

# CALCULATOR—

## For Distribution and Transmission Engineers

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Westinghouse Elec. & Mfg. Co.

**A mechanical calculator for determining the electrical power loss in single and three-phase distribution.**

**E**NGINEERS and electricians who are interested in electrical distribution and transmission problems will find this power-loss calculator of value.

Considerable time can be saved while making routine calculations for  $I^2R$  losses in single-phase and three-phase transmission circuits.

The calculator operation is based upon the fundamental relation:

$$W = I^2R$$

Where:

W = power in watts

I = current in amperes

R = resistance in ohms per 1000 ft. of wire.

Then for a single-phase circuit, the current is equal to the Kva divided by Kv, and the resistance of 1000 feet of circuit is equal to 2R.

The formula, which includes the effect of power-factor variations, for the power loss of 1000 feet of circuit is:

$$W = \left( \frac{Kva}{Kv} \right)^2 2R$$

To use the single-phase or three-phase loss calculator, set the number corresponding to the delivered line voltage and marked "voltage" opposite "load in Kva". The loss in watts per 1000 feet of circuit is given on the scale opposite the wire size. The scales are designed on the basis of copper conductor and stranded copper wire for sizes No. 2 or larger.

The calculator may be conveniently constructed from the circles printed on the right hand side of this page. To construct this calculator, cut out the circles to form two discs and two rings. Next, mount these discs on cardboard. Punch the center holes as indicated and hold the discs in place by means of a brass brad or bolt.

