



INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

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

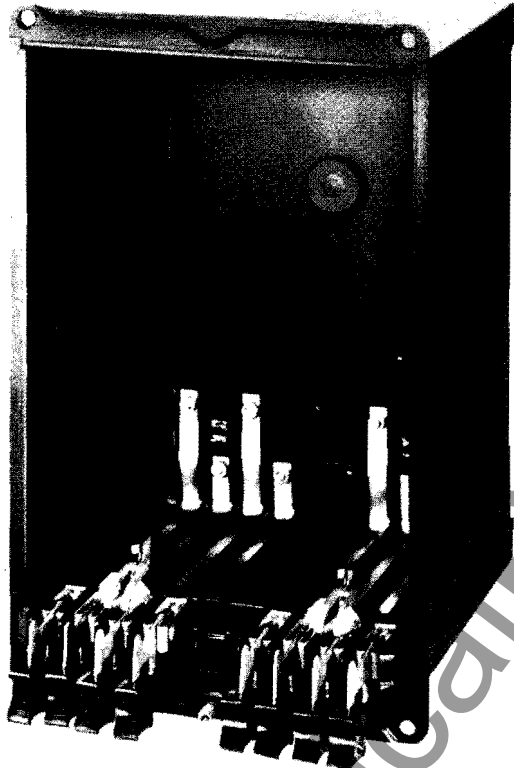


Fig. 1. FT-21 Case.

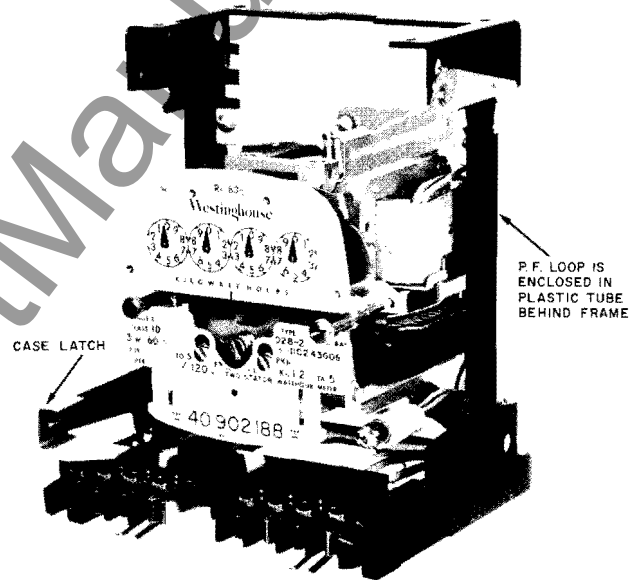


Fig. 2. D2B Chassis.

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

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-42-102.3.

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.		

WWW.ASCEPAPERMANHOLE.COM

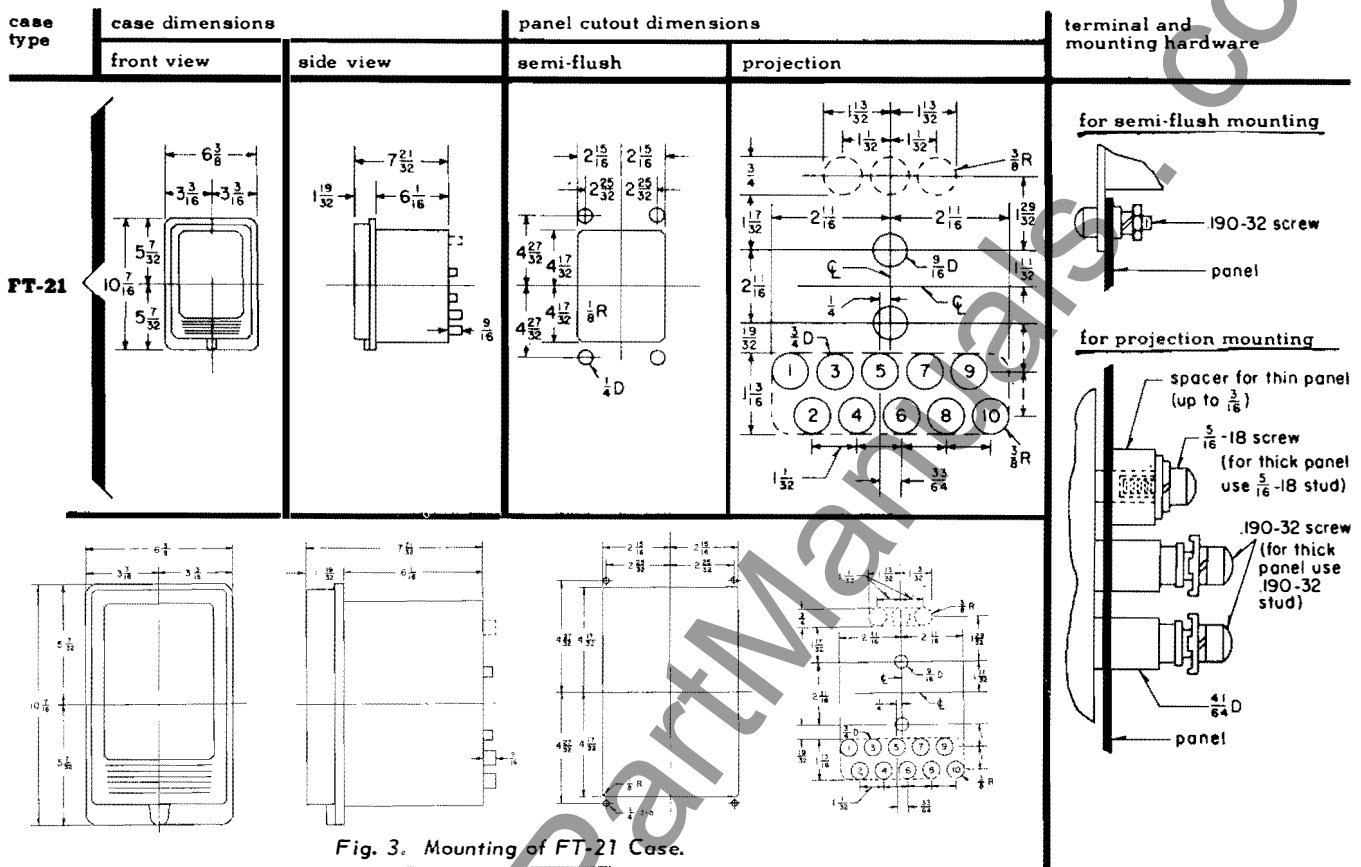


Fig. 3. Mounting of FT-21 Case.

TRANSFORMER BURDENS FOR 60 CYCLE METERS			
VOLTAGE COIL CIRCUITS, INCLUDING P.I. LAMP.			EACH STATOR
FOR RATED MULTIPLES OF 120.V.	VOLT-AMPS.	8.6	
	WATTS	1.2	
	POWER FACTOR	.14	
CURRENT COIL CIRCUITS			
EACH STATOR	FULL COIL	HALF COIL	Z CIRC.
5. AMPS. ON 5. AMP. COIL.			
VOLT-AMPS.	.18	.10	.18
WATTS	.135	.076	.135
POWER FACTOR	.75	.76	.75
5. AMPS. ON 2.5 AMP. COIL			
VOLT-AMPS.	.735	.40	.735
WATTS	.53	.32	.53
POWER FACTOR	.72	.80	.72

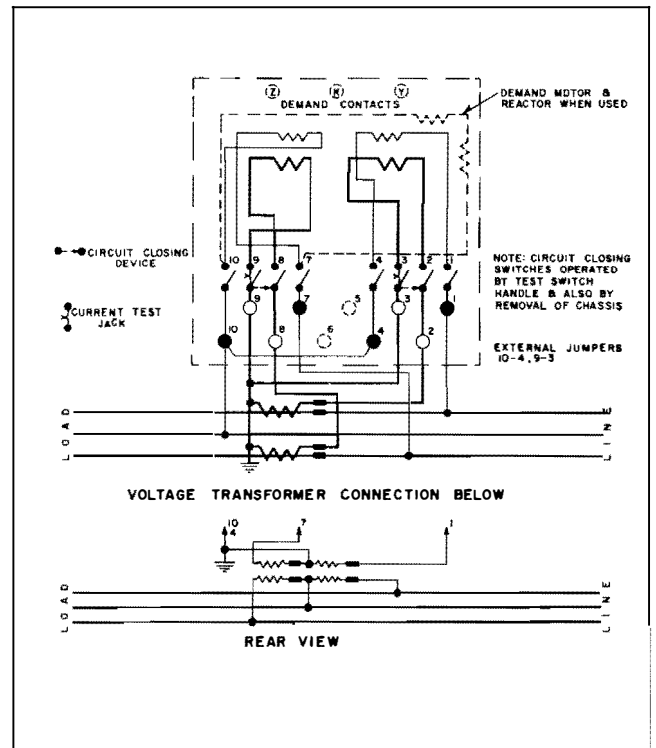


Fig. 4. Type D2B-2F, 3-Phase, 3 Wire.

TYPE D2B FLEXITEST SWITCHBOARD METERS

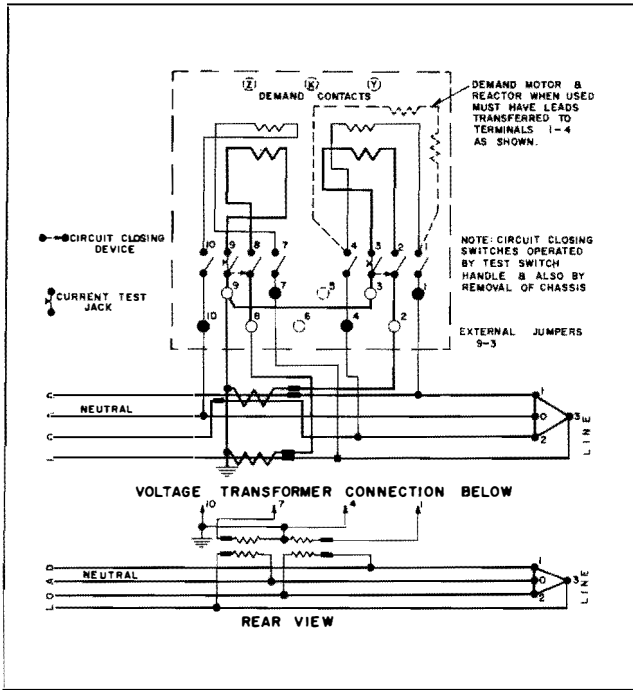


Fig. 5. Type D2B-2F, 3-Phase, 4-Wire, Delta

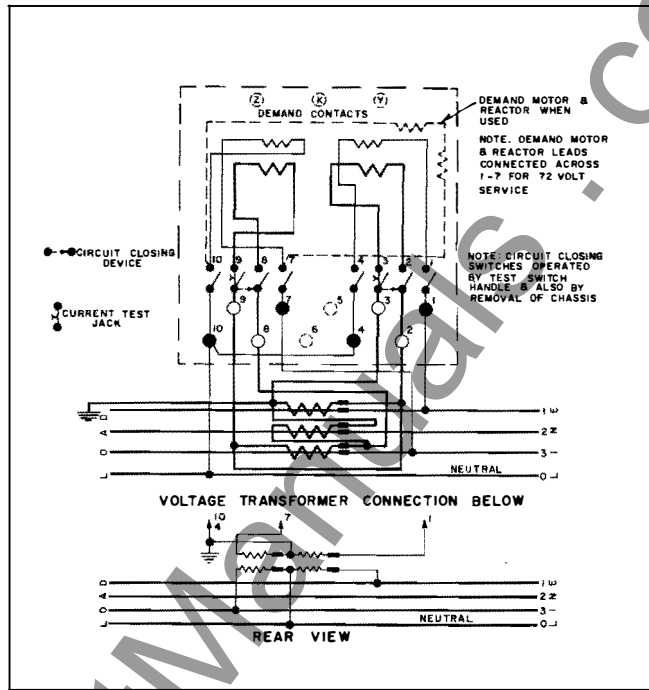


Fig. 6. Type D2B-2F, 3-Phase, 4-Wire, Wye.

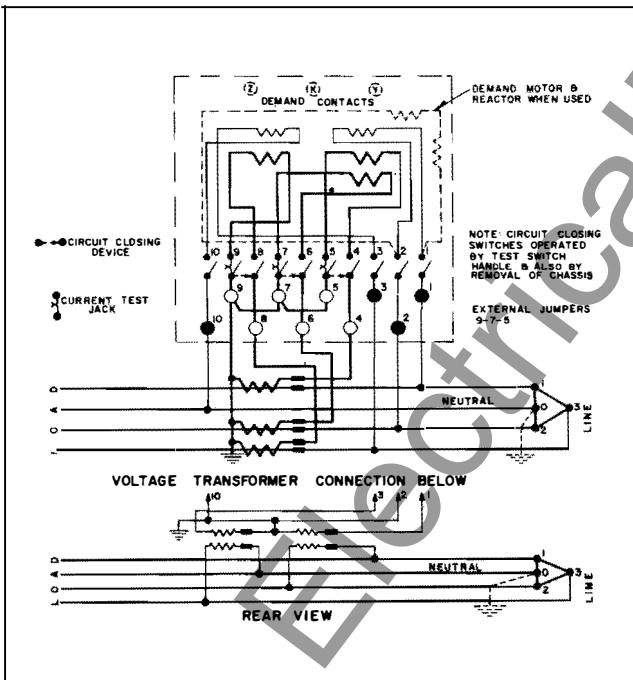


Fig. 7. Type D2B-7F, 3-Phase, 4-Wire, Delta

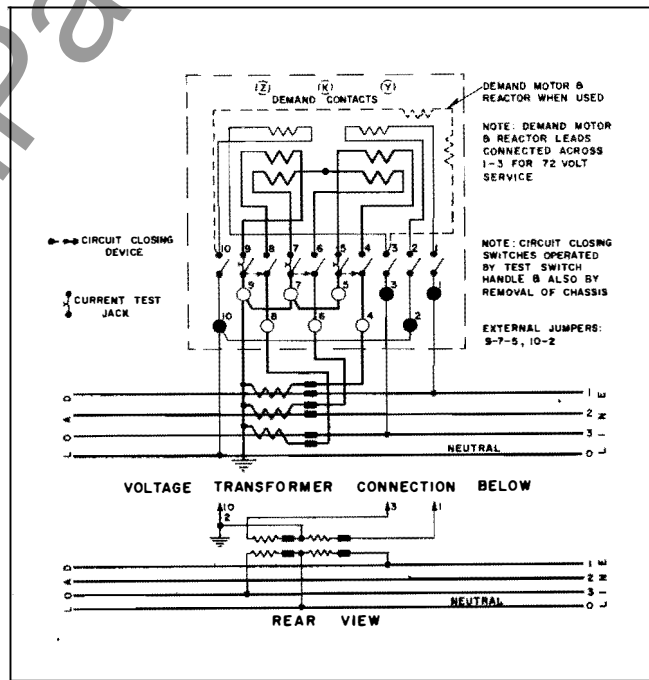


Fig. 8. Type D2B-8F, 3-Phase, 4-Wire, Wye

WESTINGHOUSE ELECTRIC CORPORATION
METER DIVISION

RALEIGH, N. C.

Printed in U.S.A.



INSTALLATION • OPERATION • MAINTENANCE INSTRUCTIONS

SWITCHBOARD WATTHOUR METERS TYPES D2B-3F; D2B-32F AND D2B-38F IN FLEXITEST CASES

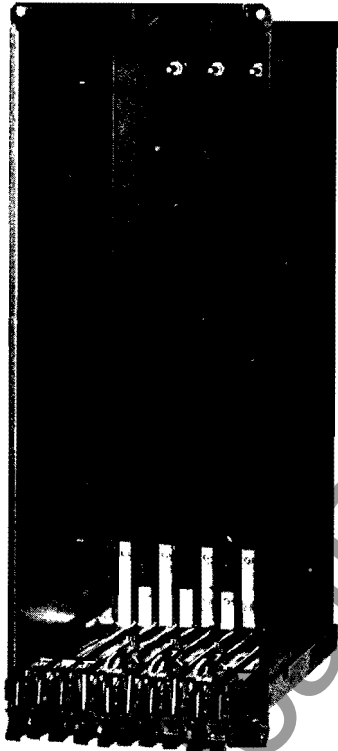


Fig. 1. FT-31 CASE WITH
AUXILIARY TERMINALS
FOR PULSE INITIATOR

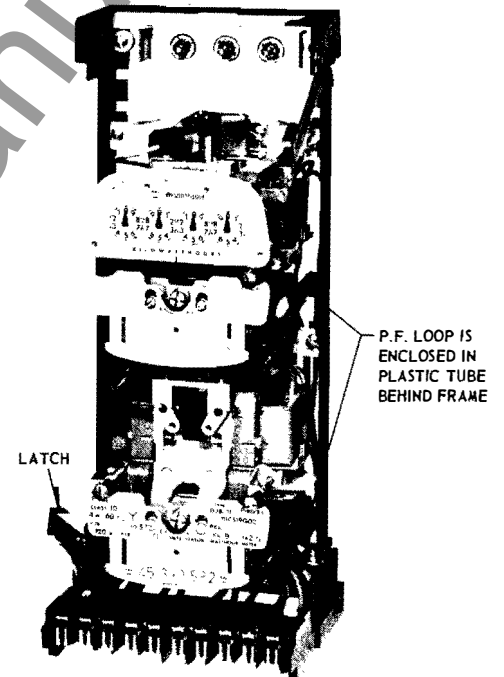


Fig. 2. D2B-3F CHASSIS WITH
CD-11 PULSE INITIATOR

APPLICATION CHART		
METER TYPE	NUMBER OF STATORS	CIRCUIT APPLICATION
D3B-3F	3	3-PHASE, 4-WIRE, WYE
D2B-32F	4	TOTALIZING TWO 2 OR 3-PHASE, 3-WIRE CIRCUITS
D2B-38F	4 (SPLIT WINDINGS)	TOTALIZING TWO 3-PHASE, 4-WIRE, WYE CIRCUITS

GENERAL

The meter elements are mounted on a removable chassis which is held in the case by two latches. All connections between the meter elements and the case are made through test switches. Circuit closing devices, to prevent open-circuiting of current transformers, are operated both by opening of test switches and by removing the chassis from the case. All rotors are supported by a maintenance-free MAGNETHRUST® bearing system and include a pinion for operating gear driven pulse initiators.

Provisions have been made on all FT-31 cases for convenient field installation of either 2 or 3-wire pulse initiators. 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 plugs, to be fastened to the case. A bracket with the proper number of sockets can be attached to the rear of the meter-frame & latch assembly in the proper position to make contact through the plugs when the meter is inserted in the case. These parts are available in kit form for field installation, or may be factory installed if desired. Style 511C137G08 is used for 3-terminal pulse initiators, such as Types CD-3, CD-11 and CD-14.

Additional switch and jaw positions are available in the FT-32 case to provide connections for pulse initiators; except in the D2B-38F which uses all 20 switch and jaw positions for metering connections. Pulse initiators for the D2B-38F must be installed at the factory.

INSTALLATION

The meter case should be mounted and wired permanently before the meter chassis is placed in the case.

Hardware supplied with the meter permits mounting semi-flush on panels up to 3/16 of an inch thick. Special hardware for projection mounting is supplied on request. Refer to Fig. 3.

Before the meter is placed in operation the disk blocks, which are inserted to protect the rotor during shipment, must be removed. At this time the meter should be inspected to make certain that it is free from any foreign material.

CALIBRATION AND TESTING

All meters are calibrated on single phase. With rated voltage supplied to all voltage coils connected in parallel and rated current (T.A.) supplied to all current circuits connected in series the single phase test speeds are:

D2B-3F and D2B-32F ----- 16 2/3 R.P.M.
D2B-38F ----- 22 2/9 R.P.M.

Opening test switches disconnects the meter chassis from the case (and closes incoming circuits from current transformers). Test clip leads may then be attached to test lugs (above each jaw on the chassis) and to the switches as required. Test plugs

are also available to facilitate testing:

Style No. 1164046. A 10-position plug for test using a separate supply source. Ten terminals bring out connections to meter chassis only.

Style No. 07B4618 G04. An individual current circuit test plug for inserting leads, to an external metering device, between the case and the meter chassis.

In-Service Test Jacks. Block with terminals and contacts arranged to match the meter test switches. Used to insert connections from external meters between the case switches and the chassis jaws. Built to order only.

Detailed calibration procedure is available in I.L. 42-101.3.

ADJUSTMENTS

Full load adjusters are provided on each of two permanent magnets. Any change to be made should be divided equally between the two.

A single light load adjuster is mounted on the lower, left-hand stator.

Balance (torque) adjusters are provided on all stators except the lower, left-hand stator which is the reference to which the other stators must be matched.

Lagging adjustment is made, if needed, by adjusting the effective length of the P.F. loop. Refer to Fig. 2 for location.

1. Remove the plastic cover from the loop.
2. Adjust length, to soldered connection, as required. Solder new connection point carefully. Insulate all bared wire between stator and connection point.
3. Fold loop and replace plastic cover.

Each screw type adjuster is identified by nameplate marking and an arrow with the letter 'F' added to show which direction of turning will increase the meter speed.

MAINTENANCE AND REPAIR

Meters equipped with the MAGNETHRUST® bearing system require very little maintenance. If they should be damaged by severe overloads or other abnormal conditions, replacement parts can be ordered from the factory. Always furnish all the information on the nameplate.

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.

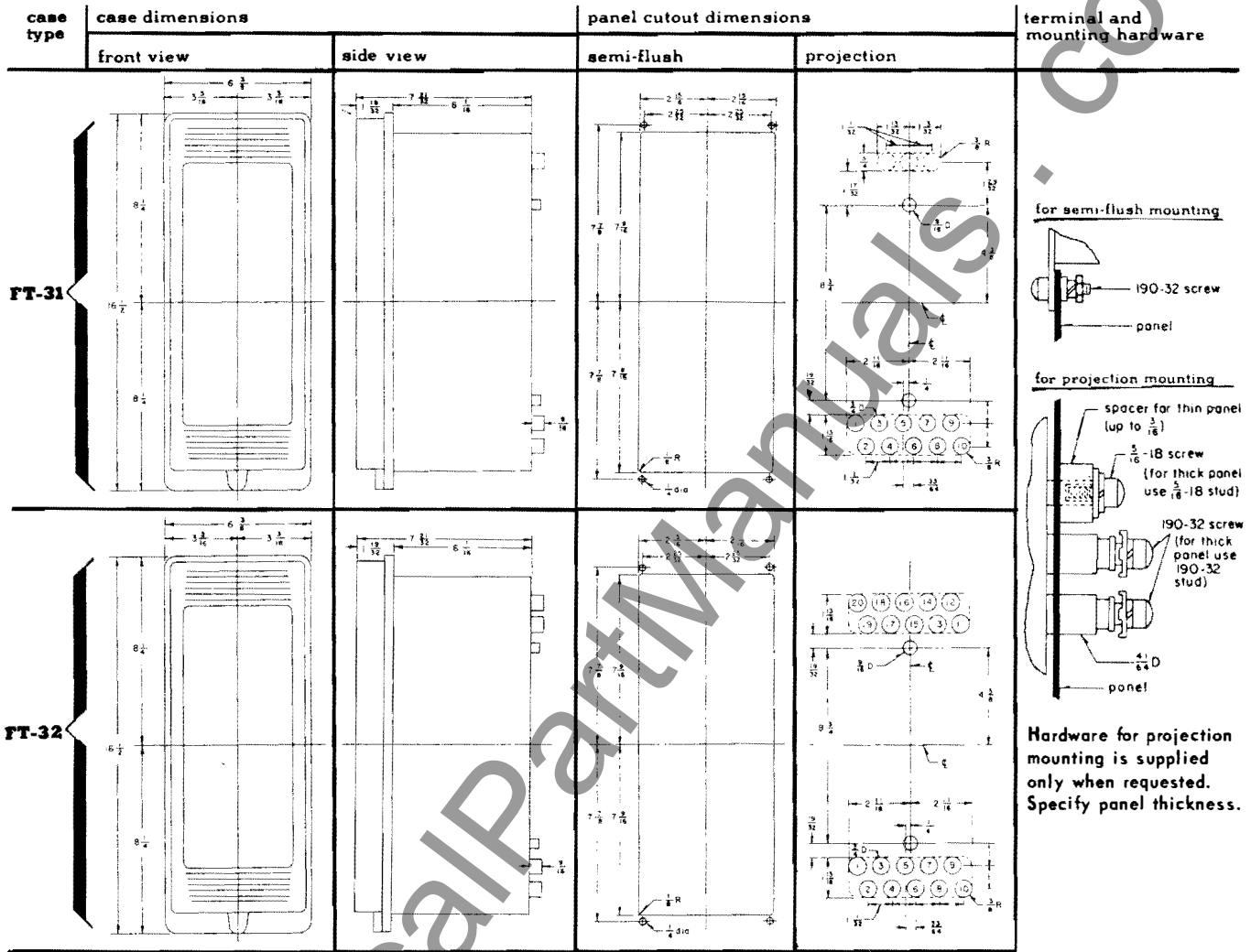


Fig. 3 Mounting details for FT-31 and FT-32 cases.

GENERAL DATA			
COMBINED STATORS OF 5 AMP - 120 VOLT - 60 CYCLE METERS			
	TYPE		
	D2B-3F	D2B-32F	D2B-38F
STARTING WATTS	9	12	12
WATTHOUR CONSTANT (K _h)	1.8	2.4	3.6
FULL LOAD R.P.M. ON SINGLE PHASE TEST	16 2/3	16 2/3	22 2/9

TRANSFORMER BURDENS FOR 60 CYCLE METERS			
EACH VOLTAGE COIL CIRCUIT INCLUDING P.I. LAMP		EACH STATOR	
FOR RATED MULTIPLES OF 120 VOLT	VOLT - AMPS WATTS POWER FACTOR	8.65 1.35 .16	
EACH CURRENT CIRCUIT			
	D2B-3F D2B-32F FULL COIL	D2B-38F HALF COIL Z CIRCUIT	
5 AMPS IN 5 AMP COIL			
VOLT-AMPS	.40	.25	.40
WATTS	.30	.21	.30
POWER FACTOR	.75	.84	.75
5 AMPS IN 2.5 AMP COIL			
VOLT-AMPS	1.20	.65	1.20
WATTS	.65	.40	.65
POWER FACTOR	.54	.62	.54

WIRING DIAGRAMS

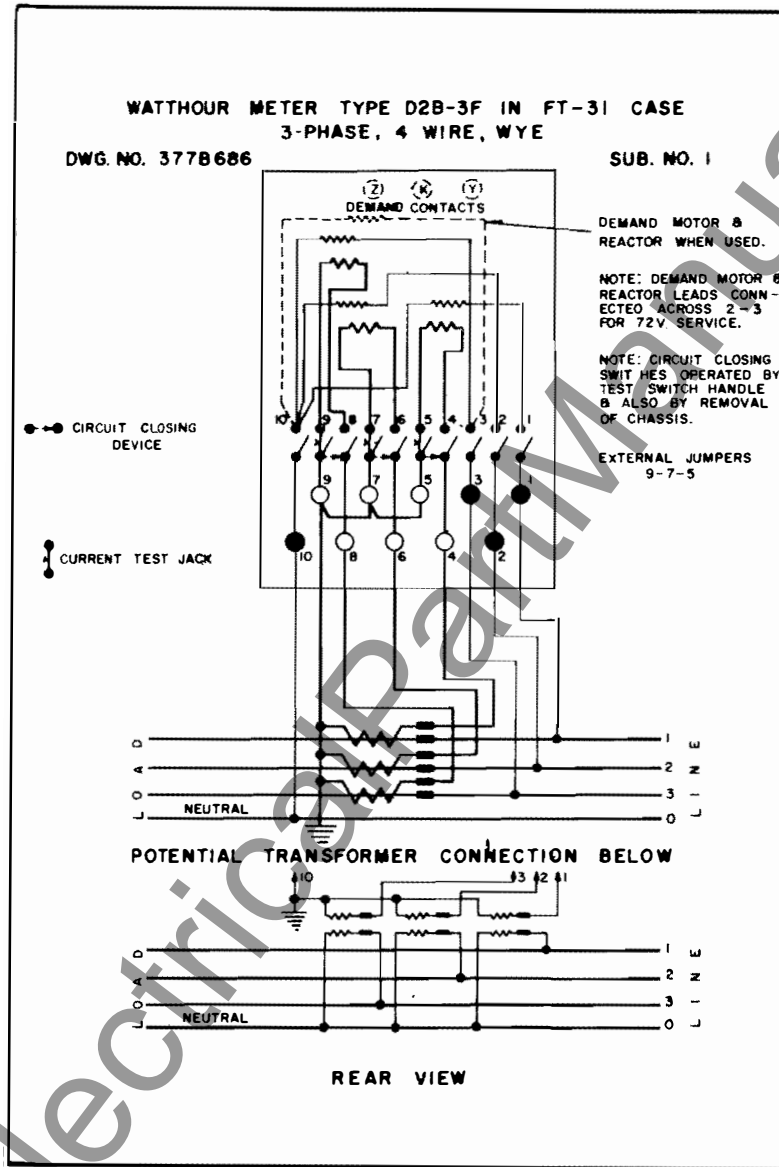


Fig. 4 Type D2B-3F, 3-phase, 4-wire wye. in FT-31 case (10 switches).

WIRING DIAGRAMS

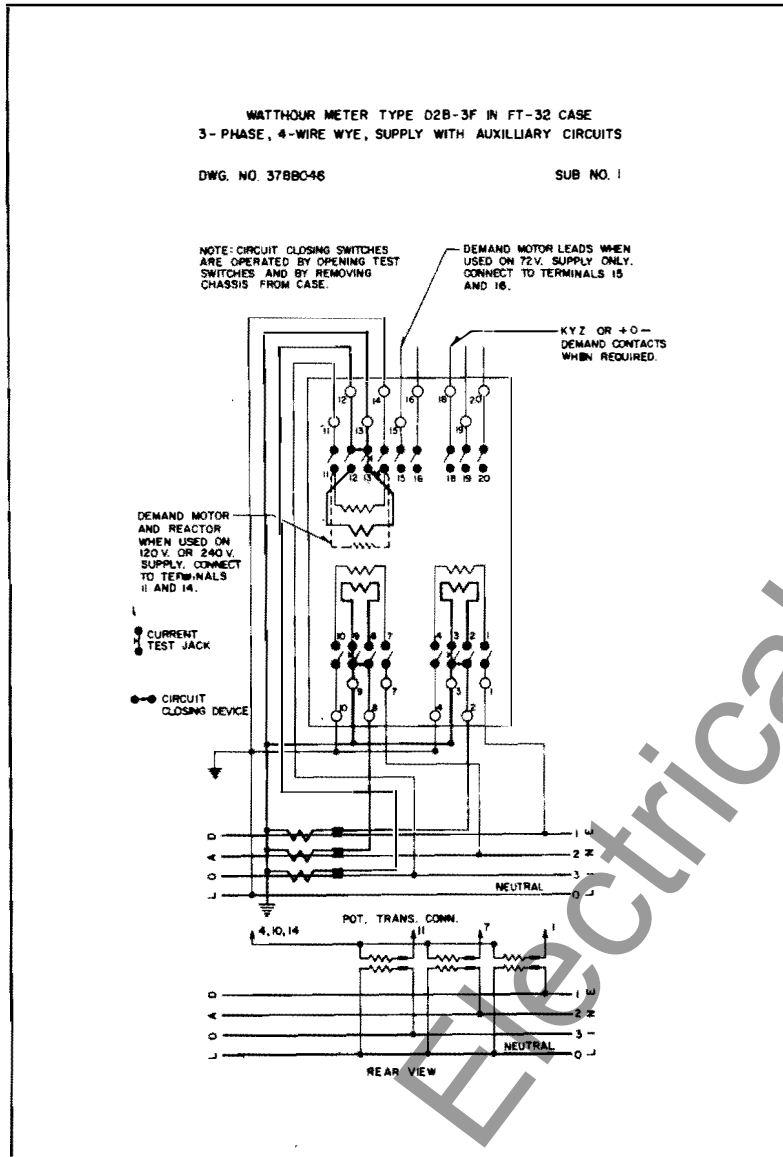


Fig. 5 Type D2B-3F, 3-phase, 4-wire wye. In FT-32 case. (20 switch positions)

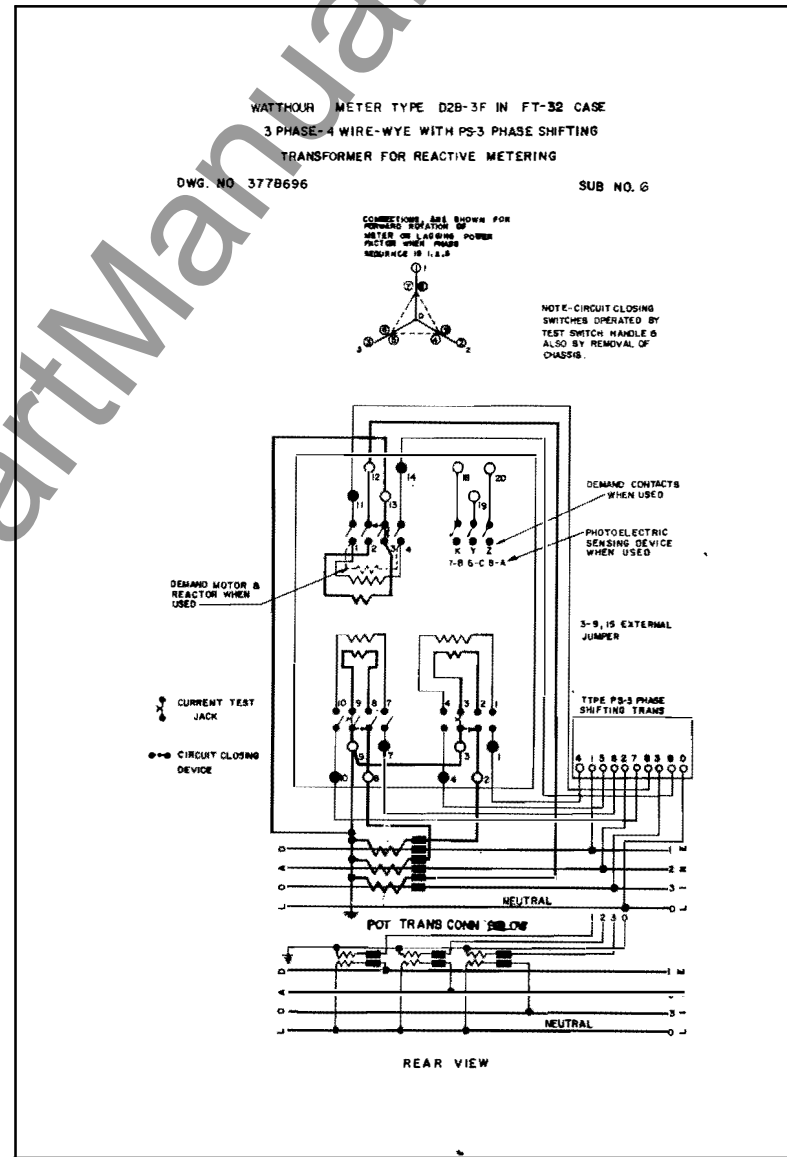


Fig. 6 Type D2B-3F, 3-phase, 4-wire wye, connected for reactive metering. In FT-32 case. (20 switch positions)

WIRING DIAGRAM

WATTHOUR METER TYPE D2B-32F IN FT-32 CASE
 TOTALIZING TWO 3PH 3W CIRCUITS
 WITH CURRENT TRANSFORMERS

DWG. NO. 3778697

SUB NO. 4

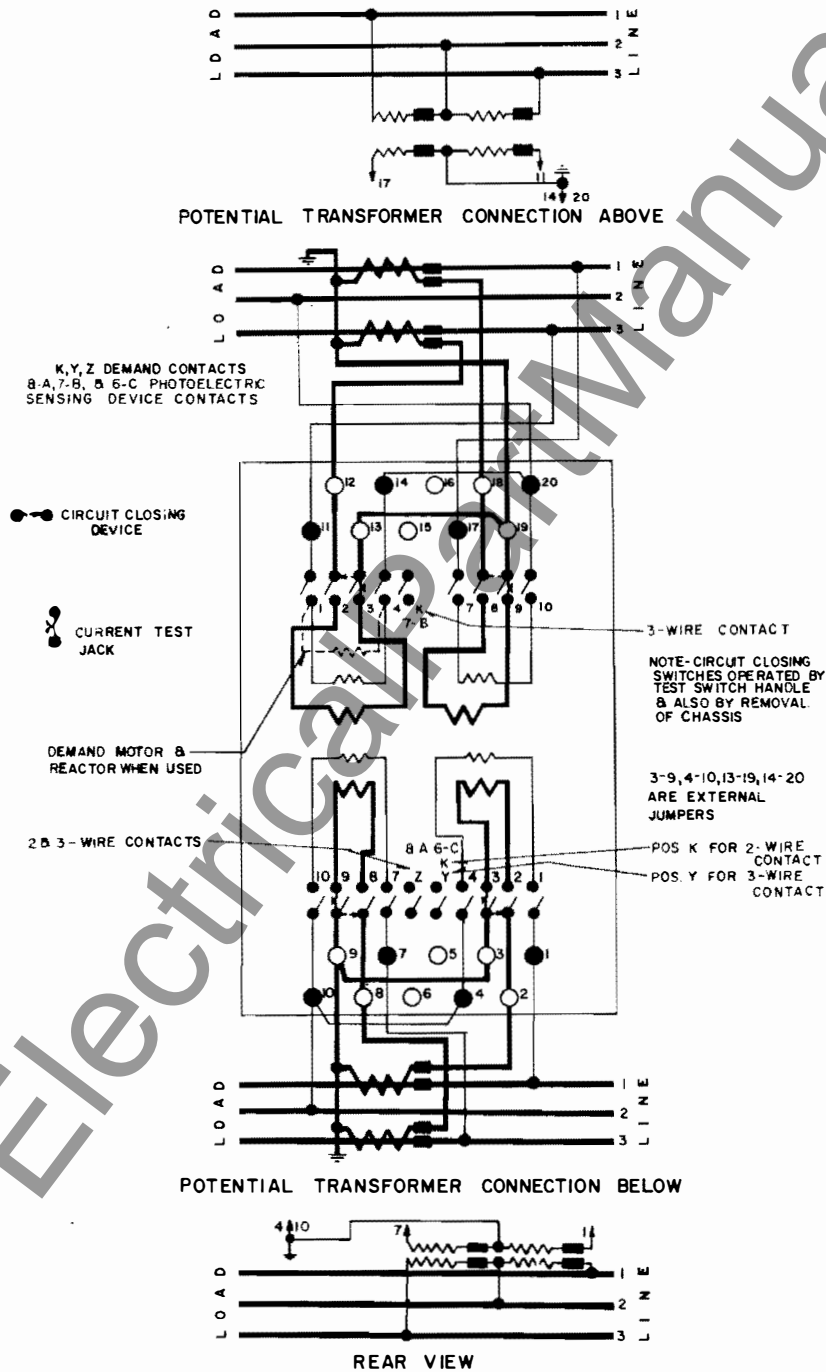


Fig. 7 Type D2B-32F, totalizing two 3-phase, 3-wire circuits. In FT-32 case (20 switch positions).

WIRING DIAGRAM

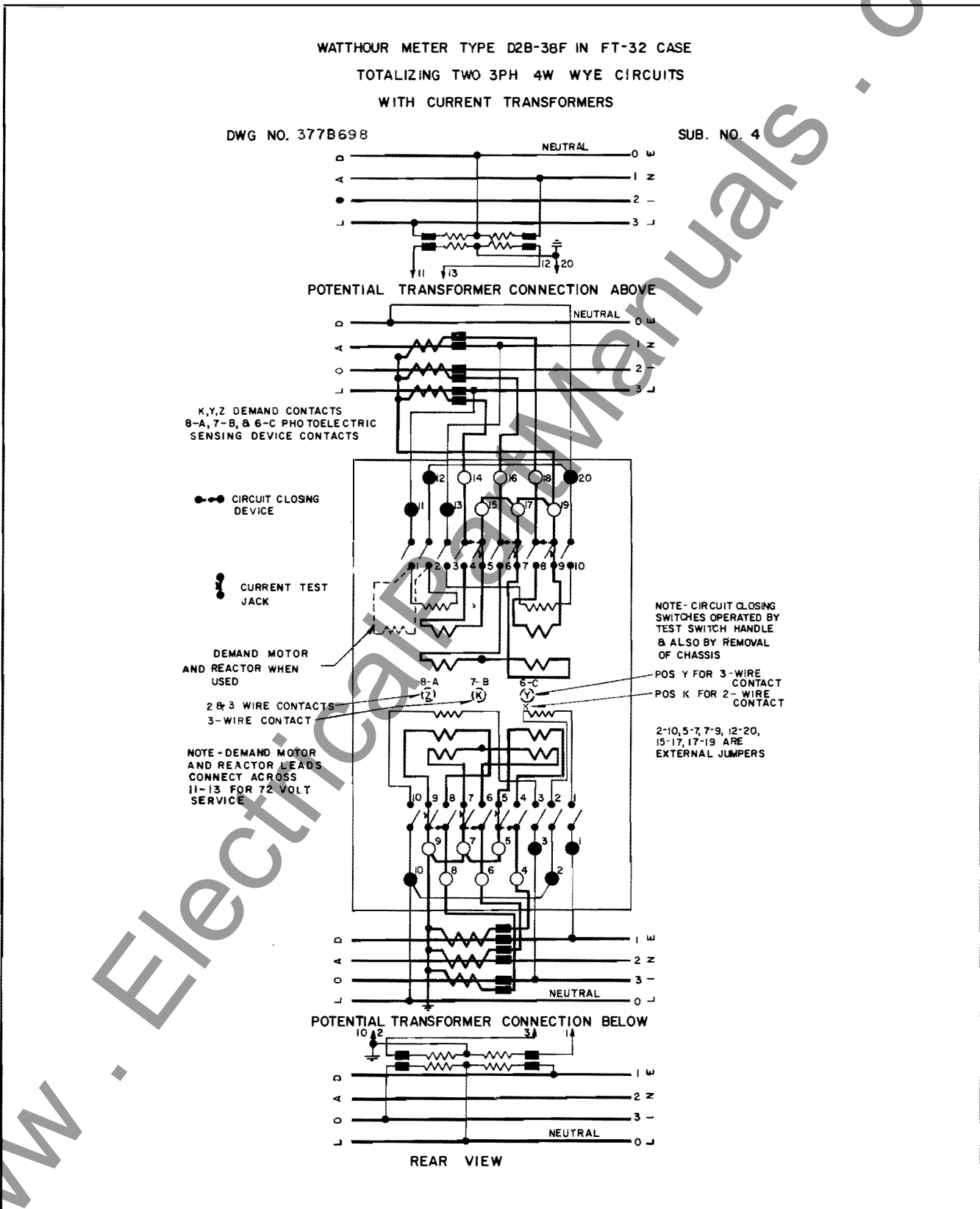


Fig. 8 Type D2B-38F, totalizing two 3-phase, 4-wire wye circuits. In FT-32 case (20 switches).

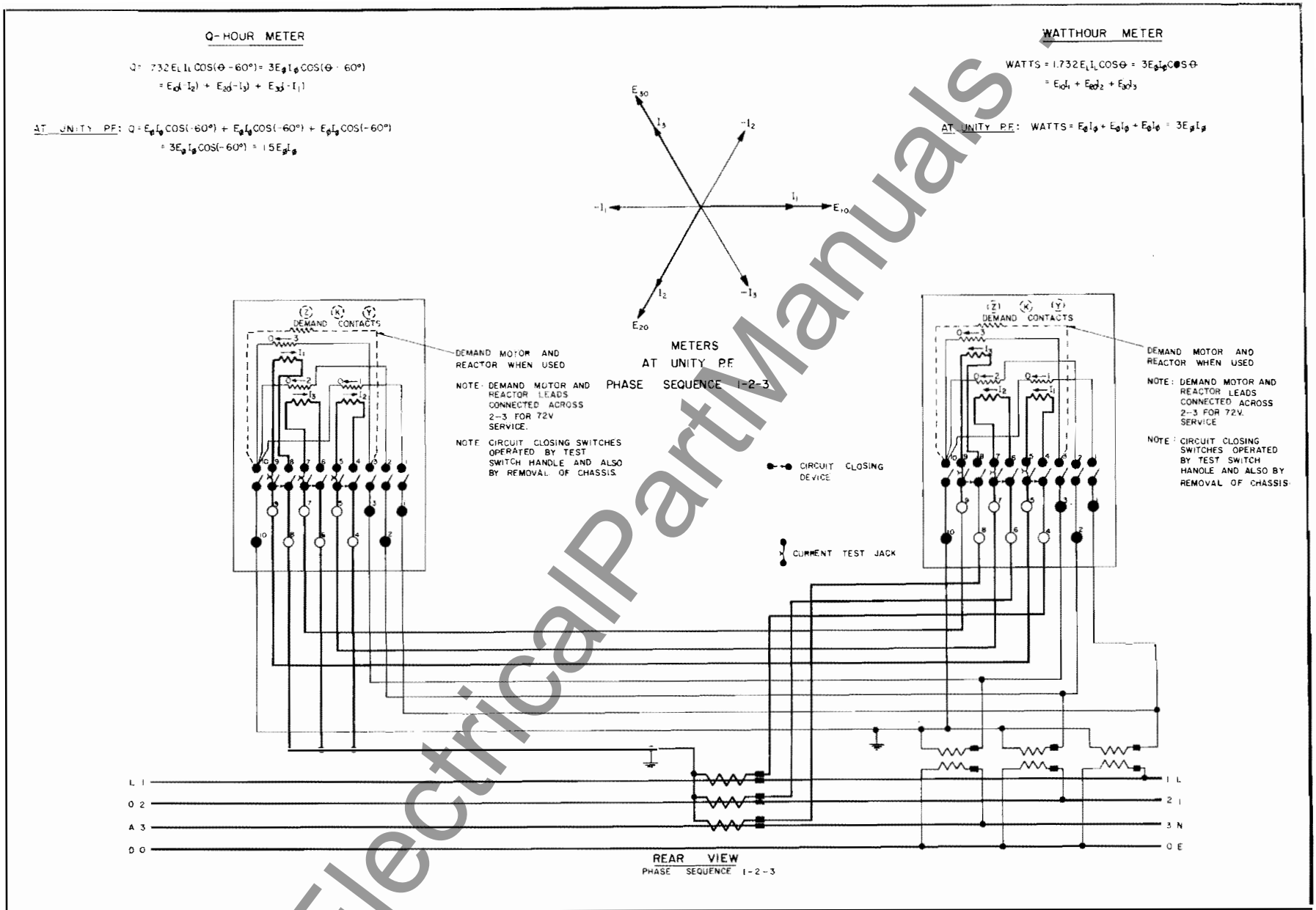


Fig. 9 A type D2B-3F meter in FT-31 case connected as a Q-Hour meter plus a type D2B-3F meter in FT-31 case connected as a watt-hour meter for a 3-phase, 4-wire wye system



INSTALLATION • OPERATION • MAINTENANCE INSTRUCTIONS

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

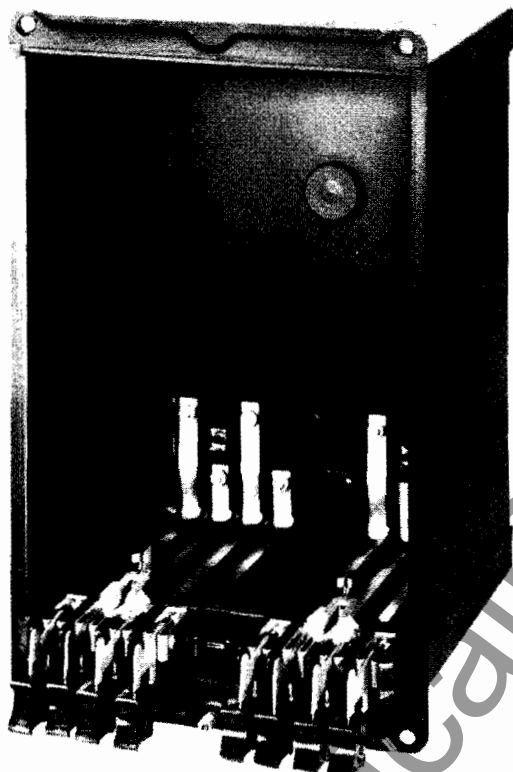


Fig. 1. FT-21 Case.

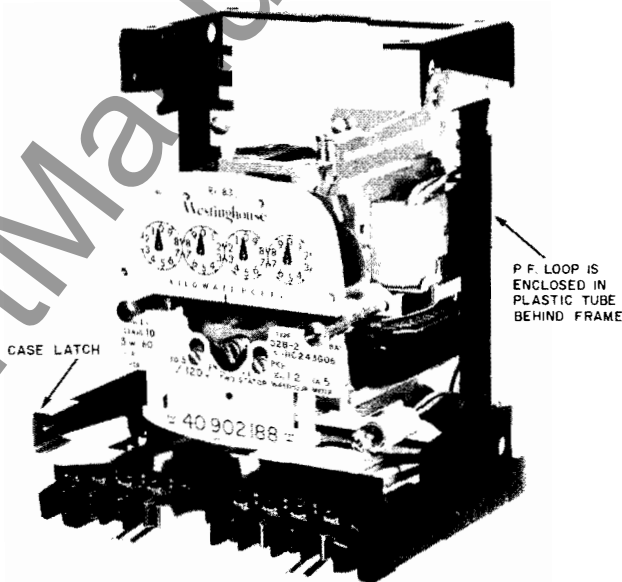


Fig. 2. D2B Chassis.

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

TYPE D2B FLEXITEST SWITCHBOARD METERS

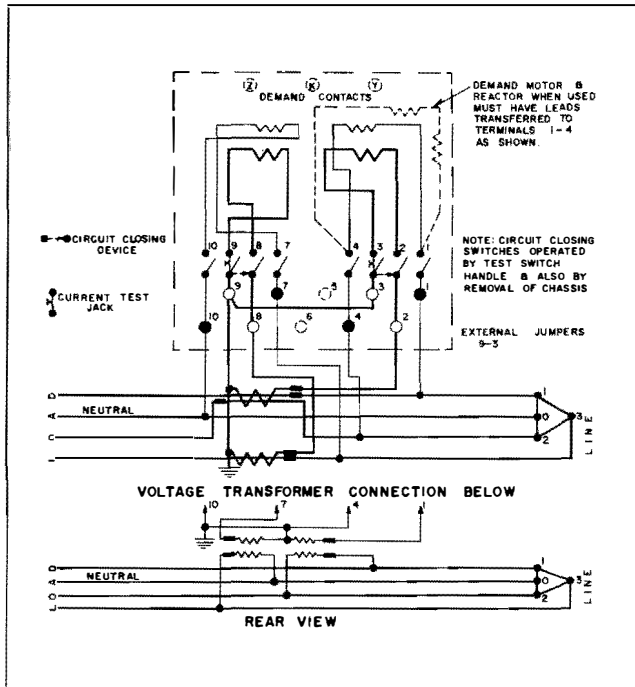


Fig. 5. Type D2B-2F, 3-Phase, 4-Wire, Delta

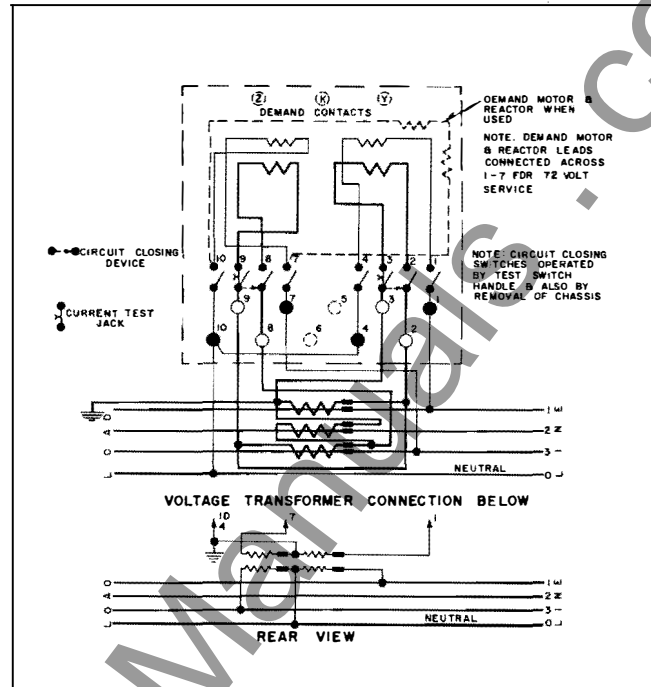


Fig. 6. Type D2B-2F, 3-Phase, 4-Wire, Wye.

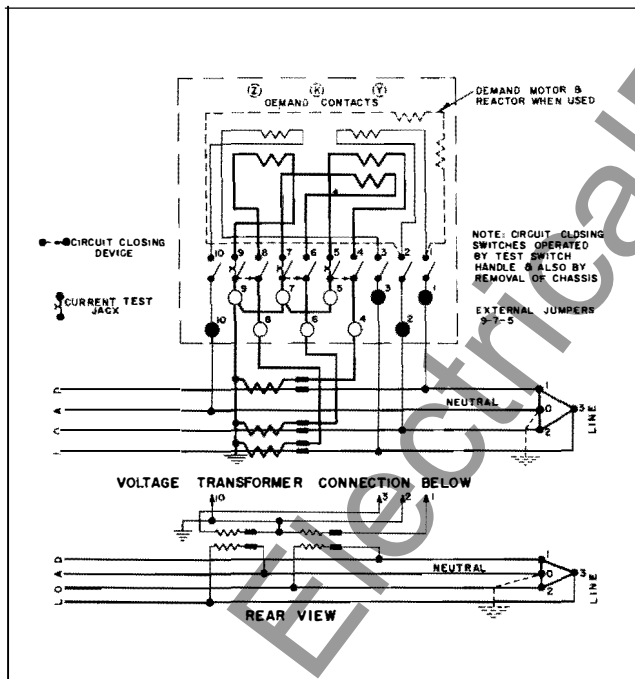


Fig. 7. Type D2B-7F, 3-Phase, 4-Wire, Delta

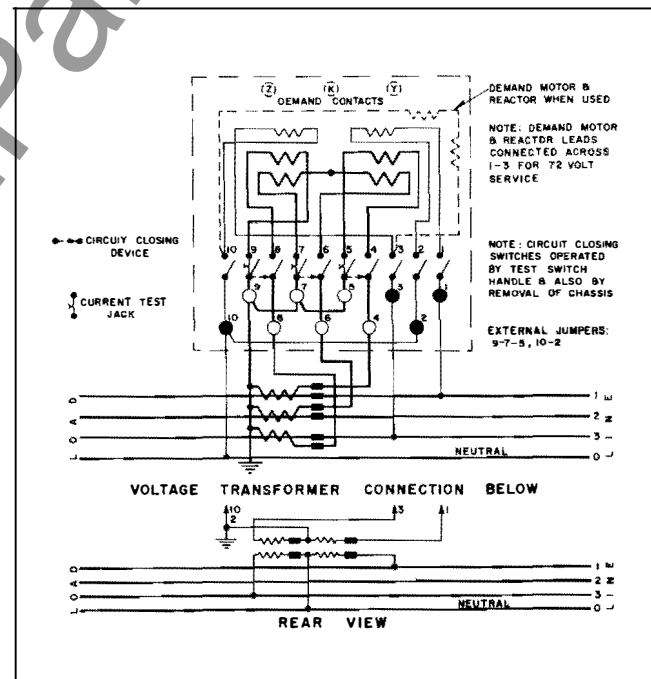


Fig. 8. Type D2B-8F, 3-Phase, 4-Wire, Wye

WESTINGHOUSE ELECTRIC CORPORATION
METER DIVISION

RALEIGH, N. C.

Printed in U.S.A.

TO Zarita Job Site - Geo. Lenkiewicz 17 July 68

LOCATION

DEPT.

NAME

DATE

SUBJECT kWhr Meters - Use of 60Hz units on 50Hz / error

cc: WEICO-NY - Nuclear Proj - J. Cicinelli

① Re: Your 10 July memo for information on error.

② This should be considered for your information only until Joe Cicinelli has a chance to resolve the situation and advise the Site.

③ We discussed this special situation with Bob Bellon - Application Engineer at Raleigh Wks - and these are the considerations -

- When a 60Hz D2B-2F whr. meter is applied to 50Hz you will have an power factor error of 2-3% primarily due to the strength of the permanent magnets used for dampening. Also the impedance of the current and voltage coils will be lowered.

- As you indicate the Customer did try to recalibrate the meters. More

FROM

LOCATION

DEPT.

NAME

www.ElectricalPartManuals.com

70

LOCATION

DEPT.

NAME

DATE

SUBJECT

- 2 -

than likely he was successful at light and full load points. However if he checked at unity power factor he would have a 2-3% error.

A. Kwhr meter must be built for 50Hz to obtain specified accuracy.

- ④ We understand that the project was planning to supply new electro-magnet assemblies and have the meters rebuilt at the job site. Our consideration this morning indicates that this is not a practical approach due to the type of work, care and calibration required. Just bumping the rotating disc could damage its pivot a slight amount and this would not be recognized until much time was used in an unsuccessful attempt to bring the meter into calibration -

A high degree of metering accuracy will be required if their values are

FROM

LOCATION

DEPT.

NAME

www.ElectricalPartManuals.com

TO

LOCATION

DEPT.

NAME

DATE

SUBJECT

-3-

to be used to reconcile fuel consumption.

- ⑤ Joe is now trying to have an order entered on Raleigh for 14 new 50HZ, D2B-2F watt-hour meters. The 60HZ meters would be returned for credit. Apparently the situation is due to a Raleigh shipping error.

Allan

FROM

WEICC-NY

LOCATION

FS&S

DEPT.

NAME

Allan Powell

www.ElectricalPartManuals.com