INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

"D" LINE WATTHOUR METER CALIBRATION INFORMATION

INTRODUCTION

This leaflet is intended to give specific instructions for the calibration of Westinghouse watthour meters.* Part I of this leaflet contains a very detailed description of the calibration and testing of single-phase socket type meters. The basic methods described in this part are applicable to all meter testing. Slight modification is necessary in applying these methods to other types of meters. Part II contains suggested calibration procedures for all types of singlephase and polyphase meters.

PART I – TESTING TYPE DS SINGLE-PHASE METER

FIELD TESTING OF 3-WIRE METERS

A. Equipment

1. Portable rotating standard.
2. Test jack. (Suggested Westinghouse S#838800.)
3. Portable phantom load box.

B. Procedure

Break seal and remove meter from socket. Brush off any excessive dirt on glass cover that may fall into meter when cover is removed. Remove seal on back of meter in order to remove glass cover. NOTE: "As found" check may be made before cover is removed.

Open the potential disconnect link on the rear of the base plate.

CAUTION After opening the disconnect link, tighten the screw to make certain that the link remains open throughout the duration of the test. After test has been completed, close link and tighten in this position.

Check that the ratio stamped on the front of the register dial plate is correct for the meter rating as shown in Table 1.

Connect standard and phantom load to the test jack as shown in Fig. 1. Make sure the voltage switches on both the standard and the phantom load are set at the proper rating and that the current leads are connected to the terminals on the standard corresponding to the rating of the meter being tested.

* General information on meter testing is given in the "Electrical Metermen's Handbook" published by Edison Electric Institute.

TABLE I

Register Ratio (R_r) and Watthour Constants (K_h)

Volts	Amps	Wire	R_r	K_h
120	2 1/2	2	333 1/3 +	0.3
120	15	2	55 5/9	1.8
240	2 1/2	3	166 2/3 +	0.6
240	15	3	27 7/9 (or 277 7/9 mult. 10)	3.6
240	30	3	13 8/9 (or 138 8/9 mult. 10)	7.2

Plug meter into the front of the test jack, tighten the set screws, and then plug this whole assembly into the customer's socket.

CAUTION Plug the meter into the test jack before plugging the jack into the socket – a safety precaution.

C. Order of Test

This is the suggested order of test. For details of each step see paragraphs below.

1. Check full-load point for "as-found" value.
2. Check light-load point for "as-found" value.
3. Adjust full-load point.
4. Adjust light-load point.
5. Recheck full-load point.

D. Detailed Instructions

1. Check the full-load point. This is done by comparing the rotation of the meter with the rotation of the standard. The standard is an extremely accurate meter with current and voltage coils of different

+ Secondary rated transformer type meter only.

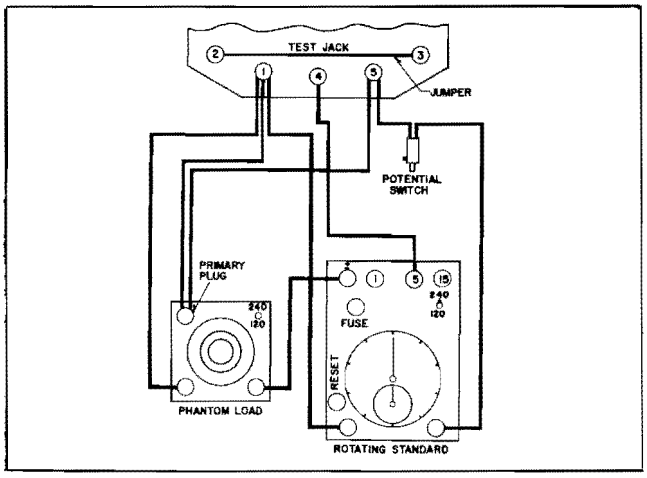

Fig. 1. Connections for Field Testing of 3-Wire Meters

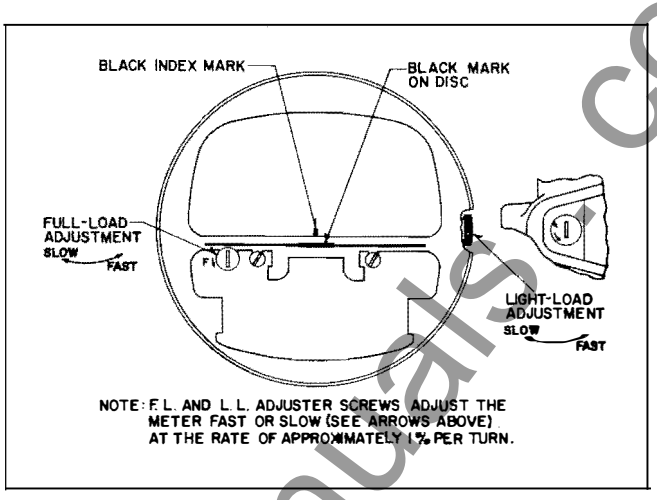

Fig. 2. Single-Phase Meter Adjustment

ratings. Select the current coil and the voltage coil equal (or nearest) to those shown on the nameplate of the meter under test. Revolutions of the meter disc should be compared to corresponding standard revolutions (checked according to the table of constants located in the lid.) The resulting percentage of meter revolutions to equivalent standard revolutions is expressed as meter accuracy.

$$\frac{\text{Meter Rev.} \times K_h \text{ of Meter} \times 100}{\text{Std. Rev.} \times K_h \text{ of Std.}} = \% \text{ Meter Acc.}$$

Any difference represents an error. If the standard used has no current coil rated above 15 amperes, 30 ampere meters may be checked at full load on the 15 ampere coil.

Set the phantom load at full-load (2 1/2 amperes if testing a 2 1/2 ampere meter, 15 amperes if testing a 15 ampere meter, 30 amperes if testing a 30 ampere meter). Note that the meter disc and the standard pointer are rotating in the correct direction. If either the meter, or both the meter and the standard are rotating incorrectly, reverse the voltage plug to the phantom load. If only the standard is rotating incorrectly, reverse its voltage leads. The discs of both meters should turn in the same direction. Before making any test run, replace the glass cover on the meter.

Open the potential switch which stops the rotation of the standard. Reset the pointer to zero. Note the black mark on the edge of the meter disc, and watch it as it passes under the black index mark on the dial plate. When ready to start the test run, close the potential switch, starting the standard at the instant that the black mark passes the index. A recommended count of at least ten revolutions of the disc should be made by stopping the standard as the black mark on the disc passes under the index at the end of the tenth revolution. Observe the position of the standard pointer. The percent accuracy of the meter at full load can be determined by comparison of meter to portable revolutions (observing correct constants).

The calibration of the standard (as given on the card in the lid) will not affect those readings to any extent.

Record the "as-found" value at full load. Repeat the test run several times, resetting the standard each time, in order to make sure of consistent readings.

2. Check the light-load point. Since light-load equals 10% of full-load, the phantom load should be set to a corresponding value (1/4 ampere for a 2 1/2 ampere meter, 1 1/2 amperes for a 15 ampere meter, 3 amperes for a 30 ampere meter). On account of the longer time required for each disc revolution with only light-load applied, it is customary to make a run of only one or two revolutions of the meter. It is recommended that in testing the light-load point on the 2 1/2 and 15 ampere meters, that the one ampere coil of the standard be used. In testing light-load on a 30 ampere meter, use of the 5 ampere coil is advised. Percent meter accuracy is determined similar to the method described for the full load test.

Record the "as-found" value at light-load. Repeat the test run several times, resetting the standard each time, in order to be sure of consistent readings.

3. If the meter "as-found" is outside the limits at full-load, make a full-load adjustment (See Fig. 2) and make another test. Repeat until the meter is within limits at the full-load point.

4. If the meter "as-found" is outside the limits at

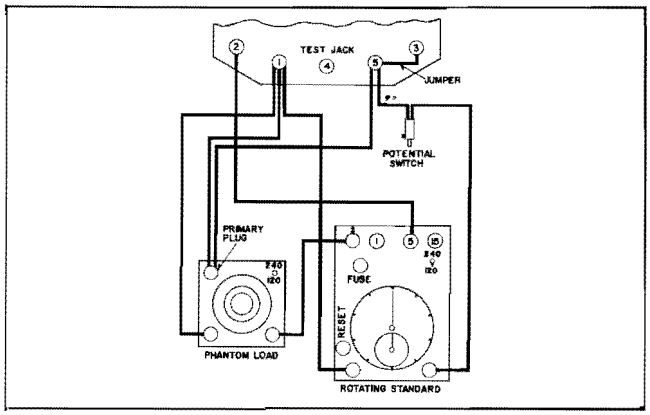

Fig. 3. Connections for Field Testing of 2-Wire Meters

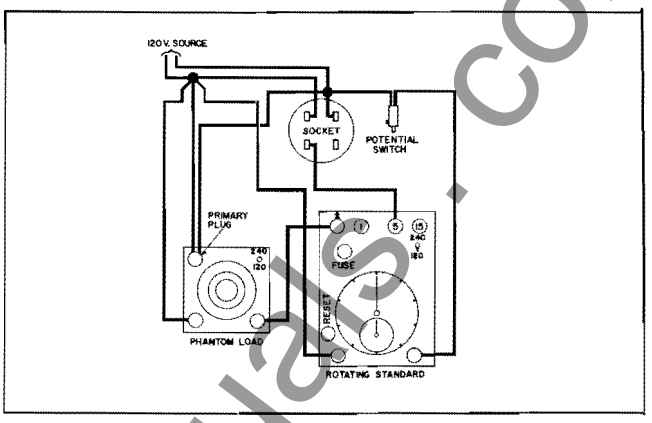

Fig. 4. Connections for Shop Testing of 2-Wire Meters

light-load, make a light-load adjustment (See Fig. 2) and make another test. Repeat until the meter is within limits.

5. If adjustments were made in (4) recheck the full-load point.

FIELD TESTING OF 2-WIRE METERS

A. Equipment

1. Portable rotating standard.
2. Test jack. (Suggested Westinghouse S#838800)
3. Portable phantom load box.

B. Procedure

Break seal and remove meter from socket. Brush off any excessive dirt on glass cover that may fall into meter when cover is removed. Remove seal on back of meter in order to remove glass cover.

Connect standard and phantom load to the test jack as shown in Fig. 3.

From this point on, the procedure is the same as that described for the field testing of single phase 3-wire meters.

SHOP TESTING OF 2-WIRE AND 3-WIRE METERS

The procedure for shop testing is similar to that used in field testing except that a permanently installed socket or similar device may be used instead of a test jack. Figs. 4 and 5 show the connections used in making these tests with sockets. As indicated, it is necessary to make a connection to the opened disconnect link in testing 3-wire meters. The test procedure is the same as that outlined for field testing.

In addition, power factor calibration may be checked. This requires additional test equipment, either an inductive load capable of providing a 100% rated current at 50% power factor or a phase shifting device that will shift the voltage by 60°. The power factor adjustment is pre-set at the factory and is to be observed, only, for within limits accuracy.

PART II – GENERAL CALIBRATION PROCEDURES

General

The following order of tests is laid out so the effect of each adjustment on the others is minimized. Following the suggested order will avoid repetition and save time. The various instruction leaflets accompanying individual types of meters show connections and explain the mechanisms for making the adjustments. The meter nameplates give the ratings and constants.

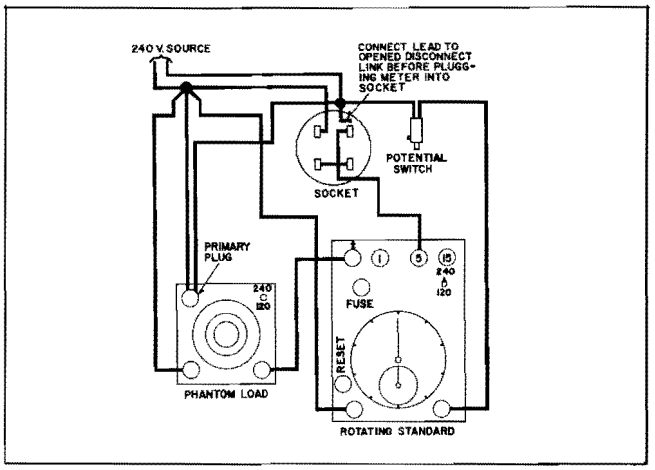

Fig. 5. Connections for Shop Testing of 3-Wire Meters

SINGLE-PHASE METERS

All Westinghouse 2 and 3 wire single-phase meters.

NOTE 1. All Westinghouse DS single-phase meters operate at 16-2/3 rpm when energized at nameplate ratings.*
2. Check 3-wire meters with current windings in series.

1. Apply 100% load (nameplate ratings) at unity power factor. Adjust to 100% registration by means of the permanent magnet adjustment.

2. Apply 10% load at unity power factor. Adjust to 100% registration by means of the light load adjuster.

3. Recheck 100% load, unity power factor and reset permanent magnet adjustment if necessary.

4. If adjustment was required under (3) recheck 10% load and readjust, if necessary, by means of the light load adjuster.

5. Apply 100% load at 50% power factor (lagging), and observe results.

* The 2-3 wire convertible meter operates at 8 1/3 rpm when connected for 120 volts, 2-wire service. When connected for 240 volt, 3-wire service it operates at 16 2/3 rpm.

All DSW demand single phase meters (with RWD or RWD-2 registers) operate at 15 rpm. when energized at nameplate ratings.

POLYPHASE METERS

All polyphase meters designated as DSP-2, DS-5, DSP-7, DSP-8, DAP-2, DA-5, DAP-7, and DAP-8 may be calibrated by the following procedure:

1. All meters are to be tested on single phase power. Voltage coils are to be connected in parallel with voltage applied to both coils during entire calibration procedure. Combined stator single phase test speed at rated voltage, and rated current for -2, -5, and -7 is 16 2/3 R.P.M. The -8 meter has a single phase test speed of 22 2/9 R.P.M.

2. Combined Stator Operation

Connect all current coils in series. See pages 5 to 9 for proper wiring.

a. Observe full load and light load readings.

(1) Calibrate light load to full load, e.g. if full load reading is 102% calibrate light-load to 102%.

3. Left Stator Operation

Connect left stator current coils in series, leave right stator current coils open. For the -8 meter connect only 1/2 left stator current coil. See pages 5 to 9 for proper wiring.

a. Calibrate full load unity P.F. to 100% by use of the full load adjuster.

b. Observe 50% lagging P.F. (Fixed factory-adjustment)+

4. Right Stator Operation

Connect right stator current coil and leave left stator current coils open. For the 8 meter connect only 1/2 right stator current coil. (See pages 5 to 9 for proper wiring).

a. Calibrate full load unity P.F. to 100% by means of the phase balancer (torque balancer).

b. Observe 50% lagging power factor (Fixed factory adjustment).+

5. Combined Stator Operation

Connect current coils in series. See pages 5 to 9 for proper wiring.

a. Observe full load unity P.F., light-load unity P.F., and 50% lagging P.F. (Fixed factory adjustment)*

b. Make minor correction on light load and full load unity power factor, if necessary.

+ On transformer type meters 50% lagging P.F. may be field adjusted, if desired, by means of a vernier P.F. loop. This loop is located at the rear of each current section.

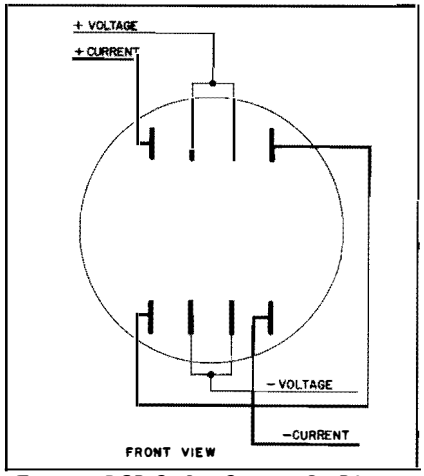

Fig. 6. DSP-2 1, 2, or 3 Phase, 3 Wire, Self-contained and Transformer type, Combined Stator Test.

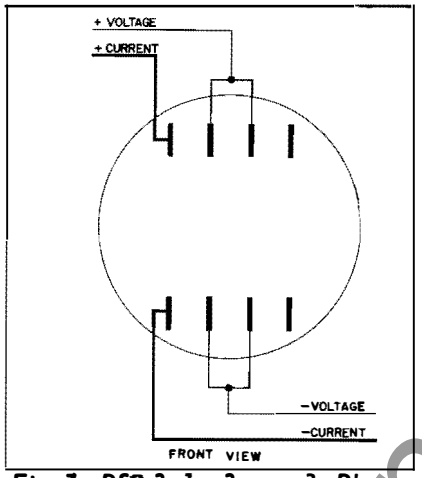

Fig. 7. DSP-2 1, 2, or 3 Phase, 3 Wire, Self-contained and Transformer type, Left Stator Test.

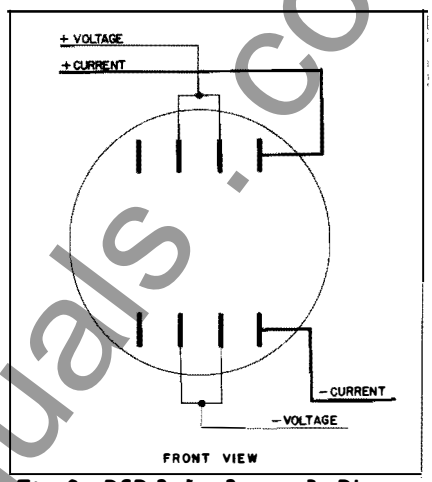

Fig. 8. DSP-2 1, 2, or 3 Phase, 3 Wire, Self-contained and Transformer type, Right Stator Test.

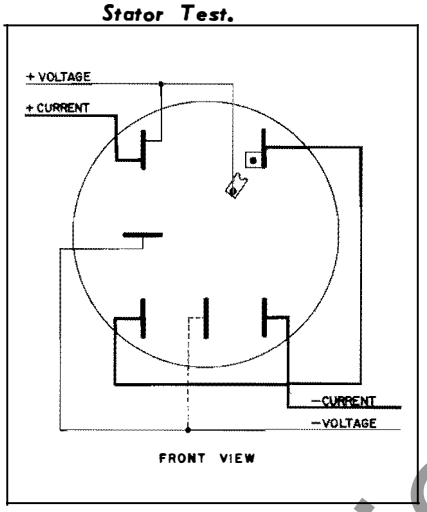

Fig. 9. DS-5 1, 2, or 3 Phase, 3 Wire, Self-contained, Combined Stator Test.

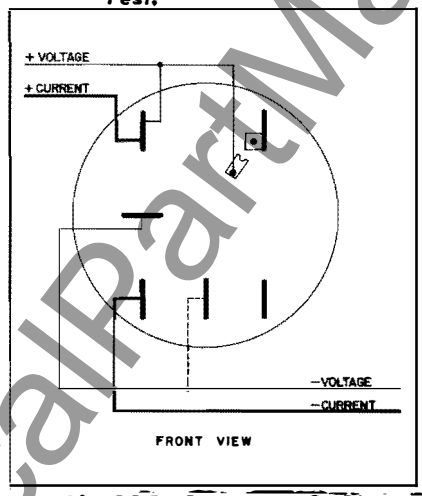

Fig. 10. DS-5 1, 2, or 3 Phase, 3 Wire, Self-contained, Left Stator Test.

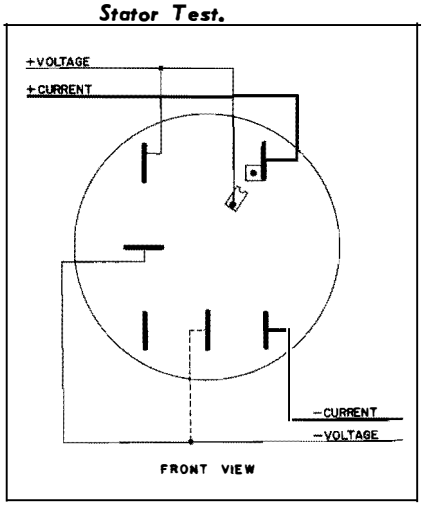

Fig. 11. DS-5 1, 2, or 3 Phase, 3 Wire, Self-Contained, Right Stator Test.

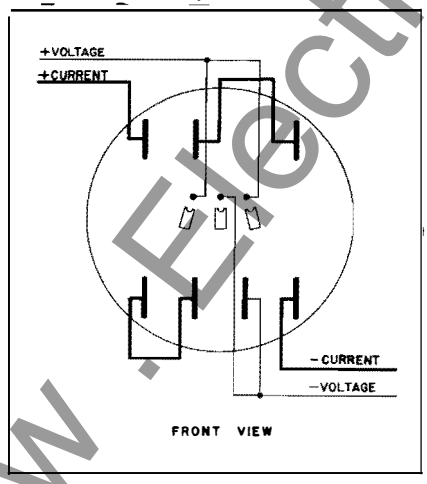

Fig. 12. DSP-7 3 Phase, 4 Wire, Self-Contained, Combined Stator Test.

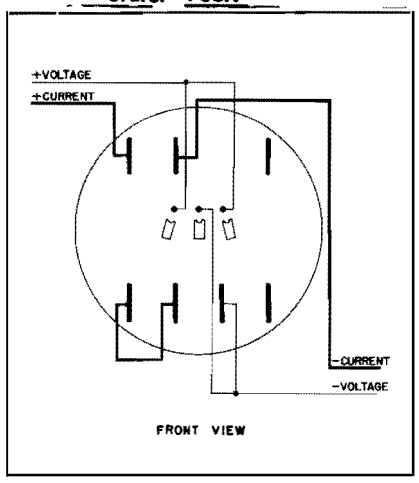

Fig. 13. DSP-7 3 Phase, 4 Wire, Self-Contained, Left Stator Test.

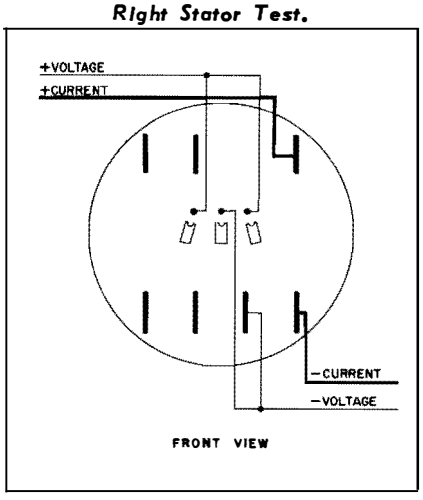

Fig. 14. DSP-7 3 Phase, 4 Wire, Self-Contained, Right Stator Test.

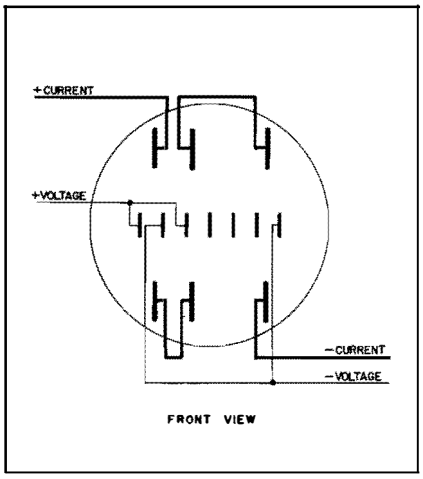

Fig. 15. DSP-7 3 Phase, 4 Wire, Transformer Type, Combined Stator Test.

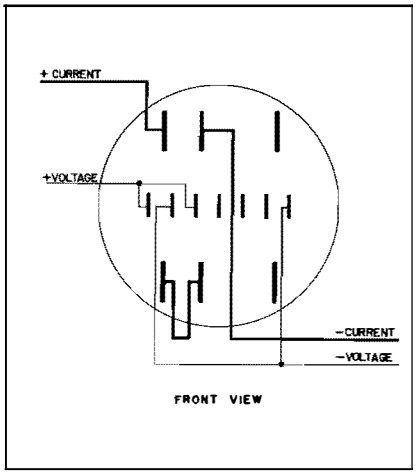

Fig. 16. DSP-7 3 Phase, 4 Wire, Transformer Type, Left Stator Test.

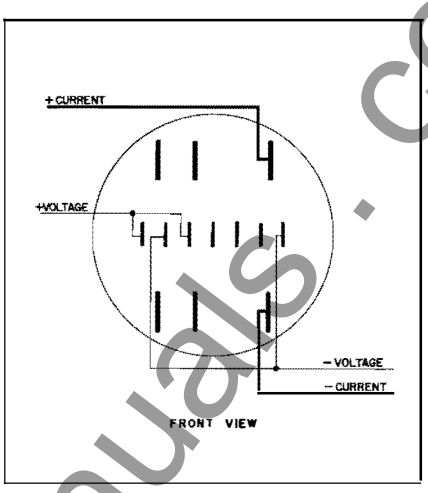

Fig. 17. DSP-7 3 Phase, 4 Wire, Transformer Type, Right Stator Test.

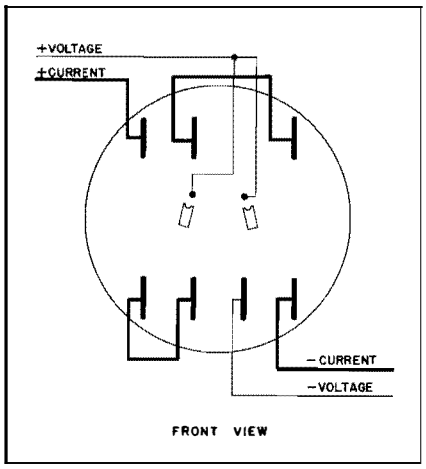

Fig. 18. DSP-8 3 Phase, 4 Wire, Self-Contained, Combined Stator Test.

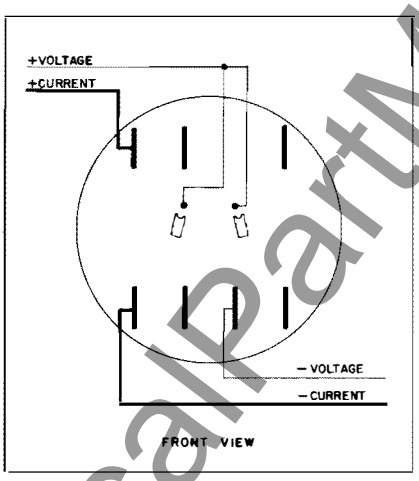

Fig. 19. DSP-8 3 Phase, 4 Wire, Self-Contained, Left Stator Test.

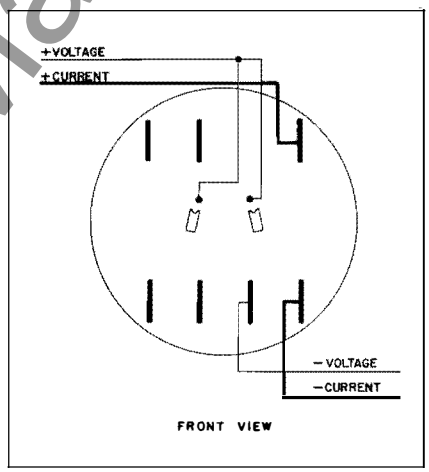

Fig. 20. DSP-8 3 Phase, 4 Wire, Self-Contained, Right Stator Test.

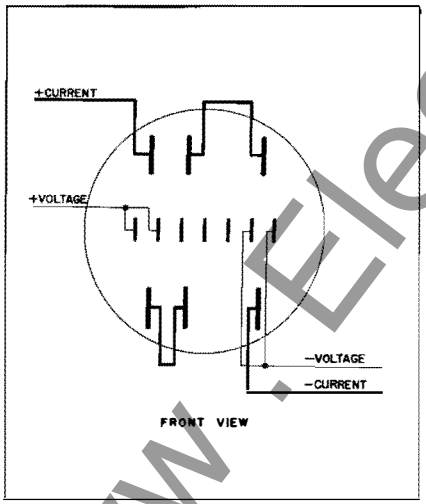

Fig. 21. DSP-8 3 Phase, 4 Wire, Transformer Type, Combined Stator Test.

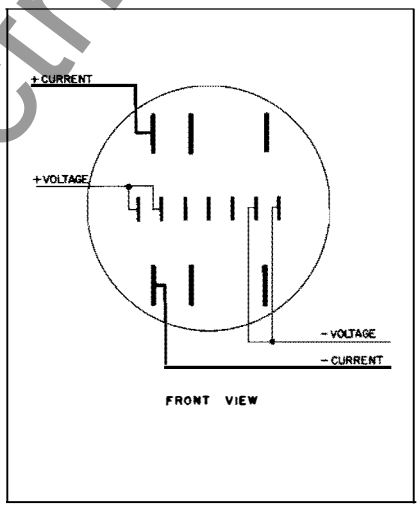

Fig. 22. DSP-8 3 Phase, 4 Wire, Transformer Type, Left Stator Test.

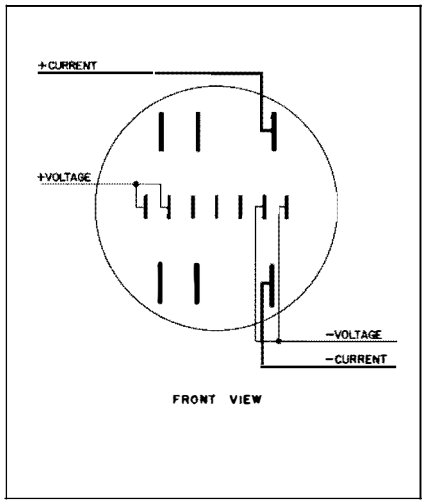

Fig. 23. DSP-8 3 Phase, 4 Wire, Transformer Type, Right Stator Test.

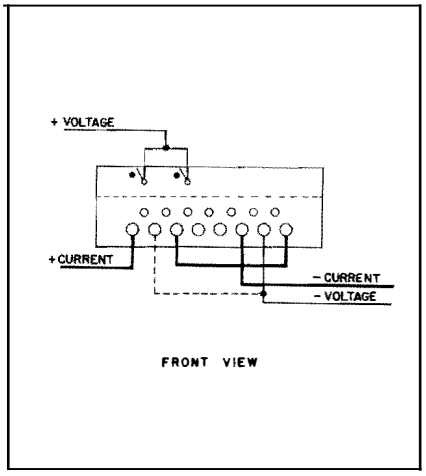

Fig. 24. DAP-2 1, 2, or 3 Phase, 3 Wire, Self-Contained, Combined Stator Test.

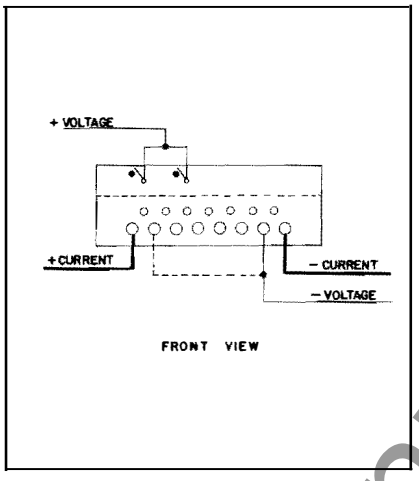

Fig. 25. DAP-2 1, 2, or 3 Phase, 3 Wire, Self-Contained, Left Stator Test.

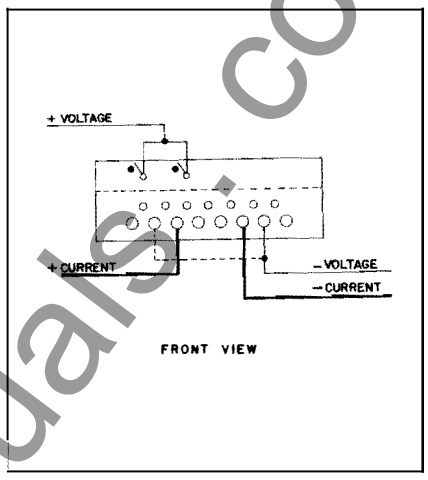

Fig. 26. DAP-2 1, 2, or 3 Phase, 3 Wire, Self-Contained, Right Stator Test.

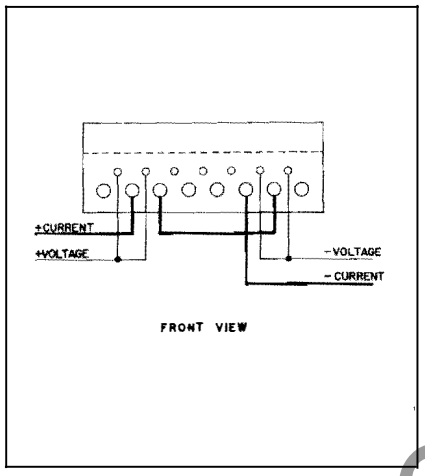

Fig. 27. DAP-2 1, 2, or 3 Phase, 3 Wire, Transformer Type, Combined Stator Test.

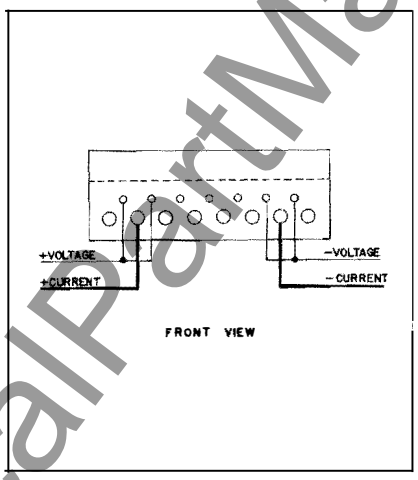

Fig. 28. DAP-2 1, 2, or 3 Phase, 3 Wire, Transformer Type, Left Stator Test.

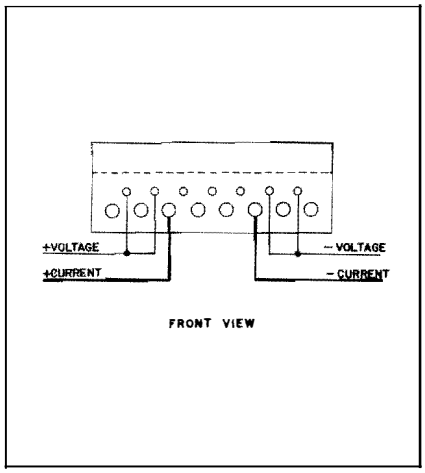

Fig. 29. DAP-2 1, 2, or 3 Phase, 3 Wire, Transformer Type, Right Stator Test.

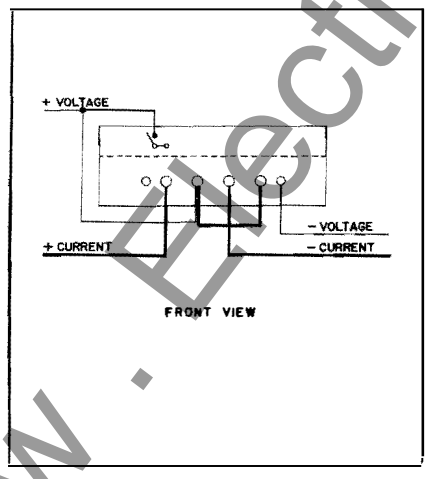

Fig. 30. DA-5 1, 2, or 3 Phase, 3 Wire, Self-Contained, Combined Stator Test.

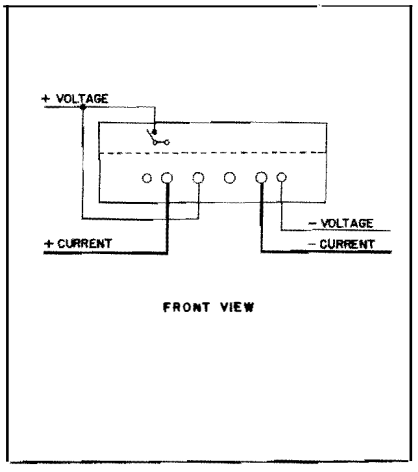

Fig. 31. DA-5 1, 2, or 3 Phase, 3 Wire, Self-Contained, Left Stator Test.

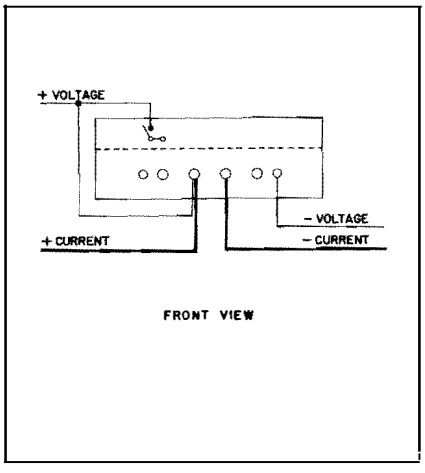

Fig. 32. DA-5 1, 2, or 3 Phase, 3 Wire, Self-Contained, Right Stator Test.

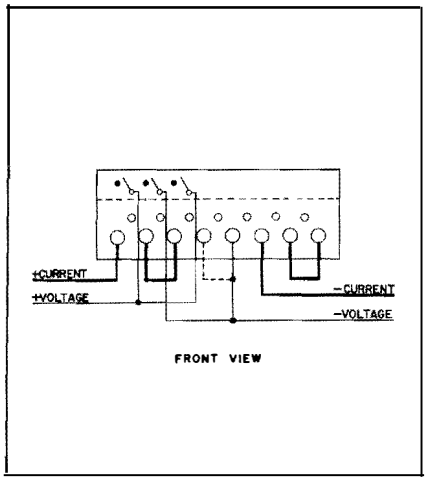

Fig. 33. DAP-7 3 Phase, 4 Wire, Self-Contained, Combined Stator Test.

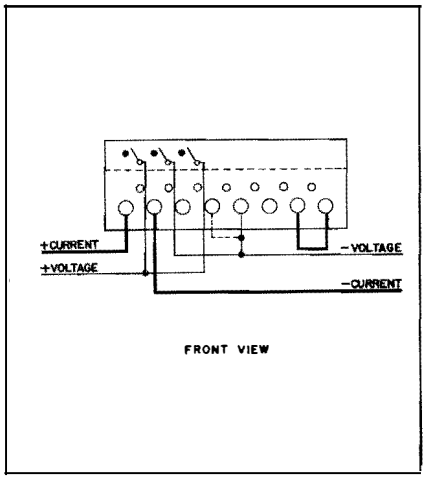

Fig. 34. DAP-7 3 Phase, 4 Wire, Self-Contained, Left Stator Test.

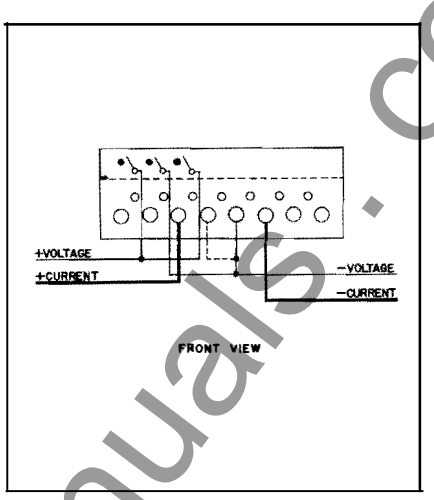

Fig. 35. DAP-7 3 Phase, 4 Wire, Self-Contained, Right Stator Test.

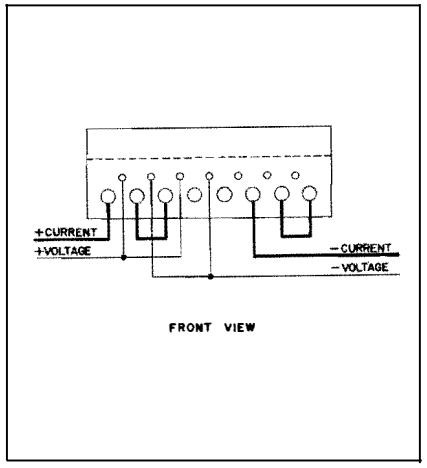

Fig. 36. DAP-7 3 Phase, 4 Wire, Transformer Type, Combined Stator Test.

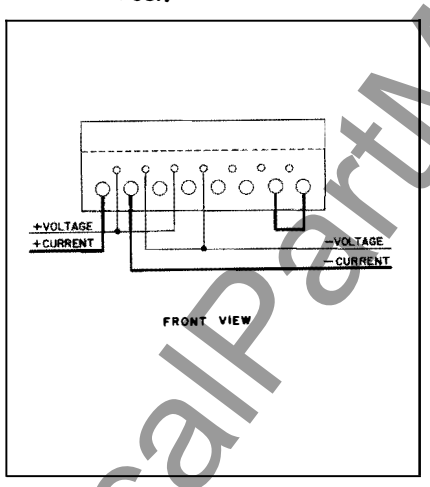

Fig. 37. DAP-7 3 Phase, 4 Wire, Transformer Type, Left Stator Test.

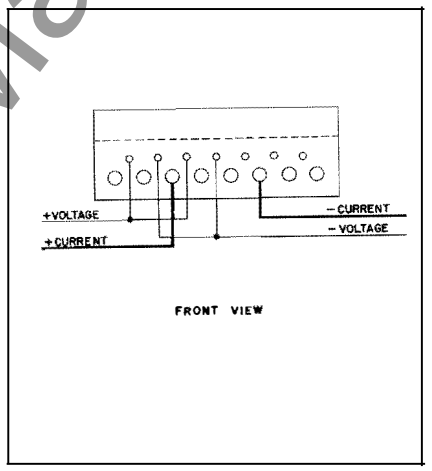

Fig. 38. DAP-7 3 Phase, 4 Wire, Transformer Type, Right Stator Test.

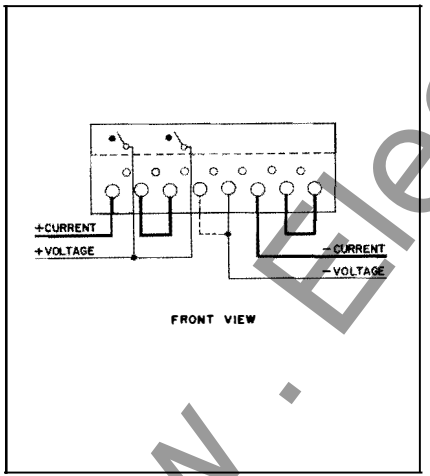

Fig. 39. DAP-8 3 Phase, 4 Wire, Self-Contained, Combined Stator Test.

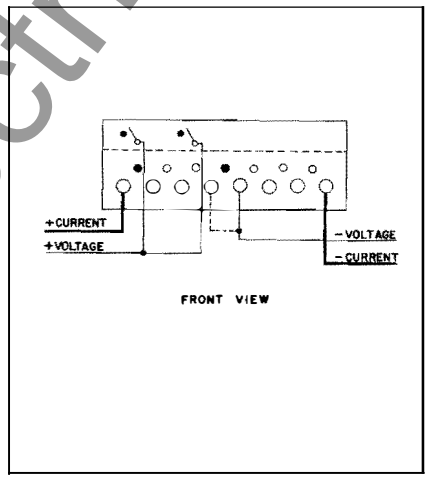

Fig. 40. DAP-8 3 Phase, 4 Wire, Self-Contained, Left Stator Test.

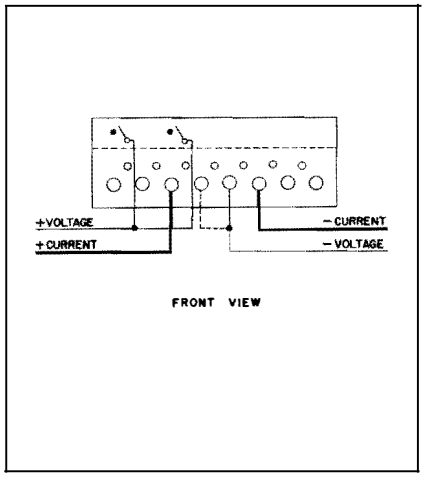

Fig. 41. DAP-8 3 Phase, 4 Wire, Self-Contained, Right Stator Test.

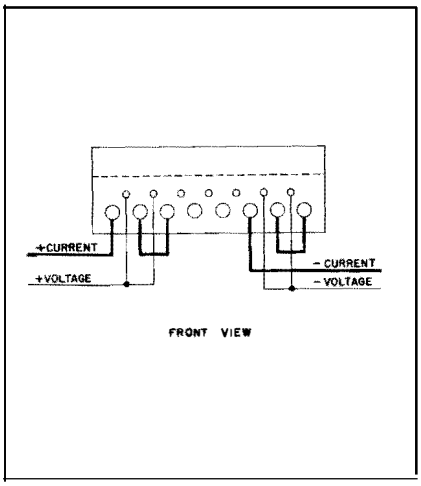

Fig. 42. DAP-8 3 Phase, 4 Wire, Transformer Type, Combined Stator Test.

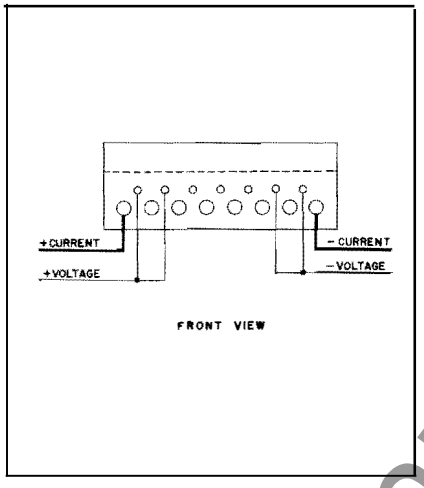

Fig. 43. DAP-8 3 Phase, 4 Wire, Transformer Type, Left Stator Test.

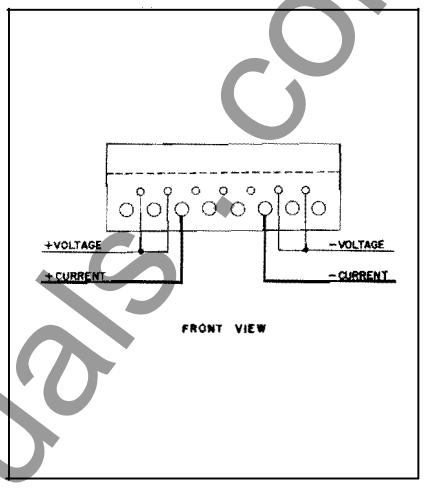

Fig. 44. DAP-8 3 Phase, 4 Wire, Transformer Type, Right Stator Test.

WESTINGHOUSE ELECTRIC CORPORATION

METER DEPARTMENT **RALEIGH, N. C.**

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INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

POLYPHASE AND NETWORK WATTHOUR METERS

TWO STATOR TYPES D2A-2, D2A-5, D2A-7, & D2A-8

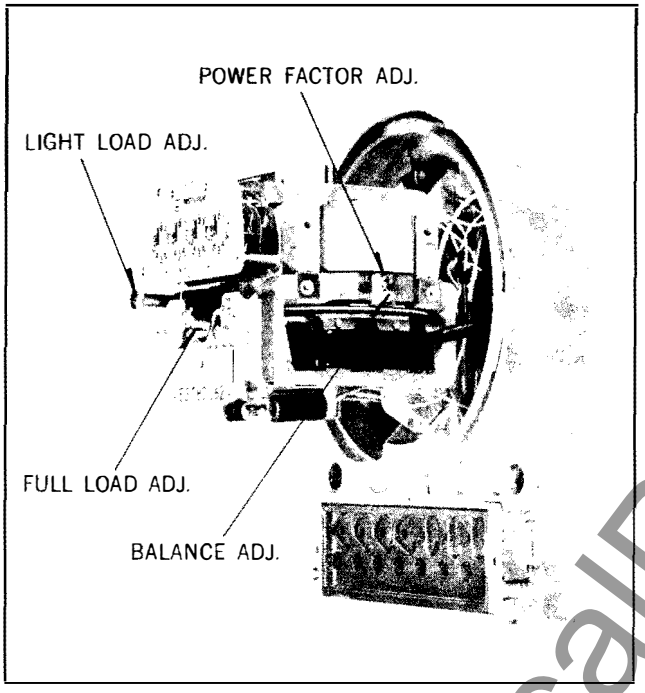


Fig. 1. Type D2A Polyphase

APPLICATION CHART

METER TYPE	CIRCUIT APPLICATION
D2A-2	2, OR 3 PHASE, 3 WIRE * 3 PHASE, 4 WIRE DELTA * 3 PHASE, 4 WIRE WYE
D2A-5	2 OR 3 PHASE, 3 WIRE
D2A-7 D2A-8	3 PHASE, 4 WIRE DELTA 3 PHASE, 4 WIRE WYE

* Transformer Type Only

INSTALLATION

All polyphase watthour meters are ground tested and calibrated before shipment. Inspect meters for damage during shipment. If desired, check calibration. Before installation, check that the voltage disconnect links are closed, the hanger is in place and the socket is accurately wired (see pages 3 and 4).

GENERAL

The exclusive Magnethrust rotor bearing system is featured in the D2 two-stator polyphase meters.

A number 43 potential indicating lamp is used on meters with serial number 52,880,000 and above. Previously a number 49 lamp was used.

Registers should be reset by turning the split pointers. Proper mesh (requiring no adjustment) between register, transfer gearing, and rotor shaft is assured by close tolerances and precision machining.

The transfer gearing does not change the register ratio but simply enables all single phase and polyphase meters to use the same registers (clock, cyclometer, and Mark series demand). The transfer gearing is designed with plastic bearings and dry lubrication to insure negligible low load friction.

Reverse rotation of the meter disk can be prevented by adding a detent with a pawl that operates against the die cast ratchet on the disk hub. Figure 13 shows the location of a detent on the transfer gearing for proper assembly. When reassembling the transfer gearing to the front frame, the two mounting screws should be turned until the shoulder on each screw locates the assembly loosely in place. The screw in the round hole on the left adapter mounting flange should be tightened before the screw in the oblong hole.

CALIBRATION ADJUSTMENTS

Four adjustments (full load, light load, power factor, and phase balance) are provided for calibration. Direction of adjustment is shown by an arrow and the letter "F" (indicating fast) on the nameplate and the balance adjuster bracket.

FULL LOAD

The Full Load (F.L.) adjuster screw is located on the front of the meter. Sensitivity is 0.5 percent per turn.

LIGHT LOAD

The Light Load (L.L.) adjuster screw is located on the left stator on the front of the meter. Sensitivity is 1.0 percent per turn.

POWER FACTOR (Lag Adjuster)

The Power Factor (P.F.) adjuster screw is located on the balance bracket on both stators. Adjustment is made by simply turning the screw. Sensitivity is 0.5 percent per turn. There are no pigtails or notched lag plates.

PHASE BALANCE

The Phase Balance (BAL.) adjuster screw is located on the balance bracket on the right stator. Sensitivity is approximately 2.0 percent per turn but will vary with the adjuster position.

CALIBRATION PROCEDURE

Single-phase test speed is 16 2/3 rpm (22 2/9 rpm for -8 meters). All meters are tested on a single-phase power source with voltage coils connected in parallel. The following calibration procedures should be used:

COMBINED STATOR OPERATION

Connect all current coils in series and observe full load and light load registration. Calibrate light load to full load. For example, if full load registration is 101.0 percent, calibrate light load to 101.0 percent.

LEFT STATOR OPERATION

Energize the left stator current coil or coils. Leave the right stator current coils and the -8 meter "Z" (crossover) winding open. Calibrate full load unity power factor to 100 percent registration by turning the Full Load adjuster screw on the front of the meter. Calibrate full load 50 percent lagging power to 100 percent registration by turning the Power Factor adjuster screw on the left stator balance bracket.

RIGHT STATOR OPERATION

Energize the right stator current coil or coils. Leave the left stator current coils and the -8 meter "Z" (crossover) winding open. Calibrate full load unity power factor to 100 percent registration by turning the Phase Balance adjuster screw on the right stator balance bracket. Calibrate full load 50 percent lagging power factor to 100 percent registration by turning the Power Factor adjuster screw on the right stator balance bracket.

COMBINED STATOR OPERATION

Connect all current coils in series and observe full load, light load, and 50 percent lagging power factor. If necessary, make minor corrections on full load and light load registration. Note: If a minor correction is necessary for 50 percent lagging power factor, repeat Left and Right Stator Operations with a slight re-adjustment made to 50 percent lagging power factor to insure proper registration on Combined Stator Test.

BEARING ADJUSTMENT

When necessary, adjust the moving element by:

1. Placing the meter in the normal operating position.
2. Inserting the upper and lower bearing with the set screws loose.
3. Moving the lower bearing until the disk is slightly below center in the meter gap.
4. Tightening the lower set screw, raising the upper bearing to obtain 0.005 to 0.010 inch end play, and tightening the upper set screw.

REPLACEMENT PARTS AND REPAIRS

A replacement frame and electromagnet assembly is provided for field repairs of D-line polyphase meter, consisting of two calibrated electromagnets, rear frame and front frame with the Magnethrust rotor system. Refer to I.L. 42-101.18 for the proper disassembly and reassembly procedure and Renewal Parts Data 42-102B1 for replacement parts listing.

If desired, return meters to the factory for repairs. Obtain Return Material Tag from the nearest sales office to avoid delay in identifying the shipment.

ACCESSORIES

To install a Mark series demand register or a CD series contact device on a D-line polyphase meter, see instruction leaflets:

(1) Mark Ia	42-302.11
(2) Mark II	42-302.2A
(3) Mark III	42-302.3
(4) CD-2, -3, -5	42-950.3
(5) CD-11 and -21	42-950.4

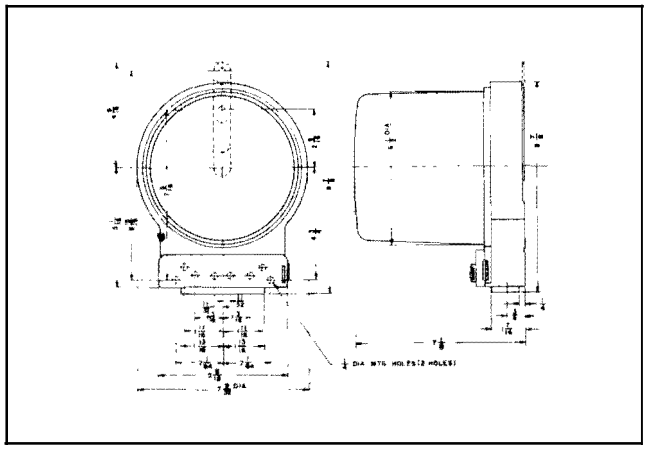


Fig. 2. Type D2A-5 Meter Outline Dimensions

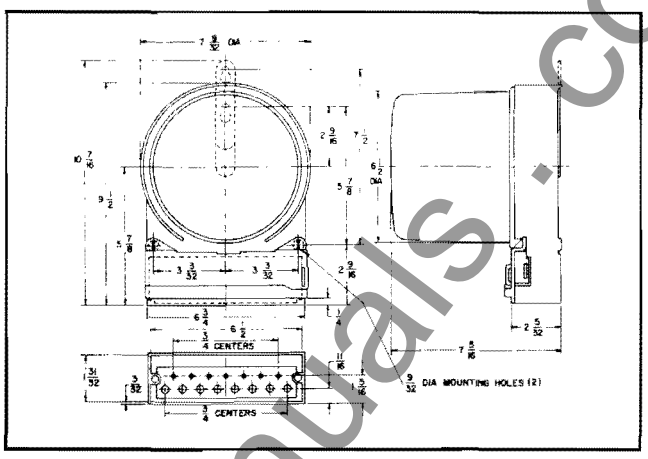


Fig. 3. Type D2A-2, 7, & 8 Meter Outline Dimensions

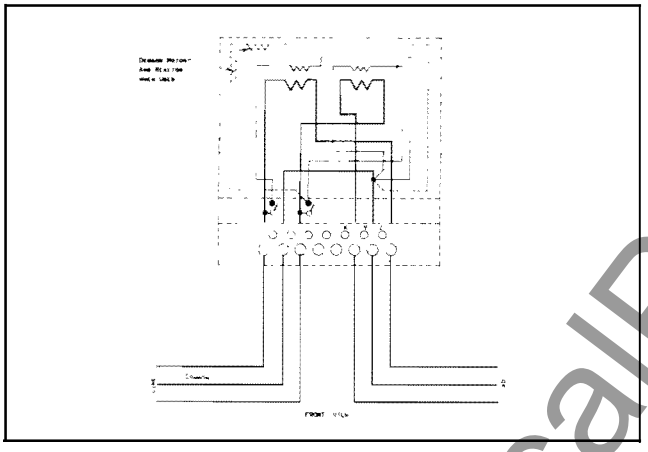


Fig. 4. Type D2A-2, 2 or 3-phase, 3-wire, Self Contained

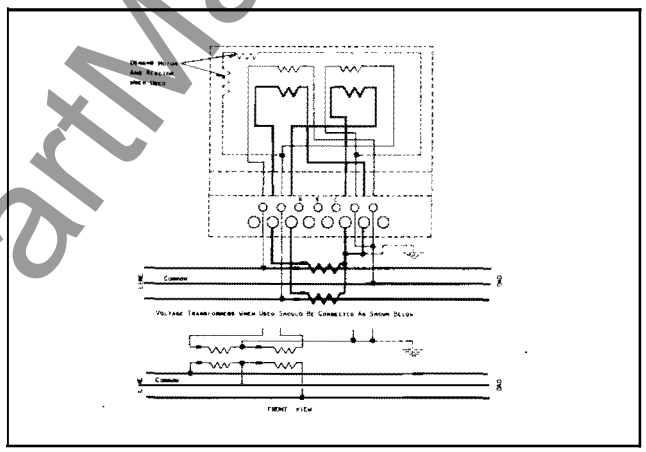


Fig. 5. Type D2A-2, 2 or 3-phase, 3-wire Transformer Type

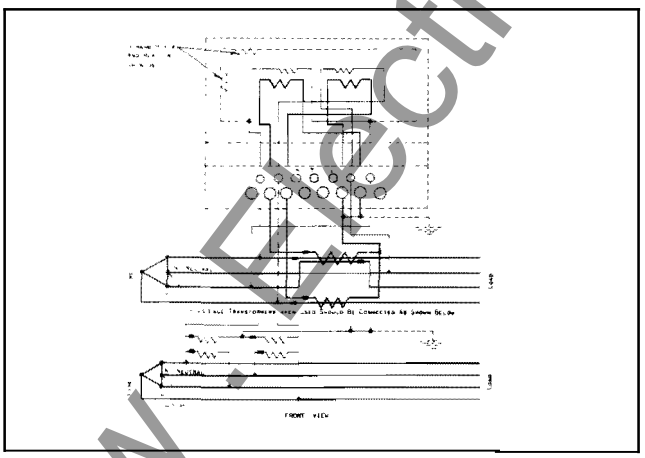


Fig. 6. Type D2A-2, 3-phase, 4-wire Delta, Transformer Type

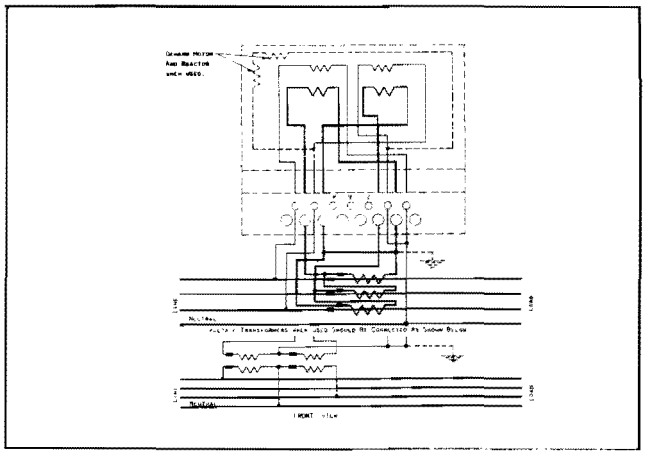


Fig. 7. Type D2A-2, 3-phase, 4-wire Wye Transformer Type

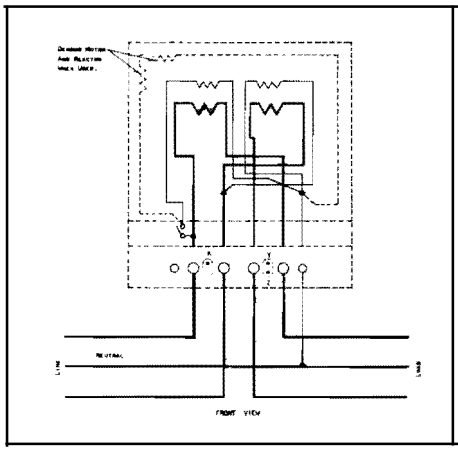


Fig. 8. D2A-5, 2 or 3-phase, 3-wire, Self Contained

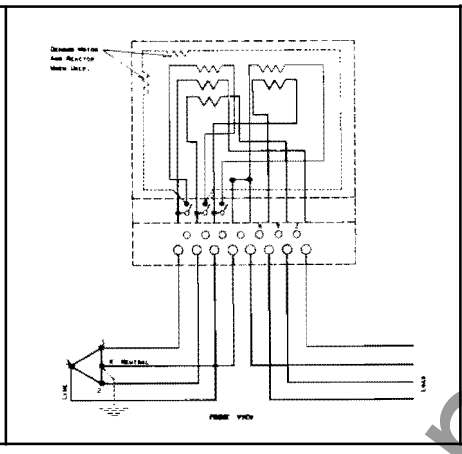


Fig. 9. D2A-7, 3-phase, 4-wire Delta, Self Contained

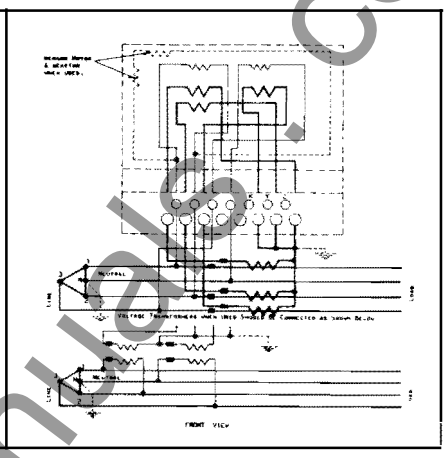


Fig. 10. D2A-7, 3-phase, 4-wire Delta, Transformer Type

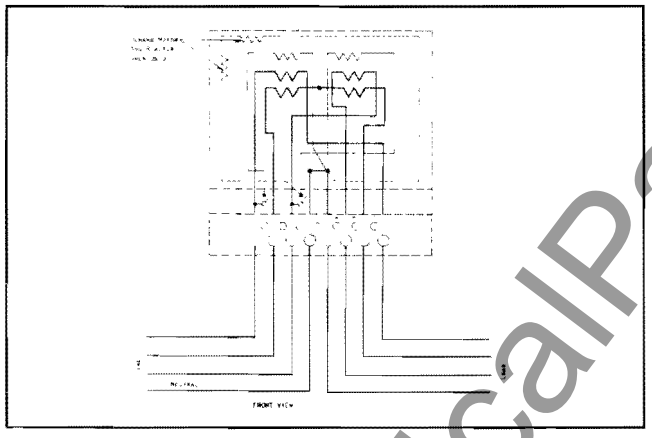


Fig. 11. D2A-8, 3-phase, 4-wire Wye, Self Contained

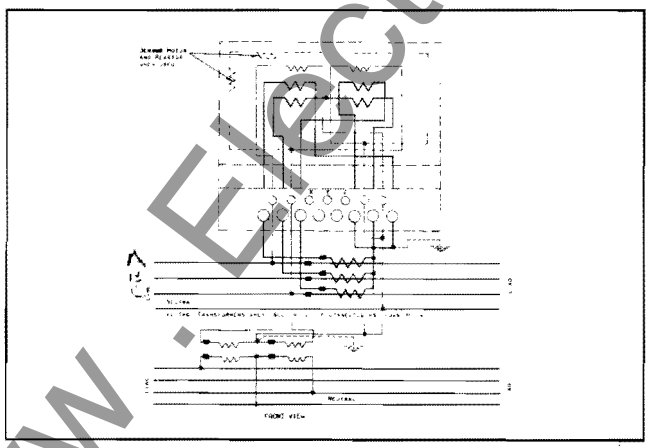
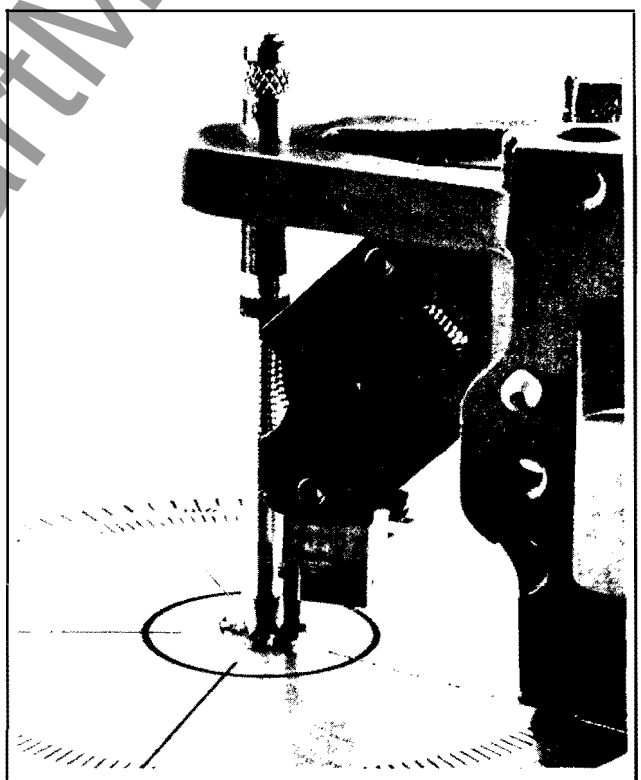


Fig. 12. D2A-8, 3-phase, 4-wire Wye, Transformer Type



This new detent is designed to fasten on the D2 meter's transfer gearing bracket, and guards against backward rotation of the meter disc by operation of a pawl against a die-cast ratchet. No friction is added to the meter as the pawl rides over the ratchet.

Installation is quick and easy, and can be made in the field as well as in the shop.

Fig. 13. Detent

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INSTRUCTIONS

TYPE D2S TWO-THREE-WIRE WATTHOUR METER

CALIBRATION

The full load test speed is 16-2/3 rpm. and the watthour constant is .6 per nominal 600 watt rating. (Constant of 3.6 for 15 Amp., 240 Volt Meter.)

The following is a guide to the watthour element calibration.

ADJUSTMENTS

FULL LOAD

The full load adjusting screw is located at the front of the meter on the left side. Direction of adjustment is indicated by the arrow on the nameplate ("F" indicates fast). Sensitivity is one percent per turn.

LIGHT LOAD

The light load adjusting screw is located at the right side of the meter. Direction of adjustment is similarly indicated by an "F" arrow on the knob. Sensitivity is one percent per turn.

POWER FACTOR

Power factor calibration is a fixed factory adjustment and is permanent.

REPLACEMENT PARTS AND REPAIRS

Where facilities are limited or where only a small number of meters are used, it is recommended that the meters be returned to the factory for repairs. When returning a meter for repairs, obtain a Returned Material Tag from the District Office so as to avoid delay in identifying the shipment.

When ordering renewal parts, give the entire nameplate reading. Always give the name of the part wanted. Check Renewal Parts Data 42-101B1 for aid in identifying parts.

DEMAND METERS

For demand meter operation consult demand Instruction Leaflet.

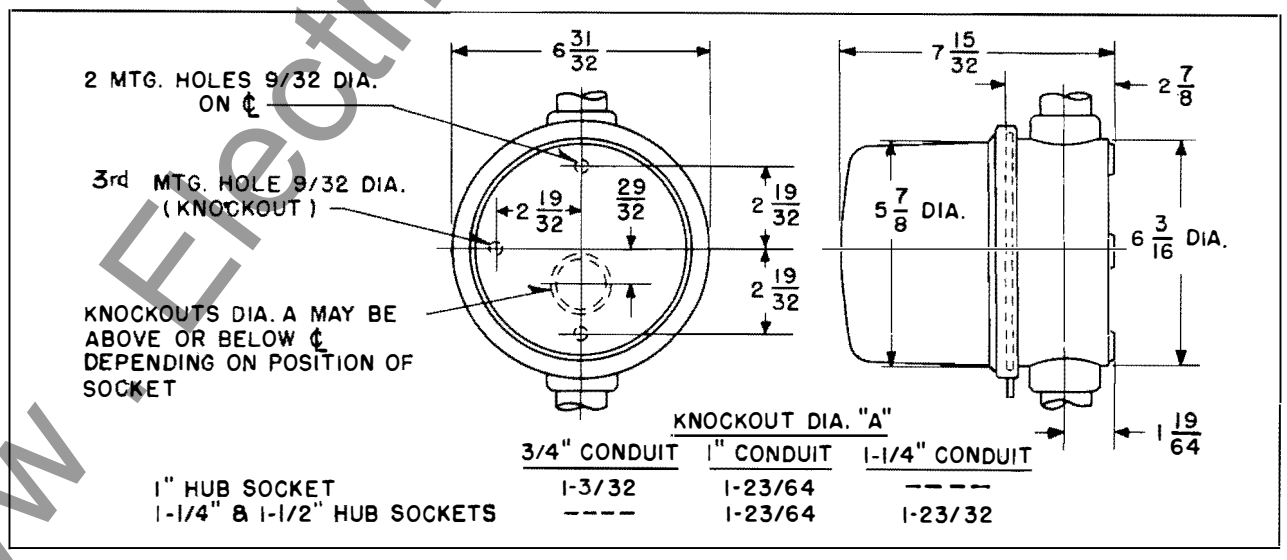


Fig. 1—Outline Dimensions—Type D2S Meter with Type S Socket. (With Knockouts)

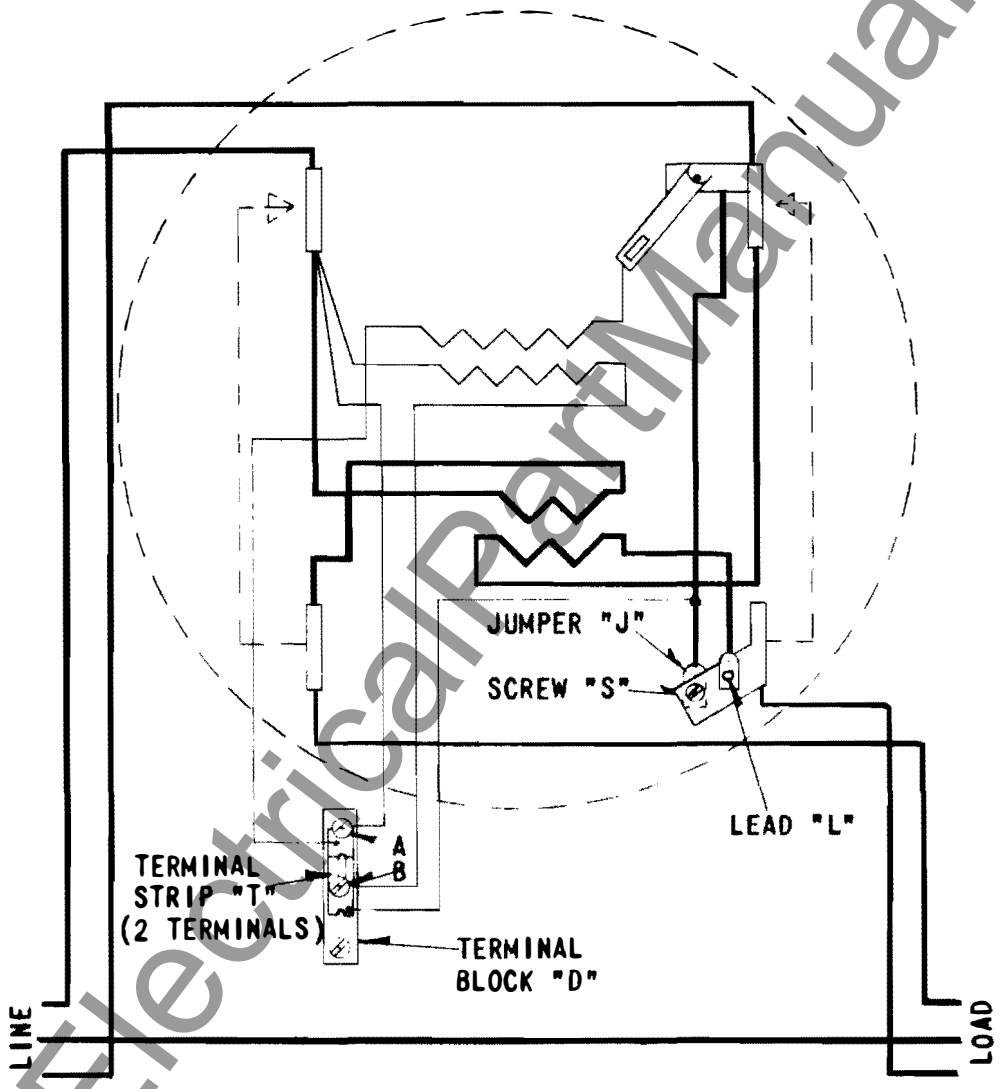
NEW INFORMATION

EFFECTIVE MAY 1960

WATTHOUR METER TYPE "D2S"
2-3 WIRE 15 AMP. SELF CONTAINED
CHANGE-OVER CONNECTIONS

FRONT VIEW

2 WIRE CONNECTIONS SHOWN



TO CHANGE TO 3 WIRE

1. LOOSEN SCREWS "A"-"B" ON TERMINAL BLOCK "D"
2. SLIDE TERMINAL STRIP "T" TO DOWN POSITION & TIGHTEN SCREW "B" & "A"
3. CHANGE SCREW "S" FROM "J" (JUMPER) TO "L" (LEAD)

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Tom Folk (new)
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INSTRUCTIONS

SWITCHBOARD WATTHOUR METERS
TYPES D2B-2F; D2B-7F AND D2B-8F
IN FT-21 FLEXITEST CASE

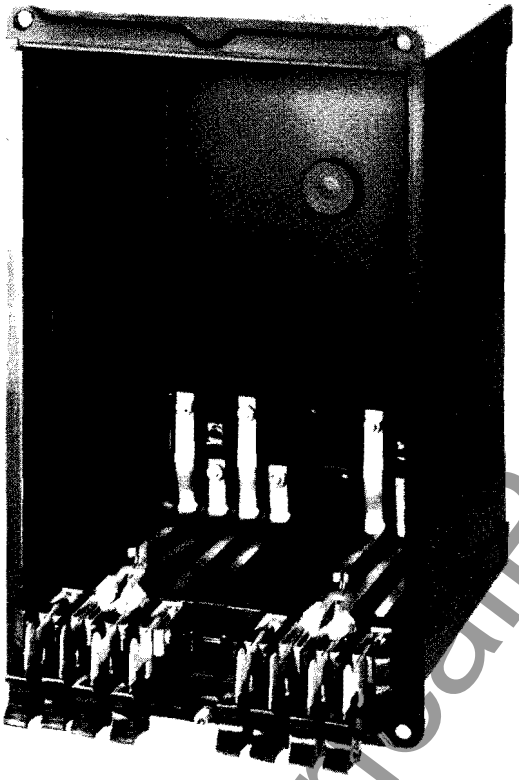

Fig. 1. FT-21 Case.

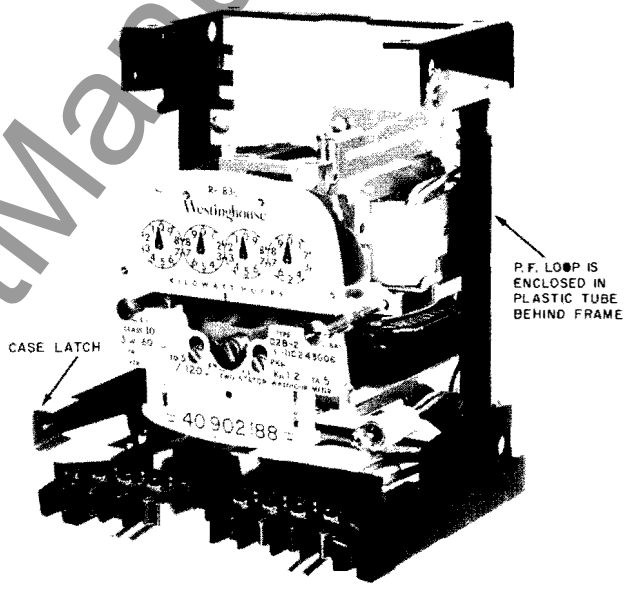

Fig. 2. D2B Chassis.

APPLICATION CHART		
METER TYPE	NUMBER OF STATORS	CIRCUIT APPLICATION
D2B-2F	2	2, or 3-phase, 3 wire 3-phase, 4 wire Delta 3-phase, 4 wire Wye
D2B-7F	2	3-phase, 4 wire Delta
D2B-8F	2	3-phase, 4 wire Wye

SUPERSEDES I.L. 42-201.3A

EFFECTIVE JUNE 1967

GENERAL

The meter elements are mounted on a removable chassis, which is held in the case by two latches. All connections between the case and the chassis are made through the test switches. Automatic shorting switches are provided on all current circuits to prevent opening current transformers when testing or removing the chassis. For testing, leads can be clipped to the test lugs above the chassis jaws and on the switch blades.

Two test plugs are available to facilitate calibration of these meters. The 10-circuit plug is inserted into the chassis jaws and is provided with binding post terminals for connections to the test circuit. Current measurements are made by connecting ammeters to a current circuit test plug, which is then inserted into the current switch assembly, between the chassis and the case.

The hardware supplied with the meter permits mounting either projection or semi-flush on panels up to 3/16" thick. For projection mounting on panels thicker than 3/16" special hardware is furnished on request.

Provisions have been made on all FT-21 cases for convenient field installation of either 2 or 3 wire contact devices. Three knockouts located on the back of the case (close to the top) when removed, allow a molded insulation block, with two or three terminals and male plugs, to be fastened to the case. A bracket, with the proper number of female sockets, can be attached to the rear of the meter-frame & latch assembly in the proper position to allow the male and female parts to mate when the meter is inserted in the case. The parts are available in kit form for this application.

CALIBRATION

All meters are calibrated on single phase. The basic watthour constant (K_h) for these meters is .6 per nominal 600 watt rating. The single-phase test speed 16-2/3 rpm except for the D2B-8 for which it is 22-2/9 rpm. Both of these are given on a 120 volt basis.

The following is a guide to watthour stator calibration. Detailed calibration procedure is available in IL-42-101.3.

ADJUSTMENTS

Full Load, Light Load and Balance.

All of these adjustments are made at the front of the meter. The full load adjuster knob is in the center; the light load knob at the left and the balance knob at the right. Direction of adjustment is indicated by the arrow on the nameplate ("F" indicates fast).

Power Factor

Power factor adjustment is made by changing the resistance of the soldered loop located at the back of each electromagnet. Increasing the resistance (lengthening the loop) increases the speed on lagging power factors.

REPLACEMENT PARTS AND REPAIRS

Where facilities are limited or where only a small number of meters are used, it is recommended that the meters be returned to the factory for repairs. When returning a meter for repairs, obtain a Returned Material Tag from the District Office so as to avoid delay in identifying the shipment.

GENERAL DATA		
COMBINED STATORS OF 5. AMP. – 120. VOLT – 60 CYCLE METERS		
TYPE	D2B-2F	D2B-8F
STARTING WATTS	6.	6.
WATTHOUR CONSTANT (K_h)	1.2	1.8
FULL LOAD R.P.M. ON SINGLE PHASE TEST	16-2/3	22-2/9
FOR TRANSFORMER BURDENS SEE THE TABLE ON PAGE 3.		

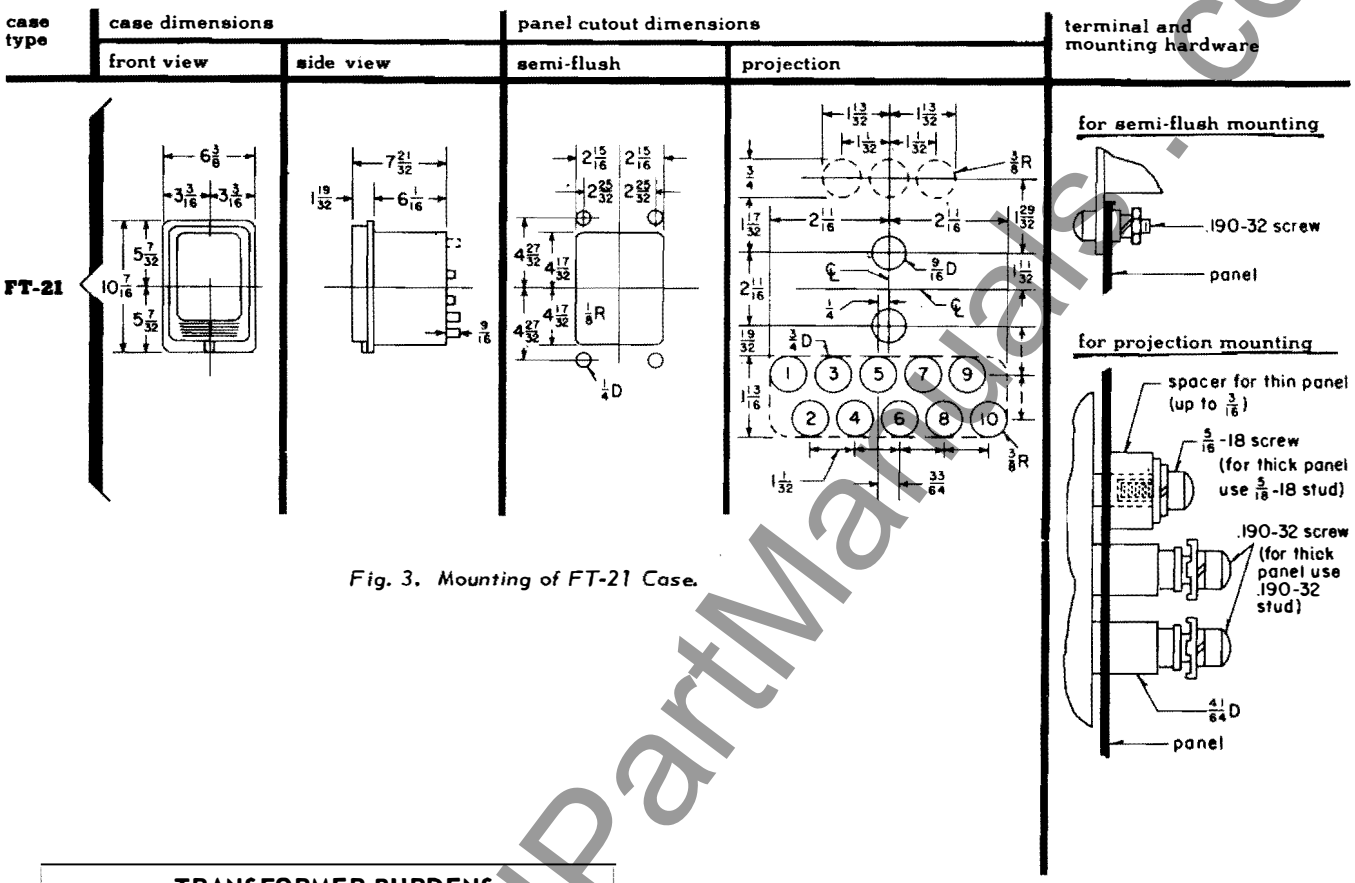

Fig. 3. Mounting of FT-21 Case.

TRANSFORMER BURDENS FOR 60 CYCLE METERS			
VOLTAGE COIL CIRCUITS, INCLUDING P.I. LAMP.			EACH STATOR
FOR RATED MULTIPLES OF 120. V.	VOLT-AMPS.		8.65
	WATTS		1.35
	POWER FACTOR		.156
CURRENT COIL CIRCUITS			
EACH STATOR	FULL COIL	HALF COIL	Z CIRC.
5. AMPS. ON 5. AMP. COIL.			
VOLT-AMPS.	.39	.25	.39
WATTS	.29	.21	.29
POWER FACTOR	.75	.84	.75
5. AMPS. ON 2.5 AMP. COIL.			
VOLT-AMPS.	1.2	.65	1.2
WATTS	.64	.39	.64
POWER FACTOR	.533	.600	.533

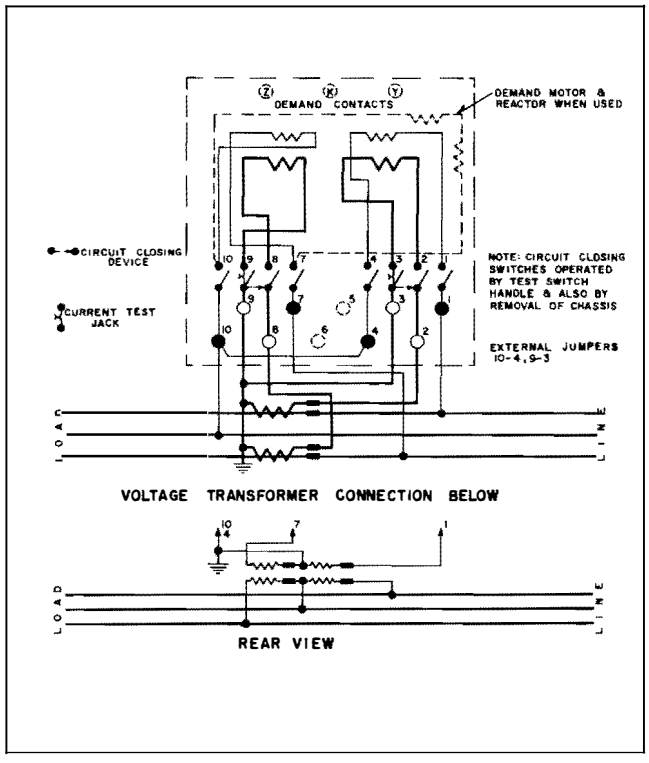

Fig. 4. Type D2B-2F, 3-Phase, 3 Wire.

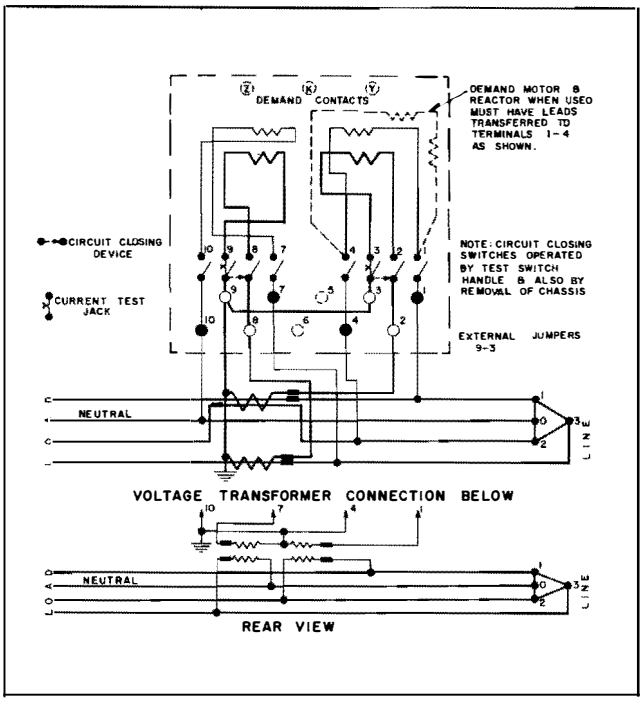

Fig. 5. Type D2B-2F, 3-Phase, 4-Wire, Delta

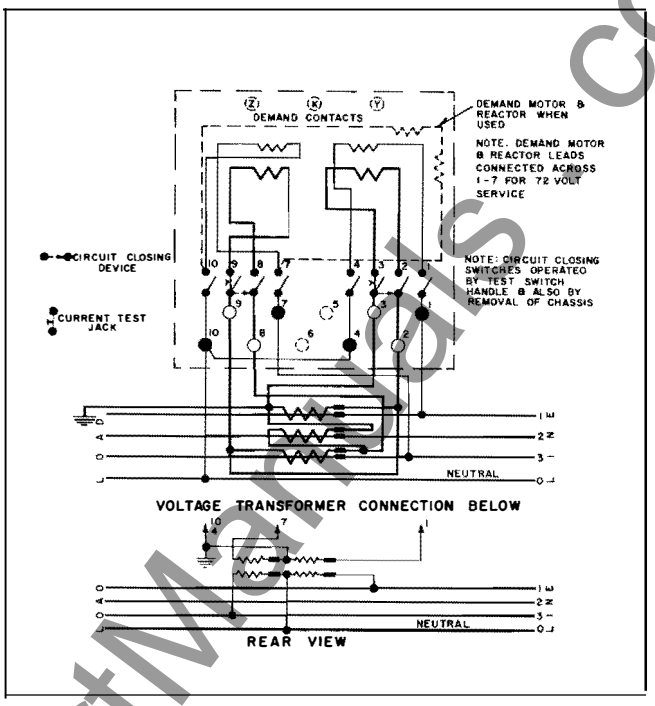

Fig. 6. Type D2B-2F, 3-Phase, 4- Wire, Wye.

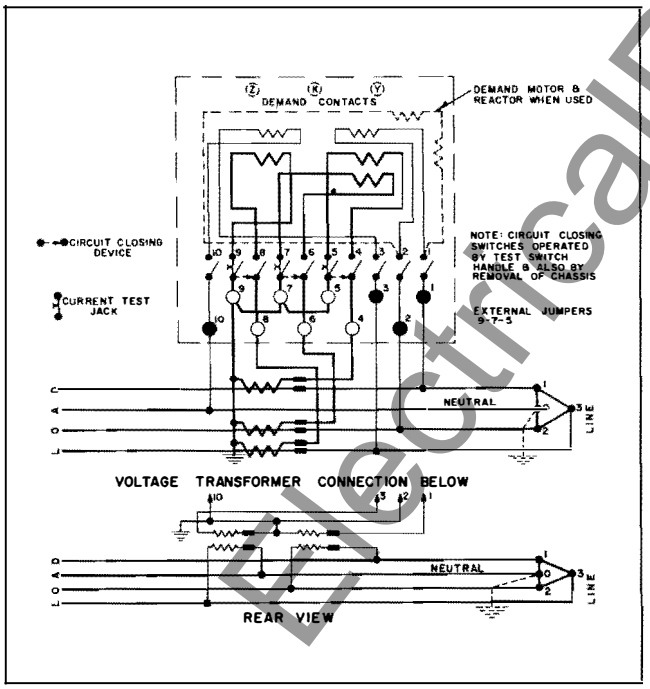

Fig. 7. Type D2B-7F, 3-Phase, 4-Wire, Delta

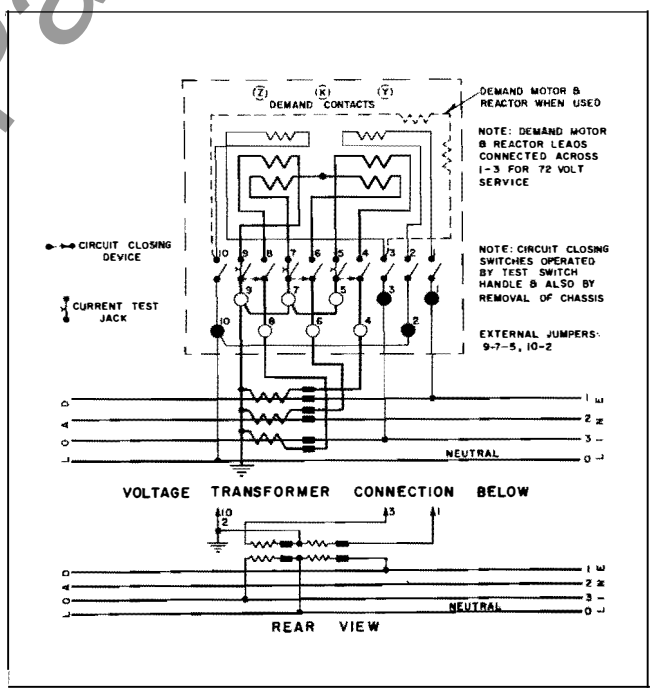

Fig. 8. Type D2B-8F, 3-Phase, 4-Wire, Wye