**Denso Parametric Test System – ECU Output, Load Current Measurement**

This requirements document relates to FoDM Digital and PWM outputs that have Ball Systems Current Measurement boards attached for current measuring purposes.

Theory of Operation: A single Analog Input channel of a DAQ board acquires a specified number of samples, determined by supplying the desired sample rate and length of the acquisition time. The acquired waveform is averaged and a single, scaled Current value is returned back to the NI VeriStand system.

Analog Input, Current Measurement Custom Device behavior:

1. Create a Trigger User Channel
2. The Trigger User Channel is used to trigger an event in the test system, such as sending a CAN message and to trigger the start of an Analog Input waveform acquisition
3. Only one Analog Input channel will be active at a time
4. Inputs to the AI CM Acquisition and Analysis Custom Device
   1. Trigger channel
   2. AI Channel (on PXIe DAQ board)
   3. CM Scaling: 0-5V CM output scaled to 0-X Amps of Current [Can be in Sys Def, based on spec of the Current Measurement board; Needs to be scaled on a per-channel basis since we have different CM boards with different current ranges.]
   4. AI Sampling Rate [Can be in Sys Def]
   5. Time delay between trigger and start of acquisition [Can be the same for all channels but should be settable during run-time.]
   6. Acquisition Time [Defined as amount of time for acquiring samples to be averaged. Can be the same for all channels but should be settable during run-time. We can establish a “maximum acquisition time” in the Sys Def and then take a subset of the waveform to use in the average value evaluation, however. Note: If “Max Acq Time” value from Sys Def is used, that would then define the amount of time that test step would take to complete. Slowest PWM is 100Hz and I would guess that 5 pulses would be the max we would want to average, so that helps us define what a “worst-case step time”would be.]
5. Outputs from the AI CM Acquisition and Analysis Custom Device
   1. Average Current (Amps)