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HydrX™ Fuel Conditioning System

Product Description	The Veeder-Root HydrX Fuel Conditioning System combats in-tank corrosion by providing continuous water removal within diesel Underground Storage Tanks (USTs). HydrX unique design removes water from the lowest point in the tank, preventing water from stagnating on the tank bottom and breeding microbial contaminants. The integrated filtration removes entrained water, rust, sand, and microbial particulate from the fuel, polishing it before returning clean fuel back to the tank.

System Features

System Description

The Fuel Conditioning System shall be of coalescing type with integrated filtration and provide continuous water removal. The Fuel Conditioner shall install in the Submersible Turbine Pump (STP) sump, mounted to a 4" riser that houses the Guide Tube and Water Intake Device.

Fuel Conditioner	Water Intake Device (WID)
The Fuel Conditioner is a fully integrated system that effectively removes water and maintains fuel cleanliness. The Fuel Conditioner includes two automatic solenoid valves that control the flow of water removed from the bottom of the underground storage tank and the flow of clean fuel returning back to the UST. Integrated sensors enable predictable maintenance for the site operator.	The WID contains 1-6 fluid transfer tubes (depending on the configuration of the tank) that extend along the tank bottom to the lowest point of the tank. The WID operates in multiple modes and is powered by the STP to circulate fluids through the Fuel Conditioner in the sump. Vacuum mode uses suction from the STP port to pull fuel, water and particulate into the Fuel Conditioner. Sweep mode uses clean fuel to push water and particulate to the lowest point in the tank where it is then extracted using vacuum mode. Polishing mode is activated when the vacuum and sweep modes are complete (i.e., no more water is being collected).
Guide Tube	**STP Adapter**
The Guide Tube is a reinforced composite tube that extends vertically into the tank below the Fuel Conditioner through a custom riser. The Guide Tube provides mounting and precise orientation of the WID. A stainless steel elbow at the distal end guides the WID along the tank bottom.	The STP Adapter is a stainless steel connector that links an STP port through a standard hose fitting that connects to the Fuel Conditioner. An integrated ball valve on the STP Adapter allows for maintenance on the Fuel Conditioner without shutting down the STP.
Fuel Conditioning Controller (FCC)	**Filters**
The FCC is a logic controller that controls the Fuel Conditioner operation through a series of user defined inputs on a backlit color display. The FCC integrates with the TLS-450PLUS Automatic Tank Gauge (ATG), providing Fuel Conditioner status data and alarms.	Two filters are installed in the Fuel Conditioner housing. The inlet filter is a two-stage particle and coalescing type filter. The outlet filter is a single stage fine water separating element that provides a fine polish for optimal fuel quality.

Specifications

System Specifications

Operating Temperature	-4°F (-20°C) to 122°F (50°C)	**Fuel Compatibility**	100% Diesel
Storage Temperature	-40°F (-40°C) to 158°F (70°C)		Biodiesel (B100)
Installation Location	STP Sump and Diesel UST		Biodiesel Blends
Relative Humidity	0-100% (Condensing)		
Waste Water Capacity	5 gallons		
Filtration	25 microns		
Water Removal	Multi-port water removal throughout the tank bottom and from the lowest point in the tank.		
Intelligent Operation	Pump utilization is optimized based on water removal. HydrX gives the user complete control over how much time is allotted per day to polish the fuel. Logic is built-in to prevent freezing under extreme temperature conditions.		

Fuel Conditioning Controller Specifications

Display Specifications	4" Touchscreen Color LCD
Customized Alarm Features	Integrated with TLS-450PLUS ATG, as an external input alarm, allowing networked alarm notification and management
Connection to TLS-450PLUS	Requires 1 RS-232 serial port connection
External Dimensions (inches)	8.0 (H) x 8.3 (W) x 6.0 (D)

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System Construction	
Fuel Conditioner External Dimensions (inches)	30 (H) x 15 (W) x 12 (D)
Fuel Conditioner	
Lifting Eyebolt	Stainless Steel
Waste Water Tank	
Water Removal Fitting	
WID Hose Connection	
Filter Housing & Access Caps	Anodized Aluminum
Solenoid Manifold	
Guide Tube	
Elbow	Stainless Steel
Guide Tube Flange	
Tube	Fiberglass Reinforced Composite
Water Intake Device (WID)	
Body	Stainless Steel
Fittings	
Vacuum Tip Sled	
WID Manifold	
Intake Lines	Fluorinated Ethylene Propylene (FEP)
Sleeve	Polyethylene/Polyester
Approvals & Manuals	
Component Approvals	**Solenoid Valve:** UL/cUL recognized components, reference UL/cUL E37780 **Intrinsically Safe Sensors:** UL/cUL listed, reference UL/cUL MH11766 **FCC:** UL/cUL listed, reference UL/cUL E102542
Manuals	577014-446 HydrX Fuel Conditioning System Installation
	577014-466 HydrX Fuel Conditioning Controller Setup & Operation
	577014-469 HydrX Fuel Conditioner Mag Probe Replacement Instructions
	577014-470 HydrX Fuel Conditioner Sensor Replacement Instructions

Site Requirements

System Requirements

Equipment Requirements

- TLS-450PLUS ATG with software version 9R or higher
- Compatible with 4” STPs only, up to 4HP
- Veeder-Root Compatible STP Models: The Red Jacket®, The Red Jacket AG, and The Red Armor®
- FE Petro® Compatible STP Models: MagShell™ fixed speed and variable speed STPs with MagVFC™
- STP must have a spare pressure port
- Manifolded STPs and manifolded tanks are not supported

  Note: Sump sensors are recommended with HydrX and may be required by local jurisdictions having authority

Tank Requirements

- Diesel USTs less than or equal to 30,000 gallons
- Fiberglass Tanks; Consult Veeder-Root Technical Support at technicalsuppport@veeder.com or 1-800-323-1799 for Steel Tanks and Aboveground Storage Tanks (ASTs) compatibility.
- Tank diameter must be between 8’ (96”) and 10’ (120”)

Sump Requirements

- Spare 4" bung in tank top manway with clearance for the 15.5” high WID Riser
- Clearance for the Fuel Conditioner footprint around the spare bung (Dimensions can be found on page 4)

  Note: The True To Size Fit-Test Model or a 1:1 scale template can be used to quickly confirm space available
- The Fuel Conditioner is 30” tall and will require 10” of clearance above the system to any fixed, immovable portion of the sump to service the filters. If the Fuel Conditioner fits in the center of the sump, directly under the sump lid, a 6” clearance to the sump lid is sufficient.

Recommendations for New to Industry (NTI) Sites

- Install 48” diameter sumps with 4+ bung manways to maximize HydrX placement options
- Sump depth from the manway to any immovable obstruction should be 40” or greater
- Route product line and conduit around perimeter of sump, leaving room for the HydrX Fuel Conditioner footprint depicted on page 4
- Tank tilted preferably away from STP sump
- Size high voltage and low voltage conduit for additional HydrX wiring – Wiring requirements identified on page 3
- Pull additional HydrX wiring during site construction

Wiring Requirements	**System Requirements**	
	HydrX Solenoid Valve Power Requirements (to the sump)	AC Power Wiring carrying 120 VAC control circuit to power solenoid valves on a separate breaker. Local electrical codes or site requirements may also require a separate Emergency Stop Control. Minimum wire size shall be 14 AWG. 4 wires total: 2 wires for valve control voltage, 1 common neutral and 1 earth ground.
	HydrX Sensor Wiring Requirements	**1. Wire Type** – Shielded cable required regardless of conduit material or application. Shielded cable must be rated less than 100 picofarad per foot manufactured with a suitable material such as Carol C2534 or Belden 88760, 8760, or 8770. **2. Wire Length** – Maximum 1,000 ft to meet intrinsic safety requirements. Improper system operation could result for runs over 1,000 ft. **3. Wire Gauges** – Color coded – shielded cable used in all installations. Wires should be #14 - #18 AWG stranded copper wire and installed as Class 2 circuits. As an alternate method when approved by the local authority having jurisdiction, #22 AWG wire such as Belden 88761 may be suitable with the following requirements: Wire run is less than 750 ft; Capacitance does not exceed 100 pF/ft; Inductance does not exceed 0.2 uH/ft. **Note:** 2 Intrinsically Safe (IS) pairs are required
	Fuel Conditioning Controller Power Requirements	AC Power Wiring carrying 120 VAC from the power panel to the controller should be #14 AWG (or larger) copper wire for line, neutral and chassis ground (3).

Fuel Conditioning System Components	**First Time Installation Orderable Part Numbers**				
	Part Number	**Description**	**Overall Length**		
			7th Digit	**8th Digit**	**9th Digit**
	860801-XXX	Water Intake Device (WID) for Fiberglass Tank with 1 Tube	143 to 600 (increments in 1 inch) ***Example:*** *860816-500* *500" WID for 8' diameter fiberglass tank with 6 tubes*		
	860813-XXX	WID for 8' Diameter Fiberglass Tank with 3 Tubes			
	860816-XXX	WID for 8' Diameter Fiberglass Tank with 6 Tubes			
	860823-XXX	WID for 10' Diameter Fiberglass Tank with 3 Tubes			
	860826-XXX	WID for 10' Diameter Fiberglass Tank with 6 Tubes			
	860780-XXX	Guide Tube	107, 113, or 135 (inches)		
	860580-050	Fuel Conditioner (5 Gallon Water Holding Capacity)			
	860400-001	Fuel Conditioning Controller (FCC) – 6' Cable			
	330020-867	Kit – Fuel Conditioning System Riser – 15.5" Length			
	330020-885	Kit – Valve Conduit			
	332972-032	HydrX Software Feature Enhancement			
	Part Number	**Description**	**Options: A or B, C or D**		
	330020-875	Kit – TRJ Installation (Option A)	Option A or Option B		
	330020-874	Kit – FE Installation (Option B)			
	330020-880	Kit – Water Drain (Option C)	Option C or Option D		
	330020-884	Kit – Water Drain Quick Coupling (Option D)			

Fuel Conditioning System Replacement Parts & Accessories	**Part Number**	**Description**	**Category**
	330020-878	Kit – Manifold Hose	Replacement
	330020-876	Kit – Tank Return Hose	Replacement
	330020-868	Kit – Fuel Conditioner Filter Cartridges	Replacement
	330020-873	Kit – Replacement Probe	Replacement
	330020-872	Kit – Replacement Pressure Sensor	Replacement
	330020-871	Kit – RJ Siphon Port Adapter Assembly	Replacement
	330020-870	Kit – FE Siphon Jet Access Port Adapter Assembly	Replacement
	330020-882	Kit – Inlet Valve Service	Replacement
	330020-883	Kit – Outlet Valve Service	Replacement
	330020-855	Kit – Water Float, Diesel	Replacement
	330020-881	Kit – Adapter (90° Hose End Adapters)	Accessory
	330020-869	Kit – Alignment Bar	Accessory

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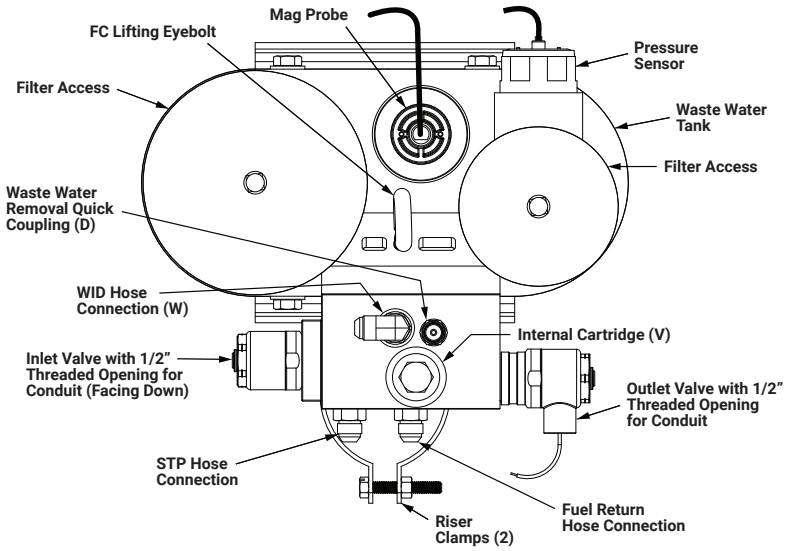
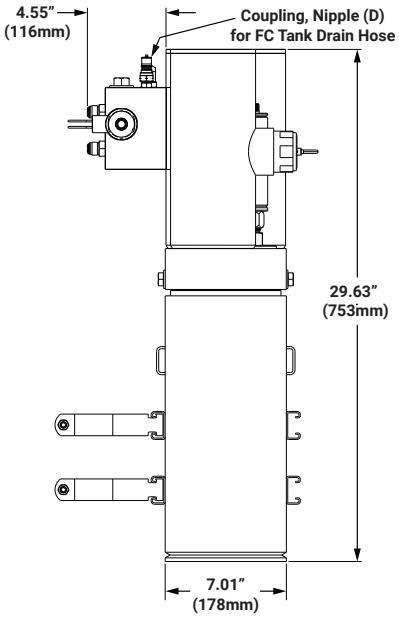
System Overview

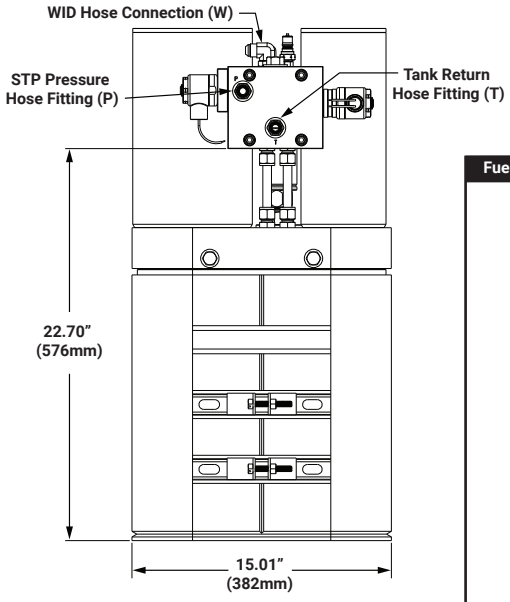
Fuel Conditioner



TOP VIEW

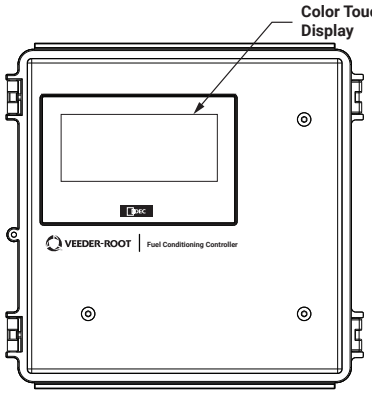


RIGHT VIEW

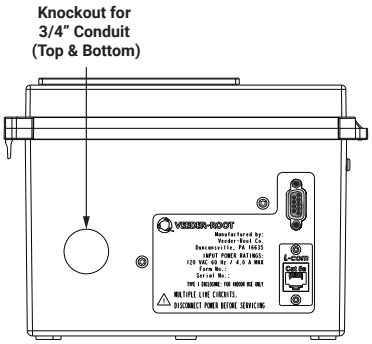


FRONT VIEW

Fuel Conditioning Controller

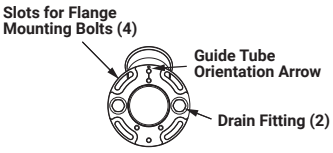


FRONT VIEW

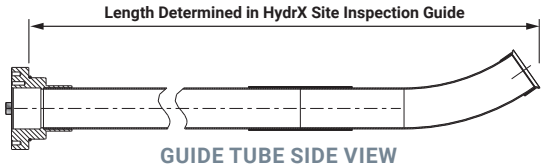


BOTTOM VIEW

Guide Tube

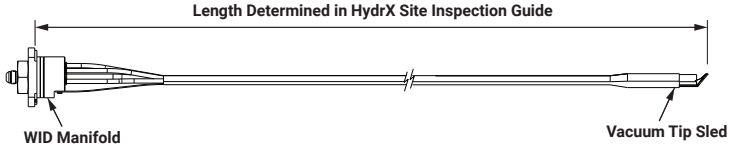


GUIDE TUBE FLANGE



GUIDE TUBE SIDE VIEW

Water Intake Device



SIDE VIEW

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Example Illustrations

Illustrations used in this guide for example sensor installations may contain components that are customer supplied and not included with the sensor. Please check with your Veeder-Root Distributor for recommended installation accessories.

Third Party Evaluations

Third party evaluations of the Veeder-Root sensors contained in this application guide can be found under the Veeder-Root vendor name on the National Work Group on Leak Detection Evaluations (NWGLDE) website:

http://www.nwglde.org