

# mAT-125E

## HF-SSB General Automatic Antenna Tuner

*Instruction Manual Version V2.0*

### INTRODUCTION

The mAT-125E is an automatic tuner intended for use with HF transceivers. The mAT-125E can work within the range of 1.6MHz to 54MHz.

The mAT-125E provides automatic antenna tuning across the entire HF spectrum plus 6 meters, at power levels up to 120 watts. It will tune dipoles, verticals, Yagis, or virtually any coax-fed antenna. It will match an amazing range of antennas and impedances, far greater than some other tuners you may have considered, including the built-in tuners on many radios.

The mAT-125E also features advanced memory tuning, providing 16000 memory locations; when tuning near a previously used frequency it will recall the settings for nearly instant tuning. It learns your favorite frequencies and bands as you use it. You can also start a tuning cycle manually whenever necessary.

The mAT-125E has 16,000 frequency memories. When tuning on or near a previously tuned frequency, the mAT-125E uses "Memory Tune" to recall the previous tuning parameters in a fraction of a second. If no memorized settings are available, the tuner runs a full tuning cycle, storing the parameters for memory recall on subsequent tuning cycles on that frequency. In this manner, the mAT-125E "learns" as it is used, adapting to the bands and frequencies as it goes.

Two 18650 lithium batteries installed inside tuner to provide power for the tuner. Tuner is charged, can only be used with prescribed charger, the charger has the highest output voltage of 8.4VDC. mAT-125E uses little power while tuning, and essentially zero power when in standby, when the equipment is full of electricity, it can work for a long time. These 18650 lithium batteries do not have a protective circuit, and the protection function is completed by tuner.

**NOTE: Before the first use or after the battery is replaced, the tuner must be charged by the charger to activate the internal protection circuit before it can be used normally.**

### SPECIFICATIONS

- 0.1 to 120 watts SSB and CW peak power, 30 watts on PSK and digital modes, and 100 watts on 6 meters.
- Latching relays for ultra-low power operation.
- 16,000 memories for instantaneous frequency and band changing.
- Works with most radios that output power can be reduced to less than 10 watts
- Tuning time: 0.1 to 5 seconds full tune, 0.1 seconds memory tune.
- 1.6 to 54.0 MHz coverage. Built-in frequency sensor.
- Tunes 5 to 1500 ohm loads.
- For dipoles, verticals, Vees, beams, long wire or any coax-fed antenna.
- Includes a lithium battery charger.
- Dimensions: 20cm x 13cm x 4cm (L x W x H).
- Weight: 0.8Kg.

**AN IMPORTANT WORD ABOUT POWER LEVELS**

The mAT-125E is rated at 120 watts maximum power input at most. Many ham transmitters and transceivers, and virtually all amplifiers, output well over 120 watts. Power levels that significantly exceed specifications will definitely damage or destroy your mAT-125E. If your tuner fails during overload, it could also damage your transmitter or transceiver. Be sure to observe the specified power limitations.

**FRONT PANEL**

On the front panel there are four LED indicator lights and six pushbuttons.

**TUNE:** Initiates a tuning cycle.

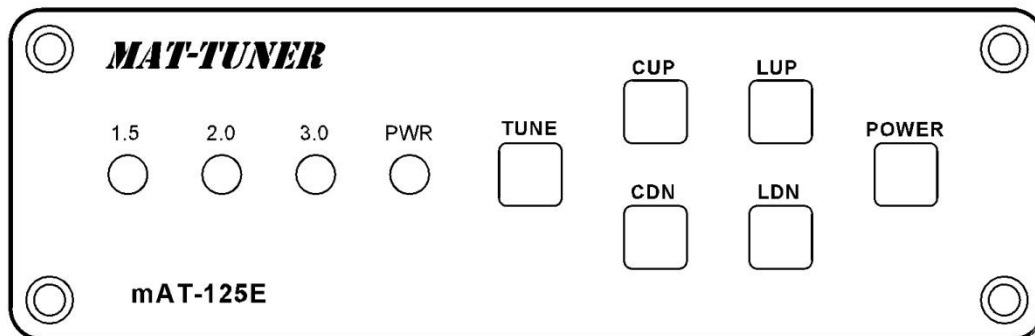
**CUP / CDN:** Manually increase/decrease capacitance.

**LUP / LDN:** Manually increase/decrease inductance.

**POWER:** Power key.

**1.5, 2.0, and >3.0 LEDs:** Indicate SWR.

**PWR LED:** Power light.

**REAR PANEL**

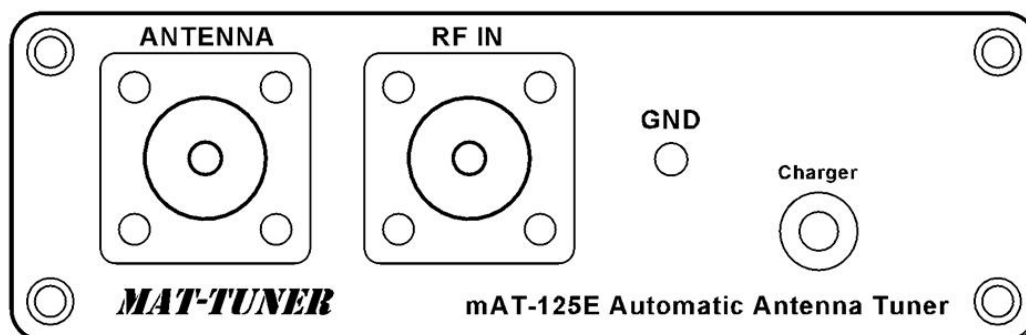
The rear panel of the mAT-125E features four connectors.

**ANTENNA:** Connect the 50-ohm coax antenna feedline to this standard SO-239 connector.

**RF IN:** Connect a 50 ohm coax jumper cable from this standard SO-239 connector to the ANT jack on the back of the transceiver.

**Charger:** Connected to charger

**GND:** Connect to antenna system ground.



**OPERATION**

As with other general tuners, a constant RF signal of 1-10 watts power level is needed to be input to the tuner during the tuning cycle, this signal should be CW, FM, FSK, or RTTY, it can't be SSB. The power level of the input RF signal must not be greater than 10 watts, otherwise it will shorten the life of the tune, and even the tuner will be damaged.

The mAT-125E have two modes of operation: automatic and semi-automatic, for better operation, you need to know more about the differences between the two models.

**Automatic Mode:**

When the RF signal is input into the mAT-125E, the tuner verifies that the tune power at its input (FORWARD) is within the predefined range (1-10W). Power above this range can damage the relays during the Hot Switching, while power below the predefined range can cause inaccurate tuning. If the tune power is within the specified range, the tuner captures a 20ms sample of the signal. The sample signal frequency is divided by 128 and measured by a counter. The tuner reads the tuning data corresponding to the measured frequency from its internal memory (such data exists if tuning was previously performed for this frequency). The tuner sets the tuning network according to that data and measures the resulting VSWR, and display the current VSWR by the LED of the front panel. Even if SWR is higher than 2, the tuning cycle will not be activated unless the TUNE key is pressed and released.

**Semi-automatic:**

When the RF signal is input into the mAT-125E, the tuner only measures the current VSWR and displays the results through the LED on the front panel, a tuning cycle is not initiated until the TUNE key is pressed. When the TUNE key is pressed and released, similar to the automatic mode, the tuner measures the frequency of the input signal, reads the configuration data from the corresponding memory, and configures the LC tuning network. After completing the above operation, the tuner will measure the current VSWR. If  $VSWR < 1.5$ , the tuning is completed. If it is higher, a new tuning cycle is started. When the tuner completes the tuning process it stores the tuning network data in memory in a location corresponding to the current frequency.

**Manual:**

Regardless of whether the tuner is in automatic or semi-automatic mode, you can fine tune the current LC tuning network by pressing the CUP, CDN, LUP, and LDN key. After the manual seat adjustment is completed, you can save the current configuration data in the corresponding memory by pressing the TUNE+LUP combination key.

**Combination key**

A combination key is formed by TUNE and other keys(CDN, LUP, LDN) to perform part of the function operation. The combination key means that the TUNE key is first pressed and held, the other key is pressed, and then released together.

TUNE+CDN: Activation/bypass status switching. When the 1.5 light flashes, it indicates that the current status is activation. When the 3.0 light is flashing, it indicates that it is bypass now.

TUNE+LDN: Automatic/semi-automatic mode switching. When the 1.5 light flashes, it indicates that the current mode is automatic. When the 3.0 light is flashing, it indicates that it is semi-automatic now.

TUNE+LUP: The configuration data of the tuning network is saved to the corresponding memory.

**AUTOMATIC SHUTDOWN**

The tuner has automatic shutdown function for saving electric energy, when the function is activated, the tuner will turn off automatically if no key is pressed in about 3 minutes. Because the tuner uses magnetic latching relay, the current tuning state will not be affected after the tuner is turned off

In the off state, press on the TUNE key, and then press POWER key to boot, you can open or close the function, When the 1.5 light blinks once, it indicates that this function is activated. When the 3.0 light blinks once, this function is turned off.

**THE FLASHING OF THE INDICATOR LIGHT WHEN STARTING UP**

When the mAT-125E is powered on, the LED on the front panel flashes to indicate the settings for the current tune.

1.5: If flashing once, indicating that the current is semi-automatic mode; flashing two times, indicating that the current mode is automatic.

2.0 : If flashing once, indicating automatic shutdown function closed; If not flashing, indicating automatic shutdown function open.

**SAFETY PRECAUTIONS**

*Never operate the tuner with its cover removed. Contact with the components inside the tuner while transmitting will result in painful RF burns.*

*Locate the tuner so that the rear terminals are not accessible during operation. The single wire connection may have high voltage while transmitting.*

*Disconnect all antennas from the tuner during lightning storms.*

**TRANSPORT**

Because there are two lithium batteries installed inside the tuner, Please comply with local laws when transporting. It could be banned from air transportation.

**TECHNICAL SUPPORT**

Visit the Support Center at: <http://www.mat-tuner.com>

The website provides links to product manuals, just in case you lose this one! When you are thinking about the purchase of other **MAT-TUNER** products our website also has complete product specifications and photographs you can use to help make your purchase decision. Don't forget the links to all of the quality **MAT-TUNER** Dealers also ready to help you make that purchase decision.

**PRODUCT FEEDBACK**

We encourage product feedback! Tell us what you really think of your MAT-TUNER product. In an email tell us how you used the product and how well it worked in your application.

We like to share your comments with our staff, our dealers, and even other customers at the **MAT-TUNER** website.

Welcome to <http://www.mat-tuner.com/> for more information

**MAT-TUNER**

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