General Data

ON

Thomson Watthour Meters

General Electric Company
Schenectady, N. Y.

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THOMSON WATTHOUR METERS

The information and instructions given in this book are general in character and may be modified by special information which may accompany meters when shipped.

FINISH OF THOMSON WATTHOUR METERS

The finish of Thomson watthour meters is designated at the factory by numbers.

Finish No. 1. Prominent parts finished in buffed brass.
" No. 2. Prominent parts finished in buffed nickel.
" No. 3. Cover and base black japan.
" No. 4. Prominent parts oxidized.
" No. 5. Prominent parts finished in dull black marine.

Switchboard watthour meters both alternating current and direct current are, unless otherwise specified, finished in dull black marine.

House type watthour meters are always finished in black japan.

ORDERING THOMSON WATTHOUR METERS

DIRECT CURRENT METERS

In ordering direct current meters the following data is required: type and catalogue number, complete rating in amperes and volts (quoting normal operating voltage), nature of circuit (whether two- or three-wire).

ALTERNATING CURRENT METERS

In ordering alternating current meters, in addition to the above information, specify the frequency and nature of the circuit upon which meters are to be used, i.e. whether single-phase, two-phase three-wire, three-phase three-wire, two-phase four-wire or three-phase four-wire.

If three-phase four-wire state both the normal delta and Y voltages of the circuit.

If meters are to be used with transformers in the customer's possession the primary and secondary windings as well as the ratio should be specified. If the transformers are to operate other devices these should be specified so that it may be determined whether the meters will operate satisfactorily on such a combination.

If a customer orders meters for use with transformers of other than General Electric manufacture the meters will be calibrated in accordance with their specified ratios assuming a straight line-calibration curve.

In no instance should meters be operated from the secondaries of power transformers instead of potential transformers. Standard General Electric current transformers have a five ampere secondary winding and potential transformers a 110 volt secondary winding. The meters used with transformers are therefore wound for 5 amperes, 110 volts.

PREPAYMENT WATTHOUR METERS

In ordering prepayment watthour meters in addition to information applying in general to the class of meter desired, the rate of charge per kilowatt-hour for which the meters are to be adapted should also be specified.

ORDERING OF PARTS

Parts for obsolete as well as modern meters may be secured from the factory at any time.

When ordering parts, the factory is greatly assisted if, in addition to the full rating, the serial number of the meter for which parts are desired is quoted.

Correct material can always be sent if samples are forwarded with order, although, in most cases, samples are not required.

Where catalogue numbers have been assigned to meter parts, they should be specified when ordering.

CALIBRATING VOLTAGES AND NAME PLATE STAMPING

Meters for both secondary and primary circuits will be calibrated and stamped in accordance with the following tabulation.

Meters which are received at the factory for repairs or recalibration will be returned with their original name plate marking.

Meters which are received at the factory for converting into another capacity must of necessity have their name plates changed. In such cases the tabulation as noted on page 5 will be followed.

Prior to April 1, 1912, the range of voltage was from 100 to 120, 200 to 240 instead of 106 to 120 and 212 to 240 and all data can be used upon the previous range.

Volts Ordered	Ampere Capacity	Calibration Voltage	Volts Stamped
50/55	All	55	50/55
106/110	3/600 inc.	110	106/110
106/110	Above 600	110	110
111/115	3/600 inc.	115	111/115
111/115	Above 600	As ordered	As ordered
116/120	3/600 inc.	120	116/120
116/120	Above 600	As ordered	As ordered
121/130	3/600 inc.	130	121/130
121/130	Above 600	As ordered	As ordered
212/220	3/600 inc.	220	212/220
212/220	Above 600	220	220
221/230	3/600 inc.	230	221/230
221/230	Above 600	As ordered	As ordered
231/240	3/600 inc.	240	231/240
231/240	Above 600	As ordered	As ordered
400/440	3/600 inc.	440	400/440
400/440	Above 600	As ordered	As ordered
441/480	3/600 inc.	480	441/480
441/480	Above 600	As ordered	As ordered
500/550	3/600 inc.	525	500/550
500/550	Above 600	550	550
551/600	3/600 inc.	575	551/600
551/600	Above 600	As ordered	As ordered
1000/1100	All	110	1000/1100
1150	All	115	1150
2000/2200	All	110	2000/2200
2300	All	115	2300
3300	All	110	3300
5500	All	110	5500
6600	All	110	6600
11000	All	110	11000
13200	All	110	13200

NOTE:—This does not include portable test meters. These are calibrated and marked as ordered.

JEWELS AND PIVOTS

As in the past, the General Electric Company continues to use only the highest grade of selected Eastern sapphires, and diamonds. Each jewel is subjected to a rigid inspection, binocular microscopes being employed. Stones which do not conform to requirements are rejected. It is obvious that the percentage of rejections is large since it is difficult to secure even at exorbitant prices stones entirely free from flaws.

The most skilled workmen are engaged to cut, polish and set the jewels, methods being employed which are known only to the General Electric Company and which were perfected only at considerable expense and after years of careful research.

A method has been perfected for cupping diamond as well as sapphire jewels which eliminates the necessity of the ring-stone end-stone jewel.

Cupped diamond jewels are furnished in all direct current meters of 50 kw. capacity and over, sapphire jewels being furnished in direct current meters under this capacity and in all induction meters.

It is needless to state that the life of a diamond jewel is considerably longer than that of a sapphire. For this reason some of the larger operating companies have adopted the use of diamond jewels in all direct current meters. The expense of diamond jewels is inappreciable when compared to the increased revenue received from continued accuracy upon the lighter loads.

Jewels which during service have worn slightly may be returned to the factory for recupping and repolishing. Badly worn jewels will not permit of this and are rejected.

All jewels repolished by the General Electric Company are taken from their settings. Any attempt to repolish them without doing this is not permissible since it is impossible to insure the elimination of the polishing powder.

Pivots for Thomson watthour meters are made of the highest grade of steel wire drawn and hardened expressly to conform to the General Electric Company's requirements.

The fine pivot points are forced into a brass plug one end of which is threaded to engage into the end of the meter shaft. The end of the pivot is then stoned and highly polished.

Notwithstanding the rigid requirements which are exacted upon the manufacturers of the wire, an analysis of the wire is made from time to time to determine the proportion of its constituents.

Owing to the possibility of pivot points becoming charged with fine particles of sapphire which cannot be readily removed, pivots should never be repolished.

REPLACING JEWELS AND PIVOTS

When inserting a new jewel, it may be found necessary to raise or lower the moving element of the meter due to a slight variation in the tension of the jewel spring. This is readily effected by first tightening the jewel in its bushing sufficiently to permit of the jewel and bushing being moved as a unit. Next, loosen the hexagonal check nut. The desired adjustment can then be made by turning the jewel screw up or down, its bushing moving with it. This applies to all Thomson watthour meters excepting such Type I-10 as have no lower jewel bushing. In this case it is only necessary to loosen the check nut and back out the jewel. In replacing it care must be taken to see that the disk is left in the same position in the air gap as when found.

To insert a new pivot, remove the jewel screw, insert the pivot wrench and remove the old pivot. Place the new pivot in the end of the pivot wrench

and screw into the shaft. During this operation, it is well to either wedge the disk firmly or hold it by pressing near the hub with the index and middle fingers. Too much care cannot be exercised in this operation since one can easily bend the disk and shaft and, in the case of direct current watthour meters, alter the tension of the brushes.

REGISTERS

The older five pointer type of register has been replaced in modern meters by the four pointer type excepting in the Type I-10 meter where a three pointer register is employed upon meters of 5 and 10 amperes capacity.

The four pointer registers used upon Type I, IS, D-3 and upon similar types of alternating current meters differ from the registers used upon Type C, CS, G-3 and similar direct current meters in the position of the driving dog. In registers for the alternating current meters this dog is below the center line of the register, while in the direct current meters it is above the center. For this reason when ordering registers, it is not sufficient to quote merely the register ratio and dial face multiplier, but preferably the serial number, type, and rating of the meter should be given to insure correct filling of the order.

The significance of the figures stamped upon the back plate of a meter register and the relation of these figures to the marking on the dial face as well as the figures on the edge of the disk are as follows: The figure marked on the disk is known as the meter constant, denoted by the letter "K", and represents the watthours recorded per revolution of the disk. For example consider a Type D-3 Thomson polyphase watthour meter rated 10/5 amperes 2300/115 volts, 60 cycles, three-phase. A meter so rated has a meter constant "K" of 25; a register ratio of 40; a dial face multiplier of 10 with "10" over the first circle and reads in kilowatt-hours. One revolution of the first pointer in this case equals 100 kilowatt-hours or 100,000 watthours. In all modern General Electric meters the worm wheel which meshes with the worm upon the meter shaft has 100 teeth. Hence the disk must make 100 revolutions while the worm wheel is completing one. If 25 watthours are recorded by one revolution of the disk, for 100 revolutions or one revolution of the worm wheel 2500 watthours will have been recorded. The stamping upon the back plate of the register, which in this case is 40, signifies that the worm wheel must make 40 revolutions while the most rapidly moving pointer is completing one. Since 2500 watthours are recorded by one revolution of the worm wheel, 100,000 watthours will have been recorded when the worm wheel has completed 40 revolutions.

From the above it will be seen that the following formula may be derived: Meter constant "K" $\times$ 100 $\times$ register ratio = number of watthours corresponding to one revolution of the most rapidly moving pointer. By substituting the proper values for two of the unknown factors in the above formula the third factor can readily be determined.

This can be used to advantage in checking the value of the meter constant in case there is any question in regard to its accuracy. For example: Given the number of watthours corresponding to one revolution of the first pointer

as 100,000 and the register ratio as 40, to find the disk constant "K." Substituting the values in the above formula and solving for "K" we have

$$\frac{100{,}000 \text{ watthours}}{40 \times 100} = \text{"K"}$$

hence "K" = 25 watthours.

READING METER REGISTERS

Some companies do not require the meter reader to record the exact reading of the register in kilowatt-hours, but provide him with a book of printed forms representing the circles on the dial face and their subdivisions. The person reading the meter has only to indicate in pencil the position of the register pointers and submit in this form to the billing department where one person interprets the indications.

This is a very satisfactory method of reading meters as there is little chance of error and a definite record of the meter's performance is always available. A sample sheet taken from such a record book is shown on page 9.

All modern Thomson watthour meters are equipped with direct reading registers. As the name implies, the number of kilowatt-hours recorded is read directly from the dial and under no circumstances should a multiplying constant be used in reading the meter unless the words "Multiply by 10," "Multiply by 100," etc., appear on the dial face.

One revolution of the most rapidly moving pointer on both house and switchboard type meter registers equals 10 kilowatt-hours except registers with multiplying constants. In the case of some low capacity meters the usual switchboard meter register would have a dial constant of 1/10. To overcome the use of a fractional multiplier in such cases a dial is used having "1" over the most rapidly moving pointer, "10" over the second, etc. In other words such dials read 1 kilowatt-hour for one revolution of the fastest moving pointer. To distinguish these dials, the right-hand circle is black, pointer and figures being white. This distinguishing feature will prevent errors due to any oversight in noting the different units in which the dials read. It is customary to furnish switchboard meters with registers which move ten times as fast as those of house type meters of the same ratings so that log readings can be made.

Whenever SWITCHBOARD METERS are read so infrequently that the dials may repeat too often, the meters can be furnished with house type registers which move only 1/10 as rapidly. Conversely house type meters may be furnished with switchboard registers in cases where frequent readings are necessary.

To prevent the necessity of replacing standard registers on switchboard type meters, orders should state that the house type register should be furnished if frequent readings are not to be made.

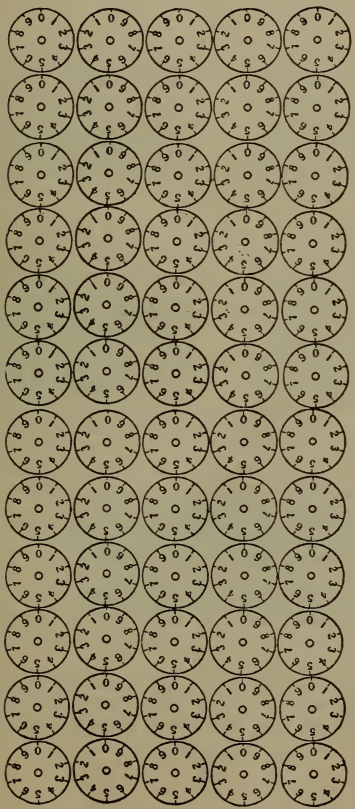
The dial of the combined PREPAYMENT METER is enlarged and contains, in addition to the standard marking, a scale marked in plain figures over which a pointer passes indicating the number of coins remaining to the credit of the customer. When the meter has a separate prepayment attachment, the dial showing the number of coins standing to the customer's credit is placed on the attachment.

NAME .....

LOCATION .....

Meter No. _____ Capacity _____

Rate _____ Constant _____

DATE	RECORD	READING	DIFF.
			

EXAMPLES IN READING METER REGISTERS

In deciding the reading of a pointer, the pointer before it (to the right) must be consulted. Unless the pointer to the right has reached or passed zero, or in other words, completed a revolution, the other has not completed the division upon which it may appear to rest.

Figures 1 to 7 inclusive will assist in reading and enable one to detect a misplaced dial hand.

Fig. 1 reads 11 kw-hrs. as the pointer to the extreme right has made one complete revolution thus advancing the second pointer to the 1st digit and has itself passed the 1st digit on its dial.

Fig. 3 reads 424 kw-hrs. The second pointer (from the right) has made four complete revolutions and has advanced the pointer of the third circle to the fourth digit.

The first pointer has, disregarding the indications of the third circle, made two complete revolutions advancing the second pointer to the second digit and has itself passed the fourth digit on its dial.

Fig. 5 reads 4588 kw-hrs.

The third pointer (from the right) has made four complete revolutions and has advanced the pointer of the fourth circle to the fourth digit. The second pointer has, disregarding the indications on the fourth circle, made five revolutions and has advanced the pointer of the third circle to the fourth digit. The first pointer has, disregarding the indications of the third and fourth circles, made eight complete revolutions and has advanced the pointer of the second circle to the eighth digit and has itself passed the eighth digit on its dial.

In Fig. 2 the pointer of the second circle is misplaced. The actual reading of the dial is 9 kw-hr., though one might erroneously read it 19 kw-hrs. The second pointer should not indicate one on its circle until the first pointer has reached or passed zero.

In Fig. 4 the pointer of the third circle is misplaced. The actual reading of the dial is 9484 kw-hrs., although it might very easily be read 9584 kw-hrs.

It will be seen that the second pointer has not yet reached or passed zero, reading only 8, consequently the third pointer should not rest at 5.

In Fig. 6, the pointer of the fourth circle is misplaced. The actual reading of the dial is 2855 kw-hrs., although it might very easily be read 3855 kw-hrs.

The third pointer, as will be noted, has not yet reached or passed zero, as it reads only 8, consequently the fourth pointer has not reached 3.

In Fig. 7 the pointer of the second and fourth circles are misplaced. The actual reading of the dial is 4818 kw-hrs., although it might very easily be read 5828 kw-hrs.

Since the first pointer to the right has not yet made a complete revolution, the pointer of the second circle should not indicate 2, and since the pointer of the third circle has not yet completed a revolution, the pointer of the fourth circle should not indicate 5.

In a very short time, a person may by setting a meter register at different readings become familiar with the various positions of the pointers enabling them to read accurately and rapidly and determine at a glance a misplaced pointer.

EXAMPLES IN READING METER REGISTERS

Fig. 1

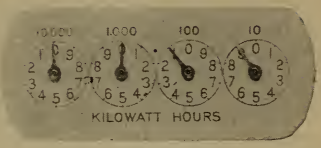


Fig. 2

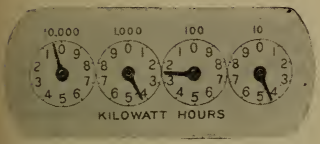


Fig. 3

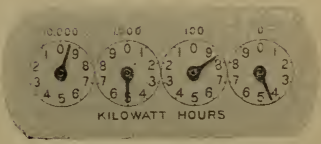


Fig. 4

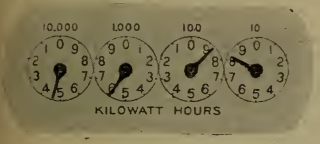


Fig. 5

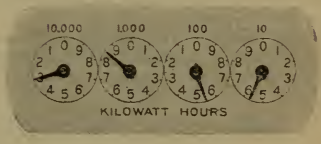


Fig. 6

Fig. 7

No. 1 = 11 kw-hrs. No. 2 = 9 kw-hrs.
No. 3 = 424 kw-hrs. No. 4 = 9484 kw-hrs.
No. 5 = 4588 kw-hrs. No. 6 = 2855 kw-hrs.
No. 7 = 4818 kw-hrs.

INSTALLING THOMSON WATTHOUR METERS

Instruction books showing the manner of connecting Thomson watthour meters in circuit and containing specific directions in regard to installing same are included in each shipment. This information should be carefully noted before attempting the installation.

All Thomson watthour meters have a jewel bearing and should be handled with care. If the meter has a shipping device, this should be used when transporting same to and from the point of installation, and the moving element should not be lowered on the jewel until all of the preliminary work of installation has been completed.

If the meter is of the house type, considerable judgment must be exercised in deciding upon a proper location for it. A dry, light place as free from vibration as possible should be selected. The location of the meter should also be as accessible as possible, since this will decrease the amount of labor necessary in reading and testing it.

It is always well to be sure that the meter operates freely on a light load before leaving it. *Caution. Before leaving the meter, see that the top bearing is set midway between the shoulder of the worm and the top of the shaft, as shown in sketch on page 17, Fig. 9.* In the installation of direct current watthour meters the adjustment of the brushes should be noted. *Never leave a meter which sparks at the commutator.* This may happen if the brush tension is too tight and will materially increase if the meter is subject to vibration. If the brush tension is too heavy, friction errors are introduced, causing the meter to register slow on the lighter loads.

A method of estimating the brush tension is to draw first one and then the other arm approximately ⅛ in. from the commutator, noting when released that they do not rebound.

REQUIREMENTS FOR CHECKING AND TESTING WATTHOUR METERS

The importance of providing facilities for periodically checking the accuracy of watthour meters and making such minor repairs as may be necessary, is fast becoming recognized by all central station managers.

It is considered the best practice to test house type meters on the customer's premises, and for this purpose rotating standards and portable meter testing rheostats are recommended. This method of testing saves the expense of transporting the meters to and from the central station, enables correct tests to be taken notwithstanding fluctuating load conditions, and permits of adjusting the meter under the exact local conditions as regards vibration, etc., on which it is to operate.

Every central station should have a room set apart for a testing department. This may not be at all elaborate, and its equipment would vary, depending on the size of the company, the character of the installation, etc. The testing department should be located in a dry, well lighted place as free from vibra-

tion as possible. In this department such minor repairs as are necessary can be made, as well as all tests which it is not possible or deemed advisable to make on the customer's premises; also tests on large capacity switchboard meters, etc.

Some companies suspend the racks upon which the meters are hung for test, by wires fastened to the ceiling, using weights suspended below the racks for balancing. Such a rack will be practically free from vibration. For load it is customary to use a bank of lamps so connected to the switchboard as to permit any desired load to be easily applied. These lamps can be connected in steps so that light and full load can be easily obtained. For heavier loads resistance wire or a water rheostat is often used.

For lagging induction watthour meters a theater dimmer will be found very convenient, or if such is not available, the reactive coils of an arc lamp may be used to advantage. For very fine regulation ordinary rheostats are employed.

For the testing department, an equipment of high grade instruments is of course necessary. These may be used to advantage not only in checking service meters but also the rotating standards.

For testing direct current watthour meters a portable ammeter and voltmeter are required, and for alternating current watthour meters, a portable wattmeter should be added. Two sets of instruments of different capacities should be provided, one of sufficient capacity to take care of the full load of the meter, the other of small enough capacity to take care of the light load with a proper degree of accuracy. If necessary, transformers may be used in connection with the alternating current instruments and shunts in connection with the direct current.

It is advisable to have at least two reliable stop watches for timing the meter, one to serve as a check on the other in test. Too much care cannot be exercised in the selection, handling and care of these watches and their accuracy should be periodically checked.

By applying to the nearest District Office, recommendations may be obtained to cover any specific case.

METHOD OF TESTING WITH INDICATING INSTRUMENTS

For convenience in testing General Electric meters, a mark will be noted near the outer edge of the disk in order that the revolutions may be accurately counted.

The watts recorded by the meter, i.e., the rate at which the meter is recording can be found for General Electric meters by the following formula.

No. I. $$\frac{K \times 3600 \times R}{S} = \text{watts.}$$

"K" is the meter calibrating constant, and will be found marked on the disk.

3600 is the number of seconds in an hour. Multiplying the watthours per revolution of the disk (K) by the number of seconds in one hour reduces the watthours to watt-seconds per revolution of the disk.

R is the number of revolutions of the disk counted for the test. Multiplying the watt-seconds per revolution of the disk by the total number of revolutions counted gives the *total* watt-seconds for the test.

S is the number of seconds required for the disk to make (R) revolutions. Dividing the total watt-seconds by the number of seconds (S) gives the total watt load recorded by the meter.

Dividing the total watthours recorded by the meter by the actual watts read on the indicating instruments and multiplying by 100 gives the percentage accuracy of the meter under test.

A number of revolutions should be taken, so that the time of observation will be at least from 40 to 60 seconds. If materially less than 40 seconds, errors in the measurement of time are probable, and observations of longer periods than 60 seconds are generally unnecessary.

METHOD OF TESTING WITH PORTABLE ROTATING STANDARDS

The following formula is used when calibrating Thomson watthour meters with General Electric portable test meters.

No. 2. $$\frac{r \times k}{R \times K} = \text{accuracy.}$$

when r = revolutions of disk of meter under test.

k = constant to be used for meter under test.

R = revolutions of test meter read from the dial.

K = constant for the particular coil used of test meter.

The dial of the test meter reads directly in revolutions of the meter disk. Note the dial reading at the start and at the end of the test.

The difference between the two dial readings gives the number of revolutions of the disk. Multiply this by the proper meter constant "K" (the watthours per revolution of the disk) and the result is the total watthours recorded by the test meter.

For the service meter under test count the revolutions of the disk. For five per cent. of full load, one or two revolutions. For full load, 20 or 30 revolutions is sufficient. Multiply the disk revolutions by the meter constant (k) marked on the disk and the result is the total watthours recorded by the service meter under test. To find the percentage accuracy, divide the watthours recorded by the service meter under test by the watthours recorded by the portable test meter and multiply by 100.

Caution

Extreme care should be exercised by the tester to guard against either the instruments or meters indicating or recording the losses of one another since this might cause an error of appreciable magnitude upon the lighter loads.

In order to avoid this, the current circuits of the testing instruments should be connected in series with the meter under test, while the potential circuits of both the testing instruments and meter under test should be connected to the source side of the line at some point ahead of both meter and instruments.

In general, three-wire meters can be tested as two-wire meters by connecting the current coils in series. The meter constant (K) must be divided by two when making the test in this manner. When testing between sides with only one current coil in circuit the constant (K) marked on the meter should be used.

In testing polyphase meters it is easier to check as a single-phase meter. Connect the potential circuits in parallel, the current coils in series and divide the meter constant (K) by two (except in the case of four-wire three-phase meters having three current coils, when the constant "K" should be divided by 4).

TESTING METERS USED WITH CURRENT AND POTENTIAL TRANSFORMERS

Meters used with current and potential transformers are generally calibrated as secondary meters, in which case the constant (K) marked on the disk should be divided by the product of the ratios of the current and potential transformer before applying it in formulas Nos. 1 and 2, given above.

GENERAL INSTRUCTIONS PERTAINING TO THE INSPECTION OF THOMSON WATTHOUR METERS PREVIOUS TO TEST

Before attempting to test a meter it should be inspected for mechanical defects. The thoroughness of this inspection will depend upon the nature of the test. For instance, a periodic test taken at the point of installation would not in general necessitate as thorough an inspection as a shop test which is taken on meters removed from service or a complaint test. If, however, after making a periodic test the meter is found to be very inaccurate, it is necessary to make a rigid inspection to determine the cause.

In other words, judgment should be exercised in determining the amount of inspection necessary to satisfy a given condition. It is well to err in over-inspection, rather than on the other side.

The following hints may be useful to the meter inspector or tester:

Among the numerous observations which are essential in testing meters, the bearings, moving element, registering mechanism, damping mechanism and electrical element should be given special attention.

BEARINGS

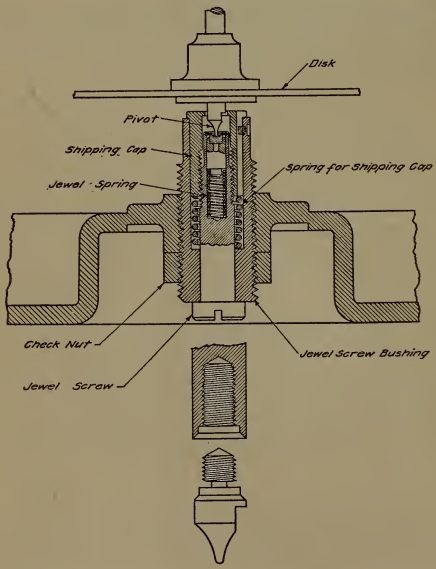


Fig. 8

The bearings should be free from dust and other particles which would tend to grind or rub against each other, thus roughening the surfaces and consequently increasing friction resulting in a retardation of the moving element. Rough or damaged jewels should be replaced by new ones, in which case the pivot should also be replaced since it may have become damaged by coming in contact with the defective jewel. Lower jewel bearings are apt to have become dry during service. For such cases, it is recom-

mended that a minute drop of high grade watch oil be applied to its surface.

If during service, the top of the meter shaft has become dirty or corroded, it may be cleaned by the use of cotton or linen tape. If this fails, a piece of tape saturated with benzine or gasolene may be used.

The top bearing should be set in a position so that the lower end is midway between the shoulder of the worm and the top of the shaft as shown in sketch.

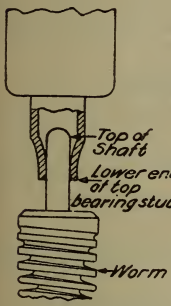


Fig. 9

MOVING ELEMENT

The disk should be examined to see that it runs true. It should be free to rotate midway between the jaws of the magnets. Any foreign matter which might possibly have collected since the installation of the meter must be removed.

Fig. 10

Should the worm be dirty, it may be cleaned by running a fine piece of thread through it. If very dirty, the application of benzine or gasolene will assist in cleaning, after which, parts should be carefully wiped.

In the case of direct current meters, should the commutator or brushes be corroded, they may be cleaned by the use of cotton or linen tape.

Under no circumstances should a chemical polishing compound or emery cloth be used upon the commutator, brushes or top of the meter shaft. The former would be apt to gum and perhaps clog the fine threading of the worm. The latter would cause the top of shaft to become charged with fine particles of emery which would gradually work its way into the bearing resulting in trouble.

REGISTERING MECHANISM

The position of the pointers upon a meter register should be noted, particularly if the meter has been subjected to severe jars or excessive vibration as it is possible that they may have become displaced. This point is of great importance, since incorrect bills might be rendered.

It should be noted that the worm wheel meshes properly with the worm upon the meter shaft and in turn, that the driving dog upon the worm wheel shaft engages properly with the transmitting dog upon the meter register.

If it is deemed necessary to oil the registering mechanism, it should be carefully wiped afterward, to prevent the superfluous oil from dropping. Only a high grade of oil should be used. Under no circumstances should the worm or worm wheel be oiled since oil upon these parts would collect dust and other particles which would interfere materially with the operation of the meter.

DAMPING MECHANISM

The magnets, two in number, are rigidly mounted in a "shoe," the north seeking pole of one opposite, the south seeking pole of the other. When two

pairs are used they are astatically arranged, each pair of which may be moved laterally to effect necessary adjustment. Should the magnets be removed, care should be used when replacing that the astatic arrangement be maintained.

When inspecting the meter the magnets should be carefully inspected for proper alignment, and to see that no foreign substance is lodged upon them.

ELECTRICAL ELEMENT

The windings should be inspected for grounds and short circuits. Care should be taken that all connections are properly tightened and that all soldered connections are properly made.

TYPE I WATTHOUR METERS

The Type I watthour meters are for use upon single-phase two- or three-wire circuits. They are built self-contained in capacities of 3, 5, 10, 15, 25, 50, 75, 100, 150, 200 and 300 amperes, 106 to 120 and 212 to 240 volts, two-wire, 25 to 140 cycles, and 3, 5, 10, 15, 25, 50, 75, 100 and 150 amperes, 212 to 240 volts, three-wire, 25 to 140 cycles. For three-wire circuits of above 150 amperes, current transformers are employed.

If in the installation of switchboard apparatus, economy is an important factor, this type of meter may be used with good results upon a switchboard it being customary to install upon the back of the board.

When furnished for the higher frequencies it is furnished double-lagged for this higher frequency and 60 cycles as the higher frequency systems are now quite generally being converted to 60 cycles. It is calibrated for both frequencies and is always sent out connected for that frequency for which it is ordered. Directions for changing the connections for a change in frequency will be found on pages 73 and 74.

This meter is finished in dull black japan, the cover being provided with glass windows for observing the operation of the moving element and for reading the meter register.

When so desired a moulded glass cover can be furnished.

The leading in wires enter into binding posts located at the sides of the meter

When ordering Type I watthour meters for use with transformers the order must so specify since meters will then be furnished whose potential circuits are independent of the current.

APPROXIMATE SHIPPING WEIGHT, ALL VOLTAGES:

5 to 25 amperes inclusive	1 in a box, 15 lb. 2 in a box, 20 lb. 4 in a box, 54 lb.
50 and 75 amperes	1 in a box, 24 lb. 2 in a box, 45 lb. 4 in a box, 86 lb.
100 and 150 amperes	1 in a box, 35 lb. 2 in a box, 65 lb.
300 amperes	1 in a box, 45 lb. 2 in a box, 70 lb.

TYPE I-8 WATTHOUR METERS

The Type I-8 watthour meter like the Type I is for house service and is built in capacities of 3, 5, 10, 25, 50 and 75 amperes, 106 to 120 and 212 to 240 volts, 25 to 140 cycles, for use upon two- or three-wire single-phase circuits.

The meter is essentially the same as the Type I except that the terminals are located in a separate compartment at the bottom of the meter, permitting the connection being made without removing the cover of the meter proper.

For gaining access to the jewel screw when the meter is sealed, the meter cover is drilled directly below the jewel screw and by removing the terminal cover the jewel may be readily removed for inspection or replacement.

Replacing the terminal cover prevents further access to the jewel screw.

Approximate Shipping Weight, all Voltages:

5 to 25 amperes inclusive	1 in 1 box, 22 lb. 2 in a box, 49 lb. 4 in a box, 94 lb.
50 and 75 amperes	1 in a box, 25 lb. 2 in a box, 51 lb. 4 in a box, 98 lb.

TYPE I-10 WATTHOUR METERS

The Type I-10 watthour meter is furnished to meet the demand for a low capacity single-phase, two- or three-wire house meter of moderate price to enable lighting companies to more profitably extend their service to the smaller consumers.

This type of meter is different in construction and appearance from any type of induction meter previously put on the market by the General Electric Company. It is circular in shape and has a moulded terminal block at the bottom of the meter base into which the leading in wires pass. The jewel and pivot are removable and the friction compensation is adjustable to allow for wear, etc. The register reads in kilowatt-hours, the dial being of dull finish porcelain, and easily legible. The meter back and cover are finished in dull black japan.

Approximate Shipping Weight:

One in a box, 13 lb.
Two in a box, 22 lb.
Three in a box, 45 lb.

TYPE IS WATTHOUR METERS

The Type IS watthour meter was designed for switchboard service for use upon two- and three-wire circuits. It was built self-contained in capacities of 3, 5, 10, 15, 25, 50 and 75 amperes, 100 to 120, 200 to 240, 400 to 480 and 500 to 600 volts, 25 to 140 cycles.

This type of meter has a rectangular glass cover and was finished in dull black throughout.

TYPES IS-2 AND IS-3 WATTHOUR METERS

Superseding the Type IS are the Types IS-2 and IS-3, the difference being that permanent magnets of the same type as in the Type I meter are used, the adoption of which slightly changes the appearance of the meter. The IS-2 meter has a cast metal cover, the front surface of which is pebbled. It is provided with windows for reading the dial and for observing the rotation of the disk.

The IS-3 differs from the IS-2 only in being furnished with glass cover.

They are built self-contained in capacities of 5, 10, 15, 25, 50, 75, 100 and 150 amperes, 106 to 120, 212 to 240, 400 to 480 and 500 to 600 volts, 25 to 140 cycles, 2 wire.

Approximate Shipping Weight

IS-2	One in a box, 60 lb. Two in a box, 110 lb.
IS-3	One in a box, 65 lb. Two in a box, 120 lb.

TYPE D-3 WATTHOUR METERS

The Type D-3 watthour meter is for house service for use upon two-phase, three-phase or monocyclic circuits of balanced or unbalanced loads. It is built self-contained in capacities of 3, 5, 10, 15, 25, 50, 75, 100 and 150 amperes, 106 to 120, 212 to 240, 400 to 480, 500 to 600 volts, 25 to 140 cycles, for use upon four-wire two-phase, three-wire two- and three-phase and monocyclic circuits, in capacities of 3, 5, 10, 15, 25, 50 and 75 amperes, 212 to 220 △ 115 to 125 Y; 400 to 440 △ 230 to 250 Y volts, 25 to 140 cycles, for use upon four-wire three-phase circuits.

Originally, four-wire three-phase polyphase watthour meters were constructed with only two current elements, necessitating their being wound for one and one-half times the current delivered from the secondary of the transformer from which they were to operate. For diagrams illustrating the above refer to pages 151 and 153. All four-wire three-phase polyphase watthour meters whether for use with or without transformers are now constructed with three current elements.

This type of meter may be used for switchboard service with good results, where a back connected meter is not desired.

This meter is finished in dull black japan, the cover being provided with glass windows for observing the operation of the moving element and for reading the meter register.

The leading in wires enter into binding posts located at the sides of the meter. When ordering Type D-3 watthour meters for use with transformers the order must so specify since meters will then be furnished whose potential circuits are independent of the current.

APPROXIMATE SHIPPING WEIGHT:

3 to 75 amperes inclusive	1 in a box, 46 lb. 2 in a box, 90 lb.
100 and 150 amperes	1 in a box, 60 lb. 2 in a box, 97 lb.

TYPE D-4 WATTHOUR METERS

This type of meter is in general similar to the Type D-3 except that the terminals are located in a separate compartment at the sides of the meter back permitting the connections being made without removing the cover of the meter proper.

It is built in capacities of 3, 5, 10, 15, 25, 50 and 75 amperes, 106 to 120, 212 to 240, 400 to 480, 500 to 600 volts, 25 to 140 cycles, for use upon four-wire two-phase, three-wire two- and three-phase and monocylic circuits, and 212 to 220 △115 to 125 Y, 400 to 440 △230 to 250 Y volts, four-wire three-phase.

When ordering meters for use with transformers, the order should so specify.

Shipping weights approximately the same as the Type D-3 meter.

TYPES DS-2 AND DS-3 WATTHOUR METERS

The Types DS-2 and DS-3 watthour meters are for switchboard service for use upon two-phase, three-phase or monocyclic circuits of balanced or unbalanced loads. They were built self-contained in capacities of 3, 5, 10, 15, 25, 50, 75, 100 and 150 amperes, 100 to 120, 200 to 240, 400 to 480, 500 to 600 volts, 25 to 140 cycles, for use upon four-wire two-phase, three-wire two- and three-phase and monocyclic circuits and in capacities of 3, 5, 10, 15, 25, 50 and 75 amperes, 200 to 220 △115 to 125 Y, 400 to 440 △200 to 250 Y volts, 25 cycles and above for use upon four-wire three-phase circuits.

The former type of meter has a cast metal cover, the front surface of which is pebbled and is provided with glass windows for observing the operation of the moving element and for reading the meter register.

The latter type of meter has a rectangular glass cover.

The current and potential circuits of these meters are independent of each other, hence meters are interchangeable for use with or without transformers.

The Types DS-2 and DS-3 meters are finished in dull black, the raised portion of the Type DS-2 meter cover being finished in polished copper.

TYPES DS-4 AND DS-5 WATTHOUR METERS

The Types DS-4 and DS-5 meters supersede respectively the Types DS-2 and DS-3.

The same general characteristics are maintained in the Types DS-4 and DS-5 watthour meters as in the Types DS-2 and DS-3, the slight difference being in the location of the electrical elements.

DS-4.....One in a box, 85 lb.
DS-4.....Two in a box, 135 lb.
DS-5.....One in a box, 120 lb.

INDUCTION PORTABLE TEST METERS

The Type IB portable test meter represents the first induction portable test meter manufactured by the General Electric Company. This type of meter had the electrical element of the Type IS meter.

In the Type IB-2 meter, the use of the damping system of the Type IS meter was discontinued, and the damping system of the Type I meter adopted. A new design of fuse plug was incorporated which permitted of the renewing of the fuse wire without replacing the entire plug. Modifications in general were made to better adapt the meter to the requirements of operating companies.

The Types IB and IB-2 meters were built with capacities of 1, 10 and 20 amperes.

Upon the designing of the Type IB-3 meter the range was increased, this type of meter being built in capacities of 1, 10 and 20 amperes and 1, 5, 10, 50 and 100 amperes.

In low capacity meters, i.e., 1, 10 and 20 amperes, the one ampere circuit is protected by a fuse and in the high capacity meters, i.e., 1, 5, 10, 50 and 100 amperes, the 1 and 10 ampere circuits are protected by fuses.

The Type IB-4 meter differs in minor mechanical details from the Type IB-3, having the same electrical characteristics and capacities.

One in box only, 40 lb.

TYPE C WATTHOUR METERS

The Type C watthour meter is for house service for use upon direct current two- and three-wire circuits.

It was built in capacities of 5, 10, 15, 25, 50, 75, 100, 150, 300 and 600 amperes, 100 to 120, 200 to 240, 500 to 600 volts two-wire and 5, 10, 15, 25, 50, 75, 100, 150 and 300 amperes, 200 to 240, 400 to 500 volts three-wire.

For meters up to 250 volts, the resistance was wound upon a tube and mounted inside of the meter on the back. For meters above 250 volts up to and including 600 volts the resistance was wound on tubes and mounted in an external cage upon the meter back.

This type of meter was finished in dull black japan, the cover being provided with a glass window for reading the meter register. When so specified, moulded glass covers were furnished.

The leading in wires entered into binding posts located at the sides of the meter.

TYPES C-6 AND C-7 WATTHOUR METERS

The Type C-6 watthour meter supersedes the Type C in capacities up to 250 volts; above this capacity, Type C-7 being furnished.

The Types C-6 and C-7 watthour meters are built in the same current capacities as the Type C, the Type C-7 being built for use on two-wire circuits only, of voltages ranging from 251 to 600 volts.

The combined shunt and resistance is used upon all Type C-6 meters. Upon Type C-7 meters, the separate shunt field coil is used, and for meters up to 600 volts the resistance is wound upon tubes mounted in an external cage upon the meter back.

These meters are finished in dull black japan, the covers being provided with glass windows for reading the meter register. When so desired, moulded glass covers can be furnished.

The leading in wires enter into binding posts located at the sides of the meter.

Approximate Shipping Weight, all Voltages:

5 to 50 amperes inclusive	1 in a box, 26 lb. 2 in a box, 55 lb.
75 amperes	1 in a box, 35 lb. 2 in a box, 69 lb.
100 to 600 amperes	1 in a box, 48 lb.

TYPES C-5 AND C-9 WATTHOUR METERS

The Type C-5 meter is essentially the Type C-6, but back connected. It was built in similar capacities as the Types C-6 and C-7.

Meters up to 250 volts were equipped with combined shunts and resistances, above this voltage the resistance being wound on tubes and mounted in a separate box.

This type of meter was finished in dull black japan, the cover being provided with a glass window for reading the meter register. Moulded glass covers were furnished whenever desired.

This type of meter has been superseded by the Type C-9.

The difference between Types C-5 and C-9 watthour meters lies in the omission of supporting lugs on the Type C-9 meter and the vertical arrangement of the potential studs.

Approximate Shipping Weight, all Voltages:

5 to 50 amperes inclusive	1 in a box, 26 lb. 2 in a box, 55 lb.
75 amperes	1 in a box, 35 lb. 2 in a box, 69 lb.
100 to 600 amperes	1 in a box, 48 lb.

TYPES CQ AND CQ-2 THOMSON WATTHOUR METERS

The Type CQ watthour meter is for house service for use upon direct current two- and three-wire circuits. It is particularly adapted for installations where a meter which is independent of stray fields is required.

The construction and arrangement of the field coils, of which there are four, is radically different from any of the other types of direct current watthour meters herein described. The field coils are formed in quadrants so as to surround the four-pole armature as completely as possible, this construction minimizing the effect of stray fields.

The Type CQ meter is built in capacities of 50, 75, 100, 200 and 400 amperes, 106 to 120, 212 to 240, 500 to 600 volts, two-wire, and 50, 75, 100 and 200 amperes, 212 to 240 volts, three-wire. For meters up to 240 volts the resistance is wound upon tubes and mounted in an external cage upon the meter back. Above this voltage up to 600 volts, the resistance is wound on tubes and mounted in a separate box.

This type of meter is finished in dull black japan, the cover being provided with a glass window for reading the meter register. Moulded glass covers can be furnished when so desired.

The leading in wires enter into binding posts located at the sides of the meter.

Shipping weights are approximately the same as C-6.

The Type CQ-2 watthour meter differs only from the Type CQ in that it is back connected.

TYPE CS THOMSON WATTHOUR METERS

The Type CS astatic watthour meter is for switchboard service for use on direct current two- and three-wire circuits. It is built in capacities of 50, 75, 100, 150, 200, 300, 400, 600, 800, 1200 and 1500 amperes, 106 to 120, 212 to 240, 500 to 600 volts, two-wire, and 212 to 240 volts, three-wire.

The damping magnets are enclosed in a laminated shield of soft steel punchings thereby protecting them from the effects of the short circuits. Both the armatures and damping magnets are astatically arranged, thus minimizing the effects of stray fields.

The resistance for all Type CS watthour meters is wound upon tubes and mounted in a separate box. The CS meter has a rectangular glass cover and is finished in dull black, the prominent internal parts being finished in polished brass.

TYPES G-2 AND G-3 ASTATIC WATTHOUR METERS

The Type G-2 watthour meter is for switchboard service for use upon direct current two- and three-wire circuits. It was built self-contained in capacities of 2000, 3000, 4000, 6000, 8000 and 10,000 amperes, 100 to 120, 200 to 240, 500 to 600 volts, two-wire, and 2000, 3000, 4000 and 6000 amperes, 212 to 240 volts, three-wire. The resistance for all Type G-2 watthour meters is wound upon tubes and mounted in a separate box.

This type of meter has a rectangular glass cover and is finished in dull black the prominent internal parts being finished in polished copper and brass. The cover is secured to the switchboard by means of four bolts.

The Type G-3 watthour meter superseding the Type G-2 is in every respect similar to the Type G-2, except that the cover or case consists of two parts, a metal sub-base which is bolted to the switchboard and a glass cover which is fastened to this sub-base by means of screws. This construction makes the cover removable from the front.

The armatures and the damping magnets of Types CS, G-2 and G-3 watthour meters are astatically arranged, this arrangement minimizing the effects of stray fields.

The damping magnets of the above types of meters are enclosed in a laminated shield of soft steel punchings, thereby protecting them from the effects of short circuits.

DIRECT CURRENT PORTABLE TEST METERS

The Type CB portable test meter was a direct current portable standard built along the lines of the alternating current test meters. The electrical characteristics of the Type CB meter are similar to the Type C. This type of meter was built in capacities of 1, 2, 10, 20 and 40 amperes.

In the designing of the Type CB-2 meter which differed somewhat in mechanical details from the Type CB, the range was increased by furnishing a higher capacity meter with 5, 10, 50 and 100 ampere coils, as well as the 1–40 ampere meter above mentioned.

The CB-3 meter differed only in minor mechanical details from its predecessor, the CB-2, and has now been superseded by the CB-4 which has further improved electrical characteristics.

PREPAYMENT WATTHOUR METERS

The Type IP prepayment watthour meter is essentially the Type I differing only in the addition of extra terminals and in the contact making register. It is built in capacities of 3, 5, 10, 15 and 25 amperes, 106 to 120,

212 to 240 volts, 25 to 140 cycles, two-wire, and 212 to 240 volts, 25 to 140 cycles, three-wire. This type of meter may be used with either the Form 3 or Form 4 prepayment attachment.

The ordinary Type I meter cannot be used with these prepayment attachments, since it lacks the terminals and the contact making register above referred to.

The Type IP-2 prepayment watthour meter is a combination of a separate prepayment attachment and meter, the prepayment mechanism, which is of the well known "Wood" construction, being mounted on the top of the meter proper, the gearing and actuating mechanism being directly connected to the recording mechanism of the meter. This type of meter was built in capacities of 3, 5, 10, 15 and 25 amperes, 100 to 120, 200 to 240 volts, 25 to 140 cycles, two-wire, and 200 to 240 volts, 25 to 140 cycles, three-wire, and could be adapted for either a ten or twenty-five cent coin. This meter was finished in black japan, the cover as in the other forms of induction meters being provided with a register window and disk window.

The Type IP-3 prepayment watthour meter is a radical redesign of and superseded the Type IP-2 meter. The meter and prepayment mechanism are housed in the same case and are accessible for inspection and adjustment, by removing the meter cover. The coin box may be emptied by the collector without removing the meter cover, and conversely removal of the meter cover does not permit of access to the coin box. For convenience in reading the register and noting the number of coins to customer's credit, the coin register and meter dial face are combined, the hand indicating the coins to credit being directly above the register dials. The Type IP-3 was built in capacities like the IP-2 meter, and only adapted for use with a twenty-five cent coin.

The Type IP-4 prepayment watthour meter differs from the IP-3 only in the construction of the mechanism which transmits motion to the contact making switch. In the Type IP-3 meter the actuating knob is attached directly to the main arbor. In the IP-4 meter a slotted cylindrical disk is mounted upon the end of the main arbor, which is thus actuated by a "dog" attached to the knob.

The Type CP prepayment watthour meter is in every respect similar to the Type C-6, except in the number of terminals and in the contact making register. It is built in capacities of 3, 5, 10, 15 and 25 amperes, 106 to 120, 212 to 240 volts, two-wire, and 212 to 240 volts, three-wire. This type of meter may be used with either the Form 3 or Form 4 prepayment attachments.

The ordinary Type C-6 meter is not adapted for operating in connection with these prepayment attachments since it lacks the terminals and the contact making register mentioned above.

The Type CP-2 prepayment watthour meter is a combination of the "Wood" prepayment mechanism and the Type C-6 meter, the "Wood device" being adapted mechanically to this type of meter, similar to its adaptation to the Type I meter in the Type IP-2 meter. This type of meter was built in capacities of 3, 5, 10, 15 and 25 amperes, 100 to 120, 200 to 240 volts, two-wire, and 200 to 240 volts, three-wire, and could be adapted for either a ten or twenty-five cent coin. The Type CP-2 meter was finished in black japan, the cover as

in the Type C-6 meter being provided with a glass window for reading the meter register.

The Type CP-3 prepayment meter is the superseding redesign of the CP-2, being the direct current prepayment meter corresponding to the alternating current meter, Type IP-3. It is similar to the IP-3 as regards its prepayment mechanism, the direct current meter of modified Type C-6 construction being housed in the same case with the prepayment device. This type of meter was built in capacities of 5, 10, 15 and 25 amperes, 100 to 120, 200 to 240 volts two-wire and 200 to 240 volts three-wire, and is only adapted for use with a twenty-five cent coin. The meter was finished in dull black japan, the cover being fitted with a window to permit of reading the meter dial and the coin indicator.

The Type CP-4 meter differs from the Type CP-3 only in the manner of actuating the prepayment mechanism, the difference being described under the Type IP-4 meter.

The Form 3 prepayment device used in connection with Types IP and CP meters is one of the well known "Wood" devices and was used interchangeably upon direct and alternating current circuits up to 60 cycles. This device consisted of the prepayment mechanism, the contact making switch and the electromagnet which operated whenever energy to the value of a coin was consumed, causing the coin mechanism to release to the next digit below indicating one less coin to customer's credit. This form of device was finished in bright japan, the coin chute being polished brass. The Form 3 device could be furnished for use with either dime or quarter coin.

The Form 4 prepayment device is a radical redesign of the Form 3 device which it supersedes. Like the Form 3, it is interchangeable upon direct or alternating current up to and including 60 cycles. This device consists of a prepayment mechanism and contact making switch both of which are a marked improvement in both design and construction over the older Form 3 device. The principle of the coin releasing mechanism is the same as in the Form 3 device, except that the number of coins to customer's credit is indicated by a pointer which traverses a porcelain dial. As energy to the value of a coin has been consumed, this pointer travels back one digit, this motion being actuated by the electromagnet. The Form 4 device is finished in dull black japan and is adapted only for use with a twenty-five cent coin.

TYPE W MAXIMUM WATT DEMAND INDICATORS

The Type W maximum watt demand indicator is used to indicate at any instant the amount of power being delivered and the maximum amount of power that has been delivered to a circuit, subject to a certain arbitrary time lag incorporated in the indicator. This time lag prevents the indicator from recording any instantaneous overload or short circuit which may occur.

It is for use upon alternating current, three-wire two- and three-phase and monocyclic, four-wire two- and three-phase circuits and is built self-contained in capacities of 5, 10, 15, 25, 50, 75, 100 and 150 amperes, 106 to 120, 212 to 240,

400 to 480, 500 to 600 volts, 25 to 140 cycles, for use on three-wire two- and three-phase and monocyclic circuits and four-wire, two-phase circuits and in capacities of 5, 10, 15 and 25 amperes, 25 to 140 cycles, for use upon 4-wire, 3-phase circuits.

This indicator is finished in dull black japan, the cover being provided with a circular glass window for noting the position of the pointers. The leading in wires enter into binding posts located at the sides of the indicator. This indicator can also be furnished with studs for back connection in either the Type DS-4 or DS-5 meter style.

DETAILED INSTRUCTIONS FOR TESTING VARIOUS TYPES OF THOMSON WATTHOUR METERS

TESTING TYPE I SINGLE-PHASE WATTHOUR METERS

In testing a two-wire meter by means of instruments, connect according to Fig. 11 and if by a rotating standard according to Figs. on pages 177 and 178. Three-wire meters may be tested as two-wire upon either a two- or three-wire circuit by connecting the current coils in series and if testing is to be done upon a three-wire circuit by connecting the load on one side of it; following in general the method of testing outlined for two-wire meters.

Operation No. 1

At full load power-factor unity adjust meter correctly by means of the magnets. Moving same toward the shaft increases, and away from the shaft, decreases its speed. When testing by means of instruments the formula given on page 13 should be used. When testing by means of rotating standards the formula as given on page 14 should be used for this operation. Divide the constant marked upon the meter disk by 2 if a three-wire meter is being tested.

Operation No. 2

At one-half load power-factor unity read meter taking an observation of not less than 30 seconds.

At full load current power-factor 0.5 read meter taking the same number of revolutions as before.

Any small difference that may exist between these readings may be compensated for by means of the adjusting resistance in series with the lag coil.

When testing a meter on the customer's premises, it may be desirable or necessary in the absence of inductive load to omit this operation trusting to the accuracy of the original adjustment.

Operation No. 3

At 5 per cent. load or less (in accordance with local practice) at power-factor unity, adjust meter on light load. This adjustment is obtained by varying the position of the starting plate, the proper direction in which it is to be moved to affect the necessary adjustment being indicated upon the meter.

Operation No. 4

At full load power-factor unity repeat operation No. 1. A slight change in adjustment may be necessary particularly if it was necessary to change the adjustment of either of the other two operations to any marked degree.

METHOD OF CONNECTING A TYPE I WATT-HOUR METER AND INSTRUMENTS FOR TESTING PURPOSES

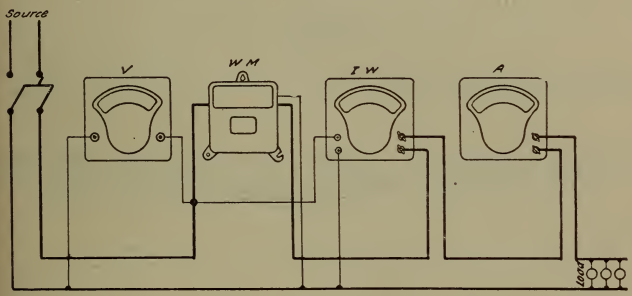


Fig. 11

V Voltmeter
WM Watthour Meter under Test, Two-Wire
IW Indicating Wattmeter
A Ammeter

TESTING METERS IN SERIES

To permit of any number of meters being tested in series without recording the losses of their potential circuits, a testing loop or wire from the potential coil is brought out, which in actual operating service is connected to one side of the line. The service connection should be disconnected and a connection made to the wire from the potential coil to the source of potential at a point before current enters the first meter of the series. Refer to Figs. 12 and 13.

CONNECTIONS OF TYPE I WATTHOUR METER, FOR TESTING PURPOSES, TWO-WIRE

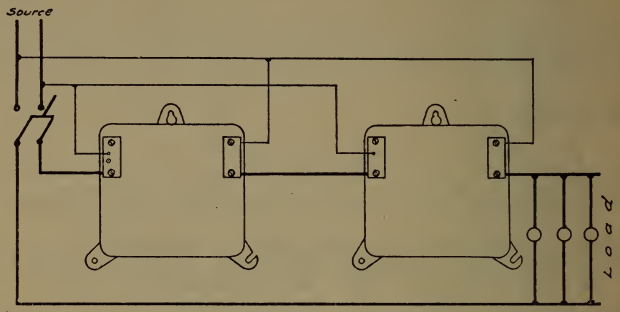


Fig. 12

NOTE—In the above diagram, it will be noted that the upper left hand binding post is not used.

CONNECTIONS OF TYPE I WATTHOUR METER, FOR TESTING PURPOSES, THREE-WIRE

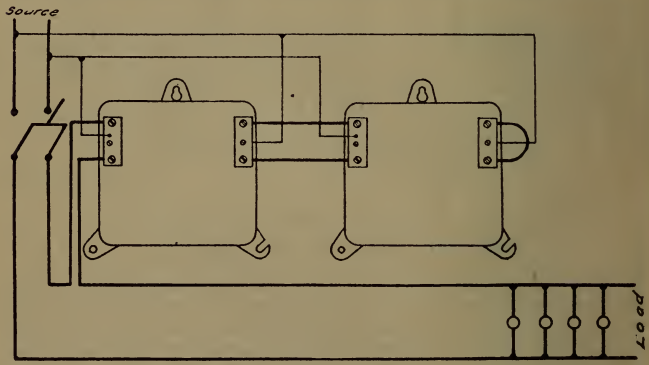


Fig. 13

TYPE I-10 METERS

In general, Type I-10 meters are tested in the same manner as the Type I meters with the following exceptions:

Full load adjustment is accomplished by shunting more or less of the magnetic flux straight across the poles of the permanent magnet by means of an iron screw in the air gap. Turning this screw in speeds the meter and conversely turning the screw out slows the meter. A clamping device is provided for holding this adjustment when once obtained. *The iron pole piece below the disk is not for adjusting full load and under no circumstances should it be removed from the frame.*

Light load adjustment is accomplished by means of a movable starting plate which is released by a brass clamping screw to the right of the shaft as one faces the meter and almost directly in line with the first pointer. The light load adjustment is then obtained by the two knurled headed brass screws which project through the meter frame on either side.

As one faces the meter, the screw to the right is marked with the letter F and an arrow indicating the direction in which the screws are to be turned in order to speed the meter. To slow the meter the screws must be turned in the opposite direction. Both screws must be turned forward or backward at the same time. The above may be clearly seen in Fig. 14.

The meter is adjusted at the factory to record correctly on inductive loads by means of a lagging plate which is permanently fastened to the laminated iron core and which is directly in the path of the flux of the potential circuit.

THOMSON SINGLE-PHASE WATTHOUR METER
TYPE I-10

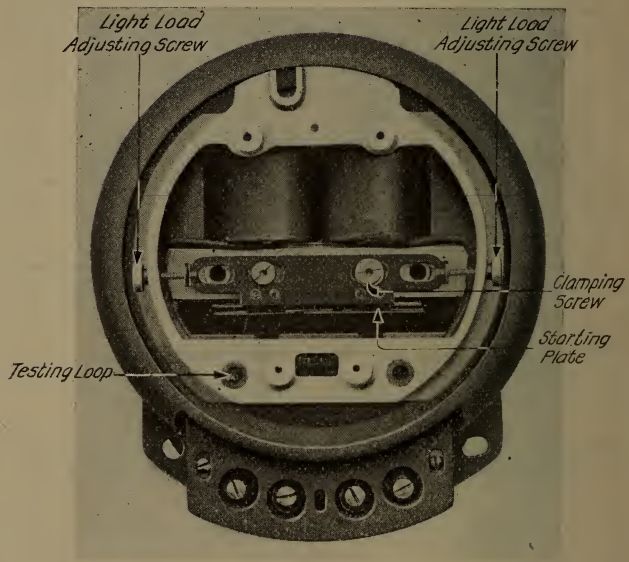


Fig. 14

Cover, register, magnet, moving element and part of frame removed to show operation of light load adjustment.

DATA FOR TESTING 60 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 10, 20 AMP.

SERV. METER				REVOLUTIONS OF TEST METER FOR 94–106% REGISTRATION OF SERVICE METER													WATTHOURS PER REV.			
Amp. Cap.	Revolutions Heavy Load	Revolutions Light Load	Amp. Cap.	94%	95%	96%	97%	98%	99%	100%	101%	102%	103%	104%	105%	106%	100–110 V. Meters Service	100–110 V. Meters Standard	200–220 V. Meters Service	200–220 V. Meters Standard
3	30		10	12.77	12.63	12.50	12.37	12.24	12.12	12.0	11.88	11.76	11.65	11.54	11.43	11.32	0.2	0.5	0.4	1.0
5	30		10	19.15	18.95	18.75	18.56	18.37	18.18	18.0	17.82	17.65	17.48	17.31	17.14	16.98	0.3	0.5	0.6	1.0
10	30		10	38.30	37.89	37.50	37.11	36.73	36.36	36.0	35.64	35.29	34.95	34.62	34.29	33.96	0.6	0.5	...	...
10	30		*10	39.89	39.47	39.06	38.66	38.27	37.88	37.5	37.13	36.76	36.41	36.06	35.71	35.38	...	....	1.25	1.0
15	30		20	31.91	31.58	31.25	30.93	30.61	30.30	30.0	29.70	29.41	29.13	28.85	28.57	28.30	1.0	1.0	2.00	2.0
25	25		20	39.89	39.47	39.06	38.66	38.27	37.88	37.5	37.13	36.76	36.41	36.06	35.71	35.38	1.5	1.0	3.00	2.0
50	15		20	47.87	47.37	46.88	46.39	45.92	45.45	45.0	44.55	44.12	43.69	43.27	42.86	42.45	3.0	1.0	6.00	2.0
3		1	1	4.25	4.21	4.17	4.12	4.08	4.04	4.0	3.96	3.92	3.88	3.85	3.81	3.77	0.2	0.05	0.4	0.1
5		1	1	6.38	6.32	6.25	6.19	6.12	6.06	6.0	5.94	5.88	5.83	5.77	5.71	5.66	0.3	0.05	0.6	0.1
10		1	1	12.77	12.63	12.50	12.37	12.24	12.12	12.0	11.88	11.76	11.65	11.54	11.43	11.32	0.6	0.05	...	...
10		1	*1	13.30	13.16	13.02	12.89	12.75	12.63	12.5	12.38	12.26	12.14	12.02	11.90	11.79	...	....	1.25	0.1
15		1	1	21.28	21.05	20.83	20.62	20.41	20.20	20.0	19.80	19.61	19.42	19.23	19.05	18.87	1.0	0.05	2.00	0.1
25		1	1	31.91	31.58	31.25	30.93	30.61	30.30	30.0	29.70	29.41	29.13	28.85	28.57	28.30	1.5	0.05	3.00	0.1
50		1	10	6.38	6.32	6.25	6.19	6.12	6.06	6.0	5.94	5.88	5.83	5.77	5.71	5.66	3.0	0.50	6.00	1.0

Speeds for the 110 and 220 volt meters are the same excepting for 10 amperes.

The service meter should be loaded so as to give the number of revolutions stated in table in about one minute's time upon heavy load, and in about 40 seconds upon light load.

This gives test at approximately full load (except upon 50 amp. meter) and 5 per cent. of full load.

NOTE.—This data also applies to frequencies above 60 cycles; the frequency of test and service meters must be the same.

* 200 v.

DATA FOR TESTING 40 AND 50 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 10, 20 AMP.

SERVICE METER			THOMSON PORTABLE INDUCTION TEST METER														WATTHOURS PER REV.			
Amp. Cap.	Revolutions		Amp. Cap.	REVOLUTIONS OF STANDARD FOR 94–106 % REGISTRATION OF SERVICE METER													100–120 V. Meters		200–240 V. Meters	
	Heavy Load	Light Load		94 %	95 %	96 %	97 %	98 %	99 %	100 %	101 %	102 %	103 %	104 %	105 %	106 %	Service	Standard	Service	Standard
3	18		10	7.66	7.58	7.50	7.42	7.35	7.27	7.20	7.13	7.06	6.99	6.92	6.86	6.79	0.3	0.750	0.6	1.50
5	18		10	12.77	12.63	12.50	12.37	12.24	12.12	12.00	11.88	11.76	11.65	11.54	11.43	11.32	0.5	0.750	1.0	1.50
10	18		10	25.53	25.26	25.00	24.74	24.49	24.24	24.00	23.76	23.53	23.30	23.08	22.86	22.64	1.0	0.750	2.0	1.50
15	18		20	19.15	18.95	18.75	18.56	18.37	18.18	18.00	17.82	17.65	17.48	17.31	17.14	16.98	1.5	1.500	3.0	3.00
25	17		20	30.14	29.82	29.51	29.21	28.91	28.62	28.33	28.05	27.78	27.51	27.24	26.98	26.73	2.5	1.500	5.0	3.00
50	8		20	28.37	28.07	27.78	27.49	27.21	26.94	26.67	26.40	26.14	25.89	25.64	25.40	25.16	5.0	1.500	10.0	3.00
3		1	1	4.25	4.21	4.17	4.12	4.08	4.04	4.00	3.96	3.92	3.88	3.85	3.81	3.77	0.3	0.075	0.6	0.15
5		1	1	7.09	7.02	6.94	6.87	6.80	6.73	6.67	6.60	6.54	6.47	6.41	6.35	6.29	0.5	0.075	1.0	0.15
10		1	1	14.18	14.03	13.89	13.75	13.61	13.47	13.33	13.20	13.07	12.94	12.82	12.70	12.58	1.0	0.075	2.0	0.15
15		1	1	21.28	21.05	20.83	20.62	20.41	20.20	20.00	19.80	19.61	19.42	19.23	19.05	18.87	1.5	0.075	3.0	0.15
25		1	10	3.55	3.51	3.47	3.44	3.40	3.37	3.33	3.30	3.27	3.24	3.21	3.17	3.14	2.5	0.750	5.0	1.50
50		1	10	7.09	7.02	6.94	6.87	6.80	6.73	6.67	6.60	6.54	6.47	6.41	6.35	6.29	5.0	0.750	10.0	1.50

Speeds for 110 and 220 volt meters are the same.

The service meter should be loaded so as to give the number of revolutions stated in the table in about one minute's time upon full load and in 50 seconds upon light load.

This gives test at full load and approximately 5 per cent. of full load except upon 50 ampere meter.

DATA FOR TESTING 25 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 10, 20 AMP.

SERV. METER			THOMSON PORTABLE INDUCTION TEST METER														WATTHOURS PER REV.			
	Revolutions			REVOLUTIONS OF STANDARD FOR 94–106 % REGISTRATION OF SERVICE METER													100–110 V. Meters		200–220 V. Meters	
Amp. Cap.	Heavy Load	Light Load	Amp. Cap.	94 %	95 %	96 %	97 %	98 %	99 %	100 %	101 %	102 %	103 %	104 %	105 %	106 %	Service	Standard	Service	Standard
3	14		10	5.96	5.89	5.83	5.77	5.71	5.66	5.60	5.54	5.49	5.44	5.38	5.33	5.28	0.40	1.0	...	...
3	14		*10	5.59	5.53	5.47	5.41	5.36	5.30	5.25	5.20	5.15	5.10	5.05	5.00	4.95	...	...	0.75	2.0
5	15		10	9.57	9.47	9.37	9.28	9.18	9.09	9.00	8.91	8.82	8.74	8.65	8.57	8.49	0.60	1.0	...	...
5	15		*10	9.97	9.87	9.77	9.66	9.57	9.47	9.37	9.28	9.19	9.10	9.01	8.93	8.84	...	...	1.25	2.0
10	15		10	19.95	19.74	19.53	19.33	19.13	18.94	18.75	18.56	18.38	18.20	18.03	17.86	17.69	1.25	1.0	2.50	2.0
15	14		20	14.89	14.74	14.58	14.43	14.29	14.14	14.00	13.86	13.73	13.59	13.46	13.33	13.21	2.00	2.0	4.00	4.0
25	13		20	20.74	20.53	20.31	20.10	19.90	19.70	19.50	19.31	19.12	18.93	18.75	18.57	18.40	3.00	2.0	6.00	4.0
50	6		20	19.15	18.95	18.75	18.56	18.37	18.18	18.00	17.82	17.65	17.48	17.31	17.14	16.98	6.00	2.0	...	...
50	6		*20	19.95	19.74	19.53	19.33	19.13	18.94	18.75	18.56	18.38	18.20	18.03	17.86	17.69	...	...	12.50	4.0
3		1	1	4.25	4.21	4.17	4.12	4.08	4.04	4.00	3.96	3.92	3.88	3.85	3.81	3.77	0.40	0.1	...	...
3		1	*1	3.99	3.95	3.91	3.87	3.83	3.79	3.75	3.71	3.68	3.64	3.61	3.57	3.54	...	...	0.75	0.2
5		1	1	6.38	6.32	6.25	6.19	6.12	6.06	6.00	5.94	5.88	5.83	5.77	5.71	5.66	0.60	0.1	...	...
5		1	*1	6.65	6.58	6.51	6.44	6.38	6.31	6.25	6.19	6.13	6.07	6.01	5.95	5.90	...	...	1.25	0.2
10		1	1	13.30	13.16	13.02	12.89	12.75	12.63	12.50	12.38	12.26	12.14	12.02	11.90	11.79	1.25	0.1	2.50	0.2
15		1	1	21.28	21.05	20.83	20.62	20.41	20.20	20.00	19.80	19.61	19.42	19.23	19.05	18.87	2.00	1.0	4.00	2.0
25		1	10	3.19	3.16	3.12	3.09	3.06	3.03	3.00	2.97	2.94	2.91	2.88	2.86	2.83	3.00	1.0	6.00	2.0
50		1	10	6.38	6.32	6.25	6.19	6.12	6.06	6.00	5.94	5.88	5.83	5.77	5.71	5.66	6.00	1.0	...	...
50		1	*10	6.65	6.58	6.51	6.44	6.38	6.31	6.25	6.19	6.13	6.07	6.01	5.95	5.90	...	...	12.50	2.0

Speeds for the 110 and 220 volt meters are the same except for 3, 5 and 50 amperes.

The service meter should be loaded so as to give the number of revolutions stated in table in about one minute's time upon heavy load, and in about 40 seconds upon light load.

This gives test at full load and approximately 5 per cent. of full load except upon 50 ampere meter.

* 220 v.

DATA FOR TESTING 60 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 5, 10, 50, 100 AMP.

SERV. METER			THOMSON STANDARD PORTABLE TEST METER															WATTHOURS PER REV.			
	Revolutions			REVOLUTIONS OF STANDARD FOR 94–106 % REGISTRATION OF SERVICE METER														100–120 V. Meters		200–240 V. Meters	
Amp. Cap.	Heavy Load	Light Load	Amp. Cap.	94 %	95 %	96 %	97 %	98 %	99 %	100 %	101 %	102 %	103 %	104 %	105 %	106 %	Service	Standard	Service	Standard
3	30		5	25.53	25.26	25.00	24.74	24.49	24.24	24.0	23.76	23.53	23.30	23.08	22.86	22.64	0.2	0.25	0.40	0.5
5	30		5	38.30	37.89	37.50	37.11	36.73	36.36	36.0	35.64	35.29	34.95	34.62	34.29	33.96	0.3	0.25	0.60	0.5
10	30		10	38.30	37.89	37.50	37.11	36.73	36.36	36.0	35.64	35.29	34.95	34.62	34.29	33.96	0.6	0.50	...	...
10	30		*10	39.89	39.47	39.06	38.66	38.27	37.88	37.5	37.13	36.76	36.41	36.06	35.71	35.38	...	...	1.25	1.0
15	20		10	42.55	42.11	41.67	41.24	40.82	40.40	40.0	39.60	39.22	38.83	38.46	38.10	37.74	1.0	0.50	2.00	1.0
25	30		50	19.15	18.95	18.75	18.56	18.37	18.18	18.0	17.82	17.65	17.48	17.31	17.14	16.98	1.5	2.50	3.00	5.0
50	30		50	38.30	37.89	37.50	37.11	36.73	36.36	36.0	35.64	35.29	34.95	34.62	34.29	33.96	3.0	2.50	6.00	5.0
75	30		100	31.91	31.58	31.25	30.93	30.61	30.30	30.0	29.70	29.41	29.13	28.85	28.57	28.30	5.0	5.00	10.00	10.0
100	30		100	38.30	37.89	37.50	37.11	36.73	36.36	36.0	35.64	35.29	34.95	34.62	34.29	33.96	6.0	5.00	...	...
100	30		*100	39.89	39.47	39.06	38.66	38.27	37.88	37.5	37.13	36.76	36.41	36.06	35.71	35.38	...	...	12.50	10.0
3		1	1	4.25	4.21	4.17	4.12	4.08	4.04	4.0	3.96	3.92	3.88	3.85	3.81	3.77	0.2	0.05	0.40	0.1
5		1	1	6.38	6.32	6.25	6.19	6.12	6.06	6.0	5.94	5.88	5.83	5.77	5.71	5.66	0.3	0.05	0.60	0.1
10		1	1	12.77	12.63	12.50	12.37	12.24	12.12	12.0	11.88	11.76	11.65	11.54	11.43	11.32	0.6	0.05	...	...
10		1	*1	13.30	13.16	13.02	12.89	12.75	12.63	12.5	12.38	12.26	12.14	12.02	11.90	11.79	...	...	1.25	0.1
15		1	1	21.28	21.05	20.83	20.62	20.41	20.20	20.0	19.80	19.61	19.42	19.23	19.05	18.87	1.0	0.05	2.00	0.1
25		1	1	31.91	31.58	31.25	30.93	30.61	30.30	30.0	29.70	29.41	29.13	28.85	28.57	28.30	1.5	0.05	3.00	0.1
50		1	5	12.77	12.63	12.50	12.37	12.24	12.12	12.0	11.88	11.76	11.65	11.54	11.43	11.32	3.0	0.25	6.00	0.5
75		1	5	21.28	21.05	20.83	20.62	20.41	20.20	20.0	19.80	19.61	19.42	19.23	19.05	18.87	5.0	0.25	10.00	0.5
100		1	5	25.53	25.26	25.00	24.74	24.49	24.24	24.0	23.76	23.53	23.30	23.08	22.86	22.64	6.0	0.25	...	...
100		1	*5	26.60	26.32	26.04	25.77	25.51	25.25	25.0	24.75	24.51	24.27	24.04	23.81	23.58	...	...	12.50	0.5

Speeds for the 110 and 220 volt meters are the same except for 10 and 100 amperes.

The service meter should be loaded so as to give the number of revolutions stated in the table in about one minute's time upon heavy load, and in about 40 seconds upon light load. This gives test at full load and approximately 5 per cent. of full load.

NOTE.—This data also applies to frequencies above 60 cycles; the frequency of test and service meters must be the same.

* 220 v.

DATA FOR TESTING 40 AND 50 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 5, 10, 50, 100 AMP.

SERV. METER			THOMSON PORTABLE INDUCTION TEST METER															WATTHOURS PER REV.			
	Revolutions			REVOLUTIONS OF STANDARD FOR 94–106% REGISTRATION OF SERVICE METER														100–120 V. Meters		200–240 V. Meters	
Amp. Cap.	Heavy Load	Light Load	Amp. Cap.	94%	95%	96%	97%	98%	99%	100%	101%	102%	103%	104%	105%	106%		Service	Standard	Service	Standard
3	18		5	15.32	15.16	15.00	14.84	14.69	14.54	14.40	14.26	14.12	13.98	13.85	13.71	13.58		0.3	0.375	0.6	0.75
5	18		5	25.53	25.26	25.00	24.74	24.49	24.24	24.00	23.76	23.53	23.30	23.08	22.86	22.64		0.5	0.375	1.0	0.75
10	18		10	25.53	25.26	25.00	24.74	24.49	24.24	24.00	23.76	23.53	23.30	23.08	22.86	22.64		1.0	0.750	2.0	1.50
15	15		10	31.91	31.58	31.25	30.93	30.61	30.30	30.00	29.70	29.41	29.13	28.85	28.57	28.30		1.5	0.750	3.0	1.50
25	18		50	12.77	12.63	12.50	12.37	12.24	12.12	12.00	11.88	11.76	11.65	11.54	11.43	11.32		2.5	3.750	5.0	7.50
50	18		50	25.53	25.26	25.00	24.74	24.49	24.24	24.00	23.76	23.53	23.30	23.08	22.86	22.64		5.0	3.750	10.0	7.50
75	18		100	19.15	18.95	18.75	18.56	18.37	18.18	18.00	17.82	17.65	17.48	17.31	17.14	16.98		7.5	7.500	15.0	15.00
100	18		100	25.53	25.26	25.00	24.74	24.49	24.24	24.00	23.76	23.53	23.30	23.08	22.86	22.64		10.0	7.500	20.0	15.00
3		1	1	4.25	4.21	4.17	4.12	4.08	4.04	4.00	3.96	3.92	3.88	3.85	3.81	3.77		0.3	0.075	0.6	0.15
5		1	1	7.09	7.02	6.94	6.87	6.80	6.73	6.67	6.60	6.54	6.47	6.41	6.35	6.29		0.5	0.075	1.0	0.15
10		1	1	14.18	14.03	13.89	13.75	13.61	13.47	13.33	13.20	13.07	12.94	12.82	12.70	12.58		1.0	0.075	2.0	0.15
15		1	1	21.28	21.05	20.83	20.62	20.41	20.20	20.00	19.80	19.61	19.42	19.23	19.05	18.87		1.5	0.075	3.0	0.15
25		1	5	7.09	7.02	6.94	6.87	6.80	6.73	6.67	6.60	6.54	6.47	6.41	6.35	6.29		2.5	0.375	5.0	0.75
50		1	5	14.18	14.03	13.89	13.75	13.61	13.47	13.33	13.20	13.07	12.94	12.82	12.70	12.58		5.0	0.375	10.0	0.75
75		1	5	21.28	21.05	20.83	20.62	20.41	20.20	20.00	19.80	19.61	19.42	18.23	19.05	18.87		7.5	0.375	15.0	0.75
100		1	10	14.18	14.03	13.89	13.75	13.61	13.47	13.33	13.20	13.07	12.94	12.82	12.70	12.58		10.0	0.750	20.0	1.50

Speeds for the 110 and 220 volt meters are the same.

The service meter should be loaded so as to give the number of revolutions stated in the table in about one minute's time upon full load, and in about 50 seconds upon light load.

This gives test at full load and approximately 5 per cent. of full load.

DATA FOR TESTING 25 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 5, 10, 50, 100 AMP.

SERV. METER			THOMSON PORTABLE INDUCTION TEST METER															WATTHOURS PER REV.			
	Revolutions			REVOLUTIONS OF STANDARD FOR 94–106 % REGISTRATION OF SERVICE METER														100–120 V. Meters		200–240 V. Meters	
Amp. Cap.	Heavy Load	Light Load	Amp. Cap.	94 %	95 %	96 %	97 %	98 %	99 %	100 %	101 %	102 %	103 %	104 %	105 %	106 %	Service	Standard	Service	Standard
3	14		5	11.91	11.79	11.67	11.55	11.43	11.31	11.20	11.09	10.98	10.87	10.77	10.67	10.53	0.40	0.5	...	...
3	15		* 5	11.97	11.84	11.72	11.60	11.48	11.36	11.25	11.14	11.03	10.92	10.82	10.71	10.61	...	...	0.75	1.00
5	15		5	19.15	18.95	18.75	18.56	18.37	18.18	18.00	17.82	17.65	17.48	17.31	17.14	16.98	0.60	0.5	...	...
5	15		* 5	19.95	19.74	19.53	19.33	19.13	18.94	18.75	18.56	18.38	18.20	18.03	17.86	17.69	...	...	1.25	1.00
10	15		10	19.95	19.74	19.53	19.33	19.13	18.94	18.75	18.56	18.38	18.20	18.03	17.86	17.69	1.25	1.0	2.50	2.00
15	11		10	23.40	23.16	22.92	22.68	22.45	22.22	22.00	21.78	21.57	21.36	21.15	20.95	20.75	2.00	1.0	4.00	2.00
25	15		50	9.57	9.47	9.37	9.28	9.18	9.09	9.00	8.91	8.82	8.74	8.65	8.57	8.49	3.00	5.0	6.00	10.00
50	15		50	19.15	18.95	18.75	18.56	18.37	18.18	18.00	17.82	17.65	17.48	17.31	17.14	16.98	6.00	5.0	...	...
50	15		*50	19.95	19.74	19.53	19.33	19.13	18.94	18.75	18.56	18.38	18.20	18.03	17.86	17.69	...	...	12.50	10.00
75	15		100	15.96	15.79	15.62	15.46	15.31	15.15	15.00	14.85	14.71	14.56	14.42	14.29	14.15	10.00	10.0	20.00	20.00
100	15		100	19.95	19.74	19.53	19.33	19.13	18.94	18.75	18.56	18.38	18.20	18.03	17.86	17.69	12.50	10.0	25.00	20.00
3		1	1	4.25	4.21	4.17	4.12	4.08	4.04	4.00	3.96	3.92	3.88	3.85	3.81	3.77	0.40	0.1	...	...
3		1	* 1	3.99	3.95	3.91	3.87	3.83	3.79	3.75	3.71	3.68	3.64	3.61	3.57	3.54	...	...	0.75	0.20
5		1	1	6.38	6.32	6.25	6.19	6.12	6.06	6.00	5.94	5.88	5.83	5.77	5.71	5.66	0.60	0.1	...	...
5		1	* 1	6.65	6.58	6.51	6.44	6.38	6.31	6.25	6.19	6.13	6.07	6.01	5.95	5.90	...	...	1.25	0.20
10		1	1	13.30	13.16	13.02	12.89	12.75	12.63	12.50	12.38	12.26	12.14	12.02	11.90	11.79	1.25	0.1	2.50	0.20
15		1	1	21.28	21.05	20.83	20.62	20.41	20.20	20.00	19.80	19.61	19.42	19.23	19.05	18.87	2.00	0.1	4.00	0.20
25		1	5	6.38	6.32	6.25	6.19	6.12	6.06	6.00	5.94	5.88	5.83	5.77	5.71	5.66	3.00	0.5	6.00	1.00
50		1	5	12.77	12.63	12.50	12.37	12.24	12.12	12.00	11.88	11.76	11.65	11.54	11.43	11.32	6.00	0.5	...	...
50		1	* 5	13.30	13.16	13.02	12.89	12.75	12.63	12.50	12.38	12.26	12.14	12.02	11.90	11.79	...	...	12.50	1.00
75		1	10	10.64	10.53	10.42	10.31	10.20	10.10	10.00	9.90	9.80	9.71	9.62	9.52	9.43	10.00	1.0	20.00	2.00
100		1	10	13.30	13.16	13.02	12.89	12.75	12.63	12.50	12.38	12.26	12.14	12.02	11.90	11.79	12.50	1.0	25.00	2.00

Speeds for the 110 and 220 volt meters are the same except for 3, 5 and 50 amperes.
The service meter should be loaded so as to give the number of revolutions stated in table in about one minute's time upon both heavy and light load. This gives test at full load and approximately 5 per cent. of full load.

DATA FOR TESTING 60, 125 AND 133 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I-10, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 10, 20 AMP.

SERV. METER			THOMSON PORTABLE INDUCTION TEST METER															WATTHOURS PER REV.			
Amp. Cap.	Revolutions		Amp. Cap.	REVOLUTIONS OF TEST METER FOR 94–106 % REGISTRATION OF SERVICE METER														100–110 V. Meters		200–220 V. Meters	
	Heavy Load	Light Load		94 %	95 %	96 %	97 %	98 %	99 %	100 %	101 %	102 %	103 %	104 %	105 %	106 %		Service	Standard	Service	Standard
5	36		10	19.15	18.95	18.75	18.56	18.37	18.18	18.00	17.82	17.65	17.47	17.31	17.14	16.98		0.25	0.50	0.50	1.00
10	36		10	38.30	37.89	37.50	37.11	36.73	36.36	36.00	35.64	35.29	34.95	34.61	34.28	33.96		0.50	0.50	1.00	1.00
15	36		20	28.72	28.42	28.12	27.83	27.55	27.27	27.00	26.73	26.47	26.21	25.96	25.71	25.47		0.75	1.00	1.50	2.00
25	30		20	39.89	39.47	39.06	38.66	38.27	37.88	37.50	37.13	36.76	36.41	36.06	35.71	35.38		1.25	1.00	2.50	2.00
5		1	1	5.32	5.26	5.21	5.16	5.10	5.05	5.00	4.95	4.90	4.85	4.81	4.76	4.72		0.25	0.05	0.50	0.10
10		1	1	10.64	10.53	10.42	10.31	10.20	10.10	10.00	9.90	9.80	9.71	9.62	9.52	9.43		0.50	0.05	1.00	0.10
15		1	1	15.96	15.79	15.63	15.46	15.31	15.15	15.00	14.85	14.70	14.56	14.42	14.29	14.15		0.75	0.05	1.50	0.10
25		1	1	26.60	26.32	26.40	25.77	25.51	25.25	25.00	24.75	24.51	24.27	24.04	23.81	23.58		1.25	0.05	2.50	0.10

Speeds for the 110 and 220 volt meters are the same.

The service meter should be loaded so as to give the number of revolutions stated in the table in about one minute's time upon heavy load, and in about 33 seconds upon light load.

This gives test at full load, and approximately 5 per cent. of full load.

DATA FOR TESTING 40 AND 50 CYCLE, 110 AND 220 VOLT, SINGLE-PHASE WATTHOUR METERS, TYPE I-10, WITH THOMSON PORTABLE HIGH TORQUE INDUCTION TEST METER, 1, 10, 20 AMP.

SERV. METER			THOMSON PORTABLE INDUCTION TEST METER														WATTHOURS PER REV.			
	Revolutions			REVOLUTIONS OF TEST METER FOR 94–106 % REGISTRATION OF SERVICE METER													100–110 V. Meters		200–220 V. Meters	
Amp. Cap.	Heavy Load	Light Load	Amp. Cap.	94 %	95 %	96 %	97 %	98 %	99 %	100 %	101 %	102 %	103 %	104 %	105 %	106 %	Service	Standard	Service	Standard
5	36		10	12.77	12.63	12.50	12.37	12.24	12.12	12.00	11.88	11.76	11.65	11.54	11.43	11.32	0.25	0.75	0.50	1.50
10	36		10	25.53	25.26	25.00	24.74	24.49	24.24	24.00	23.76	23.53	23.30	23.08	22.87	22.64	0.50	0.75	1.00	1.50
15	36		20	19.15	18.95	18.75	18.56	18.37	18.18	18.00	17.82	17.65	17.48	17.31	17.14	16.98	0.75	1.5	1.50	3.00
25	30		20	26.60	26.32	26.04	25.77	25.51	25.25	25.00	24.75	24.51	24.27	24.04	23.81	23.58	1.25	1.5	2.50	3.00
5		1	1	3.55	3.51	3.47	3.44	3.40	3.37	3.33	3.30	3.27	3.24	3.21	3.18	3.15	0.25	0.075	0.50	0.15
10		1	1	7.09	7.02	6.94	6.87	6.80	6.73	6.67	6.61	6.54	6.47	6.41	6.35	6.29	0.50	0.075	1.00	0.15
15		1	1	10.64	10.53	10.42	10.31	10.20	10.10	10.00	9.90	9.80	9.71	9.62	9.52	9.43	0.75	0.075	1.50	0.15
25		1	1	17.72	17.54	17.35	17.18	17.00	16.84	16.67	16.50	16.33	16.17	16.02	15.87	15.72	1.25	0.075	2.50	0.15

Speeds for 110 and 220 volt meters are the same.

The service meter should be loaded so as to give the number of revolutions stated in the table in about one minute's time upon heavy load, and in about 33 seconds upon light load.

This gives test at full load, and approximately 5 per cent. of full load.

METHOD OF TESTING THOMSON POLYPHASE WATTHOUR METERS

The following outlines and diagrams explain the manner in which Thomson polyphase watthour meters may be tested upon a single-phase circuit.

FOUR-WIRE THREE-PHASE METERS, WITH THREE CURRENT AND TWO POTENTIAL ELEMENTS

Operation 1

Excite the current circuit of the upper element and potential circuits of both elements. If meter has been previously adjusted at any time, leave magnets in position. If not, place magnets in an approximately correct position, moving both sets about equally.

With meter connected as above, at one-half load, power-factor unity, read upper element.

With the same connection, at full load current, power-factor 0.5, read inductive load on upper element. By means of the left-hand lag wire (facing meter) the readings obtained upon inductive load should be made to check within the required limits of the readings obtained on non-inductive load.

Operation 2

Excite the current circuit of the lower element leaving the potential circuits of both elements excited. At one-half load, power-factor unity, balance the lower element with the upper by means of the taps of the lower reactive coil. This element should be adjusted so that the reading obtained will check within required accuracy limits of the corresponding one-half load reading obtained upon the upper element.

With this same connection, at full load, power-factor 0.5, read inductive load on lower element. By means of the right-hand lag wire (facing meter) the readings obtained upon inductive load should be made to check within the required limits of the readings obtained on non-inductive load.

Operation 3

Excite middle current element, leaving potential circuits of upper and lower elements excited. At one-half load, power-factor unity, read meter. If other operations have been carefully carried out, the meter will make twice the number of revolutions in the same time as when corresponding load passed through either the upper or lower element.

Operation 4

Connect current elements in series exciting both potential elements, and at power-factor unity load meter to its full rated capacity and adjust at this load by means of the magnets, moving both the upper and lower sets about equally. When the meter is connected as above, the constant marked upon the meter disk should be divided by 4. Assuming that a 5 amp., 220 "Δ" volts 127 "Y" volts 60 cycle meter having a calibrating constant of 1.25 is to be tested, the formula for testing, with instruments, becomes

$$\frac{3600 \times 0.3125 \times 25 \text{ (revs.)}}{635 \text{ (full load watts)}} = 44.3 \text{ (seconds)}.$$

Operation 5

Connect the meter as in operation (1) exciting only the potential circuit of the upper element. At the desired light load, 5 per cent. to 10 per cent. of full load, power-factor unity, adjust upper element on light load, the adjustment being obtained by moving the upper light load plate. Moving the light load lever toward the top bearing increases the speed and away from the top bearing decreases the speed. For this operation the constant marked upon the meter disk should be used.

Operation 6

Connect meter as in operation (2) exciting only the potential circuit of lower element. Repeat tests outlined in operation (5).

Four-wire, three-phase meters are rated both with delta and "Y" voltage, the meter constant being determined by the voltage between lines which is called the "delta" voltage. The calibrating voltage, or voltage on the meter is the delta voltage divided by square root of 3, i.e., it is the voltage between neutral and either of the lines.

In the case of meters with potential transformers, the latter are connected between the neutral and the lines, which is the equivalent of the practice upon secondary meters.

THREE-WIRE, TWO- AND THREE-PHASE AND FOUR-WIRE, TWO-PHASE METERS

In testing three-wire two- and three-phase and four-wire two-phase polyphase watthour meters, operations 1, 2, 5 and 6 of the four-wire, three-phase method of testing should be carried out.

Operation 3

Connect the current elements in series, exciting both potential elements, and at power-factor unity, load meter to its full rated capacity and adjust at this load by means of the magnets. When the meter is connected as above, the constant marked upon the meter disk should be divided by 2. Assuming that a 5 amp., 110 volt, 60 cycle meter having a meter constant of 0.6 is to be tested, the testing formula, using instruments becomes

$$\frac{3600 \times 0.3 \times 25 \text{ (revs.)}}{550 \text{ (full load watts)}} = 49.1 \text{ (seconds)}$$

Operations 4 and 5 correspond to operations 5 and 6 respectively, in the testing of four-wire three-phase meters.

It is desirable to check polyphase watthour meters finally upon light load with all the current coils in series and with both potential coils excited in the same manner that the full load was checked. Any necessary final adjustment of the light load may be made by means of either of the light load levers.

NOTE:—Rotating standards can be used to advantage in testing, especially where the voltage, and therefore the load, is variable.

CONNECTIONS OF A FOUR-WIRE THREE-PHASE WATTHOUR METER FOR TESTING UPON A SINGLE-PHASE CIRCUIT FOR METERS WITH THREE CURRENT AND TWO POTENTIAL ELEMENTS

FRONT VIEW

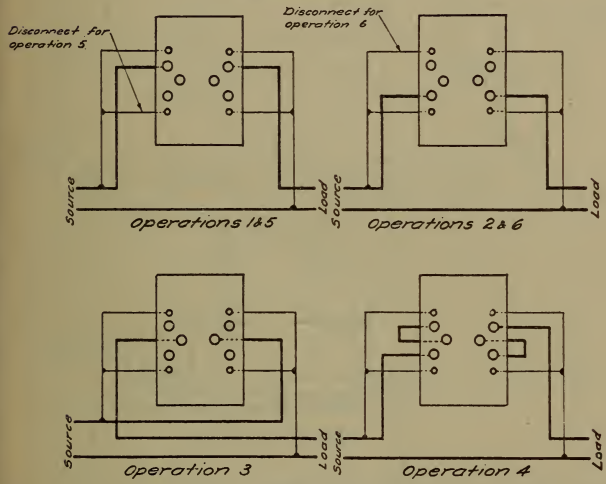


Fig. 15

This diagram covers only back connected meters whose potential circuits re independent of the current. In the case of front connected primary neters, connections should be made to the corresponding binding posts. For ront connected secondary meters, disconnect testing loops and make otential connections to leads of the potential coils.

CONNECTIONS OF A THREE-WIRE TWO- OR THREE-PHASE OR FOUR-WIRE TWO-PHASE WATTHOUR METER FOR TESTING UPON A SINGLE-PHASE CIRCUIT

FRONT VIEW

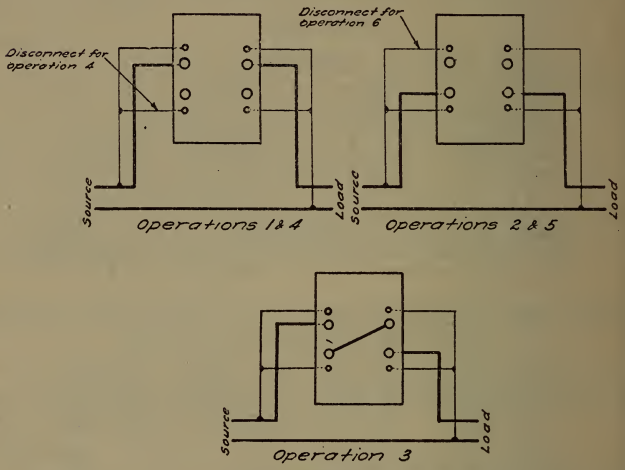


Fig. 16

This diagram covers only back connected meters whose potential circuits are independent of the current. In the case of front connected primary meters, connections should be made to the corresponding binding posts. For front connected secondary meters, disconnect testing loops and make potential connections to leads of the potential coils.

CONNECTIONS OF A THREE-WIRE TWO- OR THREE-PHASE WATTHOUR METER WHEN CHECKING BY MEANS OF SINGLE-PHASE PORTABLE TEST METER

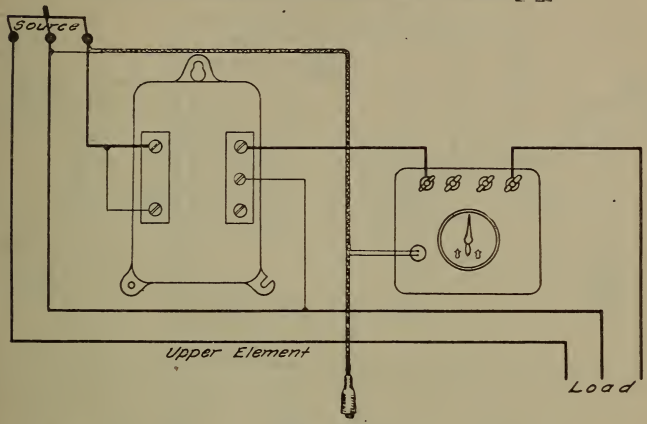


Fig. 17

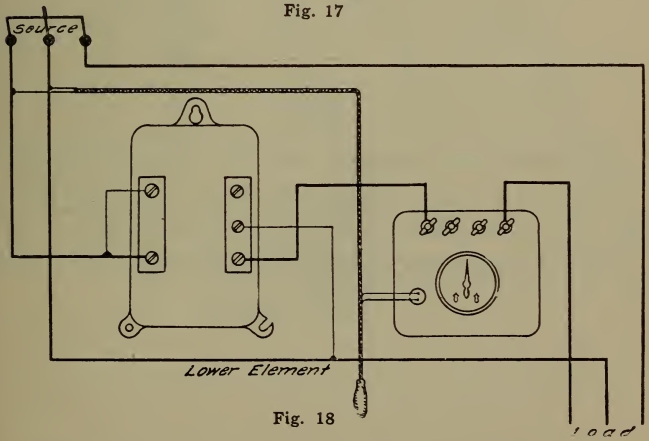


Fig. 18

NOTE.—From these sketches the corresponding connections for four-wire, two- or three-phase meters and for primary meters will be apparent.

CONNECTIONS OF A THREE-WIRE TWO- OR THREE-PHASE WATTHOUR METER WHEN CHECKING BY MEANS OF SINGLE-PHASE PORTABLE TEST METER

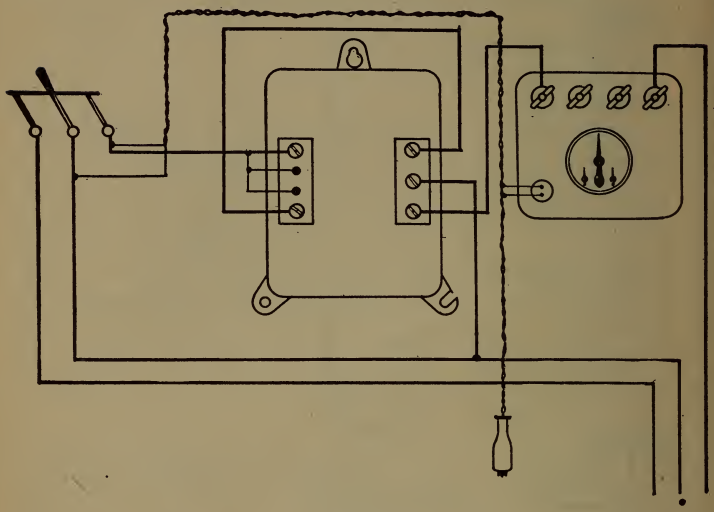


Fig. 19

This diagram shows method of testing with the elements connected in series.

NOTE.—In a secondary meter as shown above, testing loops should be disconnected and potential connections made to the wire from the potential coil. In a primary meter, potential connections should be made to the potential posts.

From this sketch the corresponding connections for 4-wire 2- or 3-phase and for primary meters will be apparent.

CONNECTIONS OF A THREE-WIRE TWO- OR THREE-PHASE WATTHOUR METER WHEN CHECKING, BY MEANS OF INDICATING INSTRUMENTS

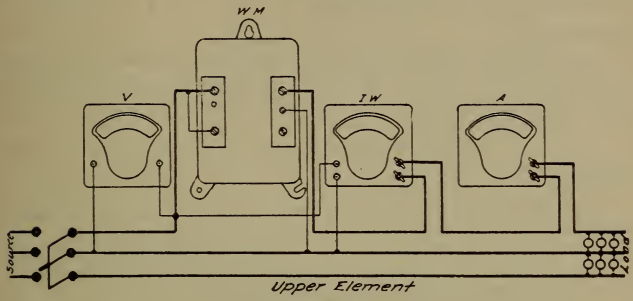


Fig. 20

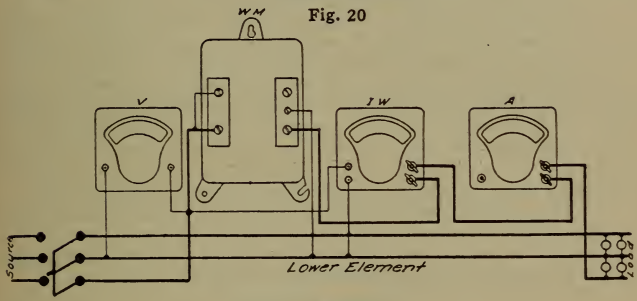


Fig. 21

V Voltmeter
WM Watthour Meter under Test
IW Indicating Wattmeter
A Indicating Ammeter

TESTING DIRECT CURRENT WATTHOUR METERS

Rotating standards can be used to advantage in the testing of direct current watthour meters, especially if the load is unsteady.

Before testing direct current watthour meters, it is advisable to allow them to run for at least twenty minutes in order to allow their potential circuits to heat up to their normal temperature.

Operation 1

Adjust meter on full load, adjusting by means of the front and back set of magnets. The formula for this operation when instruments are used is as quoted in previous tests.

$$\frac{3600 \times K \times R}{\text{watts}} = \text{time.}$$

Operation 2

Adjust meter on light load (one-twentieth of full load), by means of the adjustable shunt field coil.

Moving the shunt field coil into the field of the armature assists rotation and consequently speeds the meter while, conversely, moving the coil out of the field lessens its effect and tends to slow the meter.

The shunt field coil holders of Types C-5, C-6, C-7, C-9 and CR watthour meters are constructed so that the adjustment is obtained by swinging the coil and holder upon its supporting stud which is attached to the frame.

Three-wire meters may be tested as two-wire, by connecting the fields in series, the constant marked upon the disk being divided by 2. By disconnecting the potential wire which is grounded to the current coil terminal, and making a connection to this wire and to the other terminal to which the opposite side of the potential circuit is grounded any number of meters may be tested in series without recording the losses in the potential circuit.

The same general method of testing also applies to the Types CS, G-2 and G-3 meters.

To facilitate testing, the magnetic shield may be removed, but the meter should receive its final check with the shield in position.

ARMATURES

All standard direct current Thomson watthour meters with spherical armatures, except Types CQ and CQ-2, take the same armature differing only in the length of the leads.

The following description will assist in assembling a new armature into a meter.

First, loosen the check nut upon the jewel screw bushing and unscrew the jewel and the bushing as a unit. Remove the pivot and register, disconnect the leads and carefully remove the brushes.

Next, remove the shunt field coil, front series coil, and, the front set of magnets. The entire moving element may then be withdrawn from the meter.

Remove the disk from the shaft and unsolder leads from the commutator.

Insert a very small screw driver through the holes provided for this purpose in the armature core and unscrew the clamping screw in the armature sleeve or, if the armature be clamped to the meter shaft externally, loosen the clamping screw before attempting to remove the armature.

Withdraw the armature from the lower end of the shaft.

The ends of the commutator segments should then be carefully cleaned, if necessary using a piece of well-worn crocus cloth.

Next, slip new armature on the shaft taking care to see that the clamping screw has been loosened beforehand so that the shaft will be neither strained nor bent in sliding on the new armature.

Adjust armature correctly on shaft gauging its position by setting the shaft in position in the meter. The armature should rotate freely within the back field coil and should be located as nearly as possible in the center. When the correct position has been obtained bring the armature to a position on the shaft so that its leads are directly under the commutator segments, i.e., that the leads run straight up. Thus, in Type C armatures a lead starting from the junction of two armature coils connects to the commutator bar directly above it. In a correctly mounted armature the eight commutator bars will be directly in line with the eight openings in the armature core between coils as may be noted by sighting along the armature with the pivot end towards the eye. Any variation from this correct position will reduce the torque, causing the meter to run slower. In fact, a test for the correct setting of the "armature lead" consists in moving the armature slightly, first in one direction, then in the opposite direction. If the speed is reduced in either case, the armature was set correctly. In other words, the correct position of the armature is at the point of maximum torque.

When all necessary adjustments have been obtained, clamp the armature firmly upon the shaft.

Cut off armature leads to the desired length and solder leads to commutator segments, using only a soldering flux composed of rosin and alcohol.

Armatures may be assembled into Types CS, G-2 and G-3 meters in the same general manner.

In assembling armatures into meters of the types referred to above, the leads of the bottom armature should be given a half turn to the right, around its insulating sleeve, and brought straight up to a commutator segment. Another method of accomplishing the same result is to first connect all leads direct to the commutator segments and then turn the lower armature to the left 180 degrees.

Upon the lower end of the sleeve of the top armature for Types G-2 and G-3 meters is mounted a small wooden bushing with eight small holes drilled in it. In bringing up the leads of the lower armature to the commutator, they should pass through these holes. In all cases, it is recommended that the original construction, position and adjustment of parts be carefully noted that the new parts may be similarly assembled.

TYPE I THOMSON SINGLE-PHASE HIGH TORQUE WATTHOUR METER

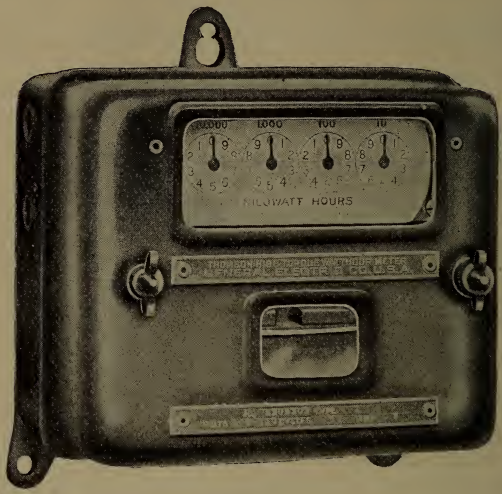


Fig. 22

INTERIOR VIEW OF TYPE I THOMSON SINGLE-PHASE HIGH TORQUE WATTHOUR METER

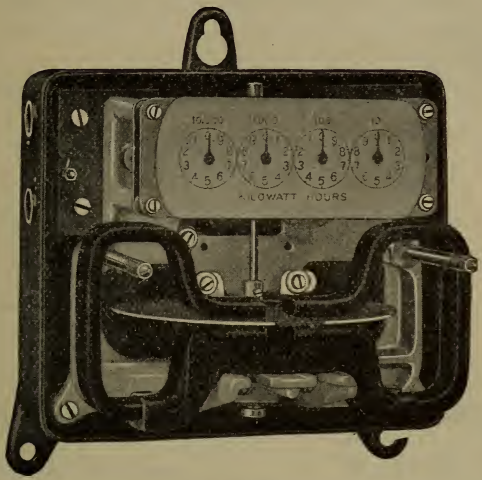


Fig. 23

DIMENSIONS OF TYPES I AND IP THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 25 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, 2-Wire, With and Without Transformers

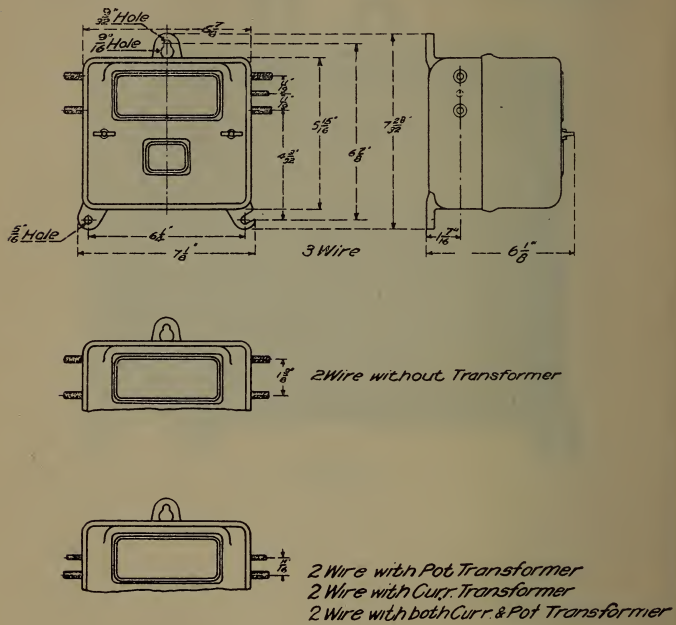


Fig. 24

DIMENSIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

50 to 100 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, 2-Wire, With and Without Transformers

50 to 100 Amps., 212 to 240 Volts, 25 to 60 Cycles (Single Lag Adjustment), 3-Wire, Without Transformers

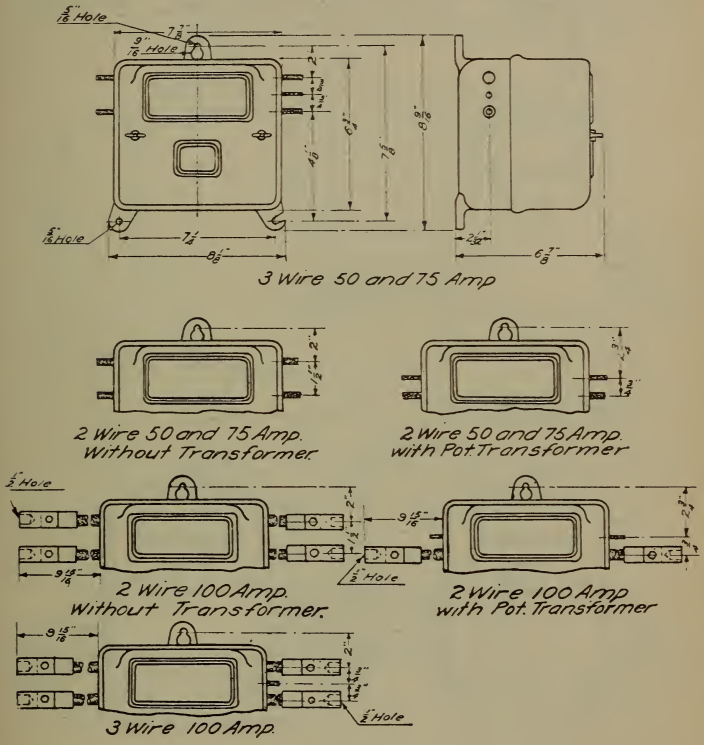


Fig. 25

DIMENSIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

50 to 100 Amps., 212 to 240 Volts, 125 to 140 Cycles (Double Lag Adjustment), 3-Wire, Without Transformers

150 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, 2- and 3-Wire, Without Transformers

200 and 300 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, 2-Wire, Without Transformers

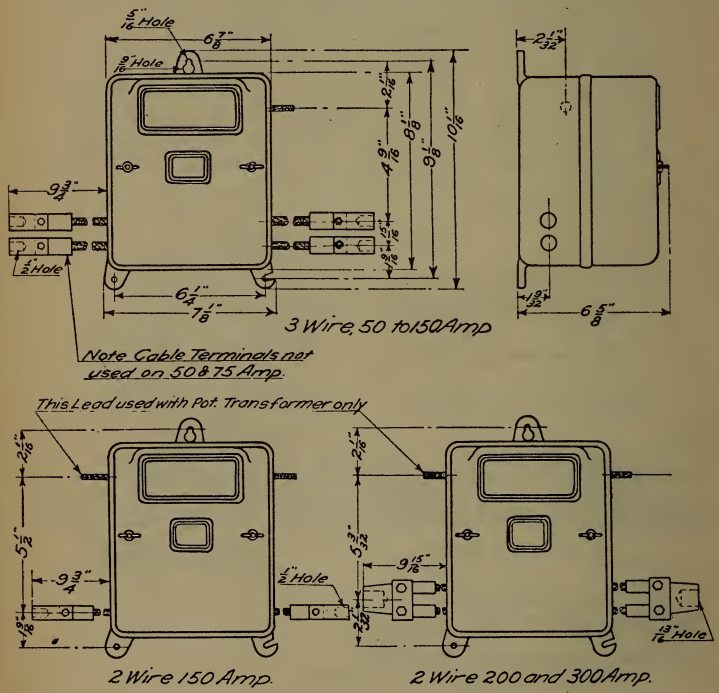


Fig. 26

EXTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 300 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, 2-Wire, Without Transformers

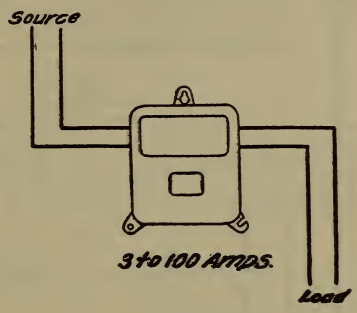


Fig. 27

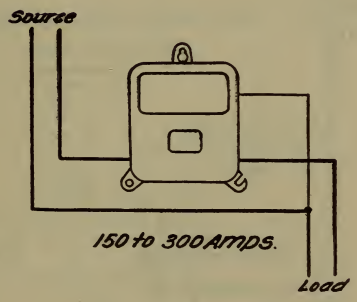
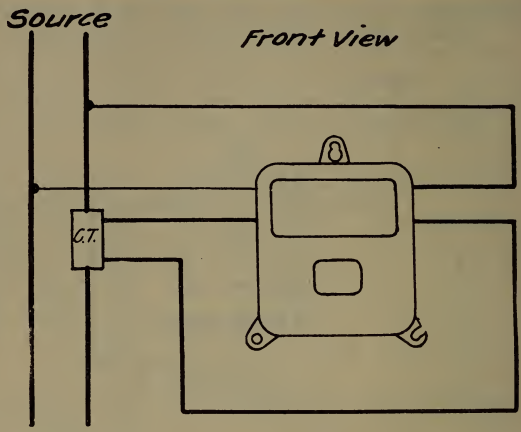


Fig. 28

EXTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

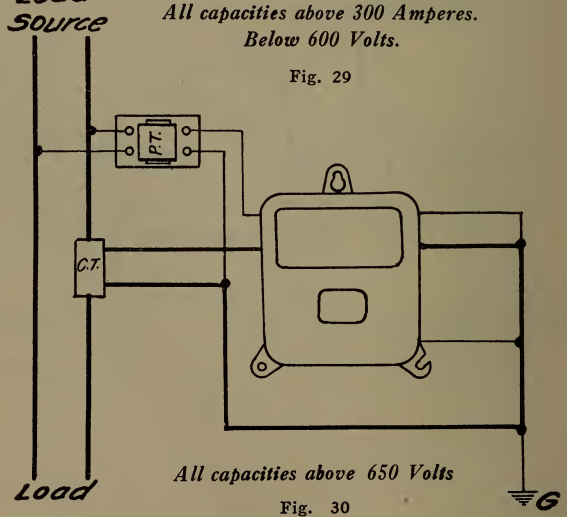
Above 300 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, With Current Transformer



All capacities above 300 Amperes. Below 600 Volts.

Fig. 29

Above 650 Volts, 25 to 140 Cycles, With Current and Potential Transformer



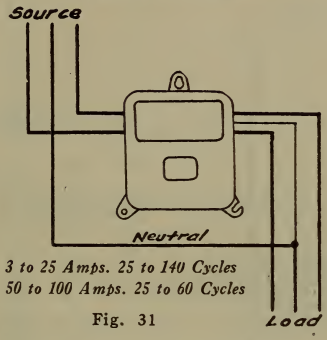
All capacities above 650 Volts

Fig. 30

EXTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

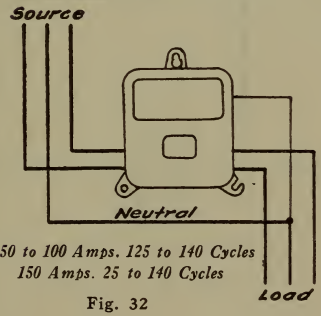
3 to 150 Amps., 212 to 240 Volts, 25 to 140 Cycles, 3-Wire
Without Transformers

FRONT VIEW



3 to 25 Amps. 25 to 140 Cycles
50 to 100 Amps. 25 to 60 Cycles

Fig. 31



50 to 100 Amps. 125 to 140 Cycles
150 Amps. 25 to 140 Cycles

Fig. 32

EXTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

Above 150 Amps., 212 to 240 Volts, 25 to 140 Cycles, 3-Wire
With Form DM-16 Current Transformer

FRONT VIEW

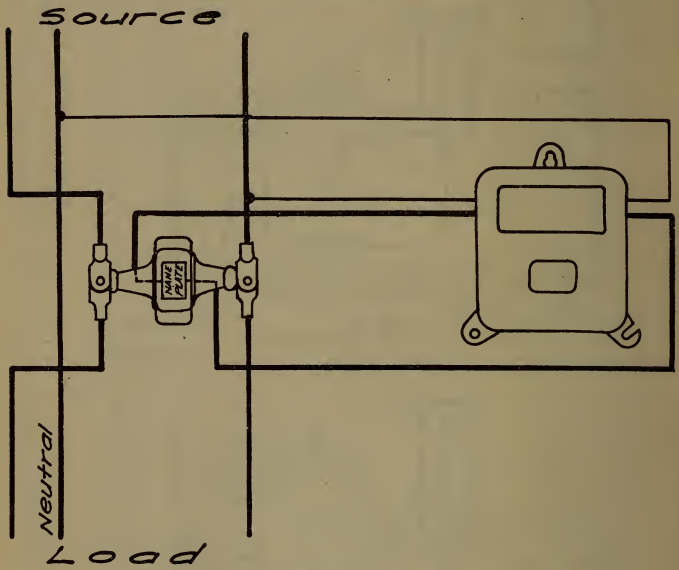


Fig. 33

EXTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

Above 150 Amps., 212 to 240 Volts, 25 to 140 Cycles, 3-Wire With Current Transformers

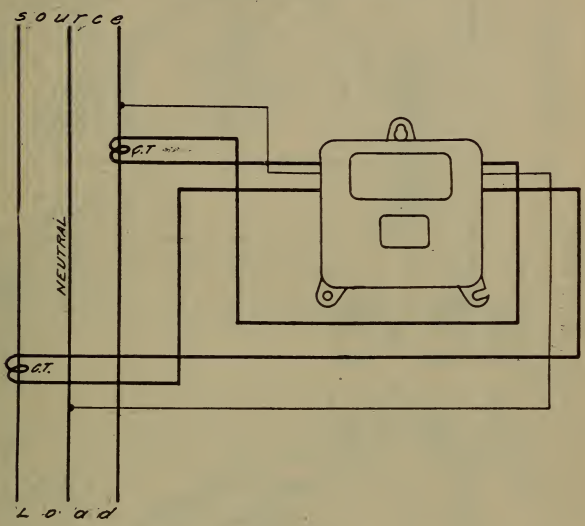
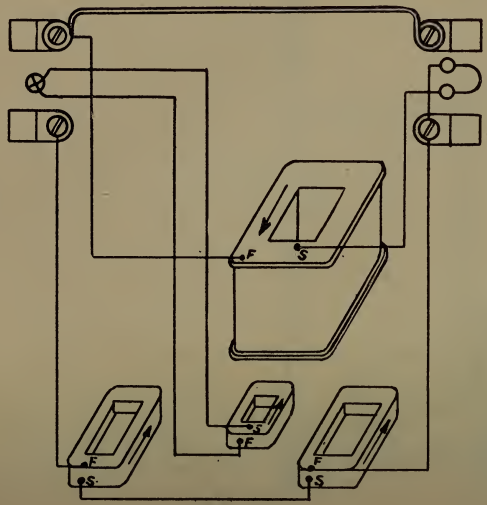


Fig. 34

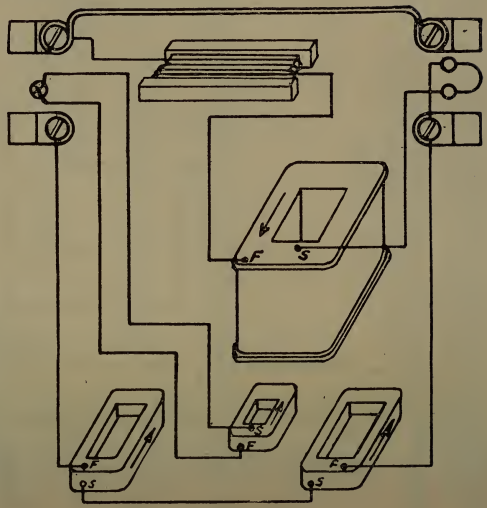
NOTE—This method supersedes method shown on page 58.

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 100 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 60 Cycles, 2-Wire
Without Transformers
BACK VIEW



3-25 Amps.
Fig. 35

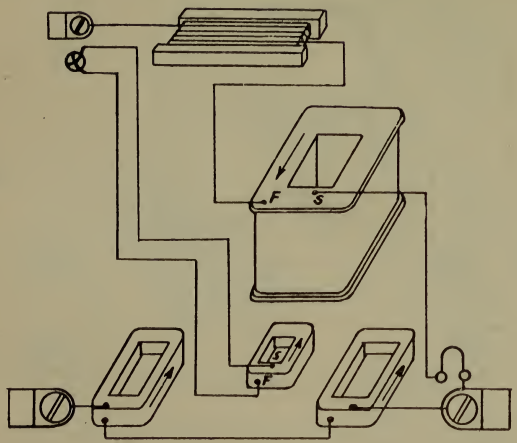


50-100 Amps
Fig. 36

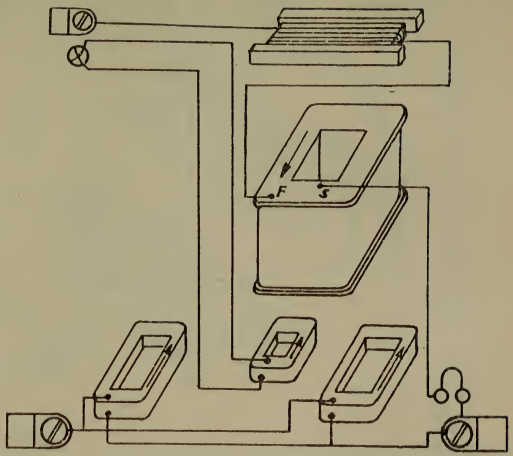
INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

150 to 300 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 60 Cycles, 2-Wire
Without Transformer

BACK VIEW



150 Amps.
Fig. 37



200 and 300 Amps.
Fig. 38

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 150 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 125 to 140 Cycles, 2-Wire, Without Transformer

BACK VIEW

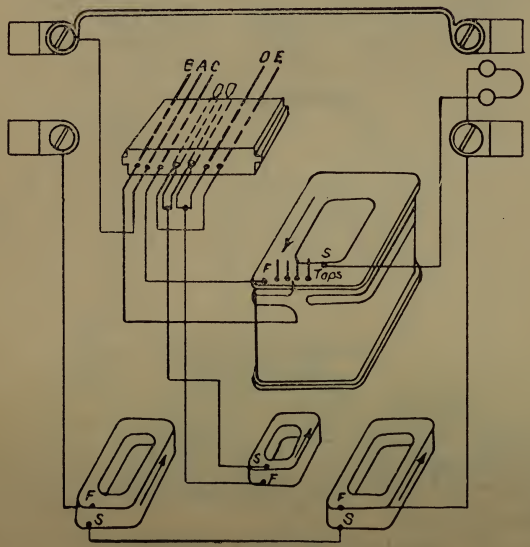


Fig. 39. 3-100 Amps.

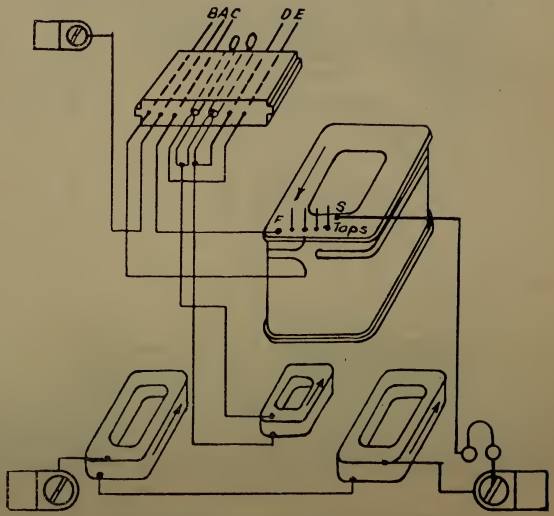
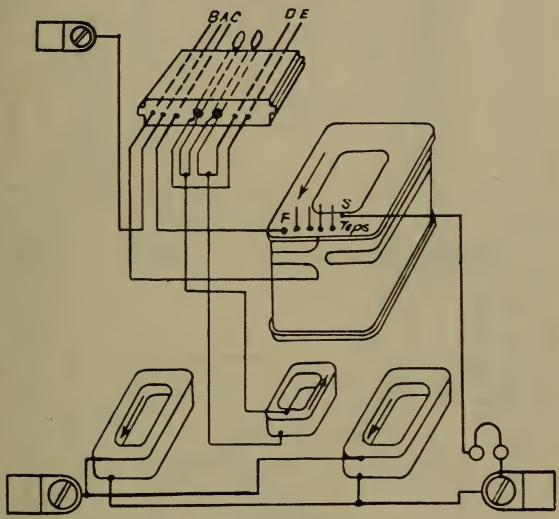


Fig. 40. 150 Amps.

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

200 to 300 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 125 to 140 Cycles, Without Transformer

BACK VIEW



200-300 Amps.

Fig. 41

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 100 Amps., 25 to 60 Cycles

Fig. 41, 2-Wire, Shows Connections of Meters With Either Current or Potential Transformer or both. Fig. 42 Shows Connections of Meters With Potential Transformer Only

BACK VIEW

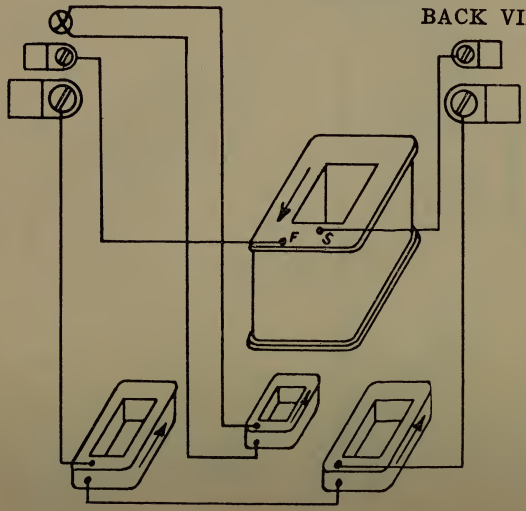


Fig. 42. Single Lag Adjustment 3-25 Amps.

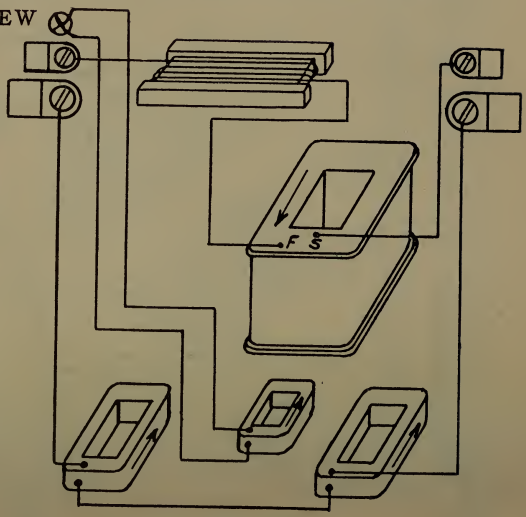
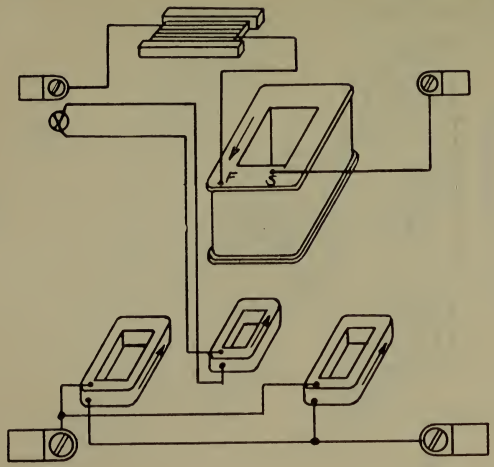


Fig. 43. Single Lag Adjustment 50-100 Amps.

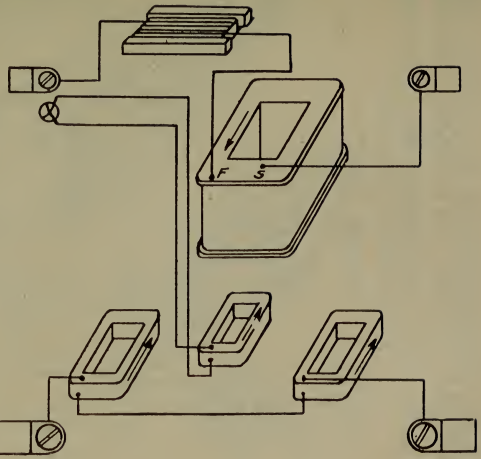
INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

150 to 300 Amps., 25 to 60 Cycles, 2-Wire, With Potential Transformer

BACK VIEW



150 Amps.
Fig. 44

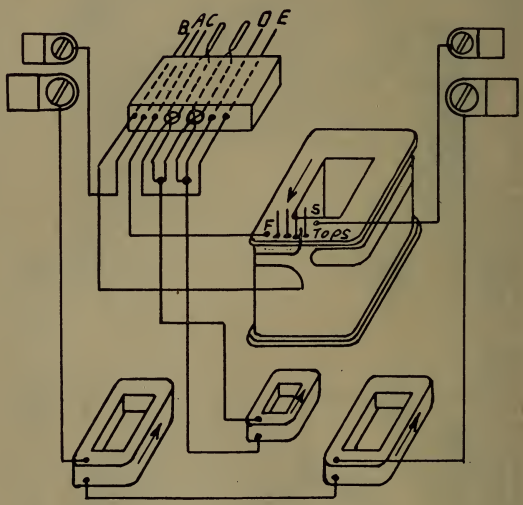


200 and 300 Amps.
Fig. 45

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 100 Amps., 125 to 140 Cycles, 2-Wire, With Either Current or Potential Transformer

BACK VIEW



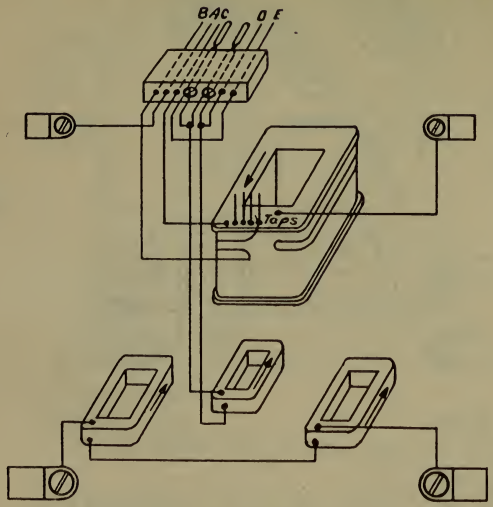
Double Lag Adjustment

Fig. 46

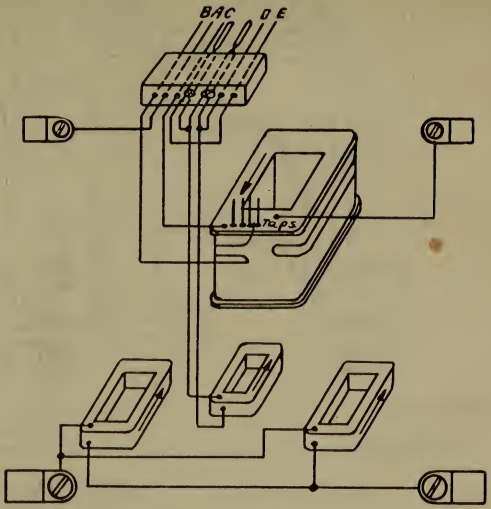
INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

150 to 300 Amps., 125 to 140 Cycles, 2-Wire, With Potential Transformer

BACK VIEW



150 Amps.
Fig. 47



200/300 Amps.
Fig. 48

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 25 Amps., 212 to 240 Volts, 25 to 60 Cycles, 3-Wire, Without Transformers

BACK VIEW

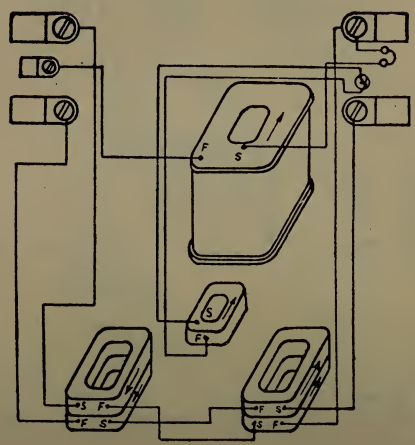


Fig. 49

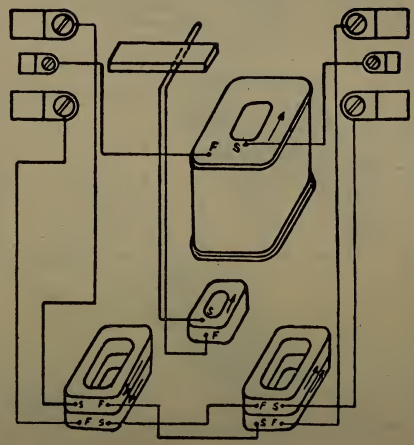


Fig. 50 (Special)

Fig. 50 marked "Special" indicates that the usual testing loop is omitted and a potential post is used instead.

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

50 to 100 Amps., 212 to 240 Volts, 25 to 60 Cycles, 3-Wire, Without Transformers

BACK VIEW

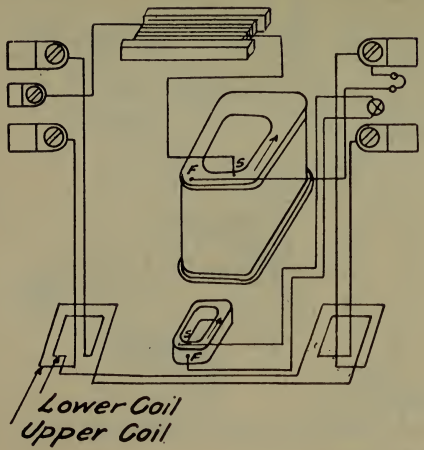


Fig. 51

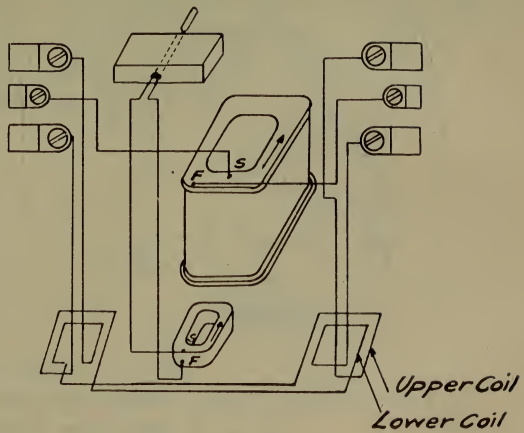


Fig. 52 (Special)

NOTE.—Fig. 52 marked "Special" indicates that the usual testing loop is omitted and a potential post is used instead.

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

150 Amps., 212 to 240 Volts, 25 to 60 Cycles, 3-Wire, Without Transformers

BACK VIEW

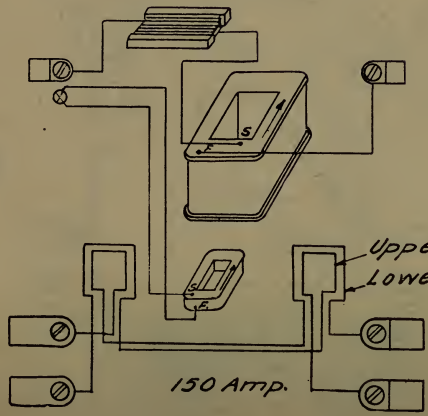


Fig. 53 (Special)

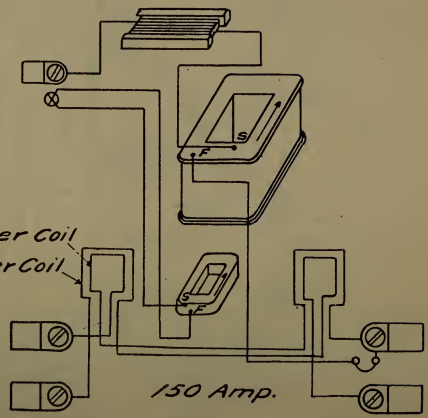


Fig. 54

NOTE.—Fig. 53 marked "Special" indicates that the usual testing loop is omitted and a potential post is used instead.

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 25 Amps., 212 to 240 Volts, 125 to 140 Cycles (Double Lag Adjustment), 3-Wire Without Transformer

BACK VIEW

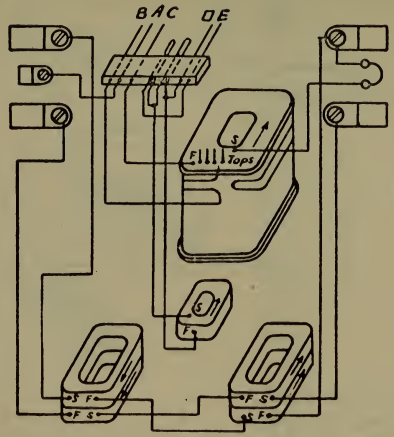


Fig. 55

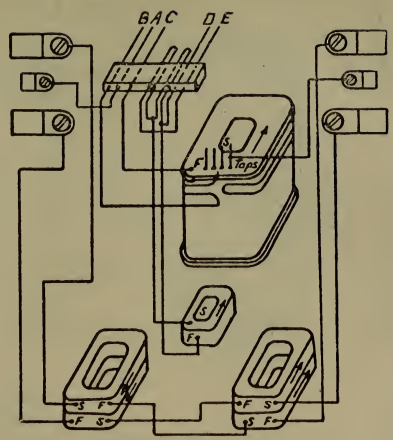


Fig. 56 (Special)

NOTE.—Fig. 56 marked "Special" indicates that the usual testing loop is omitted and a potential post is used instead.

INTERNAL CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

50 to 150 Amps., 212 to 240 Volts, 125 to 140 Cycles (Double Lag Adjustment), 3-Wire Without Transformers

BACK VIEW

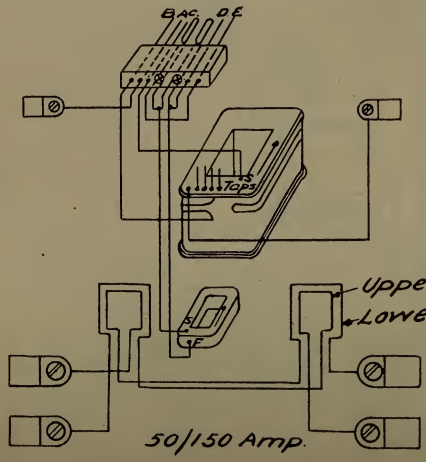


Fig. 57 (Special)

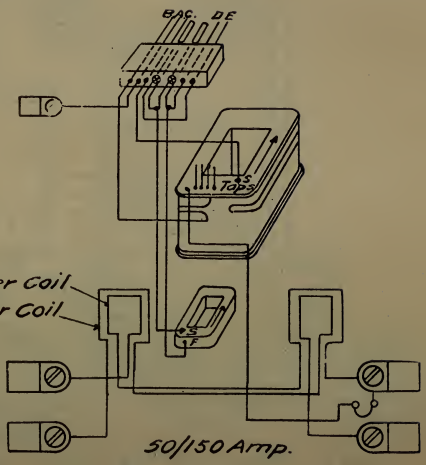


Fig. 58

NOTE.—Fig. 57 marked "Special" indicates that the usual testing loop is omitted and a potential post is used instead.

CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

SHOWING METHOD OF MAKING CONNECTIONS FOR DOUBLE LAG ADJUSTMENT

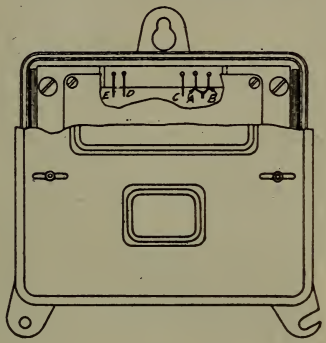


Fig. 59

Double Lag Adjustment

This sketch shows the connections made for the higher of the two frequencies. If it is desired to run the meter on a lower frequency, disconnect the wire A from B and solder A to C. Make a soldered connection between D and E. No other change is required except that it may be necessary to readjust the starting device.

CONNECTIONS OF TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

SHOWING METHOD OF MAKING CONNECTIONS FOR TESTING UPON SEPARATE POTENTIAL

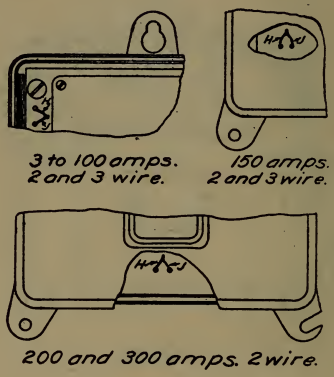


Fig. 60

Separate Potential Connections

If it is desired to test with separate potential connections, disconnect H and J. Connect J to one side of the source. In two-wire meters and in three-wire 150 amp. meters, connect the opposite side of source to upper right-hand terminal. In three-wire meters 3 to 100 amps. connect opposite side of source to central right-hand terminal.

TYPE I-8 THOMSON SINGLE-PHASE HIGH TORQUE WATTHOUR METER

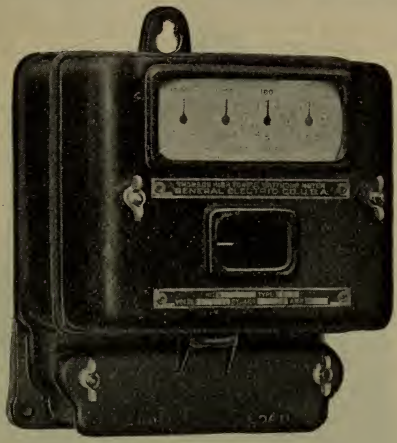


Fig. 61

INTERIOR VIEW OF TYPE I-8 THOMSON SINGLE-PHASE HIGH TORQUE WATTHOUR METER

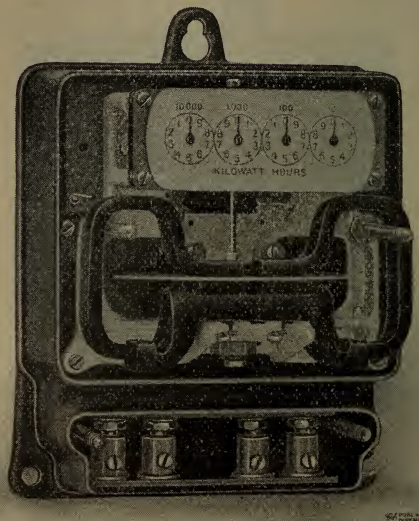


Fig. 62

DIMENSIONS OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 25 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 2-Wire and 212 to 240 Volts, 3-Wire, 25 to 140 Cycles, With and Without Transformers

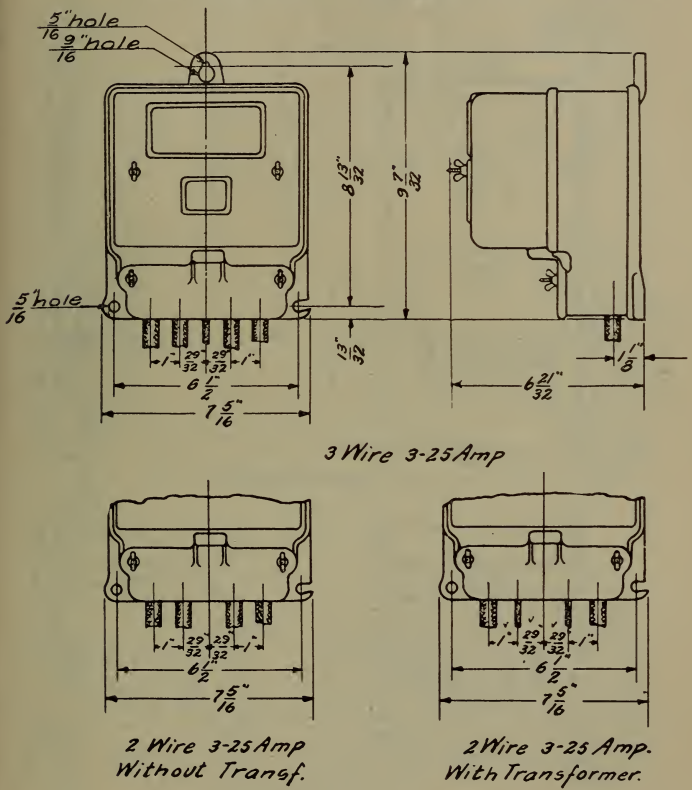


Fig. 63

DIMENSIONS OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

50 to 75 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, and 212 to 240 Volts, 3-Wire, 25 to 140 Cycles, With and Without Transformers

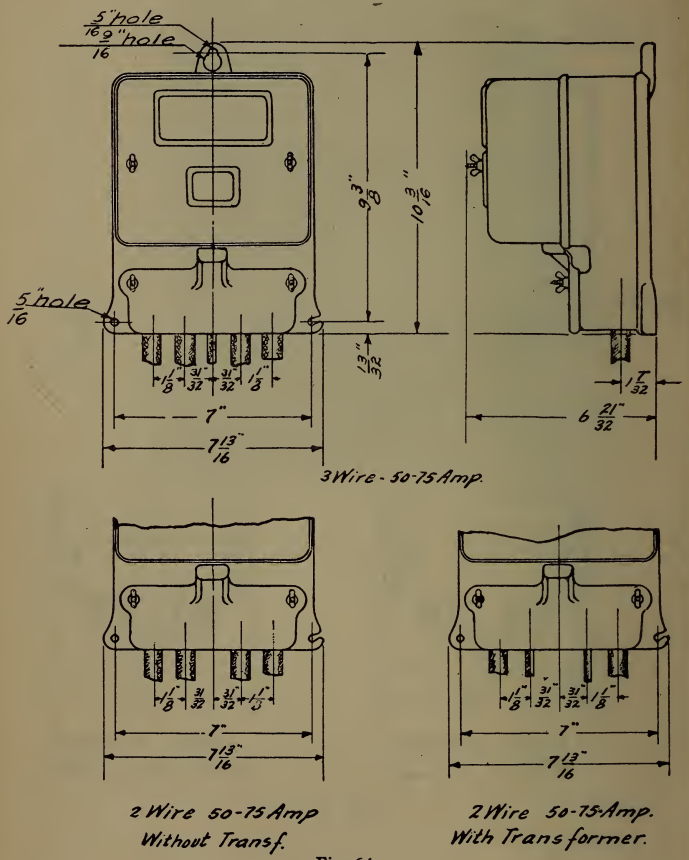


Fig. 64

EXTERNAL CONNECTIONS OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

2-WIRE

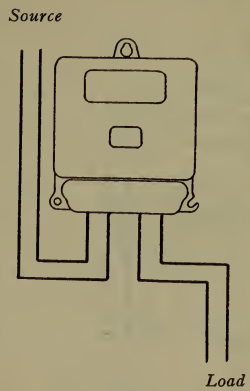


Fig. 65

3 to 75 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, Without Transformer

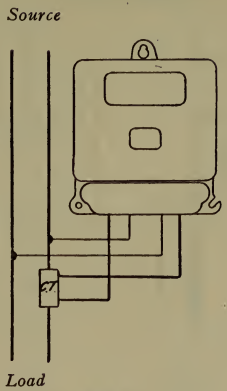


Fig. 66

Above 75 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 140 Cycles, With Current Transformer

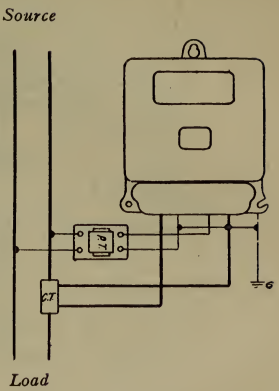


Fig. 67

Above 650 Volts, 25 to 140 Cycles, With Current and Potential Transformer

EXTERNAL CONNECTIONS OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

3-Wire

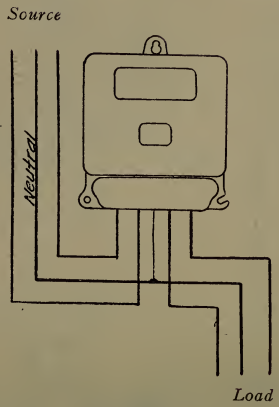


Fig. 68

3 to 75 Amps., 212 to 240 Volts, 25 to 140 Cycles, Without Transformer

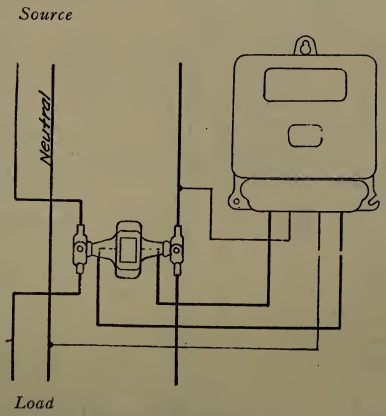


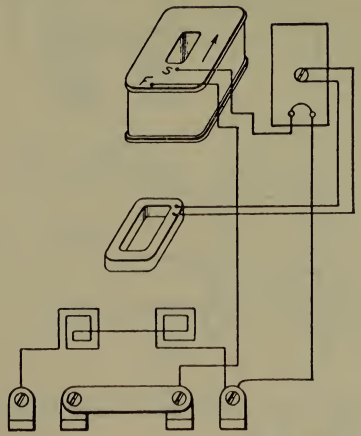
Fig. 69

Above 75 Amps., 212 to 240 Volts, 25 to 140 Cycles, with Form DM-16 Current Transformer

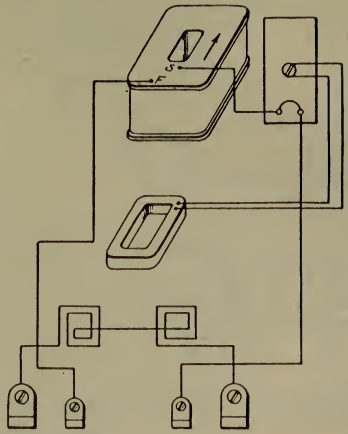
INTERNAL CONNECTIONS OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 75 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 25 to 60 Cycles, 2-Wire, With and Without Transformer

BACK VIEW



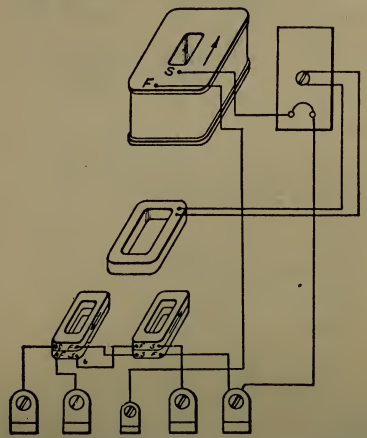
2-Wire Single Lag without Transformer.
3-75 Amps.
Fig. 70



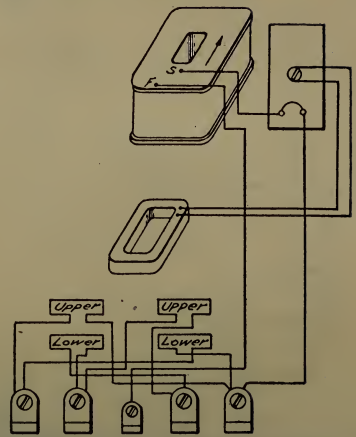
2- and 3-Wire Single Lag with Transformer.
3-75 Amps.
Fig. 71

INTERNAL CONNECTIONS OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 75 Amps., 212 to 240 Volts, 25 to 60 Cycles, 3-Wire, Without Transformer



3-Wire Single Lag without Transformer.
3-25 Amps.
Fig. 72



3-Wire Single Lag without Transformer.
50-75 Amps.
Fig. 73

CONNECTIONS OF POTENTIAL CIRCUIT OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

Showing Method of Making Connections for Double Lag Adjustment and of Making Connections to the Terminals

FRONT VIEW

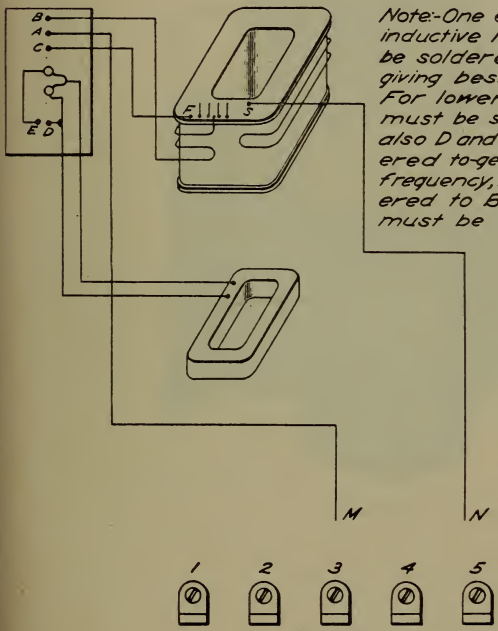


Fig. 74

All two-wire meters, post No. 3 is omitted.
Two-wire meters without trans., connect M to 4, N to 5. Type I-8.
Two-wire meters with trans., connect M to 2, N to 4. Type I-8.
Three-wire meters without trans., connect M to 3, N to 5. Type I-8.

CONNECTIONS OF POTENTIAL CIRCUIT OF TYPE I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

Showing Method of Making Connections for Double Lag Adjustment and for Separate Potential Testing

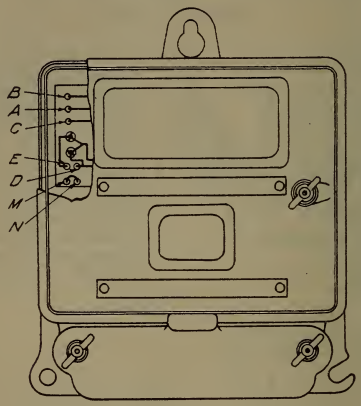


Fig. 75

For lower frequencies A must be soldered to C and D to E. For higher frequencies A must be soldered to B and D and E left open circuited.

Testing Loop: If it is desired to test meter on separate potential circuit, M and N should be opened and line connection made to N.

TYPE IP-2 THOMSON SINGLE-PHASE PRE-PAYMENT WATTHOUR METER

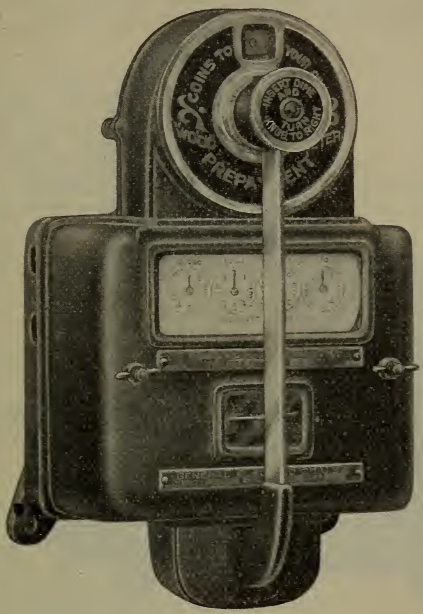


Fig. 76

INTERIOR VIEW OF TYPE IP-2 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METER

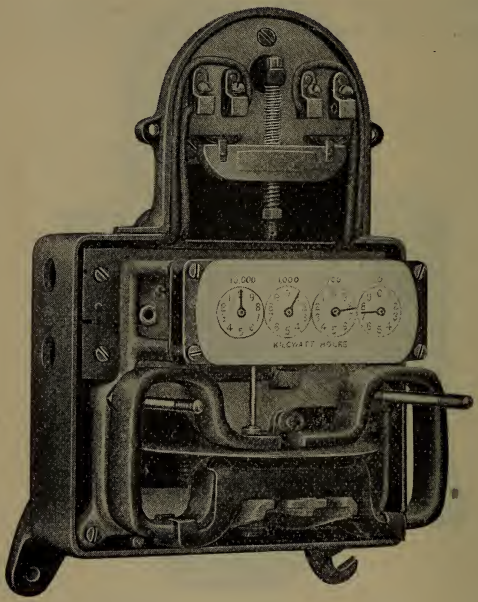
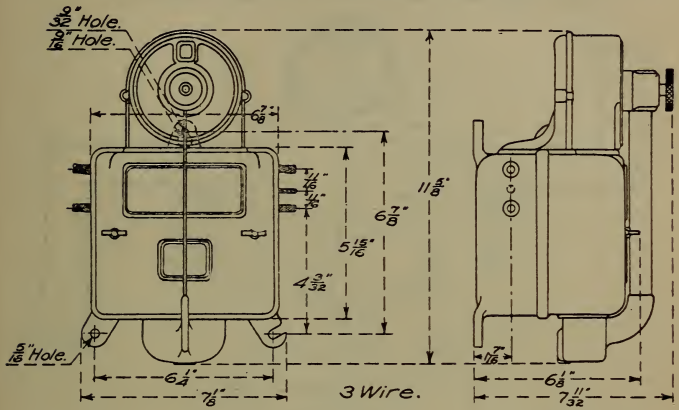
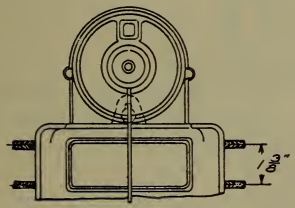


Fig. 77

DIMENSIONS OF TYPE IP-2 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METERS

3 to 25 Amps., 100 to 120, 200 to 240 Volts, 2-Wire, 200 to 240 Volts, 3-Wire, 25 to 140 Cycles





2 Wire without Transformer.

Fig. 78

EXTERNAL CONNECTIONS OF TYPE IP-2 THOMSON SINGLE-PHASE PRE-PAYMENT WATTHOUR METERS

3 to 25 Amps., 100 to 120, 200 to 240 Volts 2-Wire, 200 to 240 Volts 3-Wire, 25 to 140 Cycles

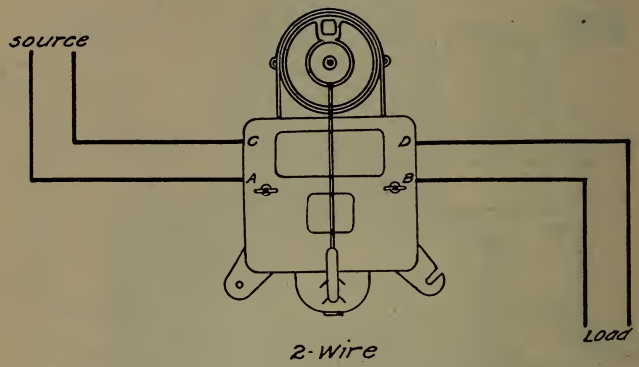


Fig. 79

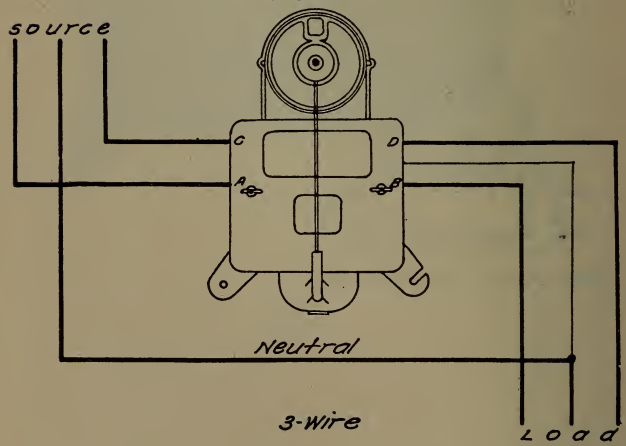


Fig. 80

Internal circuit is from A to B and C to D.

INTERNAL CONNECTIONS OF TYPE IP-2 THOMSON SINGLE-PHASE PREPAYMENT WATT-HOUR METERS

3 to 25 Amps., 25 to 60 Cycles, 2- and 3-Wire

BACK VIEW

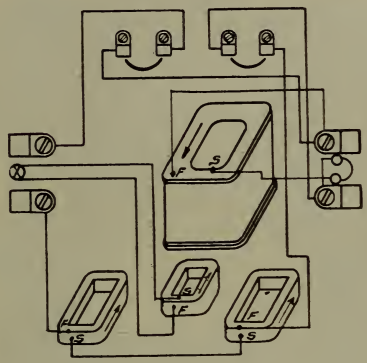


Fig. 81

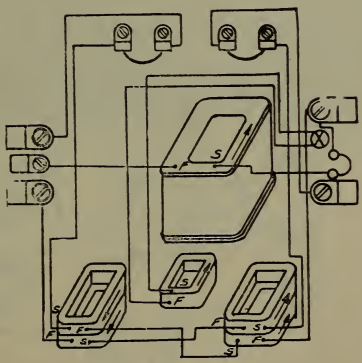


Fig. 82

INTERNAL CONNECTIONS OF TYPE IP-2 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METERS

3 to 25 Amps., 125 to 140 Cycles, 2- and 3-Wire

BACK VIEW

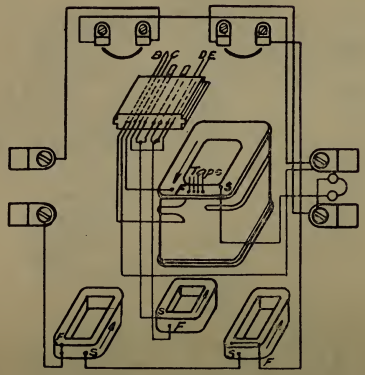


Fig. 83

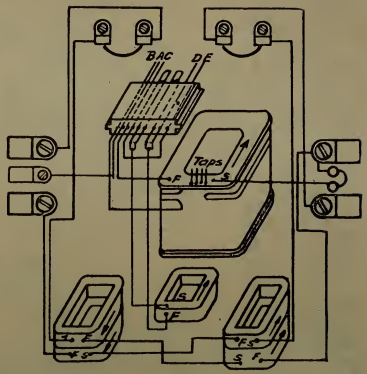


Fig. 84

TYPES IP-3 AND IP-4 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METER

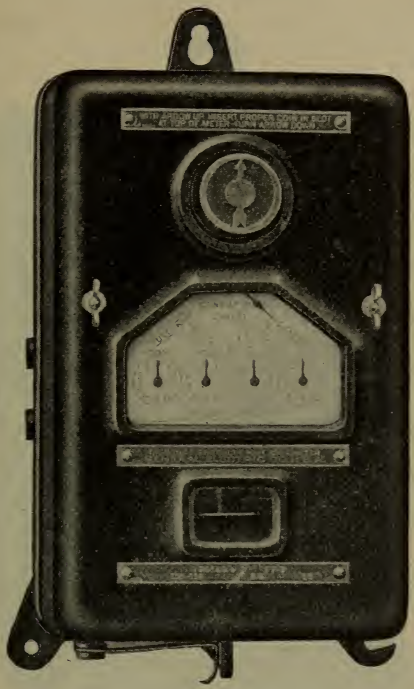


Fig. 85

INTERIOR VIEW OF TYPE IP-3 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METER

Fig. 86

INTERIOR VIEW OF TYPE IP-4 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METER

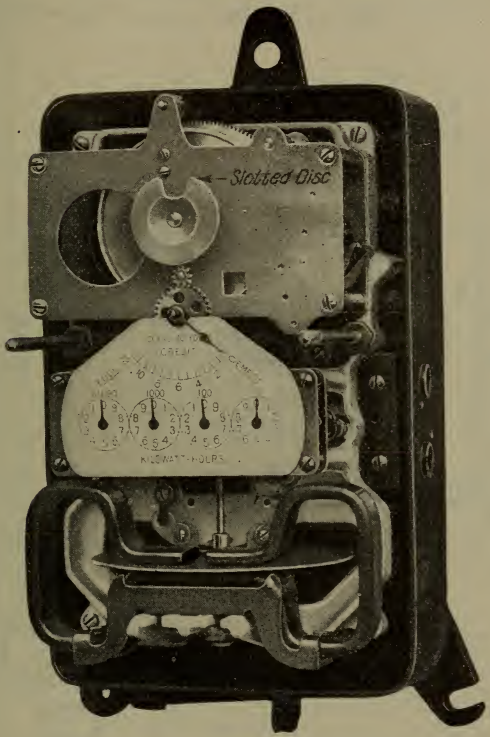


Fig. 87

DIMENSIONS OF TYPES IP-3 AND IP-4 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METERS

3 to 25 Amps., 25 to 140 Cycles, 2- and 3-Wire

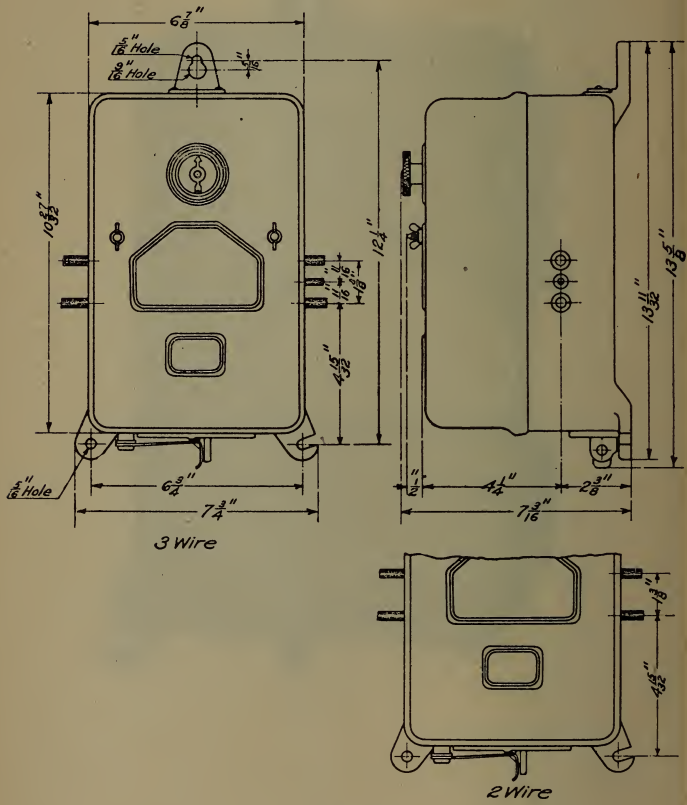


Fig. 88

EXTERNAL CONNECTIONS OF TYPES IP-3 AND IP-4 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METERS

3 to 25 Amps., 25 to 140 Cycles, 2- and 3-Wire

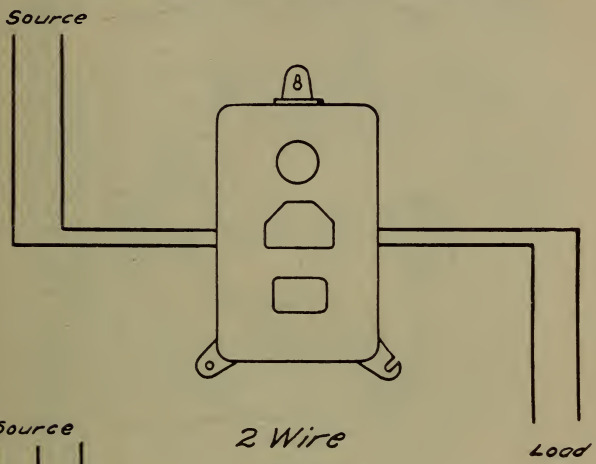


Fig. 89

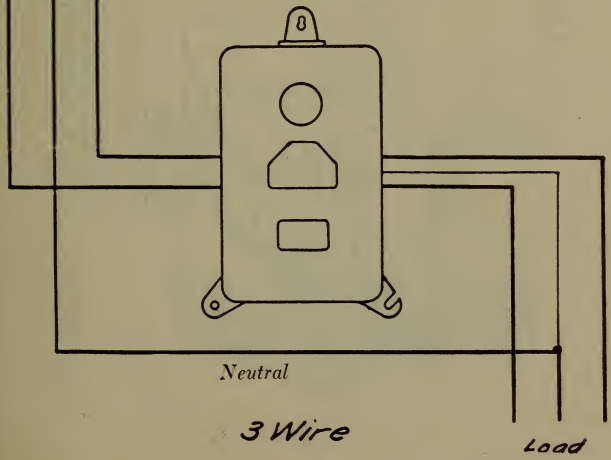


Fig. 90

INTERNAL CONNECTIONS OF TYPES IP-3 AND IP-4 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METERS

3 to 25 Amps., 25 to 60 Cycles, 2- and 3-Wire

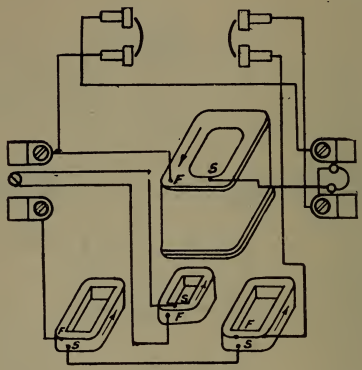


Fig. 91

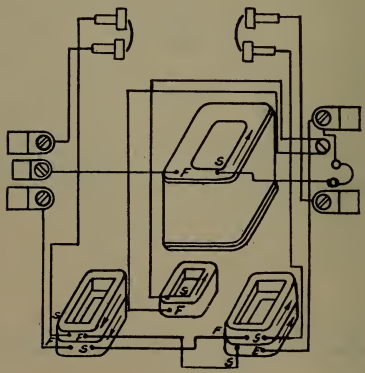


Fig. 92

INTERNAL CONNECTIONS OF TYPES IP-3 AND IP-4 THOMSON SINGLE-PHASE PREPAYMENT WATTHOUR METERS

3 to 25 Amps., 125 to 140 Cycles, 2- and 3-Wire

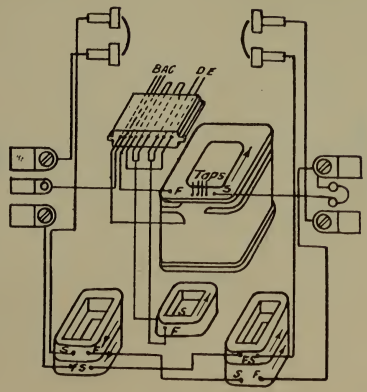


Fig. 93

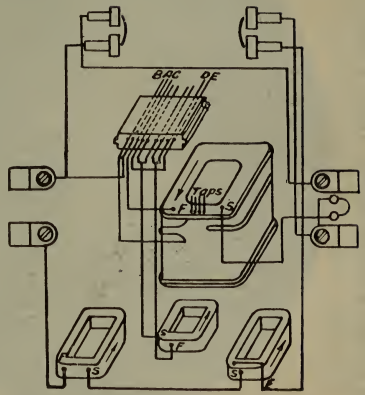


Fig. 94

TYPE I-10 THOMSON WATTHOUR METER

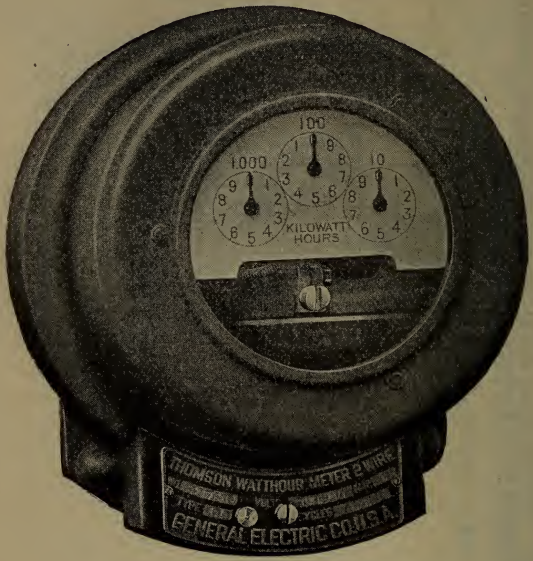


Fig. 95

INTERIOR VIEW OF TYPE I-10 THOMSON SINGLE-PHASE WATTHOUR METER

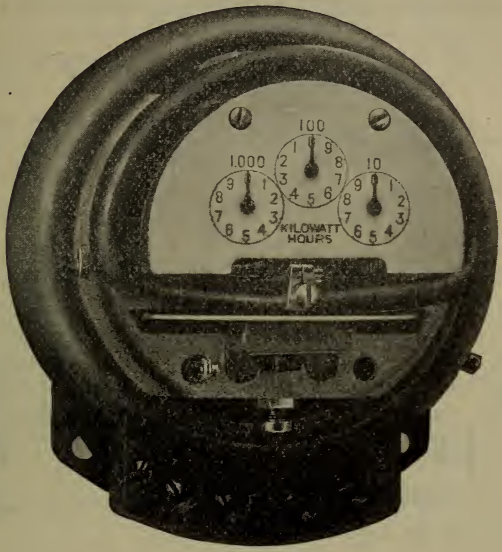


Fig. 96

DIMENSIONS OF TYPE I-10 THOMSON SINGLE-PHASE WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 5 to 15 Amps., 212 to 240 Volts 3-Wire, 60 Cycles

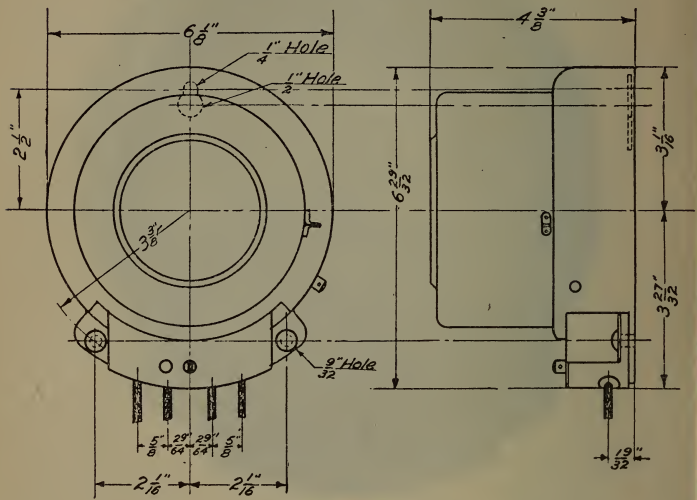


Fig. 97

EXTERNAL CONNECTIONS OF TYPE I-10 THOMSON SINGLE-PHASE WATT-HOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 5 to 15 Amps., 212 to 240 Volts 3-Wire

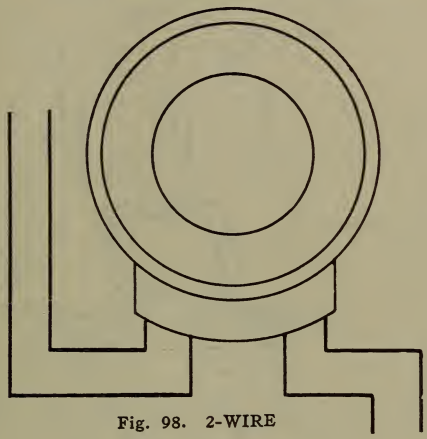


Fig. 98. 2-WIRE

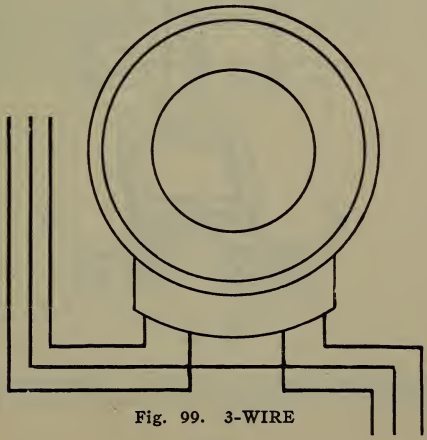


Fig. 99. 3-WIRE

INTERNAL CONNECTIONS OF TYPE I-10 THOMSON SINGLE-PHASE WATT-HOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 5 to 15 Amps., 212 to 240 Volts 3-Wire

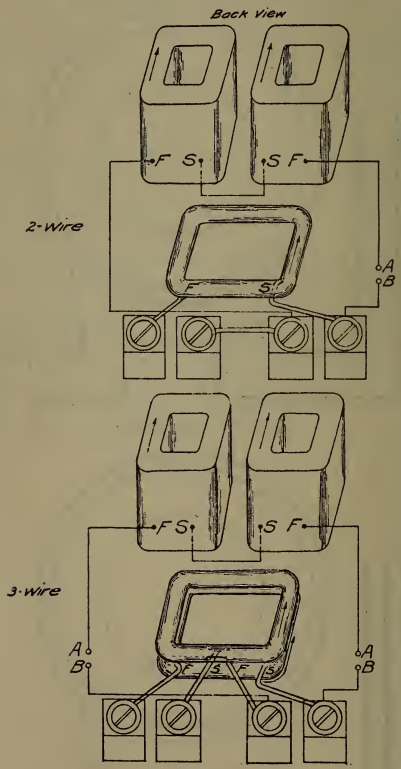


Fig. 100

NOTE—Arrows indicate direction of winding. When testing upon separate potential, disconnect wire "A" from "B" and connect wire from source to "A."

CONSTANTS AND REGISTER DATA FOR TYPES I, I-8, IP, IP-2, IP-3 AND IP-4 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 3 to 50 Amps., 106 to 120, 212 to 240 Volts, 25 Cycles

Volts	AMPERES								
	3			5			10		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.4	250	†	.6	166⅔	†	1.25	80	†
212 to 240	.75	133⅓	†	1.25	80	†	2.5	40	†

Volts	AMPERES								
	15			25			50		
106 to 120	2	50	†	3	33⅓	†	6	16⅔	†
212 to 240	4	25	†	6	16⅔	†	12.5	80	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES I AND I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 75 to 300 Amperes, 106 to 120, 212 to 240 Volts, 25 Cycles

Volts	AMPERES								
	75			100			150		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	10	10	†	12.5	80	10	20	50	10
212 to 240	20	50	10	25	40	10	40	25	10

Volts	AMPERES								
	200			300					
106 to 120	25	40	10	40	25	10			
212 to 240	50	20	10	75	13⅓	10			

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES I AND I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 800 Amps., 1000 to 1200, 2000 to 2400 Volts 25 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	6	16⅔	†	12.5	80	10
10	12.5	80	10	25	40	10
15	20	50	10	40	25	10
20	25	40	10	50	20	10
30	40	25	10	75	13⅓	10
40	50	20	10	100	10	10
60	75	13⅓	10	150	66⅔	100
80	100	10	10	200	50	100
100	125	80	100	250	40	100
150	200	50	100	400	25	100
200	250	40	100	500	20	100
300	400	25	100	750	13⅓	100
400	500	20	100	1000	10	100
600	750	13⅓	100	1500	66⅔	1000
800	1000	10	100	2000	50	1000

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES I, I-8, IP, IP-2, IP-3 AND IP-4 THOMSON SINGLE-PHASE HOUSE PATTERN WATTHOUR METERS

Capacities 3 to 100 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 40 and 50 Cycles

Volts	AMPERES											
	3			5			10			15		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.3	333⅓	†	.5	200	†	1	100	†	1.5	66⅔	†
212 to 240	.6	166⅔	†	1	100	†	2	50	†	3	33⅓	†
500 to 600	1.5	66⅔	†	2.5	40	†	5	20	†	7.5	13⅓	†

Volts	AMPERES											
	25			50			75			100		
106 to 120	2.5	40	†	5	20	†	7.5	13⅓	†	10	10	†
212 to 240	5	20	†	10	10	†	15	66⅔	10	20	50	10
500 to 600	12.5	80	10	25	40	10	40	25	10	50	20	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES I AND I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 40 and 50 Cycles

Volts	AMPERES											
	150			200			250			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	15	66⅔	10	20	50	10	25	40	10	30	33⅓	10
212 to 240	30	33⅓	10	40	25	10	50	20	10	60	16⅔	10
500 to 600	75	13⅓	10	100	10	10	125	80	100	150	66⅔	100

Volts	AMPERES											
	400			450			500			600		
106 to 120	40	25	10	50	20	10	50	20	10	60	16⅔	10
212 to 240	75	13⅓	10	100	10	10	100	10	10	125	80	100
500 to 600	200	50	100	250	40	100	250	40	100	300	33⅓	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

In all cases one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES I AND I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 400 Amps., 1000 to 1200, 2000 to 2400 Volts, 40 and 50 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	5	20	†	10	10	†
10	10	10	†	20	50	10
15	15	66⅔	10	30	33⅓	10
20	20	50	10	40	25	10
30	30	33⅓	10	60	16⅔	10
40	40	25	10	75	13⅓	10
60	60	16⅔	10	125	80	100
80	75	13⅓	10	150	66⅔	100
100	100	10	10	200	50	100
150	150	66⅔	100	300	33⅓	100
200	200	50	100	400	25	100
300	300	33⅓	100	600	16⅔	100
400	400	25	100	750	13⅓	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES I, I-8, IP, IP-2, IP-3 AND IP-4 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 3 to 50 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 60 to 140 Cycles

Volts	AMPERES								
	3			5			10		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.2	500	†	.3	$333\frac{1}{3}$	†	.6	$166\frac{2}{3}$	†
212 to 240	.4	250	†	.6	$166\frac{2}{3}$	†	1.25	80	†
500 to 600	1	100	†	1.5	$66\frac{2}{3}$	†	3	$33\frac{1}{3}$	†

Volts	AMPERES								
	15			25			50		
106 to 120	1	100	†	1.5	$66\frac{2}{3}$	†	3	$33\frac{1}{3}$	†
212 to 240	2	50	†	3	$33\frac{1}{3}$	†	6	$16\frac{2}{3}$	†
500 to 600	5	20	†	7.5	$13\frac{1}{3}$	†	15	$66\frac{2}{3}$	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES I AND I-8 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 75 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 60 to 140 Cycles

Volts	AMPERES								
	75			100			150		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	5	20	†	6	16⅔	†	10	10	†
212 to 240	10	10	†	12.5	80	10	20	50	10
500 to 600	25	40	10	30	33⅓	10	50	20	10

Volts	AMPERES								
	200			300			600		
106 to 120	12.5	80	10	20	50	10	40	25	10
212 to 240	25	40	10	40	25	10	75	13⅓	10
500 to 600	60	16⅔	10	100	10	10	200	50	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

† Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPE I THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 400 Amps., 1000 to 1200, 2000 to 2400 Volts, 60 to 140 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	3	33⅓	†	6	16⅔	†
10	6	16⅔	†	12.5	80	10
15	10	10	†	20	50	10
20	12.5	80	10	25	40	10
30	20	50	10	40	25	10
40	25	40	10	50	20	10
60	40	25	10	75	13⅓	10
80	50	20	10	100	10	10
100	60	16⅔	10	125	80	100
150	100	10	10	200	50	100
200	125	80	100	250	30	100
300	200	50	100	400	25	100
400	250	40	100	500	20	100

CONSTANTS AND REGISTER DATA FOR TYPE I-10 THOMSON SINGLE-PHASE WATT-HOUR METER

Capacities 5 to 25 Amps., 106 to 120, 212 to 240 Volts, 2-Wire; 5 to 15 Amps., 212 to 240 Volts, 3-Wire 25 to 133 Cycles

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106to120	.25	400	†	.5	200	†	.75	133⅓	†	1.25	80	†
212to240	.5	200	†	1.	100	†	1.5	66⅔	†	25	40	†

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

TYPE IS THOMSON SINGLE-PHASE WATTHOUR METER

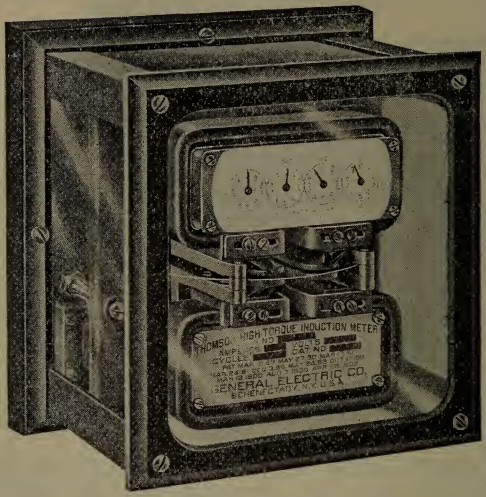


Fig. 101

TYPE IS-2 THOMSON SINGLE-PHASE WATTHOUR METER

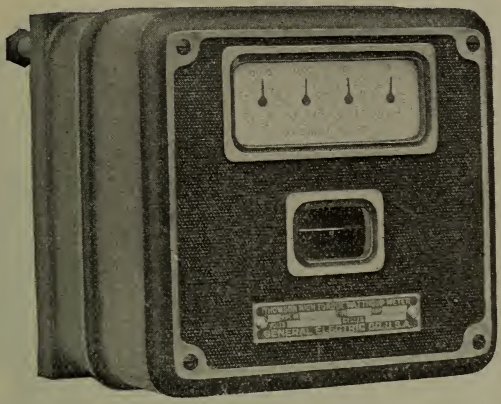


Fig. 102

INTERIOR VIEW OF TYPE IS-2 THOMSON SINGLE-PHASE WATTHOUR METER

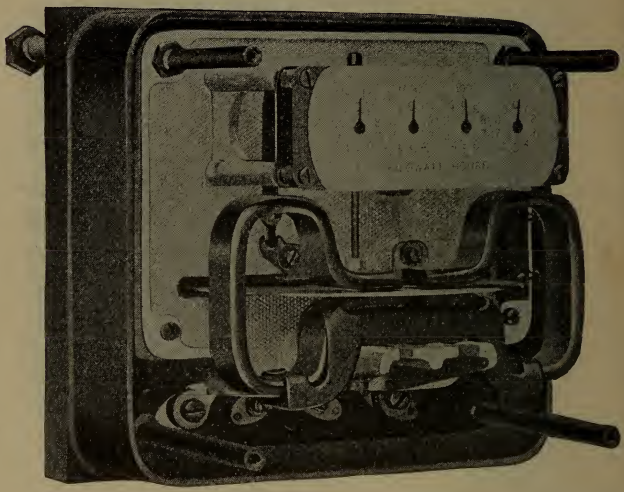


Fig. 103

TYPE IS-3 THOMSON SINGLE-PHASE WATTHOUR METER

Fig. 104

DIMENSIONS OF TYPE IS THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 75 Amps., 25 to 140 Cycles, 2- and 3-Wire, With and Without Transformers

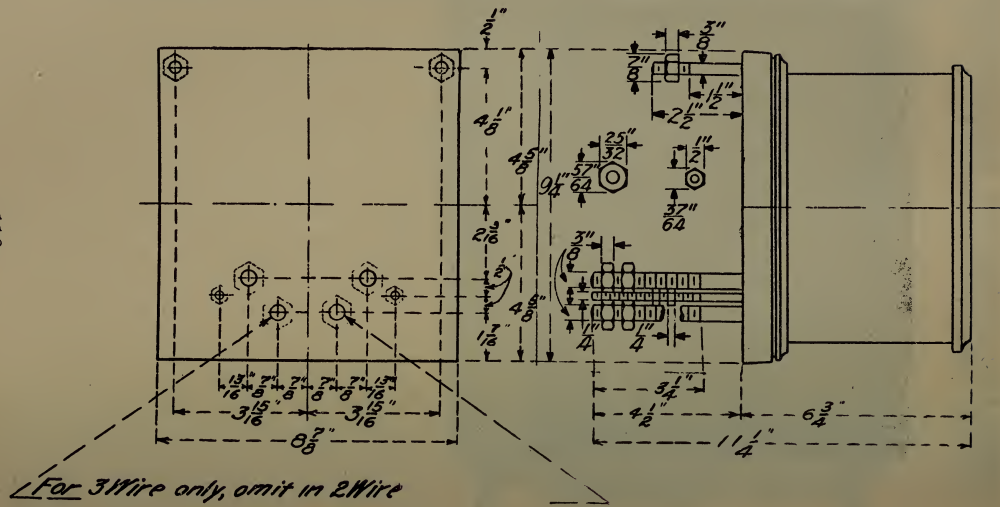


Fig. 105

DIMENSIONS OF TYPE IS-2 THOMSON SINGLE-PHASE WATTHOUR METERS

5 to 150 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 25 to 140 Cycles, With and Without Transformers

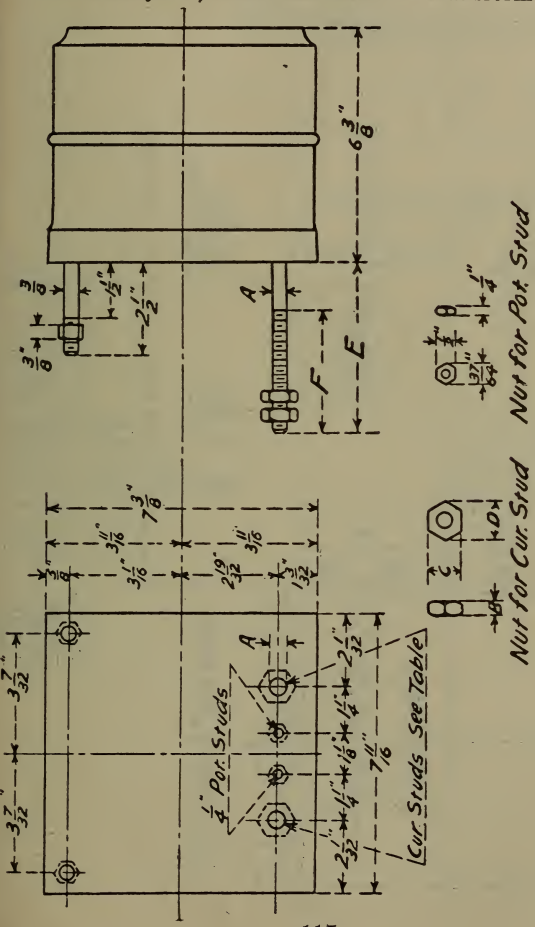


Fig. 106

Capacity	A	B	C	D	E	F
5–50	3/8 in.	3/8 in.	25/32	63/64	3 in.	2 1/4 in.
100	3/8 in.	3/8 in.	25/32	63/64	3 in.	1 3/4 in.
150 Amp.	1/2 in.	1/2 in.	1 1/16	1 3/32	3 1/2 in.	2 1/4 in.

DIMENSIONS OF TYPE IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

5 to 150 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 25 to 140 Cycles, With and Without Transformers

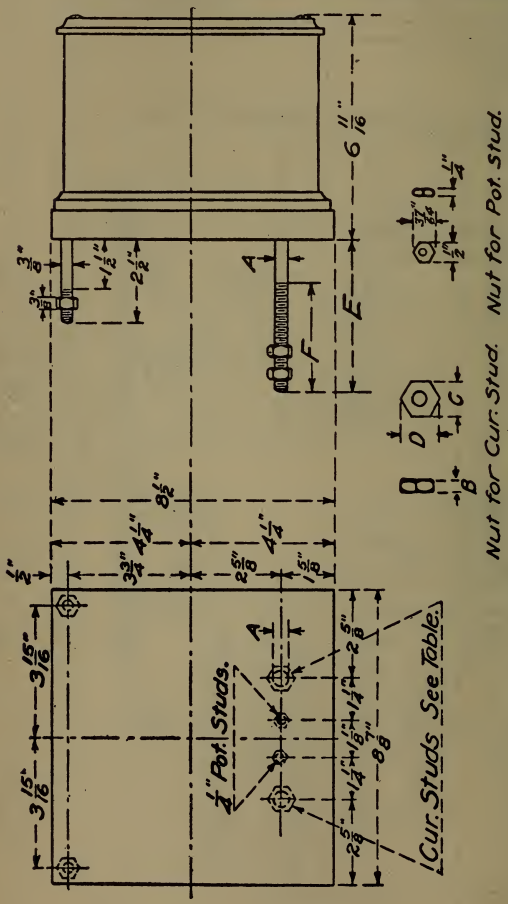


Fig. 107

Capacity	A	B	C	D	E	F
5–50	1/4 in.	3/8 in.	11/16 in.	11/16 in.	3 in.	2 1/8 in.
100	1/4 in.	3/8 in.	11/16 in.	11/16 in.	3 in.	1 1/4 in.
150 Amp.	1/4 in.	3/8 in.	1 1/16 in.	1 7/32 in.	3 1/2 in.	2 1/4 in.

INTERNAL CONNECTIONS OF TYPE IS THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 75 Amps., 25 to 140 Cycles, With and Without Transformers

FRONT VIEW

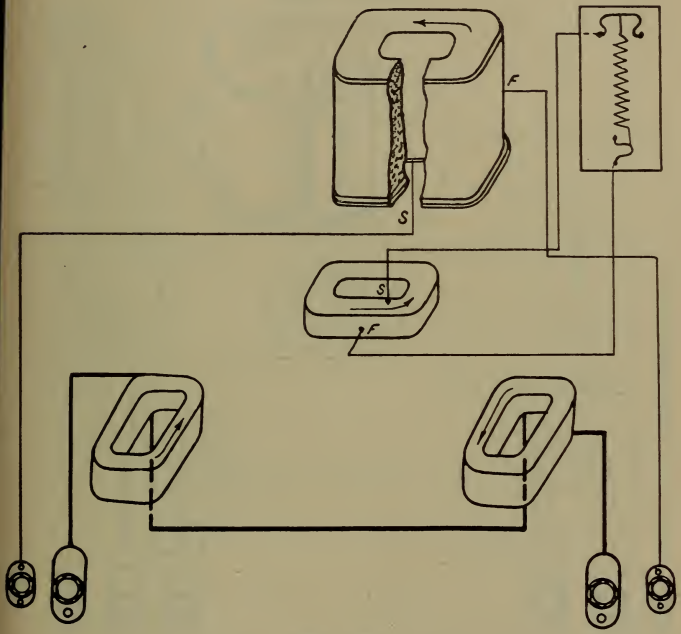


Fig. 108

INTERNAL CONNECTIONS OF TYPE IS THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 75 Amps., 25 to 140 Cycles, 3-Wire, Without Transformers

FRONT VIEW

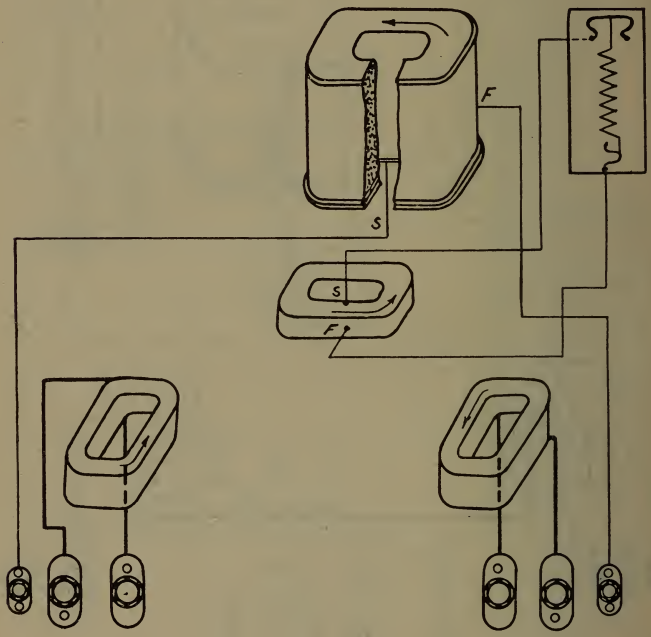


Fig. 109

INTERNAL CONNECTIONS OF TYPES IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

5 to 150 Amps., 25 to 140 Cycles, With and Without Transformers

FRONT VIEW

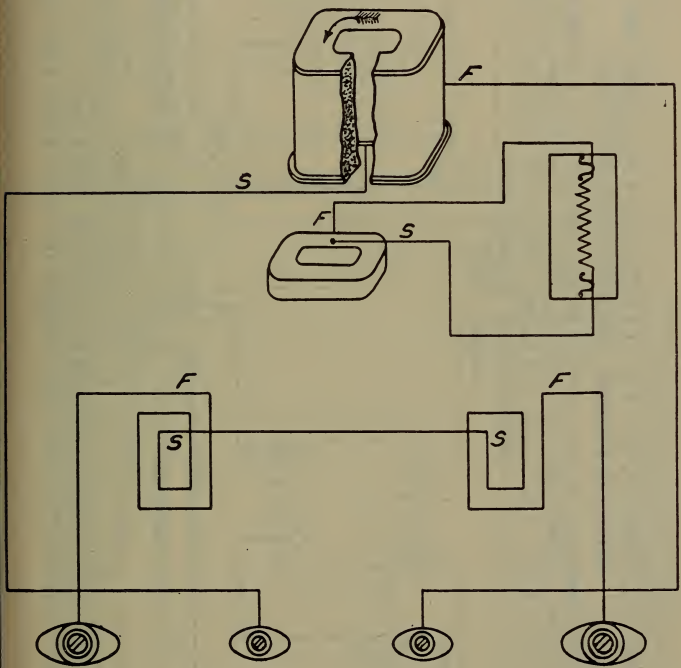


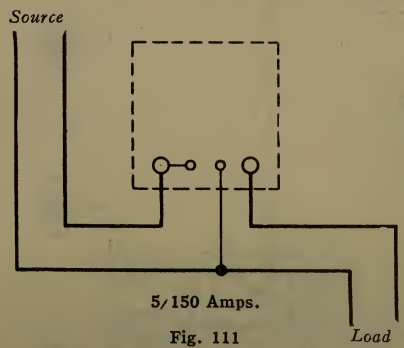
Fig. 110

EXTERNAL CONNECTIONS OF TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Types IS-2 and IS-3 Meters, 5 to 150 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 25 to 140 Cycles, Without Transformer

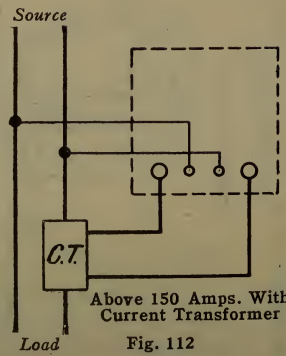
Above 150 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 25 to 140 Cycles With Current Transformer

BACK VIEW



5/150 Amps.

Fig. 111



Above 150 Amps. With Current Transformer

Fig. 112

NOTE—The studs of Type IS meters are somewhat differently located than shown in the above diagrams. Connections, however, should be made to correspond.

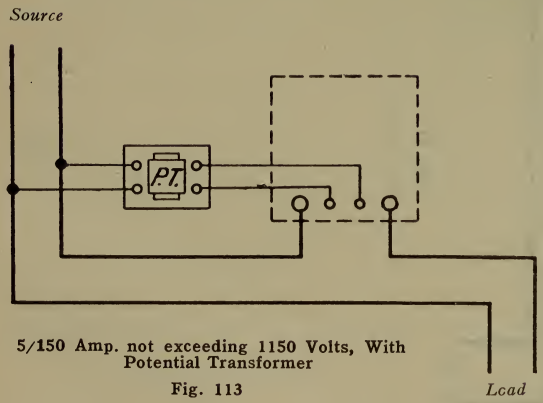
Type IS meters made self-contained only up to 75 amps.

EXTERNAL CONNECTIONS OF TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Types IS-2 and IS-3 Meters, 5 to 150 Amps., Not Exceeding 1150 Volts, 25 to 140 Cycles, With Potential Transformer

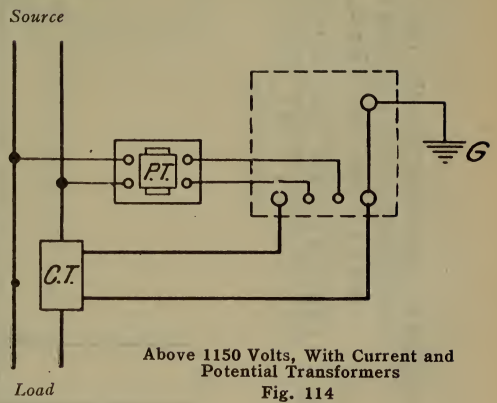
Above 1150 Volts, 25 to 140 Cycles, With Current and Potential Transformers

BACK VIEW



5/150 Amp. not exceeding 1150 Volts, With Potential Transformer

Fig. 113



Above 1150 Volts, With Current and Potential Transformers

Fig. 114

NOTE.—The studs of Type IS meters are somewhat differently located than shown in the above diagrams. Connections, however, should be made to correspond.

Type IS meters made self-contained only up to 75 amps.

EXTERNAL CONNECTIONS OF TYPE IS THOMSON SINGLE-PHASE WATTHOUR METERS

3 to 75 Amps., 212 to 240 Volts, 25 to 140 Cycles
Without Transformers

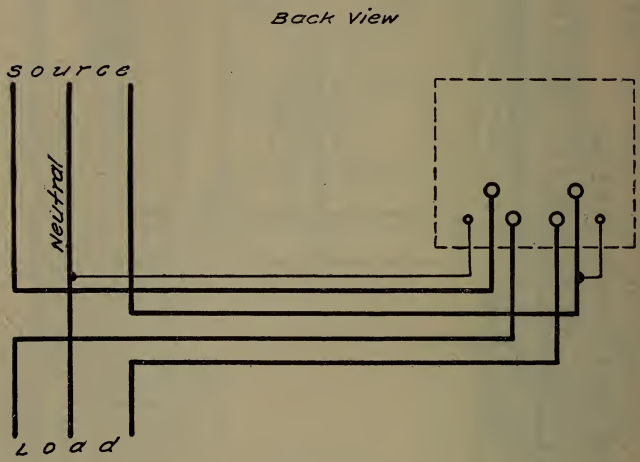


Fig. 115

EXTERNAL CONNECTIONS OF TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Types IS-2 and IS-3 Meters For Use Upon 3-Wire Circuits With Form DM-16 Current Transformer

Type IS Meters Above 75 Amperes For Use Upon 3-Wire Circuits With Form DM-16 Current Transformer

BACK VIEW

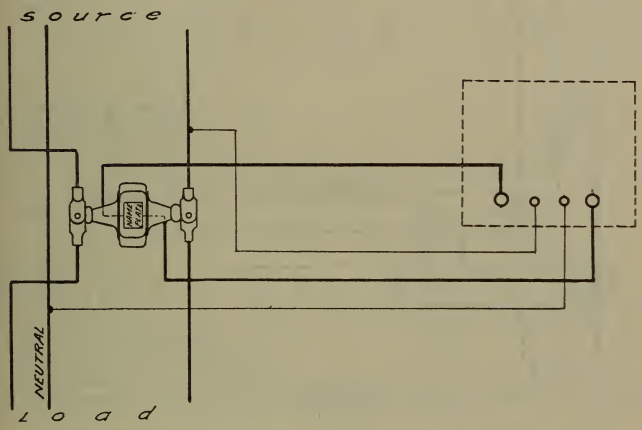


Fig. 116

EXTERNAL CONNECTIONS OF 2-WIRE TYPES IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS, WHEN USED UPON A 3-WIRE CIRCUIT

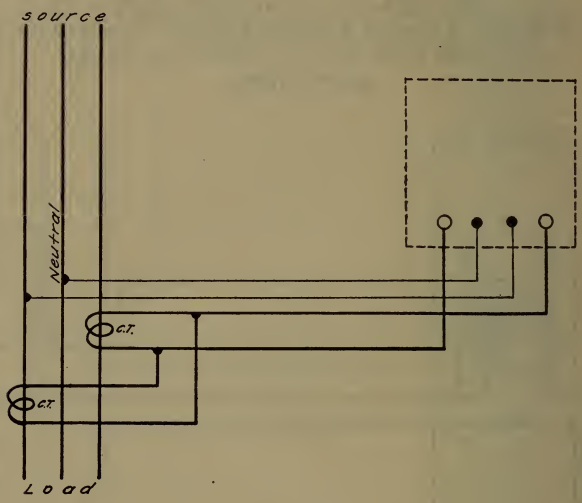


Fig. 117

NOTE.—This method supersedes the method shown on page 125.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 100 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 25 Cycles

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.6	$16\frac{2}{3}$	*	1.25	8	*	2	5	*	3	$3\frac{1}{3}$	*
212 to 240	1.25	8	*	2.5	4	*	4	$2\frac{1}{2}$	*	6	$1\frac{2}{3}$	*
400 to 480	2.5	4	*	5	2	*	7.5	$1\frac{1}{3}$	*	12.5	8	†

Volts	AMPERES											
	50			75			100					
106 to 120	6	$1\frac{2}{3}$	*	7.5	$1\frac{1}{3}$	*	12.5	8	†			
212 to 240	12.5	8	†	15	$6\frac{2}{3}$	†	25	4	†			
400 to 480	25	4	†	30	$3\frac{1}{3}$	†	50	2	†			

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 25 Cycles

Volts	AMPERES								
	150			200			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	15	$6\frac{2}{3}$	†	25	4	†	40	$2\frac{1}{2}$	†
212 to 240	30	$3\frac{1}{3}$	†	50	2	†	75	$1\frac{1}{3}$	†
400 to 480	60	$1\frac{2}{3}$	†	100	1	†	150	$6\frac{2}{3}$	10

Volts	AMPERES					
	400			600		
106 to 120	50	2	†	75	$1\frac{1}{2}$	†
212 to 240	100	1	†	150	$6\frac{2}{3}$	10
400 to 480	200	5	10	300	$3\frac{1}{3}$	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 1500 Amps., 1000 to 1200, 2000 to 2400 Volts, 25 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	6	$1\frac{2}{3}$	*	12.5	8	†
10	12.5	8	†	25	4	†
15	20	5	†	40	$2\frac{1}{2}$	†
20	25	4	†	50	2	†
30	40	$2\frac{1}{2}$	†	75	$1\frac{1}{3}$	†
40	50	2	†	100	1	†
60	75	$1\frac{1}{3}$	†	150	$6\frac{2}{3}$	10
80	100	1	†	200	5	10
100	125	8	10	250	4	10
150	150	$6\frac{2}{3}$	10	300	$3\frac{1}{3}$	10
200	250	4	10	500	2	10
300	400	$2\frac{1}{2}$	10	750	$1\frac{1}{3}$	10
400	500	2	10	1000	1	10
600	750	$1\frac{1}{3}$	10	1500	$6\frac{2}{3}$	100
800	1000	1	10	2000	5	100
1000	1250	8	100	2500	4	100
1200	1500	$6\frac{2}{3}$	100	3000	$3\frac{1}{3}$	100
1500	2000	5	100	4000	$2\frac{1}{2}$	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs., except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 100 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 40 and 50 Cycles

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.4	25	*	.75	$13\frac{1}{3}$	*	1.25	8	*	2	5	*
212 to 240	.75	$13\frac{1}{3}$	*	1.5	$6\frac{2}{3}$	*	2.5	4	*	4	$2\frac{1}{2}$	*
400 to 480	1.5	$6\frac{2}{3}$	*	3	$3\frac{1}{3}$	*	5	2	*	7.5	$1\frac{1}{3}$	*

Volts	AMPERES											
	50			75			100					
106 to 120	4	$2\frac{1}{2}$	*	5	2	*	7.5	$1\frac{1}{3}$	*			
212 to 240	7.5	$1\frac{1}{3}$	*	10	1	*	15	$6\frac{2}{3}$	†			
400 to 480	15	$6\frac{2}{3}$	†	20	5	†	30	$3\frac{1}{3}$	†			

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multipler.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs., except where indicated by * in which case one revolution = $1\frac{1}{5}$ kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 40 and 50 Cycles

Volts	AMPERES								
	150			200			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	10	1	*	15	$6\frac{2}{3}$	†	25	4	†
212 to 240	20	5	†	30	$3\frac{1}{3}$	†	50	2	†
400 to 480	40	$2\frac{1}{2}$	†	60	$1\frac{2}{3}$	†	100	1	†

Volts	AMPERES					
	400			600		
106 to 120	30	$3\frac{1}{3}$	†	50	2	†
212 to 240	60	$1\frac{2}{3}$	†	100	1	†
400 to 480	125	8	10	200	5	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs., except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 1500 Amps., 1000 to 1200, 2000 to 2400 Volts, 40 and 50 Cycles

Amperes	VOLTS					
	1000/1300			2000/2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	4	$2\frac{1}{2}$	*	7.5	$1\frac{1}{3}$	*
10	7.5	$1\frac{1}{3}$	*	15	$6\frac{2}{3}$	†
15	12.5	8	†	25	4	†
20	15	$6\frac{2}{3}$	†	30	$3\frac{1}{3}$	†
30	25	4	†	50	2	†
40	30	$3\frac{1}{3}$	†	60	$1\frac{2}{3}$	†
50	40	$2\frac{1}{2}$	†	75	$1\frac{1}{3}$	†
60	50	2	†	100	1	†
80	60	$1\frac{2}{3}$	†	125	8	10
100	75	$1\frac{1}{3}$	†	150	$6\frac{2}{3}$	10
150	100	1	†	200	5	10
200	150	$6\frac{2}{3}$	10	300	$3\frac{1}{3}$	10
300	250	4	10	500	2	10
400	300	$3\frac{1}{3}$	10	600	$1\frac{2}{3}$	10
600	500	2	10	1000	1	10
800	600	$1\frac{2}{3}$	10	1250	8	100
1000	750	$1\frac{1}{3}$	10	1500	$6\frac{2}{3}$	100
1200	1000	1	10	2000	5	100
1500	1250	8	100	2500	4	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs., except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 100 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 60 to 140 Cycles

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.3	$33\frac{1}{3}$	*	$16\frac{2}{3}$	6	*	1	10	*	1.5	$6\frac{2}{3}$	*
212 to 240	.6	$16\frac{2}{3}$	*	1.25	8	*	2	5	*	3	$3\frac{1}{3}$	*
400 to 480	1.25	8	*	2.5	4	*	4	$2\frac{1}{2}$	*	6	$1\frac{1}{3}$	*

Volts	AMPERES											
	50			75			100					
106 to 120	3	$3\frac{1}{3}$	*	4	$2\frac{1}{2}$	*	6	$1\frac{2}{3}$	*			
212 to 240	6	$1\frac{2}{3}$	*	7.5	$1\frac{1}{3}$	*	12.5	8	†			
400 to 480	12.5	8	†	15	$6\frac{2}{3}$	†	25	4	†			

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs., except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 400 to 480 Volts, 60 to 140 Cycles

Volts	AMPERES								
	150			200			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	7.5	$1\frac{1}{2}$	*	12.5	8	†	20	5	†
212 to 240	15	$6\frac{2}{3}$	†	25	4	†	40	$2\frac{1}{2}$	†
400 to 480	30	$3\frac{1}{3}$	†	50	2	†	75	$1\frac{1}{4}$	†

Volts	AMPERES								
	400			600					
106 to 120	25	4	†	40	$2\frac{1}{2}$	†			
212 to 240	50	2	†	75	$1\frac{2}{3}$	†			
400 to 480	100	1	†	150	$6\frac{2}{3}$	10			

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs., except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES IS, IS-2 AND IS-3 THOMSON SINGLE-PHASE WATTHOUR METERS

Capacities 5 to 1500 Amps., 1000 to 1200, 2000 to 2400 Volts, 60 to 140 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	3	$3\frac{1}{3}$	*	6	$1\frac{2}{3}$	*
10	6	$1\frac{2}{3}$	*	12.5	8	*
15	10	1	*	20	5	†
20	12.5	8	†	25	4	†
30	20	5	†	40	$2\frac{1}{2}$	†
40	25	4	†	50	2	†
50	30	$3\frac{1}{3}$	†	60	$1\frac{2}{3}$	†
60	40	$2\frac{1}{2}$	†	75	$1\frac{1}{3}$	†
80	50	2	†	100	1	†
100	60	$1\frac{2}{3}$	†	125	8	10
150	75	$1\frac{1}{3}$	†	150	$6\frac{2}{3}$	10
200	125	8	10	250	4	10
300	200	5	10	400	$2\frac{1}{2}$	10
400	250	4	10	500	2	10
600	400	$2\frac{1}{2}$	10	750	$1\frac{1}{3}$	10
800	500	2	10	1000	1	10
1000	600	$1\frac{2}{3}$	10	1250	8	100
1200	750	$1\frac{1}{3}$	10	1500	$6\frac{2}{3}$	100
1500	1000	1	10	2000	5	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs., except where indicated by * in which case one revolution = 1 kw-hr.

TYPE D-3 THOMSON POLYPHASE WATTHOUR METER

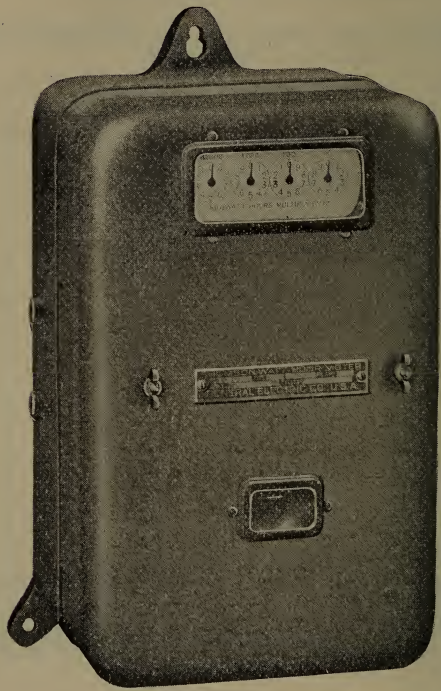


Fig. 118

INTERIOR VIEW OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METER

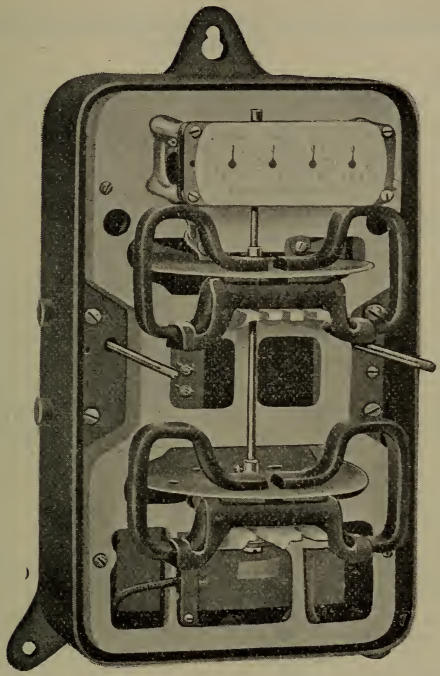


Fig. 119

DIMENSIONS OF TYPE D-3 THOMSON POLY-PHASE WATTHOUR METERS

3 to 75 Amps., 25 to 140 Cycles, With and Without Transformers

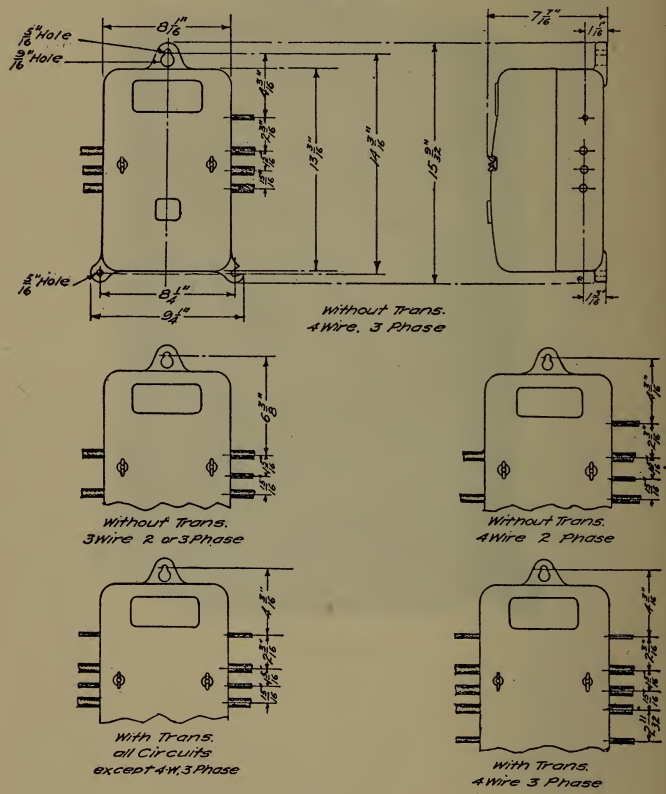


Fig. 120

NOTE—The domed cover such as shown above was not embodied in the earlier D-3 meters.

DIMENSIONS OF TYPE D-3 THOMSON POLY-PHASE WATTHOUR METERS

100 and 150 Amps., 25 to 140 Cycles, Without Transformers

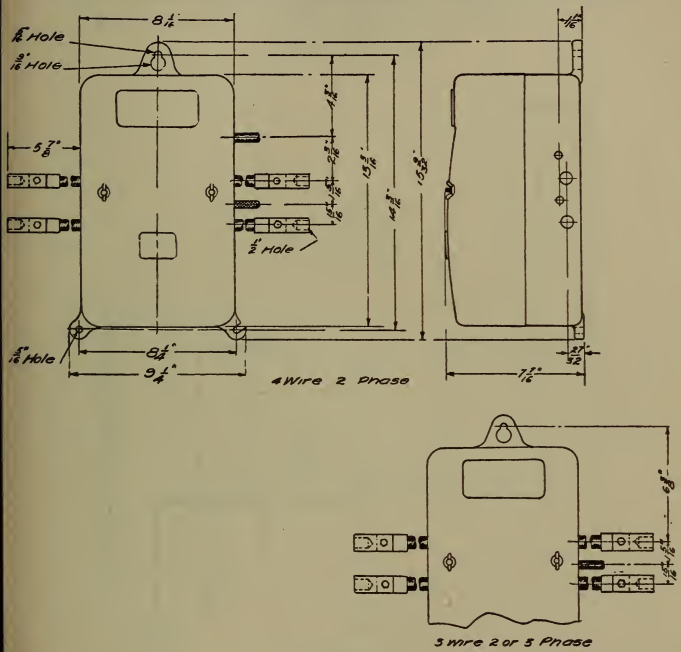


Fig. 121

NOTE—The domed cover such as shown above was not embodied in the earlier D-3 meters.

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

3 to 150 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 3-Wire 2- and 3-Phase and Monocyclic Circuits, Without Transformers

FRONT VIEW

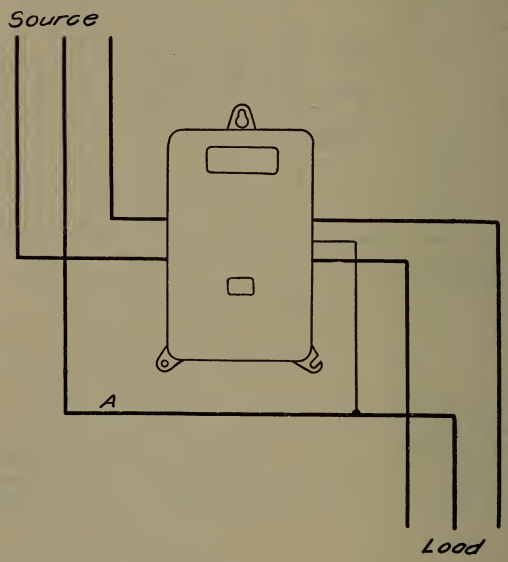


Fig. 122

NOTE.—On 3-wire 2-phase circuits, wire "A" should be the common return, on monocyclic circuits wire "A" must be the teaser wire.

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

Above 150 Amps., Not Exceeding 1150 Volts, 25 to 140 Cycles, 3-Wire 2- and 3-Phase and Monocyclic Circuits With Current Transformers

FRONT VIEW

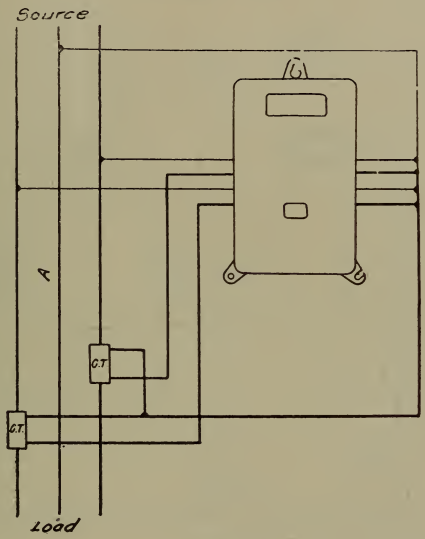


Fig. 123

NOTE.—On 3-wire 2-phase circuits, wire "A" should be the common return, on monocyclic circuits wire "A" must be the teaser wire.

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, 3-Wire 2- and 3-Phase and Monocyclic Circuits, With Current and Potential Transformers

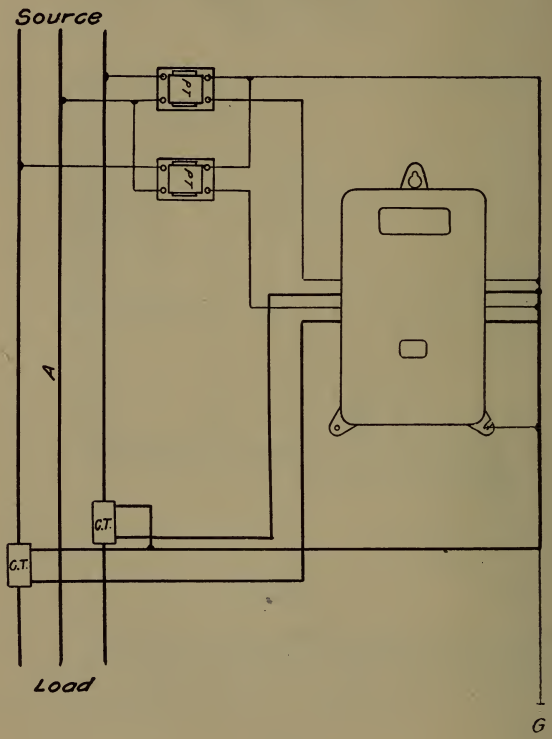


Fig. 124

NOTE.—On 3-wire 2-phase circuits, wire "A" should be the common return, on monocyclic circuits wire "A" must be the teaser wire.

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

3 to 150 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 4-Wire 2-Phase Circuits, Without Transformers

FRONT VIEW

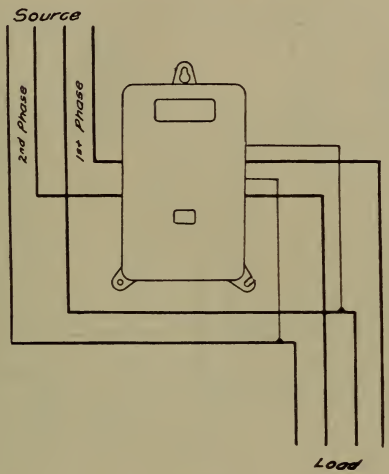


Fig. 125

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

Above 150 Amps., Not Exceeding 1150 Volts, 25 to 140 Cycles, 4-Wire 2-Phase Circuits, With Current Transformers

FRONT VIEW

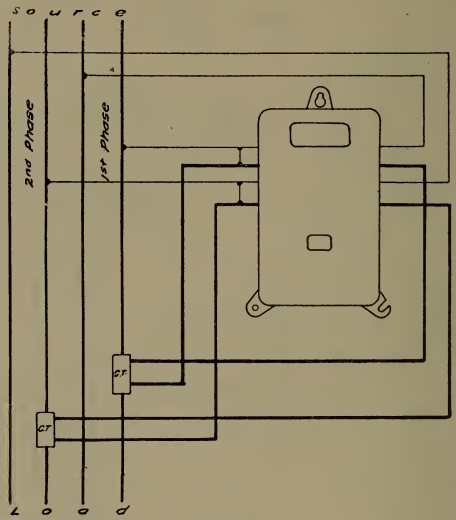


Fig. 126

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, 4-Wire 2-Phase Circuits, With Current and Potential Transformers

FRONT VIEW

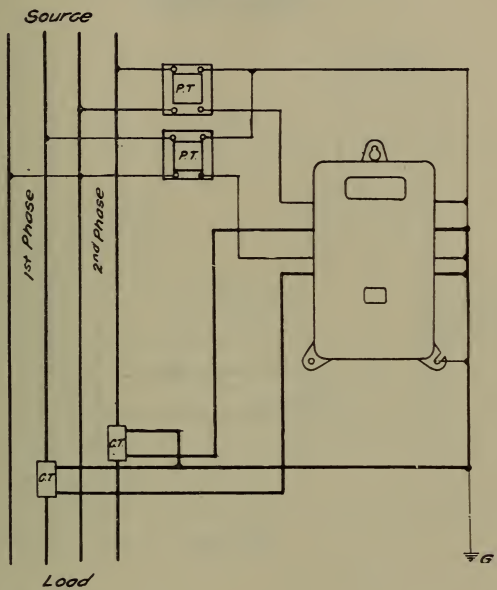


Fig. 127

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

3 to 75 Amps., 200 to 220 △ 115 to 125 Y, 400 to 440 △ 230 to 250 Y Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits Without Transformers

FRONT VIEW

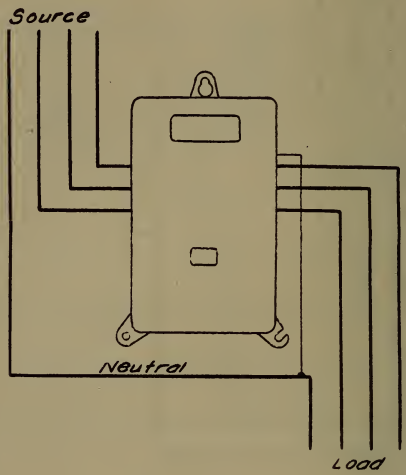


Fig. 128

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

Above 75 Amps., Not Exceeding 1150 Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits, With Current Transformers

FRONT VIEW

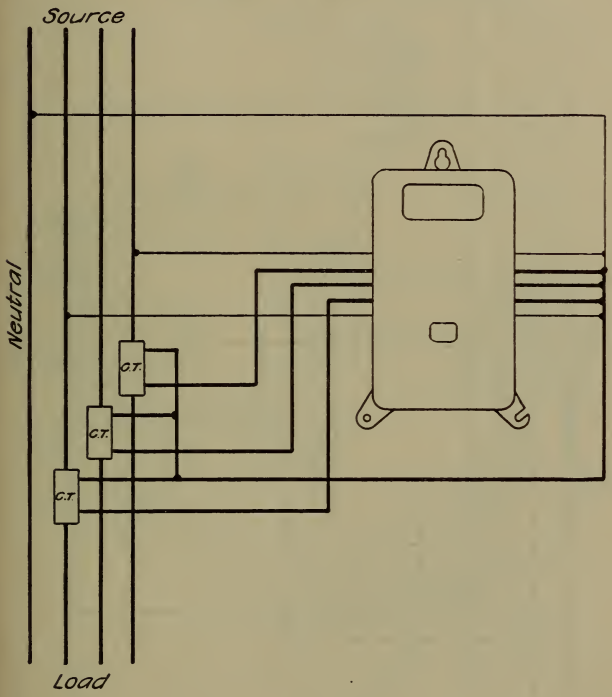


Fig. 129

EXTERNAL CONNECTIONS OF TYPE D-3 THOMSON POLYPHASE WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits, With Current and Potential Transformers

FRONT VIEW

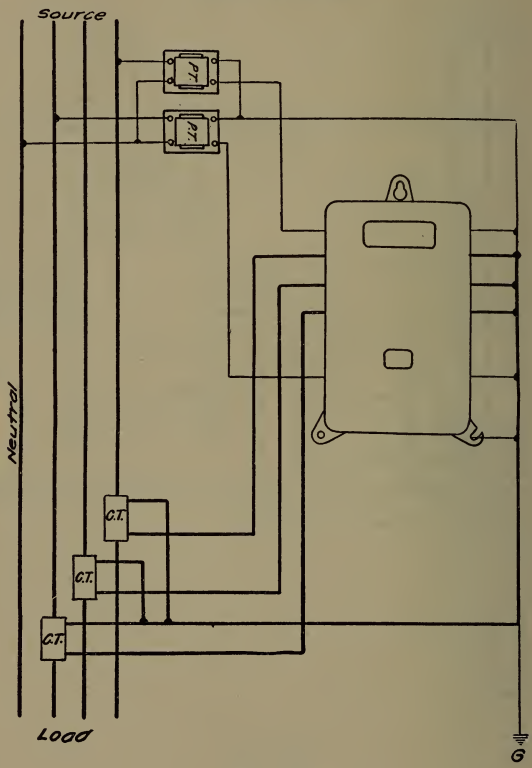


Fig. 130

INTERNAL CONNECTIONS OF TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

3 to 150 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, All Circuits Except 4-Wire 3-Phase, Without Transformers

BACK VIEW

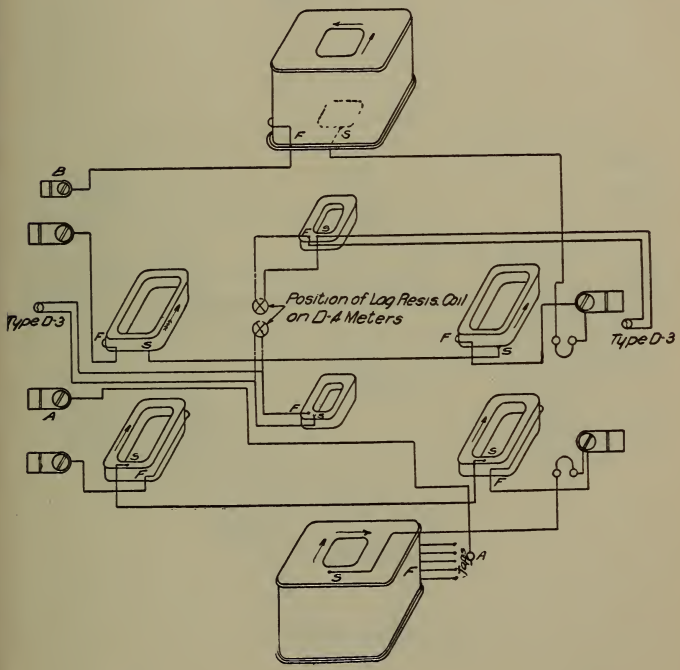


Fig. 131

NOTE.—4 wire 2-phase circuits as shown. For 2- and 3-phase monocyclic circuits binding post B is omitted and wire should be connected on A.

INTERNAL CONNECTIONS OF TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, With Current or Potential Transformers or Both, All Circuits Except 4-Wire 3-Phase

BACK VIEW

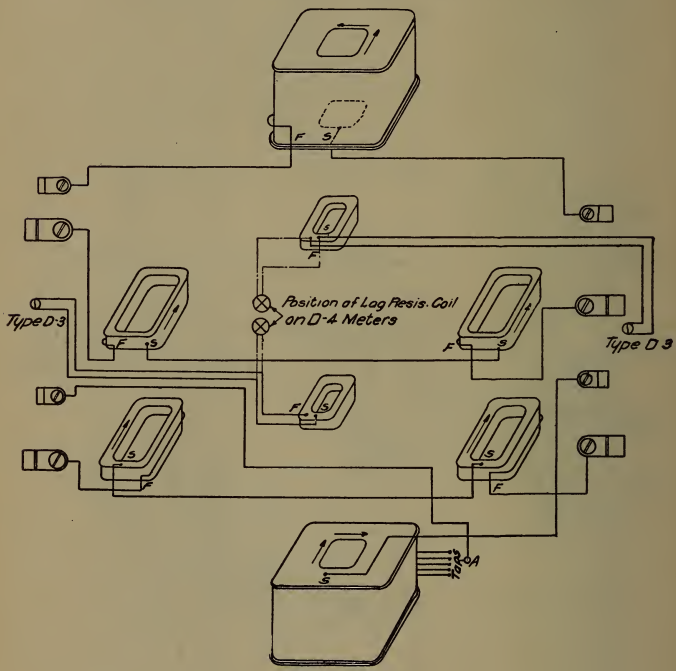


Fig. 132

NOTE.—The lead marked "A" will be soldered to the tap giving the best results in the test.

INTERNAL CONNECTIONS OF TYPES D-3 AND D-4 POLYPHASE THOMSON WATTHOUR METERS

3 to 75 Amps., 200 to 220△ 115 to 125 Y, 400 to 440△ 230 to 250 Y Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits Without Transformers

BACK VIEW

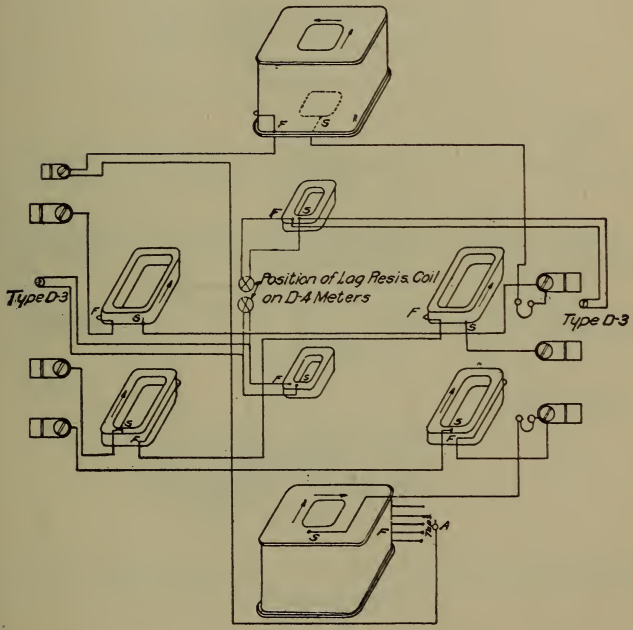


Fig. 133

NOTE —The lead marked "A" will be soldered to that tap which gives the best results in the test.

INTERNAL CONNECTIONS OF TYPES D-3 AND D-4 POLYPHASE THOMSON WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, With Current or Potential Transformers or Both, 4-Wire 3-Phase Circuits

BACK VIEW

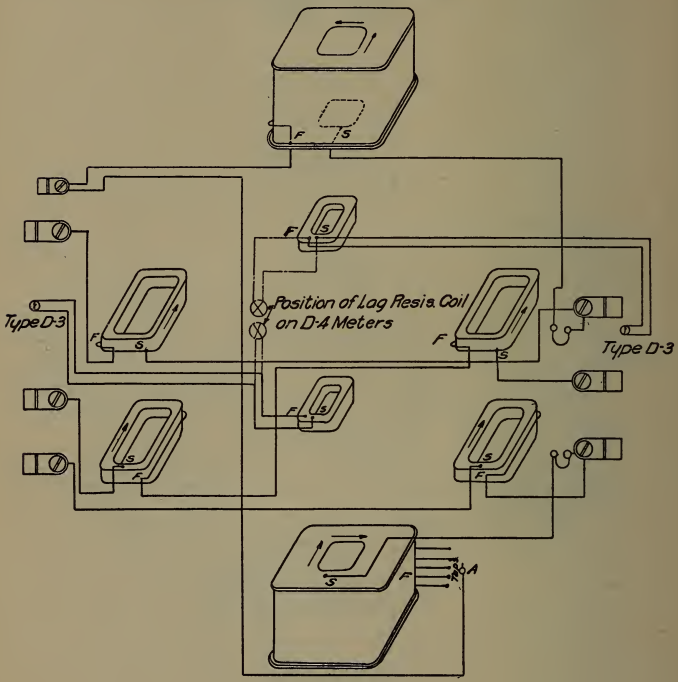


Fig. 134

NOTE.—The lead marked "A" will be soldered to that tap which gives the best results in the test.

INTERNAL CONNECTIONS OF TYPES D-3, D-4, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

3 to 75 Amps., 200 to 220△, 115 to 125Y, 400 to 440△, 230 to 250Y Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits. With and Without Transformers

BACK VIEW

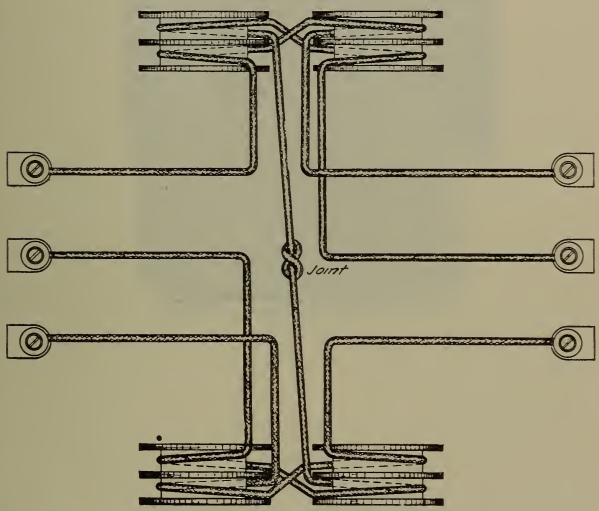


Fig. 135

NOTE.—The above diagram shows later method of winding 4-wire 3-phase current coils. Potential connections of meters so wound correspond to connections as shown on page 151.

TYPE D-4 POLYPHASE WATTHOUR METER

Fig. 136

INTERIOR VIEW OF TYPE D-4 POLYPHASE WATTHOUR METER

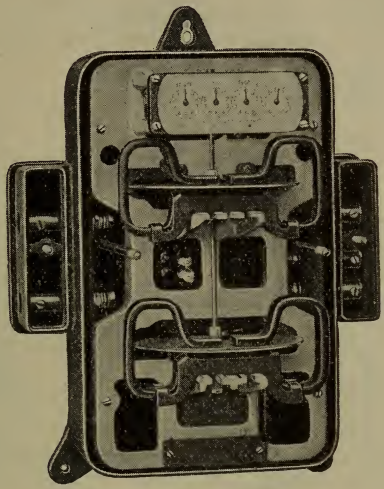


Fig. 137

DIMENSIONS OF TYPE D-4 THOMSON POLY-PHASE WATTHOUR METERS

3 to 75 Amps., 25 to 140 Cycles, With and Without Transformers

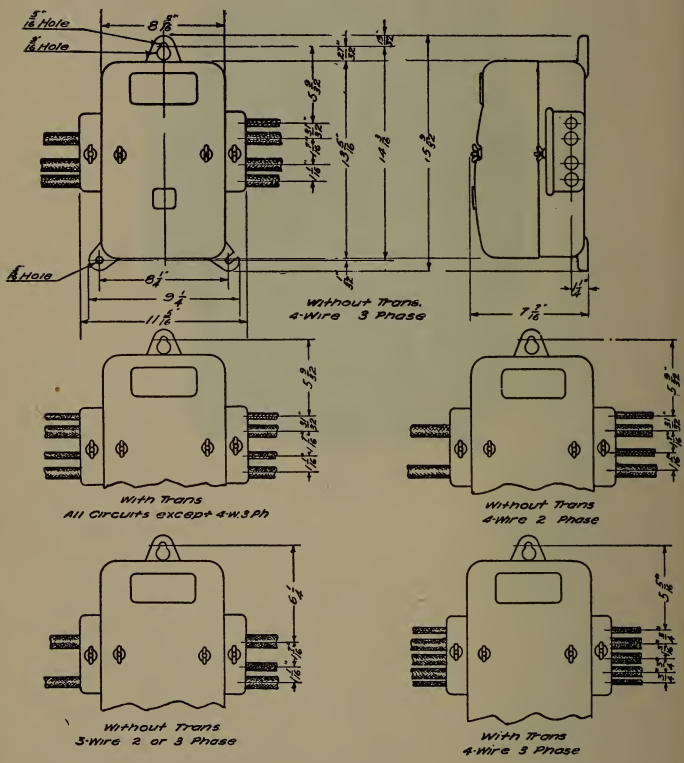


Fig. 138

NOTE—The domed cover such as shown above was not embodied in the earlier D-4 meters.

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

3 to 75 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 3-Wire 2- and 3-Phase and Monocyclic Circuits, Without Transformers

FRONT VIEW

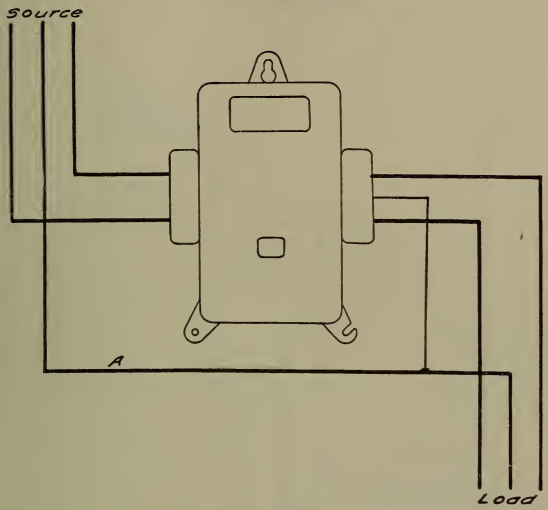


Fig. 139

NOTE.—On 3-wire 2-phase circuits, wire "A" should be the common return, on monocyclic circuits wire "A" must be the teaser wire.

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

Above 75 Amps., Not Exceeding 1150 Volts, 25 to 140 Cycles 3-Wire 2- and 3-Phase and Monocyclic Circuits, With Current Transformers

FRONT VIEW

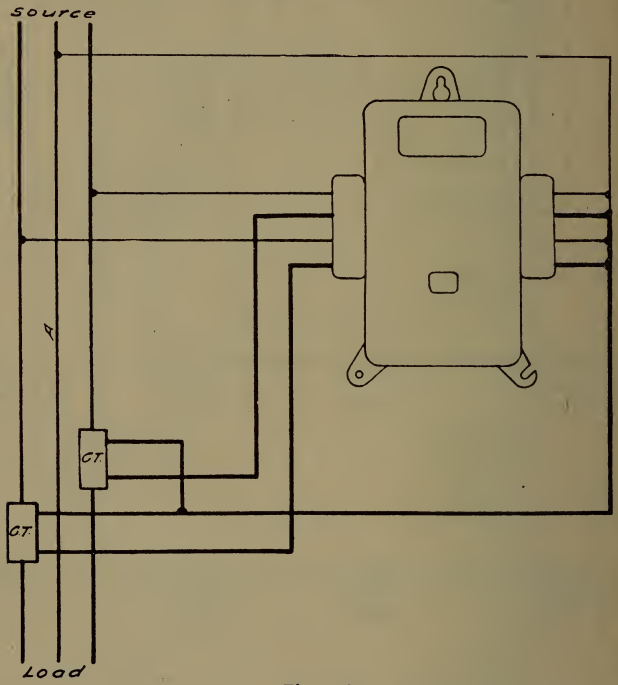


Fig. 140

NOTE.—On 3-wire 2-phase circuits, wire "A" should be the common return, on monocyclic circuits wire "A" must be the teaser wire.

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, 3-Wire 2- and 3-Phase and Monocyclic Circuits, With Current and Potential Transformers

FRONT VIEW

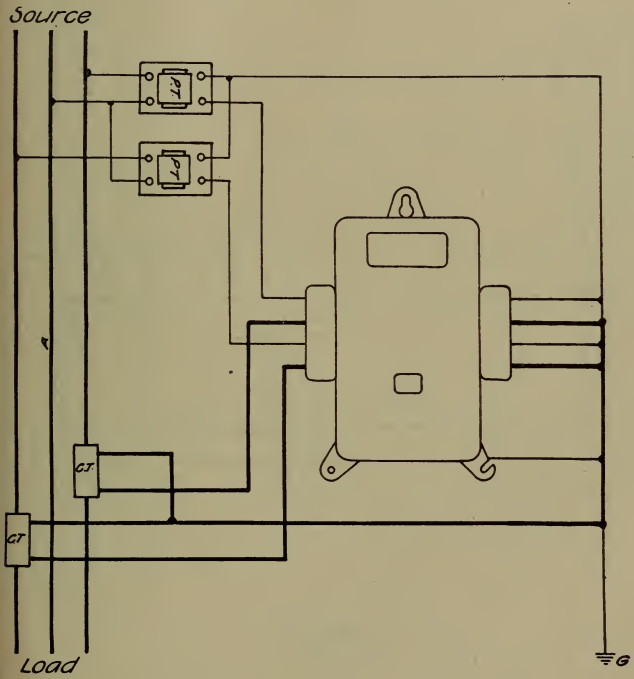


Fig. 141

NOTE.—On 3-wire 2-phase circuits, wire "A" should be the common return, on monocyclic circuits wire "A" must be the teaser wire.

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

3 to 75 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 4-Wire 2-Phase Circuits, Without Transformers

FRONT VIEW

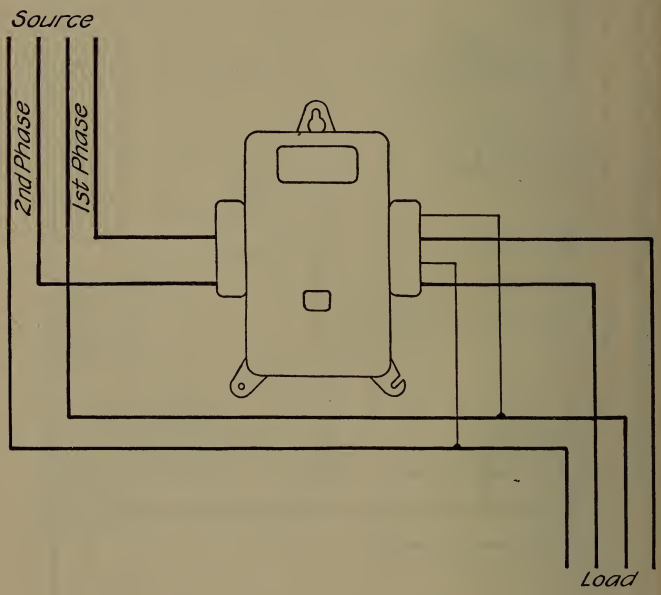


Fig. 142

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

Above 75 Amps., Not Exceeding 1150 Volts, 25 to 140 Cycles, 4-Wire 2-Phase Circuits, With Current Transformers

FRONT VIEW

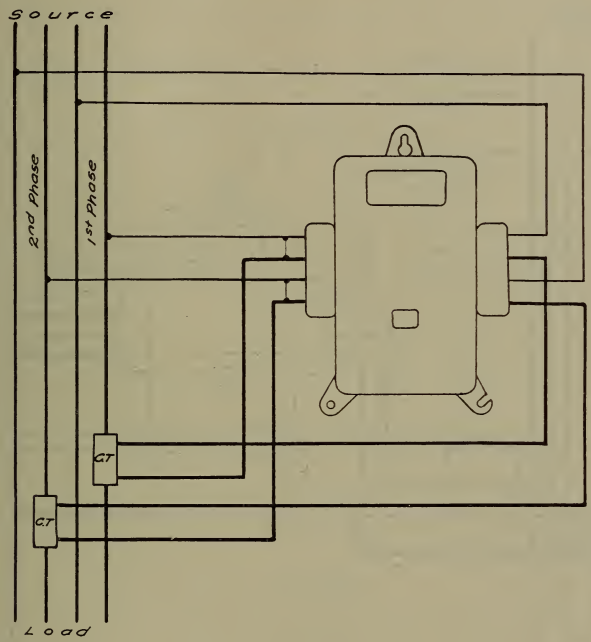


Fig. 143

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, 4-Wire 2-Phase Circuits, With Current and Potential Transformers

FRONT VIEW

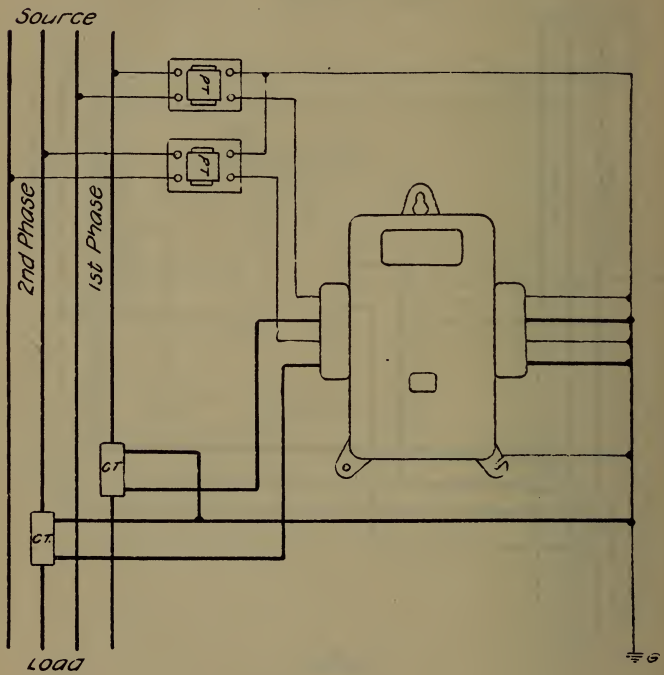


Fig. 144

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

3 to 75 Amps., 200 to 220 △ 115 to 125 Y, 400 to 440 △ 230 to 250 Y Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits, Without Transformers

FRONT VIEW

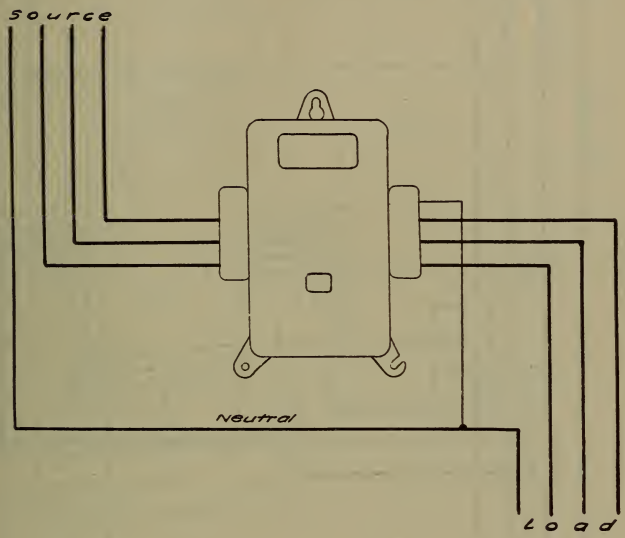


Fig. 145

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

Above 75 Amps., Not Exceeding 1150 Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits, With Current Transformers

FRONT VIEW

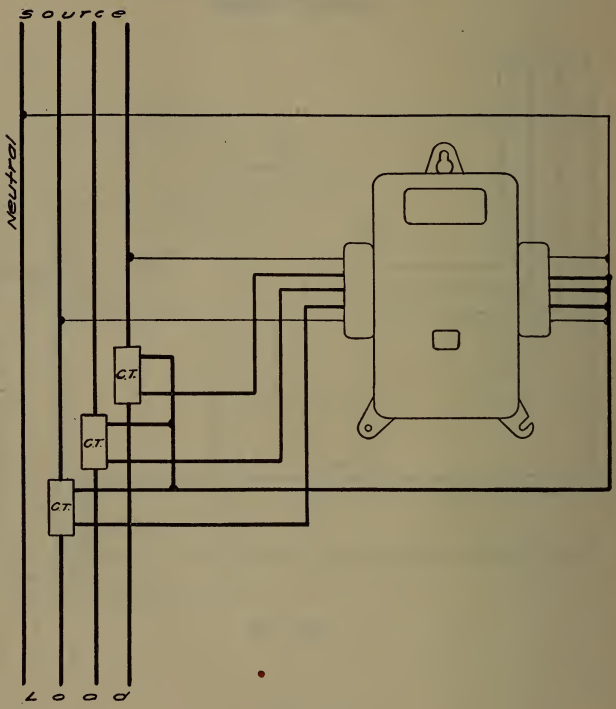


Fig. 146

EXTERNAL CONNECTIONS OF TYPE D-4 THOMSON POLYPHASE WATTHOUR METERS

Above 1150 Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits, With Current and Potential Transformers

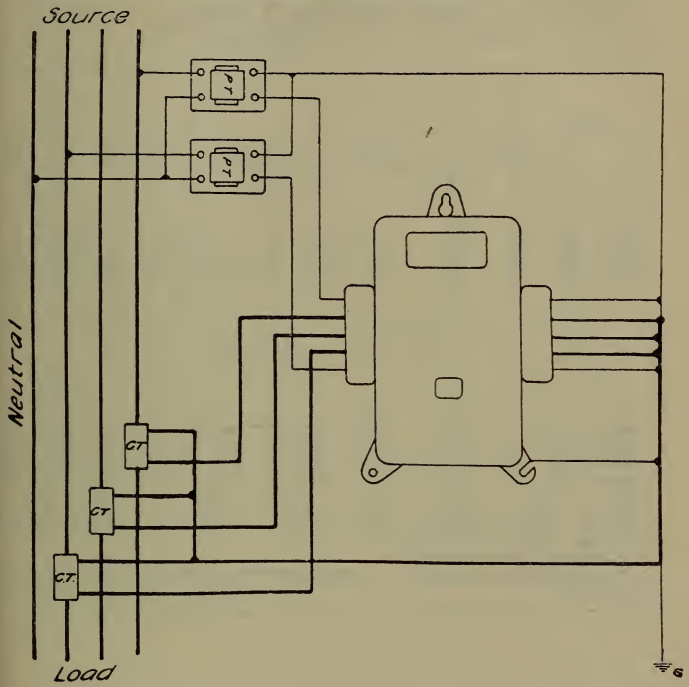


Fig. 147

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 3 to 100 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 Cycles

Volts	AMPERES											
	3			5			10			15		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	1	100	†	1.5	66⅔	†	3	33⅓	†	5	20	†
212 to 240	2	50	†	3	33⅓	†	6	16⅔	†	10	10	†
400 to 480	4	25	†	6	16⅔	†	12.5	80	10	20	50	10
500 to 600	5	20	†	7.5	13⅓	†	15	66⅔	10	25	40	10

Volts	AMPERES											
	25			50			75			100		
106 to 120	7.5	13⅓	†	15	66⅔	10	20	50	10	30	33⅓	10
212 to 240	15	66⅔	10	30	33⅓	10	40	25	10	60	16⅔	10
400 to 480	30	33⅓	10	60	16⅔	10	75	13⅓	10	125	80	100
500 to 600	40	25	10	75	13⅓	10	100	10	10	150	66⅔	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 Cycles

Volts	AMPERES								
	150			200			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	40	25	10	60	16⅔	10	100	10	100
212 to 240	75	13½	10	125	80	100	200	50	100
400 to 480	150	66⅔	100	250	40	100	400	25	100
500 to 600	200	50	100	300	33⅓	100	500	20	100

Volts	AMPERES					
	400			600		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	125	80	100	200	50	100
212 to 240	250	40	100	400	25	100
400 to 480	500	20	100	750	13⅓	100
500 to 600	600	16⅔	100	1000	10	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 5 to 800 Amps., 1000 to 1200, 2000 to 2400 Volts, 25 Cycles

Amperes	VOLTS					
	1000 to 1200			3000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	15	66⅔	10	30	33⅓	10
10	30	33⅓	10	60	16⅔	10
15	50	20	10	100	10	10
20	60	16⅔	10	125	80	100
30	100	10	10	200	50	100
40	125	80	100	250	40	100
60	200	50	100	400	25	100
80	250	40	100	500	20	100
100	300	33⅓	100	600	16⅔	100
150	400	25	100	750	13⅓	100
200	600	16⅔	100	1250	80	1000
300	1000	10	100	2000	50	1000
400	1250	80	1000	2500	40	1000
600	2000	50	1000	4000	25	1000
800	2500	40	1000	5000	20	1000

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

† Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 3 to 100 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 40 and 50 Cycles

Volts	AMPERES											
	3			5			10			15		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.6	$166\frac{2}{3}$	†	1	100	†	2	50	†	3	$33\frac{1}{3}$	†
212 to 240	1.25	80	†	2	50	†	4	25	†	6	$16\frac{2}{3}$	†
400 to 480	2.5	40	†	4	25	†	7.5	$13\frac{1}{3}$	†	12.5	80	10
500 to 600	3	$33\frac{1}{3}$	†	5	20	†	10	10	†	15	$66\frac{2}{3}$	10

Volts	AMPERES											
	25			50			75			100		
106 to 120	5	20	†	10	10	†	12.5	80	10	20	50	10
212 to 240	10	10	†	20	50	10	25	40	10	40	25	10
400 to 480	20	50	10	40	25	10	50	20	10	75	$13\frac{1}{3}$	10
500 to 600	25	40	10	50	20	10	60	$16\frac{2}{3}$	10	100	10	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 40 and 50 Cycles

Volts	AMPERES								
	150			200			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	25	40	10	40	25	10	60	$16\frac{2}{3}$	10
212 to 240	50	20	10	75	$13\frac{1}{3}$	10	125	80	100
400 to 480	100	10	10	150	$66\frac{2}{3}$	100	250	40	100
500 to 600	125	80	100	200	50	100	300	$33\frac{1}{3}$	100

Volts	AMPERES					
	400			600		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	75	$13\frac{1}{3}$	10	125	80	100
212 to 240	150	$66\frac{2}{3}$	100	250	40	100
400 to 480	300	$33\frac{1}{3}$	100	500	20	100
500 to 600	400	25	100	600	$16\frac{2}{3}$	100

Meter K $\times$ 100 $\times$ Register Ratio = No. of watthours recorded by one revolution of the first pointer.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 3 to 800 Amperes, 1000 to 1200, 2000 to 2400 Volts, 40 and 50 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	10	10	†	20	50	10
10	20	50	10	40	25	10
15	30	33⅓	10	60	16⅔	10
20	40	25	10	75	13⅓	10
30	60	16⅔	10	125	80	100
40	75	13⅓	10	150	66⅔	100
60	125	80	100	250	40	100
80	150	66⅔	100	300	33⅓	100
100	200	50	100	400	25	100
150	250	40	100	500	20	100
200	400	25	100	750	13⅓	100
300	600	16⅔	100	1250	80	1000
400	750	13⅓	100	1500	66⅔	1000
600	1250	80	1000	2500	40	1000
800	1500	66⅔	1000	3000	33⅓	1000

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 3 to 200 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 60 to 140 Cycles

Volts	AMPERES											
	3			5			10			15		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.4	250	†	.6	166⅔	†	1.25	80	†	2	50	†
212 to 240	.75	133⅓	†	1.25	80	†	2.5	40	†	4	25	†
400 to 480	1.5	66⅔	†	2.5	40	†	5	20	†	7.5	13⅓	†
500 to 600	2	50	†	3	33⅓	†	6	16⅔	†	10	10	†

Volts	AMPERES											
	25			50			75			100		
106 to 120	3	33⅓	†	6	16⅔	†	7.5	13⅓	†	12.5	80	10
212 to 240	6	16⅔	†	12.5	80	10	15	66⅔	10	25	40	10
400 to 480	12.5	80	10	25	40	10	30	33⅓	10	50	20	10
500 to 600	15	66⅔	10	30	33⅓	10	40	25	10	60	16⅔	10

Volts	AMPERES											
	150			200								
106 to 120	15	66⅔	10	25	40	10						
212 to 240	30	33⅓	10	50	20	10						
400 to 480	60	16⅔	10	100	10	10						
500 to 600	75	13⅓	10	125	80	100						

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

† Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES D-3 AND D-4 THOMSON POLYPHASE WATTHOUR METERS

Capacities 300 to 600 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 60 to 140 Cycles

Volts	AMPERES											
	300			400			450			600		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	40	25	10	50	20	10	60	16⅔	10	75	13⅓	10
212 to 240	75	13⅓	10	100	10	10	125	80	100	150	66⅔	100
400 to 480	150	66⅔	100	200	50	100	250	40	100	300	33⅓	100
500 to 600	200	50	100	250	40	100	300	33⅓	100	400	25	100

Capacities 5 to 2500 Amps., 1000 to 1200, 2000 to 2400 Volts, 60 to 140 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	6	16⅔	†	12.5	80	10
10	12.5	80	10	25	40	10
15	20	50	10	40	25	10
20	25	40	10	50	20	10
30	40	25	10	75	13⅓	10
40	50	20	10	100	10	10
60	75	13⅓	10	150	66⅔	100
80	100	10	10	200	50	100
100	125	80	100	250	40	100
150	150	66⅔	100	300	33⅓	100
200	250	40	100	500	20	100
300	400	25	100	750	13⅓	100
400	500	20	100	1000	10	100
600	750	13⅓	100	1500	66⅔	1000
800	1000	10	100	2000	50	1000

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

TYPE DS-2 THOMSON POLYPHASE WATTHOUR METER

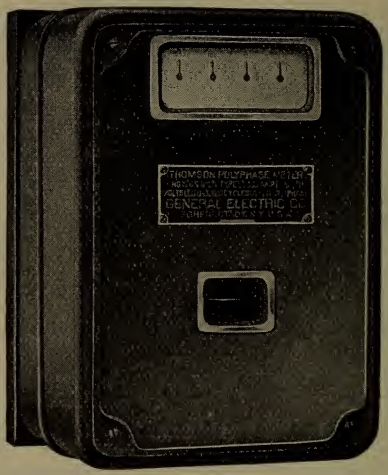


Fig. 148

INTERIOR VIEW OF TYPE DS-2 THOMSON POLYPHASE WATTHOUR METER

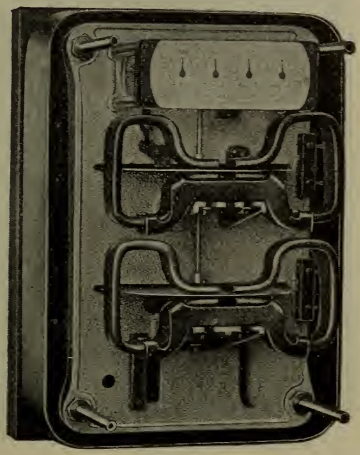


Fig. 149

TYPE DS-3 THOMSON POLYPHASE WATTHOUR METER

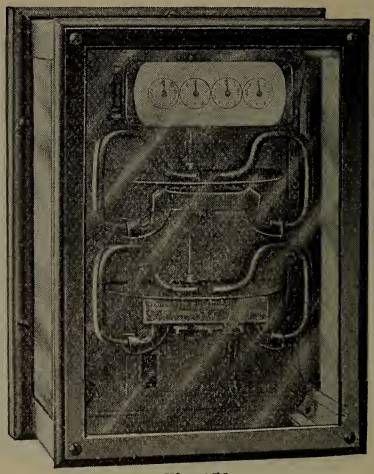


Fig. 150

TYPE DS-4 THOMSON POLYPHASE WATTHOUR METER

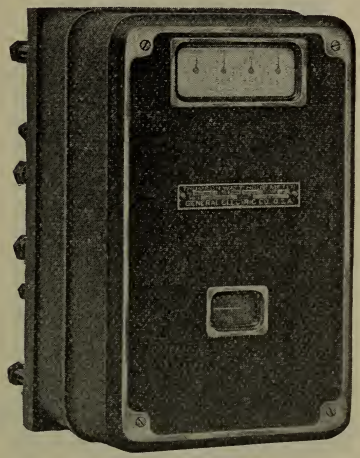


Fig. 151

INTERIOR VIEW OF TYPE DS-4 THOMSON POLYPHASE WATTHOUR METER

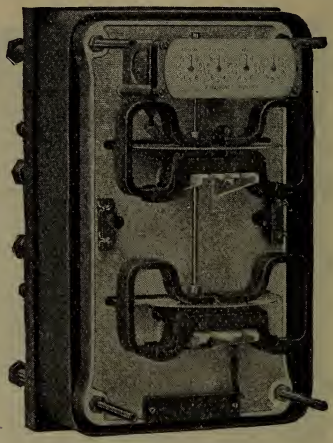


Fig. 152

TYPE DS-5 THOMSON POLYPHASE WATTHOUR METER

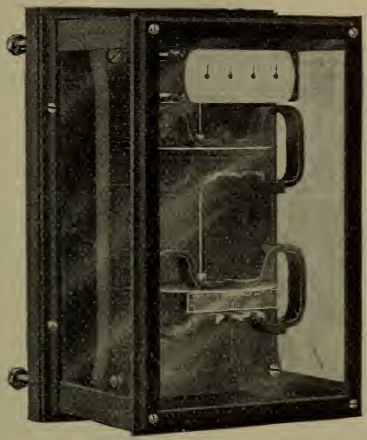


Fig. 153

DIMENSIONS OF TYPE DS-2 THOMSON POLYPHASE WATTHOUR METERS

3 to 150 Amps., 25 to 140 Cycles, With and Without Transformers

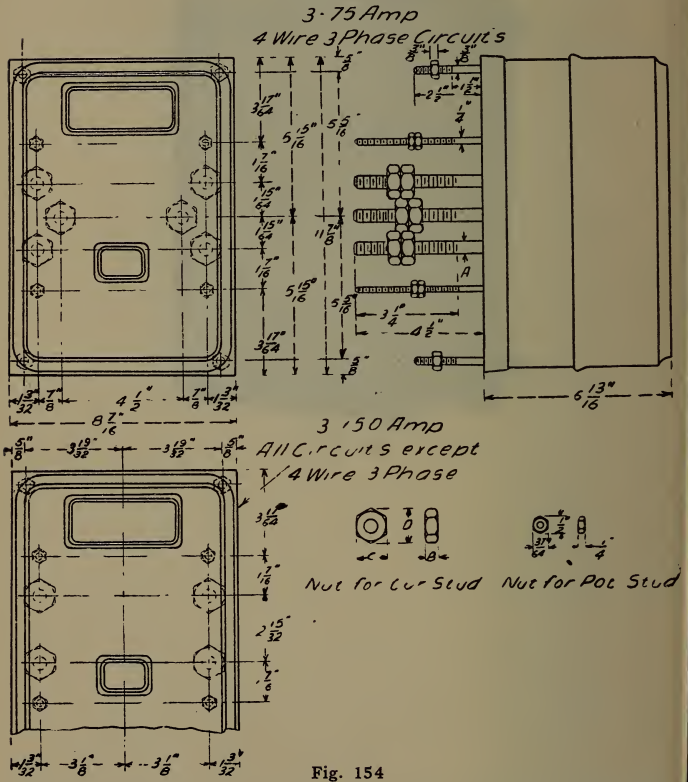


Fig. 154

Capacity	DIMENSIONS IN INCHES			
	A	B	C	D
3–100 amp.	3/8	3/8	25/32	57/64
150 amp.	1/2	1/2	1 1/16	1 7/32

DIMENSIONS OF TYPE DS-3 THOMSON POLY-PHASE WATTHOUR METERS

3 to 150 Amps., 25 to 140 Cycles, With and Without Transformers

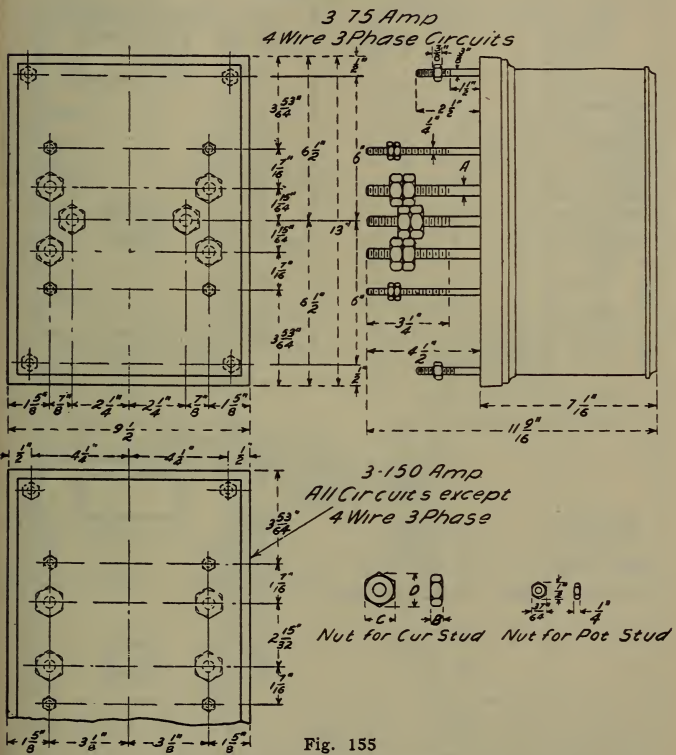


Fig. 155

Capacity	DIMENSIONS IN INCHES			
	A	B	C	D
3–100 amp.	3/8	3/8	25/32	57/64
150 amp.	1/2	1/2	1 1/16	1 9/32

DIMENSIONS OF TYPE DS-4 THOMSON POLY-PHASE WATTHOUR METERS

3 to 150 Amps., 25 to 140 Cycles, With and Without Transformers

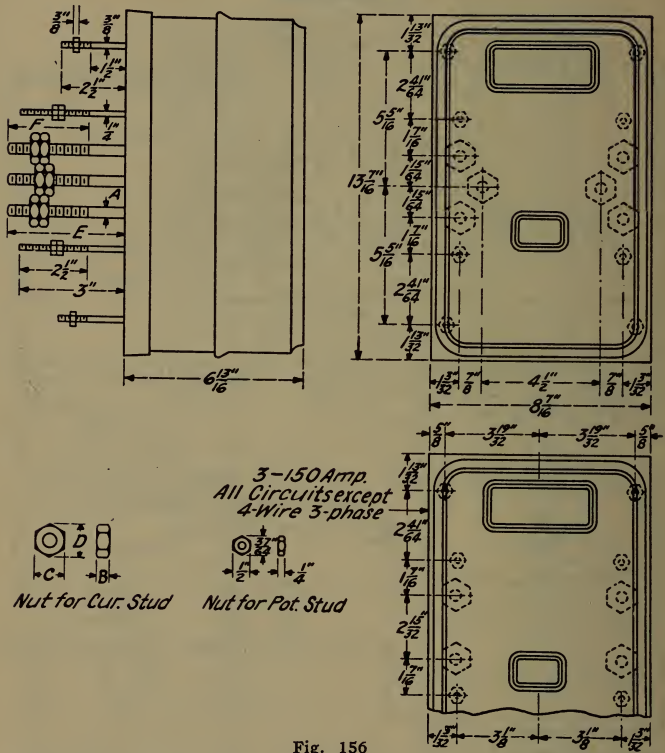


Fig. 156

Capacity	DIMENSIONS IN INCHES					
	A	B	C	D	E	F
3– 50 amp.	3/8	3/8	25/32	57/64	3	2 1/2
75–100 amp.	3/8	3/8	25/32	57/64	3	1 3/4
150–200 amp.	1/2	1/2	1 1/16	1 7/32	3 1/2	2 1/4

DIMENSIONS OF TYPE DS-5 THOMSON POLY-PHASE WATTHOUR METERS

3 to 150 Amps., 25 to 140 Cycles, With and Without Transformers

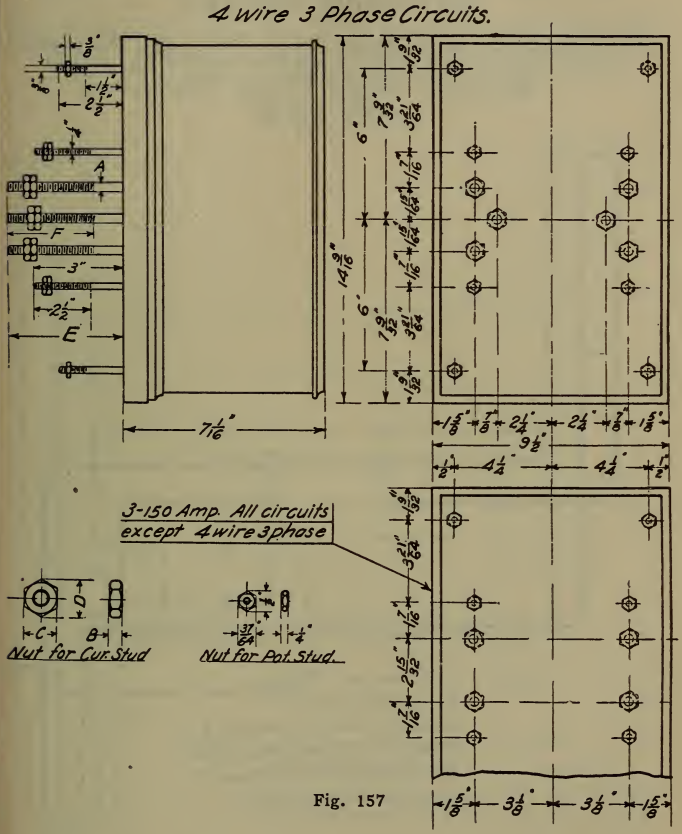


Fig. 157

Capacity	DIMENSIONS IN INCHES					
	A	B	C	D	E	F
3– 50 amp.	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{25}{32}$	$\frac{57}{64}$	3	$2\frac{1}{2}$
75–100 amp.	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{25}{32}$	$\frac{57}{64}$	3	$1\frac{3}{4}$
150–200 amp.	$\frac{5}{8}$	$\frac{1}{2}$	$1\frac{1}{16}$	$1\frac{7}{32}$	$3\frac{1}{2}$	$2\frac{1}{4}$

EXTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

5 to 150 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 3-Wire 2- and 3-Phase and Monocyclic Circuits Without Transformers

BACK VIEW

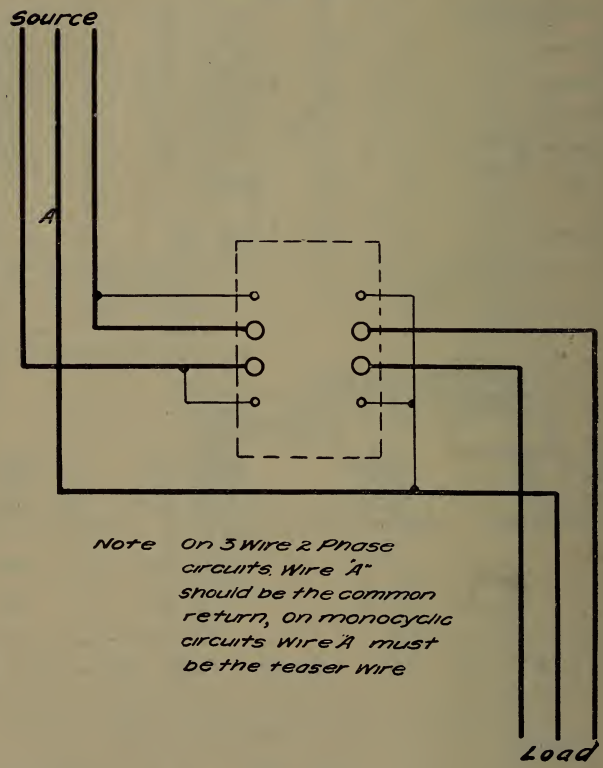


Fig. 158

EXTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

Above 150 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 3-Wire 2- and 3-Phase and Monocyclic Circuits, With Current Transformers

BACK VIEW

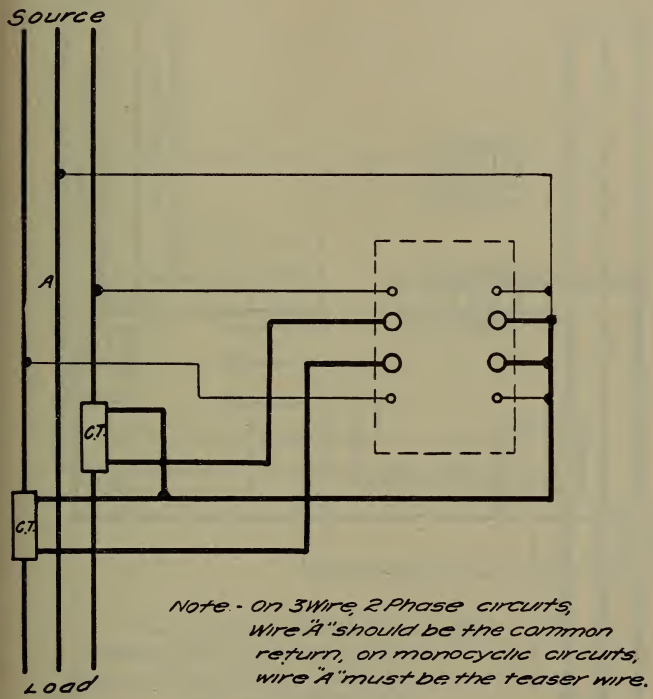


Fig. 159

EXTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

Above 150 Amps. and 650 Volts, 3-Wire 2- and 3-Phase and Monocyclic Circuits With Current and Potential Transformers

BACK VIEW

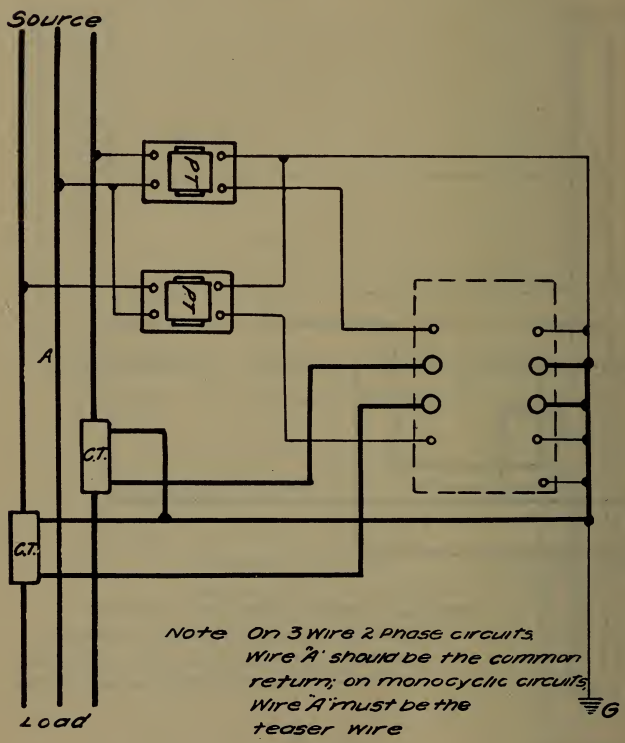


Fig. 160

EXTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

5 to 150 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 4-Wire 2-Phase Circuits, Without Transformers

BACK VIEW

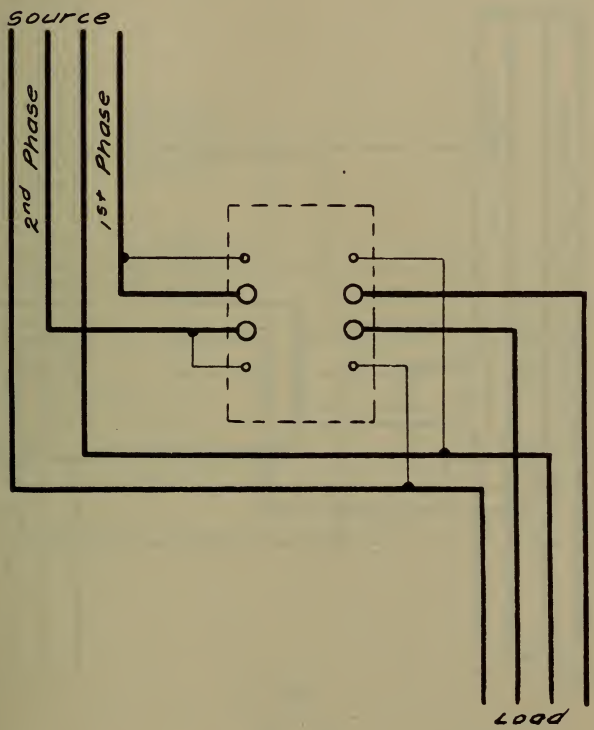


Fig. 161

EXTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

Above 150 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 4-Wire 2-Phase Circuits With Current Transformers

BACK VIEW

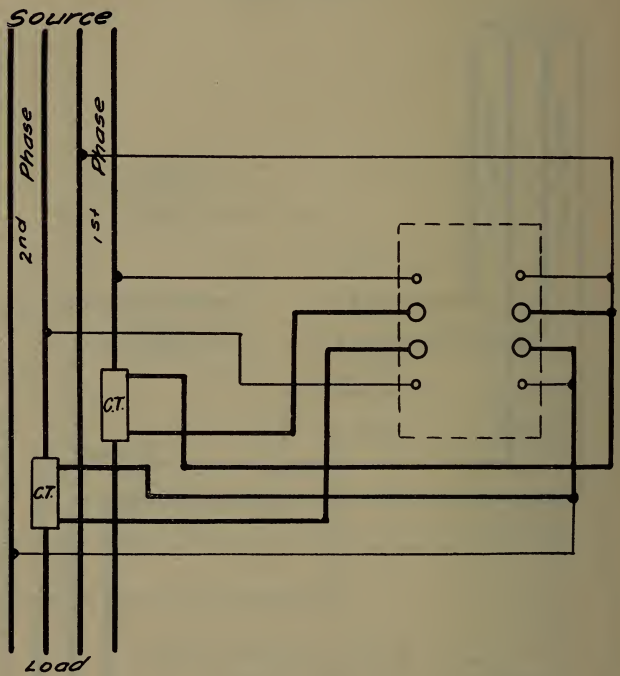


Fig. 162

EXTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

Above 150 Amps., and 650 Volts, 4-Wire 2-Phase Circuits, With Current and Potential Transformers

BACK VIEW

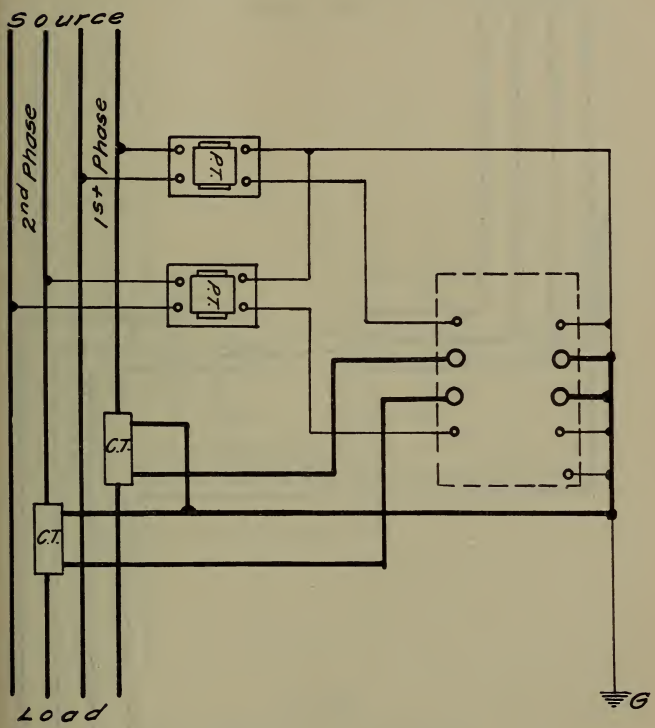


Fig. 163

EXTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

5 to 75 Amps., 200 to 220 △ 115 to 125 Y, 400 to 440 △ 230 to 250 Y
4-Wire 3-Phase Circuits, Without Transformers
BACK VIEW

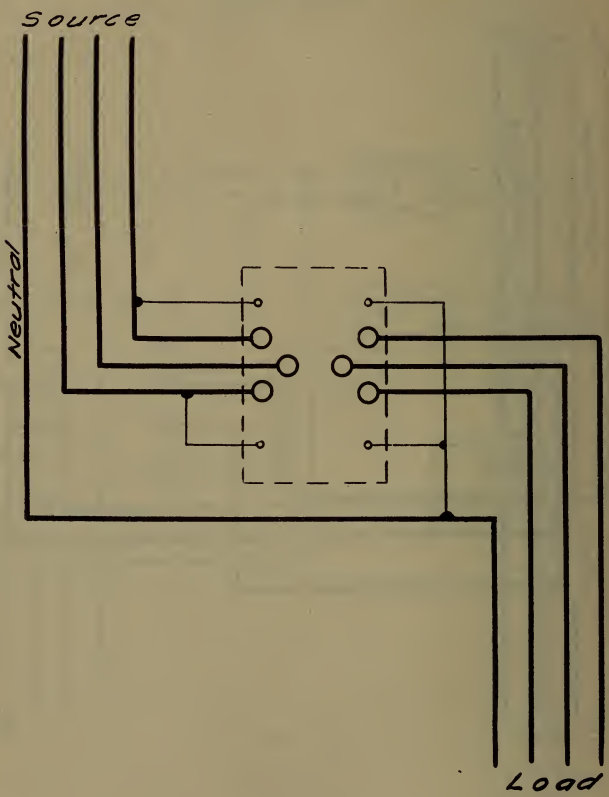


Fig. 164

EXTERNAL CONNECTIONS OF TYPES DS-4 AND DS-5* THOMSON POLYPHASE WATTHOUR METERS

Above 75 Amps., 200 to 220 △ 115 to 125 Y, 400 to 440 △ 230 to 250 Y, 4-Wire 3-Phase Circuits, With Current Transformers

BACK VIEW

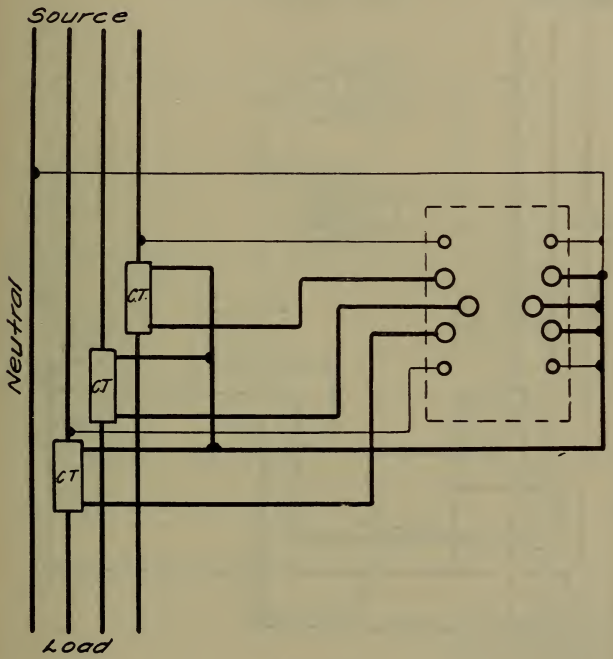


Fig. 165

* Also Types DS-2 and DS-3 with 3 current elements.

EXTERNAL CONNECTIONS OF TYPES DS-4 AND DS-5* THOMSON POLYPHASE WATTHOUR METERS

Above 75 Amps. and 650 Volts, 4-Wire 3-Phase Circuits With Current and Potential Transformers

BACK VIEW

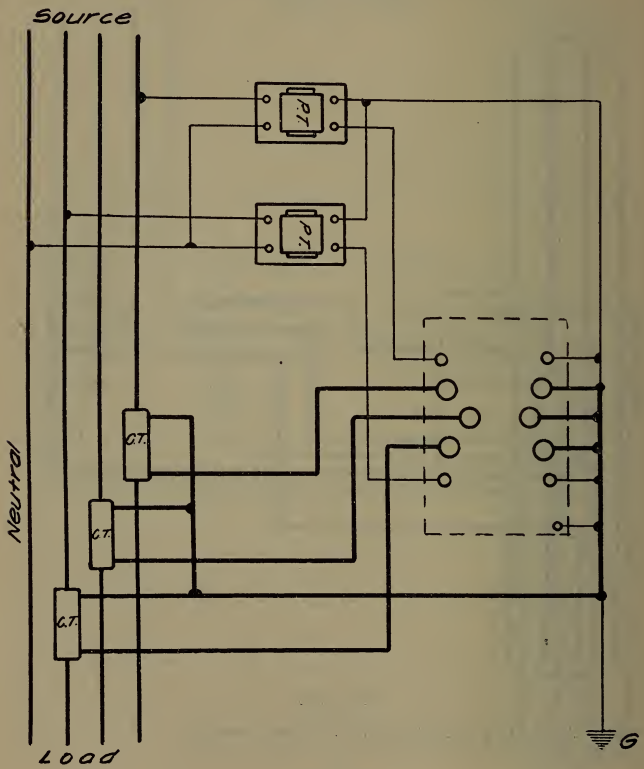


Fig. 166

*Also Types DS-2 and DS-3 with 3 current elements.

INTERNAL CONNECTIONS OF TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

All Capacities and All Circuits for Types DS-2 and DS-3 Meters Including 4-Wire 3-Phase With 2 Current Elements. All Circuits for Types DS-4 and DS-5 Meters Except 4-Wire 3-Phase, With and Without Transformers

BACK VIEW

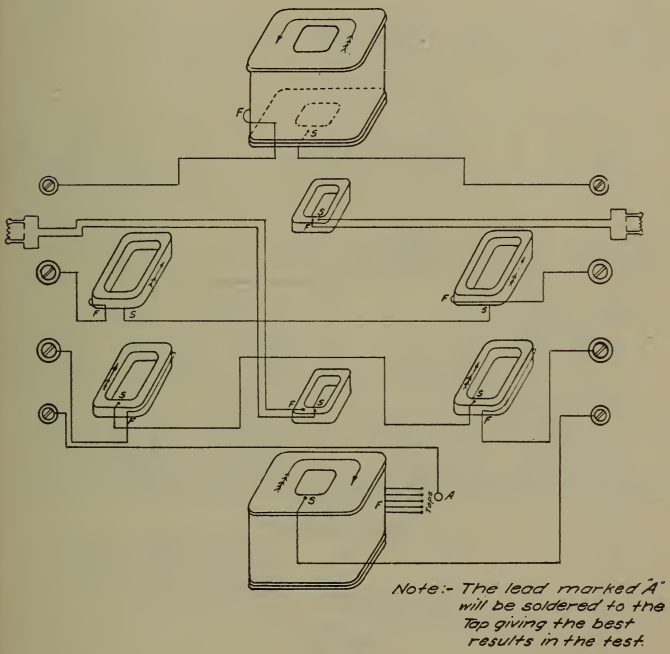


Fig. 167

INTERNAL CONNECTIONS OF TYPES DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS, ALSO TYPES DS-2 AND DS-3 POLYPHASE WATTHOUR METERS WITH 3 CURRENT ELEMENTS

3 to 75 Amps., 200 to 220△ 115 to 125Y, 400 to 440△ 230 to 250Y Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits Only With and Without Transformers

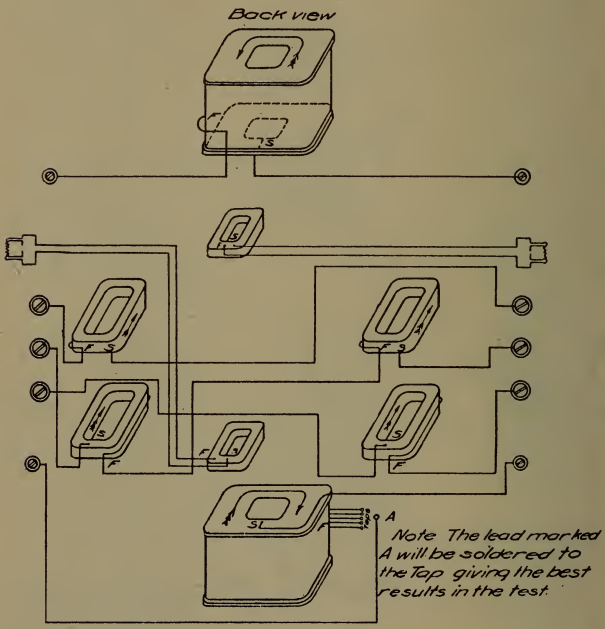


Fig. 168

NOTE.—Refer to page 153 for diagram showing later method of connecting current coils of Types DS-4 and DS-5 meters.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLY-PHASE WATTHOUR METERS

Capacities 5 to 100 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 Cycles

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	1.5	$6\frac{2}{3}$	*	3	$3\frac{1}{3}$	*	5	2	*	7.5	$1\frac{1}{3}$	*
212 to 240	3	$3\frac{1}{3}$	*	6	$1\frac{2}{3}$	*	10	1	*	15	$6\frac{2}{3}$	†
400 to 480	6	$1\frac{2}{3}$	*	12.5	8	†	20	5	†	30	$3\frac{1}{3}$	†
500 to 600	7.5	$1\frac{1}{3}$	*	15	$6\frac{2}{3}$	†	25	4	†	40	$2\frac{1}{2}$	†

Volts	AMPERES								
	50			75			100		
106 to 120	15	$6\frac{2}{3}$	†	20	5	†	30	$3\frac{1}{3}$	†
212 to 240	30	$3\frac{1}{3}$	†	40	$2\frac{1}{2}$	†	60	$1\frac{2}{3}$	†
400 to 480	60	$3\frac{1}{3}$	†	75	$1\frac{1}{4}$	†	125	8	10
500 to 600	75	$1\frac{1}{3}$	†	100	1	†	150	$6\frac{2}{3}$	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLY-PHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 25 Cycles

Volts	AMPERES								
	150			200			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	40	$2\frac{1}{2}$	†	60	$1\frac{2}{3}$	†	100	1	†
212 to 240	75	$1\frac{1}{3}$	†	125	8	10	200	5	10
400 to 480	150	$6\frac{2}{3}$	10	250	4	10	400	$2\frac{1}{2}$	10
500 to 600	200	5	10	300	$3\frac{1}{3}$	10	500	2	10

Volts	AMPERES					
	400			600		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	125	8	10	200	5	10
212 to 240	250	4	10	400	$2\frac{1}{2}$	10
400 to 480	500	2	10	750	$1\frac{1}{3}$	10
500 to 600	600	$1\frac{2}{3}$	10	1000	1	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

Capacities 5 to 800 Amps., 1000 to 1200, 2000 to 2400 Volts, 25 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Ratio Reg.	Dial Face Mult.
5	15	6⅔	†	30	3⅓	†
10	30	3⅓	†	60	1⅔	†
15	50	2	†	100	1	†
20	60	1⅔	†	125	8	10
30	100	1	†	200	5	10
40	125	8	10	250	4	10
60	200	5	10	400	2½	10
80	250	4	10	500	2	10
100	300	3⅓	10	600	1⅔	10
150	400	2½	10	750	1⅓	10
200	600	1⅔	10	1250	8	100
300	1000	1	10	2000	5	100
400	1250	8	100	2500	4	100
600	2000	5	100	4000	2½	100
800	2500	4	100	5000	2	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLY-PHASE WATTHOUR METERS

Capacities 5 to 100 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 660 Volts, 40 and 50 Cycles

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	1	10	*	2	5	*	3	$3\frac{1}{3}$	*	5	2	*
212 to 240	2	5	*	4	$2\frac{1}{2}$	*	6	$1\frac{2}{3}$	*	10	1	*
400 to 480	4	$2\frac{1}{2}$	*	7.5	$1\frac{1}{3}$	*	12.5	8	†	20	5	†
500 to 600	5	2	*	10	1	*	15	$6\frac{2}{3}$	†	20	4	†

Volts	AMPERES								
	50			75			100		
106 to 120	10	1	*	10	1	*	20	5	†
212 to 240	20	5	†	25	4	†	40	$2\frac{1}{2}$	†
400 to 480	40	$2\frac{1}{2}$	†	50	2	†	75	$1\frac{1}{3}$	†
500 to 600	50	2	†	60	$1\frac{2}{3}$	†	100	1	†

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLY-PHASE WATTHOUR METERS

Capacities 150 to 600 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 40 and 50 Cycles

Volts	AMPERES								
	150			200			300		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	25	4	†	40	$2\frac{1}{2}$	†	60	$1\frac{2}{3}$	†
212 to 240	50	2	†	75	$1\frac{2}{3}$	†	125	8	10
400 to 480	100	1	†	150	$6\frac{2}{3}$	10	250	4	10
500 to 600	125	8	10	200	5	10	300	$3\frac{1}{3}$	10

Volts	AMPERES								
	400			600					
106 to 120	75	$1\frac{1}{3}$	†	125	8	10			
212 to 240	150	$6\frac{2}{3}$	10	250	4	10			
400 to 480	300	$3\frac{1}{3}$	10	500	2	10			
500 to 600	400	$2\frac{1}{2}$	10	600	$1\frac{2}{3}$	10			

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLYPHASE WATTHOUR METERS

Capacities 5 to 800 Amps., 1000 to 1200, 2000 to 2400 Volts, 40 and 50 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	10	1	*	20	5	†
10	20	5	†	40	$2\frac{1}{2}$	†
15	30	$3\frac{1}{3}$	†	60	$1\frac{2}{3}$	†
20	40	$2\frac{1}{2}$	†	75	$1\frac{1}{3}$	†
30	60	$1\frac{2}{3}$	†	125	8	10
40	75	$1\frac{1}{3}$	†	150	$6\frac{2}{3}$	10
60	125	8	10	250	4	10
80	150	$6\frac{2}{3}$	10	300	$3\frac{1}{3}$	10
100	200	5	10	400	$2\frac{1}{2}$	10
150	250	4	10	500	2	10
200	400	$2\frac{1}{2}$	10	750	$1\frac{1}{3}$	10
300	600	$1\frac{2}{3}$	10	1250	8	100
400	750	$1\frac{1}{3}$	10	1500	$6\frac{2}{3}$	100
600	1250	8	100	2500	4	100
800	1500	$6\frac{2}{3}$	100	3000	$3\frac{1}{3}$	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLY-PHASE WATTHOUR METERS

Capacities 5 to 200 Amps., 106 to 120, 212 to 240, 400 to 480 500 to 600 Volts, 60 to 140 Cycles

Volts	AMPEEES														
	5			10			15			25			50		
	Meter K'	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K'	Reg. Ratio	Dial Face Mult.
106 to 120	.6	$16\frac{2}{3}$	*	1.25	8	*	2	5	*	3	$3\frac{1}{3}$	*	6	$1\frac{2}{3}$	*
212 to 240	1.25	8	*	2.5	4	*	4	$2\frac{1}{2}$	*	6	$1\frac{2}{3}$	*	12.5	8	†
400 to 480	2.5	4	*	5	2	*	7.5	$1\frac{1}{3}$	*	12.5	8	†	25	4	†
500 to 600	3	$3\frac{1}{3}$	*	6	$1\frac{1}{3}$	*	10	1	*	15	$6\frac{2}{3}$	†	30	$3\frac{1}{3}$	†

Volts	AMPERES											
	75			100			150			200		
106 to 120	7.5	$1\frac{1}{3}$	*	12.5	8	†	15	$6\frac{2}{3}$	†	25	4	†
212 to 240	15	$6\frac{2}{3}$	†	25	4	†	30	$3\frac{1}{3}$	†	50	2	†
400 to 480	30	$3\frac{1}{3}$	†	50	2	†	60	$1\frac{2}{3}$	†	100	1	†
500 to 600	40	$2\frac{1}{2}$	†	60	$1\frac{2}{3}$	†	75	$1\frac{1}{3}$	†	125	8	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLY-PHASE WATTHOUR METERS

Capacities 300 to 600 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts, 60 to 140 Cycles

Volts	AMPERES								
	300			400			600		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	40	$2\frac{1}{2}$	†	50	2	†	75	$1\frac{1}{3}$	†
212 to 240	75	$1\frac{1}{3}$	†	100	1	†	150	$6\frac{2}{3}$	10
400 to 480	150	$6\frac{2}{3}$	10	200	5	10	300	$3\frac{1}{3}$	10
500 to 600	200	5	10	250	4	10	400	$2\frac{1}{2}$	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPES DS-2, DS-3, DS-4 AND DS-5 THOMSON POLY-PHASE WATTHOUR METERS

Capacities 5 to 800 Amps., 1000 to 1200, 2000 to 2400 Volts 60 to 140 Cycles

Amperes	VOLTS					
	1000 to 1200			2000 to 2400		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
5	6	$1\frac{2}{3}$	*	12.5	8	†
10	12.5	8	†	25	4	†
15	20	5	†	40	$2\frac{1}{2}$	†
20	25	4	†	50	2	†
30	40	$2\frac{1}{2}$	†	75	$1\frac{1}{3}$	†
40	50	2	†	100	1	†
60	75	$1\frac{1}{3}$	†	150	$6\frac{2}{3}$	10
80	100	1	†	200	5	10
100	125	8	10	250	4	10
150	150	$6\frac{2}{3}$	10	300	$3\frac{1}{3}$	10
200	250	4	10	500	2	10
300	400	$2\frac{1}{2}$	10	750	$1\frac{1}{3}$	10
400	500	2	10	1000	1	10
600	750	$1\frac{1}{3}$	10	1500	$6\frac{2}{3}$	100
800	1000	1	10	2000	5	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of first pointer.

† Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = kw-hr.

TYPE IB THOMSON INDUCTION PORTABLE TEST METER

Fig. 169

INTERIOR VIEW OF TYPE IB THOMSON INDUCTION PORTABLE TEST METER

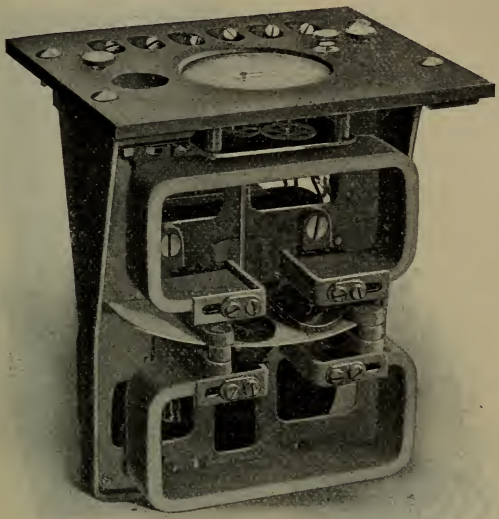


Fig. 170

TYPE IB-2 THOMSON INDUCTION PORTABLE TEST METER

Fig. 171

INTERIOR VIEW OF TYPE IB-2 THOMSON INDUCTION PORTABLE TEST METER

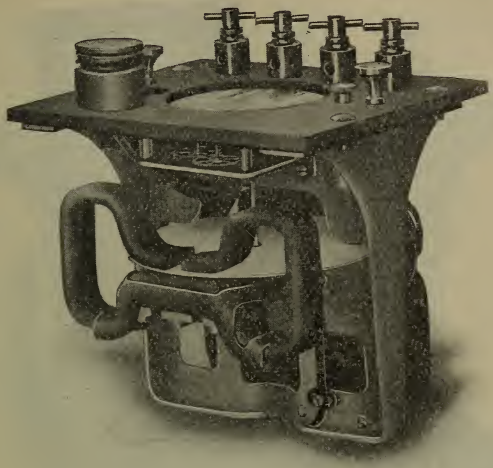


Fig. 172

TYPE IB-3 THOMSON INDUCTION PORTABLE TEST METER

Fig. 173

INTERIOR VIEW OF TYPE IB-3 THOMSON INDUCTION PORTABLE TEST METER

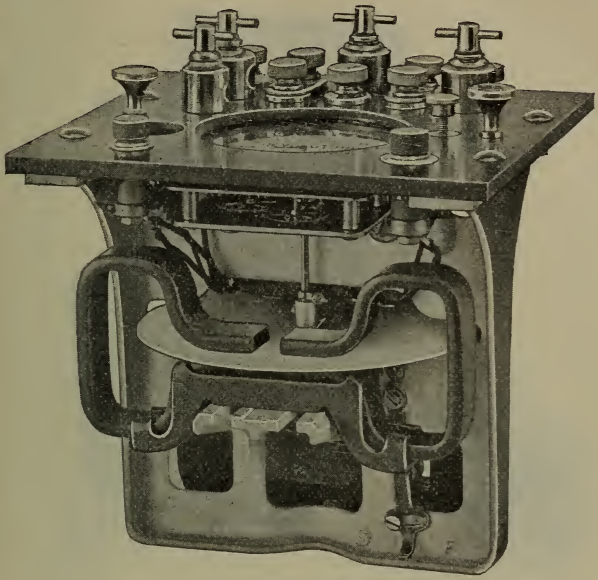


Fig. 174

TYPE IB-4 THOMSON INDUCTION PORTABLE TEST METER

Fig. 175

INTERIOR VIEW OF TYPE IB-4 THOMSON INDUCTION PORTABLE TEST METER

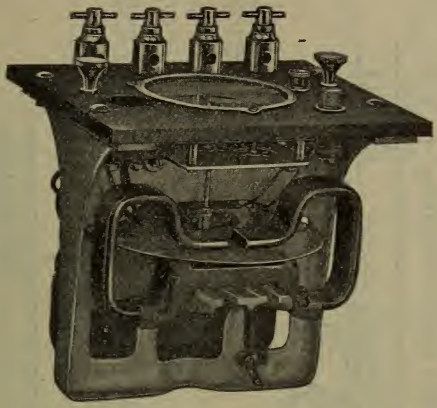


Fig. 176

EXTERNAL CONNECTIONS OF TYPES IB-2, IB-3 AND IB-4 THOMSON INDUCTION PORTABLE TEST METERS

1-10-20 Amp., Double Voltage, Single Frequency
1-10-20 Amp., Single Voltage, Double Frequency

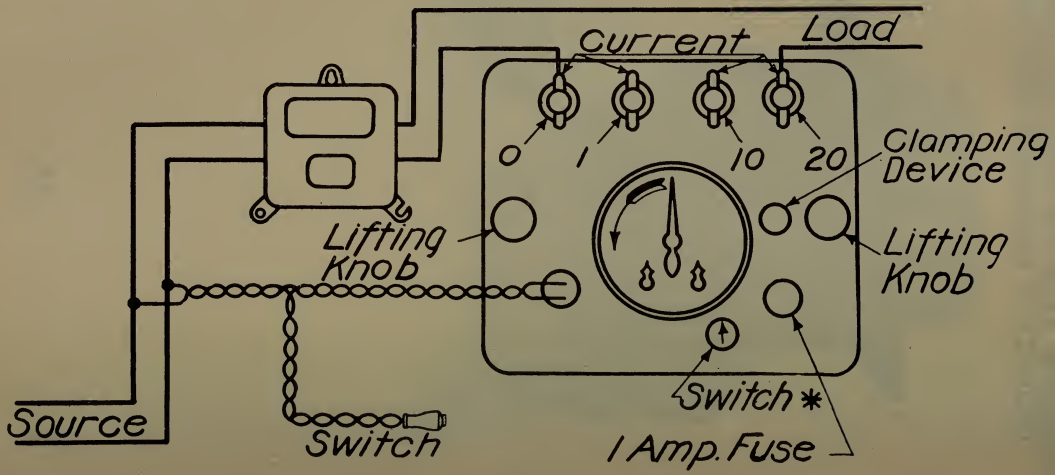


Fig. 177

* Used only on double voltage or double frequency meters.

EXTERNAL CONNECTIONS OF TYPES IB-3 AND IB-4 THOMSON INDUCTION PORTABLE TEST METERS

1-5-10-50-100 Amps., Double Voltage, Single Frequency
1-5-10-50-100 Amps., Single Voltage, Double Frequency

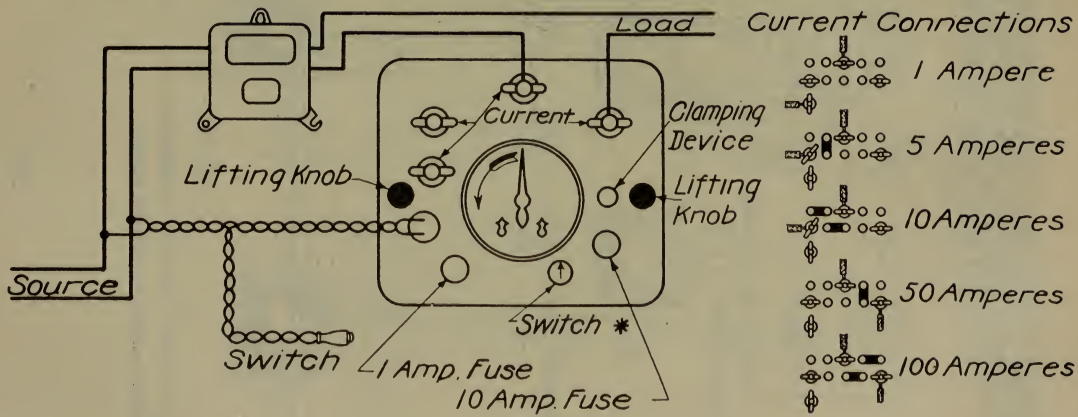


Fig. 178

* Used only on double voltage or double frequency meters.

INTERNAL CURRENT CONNECTIONS OF TYPES IB, IB-2, IB-3 AND IB-4 THOMSON INDUCTION PORTABLE TEST METERS

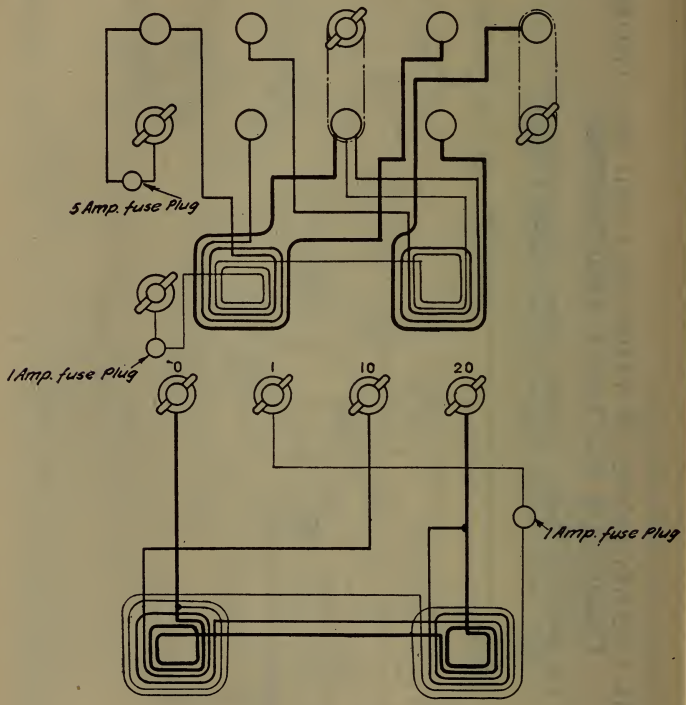


Fig. 179

NOTE.—Types IB and IB-2 meters made only in capacities of 1, 10 and 20 amps.

Fuse plug omitted on Type IB meters.

INTERNAL POTENTIAL CONNECTIONS OF THOMSON PORTABLE INDUCTION TEST METERS, TYPES IB, IB-2, IB-3 AND IB-4

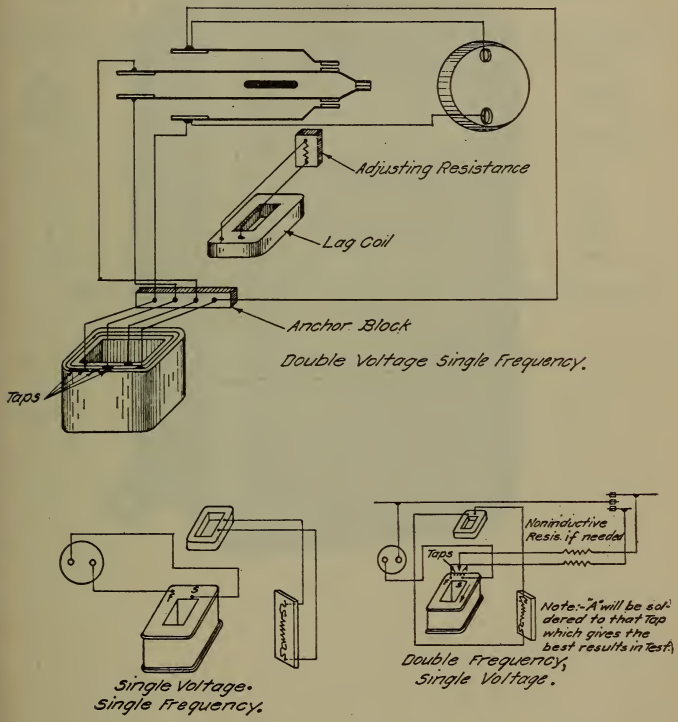


Fig. 180

CONSTANTS FOR TYPES IB, IB-2, IB-3, AND IB-4 THOMSON INDUCTION PORTABLE TEST METERS

Capacities 1 to 100 Amps., 100 to 120, 200 to 240 Volts 25 to 140 Cycles

Volts	100 to 120			200 to 240		
Cycles	25	40 and 50	60 and above	25	40 and 50	60 and above
Amps.	Constants					
1	.1	.075	.05	.2	.15	.1
5	.5	.375	.25	1	.75	.5
10	1	.75	.5	2	1.5	1
20	2	1.5	1	4	3	2
40	4	3	2	8	6	4
50	5	3.75	2.5	10	7.5	5
100	10	7.5	5	20	15	10

One revolution of large pointer corresponds to one revolution of disk.

TYPE C THOMSON DIRECT CURRENT WATTHOUR METER

Fig. 181

INTERIOR VIEW OF TYPE C THOMSON DIRECT CURRENT WATTHOUR METER

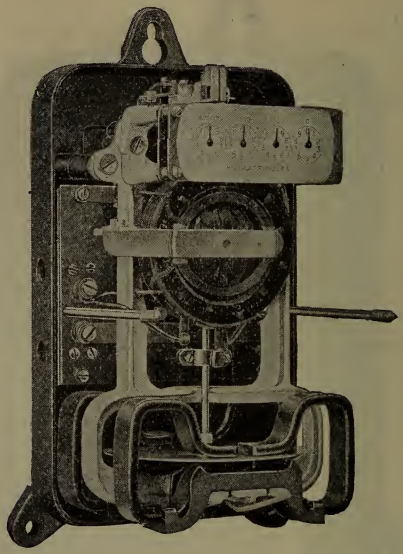


Fig. 182

TYPE C-6 THOMSON DIRECT CURRENT WATTHOUR METER

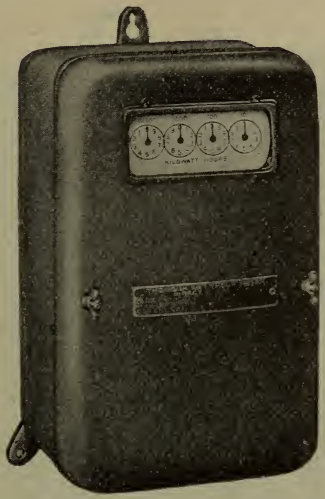


Fig. 183

INTERIOR VIEW OF TYPE C-6 THOMSON DIRECT CURRENT WATTHOUR METER

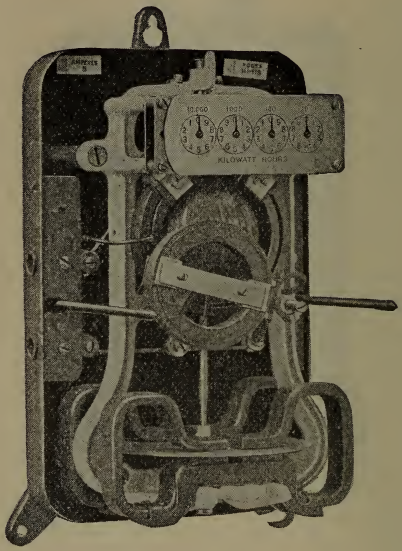


Fig. 184

TYPE C-7 THOMSON DIRECT CURRENT WATTHOUR METER

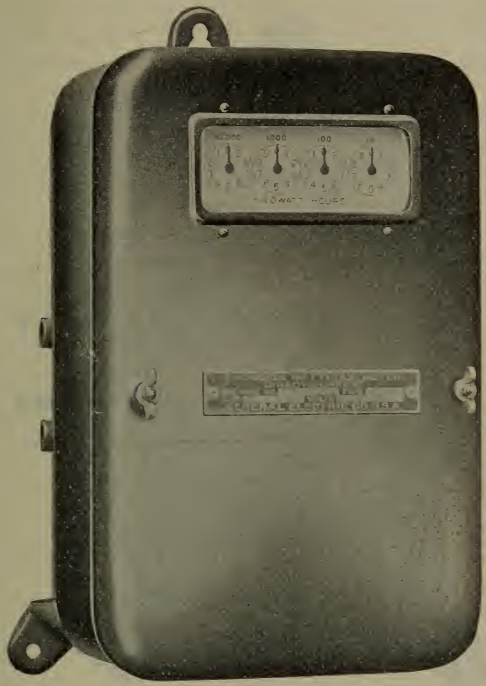


Fig. 185

INTERIOR VIEW OF TYPE C-7 THOMSON DIRECT CURRENT WATTHOUR METER

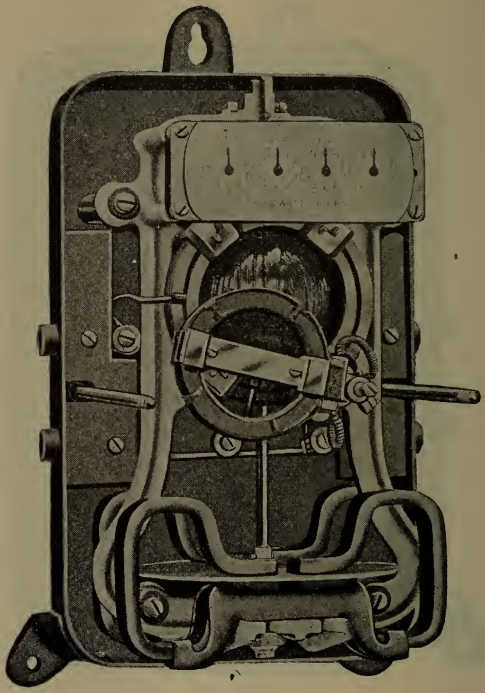
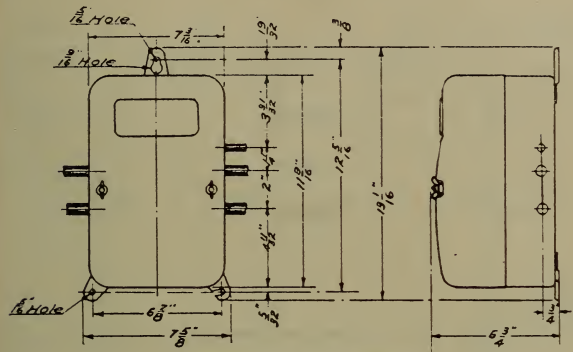


Fig. 186

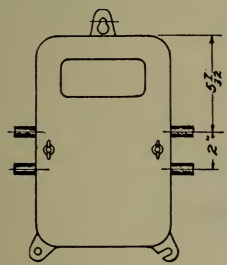
DIMENSIONS OF TYPES C, C-6 AND C-7 THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 5 to 50 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 400 to 500 Volts 3-Wire

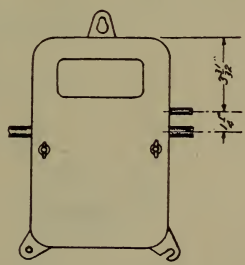
Type C-7 Watthour Meters, 5 to 50 Amps., 500 to 600 Volts 2-Wire



Types C and C-6, 3-Wire



Types C and C-6, 2-Wire



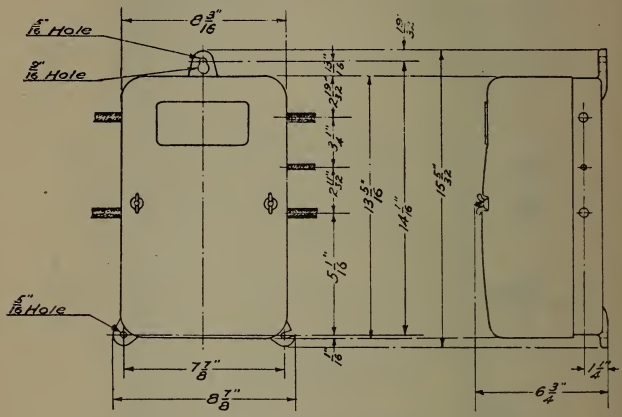
Type C-7, 2-Wire

Fig. 187

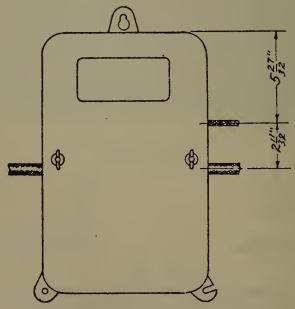
NOTE—The domed cover such as shown above was not embodied in the Type C meter and in the earlier Type C-6 meter.

DIMENSIONS OF TYPES C, C-6, C-7 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 75 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 400 to 500 Volts 3-Wire
Type C-7 Watthour Meters, 75 Amps., 500 to 600 Volts 2-Wire
Type CQ Watthour Meters, 50 and 75 Amps., 500 to 600 Volts 2-Wire



Types C and C-6, 3-Wire



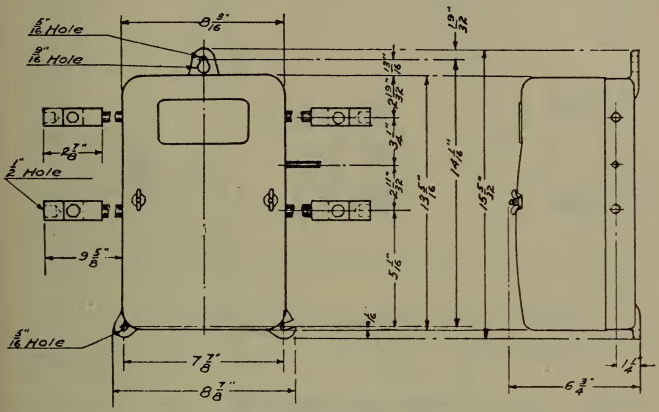
Types C and C-6, 2-Wire
Type C-7, 2-Wire
Type CQ, 2-Wire

Fig. 188

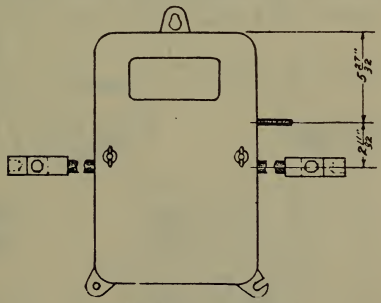
NOTE—The domed cover such as shown above was not embodied in the Type C meter and in the earlier Type C-6 meter.

DIMENSION OF TYPES C, C-6, C-7 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 100 and 150 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire
Type C-7 Watthour Meters, 100 and 150 Amps., 500 to 600 Volts 2-Wire
Type CQ Watthour Meters, 100 Amps., 500 to 600 Volts 2-Wire



Types C and C-6, 3-Wire



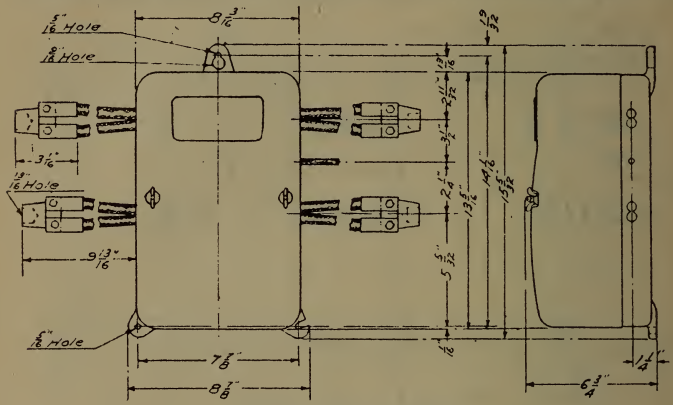
Types C and C-6, 2-Wire
Type C-7, 2-Wire
Type CQ, 2-Wire

Fig. 189

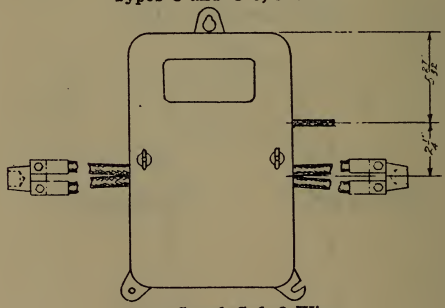
NOTE—The domed cover such as shown above was not embodied in the Type C meter and in the earlier Type C-6 meter.

DIMENSIONS OF TYPES C, C-6, C-7 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 300 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire
Type C-7 Watthour Meters, 300 Amps., 500 to 600 Volts 2-Wire
Type CQ Watthour Meters, 200 Amps., 500 to 600 Volts 2-Wire



Types C and C-6, 3-Wire



Types C and C-6, 2-Wire
Type C-7, 2-Wire
Type CQ, 2-Wire

Fig. 190

NOTE—The domed cover such as shown above was not embodied in the Type C meter and in the earlier Type C-6 meter.

DIMENSIONS OF TYPES C AND C-6 THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 600 Amps., 106 to 120, 212 to 240 Volts 2-Wire

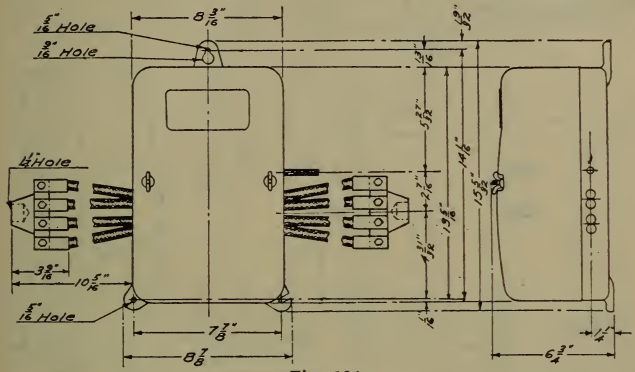


Fig. 191

NOTE—The domed cover such as shown above was not embodied in the Type C meter and in the earlier Type C-6 meter.

DIMENSIONS OF TYPE C-7 THOMSON DIRECT CURRENT WATTHOUR METERS

600 Amps., 500 to 600 Volts 2-Wire

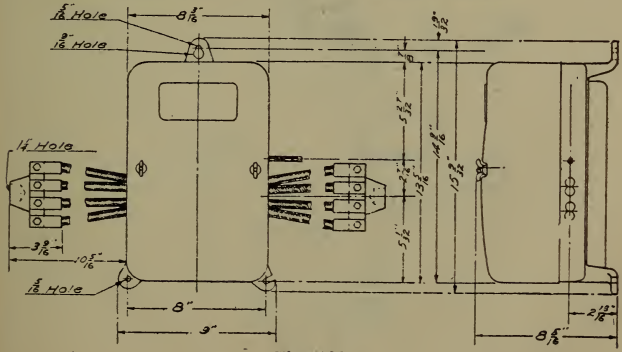
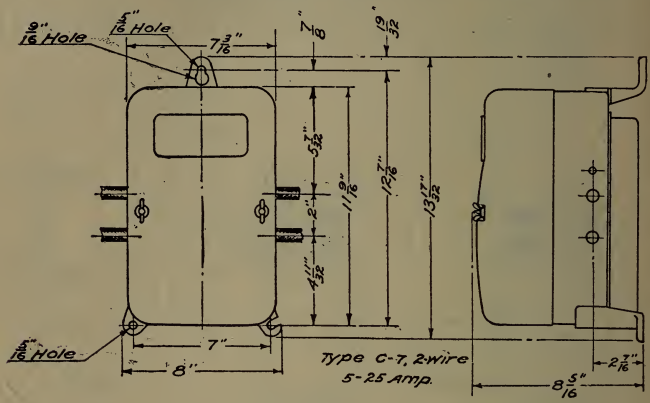
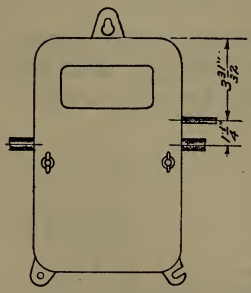


Fig. 192

DIMENSIONS OF TYPE C-7 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 50 Amps., 500 to 600 Volts 2-Wire



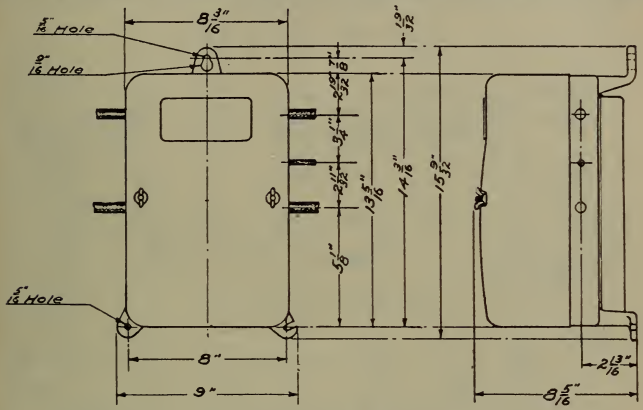


Type C-7, 2 Wire
50 Amp.

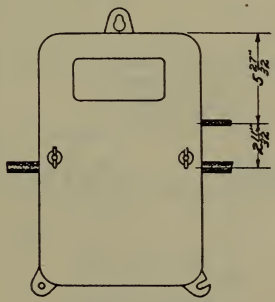
Fig. 193

DIMENSIONS OF TYPES C-7 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-7 Watthour Meters, 75 Amps., 500 to 600 Volts 2-Wire
Type CQ Watthour Meters, 50 and 75 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts 3-Wire



Type CQ, 3-Wire



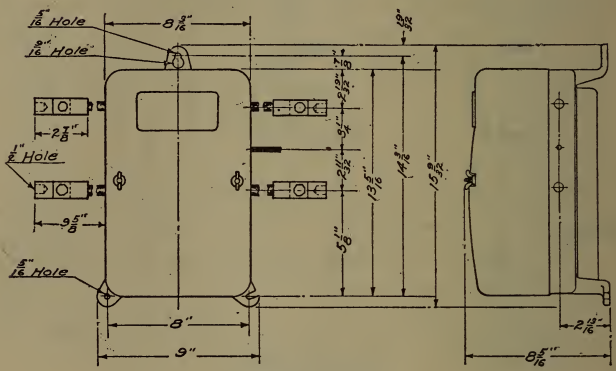
Type C-7, 2-Wire
Type CQ, 2-Wire
Fig. 194

DIMENSIONS OF TYPES C-7 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

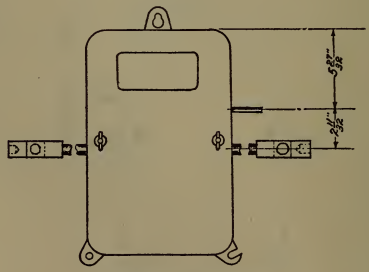
Type C-7 Watthour Meters, 100 and 150 Amps., 500 to 600 Volts 2-Wire

Type CQ Watthour Meters, 100 Amps., 106 to 120, 212 to 240 Volts 2-Wire

212 to 240 Volts 3-Wire



Type CQ, 3-Wire

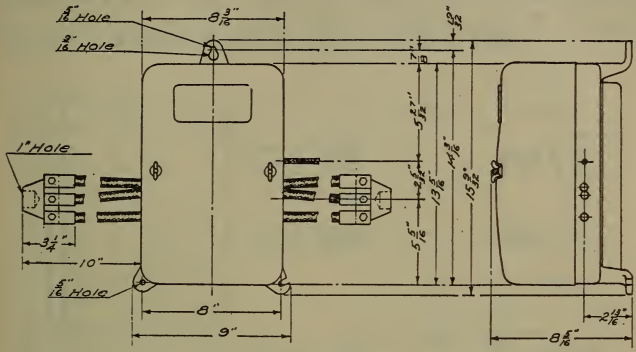


Type C-7, 2-Wire
Type CQ, 2-Wire

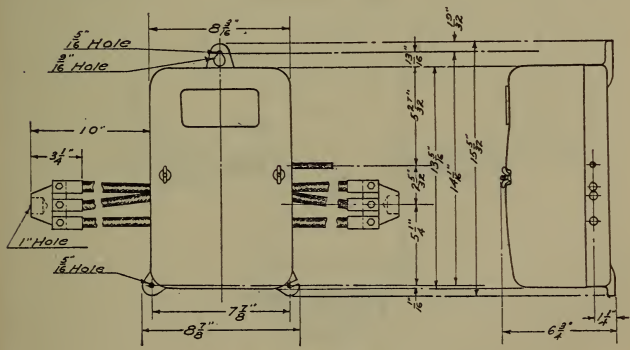
Fig. 195

DIMENSIONS OF TYPE CQ THOMSON DIRECT CURRENT WATTHOUR METERS

400 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire



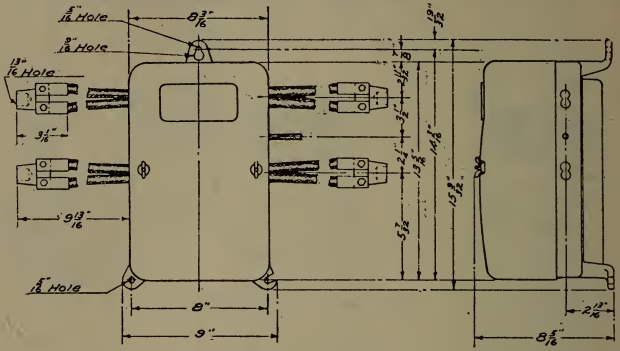
106 to 120, 212 to 240 Volts



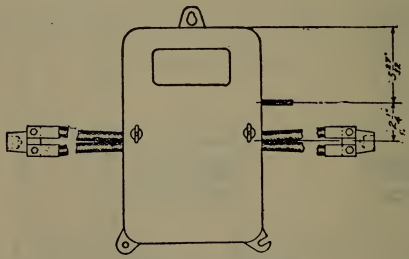
500 to 600 Volts
Fig. 196

DIMENSIONS OF TYPES C-7 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-7 Watthour Meters, 300 Amps., 500 to 600 Volts 2-Wire
Type CQ Watthour Meters, 200 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts 3-Wire



Type CQ, 3-Wire



Type C-7, 2-Wire
Type CQ, 2-Wire
Fig. 197

EXTERNAL CONNECTIONS OF TYPES C, C-6 AND C-7 THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 5 to 50 Amps., 106 to 120, 212 to 240 Volts 2-Wire

Type C-7 Watthour Meters, 5 to 25 Amps., 500 to 600 Volts 2-Wire

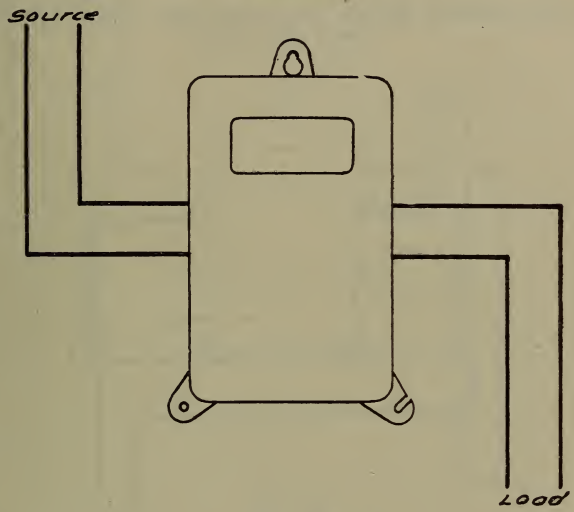


Fig. 198

EXTERNAL CONNECTIONS OF TYPES C, C-6, C-7, CR AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Types C, C-6 and CR Watthour Meters, 75 to 600 Amps., 106 to 120, 212 to 240 Volts 2-Wire

Type C-7 Watthour Meters, 50 to 600 Amps., 500 to 600 Volts 2-Wire

Type CQ Watthour Meters, 50 to 400 Amps., 106 to 120, 212 to 240 Volts 2-Wire

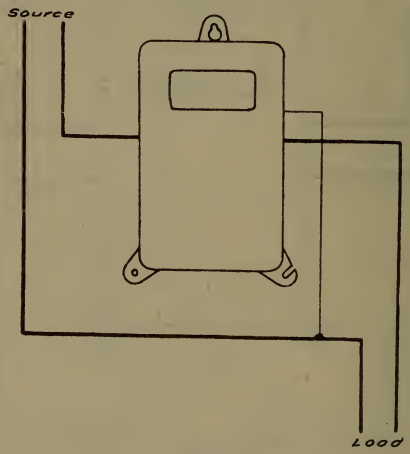


Fig. 199

EXTERNAL CONNECTIONS OF TYPES CR AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Type CR Watthour Meters, 75 to 600 Amps., 500 to 600 Volts
Type CQ Watthour Meters, 50 to 400 Amps., 500 to 600 Volts
2-Wire

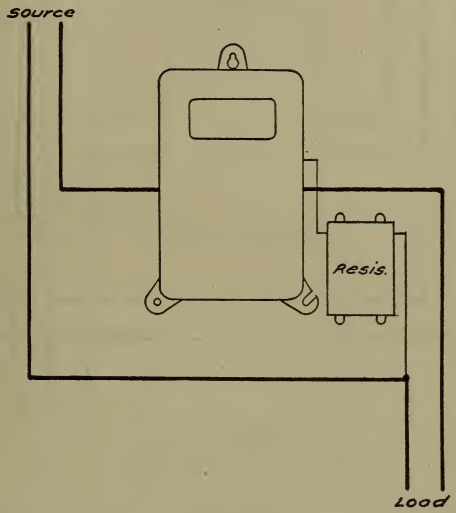


Fig. 200

EXTERNAL CONNECTIONS OF TYPES C AND C-6 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 50 Amps., 212 to 240, 400 to 500 Volts 3-Wire

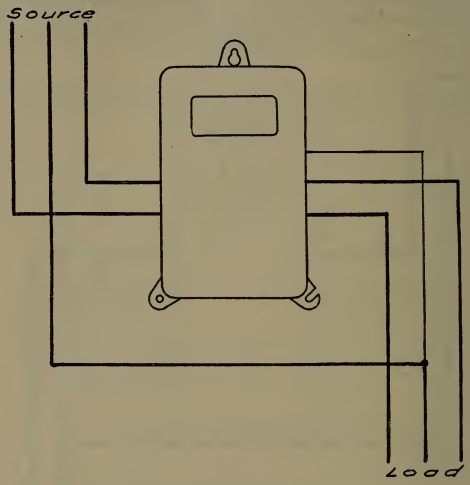


Fig. 201

EXTERNAL CONNECTIONS OF TYPES C, C-6 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 75 to 300 Amps., 212 to 240, 400 to 500 Volts 3-Wire

Type CQ Watthour Meter, 50 to 200 Amps., 212 to 240 Volts 3-Wire

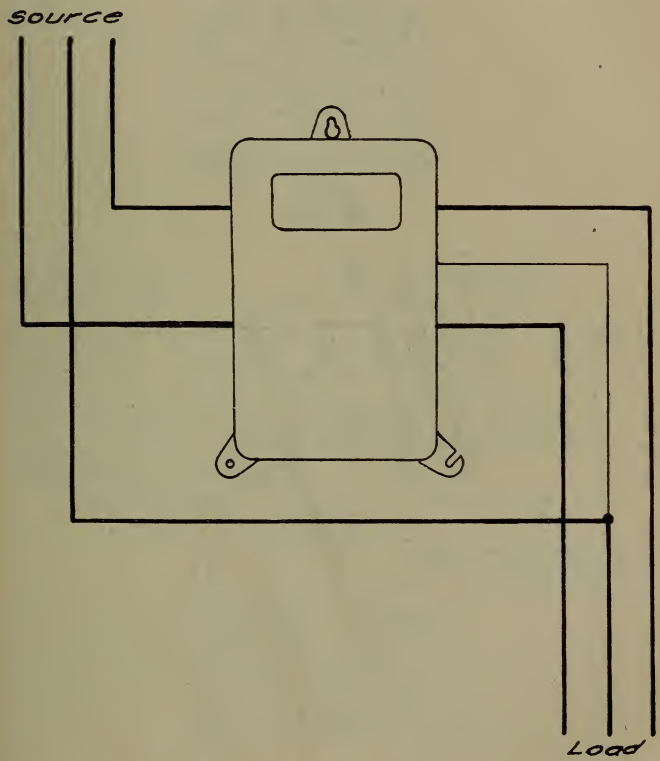
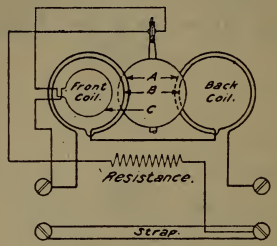


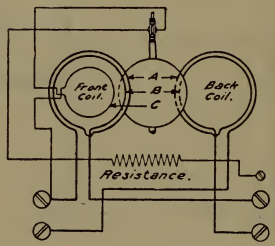
Fig. 202

INTERNAL CONNECTIONS OF TYPE C THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 15 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire, 400 to 500 Volts 3-Wire



2-Wire
Fig. 203

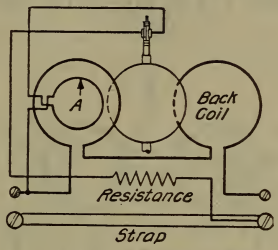


3-Wire
Fig. 204

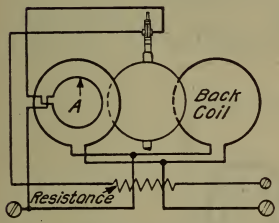
A—Outer Section of Coil.
B—Inner Section of Coil.
C—Starting Coil.

INTERNAL CONNECTIONS OF TYPE C THOMSON DIRECT CURRENT WATTHOUR METERS

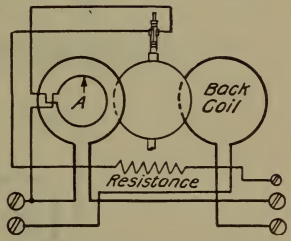
25 to 600 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire
25 to 50 Amps., 400 to 500 Volts 3-Wire



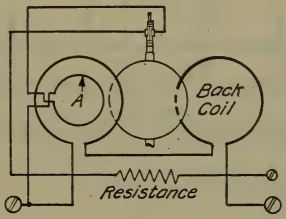
25 and 50 Amps., 2-Wire
Fig. 205



600 Amps., 2-Wire
Fig. 206



25 and 50 Amps., 3-Wire
Fig. 207



75 to 300 Amps., 2-Wire
Fig. 208

A—Starting Coil.

INTERNAL CONNECTIONS OF TYPE C-6 THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-6 Watthour Meter 5 to 15 Amps., 106 to 120, 212 to 240, Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire

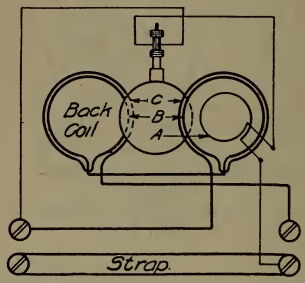


Fig 209
106 to 120, 212 to 240 Volts, 2-Wire

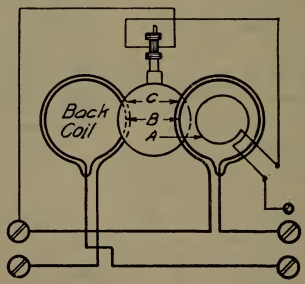


Fig. 210
212 to 240, 400 to 500 Volts, 3-Wire

A.—Shunt field coil and resistance combined for 2-wire 106 to 120, 212 to 240 volts and 3-wire 212 to 240, 400 to 500 volts.
B.—Inner section of coil.
C.—Outer section of coil.

INTERNAL CONNECTIONS OF TYPES C-6 AND CR THOMSON DIRECT CURRENT WATT-HOUR METERS

Type C-6 Watthour Meters, 25 to 600 Amps., 106 to 120, 212 to 240 Volts

Type CR Watthour Meters, 75 to 600 Amps., 500 to 600 Volts

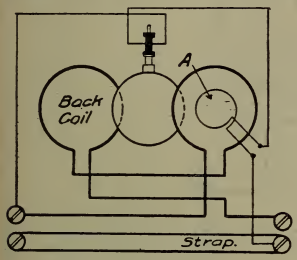


Fig. 211
25 and 50 Amps., 2-Wire
106 to 120, 212 to 240 Volts

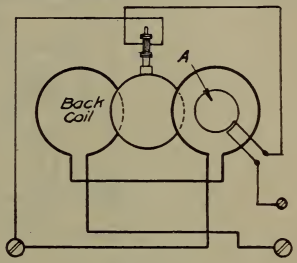


Fig. 212
75 to 300 Amps., 106 to 120, 212 to 240 Volts

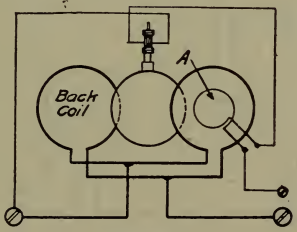


Fig. 213
600 Amps. 2-Wire, 106 to 120, 212 to 240 Volts

A.—Shunt field coil and resistance combined for 106 to 120, 212 to 240 volts.
A.—Shunt field coil only for 500 to 600 volt resistance in separate box.

INTERNAL CONNECTIONS OF TYPES C AND C-6 THOMSON DIRECT CURRENT WATTHOUR METERS

Types C and C-6 Watthour Meters, 25 to 300 Amps., 122 to 240, 400 to 500 Volts 3-Wire

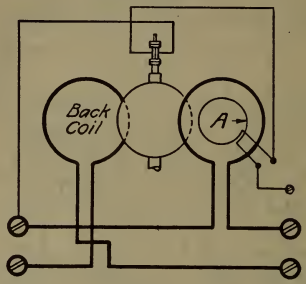


Fig. 214
25 to 50 Amps., 212 to 240, 400 to 500 Volts

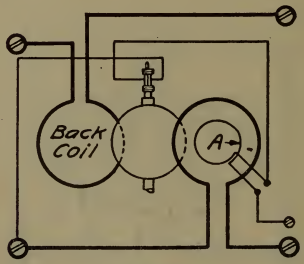


Fig. 215
75 to 300 Amps., 212 to 240, 400 to 500 Volts

A.—Shunt field coil and resistance combined for 200-500 volts.
The combined shunt and resistance was not employed upon Type C meters, the resistance being wound upon a tube and mounted inside of the meter.

INTERNAL CONNECTIONS OF TYPE C-7 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 15 Amps., 500 to 600 Volts 2-Wire

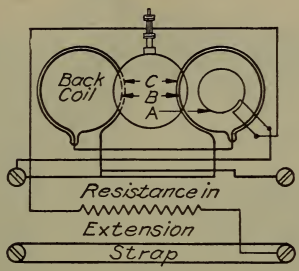


Fig. 216

A.—Shunt field coil.
B.—Inner section of coil.
C.—Outer section of coil.

INTERNAL CONNECTIONS OF TYPE C-7 THOMSON DIRECT CURRENT WATTHOUR METERS

25 to 600 Amps., 500 to 600 Volts 2-Wire

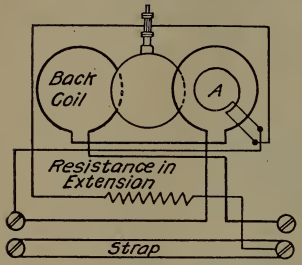


Fig. 217
25 Amps.

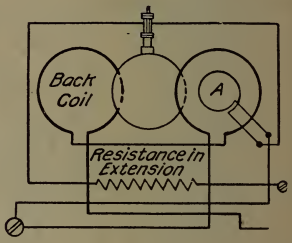


Fig. 218
50 to 300 Amps.

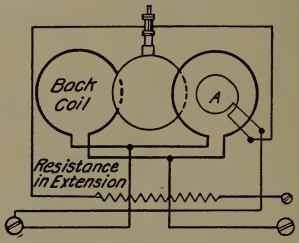


Fig. 219
600 Amps.

A.—Shunt field coil.

NOTE—Type C-7 meters made only for use upon two-wire circuits.

TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METER

Fig. 220

INTERIOR VIEW OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METER

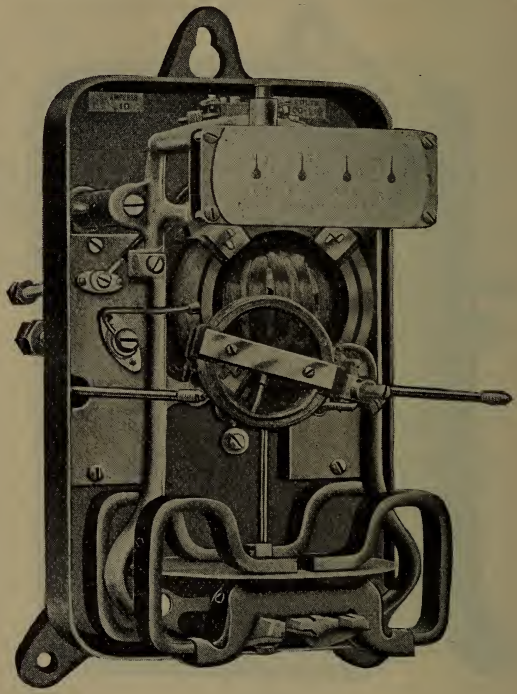


Fig. 221

DIMENSIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 50 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire

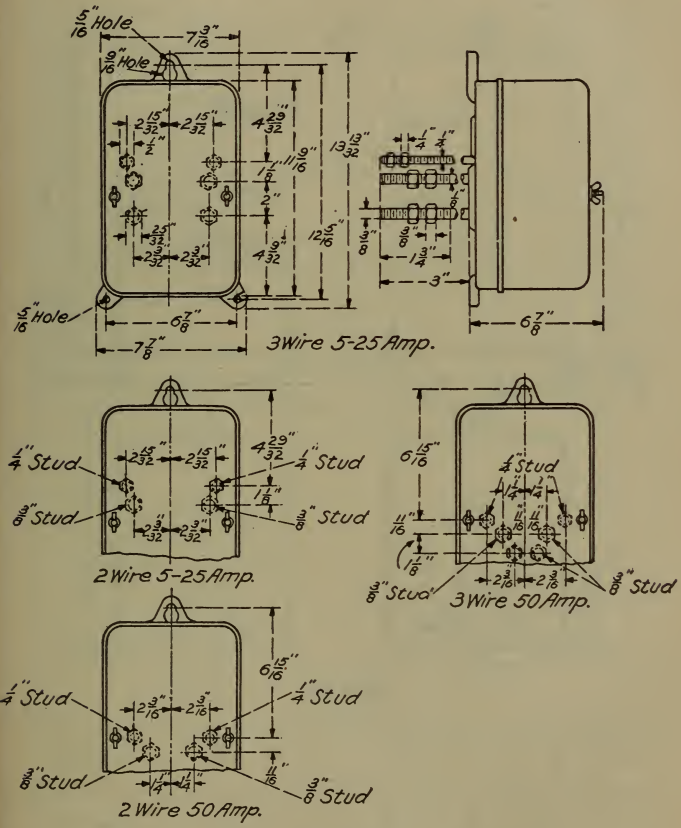


Fig. 222

DIMENSIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

75 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire, 200 to 240, 400 to 500 Volts 3-Wire

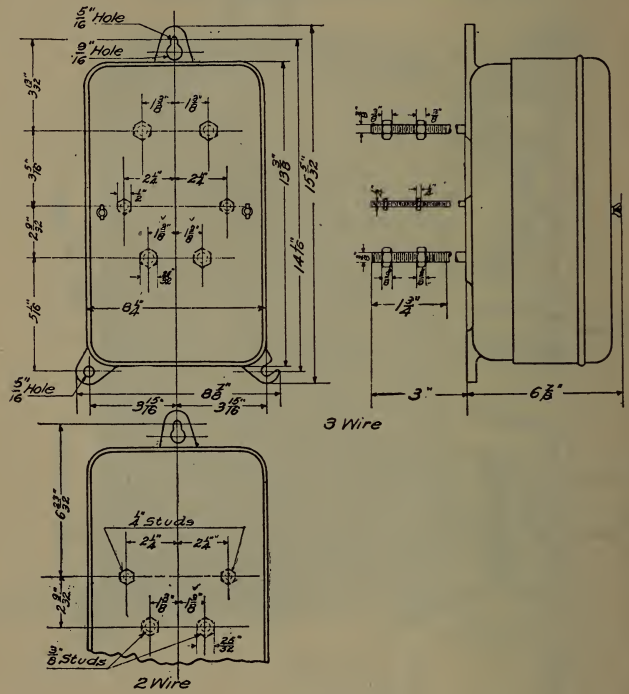


Fig. 223

DIMENSIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

100 to 150 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire, 200 to 240, 400 to 500 Volts 3-Wire

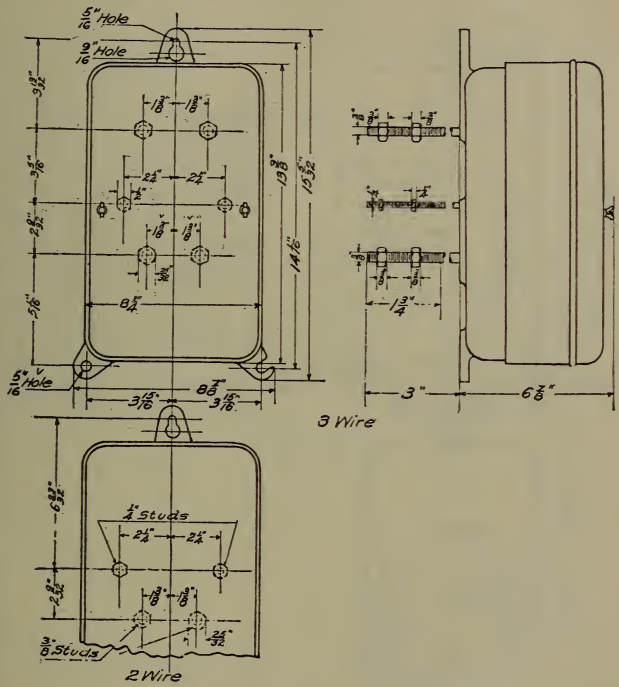


Fig. 224

Capacity	A	B	C	D	E	F
100 amps.	3/8	3/8	25/32	57/64	3	1 3/4
150 amps.	1/2	1/2	1 1/16	1 7/32	4 1/2	3 1/4

DIMENSIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

300 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire, 200 to 240, 400 to 500 Volts 3-Wire

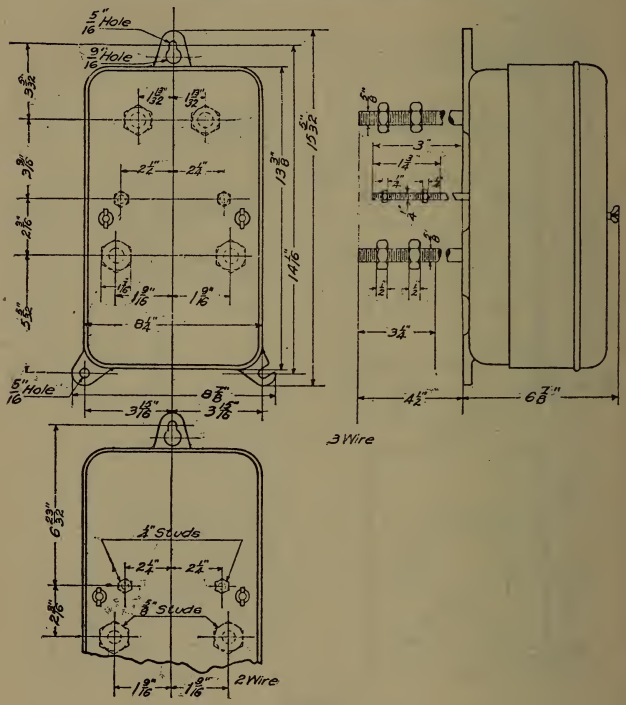


Fig. 225

DIMENSIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

600 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire

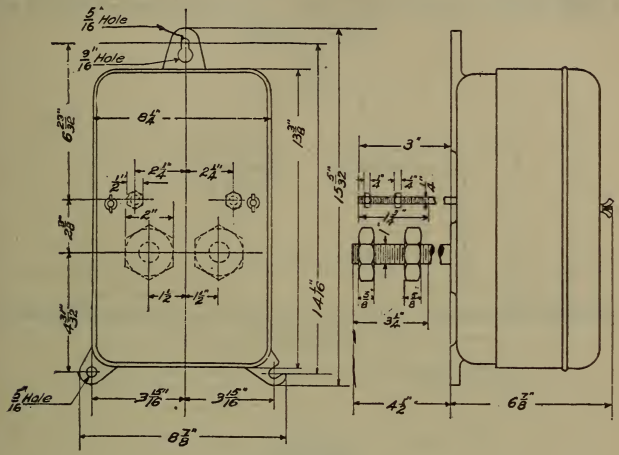


Fig. 226

EXTERNAL CONNECTIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 600 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire

BACK VIEW

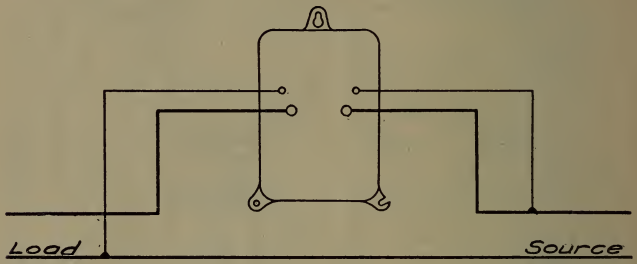


Fig. 227

5 to 600 Amps., 100 to 120, 200 to 240 Volts, 2-Wire

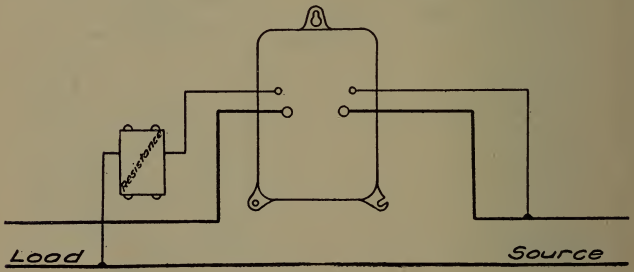


Fig. 228

5 to 600 Amps., 500 to 600 Volts, 2-Wire

EXTERNAL CONNECTIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 300 Amps., 200 to 240, 400 to 500 Volts 3-Wire

BACK VIEW

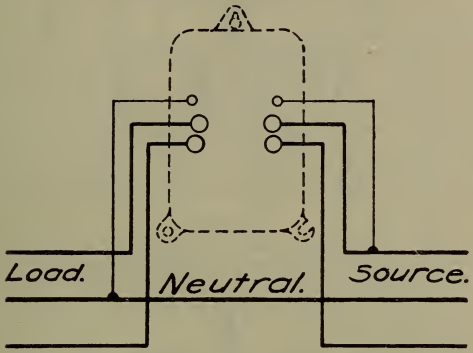


Fig. 229
5 to 50 Amps., 200 to 240, 400 to 500 Volts, 3-Wire

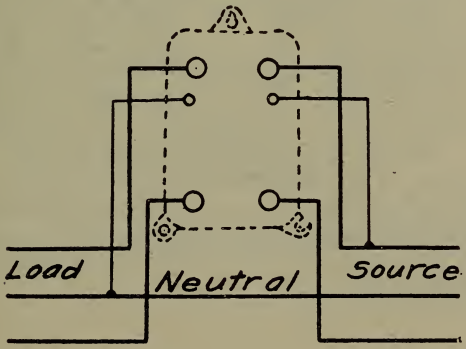


Fig. 230
75 to 300 Amps., 200 to 240, 400 to 500 Volts, 3-Wire

INTERNAL CONNECTIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 15 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire, 200 to 240, 400 to 500 Volts 3-Wire

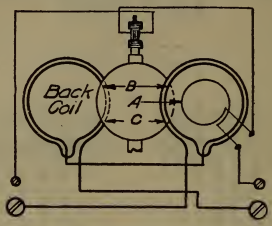


Fig. 231

5 to 15 Amps., 100 to 120, 200 to 240, 500 to 600 Volts, 2-Wire

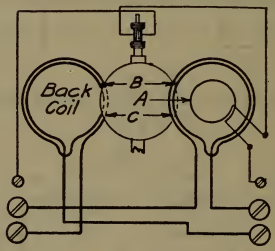


Fig. 232

5 to 15 Amps., 200 to 240, 400 to 500 Volts, 3-Wire

A.—Starting coil and resistance combined for 100 to 120, 200 to 240 volt 2-wire and 200 to 240, 400 to 500 volt 3-wire.
A.—Starting coil only for 500 to 600 volt 2-wire meters, resistance in separate box.
B.—Inner section of coil.
C.—Outer section of coil.

INTERNAL CONNECTIONS OF TYPE C-5 THOMSON DIRECT CURRENT WATTHOUR METERS

25 to 600 Amps., 100 to 120, 200 to 240, 500 to 600 Volts 2-Wire, 200 to 240, 400 to 500 Volts 3-Wire

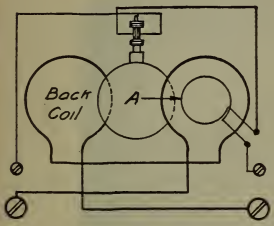


Fig. 233

25 to 300 Amps., 106 to 120, 200 to 240, 500 to 600 Volts, 2-Wire

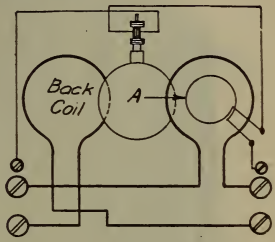


Fig. 234

25 to 50 Amps., 200 to 240, 400 to 500 Volts, 3-Wire

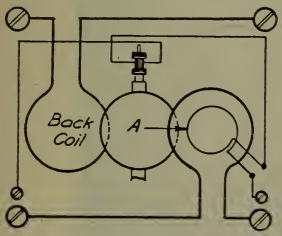


Fig. 235

75 to 300 Amps., 200 to 240, 400 to 500 Volts, 3-Wire

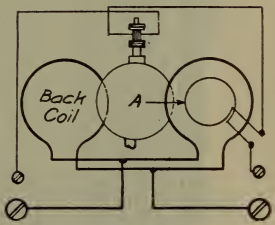


Fig. 236

600 Amps., 100 to 120, 200 to 240, 500 to 600 Volts, 2-Wire

A.—Starting coil and resistance combined for 200 to 240 volt 2-wire and 200 to 240, 400 to 500 volt 3-wire.
A.—Starting coil only for 251 to 600 volt 2-wire, resistance in separate box.

TYPE C-9 THOMSON DIRECT CURRENT WATTHOUR METER

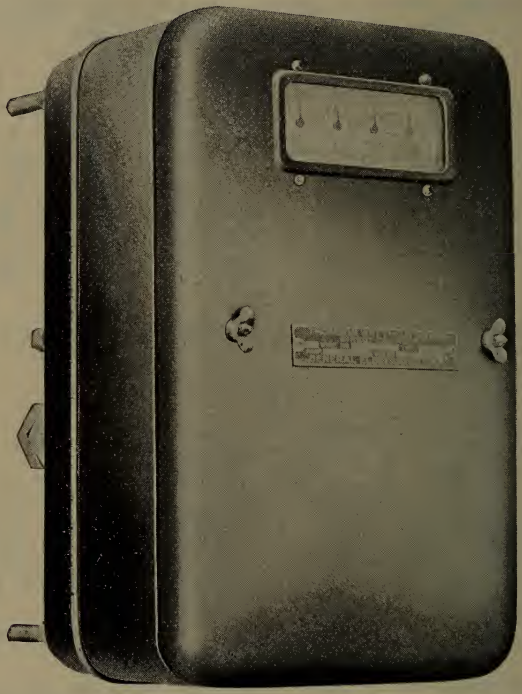


Fig. 237

INTERIOR VIEW OF TYPE C-9 THOMSON DIRECT CURRENT WATTHOUR METER

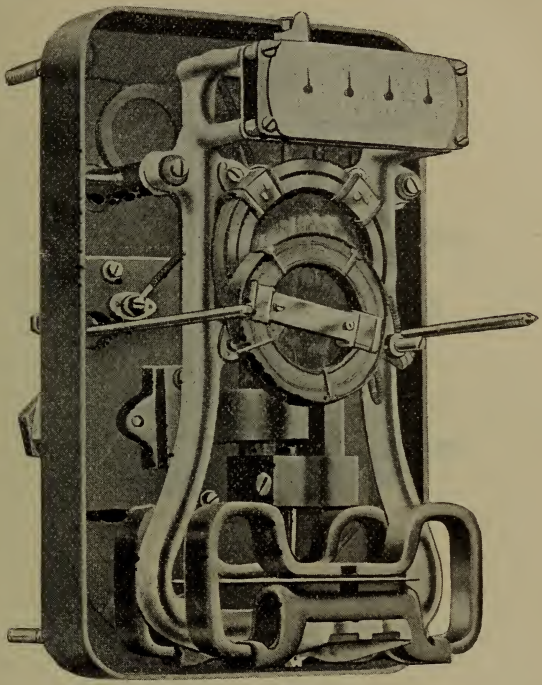


Fig. 238

TYPE CQ-2 THOMSON DIRECT CURRENT WATTHOUR METER

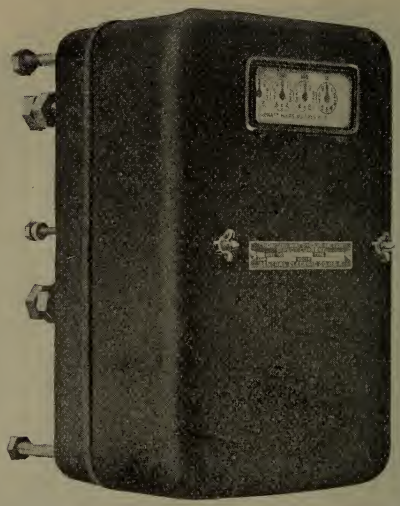


Fig. 239

INTERIOR VIEW OF TYPE CQ-2 THOMSON DIRECT CURRENT WATTHOUR METER

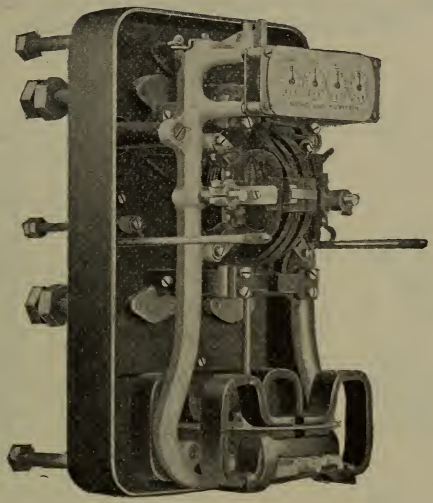


Fig. 240

DIMENSIONS OF TYPE C-9 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire

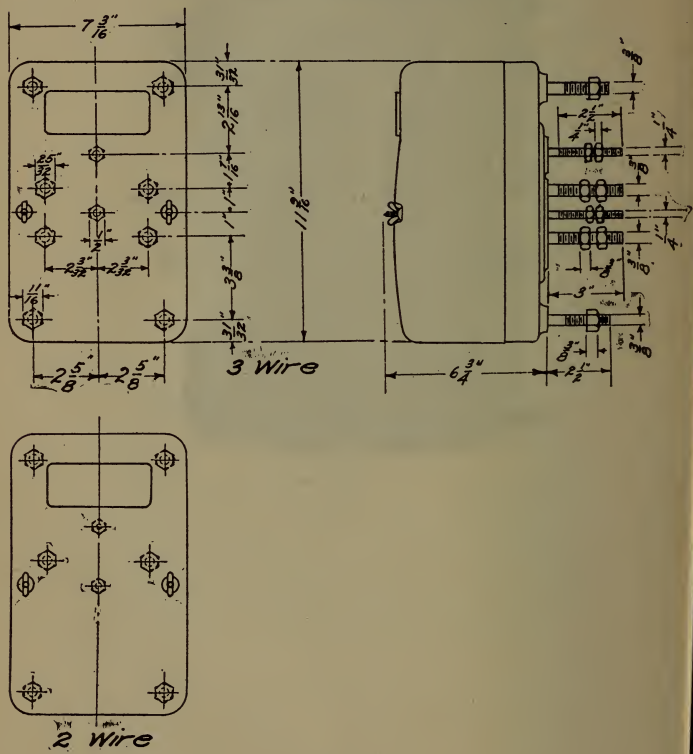
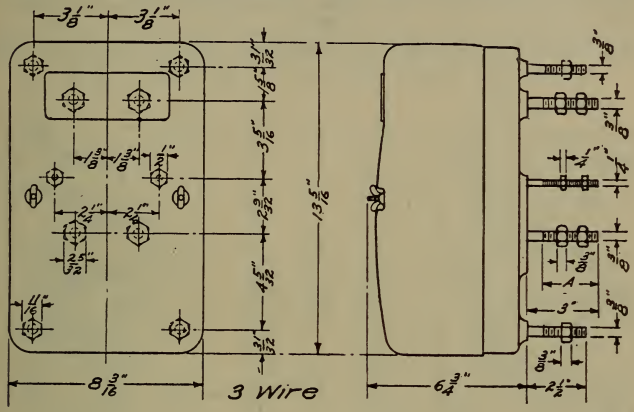


Fig. 241

DIMENSIONS OF TYPES C-9 AND CQ THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 75 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire



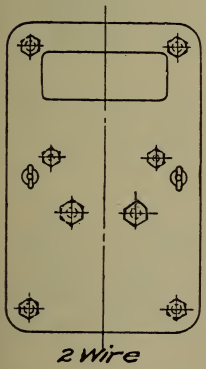


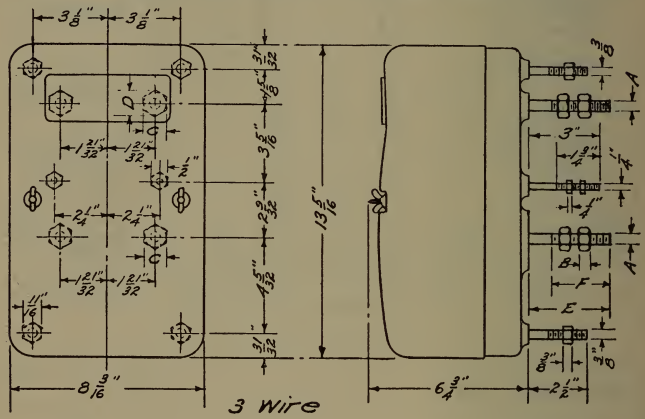
Fig. 242

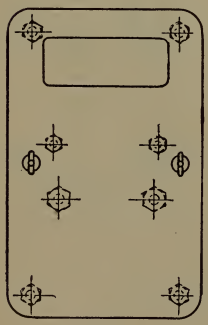
Capacity	A
50 amps.	2½ in.
75 amps.	1¾ in.

DIMENSIONS OF TYPES C-9 AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-9 Watthour Meters, 100 to 150 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire

Type CQ-2 Watthour Meters, 100 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, 212 to 240 Volts 3-Wire





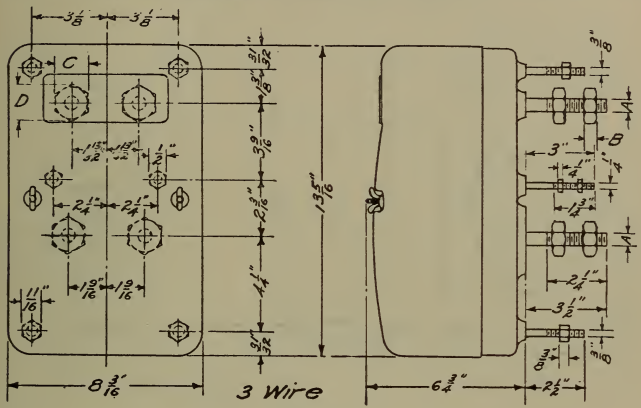
Capacity	A	B	C	D	E	F
100 amps.	3/8	3/8	25/32	57/64	3	1 3/4
150 amps.	1/2	1/2	1 1/16	1 7/32	3 1/2	2 1/4

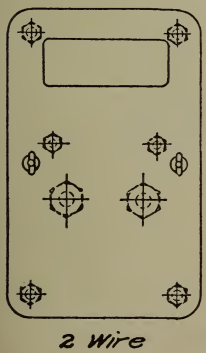
Fig. 243

DIMENSIONS OF TYPES C-9 AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-9 Watthour Meters, 300 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire

Type CQ-2 Watthour Meters, 200 Amps., 106 to 120, 212 to 240, 400 to 500 Volts 2-Wire, 212 to 240 Volts 3-Wire





Capacity	A	B	C	D
200 amps.	½	½	1 1/16	1 7/32
300 amps.	⅝	½	1 7/16	1 21/32

Fig. 244

DIMENSIONS OF TYPES C-9 AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-9 Watthour Meters, 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

Type CQ Watthour Meters, 400 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

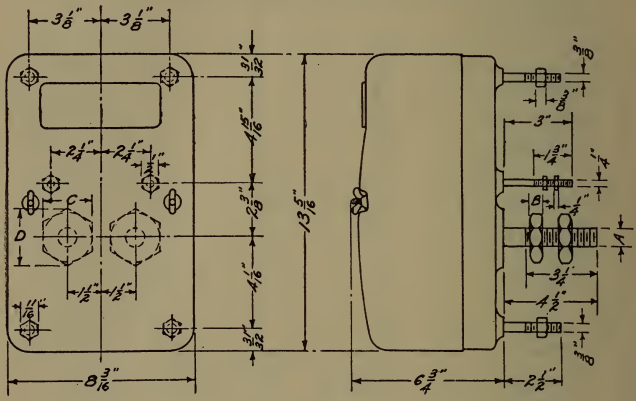


Fig. 245

Capacity	A	B	C	D
400 amps.	3/4	5/8	1 5/8	1 7/8
600 amps.	1	5/8	2	2 5/16

EXTERNAL CONNECTIONS OF TYPE C-9 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

BACK VIEW

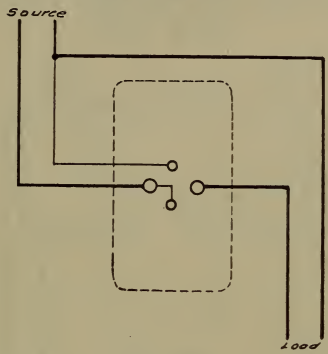


Fig. 246
5 to 25 Amps., 106 to 120, 212 to 240 Volts

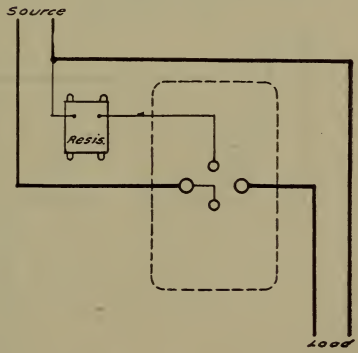


Fig. 247
5 to 25 Amps., 500 to 600 Volts

EXTERNAL CONNECTIONS OF TYPES C-9 AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-9 Watthour Meters, 50 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

Type CQ-2 Watthour Meters, 50 to 400 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

BACK VIEW

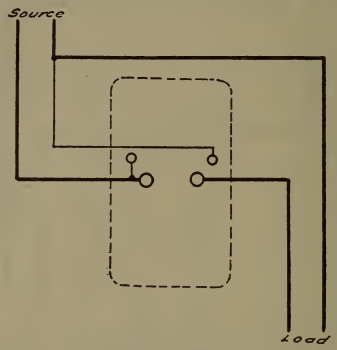


Fig. 248

Type C-9, 50 to 600 Amps., 106 to 120, 212 to 240 Volts

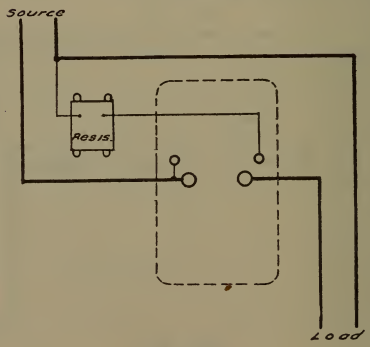


Fig. 249

Type C-9, 50 to 600 Amps. 500 to 600 Volts

Type CQ-2, 50 to 400 Amps., 106 to 120, 212 to 240, 500 to 600 Volts

EXTERNAL CONNECTIONS OF TYPE C-9 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 25 Amps., 212 to 240, 400 to 500 Volts 3-Wire

BACK VIEW

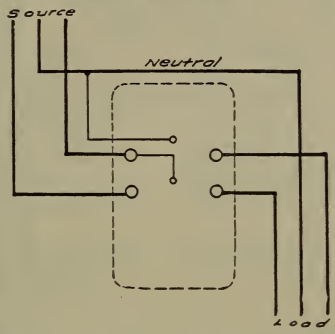


Fig. 250
5 to 25 Amps., 212 to 240,
400 to 500 Volts

EXTERNAL CONNECTIONS OF TYPES C-9 AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

Type C-9 Watthour Meters, 50 to 300 Amps., 212 to 240, 400 to 500 Volts 3-Wire

Type CQ-2 Watthour Meters, 50 to 200 Amps., 212 to 240, 500 to 600 Volts 3-Wire

BACK VIEW

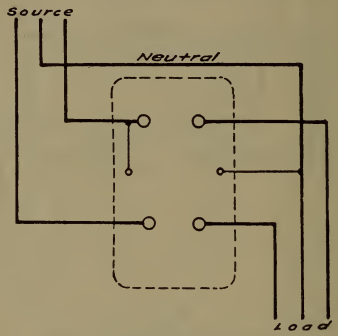


Fig. 251
Type C-9, 50 to 300 Amps., 212 to 240, 400 to 500 Volts

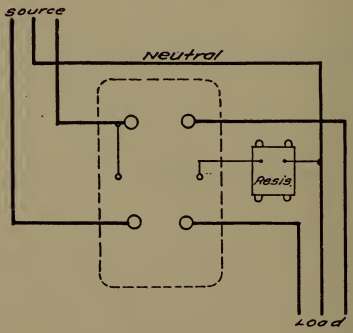


Fig. 252
Type CQ-2, 50 to 200 Amps., 212 to 240, 500 to 600 Volts

INTERNAL CONNECTIONS OF TYPE C-9 THOMSON DIRECT CURRENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, 212 to 240, 400 to 500 Volts 3-Wire

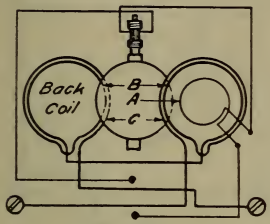


Fig. 253
5 to 15 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 2-Wire

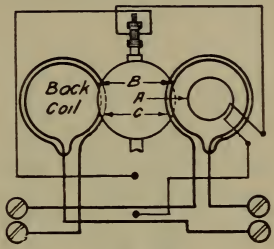


Fig. 254
5 to 15 Amps., 212 to 240, 400 to 500 Volts, 3-Wire

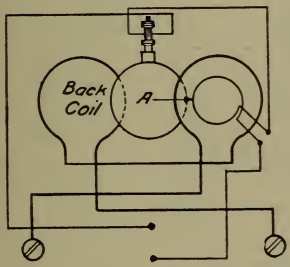


Fig. 255
25 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 2-Wire

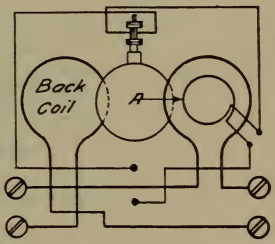


Fig. 256
25 Amps., 212 to 240, 400 to 500 Volts, 3-Wire

A.—Starting coil and resistance combined for 106 to 120, 212 to 240 volts 2-wire and 212 to 240, 400 to 500 volts 3-wire.
A.—Starting coil only for 500 to 600 volts 2-wire, resistance in separate box.
B.—Inner section of coil.
C.—Outer section of coil.

INTERNAL CONNECTIONS OF TYPE C-9 THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire
50 to 300 Amps., 212 to 240, 400 to 500 Volts 3-Wire

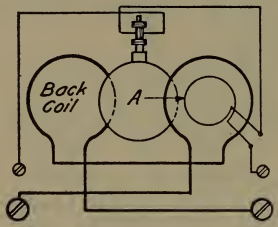


Fig. 257

600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts, 2-Wire

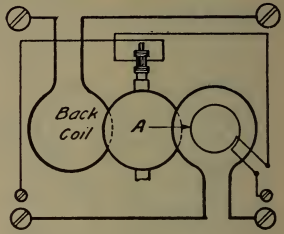


Fig. 258

50 to 300 Amps., 212 to 240, 400 to 500 Volts, 3-Wire

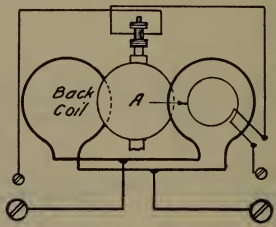


Fig. 259

50 to 300 Amps., 100 to 800 Volts, 2-Wire

A.—Starting coil and resistance combined for 106 to 120, 212 to 240 volt 2-wire and 212 to 240, 400 to 500 volt 3-wire.
A.—Starting coil only for 500 to 600 volt 2-wire, resistance in separate box.

EXTERNAL CONNECTIONS OF TYPE CP THOMSON DIRECT CURRENT PREPAYMENT WATT-HOUR METER WITH FORM 3 PREPAYMENT ATTACHMENT

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire

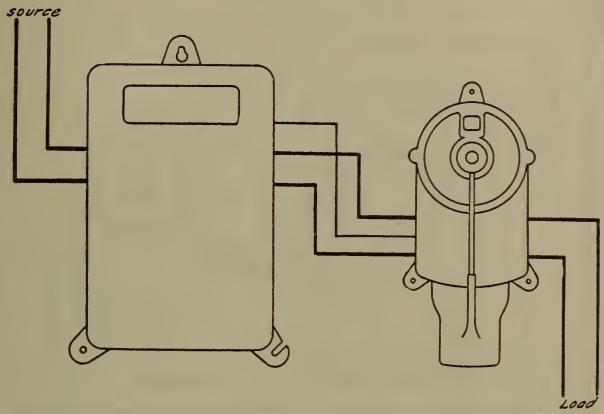


Fig. 260

EXTERNAL CONNECTIONS OF TYPE CP THOMSON DIRECT CURRENT PREPAYMENT WATT-HOUR METER WITH FORM 3 PREPAYMENT ATTACHMENT

5 to 25 Amps., 212 to 240 Volts 3-Wire

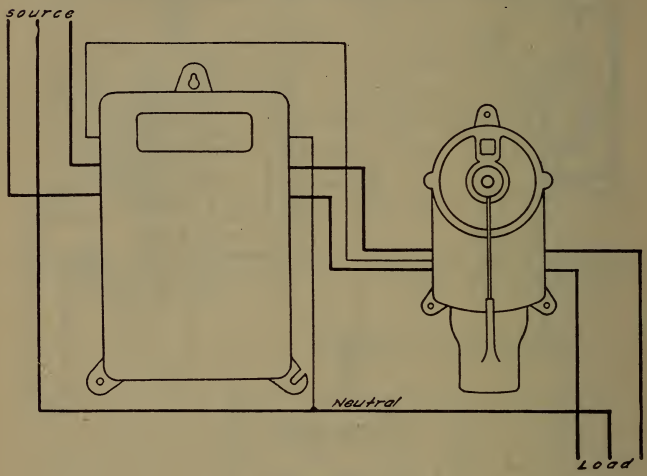
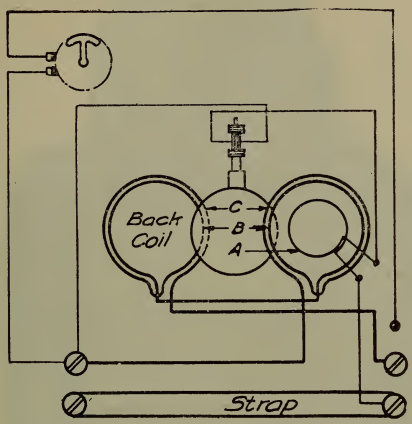


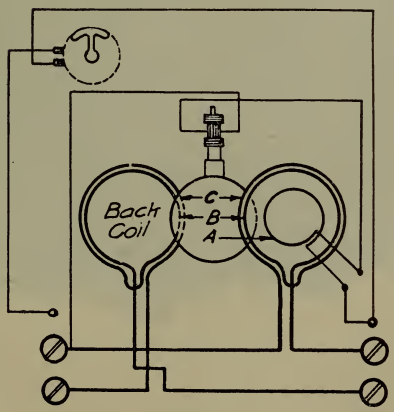
Fig. 261

INTERNAL CONNECTIONS OF TYPE CP THOMSON DIRECT CURRENT PREPAYMENT WATT-HOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts 3-Wire



2-Wire
Fig. 262



3-Wire
Fig. 263

C—Outer Section of Coil. B—Inner Section of Coil. A—Shunt Field Coil and Resistance Combined.

TYPE CP-2 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METER

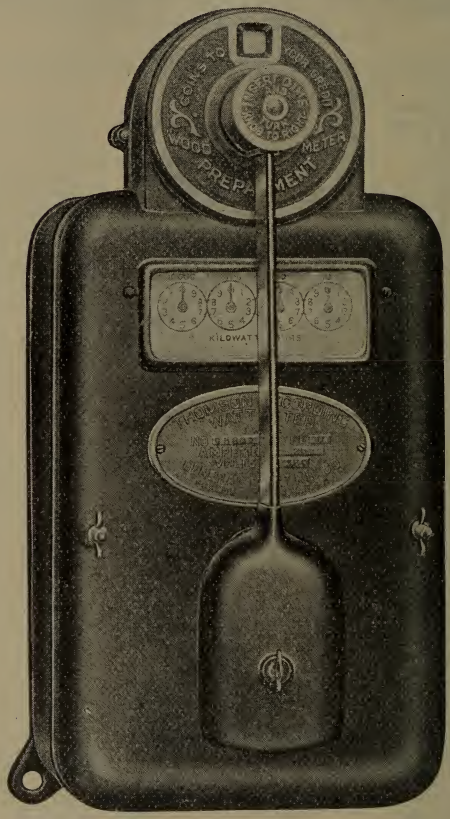


Fig. 264

INTERIOR VIEW OF TYPE CP-2 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METER

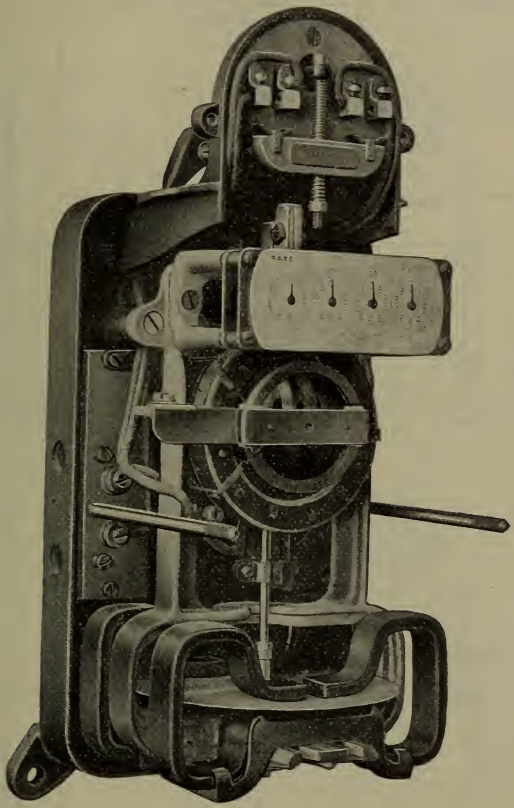
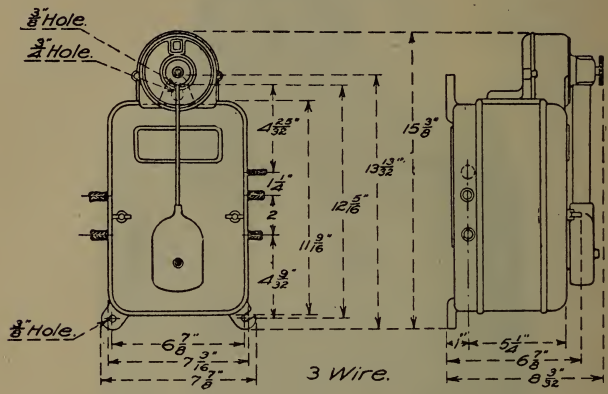
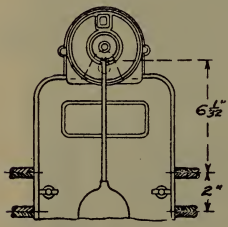


Fig. 265

DIMENSIONS OF TYPE CP-2 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts 3-Wire





2-Wire

Fig. 266

EXTERNAL CONNECTIONS OF TYPE CP-2 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts 3-Wire

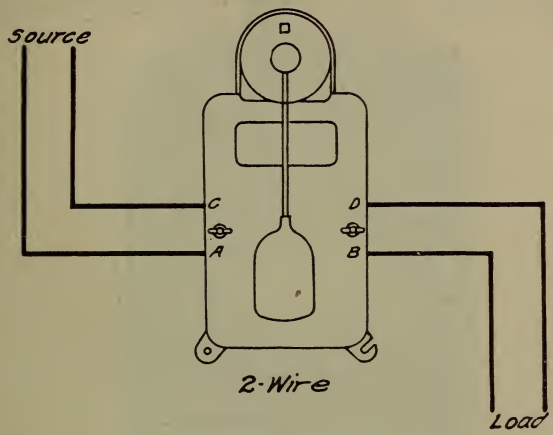


Fig. 267

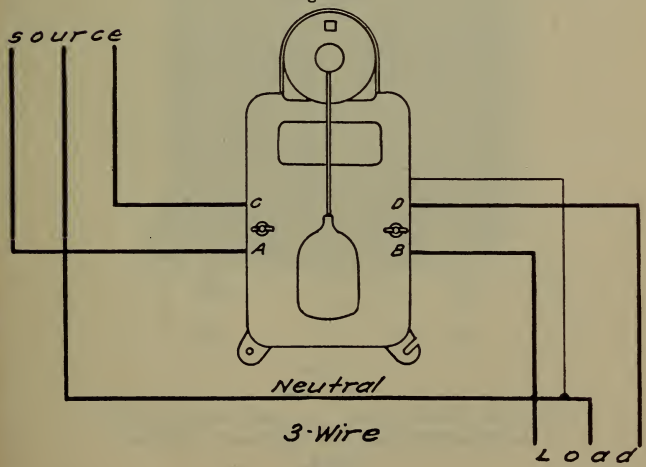
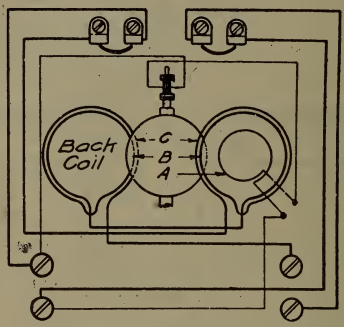


Fig. 268

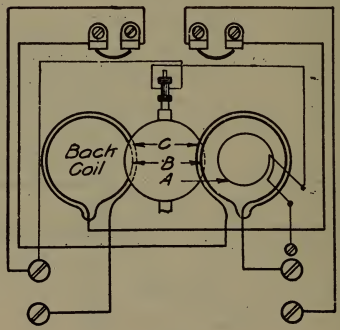
Internal circuit from A to B and C to D.

INTERNAL CONNECTIONS OF TYPE CP-2 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METERS

5 to 25 Amps., 100 to 120, 200 to 240 Volts 2-Wire, and 200 to 240 Volts 3-Wire



2-Wire



3-Wire

Fig. 269

C—Outer Section of Coil. B—Inner Section of Coil.
A—Shunt Field Coil and Resistance Combined

TYPE CP-3 THOMSON DIRECT CURRENT PRE-PAYMENT WATTHOUR METER

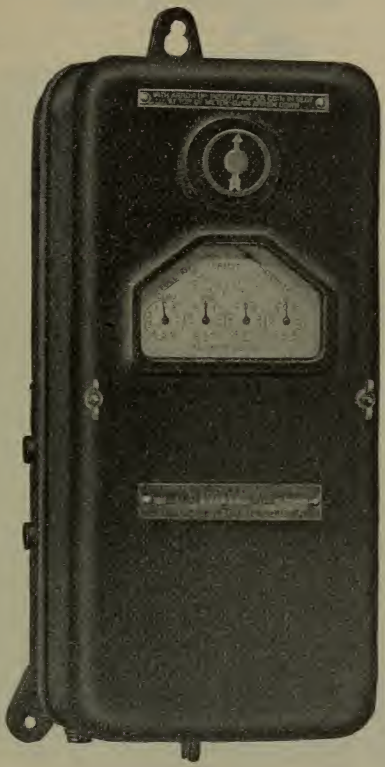


Fig 270

INTERNAL VIEW OF TYPE CP-3 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METER

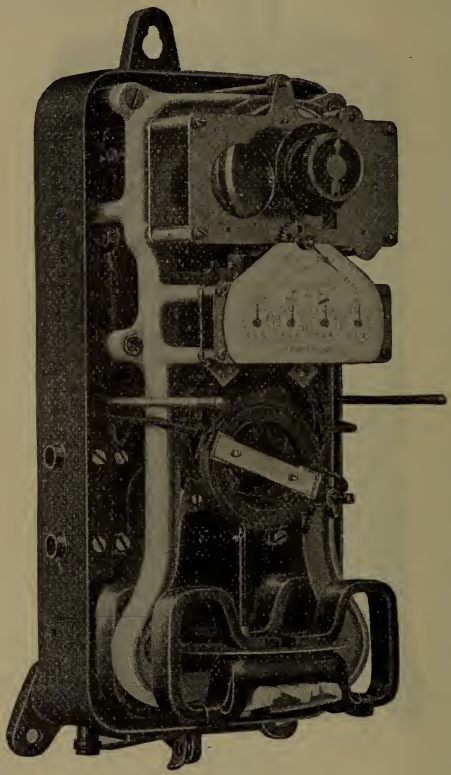


Fig. 271

TYPE CP-4 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METER

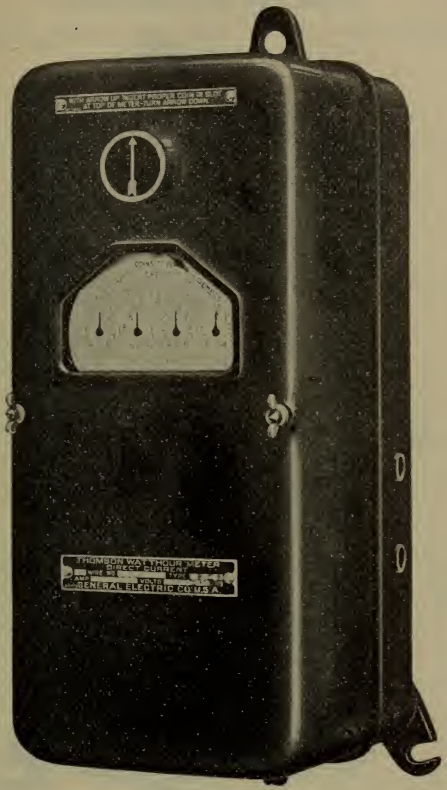


Fig. 272

INTERNAL VIEW OF TYPE CP-4 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METER

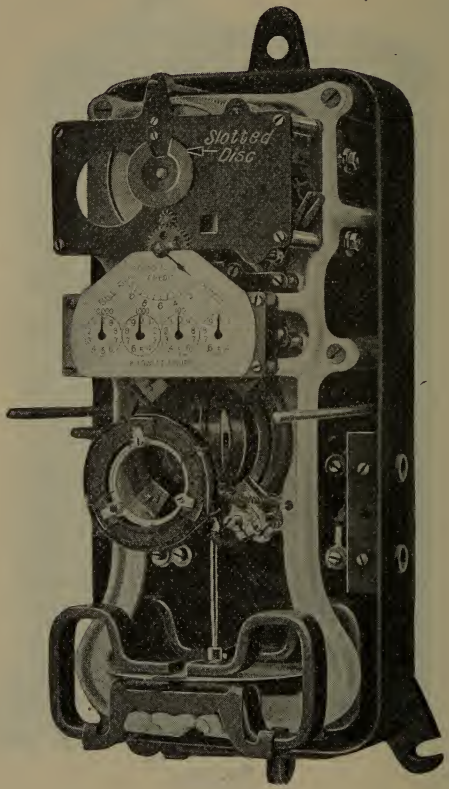


Fig. 273

DIMENSIONS OF TYPES CP-3 AND CP-4 THOMSON DIRECT CURRENT PREPAYMENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts 3-Wire

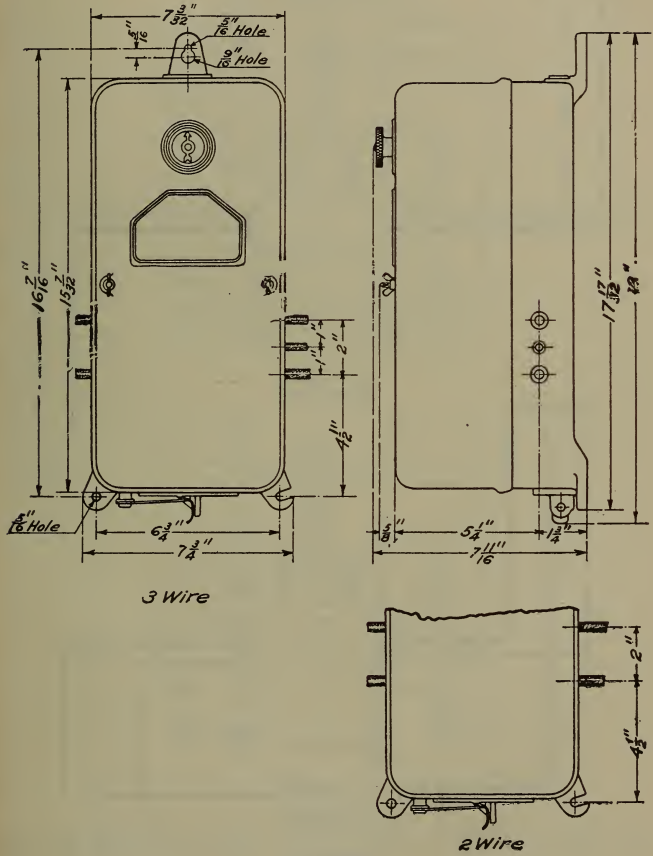


Fig. 274

EXTERNAL CONNECTIONS OF TYPES CP-3 AND CP-4 THOMSON DIRECT CURRENT PRE-PAYMENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts, 3-Wire

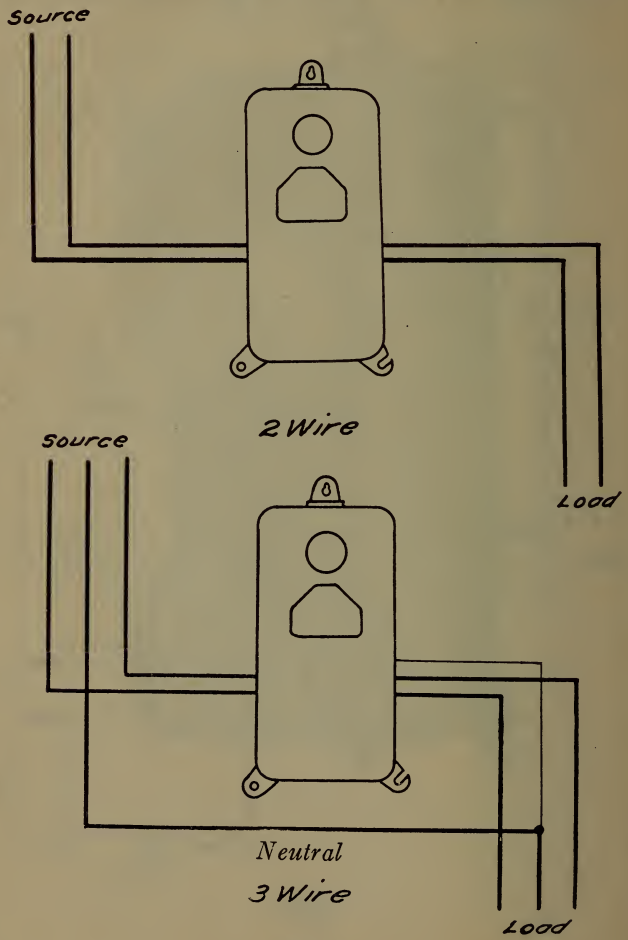
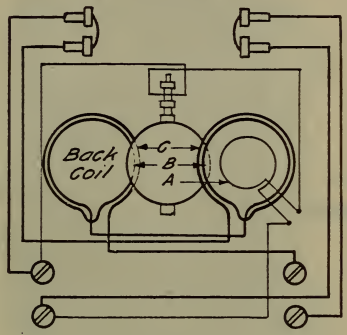


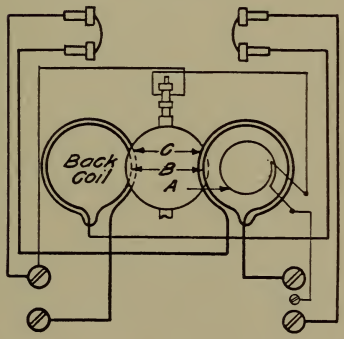
Fig. 275

INTERNAL CONNECTIONS OF TYPES CP-3 AND CP-4 THOMSON DIRECT CURRENT PRE-PAYMENT WATTHOUR METERS

5 to 25 Amps., 106 to 120, 212 to 240 Volts 2-Wire, 212 to 240 Volts 3-Wire



2-Wire



3-Wire
Fig. 276

C—Outer Section of Coil. B—Inner Section of Coil. A—Shunt Field Coil and Resistance Combined.

TYPE CR THOMSON DIRECT CURRENT WATTHOUR METER

Fig. 277

INTERIOR VIEW OF TYPE CR THOMSON DIRECT CURRENT WATTHOUR METER

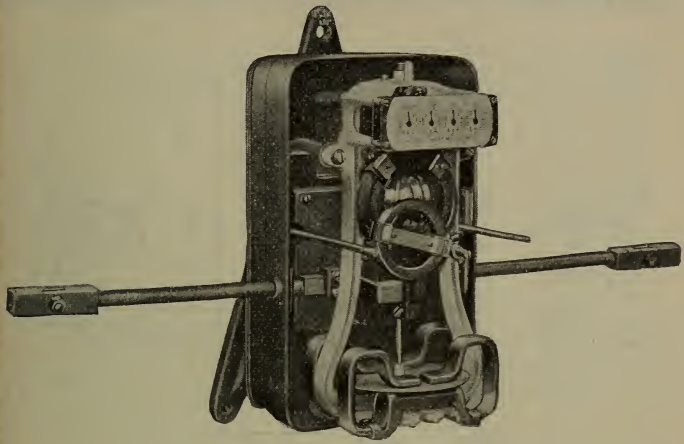


Fig. 278

DIMENSIONS OF TYPE CR THOMSON DIRECT CURRENT WATTHOUR METERS

75 to 150 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

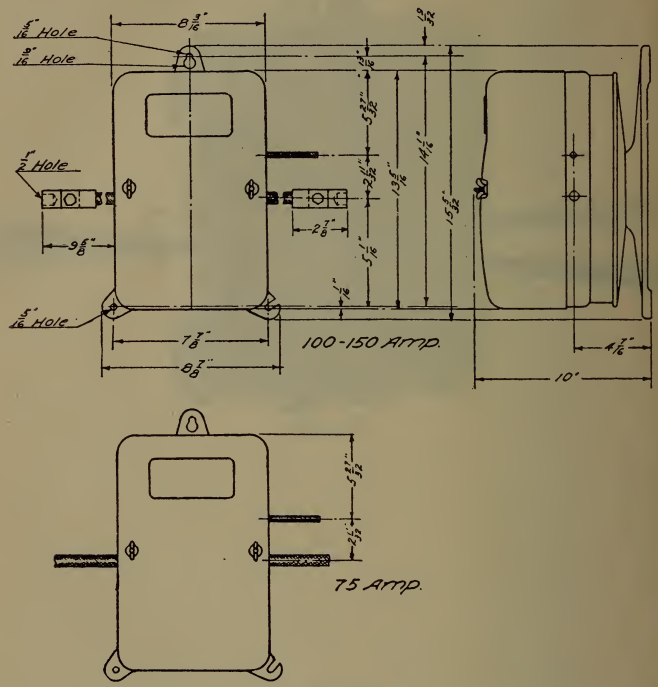


Fig. 279

NOTE:—For external connection diagrams refer to pages 234 and 235.

DIMENSIONS OF TYPE CR THOMSON DIRECT CURRENT WATTHOUR METERS

300 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

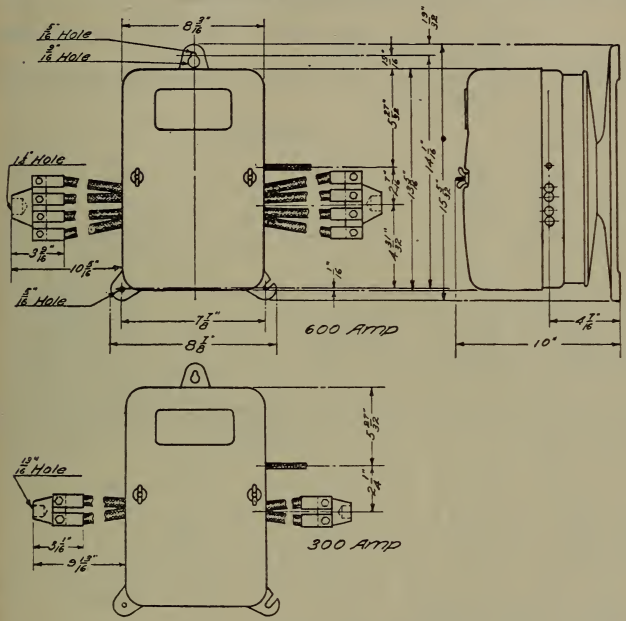


Fig. 280

CONSTANTS AND REGISTER DATA FOR TYPES C, C-6, C-7, CR, CP, CP-2, CP-3 AND CP-4 THOMSON DIRECT CURRENT WATTHOUR METERS

Capacities:
- 2-Wire: 5 to 100 Amps., 106 to 120, 212 to 240, 500 to 600 Volts
- 3-Wire: 5 to 100 Amps., 212 to 240, 400 to 440 Volts

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.2	500	†	.4	250	†	.6	166⅔	†	1	100	†
212 to 240	.4	250	†	.75	133⅓	†	1.25	80	†	2	50	†
400 to 440	.75	133⅓	†	1.5	66⅔	†	2.5	40	†	4	25	†
500 to 600	1	100	†	2	50	†	3	33⅓	†	5	20	†

Volts	AMPERES											
	50			75			100					
106 to 120	2	50	†	3	33⅓	†	4	25	†			
212 to 240	4	25	†	6	16⅔	†	7.5	13⅓	†			
400 to 440	7.5	13⅓	†	12.5	80	10	15	66⅔	10			
500 to 600	10	10	†	15	66⅔	10	20	50	10			

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES C, C-6, C-7 AND CR THOMSON DIRECT CURRENT WATTHOUR METERS

Capacities { 2-Wire: 150 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts
3-Wire: 150 to 300 Amps., 212 to 240, 400 to 440 Volts

Volts	AMPERES								
	150			300			600		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	6	16⅔	†	12.5	80	10	25	40	10
212 to 240	12.5	80	10	25	40	10	50	20	10
400 to 440	25	40	10	50	20	10	100	10	10
500 to 600	30	33⅓	10	60	16⅔	10	125	80	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES C-5 AND C-9 THOMSON DIRECT CURRENT WATTHOUR METERS

Capacities
- **2-Wire: 5 to 150 Amps., 106 to 120, 212 to 240, 500 to 600 Volts**
- **3-Wire: 5 to 150 Amps., 212 to 240, 400 to 440 Volts**

Volts	AMPERES											
	5			10			15			25		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	.2	500	†	.4	250	†	.6	166⅔	†	1	100	†
212 to 240	.4	250	†	.75	133⅓	†	1.25	80	†	2	50	†
400 to 440	.75	133⅓	†	1.5	66⅔	†	2.5	40	†	4	25	†
500 to 600	1	100	†	2	50	†	3	33⅓	†	5	20	†

Volts	AMPERES											
	50			75			100			150		
106 to 120	2	50	†	3	33⅓	†	4	25	†	6	16⅔	†
212 to 240	4	25	†	6	16⅔	†	7.5	13⅓	†	12.5	80	10
400 to 440	7.5	13⅓	†	12.5	80	10	15	66⅔	10	25	40	10
500 to 600	10	10	†	15	66⅔	10	20	50	10	30	33⅓	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES C-5 AND C-9 THOMSON DIRECT CURRENT WATTHOUR METERS

Capacities { 2-Wire: 300 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts
3-Wire: 300 Amps., 212 to 240, 400 to 440 Volts

Volts	AMPERES					
	300			600		
	Meter K	Reg. Ratio Dial	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106/120	12.5	80	10	25	40	10
212/240	25	40	10	50	20	10
400/440	50	20	10	100	10	10
500/600	60	$16\frac{2}{3}$	10	125	80	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

TYPE CQ THOMSON DIRECT CURRENT WATTHOUR METER

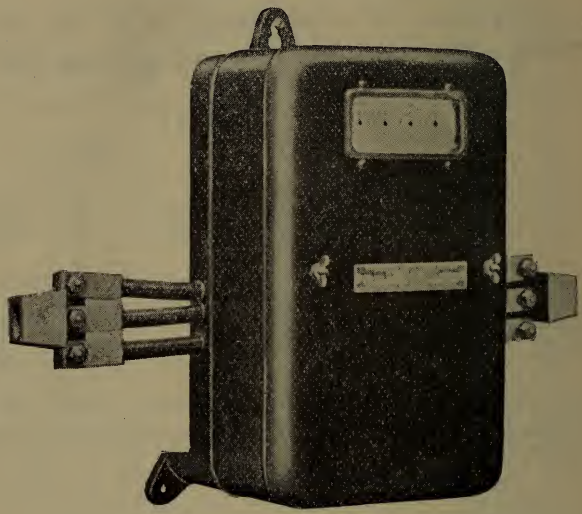


Fig. 281

INTERIOR VIEW OF TYPE CQ THOMSON DIRECT CURRENT WATTHOUR METER

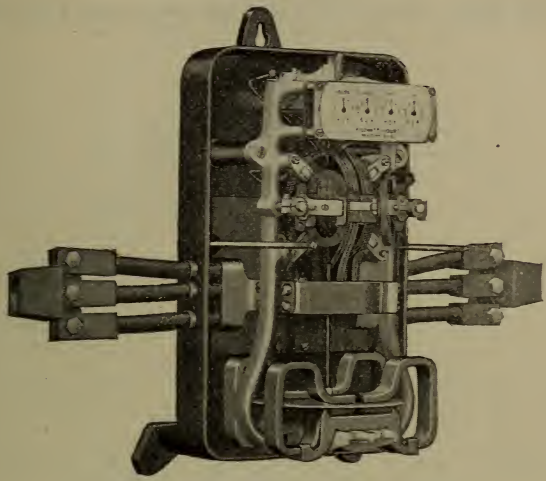


Fig. 282

INTERNAL CONNECTIONS OF TYPES CQ AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 400 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire 212 to 240 Volts 3-Wire

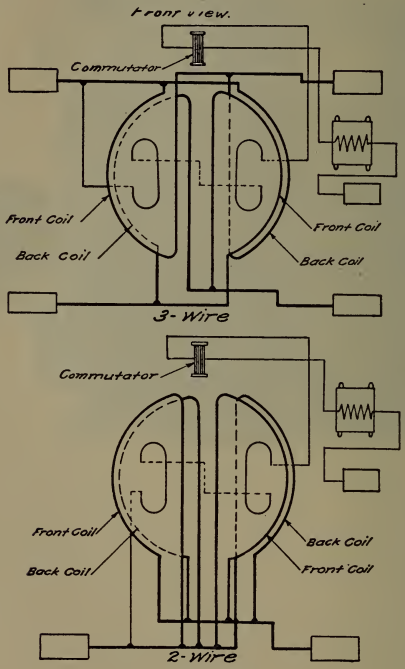
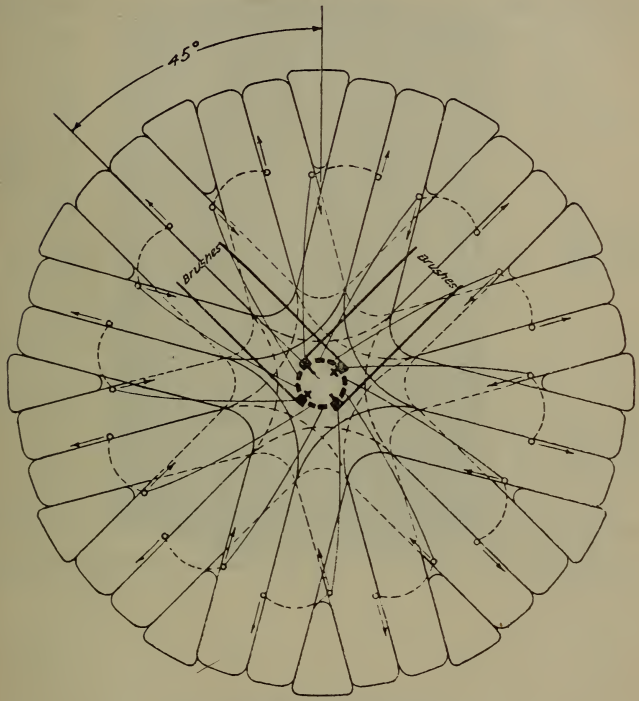


Fig. 283

NOTE.—Resistance for Type CQ meters up to 300 volts, 2-wire and 600 volts 3-wire mounted in a cage upon the meter back. Resistance for Type CQ meters above 300 volts 2-wire and 600 volts 3-wire, all Type CQ-2 meters and special Type CQ meters mounted in a separate box.

CONNECTIONS OF ARMATURE FOR TYPES CQ AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

2- and 3-Wire



Arrows show direction of wire after entering coil

Fig. 284

CONSTANTS AND REGISTER DATA FOR TYPES CQ AND CQ-2 THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 400 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire, 212 to 240 Volts 3-Wire

Volts	AMPERES								
	50			75			100		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	2	50	†	3	33⅓	†	4	25	†
212 to 240	4	25	†	6	16⅔	†	7.5	13⅓	†
500 to 600	10	10	†	15	66⅔	10	20	50	10

Volts	AMPERES								
	200			400					
106 to 120	7.5	13⅓	†	15	60⅔	10			
212 to 240	15	66⅔	10	30	33⅓	10			
500 to 600	40	25	10	75	13⅓	10			

Meter K × Register Ratio × 100 = No. of watthours recorded by one revolution of the first pointer.

† Dial face bears no multiplier.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

TYPE CS THOMSON DIRECT CURRENT WATTHOUR METER

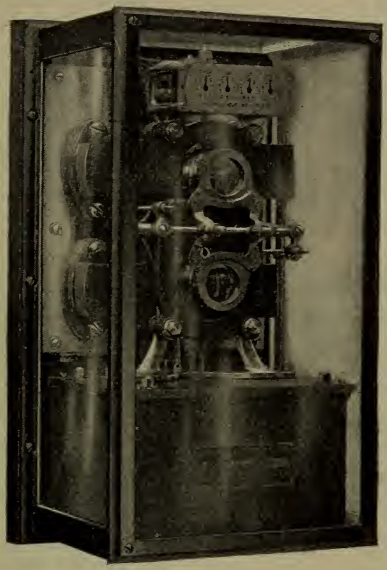


Fig 285

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

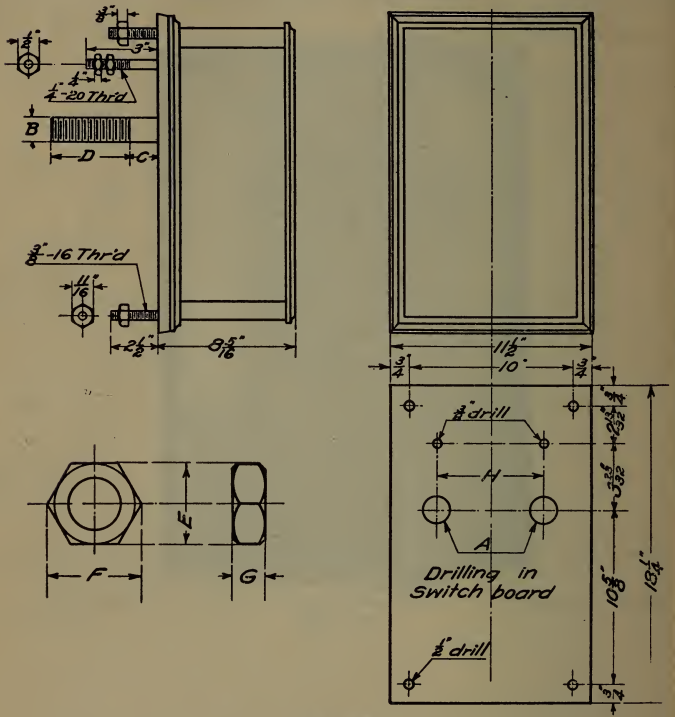


Fig. 286

NOTE.—Originally Type CS meters were designed with the potential studs arranged in a horizontal plane as noted above. Later, the potential studs were arranged in a vertical plane as noted upon pages 304 to 307 inclusive.

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
50–100	1/2	3/8	1 1/4	1 3/4	16	25/32	57/64	3/8	2	4 1/4
150	5/8	1/2	1 1/4	3 1/4	13	1 1/16	1 3/32	1/2	2	4 1/4
200	5/8	1/2	1 1/4	3 1/4	13	1 1/16	1 7/32	1/2	2	5 7/8
300	3/4	5/8	1 1/4	3 1/4	11	1 7/16	1 31/32	1/2	2	5 7/8
400	7/8	3/4	1 1/4	3 1/4	12	1 13/16	2 3/32	5/8	2	5 7/8
600	1 1/8	1	1 1/2	3 1/4	12	2	2 5/16	5/8	2	5 7/8

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

800 to 1500 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

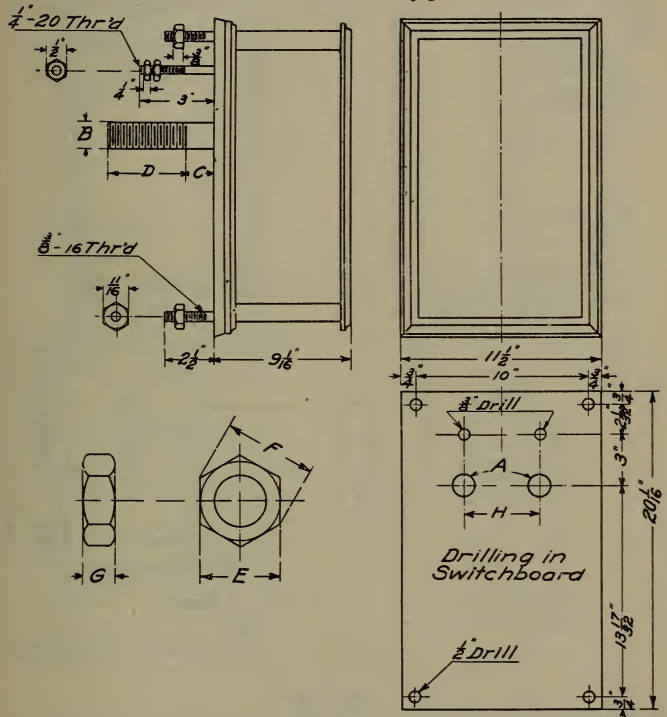


Fig. 287

NOTE.—Originally Type CS meters were designed with the potential studs arranged in a horizontal plane as noted above. Later, the potential studs were arranged in a vertical plane as noted upon pages 304 to 307 inclusive.

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
800	1 1/4	1 1/8	1 1/4	3 1/4	12	2 3/16	2 17/32	3/4	2	5 7/8
1200	1 3/8	1 1/4	1 1/4	4 1/4	12	2 3/8	2 3/4	3/4	3	5 7/8
1500	1 5/8	1 1/2	1 3/4	3 3/4	12	2 3/4	3 3/16	1	3	5 7/8

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 300 Amps., 212 to 240 Volts 3-Wire

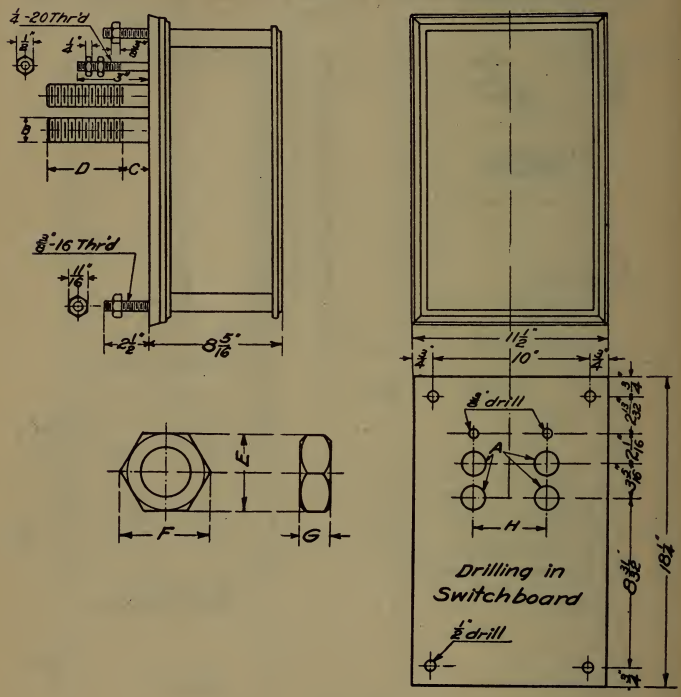


Fig. 288

NOTE.—Originally Type CS meters were designed with the potential studs arranged in a horizontal plane as noted above. Later, the potential studs were arranged in a vertical plane as noted upon pages 304 to 307 inclusive.

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
50–75	1/2	3/8	1 1/4	1 3/4	16	25/32	57/64	3/8	2	4 1/4
100	1/2	3/8	1 1/4	1 3/4	16	25/32	57/64	3/8	2	5 7/8
150–200	5/8	1/2	1 1/4	3 1/4	13	1 1/16	1 7/32	1/2	2	5 7/8
300	3/4	5/8	1 1/4	3 1/4	11	1 7/16	1 21/32	1/2	2	5 7/8

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

400 to 1500 Amps., 212 to 240 Volts 3-Wire

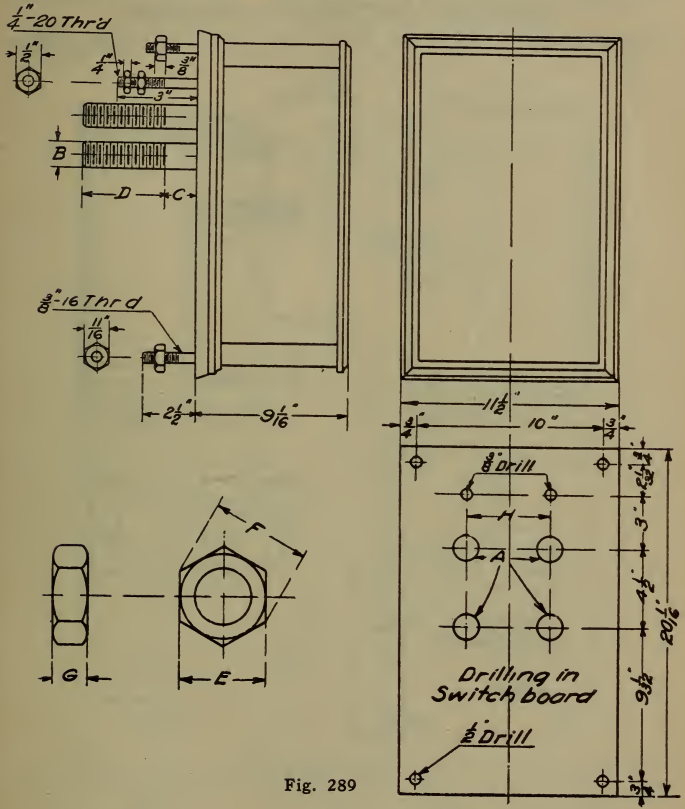


Fig. 289

NOTE.—Originally Type CS meters were designed with the potential studs arranged in a horizontal plane as noted below. Later, the potential studs were arranged in a vertical plane as noted upon pages 304 to 307 inclusive.

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
400	7/8	3/4	1 1/4	3 1/4	12	1 13/16	2 3/32	5/8	2	5 7/8
600	1 1/8	1	1 1/4	3 1/4	12	2	2 5/16	5/8	2	5 7/8
800	1 1/4	1 1/8	1 1/4	3 1/4	12	2 3/16	2 17/32	3/4	2	5 7/8
1200	1 3/8	1 1/4	1 1/4	4 1/4	12	2 3/8	2 3/4	3/4	3	5 7/8
1500	1 5/8	1 1/2	1 3/4	3 3/4	12	2 3/4	3 3/16	1	3	5 7/8

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

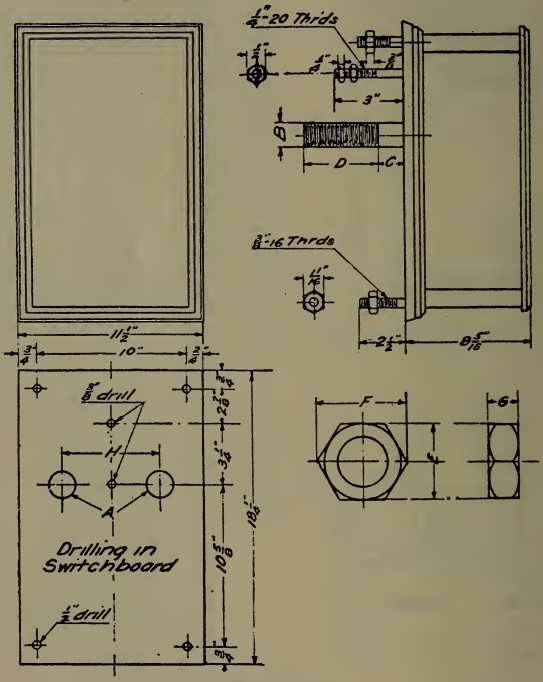


Fig. 290

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
50	1/2	3/8	1/2	2 1/2	16	25/32	57/64	3/8	2	4 1/4
75–100	1/2	3/8	1 1/4	1 3/4	16	25/32	57/64	3/8	2	4 1/4
150	5/8	1/2	1 1/4	2 1/4	13	1 1/16	1 7/32	1/2	2	4 1/4
200	5/8	1/2	1 1/4	2 1/4	13	1 1/16	1 7/32	1/2	2	5 5/8
300	3/4	5/8	1 1/4	2 1/4	11	1 7/16	1 21/32	1/2	2	5 5/8
400	7/8	3/4	1 1/4	3 1/4	12	1 13/16	2 3/32	5/8	2	5 5/8
600	1 1/8	1	1 1/4	3 1/4	12	2	2 5/16	5/8	2	5 5/8

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

800 to 1500 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

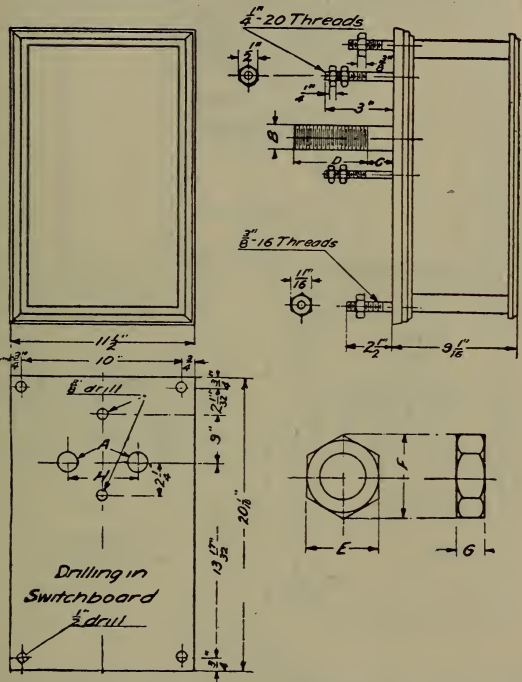


Fig. 291

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
800	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$3\frac{1}{4}$	12	$2\frac{3}{16}$	$2\frac{17}{32}$	$\frac{3}{4}$	2	$5\frac{7}{8}$
1200	$1\frac{3}{8}$	$1\frac{1}{4}$	$1\frac{1}{4}$	$4\frac{1}{4}$	12	$2\frac{3}{8}$	$2\frac{3}{4}$	$\frac{3}{4}$	3	$5\frac{7}{8}$
1500	$1\frac{5}{8}$	$1\frac{1}{7}$	$1\frac{3}{4}$	$3\frac{3}{4}$	12	$2\frac{3}{4}$	$3\frac{3}{16}$	1	3	$5\frac{7}{8}$

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 300 Amps., 212 to 240 Volts 3-Wire

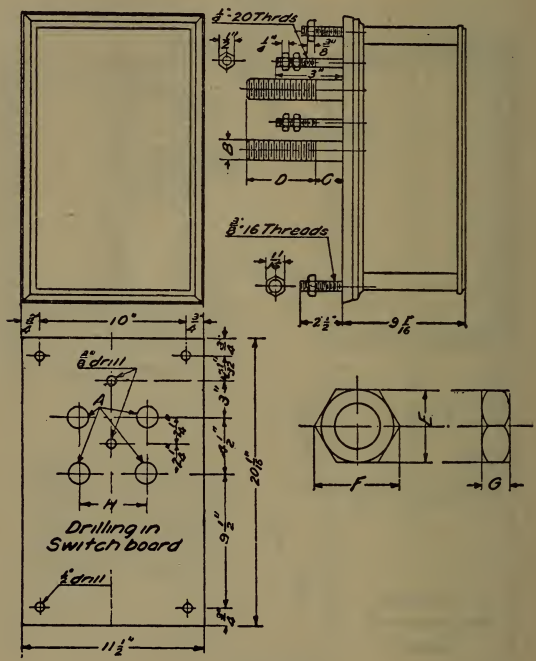


Fig. 292

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
50	1/2	3/8	1/2	2 1/2	16	25/32	57/64	3/8	2	4 1/4
75	1/2	3/8	1 1/4	1 3/4	16	25/32	57/64	3/8	2	4 1/4
100	1/2	3/8	1 1/4	1 3/4	16	25/32	57/64	3/8	2	5 7/8
150–200	5/8	1/2	1 1/4	2 1/4	13	1 1/16	1 7/32	1/2	2	5 7/8
300	3/4	5/8	1 1/4	2 1/4	11	1 7/16	1 21/32	1/2	2	5 7/8

DIMENSIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

400 to 1500 Amps., 212 to 240 Volts 3-Wire

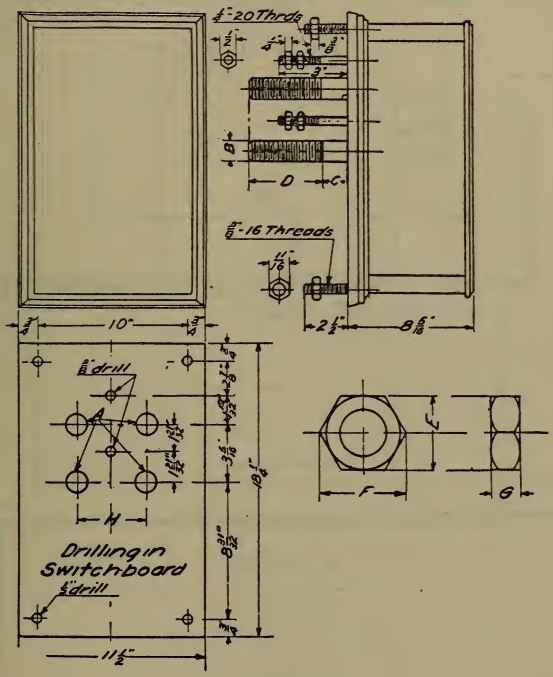


Fig. 293

Amperes	STUDS					NUTS				
	A	B	C	D	No. Threads per Inch	E	F	G	No. Used per Stud	H
400	7/8	3/4	1 1/4	3 1/4	12	1 13/16	2 3/32	5/8	2	5 7/8
600	1 1/8	1	1 1/4	3 1/4	12	2	2 5/16	5/8	2	5 7/8
800	1 1/4	1 1/8	1 1/4	3 1/4	12	2 3/16	2 17/32	3/4	2	5 7/8
1200	1 3/8	1 1/4	1 1/4	4 1/4	12	2 3/8	2 3/4	3/4	3	5 7/8
1500	1 5/8	1 1/2	1 3/4	3 3/4	12	2 3/4	3 3/16	1	3	5 7/8

EXTERNAL CONNECTIONS OF TYPE CS THOMSON DIRECT CURRENT WATT-HOUR METERS

50 to 1500 Amps., 106 to 120, 212 to 240, 500 to 600 Volts
2-Wire

BACK VIEW

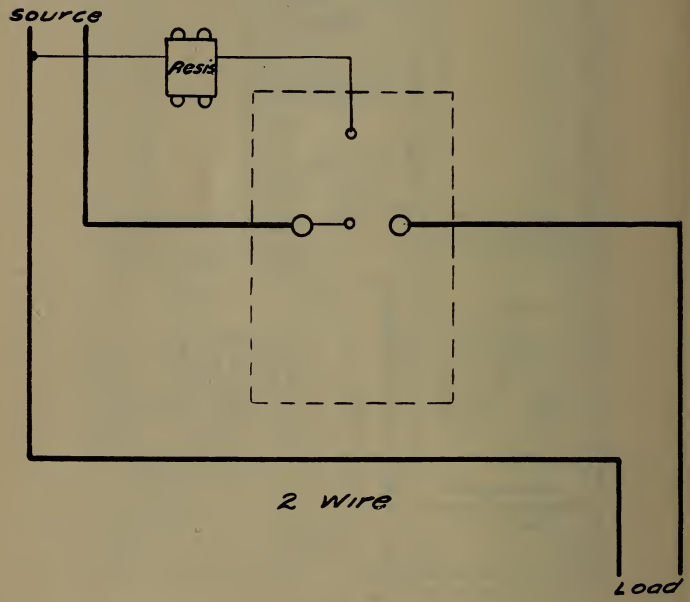


Fig. 294

EXTERNAL CONNECTIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 1500 Amps., 212 to 240 Volts 3-Wire

BACK VIEW

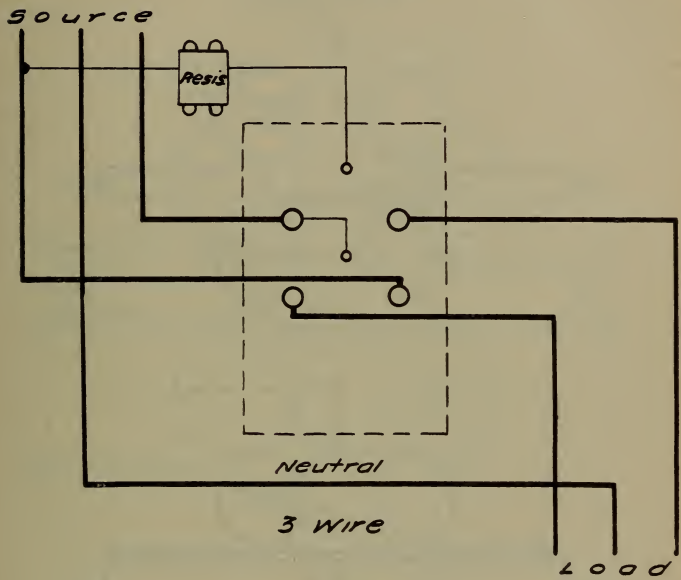
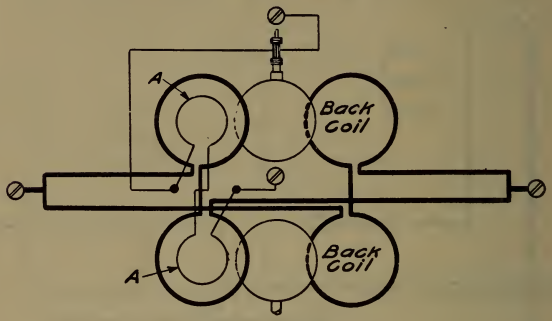


Fig. 295

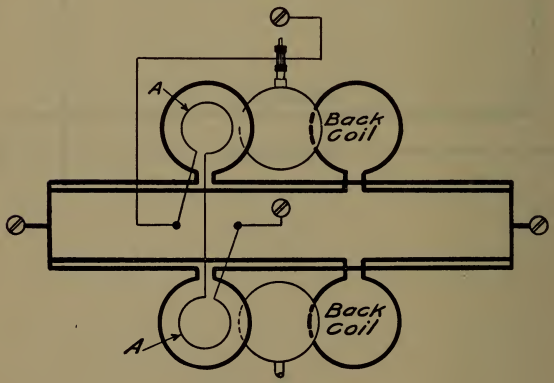
INTERNAL CONNECTIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 150 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

FRONT VIEW



50 to 75 Amps.
A—Starting Coil.



100 to 150 Amps.
Fig. 296

INTERNAL CONNECTIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 75 Amps., 212 to 240 Volts 3-Wire

FRONT VIEW

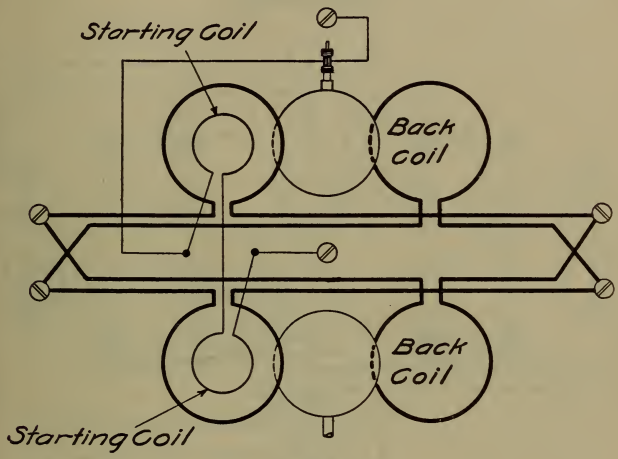


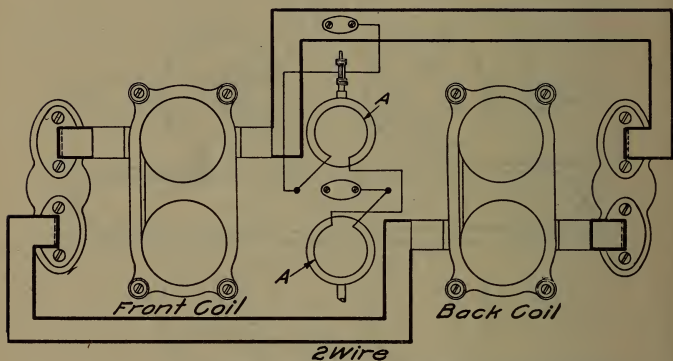
Fig. 297

INTERNAL CONNECTIONS OF TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

200 to 1500 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

100 to 1500 Amps., 212 to 240 Volts 3-Wire

FRONT VIEW



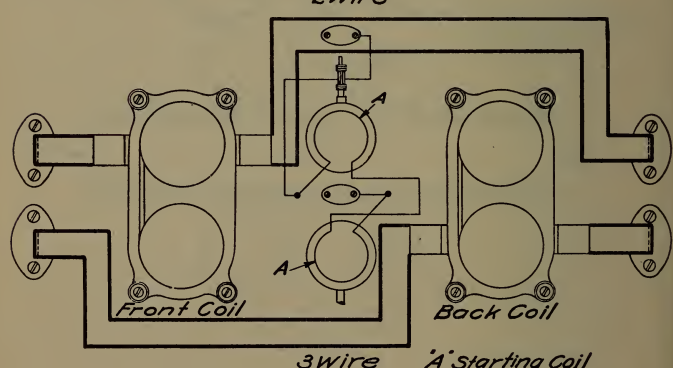
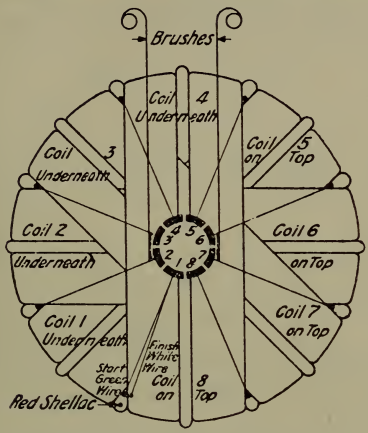


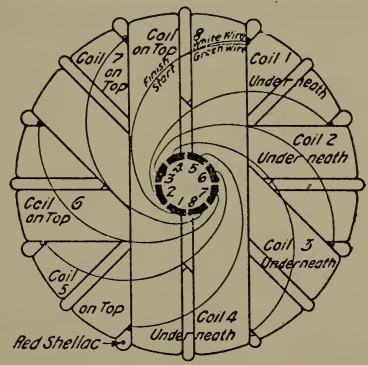
Fig. 298

ARMATURE CONNECTIONS OF TYPES CS, G-2 AND G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

50 to 1500 Amps., 2- and 3-Wire



Top Armature, Top View



Bottom Armature, Top View
Leads wound around on Shaft between Two Armatures

Fig. 299

CONSTANTS AND REGISTER DATA FOR TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

Capacities { 2-Wire: 50 to 600 Amps., 106 to 120, 212 to 240, 500 to 600 Volts
3-Wire: 50 to 300 Amps., 212 to 240 Volts

Volts	AMPERES											
	50			75			100			150		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	2	5	*	3	$3\frac{1}{3}$	*	4	$2\frac{1}{2}$	*	6	$1\frac{2}{3}$	*
212 to 240	4	$2\frac{1}{2}$	*	6	$1\frac{2}{3}$	*	7.5	$1\frac{1}{3}$	*	12.5	8	†
500 to 600	10	1	*	15	$6\frac{2}{3}$	†	20	5	†	30	$3\frac{1}{3}$	†

Volts	AMPERES											
	200			300			400			600		
106 to 120	7.5	$1\frac{1}{3}$	*	12.5	8	†	15	$6\frac{2}{3}$	†	25	4	†
212 to 240	15	$6\frac{2}{3}$	†	25	4	†	30	$3\frac{1}{3}$	†	50	2	†
500 to 600	40	$2\frac{1}{2}$	†	60	$1\frac{2}{3}$	†	75	$1\frac{1}{3}$	†	125	8	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs. except where indicated by * in which case one revolution = 1 kw-hr.

CONSTANTS AND REGISTER DATA FOR TYPE CS THOMSON DIRECT CURRENT WATTHOUR METERS

Capacities { 2-Wire: 800 to 1500 Amps., 106 to 120, 212 to 240, 500 to 600 Volts
3-Wire: 800 to 1500 Amps., 212 to 240 Volts

Volts	AMPERES								
	800			1200			1500		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	40	$2\frac{1}{2}$	†	60	$1\frac{2}{3}$	†	75	$1\frac{1}{3}$	†
212 to 240	75	$1\frac{1}{3}$	†	125	8	10	150	$6\frac{2}{3}$	10
500 to 600	200	5	10	300	$3\frac{1}{3}$	10	400	$2\frac{1}{2}$	10

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of first pointer.

†Dial face bears no multiplier.

In all cases, one revolution of first pointer, disregarding dial face multiplier = 10 kw-hrs.

TYPE G-3 THOMSON DIRECT CURRENT WATTHOUR METER

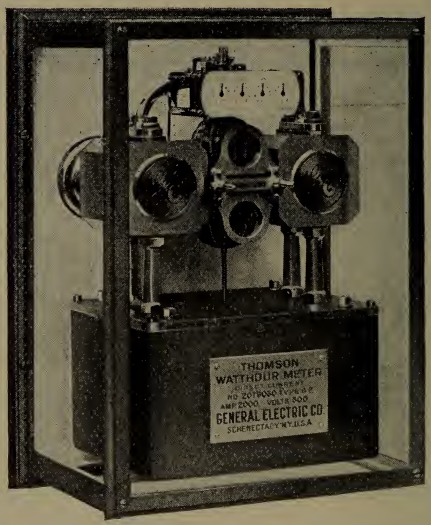


Fig. 300

DIMENSIONS OF TYPE G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 10,000 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts 2-Wire

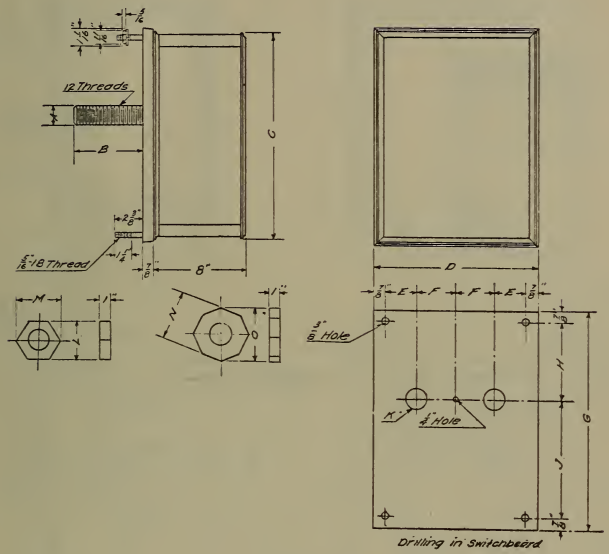
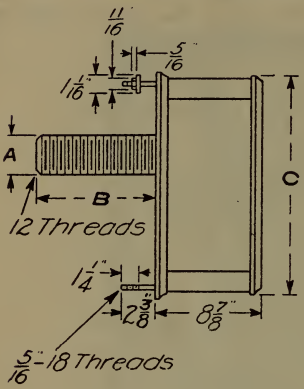


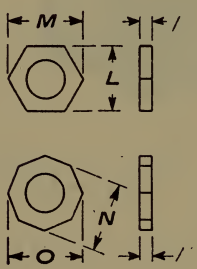
Fig. 301

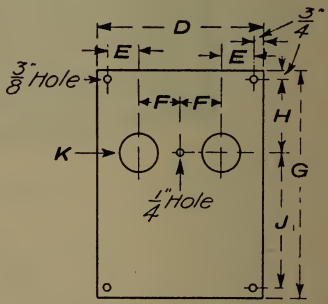
Amperes	A	B	C	D	E	F	G	H	J	K	L	M	N	O	Nuts Used per Stud
2000	$1\frac{3}{4}$	6	$18\frac{1}{2}$	$14\frac{3}{8}$	$2\frac{13}{16}$	$3\frac{1}{2}$	$19\frac{7}{16}$	$6\frac{5}{32}$	$11\frac{17}{32}$	$1\frac{7}{8}$	$2\frac{3}{4}$	$3\frac{3}{16}$			3
3000	2	7	$18\frac{1}{2}$	$14\frac{3}{8}$	$2\frac{13}{16}$	$3\frac{1}{2}$	$19\frac{7}{16}$	$6\frac{5}{32}$	$11\frac{17}{32}$	$2\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{5}{8}$			4
4000	$2\frac{1}{2}$	8	$18\frac{1}{2}$	$14\frac{3}{8}$	$2\frac{13}{16}$	$3\frac{1}{2}$	$19\frac{7}{16}$	$6\frac{5}{32}$	$11\frac{17}{32}$	$2\frac{3}{8}$	$3\frac{7}{8}$	$4\frac{1}{2}$			5
6000	$3\frac{1}{4}$	9	$18\frac{1}{2}$	$14\frac{3}{8}$	$2\frac{13}{16}$	$3\frac{1}{2}$	$19\frac{7}{16}$	$6\frac{5}{32}$	$11\frac{17}{32}$	$3\frac{3}{8}$			$4\frac{1}{2}$	$4\frac{19}{32}$	5
8000	4	$11\frac{1}{2}$	$21\frac{3}{4}$	$19\frac{3}{8}$	$4\frac{1}{16}$	$4\frac{3}{4}$	$22\frac{11}{16}$	$6\frac{23}{32}$	$14\frac{7}{32}$	$4\frac{1}{8}$			$5\frac{3}{8}$	$5\frac{13}{16}$	7
10000	$4\frac{3}{4}$	$11\frac{1}{2}$	$21\frac{3}{4}$	$19\frac{3}{8}$	$4\frac{1}{16}$	$4\frac{3}{4}$	$22\frac{11}{16}$	$6\frac{23}{32}$	$14\frac{7}{32}$	$4\frac{1}{8}$			$7\frac{3}{8}$	$8\frac{1}{4}$	7

DIMENSIONS OF TYPE G-2 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 10,000 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts 2-Wire







Drilling in Switchboard

Fig. 302

Amperes	A	B	C	D	E	F	G	H	J	K	L	NUTS M	NUTS N	NUTS O	No. Used per Stud
2000	1 3/4	6	18 1/2	14 1/8	2 13/16	3 1/2	19 3/16	6 5/32	11 17/32	1 7/8	2 3/4	3 3/16			3
3000	2	7	18 1/2	14 1/8	2 13/16	3 1/2	19 3/16	6 5/32	11 17/32	2 1/8	3 1/8	3 5/8			4
4000	2 1/2	8	18 1/2	14 1/8	2 13/16	3 1/2	19 3/16	6 5/32	11 17/32	2 5/8	3 7/8	4 1/2			5
6000	3 1/4	9	18 1/2	14 1/8	2 13/16	3 1/2	19 3/16	6 5/32	11 17/32	3 3/8			4 1/8	4 19/32	5
8000	4	11 1/2	21 3/4	19 1/8	4 1/16	4 3/4	22 7/16	6 23/32	14 7/32	4 1/8			5 3/8	5 13/16	7
10000	4 3/4	11 1/2	21 3/4	19 1/8	4 1/16	4 3/4	22 7/16	6 23/32	14 7/32	4 7/8			7 5/8	8 1/4	7

DIMENSIONS OF TYPE G-2 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 6000 Amps., 212 to 240 Volts 3-Wire

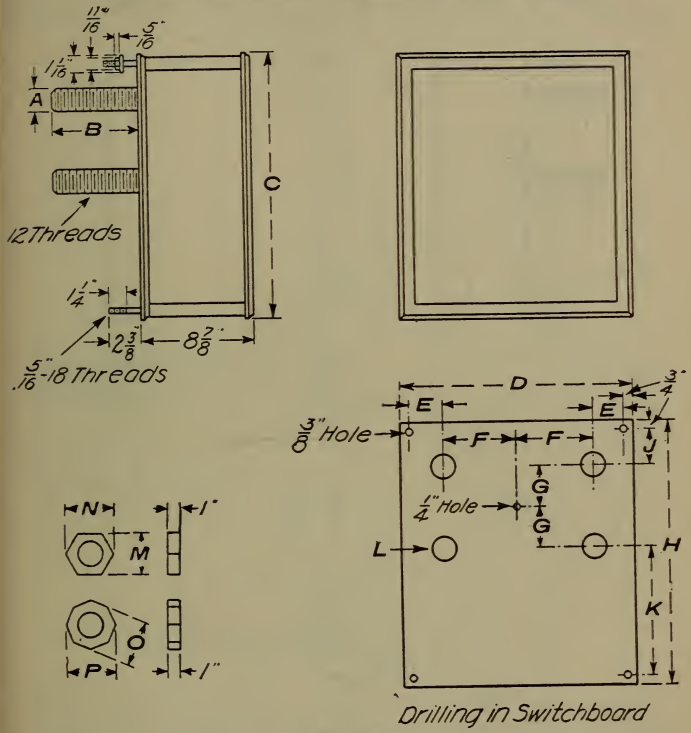


Fig. 303

Amperes	A	B	C	D	E	F	G	H	J	K	L	NUTS M	NUTS N	NUTS O	NUTS P	No. Used per Stud
2000	1 3/4	6	21 3/4	19 1/8	2 7/16	6 3/8	3 1/2	22 7/16	3	10 15/16	1 7/8	2 3/4	3 3/16			3
3000	2	7	21 3/4	19 1/8	2 7/16	6 3/8	3 1/2	22 7/16	3	10 15/16	2 1/8	3 1/8	3 5/8			4
4000	2 1/2	8	21 3/4	19 1/8	2 7/16	6 3/8	3 1/2	22 7/16	3	10 15/16	2 5/8	3 7/8	4 1/2			4
6000	3 1/4	9	23 5/16	21 1/8	2 15/16	7	4 3/4	24	2 5/16	10 7/16	3 3/8			4 1/4	4 19/32	5

DIMENSIONS OF TYPE G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 6000 Amps., 212 to 240 Volts 3-Wire

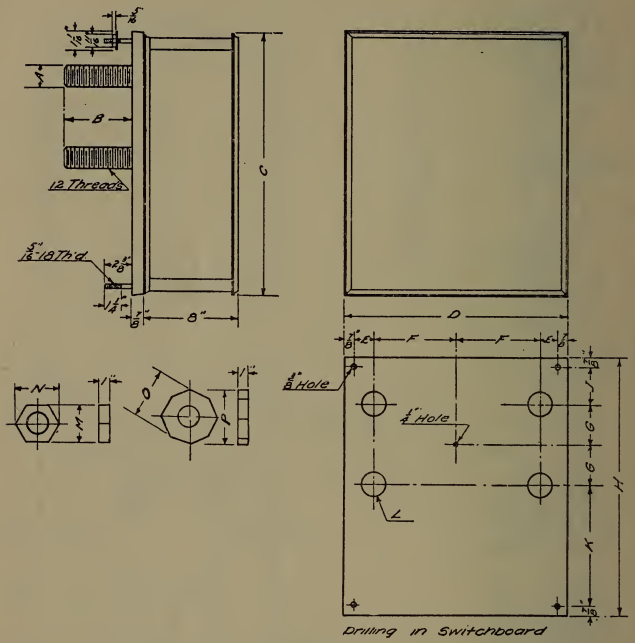


Fig. 304

Amperes	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Nuts Used per Stud
2000	$1\frac{3}{4}$	6	$21\frac{3}{4}$	$19\frac{3}{8}$	$2\frac{7}{16}$	$6\frac{3}{8}$	$3\frac{1}{2}$	$22\frac{11}{16}$	3	$10\frac{15}{16}$	$1\frac{7}{8}$	$2\frac{3}{4}$	$3\frac{3}{16}$			3
3000	2	7	$21\frac{3}{4}$	$19\frac{3}{8}$	$2\frac{7}{16}$	$6\frac{3}{8}$	$3\frac{1}{2}$	$22\frac{11}{16}$	3	$10\frac{15}{16}$	$2\frac{1}{8}$	$3\frac{1}{2}$	$3\frac{5}{8}$			4
4000	$2\frac{1}{2}$	8	$21\frac{3}{4}$	$19\frac{3}{8}$	$2\frac{7}{16}$	$6\frac{3}{8}$	$3\frac{1}{2}$	$22\frac{11}{16}$	3	$10\frac{15}{16}$	$2\frac{5}{8}$	$3\frac{7}{8}$	$4\frac{1}{2}$			5
6000	$3\frac{1}{4}$	9	$23\frac{5}{16}$	$21\frac{3}{8}$	$2\frac{13}{16}$	7	$4\frac{3}{4}$	$24\frac{1}{4}$	$2\frac{15}{16}$	$10\frac{1}{16}$	$3\frac{3}{8}$			$4\frac{1}{4}$	$4\frac{13}{32}$	5

CONNECTIONS OF TYPES G-2 AND G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 10,000 Amps., 106 to 120, 212 to 240, 400 to 480, 500 to 600 Volts 2-Wire

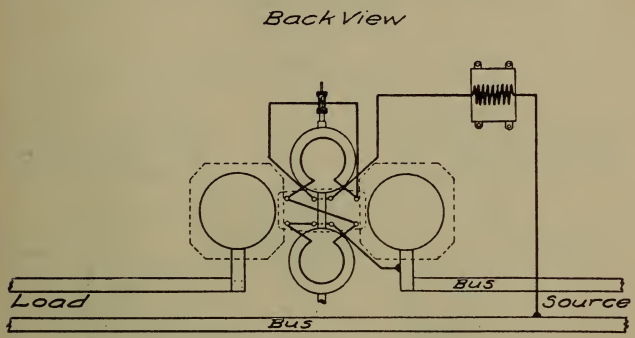


Fig. 305

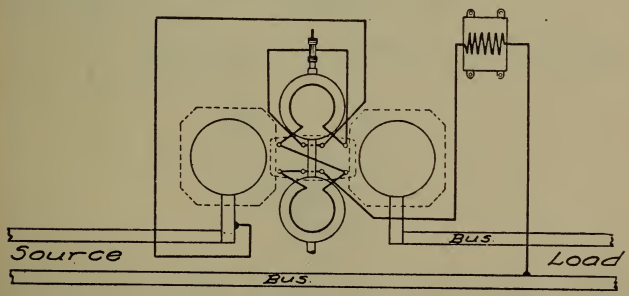


Fig. 306

CONNECTIONS OF TYPES G-2 AND G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 6000 Amps., 212 to 240 Volts 3-Wire

FRONT VIEW

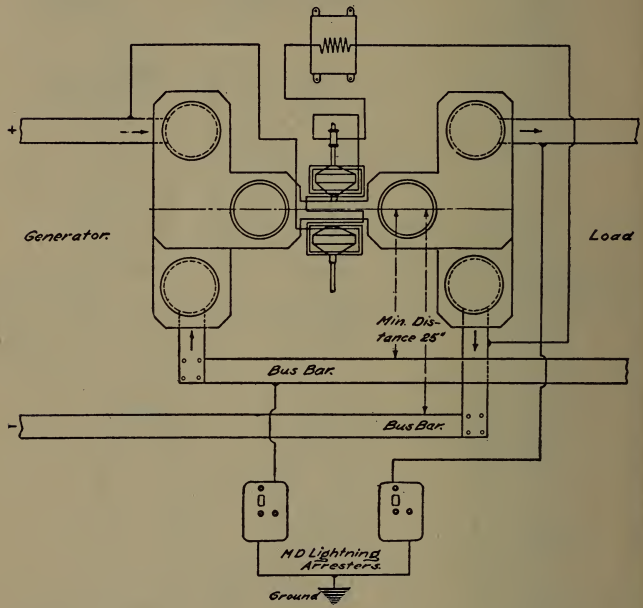


Fig. 307

NOTE.—Load and generator connections are interchangeable, top bus always +. Leads of potential circuit always on generator side, the leads of lightning arresters on the load side. If generator is on the right, the leads at the brush bracket must be interchanged.

CONNECTIONS OF TYPES G-2 AND G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 6000 Amps., 212 to 240 Volts 3-Wire

BACK VIEW

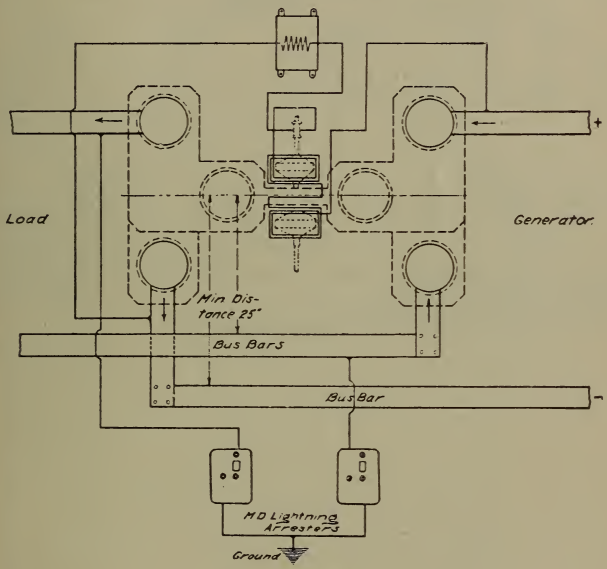


Fig. 308

NOTE.—Load and generator connections are interchangeable, top bus always+. Leads of potential circuit always on generator side, the leads of lightning arresters on the load side. If generator is on the left, the potential leads of the meter must be interchanged.

CONSTANTS AND REGISTER DATA FOR TYPES G-2 AND G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

2000 to 6000 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire and 212 to 240 Volts 3-Wire

Volts	AMPERES											
	2000			3000			4000			6000		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	100	1	†	150	$6\frac{2}{3}$	10	200	5	10	300	$3\frac{1}{3}$	10
212 to 240	200	5	10	300	$3\frac{1}{3}$	10	400	$2\frac{1}{2}$	10	600	1	10
500 to 600	500	2	10	750	$1\frac{1}{3}$	10	1000	1	10	1500	$\frac{2}{3}$	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

† Dial face bears no multiplier.

In all cases one revolution of first pointer = 10 kw-hrs.

CONSTANTS AND REGISTER DATA FOR TYPES G-2 AND G-3 THOMSON DIRECT CURRENT WATTHOUR METERS

8000 to 10,000 Amps., 106 to 120, 212 to 240, 500 to 600 Volts 2-Wire

Volts	AMPERES					
	8000			10000		
	Meter K	Reg. Ratio	Dial Face Mult.	Meter K	Reg. Ratio	Dial Face Mult.
106 to 120	400	$2\frac{1}{2}$	10	500	2	10
212 to 240	750	$1\frac{1}{3}$	10	1000	1	10
500 to 600	2000	5	100	2500	4	100

Meter K × 100 × Register Ratio = No. of watthours recorded by one revolution of the first pointer.

In all cases, one revolution of first pointer disregarding dial face multiplier = 10 kw-hrs.

TYPE CB THOMSON DIRECT CURRENT PORTABLE TEST METER

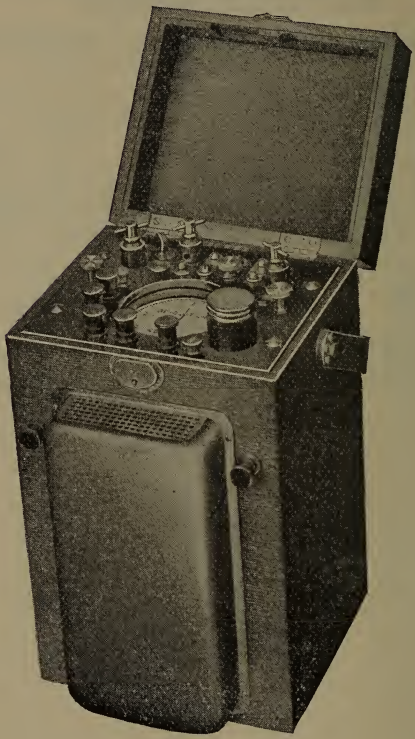


Fig. 309

INTERIOR VIEW OF TYPE CB THOMSON DIRECT CURRENT PORTABLE TEST METER

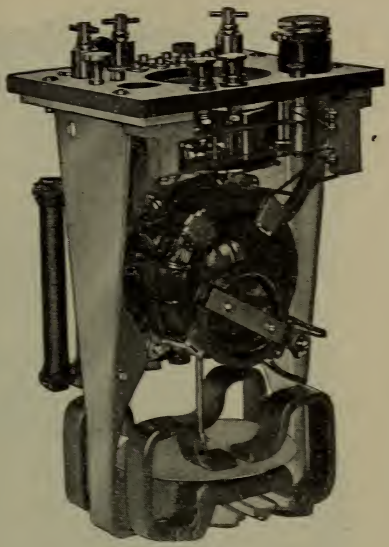


Fig. 310

TYPE CB-2 THOMSON DIRECT CURRENT PORTABLE TEST METER

Fig. 311

INTERIOR VIEW OF TYPE CB-2 THOMSON DIRECT CURRENT PORTABLE TEST METER

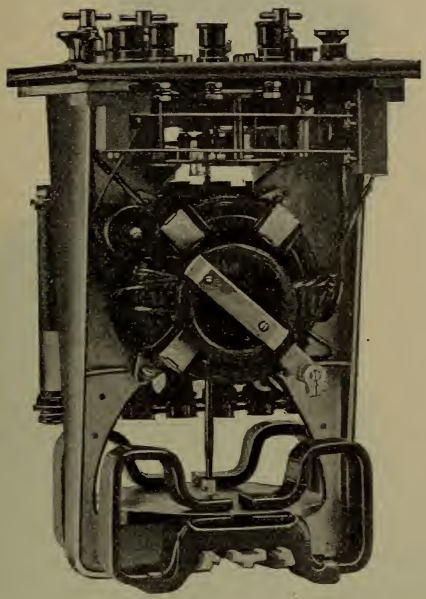


Fig. 312

TYPE CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METER

Fig. 313

INTERIOR VIEW OF TYPE CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METER

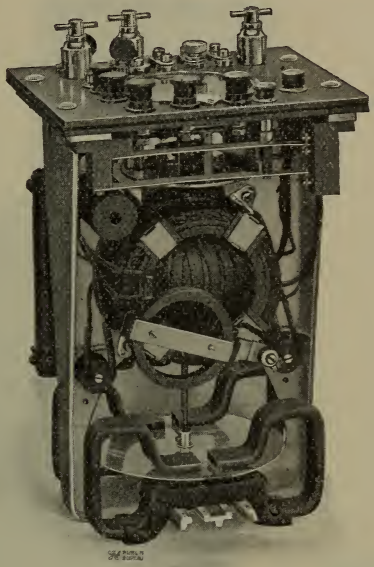


Fig. 314

TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METER

Fig. 315

INTERIOR VIEW OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METER

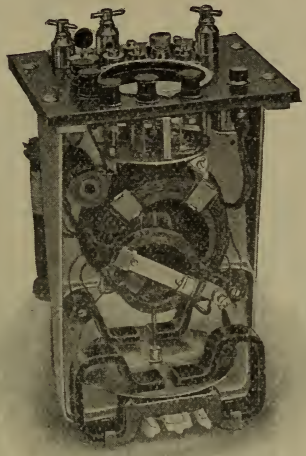


Fig. 316

EXTERNAL SINGLE VOLTAGE CONNECTIONS OF TYPES CB, CB-2 AND CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METERS

1-2-10-20-40 Amps., 100 to 120 Volts

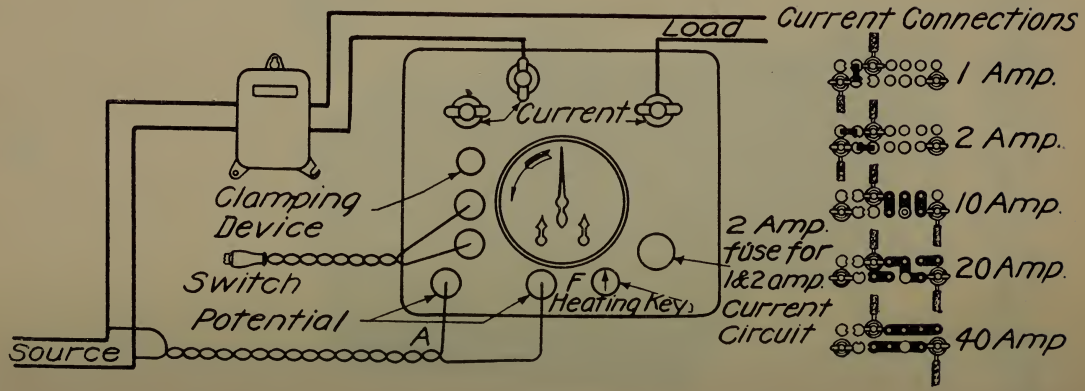


Fig. 317

EXTERNAL CONNECTIONS OF TYPES CB-2 AND CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METERS

5-10-50-100 Amps., 100 to 120 Volts

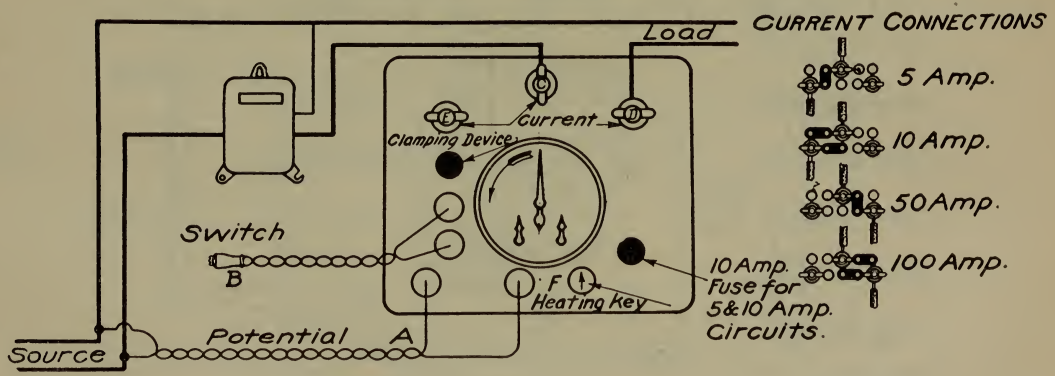


Fig. 318

EXTERNAL CONNECTIONS OF TYPES CB, CB-2 AND CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METERS

1-2-10-20-40 Amps., 100 to 120 and 200 to 240 Volts

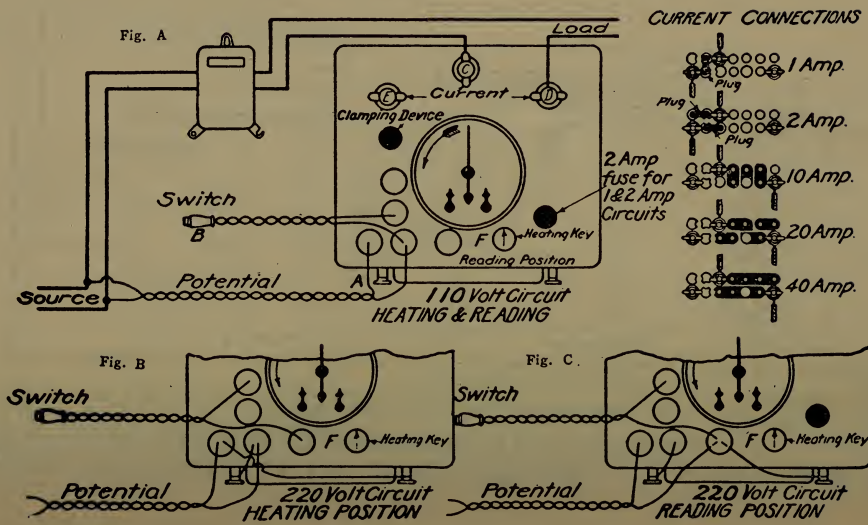


Fig. 319

EXTERNAL CONNECTIONS OF TYPES CB-2 AND CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METERS

5-10-50-100 Amps., 100 to 120 and 200 to 240 Volts

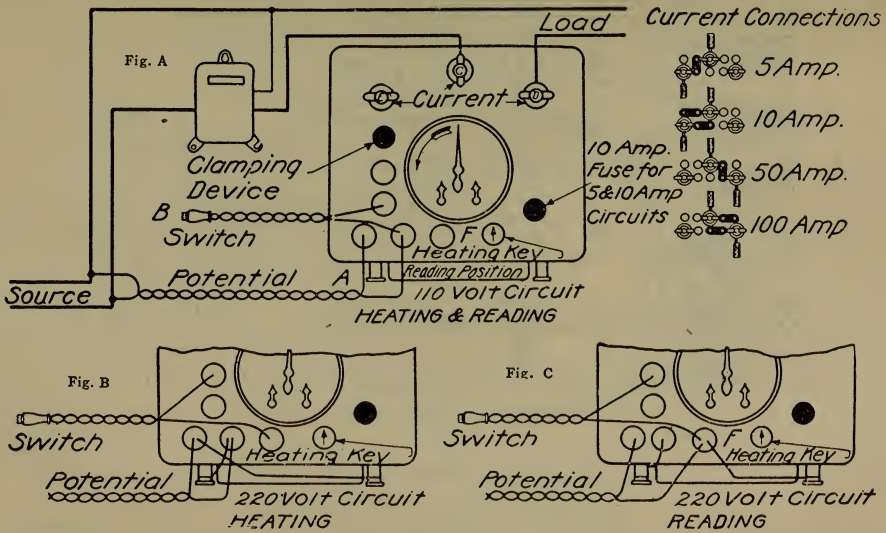


Fig. 320

EXTERNAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

1-2-10-20-40 Amps., 100 to 120 Volts

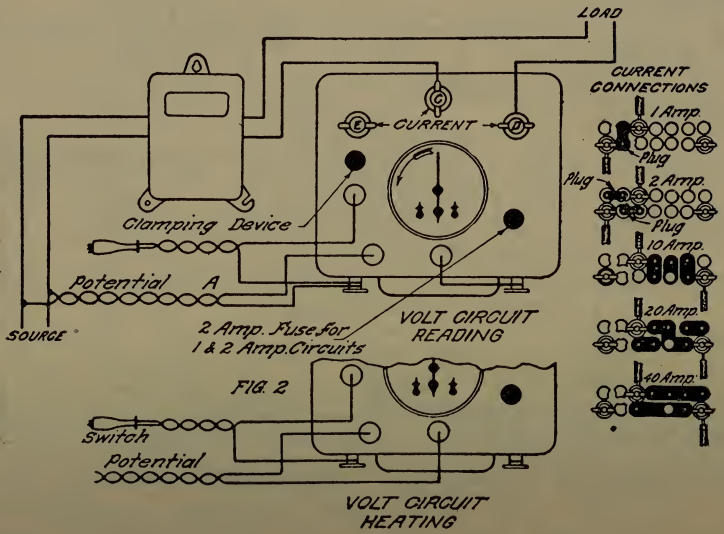


Fig. 321

EXTERNAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

1, 2, 10, 20 and 40 Amps., 200 to 250 Volts

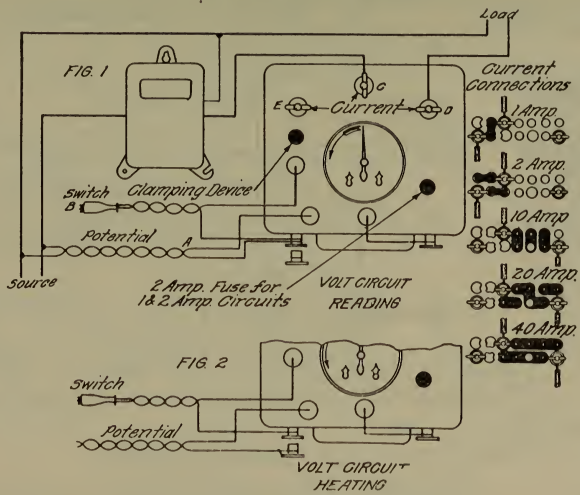


Fig. 322

EXTERNAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

5-10-50-100 Amps., 100 to 120 Volts

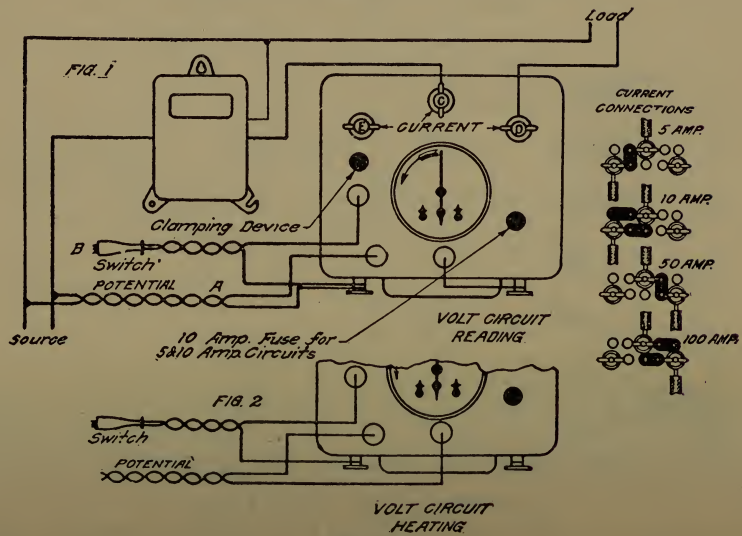
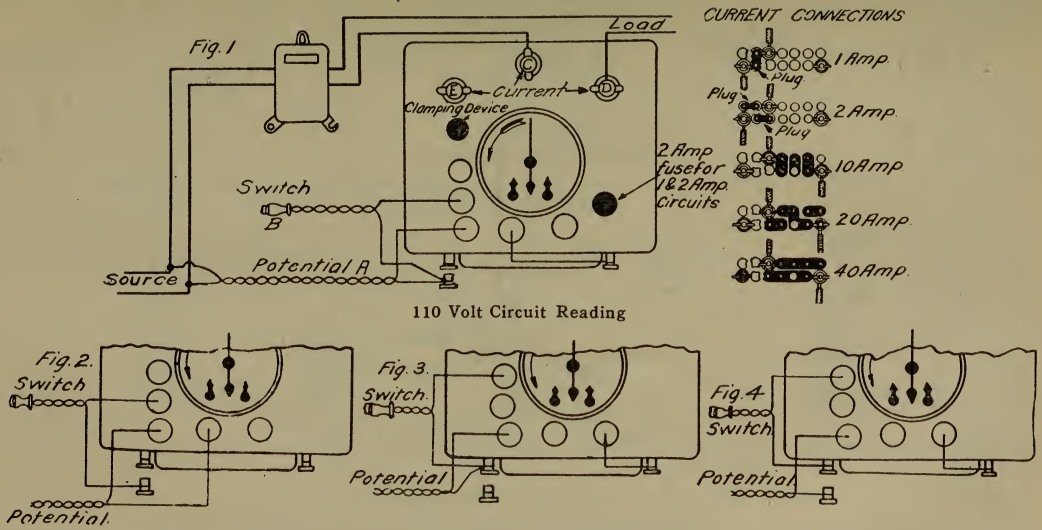


Fig. 323

EXTERNAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

1-2-10-20-40 Amps., 100 to 120 and 200 to 240 Volts



110 Volt Circuit Reading

110 Volt Circuit Heating

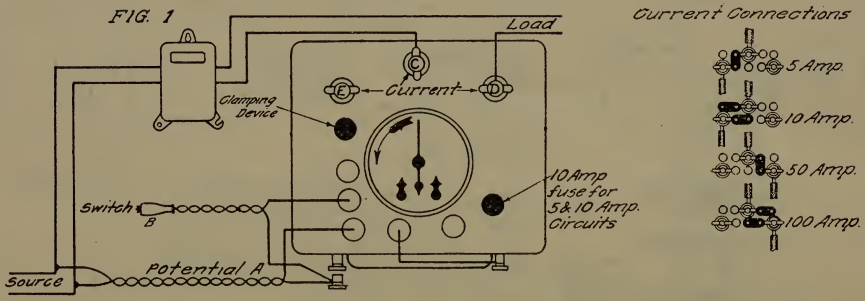
220 Volt Circuit Reading

220 Volt Circuit Heating

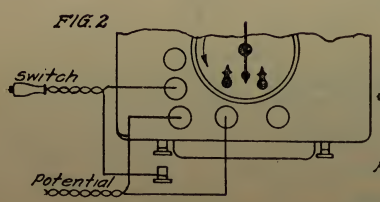
Fig. 324

EXTERNAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

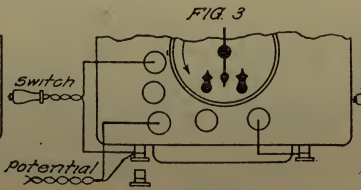
5-10-50-100 Amps., 100 to 120 and 200 to 240 Volts



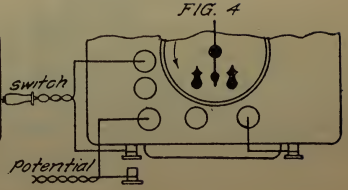
110 Volt Current Reading



110 Volt Circuit Heating



220 Volt Circuit Reading

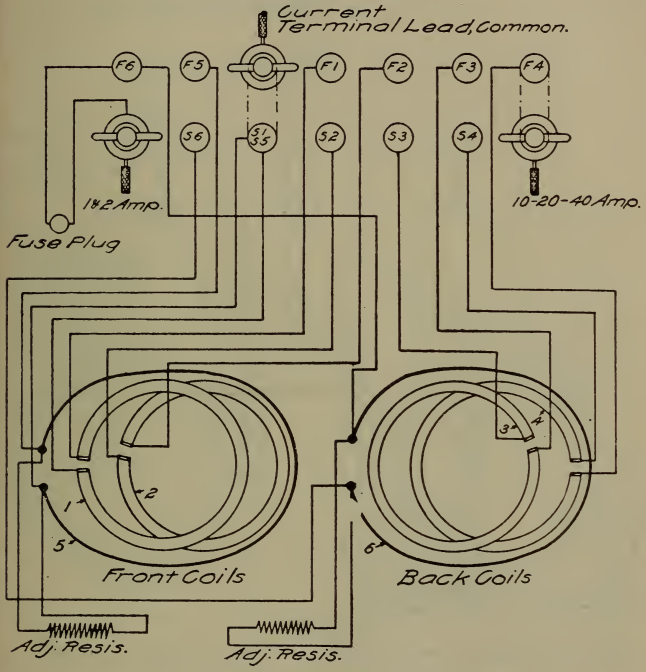


220 Volt Circuit Heating

Fig. 325

INTERNAL CURRENT CONNECTIONS OF TYPE CB AND LOW CAPACITY TYPES CB-2, CB-3 AND CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

1-2-10-20-40 Amps.



No. 1—1st strip wound section, 10 amp.
No. 2—2nd strip wound section, 10 amp.
No. 3—3rd strip wound section, 10 amp.
No. 4—4th strip wound section, 10 amp.
No. 5—1st wire wound section, 1 amp.
No. 6—2nd wire wound section, 1 amp.

Fig. 326

NOTE.—"S" denotes start of a section. "F" denotes finish of a section.

INTERNAL CURRENT CONNECTIONS OF TYPES CB-2, CB-3 AND CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

5-10-50-100 Amps.

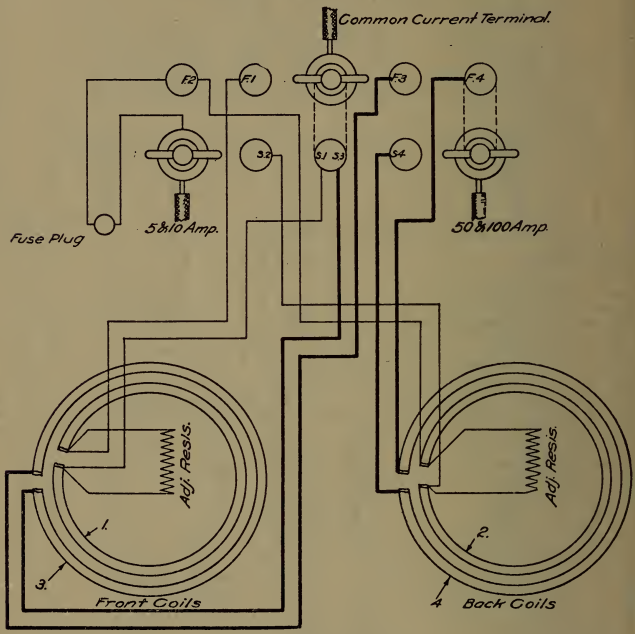


Fig. 327

NOTE—"S" denotes start of a section. "F" denotes finish of a section.

INTERNAL POTENTIAL CONNECTIONS OF TYPES CB, CB-2 AND CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METERS

100 to 120 Volts

Viewed from Front & Top.

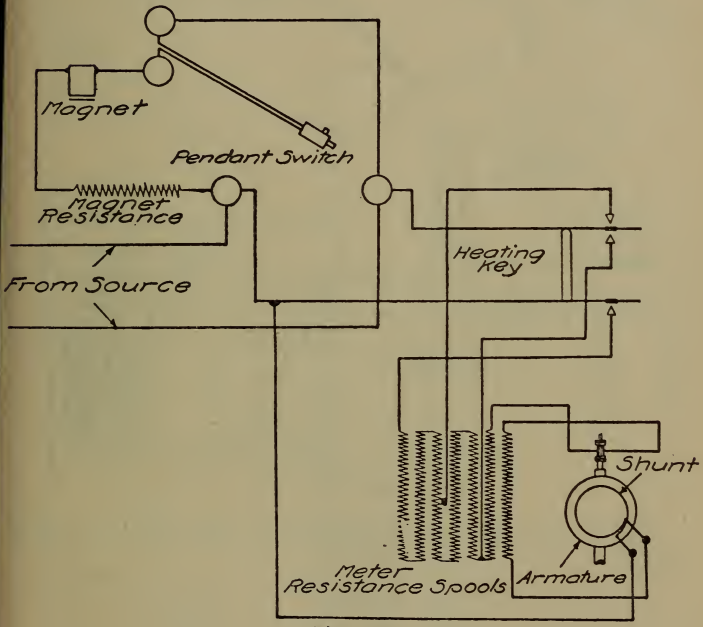


Fig. 328

NOTE—Heating key down—heating position. Heating key up—working position.

INTERNAL POTENTIAL CONNECTIONS OF DOUBLE VOLTAGE TYPES CB, CB-2 AND CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METERS

Connections as Shown are for the Lower of Two Voltages

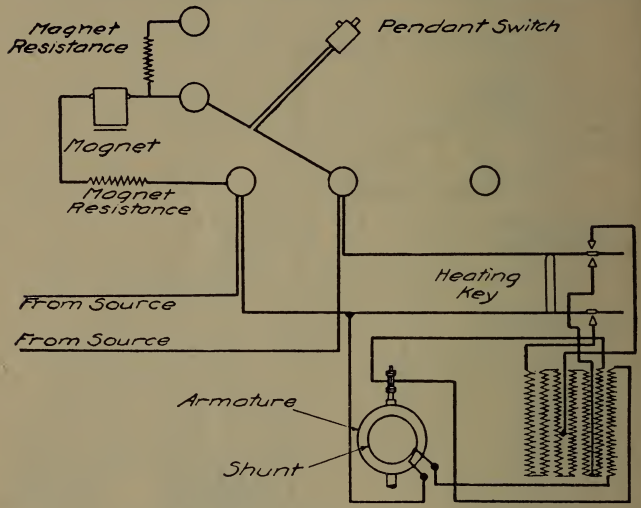


Fig. 329

NOTE.—Heating key down—heating position. Heating key up—working position.

INTERNAL POTENTIAL CONNECTIONS OF DOUBLE VOLTAGE TYPES CB, CB-2 AND CB-3 THOMSON DIRECT CURRENT PORTABLE TEST METERS

Connections as Shown are for the Higher of Two Voltages

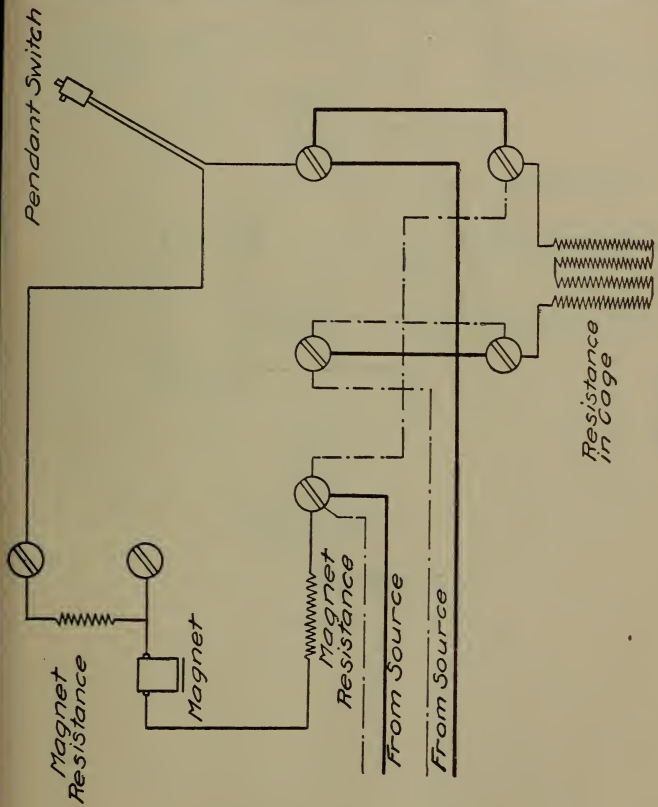


Fig. 330

Heavy lines show working connections.
Dash and dot lines show heating connections.

INTERNAL POTENTIAL CONNECTIONS OF TYPES CB, CB-2 AND CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

200 to 250 Volts

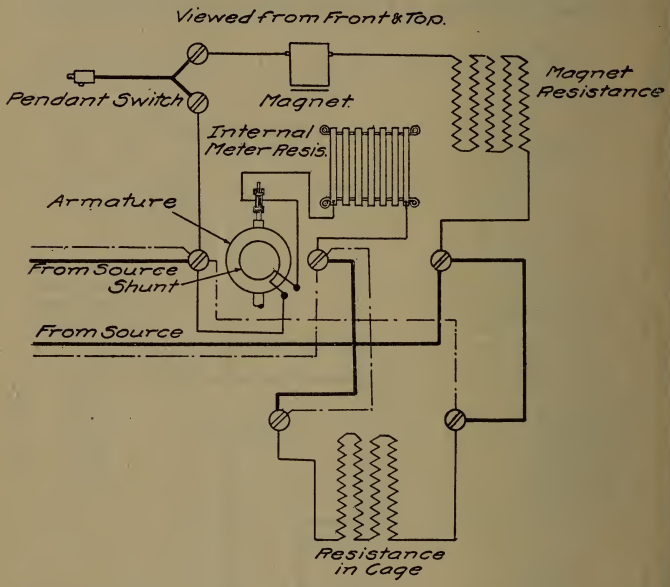


Fig. 331

INTERNAL POTENTIAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

100 to 120 Volts

VIEWED FROM FRONT AND TOP

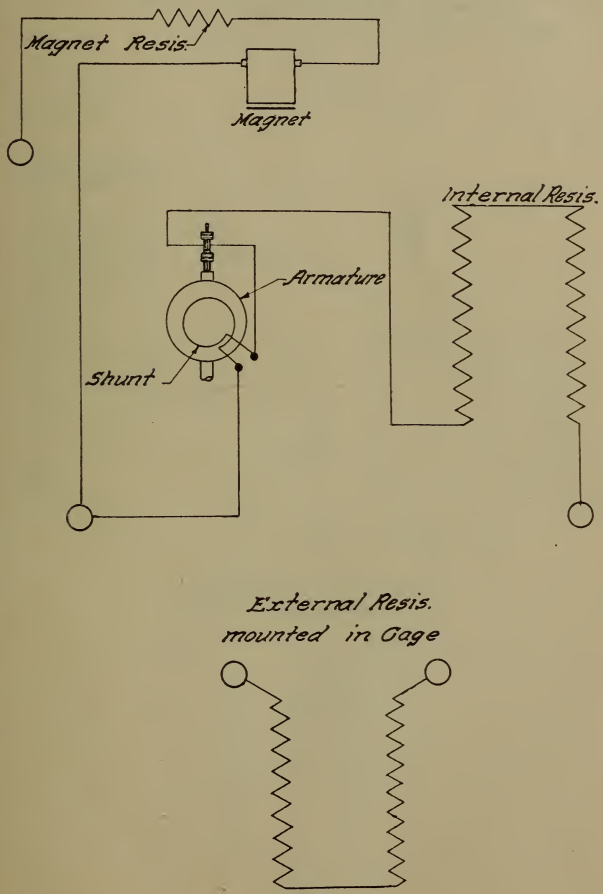


Fig. 332

INTERNAL POTENTIAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

200 to 240 Volts

VIEWED FROM FRONT AND TOP

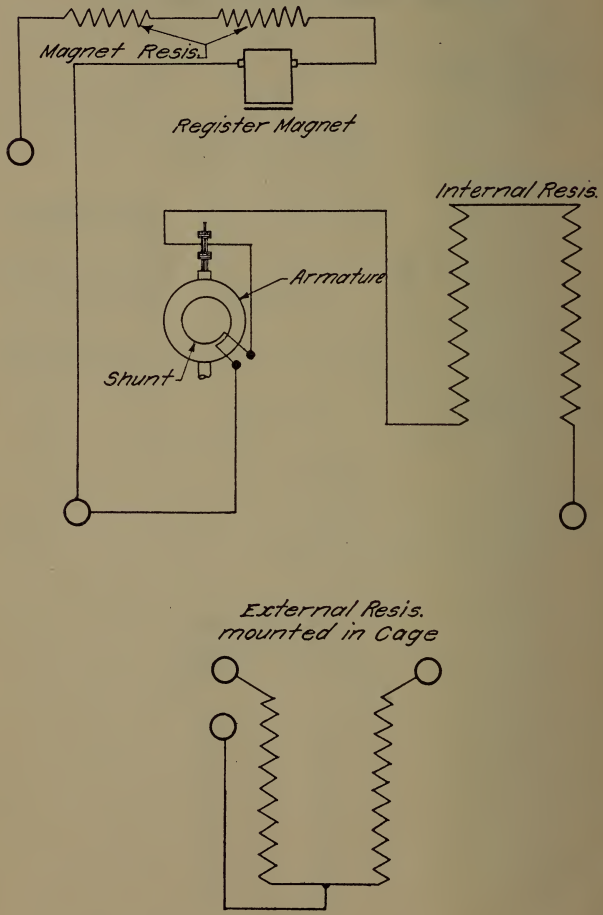


Fig. 333

INTERNAL POTENTIAL CONNECTIONS OF TYPE CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

100 to 120 and 200 to 240 Volts

VIEWED FROM FRONT AND TOP

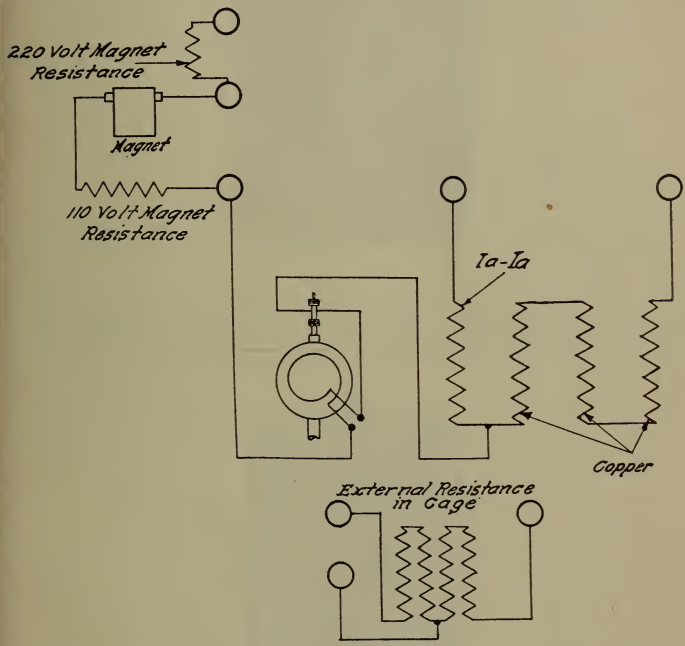


Fig. 334

CONSTANT DATA FOR TYPES CB, CB-2, CB-3 AND CB-4 THOMSON DIRECT CURRENT PORTABLE TEST METERS

Capacities 1 to 100 Amps., 100 to 120, 200 to 240 Volts

Amperes	VOLTS	
	100–120	200–240
	Constants	
1	.05	.1
2	.1	.2
5	.25	.5
10	.5	1.
20	1.	2.
40	2.	4.
50	2.5	5.
100	5.	10.

One revolution of large pointer corresponds to one revolution of the meter disk.

TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATOR

Fig. 335

INTERIOR VIEW OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATOR

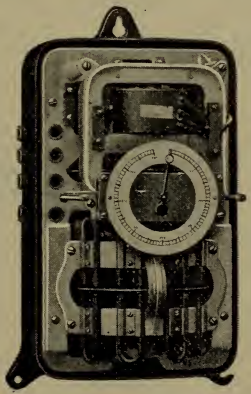


Fig. 336

DIMENSIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

3 to 25 Amps., 25 to 140 Cycles, With and Without Transformers

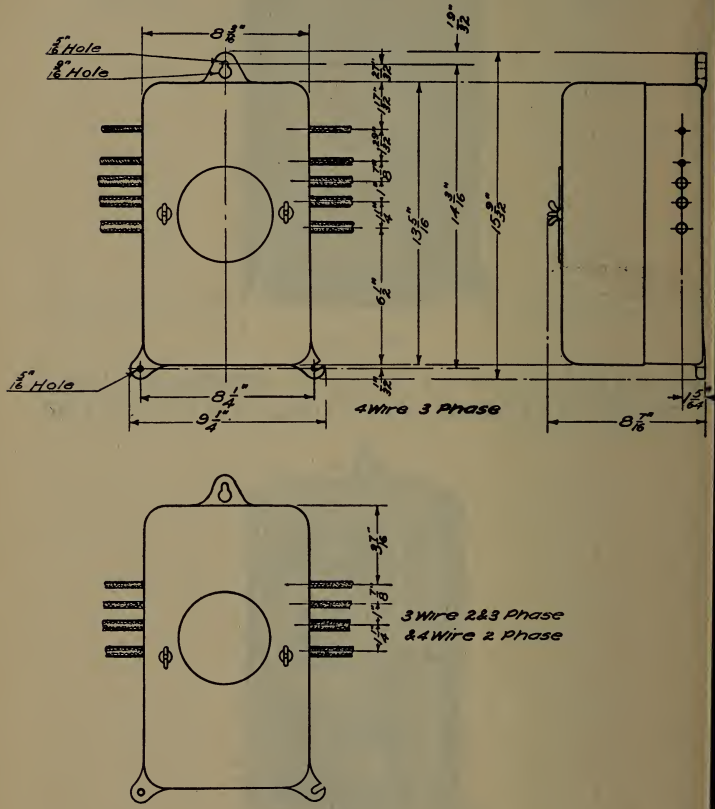


Fig. 337

DIMENSIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

50 to 75 Amps., 25 to 140 Cycles. All Circuits Except 4-Wire 3-Phase* With and Without Transformers

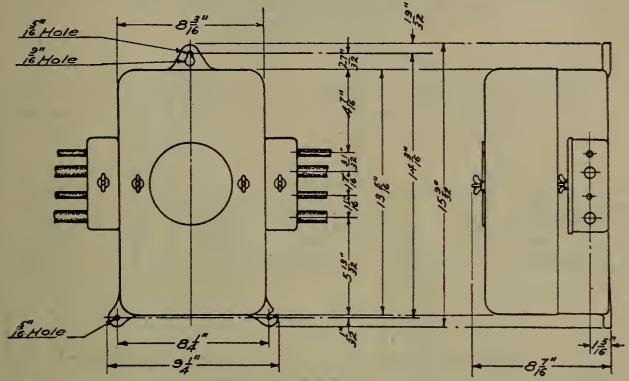


Fig. 338

*4 wire 3-phase indicators made self-contained up to 25 amp. only.

DIMENSIONS OF TYPE W THOMSON POLY-PHASE MAXIMUM WATT DEMAND INDICATORS

100 to 150 Amps., 25 to 140 Cycles and Above. All Circuits Except 4-Wire 3-Phase* With and Without Transformers

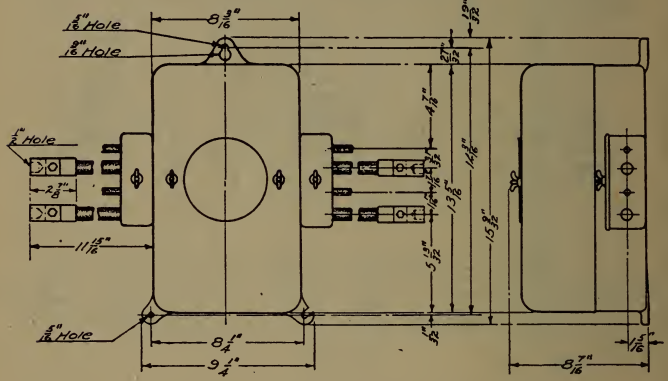


Fig. 339

*4-wire 3-phase indicators made self-contained up to 25 amperes only.

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

3 to 25 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 3-Wire, 2 and 3-Phase and Monocyclic Circuits, Without Transformers

FRONT VIEW

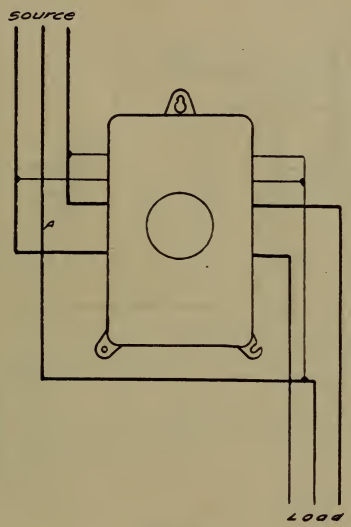


Fig. 340

NOTE.—On 3-wire 2-phase circuits wire "A" should be the common return.

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

50 to 150 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 3-Wire, 2- and 3-Phase and Monocyclic Circuits, Without Transformers

FRONT VIEW

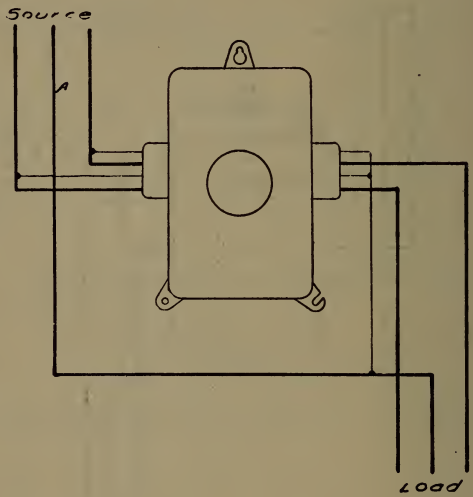


Fig. 341

NOTE.—On 3-wire 2-phase circuits wire "A" should be the common return.

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

Above 150 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 3-Wire, 2- and 3-Phase and Monocyclic Circuits, With Current Transformers

FRONT VIEW

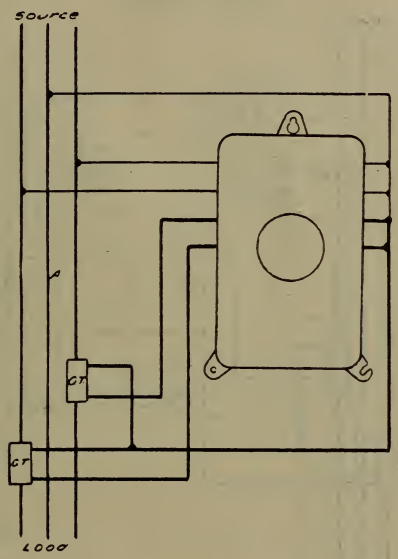


Fig. 342

NOTE.—On 3-wire 2-phase circuits wire "A" should be the common return.

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

Above 650 Volts, 25 to 140 Cycles, 3-Wire, 2- and 3-Phase and Monocyclic Circuits, With Current and Potential Transformers

FRONT VIEW

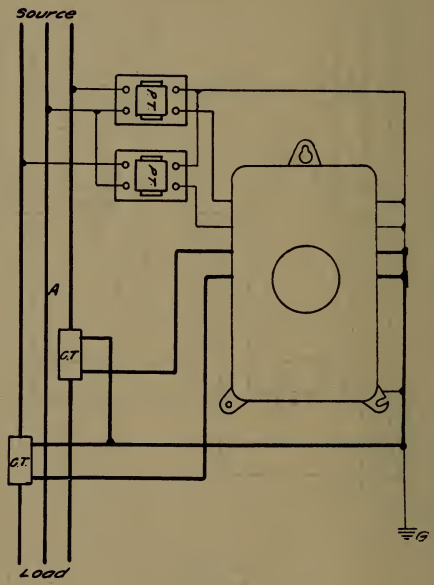


Fig. 343

NOTE.—On 3-wire 2-phase circuits wire "A" should be the common return.

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

3 to 25 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to to 140 Cycles, 4-Wire, 2-Phase Circuits, Without Transformers

FRONT VIEW

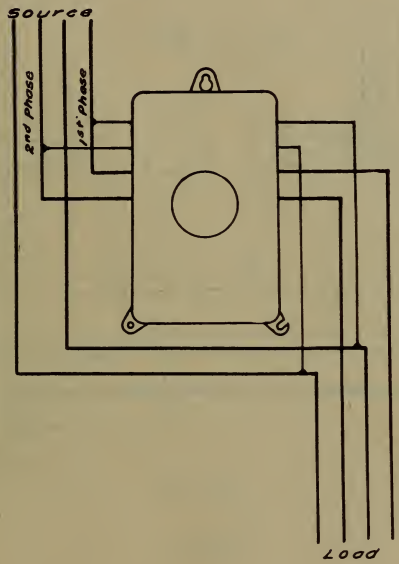


Fig. 344

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

50 to 150 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 4-Wire, 2-Phase Circuits, Without Transformers

FRONT VIEW

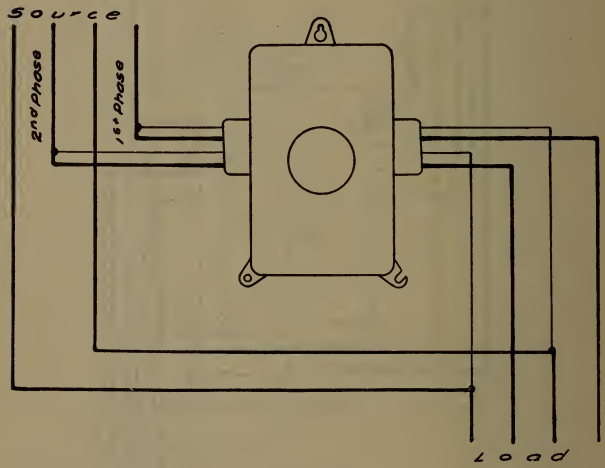


Fig. 345

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

Above 150 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 4-Wire, 2-Phase Circuits, With Current Transformers

FRONT VIEW

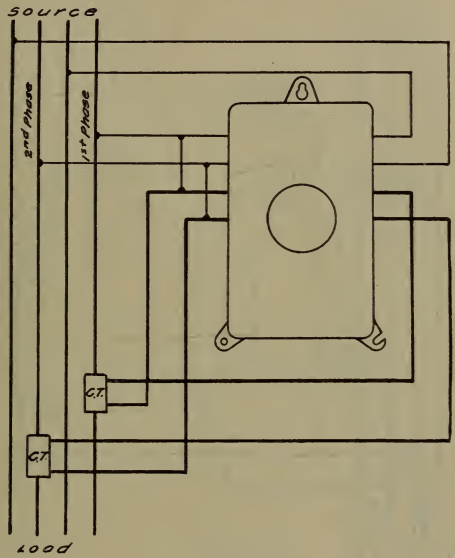


Fig. 346

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

Above 650 Volts, 25 to 140 Cycles, 4-Wire, 2-Phase Circuits, With Current and Potential Transformers

FRONT VIEW

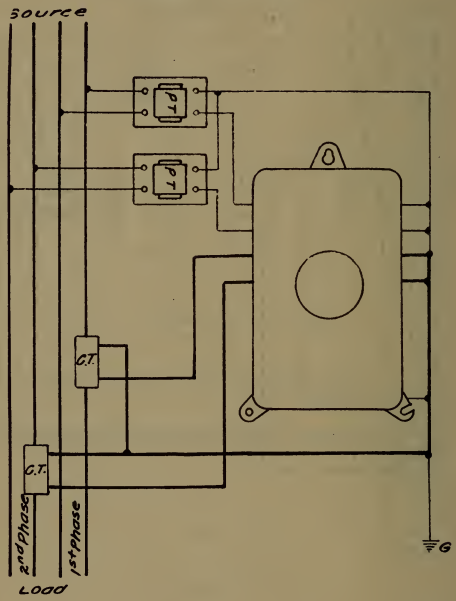


Fig. 347

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

3 to 25 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 4-Wire, 3-Phase Circuits, Without Transformers

FRONT VIEW

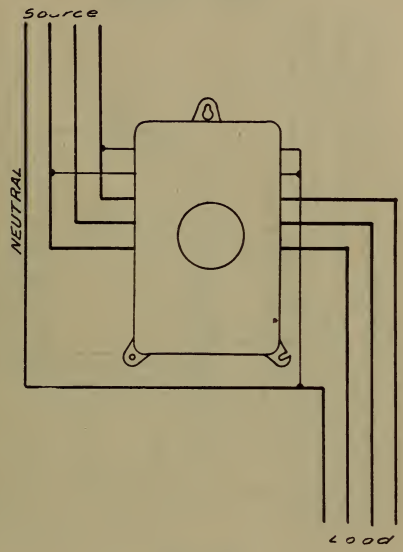


Fig. 348

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

Above 25 Amps., 212 to 240, 400 to 480, 500 to 600 Volts, 25 to 140 Cycles, 4-Wire, 3-Phase Circuits, With Current Transformers

FRONT VIEW

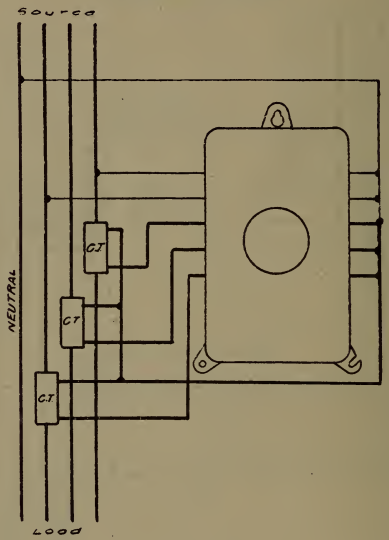


Fig. 349

EXTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

Above 650 Volts, 25 to 140 Cycles, 4-Wire 3-Phase Circuits, With Current and Potential Transformers

FRONT VIEW

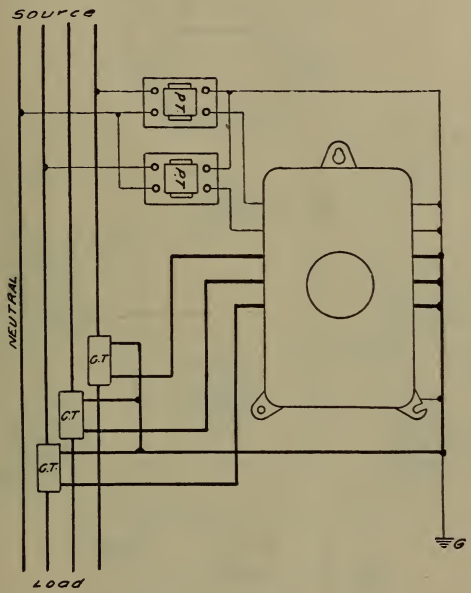


Fig. 350

INTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

5 to 150 Amps., 25 to 140 Cycles. All Circuits Except 4-Wire, 3-Phase, With and Without Transformers

BACK VIEW

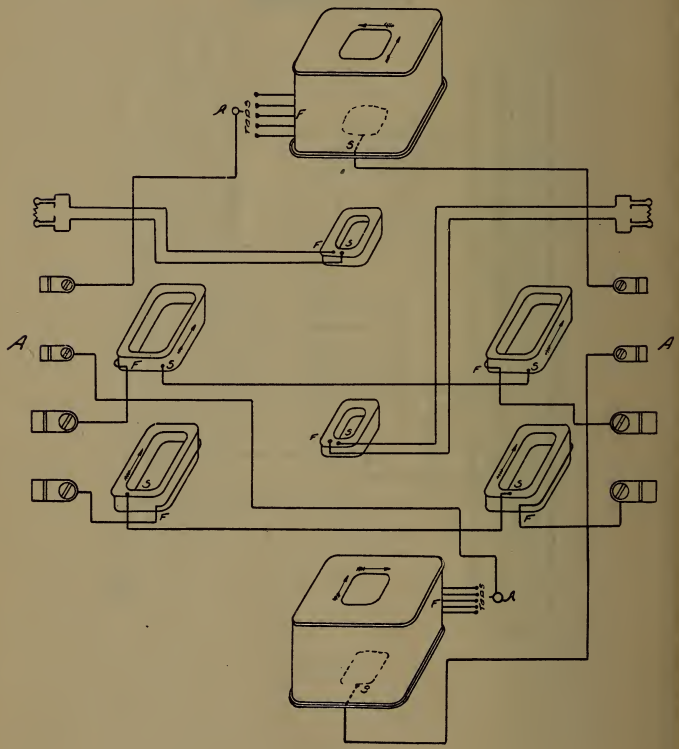


Fig. 351

NOTE.—On 50 to 150 amp. potential posts marked "A" are located between current posts.

NOTE.—The lead marked "A" will be soldered to that tap which gives the best results in the test.

INTERNAL CONNECTIONS OF TYPE W THOMSON POLYPHASE MAXIMUM WATT DEMAND INDICATORS

5 to 25 Amps., 25 to 140 Cycles, 4-Wire 3-Phase Circuits, With and Without Transformers

BACK VIEW

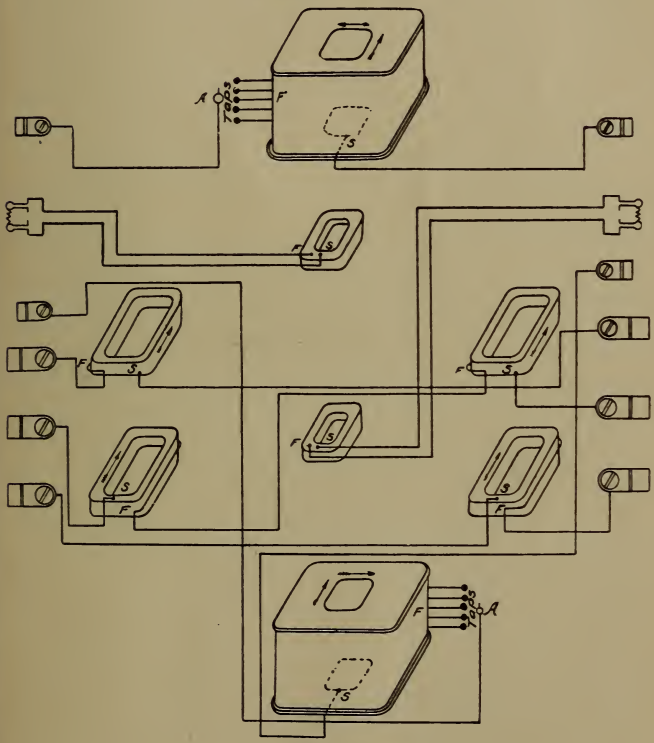


Fig. 352

NOTE.—The lead marked "A" will be soldered to that tap which gives the best results in test.

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