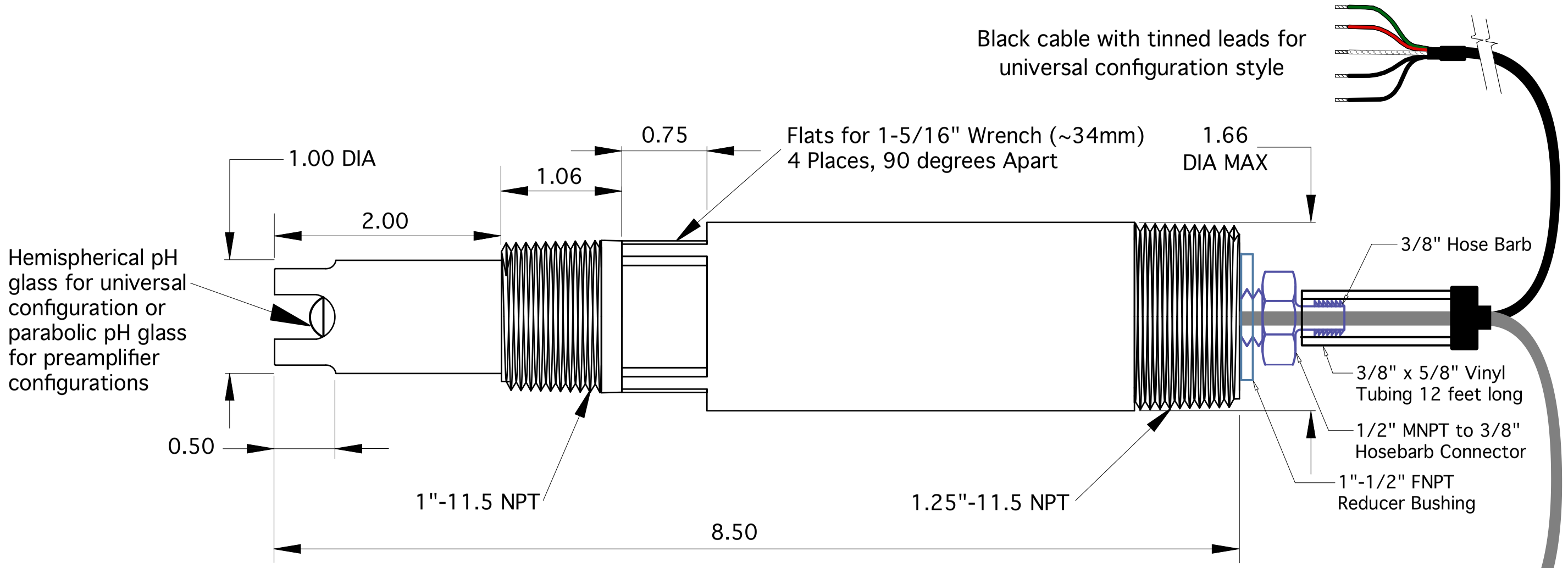
ZEUS™ ANALOG pH SENSORS WITH ULTRA-RUGGED CONSTRUCTION

Description of Most Important Common Core Features:	**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
Features for each configuration in addition to common core features itemized to differentiate models.	**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 Corrsion Resistant Connector * Up to 100 meters (330 feet) low-noise preamplified signal using Q7F snap extensions
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.	**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 Corrsion Resistant Connector * Up to 305 meters (1,000 feet) low-noise preamplified signal with Q7F snap extensions
Process Connections:	1" MNPT Threads on Front for Inline Screw-in Installations 1.25" MNPT Threads on Back for Immersion & Submersible Installations
General Sensor Specifications:	
Operating Temperature Range:	-15 to 150°C
Operating Pressure Range:	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**
Sensor Body Material: Junction Support Matrix Material: External Dimensional Drawing:	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
pH Measurement Specifications:	
Measurement pH Range:	-0.5 to +14.5
Measuring Glass Type:	**Hemispherical** Green Glass (MUGG) - **ZEUS™ UNIVERSAL** **Low-Profile Parabolic** Thick-Wall Break-Resistant **ZEUS™ WITH PREAMPLIFIER**
pH Glass Dimensions:	0.315" (8.0 mm) DIA
Initial Impedance:	< 800 MΩ @ 25 °C for **ZEUS™ UNIVERSAL CONFIGURATION** < 1,500 MΩ @ 25 °C for **ZEUS™ WITH PREAMPLIFIER CONFIGURATIONS**
Sodium Ion Error: Acidic Error:	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
Reference System Specifications:	
Type:	Triple Junction Standard
Reference Half Cell:	Ag/AgCl, Saturated KCl
Triple Junction: Primary & Secondary Junctions:	- 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
Some Selected Examples of Recommended Applications:	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.**
Storage and Shelf Life:	One (1) year from date of dispatch from ASTI factory when stored at indoor ambient room temperature with proper orientation & protector cap.



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.

Gray cable with Snap Connectors for Preamplifier Configurations

TOLERANCES		DRAWN BY	TITLE
1 Place: ± .1	3 Places: ± .005	TADP	1"-1.25" MNPT Inline / Immersion / Submersible
2 Places: ± .01	4 Places: ± .0005	CHECKED BY TADP	SIZE B · PROJECT ULTRA RUGGED · DRAWING NO. ZEUS™ Analog pH Sensor · REV /
Angular: ± 0.25°		APPROVED BY MJP	SCALE Not to Scale · MODEL Universal or Preamplifier · SHEET 1 OF 1

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

Connection Diagram of ZEUS™ pH Sensors Item # 1202 for use with pH transmitters that interface Analog pH sensors WITHOUT Preamplifiers

Contact ASTI for terminal assignments to your specific mating pH transmitter

ASTI Cable Color Coding	Instrument Terminal Value	pH Transmitter Terminal (Write below for records)
Clear	Active pH mV Signal	
Red	Reference	
Black	Pt1000 TC Element	
Black	Pt1000 TC Element	
Green	Liquid Earth Solution Ground (Hastelloy® C-276 Alloy)	
Drain	Outer Shield	

Note 1: The liquid earth solution ground may not be used for all pH transmitters. If one is not required simply do not connect the green lead but rather fold it back and tape it off.

Note 2: The outer shield drain connection may not be used for all pH transmitters. If one is not required simply do not connect the green lead but rather fold it back and tape it off.

Note 3: Be sure to select the Pt1000 type input on your transmitter to ensure compatibility with the platinum temperature compensation element in your ZEUS™ pH Sensor.

Note 4: The ZEUS™ pH Sensors Item # 1202 is supplied with 25 feet of integral cable. This cable should not be cut or adulterated in any way. If less cable length is desired you must coil-up any surplus unused cable carefully and secure appropriately. If a cable length longer than 25 feet is required please choose an alternate configuration of the ZEUS™ pH Sensor:

*** Item # 1203 for pH transmitters supporting analog conventional preamplifiers (max 330 feet)**
*** Item # 1204 for pH transmitters supporting analog 5-wire differential preamps (max 1000 feet)**
*** Item # 1205 smart digital pH sensor for 3TX-HiQ-pH digital transmitters (max 2000 feet)**

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 keep 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 effective 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!