



SOFTWARE ENHANCEMENT APPLICATION GUIDE

FOR THE TLS-450PLUS & TLS4 SERIES ATG PLATFORM

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What are Software Enhancements?

Enhanced intelligence and capabilities to improve operational efficiency

The Veeder-Root Software Enhancements are a set of software upgrades that help customers to optimize fueling operations, maintain regulatory compliance, and enhance operational visibility and control across multiple devices in the forecourt.

- Tank and Line Leak Detection
- Tank Chart Auto-Calibration
- Vapor Recovery Monitoring
- STP Operational Visibility & Control
- Theft Detection
- Fuel Conditioning
- Tank Reconciliation
- DEF Recirculation

Benefits of Software Enhancements



Environmental Human Health & Safety (EHS)

Primary purpose of an Automatic Tank Gauge (ATG) is protection. TLS4 Series features — advanced tank & line leak detection, tank reconciliation, Intelligent Pump Control — add layers of protection for people and the environment.



Ensuring Uptime

Minimize forecourt downtime and lost sales with integrated visibility and control. Intelligent Pump Control, DEF Recirculation, and the HydrX™ Fuel Conditioning System deliver alerts and insights, so issues are fixed before they escalate.



Visibility & Proactive Problem Solving

Real-time monitoring, analytics and notifications give operators clear inventory and equipment status, enabling faster, data-driven responses and fewer surprises.



Operational Efficiency

Automate routine tasks and reduce truck rolls with automated diagnostics, alarm grouping, and remote configuration — freeing teams to focus on customers.



I use Veeder-Root line leak detection to stay in compliance and assurance that my infrastructure is tight



I use IPC to see my STP data to ensure they are working as intended



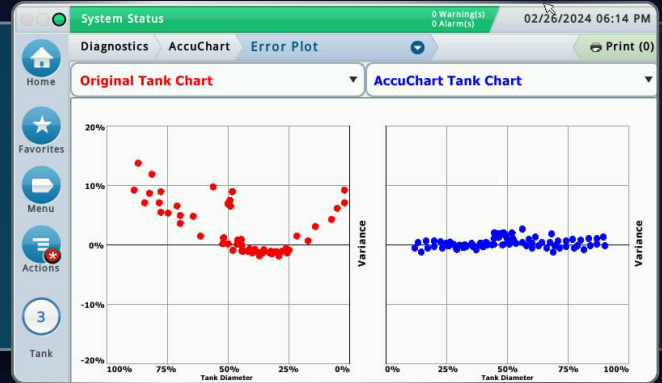
BIR helped us save \$25,000 in inventory adjustments



Business Inventory Reconciliation

Reconcile fuel inventory accurately with rapid leak/theft detection.

Business Inventory Reconciliation (BIR) automatically collects metered sales data from electronic or mechanical dispensers to improve delivery-report accuracy and reconcile the fuel that has entered and exited a tank. BIR reports can be used to meet federal, state, and local inventory-tracking requirements and to identify potential fuel leaks or theft.

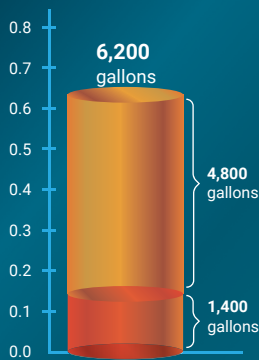


Key Features & Benefits

- **Adjusted Delivery Reporting** — Calculates fuel dispensed during delivery and includes it in the Adjusted Delivery Report, for accurate delivered volumes.
- **AccuChart™ Tank Calibration** — Improves tank strapping charts for more accurate inventory, delivery, and reconciliation data.
- **Programmable Variance Methods** — Configure tolerance rules to meet federal, state, and local inventory control requirements.
- **Hourly Reconciliation Monitoring** — Reconciles data hourly to surface discrepancies faster for quicker leak and theft detection.
- **Flexible Reporting & Notifications** — Hourly/shift/daily/weekly/monthly/yearly reports plus alarms and warnings enable rapid response to inventory issues.

Delivery Accuracy Comparison

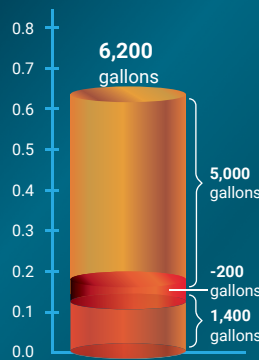
Calculating Delivery without BIR



Starting Fuel Inventory:
1,400 gallons
Ending Fuel Inventory:
6,200 gallons
Bill of Lading Discrepancy:
200 gallons
Standard Delivery Report:
4,800 gallons

Note: The TLS-450PLUS has no visibility into the dispensing that occurs during the delivery and reports the delivery as off by 200 gallons compared to the Bill of Lading (BOL).

Calculating Delivery with BIR



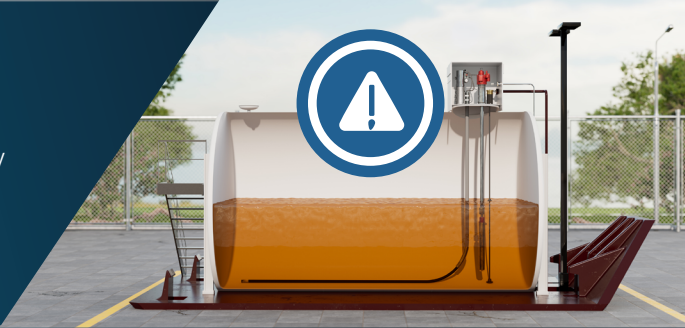
Starting Fuel Inventory:
1,400 gallons
Ending Fuel Inventory:
6,200 gallons
Fuel Dispensed during Delivery:
200 gallons
Standard Delivery Report:
5,000 gallons

Note: With BIR, the TLS-450PLUS can track dispensing that occurs during the delivery and calculate a delivery that is more accurate and more closely matches the BOL.

Timed Sudden Loss Detection

Detect idle-period tank losses to prevent theft and limit product loss.

Time Sudden Loss Detection detects unexplained product loss from a tank during predefined site idle periods. It continuously monitors inventory during quiet periods and alerts operators to potential theft or loss.

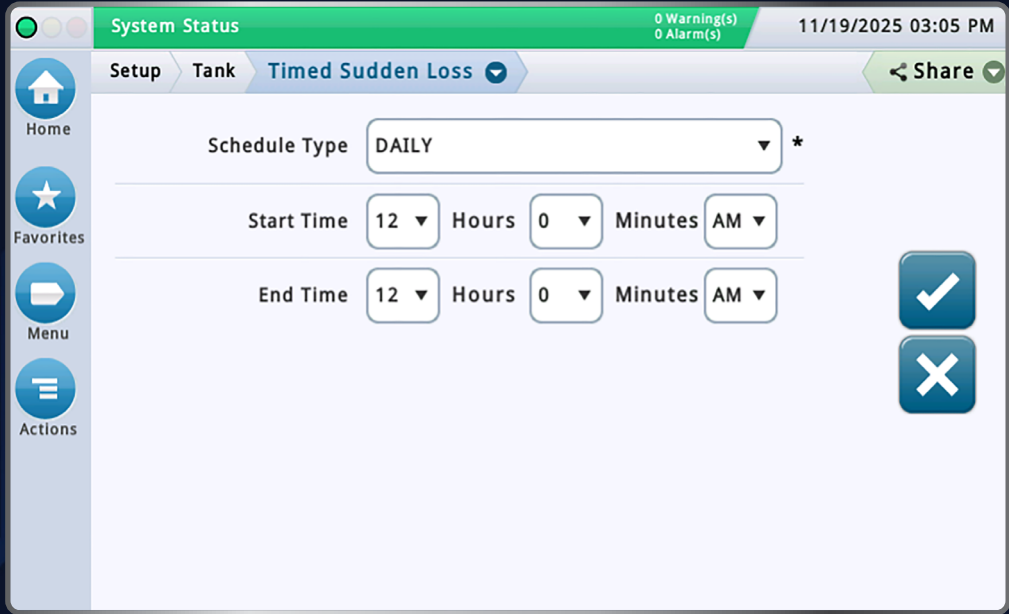


Key Features & Benefits

- **Custom Monitoring Periods** – Operators can define custom quiet periods.
- **Programmable Alarm Thresholds** – Set the lost-volume threshold that triggers an alarm.
- **Automatic Notifications** – Automatically receive notifications of inventory changes during user-defined quiet periods.
- **Local or Remote Configuration** – Configure settings via GUI, web interface, or RS-232 command.



Timed Sudden Loss Custom Monitoring Periods



Intelligent Pump Control

Optimize fueling operations with real-time pump control and diagnostics.

Intelligent Pump Control (IPC) connects the TLS-450PLUS ATG to IQ2 Smart Controllers delivering real-time Submersible Turbine Pump (STP) status, reports, performance metrics, electrical information, and advanced pump control for improved visibility and optimized fueling operations.

The screenshot shows a software interface with a top navigation bar containing 'System Status', 'Diagnostics', 'Pumps', and 'Overview'. Below this is a table with two main sections: 'PUMP 1: Pump1' and 'PUMP CONTROLLER 1: IQ2_1'. The 'PUMP 1' section lists metrics like Line, Tank, Siphon Set, and Pump Selection. The 'PUMP CONTROLLER 1' section lists metrics like Address, Type, ATG Status, PC Status, and Software Revision. A sidebar on the left includes navigation icons for Home, Favorites, Menu, Actions, and Pump.

		Operations	Settings
PUMP 1: Pump1		Amps 1	10.0 A
Line	Ln 1: Line1	Amps 2	11.0 A
Tank	T 1: * Regular	Amps 3	12.0 A
Siphon Set		Amps Avg	11.0 A
Pump Selection	Alternate	Volts 1	126 V
		Volts 2	127 V
		Volts 3	128 V
		Volts Avg	127 V
PUMP CONTROLLER 1: IQ2_1		Active Power	1.374 kW
Address	C6.1	Reactive Power	1.372 kVAR
Type	RJ IQ 2	Apparent Power	1.371 kVA
ATG Status	Idle	Power Factor	95.536
PC Status	OK	Enclosure Temperature	30 Celsius
Software Revision	0.0.0	Thermal Capacity	97 %

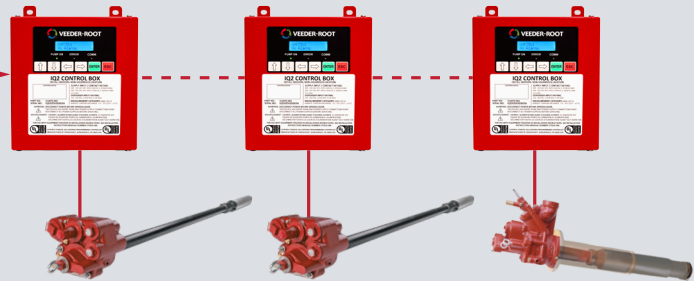
Key Features & Benefits

- **Remote Diagnostics** — Provides real-time status of STPs with key electrical metrics. Combines alarm, warning, and event activity logs to deliver advanced data for improved remote and on-site troubleshooting.
- **Advanced Inventory Control** — Utilizes TLS dispense modes to enable advanced inventory management:
 - **Sequential:** Uses the lowest tank number until it reaches a set low level.
 - **Alternate by Height or Volume:** Balances tank levels by volume or height.
 - **Alternate by Pump:** Engages pumps in numbered order.
 - **Priority:** Selects tanks based on configured priority using tank and flow-rate data.
- **Staging (Helper Mode)** — Flexible control of multiple pumps feeding the same line to optimize consistent delivery at the nozzle.
- **Asset Protection** — IPC optimizes flow, enables operational redundancy, and manages equipment loading.
- **Flow Optimization** — Uses pump staging/de-staging to ensure consistent product delivery at the nozzle.
- **Operational Redundancy** — Detects when a pump needs assistance and reassigns load so operation continues during maintenance.

Equipment Compatibility

- Red Jacket IQ Control Box
- Red Jacket IQ2 Smart Controller
- Third-Party Controllers

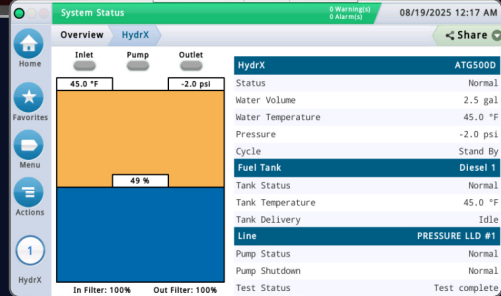
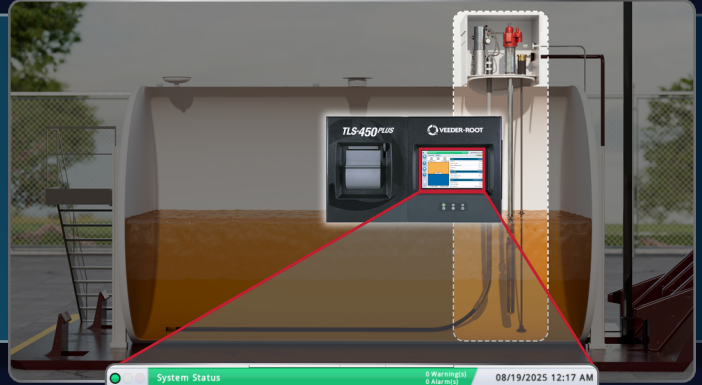
Software & Hardware Solution



HydrX Fuel Conditioning System

Continuously remove water to help prevent in-tank corrosion.

HydrX Fuel Conditioning System combats in-tank corrosion by providing continuous water removal within diesel storage tanks. The unique design removes water from the lowest point in the tank, preventing water from stagnating and breeding microbial growth.



Key Features & Benefits

- **Combats Microbial Contamination** – Continuous fuel conditioning removes standing water, emulsified water, rust, sand, and microbial particulates to help prevent fuel contamination.
- **Lowers Operational Costs** – Continuous fuel conditioning eliminates the need for emergency tank cleanings and fuel polishing.
- **Increases Flow Rates** – HydrX helps increase flow at the dispenser by reducing microbial growth that frequently clogs filters.
- **Removes Particulates** – HydrX removes particulates down to 10 microns with > 90% efficiency and 20 microns with > 99.9% efficiency, conforming to ISO's 16889 standard for hydraulic fluid power filters.

HydrX Status Interface

Displays critical information to ensure proper operation and protect against corrosion.

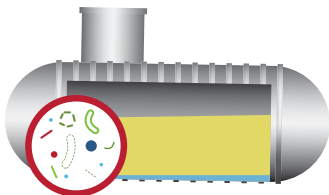
Includes:

- Status
- Water Volume
- Water Temperature
- Pressure
- Capacity Percentage

TANK MAINTENANCE COST

Stagnant water breeds microbial growth:

- Water is the chief enemy of diesel storage
- Traditional water removal and tank cleaning methods are costly and time consuming
- Tank maintenance, costs up to \$6K/yr

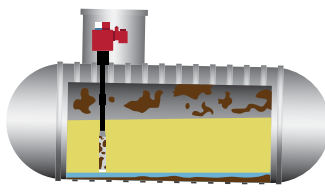


Return on Investment*
\$6,000/year

EQUIPMENT LIFE PENALTY

Microbial growth attacks fueling equipment:

- Corrosion causes improper operation or failure
- Acceleration of equipment aging up to 5X
- Reduced equipment life, costs up to \$10K/yr

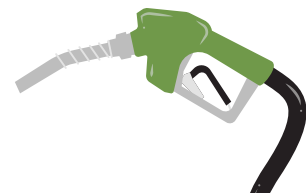


Return on Investment*
\$10,000/year

DISPENSER THROUGHPUT IMPACT

Microbial growth contaminates the fueling system:

- Microbial particulate reduces dispenser filter life
- Clogged filters reduce fuel throughput
- A reduction in flow translates to \$15K in lost profit

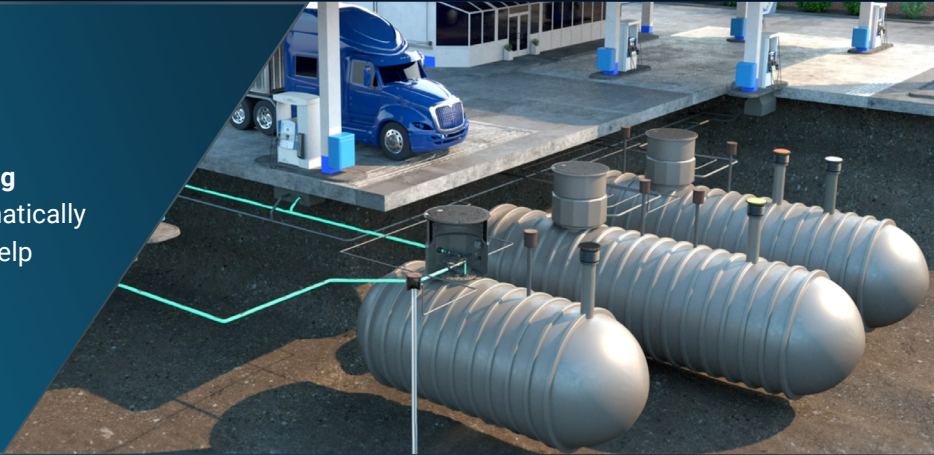


Return on Investment*
\$15,000/year

Diesel Exhaust Fluid Recirculation Monitoring

Automate DEF recirculation and heat-trace to help prevent freezing or overheating.

Diesel Exhaust Fluid (DEF) Recirculation Monitoring continuously monitors DEF temperature and automatically controls heat tracing and product recirculation to help prevent DEF lines from freezing or overheating.



Key Features & Benefits

- **Automated DEF Recirculation** – The software automatically circulates DEF product from the tank into the line at user-defined temperatures to increase or decrease product temperature in the line as needed.
- **Optional Automated Heat-Trace Control** – Automatically activates compatible third-party heat-trace systems to protect DEF lines in extreme cold.
- **Energy-Cost Minimization** – Automatically controlling the recirculation and the heat trace reduces energy cost by eliminating unnecessary and costly operation.
- **System Monitoring and Notifications** – The software monitors system operation, detects faults in the recirculation or heat-trace systems, and notifies store personnel.

DEF Recirculation Status

VEEDER-ROOT TLS450P V.C.400.07 Berkshire Depot 12/17/25 12:54 PM leclair | Log Out | Help

Main Menu Home Diagnostics > Recirculation > Status Print

Line: Line 2: DEF Start Recirculation

Temp Sensors			
#	Label	Status	Current Temp
1	Dispenser Temp	NORMAL	43.0

Probes			
#	Label	Status	Current Temp
2	DEF	Active	59.0

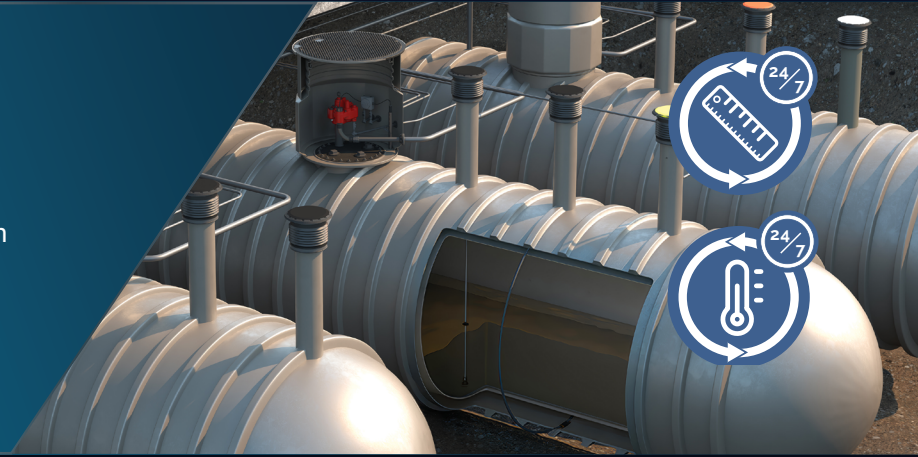
Recirculation Time: --:--

Message: No Recirculation

Continuous Statistical Leak Detection

Continuously detect tank leaks without disrupting operations.

Continuous Statistical Leak Detection (CSLD) is a third-party approved tank leak detection system that continuously monitors fuel height and temperature in underground storage tanks to detect leaks without disrupting site operations.



Key Features & Benefits

- **Continuous Operation** – CSLD gathers the data required to complete a test automatically during idle periods.
- **Compatibility** – Works seamlessly with TLS-450PLUS and TLS4 ATGs using MAG Plus Probes equipped with in-tank leak detection capabilities.
- **Real-Time Updates** – Provides continuous updates, ensuring results are always current and accessible at the press of a button.
- **Automated Reporting** – Test reports are generated and delivered automatically every 24 hours.
- **Advanced Data Analysis** – The CSLD algorithm sorts through all available data, utilizing only the highest-quality information for leak testing and thereby minimizing the chances of false alarms.
- **Certificated for Manifolder Tanks** – Enables in-tank leak detection on manifolded tanks to help maintain compliance.

CSLD Diagnostic Data

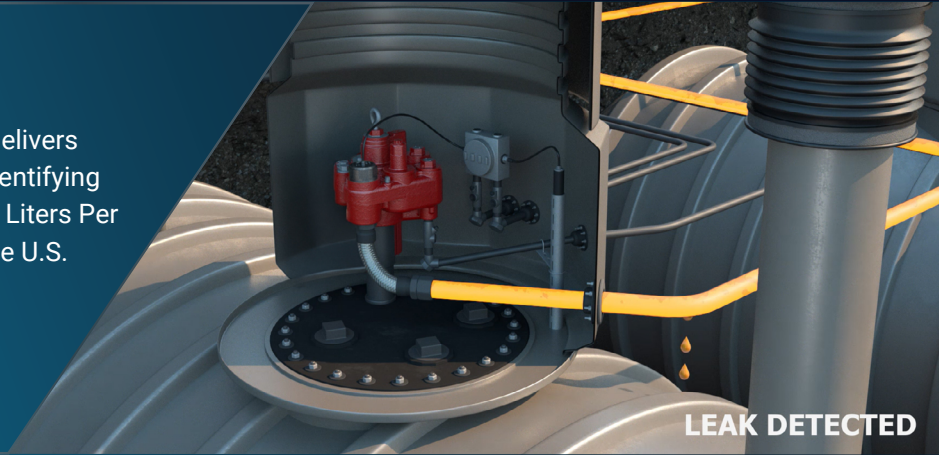
A screenshot of the Veeder-Root TLS-450PLUS diagnostic interface. On the left, a physical control panel is shown with a printer and a screen displaying data. On the right, a software interface displays a table of diagnostic data for 'TANK 3: Premium'. The table includes columns for Date / Time, Status, Leak Rate, Avg Temp, Top Temp, and Board Temp. The interface also shows a 'Diagnostics' menu, a 'Tank Test' status, and a 'CSLD Rate Table' dropdown. A 'Share' button is visible in the top right corner of the software interface.

Date / Time	Status	Leak Rate	Avg Temp	Top Temp	Board Temp
TANK 3: Premium					
11/11/2025 08:00 PM	0	-0.004	64.5	65.9	71.8
11/11/2025 11:01 PM	0	0.004	64.6	66.0	71.8
11/12/2025 02:00 AM	3	-0.012	64.6	66.0	71.9
11/12/2025 05:01 AM	3	-0.026	64.8	66.1	72.0
11/12/2025 08:01 AM	3	-0.127	65.0	66.3	72.1
11/12/2025 11:02 AM	3	-0.087	66.2	67.4	73.1
11/12/2025 02:02 PM	3	-0.029	66.9	68.1	73.9
11/12/2025 05:02 PM	3	0.068	67.0	68.3	74.2
11/12/2025 08:03 PM	3	0.044	66.0	67.3	73.2
11/12/2025 11:03 PM	0	0.054	65.5	66.8	72.6
11/13/2025 02:04 AM	0	-0.055	65.0	66.2	72.2
11/13/2025 05:04 AM	3	-0.051	65.6	66.8	72.7

Digital Pressurized Line Leak Detection

Detect pressurized line leaks during dispensing.

Digital Pressurized Line Leak Detection (DPLLD) delivers precision leak detection at full pump pressure – identifying leaks as small as 0.1 Gallons Per Hour (GPH)/0.38 Liters Per Hour (LPH) – and its pressure-decay test meets the U.S. Environmental Protection Agency (EPA) 3.0 GPH/11.4 LPH requirement.

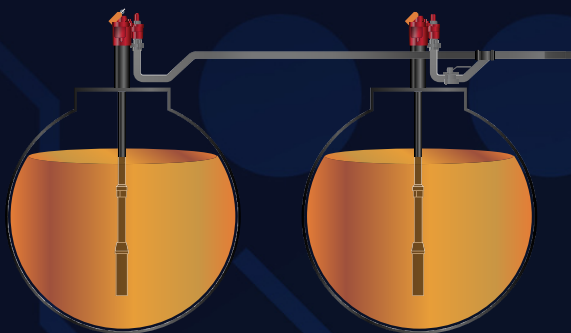


Key Features & Benefits

- **Ease of Installation** – Pressure sensors install without breaking piping or adding a sump; calibration is simple without complex procedures.
- **Stainless Steel Construction** – The pressure sensor design resists highly corrosive environments.
- **Full Pressure Testing** – Performs tests at full line pressure for fast, accurate results without restricting fuel flow rates.
- **Thermal Stability** – Not impacted by thermal contraction of fuel in the line due temperature changes.
- **Active Monitoring** – Monitors line pressure during dispensing to detect catastrophic leaks.
- **Automatic Shutoff** – Detects leaks and automatically shuts off power to the Submersible Turbine Pump (STP) to minimize environmental damage and public safety risk.
- **Alarm/Shutdown Options** – Two shutdown options when a failure occurs:
 1. Standard Dispenser Shutdown (Alarm and Shutdown)
 2. Optional No Shutdown (Alarm Only)
- **Auto-Confirm** – Optional second line leak test after an initial test failure to verify results and reduce false alarms caused by mechanical issues elsewhere in the fueling system.

Supports Manifolded Lines

One transducer per manifold line is required



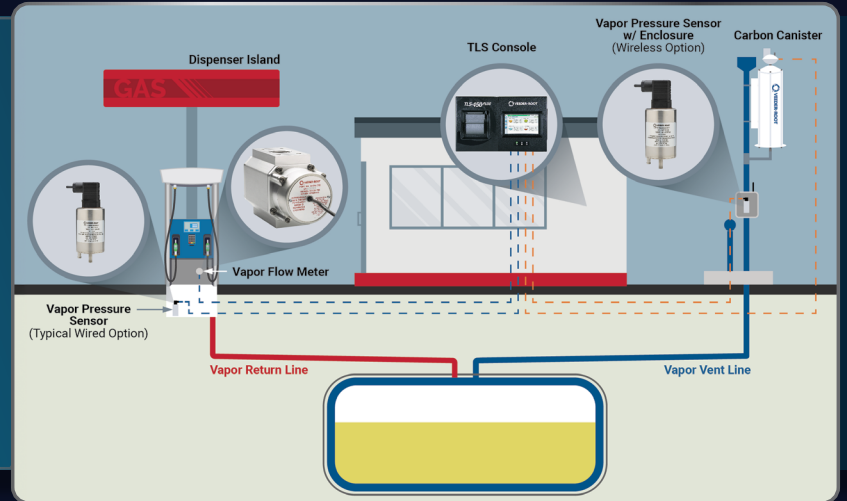
Line Leak Overview

Test Type	Date / Time	Test Method	Gross Test Previous 24Hrs
Line 1: Unl.87A			
Gross		PLLD	26
Last Gross	Nov 19 2025 08:40 AM	PLLD Gross Test	
Line 2: Unl.87B			
Gross		PLLD	0
Last Gross	Sep 30 2025 07:20 AM	PLLD Gross Test	
Line 3: Premium			
Gross		PLLD	0
Last Gross	Sep 30 2025 07:22 AM	PLLD Gross Test	
Line 4: Gas Add.			

In-Station Diagnostics

Ensure CARB-compliant vapor recovery with continuous, accurate failure detection.

In-Station Diagnostic (ISD) is Veeder-Root's California Air Resources Board (CARB) certified vapor recovery monitoring system. It continuously monitors a site's vapor recovery equipment to ensure proper operation. ISD is available on the TLS-450PLUS ATG, which provides remote access and enhanced security features not available on legacy TLS consoles.



Key Features & Benefits

- **CARB Certified** – Meets ISD performance requirements (CP-201), including at least 95% probability of failure detection while operating at no more than a 1% probability of false alarms.
- **Flexible** – Certified with all hanging hardware and multiple vapor processor configurations.
- **Accuracy** – Delivers highly accurate A/L (air-over-liquid) ratio and pressure readings.
- **Trusted** – The most installed ISD solution on the market, trusted by thousands of customers for reliable ISD monitoring.
- **Cost Effective** – The TLS-450PLUS ATG provides an expanded, advanced feature set at a lower price point than the TLS-350 console without needing to replace existing probes or sensors.*
- **Installation & Compatibility** – ISD sensors can share wiring conduit with other Veeder-Root intrinsically safe (IS) sensors; compatible with all dispensers.
- **Operational Flexibility** – Supports single-dispenser or STP shutdown to maximize site uptime; wireless option available.

ISD Monthly Events

The screenshot shows the 'Status Events (Monthly)' view in the software. It displays the following information:

STATUS	
EVR Type	Vacuum Assist
ISD Type	01.07
Vapor Processor Type	Arid Permeator
Overall Status	WARN
EVR Vapor Collection	PASS
EVR Vapor Containment	WARN
ISD Monitor Up-Time	100%
EVR/ISD Pass Time	0%
Vapor Processor	PASS

Below the status table, there is a section for **WARNING ALARMS**.

ISD Hose Event History

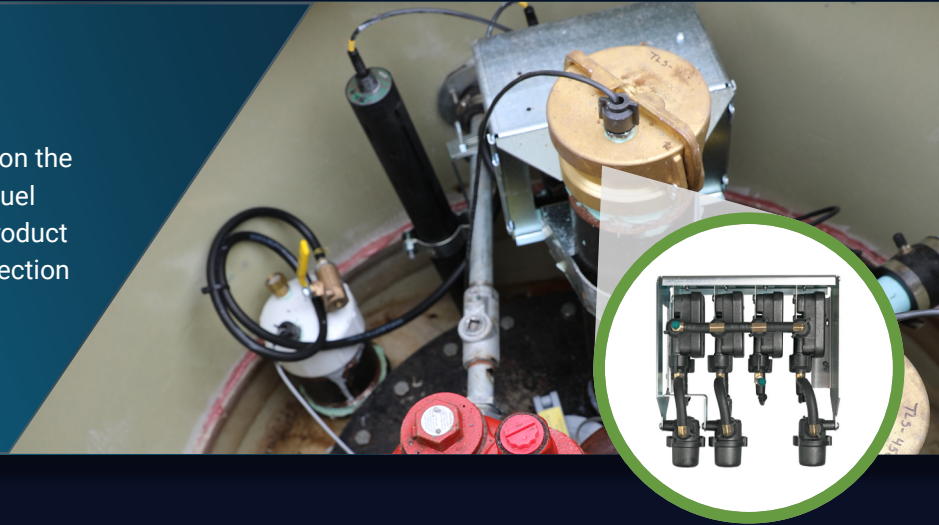
The screenshot shows the 'Hose Events' view in the software. It displays a table with the following data:

#	Date/Time	Duration	A/L	Vapor	Fuel
1	Oct 27 2025 10:38 AM	94	0.83	37.42	45.00
2	Oct 27 2025 10:58 AM	52	1.32	31.71	24.00
3	Oct 27 2025 11:18 AM	100	0.41	6.17	15.00
4	Oct 27 2025 11:41 AM	88	0.42	5.49	13.00
5	Oct 27 2025 01:24 PM	64	0.37	3.65	10.00
6	Oct 27 2025 02:10 PM	40	0.28	1.38	5.00
7	Oct 27 2025 03:51 PM	46	0.73	15.35	21.00
8	Oct 27 2025 04:08 PM	100	0.58	27.61	48.00
9	Oct 27 2025 04:50 PM	46	0.15	0.92	6.00
10	Oct 27 2025 05:40 PM	100	0.17	2.66	16.00
11	Oct 27 2025 06:52 PM	64	1.22	32.88	27.00
12	Oct 27 2025 07:59 PM	46	0.24	1.45	6.00
13	Oct 27 2025 09:33 PM	88	0.76	31.86	42.00

Secondary Containment Vacuum Sensing

Detect and contain secondary-containment leaks.

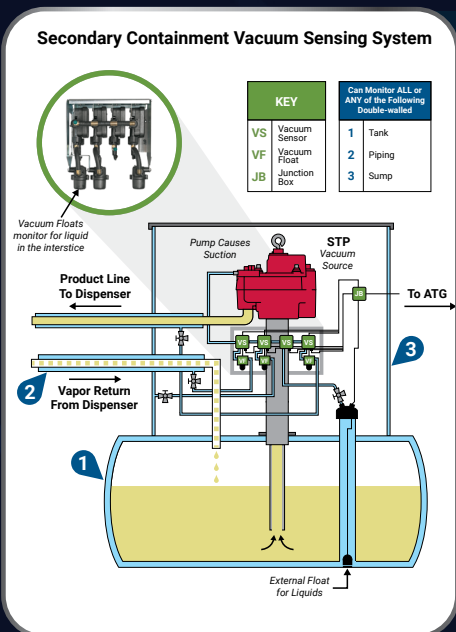
Secondary Containment Vacuum Sensing (SCVS) on the TLS-450PLUS ATG detects leaks in double-walled fuel tank, sump, and piping systems. It helps contain product releases, while under vacuum, and maximizes protection of secondary containment systems.



Key Features & Benefits

- **Limits Exposure** — TLS-450PLUS alarms if vacuum cannot be maintained, if replenish rates exceed 22.5 GPH/85 LPH, or if liquid is detected in the secondary space. Facilitates periodic operability testing.
- **Flexible** — Vacuum sensors connect to tank, sump, and piping interstices; each vacuum sensor is paired with a liquid sensor and supplied in pre-assembled Vacuum Sensor Monitoring Kits.
- **Regulatory Compliance** — Certified to meet California AB 2481 secondary-containment monitoring requirements; satisfies Class 1 leak-detection per the European Standard EN 13160-2; meets continuous-monitoring requirements implemented by several states.

SCVS Status



ISD GROSS PRES WARN 5 Warning(s)
33 Alarm(s) Dec 02 2025 10:42 AM

Diagnostics > Vac Sensor > Status Share

Vac Sensor	Evac State	Valve	Pressure (Comp) [psi]	Leak Rate [gph]
Vs 1: Unl.87A Product vac.	VACUUM OK	Closed	-17.768	0.000
Vs 2: Unl1.87A Vapor vac.	VACUUM OK	Closed	-17.768	0.000
Vs 3: Unl.87A Vent vac.	VACUUM OK	Closed	-17.768	0.000
Vs 5: Unl.87B Product vac.	VACUUM OK	Closed	-17.768	0.000
Vs 6: Unl.87B Siphon vac.	VACUUM OK	Closed	-17.768	0.000

If you have non-STP installation, such as chemical, suction, food-grade, and waste-liquid applications, reference [Veeder-Root SCVS System for Non-STP Applications \(576047-629\)](#) for more information.

Software Application Part Numbers

Business Inventory Reconciliation - Page 4

0333149-001	BIR/ AccuChart EDIM - Factory Installed, for TLS-450PLUS
0333580-001	BIR/ AccuChart CDIM 3 Input - Factory Installed, for TLS-450PLUS
0333581-001	BIR/ AccuChart LVDIM 12 Input - Factory Installed, for TLS-450PLUS
0333582-001	BIR/ AccuChart MDIM 12 Input - Factory Installed, for TLS-450PLUS

Timed Sudden Loss Detection - Page 5

0332972-018	Timed Sudden Loss Detection for TLS-450PLUS
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Intelligent Pump Control - Page 6

0332972-028	IPC Software Enhancement for TLS-450PLUS
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HydrX - Page 7

0332972-032	HydrX Software Feature Enhancement
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DEF Recirculation - Page 8

0332972-026	DEF Recirculation Software Feature for TLS-450PLUS
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Continuous Statistical Leak Detection - Page 9

0332972-006	Continuous Statistical Leak Detection for TLS-450PLUS
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Digital Pressurized Line Leak Detection - Page 10

0332972-007	Ultimate Testing: Digital Line Leak Detection for TLS-450PLUS*
0332972-008	Risk Management: Digital Line Leak Detection for TLS-450PLUS*
0332972-009	Base Compliance: Digital Line Leak Detection for TLS-450PLUS*

In-Station Diagnostics - Page 11

0332972-102	Software Enhancement Feature - In-Station Diagnostics
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Secondary Containment Vacuum Sensing - Page 12

0333972-029	Software Enhancement Feature - Secondary Containment Vacuum Sensing
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* If added to an existing console, the DPLLD Software will be shipped on a Veeder-Root iButton adapter, P/N 0330020-659.

Notes

TLS-450 PLUS
VEEDER-ROOT



VEEDER-ROOT
TLS-XB



VEEDER-ROOT
302 CONTROL BOX



VEEDER-ROOT
302 CONTROL BOX



VEEDER-ROOT
302 CONTROL BOX



VEEDER-ROOT
302 CONTROL BOX



VEEDER-ROOT
302 CONTROL BOX



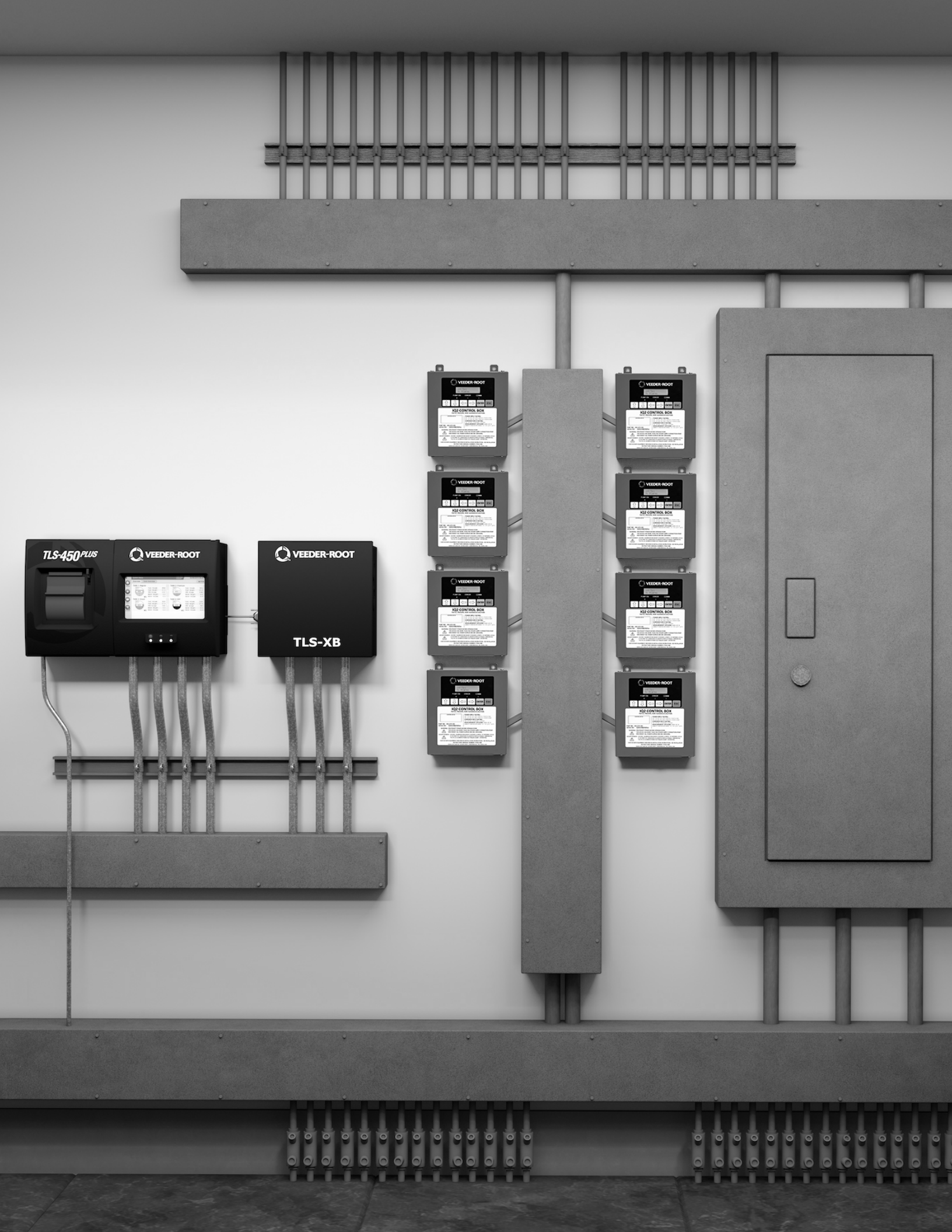
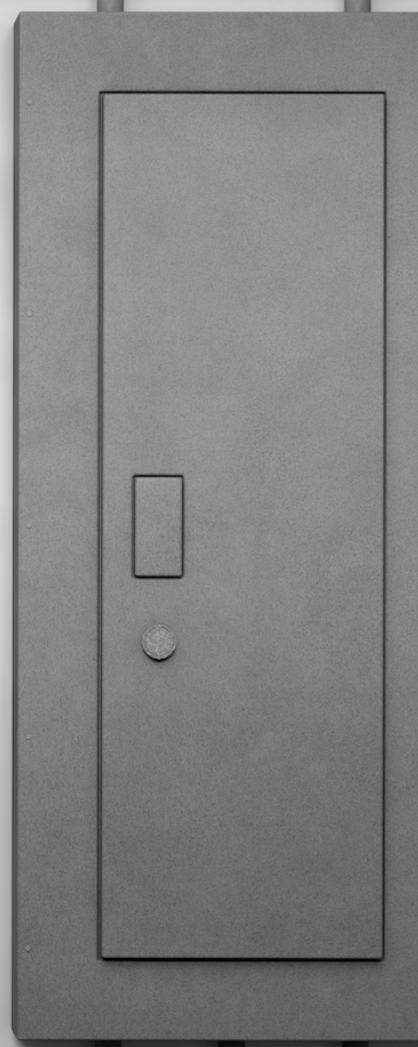
VEEDER-ROOT
302 CONTROL BOX



VEEDER-ROOT
302 CONTROL BOX



VEEDER-ROOT
302 CONTROL BOX





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