Introduction

Congratulations on purchasing a ServoStation. The ServoStation uses the very latest switching technology to achieve an unprecedented level of performance; we believe it is the finest power supply currently available for radio controlled and autonomous vehicles. If cared for properly your ServoStation will provide years of reliable and efficient service.

The ServoStation doesn't just have the highest efficiency and lowest noise, it also has a whole host of features not found on other products, including:

- An ultra low-noise power supply just for the receiver.
- Servo pulse amplifiers for driving multiple servos per channel, or long servo cables.
- Reverse polarity protection that protects not only your ServoStation, but your receiver and servos as well.

Installation of a ServoStation is simple: just connect a battery to the battery cable, a receiver to the receiver connectors, and some servos to the servo connectors, like this:

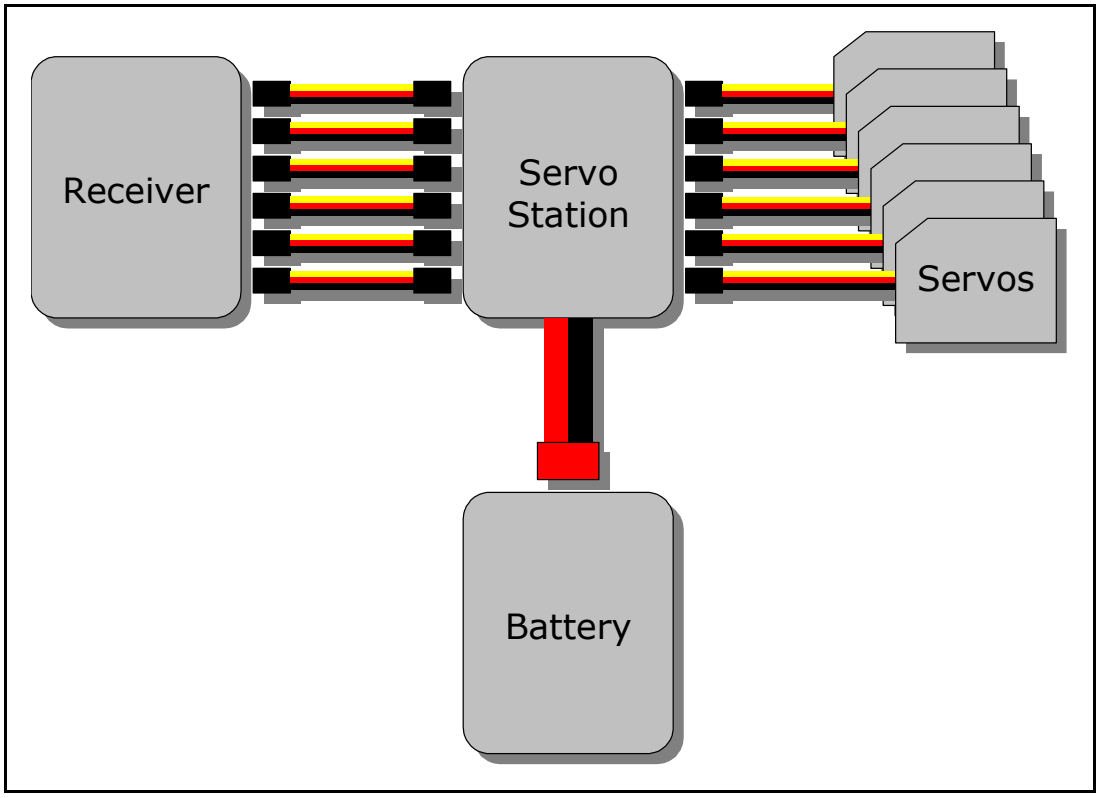


Fig. 1: ServoStation connections

The rest of this document describes installation in more detail. The boxed text is technical information that may safely be ignored. The bold text explains exactly what it is you have to do.

Connecting the Battery

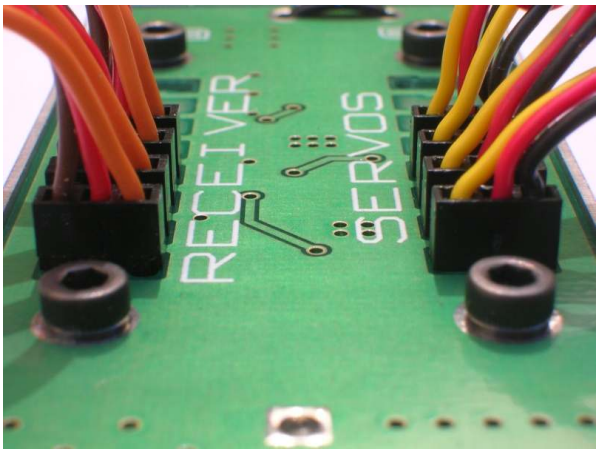
The ServoStation can be powered from any suitable DC power source, but most commonly this will be a Lithium Polymer (LiPo) battery. A battery voltage between 8 and 22 volts is required, so 3S, 4S and 5S LiPos are all suitable. If NiCd or NiMH batteries are to be used, then a series combination of 7 to 16 cells is required. If A123 batteries are to be used, then 3S, 4S, 5S and even 6S batteries may be used.

The ServoStation is fully reverse-polarity protected, so accidentally connecting the battery up backwards does no harm, although the ServoStation will only work when power is applied the right way around.

Connect the ServoStation's red (positive) wire to the positive terminal of your battery, and the ServoStation's black (negative) wire to the negative terminal of your battery.

Connecting the Receiver

The ServoStation connects to your receiver via the 3-way ribbon cables, one for each channel being used. These cables are similar to servo extension cables, except they have the same gender connector fitted to each end.



Note that the connectors on the receiver cables are polarised and must be inserted the right way around. There are legends printed on the ServoStation itself showing the correct orientation. If there is any resistance to insertion then stop and check the orientation; the connectors slide in very easily when oriented correctly.

Connect your receiver to the ServoStation using one receiver cable per channel. The 8 channels provided by the ServoStation are all identical and may be arranged in any order.

Each cable carries 3 signals: a received channel signal, power and ground. The received channel signals flow from the receiver to the ServoStation, which cleans them up, amplifies them, and sends them on to the servos. The power and ground signals are generated by the ServoStation and supplied to the receiver along each and every receiver cable.

The power provided to the receiver is 5 volts DC, generated by linearly regulating the output of a switching power supply. Unlike most BECs, which suffer from either appalling efficiency or electrical switching noise, this approach provides excellent efficiency and very low switching noise.

Connecting the Servos

The 8 servo connections are arranged in a logical fashion opposite their corresponding receiver connections. As noted before, each channel is identical.

Plug your servos into the servo connectors on the ServoStation, again taking care to orient them correctly.

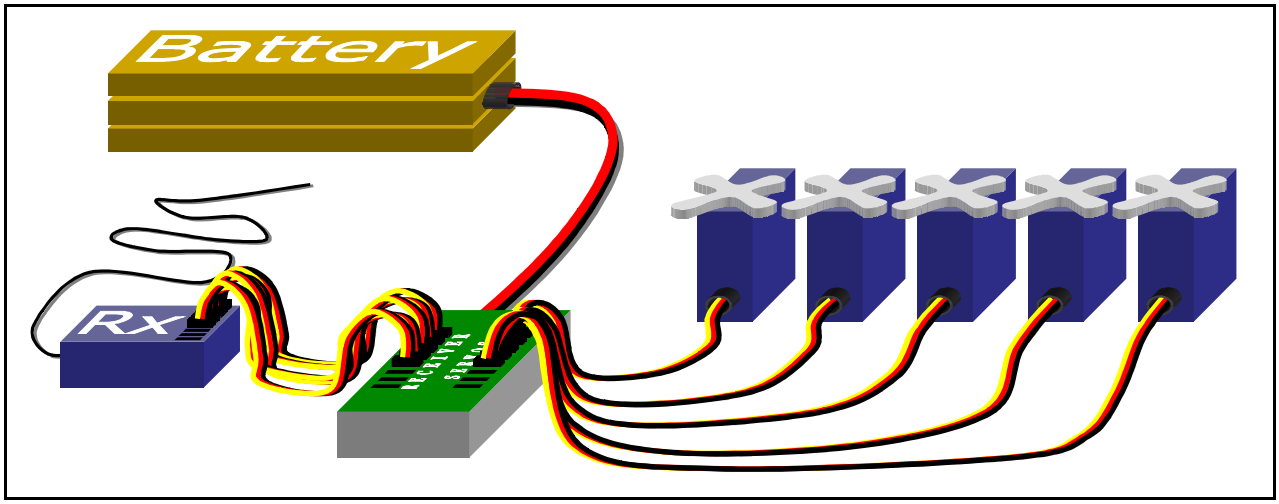


Fig. 2: A typical 5-channel setup for fuel powered vehicles

Each servo cable carries 3 signals: a received channel signal, power and ground. The ServoStation has 8 independent servo pulse amplifiers that perform some signal processing on each of the received channel signals in order to maximise system performance. The signal processing circuit includes:

- A level detector to reject electrical noise,
- A limiting amplifier to square up the received signal, and
- A balanced, high-current, push-pull output stage, to drive the servo cable.

The power provided to each servo is derived from a high efficiency switching power supply, which achieves efficiencies of up to 95%. It generates 6 volts DC, and is conservatively rated to deliver 5 Amps continuously over the full operating temperature range.

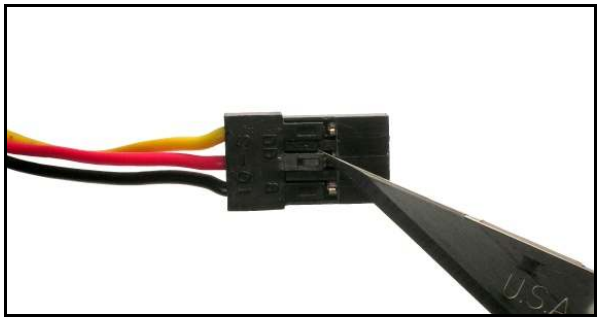
Connecting an Electronic Speed Controller (ESC)

One of the receiver channels – usually channel 3 – controls your vehicle's throttle. In electric powered vehicles this channel connects to an Electronic Speed Controller (ESC), which then drives the motor. Most ESCs have an on-board Battery Eliminator Circuit (BEC), the aim of which is to provide a simple way of powering a vehicle's receiver and servos. This on-board BEC must be disconnected or at least disabled, preferably both. If this is not done the BEC and ServoStation will fight each other, potentially damaging your ESC.

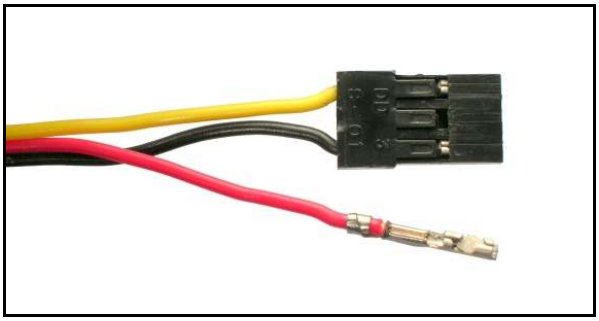
On-board BECs work well for small vehicles with small servos. However, on-board BECs are highly inefficient and cannot drive many larger servos before going into thermal shutdown, often with spectacular results.

If the ESC is configurable, configure its BEC to be off.

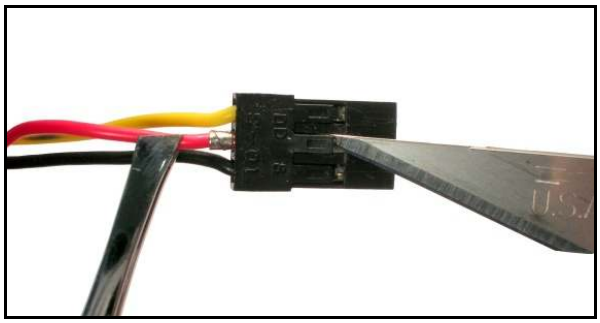
Now we're going to disconnect the ESC's BEC, preventing it from conflicting with the ServoStation. Of course you *can* just cut the middle wire, but a nicer (and completely reversible) way to do it is to pull the middle pin out of the ESC's receiver connector, like this:



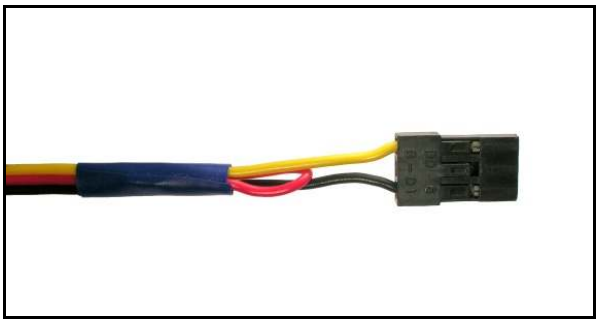
Step 1: Insert a scalpel blade behind the middle plastic tongue of the ESC's receiver connector.



Step 3: The middle pin is now out.



Step 2: Lift up the plastic tongue and pull out the middle wire with its pin. Tweezers and a third hand are useful.



Step 4: Secure the wire and pin with some insulating tape or heatshrink tubing.

Now plug the ESC's modified receiver connector into either:

- **The appropriate ServoStation servo connector (opposite whichever receiver channel you are using for throttle), or**
- **Directly into your receiver.**

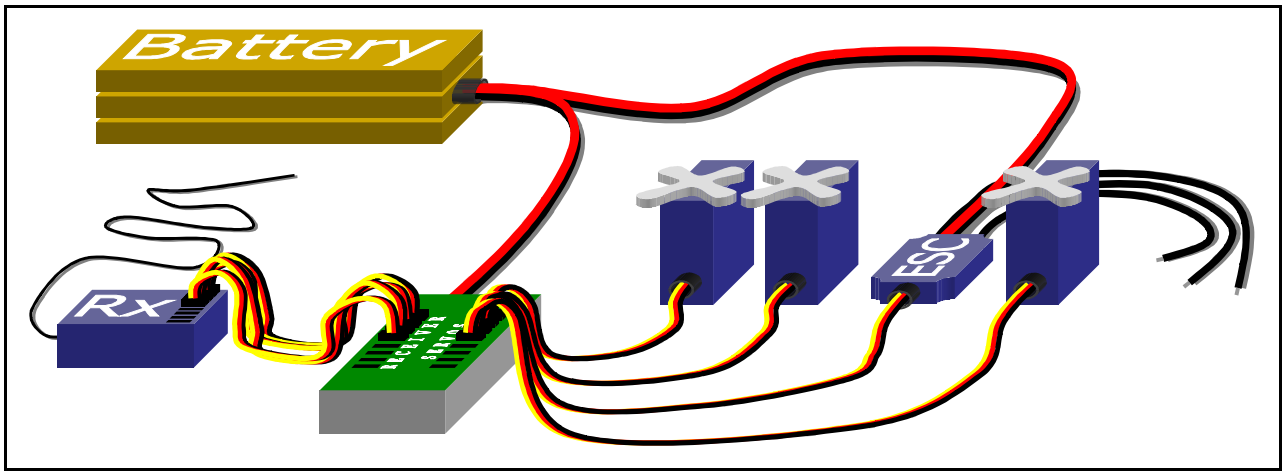


Fig. 3: A typical 4-channel setup for electric powered vehicles

Further Information

Visit us on the web at www.millswoodeng.com.au

Didn't find what you wanted? Send us an email or give us a call – contact details are on our website.

MILLSWOOD engineering ServoStation

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