GEH-764AB
Supersedes GEH-764AA

INSTRUCTIONS

Polyphase Switchboard Watthour Meters

TYPES DS-19, DSW-19, DSM-19, DS-20, DSW-20
DSM-20, DS-34, DSW-34, DSM-34, DS-35
DSW-35, DSM-35, DS-38, DSW-38, DSM-38
DS-39, DSW-39, DSM-39, DS-40, DSM-40
DSW-40, DS-41, DSW-41, DSM-41, DS-43
DSW-43, DSM-43, DS-44, DSW-44, DSM-44

GENERAL ELECTRIC

TYPES COVERED

TWO-ELEMENT CONSTRUCTION

DS-19, DSW-19, DSM-19 (Surface Mounting)

DS-34, DSW-34, DSM-34 (Semiflush Mounting)

DS-38, DSW-38, DSM-38 (Drawout, Semiflush Mounting)

DS-40, DSW-40, DSM-40 (Drawout, Surface Mounting)

DS-43, DSW-43, DSM-43 (Drawout, Semiflush or Surface Mounting)

THREE-ELEMENT CONSTRUCTION

DS-20, DSW-20, DSM-20 (Surface Mounting)

DS-35, DSW-35, DSM-35 (Semiflush Mounting)

DS-39, DSW-39, DSM-39 (Drawout, Semiflush Mounting)

DS-41, DSW-41, DSM-41 (Drawout, Surface Mounting)

DS-44, DSW-44, DSM-44 (Drawout, Semiflush or Surface Mounting)

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

POLYPHASE

SWITCHBOARD WATTHOUR METERS

The Types DS-19, DS-34, DS-38, DS-40, and DS-43 meters are back-connected, switchboard, two-stator, polyphase meters. The DS-20, DS-35, DS-39, DS-41, and DS-44 are the corresponding three-stator meters.

The above meters can be furnished self-contained in current capacities of 5 and 10 amperes and for voltages up to 600 volts. Transformer-rated meters can be furnished for use with both current and potential transformers or with current transformers only.

The meters are called Types DSW-19, DSW-34, DSW-38, DSW-40, DSW-43, and DSW-20, DSW-35, DSW-39, DSW-41, and DSW-44 when they are equipped with contact device terminals and 2-wire or 3-wire contact devices. Separate instructions covering the contact devices accompany such meters.

The meters are known as Types DSM-19, DSM-34, DSM-38, DSM-40, DSM-43, and DSM-20, DSM-35, DSM-39, DSM-41, and DSM-44 watthour demand meters when they are equipped with demand meter registers. Separate instructions covering the register and containing supplementary diagrams and dimensions accompany these watthour demand meters.

INSTALLATION

The DS-19 and DS-20 polyphase watthour meters are designed for surface mounting and are equipped with two studs for this purpose at the top center and bottom center of the case.

The DS-34 and DS-35 meters are the corresponding polyphase watthour meters available for semiflush mounting. The meter is mounted through the panel with the flange against the front of the panel. Holes in the flange will accomodate mounting bolts or screws 3/16 in. in diameter. No other support is necessary.

The DS-38, DS-39, DS-40, and DS-41 meters are similar to the DS-34, DS-35, DS-19, and DS-20 respectively, but provide the additional advantage of a drawout construction. The case for these meters may be mounted and wired permanently before the meter unit is placed in the case. The meter unit is then installed by aligning it with the guides in the case and sliding into place. The connecting plug is next inserted completing the electric circuits through the meter and locking the latch on the cradle. The cover is drawn to the case by four thumb-screws, holding the connecting plug in place.

The DS-43 meter is the latest model drawout switchboard two-stator, polyphase meter. It supersedes the DS-38 and DS-40 meters, and is so designed that it may be used either for surface or semi-flush mounting. The DS-44 meter is the corresponding three-stator meter replacing the DS-39 and DS-41 meters and is also designed for use either for surface or semiflush mounting. Screws for semiflush mounting are inserted from the back of the panel into threaded bosses on the mounting flange. Screws and bosses are hidden by the cover. An assortment of hardware providing for any type of mounting (semiflush, surface, metal or insulating panel), and either type of connection (threaded stud with nuts and flat washers or washer head screw with prong washer) accompanies each meter.

The proper dimension sketch given in this book should be followed for switchboard drilling. The meters have jewel bearings which may be injured by rough handling; consequently all wiring and hammering should be done on the switchboard before the meters are installed.

The meters have removable studs and are shipped with the studs removed.

Before placing the meter in service, remove the shipping device and make sure that the meter is perfectly clean and in good operating condition.

The meters are tested before shipment and only require connecting and sealing before being placed in operation.

SEALING

The cover is held in position by sealing screws, four on the drawout cases and two on all other meters. The screws have knurled heads to permit tightening with the fingers and are slotted to take all standard types of sealing devices. When assembling the cover on the meter, make sure that the edges enter the

recess in the meter base properly. The sealing screws should not be tightened any more than necessary to produce a slight compression of the felt gasket in the recess in the meter base.

CONNECTIONS

The connection diagrams in this book show approved methods of wiring the apparatus. Other methods are possible which are electrically equivalent and which for particular installations may result in more convenient or economical wiring. If properly connected in the circuit, the disk will rotate counterclockwise, viewed from above.

Connections for the DSM and DSW type meters are identical to those for the DS type meters except for the register motor connections for the DSM and the contact device terminal connections for the DSW line of meters.

The current terminals are identified by the letter C, the potential terminals by the letter P and the contact device terminals by the letters K, Y, and Z. These three terminals and studs are furnished whether the meter has 2-wire or 3-wire contact devices. For 2-wire contact devices only K and Z are connected, while for 3-wire contact devices all three are used. Letters identifying the terminals are stamped on the base.

It is frequently desirable to use transformers in circuits of over 150 volts. The cases of meters which are used with current and potential transformers should be connected to the grounded side of the secondary circuit of such transformers. For this purpose No. 12 Awg copper wire is suitable.

At the earth end of the wire the usual precautions employed in connection with lightning arresters should be followed.

POLARITY MARKINGS

Instrument transformers have polarity markings of white paint or markers, H_1 for primary and X_1 for secondary, on or near one primary and one secondary terminal. These markings denote the relative polarity and facilitate making proper connections for correct direction of rotation of watthour meters. The relation of the marked leads is such that the instantaneous direction of the current in them is the same; namely, toward the transformer in the marked primary lead and from the transformer in the marked secondary lead, or vice versa. These polarity markings are indicated in the connection diagrams and should be followed irrespective of their physical location on the transformers.

POTENTIAL INDICATING LAMPS

Meters are furnished with potential circuit indicating lamps and have special potential coils with an auxiliary winding connected to these lamps as illustrated in Fig. 14.

METERS FOR USE WITH CURRENT TRANSFORMERS

In order to utilize effectively the accuracy of these meters, 2.5-ampere meters are used with instrument current transformers. The current coils have double the normal turns of the standard 5-ampere meter. The torque is therefore double, and affords the advantages inherent in such high-torque characteristics and with practically no sacrifice in accuracy throughout the working range.

Under no conditions should the current circuits of a transformer-rated meter be opened without first short-circuiting the secondary winding of the current transformer. This may be done either at the transformer terminals or the meter current terminals. Removal of the connection plug in drawout type meters automatically short-circuits the current terminals so that the meter unit can safely be removed from the case.

CALIBRATING ADJUSTMENTS

The letters S and F and the arrows on the retarding magnets denote the proper direction to turn all adjusting screws for calibrating the meter.

Full Load

Full-load adjustment is accomplished by movable permanent magnets.

The two magnets in the two-stator meter and the three magnets of the three-stator meter may be placed in an approximately correct position and clamped.

A change in the position of any magnet affects all stators alike. Moving the magnet in will increase the speed of the meter, while conversely, moving the magnet out will decrease the speed of the meter. When the proper adjustment has been obtained, the magnet should be clamped securely to its support by means of the clamping screw.

To facilitate the clamping of the magnets, hexagonal head screws are provided which are easily turned with a wrench. *Do not use special open-end wrenches for this purpose. They are not strong enough.*

Light Load

The brackets supporting the lag and light load plates are attached to the frame. The one for the upper stator is located just under the disk and the one for the lower stator, and the middle and lower in three-stator meters, is just over the disk.

The light-load adjustment is made by turning the adjusting screw located at the extreme right of the bracket. Turning the screw counterclockwise increases the speed of the meter and clockwise decreases it. The screw at the extreme left of the bracket should not be disturbed.

The effect of light-load adjustment varies inversely with the load. For example, a 5 per cent change at 1/10 full-load current changes the calibration at full-load current approximately 0.5 per cent.

INDUCTIVE LOAD (WATTHOUR STATORS)

The inductive-load adjustment is made by turning the screw located to the left of the light load adjusting screw. Turning the screw counterclockwise increases the speed of the meter and clockwise decreases it.

If the lag plate is moved, full and light load should be checked.

Meters furnished for 25- and 30-cycle service sometimes are provided with an adjustable compensating coil. The purpose of this coil is to give additional range of adjustment for calibrating the meter at inductive loads.

The two ends of the figure-eight compensating coil are extended beyond the meter stator and are connected by an adjustable slider soldered in position. The wires are covered with insulation tubing and both slider and wires are protected by an outer sleeving. These adjustable ends of the coils are located along the edge of the back side of the meter frame.

These meters are adjusted in the factory so that the front screw adjustment for inductive loads provides a range sufficient for most conditions of operation. Should it be necessary to change this range, its limits can be raised or lowered by means of the adjustable compensating coil. The procedure is outlined below:

1. Remove the outer sleeving and inner insulation tubing, unsolder the sliding connector and move it to the desired position.

Move the connector away from the stator to increase the speed of the meter and toward the stator to decrease it.

2. Resolder the connector carefully in its new position.

Allow the connector and wires to cool to room temperature before checking the meter, so its calibration will not be affected by the increased resistance of the coil due to heating.

3. When the connector has been set in its final position, reinsulate the wires with the proper tubing and replace the outer protective sleeving. Care should be taken to locate the butt joints in the tubing so they are not opposite each other or a section of bare wire.

Adjustments Between Stators

Equalizing the torque of the stators may be accomplished from the front of the meters and without disturbing any of the parts.

The meter stators are balanced at the factory, but if it is necessary to make any change loosen the lock nut, turn the adjusting screws an equal amount in the same direction, then tighten the lock nut. Turning clockwise decreases and counterclockwise increases the torque of the stator.

READING THE METER REGISTER

The meter register is of the dial type and is normally furnished with a register ratio so that it reads in primary kilowatt-hours.

On meters measuring a large amount of power and equipped with a "primary-reading" register a dial-face multiplier is printed below the dials.

For a "secondary-reading" register the actual reading must be multiplied by a constant which is the ratio of primary energy to secondary energy, that is, usually the product of the current and potential transformer ratios of the instrument transformers used with the meter.

Facing the meter, one revolution of the extreme right pointer equals 10 kilowatt-hours; one revolution of the second, 100 kilowatt-hours, etc., except in the case of meters which have a dial-face multiplier.

One division of a circle, it will be seen, corresponds to one tenth of the total amount indicated by one complete revolution of the pointer.

In deciding upon the reading of a pointer, the pointer before it (to the right) must be consulted. Unless the pointer has reached or passed the "0" or, in other words, completed a revolution, the other has not completed the division on which it may appear to rest. For this reason ease and rapidity are gained by read-

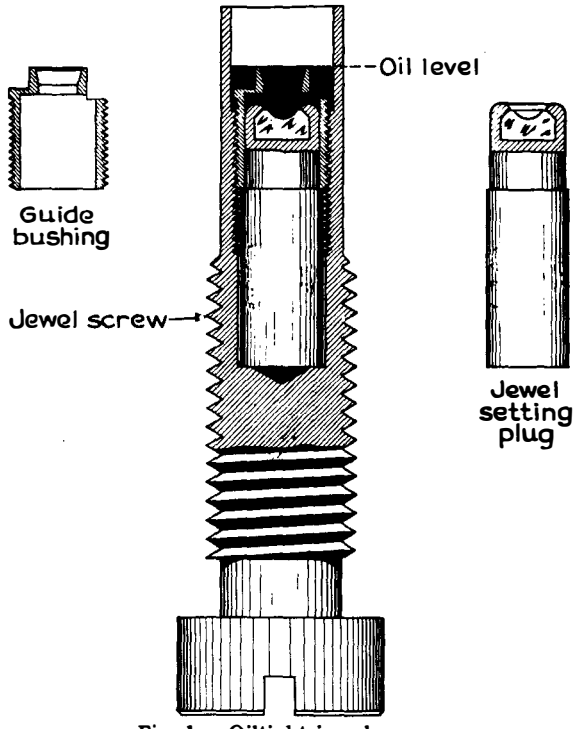


Fig. 1. Oiltight jewel screw

ing the meter register from right to left.

The test constant marked on the nameplate or disk is for use only in calibrating and checking the meter and must not be used in connection with the register reading.

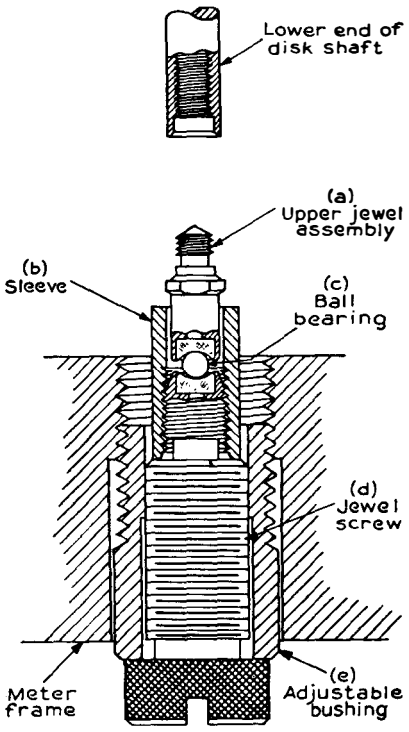


Fig. 2. Open-type ball bearing

MAINTENANCE

Bearings

The lower bearing may be one of two forms as follows:

a. The oiltight jewel-pivot bearing.

b. The open-type ball bearing.

The oiltight jewel-pivot bearing, Fig. 1, consists of a jewel assembled within an adjustable bushing at the bottom of the meter frame, and a pivot which is screwed into the lower end of the disk shaft.

The open-type ball bearing consists of a ball held between an upper and lower jewel and protected with a sleeve as shown in Fig. 2.

The upper bearing consists of a guide pin mounted in an adjustable top-bearing plug and a guide bushing set into the tip of the disk shaft.

1. Lubrication of Oiltight Jewel-pivot Bearing

All jewels shipped from the factory in meters are properly lubricated. Since meters may be stored for indefinite periods before use and since the length of time between tests is increasing, it is recommended that all jewels be examined for proper oil level before the meter is placed in service and that General Electric Watthour Meter Jewel Oil be added, if required, to raise it to the level indicated in Fig. 1. It is not always necessary to disassemble the jewel screw for a second oiling, as there is little chance for the oil in the reservoir to be lost.

Jewels shipped separately as supplies are not oiled at the factory and must therefore be oiled before they are installed in meters.

The following directions for initial oiling of the Oiltight Jewel Screw are given with reference to Fig. 1:

a. Remove the guide bushing by means of the combination jewel-and-pivot wrench.

b. Invert the screw and allow the jewel-setting plug to drop out. If the plug does not drop out readily, gently tap the head of the screw.

c. By means of a wire-loop oil applicator, put two drops of G-E Watthour Meter Jewel Oil in the reservoir of the jewel screw. Allow a short time for the oil to run to the bottom of the reservoir. It is necessary that this reservoir under the jewel plug be filled.

d. Drop the jewel plug in the screw.

e. Replace the guide bushing and screw it down tightly.

f. Put in another drop of oil which will run down through the oil slot of the guide bushing into the jewel cup.

g. Inspect the oil level, which should be as shown in Fig. 1. Because of minor variations in mechanical dimensions of the reservoir or variation in size of the drops obtained from the wire loop, three drops of oil cannot always be taken as the correct amount. If more is needed to fill to the right level, it should be added.

The pivots require no lubrication other than that obtained from properly oiled jewel screws.

The top-bearing assembly should require no attention during the normal life of the meter.

2. Replacement of Oiltight Jewel-pivot Bearing

At each test period the jewel screw should be removed, inspected for oil level, and re-oiled with G-E Wattthour Meter Jewel Oil if necessary.

If a meter requires a new lower bearing, both the pivot and jewel should be changed. Pivots are injured by operation in badly worn or damaged jewels.

The following procedure is recommended for replacement of a pivot and jewel:

a. Loosen the top-bearing clamping screw so that the bearing plug is free to move.

b. Remove the jewel screw from its adjustable bushing. Do not disturb the setting of this

bushing since it is adjusted at the factory to provide proper clearance of the meter disk in the magnet GAP when the jewel screw is screwed completely into it.

c. Insert the pivot-wrench end of a combination jewel-and-pivot wrench through the jewel-screw hole. Engage the pivot and unscrew.

d. Replace with a new pivot.

e. Disassemble the jewel screw, replace the jewel-setting plug with a new one, reassemble and re-oil according to instructions given previously.

f. Assemble the repaired jewel screw, or a new one, screwing it into the adjustable bushing as far as it will go.

g. Should the disk need adjusting for proper clearance in the retarding magnet gap, this may be accomplished by loosening the clamping screw of the guide bushing and moving the guide bushing and jewel-screw assembly up or down as desired.

h. Reset the top bearing by pushing the disk of the moving element up against the top of the retarding magnet gap and the electrical stator gap, and then tightening the top bearing clamping screw. This gives the proper setting for the top bearing, and it is recommended that this be followed.

3. Lubrication of Open-type Ball Bearing

It is recommended that no lubrication be used with this type of meter bearing.

4. Replacement of Open-type Ball Bearing

If the meter requires a new jewel, the following procedure, with reference to Fig. 2, is recommended for replacement of an open-type ball bearing.

a. Loosen the top bearing clamping screw so that the bearing plug is free to move.

b. Remove the jewel screw from its adjustable bushing. Do not disturb the setting of this bushing since it is adjusted at the factory to provide proper clearance of the meter disk in the magnet gap when the jewel screw is screwed completely into it.

c. Insert the special jewel-assembly wrench, Cat. No. 4131823, through the jewel-screw hole. Engage the upper jewel assembly and unscrew.

d. Replace upper jewel assembly.

e. Replace lower jewel assembly with a new assembly and ball. Check to insure that sleeve (b) is tight on the jewel screw (d).

f. Carefully screw the lower jewel screw into the adjustable guide bushing (e) in the watthour meter frame, as far as it will go.

g. Should the disk need adjusting for proper clearance in the retarding magnet gap, this may be accomplished by loosening the clamping screw of the guide bushing and moving the guide bushing and jewel-screw assembly up or down as desired.

h. The top bearing should then be reset by pushing the disk of the moving element up against the top of the retarding magnet gap and the electrical driving stator gap, and tightening the top bearing clamping screw. This gives the proper setting for the top bearing, and it is recommended that this be followed.

Register

The register dial face may be cleaned by the use of a cloth moistened slightly in water.

When replacing a register, carefully inspect the mesh of its wormwheel with the worm on the disk shaft to see that it is approximately 1/3 to 1/2 the length of tooth of the register wormwheel. If not, a means for its adjustment is provided in the eccentric adjusting screw in the bracket on the back of the register. Avoid meshing too deeply, which might cause friction and effect the accuracy of the meter.

The use of oil on the bearings of watthour meter registers is not recommended.

Refer to separate Instructions for proper care of the demand registers used on Types DSM-19, -20, -34, -35, -38 to -41 incl., -43, and -44 meters.

Stators

In case a potential or current coil is damaged the entire stator should be replaced.

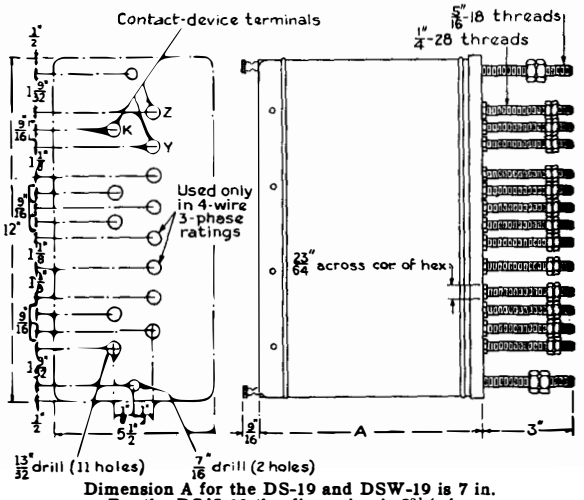
TEST CONSTANT

The watthour constant, or the watthours per revolution of the meter disk, is marked on the nameplate or disk. In the case of transformer-rated meters, the K_h is the over-all constant for the meter with its transformers. The "Test K" on the nameplate, however, is the watthour constant to be used when testing the meter without its transformers.

TESTING

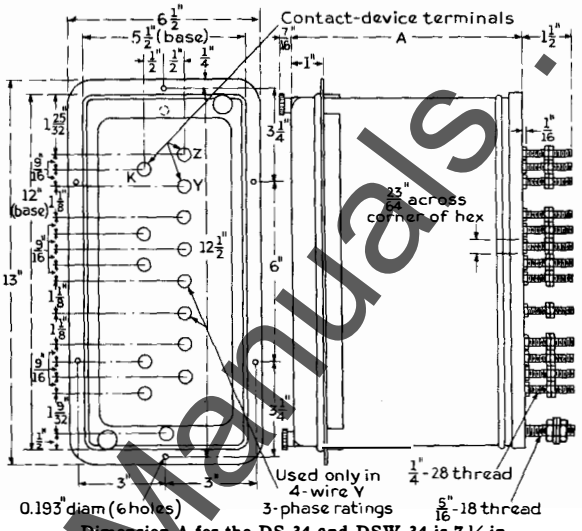
All electric central station companies should be equipped for periodic meter calibration. One method of making such tests is by the use of a reliable timing device and indicating instruments. Although there is no question regarding the accuracy of this method, the portable watthour-meter standards manufactured by the General Electric Company provide a means for testing more quickly, yet accurately and independently of load variations. Instructions for testing watthour meters accompany each portable standard. Copies may also be obtained on application to the General Electric Company.

OUTLINE AND MOUNTING DIMENSIONS



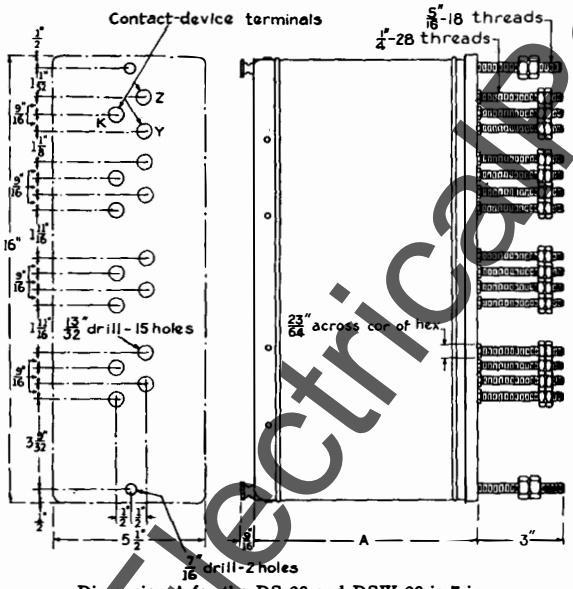
Dimension A for the DS-19 and DSW-19 is 7 in.
For the DSM-19 the dimension is 8 21/32 in.

Fig. 3. Dimensions and front-view drilling plan for Types DS-19, DSW-19, and DSM-19 See notes 1, 2 and 3 below



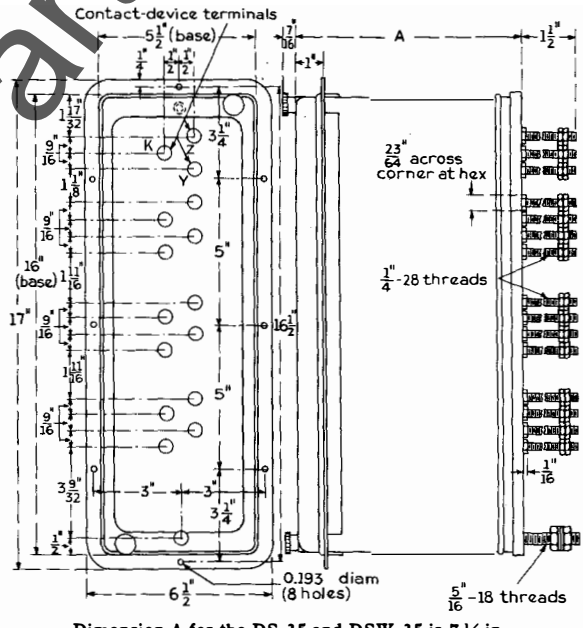
Dimension A for the DS-34 and DSW-34 is 7 1/8 in.
For the DSM-34 the dimension is 8 11/16 in.

Fig. 4. Dimensions for Types DS-34, DSW-34, and DSM-34 See notes 2 and 3 below



Dimension A for the DS-20 and DSW-20 is 7 in.
For the DSM-20 the dimension is 8 21/32 in.

Fig. 5. Dimensions and front-view drilling plan for Types DS-20, DSW-20, and DSM-20 See notes 1, 2 and 3 below



Dimension A for the DS-35 and DSW-35 is 7 1/8 in.
For the DSM-35 the dimension is 8 11/16 in.

Fig. 6. Dimensions for Types DS-35, DSW-35, and DSM-35 See notes 2 and 3 below

NOTES: 1. When Types DS-19, DS-20, etc. meters are mounted on steel panels, using insulating bushings and washers, drill 5/8 in. clearance holes for all studs, except the two mounting studs.

2. Contact-device terminals K, Y, and Z are furnished for Types DSW-19, -20, -34, and -35 only. For 25-cycle ratings of Types DSM-19, -20, -34, and -35 above 280 volts (Y voltage for DSM-20 and -35) two extra terminals K and Z are furnished.

3. For Types DSM-19, -20, -34, and -35 the dimensions do not show the reset device on the front of the cover, which protrudes out 1/2 in. or 3/4 in., depending on the type of demand register.

OUTLINE AND MOUNTING DIMENSIONS

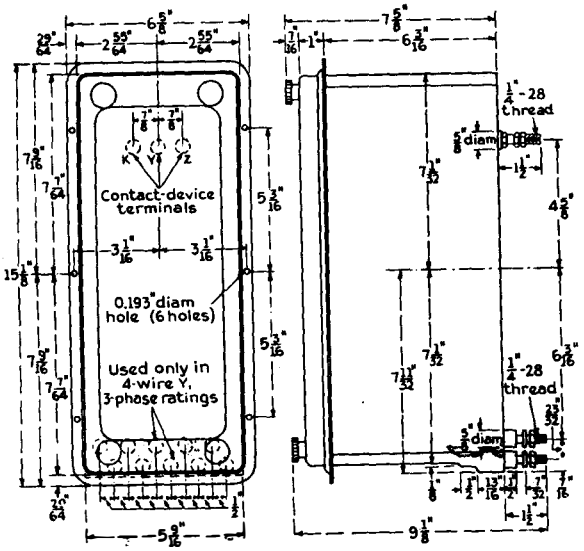


Fig. 7. Dimensions for Types DS-38, DSW-38, and DSM-38
See notes 2 and 3 below

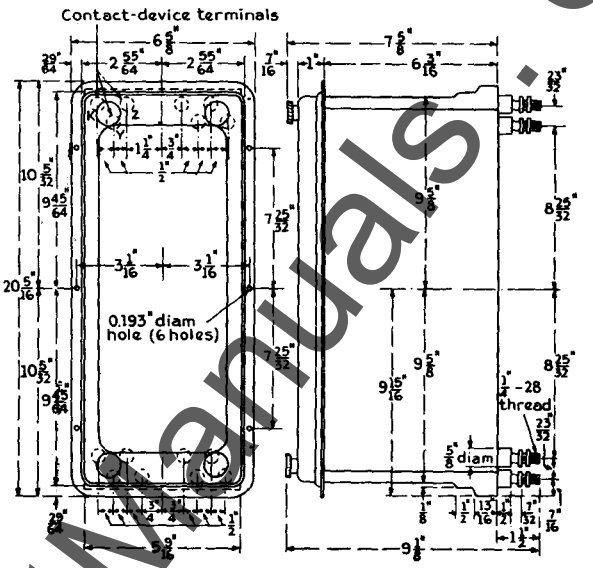


Fig. 8. Dimensions for Types DS-39, DSW-39, and DSM-39
See notes 2 and 3 below

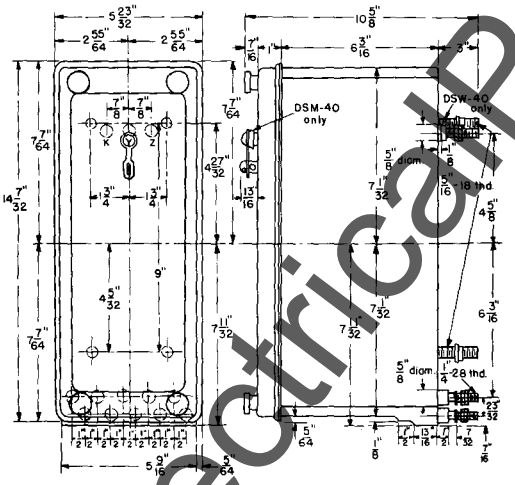


Fig. 9. Dimensions for Types DS-40, DSW-40, and DSM-40
See notes 1, 2 and 3 below

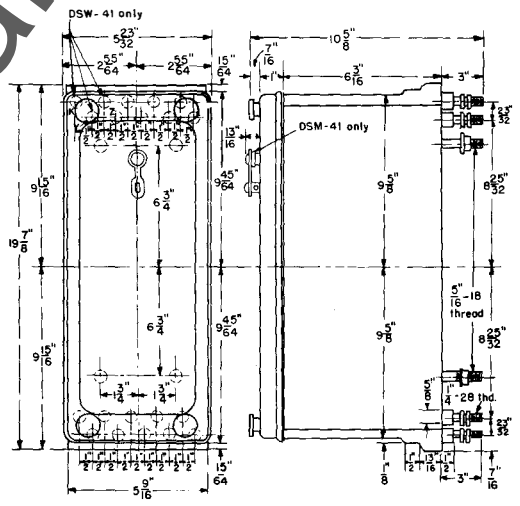


Fig. 10. Dimensions for Types DS-41, DSW-41, and DSM-41
See notes 1, 2 and 3 below

NOTES: 1. When Types DS-40, DS-41, etc., meters are mounted on steel panels, using insulating bushings and washers, drill 11/16 in. clearance holes for all stud *Textolite projection whether or not studs are used at that location. Drill 21/64 in. clearance holes for the four mounting studs.

2. Contact-device terminals K, Y, and Z are furnished for Types DSW-38, -39, -40, and -41 only. For 25-cycle ratings of Types DSM-38, -39, -40, and -41 above 280 volts (Y voltage for DSM-39 and -41) two extra terminals K and Z are furnished.

3. For Types DSM-38, and -39, the dimensions do not show the reset device on the front of the cover, which protrudes out ½ in. or ¾ in., depending on the type of demand register.

* Reg. U.S. Pat. Off.

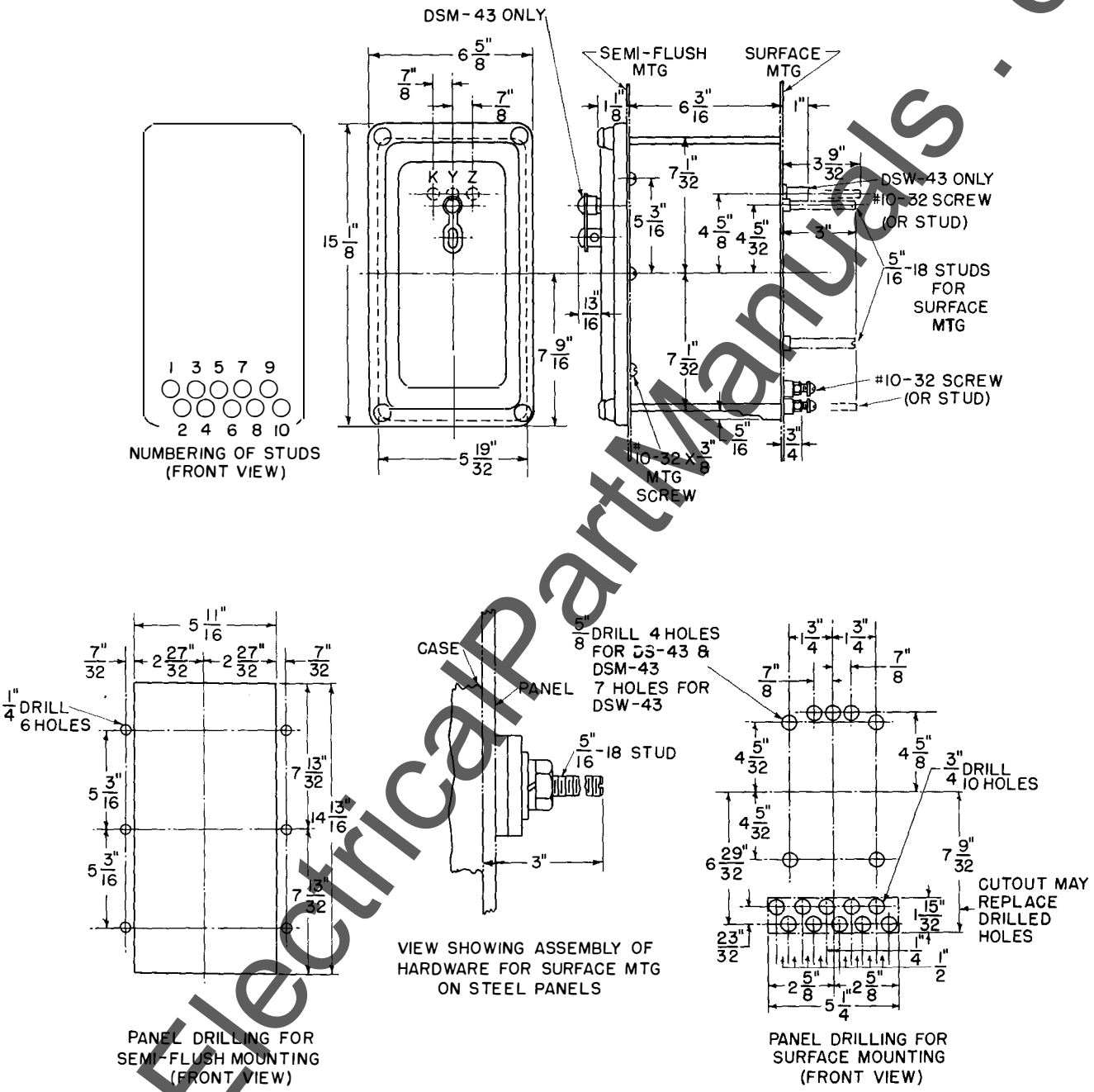


Fig. 11. Dimensions for Types DS-43, DSW-43, and DSM-43

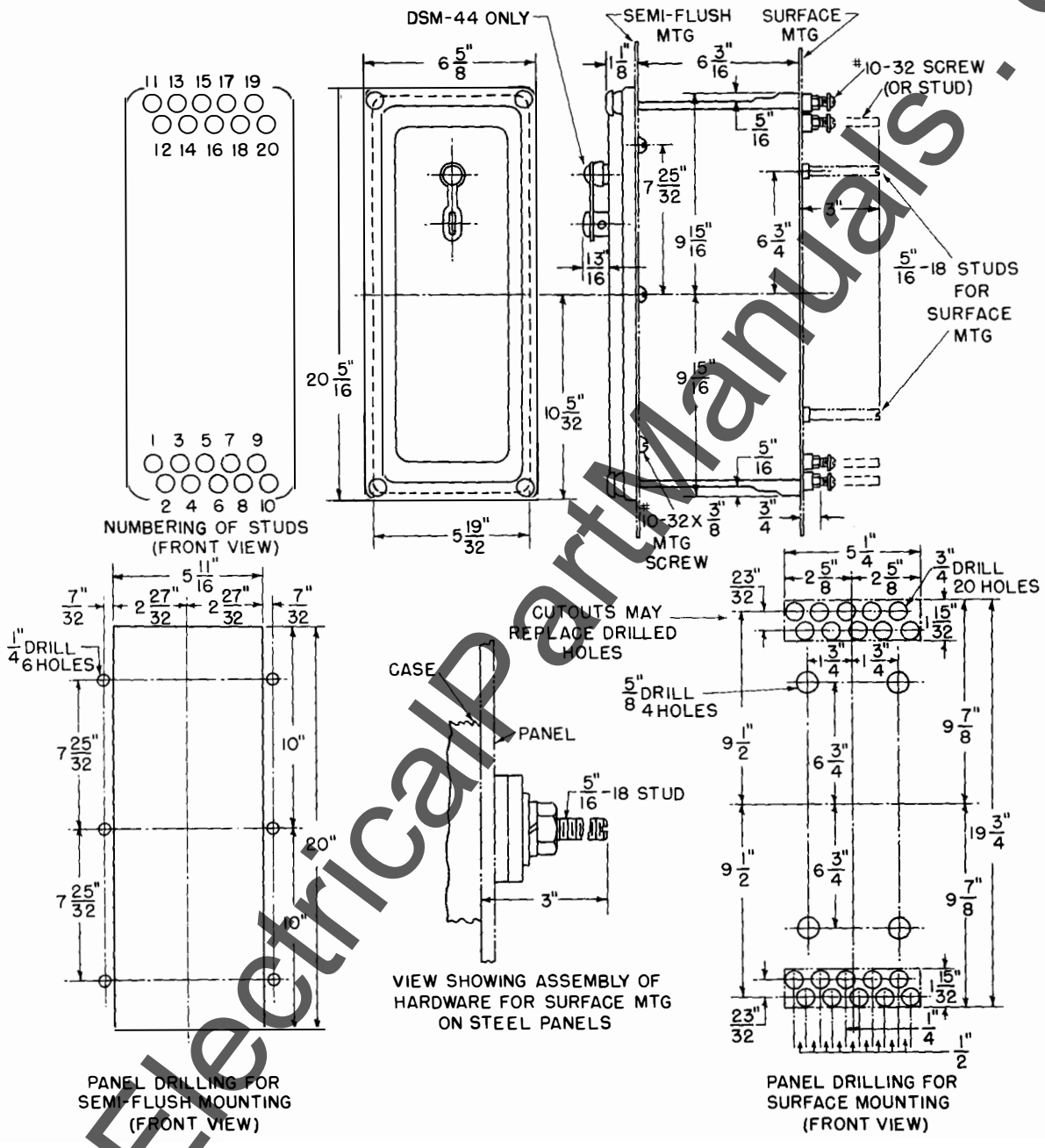
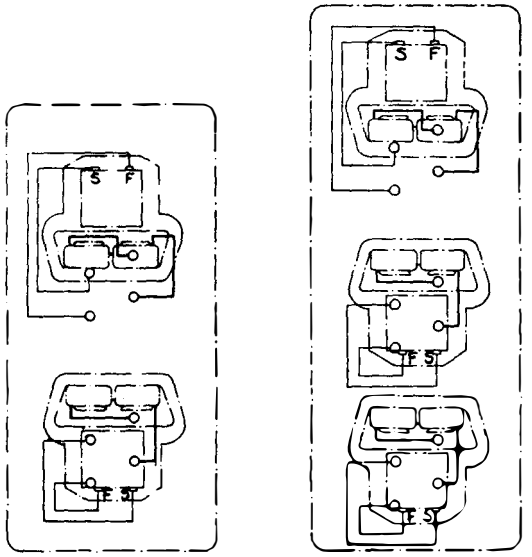


Fig. 12. Dimensions for Types DS-44, DSW-44, and DSM-44

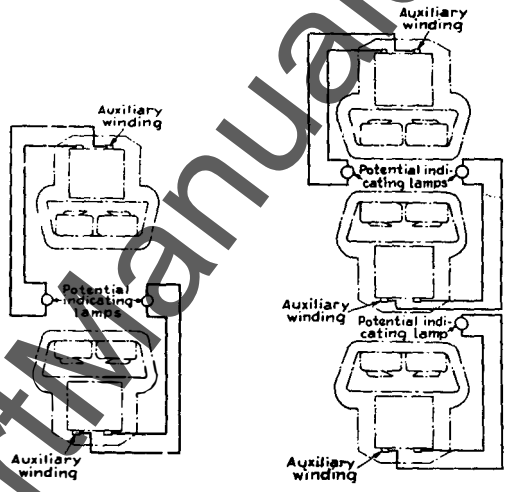
SCHEMATIC CONNECTION DIAGRAMS



(a) Types DS-19 and DS-34, 3-wire, 2- and 3-phase, and 4-wire, 2-phase

(b) Types DS-20 and DS-35, 4-wire, 3-phase

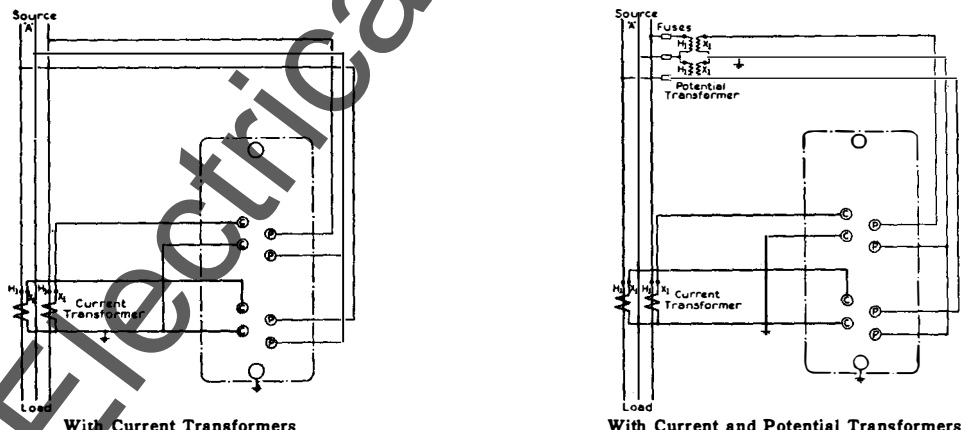
Fig. 13. Internal connections (front views)



(a) Types DS-19, DS-34, DS-38, and DS-40

(b) Types DS-20, DS-35, DS-39, and DS-41

Fig. 14. Showing connections of open potential circuit indicating lamps to auxiliary potential windings (front views)



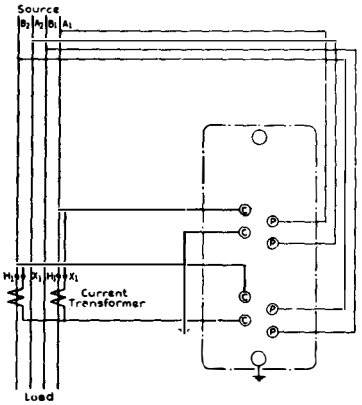
With Current Transformers

With Current and Potential Transformers

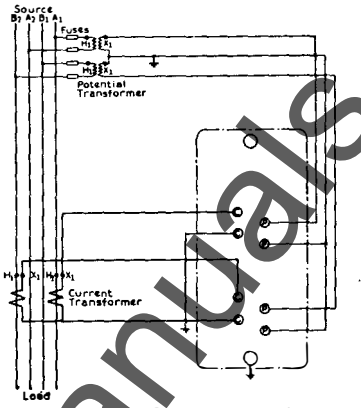
NOTE: For 3-wire, 2-phase circuits, wire "A" should be the common return. For 3-wire single-phase circuits, wire "A" should be the neutral.

Fig. 15. Connections for Types DS-19 and DS-34, 3-wire, single-, 2-, or 3-phase (back views)

SCHEMATIC CONNECTION DIAGRAMS

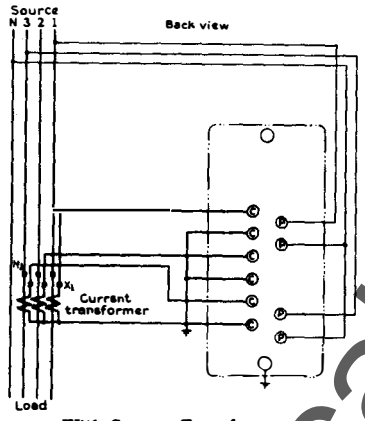


With Current Transformers

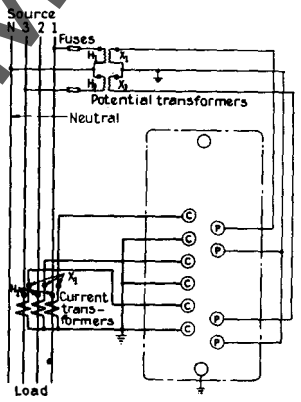


With Current and Potential Transformers

Fig. 16. Connections for Types DS-19 and DS-34, 4-wire, 2-phase (back views)

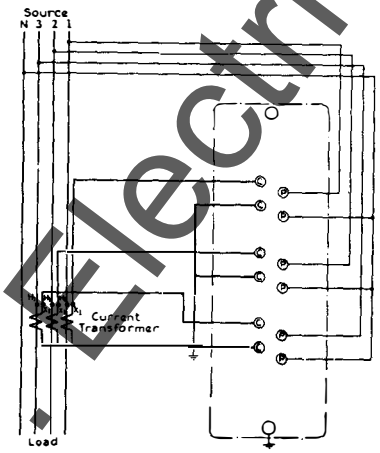


With Current Transformers

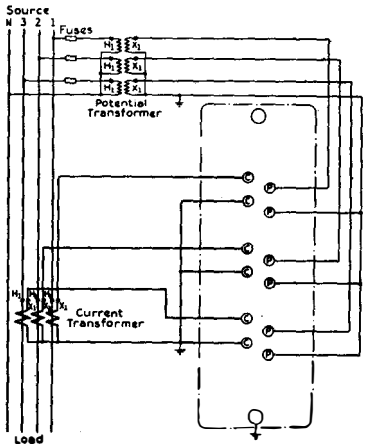


With Current and Potential Transformers

Fig. 17. Connections for Types DS-19 and DS-34 for 4-wire Y, 3-phase circuits (back views)



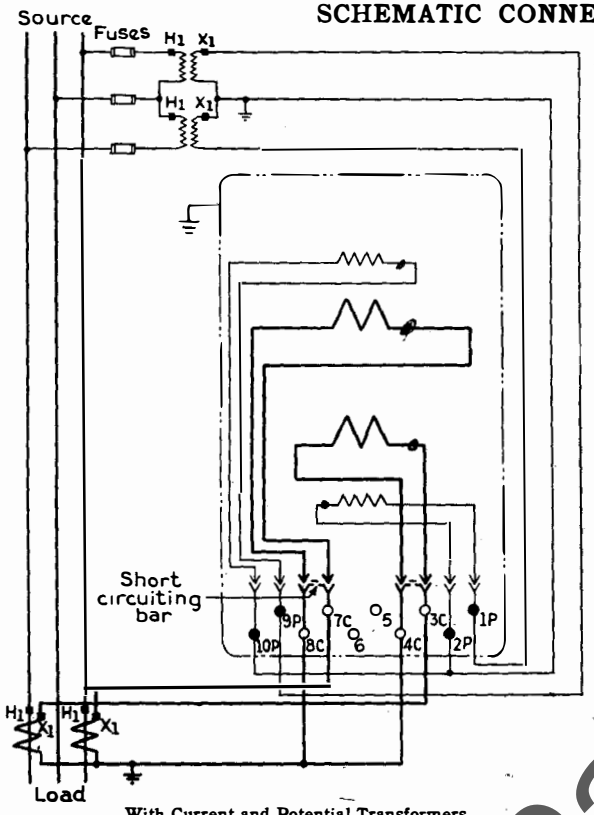
With Current Transformers



With Current and Potential Transformers

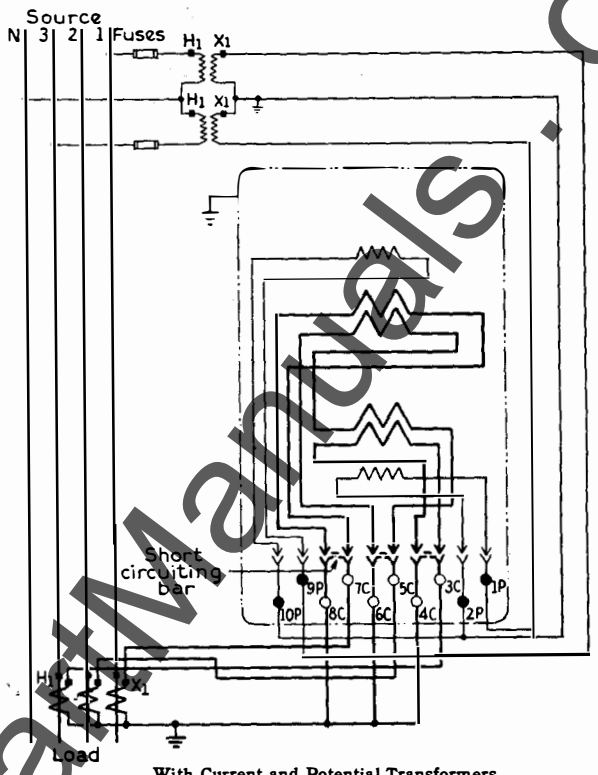
Fig. 18. Connections for Types DS-20 and DS-35, 4-wire Y, 3-phase (back views)

SCHEMATIC CONNECTION DIAGRAMS



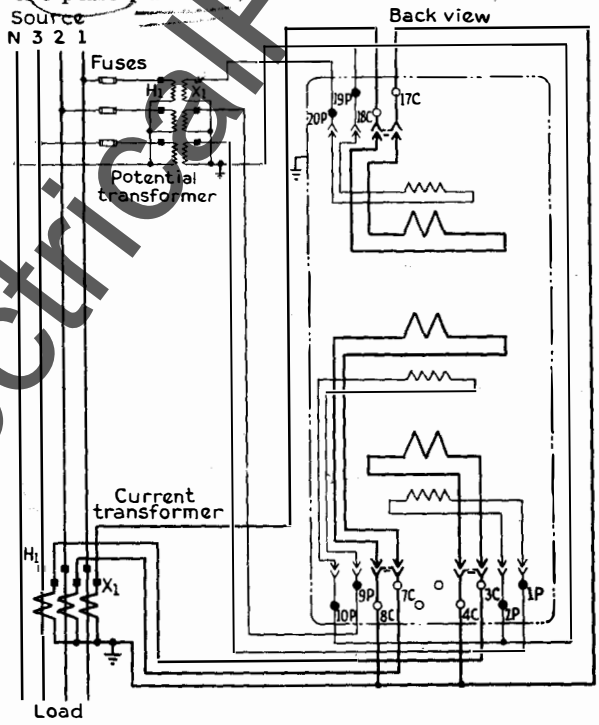
With Current and Potential Transformers

Fig. 19. Connections for Types DS-38, DS-40, and DS-43 3-wire, single-, 2- or 3-phase (back view)



With Current and Potential Transformers

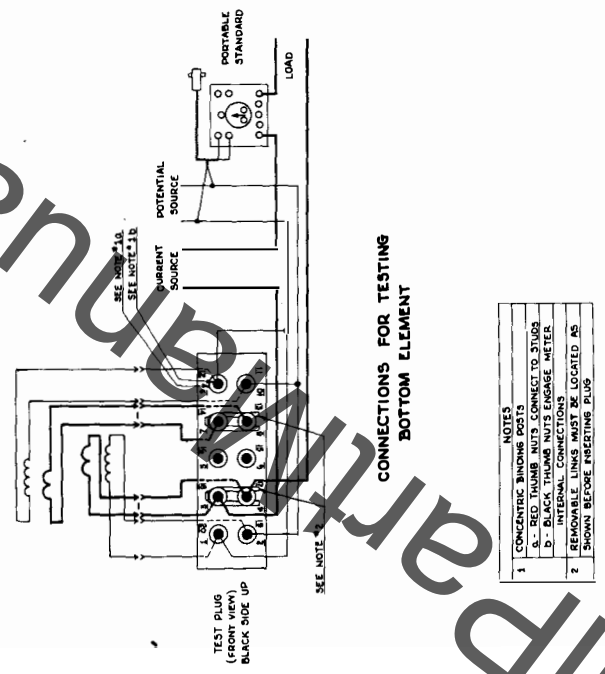
Fig. 20. Connections for Types DS-38, DS-40, and DS-43 4-wire Y, 3-phase (back view)

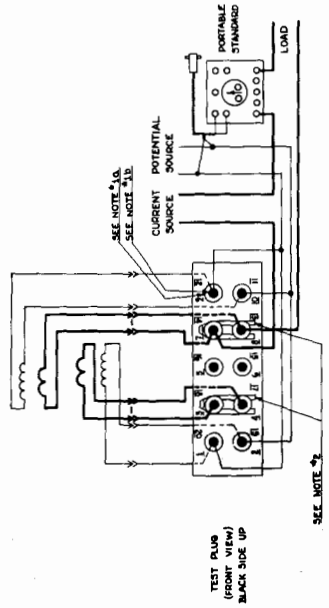


With Current and Potential Transformers

Fig. 21. Connections for Types DS-39, DS-41, and DS-44 4-wire Y, 3-phase (back view)

FIELD TESTING CONNECTION DIAGRAMS





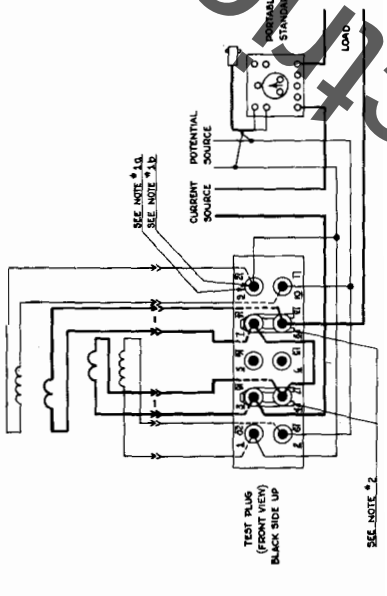
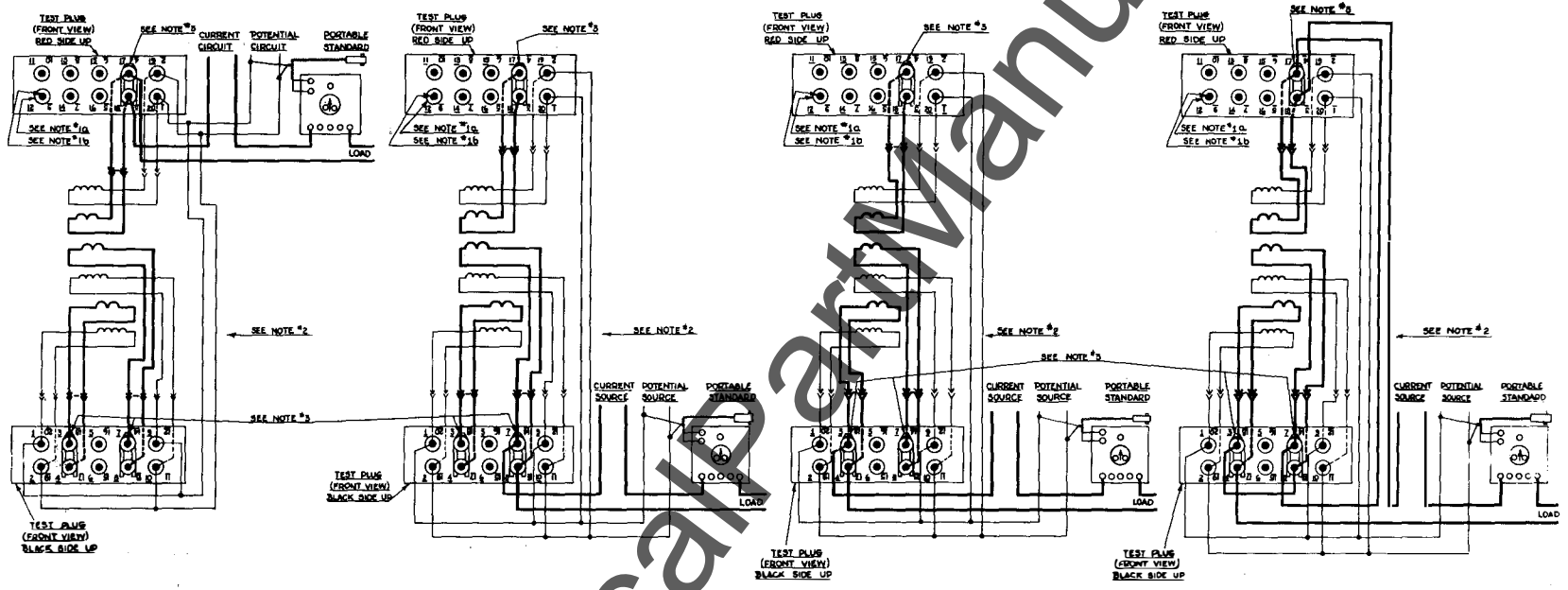


Fig. 22 Field testing connections for Types DS-38, DS-40, and DS-43 using test plug model 12XLA12A1



CONNECTIONS FOR TESTING TOP ELEMENT (FRONT VIEW)

CONNECTIONS FOR TESTING MIDDLE ELEMENT (FRONT VIEW)

CONNECTIONS FOR TESTING BOTTOM ELEMENT (FRONT VIEW)

CONNECTIONS FOR TESTING THREE ELEMENTS WITH POTENTIAL COILS IN MULTIPLE AND CURRENT COILS IN SERIES (FRONT VIEW)

	NOTES
1	CONCENTRIC BINDING POSTS
	a - RED THUMB NUTS CONNECT TO STUDS
	b - BLACK THUMB NUTS ENGAGE METER INTERNAL CONNECTIONS
2	TWO TEST PLUGS MUST BE USED FOR TESTING THE THREE ELEMENT METER TO ISOLATE METER ELEMENTS
3	SHORT CIRCUITING LINK MUST BE LOCATED AS SHOWN BEFORE INSERTING PLUG.

Fig. 23 Field testing connections for Types DS-39, DS-41, and DS-44 using test plug model 12XLA12A1