

mAT-80R Antenna Tuner Operating Manual

Universal Remote Antenna Tuner

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

- ◇ The mAT-80R is a universal remote automatic antenna tuner. It can be used with a wide range of HF transceivers and does not depend on a specific manufacturer or brand.
- ◇ Equipped with a tower-type antenna terminal and an SO-239 coaxial antenna connector for wire antennas or coax-fed antennas.
- ◇ Only one coaxial cable is required between the tuner and the transceiver side. The coaxial cable carries RF signals, DC power, and control signals.
- ◇ Fast tuning and a wide tunable antenna impedance range.
- ◇ Frequency range: 1.8–30 MHz, RF power: 200 W (SSB).
- ◇ A Bias-T (mAT-4117) is included with the tuner.
- ◇ Waterproof ABS enclosure, suitable for fixed and outdoor installation.
- ◇ The coaxial feed line is not included and must be provided by the user.

Compatibility

The mAT-80R uses the coaxial feedline for power and control. Only one coaxial cable is required to connect the tuner.

On the transceiver side, the included mAT-4117 Bias-T combines the RF signal and DC power and sends them to the tuner through the RF coaxial cable.

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.

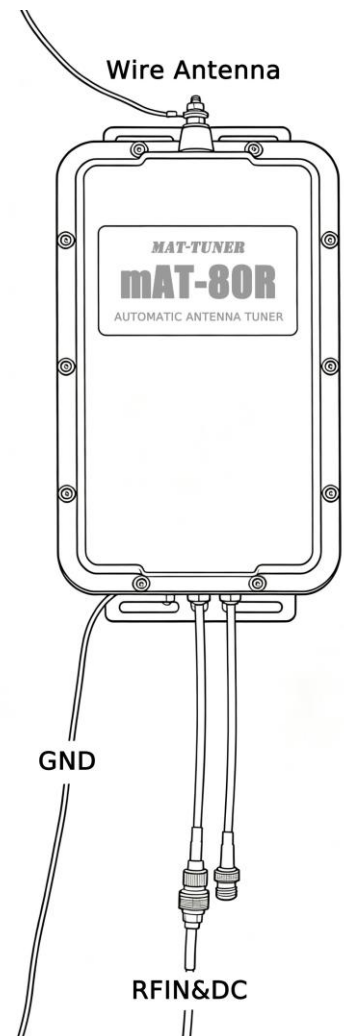
Installing a Wire Antenna

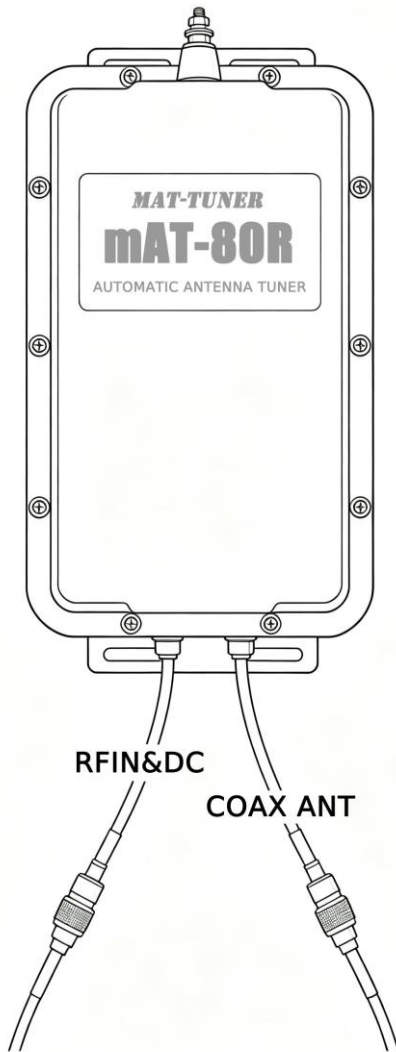
Connect the wire antenna to the tower-type antenna terminal labeled “ANT” on the top of the tuner.

- ◇ 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.

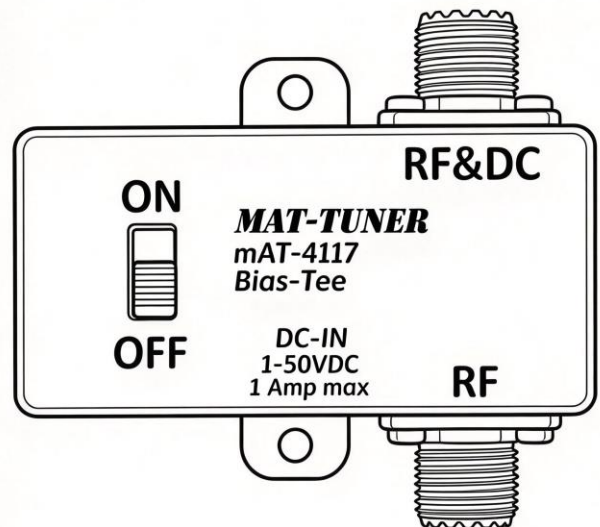
IMPORTANT: Connect either a wire antenna or a coax-fed antenna. Do not connect both at the same time!

Bias-T mAT-4117

The mAT-4117 is designed specifically for remote antenna tuners that use the coaxial feedline for power and control. It combines the RF signal and DC power and sends them to the remote tuner through a single coaxial cable.

The Bias-T supports up to 1500 W RF power, a DC voltage of 1–50 V, and a maximum DC current of 1 A. The supported RF frequency range of the Bias-T is 1.8–30 MHz. Therefore, the mAT-80R operates from 1.8–30 MHz and cannot be used on the 6-meter band.

Note: The coaxial cable between the Bias-T and the tuner carries both RF signals and DC power. Do not connect any device that does not support DC power over the coaxial cable in this section of the feedline. Doing so may cause a



DC short circuit or damage the equipment. If a power/SWR meter is required, connect it between the transceiver and the RF IN connector of the Bias-T, and make sure its power rating is sufficient.

Connecting the RF and DC Cables

1. Transceiver “**ANT**” → Bias-T “**RF**”
2. Bias-T “**RF&DC**” → Tuner “**RFIN&DC**”
3. Bias-T “**DC-IN**” → 12–14 V DC power supply, 1 A

Transceiver Requirements

The mAT-80R is a universal tuner. It does not use proprietary external tuner control protocols from manufacturers such as ICOM or YAESU.

Almost any HF transceiver that meets the following requirements can be used.

1. The transmit power can be set to **15 W** or **less**.
2. The transceiver supports at least one mode that can provide a stable carrier, such as **CW, AM, FM, FSK, or RTTY**. In CW mode, key operation may be required.

Tuner Operation

Starting the Tuning Process

1. Turn off the power switch on the Bias-T.
2. Set the transceiver transmit power to **5–10 W**, and never exceed **15 W**.
3. Set the transceiver to **CW, AM, FM, FSK, or RTTY** so that it can transmit a stable carrier.
4. Press the transceiver **PTT** to transmit a stable carrier.
5. Wait until the SWR shown by the transceiver or an external SWR meter becomes stable and stops changing. This indicates that tuning is complete.
6. If the resulting SWR is acceptable, restore the transceiver to the desired transmit power and operating mode. If the SWR is not acceptable, repeat the procedure from Step 1 to start another tuning cycle.

Bypass Mode

With the transceiver in receive mode, turn off the Bias-T power switch and wait for 3 seconds. Then turn the Bias-T power switch on again and wait for another 3 seconds.

The tuner will enter bypass mode.

In bypass mode, the tuner is inactive and the RF input and output are directly connected.

Notes

1. During tuning, the transceiver RF output power must not exceed **15 W**. Excessive RF power can significantly reduce the service life of the tuner and may also damage the transceiver.

The tuner includes an over-power protection function. If the input power is too high during tuning, the tuner will stop the tuning process to protect the tuner and transceiver.

Even with this protection function, **we strongly recommend not using high power during tuning**.

2. During tuning, the transceiver may temporarily stop transmitting after detecting a high SWR and then transmit again. This does not normally affect the tuning process.

However, some older transceivers may have ineffective power control. They may output excessive RF power during tuning, which can cause tuning failure.

3. Tuning with less than **5 W** of RF power will not normally damage the tuner or transceiver. However, the tuner may not obtain a sufficiently low SWR, and tuning may fail.
4. If you do not use the supplied mAT-4117 Bias-T and use another Bias-T instead, make sure that its RF power rating, DC voltage range, current capacity, and other specifications meet the requirements of the mAT-80R system.

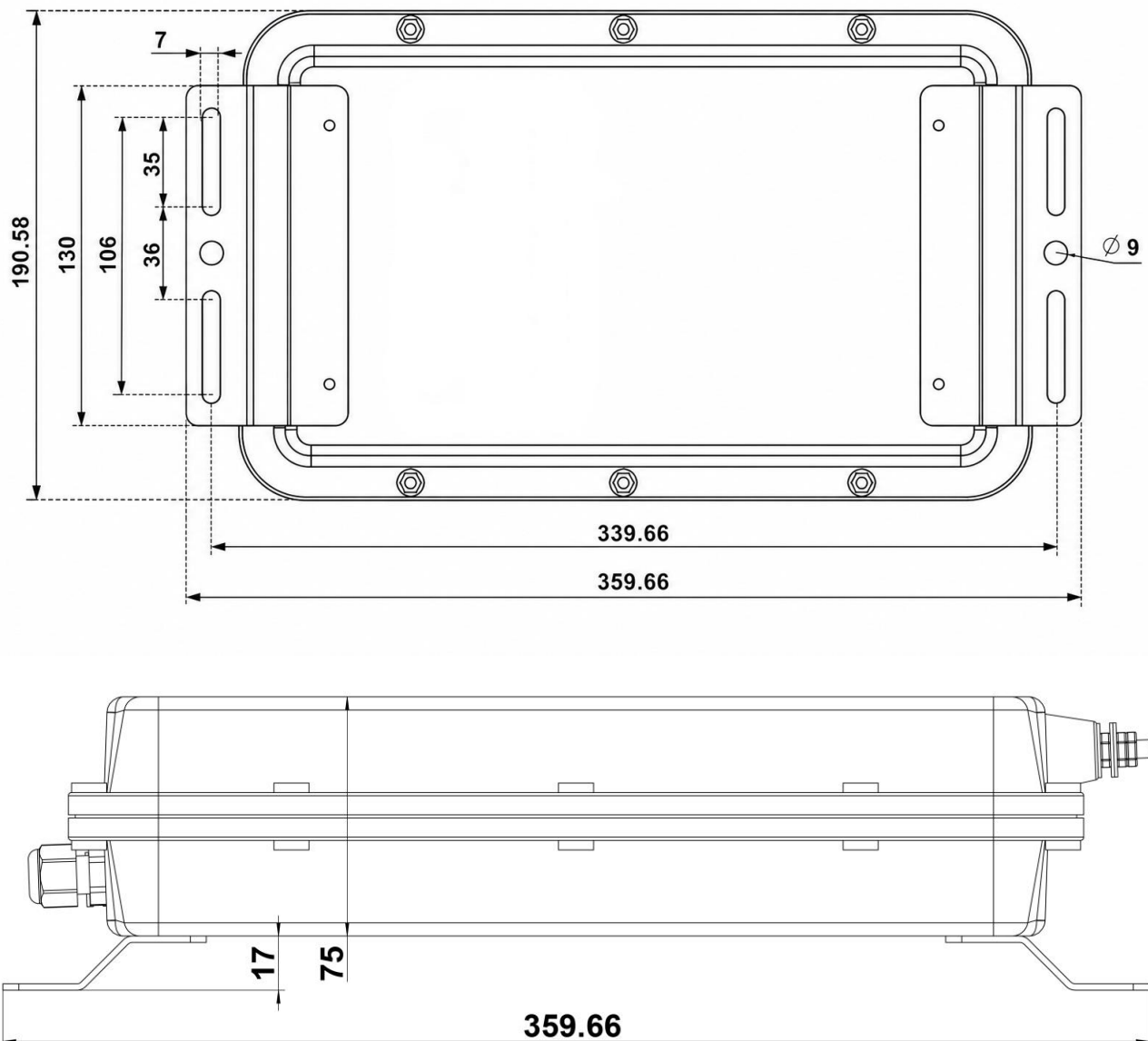
5. The Bias-T power supply may be shared with the transceiver power supply or provided by a separate power supply.
6. Make sure that the supply voltage does not fall below **11 V**. Otherwise, the tuner may not operate properly.

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-80R. 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. mAT-4117 Bias-T × 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.