Malahit ATU-500W

Malahit ATU-500W Automatic Antenna Tuner User Manual

Model: ATU-500W

1. Introduction

The Malahit ATU-500W is an automatic antenna tuner designed for amateur radio applications, facilitating efficient impedance matching between your transceiver and antenna system. This device operates across a frequency range of 1.8 to 50 MHz and supports power levels from 10W to 500W. This manual provides essential information for the safe and effective setup, operation, and maintenance of your ATU-500W.

2. Safety Information

- Always ensure proper grounding for your radio equipment to prevent electrical hazards and improve performance.
- Do not exceed the maximum working power rating of 500 watts. Operating above this limit can cause severe damage to the tuner.
- Avoid operating the tuner in wet or damp conditions. Exposure to moisture can lead to electrical shock or device malfunction.
- Disconnect all power sources before making any connections or disconnections to the tuner or associated equipment.
- During the tuning process, the recommended maximum power input is**30 watts**. Applying higher power during tuning can damage the internal components. After tuning is complete, you may increase power to the desired operating level, up to 500 watts.
- The minimum power required for the tuner to initiate tuning is**10 watts**. Power levels below 10 watts may result in insufficient or inaccurate tuning.

3. Product Overview

3.1 Key Features

- **Frequency Range:** 1.8 – 50 MHz
- **Power Supply Range:** 10 – 15 VDC
- **Maximum Working Power:** 500 watts
- **Minimum Power for Tuning Start:** 10 watts (1-10W may cause insufficient tuning)
- **Power Measurement Accuracy:** 10%
- **Maximum Inductance Set:** 8.5 uH (Minimal step: 0.1uH)
- **Maximum Installed Capacity:** 1870 pF (Minimal step: 10 pF)
- Equipped with the latest 3.2 version firmware for enhanced stability.
- Comes fully assembled with a protective case, ready for immediate use.
- Utilizes high-quality components including T130-2EW magnetic rings with low loss and temperature rise, German BASF6000 iron powder core, and 4KV NPO capacitors.

3.2 Components

The Malahit ATU-500W package includes:

- 1x ATU-500W Automatic Antenna Tuner unit (assembled with case)
- 1x DC5.5 x 2.1 power cord

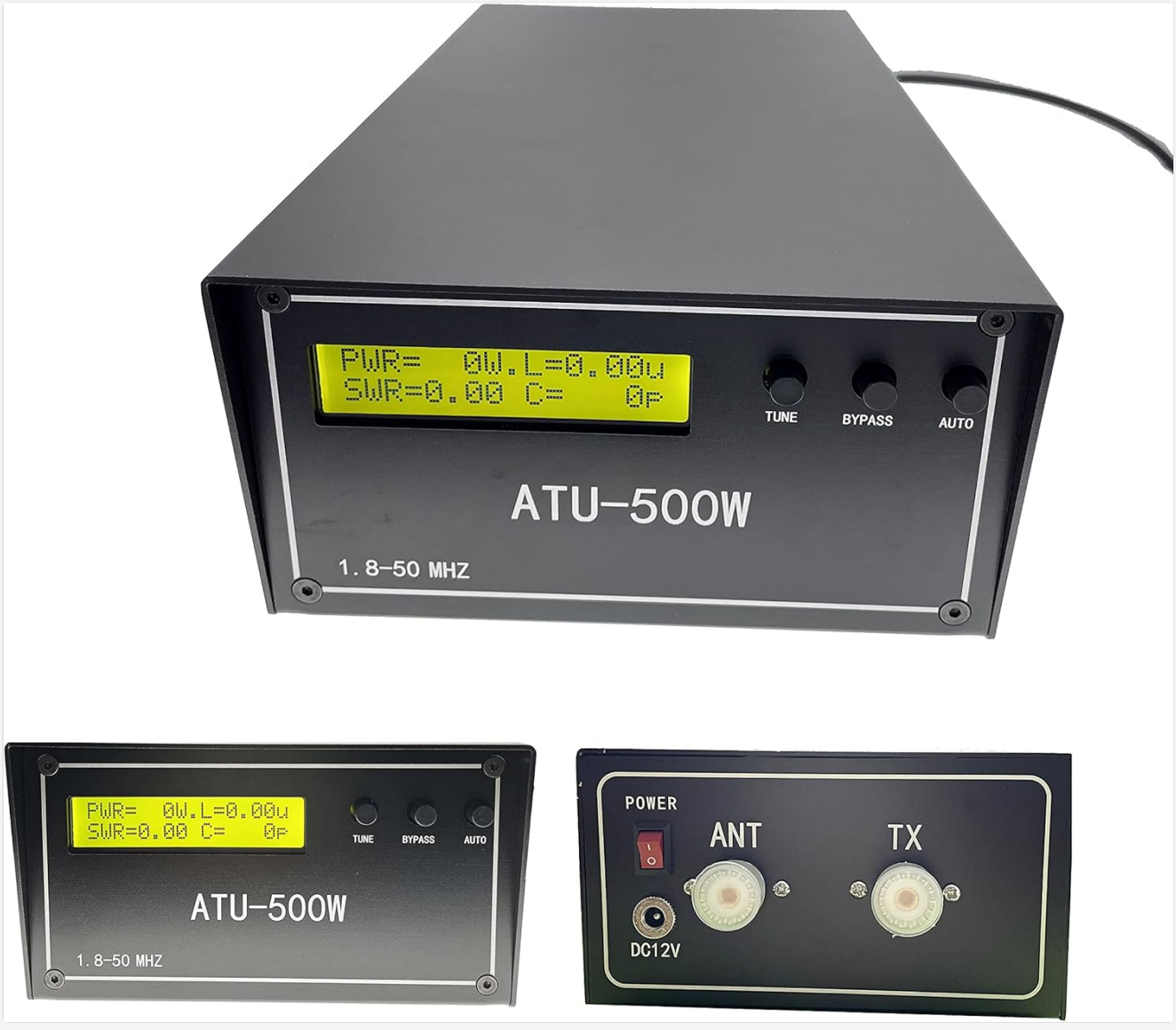

Figure 1: Front view of the Malahit ATU-500W Automatic Antenna Tuner, showing the LCD display and control buttons.

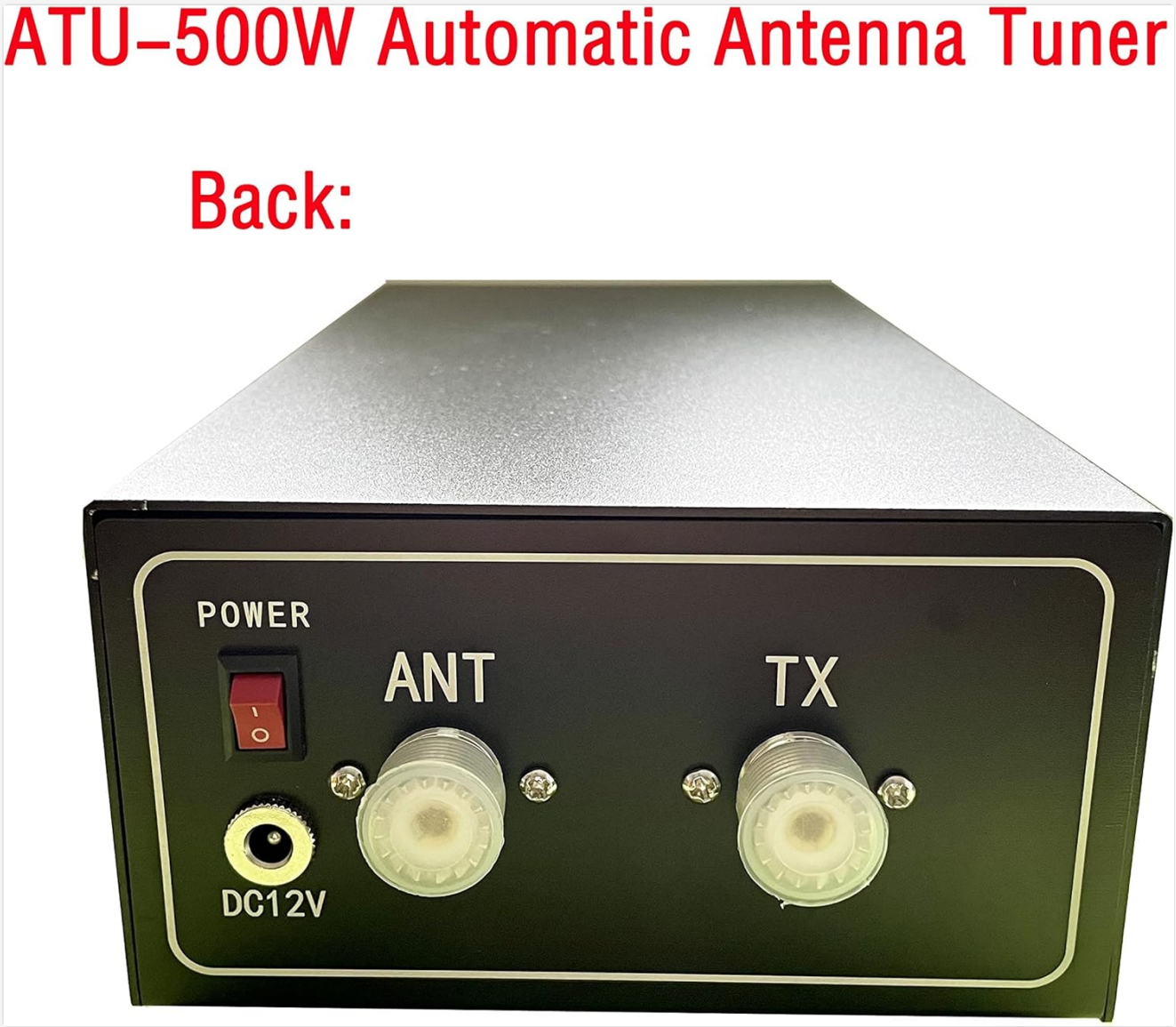

Figure 2: Rear view of the Malahit ATU-500W, displaying the power switch, DC12V input, ANT connector, and TX connector.

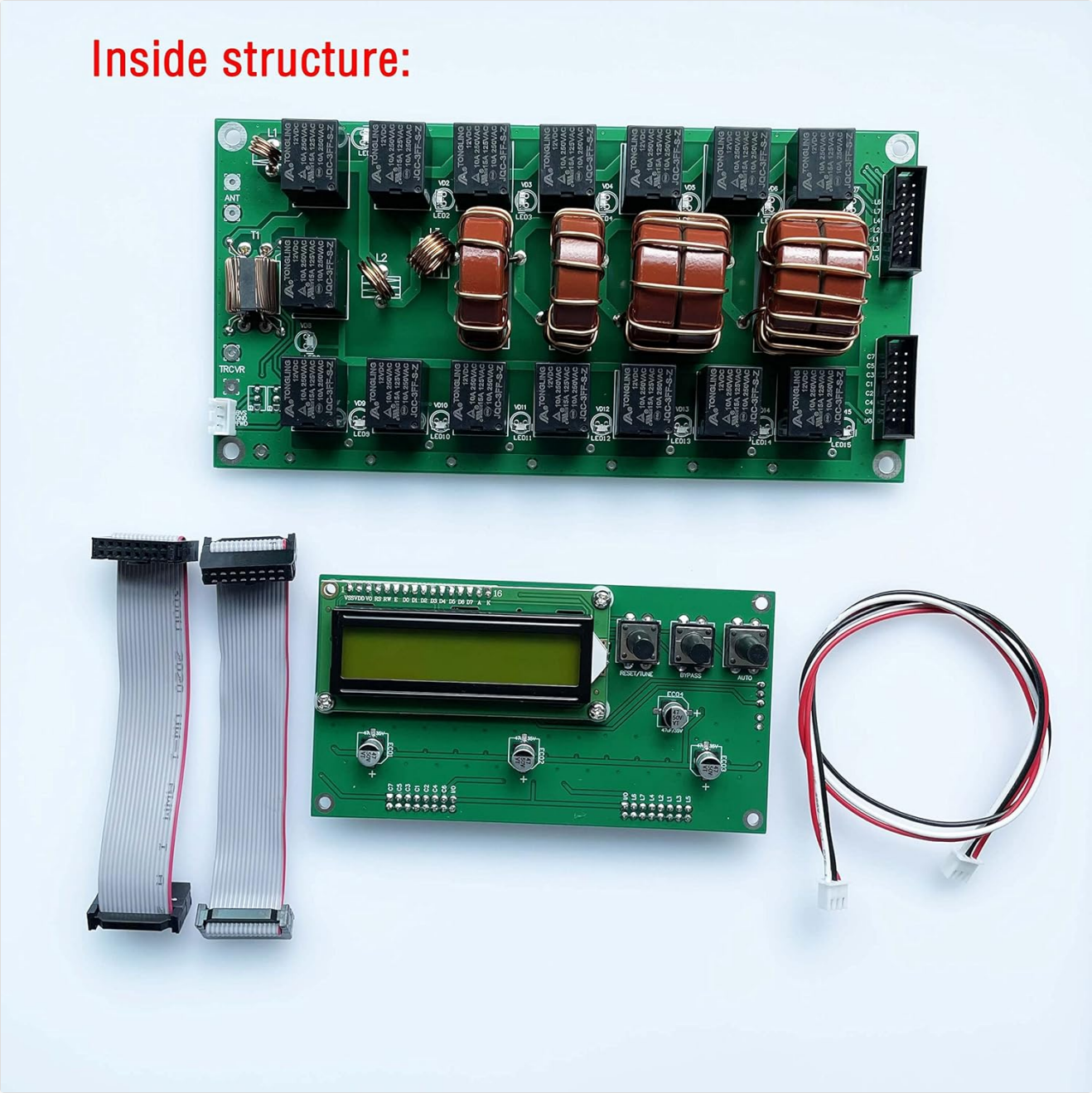

Figure 3: Internal structure of the ATU-500W, showing the main tuning board with relays and inductors, and the separate display control board.

4. Specifications

Specification	Value
Product Dimensions	9.8 x 5.3 x 2.9 inches (24.9cm L x 13.5cm W x 7.4cm H)
Item Weight	2.7 pounds (1.22 kg)
Manufacturer	Malahit
Item Model Number	ATU-500W
Antenna Type	Radio
Color	Black

Specification	Value
Number of Channels	1
Impedance	50 Ohms

5. Setup

5.1 Initial Connections

1. **Power Connection:** Connect the provided DC5.5 x 2.1 power cord to the DC12V input on the rear panel of the ATU-500W. Connect the other end to a stable 10-15 VDC power source. Ensure the power source can supply sufficient current for the tuner's operation.
2. **Transceiver Connection:** Connect the output of your transceiver to the**TX** connector on the rear panel of the ATU-500W using a suitable coaxial cable (e.g., with PL259 connectors).
3. **Antenna Connection:** Connect your antenna feedline to the**ANT** connector on the rear panel of the ATU-500W using a suitable coaxial cable.

> **Important Note on SO239 Connectors:** Some users have reported that the SO239 connectors on the ATU-500W may have non-standard threading, potentially causing issues with standard PL259 connectors. If you encounter difficulty, ensure a proper connection is made, or consider using a push-on adapter if necessary. Avoid forcing connections to prevent damage.

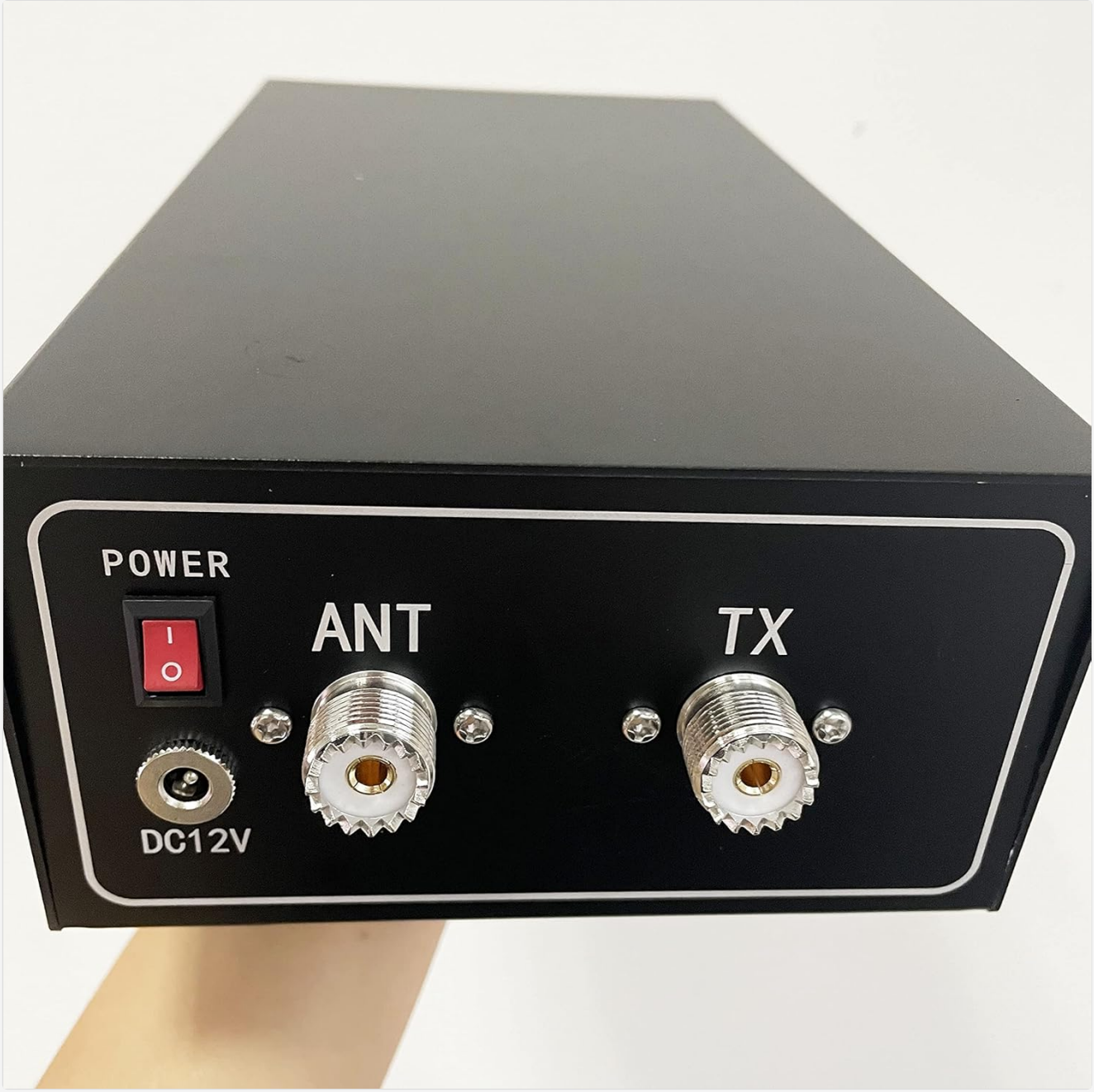

Figure 4: Close-up of the rear panel showing the DC12V input, power switch, ANT, and TX connectors.

6. Operating Instructions

6.1 Powering On/Off

Toggle the red power switch on the rear panel to turn the unit ON or OFF. Upon powering on, the LCD display will illuminate and show current power (PWR), inductance (L), capacitance (C), and Standing Wave Ratio (SWR) values.

6.2 Operating Modes

The ATU-500W features three primary operating modes, selectable via the front panel buttons:

- **AUTO Mode:** Press the **AUTO** button. In this mode, the tuner automatically initiates a tuning cycle when it detects an SWR above a preset threshold (typically 1.3:1). This is the most common operating mode for continuous use.
- **TUNE Mode:** Press the **TUNE** button to manually initiate a tuning cycle. This is useful for initial setup or when you want to force a tune.

- **BYPASS Mode:** Press the **BYPASS** button. In bypass mode, the tuner's matching network is disengaged, and the antenna is directly connected to the transceiver. This is useful for checking the raw SWR of your antenna or when tuning is not required.

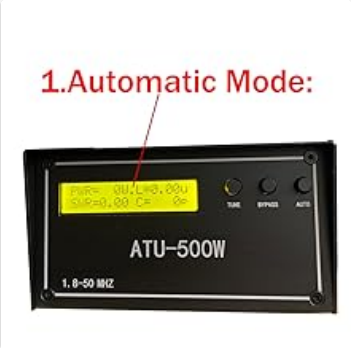

Figure 5: Display in Automatic Mode.

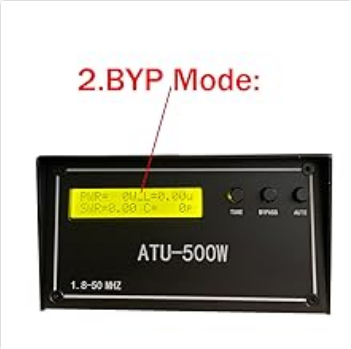

Figure 6: Display in Bypass Mode.

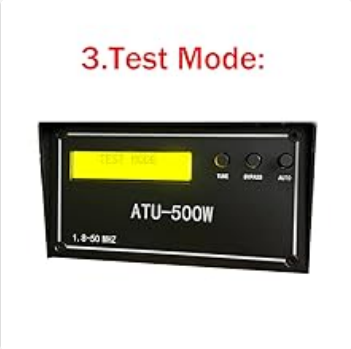

Figure 7: Display in Test Mode.

6.3 Tuning Process

1. Select your desired operating frequency on your transceiver.
2. Ensure the ATU-500W is powered on and in AUTO or TUNE mode.
3. Transmit a low power signal (**maximum 30 watts**) from your transceiver. The tuner will automatically begin searching for the best match.
4. The LCD display will show the SWR decreasing as the tuner finds a match. Once a satisfactory SWR is achieved (typically below 1.5:1), the tuning process will stop.
5. After tuning is complete, you may increase your transceiver's power output up to the maximum rated power of 500 watts for operation.

> **Important:** If the tuner fails to achieve a low SWR, check your antenna system for issues or try a different frequency. The tuner requires a minimum of 10 watts to effectively tune.

7. Maintenance

- **Cleaning:** Keep the tuner clean and free from dust. Use a soft, dry cloth to wipe the exterior. Do not use liquid cleaners or solvents.
- **Connections:** Periodically inspect all coaxial and power connections for tightness and corrosion. Loose or corroded connections can degrade performance.
- **Storage:** When not in use for extended periods, store the tuner in a dry, cool environment, away from direct sunlight and extreme temperatures.

8. Troubleshooting

Problem	Possible Cause	Solution
Tuner does not power on.	No power, incorrect voltage, or faulty power cord.	Check power supply connection, ensure 10-15 VDC, test power cord.
Tuner fails to tune or SWR remains high.	Input power too low, antenna system issue, or frequency out of range.	Ensure input power is at least 10W. Inspect antenna and feedline. Verify operating frequency is within 1.8-50 MHz.
Tuner gets excessively hot during operation.	Operating at high power for extended periods with high SWR, or poor ventilation.	Reduce power. Ensure adequate ventilation around the tuner. Check SWR and antenna efficiency.
SO239 connectors are difficult to connect.	Non-standard threading on tuner connectors.	Do not force connections. Use a push-on PL259 to SO239 adapter if necessary.
Tuner creates radio frequency interference (RFI).	Grounding issues or proximity to sensitive equipment.	Ensure proper station grounding. Increase distance from sensitive electronics. Add ferrite chokes to power and control lines.

9. Warranty and Support

For warranty information and technical support, please refer to the documentation provided at the time of purchase or contact your vendor. Keep your proof of purchase for any warranty claims.

10. Official Product Videos

No official product videos from the seller were available for embedding in this manual.