MFJ

MFJ Giant SWR/Wattmeter

Model MFJ-868

CAUTION: Read All Instructions Before Operating Equipment

MFJ ENTERPRISES, INC.

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VERSION 1A

DISCLAIMER

Information in this manual is designed for **user purposes only** and is ***not*** intended to supersede information contained in customer regulations, technical manuals/documents, positional handbooks, or other official publications. The copy of this manual provided to the customer will ***not*** be updated to reflect current data.

Customers using this manual should report errors or omissions, recommendations for improvements, or other comments to MFJ Enterprises, 300 Industrial Park Road, Starkville, MS 39759. Phone: (662) 323-5869; FAX: (662) 323-6551. Business hours: M-F 8-4:30 CST.

MFJ-868 Giant SWR/Wattmeter

Introduction

The **MFJ-868 Giant SWR/Wattmeter** is the World's Largest HF SWR/Wattmeter. The MFJ-868 measures peak or average forward and reflected power as well as standing wave ratio. It is designed to operate on 1.8-30 MHz. The MFJ-868 has three power scales, which are selected with the front panel slide switch. The high power scale measures 0-2000 Watts forward or reflected power. The mid power scale measures 0-200 Watts forward and reflected power. The low power scale measures 0-20 Watts forward and reflected power. MFJ's exclusive *Power Saver* circuit turns the meter on only when RF power is being measured. The MFJ-868 utilizes a large illuminated 6.5-inch Single-Needle meter to read the SWR from 1:1 to ∞.

Features

- **Huge Backlit Meter:** 6.5 in. measured diagonally across the front.
- **Easy-to-Read Scales:** Large numbers and pickets make reading a breeze.
- **Power Saver Circuit:** Meter turns on only when transmitting.
- **Three Power Scales:** 20/200/2000 Watt power scales.
- **Forward and Reflected:** Measures forward power and reflected power.
- **Peak or Average Reading:** Measures Peak or Average power.
- **Power or SWR:** Measures Power and SWR.
- **Easy-to-Set SWR:** Easy set for accurate SWR measurements.
- **Frequency Range:** 1.8 - 30 MHz.
- **Input/Output Impedance:** 50 Ohms.

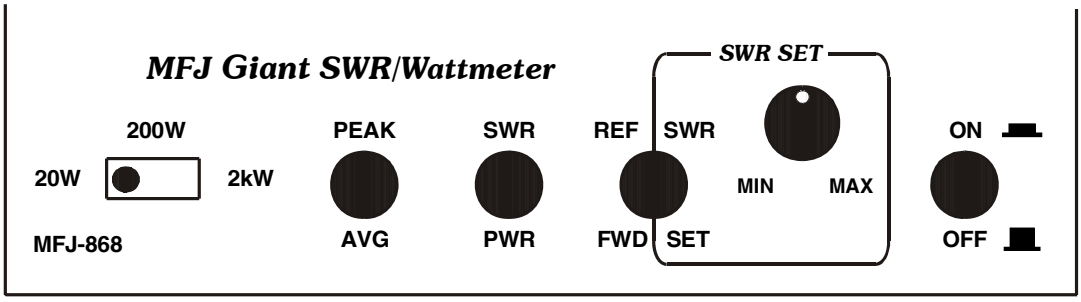


***Figure 1**: Controls*

Controls

1. **20W / 200W / 2kW switch:** Selects between 20, 200, 2000-Watt power scales.
2. **PEAK/AVG switch:** Selects Peak or Average power measurement.
3. **SWR/PWR switch:** Selects Power or SWR measurement.
4. **REF/FWD switch:** Selects forward or reflected power measurement.
5. **SWR/SET switch:** Selects SWR measurement or set.
6. **SWR SET knob:** Sets full-scale deflection to measure SWR.
7. **ON/OFF switch:** Turns power to the unit and lamp on or off.

Installation

1. Connect your transmitter to the connector labeled TRANSMITTER and your antenna to the connector labeled ANTENNA. It is important that you use good quality coax and properly installed connectors.

2. **The meter must have a power source in order to function.** Power can be provided by an external 12 VDC supply such as the MFJ-1312B or an internal nine-volt "transistor radio" battery. Use a 2.1 mm coaxial plug with the center conductor positive and the sleeve ground. MFJ's exclusive *Power Saver* circuit turns the meter on only when RF power is being measured.

3. An internal lamp backlights the meter scale. The lamp requires a 12 VDC supply such as the MFJ-1312B. Use a 2.1 mm coaxial plug with the center conductor positive and the sleeve ground. The **ON/OFF** switch turns the unit and internal lamp on or off.

> **Note: The meter must have a power source in order to function. Power can be provided by an external 12 VDC supply (negative ground only) or an internal nine-volt "transistor radio" battery.**

4. To measure the power output capability of a transmitter/amplifier you should connect a quality 50-ohm dummy load to the ANTENNA connector of the MFJ-868.

Operation

Power Measurement Settings

1. Set the **SWR/PWR** switch to **PWR (out)** for power measurement.

2. Set the **REF/FWD** switch to **FWD (out)** for forward power measurement or to **REF (in)** for reflected power measurement. (REF/FWD and SWR/SET settings share the same switch.)

3. Select peak or average reading by setting the **PEAK/AVG** switch to the desired position. Set to **AVG (out)** to read average RF power. Set to **PEAK (in)** for use with SSB and AM transmissions. In this mode, there will be a slow rise and decay time.

Power Measurement Scales

1. The MFJ-868 Giant SWR/Wattmeter has three power scales. Refer to Figure 2 below for scale location and scale mark representation.

2. The meter's full-scale forward and reflected power range is controlled by the **20W / 200W / 2kW** slide switch. Select between 20, 200 or 2000 Watts. If your transmitter/amplifier runs less than 20 Watts of output power, push the slide switch all the way to the **left** for the 20-Watt scale. If your transmitter/amplifier runs more than 20 Watts but less than 200 Watts of output power, push the slide switch to the **middle** position for the 200-Watt scale. If your transmitter/amplifier runs more than 200 Watts of output power, push the slide switch all the way to the **right** for the 2000-Watt scale.

3. On the **2kW** scale, each tall picket (scale mark) represents 100-Watts below the 500 Watt picket and 500 Watts above the 500 Watt picket. The short pickets represent 50 Watts below the 500 Watt picket and 100 Watts above the 500 Watt picket

4. On the **200W** scale, each tall picket represents 10-Watts below the 50 Watt picket and 50 Watts above the 50 Watt picket. The short pickets represent 5 Watts below the 50 Watt picket and 10 Watts above the 50 Watt picket

5. On the **20W** scale, each picket represents 1-Watt.

6. The most accurate power readings occur in the upper half of the meter scales. When trying to measure power with a less than perfect match, the reflected power should be subtracted from the forward power reading in order to find the true power

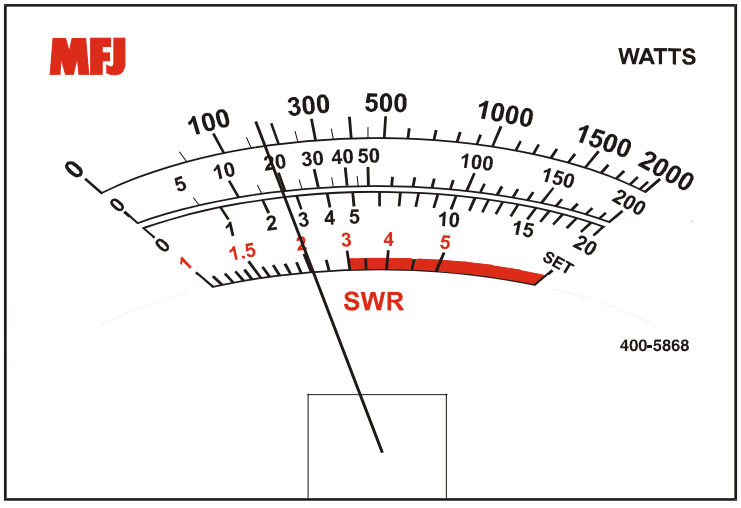


***Figure 2**: Power and Standing Wave Ratio Scales for MFJ-868 Giant SWR/Wattmeter*

SWR Measurement Settings

1. Set the **SWR/PWR** switch to **SWR (in)** for standing wave ratio measurement.

2. Set the **SWR/SET** switch to the **SET (out)** position in order to set the full-scale deflection to measure SWR. (SWR/SET and REF/FWD settings share the same switch.)

3. Set the radio transceiver to transmit mode and transmit the desired power output.

4. Slowly turn the **SWR SET** knob **clockwise** towards **MAX** until the meter point is at the **SET** position on the SWR scale. If the meter point goes past the **SET** position, slowly turn the **SWR SET** knob **counter-clockwise** towards **MIN** until the meter point is at the **SET** position on the SWR scale.

5. Set the **SWR/SET** switch to the **SWR (in)** position while transmitting. The meter will now indicate the standing wave ratio. Note: The **SWR SET** knob must be reset when the power level is changed. As you increase the power, the knob will need to be turned **counter-clockwise** towards **MIN**. This will maintain an accurate SWR reading.

SWR Measurement Scale

1. The **MFJ-868 Giant SWR/Wattmeter** has one standing wave ratio scale. Refer to Figure 2 above for scale location and scale mark representation.

2. On the SWR scale, each tall picket represents 0.5 units below the 2 picket and 1 unit above the 2 picket.

3. The short pickets represent 0.1 units below the 2 picket and 0.5 units above the 2 picket.

4. The red shaded area represents a SWR of greater than 3:1. It is not recommended to operate within this shaded area of a SWR greater than 3.0:1.

Calibration

The MFJ-868 has been calibrated at the factory. If it should ever need to be recalibrated, then follow this procedure:

Equipment Needed

1. Transmitter capable of supplying enough power to obtain ½ to full-scale reading at 14 or 21 MHz.

2. 50-ohm dummy load that is capable of handling full transmitter output power and has better than a 1.15:1 SWR.

3. Power meter of know accuracy. The calibration will only be as good as the standard reference meter.

4. 50-ohm cables capable of handling the power. RG-58/u is recommended. DO NOT USE RG-59 or RG-11.

Meter Calibration

1. Refer to Figure 3 for the Calibration Setup and Figure 4 for trim pot location.

2. Connect the Calibration Setup equipment as shown in Figure 3. Use a 50-ohm dummy load for the antenna. Set the Transmitter to the 14 MHz in the 20-meter band.

3. With the **20W / 200W / 2kW** switch on the 20 Watt scale, transmit 20 Watts as indicated on the reference meter. Adjust the 20 trim pot on the inside board to set the forward power scale to 20 Watts. Refer to Figure 4 for trim pot location.

4. With the **20W / 200W / 2kW** switch on the 200 Watt scale, transmit 200 Watts as indicated on the reference meter. Adjust the 200 trim pot on the inside board to set the forward power scale to 200 Watts. Refer to Figure 4 for trim pot location.

5. With the **20W / 200W / 2kW** switch on the 2000 Watt scale, transmit 2000 Watts as indicated on the reference meter. Adjust the 2000 trim pot on the inside board to set the forward power scale to 2000 Watts. Refer to Figure 4 for trim pot location.

6. Calibration is complete. Reflected power and standing wave ratio do not need calibration. Setting the forward power also sets the reflected power and SWR.

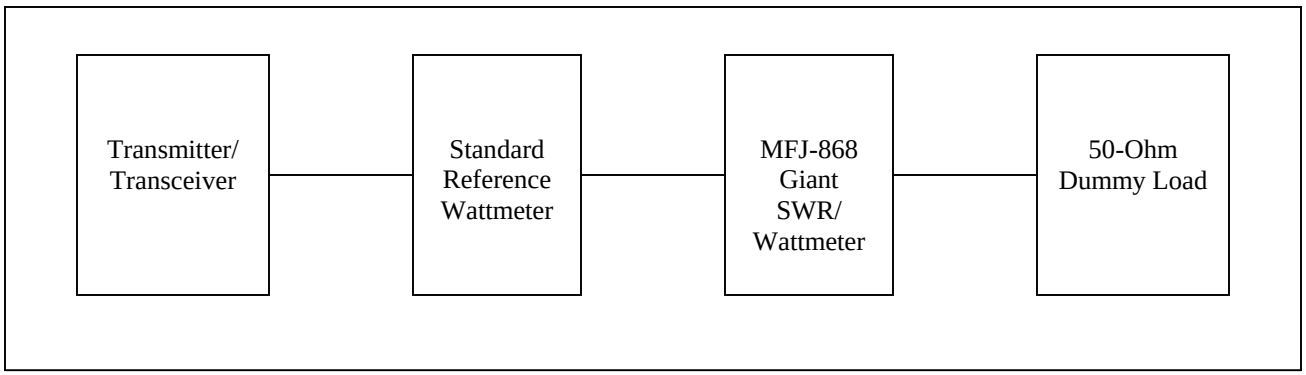


***Figure 3**: Calibration Setup*

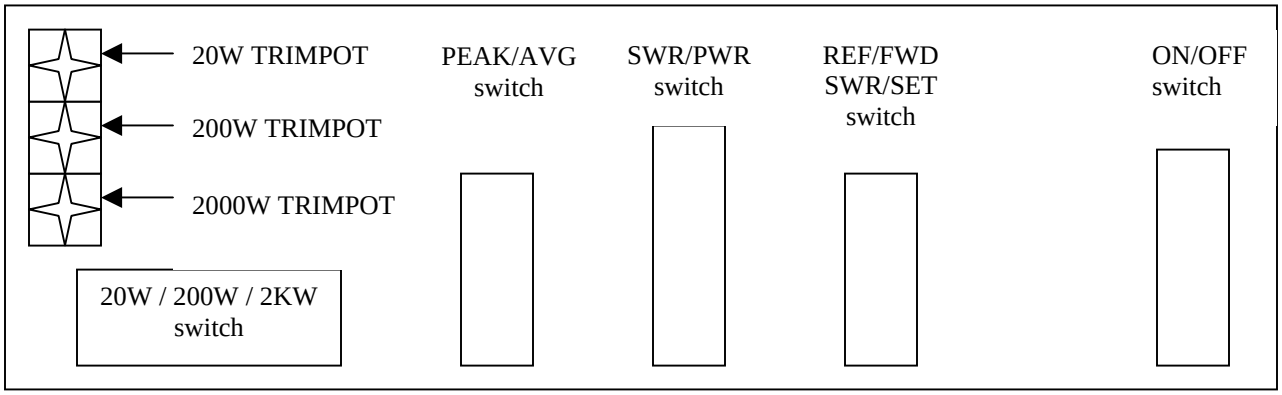


***Figure 4**: Trim pot location (inside view)*

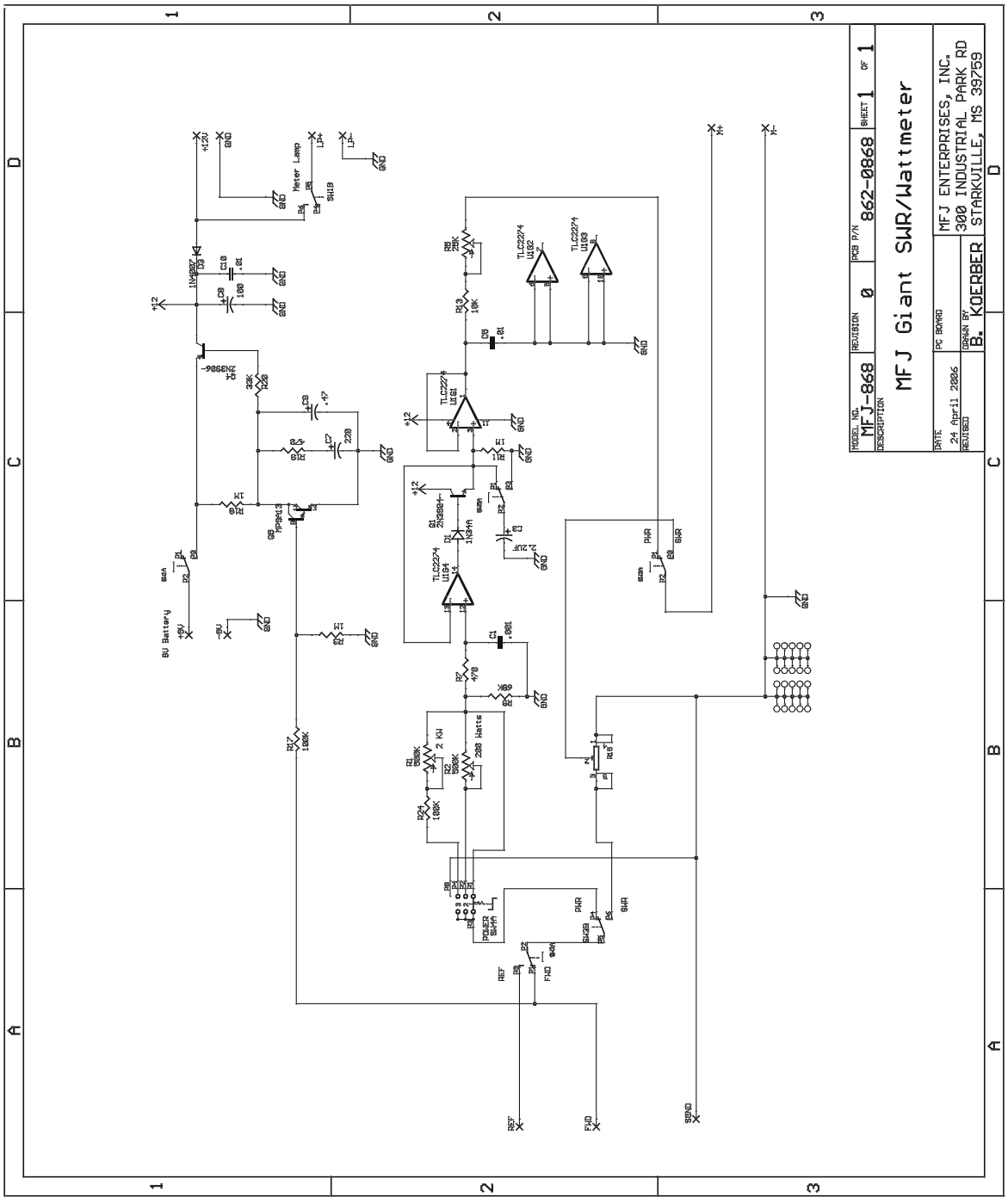
Technical Assistance

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or reading the manual does not solve your problem, you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile (FAX) to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

Notes

Schematic


MFJ Giant SWR/Wattmeter
MODEL NO. MFJ-868
REVISION 0
PCB P/N 862-0868
SHEET 1 OF 1
DESCRIPTION
DATE 24 April 2006
REVISED
PC BOARD
DRAWN BY B. KOERBER
MFJ ENTERPRISES, INC.
300 INDUSTRIAL PARK RD
STARKVILLE, MS 39759
Meter Lamp
9V Battery
REF
FWD
SGND

FULL 12-MONTH WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free from defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original or machine reproduction of such proof of purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, of forgery shall be cause to void any and all warranty terms immediately.

2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **$10.00** covering postage and handling.

3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof of purchase and a **$8.00** personal check, cashiers check, or money order must be provided to cover postage and handling.

4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (662) 323-5869.

5. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc.

6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board product is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, or cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.

7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ products.

8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.

9. This warranty is given in lieu of any other warranty expressed or implied.

10. MFJ Enterprises, Inc. reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.

11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 300 Industrial Park Rd, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase and a telephone number.

12. This warranty gives you specific rights, and you may also have other rights, which vary from state to state.

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Starkville, MS 39759

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Printed In U.S.A.