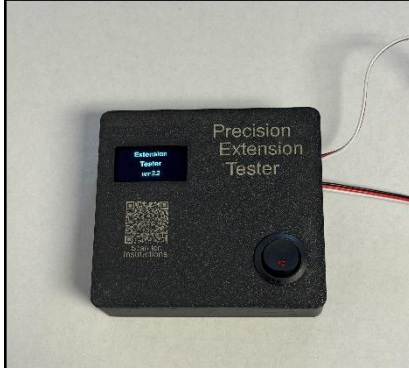


Precision Extension Tester Instructions

August 2, 2025



We often install inexpensive extensions and switches, which can be prone to failure, in expensive RC aircraft, without having any means of testing the extensions and switches. The RC Extension Tester measures the resistance of servo extensions, switches, or any item that can be adapted to standard 3-wire JR connectors. The resistance is measured on each of the three wires to the nearest one-thousandth of an ohm (milli ohm or abbreviated mohm). For reference, a 12-inch, 20-AWG extension should have a resistance of about 55 mohm. However, if an extension or switch had degraded to a resistance of one ohm (1000 mohm) a servo current of 4 amps would cause a 4-V drop across this extension or switch, possibly

causing a brownout or failure in the aircraft, drone, helicopter, or whatever installation is used. A typical volt-ohm meter does not measure resistances of less than an ohm, so a special purpose tester is required.

It is believed that common causes of RC crashes are poor extensions or switches. A complex aircraft can have upwards of 100 connections. For example, a single aileron might have an extension on the servo and a second extension from the receiver. That's five connectors with three wires (and crimps) each per connector, yielding 15 connections for just one aileron. Having 99 good connections out of 100 can cause a crash! Failures have been observed due to corrosion on connectors, poor crimps (on new, brand name extensions), abraded wiring, and degraded connections from use.

In addition to extensions, switches are a known failure mechanism, particularly on gas planes which generally have a high vibration environment. Switches are often cheap in construction and prone to failure. While some are double pole, which should provide improved reliability, often only one pole is wired. When testing switches with the tester, in addition to measuring the resistance of the switch, you can move the switch while under test and see where contact is lost. It is recommended that all extensions and switches be tested prior to installation, upon any unexplained behavior, and ideally, at some regular interval.

Installation and Start Up

Your PET may arrive with servo lead wires in Black, Red and White colors or in Brown, Red and Orange colors. The connectors fit either style extension lead. Red is always the + lead, Black or Brown is the minus lead, and Orange or White is the data lead.

Precision Extension Tester is shipped without 9v battery so you will need to remove the back case cover and install a 9V battery.



First remove 4 case cover screws and remove the case cover.



Install 9v battery and place it in its compartment. You can use a small piece of foam or foam tape as a spacer if you want. Then install the back cover using the 4 screws.

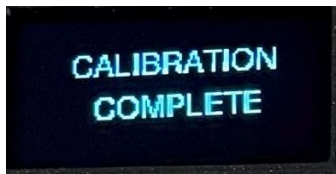
The Extension Tester can be used in a calibrated or uncalibrated mode. For calibrated mode, plug the connectors together firmly before the tester is turned on as shown in the picture.



Next turn on the power switch



And the version number is displayed



Next the display will indicate "CALIBRATION COMPLETE" at turn on. The tester measures the resistance of the test leads and connectors and subtracts that resistance out when the resistance is measured of an extension or switch. If the test leads remain connected together, the tester will show values of only a few +/- mohm on each of the three wires as their resistance is subtracted out from the measurement. The test leads can then be disconnected and the extension or switch to be tested connected. It is recommended to use calibrated mode so that the tester displays only the resistance of the extension or switch under test.

Uncalibrated mode is entered if the Extension Tester connectors are not plugged in when the tester is powered on. The tester display will indicate "NO CALIBRATION" "** Test Leads Open **" at turn on. If the test leads are then connected the tester measures the resistance of the test leads, typically 25-40 mohm. If an extension or switch is then connected, the displayed resistance will include this tester resistance. While the calibrated mode is the preferred mode for testing, the uncalibrated mode can provide a useful test of the tester leads and connectors to ensure they are not degraded from use.

The Extension Tester is powered by an internal 9-V battery. If the battery voltage drops below 7 VDC during use, "Low Battery" is indicated on the display and the battery should be replaced. Battery lifetime is greatly reduced when the test leads are connected together, or an extension or switch is being tested. So, minimize the time during actual test. To replace the battery, remove the four screws on the back cover and replace the existing battery.

To measure an extension simply connect it to the PET output leads. The display will show the measured resistance of all 3 wires. It is recommended to softly flex the extension near its connectors since we have seen leads that look fine until they are moved or flexed.

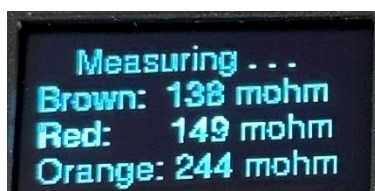
A switch is tested in the same manner as an extension. Not only should the switch leads be tested by flexing the lead wires but the switch itself should be turned on and off several times noting the milliohm readings each time.



This is an example of a good wire or switch. Note the 3 wires have similar readings. They will not all be the same because the crimps inside the wire connectors are not all the same. But they should be close.



This is an example of a bad wire. In fact, the Orange (or White) is completely open, no signal could reach anything this extension was plugged into. Also note the Red wire has very high resistance when compared to the Brown (or Black) wire. Attempting to power a servo or other device with a high resistance lead limits the servo to low torque and if the resistance is high enough it will not even operate.



This picture shows a possible bad Orange lead- see how the resistance is about 100 mohms higher than the other two leads. It has a possible bad crimp or connector and really should not be used.

Specifications

Power source: internal 9 VDC battery

Current consumption: approx. 173 mA with extension under test, 23 mA without extension connected

Measurement accuracy: approx. 1 mohm

Measurement resolution: 0.312 mohm, rounded to the nearest mohm for display