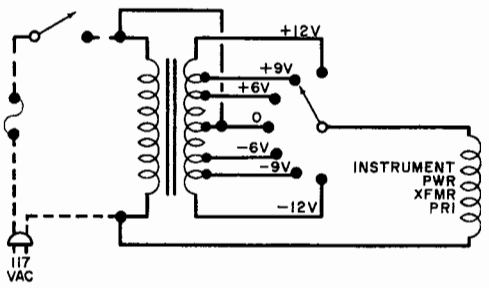
POWER-LINE BOOSTER/REDUCER

OFFSET VOLTAGE FLUCTUATIONS SIMPLY AND INEXPENSIVELY

BY FRANK H. TOOKER

POWER-LINE fluctuations are common occurrences these days. In some localities, periodic voltage increases can be observed. In other localities, especially in large urban areas where peak demand can exceed the power company's ability to supply, voltage reductions are a way of life. Whether they are increases or decreases, changes in the line voltage that is supplied to some test instruments can have adverse effects on the instruments' operation.

It is necessary, therefore, to supply any voltage-sensitive instruments on your workbench with a facility for offsetting power line fluctuations. To accomplish this, you can install a booster/reducer right in the equipment by connecting a transformer in the primary circuit of each instrument.



Instruments that are voltage-sensitive must be protected from power-line fluctuations. This circuit does it easily with only a transformer and rotary switch. Addition or subtraction of 12 volts is obtained in 3-volt increments taken from taps on transformer.

Ordinarily, a power-line booster/reducer requires several switches to provide the needed functions. This makes the setup shown in the schematic diagram especially interesting inasmuch as the boosting, reducing, and in/out functions are all accomplished by means of a single 7-position rotary switch. A multi-tap transformer, with three outputs on each side of the center-tap, makes the simplification possible.

With the switch set at its center position, the output voltage from the transformer into the instrument's power transformer primary is unchanged from that supplied by the ac line. However, when the switch is set to any other position, the system adds or subtracts the amount of voltage selected from the line-voltage level. By this means, a maximum addition and subtraction of 12 volts can be obtained in 3-volt increments, starting at 6 volts. Electrically, whether addition or subtraction takes place is a matter of phasing.

The Burstein-Applebee Co. Stock No. 13A-902 transformer, which can be purchased for $3.99 plus postage, is rated at 1 ampere. It is very well made, with the primary and secondary wound on a nylon bobbin. When selecting a rotary switch, get one with contacts rated at 1 ampere at 117 volts. If possible, choose a ceramic type over the phenolic type.

Most test instruments have more than enough space inside their cabinets to accommodate the extra transformer. If this is the case in your instrument, locate the booster/reducer transformer as close to both the instrument's power transformer and fuse assembly as possible.

Unless the front panel of the instrument is extremely crowded—and few are—the add-on rotary switch can be mounted in any convenient location on the panel. However, when mounting the switch, make absolutely certain that it does not interfere with the operation of other switches and controls nearby. Also, when wiring the switch to the booster/reducer transformer and the primary of the instrument's power transformer, use No. 18 stranded wire. If practical, use the heavy wire leads on the add-on transformer to connect it to the switch. Do not ground any part of the add-on assembly. ◈