TECH NOTE :: ClipX Peak value monitoring of a periodic process

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Brief description

In this application note the peak value monitoring of a periodic signal, e.g. force curve of a high speed press (e.g. coin press or tablet press) with a ClipX.
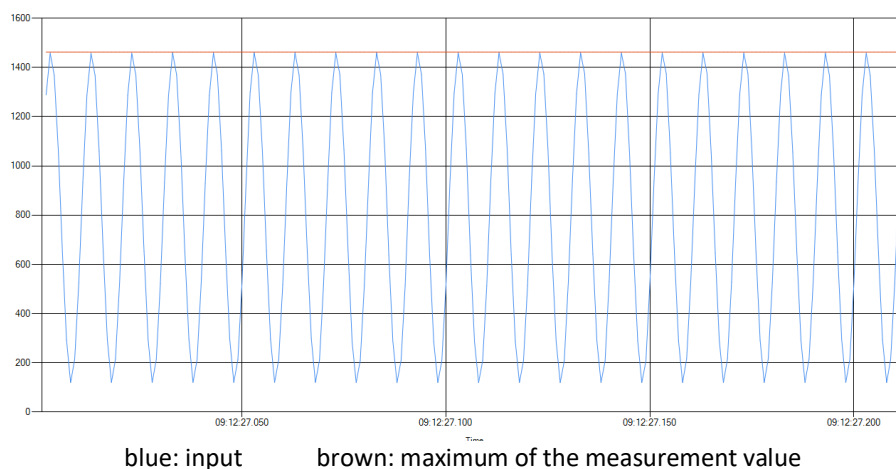
Three methods are shown:

1. The first method captures, monitors and periodically resets the maximum value.

   Usable up to 999.9Hz

   blue: input   brown: maximum of the measurement value
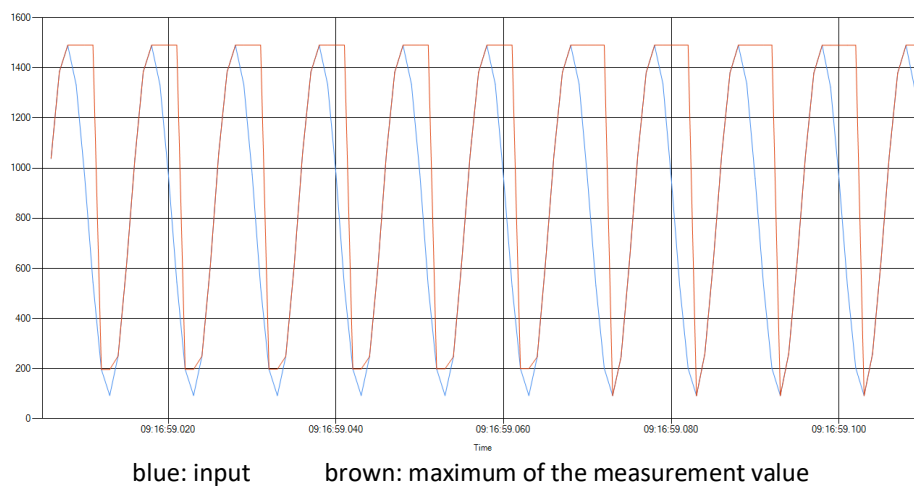
2. The second method holds the maximum cyclically (capture and hold) so that the maximum of the last period is shown.

   Usable up to 999.9Hz

   blue: input   brown: maximum of the measurement value

3. The third method uses a tolerance window to capture the maximum value periodically and holds it for one period.

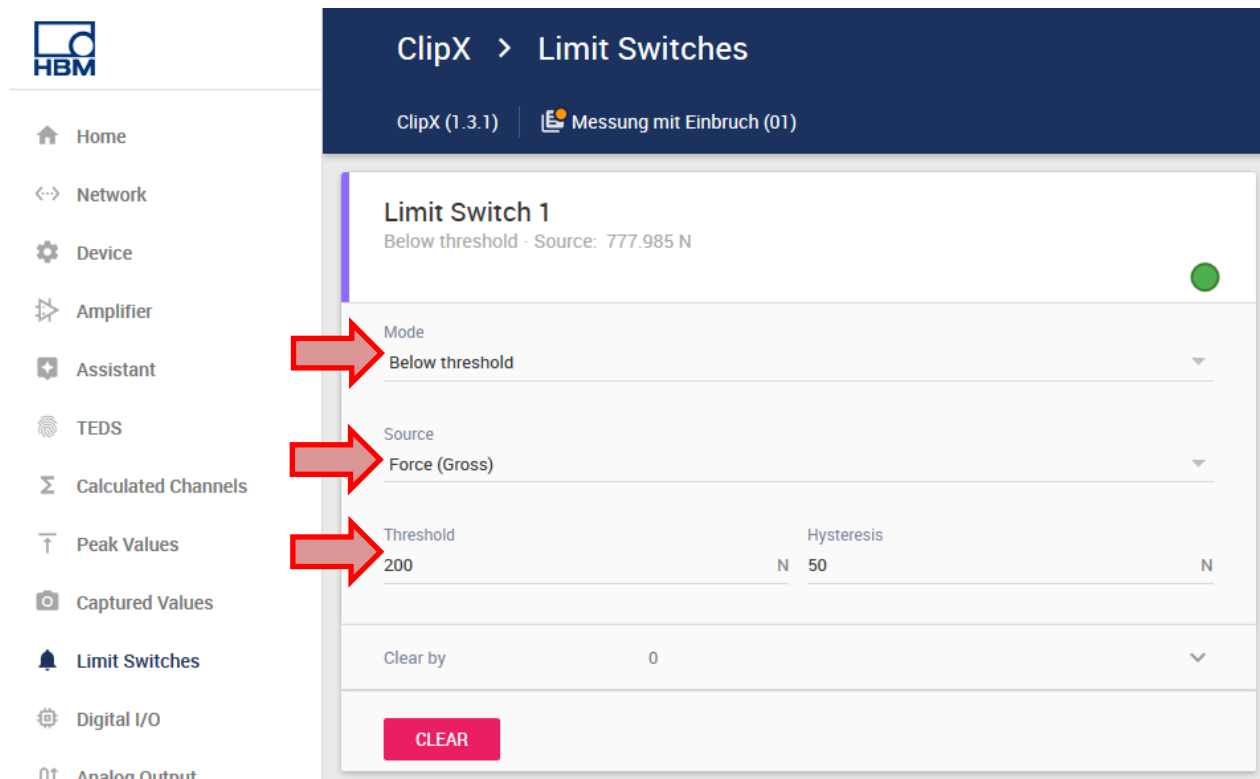   Useable up to 100Hz (Inaccuracies may occur at higher frequencies)

blue: input   brown: maximum of the measurement value
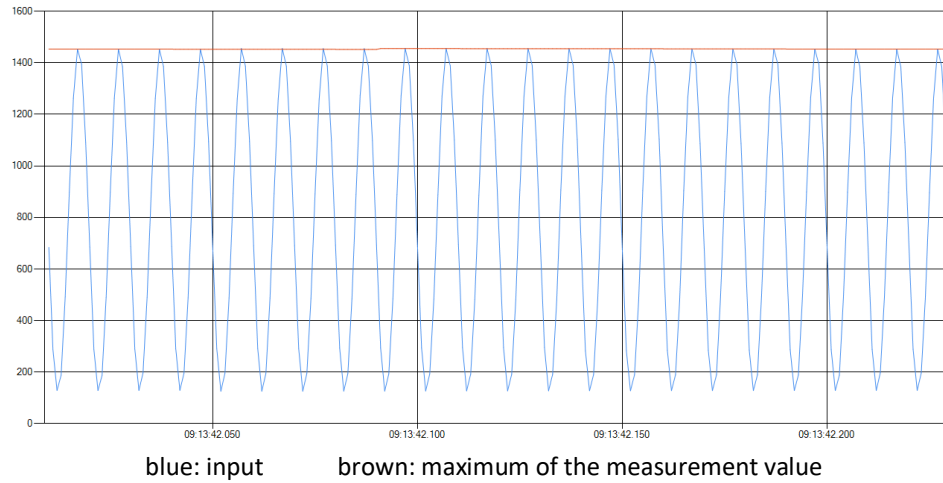
Hint: With each method a signal can be output via fieldbus or the digital output, if the maximum value exceeds a certain limit.

Operation

1. Method – Capturing and monitoring with periodically deletion

At first a limit switch is set which resets the maximum value periodically
- Switch to the menu item 'Limit Switches'
- Choose "Below threshold" as mode and the gross force signal as source
- The threshold should be set low to hold the maximum value for a longer time
- To avoid the activation of the limit switch by noise add a hysteresis
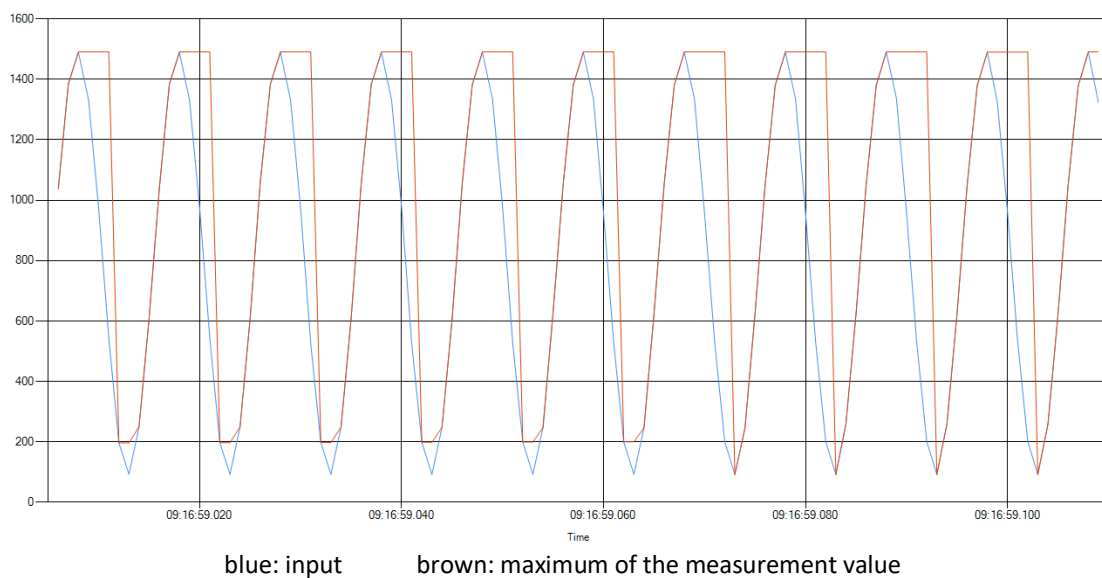
Switch to the menu item 'Peak Values'.

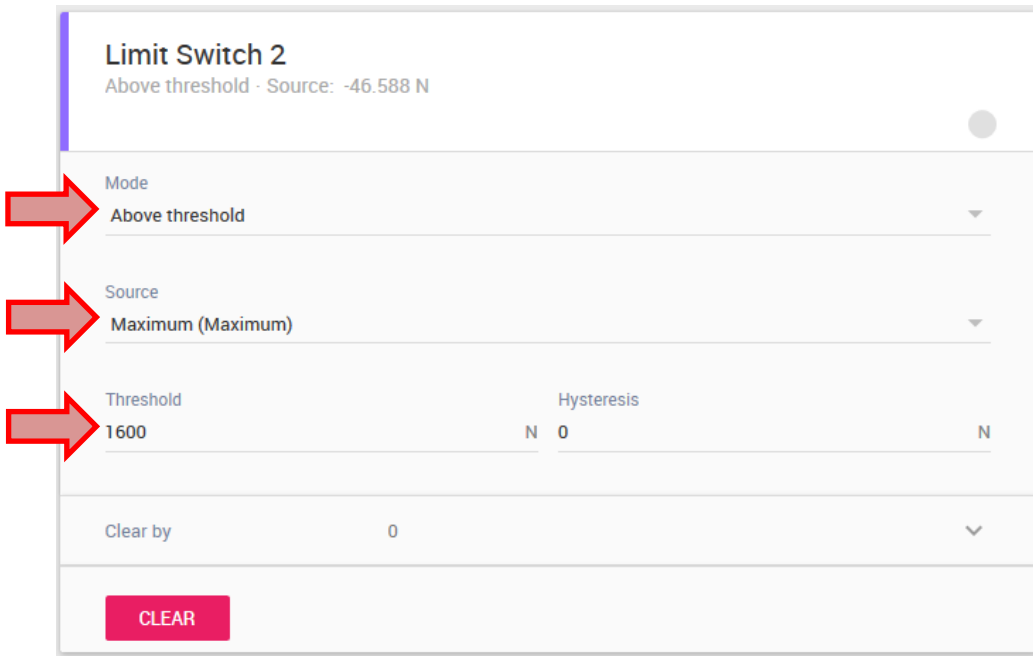At 'Source' the gross signal and at 'Clear by' the created limit switch is set:
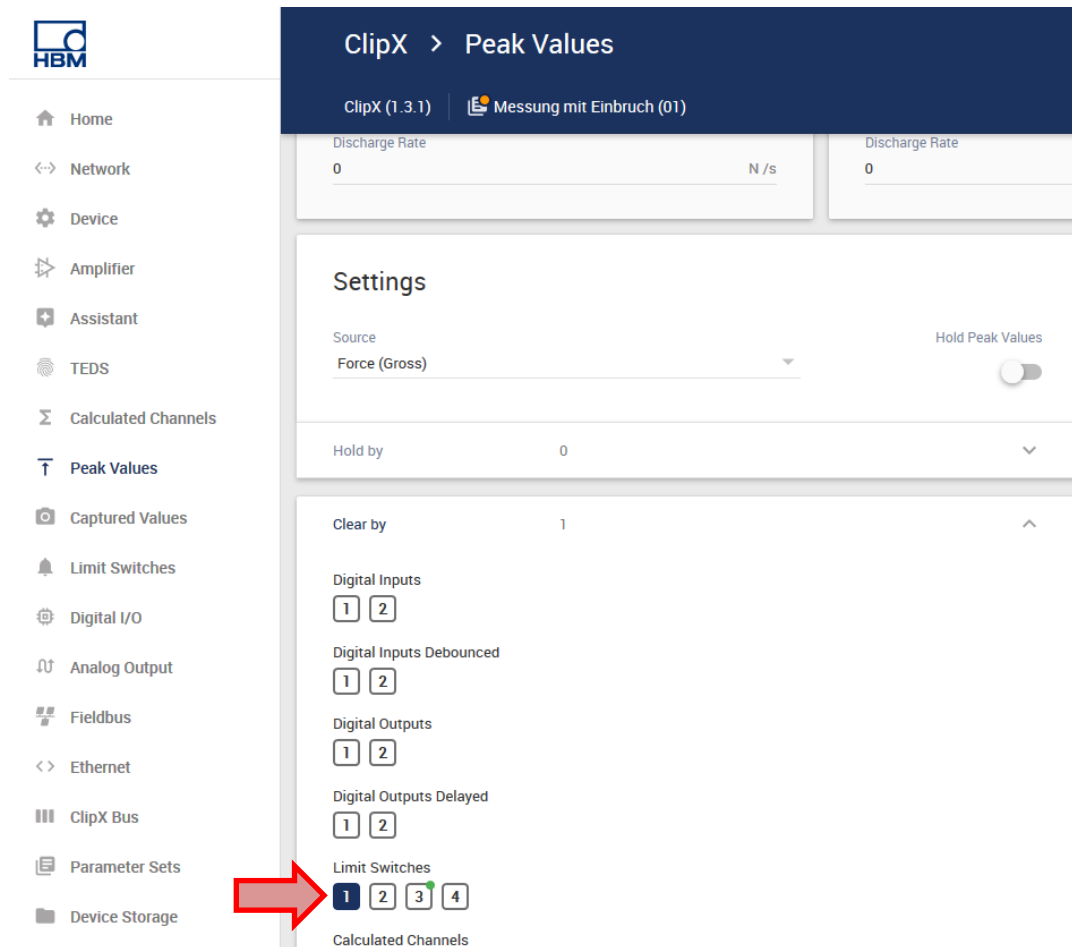
The measurement of the force and the maximum value with the ClipX Dataviewer 2 tool with a period duration of 10ms (100Hz) looks like this:

blue: input   brown: maximum of the measurement value

Now there is the possibility to create another limit switch to monitor the maximum force. The limit switch can output a signal if the maximum permissible load is exceed.

Therefor switch to the menu item 'Limit Switches'.
- Choose "Above threshold' as mode and 'Maximum (Maximum)' as source
- At 'Threshold' the maximum permissible load is entered
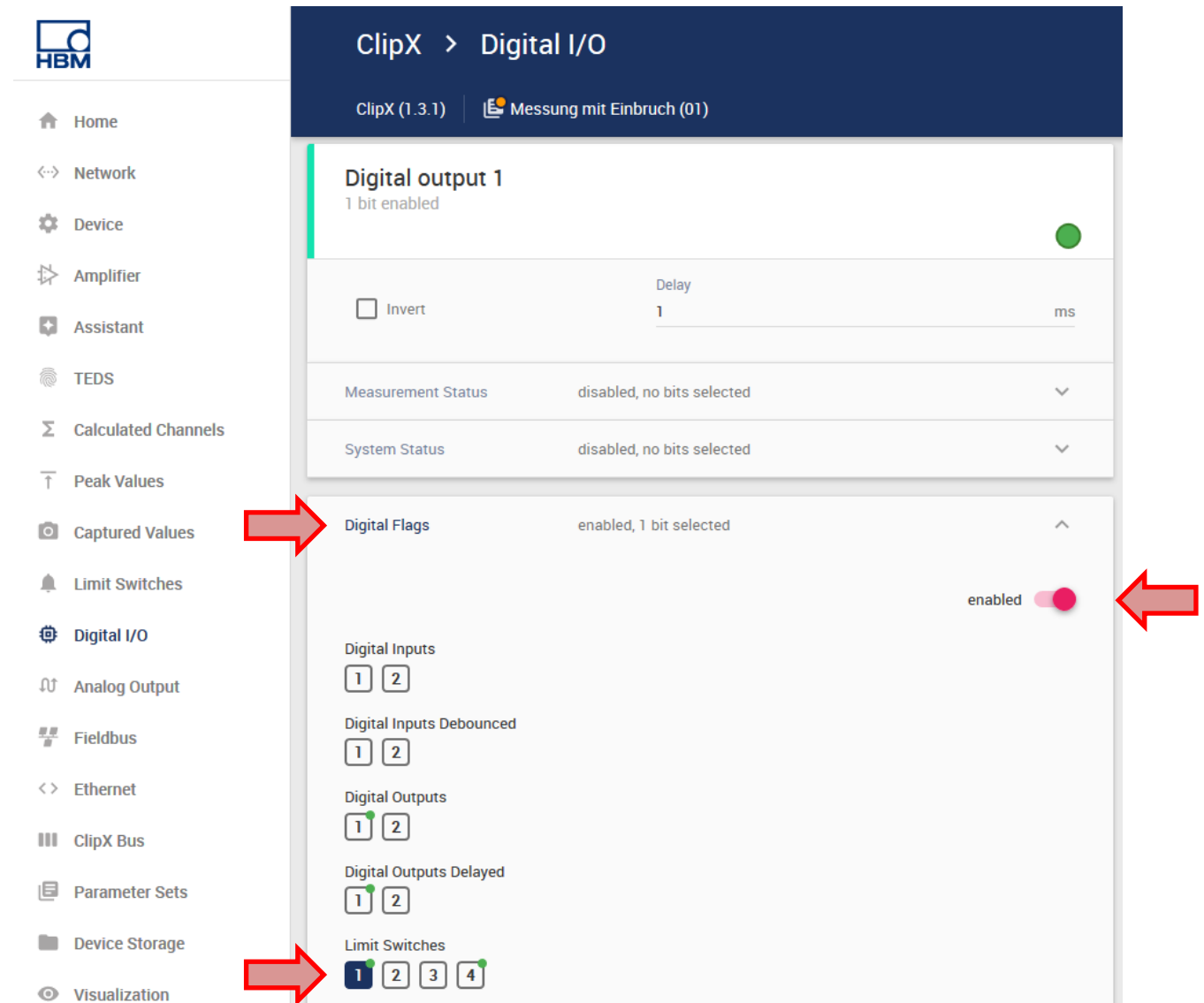

The flag of the limit switch can be transmitted via fieldbus or the digital output.

2. Method – Capturing, monitoring and holding the maximum value

Now the maximum value is hold until the end of the period.
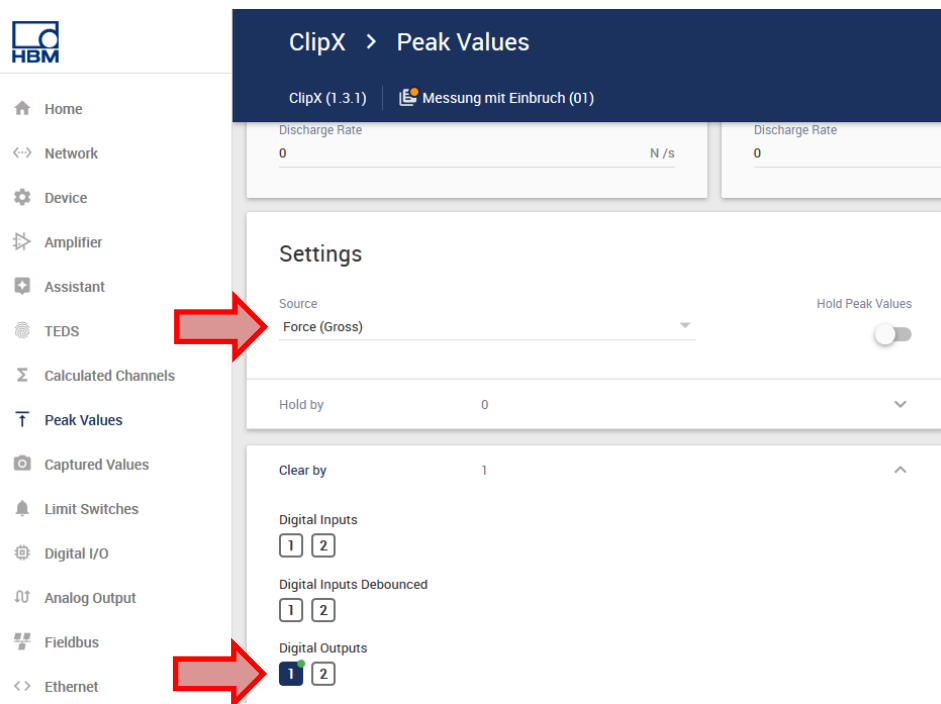Therefor the same limit switch as in the first method is needed (see page 2).

After that the limit switch is linked to a digital output:
- Switch to 'Digital I/O'
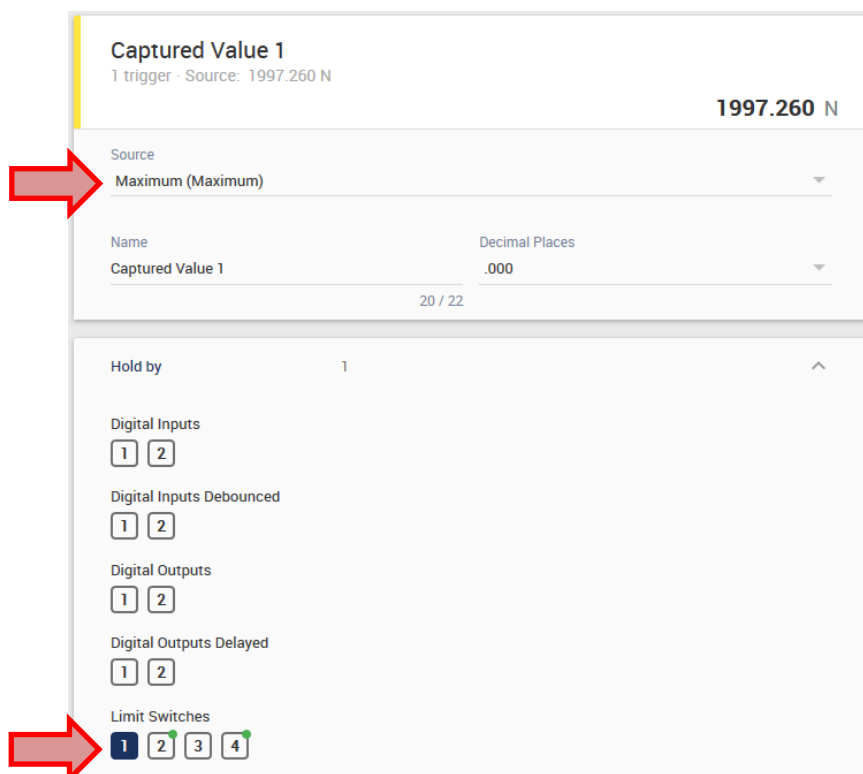- At 'Digital Flags' link the created limit switch and set it enabled

In the menu item 'Peak Values' the gross signal is set as source and at 'Clear by' the digital output is selected:


So that the maximum value is not periodically reset (as in the first procedure), the maximum value is held in the "Captured Values" menu.

Switch to the mentioned menu and set 'Maximum (Maximum)' as source and activate the limit switch at 'Hold by':

The measurement of the force and the maximum value with the ClipX Dataviewer 2 tool with a period duration of 10ms (100Hz) looks like this:

blue: input   brown: maximum of the measured value
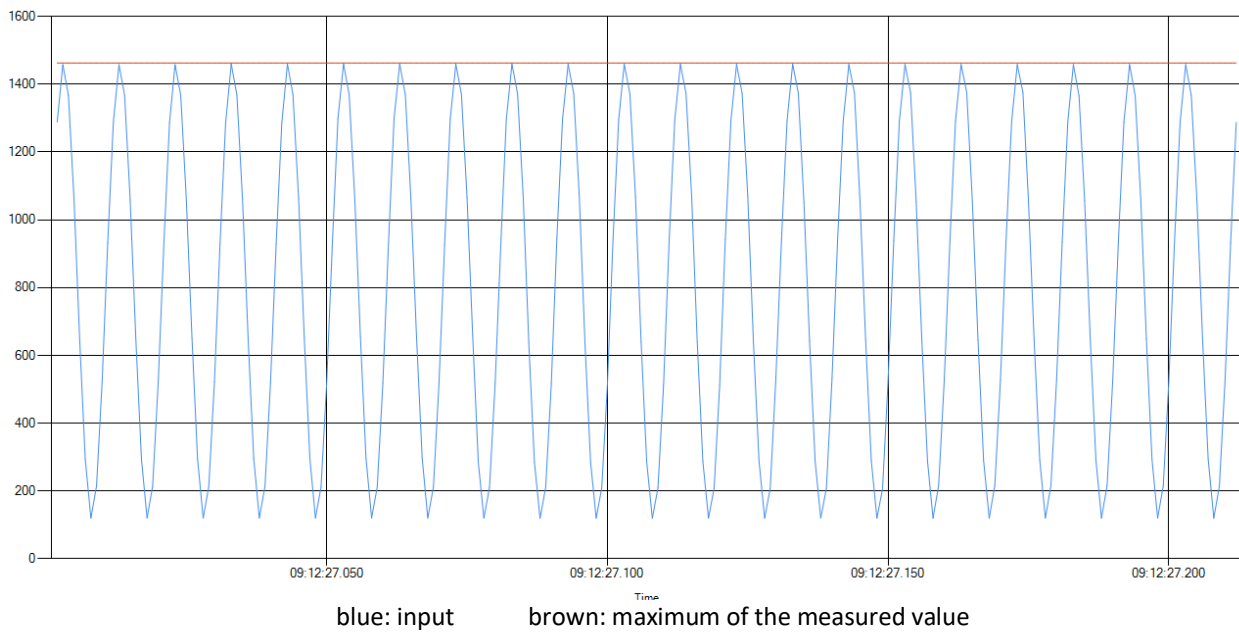
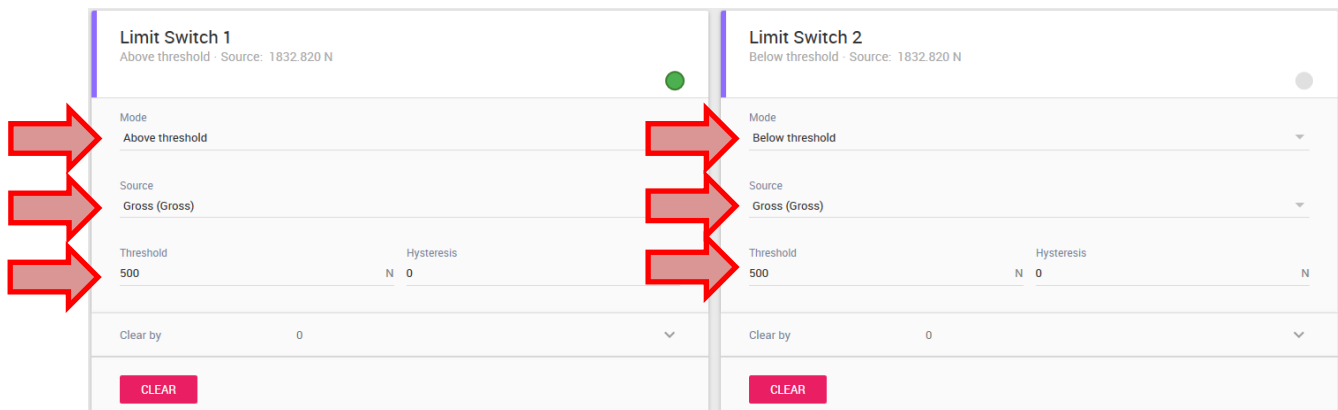As in the first method a limit switch can be set to monitor the maximum value (see page 4).

3. Method – Monitoring the maximum value using a tolerance window

This method should (like the second method) monitor the maximum value and hold it for one period.

To create the tolerance window we need to define a start and a stop condition. In the case of periodic signals, the start can be defined by exceeding a certain value and the stop by falling below the same value.

In this example the forces appear periodically in an interval of 0 N up to 1600 N. We choose 500 N as threshold.
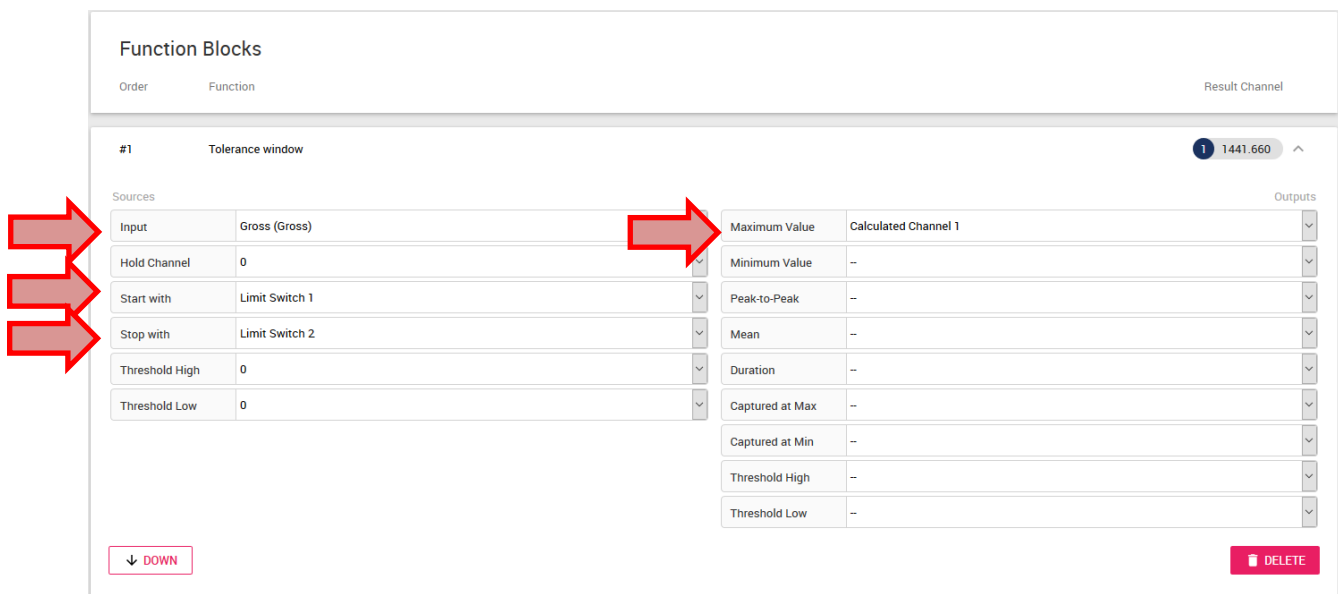
- Switch to the menu 'Limit Switches'
- Select the gross force signal as source
- Enter the threshold
- As mode select one time 'Above Threshold' and one time 'Below Threshold'
- To avoid the activation of the limit switch by noise add a hysteresis

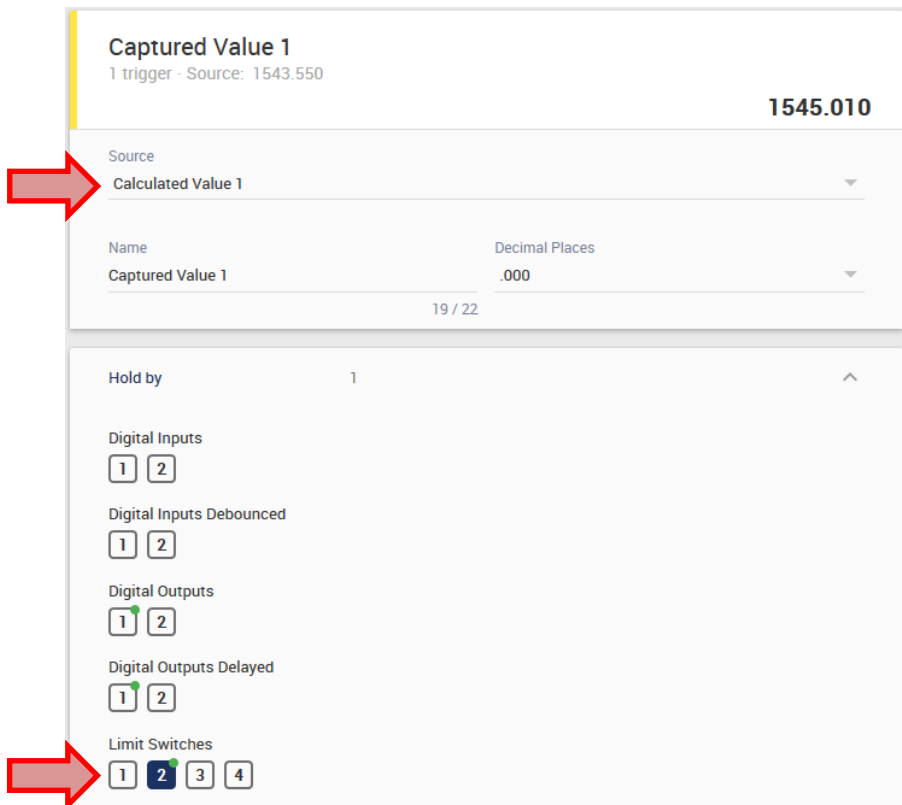Now the tolerance window is added which should capture the maximal value.

Therefor switch to the menu 'Calculated Channels' and follow the steps:
- Add a new calculated channel of the type 'tolerance window'
- Select the gross force signal as source
- At 'Start with' add the limit switch with the mode 'Above threshold'
- At 'Stop with' add the limit switch with the mode 'Below threshold'
- Link the maximum value to a calculated channel

The signal on the calculated channel is similar to the signal of the first method because it reset during the period (at the end of the tolerance window). To fix this and hold the maximum value until the next period, follow the following steps:

- Switch to the menu 'Captured Values'
- Select the calculated channel as source
- At 'Hold by' select the limit switch which stops the tolerance window

The measurement of the force and the maximum value with the ClipX Dataviewer 2 tool with a period duration of 10ms (100Hz) looks like this:
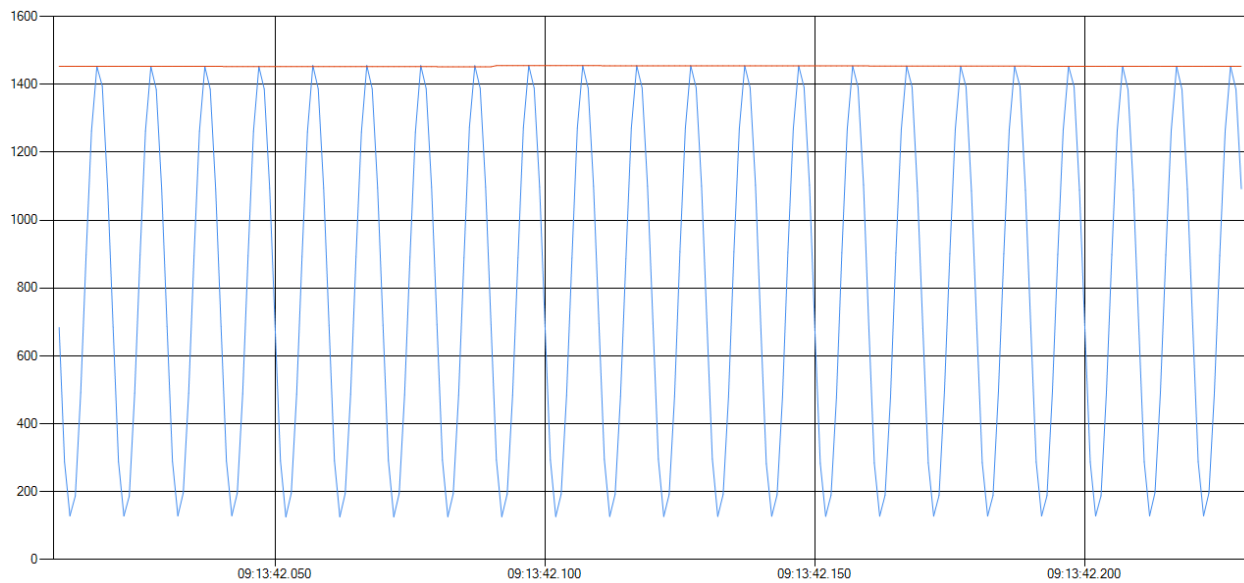
blue: input   brown: maximum of the measurement value

As in the first method a limit switch can be set to monitor the maximum value (see page 4).

Disclaimer
These examples are for illustrative purposes only. They cannot be used as the basis for any warranty or liability claims.