

# **HydrX<sup>TM</sup> Fuel Conditioning System**

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## **Installation Manual**

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2. Fax signed Bill of Lading (BOL) to Veeder-Root Customer Service at 800-234-5350.
3. Veeder-Root will file the claim with the carrier and replace the damaged/missing product at no charge to the customer. Customer Service will work with production facility to have the replacement product shipped as soon as possible.

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**NOTE:** Contact Veeder-Root Customer Service for warranty claim assistance at 800-873-3313..

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# Introduction

## Contractor Certification Requirements

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Veeder-Root requires the following minimum training certifications for contractors who will install and setup the equipment discussed in this manual:

**Service Technician Certification (Previously known as Level 2/3):** Contractors holding valid Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection.

**TLS-4xx Technician Certification:** Contractors holding valid TLS-450 Technician Certifications are approved to perform installation checkout, startup, programming and operations training, troubleshooting and servicing for all Veeder-Root TLS-450 Series Tank Monitoring Systems, including Line Leak Detection and associated accessories.

All service personal on site must comply with all recommended safety practices identified by OSHA and your employer.

Review and comply with all the safety warnings in the manuals listed in this document above and any other Federal, State or Local requirements.

**Warranty Registrations** may only be submitted by selected Distributors.

## Related Manuals

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577014-492	HydrX™ Fuel Conditioning System Setup & Operation Manual - ATG Control
577014-493	HydrX™ Fuel Conditioning System Quick Help - ATG Control
577014-466	HydrX™ Fuel Conditioning System Setup & Operation Manual - FCC Control
577014-472	HydrX™ Fuel Conditioning System Quick Help - FCC Control
577014-490	HydrX™ Fuel Conditioning System - FCC to ATG Conversion Guide
577014-476	HydrX™ Fuel Conditioner Offset Mounting Bracket Installation Guide
577014-473	HydrX™ Fuel Conditioner Inlet/Outlet Filter Replacement Instructions
577014-474	HydrX™ Fuel Conditioner Waste Water Tank Draining Instructions
577014-469	HydrX™ Fuel Conditioner Mag Probe Replacement Instructions
577014-470	HydrX™ Fuel Conditioner Pressure Sensor Replacement Instructions
577014-478	HydrX™ Fuel Conditioner Siphon Cartridge Service/Installation Guide
577014-073	TLS-450PLUS Site Prep and Installation Manual
577014-072	TLS-450PLUS Operators Quick Help Guide
577014-110	TLS-450PLUS/TLS4 Operator's Manual
576013-858	Direct Burial Cable Installation Manual

## HydrX System Parts

Table 1. HydrX System Parts List





Part Number	Description	Qty. Req'd.
8605X0-025	Fuel Conditioner - 2.5 gal. water holding capacity	1 per tank, model selected based upon available sump space
8605X0-050	Fuel Conditioner - 5 gal. water holding capacity	
8606XX-XXX	Water Intake Device (WID)	1 per tank
8607X0-XXX	Guide Tube	1 per tank
330020-869	Kit - WID Alignment Bar	1 per site
330020-867	Kit - Riser - 15.5"	1 per tank, based upon Model 500D or 250D
330020-901	Kit - Riser - 8.75"	
330020-874	Kit - Installation - Fuel Conditioner for FE Petro <sup>®</sup> pump	1 per tank pump type
330020-875	Kit - Installation - Fuel Conditioner for TRJ pump	
330020-880	Kit - Water Drain	1 per site
330020-885	Kit - Valve Conduit	1 per tank
860400-001	Fuel Conditioning Controller- w/ 6' cable	1 per Hydrx when ATG control is not utilized











## ATG Hardware and Software Requirements






- TLS-4xx (TLS-450PLUS or TLS4 with TLS-XB)
- Input/Output Module With 3 unused relays and 1 unused high voltage input.
- Universal Sensor Module with 2 open inputs
- ATG software version 10F or higher
- FCC software (P/N 332972-032)

## Safety Precautions

The following safety symbols are used throughout this manual to alert you to important safety hazards and precautions.

 <p><b>EXPLOSIVE</b> Fuels and their vapors are extremely explosive if ignited.</p>	 <p><b>FLAMMABLE</b> Fuels and their vapors are extremely flammable.</p>
 <p><b>ELECTRICITY</b> High voltage exists in, and is supplied to, the device. A potential shock hazard exists.</p>	 <p><b>TURN POWER OFF</b> Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.</p>

 <b>WARNING</b> indicates a hazardous situation which, if not avoided, could result in death or serious injury.	 <b>CAUTION</b> indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
 <b>WEAR EYE PROTECTION</b> Wear eye protection when working with pressurized fuel lines to avoid possible eye injury.	 <b>NOTICE</b> is used to address practices not related to physical injury.
 <b>WEAR GLOVES</b> Wear gloves to protect hands from irritation or injury.	 <b>NO POWER TOOLS</b> Sparks from power tools (such as drills) can ignite fuels and their vapors.
 <b>NO SMOKING</b> Sparks and embers from burning cigarettes or pipes can ignite fuels and their vapors.	 <b>NO OPEN FLAMES</b> Open flames from matches, lighters, welding torches, etc. can ignite fuels and their vapors.
 <b>READ ALL RELATED MANUALS</b> Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does.	 <b>TURN OFF CELL PHONES/PAGERS</b> Sparks from electronic devices in the vicinity of gasoline storage tanks could cause an explosion or fire resulting in bodily injury or death.

 <b>WARNING</b>	
    	<p><b>This product operates in the highly combustible atmosphere of a diesel storage tank.</b></p> <p><b>FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</b></p> <ol style="list-style-type: none"> <li>1. All installation work must comply with the latest issue of the National Electrical Code (NFPA 70), the Code for Motor Fuel Dispensing Facilities and Repair Garages (NFPA 30A), and any European, national, state, and local code requirements that apply.</li> <li>2. If an E-stop is required by national or local codes or a local authority having jurisdiction, the HydrX Fuel Conditioning Controller (FCC) power must be supplied by a 15 amp circuit that can be interrupted by the same E-Stop as the FCC pump. Both the hot and neutral legs of the PLC must be connected to the E-Stop.</li> <li>3. Turn off, tag, and lockout power to the STP before connecting or servicing the STP.</li> <li>4. Before installing pipe threads apply an adequate amount of fresh, UL classified for petroleum, non-setting thread sealant. For AG applications, Loctite 564 is recommended for all field serviceable pipe threads.</li> <li>5. To protect yourself and others from serious injury, death, or substantial property damage, carefully read and follow all warnings and instructions in this manual.</li> </ol>

In addition to the specified torque values noted in this manual, when properly tightened, all flanged fittings should have metal-to-metal contact.

## Warnings and Instructions

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**⚠ WARNING** This section introduces the hazards and safety precautions associated with installing, inspecting, maintaining or servicing this product. Before performing any task on this product, read this safety information and the applicable sections in this manual, where additional hazards and safety precautions for your task will be found. Fire, explosion, electrical shock or pressure release could occur and cause damage to property, environment, resulting in serious injury or death, if these safe service procedures are not followed.

### PRELIMINARY PRECAUTIONS

**⚠ WARNING** You are working in a potentially dangerous environment of flammable fuels, vapors, and high voltage or pressures. Only trained or authorized individuals knowledgeable in the related procedures should install, inspect, maintain or service this equipment.



#### Read the Manual

Read, understand and follow this manual and any other labels or related materials supplied with this equipment. If you do not understand a procedure, call 1-800-323-1719 to locate a qualified technician. It is imperative to your safety and the safety of others to understand the procedures before beginning work. **Make sure your employees and any service contractors read and follow the instructions.**

#### Follow the Regulations

Applicable information is available in National Fire Protection Association (NFPA) 30A; *Code for Motor Fuel Dispensing Facilities and Repair Garages*, NFPA 70; *National Electrical Code* (NEC), Occupational Safety and Hazard Association (OSHA) regulations and federal, state, and local codes. All these regulations must be followed. Failure to install, inspect, maintain or service this equipment in accordance with these codes, regulations and standards may lead to legal citations with penalties or affect the safe use and operation of the equipment.

#### Prevent Explosions and Fires

Fuels and their vapors will explode or burn, if ignited. Spilled or leaking fuels cause vapors. Even filling customer tanks will cause potentially dangerous vapors in the vicinity of the dispenser or island.

#### Working Alone

It is highly recommended that someone who is capable of rendering first aid be present during servicing. Familiarize yourself with Cardiopulmonary Resuscitation (CPR) methods, if you work with or around high voltages. This information is available from the American Red Cross. Always advise the station personnel about where you will be working and caution them not to activate power while you are working on the equipment. Use the OSHA Lockout/Tagout procedures. If you are not familiar with this requirement, refer to OSHA documentation.

#### Working with Electricity Safely

Ensure that you use safe and established practices in working with electrical devices. Poorly wired devices may cause a fire, explosion or electrical shock. Ensure that grounding connections are properly made. Ensure that you do not pinch wires when replacing covers. Follow OSHA Lockout/Tagout requirements. Station employees and service contractors need to understand and comply with this program completely to ensure safety while the equipment is down. Before you start work, know the location of the Emergency Power Cutoff Switch (the E-STOP). This switch cuts off power to all fueling equipment and submerged turbine pumps and is to be used in the event of an emergency. The buttons on the console at the cashier's station WILL NOT shut off electrical power to the pump/dispenser. This means that even if you press a button on the console labeled EMERGENCY STOP, ALL STOP, PUMP STOP, or something similar, fuel may continue to flow uncontrolled.

#### Hazardous Materials

Some materials may present a health hazard if not handled correctly. Ensure that you clean hands after handling equipment. Do not place any equipment in the mouth.



**⚠ WARNING**

**FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD RESULT IN PROPERTY DAMAGE, INJURY OR DEATH.**



**FIRE HAZARD!** Do **NOT** use **power tools** (Class I Division I and Class I Division II) during the installation or maintenance of equipment. Sparking could ignite fuel or vapors, resulting in fire.



**CHEMICAL EXPOSURE HAZARD!** Wear appropriate **safety equipment** during installation or maintenance of equipment. Avoid exposure to fuel and vapors. Prolonged exposure to fuel may cause severe skin irritations and possible burns.

### REQUIREMENTS FOR USE

The selection of any Veeder-Root product must be based upon physical specifications and limitations and the product's compatibility with the materials to be handled. Veeder-Root makes no warranty of fitness for a particular purpose. All Veeder-Root products should be used in accordance with applicable federal, state and local laws, ordinances and regulations.



### OPERATING PRECAUTIONS

- **NO SMOKING.** Extinguish all open flames and pilot lights, such as on RV appliances.
- **TURN OFF** cell phones and other electronic devices to prevent sparks which could cause an explosion or fire.



## National Electrical Code Compliance

The following information is for general reference and is not intended to replace recommended National Electric Code (NEC) procedures. It is important for the installer to understand that electrical equipment and wiring located in Class I, Division 1 and 2 installations shall comply with the latest appropriate Articles found in the National Electric Code (NFPA 70) and the Code for Motor Fuel Dispensing Facilities and Repair Garages, (NFPA 30A).

### Probe- and Sensor-to-Console Wiring

#### Wire Type

To ensure the best operating systems available, Veeder-Root **REQUIRES** the use of shielded cable for all probes and sensors regardless of conduit material or application. In these installations, shielded cable must be rated less than 100 picofarad per foot and be manufactured with a material suitable for the environment, such as Carol™ C2534 or Belden™ 88760, 8760, 8770 or similar.

**NOTICE**

**Throughout this manual, when mentioning any cable or wire being used for probe and sensor to console wiring, it will be referring to shielded cable.**

#### Wire Length

Improper system operation could result in undetected potential environmental and health hazards if the probe- or sensor-to-console wire runs exceed 1000 feet. Wire runs must be less than 1000 feet to meet intrinsic safety requirements.

#### Splices

Veeder-Root recommends that no splices be made in the wire run between a sensor or probe junction box and the console. Each splice degrades signal strength and could result in poor system performance.

#### Wire Gauges – Color coded

Shielded cable must be used in all installations. Probe- and Sensor-to-Console Wires should be #14-#18 AWG stranded copper wire and installed as a Class 2 circuit. As an alternate method when approved by the local authority having jurisdiction, 22 AWG wire such as Belden 88761 may be suitable in installations with the following provisions:

- Wire run is less than 750 feet

- Capacitance does not exceed 100 pF/foot
- Inductance does not exceed 0.2  $\mu$ H/foot

### **Power Wiring**

Wires carrying 120 Vac from the power panel to the IOM or FCC and valves should be #14AWG or larger copper wire for line neutral and ground.

### **Sensor and Probe Junction Boxes**

Weatherproof electrical junction boxes with a gasketed cover are required on the end of each probe and sensor conduit run at the manhole or monitoring well location. Gasketing or sealing compound must be used at each entry to the junction box to ensure a waterproof junction. The interior volume of each junction box must be a minimum of 16 cubic inches.

Veeder-Root recommends the following junction boxes or equivalent:

- Appleton Electric Co. - JB-DX junction box, JBK-B cover, and JB-GK-V gasket.
- Crouse-Hinds Co. - GRFX-139 junction box, GRF-10 cover, and GASK-643 gasket.

### **System Limitations**

- Pump Control for Tank in which HydrX is installed must be routed through the TLS-4xx Input/Output module. IPC compatibility is not supported at this time.
- Where cathodic protection or impressed current systems are used on steel tanks, provisions must be made to isolate the HydrX system in the same manner the STP is isolated.

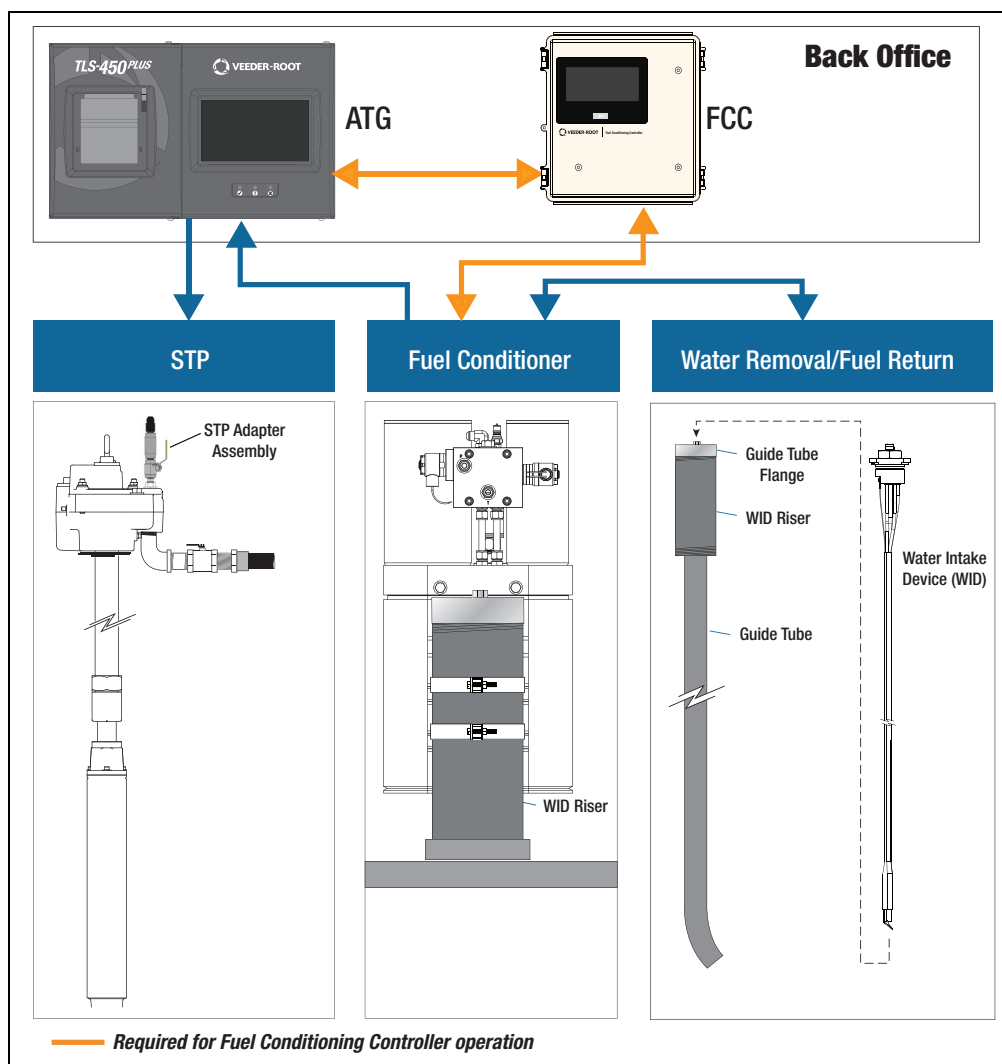
### **Inspections and Compliance**

While conducting compliance testing of fueling system components, no special precautions need to be taken with respect to the HydrX System. The HydrX pump adapter ball valve may remain open and the HydrX circuit breaker may remain on. If the state of any HydrX components are altered during compliance testing, the components must be returned to an operational state. Running a HydrX 'Fill Cycle' following service completion ensures the system is prepared to operate.

## Overview

The HydrX™ Fuel Conditioning System is installed and used in diesel STP containment sumps. Its purpose is to remove accumulated water from the tank bottom and help prevent microbial growth that can lead to broad fueling system contamination and, ultimately, corrosion of fueling system components.

The Hydrx system is controlled directly from the TLS-4xx. Certain site configurations may require the use of an external Fuel Conditioning Controller (see Figure 1).



**Figure 1. HydrX System Components**

The HydrX system includes an in-sump Fuel Conditioner containing a water detection probe and pressure sensor to monitor water collection and flow efficiency respectively. In order to process the fuel, remove water and trap particulate, the HydrX system utilizes 2-way inlet and outlet valves to control flow through the Water Intake Device for either suction based extraction or pressure based sweeping or fuel polishing.

## HydrX Sump Components

Sump components of the HydrX system are shown in Figure 2.

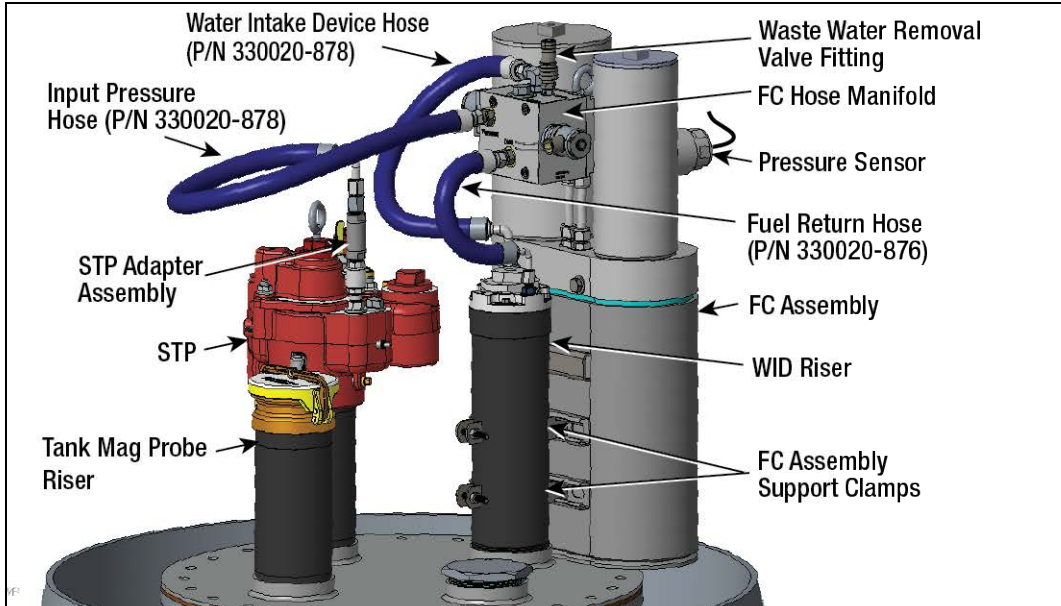


Figure 2. HydrX In-Sump Components

## Fuel Conditioner (FC) Assembly

The Fuel Conditioner (FC) Assembly connects to the STP and to the Water Intake Device (WID) at the top of the WID Riser. The WID returns processed fuel to the tank through a port in the Guide Tube flange. Components of the FC are shown in Figure 3.

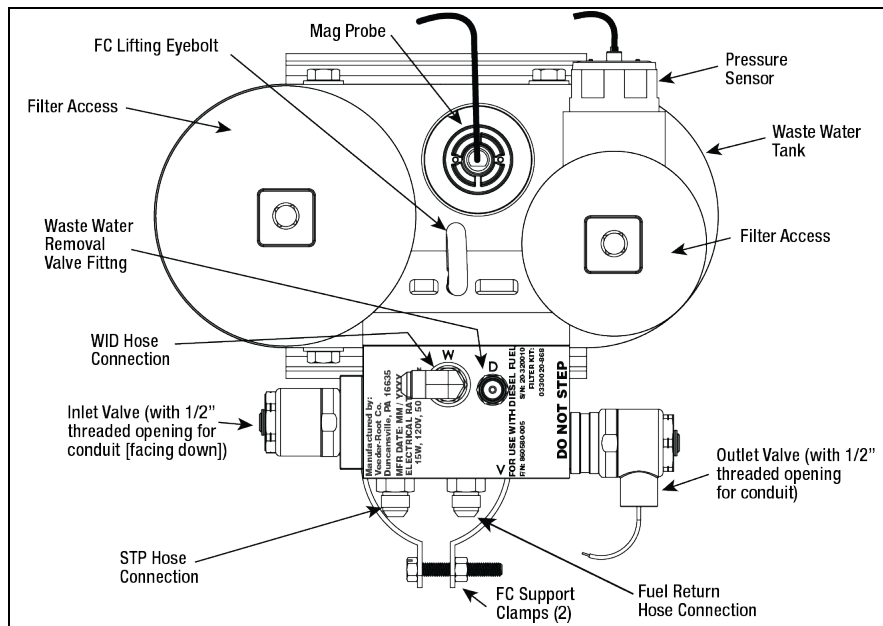


Figure 3. FC Assembly Components

# Control Options

## 1-ATG CONTROL

The HydrX system can be controlled directly from the ATG (see Figure 4). In this configuration the valves and pump request are powered through the ATG I/O module.



Figure 4. ATG HydrX System Overview Screen

## 2-FCC CONTROL

Certain HydrX systems are controlled by an external FCC which is mounted on a wall in the back office (see Figure 5). The FCC monitors the Fuel Conditioner in the sump. The FCC turns the pump on via the pump request wire from the FCC to the Pump Relay box. The ATG receives HydrX status from the FCC which is then displayed on the TLS-4xx HydrX Overview (see Figure 4).

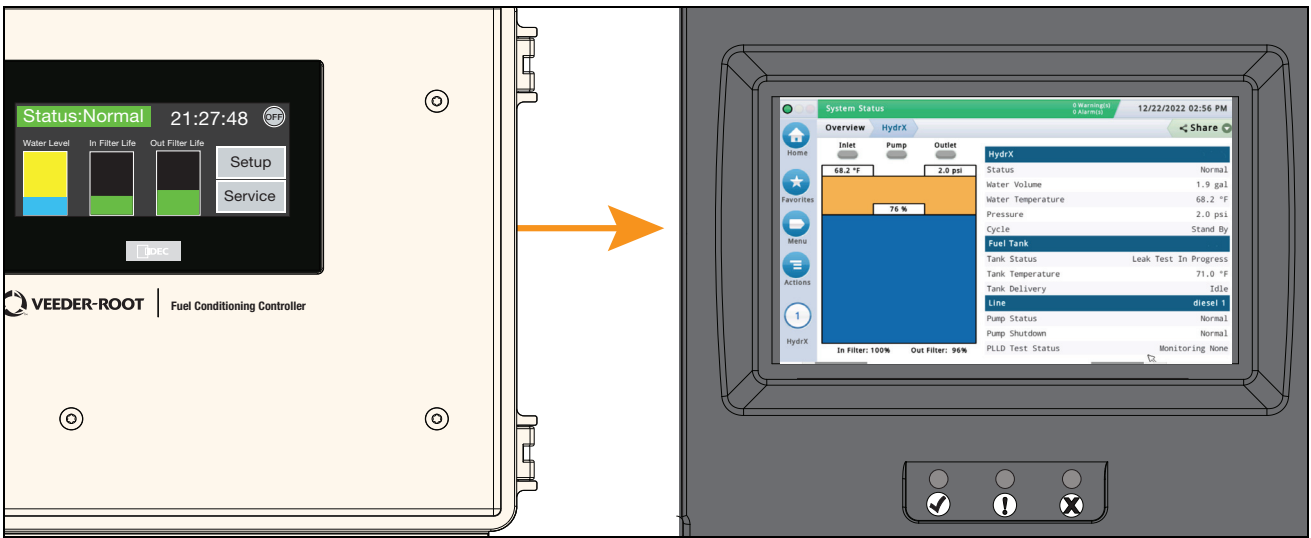


Figure 5. FCC Display and Example ATG HydrX System Overview Screen

## Guide Tube/Water Intake Device (WID)

The WID Riser has a special flange which supports the Guide Tube and which allows the Guide Tube to be oriented towards the pooled water at the low end of the tank. Once the Guide Tube is bolted in the desired direction, the WID is lowered down through the Guide Tube until the vacuum tip end of the WID reaches the center of the pooled water in the tank. The lengths of both the Guide Tube and the WID are custom made to measurements recorded in the HydrX Site Inspection Guide.

**NOTICE** If guide tube is installed before the Water Intake Device is available, a 2"- 2.5" expanding plug and 3/8" JIC cap can be used to seal the UST for air testing. Recommended expanding plugs include Cherne Industries 270528, Parker 0PCP-6 or equivalent.

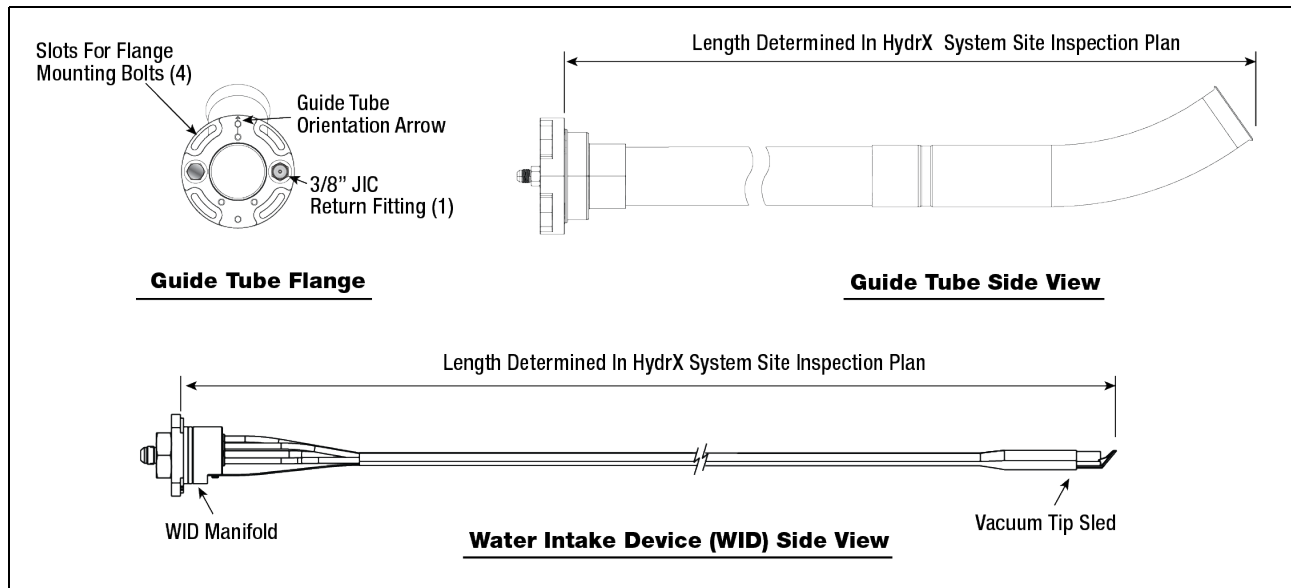


Figure 6. Guide Tube and Water Intake Device

## Installation

**NOTICE** During new installs, if there needs to be a 3rd party tank test done, or, a tank cleaning prior to opening the site, the HydrX should be installed after the tank cleaning and tank test to avoid having to remove the WID. Also, for any future tank cleanings, the WID must be removed prior to the tank cleaning.

### Recommended Tools and Materials for Fuel Conditioner Installation

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- Software Enhancement for HydrX Fuel Conditioning System (P/N 332972-032)
- Crescent wrench, large socket or custom tool – To remove 4" plug from manway plate
- Pipe wrench, chain wrench or strap wrench – To tighten the 4" stainless steel riser pipe w/flange
- Gas rated thread sealant – to put on the threads of the 4" stainless steel riser pipe.
- WID alignment tool (P/N 334003-001) – to align the WID Guide Tube before tightening it to the WID riser
- A 3/8" socket – to tighten the WID Guide Tube to the WID 4" riser/flange. Also to fasten the WID to the Guide Tube
- A 11/16" and 7/8" open ended wrench, or adjustable wrench – to tighten the hose connections from the FCC manifold to the WID, as well as the STP Adapter Assembly
- A 3-foot explosion proof flexible conduit, 1/2" electrical union, misc. 1/2" pipe nipples) - Miscellaneous electrical fittings to connect the HydrX junction box to the high power junction box in the STP sump (Kit P/N 330020-885).
- Tripod winch to lower Fuel Conditioner into sump - minimum safe load rating of 250 pounds.

### WID Riser and Guide Tube Installation

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1. Get the 4-inch stainless steel WID Riser with Guide Tube Flange from the kit. Apply a coating of fresh, UL classified for petroleum, non-setting thread sealant on the threads of the riser and install it in the same 4" manway fitting which was chosen in the HydrX Site Inspection Guide.
2. Figure 7 shows the preferred location for the WID Riser. Refer to your HydrX Site Inspection Guide to determine the tank tilt. Since the Guide Tube directs the deployment of the Water Intake Device (WID), it must be pointed in the direction of the pooling water. The Guide Tube orientation and WID configuration (1, 3, or 6 tubes) were determined by measurements made in your HydrX Site Inspection Guide.
3. Once the riser is installed, get the Guide Tube assembly and alignment bar from the kit. The Guide Tube is inserted into the riser and sits on the riser flange. Example Guide Tube installations are shown in Figure 7 and Figure 8.

**NOTICE** Apply anti-seize compound to the threads of the four 1/4-20 WID flange bolts before installing.

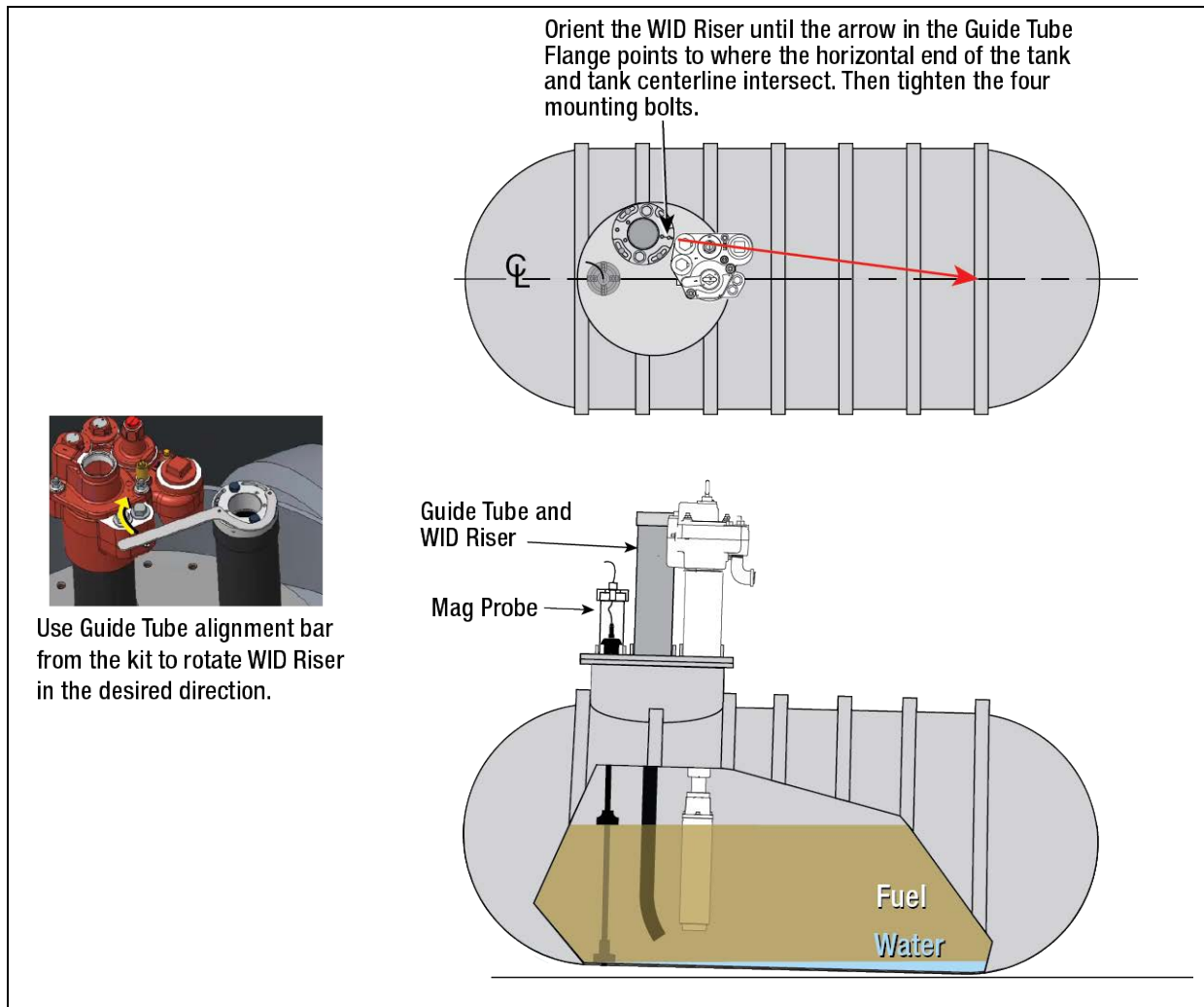


Figure 7. Guide Tube Installation Example - Tank Tilting Away From Manway



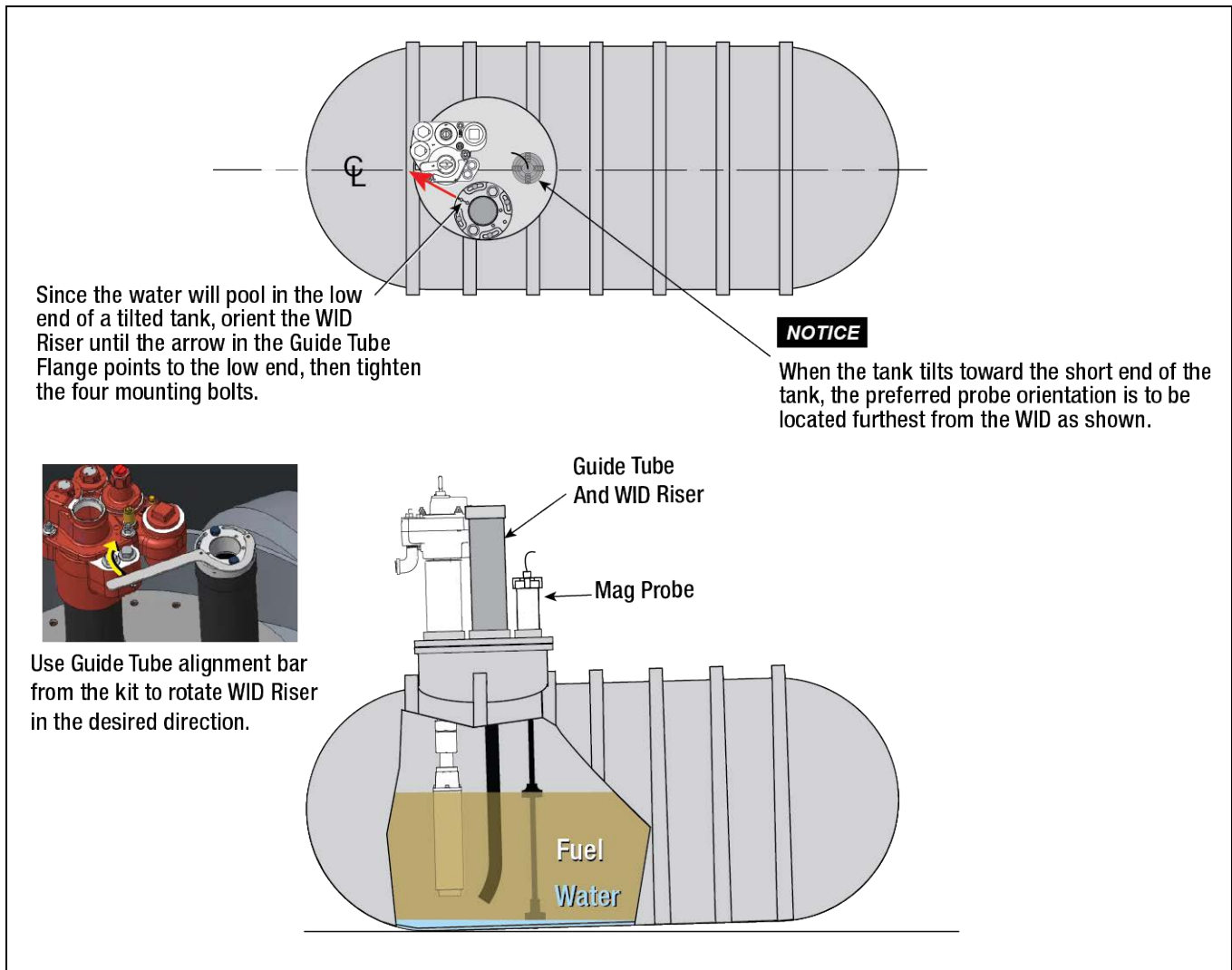


Figure 8. Guide Tube Installation Example - Tank Tilting Toward Short End of The Tank

## Water Intake Device Installation

1. Get the Water Intake Device (WID) assembly from the kit. The WID length and tube configuration was determined by measurements made in the HydrX Site Inspection Guide.
2. At the Guide Tube flange uncoil the WID tubing assembly while pushing the WID down into the Guide Tube flange (see Figure 9). Continue uncoiling/pushing the tubing assembly down until the WID flange seats against the Guide Tube flange. Since the Guide Tube is locked in the desired direction, the WID tubing's rectangular end will follow the desired path to the middle of the tank's low end.

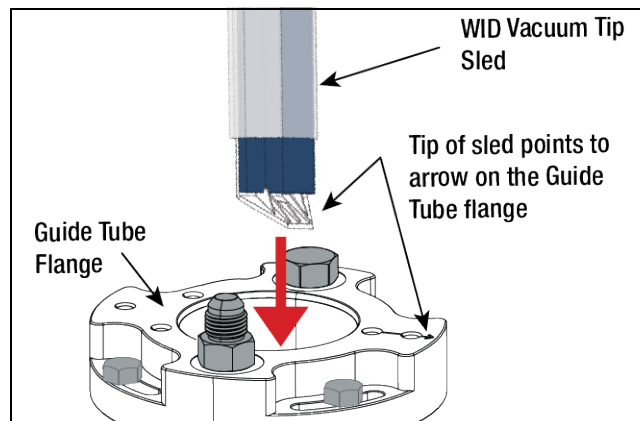


Figure 9. Installing WID

3. Secure the WID flange onto the Guide Tube flange with the 3 bolts from the kit.

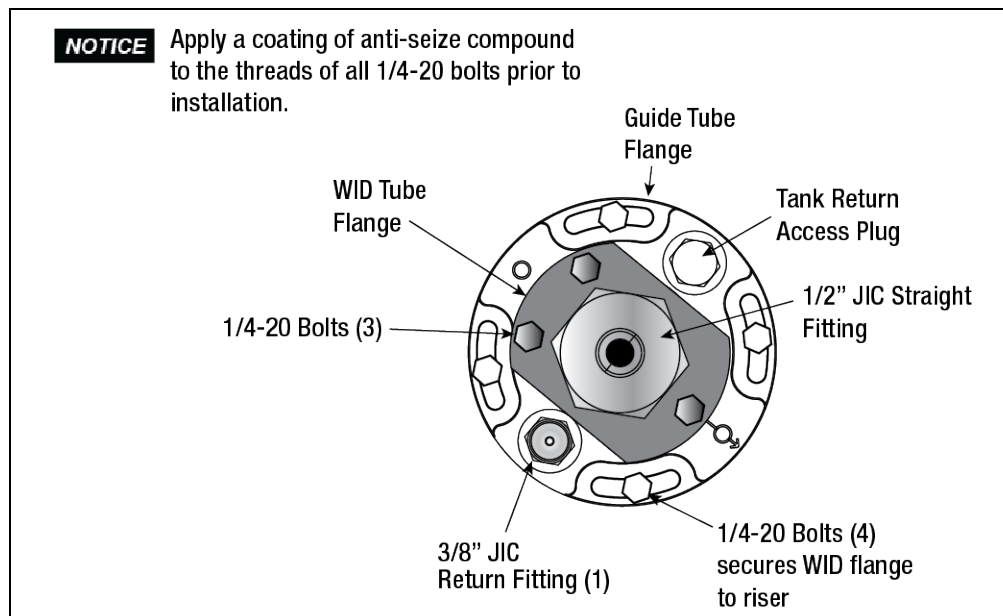
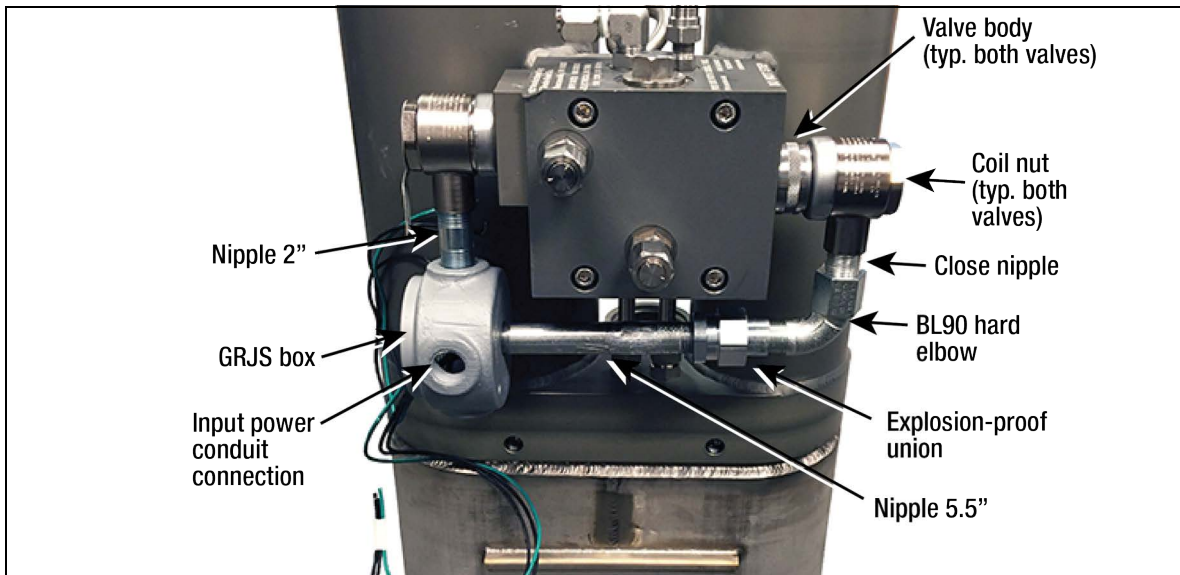


Figure 10. Securing WID Flange To Guide Tube Flange

## Fuel Conditioner Installation

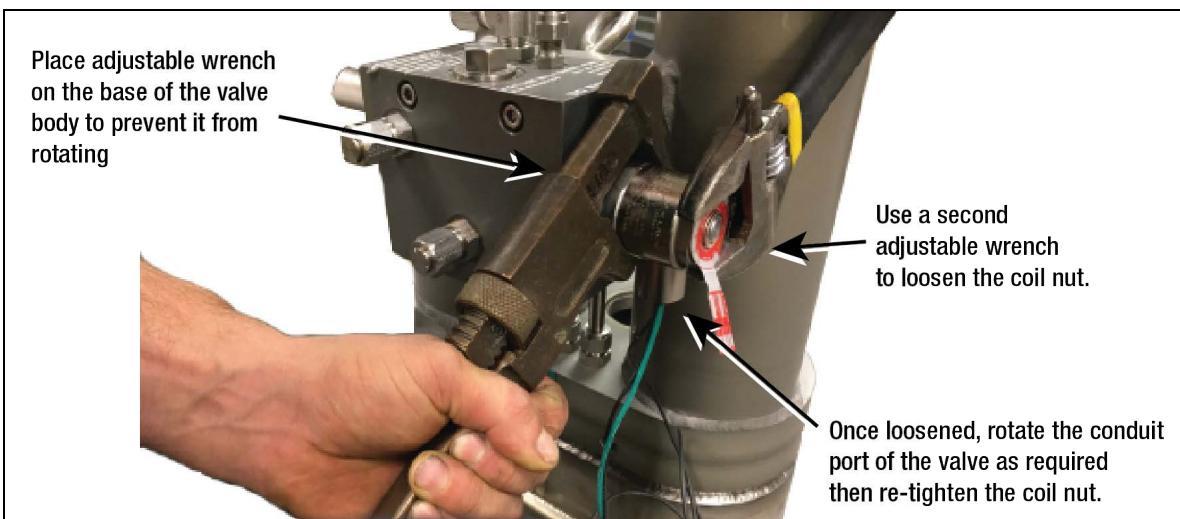
### Attaching FC Valve Wiring Conduit

Prior to lowering the Fuel Conditioner into the sump it is recommended that the electrical conduit components for the HydrX inlet/outlet valves be installed as shown in Figure 11. V-R Conduit Kit (P/N 330020-885) contains all of the necessary parts shown in the figure. Apply anti-seize to the threads of the conduit components.



**Figure 11. Inlet/Outlet Valve Electrical Conduit Installation**

The conduit connection of each valve can be loosened to facilitate conduit attachment as shown in Figure 12.



**Figure 12. Loosening Inlet/Outlet Valve Conduit Connection**

## Installing FC Into Sump

1. The dimensions of the two HydrX models are shown in Figure 13. 10 inches of clearance must be available between the top of the filter caps and the sump to allow for easy replacement of filter elements.

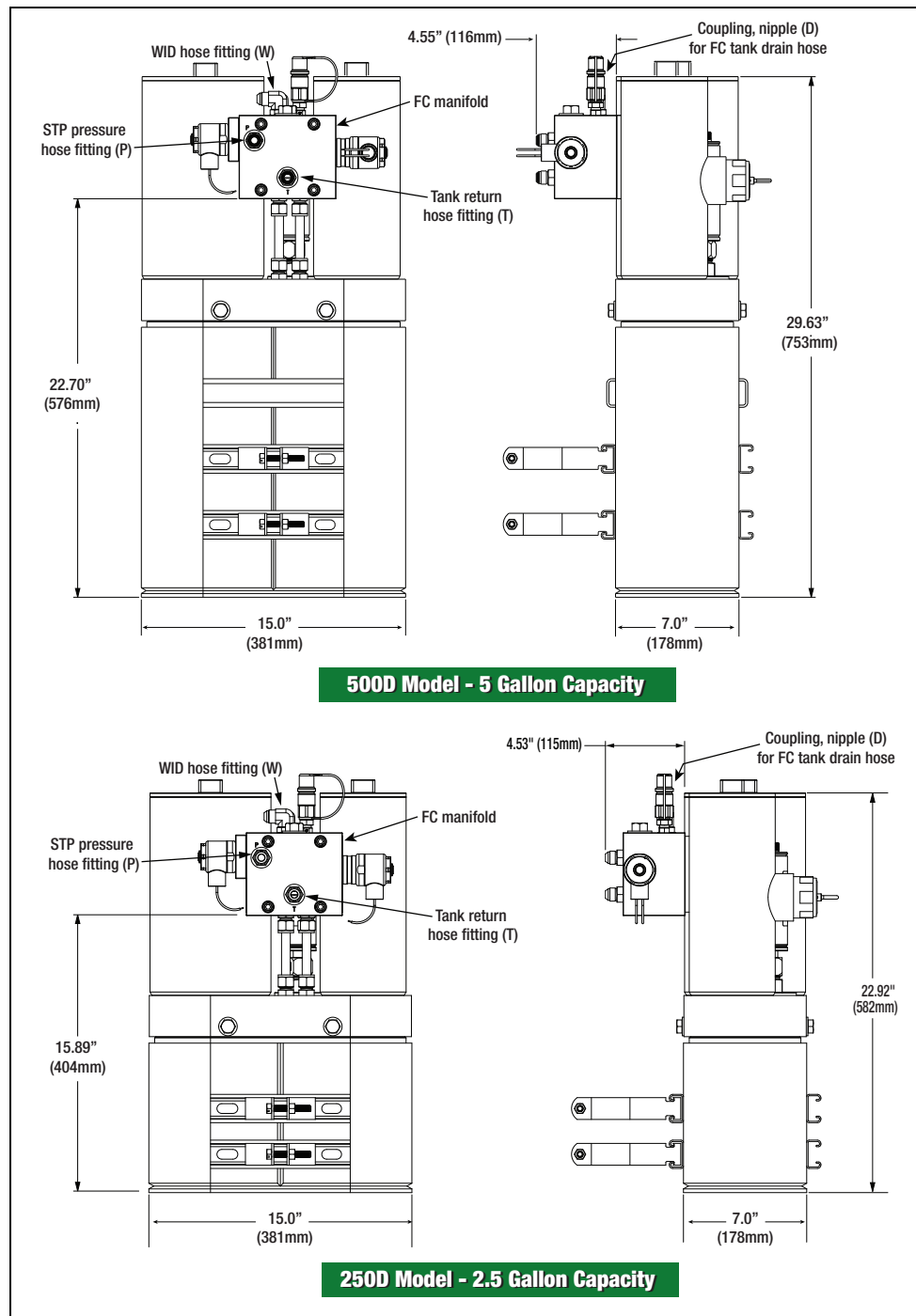


Figure 13. FC Dimensions

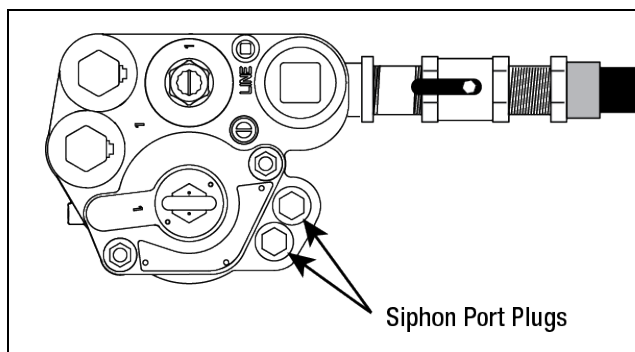
2. Check the lifting bolt on the top of the HydrX and make sure it is well tightened as it will support the approximate 145-pound weight of the HydrX fuel conditioner.
3. Utilizing a tripod and winch connected to the eyebolt, carefully lower the HydrX down into the sump and onto the Guide Tube riser until the assembly has bottomed against the manway.
4. Orient the HydrX until the hose connections on the manifold are facing the center of the manway (see Figure 2). If necessary due to space limitations, the assembly can face the opposite way. Once it is in its final position, tighten the two support clamps securely.

### STP Adapter Assembly Installation - The Red Jacket STP



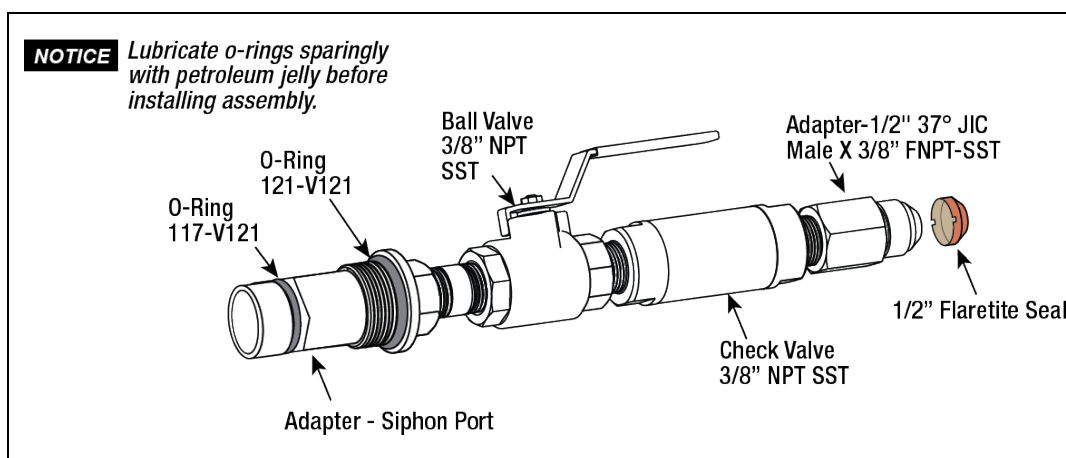
**Turn off the electricity, tag and lockout the electrical power switch to the dispenser/pump. Relieve pump pressure before proceeding with this installation.**

1. Get the STP Adapter Assembly from the kit.
2. Remove one of the siphon port plugs from the STP (see Figure 14).



**Figure 14. Locating TRJ Siphon Port Plugs**

3. Lubricate the two o-rings of the STP Adapter Assembly with petroleum jelly and install the assembly into the siphon port of the STP and tighten securely (see Figure 15).



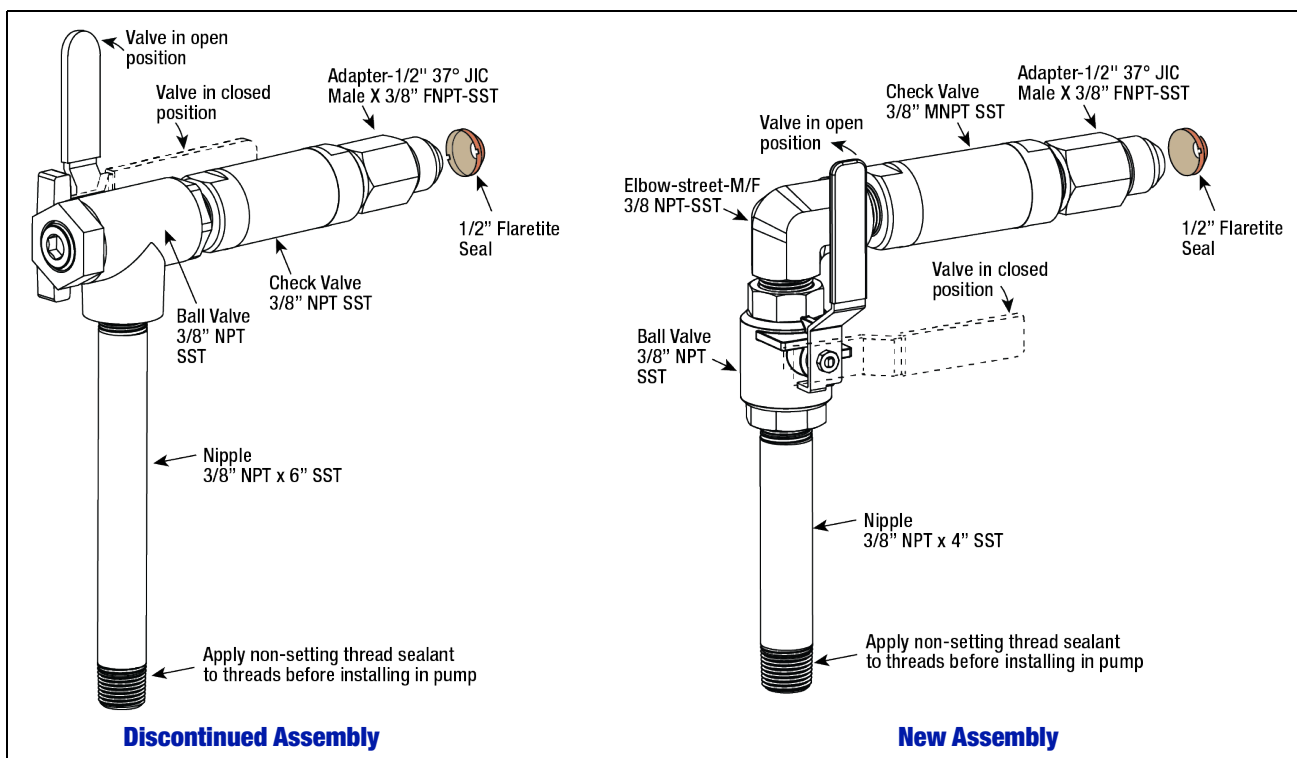
**Figure 15. TRJ Pump Siphon Port Assembly**

## STP Adapter Assembly Installation - FE Petro STP



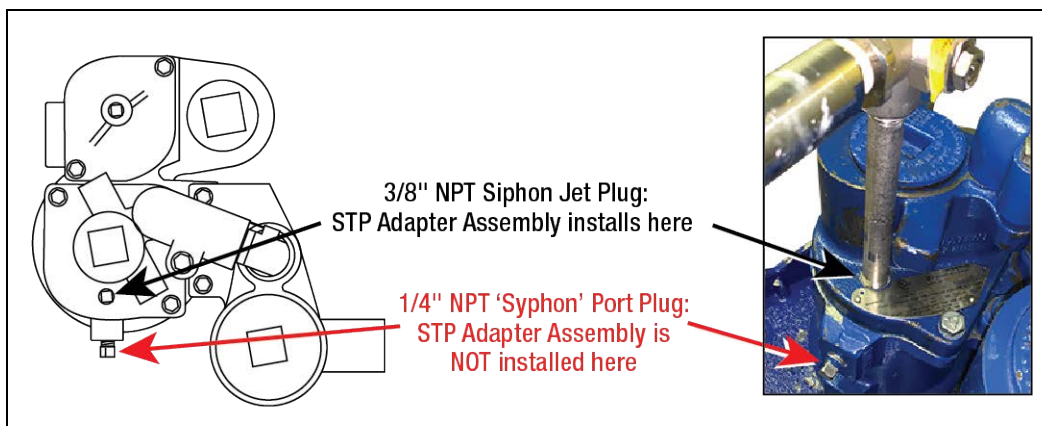
**Turn off the electricity, tag and lockout the electrical power switch to the dispenser/pump. Relieve pump pressure before proceeding with this installation.**

- Get the STP Adapter Assembly from the kit (see Figure 16).



**Figure 16. FE Petro STP Adapter Assemblies**

- Remove the 3/8" NPT siphon jet port plug from the STP (see Figure 17).



**Figure 17. Locating FE Petro 3/8" NPT Siphon Jet Port**

- Apply a coat of fresh, UL classified for petroleum, non-setting thread sealant to the threads of the STP Adapter Assembly and install it in the siphon jet port and tighten securely.



## Attaching Hoses Between HydrX System In-Sump Components

Figure 18 shows a manifold hose connection mock-up and Figure 19 is an example installation.

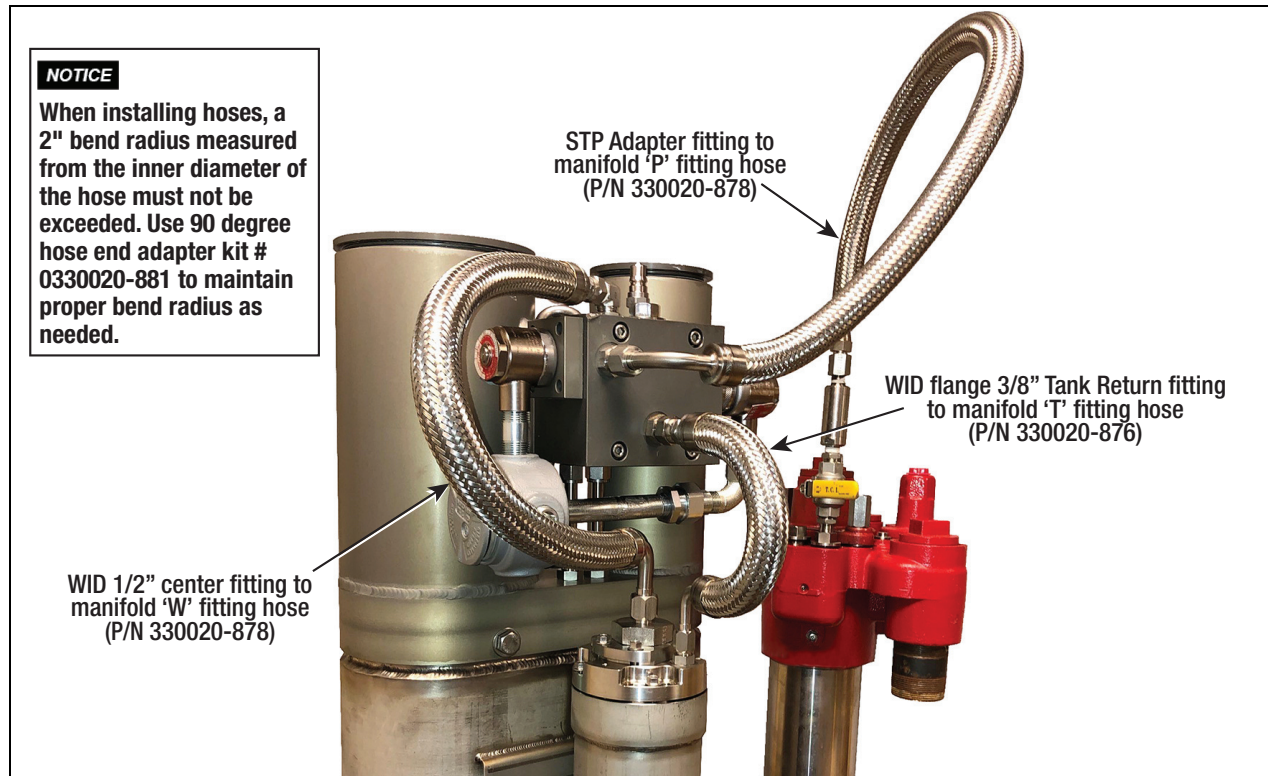


Figure 18. Hose Connection Mock-Up

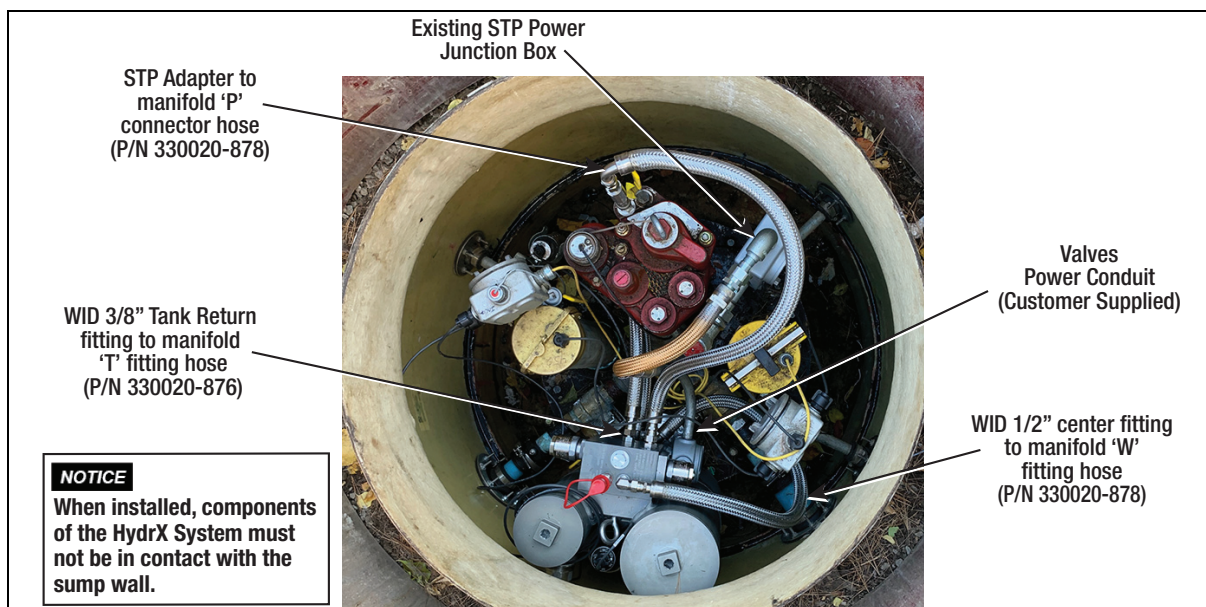


Figure 19. Hose Connection Installed

1. Get the three braided corrugated metal hoses from the kit:
  - The STP Adapter Assembly to manifold 'P' fitting hose (P/N 334016-036) with a 1/2" JIC elbow female fitting on one end and a 1/2" JIC straight female fitting on the other end.
  - The manifold 'T' fitting tank return hose (P/N 334018-036) with a 3/8" JIC elbow female fitting on one end and a 1/2" JIC straight female fitting on the other end. Also get the 3/8" JIC male, 5/8"-16 UNF male threaded fitting (P/N 576008-718) that replaces one of the guide tube flange tank return access plugs.
  - The manifold 'W' fitting to WID hose (P/N 334016-036) with a 1/2" JIC elbow female fitting on one end and a 1/2" JIC straight female fitting on the other end.
2. Place a 1/2" flaretite seal from the kit onto the 1/2" JIC fitting at the top of the STP Adapter Assembly and attach the 1/2" JIC elbow end of the hose to it (see flaretite seal placement example in Figure 15 or Figure 16 as required).

**NOTICE** When necessary to remove the pump extractable, close the STP Adapter Assembly valve and loosen this hose connection and drain the hose. Once the hose has drained move it out of the way as you lift out the extractable. The STP Adapter Assembly does not have to be disconnected from the pump siphon port.

3. Place a 1/2" flaretite seal from the kit onto the male 1/2" JIC fitting marked 'P' on the front of the Manifold and attach the 1/2" JIC straight fitting of the hose to it (see Figure 20). Tighten the fittings at both ends of the hose.

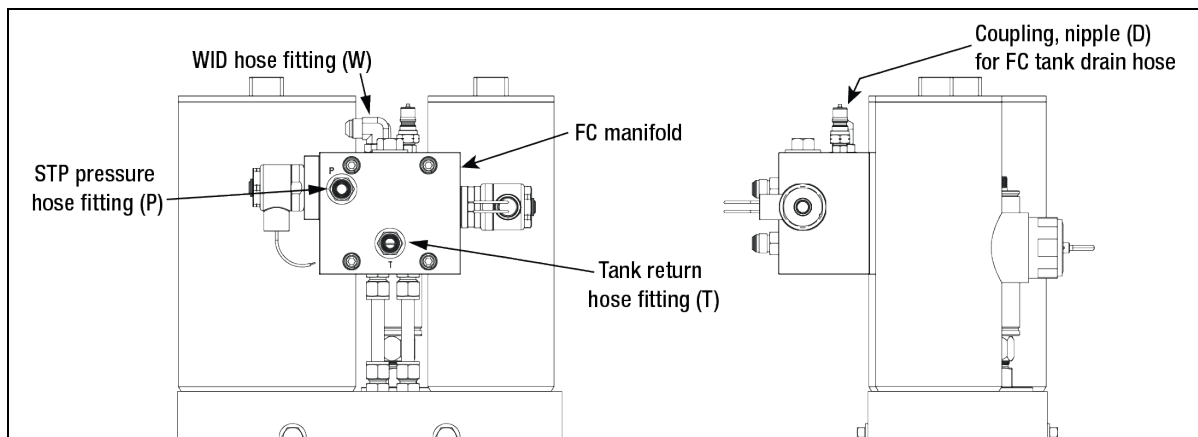
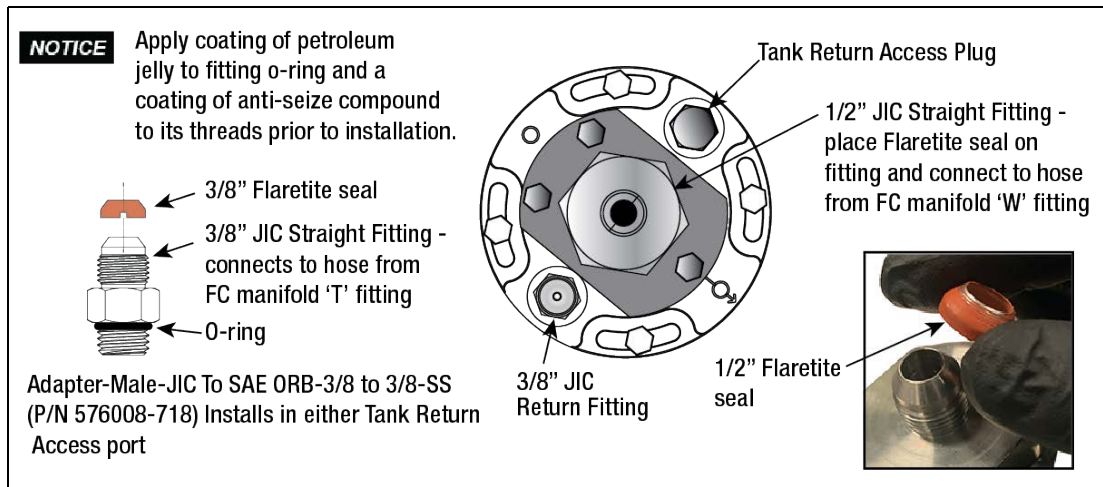


Figure 20. Manifold Hose Connections

**NOTICE** Hose end straight vs 90 orientation is based upon availability of space. All hoses except the return hose from the WID that connects to FC manifold fitting 'T' can be installed in either straight or 90° position. Use 90° Hose End Adapter kits (kit P/N 330020-881) as required.

4. Depending on accessibility, the tank return fitting may be moved to either tank return access ports on the guide tube flange. (see Figure 21). This fitting comes pre-installed.





**Figure 21. WID Hose Connections**

5. Place the 3/8" flaretite seal from the kit onto the 3/8" JIC male end of the tank return adapter fitting (Figure 21). Attach the 3/8" JIC elbow female fitting end of the drain hose to the 3/8" JIC male drain adapter fitting.
6. Place a 1/2" flaretite seal from the kit onto the 1/2" JIC fitting marked 'T' on the front of the Manifold and attach the 1/2" JIC straight end of the drain hose to it (see Figure 20). Tighten the fittings at both ends of the hose.
7. Place a 1/2" flaretite seal from the kit onto the male 1/2" JIC elbow fitting labeled 'W' on top of the manifold (see Figure 20) and attach the 1/2" JIC straight end of the hose to it. Place a 1/2" flaretite seal from the kit onto the male 1/2" JIC straight fitting on top of the WID flange (Figure 21) and attach the 1/2" JIC elbow fitting of the hose to it (see Figure 10). Tighten the fittings at both ends of the hose.

## HydrX System Wiring



**Disconnect, tag and lock out power at the power panel when making AC wiring connections.**

### HydrX Inlet/Outlet Valve AC Power Connections

---

1. Pull 4, #14 THHN conductors and 1, #14 THHN ground from the HydrX Controller (TLS 4xx I/OM or FCC) to the STP power junction box. Recommended colors are, 1x Yellow = Outlet Valve 120v, 1x Blue = Inlet Valve 120v, 2x White (Inlet Valve/Outlet Valve neutrals), 1x Green = ground.

**NOTICE** The Inlet and Outlet Valve cables are 120VAC and can be pulled through the pump AC wiring conduit.

2. Connect flexible conduit (recommended) from the STP power junction box to the HydrX junction box.
3. Route the valve wires in Step 1 from the STP power junction box through the flex conduit into the HydrX valve junction box.
4. Connect the inlet and outlet valve wires coming from the HydrX Controller (TLS 4xx I/OM or FCC) to the Inlet and Outlet Valves in the HydrX junction box.

### HydrX Intrinsically-Safe Probe/Sensor Wiring Connections

---

#### WIRING RUN THROUGH RIGID CONDUIT

1. Open the sump's existing Intrinsically Safe (I.S.) junction box. Pull two 2-wire cables, one marked 'Mag Probe' and one marked 'Pressure Sensor' from the ATG into the I.S. junction box.
2. Align the groove in the probe cable connector with the ridge in the probe canister connector and push the cable connector down onto the canister connector pins, then tighten down the integral nut.
3. Insert the cable ends from the Mag Probe and Pressure Sensor into the I.S. junction box.
4. Connect the Mag Probe wires to the wires from the ATG marked 'Mag Probe' using wire nuts. Connect the Sensor wires to the wires from the ATG marked 'Pressure Sensor' using wire nuts.

**NOTICE** Observe polarity when making these connections to ensure the Pressure Sensor and Mag Probe outputs are attached to the correct terminals of the USM module in the ATG.

5. Seal each cable's connections in an epoxy sealant pack following the instructions in Figure 22. Place the two sealed wiring packs into the I.S. junction box. Replace and tighten the junction box cover.

**NOTICE** Do NOT terminate shield or drain wire in the field junction box. Ground shield and drain wires at console only.

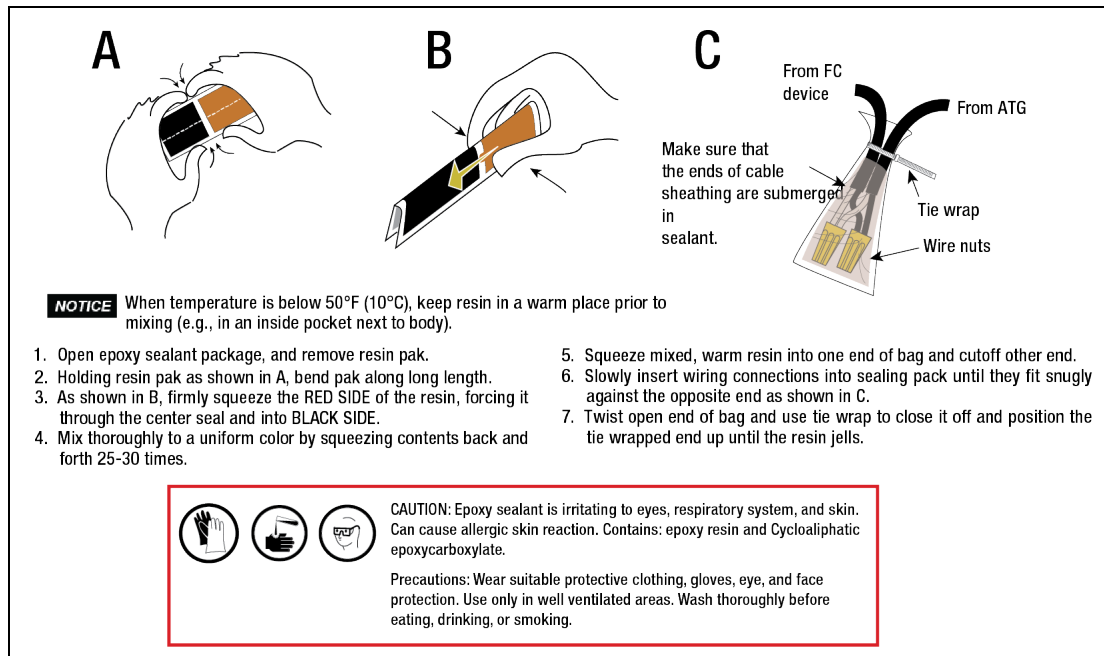


Figure 22. Epoxy Sealing Mag Probe and Pressure Sensor Field Connections

## DIRECT BURIAL CABLE

1. If using direct burial cable instead of existing I.S. conduit, refer to the Direct Burial Cable Installation Manual 576013-858.
2. The 'Mag Probe' and 'Pressure Sensor' marked cables from the ATG will be routed into the sump following the direct burial cable method.
3. Align the groove in the probe cable connector with the ridge in the probe canister connector and push the cable connector down onto the canister connector pins, then tighten down the integral nut.
4. If there is an I.S. junction box in the sump, insert the cable ends from the Mag Probe and Pressure Sensor into the I.S. junction box. If no junction box is in the sump skip to Step 7.
5. Connect the Mag Probe wires to the wires from the ATG marked 'Mag Probe' using wire nuts. Connect the Pressure Sensor wires to the wires from the ATG marked 'Pressure Sensor' using wire nuts.

**NOTICE** Observe polarity when making these connections to ensure the Pressure Sensor and Mag Probe outputs are attached to the correct terminals of the USM module in the ATG.

6. Seal each cable's connections in an epoxy sealant pack following the instructions in Figure 22. Place the two sealed wiring packs into the I.S. junction box. Replace and tighten the junction box cover.

**NOTICE** Do NOT terminate shield or drain wire in the field junction box. Ground shield and drain wires at console only.

7. Connect the cables from the ATG marked 'Mag Probe' and 'Pressure Sensor' to the Mag Probe and Pressure Sensor cables respectively, following the cable splicing and sealing instructions in the Direct Burial Cable Installation Manual.

## HydrX System Pump Control

### FE Petro Pump Controller

When an FE Petro pump is used with the HydrX System, the Controller's Extended Run Disable DIP switch must be set to the On position (disabled). The location of this DIP switch is shown in two FE Petro Controllers (see Figure 23).

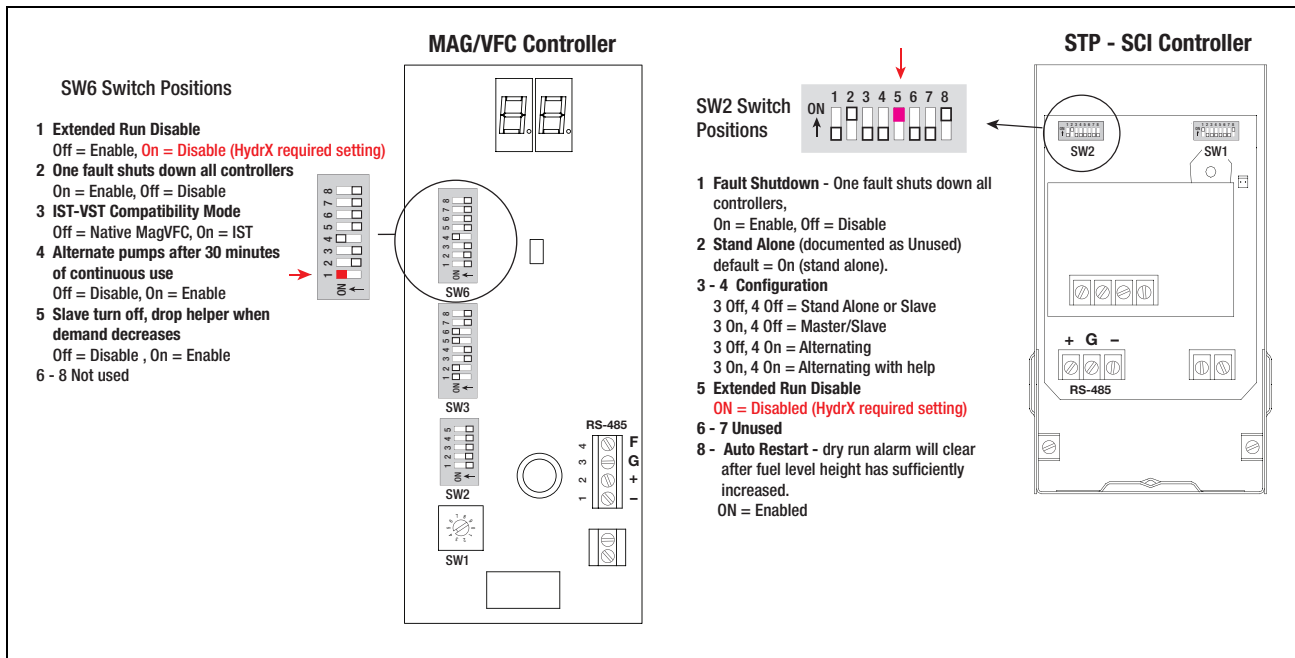


Figure 23. FE Petro SCI/Mag VFC Controller DIP Switch Locations

### Red Jacket IQ Control Box

**NOTICE** If a Red Jacket IQ Control Box is used with the HydrX System, Auto Cycle Start and End Times must be adjusted to under 6 hours duration to avoid extended run warnings.

### Guardian Pump Controller

**NOTICE** If using a Guardian pump controller, refer to manufacturer's product literature for proper dip switch settings.

## TLS-4xx Control Wiring Diagrams

Figure 32 through Figure 33 illustrate example HydrX power wiring connections between the Fuel Conditioner and TLS-4xx.

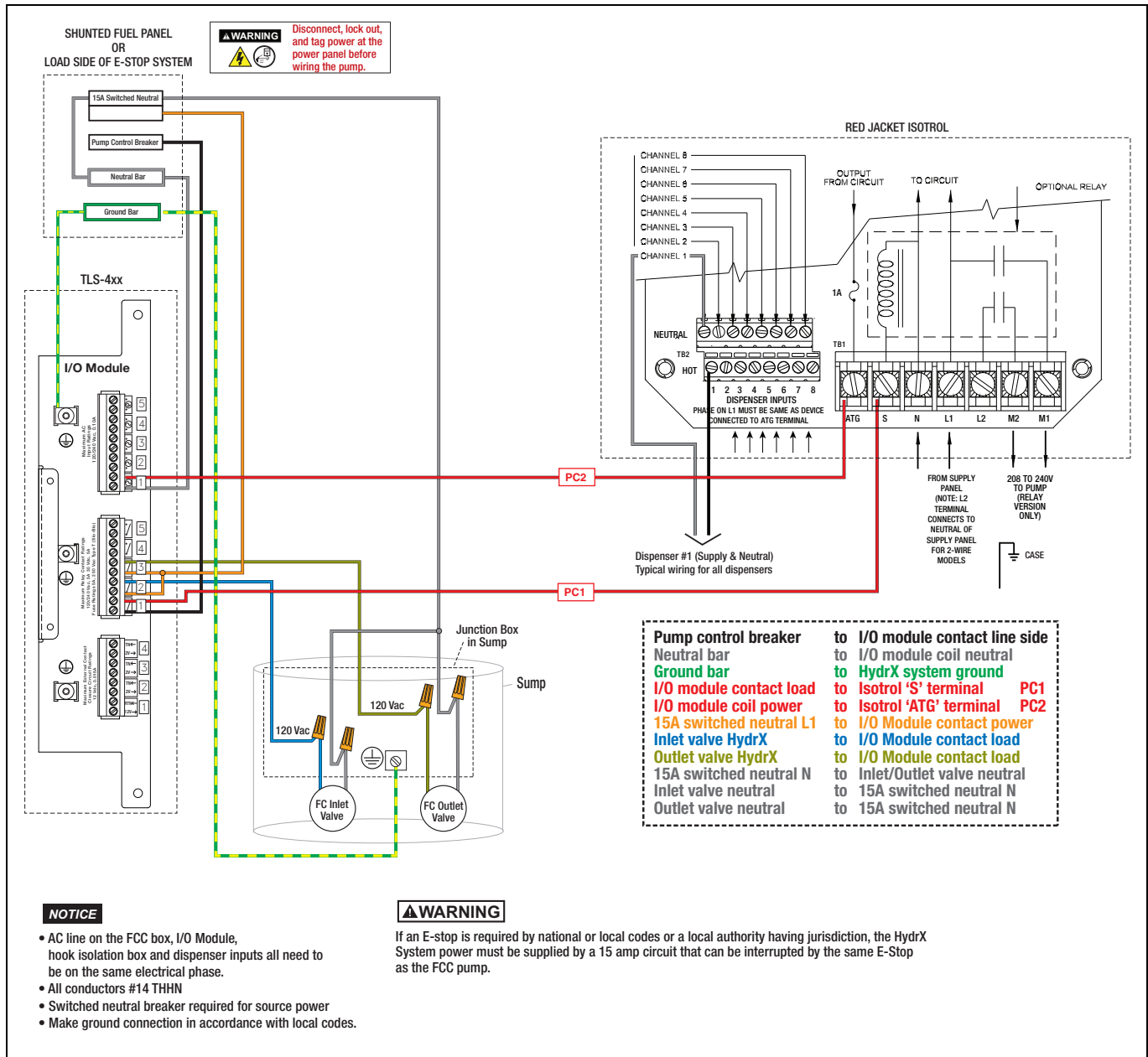


Figure 24. TLS-4xx Control Wiring - RJ Isotrol

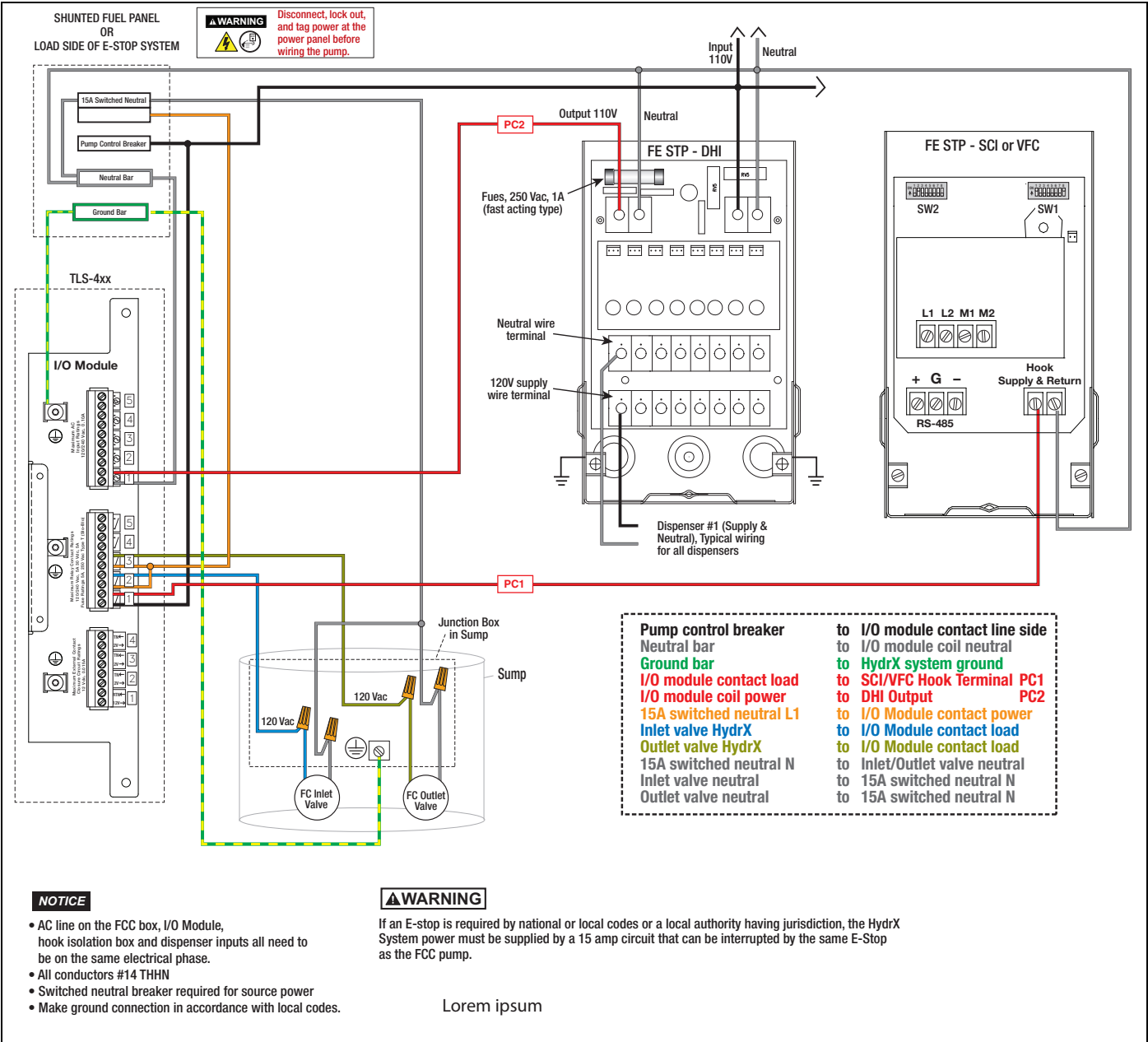


Figure 25. TLS-4xx Control Wiring - FE DHI/SCI/VFC

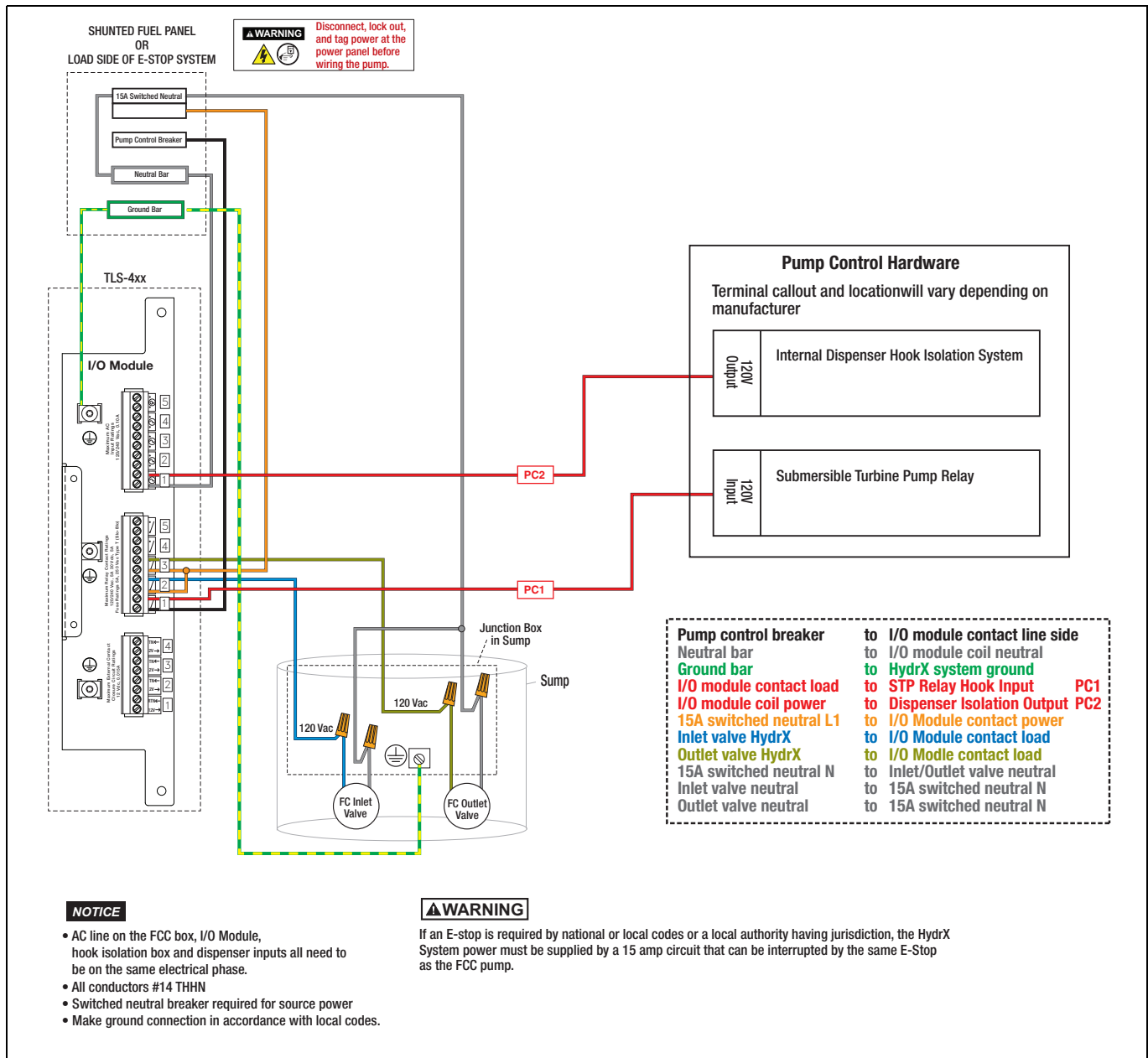







Figure 26. TLS-4xx Control Wiring - Pre-Fab Panel

## HydrX Probe/Pressure Sensor Wiring to TLS-4xx

 <b>WARNING</b>	
    	<p><b>FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</b></p> <p>The equipment is used in location where lethal voltages and explosive vapors or flammable fuels may be present.</p> <p>Care must be taken when installing, servicing or replacing parts in the system or serious injury or death from explosion, fire or shock may occur.</p> <p>For this system:</p> <ol style="list-style-type: none"> <li>1. Comply with the latest National Electric Code, federal, state, and local codes, and any other applicable safety codes. In addition, take necessary precautions during installation, service, and repair to prevent personal injury, property loss and equipment damage.</li> <li>2. Refer servicing to trained and qualified personnel only.</li> <li>3. Substitution of components may impair intrinsic safety.</li> <li>4. Be sure AC power is "OFF" before opening the console panel doors and connecting device wiring. Do not short any voltage across any barrier terminal including sensors or probes.</li> </ol>



### Probe and Sensor Wiring Precautions

**IMPORTANT** - You must read and understand this information prior to wiring devices to console.

**⚠ WARNING**

During programming, the devices wired to each connector are identified and stored in system memory. If a device is later removed and reconnected to a different set of connectors, the system will not properly recognize the data being received. Once a device has been wired to certain connectors on a USM or I/O Module and the system has been programmed, the wires from that device may not be relocated to other connectors without reprogramming that device.

**⚠ WARNING**

**Only intrinsically-safe wiring can enter a USM module slot knockouts.**

Try not to have too much wire in the console. Pull unneeded wire back into the wiring trough and loop it neatly.

1. Open both front doors of the console (see Figure 27) or the door of the TLS-XB as appropriate.
2. For sensors and probes, terminate the ground shields to the ground lug on the module (the other end at the probe or sensor is NOT grounded).
3. Write in the device name for each wire connection on the connector block in the module's wiring label attached to the inside of the door.



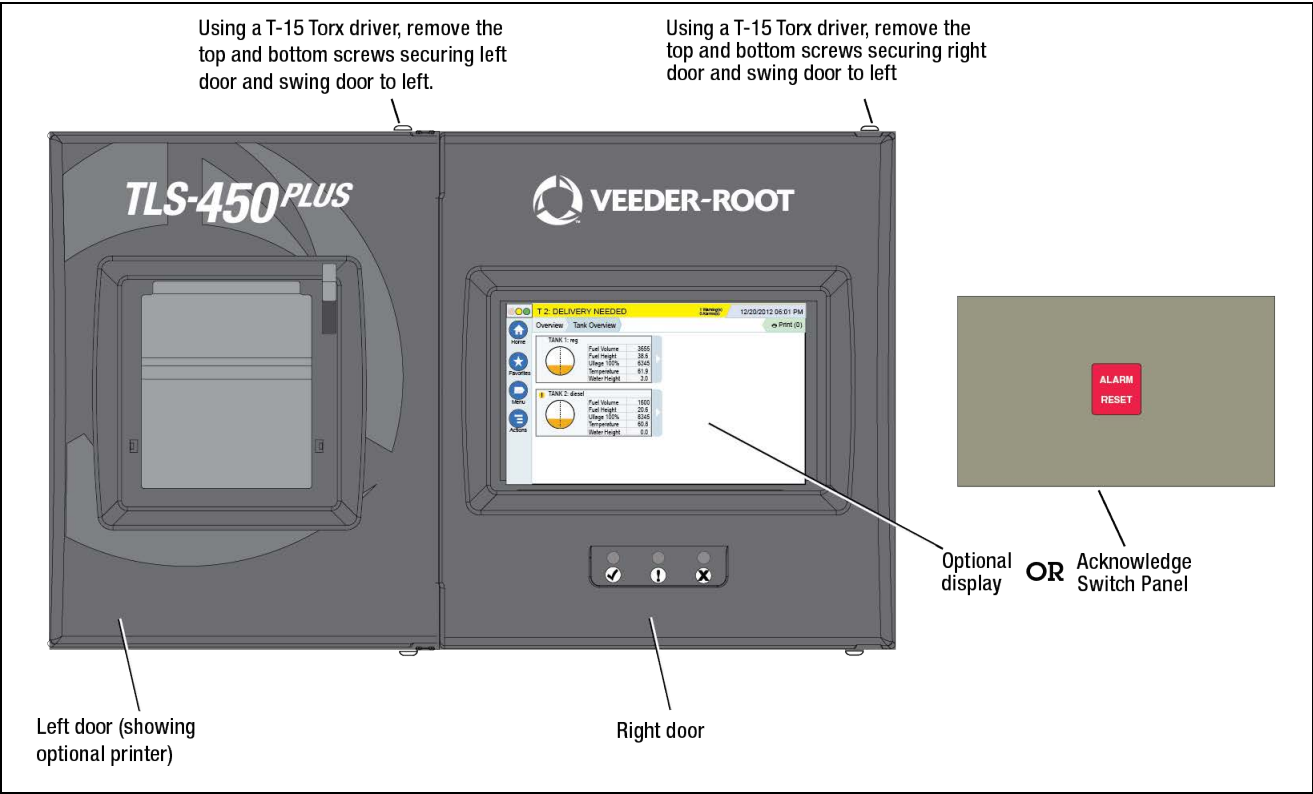


Figure 27. TLS-450PLUS Access

- 1. Refer to Figure 28 below for TLS-4xx HydrX Mag Probe and Pressure Sensor wiring connections.

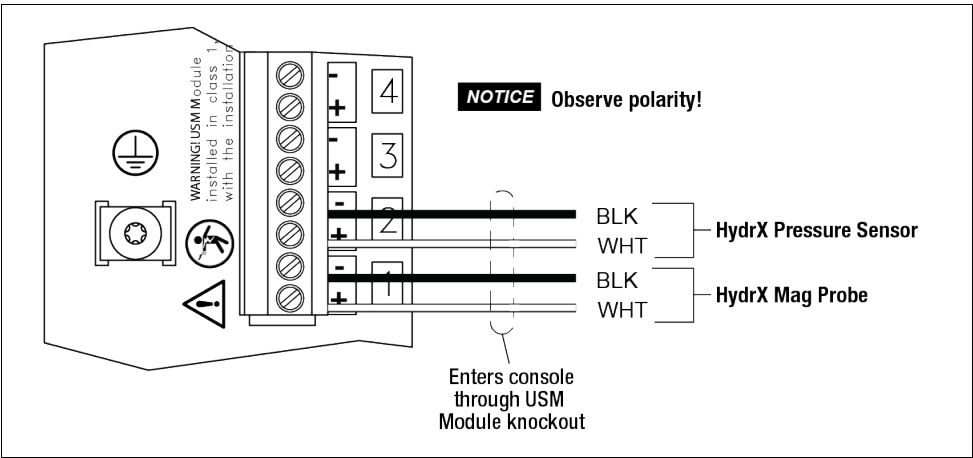


Figure 28. HydrX Mag Probe/Pressure Sensor Connection to USM Module

FCC Installation

The HydrX system can be controlled directly via the TLS 4xx using the latest software available. If the system being installed employs the use of an external Fuel Conditioning Controller, follow the steps below.

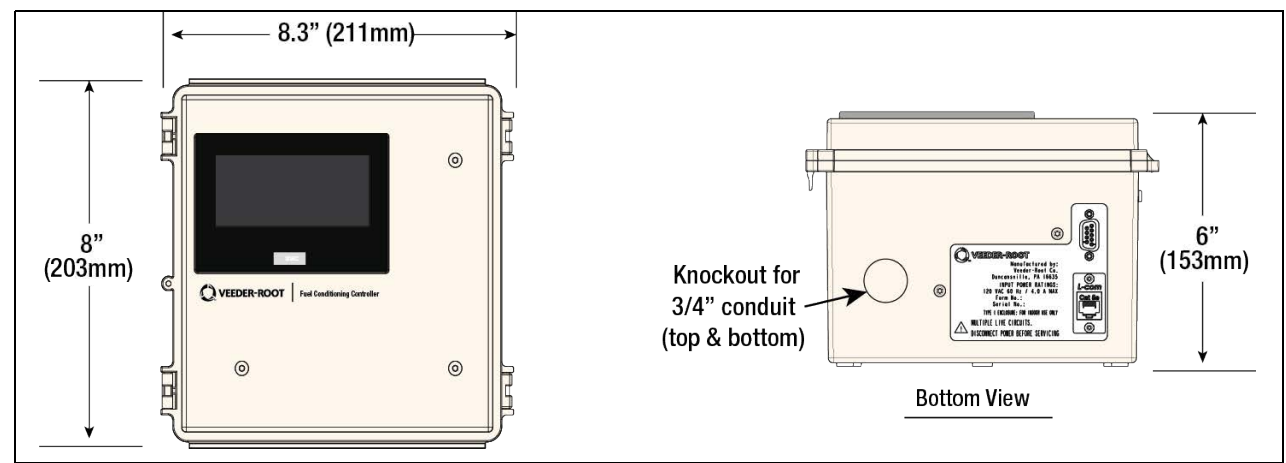


Figure 29. FCC Dimensions

The FCC is to be mounted to the wall in a dry, non-hazardous location such as the back office of the station. Get the FCC mounting bracket hardware from the kit. Attach the four brackets from the kit to the four corners of the unit with the supplied screws (see Figure 30). Mark the holes on the wall and mount the unit using customer supplied screws/anchors sufficient to support its approximate weight of 5 pounds.

Once the FCC is mounted, open the door and peel off the two pieces of shipping tape. Pull tape at a 45° angle to remove (see Figure 31).

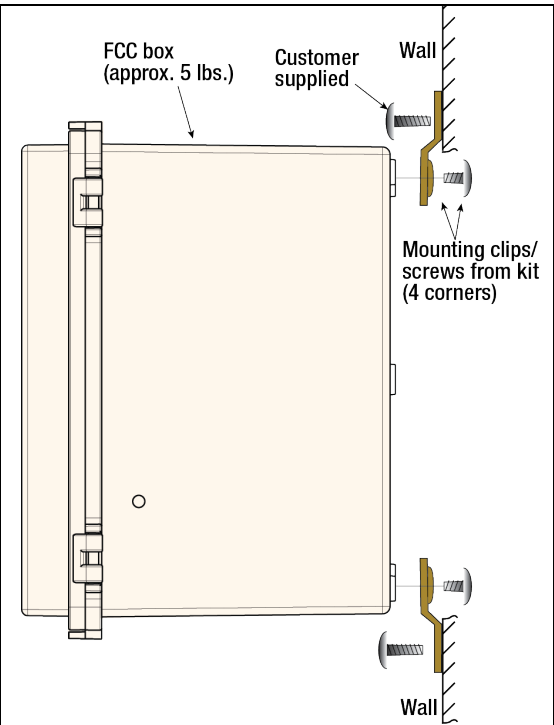


Figure 30. FCC Mounting Clip



Figure 31. Remove Shipping Tape

## FCC & FC Power Wiring Connections To TLS-4xx

Figure 32 through Figure 36 illustrate example HydrX power wiring connections between the Fuel Conditioning Controller, Fuel Conditioner and TLS-4xx.

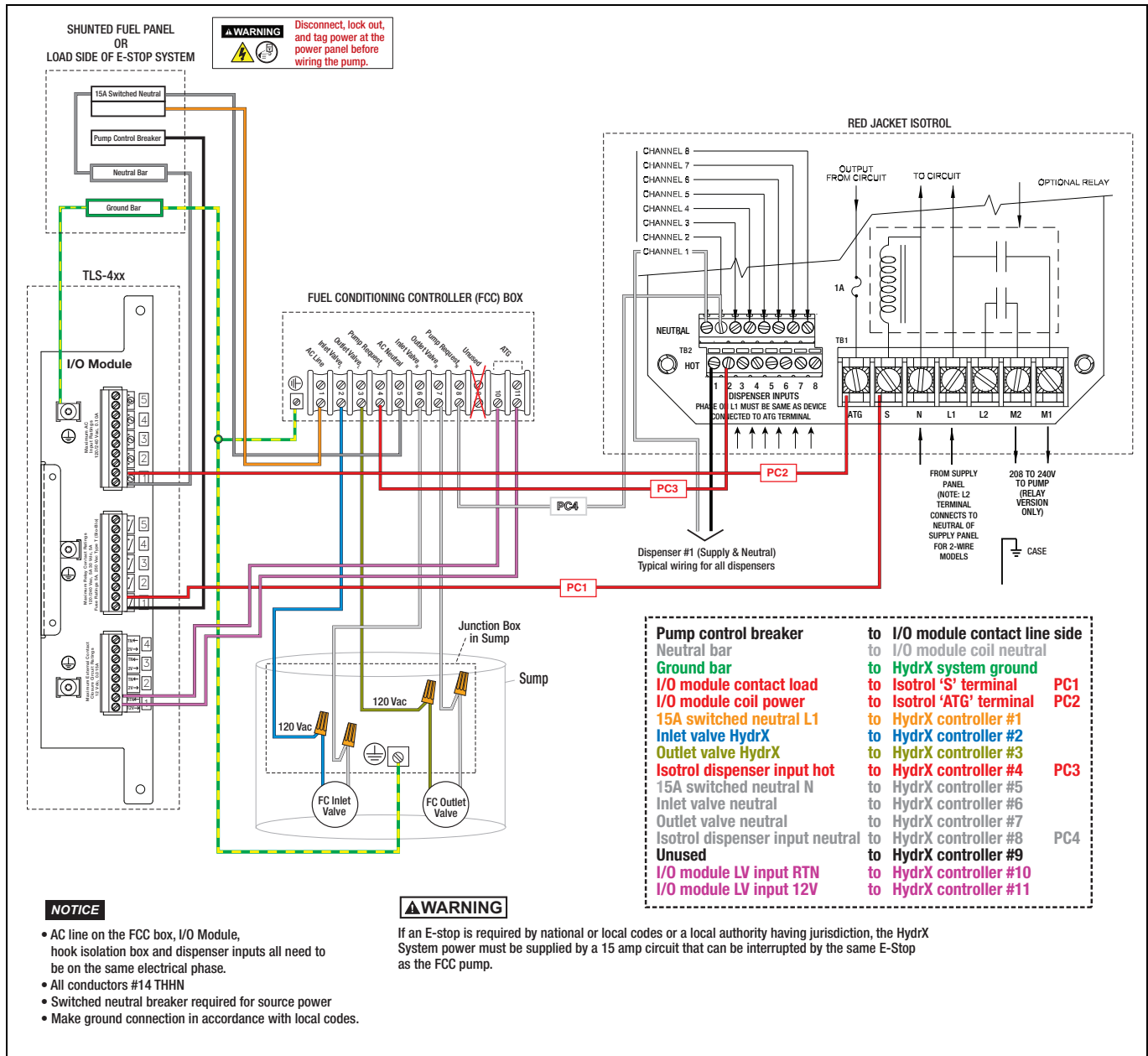


Figure 32. Wiring Using Red Jacket Isolation

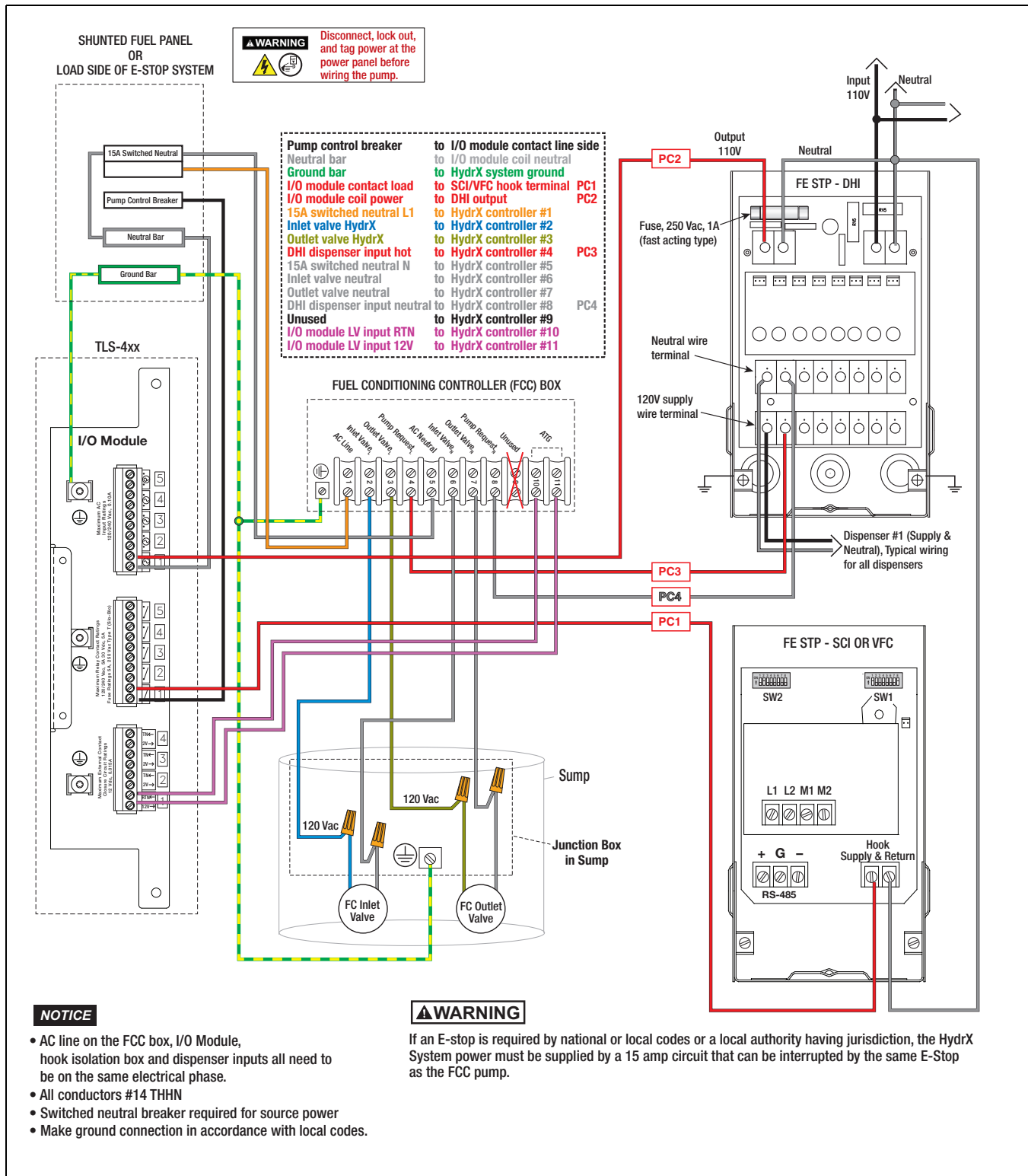


Figure 33. Wiring Using an FE Petro DHI Box

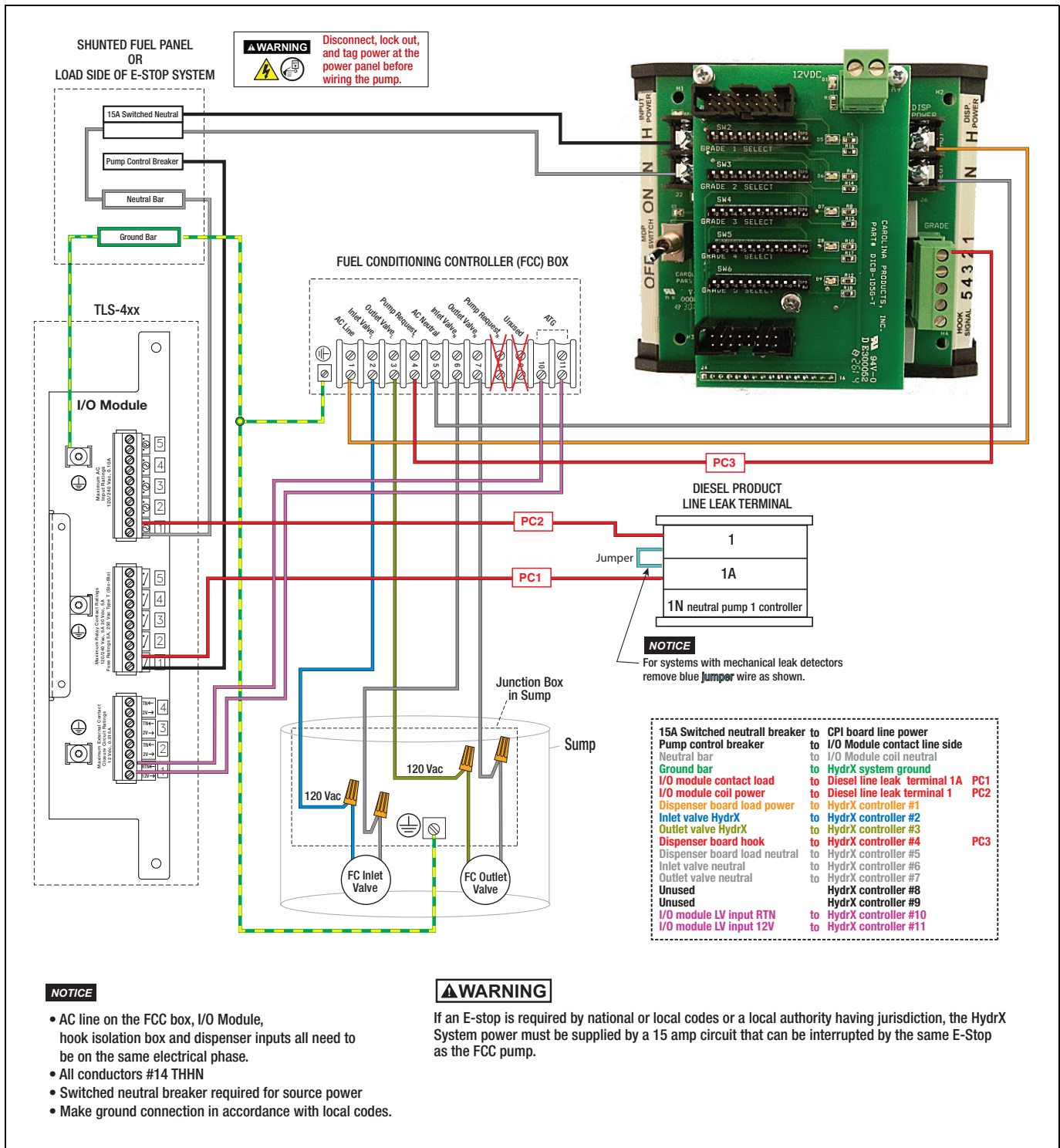


Figure 34. Wiring Using an CPI Isolation Board

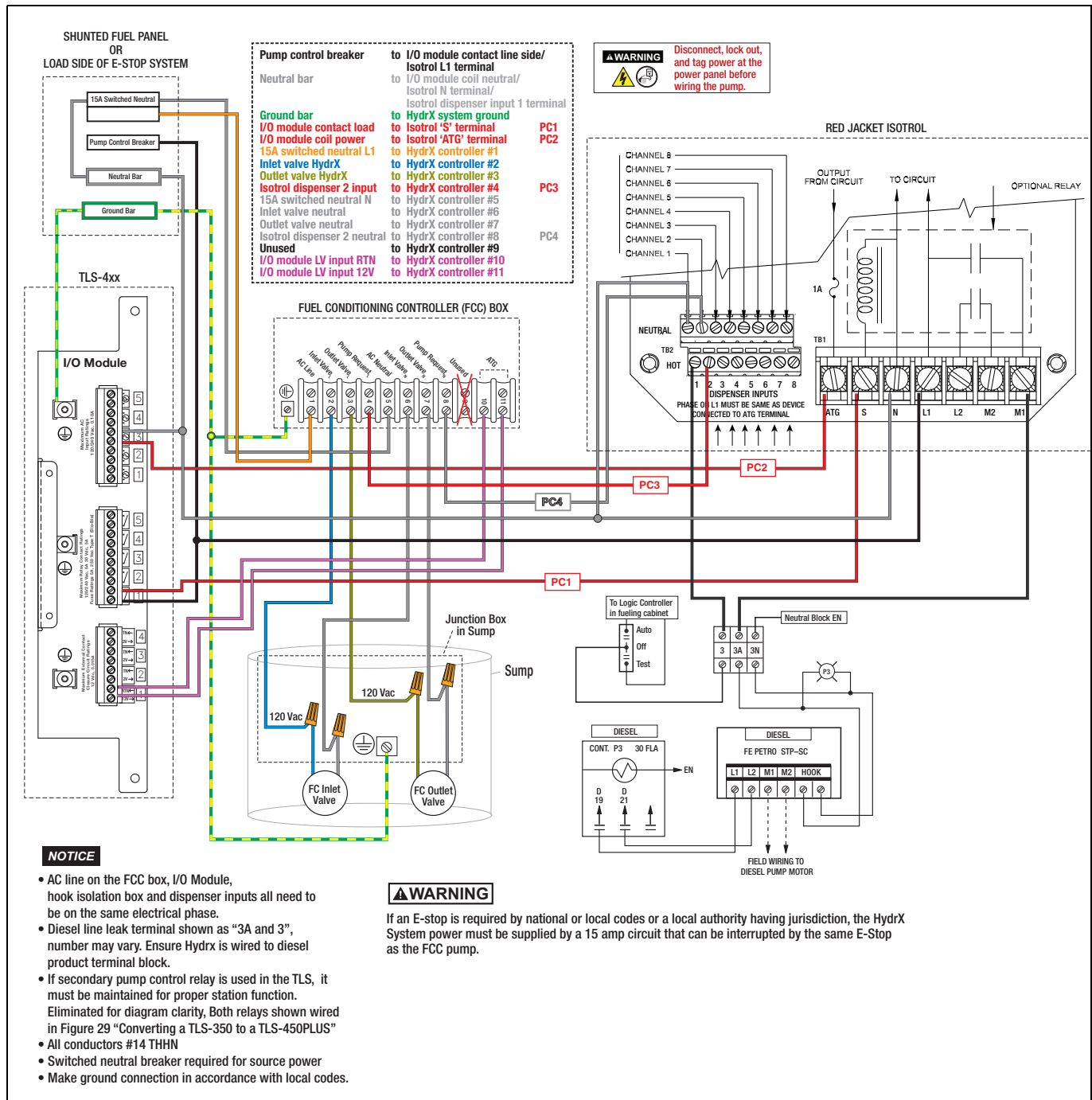


Figure 35. Adding Red Jacket Isotrol to a Pre Wired Control Panel





FCC RS-232 Serial Communication Wiring To TLS-4xx

Figure 37/Figure 38 diagram the RS-232 connection between the FCC and the TLS-450PLUS/TLS4.

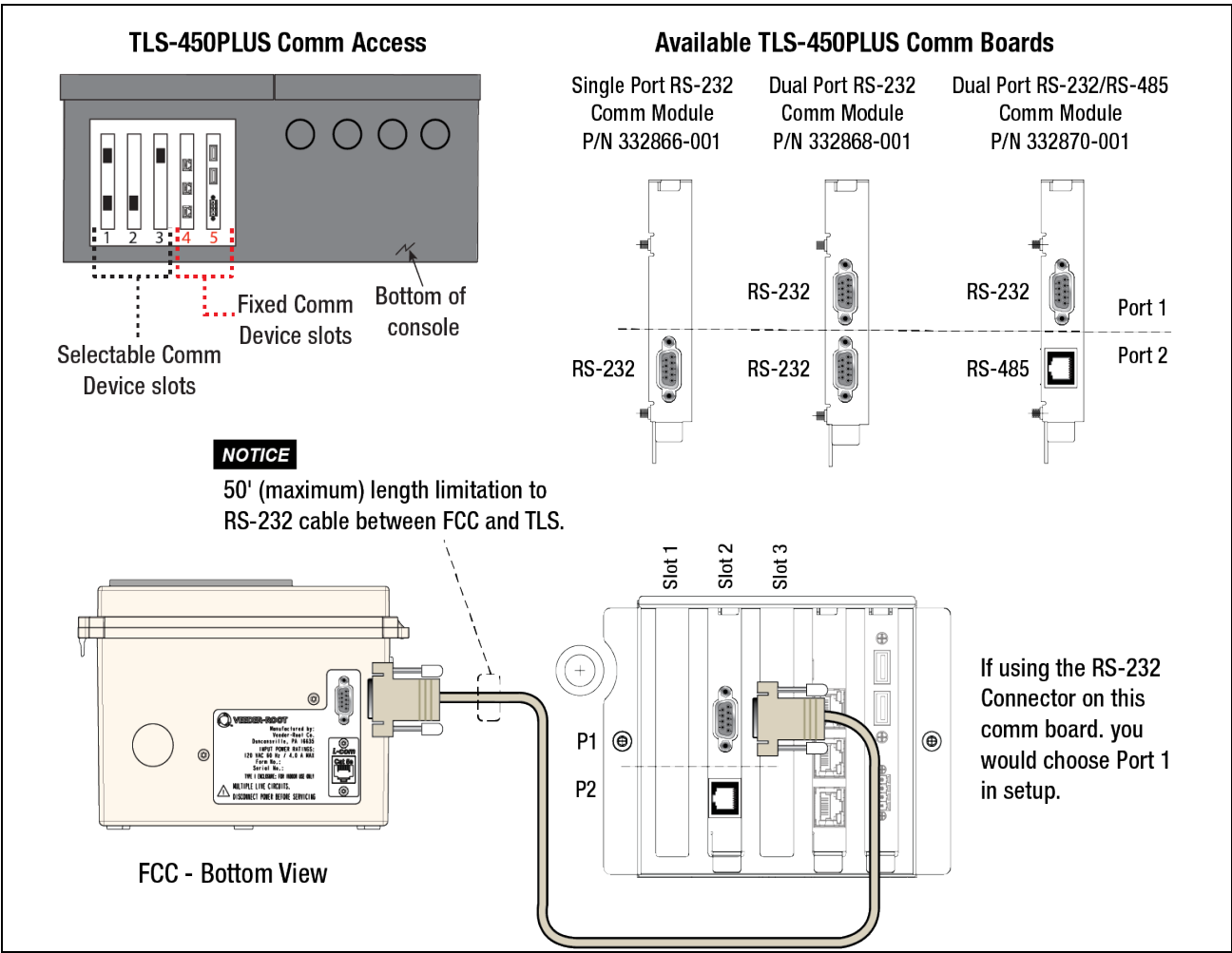


Figure 37. RS-232 Connections FCC to TLS-450PLUS

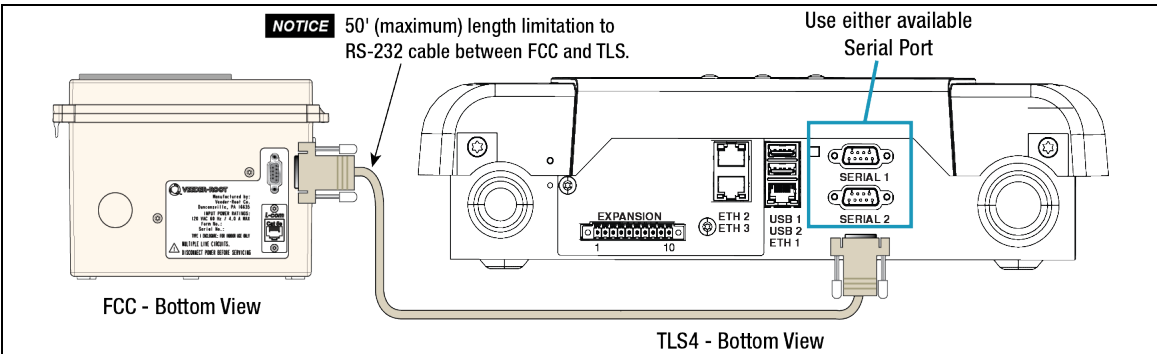


Figure 38. RS-232 Connections FCC to TLS4



## Spare Parts Lists

**Table 2. HydrX System Spare Parts List**

Part Number	Description	Category
330020-878	KIT - Hose -pressure Port to Manifold	Replacement
330020-876	Kit - Hose - Tank Return	Replacement
330020-868	Kit - Filter Cartridge	Service
330020-873	Kit - Replacement Probe for Model 500 (19")	Replacement
330020-903	Kit - Replacement Probe for Model 250D (12")	Replacement
330020-872	Kit - Replacement Pressure Sensor	Replacement
330020-871	Kit - TRJ STP Adapter Assembly	Replacement
330020-870	Kit - FE Petro Siphon Jet Access Port Adapter Assembly	Replacement
330020-869	Kit - Alignment Bar	Optional <sup>1</sup>
330020-882	Kit - Inlet Valve Service	Replacement
330020-883	Kit - Outlet Valve Service	Replacement
330020-855	Kit - Water Float - Diesel	Replacement
330020-880	Kit - Water Drain	Optional
330020-884	Kit - Water Drain Quick Coupling	Optional
330020-881	Kit - 90° Hose End Adapters	As Needed
330020-885	Kit - Valve Conduit	Required
330020-902	Kit - Flaretube Seal	Required

<sup>1</sup>Optional if you have one from a previous installation. If not, it is required.



For technical support, sales or  
other assistance, please visit:  
[veeder.com](http://veeder.com)