

Line Leak Detection

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Phoenix, AZ**

Line Leak Detection

- Early detection can protect you from the high clean up costs and third-party liability claims.
- If your site does not meet the leak detection requirements, you can be cited for violations, fined, maybe even have sales suspended.



Line Leak Detection

- Releases from piping systems are one of the primary sources of contamination from a UST system.

Line Leak Detection

- Pressurized Piping Systems
- Suction Piping Systems
 - American (standard) suction
 - European (safe) suction

Pressurized Piping System

A pump pressurizes the line to deliver the fuel to a dispenser.





Each Pressurized piping run must have one leak detection method from each:

- An Automatic Line Leak Detector that performs 3 gph continuous (hourly) testing
- And some form of Monthly monitoring method
 - Monthly .2 electronic line leak
 - SIR
 - Interstitial Monitoring
 - Or



Pressurized Piping requirements may also be met by

- Line Tightness Testing

- A Precision (annual) test that can detect a 0.1 gallon per hour leak rate at 150% of the line's operating pressure.

Automatic Line Leak Detectors

- “Methods which alert the operator to the presence of a leak by restricting or shutting off the flow of regulated substances through piping or triggering an audible or visual alarm.”
- “May be used only if they detect leaks of 3 gallons per hour at 10 psi line pressure within one hour.”
- “An annual test of the operation of the leak detector must be conducted in accordance with the manufacturer’s requirements.”

Automatic Line Leak Detectors

- Mechanical - MLLD

- Tests before dispensing begins

- Flow Restrictor - If a leak is detected, product flow through the line is well below the usual flow rate

- Line Leak signal is slow flow

- False Alarm signal is slow flow

- Reauthorize to confirm slow flow Alarm or False Alarm

Automatic Line Leak Detection

■ Electronic

- Tests after dispensing occurs
- Flow Shutoff - If a leak is detected, product flow is completely cut off in the line or the pump is shut down (ELLD wired to shut off pump).
 - If a false alarm is detected, no flow is the signal
 - Call a tech for service

Automatic Line Leak Detection

■ Electronic

- Standard ELLD only conducts a 3.0 gph test.
 - If you want to use your ELLD for monthly monitoring then additional testing capabilities must be programmed into the monitoring console.

Automatic Line Leak Detectors

- Hybrid

- Has characteristics of both mechanical and electronic line leak detection
 - Built to eliminate mechanical slow flow
 - Tests continuously and clears the line before dispensing
 - Full shutdown or Alarm and restricted flow

European (Safe) Suction Piping

- Suction Piping is Exempt from Leak Detection If:
 - The below-grade piping operates at less than atmospheric pressure;
 - The below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if suction is released;
 - Only one check valve is included in each suction line;
 - The check valve is located directly below and as close as practical to the suction pump.

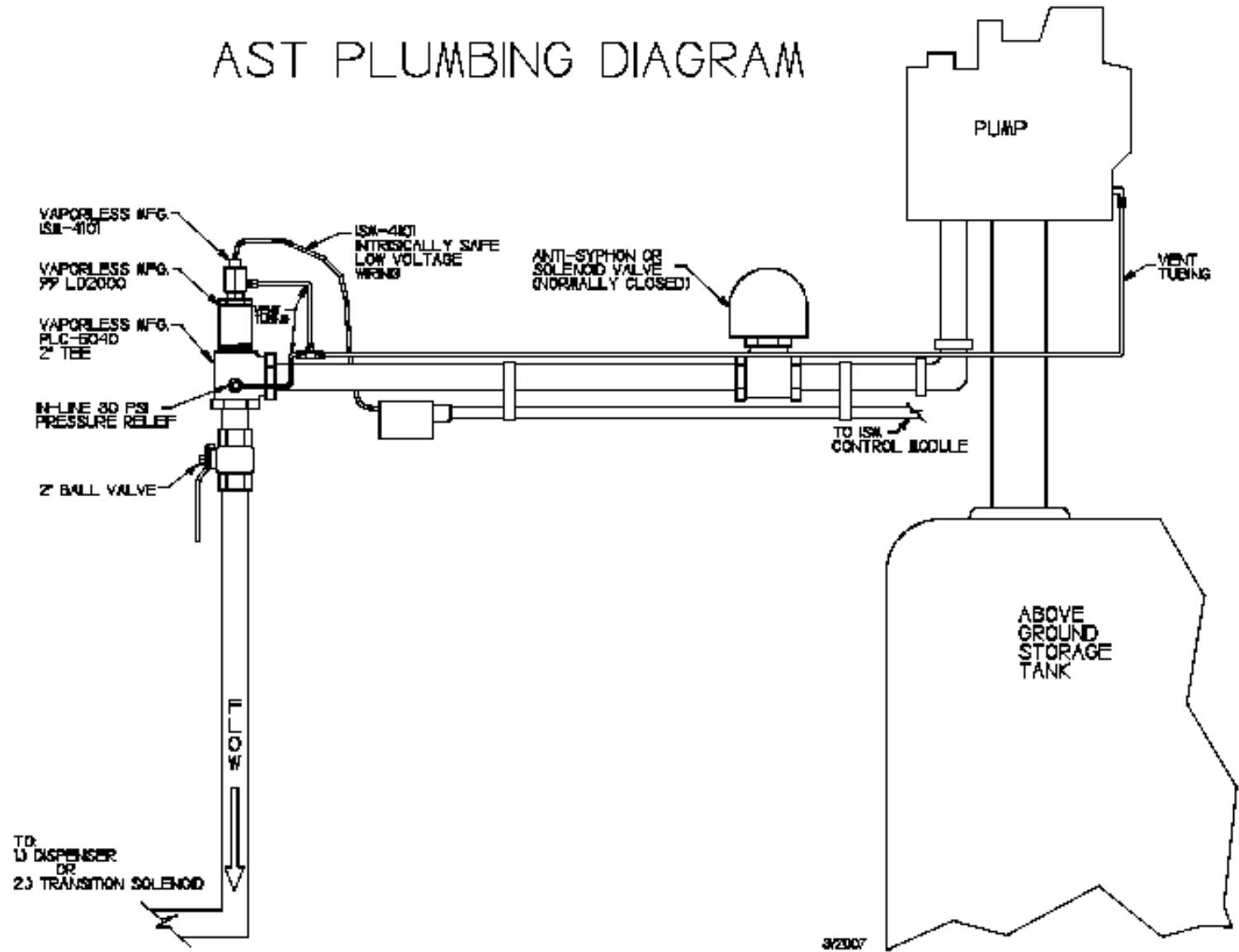
Standard Suction Piping

- Should be amended to meet Safe Suction Piping or
- Should have line testing and leak detection

Fuels - Ethanol, Methanol, Biodiesel, & Aviation Fuels

- Special Considerations
- Inspect Equipment
- For concentrations over 20% Alcohol concentrations over 5% Biodiesel, and any Aviation Fuel, use Stainless Steel Vent.

AST PLUMBING DIAGRAM



Line Leak Detection Problems

- When replaced, the old ALLD should be removed, not left in the sump or pit.
- ELLD may not be properly connected or programmed to the ATG
- Not all ELLDs are compatible with flexible piping (eg. Veeder Root WPLLD).

Slow Flow Problems

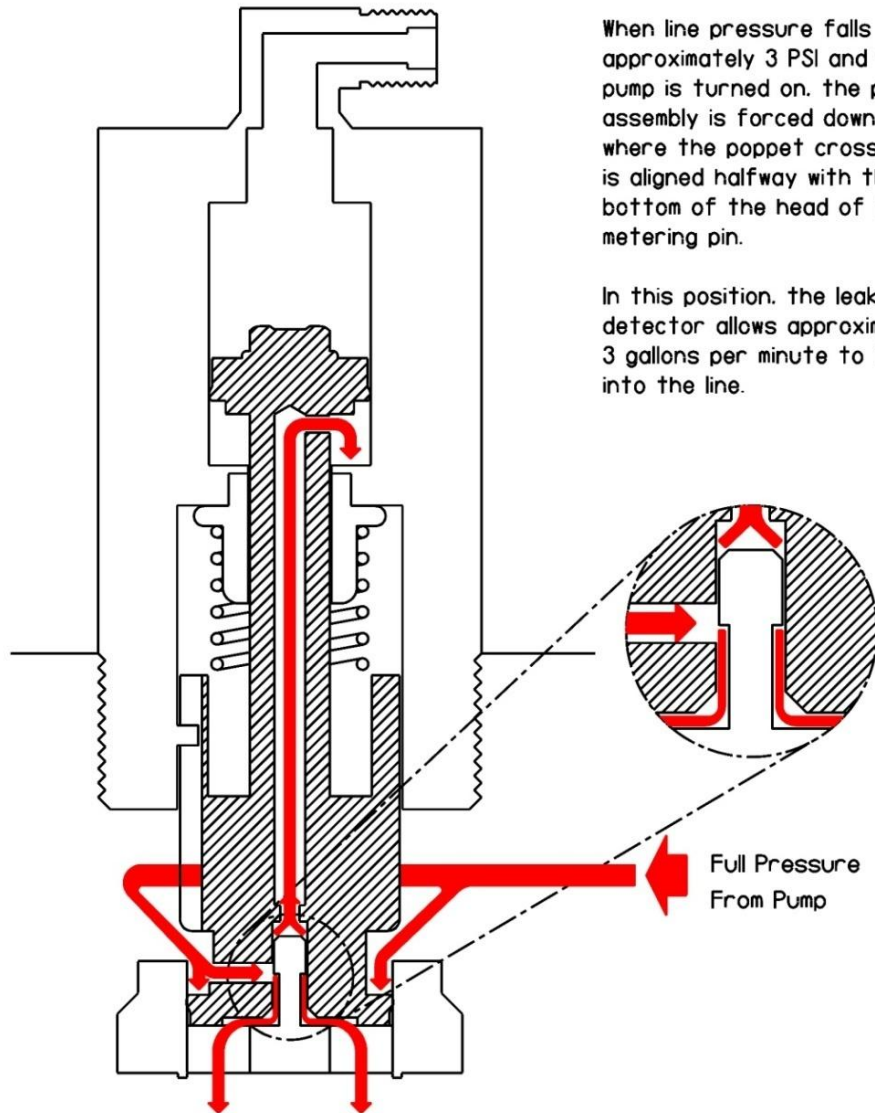
- Line Leak?
- Is there a solenoid delay in the dispenser?
How long is delay, recommended 6 seconds.
- MLLD, Check vent for flow of product past piston.
Continuous flow – bad leak detector.
- Slow flow when site has not been pumping for a while and a customer authorizes?
Usually thermal contraction.
Solenoid delays as long as possible.
ARM-4073 or ISM-4080 eliminate thermals.

Slow-Flow Continued

- When all or most dispensers are running?
 - Leak detector resetting due to high flow.
 - Worn out submersible or low horse-power.
 - Rag or foreign object across pump inlet.
- Same dispenser?
 - Intermittent dispenser handle contact.
- All dispensers?
 - Bad or intermittent pump contactor or authorization signal.

VMI LD2200 LEAK DETECTOR

Reset Position



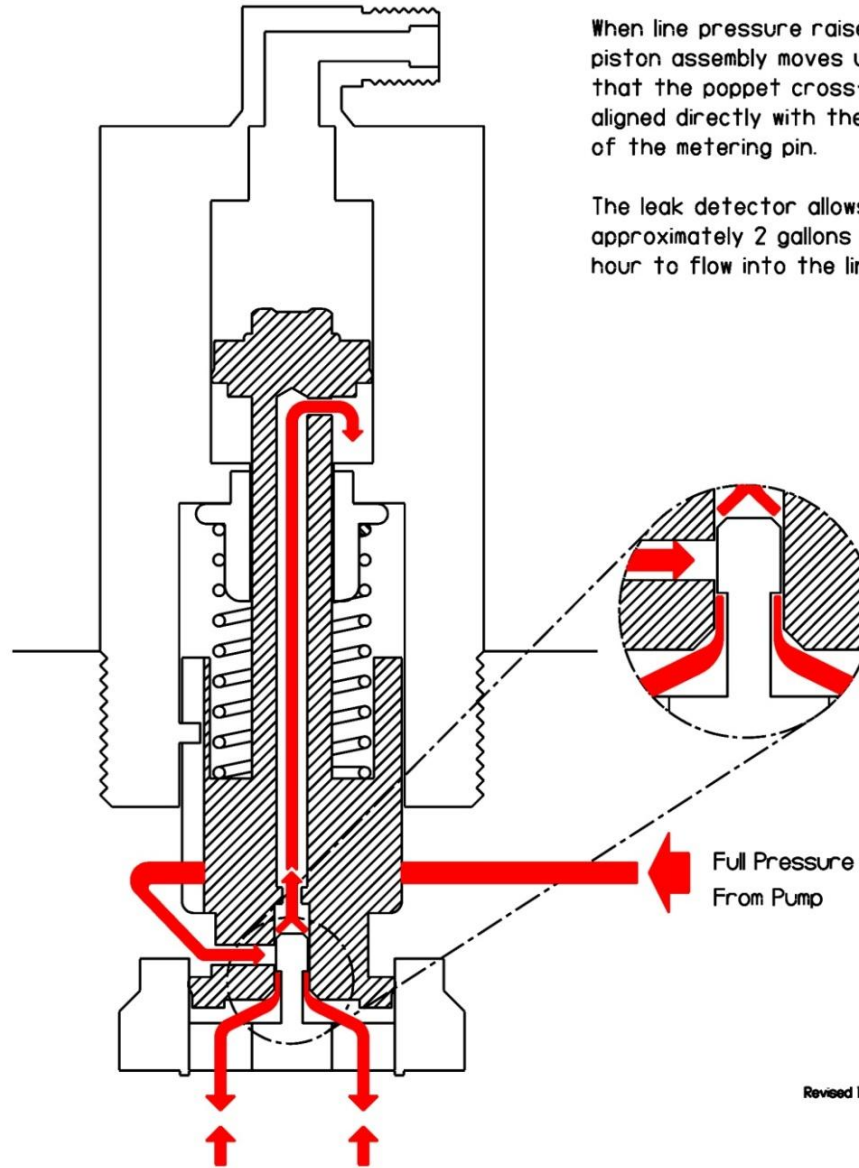
When line pressure falls to approximately 3 PSI and the pump is turned on, the piston assembly is forced down to where the poppet cross-hole is aligned halfway with the bottom of the head of the metering pin.

In this position, the leak detector allows approximately 3 gallons per minute to flow into the line.

Revised 12/08

Vmi LD2200 LEAK DETECTOR

Leak Sense Position

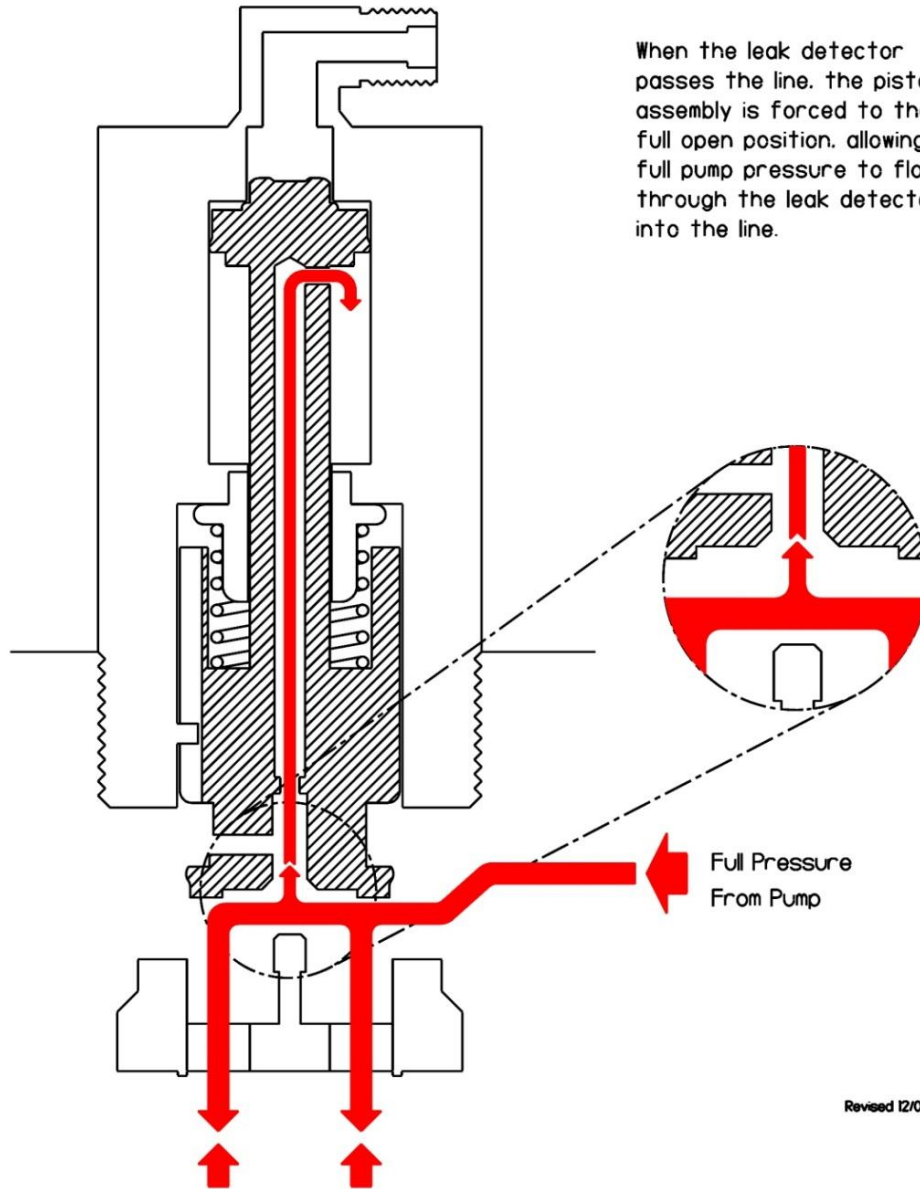


Revised 12/08

Vmi LD2200 LEAK DETECTOR

Full Flow Position

When the leak detector passes the line, the piston assembly is forced to the full open position, allowing full pump pressure to flow through the leak detector into the line.



Revised 12/08

The FX Leak Detector 3-Step Test

The V-R FX Series LLD is a pressure-sensing, diaphragm-operated valve designed to indicate a leak in the piping between the leak detector and the dispenser.

When the submerged pump is turned on, a controlled amount of product, 3 gph (11 lph) is metered through the LLD into the piping system. If a leak is present which equals or exceeds this amount, as much product escapes from the system as is metered in through the LLD. Under this condition pressure cannot build up in the piping system. When a nozzle is opened and the LLD poppet is in position one (ref. Figure 5), flow is restricted to approximately 1-1/2 to 3 gpm (5 - 11 lpm). If the poppet of the LLD is in position two when a nozzle is opened, flow is restricted to approximately 1-1/2 to 3 gpm (5 - 11 lph). This is the indication to the operator that the leak is present.

If there are no leaks, pressure rapidly builds in the system forcing the LLD to open to the full-flow position. In a system with no leaks, it takes approximately 2 - 3 seconds for the complete test. No further line testing takes place until the line pressure drops below 3 to 5 psi (21 - 35 kPa) depending on which LLD is installed.

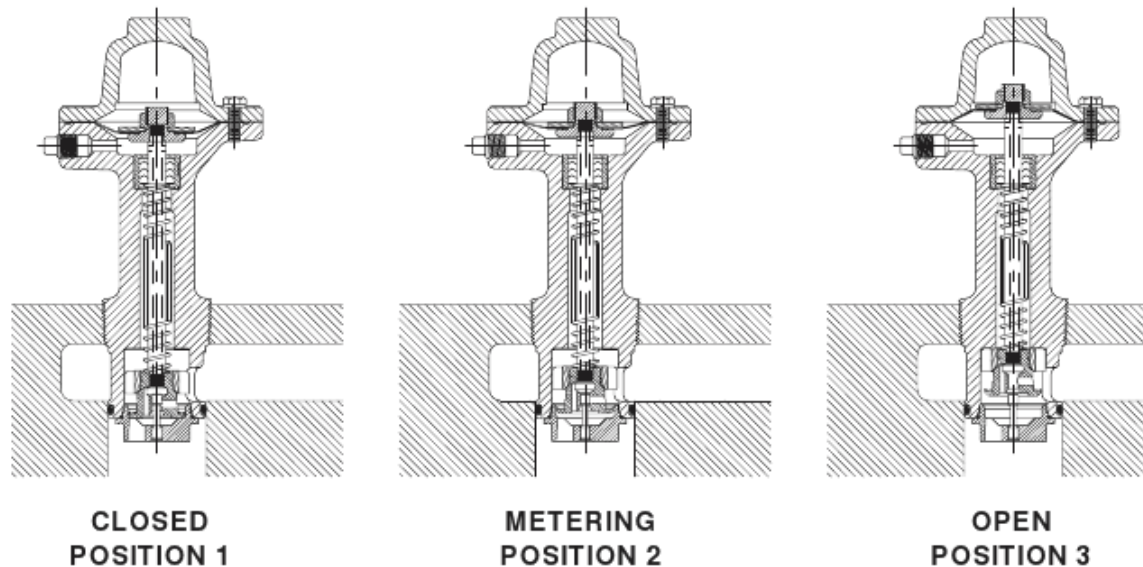


Figure 5.

1. The Trip or Relaxed Position (Closed)

Under normal operating conditions, it is assumed that the lines are filled with gasoline. When the system pressure is less than 3 to 5 psi (21 - 35 kPa), the diaphragm and poppet are in their 'down' or 'tripped' position. The position of the valve 'poppet' is such as to allow approximately 1-1/2 to 3 gpm (5 - 11 lpm) flow into the delivery line through a bypass opening in the LLD valve poppet when the submersible pump starts. Since the system is full, pressure builds rapidly and the poppet moves to the leak sensing position assuming there is no leak present.

**Review Vmi literature online:
www.vaporless.com**

**Review Franklin Fueling literature on line
at: www.franklinfueling.com**

**Review Veeder-Root, Red Jacket
literature at www.veeder.com**