FLUKE®
Biomedical

Setting VT305 triggers: adjusting start and stop trigger points

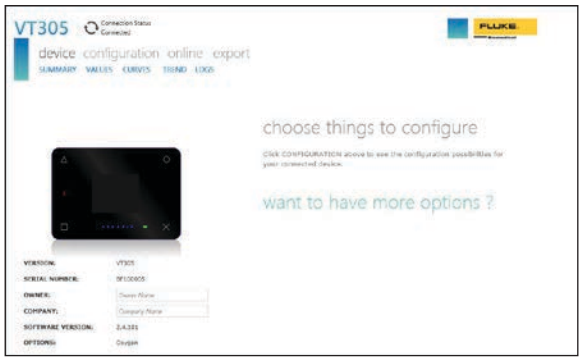
Application Note

While the VT305 Gas Flow Analyzer's default/factory settings for triggers and start and stop triggering-points work for the vast majority of ventilator testing situations, you may run into times where the start and stop triggering points need to be adjusted. When you run into one of these situations, the following step-by-step process may be helpful to you.

Begin by reviewing the VT305 Operator's Manual section on configuring the VT305. Adjusting trigger start and stop points requires setting up a different configuration file, which will be installed into and used by the VT305 during its next power-up after the new configuration file has been saved to the micro-SD card.

Note: if you have more than one VT305, the configuration file must be saved to the micro-SD card that will be used with that unit.

Connect your computer to the Fluke Biomedical VT305 and launch the browser-displayed configurator.



Once connected, select 'Configuration' and then select 'Triggers' and the specific trigger you intend to adjust (e.g., Adult, Pediatric or High Frequency).

In the illustration above, note that on the left side of the particular trigger several values can be selected:

- Trigger Source
- Start Signal: Pressure (P) can be the start signal when the ventilator is in pressure mode, but Flow (F) can also be selected when the ventilator is in volume mode.

By Jerry Zion, Product Manager

- Start Level: the start level value is 1 but other levels can be entered
- Start Delay: the start delay is 60
- End Signal: the end signal is Flow (F), expiratory flow
- End Level: the end level is –1 because expiratory flow will occur below the zero baseline
- End Delay: the end delay is 60

When you set a trigger for the first time, it is important to know the curve of the signal for the trigger (flow or pressure).

Proper trigger set up for a downstream flow curve

Illustration A shows an example of how to properly set a trigger for the flow curve downstream of the Y-piece. The standard triggers (> 3 l/min/ < –3 l/min) can be used without a problem.

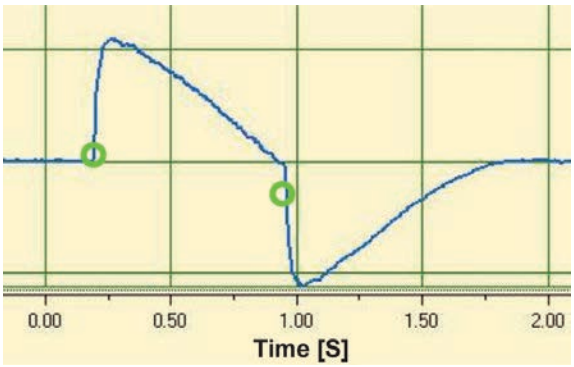


Illustration A.

It is important to keep in mind that the start trigger point needs to be significantly higher than the noise of the base line. Incorrect triggers can occur especially if the noise becomes larger.

Example of faulty trigger set up

Here's an example of faulty trigger set up in the flow curve upstream of the Y piece. The curve in Illustration B shows the flow curve in the inspiration-side breathing tubes, upstream of the Y-piece. The first two circles show the triggers that must be used here. The top figure shows a small incorrect signal at the measurement point after the inspiration. This is caused by switching the valves, which results in faulty triggering.

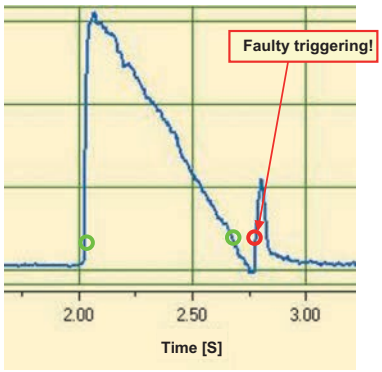


Illustration B.

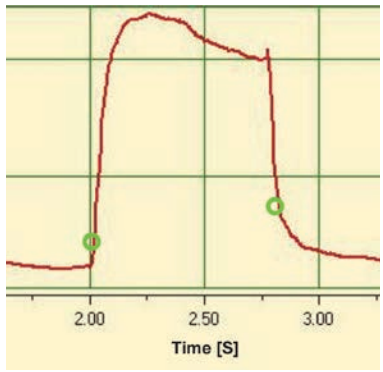


Illustration C.

Flow cannot be used in the above example as a trigger. The pressure curve must be used. Illustration C shows the solution for faulty trigger set up in the pressure curve. For the pressure curve shown in the second illustration above, the standard triggers for Pressure can be used: (> 1 mbar / < 1 mbar).

Note: It bears repeating that the trigger needs to be significantly higher than the noise of the base line. If not, the trigger value must be increased to avoid triggering on the noise.

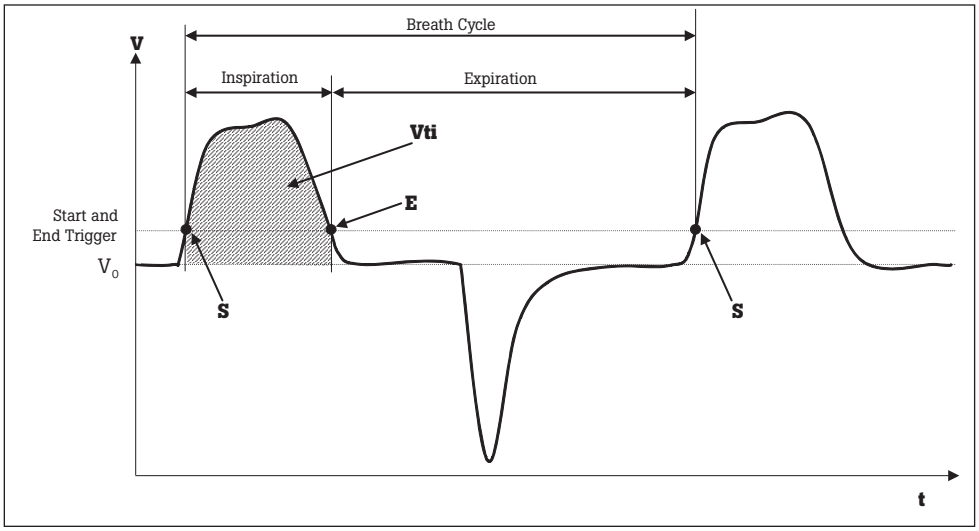
Special cases

In measurement technology a standard deviation can be applied to get a more accurate result. You can get very accurate results with the settings shown in this manual. Measurement errors inherent in the overall system occur in the respiratory apparatus and in the VT305. The values shown in the display can be different because a different parameter was measured and compared.

Inspiration volume Vti

If the breath curve shows a plateau or a break, a tiny flow can be measured during this time. Some respiratory devices do not include these tiny flows when calculating Vti. You can prevent this in the VT305 by using the following trigger settings: Vti and Vte.

Inspiration Volume Vti



Expiration Volume Vte

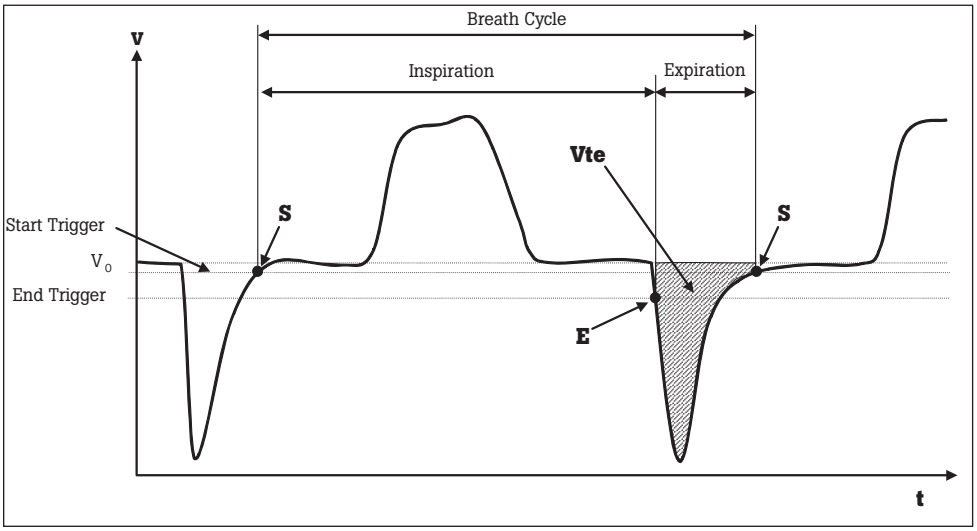


Illustration D.

In Illustration D, S refers to the start trigger, and E the end trigger.

The start trigger must be set to S and the end trigger to E.

You may have to experiment a little, so get all items ready for testing including the respiratory device to test, your VT305 and your computer.

Once you have adjusted the triggers, the new configuration file is automatically and immediately saved to the micro-SD card for your VT305. Check your other settings (e.g., gas type, standard, trigger and timing) and then you're ready to make measurements.

In summary, to adjust triggers you will need your VT305, your computer and some knowledge of the curve of the signal for the trigger (flow or pressure). With a little experimentation and practice, you will be able to adjust the triggering points for any respiratory device that delivers a breath-by-breath volume of gas. Your VT305 will count the breath rate, calculate inspiratory and expiratory time, and I:E ratio resulting in properly integrated flow, and accurate inspiratory and expiratory tidal volumes.

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- UL, CSA, ETL Certified, where required
- NRC Compliant, where required

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