3TX Transmitter for Analog pH, ORP, ISE, Conductivity & Dissolved Oxygen Sensors

Key Features of 3TX Measuring Modules

Triple Channel Nitrate, pH & Conductivity Transmitter
3TX-3MF-ISE-NO3-D-pH-D-CON-1.0/50-D-PS

Triple Channel Total Ammonia, pH & Conductivity Transmitter
3TX-4M-ISE-NH4-A-pH-A-TOT-CON-1.0/50-A

Single Channel pH Controller
3TX-2M-pH-A-REL

Single Channel Contacting Conductivity Transmitter
3TX-2M-CON-2.0/200-A-PS

Six Channel pH/ORP/ISE/Conductivity Assembly
3TX-6MW-CON-ISE-REL-pH-ORP-ISE-PS

Seven Channel pH/ORP/ISE/Conductivity Assembly
3TX-7MF-ISE-CON-ISE-REL-pH-ORP-ISE-PS

Single Channel Contacting Conductivity Transmitter
1/2-DIN Panel Mount 3MP Enclosure Assembly
Supports Max Three (3) Modules/Channels
3TX-3MP-CON-2.0/200-A-PS

Quad channel transmitter assembly in NEMA 4X rated 5MF enclosure. For measurement of pH with smart digital sensors and for measurement ion selective, dissolved oxygen and conductivity parameters with analog sensors. Any mix of smart digital and analog sensors can be used with the 3TX-HiQ & 3TX transmitter platforms, respectively.

Sensor Hookup Schematics:

pH, ORP & ISE Sensors WITHOUT Preamplifiers used with 3TX-pH & 3TX-ISE

Dual pH/ORP All-In-One “PtD” style sensors connected to two each 3TX-pH transmitters

pH, ORP & ISE Sensors WITH Preamplifiers used with 3TX-pH-X & 3TX-ISE-X

pH, ORP & ISE Sensors WITH Preamplifiers & Q7M/Q7F Quick Disconnect Snap Connector System used with 3TX-pH-X & 3TX-ISE-X

pH, ORP & ISE Sensors Without Preamplifiers used with External Preamplifiers to mate with 3TX-pH-X & 3TX-ISE-X

Mini External Preamplifier Specification Sheet

Extended cable length options for pH/ORP/ISE installations with 3TX transmitters

Conductivity Sensors used with 3TX-CON

AST-DO-UNIVERSAL Galvanic Dissolved Oxygen Sensors used with 3TX-DO (without preamp) & 3TX-DO-X (with preamp)

AST-DO & AST-DO-T Galvanic Dissolved Oxygen Sensors used with 3TX-DO(-T)

The 3TX Family of Transmitters for Measurement, Control, and Datalogging of Ion Selective (ISE), pH, ORP, Dissolved Oxygen, Conductivity and Temperature Process Parameters.

The modular components of the 3TX series provide the flexibility to meet your application needs in a cost-effective way:

- **Custom configurations** offer the freedom to only pay for the specific modules you need
- **Select any combination of measurements** that you need: pH, ORP, dissolved oxygen (DO), conductivity, ion selective (ISE) and temperature
- **Select the number of measurement channels** in the field assembly, from a single channel up to seven (7) channels
- Enjoy the flexibility to **add complementary modules either at initial installation or at a later time** without decommissioning the original analyzer assembly, including temperature transmitters (3TX-TEM), controllers (3TX-REL), dataloggers (3TX-DAT), pH compensation for ISE modules including MODbus converter for all inputs (3TX-TOT) and universal AC power supply
- For 3TX transmitters for use with smart digital pH & ORP sensors please visit the separate 3TX-HiQ product webpage. The 3TX-HiQ transmitters connected to smart digital pH & ORP sensors can be combined with the 3TX transmitters for use with analog pH, ORP, ion selective, dissolved oxygen and conductivity sensors for any field package assembly.

To learn more about how the flexible 3TX series can be tailored to fit the needs of your application, please contact us

All modules in the 3TX series share these features and options:

- **Easy-to-read displays**: Bright three-digit LED displays are visible even in bright sunlight and do not suffer from the common problems associated with LCD displays, such as environmental fatigue and wear.
- **Easy to use**: Simple and intuitive three-button operation with no complex codes to memorize for most day-to-day tasks.
- **Easy installation**: Enclosures are customized for your modules and arrive ready for field mounting on any wall with no additional specialized hardware required. Modules are also available individually in a small, 35mm DIN-rail mountable form factor for direct integration into OEM equipment.
- **Galvanic isolation** between all inputs, power & analog output (3000V rating)
- **Weatherproof**: NEMA 4X CSA/UL rated & IP65 enclosures include high quality sealing cable glands (a.k.a. strain reliefs) that are ideal for weatherproof sealing on sensor, power, and output cables. Waterproof caps are also provided at no additional cost for all cable glands to seal and weatherproof any channels that

will not be used.

- **Certifications**: CE approved for use in safe, non-hazardous areas (Class I, Division II or above – a.k.a. Zone 1 or above).
- **Security**: Optional lock available for enclosure assembly to restrict access to selected keyholders.
- **Power supply options**: Choose our CSA/UL/CE approved universal 100 to 240 VAC 50/60 Hz power supply module for line powered operation, or you may use any module with a 3-wire 24VDC powered operation if you already have a dedicated 24VDC power supply (i.e. not shared with other equipment) available onsite.
- **Option to customize default values**: Each module can be preset with your own preferred defaults for all user parameters at no additional cost (minimum order quantities may apply). This allows for your own customized transmitter configuration to be restored in the field using the reset all parameters function that is implemented on all 3TX modules.
- **1/2-DIN Panel & Pipe mounting option:** A universal two-inch (2”) NPT pipe mounting kit is available for all 3TX enclosure options. The 3MP enclosure can be installed into any standard ½-DIN panel cutout. All enclosures are ready for wall mounting standard without any additional special hardware.
- **Factory Statement of Warranty for 3TX Transmitters**: Please review before making any purchase and inquire to factory with questions if necessary.

Download the **common mechanical, electrical and dimensional details for all 3TX transmitter supplied in the base 35mm DIN-RAIL configuration**

Download the **dimensional drawings for the weatherproof 2M, 4M & 6M IP65 enclosures and pipe mounting kit**

Download the **dimensional drawings for the NEMA 4X CSA/UL listed 3MP 1/2-DIN panel mounting enclosure assembly**

Download the **dimensional drawings for the NEMA 4X CSA/UL listed 3MF field wall & pipe mounting enclosure assembly**

Download the **dimensional drawings for the NEMA 4X CSA/UL listed 5MF field wall & pipe mounting enclosure assembly**

Download the **dimensional drawings for the NEMA 4X CSA/UL listed 7MF field wall & pipe mounting enclosure assembly**

3TX Measurement Modules

- Measurement modules are available for pH, ORP, mV, temperature, ion selective (ISE), dissolved oxygen and conductivity.
- Scalable 4-20mA analog output is standard for all measurement modules, with optional MODbus digital output available at a nominal surcharge. Precise factory-

calibrated linear analog output allows excellent use in control applications. All analog outputs have built-in trim calibration support, including both offset and span adjustments.

- **Hold feature is standard for all versions of the measurement modules** for pH, ORP, ion selective (ISE), dissolved oxygen (DO) and conductivity parameters. When calibration mode is entered, the last value from measurement mode will be held for both the 4-20mA analog output as well as the MODbus output(s).

- Calibration of temperature compensation element is available for all measurement modules.

- Active 4-20mA can support remote external displays to allow for viewing measured values in control panels, secondary field locations, or instrumentation shops.
    - An example of how to connect a single 4-20mA output to multiple devices is provided in **this drawing**

- Although all of the 3TX transmitters are 3-wire devices they can be powered with installations that are designed for 2-wire loop-powered devices by using the following **2-wire to 3-wire installation scheme**. Please review the **3TX FAQ** for the typical 3-wire power and output installation scheme for the 3TX modules.

- **ISE measurement module (3TX-ISE & 3TX-ISE-kilo):**
    - 3TX-ISE module displays, calibrates and outputs in ppm units. The 3TX-ISE-kilo module displays, calibrates and outputs in kilo-ppm units. The kilo-ppm units operates in thousands of ppm. For example, 3.45 kilo-ppm is equivalent to 3,450 ppm. The kilo-ppm modules come standard with both the analog 4-20mA output and RS-485 MODBUS RTU digital output. Both the 3TX-ISE or 3TX-ISE-kilo modules are compatible with the 3TX-REL controller module, 3TX-TOT pH compensation module and 3TX-DAT field MODbus datalogging module as well as the Windows Datalogging software. Whether the input source for these mating modules is the 3TX-ISE operating in ppm units or else the 3TX-ISE-kilo operating in kilo-ppm units needs to well documented in the installation notes to ensure that the units are systematic throughout all of the measurement, datalogging and control equipment.

    - Measures any ion, including common applications such as Ammonium (NH4+), Calcium (Ca++), Sodium (Na+), Lithium (Li+), Fluoride (F-), Chloride (Cl-), Nitrate (NO3-) and Cyanide (CN-) amongst many others. The type of ISE measurement to be performed must be preset at the factory and so must be defined at time of order.

    - The standard 3TX-ISE transmitter supports and requires directly interfacing ion selective sensors without preamplifiers. In addition, the 3TX-ISE-X hardware version supports and requires ion selective sensors with preamplifiers to enable installations that require long cable lengths or to operate in very high interference areas. The software, features and functionality is perfectly identical for both hardware versions.

    - When the 3TX-ISE is combined with the 3TX-TOT and 3TX-pH modules, it can provide continuous inline field measurement of total ammonia (NH_3-N), total fluoride (HF), total cyanide (HCN) or total sulfide (H_2S) parameters without the use of any reagents within the permissible pH & temperature ranges.

- **Contacting Conductivity measurement module (3TX-CON):**
  - The 3TX-CON module supports most any cell constant (K), including but not limited to 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0, 3.0, 5.0, 10.0 & 20.0. Effective calibrated cell constants are supported from K=0.005/cm all the way up to K=34.0/cm and anywhere in between.
  - Transmitter conductivity range for the selected cell constant is optimized for your application use for best resolution and performance. Support for low ranges down to 0-5 microSiemens for very clean water RO type samples and all the way up to 0-1,000 milliSiemens as required for strong acids, bases and electrolyte solutions.
  - Zero calibration for true 0.00 reading with your sensor dry in air.
  - Precise and wide-range gain calibration allows for effective (a.k.a. apparent) cell constant to be +/- 70% of the nominal sensor value.
  - Automatic correction for the resistance and capacitance contribution of the cable length to the measurement for any sensor wire gauge and distance.
  - Download the supplement for the high resolution MODbus output **3TX-CON-E** version to allow your control system to make use of the full capabilities of our 3TX-CON contacting conductivity transmitters throughout the entirety of the working range, available for any cell constant.
  - Download the supplement for the special **3TX-CON-F** version which is optimized for accurate temperature compensation in situations where you need to measure the conductivity in both the positive and negative temperature conditions. This is accomplished by means of supporting multiple adjustable temperature compensation coefficients; one coefficient is used in the above zero (0°C) condition while another is used in the below zero (0°C) condition. The supported temperature range for the 3TX-CON-F transmitter is -40°C to +210°C.
  - Download the the **best practice guide for installation and calibration of contacting conductivity sensors with the 3TX-CON contacting conductivity transmitters**

- **pH/ORP measurement module (3TX-pH):**
  - The 3TX-pH pH/ORP/mV/Temp transmitter allows for precise sensor calibration with support for 2- and 3-point slope calibrations. This means that a precise acid slope (pH below 7) and a precise alkaline slope (pH above 7) is possible for optimal accuracy anywhere in the measurement range. One-point offset calibrations are possible at any pH value to allow for agreement with laboratory analysis.
  - The standard 3TX-pH transmitter supports and requires directly interfacing pH or ORP sensors without preamplifiers. In addition, the 3TX-pH-X hardware version supports and requires pH or ORP sensors with preamplifiers to enable installations that require long cable lengths or to operate in very high interference areas. The software, features and functionality is perfectly identical for both hardware versions.
    - Download the the **best practice guide for installation and calibration of ASTI pH sensors with the 3TX pH transmitters**

- **Dissolved Oxygen (DO) measurement module (3TX-DO):**
    - 3TX-DO module displays and outputs the concentration of dissolved oxygen in ppm, % saturation units, as well as the process temperature
    - Automatic correction for temperature, pressure and salinity for calibration and % saturation measurement modes
    - A simple gain calibration procedure is done with sensor dry in air after the reading and temperature are stabilized. The convenient automatic or manual mode gain calibration allows adjustment of the sensor slope (mV per ppm DO) to the correct value based upon pre-programmed 100% DO saturation at that temperature & pressure. No look-up tables are ever needed to calibrate the mating galvanic dissolved oxygen sensor in the field using the 3TX-DO.
        - No “Zero” calibration is ever needed for galvanic type dissolved oxygen (DO) sensors as they have a true zero potential.
    - The 3TX-DO module supports most any galvanic dissolved oxygen type sensor that is self temperature compensating (internal without integrated TC element required for this correction). A typical suitable galvanic DO sensor for use with the 3TX-DO is shown on the **dissolved oxygen sensors page**.
        - Download the **complete dissolved oxygen transmitter and sensor package**.

Temperature Module (3TX-TEM)

- 3TX-TEM is a module to add a scalable analog output for Temperature to any 3TX-pH, 3TX-ISE, 3TX-CON or 3TX-DO measurement module. This optional module can be used to add a temperature output at any time before or after commissioning.
- Input for temperature measurement can be Pt100 or Pt1000 type TC element integrated inside the sensor or else a separate temperature probe.
- Special hardware & software allows a single Pt100/Pt1000 element to be used both as input for a 3TX measurement module and a 3TX-TEM temperature transmitter. This configuration is referred to as “spliced” input mode and is the default.
- Any pH, ORP, ISE, conductivity or DO sensor with integral Pt100 or Pt1000 TC when in “splice” input mode will be used both for temperature compensation on the measurement module and to send a scalable output for temperature from the 3TX-TEM temperature module
- Direct wiring from separate (rather than shared) Pt100 or Pt1000 temperature elements is also supported. This configuration is referred to as “raw” input mode. In “raw” mode automatic correction for the resistance due to the cable is performed from user entered values for the wire gauge and cable length.
- Displays Temperature (°C) and raw Ohms from connected Pt100/Pt1000 element.
- Offset and gain (span) calibration types supported in both “splice” and “raw” modes for precise temperature measurement.
- Full range 0-210°C with a resolution of 0.2°C, Scalable 0-20mA or 4-20mA analog output type is selectable.

- Download the **3TX-TEM Temperature transmitter specification sheet and manual**.

Control Module (3TX-REL)

- Each 3TX-REL module has 2 each independent Single-Pole Single-Throw (SPST) 5 Amp contact relays.
- Each relay is fully configurable by the user as to control mode and variables for each control algorithm.
- Tight integration between 3TX alarm & relay controller and 3TX measurement modules software makes configuration and scaling simple & easy for any local control requirements of the pH, ORP, ion selective (ISE), dissolved oxygen (DO) or conductivity parameters. Find below a very useful configuration guide for setup of the REL module with any of the 3TX measurement modules:
  - Download the **3TX-REL analog input configuration guide (R10 or later software versions)**
- The 3TX-REL alarm and relay controller module includes both basic and more sophisticated controlling options, including all of the following modes:
  - 1) A simple supervision option for alarm functionality only;
  - 2) An On/Off control with a user-configurable deadband (a.k.a. hysteresis);
  - 3) Time proportional control (TPC); and,
  - 4) Proportional frequency control (PFC, a.k.a. variable pulse controller).

Download the **alternate wiring schematic for 3TX-REL module** when analog 0/4-20mA output from 3TX-pH, 3TX-ISE, 3TX-DO or 3TX-CON measurement transmitter is to be connected to other data acquisition or control device prior to connection with 3TX-REL alarm/relay module. Standard wiring for when the analog output from measurement transmitter is connected directly to the 3TX-REL is contained in the respective measurement module specification sheet.

Datalogging Module (3TX-DAT) and MODbus Option

- **MODbus**: If you would like to have MODbus digital output for your application, there are two different approaches available:
  - 1: **Order measurement modules with MODbus option included**. Although this is a very cost-effective option, please note that it is no longer an option after the module leaves the factory without MODbus.
  - 2: **Add a 3TX-TOT module to convert from analog to MODbus output.** Unlike the first approach, this flexible option may be selected either at the time of initial installation or at any time thereafter. The 3TX-TOT module also has additional functionality, as detailed in the section below.
- **Datalogging**: For datalogging functionality, there are also two different approaches and a third alternate possibility:
  - 1: If you have opted for MODbus output using either of the approaches

described above, you may **use a free of charge optional Windows PC software interface kit to the MODbus digital output**. This allows for real time display of all values for all transmitters that are wired to that MODbus line. In addition, the software kit allows for datalogging for all transmitters connected on the line, including both the scaled output value and temperature for each measurement module. Up to 247 devices can be supported on a single MODbus digital line (2-wire cable), and long cable length can be supported for field installations up to 6500 feet (1.23 miles or 1.98 kilometers) to make viewing in the instrument shop practical and easy.

- Find below a link to the installation and user manual for the **free of charge Windows PC datalogging and graphing software** described above for use with 3TX transmitters with the optional MODbus RS-485 digital output (Revision 2.5):
  - **Manual for ASTI Windows Datalogging and Graphing Software for 3TX Transmitters with MODbus**

- 2: Alternatively, you may **add a 3TX-DAT module**. The 3TX-DAT module allows for datalogging of up to 63 each MODbus digital inputs from any mix of 3TX-pH, 3TX-ISE, 3TX-CON, 3TX-DO and 3TX-TOT modules as input nodes . The sampling rate is fully configurable from once per second to once per hour, although all nodes must have the same sampling rate. With 8MB onboard flash memory standard there is a quite extensive datalogging capacity. Configuration of the 3TX-DAT is accomplished via the free of charge Windows datalogging and graphing software for 3TX transmitters with MODbus and uploaded & downloaded using the separate Windows software for 3TX-DAT. The 3TX-DAT unit can be supplied pre-configured from the ASTI factory upon request without additional charge. The logged data is downloaded to a PC or tablet for further workup, with graphing and analysis also via the Windows software. The 3TX-DAT can be added at any time after commissioning if datalogging should become a requirement provided that the mating measurement module(s) have the MODbus output option and sufficient room has been left in the ASTI supplied or customer provided enclosure assembly.

- Find below a link to the installation and user manual for the **free of charge Windows PC DAT Configuration & Download software** described above for use with 3TX transmitters with the optional MODbus RS-485 digital output together with the DAT logging module (Revision 1.5):
  - **Manual for Windows Software to Configuration & Download logged data from 3TX-DAT Module**

- 3: Naturally datalogging can also be accomplished by connecting (either directly or in series) the standard scalable 4-20mA analog output from the 3TX transmitters to any commercial PLC, SCADA or other data acquisition device that can be suitable configured to log engineered units for all measurements.

3TX-TOT pH Compensation Module to Compute Total ISE

- The 3TX-TOT module computes the total ISE. For example, this module can compute total ammonia, total cyanide, total fluoride, etc.
- The module computes the total ISE using three inputs: 1) the free ion activity; 2)

the pH; and, 3) the temperature. These three input parameters are provided by the analog output from the respective measurement modules.

- A scalable 4-20mA analog signal is available to output the computed total ISE to PLC or other data acquisition equipment.
- MODbus included: All input and output data can be sent via MODbus as a standard feature of the 3TX-TOT module.
- The following links provide examples for visualization of some common weak base and weak acid species where the total ISE can be determined:
  - **Total Ammonia** (NH3-N, or total ammonia as nitrogen)
  - **Total Fluoride** (Total HF, or unreacted fluoride)
  - **Total Cyanide** (Total HCN, or unreacted cyanide)
- Additional pH compensation algorithms for other weak acid and weak base species can be readily added upon request.
- Find below a link to the technical document that summarizes the capabilities of the 3TX-TOT module and addresses the questions of what exactly pH compensation means for ISE measurements and when it is required (recommended):
  - **Total ISE 3TX-TOT Module Summary**
- Find below a link for the 3TX-TOT wiring supplement for the Approach 1 Spliced Pt100/Pt1000 TC input scheme when using pH & ISE sensors with integral preamplifiers:
  - **3TX-TOT wiring supplement when using pH & ISE sensors with integral preamplifiers**
- Download the **MODbus output summary supplement for the 3TX-TOT** to assist with configuration of your MODbus data acquisition, SCADA or control system.

Technical Product Brochures Highlighting Complete Measurement, Control & Datalogging Solutions for pH, ORP, Ion Selective, Dissolved Oxygen & Conductivity Inline Analysis using 3TX Instruments

- **3TX Literature Packet** containing all product brochures, specification sheets and most relevant technical documentation
- **Brochure on pH and ORP** with 3TX Transmitters
- **Brochure on Dissolved Oxygen** with 3TX Transmitters
- **Brochure on Conductivity** with 3TX Transmitters
- **Brochure on Fluoride Ion Selective** with 3TX Transmitters
  - Installation, calibration and use supplement **ISE addendum for ASTI Fluoride ISE sensors with 3TX-ISE Fluoride** Ion Selective transmitters

- **Brochure on Total Ammonia, Nitrate & Nitrite** with 3TX Transmitters
    - Installation, calibration and use supplement **ISE addendum for ASTI Ammonium ISE sensors with 3TX-ISE Ammonium** Ion Selective and 3TX-pH pH/ORP transmitters together with 3TX-TOT pH compensation module

- Installation, calibration and usage supplement: **ISE addendum for ASTI Cyanide ISE Sensors with 3TX Total Cyanide systems**. Details cyanide ISE sensor installation and calibration procedures with 3TX-ISE cyanide ion selective transmitter and 3TX-TOT pH compensation module for continuous inline measurement of total cyanide (HCN).

- Installation, calibration and usage supplement for calcium (Ca2+) ion measurements: **ASTI_Calcium_Systems_High_Range_3TX.pdf**

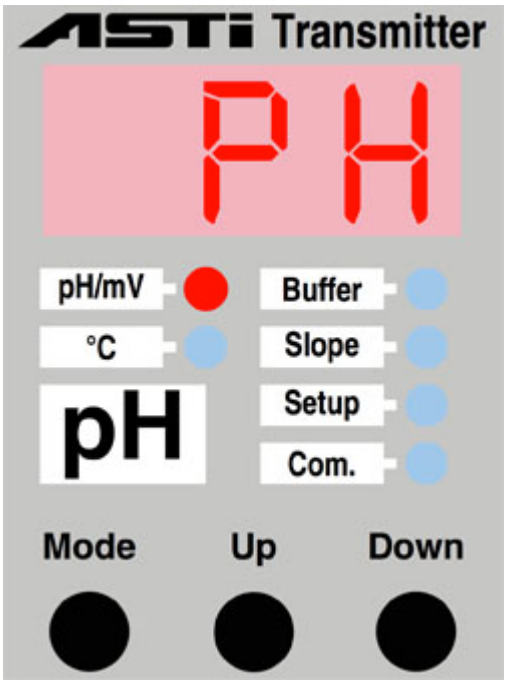
- Installation, calibration and usage supplement for Chloride (Cl-) ion measurements: **ASTI_Chloride_Systems_3TX.pdf**

- **Brochure on complete environmental measurement system** including ammonium, nitrite, nitrate, calcium (water hardness), pH, ORP, conductivity, dissolved oxygen and temperature parameters. Low power consumption and easy to use system is ideal for solar rechargeable battery powered operation with minimal maintenance required and integrated onboard datalogging with options for remote access to view and download logged data.
    - A detailed write-up on environmental monitoring stations using 3TX measurement modules can be downloaded **HERE**

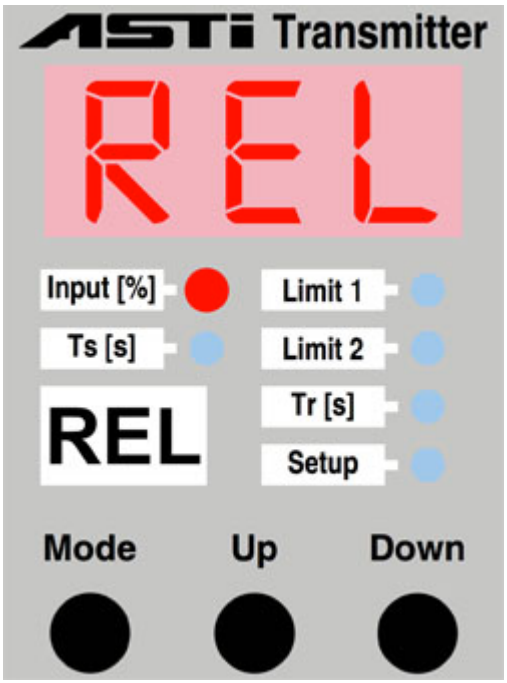
- **Portable 3TX Transmitter Assemblies** are field ready for Temporary Installations, Troubleshooting and Grab Sample Analysis of pH, OPP, Ion Selective (ISE), Conductivity & Dissolved Oxygen (DO) parameters of process samples using industrial analog and digital sensors. The 3TX portable assemblies employ the **3TX-PS/BAT module** that provides dual isolated and regulated 24VDC power to energize the 3TX transmitters from 5V, 6V or 9V rechargable or non-rechargeable battery sources.
    - The 3TX portable assemblies an ideal choice for applications where power is either unstable/unreliable or else when no AC or DC power source is available at all. All portable 3TX assemblies can be converted for use as permanent installations since the enclosure and all employed fittings are NEMA4X rated.

You can find answers to many technical issues not detailed on this webpage or the linked documentation in our Frequently Asked Questions (FAQ) & Application Notes

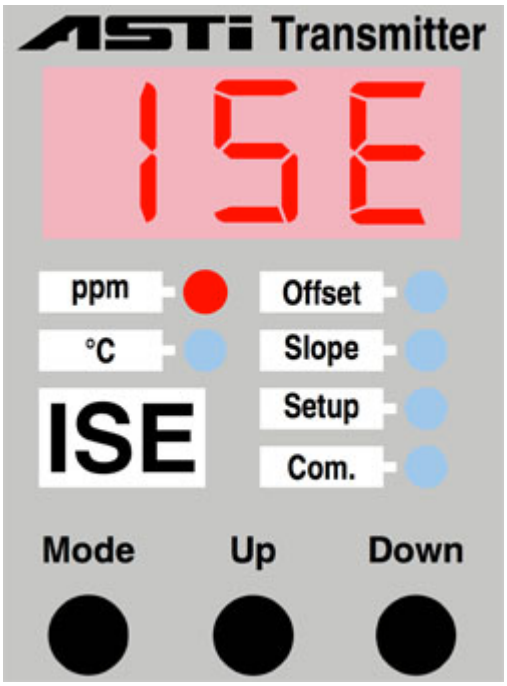
3TX-pH
pH/ORP/mV Transmitter



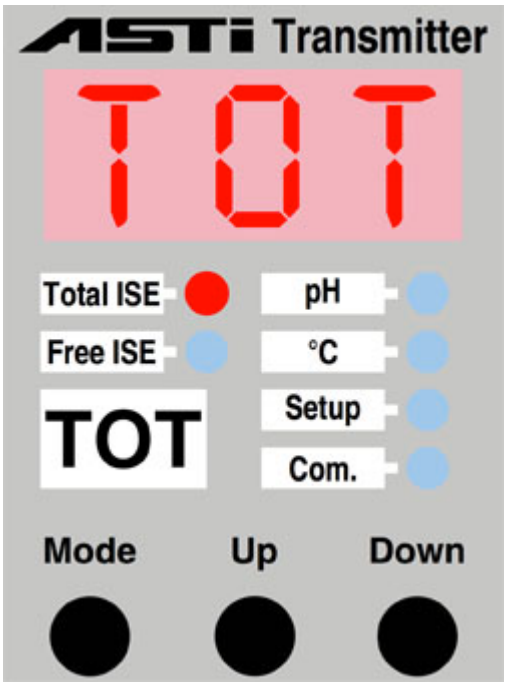
3TX-REL
Alarm & Relay Controller



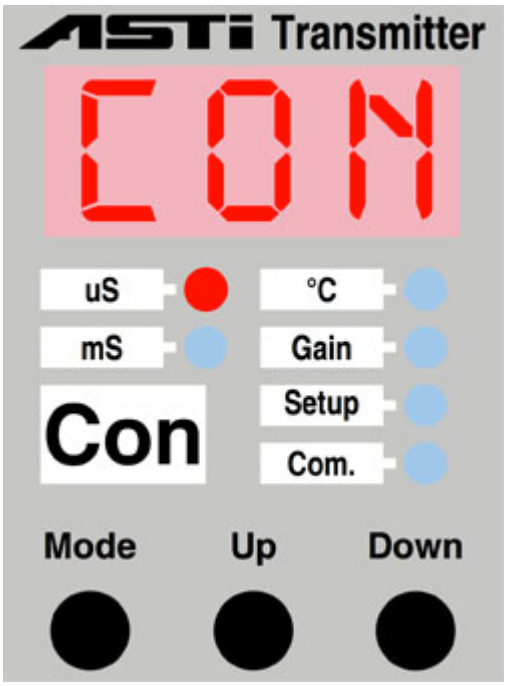
3TX-ISE
Ion Selective Transmitter



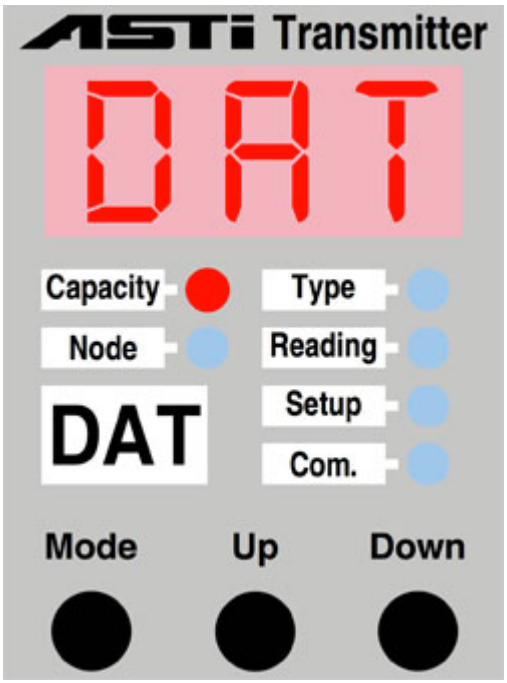
3TX-TOT
Total ISE pH Compensation Module



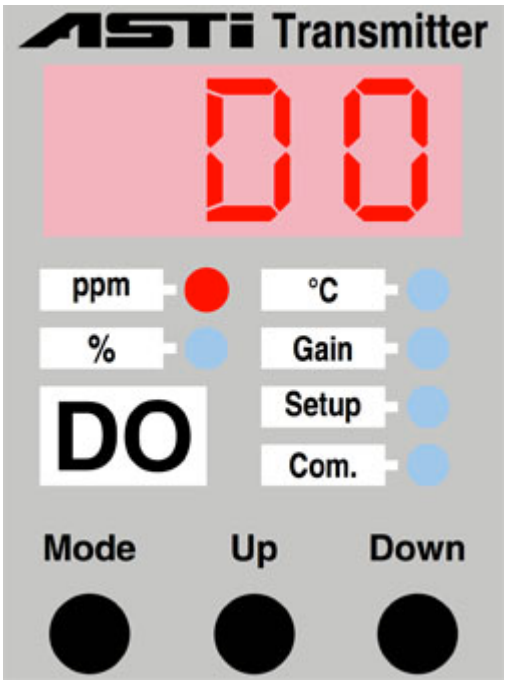
3TX-CON
Conductivity Transmitter



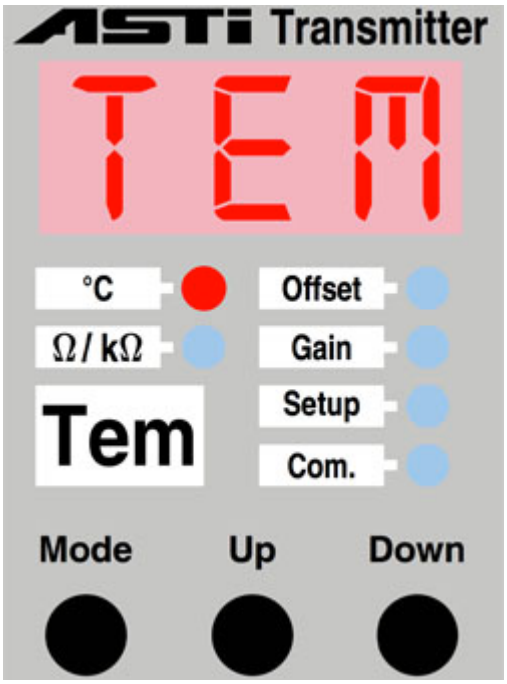
3TX-DAT
MODbus Datalogger



3TX-DO
Dissolved Oxygen Transmitter



3TX-TEM
Temperature Transmitter



3TX Product Specifications and Manuals

Measurement	Input	Measurement Range	Outputs	Calibration Points	Compatible Sensor(s)	Special Features
Ion Selective (ISE)**(3TX-ISE)** *	– Any Combination Ion Selective Solid State & Organic Membrane *	Low (0.00 to 9.99 ppm),Mid (00.0 to 99.9 ppm), andHigh (000 to 999 ppm)	– Fully Scalable Analog 0-20 mA or 4-20 mA output for ISE or temperature- Minimum 20% of selected range between 0/4mA and 20mA outputs- Optional RS-485 MODbus digital output	– 2 point user defined to determine ISE slope- 1 point user defined for ISE standardize to correct for offset (drift)	– Any Suitable ASTI Ion Selective (ISE) Sensor with 100 or 1000 Ohm Platinum TC * *or* – Any Suitable ASTI Ion Selective (ISE) Sensor with 100 or 1000 Ohm Platinum TC and integrated compatible preamplifier *	– Simplest field ISE instrument available on the market for easy commissioning and maintenance- Support for Custom OEM Configuration upon Request- Low Cost datalogging and real-time monitoring with Windows PC software & MODbus digital output combination
Ion Selective **(ISE) (3TX-ISE-kilo)**	– Any Combination Ion Selective Solid State & Organic Membrane	Low 0 to 9,990 ppm (a.k.a. 9.99 kilo-ppm) Mid 0 to 99,900 ppm (a.k.a. 99.9 kilo-ppm) or High 0 to 999,000 ppm (a.k.a. 999 kilo-ppm)	– Fully Scalable Analog 0-20 mA or 4-20 mA output for ISE or temperature – Minimum 20% of selected range between 0/4mA and 20mA outputs – RS-485 MODbus digital output	– 2 point user defined to determine ISE slope – 1 point user defined for ISE standardize to correct for offset (drift)	– Any Suitable ASTI Ion Selective (ISE) Sensor with 100 or 1000 Ohm Platinum TC * or – Any Suitable ASTI Ion Selective (ISE) Sensor with 100 or 1000 Ohm Platinum TC and integrated compatible preamplifier	– Applications where ion activity is commonly above 999 ppm. For applications at or below 999 ppm use 3TX-ISE instead of 3TX-ISE-kilo module. – Use 3TX-TOT to compute pH compensation total fluoride, total ammonia or total cyanide levels – Comes standard with both analog 4-20mA output and RS-485 MODBUS RTU digital output

pH or ORP**(3TX-pH)**	– Any Combination pH or ORP Sensor	– 0 to 14 for pH Standard *(-2 to +16 with 3TX-pHE)*-1000 to +1000 mV for ORP	– Fully Scalable Analog 0-20 mA or 4-20 mA output for pH, ORP or temperature-Minimum 3 pH units between 0/4mA and 20mA outputs-Optional RS-485 MODbus digital output	– 2 point or 3 point calibration for determination of acid and alkaline slopes – 1 point user defined pH standardize calibration to correct for offset (drift)	– Any Suitable ASTI pH or ORP Sensor with 100 or 1000 Ohm Platinum TC *or* – Any Suitable ASTI pH or ORP Sensor with 100 or 1000 Ohm Platinum TC and integrated compatible preamplifier	– Support for 1-point, 2-point, 3-point and arbitrary field offsets for optimal calibrations-Support for Custom OEM Configuration upon Request-Low Cost datalogging and real-time monitoring with Windows PC software & MODbus digital output combination
Contacting Conductivity**(3TX-CON)**	– Any Contacting Conductivity Sensor with supported Cell Constant (K)	Cell Constants Supported: 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0, 3.0, 5.0, 10.0 & 20.0Ranges: From 0-5uS up to 0-1,000 mS as per mating cell and configuration	– Fully Scalable Analog 0-20 mA or 4-20 mA output for Conductivity or temperature-Minimum 10% of full scale range between 0/4mA and 20mA outputs-Optional RS-485 MODbus digital output	– Gain adjustment to calibrate to effective (a.k.a. “apparent”) cell constant – User configurable corrections for sensor and cable capacitance and resistance contribution to readings	– Any Suitable ASTI Contacting Conductivity Sensor with supported cell constant and integrated 100 or 1000 Ohm Platinum TC	– Correction for resistance and capitance of sensor cable for both TC input and conductivity measurement itself-Support for Custom OEM Configuration upon Request-Low Cost datalogging and real-time monitoring with Windows PC software & MODbus digital output combination
Dissolved Oxygen (DO)**(3TX-DO)**	– Most galvanic dissolved oxygen sensors that are self temperature compensating	Minimum 0.00 to 4.00 ppm (0-40% Saturation)Maximum 00.0 to 40.0 ppm (0-400% Saturation)	– Fully Scalable Analog 0-20 mA or 4-20 mA output for DO ppm, % Saturation or temperature-Minimum 10% of full scale range between 0/4mA and 20mA outputs-Optional RS-485 MODbus digital outputs for all values	– Gain calibration with sensor dry in air with proper value for that temperature & pressure preprogrammed into 3TX-DO-No “Zero” calibration is required for galvanic type sensor with true zero potential	– AST-DO or equivalent active self-polarizing galvanic DO cell that is self temperature compensating (without need of integrated TC element for this correction)	– Calibration and % saturation is automatically corrected for temperature, pressure and salinity for accurate measurements-Support for Custom OEM Configuration upon Request-Low Cost datalogging and real-time monitoring with Windows PC software & MODbus digital output combination

** Ion selective measurement type must be set at time of purchase at ASTI factory. 3TX-*

ISE transmitter not sold separately but rather only as part of complete ISE system including ISE transmitter AND ISE sensor supplied complete from ASTI factory. ISE measurement must be validated for feasibility by ASTI prior to sale.