

# OPERATING INSTRUCTIONS

## MODEL 417

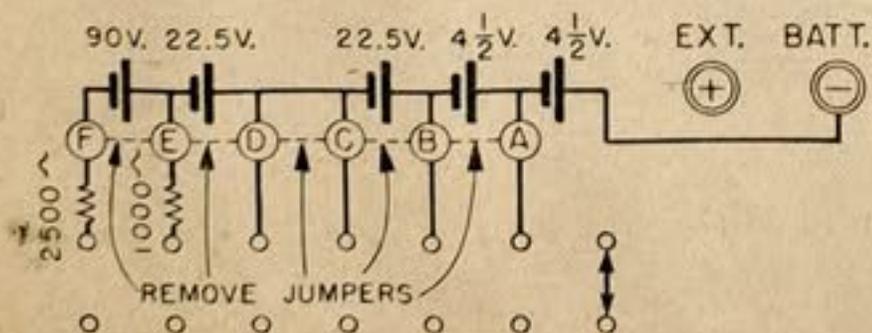
This bridge is intended for the accurate measurement of resistance in various values from a fraction of an ohm up to 10 megohms. The bridge may be operated with an internal battery or with an external battery. The galvanometer in the bridge may be used to indicate balance. Or, in cases where it is desirable to use a more sensitive galvanometer, this may be connected externally.

To operate the bridge with the internal battery and the internal galvanometer, set the battery and galvanometer switches to internal position. Check the condition of the battery by pressing the "Battery Test" push button and observing the indications on the "Good and Bad" scales of the galvanometer. If the galvanometer indicates in the Good section the battery is satisfactory for use.

To measure a resistance connect it to the binding posts marked "X". Set the selector switch and the decade switches to the approximate value of the resistance under test. If this is unknown set the selector switch to X1 or X10 position and set the "Thousands" decade to 5. Press the "Coarse" push button and observe the direction of the deflection of the galvanometer. (This push button should be depressed for only an instant and released immediately to avoid prolonged overload which may be caused by serious unbalanced conditions of the bridge.) Adjust the decade switches and the selector switch to higher or lower values as necessary to bring the bridge into balance. Balance is obtained when there is no indication on the galvanometer. When the bridge is nearly balanced as indicated by a slight deflection of the galvanometer the "Fine" push button can be used for final adjustment. (CAUTION—Neither Coarse nor Fine push button should be held down for more than an instant.)

An external galvanometer can be used by connecting it to the two binding posts marked "Galvanometer" and the switch above these binding posts moved to the "EXT" position. An external battery can be used by connecting it to the battery binding posts and moving the switch above these binding posts to the "EXT" position.

### ALTERNATE CONNECTIONS FOR BATTERIES



THE HICKOK ELECTRICAL INSTRUMENT CO.  
CLEVELAND, OHIO

Part No. 4490-11

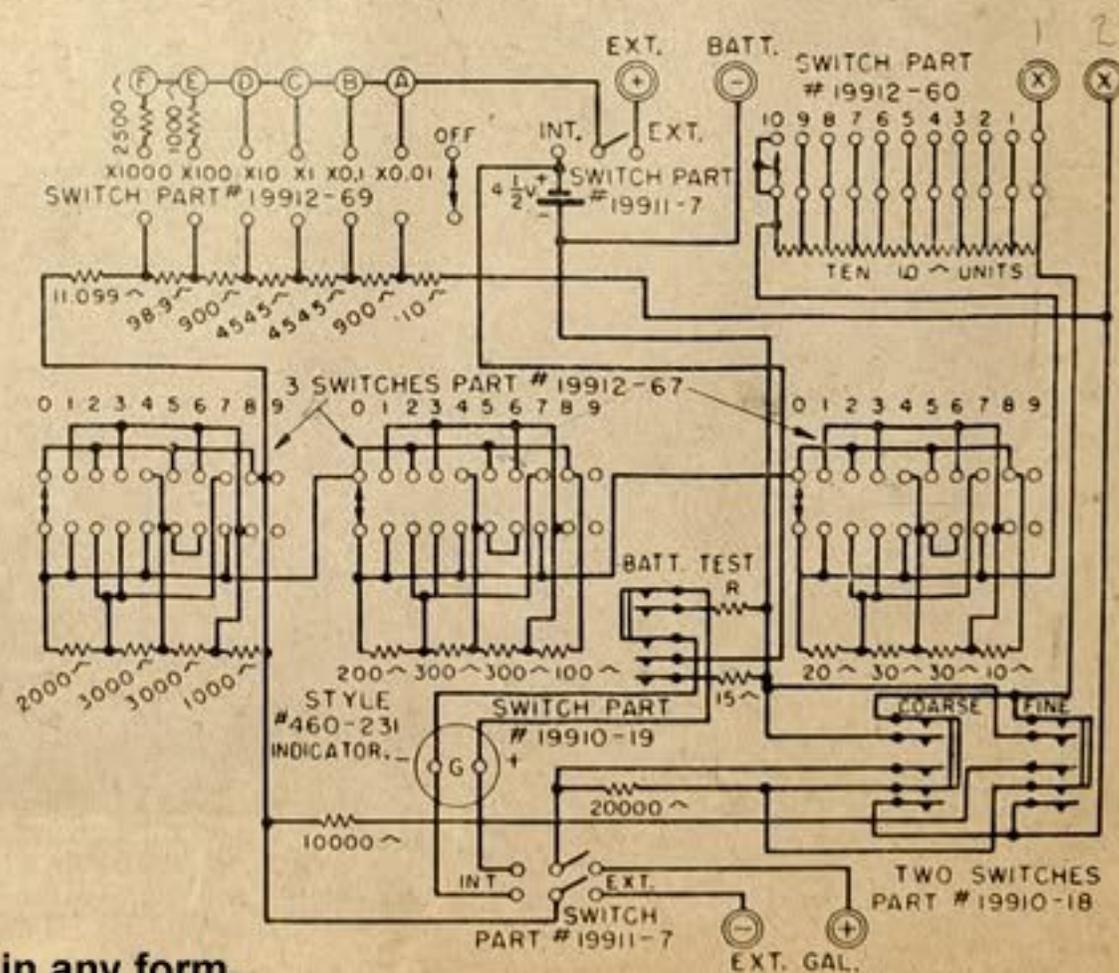
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**MAXIMUM BATTERY VOLTAGE:** The maximum voltage that can be used on any range of the selector switch is shown in the following table:—

X 0.01	4 1/2 volts
X 0.1	9 volts
X 1	45 volts
X 10	45 volts
X 100	67 1/2 volts
X 1000	135 volts

If voltage in excess of values listed above is used on any range, damage to the bridge may result. The diagram shows alternate connections for a semi-permanent installation of the batteries listed above. These connections may be used to avoid the necessity of changing the battery when switching from one selector position to another. The terminals A, B, C, D, E, and F, as well as the negative battery connection are located on the terminal strip inside the tester between the selector switch and galvanometer case.

To replace the internal battery, remove the battery cover plate and lift out the center cell. This will release the two end cells. The spring action of the contacts will push them into view where they can be lifted out. To replace the battery, drop in one cell and push it to one end. Drop in another cell and push into the other end. Spread these two apart and drop in the center cell. Replace the battery cover plate which holds the center cell in position. The cells should be installed with the cap ends toward the left.



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