



# INSTALLATION • OPERATION • MAINTENANCE INSTRUCTIONS

## TYPE RF FREQUENCY RELAY

**CAUTION** Before putting protective relays into service, remove all blocking which may have been inserted for the purpose of securing the parts during shipment, make sure that all moving parts operate freely, inspect the contacts to see that they are clean and close properly, and operate the relay to check the settings and electrical connections.

### CONSTRUCTION AND OPERATION

The type RF relay consists of two coils operating on a balanced arm which carries a contact on either side of the bearing. Both contacts are open when the arm is horizontal. The coils are connected across the same source, one with a reactance and the other with a resistance in series. As long as the normal frequency exists, balanced magnetic pulls are exerted on the arm and it remains horizontal. A change in frequency causes a change in the current flowing in the coil that has a reactance in series, whereas the current flowing in the coil with the resistance remains practically the same. Consequently, the arm will move toward one of the two stationary contacts, depending on whether the frequency has increased or decreased. Voltage variations affect both coils equally and thus do not disturb the balance appreciably. Variations up to approximately 20% of rated voltage will affect the operating point less than 1%.

The frequency at which the contacts close can be varied several cycles by changing the position of the stationary contact. With the normal setting the contacts will operate for frequency variations of  $\pm 2$  cycles from the balance point. Under favorable conditions it is possible to adjust the relay to operate for frequency variations of  $\pm 1$  cycle from the

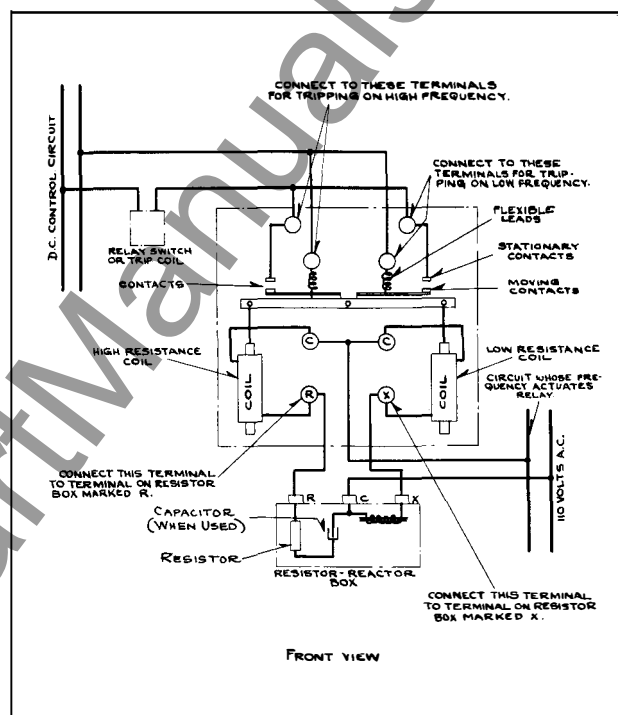


Fig. 1—Internal and External Schematic Connections of The Type RF Relay.

balance point. This is done by the contact adjustment. By increasing the contact separation the relay can be adjusted to operate at 5 cycles or more from the balance point (if the latter is approximately 60 cycles). For special conditions requiring closer frequency adjustments the relay can be equipped with a special resistor-reactor box which will permit making settings as close as  $\pm 1/2$  cycle from the balance point, with a corresponding reduction in the maximum setting obtainable. The contacts will close 1 ampere d-c. or a-c., but should not be required to open any appreciable current.

### INSTALLATION

The relays should be mounted on switchboard

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panels or their equivalent in a location free from dirt, moisture, excessive vibration and heat. Mount the relay with the back vertical and the top of the case horizontal. This is important in order to minimize friction. The arm on which the contacts are mounted should move freely in its bearings and should be in mechanical balance.

Any of the four mounting screws may be utilized for grounding the metal base. The electrical connections may be made direct to the terminal studs furnished with the relay.

The internal and external connections of the type RF relay are shown in Fig. 1. The resistor-reactor box is supplied with the relays and should be connected in the circuit as shown.

### ADJUSTMENTS AND MAINTENANCE

The proper adjustments to insure correct operation of this relay have been made at the factory and should not be disturbed after receipt by the customer. If the adjustments have been changed or the relay taken apart for repairs, the following instructions should be followed in reassembling and setting it.

All contacts should be periodically cleaned with a fine file. S#1002110 file is recom-

mended for this purpose. The use of abrasive material for cleaning contacts is not recommended, because of the danger of embedding small particles in the face of the soft silver and thus impairing the contact.

If it should be necessary to remove the balance arm, it should be replaced very carefully in its bearings, which should be adjusted to have a barely perceptible amount of end play. The position of the balance weights should be adjusted if necessary to obtain mechanical balance.

### RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable parts can be furnished to the customers who are equipped for doing repair work. When ordering parts, always give the complete name-plate data.

### ENERGY REQUIREMENTS

The burden of the type RF relay at 115 volts, 60 cycles, is 16 va at 29% P.F. lag. The burden at 25 cycles is 21 va at 33% P.F. lag.

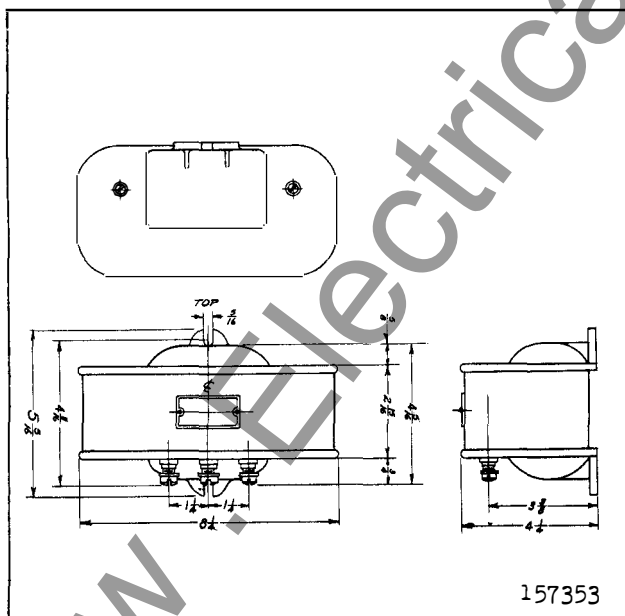


Fig. 2—Outline and Drilling Plan of the External Resistor Reactor Box. For Reference Only.

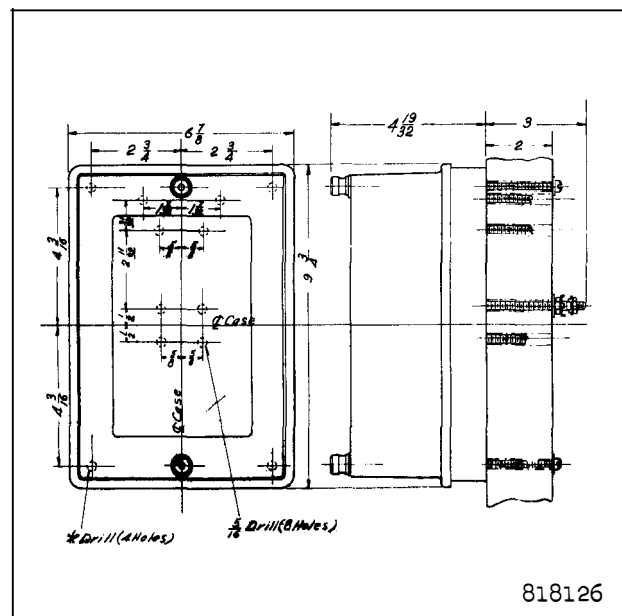


Fig. 3—Outline and Drilling Plan of the Type RF Relay. For Reference Only.

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