Department of Environmental Protection

2600 Blair Stone Road ♦ Tallahassee, Florida 32399-2400

DEP Form: 62-761.900(9)
Form Title: Storage Tank Equipment Registration Form
Effective Date: July 2019
Incorporated in Rule 62-761.850, F.A.C.

Storage Tank System Equipment Registration Form

Fill out completely

General Information

Company Name: Preferred Utilities MFG. Corp.
Contact Name: Jacob Powell
Company Address: 31-35 South St.
City, State: Danbury, Connecticut Zip: 06810
E-mail: jpowell@preferred-mfg.com
Contact Number: (203)743-6741
Product Name: Vacuum Leak Detection System
Model Number(s): VLM-P
Product Type: Leak Detection
Rule(s) citation that registration is being requested within Chapter 62-761 (UST), and/or 62-762 (AST), _____

F.A.C.: Write a brief description of equipment registration request including product limitations:

Preferred Utilities is requesting approval of our Vacuum Leak Detection System to monitor for leaks in double-walled piping, enclosures, and tank walls.

Information Checklist (Choose Yes, No, or N/A - Not Applicable):

		Yes	No	N/A
1.	Third-party Certification by a Nationally Recognized Testing Laboratory? (Required)	✔		
2.	Documentation of third-party evaluation that the equipment meets DEP Rules?	✔		
3.	Documents included about the qualifications of the Nationally Recognized Testing Laboratory?			✔
4.	Technical information and drawings included?	✔		
5.	Installation instructions included?	✔		
6.	Annual Operability Testing Requirements (Rules 62-761.500, 62-762.501, & 62-762.502 F.A.C.)?			✔
7.	Integrity Testing Requirements (Rules 62-761.700, 62-762.701, & 62-762.702, F.A.C.)?			✔
8.	Compatible with fuel blends containing >10% ethanol or >20% biodiesel?	✔		
9.	Has the product been approved or registered in other countries or states? (If so provide list)		✔	
10.	Any requirements for company-certified installers or trainers?		✔	
11.	Was this product(s) previously approved or registered by the Department? If yes, EQ- _____		✔	
12.	Any changes or modifications to the equipment since the last submittal to DEP?			✔

Document Information: Provide supporting documents indicated as "Yes" above including this form via email to Tanknotify@floridadep.gov, or documents can be sent to FDEP, Division of Waste Management, 2600 Blair Stone Road, MS 4560, Tallahassee, FL 32399.

Write a brief description of equipment installation and performance in the U.S.:

Preferred's vacuum leak detection system continuously monitors the interstitial area around double-walled piping, enclosures, and tank walls. The leak detection monitors separate zones meaning a leak in one zone will not affect the monitoring of another zone.

Equipment Registration Certification:

To the best of my knowledge and belief, all information submitted on this form is true, accurate and complete.

Jacob Powell Engineer — Printed Name and Title
Jacob Powell — Signature (right click to sign)
07/26/2022 — Date

For Department Use Only:

Date Application Received: 07/26/2022 Application complete: Yes: ✔ No: ☐

EQ- 981 Date of complete or incomplete letter sent: 08/22/2022 Date Equipment Requires Renewal: **08/22/2027**

Storage tank system equipment requires renewal every 5 years in accordance with subsection 62-761.850(2), F.A.C.

Issue Date: June 8, 2021

Preferred Utilities

Interstitial Vacuum Leak Monitoring System

CONTINUOUS INTERSTITIAL TANK SYSTEM MONITORING METHOD (PRESSURE/VACUUM)

Certification:

Leak rate of 0.1 gph with PD=100.0% and PFA=0% “Test Procedures For Tightness Testing Using A Vacuum Monitor On A Double- Walled Tank Interstice With Or Without The Addition Of A Liquid Sensor” - Standard Test Procedures for Evaluating Release Detection Monitoring Methods: Volumetric and Non-volumetric Tank Tightness Testing - USEPA May 2019 section 4.5.3.

Operating Principle:

System uses vacuum generated by a vacuum pump to continuously maintain and monitor up to 4 zones.
The console also has a “learn” function that is used during setup to determine the time to establish the vacuum on the interstice to a specific level. The time to establish the vacuum during the learn process is stored by the console and is used to determine if there is a liquid or air leak whenever the vacuum needs to be re-established at any time. System also has a float valve that is designed to detect the presence of liquid between the interstice and the vacuum pump.

Alarm Condition:

System alarms when there is a loss of vacuum in the interstice within a specific amount of time below a specific vacuum. The system will also alarm if the system cannot replenish the vacuum within 150% of the initial “learn” time. The time to alarm is determined based on the size of the interstice. The float valve located between the interstice and the vacuum pump shuts the flow of air from the vacuum pump to the interstice in the presence of liquid, therefore causing an alarm due to the system not being able to replenish the vacuum within 150% of “learn” time.

Applicability:

Double-walled piping or double-walled tank with an interstice up to 2,400 gallons (max volume to declare a tight test within 30 days), storing gasoline, gasohol, diesel, heating oil #2, kerosene, aviation fuel, motor oil, water. Storage of biodiesel blends B6-B20 meeting ASTM D7467 and biodiesel B100 meeting ASTM D6751 would also produce a system alarm if the system threshold is exceeded. Responses to these fuels were not determined but would be expected to be very similar to the system's response when storing diesel. .

Interstitial Volume	Time To Alarm with a 0.1 gal/hr leak	Time to Declare a Tight Test
(Gallons)	(hours)	(hours/minutes)
5	1 hour	1h 30m
10	2 hours	3h
20	4 hours	6h
50	10 hours	15h
100	20 hours	30h
200	40 hours	60h
500	100 hours	150h
1000	200 hours	300h
2000	400 hours	600h
2400*	480 hours	720h (30 days)

*maximum volume allowed in order to allow for a passing test within 30 days

Manufacturer's Specifications:

Alarm will activate when interstitial vacuum decreases by a specific amount during a specific amount of time, as well as the system being unable to replenish the vacuum within 150% of the “learn” time.
Volume of monitored interstitial space must not exceed 2,400 gallons to satisfy 30-day release detection requirement.

Calibration:

The system must be programmed by a factory trained technician or under the direction of the manufacturer. Maintenance schedule – Biannually - check solenoid, transmitter, and pump operation, test the alarm horn and strobe, inspect tubing, fittings, and any connections, check tubing for condensate, drain any liquid that is in the liquid stop valve.

Change the filter on the suction side of the vacuum pump that is in the control panel annually.

Comments:

The system described herein was tested with a 5-gallon vessel to simulate an interstice. Float valve was tested with water, gasoline, and diesel. System tested with a 100% probability of leak detection of .1gph ullage leak and 0% probability of false alarm. This system may not be compatible with all secondarily contained tanks and/or piping. Always consult with the tank and/or piping manufacturer and the manufacturer's applicable recommended installation practices before installing this system, or damage may be caused to the tank or piping by its use.

Preferred Utilities
31-35 South Street
Danbury, CT 06810

Evaluator: Ken Wilcox Associates, Inc.
1125 Valley Ridge Drive
Grain Valley, MO 64029
Tel: (816)–443-2494
cwilcox@kwaleak.com

Date of Evaluation: March 29, 2021

Issue Date: June 8, 2021

Preferred Utilities

Interstitial Vacuum Leak Monitoring System

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Change the filter on the suction side of the vacuum pump that is in the control panel annually.

Comments:

The system described herein was tested with a 5-gallon vessel to simulate an interstice. Float valve was tested with water, gasoline, and diesel. System tested with a 100% probability of leak detection of .1gph ullage leak and 0% probability of false alarm. This system may not be compatible with all secondarily contained tanks and/or piping. Always consult with the tank and/or piping manufacturer and the manufacturer's applicable recommended installation practices before installing this system, or damage may be caused to the tank or piping by its use.

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31-35 South Street - Danbury, CT 06810 - Tel: (203) 743-6741 - Fax: (203) 798-7313 - www.preferred-mfg.com

Vacuum Leak Monitoring System
User Manual
Issue Date: 3/12/2020
Rev. 1

Note: The Vacuum Leak Monitoring System, Part Number VLM- (suffixed to indicate appropriate model) should be installed and operated by qualified personnel only. Improper operation or maintenance may cause leakage, equipment damage, or undesired operation.

THE INSTALLATION OF THIS EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REGULATION OF
AUTHORITIES HAVING JURISDICTION

This space is reserved for revision notes.

Table of Contents

Introduction to the Vacuum Leak Monitoring System

General Description:
The purpose of the vacuum leak monitoring system is to monitor the interstitial space between double wall piping, enclosures, tank walls, etc… The vacuum leak monitoring system shall continuously monitor the interstitial space for leaks (either air or liquid). A vacuum is maintained and monitored in each zone so that if the vacuum drops below a specific threshold for a specified amount of time, the control system shall alarm that there is a leak in that zone.

Model Number Designations:

Model Description	Part Number
Vacuum Leak Monitoring Control Panel with 1 Zone Manifold	VLM-P-1
Vacuum Leak Monitoring Control Panel with 1 Zone Manifold, Intrinsically Safe	VLM-P-1-IS
Vacuum Leak Monitoring Control Panel with 2 Zone Manifold	VLM-P-2
Vacuum Leak Monitoring Control Panel with 2 Zone Manifold, Intrinsically Safe	VLM-P-2-IS
Vacuum Leak Monitoring Control Panel with 3 Zone Manifold	VLM-P-3
Vacuum Leak Monitoring Control Panel with 3 Zone Manifold, Intrinsically Safe	VLM-P-3-IS
Vacuum Leak Monitoring Control Panel with 4 Zone Manifold	VLM-P-4
Vacuum Leak Monitoring Control Panel with 4 Zone Manifold, Intrinsically Safe	VLM-P-4-IS
1 Zone Manifold (No Control Panel)	VLM-P-1-100
1 Zone Manifold (No Control Panel), Intrinsically Safe	VLM-P-1-100-IS
2 Zone Manifold (No Control Panel)	VLM-P-2-100
2 Zone Manifold (No Control Panel), Intrinsically Safe	VLM-P-2-100-IS
3 Zone Manifold (No Control Panel)	VLM-P-3-100
3 Zone Manifold (No Control Panel), Intrinsically Safe	VLM-P-3-100-IS
4 Zone Manifold (No Control Panel)	VLM-P-4-100
4 Zone Manifold (No Control Panel), Intrinsically Safe	VLM-P-4-100-IS

Vacuum Leak Monitoring Control Panel:

Application

Check the interstitial volume and equipment manufacturer's specification prior to installing the Preferred Vacuum Leak Monitoring System. It is important to determine the interstitial volume in each monitored zone, as the volume will directly influence the length of time the vacuum pump will run. The following chart illustrates the pump runtimes for different volumes of interstitial space.

If an application requires a longer pump runtime or a large interstitial space, be sure to consult the factory.

Interstitial Volume, ft^3	Pump Run Time to Reach Vacuum Setpoint, Minutes
1	1.8
2	3.6
3	5.4
4	7.1
5	8.9
6	10.7
7	12.5
8	14.3
9	16.1
10	17.9
15	26.8
20	35.7
25	44.6
30	53.6
35	62.5
40	71.4
45	80.4
50	89.3
55	98.2
60	107.1

Mechanical and Environmental Specification:

NEMA Rating: 4X

Enclosure: Cabinet for wall mounting -20”x16”x8” Stainless Steel

Weight: 50 lbs.

Operating Temperature: -20 to 104 F

Storage Temperature: 40 to 104 F

Humidity: 5-95% (non-condensing)

Electrical Specification:

Input Power to Panel: 120VAC +15/-20%, 60VA, 50/60 Hz

Discrete Inputs: 8 max. (optional liquid leak sensors) 24VDC

Relay Outputs: 8 channels max. (24V) (Minimum – 1 vacuum pump motor, up to 4 solenoid valves, 1 alarm/strobe, 3 spare) Note: All inductive DC loads need clamp diodes; solenoids might have internal diodes. Polarity is important.

Analog Inputs: 8 channels max., 4-20mA input, 0.2% accuracy, 13 bit resolution 22VDC/30mA supply for each channel (Up to 4 pressure transducers for measuring vacuum)

Communication: RS-485, Modbus Ethernet, and BacNet IP

Note: Alarm Contacts shall be NC, relay de-energizes for alarm and/or malfunction

Node Net Operation: The FSC (in the Vacuum Leak Monitoring Panel) has redundant NodeNet Communication Ports (A & B) that continuously communicate between all FSC controllers wired in parallel (up to 10 FSC’s maximum). All of the information from all of the FSC’s will travel through both cables to all of the nodes. Both cables are always active and are electrically isolated at each node

NodeNetA: Node-to-Node Communications only. Redundant Auto Fail Over: A->B or B->A
Isolated RS485, Custom Protocol, 38.4k baud NetA data & common is isolated from: NetB, FSC DC common, and FSC frame ground.
NodeNetB: Node-to-Node Communications only. Redundant Auto Fail Over: A->B or B->A
Isolated RS485, Custom Protocol, 38.4k baud NetB data & common is isolated from: NetA, FSC DC common, and FSC frame ground.
Firmware: Upgradeable via SD Memory Card

See FSC Manual for more details about the controller.

Installation – Mechanical

Piping and Instrumentation Diagram:
Refer to drawing "VMS-PID" for the P&ID for schematic details of the system. Note that this schematic shows a four-zone manifold, but the number of zones can vary depending on the system ordered.

P&ID Legend:
PCV-X71 – Vacuum Regulator
PC-X71 – Vacuum Pump
HV-X71 – Hand Valve
XX – X73 – Air Vent Valve
QSV-X75A – Solenoid Valve
QSV-X75B – Solenoid Valve
QSV-X75C – Solenoid Valve
QSV-X75D – Solenoid Valve
PT-X71 – Pressure Transmitter
PT-X72 – Pressure Transmitter
PT-X73 – Pressure Transmitter
PT-X74 – Pressure Transmitter

How to Connect Panel to the Zone Manifold and From Zone Manifolds to Zone Connections:
The panel and zone manifold come standard with push-to-connect tube fittings that are to be used with ¼" OD Polyurethane tubing, P/N PP-10222. Cut the tubing per the required length from the panel to the zone manifold and insert into the push-to-connect tube fittings. Ensure tubing is tight in the fitting after installation. Similarly, one should use P/N PP-10222, polyurethane tubing to connect from the zone manifolds to the zone leak test points. Install push-to-connect fitting, P/N PP-10221 (1/4 NPT to ¼" OD tubing) at the designated leak test points.

Alternatively, one may use copper or stainless-steel tubing in place of the polyurethane tubing.

Notes:
1. For fiberglass tanks and for applications that cannot withstand excessive vacuum pressure, a vacuum relief valve must be used to prevent equipment damage!
2. Heed manufacturer's recommendations for tanks, pipes, etc…
3. Fittings and piping/tubing must be able to withstand the vacuum and hydrostatic pressure generated from a fuel leak.
4. Mount the control panel outside of explosive environments.

Pneumatic Connection Line Mounting:
1.The full cross section of the tubing must be maintained.
2.The length of the lines between the interstitial space and the zone manifold shall not exceed 150 ft.
3.Condensate traps must be mounted at the lowest point of the tubing.
4.Ensure that the pump exhaust line is terminated in a non-hazardous location.
5.Ensure liquid tight conduit and fittings are used when connecting to instrumentation.
6.Route connection lines sloping down the interstitial space so that condensate is not trapped.
7.Route the suction line from the control panel sloping down to the zone manifold. Install condensate traps, where necessary.

Installation – Mechanical

Attach tubing to the appropriate connections on the manifold assembly.

The display on the front of the manifold assembly will show pressure once the unit is powered. Utilize polyurethane tubing to connect from the fittings on the manifold to the fittings on the control panel.

Installation – Electrical

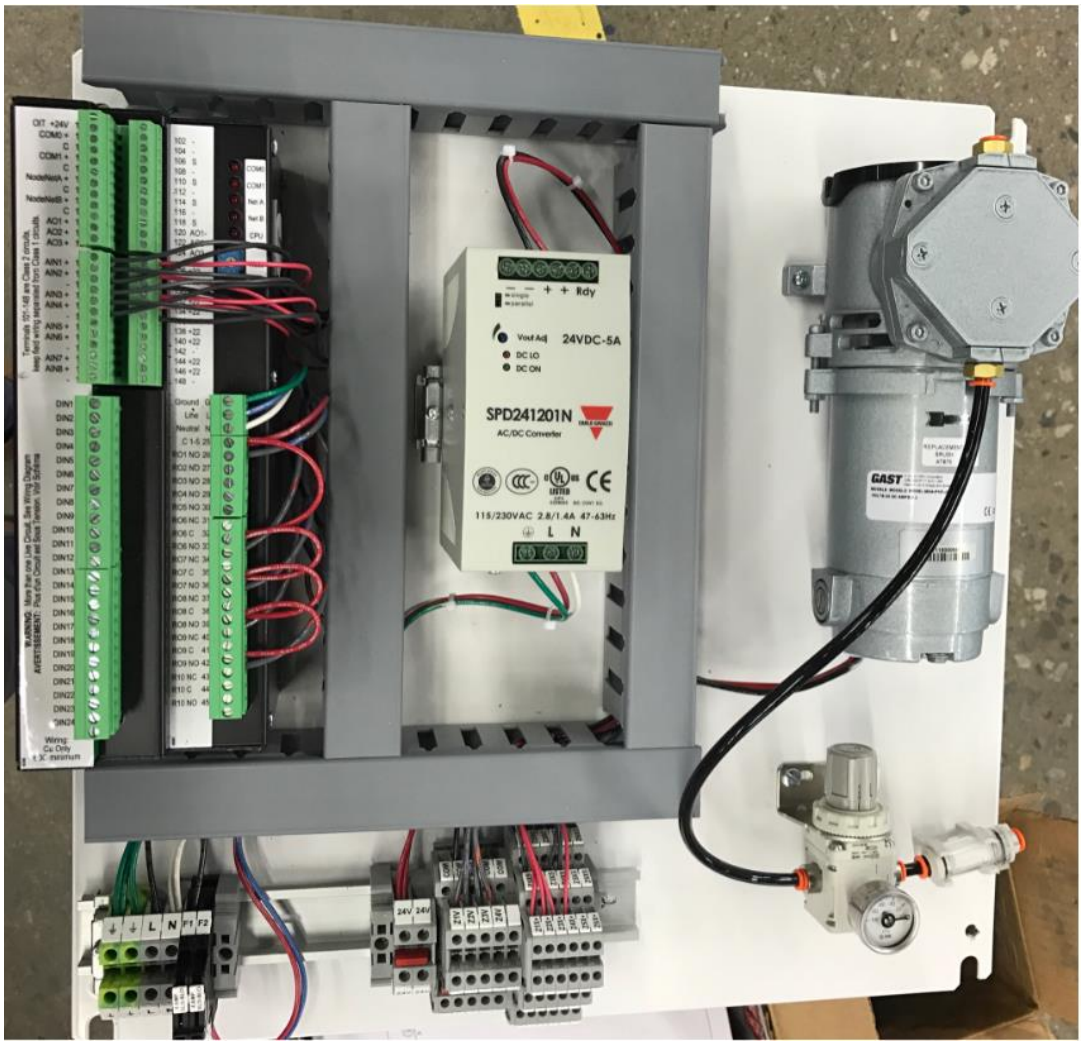
Refer to Electrical Wiring Schematic “VLM-P” for wiring details. Only qualified and trained personnel should perform wiring installation, and the electrical installation shall comply with local codes and regulations having jurisdiction.

Solenoid Valves: Utilize 24VDC twisted pair. Maximum Cable Length: 100 feet

Pressure Transmitters: Utilize 24VDC twisted pair. Maximum Cable Length: 100 feet

Control Panel: 120VAC; keep 120VAC isolated from any low voltage wiring.

Ensure all electrical connections are tight with no bare exposed metal wire. Ensure all wiring is in seal-tight conduit.



Commissioning

Pre-Start Checklist:

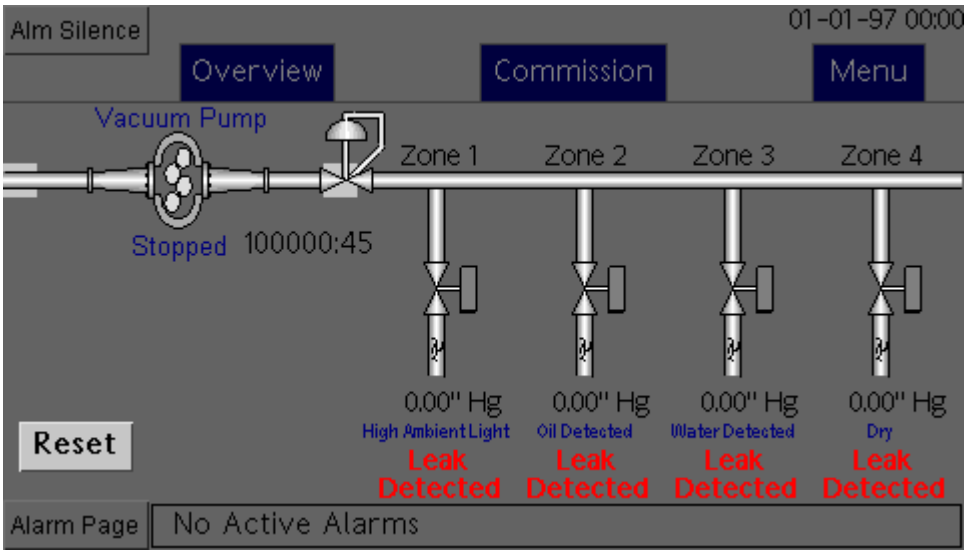
1. Ensure all tubing is connected from the vacuum monitoring panel (if provided) to the zone manifold.
2. Ensure all tubing is connected from the individual zone solenoids on the zone manifold to the connect points on the monitored interstitial spaces.
3. Confirm all tubing is slanting downward so that no condensate traps exist in the tubing. If a condensate trap is unavoidable, ensure that a manual ball valve that can serve as a drain is installed at the low point to drain any condensate/liquid.
4. Ensure power and communication (if applicable) wires are run to the panel and landed on the correct terminals per the wiring diagram.
5. Confirm there is no pressure present on the compound gauge located on the zone manifold. Pressure here prior to startup could indicate an existing leak that has generated hydrostatic pressure in the line.
6. Visually inspect all tubing, fittings, etc.. for any tears, obstructions, or damage. Replace any defective components as necessary.
7. Confirm that the monitored equipment (e.g. tanks, piping, etc…) can handle the design vacuum of the system (typically set at 7” Hg). A vacuum relief valve is required for applications unable to handle more than 7” Hg vacuum.
8. Confirm that all wiring is run in seal-tight conduit.
9. Confirm that any high voltage wiring is segregated from the low voltage wiring and not run in the same conduit.
10. Ensure that the electrical equipment is properly grounded per electrical codes.
11. Double check interstitial volumes to ensure they are within the recommended volumes for this system.

Record any applicable notes below.

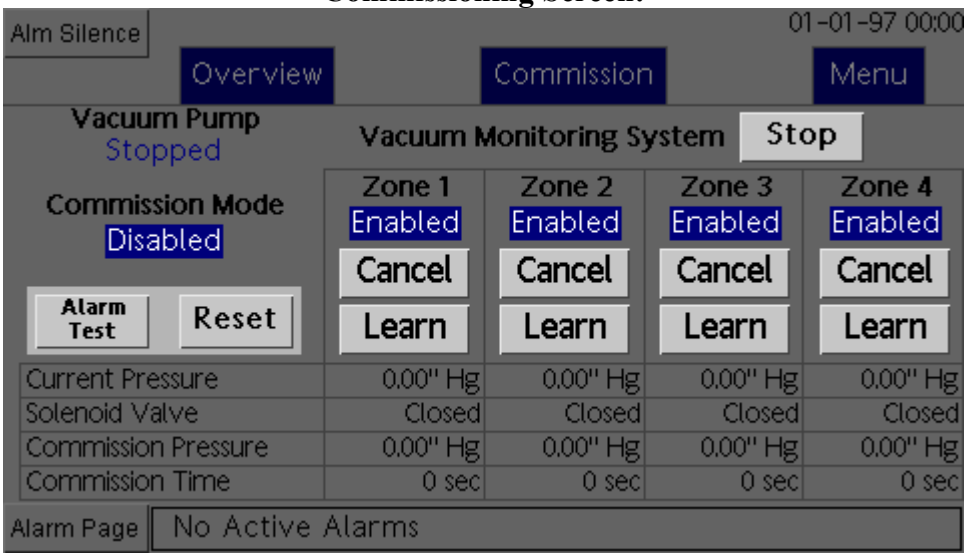
Commissioning

After the prestart checklist is completed, apply power to the panel. The touchscreen graphic should now be visible.

Overview Screen:



Commissioning Screen:



Commissioning

Each zone will need to learned. To learn a zone, press the “Learn” button on the commissioning screen. When the learn button is pressed, the vacuum pump will turn on, the solenoid for that zone will open, and the pump will continue to run until the pressure in that zone reaches 7”Hg and stabilizes there. When the pressure reaches its setpoint, the pump will stop, and the solenoid will close.

After a zone is learned, the commissioned pressure and the time it took for the pump to reach commissioned pressure will be stored on the touchscreen. The current pressure will also be displayed so one can compare the current pressure vs. the commissioned pressure.

If there is a leak present in the zone that is being learned, then the pump will continue to run, and the zone pressure will not reach setpoint. When this occurs, an error will be displayed. At this time, the commissioning technician should ensure there are no leaks in any of the interconnecting piping first, then check to make sure there are no leaks in the monitored interstitial space.

After a zone is learned, the technician may now proceed to learn the next zone if applicable. Note that only one zone can be learned at a time. The same procedure should be repeated for each zone.

After all zones are learned, the commissioning screen should display the commission times and pressure for all zones. The overview screen should be free of alarms unless there is a leak detected in one of the zones.

Doublecheck readings on the HMI with pressure gauges on a periodic basis to ensure proper operation.

Ensure any manual valves that are supposed to be open are open, and any valves that are supposed to closed are closed.

Operation

After commissioning is completed, if the pressure in a zone drops below a specified threshold of the commissioned pressure, the vacuum pump will turn on to restore the vacuum pressure in that zone. The vacuum pump will continue to run until the vacuum pressure is restored. Due to unavoidable relatively small leaks and fluctuations in temperature, this is normal operation. If the pump is unable to restore the vacuum pressure after a specified runtime, the controller will recognize there is a leak in that zone and energize the alarm horn and strobe. The alarm horn and strobe will continue to stay on until someone presses the reset button or alarm silence button on the overview screen. Any alarms will be stored and displayed on the alarm screen.

If point leak sensors are installed and wired to the vacuum leak monitoring panel, any leak detected by these sensors will also display on the overview screen. If discriminating leak sensors are used, water or oil leaks may be annunciated.

Other than temperature fluctuations and small, unavoidable leaks, any air or liquid leak will cause the zone pressure to drop below its commissioned value for an extended period and will cause an alarm.

In the common suction line going to the zone manifold, there is a liquid float valve which will prevent the flow of liquid to the vacuum leak monitoring panel. If there is liquid in the line that gets to the point of this valve, the valve will close and stop flow of air pulled by the vacuum pump. When this occurs, the pressure in monitored zones will not be able to be restored, and a leak alarm will be annunciated.

The liquid float valve will need to be drained after a leak repair so that normal operation can be restored.

Be sure to isolate any zones with manual isolation valves while repairing any leaks.

Troubleshooting

When trying to learn a zone, the controller times out and annunciates a leak:

Check to make sure pump is turning on and a vacuum is being generated.

Check to make sure there are no leaks in the interconnection tubing from the panel to the zone manifold or from the zone manifold to the monitored zones. Isolate sections as necessary to pinpoint any leaks.

Check the liquid stop valve to ensure there is no liquid in the valve. Open the drain to drain out any liquid into an appropriate vessel.

Check to make sure there is no condensate trapped in the measuring lines. This could make its way to the liquid stop valve and cause loss of flow from the interstitial zones.

Check to make sure the solenoids and pressure transmitters are properly wired per the instruction manual and that they are operating properly.

When resetting the controller, the alarm does not clear.

Check to make sure there are no leaks in each zone, including any point leak sensors that are installed.

Check the above items if there is a leak in a zone.

There is an alarm displayed on the touchscreen, but the alarm and strobe do not energize.

Press the alarm test button on the touchscreen to check operation of the alarm horn and strobe.

Spare Parts, Maintenance, and Service

Control Panel Spare Parts:

Part Number	Description
VLM-R	Vacuum Pressure Regulator
VLM-PU	Vacuum Pump and Motor, 24VDC, 1/16 HP
VLM-F	Filter for Vacuum Pump, 1/4"
TB-PXC-SD-FT-6-2-GRY	SCREW-DOWN FEED-THROUGH 6MM 2 LEVEL GREY TERMINAL BLOCK
TB-PXC-SD-FT-6-2-END-R	RIGHT END CAP FOR TB-PXC-SD-FT-6-2-*
TB-PXC-SD-FT-6-2-END-L	LEFT END CAP FOR TB-PXC-SD-FT-6-2-*
TB-PXC-PIB-6-RED-50	TERMINAL BLOCK PLUG IN BRIDGE 6MM RED 50POS
PP-10227	Through Wall Tube Fitting, 1/4" Plastic
PP-10222	Polyurethane Tubing, 1/4", 100' Roll
PP-10221	Push to Connect Tube Fitting, 1/4"
OIT-4X	OPERATOR INTERFACE TERMINAL 4 INCH WITH NEMA 4X FRONT - PROGRAMMING NOT INCLUDED
FSC-120	Fuel System Controller, 120vac, 24 DIN, 10 ROUT, 8 AIN, 3 AOUT
70460	30mm Audible/Visual Alarm Light, Red, 12-24V
70431	24VDC POWER SUPPLY, 5A OUTPUT, 120VAC
20250	RAIL, TERMINAL BLOCKS, 1 METER LENGTH
190777-5	OIT TERMINAL ADAPTER KIT 5ft CABLE
16740-4S	FUSE, 4 AMP SLO BLO FUSE, 250 VOLT, 5 x 20 mm,
16739	FUSE HOLDER TERMINAL BLOCK
12791-J-10	Jumper Bar 50 Pole Plugin 5.2mm
12791-END	TERMINAL BLOCK, THREE LEVEL, 6MM, DC/ LOW VOLTAGE END CAP
12791	TERMINAL BLOCK, THREE LEVEL, 5MM, DC/ LOW VOLTAGE
12782-J-10	Jumper Bar 10 Pole Plugin 8.2mm
12782-END	Terminal Block 8mm Feed Trough Screwdown End Cap
12782	Terminal Block 8mm Feed Trough Screwdown
12103	Terminal Block 8mm Grounded Screwdown

Spare Parts, Maintenance, and Service

Zone Manifold Spare Parts:

Part Number	Description
VLM-T	Compound Pressure Transmitter,-14.7-0-100PSIG
VLM-S	Solenoid Valve, 1/4" NPT, 24VDC
VLM-M	Four Port Manifold Block, Anodized Aluminum, 1/2" Inlet, 1/4" Outlets
VLM-FV	1/2" NPT, FLOAT VALVE
VLM-CV	Check Valve, 1/2" NPT
VLM-B	Mounting Bracket for Vacuum Manifold
PP-10224	NIPPLE, 1/2" NPT, 2" LG, BRASS
PP-10223	1/2"x1/4" Nylon Bushing
PP-10221	Push to Connect Tube Fitting, 1/4"
PP-10220	Brass Street Elbow, 1/4" NPT
PP-10219	YOR-LOK STRAIGHT FITTING ADAPTER FOR 5/16" O.D. TUBE TO 1/4 NPT
PP-10035	Standard-Wall Brass Threaded Pipe Nipple 1/4 Pipe Size X 1 1/2" Length
PP-10031	Standard-Wall Brass Threaded Pipe Nipple 1/4 Pipe Size X 3" Length
PP-10028	Low-Pressure Brass Threaded Pipe Fitting 1/4 Pipe Size, Tee
KB280-T05-.032	TUBING- SEAMLESS COPPER REFRIGERATION- 5/16~ X .032 WALL
80087	1/4" NPT Brass Plug
13150	GAUGE, COMPOUND, 2 IN., RG. 30-0-30 PSI
11941-0.25	BALL VALVE-1/4" NPT-BRONZE 600 # CWP UL YRBX MHKZ YRPV & YSDT

Maintenance:

Check solenoid, transmitter, and pump operation biannually.

Change the filter on the suction side of the vacuum pump that is in the control panel, annually.

Test the alarm horn and strobe bi-annually using the test pushbutton on the HMI.

Inspect tubing, fittings, and any connections bi-annually. Repair or replace as necessary.

Check tubing for condensate on a biannual basis.

Drain any liquid that is in the liquid stop valve on a biannual basis.

Service:

Contact Preferred Utilities Manufacturing Corporation for factory service or help locating the local service representative at 203-743-6741. For information about our products and services, visit Preferred-mfg.com

VACUUM LEAK DETECTION MONITORING
Model VLM-P

The advanced Vacuum Leak Detection System continuously monitors the interstitial area around double-walled piping, enclosures, tank walls, etc. The controller creates a vacuum in the interstitial space and if it senses a significant pressure drop for a specific amount of time, the controller alerts the operator of a leak. The system also alerts the operator to whether the leak is oil or water. Vacuum leak detection gives significant benefits of early alerts even before liquid is present.

Vacuum Leak Detector Cabinet

Features

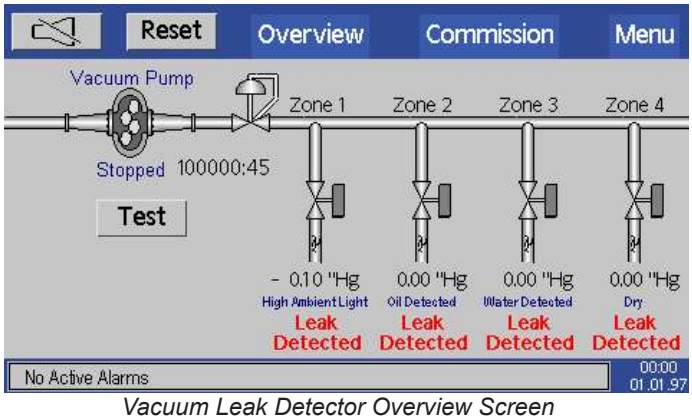
- Safe for outdoors, built in a NEMA 4X cabinet enclosure.
- Separated monitored zones means a leak in one zone does not affect the monitoring of other zones.
- Simple and quick mounting.
- UL 508 standard.
- Standard 4" touch screen showing overview, alarm, and commissioning.
- Standard Modbus Ethernet and BacNet IP communication.
- Integrates discriminating point leak detection with the vacuum leak detection.

Mechanical Specifications

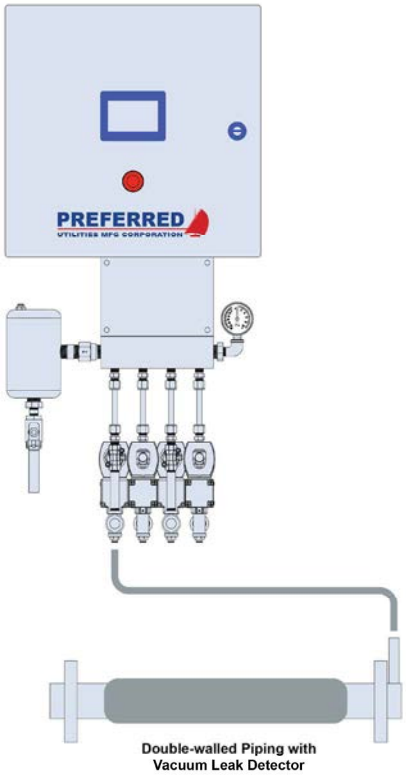
NEMA Rating:	4X
Enclosure:	Cabinet for wall mounting 20" x 20" x 10 Stainless Steel
Weight:	50 lbs.
Operating Temperature:	-20 to 104 F
Storage Temperature:	40 to 104 F
Humidity:	5-95% (novn-condensing)

Electrical Specification:

Input Power to Panel:	120VAC +15/-20%, 60VA, 50/60 Hz
Discrete Inputs:	8 max. (optional liquid leak sensors) 24VDC
Relay Outputs:	8 channels max. (24V) (Minimum – 1 vacuum pump motor, up to 4 solenoid valves, 1 alarm/strobe, 3 spare) Note: All inductive DC loads need clamp diodes; solenoids might have internal diodes. Polarity is important.
Analog Inputs:	8 channels max., 4-20mA input, 0.2% accuracy, 13 bit resolution 22VDC/30mA supply for each channel (Up to 4 pressure transducers for measuring vacuum)
Communication:	RS-485, Modbus Ethernet, and BacNet IP



Vacuum Leak Detector Overview Screen



Vacuum Leak Detector Connection Setup