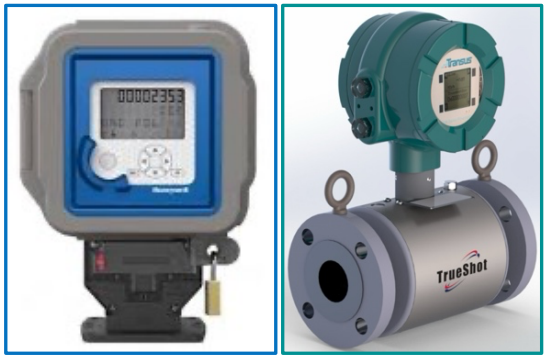
Connecting the TrueShot™ UIM to a Honeywell EC-350

Written by John Lansing

Introduction

This document discusses wiring connections and software settings required to connect a TMCO TrueShot™ UIM (2, 3 or 4-path) gas ultrasonic meter to the Honeywell EC-350 electronic volume corrector (EVC) using the UIM low frequency output (ACF/Pulse). Traditionally the output from the TrueShot is a high-speed pulse set for pulses/ACF. However, the electronics also supports a low frequency output in ACF/Pulse. This document discusses configuring both the EC-350 and the TrueShot to provide ACF/pulse.



Configuring the Honeywell EC-350

This Application Note primarily discusses the connections that are required to obtain the correct of number pulses from the TrueShot UIM 2, 3 or 4 path versions. It does not go into detail on how to use the Honeywell software as the client should be familiar with its configuration settings.

The EC-350 electronic volume corrector (EVC) has two pulse inputs. It is designed to accommodate turbine meters that provide two frequency outputs. These must be jumpered together to operate correctly. Figure 1 below is from the Honeywell User's Guide, Rev 1.7 [Ref 1]. It shows the main board where all the connections are. TB2 will be used to connect to the TrueShot UIM and is highlighted with a red rectangle.

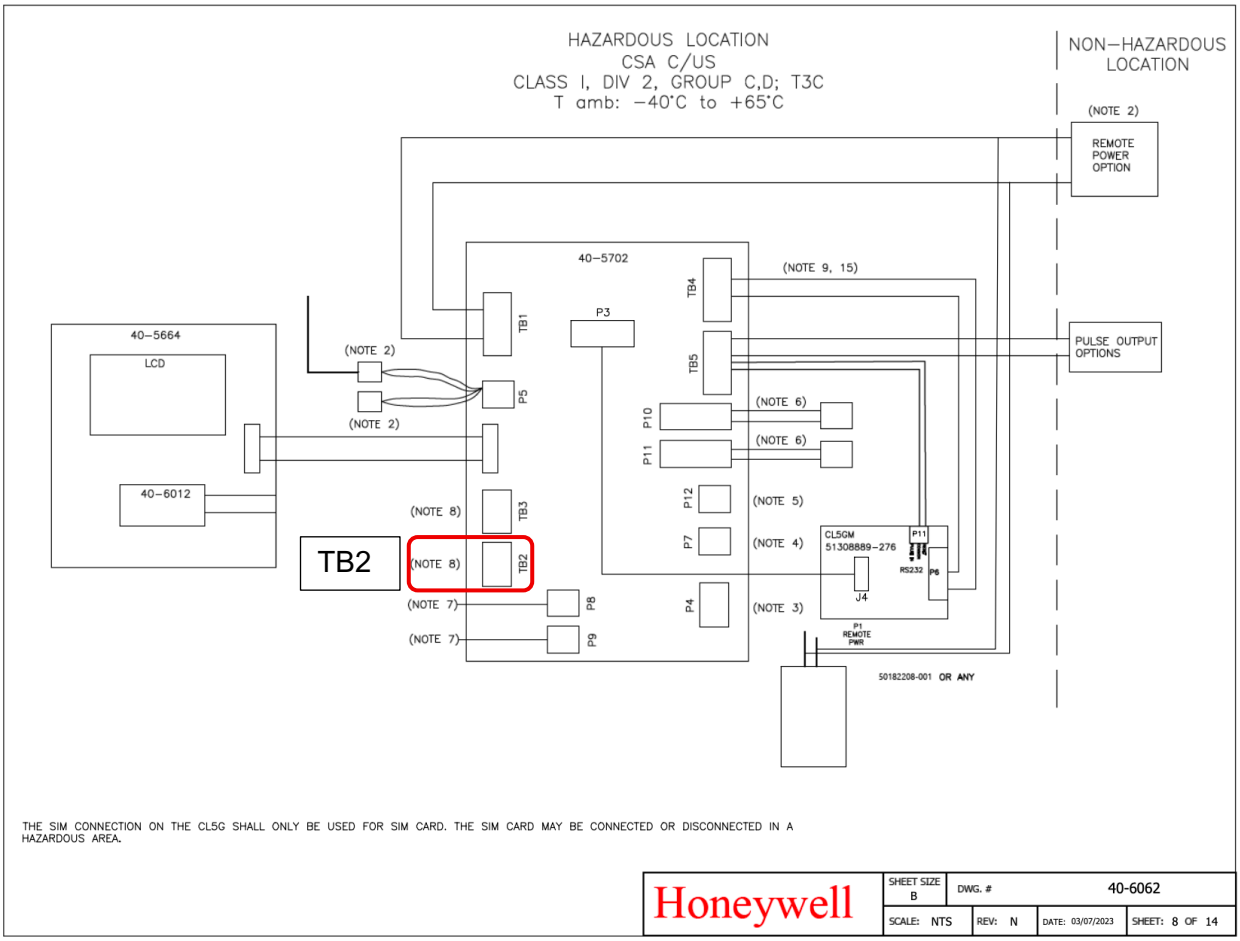


Figure 1 – EC-350 Electronic Board (Page 52 in the Honeywell Manual)

Connecting the TrueShot™ UIM to a Honeywell EC-350

Written by John Lansing

From the same manual, Figure 2 below is a close-up picture of the TB2 and TB3. TB3 can be used for alarm inputs but is not needed for connection to the TrueShot UIM.

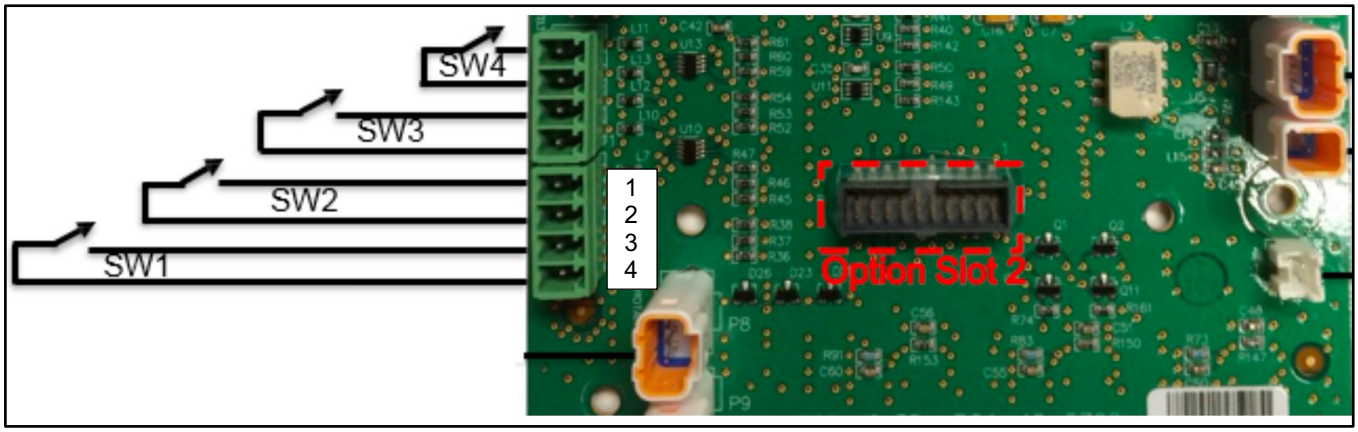


Figure 2 – TB2 Terminals

TB2 expects that both SW1 and SW2 (Figure 2) will be receiving pulses. It was designed to handle to separate pulse outputs from a variety of dual-output turbine meters. If only one pulse output is to be used, then jumpers are required. Figure 2 shows the TB2 numbering for these connections (in white). Connections 2 & 4 are the positive input and pins 1 & 3 are the negative terminals. To verify the polarity, use a multimeter and measure the voltage from terminals 2 & 1. The multimeter should read a little over a positive 3+ VDC (the same for terminals 4 & 3).

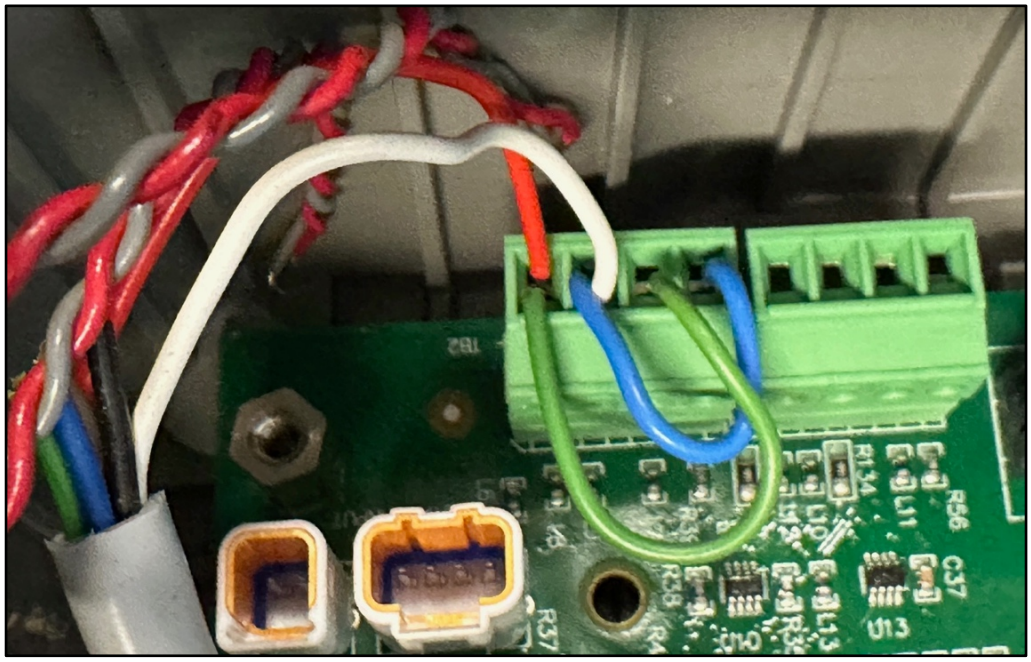


Figure 3 – TB2 with Jumpers Installed

Figure 3 above shows a jumper from pins 1 to 3 (blue wire) and from 2 to 4 (green wire). The red wire is the positive input from the TrueShot and must go to the positive TrueShot output terminal (D0 A). The white wire should be connected to the negative terminal on the UIM (D0 B). Figure 4 shows the terminal connections on the TrueShot that is equipped with a single RS-485 port, and Figure 5 shows the optional dual RS-485. Both electronics have 2 additional frequency outputs (D2 and D3) that can also be used lin lieu of D0 (highlighted with a white box).

Connecting the TrueShot™ UIM to a Honeywell EC-350

Written by John Lansing

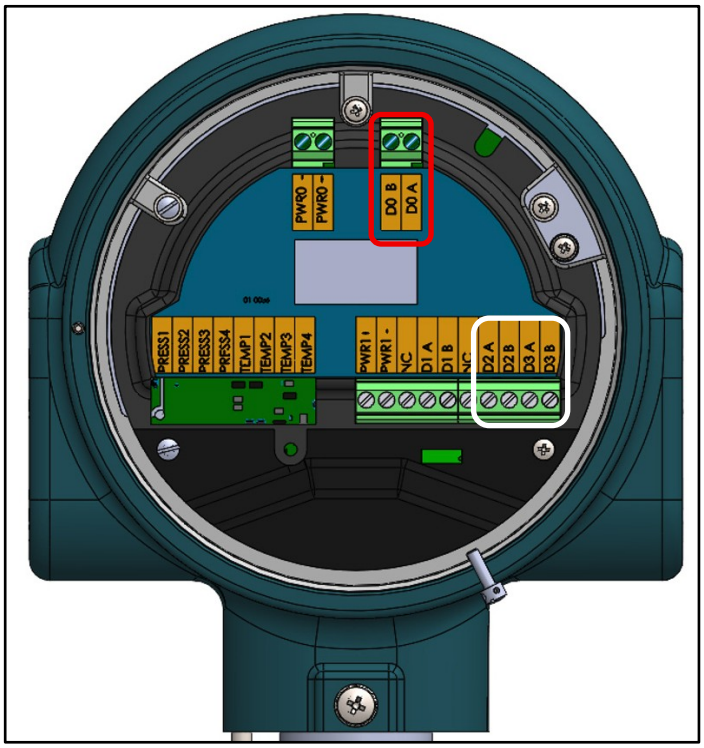


Figure 4 – TrueShot Single Frequency Board

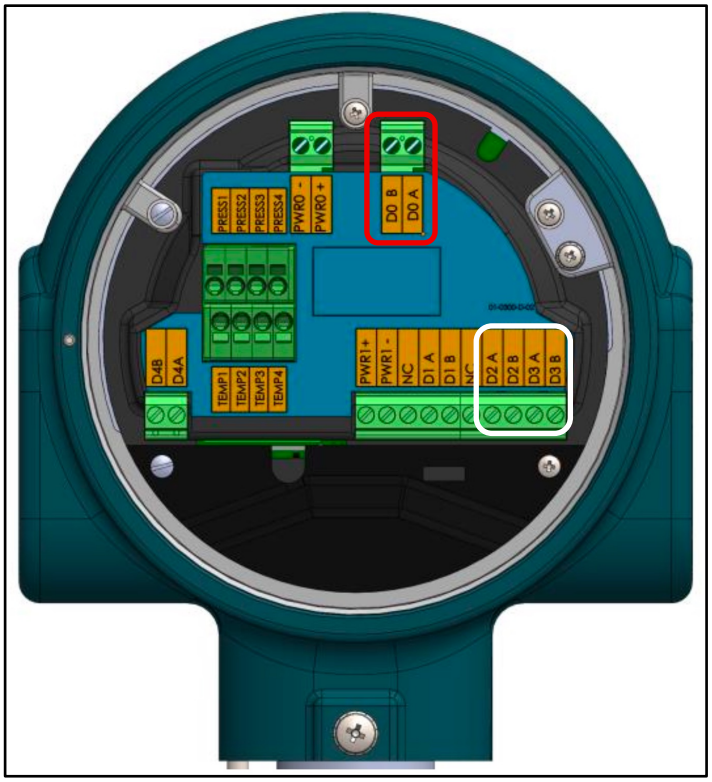


Figure 5 – TrueShot - Optional Dual RS-485 Board

It is recommended to use D0 A and D0 B (see red boxes in Figures 4 & 5) be used as this is the primary frequency output. There are two additional frequency outputs highlighted with a white box (D2 & D3). Under

Connecting the TrueShot™ UIM to a Honeywell EC-350

Written by John Lansing

Configuring the TrueShot UIM, in the following section, the example will show setting up the ACF/Pulse for D0. D0 A is the positive and D0 B is the negative input.

Figure 6 below shows the configuration screen for setting up the EC-350 for 10 ACF/Pulse (Meter Index Rate in red rectangle), and a totalizer set for 100 CCF (Cor Volume Units in green rectangle).

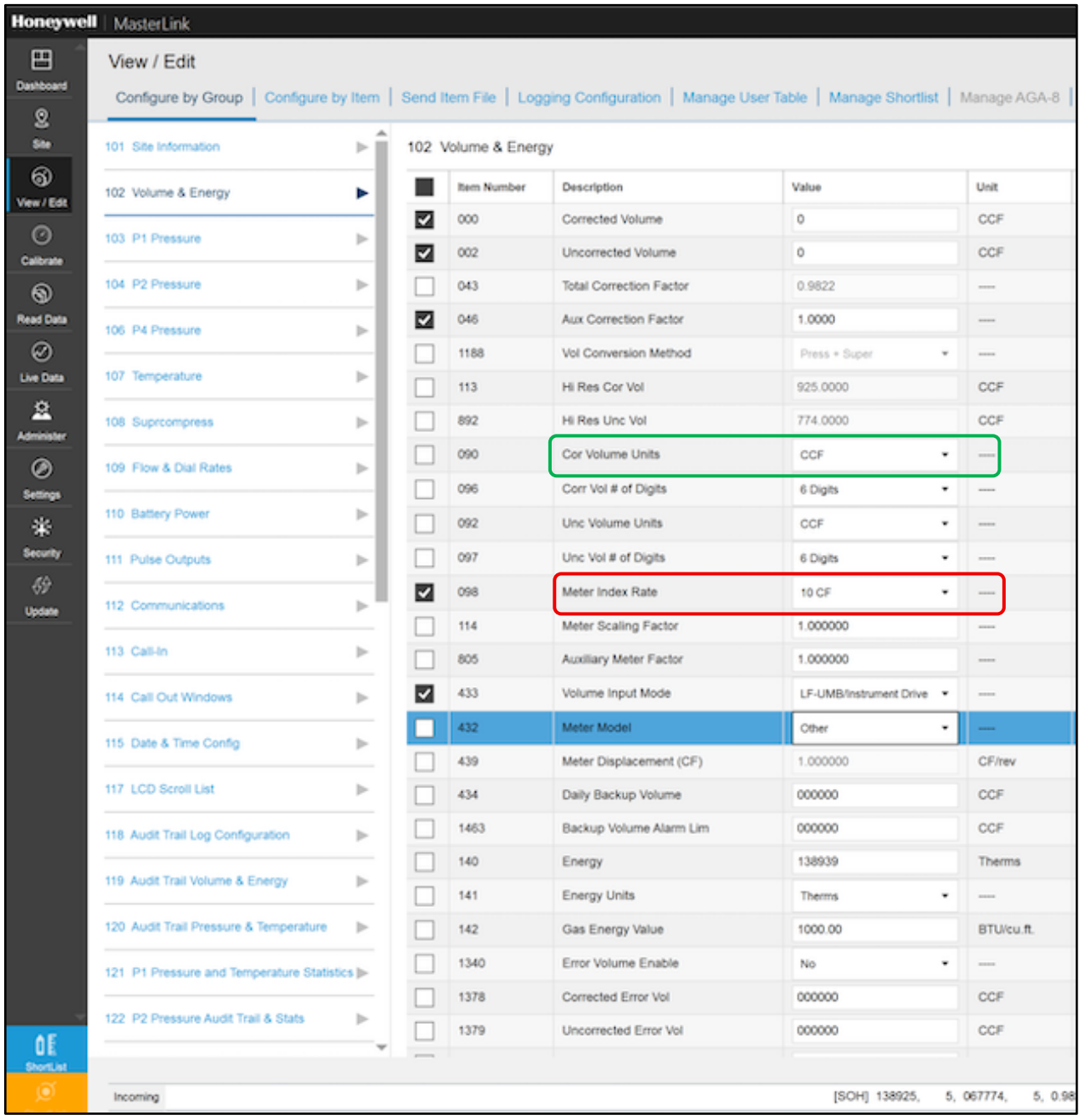


Figure 6 – EC-350 Configuration Screen

Note: The connection to the TrueShot is polarity sensitive. In Figures 4 & 5, D0 A is the positive input and D0 B is the negative connection. The output device is essentially a NPN transistor and will only conduct and provide the EC-350 with pulses if the positive of the EC-350 input (pins 2 & 4) is connected to D0 A.

Connecting the TrueShot™ UIM to a Honeywell EC-350

Written by John Lansing

The EC-350 provides the required voltage to have a small current during the time the TrueShot is generating the pulse.

Configuring the TrueShot UIM

Before configuring the TrueShot UIM for ACF/Pulse, TIM software [Ref 2] must be in the Superuser mode. Reference 2 is a link to download the latest version of TIM. Older versions may not support all the UIM features. In the upper right-hand corner of the software, click on the "Login" as shown in Figure 7. Once this is clicked, a dialog box will appear in the middle of TIM as shown in Figure 8. Click the "User" pull-down arrow below "Log in as" and select "Superuser" as shown in Figure 9. Then enter 2719 in the Password box. Click LOGIN (green rectangle) and the TIM will now be in Superuser mode. This is required to make any configuration changes. Additional details about TIM Software can be viewed in the Transus TIM Quickstart Manual, Version 1.8, [Ref 3] that is posted on the TMCO website.

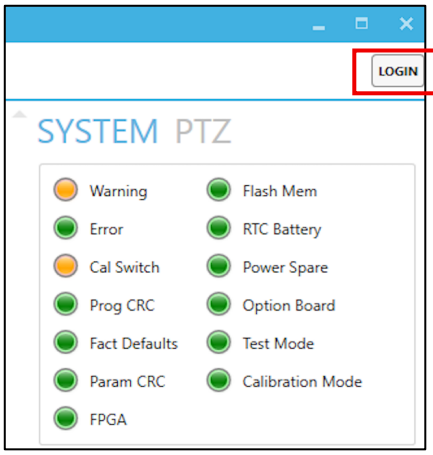


Figure 7 - Login

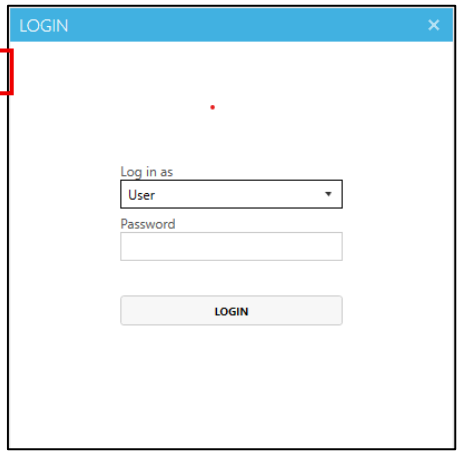


Figure 8 – Log in as

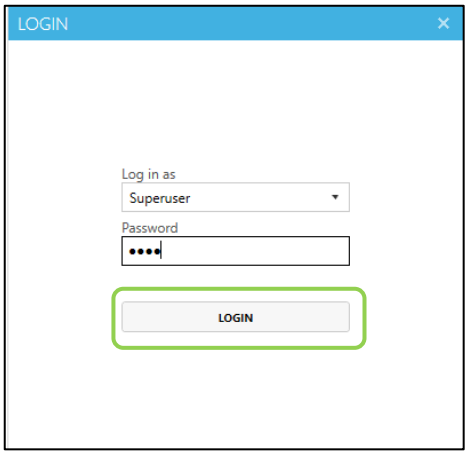


Figure 9 – Superuser Selected

Once the TIM software is in "Superuser" mode, it will be displayed in the lower right. TIM software will indicate Superuser mode in this tool bar regardless of which TIM menu has been selected. Figure 10 below shows TIM is connected to meter with a serial number of 240152 and the Access level" is now in Superuser.

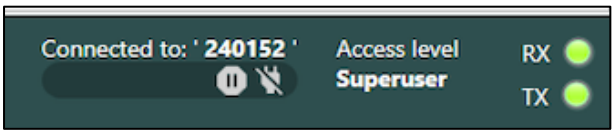


Figure 10 – TIM in Superuser Mode

The TrueShot meter's digital outputs (pulse / status) can be configured to provide a variety of different outputs. From the factory the meter is typically configured for Pulses/ACF. Figure 11 below shows a typical "OUTPUT D0" configuration for a 2" UIM 3.

"Output D0" (highlighted in red) is currently configured for forward flow only with a high frequency output. The setting in "Mode" (blue oval) is "FreqFlowFwd" is the factory default. This means the meter's D0 will output high frequency pulses (pulses/ACF).

In this example, the "Span" is set for 12000 ACFH (highlighted in the light blue band and green oval) and a full-scale frequency of 5000 Hz at the bottom ("Max Hz", highlighted with a orange rectangle). Thus, for this configuration, the meter will be generating 1500 pulses per ACF (displayed in the "Meter Factor" at the bottom of Figure 11 below the "Max Hz" value and highlighted with a black box).

Connecting the TrueShot™ UIM to a Honeywell EC-350

Written by John Lansing

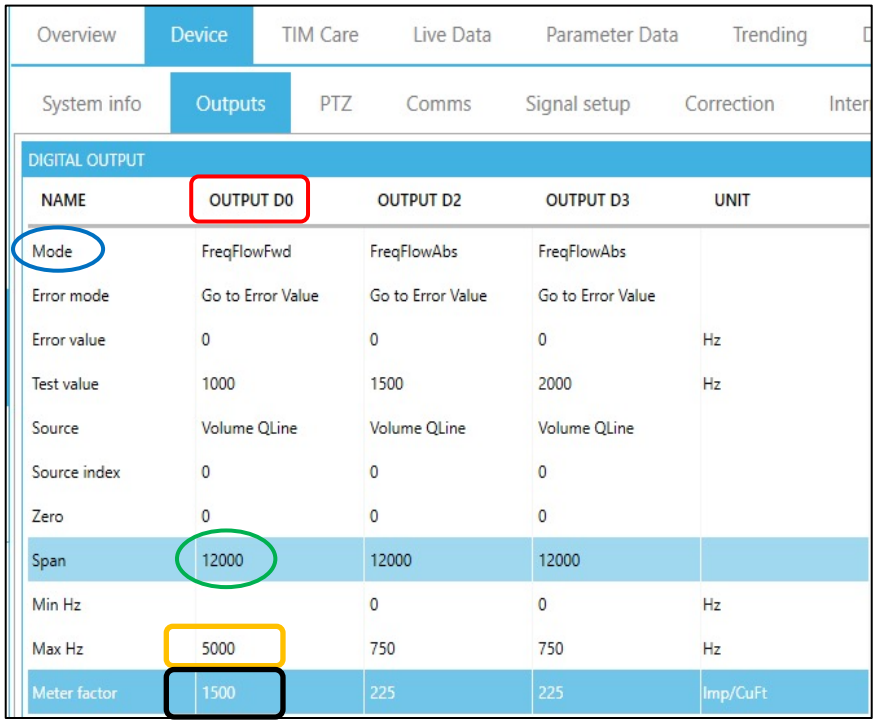


Figure 11 – Typical Defaults UIM Configuration for Pulses/ACF

The meter can also be configured for a low frequency pulse output in the form of ACF/Pulse. Typical settings for meters are 10, 100 and 1000 ACF/Pulse. The choice of ACF/Pulse depends on meter flow rate capacity. To configure the TrueShot for ACF/Pulse, select the pull-down menu by clicking on the "FreqFlowFwd" down arrow on the right as shown in Figure 12 below (red rectangle).

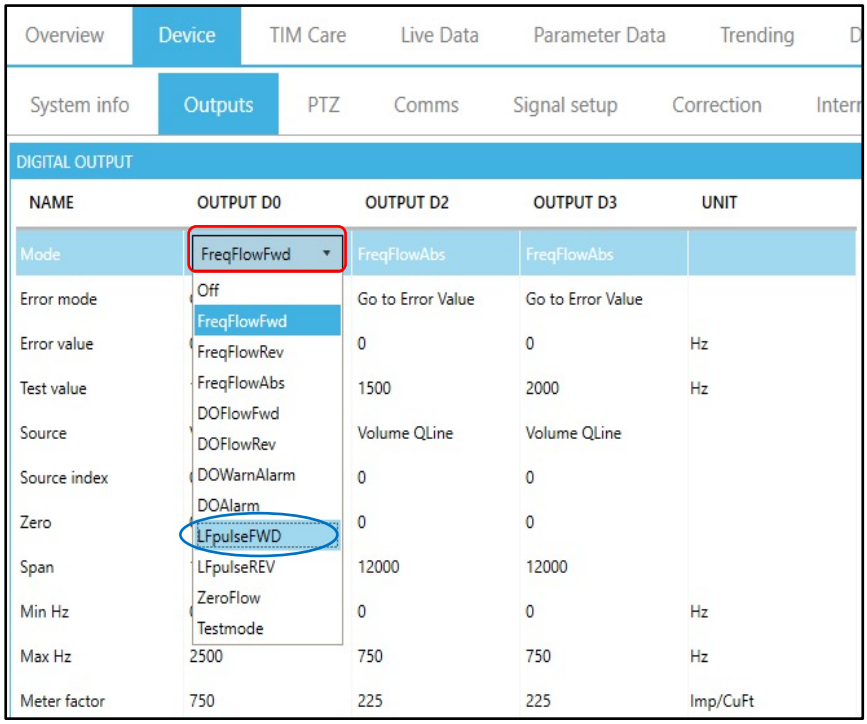
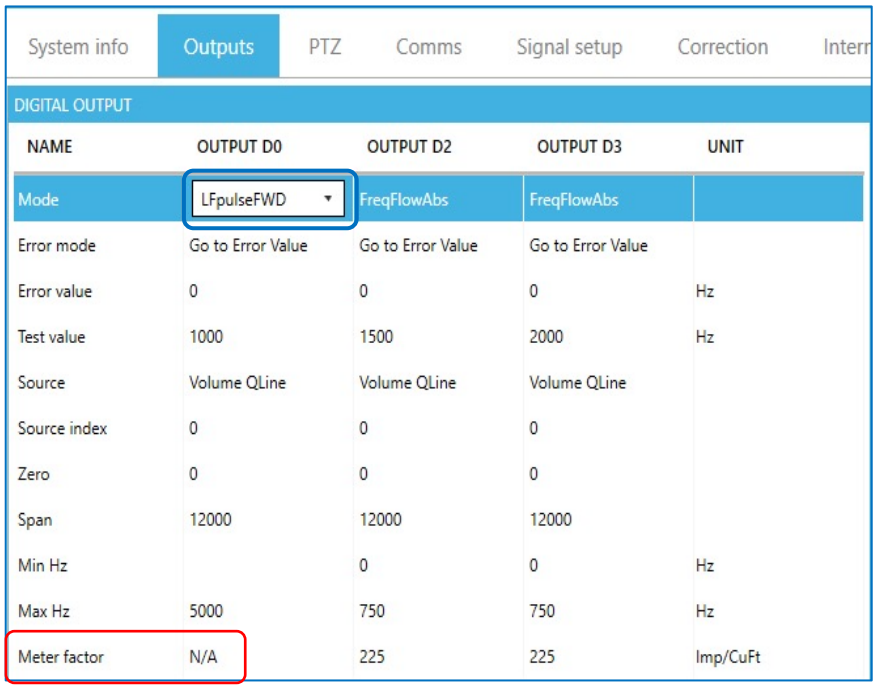


Figure 12 – Selecting D0 Output Functionality

After clicking on the “FreqFlowFwd” (red rectangle in the previous image), a variety of selections will be presented. The TrueShot can be configured for low frequency (ACF/Pulse) in the forward flow direction (LFpulseFWD), or reverse flow direction (LFpulseREV). Selecting LFpulseFWD (blue oval in Figure 12 & blue rectangle in Figure 13) will tell the meter to provide a short duration pulse after a specified number of actual cubic feet has been measured.

Once this is selected, the multiple D0 selections in dialog box will disappear, and the “OUTPUT D0” dialog box will look like Figure 13 below. Note that there is no “Meter Factor” (it now says N/A) as shown in the red rectangle box.



NAME	OUTPUT D0	OUTPUT D2	OUTPUT D3	UNIT
Mode	LFpulseFWD	FreqFlowAbs	FreqFlowAbs	
Error mode	Go to Error Value	Go to Error Value	Go to Error Value	
Error value	0	0	0	Hz
Test value	1000	1500	2000	Hz
Source	Volume QLine	Volume QLine	Volume QLine	
Source index	0	0	0	
Zero	0	0	0	
Span	12000	12000	12000	
Min Hz		0	0	Hz
Max Hz	5000	750	750	Hz
Meter factor	N/A	225	225	Imp/CuFt

Figure 13 – D0 Configuration for Forward Flow in ACF/Pulse (LFpulseFWD)

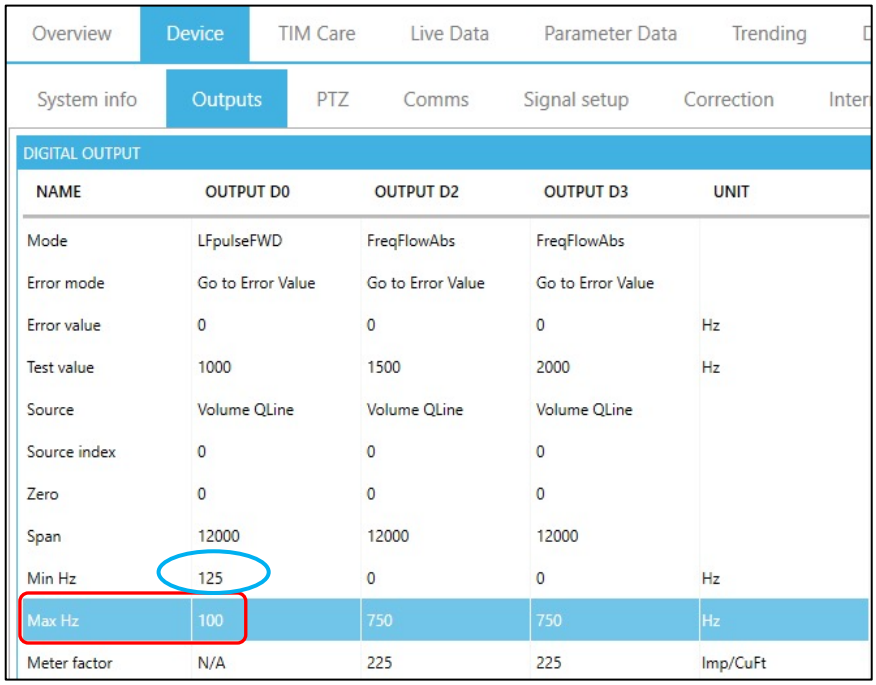
Once the “LFpulseFWD” has been selected, the meter firmware switches from a high-frequency output to low-frequency pulses. However, two more changes must be made. First, the meter needs to know how many ACF is to be measured for each pulse. This is a configurable value and can be anything from 0.1 to more than 1000 ACF.

The setting in the “Max Hz” is used for determining the number of ACF per pulse and needs to be re-configured. Its functionality has now been changed to provide the correct settings for ACF/Pulse. The actual value to enter, by editing “Max Hz”, is 10 times the desired setting. In other words, if the desired output is 10 ACF/Pulse, then a value of 100 must be entered. If the output is desired to be 100 ACF/Pulse, then 1000 must be entered. Likewise, if the meter is to provide a pulse every 1,000 ACF, then enter 10,000. To edit simply click on the number and a dialog box will appear allowing entering the desired value.

Figure 14 shows the settings required for 10 ACF/Pulse (red rectangle).

Connecting the TrueShot™ UIM to a Honeywell EC-350

Written by John Lansing



NAME	OUTPUT D0	OUTPUT D2	OUTPUT D3	UNIT
Mode	LFpulseFWD	FreqFlowAbs	FreqFlowAbs	
Error mode	Go to Error Value	Go to Error Value	Go to Error Value	
Error value	0	0	0	Hz
Test value	1000	1500	2000	Hz
Source	Volume QLine	Volume QLine	Volume QLine	
Source index	0	0	0	
Zero	0	0	0	
Span	12000	12000	12000	
Min Hz	125	0	0	Hz
Max Hz	100	750	750	Hz
Meter factor	N/A	225	225	Imp/CuFt

Figure 14 – Settings for 10 ACF/Pulse

The second parameter that needs adjusting is the pulse width (how long the UIM's output will be in conducting mode). This is configured in the "Min Hz" dialog (see blue oval). For this example, 125 has been entered which represents 125 milliseconds of "on time". The value in the "Min Hz" parameter is in milliseconds (0.001 second increments). The EC-350 requires a pulse width of 125 milliseconds to ensure the pulse is counted. Too short of a pulse width may cause the EVC to miss pulses.

Depending upon meter size (maximum flow rate capacity), and the desired ACF/Pulse, it is possible to generate too many pulses in a second, and thus the meter's output will not permit sufficient time to go to zero flowing current. When this happens the EVC will not count pulses.

The following table (Figure 15) recommends UIM settings for the ACF/Pulse, based upon UIM line size, so that the meter won't "over-run" the pulse output, thus causing the EC-350 to not count correctly.

	Flow Information	UIM Set for 10 ACF/Pulse	UIM Set for 100 ACF/Pulse	UIM Set for 1000 ACF/Pulse
Line Size	**ACF per Second at full scale**	**Seconds per Pulse when at full scale**	**Seconds per Pulsewhen at full scale**	**Seconds per Pulse when at full scale**
2	2.778	3.6	36	360
3	6.250	1.6	16	160
4	10.000	1	10	100
6	25.000	Not Recommended	4	40
8	40.000	Not Recommended	2.5	25
10	62.500	Not Recommended	Not Recommended	16
12	100.000	Not Recommended	Not Recommended	10

Figure 15 – Settings for ACF/Pulse

The column labeled "UIM Set for 10 ACF/Pulse" provides recommendations for meter line sizes 2"-4" (10 ACF/Pulse). The ACF per second in each of the 3 columns is based on the meter's maximum flow rate of

about 125% of the expected normal operating range. This will keep the output from "over-running" the pulse input to the EC-350. For the 4" meter, if more time between pulses is desired, then configure the meter for 100 ACF/Pulse (enter 1000 for the "Max Hz"). Typically for line sizes 4-8, setting the "Max Hz" to 1000 (which generates a pulse every 100 ACF) is a conservative setting. For meters larger than 8", the "Max Hz" should be set for 10000 to generate a pulse every 1,000 ACF.

The following Figure 16 shows an example of the pulse output from the TrueShot with a "Min Hz" pulse duration set of 125 milliseconds (0.125 sec.). The "off time" (non-conducting time) should be at least a second to ensure that too many pulses are not generated too quickly. This graph is not to scale.

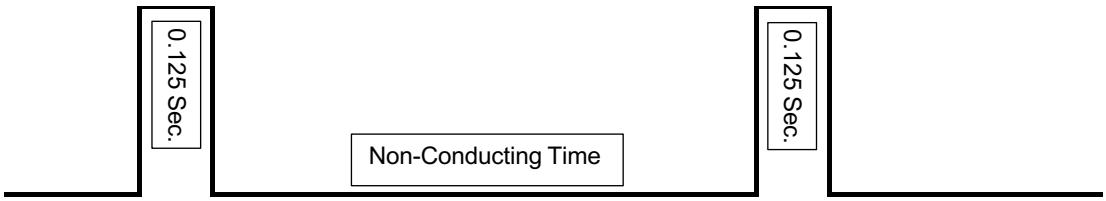


Figure 16 – Example of the TrueShot UIM Pulse Output (not to scale)

Important Note: Remember, after all the UIM parameters are changed, they must be written to the meter. If this step isn't done, the meter will revert to the previous configuration if power is lost, or if is forced to reboot. Figure 17 shows the location for the "Save Changes in Device" tab and Figure 18 the "Save Parameters to File". They are both available on the "Device" tab and "System Info" screens.

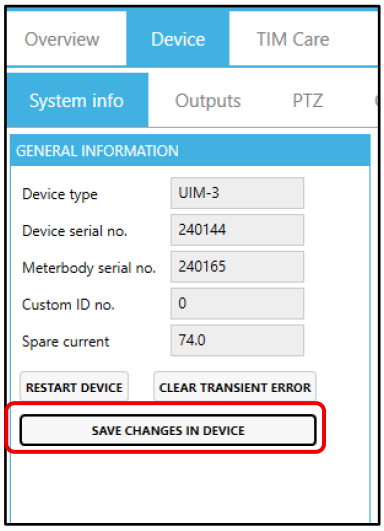


Figure 17 – Save Changes in Device

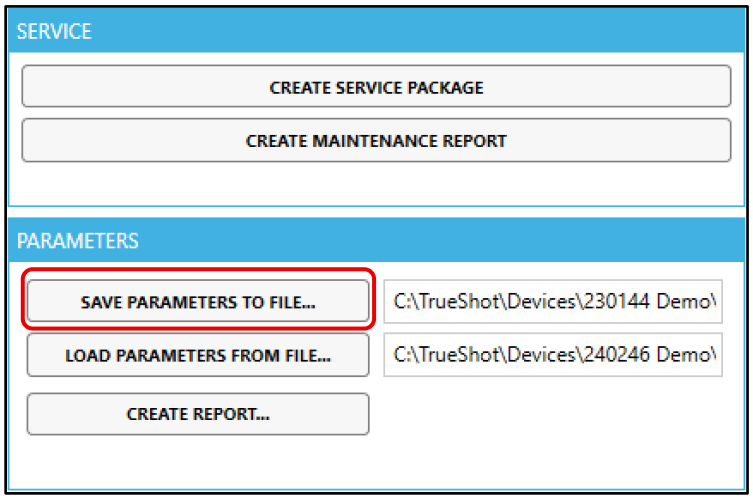


Figure 18 - Save Parameters to File

Conclusions

Configuring the TrueShot UIM, regardless of the number of paths, is the same. Making sure the pulse output doesn't generate too many pulses between conducting and non-conducting is very important. Figure 15 provides suggested settings based on meter line size and a flow rate of about 125 FPS (most clients limit their meter to 100 FPS during the design phase). Even if the meter generated 2 pulses per second, the EC-350 will be able to count them as there would be approximately 375 milliseconds of "off time".

References

1. Honeywell EC-350 User Manual, FD-583 | V1.7 | 2025
2. Transus TIM Software, Version 1.4.8
   https://tmcousa.com/wp-content/uploads/2025/06/Transus_2025_05_23_11_49_51_1.4.8.258_r171.msi_.zip
3. Transus TIM Quickstart Manual, https://tmcousa.com/resources/literatures-downloads/