a galvanic cell with a lead anode, silver cathode and Teflon membrane. The cartridge is ready to use as received, there are no solutions or membranes to install before the electrode can be used. The membrane is protected by a single tine PEEK body allowing for easy cleaning. Designed for ppm level measurements it is ideal for environmental water measurements, aerobic waste treatment and digesters.

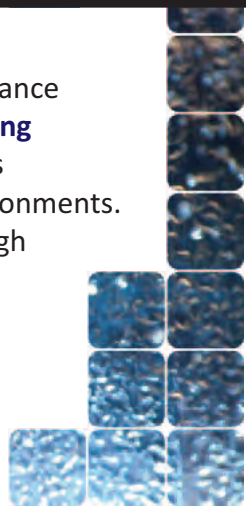
Part#	Type	Measurement Range	Pressure Range	Temperature Range
2005622	Dissolved or Gaseous Oxygen	0 - 20 ppm (mg/L) 250% Saturation	0 - 50 psig	-5°- 80°C



# Conductivity Measurements

Two competing technologies are used to measure Conductivity; **Contacting Conductivity**, an impedance measurement between two metal contacts in the solution or **Toroidal Conductivity, a non-contacting measurement** made between two coils inside the sensor inductively coupled through the solution's conductivity. Toroidal sensors excel in the higher conductivity ranges and coating or corrosive environments. Contacting sensors can measure from very low conductivities, (resistivity measurements) to very high conductivities but they are subject to coating and corrosion issues. The Contacting Conductivity S10 and S17 sensors come in three ranges, Low Range,  $1\mu\text{S} - 20\mu\text{S}$ , High Range,  $50\mu\text{S} - 20\text{mS}$  and Resistivity,  $2\text{M}\Omega - 50\text{M}\Omega$ .

the **ECD** **6** Point Advantage



## Conductivity and Resistivity Cartridges

Replaceable cartridges optimize the measurement over a specified range. Each cartridge has a specified range of  $\frac{1}{2}$  to 2 times the specified value, i.e. a Specified Value of  $20\mu\text{S}$  provides an optimal range of  $10\mu\text{S} - 40\mu\text{S}$ . Seventeen cartridges are available to cover the range of  $50\text{M}\Omega$  resistivity to  $50\text{mS}$  conductivity. The cartridge provides the inner contact of the measurement with the housing providing the other contact. The standard wetted materials are 316 Stainless Steel, PVDF and VITON o-rings. Three front end guard styles are offered; open for resistivity or low conductivity measurements, closed for high conductivity measurements and a 3A approved sanitary front end for food and pharmaceutical applications.



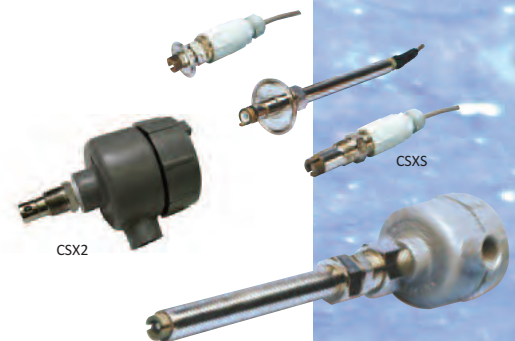
## Toroidal Sensors - (non-contacting)

The S10 and S17 Toroidal sensors have a  $\frac{3}{4}$ " diameter PVDF body, not the stainless steel used for the other measurements. The sensors are sealed and there are no replaceable cartridges. These sensors are ideal for high conductivity solutions like % concentration measurements or any application that coats or corrodes the standard contacting conductivity sensors. The measurement range is from 0.5 mS to 1000 mS.



## CSX Series Sensors

The CSX1 High Temperature- High Pressure sensors are designed for service to  $230^\circ\text{C}$  and 660 psig. These insertion style  $\frac{3}{4}$ " MNPT, 316 stainless steel sensors have PEEK insulators and are available with or without an integral signal conditioner. The junction box is rated Class I, Div I, Groups C & D, Class II, Groups E, F and G hazardous locations. The CSXS sensors are rated for service to  $150^\circ\text{C}$  and 225 psig and use RYTON®, KYNAR® or Teflon® insulators. These  $\frac{3}{4}$ " MNPT, stainless steel insertion style sensors are available in various fixed insertion lengths. An aluminum junction box is mounted on the rear of the sensor that contains a terminal block and optional signal conditioner.





# Accessories and Ordering Information

Part #	Description
1000070	Panel Mounted Flow Cell for S10, 1/2" FNPT through, PVC
1000071	Panel Mounted Flow Cell for S10, 1/2" FNPT through, PVDF
1000072	Panel Mounted Flow Cell for S10, 1/2" FNPT through, 316 SS
2000263	Handrail Mounting Kit, includes PVC extension pipe and 304 SS Hardware
1000235	Raft Float Assembly Kit, includes Float, Boom and Swivel Mount Hardware
1000122	PVC Spray Cleaning Nozzle for 3/4" Metallic Housings
1000154	PVC Spray Cleaning Nozzle for 1" PVDF or PP Housings
1000051	NEMA 4X Junction Box 5 point Terminal block, Remote mounting
2001030	ABS Black Plastic junction Box, Sensor Mounted
2000948	Aluminum Junction Box, sensor Mounted
2000756	Sanitary Flange Fitting, 2", for use with S10 (also in 1" and 2 1/2" size)
2000076	25 mm Port Fitting, Ingold Style, for use with S10
2010XXX	pH Calibration Solutions, pH 4.01(100), 7.00(101), 10.0(103), 500 ml bottles
2010XXX	Conductivity Cal Solutions, 1mS(150), 10mS(151), 100mS(155), 500 ml bottles
2010170	ORP Calibration Solution, 500 ml bottles



## Ordering Information

PH S10		T23	CBL	S	EG	75HT
Function & Style		Instrument	Cable Length	Material	Electrode Guard	Process Connection
PH	S10 or S17	T23	CBL (10 ft. Std.)	Stainless Steel	75	3/4" 316 SS Gland nylon Ferrule (S10)
MV (ORP)		T28	CBL20 (20 ft.)	Titanium	75HT	3/4" 316 SS Gland Teflon Ferrule (S10)
MV (pION)		C22	CBL** (** ft.)	Hastelloy C	75K	3/4" KYNAR Gland and Ferrule (S10)
DO			** Consult Factory	Kynar	VSS	1" 316 SS Valve Retraction Assembly
					VKY	1" KYNAR Valve Retraction Assembly

### Toroidal Conductivity

CS17	CBL20	100 mS	K	TOR	EPR	VKY
Function & Style	Cable Length	Range	Material	Toroidal	O-Ring Material	Process Connection
Toroidal	CBL (10 ft. Std.)	0 -0.5 mS    0 -50 mS	Kynar	Viton (std)	75	3/4" KYNAR Gland
CS10 (Insertion)	CBL20 (20 ft.)	0 -1 mS    0 -100 mS				
CS17 (Retractable)	CBL** (** ft.)	0 -2 mS    0 -200 mS				
	** Consult Factory	0 -5 mS    0 -500 mS				
		0 -10 mS    0 -1S				
				EPR	SIL	VKY 1" KYNAR
				FSIL	CV75	Valve Re-
				KLZ	(KALREZ)	tractable As-

### Contacting Conductivity

CS17	T23	CBL20	T	2 μS	EPR	VTT
Function & Style	Instrument	Cable Length	Material	Range	O-Ring Material	Process Connection
RS10 (Insertion)	T23 T28 C22	CBL (10 ft. Std.)	Stainless Steel	Resistivity 2, 20, 50 MΩ Low Range 1,2,5,10, 20μS High Range 0.1 to 50 mS	Viton (std)	75 75HT
RS17(Retractable)		CBL20 (20 ft.)	Titanium			
CS10 (Insertion)		CBL** (** ft.)	Hastelloy C			
CS17 (Retractable)		** Consult Factory				
					EPR	SIL 75K VSS
					FSIL	CV75 VKY (see above for explanation)
					KLZ	

## S10 & S17

All Sensors

### Dimensions:

**S10** - 3/4" OD x 13 3/4" Length

**S17** - 3/4" OD x 24" Length

### Cable Length:

10 ft. standard

Optional lengths in 10 ft increments

6 conductor shielded (Belden 8786)

### Housing Materials:

Standard: 316 Stainless Steel

Optional: Titanium (T), grade 2

Hastelloy (H), C-22

PVDF (K)

### O-Ring Materials:

Standard: Viton™ (VIT)

Optional: Ethylene Propylene (EPR),

Fluorosilicone (FSIL)

Silicone (SIL)

Kalrez™ (KLZ)

CV75 (CV)

### Process Connections:

#### S10

-75 3/4" 316 SS gland fitting  
with nylon ferrule

-75HT 3/4" 316 SS gland fitting  
with Teflon™ ferrule

-75SF 3/4" 316 SS gland fitting  
with stainless steel ferrule

-75TFE 3/4" Teflon™ gland fitting  
with Teflon™ ferrule

-100 1" Teflon™ gland fitting for  
PVDF housing only

#### S17

-VSS 1" 316 SS valve retraction  
assembly

-VKY 1" PVDF valve retraction  
assembly

### Shipping Weight:

S10 2.5 lbs (1.2 kg)

S17 2.75 lbs (1.25 kg)

S17-VSS 5.8 lbs (2.65 kg)

## PHS10 & PHS17

pH measurement

### Measurement Range:

0-14 pH

### Temperature Range:

0° - 90° C

### Optional HT version:

0° - 140° C

### Pressure Range:

0 - 100 psig @ 90° C

### Optional HP version:

0 - 300 psig @ 140° C

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C over the range

3,000 ohm BALCO RTD

## MVS10 & MVS17

ORP & Specific Ion

### Measurement Range:

ORP: -2000 mV to 2000 mV

plon: Sensor Specific, ppb, ppm & ppt

### Temperature Range:

0° - 90° C

### Pressure Range:

0 - 100 psig @ 90° C

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C, 3K ohm BALCO RTD

## DOS10 & DOS17

Dissolved Oxygen

### Measurement Range:

0-20 ppm, 0-150% SAT

### Temperature Range:

0° - 90° C

### Pressure Range:

0 - 65 psig @ 90° C

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C over the range

3,000 ohm BALCO RTD

## CS<sup>10</sup>/RS10 & CS<sup>17</sup>/RS17

Conductivity/Resistivity

### Measurement Ranges:

Low Range Sensor: 1µS to 20µS

High Range Sensor: 50µS to 20 mS

Resistivity: 2 MΩ ∫ 50 MΩ

### Temperature Range:

-5° to 100° C

### Optional HT version:

-5° to 150° C

### Pressure Range:

CS/RS10 0 - 100 psig

CS/RS17 0 - 100 psig

Optional HP version:

CS/RS10 0 - 300 psig

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C, 100K ohm thermistor

## CS10 & CS17

Toroidal Conductivity

### Measurement Ranges:

0.5mS to 1000mS

### Temperature Range:

-5° to 100° C

### Pressure Range:

CS10 0 - 100 psig

CS17 0 - 300 psig

### Temperature Compensation:

Automatic 0° - 100° C

Accuracy ± 0.2° C, 100K ohm thermistor

### Body material:

KYNAR (PVDF)

## CSX Series

### Measurement Ranges:

1.0µS to 50mS

### Temperature Range:

0° to 150° C (CSX2 to 200° C)

### Pressure Range:

0 - 250 psig (CSX2 to 400psig)

### Temperature Compensation:

Automatic 0° - 150° C

Accuracy ± 0.2° C, 10K ohm platinum RTD

### Wetted Materials:

316 SS and ceramic

Specifications subject to change without notice.

### Represented by:

## Electro-Chemical Devices

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# Model CSX2 Conductivity Sensor



**ELECTRO-CHEMICAL DEVICES**

## Features

- Rugged 316 stainless steel construction
- Double EPR o-ring seals
- Standard 3/4" MNPT process connection
- Cast Aluminum Junction Box
- PEEK insulator

## Benefits

- High Temperature, 200°C and High Pressure, 250 psig sensor
- Redundant, maximum reliability
- Standard pipe fittings, no special adapters needed
- Convenient access to wiring
- Chemically resistant with high heat deflection temperature



*Model CSX2  
Conductivity Sensor*

## Description

The ECD Model CSX2 conductivity sensor is designed for high pressure, high temperature conductivity measurements. It is an ideal choice for boiler control applications, blowdown control, condensate monitoring, leak detection on heat exchangers, and steam purity measurements are just a few of the many applications in which this rugged and reliable sensor can be used.

The Model CSX2 has a 316 stainless steel outer body and center electrode separated by a PEEK® (poly ether ether ketone) internal insulator. All possible leak paths through the sensor are double sealed with EPR O-rings for maximum on-stream reliability. Hot water is a severe environment for any elastomer. The front EPR o-ring seals bear the brunt of the chemical attack, allowing the back seals to remain relatively unaffected. This redundant design increases the reliability of the CSX2, dramatically increasing the usable lifetime of the sensor in these harsh applications.

The weather resistant aluminum junction box allows easy access to the terminal strip or the signal conditioner. The signal conditioner amplifies the

conductivity signal allowing a noise free signal to be transmitted hundreds of feet. If the temperature is below 70°C the signal conditioner can be mounted in the CSX2's integral junction box otherwise it is located in the instrument or if the sensor is more than 10 feet from the instrument, in a remote junction box.

A wide range of signal conditioners are available that optimize the conductivity measurement for a specific range. The Model C22 controller, Model T23 and T28 transmitters have a user specified signal conditioner mounted inside the instrument or optionally in a remote junction box.

The Model CSX2 conductivity sensor is designed for high temperature service up to 200°C at pressures of 250 psig. At temperatures below 100°C the CSX2 sensor is rated for pressures up to 400 psig. The CSX2 junction box has a 3/4" FNPT port for cable connection. High temperature cable and cable glands are user supplied. Low temperature PVC jacketed cable and gland fittings are available from ECD.

# Model CSX2 Conductivity Sensor

## Specifications

### Measuring principle:

Electrolytic Conductivity, two-electrode sensor

### Cell Constant:

1.0/cm

### Measuring Range:

1.0 - 50,000  $\mu$ S

### Analyzer/Remote Signal Conditioner: (select range)

1 $\mu$ S, 2 $\mu$ S, 5 $\mu$ S, 10 $\mu$ S, 20 $\mu$ S, 50 $\mu$ S, 100 $\mu$ S, 200 $\mu$ S, 500 $\mu$ S,  
1mS, 2mS, 5mS, 10mS, 20mS, 50mS

### Process Temperature Range:

-5 ...200°C

### Process pressure range:

250 psig at 200°C

400 psig at 100°C

### Temperature Compensation:

10 k $\Omega$  Platinum RTD temperature sensor

### Materials of Construction:

**Sensor body:** stainless steel 316

PEEK (poly ether ether ketone) insulator, EPR o-rings

**Junction Box:** Explosionproof, weatherproof aluminum with  $\frac{3}{4}$ " FNPT connection, includes a low temperature (80°C)  $\frac{1}{2}$ " polyamide cable gland with reducer bushing

### Process Connection:

$\frac{3}{4}$ " MNPT Thread

### Electrical connections:

From Sensor to Signal Conditioner/Analyzer:

User Supplied 4 conductor shielded cable

Signal Conditioner in optional junction box to Transmitter:

Shielded 7-conductor cable (PN 9640004.COND)

### Maximum Total Cable Length:

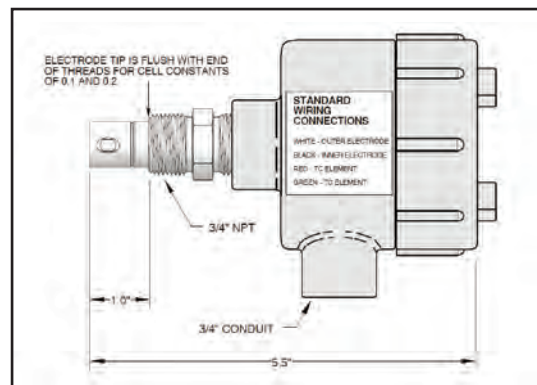
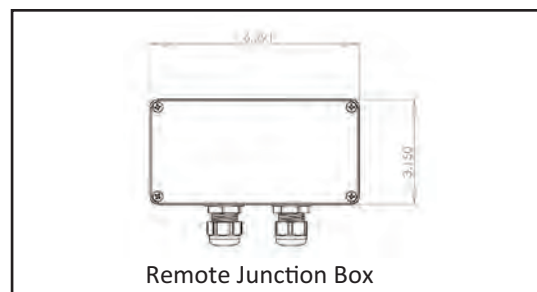
100 m cable extension with optional junction box

### Shipping Weight:

3.0 lbs (1.4 kg)

Part No.	Model and Product Description
1300400-1	CSX2 conductivity sensor with integral junction box

Part No.	Spare Parts and Accessories Description
9250008	Aluminum Junction Box (XJB)
1000190-1	Signal Conditioner in Remote Junction Box, 1 $\mu$ S
1000190-2	Signal Conditioner in Remote Junction Box, 2 $\mu$ S
1000190-3	Signal Conditioner in Remote Junction Box, 5 $\mu$ S
1000190-4	Signal Conditioner in Remote Junction Box, 10 $\mu$ S
1000190-5	Signal Conditioner in Remote Junction Box, 20 $\mu$ S
1000190-6	Signal Conditioner in Remote Junction Box, 50 $\mu$ S
1000190-7	Signal Conditioner in Remote Junction Box, 100 $\mu$ S
1000190-8	Signal Conditioner in Remote Junction Box, 200 $\mu$ S
1000190-9	Signal Conditioner in Remote Junction Box, 500 $\mu$ S
1000190-10	Signal Conditioner in Remote Junction Box, 1mS
1000190-11	Signal Conditioner in Remote Junction Box, 2mS
1000190-12	Signal Conditioner in Remote Junction Box, 5mS
1000190-13	Signal Conditioner in Remote Junction Box, 10mS
1000190-14	Signal Conditioner in Remote Junction Box, 20mS
1000190-15	Signal Conditioner in Remote Junction Box, 50mS
9640004.COND	7 conductor cable, Tinned ends, 60°C, 10 ft. increments
9640037	4 conductor cable, tinned ends, 80°C, 10 ft. increments
9360005	$\frac{1}{2}$ " MNPT cable Gland, 80°C



Specifications subject to change without notice.

### Represented by:

## Electro-Chemical Devices

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# FC80 Free Chlorine Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- Panel Mounted System Plumb and Play Design
- Automatic pH Compensation
- Automatic Flow Control
- T80 Transmitter Capability
- Compliant with EPA Method 334.0

## Benefits

- Complete System, Easy Installation, Ready to Use
- No Expensive Reagents
- Eliminates Pressure Regulators and Rotameters
- Dual Measurements, Single parameter or Dual parameter Displays, MODBUS RTU, Spray Cleaner (optional for fouling applications)



Model FC80  
*Free Chlorine Analyzer*

## Description

The FC80 is a panel mounted, ready to use Free Chlorine Analyzer. It is designed to monitor free chlorine in drinking water, rinse water, cooling water or other fresh water samples from 0.05 – 20 ppm chlorine as the standard range or 0.01 - 5.00 ppm with the low range sensor. The FC80 is compliant with EPA method 334.0 for measuring drinking water.

The FC80 features a plug and play design that incorporates a constant head flow control device, a pH sensor, a chlorine sensor and the T80 analyzer/transmitter conveniently mounted on a PVC panel. Connect the sample and drain lines, connect the power and outputs and it is ready to use. Calibration is accomplished by DPD comparison.

Free chlorine exists in solution as a pH dependent ratio of hypochlorous acid (~100% at pH 5) and hypochlorite ion (~100% at pH 10). The Free Chlorine Sensor measures only the hypochlorous acid component of the free chlorine and the analyzer calculates the balance using either the measured pH or a user defined fixed value. The use

of the pH sensor provides accurate compensation for samples between pH 6 and pH 9 eliminating the need for expensive sample conditioning systems to control the pH of the solution.

The T80 is 110-240 VAC or 24 VDC powered and allows either parameter to be graphically displayed with user defined Line, Bar or Guage style graphs. The standard configuration has (2) 4-20 mA outputs, (3) alarm relays and MODBUS RTU.

Amperometric chlorine sensors are flow sensitive, the minimum required flow by the sensor is 0.5 ft/sec, above this value the output is virtually flow independent. A "Constant head" Flow control Device (CFD) maintains the optimum flow past the sensor over a wide range of incoming sample flow rates. The minimum flow required for the CFD is 10 gal/hr and the maximum flow is 80 gal/hr with the sample going to drain at atmospheric pressure.

The Auto Clean option includes a solinoid actuated spray cleaner that uses either 30 psi process water or air. An easily adjusted timer controls the period and duration of the cleaning cycle.

# FC80 Free Chlorine Analyzer

## Specifications

### Sensor and Flow Train

#### Sensor

Polarographic, Gold/Silver, PTFE membrane, Digital communication

#### Measurement Range

Chlorine: 0.05 to 20 ppm (High Range)  
0.01 to 5.00 ppm (Low Range)

pH: 0 to 14 pH

#### Operating Temperature

0° C to 50° C (32° F to 122° F)

#### Min/Max Flow

38 L/hr to 300 L/hr (10 gal/hr to 80 gal/hr)

#### Wetted Materials

PVC, PP, PVDF, PTFE, Glass, 316 SS

#### Process Connections

Input ¼" barb fitting (¼" FNPT), Drain ¾" FNPT

#### Response Time

T90 in 2 minutes

#### Electrolyte Life

Up to 12 months

### T80 Analyzer/Transmitter

#### Measurements

Chlorine: 000.0 to 999.9 ppb, ppm auto ranging

pH: 0 to 14 pH

Temperature: 0° C to 100° C (32° F to 212° F)

#### pH Compensation

pH 5 - 10 (accuracy degrades rapidly above 9 pH)

#### Display

128 x 64 pixels (2.75" x 1.5") LCD, Black on Grey background, Blue on White background with LED backlight

#### Enclosure

IP65, weatherproof, ½ DIN, (L x W x D) 5.7" X 5.7" X 3.5"

#### Outputs

(1) 4-20 mA for Free Chlorine, set to Sensors Range

(1) 4-20 mA for pH (Optional) , set 0-14 pH

#### Alarm Relay Ratings

Three (3) SPDT, 1 form C, 250 VAC, 10 Amp

#### Input Power

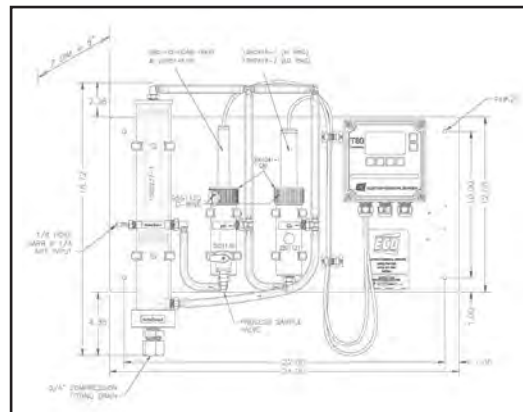
Code -1 24 VDC (18-36 VDC @ 250 mW minimum)

Code -2 100-240 VAC, 50/60 Hz, 4W, protected with 250V, 1A, Slow Blow fuse



Part No.	Model and Product Description
FC80-01-2200	Free Chlorine Analyzer (FC80), complete, 0.05-20.00 ppm, 100-240 VAC
FC80-01-2210	Free Chlorine Analyzer (FC80), complete, 0.05-20.00 ppm, with spray cleaner, 100-240 VAC
FC80-11-2200	Free Chlorine Analyzer (FC80), complete, 0.01-5.00 ppm, 100-240 VAC
FC80-11-2210	Free Chlorine Analyzer (FC80), complete, 0.01-5.00 ppm, with spray cleaner, 100-240 VAC

Part No.	Spare Parts and Accessories Description
1390918-1	Free Chlorine Sensor, Standard Range, 0.05-20 ppm
1390918-2	Free Chlorine Sensor, Low Range, 0.01-5.00 ppm
1000238	Membrane Replacement Kit with electrolyte
S80-00-0C66-0B00	pH Sensor, 316L SS body with Flange, 4' cable
2005145.VIT	Replacement pH Cartridge
3501131	Chlorine Flow Cell
3501130	pH Flow Cell
3501041-1	Flow Cell Threaded Cap



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# TC80 Total Chlorine Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- Panel Mounted System Plumb and Play Design
- Automatic pH Compensation
- Automatic Flow Control
- T80 Analyzer Capability
- Compliant with EPA Method 334.0

## Benefits

- Complete System, Easy Installation, Ready to Use
- No Expensive Reagents
- Eliminates Pressure Regulators and Rotameters
- Dual Measurements, (2) 4-20 mA and (3) Alarm Relays, 24VDC or 110/220 VAC Power, Auto clean option



*Model TC80  
Total Chlorine Analyzer*

## Description

The Model TC80 is a panel mounted, ready to use Total Chlorine Analyzer. It is designed to monitor total chlorine in drinking water, rinse water, cooling water or other fresh water samples from 0.05 – 20 ppm  $\text{Cl}_2$  with the High Range sensor and 0.005 to 2.000 ppm with the Low Range sensor. The TC80 features a plug and play design that incorporates a flow control device, a pH sensor, a chlorine sensor and the T80 transmitter are conveniently mounted on a PVC panel. Connect the sample and drain lines, connect the power and outputs and it is ready to use. The TC80 is calibrated at the factory before shipment, additional Calibrations are accomplished by DPD comparison.

**Total Chlorine** is the combined amount of Free Chlorine, Chloramine, Organic and Bound Chlorine in the sample. The TC Sensor is a three electrode amperometric sensor with a Gold cathode, Silver Halide anode and 304 SS counter electrode. The Counter electrode provides a stable base potential that minimizes drift. The Total Chlorine sensor has a micro-porous membrane that allows ions to diffuse in and out of the sensor. The various chlorine species in the measured solution diffuse

into the sensor and react with the acidic potassium iodide electrolyte to form iodine. The iodine is reduced at the cathode back to iodide and the current flow between the cathode and silver iodide anode is proportional to the Total Chlorine. The pH sensor provides accurate compensation for samples between pH 4 and pH 12 and eliminates the need for an expensive sample conditioning system. The T80 graphically displays both the Total Chlorine and pH allowing easy trend analysis.

**Amperometric chlorine sensors** are flow sensitive, the minimum required flow by the sensor is 0.5 ft/sec, above this value the output is virtually flow independent. A "Constant head" Flow controller maintains the optimum flow by the sensor over a wide range of incoming sample flow rates. The minimum flow required is 10 gal/hr and the maximum flow is 80 gal/hr with the sample going to drain at atmospheric pressure.

**The Auto Clean option** includes a solinoid actuated spray cleaner that uses either 30 psi process water or compressed air to clean the electrode surfaces. An easily adjusted timer controls the period and duration of the cleaning cycle. (shown above)

# TC80 Total Chlorine Analyzer

## Specifications

### Sensor and Flow Train

#### Sensor

Amperometric, Three Electrode, Gold-Cathode/Silver-Silver Halide-Anode/ 304 SS counter electrode, Digital

#### Measurement Range

Chlorine: 0.05 to 20.00 ppm (High Range)

0.005 to 2.000 ppm (Low Range)

pH: 4 to 12 pH

#### Operating Temperature

0° C to 45° C (32° F to 113° F)

#### Min/Max Flow

38 L/hr to 300 L/hr (10 gal/hr to 80 gal/hr)

#### Wetted Materials

PVC, PP, PVDF, PTFE, Glass, 304 & 316 SS

#### Process Connections

Input 1/4" barb fitting (1/4" FNPT), Drain 3/4" FNPT fitting

#### Response Time

T90 approximately 2 minutes

#### Electrolyte Life

Up to 6 months

### T80 Transmitter

#### Measurements

Chlorine: 0.001 to 999.9 ppb, ppm, auto ranging

pH: 0 to 14 pH

Temperature: 0° C to 100° C (32° F to 212° F)

#### pH Compensation

pH 4 - 12

#### Display

2.5" X 1.75" backlit LCD, 4 lines for Text & Graphical

#### Enclosure

NEMA 4X, LxWxD: 5.7" x 5.7" x 3.5"

#### Outputs

(1) 4-20 mA for Total Chlorine, set to Sensors Range

(1) 4-20 mA for pH (Optional) , set 0-14 pH

#### Alarm Relay Ratings

(3) SPDT 230 VAC/5A

#### Input Power

110/220 VAC @ 50/60 Hz

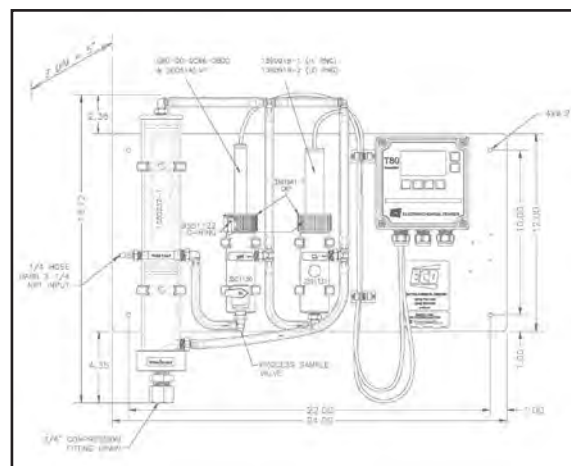
Optional 24 VDC (12 to 50 VDC) @ 0.25A

Part No.	Model and Product Description
TC80-01-2200 (HR), TC80-11-2200 (LR)	TC80, complete, panel mounted, auto pH compensation, 110/220 VAC
TC80-01-1200 (HR), TC80-11-1200 (LR)	TC80, complete, panel mounted, auto pH compensation, 24 VDC
TC80-01-2210 (HR), TC80-11-2210 (LR)	TC80, complete, panel mounted, auto pH comp, 110/220 VAC, with spray cleaner
TC80-01-1210 (HR), TC80-11-1210 (LR)	TC80, complete, panel mounted, auto pH comp, 24 VDC, with spray cleaner

(HR) = High Range, 0.05-20.00 ppm

(LR) = Low Range, 0.005-2.000 ppm

Part No.	Spare Parts and Accessories Description
1391005-1	Total Chlorine Sensor (High Range)
1391005-2	Total Chlorine Sensor (Low Range)
1000248-1	Recharge Kit, (membrane and refill sol'n)
1000245-1	Membrane Replacement Kit
1000246-1	Electrolyte Refill Kit
S80-00-0C00-0C00	S80 pH Sensor, Complete
2005145.VIT	Replacement pH Cartridge
3501131	Flow Cell, Chlorine
3501130	Flow Cell, pH
1000263	Cable assembly, Total Chlorine sensor, 2 meter



Specifications subject to change without notice.

### Represented by:

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# DC-80 De-Chlorination Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- Zero Shift method, 0.00 ppm to 20.00 ppm
- Automatic pH Compensation
- Automatic Flow Control
- T80 Analyzer Capability
- Panel Mounted System Plumb and Play Design

## Benefits

- Chlorine metered into flow cell subtracted from measurement
- No Expensive Reagents
- Eliminates Pressure Regulators and Rotameters
- Dual Measurements, (2) 4-20 mA and (3) Alarm Relays, 24VDC or 110/220 VAC Power, Auto clean option
- Complete System, Easy Installation, Ready to Use



*Model DC-80  
De-Chlorination Analyzer*

## Description

The Model DC-80 is a panel mounted, ready to use De-Chlorination Analyzer. Since amperometric chlorine sensors are unstable when measuring near zero amounts of chlorine, the DC80 Analyzer uses the “zero shifted” strategy to make the measurement. A TC80 Total chlorine Analyzer is fitted with a chlorine dosing pump that feeds a metered amount of chlorine into the outfall of the Constant Head Flow Controller. An “Offset” feature allows the zero point to be shifted by the amount of chlorine that is added. The Total Chlorine sensor is now measuring 3-5 ppm of total chlorine which provides for a stable and reliable measurement and the analyzer displays the concentration of Total Chlorine present in the sample. Calibrations are accomplished by DPD comparison.

The TCA Sensor is a three electrode amperometric sensor with a Gold cathode, Silver Halide anode and 304 SS counter electrode. The Counter electrode provides a stable base potential that minimizes drift. The TCA sensor has a micro-porous membrane that allows ions to diffuse in and out of the sensor. The various chlorine species in the measured solution diffuse into the sensor and react

with the acidic potassium iodide electrolyte to form iodine. The iodine is reduced at the cathode back to iodide and the current flow between the cathode and silver iodide anode is proportional to the Total Chlorine. The pH sensor provides accurate compensation for samples between pH 4 and pH 12 and eliminates the need for an expensive sample conditioning system. The T80 graphically displays both the Total Chlorine and pH allowing easy trend analysis.

Amperometric chlorine sensors are flow sensitive, the minimum required flow by the sensor is 0.5 ft/sec, above this value the output is virtually flow independent. A “Constant head” Flow controller maintains the optimum flow by the sensor over a wide range of incoming sample flow rates. The minimum flow required is 10 gal/hr and the maximum flow is 80 gal/hr with the sample going to drain at atmospheric pressure.

The Auto Clean option includes a solenoid actuated spray cleaner that uses either 30 psi process water or compressed air to clean the electrode surfaces. An easily adjusted timer controls the period and duration of the cleaning cycle. (shown above)





# DCA-23 Seawater Dechlorination Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- Dual Input Potentiometric Design
- 0.00 - 2.00 ppm Chlorine Range
- MDL of 0.014 ppm
- Complete Uni-Strut Rack Mounted System
- separately as Analyzer, Sensors and Tees

## Benefits

- No Added Chemicals
- No Flow sensitivity
- Measures TRO
- Optimal Seawater Range
- Minimum Detection Limit
- Easy Installation, Connect Power, Feed and Drain Lines
- Design Custom Installations



**Model DCA-23**  
*Seawater Chlorination  
Dechlorination Analyzer*

## Description

The Model DCA-23 is a single purpose analyzer designed to monitor the chlorination and dechlorination of sea water from 0.00 - 2.00 ppm.

Sea water is used for cooling in power plants, refineries and SWAC systems (salt water air conditioning). The heat exchangers on LNG terminals use large quantities of sea water in the regasification process. Sea water is also chlorinated and de-chlorinated at desalination plants. The chlorination of sea water inhibits the growth of marine life on the various filters, screens and heat exchange surfaces that the sea water passes over.

Sea water contains 68 mg/L of bromide. When chlorine is added to sea water, the bromide ion is oxidized to hypobromous acid (HOBr) and hypobromite (OBr<sup>-</sup>) by the Free Chlorine (HOCl and OCl<sup>-</sup>). This is a very rapid reaction and essentially all of the chlorine is instantaneously converted into bromine and bromamines. The DCA-23 displays Chlorine ppm in order to conform with existing regulations, it actually measures the Total Residual Oxidant (TRO) and converts it into an equivalent ppm of chlorine. TRO is defined as the total oxidizing capacity (free and combined) of the sea water that is available after chlorination.

The DCA-23 measures the pH, temperature and the TRO potential of the sea water and then displays an equivalent chlorine concentration as Cl ppm. The measurement range of the analyzer is limited to 0.00 ppm to 2.00 ppm Cl in seawater and it is not suitable for fresh water service.

The DCA-23 is easily calibrated by comparison to a Free Chlorine Grab Sample test. Simply set the observed TRO potential to agree with the Standard Potential from the TRO Calibration Chart.

The DCA-23 has a minimum detection limit (MDL) of 0.014 ppm and a limit of quantification (LOQ) of 0.044 ppm making it suitable for monitoring in environments with the most stringent dechlorination regulations.

The DCA-23 is available as a Complete Uni-Strut Rack Mounted System as shown above or as separate components. There are five variations of the analyzer: (1) Loop Powered, 4-20 mA = 0.00 to 2.00 ppm Cl (2) 24VDC powered with two 4-20 mA outputs, Cl and pH, (3) 24VDC powered with two 4-20 mA outputs and two alarm relays, (4) 110 VAC powered with two 4-20 mA outputs and two alarm relays, (5) 220 VAC powered with two 4-20 mA outputs and two alarm relays.

# DCA-23 Seawater Dechlorination Analyzer

## Specifications

### Sensors

#### pH Model #

PHS10-T23-CBL-EG-75PP

#### TRO Model #

MVS10-T23-CBL-EG-75PP

#### Measurement Range

pH Sensor: 0 to 14 pH  
 0 - 80°C  
 0 - 100 psig  
 TRO Sensor: ± 1500 mV  
 0 - 80°C  
 0 - 100 psig  
 Temperature: 0° - 100° C

#### Wetted Materials

PHS10: 316 SS, PES, Teflon, Glass, Viton  
 TRS10: 316 SS, PES, Teflon, Platinum, Viton  
 Flow Train and Process Fittings

¾" Compression Fitting: PP, Viton  
 ¾" pipe & 1" pipe tee: Schedule 80 PVC

#### Rack Mounted System

Plumbed with ¾" schedule 80 pipe, slip fittings for input and drain. The T-23 Analyzer, (2) sensors, pH flow cell, TRO flow cell are rack mounted using 1½"x 1½" Uni-Strut rail. Maximum System Pressure & Temperature rating: 50 psig @ 60°C

#### Dimensions

26" length x 20" high x 8.5" deep

### T-23 Transmitter

#### Measurements

pH, TRO, Temperature

#### Display

4" X 1" LCD, 2 x 16 character

#### Enclosure

NEMA 4X, LxWxD: 5.7" x 5.7" x 3.5"  
 Membrane switch keypad, (2) ½" Cable Glands

#### Input Power

1290220-1 Loop Powered  
 1290200-2 24 VDC (12 to 36 VDC) @ 0.05 A  
 1290200-3 24 VDC (12 to 36 VDC) @ 0.10 A  
 1290200-4 110 VAC 50/60 hz  
 1290200-5 220 VAC 50/60 hz

#### Outputs

4-20 mA 525 Ω max. load  
 DCA-23 analyzers, All  
 mA 1: Chlorine 0.00-2.00 ppm  
 DCA Analyzers 1290200-2, -3, -4, -5  
 mA 2: pH 0 - 14 pH

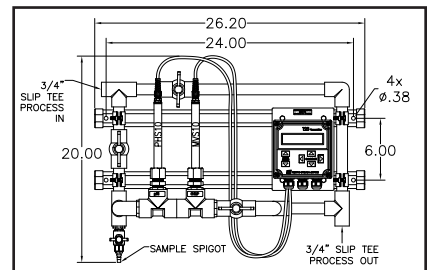
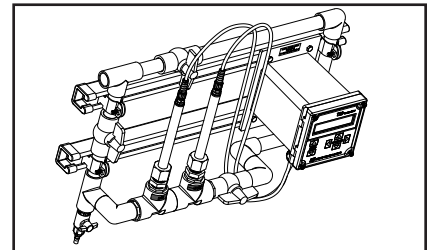
#### Alarm Relay Ratings

Optional (2) SPDT 230 VAC/5A or 30 VDC/5A resistive max.

#### Shipping Weight

T-23 Transmitter 4.8 lbs.  
 PHS10 or TRS10 2.5 lbs.  
 Rack Mounted Complete 18 lbs.

Part#	Model / Description
1290220-1	DCA-23 System, Loop Powered, (1) 4-20 mA
1290220-2	DCA-23 System 24VDC-50 mA powered (2) 4-20 mA
1290220-3	DCA-23 System 24VDC-100 mA powered (2) 4-20 mA, (2) Relays
1290220-4	DCA-23 System 110 VAC powered (2) 4-20 mA, (2) Relays
1290220-5	DCA-23 System 220 VAC powered (2) 4-20 mA, (2) Relays
140406J.30G0	PHS10 pH sensor, PHS10-T23-CBL4-EG-75PP (no electrode cartridge)
141406J.30G0	MVS10 TRO sensor, MVS10-T23-CBL4-EG-75PP (no electrode cartridge)
1900120.1527	DCA-23 Transmitter, Loop Powered, (1) 4-20 mA
1900130.1527	DCA-23 Transmitter, 24VDC-50 mA powered (2) 4-20 mA
19R0130.1527	DCA-23 Transmitter, 24VDC-100 mA powered (2) 4-20 mA, (2) Relays
19E0130.1527	DCA-23 Transmitter, 110 VAC powered (2) 4-20 mA, (2) Relays
19F0130.1527	DCA-23 Transmitter, 220 VAC powered (2) 4-20 mA, (2) Relays
2005145.VIT	Replacement pH cartridge ( <b>recommended spare part</b> )
2005167.VIT	Replacement TRO cartridge ( <b>recommended spare part</b> )



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# CD80 Chlorine Dioxide Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- **Panel Mounted System Plumb and Play Design**
- **Amperometric Design**
- **Automatic Flow Control**
- **T80 Transmitter Capability**
- **Compliant with EPA Method 334.0**

## Benefits

- **Complete System, Easy Installation, Ready to Use**
- **No Expensive Reagents**
- **Eliminates Pressure Regulators and Rotameters**
- **Dual Measurements, Single parameter or Dual parameter Displays, MODBUS RTU, Spray Cleaner (optional for fouling applications)**



Model CD80  
*Chlorine Dioxide Analyzer*

## Description

The CD80 is a panel mounted, ready to use Chlorine Dioxide Analyzer. It is designed to monitor free chlorine in drinking water, rinse water, cooling water or other fresh water samples from 0.05 – 20 ppm chlorine as the standard range or 0.01 - 5.00 ppm with the low range sensor. The CD80 is compliant with EPA method 334.0 for measuring drinking water.

The CD80 features a plug and play design that incorporates a flow control device, a chlorine dioxide sensor, optional pH sensor and the T80 analyzer/controller conveniently mounted on a PVC panel. Connect the sample and drain lines, connect the power and outputs and it is ready to use. Factory calibrated, calibration is accomplished by DPD comparison.

Chlorine Dioxide ( $\text{ClO}_2$ ) exists as a gas in solution, it does not dissolve like other chlorine compounds and is therefore not affected by the pH of the solution.  $\text{ClO}_2$  is approximately 10 times more soluble than chlorine in water but it is extremely volatile and can be easily removed from dilute aqueous solutions with minimal aeration. Chlorine Dioxide diffuses through the PTFE membrane of the sensor and is reduced to chloride ion by the addition of electrons from the cathode. Silver from the anode is then oxidized to silver chloride. The electrons released from the gold cathode and the electrons accepted on the silver anode result in a current flow which is

proportional to the chlorine dioxide concentration in the medium.

Temperature affects the  $\text{ClO}_2$  permeability of the PTFE membrane, increasing the temperature increases the output of the sensor about 4% per  $^{\circ}\text{C}$ . The chlorine flow cell includes a temperature sensor that allows the T80 analyzer to perform automatic temperature compensation of the measurement.

The T80 is 110-240 VAC or 24 VDC powered and allows either parameter to be graphically displayed with user defined Line, Bar or Guage style graphs. The standard configuration has (2) 4-20 mA outputs, (3) alarm relays and MODBUS RTU.

Amperometric chlorine sensors are flow sensitive, the minimum required flow by the sensor is 0.5 ft/sec, above this value the output is virtually flow independent. A "Constant head" Flow control Device (CFD) maintains the optimum flow past the sensor over a wide range of incoming sample flow rates. The minimum flow required for the CFD is 10 gal/hr and the maximum flow is 80 gal/hr with the sample going to drain at atmospheric pressure.

The Auto Clean option includes a solenoid actuated spray cleaner that uses either 30 psi process water or air. An easily adjusted timer controls the period and duration of the cleaning cycle.

# CD80 Chlorine Dioxide Analyzer

## Specifications

### Sensor and Flow Train

#### Sensor

Polarographic, Gold/Silver, PTFE membrane, Digital communication

#### Measurement Range

Chlorine: 0.05 to 20 ppm (High Range)

0.01 to 5.00 ppm (Low Range)

pH: 0 to 14 pH

#### Operating Temperature

0° C to 50° C (32° F to 122° F)

#### Min/Max Flow

38 L/hr to 300 L/hr (10 gal/hr to 80 gal/hr)

#### Wetted Materials

PVC, PP, PVDF, PTFE, Glass, 316 SS

#### Process Connections

Input ¼" barb fitting (¼" FNPT), Drain ¾" FNPT

#### Response Time

T90 in 2 minutes

#### Electrolyte Life

Up to 12 months

### T80 Analyzer/Transmitter

#### Measurements

Chlorine: 000.0 to 999.9 ppb, ppm auto ranging

pH: 0 to 14 pH

Temperature: 0° C to 100° C (32° F to 212° F)

#### pH Compensation

Not needed, ClO<sub>2</sub> is not pH dependent

#### Display

128 x 64 pixels (2.75" x 1.5") LCD, Black on Grey background, Blue on White background with LED backlight

#### Enclosure

IP65, weatherproof, ½ DIN, (L x W x D) 5.7" X 5.7" X 3.5"

#### Outputs

(1) 4-20 mA for Chlorine Dioxide, set to Sensors Range

(1) 4-20 mA for pH (Optional) , set 0-14 pH

#### Alarm Relay Ratings

Three (3) SPDT, 1 form C, 250 VAC, 10 Amp

#### Input Power

Code -1 24 VDC (18-36 VDC @ 250 mW minimum)

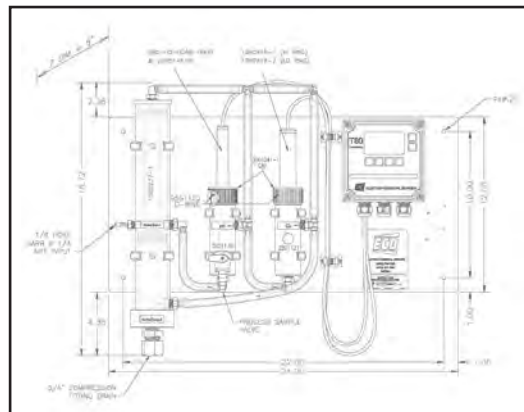
Code -2 100-240 VAC, 50/60 Hz, 4W, protected with

250V, 1A, Slow Blow fuse



Part No.	Model and Product Description
CD80-01-2200	Chlorine Dioxide Analyzer (CD80), complete, pH, ClO <sub>2</sub> 0.05-20.00 ppm, 100-240 VAC
CD80-01-2210	Chlorine Dioxide Analyzer (CD80), complete, pH, ClO <sub>2</sub> 0.05-20.00 ppm, with spray cleaner, 100-240 VAC
CD80-11-2200	Chlorine Dioxide Analyzer (CD80), complete, pH, ClO <sub>2</sub> 0.01-5.00 ppm, 100-240 VAC
CD80-11-2210	Chlorine Dioxide Analyzer (CD80), complete, pH, ClO <sub>2</sub> 0.01-5.00 ppm, with spray cleaner, 100-240 VAC

Part No.	Spare Parts and Accessories Description
1390920-3	Chlorine Dioxide Sensor, Std Range, 0.05 – 20.0 ppm
1390920-4	Chlorine Dioxide Sensor, Low Range, 0.01-5.00 ppm
1000256-1	Membrane Replacement Kit with electrolyte
S80-00-0C66-0B00	pH Sensor, 316L SS body with Flange, 4' cable
2005145.VIT	Replacement pH Cartridge
3501131	Chlorine Flow Cell
3501130	pH Flow Cell
3501041-1	Flow Cell Threaded Cap



Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# HP80 Hydrogen Peroxide Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- Panel Mounted System Plumb and Play Design
- Multiple H<sub>2</sub>O<sub>2</sub> ranges
- Automatic Flow Control
- T80 Transmitter Capability
- pH measurement for added process information

## Benefits

- Complete System, Easy Installation, Ready to Use
- 0-200 ppm, 0-20.0%
- Eliminates Pressure Regulators and Rotameters
- Dual Measurements, Single parameter or Dual parameter Displays, MODBUS RTU, Spray Cleaner (optional for fouling applications)



Model HP80  
*Hydrogen Peroxide Analyzer*

## Description

The HP80 is a panel mounted, ready to use Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) analyzer. It is available in several ranges to suit its various applications, 0-200 ppm for oxidation and disinfection processes and 0-20% for bleaching applications. Hydrogen Peroxide is a colorless liquid that in high concentrations gives off an irritating acidic odor. It is a strong oxidizer, stronger than either chlorine or chlorine dioxide. Hydrogen peroxide reacts very fast. It will then disintegrate into oxygen gas and water, without the formation of byproducts and also increases the amount of oxygen in water.

Hydrogen Peroxide is widely used in the Paper and Pulp industries as a bleaching agent and as an oxidizer for removing metals from well water. It is also used as a disinfectant in cooling towers and municipal waste water treatment plants. H<sub>2</sub>O<sub>2</sub> is an effective bactericide that does not form any harmful Disinfection By Products (DBP) like many chlorine products do. It decomposes naturally into oxygen and water and does not form a residual that has to be removed from the treated water before it is released to the environment.

The HP80 features a plug and play design that incorporates a constant head flow control device, a pH sensor, a hydrogen peroxide sensor and the T80

analyzer/ transmitter conveniently mounted on a PVC panel. Simply connect the sample and drain lines, connect the power and outputs and it is ready to use. Calibration is accomplished by a grab sample comparison.

The T80 is 110-240 VAC or 24 VDC powered and allows either parameter to be graphically displayed with user defined Line, Bar or Guage style graphs. The standard configuration has (2) 4-20 mA outputs, (3) alarm relays and MODBUS RTU.

Amperometric H<sub>2</sub>O<sub>2</sub> sensors are flow sensitive, the minimum required flow by the sensor is 0.5 ft/sec, above this value the output is virtually flow independent. A "Constant head" Flow control Device (CFD) maintains the optimum flow past the sensor over a wide range of incoming sample flow rates. The minimum flow required for the CFD is 10 gal/hr and the maximum flow is 80 gal/hr with the sample going to drain at atmospheric pressure.

The Auto Clean option includes a solinoid actuated spray cleaner that uses either 30 psi process water or air. An easily adjusted timer controls the period and duration of the cleaning cycle.

# HP80 Hydrogen Peroxide Analyzer

## Specifications

### Sensor and Flow Train

#### Sensor

Polarographic, Gold/Silver, micro-porous membrane, Digital communication

#### Measurement Range

H2O2: 0.00 to 200 ppm (2000 ppm, 2%, 20% optional)

pH: 2 to 11 pH

#### Operating Temperature

0° C to 45° C (32° F to 113° F)

Automatic temperature compensation in H2O2 sensor

#### Min/Max Flow

38 L/hr to 300 L/hr (10 gal/hr to 80 gal/hr)

#### Wetted Materials

PVC, PP, PVDF, PTFE, Glass, 316 SS

#### Process Connections

Input 1/4" barb fitting (1/4" FNPT), Drain 3/4" FNPT

#### Response Time

T90 in 8 minutes

#### Electrolyte Life

Up to 6 months

### T80 Analyzer/Transmitter

#### Measurements

Hydrogen Peroxide: 000.0 to 999.9 ppm

pH: 0 to 14 pH

Temperature: 0° C to 100° C (32° F to 212° F)

#### pH Compensation

none, measurement between 2-11 pH

#### Display

128 x 64 pixels (2.75" x 1.5") LCD, Black on Grey background, Blue on White background with LED backlight

#### Enclosure

IP65, weatherproof, 1/2 DIN, (L x W x D) 5.7" X 5.7" X 3.5"

#### Outputs

(1) 4-20 mA for H2O2, set to 0 - 2.00%

(1) 4-20 mA for pH (Optional) , set 0-14 pH

#### Alarm Relay Ratings

Three (3) SPDT, 1 form C, 250 VAC, 10 Amp

#### Input Power

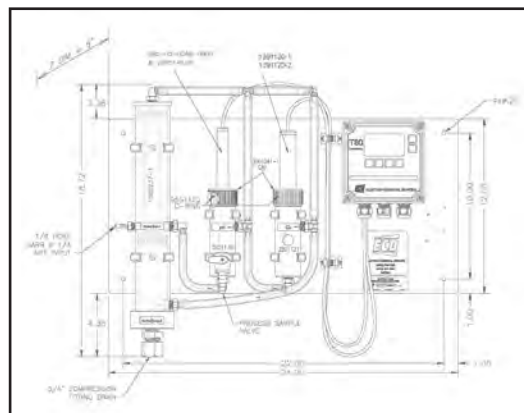
Code -1 24 VDC (18-36 VDC @ 250 mW minimum)

Code -2 100-240 VAC, 50/60 Hz, 4W, protected with 250V, 1A, Slow Blow fuse (Standard)



Part No.	Model and Product Description
HP80-01-2200	Hydrogen Peroxide Analyzer (HP80), complete, 0.00-200 ppm, 100-240 VAC
HP80-01-2210	Hydrogen Peroxide Analyzer (HP80), complete, 0.00-200 ppm, with spray cleaner, 100-240 VAC

Part No.	Spare Parts and Accessories Description
1391115-1	Hydrogen Peroxide Sensor, 0.00-200 ppm
1000267-1	Membrane Replacement Kit with electrolyte
S80-00-OC66-0B00	pH Sensor, 316L SS body with Flange, 4' cable
2005145.VIT	Replacement pH Cartridge
3501131	HP Flow Cell
3501130	pH Flow Cell
3501041-1	Flow Cell Threaded Cap



Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# OZ80 Ozone Analyzer



## ELECTRO-CHEMICAL DEVICES

### Features

- Panel Mounted System Plumb and Play Design
- Multiple O3 ranges
- Automatic Flow Control
- T80 Transmitter Capability
- pH measurement for added process information

### Benefits

- Complete System, Easy Installation, Ready to Use
- 0-2.00 ppm, 0-20.0 ppm
- Eliminates Pressure Regulators and Rotameters
- Dual Measurements, Single parameter or Dual parameter Displays, MODBUS RTU, Spray Cleaner (optional for fouling applications)



Model OZ80  
*Ozone Analyzer*

## Description

The OZ80 is a panel mounted, ready to use Ozone (O3) analyzer. It is available in several ranges to suit its various applications, 0-2.00 ppm for disinfection processes and 0-20.00 ppm for oxidation and bleaching applications. Ozone is a colorless to pale blue gas that in low concentrations gives off an irritating acidic odor. It is a strong oxidizer, stronger than either chlorine or chlorine dioxide. Ozone reacts quickly and disintegrates into oxygen gas, without the formation of harmful byproducts common to most chlorine chemistries. It also increases the amount of oxygen in water.

Ozone is widely used in the drinking water and waste water industries. It can be used at several points in the processing of drinking water, as an oxidizer for removing metals from well water and organics, odors and color from surface water. It is also used as a disinfectant in cooling towers and municipal waste water treatment plants. Ozone is an effective bactericide that does not form any harmful Disinfection By Products (DBP) like many chlorine products do. It decomposes naturally into oxygen and water and does not form a residual that has to be removed from the treated water before it is released to the environment.

The OZ80 features a plug and play design that incorporates a constant head flow control device, a pH

sensor, an ozone sensor and the T80 analyzer/transmitter conveniently mounted on a PVC panel. The large bore tubing and fittings rarely if ever get clogged. Simply connect the sample and drain lines, connect the power and outputs and it is ready to use. Calibration is accomplished by a grab sample comparison.

The T80 is 110-240 VAC or 24 VDC powered and allows either parameter to be graphically displayed with user defined Line, Bar or Guage style graphs. The standard configuration has (2) 4-20 mA outputs, (3) alarm relays and MODBUS RTU.

Amperometric Ozone sensors are flow sensitive, the minimum required flow by the sensor is 0.5 ft/sec, above this value the output is virtually flow independent. A "Constant head" Flow control Device (CFD) maintains the optimum flow past the sensor over a wide range of incoming sample flow rates. The minimum flow required for the CFD is 10 gal/hr and the maximum flow is 80 gal/hr with the sample going to drain at atmospheric pressure.

The Auto Clean option includes a solinoid actuated spray cleaner that uses either 30 psi process water or air. An easily adjusted timer controls the period and duration of the cleaning cycle.

# OZ80 Ozone Analyzer

## Specifications

### Sensor and Flow Train

#### Sensor

Polarographic, Gold/Silver, micro-porous membrane, Digital communication

#### Measurement Range

Ozone: 0.00 to 2.00 ppm, 0.00 to 20.00 ppm

pH: 2 to 11 pH

#### Operating Temperature

0° C to 45° C (32° F to 113° F)

Automatic temperature compensation in ozone sensor

#### Min/Max Flow

38 L/hr to 300 L/hr (10 gal/hr to 80 gal/hr)

#### Wetted Materials

PVC, PP, PVDF, PTFE, Glass, 316 SS

#### Process Connections

Input ¼" barb fitting (¼" FNPT), Drain ¾" FNPT

#### Response Time

T90 in 8 minutes

#### Electrolyte Life

Up to 6 months

### T80 Analyzer/Transmitter

#### Measurements

Ozone: 000.0 to 999.9 ppm

pH: 0 to 14 pH

Temperature: 0° C to 100° C (32° F to 212° F)

#### pH Compensation

none, measurement between 2-11 pH

#### Display

128 x 64 pixels (2.75" x 1.5") LCD, Black on Grey background, Blue on White background with LED backlight

#### Enclosure

IP65, weatherproof, ½ DIN, (L x W x D) 5.7" X 5.7" X 3.5"

#### Outputs

(1) 4-20 mA for H2O2, set to 0 - 2.00%

(1) 4-20 mA for pH (Optional) , set 0-14 pH

#### Alarm Relay Ratings

Three (3) SPDT, 1 form C, 250 VAC, 10 Amp

#### Input Power

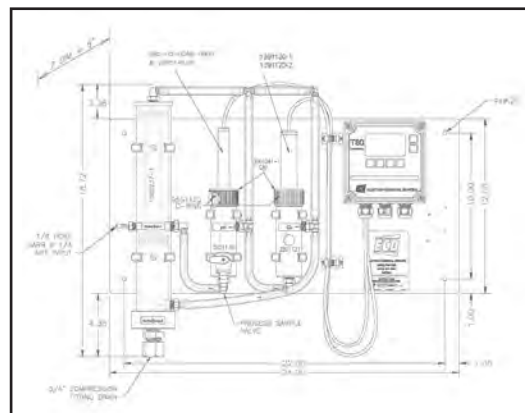
Code -1 24 VDC (18-36 VDC @ 250 mW minimum)

Code -2 100-240 VAC, 50/60 Hz, 4W, protected with 250V, 1A, Slow Blow fuse (Standard)



Part No.	Model and Product Description
OZ80-01-2200	Ozone Analyzer (OZ80), complete, 0.00-2.00 ppm, 100-240 VAC, 2x4-20 mA, 3 Alarm Relays
OZ80-01-2210	Ozone Analyzer (OZ80), complete, 0.00-2.00 ppm, with spray cleaner, 100-240 VAC, 2x4-20 mA, 3 Alarm Relays
OZ80-11-2200	Ozone Analyzer (OZ80), complete, 0.00-20.00 ppm, 100-240 VAC, 2x4-20 mA, 3 Alarm Relays
OZ80-11-2210	Ozone Analyzer (OZ80), complete, 0.00-20.00 ppm, with spray cleaner, 100-240 VAC, 2x4-20 mA, 3 Alarm Relays

Part No.	Spare Parts and Accessories Description
1391116-2	Ozone Sensor, 0.00-2.00 ppm
1391116-1	Ozone Sensor, 0.00-20.00 ppm
1000268-1	Membrane Replacement Kit with electrolyte
S80-00-0C66-0B00	pH Sensor, 316L SS body with Flange, 4' cable
2005145.VIT	Replacement pH Cartridge
1000040-6	Photometric Ozone Test Kit, HCA1 test kit for Ozone
9260104	Reagent Test strips for Ozone HCA1 Tester, Qty. 100 strips
3501130	pH Flow Cell



Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# PA80 Peracetic Acid Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- **Panel Mounted System Plumb and Play Design**
- **Multiple PAA ranges**
- **Automatic Flow Control**
- **T80 Transmitter Capability**
- **pH measurement for added process information**

## Benefits

- **Complete System, Easy Installation, Ready to Use**
- **0-20, 0-200, 0-2000 ppm**
- **Eliminates Pressure Regulators and Rotameters**
- **Dual Measurements, Single parameter or Dual parameter Displays, MODBUS RTU, Spray Cleaner (optional for fouling applications)**



Model PA80  
*Peracetic Acid Analyzer*

## Description

The PA80 is a panel mounted, ready to use peracetic acid (PAA) analyzer. Peracetic acid is a colorless liquid with a characteristic pungent odor similar to vinegar. PAA is produced by a reaction between hydrogen peroxide and acetic acid and is typically supplied as an equilibrium solution of the three with a concentration between 5-15%. It is a strong oxidizer, stronger than either chlorine or chlorine dioxide.

Peracetic acid is widely used in the Food and Beverage, Pharmaceutical and Medical industries as a cleaner and sanitizer of process equipment, medical instruments and for bottle washing. It is also widely used as a disinfectant in cooling towers and municipal waste water treatment plants. PAA is a highly effective bactericide that does not form any harmful Disinfection By Products (DBP) like many chlorine products do. It decomposes naturally into acetic acid and water and does not form a residual that has to be removed from the treated water before it is released to the environment.

The PA80 features a plug and play design that incorporates a constant head flow control device, a pH sensor, a peracetic acid sensor and the T80 analyzer/

transmitter conveniently mounted on a PVC panel. Simply connect the sample and drain lines, connect the power and outputs and it is ready to use. Calibration is accomplished by a grab sample comparison.

The T80 is 110-240 VAC or 24 VDC powered and allows either parameter to be graphically displayed with user defined Line, Bar or Guage style graphs. The standard configuration has (2) 4-20 mA outputs, (3) alarm relays and MODBUS RTU.

Amperometric PAA sensors are flow sensitive, the minimum required flow by the sensor is 0.5 ft/sec, above this value the output is virtually flow independent. A "Constant head" Flow control Device (CFD) maintains the optimum flow past the sensor over a wide range of incoming sample flow rates. The minimum flow required for the CFD is 10 gal/hr and the maximum flow is 80 gal/hr with the sample going to drain at atmospheric pressure.

The Auto Clean option includes a solinoid actuated spray cleaner that uses either 30 psi process water or air. An easily adjusted timer controls the period and duration of the cleaning cycle.

# PA80 Peracetic Acid Analyzer

## Specifications

### Sensor and Flow Train

#### Sensor

Polarographic, Gold/Silver, micro-porous membrane, Digital communication

#### Measurement Range

PAA: 0.00 to 200 ppm

0.0 to 2000 ppm

pH: 0 to 14 pH

#### Operating Temperature

0° C to 50° C (32° F to 122° F)

#### Min/Max Flow

38 L/hr to 300 L/hr (10 gal/hr to 80 gal/hr)

#### Wetted Materials

PVC, PP, PVDF, PTFE, Glass, 316 SS

#### Process Connections

Input ¼" barb fitting (¼" FNPT), Drain ¾" FNPT

#### Response Time

T90 in 2 minutes

#### Electrolyte Life

Up to 12 months

### T80 Analyzer/Transmitter

#### Measurements

PAA: 000.0 to 999.9 ppb, ppm auto ranging

pH: 0 to 14 pH

Temperature: 0° C to 100° C (32° F to 212° F)

#### pH Compensation

none, measurement degrades above pH 8

#### Display

128 x 64 pixels (2.75" x 1.5") LCD, Black on Grey background, Blue on White background with LED backlight

#### Enclosure

IP65, weatherproof, ½ DIN, (L x W x D) 5.7" X 5.7" X 3.5"

#### Outputs

(1) 4-20 mA fo rPAA, set to Sensors Range

(1) 4-20 mA for pH (Optional) , set 0-14 pH

#### Alarm Relay Ratings

Three (3) SPDT, 1 form C, 250 VAC, 10 Amp

#### Input Power

Code -1 24 VDC (18-36 VDC @ 250 mW minimum)

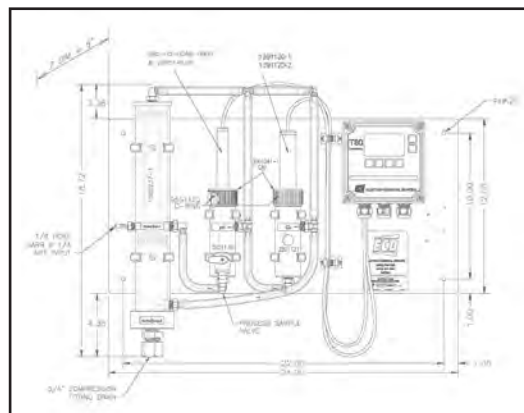
Code -2 100-240 VAC, 50/60 Hz, 4W, protected with

250V, 1A, Slow Blow fuse



Part No.	Model and Product Description
PA80-01-2200	Peracetic Acid Analyzer (PA80), complete, 0.00-200 ppm, 100-240 VAC
PA80-01-2210	Peracetic Acid Analyzer (PA80), complete, 0.00-200 ppm, with spray cleaner, 100-240 VAC
PA80-11-2200	Peracetic Acid Analyzer (PA80), complete, 0.0-2000 ppm, 100-240 VAC
PA80-11-2210	Peracetic Acid Analyzer (PA80), complete, 0.0-2000 ppm, with spray cleaner, 100-240 VAC

Part No.	Spare Parts and Accessories Description
1391120-1	PAA Sensor, 0.00-200 ppm
1391120-2	PAA Sensor, 0.0-2000 ppm
1000273-1	Membrane Replacement Kit with electrolyte
S80-00-0C66-0B00	pH Sensor, 316L SS body with Flange, 4' cable
2005145.VIT	Replacement pH Cartridge
3501131	PAA Flow Cell
3501130	pH Flow Cell
3501041-1	Flow Cell Threaded Cap



Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# Model DO90 Trace DO<sub>2</sub> Sensor



**ELECTRO-CHEMICAL DEVICES**

## Features

- Large Measurement Range
- Lead Silver Galvanic Cell
- Minimal maintenance
- Replaceable Electrode
- Easy Calibration
- Digital Signal

## Benefits

- 0.001 to 20.00 mg/L
- Long term stability
- Drift < 1% per Month
- No membrane or fill solutions to mess with
- Air Calibration and Zero Calibration
- Noise Free signal, Calibration Stored in the Sensor



*Model DO90  
ppb Dissolved Oxygen*

## Description

The Model DO90 Trace DO<sub>2</sub> is designed for the continuous measurement of trace levels of dissolved oxygen in aqueous systems. The primary application of the Model DO90 trace dissolved oxygen sensor is in the monitoring of boiler feedwater. Oxygen should only be present in trace quantities, excessive concentrations of oxygen can result in corrosion damage to the components of the Steam Cycle.

Boiler feed water is thermally and chemically degassed to achieve oxygen-free water. This state must be maintained throughout the Steam Cycle.

Using periodic grab samples to measure the ppb oxygen concentration introduces the risk of significant sampling errors. The Model S80 DO will continuously measure the ppb level of dissolved oxygen directly in the process eliminating grab sampling errors and providing highly reliable information.

The Model DO90 Trace DO<sub>2</sub> is a Lead Silver Galvanic sensor with a durable PFA Teflon® membrane. Oxygen diffusing through the membrane is reduced at the cathode producing hydroxide ions which react with the lead ions in the electrolyte to form lead hydroxide. The anode dissolves more lead ions into the electrolyte sending electrons to the cathode to reduce any oxygen present. The current flows from the Lead anode dissolving into the electrolyte to the cathode where electrons react with the Oxygen which reacts with the lead ions in solution. Under constant conditions, the current is proportional to the oxygen concentration of the medium.

The Model DO90 Trace DO<sub>2</sub> is a digital sensor, all of the signal

conditioning, calibration and diagnostic functions are performed inside the sensor. The DO90 sensor has an easily replaceable electrode cartridge eliminating the need for messy electrolyte/membrane replacement kits. The Model T80 Analyzer is compatible with both the Model DO90 trace dissolved oxygen sensor and other Model S80 sensors.

The Model DO90 flow cell has been specially designed for use with the Model DO90 trace dissolved oxygen sensor. The orientation of the inlet and outlet sample lines automatically purge air from the flow cell. The measurement chamber is optimized for fast response and all wetted parts are 316L stainless steel.

Installation of the flow cell is easy, using either the clamp style holders for wall mount or the two 10 x 32 threaded ports on the backside of the flowcell for panel mounting. Simply connect the input and output sample lines to the ¼" tube fittings and insert the sensor into the flow cell, tighten it in place with the threaded cap and it is ready to go. The 316 SS flange fitting allows for easy removal of the Model DO90 sensor from the flow cell for air calibration.

The Model DO90 Trace DO<sub>2</sub> is available as separate components, sensor, fittings, flowcell, Model T80 Transmitter or as a complete panel mounted system. The Panel mounted system is a complete plumb and play device, mount the panel (17" x 12" panel), plumb ¼" sample tubing to the tube fittings and power to the analyzer either Loop Powered or 110/220 VAC. The system is also available as a complete kit, less the panel, for mounting to an existing water panel.

# Model DO90 Trace DO<sub>2</sub> Sensor

## Specifications

### Measuring principle:

Galvanic, Silver cathode, Lead anode, self polarizing

### Measured Parameter:

Oxygen partial pressure-proportional current signal

### Measuring Range:

0.001 ... 20.00 mg/l or ppm/ppb auto-ranging

### Process Temperature Range:

-5 °C ... 50 °C

### Process pressure range:

0-15 psi maximum overpressure

Vacuum operation is not permitted

### Slope:

approx. 1.5nA/ppbO<sub>2</sub> at 20 °C and 1013 hPa

### Temperature Compensation:

NTC temperature sensor 100 kΩ, 0 ... 50 °C

### Response time:

t90: 30 sec / t99: 90 sec

### Polarization time:

< 60 minutes

### Minimum Flow Rate:

(200 ml/min with PN 1000008-1 flow cell

### Drift:

With continuous polarization: < 1% / month

### Materials of Construction:

Sensor body: Flanged stainless steel AISI 316 Ti

Electrode body: PEEK

Membrane: PFA Teflon®

Cathode: Silver

Anode: Lead

### Process Connection:

¼" 316 SS tube fittings

### Electrical connection (transmitter side)

Digital signal on a shielded 4-wire cable

### Membrane:

2 mil thickness (approx.)

### Maximum Total Cable Length:

100 m cable extension

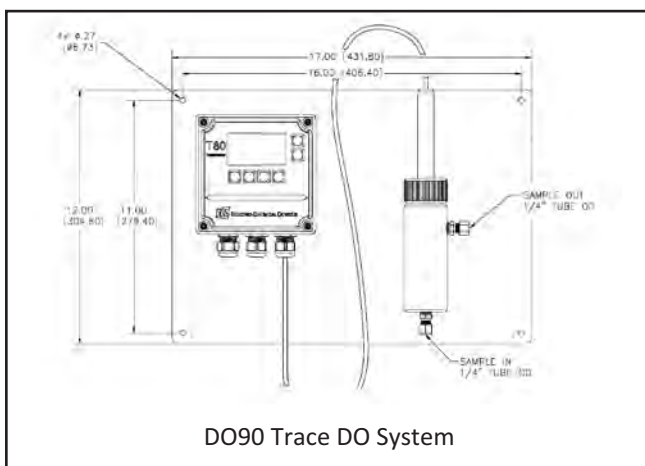
### Shipping Weight:

Model DO90 sensor with 10' cable length, 0.7 kg

Stainless Steel Flow cell, 2.0 kg

Part No.	Model and Product Description
1200200-1 (1200200-98)	DO90 Trace DO System, Loop Powered w/ PVC Panel, complete system, plumb and play ready (Kit with no panel)
1200200-2 (1200200-99)	DO90 Trace DO System, AC Powered & Relays w/ PVC Panel, complete system, plumb and play ready (Kit with no Panel)

Part No.	Spare Parts and Accessories Description
2005621.VIT	Dissolved Oxygen Electrode, ppb
1000008-1	DO90 Flow cell , 316 SS, ¼" Tube fittings
3501041-1	Replacement Threaded Cap for Flow cell
9310051-1	¼" 316 SS Tube fitting
DO90-01-0000-0B	Model DO90 ppb Dissolved Oxygen Sensor, 4' cable, complete with electrode
DO90-01-0001-0B	Model DO90 ppb Dissolved Oxygen Sensor, as above with Flow Cell



Specifications subject to change without notice.

### Represented by:

## Electro-Chemical Devices

1500 North Kellogg Dr.

Anaheim, California, USA 92807

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Model DO90 D1916

# TRITON® DO82 Dissolved Oxygen Sensor

## The ECD 6 Point Advantage



ELECTRO-CHEMICAL DEVICES

- 1 Optical Dissolved Oxygen Sensor** that uses Fluorescence Quenching Method to determine oxygen concentration in water eliminating the need for frequent calibration and membrane replacement
- 2 Intelligent Sensor with Stored Calibration Data**, advanced 2nd generation software algorithms for noise free, stable output
- 3 ULTRA Long Life Membrane Cap** provides years of service, there is no required/recommended annual membrane cap replacement
- 4 Membrane Cap is Easily Replaceable** if physically damaged, there is no need to return the sensor for factory repair or replacement, saving time and money
- 5 Universal Design with Waterproof Fixed or Detachable Cable** assemblies. Available with hand rail mounted immersion assemblies, flow through cells and automatic spray cleaning systems
- 6 Interfaces with T80 Transmitter:** 4-20 mA with MODBUS RTU or HART® on the T80 transmitter, single or dual channel models



## Description

The Triton® DO82 Optical Dissolved Oxygen sensor uses fluorescence quenching to determine the oxygen concentration in water. The use of this optical method by the Triton® DO82 minimizes maintenance, increases reliability and improves the long term accuracy of the measurement. Combine this improved measurement technology with the rugged, easy to install design and the Triton® DO82 provides the best solution for long term measurements in aeration basins, aquaculture and all types of environmental water.

A circular layer of optically active, oxygen sensitive molecules is integrated into an easily replaceable cap. This durable layer is highly permeable to oxygen and rapidly equilibrates to its surroundings. The cap aligns the optically active fluorescence layer above the emitter and detector inside the sensor. The emitter flashes a green light at the layer and the layer fluoresces back a red light. The duration and intensity of the fluorescence are directly dependent on the amount of oxygen in the layer. With little to no oxygen in the layer the response is longer and more intense. Oxygen, however, quenches the fluorescence response so the response decreases to shorter times and lower intensities as the oxygen level increases. Both the time and intensity values are used to

calculate the oxygen level and various diagnostics functions associated with the measurement.

The optical signals are continuously monitored and analyzed to calculate the dissolved oxygen value. The O<sub>2</sub> level and diagnostic values, including the aging of the sensor cap are digitally communicated to the instrument. The digital communication provides a stable, trouble free connection that is immune to the RFI and EMI noise common at waste water treatment plants.

The Triton® DO82 is unaffected by changes in the flow, pH or conductivity of the sample. Unlike many amperometric dissolved oxygen sensors, there are no membranes to replace, electrolytes to refill or anode/cathode assemblies to service or replace. The only serviceable part of the Triton® DO82 sensor is the easily replaceable sensor cap and it should provide greater than two years of service in an aeration basin.

The standard installation method for The Triton® DO82 sensor is immersion into a basin or stream with the sensor mounted at the end of a PVC extension pipe. Rail Mounting Brackets and Wall Mounting Brackets are available. For installations where immersion mounting is not convenient or possible, a flow through assembly is also available.



### Specifications

#### Measurement Range

0 - 20 mg/l (0 - 20 ppm)  
 0 - 200 % Saturation  
 0 - 400 hPa (0 - 6 psi)

#### Pressure Range

Maximum Pressure 10 bar (145 psi)

#### Temperature Range

-5° - 50°C (20° - 120°F) Measuring  
 -20° - 60°C (0° - 140°F) Ambient

#### Response Time

T<sub>90</sub> = 60 sec

#### Accuracy

Max. error < 0.02 ppm below 12 ppm, 0.04 ppm >12 and <20 ppm  
 Temperature Element Class B Pt RTD: ±0.3°C

#### Repeatability

±0.5 % of measured range

#### Resolution

0.01 ppm or 0.01 % Saturation

#### Wetted Materials

316 SS, CPVC, Silicone

#### Sensor Cable

Shielded 4 core cable  
 10 ft (3 m), 20 ft (6.1 m), 30 ft (9.1 m), 40 ft (12.2 m),  
 50 ft (15.25 m) lengths  
 Optional Detachable cable assembly, IP68 rating

#### Process Connection

¾" NPT, rear facing thread or G1 rear facing thread

#### Maximum Cable Length

100 m maximum from T80 transmitter

#### Dimensions

Length 8.0" (200 mm, rear thread to front)  
 Diameter 1.6" (40 mm)

#### Weights

Cable length 10 ft (3 m): 0.7 kg (1.5 lbs)  
 Cable length 50 ft (15.2 m): 1.1 kg (2.4 lbs)

### Part Number Configurator

DO82	TRITON DO80 Optical Dissolved Oxygen Sensor			
Sensor Style	0	(I) Immersion Style Sensor - ¾" MNPT		
	1	(IM) Immersion Style Sensor - G1 thread		
	2	(F) Flow Cell Style Sensor - ¾" FNPT entries		
	3	(FM) Flow Cell Style Sensor - DN25 entries		
	Spray Cleaner	00	No Spray Cleaner	
		01	(SC) Spray Cleaner	
		02	(SC2) Spray Cleaner for Flow Cell Style	
		03	PVC Compression Fitting, DO82 to 1¼" MNPT	
	Cable Style	-0	Fixed Cable	
		-1	(DA) Axially Detachable Cable	
	Cable Length	00	No Cable	
		10	10 ft	
		20	20ft (Standard)	
30		30 ft		
40		40 ft		
50		50 ft		
X0	Specify Length			
DO82 -	0	00	-1	20

### Accessories and SpareParts

1000334-XX (X=length in ft), -99 (user supplied 1" pipe)	Immersion assembly, (¾" FNPT to 1" pipe adapter, 1" Cable feed thru, 5 ft x 1" PVC pipe down tube)
1000234-XX (X=length in ft), -99 (user supplied 1" pipe)	Immersion assembly, (G1 to 1" pipe adapter, 1" Cable feed thru, 5 ft x 1" PVC pipe down tube)
1000450-1 (¾" FNPT entries), -2 (G¾ entries)	Flow thru assembly, PVC, ¾" FNPT or G¾ entries with DO82 compression fitting
2500207-1	Replacement Membrane Cap (optically active component)
1000255	O-Rings (2) sealing o-rings for sensor cap

### Engineering Specification

- The dissolved oxygen sensor shall use Fluorescence Quenching as the method for continuously monitoring the dissolved oxygen.
- The sensor should meet an ingress protection rating of IP68.
- The sensor shall be housed in 316 SS and the body shall be constructed of chlorinated polyvinyl chloride, CPVC plastic.
- The optically active surface shall be coated with silicone rubber.
- The operation of the sensor should not be affected by changes in the pH of the solution or changes in the flow or air bubbles at the sensing tip.
- The operation of the sensor should not be affected by H<sub>2</sub>S or other reducing agents in the sample, or chlorine and other oxidizing chemicals in the sample.
- The sensor shall facilitate either immersion (pipe) mounting or flow through designs.
- The sensor shall be 8.0" L x 1.6" diameter with rear facing ¾" MNPT or G1 threaded connection.
- The sensor shall have a threaded, replaceable, optically active cap that does not require annual/yearly replacement.
- The sensor shall be available with a fixed cable or an optional waterproof IP68 detachable cable assembly.
- The analyzer shall be an ECD Triton® Series DO82 dissolved oxygen sensor and T80 transmitter manufactured by Electro-Chemical Devices, Inc.

Specifications subject to change without notice.

### Represented by:

#### Electro-Chemical Devices

1500 North Kellogg Dr.  
 Anaheim, California, USA 92807  
 Phone: +1-714-695-0051  
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# Triton® TR8 Series Turbidity Sensors

## Triton® TR8



### Turbidity Measurement

Drinking Water, Industrial Water, Water Treatment

### Suspended Solids

Waste Water Treatment Paper and Pulp Processing

Environmental Run-Off



**ELECTRO-CHEMICAL DEVICES**

# Triton® TR8 Series Turbidity/SS Sensors

## Applications

### Clear Water Sensor \$@1\$

- All phases of drinking water processing
- Control of Clear Rinse Water
- Filter rupture or backwash
- Monitoring WWTP discharge
- Monitoring Surface Waters

### Suspended Solids Sensor (-2)

- Activated sludge WWTP
- Return & Digested Sludge WWTP
- Filtrate in paper manufacturing
- Blending Mixing Applications
- Monitoring Environmental runoff

## Features and Benefits

- Intelligent Sensor Technology
  - Factory Calibration Stored in Sensor
  - Self Monitoring Diagnostics
  - Integrated Temperature Measurement
- Multiple Installation Methods
  - Immersion assembly
  - Flow through assembly
  - Gas debubbler assembly
- Digital Data Transmission
  - 200 m between sensor and transmitter
  - Insensitive to electromagnetic interference
- Self Cleaning Design
  - Inclined sensor surface to enhance self cleaning with moderate flow
  - Sapphire measuring windows for improved scratch resistance
  - Wiper Unit can be retrofitted

## General Description

The Triton TR8 is a nephelometric turbidity sensor designed for use in water and wastewater. Turbidity, the cloudiness or haziness of a water sample, is caused by particles suspended in the water, typically clay and silt. Since bacteria and viruses can be attached to these particles, turbidity has become a critical indicator of the overall water quality.

The Triton TR8 uses an optical method for determining the turbidity, a light beam is directed into the sample where it is scattered by suspended particles in the water. The amount of scattering depends on the amount of material in the water, the wavelength of light used and the size and composition of the suspended particles.

The Triton TR8 uses a long lived near infrared LED light source (880 nm) and the 90° scattered light method in accordance with ISO 7027 / EN 27027 to assure accurate turbidity values under standardized and comparable conditions. The 90° scattered light detection method is the most common sensor design for turbidity. This sensor has the advantage of a high sensitivity at low levels of turbidity, a simple optical configuration and a balanced sensitivity to all particle

sizes. Three detectors monitor the light beam at an angle of 90°. The first detector, inside the sensor, (see Figure 1) is the reference detector that compensates for changes in the LED light source caused by aging or other variations. The second detector measures a short path length, which is best for high concentration measurements, % concentration and g/L. The third detector measures the longer path length which is best for lower concentrations, FNU and ppm. The turbidity signal is constantly adjusted versus the reference detector and digital filter functions help to suppress interfering signals while the self monitoring diagnostics assure a highly reliable measurement.

The Optical Surface must remain clean for accurate

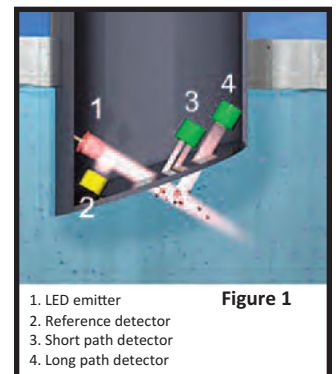


Figure 1  
1. LED emitter  
2. Reference detector  
3. Short path detector  
4. Long path detector

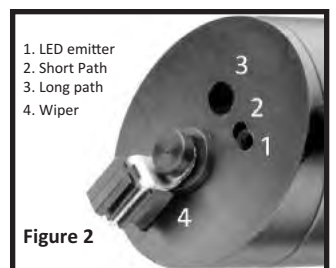


Figure 2  
1. LED emitter  
2. Short Path  
3. Long path  
4. Wiper

# Triton® TR8 Series Turbidity/SS Sensors



Immersion Holder    Flow Through Assembly    Debubbler Assembly

measurements. The inclined sensor face of the TR8 should be oriented into the flow for optimum self cleaning. Periodic cleaning is required for all turbidity sensors. In most cases this entails simply removing the sensor and wiping the optical surface with a soft cloth to remove any dirt or biofilms. An optional automated mechanical wiper is available for installations where manual wiping is inadequate. This option should be ordered on the TR8 sensor in order to maximize the accuracy and minimize the maintenance requirement coating applications. The Flow Through Assembly provides a port for accommodating a spray cleaning capability.

Air bubbles in the water reflect light and will interfere with the measurement. Micro air bubbles

can form when a water sample is depressurized. Care must be taken to ensure the water sample at the measurement point has a higher head pressure than the incoming sample. Water siphoning out from the measurement point can release dissolved gases in the flow cell and create noisy erratic readings. If air bubbles cannot be removed from the sample then the optional wiper assembly effectively removes air bubbles that form on or cling to the optical window. The De-Bubbler flow cell removes air bubbles that are entrained in the sample flow.

The Triton TR8 sensors are factory calibrated in formazine, FNU (Formazine Nephelometric units) and are ready to use in most clean water applications. The factory calibration is permanently stored in the sensor's memory and these values are also used for diagnostic purposes throughout the sensor's life. Two other nonvolatile memory banks are available to store user initiated calibration data.

The TR8 Turbidity Sensor is easy to install, it is easy to use with FNU factory calibration, it is Plug and Play. With the rugged construction including a tough sapphire optical window, self monitoring diagnostics with plausibility checking and an automatic wiper based cleaner the TR8 Turbidity sensor is reliable, accurate and requires minimal maintenance, it is the solution.

## Specifications

### Measurement Principle

Nephelometric 90° NIR scattered light, ISO 7027

### Light source and wavelength

LED, 880 nm

### Optical Reference Compensation

Reference Photodiode

### Measurement Range

- 1 Low Range Version
- (-2) High Range version (Turbidity > 500 NTU)
  - 0.000- 9999 FNU, (0.00- 9999 FNU)
  - 0.00- 3000 ppm (0.00 - 9999 ppm)
  - 0.0 - 3.0 g/l (0-300g/l), 0 - 20% (0-200%)

### Accuracy

Maximum error < 5% of reading

### Repeatability

<1% of reading

### Temperature Range

Operating: -5° - 50°C  
Storage: -20° - 60°C

### Temperature Sensor

NTC, 30 k-ohm @ 25°C

### Pressure/Temperature Rating

6 bar @ 25°C 1 bar @ 50°C

### Wetted Materials

PVC, PPS GF40, Sapphire (wiper, rubber)

### Sensor Cable

Shielded 7 core cable  
7 meter (23 ft) or 15 meter (49 ft) lengths

### Process Connection

G1 Thread, ¾" FNPT

### Maximum Cable Length

200 m maximum from C-22 controller

### Dimensions

Length 8.7" (220 mm)  
Diameter 1.6" (40 mm)

### Weights

Cable length 7 m (23 ft): 0.7 kg (1.5 lbs)  
Cable length 15 m (49 ft): 1.1 kg (2.4 lbs)

# Triton® TR8 Series Turbidity/SS Sensors

## Ordering Information

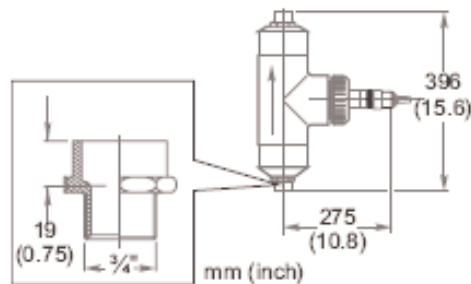
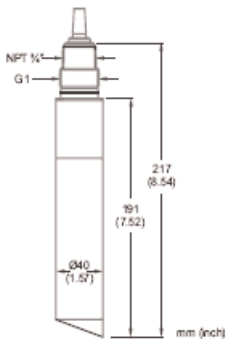
Part #	Model and Description
1398000-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 7 meter cable
1398001-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 15 meter cable
1398010-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 7 meter cable & Automatic Wiper
1398011-1 or (-2)	Triton TR8 Turbidity (SS) Sensor with 15 meter cable & Automatic Wiper
1398100-1	Triton TR8 Turbidity Sensor with 7 meter cable & Flow Through Assembly
1398101-1	Triton TR8 Turbidity Sensor with 15 meter cable & Flow Through Assembly
1398110-1	Triton TR8 Turbidity Sensor with 7 meter cable, Automatic Wiper & Flow Through Assembly
1398111-1	Triton TR8 Turbidity Sensor with 15 meter cable, Automatic Wiper & Flow Through Assembly
1398200-1	Triton TR8 Turbidity Sensor with 7 meter cable & De-Bubbler Assembly
1398201-1	Triton TR8 Turbidity Sensor with 15 meter cable & De-Bubbler Assembly
1398210-1	Triton TR8 Turbidity Sensor with 7 meter cable, Automatic Wiper & De-Bubbler Assembly
1398211-1	Triton TR8 Turbidity Sensor with 15 meter cable, Automatic Wiper & De-Bubbler Assembly
1290100-1	Triton TR8 Turbidity Analyzer, 115 VAC, (1) 0/4-20 mA output, (1) Failure Alarm Relay*
1290100-2	Triton TR8 Turbidity Analyzer, 230 VAC, (1) 0/4-20 mA output, (1) Failure Alarm Relay*
1290100-3	Triton TR8 Turbidity Analyzer, 24 VDC, (1) 0/4-20 mA output, (1) Failure Alarm Relay*
1290100-*	Consult factory for optional dual 0/4-20 mA outputs and multiple relays up to (4) additional relays

(-2) = High Range Turbidity Sensor, recommended for turbidity > 500 FNU

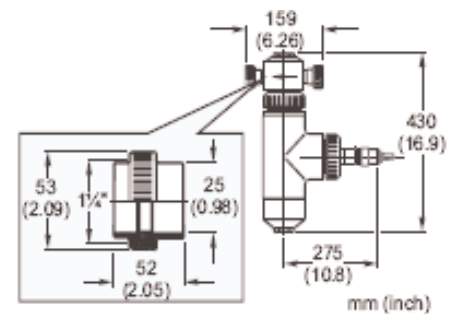
## Accessories

Part #	Model and Description
1000223	Immersion Assembly ( Cap/Cable feed-through, 1 meter down pipe)
2000278	Rail Mounting Brackets, (2) Quick Release "U" clamps for 2" Guard Rail mounting
9640004.cond	TR8 5 Conductor Cable, per meter
1000222	NEMA 4X Junction Box, (2) cable glands, terminal strip, PVC box, 6"x3"x2", LWD
1000228-1	Service Kit, for Wiper Arm, rubber and mounting material (3 sets)
1000227	TR8 Check Unit, used to check Stability of the sensor, (calibration cup)
1000232	Flow Through Assembly, Triton TR8 (-2) High Range only
1000300-1	4-20 mA USB Data Logger

## Dimensions



Flow Through Assembly



De-Bubbler Assembly

Specifications subject to change without notice.

**Represented by:**

### Electro-Chemical Devices

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# Triton® TR86 Suspended Solids Sensor



## ELECTRO-CHEMICAL DEVICES

### Applications

- Monitoring WWTP discharge
- Filter rupture or backwash
- Clarity in Settling Ponds
- Monitoring Surface Waters
- Environmental Monitoring
- Control of Clear Rinse Water

### Features

- 2 Channel capability, SS +pH, DO, Cond, plon or Turbidity
- Side or End mounted Optics
- Multiple Installation Methods
  - Immersion
  - Flow Through
- mg/L, ppm, % Solids



*Model Triton® TR86  
Suspended Solids Sensors*

### Description

The Triton®TR86 sensor is designed for the continuous measurement of suspended solids in various ranges from 0 - 1000 mg/l to 0 - 5000 mg/l. The sensor emits a beam of 850 nm near infrared light into the sample where it is scattered by particles suspended in the water. The amount of back scattered light returning to the sensor is measured and correlated to the amount of suspended solids in the sample. The TR86 response depends on the size, shape and composition of the suspended particles. For this reason, mg/L, ppm and % Solids measurements must be calibrated with suspended solids from the waters to be monitored. Turbidity measurements (NTU, FNU) can be calibrated with calibration standards such as Formazin, StablCal or SDVB beads.

The Triton®TR86 is available in two optical configurations, one with side mounted optics, the TR86-2 and the other with axially front mounted optics, the TR86-1. These design options address the fact that reflective surfaces in the emitted lights range will yield artificially high readings. The side mounted optical configuration minimizes interference from surfaces below the sensor while the axially mounted optics avoid interference from surfaces around the sensor. A daylight rejection filter blocks sun light and reduces ambient-light interference. The axial front mounted optics of the TR86-1 are surrounded with a copper ring that inhibits the growth of algae and other biological films.

The Triton®TR86 sensors are available in (3) different ranges. The sensors are 10 inches long by 1 inch diameter with a

reference line scored into the PVC body. This indicates the proper insertion depth of the sensor when used with the ECD compression fitting on the flow through Tee. The available Triton® TR86 sensor ranges are;

- 0-1000 NTU**
- 0-2000 NTU**
- 0-4000 NTU**

The Triton®TR86 sensors are designed to work with the T80 transmitter. The T80 is a single or dual channel transmitter with one or two 4-20 mA outputs with MODBUS RTU and optional (3) Alarm Relays or HART 7 communication. The T80 Transmitter allows the suspended solids measurement to be combined with any of it's other standard measurements using the S80 pH, S80 ORP, S80 plon, S80 Conductivity or S80 Dissolved Oxygen or DO 82 sensors.

Installation is accomplished with a 1" stand pipe for immersion service or with the PVC flow cell for an in line flow through application. Either optical configuration is suitable for immersion service while only the Side Mounted optical configuration is suitable for in line service.

The standard cable is a water resistant 4 conductor cable. It is available with 10 ft, 20 ft or 30 ft (9.1 meters) lengths.

Designed for use in environmental water, the Triton®TR86 is suitable for most aqueous applications. It is not suitable for use in organic solvents or in solutions with an extreme pH value, only use when the pH is between 2-12 pH. The temperature range for the sensor is 0° to 50°C.

# Triton® TR86 Suspended Solids Sensor

## Specifications

### Measuring principle:

Particle caused back scattering of 850 nm near infrared light with sunlight rejection filter

### Measuring Range:

- 1 sensor, 0.00-1000 mg/l or 0 ... 1000 NTU, FNU
- 2 sensor 0.00-2000 mg/l or 0 ... 2000 NTU, FNU
- 3 sensor 0.00-5000 mg/l or 0 ... 4000 NTU, FNU ppm, mg/L and %solids

### Accuracy

2% of reading or 0.5 NTU, whichever is larger

### Process Temperature Range:

-5 ... 50°C

### Temperature Compensation:

Internal Temperature compensation

### Process pressure range:

50 psi max. in Flow Cell. Vacuum operation is not permitted,

### Drift:

< 1% / month

### Wetted Materials

Sensor body: stainless steel AISI 316 Ti

Sensing end: epoxy

### Process Connection:

1" NPT Nylon compression fitting

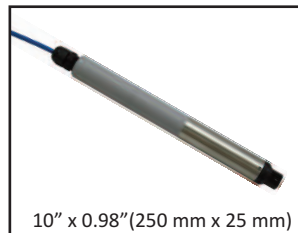
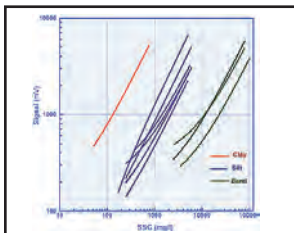
### Electrical connection

Water Resistant 5-wire measuring cable(Standard)

### Cable Length:

10 ft (3.0 m), 20 ft (6.1 m), 30 ft(9.1 m) cables

*Specifications subject to change without notice.*



Model Triton®TR86 Turbidity Sensor, Part # Guide				
TR86	Sensor Style (optical configuration)			
	1	Front Mounted with copper ring for use with immersion assembly		
	2	Side Mounted, for use with immersion assembly		
	<b>Process Connection</b>			
	0	None		
	1	1" MNPT Nylon Gland Fitting		
	2	Flow Through Cell, 2 x 2" FNPT entries, 1 x 1" FNPT sensor port		
	3	Flow Through Cell, 2 x 2" FNPT entries, 1 x 1" FNPT sensor port with spray cleaner		
	<b>Cable Length</b>			
	04	10 ft (3.0 m)		
	05	20 ft (6.1 m)		
06	30 ft (9.1 m)			
<b>Measurement Ranges</b>				
0	0-1000 NTU			
1	0-2000 NTU			
2	0-4000 NTU			
TR86-	1	0	01	2

Model Triton® TR6 Installation Assemblies	
Part #	Description
1000260-5	Immersion Assembly, 5 ft x 1"OD standpipe, with 1" compression fitting and T-Handle
1000260-99	Immersion Assembly, User supplied standpipe, with 1" Compression fitting and T-Handle
1000280-1	Flow Through Tee, 4" PVC tee base reduced to 2" FNPT entries
3600066.NY	1" MNPT Nylon Gland Fitting

### Represented by:

### Electro-Chemical Devices

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email: sales@ecdi.com  
web: www.ecdi.com



# HYDRA<sup>®</sup> Ammonium Analyzer



ELECTRO-CHEMICAL DEVICES

## Features

- Ammonium ISE electrode
- K+, pH and Temp. electrodes
- Rugged PVC design
- Integral Spray Head Cleaner
- Internal Signal Conditioning

## Benefits

- Fast and Accurate Ammonium Measurement NH<sub>4</sub><sup>+</sup> or NH<sub>4</sub><sup>+</sup>-N
- Fully compensated for pH, K<sup>+</sup> interferences & Temperature
- Removable electrode guard for easy maintenance
- Clean sensor in situ with pressurized water or air
- Amplified signals allow up to 200 meters between Sensor and Analyzer



HYDRA<sup>®</sup> NH<sub>4</sub>-N

## Description

The HYDRA<sup>®</sup> Ammonium Analyzer measures the concentration of dissolved ammonium as nitrogen (NH<sub>4</sub><sup>+</sup>-N) in water. The sensor uses three electrodes to determine the NH<sub>4</sub><sup>+</sup>-N concentration, an Ammonium Ion Electrode, a Potassium Ion Electrode and a pH Electrode. It is designed for use in all kinds of water. Typical applications include monitoring environmental waters, lakes, streams and wells as well as wastewater treatment in aeration basins and effluent.

The Ammonium Ion Electrode provides the primary measurement. Any potassium ion in the sample generates a positive interference in the measurement, due to its similar size and charge to the ammonium ion. A Potassium Ion Electrode measures the amount of potassium ion present in the sample and HYDRA C22 Analyzer subtracts the appropriate amount of signal from the Ammonium Measurement.

The Ammonium Ion Electrode only measures the ammonium ion (NH<sub>4</sub><sup>+</sup>) not ammonia (NH<sub>3</sub>). Ammonium ion and ammonia coexist in a pH dependent ratio in solution. The more acidic pH values favor the NH<sub>4</sub><sup>+</sup> and the more basic values favor dissolved ammonia gas, NH<sub>3</sub>. The pH Electrode measures the pH and the HYDRA<sup>®</sup> C22 Analyzer calculates the total NH<sub>4</sub><sup>+</sup>-N concentration based on the pH vs. NH<sub>4</sub><sup>+</sup> concentration profile stored in the instrument.

Temperature is measured and used to compensate each of the

three electrode measurements. While the pH Electrode's response is well defined with respect to temperature, the ion electrodes, NH<sub>4</sub><sup>+</sup> and K<sup>+</sup>, tend to be less well behaved. For the best results, calibrate the sensors near the process temperature.

The HYDRA<sup>®</sup> Ammonium Analyzer is configured to periodically actuate a cleaning cycle using the integral spray cleaner in the sensor. This minimizes the formation biofilms or other coatings on the electrodes which keeps maintenance to a minimum. The period and duration of the cleaning cycles are user configurable. During the cleaning cycle the 4-20 mA output is held at either the last value or a preset value.

The rugged HYDRA<sup>®</sup> Sensor has 1 ¼" NPT rear facing threads for attaching an extension/immersion tube for easy installation from catwalks or handrails. The HYDRA sensor is submersible with an IP68 degree of ingress protection. The HYDRA sensor can not be supported by the cable and the cable must not be immersed in the water.

A removable electrode guard facilitates easy electrode replacement when necessary. The HYDRA sensor features internal signal conditioning that allows the sensor to be mounted up to 200 meters from the analyzer.

The HYDRA<sup>®</sup> Analyzer is also available in a NO<sub>3</sub><sup>®</sup> Analyzer configuration.

# HYDRA® Ammonium Analyzer

## Specifications

### Sensor

#### Sensor

Three Electrode system with spray cleaner, Ammonium ISE (NH<sub>4</sub><sup>+</sup>- N) is the primary measurement. The Potassium ISE and pH glass electrodes are used to compensate the NH<sub>4</sub><sup>+</sup> signal. The Sensor is waterproof with an ingress rating of IP 68.

#### Measurement Range

NH<sub>4</sub><sup>+</sup>- N: 0.1 to 14,000 ppm

#### Operating Temperature

0° C to 50° C (32° F to 122° F)

#### Min/Max Flow Rate

Minimum 0.1 m/s  
Maximum 3.0 m/s

#### Wetted Materials

PVC, PES, PVDF, PTFE, Viton, Glass, 316 SS

#### Accuracy

± 3% of reading, dependent on Calibration

#### Response Time

T90 1 minute

#### Electrode Life

ISEs: 4- 6 months, typical  
pH electrode: 6-12 months, typical

### C22 Analyzer

#### Measurements

Ammonium: 0.01 to 14,000 ppm as NH<sub>4</sub><sup>+</sup>- N  
Potassium: 0.01 to 40,000 ppm  
pH: 0 to 14 pH  
Temperature: 0° C to 100° C (32° F to 212° F)

#### Compensation

pH 4 - 10 pH  
Potassium: 0.1 to 1000 ppm

#### Display

2.5" X 1.75" backlit LCD, 4 lines of Text & Graphical

#### Enclosure

NEMA 4X, LxWxD: 5.7" x 5.7" x 7

#### Outputs

(2) 4-20 mA maximum load 800 ohms @ 24 VDC  
Configured: 0.1 to 50 mg/l NH<sub>4</sub><sup>+</sup>- N  
0 - 14 pH  
Optionally up to (4) 4-20 mA outputs\*

#### Input Power

110/220 VAC @ 50/60 Hz

#### Alarm Relay Ratings

(2) SPDT 230 VAC/5A or 30 VDC/5A resistive max.  
Relay(1) Spray Cleaner, Relay(2) Alarm  
Optionally up to (8) Relays\*

Part No.	Model and Product Description
1290030-1	HYDRA® NH <sub>4</sub> -N Sensor, complete, NH <sub>4</sub> , K <sup>+</sup> , pH, Temp, Spray Cleaner head and 30 ft. cable
1290030-2	HYDRA® NH <sub>4</sub> -N Sensor, complete, NH <sub>4</sub> , pH, Temp, Spray Cleaner head and 30 ft. cable (No K <sup>+</sup> Sensor)
16KA2221.K100	HYDRA® C22 NH <sub>4</sub> -N Analyzer, K <sup>+</sup> compensated, (2) 4-20 mA output, 0.1 - 50 ppm NH <sub>4</sub> -N and (2) relays*
16KA2221.J100	HYDRA® C22 NH <sub>4</sub> -N Analyzer, (2) 4-20 mA output, 0.1 - 50 ppm NH <sub>4</sub> -N and (2) relays* (No K <sup>+</sup> compensation)

Part No.	Spare Parts and Accessories Description
2005083.VIT	Ammonium Electrode Cartridge (recommended spare)
2005034.VIT	Potassium Electrode Cartridge (recommended spare)
2005145.VIT	pH Electrode Cartridge (recommended spare)
3300854-1	Replacement Spray Nozzle
3501050-1	PVC Front Sensor Guard
2010449-1	Ammonium Calibration solution, NH <sub>4</sub> -N 10 ppm
2010446-1	Ammonium Calibration solution, NH <sub>4</sub> -N 100 ppm
2010441-1	Potassium Calibration solution, 10 ppm
2010444-1	Potassium Calibration solution, 100 ppm
2010100	pH 4 Buffer Calibration solution
2010101	pH 7 Buffer Calibration solution
1000300-1	4-20 mA USB Data Logger

\* Consult Factory for Part# and pricing of optional configurations.



HYDRA® Dimensions

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# HYDRA<sup>®</sup> Nitrate Analyzer



**ELECTRO-CHEMICAL DEVICES**

## Features

- Nitrate ISE electrode
- Cl<sup>-</sup> and Temp. electrodes
- Nitrate, Ammonium Option
- Rugged PVC design
- Integral Spray Head Cleaner
- Internal Signal Conditioning

## Benefits

- Fast and Accurate Nitrate Measurement NO<sub>3</sub><sup>-</sup> or NO<sub>3</sub>--N
- Fully compensated for Cl<sup>-</sup> interferences & Temperature
- Follow nitrification progress
- Removable electrode guard for easy maintenance
- Clean sensor in situ with pressurized water or air
- Amplified signals allow up to 200 meters between Sensor and Analyzer



**HYDRA<sup>®</sup> NO<sub>3</sub>-N**

## Description

The HYDRA<sup>®</sup> Nitrate Analyzer measures the concentration of dissolved nitrate as nitrogen (NO<sub>3</sub><sup>-</sup>-N) in water. The sensor uses two electrodes to determine the NO<sub>3</sub><sup>-</sup>-N concentration, a Nitrate Ion Electrode and a Chloride Ion Electrode. It is designed for use in all kinds of water. Typical applications include monitoring environmental waters, lakes, streams and wells as well as wastewater treatment in aeration basins and effluent.

Nitrogen primarily enters a municipal wastewater treatment plant as ammonia/ammonium compounds. Nitrification oxidizes the toxic ammonium ion into much less toxic nitrate ion using an aerobic activated sludge process. De-nitrification reduces the nitrate ion (NO<sub>3</sub><sup>-</sup>) to nitrogen gas (N<sub>2</sub>) by an anoxic reaction in the same treatment basin or in a separate anaerobic digester. The NO<sub>3</sub><sup>-</sup>-N measurement can optimize the methanol being fed to the digester, minimizing cost, and also provide a trend of the total nitrogen (TN) in the effluent.

The Nitrate Ion Electrode provides the primary measurement. A second electrode measures the Chloride ions in the sample. The chloride ion due to its similar size and charge to the nitrate ion, causes a positive interference in the measurement. The Chloride Ion Electrode measures the amount of chloride ion present in the sample and HYDRA<sup>®</sup> C22 Analyzer subtracts the appropriate amount of signal from the Nitrate Measurement.

An optional pH or NH<sub>4</sub><sup>+</sup> electrode is also available in the HYDRA<sup>®</sup>-NO<sub>3</sub> sensor. While not required for the measurement an

optional pH or ammonium electrode can provide valuable information about the process. Temperature is measured and used to compensate each of the measurements. Ion electrodes tend to be less well behaved than pH electrodes so for the best results, calibrate the sensor near the process temperature.

The rugged HYDRA<sup>®</sup>-NO<sub>3</sub> sensor has a 1 ¼" NPT rear facing thread for attaching an extension/immersion tube for easy installation from catwalks or handrails. The HYDRA-NO<sub>3</sub> sensor is submersible with an IP68 degree of ingress protection. A removable electrode guard facilitates easy electrode replacement when necessary. The HYDRA-NO<sub>3</sub> sensor features internal signal conditioning that allows the sensor to be mounted up to 200 meters from the analyzer.

The HYDRA<sup>®</sup> Nitrate Analyzer displays all measurements on the Home Screen. Provides (2) 4-20 mA outputs and two Alarm Relays. It is configured to periodically actuate a cleaning cycle using the integral spray cleaner in the sensor. This minimizes the formation of biofilms and other coatings on the electrodes, keeping maintenance to a minimum. The period and duration of the cleaning cycle is user configurable. The 4-20 mA output is held at either the last value or a preset value during the cleaning.

The HYDRA<sup>®</sup> Analyzer is also available in an Ammonium, NH<sub>4</sub><sup>+</sup>-N, Analyzer configuration.

# HYDRA® Nitrate Analyzer

## Specifications

### Sensor

#### Sensor

A Three Electrode system with spray cleaner, Nitrate ISE ( $\text{NO}_3^-$ -N) is the primary measurement. The Chloride ISE is used to compensate the  $\text{NO}_3^-$  signal. An optional pH or  $\text{NH}_4$  electrode is available for additional measurements. The Sensor is waterproof with an ingress rating of IP 68.

#### Measurement Range

$\text{NO}_3^-$ -N: 0.1 to 14,000 ppm  
 $\text{NH}_4^+$ -N: 0.1 to 14,000 ppm

#### Operating Temperature

0° to 50° C (32° F to 122° F)

#### Min/Max Flow Rate

Minimum 0.1 m/s  
 Maximum 3.0 m/s

#### Wetted Materials

PVC, PES, PVDF, PTFE, Viton, Glass, 316 SS

#### Accuracy

± 3% of reading, dependent on Calibration

#### Response Time

T90 1 minute

#### Electrode Life

ISEs: 4- 6 months, typical  
 pH electrode: 6-12 months, typical

### C22 Analyzer

#### Measurements

Nitrate: 0.1 to 14,000 ppm as  $\text{NO}_3^-$ -N  
 Chloride: 2.0 to 35,000 ppm  
 Ammonium: 0.01 to 14,000 ppm as  $\text{NH}_4^+$ -N  
 Temperature: 0° to 100° C (32° F to 212° F)

#### Compensation

Chloride: 0.1 to 1000 ppm  
 pH: No pH compensation

#### Display

2.5" X 1.75" backlit LCD, 4 lines of Text & Graphical

#### Enclosure

NEMA 4X, LxWxD: 5.7" x 5.7" x 7

#### Outputs

(2) 4-20 mA maximum load 800 ohms @ 24 VDC  
 Configured: Ch1- 0.1 to 50 mg/l  $\text{NO}_3^-$ -N  
 Ch2- 0.1 to 50 mg/l  $\text{NH}_4^+$ -Nor 0 - 14 pH  
 Optionally up to (4) 4-20 mA outputs\*

#### Input Power

110/220 VAC @ 50/60 Hz

#### Alarm Relay Ratings

(2) SPDT 230 VAC/5A or 30 VDC/5A resistive max.  
 Relay(1) Spray Cleaner, Relay(2) Alarm  
 Optionally up to (8) Relays\*

Part No.	Model and Product Description
1290030-3	HYDRA® $\text{NO}_3$ -N Sensor, complete, $\text{NO}_3$ , Cl <sup>-</sup> , pH, Temp, Spray Cleaner head and 30 ft. cable
1290030-4	HYDRA® $\text{NO}_3$ -N Sensor, complete, $\text{NO}_3$ , Cl <sup>-</sup> , Temp, Spray Cleaner head and 30 ft. cable (No pH Electrode)
1290030-5	HYDRA® $\text{NO}_3$ -N Sensor, complete, $\text{NO}_3$ , Cl <sup>-</sup> , $\text{NH}_4^+$ , Temp, Spray Cleaner head and 30 ft. cable
16LA2221.L100	HYDRA® C22 $\text{NO}_3$ -N Analyzer, Cl <sup>-</sup> , pH, (2) 4-20 mA output, 0.1 - 50 ppm $\text{NO}_3$ -N and (2) relays*
16L02221.L000	HYDRA® C22 $\text{NO}_3$ -N Analyzer, Cl <sup>-</sup> , (2) 4-20 mA output, 0.1 - 50 ppm $\text{NO}_3$ -N and (2) relays* (No pH Channel)
16LB2221.LT00	HYDRA® C22 $\text{NO}_3$ -N Analyzer, Cl <sup>-</sup> , $\text{NH}_4^+$ , (2) 4-20 mA output, 0.1 - 50 ppm $\text{NO}_3$ -N and (2) relays*

Part No.	Spare Parts and Accessories Description
2005086.VIT	Nitrate Electrode Cartridge (recommended spare)
2005008.VIT	Chloride Electrode Cartridge (recommended spare)
2005145.VIT	pH Electrode Cartridge (recommended spare)
3300854-1	Replacement Spray Nozzle
3501078-1	PVC Front Sensor Guard
2010465	Nitrate Calibration solution, $\text{NO}_3$ -N 10 ppm
2010452	Nitrate Calibration solution, $\text{NO}_3$ -N 100 ppm
2010460	Chloride Calibration solution, 10 ppm
2010454	Chloride Calibration solution, 100 ppm
2010100	pH 4 Buffer Calibration solution
2010101	pH 7 Buffer Calibration solution
1000300-1	4-20 mA USB Data Logger

\* Consult Factory for Part# and pricing of other configurations



Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# Model 61 Boiler Blowdown System



**ELECTRO-CHEMICAL DEVICES**

## Features

- Panel Mounted System Plumb and Play Design
- Sample conditioner reduces temperature prior to the conductivity measurement
- Sludge trap for easy removal of sludge build up
- C22 Analyzer Capability

## Benefits

- Complete System, Easy Installation, Ready to Use
- Improves the accuracy and the longevity of the conductivity measurement
- Ease of Maintenance
- Local Display, 4-20 mA output, Alarm Relays, XY Graphical Plot



**Model 61**  
*Boiler Blowdown System*

## Description

The [ECD Model 61 Boiler Blowdown System](#) provides a reliable solution for the continuous control of the surface blowdown rate for commercial and industrial boilers. Boilers concentrate dissolved solids in the water as the boiler operates. The increasing concentration of dissolved solids (TDS) may cause damage to piping, steam traps and other process equipment. It can also form sludge in the boiler, which impairs boiler efficiency and heat transfer capability. To avoid these problems the boiler water must be periodically discharged, *Blown Down*, and replenished with fresh feedwater. There are two types of blowdown, surface blowdown pulls the water from the top to middle of the boiler while bottom blowdown removes the sludge from the bottom of the boiler.

The [Model 61 Boiler Blowdown System](#) is a rack mounted modular design that includes: a 316 SS sediment trap, 316 SS sample cooler, temperature gauge, sample control valve and safety relief valve. Tubing and fittings are 316 SS.

The [Conductivity \(TDS\) measurement](#) is made with the Model C22 controller or one of the optional two wire transmitters, the T80 or T28, and the field proven Model CS10 conductivity sensor with 316 SS sensor body and

integral preamplifier.

The [Model C22 Controller](#) is a line powered instrument with PID control functions, logic functions and timers. The standard instrument is supplied with one 4-20 mA output and two alarm relays, options include up to 4 outputs and 8 relays.

The [Model C22 4-20 mA Output](#) can be configured as a PID control output. The proportional/integral signal can modulate a control valve to keep the surface blowdown rate uniformly close to the maximum allowable dissolved solids level, regardless of load conditions. This lowers the operating costs of the boiler when compared to manual blowdown by minimizing the blowdown rate which lowers the fuel and make up water consumption. Timers in the C22 can be configured to periodically trigger a relay for bottom blowdown which may only be needed on a weekly or monthly basis.

If a controller is not needed, the General Purpose NEMA 4X Model T80 two wire transmitter can provide a 4-20 mA signal to the DCS or PLC. The FM and CSA approved intrinsically safe and/or explosion proof Model T28 two wire transmitter and sensor can be used in hazardous locations.

# Model 61 Boiler Blowdown System

## Specifications

### Measurement range

Conductivity Range:  
 0-10,000  $\mu\text{S}$  (standard range)  
 use sensor CS10-C22-CBL-5mS-75  
 0-1,000  $\mu\text{S}$  (optional)  
 use sensor CS10-C22-CBL-500 $\mu\text{S}$ -75  
 0-100 mS (optional)  
 use sensor CS10-C22-CBL-50mS-75

Process Connection:  
 Compression fitting, 3/4" NPT to fit CS10

Temperature Range:  
 0-100°C

Pressure Range:  
 0-75psig

Wetted materials:  
 316 SS, Ryton, VITON

### Sample Assembly

Part#: Model 6122-SA  
 Includes Sludge trap, Sample Cooler\*, Temperature Gauge, Sample control valve, 75 psi Pressure Relief Valve, Tubing and Piping, all parts are 316 SS, U-Channel Rack is carbon steel  
 \*Sample cooler requires 3-5 gpm water for cooling

Part#: Model 6122-SA-PH  
 Includes all features of the Model 6122-SA plus an addition port for a PHS10 pH sensor

Part #	Description
Model 6122-SA	Rack mounted assembly, conductivity only
Model 6122-SA-PH	Rack mounted assembly, conductivity & pH
C22-CDH-1mA-C/2-UM	Model C22 controller conductivity only
C22-CDH/pH-2mA-C/2-UM	Model C22 controller conductivity & pH
T80-01-100-01	Model T80 Transmitter conductivity only
T80-01-100-01	Model T80 Transmitter pH only
T28-CDH/MA-UM	Model T28 controller conductivity only
T28-PH/MA-UM	Model T28 controller pH only
CS10-C22-CBL-5mS	Conductivity Sensor, 0-10,000 $\mu\text{S}$ range
CS10-C22-CBL-500 $\mu\text{S}$	Conductivity Sensor, 0-1000 $\mu\text{S}$ range
CS10-C22-CBL-50mS	Conductivity Sensor, 0-100 mS range
PHS10-C22-CBL-EG	pH Sensor, 0-14 pH, 5°-90°C, 0-75 psig

### Model C22 Controller

(see C22 Data Sheet for detailed specifications)

Part#: C22-CDH-1mA-C/2-UM  
 C22 conductivity controller, line powered 110 VAC, 1/2 DIN NEMA 4X, backlit display, (1) 4-20 mA output, (2) Form C relay contacts, universal mounting bracket

Part#: C22-CDH/pH-2mA-C/2-UM  
 Same as above with a 2nd channel for pH measurement and an additional 4-20 mA output for the pH signal

### Model T80 Transmitter

(see T80 Data Sheet for detailed specifications)

Part#: T80-01-100-01  
 T80 conductivity transmitter, 24V loop powered, 1/2 DIN NEMA 4X, (1) 4-20 mA output, universal mounting bracket

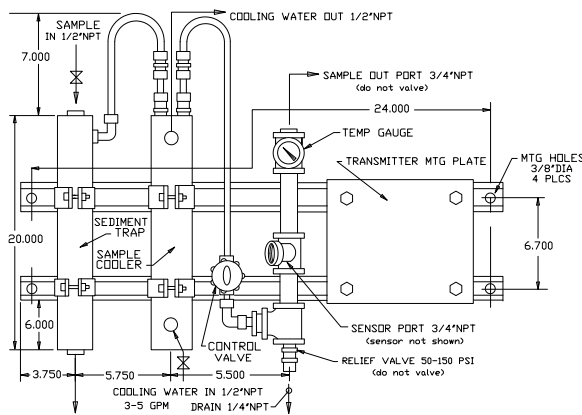
Part#: T80-01-100-01  
 T80 pH transmitter, 24V loop powered, 1/2 DIN NEMA 4X, (1) 4-20 mA output, universal mounting bracket

### Model T28 Transmitter

(see T28 Data Sheet for detailed specifications)

Part#: T28-CDH/MA-UM  
 T28 conductivity transmitter, 24V loop powered, NEMA 7C, CSA & FM approved Explosion Proof for use in Class I, Division I, Groups C through G, CSA & FM approved intrinsically safe in Class I, II and III Division I Groups A-G

Part#: T28-pH/MA-UM  
 T28 pH transmitter, specifications are the same as above



Model 6122-SA Sample Conditioning Assembly

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# Model 2122 Cooling Tower Control System



**ELECTRO-CHEMICAL DEVICES**

## Features

- Dual input design, pH and Conductivity sensors
- Control Logic and Failsafe Interlocks
- Biocide feed Timer
- C22 Analyzer Capability

## Benefits

- Conductivity controls the Blow Down and the pH controls the acid or base feed
- Reduces cost and waste by inhibiting excess chemical feed
- Ease of Maintenance
- Local Display, 4-20 mA output, Alarm Relays, XY Graphical Plot, PID, Logic Functions



**Model 2122**  
*Cooling Tower Control System*

## Description

The Model 2122 Cooling Tower Control System from ECD is an integrated system designed to control acid feed, blowdown and inhibitor feed in cooling processes. Acid feed is controlled via pH, blowdown is controlled via Conductivity (TDS) and inhibitor is fed on a user selectable timed basis. Both the interval and dose time are easily configured by the user.

The Model 2122 Cooling Tower Control System features a timer based overfeed function that locks out the blowdown cycle or acid/base feed function and triggers an alarm if the acid feed or blowdown cycle proceed longer than the predetermined time. The Lockout Timer Alarm is reset with a simple push button switch that resets all timers allowing a second interval to pass. If the control parameter is corrected the relays will return to the normal state. If not then the timer will initiate another alarm. The standard outputs include two isolated 4-20 mA outputs, one for the pH signal, one for the

conductivity signal and four SPDT 230 VAC 5A relays, (1) acid/base feed, (2) blowdown control, (3) biocide feed and (4) system alarm.

The standard system includes a Model C22 Cooling Tower Controller, a Model PHS10 pH sensor and a Model CS10 conductivity sensor. The sensors are an easily serviced insertable design with signal conditioned outputs for a noise free signal to the C-22 analyzer. Electrode cartridges for both pH and Conductivity are field replaceable. The S10 housings and guards are 316 stainless steel.

The C-22 analyzer is available with an optional digital input card that can be configured with a flow switch to Alarm in a no flow condition. The Model 2122 can be ordered as separate components, a complete system or as an assembled rack mounted system that is prewired and tested. The junction box facilitates wiring with easily accessed large labelled terminal strips.

# Model 2122 Cooling Tower Control System

## Specifications

### Sensors

#### pH Model #

PHS10-C22-CBL-EG-75pp

#### Contacting Conductivity Model #

CS10-C22-CBL-2mS-75pp (500µS - 5 mS)

CS10-C22-CBL-5mS-75pp (2 mS - 10 mS)

CS10-C22-CBL-10mS-75pp (4 mS - 20 mS)

#### Measurement Range

pH: 0 to 14 pH

0 - 80°C

0 - 100 psig

Conductivity:

500 us to 20ms

0 - 80°C

0 - 100 psig

Temperature:

0° - 100° C

#### Wetted Materials

PHS10 316 SS, PES, Teflon, Glass, Viton

CS10 316 SS, PVDF, Viton

Process Fittings

¾" Compression Fitting, PP, Viton

1" NPT Pipe Tee Flow Cell, slip fitting, PVC

#### Rack Mounted System

Ready to use plumb and play system. Plumbed with ¾" pipe, slip fittings, in and out. C-22 Analyzer, (2) sensors, pH flow cell, conductivity flow cell, optional Flow switch, Junction Box with reset button are rack mounted using 1½"x 1½" Uni-Strut rail.

Dimensions: 36" length x 20" high

System Pressure & Temperature rating: 50 psig @ 60°C

## C22 Analyzer

### Measurements

pH, Conductivity, Temperature

### Display

2.5" X 1.75" backlit LCD, 4 lines for Text & Graphical

### Enclosure

NEMA 4X, LxWxD: 5.7" x 5.7" x 7

### Input Power

110/220 VAC @ 50/60 Hz

Optional 24 VDC (12 to 36 VDC) @ 0.6A

### Outputs

(2) 4-20 mA 800 Ωmax. load, Internally Powered, isolated

pH 0 - 14 pH

Conductivity 0 - 10 mS

Temperature 0° - 100°C (optional Output Card)

PID control 2 channels (optional Output Card)

### Alarm Relay Ratings

(4) SPDT 230 VAC/5A or 30 VDC/5A resistive max.

#1 pH control, acid/base feed, overfeed protection, alarm

#2 Blowdown control, overfeed protection, alarm

#3 Biocide feed, overfeed protection, Blowdown lock out timer to prevent biocide waste, alarm

#4 System Alarm

### Digital Input

Push button Alarm Reset Switch

Flow switch, Alarms on No/Low Flow condition (requires an optional input card)

### Shipping Weight

C-22 Analyzer 4.8 lbs.

PHS10 or CS10 2.5 lbs.

Panel Mounted 27 lbs.

Part#	Model / Description
16CAA420.41GO	C-22 CTCS Analyzer, Base Model (2) 4-20, (4) relays, 110/220 VAC+ Reset Switch
16CAB420.41GO	C-22 CTCS Analyzer, Base Model + Reset Switch + Flow Switch
1290210-1, -2 or -3	Rack Mounted C-22 CTCS Analyzer, Base Model, pH/Cond+ Reset Switch
1290211-1, -2 or -3	Rack Mounted C-22 CTCS Analyzer, Base Model + Reset Switch + Flow Switch, pH, Cond
140806J.3000	PHS10-C22-CBL-EG-75, pH sensor with signal conditioner, 316 SS body, 10 ft cable
131010J.0000	CS10-C22-CBL-2mS-75, Cond. sensor with signal conditioner, 316 SS body, 10 ft cable (see range above)
131011J.0000	CS10-C22-CBL-5mS-75, Cond. sensor with signal conditioner, 316 SS body, 10 ft cable (see range above)
131012J.0000	CS10-C22-CBL-10mS-75, Cond. sensor with signal conditioner, 316 SS body, 10 ft cable (see range above)
1000250	Flow cell, for pH or Conductivity, 1" NPT slip fitting, with Compression fitting
2005145.VIT	pH replacement electrode cartridge
2007104 (-3 version)	Conductivity cartridge, 2 mS
2007103 (-2 version)	Conductivity cartridge, 5 mS
2007102 (-1 version)	Conductivity cartridge, 10 mS

Specifications subject to change without notice.

### Represented by:

## Electro-Chemical Devices

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# CA-6 OnLine Analyzers



## ELECTRO-CHEMICAL DEVICES

### Colorimetric and ISE Analyzers

- **Simple** Easy Installation  
User Friendly Menu Structure  
Touchscreen Interface  
Easy Process Configuration
- **Reliable** Epoxy Powder Coated  
Rugged Cold Rolled Steel Cabinet  
Two separate Compartments  
(Electronics and Hydraulics)  
Loss of Sample and Low Reagent Alarms
- **Cost Effective** Low Maintenance  
Adjustable Cycle Time to minimize  
Reagent usage

Aluminum  
Ammonia  
Chlorine  
Chloride  
Chromium VI  
Copper  
Cyanide  
Hardness  
Iron  
Manganese  
Nickel  
Nitrite  
Phosphate  
Total Phosphate  
Silica  
Sulfate  
Sulfide  
Zinc



### Description

The CA-6 Series Analyzers are a family of on-line sequential sampling analyzers that use Colorimetric technology to perform an analysis. The analyzers can be configured to perform most colorimetric analysis that use up to four reagents.

The CA-6 Analyzers are easy to start up and use, simply connect the sample, waste and reagent lines and then power up the Factory Calibrated analyzer. Wall mounting hardware is standard but an optional benchtop stand with reagent holder is also available. Accessing information or customizing an analysis routine are easily accomplished with the simple, user friendly menu structure and touch screen interface.

The analyzer has two separated enclosures with lockable doors. The Top enclosure, called the ELECTRICAL enclosure, includes the main power supply, the controller PCB assembly and the touchscreen interface. The Bottom enclosure, called the LIQUIDS enclosure, includes all the components involved in the sample and reagent flow, mixing and reaction stages (sampling pump, reagent Micro Pumps and colorimetric reaction cell). Numerous analysis configurations can be programmed, depending on the accessories and the number of micropumps mounted in the Liquids enclosure.

The colorimetric analysis are based on the measurement of color formation in the sample after the addition of reagents. The absorbance of the solution is measured through a Quartz Reaction Cell at a specific wavelength using a long life LED light source and a photometer. The absorbance is related to the sample concentration according to 'Lambert-Beer Law'.

The CA-6 Colorimeters make two measurements during an analysis cycle. The first measurement, the Reference, sets the base line for the raw sample, measuring the color, turbidity and optical characteristics of the cell. The second measurement, the Reading, occurs after the color forming reagents have been added to the sample, mixed and adequate time has past to allow for color formation. The concentration is calculated using the difference between the two absorbance measurements and the stored calibration information in the analyzer.

The CA-6 analyzers typically make a single measurement per analysis cycle, although a user defined calibration or cleaning sequence, an Extra Cycle, can be added to precede the measurement every "X" number of measurement cycles. A standard program sequence consists of a drain cycle, 3 rinse cycles, sample acquisition, reference measurement, addition of reagents, mixing time, waiting period and measurement. Higher Range samples are accommodated using the optional Dilution Module providing 10:1 or 50:1 dilution ratios.

The CA-6 Analyzer home screen displays the measured parameter, the status or operation being performed, % reagent volumes and Menu choices, RUN, DISPLAY, PROGRAM, SERVICE and HELP. The on screen HELP menu includes information on how to Start Up, Shut Down and Calibrate the CA6. It also defines each of the analyzer's Functions, the Start/Stop Commands, Maintenance and Troubleshooting. Outputs include two Alarm Relays and a 4-20 mA channel.

# CA-6 OnLine Analyzers

Parameter	Range	Model #	Parameter	Range	Model #
Aluminum	(A) 0-1.00 mg/L (B) 0-10.0 mg/L (C) 0-50.0 mg/L	CA6-01-X X = A,B or C	Manganese	(A) 0-100 µg/L (B) 0-1.0 mg/L (C) 0-5.0 mg/L	CA6-10-X X = A,B or C
Ammonia	(A) 0-1.0 mg/L (B) 0-10.0 mg/L (C) 0-50.0 mg/L	CA6-02-X X = A,B or C	Nickel	(A) 0-3.0 mg/L (B) 0-30.0 mg/L (C) 0-150.0 mg/L	CA6-11-X X = A,B or C
Chloride	(A) 0-3.0 mg/L (B) 0-30.0 mg/L (C) 0-150.0 mg/L	CA6-03-X X = A,B or C	Nitrite	(A) 0-600 µg/L (B) 0-6.0 mg/L (C) 0-30.0 mg/L	CA6-13-X X = A,B or C
Chlorine (free-total)	(A) 0-3.0 mg/L (B) 0-30.0 mg/L (C) 0-150.0 mg/L	CA6-04-X X = A,B or C	Phosphate	(A) 0-5.0 mg/L (B) 0-50.0 mg/L (C) 0-200 mg/L	CA6-15-X X = A,B or C
Chromium VI	(A) 0-1.0 mg/L (B) 0-10.0 mg/L (C) 0-50.0 mg/L	CA6-05-X X = A,B or C	Total Phosphorus	(A) 0-2.0 mg/L (B) 0-20.0 mg/L (C) 0-100 mg/L	CA6-16-X X = A,B or C
Copper	(A) 0-5.0 mg/L (B) 0-50.0 mg/L (C) 0-250.0 mg/L	CA6-06-X X = A,B or C	Silica	(A) 0-1.0 mg/L (B) 0-10.0 mg/L (C) 0-50.0 mg/L	CA6-17-X X = A,B or C
Cyanide (free)	(A) 0-200 µg/L (B) 0-2.0 mg/L (C) 0-10.0 mg/L	CA6-07-X X = A,B or C	Sulfate	(A) 0-50 mg/L (B) 0-500 mg/L (C) 0-2500 mg/L	CA6-18-X X = A,B or C
Hardness	(A) 0-1.0 mg/L (B) 0-10.0 mg/L (C) 0-50.0 mg/L	CA6-08-X X = A,B or C	Sulfide	(A) 0-2.5 mg/L (B) 0-25.0 mg/L (C) 0-75.0 mg/L	CA6-19-X X = A,B or C
Iron	(A) 0-0.1 mg/L (B) 0-1.0 mg/L (C) 0-5.0 mg/L	CA6-09-X X = A,B or C	Zinc	(A) 0-2.0 mg/L (B) 0-20.0 mg/L (C) 0-100 mg/L	CA6-20-X X = A,B or C

\*\*Ranges (B) and (C) require the addition of the Dilution Module Option\*\*

## CA-6 Analyzers Specifications:

**Method:** Photometric differential absorbance or ISE

**Measuring range:** Refer to the specific parameter for the colorimetric measurement range

**Response time:** Dependent on the specific colorimetric measurement

**Repeatability:** +/- 2% on absorbance value with turbidity < 80 NTU

**Drift:** +/- 2% per month on the absorbance measurement

**Power supply:** 110-220VAC, 50-60 Hz, 80 VA

**Mounting:** Wall mounting or with optional bench support

**Operating temperature:** 5-50°C

**Cabinet:** Cold rolled steel epoxy powder coated

**Dimensions:** 380L x 600H x 210D mm (15"x 24"x 8.25" in.)

**Weight:** Approx. Kg. 17 kg.(37.5 lbs)

**Reagent consumption:** Dependent on the specific colorimetric measurement, approximately 2500 tests per liter of reagent.

**Analog output:** 4-20 mA

**Alarms:** 2 configurable relays

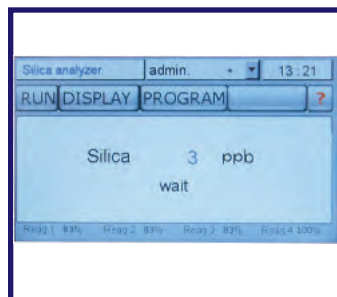
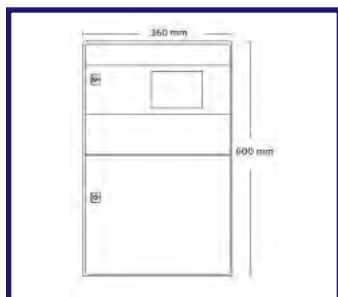
**Sample**

**Inlet sample pressure:** Atmospheric

**Outlet sample pressure:** Atmospheric, waste tubing O.D. 3/8"

**Sample flow for the fast loop reservoir:** 100-500 ml / min

**Connections:** To the fast loop reservoir with flexible tubing O.D. 1/4"



Specifications subject to change without notice.

**Represented by:**

## Electro-Chemical Devices

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CA6-D1516





### UV Spectroscopic Analyzers

• Ammonia	<p><b>Range:</b> Various from 0-10 mg/L to 0-1000 mg/L</p> <p><b>Method:</b> Sodium Hydroxide addition to convert ammonium to ammonia, UV detection of ammonia in carrier gas.</p>
• Nitrate	<p><b>Range:</b> Various from 0-30 mg/L, 0-100 mg/L, 0-250 mg/L</p> <p><b>Method:</b> Continuous measurement, differential N-O absorption versus reference wavelength</p>
• COD 254 nm	<p><b>Range:</b> Various from 0-200 mg/L to 0-20,000 mg/L</p> <p><b>Method:</b> Continuous measurement, differential 254 nm absorption versus reference wavelength</p>



### Description

The CA-6 UV Analyzers are a family of on-line sampling analyzers that use UV absorption to perform an analysis. The analyzers are configured to perform analysis over a wide range of values for each parameter measured.

The CA-6 UV Analyzers are easy to start up and use, simply connect the sample, waste and cleaning solution/reagent lines and then power up the Factory Calibrated analyzer. Wall mounting hardware is standard but an optional benchtop stand with reagent holder is also available. Accessing information or customizing an analysis routine are easily accomplished with the simple, user friendly menu structure and touch screen interface.

The analysis are based on the measurement of UV absorption in the sample. The absorbance of the solution or gas is measured through a Quartz Flow Cell at a specific wavelength using a long life Xenon light source and photodetectors. The absorbance is related to the sample concentration according to 'Beer-Lambert Law'.

$$\text{Concentration} = (\text{Absorption coefficient}) \log(\text{light in/light out})$$

#### CA6 UV Ammonia Analyzer

The measurement principle is based on the UV-light absorption spectrum of ammonia gas (NH<sub>3</sub>) in equilibrium with dissolved ammonium in the water sample. A small quantity of Sodium Hydroxide (NaOH) is added to the sample to increase the pH converting the ammonium into ammonia gas. A fast Fourier Transform (FFT) is applied to the spectrum to extract the absorption signal typical of ammonia gas. A water temperature probe performs automatic temperature compensation.

This method is very selective and no interferences are present

in river water or waste water. The turbidity or color of water have no influence as the measurement is performed in the gaseous phase. Waste water with suspended solids such as activated sludge can be measured without filtering. An autozero is performed at each measuring cycle.

#### CA6 UV Nitrate Analyzer

The measurement principle is based on the strong absorption of UV light by the chromophore N-O according to the Beer-Lambert law. An automatic internal linearization compensates for the inherent nonlinearity of the Beer-Lambert law for high concentrations. The measurement is the weighted sum of the nitrite and nitrate concentrations, but in most applications the nitrite concentration is negligible.

Turbidity, organic matter, suspended solids or dirt on the flow cell is automatically compensated for by a differential measurement with a second detector at a reference wavelength. Chlorates and chlorites at high concentration are the only inorganic causes of interference, but these are usually not encountered with drinking water or urban wastewater.

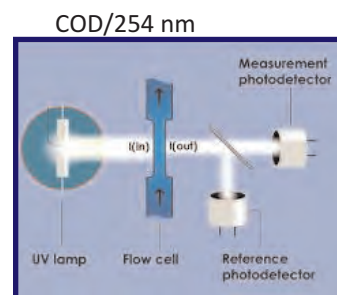
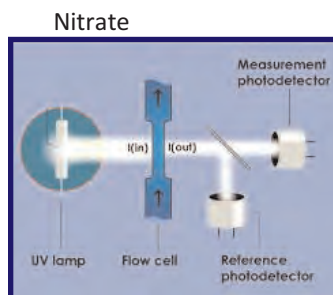
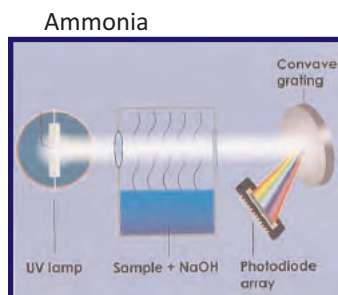
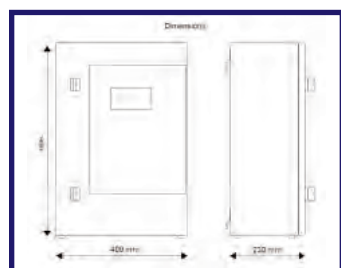
#### CA6 UV COD 254 nm Analyzer

The measuring principle is based on the UV light absorption by unsaturated organic molecules at 254 nm wavelength, according to the Beer-Lambert law. There is a close correlation between the absorbance at 254 nm and the COD as determined by the permanganate and dichromate methods in river water, potable water and municipal wastewater. The measurement time is very fast, less than 10 seconds and it requires no reagents or calibration solutions. Turbidity or suspended solids are automatically compensated for by a second detector at a reference wavelength.

# CA-6 UV Analyzers

## Product Specifications

Measurement	Ammonia	COD / 254 nm	Nitrate	Ammonia + Nitrate
Part Number	CA6-31-A-1-0-0	CA6-40-A-1-0-0	CA6-30-A-1-0-0	CA6-32-A-1-0-0
Range	0-10 mg/l 0-30 mg/l 0-100 mg/l 0-400 mg/l 0-1000 mg/l	0-200 mg/l 0-800 mg/l 0-2000 mg/l 0-5000 mg/l 0-20,000 mg/l	0-30 mg/l 0-100 mg/l 0-250 mg/l	0-200 mg/l
Accuracy	5%	10%	5%	5%
Repeatability	3%	0.15%	0.3%	3% / 0.3%
Zero Drift	5%	5%	5%	5%
Full Range Drift	6%	10%	10%	6% / 10%
Measurement time	15 minutes	10 seconds	10 seconds	15 min / 10 seconds
Reagents	NaOH	None	None	NaOH
Filtration	Not needed			
Auto cleaning	Yes, Integrated in design			
Sample Temperature	0° - 80° C, sample can not be frozen			
Ambient temperature	0° - 50° C			
Alarm relays	4 Alarm relays, Normally Open, 5 A at 250 VAC for resistive loads.			
Analog Output	Single 4-20 mA output, 12 bit resolution, 500 Ω maximum load (option 2nd channel)			
Communication	RS232, download data to Excel file, (optional RS485 MODBUS module)			
Data Logging	Integrated, download via RS232			
Power Supply	110-130 VAC or 220-240 VAC /30VA / 50-60Hz), 12-15 VDC / 4A			
Dimensions	600mm x 420mm x 230mm			
Weight	30 kg			



Specifications subject to change without notice.

**Represented by:**

### Electro-Chemical Devices

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# SMS-22 Sulfide Ion Measuring System

## The ECD **6** Point Advantage



ELECTRO-CHEMICAL DEVICES

- 1 Compact all in one measurement system**, conditions the sample, measures the sulfide, neutralizes the sample, measures the pH, drains and rinses the cell.
- 2 ISE based Sulfide Ion Measurement** provides a wide measurement range, 20 ppb to 500 ppm using economical, easily replaceable electrode cartridges
- 3 pH adjusted and compensated measurement** the sample is optimized for the sulfide ion that only exists at high pH values
- 4 Sample neutralized after measurement** the highly caustic sample pH is reduced to a safe level near pH 8
- 5 Automated Sequential Sampling** The Model C-22 analyzer controls the sequential sampling with a combination of relays and timers. Sampling times are easily adjustable from 2 samples per hour to 10 samples per hour.
- 6 Low reagent consumption** Less than 2 gallons per month of 10 % KOH and an equivalent amount of HCl at 10 samples per hour or 5 months at 2 samples per hour.



## Description

The ECD SMS-22 Sulfide Measurement System is an all in one analyzer for the continuous measurement of sulfide ions in aqueous media. Sulfide is present in well water, municipal waste water and waste waters from refineries, tanneries, chemical plants and paper and pulp facilities.

Hydrogen sulfide ( $H_2S$ ) is a gas that dissolves in water and gives it that “rotten egg” odor.  $H_2S$  exists in acidic water as a dissolved gas, at pH values above pH 7 bisulfide ions ( $HS^-$ ) are the predominate form and at very high pH values, > pH13, sulfide ions ( $S^{2-}$ ) predominate.

The ECD SMS-22 uses a sulfide ion selective electrode (ISE) to measure the total amount of sulfide present in the sample. The measurement must be made at high pH levels where  $S^{2-}$  exists. Potassium hydroxide (KOH) is added to raise the pH of the sample to around pH 13 and a pH electrode measures the actual pH. Sulfide and bisulfide exist in a pH dependent equilibrium with the ratio of each dependent on the pH. The sulfide ISE measures the sulfide present in the sample and the pH measurement infers what percentage of the total sulfide was measured. The C22 calculates and displays the Total sulfide present.

The highly caustic sample is then neutralized with HCl and the pH is measured and displayed to verify the neutralization. The neutralization of KOH with HCl produces potassium chloride salt (KCl) and water. The neutralized sample can be disposed of as waste or returned to the water supply.

The ECD SMS-22 is a sequential sampling analyzer. It runs the following analysis cycle; fill the measurement cell with sample and drain, fill and drain, fill, add caustic, mix, measure  $S^{2-}$ , adjust 4-20 mA signal, add acid, mix, measure pH, adjust 4-20 mA signal, drain the flow cell and repeat the cycle. Each cycle uses about 1 ml of caustic and 1 ml of acid. The analyzer is set to run 6 minute analysis cycles but can easily be programmed to run 12 minute or 30 minute cycles. Running continuously at 10 cycles per hour, the SMS-22 uses 7.2 liters of each reagent per month, at 5 cycles per hour, 3.6 liters per month and at 2 cycles per hour less than 1.5 liters per month.

The ECD SMS-22 is easy to start up and maintain. First connect the Sample feed line, reagent lines and Drain line to the analyzer. Mount the S10 sulfide and pH sensors in the flow cell. Next connect the two 4-20 mA outputs,  $S^{2-}$  and pH and supply power, a switched 110/220 VAC line. Prime the peristaltic pumps and start the measurement cycle. The digital display and 4-20 mA outputs will indicate the total sulfide and the neutralized pH value. A digital display indicates the Sulfide measurement and the 4-20 mA output values are captured in the measurement cycle and displayed until the next measurement cycle.

The enclosure provides IP66 protection and is rated NEMA 4X. The base is made of gray hot-molded fiberglass reinforced polyester and the cover is made of transparent polycarbonate with non-metallic hinges.



## Specifications

### Principle of Operation

Sequential sampling, Sulfide Ion Selective Electrode, pH compensated measurement, sample neutralization

### Measurement Range

0.02 - 500 mg/l (0.02 - 500 ppm)

### Temperature Range

-5° - 50°C (20° - 120°F) Measuring

### Cycle Response Time

6, 12 or 30 minutes, user selectable

### Accuracy

± 20 ppb or 5 % of reading, whichever is greater

### Repeatability

± 2 % of reading

### Operating Conditions

Temperature: 10° - 50°C

Humidity: 5 to 95% noncondensing humidity

### Sample Requirements

Pressure: Sample should be drawn from atmospheric pressure

Flow: greater than 100 ml/minute

Temperature: 10° - 50°C

### Reagents

16% KOH, Potassium Hydroxide

7.5 % HCl, Hydrochloric Acid, (Muriatic Acid)

### Reagent Consumption:

6 minute cycle time: 7.2 liters/ month, (1.9 gallons) each

12 minute cycle time: 3.6 liters/month, (0.95 gallons) each

30 minute cycle time: 1.5 liters/month., (0.4 gallons) each

### Hydraulic Connections

Sample Inlet: 1/8" ID tubing barb fitting

Drain Outlet: 1/4" ID tubing barb Fitting

### Power Requirement

100/240 Vac, 50/60 Hz, switch selectable

### Outputs

4-20 mA1 configured S<sup>2</sup> 0.1 ppb to 100 ppm, user configurable

4-20 mA2 configured pH, 0-14 pH, user configurable

### Electrical Connections

2 x 4-20 mA, Line Neutral and Ground for Power

All connections are to a terminal strip, Access through IP65 1/2" cable glands

### Enclosure

Gray hot-molded fiberglass reinforced polyester transparent polycarbonate cover with non-metallic hinges. NEMA 4X,

Protection degree IP66-11

### Dimensions

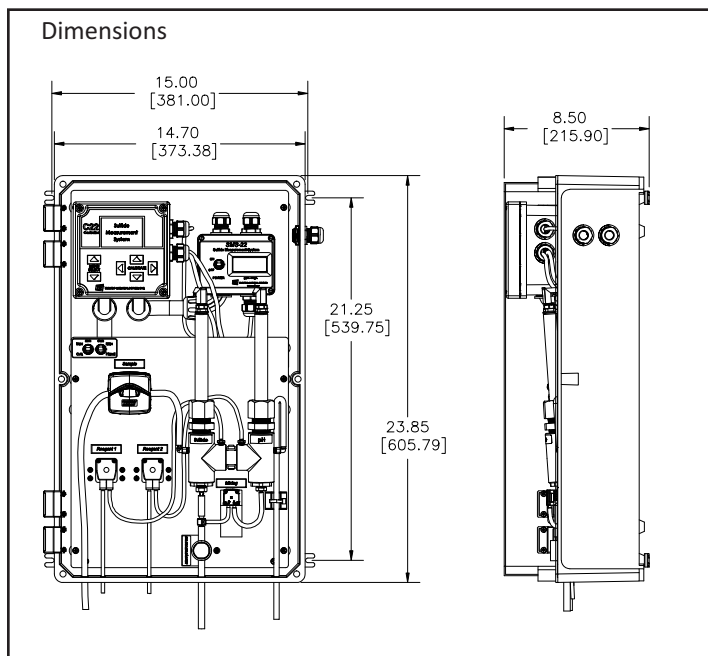
LxWxD: 23.78" x 14.66" x 10.63" (604mm x 375mm x 270mm)

### Mounting Configurations

Wall Mounting, Non-metallic mounting feet, set of 4 pieces

### Weight

Approximately 25 lbs (11.5 kg) without reagents



## Order Information

Part #	Description
1280200-1	SMS-22 Sulfide Analyzer, Complete, No Reagents

## Accessories and spare parts

2000125	Tubing Kit, replacement kit for all interior tubing, recommended every 3 months
2010040-1	Reagent Kit, 2.5 gallons each, 16 % KOH and 7.5 % HCl
2005122	Sulfide Ion Electrode
2005059	pH electrode for high pH
1000270-1	Fast loop reservoir ( atmospheric sample conditioner, constant head overflow)

Specifications subject to change without notice

## Represented by:

### Electro-Chemical Devices

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web: www.ecdi.com





# Ammonium Ion Sensors



**ELECTRO-CHEMICAL DEVICES**

## Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Available with pH compensation

## Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Wide range of service from 2 pH to 10pH



Model S80 Sensors  
*Ammonium 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 Ammonium Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of ammonium ions in the measured solution. The S80 Ammonium Ion sensors can be used with the Model T80 Transmitter with its dual channel and pH compensation capabilities. The T80 Transmitter will measure ammonium from 0.1 ppm to 14,000 ppm in the optimum pH range of 2-7 pH. Outside this pH range large errors can occur, in the alkaline pH ranges  $\text{NH}_4^+$  gives up a hydrogen ion to form ammonia,  $\text{NH}_3$  which is not measured, a small amount of ammonium is measured and a large compensation factor is applied.

Ammonium,  $\text{NH}_4^+$ , is a conjugate acid with the  $\text{pKa} = 9.2$ , at 9.2 pH half of the available ammonia is the measureable  $\text{NH}_4^+$  and half is  $\text{NH}_3$ . This generates a 50% error in the ammonium

measurement at 9.2 pH and a 10 % error at 8.2 pH. This error can be compensated for by adding a pH sensor into the measurement loop. The T80 Transmitter will report the total ammonium/ammonia concentration by measuring the available ammonium and adjusting the value in accordance with the  $\text{pKa}$  and measured pH value.

Potassium ions, sodium ions, magnesium ions, hydrogen ions, all interfere with the ammonium measurement. Potassium is the worst with 8 potassium ions generating the same signal as 1 ammonium ion, sodium and magnesium are 800:1 If the potassium ion concentration is changing then  $\text{K}^+$  compensation can be accomplished in the T80 by adding an S80 potassium ion sensor.

The sensor is calibrated using two standard solutions differing in concentration by a factor of 10, i.e. 10 ppm and 100 ppm. This calibration sets the slope of the electrode, mV/decade and a zero potential for the sensor. In many cases the process solution's ionic strength, temperature and pH value differ widely from the calibration solutions characteristics. This will affect the zero potential of the ammonium sensor, an offset, but not affect the slope. Eliminate the offset by performing a process standardization. When the sensor has stabilized in the process solution take a grab sample of the process and determine the ammonium concentration and the adjust the analyzer to read this laboratory determined value.

# Ammonium Ion Sensors

## Specifications

### Model S80 Sensors

Combination electrode cartridge with a PVC membrane measurement cell and a single junction, KCl/AgCl, reference electrode, signal conditioner, ATC

### Electrode Slope

54 ± 5 mV per decade of concentration change

### Measurement Range

Ammonium: 0.1 to 14,000 ppm

pH: 2 to 8 pH, 2 to 10.5 pH with pH compensation

### 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

6 to 12 months

### Interfering ions

Potassium, 8:1, Sodium 800:1, Magnesium 800:1

### 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
S80-00-0002-0100-071	S80 Ammonium, NH <sub>4</sub> <sup>+</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-071	S80 Ammonium, NH <sub>4</sub> <sup>+</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-071	S80 Ammonium, NH <sub>4</sub> <sup>+</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-071	S80 Ammonium, NH <sub>4</sub> <sup>+</sup> 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 Transmitter, 110/220 VAC, (1) 4-20 mA outputs, (3) Alarm Relays, UM
T80-11-21-20-1	Model T80 Dual Channel Transmitter, 110/220 VAC, (2) 4-20 mA outputs, (3) Alarm Relays, UM

Part No.	Spare Parts and Accessories Description
2005083.VIT	Ammonium Ion Electrode, Radel body, double junction Teflon Ref, 0.1-14,000 ppm, 0°-40°C
2010449	Ammonium Ion Calibration Solution, 10 ppm
2010446	Ammonium Ion Calibration Solution, 100 ppm
S80-00-0002-0100-001	S80 pH, insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable with General Purpose pH electrode (for pH compensated measurement)
S80-00-0002-0100-082	S80 Potassium, K <sup>+</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable with Potassium electrode (for Potassium Ion compensated measurement)
2005034.VIT	Potassium Ion Electrode, Radel body, double junction Teflon Ref, 0.1-39,000 ppm, 0°-40°C
2005145.VIT	General Purpose pH electrode cartridge, double junction reference, 0-14 pH, 0°-100°C

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Bromide 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 Bromide Ion Electrode is a combination electrode with a silver bromide/silver sulfide (AgBr/AgS) solid state pressed crystal sensing element and a double junction reference electrode. The Bromide Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of bromide ions in the measured solution. The typical output is 54mV to 60 mV 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 Bromide Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. This analyzer will measure bromide from 0.2 ppm to 79,000 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

All silver sulfide based solid state ion electrodes are sensitive to the silver and sulfide ions in solution in addition to the primary ion of interest. Both ions must be absent from the measured solution. Strong reducing solutions like photographic developer, thiosulfate, cyanide, ammonia, will attack the sensor depositing silver on the sensing crystal surface. Chloride, sulfide, iodide will form insoluble precipitates on the crystal surface diminishing the response. Polishing the sensor with the supplied polishing strips will restore the function.

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 bromide 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 bromide ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

# Bromide Ion Sensors

## Specifications

### Model S80 Sensors

Combination electrode cartridge with a silver bromide measurement cell and a double junction,  $\text{KNO}_3/\text{KCl}/\text{AgCl}$ , reference electrode, signal conditioner, ATC

### Electrode Slope

$54 \pm 5$  mV per decade of concentration change

### Measurement Range

Bromide: 0.2 to 79,000 ppm (1-12 pH)  
 $2 \times 10^{-6}$  molar to 1.0 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

Chloride, iodide, strong reducing agents

### Wetted Materials

Radel, epoxy, AgS/AgBr, PTFE, 316 SS, Viton O-Ring

### Process Connections

S80 Insertion:  $\frac{3}{4}$ " MNPT compression fitting

S80 Valve Retractable: 1" MNPT Ball Valve

### Model T80 Transmitter

General purpose,  $\frac{1}{2}$  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  $\rightarrow$  ppm  $\rightarrow$  ppthousand

Part No.	Model and Product Description
S80-00-0002-0100-072	S80 Bromide, Br <sup>-</sup> insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-072	S80 Bromide, Br <sup>-</sup> insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-072	S80 Bromide, Br <sup>-</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 10 ft cable
S80-01-0131-0310-072	S80 Bromide, Br <sup>-</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " 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
2005062.VIT	Bromide Ion Electrode, Radel body, double junction Teflon Ref, 0.2-79,000 ppm, 0°-80°C
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes
2010456	Bromide Ion Calibration Solution, 10 ppm
2010457	Bromide Ion Calibration Solution, 100 ppm

Specifications subject to change without notice.

### Represented by:

<p><b>Electro-Chemical Devices</b>          1500 North Kellogg Dr.          Anaheim, California, USA 92807          Phone: +1-714-695-0051          +1-800-729-1333          Fax: +1-714-695-0057          email: sales@ecdi.com          web: www.ecdi.com</p> 	
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# Cadmium Ion Sensors



**ELECTRO-CHEMICAL DEVICES**

## Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

## Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Cadmium 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 Cadmium Ion Electrode is a combination electrode with a cadmium sulfide (CdS) solid state pressed crystal sensing element and a double junction reference electrode. The cadmium Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free cadmium ions,  $Cd^{+2}$ , in the measured solution. The typical output is 25mV to 30mV 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 Cadmium Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. This analyzer will measure cadmium ions from 0.1 ppm to 11,200 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

The cadmium ion electrode is poisoned by copper, silver, lead, ferric and mercury ions in solution. Copper, silver and mercury must be absent from the measured solution. Ferric and Lead must be at a lower concentration than the cadmium. Polishing the sensor with the supplied polishing strips will restore the function if the sensing tip becomes poisoned.

In basic solutions, cadmium reacts with hydroxide and precipitates as  $Cd(OH)_2$ , cadmium hydroxide is not measured by the sensor. The Hydrogen ion (the pH) interferes with the cadmium measurement at low ppm levels, limiting the pH range to values greater than pH3 and less than pH9.

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 cadmium sensor causing an offset. To eliminate the offset perform a standardization, a single point in-line calibration. Once the sensor has stabilized in the process, take a grab sample and determine the  $Cd^{+2}$  value. Adjust the analyzer to read this laboratory determined value, verify weekly.

# Cadmium Ion Sensors

## Specifications

### Model S80 Sensors

Combination electrode cartridge with a cadmium sulfide sensing cell and a double junction,  $\text{KNO}_3/\text{KCl}/\text{AgCl}$ , reference electrode, signal conditioner, ATC

### Electrode Slope

$27 \pm 3$  mV per decade of concentration change

### Measurement Range

Cadmium ion: 0.1 ppm to 11,200 ppm (3-9 pH)  
 $10^{-7}$  molar to 0.1 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

Copper, Silver, Mercury, Lead, Ferric must be absent

### Wetted Materials

Radel, epoxy, CdS, PTFE, 316 SS, Viton O-Ring

### Process Connections

S80 Insertion:  $\frac{3}{4}$ " MNPT compression fitting

S80 Valve Retractable: 1" MNPT Ball Valve

### Model T80 Transmitter

General purpose,  $\frac{1}{2}$  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
S80-00-0002-0100-073	S80 Cadmium, $\text{Cd}^{+2}$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-073	S80 Cadmium, $\text{Cd}^{+2}$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-073	S80 Cadmium, $\text{Cd}^{+2}$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 10 ft cable
S80-01-0131-0310-073	S80 Cadmium, $\text{Cd}^{+2}$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " 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
2005140.VIT	Cadmium Ion Electrode, Radel body, double junction Teflon Ref, 0.1 ppm -11,200 ppm, 0°-80°C
2010468	Cadmium Ion Calibration Solution, 10 ppm, 500 ml
2010469	Cadmium Ion Calibration Solution, 100 ppm, 500 ml
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

1500 North Kellogg Dr.  
 Anaheim, California, USA 92807

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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Calcium 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 Calcium 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 Calcium Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of calcium ions in the measured solution. The typical output is 25mV to 30 mV 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 Calcium Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. This analyzer will measure calcium from 20 ppb to 40,000 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

The calcium ion electrode is an ion exchange sensor that is selective for calcium ions but many anions also interact with the sensing membrane. Lead ions strongly interfere with the measurement, 2 Lead ions = 1 Calcium ion. Mercury, iron (II), Copper (II), nickel (II) and ammonium interfere at 1000 - 3000:1. The pH also interferes with low level measurements, keep the pH >4 for concentrations < 1ppm Ca<sup>++</sup>. Hydroxide, carbonates, fluorides, phosphates, sulfates all complex with calcium ions. Adjusting the pH <7 eliminates carbonate and hydroxide issues. 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 calcium 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 calcium ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

# Calcium Ion Sensors

## Specifications

### Model S80 Sensors

Combination electrode cartridge with a PVC / ion exchange membrane and a double junction, KNO<sub>3</sub>/KCl /AgCl, reference electrode, signal conditioner, ATC

### Electrode Slope

26 ± 3 mV per decade of concentration change

### Measurement Range

Calcium: 20 ppb to 40,000 ppm (3-11 pH)  
5 x 10<sup>-7</sup> molar to 1.0 molar

### 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

6 to 12 months

### Interfering ions

Lead (II), Mercury (II), Iron (II), Ammonium

### 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
S80-00-0002-0100-074	S80 Calcium, Ca <sup>+2</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-074	S80 Calcium, Ca <sup>+2</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-074	S80 Calcium, Ca <sup>+2</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-074	S80 Calcium, Ca <sup>+2</sup> 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
2005143.VIT	Calcium Ion Electrode, Radel body, double junction Teflon Ref, 20 ppb -40,000 ppm, 0°-40°C
2010408	Calcium Ion Calibration Solution, 1 ppm
2010407	Calcium Ion Calibration Solution, 10 ppm
2010421	Calcium Ion Calibration Solution, 100 ppm

Specifications subject to change without notice.

### Represented by:

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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Chloride 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 Chloride Ion Electrode is a combination electrode with a silver Chloride/silver sulfide (AgCl/AgS) solid state pressed crystal sensing element and a double junction reference electrode. The Chloride Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of chloride ions in the measured solution. The typical output is 54mV to 60 mV 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 Chloride Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. These analyzers will measure chloride from 2.0 ppm to 35,500 ppm autoranging the display between the ppb, ppm and ppt (parts

per thousand) scales.

All silver sulfide based solid state ion electrodes are sensitive to the silver and sulfide ions in solution in addition to the primary ion of interest. Both ions must be absent from the measured solution. Strong reducing solutions like photographic developer, thiosulfate, cyanide, ammonia, will attack the sensor depositing silver on the sensing crystal surface. Bromide, sulfide, iodide will form insoluble precipitates on the crystal surface diminishing the response. Polishing the sensor with the supplied polishing strips will restore the function.

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 chloride ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

# Chloride Ion Sensors

## Specifications

### Model S80 Chloride Sensors

Combination electrode cartridge with a silver chloride measurement cell and a double junction, KNO<sub>3</sub>/KCl /AgCl, reference electrode, signal conditioner, ATC

### Electrode Slope

54 ± 5 mV per decade of concentration change

### Measurement Range

Chloride: 2.0 to 35,500 ppm (2-12 pH)  
5.6 x 10<sup>-5</sup> molar to 1.0 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

Bromide, iodide, strong reducing agents

### Wetted Materials

Radel, epoxy, AgS/AgCl, 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
S80-00-0002-0100-075	S80 Chloride, Cl <sup>-</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-075	S80 Chloride, Cl <sup>-</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-075	S80 Chloride, Cl <sup>-</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-075	S80 Chloride, Cl <sup>-</sup> 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
2005008.VIT	Chloride Ion Electrode, Radel body, double junction Teflon Ref, 2 -35,000 ppm, 0°-80°C
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes
2010460	Chloride Ion Calibration Solution, 10 ppm
2010454	Chloride Ion Calibration Solution, 100 ppm

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# Cupric (Copper) Ion Sensors



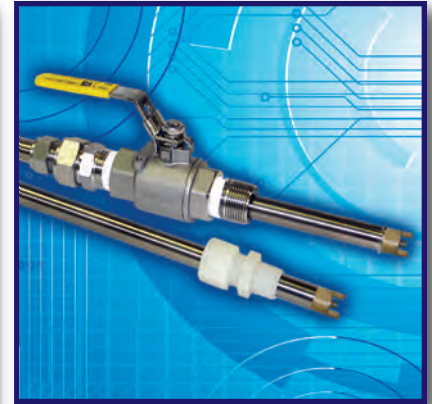
**ELECTRO-CHEMICAL DEVICES**

## Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

## Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 sensors  
*Cupric 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 Cupric Ion Electrode is a combination electrode with a copper sulfide (CuS) solid state pressed crystal sensing element and a double junction reference electrode. The Cupric Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free cupric ions,  $\text{Cu}^{+2}$  not  $\text{Cu}^{+}$ , in the measured solution. The typical output is 25mV to 30mV 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 Cupric Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. This analyzer will measure copper ions from 1.0 ppb to 6,300 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

The copper ion electrode is poisoned by silver and mercury ions in solution. Silver and mercury must be absent from the measured solution. Chloride and Bromide ions will also react with the membrane if present in high enough concentrations. Polishing the sensor with the supplied polishing strips will restore the function if a mercury amalgam or silver layer forms on the electrode. In basic solutions, copper reacts with hydroxide and precipitates as  $\text{Cu}(\text{OH})_2$ , cupric hydroxide. This can be avoided by keeping the solutions acidic, pH 6 or lower. 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 cupric 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 cupric ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

# Cupric (Copper) Ion Sensors

## Specifications

### Model S80 Cupric Sensors

Combination electrode cartridge with a copper sulfide measurement cell and a double junction,  $\text{KNO}_3/\text{KCl}/\text{AgCl}$ , reference electrode, signal conditioner, ATC

### Electrode Slope

$27 \pm 3$  mV per decade of concentration change

### Measurement Range

Cupric ion: 1.0 ppb to 6,300 ppm (2-6 pH)  
 $10^{-8}$  molar to 0.1 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

Silver, Mercury must be absent, Chloride and Bromide

### Wetted Materials

Radel, epoxy, CuS, PTFE, 316 SS, Viton O-Ring

### Process Connections

S80 Insertion:  $\frac{3}{4}$ " MNPT compression fitting

S80 Valve Retractable: 1" MNPT Ball Valve

### Model T80 Transmitter

General purpose,  $\frac{1}{2}$  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
S80-00-0002-0100-076	S80 Cupric, $\text{Cu}^{+2}$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-076	S80 Cupric, $\text{Cu}^{+2}$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-076	S80 Cupric, $\text{Cu}^{+2}$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 10 ft cable
S80-01-0131-0310-076	S80 Cupric, $\text{Cu}^{+2}$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 30 ft cable
T80-10-21-00-1	Model T80 Single Channel Transmitter, 110/220 VAC, (1) 4-20 mA outputs, (3) Alarm Relays, UM
T80-11-21-20-1	Model T80 Dual Channel Transmitter, 110/220 VAC, (2) 4-20 mA outputs, (3) Alarm Relays, UM

Part No.	Spare Parts and Accessories Description
2005058.VIT	Cupric Ion Electrode, Radel body, double junction Teflon Ref, 1.0 ppb -6,300 ppm, 0°-80°C
2010463	Cupric Ion Calibration Solution, 10 ppm, 500 ml
2010464	Cupric Ion Calibration Solution, 100 ppm, 500 ml
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes

Specifications subject to change without notice.

### Represented by:

#### Electro-Chemical Devices

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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Cyanide 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 Cyanide Ion Electrode is a combination electrode with a silver cyanide/silver sulfide (AgCN/AgS) solid state pressed crystal sensing element and a double junction reference electrode. The Cyanide Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free cyanide 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 Cyanide Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. This analyzer will measure cyanide from 0.2 ppm to 260 ppm autoranging the display between the ppb and ppm scales.

All silver sulfide based solid state ion electrodes are sensitive to the silver and sulfide ions in solution in addition to the primary ion of interest. Both ions must be absent from the measured solution. Strong reducing solutions like photographic developer, thiosulfate, cyanide, ammonia, will attack the sensor depositing silver on the sensing crystal surface. Bromide, sulfide, iodide will form insoluble precipitates on the crystal surface diminishing the response. Polishing the sensor with the supplied polishing strips will restore the function.

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 cyanide ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

# Cyanide Ion Sensors

## Specifications

### Model S80 Cyanide Sensors

Combination electrode cartridge with a silver cyanide measurement cell and a double junction,  $\text{KNO}_3/\text{KCl}/\text{AgCl}$ , reference electrode, signal conditioner, ATC

### Electrode Slope

$54 \pm 5$  mV per decade of concentration change

### Measurement Range

Cyanide: 0.2 to 260 ppm (10-14 pH)  
 $8 \times 10^{-6}$  molar to  $10^{-2}$  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

sulfide, iodide, strong reducing agents

### Wetted Materials

Radel, epoxy, AgS/AgCN, PTFE, 316 SS, Viton O-Ring

### Process Connections

S80 Insertion:  $\frac{3}{4}$ " MNPT compression fitting

S80 Valve Retractable: 1" MNPT Ball Valve

### Model T80 Transmitter



General purpose,  $\frac{1}{2}$  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
S80-00-0002-0100-077	S80 Cyanide, $\text{CN}^-$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-077	S80 Cyanide, $\text{CN}^-$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-077	S80 Cyanide, $\text{CN}^-$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 10 ft cable
S80-01-0131-0310-077	S80 Cyanide, $\text{CN}^-$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 30 ft cable
T80-10-21-00-1	Model T80 Single Channel Transmitter, 110/220 VAC, (1) 4-20 mA outputs, (3) Alarm Relays, UM
T80-11-21-20-1	Model T80 Dual Channel Transmitter, 110/220 VAC, (2) 4-20 mA outputs, (3) Alarm Relays, UM

Part No.	Spare Parts and Accessories Description
2005142.VIT	Cyanide Ion Electrode, Radel body, double junction Teflon Ref, 0.2 -260 ppm, 0°-80°C
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes
2005145.VIT	General Purpose pH electrode cartridge, double junction reference, 0-14 pH, 0°-100°C

Specifications subject to change without notice.

### Represented by:

<p><b>Electro-Chemical Devices</b>          1500 North Kellogg Dr.          Anaheim, California, USA 92807          Phone: +1-714-695-0051          +1-800-729-1333          Fax: +1-714-695-0057          email: sales@ecdi.com          web: www.ecdi.com</p> 	
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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Available with pH compensation

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Wide range of service from 2 pH to 8 pH



Model S80 Sensors  
*Fluoride 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 Fluoride Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free fluoride ions in the measured solution. The model S80 Fluoride Ion sensors are used with the Model T80 Transmitter with its dual channel and pH compensation capabilities. These analyzers will measure free fluoride ions from 0.02 ppm to 2,000 ppm in the optimum pH range of 5-8 pH. Outside this pH range, large errors will occur in the acid range and small errors will occur in the alkaline pH ranges.

In acidic solutions fluoride ions react to form hydrofluoric acid, HF,  $pK_a = 3.2$ , at 3.2 pH half of the available fluoride ions are HF and half are the measureable  $F^-$ . This characteristic can be compensated for by adding a pH sensor into the measurement

loop. The T80 analyzer will report the total Fluoride ion concentration by measuring the available free fluoride and adjusting the value in accordance with the measured pH value. Hydroxide ions,  $OH^-$ , interfere with the fluoride measurement, 10 hydroxide ions generate the same signal as 1 fluoride ion. This accounts for an error of 1.7 ppb at pH 8, 17 ppb at pH 9 and 0.17 ppm at pH 10.

Fluoride ions will complex with aluminum, silicon, iron (+3), and other polyvalent cations as well as hydrogen and these fluoride ion complexes will not be "seen" by the sensor. If any of these chemicals are present in the measured solution the analyzer will report a lower concentration than the true value.

The sensor is calibrated in two standard solutions differing in concentration by a factor of 10, i.e. 10 ppm and 100 ppm. This calibration sets the slope of the electrode, mV/decade and a zero potential for the sensor. In many cases the process solution's ionic strength and pH value differ widely from the calibration solutions characteristics. This will affect the zero potential of the fluoride sensor but not the slope causing an offset in the measurement. The offset is eliminated by performing a process standardization. When the sensor has stabilized in the process solution take a grab sample of the process and determine the fluoride ion concentration and the adjust the analyzer to read this laboratory determined value.

# Fluoride Ion Sensors

## Specifications

### Model S80 Fluoride Sensors

Combination electrode cartridge with a Lanthanum Fluoride measurement cell and a single junction, KCl/AgCl, reference electrode

### Electrode Slope

54 ± 5 mV per decade of concentration change

### Measurement Range

Fluoride: 0.02 to 2,000 ppm

pH: 2 to 8 pH

### Temperature Range

0° C to 80° C (32° F to 176° F)

### Pressure Range

0 - 50 psig (0 - 3.5 bar)

### Response Time

T90 in 10 seconds

### Electrode Life

6 to 12 months

### Interfering ions

Hydroxide, 0.1 selectivity (10 OH<sup>-</sup> = 1 F<sup>-</sup>)

### Wetted Materials

PEEK, epoxy, LaF crystal, 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
S80-00-0002-0100-078	S80 Fluoride, F <sup>-</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-078	S80 Fluoride, F <sup>-</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-078	S80 Fluoride, F <sup>-</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-078	S80 Fluoride, F <sup>-</sup> 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 Transmitter, 110/220 VAC, (1) 4-20 mA outputs, (3) Alarm Relays, UM
T80-11-21-20-1	Model T80 Dual Channel Transmitter, 110/220 VAC, (2) 4-20 mA outputs, (3) Alarm Relays, UM

Part No.	Spare Parts and Accessories Description
2005063.VIT	Fluoride Ion Electrode, PEEK body, dbl junction Teflon Ref, 0.02-2,000 ppm, 0°-80°C
2010400	Fluoride Ion Calibration Solution, 50% TISAB II, 1.0 ppm
2010401	Fluoride Ion Calibration Solution, 50% TISAB II, 10.0 ppm
2010431	Fluoride Ion Calibration Solution, 50% TISAB II, 100 ppm
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes
S80-00-0002-0100-010	S80 pH, insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable with General Purpose pH electrode (for pH compensated measurement)
2005103.VIT	pH electrode cartridge, fluoride resistant, PEEK body, dbl junction Teflon Reference

Specifications subject to change without notice.

### Represented by:

#### Electro-Chemical Devices

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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Lead 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 Lead Ion Electrode is a combination electrode with a lead sulfide (PbS) solid state pressed crystal sensing element and a double junction reference electrode. The Lead Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free Lead ions,  $Pb^{+2}$ , in the measured solution. The typical output is 25mV to 30mV 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 Lead Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. This analyzer will measure Lead ions from 2.0 ppm to 20,700 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

The Lead ion electrode is poisoned by silver, cadmium, ferric and mercury ions in solution. Silver and mercury must be absent from the measured solution. Ferric and cadmium must be at a  $1/10$  lower concentration than the Lead. Polishing the sensor with the supplied polishing strips will restore the function if the sensing tip becomes poisoned.

In basic solutions, Lead reacts with hydroxide and precipitates as  $Pb(OH)_2$ , Lead hydroxide is not measured by the sensor. The Hydrogen ion interferes with the Lead measurement at low ppm levels, limiting the pH range to values greater than pH4 and less than pH8.

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 Lead sensor causing an offset. To eliminate the offset perform a standardization, a single point in-line calibration. Once the sensor has stabilized in the process, take a grab sample and determine the  $Pb^{+2}$  value. Adjust the analyzer to read this laboratory determined value, verify weekly.

## Specifications

### Model S80 Lead Sensors

Combination electrode cartridge with a Lead sulfide sensing cell and a double junction,  $\text{KNO}_3/\text{KCl}/\text{AgCl}$ , reference electrode, signal conditioner, ATC

### Electrode Slope

$27 \pm 3$  mV per decade of concentration change

### Measurement Range

Lead ion: 2.0 ppm to 20,700 ppm (4-8 pH)  
 $10^{-6}$  molar to 0.1 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

Silver, Mercury, Cadmium, Ferric must be absent

### Wetted Materials

Radel, epoxy, PbS, PTFE, 316 SS, Viton O-Ring

### Process Connections

S80 Insertion:  $\frac{3}{4}$ " MNPT compression fitting

S80 Valve Retractable: 1" MNPT Ball Valve

### Model T80 Transmitter

General purpose,  $\frac{1}{2}$  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
S80-00-0002-0100-079	S80 Lead, $\text{Pb}^{+2}$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-079	S80 Lead, $\text{Pb}^{+2}$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-079	S80 Lead, $\text{Pb}^{+2}$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 10 ft cable
S80-01-0131-0310-079	S80 Lead, $\text{Pb}^{+2}$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " 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
2005141.VIT	Lead Ion Electrode, Radel body, double junction Teflon Ref, 0.1 ppm -11,200 ppm, 0°-80°C
2010470	Lead Ion Calibration Solution, 10 ppm, 500 ml
2010471	Lead Ion Calibration Solution, 100 ppm, 500 ml
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes

Specifications subject to change without notice.

### Represented by:

<p><b>Electro-Chemical Devices</b>                  1500 North Kellogg Dr.                  Anaheim, California, USA 92807                  Phone: +1-714-695-0051                  +1-800-729-1333                  Fax: +1-714-695-0057                  email: sales@ecdi.com                  web: www.ecdi.com</p> 	
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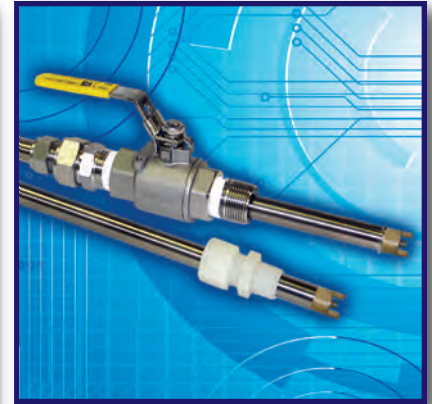


### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- 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.

# Nitrate Ion Sensors

## Specifications

### Model S80 Nitrate Sensors

Combination electrode cartridge with a PVC/ion xchgr measurement cell and a double junction, KNO<sub>3</sub>/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<sup>-6</sup> molar to 1 molar NO<sub>3</sub>

### 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

ClO<sub>4</sub>, ClO<sub>3</sub>, I, CN, Br, NO<sub>2</sub>, HS, HCO<sub>3</sub>, CO<sub>3</sub>, 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 <sub>3</sub> <sup>-</sup> 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 <sub>3</sub> <sup>-</sup> 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 <sub>3</sub> <sup>-</sup> 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 <sub>3</sub> <sup>-</sup> 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 <sup>-</sup> 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.

### Represented by:

### Electro-Chemical Devices

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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Nitrite 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 Nitrite 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 Nitrite Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of nitrite 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 Nitrite Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. These analyzers will measure nitrate ions from 0.05 ppm to 200 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

The Nitrite Ion Electrode is an ion exchange sensor that is selective for nitrite ions but many anions also interact with the sensing membrane. Salicylate, Chlorate, iodide, Bromide, Chloride and Sulfate all interfere with the measurement. Iodide interacts at 150:1 with nitrate and chloride interacting at 2000 and 3000:1, respectively.

Although the electrode can be used in a pH range of 4 to 8, the optimum pH range for the nitrite electrode is pH 4 to 5. A constant pH must be maintained on both samples and standards.

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 nitrite 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.

# Nitrite Ion Sensors

## Specifications

### Model S80 Nitrite Sensors

Combination electrode cartridge with a PVC/ion xchgr measurement cell and a double junction,  $\text{KNO}_3/\text{KCl}/\text{AgCl}$ , reference electrode, signal conditioner, ATC

### Electrode Slope

$50 \pm 10$  mV per decade of concentration change

### Measurement Range

Nitrite: 0.05 ppm to 200 ppm (4-8 pH)  
 $3.6 \times 10^{-6}$  molar to  $1.4 \times 10^{-2}$  molar  $\text{NO}_2^-$

### 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 120 seconds

### Electrode Life

3 to 6 months

### Interfering ions

$\text{ClO}_4$ ,  $\text{ClO}_3$ , I, Br, F,  $\text{NO}_3$ ,  $\text{SO}_4$ ,  $\text{HCO}_3$ , Cl, Acetate

### Wetted Materials

Radel, epoxy, PVC, PTFE, 316 SS, Viton O-Ring

### Process Connections

S80 Insertion:  $\frac{3}{4}$ " MNPT compression fitting

S80 Valve Retractable: 1" MNPT Ball Valve

### Model T80 Transmitter

General purpose,  $\frac{1}{2}$  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
S80-00-0002-0100-081	S80 Nitrite, $\text{NO}_2^-$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-081	S80 Nitrite, $\text{NO}_2^-$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-081	S80 Nitrite, $\text{NO}_2^-$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " Diameter x 17" length, 10 ft cable
S80-01-0131-0310-081	S80 Nitrite, $\text{NO}_2^-$ Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, $\frac{3}{4}$ " 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
2005161.VIT	Nitrite Ion Electrode, Radel body, double junction Teflon Ref, 0.05 ppm - 200 ppm, 0°-40°C
2010474	Nitrite Ion Calibration Solution, 10 ppm, 500 ml
2010475	Nitrite Ion Calibration Solution, 100 ppm, 500 ml
S80-00-0002-0100-075	S80 Chloride, $\text{Cl}^-$ insertion style sensor with $\frac{3}{4}$ " 316 SS compression fitting, 316 SS body, $\frac{3}{4}$ " 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.

### Represented by:

#### Electro-Chemical Devices

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# Potassium Ion Sensors



**ELECTRO-CHEMICAL DEVICES**

## Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

## Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Potassium 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 Potassium Ion Electrode is a combination electrode with a sensing element made of a PVC membrane containing an ion selective ionophore, valinomycin, and a double junction reference electrode. The Potassium Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of potassium ions in the measured solution. The typical output is 50mV to 60mV per decade of change in concentration. The Potassium Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. The analyzer will measure potassium ions from 20 ppb to 39,000 ppm in the optimum pH range of 4-11 pH. In the acidic solutions the potassium ion electrode,  $K^+$ , is interfered by the hydrogen ions,  $H^+$ , and in alkaline pH solutions, above

pH 11, the active ionophore in the membrane is attacked by the caustic diminishing response and destroying the electrode. For measurements below 1 ppm potassium the pH of the solution should be above pH 4.5.

Ammonium ions, cesium ions, thallium ions and hydrogen ions all interfere with the potassium measurement. Cesium ions are the worst with 10 cesium ions generating the same signal as 1 potassium ion, ammonium is around 30:1 and thallium is around 300:1. Other ions also interfere but to a much lower level, lithium at 3500:1, sodium at 12,000:1 and silver at 30,000:1.

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 potassium 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 potassium ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

# Potassium Ion Sensors

## Specifications

### Model S80 Potassium Sensors

Combination electrode cartridge with an ion selective PVC membrane and a double junction, NaCl/KCl-AgCl, reference electrode, signal conditioner, ATC

### Electrode Slope

54 ± 5 mV per decade of concentration change

### Measurement Range

Potassium: 20 ppb to 39,000 ppm

pH: 2.5 to 11 pH

### 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

6 to 12 months

### Interfering ions

Cesium, 10:1, Ammonium 30:1, sodium 12,000:1

### 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
S80-00-0002-0100-082	S80 Potassium, K <sup>+</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-082	S80 Potassium, K <sup>+</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-082	S80 Potassium, K <sup>+</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-082	S80 Potassium, K <sup>+</sup> 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
2005034.VIT	Potassium Ion Electrode, Radel body, double junction Teflon Ref, 20 ppb -39,000 ppm, 0°-40°C
2010443	Potassium Ion Calibration Solution, 1 ppm
2010441	Potassium Ion Calibration Solution, 10 ppm
2010444	Potassium Ion Calibration Solution, 100 ppm

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- 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<sub>3</sub>/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<sup>-7</sup> 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 <sup>+</sup> 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 <sup>+</sup> 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 <sup>+</sup> 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 <sup>+</sup> 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.

### Represented by:

### Electro-Chemical Devices

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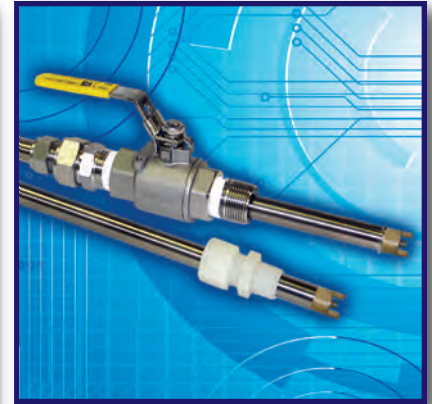


### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model S80 Sensors  
*Sodium 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 Sodium Ion Electrode is a combination electrode with a glass bulb sensing element and a double junction reference electrode. The Sodium Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of sodium ions in the measured solution. The typical output is 50mV to 60mV per decade of change in concentration. The Sodium Ion sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. These analyzers will measure sodium ions from 200 ppb to 100,000 ppm in the optimum pH range of 6-12 pH. In the acidic solutions the sodium ion electrode, Na<sup>+</sup>, is interfered by the hydrogen ions, H<sup>+</sup>, and in alkaline pH solutions, above pH 12, the cations present swamp out all but the highest levels of sodium ions. For measurements below 2 ppm sodium, the pH

of the solution should be above pH 10, 20 ppm > 9 pH, 200 ppm > 8 pH....

Lithium ions, potassium ions and ammonium ions interfere with the sodium measurement. Lithium ions are the worst with 120 lithium ions generating the same signal as 1 sodium ion, potassium is around 1700:1 and ammonium is around 1,800:1. Other ions also interfere but to a much lower level, rubidium and thallium are two examples but they are rarely present in the sample solutions. Silver ions react with the glass bulb forming complexes changing the base potential, silver should be absent.

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 sodium 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 sodium ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

# Sodium Ion Sensors

## Specifications

### Model S80 Sodium Sensors

Combination electrode cartridge with a Sodium sensitive glass bulb and a double junction, KCl-AgCl, reference electrode, signal conditioner, ATC

### Electrode Slope

54 ± 5 mV per decade of concentration change

### Measurement Range

Sodium: 200 ppb to 100,000 ppm

pH: 6 to 12 pH

### Temperature Range

0° C to 80° C (32° F to 176° F)

### Pressure Range

0 - 100 psig (0 - 3.5 barg)

### Response Time

T90 in 10 seconds

### Electrode Life

12+ months

### Interfering ions

Lithium, 120:1, Potassium 1700:1, silver 0.04:1

### 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
S80-00-0002-0100-084	S80 Sodium, Na <sup>+</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-084	S80 Sodium, Na <sup>+</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-084	S80 Sodium, Na <sup>+</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-084	S80 Sodium, Na <sup>+</sup> 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
2005031.VIT	Sodium Ion Electrode, Radel body, double junction Teflon Ref, 0.2 -100,000 ppm, 0°-80°C
2010466	Sodium Ion Calibration Solution, 10 ppm
2010467	Sodium Ion Calibration Solution, 100 ppm

Specifications subject to change without notice.

### Represented by:

<p><b>Electro-Chemical Devices</b>          1500 North Kellogg Dr.          Anaheim, California, USA 92807          Phone: +1-714-695-0051          +1-800-729-1333          Fax: +1-714-695-0057          email: sales@ecdi.com          web: www.ecdi.com</p> 	
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### Features

- Model S80 Universal Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Available with pH compensation

### Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Range, 12 pH to 14 pH with pH compensation



Model S80 Sensors  
*Sulfide 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 Sulfide Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free sulfide ions in the measured solution. The Sulfide Ion Sensors are used with the Model T80 Transmitter with its dual channel mix and match capabilities. These analyzers will measure free sulfide ions from 0.02 ppm to 32,000 ppm with the pH greater than pH 14. Without pH compensation a 10 % low error will occur at pH 13 and 50% low error will occur at pH 12.

Hydrogen Sulfide is a diprotic acid, it dissociates from  $H_2S$  to  $H^+ + HS^-$  as the pH rises and then to  $H^+ + S^{2-}$ . Only the  $S^{2-}$  ion is measured by the sulfide ion sensor. The dissociation constants for the two hydrogen ions are  $pK_{a1} = 7.04$  and  $pK_{a2} = 11.9$ . When the pH of a solution equals the pKa of an acid then half

of the acid is dissociated and half is not. For the sulfide ion the  $pK_{a2} = 11.9$ , so at 11.9 pH half of the total sulfide is the measurable  $S^{2-}$  ion and half is not. This characteristic can be compensated for by adding a pH sensor into the measurement loop. The T80 analyzer will report the total sulfide ion concentration by measuring the available free sulfide and adjusting the value in accordance with the measured pH value.

The sensor is calibrated in two standard solutions differing in concentration by a factor of 10, i.e. 10 ppm and 100 ppm. This calibration sets the slope of the electrode, mV/decade and a zero potential for the sensor. In many cases the process solution's ionic strength and pH value differ widely from the calibration solutions characteristics. This difference will affect the zero potential of the sulfide sensor, causing an offset in the measurement but it will not affect the slope.

The offset is eliminated by conditioning the solution with sodium hydroxide to get the pH above pH 14 and performing a process standardization. When the sensor has stabilized in the conditioned process solution take a grab sample and determine the sulfide ion concentration and the adjust the analyzer to read this laboratory determined value. When using the pH compensated system, the solution only needs to be conditioned to above pH 11, this uses much less conditioning solution.

# Sulfide Ion Sensors

## Specifications

### Model S80 Sulfide Sensors

Combination electrode cartridge with a Silver Sulfide measurement cell and a double junction reference electrode, KNO<sub>3</sub> : KCl/AgCl, signal conditioner, ATC

### Electrode Slope

27 ± 2 mV per decade of concentration change

### Measurement Range

Sulfide: 0.02 to 32,000 ppm, pH sensitive measurement, 11 pH to 14 pH with pH compensation, >13 pH without

### Temperature Range

0° C to 80° C (32° F to 176° F)

### Pressure Range

0 - 50 psig (0 - 3.5 bar)

### Response Time

T90 in 10 seconds

### Electrode Life

6 to 12 months

### Interfering ions

None

### Wetted Materials

PEEK, epoxy, AgS crystal, 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
S80-00-0002-0100-085	S80 Sulfide, S <sup>2</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
S80-00-0002-0300-085	S80 Sulfide, S <sup>2</sup> insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 30 ft cable
S80-01-0131-0110-085	S80 Sulfide, S <sup>2</sup> Valve Retractable Style with 1" Ball Valve Assembly, 316 SS body, ¾" Diameter x 17" length, 10 ft cable
S80-01-0131-0310-085	S80 Sulfide, S <sup>2</sup> 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 Transmitter, 110/220 VAC, (1) 4-20 mA outputs, (3) Alarm Relays, UM
T80-11-21-20-1	Model T80 Dual Channel Transmitter, 110/220 VAC, (2) 4-20 mA outputs, (3) Alarm Relays, UM

Part No.	Spare Parts and Accessories Description
2005122.VIT	Sulfide Ion Electrode, PEEK body, double junction reference, 0.02-32,000 ppm, 0°-80°C
2010414	Sulfide Ion Calibration Solution, 25% SAOB, 1.0 ppm (Hazardous Shipping Charge)
2010415	Sulfide Ion Calibration Solution, 25% SAOB, 10.0 ppm (Hazardous Shipping Charge)
2010437	Sulfide Ion Calibration Solution, 25% SAOB, 100 ppm (Hazardous Shipping Charge)
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes
S80-00-0002-0100-007	S80 pH, insertion style sensor with ¾" 316 SS compression fitting, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable with Sulfide Resistant pH electrode (for pH compensated measurement)
2005130.VIT	Sulfide resistant Electrode cartridge, PEEK body, double junction reference, 0°-80°C

Specifications subject to change without notice.

### Represented by:

#### Electro-Chemical Devices

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**ELECTRO-CHEMICAL DEVICES**

## HCA1 Chlorine Plus Test Kit

- Measures Free and Total Chlorine
- USEPA, DIN and ISO compliant Test Method
- Photometric measurement using a 525 nm LED
- 4 ml sample cell uses 60% less chemical per test
- Easy to use, Fast and Accurate



## Description

The **Electro-Chemical Devices Chlorine Plus Test Kit** is ideal for testing Free and Total Chlorine in drinking water, wastewater, environmental waters, cooling towers and rinse waters in the food and beverage industry. The Chlorine Plus photometer is designed to use the Micro Strip reagent delivery system. The kit is supplied with 100 test strips for Free Chlorine and 100 test strips for Total Chlorine. Test strips for Combined Chlorine, Chlorine Dioxide, High Range Chlorine, Bromine, Hydrogen Peroxide, Peracetic Acid and Ozone are also available for the HCA1 Chlorine Plus meter.

This DPD test system is accepted by most health departments because this test is USEPA (DIN Standard 38 408 G4, ISO 7393/2) accepted for testing requirements for Free and Total Chlorine. All tests have been calibrated using certified reference standards and standard analytical spectrophotometric methods. The algorithm in the software of the eXact® Chlorine Plus Systems mirrors the AWWA, US EPA, DIN, and ISO reference test methods for chlorine. Studies show that the HCA1 Chlorine Plus System, with the Micro Strip CL (DPD-1), repeatedly agrees with an EPA Compliant reference method greater than 99% ( $R^2 = 0.9989$ , 0 - 6.0 ppm). The HCA1 Chlorine Plus Advanced Photometric System has been factory calibrated for your convenience. You can expect the fixed calibrations in the meter to be valid for the life of the meter due to the long life LED, the photo cell and the software.

The **HCA1 Chlorine Plus** meter is easy to use and is controlled

by just three buttons:

**ZERO/ON** When first pressed, it turns the meter ON. When pressed again, it zeroes the sample in the cell. Once the meter is zeroed, this zero value applies to all parameters and is stored and retained even when meter turns off. However, it is recommended that each new water sample analyzed is zeroed before testing, to maximize sensitivity and accuracy.

**MENU**: With each press, the MENU button advances through the tests in the following sequence: CL1, bR2, O3, Cd4, PA5, HP6, PH7, HR8. Each test menu can store up to 20 results. To retrieve the stored results, go to the desired test using the MENU key. When the desired test is displayed, press and hold down the MENU key. Continue holding down the MENU key to scroll the stored results for that test, starting with the most recent result. The meter will display, from memory, the last 20 readings in sequence beginning with -20, which is the latest result, followed by -19, which is the 2nd oldest result retained. Only the last 20 readings are stored in each menu. This meter is able to store 160 results in memory (20 in each menu).

**READ**: When pressed once, this button starts the timer for the parameter being tested. When pressed a second time the meter exits the timer and immediately prepares to colorimetrically measure the sample, and simultaneously stores the measurement in memory.

# HCA1 Chlorine Plus Test Kit

## Specifications

<b>Description:</b>	Free and Total Chlorine Test Kit
<b>Kit Includes:</b>	Chlorine Plus meter Micro Strip Reagent Free Chlorine (100 test strips) Micro Strip Reagent Total Chlorine (100 test strips) Instruction Manual Carrying Case with Cell Cleaning Brush
<b>Measurement Method:</b>	Photometric
<b>Light Source:</b>	Light Emitting Diode (LED)
<b>Wavelength:</b>	525 nm
<b>Transmission Range:</b>	100 - 0.00 %T
<b>Photometric Precision:</b>	+/- 0.1/0.01 %T
<b>Range Selection:</b>	See specifications below
<b>Display:</b>	3-digit customized liquid crystal display with annunciators
<b>CELL Pathlength:</b>	20mm
<b>Cell Chamber:</b>	Custom-molded, PET plastic fused in chamber, non-removable
<b>Sample Required:</b>	4 ml (0.13 oz)
<b>Operating Temperature Range:</b>	0 - 50°C (32° - 122°F)
<b>Power Supply:</b>	(4) AAAalkaline batteries (Not Included)
<b>Battery Life:</b>	> 2000 tests
<b>Electromagnetic Compliance: (EMC)</b>	Emitted Interference EN61326 Immunity to Interference EN61326
<b>Waterproof Rating:</b>	Exceeds IP67
<b>Weight:</b>	Instrument 140 g (5 oz)
<b>Dimensions:</b>	Instrument: 5 (w) x 3.5 (d) x 16.5 (l) cm (2 x 1.4 x 3.75 in)

Parameter	Number of Tests	Range	Chemistry
The Free Chlorine and Total Chlorine reagents are compliant for meeting USEPA (4500-Cl G)			
Free Chlorine	100	0-11 ppm	DPD-1
Total Chlorine	100	0-11 ppm	DPD-4

Part#	Description
1000040-1	Kit, Photometer Tester HCA-1, Free & Total Chlorine
1000040-2	Kit, Photometer Tester HCA-1, Free Chlorine
1000040-3	Kit, Photometer Tester HCA-1, Total Chlorine
1000040-4	Kit, Photometer Tester HCA-1, Chlorine Dioxide
9260100	Micro Strip Reagent, Free Chlorine (100 test strips)
9260101	Micro Strip Reagent, Total Chlorine (100 test strips)
9260102	Micro Strip Reagent, Chlorine Dioxide (100 test strips)

Specifications subject to change without notice.

### Represented by:

### Electro-Chemical Devices

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# H10C Handheld Conductivity Meter



## ELECTRO-CHEMICAL DEVICES

### H10C Handheld Conductivity, Salinity, TDS & Temp Meter

- Large LCD Display with Backlight
- Displays Conductivity, Salinity or TDS and Temp.
- 4 wire Conductivity Electrode with TC
- Calibration stored in nonvolatile memory
- Adjustable TDS and Temp. Coefficients



### Description

The H10C Handheld Conductivity, Salinity, TDS and Temperature meter is a microprocessor based precision instrument. The meter has a large LCD that displays the Conductivity, Salinity or TDS and Temperature along with user prompts and measurement mode indicators. The IP67 waterproof case has a shock resistant protective rubber boot and highly reliable keys that provide both tactile and audio feedback. The H10 is battery powered (four 1.5 volt AAA batteries).

A few key strokes will adjust all of the parameters for the probe including the TDS constant, Reference Temperature and Temperature Coefficient. The Mode Key toggles the display between the Conductivity, Salinity (ppt) and TDS (mg/L) screens. A single 4-wire electrode will measure Conductivity, Salinity and TDS. Additional features include automatically finds the best range for each measurement mode and has automatic temperature compensation.

Meter and Electrodes sold separately.

Part #	Description
1100510	H10C Conductivity/Temperature meter
2008210	4 wire Cond/Temp electrode, K=0.5, 0-200mS/cm with 8 pin DIN connector
1000560-1	Conductivity Calibration Solutions Kit

### Specifications

Electrode Type	4 wire Cond. w TC
Reference Temperature	15.0° to 25.0°C (Default 25.0°C)
Temperature Coefficient	0.0% to 4.0% (Default 1.91%)
TDS Constant	0.30 to 1.00 (Default 0.65)
Power	4 AAA batteries (6VDC)
Display	2 in x 1 1/8 in, LCD
Ambient Temperature Range	0° to 50°C
Relative Humidity	Up to 90%
Case	IP67
Dimensions	75mmx157mmx35mm
Weight(with Batteries)	230 gm (0.51 lb)

Display	Range	Resolution	Accuracy
Conductivity	0.000 to 499.9 µS/cm	0.1 µS/cm	±1%
	500 to 4999 µS/cm	1.0 µS/cm	±1%
	5.00 to 49.99 mS/cm	0.01 mS/cm	±1%
	50.0 to 200 mS/cm	0.1 mS/cm	±2.5%
Salinity	0.00 to 70.0 ppt	0.01 ppt	±0.2% FS
Temp.	0.0 to 100°C	0.1°C	±0.2°C

# H10 Handheld pH/ORP Meter



**ELECTRO-CHEMICAL DEVICES**

## H10 Handheld pH/ORP & Temperature Meter

- Large LCD Display with Backlight
- Displays pH or mV and Temperature
- Resolution of 0.1 mV in ORP or Ion Mode
- Automatic or Manual Temp. Compensation
- Automatic Buffer Recognition
- Calibration stored in nonvolatile memory



### Description

The H10 Handheld pH/ORP and Temperature meter is a microprocessor based precision instrument. The meter has a large LCD that displays the pH or millivolts and Temperature along with user prompts and measurement mode indicators.

The H10 features Automatic Temperature Compensation and Automatic pH buffer recognition for both US and NIST primary standard buffers. Calibrations can be single, dual or three point calibrations. The AUTOLOCK function in both the pH and mV modes senses the end point of a calibration or measurement and locks the reading once the sensor has stabilized. Electrode offset and slope are monitored and the pH electrode efficiency is displayed.

The IP67 waterproof case has a shock resistant protective rubber boot and highly reliable keys that provide both tactile and audio feedback. The H10 is battery powered (four 1.5 volt AAA batteries).

Meter and Electrodes sold separately.

Part #	Description
1100500	H10 pH/ORP/Temp meter
2008200	pH/Temp electrode
2008240	ORP electrode
2008019	pH Electrode (no Temp)
1000550-1	pH Buffer Kit, 4,01, 7.00, 10.00

### Specifications

pH Buffer Recognition	(US) 7.00, 4.01, 10.01 (NIST) 6.86, 4.01, 9.18
pH Temp. Compensation	-10.0° to 120°C
pH Buffer Temp. Range	0.0° to 60°C
pH Offset Recognition	± 1.5 pH
pH Slope Recognition	± 30% of theoretical
Autolock sensing & Hold	Yes
Audio Feedback	All Keys
Calibration Back up	EEPROM
Input Impedance	> 10 <sup>12</sup> Ω
Temperature Sensor	Thermistor, 10KΩ @25°C
Display	2 in x 1 3/8 in, LCD
Case	IP67 waterproof
Ambient Temperature	0° to 50°C
Relative Humidity	Up to 90%
Dimensions (W x D x H)	75mmx157mmx35mm
Weight (Batteries Included)	230 gm (0.51 lb.)

Display	Range	Resolution	Accuracy
pH	-2.00 to 16.00 pH	0.01 pH	± 0.02 pH
mV	-1999.9 to 1999.9mV	0.1 mV	± 0.1% FS
Temp.	0.0 to 100.0°C	0.1°C	± 0.5°C

# L20 Lab Conductivity Meter



**ELECTRO-CHEMICAL DEVICES**

## L20 Laboratory Conductivity, TDS & Temperature Meter

- Large LCD Display with Backlight
- Displays Conductivity or TDS and Temperature
- 2 wire Conductivity Electrodes with TC
- Calibration stored in nonvolatile memory
- Accepts 4 Cell Constants for improved accuracy



### Description

The L20 Laboratory Conductivity, TDS and Temperature meter is a microprocessor based precision instrument. The meter has a large LCD that displays the Conductivity or TDS (mg/L) and Temperature along with user prompts and measurement mode indicators. The IP54 waterproof case uses highly reliable keys that provide both tactile and audio feedback. The L20 is AC line powered with a universal AC adapter, 9VDC output, or it can be battery powered (six 1.5 volt AAA batteries).

A few key strokes will adjust all of the parameters for the probe including the cell constant 0.01, 0.1, 1.0, 10.0 or the specic K value of a conductivity cell. The Mode Key toggles the display between the Conductivity and TDS screens. Additional features include auto-ranging conductivity scales and automatic temperature compensation.

Meter and Electrodes sold separately.

Part #	Description
1100520-2	L20 Conductivity meter with AC adapter
2008230	Conductivity probe, K=0.1, 0-200µS/cm
2008231	Conductivity probe, K=1.0, 0-200µS/cm
2008232	Conductivity probe, K=10, 0-200µS/cm
1000540	Conductivity probe Holder/Arm

### Specifications

Reference Temperature	15.0° to 25.0°C
Temperature Coefficient	0.0% to 4.0%
Cell Constant	0.01, 0.10, 1.00, 10.0
TDS Constant	0.30 to 1.00
Power	6 AAA batteries (9VDC)
Display	3½ in x 2¼ in, LCD
Ambient Temperature Range	0° to 50°C
Relative Humidity	Up to 90%
Case	IP54
Dimensions	150mm x 203mm x 72
Weight(with Batteries)	504 gm (1.1 lb)

Display	Range	Resolution	Accuracy
Conductivity K=0.01	0.000 to 1.999 µS/cm	0.001 µS/cm	±0.5% FS
	2.00 to 19.99 µS/cm	0.01 µS/cm	±0.5% FS
Conductivity K=0.10	0.00 to 19.99 µS/cm	0.01 µS/cm	±0.5% FS
	2.0 to 199.9 µS/cm	0.1 µS/cm	±0.5% FS
	2.00 to 19.99 mS/cm	0.01 mS/cm	±0.5% FS
Conductivity K=1.00	0.0 to 199.9 µS/cm	0.1 µS/cm	±0.5% FS
	200 to 1999 µS/cm	1 µS/cm	±0.5% FS
	2.00 to 19.99 mS/cm	0.01 mS/cm	±0.5% FS
Conductivity K=10.0	0 to 1999 µS/cm	1 µS/cm	±0.5% FS
	2.00 to 19.99 mS/cm	0.01 mS/cm	±0.5% FS
	20.0 to 199.9 mS/cm	0.1 mS/cm	±0.5% FS
Temp.	0.0 to 100°C	0.1°C	±0.2°C



**ELECTRO-CHEMICAL DEVICES**

## L20 Laboratory pH/ORP & Temperature Meter

- Large LCD Display with Backlight
- Displays pH or mV and Temperature
- Resolution of 0.1 mV in ORP or Ion Mode
- Automatic or Manual Temp. Compensation
- Automatic Buffer Recognition
- Calibration stored in nonvolatile memory



### Description

The L20 Laboratory pH/ORP and Temperature meter is a microprocessor based precision instrument. The meter has a large LCD that displays the pH or millivolts and Temperature along with user prompts and measurement mode indicators.

The L20 features Automatic Temperature Compensation and Automatic pH buffer recognition for both US and NIST primary standard buffers. Calibrations can be single, dual or three point calibrations. The AUTOLOCK function in both the pH and mV modes senses the end point of a calibration or measurement and locks the reading once the sensor has stabilized. Electrode offset and slope are monitored and the pH electrode efficiency is displayed.

The IP54 waterproof case uses highly reliable keys that provide both tactile and audio feedback. The L20 is AC line powered with a universal AC adapter, 9VDC output, or it can be battery powered (six 1.5 volt AAA batteries).

Meter and Electrodes sold separately.

Part #	Description
1100520-1	L20 pH/mV meter with AC adapter
2008220	pH/Temp electrode
2008240	ORP electrode
2000675	Temperature Electrode with 8 pin DIN
1000540	Electrode Holder/Arm

### Specifications

Display	Range	Resolution	Accuracy
pH	0.00 to 14.00 pH	0.01 pH	± 0.01 pH
mV	-1999.9 to 1999.9mV	0.1 mV	± 0.05% FS
Temp.	0.0 to 100.0°C	0.1°C	± 0.2°C

pH Buffer Recognition	(US) 7.00, 4.01, 10.01 (NIST) 6.86, 4.01, 9.18
pH Temp. Compensation	0.0° to 100°C
pH Buffer Temp. Range	0.0° to 60°C
pH Offset Recognition	± 1.5 pH
pH Slope Recognition	± 30% of theoretical
Autolock sensing & Hold	Yes
Audio Feedback	All Keys
Calibration Back up	EEPROM
Input Impedance	> 10 <sup>12</sup> Ω
Temperature Sensor	Thermistor 10KΩ @
25°C	
Display	3½ in x 2¼ in, LCD
Case	IP54 waterproof
Ambient Temperature	0° to 50°C
Relative Humidity	Up to 90%
Dimensions (W x D x H)	150mmx203mmx72mm
Weight (Batteries Included)	504 gm (1.1 lb.)



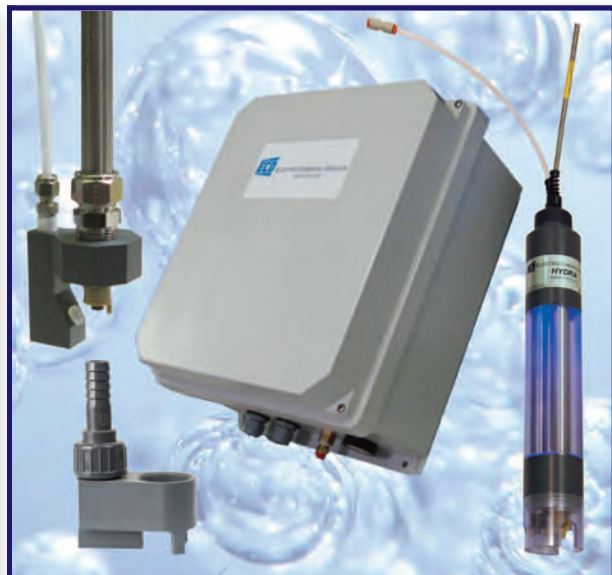
# AC10 Air Blast Spray Cleaner



**ELECTRO-CHEMICAL DEVICES**

## AC10 Automatic Sensor Cleaning

- Removes Biofilms and Other Soft Coatings
- Use with pH, ORP, DO, ISE and Conductivity
- NEMA 4X Self Contained System
- T80 Transmitter or C22 Analyzer Controls  
Cleaning Cycles
- Wall Mount or optional 2" Handrail Mount



## Description

The AC10 is a self contained, relay activated air compressor. The AC10 combined with a Sensor Spray Head and a C22 Analyzer/Controller uses pressurized air to generate an area of high turbulence in the water surrounding the measurement end of the sensor. The turbulence is suitable for removing biofilms and other soft coatings.

The AC10 can be a Single Channel or Dual Channel System. It is designed to be used with HYDRA Ammonium and Nitrate sensors, Triton® DO8 dissolved oxygen sensors or S10 style sensors for measuring pH, ORP, ISEs or Conductivity . Cleaning two sensors with the Dual Channel AC10 requires the C22 Analyzer/Controller be ordered with 4 Relays.

The AC10 uses redundant intake air filters and redundant fuses on both the relays and the compressor. A highly reliable high current contactor assures years of trouble free service. The 115 VAC 3.0 Amp or 220 VAC 1.3 Amp Air Compressor is

housed in a rugged, corrosion resistant, hot compression molded, fiberglass reinforced, polyester enclosure with a stainless steel piano hinge to secure the cover to the base. The AC10 can be wall mounted or use the optional 2" handrail mounting system that uses stainless steel support rails with two 2" galvanized pipe clamps.

The C22 Analyzer/Controller uses its internal Timers and Relays to control the Period and Duration of the cleaning cycles. The Period between cleaning cycles and the Duration of the cleaning are easily adjusted in the SET-UP menu of the C22. The 4-20 mA Outputs are placed in a "Hold Last Value" function during the cleaning cycle (Manual Mode-Bumpless setting).

Most cleaning operations can be accomplished with a 30 second cleaning every 15 - 30 minutes. When using the AC10 to clean stubborn coatings or two sensors keep in mind the maximum duty cycle for the AC10 is 10 minutes per hour, exceeding this value may cause the compressor to overheat.

# AC10 Air Blast Spray Cleaner

## Specifications

**Description:** Self Contained Relay Activated Air Compressor used for cleaning sensors configured with Air Blast Spray Cleaning Heads.

**Enclosure:** Fiberglass reinforced Polyester, NEMA 4X

**Pressure:** 40 psi, maximum(2.8 bar)

**Flowrate:** 1.24 CFM (35.1 LPM) 115 VAC  
1.15 CFM (32.6 LPM) 220 VAC

**Air Connection:** 1/4" Tube fitting

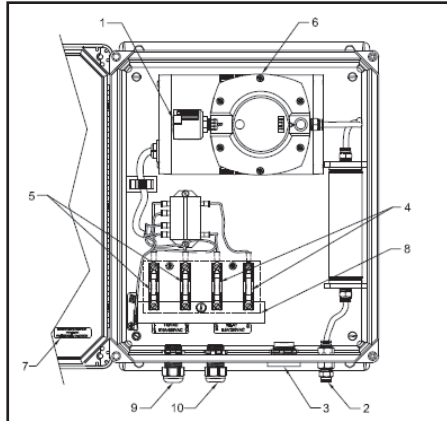
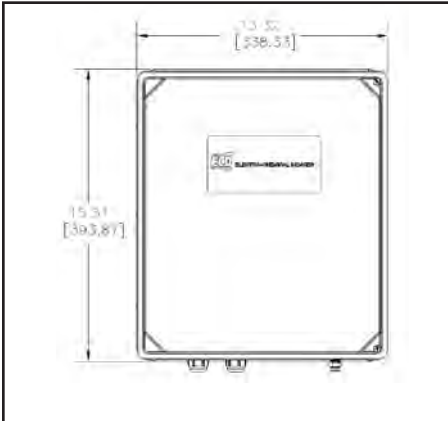
**Duty Cycle:** Less than 10 minutes per hour

**Power:** 115 VAC 60hz 5.5 A  
220 VAC 50 hz 2.1 A

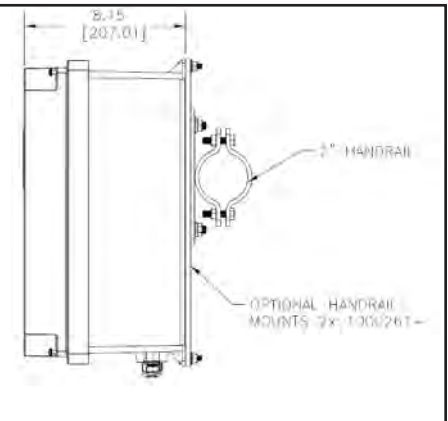
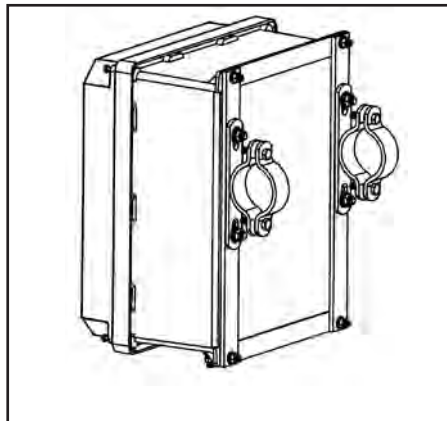
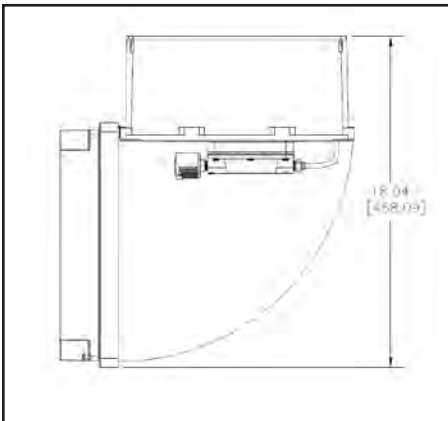
**Fuses:** Compressor 115VAC: (2) T.10A 250V, L & N  
220VAC: (2) T.10A 250V, L & N  
Controller Relay:(2) T. 0.5A 250V

**Dimensions:** 15.5"x 13.3"x 8.2"(39.4 x 33.7 x 20.7 cm)

**Weight:** AC10 wall mount: 20 lbs (9.1 kg)  
AC10 Handrail Mount: 25 lbs (11.3 kg)



1. Air Filter, Interior
2. 1/4" Quick Connect Tube Fitting
3. Air Filter, Exterior
4. Relay Fuses, T. 0.5A 250V
5. Compressor Fuses, T. 10A 250V
6. Air Compressor
7. Product Label, Part#, Serial#
8. Folding Protective Cover
9. Cable Gland, AC Power
10. Cable Gland, Control Signal



Part#	Description
1280100-1 (-5 Dual Ch)	AC10 Air Blast Cleaner, 115 VAC, Wall Mount
1280100-2 (-6 Dual Ch)	AC10 Air Blast Cleaner, 220 VAC, Wall Mount
1280100-3 (-7 Dual Ch)	AC10 Air Blast Cleaner, 115 VAC, Handrail Mount
1280100-4 (-8 Dual Ch)	AC10 Air Blast Cleaner, 220 VAC, Handrail Mount

Specifications subject to change without notice.

**Represented by:**

### Electro-Chemical Devices

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### Features

- 12.7 mm (0.5") Digit Height
- 4-20mA Loop Powered Indication
- Low Volt Drop
- Programmable Decimal Points
- LED Backlighting (30mA @ 5V typ.)
- Band gap Reference
- Wide Adjustment Range
- Auto-polarity on Display
- IP67 / NEMA 4X Protection via BEZ 700-IP



*Model R350D  
4-20 mA Remote Display*

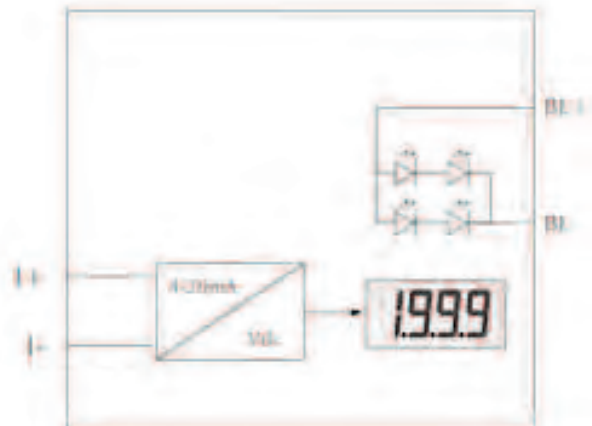
### Description

The R350D 3 1/2 digit liquid crystal display (LCD) is calibrated to directly read any process variable between of -1999 and +1999. The display is loop powered by any 4 to 20 milliamp loop and responds to the current being driven through the loop. The display is housed in a windowed, corrosion resistant, weatherproof enclosure (rated NEMA 4x). The reflective LCD does not wash out, or fade in intense direct light. As the incident light is increased, the display becomes sharper with greater visibility, making it an ideal indicating device for outdoor installations.

Access to the wiring is made available through a 1/2-inch conduit knockout in the bottom of the enclosure. The wiring information is located on the PCB. Mounting hardware is available for wall, pipe or panel as standard factory installed options. For convenience during installation, the complete electronic assembly lifts out of the enclosure via the keyed hinging arrangement leaving only the

essentials for mechanical installation.

Although the circuit board has a conformal coating to endure highly corrosive and humid environments, the wiring port must be sealed to protect the display surface itself. The screws that hold the cover on the enclosure are captive to the cover, preventing misplacement or loss of small hardware during routine maintenance.



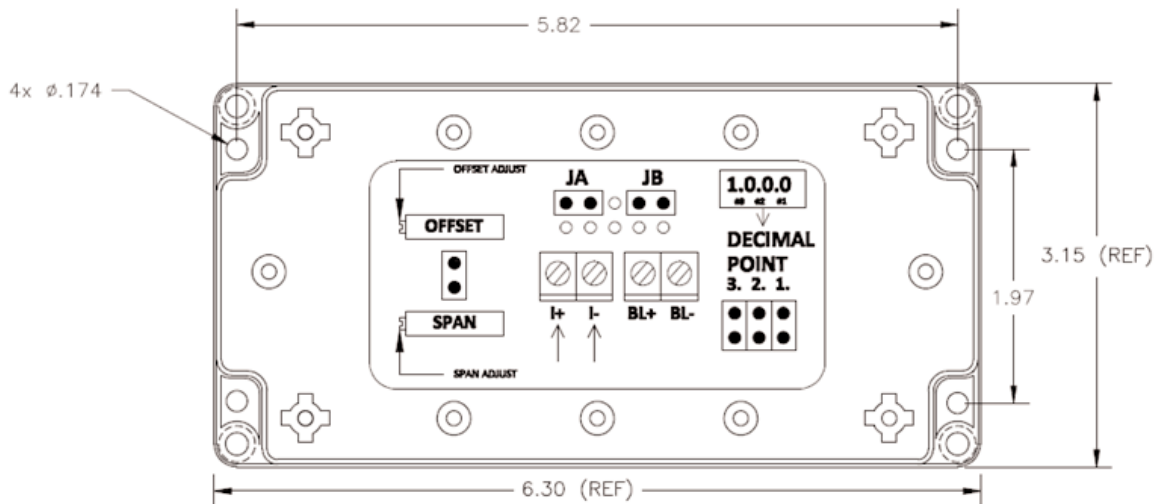
# R350D Remote Display

Specification	Minimum	Typical	Maximum	Units
Accuracy*	0.05		0.1	% ( $\pm 1$ count)
Linearity			$\pm 1$	count
Sample Rate		2.5		Samples/sec
Operating Range	0 (32)		50 (122)	$^{\circ}\text{C}$ ( $^{\circ}\text{F}$ )
Temperature Stability		200		ppm/ $^{\circ}\text{C}$
Loop Volt Drop	5	5.6		V
Supply Current	4		20	mA
Backlight Supply Voltage	4.75	5.0	**	VDC
Backlight Supply Current @ 5VDC		30	50***	mA
Full Scale Reading (20 mA)	0		1999	count
Offset Adjustment Range	-1999		+1999	count

\* To ensure maximum accuracy, re-calibrate periodically.

\*\* An external series resistor is required if the power supply is above 5V.

\*\*\* This specification linearly de-rates to 30mA @ 50 $^{\circ}\text{C}$ .



Part No.	Parts and Accessories Description
1100090	4-20 mA Remote Display

Specifications subject to change without notice.

**Represented by:**

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# Standalone Analytical Sensors

## DS80 Intelligent Sensors

Designed for Integrators and OEMs



Measure pH, ORP, Specific Ion, Dissolved Oxygen,  
Turbidity, Conductivity or Resistivity with any  
**PLC or Computer**

**Electro-Chemical Devices** offers a complete line of liquid analytical sensors: pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity. The Model DS80 Digital Sensors communicate via MODBUS RTU providing the ability to connect directly to a PLC or computer with a MODBUS RTU emulator.



## 6 Point Advantage

- 1** **Intelligent sensor design with digital communication**  
Calibration data is stored in the sensor allowing field installation of a pre-calibrated sensor. Detachable cable option simplifies the installation of pre-calibrated sensors.
- 2** **Multiple individual measurement parameters** in the same mechanical configuration- pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity & Resistivity
- 3** Readily available **application specific electrode cartridges**. Many unique pH electrode design formulations and materials of construction which are field proven and selected for long life and accuracy.
- 4** Long life **replaceable electrode cartridges** lower the over all operating cost.
- 5** **Submersible and Retractable Sensors** Various process fittings with adjustable insertion lengths - threaded fittings, sanitary fittings, flanges and valve retractable fittings.
- 6** **Industrial housing materials for compatibility with process fluid**. Stainless Steel, Titanium, Hastelloy C-22, Polypropylene or PVDF (Kynar™). Standard 10" or 17" lengths additional lengths available.



**ECD Model DS80 Sensor Overview** - The intelligent sensor choice to fit your application. The DS80 sensors have two Universal Sensor Designs; Insertion/Submersion or Valve Retractable with flaired end to prevent blow out. The standard Model DS80 sensors have a rugged 3/4" O.D. 316 stainless steel body with a 10 ft. cable or an optional waterproof detachable cable assembly.

### DS80 Sensor

#### Insertion/Submersion

The DS80 Sensor uses a 3/4" MNPT compression fitting as the process connection. This allows a variable insertion length to accommodate installation in pipe tees, flow cells, or through tank walls. If the fitting is reversed the sensor can be installed in a stand pipe for submersion into a tank.

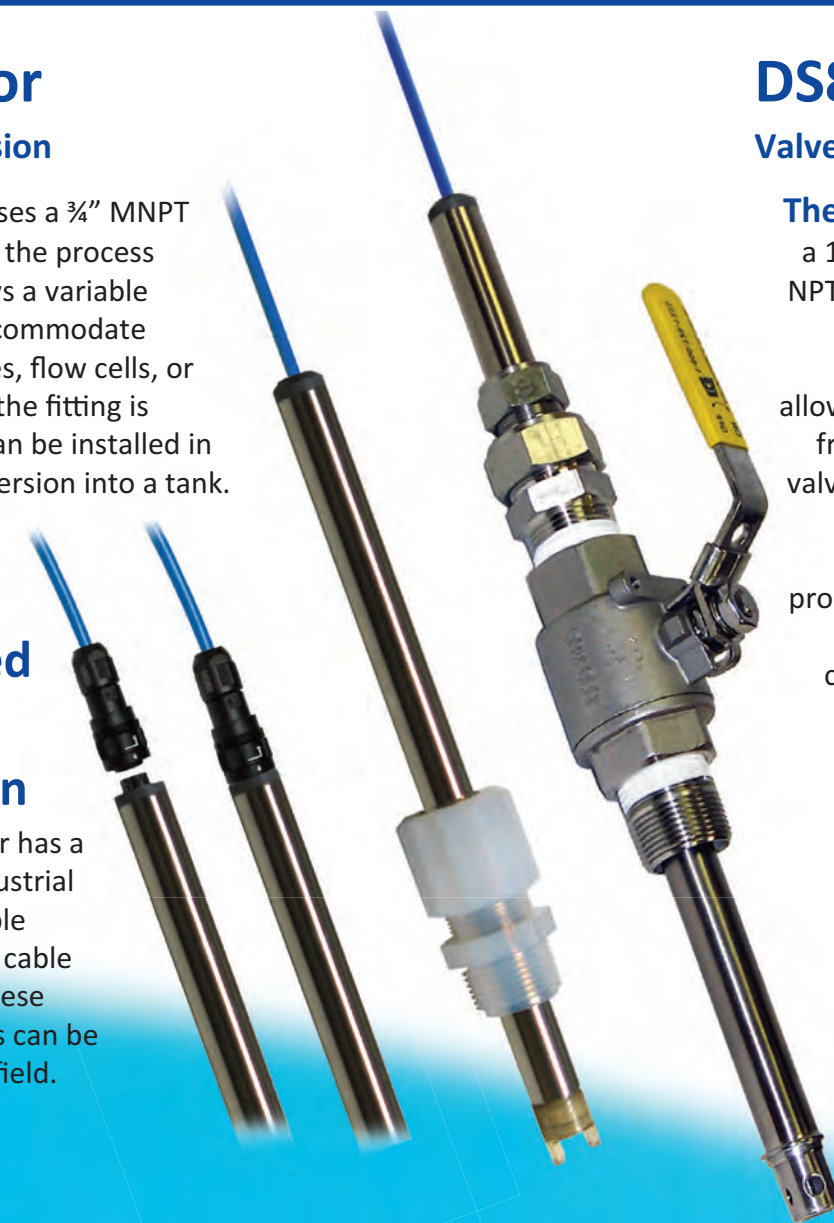
#### Pre-Calibrated Detachable Sensor Option

This detachable sensor has a rugged IP68 rated industrial connector. Just a simple quarter turn locks the cable connector in place. These Pre-Calibrated sensors can be easily installed in the field.

### DS80 Sensor

#### Valve Retractable

The DS80 Sensor uses a 1" ball valve with a 1" NPT process connection. Loosening the rear compression fitting allows the sensor to slide freely through the ball valve for either insertion into the process or retraction from the process. Once retracted, the ball valve can be closed and the sensor removed for maintenance or replacement without shutting down the process line.



The Model DS80 Intelligent Sensors use replaceable electrode cartridges to provide application specific solutions for the most demanding pH measurements.

- Radel (PES) or PEEK construction
- Single tine, double tine or full crown style pH bulb protection.
- Spherical bulbs (best response), hemispherical bulbs (more durable) or a slightly radiused flat surface (easily cleaned)
- Platinum tip ORP electrodes.
- Double or Triple junction reference cells
- Porous Teflon® and ceramic junctions with various reference electrolytes.

One of these three widely used pH electrode cartridges will satisfy most installations, Consult our technical support staff for additional configurations.

## 6 Point Advantage

**2005145** – This **General Purpose Electrode** has a two tine Radel body, double junction reference and slightly radiused pH bulb. While suitable for higher temperatures it is optimized for fast and stable readings in ambient temperature applications. Neutralizations, waste effluent monitoring, rinse applications and potable water are just a few of the suggested applications.

**2005157** – This **High Temperature Electrode** has a two tine PEEK body, triple junction reference and hemispherical pH bulb. This electrode is designed for the process control or neutralization of most mineral acids and bases in applications up to 130°C. The triple junction design is resistant to sulfide ion poisoning making it ideal for use in petroleum refineries and metal processing plants.

**2005066** – This **Chemically Resistant Electrode** has a two tine PEEK body, double junction reference and slightly radiused pH bulb. The PEEK body is suitable for use in most aggressive solvents, oxidizing solutions and acids or bases. This electrode is optimized for a harsh chemical environment and is suitable for service up to 130°C. Chemical separations and solvent recovery in the CPI and pharmaceutical industries along with chlorine production and flotation in mining are suggested applications.

**2005167** – This **ORP (Oxidation Reduction Potential) Electrode** has a two tine PEEK body, double junction reference and a platinum tip. This general purpose sensor can be used for monitoring the oxidant level of cooling towers, swimming pools, aquariums or the de-chlorination of waste water. Metal finishing and mining also provide applications such as cyanide destruction and monitoring chrome plating baths.

**Ion selective electrodes** are not limited to laboratory use; some are suitable for continuous online measurement. ECD offers Specific Ion Electrode cartridges to measure the various ions listed below. Specific Ion electrodes measure the activity (concentration) of the ion in solution, the “free” ion, not a complexed version. Cyanide, Fluoride and Sulfide ions only exist in a specific pH range as free ions and outside this pH range some percentage of the total concentration is complexed as H(X) which is not seen by the sensor. These measurements can be pH compensated using a pH sensor on a second channel to determine the total ion concentration using the dissociation curve for the specific chemical being measured. Most ion sensors are subject to interfering ion errors. A positive interference caused by similar ions in the solution. Consult with the factory on all new installations to determine the suitability of the measurement.

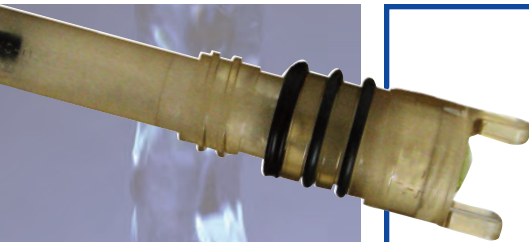
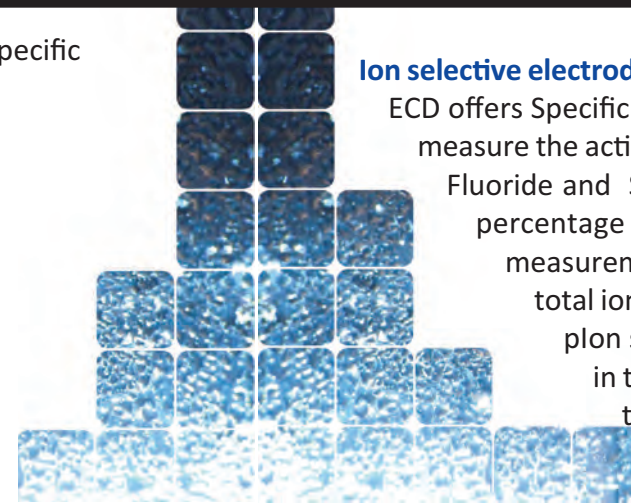
## Specific Ion (Ions) Electrodes

Part#	Type	Measurement Range	pH Range	Temperature Range
2005083	Ammonium	0.05 - 18,000 ppm	2-10 pH	0°-40°C
2005062	Bromide	1 - 80,000 ppm	2 - 12pH	0°-50°C
2005140	Cadmium	0.1 - 11,200 ppm	3 - 9 pH	0°-80°C
2005143	Calcium	0.1 - 40,000 ppm	2.5 - 10 pH	0°-40°C
2005008	Chloride	2 - 35,000 ppm	2 - 12 pH	0°-50°C
2005142	Cyanide	0.1 - 260 ppm	11 - 13 pH	0°-80°C
2005058	Cupric	1.0 ppb -6,300 ppm	2 - 6 pH	0°-80°C
2005163	Fluoride	0.02 - 2,000 ppm	5 - 8 pH	0°-80°C
2005141	Lead	2.0 - 20,700 ppm	4 - 8 pH	0°-80°C
2005086	Nitrate	0.1 - 1000 ppm	2 - 12 pH	0°-40°C
2005161	Nitrite	0.5 - 500 ppm	4.5 - 8 pH	0°-40°C
2005034	Potassium	0.1 - 40,000 ppm	2 - 12 pH	0°-40°C
2005031	Sodium	0.2 - 23,000 ppm	2 - 14 pH	0°-80°C
2005122	Sulfide	0.01 - 32,000 ppm	11 - 14 pH	0°-80°C
2005016	Silver	0.1 - 107,000 ppm	2 - 14 pH	0°-80°C

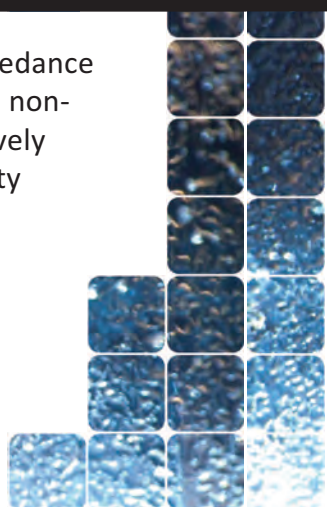
## Dissolved Oxygen Electrodes

The **ECD Dissolved Oxygen** electrodes are galvanic cells with a lead anode, silver cathode and either the quick response 2 mil or rugged 5 mil Teflon membrane. The electrode is ready to use as received, there are no solutions or membranes to install before the electrode can be used. The membrane is protected by a double tine PEEK body allowing for easy cleaning. Designed for ppm level measurements it is ideal for environmental water measurements and aerobic waste treatment.

Part#	Type	Range	Pressure Range	Temperature Range
2005622 (2 mil)	Dissolved or Gaseous Oxygen	0 - 20 ppm (mg/L) 250% Saturation	0 - 50 psig	-5°- 80°C
2005623 (5 mil)	Dissolved or Gaseous Oxygen	0 - 20 ppm (mg/L) 250% Saturation	0 - 50 psig	-5°- 80°C



Two technologies are used to measure Conductivity. **Contacting Conductivity** is an impedance measurement made between two metal contacts in the solution. **Inductive Conductivity** is a non-contacting measurement made between two toroidal coils inside the sensor that are inductively coupled through the solution's conductivity. Inductive sensors excel in the higher conductivity ranges and where coating is a problem. The chemically resistant PVDF (KYNAR) body is excellent for corrosive environments. Contacting sensors can measure from very low conductivities, (resistivity measurements) to very high conductivities but they are subject to coating and corrosion issues, conditions where the inductive sensors excel. The Contacting Conductivity DS80 sensors come in three ranges, Low Range, 0.05µS – 50µS, High Range, 50µS – 50mS and Resistivity, 0 – 20MΩ. Inductive Sensors measure from 500 µS to 1000 mS.



The proper installation and calibration of an analytical loop is critical for a successful measurement. Using the flow of the sample in an insertion application to maximize the cleaning potential can be as simple as changing the size of the Pipe Tee, changing the insertion depth or using an ECD Flow Cell with a spray cleaning port in the most difficult applications. Spray Cleaning heads are also available for immersion applications where the sample velocity is much lower and fouling is more common. Valve retractable units allow the sensor to be removed, serviced and installed without shutting down the sample flow in a pipe or emptying a tank. A compression gland fitting seals the sensor into a ball valve, loosening the gland fitting allows the sensor to be retracted through the ball valve which is then closed, isolating the process solution, before removing the sensor for service. Materials of construction for the Valves, Glands, Flanges and Immersion Assemblies vary from PVC, PVDF and polypropylene plastics to 316 SS, Titanium and Hastelloy C-22. Contact our application specialists for the most cost effective solution to your application.

## 6 Point Advantage

### Conductivity and Resistivity Sensors

The **Model DS80 Conductivity** sensor is available in two ranges, a Low Range sensor for measurements from 0.05µS to 50µS and a High Range sensor for measurements from 50µS to 50mS. The **Model DS80 Resistivity** sensor measures from 0 - 20 MΩ. The design of the inner electrode defines the measurement range of the sensor. The Open Style with its large surface area inner electrode and short path length is best for resistivity and low conductivity measurements while the Closed Style is best suited to high conductivity measurements. The standard wetted materials are 316 Stainless Steel, PEEK insulators and VITON o-rings.



### Calibration Solutions

All of the **DS80 sensors** require periodic calibration and ECD offers a full range of calibration solutions. For pH applications we offer pH 4.00, 7.00 and 10.00 buffers. ORP calibrations can be accomplished with a +465 mV ferric-ferrous solution or by adding quinhydrone to pH 4 and pH 7 buffer solutions creating +267 mV ORP and +90 mV ORP respectively. Specific ion calibration solutions are standardly 10 ppm and 100 ppm although any value can be formulated at no extra cost. Conductivity solutions are made with KCl and Deionized water, values from 10 µS to 500 mS are available. Solutions to simulate % acid or % caustic are labelled as the actual solution, i.e. 4% NaOH, even though the solution is made from KCl with an equivalent conductivity providing a safe and accurate calibration system.



### Inductive Conductivity Sensors - (non-contacting)

The **Model DS80 Inductive** sensors have a 3/4" diameter PVDF body. These sensors are ideal for measuring high conductivity solutions and % concentration measurements. Since the toroidal electrodes are inside the PVDF body, the inductive sensors are ideal for any application that coats or corrodes the electrode of the standard contacting conductivity sensors. The measurement range of the inductive sensor is from 500 µS to 1000 mS.



### Fittings and Flow cells

The **Model DS80 sensors** are offered with a wide array of fittings, flow cells, immersion assemblies and valve retraction assemblies. 3/4" MNPT compression fittings are available for DS80 insertion into pipe Tees or flow cells and when reversed, for coupling with Stand Pipes for immersion applications. Flow cells of PVC, PVDF or 316 SS have 3/8" or 1/2" FNPT ports on a 2" O.D. by 5" body. 316 SS Sanitary 3A Flanges and 150# Flanges can be adapted for insertion or valve retractable service. Contact our Technical support staff for other configurations.



### High Temperature/Pressure Sensors

The **CSX2** High Temperature- High Pressure sensor is designed for service to 200°C and 250 psig, 400 psig at 100°C. This insertion style 3/4" MNPT, 316 stainless steel sensor has PEEK insulators and is available with or without an integral signal conditioner. An aluminum junction box is mounted on the rear of the sensor that contains a terminal block and optional signal conditioner. The junction box is rated Class I, Div I, Groups C & D, Class II, Groups E, F and G hazardous locations. It is an ideal choice for boiler control applications, blowdown control, condensate monitoring, leak detection on heat exchangers, and steam purity measurements.



### Model DS80 Communications

The ECD DS80 digital sensors facilitate two way communication with MODBUS RTU. An RS485 to USB adapter can be supplied for connection to a computer. The sensors have four wires, two for power, 0 and +5 VDC, and two for communication. There are registers for naming the sensor, reading and writing the sensor configuration, calibration information and temperature compensation. The type of sensor, identity and serial number are stored in the sensor's non-volatile memory along with calibration information. Whether connecting multiple sensors to a PLC or a single sensor to a computer, the DS80 sensors provide access to multiple analytical measurements.





# Product Specifications

<b>DS80</b> All Sensors	<b>PHDS80</b> pH measurement	<b>ICDS80</b> Inductive Conductivity
<p><b>Dimensions:</b>  <b>S80 Insertion</b> - 3/4" OD x 10" Length  <b>S80 Valve Retractable</b> - 3/4" OD x 17"  <b>Cable Length:</b>                      10 ft. standard, optional lengths in 10 ft increments, optional Detachable cable connection  <b>Housing Materials:</b>                      Standard: 316 Stainless Steel                      Optional: Titanium (T), grade 2                      Hastelloy C-22 (H),                      PVDF (K)                      Polypropylene (P)  <b>O-Ring Materials:</b>                      Standard: Viton® (VIT)                      Optional: Ethylene Propylene (EPR),                      VITON® 75 (VIT75)                      Kalrez® (KLZ)                      CV75 (CV)  <b>Process Connections:</b>  <b>S80 Insertion/Immersion</b>                      -75 3/4" 316 SS gland fitting with nylon ferrule                      -75HT 3/4" 316 SS gland fitting with Teflon® ferrule                      -75SF 3/4" 316 SS gland fitting with stainless steel ferrule                      -75TFE 3/4" Teflon® gland fitting with Teflon™ ferrule                      -100P 1" Polypropylene gland fitting for Polypropylene housing only  <b>S80 Valve Retractable</b>                      -VSS 1" 316 SS valve retraction assembly                      -VSSE 1" 316 SS valve retraction assembly for Inductive sensors                      -VKY 1" PVDF valve retraction assembly                      -VPP 1" Polypropylene Valve Retraction assembly</p>	<p><b>Measurement Range:</b>                      0-14 pH  <b>Temperature Range:</b>                      0° - 90° C  <b>Optional HT version:</b>                      0° - 140° C  <b>Pressure Range:</b>                      0 - 100 psig @ 90° C  <b>Temperature Compensation:</b>                      Automatic 0° - 100° C                      Accuracy ± 0.2° C  <b>MVDS80</b>                      ORP &amp; Specific Ion  <b>Measurement Range:</b>                      ORP: -2000 mV to 2000 mV                      plon: Sensor Specific, ppb, ppm&amp;ppt  <b>Temperature Range:</b>                      ORP -0° - 90° C, plon Sensor Specific  <b>Pressure Range:</b>                      0 - 100 psig @ 90° C  <b>Temperature Compensation:</b>                      Automatic 0° - 100° C (plon not ORP)                      Accuracy ± 0.2° C  <b>DODS80</b>                      Dissolved Oxygen  <b>Measurement Range:</b>                      0-20 ppm, 0-150% SAT  <b>Temperature Range:</b>                      0° - 90° C  <b>Pressure Range:</b>                      0 - 65 psig @ 90° C  <b>Temperature Compensation:</b>                      Automatic 0° - 100° C                      Accuracy ± 0.2° C  <b>CDS80 / RDS80</b>                      Conductivity/Resistivity  <b>Measurement Ranges:</b>                      Conductivity: 0.05µS to 50 µS                      50 µS to 500 mS                      Resistivity: 0 - 20 MΩ</p>	<p><b>Temperature Range:</b>                      -5° to 100° C  <b>Optional HT version:</b>                      -5° to 150° C  <b>Pressure Range:</b>                      CDS/RDS80 0 - 100 psig  <b>Temperature Compensation:</b>                      Automatic 0° - 150° C                      Accuracy ± 0.2° C, 100K thermistor  <b>Measurement Ranges:</b>                      500 µS to 1000 mS  <b>Temperature Range:</b>                      -5° to 100° C  <b>Pressure Range:</b>                      0 - 100 psig  <b>Temperature Compensation:</b>                      Automatic 0° - 100° C                      Accuracy ± 0.2° C, 100K thermistor  <b>Body material:</b>                      KYNAR (PVDF)  <b>CSX2 Series</b>                      High Temperature Conductivity  <b>Measurement Ranges:</b>                      1.0µS to 50mS  <b>Temperature Range:</b>                      0° C to 200° C  <b>Pressure Range:</b>                      0 - 250 psig ( 400psig @ 100° C)  <b>Temperature Compensation:</b>                      Automatic 0° - 200° C                      Accuracy ± 0.2° C, 10K ohm platinum RTD  <b>Wetted Materials:</b>                      316 SS and PEEK  <b>Shipping Weight:</b>                      DS80 (10") 2.5 lbs (1.2 kg)                      DS80 (17") 2.75 lbs (1.25 kg)                      DS80-VSS 5.8 lbs (2.65 kg)</p>

Specifications subject to change without notice.

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