



**SPILLSTOP™** Overfill Prevention System

**MODEL 815 MANUAL**



# ***SPILLSTOP***<sup>™</sup> Overfill Prevention System

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# CHAPTER 1

## OVERVIEW

Congratulations on purchasing the Garnet Instruments Model 815 SpillStop overfill prevention system. The SpillStop represents the state of the art in spill control for crude oil and chemical hauling. The SpillStop is designed to work in conjunction with the Garnet Model 810PS2 SeeLevel and 808P2 SeeLevel Special gauges to assist the truck operator with truck tank overfill protection in applications where the fluid is loaded with a PTO driven pump.

The system is dependent upon the operator to determine SeeLevel float movement, and is intended as an emergency backup system in the event that the operator is unable to shut down loading when the tank is full.

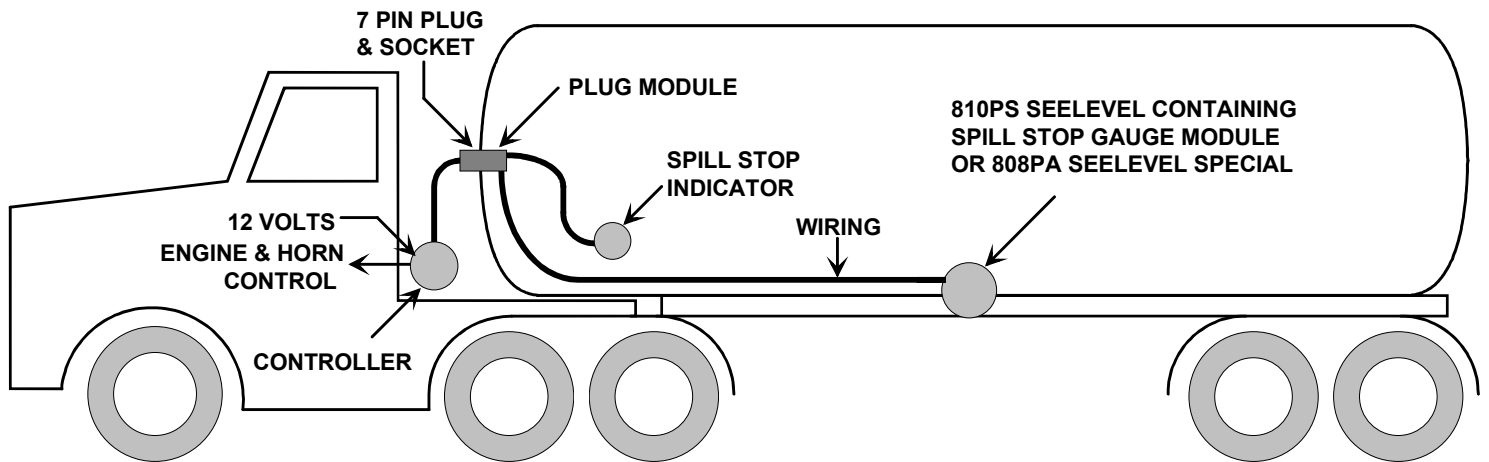
The SpillStop is easy to install and operate, and is designed to withstand the rigors of mobile applications. It consists of a truck mounted controller and a small module that inserts into the SeeLevel gauge (the module is built in to the SeeLevel Special gauge). An optional indicator is available to verify proper plug connections for tractor trailer applications. The system can shut down the truck engine or hydraulically operated loading pumps. A horn alarm is provided to warn of an impending shut down condition.

The Model 916 Programmer is used to set the alarm points in the SeeLevel gauge, which determines the horn alarm and shutdown points. These points can be reprogrammed as required for different hauling applications.

## CHAPTER 2

### 815 SPILLSTOP FEATURES AND OPERATION

The sketch below shows the basic components and connections of the SpillStop for a tractor trailer application. A body truck application would be similar except that the 7 pin plug & socket, the plug module, and the SpillStop indicator would not be required since the tank is never disconnected from the truck.



The SpillStop consists of three main components: the controller in the cab of the truck, the optional plug module inside the 7 pin socket housing on the trailer, and the gauge module inside the SeeLevel truck gauge (the gauge module is built into the 808P2 and 810PS2 displays).

The gauge module installs inside the SeeLevel gauge display, and converts the alarm signals from alarms 1, 2, and 3 in the SeeLevel gauge to a pulse signal that is sent along a single wire to the controller. The plug module monitors the signal between the gauge module and the controller and turns on the SpillStop indicator only if the 7 pin plug is connected and the signal is getting from the gauge to the controller. The controller monitors and displays the alarm status of the gauge, and activates a horn if the fluid level in the truck tank is at the full point, and shuts off the vehicle engine if a spill is imminent. The standard controller can accommodate 2 compartments, and the double controller can accommodate up to 4 compartments. Each compartment is treated independently and has its own controls, so full spill protection is maintained for each compartment even if another compartment has already been filled.

**WARNING: The *SPILLSTOP*™ is intended as an emergency backup system only, and is not intended as a substitute for operator diligence during the loading process.**

The operation of the SpillStop during the loading operation is as follows: When the tank is empty, the green TANK EMPTY indicator is on, the horn is off, and the engine is allowed to run. As the fluid level rises, the empty indicator goes out. When the horn alarm point is reached, the yellow HORN ALARM indicator comes on and the horn is activated with a 0.5 second on, 0.5 second off cycle. Depressing the horn alarm BYPASS at this point will silence the horn. If the fluid level continues to rise and reaches the engine shutdown point, the red SHUTDOWN indicator will come on, the green ENGINE ON indicator will go out, and the truck engine will be shut off. Depressing the shutdown BYPASS at this point will re-light the ENGINE ON indicator and allow the engine to be restarted. When a BYPASS switch is depressed, the alarm indicator stays on and the red bypass indicator comes on. As the tank is unloaded the alarm indicators will go out when the fluid level drops below the alarm points, and the bypasses will be cleared (the system is re-armed) when the TANK EMPTY indicator comes back on. There is no need for the operator to re-arm the system, removing the possible operator error of forgetting to re-arm. If the tank is not filled to the alarm point, the system can still be bypassed to prevent sloshing from sounding the horn or shutting down the engine during driving. If a single tank is to be filled from more than one location, the alarms can be bypassed during driving between loading sites, and the system re-armed with the MANUAL RE-ARM switch to re-establish spill protection for the second load.

The SpillStop has a number of convenience and safety features built into the system. When the tank is empty, the bypasses will not work, preventing accidental bypassing when the driver is leaving the cab to begin loading. Delays are incorporated into the system to prevent noise spikes or momentary bad connections from disrupting operation. A short circuit in the wiring to the gauge, or plugging the SpillStop plug into the trailer lighting socket, lights the red SHORT CIRCUIT indicator and shuts down the engine. An open circuit in the wiring to the gauge, or a disconnection of the plug to the trailer, lights the red UNPLUGGED indicator, sounds the horn, and shuts down the engine. These alarms can be bypassed to allow operating the tractor without the trailer connected. The pulse signal between the gauge and the controller cannot be corrupted by poor connections or moisture in the wiring; if the signal is too badly degraded it defaults directly to an open or short circuit condition. A failure of the SeeLevel gauge defaults to the engine shutdown alarm

condition. The gauge and plug modules cannot be damaged by short circuits or by plugging the trailer light plug into the SpillStop socket. The controller will operate at truck voltages from 8 to 16 volts, and draws less than 1/4 amp so it can operate from any convenient 12 volt circuit.

## CHAPTER 3 INSTALLATION GUIDE

Refer to the appropriate wiring diagram during installation of the SpillStop system. The wiring diagrams are in section D).

1. Pick a spot in the cab of the truck for the SpillStop controller box to be mounted. Do not mount the controller where it can be kicked. It is recommended that the controller be mounted to the right of the PTO control. Use the existing studs in the box walls to mount the controller, do not put additional screws into the box as they may contact and damage the circuitry inside. If the wiring connections on the back of the box are hard to access after the box is mounted, leave it unmounted for now until it is wired up.
2. Remove the front panel of the SeeLevel gauge(s) and silicone the gauge module into the base of the enclosure. Note that one side of the display face sticks down into the enclosure so you will need to mount the gauge module so that the display face can still be mounted properly. Connect the YELLOW, ORANGE, BLACK and GREEN wires to the matching coloured wires on the display. The RED wire, the gauge module signal wire, will connect to the SpillStop compartment terminal. If an 808PA SeeLevel Special is being used rather than an 810PS SeeLevel, no gauge module is required since it is built into the SeeLevel Special display where the signal wire is the GREEN wire. If you are connecting a gauge module to an older 810 SeeLevel with a terminal block mounted on a circuit board in the base of the box then connect YELLOW to Alarm 1, ORANGE to Alarm 2, and BLACK to Alarm 3. The GREEN wire is ground. Note that Alarms 1, 2 and 3 are the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> terminals from the left on the terminal block. Ground is on the far right side of the terminal block.

**IMPORTANT:** When connecting wiring, all terminal ends should be soldered to the wire. Any multiple wire hookups to the controller terminal blocks must at least be twisted together, and preferably soldered. When tightening terminal block screws which retain the wires, re torque the terminals after 1/2 hour to allow the terminals to take a "set".

**Follow these instructions for a tractor trailer installation:**

3. Mount a standard 7 pin socket to the front of the trailer and a 7 pin plug and cable from the tractor. Make sure there is room inside the socket housing for the plug module.
4. Mount the SpillStop indicator light (not supplied -- use a standard clearance light) in a convenient location. Label the indicator as an equipment monitoring light.
5. Route a single wire from each gauge to the socket housing. Connect the gauge end of this wire to the wire coming out of the gauge module. From the inside, seal the wire entry into the enclosure with RTV silicon rubber. Make sure that the RTV fully surrounds the wire where it goes through the fitting.
6. Route a single wire from the socket housing to the SpillStop indicator light. Connect this wire to the hot side of the light, and ground the other light terminal.
7. Insert the plug module into the socket housing and connect the YELLOW plug module wire to the wire from the SpillStop indicator.
8. Wire the socket as follows:
  - a) White socket terminal to ground and to the GREEN plug module wire.
  - b) Blue socket terminal to the RED plug module wire.
  - c) Brown socket terminal to the wire from gauge #1, and to one of the GREY plug module wires.
  - d) Green socket terminal to the wire from gauge #2, and to one of the GREY plug module wires.
  - e) Red socket terminal to the wire from gauge #3, and to one of the GREY plug module wires.
  - f) Yellow socket terminal to the wire from gauge #4, and to one of the GREY plug module wires.

Note: If there are left over GREY plug module wires, connect them to one of the used ones. If this is not done the indicator will not work. For one or two gauge applications, there are two GREY plug module wires, and for three or four gauge applications, there are four GREY plug module wires.
9. Wire the plug so that the socket colors can be identified at the other end of the 7 conductor cable. Route the cable to the SpillStop controller.

### **Follow these instructions for a body truck installation:**

3. Route a single wire from each gauge to the SpillStop controller. Connect the gauge end of this wire to the wire coming out of the gauge module. From the inside, seal the wire entry into the enclosure with RTV silicon rubber. Make sure that the RTV fully surrounds the wire where it goes through the fitting.
4. Make sure that the gauge(s) are well grounded to the same ground as the controller.

### **Follow these instructions for all installations:**

10. Connect the wire from each gauge module to the corresponding compartment terminal on the back of the controller.
11. If there are unused controller compartment channels, connect a dummy gauge module between the unused compartment terminal and ground. The RED wire goes to the terminal, and the green or black wire to ground. This will simulate an EMPTY condition on the unused compartment.
12. Connect a controller GROUND terminal to ground. All of the controller GROUND terminals are internally connected together.
13. Connect the controller 12V INPUT terminal to a 12 volt source. All of the controller 12V INPUT terminals are internally connected together. This 12 volt source should be an ignition source so the truck battery is not drained when the truck is off. Jumper the a 12V INPUT to one of the SHUTDOWN terminals.
14. Locate an electrical shutoff switch (such as the key switch) in the truck. Break the connection to the switch and connect the two wire ends to the contact terminals (#30 & #87) of the auxiliary ESD relay (supplied). Connect one of the auxiliary ESD relay coil terminals (#86) to ground and the other coil terminal (#85) to the remaining SHUTDOWN terminal on the SpillStop controller. It is a good idea to mount the auxiliary ESD relay close to the existing shutoff wiring to minimize any extra wire length in the truck shutoff circuit.

15. Connect the PTO sense relay (supplied) as shown in the wiring diagram. Use a standard clearance lamp (not supplied) as the PTO indicator light. The PTO sense relay functions so that the ESD (Engine Shutdown) relay cannot operate unless the PTO is engaged. This prevents the engine from being accidentally shutdown if fluid sloshing occurs and raises the float above the engine shutdown point.
16. Connect the HORN terminal to the electrical horn switch (or button).
17. Program the alarm points in the gauges. Program alarm #1 as SHUT DOWN at the point where the engine should be shut down. Program alarm #2 as SHUT DOWN at the point where the horn alarm should come on. Program alarm #3 as SHUT DOWN at the point where the tank is considered empty. See the 810PS Shop or 916 manuals for programming details.

Example: The tank is 58 inches high, with a bottom reading of 4.6 inches. Suggested points would be alarm #1 at 55 inches, alarm #2 at 53 inches, and alarm #3 at 6 inches.

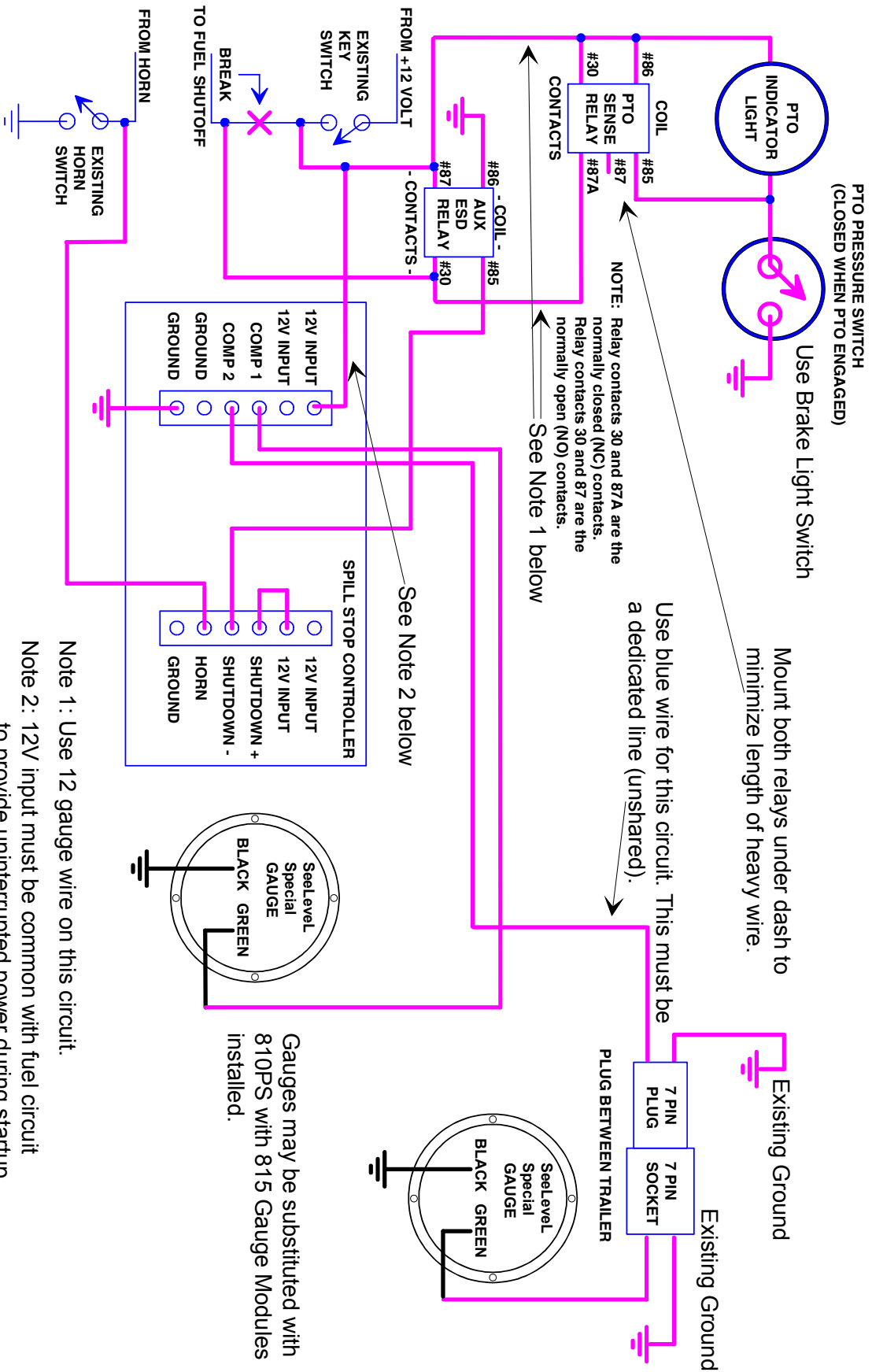
**WARNING:** To properly determine the ESD point, raise the SeeLevel float to the top of the tank, and then lower the float by **at least one inch**. Record this point as the ESD value. **Ensure that the truck operator is aware of this value. Ensure that this value and the empty reading is recorded in the provided area in the operators manual. The truck operator must be given the owners manual upon delivery with all front page data filled in.**

18. Put the covers back on the SeeLevel gauges, and test the system for proper operation by lifting the float(s). As the float is raised, the horn should turn on first, and then the engine or hydraulic pump should shut off with the float at least one inch below the top of the tank. Bypass the horn and ESD and ensure that the bypasses are removed with the float at least one inch above the bottom of the tank.

# BODY TANK WITH PUP WIRING DIAGRAM

## UNITS BUILT SINCE SN 0049

### CHAPTER 4 WIRING DIAGRAMS



## **CHAPTER 5 TROUBLESHOOTING GUIDE**

There are only 3 (2 for the SeeLevel Special) serviceable components in the system: the gauge module, the plug module, and the controller. The system will function without a plug module, except that the SpillStop indicator will not work.

If problems are encountered, check the following:

1. Is the controller getting at least 8 volts?
2. Are all the wires properly connected, with no short circuits?
3. Are the SeeLevel gauges working properly?
4. Are the gauges programmed properly?

To test the various components, substitute a known good component to see if the rest of the system is working. The terminals on the back of the controller unplug for easy substitution of another controller.

To test a gauge module, connect the wire to the controller compartment terminal, and ground the right hand terminal (looking at the module as it would be mounted, with the pins down and the wire coming out of the right hand side). With no other pins connected, the module should indicate engine shutdown. Grounding the second pin from the left simulates a horn alarm condition, grounding the third pin from the left simulates a mid tank condition, and grounding the fourth pin from the left simulates an empty tank condition.

## **CHAPTER 6**

### **SERVICE AND WARRANTY INFORMATION**

The warranty will apply only if the warranty card shipped with the equipment has been returned to Garnet Instruments Ltd.

Garnet Instruments Ltd. warrants equipment manufactured by Garnet to be free from defects in material and workmanship under normal use and service for a period of one year from the date of sale from Garnet or an Authorized Dealer. The warranty period will start from the date of purchase or installation as indicated on the warranty card. Under these warranties, Garnet shall be responsible only for actual loss or damage suffered and then only to the extent of Garnet's invoiced price of the product. Garnet shall not be liable in any case for labor charges for indirect, special, or consequential damages. Garnet shall not be liable in any case for the removal and/or reinstallation of defective Garnet equipment. These warranties shall not apply to any defects or other damages to any Garnet equipment that has been altered or tampered with by anyone other than Garnet factory representatives. In all cases, Garnet will warrant only Garnet products which are being used for applications acceptable to Garnet and within the technical specifications of the particular product. In addition, Garnet will warrant only those products which have been installed and maintained according to Garnet factory specifications.

#### **LIMITATION ON WARRANTIES**

These warranties are the only warranties, expressed or implied, upon which products are sold by Garnet and Garnet makes no warranty of merchantability or fitness for any particular purpose in respect to the products sold. Garnet products or parts thereof assumed to be defective by the purchaser within the stipulated warranty period should be returned to the seller, local distributor, or directly to Garnet for evaluation and service. Whenever direct factory evaluation, service or replacement is necessary, the customer must first, by either letter or phone, obtain a Returned Material Authorization (RMA) from Garnet Instruments directly. No material may be returned to Garnet without an RMA number assigned to it or without proper factory authorization. Any returns must be returned freight prepaid to: Garnet Instruments Ltd., 288 Kaska Road, Sherwood Park, Alberta, Canada T8A 4G7. Returned warranted items will be repaired or replaced at the discretion of Garnet Instruments. Any Garnet items under the Garnet Warranty Policy that are deemed irreparable by Garnet Instruments will be replaced at no

charge or a credit will be issued for that item subject to the customer's request.

If you do have a warranty claim or if the equipment needs to be serviced, contact the installation dealer. If you do need to contact Garnet, we can be reached as follows:

Garnet Instruments Ltd.  
288 Kaska Road  
Sherwood Park, Alberta  
Canada T8A 4G7  
E-mail: [tstalker@garnetinstruments.com](mailto:tstalker@garnetinstruments.com)