

March 2024 – Dualsky XM3045EG-12 on 6S and 4S GPS logs

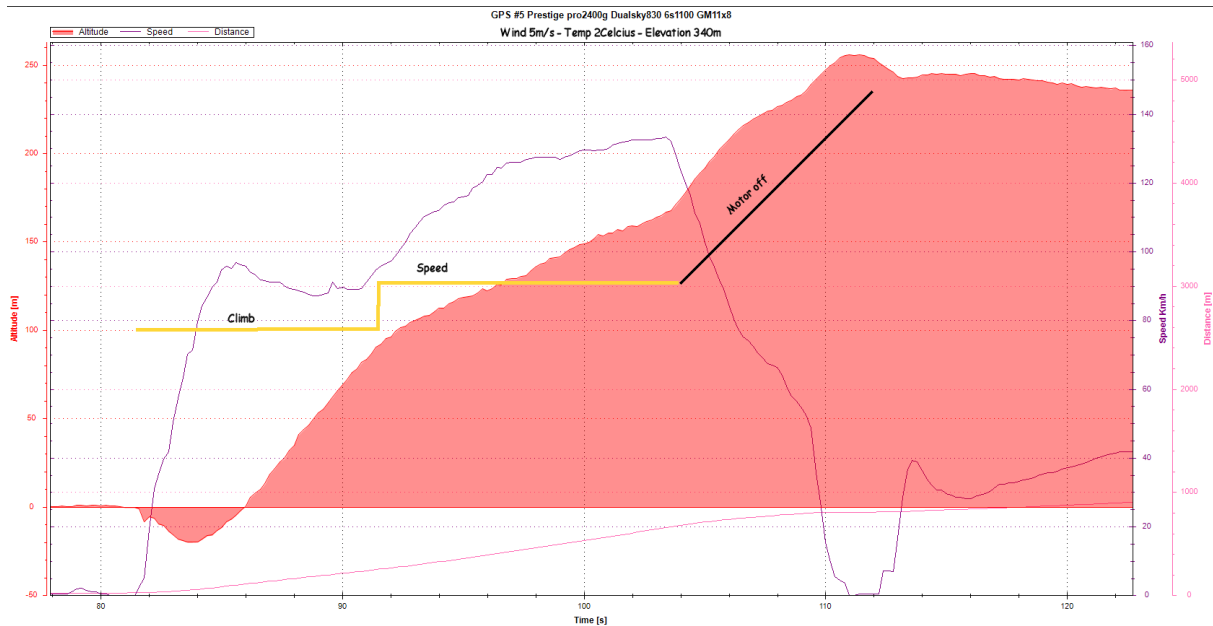
Have not had time to do GPS tests on the EG-12 from Dualsky. But now the weather was favourable although wind was low. To be sure I did some altitude tests upwind/downwind to see wind speed at 200m altitude. Measurements was 5m/s difference and that means the wind there was about that. On ground it was lower. So I have opted to disregard the wind speed but if you count it also it means 100m more distance covered. If the winds speed had been 12m/s it would mean 100m less distance covered. The old numbers in the excel sheet is done in maybe slightly higher wind and maybe not compareable as I have learned more on how to do the upwind effectively. But I leave them there as they are good numbers. Beware the amp numbers are high and the battery used are drone battery. So never do more than one 30sec go as temperature on motor rises even long after it has stopped. I should have liked to have the new Dualsky 6S900 long battery that should fit in the Prestige nicely but that will have to be a later test when I get my hands on them.

So to the test. I wanted to have a setup that I can run FAR upwind in high wind conditions. It will need to perform very good at 2400g or even higher weights. It also needs to be stable in 100+ flights without burning any motor, esc, battery or connector. I had a few Dualsky motors to test and the XM3045EG-12 at 830kv is doing what I hoped for. Motor is direct driven with a low kv so I could use smaller props with slightly higher pitch. Launch is at 50% power and I go to full power within 2-3 seconds. This helps not having extreme amps when props are stalling in the air before model gets a bit speed.

I have opted to climb first and then fly “straight” to build speed. To me this is easier to find a certain altitude and have a few more benefits. Today I launched 45 degrees to the side of the sun and actually had to stop motor at about 20seconds since visibility of model was poor. Numbers were logged on Altis GPS that logs both altitude and position. Looking at the numbers I will reach over 1000m forward if I use all 30 seconds of motor and try to end up at 200m. I am very happy on the test and it shows I have found some good setup for high wind were I want to reach some distance away. I did 3 tests on 6S and a couple on 4S with same motor/esc (bigger prop with high pitch from CCM). Could have done a lot more different props but I wanted to have fun and enjoy the day on the ice also ;-)

Conclusion is that a direct drive Dualsky is sure enough a possibility for extreme setup in wind F5J

Speedtesting forward																		
Straight speed	Motor	Weight	KV	Battery	Prop	Max amp	Climb amp	Straight amp	Max range 2	Weight model	Zoom m	Temp outs	Temp motc	Temp batt	Altitude f5j	Altitude	MA speed 30s	
233	Dualsky XM3040EG-9	104g	1350	4S	Turnigy 650 RF11x6,5	60	45		700,0	1650	18	C* 2		C* 25	248	340	23ms	
232	Dualsky XM3040EG-9	104g	1350	4S	Turnigy 650 RF11x6,5	59	45		650	1650	25	C* 2		C* 25	224	340	20ms	
217	Tenshock 1510A02	107	3550	4S	Turnigy 650 GM15x8	35	31	25	500	1700	15	C* 20	35	C* 20	210	500	17ms	
216	Tenshock 1510A02	107	3550	4S	Turnigy 650 GM16x10	45	37	32	580	1700	15	C* 20	40	C* 20	180	500	20ms	
5	36ms	Dualsky XM3045-EG12	120g	820	6s 1100CNHL	GM 11x8	62	apx54	apx48	1050	2400	35	C* 2	50	C* 20	230	340	35ms
7	28ms	Dualsky XM3045-EG12	120g	820	4s 900	CCM 13x9	58	apx47	apx38	800	2400	20	C* 2	50	C* 20	185	340	326ms

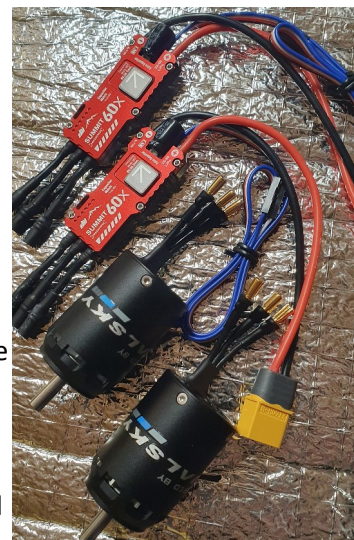


November 2023 - Dualsky XM3045EG-12 6S/4S motor and Dualsky 6S ESC

I got a question if I could include some new Dualsky motor(s) and a new ESC. These are intended for higher number of cells as this might be more efficient when one want to have a heavy F5J plane in strong wind. In strong wind one needs forward speed to overcome the wind and also travel forward to start the flight far in front. This way one can follow a thermal for a longer time than if one starts straight above. I received a couple of motors where I soon concentrated on one of them that are actually in the shops at some resellers. I also received a couple of new thin and light motor controllers that is rated to 60A/6S namely the Dualsky Summit 60X.08. Based on BIHeli it can be programmed by USB programmer or thru an old drone Flightcontroller (that is what I do). They come in two versions with BEC 8V or 6V but also a slim/light version have been seen on webshops. Ready soldered together with the XM3045EG-12 the weight is 155g. Beware the motor normally needs 32mm nose but I have mounted it in 30mm also but deppends how well moulded the noses are and how much material is used.

My main goal for the tests was to find a 6S setup with some good pitch that could cover a lot of ground in high wind situations with heavy ballast. But would also be nice to use the same setup on 4S for all "normal" conditions. Testing have shown one actually can just change directly from 4S to 6S when carefully choosing propellers.

One can debate if my old tests from some years ago might have to be done again with the same batteries I have today. But the biggest difference is that some of todays batteries I can do two or even 3 starts with voltage not sagging. This makes it easier to also do the straight line test of amperage I want to include. I used a rather big 6S1100 (rebuilt to 3+3) so I was sure to have enough juice. A smaller 6S might give slightly lower numbers. Especially on the higher amps tests. In competitions I intend to use around 6S 700-900mah that will be heated if the temeperature is below 10-15C.





The motor is designed just like the other canned Dualsky motors as an outrunner that is encapsulated so that the wires can come out from the back and the motor can be screwed directly to the bulkhead. I must say it is amazing quality and the motor never touch the outer shell even at much higher loads than intended on the design.

So is a canned outrunner performing on the level of a geared inrunner? Yes I will say they actually are doing very well. You need slightly more width of the nose but performance of these outrunners have really caught up with the geared stuff.

Testing shows this motor has a fine line around 45-50A when it starts to heat up even at our max 30second runs. So when you choose a setup try to keep under 45-50A. Beware of two things. These tests were done in winter (though with sealed bulkhead and heated batteries) and I do not test motor on the ground. There is absolutely no point in doing tests on the ground for more than a few seconds because propellers are cavitating and using much more amps than in the air. So DO NOT run F5J motors on the ground for 30seconds on full speed. And measuring on ground has no point at all. That is also why I state the startup amps that usually goes down to climb amps within a few seconds. So what props did I like best? Well props are getting more and more equal. I mostly use the best carbon brands in my tests (GM, CCM, CN, VM). I think the numbers still tell small advantage from some. If you want me to test others you will have to send me. I have used enough money on stuff and pay full import taxes even on test motors as Norway is outside EC.

There is still tests to be done with GPS/pitot tube but that will have to come later. Hopefully I can do tests side by side in same conditions with the best geared setups from last summer. That will also be interesting.



Conclusion: This is a very interesting and good motor (Dualsky XM3045EG-12 with Dualsky Summit 60X.08) to use from light/normal and up to fully ballasted 2400g F5J models. The climb values on some of the tests are just fantastic and rarely seen on these tiny setups. It is a safer choice for 6S and probably also 4S than the XM3045EG-8 I tested earlier. It also shows small differences in props make huge impact on climb rate and amps. The ESC has been great with not a single hiccup and I could program full brake and heavy startup since the outrunner can take it. Big congrats to Dualsky for yet another super F5J motor / ESC

All the other motortests is at the end of this document

Weight model	Motor	Weight	KV	Battery	Prop	Max amp	Climb amp	Straight amp	Sec. to 200m	Max m 30sek	Max climb m/s	Temp out*	Temp mot*	Temp bat*	Altitude MASL	Weight moe	Zoom m
282	2.400g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	GM 10x6CL	39	33	30	13	435	15	C° 0	<30	20	450	2400	11
283	2.400g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	9x7 CN	39	35	34	15	377	13	C° 0	<30	20	450	2400	11
284	2.400g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	11x7 CCM	52	45	43	11	522	18	C° 0	50	20	450	2400	14
155	2.400g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	11x8 GM	57	50	44	11	522	18	-C° 10	50	20	450	2400	14
156	2.400g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	11x8 CN	57	53	45	13	464	16	-C° 10	60	15	450	2400	16
287	1.500g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	9x7 CN	33	30	25	13	435	15	C° 0	<30	20	450	1500	16
152	1.500g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	11x6 GM	48	39	33	10	580	20	-C° 5	50	20	450	1500	21
286	1.500g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	11x7 CCM	52	44	42	10	609	21	C° 0	50	20	450	1500	24
290	1.500g	Dualsky XM3045-EG12	120g	820 6s 1100CNHL	11x8 GM	54	44	42	10	609	21	C° 0	50	20	450	1500	20
151	1450g	Dualsky XM3045-EG12	120g	820 4s 900	11x6 GM	29	24	18	20	290	10	-C° 5	<30	20	450	1450	7
159	1450g	Dualsky XM3045-EG12	120g	820 4s 900	11x7 CCM	28	26	23	17	348	12	-C° 10	<30	15	450	1450	7
158	1450g	Dualsky XM3045-EG12	120g	820 4s 900	11x8 GM	35	32	30	15	377	13	-C° 10	<30	15	450	1450	9
157	2.400g	Dualsky XM3045-EG12	120g	820 4s 900	11x8 GM	37	33	29	22	261	9	-C° 10	<30	15	450	1450	5
161	1450g	Dualsky XM3045-EG12	120g	820 4s 900	12x8 CCM	42	36	31	12	493	17	-C° 12	<30	20	450	1450	11
308	1450g	Dualsky XM3045-EG12	120g	820 4s 900	12x8 VM	45	37	34	12	493	17	-C° 5	<30	20	450	1450	11
163	1450g	Dualsky XM3045-EG12	120g	820 4s 900	13x8 GM	48	42	36	13	435	15	-C° 12	<30	15	450	1450	12
162	1450g	Dualsky XM3045-EG12	120g	820 4s 900	13x9 CCM	52	46	38	13	464	16	-C° 12	45	15	450	1450	14



September/October 2023 - CCM props

Long time since my first tests and it has given me a lot of good information whenever I want a change or need that small extra. This summer World Championship F5J showed us some horrible conditions that needed a lot of ballast and powerful powercombo with lots of pitch. I never thought I would need a 6-8cell setup but that is what I should have prepared for. I did not bring the right motors for that but high pitch propellers were in my box. So GM Competition line and a brand new CCM 13x9 was with me. These props were vital as I (we the whole team actually) was stuck in 4S setup and needed that extra speed forward in up to 18m/s in the gusts of some rounds. It was vital to end up 6-800m ahead at just under 200m. That is ok with lots of my 4S setups in calm weather but not with more than 12m/s headwind... So we ended up using bigger 4S batterier and my main propeller became the CCM13x9 on a Tenshock 1510-5000kv motor and AX40/AX60 controller. We did end up in 4th place as team so I would say it was succesful tuning. Now into autumn it was time to test some more CCM props (CCM11x7, 12x8 and 13x9) on different motors and 3, 4 and 6cells.

Beware when reading all my numbers that they might all have some detail you must pay attention to. First of all is type of battery. All batteries have different inner resistance and some of them needs to be heated to give full power. Some even sag a lot when they are not heated to above 25celcius. So choosing a worse battery or a very good battery will give you different results. It is not like one motor gives a



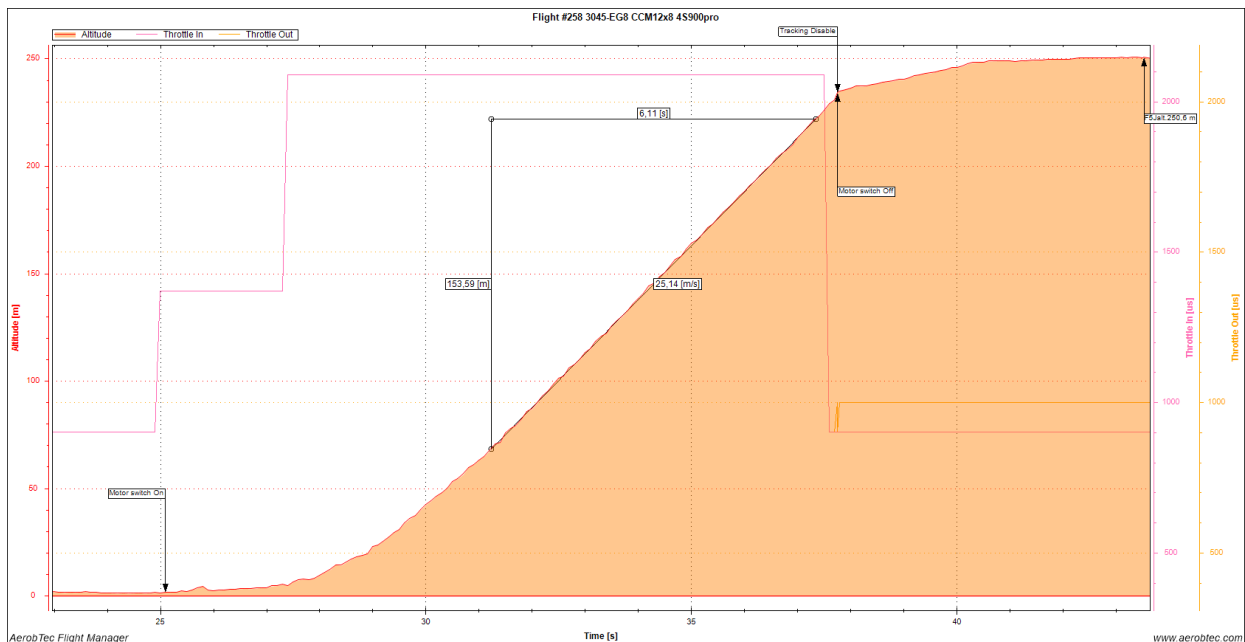
certain amps. A good indication on that is from test 245 compared to 252 where is used a different battery with the same amount of cells. That battery sagged a lot (voltage dropped) and gave a poor result. It is the whole system from total weight, plane type and setting, battery, contacts, motor, controller, propeller, spinner type that gives some climb rate. Another thing is weight of plane tested and height above sea level at the test.

The CCM props clearly performs up there with the best props and have well thought out pitch numbers for the F5J task. They are not under cambered and is wide enough to get things going

before they really grab the air. I also acquired a 30mm CCM spinner and together with the Prestige 30mm fuse the CCM 11x7 fits well. CCM 12x8 is not folding super all the way around but might be usable. CCM13x9 is not fitting with the CCM 30mm spinner. But I found the Vladimir spinners have slightly bigger yoke so I could use them. Also the more standard Vladimir spinners made it possible to use the CCM props on the 32mm Prestige nose. The way the props are designed they fit best with a "Z" yoke but can off course be used with a more standard straight Yoke from GM or similar. The reason for a "Y" yoke is that a high pitch prop will be more "flat" on the fuse. It should also be said that the spinner has a very clever and nice solution with inside screw to keep the spinner completely smooth on the nose.



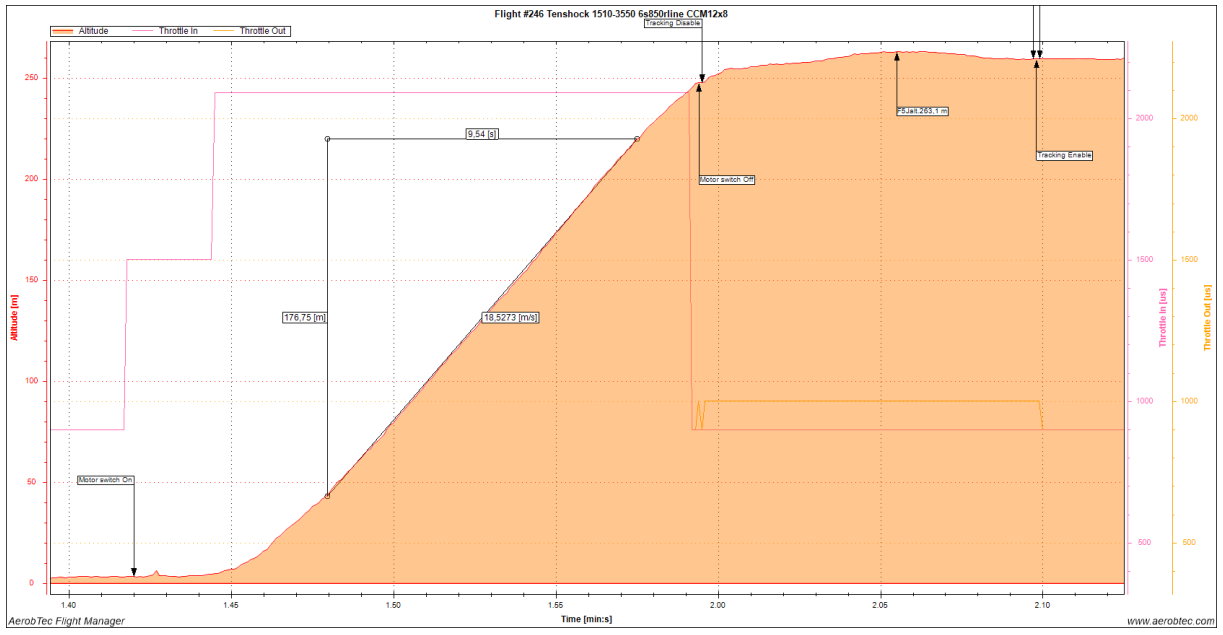
After a comment on Facebook I tested the CCM 12x8 and the VM 12x8 on the Dualsky 3045-EG8 / Dualsky 65lite with strong 4s900 batteries. That is not something I recommend but the motor can take the power for 10-12seconds and that is enough to reach 200m with 1500g model in 8-10 seconds. BUT none of the components are rated for the 100A (75A during climb) you are pulling. So be very careful as some component will at some point fail. Especially testing on the ground,



I also got a 25mm spinner and props for turning some older DLG's into electric F5K models. But that is a different story.

So a small conclusion is that the CCM line of props (ccm.in.ua) is fantastic and a good choice for a proper setup. They work with both direct setups and geared setup and will give you confidence if mated with a good complete setup

Motor	Weight	KV	Battery	Prop	Max amp	Climb amp	Straight amp	Sec. to 200m	Max m 30sek	Max climb m/s	Temp out*	Temp mot*	Temp bat*	Altitude MASL	Weight moe	Zoom m
258	Xpower 2926/8 windy	102g	1380 4s 900	11x7 CCM	60	59	58	12	493	17	C° 10	HOT	20	450	1500	14
260	Xpower 2926/8 windy	102g	1380 3s 850 95C	11x7 CCM	52	44	42	15	377	13	C° 10	<30	21	450	1500	10
263	Xpower 2926/8 windy	102g	1380 3s 850 95C	12x8 CCM	59	49	48	18	319	11	C° 10	50	22	450	1500	7
267	Xpower 2926/8 windy	102g	1380 4s 900	12x8 CCM	70	58		14	406	14		Too hot		450	1500	12
242	Dualsky XM3045-EG8	120g	1250 3s 850 95C	11x7 CCM	55	42	39	13	464	16	C° 10	<30	24	450	1500	8
243	Dualsky XM3045-EG8	120g	1250 4s 900	11x7 CCM	60	57	54	15	377	13	C° 10	<30	25	450	1500	20
257	Dualsky XM3045-EG8	120g	1250 4s 900 Dualsky	12x8VM	101	75		10	609	21	C° 15	50	30	450	1500	31
258	Dualsky XM3045-EG8	120g	1250 4s 900 pro	12x8VM	97	76		8	725	25	C° 15	50	30	450	1500	30
253	Tenshock 1510A02	107	3550 6s 1100CNHL	12x8CCM	44	39	33	10,0	580,0	20	C° 14	50	25	450	1550	28
245	Tenshock 1510A02	107	3550 6s R-line 850	11x7CCM	29	28	24	13,3	435,0	15,0	C° 14	<30	25	450	1500	14
246	Tenshock 1510A02	107	3550 6s R-line 850	12x8CCM	41	33		11,1	522,0	18,0	C° 14	50	25	450	1500	15
247	Tenshock 1510A02	107	3550 6s R-line 850	13x9CCM	46	39	34	10,5	551,0	19,0	C° 14	Hot	25	450	1500	18
250	Tenshock 1510A02	107	3550 4s 900 Dualsky	13x9CCM	29	25	20	16,7	348,0	12,0	C° 14	<30	25	450	1500	7
252	Tenshock 1510A02	107	3550 6s Tattu 650	12x8CCM	30	27-23	25	sagging batt		14-12 batt	C° 14	<30	25	450	1500	8



August/September 2022 - Dualsky XM3045EG-8

In Hungary at the European Championship F5J I received a Dualsky XM3045EG-8 motor for testing. The motor is a «beefed up» version of the XM3040EG-9 and is heavier but should also take more power and more motor time before getting hot. The idea is that windy F5J models or even GPS light models up to 2,8kg could use this motor. My team mate happened to buy a used model at the the event so I borrowed him the motor and controller for use during the event. The motor were used for 20 starts before I got it back. Then I started testing it with different weights, props and batteries. The motor was installed in a typical 32mm nose for the Prestige 2PK F5J model and I used the Dualsky X-65-Lite controller as this has proven before to be a inexpensive but good controller. First tests were done with 1350g model and 4s650mah Tenshock battery and 4s600mah Dualsky battery. For the heavier model test (2100g) I also doubled up with 2pcs 4s600mah in paralell so that the battery becomes a strong 4s1200mah 120C battery. This also confirmed my numbers using single 4s600 batteries.



Equipment used for the tests were:

Motor Dualsky XM3045EG-8 with controller XC-65-Lite.

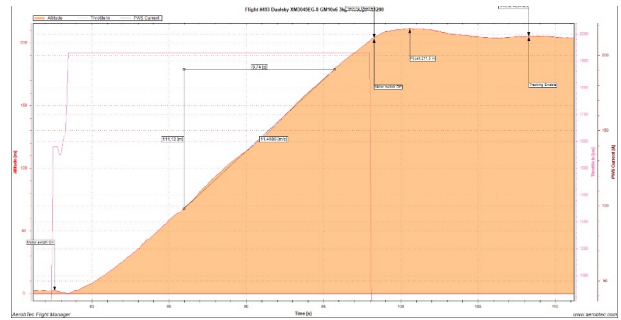
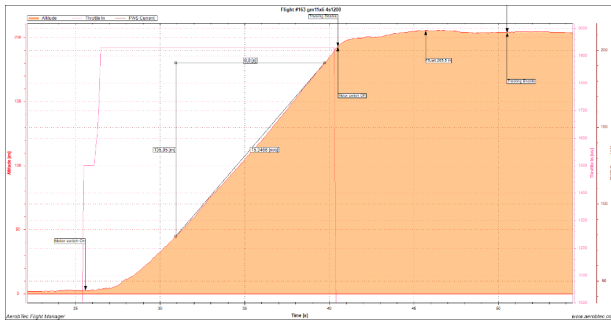
Model Prestige 2PK light and F3J (1350g, 1500g, 2000g, 2200g, 3000g)

Batteries 3s650mah 75C Tenshock, 4s650mah 75C Tenshock, 4s600mah 120C Dualsky

Alti nano/V4+, Unisense-E

Now after testing and validating the numbers I can say the motor performs just as it should. It would be a very nice motor for any F5J model or GPS light model on 3 or 4 cells. Amps during testing have been held under 65A but I think it can take a lot more as the temperature of the motor has never exceeded 50Celcius even after many tests in a short time period.

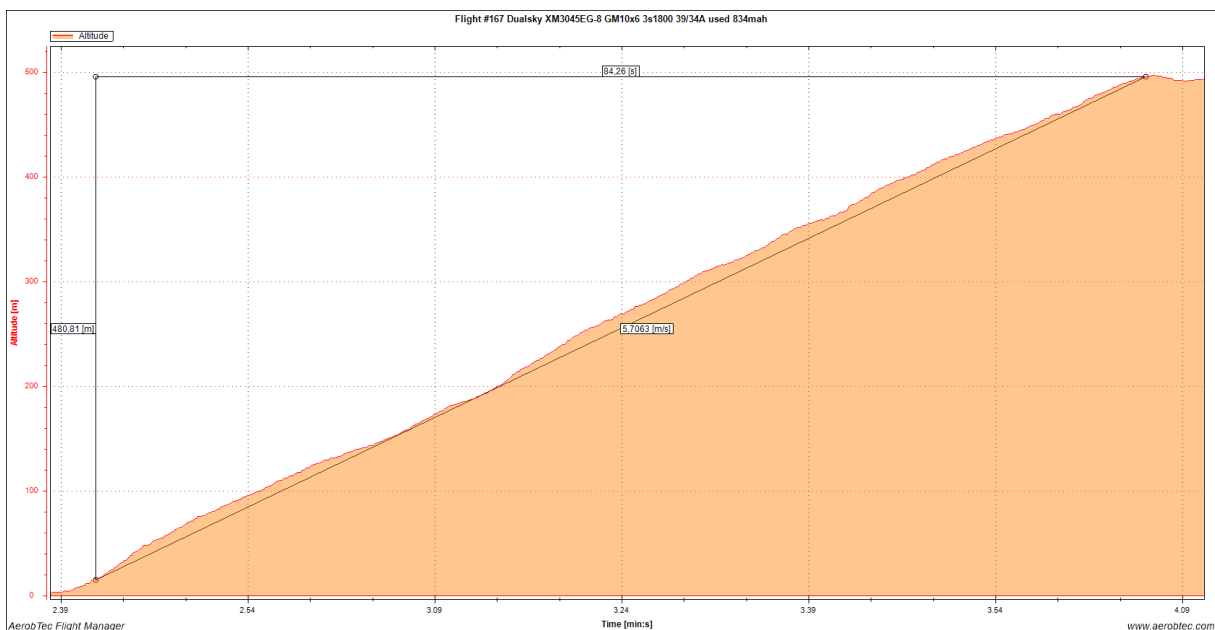
Test results is also in the Excel sheet is at the end of this document to compare with other motors.



Motor	Weight	KV	Battery	Prop	Max amp	Climb amp	Straight amp	Sec. to 200m	Max m 30sek	Max climb m/s	Temp out	Temp mot	Temp bat	Altitude MASL	Weight mo
Dualsky XM3045EG-8	120g	1250	3s Turnigy 650	12x6 CN	58	55	51	12	360	12	20	<30	C° 25	450	1450
Dualsky XM3045EG-8	120g	1250	3s 1800 turnigy	10x6 GM	39	34		33	180	6	15	50	C° 15	450	GPS 2780
Dualsky XM3045EG-8	120g	1250	4S Dualsky 1200	11x6 GM	59	58		13	465	15,5	20	45	C° 25	450	2200
Dualsky XM3045EG-8	120g	1250	4S Dualsky 1200	10x6 GM	59	57		14	420	14	20	<30	C° 25	450	2200
Dualsky XM3045EG-8	120g	1250	4S Turnigy 650	12x6 CN	61	59		12	510	17	20	45	C° 25	450	1350
Dualsky XM3045EG-8	120g	1250	4S Turnigy 650	10x6 GM	59	57		13	465	15,5	20	<30	C° 25	450	1350
Dualsky XM3045EG-8	120g	1250	4S Dualsky 600	10x6 GM	59	57		13	450	15	20	<30	C° 25	450	1350
Dualsky XM3045EG-8	120g	1250	4S Dualsky 1200	10x6 GM	59	55		17	345	11,4	23	45	C° 25	500	3000
Dualsky XM3045EG-8	120g	1250	4S Dualsky 1200	10x6 GM	59	58		12	20	55	20	55	C° 20	700	F3B 2200
Dualsky XM3045EG-8	120g	1250	4S Dualsky 1200	11x5 GM	68	57		11	20	55	20	55	C° 20	450	F3B 3050
Dualsky XM3045EG-8	120g	1250	4S Dualsky 1200	11x6 GM	80	64				13	20	60	C° 20	450	F3B 3050

GPS Light:

The Prestige 2PK is excellent for GPS Light class where max takeoff weight is 2598g (Vtail 2648g). So I ballasted the strong 130% F3J version (very similar to GPS version) to 2780g (180g more than allowed) and did some tests with the specially designed GM 10x6C.L propeller and C.L 32mm spinner (can be bought thru samba or dealers). It is specially designed for the 32mm Prestige nose cone to have very little drag and because it is a small propeller the drag is even less also sideways when folded. In GPS class there is no need for fast launch but it needs to be safe for launch in turbulent conditions and have enough power to do several climbs to <350m before you enter the course (searching for thermals). This test is therefore done with heavier and higher than allowed to be sure it is a good setup. Climb rate was on average 5,7m/s in turbulent air but stable thru-out many climbs/tests at 5,5-6,5m/s. Launching felt very safe with good acceleration. A total of 830mah was used to climb 500m.



F3B/F3F/F3G model:

Put the Dualsky XM3045EG-8 motor in my Pike Precision 2 from Samba Model. Fit is excellent. Flew 4 flights with mostly aerobatics and using 800-1000mah of a 4s1200 pack (double 4s600 Dualsky). The motor got slightly warm around 50-60 degrees on the 2nd flight were is used 1000mah during 5min. Esc was Dualsky Lite 65 (did not get warm). It seems the motor is excellent for F3B/F model flying aerobatic fun or F3G competition. For sure can recommend this setup for such model.

Further testing with ballast and different propellers have also been done. Climb rate 12-15m/s at 2300g flying weight and 10-12m/s at 3050g flying weight. Using 11x6GM on 4S is possibly pushing the motor when using more than one climb. Heat was building up a bit in the motor.



January/February 2021 - Tenshock 1510A01-04

4 new motors and 2 controllers arrived. This is final version motors I think. They made the gear parts more solid and have winded a couple more versions (3550, 3950, 4650 and 5000kv). All have the same gear. The new controllers are 2-4 cell with a beefy 10A BEC. First impressions on logs is a very stable BEC voltage.

Both controllers (TS AX40) and motors (Tenshock 1510A01 to 04) have been tested a lot of flights and well above max what specifications said was max. They seem to be very robustly made and can cope with long endurance. I will open up the gears and check for damages at a later point but no noise changes have been heard during testing and no over heat or smell from windings have been observed. They are for sure good combinations. A new TS AX60-PRO is also released now for those that wants up to 6S / 1000watt setup.



Not many starts yet and temperature is low outside. So beware that there are some uncertainties as even when I heat the small batteries to 25-30 degrees they can be much lower before I manage to start the model. One could heat to 35-40Celcius and they do give more power this hot. But I try to not push them too far and instead try to show what we have in a normal summer day. I could do tests also with high temperature batteries but I have to draw the line somewhere on how many tests I do..

Some of the tests is done with 6S and 8S batteries as these motors can easily cope with the higher voltage with correct props. So beware the columns showing what battery/props is used.

These 6S/8S tests are not done with the Tenshock controller but a castle edge lite50 (Timing at 6degrees) and a Dualsky 6S controller. Now a new 6S/1000watt Tenshock is released that should be excellent for those bigger power setups.

Probably my motors will not be run much on more than 4S setups (4cells series) as testing have proven 4S is plenty power for F5J use or fun flying.



I have also included a new propeller that is made by Solidtec (design by Julian Benz and sold thru servorahmen.de). It is just called A1. Max rpm is 11000 and max 1900watt. Weight 6,6gr.

Propeller is made from carbon fiber reinforced plastic by injection molding. It is an interesting material if mixed correctly. We know Solidtec is good at this from the servo frames they also produce. But care should be taken after landing hard as always. Landing tests have to wait for spring time as I have only snow and ice now 😊

The propeller seems to be performing well and I have done some tests with different motors (see excel sheet below). It also corresponds with the producers own tests. Small differences is probably battery temperature and battery type. Timing can also do differences.



May 2020 - Tenshock new motors

Sooo.. another update and why some of you might be interested.

As many know I have been doing motor/prop/battery testing since winter. Not really scientific but good enough so I can be confident on my motor combos. I have off course no time or money to test all out there but a selection of what i have or got. This time the update is after I got some new Tenshock motors. http://www.tenshock.com/ts-gdm1510a-planetary-gear-drive-motor-4-75-1.html?fbclid=IwAR04m3GeYOITkk_ScTHNVuT-ZFQCTjDzp1p0CxM9PjDAcc3ph7dsdTU74fw. They

have made their own gears and two new motors specially designed for F5J 3 and 4 cell setups. Looking nice, good weights and a nice feature of motor front screw that means you will not destroy it by using too long screws. It also has so many holes that it will fit even if you have used 3 screw reisenauer before. Just make some new holes and one can switch back and forth.

The motors run very quiet and together with some quiet props you are almost stealth compared to some others ;-)

I dont think I have found the best setup yet as I have only reached 13m/s as best. But forward speed is decent for windy conditions (Reaching 5-600m forward in 5-6m/s wind). I might want to use the 3S motor with 4cell?.. Need to complete more props before I do that as it is more than it is spec'ed for.

On my motors there are some improvement points that I think they will adrese. They had forgotten to put some loctite on the gear case and I think the later produced shafts will be "D" connection. We pilots like very fast start and hard braking. That is hard on the gears..

So a small conclusion on these two Tenshock motors:

Quiet. Runs smooth and within specs they do not get too hot.

Design and fit is good. And it fits small fuses that had previously had other screw holes.

Performance could be better for heavier models. 2kg and launching to 200m far forward is ok but not more. Might be different view when/if I do more testing. Using more cells than spec might probably be good as rpm on gear is not at max (speced 70000rpm)

Assembly gears had some faults that they should have fixed on later deliveries (I got early birds).

March 2020

So time to release all my test results.. though I am far from finished 😊

In F5J your means of start is a motor and 30seconds to use that. You want enough power for 30seconds but also some extra for practice and an hour of two flying. We dont want to getvas much altitude as possible because the lower we launch and fly 10min the better score we get. Over 200m we get extra penalty so to use the 30sec motortime properly is important. Last year I started to use some really small and powerful 4 cell batteries from Turnigy. They have been great and one can push them far even cold (some increase though heated)

Last year I used several different gear motors but I was fairly impressed by the cheap AXI 2217/12 v2 Long that gave me some good results in competitions even at 2100g flying weight on my Prestige 2PK (empty weight 1250g).

So I bought 2pcs of the brother 2220/12 long and upped the power to 4 cells after some messages from the producer this was possible (30A continious and 35A short term no issues). The reason for 2 was to use it over the limit and possibly burn it. It has not yet burned though it has been warm (upwards of 60A/30sec) Results have been good but also not so good depending on propellers. So I ordered a lot of different propellers from different producers and also got my hands on some new smaller GM props (Georgi Mirov) <https://www.gmpropellers.com/> he sent me for free. Result after many props is that this is a very nice and cheap alternative to a geared motor. No gear to break, 4 cells means temoerature of battery is not so important and the props are smaller = less drag.

Then a second motor came in that was interesting. Ivan Horejsi from <https://horejsi.cz/> suggested sending me a Dualsky motor designed for our purpose for free.

Motor is outrunner but with case so there is no outside can turning and the motor wires out the back. Dualsky XM3040RG-9 was the cryptic name as part of a series newly developed motors from Dualsky <http://www.dualsky.com/motor/67f3bf8a-9b1d-266d-41e6-8960fc50f8ee.shtml>

First test was fantastic so I bought 2 more in the local hobby shop to also with these try and find the limit. With this motor I could also install a temperature probe on the case and monitor it thru the telemetry.

I also bought two pieces of the new Aerobtec power sensor so I could log amperage together with the Alti altimeter, This meant I had full control of initial power and thru the full climb phase of a typical F5J start.

So what am I looking for? Well most F5J starts end up in 100-150m and you know were to start searching. But sometimes the thermals are low and strong so you need to use the 30seconds to search in low altitude for 20sec with motor on 1/3 throttle or even lower. Then if you dont find it you might want to climb 100m the last seconds. That again means you want a fast and powerful climb for 5 seconds in worst case.

Another case might be the wind speed is high and you want to reach a treeline 500m in front. You then need to fly faster than the wind forward and also climb to whatever height you feel necessary in those 30sec. Here an outrunner (or innrunner) with small prop have an advantage as it often runs on higher rpm with the same pitch as their geared counterparts.

The motor combo also needs to perform with full ballast and it would be nice if it is so light one consider it in the lightest models were you try to save every gram. Most tests were done with 1650g windy Prestige with some tests full ballast and some speeding forward.

Looking at the results I put into an excel sheet I find extreme values both on AXI and Dualsky motor but I also want the motors to run for many seasons without service so it is always nice to take a step back. Motor efficiency also goes down when using a "too big prop" so sometimes it is no point in going bigger prop just for a few % better performance.

As a results of all this testing (>100 logs with many of the multiple climbs. many for double testing) I am happy to say both AXI2220/12 long and the Dualsky XM3040EG-9 perform well for F5J flying as I see it.

The Dualsky XM3040EG-9 have really performed the extra mile as it has never been above 34Celcius temperature on the outside and performs above 15m/s climb if you want.

All tests have been double checked with 30sec first climb and then extra climb(s) on same battery so that any heat build up will show and simulate summer conditions/worst case.

I am still waiting for some new propellers and spinners (VM and GM) to tweak and also to get the best aerodynamic nose. Flying F5J means flying a lot slow and also a lot sideways (sideslip) in the wind. So drag is important. More on that later.

So for propeller I am now currently "in love" with the new GM small series. Very little sound and it seems to outperform what I had available of props.

Gear:

- Plane is Samba Model, Prestige 2PK windy designed by Philip Kolb (1650g with F3J tips). 32mm nose cone (new 30mm nose just barely fits the Dualsky but needs sanding or cutting to 32mm)

- Battery: mostly Turnigy 4s650 75C and 3Stattu R-line 4s850 95C
- Controller DYS40 mediumhigh timing for outrunners and Tenshock/Castle/Dualsky on geared motors
- BEC CC10A used for the DYS40
- Altimeter/powerlog Aerobtec nano and powersensor. For range test the Aerobtec GPS was used as extra logger.
- As a backup I read and log also most data on a Unisense-E from SM-modelbau
- Tx and telemetry JR XG11

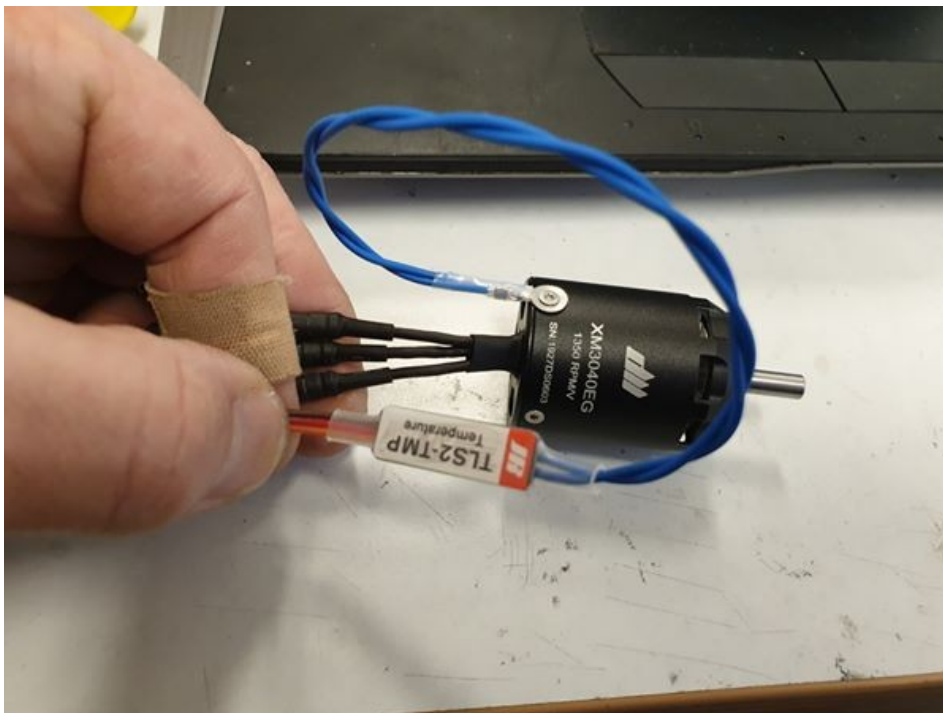
All results from my excel sheet here (pdf) <http://www.jojoen.no/div/2020testingmotor.pdf>

Edit and disclaimer: to all of you following.. i am doing all these tests to find something that works for me in any condition with any weight in my models. Dont expect the exact results if you change something. An example of this is todays GM11x6 that uses around 50A on this Dualsky setup. But i also see that warmer battery makes higher amps. A bigger battery with same C will outperform the battery i use and that means you will draw even more and "might" be too much for the motor. A second climb almost always gives better climb because of heated battery. So I have tried to discard those but oftem perform them to check. I also might need to go thru the logs again to recheck. There might be things that went wrong (example one bad battery of the 12-15pcs I have)

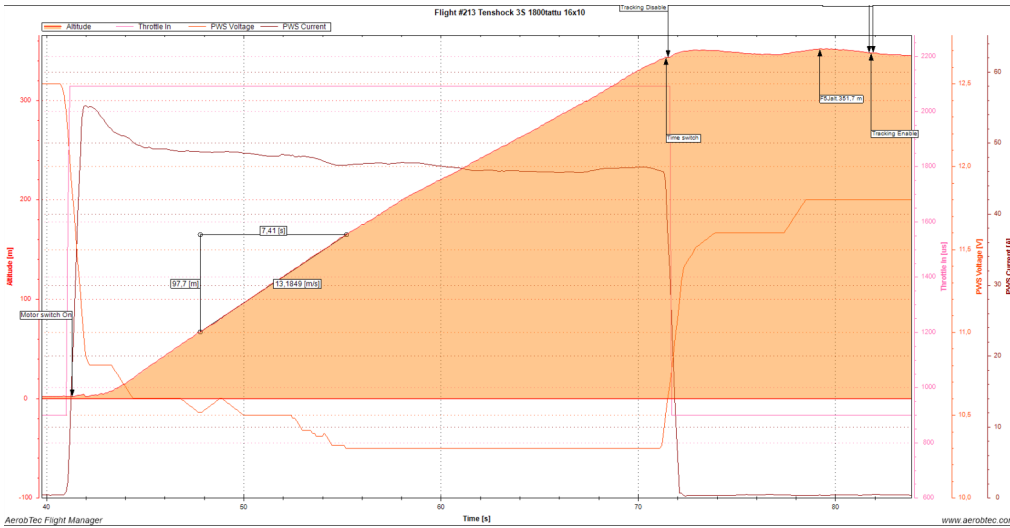
That is why my favourite is not the propeller that gives highest climb. It should also fit fuse for less drag and be a good setup in both cold and warm weather (warmer/colder batteries). And i want the setup to last many seasons.

These test have been performed without any sponsorship. I have had one motor and some props sent to me but I have bought most of it with own money. Though the testing have sparked producers sending me stuff i try to not get influenced in the testing.

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Updated 02.12.2023

These are my personal findings and scores are according to what I feel.

Some small adjustments to spinners might have to be done.

Some props are wider than others. That is mainly not taken into consideration.

Some combinations could deserve a 7 but I have not opted for a best score.

- 1 Bad fit and does not fold to fuse
- 2 Not folding properly
- 3 Folds but not perfect
- 4 Folds and fits decent
- 5 Folds good and fit is good
- 6 Folds almost perfect and fit is good

30mm Prestige nose - 30mm spinners

Propeller	Spinner		Hyperspinner	GM 28mm yoke	GM 30mm yoke	GM 32mm yoke	GM 34mm yoke	CCM 30	GM comp	GM comp(bigger yoke)
	VM PRO	VM PRO Yoke fr 32mm								
GM9x5	1	2	5	6	6					
GM13x8	1	2	5	6	5					
GM12x8	1	1	5	6	6					4
GM11x5	1	1	6	6	6					5
GM15x8	1	1	5	6	6					5
GM16x8	1	1	5	6	5					4
GM14x7	1	1	5	6	6					4
GM10x6	1	1	6	6	6					5
GM10x5	1	1	6	6	6					5
GM9x6	1	1	6	6	6					5
GM11x6	1	1	6	6	6					5
RF10x6	4	5	4	5	5					4
RF12x6	3	5	3	5	5					3
RF11x6,5	1	5	3	6	6					5
VM12x8	5	5	5	5	5					4
VM11x7	5	6	5	6	6					4
Vita11x6	1	4	5	5	5					4
Vita9x6	1	2	4	3	3					4
CAM13x7	1	1	2	4	4					4
CAM10x6	1	1	3	3	3					4
CAM11x6	1	1	2	4	4					4
CAM12x6	1	1	2	4	4					4
GM14x10F				5	6					
GM 12x10 Comp									4	6
GM 13x10C									4	6
GM 14x10C									4	6
CCM11x7	6	5						6		
CCM12x8	5	5						4		
CCM13x9								1		

32mm Prestige nose - 32mm spinners

Propeller	VM PRO	Hyperspinner	Hypersp. 30mm	RF Z 23mm yoke	GM 28mm yoke	GM 30mm yoke	GM 32mm yoke	GM 34mm yoke	GM C.L
GM13x8	1	5		3	3	6	5	5	
GM12x8	1	5		2	3	6	6	5	
GM11x5	1	5		2	2	3	4	6	
GM15x8	1	5		3	3	6	6	5	
GM16x8	1	5		2	3	6	6	6	
GM14x7	1	5		2	3	3	6	6	
GM10x6	1	5		2	2	3	4	6	
GM10x5	1	5		2	3	3	4	6	
GM9x6	1	5		2	3	3	5	6	
GM11x6	1	5		2	2	3	5	6	
RF10x6	5	5		6	3	5	5	4	
RF12x6	4	5		6	4	5	5	4	
RF11x6,5	2	6		4	3	4	6	6	
VM12x8	3	5		2	2	2	3	5	
VM11x7	2	5		2	2	2	5	5	
Vita11x6	2	5		3	3	6	6	4	
Vita9x6	1	6		1	1	2	2	2	
CAM13x7	1	4		1	1	3	5	4	
CAM10x6	1	3		1	1	3	5	4	
CAM11x6	1	4		2	2	4	5	4	
CAM12x6	1	5		1	1	5	5	4	
GM 14x10F							4	6	
RF 10x16							1		
GM 16x10							5	6	
Solidtec A1		5							
GM10x6C.L									10
CCM11x7		5							
CCM12x8		6						5	
CCM13x9	5	5	5						