

KENWOOD

SW-50/SW-100

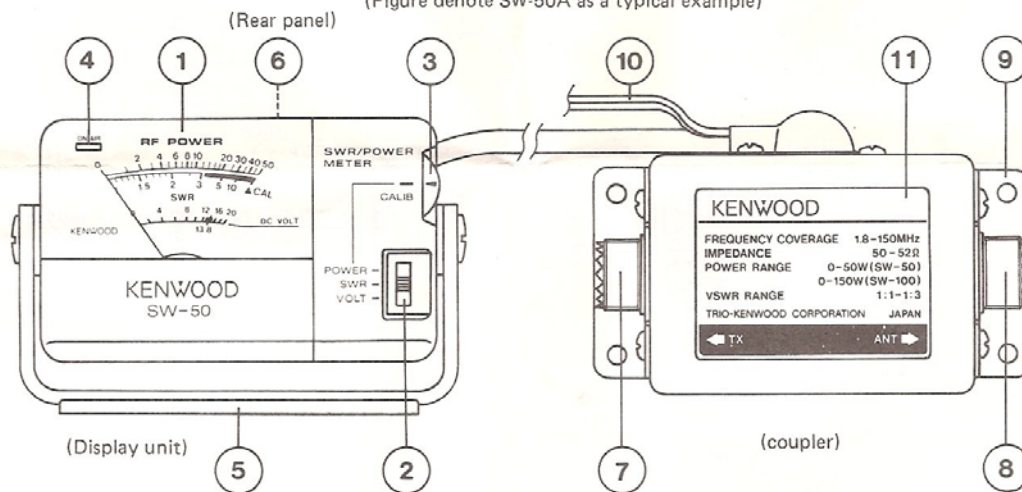
SWR/POWER METER

■ Features

- Measurements over a wide frequency range can be made with this through-type SWR/POWER meter.
- Although compact, SWR/RF Power and battery voltage can be measured and ON AIR indicators and illumination for night use are provided.
- The coupler and display unit can be separated. The display unit can be mounted wherever convenient.
- The compact display unit will improve operation of both a fixed station and can also be installed in a mobile station.

■ Part names and their functions

(Figure denote SW-50A as a typical example)



① Meter

Full-scale deflection indicates RF power at 50W (SW-50A/B) or 150W (SW-100A/B) and DC voltage up to 20V. The meter can be illuminated for night time operation.

② Function selector

Used to select POWER, SWR or VOLT.

③ Calibration control

For SWR measurement, this control adjusts meter sensitivity. When this control is turned fully counterclockwise and the transmitter is ON, the meter functions as a power meter.

④ ON AIR indicator

This lights when the RF output power is 3W or greater; the brightness increases with the output level, and "Flickers" in SSB mode.

⑤ Adjustable tilt mounting bracket

This is used to secure the display unit and allows the display unit to be positioned most conveniently. Peel of the protective backing from the adhesive strip at the bottom of the bracket and affix in the desired position. Two holes are also provided in the mounting bracket so it can also be attached with screws. Loosen the bracket side-screws and adjust the viewing angle of the display unit.

⑥ Lamp switch

Controls lamp power for meter illumination. If this switch is left ON for too long, the battery will discharge. For normal operation, place at OFF.

⑦ TX connector

This UHF connector should be connected to the transmitter output jack.

⑧ ANT connector

This UHF connector should be connected to the antenna or dummy load.

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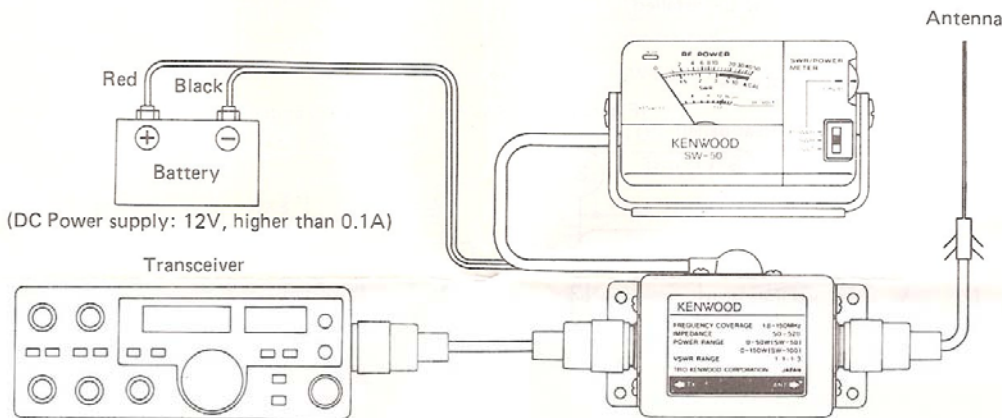
- 9 **Coupler bracket**
Used for mounting the coupler. Attach as required using screws.
- 10 **Power cable**
To measure battery voltage or light the meter, connect the red lead to (+) and the black lead to (-). Never apply voltage greater than 20V DC.
- 11 **Nameplate**
This indicates the rating of the coupler. Do not attempt to use the coupler at power levels exceeding the specified rating.

■ **Before operation**

- To use this unit, a connection cable is necessary. Use a 50Ω coaxial cable terminated with good quality UHF connectors. When measuring above HF (140 – 450 MHz), a poor connection will result in measurement errors. Always use heavy coaxial cable.
- When measuring power, use an accurate 50Ω non-inductive dummy load.

- Set the function switch to SWR. Read the SWR value from the SWR scale.
- The SWR can be obtained from formula (1) which uses the forward wave power (Pf) and reflected wave power (Pr). The actual injected power to the antenna is the difference between these two (Pf – Pr). The relationship between the SWR, Pr and Pf is shown in the following table. As can be seen from the table, when the SWR is 3:1 or greater, the ratio of Pr/Pf is 25%, thus illustrating that power is wasted.

Under normal circumstance, SWR of 1:1 (transmitter and the antenna match perfectly) is not possible. An SWR of 1.2 or less is almost too good to be true; an SWR of 1.5 is excellent and an SWR of 2 or less is good. An radiated SWR of 3 or greater not only reduces the effective radiated power but also increases the likely hood of problems such as TVI and BCI.



Connection and operation

- Connect the transceiver output jack to the coupler TX connector and the antenna or dummy load to the ANT connector with a properly terminated, quality 50Ω coaxial cable.
- Connect the Red/Black lead to a source of 13.8V DC. Observe polarity: Red +
Black –
- Before beginning a measurement, turn the calibration control fully counterclockwise while still in the receive mode to protect the meter.
- **Remember:** The airwaves are already sufficiently crowded
 1. Listen on frequency before transmitting.
 2. Use the least possible amount of power from the transceiver consistent with reliable measurement.
 3. Keep dead-carrier transmissions as short as practical. This helps both your equipment, and fellow operators.
 4. Please be courteous when testing.

(2) **Measuring power**

- Set the function selector to POWER.
- Turn the calibration control fully counterclockwise, and align the pointer ◀ with CALIB mark.
- The unit is now ready to measure RF output power when the transceiver transmit. The RF POWER scale indicates the power output.

SWR	Pr / Pf (%)
1.0	0
1.2	0.8
1.5	4.0
2.0	11.1
2.5	18.4
3.0	25.0

$$SWR = \frac{1 + \rho}{1 - \rho}$$

$$\rho = \sqrt{\frac{P_r}{P_f}} \dots\dots\dots(1)$$

$$SWR = \frac{\sqrt{P_f} + \sqrt{P_r}}{\sqrt{P_f} - \sqrt{P_r}}$$

(1) **Measuring SWR**

- Set the function selector to POWER.
- Key the transceiver and adjust the calibration control fully counterclockwise so the meter deflects to the ▲ CAL mark (full scale).

(3) Measuring DC voltage

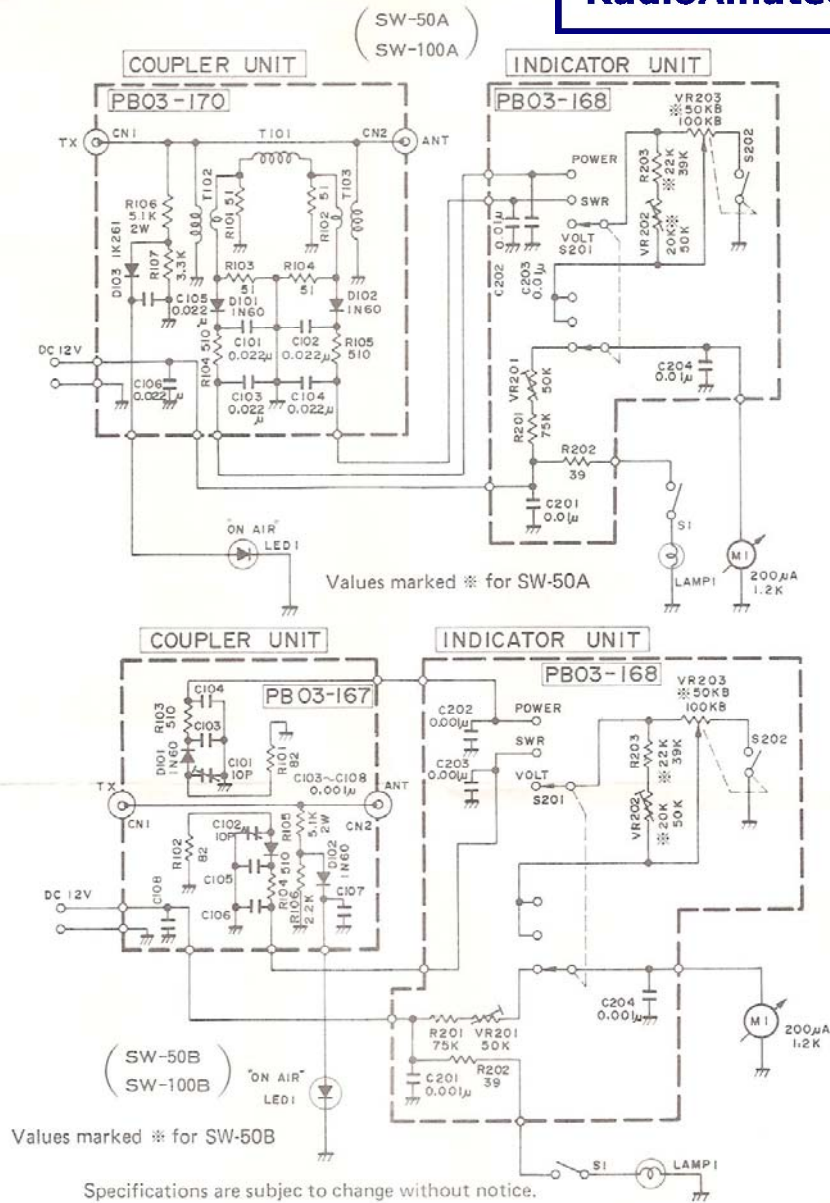
- Set the function selector to VOLT.
The unit is now a DC voltmeter with a full-scale reading of 20V DC. It cannot measure AC voltage.
- When the unit is powered from a car battery, the battery voltage should be 13.8V or less.
When the meter indicates in the red zone (13.8V), battery voltage is normal.
- With the engine on, the alternator may be boost this up to as high as 14.3V DC, nominal.
Be sure to turn off the light when not needed or when exiting your vehicle to prevent battery discharge.

■ Notes on use

- Coaxial connectors should be securely connected and never disconnected during transmitter operation.
- High SWR at high power will result in high voltages and can damage the unit; never apply high power without prior knowledge of a good SWR. Use low power first to test.
- The meter is delicate so avoid rough handling.
- The unit is fully factory adjusted; do not remove the case or touch internal components since this can result in measurement errors or other malfunctions.

■ Specifications

Item	Rating	Models applied
Impedance	50 ~ 52Ω	all models
Frequency range	1.8 – 150 MHz 140 – 450 MHz	SW-50A, SW-100A SW-50B, SW-100B
Power measurement range	0 – 50W 0 – 150W	SW-50A, SW-50B SW-100A, SW-100B
Power measurement accuracy	±10% (full scale)	all models
Feed through power overload	100W continuous, 200W PEP (coupler) 150W continuous, 300W PEP	SW-50B, SW-100B SW-50A, SW-100A
SWR measurement range	1 : 1 – 1 : 3	all models
DC voltage measurement range	0 – 20V DC	all models
Insertion loss	Less than 0.3 dB Less than 0.5 dB	SW-50A, SW-100A SW-50B, SW-100B
Residual SWR	Within 1.2	all models
Meter illumination power	Less than 15V	all models
Connector	M type (SO-239)	all models
Coupler-display cable length	Approx. 1.5m	all models
Dimensions	Coupler section 68(W) x 32(H) x 52(D) mm (93) (33) (62) () including projecting part Display section 92(W) x 62(H) x 36(D) mm (94) (63) (37)	
Weight	Coupler section 260g. Display section 90g.	all models



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