

INSTRUCTION MANUAL

ANTENNA TUNER

MODEL CNW-419



■ SPECIFICATIONS :

SWR/Power Meter Circuitry :

- 1) Frequency Coverage : 1.8–30MHz
- 2) Input/Output Impedance : 50 ohm
- 3) SWR Detection Sensitivity : 5W Min.
- 4) SWR/Measurement : 1 – Infinite
- 5) Power Range : Forward Power 20/200W
Reflected Power 4/40W
- 6) Tolerance : $\pm 10\%$ at Full scale

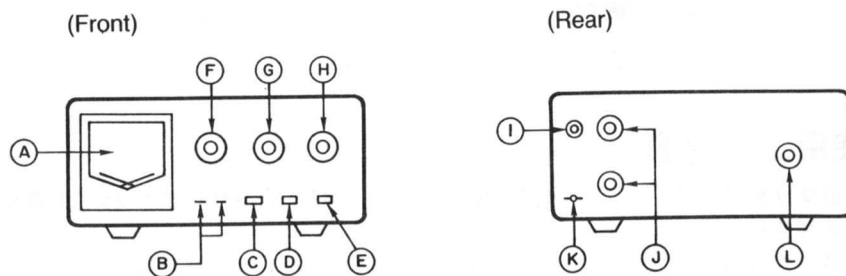
■ TUNER CIRCUITRY :

- 1) Band : 1.8–30MHz (Continuous coverage in 17 bands)
- 2) Output Impedance : 10–250 ohm Unbalanced
- 3) Power Rating : 100WCW on 1.8–3.5MHz
200WCW on 3.5–30MHz
- 4) Insertion Loss : Less than 0.5dB.
(Connecting to 50 ohm load resistance)

■ OTHERS :

- 1) Input/Output Connectors : S0-239.
- 2) Dimensions : 225(W)×90(H)×245(D)m/m
- 3) Net Weight : 3.1Kg. Approximately

■ CONTROLS



The CNW-419 is a high quality antenna tuner with an advanced art which features precise measurements of SWR and power for antenna tests.

(FRONT PANEL)

- (A) Meter (Cross Needles Type) : Indicating SWR, Forward & Reflected Power simultaneously.
- (B) Range indicator : LED lights up indicating power range.
- (C) Power Range Selector : Set to required power range.
- (D) Tuner Switch : 'ON' – To function of 'SWR/Power meter circuitry' with 'Tuner circuitry'.
'OFF' – To function of 'SWR/Power meter circuitry' only.
- (E) Antenna Selector : Change-Over switch for two antennas.
- (F) TR Matching ; Tuning-knob for capacitor of input side (Transmitter side, VC-1).
- (G) Band Switch : Set to required frequency band.
- (H) ANT Matching : Tuning-knob for capacitor of output side (Antenna side, VC-2).

(REAR PANEL)

- (I) Terminal for wire antenna : For connection to a long wire antenna.
- (J) Antenna Output : Connect to dummy load or antenna by 50 ohm coaxial cable.
- (K) GND (Ground) : Connect to the earth by thick wire.
- (L) Input Connector : Connect to transceiver by 50 ohm Coaxial cable.

■ PREPARATIONS I

The CNW-419 contains tuner circuitry and SWR and power meter circuitry. The switch for 'SWR/Power meter operation' being independent of 'Tuner Circuit' is on front panel. "ON" or "OFF" (switchable)
Therefore, we explain operation method each of : –
'SWR/Power meter circuitry' only and 'SWR/Power meter circuitry with Tuner circuitry'.

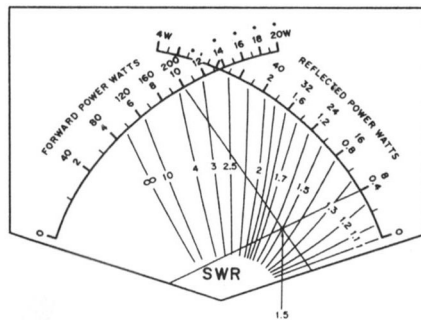
(For SWR & Power meter is used Independently)

- 1) Use only 50 ohm coaxial line for connections. This will maintain the accuracy of the meter.
- 2) Set the tuner switch to 'OFF' on the front panel.
- 3) Set 'Power Range' switch to 200W or 20W which required.

OPERATION :

- 1) Forward power watts measurement :
'FORWARD POWER WATTS' scale on fig-1 indicates forward power in accordance with transmitting power.
- 2) Reflected power measurement :
'REFLECTED POWER WATTS' scale on fig-1 indicates reflected power in accordance with matching of antenna system.
- 3) Effective radiated power measurement :
To measure effective radiated power by subtracting Reflected power from Forward power.
- 4) SWR Measurement

fig-1



Mathematical verification

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

$$SWR = \frac{\sqrt{200} + \sqrt{8}}{\sqrt{200} - \sqrt{8}} = 1.5$$

P_f : Forward Power
P_r : Reflected Power

See fig-1 The meter indicates Forward power 200W and Reflected Power 8W. At the crossing point of the two meter needles, the indication is SWR 1.5.

■ PREPARATION II

(For operation of SWR/Power Meter with Tuner)

- 1) Set the 'Tuner switch' to 'ON' on the front panel.

OPERATION :

- 1) Set the 'Power range switch to 200W'. Adjust the transmitting power approximately 10W.
- 2) Keep transmitting, decrease the SWR by tuning of VC-1 and VC-2 alternately.
- 3) Increase the transmitting power to normal operated output after SWR gets tuned around 1:1.0.
- 4) Repeat the tuning of 2) and 3).

Following chart is indicating approx positions of matching knobs, VC-1 or VC-2, for each band under termination by 50 ohm dummy load. Please refer this advance chart for your fine tuning.

BAND	1.8	3.5	7	10	14	18	21	24	28
VC-1	4.0	4.2	5.9	7.0	8.2	8.5	3.8	5.0	6.0
VC-2	4.8	4.6	6.0	7.0	8.2	8.5	2.1	3.5	5.0

CAUTION!!!

- 1) Do not change 'Tuner ON/OFF switch', 'Antenna selector switch' and 'BAND switch' when transmitting. Do not transmit without antenna connecting.
- 2) It is no problem of operation when SWR is less than 1:1.5 and it is no necessary of re-tuning in same band even SWR may change around 1:1.5.
- 3) Set 'Power' range to high range firstly even if output power is low. Change to suitable 'Power' range for transmitting power after SWR is adjusted approx. 1:1.0.
- 4) Connect to satisfactory ground earth with 'GND' terminal on rear panel. (effective against BCI or TVI problems)
- 5) Do not give the mechanical vibration and shock because the meter movements are highly sensitive.
- 6) Measuring power with a poorly matched antenna or disconnecting the output of the bridge while operating will certainly damage the meter and tuner circuitry.

