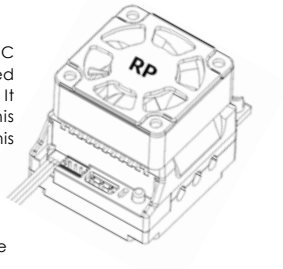
X SERIES **Racing Performer**

RPX II

BRUSHLESS SPEED CONTROLLER

BRUSHLESS SPEED CONTROLLER RPXII COMPETITION Instruction Manual

1.Introduction



Thank you for trusting YOKOMO products. Purchasing RPXII Competition Brushless ESC means that you selected the best ESC out of currently existing ones. This ESC is integrated with Hi-Tech features, and it is the most outstanding ESC you can get in the market. It is very dangerous when used improperly or remodeled without an approval, and this can cause critical damages to peripheral products & devices. Please carefully read this manual before use of this product.

2.Caution

- To avoid short circuit, please check if the wires and connections of the ESC are protected and are not in contact with peripheral devices.
- Be well-acquainted with the user manual for power devices / chassis before use, and check with the operating ranges.
- Use a soldering iron with at least 60W for soldering all input / output wires and connections.
- Keep the operation atmosphere dry in order to protect the ESC from humidity, water, oil, and other substances.
- Allow the product to have good ventilation, and be cautious for overheat.
- The ESC must be separated from the battery after use.

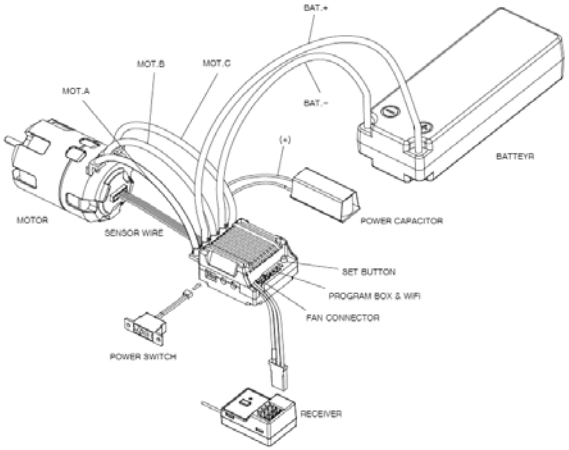
3.Features

- Full aluminum case and heat sink design
- Full compatibility with modified and stock race
- The excellence of the software reduced the motor temperature by modifying commutation algorithm and upgrading hardware, and it also increased the speed.
- New turbo / 3 Models of boost timing setting and delay time setting.
- It became possible to have various types of race and controls by setting new brake response mode and PWM / brake frequency individually.
- It is settable by connecting ESC to a program box or WiFi module with separated program port
- Using new WiFi module, the user can set the program parameter and upgrade the firmware. Also, all the ESC & motor data such as temperature, current, voltage, RPM and battery consumption can be stored in real time with the data log.
- Using superlative FET and low resistance power PCB design
- Maximizing the cooling with a 30mm fan

4.Specification

Pure Brushless Competition	yes	Plugged 30x30x10mm Fan	yes
Motor Limit	>3.0T	BEC Output	6V,7.4V / 6A Linear
Operating voltage	3.7-7.4V	Multi-Protection-System	yes
Forward / Brake / Reverse	yes	"Boost 0" Mode	yes
Full aluminum case / heatsink	yes	Multi-frequency system	yes
Typ. Voltage Drop @20A per phase	0.0048V	Power Wires	12Awg
Rated Current per phase	2449A	Case Size(without fan)	32.9 x 34.6 x 19.60mm
USB Software Updateability	yes	Weight(without cable)	44g

5.Connection



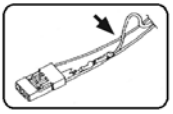
■ Caution
For maximum performance, black silicon wire without any connector was used for provided 12AWG wire. For soldering the battery and motor wires onto the solder bar, we recommend the soldering iron with at least 60W, and try to avoid soldering more than 5 seconds. Overheat can damage the ESC. With provided tube, it is possible to prevent the short circuit and to check the polarity after connection.

■ Motor wire connection
When connecting ESC and motor, the wire A/B/C should go to where they belong. However, some cars have their wirings in opposite way. For this case, you can switch from A-B-C to C-B-A on Motor-Wiring setting. If changed it to C-B-A, then the C & A should be switched on the figure above, and incorrect setting and connection can cause a critical problem. For your information, if the ESC is reset, then the C-B-A wiring setting will be back to A-B-C, so switch it to C-B-A again and then use. Then connect the sensor wire to 6-pin sensor port.

■ Power capacitor
Do not ever drive without power capacitor. This is absolutely needed to protect the ESC and improve the punch. Proper polarity is very significant. Connect indicated red wire in the figure above to (+) of the ESC. Connect another wire to (-) of the ESC, and the connected wire should be short. Incorrect connection and poor soldering will damage the ESC. The warranty does not cover this part.

■ Battery wire connection
Proper polarity is very significant. Make sure if (+) wire is connected to (+) of the battery, and vice versa for (-) wire. If connection is not adequate, then it will surely damage the ESC. The warranty does not cover this part.

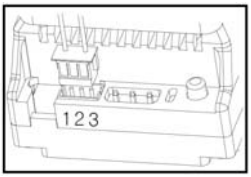
■ Receiver wire connection
Throttle wire of the ESC should be connected to 2CH of the receiver, and the white indication of the wire is the signal. This wire supplies 6/7.4V voltage to receiver and servo and others, therefore, there is no need of additional battery connected to receiver. If external power is connected to the receiver, the ESC might get damaged.



Note!
If you want to use a separate battery for the receiver, not using the ESC power, the middle wire(+) of the BEC plug should be disconnected as shown in the figure. This will prevent reverse current to the ESC. Otherwise the ESC can be burned by overheating.

■ Power switch box
To power on/off the ESC, you can use the Power Switch Box by connecting it to the connector on the side of the ESC. Without using it, the ESC will be powered on immediately when the battery is connected.

■ Fan connector
A cooling fan, screws and fan protector are provided according to the ESC specification. The fan mount is located on top of the heat sink, and it is recommended to use fan under the extreme situation such as modified or 4WD off-road.
You need to remove the RED connector in the center and then connect to the port 1 to use the battery power. In this case, the fan operates all the time.



6.Connection Install Guide

- Locate the ESC in a safe place where is easily accessible to connector and buttons.
- Tightly fix the ESC with provided double-sided tape.
- Make sure that there is some distance among the ESC, power wire and antenna / receiver. Try to avoid the direct touch among such parts. If the receiver and antenna are too close to each other, then signal confusion might be occurred. If this happens, re-install the parts with more distance.

7.Transmitter Settings

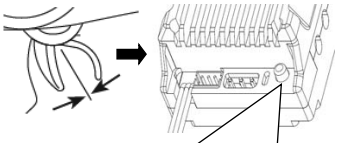
Before connecting the ESC to the receiver, check the transmitter settings are set as below. (Default settings)

Throttle Travel	High ATV,EPA	100%
Brake Travel	Low ATV,EPA,ATL	100%
Throttle Exponential	EXP,EXPO	Start with 0
Neutral Trim	SUB Trim	Center
Trigger	RATE Forward-Brake	F50 : B50

- Make sure that the ESC is not connected to the battery and its power is OFF.
- Remove the motor pinion, or check if the wheels rotate freely while the car is over (not touching) the surface.

8.CALIBRATION TO TRANSMITTER

- Turn the transmitter on and place the throttle on the neutral.
- Connect the ESC to the battery, and then turn the switch ON.



Hold the SET button at least for 3 seconds. Release the button when GREEN LED blinks. GREEN LED turns on with the motor sound. "Neutral Position Save"

RED LED turns on when throttle is moved forward to the maximum. " Acceleration Full Position Save"

Both GREEN and RED LED turn on when throttle is moved backward to the maximum. "Brake or Reverse Full Position Save"

Green and RED LED blink by turns when throttle is moved to " Neutral Position" and motor sound occurs.

- After the procedure above, then the ESC becomes possible to use.
- If motor moves at neutral position, it means there is difference with saved neutral value. Re-calibrate the throttle range.
- It is possible to check the ESC settings are correctly done with the LEDs' condition in accordance with the throttle movement.

	GREEN LED	RED LED
Neutral	ON	OFF
Neutral("BOOST OFF MODE")	Blinking	OFF
Max Acceleration	OFF	ON
Max Reverse or Brake	ON	ON

9.Programmable items

■ You can set detailed setting parameters and check racing information & present data using the program card or WiFi module decide. If motor is not connected, the program card is not connected. It can be connected using the front 3pin connector, and please refer to the manuals on the program card and WiFi module decide for further details.

	Programmable Items	Parameter Values	Default
1	Select Battery	LiPo / LiFe / NiMh(NiCd)	LiPo
2	Cut Off Voltage	Disable / Auto / 3.0V ~ 7.5V(Step:0.1V)	Auto
3	Power Curve	0 ~ 10	5
4	Boost Mode	Boost Max + TB Off X X ON 0 ~ 58 0 ~ 58 +TH 0 ~ 58 0 ~ 58 +ATH 0 ~ 58 0 ~ 58	Off
5	Boost-TH. Limit	TH Limit 10,20,30,40,50,60,70,80,90,100 0~58	0
6	Boost Min-rpm	0~64500(Step: 500rpm)	5000rpm
7	Boost Max-rpm	500~65000(Step: 500rpm)	25000rpm
8	Turbo Delay	0.0~ 1.00s (step: 0.05s)	0.20s
9	Turbo + Slope	0.0~ 1.00s (step: 0.05s)	0.20s
10	Turbo - Slope	0.0~ 1.00s (step: 0.05s)	0.20s
11	Acceleration	0~10	5
12	Start Power	0~100(step: 1%)	0%
13	Smooth Start Rate	0~30(step: 1)	0
14	Smooth Start Range	0~75%(step: 1%)	0%
15	Voltage Limit	Off, 7.4V ~ 8.7V(step: 0.1V)	Off
16	Reverse Function	One Way / Two Way / Two Way2 / Two Way3	Two Way
17	Reverse Delay	Off / 0.2s / 0.5s / 0.8s / 1.3s / 1.8s / 2.5s	2.5s
18	M- Reverse Amount	20% ~ 100%(step: 1%)	100%
19	Neutral Width	Narrow / Normal / Wide	Normal
20	Motor Direction	Normal / Reverse	Normal
21	Brake Response	0% ~ 100%(step: 1%)	0%
22	FAN Control	Auto, On	Auto
23	Drag Brake	0% ~ 100%(step: 1%)	0%
24	Min Brake Amount	0% ~ 100%(step: 1%)	30%
25	Mid Brake Amount	0% ~ 100%(step: 1%)	50%
26	Mid Brake Location	0% ~ 100%(step: 1%)	50%
27	Max Brake Amount	0% ~ 100%(step: 1%)	100%
28	Soft Brake	Hard / Soft	Soft
29	Brake Freq	1KHz ~ 16KHz(step: 1KHz) / 32Khz	1Khz
30	Motor Freq	1KHz ~ 16KHz(step: 1KHz) / 32Khz	5Khz
31	Drag Freq	1KHz ~ 16KHz(step: 1KHz) / 32Khz	1Khz
32	Cut Off Temp	100° ~ 135°(step: 5) / Disable	135°
33	Cut Off M-Temp	100° ~ 135°(step: 5) / Disable	135°
34	B.E.C Voltage	6.0V / 7.4V	6.0V
35	Gear Ratio	2.0 : 1 ~ 15.0 : 1	2.0 : 1
36	Tire Diameter	40mm ~ 200mm	63mm
37	Motor-Wiring	A-B-C / C-B-A	A-B-C

	Programmable Items	Parameter Values	Default
38	Units	Metric / English	Metric
39	Download	All parameters inside the setup card are downloaded to the ESC.	–
40	Factory Setting	Change the setting of ESC to default factory status.	–
41	Current Voltage	XX.X	–
42	Current Temp	0°~ 135°	–
43	Max Temperature	0°~ 135°	–
44	Motor Temp	0°~ 135°	–
45	Motor Max Temp	0°~ 135°	–
46	Max Current	0 A ~ 999 A	–
47	Maximum Speed	XXX.X km/h	–
48	Maximum RPM	XXX rpm	–
49	Error History	M,T1,T2, S, V, R	–

■ 1 Select Battery

It is extremely important to select correct battery type. Otherwise, it could damage the battery.

■ 2 Cut Off Voltage

This function is to set the cut off voltage to protect the battery.

■ 3 Power Curve

The parameters of the throttle curve are relating to the position of the throttle and it impacts the output of the ESC. Its default is "5" and the power curve should be changed into other shapes using the PC program or WiFi module. For example, if +EXP value is added at initial part, the value of the initial output value is increased, and if –EXP value is added, smaller throttle value is outputted.

■ 4 Boost Max+TB

OFF: All timing is disabled, and this can be set at the condition of "True stock racing" etc.. green LED should blink at neutral in this mode.

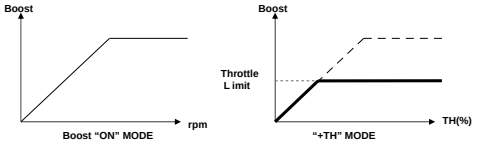
ON: The speed and efficiency of the motor is depending on boost timing setting. When boost timing is bigger, speed should be fast, and it also impacts the output depending on the motor RPM. Higher values would increase the power and RPM but also cause high heating. So, excessive setting could cause fatal problems to the ESC and motor.

TB(Turbo): should be activated when the throttle is located at 100%. (Boost setting + TB setting) are applied into timing. Although the combined value of the two can be set up to 116, its upper limit is 88. If the motor timing is set to more than 60 from the center, it can cause heating in the motor and ESC. It is recommended to set to 60 or lower. This item is an ideal for long straight course.

ATH: If the Auto Throttle function is set, the Boost does not get affected by RPM, but operates only according to the throttle ratio. For example, if the set value for the Boost is 30 and the throttle position is 40%, the operating boost outputs "12" which is 40% of 30.

■ 5 Boost-TH. Limit

At Boost Mode, +TH mode allows the setting of timing limit with 10 steps of the throttle location. Please refer to the graphs below.



■ 6 Boost Min-rpm

This is to set the required RPM that causes the Boost timing to be activated. For example, if the boost start timing is set as 1000, when RPM reaches the 1000, timing should be activated. It can be set 0~64500. This value cannot be set higher than Boost Max RPM.

■ 7 Boost Max-rpm

After boost value is set, then rpm is set. For example, if boost timing is set as 20 degree and boost finish RPM is set as 20000, When the ESC reaches over 20000, then timing boost is activated as 20 degree that you set. It can be set 500~65000. This value cannot be set lower than the value of Boost Min-rpm.

■ 8 Turbo Delay

Turbo start should be immediately activated when the throttle is moved to "full" when it is set as "0.00", it is immediately applied. When it is set as other values, the turbo is activated after a delay time that is set at full throttle location.

■ 9 Turbo + Slope

This is to set the slope time when turbo is activated. When the value of this item becomes lower, acceleration and heating are increased. This item is about time that reaches up to "50"

■ 10 Turbo – Slope

After turbo timing is activated, when the throttle is back to the original location from turbo condition, this item is to set its applied time. When its value is lower, brake effect occurs and movement of the vehicle becomes worse. This item is about time that reaches up to "50"

■ 11 Acceleration

This is to adjust the TIME that reaches the max output from the motor at pause.

■ 12 Start Power

This is to be used when setting the minimum start power and set the minimum power when the motor is rotated.

■ 13 Smooth Start Rate

The modified motor has a large output when starting, which hinders a car from moving gently due to the strong power of its start. This function allows a gentle start with the effect of applying the boost value in "-" direction according to the set value.

■ 14 Smooth Start Range

This is to set throttle stick range for smooth start. For example, if it is set to 50%, the smooth start function works up to 50% of the throttle stick. If one of the Smooth Start Rate and the Smooth Start Range is set to "0", this function does not work.

■ 15 Voltage Limit

This is to help stable racing by keeping the output constant against voltage fluctuation. Based on the set voltage, the output will be generated small if the battery voltage is high and the output will be generated big if the battery voltage is low.

■ 16 Reverse Function

One Way: forward/brake
Two Way: Forward/brake/reverse. Reverse is activated after reverse delay. Brake is activated during this delay period.
Two Way2: Forward / brake / reverse. Reverse is activated after 1second at motor pause, regardless of the reverse delay. Direction can be changed after max 6~7 seconds.
Two Way3: Forward / brake / reverse. When the motor is rotated forward, if the throttle stick is moved to the reverse, brake is activated. Even if the stick stays there, reverse function is not activated. To function the reverse, move the throttle stick to the neutral then back again to the reverse direction then reverse is activated.

■ 17 Reverse Delay

This is to set the delay before reverse. After this delay, reverse is activated.

■ 18 M- Reverse Amount

This is to set the max reverse speed to 20~100% during driving.

■ 19 Neutral Width

This is to set the neutral width. This neutral width is the barometer to determine the neutral position of a transmitter.

■ 20 Motor Direction

This is to set the forward / reverse rotation of the motor.

■ 21 Brake Response

This is to adjust the strength of the brake. You can obtain the strongest brake at 100%.

■ 22 FAN Control

In the Auto mode, it works depending on the ESC temperature and throttle position. In the On mode, it works all the time.

■ 23 Drag Brake

This is to set auto brake which delivers small brake effect at neutral position.

■ 24 Min Brake Amount

This is to set the first brake amount.

■ 25 Mid Brake Amount

This is to set the middle brake amount.

■ 26 Mid Brake Location

This is to set the position on the middle brake amount.
This function is deactivated when mid brake amount and mid brake location are set as 0%.

■ 27 Max Brake Amount

This is to set max brake range. Please leave the brake at "FULL BRAKE" position.

■ 28 Soft Brake

This is to set the brake power like "Hard" or "Soft". It is recommended to use "Hard" brake when using Stock Motor.

■ 29 Brake Freq

This is to set the brake frequency. When the frequency is lower, control becomes also bigger, and if the frequency is higher, soft control is achieved.

■ 30 Motor Freq

This is to set the motor frequency. When the frequency is lower, initial acceleration becomes rapidly fast. When the frequency is higher, it becomes softer, but the ESC generates more heating.

■ 31 Drag Freq

This is to set drag frequency. When the frequency is lower, the effect of the brake control is very good. When the frequency is higher, soft control is achieved.

■ 32 Cut Off Temp

This is to set the cutoff temperature of the ESC. When this function is disabled, the ESC cannot be protected from the temperature, thus we do not recommend that you set this function as disable.

■ 33 Cut Off M-Temp

This is to set the cutoff temperature of the motor. When this function is disabled, the motor cannot be protected from the temperature, thus we do not recommend that you set this function as disable.

■ 34 B.E.C Voltage

This is to set the voltage that is supplied to a receiver. The ESC could get damage due to wrong voltage setting, this please make sure to use according to the servo spec.

■ 35 Gear Ratio
This is to set the gear rate of the vehicle. If this setting is not done correctly, max speed could be indicated differently.

■ 36 Tire Diameter
This is to set the diameter of the tire. If this setting is not done correctly, max speed could be indicated differently.

■ 37 Motor-Wiring
This is to set the order of motor cable connection like A-B-C or C-B-A. When you need to change this, make sure to also change the motor configuration and setting identically. Otherwise, wrong configuration and setting could cause the damage to the ESC.

■ 38 Units
You can change the unit to display temperature and speed.

■ 39 Download
Changed setting value is stored at the ESC.

■ 40 Factory Setting
Changes the ESC setting parameters to the factory default settings.

■ 41 Current Voltage
You can check the present battery voltage when the program is connected.

■ 42 Current Temp
You can check the present ESC's temperature when the program is connected.

■ 43 Max Temperature
You can check the max temperature that is obtained during racing when the program is connected.

■ 44 Motor Temp
You can check the present motor's temperature when the program is connected

■ 45 Motor Max Temp
You can check the max temperature of the motor that is obtained during racing when the program is connected.

■ 46 Max Current
You can check the max current that is obtained during racing when the program is connected.

■ 47 Maximum Speed
This is to confirm the max speed that is obtained at racing of the car.

■ 48 Maximum RPM
This is to confirm the max RPM of the motor that is obtained at racing of the car.

■ 49 Error History
(R) signal problem of the receiver.
(V) this is to indicate the ESC stops due to low voltage.
(S) Sensor problem.
(T1) this is to indicate the ESC stops due to the temperature issue on the ESC.
(M) Motor connection problem / motor problem / product damage
(T2) this is to indicate the ESC stops due to the temperature issue on the motor.

10.LED status for the error

- RED LED blinks one time repeatedly mean that there is no receiver signal. Please check the connection part of transmitter/receiver.
- RED LED blinks two times repeatedly mean that low voltage cut is activated.
- RED LED blinks three times repeatedly mean that motor sensor has a problem. Please check the sensor cable connection and motor status.
- RED LED blinks four times repeatedly mean that temperature protection of ESC is activated.
- RED LED blinks five times repeatedly mean that there is PWM output but the motor isn't running for more than 2 seconds. Please check the motor status or check the car.
- RED LED blinks six times repeatedly mean that temperature protection of motor is activated.

11.Data check

You can check the maximum temperature/current/speed/rpm of ESC and MOTOR through a program box or WiFi module.
When using the program box, the ESC should not be powered off after racing and the program box should be connected to the connection port to check the data. Data are deleted if the ESC is powered off.

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