

## UK - BMI Electronic Speed Controller



Congratulations for purchasing our BMI Programmable Speed Controller. This sensorless speed controller features the latest software, which enables it to be compatible with all types of brushless motors with the proper Amp draw. Carefully read the instructions before you start using the speed controller.

### Connecting the wires

You can connect your controller to the motor either by soldering them or by using high quality connectors. If you use connectors, make sure they are new ones and insulated with heat shrink tube. The maximum length of the battery pack wires may not exceed 12 cm.

- Solder the controller to the motor wires
- Solder appropriate connectors to the battery wires
- Insulate all connectors with heat shrink tubes
- Plug the « JR » connector into the throttle channel of the receiver
- Connect the red and black wires to the red and black wires of your battery pack

### Installing the controller

Install the controller in the model so that it is free from vibration and shock, using velcro or double sided foam tape. Make sure that there is sufficient cooling for the motor and controller by making duct vents in your body or fuselage.

### Initialisation

Switch on your transmitter and check that the throttle settings are at 100%.

For Futaba transmitters, change the throttle channel to it's reverse mode.

Put your throttle stick in the brake position.

- Switch your transmitter on
- Connect the battery pack to the controller, and your receiver will switch on
- You will hear one beep and the green LED flash one time for brake on or two tones and the green LED flash two time for brake off, then the green LED become bright.
- The full throttle position will be calibrated automatically
- Your motor is now ready to run

### Warning

- Always connect the battery just before flying and disconnect it after landing
- Be careful once the battery pack is connected
- Make sure you don't stand close to the propeller, because a rotating propeller can be dangerous

### Factory default settings

Brake ;	Off
Battery type ;	3 LiPo
Under voltage ;	reduce power
Soft start ;	enable
Timing ;	auto
Frequency	8 Khz
Active RPM Controller	OFF

### How to program the Controller

- Switch the transmitter on and push the throttle stick to the full throttle position
- Connect the motor battery and switch on the receiver
- After 5 seconds, you'll hear a tone and red LED turn on which indicates you have entered setup mode
- You will now hear all the different tones and green LED flash follow the rhythm of the tone for the different steps.
  - First tones and the green LED flash one time will be the battery type. Nicad, then 2 Lipo, ...
  - If you want to change a setting, you need to do it directly after you have heard the tones or see the green LED flash for that specific setting
- Once you have heard the tones or see the green LED flash of the setting you would like to change, go to full brakes and you'll hear two confirmation tones, and see the green LED turn on and red LED turn off. The setting is now memorized
- You can only change one setting at a time, if you need to change more settings, disconnect the battery pack, wait for 5 seconds and repeat the abovementioned procedure. If you want to change several setting, you will have to run through the different stages.
- If you have the « PC » version of the controller, you can program it by using the optional Spitz Gold Card (BMI # 85520).

#### 1. Propeller brake setup

If you release the throttle stick within 5 seconds, the brake will be changed from ON <-> OFF

#### 2. Battery type

Programms the cut-off voltage of the controller

NiCad/NiMH :	(50 % of initial voltage)
2 Lipos : 7.4V	
3 Lipos : 11.1V	
4 Lipos : 14.8V (Opto version only)	
5 Lipos : 18.5V	
6 Lipos : 22.2V	

#### Tones

o o o o o  
o o o o o o o o  
o o o o o o o o o o  
o o o o o o o o o o o o  
o o o o o o o o o o o o  
o o o o o o o o o o o o o o  
o o o o o o o o o o o o o o o o o

#### 3. Rotation reverse

With this function you can change the rotation direction from left to right and vice versa  
Reverse motor rotation

#### Tones

W W W W W W

#### 4. Soft start (acceleration)

When a gearbox is used, it's highly recommended to enable the soft start. Having a less aggressive acceleration curve doesn't stress your gearbox that much. When you use a direct drive, you can disable the soft start function to have a more aggressive acceleration.

Enable :	V V V V V V V V
Disable :	V V V V V

#### 5. Under Voltage (cut-off voltage)

If the motor battery pack drops to the programmed cut-off voltage, the controller will either reduce the motor speed or stop the motor to ensure that there is enough power for the receiver and servos. Either one is active, but you can resume the normal operation by pulling down the throttle stick and accelerating. Remember however it is time to land the model.

Ignore :	- - - - -
Reduced power (reduced motor speed) :	- - - - -
Cut off (stop motor) :	- - - - -

#### 6. Timing (advance timing)

The controller has three modes ; Automatic for all types of brushless motors



It is however possible that you need to set the right timing to get optimal power and efficiency out of some homemade brushless motors. Set the timing to 7 degrees for multi-pole motors and 30 degrees for outrunners.

Automatic : (7 - 30 degrees)

Soft : (7 degrees)

Hard : (22-30 degrees)

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## 7. Switching Frequency

The controller has two switching frequency modes. 8KHZ is good for all types of two pole motors whereas 16Khz is good for multi pole motors

8 KHz :

16Khz :

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## 8. Restore Factory Default settings

## 9. Active RPM Control (if applicable)

Off :

First Range :

Second Range :

Third Range :

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### Notice for operation :

Do not exceed 10 cells/3 Lipos or 4-5 servos when using Bec.

Temperature overload protection is built into the speed controller, it turns the motor off when the temperature reaches 110°C.

Always pay attention to the correct polarity when connecting the battery and controller.

# BM	Type	Current A	Peak A	Airolane	BEC	Servos	A rpm	Opto	NC-NIMH	Lipo	Weightg
#85501	ESCC-10	10A	15A	Airolane	1A	2-3servos	x	x	5-10cells	2-3cells	12g
#85502	ESCC-15	15A	20A	Airolane	1A	2-3servos	x	x	5-10cells	2-3cells	22g
#85503	ESCC-25	20A	25A	Airolane	1.5A	2-4servos	x	x	5-10cells	2-3cells	22g
#85504	ESCC-35	35A	40A	Airolane	1.5A	2-4servos	x	x	5-10cells	2-3cells	28g
#85505	ESCC-45	45A	50A	Airolane	1.5A	2-4servos	x	x	5-10cells	2-3cells	43g
#85506	ESCC-75	75A	85A	Airolane	1.5A	2-4servos	x	x	5-10cells	2-3cells	50g
#85508	ESCC-45Opto	45A	50A	Airolane	x	+ 4servos	x	Yes	5-10cells	2-5cells	43g
#85509	ESCC-75Opto	75A	85A	Airolane	x	+ 4servos	x	Yes	5-16cells	2-5cells	50g
#85510	ESCC-90HighVolt	90A	100A	Airolane	x	+ 4servos	x	x	16-32cells	5-10cells	75g
#85511	ESCC-25H	25A	25A	Helicopter	2A	3-4servos	Yes	x	5-10cells	2-3Cells	22g
#85512	ESCC-35H	35A	40A	Helicopter	2A	3-4servos	Yes	x	5-10cells	2-3Cells	28g
#85515	ESCC-45-S	45A	50A	Helicopter	4A	2-6servos	Yes	Yes	6-18cells	2-6Cells	57g
#85516	ESCC-75-S	75A	85A	Helicopter	4A	2-6servos	Yes	Yes	6-18cells	2-6Cells	69.5g

BMI Brushless Motors

**SPITZ**

### Description:

- These motors are brushless. They require a specific Electronic Speed Controller (ESC) to control its operation. Don't use a speed controller for brushed motors. It is quite easy to discern a speed controller for a brushless motor from a speed controller for a brushed motor as the brushless ESC has 3 wires that need to be connected to the motor whereas the « brushed » ESC only has two.
- Use only the recommended number of battery cells and the recommended propeller size. A too big propeller and too many cells will deteriorate the motor or damage it.

### Connection:

- Connect the three wires from the motor to the ESC. If the motor would turn in the wrong direction, change two wires till the motor runs correctly.
- Only use plugs that are capable of coping with the current draw of your motor.
- Please pay attention never to overheat your motor. If the temperature would exceed 80°C, the motor might be damaged. Let it sufficiently cool down between flights.
- Do not mount your propeller until your ESC is programmed and working correctly. A propeller can cause serious injury when the motor start to run.

### Motor specifications:

Motor	# 85562	# 85564	# 85566	# 85570	# 85571	# 85572	# 85574	# 85576	# 85595	# 85556	# 85557	# 85558	# 85559	# 85551
Combo	# 85580	# 85581	# 85582	# 85583	# 85584	# 85584	# 85585	# 85586						
Type	Spitz 05	Spitz 08	Spitz 10	Spitz 15	Spitz 20	Spitz 25	Spitz 30	Spitz 40	Spitz 46	Spitz 60	Spitz 80	Spitz 90	Hel 3600	Hel 3100
Application	mini glider Shockflyer Indoor	mini glider 3D Indoor	1,2m glider 3D Outdoor	1,2-1,5m glider 3D Aerobatics	1,5m glider 3D Aerobatics	1,5m glider Mini F3A Aerobatics	2 m glider Sport Aerobatics	2-3m glider Sport Aerobatics	< 3500g Sport Aerobatics	< 4000g Sport Aerobatics	< 6000g Sport Aerobatics	< 7000g Sport Aerobatics	Carbon 400	Carbon FP Carbon CP Carbon 400
Internal mot. Diam.	22mm	22mm	22mm	30mm	30mm	30mm	30mm	30mm	49mm	49mm	49mm	49mm	22mm	22mm
Weight g	27g	41g	55g	78g	78g	104g	136g	168g	325g	325g	410g	410g	61g	61g
Length mm	33mm	38mm	42mm	30mm	30mm	36mm	42mm	48mm	49mm	49mm	59mm	59mm	43mm	43mm
Axle mm	3mm	3mm	3mm	4mm	4mm	5mm	5mm	6mm	6mm	6mm	6mm	6mm	2,3mm	2,3mm
Current A	4A	7A	8A	7-15A	7-16A	15-25A	15-25 A	15-35A	20-40A	15-40A	18-40A	18-40A	15A	13A
Peak current A	8A	12A	16A	23A/30"	21A/60"	40A/60"	42A/60"	45A/60"	55A	55A	60A	55A	25A	20A
Efficiency	76%	77%	77%	78%	78%	81%	82%	82%	83%	83%	85%	85%	78%	77%
Lipo cells	2-3Cells	2-3Cells	2-3Cells	2-3Cells	2-3Cells	2-3Cells	3-4Cells	3-5Cells	4-5	5-7	5-8	6-10	2-3Cells	2-3Cells
NIMH & NC cell	6-10Cells	6-10Cells	6-10Cells	6-10Cells	8-12Cells	8-12Cells	10-12Cells	10-16Cells	12-16	16-22	16-24	20-30	6-10Cells	6-10Cells
KV rpm/V	1360	1150	1025	1130	980	860	850	890	580	460	340	270	3650	3100
Nominal Power Watt	55W	75W	99W	130W	190W	300W	379W	630W	460W	510W	640W	820W	150W	130W
Maximal Power Watt	80W	120W	170W	270W	250W	480W	630W	810W	570W	630W	830W	1200W	210W	180W
Recommended ESC	# 85501 (10A)	# 85502 (15A)	# 85503 (25A)	# 85503 (25A)	# 85503 (25A)	# 85505 (45A)	# 85505 (45A)	# 85505 (45A)	# 85509	# 85509	# 85510	# 85510	# 85511 (25A)	# 85511 (25A)

