THORO TEST®

YOUR ASSURANCE
OF QUALITY

GDM - 3

TRANSISTORIZED GRID-DIP METER

THUROW ELECTRONICS, INC.

3. COIL SOCKET—A seven pin miniature socket located on top of the GDM-3 is provided for the insertion of the six coils that are supplied with this set.

CAUTION: ALWAYS BE SURE TO INSERT THE COIL WITH THE CODE MARKING FACING TOWARDS YOU. ALTHOUGH, THE COILS ARE ENCAPSULATED, EXERCISE GREAT CARE DURING THE MEASUREMENTS AROUND LIVE POWER CIRCUITS OR WHERE THERE ARE HIGH RF POTENTIAL CIRCUITS. DO NOT ALLOW THE CASE OF THE UNIT TO COME INTO CONTACT WITH ENERGIZED EQUIPMENT.

4. CHIEF APPLICATIONS—The GDM-3 may be used for a variety of purposes which could not be fully covered in this manual. We recommend that you ask your dealer or distributor to recommend a book on the finer points of the grid-dip meter.

a. Measuring the tuning frequencies
b. Oscillating frequency circuit to be measured without oscillation.
c. Earphone monitoring—heterodyne frequency meter
d. Relative field strength meter
e. Substitution as a test oscillator.
f. Frequency meter
g. For many other practial uses.

OPERATIONAL PROCEDURES

A. MEASURING THE RESONANT FREQUENCY OF A TUNED CIRCUIT (See Figure 1)

1. Select the coil whose range includes the approximate frequency of the tuned circuit. Insert the coil into the socket on top of the grid dip meter.
2. Set frequency scale to the red dot over the red hairline.
3. Turn on the oscillation adjuster knob from "Off" position to "On" position. Be sure to turn knob clockwise.
4. Rotate the oscillation adjuster knob for full scale reading.
5. Place the coil close to the tuned circuit being measured and rotate the control until a sharp dip is noted on the meter. Then increase the distance of the coil from the tuned circuit until the dip is hardly noticable. Recheck for a dip, and then read the frequency indicated on the appropriate scale. This is the frequency to which the tuned circuit is presently set. If you wish to adjust a variable tuned circuit to a specific frequency, simply set the GDM-3 to the required frequency and adjust the variable element to the tuned circuit until a dip is observed on the GDM-3.

Note: Be careful not to place the grid-dip meter excessively close to the resonant circuit, as the measuring accuracy may be affected. During measurement, power should be removed from the circuit being measured.

B. OSCILLATING FREQUENCY MEASUREMENT (See Figure 2)

1. When measuring oscillating frequency, the instrument will function as a variable frequency oscillator, a meter in the grid circuit provides an indication of oscillator activity.
2. If the coil of the GDM-3 is placed to a tuned circuit being measured and both are tuned to the same frequency, energy absorbed from the tank circuit will cause a reduction or dip in meter reading.
3. Maximum grid-dip thus occurs when the GDM-3 is tuned to exactly the same frequency as the external tuned circuit.
4. This procedure in used to determine the resonant frequency of various tuned circuits such as traps, chokes, tank circuits, IF circuits, RF circuits and filters.
5. With the earphone plugged into the phone jack, the oscillator is now converted into an oscillating detector. The GDM-3 can then be used to determine the frequency of an RF source by heterodyning or "ZERO-BEATING" the oscillator signal with the signal from the RF source.

C. MEASURING THE HETERODYNE FREQUENCY (see Figure 3)

1. Insert earphone to jack marked "Phone" on the GDM-3 Grid-Dip Meter.
2. Place the coil near the oscillating circuit and gently rotate the dial.
3. When the frequency values of the oscillator and the grid-dip meter are harmonic, beating can be heard.

D. USING THE GDM-3 AS A SIGNAL GENERATOR

1. The Thoro-Test GDM 3 can be used as a signal source for preliminary alignment of receivers. A general outline is given below on how to use it.
2. Select the coil whose range covers the desired frequency. Plug coil into the unit.
3. Set dial on the GDM-3 to the required frequency.
4. The amount of pick-up by the receiver is varied by adjusting the position or distance of the GDM-3. Since the output signal is unmodulated, a VTVM is necessary for indicating the proper alignment of the tuned circuit. If the receiver is equipped with an "S-Meter" which operates from an AVC circuit, a VTVM will not be required, proper indications then being obtained on the "S-Meter".

E. USING THE GDM-3 AS A RELATIVE FIELD STRENGTH METER

1. The GDM-3 can be used to measure the relative field strength of nearby RF sources. Select the coil whose range includes the approximate frequency of the RF source.
2. Switch oscillation adjuster knob to "On" position, and rotate control so that meter needle is 5% of full scale.
3. Place the coil close to the RF source and rotate the tuning control for maximum indication on the meter. Reduce the setting of the sensitivity control if readings are too great. The frequency of RF source can then be read from the GDM-3 dial. In addition, adjustment may be made at the RF source, the change in output being observed on the GDM-3 meter.

As a relative field strength meter, the GDM-3 will be useful in checking transmitter output, neutralization, harmonics, parasitic analysis, and investigation of standing waves on open transmission lines.

F. MEASURING THE COIL INDUCTANCE AND CONDENSER CAPACITY (See Fig. 4)

1. To measure coil inductance, make a resonant circuit with a known condenser capacity as shown in Figure 4.
2. Place GDM-3 near to the resonant circuit under test and read the frequency scale on the dial.
3. You now have the coil capacitance of the resonant circuit. By using the following equation, the inductance can be obtained.

$$f=\frac{1}{2\pi\sqrt{LC}}$$

4. To measure the condenser capacity, make a resonant circuit with a known coil inductance.
5. Place the GDM-3 near to the resonant circuit under test and read the frequency scale on the dial.
6. You now have the condenser capacity of the resonant circuit. By using the following equation, the capacitance can be obtained.

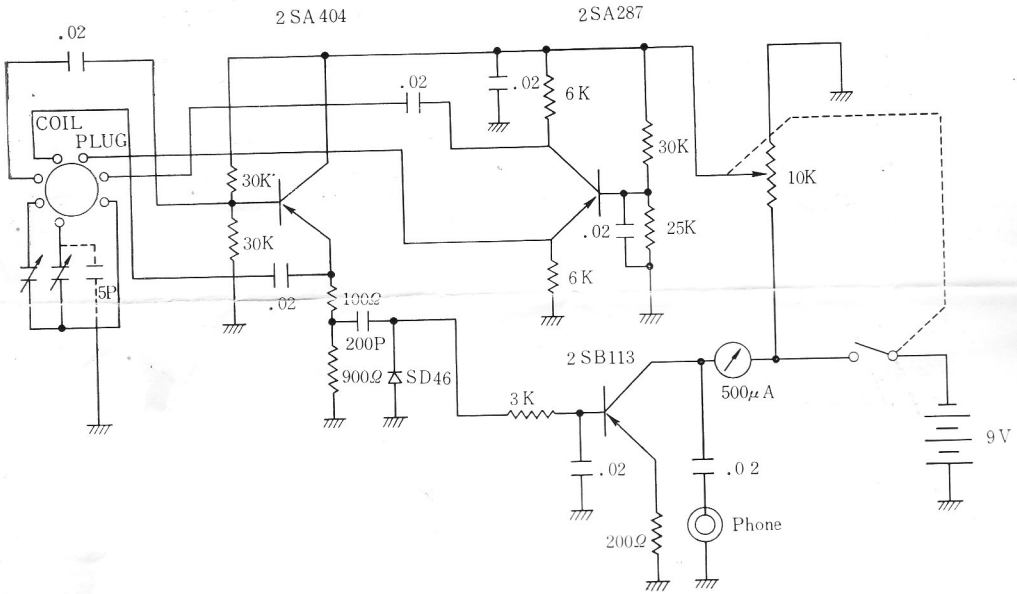
$$f=\frac{1}{2\pi\sqrt{LC}}$$

G. MEASURING THE "Q" OF THE RESONANT CIRCUIT (See Figure 5)

1. To measure the "Q" of the resonant circuit, connect RF VTVM to circuit.
2. Place the GDM-3 close to the resonant circuit and rotate the control until a sharp dip is observed on the meter. Read scale on the dial. Note the reading down on paper.
3. Then, read and note the voltage indication on the VTVM.
4. Gently rotate tuning dial knob of the GDM-3 until the voltage indication of the VTVM is 70% of noted value.
5. Again read and note the reading of the GDM-3 frequency scale.
6. Take the frequency readings you have obtained and the following equation is observed.

$$Q=2\left|\frac{f^1}{f^1-f^2}\right|$$

CIRCUIT DIAGRAM



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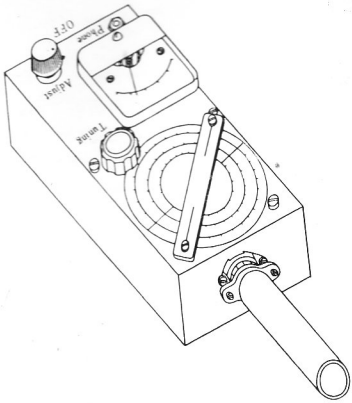
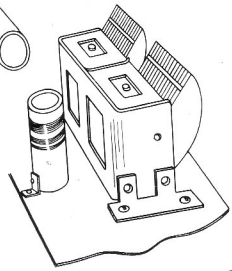
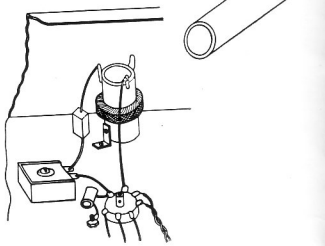


Fig 1

Fig 2





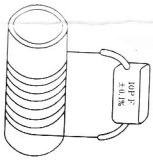
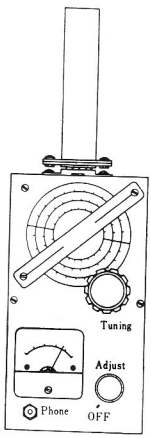


Fig 4



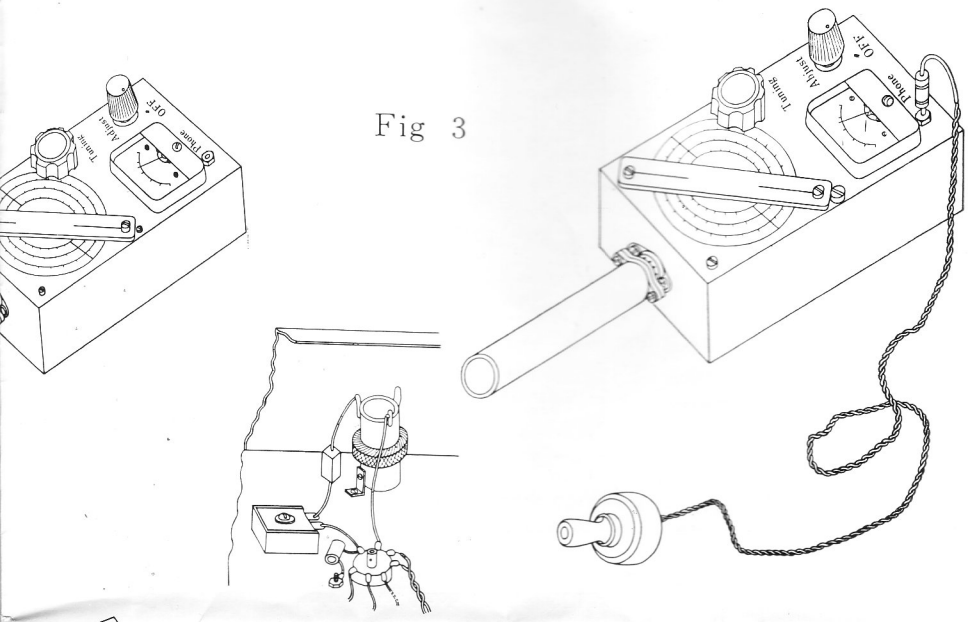


Fig 3

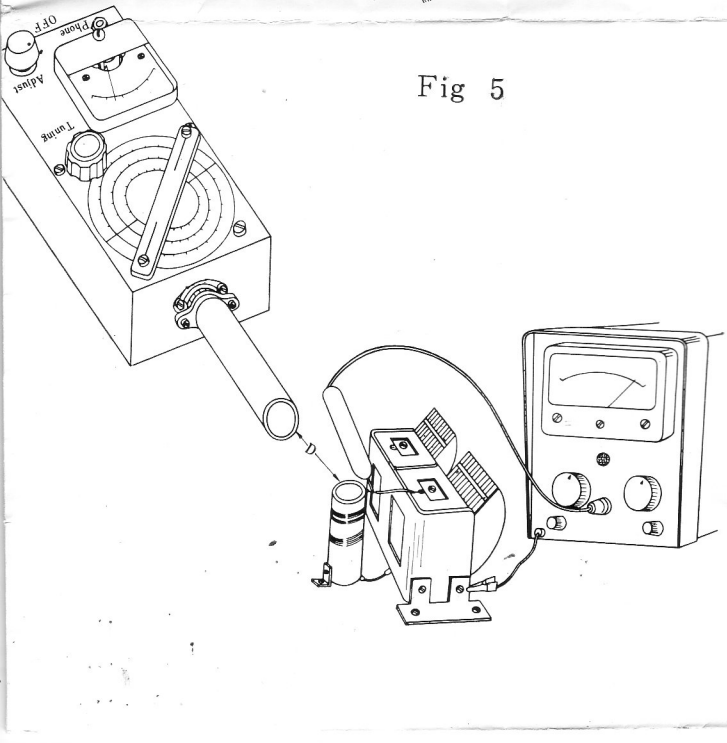


Fig 5