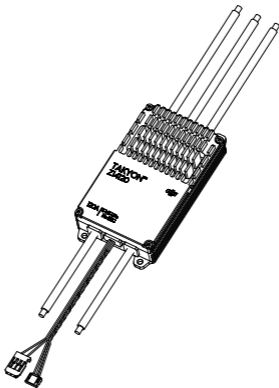


# TAKYON Z14120

## Electronic Speed Controller

User Manual V1.2

2017.02





### **Searching for Keywords**

Search for keywords such as “battery” and “install” to find a topic. If you are using Adobe Acrobat Reader to read this document, press Ctrl+F on Windows or Command+F on Mac to begin a search.



### **Navigating to a Topic**

View a complete list of topics in the table of contents. Click on a topic to navigate to that section.



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## Disclaimer

Thank you for purchasing the TAKYON™ Z14120 Electronic Speed Controller (hereinafter referred to as "product"). Read this disclaimer carefully before using the product. By using this product, you hereby agree to this disclaimer and signify that you have read it fully. Please use this product in strict accordance with this document. SZ DJI TECHNOLOGY CO., LTD. and its affiliated companies assume no liability for damage(s) or injuries incurred directly or indirectly from using or refitting this product improperly.

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This disclaimer is produced in various languages. In the event of variance among different versions, the Simplified Chinese version shall prevail when the product in question is purchased in China, and the English version shall prevail when the product in question is purchased in any other region.

## Warning

1. The maximum allowable voltage of the Takyon Z14120 is 61 V. Operate with care.
2. Always attempt to fly your aircraft in areas free of people, animals, power lines, and other obstacles.
3. DO NOT approach or touch the motors or propellers when the unit is powered on.
4. Be sure to use the product in strict accordance with the specifications (voltage, current, temperature, etc.) listed in this document. Failure to do so may result in permanent damage to the product.
5. Ensure that there are no open circuits or short circuits when soldering the power cables.
6. Before takeoff, ensure that the propellers and motors are installed correctly.
7. Ensure that all parts of the aircraft are in good condition. DO NOT fly with worn or damaged parts.
8. Ensure that all parts are firmly in place and all screws are tight before each flight.

## Legend



Important



Hints and Tips



Reference

If you encounter any problems or if you have any questions, please contact your local DJI authorized dealer or DJI Support.

DJI Support Website:

<http://www.dji.com/support>

Download the latest version of this manual from:

<http://www.dji.com/takyon-z14120>

Visit the official DJI Forum for more topics:

<http://forum.dji.com>

Visit the DJI Online Store for more related products:

<http://store.dji.com>

For details on our after-sales policy, visit: <http://www.dji.com/service>. If you are unable to view the webpage or would like to request a hard copy of our policy, please contact your local DJI branch office or authorized dealer.

## Profile

The Takyon Z14120 Electronic Speed Controller (ESC) is designed for applications where high power and high reliability is of importance. Its exterior (IP66 rated, IEC standard 60529) is sealed against dust and liquid in order to prevent corrosion, while excellent heat dissipation capabilities enable it to function stably during highly intensive periods of work. The Active Protection functions extend the life of the ESC and prevent damage from misuse, with a voice prompt from the motor connected to the ESC notifying users if a fault occurs. The ESC's data cable also works as a backup throttle signal transmission cable for increased reliability and a safer flight, when used together with the DJI N3 or A3 flight controllers.

DJI ASSISTANT™ 2 allows you to configure the timing, acceleration, active braking, motor rotation direction and other parameters. Built-in configurations, specifically for different propellers and applications, can be selected to minimize setup time and risk. Upgradable firmware ensures the Takyon series stays up-to-date with DJI's latest motor control technology and features.

## Features

**Active Braking Function**

**Broad Motor Compatibility\***

**Adjustable Output PWM Frequency**

**Batteries: 5S-14S LiPo**

**Maximum Continuous Current: 120 A**

\* Refer to Specifications (p. 14) for details.

## Active Protection\*

- Overvoltage protection
- Undervoltage protection
- Short-circuit protection
- Overheating protection
- Stall protection
- Redundant throttle signal transmission

## Main and Backup Throttle Signal

- Main throttle signal: 30 Hz to 500 Hz PWM signal
- Backup throttle signal: Serial signal (DJI N3 or A3 flight controller required)

## High Rotational Speed Motors

- 40000 rpm (7 pole pairs)
- 280000 rpm (1 pole pair)

## PC Assistant Software

- Timing settings
- Voice prompt settings
- Active braking settings
- Motor rotation direction settings
- Throttle range settings
- Motor rotation direction testing
- Firmware upgrade
- Flight data export

## Typical Applications

- Agricultural multirotor aircraft
- Industrial aerial imaging multirotor aircraft



**Active Braking:** The motor actively provides a reverse torque when decelerating, recovering some of the rotational energy. Normal braking mainly relies on air resistance.



**DO NOT** use a direct-current power supply for testing to avoid damage to the power supply when active braking function is enabled.

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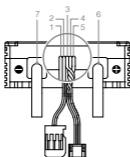
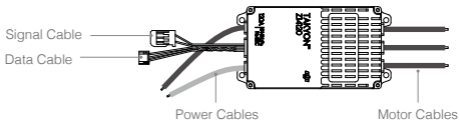
\* Refer to [Active Protection Functions \(p. 13\)](#) for details.



## Connection

Tools Required: Power distribution board (PDB)\*, electric soldering iron and soldering tin

1. Solder the ESC's black and gray power cables to the pads on the PDB.
2. Connect the signal cable to your flight controller. The signal cable's gray wire transmits the control signal and the black wire is for ground.
3. When using the Takyon Z14120 together with the DJI N3 or A3 flight controller, connect the data cable (JST 3-pin) to the iESC port on the flight controller via a smart ESC communication cable for redundant throttle signal transmission.
4. Connect the motor to the ESC.



ESC Cable Layout

1. GND
2. Control Signal
3. GND
4. S+
5. S-
6. Positive Power Cable (Gray)
7. Negative Power Cable (Black)

\* Use a PDB which has sufficient trace spacing and current capacity, according to the number of ESCs and the battery voltage.



Ensure that there are no open circuits or short circuits when soldering the ESC cables.

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It is recommended that you solder a power connector on the PDB for the battery.

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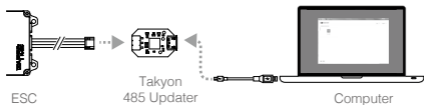
## Using DJI Assistant 2

DJI Assistant 2 is used to upgrade and configure the ESC.

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- The DJI Takyon 485 Updater is required but is not included with the ESC. To use DJI Assistant 2, connect the ESC to a computer through the DJI Takyon Updater as shown below.
  - To ensure your own safety, remove the propellers or disconnect the ESC and motors before using DJI Assistant 2.
  - Unplug any other serial devices that are connected to your computer before using the Updater.
- 



1. Download and install DJI Assistant 2 from the official DJI website.  
<http://www.dji.com/takyon-z14120/info#downloads>
2. Connect the Updater to the ESC with the data cable and to your computer with a Micro USB cable.

3. Connect a battery (5S - 14S LiPo) to supply power to the ESC. Do not disconnect the ESC from your computer or the power supply until configuration is complete.
4. Launch DJI Assistant 2. When a connection is established, the software will display the connected devices.
5. Click the Settings tab for basic settings such as Active Braking, Timing, Motor Rotation, Startup Tone, etc. Click the Advanced Settings tab for Output PWM Frequency Settings. Click the Data Recorder tab to view and export flight data.
6. Click Firmware Update to check the current firmware version and ensure the installed firmware is up to date. If not, login with your DJI account and click the Upgrade button.



If your ESC is not recognized by DJI Assistant 2 (no connected devices):

- Check if there is more than one FTDI device connected such as another Updater, an FTDI USB adapter or development board (e.g. a BeagleBone, Raspberry or Arduino board). Unplug the other FTDI devices, restart the ESC and DJI Assistant 2, and try again.
  - Re-connect the ESC and the power supply in the following order: Connect the ESC to your computer, connect the power supply to the ESC, and then launch DJI Assistant 2.
-

## Using the Remote Controller for ESC Configuration

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Be sure to remove the propellers before configuring the ESC.

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Calibrate the throttle range and switch the motor rotation direction using the remote controller:

1. Power on the remote controller and receiver. Ensure a good communication between them.
2. Push the throttle stick all the way up, connect the ESC to the motor and power on the ESC. The motor will start beeping, alternating between a double beep and a triple beep with a two-second gap between each beep. To configure the ESC, carry out each of the following movements within the two-second gap.
  - a. Throttle Range Calibration  
After the double beep, pull the throttle stick all the way down. A 1-second beep will sound if calibration is complete.
  - b. Motor Rotation Direction Switch  
After the triple beep, pull the throttle stick all the way down. A 1-second beep will sound once motor rotation direction has been switched.


## Active Protection Functions

The Takyon Z14120 ESC's Active Protection functions prevent ESC damage and extend the controller's lifespan.

Function	Trigger Condition	ESC Response	Release Condition
Overvoltage Protection	Input voltage > 66 V	Stop output	Adjust input voltage and restart the ESC
Undervoltage Protection	Input voltage < 15 V	Stop output and alert	Adjust input voltage and restart the ESC
Short-circuit Protection	Output short-circuit	Stop output	Clear short-circuit and restart the ESC
Stall Protection	ESC stalled	Stop output	Reduce throttle to minimum
Overheated Protection	120°C < ESC internal temperature < 140°C	Output power limit	ESC internal temperature < 115°C
Critically Overheated Protection	ESC internal temperature > 140°C	Stop output	ESC internal temperature < 115°C and restart the ESC
Redundant throttle signal transmission (DJI N3 or A3 flight controller required)	Main throttle signal lost, i.e. the ESC signal cable is disconnected.	Switch to backup throttle	The aircraft can fly with the backup throttle. However, it is recommended to land the aircraft and re-connect the PWM signal cable as soon as possible.

## System Status Beep Codes

You can instantly tell the system's status by observing the emitted sounds from the motor.

Normal	Description
Startup Tone 	System ready.
Abnormal	Description
Rapid Beeping	Starting input signal is not at minimum. Check the settings of your flight controller, receiver and remote controller.
Slow Beeping	No signal input.
Alternating Double and Triple Beeps	Using the remote controller for configuration.

## Specifications

Max Allowable Voltage	61 V
Max Allowable Current* (Continuous)	120 A
Max Peak Current (< 3 sec)	160 A
Max Regular Signal Frequency	500 Hz
Defaulted Output PWM Frequency	16 kHz
Weight (Without Cables)	130 g
Battery	5S - 14S LiPo
Operating Temperature	-10° to 40°C (14° to 104° F)
Compatible with DJI Flight Controllers	DJI N3 or A3 are recommended for accessing all Takyon functions.
Compatible Motor Models	Include but not limited to: 6010, 6025, 6035, 6135, 6215, 6340, 6610, 8308, 8314, 8318, 9225, 9235, 10010

\* Data measured in a ventilated environment and at a temperature of 25°C .

## Extreme Operating Environment

Unless specified, the data below was measured at a temperature of 25°C.

Parameters	Min	Max	Unit
Input Voltage	15	61	V
Allowable Current (Continuous)	-	120	A
Peak Current (< 3 sec)	-	180	A
PWM Input Signal Level	3.0	5.0	V
Regular Signal Frequency	30	500	Hz
Operating Temperature	-10	50	°C

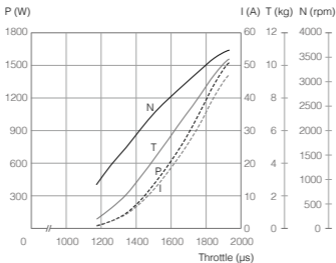
## Recommended Operating Environment

Parameters	Min	Typ	Max	Unit
Input Voltage	20	50	61	V
PWM Input Signal Level	3.3	-	5.0	V
Regular Signal Frequency	30	-	500	Hz
Operating Temperature	-10	25	40	°C

## Performance Diagram

The data below was measured using the 10010 motor (KV120, 21 pole pairs) and 28-inch propeller, with Active Braking enabled, and at a temperature of 25°C.

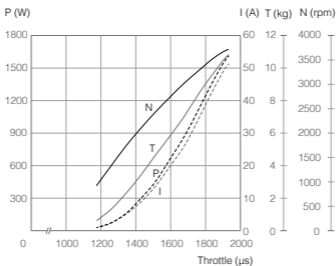
1. Set at High Timing



P- Output Power, I- Current, T- Thrust, N- Rotational Speed

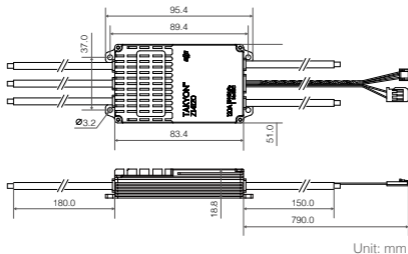


## 2. Set at Medium Timing



P- Output Power, I- Current, T- Thrust, N- Rotational Speed

## ESC Dimensions



Unit: mm

## Compliance Information

### FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### CE Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

**EU Compliance Statement:** SZ DJI TECHNOLOGY CO., LTD. hereby declares that this device is in compliance with the essential requirements and other relevant provisions of the EMC Directive.

A copy of the EU Declaration of Conformity is available online at [www.dji.com/euro-compliance](http://www.dji.com/euro-compliance)



EU contact address: DJI GmbH, Industrie Strasse. 12, 97618, Niederlauer, Germany

DJI Support  
<http://www.dji.com/support>

This content is subject to change.

**Download the latest version from**  
<http://www.dji.com/takyon-z14120>

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