Westinghouse

SWITCHBOARD TYPE WATTHOUR METER
TYPE CB-3
INSTRUCTIONS

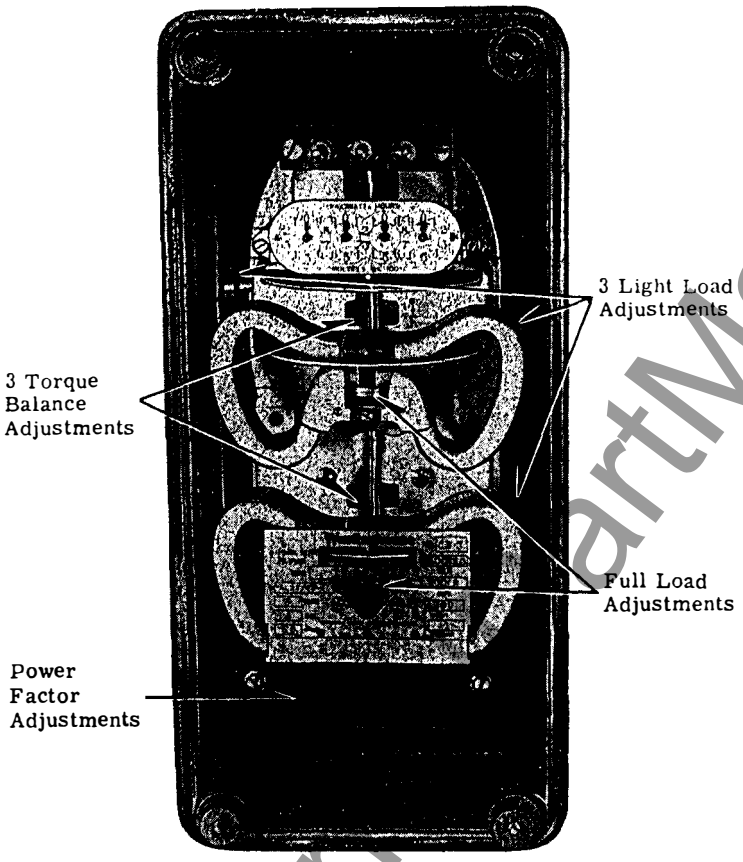

Fig. 1

GENERAL

The Type CB-3 watthour meters consist of three 2-wire meter elements. Self contained and transformer types are used to meter 3-phase, 4-wire star connected circuits. The transformer types are also used to totalize combined 3-phase, 3-wire and 1-phase, 3-wire loads or combined 3-phase, 3-wire and 1-phase, 2-wire loads.

The cases are similar in appearance to those of the Westinghouse standard relays, and are of either the front of board or semi-flush type.

Note:

This Instruction Leaflet pertains only to the type in the title, and furnished as part of a complete equipment. For general instructions on all Type CB meters see I.L. 42-104.1, copies of which are obtainable at request from the Meter Division or through the District Offices.

CONSTRUCTION AND OPERATION

The CB-3 meter contains the standard watthour meter elements and registers mounted in switchboard type cases. The ends of the terminals are drilled and tapped to accommodate either screws for close connection wiring or studs for thicker panels.

The covers are of glass and held to the base by cover studs and mountings. A standard wire seal is passed through the cover-stud nuts for sealing the meters.

Due to the use of a ball in the lower bearing, no lubrication is necessary. Sealed in the top bearing is a lubricant which continuously oils the pin. Potential indicating lamps are operated by the electromagnets and show that the potential circuits are energized.

CALIBRATION

Meters are calibrated at rated current and 120 volts or multiples thereof, with a full load speed on single-phase test of 30 rpm. on all meters.

CONSTANTS

The watthour constant, Kh, is ⅓ watthours per revolution of the disc, or multiples thereof for each 500 watts **nominal** rating.

This nominal rating is based on the nominal rated current and 100 volts or multiples thereof.

The Kh value (both primary and secondary, in the case of transformer type meters) is given together with other rating data on the nameplate. The ratio between the primary and secondary Kh values, when instrument transformers are used, is equal to the combined transformation ratio.

ADJUSTMENTS

Note: It is recommended that adjustments should be done only by trained metermen, as in Electric Power Companies.

The various adjustments are as follows:

Full Load—Moving iron discs below permanent magnets to right increases meter speed; to left, decreases it. (F on nameplate indicates "fast".)

Light Load—Turn screw at sides of electromagnets as shown by arrow in Fig. 1 "F" indicates "faster."

Balance—Turn screw in front center of meter near disc shaft to move balance plate in or out as required.

Moving balance plate out from electromagnet decreases torque. Balance plates should be moved to maximum torque position before balancing elements.

Power Factor—Adjustment is obtained by changing the resistance of the power factor adjusting loops located under micarta cover which is located below the nameplate, as shown in Fig. 1. The adjusting loops are identified as to electromagnets by notations U (upper), L (lower), and M (middle, for 3-element meters) as are also the indicator lamps. Increasing the loop resistance increases the speed on lagging power factor single phase test circuit and vice versa.

CALIBRATION PROCEDURE

General information on meter testing is quite fully covered in the Electrical Metermen's Handbook, Edition 4 Published by Edison Electric Institute.

It is not intended in this instruction leaflet to duplicate or abstract the information given in the above literature.

The following information is offered with a view to establishing the best order of procedure for calibration.

A. Preliminary Calibration

Use a single-phase circuit of the frequency and voltage specified on nameplate.

1. Remove any potential creep present in each element by moving the light load adjuster, and applying rated voltage only to the element being tested.

*Supersedes I. L. 3572

2. Adjust each single element to the same speed at unity power factor, 100% load by adjusting phase balancers. This may also be done by bucking two elements at a time. When starting with an uncalibrated meter it is preferable to set all balancers in maximum torque position and adjust by moving only the balancers of the faster element or elements. All potential coils should be energized at rated voltage for this and all succeeding tests.

3. Calibrate one of the elements to 100% registration at unity power factor, 100% load by adjusting the permanent magnet.

4. Adjust each element to 100% registration at 50% lagging power factor, 100% load by adjusting the length of the power factor loop.

5. Recheck each element on unity power factor and readjust by means of the phase balancers, if necessary.

B. Final Calibration

1. Connect the current coils in series and the potential coils in parallel, and calibrate to 100% registration at unity power factor, 100% load by adjusting the permanent magnets.

2. Check combined elements at 50% lagging power factor, 100% load. If unsatisfactory, repeat tests, beginning with (A-3).

3. Check combined elements at unity power factor, 5% load. Adjust by moving each light load adjuster approximately the same amount.

4. Recheck combined elements at unity power factor, 100% load; and, if necessary, adjust by means of the permanent magnet.

5. If a readjustment was necessary, re-check 5% load as in (B-3).

6. Seal the meter.

REPAIR AND RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable repair parts can be furnished as desired. When ordering parts, describe the part wanted and give the identification data as on the nameplate.

If a meter is to be returned to the factory for repairs, obtain a return material tag from the local sales office so that the shipment may be promptly identified at the factory.

PATENT NUMBERS

This apparatus is manufactured under one or more of the following patent numbers:

1,691,354	1,798,710	2,254,920
1,783,547	1,810,028	Re. 17,694

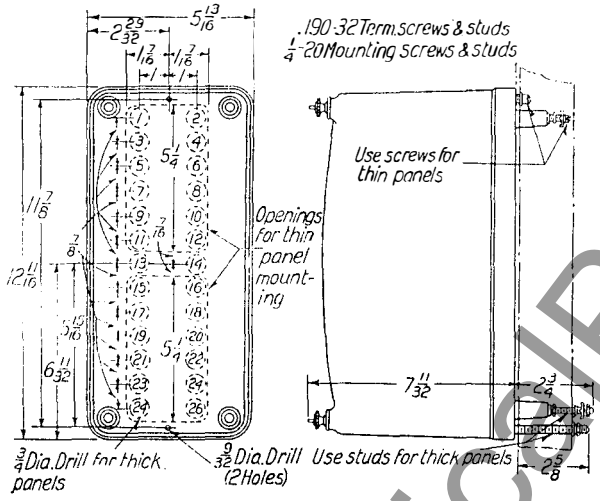

FIG. 2—OUTLINE, PROJECTION MOUNTING, 3-ELEMENT METER. Either drill only holes numbered as per connection diagram or cut rectangular holes as indicated by dotted lines.

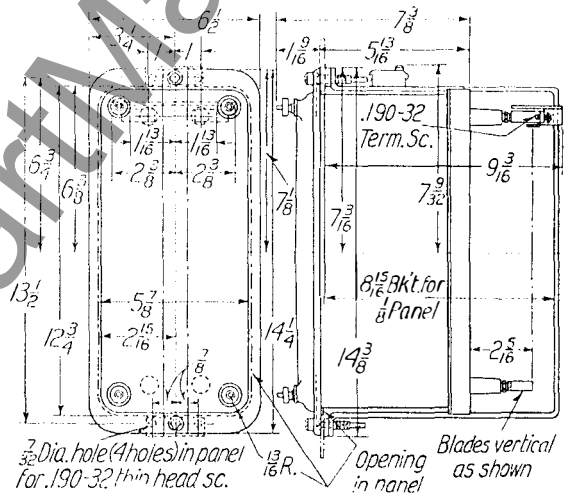

FIG. 3—OUTLINE, PLUG-IN, 3-ELEMENT FLUSH MOUNTING METER. NUMBER AND LOCATION OF TERMINALS AS PER CONNECTION DIAGRAM.

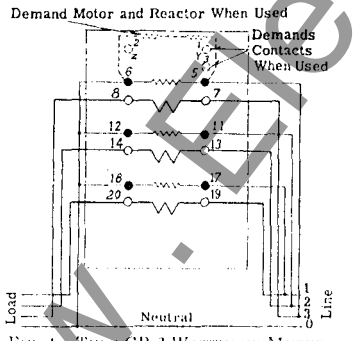

FIG. 4—TYPE CB-3 WATTHOUR METER, 3-PHASE, 4-WIRE, SELF-CONTAINED. (DWG. 2-A-9253)

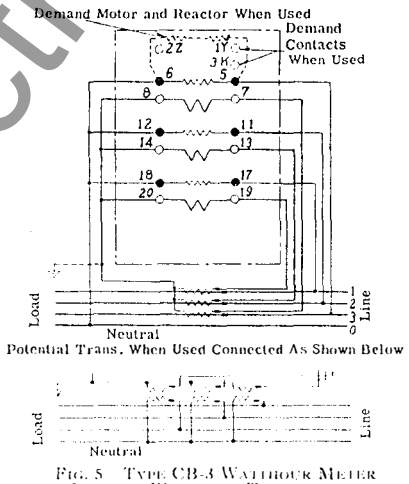

FIG. 5—TYPE CB-3 WATTHOUR METER 3-PHASE, 4-WIRE WITH TRANSFORMERS. (DWG. 2-A-9253)

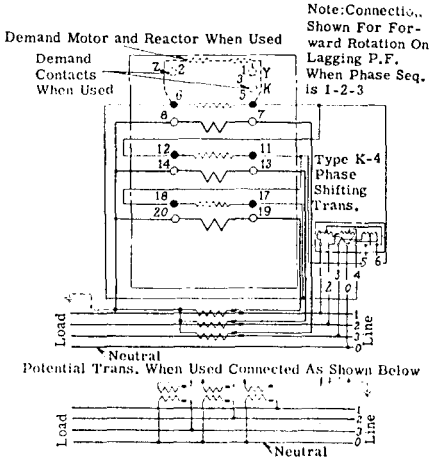

FIG. 6—TYPE CB-3 VARHOUR METER, 3-PHASE, 4-WIRE WITH TRANSFORMERS. (DWG. 2-A-9253)

Westinghouse Electric & Manufacturing Company

Meter Division, Newark, New Jersey

Westinghouse Press
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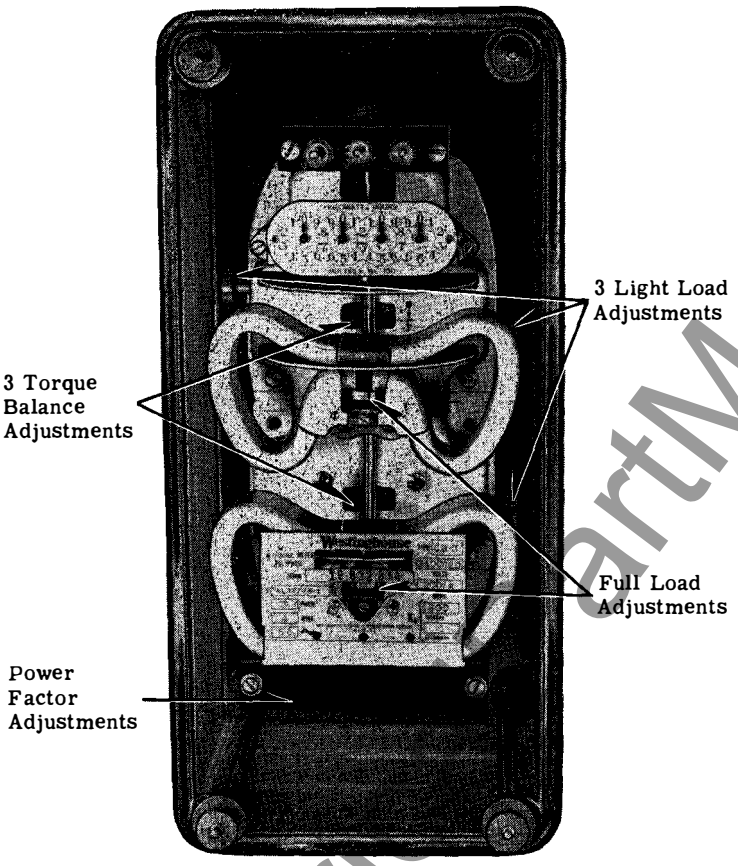

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Meters are calibrated at rated current and 120 volts or multiples thereof, with a full load speed on single-phase test of 30 rpm. on all meters.

CONSTANTS

The watthour constant, K_h, is $\frac{1}{3}$ watthours per revolution of the disc, or multiples thereof for each 500 watts **nominal** rating.

This nominal rating is based on the nominal rated current and 100 volts or multiples thereof.

The K_h value (both primary and secondary, in the case of transformer type meters) is given together with other rating data on the nameplate. The ratio between the primary and secondary K_h values, when instrument transformers are used, is equal to the combined transformation ratio.

ADJUSTMENTS

Note: It is recommended that adjustments should be done only by trained metermen, as in Electric Power Companies.

The various adjustments are as follows:

Full Load—Moving iron discs below permanent magnets to right increases meter speed; to left, decreases it. (F on nameplate indicates "fast".)

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2. Adjust each single element to the same speed at unity power factor, 100% load by adjusting phase balancers. This may also be done by bucking two elements at a time. When starting with an uncalibrated meter it is preferable to set all balancers in maximum torque position and adjust by moving only the balancers of the faster element or elements. All potential coils should be energized at rated voltage for this and all succeeding tests.

3. Calibrate one of the elements to 100% registration at unity power factor, 100% load by adjusting the permanent magnet.

4. Adjust each element to 100% registration at 50% lagging power factor, 100% load by adjusting the length of the power factor loop.

5. Recheck each element on unity power factor and readjust by means of the phase balancers, if necessary.

B. Final Calibration

1. Connect the current coils in series and the potential coils in parallel, and calibrate to 100% registration at unity power factor, 100% load by adjusting the permanent magnets.

2. Check combined elements at 50% lagging power factor, 100% load. If unsatisfactory, repeat tests, beginning with (A-3).

3. Check combined elements at unity power factor, 5% load. Adjust by moving each light load adjuster approximately the same amount.

4. Recheck combined elements at unity power factor, 100% load; and, if necessary, adjust by means of the permanent magnet.

5. If a readjustment was necessary, re-check 5% load as in (B-3).

6. Seal the meter.

REPAIR AND RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable repair parts can be furnished as desired. When ordering parts, describe the part wanted and give the identification data as on the nameplate.

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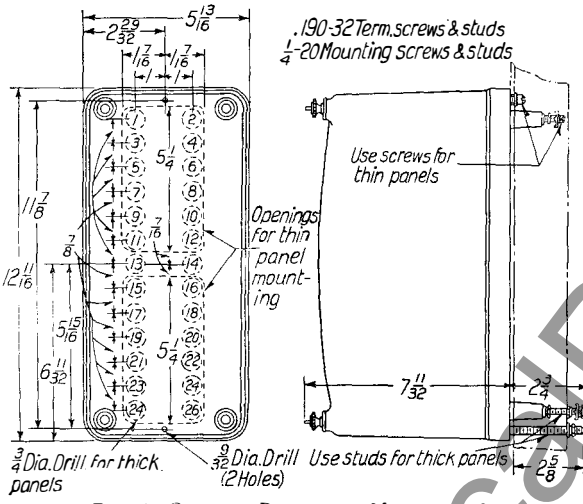

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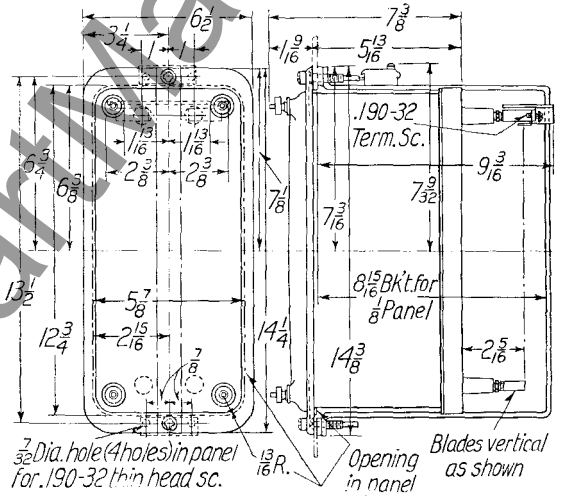

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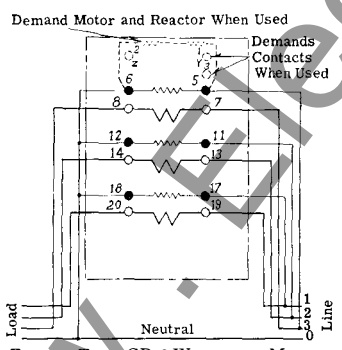

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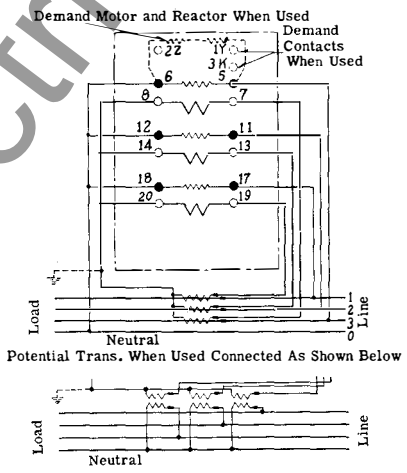

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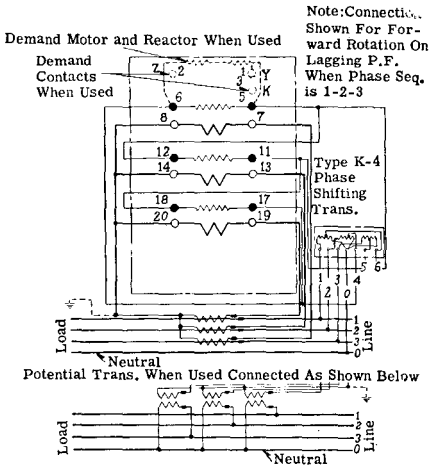

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