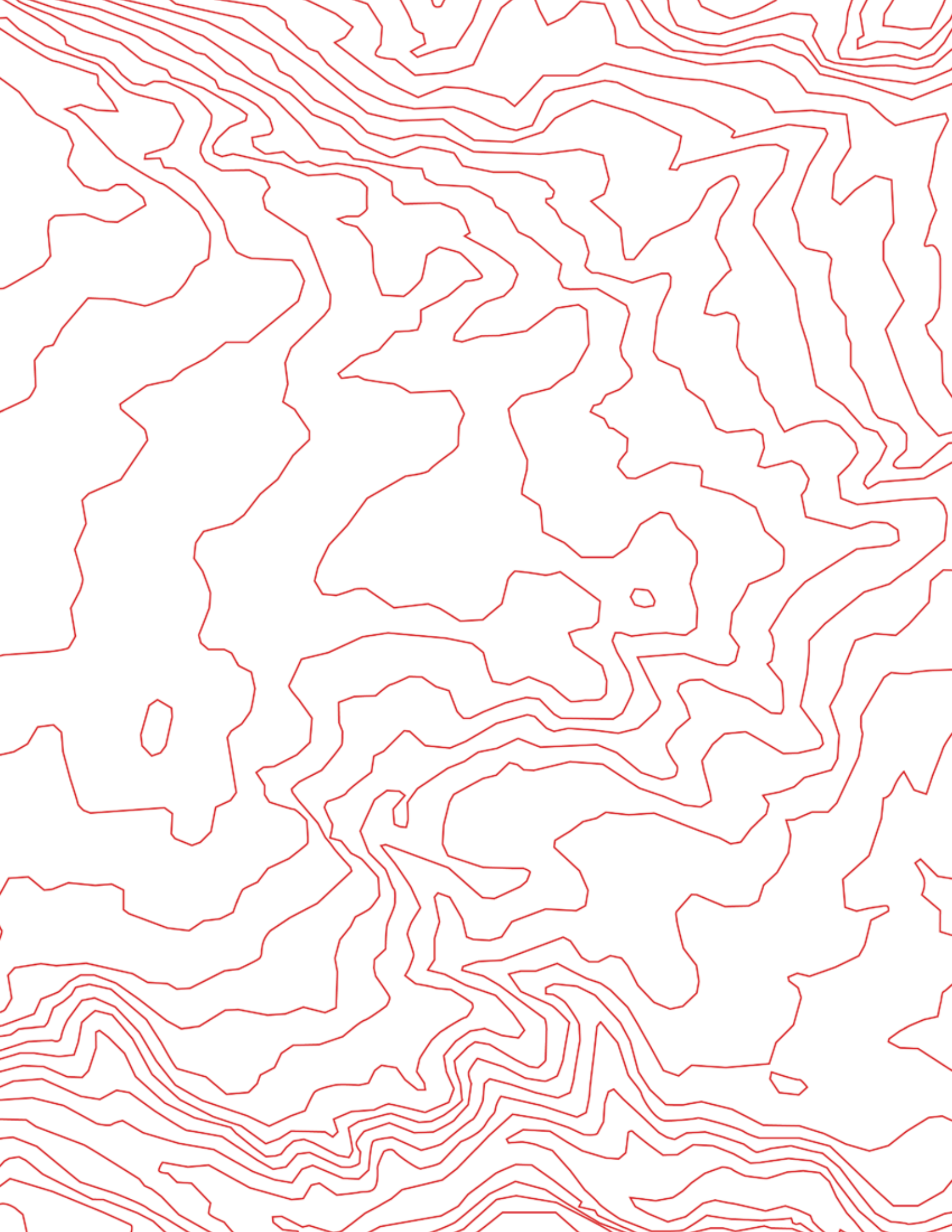
/2019

FAST FILL SYSTEMS

Owners Manual

Pressureless



WWW.SILVERIENG.COM
SALES@SILVERIENG.COM
1300 766 413
WHATSAPP: +61 458 047 075

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STANDARD PRESSURELESS

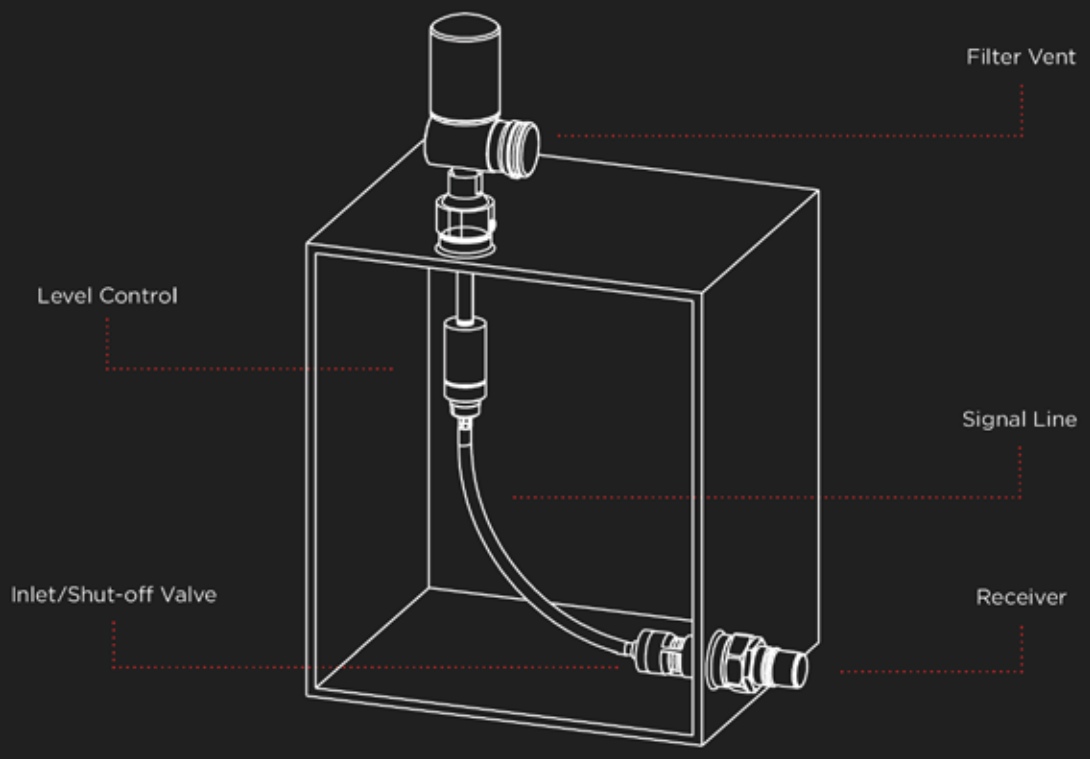
PLA150-M VLCE

PLA150-M SV

PLA150

The vent/level control system operates using 5" long, 1/2" NPT piping, and is widely compatible with more than 80% of heavy equipment used worldwide. The 5" pipe can easily be changed out for different lengths to reach the desired shut off level. They can be ordered in 5", 7" or 12", or can be custom made to suit your needs. The VLCE includes extra 1/2" pipe nipples, that comes in 2" and 3" lengths, and the necessary Loctite thread lock to secure your pipe. Other features include external and internal signal line ports and integrated rollover spill protection. The VLCE is precisely engineered to function on the largest tanks with only 4" of operating space. A clearence of 16" is required for installation.

Flow rates over 150 gpm / 568 lpm are only possible with diesel fuel nozzles rated for such, e.g. N150SL800. The minimum operating pressure is a requirement at the nozzle. Additional plumbing will add additional pressure drop to the system.



Max Operating Pressure	Min Operating Pressure	Min Flow Rate	Max Flow Rate	Diesel Fuel Nozzle Shut-Off Pressure
862 kPa	35 kPa	95 LPM	568 LPM	48-69 kPa
125 PSI	5 PSI	25 GPM	150 GPM	7-10 PSI

This system has been designed for use with pressure sensitive automatic shut-off nozzles such as the Fast Fill Systems Pitboss and Sureloc. For use with a non-pressure sensitive nozzle such as the emco Wheaton J72C, it is recommended there be a pressure switch and time-delay-relay installed on the pump system to shut-ff the pump and avoid deadhead conditions when the shut-off valve closes.

ADVANTAGES:

- Eliminates costly diesel fuel spills
- Eliminates pressure damage to diesel fuel tanks
- Eliminates sprayed fuel from stuck or open receiver poppet when uncoupling nozzle
- Eliminates over filling of system
- helps prevent diesel fuel theft from receiver
- Compatible with plastic fuel tanks
- Allows fuel receiver replacement without draining the tank
- Easy to field retrofit

REQUIREMENTS:

1. 2" NPT opening at the top of the tank with a minimum of 16" of clearance for insertion of the vent/level control assembly

2. 2" NPT opening at the bottom portion of the tank with a minimum of 12" of clearance for insertion of the inlet/shut-off valve assembly (including the receiver.)

3. Measure the distance from the receiver to the vent/level control assembly to determine the required length of the signal line. Add 24" to that distance, for ease in installation of the system. Take into account baffles or supports you may have to go over or around

PRECAUTIONS:

Make sure that all necessary safety precautions have been taken. Before installation or maintenance on the inlet/shut off valve, make sure that the fuel tank is at atmospheric pressure and that the fuel tank has been drained so that the fuel level is below the inlet valve.

THE SIGNAL LINE IS THE MOST CRITICAL PART OF THE SYSTEM. Make sure you have a good quality signal line with the ends properly fitted. The standard signal line is a 3/8" braided stainless steel TEFLON hose with #6 JIC female fittings. The JIC fittings only require 18-20 ft/lbs of tourgue - DO NOT OVER TIGHTEN. The integrity of the signal line must be maintained; make sure that there are no leaks, kinks, or twisted places as the line is installed in the fuel tank.

if the Receiver is to be remote mounted be mindful of the number fittings. such as 90° bends, and the length and diameter of the hose between the shut-off valve and the receiver as these can add back pressure to the fuel nozzle causing it to shut off prematurely.

The Fast Fill Systems Pressureless Diesel Fueling System allows automatic shut-off with out introducing pressure to the tank structure. This is a positive shut-off system, witch closes the shit-off valve by sensing the level in the tank.

FUELING INITIATED (SEE FIG. 1)

The diesel fuel nozzle (a) is connected to the receiver and is turned on. The incoming fuel pushes the inlet/shutoff valve open filling the diesel fuel tank (b) A small amount of fuel flows through the 3/8" signal line © to the vent/level controller and is bled off into the tank. (d) As diesel fuel fills the tank, the vapor (d) is discharged through the vent/level control and vent filter assembly.

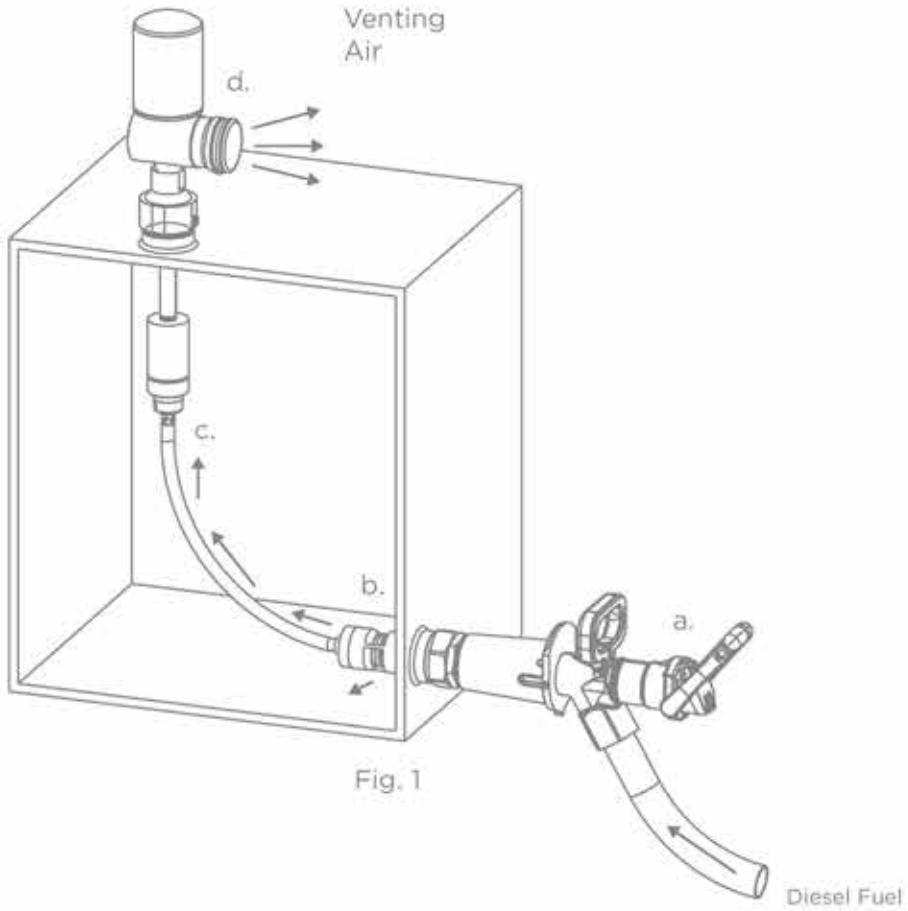


Fig. 1

HOW IT WORKS

DIESEL FUEL REACHES SHUT-OFF LEVEL (SEE FIG. 2)

When the diesel fuel reaches the predetermined shutoff level (e) a float in the vent/level control is raised and pressure begins to build in the signal line (f).

SHUTOFF IS INITIATED

The inlet/shutoff valve (g) senses the pressure in the signal and closes. The pressure sensitive diesel fuel nozzle senses an increase in pressure, because the inlet/shutoff valve closed, and shuts off. The shutoff valve cannot be reopened until the fuel level is decreased to lower the float; the diesel fuel nozzle can not add fuel until the shutoff valve can be reopened.

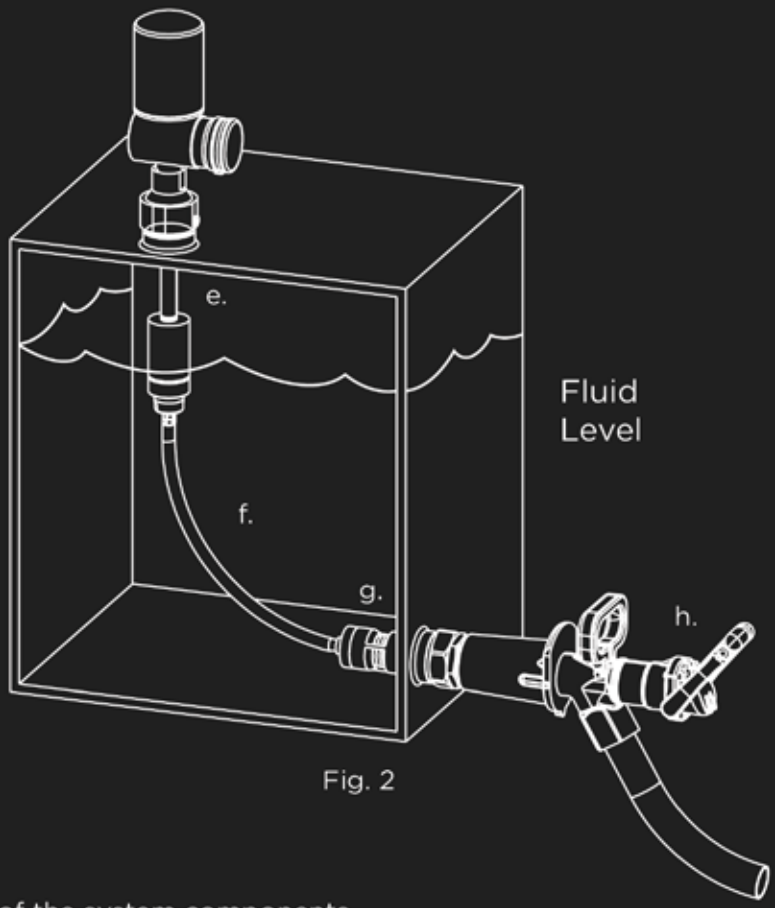
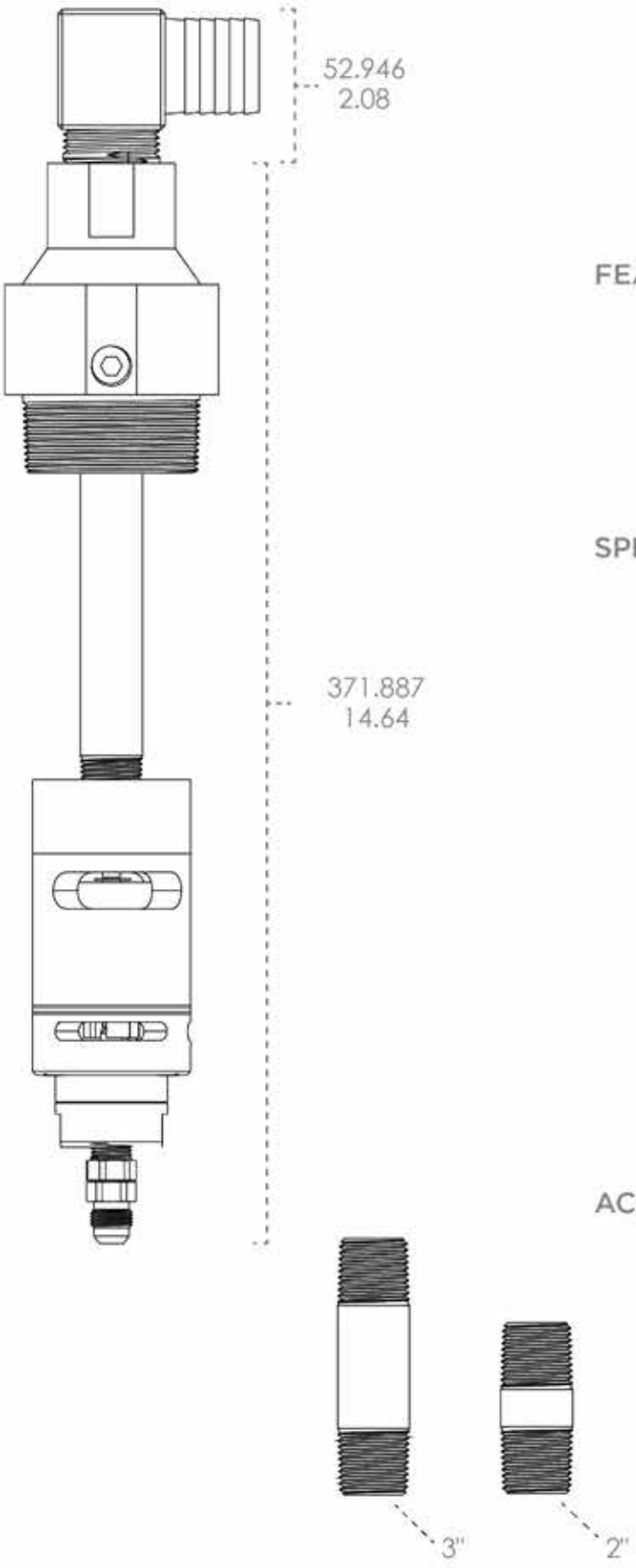


Fig. 2

See page 14 for a diagram of the system components.



PLA 150-M VLCE

Vent/Level Controller

FEATURES:

1. 1/4" NPT plug
2. Removable Stainless Steel Tube
3. Level Control Float
4. Float Chamber
5. #6 JIC Fitting

SPECIAL INSTRUCTIONS:

- Adjust your shut-off level by using one of your three steel tubes. Shut-off level must allow for 5% ullage (refer to our ullage calculator at: www.fastfillsystems.com

- Tightly secure the steel tube. (apply small bead of Loctite #243)

- Make sure the assembly is properly secured to the fuel tank.

- Tighten the signal line to the assembly using 18-20 ft-lb

ACCESSORIES:

Included with PLA150-M VLCE

6. Removable Stainless Steel tube 2"
7. Removable Stainless Steel tube 3"
8 Loctite #243

SIGNAL LINE

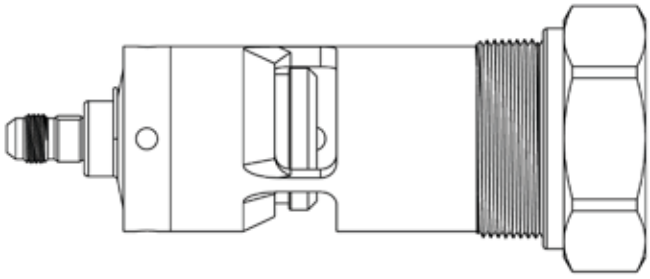
FEATURES:

1. 3/8" x 10' braided stainless steel
2. #6 JIC ends

PLA150-M SV

FEATURES:

3. Shut-off Valve
4. Shut-off Valve Screen
5. Piston Chamber
6. Swivel
7. #6 JIC Fitting



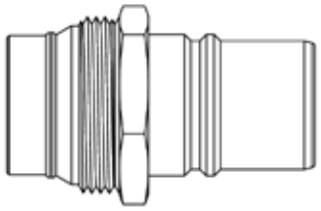
R150CVR-J

FEATURES:

8. Receiver Poppet (green)
9. Locking Nut
10. Receiver Body

SPECIAL INSTRUCTIONS

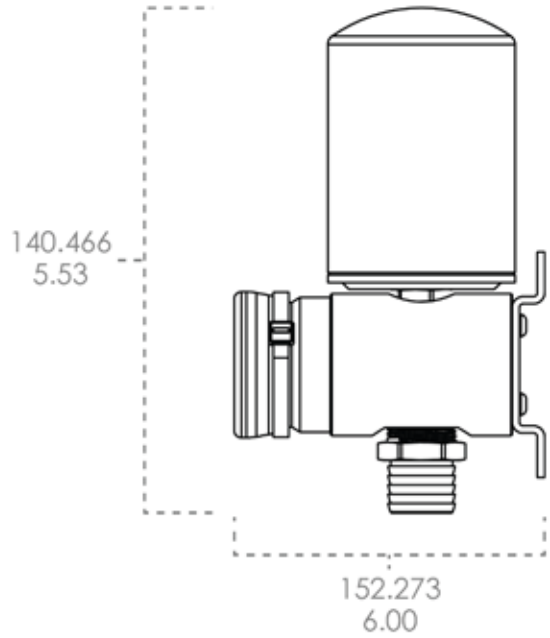
- Make sure the receiver is properly secured to the shut-off valve



FFV150

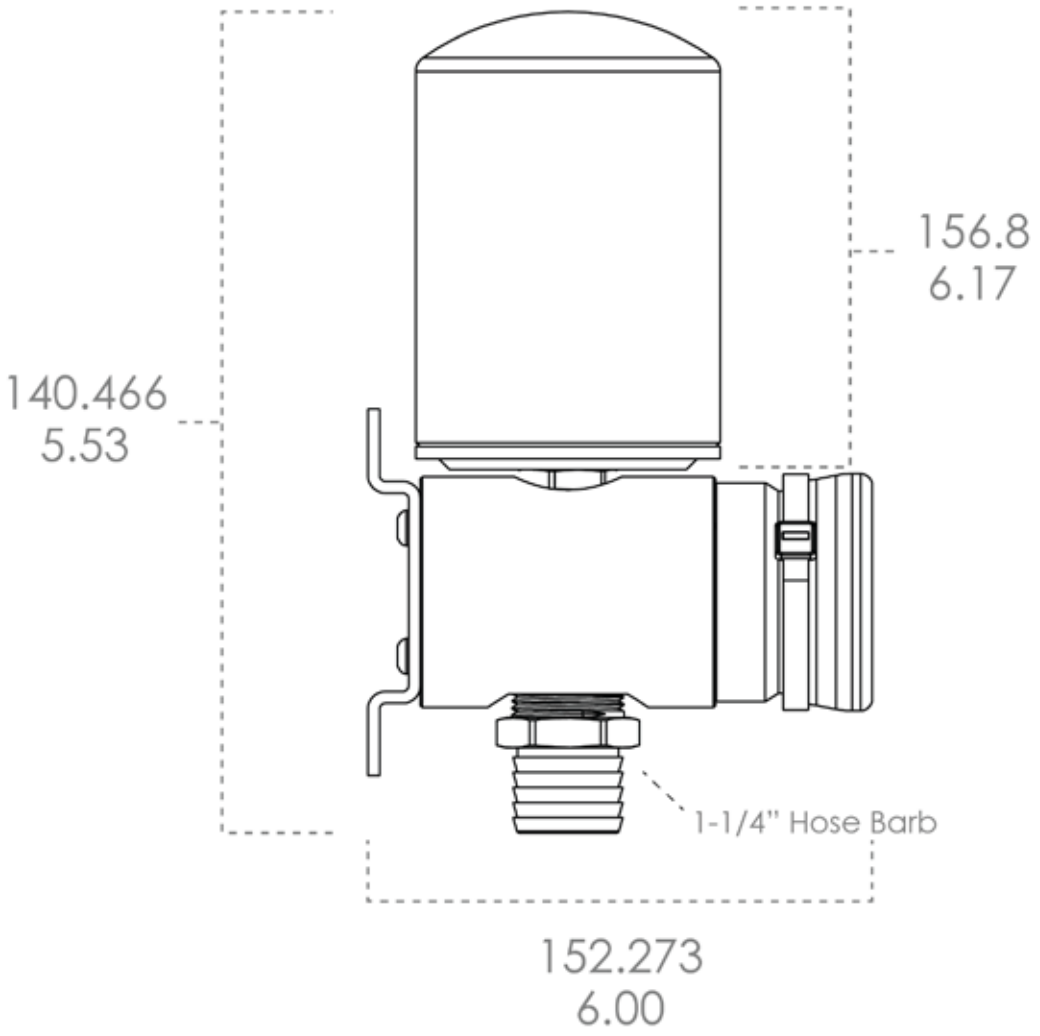
SPECIAL INSTRUCTIONS

- If not secured directly to the PLA150-M VLC, then FFV150 must be secured to a location that is above the maximum fluid level



FFV150

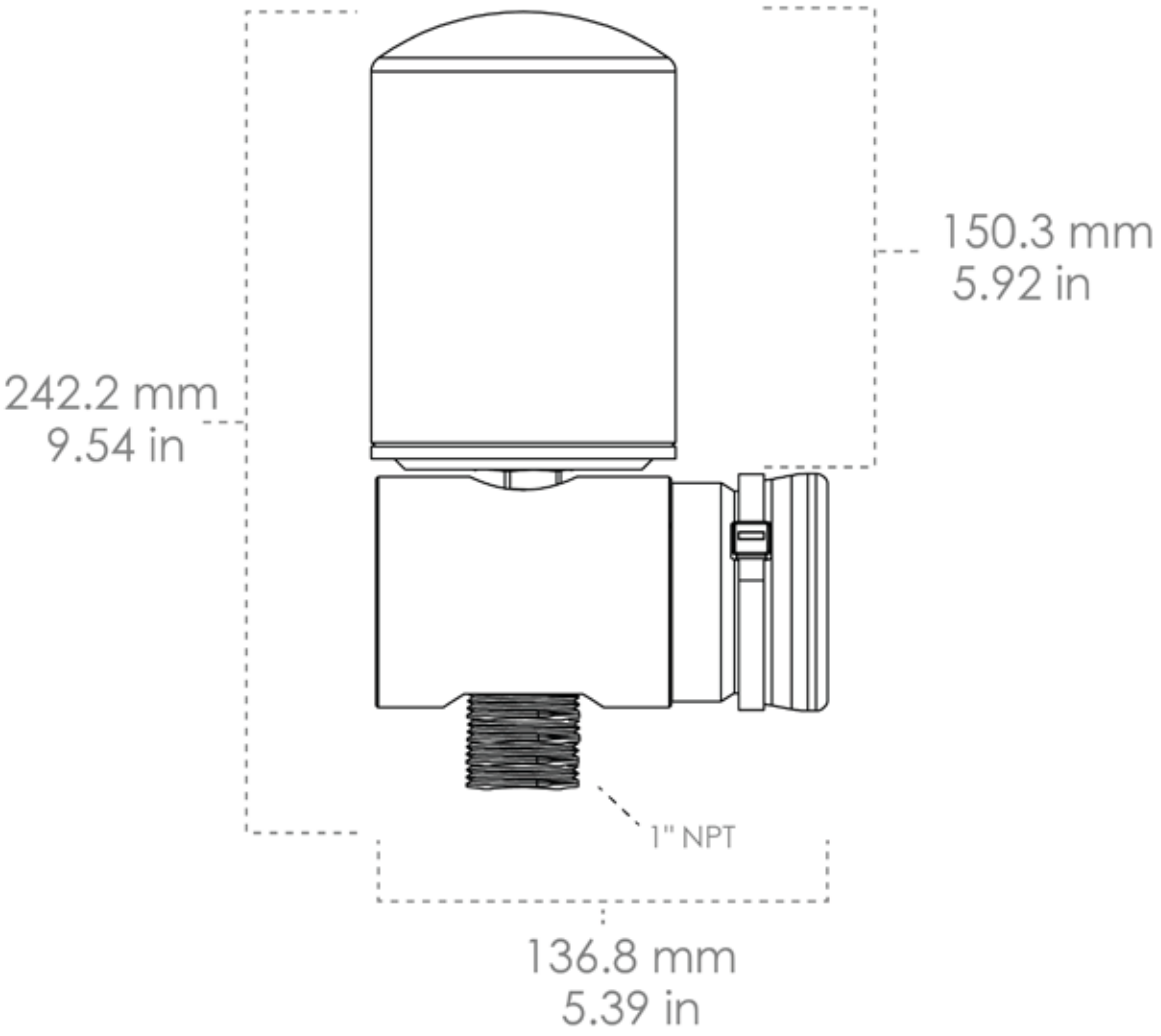
Remote Mount Filter Vent



Air filtration system for fuel tanks. One check valve allows only air filtered to 3 microns into the tank. Another check valve keeps diesel fuel and diesel fuel vapors from contaminating the filter media.

FFV150-PL

Pressureless Direct Mount Filter Vent



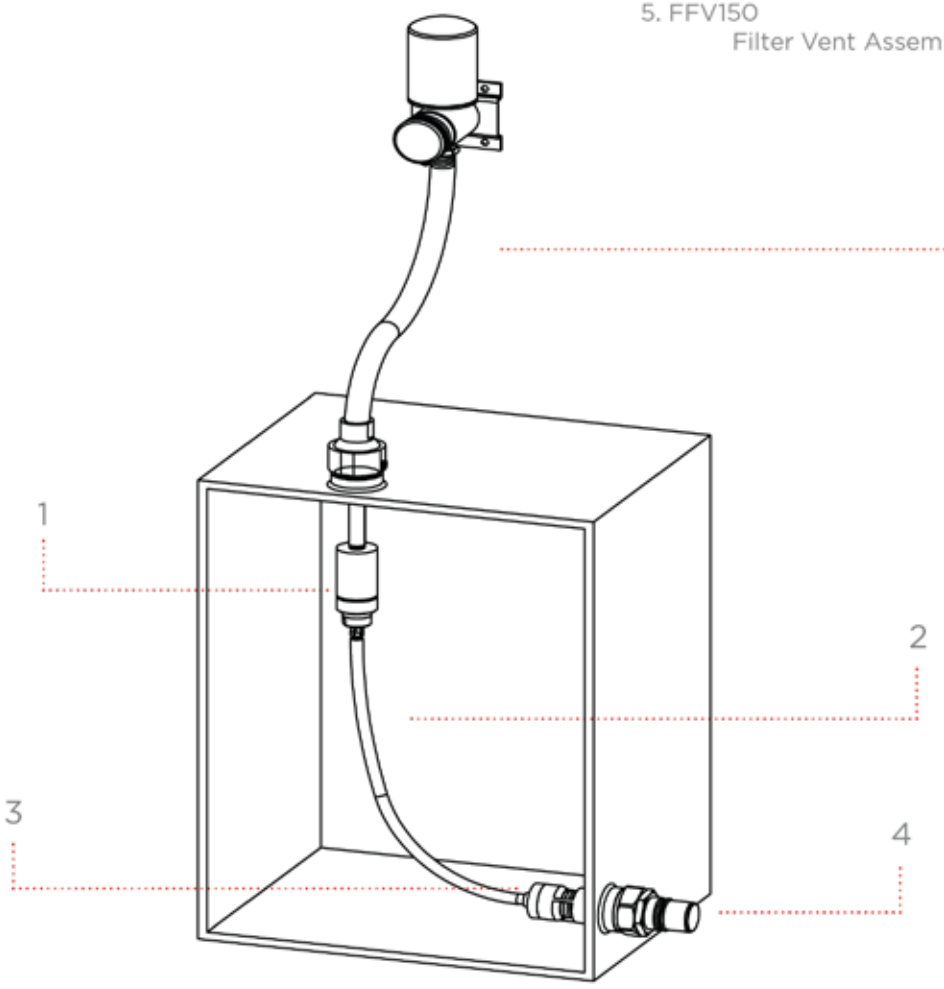
Max Air Output: 43 scfm

Max Air Inlet: 15 scfm

PLA150-M w/ FFV150

Remote Mount Pressureless Diesel Fueling System

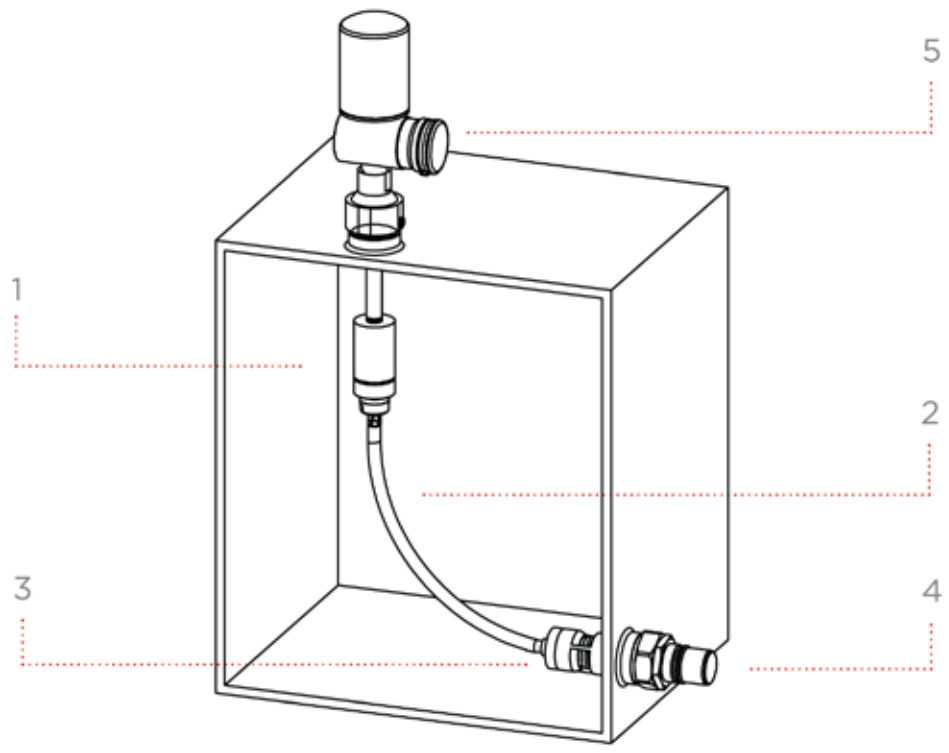
1. PLA150-M VLC
   Vent Level Controller
2. pl-p-6
   10' #6 Signal Line w/ JIC female ends
3. PLA150-M SV
   Shut-off Valve
4. R150CVR-J
   2 Piece Receiver w/ green poppet
5. FFV150
   Filter Vent Assembly



PLA150

Pressureless Diesel Fueling System

1. PLA150-M VLC
   Vent Level Controller
2. pl-p-6
   10' #6 Signal Line w/ JIC female ends
3. PLA150-M SV
   Shut-off Valve
4. R150CVRc-J
   Fuel Receiver w/ Cap and green poppet
5. FFV150-PL
   Pressureless Filter Vent Assembly



There are many different applications of this system; thesse are typical, if yours differs please contact sales for assistance.

System with Direct Mounted Receiver - PLA150M

1. The shape of the tank:
   the longer the tank from front to back, the greater the affect the level has on the required vent height
2. The placement of the vent:
   if the vent is placed in the center of the tank the level has the least affect
3. The pitch of the grade required for travel
4. The Ullage (air space left on top of the tank after filling.)

To avoid diesel fuel spills while traveling on severe grades:

1. Vent/Level Controllers with direct mount FFV150-PL should be placed near the center line of the tank. If this is not possible it may be necessary to install the remote mount FFV150 in place of the FFV150-PL
2. Remote mount filters should be placed higher than the fuel level at the most severe grade. Make sure there are no "P" traps or low points in the discharge line.

Drop Down Tube Instructions

If you desire to change the shut-off height of the PLA150-M VLCE

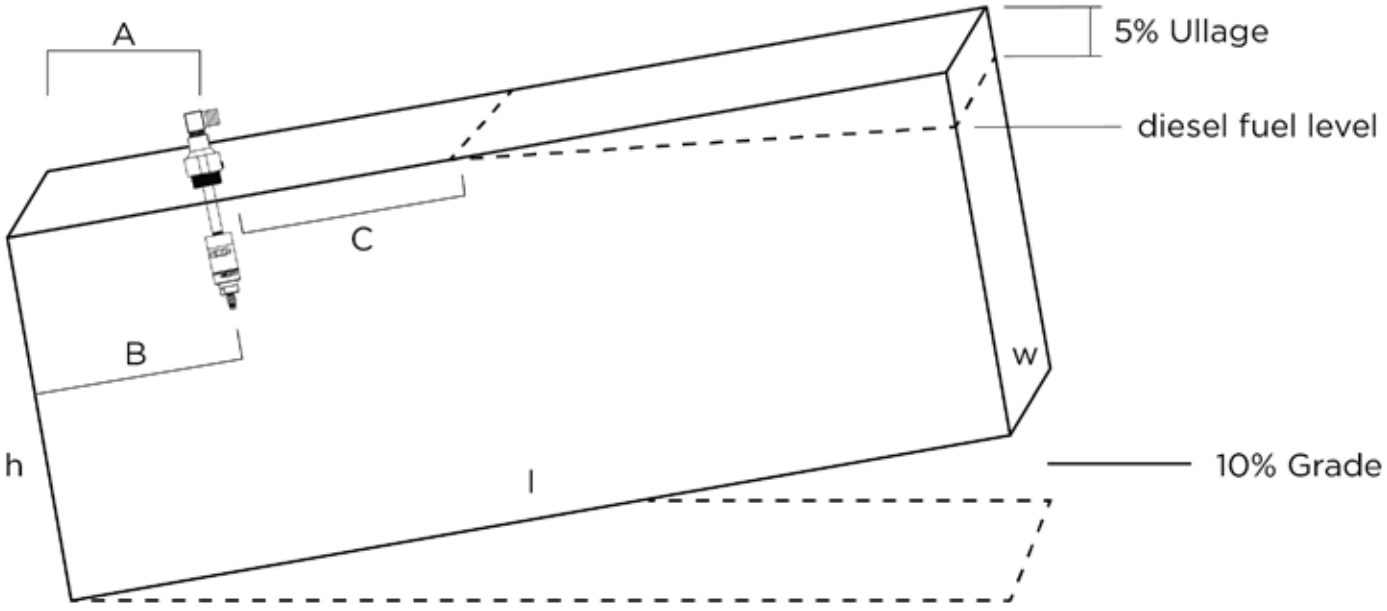
Follow these instructions:

- Unscrew the current drop down pipe from both the head and the body
- Replace with desired length of pipe, using a blue Loctite bead around the threads to ensure a good hold. Make sure to tighten the pipe more than just hand tight (Pipe Wrench or Strap Wrench), to ensure the NPT Threads seal with themselves.

A = distance from edge of tank to center of vent/level control

B = distance from edge of tank to fluid line of top of the tank

C = height of fluid above the top of the tank at the vent/level control



System with Direct Mounted Receiver - PLA150M

1. Determine the correct tank shut-off level. A 5% by volume ullage* (air space on top of the tank is recommended. This allows room for thermal expansion of the diesel fuel, and the necessary shut-off time.

2. Adjust the insertion length of the vent/level controller by choosing the correct length of stem from the different pipe nipples provided. Once desired shut-off level is determined, it is important to check all fittings prior to installation to verify that factory threadlock was not broken during shipping or adjustment. Use LocTite 242 to secure all joints and fittings that may have been loosened. Hand tighten*. Allow sufficient time for LocTite to cure and verify all joints are secure.

3. Connect the signal line to the vent/level control assembly.

4. Install the signal line (connected to the level control) from the top of the tank to the receiver opening at the bottom of the tank.

Some methods that have been successfully used in "fishing" signal lines through the tank.

a. With an electrician's fish line that is used in pulling wire through walls.
b. By pushing the signal line downward towards the receiver opening, then using a welders brazing rod (1m) with a hook bend on the end to catch the line.
c. On plastic tank installations, tie a string to the receiver ed of the signal line and attach a small nut or bolt to the other end of the string. Drop the nut or bolt, with the string attached, into the talk. Us a magnet extended through the 2" NPT receiver mounting coupling to locate the nut or bolt and pull the signal line through the opening.

5. With the signal line extended through the receiver opening connect the signal line to the inlet/shut-off valve assembly and install into the mounting coupling.

6. Before installing the Vent/level Controller in the tank it is recommended that signal line and shut off valve installation be tested. This can be accomplished by disconnecting the signal line from the vent level controller and starting to fill the diesel fuel tank. (Take extreme care not to let the signal line drop into the tank; it can be secured to the top of the tank with a piece of wire or string.

When the diesel fuel begins to flow into the tank, a small stream of diesel fuel will flow out of the signal line. Direct this stream into the tank through the vent opening.

The shutoff valve can now be actuated closed by fitting a 9/16 JIC plug to the female JIC swivel of the signal line to stop the diesel fuel flow. If the signal line is 100% sealed and the flow rate is the minimum of 25gpm/95lpm, pressure will begin to build in the signal line. Within 2-6 seconds, depending on flow rate, the pressure will be sufficient to close the inlet valve and shut-off the fuel nozzle, stopping flow into the tank. Lower flow rates will cause longer shut-off delays.

7. If the diesel fuel nozzle shuts off every time, install the vent level controller, and the 3 micron filter vent assembly. See the filter vent installation guide for the different configurations available.

8. Continue to fill the diesel fuel tank and observethat the diesel fuel nozzle shutoff occurs at the desired calculated level. Adjust by adding or removing spacers in the vent/level controller.

System with Remote Mounted Receiver

PLA150-MAR (2"NPT adaptor)

PLA150-MARJ (2" JIC adaptors)

1. Determine the correct tank shut-off level. A 5% by volume ullage* (air space on top of the tank is recommended. This allows room for thermal expansion of the diesel fuel, and the necessary shut-off time.

2. Adjust the insertion length of the vent/level controller by choosing the correct length of stem from the different pipe nipples provided. Once desired shut-off level is determined, it is important to check all fittings prior to installation to verify that factory threadlock was not broken during shipping or adjustment. Use LocTite 242 to secure all joints and fittings that may have been loosened. Hand tighten*. Allow sufficient time for LocTite to cure and verify all joints are secure.

3. Connect the signal line to the vent/level control assembly.

4. Install the signal line (connected to the level control) from the top of the tank to the receiver opening at the bottom of the tank.

Some methods that have been successfully used in "fishing" signal lines through the tank.

a. With an electrician's fish line that is used in pulling wire through walls.

b. By pushing the signal line downward towards the receiver opening, then using a welders brazing rod (1m) with a hook bend on the end to catch the line.

c. On plastic tank installations, tie a string to the receiver ed of the signal line and attach a small nut or bolt to the other end of the string. Drop the nut or bolt, with the string attached, into the talk. Us a magnet extended through the 2" NPT receiver mounting coupling to locate the nut or bolt and pull the signal line through the opening.

5. With the signal line extended through the receiver opening connect the signal line to the inlet/shut-off valve assembly and install into the mounting coupling.

6. After mounting the inlet/shut-off valve assembly directly in the diesel fuel tank, install the AD150 2" NPT adapter in the inlet/shut-off valve assembly. (see Fig. 1)

7. Install a 2" pipe or hose from the AD150 adapter to a 2" NPT coupling (a) that has been mounted on the receiver bracket (b); install a standard steel receiver with light spring and green poppet (R150Sc-J) on the other side of the coupling. (See Fig 2)

Note:
A 2" Hose with JIC ends can be used with the AD150J adaptor to connect the hose to the inlet/shutoff valve.

8. Before installing the Vent/level Controller in the tank it is recommended that signal line and shut off valve installation be tested. This can be accomplished by disconnecting the signal line from the vent level controller and starting to fill the diesel fuel tank. (Take extreme care not to let the signal line drop into the tank; it can be secured to the top of the tank with a piece of wire or string.
When the diesel fuel begins to flow into the tank, a small stream of diesel fuel will flow out of the signal line. Direct this stream into the tank through the vent opening.

The shutoff valve can now be actuated closed by fitting a 9/16 JIC plug to the female JIC swivel of the signal line to stop the diesel fuel flow. If the signal line is 100% sealed and the flow rate is the minimum of 25gpm/95lpm, pressure will begin to build in the signal line. Within 2-6 seconds, depending on flow rate, the pressure will be sufficient to close the inlet valve and shut-off the fuel nozzle, stopping flow into the tank. Lower flow rates will cause longer shut-off delays.

9. If the diesel fuel nozzle shuts off every time, install the vent level controller, and the 3 micron filter vent assembly. See the filter vent installation guide for the different configurations available.

10. Continue to fill the diesel fuel tank and observethat the diesel fuel nozzle shutoff occurs at the desired calculated level. Adjust by adding or removing spacers in the vent/level controller.

There are many different applications of this system, if yours differs pease contact engineering for specific instructions.

Note: It may become necessary to perform periodical maintenance and check system wear points.

For help with troubleshooting contact our customer service team

PROBLEM: Pressureless system is NOT shutting off soon enough, over filling tank causing it to overflow out of the vent.

POSSIBLE CAUSES:	REMEDY:
1. The discharge line from the vent/level controller to the filter has a "P" trap, or low spot, vapors and moister can carryover and collect (like condensation) in the line and spew out making it look like it is coming from the tank.	1. Make sure that the filter discharge is mounted higher than the diesel fuel level at all grads. Also check that there are no low spots in the discharge line connecting the vent/level controller to the filter.
2. The shut-off level is set too high, not allowing enough room for the 2-3 second system shut-off delay and/or the thermal expansion of the diesel.	2. Has the proper ullage been calculated? It is important to allow for 5% by volume ullage. If there is insufficient air space on the top of the tank the tank can over flow.
3. The vent/level control assembly is designed to be used on level ground Any where from 0 degrees to 4 degrees is considered "level ground", whereas a 10 degree slope is considered "severe".	3. If the shutoff level was set on level ground, and refueling is now required to be done on a slope, a shorter or longer stem may be necessary to reset the shutoff level. **Do not refuel on a severe slope**
4. If the signal line is leaking it will not build up the sufficient pressure to signal the shut-off valve to close.	4. Check that the signal line connections are secure. The signal line and the inlet/shutoff valve function can be tested by disconnecting the signal line from the vent/level control. Take extreme care not to let the signal line drop into the tank. It can be secured to the top of the tank with a piece of wire or string. Once you have the signal line disconnected, begin to fill the tank. When the diesel fuel begins to flow into the tank, a small stream of diesel will flow out of the signal line. Direct this stream into the tank through the vent opening. The shut off valve can now be simulated closed by putting your thumb over the end of the signal line and stopping the diesel fuel flow. The Diesel fueling nozzle should shut off within 2-3 seconds of stopping the flow. Initiate this test several times.

TROUBLE SHOOTING

5. The vent/level control float is not sealing the signal line pressure	5. Remove the vent/level control assembly from the tank. Check to make sure the flow is free floating by turning upside down. With the signal line detached, and the vent/level control upside down, blow into the JIC fitting. A small amount of air should pass through the very small bleed hole. Cover the bleed hole with your finger and no air should escape.
6. The inlet/shutoff valve poppet is not moving freely.	6. Remove the receiver and gently depress the purple poppet into the open position. Check to make sure the inlet valve poppet moves freely, and comes close when released.
7. The inlet/shutoff valve poppet screen is covered with debris.	7. If the screen is plugged there will be insufficient flow to the float, which will not signal the shutoff valve to close. Remove the receiver and observe that the poppet screen is clear.

PROBLEM: Pressureless system is NOT shutting off soon enough, over filling tank causing it to overflow out of the vent.

POSSIBLE CAUSES:	REMEDY:
1. System doesnt have the correct receiver.	1. The receiver is calibrated specifically for the Fast Fill Systems Pressureless System. The correct receiver will have a green poppet.
2. The receiver is remote mounted, and there is too much back pressure on the diesel fuel nozzle.	2. In the piping between the diesel fuel tank and the receiver: how many fittings and 90 deg bends are there? How long is the hose or pipe? Is the hose/pipe diameter less than 2" All of these will add backpressure to the diesel fuel nozzle causing it to shut off prematurely.
3. The signal line inside the tank has become kinked or twisted.	3. If the installation was not done correctly the signal line can become kinked, twisted, or pinched. If this happens, fluid will not be able to pass through the signal line and will signal the shut-off valve to close.

TROUBLE SHOOTING

PLEASE CONTACT OUR ENGINEERING DEPARTMENT FOR ANY ADDITIONAL TECHNICAL ASSISTANCE.

ULLAGE CALCULATION

5% Ullage for PLA150-M VLCE

For use with rectangular tanks only.

Tank Volume:

L x H x W = cubic units (inches or centimeters)
Ullage = .05 x Volume

Ullage Height:

h= Ullage/(L x W)
h - 2.17" (5.5 cm) + 1.5" (3.8 cm) (approximation of length lost due to pipe thread) = Length of 1/2" pipe needed

There is a 3 second delay between the time the level control closes and the nozzle shuts off.

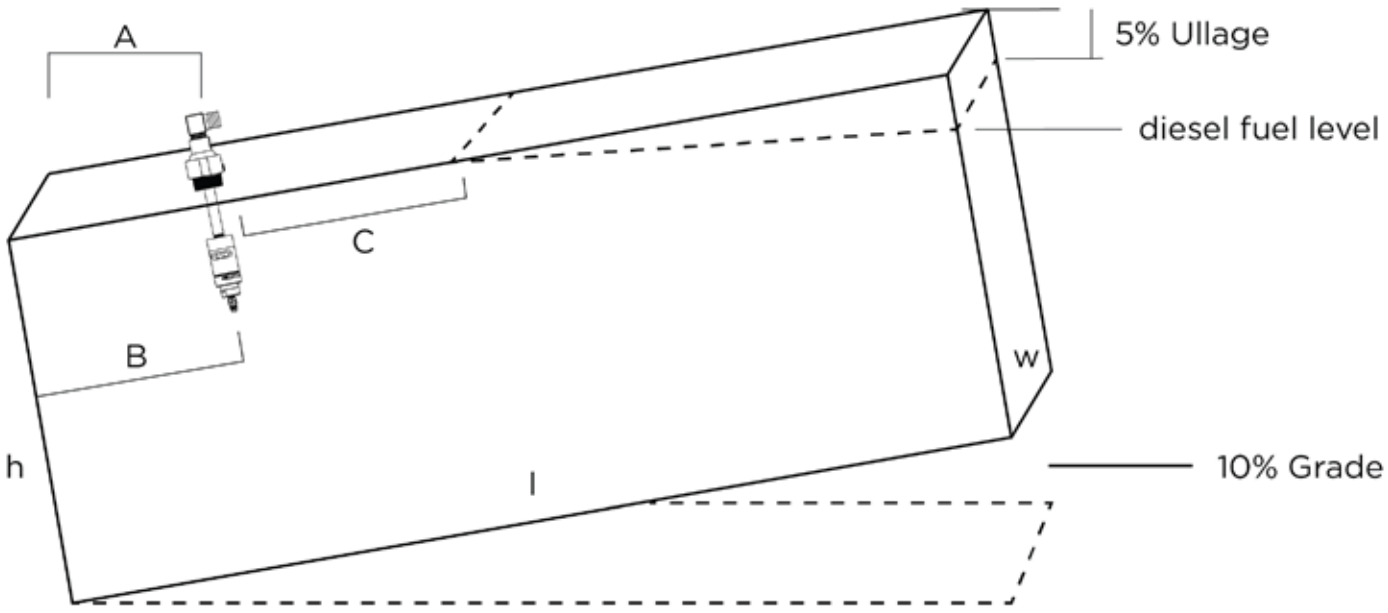
For cylindrical and elliptical tanks and a Tank Volume Calculator Visit:

http://www.fastfillsystems.com/tank volumes.xls

A = distance from edge of tank to center of vent/level control

B = distance from edge of tank to fluid line of top of the tank

C = height of fluid above the top of the tank at the vent/level control



801. 491.3600 // orders@fastfillsystems.com // www.fastfillsystems.com

SILVERI ENGINEERING & TRADING

WWW.SILVERIENG.COM
SALES@SILVERIENG.COM
1300 766 413
WHATSAPP: +61 458 047 075