In System Current Sensor Test (5/15/2023)

Firmware Rev: 1

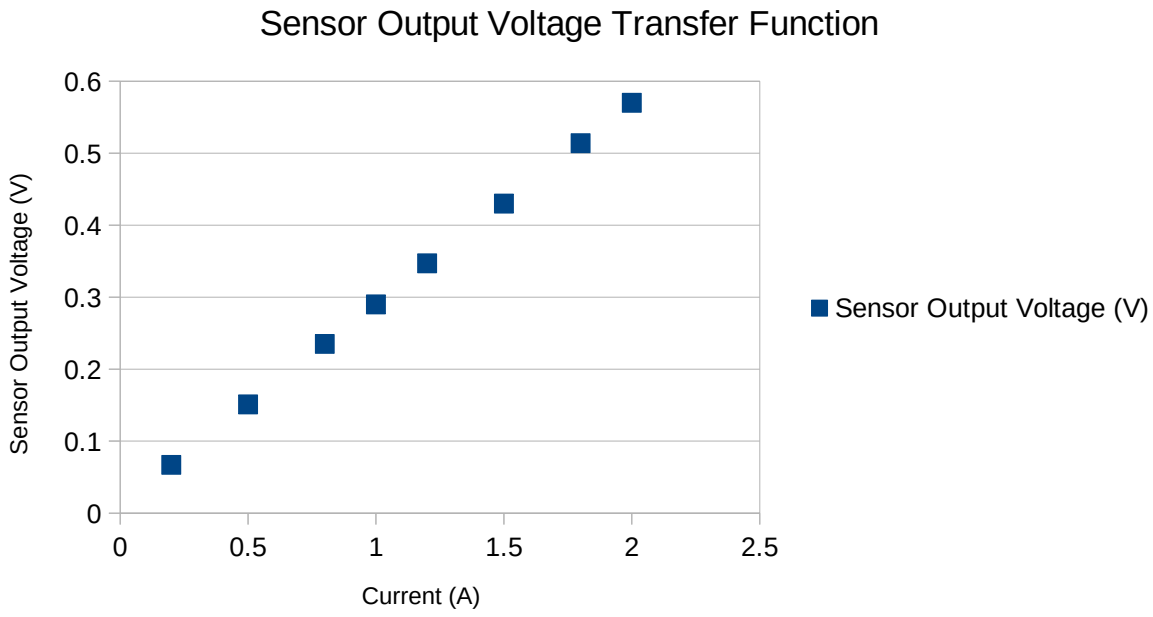
Purpose: The current sensor seemed to give wrong values on the last full system test. The current sensor should be tested while integrated into the system as much as possible.

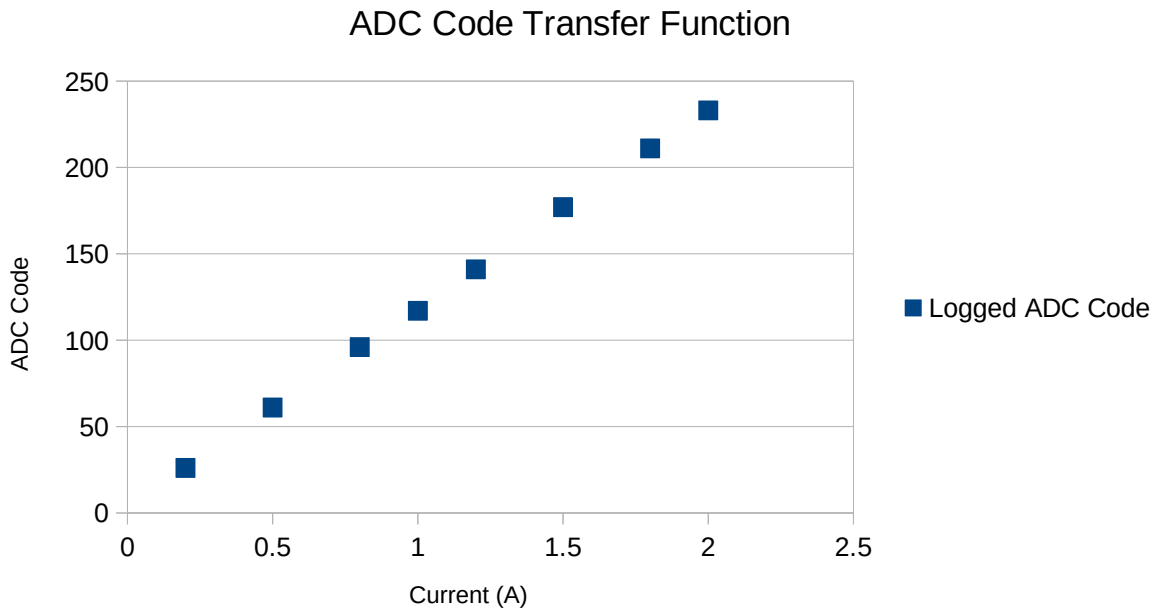
Description: A power supply is attached across the shunt to supply a known current through it. The sensor output voltage is measured and recorded at various currents. Also at various currents, the ADC code that corresponds to the current that the system is reading is recorded. Both values are compared to their theoretical counterparts.

Results:

PSU Current(A)	Sensor Output Voltage (V)	Logged ADC Code
0.2	0.067	26
0.5	0.151	61
0.8	0.235	96
1	0.29	117
1.2	0.347	141
1.5	0.43	177
1.8	0.514	211
2	0.57	233

Theoretical Sensor Voltage (V)	Theoretical ADC Code	Sensor Error (%)	ADC Error (%)
0.06	24	11.67	8.33
0.15	61	0.67	0
0.24	98	2.08	2.04
0.3	122	3.33	4.1
0.36	147	3.61	4.08
0.45	184	4.44	3.8
0.54	221	4.81	4.52
0.6	245	5	4.9





Analysis: The current sensor still seems to be functioning correctly in the system. Both the current sensor output, and the ADC code representing current that is read by the controller, seem to maintain linearity. For both parameters, the error is less than or equal to 5% except for the lowest value. The lowest value is not a usual current for the system, and the high error could also be due to the power supply sourcing the current.