

Manual: 8.3. Minimum and Maximum

The normal range of values is defined by providing each tag with a minimum and maximum value. These two values define the range of numerical values that this tag can reasonably have. If a tag's value at some time in history does not lie in this range, the entire operational point of the plant at this time will be excluded from the training data set.

Let's take an example. A chemical process requires a temperature of 250°C. In the actual process, the temperature will actually vary between 220 and 270°C. A temperature above 270°C will trigger an automatic shutdown. However if the plant is offline, the temperature will slowly adjust to the ambient temperature, which may be as low as -20°C. Thus, the range should be -20°C to 270°C because the plant being offline is a valid state.

Let's take a second example. A valve can be opened and closed. Its status is measured in percent. Strictly speaking therefore, the range is 0 to 100% from fully closed to fully open. However, the sensor that measures the status sometimes measures values slightly lower than 0 or slightly higher than 100. We can approach this problem in two ways. Either we can define the range to lie between -5% and 105% or we can define the range to lie between 0 and 100% and additionally define two correction rules that will force any measurement below 0 to be equal to 0 and any measurement above 100 to be equal to 100.

After you have set the metadata for the plant, the analysis will perform a plausibility check. Among other things, this check will compute how many historical operational points of the plant will be ignored based on the range setting of each tag. You can use this information to adjust your settings. In addition, each tag has its own properties page that contains a histogram displaying the distribution of its values. You may use this to gain insight into what values a tag actually adopts much of the time.

Frequently we find that some ranges are defined such that all, or very close to all, operational points become disallowed for modeling. This is usually the case because the range is a theoretically desired range that is not actually obeyed in real operations or because of various errors, for example that the tag is actually measured in different units than expected. If the tag is in tons and the range is set in kilograms, then this will happen.