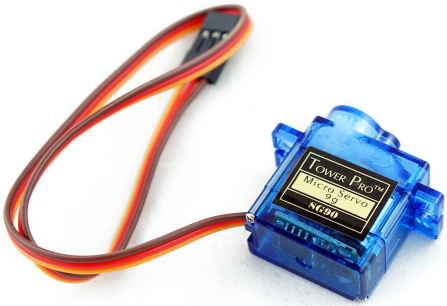
Tower Pro SG90

Analog micro servo 9 g
User manual



Read this manual carefully before first use and keep it for future reference.

www.rotorama.com

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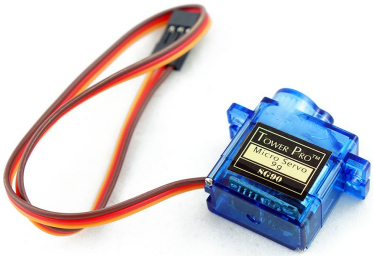
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1. Product description

1.1 Purpose

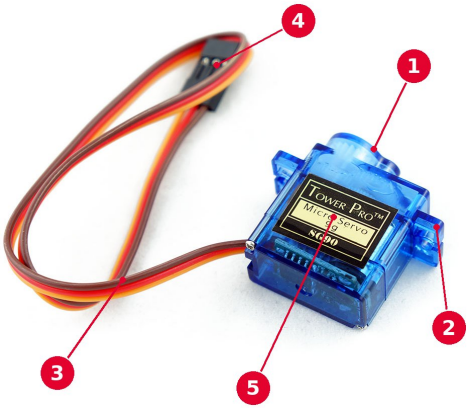
The Tower Pro SG90 is a small, lightweight **analog servo** with plastic gears and a weight of 9 g. The servo converts the control signal from an RC receiver, a flight controller (FC) or a microcontroller into rotation of its output shaft. A servo horn is fitted onto the shaft; through a pushrod, the servo moves a control surface, flap or other mechanism.

Thanks to its low weight and small size it is suitable for light RC aircraft and gliders, for operating small mechanisms (e.g. camera tilt, payload release, latches) and for electronics and robotics projects. For heavy loads and highly stressed control surfaces, choose a stronger servo, ideally with metal gears.



Tower Pro SG90 servo

1.2 Parts overview



Main parts of the servo

① Gearbox with output shaft (splined shaft for the servo horn)
② Mounting tabs with holes for fixing the servo
③ Three-wire cable – brown, red and orange wire
④ JR-type connector
⑤ Label with product designation (SG90)

1.3 Specifications and package contents

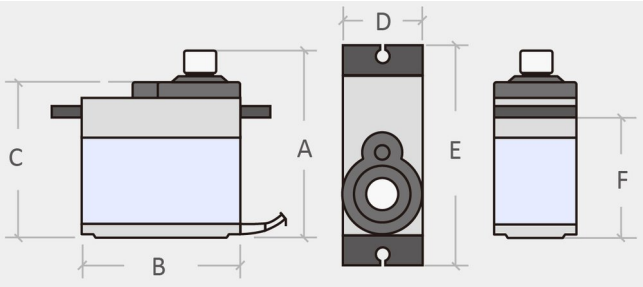
Parameter	Value
Product designation	Tower Pro SG90 (Micro Servo 9g)
Type	analog servo
Weight	9 g
Operating voltage	4.8–6 V
Torque	1.2 kg·cm (4.8 V) 1.6 kg·cm (6 V)
Speed	≤ 0.12 s/60° (4.8 V) ≤ 0.09 s/60° (6 V)
Travel	90° (1000–2000 µs)
Dead band width	1 µs
Gears	plastic
Operating temperature	0 °C to 55 °C
Cable length	approx. 25 cm
Connector	JR (fits JR and Futaba)

▶ Package contents

- 1× Tower Pro SG90 servo
- 1× servo horn set

Not included: receiver, flight controller or other control electronics, power supply (BEC), extension cable, pushrods and pushrod connectors.

▶ Dimensions



Dimension drawing (manufacturer Tower Pro)

A	B	C	D	E	F
30.3 mm	22.7 mm	27 mm	12.2 mm	32.3 mm	17 mm

2. Use

2.1 Safety

- Power the servo only with a voltage of **4.8–6 V**. Never connect it directly to a battery with a higher voltage (e.g. 2S LiPo, 8.4 V fully charged) – the servo will be destroyed.
- When working on a model with the power system connected, always disconnect the motor or remove the propeller. The servo may move unexpectedly when power is switched on.
- Keep your fingers away from the servo horn, pushrods and control surfaces while the servo is powered.
- The servo is not waterproof. Protect it from water, moisture, dust and sand.
- Keep small parts (servo horns, screws) out of the reach of small children.
- Operate the model with the servo in accordance with the regulations. The law of the country in which you operate the model always prevails.

2.2 Connection and power supply

The servo has a three-wire cable terminated with a JR-type connector. Wire assignment:

Wire	Function
brown	− (ground, GND)
red	+ (power 4.8–6 V)
orange	signal (control pulses)

❖ The manufacturer states an operating current of approx. 0.5–2 A. Size the power supply (BEC) with a margin according to the number of servos that may move at the same time.

- **RC receiver:** plug the connector into the channel output so that the brown wire is on the − (ground) pin. The receiver must be powered from the BEC of the electronic speed controller (ESC) or from a separate BEC with a voltage of 4.8–6 V.
- **Flight controller (FC):** connect the signal to an output intended for a servo and power the servo from a BEC with an output of 4.8–6 V. The servo output must be configured in the FC firmware.
- **Microcontroller (e.g. Arduino):** connect the signal to a digital pin and connect the servo ground to the microcontroller ground. Power the servo from a separate 5 V supply, not from the board's power pin – when the servo starts moving, the board voltage could drop and the microcontroller would reset.

2.3 Mounting the servo and servo horn

① Fix the servo by its mounting tabs with screws to a rigid part of the model, or glue or secure it according to the model's design. The servo must be mounted firmly, without play.

② Before fitting the servo horn, switch on the transmitter and power and let the servo move to the **centre position** (see chapter 2.4).

③ Fit the servo horn onto the splined shaft so that in the centre position it is as close to perpendicular to the pushrod as possible. If a centre screw is supplied with the horn, secure the horn with it – do not overtighten the screw.

④ Connect the pushrod and check that the control surface or mechanism moves freely, without binding, and does not hit an end stop anywhere within the travel.

2.4 Setting the centre and travel

The servo is controlled by standard RC servo control pulses. The range of 1000–2000 µs corresponds to a travel of 90°; the centre position corresponds to approx. 1500 µs.

- First set the centre mechanically – by fitting the horn on the nearest spline of the shaft. Fine-tune it in the transmitter (subtrim) or in the FC output settings.
- Limit the end points in the transmitter or the FC so that neither the servo nor the mechanism **ever hits a mechanical end stop**. A servo pushing against an end stop buzzes, draws high current, heats up and may damage its gears.
- Reverse the direction of movement using the channel reverse function in the transmitter or the FC.
- After every change of settings, check the movement over the full travel.

3. Maintenance and troubleshooting

3.1 Maintenance and storage

- Before each use of the model, check that the servo responds smoothly, has no play in the gears and the horn is firmly attached.
- Check the cable and connector – replace a broken or chafed wire, secure a loose connector.
- After a crash or hard impact, check the gears. Do not use a damaged servo.
- Do not open the servo and do not lubricate it with ordinary oils – they may damage the plastic parts.
- Store in a dry place, out of direct sunlight, within the operating temperature range.

3.2 Troubleshooting

Problem	Cause and solution
Servo does not move	Check the connector orientation (brown wire on −), the receiver or BEC power supply and the channel assignment in the transmitter or the FC.
Servo buzzes at rest or at an end point	The servo is hitting an end stop or the mechanism is too stiff. Reduce the travel, free the pushrod, eliminate binding.
Servo twitches or jitters	Insufficient power or signal interference. Use a more powerful BEC, shorten the cables, route the wires away from the motor and ESC power cables.
Receiver or microcontroller resets	Voltage drop when the servo moves. Power the servo from a separate supply with sufficient current.
Shaft slips, servo loses position	Damaged gears (typically after an impact or overload). Replace the servo.
Servo moves in the wrong direction	Reverse the direction using the channel reverse function.

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

5.1 Rights of the buyer under Czech law

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.