

CONVERTING A 90° WINCH TO 180° OPERATION

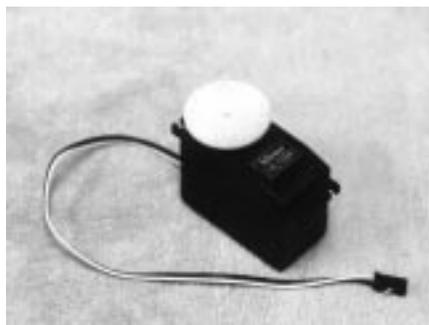


Figure 1. The Hitec RCD 715 BB.

Because it seems to be getting harder and harder to find a suitable arm winch for one meter boats without spending a pile of dough, a lot of people have asked how to convert one of the less expensive 1/4 scale aircraft servos from 90 degree rotation to 180 degrees. The answer is that it's simple if you choose the right servo.

While I make no claim that the following method will work for all servos, I have used it on a number of different brands with success. Basically, the principle is to increase the resistance of each leg of the trimmer potentiometer (hereafter referred to

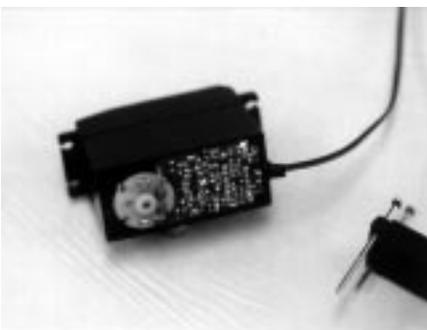


Figure 2. In this photo the motor is to the left and the integrated circuit board is to the right of the case.

simply as a *pot*); the higher the resistance, the more the rotation. The rule-of-thumb is that increasing the resistance of each leg of the pot approximately 2,000 ohms will give the desired 180 degrees of rotation.

The easiest way to do this is to open the servo case, cut the wires to the legs of the pot (not the wiper, which is almost always the centerpost), solder in a couple of 1/4 watt fixed resistors and put it all back together.

Of course there are a number of different servo configurations, and this modification is easier to make on some servos than others. For this example I'll use a Hitec HS-715BB which is by far the easi-

est to work with. Converted to 180° operation, the 715BB makes an excellent sail winch. It weighs 3.6 ounces, and has 189 oz-in of torque at 6 volts (161 oz-in at 4.8 V), and that's plenty of power for most one meter yachts (including the S1m and US1m). Not bad when you consider that you can buy the 715BB from Tower Hobbies for \$50 while a comparable Futaba 3801 costs \$90, and actually rotates less than 140°. By the way, a package of five 2.2 K-ohm resistors is 49 cents at Radio Shack (Part # 271-1325), so I guess the converted

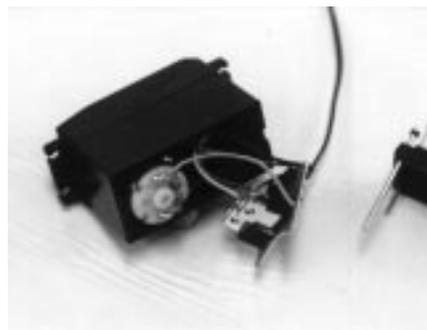


Figure 3. Using a small screwdriver, gently pry the integrated circuit board out of the case.

winch really costs \$50.25. Once your soldering iron has warmed up, you should be able to do the job in ten minutes.

Please don't misunderstand, the Futaba is a fine winch, but if you're willing to spend ten minutes to save \$40, here's the way to do it.

1. Buy a Hitec HS-715BB servo (Figure 1).

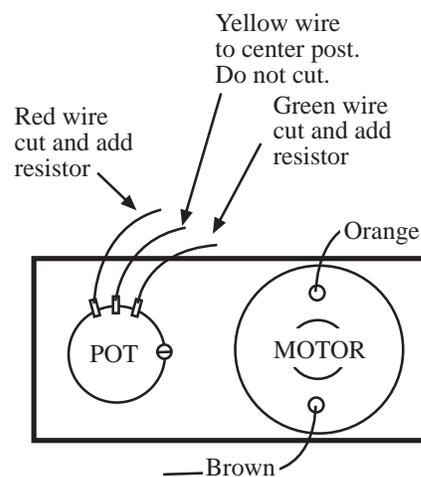


Figure 4. Location of wires. Colors may vary, but location is consistent.



Figure 5. In this photo the two 2.2 k-ohm resistors have been soldered in place.

2. Remove the bottom (Figure 2).
3. Carefully pull out the printed circuit board (Figure 3). Inside you will see a motor and a pot. The pot is deep inside the case. It has three wires soldered to it. (Figure 4)
4. Note the color coding of the three wires soldered to the pot. They may vary, but on mine, the centerpost wire was yellow and the outside post wires were red and green (Figure 4).
5. Cut one of the wires that go to the pot's outside posts, strip the cut ends and solder a 1/4 watt 2.2 k-ohm resistor between the two cut ends.
6. Repeat step 5 for the wire that goes to the pot's other outside post (Figure 5)
7. Tape the new connections to insulate and avoid shorting
8. Carefully push the new resistors up inside the servo case and reassemble the unit using the supplied sail winch arm (Figure 6).

That's all there is to it. Other servos have different layouts, but the principle is the same.



Figure 6. Insulate the new connections before stuffing everything back into the servo case. I use electrical tape.