

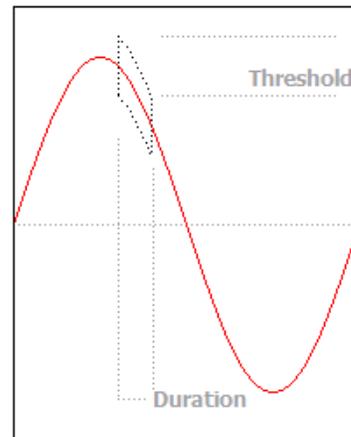
Dranetz HDPQ Waveshape Triggering and Distorted Loads

INTRODUCTION

Certain loads with high harmonics or electronic switching content can distort the voltage waveforms. Such waveform distortion can include harmonics, inter-harmonics, voltage fluctuations, and/or electronic notching from SCR switching loads.

The ability to capture changes in the Voltage (V) and Current (I) waveshapes and V & I transients are a powerful feature of the Dranetz HDPQ family of instruments and are unique to Dranetz products. However, when monitoring distorted loads, the instruments can continually trigger when not properly configured, resulting in large data files with hundreds or thousands of Waveshape events.

This TechTip describes how the Dranetz Waveshape trigger methods work and how to best set up the Dranetz HDPQ instruments to monitor distorted loads.



DRANETZ WAVESHAPES TRIGGER METHODS

Most Dranetz products, including the Dranetz HDPQ family, have two waveshape trigger methods - Waveshape Difference Trigger and RMS Deviation Trigger. They are similar, and both compare the present V or I (50/60Hz) waveshape recorded to the previous waveshape, and trigger on the difference between them. However, they use different triggering methods.

The Waveshape Trigger method breaks the present 50/60Hz cycle into smaller windows in time and compares each window to the same part of the previous cycle.

The RMS Deviation Trigger uses the entire cycle and does a sample by sample subtraction of the previous 50/60Hz cycle from the present waveshape. Since the waveshape difference trigger is used more often we'll focus on it here.

Being the most common waveshape trigger method used, this TechTip describes how the Dranetz Waveshape Difference trigger functions and how to best set up the instruments for your application.

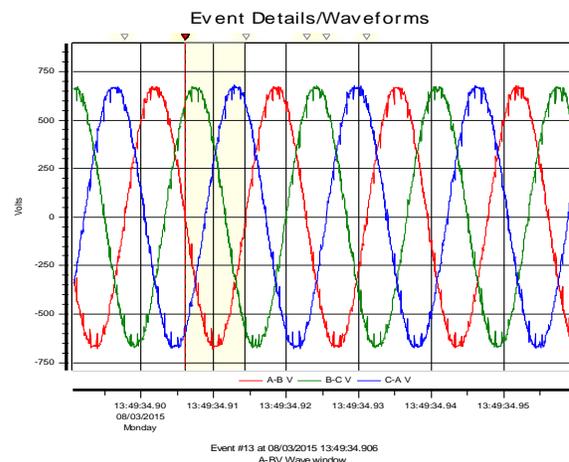
HOW THE WAVESHAPES DIFFERENCE TRIGGER WORKS

The Waveshape Difference trigger uses a "floating window" algorithm for waveshape fault detection. This window can be visualized as sliding along a waveform, precisely one cycle behind the present waveshape - See the figure below.

This method breaks down the AC waveform being measured into user-defined windows of time (see above) that represents a percentage of the overall waveform. Each window is compared to the same window in time in the previous waveform, and if the difference exceeds the user's limits, an event is recorded. In the figure above, the duration (width of the window) is 10% (1.67ms @60Hz), which means the waveform is broken down into 10 consecutive windows, with each representing 10% of the overall waveform. If the duration were 50%, the waveform would be broken down into 2 windows, with each representing 50% (8.3ms) of the overall waveform.

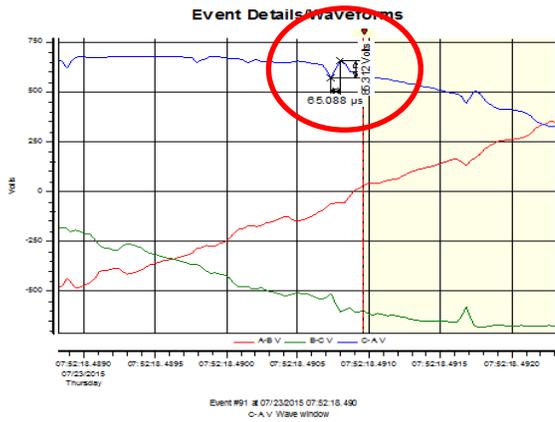
WAVESHAPES TRIGGER EXAMPLE

The figure below shows distorted voltage waveforms in our Dran-View 7 software that were recorded by a Dranetz HDPQ instrument with numerous waveshape event triggers.



- #10769 06/17/2015 01:57:42.485 CV Wave window
- #10770 06/17/2015 01:57:43.084 AV Wave window
- #10771 06/17/2015 01:57:43.084 BV Wave window
- #10772 06/17/2015 01:57:43.084 CV Wave window
- #10773 06/17/2015 01:57:43.092 AV Wave window
- #10774 06/17/2015 01:57:43.092 BV Wave window
- #10775 06/17/2015 01:57:43.092 CV Wave window
- #10776 06/17/2015 01:57:43.101 AV Wave window
- #10777 06/17/2015 01:57:43.101 CV Wave window

By using Dran-View 7 you can zoom in on the actual triggered data - See the vertical trigger line in the figure below. It illustrates the amount of distortion shown by using Dran-View's delta X, Y change feature. Notice the value of 66.3Vpk-pk. This voltage value exceeds the Waveshape magnitude threshold and is just one instance where the default setting threshold was exceeded in this file.

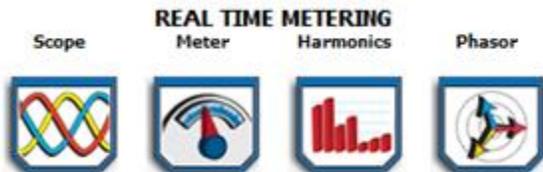


Below are the Wave Window threshold settings as shown in Dran-View's Instrument Configuration menu - The Wave Window Magnitude threshold of 48.0 vpk is being continually triggered by the 66.3 vpk voltage change.

WAVE Window Mag: 48.0 48.0 48.0 0.00
WAVE Window Dur: 10.0 10.0 10.0 0.00

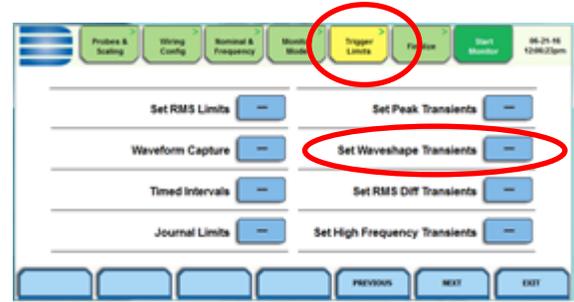
IDENTIFYING BEFORE MONITORING

It's important to properly adjust the instrument settings *before* placing the Dranetz HDPQ into service to avoid continual Waveshape triggering. Users can identify the correct waveshape magnitude settings by using the Real Time Scope mode located on the Dranetz HDPQ's Home screen.

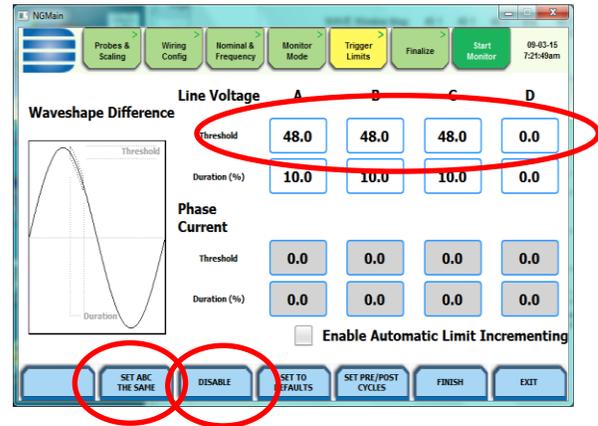


If the voltage waveforms exhibit significant distortion, it is recommended to disable the Waveshape triggers if they are not needed, or to increase the Waveshape Magnitude thresholds. *If the waveforms look normal with clean sinusoidal voltage waveforms, then the default setting can be used.*

DRANETZ HDPQ WAVESHAPe TRIGGER SETUP ADJUSTMENTS
 Step through the HDPQ Wizard setup to the Trigger Limits tab and select "Set Waveshape Transients" to change the Magnitude Limits.



Adjust the Waveshape Threshold magnitudes by increasing the threshold. You can set all three individually or use the Set ABC the SAME button at the bottom.



The user can also disable the Waveshape trigger if these events are not needed by pressing the Disable button at the bottom.

TO CONTACT DRANETZ

- Call 1-800-372-6832 (US and Canada) or 1-732-287-3680 for Technical or Sales support
- To submit a support request online, please visit: <http://www.dranetz.com/contact-us-2/technical-support-request/>