

## Cyclone 360-watt motor with internal controller

CW rotation

Full Throttle

Power (Drain Brain)	Power (PowerTap)	Efficiency
76	0	0.0%
160	100	62.5%
250	170	68.0%
350	250	71.4%
450	328	72.9%
530	372	70.2%
610	410	67.2%
675	435	64.4%

CW rotation

Half Throttle

Power (Drain Brain)	Power (PowerTap)	Efficiency
40	0	0.0%
80	37	46.3%
105	58	55.2%
150	96	64.0%
215	137	63.7%
265	157	59.2%
310	182	58.7%
350	182	52.0%

CCW rotation

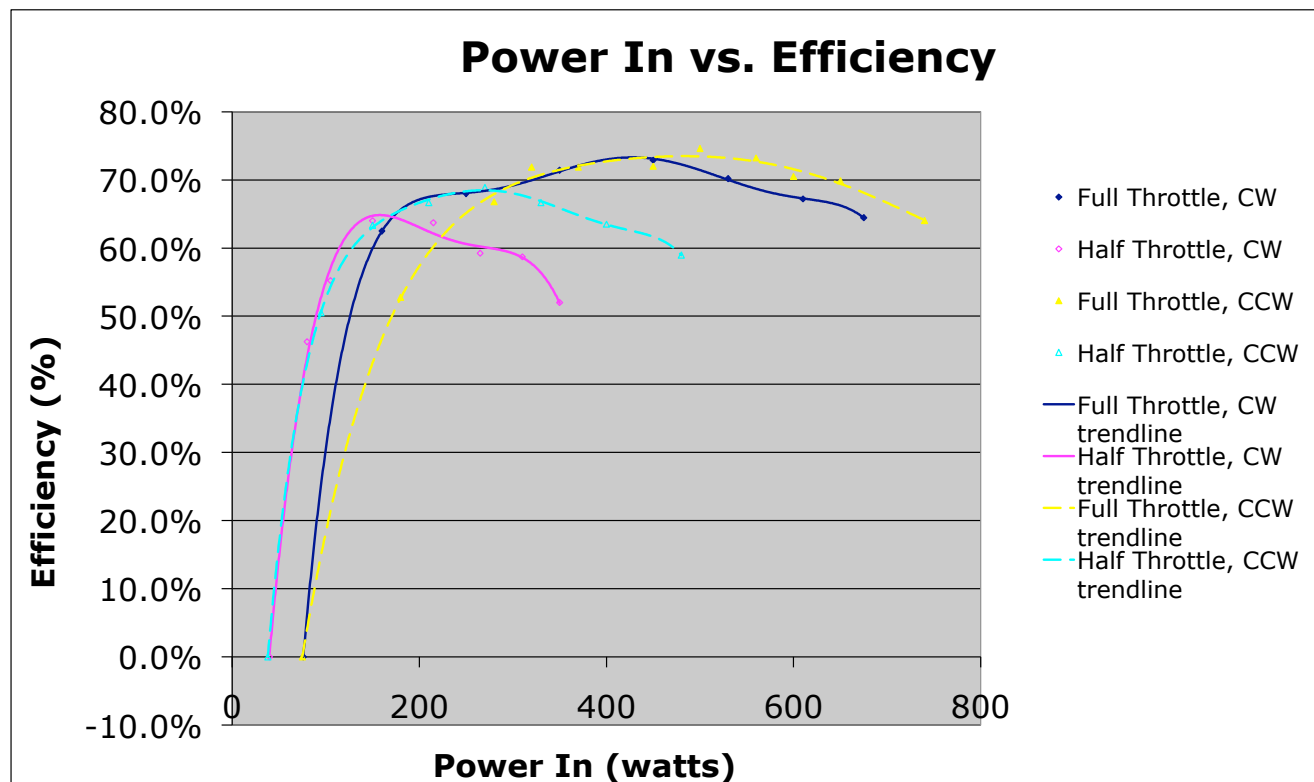
Full Throttle

Power (Drain Brain)	Power (PowerTap)	Efficiency
75	0	0.0%
180	95	52.8%
280	187	66.8%
320	230	71.9%
370	266	71.9%
450	324	72.0%
500	373	74.6%
560	410	73.2%
600	423	70.5%
650	454	69.8%
740	474	64.1%

CCW rotation

Half Throttle

Power (Drain Brain)	Power (PowerTap)	Efficiency
38	0	0.0%
95	48	50.5%
150	95	63.3%
210	140	66.7%
270	186	68.9%
330	220	66.7%
400	254	63.5%
480	283	59.0%



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 chainring and then directly to a 34t sprocket on the rear wheel.

Efficiency of the two-stage chain and sprocket drive is probably around 88%, so actual motor/controller efficiency is about 13% greater.