



INSTRUCTION MANUAL

PRO.C MAX

High Voltage Speedcontrollers

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Features

Tahmazo Pro.C Max speedcontrollers are versatile and easy-to-program. Pro.C Max speedcontrollers deliver amazing performance for model aircraft, boats, cars and helicopters – ‘all-in-one’ speedcontroller.

Features of the Tahmazo Pro.C Max speedcontrollers include:

- **Safe-Start function (SSF)** prevents accidental propeller rotation until the speedcontroller is deliberately ‘armed’
- **Anti-Spark (ASP)** reduces the sparks when connecting battery source
- **Switching Battery Eliminator Circuit (S-BEC)** delivers consistent power to the receiver without excessive loss of power, minimize power ‘wastage’ and unnecessary heat being generated
- **Thermal Protection Function (TPF)** reduces the power output of the motor in steps. When the temperature of the speedcontroller exceeds 110°C, the speedcontroller will first reduce

the motor output by 75%. If the temperature remains high, the speedcontroller will then cutoff the power

- **SIGNAL FILTER SYSTEM (SFS)** filters the receiver signal to ensure the correct receiver signal is received and prevents noise from interfering with the operation
- **POWER RECOVERY FUNCTION (PRF)** - Power will reset and recover when the throttle is move to the minimum or ‘low’ position. When the speedcontroller cuts off due to extreme temperature or low voltage while in flight, it can be activated in flight by moving the throttle to the minimum or stop position
- 3 levels of brake settings
- Storing last flight data such as Max RPM and Average RPM
- Setting for different model type - model aircraft, helicopter and car/boat

The default setting for Tahmazo Pro.C Max speedcontrollers are for model aircraft with auto-cutoff voltage and no airbrakes.

Specifications of Tahmazo Pro.C Max Speedcontrollers

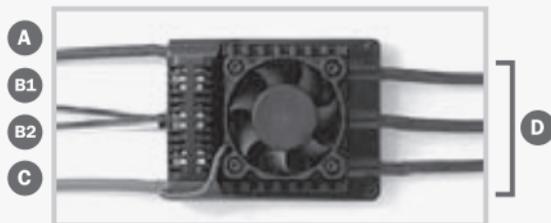
Pro.C Max Programmable Speedcontroller for brushless motors	Pro.C Max HV 120	Pro.C Max HV 75	Pro.C Max 6018-3s	Pro.C Max 4018-3s	Pro.C Max 3018-3s	Pro.C Max 1812-3s
Continuous Current (A)	120	75	60	40	30	18
Maximum Current (15 seconds)	150	85	70	50	25	22
Programming using Pro.C Max Program Box	Yes	Yes	Yes	Yes	Yes	Yes
Dimension	73.4x 56.2x31mm	78x 29x14mm	66x 25x10mm	66x 25x10mm	49x 25x10mm	38x 22x7mm
Weight (with wires)	172g	82g	49g	47g	29g	25g
BEC voltage and current	N/A	N/A	5.5v, 3A (Peak 5A)	5.5v, 3A (Peak 5A)	5.5v, 3A	5.5v, 2A
Switching Frequency	32kHz	32kHz	32kHz	32kHz	32kHz	32kHz
No. of NiCd/NiMH cells	14-36	14-36	6-18	6-18	6-18	6-12
No. of Li-Ion/Li-Po cells	4-12	4-12	2-6	2-6	2-6	2-4
Adjustable timing	0-25°	0-25°	0-25°	0-25°	0-25°	0-25°
TPF	Yes	Yes	Yes	Yes	Yes	Yes
SFS	Yes	Yes	Yes	Yes	Yes	Yes
Cooling Fan	Yes	No	No	No	No	No

Precautions

- Never use more than the specified voltage on the ESC's input
- Never apply 'reverse' voltage to the ESC by connecting the opposite polarity of the battery to the ESC
- Always mount the ESC in a position where air can freely flow across it during operation
- Always turn on the transmitter before connecting the battery to the ESC
- Always disconnect the battery from the ESC when not in use
- Always disconnect the battery from the ESC when charging the battery
- Always remove the propeller from the motor when working on the model
- Always observe that a propeller might unexpectedly rotate anytime that power is applied to the ESC, which could cause severe injury. Always keep a safe distance from a propeller when the battery is connected to the ESC
- Make sure the input battery is fully charged before connecting to the ESC, so the low voltage cutoff feature can function properly
- Make sure the wires do not become frayed, which can cause short-circuit
- Do not attempt to use this ESC with brushed motors
- Do not allow water, moisture or any foreign material onto the ESC's circuit board
- Do not operate the ESC under wet conditions or in areas of extremely high humidity, rain or snow
- Do not tamper with any of the electronic components or dismantle the ESC
- Use heat-shrink tubing to insulate any bare wires between the motor battery and ESC, and from the ESC to the motor to prevent a short-circuit
- Allow the ESC to cool between flights
- Do not pack the ESC with foam padding or similar that may hinder the ESC from properly radiating heat
- Keep out of reach of children. This ESC is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use the ESC safely

Connecting The Speedcontroller

HV 120



HV 75



WIRES A and C

Connect to battery (input)

Solder the connectors to match the battery connectors. Make sure the polarity of the battery's connector matches the polarity of the ESC's connector.

REMOVE THE PROPELLER FROM THE MOTOR BEFORE CONNECTING THE BATTERY.

*Wires B1 & B2 are interchangeable

WIRE B1: Connect to receiver (to throttle channel)

Connect this socket to the receiver's throttle channel slot. Firmly press the connector into the slot. The white 'signal wire' should be in the same position as the orange wire on JR/Spectrum receiver, yellow wire on Hitec receiver and blue wire on Airtronics "Z" connectors.

WIRE B2: Connect to Pro.C Max Programming Box

Connect this to the programming box. Once the connections are made, the programming box is ready to program the speedcontroller. The arrow (▲)(▼) buttons are used to select the parameters. The (+) and (-) buttons are used to change the value of the parameter selected.

WIRE D

To brushless motor (output)

Solder the connectors that matches the motor. As these connections are not polarised, there is no need to match the colour of the ESC and motor wires. The direction of the motor can be changed by either switching any two(2) of the ESC's motor connectors or programming the ESC.

Once connected, make sure all the connections are insulated electrically. Failure to do so could result in permanent damage to the motor/ESC, and void all warranties.

Programming The Speedcontroller

1 Checking the transmitter throttle stick position

Note: Remove the propeller before connecting the battery to the Pro.C Max speedcontroller!

- 1.1 Switch on the transmitter and move the throttle stick to 'low' position (towards you).
- 1.2 Connect the speedcontroller to the receiver
- 1.3 Connect the battery to the speedcontroller

- 1.4 The motor will beep and/or, after 5 seconds the LED on the speedcontroller remains steady RED, then the throttle stick position is correct. If the motor beeps and after 5 seconds, there is no LED indication or the LED blinks, the throttle stick position needs to be 'reverse'. Please refer to the transmitter manual. Once the throttle stick position is 'reverse', repeat step 1.

Throttle Stick	BEEP	LED	Check
			Throttle stick position is correct and you are ready to program the ESC
		No LED	Throttle stick position needs to be reversed. Please refer to your transmitter manual. Once the throttle stick is reversed, repeat step 1.1

Programming The Speedcontroller

2 Programming Throttle Stick position

Pro.C Max speedcontroller can be programmed for user-specified throttle stick position. The speedcontroller can be programmed for the motor to start at any throttle stick position other than 'low' throttle stick position.

When the throttle stick position is set above the 'low' throttle position, the speedcontroller will automatically have 'reverse' throttle if model type is set to 'CAR' or 'BOAT' and the 'reverse' function is set ON.

To set the throttle stick position,



If the speedcontroller LED turns ON during the Programming Throttle Stick position sequence,

'reverse' the throttle channel (Refer to the transmitter manual).

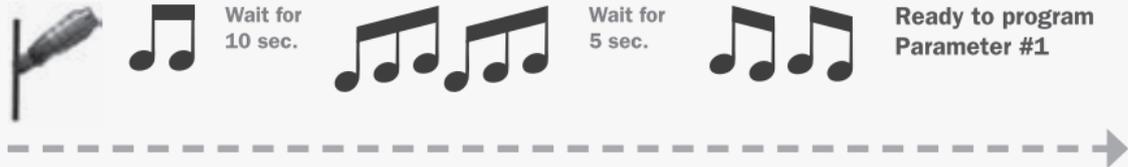
Programming The Speedcontroller

3 Programming with the transmitter

Enter Programming Mode

First of all, enter the speedcontroller's programming mode by holding the throttle stick at 'top' position

for more than 15 seconds. When you hear the continuous beep and LED blinking, you are in the Programming Mode - Parameter #1.



Selecting Parameter

In the programming mode, select the Parameter to program by

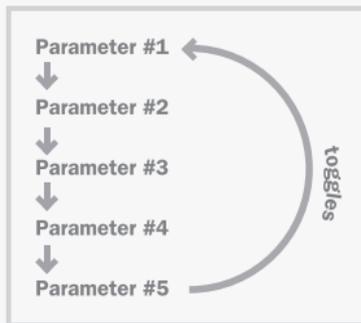
- first moving the throttle stick to the 'low' position, and
- immediately moving the throttle stick back to 'top' position

Each time the throttle stick moves from 'top' to 'low' and back to 'top' position, the speedcontroller toggles to the next parameter as shown on the following page.

Programming The Speedcontroller

Selecting Parameter

Once you are in the Programming Mode



Parameter Chart

Number of times Motor beeps and LED flashes	Parameter selected for programming
1	#1 Battery Type
2	#2 Direction of motor
3	#3 Brake ON/OFF (Air) Governor ON/OFF (HELI) Reverse ON/OFF (Car/Boat)
4	#4 Model Type (AIR/HELI)
5	#5 Model Type (BOAT/CAR)

To change the Parameter Values, proceed to 'Set Parameter Values'

Programming The Speedcontroller

Set Parameter Values

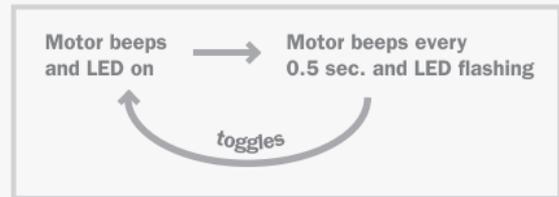
Once the parameter to be programmed is selected, move the throttle stick to the 'low' position.

The LED will indicate the current value of the parameter, either Motor beeps/LED on, or Motor

beeps every 0.5 secs/LED flashing. To change the value of the parameter,

- move the throttle stick to the 'top' position and
- immediately move the throttle stick back to the 'low' position.

Once the parameter to be programmed is selected, move the throttle stick to the 'low' position



To confirm the parameter value, move the throttle stick to 'top' position. In doing so, the parameter value has been 'memorised' and the

speedcontroller indicates the parameter that was programmed by the number of motor beeps and LED Flashing.

Programming The Speedcontroller

Parameter Values	Motor beeps and LED on	Motor beeps every 0.5 sec LED Flashing
#1 Battery Type	LIPO	NiCD/NiMH
#2 Direction of motor	Normal	Reverse
#3 Brake ON/OFF (Air) Governor ON/OFF (HELI) Reverse ON/OFF (Car/Boat)	OFF OFF OFF	ON ON ON
#4 Model Type (AIR/HELI)	AIR	HELI
#5 Model Type (BOAT/CAR)	BOAT	CAR



#4 Model Type (AIR/HELI)



#5 Model Type (BOAT/CAR)

⚠ These parameter **MUST** be set first before changing the other parameters

Procedure	Throttle stick	LED/BEEP
Once the Parameter is selected		LED Flashes to indicate the parameter being selected
Move the throttle stick to the 'low' or minium position		Motor beeps and LED ON steady
Move the throttle stick to the 'top' or maximum position and immediately move the throttle stick to the 'low' or minimum position		Motor beeps every 0.5 seconds and LED is flashing

Programming The Speedcontroller

4 Programming with Pro.C Max Programming Box

By using the Pro.C Max Programming box, the parameters of the ESC can be programmed more easily.

Connecting to the Programming Box

4.1 Connect the Programmer Cable to the Programming Box.

4.2 Connect the battery source to the speedcontroller.

Once the above connections are made, the programming box is ready to program the speedcontroller.

The arrows (▲) (▼) buttons are used to select the parameters. The INC (+) and DEC (-) buttons are used to change the value of the parameter selected.

Parameters of Programming Box

The following chart shows the parameter of the Pro.C Max speedcontroller that can be programmed using the Pro.C Max Programming Box.

To change the model type of the speedcontroller, press the arrow buttons (▲) and (▼) at the same time.

Parameters of Programming Box

Programming Table For Pro.C Programming Box

Parameter	LCD Display	Range	Value of Parameters				Model Type(s)	
Select Battery	SELECT BATTERY LiPo <input checked="" type="checkbox"/> AIR		LiPo	NiCD/NiMH				
Cut Off Voltage If you have selected a LIPO battery the speedcontroller switches off at 3.0v per cell in Auto mode. If you have selected a NiCD/NiMH pack, the unit switches off at 5.5v (using variable cut-off type)	CUT OFF VOLTAGE AUTO <input checked="" type="checkbox"/> HELI	4.5v to 33.0v	Auto					
Cut Off Type select the cut-off method when the battery voltage falls to the 'Cut Off Voltage' set	CUT OFF TYPE SOFT OFF <input checked="" type="checkbox"/> HELI		Soft	Hard				

Parameters of Programming Box

Parameter	LCD Display	Range	Value of Parameters					Model Type(s)
Motor Direction	MOTOR DIRECTION Reverse  HELI		Normal	Reverse				   
Advance Timing alters the advance of the rotational field similar to "Advancing the Ignition Point". 0° to 10° is recommended for in-runner motors, and 15° to 25° for out-runner motors.	ADVANCE TIMING 8°  HELI	0° to 25°	Auto					   
Acceleration sets the rate of acceleration of the motor.	ACCELERATION Highest  HELI		Lowest	Low	Normal	High	Highest	   

Parameters of Programming Box

Programming Table For Pro.C Programming Box

Parameter	LCD Display	Range	Value of Parameters					Model Type(s)
<p>Start Power</p> <p>sets the level of power fed to the motor when it starts up.</p>	<p>START POWER Lowest  HELI</p>		Lowest	Low	Normal	High	Highest	   
<p>Air Brake type</p> <p>Air brake setting is only available for Aircraft(AIR) for adjusting the effect of the motor brake. Slow brake will stop the motor gently, while Fast brake will stop the motor abruptly.</p>	<p>AIR BRAKE TYPE Fast  AIR</p>		Slow	Normal	Fast			
<p>Air Brake On/Off</p>	<p>AIR BRAKE On/Off On  AIR</p>		On	Off				

Parameters of Programming Box

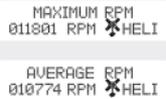
Parameter	LCD Display	Range	Value of Parameters					Model Type(s)
<p>Response of Governor</p> <p>Sets the characteristics of the speedcontroller in speed governor mode, The faster the response, the higher the current drawn from the battery.</p>	<p>RESPONSE OF GOV Normal  HELI</p>		Slowest	Slow	Normal	Fast	Fastest	
<p>Governor On/Off</p> <p>Switches speed governor operation on and off. Governor mode ON stabilises the pre-set rotational speed and keeps the speed constant.</p>	<p>GOVERNOR ON/OFF OFF  HELI</p>		On	Off				

Parameters of Programming Box

Programming Table For Pro.C Programming Box

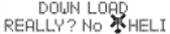
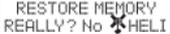
Parameter	LCD Display	Range	Value of Parameters				Model Type(s)
<p>Reverse Function</p> <p>Only use in Boat and Car modes. In 'One Way' mode, the motor will only rotate in one direction, and in 'Two Way' mode, the motor will have forward and reverse direction.</p>			One Way	Two Way			
<p>Motor Pole Num</p> <p>Sets the number of poles in the motor for the Programming Box to display the exact rotational speed.</p>		2 to 36					

Parameters of Programming Box

Parameter	LCD Display	Range	Value of Parameters				Model Type(s)
<p>Gear Ratio</p> <p>Sets the gearbox ratio in order for the Programming Box to display exact rotational speed.</p>		<p>1.0:1 to 25.0:1</p>					
<p>Max. RPM & Average RP</p> <p>Displays the maximum and average rotational speeds recorded during the last flight.</p>		<p>Display Data</p>					

Parameters of Programming Box

Programming Table For Pro.C Programming Box

Parameter	LCD Display	Range	Value of Parameters				Model Type(s)
<p>Download</p> <p>Transfers the above values set to the speedcontroller. Press (+) to start the transfer process. The Programming Box will beep once every second until the transfer is complete. Press (-) to abort the process at any time.</p>			Yes	No			
<p>Restore Memory</p> <p>Retrieves the parameter values stored in the Programming Box. Press (+) to start retrieving the values. The Programming Box will beep once every second until the transfer is complete. Press (-) to abort the process at any time.</p>			Yes	No			

Parameters of Programming Box

Parameter	LCD Display	Range	Value of Parameters				Model Type(s)
Stores the parameter values in the Programming Box. Press (+) to start saving the values. The Programming Box will beep once every second until the transfer is complete. Press (-) to abort the process at any time.	BACKUP MEMORY REALLY? No  HELI		Yes	No			   

For parameters that can only be programmed using the Programming Box, the value of the parameter will not change when the speedcontroller is programmed using the transmitter. For example, if the Air Brake Type is set as 'FAST', whenever the brake is set 'ON' by programming with the transmitter, the Air Brake Type will remain as 'FAST'.

Note: RPM indicated is calculated from the motor pole number and gear ratio. Default value is a factory test value, and will change when the motor is operated with the speedcontroller.

LEGENDS



Aircraft



Boat



Helicopter



Car

Service Procedure

Tahmazo Products warrants this product to be free from defects in materials and workmanship for a period of 180 days from date of purchase. During that period, we will repair or replace at our opinion, any products that does not meet these standards. You will be required to provide proof of purchase date (receipt or invoice). If, during the warranty period, your ESC shows defects caused by abuse, misuse or accident, it will be repaired or replaced at our option, at a service charge not greater than 50% of the current retail list price.

This warranty does not cover components worn by use, application or reverse voltage, cross connections, poor installation, subject of components to foreign materials, any alterations to wires or tampering. In no case shall our liability exceed the original cost of the product.

Under no circumstances will the purchaser be entitled to consequential or incidental damages. If you attempt to disassemble or repair this unit, it may void the warranty.

For servicing of your Pro.C Max Speedcontroller, either in or out of warranty, you can send them to our nearest dealer to you, or by post paid and insured to:

Tahmazo

Tahmazo Products Pte Ltd
126 Joo Seng Road
Goldpine Industrial Building #08-03
Singapore 368355

Email service@tahmazo.com

Website www.tahmazo.com

Please include your address and email with the speedcontroller.

Speedcontrollers that operate normally when received by Tahmazo Products will be charged a minimum service fee and return shipping charges.

Disclaimer

Tahmazo Products Pte Ltd is not responsible for your use of this product, or for any damages or injuries you may cause or sustain as a result of its usage. An electric motor that is connected to a battery and speedcontroller may start unexpectedly and cause serious injuries. Keep the propeller away from your body and others at all times. Always observe local laws regarding the operation of remote control model.



Tahmazo

www.tahmazo.com

