

GENERAL RADIO COMPANY

MANUFACTURERS OF
ELECTRICAL AND RADIO LABORATORY APPARATUS
CAMBRIDGE, MASSACHUSETTS

TYPE 247 W FILTER INSTRUCTIONS

The Type 247 filter was designed primarily to reduce interference when listening in on broad tuning receiving sets, such as the crystal or single circuit receivers. Its value when used with sharp tuning sets, such as the three circuit, lies chiefly in its use as a wavemeter. A little practice is necessary in order to obtain good results.

SERIES CONNECTION—REJECTOR

The series connection for the filter is termed a "Rejector" circuit, inasmuch as it will **reject** any particular station within the filter's range. This connection is used to eliminate a single undesired broadcasting station.

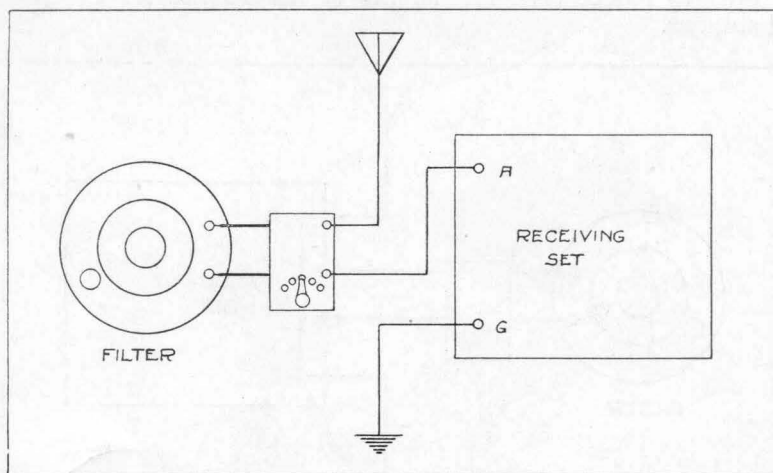


FIG. 1 SERIES FILTER

Operation

1. Remove the filter from the carton and insert the coil projections into the condenser binding posts. Be sure that the condenser binding posts are tightened securely after coil is in position.
2. Connect lead from antenna to either binding post on top of coil. Connect remaining binding post to antenna binding post of receiving set. The filter is now ready for use.

3. Place filter switch on contact 0 and tune in on the set any desired station. If interference is encountered, place the filter switch on 3 and rotate filter dial slowly.

At one particular point the undesired station will be tuned out. If complete elimination is not possible set the switch on 5 or 8 and try again.

It is advisable to keep the switch on the lowest figure permissible for clear reception. Do not use point 8 if point 5 is satisfactory or point 5 if point 3 works well.

4. Setting the filter may change the adjustment of the receiving set slightly. To correct this carefully retune the desired station leaving the filter adjustment untouched.

5. The wavelength of a station eliminated may be read directly from the dial when the filter is so adjusted that the station is tuned out.

PARALLEL CONNECTION—ACCEPTOR

The parallel connection is termed an "acceptor" circuit because it will **accept** only one station within the filter's range. It is used to reduce code interference or interference from a group of stations.

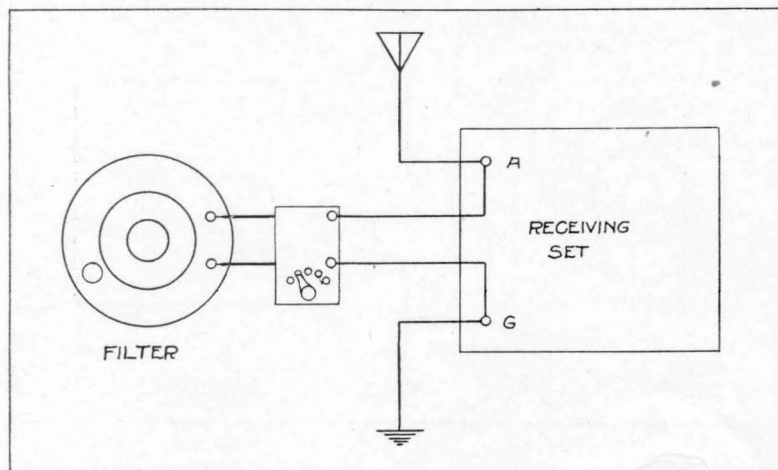


FIG. 2 PARALLEL FILTER

Operation

1. With the set connected in the usual manner, connect filter coil binding posts to antenna and ground binding posts of set.

2. Place filter switch on OPEN and tune in any desired station on set.

3. If the station you wish to listen to is interfered with, place filter switch on 8 as a trial and then move filter dial to a position where no station is heard except the desired one. If point 8 will not permit this, try point 5 or 3 and experiment with dial until the clearest possible reception is obtained.

Use the highest numerical point on filter switch that will allow good receiving. Do not use point 5 if point 8 is satisfactory or point 3 if point 5 works well.

4. Make any readjustment necessary to receiving set after filter has been adjusted.

5. The wavelength of any station may be read directly from the filter dial when the filter is so adjusted that the station is received with maximum strength.

SUGGESTIONS

The series connection (rejector) is recommended whenever possible. The audibility of the desired signal is reduced when using the parallel connection (acceptor) and for this reason it is recommended for use only in cases of severe interference such as local code transmitters and when the desired signal is of at least moderate intensity.

When using the rejector circuit a band of wavelengths will be filtered. The width of the band is determined by the switch points of the filter. If point 8 of the filter is used and the dial adjusted to tune out a station on 400 meters, the band will extend approximately from 390 to 410 meters. At 390 and 400 meters the filtering action is just noticeable. The nearer the station is to 400 meters the weaker it will be. At just 400 meters a station will be inaudible. Setting the switch on 5 will narrow the band until it would be approximately between 395 and 405 meters or 10 meters wide instead of 20 as in the former case. Point 3 of the filter switch will still further narrow the band. Thus it will be seen that if you wish to tune out a station on 400 meters and listen to one on 410 meters, the switch should be set on a point that will remove the interfering station but still not affect the station you care to listen to. In this case switch point 5 should be used.

The type 247W filter will greatly facilitate close adjusting of a set having no vernier adjustments.

The filter may be left permanently connected and can be cut out of the circuit by placing the switch on 0 for rejector connection or on OPEN for acceptor connection.

The type 247W filters are individually calibrated in wavelength to an accuracy of 2%. Therefore, in order not to injure this accuracy the filter should not be handled roughly, set down heavily, or otherwise mistreated. The set screw of the dial should not be loosened under any circumstances.

When used with the extension coils, the dial readings are multiplied by the proper factor, i.e., two for the double range coil, one-half for the half, and one-quarter for the quarter range coils.

In the case of very strong interference, such as a broadcasting station in close proximity to the receiver, it may be found that the filter will not reduce the interference to the desired amount. In this case connect the antenna lead and the lead from the filter to the receiving set to the same condenser binding posts that the filter coil is attached to. Set the switch at 0 and proceed to tune out in the usual manner. There are cases where the interference is only a very short distance away that no filter will help. There will be enough energy picked up on the wiring of the set itself to cause interference even though the antenna circuit is properly filtered.

OTHER USES

The 247W filter may also be used as a wavemeter for the measurement of the wavelength of a received signal, or of the wavelength of a transmitter.

To measure the wavelength of an incoming signal. Use the series connection. Tune the set to the desired signal. Then rotate the filter condenser until the signal disappears. The wavelength may then be read from the filter dial. The dial settings on the receiver also correspond to this wavelength. If several stations in different portions of the range are measured in this manner, a calibration curve for the tuner may be obtained.

To measure the wavelength of a transmitter. C. W. and Radiophone Transmitters. With the transmitter in operation the wavemeter is placed about six inches from the antenna tuning inductance. Resonance is indicated by a downward kick of the plate and antenna ammeters. The filter dial setting corresponding to the minimum reading of these meters, is the wavelength at which the transmitter is operating.

Spark Transmitters. When measuring the wavelength of a spark transmitter, it is suggested that resonance between the wavemeter and the transmitter be indicated by the use of an ignition tester sold by automobile supply stores for testing spark plugs. These testers contain a tube filled with a gas Neon which lights up if held in the hand and touched to the left-hand binding post on the wavemeter condenser when the wavemeter is absorbing power from the transmitter. Couple the wavemeter coil to a few turns in the transmitter ground wire and not to the primary circuit inductance. Rotate the wavemeter condenser dial until the Neon tube gives the brightest glow. This indicates that the wavemeter is in resonance with the transmitter, and the transmitter wavelength may be read directly from the wavemeter dial. Other resonance indicators that may be used (connected in series with the wavemeter coil) are a sensitive hot wire ammeter, a thermo-galvanometer, or a low voltage lamp. The use of these devices will alter the calibration somewhat. It should be noted that the coupling coil is not used when measuring the wavelength of radio transmitters.