Test Case Report

General Information

Description: Test and record three samples of a KCR-1106.4500Kv BLDC for output RPM at 10vdc

Deliverable: Chart with three motor samples, three rpm recordings each with a WestRock ESC and an X89 ESC.

Equipment/Hardware: Gophert 1610 Power Supply, DT-2234C+ Optical Tachometer, optical wheel with reflective patch, Fluke Multimeter.

Procedure:
Mount BLDC sample to be tested in the motor fixture, attached the optical encoder wheel, connect ESC to be tested to the BLDC. Turn on the power supply at 10vdc using the Fluke validate the voltage reading on the power supply to the recording on the Fluke match at 10vdc. Place power supply on standby and connect the ESC to the power supply.

Start the power supply at 10v and operate the BLDC for 1 minute to stabilize stator temperature.
1) Turn off the power supply for 10 seconds.
2) Restart the power supply and Optical Tachometer and operate for 30 seconds
3) Record the rpm
4) Record the amperage
5) Go back to #1 and repeat two more times.

<u>Test Result Take-away</u>

- The variance in rpm between the three BLDC samples using a WestRock ESC at 10v is **<u>less than 300 rpm</u>**, less than 7 tenths of one percent (0.7%) of the total rpm.
- The variance in rpm between the three BLDC samples using the X89 ESC at 10v is **<u>less than 250 rpm</u>**, less than 5 tenths of one percent (0.5%) of the total rpm.
- The X89 ESC provides an additional 1300 rpm over the WestRock using the same motors, equating to an added 3% rpm.

Photos:
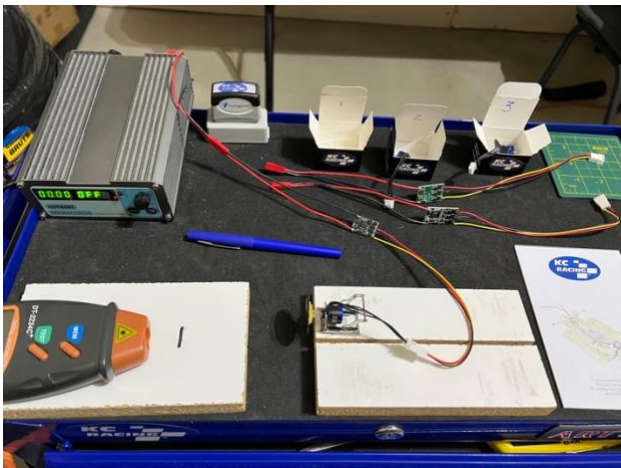
Test set up
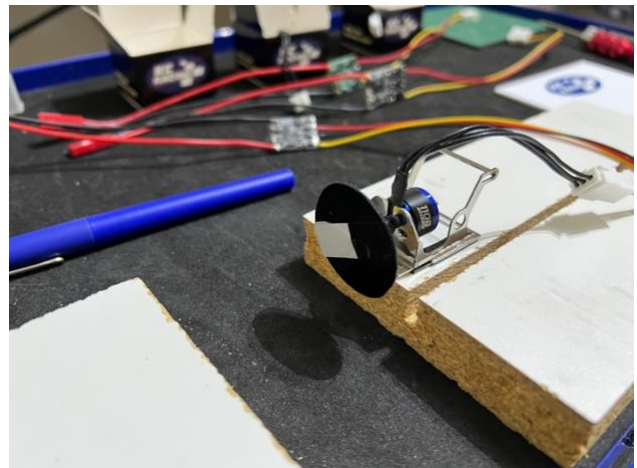
Optical wheel with reflective pad

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Test Results - Motor Speed Consistency

ESC	WestRock WRBLC (v2) - Pentagon / Square				ESC	X89			
MOTOR	KCR-1106.4500Kv				MOTOR	KCR-1106.4500Kv			

Motor Sample #	RPM	Amp Draw			Motor Sample #	RPM	Amp Draw		
1	43027	0.86			1	44390	0.89		
1	43072	0.86			1	44403	0.89		
1	43091	0.86			1	44352	0.91		
Average	43063		Mean**	43072	Average	44382		Mean**	44390
2	43238	0.86			2	44608	0.88		
2	43251	0.86			2	44601	0.88		
2	43264	0.86			2	44646	0.87		
Average	43251		Mean**	43251	Average	44618		Mean**	44608
3	43372	0.85			3	44524	0.91		
3	43372	0.85			3	44594	0.91		
3	43324	0.86			3	44600	0.91		
Average	43356		Mean**	43372	Average	44573		Mean**	44594
Avg of Averages	43223		Avg of Means	43232	Avg of Averages	44524		Avg of Means	44531

Using the Average Readings		Using Means		Using the Average Readings		Using Means	
Variance Hi to Low	293	Hi to Low	300	Variance Hi to Low	237	Hi to Low	218
% change of Avg	0.68%		0.69%	% change of Avg	0.53%		0.49%

	X89 faster than WRBLC by:	1301 rpm	1299

Motor Kv is the rpm at which the motor will generate 1vdc BEMF

**Mean - Throw out the high and the low and record the middle reading