DESCRIPTION

LONG SCALE 4½ INCH RECTANGULAR CLASS SWITCHBOARD INSTRUMENTS

General

I-T-E offers a line of switchboard instruments in the $4\frac{1}{2}$ inch rectangular class to be used on all assembled equipment as manufactured by the Switchgear Division.

These instruments are manufactured to I-T-E Standards and will perform to ASA Standard C39.1.

The I-T-E instruments incorporate the many advantages of longer scales combined with small size and are designed for flush mounting. Large easy to read numerals are printed on the dial. The pointer is of the tapered-spear type moving in the same plane as the raised rim of a platform type dial on which the scale graduations are marked, reducing risk of parallax error when taking readings. The dials are white with black markings. Each instrument is individually calibrated at marked frequency and the error at any part of the scale within the effective range does not exceed plus or minus 1% of maximum scale value.

Instrument Case

The case is of steel formed in the shape of a barrel, having a flange on the front end to which a molded transparent plastic cover is secured by four screws. A zero adjuster is fitted in the transparent plastic window where applicable. The rear end of the instrument is closed by a molded insulating base, to which the complete instrument movement assembly is secured. Gaskets between the insulating base and the case and also between the front cover and the case flange render the instrument dust and moisture proof. The case is finished in dull black enamel.

A-C Ammeter and Voltmeter - Pivotless (Moving-Iron)

The movement is of the pivotless (taut band) suspension repulsion type with the addition of attraction elements forming part of the magnetic screens.

These screens in addition to incorporating the attraction elements and providing magnetic shielding against interference from external magnetic fields, also increase the efficiency of the movement by reducing the ampere turns required in the winding to produce fullscale deflection.

Magnetic damping is provided by an aluminum disc working in the gap of a permanent magnet system mounted on the movement frame.

The moving-part assembly is suspended by metal strips held in tension by springs mounted on the top and bottom of the movement framework.

A-C Motor Ammeter - Pivotless
A-C Ammeter and Voltmeter - Expanded Scale - Pivotless

The motor ammeter is similar to the standard ammeter with the exception of a special scale which extends to a point at six(6) times the standard scale. The purpose is to give a more accurate reading of motor inrush currents.

The expanded scale ammeter and voltmeter is similar to the standard ammeter and voltmeter with the exception of an expansion of the scale in the low range for ammeters and the high range for voltmeters. This expansion gives a far greater reading accuracy at these ranges.

A-C Wattmeter and Varmeter - Jewel Bearing (Iron Core Dynamometer)

The magnetic system of each element is of the self-shielding type consisting of a laminated yoke, pole piece and core built up of heat treated low loss silicon iron stampings and the current coil which is wound on a molded plastic bobbin.

The yoke, pole piece and core together with the associated current coil are rigidly located

relative to each other by being riveted to a steel plate.

The magnetic system so constructed is mounted on a molded plastic base, together with the necessary impedors in the voltage circuits.

It is also resiliently mounted radially between the yoke and the inside of the circular barrel by means of a rubber grommet which fits over the outside of the yoke.

The moving-coil is formless and carried on brackets secured to the aluminum alloy shaft which also carries the pointer, balance arms, damping disc, etc.

Hardened and polished carbon steel pivots working in synthetic sapphire jewel bearings are provided.

The jewel bearings which are spring-mounted to protect the pivots from damage due to vibration and shock are adjustably mounted in the die-cast tinbase alloy frame which also carries the spring supports, the zero adjuster mechanism and the damping magnetic system.

Damping is effected by an aluminum disc mounted on the shaft of the movement and moving in the gap of a permanent magnet carried on the frame.

Power Factor Meter - Jewel Bearing (Moving-Iron)

The movement is of the movingiron type having radial iron vanes which are energized by axial magnetizing coils and operate in the field provided by radially mounted coils.

The coils are clamped rigidly to members which are attached to front and back supporting plates and the entire movement assembly is given resilience to shock in radial direction by a rubber grommet around the front supporting plate and other grommets around the pillars carrying the dial and crossbar.

The moving-iron vanes are mounted on an aluminum alloy shaft which also carries the pointer, balance system and damping disc and the assembly so formed possesses rotational freedom.

Adjustably mounted synthetic sapphire bearings are provided. These are spring mounted to protect the hardened and polished steel pivots from damage due to vibration and shock.

Synchroscope - Jewel Bearing (Moving-Iron)

The movement is of the movingiron type having radial iron vanes which are energized by axial magnetizing coils connected through a phase splitting device to the incoming supply and operate in the field provided by radially mounted coils connected to the running supply.

The coils are clamped rigidly to members which are attached to a supporting plate and the entire movement assembly is given resilience to shock in radial direction by a rubber grommet around the front supporting plate.

The moving-iron vanes are mounted on an aluminum alloy shaft which also carries the pointer, balance system and damping disc.

Adjustably mounted synthetic sapphire bearings are provided. These are spring mounted to protect the hardened and polished steel pivots from damage due to vibration and shock.

Frequency Meter - Pivotless (D-C Moving-Coil Movement)

The frequency meter consists of a side zero DC movement basically like the DC voltmeter described below, but connected to frequency sensitive bridge network. This network consists of resistors, condensers, inductances and half-wave rectifiers to give the unidirectional output necessary to operate the instrument. The network is balanced so that no current flows through the instrument at the lower frequency indicated on the dial. If the applied frequency is greater a unidirectional current, which is proportional to the difference, passes in a positive direction, and the pointer takes up a position to indicate the frequency.

D-C Ammeter and Voltmeter - Pivotless (Moving-Coil)

The magnetic system is of the self-shielding type consisting of a yoke, pole piece, core and two anisotropic magnets.

The yoke, pole piece and core are of cadmium-plated mild steel, and are rigidly located by being riveted between aluminum alloy plates which also hold in position the magnets which are located in slots in the yoke.

The magnetic system so constructed is resiliently mounted axially by means of rubber bushings between it and the molded plastic base.

The moving-coil is wound on an aluminum form and is carried on brackets secured to an insulated fabricated shaft which also carries the pointer, balance arms, etc. The above assembly is suspended by metal strips held intension by springs mounted on cross bars which are attached to the magnet system assembly.

The top spring incorporates a zero adjusting mechanism.

Wattmeter - Pivotless (Transducer)

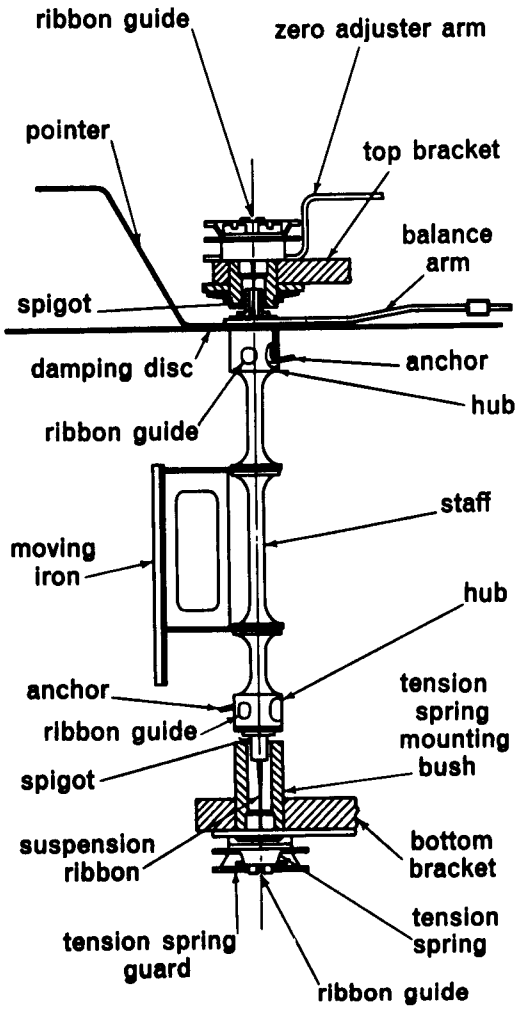
The introduction of the transducer for use with instruments has greatly simplified the use of wattmeters for switchboard applications. By placing the transducer within the switchboard cubicle, only two wires are required from the transducer to the door-mounted instrument. The instrument itself is a standard pivotless d-c voltmeter scaled in watts.

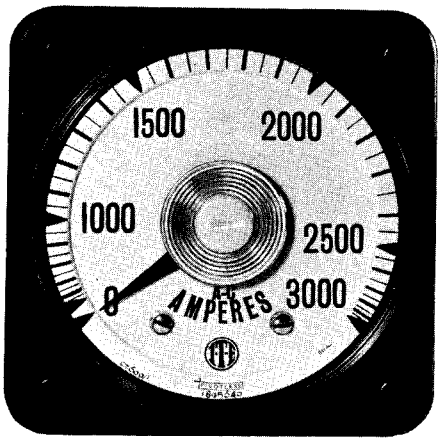
The jewel bearing wattmeters with their long and heavy movements and their 3 or 4 spiral control springs are much more cumbersome than the simple trouble-free pivotless voltmeter movement.

In addition, the transducer pattern can be supplied for almost any value of power factor as compared to the unity power factor requirement of the jewel bearing type.

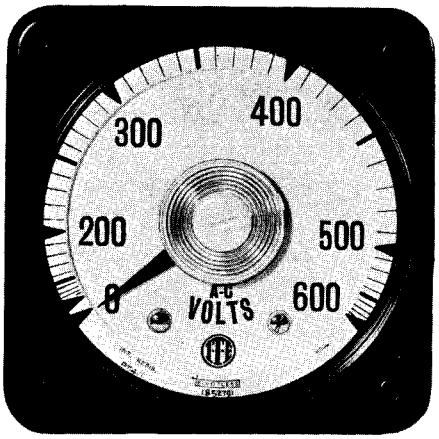
It is also possible to connect more then one instrument to each transducer box.

Pivotless

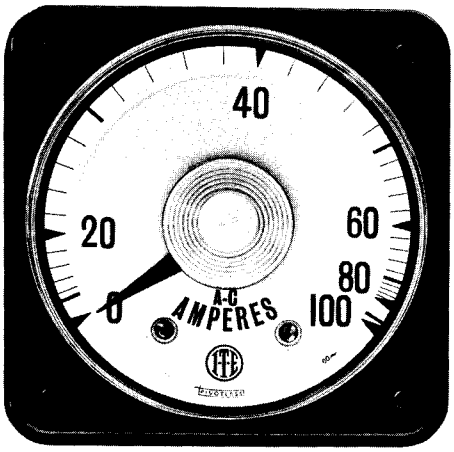




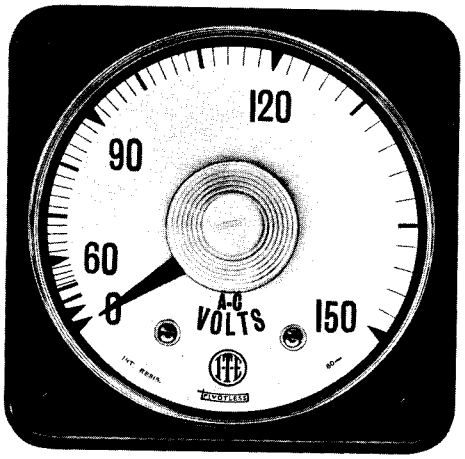
A-C AMMETER 44471
PIVOTLESS



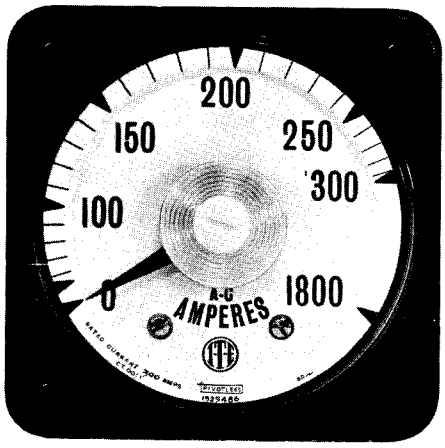
A-C VOLTMETER 44468
PIVOTLESS



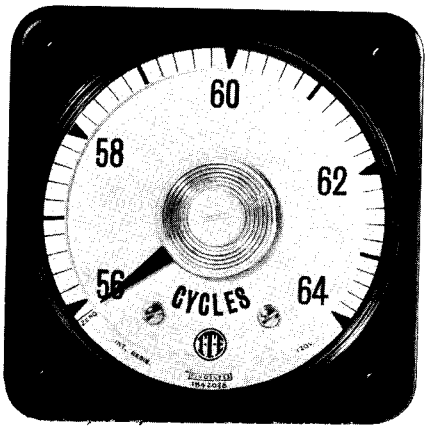
A-C AMMETER - EXPANDED SCALE 45205
PIVOTLESS



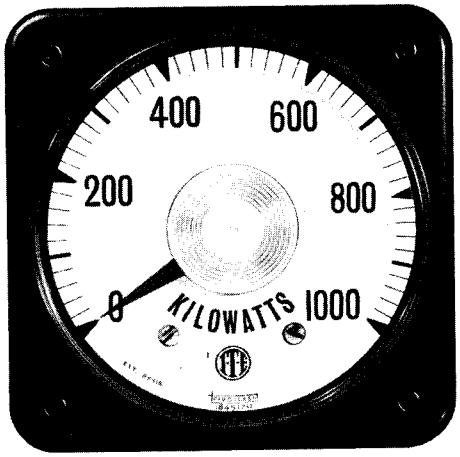
A-C VOLTMETER - EXPANDED SCALE 45206
PIVOTLESS



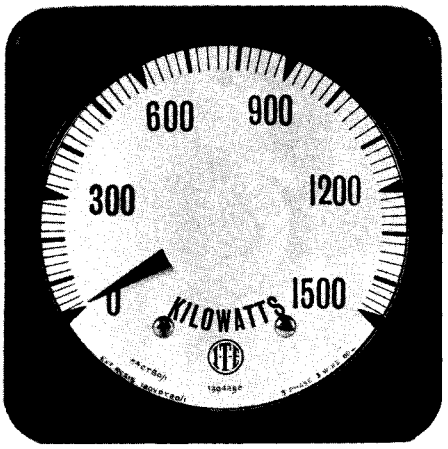
A-C MOTOR AMMETER 44842
PIVOTLESS



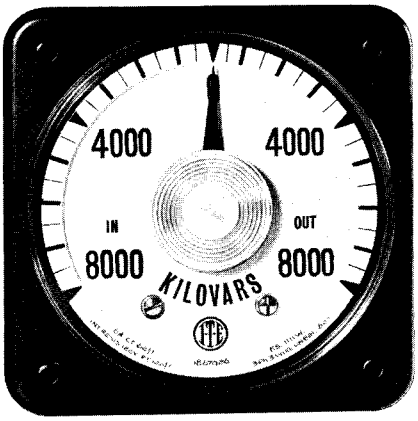
FREQUENCY METER
PIVOTLESS



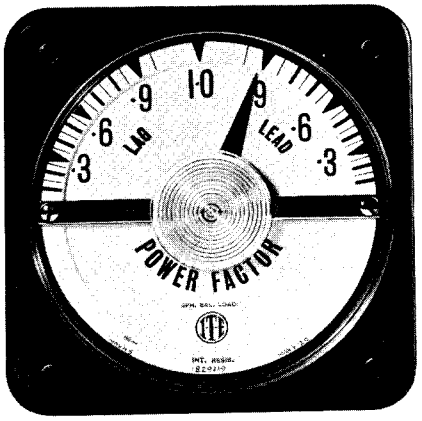
WATTMETER 44682
PIVOTLESS (TRANSDUCER)



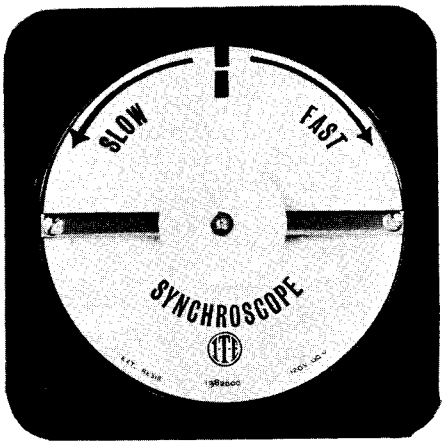
WATTMETER 32764
JEWEL BEARING



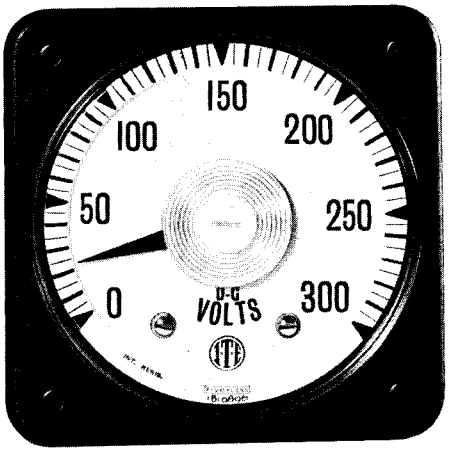
VARMETER 44474
JEWEL BEARING



POWER FACTOR METER 44472
JEWEL BEARINGS



SYNCHROSCOPE A-31829
JEWEL BEARINGS



D-C VOLTMETER 44469
PIVOTLESS