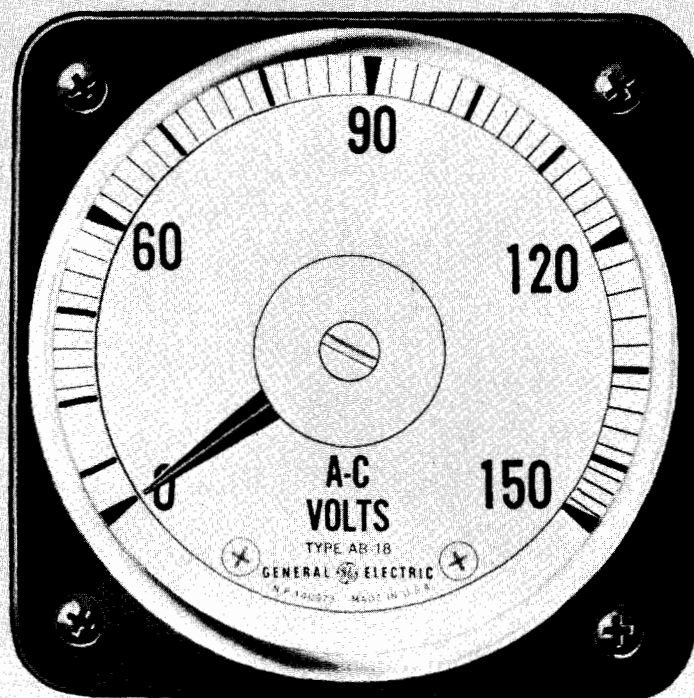




## INSTRUCTIONS

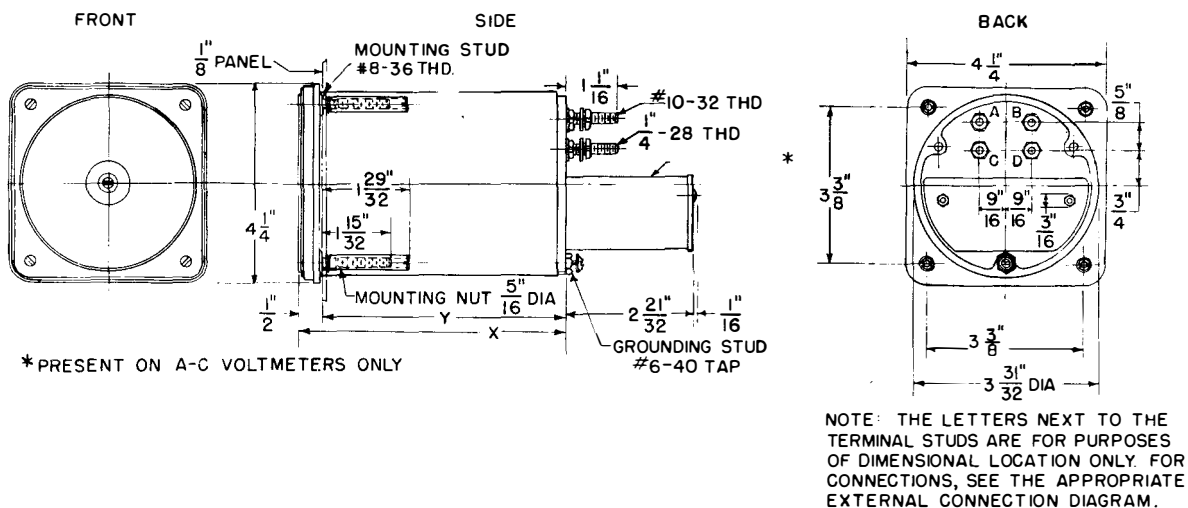
GEH-1539C  
Supersedes GEH-1539B

# TYPES AB AND DB AMMETERS AND VOLTMETERS



FOR DIMENSIONS OF TYPES DB-16 & -18 INSTRUMENTS  
AFTER JULY, 1956 (MODEL NOS. 8DB.....2)  
SEE SUPPLEMENT GEI-49099

GENERAL  ELECTRIC



INSTRUMENT	STUD LOCATION	DIMENSIONS	
		X	Y
Type DB-10 Ammeter	CD	3 15/32"	2 31/32"
Type DB-10 Voltmeter	AB	3 15/32"	2 31/32"
Type DB-10 Ground Detector	CD	3 15/32"	2 31/32"
Type AB-10 Ammeter	AB	4 3/8"	3 7/8"
Type AB-10 Voltmeter	AB	4 3/8"	3 7/8"

Fig. 1. Dimensions of Types AB-10 and DB-10 ammeters and voltmeters and DB-10 ground detectors.

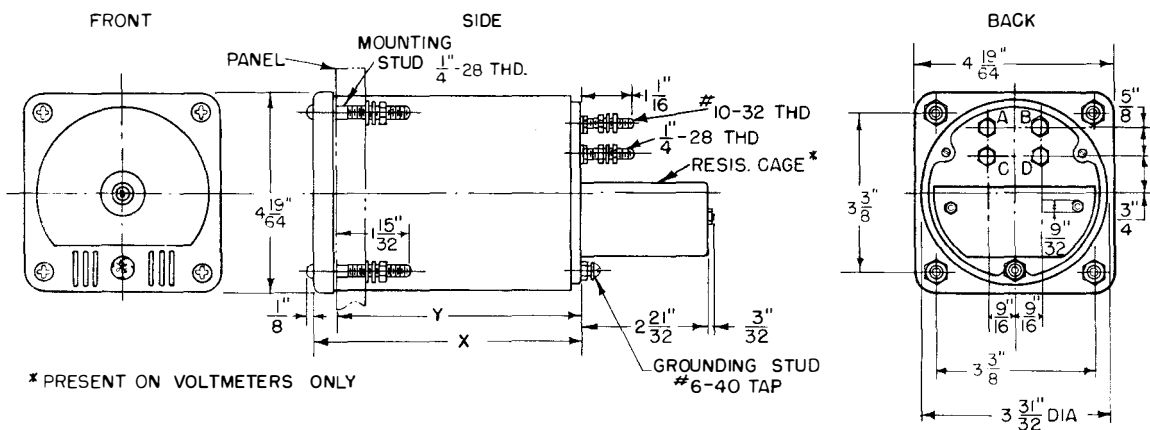


FIG. 2. DIMENSIONS OF TYPES AB-12 AND -13, AND TYPES DB-12 AND -13 AMMETERS, VOLTMETERS AND GROUND DETECTORS.

INSTRUMENT	STUD LOCATION	DIMENSIONS	
		X	Y
D-c Ammeters	CD	3 1/2"	2 31/32"
D-c Voltmeters	AB	3 1/2"	2 31/32"
D-c Ground Detector	CD	3 1/2"	2 31/32"
A-c Ammeters	AB	4 13/32"	3 7/8"
A-c Voltmeters	AB	4 13/32"	3 7/8"

Fig. 2. Dimensions of Types AB-12 and -13, and Types DB-12 and -13 ammeters, voltmeters, and ground detectors.

# TYPES

## AB-10\*,-12\*,-13\*,-14,-15\*,-16,-18, AND -19\*

## AND

## DB-10\*,-12\*,-13\*,-14,-15\*,-16,-18, AND -19\*

# AMMETERS AND VOLTMETERS

### INTRODUCTION

These instructions cover the installation of the General Electric Types AB and Types DB a-c and d-c ammeters and voltmeters. These instruments are long-scale, rectangular-pattern, switchboard types designed for flush mounting. The instruments, as supplied, are intended for use on the circuit specified by the customer.

There is a nameplate located on the back of each instrument. This nameplate gives the serial number and such information on the current or voltage rating, frequency rating, transformer ratio, full-scale value, and lead resistance as is applicable to the instrument. On voltmeters, the nameplate also indicates whether the resistor is internal or external.

Ammeters and voltmeters supplied with transformers will have their scales calibrated in primary amperes or primary volts respectively, unless otherwise specified.

#### A-C AMMETERS

When the circuit exceeds 20 amperes, a current transformer of the ratio indicated on the nameplate must be used. When the circuit exceeds 650 volts a current transformer must be used for purposes of in-

sulation. The current transformer must have a frequency rating which corresponds to that indicated on the instrument nameplate.

#### A-C VOLTMETERS

When the circuit exceeds 750 volts, a potential transformer of the ratio indicated on the instrument nameplate must be used. The transformer must have a frequency rating which corresponds to that on the instrument nameplate.

An external Form-3 resistor must be used when so indicated on the instrument nameplate. The table below gives the number of tubes in the resistor supplied with instruments of various voltage ratings. When an external resistor is used, it must bear the same serial number as that of the instrument. The

EXTERNAL RESISTORS		
Description	Volts	External Resistor
Single-range	150	None
Single-range	175, 300	One 1-tube
Single-range	350	One 1-tube or 2-tube
Single-range	500	One 4-tube or 2-tube
Single-range	600, 750	One 4-tube
Double-range	75/150	None
Double-range	150/300	One 1-tube

\* Discontinued type; no longer available

BURDEN DATA							
TYPE	Impedance in Ohms	Effective Resistance in Ohms	Inductance in Henries	Volt-amperes	Watts	Vars	Power Factor
120-volt, 60-cycle Potential Circuit							
Voltmeters (150-volt rating)	3020	2960	1.52	4.76	4.67	0.94	0.98
5-ampere, 60-cycle Current Circuit							
Ammeters	0.086	0.05	0.000187	2.15	1.25	1.78	0.58

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

dimensions of the external resistors are given in Fig. 10, 11, and 12.

### D-C AMMETERS

D-c ammeters designed for current measurement above 60 amperes necessitate the use of shunts which are to be connected to the ammeter by means of the leads provided. In the event that leads are supplied by the purchaser, their resistance should agree with the value stamped on the instrument nameplate. Any change in the resistance of these leads will introduce an error in the reading. General Electric shunts of the same ampere rating and millivolt drop are interchangeable.

**Warning:** All ammeter shunts should be connected in the grounded side of the line when possible. When this is not possible, or the circuit cannot be grounded, the metal parts of manually operated contact devices or auxiliary pointer knobs which project through the cover are at line potential. When the cover is removed, also remember that the instrument windings, as well as the scale and pointer, are at line potential. Use caution to avoid contacting this potential.

As the resistance of the shunt leads used in certain applications cannot be predetermined at the factory, it has been found desirable to furnish some d-c ammeters with an internal rheostat to adjust for non-standard lead resistances.

The nameplate on the instrument has an **INSTRUMENT + LEAD RESIS.** value stamped upon it. This value is to be that of the total circuit, which is considered to include the resistance of the instrument and its leads with the shunt disconnected. This total circuit resistance must be adjusted correctly in order to attain the specified accuracy of the instrument.

To adjust the rheostat for a given lead resistance, proceed as follows:

If a resistance bridge is available, connect it across the shunt end of the leads (shunt disconnected) and the instrument across the opposite end. Set the resistance bridge for the **INSTRUMENT + LEAD RESIS.** value stamped on the instrument nameplate. Loosen the lock nut (located under the nameplate), and turn the rheostat shaft (which projects through the nameplate) until a zero deflection is secured on the bridge galvanometer. After the correct setting has been obtained, retighten the lock nut.

If a resistance bridge is not available, adjustment may be made by connecting a standard millivoltmeter across the shunt end of the leads (shunt disconnected) and the instrument across the opposite end. Apply a low adjustable d-c voltage across the shunt end of the leads and adjust this voltage until the indication on the standard millivoltmeter agrees with the full-

scale millivolts (marked **FULL SCALE MV**) on the instrument nameplate. Loosen the lock nut (located under the nameplate), and turn the rheostat shaft (which projects through the nameplate) until the ammeter reads full scale. Retighten the lock nut.

**Note:** The maximum lead resistance is about 1 ohm for a 100-millivolt instrument and about 0.26 ohm for a 50-millivolt instrument.

### D-C VOLTMETERS

D-c voltmeters designed for use on circuits above 750 volts and d-c ground detectors for voltages up to and including 750 volts are furnished with external resistors and are connected directly to the circuit to be measured.

## INSTALLATION

### MOUNTING

The appropriate dimension drawings shown in this book should be followed when drilling the switchboard. All drilling and all wiring on the switchboard should be completed before mounting the instruments. Supporting studs are provided for mounting on the switchboard. Mount the instruments in a level position.

These instruments are practically unaffected by stray fields, but it is advisable to keep transformers and wires carrying heavy current as far as possible from all indicating instruments.

When there is no current flowing through the instrument and it is properly leveled, the pointer should indicate zero. Any deviation from zero should be corrected by means of the zero adjustor.

### TERMINAL CONNECTIONS

The threads on the terminal studs and nuts should be clean and bright. The contact surfaces of nuts, busbars, and cable terminals must be thoroughly clean to insure good contact. If a nut turns hard, it should be run over a tap of the proper dimensions; otherwise, the threads on the stud may be ruined or the stud turned in the instrument, thereby breaking the connection. After the instrument has been connected, tighten the nuts sufficiently to insure good contact. Do not overtighten.

The nuts and studs used in these instruments are U. S. standard.

Connect the instrument as shown in the appropriate diagram. The numbers in these connection diagrams correspond to the numbers stamped on the instrument terminals.

On instruments manufactured prior to 1951, the terminal studs are stamped with letters instead of

numbers. For such instruments, the connection diagrams in this book may be followed by observing the pictorial positioning of the terminals, rather than the stud markings.

**Warning:** Care must be exercised in handling high tension wires when installing instruments on such circuits.

### POLARITY MARKINGS OF TRANSFORMERS

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

### GROUNDING CASES OF A-C INSTRUMENTS

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

Grounding connections from the grounded side of the secondary circuits to earth should be made in accordance with the provisions of the National Electric Code.

## PRINCIPLES OF OPERATION

The d-c instruments utilize a permanent-magnet, moving-coil mechanism adapted for the longscale instrument design. Current passing through the moving coil produces a magnetic field which interacts with the field produced by the permanent magnet, thus supplying the deflecting torque. The moving system deflects until counterbalanced by the instrument control springs.

The a-c instruments (except expanded-scale voltmeters) employ a moving iron mechanism of the attraction-repulsion type. In these instruments, three soft-iron strips of carefully determined configuration are mounted inside the field coil.

When this coil is energized, it magnetizes the three iron strips and also a vane attached to the pivoted shaft. The center iron strip exerts a force of repulsion, and the other two strips a force of attraction, on the moving vane, in such a manner that the pointer moves upscale until the torque is counterbalanced by the instrument control spring.

The expanded-scale, a-c voltmeters utilize a standard electro-dynamometer mechanism with a saturable reactor placed in series with the moving coil. The moving-coil circuit is connected in parallel with a circuit consisting of the field and frequency compensating network.

When the voltage source is applied across the saturable reactor, the exciting current varies in a nonlinear fashion with the voltage. The scale distribution corresponds to this nonlinear variation, and the instrument produces an accurate, readable indication in the area of the reference voltage.

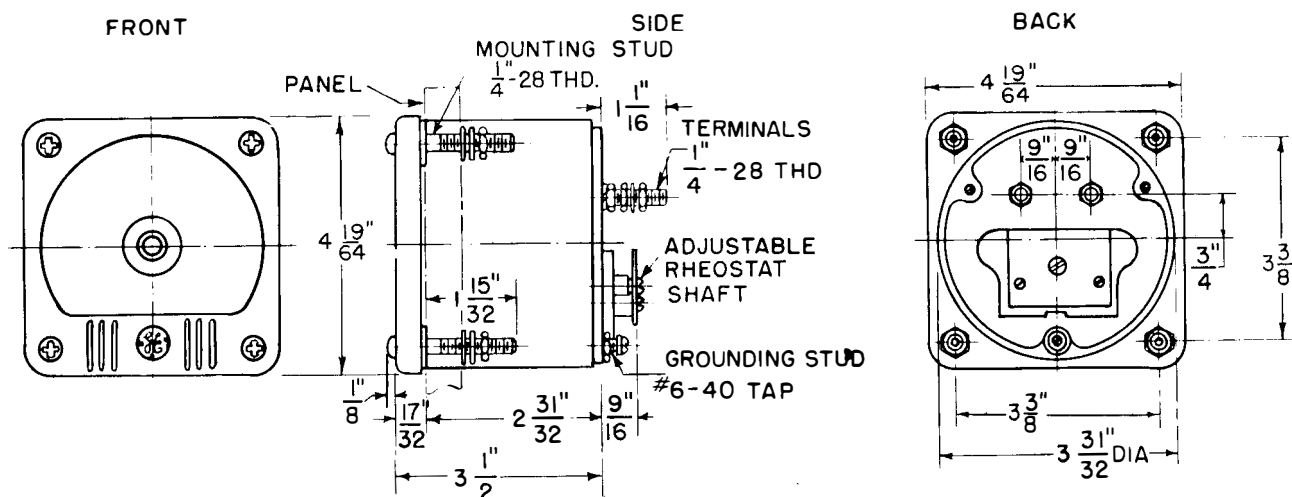
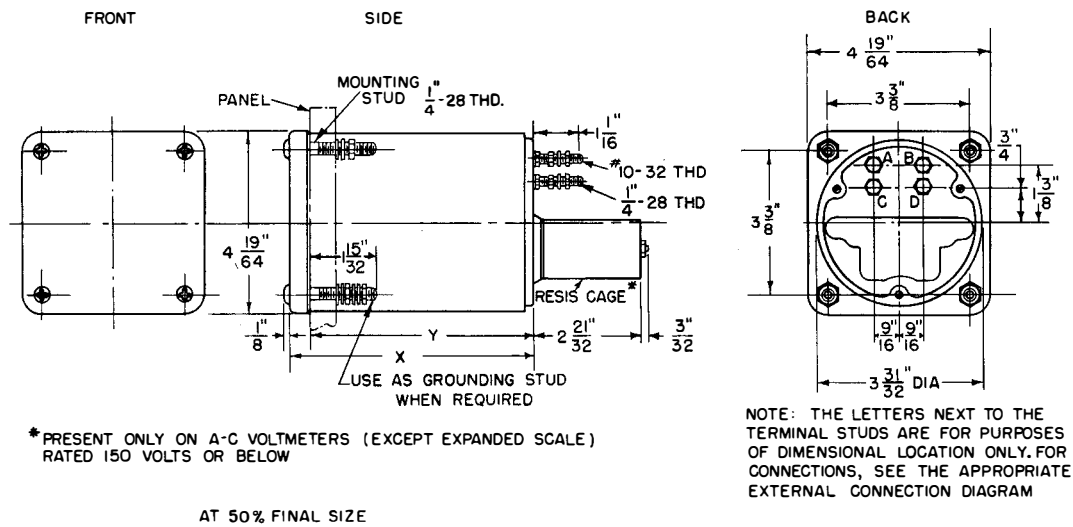


Fig. 3. Dimensions of Types DB-12 and -13 ammeters with rheostat for lead-length compensation.



INSTRUMENT	STUD LOCATION	DIMENSIONS	
		X	Y
D-c Ammeters	CD	$3 \frac{9}{16}$ "	$2 \frac{31}{32}$ "
D-c Voltmeters	AB	$3 \frac{9}{16}$ "	$2 \frac{31}{32}$ "
D-c Ground Detector	CD	$3 \frac{9}{16}$ "	$2 \frac{31}{32}$ "
A-c Ammeters	AB	$4 \frac{15}{32}$ "	$3 \frac{7}{8}$ "
A-c Voltmeters	AB	$4 \frac{15}{32}$ "	$3 \frac{7}{8}$ "
A-c Voltmeters (expanded-scale)	AB	$5 \frac{29}{32}$ "	$5 \frac{5}{16}$ "

Fig. 4. Dimensions of Types AB-14, -15, and -19 and Types DB-14, -15, and -19 ammeters, and voltmeters, and ground detectors

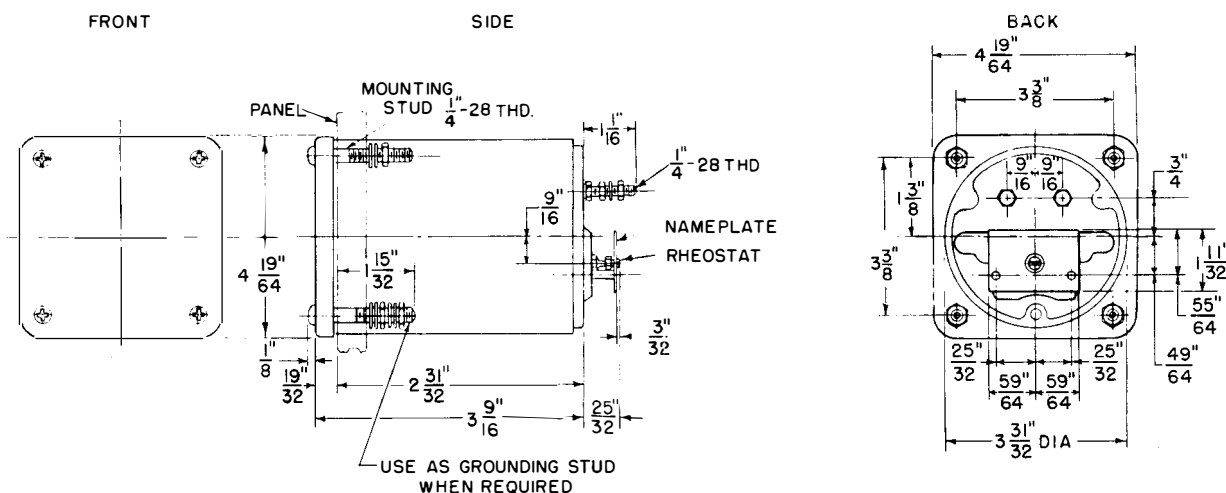
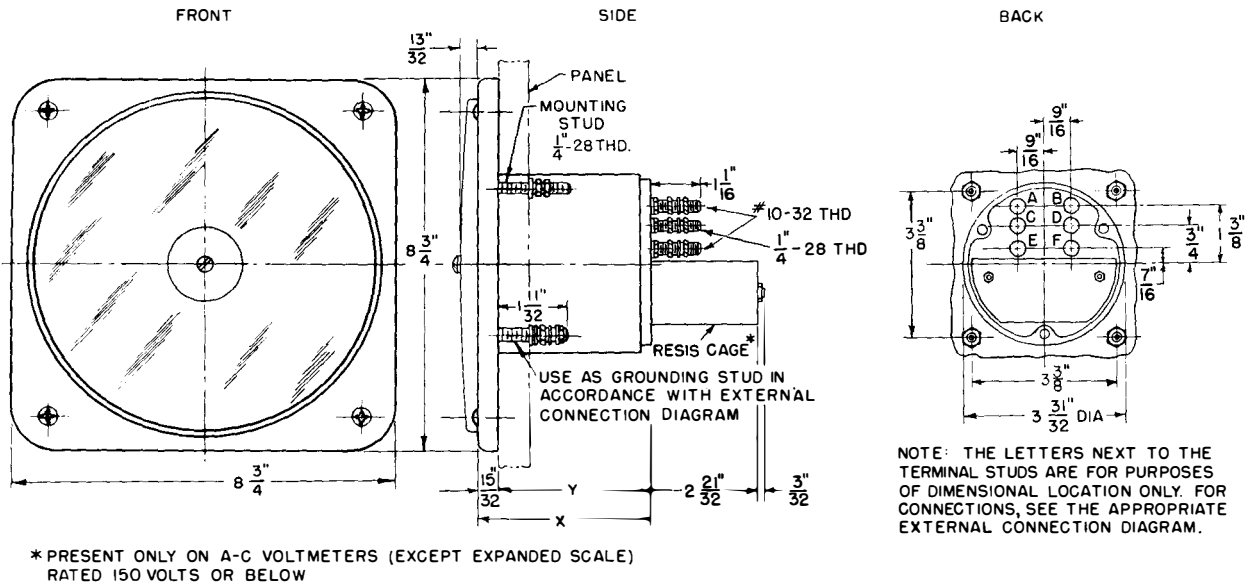


Fig. 5. Dimensions of Types DB-14, -15, and -19 ammeters with rheostat for lead-length compensation.



INSTRUMENT	STUD LOCATION	DIMENSIONS	
		X	Y
D-c Ammeter	CD	3 5/16"	2 27/32"
D-c Voltmeter	AB	3 5/16"	2 27/32"
D-c Ground Detector	CD	3 5/16"	2 27/32"
A-c Ammeter	AB	4 7/32"	3 3/4"
A-c Ammeter (double-rated)	AB EF	4 7/32"	3 3/4"
A-c Voltmeter	AB	4 7/32"	3 3/4"
A-c Voltmeter (expanded-scale)	AB	5 21/32"	3 3/16"

Fig. 6. Dimensions of Types AB-16 and DB-16 ammeters, voltmeters, and ground detectors.

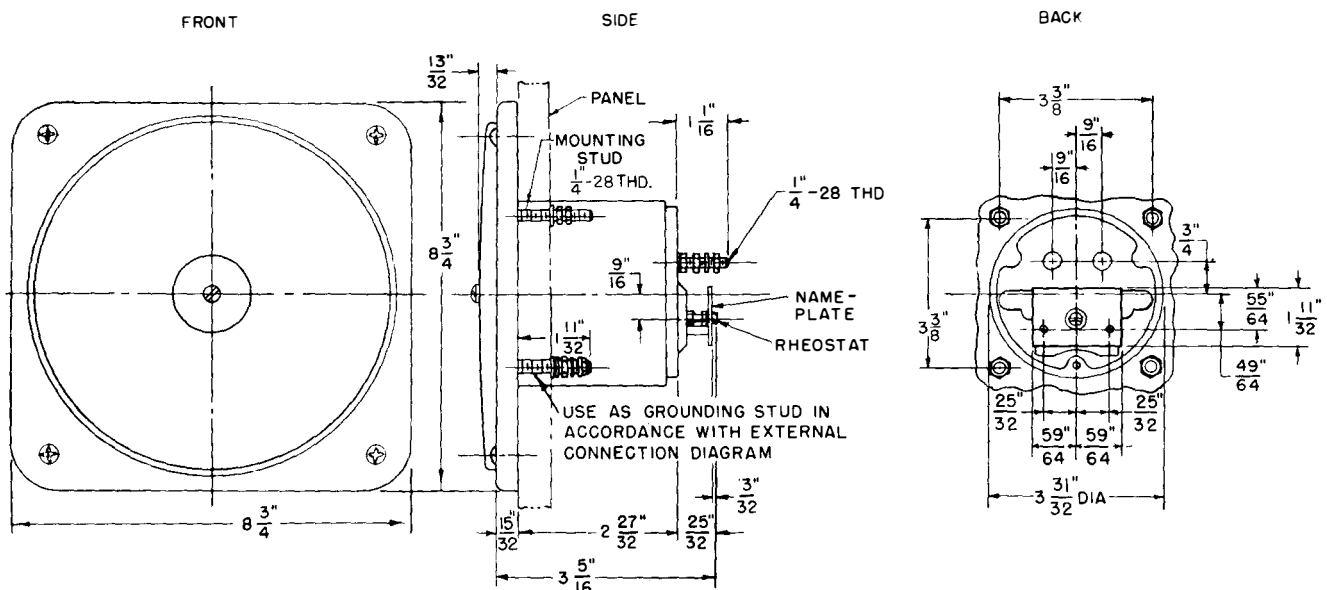


Fig. 7. Dimensions of Type DB-16 ammeters with rheostat for lead-length compensation.

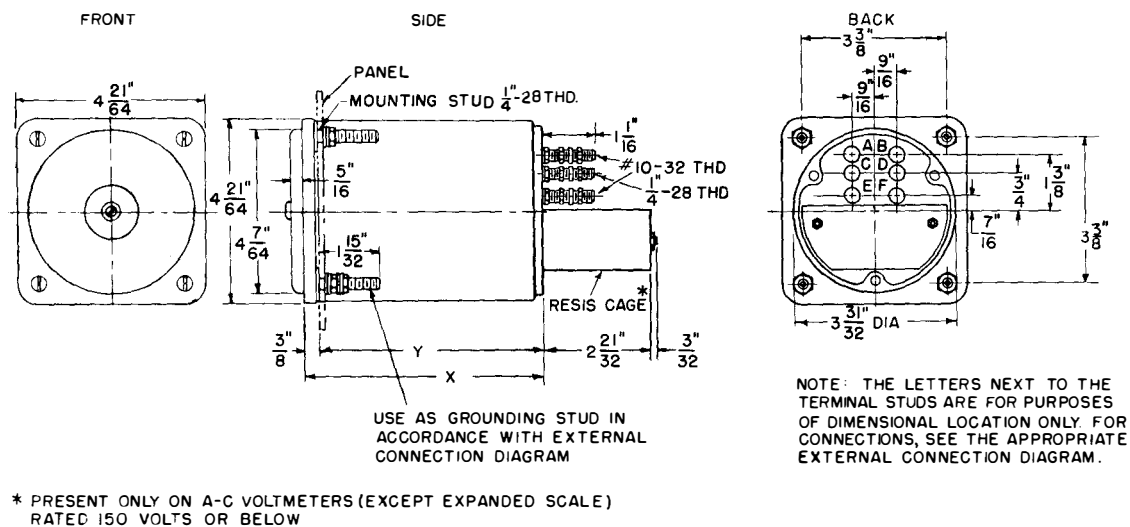


Fig. 8. Dimensions of Types AB-18 and DB-18 ammeters, voltmeters, and ground detectors.

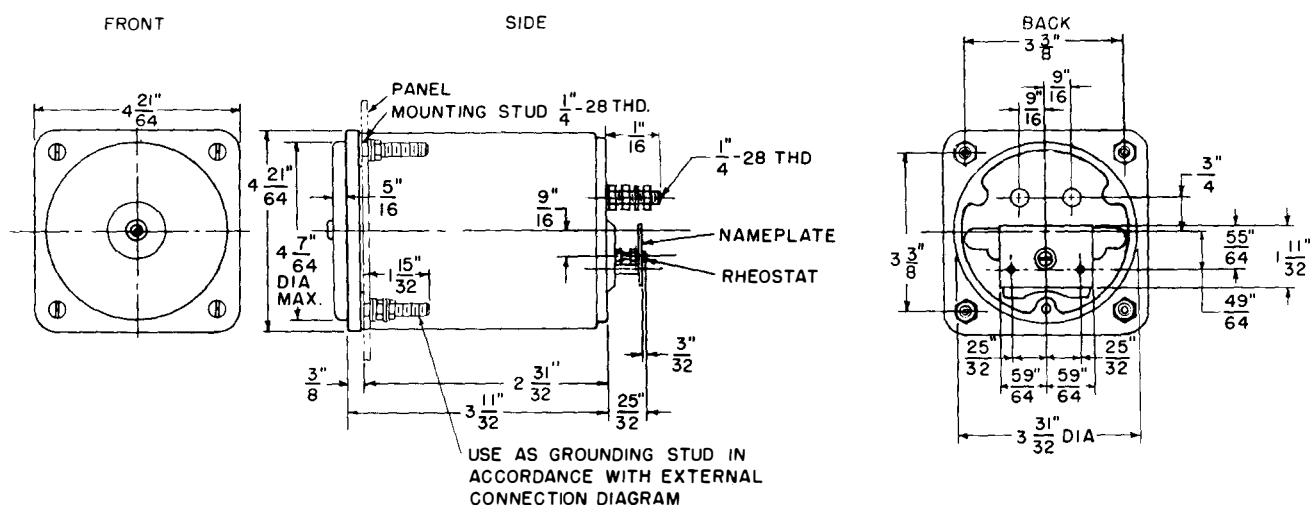


Fig. 9. Dimensions of Type DB-18 ammeters with rheostat for lead-length compensation.



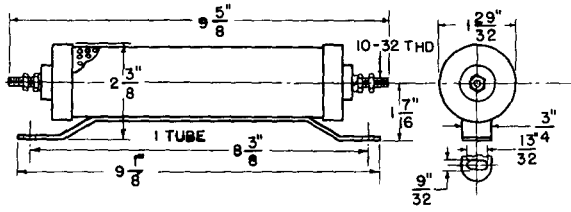


Fig. 10. Single-tube, Form-3 resistor.

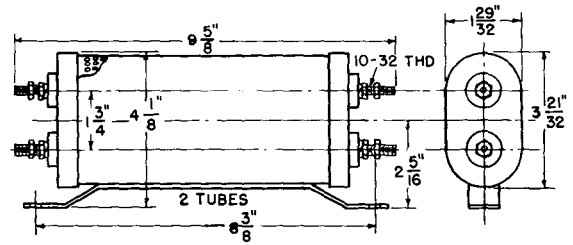


Fig. 11. Two-tube, Form-3 resistor.

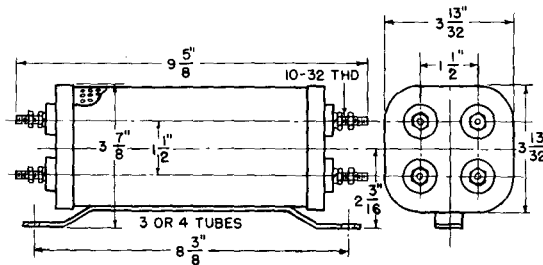


Fig. 12. Four-tube, Form-3 resistor.

### CONNECTION DIAGRAMS

(Back Views)

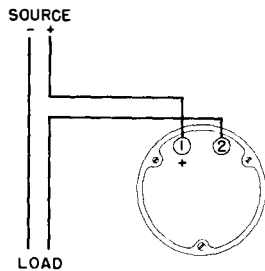


Fig. 13. Self-contained d-c ammeter.

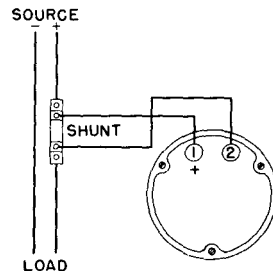


Fig. 14. D-c ammeter with external shunt.

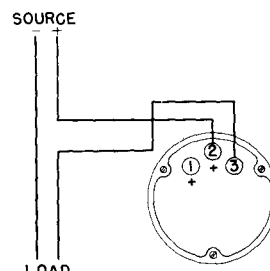


Fig. 15. Low range on double-rated d-c ammeter.

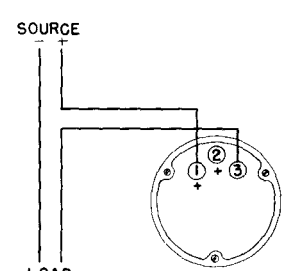


Fig. 16. High range on double-rated d-c ammeter.

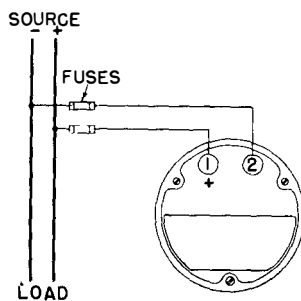


Fig. 17. Self-contained d-c voltmeter.

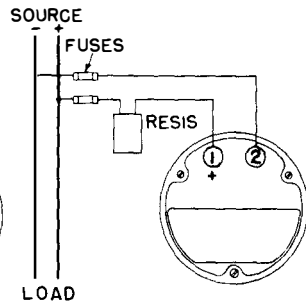


Fig. 18. D-c voltmeter rated above 750 volts (with external resistor).

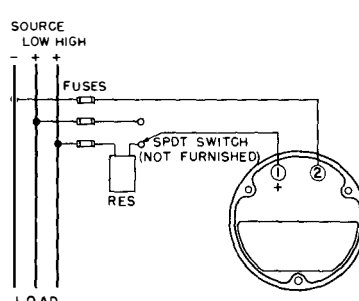


Fig. 19. Double-rated d-c voltmeter (illustrating use of switch to select range).

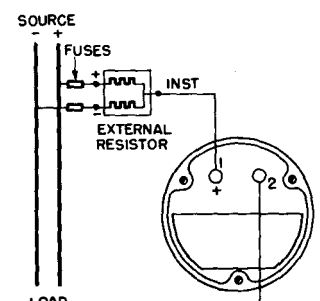


Fig. 19a. D-c ground detector for voltages up to and including 750 volts (with external resistor).

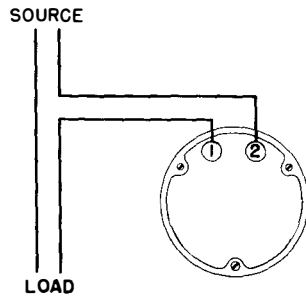


Fig. 20. Self-contained a-c ammeter.

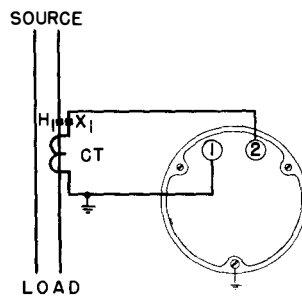


Fig. 21. A-c ammeter (Types AB-10, -12, and -13 only) with current transformer.

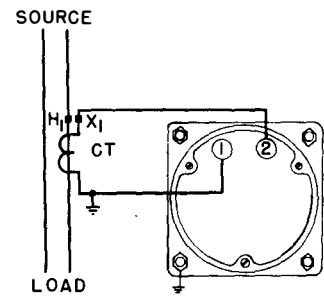


Fig. 22. A-c ammeter (Types AB-14, -15, -16, -18, and -19 only) with current transformer.

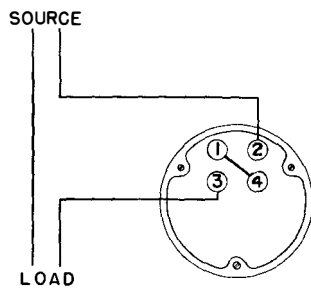


Fig. 23. Low range on double-rated a-c ammeter.

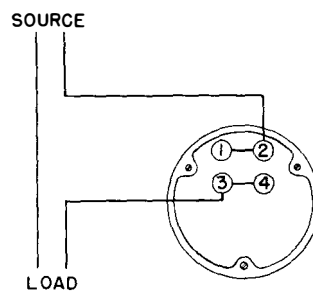


Fig. 24. High range on double-rated a-c ammeter.

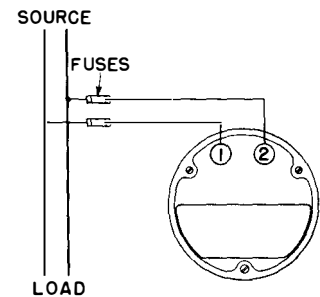


Fig. 25. Self-contained a-c voltmeter.

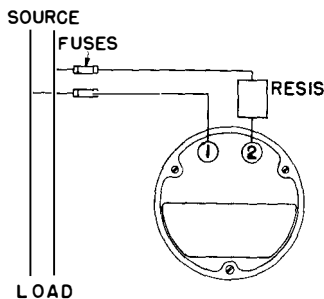


Fig. 26. A-c voltmeter rated above 150 volts (with external resistor).

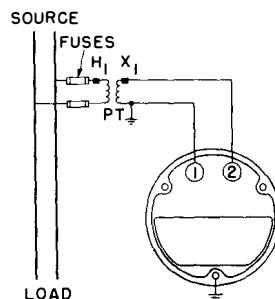


Fig. 27. A-c voltmeter (Types AB-10, -12, and -13 only) with potential transformer.

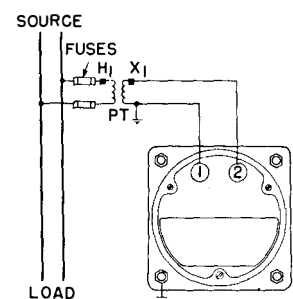


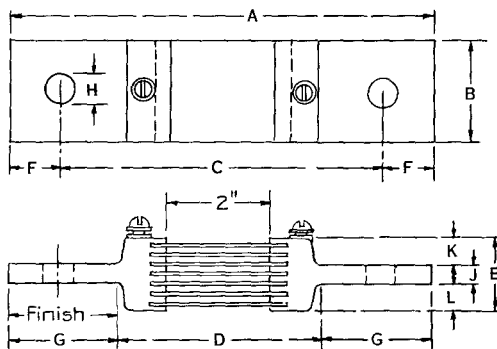
Fig. 28. A-c voltmeter (Types AB-14, -15, -16, -18, and -19 only) with potential transformer.

## FORM-15, 50-MILLIVOLT SHUNTS

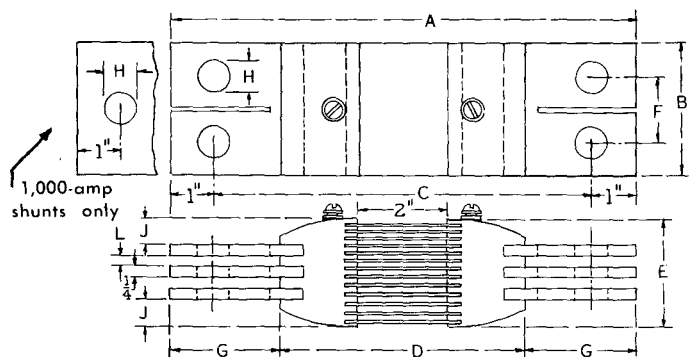
Amp	DIMENSIONS IN INCHES												Connection Strips Each End
	Fig. No.29	A	B	C	D	E	F	G	H	J	K	L	
75	a	6 $\frac{3}{4}$	1 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{11}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	1 $\frac{9}{32}$	1 $\frac{3}{32}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	1
80	a	6 $\frac{3}{4}$	1 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{11}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	1 $\frac{9}{32}$	1 $\frac{3}{32}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	1
100	a	6 $\frac{3}{4}$	1 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{11}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	1 $\frac{9}{32}$	1 $\frac{3}{32}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	1
150	a	6 $\frac{3}{4}$	1 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{11}{16}$	$\frac{11}{16}$	$\frac{3}{4}$	1 $\frac{17}{32}$	1 $\frac{3}{32}$	$\frac{1}{4}$	$\frac{7}{32}$	$\frac{7}{32}$	1
200	a	6 $\frac{3}{4}$	1 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{11}{16}$	$\frac{7}{8}$	$\frac{3}{4}$	1 $\frac{17}{32}$	1 $\frac{3}{32}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	1
250	a	6 $\frac{3}{4}$	1 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{11}{16}$	1 $\frac{1}{8}$	$\frac{3}{4}$	1 $\frac{17}{32}$	1 $\frac{3}{32}$	$\frac{1}{4}$	$\frac{13}{32}$	$\frac{13}{32}$	1
300	a	6 $\frac{3}{4}$	1 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{11}{16}$	1 $\frac{1}{4}$	$\frac{3}{4}$	1 $\frac{17}{32}$	1 $\frac{3}{32}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	1
400	a	8 $\frac{3}{4}$	1 $\frac{1}{8}$	6 $\frac{3}{4}$	3 $\frac{3}{8}$	1 $\frac{5}{8}$	1	2 $\frac{1}{16}$	1 $\frac{3}{32}$	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	1
500	a	8 $\frac{3}{4}$	1 $\frac{1}{8}$	6 $\frac{3}{4}$	3 $\frac{3}{8}$	1 $\frac{5}{8}$	1	2 $\frac{1}{16}$	1 $\frac{3}{32}$	$\frac{3}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	1
600	a	8 $\frac{3}{4}$	2	6 $\frac{3}{4}$	3 $\frac{3}{8}$	1 $\frac{13}{16}$	1	2 $\frac{1}{16}$	2 $\frac{1}{32}$	$\frac{3}{8}$	2 $\frac{13}{32}$	2 $\frac{13}{32}$	1
800	a	8 $\frac{3}{4}$	2 $\frac{1}{8}$	6 $\frac{3}{4}$	3 $\frac{3}{8}$	2	1	2 $\frac{1}{16}$	2 $\frac{1}{32}$	$\frac{3}{8}$	1 $\frac{13}{16}$	1 $\frac{13}{16}$	1
1000	b	9 $\frac{3}{4}$	3	7 $\frac{3}{4}$	4 $\frac{3}{4}$	1 $\frac{11}{16}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	1 $\frac{15}{32}$	.....	$\frac{1}{4}$	2
1200	b	10	3	8	5	2 $\frac{5}{16}$	1 $\frac{3}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	1 $\frac{15}{32}$	.....	$\frac{1}{4}$	2
1500	b	10	3	8	5	2 $\frac{5}{16}$	1 $\frac{3}{4}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	1 $\frac{15}{32}$	.....	$\frac{1}{4}$	3
2000	b	10 $\frac{1}{2}$	4	8 $\frac{1}{2}$	5 $\frac{1}{2}$	2 $\frac{13}{32}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	1 $\frac{39}{64}$	.....	$\frac{1}{4}$	3
2500	b	10 $\frac{1}{2}$	4	8 $\frac{1}{2}$	5 $\frac{1}{2}$	2 $\frac{13}{16}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	1 $\frac{19}{32}$	.....	$\frac{1}{4}$	4
3000	b	11 $\frac{1}{4}$	4	9 $\frac{1}{4}$	6 $\frac{1}{4}$	3 $\frac{9}{16}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	2 $\frac{19}{32}$	.....	$\frac{1}{4}$	4
4000	c	11 $\frac{1}{4}$	4	9 $\frac{1}{4}$	6 $\frac{1}{4}$	7	4 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	.....	.....	.....	5
5000	c	11 $\frac{1}{4}$	5	9 $\frac{1}{4}$	6 $\frac{1}{4}$	7 $\frac{1}{2}$	4 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{32}$	.....	.....	.....	5
6000	c	13 $\frac{3}{4}$	6	11 $\frac{3}{4}$	8 $\frac{3}{4}$	8	4 $\frac{21}{32}$	2 $\frac{3}{8}$	3	.....	.....	.....	5
8000	c	15 $\frac{3}{4}$	6	13 $\frac{3}{4}$	10 $\frac{3}{4}$	9 $\frac{1}{2}$	6 $\frac{7}{32}$	3 $\frac{3}{8}$	3	.....	.....	.....	7
10000	c	17 $\frac{3}{4}$	8	15 $\frac{3}{4}$	12 $\frac{3}{4}$	10 $\frac{1}{2}$	5 $\frac{3}{4}$	3 $\frac{3}{8}$	.....	.....	.....	.....	7

For current values above 10,000 amp, the best arrangement is to use two or more shunts in parallel with a separate set of leads for each shunt.

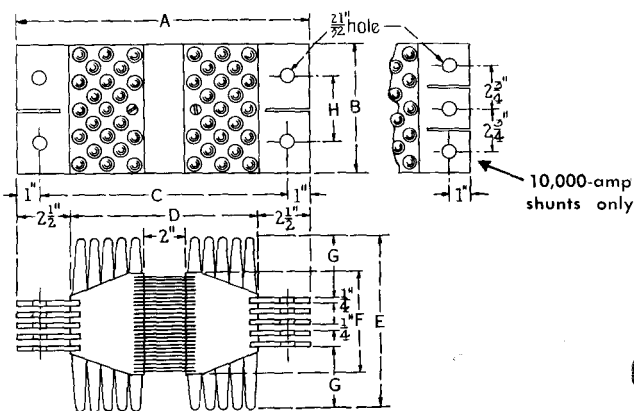
The Form-15 shunts for 800 amp and below have single-leaf terminals; above 800 amp, multileaf terminals are provided.



(a) 75- to 800-amp shunts



(b) 1,000- to 3,000-amp shunts



(c) 4,000- to 10,000-amp shunts

Fig. 29. Dimensions of Form-15 shunts, 75 to 10,000 amperes, 50-millivolt drop.

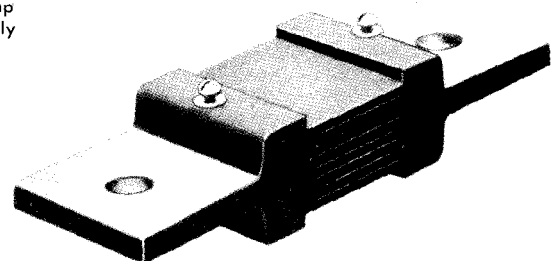


Fig. 30. Form-15 shunts, 75 to 800 amperes.

# WHEN YOU NEED SERVICE

IF YOU NEED TO REPAIR, recondition, or rebuild any electric apparatus, a G-E service shop near you is available day and night, seven days a week, for work in the shops or on your premises. Latest factory methods and genuine G-E renewal parts are used to maintain the original performance of your G-E equipment. For full information about these services, contact the nearest service shop or sales office listed below:

## APPARATUS SERVICE SHOPS

Allentown, Pa. . . . . 672-676 E. Highland St.  
Appleton, Wisc. . . . . Midway Industrial Area,  
County Trunk, "P"  
Atlanta—Chamblee, Ga. . . . . 4639 Peachtree  
Indus. Blvd.  
Baltimore 30, Md. . . . . 920 E. Fort Ave.  
Boston—Medford 55, Mass. Mystic Valley Pkwy.  
Buffalo 11, N. Y. . . . . 318 Urban St.  
Charleston 28, W. Va. . . . . 306 MacCorkle Ave., S.E.  
Charlotte, N. C. . . . . 2328 Thrift Road  
Chicago 32, Ill. . . . . 4360 W. 47th St.  
Cincinnati 2, Ohio . . . . . 444 W. Third St.  
Cleveland 4, Ohio . . . . . 4966 Woodland Ave.  
Columbus 23, Ohio . . . . . 2128 Eakin Rd.  
Corpus Christi, Texas . . . . . 115 Busse St.  
Dallas 19, Texas . . . . . 3202 Manor Way  
Davenport—Bettendorf, Ia. . . . . 1039 State St.  
Decatur, Ill. . . . . 2225 E. Logan St.  
Denver 5, Colo. . . . . 3353 Larimer St.  
Detroit 2, Mich. . . . . 5950 Third Ave.  
Houston 20, Texas . . . . . 5534 Harvey Wilson Drive  
Indianapolis 22, Ind. . . . . 1740 W. Vermont St.  
Johnstown, Pa. . . . . 841 Oak St.  
Kansas City 8, Mo. . . . . 819 E. 19th St.  
Los Angeles 1, Calif. . . . . 6900 Stanford Ave.  
Louisville, Ky. . . . . 2014 New Main St.  
Midland, Tex. . . . . 3404 Bankhead Hwy.  
Milwaukee 3, Wisc. . . . . 940 W. St. Paul Ave.  
Minneapolis 12, Minn. . . . . 2025 49th Ave., N.  
New Orleans, La. . . . . 2815 N. Robertson St.  
New York 14, N. Y. . . . . 416 W. 13th St.  
Oakland, Calif. . . . . 1525 Peralta St.  
Philadelphia 24, Pa. . . . . 1040 E. Erie Ave.  
Pittsburgh 6, Pa. . . . . 6519 Penn Ave.  
Portland 10, Oregon . . . . . 2727 N.W. 29th Ave.  
Richmond 24, Va. . . . . 1403 Ingram Ave.  
Roanoke, Va. . . . . 115 Albermarle St.  
Sacramento, Calif. . . . . 99 N. 17th St.  
St. Louis 10, Mo. . . . . 1115 East Road  
Salt Lake City 4, Utah . . . . . 301 S. Seventh West St.  
San Francisco 3, Calif. . . . . 1098 Harrison St.  
Seattle 4, Wash. . . . . 3422 First Ave., S.  
Southington, Conn. . . . . 53 Railroad Ave.  
Spokane 3, Wash. . . . . S. 155 Sherman St.  
Toledo 4, Ohio . . . . . 1 So. St. Clair St.  
Wheeling, W. Va. . . . . 2050 National Rd.  
York, Pa. . . . . 54 N. Harrison St.  
Youngstown 5, Ohio . . . . . 272 E. Indianola Ave.

## APPARATUS SALES OFFICES

Abilene, Texas . . . . . 442 Cedar St.  
Akron 8, Ohio . . . . . 335 S. Main St.  
Albany 7, N. Y. . . . . 90 State St.  
Albuquerque, N. Mex. . . . . 323 Third St., S.W.  
Alexandria, La. . . . . 720 Murray St.  
Allentown, Pa. . . . . 1132 Hamilton St.  
Amarillo, Texas . . . . . Amarillo Bldg.  
Appleton, Wisc. . . . . 531 W. College Ave.  
Atlanta 3, Ga. . . . . 1860 Peachtree Rd., N.W.  
Augusta, Ga. . . . . Masonic Bldg.  
Augusta, Me. . . . . 152 State St.  
Baltimore 1, Md. . . . . 111 Park Ave.  
Bangor, Maine . . . . . 77 Central St.  
Baton Rouge 6, La. . . . . 3170 Florida Blvd.  
Battle Creek, Mich. . . . . 25 W. Michigan Ave.  
Beaumont, Texas . . . . . 1385 Calder Ave.  
Billings, Mont. . . . . Rm. 816, 303 N. Broadway  
Binghamton, N. Y. . . . . 19 Chenango St.  
Birmingham 3, Ala. . . . . 1804 Seventh Ave., N.

Bismarck, N. Dak. . . . . 418 Rosser Ave.  
Bluefield, W. Va. . . . . 704 Bland St.  
Appalachian Bldg.  
Boise, Idaho . . . . . 1524 Idaho St.  
Boston 1, Mass. . . . . 140 Federal St.  
Buffalo 3, N. Y. . . . . 535 Washington St.  
Butte, Mont. P.O. Box 836, 103 N. Wyoming St.  
Canton 2, Ohio . . . . . 700 Tuscarawas St., W.  
Cedar Rapids, Iowa . . . . . 210 Second St., S.E.  
Charleston 28, W. Va. . . . . 306 MacCorkle Ave., S.E.  
Charlotte 1, N. C. . . . . 112 S. Tryon St.  
Chattanooga 2, Tenn. . . . . 832 Georgia Ave.  
Chicago 80, Ill. P.O. Box 5970A, 840 S. Canal St.  
Cincinnati 2, Ohio . . . . . 215 W. Third St.  
Cleveland 4, Ohio . . . . . 4966 Woodland Ave.  
Columbia 1, S.C., P.O. Box 1434, 1420 Lady St.  
Columbus 15, Ohio . . . . . 40 S. Third St.  
Corpus Christi, Texas . . . . . 205 N. Chaparral  
Dallas 2, Texas . . . . . 1801 N. Lamar St.  
Davenport—Bettendorf, Ia. . . . . 1039 State St.  
Dayton 2, Ohio . . . . . 11 W. Monument Bldg.  
Dayton 9, Ohio. Avia. & Def.,  
2600 Far Hills Ave.  
Denver 2, Colo. . . . . 650 Seventeenth St.  
Des Moines 9, Iowa . . . . . 505 W. Fifth Ave.  
Detroit 2, Mich. . . . . 700 Antoinette St.  
Duluth 2, Minn. . . . . 14 W. Superior St.  
Elmira, N. Y. . . . . Main and Woodlawn Aves.  
El Paso, Texas . . . . . 215 No. Stanton  
Erie, Pa. . . . . 1001 State St.  
Eugene, Ore. . . . . 610 High St.  
Evansville 19, Ind. . . . . 123 N.W. Fourth St.  
Fairmont, W. Va. . . . . 310 Jacobs Bldg.,  
P.O. Box 1626  
Fergus Falls, Minn. 108 N. Court Ave. P.O. Box 197  
Flint 3, Mich. . . . . 653 S. Saginaw St.  
Fort Wayne 6, Ind. . . . . 3606 So. Calhoun St.  
Fort Worth 2, Tex. . . . . 408 W. Seventh St.  
Fort Worth, Tex. . . . . Avia. & Def.,  
6200 Camp Bowie Blvd.  
Fresno 1, Calif. . . . . 407 Patterson Bldg.  
Tulare and Fulton St.  
Grand Rapids 2, Mich. . . . . 425 Cherry St., SE  
Greensboro, N. C. . . . . 301 S. Elm St.  
Greenville, S. C. . . . . 108 W. Washington St.  
Gulfport, Miss. . . . . 207 Jo-Fran Bldg.  
Hagerstown, Md. . . . . Professional Arts Bldg.  
Hartford 5, Conn. . . . . 764 Asylum Ave.  
Houston 1, Texas . . . . . 1312 Live Oak St.  
Indianapolis 4, Ind. . . . . 110 N. Illinois St.  
Jackson, Mich. . . . . 120 W. Michigan Ave.  
Jackson 1, Miss. . . . . 203 W. Capitol St.  
Jacksonville 2, Fla. . . . . 700 E. Union St.  
Jamestown, N. Y. . . . . P.O. Box 548, 2 Second St.  
Johnstown, Pa. . . . . 841 Oak St.  
Joplin, Mo. P.O. Box 948, 220½ W. Fourth St.  
Kalamazoo 3, Mich. . . . . 112 Parkway Ave.  
Kansas City 6, Mo. . . . . 106 W. Fourteenth St.  
Knoxville 08, Tenn. . . . . 602 S. Gay St.  
Lake Charles, La. . . . . 422 Seventh St.  
Lansing 8, Mich. 306 Michigan National Tower  
Lexington, Ky. . . . . First National Bank Bldg.  
Lincoln 8, Nebr. Sharpe Bldg., 206 S. 13th St.  
Little Rock, Ark. . . . . 103 W. Capitol Ave.  
Los Angeles 54, Calif. . . . . 212 N. Vignes St.  
Louisville 2, Ky. . . . . 455 S. Fourth St.  
Lubbock, Texas . . . . . 3202 Avenue "A"  
Macon, Ga. . . . . 682 Cherry St.  
Madison 3, Wisc. . . . . 16 N. Carroll St.  
Manchester, N. H. . . . . 875 Elm St.

Medford, Ore., P.O. Box 1349, 205 W. Main St.  
Memphis 3, Tenn. . . . . 8 N. Third St.  
Miami 32, Fla. . . . . 25 S.E. Second Ave.  
Midwest City, Okla. . . . . Avia. & Def.,  
207 Post Off. Bldg.  
Milwaukee 3, Wisc. . . . . 940 W. St. Paul Ave.  
Minneapolis 3, Minn. . . . . 12 S. Sixth St.  
Mobile 13, Ala. . . . . 54 St. Joseph St.  
Nashville 3, Tenn. . . . . 234 Third Ave., N.  
Newark 2, N. J. . . . . 744 Broad St.  
New Haven 6, Conn. . . . . 129 Church St.  
New Orleans 12, La. . . . . 837 Gravier St.  
New York 22, N. Y. . . . . 570 Lexington Ave.  
New York . . . . . Avia. & Def., Fed. Bldg.,  
N. Y. International Airport, Jamaica 30, N. Y.  
Niagara Falls, N. Y. . . . . 253 Second St.  
Norfolk 10, Va. . . . . 229 W. Bute St.  
Oakland 12, Calif. . . . . 409 Thirteenth St.  
Oklahoma City 2, Okla. . . . . 119 N. Robinson St.  
Omaha 2, Nebr. . . . . 409 S. Seventeenth St.  
Pasco, Wash. . . . . 824 W. Lewis St.  
Peoria 2, Ill. . . . . 309 Jefferson Bldg.  
Philadelphia 2, Pa. . . . . 1405 Locust St.  
Phoenix, Ariz. P.O. Box 4037, 303 Luhrs Tower  
Pittsburgh 22, Pa. The Oliver Bldg., Mellon Sq.  
Portland 7, Ore. . . . . 920 S.W. Sixth Ave.  
Providence 3, R. I. . . . . Industrial Trust Bldg.  
Raleigh, N. C. . . . . 336 Fayetteville St.  
Reading, Pa. . . . . 31 N. Sixth St.  
Richmond 17, Va. . . . . 700 E. Franklin St.  
Riverside, Calif. . . . . 3570 Ninth St.  
Roanoke 16, Va. . . . . 920 S. Jefferson St.  
Rochester 4, N. Y. . . . . 89 E. Ave.  
Rockford, Ill. . . . . 110 S. First St.  
Rutland, Vt. . . . . 38½ Center St.  
Sacramento 14, Calif. . . . . 626 Forum Bldg.  
Saginaw, Mich. . . . . Second National Bank Bldg.  
St. Louis 1, Mo. . . . . 818 Olive St.  
Salt Lake City 9, Utah . . . . . 200 S. Main St.  
San Antonio 5, Texas . . . . . 434 So. Main Ave.  
San Diego 1, Calif. . . . . 1240 Savannah Ave.  
San Francisco 6, Calif. . . . . 235 Montgomery St.  
San Jose 10, Calif. . . . . 460 Park Ave.  
Savannah, Ga. . . . . 4 E. Bryan St.  
Seattle 4, Wash. . . . . 710 Second Ave.  
Seattle 8, Wash. Avia. & Def., 220 Dawson St.  
Shreveport, La. . . . . 910 Shelby Bldg.  
Sioux City 13, Iowa . . . . . 572 Orpheum Electric Bldg.  
South Bend 1, Ind. . . . . 112 W. Jefferson Blvd.  
Spokane 4, Wash. . . . . S. 162 Post St.  
Springfield, Ill. . . . . 607 E. Adams St.  
Springfield 3, Mass. . . . . 1387 Main St.  
Stockton, Calif. . . . . 11 So. San Joaquin St.  
Syracuse 6, N. Y. . . . . 3532 James St.  
Tacoma 1, Wash. . . . . 1202 Washington Bldg.  
Tampa 6, Fla. . . . . 1206 North A St.  
Toledo 4, Ohio . . . . . 420 Madison Ave.  
Trenton 8, N. J. . . . . 214 E. Hanover St.  
Tucson, Ariz. P.O. Box 710, 650 N. Sixth Ave.  
Tulsa 3, Okla. . . . . 320 S. Boston Ave.  
Utica 2, N. Y. . . . . 258 Genesee St.  
Washington 5, D. C. . . . . 777-14th St., N.W.  
Waterloo, Iowa . . . . . 206 W. 4th St.  
Wenatchee, Wash. . . . . 328 N. Wenatchee Ave.  
Wheeling, W. Va. . . . . 40 Fourteenth St.  
Wichita 2, Kan. . . . . 200 E. First St.  
Williamston, N. C. . . . . 115 E. Main St.  
Worcester 5, Mass. . . . . 288 Grove St.  
York, Pa. . . . . 56 N. Harrison St.  
Youngstown 5, Ohio . . . . . 272 E. Indianola Ave.

Hawaii: American Factors, Ltd., P. O. Box 3230, Honolulu 1 Canada: Canadian General Electric Company, Ltd., Toronto

INSTRUMENT DEPARTMENT, GENERAL ELECTRIC COMPANY, WEST LYNN, MASS.

SUPPLEMENT TO GEH-1539B & GEH-1539C

TYPES AB & DB AMMETERS AND VOLTMETERS

Use the dimension drawings in this supplement for Type DB-16 & -18 instruments having model numbers ending in "2" (Example: 8DB . . . . . 2) instead of Fig. 6, 7, 8, & 9 in Instructions GEH-1539B and -1539C.

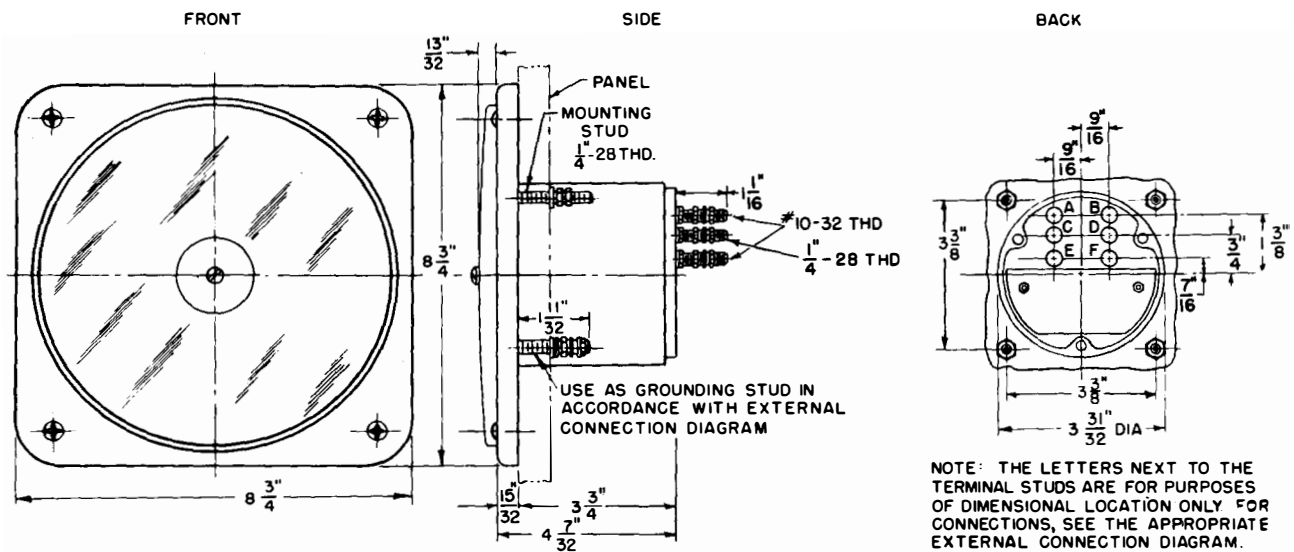


Fig. 1. Dimensions of Type DB-16 ammeters, voltmeters, and ground detectors having model numbers ending in "2"

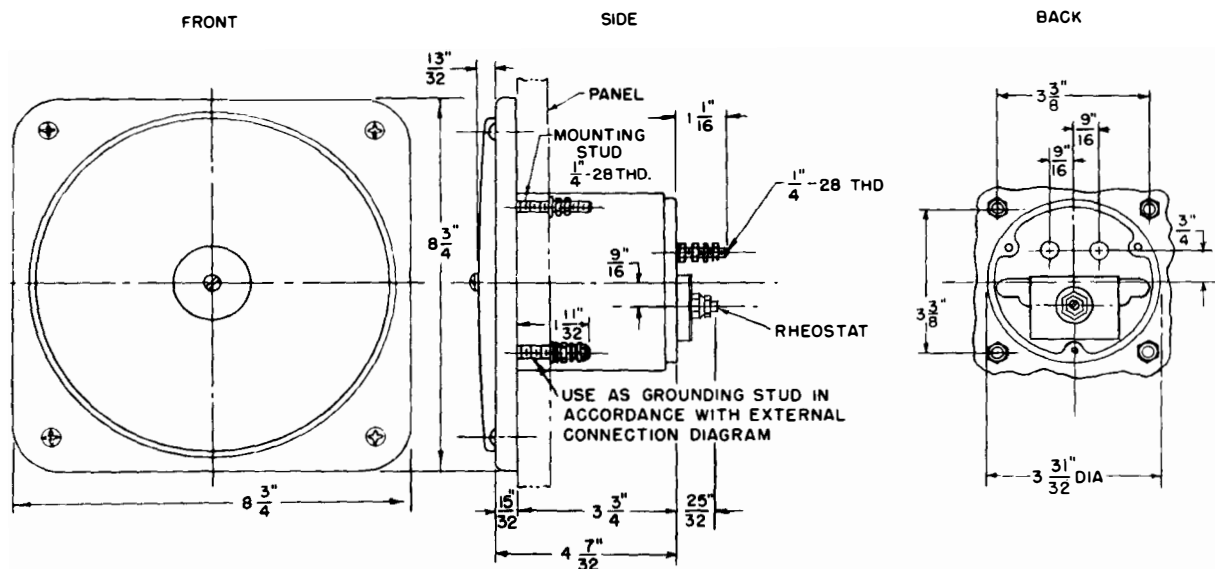


Fig. 2. Dimensions of Type DB-16 ammeters with rheostat for lead-length compensation, having model numbers ending in "2"

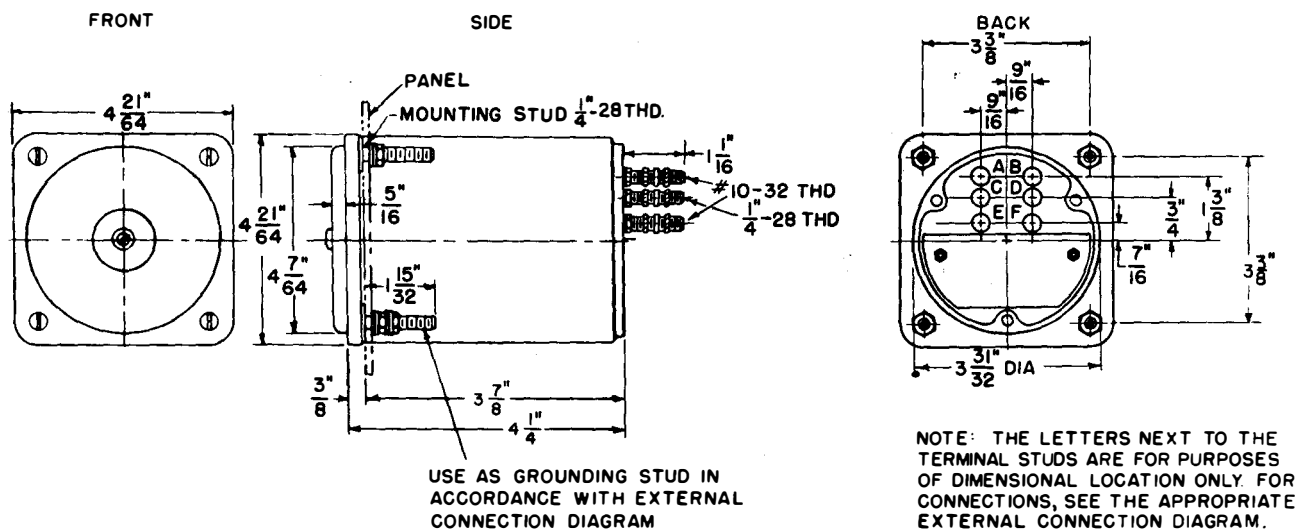


Fig. 3. Dimensions of Type DB-18 ammeters, voltmeters, and ground detectors having model numbers ending in "2"

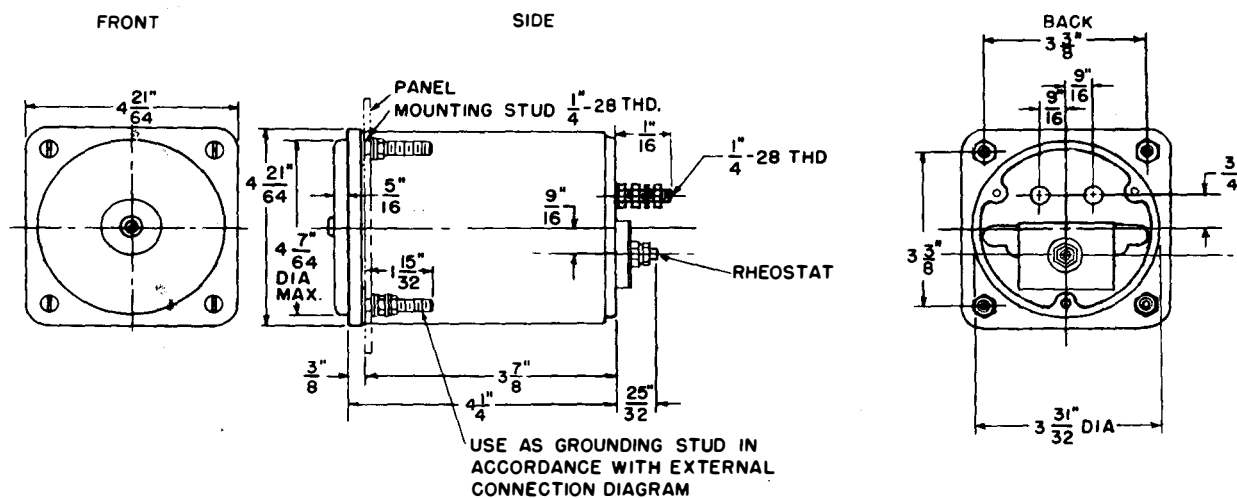


Fig. 4. Dimensions of Type DB-18 ammeters with rheostat for lead-length compensation, having model numbers ending in "2"