

SW-111

SWR Power Meter 3-function test instrument

Introduction

MODEL 15PSM111 test instrument is a compact 3-function test meter designed to indicate the condition of any 52 ohm antenna and antenna coax used for Citizens Band radio operation (see Specifications) by testing for Standing Wave Ratio, relative RF power, or field strength. Tuning of transmitters can also be accomplished when using this meter as a field strength meter. Also, comparing antennas can be accomplished with this meter. It is designed to be used for base stations or mobile operations and can be permanently installed in the antenna system without any measurable loss of power.

Specifications

SWR.....1:1 to 3:1	Meter.....100~250 micro-amp DC
RF power.....0-10 watts	Connectors.....SO-239
.....0- 100 watts	Size.....84(W) X 59(H) X 52(D) mm
Impedance.....52 ohms	Weight.....120 g
Accuracy.....SWR 5%	
.....RF power 10%	

SWR Function

The SWR Function of the test instrument is probably the most useful test performed. Testing for the SWR of Standing Wave Ratio provides the operator of the transmitter a good indication of the condition of his antenna and antenna lead cable since most antennas are located externally of the transmitter. In order to get the maximum amount of power radiated from the antenna, the lead line or coax and the antenna should be matched to the transmitter. For this meter a 52 ohm match is required which includes most CB operations that use RG-58U or RG-8U coax. Because a perfect match is never achieved the amount of mismatch can be measured by measuring the amount of Standing Waves that exist in the coax or antenna feed-line. Measuring the Standing Waves can be accomplished by sampling the forward "FWD" power and the reflected "REF" power and comparing them and then expressing this difference as a ratio of reflected power to forward power. The following ratios are examples of the amount of power loss for a Standing Wave Ratio.

POWER LOSS	=	SWR	POWER LOSS	=	SWR
0%	=	1:1	11%	=	2:1
2%	=	1.3:1	25%	=	3:1
3%	=	1.5:1	38%	=	4:1
6%	=	1.7:1	48%	=	5:1
			70%	=	10:1

A ratio of from 1.1:1 to a 2:1 is usually considered satisfactory for most operations.

Power Meter Function

The power meter function is provided to monitor the condition of the transmitter by measuring the relative RF power being generated in the transmitter. This meter will measure up to 100 watts of RF power with a 10% accuracy. This is accomplished by sampling a small amount of RF energy from the transmission line. There will be no measurable power loss if the meter is left in the coax as a permanent installation.

SWR Measurement

CAUTION: DO NOT TURN THE TRANSMITTER ON WHILE THE ANTENNA AND TEST METER ARE DISCONNECTED!

1. With the meter properly connected and the transmitter off place the slide switches on the SWR meter to the "FWD" and "SWR" positions.
2. Place the SWR adjustment control on the SWR meter to the extreme left position.
3. Key to the transmitter and adjust the SWR adjustment control for a full scale deflection to the "SWR" mark on the meter.
4. While the transmitter is on, place the "FWD-REF" switch to the "REF" or down position and read the meter on the middle scale. This is the SWR.

NOTE: IF THE SWR IS ABOVE 2:1 THE ANTENNA MAY NEED TUNING OR THERE MAY BE A PROBLEM ON THE ANTENNA OR ANTENNA CABLE.

5. Several antennas provide a means for tuning by either slide adjustment or control at the base. For sliding antennas, sliding 1/4" each time and repeating the SWR measurement steps after each adjustment is usually a good method. First, moving the antenna inward and watching for an improvement in the SWR; then, outward if no improvement is noticed. For Citizens Band operation, tuning your antenna to one of the center channels will usually provide for the best SWR over the entire band. Use channels 11, 12 or 13.

Power Measurement

CAUTION: DO NOT TURN THE TRANSMITTER ON WHILE THE ANTENNA AND TEST METER ARE DISCONNECTED!

1. Connect the meter in the antenna feed in the same manner as for the SWR measurement.
2. For measuring power below 10 watts (standard CB transmitters) place the left switch 10W-100W in the 10W position (up). For measuring power above 10 watts (business band transmitters), use the lower position 100W.

NOTE: FOR ACCURATE POWER READINGS, THE SWR SHOULD BE NO HIGHER THAN 1.5:1 AND THE FREQUENCY NO HIGHER THAN 148 MHz.

place the (right switch) "SWR-POWER" in the up or "POWER" position.

3. Turn the transmitter on and read the power from the upper scale.

CAUTION: ABNORMALLY HIGH READINGS OR READINGS ABOVE THE RATED POWER OF THE TRANSMITTER COULD INDICATE A FAULTY ANTENNA SYSTEM. CHECK ALL CONNECTORS FOR TIGHTNESS OR CORROSION.