

mAT-80M Antenna Tuner Operating Manual

ICOM Dedicated

Thank you for choosing this MAT-TUNER product. Please read this manual carefully before using the product.

Important Safety Information

- ◇ Do not touch the antenna, terminals, or ground system while transmitting. Electric shock or burns may result.
- ◇ Always turn off the transceiver and antenna tuner before connecting or disconnecting any cable. Connecting or disconnecting cables while powered may cause permanent damage to the equipment.

Introduction

- ◇ Designed for ICOM HF transceivers and follows the ICOM external antenna tuner protocol. Compatible with external tuners such as the AT-130, AT-140, and AT-141.
- ◇ Equipped with a tower-type antenna terminal and an SO-239 coaxial antenna connector for wire antennas or coax-fed antennas.
- ◇ Fast tuning and a wide tunable antenna impedance range.
- ◇ Frequency range: 1.8–54 MHz, RF power: 200 W (SSB).
- ◇ Automatic tuning can be performed using the tuner control on the transceiver front panel.
- ◇ Waterproof ABS enclosure, suitable for fixed and outdoor installation.
- ◇ A 10-meter, ICOM-dedicated four-conductor control cable is included.
- ◇ The coaxial feed line is not included and must be provided by the user.

Compatibility

The mAT-80M is compatible with ICOM external tuners such as the AT-130, AT-140, and AT-141. It can be used as a direct replacement, with the same tuning operation as the original models. Compatibility refers to the control and operating method and does not mean that all electrical specifications are identical.

Installing the Tuner

Use the supplied U-bolts to mount the tuner on a mast. Expansion bolts may also be used to mount the tuner on a wall.

The tuner may be installed vertically or horizontally. Regardless of the installation orientation, make sure the coaxial feed line and control cable exit downward to reduce the possibility of rainwater entering the unit.

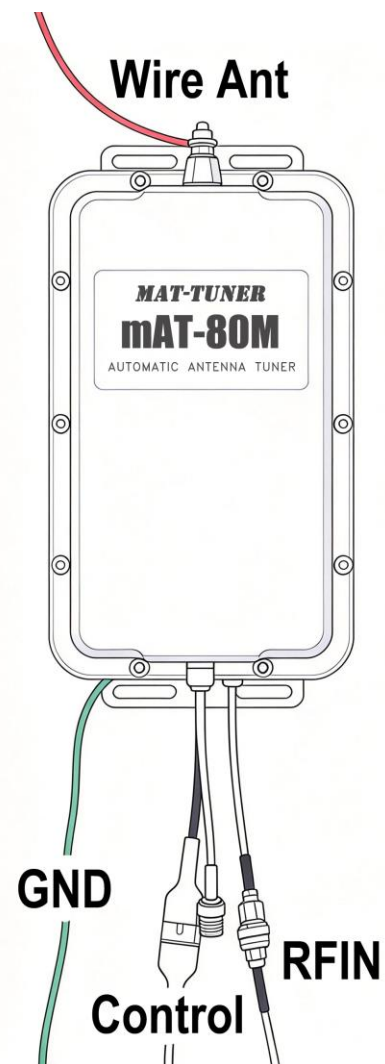
Installing a Wire Antenna

Connect the wire antenna to the tower-type antenna terminal labeled “ANT” on the top of the tuner.

- ◇ First, secure the antenna firmly using a ceramic or resin insulator. Then connect it to the “ANT” terminal on the top of the tuner and tighten the screw.
- ◇ Do not connect an unsecured antenna directly to the tuner terminal. The tension of the antenna may damage the tuner.

Antenna Length

- ◇ An antenna length close to 1/4 wavelength will generally provide good matching performance.
- ◇ A longer antenna is recommended. For the same type of HF wire antenna, an antenna that is too short will generally reduce radiation



efficiency and may make tuning more difficult when other conditions are similar.

- ◇ Avoid antenna lengths close to an integer multiple of $1/2$ wavelength whenever possible. In some cases, such lengths may produce a high feed-point impedance and make tuning difficult.
- ◇ For users of a single-wire antenna, an antenna length of approximately 12–14 meters may be used as a reference. With a suitable ground system or RF return path, this can cover many frequencies from the 80-meter through 10-meter bands.
- ◇ If a satisfactory SWR cannot be obtained after repeated tuning attempts, adjust the antenna length as appropriate and tune again.

Grounding When Using a Wire Antenna

For an unbalanced antenna, such as a single-wire antenna, a suitable RF return path should be provided. A low-impedance RF ground can significantly improve the radiation efficiency of the antenna.

The lower the antenna impedance, the more significant the effect of a good RF ground can be.

It is recommended to connect the **GND** terminal of the tuner to a suitable ground, radial system, counterpoise, or other appropriate RF return conductor. This can improve the overall performance and tuning stability of the antenna system.

Installing a Coax-Fed Antenna

Connect the coaxial feed line from the antenna to the SO-239 RF connector labeled “**COAX ANT**” on the bottom of the tuner. Apply the waterproofing measures described above.

Grounding When Using a Coax-Fed Antenna

A coax-fed antenna normally does not require a dedicated RF ground or radial system. If a suitable grounding system is available, the GND terminal of the tuner may be connected to the equipment grounding system.

IMPORTANT: Connect either a wire antenna or a coax-fed antenna. Do not connect both at the same time.

Connecting the RF Input Feed Line

- ◇ Without a power/SWR meter: Transceiver “**ANT**” → mAT-80M “**RF IN**”.
- ◇ With a power/SWR meter:
 1. Transceiver “**ANT**” → the meter “**RF IN**”, “**TX**”, or “**TRANSCEIVER**” connector.
 2. Meter “**RF OUT**” or “**ANT**” → mAT-80M “**RF IN**”.

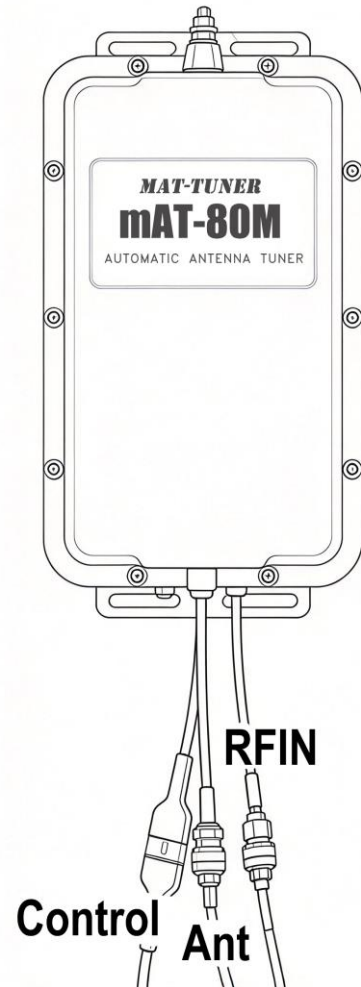
Connecting the Control Cable

Use the supplied 10-meter control cable to connect the tuner “**CONTROL**” connector to the transceiver’s “**TUNER**” external tuner connector.

Before connecting, confirm the connector type and pin assignment, and apply the waterproofing measures described above.

Note 1: For all outdoor cable connection points mentioned above, it is recommended to seal the connection with self-fusing rubber tape first, then wrap it with waterproof vinyl tape to improve water resistance.

Note 2: The coaxial feed line, self-fusing rubber tape, and vinyl tape mentioned above are not supplied with the tuner and must be provided by the user.



Special External Tuner Connectors

IC-M710, IC-F7000, and IC-F8101 do not use the standard 4-pin ICOM external tuner connector. The control cable supplied with the mAT-80M cannot be connected directly to these transceivers. When using the mAT-80M with these transceivers, a correct adapter cable or proper interface conversion is required. Make sure every wire is connected correctly. **In particular, an incorrect power-wire connection may damage the tuner or transceiver.**

Transceiver Settings

The mAT-80M uses the ICOM external tuner control method. For ICOM transceivers that support external tuners such as the AH-4, AT-130, AT-140, and AT-141, use the mAT-80M according to the external tuner settings of the original transceiver.

Most ICOM HF transceivers normally require no additional settings to use an external tuner such as the mAT-80M. Refer to the external tuner section of the transceiver operating manual for specific information.

The following are examples of transceivers that require menu settings to use an external tuner:

- ◇ IC-7300: No additional setting is required.
- ◇ IC-78: In Initial Set mode, select the antenna tuner type as “**4 (AH-4)**”. See page 32 of the transceiver operating manual.
- ◇ IC-M710/RT, IC-M700PRO: In Initial Set mode, select the antenna tuner type as “**AH-3**”. See page 13 of the IC-M710/RT operating manual or page 11 of the IC-M700PRO operating manual.
- ◇ IC-M802: In Initial Set mode, select the antenna tuner type as “**AT-140**”. See page 49 of the transceiver operating manual.

Note: This tuner cannot be used with the ICOM IC-705 transceiver. If you are using an IC-705, we recommend our portable automatic antenna tuner, the mAT-705, which is specifically designed for the ICOM IC-705.

Tuner Operation

The external tuner is fully controlled by the transceiver. Tuning and switching the tuner online/offline are performed using the transceiver's **[TUNER]** key. On some transceivers, this key may be labeled **[TUNER/CALL]**. Refer to the transceiver operating manual for details.

Start tuning: Press and hold the tuner key on the transceiver.

During tuning, “**TUNE**” will normally appear or flash on the transceiver display. When tuning is complete, the indicator stops flashing and remains on.

The mAT-80M has two tuning modes: Memory Tuning and Full Tuning. After receiving a tuning command, the tuner first performs Memory Tuning. If the resulting SWR is $\leq 1.5:1$, tuning is complete. If the SWR is too high, Full Tuning starts.

1. Memory Tuning: The tuner automatically measures the current RF frequency, reads the LC parameters stored for the corresponding frequency, and configures the LC circuit. This normally takes about 0.1 second.
2. Full Tuning: The tuner automatically searches for the best LC combination according to the current SWR. This normally takes several seconds. After tuning is complete, if the SWR is $\leq 1.5:1$, the current LC data is stored in the memory corresponding to the current frequency.

Turn off the tuner: Briefly press the tuner key on the transceiver.

When the tuner is off, the RF input and output are directly connected and the tuner is bypassed. When offline, the “**TUNE**” indicator on the transceiver display turns off. Some ICOM transceivers do not provide this function.

PTT TUNE Function

This is an automatic tuning function provided by some ICOM HF transceivers. When enabled, the transceiver automatically starts tuning on the first transmission after the frequency is changed, without requiring the tuner key to be pressed.

This function makes operation of the transceiver and tuner more convenient. It is disabled by default. Refer to the ICOM HF transceiver operating manual for instructions on enabling it.

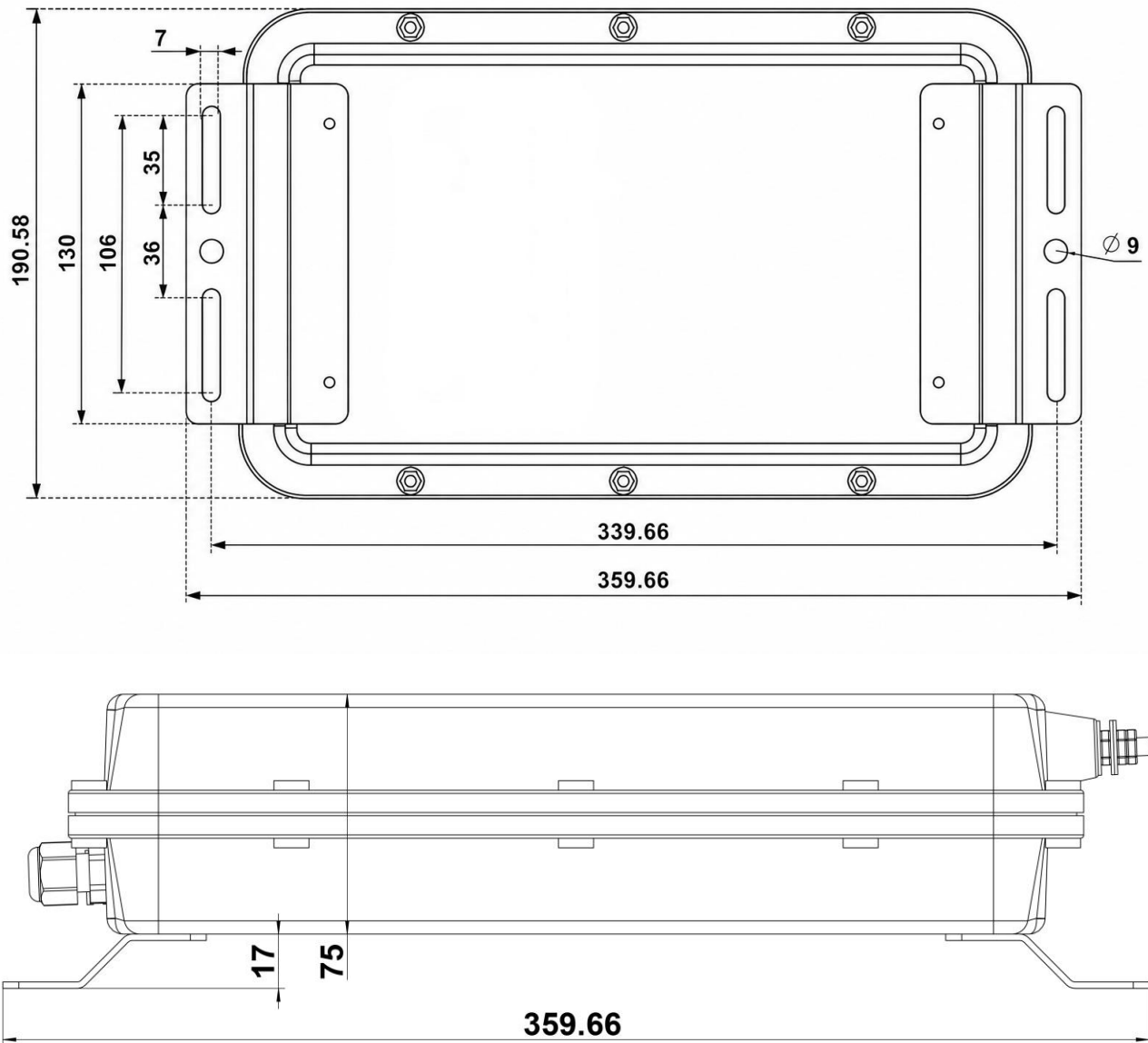
IC-7300: This function is disabled in Initial Set mode. To enable it, set **MENU** → **SET** → **Function** → **Tuner** → **PTT Start**.

Specifications

- ◇ Frequency range: 1.8–54 MHz
- ◇ Maximum input power: 200 W PEP (SSB), 100 W (Data mode)
- ◇ Tuning power: 1–5 W; 10 W recommended
- ◇ Typical matching range: 3–2000 Ω
- ◇ Tuning time: ≤ 3 seconds (Full Tuning, $\geq 90\%$ of tuning points); 0.1 second (Memory Tuning)
- ◇ Power supply: 10–15 V DC; maximum operating current 1.0 A. The tuner is powered by the transceiver through the control cable and does not require a separate power connection.
- ◇ Operating temperature: -10°C to $+60^{\circ}\text{C}$ (14°F to 140°F)
- ◇ Dimensions / weight: $350 \times 190 \times 75$ mm; 1.5 kg

Dimensions

See the dimension drawing for the external dimensions of the mAT-80M. If the tuner needs to be mounted on a wall, it can be secured with bolts according to the dimensions in the figure below.



If the tuner needs to be mounted on a mast, the included stainless steel U-bolt can be used for securing it. The mast diameter must not exceed 40 mm (1.5 inches).

Supplied Accessories

1. 10-meter control cable × 1
2. Stainless-steel U-bolts and screws × 2 sets
3. Operating manual × 1

Technical Support

Visit our official website to download the latest manuals, watch operating videos, and learn more about our products.

Website: <http://www.mat-tuner.com>

If you encounter any problems while using the tuner, please contact your dealer for assistance.

Important Notice: To ensure product quality and access to fast, high-quality, and affordable after-sales service, please purchase from our authorized dealers. Some unauthorized sellers use the internet to resell tuners—originally intended for sale within China—to countries and regions outside China without authorization. If you purchase these illegally resold products, you will not be able to obtain high-quality, affordable after-sales service.