Hysteresis Logging

History

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1.00	2013-06-24	First release	SDa

Contents

1 What is Hysteresis logging? 3
1.1 Hysteresis Logging Example 3
1.2 Values Measured Continuously 4
1.3 Available Log Points 4
1.4 Setting a Good Hysteresis Level 4

1 What is Hysteresis logging?

Hysteresis logging is used to log a parameter that includes small variations over time. When a filter value is set, only values that have changed more than the set value will be stored. If the change is less than the filter value, the log point will not be stored.

The advantage of hysteresis logging is that the log interval can be shorter than for standard logging, (e.g. every 10 seconds), but at the same time, the logged data to store can be limited to just the data that is of the greatest interest or value to save. Hysteresis logging is not designed to store every single log sample, but is instead intended to allow the logging of greater changes that appear within a limited time.

1.1 Hysteresis Logging Example

The value to be measured is represented by the yellow line in the graph in figure 1.

The numbered items below refer to the numbers in the graph.

● Red dots indicate log values that are stored.

X Blue crosses indicate values not stored.

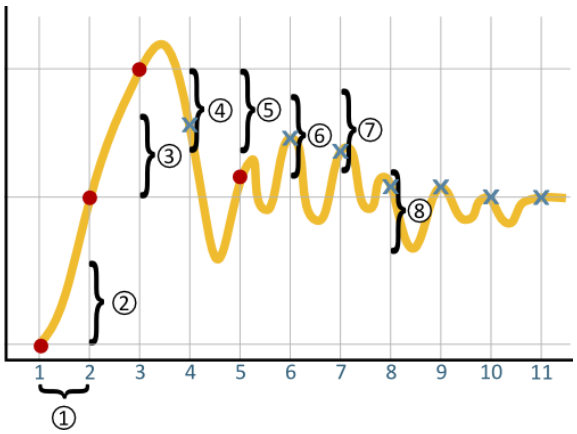

Figure 1

1. This is the log interval, i.e. the time between log samples (time2 - time1 = log interval).
2. The height of the } symbol represents the level of the hysteresis filter. At time1, the value is logged.● At time2, the new log sample compared to time1 has changed more than the hysteresis level, and so is logged. ●
3. At time3, the change in value is also greater than the hysteresis value and is thus also logged.●
4. At time4, the value as compared to time3 has changed less than the hysteresis value and is thus not logged. X
5. At time5, the change in value when compared to the last logged value (time3) is greater than the hysteresis value and is logged. ●
6. From time6 and onwards, the values compared to time5 have changed less than the hysteresis value, and are not logged. X

1.2 Values Measured Continuously

The measured parameter's value will be logged every hour, irrespective of the hysteresis filter value.

In the example in Figure 2, the value is logged at time1.●

At time2, the value has changed less than the hysteresis value, and is not logged. X

For the following samples (time3 to time5), the value changes are greater than the hysteresis value and as such are logged accordingly. ●

None of the remaining samples in the hour (time6 and onwards) will be logged, as the changes when compared to the last logged value (time5) are less than the hysteresis value.

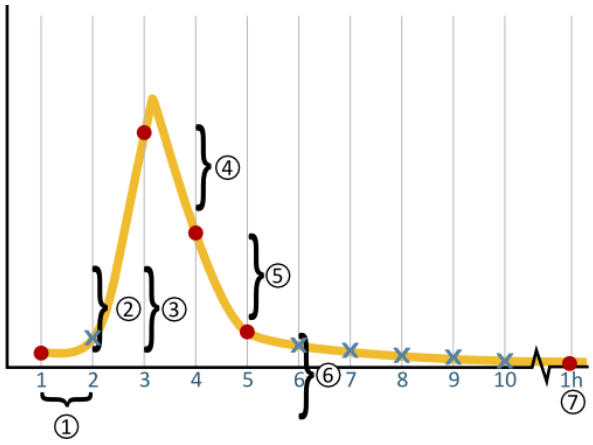

Figure 2

The value will, however, be logged at every new full hour (7), whatever the hysteresis filter is set to. This eliminates measurement errors due to no values being logged after stabilization.

1.3 Available Log Points

It is important to understand that a maximum of 50% of the log points configured for each hour can be stored. The number of points stored is thus calculated according to the following:

$$interval\ (No.per\ min) * \frac{60\ (minutes)}{2} = \text{log points per hour.}$$

For a log interval of 60 seconds, the number will be 1 (per min) x 60(min)/2 = 30 log points per hour.

For a log interval of 10 seconds (the shortest available), the number will be 6 (per min) x 60(min)/2 = 180 log points per hour.

1.4 Setting a Good Hysteresis Level

Hysteresis logging is not designed to log every single log interval sample. Instead, it is intended to track the larger changes that can occur within a limited period of time.

If the hysteresis value is set too low, there will probably be a disproportionate number of log values from one part of the period, and little or no log data from other parts, as the available log points will have been used up.

In the example in Figure 3, every sample from 1 to 8 (the red dots) is logged, which will happen if the hysteresis value is set too low.

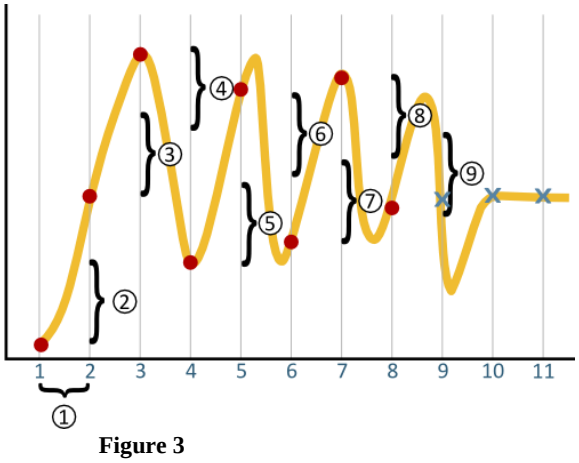

Figure 3