N2VZ Enterprises

Turbo Tuner™

Fully automatic screwdriver antenna controller for:

Universal

Version R5

Operating and Installation Instructions

Theory of Operation:

The Turbo Tuner is designed to allow semi-automatic Tuning and control of screwdriver antennas based on finding the minimum SWR for the current operating frequency. This is accomplished by using the radio to supply 10 - 25 watts of power while the Turbo Tuner moves the screwdriver antenna in the correct direction based on the operator and looks for the minimum SWR. Once the minimum SWR is found, the Turbo Tuner announces the completion of tuning with a Morse code 'K'.

INSTALLATION:

Turbo Tuner Setup:

The next step is to set the dip switches to configure the Turbo Tuner to operate with your screwdriver antenna configuration.

Access to the dip switches is accomplished by removing the 4 Phillips head screws located at the bottom of the Turbo Tuner enclosure. Once the 4 screws are removed, lift off the top cover and you will see the 6 position dip switch located on the printed circuit board next to the fuse.

Dip Switch Settings:

Antenna Direction – This option sets the direction of travel for the antenna. This is normally set in the "Normal" position. If during the tuning cycle, the antenna does not move in the proper direction, change Dip SW-1 to the "Reversed" position.

Antenna Stall Current – For the LittleTarheel use 300 MA. For Tarheel Models 75 – 400, use 1000 MA. For Tarheel Models 1000 – 1200 use 1500Ma. For High Sierra antennas with the Black Hawk motor set stall current to 750 MA. For Hi-Q antennas use 1000 MA.

SWR Threshold – Keep this in the Normal position unless the controller has trouble finding a match on some bands. This option will allow the controller to accept a slightly higher SWR. With the option set to "Alternate" the controller will still search and find the lowest SWR.

Factory Default Settings *

Antenna Direction	Dip SW-1 = OFF Dip SW-1 = ON	Normal * Reversed
Antenna Stall Current	Dip Sw-2 = OFF Dip SW-3 = OFF Dip SW-4 = OFF Dip Sw-2 = OFF Dip SW-3 = ON Dip SW-4 = OFF Dip Sw-2 = ON Dip SW-3 = OFF Dip SW-4 = OFF Dip Sw-2 = ON Dip SW-3 = ON Dip SW-4 = OFF Dip Sw-2 = ON Dip SW-3 = ON Dip SW-4 = ON	300 MA * 500 MA 750 MA 1000 MA 1500 MA
SWR Threshold	Dip SW-5 = OFF 1.7 : 1 Dip SW-5 = ON 2.0 : 1	Normal * Alternate

Once the Dip switches have been set correctly, place the top cover on the Turbo Tuner and make sure the Motor and Interface wires are positioned correctly in the enclosure cut outs before screwing the top cover into place.

Connections:

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Connect the interface cable from the Turbo Tuner to a +12V source. If you radio supplies a +12V out of an accessory jack this is a good choice.

Connect the Motor wire from the Screwdriver antenna to the 'Motor' connector on the Turbo Tuner.

Connect the coax from the antenna to the "Antenna" on the Turbo Tuner.
Connect coax from the radio to "Radio" on the Turbo Tuner.

This completes the installation of the Turbo Tuner.

OPERATION:

Power On:

When the Turbo Tuner is first powered up, the Turbo Tuner after initializing will sound a Morse code 'R5' to signify that it is ready. The number signifies the firmware revision and can change.

Tuning:

To initiate tuning of the antenna, select a proper operating frequency and change the mode to AM on radio. If you are moving up in frequency press and hold the ptt switch on the mic. If you moving down in freq press and hold the ppt switch on the mic for 1 second release and then press the ptt on the mic again and hold. The Turbo Tuner will start and measure the SWR and if it is greater than 1.7 : 1 This will place the Turbo Tuner in tune mode and you will see the screwdriver antenna start moving. Once the antenna is tuned and a proper match is found, the Turbo Tuner will sound a Morse code 'K'. At this point the antenna is tuned and you can release the mic. Return to your original mode and you are ready to operate on the new frequency.

If the antenna can not be tuned and an acceptable match found after the screwdriver antenna makes two reversals looking for a match, the Turbo Tuner will sound a series of Morse code 'E' and stop.

Parking the Antenna:

The Turbo Tuner also has a Park function that will automatically lower the screwdriver antenna to its minimum height. Key the PTT button 3 times and the Turbo Tuner will enter Park mode. Upon entering Park mode, the Turbo Tuner will sound a Morse code 'P'; and once the screwdriver antenna is completely lowered, the Turbo Tune will sound another Morse code 'P' to signify completion of the park cycle. Once Park mode is initiated, it can not be interrupted.

TROUBLE SHOOTING:

Antenna reverses before reaching end of travel while tuning:

This is caused by the antenna stall current being set too low. Set the antenna stall current one setting higher via the dip switches.

Turbo Tuner gives immediate tuning error when initiating a tune cycle:

This is caused by the antenna stall current being set too low. Set the antenna stall current to the correct setting via the dip switches.

Antenna stalls at end of travel and does not reverse while tuning:

This is caused by the antenna stall current being set too high. Decrease the stall current by one setting via the Dip switches.

When changing frequency, the antenna moves in the incorrect direction:

This can be corrected without reversing the antenna motor wires by changing the position of Dip switch 1.

Can not find a proper match on one or more bands:

Manually check the antenna for an SWR of less than 2:1 on all bands of operation, if this is the problem check, the antenna installation and grounding. Changing Dip switch 5 to the alternate position will help the Turbo Tuner find a match if the antenna can not be tuned to better than 2:1 SWR.

Turbo Tuner totally dead, no audio feed back, and tuning will not initiate:

Check that the interface cable is connected to +12V. Check the internal fuse in the Turbo Tuner which is a 20mm 3A fast blow.