## Cyclone raw motor with external controller, 48v/35A (1200w kit)

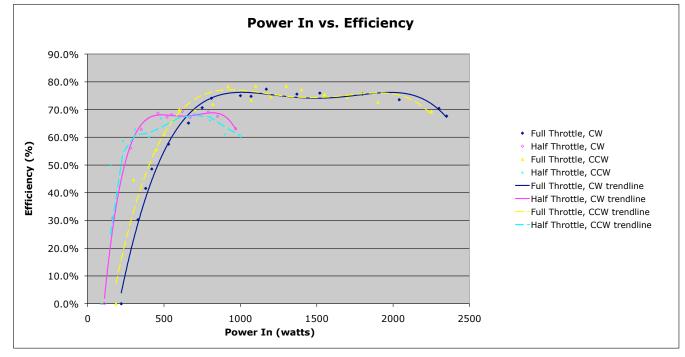
CW 1 - 1 · · ·		
CW rotation Full Throttle		
Power (Drain Brain)	Power (PowerTap)	Efficiency
220	0	0.0%
330	100	30.3%
380	158	41.6%
420 530	204 305	48.6% 57.5%
660	430	65.2%
750	530	70.7%
810	600	74.1%
1000	750	75.0%
1070	800	74.8%
1170 1370	905 1035	77.4% 75.5%
1520	1154	75.9%
1800	1360	75.6%
2040	1500	73.5%
2300	1620	70.4%
2350	1590	67.7%
CW rotation		
Half Throttle		
Power (Drain Brain)	Power (PowerTap)	Efficiency
110	0	0.0%
165	51	30.9%
280	157	56.1%
350	220	62.9%
460	316 350	68.7%
520 550	350 375	67.3% 68.2%
620	430	69.4%
670	450	67.2%
790	546	69.1%
850	574	67.5%
970	612	63.1%
CCW rotation		
CCW rotation Full Throttle		
Full Throttle Power (Drain Brain)	Power (PowerTap)	Efficiency
Full Throttle Power (Drain Brain) 185	0	0.0%
Full Throttle Power (Drain Brain) 185 300	0 134	0.0% 44.7%
Full Throttle Power (Drain Brain)  185 300 450	0 134 250	0.0% 44.7% 55.6%
Full Throttle Power (Drain Brain) 185 300 450 500	0 134 250 305	0.0% 44.7% 55.6% 61.0%
Full Throttle Power (Drain Brain)  185 300 450 500 600	0 134 250 305 420	0.0% 44.7% 55.6% 61.0% 70.0%
Full Throttle Power (Drain Brain) 185 300 450 500	0 134 250 305	0.0% 44.7% 55.6% 61.0%
Full Throttle Power (Drain Brain) 185 300 450 500 700 820 920	0 134 250 305 420 490 590 720	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3%
Full Throttle Power (Drain Brain)  185 300 450 500 600 700 820 920	0 134 250 305 420 490 590 720 786	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 73.5%
Full Throttle Power (Drain Brain)  185 300 450 500 600 700 820 920 1070	0 134 250 305 420 490 590 720 786 863	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 73.5% 78.5%
Full Throttle Power (Drain Brain)  185 300 450 500 600 700 820 920 1070 1100 1200	0 134 250 305 420 490 590 720 786 863 896	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 73.5% 78.5% 74.7%
Full Throttle Power (Drain Brain)  185 300 450 600 700 820 920 1070 1100 1200	0 134 250 305 420 490 590 720 786 863 896	0.0% 44.7% 55.6% 61.0% 70.0% 70.0% 72.0% 78.3% 78.5% 78.5% 78.5%
Full Throttle Power (Drain Brain)  185 300 450 500 600 700 820 920 1070 1100 1200	0 134 250 305 420 490 590 720 786 863 896	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 73.5% 78.5% 74.7%
Full Throttle Power (Drain Brain) 185 300 450 500 600 700 820 920 1100 1100 1200 1300	0 134 250 305 420 490 590 720 786 863 896 1020 1080	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 73.5% 78.5% 74.7% 75.5% 74.4%
Full Throttle Power (Drain Brain)  185 300 450 500 700 820 920 1100 1200 1200 1400 1400 1550 1700	0 134 250 305 420 490 590 720 786 863 896 1020 1080 1170 1265 1380	0.0% 44.7% 55.6% 61.0% 70.0% 70.0% 73.5% 78.5% 78.5% 77.1% 75.5% 74.4%
Full Throttle Power (Drain Brain) 185 300 450 500 600 700 820 920 1070 1100 1300 1400 1550	0 134 250 305 420 490 790 786 863 896 1020 1080 1170 1265	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 73.5% 78.5% 78.5% 77.1% 75.5% 74.4%
Full Throttle Power (Drain Brain) 185 300 450 500 700 820 920 1100 1200 1300 1400 1550 1700 1900 2250	0 134 250 305 420 490 590 720 786 863 896 1020 1080 1170 1265 1380	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 78.5% 78.5% 74.7% 75.5% 74.4%
Full Throttle Power (Drain Brain)  185 300 450 500 700 820 920 1100 1200 1200 1400 1400 1550 1700	0 134 250 305 420 490 590 720 786 863 896 1020 1080 1170 1265 1380	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 78.5% 78.5% 74.7% 75.5% 74.4%
Full Throttle Power (Drain Brain) 185 300 450 500 600 700 820 920 1100 1100 1300 1440 1550 1700 1900 2250	0 134 250 305 420 490 590 720 786 863 896 1020 1080 1170 1265 1380	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 73.5% 74.7% 78.5% 77.1% 75.5% 74.4% 69.3%
Full Throttle Power (Drain Brain)  185 300 450 500 700 820 920 1070 1100 1200 1300 1550 1700 1550 1700 1401 Half Throttle Power (Drain Brain) 90	0 134 250 305 420 490 590 720 786 863 896 1020 1170 1265 1380 1560	0.0% 44.7% 55.6% 61.0% 70.0% 70.0% 78.3% 78.5% 74.7% 78.5% 77.1% 75.5% 74.4% 72.6% 69.3%
Full Throttle Power (Drain Brain) 185 300 450 500 600 700 820 920 1070 1100 1200 1300 1550  CCW rotation Half Throttle Power (Drain Brain) 150 150	0 134 250 305 420 490 590 720 786 863 896 1020 1170 1265 1380 1560  Power (PowerTap) 75	0.0% 44.7% 55.6% 61.0% 70.0% 70.0% 72.0% 78.3% 78.5% 78.5% 74.7% 75.5% 72.16% 69.3%
Full Throttle Power (Drain Brain) 185 300 450 450 500 700 820 920 1100 1100 1300 1550 1700 1550 CCCW rotation Half Throttle Power (Drain Brain) 90 150 230	0 134 250 305 420 490 590 720 786 863 896 1020 1080 1170 1265 1380 1560  Power (PowerTap) 0 75 135	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 78.3% 78.5% 74.7% 78.5% 77.1% 75.5% 69.3%
Full Throttle Power (Drain Brain) 185 300 450 500 600 700 820 920 1070 1100 1200 1300 1550 CCW rotation Half Throttle Power (Drain Brain) 150 230 320 320	0 134 250 305 420 490 590 786 863 896 1020 11080 1170 1265 1380 0 590 75 135 135	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 72.0% 78.3% 78.5% 78.5% 74.7% 75.5% 72.16% 72.6% 69.3%
Full Throttle Power (Drain Brain)  185 300 450 450 600 700 820 920 1100 1100 1200 1300 1550 1700 1990 2250  CCCW rotation Half Throttle Power (Drain Brain) 90 150 230 310 400	0 134 250 305 420 490 590 720 786 863 896 1020 1080 1170 1265 1380 1560  Power (PowerTap) 0 75 135 195 241	0.0% 44.7% 55.6% 61.0% 70.0% 70.0% 72.0% 78.3% 78.5% 78.5% 74.7% 75.5% 72.6% 69.3%
Full Throttle Power (Drain Brain) 185 300 450 500 600 700 820 920 1070 1100 1200 1300 1550 CCW rotation Half Throttle Power (Drain Brain) 150 230 320 320	0 134 250 305 420 490 590 786 863 896 1020 11080 1170 1265 1380 0 590 75 135 135	0.0% 44.7% 55.6% 61.0% 70.0% 72.0% 72.0% 78.3% 78.5% 78.5% 74.7% 75.5% 72.16% 72.6% 69.3%
Full Throttle Power (Drain Brain) 185 300 450 500 500 600 700 820 920 1070 1100 1300 1550 CCW rotation Half Throttle Power (Drain Brain) 150 230 310 400	0 134 250 305 420 490 590 786 863 896 1020 1080 1170 1265 1380 1560  Power (PowerTap) 75 135 195 241 321 404	0.0% 44.7% 55.6% 70.0% 70.0% 72.0% 78.3% 78.5% 78.5% 78.5% 78.5% 79.1% 75.5% 69.3% Efficiency 0.0% 50.0% 58.7% 60.3% 66.9% 67.3% 68.4%
Full Throttle Power (Drain Brain)  185 300 450 450 500 700 820 920 1100 1200 1300 1500 1500 2250  CCW rotation Half Throttle Power (Drain Brain) 90 150 310 480 480 600 700 800	0 134 250 305 420 490 590 720 786 863 896 1020 1170 1265 1380 1560  Power (PowerTap) 7 241 321 404 479 530	0.0% 44.7% 55.6% 61.0% 70.0% 70.0% 78.3% 78.5% 78.5% 74.7% 78.5% 77.1% 75.5% 69.3%  Efficiency 0.0% 50.0% 50.0% 62.9% 60.3% 66.9% 68.4% 66.3%
Full Throttle Power (Drain Brain) 185 300 450 500 500 600 700 820 1070 1100 1200 1300 1500 CCW rotation Half Throttle Power (Drain Brain) 150 230 310 400 480 6600 700	0 134 250 305 420 490 590 786 863 896 1020 1080 1170 1265 1380 1560  Power (PowerTap) 75 135 195 241 321 404	0.0% 44.7% 55.6% 70.0% 70.0% 72.0% 78.3% 78.5% 78.5% 78.5% 78.5% 79.1% 75.5% 69.3% Efficiency 0.0% 50.0% 58.7% 60.3% 66.9% 67.3% 68.4%











Notes: The curves should generally be concave downward. Variation from this is no doubt due to errors in my measurement equipment.

Efficiency was measured by comparing energy drawn from the battery according to a Cycle Analyst and comparing that to energy sent to the rear wheel of the bicycle as read from a PowerTap hub.

Motor power passes through a 9.33:1 planetary gearbox and a standard bicycle chain and 14t - 52t sprocket on a left crank.

Torque then passes through the bottom bracket to a 51t chainning and then directly to a 34t sprocket on the rear wheel.