

Kyoritsu

MODEL K-126A & K-126B
GRID-DIP METER
OPERATING MANUAL



KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.
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INTRODUCTION

The Kyoritsu Model K-126A and K-126B Grid Dip Meters are highly sensitive and accurate test instrument covering the frequency range of 360 Ke to 220 Mc.

Eight color-coded plug-in coils are supplied with each unit. Each of the eight coils is plastic encapsulated and coded by means of a colored vinyl band which is matched by a similar color on the appropriate scale of the calibrated dial.

Kyoritsu Grid Dip Meter features more stability, longer life and greater sensitivity than ever before.

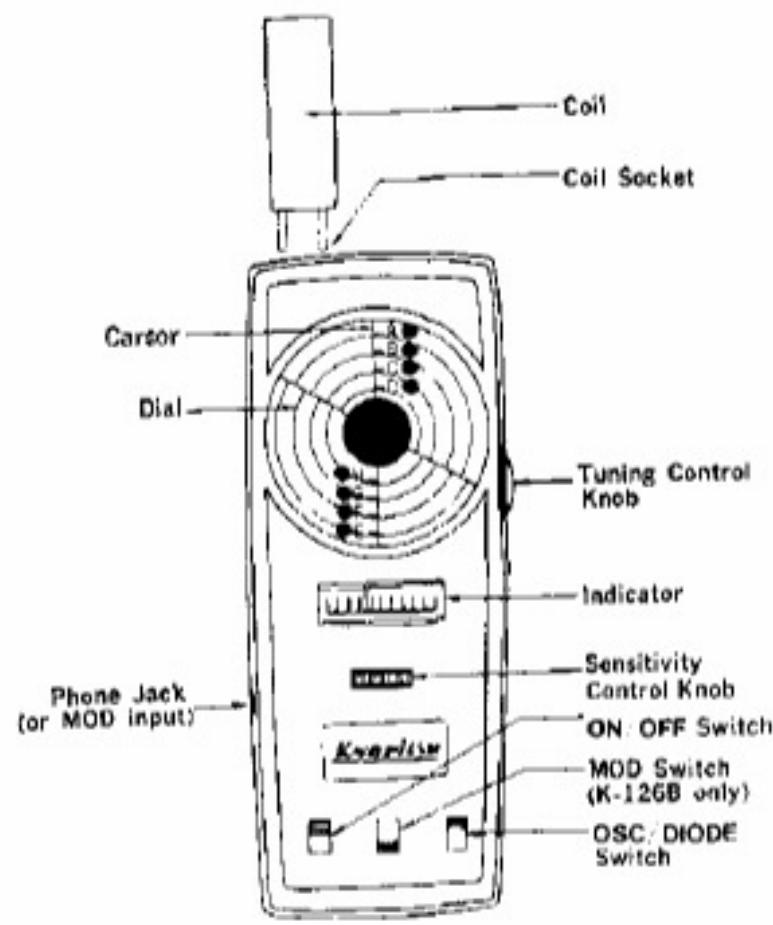
A) FEATURES

- Determine the resonance frequency of a tuned circuit (measuring a natural wavelength, etc.).
 - Determine the oscillator frequency of an oscillator (heterodyne type or absorbing frequency indicator).
 - As a test oscillator by modulating internal modulation is done on Model K-126B.
 - With earphones plugged into the phone jack, the oscillator is converted into an oscillating detector.
 - Determine inductance (L_x) and capacitance (C_x).
 - Use as a crystal oscillator by inserting a crystal in a coil socket.
- In addition, the Model K-126B controls an audio circuit by putting out low frequency signals (approx. 1000 cps) for internal modulation.

B) SPECIFICATIONS

	K-126A	K-126B
Frequency Range	360Kc ~ 220Mc	435Kc ~ 220Mc
Band A (black)	360Kc ~ 620Kc	435Kc ~ 800Kc
Band B (brown)	620Kc ~ 1300Kc	800Kc ~ 1500Kc
Band C (red)	1.1Mc ~ 3Mc	1.5Mc ~ 3Mc
Band D (orange)	3Mc ~ 7Mc	3Mc ~ 7Mc
Band E (yellow)	7Mc ~ 16.5Mc	7Mc ~ 16Mc
Band F (green)	16.5Mc ~ 38Mc	16Mc ~ 35Mc
Band G (blue)	38Mc ~ 90Mc	35Mc ~ 80Mc
Band H (white)	90Mc ~ 220Mc	80Mc ~ 220Mc
Accuracy	+ 1 %	+ 0.5% 1F BAND + 1% 500Kc ~ 220Mc
MOD	Out	In ~1000cps, + 10%, Out
Meter Sensitivity	0 - 500DCμA	0 - 500DCμA
Vacuum tube or Transistor	6AF6A	2 Transistor and 3 Diode
Power supply	AC, $\sqrt{V^2 + I^2} \leq 2$ (WVA)	006P 9V
Size, Weight	185 × 70 × 50mm 750g	185 × 70 × 50mm 500g
Accessory	Earphone cord with plug	

C) INSTRUMENT CONSTRUCTION



1. **ON/OFF SWITCH** This slide switch powers the unit when placed in the ON position. The Model K-126A should be plugged into AC Power source only.

2. **OSC/DIODE SWITCH** When this switch is placed in the OSC position, the instrument functions as a variable frequency oscillator, and in the DIODE position as an absorption wave-meter.

3. **COIL SOCKET** A socket on the top is provided for the insertion of any of the eight coils supplied, or a crystal.

4. **COIL** Each of eight coils contracts a tuning circuit with inner variable condenser.

5. SENSITIVITY CONTROL KNOB

The sensitivity control provides a means of adjusting the meter to a suitable scale reading—usually about mid-scale. Movement to the right increases the sensitivity of the instrument while movement to the left decreases it.

6. **INDICATOR** The indicator is 0-500 microampere sensitive and scale is calibrated in increments of 50 micro-amperes.

7. **TUNING CONTROL KNOB** Use this knob for tuning oscillator frequencies and to determine resonance frequency of a tuned circuit.

8. **CARSOR** A hairline drawn vertically beneath the dial glass permits an accurate and precise reading to be taken.

9. **FREQUENCY DIAL** The dials divided into eight separate scales. Each scale is accurately calibrated in its range and is

marked with a letter and a colored dot which corresponds to the coding found on the plug-in coil.

10. **PHONE JACK** With earphones (crystal or 1-4K ohm impedance earphone) plugged into the phone jack, the oscillator is converted into an oscillating detector. It is also used to determine the frequency of an RF source by heterodyning (zero-beating) the oscillator signal with the signal from the RF source.

In case of the Model K-126A connect a condenser (0.01-0.05) in series with Xtal earphones.

Outer modulation can be done by adding 0.2V-IV signal to this phone jack.

11. **MOD SWITCH** This switch is found only on the Model K-126B. With this switch placed in the "IN" position wave is modulated at approximately 1000 % with low frequency oscillator. In the OUT position the instrument functions as an outer modulation.

When MOD switch is placed in the "IN" position the Model K-126B audio circuits will be adjusted since 1000 % signal will be put out from phone jack.

D) OPERATING PROCEDURE WARNING

1. Handle coils very carefully. Don't harm the external vinyl band.
2. Set the ON/OFF switch to OFF after operating Model K-126B.
3. When using the instrument as a Grid Dip Meter, place the coil close to the tuned circuit being measured (see Fig. 1) and rotate the tuning control until a sharp dip is noted on the meter. Then increase the distance (ℓ) of the coil from the tuned circuit until the dip is barely noticeable. Recheck for a dip and read the frequency indicated on the appropriate scale. This is the frequency to which the tuned circuit is presently set.
4. When using the instrument as Xtal oscillator, rotate the tuning control knob and the Xtal oscillator frequency will change. This is due to the change of capacitance applied in parallel to the Xtal. Then, set the dial to the neighborhood of the 120-150 MC range in the II Band. In this case a capacitance of approximately 20-30 pF will be applied in parallel to the Xtal.

E) OPERATION OF MODEL K-126A and 126B

Table 12

OPERATIONS STARTS FROM HERE	ON/OFF Switch	OSC/DIODE Switch	MOD Switch (X.1MHz only)	Coax	Earphone	Sensitivity Control
A) Determine the resonance frequency of a tuned circuit.	ON (position)	OSC (position)	OUT (position)	Plug-in	—	SFT to the 1/2 or 2/3 SWING
B) Determine the oscillation frequency of an oscillator	ON	OSC	OUT	Plug-in	LSF	—
C) As a test oscillator	ON	OSC	IN (or OUT)	Plug-in	—	—
D) Monitoring of modulation carrier	ON	MON	OUT	Plug-in	LSF	SFT to the minimum or 1/2 position
E) Use as a crystal oscillator by inserting a crystal	ON	OSC	OUT (or IN)	Crystal Plugged to the Coax socket	—	—
F) 1000 Hz oscillator	ON	OSC	IN	—	—	Out-put frame phone jack

2. Insert code and X(3) as shown below:



As shown in the AS-126 type (and dip oscillators oscillate frequency bands by using one vacuum tube or transistor only it must be noted that the oscillator output voltage will be quite low since it is a little more difficult to check dip in a high frequency band than in a lower one. In this case change the resonant frequency of the circuit being measured so that the dip may be checked more easily.

Example: Adjusting the Mc Resonance Frequency

First, connect the H Band coil into the dip meter. Then, set the dip to 44 Mc and change the inductance or capacitance of the coil being measured by turning the dial of the coil being measured by the dip meter. The pointer of the dip meter will dip when the dip frequency of the circuit being measured is close to that of the coil being measured by the dip meter. The dip frequency of the circuit being measured by the dip meter is 44 Mc.

1

Example: Adjusting the MC Resonance Frequency

The Table I shows the procedure of the operations described in the section (A). Switch the Model K-126A and allow about 30 second for the unit to warm up, while the Model K-126B will work as soon as power turned on.

CASE 1a. To determine the resonance frequency of a tuned circuit using the Model K-126 as a grid dip meter. Follow the procedure described on the Table I. Then place the coil close to the tuned circuit being measured (*t*) and rotate tuning control until a sharp dip is noted on the meter. Then increase the distance of the coil from the tuned circuit (*t*) until the dip is barely noticeable (see Fig. 1).

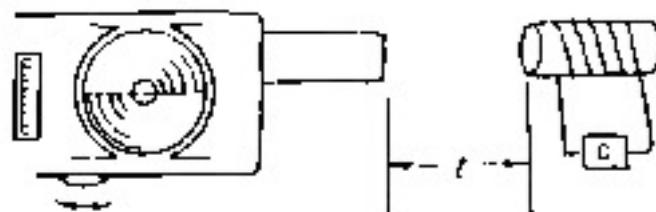


Fig. 1



Fig. 2

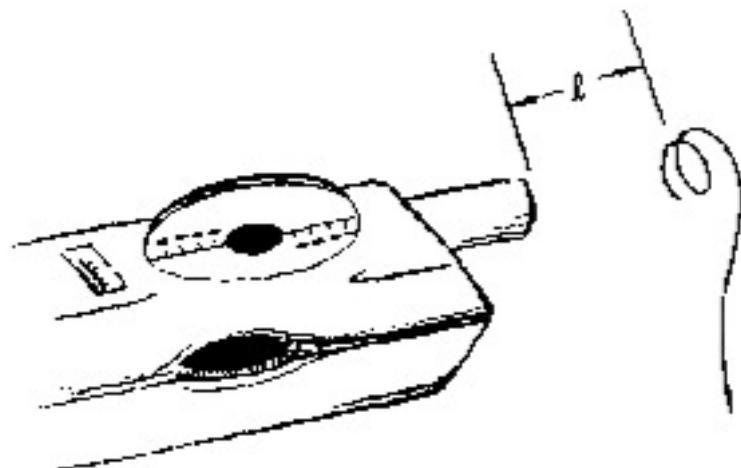


Fig. 3

Recheck for a dip and read the frequency indicated on the appropriate scale. This is the frequency to which the tuned circuit is presently set.

CASE 1b. Determine the resonance frequency of a natural wavelength. Follow the same method used in the **Case 1a** and determine the resonance frequency by placing the coil close to the *L* shown in fig. 4a, 4b and 4c.

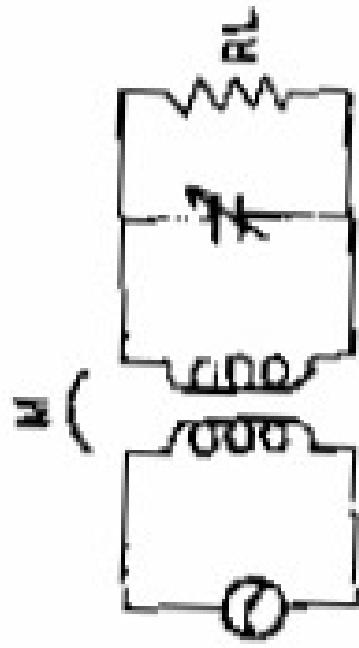
Fig. 4a and 4b are for aperiodic feeder and the feeder length is optional. Fig. 4c is the tuning feeder.

In either case, *L* would be the 1 to 4 turns coil. Lesser the turns the better.

To tune the wave to the desired frequency, always change the length of the "ANTENNA". Resonate regardless of the length in case of aperiodic tuning feeder.

When it is a tuning feeder type, resonate in the same method as above. Then cap-

at the insulating points at current lamp
(maximum) current, minimum voltage.



"Matching of wave with feeder" is considered as a different adjustment from a resonator if want.

Remarks:

When $L_1 = L_2$ we have fixed, approximate resonance frequency is

$$f = \frac{1}{2\pi\sqrt{L_1 C_1}}$$

And when $L_1 \neq L_2$ and f are fixed, impedance Z_0 from signal source load (RL) is

$$Z_0 = \left(\frac{N_2^2}{N_1^2} \right)^{\frac{1}{2}} RL \text{ or } \left(\frac{N_1}{N_2} \right) RL$$

N_1 and N_2 are number of turns of L_1 and L_2 respectively.

From above it is understood that matching the resonance frequency with impedance

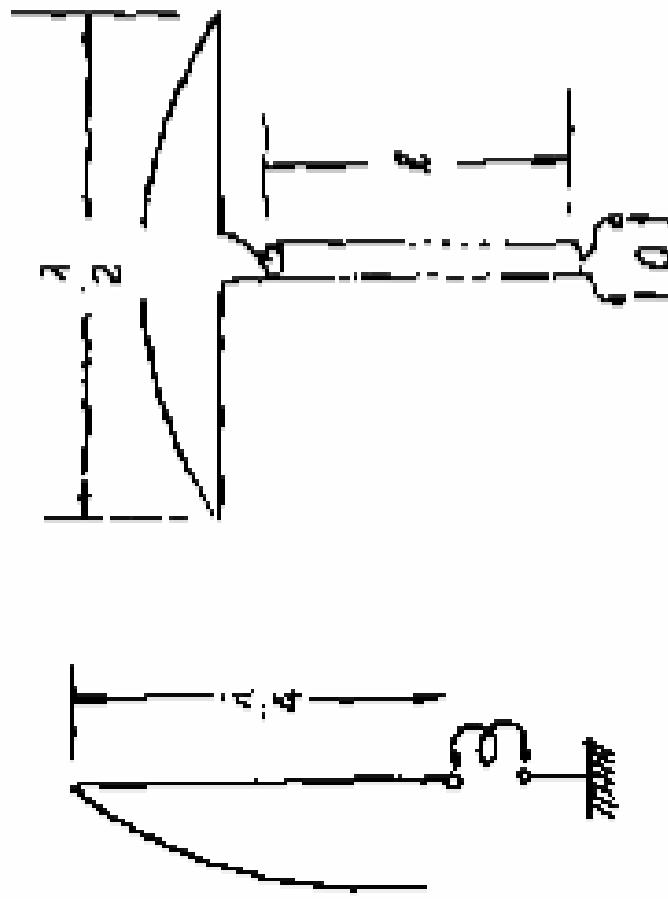


Fig. 4b

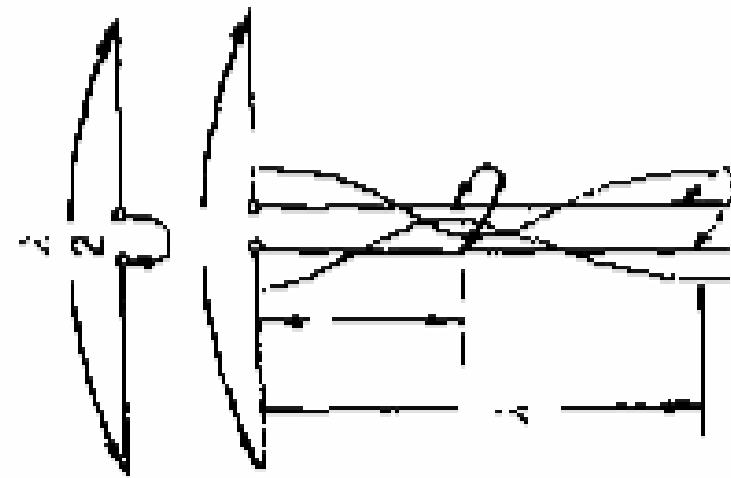


Fig. 4c

insert a 1-2 turn coil at current loop on a feeder line ($\lambda/4 \times \lambda/4 \times \lambda/4$. . . from feeding point).

Note: In these determinations always

is very hard in one stroke. Logically the matching is possible but practically it is difficult to do so. It is suggested to experiment the matching of impedance on the wave.

Case 1c. Determine inductance and capacitance. Use Model K-126 in the same procedure as Case 1a. Then prepare the standard capacitance C_s (10 or $100\text{pF} \pm 1\sim 5\%$) and connect L_s in a series. In this case determine resonance frequency by the same procedure as Case 1a. So the formula is written (frequency: f_o):

$$L_s = \frac{1}{40 \times f_o^2 \times C_s}$$

To measure C prepare inductance L_s and determine the resonance frequency f_o (f_o) with the same method.

$$C_s = \frac{1}{40 \times f_o^2 \times L_s}$$

Case 2. Determine the frequency of oscillator and monitoring of the transmitter. Follow the instruction described in the Table 1. Then place the coil close to the oscillator. Set the sensitivity control knob on the maximum sensitivities (to the right) and control the sensitivity.

Read the scale at the maximum movement which shows the oscillation frequency.

Adjustment and monitoring of transmitter are also in the same procedure. Place the coil close to the output of the transmitter. Spurious is also measured near wave.

Earphones may be used to monitor the

modulation on the RF signal. Insertion of the phone plug disconnects the meter and allows the earphones to be used for the determination of hum and noise, distortion and quality. See C. for details.

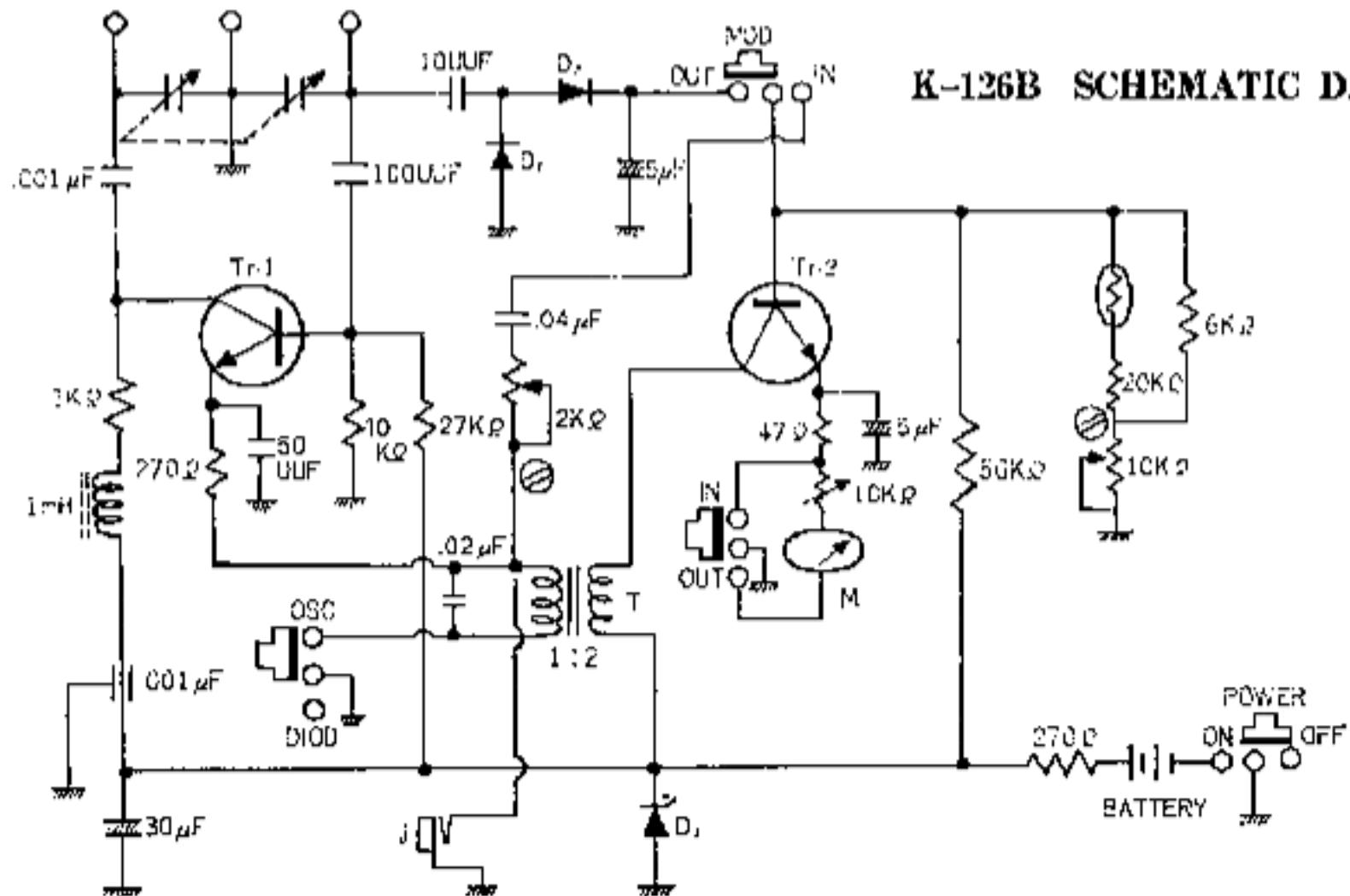
F) REPLACING THE BATTERY

Replace the battery of Model K-126B when it does not oscillate. To find out the battery length first place the ON/OFF switch on the ON position, OSC/DIODE switch on OSC, and MOD switch on the OUT, before you put a coil into the coil socket.

Then, set the sensitivity control knob to the maximum. Indicate or should points somewhere between 2 and 4. Insert H band coil into the coil socket. When the pointer swing to approximately 6 or less replace the battery.

Battery is easily replaceable by merely turning off the two screws on the back.

K-126B SCHEMATIC DIAGRAM



D₁ · D₃ SD-46 or IN34A D₂ MZ1006 or RD-6A

Tr₁ 2SC288A Tr₂ 2SC430 or 2SC183

M 0-500μADC T 2 : 1 (10K : 2.5K or 10K : 2K)

K-126A SCHEMATIC DIAGRAM

