to 50 on the "Horse Power" circle, and read the data in the window as follows:

Circuit Switch 400 amperes

Starting Fuse 250 amperes
Conduit 2 inch
R. C. Wire 000
Running Protection 156.5 amperes

Full Load Current 125 amperes
Note the HIGH-REACTANCE motors (which are thrown directly on the line) are classed the same as squirrel-cage motors with compensators. Note also that squirrel-cage-motors which are not of the high-reactance type require larger starting current when no compensator is used, therefore the arrow marked "SQUIRREL-CAGE WITHOUT COMPENSATOR" must be used for these motors.

NOTE that a 400 ampere switch is required for 440 volt motors above 50 horse-power, in California.

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T & T Fast Calculator

Simply set the movable disks to indicate the given data, and read the answer. All directions necessary will be found on the Calculator, but a few examples are given here to indicate the ease with which your problems may be solved with THE FAST CALCULATOR.

WIRE CALCULATOR

(Based on Resistance Drop Only)

CAUTION: Always check MINIMUM size R. C. wire required, by reference to the large table at the bottom of the front of the Calculator.

Example 1

Given: 110 volt single-phase system

9 amperes

22 feet to center of load

1% drop

Find size of wire.

SOLUTION: Set 9 amperes on large disk (by turning disk with finger in slot at top) to 110-volt single-phase on System Index, in large circular window; then turn small disk (by pressing thumbs against it) until 1 appears in the small round window (marked "Per Cent Drop"). Read the answer, No. 14 (on small disk) opposite 22 feet (on large scale marked "Feet One Way").

Example 2

Given: 110 volt single-phase system

    20 amperes

    120 feet to center of load

    3% drop

        Find size of wire.

SOLUTION: Set 20 amperes to 110 volt single-phase Index; then set Per Cent Drop to 3 (by turning small disk). Read the answer, No. 8, opposite 120 feet. Note that No. 8 is required for 120 feet even though the table shows that No. 12 has a safe carrying capacity of 20 amperes. With No. 12 the drop should be 7½%. Check this by setting No. 12 opposite 120 feet, and read 7½ in the Per Cent Drop Window.

Example 3

Given: 110 volt three-phase system

    34 amperes

    2% drop

    No. 8 wire

    How far can this circuit be run?

SOLUTION: Set 34 amperes to 110 volt 3-phase Index; then turn small disk until 2 appears in Per Cent Drop window; opposite No. 8 read the answer, 55 feet. (Note that it is as easy to make calculations for 3-phase circuits with THE FAST CALCULATOR as it is for the single-phase circuits.)

Example 4

Given: 220 volt single-phase system

    50 amperes

    No. 6 wire

    500 feet

        Find Per Cent Drop.

SOLUTION: Set 50 amperes to 220 volt single-phase Index; then turn small disk until No. 6 wire comes opposite 500 feet. Read the answer, 9½% drop, in the round window.

Example 5

Given: 220 volt three-phase system

    250,000 circular mil cable

    100 feet

    ¾% drop

    How many amperes may be carried?

SOLUTION: Set 250,000 circular mils to 100 feet (by turning small disk). Now turn LARGE disk until ¾ appears in Per Cent Drop window. Read the answer, 215 amperes at the 220 volt three-phase Index. Checking the table (at bottom of Calculator) we find that 250,000 circular mil R. C. cable has a safe carrying capacity of 250 amperes; so the number of amperes found (215) may be safely carried by the 250,000 circular mil R. C. cable.

THE SMALL TABLE (on front of Calculator) gives the constant for finding amperes (single-phase or 3-phase) for unity power-factor loads (such as heaters).

Example

Given:

    Six 2000 watt heaters to be supplied by a 2-wire (single-phase) 220 volt sub-feeder 230 feet long, with a drop of 3%.
        Find size of R. C. wire required.

SOLUTION: 6x2000=12,000 watts=12 KW. The table gives 4.54 as the constant for 220 volt single-phase, therefore the current will be 12x4.54=54.5 amperes. Set 54.5 amperes to the 220 volt single-phase System Index; then set 3% drop in the window. Opposite 230 feet, find No. 4 R. C. wire.

MOTOR CALCULATOR
(Motor Data Based on 1937 National Electrical Code)

The Fast Calculator gives the data necessary for 220 V. and 440 V. 3-phase motor circuits, by simply setting the proper arrow (for the kind of motor and method of starting) to the Horse-Power. Then turn the disk by pressing the thumbs against it.

Example A

For a 50 Horse Power 220 V., 3-phase HIGH REACTANCE motor, set the arrow marked "HIGH-REACTANCE" on the 220 V. disk