Troubleshooting

Symptom	Cause	Remedy
Cannot set "High point"	Improper setting of ESC	Reset transmitter throttle setting to normal before setting "High point". Set "High point" position at 90% of full throttle.
	Improper transmitter setting	Correct transmitter throttle setting.
The brake does not function. The car does not set into reverse.	Improper setting of ESC	Reset transmitter brake setting to normal before setting "Brake point" (reverse) . Set "Brake point" (reverse) position at 90% of full throttle.
	Improper transmitter setting	Correct transmitter brake setting.
Motor and servo both do not work.	Bad contact with battery	Check that contact with battery is good.
	Improper wiring of receiver	Check that wiring of receiver and servo is correct.
	Receiver failure	Replace crystal or request repair.
	Transmitter failure	Replace crystal or request repair.
	ESC failure	Request repair.
Motor does not work, but servo works.	Improper setting of ESC	Setup ESC again from the beginning.
	Motor failure	Replace motor.
	Bad contact with battery	Check that battery and cables are properly connected.
	Bad contact with receiver connector	Confirm whether the Rx connector pin is broken or loose.
	ESC failure	Request repair.
ESC gets too hot.	Input voltage is too high	Use 6-cell power supply.
	Insufficient cooling	Attach radiating fin to improve air flow and heat radiation.
	Driving load is too high	Adjust driving system.
	A diode is attached to the motor.	Remove the Shottky diode from the motor.
Acceleration is decreased.	Improper ESC setting	Setup ESC again from the beginning.
	Current limiter value is too low	Increase current limiter value.
Car behaves incorrectly.	Failure in motor capacitor	Replace motor capacitor.
	Bad position of receiver	Keep receiver as far from battery or ESC as possible.
	Transmitter/receiver failure	Request repair.
	Incorrect wiring	Make silicone cables as short as possible.

Specifications

Power supply — 6-cell Ni-Cd battery
Maximum current — Max. current of Ni-Cd battery
PWM frequency — 2,930 Hz
ON resistance — 0.0018 ohm (FET specification), 0.003 ohm (Actual value, at board terminals)
Dimensions — 31.0 (W) x 26.5 (D) x 18.0 (H) mm
Weight (ESC unit) — 26 g (46 g when cable included)
Receiver/Servo regulator — 7.2 V (input), 5.8 V (output), 1 A max.

Perforated line

Repair regulations

1. The part that can be repaired is as follows. Internal electronic circuit
   (Damage caused by incorrect connection or running operation is not covered by the warranty.)
2. Note that repairing the ESC is impossible in the following cases.
   When opening the ESC housing.
   When using a power supply other than the specified 6-cell Ni-Cd battery (7.2 V).
   When modifying the wiring in order to use a separate power supply.
3. KEYENCE assumes no responsibility for damage of the receiver or servo caused by incorrect connection of the ESC.
4. Note that if the repair card is not filled out, repair and return of the ESC may be delayed.

Warranty

Item	Ultra-small digital speed controller A－07 series	Date of purchase	・ ・ ・
Manufacture no.		Warranty term	3 months from the date of purchase
Costomer's address	－		
Telephone no.	TEL ( )		
Name			

Note that if the date and location of the A-01 purchase are not entered on the warranty card, you will be charged for repairs even within the warranty term.

If a failure should occur within three months of the date of purchasing the ESC, write the symptoms of the problem and the working condition on a separate sheet. Request a repair of the ESC from either the distributor where you purchased the ESC or from KEYENCE (Service Section of the Hobby Department).

KEYENCE CORPORATION Hobby Div.
1-3-14 Higashinakajima, Higashiyodogawa-ku, Osaka 553-8555, Japan
Phone 81-6-6379-1191 • Fax 81-6-6379-1190 • E-mail: hobby@mail.keyence.co.jp

Request card for repair

1. Symptom (Condition)
   Please describe condition of the ESC as detailed as possible.

2. Your equipment
   Please fill in the blanks below.

Description	Maker	Model No.	Others
Motor			Turn No.
Battery		Voltage: V	
		Capacity: mAh	
Receiver			
Transmitter			
Servo			
R/C Car		☐ F-1 ☐ Touring Car	☐ Buggy (4WD) ☐ Buggy (2WD)

3. Shop where you bought the ESC
   Name :
   Address :
   Tel. No. :

Electronic Speed Controller

A-07

KEYENCE
KEYENCE CORPORATION

Introduction
Thank you for purchasing the A-07. To get the best from your A-07, please read this manual carefully.
After reading it, be sure to keep it in a convenient location.

Ultra-small digital speed controller Instruction Manual

Features of the super-small digital speed controller A-07

- Featuring 24 of the latest POWER MOS-FETs (SOP [Note 1]) with reverse run function, the A-07 has achieved the world's top class ON-resistance of 1.8 mΩ (FET specification) (Actual value: 3 mΩ at board terminals). As a result, it provides powerful forward run as well as strong reverse run.
- With the three-layered internal board configuration and the high-density mounting of electronic components, the A-07 occupies the smallest mounting area without compromising its performance.
- The innovative FET drive method was adopted to improve the efficiency for low to middle acceleration while preventing heat generation. (S.R.S. drive [Note 2], RZ type only) (Patent pending)
- The MPRS system [Note 3] which is proven with the A-01 series is adapted to a large current circuit. Both super-small body and high performance have been achieved.
- All connectors are gold-plated to reduce contact resistance.

[Note 1] SOP: Surface-mount package. It has only a fraction of the weight of a conventional FET.
[Note 2] S.R.S. drive: Synchronous Reverse-voltage Suppression. This is an innovative driving system, which actively eliminates the loss, generated during the pulse drive.
[Note 3] MPRS: Metal Plate Heat Radiation Structure. This is a hybrid structure that feeds a current not only through a copper foil but also through a metal plate on the PC board. It allows the best configuration with the FETs.

⚠ CAUTION

The following symbols alert you to important messages. Be sure to read these messages carefully.

⚠WARNING Instructions to prevent serious injury
⚠CAUTION Instructions to prevent accidents or product damage
NOTE Additional information on proper operation

Precautions

1. Ni-Cd battery

⚠ WARNING: To prevent fumes, fire, and burns

Improper use of the Ni-Cd battery is very dangerous. The battery must be handled carefully. Incorrect wiring or short-circuiting of the cables may cause fire or fumes. Before connecting or disconnecting the battery to or from the ESC, be sure to turn off the ESC's power switch. Do not charge the battery while it is connected to the ESC. When the battery is not in use, disconnect it from the ESC or charger, and store it in a location with no wires or screws.

2. Mounting motor

⚠ WARNING: To prevent fumes, fire, burns, and explosion

NEVER attach a Shottky diode to the motor to be used. If a Shottky diode is attached, it may explode or the ESC may be damaged. To prevent noise, be sure to mount three noise-killer capacitors according to the illustration.

3. Connection of silicone cable and connector

⚠ WARNING: To prevent fumes, fire, and burns

Before using the ESC, check if dust has accumulated on the connector terminals (metallic part) of the battery and the motor, and check if the terminals are loose. Poor contact of the connectors may reduce the efficiency and may generate heat resulting in the deformation or fusion of the resin part.

4. Heat sink (Radiating fin)

⚠ WARNING: To prevent fumes, fire, and burns

Electricity flows through the metallic part at the top of the ESC. Therefore, do not allow wiring cables, other metallic parts and the carbon chassis to make contact with the ESC. When a heat sink is attached, electricity flows through the heat sink. Exercise the same precautions.

5. Proper operation

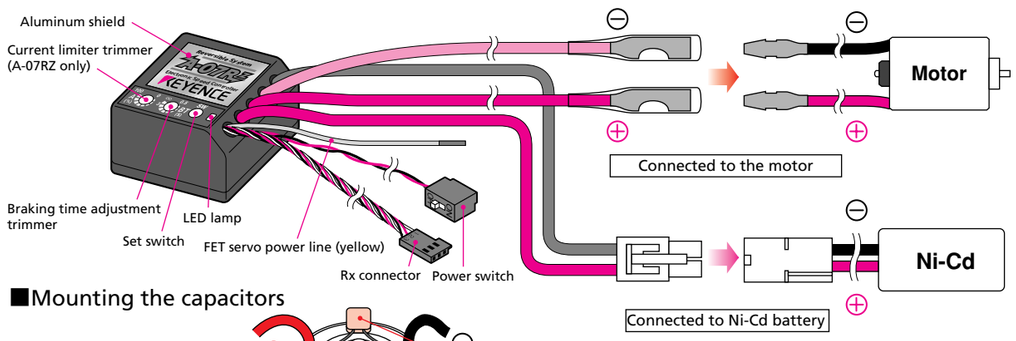
⚠ CAUTION: To prevent accidents and product damage

Do not modify the ESC. Use it only for its intended purpose.
Keep the ESC away from flames or heat. Avoid splashing any liquid, such as water, on the ESC.

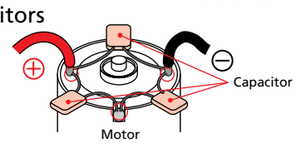
Part names and wiring

⚠ WARNING: Precautions to prevent smoke, fire, or an explosion

Be extremely careful to observe the correct polarity for the wiring of the battery and Schottky diode. Be sure to install a capacitor and Schottky diode to the motor. If you do not, the ESC may malfunction.



■Mounting the capacitors



NOTE NEVER attach a Shottky diode to the motor to be used. If a Shottky diode is attached, it may explode or the ESC may be damaged.

Receiver connector

⚠ WARNING: Precautions to prevent smoke, fire, or an explosion

Be sure to remove the batteries before modifying the wiring. Be extremely careful that the wires' polarity is correct.
Note that we do not repair servos and receivers.

Insert the Rx connector pin according to the manufacturer's instructions of your receiver. Align the claw of the connector pin with the connector hole and insert it properly.
Improper connection or reverse insertion of the connector may damage the servo and receiver.
If you use a receiver other than those listed, contact your distributor or KEYENCE.

Manufacturer of your receiver	Former SANWA, Former KO	FUTABA, New KO	New SANWA (Z connector), JR
Shape of connector insert port (receiver side)	Avoid reverse insertion.	The connector can be used without change.	Avoid reverse insertion.
Wiring	Cut here		Cut here

★ To disconnect each cable, use a pointed object to hold down the part on the top of the connector pin. Slowly disconnect the cable from the connector, one by one.
★ When removing the connector, be careful not to apply excessive pressure to the claw (metallic part that can be viewed from the top of the connector). Otherwise, the connector pin contacts will be degraded, causing the unit to malfunction.

Usage

● Setup ★Perform each setup procedure within 10 seconds after the LED begins flashing. (This is because the unit is automatically reset after 10 seconds.)

1. Ensure that the ESC's power switch is turned off.
2. To lock a car, eliminate any driving force on the tires by disconnecting the motor cable, etc.
3. Turn the transmitter on. Set each function on the throttle side.
   Reset all settings of the "Neutral", "High point", and "Brake point" of the transmitter to the normal position.
4. Turn the ESC on.
5. Hold down the SET switch for approximately 5 seconds.
6. The red LED will begin flashing.
7. Release the SET switch.
8. Set the transmitter throttle to "Neutral" and press the SET switch once.
9. The red LED will flash faster.
10. Set the transmitter throttle to "High point" (at 90% of full throttle) and press the SET switch once.
11. The red LED will flash slower.
12. Set the transmitter throttle to "Brake point" (at 90% of full brake) and press the SET switch once.
13. The setup is completed

※Use the supplied resin driver to press the switch.

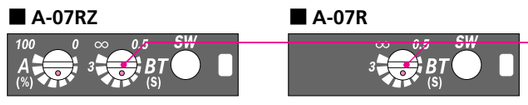
● Setup confirmation ★Check the LED illumination status to confirm whether the ESC is properly set.

The proper setting can be confirmed with the LED. When the ESC is properly set, the LED indicator illuminates at "Neutral", then it goes off once and illuminates again at "High point" and at "Brake high point (Reverse high point)" as you turn the throttle. If the setup fails due to the transmitter settings, set the reverse switch of the transmitter throttle to the opposite side and repeat the setup procedure.

● Braking time adjustment function ★The braking time can be adjusted to control the brake according to the application.

NOTE The braking time adjustment (BT) trimmer turns only within the range of 240 °. Do not force it past this range.

■ A-07RZ ■ A-07R



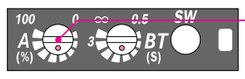
Brake adjustment trimmer (0 to approx. 70%)
The "●" mark in the trimmer indicates the set value.

You can adjust the duration of the brake that works, when the throttle is moved from forward to reverse, by changing the current braking time value. The braking time can be changed from 0.5 seconds (min. value) to 3 seconds (max. value). The reverse run is activated after the brake is applied. When the trimmer is turned fully to the right, the braking time is set to infinite and the reverse run is disabled.

<To start reverse run quickly after the braking time setting>
Set the throttle lever from forward to reverse and apply the brake. Then return the throttle to neutral once and set it to reverse again.

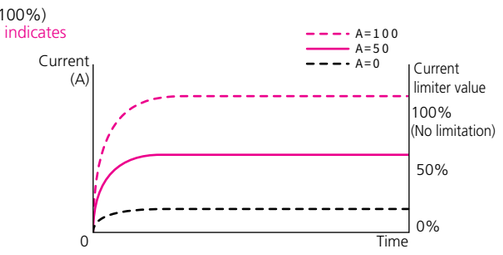
● Current limiter (RZ Type) ★Limiting the maximum current to the motor prevents a skid and improves battery efficiency.

NOTE Current limiter (A) trimmer turns only within the range of 240 °. Do not force it past this range.
The Ni-Cd battery of 7.2 V, 2000 mAh can produce instantaneous maximum current of 200 A;however, when it is used for a touring car, the available current is 20 to 50 A in the normal race run.



Current limiter trimmer (0 to 100%)
The "●" mark in the trimmer indicates the set value.

As illustrated on the right, changing the current limiter value changes the maximum current capacity at full throttle. When the road surface is slippery, lower the limiter value. When you need high torque, raise the value. If you set the current limiter value to maximum, the current limiter function is disabled, allowing maximum torque. If you set the value to 0%, current is limited to the minimum value causing some motors to revolve at a slow speed. Set the value according to your needs.



● Battery save mode (S.R.S. drive) (RZ type only, patent pending) ★The battery save mode reduces heat generation and fuel consumption for low- to middle-acceleration throttle operation. If you can't get the subtle throttle feel that you want, you can cancel this mode.

1. Turn off the power switch of the ESC once.
2. Turn the transmitter on.
3. Turn the ESC on while holding down the SET switch.
4. When the LED indicator flashes, the ESC is in battery save mode.
   When the LED indicator illuminates, the ESC is in normal mode.
5. Repeating the steps above switches the normal mode and the battery save mode alternately.
6. The ESC stores the selected mode so that resetting is unnecessary.

● Dash power mode ★When a car is started, the current limiter can be canceled only with the first throttle operation if you want to make a quick start.

NOTE If any noise interferes with the setting procedure, the ESC may mistake the noise for throttle operation and may not set the dash power mode.

1. Turn the transmitter on and hold down the SET switch for approximately 5 seconds. The LED will flash. (Same as in the setup mode.)
2. Wait until the LED stops flashing. (Approximately 10 seconds) The dash power mode is set.

Mounting heat sink (Radiating fin)

⚠ WARNING: To prevent fumes, fire, and burns

Electricity flows through the radiating plates. If you mount a radiating fin, the electricity might flow through it. Do not allow other cables and metallic parts to make contact with the radiating fin.

★If you run a car under normal conditions, the radiating fin is not necessary. When running a car under a blazing sun or if you are using a high-torque motor, mounting the radiating fin enables a more stable run. **Mount the radiating fin as described below:**

1. Remove an aluminum top sticker at the top of the ESC housing.
2. A metallic plate is exposed.
3. Remove dust from the plate surface.
4. Attach the double-sided tape (included) to a radiating fin.
   (Be sure to always use thin double-sided tape.)
5. Securely attach the heat sink to the metallic plate of the ESC.

(To improve radiation, apply 2-gel type epoxy resin adhesive instead of the double-sided tape. Knead the gels well and apply a light coat of it to the heat sink. Attach the heat sink to the metallic plate and fix them until the adhesive dries. Note that you cannot remove the heat sink once you attach it.**)**