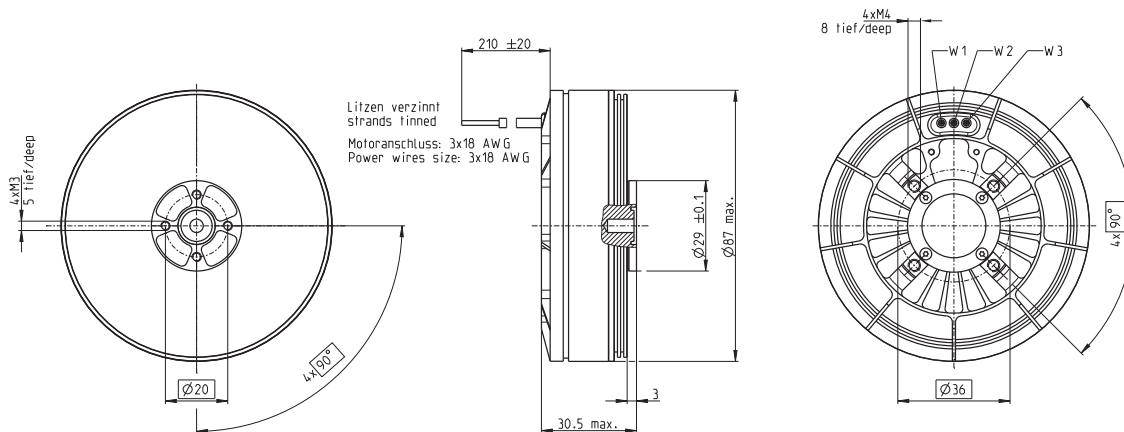


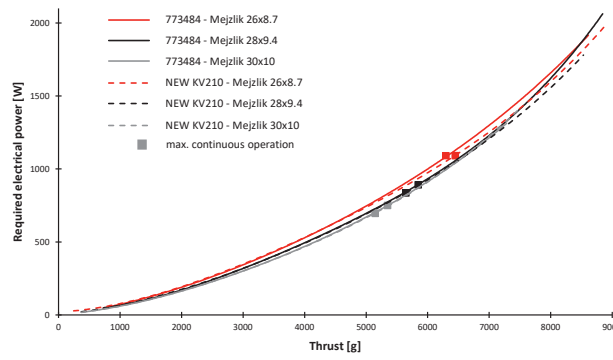
# EC 87 flat UAV $\varnothing 87$ mm, brushless

Designed for professional UAV applications



		Part number		Propeller selection	
sensorless		773484	NEW		

Motor data					
Values at nominal voltage					
1	Nominal voltage <sup>1</sup>	V	24	24	
2	No load speed	rpm	3500	4990	
3	No load current	mA	895	1630	
4	Nominal speed	rpm	2690	3890	
5	Nominal torque (max. continuous torque)	mNm	1590	1700	
6	Nominal current (max. continuous current)	A	22	33.4	
7	Stall torque <sup>2</sup>	mNm	5380	5970	
8	Stall current	A	227	424	
9	Max. efficiency	%	88	88	
Characteristics					
10	Terminal resistance phase to phase	$\Omega$	0.106	0.0566	
11	Terminal inductance phase to phase	mH	0.048	0.0175	
12	Torque constant	mNm/A	64.9	45.4	
13	Speed constant	rpm/V	147	210	
14	Speed/torque gradient	rpm/mNm	0.239	0.262	
15	Mechanical time constant	ms	3.26	3.57	
16	Rotor inertia	gcm <sup>2</sup>	1300	1300	
17	Thermal resistance housing-ambient <sup>3</sup>	K/W	0.471	0.338	
18	Thermal resistance winding-housing <sup>3</sup>	K/W	0.553	0.474	
19	Thermal time constant winding	s	9.4	8.2	
20	Thermal time constant motor	s	72.9	52.2	



<sup>1</sup> The nominal voltage is used to characterize the motor properties. This value does not represent the maximum operating voltage.  
<sup>2</sup> Calculation does not include saturation effect.  
<sup>3</sup> At nominal working point.

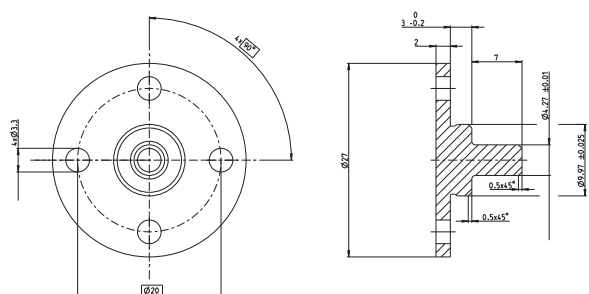
Specifications				Modifications on request - contact aerospace@maxongroup.com	
<b>Thermal data</b>					
21	Ambient temperature	$^{\circ}\text{C}$	-40...+70	-40...+70	
22	Max. continuous winding temperature	$^{\circ}\text{C}$	+155	+155	
	Absolute winding temperature	$^{\circ}\text{C}$	+180	+180	
<b>Mechanical data (preloaded ball bearings)</b>					
23	Max. speed	rpm	6000	6000	
<b>Other specifications</b>					
24	Number of pole pairs		21	21	
	Magnetic system configuration		36N42P	36N42P	
25	Number of phases		3	3	
26	Weight of motor (incl. 210 mm cable)	g	310	310	
27	Recommended propeller sizes	inch	26...30	26...30	

**maxon accessories**

Propeller adapter: 718087

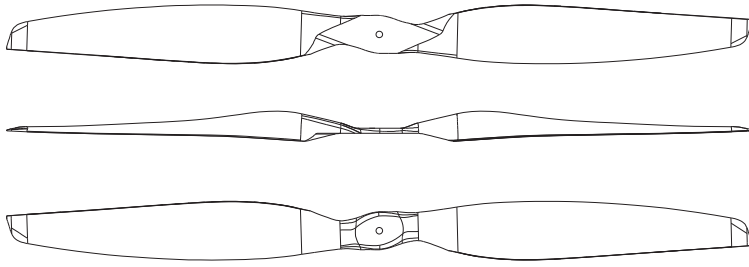
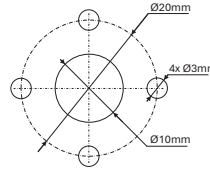
Values listed in the tables are nominal, i.e. defined for operation without a propeller attached (no active cooling). Motor data when operated with a propeller attached differs from the nominal values. The adjusted motor data depending on the propeller used can be found on the following pages under the section "Adjusted motor data for use with specified propeller (active cooling)."

**Cable and connection**  
 Connection cable with polyolefin insulation, L = 210 mm, AWG 18  
 W1: Motor winding 1, W2: Motor winding 2, W3: Motor winding 3



# Propeller 26x8.7

maxon recommended propeller for EC 87 flat



Propeller specifications		
1 Diameter	inch	26.0 (660.4 mm)
2 Pitch	inch	8.7 (221.0 mm)
3 Weight of propeller	g	68.0
4 Drill pattern		maxon EC87fl UAV
5 Interface thickness	mm	4.85
6 Material		carbon/glass fiber
7 Max. recommended speed	rpm	6900

Motor propeller combination					
Adjusted motor data for use with specified propeller (active cooling)					
		773484		NEW motor – please contact aerospace@maxongroup.com	
8 Max. continuous speed	rpm	3700	3670		
9 Max. continuous torque	mNm	2080	2076		
10 Max. continuous current	A	36.8	50.1	motor current=output current from ESC   maxon UAV ESC parameter: nominal current	
11 Max. continuous electrical power	W	1168	1170		
12 Max. peak electrical power	W	2037	2018	<15s	
13 Thermal time constant winding	s	27.5	29.5		

## Propulsion system performance table

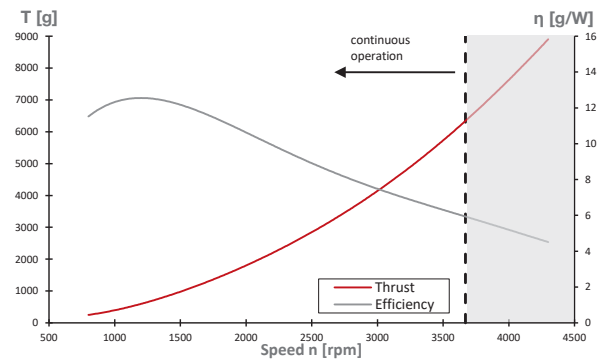
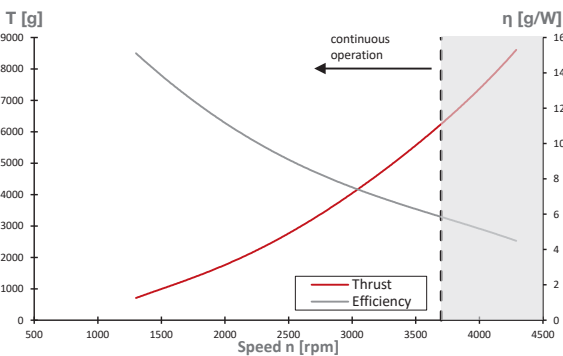
ESC supply voltage: 52.2 V (12S max. LiPo voltage) / Ambient temperature: 20°C / Elevation (AMSL): 475 m

773484

NEW motor – please contact aerospace@maxongroup.com

Achievable speed with battery level	Speed [rpm]	Current [A]	Torque [mNm]	Thrust [g]	el. Power [W]	Efficiency [g/W]
<b>Continuous operation (<math>T_w &lt; 155^\circ\text{C}</math>)</b>						
6S (22.2V)	1300	0.9	266	724	48	15.2
2690 rpm	1400	1.1	303	840	58	14.4
	1600	1.6	390	1112	84	13.3
	1700	1.9	441	1270	100	12.7
	1800	2.3	494	1437	118	12.2
	1900	2.6	550	1608	138	11.7
	2100	3.5	661	1946	182	10.7
	2200	4.0	724	2146	209	10.3
	2300	4.5	786	2339	236	9.9
	2500	5.9	932	2775	306	9.1
	2600	6.6	1005	3000	343	8.7
	2700	7.3	1062	3172	379	8.4
	2900	9.3	1257	3777	484	7.8
	3000	10.3	1351	4048	538	7.5
	3100	11.4	1436	4312	595	7.2
8S (29.6V)	3200	12.5	1524	4610	654	7.0
3380 rpm	3400	15.4	1739	5243	805	6.5
	3500	17.0	1856	5608	890	6.3
	3600	18.8	1974	5954	984	6.1
<b>Short term operation (<math>T_w &gt; 155^\circ\text{C}</math>)</b>						
10S (37.0V)	3800	22.4	2171	6560	1168	5.6
3925 rpm	3900	24.6	2305	6937	1285	5.4
	4000	27.3	2448	7374	1423	5.2
	4200	33.3	2736	8207	1737	4.7
12S (44.4V)	4290 rpm	36.8	2849	8612	1919	4.5

Achievable speed with battery level	Speed [rpm]	Current [A]	Torque [mNm]	Thrust [g]	el. Power [W]	Efficiency [g/W]
<b>Continuous operation (<math>T_w &lt; 155^\circ\text{C}</math>)</b>						
6S (22.2V)	800	0.4	113	246	21	11.4
	900	0.5	137	318	26	12.1
	1100	0.8	195	494	39	12.5
	1200	0.9	229	600	48	12.6
	1400	1.3	305	842	68	12.4
	1500	1.6	349	979	81	12.1
	1700	2.1	442	1278	111	11.5
	1800	2.5	495	1444	128	11.3
	2000	3.3	602	1797	169	10.6
	2100	3.7	654	1985	191	10.4
	2300	4.9	799	2408	252	9.6
	2500	6.2	936	2860	317	9.0
	2600	6.9	1008	3055	359	8.5
	2800	8.7	1170	3575	448	8.0
	2900	9.7	1257	3884	499	7.8
	3100	11.9	1446	4466	615	7.3
	3200	13.2	1548	4754	681	7.0
	3400	16.1	1758	5383	829	6.5
6S (22.2V)	3500 rpm	17.5	1853	5684	906	6.3
3500 rpm	3700	21.5	2108	6481	1108	5.8
<b>Short term operation (<math>T_w &gt; 155^\circ\text{C}</math>)</b>						
8S (29.6V)	3800	23.3	2201	6748	1205	5.6
4260 rpm	4000	28.5	2475	7650	1454	5.3
8S (29.6V)	4100	31.6	2627	8116	1610	5.0
4260 rpm	4300	38.8	2900	8868	1992	4.5

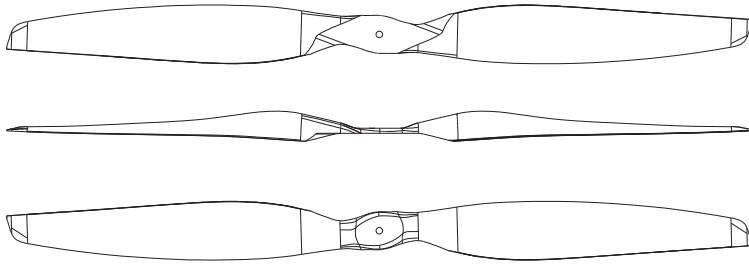
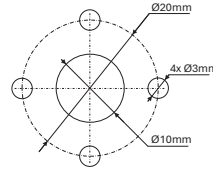


## Notes

Bench test data for reference only. Direct comparison with datasheets from other manufacturers can be misleading. The propeller is not distributed by maxon. Please contact the propeller manufacturer. Please note the interface to the motor, see drawing above.

# Propeller 28x9.4

maxon recommended propeller for EC 87 flat



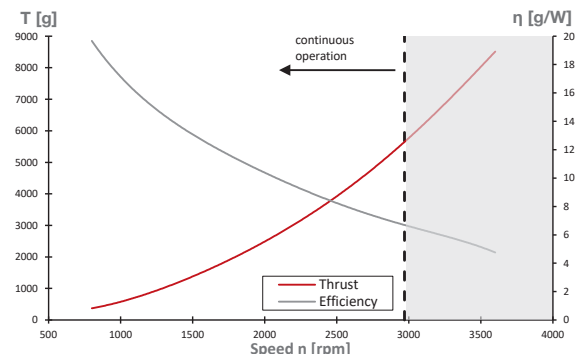
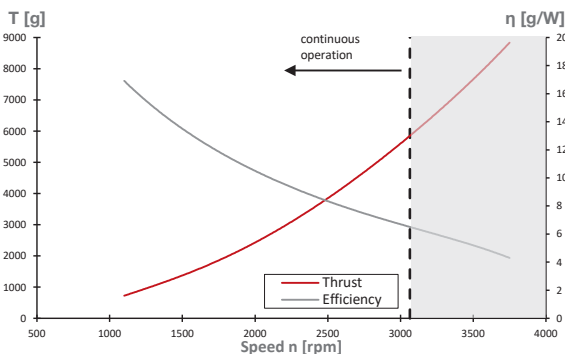
Propeller specifications		
1 Diameter	inch	28.0 (711.2 mm)
2 Pitch	inch	9.4 (238.8 mm)
3 Weight of propeller	g	78.0
4 Drill pattern		maxon EC87fl UAV
5 Interface thickness	mm	5.17
6 Material		carbon/glass fiber
7 Max. recommended speed	rpm	6400

Motor propeller combination					
Adjusted motor data for use with specified propeller (active cooling)					
			773484	NEW motor – please contact aerospace@maxongroup.com	
8 Max. continuous speed	rpm	3065	2970		
9 Max. continuous torque	mNm	2060	1972		
10 Max. continuous current	A	34.8	46.8	motor current=output current from ESC   maxon UAV ESC parameter: nominal current	
11 Max. continuous electrical power	W	970	925		
12 Max. peak electrical power	W	1806	1783	<15s	
13 Thermal time constant winding	s	27.5	34.5		

## Propulsion system performance table

ESC supply voltage: 52.2 V (12S max. LiPo voltage) / Ambient temperature: 20°C / Elevation (AMSL): 475 m

773484							NEW motor – please contact aerospace@maxongroup.com						
Achievable speed with battery level	Speed [rpm]	Current [A]	Torque [mNm]	Thrust [g]	el. Power [W]	Efficiency [g/W]	Achievable speed with battery level	Speed [rpm]	Current [A]	Torque [mNm]	Thrust [g]	el. Power [W]	Efficiency [g/W]
<b>Continuous operation (<math>T_w &lt; 155^\circ\text{C}</math>)</b>							<b>Continuous operation (<math>T_w &lt; 155^\circ\text{C}</math>)</b>						
	1100	0.8	287	733	43	16.9		800	0.4	155	369	19	19.8
	1200	1.0	335	870	54	16.0		900	0.5	190	466	26	18.2
	1300	1.3	394	1037	69	15.1		1000	0.7	229	580	34	17.1
	1400	1.6	446	1184	83	14.3		1100	0.9	273	706	44	16.0
	1500	2.0	515	1380	102	13.5		1300	1.4	376	1024	70	14.5
	1600	2.3	577	1564	122	12.8		1400	1.7	437	1185	86	13.8
	1800	3.3	722	1981	171	11.6		1500	2.0	498	1379	105	13.1
	1900	3.8	790	2179	198	11.0		1600	2.4	564	1567	125	12.5
	2000	4.4	881	2449	232	10.5		1800	3.4	715	2020	177	11.4
	2100	5.1	960	2663	266	10.0		1900	4.0	795	2247	208	10.8
	2200	5.9	1057	2944	310	9.5		2000	4.6	875	2495	242	10.3
	2300	6.8	1151	3236	354	9.1		2100	5.3	962	2723	277	9.8
6S (22.2V)	2500	8.8	1363	3843	459	8.4		2300	7.0	1151	3312	364	9.1
2570 rpm	2600	10.0	1479	4171	520	8.0		2400	8.0	1249	3588	415	8.6
	2700	11.3	1608	4541	591	7.7		2500	9.2	1370	3929	476	8.3
	2800	12.8	1733	4876	670	7.3		2600	10.4	1483	4278	541	7.9
	2900	14.3	1859	5227	748	7.0		2800	13.2	1728	4959	686	7.2
	3000	15.9	1962	5530	829	6.7		2900	14.9	1861	5335	770	6.9
8S (29.6V)	<b>Short term operation (<math>T_w &gt; 155^\circ\text{C}</math>)</b>						6S (22.2V)	<b>Short term operation (<math>T_w &gt; 155^\circ\text{C}</math>)</b>					
3180 rpm	3200	20.2	2294	6436	1058	6.1	3240 rpm	3000	16.9	2003	5749	873	6.6
	3300	22.5	2423	6846	1177	5.8		3100	19.1	2159	6242	986	6.3
	3400	24.9	2546	7158	1299	5.5		3300	24.1	2451	7113	1233	5.8
10S (37.0V)	3500	28.2	2727	7675	1473	5.2		3400	27.0	2610	7516	1383	5.4
3570 rpm	3600	31.5	2875	8099	1645	4.9		3500	30.5	2797	8002	1554	5.1
12S (44.4V)	3750	39.7	3142	8845	2075	4.3	8S (29.6V)	3600	34.5	2968	8532	1784	4.8
3750 rpm							3640 rpm						

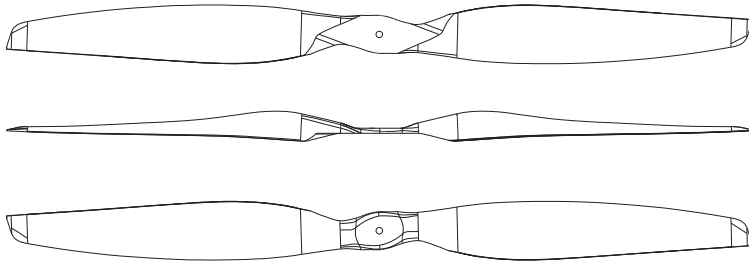
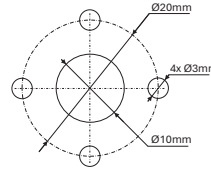


## Notes

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# Propeller 30x10

maxon recommended propeller for EC 87 flat



Propeller specifications		
1 Diameter	inch	30.0 (762.0 mm)
2 Pitch	inch	10.0 (254.0 mm)
3 Weight of propeller	g	96.0
4 Drill pattern		maxon EC87fl UAV
5 Interface thickness	mm	5.55
6 Material		carbon/glass fiber
7 Max. recommended speed	rpm	6000

Motor propeller combination					
Adjusted motor data for use with specified propeller (active cooling)					
			773484	NEW motor – please contact aerospace@maxongroup.com	
8	Max. continuous speed	rpm	2590	2502	
9	Max. continuous torque	mNm	2005	1906	
10	Max. continuous current	A	33.3	45.0	motor current=output current from ESC   maxon UAV ESC parameter: nominal current
11	Max. continuous electrical power	W	820	774	
12	Max. peak electrical power	W	1555	1498	<15s
13	Thermal time constant winding	s	23.5	33.5	

## Propulsion system performance table

ESC supply voltage: 52.2 V (12S max. LiPo voltage) / Ambient temperature: 20°C / Elevation (AMSL): 475 m

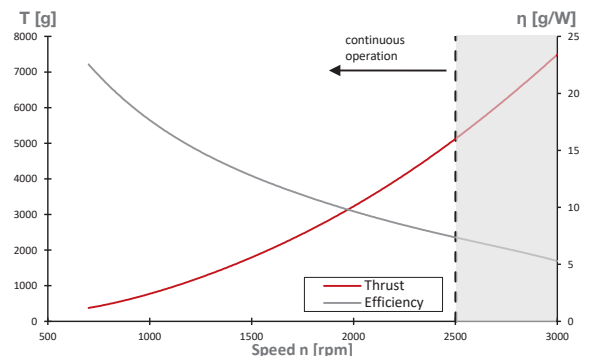
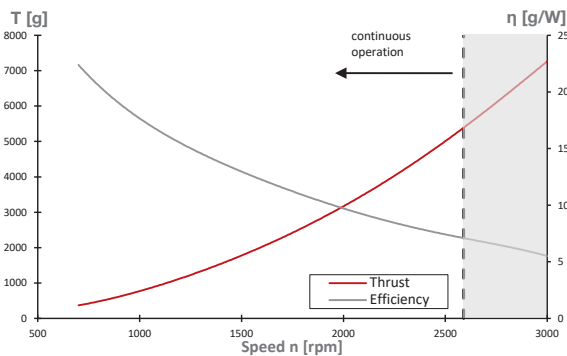
### 773484

NEW motor – please contact aerospace@maxongroup.com

Achievable speed with battery level	Speed [rpm]	Current [A]	Torque [mNm]	Thrust [g]	el. Power [W]	Efficiency [g/W]
Continuous operation ( $T_w < 155^\circ\text{C}$ )						
	700	0.3	170	372	17	22.5
	800	0.5	213	480	24	20.3
	900	0.6	263	613	32	18.9
	1000	0.8	318	771	43	17.9
	1100	1.1	384	940	57	16.6
	1200	1.4	455	1122	73	15.4
	1300	1.8	537	1351	93	14.5
	1400	2.2	604	1533	112	13.7
	1500	2.7	692	1793	136	13.2
	1600	3.2	781	2016	166	12.1
	1700	3.8	871	2273	196	11.6
	1800	4.6	978	2578	234	11.0
	1900	5.4	1093	2851	281	10.1
	2000	6.3	1213	3159	329	9.6
	2100	7.3	1328	3485	382	9.1
	2200	8.6	1468	3875	445	8.7
	2300	9.8	1594	4194	505	8.3
6S (22.2V)	2400	11.3	1748	4630	583	7.9
2450 rpm	2500	13.0	1898	5009	678	7.4
Short term operation ( $T_w > 155^\circ\text{C}$ )						
	2600	14.7	2041	5394	766	7.0
	2700	17.0	2223	5926	882	6.7
	2800	19.5	2397	6319	1013	6.2
8S (29.6V)	2900	21.9	2548	6762	1132	6.0
2965 rpm	3000	25.2	2722	7283	1314	5.5

Achievable speed with battery level	Speed [rpm]	Current [A]	Torque [mNm]	Thrust [g]	el. Power [W]	Efficiency [g/W]
Continuous operation ( $T_w < 155^\circ\text{C}$ )						
	700	0.3	169	370	16	22.5
	800	0.5	211	491	24	20.8
	900	0.6	260	619	33	18.8
	1000	0.8	320	784	44	17.8
	1100	1.1	379	944	57	16.6
	1200	1.4	451	1129	74	15.3
	1300	1.8	521	1330	92	14.4
	1400	2.2	603	1548	114	13.5
	1500	2.7	691	1798	141	12.8
	1600	3.3	779	2047	171	12.0
	1700	3.9	883	2331	203	11.5
	1800	4.6	984	2611	242	10.8
	1900	5.5	1095	2913	287	10.2
	2000	6.4	1202	3231	333	9.7
	2100	7.4	1322	3558	386	9.2
	2200	8.7	1466	3922	454	8.6
	2300	10.1	1608	4309	527	8.2
6S (22.2V)	2400	11.6	1746	4656	603	7.7
2980 rpm	2500	13.5	1914	5155	699	7.4
Short term operation ( $T_w > 155^\circ\text{C}$ )						
	2600	15.5	2074	5598	803	7.0
	2700	17.6	2220	6026	903	6.7
	2800	20.4	2414	6437	1054	6.1
6S (22.2V)	2900	23.6	2597	7016	1223	5.7
2980 rpm	3000	27.2	2793	7485	1412	5.3

10S (37.0V)  
3000 rpm



## Notes

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The propeller is not distributed by maxon. Please contact the propeller manufacturer.  
Please note the interface to the motor, see drawing above.