

## Manual: 6.1. Creating a new Soft Sensor

In the ISS menu, you can access the list of all soft sensor present in your plant. The button at the bottom will lead you to a page for creating a new soft sensor. The tag is the tag that contains the manually collected data for the quantity of interest that you want to model. The new tag is the alphanumeric nomenclature for the new tag that will be the result of the formula about to be constructed. We recommend that this nomenclature be very similar to the nomenclature of the original tag but it must be a unique identifier for this plant. When you click on Create, not only will a new soft sensor object be generated but a new column will be added to the table of historical data for your plant. This new column is for the computed data from the new soft sensor.

You will be taken to the edit page for the soft sensor. First, you will need to define one or more training time periods that select the historical data on which the soft sensor is to be trained. From these time periods, any points will be excluded that match any of the exclude conditions that you can also define here. Both of these elements together will result in a list of data points that will be used for training.

Next, comes the selection of independent variables. These are the variables that go into the formula that will eventually compute the value of the soft sensor. If you know what tags influence the quantity of interest, you can manually select them and add them to the model. However, we do not recommend that you do so. There is a button to perform this selection automatically by virtue of data analysis. It is preferable to do any manual editing after the automatic selection process.

Having selected the variables that are going to go into the model, we may edit some more parameters of the model. The soft sensor can be given a name and you can write a comment text on it, if you would like. More importantly, you can edit the number of hidden neurons. The formula for the soft sensor will be a neural network. Hidden neurons are essentially the free parameters in this formula. The more hidden neurons one has, the more free parameters one has. Having more parameters usually allows the model to fit the training data better but only up to a point. There is a law of deminishing returns at work here and also there comes a point at which the number of parameters is so large that the training data can be memorized rather than learned. At this point, the model can reproduce past data with perfection but it cannot generalize to a new situation at all well. We recommend choosing a number of hidden neurons equal to approximately twice the number of independent variables.

After setting all this up, you are ready to construct the model. The button Model trains the model, the button Apply uses the model, computes the value of the soft sensor for the entire available history in the database and saves these values there, and the button Model and Apply does both of these things in one operation. We recommend to model and apply together. You can then go to the show page in order to examine how good the soft sensor is.