

1.1 The Apparatus

For this test:

The isolation transformer is plugged into a power strip

The plug for the motor off/on switch is plugged into the isolation transformer.

The switch then connects to the motor control board power terminal block *L,N, Ground*.

The motor control cable from the motor connects to the *A,B,C,Ground* on the power terminal block of the motor control board also the commutation sensor input terminal plugs into the board.

From the opto side on the digital brick, the speed feedback module G4IDC5K connects to *T-com* and *T-out* on the motor control board.

On the Analog Brick, the belt speed output module G4DA5 connects to *S1* and *S2* on the motor control board pigtailed to the *S1* an *S2* are the plugs for the Voltmeter testing. **Meter used – Fluke 117 true RMS multimeter**

| START FROM ZERO BELT SPEED | INITIAL START UP VOLTAGE FROM ZERO | STABLE VOLTAGE RANGE | MAXIUM VOLTAGE FROM METER | NUMBER OF SPIKES | MINIMUM VOLTAGE FROM METER | NUMBER OF DROPS | OBSERVED TIME IN MINUTES |
|----------------------------|------------------------------------|----------------------|---------------------------|------------------|----------------------------|-----------------|--------------------------|
| 40 | 9.99 | 9.92 - 9.89 | 9.92 | 0 | 9.82 | 0 | 5 |
| 40 | 9.94 | 9.90 - 9.88 | 9.90 | 0 | 9.84 | 0 | 5 |
| 35 | 8.64 | 8.67 - 8.67 | 8.67 | 0 | 8.67 | 0 | 5 |
| 30 | 7.42 | 7.45 - 7.45 | 7.45 | 0 | 6.31 | 1 | 5 |
| 30 | 7.54 | 7.49 - 7.46 | 7.49 | 0 | 7.46 | 0 | 5 |
| 25 | 6.14 | 6.22 - 6.23 | 6.23 | 0 | 4.26 | 3 | 5 |
| 25 | 6.20 | 6.23 - 6.22 | 6.23 | 0 | 4.95 | 1 | 5 |
| 20 | 4.97 | 5.00 - 5.00 | 7.76 | 2 | 5.00 | 0 | 5 |
| 20 | 4.97 | 5.00 - 5.00 | 7.19 | 1 | 5.00 | 0 | 5 |
| 15 | 3.75 | 3.76 - 3.77 | 7.33 | 50 | 3.76 | 0 | 5 |
| 15 | 3.75 | 3.76 - 3.77 | 7.38 | 54 | 3.76 | 0 | 5 |
| 10 | 2.52 | 2.53 - 2.54 | 5.24 | 10 | 2.53 | 0 | 5 |
| 10 | 2.416 | 2.528 -2.533 | 5.519 | 20 | 2.528 | 0 | 5 |
| 5 | 1.289 | 1.292 - 1.294 | 3.044 | 54 | 1.292 | 0 | 5 |
| 5 | 1.219 | 1.292 - 1.297 | 2.855 | 51 | 1.292 | 0 | 5 |
| 4 | 1.038 | 1.038 - 1.041 | 2.183 | 53 | 1.028 | 0 | 5 |

1.2 The Procedure

This test was run with the opto (belt_ speed-control multiplier) BeltSpeedTvf2 changed from .05 to .025

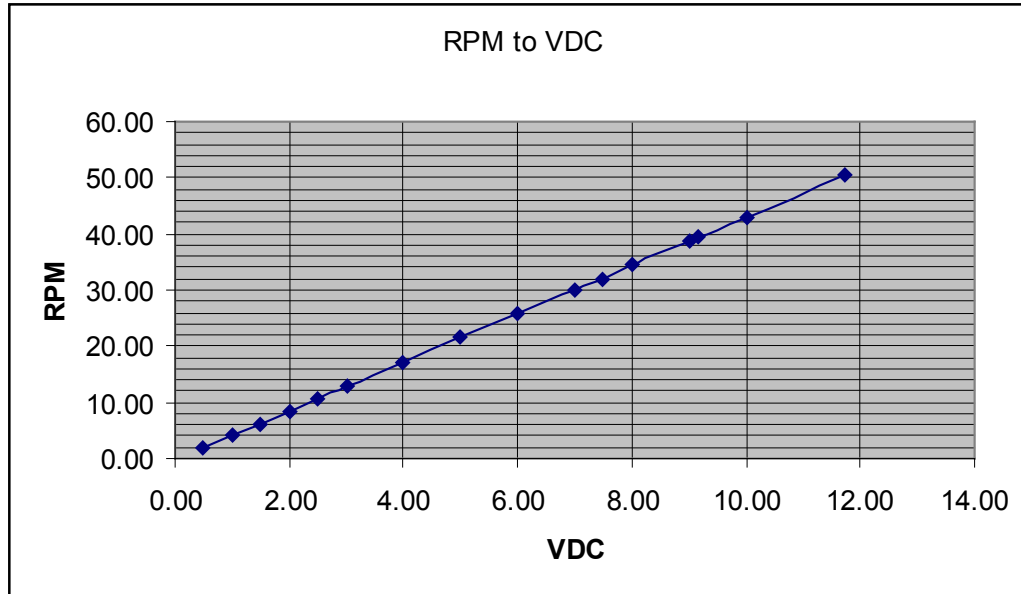
There was no load on the motor.

All individual tests were started from Zero belt speed from the Opto process screen.

1.3 Observations

1. The first item of notice is the number of voltage spikes on belt speeds lower than 20 ipm.
2. The highest spikes are basically 2x the stable voltage
3. With every voltage spike on the meter there was an audible surge heard at the motor.
4. Some spikes were higher some were lower but every spike caused a surge in the motor.
5. The stable voltage range seems to be very consistent and linear in an overall view.
6. The higher speeds were very steady with little or no variations.

7. The initial start up showed a small rise above stable voltage on the higher speeds and on the lower speeds the initial voltage was lower than the stable voltage. The Process screen in Opto showed this variance as an small overage or underage of belt speed before it settled onto the set speed. This usually took around a half a minute to stabilize.

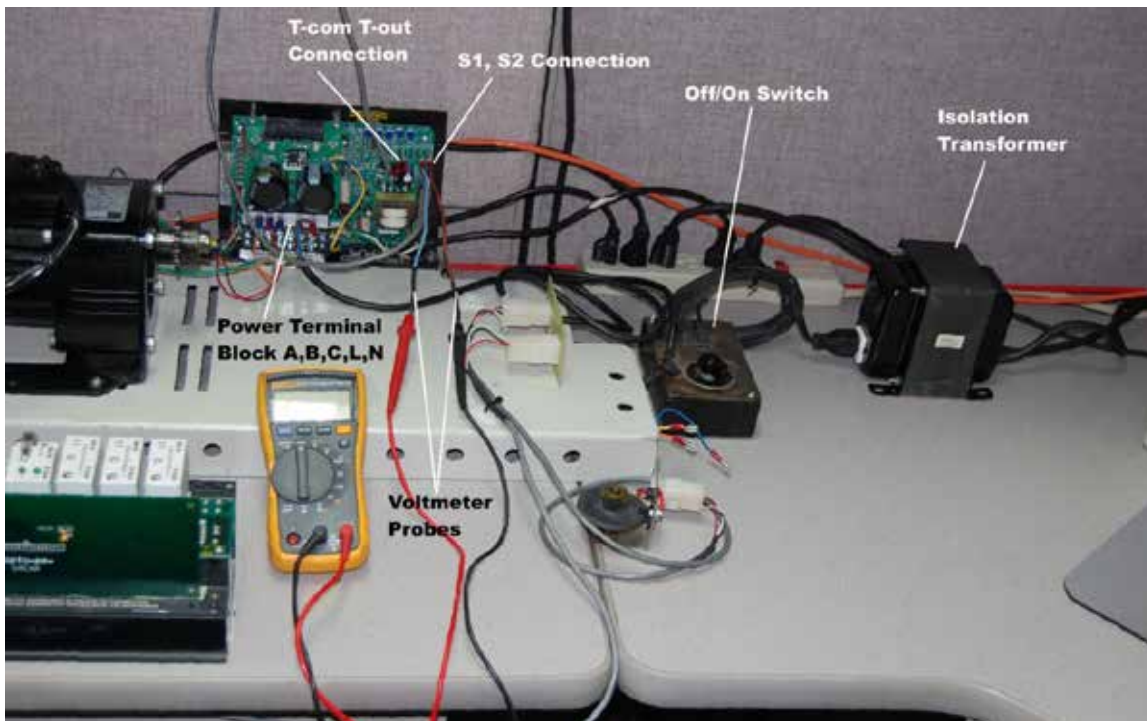


| | | | |
|----------|-----------|-----------|-----------|
| 0.50 VDC | 2.00 RPM | 6.00 VDC | 25.75 RPM |
| 1.00 VDC | 4.00 RPM | 7.00 VDC | 30.00 RPM |
| 1.50 VDC | 6.25 RPM | 7.50 VDC | 32.00 RPM |
| 2.00 VDC | 8.50 RPM | 8.00 VDC | 34.50 RPM |
| 2.50 VDC | 10.50 RPM | 9.00 VDC | 38.75 RPM |
| 3.00 VDC | 12.75 RPM | 9.16 VDC | 39.50 RPM |
| 4.00 VDC | 17.00 RPM | 10.00 VDC | 43.00 RPM |
| 5.00 VDC | 21.50 RPM | 11.72 VDC | 50.50 RPM |

This chart shows Volts DC to RPM on the motor taken with a pot connected to S1 S2 S3.

The pot was set at each Voltage starting at 0.5VDC going up to 11.72VDC.

When Run with the pot the Voltages were very stable at all ranges down to 0.3 VDC with no observed spikes.



Motor Control Test Layout