⑪ Active Freewheel (regenerative braking system)

Setting choice : OFF / ON
Default setting : OFF

Select ON or OFF with the LEFT and the RIGHT buttons.

The “Brake Mode” activates when the throttle stick is moved up to 30% or more.

⑫ Current limit

Setting range : OFF / 40~120%
Default setting : 100%

Set the value with the LEFT and the RIGHT buttons.

This parameter regulates excessive current for energy saving and reducing heat emission.

⑬ Governor settings

(Disable the function for FAI F3A competitions.)

Setting range : OFF / ON
Default setting : OFF

Select ON or OFF with the LEFT and the RIGHT buttons.

When you use the governor, select ON and decide the values of the following items to set the governor gain.

Minimum rotation position setting: Min Speed 1~25
Maximum rotation position setting: Max Speed 1~25
Minimum rotation position setting is the rpm when a throttle stick is at full low position.
Maximum rotation position setting is the highest rpm setting.

- **Min Speed setting**
  Setting range : 1~25
  Default setting : 1

  Set the value with the LEFT and the RIGHT buttons to decide the timing when the governor starts to work.
  The governor starts to work the earliest at 1. At 25 it starts the latest.
  ※The value is usually set 1 unless you want to change it.

- **Max Speed setting**
  Setting range : 1~25
  Default setting : 8

  Set the value with the LEFT and the RIGHT buttons.
  This is to set the speed to reach the maximum rpm according to the throttle move.
  The rpm rises linearly at 8 to the maximum rpm, but it depends on how the throttle curve is set. Reduce the value in case the rpm reaches the maximum rpm before full throttle.

  ※ Increase the value in case the rpm does not reach the maximum rpm even full throttle.

- **Governor Gain setting**
  Setting range : 10%~40%
  Default setting : 20%

  Set the value with the LEFT and the RIGHT buttons.
  The larger the value is set, the more the motor rpm increases.
  ※Start from 20% then find your best setting.

⑭ Motor Type

Setting choice : Standard value / OMA-4013/OMA-6030/ OMH-4535

Select the value with the LEFT and the RIGHT buttons.

Select Standard value usually.

⑮ Throttle Mode

Setting choice : Automatic / set value

Set the value with the LEFT and the RIGHT buttons.

Select the setting item with the UP and the DOWN buttons.

When you do not choose “Automatic” and set the value:
PWM value for throttle stop position: 800~1200

PWM value for maximum throttle position: 1800~2200

⑯ Restore Default

Setting choice : NO / YES
Default setting : NO

Select NO or YES with the LEFT and the RIGHT buttons.

In case you select YES, press the RIGHT button again to confirm to restore Default settings.

Select the setting item with the UP and the DOWN buttons.

[Recommended Motor/ESC classified by airplane class.]

Class	Motor	ESC
50/70	OMA-5015-650 OMA-5025-375 OMA-5020-490	OCA-3070HV
70/F3A	OMA-5020-490 OMA-4043-165 OMA-5025-375 OMA-4043-172 OMA-6030-220	OCA-3100HV

Note: Electric current depends on combination of battery cells and size of propeller.
Read instructions of O.S. motors carefully before use not to apply excessive electric current more than its capacity to the ESC.

■ Specifications, design, and contents of the instruction manual of the motorare subject to change without prior notice for improvement.

Please contact e-info@os-engines.co.jp or professional@os-engines.co.jp for questions and inquiries.

● **Pay careful attention to the advices with the following headings.**

⚠DANGER	⚠WARNINGS	⚠NOTES
This covers the possibility which might involve death and serous injury.	These cover the possibilities which might involve death and serious injury and also may cause damage or injury.	These cover the many other possibilities, generally less obvious source of danger, but which, under certain circumstances, may also cause danger or injury.

Graphic symbols: ⃠ ; Prohibited items ❗ ; Items never fail to take action

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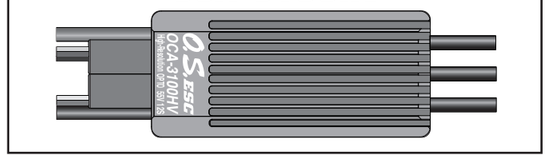
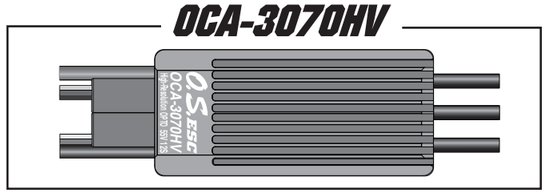
O.S.ENGINE

ESC for airplane brushless motors

OCA-3100HV



OCA-3070HV



INSTRUCTIONS

OCA-3100HV/OCA-3070HV are ESCs for airplane brushless motors.
For optimum performance of the ESCs, we recommend you to choose OS brand brushless motors.

● **Before using OCA-3100HV/OCA-3070HV**

※ Misuse or abuse of LiPo batteries is very dangerous.
Be sure to follow the instruction manual supplied with the batteries.

※ Motors other than OS brand may not work properly with the ESC.
Use the ESC with combination of OS motors listed in this manual.

※ Solder suitable connectors to the lead wires of the ESC to connect a battery.
Do not connect the connectors without soldering to a battery.

※ The governor system of this ESC does not conform to FAI F3A regulations.
Disable the function when you participate in the competitions based on FIA F3A regulations.

IMPORTANT: It is of vital importance, before attempting to operate your ESC to read through this instruction manual.

■Notes on installation

⚠ WARNINGS

❗ **Never use the ESC beyond the working conditions listed in the specifications listing.**

⃠ **Do not mistake the polarity of the batteries.**
※ Reverse connection may cause fire and ESC will be damaged or be burnt instantly.

⃠ **Never short out any place of the ESC, batteries, motor, receiver and connectors.**
※ Short circuit may cause fire and ESC will be damaged or be burnt instantly.
※ Be sure to install the ESC so that the soldering connection of the input/output wires may not touch conductive part.

❗ **Be sure to install the receiver and receiver antenna away from the place where high current flows such as ESC, motor wires, battery wires, power batteries.**
※ Malfunction of the receiver due to noise will cause to lose model control which is very dangerous.

❗ **Be sure to insert connectors all the way securely.**
※ Disconnection due to vibration may cause to lose model control which is very dangerous.

❗ **Be sure to install the ESC so that oil, grease and water may not come in contact with the ESC.**

❗ **Be sure to install the ESC at the place where there is plenty of air flow for cooling.**

⃠ **Do not wrap the ESC with aluminum foil, etc.**
※ Wrapping may spoil cooling effect and the ESC may not develop its original performance.

❗ **Be sure to install the motor securely and fix all the wires.**

⚠ NOTE

⃠ **Do not disassemble. Do not open the ESC case.**
※ Opening of the case may cause damage inside components and render it irreparable.

■Notes on operation

⚠ WARNINGS

❗ **Never touch or allow any part of the body to come into contact with any rotating part while operating.**
※ Sudden rotating may cause serious
※ Be careful with some receivers the motor may rotate for a moment when the power puts on.

⃠ **Do not fly when rainy.**
※ Entry of water drops into the ESC may cause malfunction and out of model control which is very dangerous. Also, it will cause failure. If malfunction is detected due to entry of water drops, send the ESC to the manufacturer or its distributor in each country for inspection and repair.

❗ **Be sure to follow the procedures mentioned below as to ON and OFF of the power switch.**
- **ON:** Hold the throttle stick at stop position. Switch on **the transmitter then receiver** power.
- **OFF:** Hold the throttle stick at stop position. Switch off **the receiver then transmitter** power.

※ With reverse procedure propeller may rotate suddenly, which is very dangerous.

❗ **Be sure to remove the batteries when not in use.**
※ Accidental switching on may cause sudden rotating of propeller or cause fire, which is very dangerous.

❗ **Be sure to check the ESC and all the movements of model controls before attempting flight.**
※ Incorrect settings or using of unsuitable model may cause to lose model control which is very dangerous.

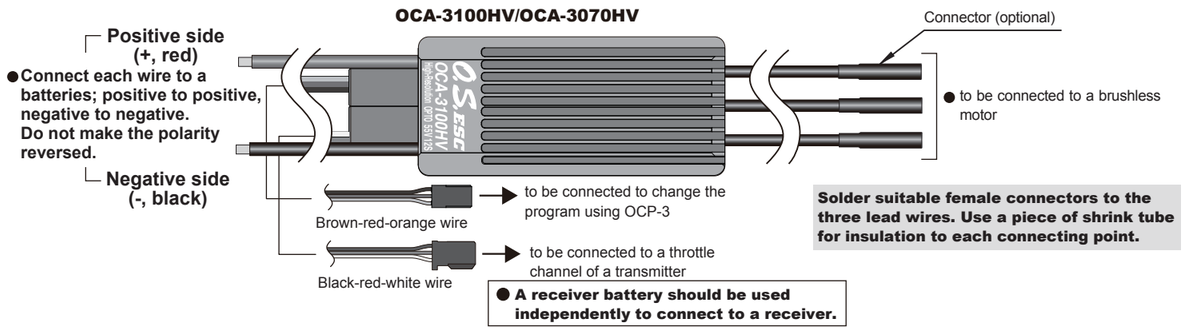
⚠ NOTE

⃠ **Do not touch the motor nor ESC right after flight.**
※ Touching them may cause burn.

How to connect OCA-3100HV/OCA-3070HV

[preparation] Solder suitable connectors to lead wires (red, black) of the ESC. Use a piece of shrink tube for insulation at each connecting point. Solder suitable female connectors to the three lead wires of the ESC, which are to be connected to three male connectors of the brushless motor. Use shrink tubes for insulation at connecting points.

The drawing below shows connection of OCA-3100HV/OCA-3070HV.



Solder suitable female connectors to the three lead wires. Use a piece of shrink tube for insulation to each connecting point.

[OCA-3100HV / OCA-3070HV SPECIFICATIONS]

	OCA-3100HV	OCA-3070HV
Input signal period	50~400Hz	50~400Hz
Voltage Range	14.8V-52.2V(4S LiPo-12S LiHV)	14.8V-52.2V(4S LiPo-12S LiHV)
Maximum peak current	150A (5 seconds, 20°C, cooling air 5m/s)	90A (5 seconds, 20°C, cooling air 5m/s)
Maximum current	100A (180 seconds, 20°C, cooling air 5m/s)	70A (180 seconds, 20°C, cooling air 5m/s)
Intemal BEC	None (Input signals are insulated by a photocoupler.)	None (Input signals are insulated by a photocoupler.)
Advance Timing	Fixed 0~25° adjustable by 1°	Fixed 0~25° adjustable by 1°
PWM Frequency	Selectable : 8kHz, 16kHz, 32kHz	Selectable : 8kHz, 16kHz, 32kHz
Active Freewheel	ON/OFF	ON/OFF
Braking force setting	OFF or adjustable 0~100% by 2%	OFF or adjustable 0~100% by 2%
Brake speed setting	Adjustable 0~2.0 sec. by 0.1 sec.	Adjustable 0~2.0 sec. by 0.1 sec.
Current limit	OFF or adjustable 40~120% by 5%	OFF or adjustable 40~120% by 5%
Governor (not for FAI F3A competitions)	ON/OFF	ON/OFF
Throttle mode	Automatic/Set value, Stop Position/Maximum Throttle Position	Automatic/Set value, Stop Position/Maximum Throttle Position
Outside dimension	37mm(W) x 95mm(L) x 16mm(H)	37mm(W) x 95mm(L) x 16mm(H)
Weight	125g including lead wires and 4ϕ connectors	124g including lead wires and 4ϕ connectors
Batterie Leads	13AWG, 100mm length, covered by silicone tube	13AWG, 100mm length, covered by silicone tube
Motor Leads	14AWG, 100mm length, covered by silicone tube	14AWG, 100mm length, covered by silicone tube
Input signal leads	22AWG, 3-Wire (Black-red-white) 240±10mm	22AWG, 3-Wire (Black-red-white) 240±10mm
Setting leads	22AWG, 3-Wire (Brown-red-orange) 140±10mm	22AWG, 3-Wire (Brown-red-orange) 140±10mm
Setting	The parameters can be set with OCP-3 ESC programmer	The parameters can be set with OCP-3 ESC programmer
Protective function	Start protection/Low voltage cutoff/Non signal cutoff/ Overheat protection/Anti-spark protection/ Automatic battery cell quantity recognizing system	Start protection/Low voltage cutoff/Non signal cutoff/ Overheat protection/Anti-spark protection/ Automatic battery cell quantity recognizing system

※ Start protection: the device stops the motor when it is started unintentionally.

※ Low voltage cut-off: the device stops the motor when it loses control, or before incoming voltage.

※ No signal cut-off: the device cut off the ESC when no signal from the transmitter is detected.

※ Protection against overheating: the device regulate the output to protect FETs when temperature of ESC rapidly rises due to overload.

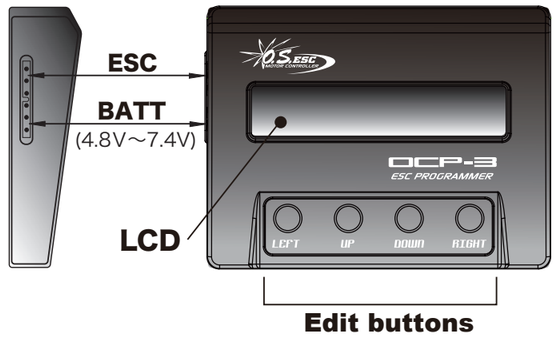
※ Anti-spark: the device reduces sparks when the ESC is connected to a battery.

※ Automatic detection of battery cells: the device detects number of battery cells automatically.

- In order to maintain an optimum current and rated current of the ESC, cooling air; propeller slip stream and natural air of atmospheric temperature 20°C or lower at wind speed (5m/s or more) over the entire heat sink is required.
- The maximum performance limit of ESC greatly changes depending on environmental factors such as atmospheric temperature and humidity.
- Battery voltage is detecting system. A buzzer tells you how many cells in a battery.
- The active free-wheeling reduces heat of the ESC generated during operation, which is a waste.

Settings of the ESC using an ESC programmer of OCP-3

With OCP-3 (optional), you can set the ESC more quickly and easily.



●Connecting the programmer

Connect OCA-3100HV/OCA-3070HV to the ESC socket of OCP-3, and a battery (4.8~7.4V) to the BATT socket of OCP-3.

● Operation of the edit buttons

Select a setting item by pressing the UP or the DOWN button.

The LEFT and the RIGHT buttons are to select each item in the setting or to change the setting.

● Setting items

The following items can be set with OCP-3.

Setting items (model type: airplane)	
① Battery type	⑨ Brake Speed
② Battery Cut-off	⑩ Start Power
③ Cut-off type	⑪ Active Freewheel
④ Motor timing	⑫ Current Limit
⑤ Acceleration	⑬ Governor settings
⑥ Drive Frequency	⑭ Motor Type
⑦ Reverse Rotation	⑮ Throttle Mode
⑧ Brake Force	⑯ Restore Default

●How to set the ESC using OCP-3

■Disconnect the battery from the ESC.

■Connect a battery (4.8~7.4V) to the socket BATT socket of OCP-3.

■Select a setting item by pressing the UP and the DOWN buttons.

■ Select or change the setting item by pressing the LEFT and the RIGHT buttons.

■Any chosen value of setting is memorized in the ESC automatically one by one without requesting you any further action to memorize the value in the ESC.

※No electronic sound is emitted from the OCP-3 and the motor when you press the buttons.

① Battery type

Setting choice : LiPo or NiCd
Default setting : LiPo

Select the battery type and number of cells with the LEFT and the RIGHT buttons.

Setting a number of the battery cells: AUTO

In case NiCd is selected, pass the setting item ②.
The cut-off voltage is automatically fixed at 50% of an initial value.

② Battery Cut-off

Setting range : 2.9V~3.2V
Default setting : 3.2V

Set the cut-off voltage when you select LiPo battery with the LEFT and the RIGHT button.

③ Cut-off type

Setting choice : Reduce power by 50% or Switch OFF (stop the motor)
Default setting : Reduce power by 50%

Select how to cut off the power when voltage of the battery drops to the set value of cut-off voltage with the LEFT and the RIGHT buttons.

④ Motor Timing

Setting range : 0~25°
Default setting : 12°

For 2~4-pole motors, usually we recommend 0~5°
Set the value within the range shown below.

for inner rotor type : 0~10° for outer rotor type : 10~25°

Select the advance timing with the LEFT and the RIGHT buttons.

⑤ Acceleration

Setting range : 20~200
Default Setting : 100

This is the speed at which the ESC reaches the top speed. Select the acceleration value with the LEFT and the RIGHT buttons.

The setting value is 50 or lower in case a motor is turned ON/OFF by an on-board switch of a transmitter such as gliders.

⑥ Drive Frequency

Setting choice : 8kHz / 16kHz / 32kHz

Select the value with the LEFT and the RIGHT buttons.

We recommend 32kHz for 10-pole or less motors.

⑦ Reverse Rotation

Setting choice : Normal / Reverse

Select the direction of rotation with the LEFT and the RIGHT buttons.

⑧ Brake Force

Setting range : OFF~100%
Default Setting : OFF

Set the value with the LEFT and the RIGHT buttons.

⑨ Brake Speed

Setting range : 0~2.0 seconds
Default Setting : 0.1 second

Set the value with the LEFT and the RIGHT buttons.

⑩ Start Power

Setting choice : Super Soft / Very Soft / Soft / Hard
Default Setting : Soft

Select the start power with the LEFT and the RIGHT buttons.