

MAC-BMC 600-watt Motor

Motor: M5
 Hall sensors tuned for CW rotation
 Winding: Wye
 Infineon Controller (55A current limit)

24-volt supply

Full Throttle		
Power (CycleAnalyst)	Power (PowerTap)	Efficiency
33	0	0.0%
88	50	56.8%
146	100	68.5%
206	151	73.3%
264	200	75.8%
325	250	76.9%
396	302	76.3%
444	333	75.0%
564	400	70.9%
678	450	66.4%
894	500	55.9%

24-volt supply

Half Throttle		
Power (CycleAnalyst)	Power (PowerTap)	Efficiency
15	0	0.0%
80	58	72.5%
140	103	73.6%
218	155	71.1%
322	215	66.8%
414	255	61.6%
570	290	50.9%

36-volt supply

Full Throttle		
Power (CycleAnalyst)	Power (PowerTap)	Efficiency
58	0	0.0%
115	50	43.5%
175	107	61.1%
240	165	68.8%
260	183	70.4%
340	253	74.4%
410	313	76.3%
440	338	76.8%
480	370	77.1%
536	414	77.2%
624	480	76.9%
625	480	76.8%
734	555	75.6%
930	668	71.8%
1146	765	66.8%
1656	833	50.3%

36-volt supply

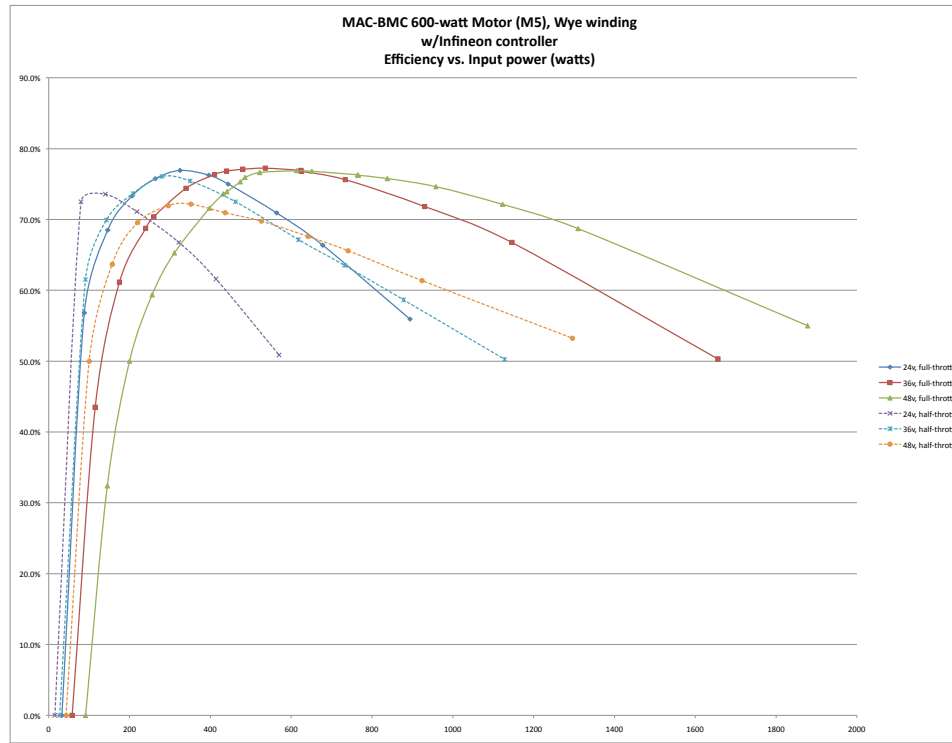
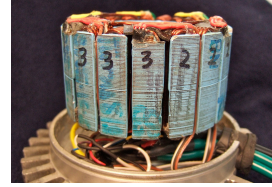
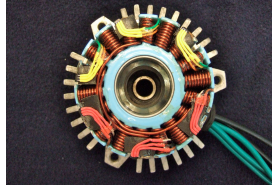
Half Throttle		
Power (CycleAnalyst)	Power (PowerTap)	Efficiency
0	0	0.0%
91	56	61.5%
143	100	69.9%
209	154	73.7%
280	213	76.1%
350	264	75.4%
462	335	72.5%
618	415	67.2%
732	465	63.5%
878	515	58.7%
1128	567	50.3%

48-volt supply

Full Throttle		
Power (CycleAnalyst)	Power (PowerTap)	Efficiency
91	0	0.0%
145	47	32.4%
200	100	50.0%
256	152	59.4%
311	203	65.3%
398	285	71.6%
432	318	73.6%
441	326	73.9%
474	357	75.3%
486	369	75.9%
522	400	76.6%
614	472	76.9%
651	500	76.8%
764	583	76.3%
766	584	76.2%
838	635	75.8%
958	715	74.6%
1123	810	72.1%
1310	900	68.7%
1878	1033	55.0%

48-volt supply

Half Throttle		
Power (CycleAnalyst)	Power (PowerTap)	Efficiency
43	0	0.0%
100	50	50.0%
157	100	63.7%
220	153	69.5%
296	213	72.0%
352	254	72.2%
437	310	70.9%
526	367	69.8%
642	434	67.6%
741	486	65.6%
924	567	61.4%
1296	690	53.2%



Notes: Efficiency was measured by comparing energy drawn from the battery according to a CycleAnalyst and comparing that to energy sent to the rear wheel of the bicycle as read from a PowerTap hub. Motor power passes through a chain and sprocket (#25 chain; 11t - 50t) to a mid-drive, which is then passed to the rear wheel using normal bicycle chain (13t - rear sprocket chosen to keep wheel speed >10mph). Efficiency of the two-stage chain and sprocket drive is probably around 93%-95%, so actual motor/controller efficiency is about 6.5% greater. Efficiency was pretty good, but overall not quite as broad or consistent as with the Delta wind. I²R losses are more apparent, showing up as rolled off efficiency at high power.