

This instruction manual provides information for the correct installation and use of Turtle Tough pH/ORP sensors to ensure you get the maximum life and performance from your sensor.

All Turtle Tough pH/ORP sensors utilise a solid-state conductive reference junction. With this technology we are able to achieve accurate measurement while resisting process contamination into the reference system. This ability to maintain high ionic conductivity while resisting aggressive gas intrusion is what makes our sensors outlast virtually all others in any process conditions.

Your Turtle Tough sensor is built with our unique and proprietary glass formulations and sensing elements to provide extreme performance in harsh environments. Through our experience in the world's toughest applications we have developed sensors that have been optimised for high hydrofluoric acid, saturated sodium, high sulphide, organic solvents, high temperature and slurry/viscous applications.

Our application specific sensors include Industrial, Waste Water, Acid Etching, Nickel, Gold, Titanium Dioxide, Food & Beverage and Pharmaceutical.

Please ensure that the model you are using is suitable for your intended application. Locate your specific sensor in the sensor selection matrix, which can be found at www.turtletough.com.au/support/sensor-selection-guides



Installation

The installation and commissioning of this sensor is crucial to its safe and effective operation. This sensor must only be used for its purpose as outlined in this manual. It must be installed and commissioned in accordance with this manual and by trained, qualified personnel.



Site Selection

Please choose a suitable location for the installation of the sensor. The choice of installation point on any site is a compromise and is best undertaken by an experienced installation engineer. The following factors need to be taken into consideration.

This list is not intended as a check-list neither is it implied that the list is complete.

- Ensure that the sensor is positioned to ensure adequate flow.
- Avoid installing the sensor within 1m of any dosing point.
- Minimise all potential sources of electrical interference.
- Static & Ground Loop Faults can damage the sensor or cause erroneous readings and all precautions should be taken to avoid them.

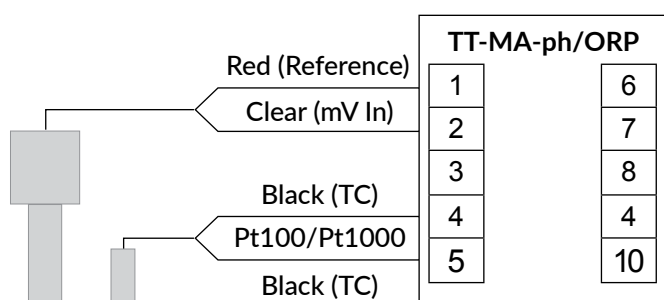


Unpacking

Please have a copy of your order with you when you unpack your instrument. All orders are checked when they leave the factory. Please check that you have all the parts that were ordered as soon as you open the box. If anything is missing, or damaged, please contact your sales outlet immediately. If the instrument needs to be returned for any reason please follow the return instructions given in this manual.

Wiring

Turtle Tough pH/ORP sensors are designed to provide optimal life when connected to a TT-MA Online Analyser or TT-PHP Portable Meter. Connection to the TT-pHP is via BNC and banana plug connectors. Wiring of non-preamp to the TT-MA is as follows:



See full manual for other connections such as external pre-amp.



Mounting

A Turtle Tough pH/ORP sensor has been engineered for installation into industrial processes. Use within the specifications is highly recommended to obtain optimal sensor life.

Care should be taken to avoid any moisture ingress through the cable inlet/outlet.

pH Sensors are optimally installed at 45° as this avoids air bubbles being trapped at the sensor/process interface and ensures optimal glass/silver-chloride interaction. They should never be installed horizontally or inverted.

All pH/ORP sensors can be installed in-line. Submersible installation is also possible provided adequate waterproofing is selected at time of order or adequate sealing is made between the sensor and immersion rod/tube at time of installation for example.

Turtle Tough has a range of installation hardware available as optional accessories including but not limited to KYNAR/PEEK Twist lock fittings, Stainless Steel Immersion Rods, Stainless Steel Sanitary Sensor Holders & Extension Tubes and Valve Retractable Assemblies. Contact your Turtle Tough Distributor for technical support on the optimal installation hardware to suit your application.

Please Note: Avoid excessive force for those pH/ORP sensors fitted with Spanner Flats

Sensor Maintenance

Maintenance Free

Turtle Tough pH and ORP sensors are a completely sealed assembly and are sealed for life.

This provides extreme process resistance as well as a totally maintenance free sensor which greatly increases sensor life and reduces labour costs.

A Turtle Tough sensor does not contain any O-rings, washers, gaskets, or serviceable components/assemblies. It does not require refreshing or refilling of electrolyte. The only requirement is regular cleaning in accordance with our recommended cleaning schedule for your application.



REGULAR CLEANING WILL PROLONG THE LIFE OF YOUR SENSOR AND ENSURE HASSLE FREE OPERATION.

Cleaning

Cleaning requirements will vary depending on the application for which the sensor is used. The following should always be observed when cleaning:

Never scratch or aggressively scrub the pH or ORP (sensing) elements.

These are delicate glass electrochemical electrodes. They can be easily broken by mechanical force. The reference junction is a solid state material and can be cleaned with aggressive chemicals. See list below of recommended cleaning solutions. 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.

Avoiding Thermal Shock

For high temperature applications where process liquid exceeds 70°C you will prolong the life of the sensor by avoiding thermal shock. Thermal shock occurs when you rapidly change the temperature of the sensor from hot to cold or vice versa. This rapid expansion/contraction of sensor components can damage internal elements and cause micro-cracking that will accelerate the rate of deterioration. In extreme cases it will crack the sensing element causing a total failure. To avoid this sensor should be heated or cooled slowly during removal/insertion and cleaning and calibration processes. Consult your Turtle Tough representative for techniques to avoid thermal shock.

Cleaning a Turtle Tough pH/ORP Sensor

Recommended Cleaning Schedule

The recommended cleaning interval is based upon the difficulty index for your application. Please contact your agent or refer to the website to identify your difficulty rating.

Application Difficulty Rating	Cleaning Schedule
1-3	Monthly
4-6	Fortnightly
6-7	Weekly
8-9	Twice (2x) per week
10	Daily

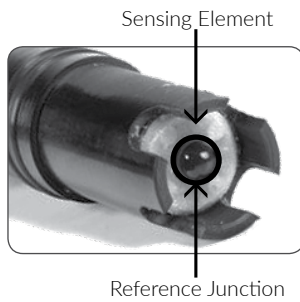
If a Turtle Tough pH/ORP sensor response slows down, it is most likely the result of a fouled reference or dirty coated glass. Cleaning should be performed as required and will vary across applications.

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 contact your local Turtle Tough representative if you plan to use any other cleaning agent

Turtle Tough pH Sensor



Storage

The standard shelf life for all Turtle Tough 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 (sensing element) 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 PVC 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.

Avoiding Thermal Shock

For high temperature applications where process liquid exceeds 70°C you will prolong the life of the sensor by avoiding thermal shock. Thermal shock occurs when you rapidly change the temperature of the sensor from hot to cold or vice versa. This rapid expansion/contraction of sensor components can damage internal elements and cause micro-cracking that will accelerate the rate of deterioration. In extreme cases it will crack the sensing element causing a total failure. To avoid this sensor should be heated or cooled slowly during removal/insertion and cleaning and calibration processes. Consult your Turtle Tough representative for techniques to avoid thermal shock.

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 precondition the pH and reference elements. Some sensors will also require 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 Warranty

Turtle Tough sensors are electrochemical devices and as such have a limited operating life. Life expectancy depends on the field of application such as the medium, pressure and temperature. It can vary between a number of weeks to several years. There are special cases in extreme environments where operating life will only be a few days. Characteristic and response time will also change with aging.

As such electrochemical sensor are articles of consumption and are not subject to a common guarantee. Replacements or exchanges are generally excluded unless a manufacturing defect is determined to be the cause.

It is not possible to predict the rate of deterioration for a particular process, nor can we provide a guarantee on sensor life because it is impossible to predict the rate of exposure, contamination and deterioration.

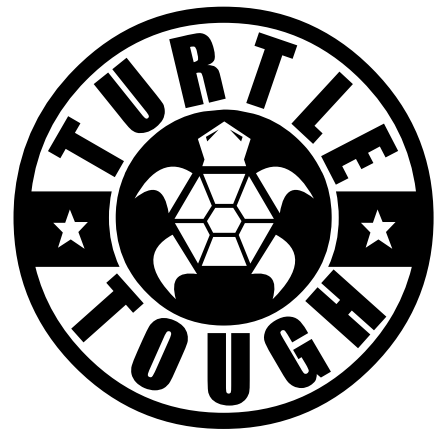
Damage caused by wear and tear, inadequate maintenance, corrosion, or by the effects of chemical processes is excluded from this warranty coverage.

Our agents or representatives may provide you with a life expectancy guide based on similar applications we have experienced; however this in no way constitutes a warranty of performance and is a general indicator.

Shelf Life Warranty

The standard shelf life for a Turtle Tough Sensor sensors is 1 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 pH/ORP/ISE 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 period of time is required.



Congratulations on purchasing a Turtle Tough sensor.

Turtle Tough sensors are handmade with care and precision, combining state-of-the art technology and materials to deliver superior performance under extreme conditions.

Turtle Tough Pty Ltd

12/634-644 Mitcham Road,
Vermont, VIC, 3133, Australia
Contact us: +61 3 8846 2900

turtletoughsensors.com

Precautions

BLOWN PREAMPLIFIERS (Preamps):

Damaged preamplifiers are not covered under warranty.

Preamps are electrical devices that are sensitive to electrostatic discharge. Sensors with preamps are clearly marked and extra care must be taken when handling these sensors as human contact with the electrical connections can discharge static to the preamplifier causing it to blow. This will render the product inoperable.

Sensors with preamplifiers undergo additional quality checks prior to shipment to ensure that preamplifiers are 100% operational upon delivery. Ground loop or analyser problems may also cause blown preamplifiers and damage to sensors by faulty installations is not covered by warranty.

IMPORTANT!

Please note that for sensors, cables must NOT be cut or this will void the warranty. The cable contains a unique identifier laminated to the cable end, and if this is removed we have no way of tracing the product. Sensors dying or expiring in the course of use is not covered by the product warranty.

For Technical Support please contact our head office **+61 3 8846 2900** or visit our website **www.turtletoughsensors.com** for information on sensor care, calibration, wiring and installation related issues.

Return Instructions

Please contact a member of our team prior to returning your sensor by calling **+61 3 8846 2900** or email **info@turtletoughsensors.com**

All sensor returns are to be accompanied by a completed Return Material Authorisation Document clearly stating the reason for the return and the with the Clean Statement Return filled in.

See the Return Goods section of your manual for further details.

All returns to be sent to:

Attention: Quality & Calibration Workshop Turtle Tough

12/634-644 Mitcham Road
Vermont, VIC 3133 Australia

