Universal Transmitters for Smart MODBUS RTU Sensors

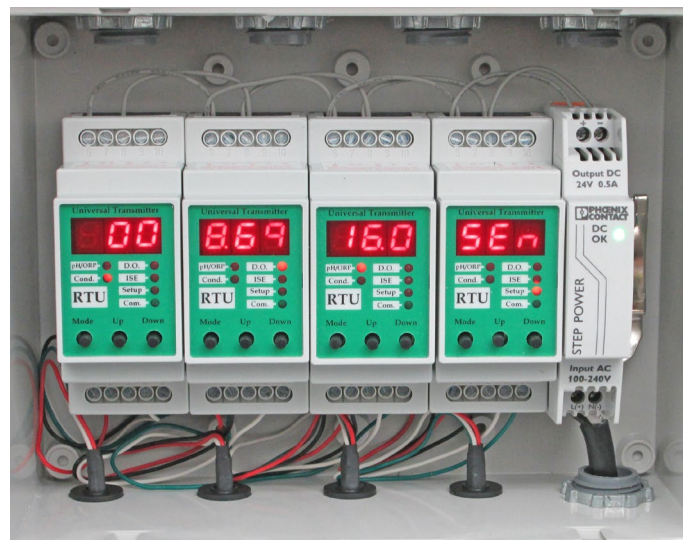

Measurements

- pH
- ORP
- **Dissolved Oxygen (D.O.)**
- **Ion Selective (ISE)**
- **Conductivity (EC)**

Features

- **Automatic recognition of sensors**
- **Isolated Scalable 4-20mA Output**
- **Plug & play hot-swap with sensors**
- **Waterproof NEMA 4X assemblies**
- **100-240 VAC or 9-36 VDC Powered**
- **From 1 to 9 channels per assembly**
- **Programmable default configuration**

Type of connected sensor is indicated with illuminated LED in main display mode. Additional parameters beyond main process value can be shown using the 'Up' and 'Down' keys as detailed in the documentation. Output is configured in setup LED mode.

3TX-RTU UNIVERSAL SMART 4-20mA TRANSMITTER for HiQDT MODBUS RTU pH, ORP, Dissolved Oxygen (D.O.), Ion Selective (ISE) & Conductivity (EC) Smart Digital Sensors

- Provides local display & isolated, scalable & reversible 0-20mA or 4-20mA output of measured parameter from mating smart digital HiQDT MODBUS RTU sensor
- Display current mA output based upon current sensor reading & scaling setup
- **Galvanic isolation between sensor input, power & analog output (3000V rating)**
- **Output scalable down to 2% of the full range input of mating sensor**
- **Universal software automatically detects measurement type of mating sensor & loads all necessary associated parameters without any user action required**
- Temperature & Absolute mV can be display for pH/ORP/ISE/DO sensors. Temperature & raw conductivity can be displayed for conductivity sensors.
- Customized user-defined default settings can be programmed without charge
- Provides isolated 9VDC power & RS-485 serial port for smart HiQDT sensors
- Smart digital HiQDT MODBUS RTU sensors store all calibrations, time since calibration performed, dispatch date, time used in field in non-volatile EEPROM memory for installation portability for seamless plug and play hot-swap in field
- **Calibration of sensors done by handheld communicator or Windows software.**
- **Notifies when connected sensor needs recalibration (user adjustable threshold)**
- Cable lengths up to 610 meters (2,000 feet) using rugged NEMA 6P & IP67 rated quick disconnect waterproof & corrosion-resistant snap connector terminations.
- Supported Data Ranges for Mating Smart digital HiQDT MODBUS RTU Sensors:
  - **pH:** -2.000 to +16.000 *(actual range is always limited by sensor specs)*
  - **ORP:** ±1000.0mV Standard Style or ±2000.0mV Wide Range Style
  - **Dissolved Oxygen (D.O.):** 0.00-150.00 ppm | 0.0-1,500.0 % Saturation
  - **Ion Selective (ISE):** 0.01-9.99 / 10.0-99.9 / 100-999 for ppm ranges & 1.00-9.99 / 10.0-99.9 / 100-99 kilo-ppm ranges (see ppm equivalents below)
    - 1,000-9,990 / 10,000-99,900 / 100,000-999,000 ppm
  - **Conductivity (EC):** 0.01-9.99/10.0-99.9/100-999 for µS/cm ranges and 1.00-9.99 / 10.0-99.9 / 100-999 for mS/cm ranges. The computed units salinity (PSU), TDS & resistivity (MΩ) supported for display & output
  - **Temperature:** -40.0 to +210.0 °C for all sensor types (display values only)

Universal Transmitter

R T U

pH/ORP D.O.
Cond. ISE
RTU Setup
Com.

Mode   **Up**   **Down**
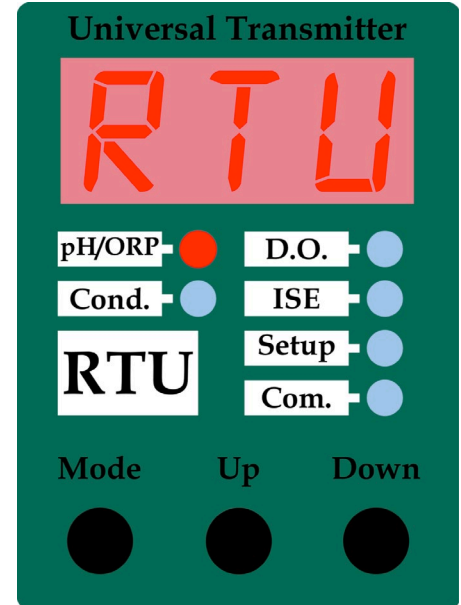
Programming

3TX-RTU has 3 digit display & 6 LEDs to setup & display values. 'Mode' is used to navigate. Programming done by 3 keys. 'Mode' toggles & 'Up' or 'Down' used to scroll & select. Setup Parameters entered via 'Mode'. Values changed using 'Up' or 'Down'. The 3TX-RTU automatically selects & illuminates LED based upon the type of sensor which is connected.
If softwarelock (P01) "On" no changes can be made. Set P01 to "Off" to allow for changes to scaling & configuration. If keys are not used for several minutes then software lock resets back "On".

MAIN FEATURES

SMART UNIVERSAL TRANSMITTER:

The 3TX-RTU supports all of the common liquid analytical electrochemical measurements parameter of pH, ORP, dissolved oxygen (D.O.), ion selective (ISE) and conductivity. **Scanning feature finds node address of sensor with the parameters automatically loaded for measurement type allowing for a single universal transmitter to be stocked for any potential electrochemical measurement of interest at facility thereby reducing both inventory & training costs.**

COMPLEMENTARY 3TX MODULES FOR 3TX-RTU:

3TX-REL: Alarm & Relay controller with simple supervision, On/Off or Time Proportional Control (TPC) Modes
3TX-TOT: Computes pH compensated "Total ISE" from Free

SMART DIGITAL MODBUS RTU SENSOR INPUT

3TX-RTU interfaces smart digital HiQDT MODBUS RTU sensors via 100% digital communications for signal integrity even in noisy areas. Integral smart sensor board provides temperature compensation & stores calibrations. Total cable lengths to 300 meters for conductivity & 1,000 meters for pH, ORP, ISE & DO sensors with waterproof snap connector.

HIGHLY CONFIGURABLE ANALOG OUTPUT

3TX-RTU provides scalable, proportional reversible 4-20mA or 0-20mA analog current loop output for any mating connected sensor input. **Minimum scaling down to 2% of the full range input of sensor allowing for a very high resolution signal to be sent to the mating analog input device.** Analog output is

ISE & pH analog inputs, 0/4-20mA analog & MODbus output — galvanically isolated from input with 3KV rated optocoupler.

TECHNICAL SPECIFICATIONS

Mechanical

Housing:	Lexan UL94V-0 (Upper part)
	Noryl UL94V-0 (Lower part)
Mounting:	M36 for 35 mm DIN rail
IP Class:	Housing IP40. Connector IP20
Connector:	Max 16A. Max 2.5 mm²
	Max torque 0,6 Nm
Temp.:	Usage -15 to +50 °C (Storage -35 to +75 °C)
Weight:	75 grams (2.64 ounces)
Dimensions:	D 58 x W 36 x H 86 mm (2.3" X 1.4" X 3.4")
CE mark:	EN61326A

RoHS COMPLIANT

Electrical

Power Supply:	24VDC ±10%
Power Consumption:	60mA max when pH/ORP/ISE/DO
	80mA max when conductivity (EC)
Input Ranges:	See pages 6 to 16 for details
Sensor Input:	Smart Digital HiQDT MODBUS RTU
Temp Sensor:	Integral Platinum TC Element
Temp Range:	-40 to +210°C ± 0.3°C
Temperature Compensation:	Automatic Temperature Compensation (ATC) is Standard
Analog Output:	0-20mA or 4-20mA, max. 500Ω
Output Hold:	Automatic if sensor is not connected

BENEFITS OF USING MATING SMART DIGITAL HiQDT RS-485 MODBUS RTU SENSORS

- **Integral RS-485 MODBUS RTU interfaces all-modern PLC controllers & data acquisition systems.**
- **Communicator provides easy management of field installations** without the cost of a mating transmitter. This is ideal for locations where a local display is not necessary or possible due to installation limitations.
- **Intelligent management of sensor calibrations and service life-cycle** for efficient commissioning & maintenance. All aspects of installation are completely portable from the shop to the field site location.
- **Days in use** value is stamped for calibrations that are performed. This allows for predictive scheduling of maintenance in the PLC to ensure the accurate measurement in the field based upon user defined criteria.
- **All digital sensors ensure** reliable operation even in noisy process environments unlike analog sensors.
- **No degradation in digital communications** even with very long cable runs. **Max 1,000 meters (3,280 feet) for pH, ORP, ISE & DO sensors and Max 300 meters (1,000 feet) for conductivity sensors with 3TX-RTU.**
- Bridging connections & modifying installations easily without loss of signal quality with **NEMA 6P & IP67 rated quick disconnect waterproof and corrosion-resistant dual snap connector**. Simple plug and play operation for intelligent maintenance planning & smart management of sensor installations and stocking.
- **Low-cost snap digital extension cables** facilitate consolidation of very many HiQDT sensors outputs into one panel enclosure where very many remote field installations can all be conveniently all viewed at once.
- **Intelligent HiQDT handheld communicator software identifies type of sensor connected** & autoloads correct features. There exists no possibility of accidentally using the wrong set of options or settings.
- **All Extension cables for HiQDT sensors are inter-compatible**. Uniform extension cables minimize stocking. Separate field installation guide details available options to commission & exchange sensors.
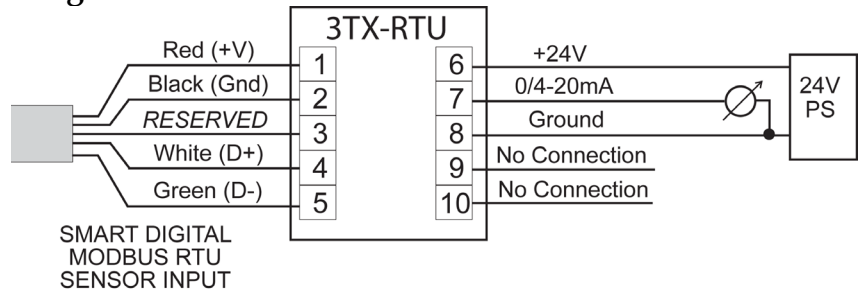
SMART MODBUS RTU SENSORS FOR USE WITH 3TX-RTU UNIVERSAL TRANSMITTER

- **Entire line of proven Iotron™** inline, immersion, submersible, twist lock, sanitary, HOT-TAP retractable **pH & ORP sensors** made by ASTI are **ALL** **available** for use with 3TX-RTU universal smart transmitter
- The very rugged low-profile **impact & break resistant parabolic pH glass element** optimized for use in **slurries & high viscosity applications** (X3XX series) is **ONLY** available for the smart digital type sensors
- The novel **extreme dehydration resistant** style reference technology that allows for **prolonged exposure to dry conditions** and **intermittent wet & dry use** is **ONLY** available for the smart digital type sensors
- **Entire line of proven Iotron™** inline, immersion, submersible, twist lock, sanitary, HOT-TAP retractable **ion selective (ISE) sensors** made by ASTI are **ALL** **available** in the smart digital HiQDT type configuration
- **Rugged Industrial AST-DO-UNIVERSAL Galvanic Dissolved Oxygen Sensors** for inline, immersion, submersible, twist lock, sanitary, HOT-TAP retractable installations are available in HiQDT configuration
- **Entire line of proven industrial** inline, immersion, submersible, twist lock, sanitary, HOT-TAP retractable **2-electrode contacting conductivity** are **ALL** **available** in the smart digital HiQDT type configuration

sensor with integral RS-485 MODBUS RTU digital output for immersion or fully submersible installations.

Field Commissioning of Transmitter

The 3TX-RTU universal smart transmitter is typically supplied preconfigured with female snap to tinned leads tinned leads panel mount connector installed onto a suitable field ready enclosure assembly. The HiQ4M male snap connector of the smart digital MODBUS RTU sensor is interfaced with female snap connector on 3TX-RTU universal smart transmitter assembly. HiQDT MODBUS RTU sensors are precalibrated ready for immediate plug & play field use.

Wiring Schematic

3TX-RTU

Red (+V)	1	6	+24V	
Black (Gnd)	2	7	0/4-20mA	24V PS
RESERVED	3	8	Ground	
White (D+)	4	9	No Connection	
Green (D-)	5	10	No Connection	

SMART DIGITAL MODBUS RTU SENSOR INPUT

If softwarelock (Setup parameter P01) is "On" all of parameters can only be read. Set P01 Software Lock to "Off "to change values. The P01 software lock will automatically reset back to "On" if no key is pressed for several minutes.

User Setup Parameters

No	Parameter	Description	Range	Default
P01	Lock	Software Lock	On / Off	On
P02	Address	Address on MODbus	Off, 1…247	Per Order
P03	Baudrate	MODbus baudrate	9,600 / 19,200	Per Order
P04	Analog Output Type	Toggle for Current Loop Type	4-20mA, 0-20mA	Per Order
P05	Analog Output Mode	Select Polarity of Analog Output	noninverted, inverted	Per Order
P06	0/4 mA Whole	Scale Low setpoint for output – Whole Percent	0% to 98%	Per Order
P07	0/4 mA Dec.	Scale Low setpoint for output – Decimal Point 0-97.XX	XX.00% - XX.99%	Per Order
P08	20 mA Set	Scale High setpoint for output – Whole Percent	2% to 100%	Per Order
P09	20 mA Set	Scale High setpoint for output – Decimal Point 2-99.XX	XX.00% - XX.99%	Per Order
P10	D.O. Units Selected	Select between ppm and % Saturation units for output	ppm or % Sat	Per Order
P11	Conductivity Units Selected for Output	If Conductivity Sensor Type = 6 (Standard/High) then choices are uS/cm, Salinity (PSU) or TDS. If Conductivity Sensor Type = 7 (Ultralow) then choices are uS/cm, MΩ Standard or MΩ for UPW	For Sensor Type = 6 uS/cm, PSU, TDS or For Sensor Type = 7 uS/cm, MΩ, UPW	Per Order
P12	Conductivity Sensor Cell Constant (K)	Indicates nominal cell constant for connected sensor From K=0.01/cm to K=20.00/cm	0.01 to 20.0	Per EC Sensor
P13	Conductivity Sensor Range Mode	Indicates the range mode scaling factor for EC sensor "UL"=2, "Std"=200, "Hi"=2,000	2..2,000	Per EC Sensor
P14	0/4mA Offset	Trim Low	±9.99% *	Per Factory Cal
P15	20mA Gain (Span)	Trim High	±9.99% *	Per Factory Cal
P16	Sampling Rate	Set sampling frequency in seconds	0.5, 1.0, 2.0 and 4.0	Per Order
P17	Recalibrate Notify	Set max time since cal last peformed before notification	1 to 999 Days	Per Order
P18	Display Sensor Type	1=pH, 2=ORP, 3=Wide ORP, 4=DO, 5=ISE, 6=Cond Standard/High Style, 7=Cond Ultralow Style	1..7	Per Sensor
P19	Formula Weight	Formula Weight of Measured Ion – Only for ISE sensors	6.94..655.35	Per ISE Sensor
P20	Type of TDS Units	Type of TDS units which are sent from EC Sensor	0=NaCl, 1=442, 2=KCl	Per EC Sensor
P21	Back to Default	Reset to Default	Def=Reset, Par=NoReset	Par

* Negative values will be shown as flashing. Shaded portions of chart above indicate display only parameters.

Par. no. 2 set node address of sensor. **If no sensor is found at the current node setting then 'SEn' will flash on screen. Press any button to enter P02 node select mode. Use 'Up' & 'Down' keys to select between 'Set' to manually define node address or 'SCn' for automatic node scanning feature (use 'Mode' to enter 'SEt' or 'SCn' feature). When node is found during scan the sensor type & node address are toggled. Accept the node address & sensor type found with 'Mode' key or press 'Up' or 'Down' to continue search**

Par. no. 3 sets baudrate to be used. Choices are 9,600 or 19,200.
Par. no. 4 select whether output type is 0-20mA or 4-20mA.
Par. no. 5 select whether output is inverted or non-inverted type.
Par. no. 6, 7, 8 & 9 define 0/4mA and 20mA setpoints. Appendix provides percentages corresponding with specific engineered units for various sensor. Min scaling between low/high setpoints 2% full range. Excel worksheet to compute % setpoints available.
Par. no. 10 selects ppm or % saturations units to be used as basis

Par. no. 12 & 13 displays cell constant & range mode of EC sensor.
Par. no. 14 & 15 Trim offset for 4mA and Trim span for 20mA
Par. no. 16 define sampling rate for connected sensor in seconds
Par. no. 17 Number of days after which recalibration notification is displayed when sensor is initially connected to transmitter. If limit is exceeded then 'CAL' 'OLd' will be dispayed as warning.
Par. no. 18 Display the sensor type which is connected
Par. no. 19 Display the formula weight of the measured ion for

~~for output & main LED display for connected D.O. sensor~~   ~~ISE Sensor. For anion selective sensor value is shown as flashing~~

Par. no. 11 selects measured conductivity or else computed PSU, TDS or MΩ units as basis for analog output & main LED display.

Par. no. 20 Display type of TDS units which are sent by EC sensor

Par. no. 21 Resets **ALL** parameters back to factory set defaults

Display Features

- **For Sensor Type 1 pH** - the "pH / ORP" LED will be continuous illuminated unless otherwise indicated below
    - -2.00 to -0.01 displayed as 2.00 to 0.01 flashing
    - 0.00 to 9.99 displayed not flashing with two decimal points
    - 10.0 to 16.0 display with one decimal point
        - If the 'Down' button is pressed, then the temperature of connected sensor is shown *
            - If 'Down' button is held for 3 to 5 seconds, then the absolute mV will be shown *
        - If the 'Up' button is pressed, then the mA for the current process value and scaling will be shown
- **For Sensor Type 2 ORP** - the "pH / ORP" LED will be continuous illuminated unless otherwise indicated below
    - -999 to -1 displayed as 999 to 1 flashing
    - 0 to +999 displayed not flashing
        - If the 'Down' button is pressed, then the temperature of connected sensor is shown *
            - If 'Down' button is held for 3 to 5 seconds, then the absolute mV will be shown *
        - If the 'Up' button is pressed, then the mA for the current process value and scaling will be shown
- **For Sensor Type 3 Wide ORP** - the "pH / ORP" LED will be continuous illuminated unless otherwise indicated below
    - -2,000 to -1,000 display as 2.00 to 1.00 with LED flashing (units are Volts)
    - -999 to -1 displayed as 999 to 1 flashing
    - 0 to +999 displayed not flashing
    - +1,000 to +2,000 display as 1.00 to 2.00 with LED not flashing (units are Volts)
        - If the 'Down' button is pressed, then the temperature of connected sensor is shown *
            - If 'Down' button is held for 3 to 5 seconds, then the absolute mV will be shown *
        - If the 'Up' button is pressed, then the mA for the current process value and scaling will be shown
- **For Sensor Type 4 Dissolved Oxygen (D.O.)** - the "D.O." LED will be continuous illuminated unless otherwise indicated below
    - If P10 is 'ppm' then 0.00 to 150.00 ppm units displayed not flashing as 0.00 to 9.99, 10.0-99.9 and 100-150 ppm
    - If P10 is '%Sat' then 0.0-1,500.0 percent (%) saturation units displayed not flashing as 0.0-99.9%, 100-999% with the special range of 1,000-1,500% displayed as 1.00-1.50 with LED flashing (kilo % Saturation Units)
        - If the 'Down' button is pressed, then the temperature of connected sensor is shown *
            - If 'Down' button is held for 3 to 5 seconds, then the absolute mV will be shown *
        - If the 'Up' button is pressed, then the mA for the current process value and scaling will be shown
            - If 'Up' button held and P10 is 'ppm' (basis of 4-20mA output) then % Saturation units are displayed
            - If 'Up' button held and P10 is '%Sat' (basis of 4-20mA output) then ppm units are displayed
- **For Sensor Type 5 Ion Selective (ISE)** - the "ISE" LED will be continuous illuminated unless otherwise indicated below
    - 0.00-9.99, 10.0-99.9, 100-999 ppm units displayed same as per 3TX-ISE transmitter
        - **kilo-ppm units displayed with LED flashing to signify kilo-ppm scale is in use same as per 3TX-ISE-kilo**
            - 1.00-9.99 (1,000-9,990 ppm), 10.0-99.9 (10,000-99,900 ppm) and 100-999 (100,000-999,000 ppm)
        - If the 'Down' button is pressed, then the temperature of connected sensor is shown *
            - If 'Down' button is held for 3 to 5 seconds, then the absolute mV will be shown *
        - If the 'Up' button is pressed, then the mA for the current process value and scaling will be shown
            - If 'Up' button held for 3 to 5 seconds, pION value is shown with same scheme used display the pH
- **For Sensor Type 6 or 7 Conductivity (EC)** - the "Cond" LED will be continuous illuminated unless otherwise indicated below
    - **<1.00 mS shown as flashing** from 1 to 999 uS/cm with 0.01-9.99, 10.0-99.9 and 100-999 floating decimal point
    - 1.00 to 999 mS/cm shown displayed not flashing with 0.01-9.99, 10.0-99.9 and 100-999 floating decimal point
    - **1,000 to 2,000 mS/cm display as 1.00 to 2.00 with the LED flashing (kilo-mS/cm)**
    - If P11 is 'PSU or MΩ' then salinity (sensor type 6) or resistivity (sensor type 7) is shown as 0.00-9.99 and 10.0-50.0
    - If P11 is 'TDS' then ppt is shown as 0.00-9.99 and 10.0-99.9 (multiply by 1,000 to get ppm units instead of ppt units)
        - If the 'Down' button is pressed, then the temperature of connected sensor is shown *
            - If 'Down' button is held for 3 to 5 seconds, then raw conductivity will be shown per scheme above
        - If the 'Up' button is pressed, then the mA for the current process value and scaling will be shown
            - If 'Up' button is held for 3 to 5 seconds and P11 is 'PSU', 'TDS' or 'MΩ' then reading in conductivity units will be shown (see scheme above). If conductivity units selected for P11 then nothing is shown.
- Production data (yy.m) displayed by pressing 'Down' & 'Mode' "Mode" simultaneously in any main LED display mode. The month will display as 1..9 and then A for October, B for November and C for December. I.e. October 2011 will display as "11.A".
- Revision of software is displayed by pressing the 'Up' 'Mode' simultaneously in any main display mode.

ORDERING INFORMATION FOR 3TX-RTU UNIVERSAL SMART TRANSMITTERS

CODE	DESCRIPTION
ENCLOSURE TYPE CODING & DETAILED DESCRIPTION	
3TX-0M	3TX Transmitter with No Enclosure
3TX-DIN	3TX Transmitter with No Enclosure; Preinstalled onto 35mm DIN-Rail
3TX-2MW	3TX Transmitter(s) in IP65 Enclosure; Up to 2 Total Modules (**Wall Installations Only**)
3TX-2M	3TX Transmitter(s) in IP65 Enclosure; Up to 2 Total Modules (Wall or Pipe Installations)
3TX-3MP	3TX Transmitter(s) in NEMA 4X CSA/UL Rated Enclosure; ½-DIN **Panel**; Max 3 Modules (**Panel Bracket assy**)
3TX-3MF	3TX Transmitter(s) in NEMA 4X CSA/UL Rated Enclosure; Up to 3 Total Modules (Wall or Pipe Installations)
3TX-4MW	3TX Transmitter(s) in IP65 Enclosure; Up to 4 Total Modules (**Wall Installations Only**)
3TX-4M	3TX Transmitter(s) in IP65 Enclosure; Up to 4 Total Modules (Wall or Pipe Installations)
3TX-5MF	3TX Transmitter(s) in NEMA 4X CSA/UL Rated Enclosure; Up to 5 Total Modules (Wall or Pipe Installations)
3TX-6MW ***	3TX Transmitter(s) in IP65 Enclosure; Up to 6 Total Modules (Wall or Pipe Installations)
3TX-6M ***	3TX Transmitter(s) in IP65 Enclosure; Up to 6 Total Modules (Wall or Pipe Installations)
3TX-7MF ***	3TX Transmitter(s) in NEMA 4X CSA/UL Rated Enclosure; Up to 7 Total Modules (Wall or Pipe Installations)
3TX-9MF ***	3TX Transmitter(s) in NEMA 4X CSA/UL Rated Enclosure; Up to 9 Total Modules (Wall or Pipe Installations)
MEASUREMENT MODULES (FROM 1 TO 9 TOTAL, PRICE IS PER __EACH__ MODULE)	
-RTU-TYPE	Universal Transmitter for Use with Smart Digital HiQDT MODBUS RTU pH, ORP, DO, ISE & Conductivity Sensors Standard with isolated, scalable & reversible 0-20mA or 4-20mA analog current loop output TYPE: The default sensor type and all user configurable parameters can be customized to be any values of desired so long as this is done at time of order. Upon reset of transmitter default values requested at time of order will be restored.
ADD-ON MODULES FOR MEASUREMENT MODULES IN ENCLOSURE ASSEMBLIES	
-PS	100 to 240 VAC 50/60 Hz Universal Power Supply Adapter for Line Powered Operation
-PS/BAT	Dual Isolated & Regulated 24VDC Power Supply Converter for operation from 5V Batteries or USB Power Supply
-SW	On/Off Power Switch (½ Width of power supply module and ¼ width of standard 3TX transmitter)
-REL	Programmable Alarm & Relay Controller with tight integration with all 3TX measurement modules for easy setup Standard with simple supervision, On/Off, Time Proportional Control (TPC) or Variable Pulse Control Modes
-TOT	pH compensated "Total ISE" from ISE & pH inputs, 0/4-20mA analog & MODbus digital ouputs

2"NPT Pipe mounting bracket kits supplied separately. For 3MP, 3MF, 6MW & 7MF enclosures the power supply is not counted as a module for space purposes. **Refer to documentation for 3TX transmitter for use with analog sensors for all 3TX measurement modules not listed here.** *3TX transmitter measurement modules for analog sensors and the 3TX-RTU & 3TX-HiQ transmitter modules for smart digital sensors can be mixed and matched into any enclosure without limitation. The female panel mount snap connector is only available for the 3TX-RTU & 3TX-HiQ-pH transmitters.*

* Enclosures standard with ½" MNPT cable glands for sensor inputs & transmitter outputs. Base enclosure cost includes this feature standard.

** Enclosures for use with 3TX-RTU can be supplied with female panel mount snap connector installed into the input side of the enclosure as an option. This option is designated by adding –XH to the end of the enclosure part number were X is the number of female panel mount snap connectors desired for the given enclosure. There exists a surcharge to the base enclosure cost for each snap connector that is installed. The number of snap connector cannot exceed the number of 3TX modules supported for the enclosure type. Examples are given below for elucidation of this –XH snap connector female panel mount option available for the HiQ digital sensors. The standard cable gland and snap connector inputs can be mixed and matched as desired. Analog 3TX transmitter can likewise be mixed and matched with digital 3TX-HiQ style transmitter modules although the snap input option is only supported on the 3TX-RTU & 3TX-HiQ-pH transmitters. All seals for the transmitter outputs are always cable glands.

*** For 2" NPT pipe mounting additional adapter plate is required for 6MW, 6M, 7MF & 9MF enclosures. The 2M, 4M, 3MF & 5MF enclosures support pipe mounting without adapter plate while 2MW, 4MW, 6MW & 3MP enclosures are not supported for pipe mounting (not even with adapter plate).

Model: **3TX-2MW-H-RTU-pH-REL**
Description: Single Channel Controller in IP65 Weatherproof Enclosure; 1 each female snap panel mount connectors installed ready for HiQDT sensors; 3TX-RTU Universal transmitters preconfigured for pH with 3TX-REL alarm/relay controller module; No AC Power Supply, 3-wire 24VDC Powered

Model: **3TX-3MF-3H-RTU-DO-SAT-RTU-CON-PSU-RTU-ORP-PS-SW**
Description: Triple Channel Transmitter Assembly in NEMA 4X CSA/UL rated Enclosure for Wall or Pipe Mounting Installations with 3 each 3TX-RTU Universal transmitter preconfigured for dissolved oxygen sensor using computed percent (%) saturation units and conductivity sensor using salinity PSU units and ORP sensor for main LED display and analog outputs; Universal 100-240 VAC Power Supply; On/Off Toggle Switch

Model: **3TX-6MW-4H-RTU-ISE-RTU-pH-TOT-NH3-RTU-DO-ppm-RTU-CON-PS**
Description: Four Channel Measurement Transmitter Assy in IP65 Weatherproof Enclosure (Max 6 Modules); 3 each 3TX-RTU Universal transmitters preconfigured for use with ion selective sensor, pH sensor, dissolved oxygen sensor in ppm mode and conductivity sensor in uS/cm or mS/cm units plus 1 each TOT module to compute total ammonia $(NH_3+NH_4^+)$ from ammonium & pH sensor inputs; Universal 100-240 VAC Power Supply included