TYPE 180 SINGLE EDGEWISE

UL RECOGNIZED:
FILE E91703

Specifications

Accuracy Class:
Standard — ± 1.5% of full-scale span for DC horizontal and vertical and AC horizontal. ± 2% for AC vertical.

Suppressed zero (mechanical) — ± 2% of full scale span.

AC Rectifier-type Ammeters and Voltmeters— Standard ± 2.5% on 60-Hertz sine wave at 25° C.

Scales (Standard):
Ranges — (see following page)
Length — 4.448 inches
Degrees rotation 60 degrees
Color — Background - White
Numerals - Black
Legend - Black
Scale Divisions - Black
Numeral Height — ¼ inch
Illumination — Refer to factory
Number of scale divisions — 100 maximum
Scale linearity — DC - linear
AC - non-linear

Maximum number of letters (counting spaces as letters) on vertical meters, 25; on horizontal meters, 30.

Repeatability: ± 2% of full scale

Overload:
Sustained — 120% for AC and DC voltmeters. 120% for 8 hours for AC and DC ammeters.

Momentary — 10 times rated current applied for 10 consecutive intervals of ½ second with one-minute intervals between successive applications for AC and DC ammeters. Mechanical overload same as momentary overload for ammeters.

Response Time:
AC — 4 seconds maximum
DC — 2.5 seconds maximum ≥ 1 mA
4 seconds maximum < 1 mA

Overshoot:
40% full scale angle maximum

Insulation Level:
Operating — 600 volts
Hi-pot — 5000 volts rms terminals to case for one minute

Mounting Position For Both Horizontal and Vertical Meters:
Mounting to a Vertical Panel is standard. If other mounting angle is necessary, then angle must be specified and instrument calibrated for the specified angle.

Operating Environment:
Temperature (Standard) — (-4° to +150°F)
(-20°C to +65°C)

Pressure — Atmospheric
Shock — 50 G's
Corrosive fumes, salt-spray (Refer to factory)
Maximum magnetic field without external shielding —
(Standard) - DC or AC, 1 gauss for 3% accuracy
(Optional) - Refer to factory for recommendations to minimize errors

Case:
Material — Base Polycarbonate
Finish — Spray painted
Color — (Standard) - Aluminum
(Optional) - Black
Pointer color — White
Window and Case — Polycarbonate
Magnetic Shielding — DC, self-shielding
AC, soft iron shielding
Gasketed cover (weather resistant) standard
Type Terminals — Stud type

Movement:
AC — Iron vane pivot and jewel
DC — D'arsonval type taut-band

Burden Data

Type	Impedance in Ohms	Effective Resistance in Ohms	Inductance in Henries	Volt-amperes	Watts	Reactive Volt-amperes	Power Factor
120-VOLT, 60-HERTZ POTENTIAL CIRCUIT							
Voltmeters	18,667	18,658	1.546	1.205	1.204	0.0545	0.9993
5-AMPERE, 60-HERTZ CURRENT CIRCUIT							
Ammeters	0.00832	0.00792	6.75×10^{-6}	0.208	0.1978	0.064	0.9520

DC AMMETERS D'ARSONVAL TYPE

Scale and Rating	Terminal Resistance, Ohms	±1.5% Accuracy Vertical	±1.5% Accuracy Horizontal

DC AMMETERS — SELF-CONTAINED

0–50µA	4735	180 113 CYCY	180 111 CYCY
0–100µA	1480	180 113 DRDR	180 111 DRDR
0–200µA	650	180 113 EAEA	180 111 EAEA
0–500µA	226	180 113 EMEM	180 111 EMEM
0–800µA	562	180 113 EWEW	180 111 EWEW
0–1 mA	40	180 113 FAFA	180 111 FAFA
0–2 mA	20	180 113 FGFG	180 111 FGFG
0–5 mA	10	180 113 FXFX	180 111 FXFX
0–10 mA	5.0	180 113 GZGZ	180 111 GZGZ
0–50 mA	1.0	180 113 HYHY	180 111 HYHY
0–100 mA	0.5	180 113 JRJR	180 111 JRJR
0–200 mA	0.25	180 113 KAKA	180 111 KAKA
0–500 mA	0.10	180 113 KMKM	180 111 KMKM
0–800 mA	0.062	180 113 KWKW	180 111 KWKW
0–1 A	0.05	180 113 LALA	180 111 LALA
0–2 A	0.025	180 113 LELE	180 111 LELE
0–5 A	0.010	180 113 LSLS	180 111 LSLS
0–10 A	0.005	180 113 MTMT	180 111 MTMT
0–15 A	0.003	180 113 NDND	180 111 NDND
0–20 A	0.0025	180 113 NGNG	180 111 NGNG
0–30 A	0.00167	180 113 NLNL	180 111 NLNL
0–40 A	0.00125	180 113 NPNP	180 111 NPNP
0–50 A	0.001	180 113 NTNT	180 111 NTNT

DC AMMETERS — SHUNT-RATED 50 MV

(Lead Resistance = .05Ω–.07Ω)

0–10 A	12.5	180 123 ECMT	180 121 ECMT
0–20 A	12.5	180 123 ECNG	180 121 ECNG
0–30 A	12.5	180 123 ECNL	180 121 ECNL
0–40 A	12.5	180 123 ECNP	180 121 ECNP
0–60 A	12.5	180 123 ECNW	180 121 ECNW
0–80 A	12.5	180 123 ECPD	180 121 ECPD
0–100 A	12.5	180 123 ECPK	180 121 ECPK
0–200 A	12.5	180 123 ECRL	180 121 ECRL
0–300 A	12.5	180 123 ECRX	180 121 ECRX
0–400 A	12.5	180 123 ECSC	180 121 ECSC
0–500 A	12.5	180 123 ECSF	180 121 ECSF
0–600 A	12.5	180 123 ECSJ	180 121 ECSJ
0–800 A	12.5	180 123 ECSN	180 121 ECSN
0–1 kA	12.5	180 123 ECVA	180 121 ECVA
0–50 mV	12.5	180 123 EC†	180 121 EC†
50–0–50 mV	25	180 124 EC†	180 122 EC†

† Order by Description.

DC AMMETERS — SHUNT-RATED 100 MV

(Lead Resistance = .04Ω–.08Ω)

0–100mV	25	180 123 GB†	180 121 GB†
100–0–100mV	50	180 124 GB†	180 122 GB†

† Order by Description.

DC MILLIAMMETERS — MECHANICALLY ZERO-SUPPRESSED, LIVE-ZERO, SELF-CONTAINED

(To read output of process transmitters, blank legend)

Rating	Scale	±2% Accuracy Vertical	±2% Accuracy Horizontal
1–5 mA	§	180 183 FYAA 8ABA	180 181 FYAA 8ABA
4–20mA	§	180 183 HEAA 8ABA	180 181 HEAA 8ABA
10–50mA	§	180 183 HXAA 8ABA	180 181 HXAA 8ABA

§ Pencil calibrated points at .25%, 50%, 75%, 100% of full-scale position

DC VOLTMETERS — SELF CONTAINED

Scale and Rating	Terminal Resistance, Ohms	±1.5% Accuracy Vertical	±1.5% Accuracy Horizontal
0–1 V	1000	180 013 LALA	180 011 LALA
0–5 V	5000	180 013 LSLS	180 011 LSLS
0–15 V	15000	180 013 NDND	180 011 NDND
0–30 V	30000	180 013 NLNL	180 011 NLNL
0–50 V	50000	180 013 NTNT	180 011 NTNT
0–80 V	80000	180 013 PDPD	180 011 PDPD
0–150 V	150000	180 013 PZPZ	180 011 PZPZ
0–300 V	300000	180 013 RXRX	180 011 RXRX
0–600 V	600000	180 013 SJSJ	180 011 SJSJ
150–0-150 V	150000	180 014 PZPZ	180 012 PZPZ
300–0–300 V	300000	180 014 RXRX	180 012 RXRX

AC AMMETERS — 40/70 HZ, IRON-VANE TYPE

Scale	Transformer Rating	±2% Accuracy Vertical	±1.5% Accuracy Horizontal
0–1 A	Self-Contained	180 143 LALA	180 141 LALA
0–3 A		180 143 LJLJ	180 141 LJLJ
0–5 A		180 143 LSLS	180 141 LSLS
0–10 A		180 143 MTMT	180 141 MTMT
0–15 A		180 143 NDND	180 141 NDND
0–20 A		180 143 NGNG	180 141 NGNG
0–30 A		180 143 NLNL	180 141 NLNL
0–50 A		180 143 NTNT	180 141 NTNT

AC AMMETERS — TRANSFORMER-RATED - 5 AMP

0–10 A	10/5	180 143 LSMT	180 141 LSMT
0–15 A	15/5	180 143 LSND	180 141 LSND
0–20 A	20/5	180 143 LSNG	180 141 LSNG
0–25 A	25/5	180 143 LSNJ	180 141 LSNJ
0–30 A	30/5	180 143 LSNL	180 141 LSNL
0–40 A	40/5	180 143 LSNP	180 141 LSNP
0–50 A	50/5	180 143 LSNT	180 141 LSNT
0–75 A	75/5	180 143 LSPB	180 141 LSPB
0–100 A	100/5	180 143 LSPK	180 141 LSPK
0–150 A	150/5	180 143 LSPZ	180 141 LSPZ
0–200 A	200/5	180 143 LSRL	180 141 LSRL
0–300 A	300/5	180 143 LSRX	180 141 LSRX
0–400 A	400/5	180 143 LSSC	180 141 LSSC
0–500 A	500/5	180 143 LSSF	180 141 LSSF
0–600 A	600/5	180 143 LSSJ	180 141 LSSJ
0–800 A	800/5	180 143 LSSN	180 141LSSN
0–1 kA	1000/5	180 143 LSVA	180 141 LSVA
0–1.2 kA	1200/5	180 143 LSVB	180 141 LSVB
0–1.5 kA	1500/5	180 143 LSVC	180 141 LSVC
0–2 kA	2000/5	180 143 LSVE	180 141 LSVE
0–3 kA	3000/5	180 143 LSVJ	180 141 LSVJ
0–4 kA	4000/5	180 143 LSVN	180 141 LSVN

AC VOLTMETERS — 60 HZ, IRON-VANE

0–150 V	Self-Contained	180 033 PZPZ	180 031 PZPZ
0–300 V		180 033 RXRX	180 031 RXRX
0–500 V		180 033 SFSF	180 031 SFSF
0–600 V		180 033 SJSJ	180 031 SJSJ

AC VOLTMETERS — TRANSFORMER RATED 150 V

0–300 V	240/120	180 033 PZRX	180 031 PZRX
0–600 V	480/120	180 033 PZSJ	180 031 PZSJ
0–750 V	600/120	180 033 PZSM	180 031 PZSM
0–3 kV	2400/120	180 033 PZVJ	180 031 PZVJ
0–5.25 kV	4200/120	180 033 PZVV	180 031 PZVV
0–6 kV	4800/120	180 033 PZVX	180 031 PZVX
0–9 kV	7200/120	180 033 PZWJ	180 031 PZWJ
0–15 kV	12000/120	180 033 PZWZ	180 031 PZWZ
0–18 kV	14400/120	180 033 PZXE	180 031 PZXE

Type 180 Optional Features

Scale Variations

1. Blank Scales
2. Special marked scales (maximum 100 divisions; Ref. Notes 3 and 4)
3. Special Legends (Ref. Notes 3 and 4)
4. Colored markings, lines, bars, etc.
5. Black scale with white markings
6. Zero-center Scale DC instruments

Ratings and Calibration

7. Unlisted ratings. Contact factory for other than listed ratings.
8. Offset-zero scale (DC meters only)
9. Special calibrations in accordance with data supplied by customer
10. Calibration for use on other than vertical panel
11. Calibration for use on 400 Hertz or other unlisted frequency.
12. High-sensitivity voltmeters (See Note 2)
13. Special-terminal resistance
14. Internal mounted rheostat
15. Rectifier-type voltmeters 2.5 percent.
16. 1 percent accuracy (DC only)
17. Suppressed zero with operable zero set (DC only) (See Note 1)

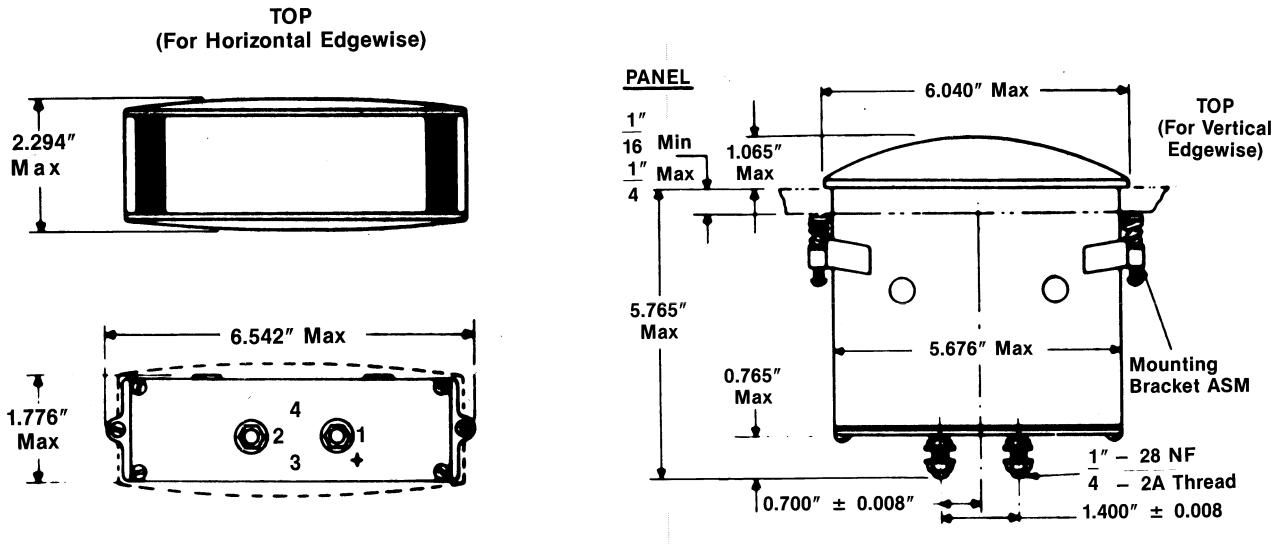
Construction

18. Internal illumination
19. Red pointer (Day-glo)
20. Anti-glare window
21. Black trim case
22. Component mark for Canada. Add "/CSA" to suffix of catalog number.

Notes:

1. Suppressed zero — Available only on DC models up to a maximum suppression of 20 percent of full-scale value. Note: Accuracy is affected on suppressed-zero instruments.
2. High-sensitivity voltmeters — DC voltmeters can be offered up to 20,000 ohms/volt. Voltmeters of high sensitivity draw less current from the circuit and are used on applications where the circuit current is so low that instrument resistance will appreciably affect circuit operation.
3. Special legends and/or scales may be obtained by special order. Maximum number of letters (counting spaces as letters) on vertical instruments is 25; on horizontal instruments, 30. Exact wording must be clearly indicated as to spelling, abbreviation, spacing, etc.
4. Type 180 scales and legends are individual parts separated by a space for the pointer. Only one set of divisions can be marked on a scale.
5. No charge for electrical legends.

Dimensions and Panel Cutout



Dimensions for Type 180 Instruments
DWG B3147K22