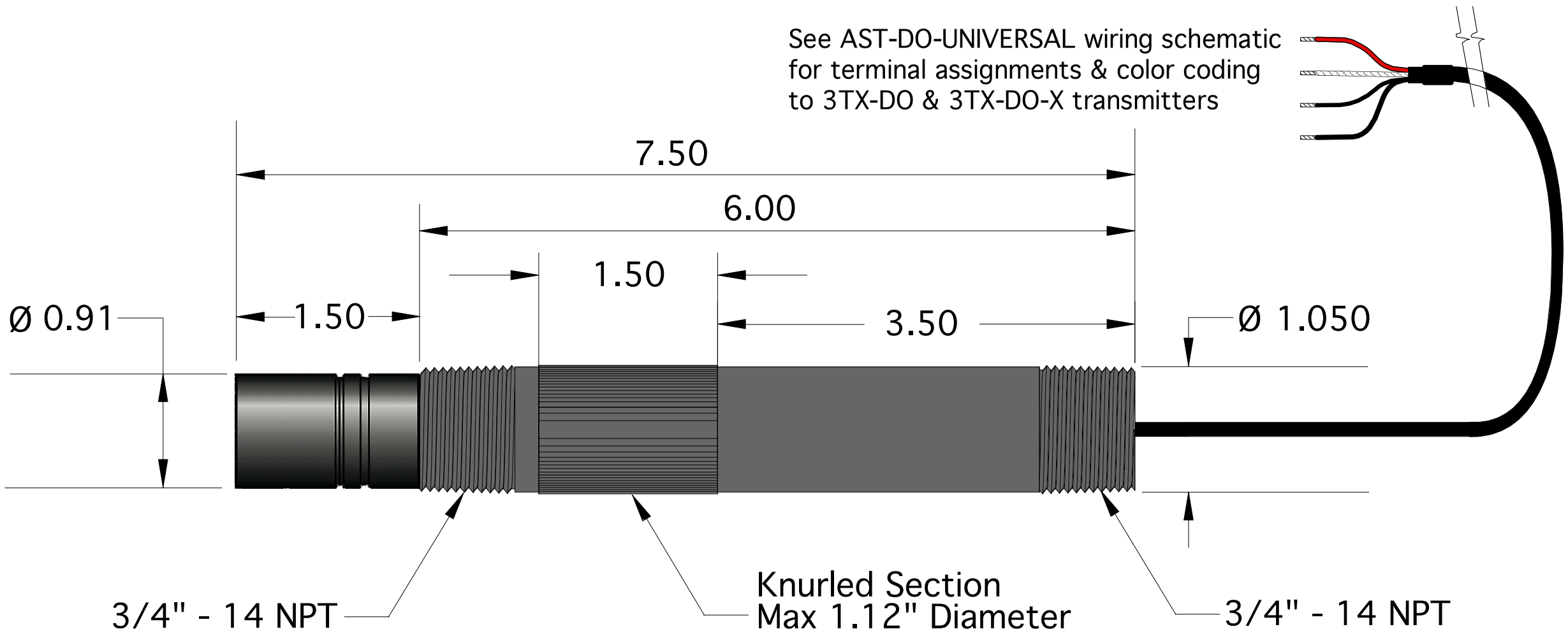
AST-DO-UNIVERSAL CONVERTIBLE INDUSTRIAL DISSOLVED OXYGEN SENSOR

Special Features Highlighting Unique Technical Advantages:	**Unique Features highlighting technical advantages for industrial application use** - Thick-wall TEFLON membrane ensures very high stability, low-drift and high durability in aggressive industrial applications & minimizes frequency of membrane replacement - No special maintenance needed. Just wipe the membrane periodically as required - Galvanic dissolved oxygen cell with true zero means only slope (span) calibration is performed dry in air. No wet solution calibration is ever needed to simple field operation - Membrane is easy to replace and electrolyte solution is simple to recharge allowing for extremely low ongoing cost of ownership and a theoretically unlimited service lifetime - The AST-DO-UNIVERSAL DO sensor is not sensitive to hydrogen sulfide gas - Temperature compensation is built-in & performed automatically for reliable readings
Description of Most Important Common Core Features:	**Rugged Industrial DO Sensor for Tough Inline, Immersion & Submersible Installs** - Inline Insertion depth from 1.5 inches (standard) to 3.5 inches (special order option) - Ready for inline or immersion use standard, submersible with waterproofing option - Waterproofing seal option is available for complete cable isolation for fully submersible installations & applications employing field washdowns and/or moist & humid conditions - Pt1000 temperature element used to compute the % saturation at the current temp - Without preamplifier configuration has 3 meters (10 feet) of cable standard, Maximum cable length in this configuration is 15 meters (50 feet) cable submersible to 25 feet - With integral conventional preamplifier configuration also has 3 meters (10 feet) of cable standard, Maximum 100 meters (330 feet) cable submersible up to 50 feet - Thick PVC jacket for aggressive use in both with & without preamp configurations
Features for each configuration in addition to common core features itemized to differentiate models	**AST-DO-UNIVERSAL-CONVERTIBLE WITHOUT PREAMP CONFIG** * Tinned lead terminations must be wired directly into transmitter terminals (max 50 feet) **AST-DO-UNIVERSAL-CONVERTIBLE WITH PREAMP CONFIGURATION** * Integral Analog Conventional Preamplifier for low-noise operation and long cable runs * Standard tinned leads end of cable can be bridged in NEMA 4X waterproof J-box Assy * Optional waterproof NEMA 6P quick disconnect Q7M Snap Connector for ease of use * Up to 100 meters (330 feet) low-noise preamplified signal using Q7F snap extensions
Process Connections for Convertible Configuration:	¾" MNPT Front Threads for Screw-in Inline Installation (1.5" Std to 4.5" Max insertion) ¾" MNPT Rear Threads for Immersion Use or Submersible with Waterproofing Option
General Sensor Specifications:	
Operating Temperature Range:	-5 to +50 °C (+23 to +122 °F)
Operating Pressure Range:	Up to 200 bar submersion pressure; Inquire to factory for installation recommendations
Sensor Body Material: DO Measuring Cell Material:	RYTON® R-4-230BL (Poly-Phenylene-Sulfone, PPS) DELRIN® (Polyoxymethylene, POM)
External Dimensional Details:	See AST-DO-UNIVERSAL ¾"-¾" MNPT Inline / Immersion / Submersible Drawing
Galvanic DO Sensor Specifications:	
Measurement DO Range:	0 to 600% saturated dissolved oxygen (Typically corresponds to about 0 to 60 ppm)
Response Time:	Typically 10 to 20 seconds near ambient (response time is temperature dependent)
Resolution:	1% saturation absolute
Repeatbility:	Typically ±1% of actual measurement under the exact same conditions
Initial Impedance:	< 2 MΩ @ 25 °C for **AST-DO-UNIVERSAL WITHOUT PREAMP CONFIGURATION** < 2 KΩ @ 25 °C for **AST-DO-UNIVERSAL WITH PREAMPLIFIER CONFIGURATION**
Typical Response & Characteristics:	Output is typically about 10mV to 40mV dry in air; Slope is 1mV to 5mV per DO ppm depending on exact conditions determined from dry in air slope (span) only calibration
Some Selected Examples of Recommended Applications:	Industrial & mining abrasive slurries as well as any solution with high turbidity. Ideal for high sulfide containing media since the AST-DO-UNIVERSAL sensor is insensitive to hydrogen sulfide gas. Any measurement where rugged process conditions may exist.
Storage and Shelf Life:	Two (2) years from date of dispatch from factory stored in dry state (without electrolyte)



NOTES

1. All dimensions are in inches, unless otherwise indicated with tolerances as detailed below
2. Material of construction for sensor body is RYTON & galvanic DO cell is Polyoxymethylene (POM)
3. Drawing shown in the standard 1.50 inch insertion depth. At time of order insertion depth can be extended to a maximum of 3.50 inches upon request without incurring any additional charge. The overall sensor length would increase to 9.50 inches in this max insertion depth configuration.
4. High stability thick-membrnae dissolved oxygen (DO) galvanic cell is active sensing portion with response from ~1mV to ~5mV per ppm with a measurement range of 0-600% DO saturation.
5. Max cable for sensors WITHOUT preamplifier is ~15 meters (50 feet) shielded composite black cable (as shown above) mating with 3TX-DO module. Max cable for sensors WITH integral preamplifier is 100 meters (330 feet) using multiconductor cable. WITH preamplifier DO sensors support quick disconnect snap termination & interface with 3TX-DO-X transmitter.
6. Do not use any sensor beyond the factory defined maximum temperature, flow or pressure rating.

TOLERANCES	
1 Place: ± .1	3 Places: ± .005
2 Places: ± .01	4 Places: ± .0005
Angular: ± 0.25°	

DRAWN BY: RH
CHECKED BY: TADP
APPROVED BY: MJP

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

TITLE: 3/4"-3/4" MNPT Inline / Immersion / Submersible

SIZE	PROJECT	DRAWING NO.	REV
B	CONVERTIBLE	AST-DO-UNIVERSAL	/

SCALE Not to Scale | MODEL AST-DO-UNIVERSAL | SHEET 1 OF 1

Wiring of AST-DO-UNIVERSAL Galvanic Dissolved Oxygen (DO) Sensors for Inline, Immersion, Submersible & Sanitary Installation Schemes to ASTI 3TX-DO & 3TX-DO-X Dissolved Oxygen (DO) Transmitters

AST-DO-UNIVERSAL DISSOLVED OXYGEN SENSOR WITHOUT PREAMPLIFIER

ASTI Cable Color Coding	Instrument Terminal Value	3TX-DO Terminal Number
Red	(-) mV Signal Anode	1
Clear	(+) mV Signal Cathode	2
N/A	No Connection	3
Black	Pt100 / Pt1000	4
Black	Pt100 / Pt1000	5

AST-DO-UNIVERSAL DISSOLED OXYGEN SENSOR WITH PREAMPLIFIER

ASTI Cable Color Coding	Instrument Terminal Value	3TX-DO-X Terminal Number
Green	+5V Power (Green)	1
White	Dissolved Oxygen Sensor *mV Signal*	2
Black	-5V Power (Black)	3
Yellow	TC (Yellow)	4
Blue & Red	TC (Blue) & Common (Red)	5

Note 1: Depending upon the TC ordered it may be necessary to change the parameter 03 from Pt100 (default) to Pt1000 (selectable). The wiring is identical whether Pt100/Pt1000 are used.

Note 2: Mating galvanic dissolved oxygen sensor connected to the 3TX-DO transmitter must have internal temperature compensation. The temperature procured from the Pt100/Pt1000 element is only used for measurement of temperature, calibration of the sensor dry in air to 100% saturation condition and computation of the percent (%) saturation from DO ppm values.

Note 3: For the AST-DO-UNIVERSAL dissolved oxygen sensors with integral preamplifier for use with the 3TX-DO-X transmitters the cable can be bridged across any ordinary suitable terminal strip in a NEMA 4X enclosure and proper sealing cable glands (max 330 feet). The AST-DO-UNIVERSAL dissolved oxygen (DO) sensors without an integral preamplifiers must be connected directly to 3TX-DO transmitter input terminals (max 15 meters / 50 feet cable).

Membrane Replacement of AST-DO-UNIVERSAL Industrial Galvanic Dissolved Oxygen (DO) Sensor

IMPORTANT NOTE BEFORE CHANGING MEMBRANE!

The AST-DO-UNIVERSAL sensor should not be taken apart for service unless the membrane is damaged the response (slope) is significantly reduced by fouling or deposits on the membrane that cannot be cleaned off. This is typically only the case after some prolonged period of use or an exceedingly aggressive process condition during a shorter time.

PREPARATION FOR CHANGING MEMBRANE

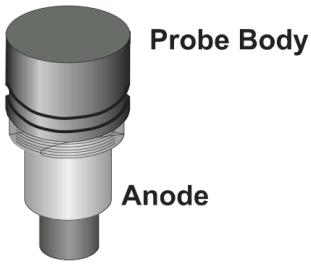
Unscrew the cap, rinse with water and clean the anode ONLY with a PLASTIC scouring pad.
→ NEVER USE A METAL SCOURING PAD ON THE ANODE!
If the cathode is tarnished it can be cleaned with a 600 grade wet-or-dry paper. → DO NOT POLISH THE CATHODE!

QUICK TEST

After the anode and (if necessary the cathode) was cleaned it is possible to perform a simple test to ensure the integrity of the sensor. Dry the top part of the sensor quite thoroughly, especially the cathode and the area surrounding it. Measure the output of the sensor when connected to the mating 3TX-DO or 3TX-DO-X dissolved oxygen transmitter. It should show zero ppm on the display. If your display does not read zero (or very near zero) contact factory for assistance.

MEMBRANE REPLACEMENT PROCEDURE:

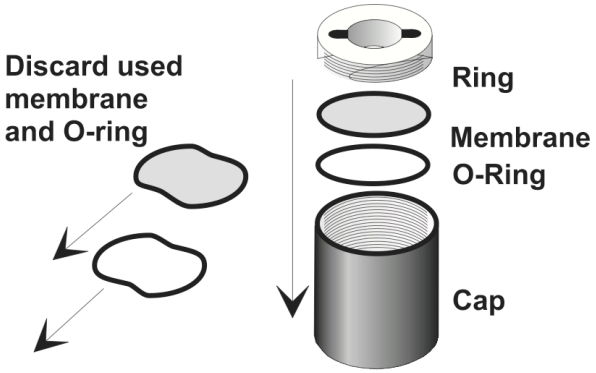
See drawing to right for all referenced components in instructions:



1. Use the tool provided to unscrew the ring the ring.
2. Remove the used membrane and O-ring.
3. Rinse the cap and ring. Dry both parts thoroughly.
4. Put a new O-ring in the bottom of the cap.
5. Put a membrane on top of the O-ring.
6. Replace ring and tighten it firmly with the supplied tool.

Precautions and Caveats:

- All parts must be clean & dry before performing procedure.
- Membrane must not be wrinkled before or after it is installed. If it is wrinkled it must be replaced with a new membrane.
- Fill the cap to the brim with electrolyte. Hold probe upright and slowly screw on cap until it completely flush. Some electrolyte solution may leak out of the cap during this step.
- Wait one hour before performing a calibration after changing the membrane. For best results calibrate again approximately 24 hours after membrane is changed as the galvanic DO cell will have reached full equilibrium by this point in time.



Spare Parts & Optional Fittings

UNIVERSAL-DO-HS-MB:	Set of 10 each thick high stability membrane with small O-rings
UNIVERSAL-DO-EL-125mL:	125ml Electrolyte (Internal Filling Solution to recharge sensor).
UNIVERSAL-DO-GUARD:	Protective guard threads onto ¾"MNPT threads of convertible sensor

Last Revised June 28, 2016