

Vertical TROUBLESHOOTING GUIDE

THE 14 MOST COMMON PROBLEMS (read this first!):

1. The antenna is out of calibration, perform the calibration as described in the manual.
2. The antenna length needs to be adjusted do to hight above ground or radial count.
3. Interaction between power lines, other antennas, metal roofs, house wiring, gutters, etc, and the antenna.
4. The automatic tuner is enabled on your rig or your external tuner is in line.
5. Your antenna selector is on the wrong antenna
6. Your rig is in the split mode and worse case, to a different band!
7. A low pass filter is in line and 6 meters has very high SWR.
8. Your in-line linear has input circuit problems or an auto-tuner causing high SWR.
9. Blown driver board from shorting the control cable with power plugged into the controller. Even with the power button pushed "off" the cable is energized.
10. Broken or damaged control cable or connector. See Cable Problems section.
11. Bad coax or coax connector.
12. Damaged driver board is pulling power supply voltage down causing the microprocessor to malfunction. Check to see if green LED is lit on power supply
13. **Ground the controller**, this prevents crashes of the microprocessor and provides a path for static discharge.

GENERAL:

Be aware that just because the controller display says an element is a certain length there is no guarantee that it is, the element could have mechanical problems, or a broken wire in the control cable (the motor will run with only one winding driven in some cases) or a faulty driver board. The controller runs open loop and has no way of knowing if the element is really moving. The motors in the elements make three distinct noises:

1. A ratcheting sound lasting 1 – 2 seconds at the start and finish of the motor running, this is the ramp-up stepper motors require and is normal.
2. A smooth whirring sound indicating normal operation.
3. A loud rattling sound that sounds like gears slipping indicates the stepper is stalling. This occurs during the middle portion of a "calibrate" with the smooth running sound before and after it and is normal. Any other time (even for brief durations) this noise indicates unwanted stalling of the motor and should be investigated.

Check the resistance with an ohmmeter between the center conductor and ground of the coax connected to the antenna, it should read zero ohms.

High SWR: Whenever the antenna has a problem you will most likely observe higher than expected SWR. In our experience an SWR of 1.5:1 or less is normal.

INTERACTION PROBLEMS:

The most common reason for higher than expected or shifted SWR is objects in the near field. Usually only one or two bands are affected but not always. It is important to take good notes so if you need to call us we can do a better job of helping you. Record the SWR on each band at least one place in the band, this is a good idea anyway so you can assess the health of your antenna over time. The usual culprits are slopers, other nearby antennas, gutters, powerlines, house wiring, metallic guy wires, etc. You can usually tune out high SWR by using the “Create, Modify” mode to adjust *only the driven element* for best SWR and save it as described in the manual. Otherwise you will need to change your installation to reduce the interaction to an acceptable level.

CABLE PROBLEMS:

The control cable uses 4 wires per motor (one motor is in the element), 2 wires for each of the two motor windings. This test assumes the antenna is connected to one end of the control cable and the measurements are taken at the 25-pin connector that mates to the controller. You need a ohmmeter capable of measuring 15 – 35 ohms with reasonable resolution or at least one that you can tell the difference between a dead short and 15 ohms. Remove the 25-pin subD control cable connector from the controller. Hold it so you are looking at the pins with them pointing at you. Orient the connector so the row with 13 pins is on top, now the upper left-hand pin is pin 1. You should read between about 18 ohms to 30 ohms (depends on cable length, 100’ is about 23ohms) between the pins listed below.

PIN NUMBERS

Driver	1 – 2	20 ohms (approx)
	3 – 4	20 ohms

Next ensure there is an open circuit between the following pins:

Connector case and any pin 1 - 12 and 14 - 16.

2 – 3, 4 – 5

Antenna is off frequency:

It is hard to predict where the best length will be on the vertical so it almost always requires some adjustment to get the lowest SWR at the proper frequency. Set the Vertical to the same frequency as the radio and use the Create modify mode to adjust the driver length for the best SWR, this will need to be done for each band.

The nature of the vertical is that if there is a problem with the motor housing or conductor strip it will show up when you use the antenna on 40M. If the antenna is off frequency on 20M after going to 40M and doing the setup mode calibrate or home commands fix the problem on 20M the motor housing needs service.

ELEMENT IS NOT MOVING:

If the element is not moving you will have very high SWR at all frequencies. However, it may have stopped at some length and you might have good SWR only at one particular frequency.

Next go into the “Create, Modify ” mode and vary the element length and monitor the SWR while you do it (100 watts or less is okay) and watch for dramatic changes (.5 SWR change, minimum). When you adjust the driven element you should be able to get an SWR of 5:1 or greater.

If adjusting the element does not affect the SWR the cause is one of the following:

1. Bad or intermittent cable, check it again.
2. Damaged driver board in the controller
3. Mechanical problem with the element