Using the DC Module to Monitor Performance of Electric Generators

This application note explains the use and configuration of TESLA's DC Module being used to monitor the electric generator performance.

The TESLA DC Module has a wide range of applications including monitoring DC current and voltage to AC current and voltage.

In this case monitoring the performance of a generator, the DC module will require the following signals coming from the generator:

- Field Voltage (4-20mA DC)

- Field Current (4-20mA DC)

- Neutral Voltage from the generator (AC voltage)

With these generator signals being injected to the DC Module, the TESLA will be able to monitor how the generator is behaving under several conditions, so that correction actions may be taken to increase that generator's performance.

Materials required:

- TESLA 3000/4000
- DC Module
- Appropriate resistors
- Test set or power source to calibrate channels of module
- PC with TESLA Control Panel installed

First, acquire all materials and connect properly (as needed refer to each product's instruction manuals).

Next upload a configuration file describing correct wiring to the DC Module that will be monitoring the generator.

On the configuration screen, add the three channels required in order to be able to monitor the generator. The order of the channels will not have any effect on the measurement as long as the channel is configured correctly as the physical connection to the module.

Two DC channels will need to be added in order to monitor Field Current and Field Voltage, and a third VAC channel will need to be added to monitor the generator's Neutral Voltage.
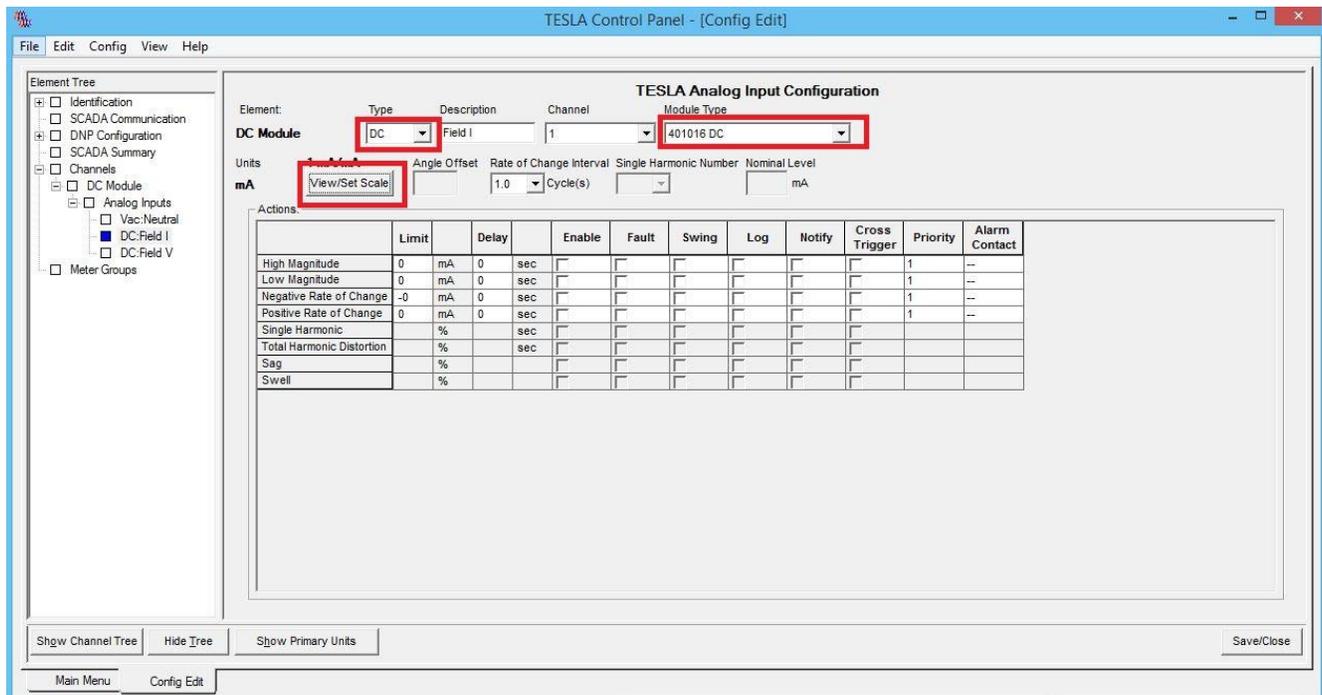
DC channel configuration:

Figure 1 Configuration file screen, DC channel.

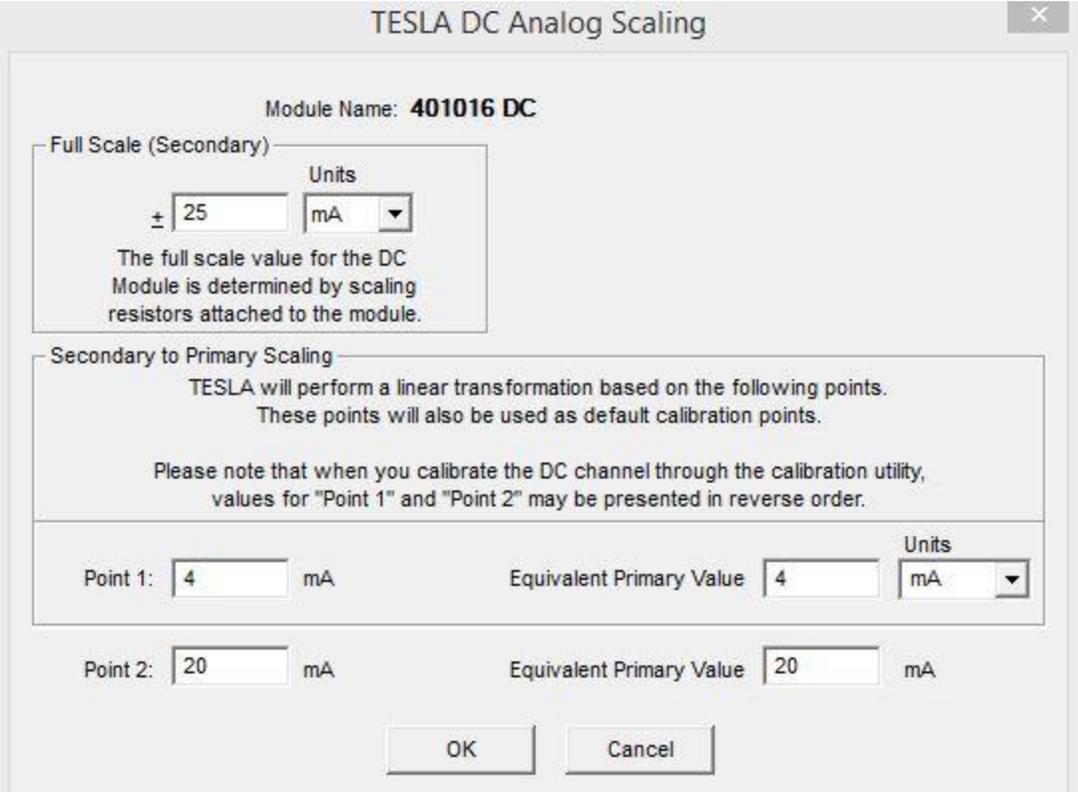The Scaling of the module will need to be configured for each of the added DC channels.

Figure 2 Scaling configuration screen of DC module.

The Vac channel that will monitor the generator's Neutral must be a Vac channel and its module type must be set to "401016 DC" in order to accept the measurements.
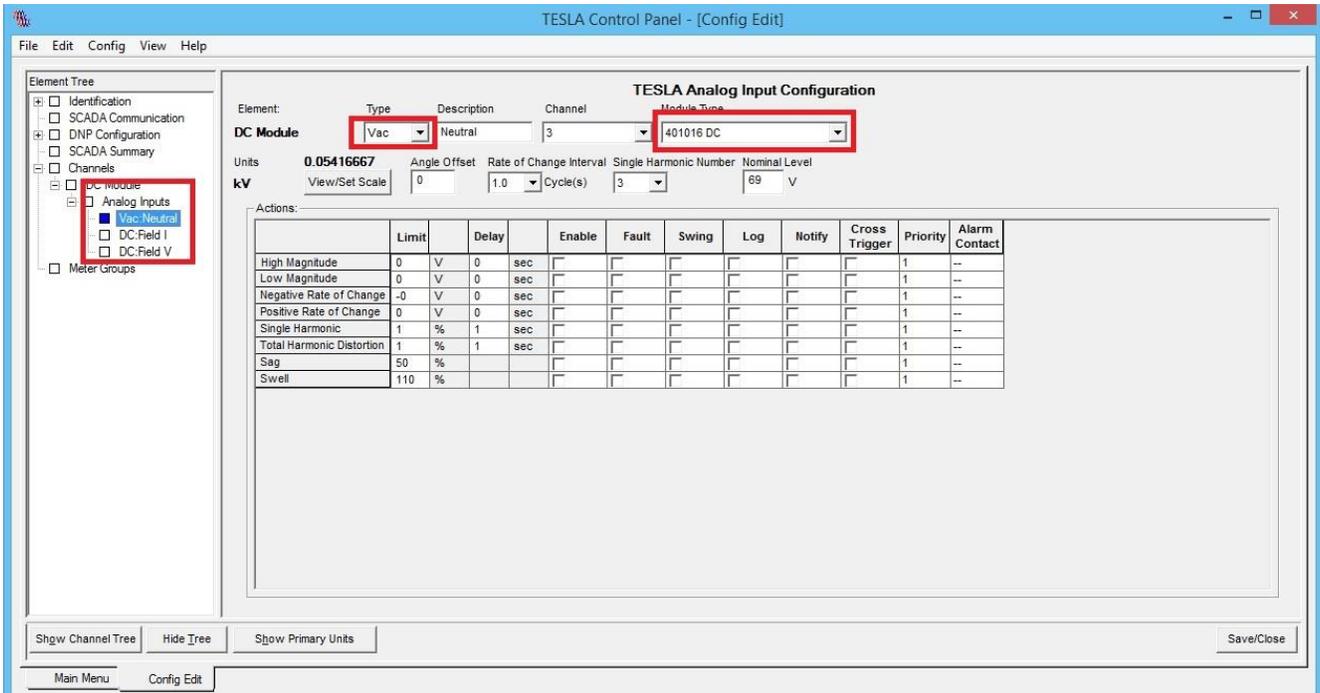

Figure 3 Configuration file screen, Vac channel.

The module's scaling must also be adjusted for this application. This example assumes a 13kV generator with a full scale on the secondary of 500Vac and a nominal value of 240Vac.
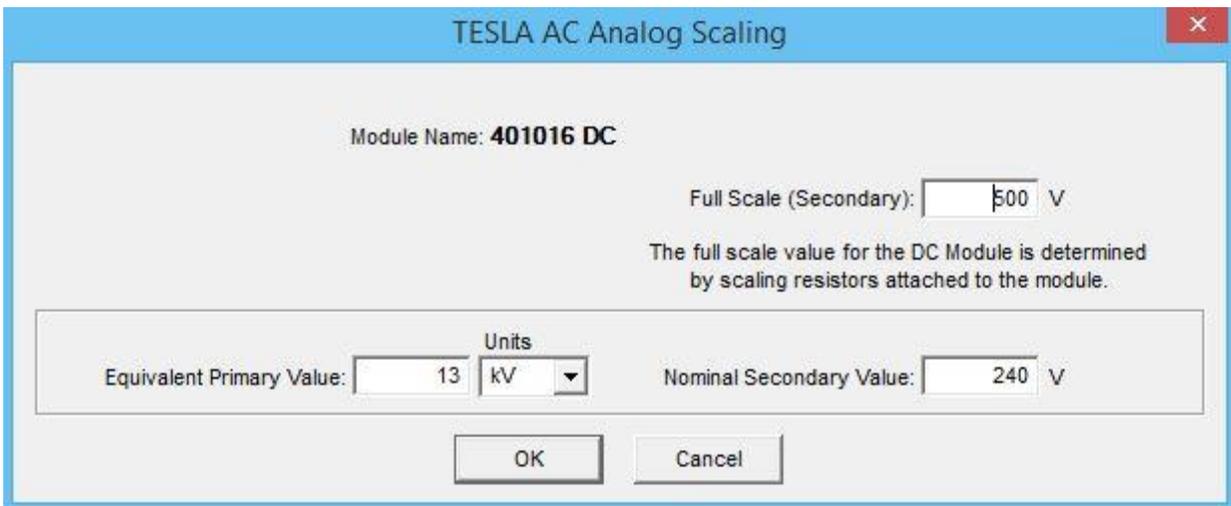

Figure 4 Scaling configuration screen, Vac channel.

After configuring the channels, the user should then calibrate them.

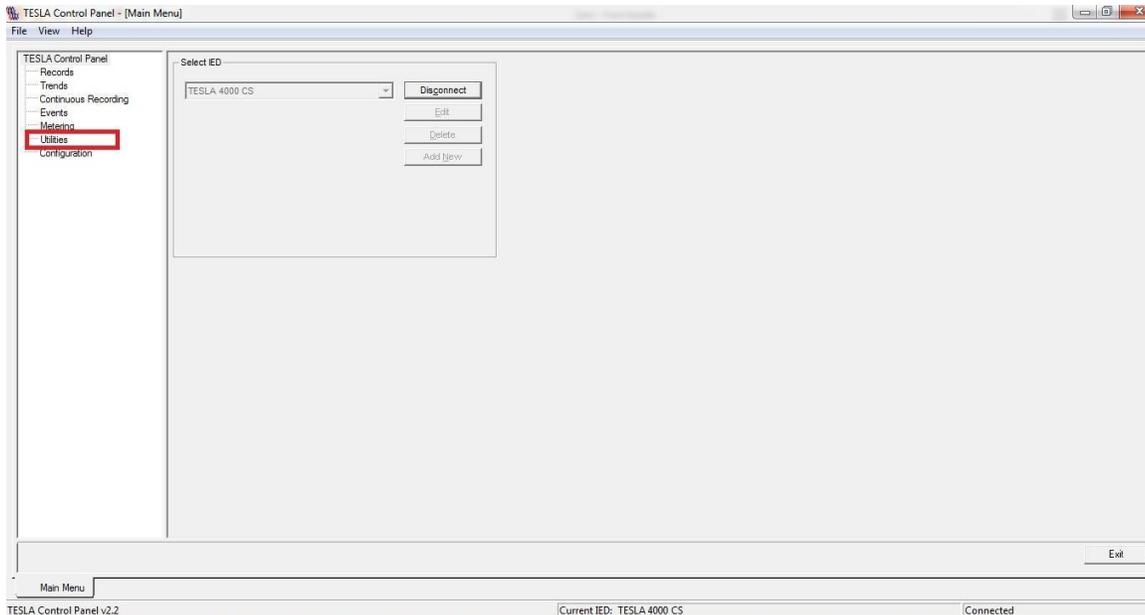Open TESLA Control Panel and then open the Utilities section, as shown below.

Figure 5 TESLA Control Panel Main Menu.

Clicking on the Utilities section brings up a password prompt, which requires either the Change or Service password in order to be able to change the parameters for the calibration of the Analog Input channels. If the passwords have not been changed then the user can use either the password "change" or "service".
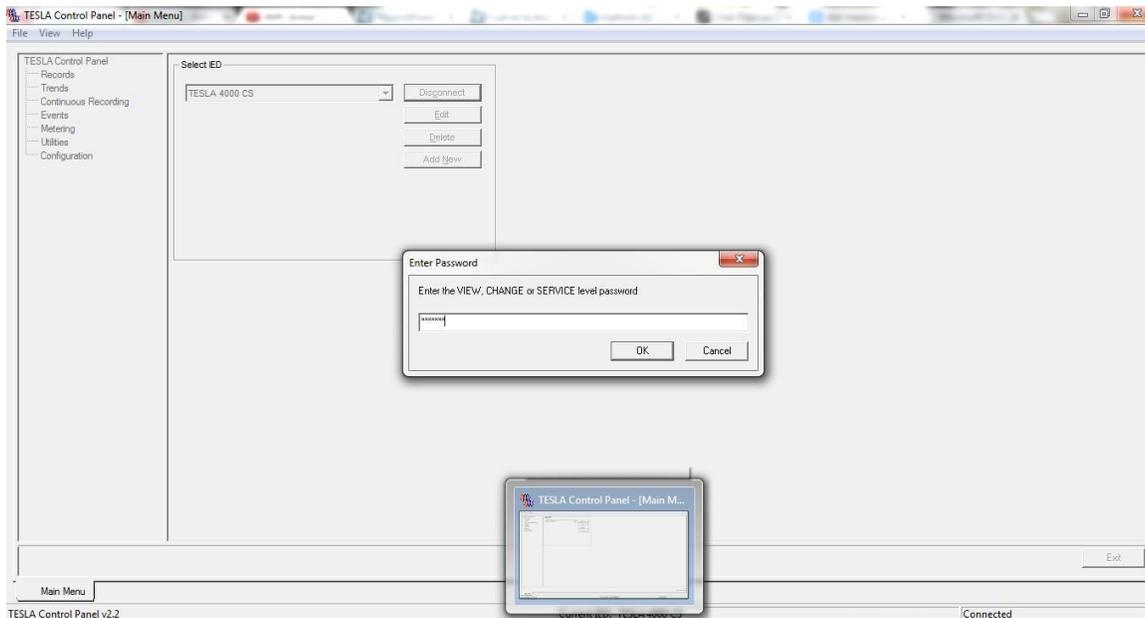

Figure 6 Password prompt in Utilities section.

On the Utilities screen, click the Analog Input Calibration tab to find the section where the channels will be calibrated for correct metering and usage.
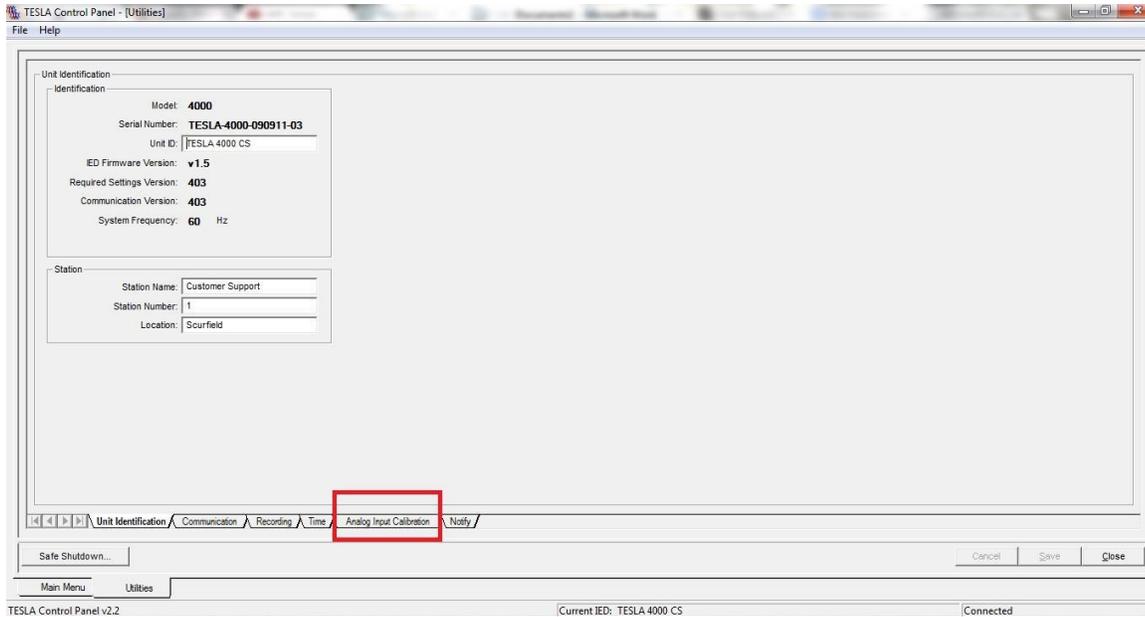

Figure 7 Analog Input Calibration tab.

Once in the Analog Input Calibration screen, the user will be shown the channels that are currently configured in the TESLA. Each channel must be calibrated in order to measure correctly. The DC channels will require two calibration points, as shown below.
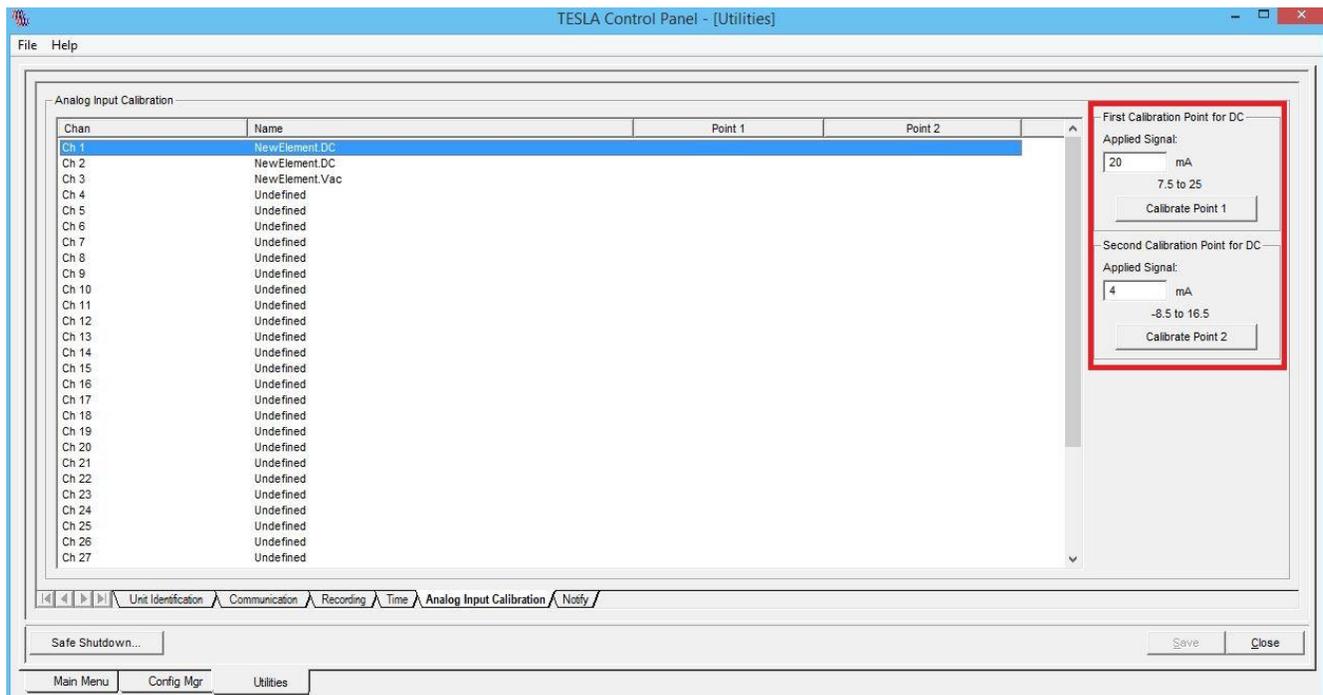

Figure 8 Calibration Screen, DC channel.

The remaining Vac channel for generator's neutral will require an AC input of 240Vac, according to the example being described.
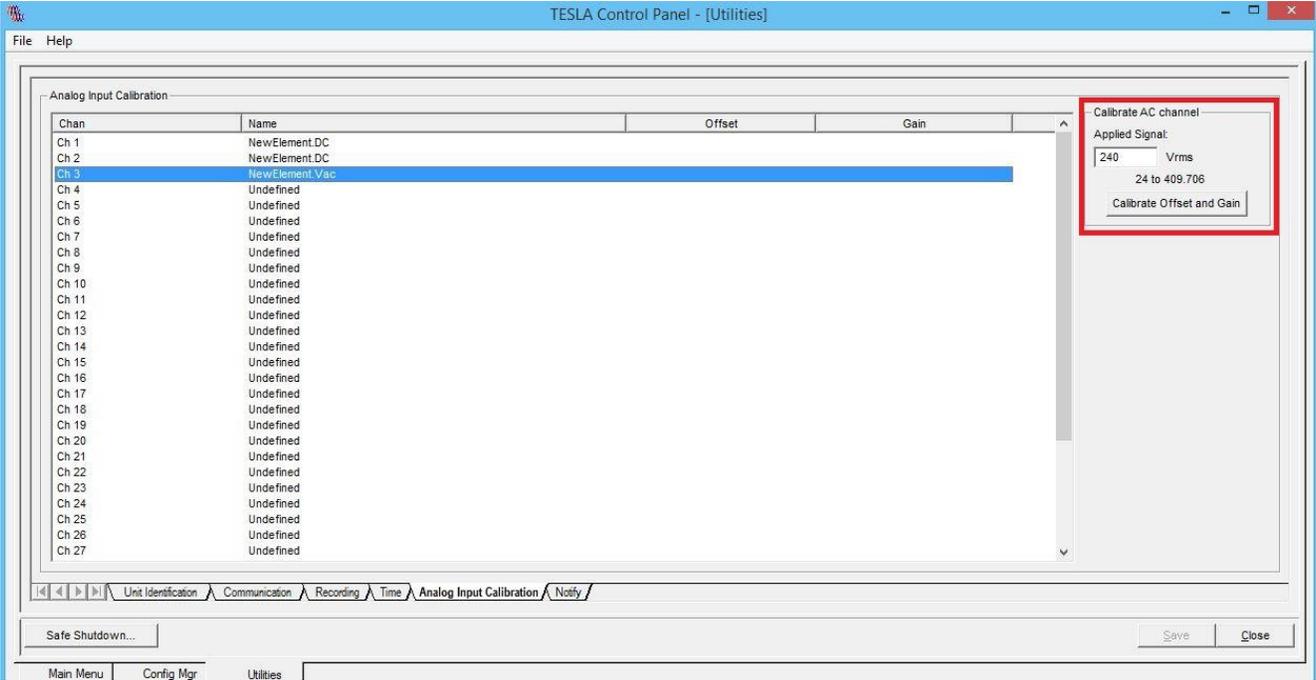

Figure 9 Calibration Screen, Vac Channel.

Our DC module is now configured and calibrated to monitor generator performance.