

HEATEC TEC-NOTE

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Setting up Vega radar sensors for Heatec vertical asphalt tanks

This document provides information for setting up Vega radar sensors installed on Heatec tanks that store liquid asphalt (**Figure 1**). It applies to VEGA PULS 65.UX sensors (**Figure 2**) with Indicating and Adjustment Module PLICSCOM (**Figure 3**). It applies to Heatec *vertical* tanks with capacities ranging from 10,000 to 35,000 gallons. The sensors are optional equipment for Heatec tanks.

The sensors indicate levels of asphalt in the tanks. Levels are shown in feet, measured from the bottom of the tank.

This document is furnished with Heatec vertical tanks equipped with the sensor. Manual **28442-EN-030925**, entitled **Operating Instructions, VEGAPULS 65** (published by Vega) is also furnished. Both documents are needed to set up the radar sensors for Heatec tanks.

The sensors require a *preliminary* setup and a *final* setup. The preliminary setup is normally done at the Heatec factory. The final setup should be done in the field after the tank is operational. If a new sensor is installed in the field, and the preliminary



Figure 1. Heatec vertical asphalt tanks.



Figure 2. VEGA PULS 65.UX radar sensor.



Figure 3 PLICSCOM indicating and adjustment module.

setup was not done at Heatec, it must be done before final setup can be done.

NOTICE

This document supplements the Vega manual and should always be used along with the Vega manual. Be sure to read all appropriate warnings and precautions in the Vega manual before doing any work on Vega sensors. The following statement appears in the Vega manual and should be followed:

2.1 Authorized personnel

All operations described in this operating instructions manual must be carried out only by trained and authorized specialist personnel. For safety and warranty reasons, any internal work on the instruments must be carried out only by VEGA personnel.

PRELIMINARY SETUP

The preliminary setup can be made either before the sensor is installed on the tank or after it is installed. Use the buttons on the PLICSCOM module (**Figure 3**) to make the settings. Set the sensor according to the settings shown in **Figure 4**. *Do not change any settings other than the ones shown in Figure 4.* These are the settings we use for preliminary setup of the sensors at the Heatec factory. They are the only settings we change from the original Vega factory settings.

HINT: Before trying to set the PLICSCOM module *be sure to get familiar* with its four keys (refer to **6.5 Adjustment system** in the Vega manual). When navigating the menu on the module of the sensor, make sure the menu numbers (which appear in the upper right-hand corner of the display) match the menu numbers shown in Figure 4. The menu terminology shown in Figure 4 should match the menu terminology that appears on the PLICSCOM module.

NOTE: If you refer to **6.5 Menu schematic** in the Vega manual you may find minor differences in terminology shown there and the terminology that appears in the display of the PLICSCOM module. Please disregard these differences because they should not affect your setup procedure.

FINAL SETUP

Final setup of the sensor can only be done after the sensor is installed in the tank. During final setup the sensor creates an electronic profile of the inside of the tank. It senses obstructions, such as ladders, mixing blades, etc. It stores the profile in memory and uses it to eliminate false echoes from those components. This procedure is known as *False echo memory*.

We normally run the false echo memory procedure on empty tanks equipped with sensors at the Heatec factory. At that time the tanks are new and have never been filled with asphalt. The profile we create should enable the sensor to provide fairly stable and accurate indications of level. However, the sensor will provide greater stability and accuracy if the procedure is repeated after the inside of the tank is coated with asphalt. The sensor can be set to *update* the profile that was originally made at Heatec.

We recommend that you update the profile after the tank has been used for a while. Do this when the asphalt level is barely above the heating coils or at the lowest level before you would normally refill the tank. If the tank has a mixer, make sure it is running while performing this procedure.

Basic instructions for creating false echo profiles are in the Vega manual under **6.4 Set-up procedure**. See the steps under the heading **False echo memory**.

Here's how to build an accurate profile: Set the sensor module to menu 4.1 False echo memory. You will see the word: Change? Press the OK button and you will be presented with three choices: Delete, Update, Create new. Be sure to choose update. Otherwise, you will delete the profile that was created at Heatec.

NOTE: While you are running the false echo memory procedure you will be prompted to enter the distance from the sensor to the surface of the asphalt. So, be prepared to make actual measurements through the manway in the top of the tank. You will need to measure from the surface of the asphalt to the mounting flange of the sensor.

TROUBLESHOOTING

The sensor may show erroneous readings if its antenna becomes contaminated with asphalt residues. If this happens you must remove the sensor unit and clean the antenna using a solvent that will dissolve asphalt. *Before removing the sensor be absolutely sure to mark its position so it can be reinstalled in the same position.* Otherwise, all of the false echo memory information will be useless and the sensor will not function properly.

Note: The sensor has a small hole drilled in the side of its stainless steel body. This hole should always point towards the center of the tank.

REVISIONS TO SETTINGS IN FIGURE 4

Recent changes to the settings shown in Figure 4 are highlighted in yellow.

Two settings were changed by this revision (dated 10-11-04). They provide increased protection against accidental overflow and immersion of the radar antenna. These two settings are 1.1 Min. adjustment and 1.2 Max. adjustment.

Changes to another setting were made in revision dated 8-19-04. This setting was to 1.3 Medium. It changed from Liquid unknown to Liquid DK<3.

If the settings of your radar unit were made prior to this revision, you should make the changes noted above. The changes are easy to make using the buttons on the PLISCOM.

EFFECT ON HONEYWELL CONTROLLER

Changes made to the two settings changed by this revision (10-11-04) affect the Honeywell controller

Figure 4. Settings for VEGAPULS 65 with Indicating and Adjustment Module PLICSCOM						
SENSOR MENU	HEATEC VERTICAL TANKS					
	TAV-10 10758 gallons	TAV-15 16931 gallons	TAV-20 21164 gallons	TAV-25 26808 gallons	TAV-30 30040 gallons	TAV-35 37570 gallons
1 Basic Adjustment						
1.1 Min. adjustment	0.00% 16' 06" 2/16	0.00% 24' 06" 2/16	0.00% 30' 06" 2/16	0.00% 38' 06" 2/16	0.00% 44' 06" 2/16	0.00% 50' 06" 2/16
1.2 Max. adjustment	100.00% 2' 00" 2/16	100.00% 2' 00" 2/16	100.00% 2' 00" 2/16	100.00% 2' 00" 2/16	100.00% 2' 00" 2/16	100.00% 2' 00" 2/16
1.3 Medium	Liquid solvent DK<3	Liquid solvent DK<3	Liquid solvent DK<3	Liquid solvent DK<3	Liquid solvent DK<3	Liquid solvent DK<3
1.4 Vessel type	Storage tank	Storage tank	Storage tank	Storage tank	Storage tank	Storage tank
1.5 Damping	0 s	0 s	0 s	0 s	0 s	0 s
1.6 Linearization curve	Linear	Linear	Linear	Linear	Linear	Linear
1.7 Sensor-tag	Sensor	Sensor	Sensor	Sensor	Sensor	Sensor
2 Display						
2.1 Display value	Height	Height	Height	Height	Height	Height
4 Service						
4.3 Current output						
Output mode	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA	4-20 mA
Failure mode	< 3,6 mA	< 3,6 mA	< 3,6 mA	< 3,6 mA	< 3,6 mA	< 3,6 mA
Min. current	3,8 mA	3,8 mA	3,8 mA	3,8 mA	3,8 mA	3,8 mA
4.6 Select	ft (d)	ft (d)	ft (d)	ft (d)	ft (d)	ft (d)

used with the radar unit. Consequently, Heatec Tec-Note 5-04-120 *Setting Honeywell controller used with Heatec vertical asphalt tanks*, also has a revision dated 10-11-04.

It is extremely important for you to change the settings of the Honeywell controller when you change the settings of the radar unit! Failure to change these settings will result in erroneous level indications and improper shutoff control!

SPECIAL SETTINGS

All of the current VEGA PULS 65 radar units used on Heatec AC tanks have special factory settings. These settings can only be made using a computer loaded with special Vega software and a special connect cable. These settings *cannot* be made using the keys on the PLICSCOM module.

One of the special settings is known as **SECURITY**. Prior to September 2004 it was set to **ON**. The advantage of having this setting turned on, is that the unit provides better control of tank overflow.

However, having this setting activated can create a problem in an environment where there is condensation of moisture and vapors. If condensation accumulates on the radar antenna it can keep the radar unit from working properly. This may occur inside an asphalt tank.

Accordingly, radar units used on Heatec AC tanks starting September 2004 have the **SECURITY** setting set to **OFF**. This should eliminate possible problems due to condensation.

If your Heatec tank uses the current radar unit that has settings made prior to September 2004 and you think you may be experiencing problems due to condensation, please contact the Heatec service department.

NOTE: The Vega software is designed primarily for use by original equipment manufacturers (OEMs) such as Heatec. It is not recommended for end users.

OVERFLOW PROTECTION

Turning off the **SECURITY** setting does *not* leave the radar without overflow protection. However,

it could make the radar overflow control more susceptible to problems if the radar antenna is accidentally immersed in asphalt.

In any case, a backup system will prevent overflow if the radar is not working properly. The backup system consists of a proximity switch activated by a float (**Figure 5 and 6**). The proximity switch will shut off the unloading pump when filling the tank and the float activates the proximity switch. An indicator light labeled **HIGH ASPHALT FLOAT LEVEL** (at the unloading pump controls) comes on when the proximity switch has been activated. For more information on shutoff controls please refer to Heatec Tec-Note 9-04-147 *Heatec asphalt tanks—maintenance*.

In normal operation the radar shuts off the unloading pump before the proximity switch is activated. Thus, if the proximity switch shuts off



Figure 5. High-level proximity switch and float pipe protruding through sleeve in top of tank.



Figure 6. Float for high-level proximity switch.

the unloading pump it means that the radar is not working properly.

So every time you fill the tank pay special attention to whether the indicator light for high float level comes on. If it *does* come on, this indicates that the radar failed to shut off the unloading pump and the shutoff was achieved only by the backup system.

If the radar fails to shut off the unloading pump the most likely cause is that the radar antenna was accidentally immersed in asphalt. This should *not* happen in normal operation. Cleaning the radar antenna should restore the radar unit to normal operation.

In the unlikely event that *both* the radar and proximity switch fails to shut off the unloading pump, the asphalt level will reach the top of the vent/overflow pipe inside the tank. It will then spill into the pipe, which will carry it out of the tank onto the ground at the bottom of the tank. Moreover, if an overflow occurs, you can be sure that the asphalt level was high enough to immerse the radar antenna.

RESERVED SPACE

Some space in the top of the tank is reserved to allow for expansion of asphalt and for overflow control when filling the tank. So you should not expect to fill the entire space inside a tank with asphalt. Your volume of asphalt will always be somewhat less than the volume of the tank.

The *new* settings shown in Figure 4 cause the radar to shut off the unloading pump when the liquid reaches a level approximately 18-5/8 inches below the bottom surface of the upper bulkhead inside the tank. At this level the asphalt will be 38-1/8 inches from the bottom surface of the flange of the radar unit. This is the surface from which all radar measurements are made.

The proximity switch and float system is set up to shut off the unloading pump when the level of asphalt is approximately 7-1/8 inches from the bottom surface of the upper bulkhead

OLDER TANKS

Certain dimensions on vertical tanks manufactured prior to 2001 may differ from those on tanks manufactured after that year. If a radar unit is being retrofitted to a vertical tank manufactured prior to 2001 you may need to use different radar settings than those shown in Figure 4. Otherwise the level indications may be incorrect. Please contact Heatec service department for help.

TECHNICAL SUPPORT

For questions about sensor settings for Heatec tanks, please contact the Heatec service dept, phone 423-821-5200. Please have the model of your sensor. If your sensor was installed at the Heatec factory, please have the Heatec job number. If you need a manual for the VEGA PULS 65 PLICSCOM sensor you can download one from heatec.com/literature/Tec-Notes/actank_pubs.htm.

For problems with the sensor, please contact Ohmart/Vega Customer Support at 1-800-367-5383 or 1-800-543-8668. Please have sensor model. Before calling, please verify that your settings match those shown in **Figure 4**.