

HEATEC TEC-NOTE

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Setting Siemens pressure transmitters used on Heatec portable asphalt tanks

This document provides information on setting Siemens Pressure Transmitter 7MF4033-1CY10-1NC6-Z-B21-Y01-Y22-A01 with remote seal 7MF4810-2QA02 (Figure 2) used on Heatec portable asphalt tanks (Figure 1). It applies to tanks with capacities of 10,000, 15,000, 20,000, 25,000, 30,000, and 35,000 gallons. It also applies to stationary horizontal tanks of these capacities.

The pressure transmitter indicates the level of liquid asphalt above the bottom of the tank and displays the level in inches.

This document is included with all Heatec asphalt tanks equipped with the Siemens transmitters. Siemens User's Manual UMSITRPDS3-1 is also furnished.

Information in these documents should enable users to set transmitters on Heatec tanks in the field. Although the transmitters are preset at the Heatec factory before the tanks are shipped, users may need to change settings for different liquid materials.



Figure 1. Heatec portable asphalt tank.

NOTICE

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

Qualified Persons

The described equipment should be installed, configured, operated, and serviced only by qualified persons thoroughly familiar with this User's Manual. A copy of this manual accompanies the equipment. The current version of the manual, in Portable Document Format (PDF), can be downloaded from www.sea.siemens.com/ia/.



Figure 2. Siemens pressure transmitter.

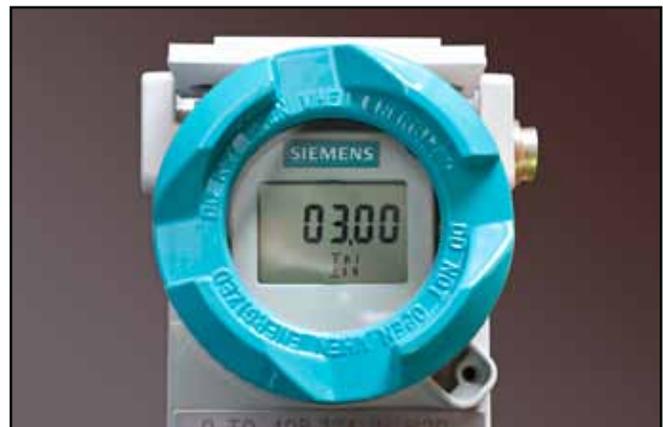


Figure 3. Display on transmitter.

FACTORY SETTINGS

The transmitter is normally set at Heatec before the tank is shipped. It is set to display the level of the liquid material in the tank in *inches* (Figure 3) above the bottom of the tank. This setting *cannot* be changed in the field by plant personnel. In the past Heatec set the transmitters to indicate levels in feet above the transmitter height.

Heatec also sets the transmitter based on the specific gravity of the material that is to be stored in the tank. The customer provides this information and we use it to determine the proper setting. However, the transmitter can be reset in the field by plant personnel for a material with a different specific gravity.

NOTICE

You should check the transmitter to make sure it is set for the specific gravity of the material actually stored in the tank. If its specific gravity is either higher or lower than that set on the transmitter, the transmitter will not provide accurate level indications.

To determine the transmitter specific gravity setting, set the transmitter to Mode 6, which is the Full Scale Blind Setting. Read the numerical value displayed. Now find that same value in Figure 4, where you can see the specific gravity for that value.

Remember, specific gravities vary with the type of asphalt. And the specific gravity of a particular type of asphalt varies with its temperature. So if you decide to store a different material, or if you change its storage temperature, you need to reset the transmitter as explained below.

If you don't know the specific gravity of the material at the temperature you plan to store it, ask your supplier.

RESETTING THE TRANSMITTER

NOTE: You *cannot* directly enter the numerical value for specific gravity when resetting the transmitter. The setting you actually set on the transmitter is known as the **Full scale blind setting**, which you should obtain from **Figure 4**. It consists of a four digit number that includes one decimal point.

Thus, to obtain a full scale blind setting for an asphalt with a known specific gravity, simply choose a specific gravity value shown in **Figure 4** with a value closest to your known value. Then note the full scale blind setting shown alongside the specific gravity listed. **Be sure the specific gravity you use is for the actual storage temperature of the asphalt and not its temperature at 60 degrees F.**

Figure 4. Specific Gravity Vs Full Scale Blind Setting.

Specific Gravity	Full Scale Blind Setting	Specific Gravity	Full Scale Blind Setting
1.140	140.2	1.015	124.8
1.135	139.6	1.010	124.2
1.130	139.0	1.005	123.6
1.125	138.4	1.000	123.0
1.120	137.8	0.995	122.4
1.115	137.1	0.990	121.8
1.110	136.5	0.985	121.2
1.105	135.9	0.980	120.5
1.100	135.3	0.975	119.9
1.095	134.7	0.970	119.3
1.090	134.1	0.965	118.7
1.085	133.5	0.960	118.1
1.080	132.8	0.955	117.5
1.075	132.2	0.950	116.9
1.070	131.6	0.945	116.2
1.065	131.0	0.940	115.6
1.060	130.4	0.935	115.0
1.055	129.8	0.930	114.4
1.050	129.2	0.925	113.8
1.045	128.5	0.920	113.2
1.040	127.9	0.915	112.5
1.035	127.3	0.910	111.9
1.030	126.7	0.905	111.3
1.025	126.1	0.900	110.7
1.020	125.5		

The full scale blind setting is equal to a tank diameter of 126 inches minus the sensor height of 3 inches multiplied by the specific gravity of the asphalt.



Figure 5. Magnetic pushbuttons.

To change the full scale blind setting on the transmitter, you must use the magnetic pushbuttons on the transmitter (**Figure 5**).

First use pushbutton M to cause Mode 6 to show in the display window. Then use the other two pushbuttons to set the numerical value for the full scale blind setting.

Remember, the only configuration parameter that you can use to reset specific gravity is the full scale “blind setting” or Mode 6. *Do not change any other parameter!*

DISPLAY LEVELS VS. GALLONS

As already noted the transmitter displays levels in inches. You may need to know how many gallons of material that various levels represent.

Some error is unavoidable when measuring levels and converting them to gallons of asphalt stored in the tank. Such determinations are not reliable substitutes for metering and calibration equipment.

It is important to note that pressure transmitters on Heatec tanks are now set up to display the height of the asphalt above the inside bottom of the tank. In the past the transmitters were set up to display the height of the asphalt above the location of the transmitter sensor.

You should not change the position of the transmitter or the location of its sensor. Doing that would cause all indications to be wrong.

The sensor of the transmitter is installed 3 inches above the bottom of the tank. (This distance may vary plus or minus 1/4-inch.) Consequently, the transmitter displays 3 inches when the asphalt level is at the same height as the sensor.

Note that the transmitter does not actually indicate asphalt levels lower than 3 inches and the display continues to show 3.00 for all levels below 3 inches.

The tables shown in **Tec-Note 11-04-149** enables you to convert levels to gallons. In this Tec-Note, the column labeled inches refers to the numbers that are displayed on the transmitter (**Figure 3**) and on the level controller (**Figure 6**).

FILLING THE TANK

The pressure transmitter works in conjunction with the controller (**Figure 6**) to automatically shut off the unloading pump when the material in the tank reaches a level approximately 24 inches from the inside top of the tank.

The tank is also equipped with a high level float switch. It functions as a backup system for the shutoff provided by the pressure transmitter. It will shut off the unloading pump at a level of approximately 7 inches from the inside top in case the pressure transmitter fails to shutoff the unloading pump.



Figure 6. Controller used to indicate levels.

INSTALLING A NEW TRANSMITTER

All new transmitters must be programmed at the Heatec factory using special Siemens software configured for Heatec tanks.

Only two settings can be reset in the field. One is the Full Scale Blind setting, which should be set according to the specific gravity of the material as explained earlier.

The other is the zero setting. This setting corrects for transmitter tilt. The transmitter is installed at Heatec with the display facing straight ahead with no tilt. If the transmitter is installed with the display at a different angle, the zero setting should be reset according to instructions in the Siemens manual under the heading **6.2.5 Zero Adjustment (Position Correction)**. We do not recommend installing the transmitter with the display facing up.

VERIFYING ACCURACY OF LEVELS

You should periodically verify that the asphalt level indications produced by the pressure transmitter are acceptably accurate.

The easiest way to do this is to measure the empty space at the top of the tank using a measuring tape marked in inches, as explained in **Tec-Note 11-04-149**.

Make this measurement while the tank is well over half full. Your final answer should match the level displayed on the transmitter and controller, within one inch. If the indicated level differs much more than an inch try and find the cause.

Start by checking the full scale blind setting of the transmitter. Make sure it is properly set for the asphalt actually stored in the tank based on the specific gravity of the asphalt at its storage temperature. Use the information under the heading “resetting the transmitter” to determine the correct settings.

Be aware that debris or anything blocking the port where the transmitter connects to the tank will cause erroneous operation of the transmitter.

LAST RESORT

In the event that measured levels differ significantly from levels indicated by the transmitter it may be possible to use a *trial and error* method to bring the two into agreement. You might want to try this method especially when you are not sure about the specific gravity of the asphalt stored in the tank.

But before proceeding with the trial and error method, carefully recheck your taped measurements and your arithmetic for errors. And then check the full scale blind scale setting on the transmitter to make sure it is correct.

If the two levels still do not agree, proceed with the trial and error method. It involves nothing more than changing the values of the full scale blind setting on the transmitter. Just arbitrarily increase or decrease the values until the displayed level indications agree with the level found with the measuring tape.

Each time you enter a new value and store it, check the transmitter to see how close it agrees with the level found using the measuring tape. Keep doing this until you get an acceptable match.

After using this method to attain agreement between the transmitter and measuring tape we recommend that you recheck one against the other several times over a period of a several days.

TROUBLESHOOTING TRANSMITTERS

Pockets of air or trash trapped in the pipe where the transmitter is connected to the tank will cause erratic level readings. When filling an empty tank be sure to bleed the pipe connection at the transmitter to avoid this problem. Also bleed the connection if the tank is refilled after it was drained below the level where the pressure transmitter is connected.

REPLACING A TRANSMITTER

All replacement transmitters need to be programmed at our factory before they are installed in your Heatec tank. We pre-program all Siemens transmitters that we install in our tanks to make settings appropriate for the tanks. We use special Siemens software that we only use on computers at our factory.

Only two settings can be reset in the field. One is the full scale blind setting, which should be set according to the specific gravity of the fuel as explained earlier.

The other is the zero setting. This setting corrects for transmitter tilt. The transmitter is normally tilted upwards for easy reading when it is installed on the tank at Heatec. If you change this tilt, you should reset the zero setting according to instructions in the Siemens manual, under the heading 6.2.5 Zero Adjustment (Position Correction).