

TB155 (Rev1) - Quick Checks for Servo Motors

Overview

The following quick and easy checks can often detect a bad servomotor and prevent damage to the servo drive electronics.

Windings Check:

1. With the motor cables/wires and shaft completely disconnected, spin the motor shaft with your fingers, it should turn fairly easily.

*If the motor shaft is very difficult to turn, you may have an internally shorted winding, or something is physically resisting the shafts motion such as dirt and debris or worn bearings.

2. Short the windings together. On DC brush servos there are two wires. On AC Brushless servos there are three wires.

*There should be a noticeable increase in drag, but you should still be able to spin the shaft with your fingers.

*If there is no additional drag, you may have an open winding or bad magnets.

*If the resistance is not smooth, but has skip spots, the motor is bad.

Note: If all three windings of AC servos are not shorted together, the motor will appear to cog when turned.

Resistance Check:

1. With a good quality ohm meter set on the lowest possible range, the following are typical motor winding resistances measure at the motor, minus the resistance of the meter used:

DC Brush Motors	Resistance	AC Brushless Motors	Resistance
Centroid 17in-lb DC*	11 ohm +/- 5 ohm	Centroid 0.4k ohm AC**	35.4 ohm +/- 0.1 ohm
Centroid 29in-lb DC*	1.4 ohm +/- 0.3 ohm	Centroid 0.75k ohm AC**	2.4 ohm +/- 0.1 ohm
Centroid 40in-lb DC*	1.1 ohm +/- 0.2 ohm	Centroid 1k ohm AC**	0.9 ohm +/- 0.1 ohm
		Centroid 2k ohm AC**	0.6 ohm +/- 0.1 ohm
		Centroid 3k ohm AC**	0.8 ohm +/- 0.1 ohm

* Given resistances for DC servos refer to the lowest measurable value at any point in the shafts rotation.

** Given resistances for AC servos refer to the resistance across any two windings, and are independent of shaft position.

If a motor winding is shorted, the measured resistance will typically be lower than that of a good motor. Here a comparison of similar motors can be very useful in diagnosing a problem. For motors with a damaged commutator or an open winding, there will be a lack of continuity. In the case of a damaged commutator or open winding on a DC brush servo, continuity will be lost when the brush passes over those areas. For an AC Brushless servo with an open winding, there will be no continuity at any position.

2. Measure the resistance of any winding to the case of the motor. The measurement should be greater than

100K ohms.

WARNING: Never remove the brushes from a DC motor. They do not wear out and more costly damage may result by removing them unnecessarily.

Document History

Rev1 Created on **2003-07-24**