

ZEUS™ **ANALOG pH SENSORS WITH ULTRA-RUGGED CONSTRUCTION**

Description of Most Important
Common Core Features:

*Features for each configuration in
addition to common core features
itemized to differentiate models.*

Universal, Conventional & Differential
preamplifier configurations are in stock
for smaller orders; Available for **Dispatch
on Same Day as Order is Accepted.**

For larger orders of any configuration
please inquire regarding lead time.

Process Connections:

General Sensor Specifications:

Operating Temperature Range:

Operating Pressure Range:

Sensor Body Material:

Junction Support Matrix Material:

External Dimensional Drawing:

pH Measurement Specifications:

Measurement pH Range:

Measuring Glass Type:

pH Glass Dimensions:

Initial Impedance:

Sodium Ion Error:

Acidic Error:

Reference System Specifications:

Type:

Reference Half Cell:

Triple Junction:

Primary & Secondary Junctions:

Some Selected Examples of Recommended Applications:

Storage and Shelf Life:

Industrial pH Sensors for Severe Service Inline, Immersion & Submersible Installs

- Waterproofing seal for complete cable isolation for submersion and field washdowns
- Solid-state reference nearly impervious to ammonia, chlorine, sulfides & most solvents
- ACCU-TEMP Fast Response Pt1000 Temperature Compensation "TC" element
- Rugged thick 3.0mm (0.12") protective tines guard configuration, 4 each 90° apart
- Thick 5.6mm (0.22") sensor body for 1.66" O.D. to endure tough mechanical wear
- Universal configuration 7.6 meters (25 feet), Conventional & Differential Preamplifier Configurations 6 meters (20 feet) of integral cable; Thick PVC jacket for aggressive use

ZEUS™ pH SENSOR – UNIVERSAL CONFIGURATION

- * Solution ground liquid earth element with Hastelloy C-276 Material of Construction
- * Tinned lead terminations must be wired directly into transmitter terminals

ZEUS™ pH SENSOR – WITH CONVENTIONAL PREAMPLIFIER

- * Integral Analog Conventional Preamplifier for low-noise operation and long cable runs
- * Waterproof NEMA 6P rated quick disconnect Q7M Snap Corrosion Resistant Connector
- * Up to 100 meters (330 feet) low-noise preamplified signal using Q7F snap extensions

ZEUS™ pH SENSOR – WITH 5-WIRE DIFFERENTIAL PREAMPLIFIER

- * Solution ground liquid earth element with Hastelloy C-276 Material of Construction
- * Integral 5-wire Differential Preamplifier for low-noise operation and long cable runs
- * Waterproof NEMA 6P quick disconnect HiQ4M Snap Corrosion Resistant Connector
- * Up to 305 meters (1,000 feet) low-noise preamplified signal with Q7F snap extensions

1" MNPT Threads on Front for Inline Screw-in Installations

1.25" MNPT Threads on Back for Immersion & Submersible Installations

-15 to 150°C

1 to **150 psig** (6.9 to 1035 kPa) for **ZEUS™ pH SENSOR UNIVERSAL**

1 to **200 psig** (6.9 to 1379 kPa) for **ZEUS™ pH SENSOR WITH PREAMPLIFIER**

RADEL® R-5000 NT (Poly-Phenyl-Sulfone, PPSU)

KYNAR® (Poly-Vinylidene-Fluoride, PVDF)

See ZEUS™ Analog pH Sensor 1"-1.25" MNPT Inline / Immersion / Submersible

-0.5 to +14.5

Hemispherical Green Glass (MUGG) - **ZEUS™ UNIVERSAL**

Low-Profile Parabolic Thick-Wall Break-Resistant **ZEUS™ WITH PREAMPLIFIER**

0.315" (8.0 mm) DIA

< 800 MΩ @ 25 °C for **ZEUS™ UNIVERSAL CONFIGURATION**

< 1,500 MΩ @ 25 °C for **ZEUS™ WITH PREAMPLIFIER CONFIGURATIONS**

Less than 0.15 pH in sodium (Na⁺) solutions at pH 14.00

Less than 0.05 pH in hydrochloric acid (HCl) solutions at 0.00 pH

Triple Junction Standard

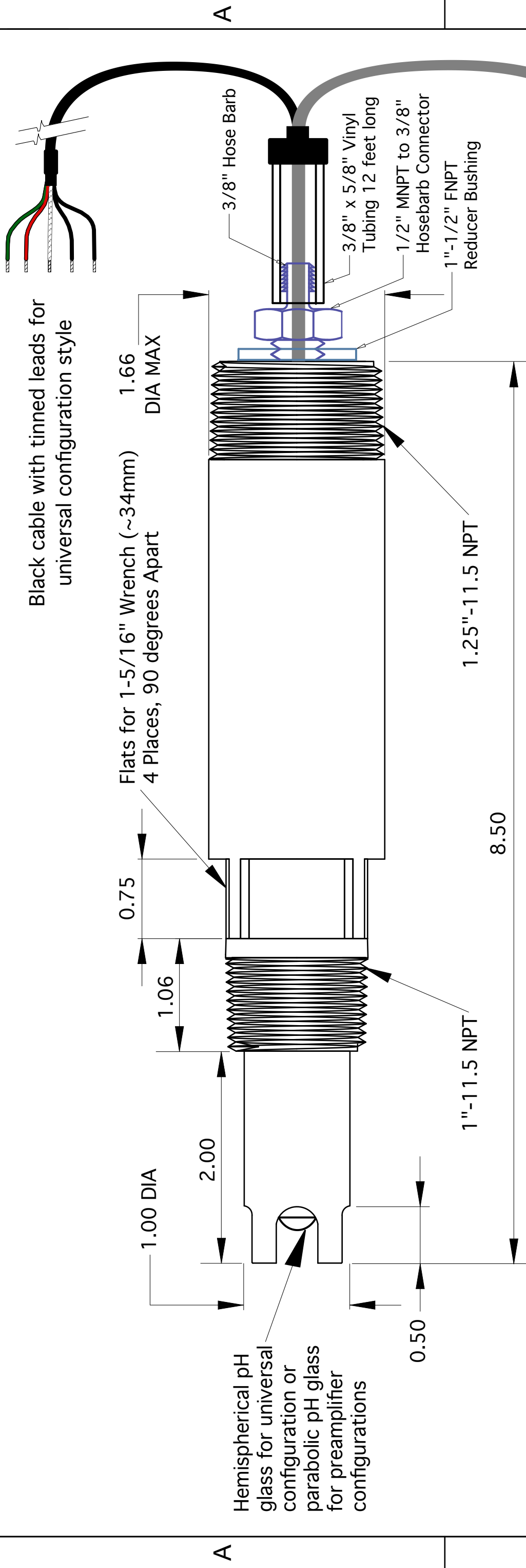
Ag/AgCl, Saturated KCl

- Solid-State Non-Porous Cross-Linked Polymer embedded in Kynar Support Matrix holds excess KCl assuring saturation at all temps for stability & long sensor service life
- Porous Ceramic, Saturated KCl in crosslinked polymer, Interfaced to Triple Junction

Industrial & mining autoclaves, abrasive slurry & high viscosity solutions, sulfide service. Any measurement where aggressive chemical cleaning is needed to remove fouling or low-maintenance operation is required with minimal cleaning and re-calibration.

Not for use in low conductivity, steam sterilization or steam type processes.

One (1) year from date of dispatch from ASTI factory when stored at indoor ambient room temperature with proper orientation & protector cap.



Black cable with tinned leads for universal configuration style

Gray cable with Snap Connectors for Pre-amplifier Configurations

NOTES

1. All dimensions are in inches with tolerances as detailed below
2. Sensor body material of construction is RADEL R-5000 NT
3. Support matrix for solid-state cross-linked conductive polymer reference system is KYNAR (PVDF) material of construction
4. Protective tines 4 places, 90 degrees apart, 0.12 inches (3.0mm) thick
5. Black composite cable for universal sensor configuration 25 feet cable length
6. Conventional or 5-wire differential preamplifier configurations use Q7M snap connectors with 20 feet cable. Use Q7F snap cable extensions to achieve the desired total cable length for field installation.
7. See hook-up schematic to interface tinned leads to desired supported mating pH transmitter.
8. Do not use any sensor beyond the factory defined maximum temperature or pressure rating.



Advanced Sensor Technologies U.S.A.
Website: <http://www.astisensor.com>

DRAWN BY TADP		TOLERANCES	
CHECKED BY TADP	1 Place: ± .1	3 Places: ± .005	
APPROVED BY MJP	2 Places: ± .01	4 Places: ± .0005	
		Angular: ± 0.25°	

TITLE 1"-1.25" MNPT Inline / Immersion / Submersible			
SIZE B	PROJECT ULTRA RUGGED	DRAWING NO. ZEUS™	REV /
SCALE Not to Scale	MODEL Universal or Preamplifier	SHEET 1	OF 1



Field Installation Guide for Quick Disconnect Q7M & Q7F Snap Connectors for pH, ORP, Ion Selective (ISE) and Dissolved Oxygen (DO) Measurements

Q7M & Q7F SNAP FIELD INSTALLATION SCHEMES - PART 1

Installation approaches for Iotron™ pH, ORP, Ion Selective (ISE) and Dissolved Oxygen (DO) sensors with integral analog preamplifiers with the Q7M & Q7F quick disconnect snap connectors are detailed in this guide.

BASE CONFIGURATIONS FOR SENSORS WITH Q7M CONNECTOR:

All Iotron™ pH, ORP, Ion Selective (ISE) and Dissolved Oxygen (DO) sensors with integral analog preamplifiers can potentially be used with the the Q7M & Q7F quick disconnect snap connectors system. These connectors must be installed at the ASTI factory at the time of fabrication and cannot be added later in the field. Sensors purchased for this installation scheme come standard with 3 meters (10 feet) of integral cable and include quick disconnect male terminated **IP67 & NEMA 6P rugged field ready Q7M quick disconnect snap connector**. The shorter integral cable length of 1.5 meters (5 feet) is also available but there is no difference in cost for this shorter sensor cable lengths. The longer integral cable length of 6 meters (20 feet) is a standard order option whereas 12 meters (40 feet) of integral cable is also available as a special order option. Surcharges apply for both stand order option for the 6m (20 feet) length as well as the special order option 12m (40 feet) integral cable length options.

For each sensor terminated in a Q7M male snap connector there must exist a mating Q7F female snap to tinned leads cable extension. **The Q7M/Q7F connectors are waterproof and corrosion resistant IP67 & NEMA 6P rated when interfaced.** The tinned leads from this cable extensions are wired directly and permanently into the mating transmitter terminal sensor input board terminals (please see the wiring schematic specific to the OEM instrument that you to interface for details). These female snap to tinned leads cable extensions are available in length 1.5 meters (5 feet), 3 meters (10 feet), 6 meters (20 feet), 12 meters (40 feet) as standard order options as well as the longer 24 meters (80 feet) length as a special order option. The best practice for design of a field commissioning scheme employing the Q7M/Q7F connector system is to use the well stocked standard sensor cable lengths and cable extension options for the lowest cost and best availability installation.

GENERAL NOTE:

The sensor terminations are always male snap connector. The female snap to male snap cable extensions and female snap to tinned leads cable extensions can be used in any combination without signal degradation so long as the maximum supported 100 meters (330 feet) of total cable length is not exceeded. For best result running the cable in conduit for area that may have high levels of noise and RF interference is recommended for best results.



Q7M & Q7F SNAP FIELD INSTALLATION SCHEMES - PART 2

The various standard and special order Q7M & Q7F installation schemes and the corresponding cable length installation achieved for each are detailed below:

Integral Cable Lengths for Sensors Terminated with Q7M Quick Disconnect Snap Connectors

→ Sensors that are terminated with Q7M male snap connector come standard with 3 meters (10 feet) of integral cable

→ Shorter 1.5 meters (5 feet) of integral sensor cable length also terminating with Q7M male snap connector are available for same price as the standard 3 meters (10 feet) length. Specify shorter lengths by -Q7M-1.5m coding. If -Q7M option is invoked without any cable length indicated the sensor is supplied with standard 3 meters (10 feet) of cable & Q7M male snap connector complete.

→ Longer 6 meters (20 feet) integral sensor cable lengths also terminating with Q7M male snap connector are available as a standard order option with applicable surcharge.

→ **Maximum 12 meters (40 feet) of integral sensor cable with Q7M male snap connector is available as a SPECIAL ORDER OPTION (-Q7M-12m) ALSO WITH APPLICABLE SURCHARGE.**

Q7F Female Snap to Tinned Leads Cable Extension Options

1.5 meters (5 feet)	Q7F-1.5m-TL
3 meters (10 feet)	Q7F -3m-TL
6 meters (20 feet)	Q7F -6m-TL
12 meters (40 feet)	Q7F -12m-TL
24 meters (80 feet)	Q7F -24m-TL - Special Order Option Only

POSSIBLE TOTAL CABLE LENGTH INSTALLATIONS FOR Q7M/Q7F CONNECTOR SYSTEM

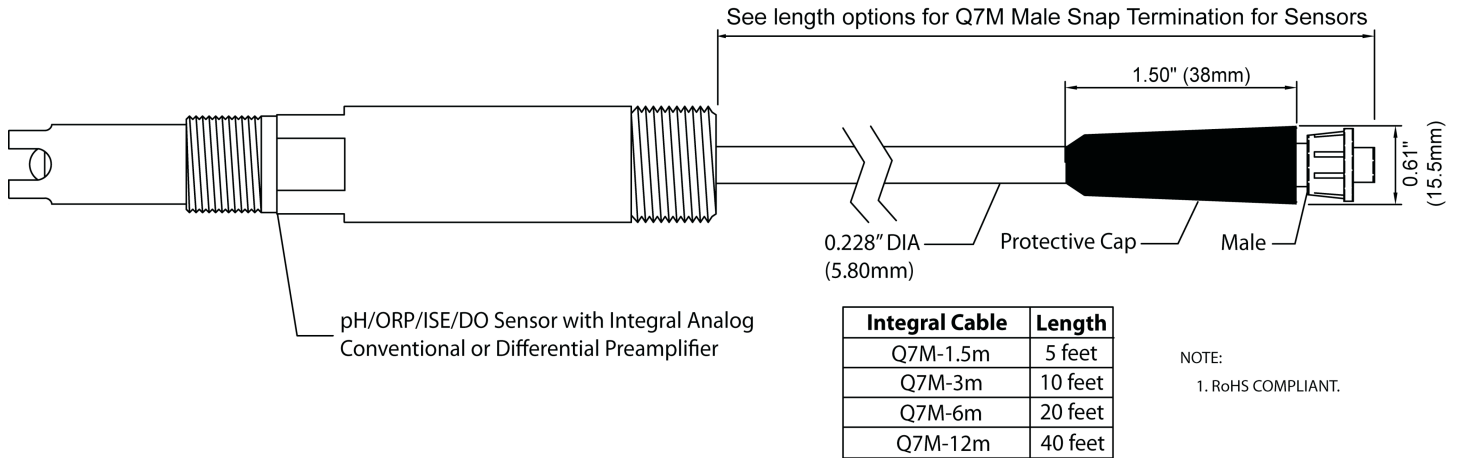
Sensors with Q7M male snap connector and female Q7F snap to tinned leads cable extension

	+1.5 meters	+3 meters	+6 meters	+12 meters	+24 meters
1.5m (5ft) integral cable:	3m (10 feet)	4.5m (15 feet)	7.5m (25 feet)	13.5m (45 feet)	25.5m (85 feet)
3m (10 ft) integral cable:	4.5m (15 feet)	6m (20 feet)	9m (30 feet)	15m (50 feet)	27m (90 feet)
6m (20 ft) integral cable:	7.5m (25 feet)	9m (30 feet)	12m (40 feet)	18m (60 feet)	30m (100 feet)
12m (40 ft) integral cable:	13.5m (45 feet)	15m (50 feet)	18m (60 feet)	24m (80 feet)	36m (120 feet)

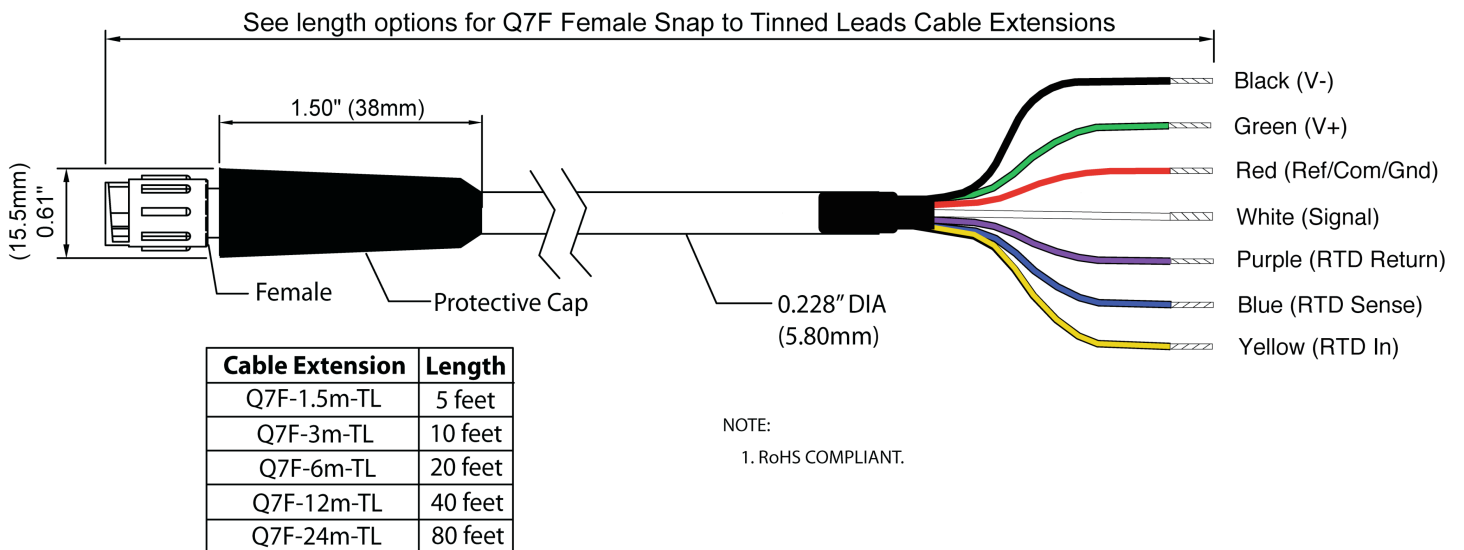
Items denoted in GREEN are special orders. This means that there may be limited availability and/or extended lead times for purchase of these items or to invoke these options. Contact ASTI factory or distributor for further details.

Q7M & Q7F SNAP FIELD INSTALLATION SCHEMES - PART 3

Detail drawing for sensors terminated with Q7M quick disconnect male snap connector (-Q7M-Xm):

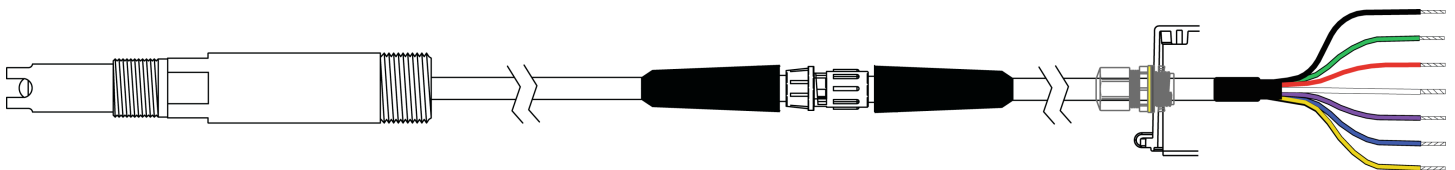


Detail drawing for female snap to tinned leads Q7F-Xm-TL cable extensions:



Assembly Drawing for Q7M & Q7F Style Quick Disconnect Field Installation Scheme:

Sensor with Q7M male snap connector bridged with female snap to tinned leads (Q7F-Xm-TL) cable extension. The tinned leads are interfaced to transmitter terminals. Sealing cable gland used on transmitter enclosure for watertight connection.



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CLEANING, CARE & MAINTENANCE RECOMMENDATIONS FOR ZEUS™ pH SENSORS

Note: The recommendations given in this document are valid the ZEUS™ Industrial pH sensors. Best practice care and maintenance for your particular installation may vary from that described here. Contact the factory for specific information regarding proper care and maintenance of your given installation scheme and process application conditions.

Storage

The standard shelf life for all Iotron™ pH and ORP sensors is one year from the date of shipment. Sensors stored longer than this period may still be functional but are no longer under warranty. Sensors should be stored in a cool, dry location with the sensor tip (where the pH/ORP element is located) oriented toward the ground. All sensors come standard with a conditioning solution in the cap. This conditioning solution is 50% pH 4 buffer and 50% saturated potassium chloride (mixed by volume). The sensor cap should be kept tightly affixed to the sensor body and sealed with common piping teflon tape when the sensor is not in use. Sensors that are to be returned for shelf life warranty claim must have the original sensor cap and conditioning solution intact to be eligible for warranty replacement. Contact the ASTI factory before returning any sensor for warranty claim to obtain a valid RMA.

Cleaning

Cleaning methods can vary greatly depending upon the application for which the sensor is used. Some common rules for cleaning include:

- 1) Never scratch or aggressively scrub the pH or ORP elements. These are delicate glass electrochemical electrodes. They can be broken easily by mechanical force.
- 2) The reference junction is a solid state non-porous cross-linked conductive polymer embedded in a porous kynar matrix. Since the reference is solid state, it can be cleaned with aggressive chemicals. This solid state reference can also be cleaned effectively by using a sharp razor edged tool. GREAT CARE SHOULD BE TAKEN NOT TO SCRATCH THE pH GLASS OR ORP ELEMENT DURING CLEANING OF THE REFERENCE JUNCTION.

Common approved cleaning solutions include:

5-15% Hydrochloric Acid – (For Alkaline deposits)
5-15% Sodium Hydroxide – (For Organic Contaminants)
Surfactant (NON-IONIC SOAPS SUCH AS MICRO-90)

Please inquire to the factory if you plan to use any other cleaning agent.

Conditioning for Calibration

After the sensor has been cleaned, it must be thoroughly rinsed with deionized water to remove any residual cleaning reagents. The sensor can then be soaked in pH 4 buffer to recondition the pH and reference elements. Some sensors will also require a conditioning in saturated potassium chloride if the reference junction has been depleted of the ions in the solid state conductive polymer (typical for clean water applications). Condition the sensor in saturated potassium chloride and/or pH 4 buffer for whatever period of time is required to achieve optimal calibration results.

Sensor Selection for Individual Process Lines

No sensor should be used beyond the indicated temperature and pressure limitations for that given sensor. Sensors should only be used for the application(s) that an authorized ASTI representative has recommended. If you are unsure that your sensor is recommended for a particular application, please contact the factory.

If you should have any doubt about whether the exact sensor model that you are using is appropriate for the installation style that you are planning to implement, please contact the factory for further assistance!