

Bristol® Series 4000

Recording AC Voltmeters

For measurement of electric voltage where low loss (burden), high torque and negligible leveling error is desired.

General

Bristol® AC electrical recorders, from Emerson Process Management, are available in 1 and 2 Pen models for universal or portable (panel or wall) mounting. They are widely used to monitor ac voltages by electric power companies in stations, sub stations, in distribution networks, etc.

Voltmeters are also widely used in industry to monitor all kinds of electrical loading.

Voltmeter: Voltmeter movements are available in nominal ratings of 120 Vac and 240 Vac, 50 or 60 Hz.

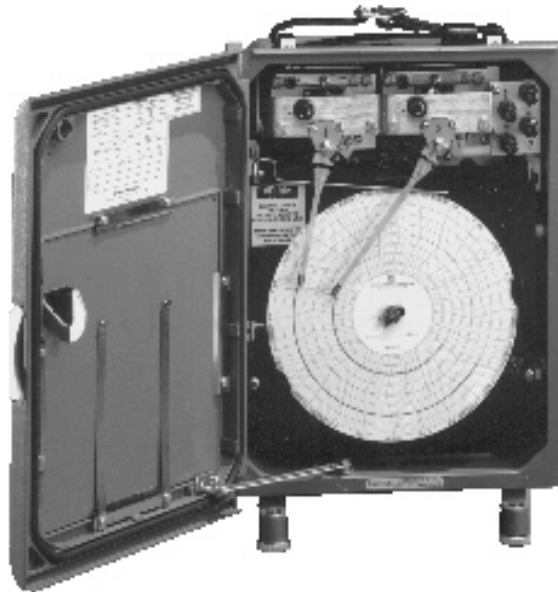
These are partial range instruments. A typical chart range would be 80 to 130 Vac or 90 to 140 Vac.

An optional dual range switch allows recording at two times the primary calibration.

Higher voltages may be measured using external potential (step down) transformers.

Features

- Moving-iron measuring element: Produces ample torque to overcome pen friction, even when instrument is tilted from level position. Moving element shaft is supported by miniature precision stainless steel ball bearings at front and rear to absorb shock, resist corrosion and minimize friction.
- Magnetic damping: Near-critical damping gives fast response with low overshoot. Damping action is provided by an aluminum vane,



Product Data Document

1101DS-1c

July 25, 2007 - Page 2

Bristol® Recording AC Voltmeters

- mounted on the moving element shaft, which swings between the pole pieces of a C-shaped Alnico magnet.
- Temperature stability: Instrument design minimizes effects due to thermal expansion of parts and changes in the magnetic permeability of iron elements. Voltmeters are thermistor-compensated to correct for changes in coil resistance.
- Magnetic shielding: Recorder accuracy changes less than 0.15% when instrument is placed in a stray magnetic field of 5 oersteds. (This field strength is equivalent to that at a distance of one foot from a conductor carrying 750 amperes).
- Stainless steel pens: Operated directly by measuring elements. No multiplying linkages are required.
- Locking device: Prevents damage to moving-iron element and pen arm while instrument is in transit.
- Case: Rectangular, die-cast aluminum case with gasketed aluminum door for moisture and weather protection.
- Case dimensions, 1 pen and 2 pen models: 10-3/4" wide x 14-3/8" high x 5-3/4" deep (dimensions do not include legs or carrying straps)
- Weight:
 - 1 pen models: approximately 20-1/2 pounds for portable use
 - 2 pen models: approximately 23 pounds for portable use
- Charts:
 - 1 pen models: circular, 8" diameter, single zone
 - 2 pen models: circular, 8" diameter, two zones
- Chart drives: choice of either-
 - Mechanical spring wound, battery (requires standard 1.5 alkaline C size battery not included) or
 - Electric – 120 volt, 50 or 60 Hz AC
- Inking: Fountain pen standard. Fibre tip pen optional on one pen instruments only.

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Operating Characteristics

Characteristics And Influences	Standard Voltmeters		
	Single Range	Double Range	
	120 V	240 V	120 V/240 V
Calibrated accuracy % of full-scale value	±1	±1	±1
Loss (Burden)**, volt amperes Power factor	5.5 96.5%	12 74%	12 74%
Sensitivity, ohms per volt	20	10	10
Ambient temperature influence % (of full-scale) change in reading caused by ±10 C	.75	.75	.75
Frequency influence % (of full-scale) Change in reading caused by ±1% deviation from rated frequency	0.6	0.6	0.6
caused by ±10% deviation from rated frequency	7	7	7
caused by ±0.2 cycle deviation from rated frequency	0.2	0.2	0.2
External field influence % (of full- Scale) change in reading caused By magnetic field of 5 oersteds	.15	.15	.15
Warm-up time, minutes	10-15	10-15	10-15
Speed of response	.3 sec. 95% FS	.3 sec. 95% FS	.3 sec. 95% FS

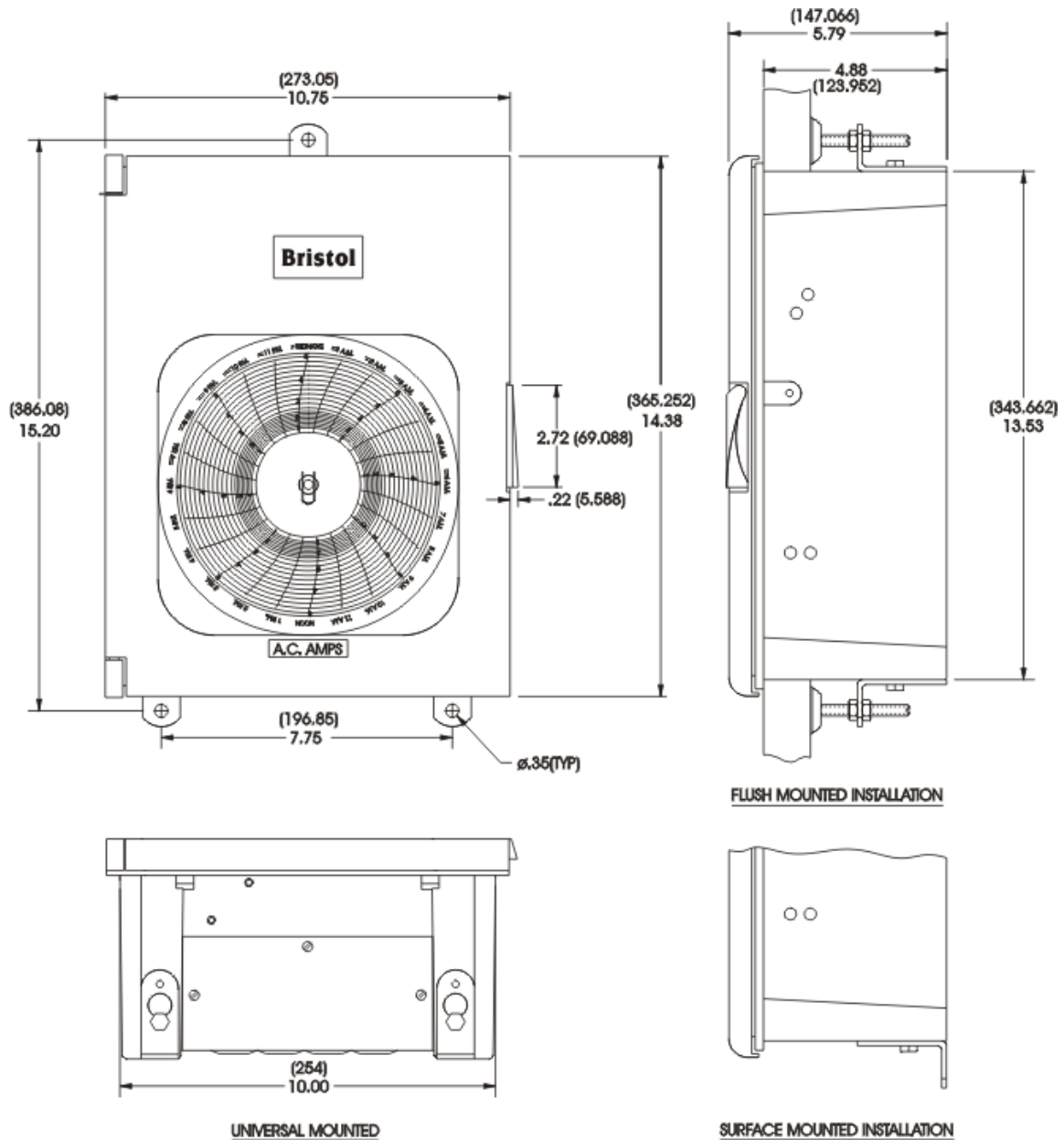
**Not including 4-volt amperes for electric chart drive.

Product Data Document

1101DS-1c

July 25, 2007 - Page 4

Bristol® Recording AC Voltmeters



UNIVERSAL MOUNTED

FLUSH MOUNTED INSTALLATION

SURFACE MOUNTED INSTALLATION

Note:

For Surface Mounted Installation, Panel Cutout Dimension Should Be Approx. 3.53 x 10.02 inches, i.e., .02 Inch Larger Than The Recorder Dimension.

Note:

Allow At Least 7 Inches From Adjacent Side Of Additional Apparatus To The Center Of This Instrument To Accommodate Door Clearance.

Note:

() = Dimensions in Millimeters, Other Dimensions are in Inches.

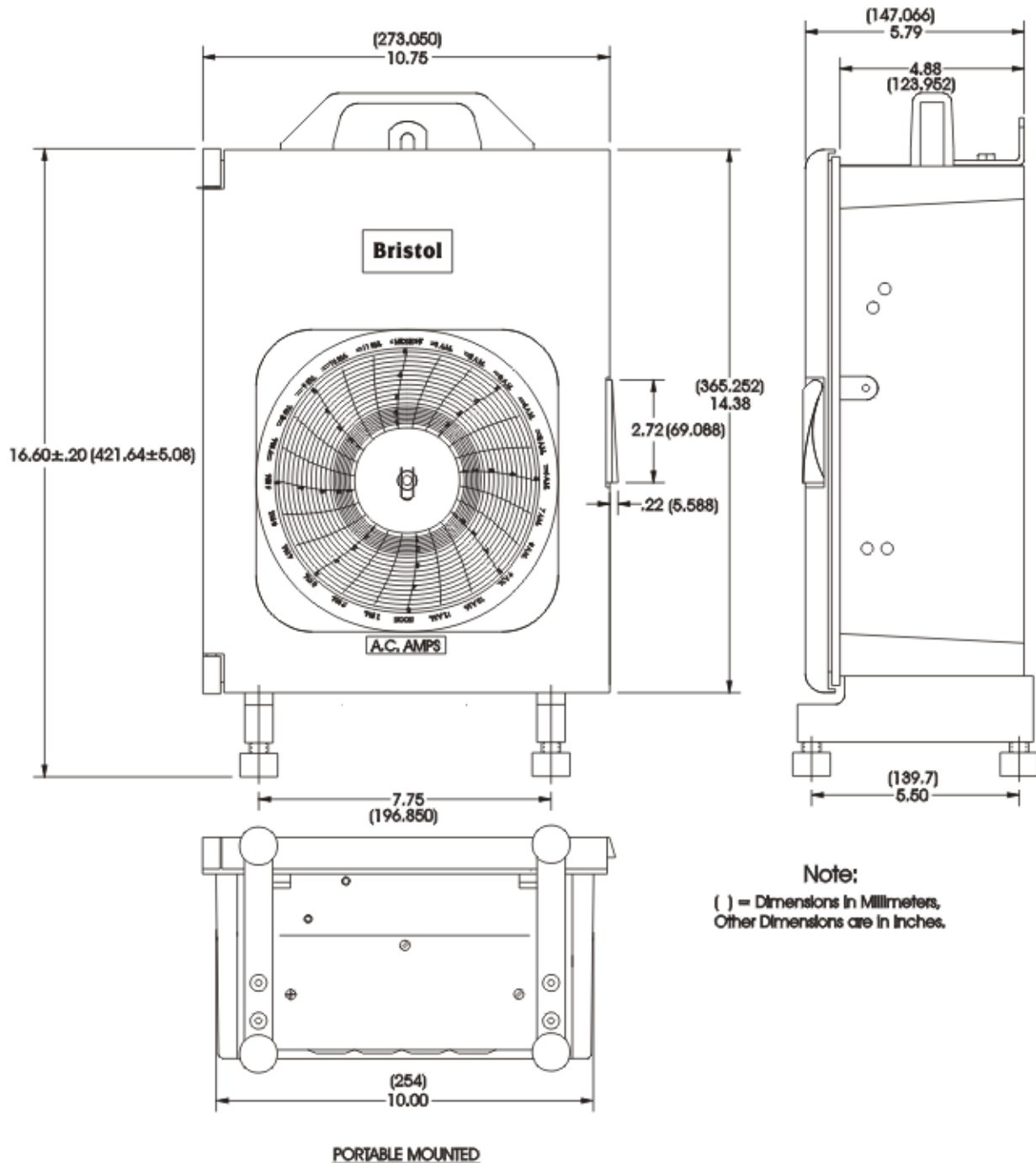
Series 4000 Recorder - Universal Mounting

Product Data Document

1101DS-1c

July 25, 2007 - Page 5

Bristol® Recording AC Voltmeters



Note:
() = Dimensions in Millimeters,
Other Dimensions are in Inches.

Series 4000 Recorder - Portable or Pole Mounting

Product Data Document

1101DS-1c

July 25, 2007 - Page 6

Bristol® Recording AC Voltmeters

Recording Voltmeters Single Pen Models

Model No. 4108-88B - A B C - D E F - G H

4108-88B

SELECT	DESCRIPTION	CODE	
A	RANGE		
10	<i>Single</i>	X410888BAS	
	70-170V (40V min span)	1	
	<i>Dual (2x the lower range)</i>		
	70-170V (40V min span) 120-300V (75V min span)	2	
B	PEN TYPE		
20	Fountain	1	
	Fibre	2	
C	MOUNTING	XAMVM-MT	
30	Universal (1UD530)	1	
	Portable (1UD541)	2	
	Portable/Pole (1U3D541)	3	
D, E, F	CHART DRIVE	XCHARTDR2	
40, 45	SPRING TYPE - TWO SPEED DRIVES		
	ROTATION	WIND	
	8 HR/2HR	30 HR	104
	3 DAY/2 HR	8 DAY	105
	7 DAY/24 HR	8 DAY	106
	7 DAY/ 48 HR	8 DAY	108
	SPRING TYPE - SINGLE SPEED DRIVES	XCHARTDR2	
	ROTATION	WIND	
	12 HR	30 HOUR	110
	48 HR	8 DAY	112
	30 DAY	32 DAY	117
	31 DAY	32 DAY	118
	ELECTRIC AC TYPE		
	24 hours	120 v - 60 Hz	231
	7 days	120 v - 60 Hz	234
	16 days	120 v - 60 Hz	236
	30 days	120 v - 60 Hz	237
	32 days	120 v - 60 Hz	239
	BATTERY	XAMVMDRIVE	
	MULTI-SPEED (60 min, 96 min, 12 hr, 24 hr, 2 day, 7 day, 8 day, 14 day, 16 day, 31 day, 32 day, off)	300	

Continued on Next Page

Product Data Document

1101DS-1c

July 25, 2007 - Page 7

Bristol® Recording AC Voltmeters

G	CUSTOMER CONNECTIONS	X4108CONN
50	Internal External - Rear Binding Posts	1 2
H	WINDOW	XAMVM-WIN
60	Shatterproof Glass (not sealed) Shatterproof Glass (sealed) Metal (not sealed) Metal (sealed)	1 2 3 4

Product Data Document

1101DS-1c

July 25, 2007 - Page 8

Bristol® Recording AC Voltmeters

Recording Voltmeters Two Pen Models

Model No. 4208-88B - A B C - D E F - G H

4208-88B

SELECT	DESCRIPTION	CODE	
A	RANGE		
10	Single	X4208BASE	
	70-170V (40V min span) *	1	
	Dual (2x the lower range)		
	70-170V (40V min span) * 120-300V (75V min span) *	2	
B	PEN TYPE		
20	Fountain	1	
C	MOUNTING	XAMVM-MT	
30	Universal (1UD530)	1	
	Portable (1UD541)	2	
	Portable/Pole (1U3D541)	3	
D, E, F	CHART DRIVE	XCHARTDR2	
40, 45	SPRING TYPE - TWO SPEED DRIVES		
	ROTATION	WIND	
	8 HR/2 HR	30 HR	104
	3 DAY/2 HR	8 DAY	105
	7 DAY/24 HR	8 DAY	106
	7 DAY/48 HR	8 DAY	108
	SPRING TYPE - SINGLE SPEED DRIVES		
	ROTATION	WIND	
	12 HR	30 HOUR	110
	48 HR	8 DAY	112
	30 DAY	32 DAY	117
	31 DAY	32 DAY	118
	ELECTRIC AC TYPE		
	24 hours	120 v - 60 Hz	231
	7 days	120 v - 60 Hz	234
	16 days	120 v - 60 Hz	236
	30 days	120 v - 60 Hz	237
	32 days	120 v - 60 Hz	239
	BATTERY		XAMVMDRIVE
MULTI-SPEED (60 min, 96 min, 12 hr, 24 hr, 2 day, 7 day, 8 day, 14 day, 16 day, 31 day, 32 day, off)		300	

Continued on Next Page

Product Data Document

1101DS-1c

July 25, 2007 - Page 9

Bristol® Recording AC Voltmeters

G	CUSTOMER CONNECTIONS	X4108CONN
50	Internal	1
	External - Rear Binding Posts	2
H	WINDOW	XAMVM-WIN
60	Shatterproof Glass (not sealed)	1
	Shatterproof Glass (sealed)	2
	Metal (not sealed)	3
	Metal (sealed)	4

Matrix of Older Model Numbers to New

Old Model	Replaced By (1983)	Current Model (1998)
UD530-24	43011-88A	4108-88B-XX1-XXX-1X
1U1D530-24	43111-88A	4108-88B-XX1-XXX-2X
1U2D530-24	43211-88A	4108-88B-XX1-XXX-2X
1UD541-24	44011-88A	4108-88B-XX2-XXX-1X
1U3D541-24	44311-88A	4108-88B-XX3-XXX-1X
2UD530-24	43012-88A	4208-88B-XX1-XXX-1X
2U1D530-24	43112-88A	4208-88B-XX1-XXX-2X
2U2D530-24	43212-88A	4208-88B-XX1-XXX-2X
2UD541-24	44012-88A	4208-88B-XX2-XXX-1X
2U3D541-24	44312-88A	4208-88B-XX3-XXX-1X
3UD500-24 (3 pen)	40013-88A	OBSOLETE
3U2D500-24 (3 pen)	40213-88A	OBSOLETE
3UD511-24 (3 pen)	41013-88A	OBSOLETE
3U3D511-24 (3 pen)	41313-88A	OBSOLETE