ES3005HV

EMAX – digital servo with metal gears
User manual



Read the entire manual before first use. Power the servo only with a voltage of 6.0–8.4 V.

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1. Product description

1.1 What it is for

EMAX ES3005HV is a standard-size digital servo with metal gears and two ball bearings (2BB). It is designed for a higher supply voltage (HV) in the range of **6.0–8.4 V**, so it can be powered from a BEC with an output within this range or directly from a two-cell Li-Po battery (2S, 8.4 V when fully charged).

The servo is intended for general use: it operates control surfaces, steering and other mechanisms of RC models – aircraft, cars, boats and other machines. It is controlled by a PWM signal from a receiver or a flight controller (FC) and connects to them with a three-wire cable with a JR connector.



ES3005HV servo with accessories (manufacturer's photo)

1.2 Technical data and package contents

Data according to the technical specification of the manufacturer EMAX. Performance depends on the supply voltage:

Parameter	6.0 V	7.4 V	8.4 V
Speed (no load)	0.15 s/60°	0.12 s/60°	0.11 s/60°
Stall torque	8 kg·cm	10 kg·cm	11 kg·cm
Running current (no load)	max. 450 mA	max. 580 mA	max. 650 mA
Maximum current	max. 2.5 A	max. 3.2 A	max. 3.6 A

Product designation	EMAX ES3005HV (label: “ES3005 HV”)
Manufacturer	EMAX
Type	digital servo, PWM control
Supply voltage	6.0–8.4 V
Idle current	9.5 mA
Weight	43 ± 0.5 g
Dimensions	38.6 × 18.8 × 34.9 mm; height including output shaft 36.9 mm
Gears	metal
Bearings	2 ball bearings (2BB)
Output shaft	23 teeth (23T), ø 5.93 mm
Connector and cable	JR, cable length 240 ± 8 mm (without connector)
Neutral position	1500 µs
Pulse width range	500–2500 µs
Operating travel	90° ± 8° (at 1000–2000 µs)
Maximum travel	180° ± 10° (at 500–2500 µs)
Extreme angle	220°
Rotating direction	counter-clockwise when the pulse changes from 1500 to 1900 µs
Operating temperature	−10 °C to 55 °C
Storage temperature	−20 °C to 70 °C

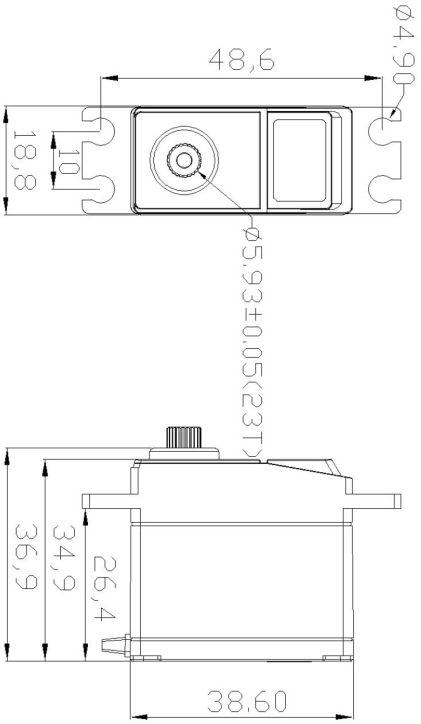
Package contents

- 1× EMAX ES3005HV servo
- 1× set of servo horns and mounting accessories

Not included

- receiver, transmitter or flight controller (FC)
- power source (BEC or battery)
- pushrods, pushrod connectors and extension cables

1.3 Dimensions



Manufacturer's dimensional drawing, dimensions in mm

2. Use

2.1 Power supply

Operate the servo only within the supply voltage range of **6.0–8.4 V**. A suitable source is the BEC of an electronic speed controller (ESC) or a separate BEC set to a voltage within this range, or directly a 2S Li-Po battery.

- A 2S Li-Po battery is fully charged to 4.20 V/cell, i.e. **8.4 V** – this is the upper limit of the servo supply voltage.
- A **2S LiHV** battery is charged to 4.35 V/cell, i.e. **8.7 V**. This exceeds the permitted range – do not connect a fully charged 2S LiHV battery directly to the servo.
- Never connect 3S or higher batteries or any source above 8.4 V to the servo.
- The power source must supply the current for all connected servos at the same time. One ES3005HV servo draws up to 3.6 A (at 8.4 V); an insufficient source may cause a voltage drop and a receiver brownout.

2.2 Connection

Plug the JR connector into the output of the corresponding channel of the receiver or flight controller (FC). Make sure the connector is oriented correctly:

Wire	Colour	Function
signal	white	PWM control signal (S)
power +	red	positive supply pole
power −	black	negative pole (GND)

Do not connect the connector in reverse. Switch off the power before connecting or disconnecting the servo.

2.3 Fitting the servo horn

① Connect the servo to the receiver, switch on the transmitter and the power supply. Set the servo channel to centre – the servo moves to the neutral position (1500 µs).

② Fit the horn onto the output shaft (23 teeth) in the position closest to the required neutral position. Fine-tune it in the transmitter (subtrim).

③ Secure the horn with the centre screw. Do not force the output shaft by hand – you may damage the gears.

2.4 Installation in the model

- Fasten the servo by its mounting lugs with screws. If you use the rubber grommets from the accessories, do not overtighten the screws so that the grommets can dampen vibrations.

- Pushrods must move freely, without play and without binding throughout the full range of movement.
- The mechanism must not stall the servo in any position. A stalled servo draws a high current, heats up and may be damaged.
- Route the cable so that it is not under tension, does not rub against sharp edges and cannot get into rotating parts.

2.5 Setting the travel in the transmitter

With the usual pulse range of 1000–2000 µs, the servo has an operating travel of approximately 90°. By extending the range up to 500–2500 µs, a travel of approximately 180° can be achieved.

- Set the end positions (*End Points* / *Limits*) in the transmitter so that neither the servo nor the mechanism hits a stop in the end positions.
- Do not use pulses outside the range of 500–2500 µs.
- Reverse the direction of movement with the *Reverse* function in the transmitter.

3. Safety, maintenance and troubleshooting

3.1 Safety instructions

- This product is not a toy. Keep it out of the reach of children – small accessory parts could be swallowed.
- Keep the power disconnected during installation and adjustment. The moving horn and pushrods can pinch your fingers.
- Check the function of the servo and its correct direction of movement before each operation of the model.
- Protect the servo from water, moisture, dust and dirt. Operate it only within the temperature range of −10 °C to 55 °C.
- The servo heats up when overloaded or stalled. If the servo is hot after operation, find and eliminate the cause.
- When operating the model, observe the regulations of the country in which you operate it – the law of that country always prevails.
- Do not disassemble or modify the servo. Mechanical damage or tampering with the servo is not a product defect.

3.2 Maintenance and storage

- Regularly check the tightness of the horn screw, the play in the gears and the condition of the cable and connector.
- Do not continue to use a servo with a damaged cable, audibly damaged gears or irregular movement.
- Store in a dry place at a temperature of −20 °C to 70 °C.

3.3 Troubleshooting

Problem	Possible cause and solution
Servo does not respond	Check the connector orientation, the receiver power supply (6.0–8.4 V), the correct channel and the link between transmitter and receiver.
Servo moves in the opposite direction	Change the direction of movement with the *Reverse* function in the transmitter.
Travel too small or too large	Adjust the end positions (*End Points*) in the transmitter or the pushrod position on the horn.
Servo buzzes or heats up at rest	The pushrod is preloaded or the mechanism hits a stop. Adjust the pushrod and the end positions.
Receiver resets when servos move	The BEC cannot supply the required current. Use a more powerful source.

4. Information for the EU and Czech Market

4.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorama.cz
Phone	+420 252 252 098
Website	www.rotorama.com

4.2 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu.

5. Warranty and rights arising from defective performance

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 4.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.