SpillStop Ultra™

Alarm Controller with Hose Protection

Overfill Prevention System

MODEL 815-UHP/H MANUAL

HYDRAULIC VERSION

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CHAPTER 1 - OVERVIEW

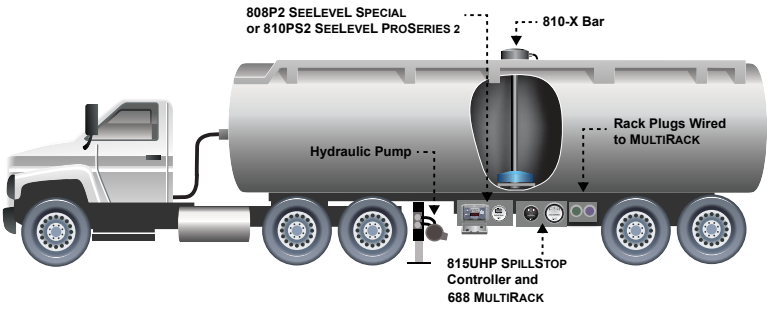
Congratulations on purchasing the Garnet Instruments Model 815UHP/H SpillStop Ultra™ Hose Protection Overfill Prevention System. The 815UHP/H represents the state of the art in spill control for crude oil and chemical hauling. The SpillStop™ is designed to work in conjunction with a Garnet Model 810PS2 SeeLevel ProSeries™ or a Model 808P2 SeeLevel Special™ system to assist the truck operator with truck tank overfill protection in applications where the fluid is loaded with a hydraulic pump or an external pump. In addition to the tank overfill protection, the 815UHP/H also assists in preventing spills due to blown hoses.

The 815UHP/H system is designed as an emergency backup system. The operator should still be responsible for loading and unloading of the tank, but in the event that the operator is unable to shut down loading when the tank is full or makes an occasional error, the 815UHP/H system can prevent a spill and damaged equipment.

The 815UHP/H is easy to install and operate, and is designed to withstand the rigors of mobile applications. The Model 817 Truck Gauge Programmer is used to set the alarm points in the 810PS2 SeeLevel ProSeries™ or the 808P2 SeeLevel Special™ gauge, which are programmed with the horn alarm and shutdown points. The system can shut down hydraulically operated loading pumps. A horn alarm is provided to warn of an impending full tank condition.

CHAPTER 2 - FEATURES AND OPERATION

The following diagram shows the basic components and connections of the 815UHP/H for a tractor trailer application.



The SPILLSTOP controller works in conjunction with alarm signals sent by the 808P2 or 810PS2 level gauges and hose pressure sensors.

The 815UHP/H alarm controller monitors and displays the alarm status of the gauge, the the loading valve status, and the horn bypass status. Wiring faults between the controller and gauge are also monitored. The controller activates a warning horn and shuts off the hydraulic pump if the fluid level in the tank reaches the full point. In addition, if an attempt is made to pump against a closed valve, or overfill the tank, loading is shut down. Each 815UHP/H controller accommodates one compartment.

WARNING: The 815UHP/H 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 UHP system during loading with a hydraulic pump is as follows: When the system is powered on and the tank is empty, the green EMPTY/RE-ARM indicator is on, the orange POWER indicator is on, the green PUMP ON indicator is on, the horn is off, and the pump is allowed to run. If the hydraulic pump in engaged to load when there is a closed valve on the discharge side of the pump, this will be detected by a pressure sensor and will cause the red VALVE ERROR indicator to go on and the PUMP ON indicator to go off, resulting in an immediate pump shutdown. This prevents equipment damage, blown off hoses, spills, and possible operator injury. The horn is not activated for this condition, and this shutdown cannot be bypassed so the operator must correct the condition before loading can occur. If loading is able to proceed normally, the EMPTY/RE-ARM indicator will go off as the fluid level starts to rise. When the horn alarm point is reached, the orange HORN ALARM indicator turns on, the PUMP ON indicator turns off, the horn will start to sound, and the pump will shut down. Pressing the BYPASS button on the right hand side of the controller will turn on the orange BYPASS indicator, turn on the PUMP ON indicator, turn off the horn and allow the pump to restart. This allows the operator to clean out hoses or to continue to load to maximize the load volume. The bypass will not work below the horn alarm point. The HORN ALARM indicator stays on even when bypassed to remind the operator that the alarm condition still exists.

If loading is continued to the point that the SHUT DOWN alarm point is reached, then the red SHUT DOWN indicator turns on, the PUMP ON indicator turns off, and the pump will shut down. There is no bypass button for this condition so it is not possible to load higher than this alarm point due to the risk of an overfill spill. However, it is possible to unload with the hydraulic pump by pressing and holding the over-ride button. This allows the pump to operate as long as the tank level does not rise any further, so it can only be used to pump off product. While the over-ride button is pressed, the orange indicator will turn on. If the over-ride indicator does not turn on, then the tank level is too high for the over-ride to work. As soon as the tank level drops below the shut down point, the over-ride button can be released.

If there is a valve closed on the discharge side of the pump for the unloading operation then the VALVE ERROR indicator will go on and the PUMP ON indicator will go off, causing an immediate pump shutdown just like during loading. Once loading is completed and the system is powered off, the horn is always off. This prevents sloshing or other disturbances from sounding the horn during driving.

The bypass is cleared whenever the system is powered up, regardless of the fluid level. This means that if the system is powered off prior to unloading and the fluid level is above the horn alarm point, then the pump will not be allowed to run on power up until the horn alarm is bypassed again. If unloading is being done in a noise sensitive area, be aware that upon power up the horn will sound since the bypass will be off. Be ready to bypass the horn alarm as soon as possible after powering up. During unloading of the tank, as the fluid level drops below the alarm points the alarm indicators will go out, and the bypass will be cleared (the system is re-armed) when the EMPTY/RE-ARM indicator comes back on. This automatic feature means that 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 level is below the horn alarm point, the bypass can also be cleared manually by pressing the MANUAL RE-ARM button on the left side of the controller. This is a dual purpose button, above the horn alarm point it functions as the over-ride, and below the horn alarm point it functions as the manual re-arm.

The 815UHP/H system has a number of convenience and safety features built into it. When the tank level is below the horn alarm point, the bypass will not work, preventing accidental bypassing below the alarm point. There is a green PUMP ON indicator which lights whenever the pump is allowed to run, so the operator knows when a pump restart can be done. Delays are incorporated into the system to prevent electrical noise or momentary bad connections from disrupting operation. A short circuit in the wiring to the gauge lights the red SHORT CIRCUIT indicator and shuts down the pump. An open circuit in the wiring to the gauge lights the red UNPLUGGED and VALVE ERROR indicators, sounds the horn, and shuts down the pump. The horn sounding can be bypassed but these shutdowns cannot be bypassed. 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 or SeeLevel Special gauge also causes the controller to default to a shutdown condition. The controller will operate at truck voltages from 8 to 16 volts, and draws less than 1/8 amp so it can operate from any convenient 12 volt circuit. The controller is also fully weatherproof, so it can be mounted at a convenient place on the trailer.

The grey horn configuration wire on the controller is not used for the hydraulic pump application. The wire may not be present, and if it is it can be left open or connected to ground.

If a valve on the discharge side of the hydraulic pump is not open when pumping is started, then the pump can generate enough pressure to blow off the rubber hose between the pump discharge and the closed valve. This can result in equipment damage, a product spill, or operator injury. The 815UHP/H controller is able to recognize a valve error in two ways, both of which result in an immediate pump shutdown. A pressure switch sensing excessive hose pressure or a micro-switch sensing valve position can be wired to break the signal connection between the 808P2/810PS2 gauge and the controller, in this case a valve error will cause both the UNPLUGGED and VALVE ERROR indicators to turn on. Alternatively, the switch can be wired to break the ground connection on the hose protection wire on the controller, in this case a valve error will cause only the VALVE ERROR indicator to turn on. If desired, both techniques can be combined in the same installation, one for loading and the other for unloading.

CHAPTER 3 - INSTALLATION GUIDE

Refer to the appropriate wiring diagram during installation of the 815UHP/H system. The wiring diagrams are in chapter 4.

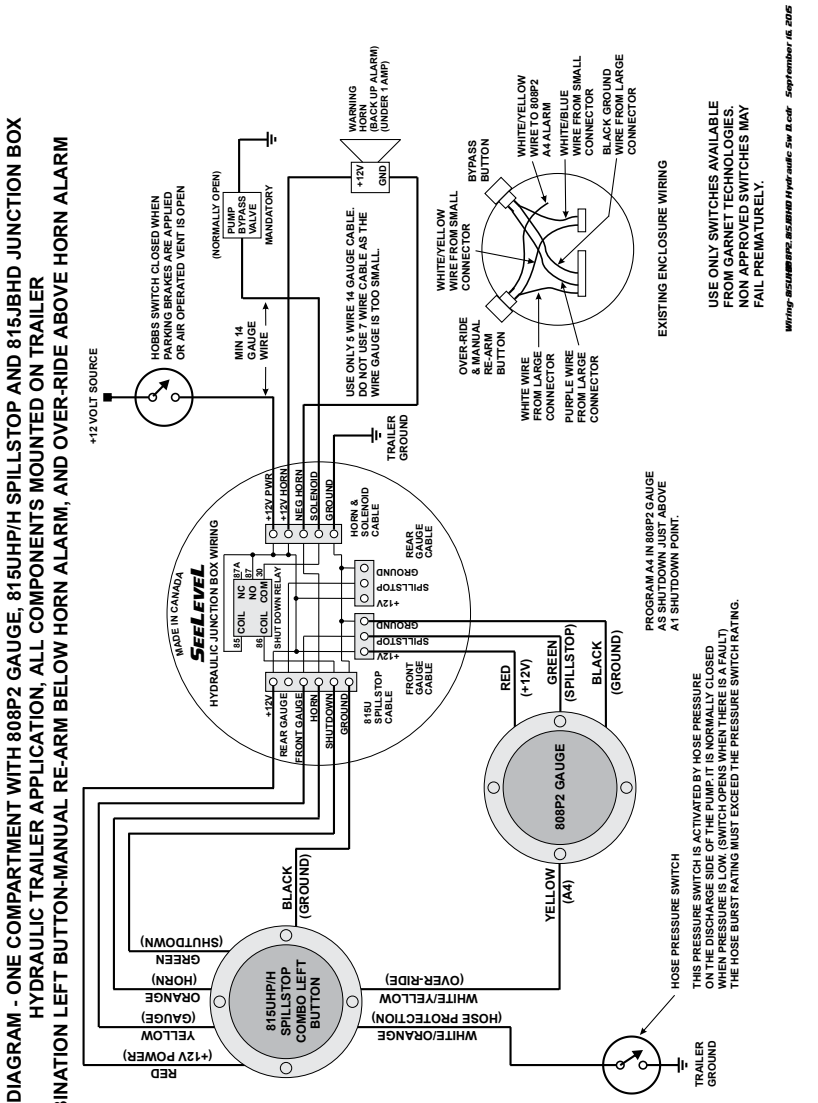
1. Pick a spot for the 815UHP/H to be mounted. It is normally mounted on the trailer. Do not mount the controller where it can be damaged and it should be easy to see and out of direct road spray. It is recommended that the controller be mounted close to the pump control.
2. Mount the display enclosure using the mounting flange holes, being certain to shim the enclosure away from the mounting surface with the spacers provided to allow water drainage. **Broken display enclosures caused by water freezing behind the enclosure are NOT covered by warranty.**

   IMPORTANT: When connecting wiring, all connections should be soldered or securely connected using crimp connectors. Do not use spade connectors as these will degrade over time.
3. Connect the wiring in accordance with the applicable wiring diagram supplied by Garnet. The following chapter contains a few typical wiring diagrams.
4. Use cable such as 7 conductor Scully cable or similar. Use a strain relief where the cable enters the enclosure to create a weatherproof seal. To simplify the wiring, use a junction box available from Garnet. In addition, components such as cable, strain reliefs, horns, hydraulic solenoids, etc. are available directly from Garnet.
5. Program the alarm points in the gauge. Program alarm #1 as SHUT DOWN at the point beyond which loading is not permitted. Program alarm #2 as SHUT DOWN at the point where the horn alarm should activate. Program alarm #3 as SHUT DOWN at the point where the tank is considered empty, normally a few inches off the bottom. Do not program the empty point right at the bottom, since any buildup of debris on the anchor will prevent the system from clearing the bypasses. Program alarm #4 as SHUT DOWN just above alarm #1. See the 808P2 or 810PS2 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 (shutdown) at 55 inches, alarm #2 (horn) at 53 inches, alarm #3 (reset) at 6 inches, and alarm #4 at 56 inches.

WARNING: To properly determine the shutdown point, raise the SeeLevel float to the top of the tank, and then lower the float by at least two inches. Record this point as the shutdown value. **Ensure that the truck operator is aware of this value. Ensure that this value and the empty reading are recorded in the provided area in the operator's manual. The truck operator must be given the owners manual upon delivery with the data entered on the back of the manual.**

6. Put the cover back on the SpillStop, and test the system for proper operation by lifting the float. Verify the following points:
   a. The horn sounds and the pump stops at the horn alarm point.
   b. Pressing the bypass button at this point silences the horn and restarts the pump.
   c. The pump shuts down at the shut down alarm point.
   d. At this point, pressing and holding the over-ride button sounds the horn and allows pump restart.
   e. Raising the float any higher than the shut down point causes the pump to shut down regardless of whether the button is pressed.
   f. Position the float below the shut down point but above the horn alarm point, bypass the horn, and then verify that the bypass is removed with the float at least one inch above the bottom of the tank.


WIRING DIAGRAM - ONE COMPARTMENT WITH 808P2 GAUGE, 815UHP/H SPILLSTOP AND 815JBHD JUNCTION BOX
HYDRAULIC TRAILER APPLICATION, ALL COMPONENTS MOUNTED ON TRAILER
COMBINATION LEFT BUTTON-MANUAL RE-ARM BELOW HORN ALARM, AND OVER-RIDE ABOVE HORN ALARM
+12 VOLT SOURCE
HOBBS SWITCH CLOSED WHEN PARKING BRAKES ARE APPLIED OR AIR OPERATED VENT IS OPEN
MIN 14 GAUGE WIRE
(NORMALLY OPEN) PUMP BYPASS VALVE MANDATORY
USE ONLY 6 WIRE 14 GAUGE CABLE. DO NOT USE 7 WIRE CABLE AS THE WIRE GAUGE IS TOO SMALL.
WARNING HORN (BACK UP ALARM) (UNDER 1 AMP)
+12V
GND
TRAILER GROUND
MADE IN CANADA
SEELEVEL
HYDRAULIC JUNCTION BOX WIRING
+12V PWR
+12V HORN
NEG HORN SOLENOID
GROUND
HORN & SOLENOID CABLE
REAR GAUGE CABLE
85 COIL
NC 87A
NO 87
86 COIL
COM 30
SHUT DOWN RELAY
SPILLSTOP GROUND
+12V
SPILLSTOP GROUND
+12V
+12V
REAR GAUGE
FRONT GAUGE
HORN
SHUTDOWN
GROUND
815U SPILLSTOP CABLE
FRONT GAUGE CABLE
RED (+12V)
GREEN (SPILLSTOP)
BLACK (GROUND)
808P2 GAUGE
PROGRAM A4 IN 808P2 GAUGE AS SHUTDOWN JUST ABOVE A1 SHUTDOWN POINT.
WHITE/YELLOW WIRE FROM SMALL CONNECTOR
OVER-RIDE & MANUAL RE-ARM BUTTON
BYPASS BUTTON
WHITE/YELLOW WIRE TO 808P2 A4 ALARM
WHITE/BLUE WIRE FROM SMALL CONNECTOR
BLACK GROUND WIRE FROM LARGE CONNECTOR
WHITE WIRE FROM LARGE CONNECTOR
PURPLE WIRE FROM LARGE CONNECTOR
EXISTING ENCLOSURE WIRING
USE ONLY SWITCHES AVAILABLE FROM GARNET TECHNOLOGIES. NON APPROVED SWITCHES MAY FAIL PREMATURELY.
Wiring 815UHP/H, 815JBHD Hydraulic Sw B.cdr September 16, 2015
RED (+12V POWER)
YELLOW (GAUGE)
ORANGE (HORN)
GREEN (SHUTDOWN)
BLACK (GROUND)
815UHP/H SPILLSTOP COMBO LEFT BUTTON
WHITE/ORANGE (HOSE PROTECTION)
WHITE/YELLOW (OVER-RIDE)
YELLOW (A4)
HOSE PRESSURE SWITCH
THIS PRESSURE SWITCH IS ACTIVATED BY HOSE PRESSURE ON THE DISCHARGE SIDE OF THE PUMP. IT IS NORMALLY CLOSED WHEN PRESSURE IS LOW. (SWITCH OPENS WHEN THERE IS A FAULT) THE HOSE BURST RATING MUST EXCEED THE PRESSURE SWITCH RATING.
TRAILER GROUND

Wiring Guide - Main Connector

Red:	+12V power
Black:	Ground
Orange:	Horn alarm output
Green:	Shutdown alarm output
Yellow:	SPILLSTOP signal from the 808P2/810PS2 gauge
Purple: (connected)	Horn Bypass switch
White: (connected)	Manual Re-arm switch

Wiring Guide - Sensor Connector

White/Orange:	Hose protection switch
White/Blue (connected):	Loading switch - always grounded
White/Yellow (via over-ride switch):	Over-ride switch connection to A4
Grey (may not be present):	Horn configuration - not used

CHAPTER 5 - TROUBLESHOOTING GUIDE

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 808P2 or 810PS2 SeeLevel gauges working properly?
4. Are the 808P2 or 810PS2 gauges programmed properly?
5. If the horn is not sounding, does the horn itself work?

To test the various components, substitute a known good component to see if the rest of the system is working. If the pump will not start, ground the green wire from the controller. If the pump still does not start, the problem is in the relay or associated wiring. If the pump now starts, and the controller indicates no shutdown alarm (or is bypassed), then the controller is bad. If the horn will not sound, ground the orange wire from the controller. If the horn still does not sound, the problem is in the horn or associated wiring. If the horn now sounds, and the controller indicates a horn alarm that is not bypassed, then the controller is bad.

CHAPTER 6 - SPECIFICATIONS

815-UHP DISPLAY	
Material	Enclosure: PBT plastic, Lid: polycarbonate
Size	152 mm (6") diameter, 67 mm 2 5/8") deep
Display type	LED lights
External power	12 Vdc truck power
Ambient temperature range	-40°C to +60°C (-40°F to +140°F) ambient
SAFETY INFORMATION	
Compliance and Certifications	CAN ICES-001(A)/NMB-001(A) This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This product can expose you to chemicals including Nickel and Lead, which are known to the State of California to cause cancer, and lead which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CHAPTER 7 - SERVICE AND WARRANTY INFORMATION

Find warranty claim process information refer to our support page on our website:

www.garnetinstruments.com/support/

DISCLAIMER OF WARRANTY ON HARDWARE

Garnet Instruments warrants equipment manufactured by Garnet to be free from defects in material and workmanship under normal use and service for a period of three years 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, 286 Kaska Road, Sherwood Park, Alberta, 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:

CANADA
Garnet Instruments
286 Kaska Road
Sherwood Park, AB T8A 4G7
CANADA
email: info@garnetinstruments.com

UNITED STATES
Garnet US Inc.
5360 Old Granbury Road
Granbury, TX 76049
USA
email: infous@garnetinstruments.com