



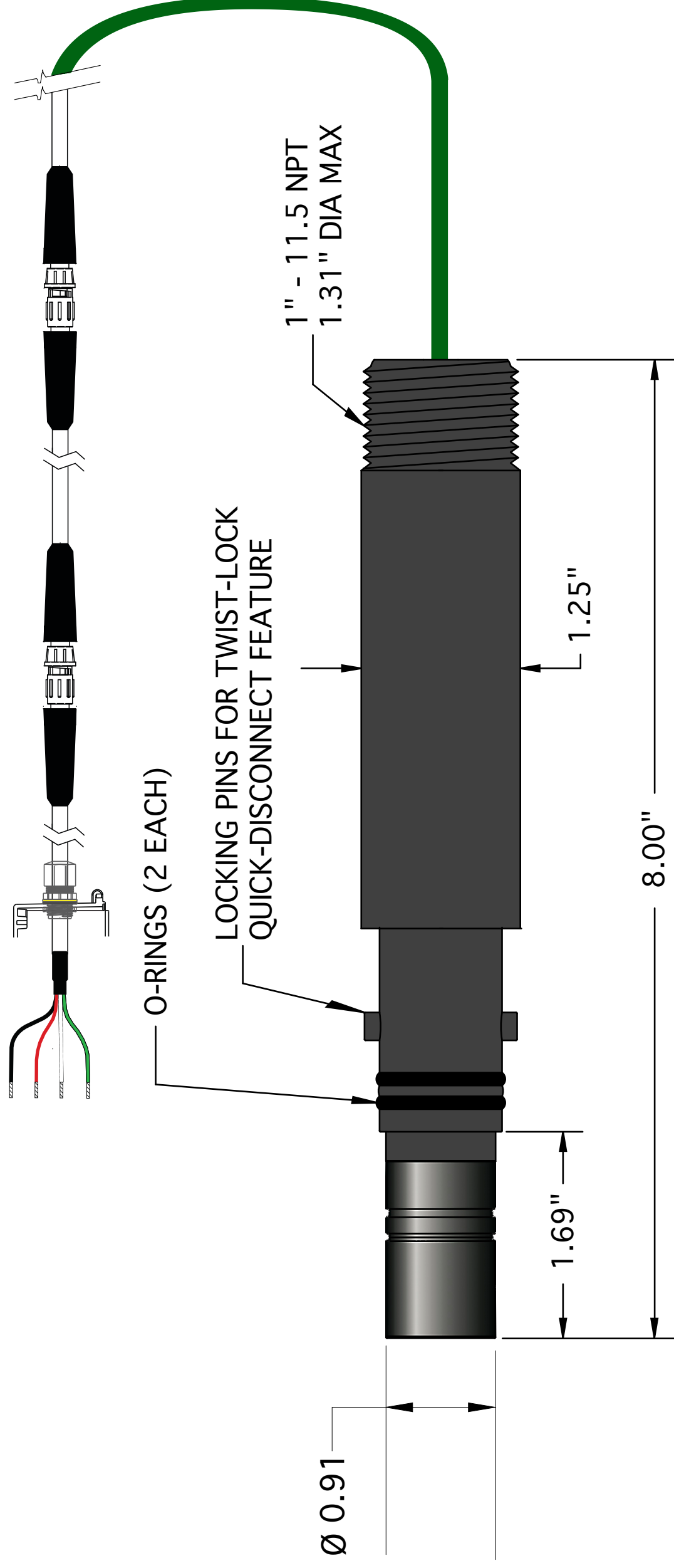
**AST-DO-UNIVERSAL-HIQDT SMART DIGITAL TWIST LOCK INDUSTRIAL DISSOLVED OXYGEN (D.O.) SENSOR WITH MODBUS RTU COMMUNICATIONS**

Special Features Highlighting Unique Technical Advantages:	<p><b>Unique Features highlighting technical advantages for industrial application use</b></p> <ul style="list-style-type: none"><li>- Thick-wall TEFLON membrane ensures very high stability, low-drift and high durability in aggressive industrial applications &amp; minimizes frequency of membrane replacement</li><li>- No special maintenance needed. Just wipe the membrane periodically as required</li><li>- 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</li><li>- 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</li><li>- The AST-DO-UNIVERSAL D.O. sensor is not sensitive to presence of hydrogen sulfide gas</li><li>- Temperature compensation is built-in &amp; performed automatically to ensure reliable readings</li></ul>
Description of Most Important Common Core Features:	<p><b>Rugged Industrial DO Sensor for Tough Inline Twist Lock Quick Disconnect Installs</b></p> <ul style="list-style-type: none"><li>- Inline insertion depth from 0.7 inches (standard) to 2.2 inches (extended insertion depth option)</li><li>- Ready for inline or immersion use standard, submersible with waterproofing option</li><li>- Waterproofing seal option is available for complete cable isolation for fully submersible installations &amp; applications employing field washdowns and/or moist &amp; humid conditions</li><li>- Integral Pt1000 temperature element used to compute the percent (%) saturation values</li></ul> <p>* Integral Smart Digital MODBUS RTU digital sensor board for low-noise operation and long cable runs as well as portability of field calibrations and configurations for plug &amp; play hot-swap</p> <p>* Fully automated calibration including corrections for air pressure and ambient temperature</p> <p>* Percent (%) Saturation computed with corrections for temperature, air pressure and salinity.</p> <p>* Special Calibration Percent (%) Saturation excludes salinity correction for dry in air condition</p> <p>* Waterproof &amp; Corrosion-Resistant NEMA 6P Quick Disconnect HiQ4M Snap Connector</p> <p>* Up to 1,000 meters (3,280 feet) total cable length using HiQ4F/HiQ4M snap extensions</p> <p>* Smart Digital HiQDT MODBUS RTU configuration has 6 meters (20 feet) of cable standard, Max integral cable length 23 meters (75 feet) cable (longer lengths possible as special orders)</p> <p>* Fully submersible up to max 15 meters (50 feet) without use of an immersion rod (standpipe)</p> <p>* Min and Max temp in use plus time since last calibration analytics stored. The total time in use, sensor item number, sensor serial number including year and month of manufacture also stored integral to sensor to support remote troubleshooting with all data portable inside sensor.</p> <p>* Modbus implementation guide gives details for programming PLC or data acquisition device</p>
Features for smart digital HiQDT MODBUS RTU configuration in addition to common core features	
Process Connections for Convertible Configuration:	1" MNPT Front Threads for Twist Lock Inline Use (0.7" Std to 2.2" Extended Max insertion config) 1" MNPT Rear Threads for Immersion Use or Submersible Use with Waterproofing Option
<u>General Sensor Specifications:</u>	
Operating Temperature Range:	-5 to +65 °C (+23 to +149 °F)
Operating Pressure Range:	Up to 200 bar submersion pressure; Inquire to factory for installation recommendations
Sensor Body Material:	RYTON® R-4-230BL (Poly-Phenylene-Sulfone, PPS)
DO Measuring Cell Material:	DELTRIN® (Polyoxymethylene, POM)
External Dimensional Details:	See AST-DO-UNIVERSAL-HIQDT Smart Digital 1" MNPT Twist Lock D.O. Sensor Drawing
<u>Galvanic DO Sensor Specifications:</u>	
Measurement D.O. Range:	0.00 to 150.00 ppm and Percent Saturation from 0.0 to 1,500.0 % (0.01pm & 0.1% Resolution)
Response Time:	Typically 10 to 20 seconds near ambient (response time is temperature dependent)
Resolution:	1% saturation absolute
Repeatibility:	Typically ±1% of actual measurement under the exact same conditions
Typical Response & Characteristics:	Typical 10mV to 40mV dry in air; Typical Slope is between 0.7mV to 3.0mV per D.O. ppm
Electrical Specifications:	Max 20mA current draw at 7VDC to 13VDC (Typical 15mA power consumption)
<u>Some Selected Examples of Recommended Applications:</u>	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 (H <sub>2</sub> S) gas. Any field measurement where rugged process conditions may exist.
<u>Storage and Shelf Life:</u>	Two (2) years from date of dispatch from factory stored in dry state (without electrolyte)

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#### NOTES

- All dimensions are in inches, unless otherwise indicated with tolerances as detailed below
- Material of construction for sensor body is RYTON & galvanic DO cell is Polyoxymethylene (POM)
- Drawing shown in the standard inch insertion depth of 0.70 inches past start of 1" MNPT threads on twist lock receptacle. Extended insertion depth of 2.20 inches past start of 1" MNPT threads on twist lock receptacle available upon request. Please see alternate drawing for extended insertion depth configuration for dimensional details.
- High stability thick-membrane dissolved oxygen (DO) self-powered galvanic cell with typical response of ~1 to 2 mV per DO ppm with a measurement range of 0 to 150 ppm (0 to 1,500 Percent % Saturation)
- Smart digital HiQDT MODBUS RTU configuration use waterproof HiQ4M quick disconnect snap connector. 20 feet (6m) integral cable is standard. Extended integral cable lengths up to 75 feet (23m) available. Extension cables can achieve desired total cable lengths up to a Maximum of 1,000 meters (3,200 feet).
- Do not use any sensor beyond the factory defined maximum temperature, flow or pressure rating.

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

TITLE		Twist Lock Smart Digital MODBUS D.O. SENSOR	
SIZE	PROJECT	DRAWING NO.	REV
B	TL-DO-HiQDT	AST-DO-TL-HiQDT-STD	/
SCALE	Not to Scale	MODEL	AST-DO-UNIVERSAL-HiQDT
		SHEET	1 OF 1

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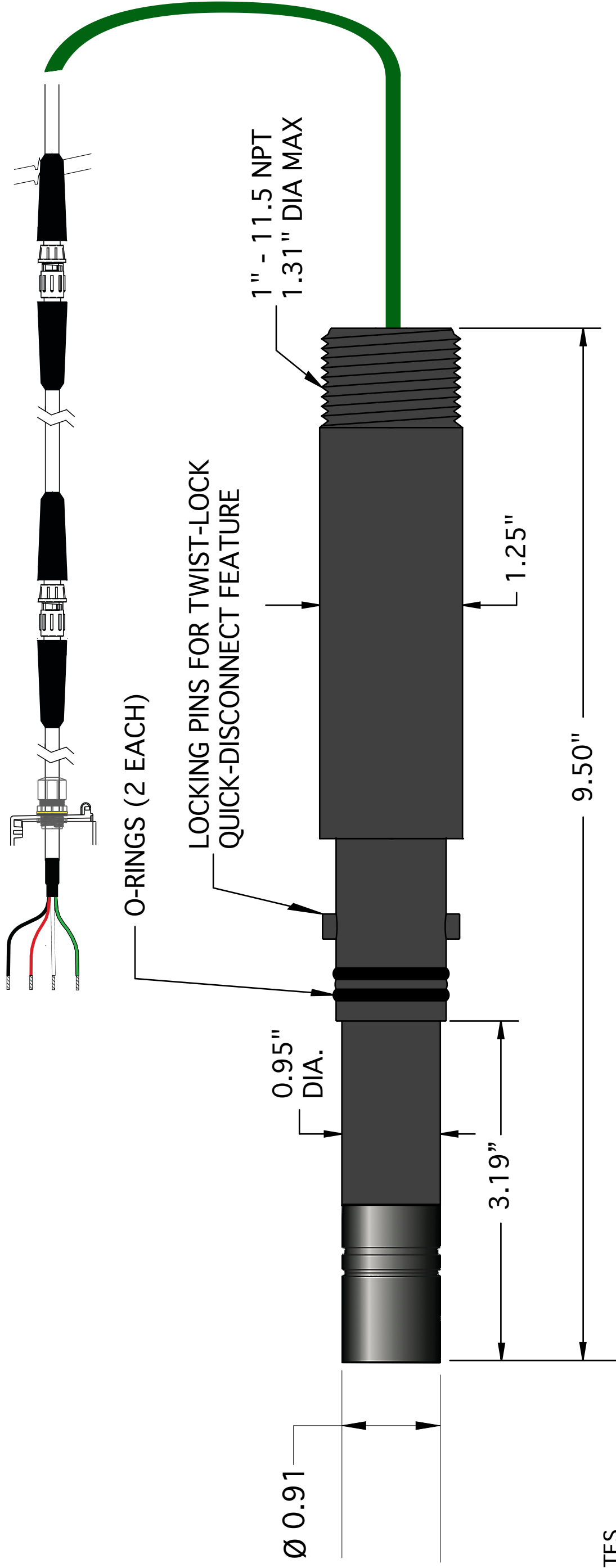
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#### NOTES

- All dimensions are in inches, unless otherwise indicated with tolerances as detailed below
- Material of construction for sensor body is RYTON & galvanic DO cell is Polyoxymethylene (POM)
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SIZE	PROJECT	DRAWING NO.	REV
B	TL-DO-HiQDT	AST-DO-TL-HiQDT-EXT	/
SCALE	Not to Scale	MODEL	AST-DO-UNIVERSAL-HiQDT
		SHEET	1 OF 1

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## 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.

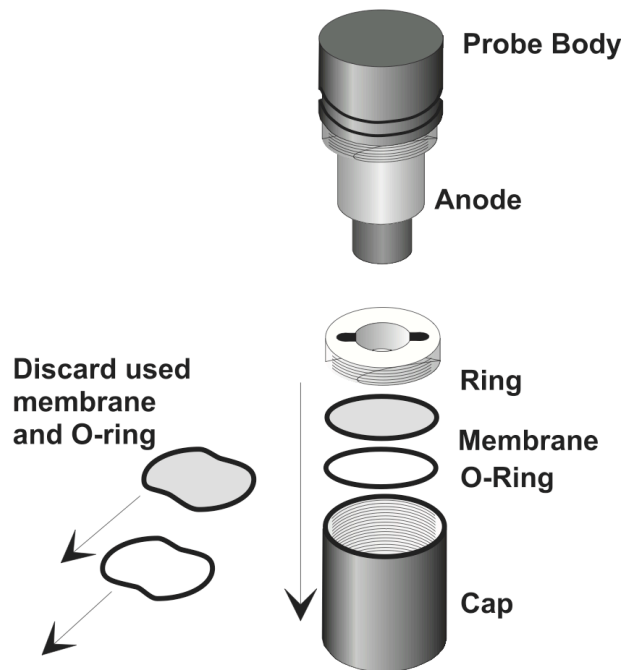
### MEMBRANE REPLACEMENT PROCEDURE:

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 3/4"MNPT threads of convertible sensor

*Last Revised June 28, 2016*