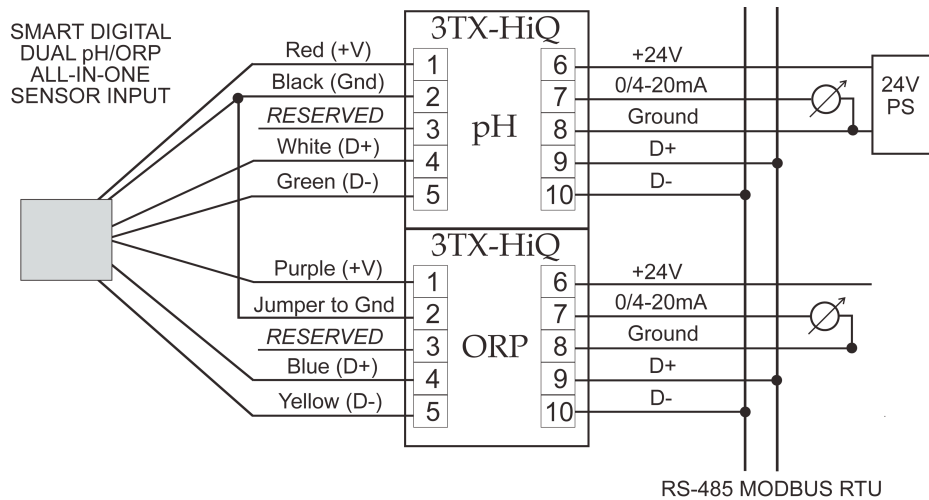


Field Installation Guide for Dual pH/ORP All-In-One Smart Digital Sensors for 3TX-HiQ Intelligent Transmitters



SMART DIGITAL DUAL pH/ORP FIELD INSTALLATION SCHEMES - PART 1

Please review the first two pages of the 3TX FAQ before wiring-up or powering on any of the 3TX modules.

Installation guide for Smart Digital Iotron™ Dual pH/ORP All-In-One HiQ sensors can be found in the following pages.

BASE SMART DIGITAL HiQ DUAL pH/ORP ALL-IN-ONE SENSOR CONFIGURATION:

All smart digital Iotron™ Dual pH/ORP All-In-One HiQ sensors for use with 3TX-HiQ-pH transmitters come standard with 6 meters (20 feet) of integral cable and include quick disconnect male terminated IP67 & NEMA 6P rugged field ready connector. Shorter cable lengths of 1.5 meters (5 feet) and 3 meters (10 feet) are also available but there is no difference in cost for these shorter sensor cable lengths. The longer integral cable length of 12 meters (40 feet) is a standard order option whereas 23 meters (75 feet) of integral cable is also available as a special order option. Surcharges apply for both the standard order option for the 12m (40 feet) length as well as the special order option 23m (75 feet) integral cable length options.

For each smart digital dual pH/ORP all-in-one sensor terminated in a HiQ7M male snap connector there must exist a mating HiQ7F female snap to tinned leads cable extension. **The HiQ7M/HiQ7F connectors are waterproof and corrosion resistant IP67 & NEMA 6P rated when interfaced.** The tinned leads from these cable extensions are wired directly and permanently into the mating 3TX-HiQ-pH transmitter terminal sensor input board terminals (please see wiring schematic above for details). The female snap to tinned leads cable extensions are available in length 1.5 meters (5 feet), 3 meters (10 feet), 6 meters (20 feet), 12 meters (40 feet) as standard order options as well as the longer 23 meters (75 feet) length as a special order option. The best practice for design of a field commissioning scheme employing the HiQ7M/HiQ7F connector system is to use the well stocked standard sensor cable lengths and cable extension options for the lowest cost and best availability installation. In addition to the use of the female snap to tinned lead extension cables long cable runs can also be accomplished by means of a permanently wired extension cable that is wired into a NEMA 4X waterproof J-Box which is permanently terminated into the 3TX-HiQ-pH intelligent digital transmitters. For very long cable runs this is quite often the most cost effective option. Inquire to the ASTI factory for available options if cable runs longer than what can be accomplished by means of standard or special order integral cable and extension cables are required to find the best choice for your particular commissioning situation.

GENERAL NOTE:

The sensor terminations are always male snap connector. The female snap to male snap cable extensions and female snap to tinned leads cable extensions can be used in any combination without signal degradation **so long as the maximum supported 305 meters (1,000 feet) of total cable length is not exceeded.** For best results running the cable in conduit for areas that may have high levels of noise and RF interference is recommended for best results.



SMART DIGITAL DUAL pH/ORP FIELD INSTALLATION SCHEMES - PART 2

The various standard and special order HiQ7M & HiQ7F installation schemes and the corresponding cable length installation achieved for each are detailed below:

Integral Cable Lengths for Sensors Terminated with HiQ7M Quick Disconnect Snap Connectors

- Smart Digital Dual pH/ORP sensors are terminated with HiQ7M male snap connector and come standard with 6 meters (20 feet) of integral cable
- Shorter 1.5 meters (5 feet) and 3 meters (10 feet) of integral sensor cable length also terminating with HiQ7M male snap connector are available for same price as the standard 6 meters (20 feet) length. Specify shorter lengths by -HiQ7M-1.5m or -HiQ7M-3m coding.
- Longer 12 meters (40 feet) integral sensor cable lengths also terminating with HiQ7M male snap connector are available as a standard order option with applicable surcharge.
- **Maximum 23 meters (75 feet) of integral sensor cable with HiQ7M male snap connector is available as a SPECIAL ORDER OPTION (-HiQ7M-23m) ALSO WITH APPLICABLE SURCHARGE.**

HiQ7F Female Snap to Tinned Leads Cable Extension Options

| | |
|----------------------------|--|
| 1.5 meters (5 feet) | Q7F-1.5m-TL |
| 3 meters (10 feet) | Q7F -3m-TL |
| 6 meters (20 feet) | Q7F -6m-TL |
| 12 meters (40 feet) | Q7F -12m-TL |
| 23 meters (75 feet) | Q7F -23m-TL - Special Order Option Only |

TOTAL CABLE LENGTHS FOR INSTALLATIONS WITH HiQ7M/HiQ7F SNAP CONNECTORS

Sensors with HiQ7M male snap connector & female HiQ7F snap to tinned leads cable extension

| | +1.5 meters | +3 meters | +6 meters | +12 meters | +23 meters |
|------------------------------------|------------------------|----------------------|----------------------|-----------------------|------------------------|
| 1.5m (5ft) integral cable: | 3m (10 feet) | 4.5m (15 feet) | 7.5m (25 feet) | 13.5m (45 feet) | 25.5m (85 feet) |
| 3m (10 ft) integral cable: | 4.5m (15 feet) | 6m (20 feet) | 9m (30 feet) | 15m (50 feet) | 27m (90 feet) |
| 6m (20 ft) integral cable: | 7.5m (25 feet) | 9m (30 feet) | 12m (40 feet) | 18m (60 feet) | 30m (100 feet) |
| 12m (40 ft) integral cable: | 13.5m (45 feet) | 15m (50 feet) | 18m (60 feet) | 24m (80 feet) | 35m (115 feet) |
| 23m (75 ft) integral cable: | 24.5m (80 feet) | 26m (85 feet) | 29m (95 feet) | 35m (115 feet) | 46m (150 feet) |

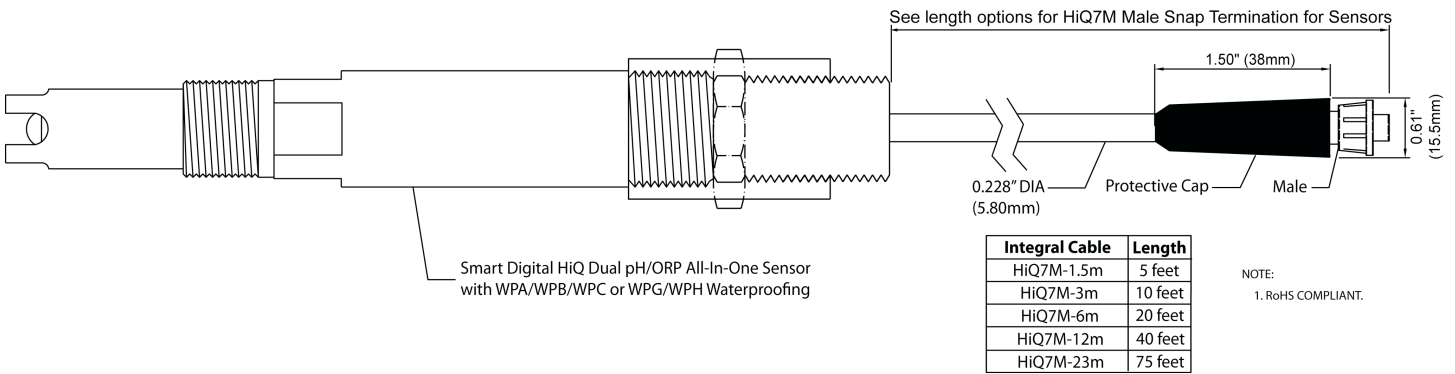
Standard installations requiring cable lengths longer than 24 meters (40 feet) or **special order style installations requiring cable lengths longer than 46 meters (150 feet)** are achieved by using 24 meter (80 feet) female snap to male snap cable extensions or wiring a permanent extension cable across a suitable terminal strip in a waterproof J-Box assembly (contact factory for details about this option). The snap to snap & snap to tinned leads cable extensions can be used together in any combination without signal degradation provided the **maximum supported 305 meters (1,000 feet) total cable length is not exceeded.**

Items denoted in GREEN are special orders. This means that there may be limited availability and/or extended lead times for purchase of these items or to invoke these options. Contact ASTI for information about availability for these items and options prior to scheduling commissioning dates.

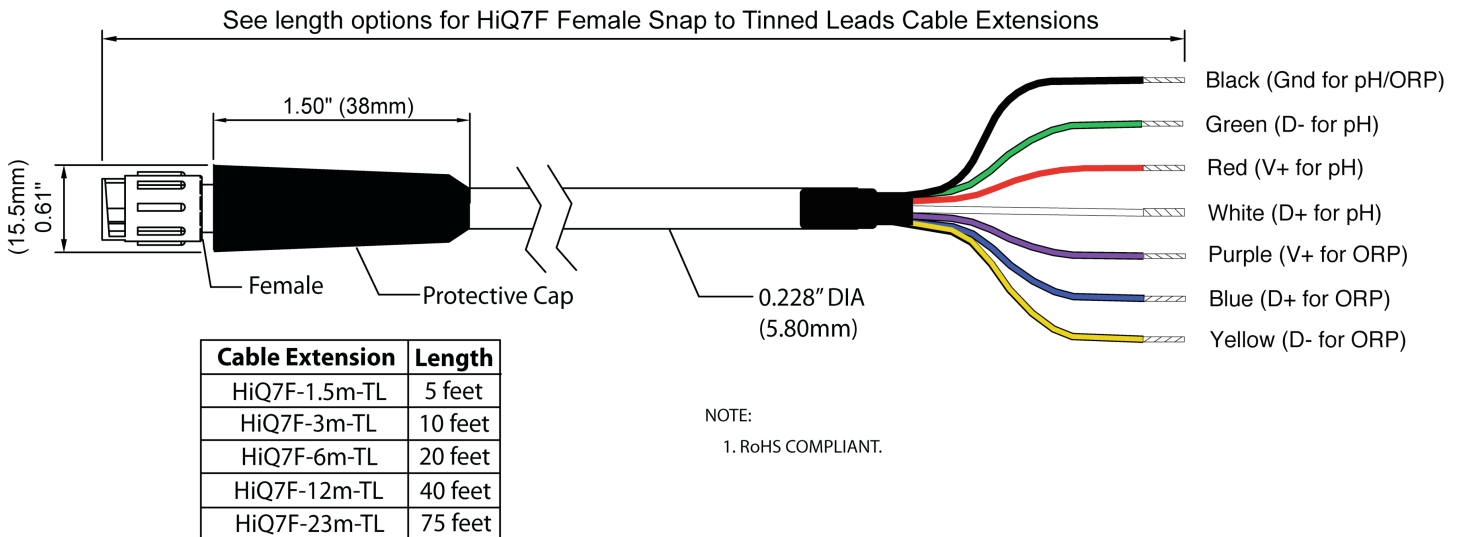
SMART DIGITAL DUAL pH/ORP FIELD INSTALLATION SCHEMES - PART 3

The terminal assignments for red, black, white & green colored leads to the 3TX-HiQ-pH transmitter to be used for the pH measurement and terminal assignments for the purple, blue and yellow leads to the 3TX-HiQ-pH to be used for the ORP measurement are detailed on page 1 of this installation guide. Care should be taken when making these connections to follow the terminal assignments exactly to avoid damaging the HiQ sensor or 3TX-HiQ-pH transmitter. No connection of any kind should be made to the factory-reserved input terminal 3 on any of the 3TX-HiQ-pH units.

Drawing for smart digital HiQ Dual pH/ORP All-In-One with male snap connector cable termination (-HiQ7M-Xm):

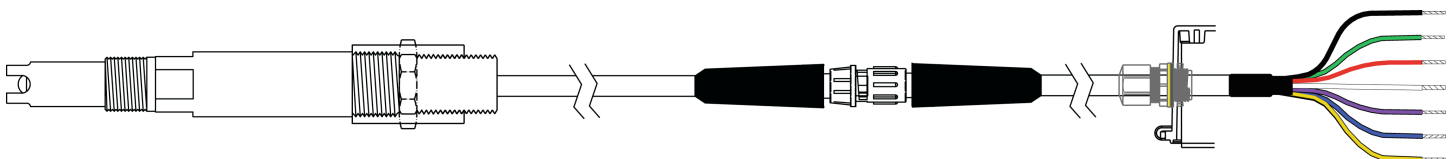


Detail drawing for female snap to tinned leads HiQ7F-Xm-TL cable extensions:



Installation Assembly Drawing for Smart Digital Dual pH/ORP sensors with HiQ7M & HiQ7F Snap Connectors:

Sensor with HiQ7M male snap connector is interfaced with female snap to tinned leads (HiQ7F-Xm-TL) cable extension. The tinned leads are wired to 3TX-HiQ-pH transmitter terminals (see wiring schematic on page 1 of this installation guide for terminal assignments). A sealing cable gland is used on transmitter enclosure to ensure a watertight cable connection.



3TX-HiQ Digital Measurement System Troubleshooting Guide & FAQ

!!! WARNING !!!

The 3TX-HiQ digital transmitters are **ONLY** for use with genuine ASTI supplied IOTRON™ smart digital HiQ sensors. Connecting any other sensor (analog or digital) may permanently damage the 3TX-HiQ transmitter and/or improper sensor. If there should be any doubt as to whether you are connecting a genuine ASTI supplied IOTRON™ HiQ digital sensor to the 3TX-HiQ digital transmitter, please inquire to the ASTI factory for verification.

The smart digital HiQ sensors are designed for a seamless and simple plug and play type operation with the intelligent digital 3TX-HiQ transmitters. In the case that any exception occurs a variety of diagnostic information may be displayed in the form of error codes reported on the 3TX-HiQ LED display. Instructions about what should be done if any of these error codes or diagnostic messages are displayed is provided below to assist with troubleshooting initial commissioning as well as ongoing maintenance of your installation.

The troubleshooting steps below are meant for use together with the specific 3TX-HiQ transmitter documentation in question as well as the general shared 3TX FAQ documentation rather than just as a standalone guide. Error codes are shown flashing on the display in the format "X.Y" where "X" is from 1 to 10 and "Y" can vary from 0 to 9. The exact coding designations are generally only relevant for internal uses by the ASTI factory. In particular the "Y" portion of the error code can be safely ignored unless specifically requested for remote diagnostic troubleshooting assistance purposes.

NO SENSOR CONNECTED OR IMPROPER WIRING ERRORS

If no genuine IOTRON™ smart digital HiQ digital sensor is connected, it is expected that one or more error will be reported including the 2.Y type error code. If there is an HiQ digital sensor connected but it is not interfaced to the correct type of mating HiQ transmitter you will get a 3.Y measurement type mismatch error. It is very important to make sure that the four leads from the smart digital HiQ sensor are properly wired to the terminals on the 3TX-HiQ transmitter to prevent damage to the electronics. Please see page one (1) for the color coding and terminal designations of the four leads. Since the HiQ digital measurement system employs a NEMA 6P rated quick disconnect termination, the tinned lead connections need only be made correctly once to the HiQ transmitter.

COMMUNICATION ERRORS

If an HiQ digital sensor is properly connected and an error code of the type 1.Y, 4.Y, 5.Y, 6.Y, 9.Y or 10.Y is received then these indicate that some form of a communication exception has occurred. Such errors are quite rare. If observed at all they are typically quite brief in duration signifying a very brief transient temporary communication issue. If these error codes starting with 1, 4, 5, 6 or 9 persist this indicates that there was some damage to the electronics inside the HiQ digital sensor and it must be replaced. Typically some ground loop or electrical/installation issue is responsible for this damage.

DATE STAMPING ERRORS

If an error code of the type 7.Y or 8.Y is received then these indicate that some form of an error has occurred related to setting the field activation or the last date of field use. These errors are also extraordinarily rare and indicate either an improper configuration or else a corruption to that portion of the EEPROM (very unlikely). If the issue is simply an improper configuration this can be resolved at the ASTI factory. The sensor item number, serial number, invoice number and dispatch date will be requested for approval of any such return. All of this information can be obtained from the HiQ transmitter to which the digital sensor is connected by looking at the appropriate parameters (see transmitter manual).

GENERAL TROUBLESHOOTING TIPS

- Ensure that all snap connections with the extension cables are secure and that none of the pins are damaged.
- Ensure that there is good integrity of PVC insulation on leads & cable jacket for both sensor and/or extension cables.
- Disconnect and reconnect the digital sensor via the snap connection. Allow ~5 to 10 seconds before reconnecting.
- Cycle the power to the transmitter and swap out the extension cable for a unit that is known to be working.
- Connect a genuine HiQ digital sensor known to be working to ensure 3TX-HiQ transmitter is functioning normally.

Last Modified March 12, 2018 | Revision 8