

# V.S.W.R. & POWER METER

## V.S.W.R. & Power Meter Instruction

This S.W.R. & Power meter is a highly accurate RF meter for measuring Forward Power, Reflected Power, and V.S.W.R.

### Main Features:

- LED back light ,analogue meter for easy reading.
- Forward RF power readings .
- Reflected RF power readings.
- V.S.W.R. ratios.
- Convenient control for easy operation.
- None battery read control .



## Instruction Manual



### EXPLANATION OF FEATURES :

1. 4 x 2.5cm analogue meter.
2. Meter Lock / ON
3. SWR Calibration Knob .
4. Meter zero adjustment screw
5. Function switch : RW,SWR / FW,CAL .
6. Function switch : WATT / SWR.
7. Power range switch 12W / 120W.
8. +5-24V DC power for meter illumination.
9. ANT : RF output to an antenna or dummy load .
10. TX : RF power input from a radio .

### FORWARD POWER MEASUREMENT

1. Set the function switch 2 to the "ON"
2. Set the function switch 6 to the "WATT"
3. Set the function switch 5 to the "FW"
4. Set the radio transceiver to transmit and read the scale corresponding to the Power range selected switch (12W, or 120W)

### REFLECTED POWER MEASUREMENT

1. Set the function switch 2 to the "ON"
2. Set the function switch 6 to the "WATT"
3. Set the function switch 5 to the "RW"
4. Set the radio transceiver to transmit and read the scale corresponding to the Power range selected switch (12W, or 120W)

### VSWR MEASUREMENT

#### Step 1

1. Set the function switch 2 to the "ON"
2. Set the function switch 6 to the "SWR" . Set the function switch 5 to the "CAL"
3. Set the radio transceiver to transmit mode.
4. Slowly turn the CAL control Knob clockwise until the meter point is at the "CAL" position. This should be full scale.

#### Step 2

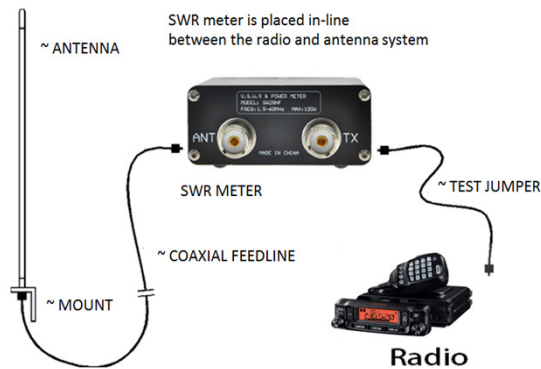
Set the function switch 5 to the 'SWR' position while transmitting. The meter will now indicate the SWR ratio.

### CAUTION

- 1.5 -> 2.0. Your antenna is acceptably tuned and should work fine.
- 2.0 -> 3.0. Your SWR reading is slightly high, it shouldn't damage your radio but you should try and tune your antenna to bring down your SWR reading.
- Above 3.0 or more . Your antenna isn't tuned acceptably and could damage your

Note: that the front and rear panel data of the two models are different. Subject to change without prior notice

### THE SET UP



### How to Use :

The S.W.R. meter is connected between the radio (TX) and the antenna, as close as possible to the transceiver (use a cable of max. 40 cm like Test Jumper. (Not include)

- 1) Check all connections.
- 2) Press the key of the microphone PTT to pass into transmission and keep it in this position.
- 3) Read data of S.W.R. / Forward watt / Reflected watt

### What is a high SWR reading?

- 1.5 -> 2.0. Your antenna is acceptably tuned and should work fine.
- 2.0 -> 3.0. Your SWR reading is slightly high, it shouldn't damage your radio but you should try and tune your antenna to bring down your SWR reading.
- Above 3.0 or more . Your antenna isn't tuned acceptably and could damage your radio.

### CAUTION

1. Since the meter is very sensitive, avoid excessive vibration or mechanical shock to the unit.
2. The absolute maximum power that should be applied to the meter is 120W.
3. The transceiver and antenna connections to the meter must never be reversed. Always observe the correct connections to the transmitter and the antenna .
4. The meter has been carefully calibrated at the factory. Tampering with any of the internal circuitry or sensors may cause damage and will degrade the accuracy of the meter.

### Understanding S.W.R. Meters

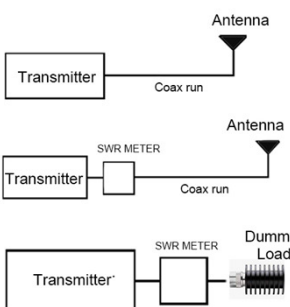
An SWR (Standing Wave Ratio) meter is an instrument used to measure the amount of reflected power (power coming back from the antenna and/or transmission cable) to the transmitter. For a transmitter to provide all the power to an antenna, the antenna needs to be resonant and the transmission cable (coax) has to introduce minimum loss. In a perfect scenario, in an efficient antenna system, all the power outputted from the transmitter makes it into the atmosphere. Both the coax and the antenna, if not tuned right will induce losses. These losses will not make it out to the air but come back to the transmitter in the form of "standing waves".

SWR is the ratio of the forward power vs the reflected power. A perfect antenna system will show 100% forward power and 0% reflected power and is referred to as 1.0:1 which is hard to maintain. Typically a 1.1:1 is ideal and 1.2:1 is average.

Anything over 3.0:1 is suspect and needs troubleshooting or tuning. 3:1 is unacceptable and could damage the transmitter if it doesn't have reflected power protection (foldback) circuitry.

- a 1.0:1 is 100% efficiency to the atmosphere.
- a 1.1:1 is 0.2366% loss, a 1.2:1 is 0.826% loss,
- a 1.5:1 is 4% loss, and a 2:1 is 11.1% loss of power.

Unfortunately you cannot tell if a problem is in the antenna or coax (transmission line) if it is placed at the output of the transmitter shown above.



Placing the SWR meter at the output of the transmitter may not necessarily show accurate reflected power since losses in the coax can show up as a decrease in reflected power. Also if there is high SWR, it can show a high false reading of output power from the transmitter.

To accurately measure output power of transmitter you must place the S.W.R. meter between a good 50 ohm purely resistive "dummy load" and the transmitter as shown below. Accurately note the power out first. Be aware that some SWR meters cannot accurately measure power output. Just relative output for indicating reflected power.

The SWR meter should then be placed between the end of the coax run with a dummy load as shown below.

\*\*All Specifications are subject to change without notice

# 驻波比 & 功率计



## 使用说明书



### 功能说明：

1. 4 x 2.5cm 仪表。
2. 仪表: 锁/开启。
3. 校准旋钮。
4. 仪表零点调整螺丝。
5. 功能开关: RW、SWR / FW、CAL。
6. 功能开关: WATT / SWR。
7. 功率范围开关 12W / 120W。
8. +5-24V 直流电源用于仪表照明。
9. ANT: RF 输出至天线或假负载。
10. TX: 来自无线电的 RF 功率输入。

### 正向功率测量

1. 将功能开关 2 设置为“ON”位置。
2. 将功能开关 6 设置为“WATT”位置。
3. 将功能开关 5 设置为“FW”位置。
4. 将无线电收发器设置为发射，并读取与所选功率范围开关（12W 或 120W）相对应的刻度。

### 反射功率测量

1. 将功能开关 2 设置为“ON”位置。
2. 将功能开关 6 设置为“WATT”位置。
3. 将功能开关 5 设置为“RW”位置。
4. 将无线电收发器设置为发射，并读取

## 驻波比/功率计使用说明

这个驻波比 & 功率计是一款射频计，用于测量正向功率、反射功率和驻波比

### 主要特点：

- LED 背光显示，指针表头，读数方便。
- 正向 RF 功率读数。
- 反射 RF 功率读数。
- V.S.W.R. 比率。
- 方便的控制，易于操作。
- 无电池读取控制。

型号	SW-112 HF	SW-112 VU
频率范围	1.5MHz -60MHz	125MHz-525MHz
功率范围	0 - 120 瓦 (最大)	
S.W.R. 范围	1:1~ ∞	
V.S.W.R 测量	所需功率 => 大于4 瓦	
LED 灯直流输入功率	DC +5V ~12V	
输入/输出阻抗	50 ohm	
输入/输出连接器	SO-239	
尺寸 (包括连接器)	88 (宽) x 59 (高) x 80 (深)	
重量	270克	
配件	使用说明书，USB 转 5.5/2.1mm 电缆	

\*\*所有规格如有更改，恕不另行通知

### VSWR 测量

#### 步骤 1

1. 将功能开关 2 设置为“ON”位置。
2. 将功能开关 6 设置为“SWR 设置”。将功能开关 5 设置为“CAL”位置。
3. 将无线电收发器设置为发射模式。
4. 慢慢顺时针旋转 CAL 控制旋钮，直到仪表指针位于“CAL”位置。这应该是满量程。

#### 步骤 2

发射时将功能开关 5 设置为“SWR”位置。仪表现在将显示 SWR 比率。

### 注意：

- 1.5 -> 2.0. 您的天线已调好，应该可以正常工作。
- 2.0 -> 3.0. 您的 SWR 读数略高，不会损坏您的对讲机但您应该尝试调整天线以降低 SWR 读数。

高于 3.0 或更高. 您的天线未调好，可能会损坏您的对讲机。

注：两款机型(SW-112HF/SW-112VU) 后后面板数据展示不同。如有更改，恕不另行通知

## 设置



### 如何使用：

- S.W.R. 计连接在无线电 (TX) 和天线之间，尽可能靠近收发器  
使用最长 40 厘米的电缆，如测试跳线(不包括)。
- 1) 检查所有连接。
  - 2) 按麦克风之PTT键进入发射状态并保持在此位置。
  - 3) 仪表显示驻波比 / 正向功率瓦特 / 反射功率瓦特数据。

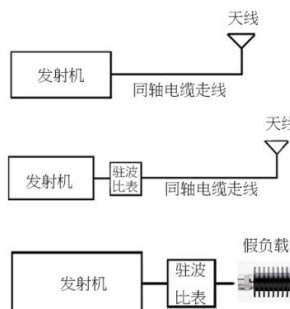
### 什么是高 S.W.R. 驻波读数？ 1.5 -> 3.0:

- 1.5-2.0 您的天线已调整到可以接受的程度并且应该可以正常工作。
- 2.0-3.0 您的 SWR 读数稍高，不会损坏您的对讲机。但您应该尝试调整天线以降低 SWR 读数。
- 高于 3.0 或更高 您的天线调谐不正确，可能会损坏您的收发器。

### 注意

1. 由于仪表非常敏感，请避免设备过度振动或机械冲击。
  2. 施加到仪表上的绝对最大功率为 120W。
  3. 收发器和天线与仪表的连接绝对不能颠倒。始终遵守发射器和天线的正确连接。
  4. 仪表在出厂时已经过仔细校准。篡改任何内部电路或传感器都可能造成损坏并降低仪表的精度。
- 请勿将仪表暴露在过高的温度、高湿度或强磁场的环境中。了解驻波比表 SWR (驻波比) 计是一种用于测量发射机反射功率 (从天线和/或传输电缆返回的功率) 的仪器。为了使发射机向天线提供所有功率，天线需要谐振，并且传输电缆 (同轴电缆) 必须引入最小的损耗。在完美的情况下，在高效的的天线系统中，发射机输出的所有功率都会进入大气中。如果调谐不当，同轴电缆和天线都会产生损耗。这些损耗不会传播到空气中，而是以“驻波”的形式返回发射器。SWR 是正向功率与反射功率之比。完美的天线系统将显示 100% 的前向功率和 0% 的反射功率，称为 1.0:1，这是很难维持的。通常，1.1:1 是理想的。任何超过 3.0:1 的值都是可疑的，需要进行故障排除或调整。3:1 是不可接受的，如果发射器没有反射功率保护 (折返) 电路，则可能会损坏发射器。1.0:1 表示对大气的效率为 100%。1.1:1 为 0.2366% 损耗，1.2:1 为 0.826% 损耗，1.5:1 为 4% 损耗，2:1 为 11.1% 损耗。

不幸的是，如果问题出现在上面所示的发射器的输出端，您无法判断问题是否出在天线或同轴电缆 (传输线) 中。



### 驻波比测量:

将 SWR 计放置在发射机的输出端可能不会显示准确的反射功率，因为同轴电缆中的损耗可能会表现为反射功率的降低。此外，如果 SWR 较高，则可能会显示发射机输出功率的较高错误读数。要准确测量发射机的输出功率，您必须将 SWR 计放置在良好的 50 欧姆纯电阻“虚拟”负载和发射机之间，如下所示。首先准确记下电源。请注意，某些 SWR 仪表无法准确测量功率输出。只是用于指示反射功率的相对输出。

### 功率测量

然后，应将 SWR 计放置在带有假负载的同轴电缆末端之间，如下所示。