

# 3 1/2 DIGIT OHMMETER, TRANSMITTER & CONTROLLER MODEL Q2000



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• <a href="#">MECHANICAL</a> 1/8 DIN (2A) Case
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## QUANTA STANDARD FEATURES

- ✓ 1,999-count display span
- ✓ 19.99 ohm to 19.99 kohm ranges
- ✓ Front-panel accessible zero and span adjust
- ✓ 1 mV/count analog output
- ✓ LED or LCD display
- ✓ Display hold and test
- ✓ 120/240 Vac, 5 Vdc, 9-32 Vdc or 26-56 Vdc power
- ✓ Screw-terminal barrier strip
- ✓ 1/8 DIN case

## OPTIONS

- ✓ Analog output for user-selected span
- ✓ Single-setpoint 10 A relay
- ✓ Dual-setpoint 10 A relays
- ✓ Proportional 4-20 mA control
- ✓ Time-proportional 2 A SS relay control
- ✓ Isolated parallel BCD output
- ✓ NEMA-4 splash-proof lens cover

## DISPLAY AND POWER OPTIONS

The **QUANTA Model Q2000** is available with an LED or an LCD display and with six types of meter power: 120 Vac, 240 Vac, 24 Vac, 5 Vdc, 9-32 Vdc (isolated) and 26-56 Vdc (isolated).

## ANALOG OUTPUT OPTIONS

A 1 mV/count ( $\pm 2$  V full-scale) analog output is standard and is ideal for driving a strip-chart recorder. An additional analog output can be provided by an optional vertical plug-in board. Available output signals are 0-5 Vdc, 0-10 Vdc, 0-1 mA (source or sink), and 4-20 mA (source or sink). The top and bottom of each output range can be scaled to fit a user-selected display span.

## CONTROL OUTPUT OPTIONS

Additional outputs can be provided by a horizontal upper board. Available options include single-setpoint control with one 10 A relay, dual-setpoint control with two 10 A relays, 4-20 mA proportional control (source or sink), time-proportional 2 A solid-state relay control, and isolated, parallel BCD output. The 10A relay options are ideal for ATE and material testing applications, which require ON/OFF control. The BCD output can communicate with programmable controllers and Newport's Model 872A thumbwheel controller. For additional information, please refer to the QUANTA and Mechanical sections.

## SPECIFICATIONS

### INPUT

Range	19.99 ohm	199.9 Kohm	1.999 Kohm	19.99 Kohm


<b>Resolution</b>	10 mohm	100 mohm	1 ohm	10 ohm
<b>Excitation Current</b>	4.2 mA	4.2 mA	420 $\mu$ A	42 $\mu$ A

**INPUT CONFIGURATION****Connection:** 2- or 4-wire**Zero adjustment:**  $\pm 50$  counts**Overvoltage protection (differential):** 15 Vp**Open-circuit voltage (max):** 12 V**NOISE REJECTION****NMR:** 50 dB, 50/60 Hz**CMR:** 120 dB**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing**ACCURACY AT 25°C****Overall accuracy:**  $\pm 0.05\%$  of reading  $\pm 1$  count**Span tempco:**  $\pm 0.006\%$  of reading/ $^{\circ}$ C**Zero tempco:**  $\pm 2.5$  m/ $^{\circ}$ C  $\pm 0.001\%$  of FS/ $^{\circ}$ C**Warmup to rated accuracy:** 1 min**ANALOG-TO-DIGITAL CONVERSION****Input configuration:** Differential, bipolar**Technique:** Dual-slope, average-value**Polarity:** Automatic**Signal integration period:** 100 ms**Read rate:** 2.5/s**DISPLAY****LED:** 0.56 in (14.2 mm) 7-segment, red**LCD:** 0.50 in (12.7 mm) 7-segment liquid crystal**Symbols:** 1.8.8.8**Decimal-point positions:** Three positions selectable by jumpers behind lens or at connector**Overrange or break indication:** Three least-significant digits blanked**POWER****AC voltages:** 120, 240, 100 or 24 Vac  $+10\%/-15\%$ **AC frequency:** 49-440 Hz**DC voltages:** 9-32 Vdc, isolated to 300 Vp; 26-56 Vdc, isolated to 300 Vp; 5 Vdc  $\pm 5\%$ , non-isolated**DC power consumption:** 5 W max**ENVIRONMENTAL****Operating temperature:** 0 to 60 $^{\circ}$ C**Storage temperature:** -40 to +85 $^{\circ}$ C**Relative humidity:** 95% at 40 $^{\circ}$ C (non-condensing)**MECHANICAL****Dimensions:** Newport DIN1A (1/8 DIN) case (See Mechanical section for drawings)**Weight:** 17 oz (480 g)**Case material:** 94 V-0 UL-rated polycarbonate

# 4-DIGIT OHMMETER, TRANSMITTERS & CONTROLLERS MODEL Q90000



## NEWPORT PRODUCT INFO

- [MANUAL](#)
  - [QUICK START](#)
  - [MECHANICAL](#) 1/8 DIN (1A) Case
  - [MECHANICAL](#) Connections Diagram
  - [PRICE](#)
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## QUANTA STANDARD FEATURES

- ✓ 9,999-count display span
- ✓ 999.9 ohm and 9.999 kohm ranges
- ✓ Front-panel accessible zero and span adjust
- ✓ 0.1 mV/count analog output
- ✓ Bright, 0.56 in (14.2 mm) LED display
- ✓ Display hold and test
- ✓ 120/240 Vac, 5 Vdc, 9-32 Vdc or 26-56 Vdc power
- ✓ Screw-terminal barrier strip
- ✓ 1/8 DIN case

## OPTIONS

- ✓ Analog output for user-selected span
- ✓ Single-setpoint 10 A relay
- ✓ Dual-setpoint 10 A relays
- ✓ Proportional 4-20 mA control
- ✓ Time-proportional 2 A SS relay control
- ✓ Isolated parallel BCD output
- ✓ NEMA-4 splash-proof lens cover

## DISPLAY AND POWER OPTIONS

The QUANTA Model Q90000 is available with an LED or an LCD display and with six types of meter power: 120 V ac, 240 V ac, 24 V ac, 5 V dc, 9-32 V dc (isolated) and 26-56 V dc (isolated).

## ANALOG OUTPUT OPTIONS

A 0.1 mV/count ( $\pm 2$  V full-scale) analog output is standard and is ideal for driving a strip-chart recorder. An additional analog output can be provided by an optional vertical plug-in board. Available output signals are 0-5 V dc, 0-10 V dc, 0-1 mA (source or sink), and 4-20 mA (source or sink). The top and bottom of each output range can be scaled to fit a user-selected display span.

## CONTROL OUTPUT OPTIONS

Additional outputs can be provided by a horizontal upper board. Available options include single-setpoint control with one 10 A relay, dual-setpoint control with two 10 A relays, 4-20 mA proportional control (source or sink), time-proportional 2 A solid-state relay control, and isolated, parallel BCD output. The 10A relay options are ideal for ATE and material testing applications, which require ON/OFF control. The BCD output can communicate with programmable controllers and Newport's Model 872A thumbwheel controller. For additional information, please refer to the QUANTA and Mechanical sections.

## SPECIFICATIONS

### INPUT

<b>Range</b>	999.9 ohm	9.999 Kohm
<b>Resolution</b>	100 mohm	1 ohm
<b>Excitation Current</b>	420 $\mu$ A	42 $\mu$ A

**INPUT CONFIGURATION****Connection:** 2- or 4-wire**Zero adjustment:**  $\pm 50$  counts**Overvoltage protection (differential):** 15 Vp**Open-circuit voltage (max):** 12 V**NOISE REJECTION****NMR:** 115dB, 50/60 Hz**CMR:** 120 dB**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing**ACCURACY AT 25°C****Overall accuracy:**  $\pm 0.05\%$  of reading  $\pm 1$  count**Zero tempco:**  $\pm 2.5$  mohm/ $^{\circ}$ C  $\pm 0.001\%$  of FS/ $^{\circ}$ C**Span tempco:**  $\pm 0.006\%$  of reading/ $^{\circ}$ C**Warmup to rated accuracy:** 1 min**ANALOG-TO-DIGITAL CONVERSION****Input configuration:** Differential, bipolar**Technique:** Dual-slope, average-value**Polarity:** Automatic**Signal integration period:** 100 ms**Read rate:** 2.5/s**DISPLAY****Type:** 7-segment, red LED**Height:** 0.56 in (14.2 mm)**Symbols:** 8.8.8.8**Decimal-point position:** Three positions selectable by jumpers behind lens or at connector**0 to 9,999 counts:** Normal operation**10,000 to 19,999 counts:** Four least-significant digits**POWER****AC voltages:** 120, 240, 100 or 24 V ac  $+10\%/-15\%$ **AC frequency:** 49-440 Hz**DC voltages:** 9-32 V dc, isolated to 300 Vp; 26-56 V dc, isolated to 300 Vp; 5 V dc  $\pm 5\%$ , non-isolated**DC power consumption:** 5 W max**ENVIRONMENTAL****Operating temperature:** 0 to 60 $^{\circ}$ C**Storage temperature:** -40 to +85 $^{\circ}$ C**Relative humidity:** 95% at 40 $^{\circ}$ C (non-condensing)**MECHANICAL****Dimensions:** Newport DIN1A (1/8 DIN) case (See Mechanical section for drawings)**Weight:** 17 oz (480 g)**Case material:** 94 V-0 UL-rated polycarbonate



## MICROPROCESSOR-BASED TRUE RMS METER



Current Transformers Sold separately

### INFCAC

- ✓ 4-Digit, 14-Segment LED Display, Red or Green
- ✓ High 0.1% of Reading Accuracy
- ✓ Wide Selection of ac Current and Voltage Ranges
- ✓ Smart Filtering Detects the Difference Between a Spike or Process Change (Patent Pending)
- ✓ Front Panel Configuration
- ✓ Available with Dual 6 Amp Relays and/or Analog Output
- ✓ Peak and Valley Detection and Memory
- ✓ Optional RS-232 or RS-485 Communications

NEWPORT PRODUCT INFO
• <a href="#">MANUAL (HTML)</a> - <a href="#">PDF Version</a>
• <a href="#">QUICK START</a>
• <a href="#">MECHANICAL</a>
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**INFCAC** true RMS meters are the leader in advanced AC monitoring and control. There are two models, an ac Voltmeter and an ac Ammeter. Four full digits plus broad scaling capabilities allow the meter to be used in most industrial and research applications. Easy plug-in rear panel connectors make installation and removal quick and easy. Optional user scalable analog output either 4-20 mA or 0-10 V allows either a control or recorder interface and the optional dual 7 A relays gives you extended control capability. The optional plug-in communication options can be added at any time allowing the instrument to grow with your application. Front panel range changes or via the serial communications option allows flexibility not often found in a meter in this price range. Security is provided by an internal hardware lockout.

### Peak and Valley

The INFCAC meter provides the ability to capture and display both peak and valley levels of your input signals. This is particularly important for such applications as destructive testing, pressure testing, etc.

### SPECIFICATIONS

- Max. Error, ac Coupling:**  $\pm(0.1\% \text{ rdg} + 10 \text{ counts})$  at 50 or 60 Hz.  $\pm(0.1\% \text{ rdg} + 40 \text{ counts})$  from 40 Hz to 3 kHz
- Max. Error, dc Coupling:**  $\pm(0.1\% \text{ rdg} + 10 \text{ counts})$  at 50 or 60 Hz.  $\pm(0.1\% \text{ rdg} + 30 \text{ counts})$  from 40 Hz to 3 kHz
- Span Temperature Coefficient:** 0.01%/ C typical
- Step Response:** 2-3 seconds to 99% of final value
- Warmup to Rated Accuracy:** 55 min.

### ENVIRONMENTAL

- Operating Temperature:** 0 to 50°C (32 to 140°F)
- Storage Temperature:** -40 to 85°C (-40 to 184°F)
- Relative Humidity:** 90% at 40°C (104°F) (non-condensing)

### POWER

- AC Voltage:** 115 or 230 Vac  $\pm 15\%$ ; 49-100 Hz
- Consumption:** 3 to 10 watts max.

### NOISE REJECTION

**CMR:** 100 dB

**CMV:** 1500 V peak per Hv test

## CONFIGURATION

**Offset & Span Adjustments:** +0.001 to +9999 or -0.01 to -199, programmable

## CONVERSION

**Technique:** dual slope

**Read Rate:** 3/sec

## MECHANICAL

**Dimensions:** 48 H x 96 W x 156 mm D (1.9" x 3.8" x 6")

**Panel Cutout:** 45 H x 92 mm W (1.8" x 3.6")

**Weight:** 574 g (20 oz.)

## INPUT TYPES AND RANGE

**AC Voltage:** (user selectable) 0-1 V, 0-10 V, 0-100 V, 0-750 V

**AC Current:** (user selectable) 0-1 mA, 0-10 mA, 0-100 mA, 0-1 A, 0-5 A

**To Order** ( \* Complete Model No.) *Prices Shown in U.S. Dollars*

INFCAC-(*)	(*)	(*)	(*)	(*)	POWER AND LED COLOR	Price
0					115 Vac power and red LED	\$345
1					230 Vac power and red LED	\$345
2					115 Vac power and green LED	\$345
3					230 Vac power and green LED	\$345
<b>CONTROL OUTPUT</b>						
	0				No control output	N/C
	1				Two 6 A form "C" relays	\$70
<b>ANALOG OUTPUT</b>						
		0			No Output	N/C
		1			4 to 20 mA or 0 to 10 Vdc	\$80
<b>COMMUNICATIONS</b>						
			0		No serial output	N/C
			1		Isolated RS-232	\$110
			2		Isolated RS-485 half duplex	\$110
<b>INPUT SIGNAL</b>						
				V5	0-750 Vac user programmable	
				C5	0-5 Aac user programmable	

**Note:** Output options are not field installable.

See specifications for user programmable input ranges.

**Ordering Example:** INFCAC-0100-C5 = 115 Vac power with red display and 2 form "C" relays, \$345 + 70 = \$415.

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# 4 1/2 DIGIT AC AVG / TRUE RMS VOLTMETER / AMMETER

## 2004, 204B, 2003B

- ✓ Parallel BCD Output
- ✓ Special Scaling for 5 A Current Transformer
- ✓ 3:1 Crest Factor (RMS)
- ✓ AC or AC + DC Components (RMS)
- ✓ 1500 Vp CMV, 120 dB CMR
- ✓ Bright, 0.56 in. (14.2 mm) LED Display
- ✓ Screw-terminal Barrier Strip
- ✓ 1/8 DIN Case



## OPTIONS

- ✓ Digital Peak or Valley Hold
- ✓ Isolated, Stored, Three-state Parallel BCD



### NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) 1/8 DIN (1A) CASE
- [MECHANICAL](#) NEMA-SIZE CASE
- [MECHANICAL](#) 2003B
- [MECHANICAL](#) 2004
- [MECHANICAL](#) 204B
- [PRICE](#) 2003B
- [PRICE](#) 2004
- [PRICE](#) 204B

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**Models 2003B and 2004** are high-accuracy AC voltmeters or true-RMS voltmeters. Exceptional noise rejection is provided by a conversion circuit with a crystal oscillator, which is set for either 50 or 50 Hz rejection. Both models are available for voltage or current input and allow special scaling for the output of a 5 A current transformer. A screw-terminal barrier strip for power and signal is standard.

All AVG models use a precision op-amp rectifier circuit to provide an economical, high-resolution AC voltmeter, which is calibrated to display the true-RMS value of sinusoidal signals. All RMS models use an integrated circuit that computes the true-root-mean-square value of complex input signals. Screw terminals are provided for AC or DC coupling. AC coupling allows the measurement of the AC component or ripple from a signal with both AC and DC components. DC coupling allows the measurement of true-RMS, including AC and DC components, from DC to over 30 kHz. Maximum crest factor ( $V_p/V_{rms}$ ) is 3:1).

## BCD Output Standard

Non-isolated parallel BCD output is a standard feature and is implemented on the main circuit board. Additional data and control outputs can be provided by an optional upper board.

## Options

The meter main assembly can be electrically configured for four voltage or five current input ranges. Upper-board options include four BCD output boards. Mechanical options include connectors and splash-proof lens cover which meets NEMA-4 standards.

## SPECIFICATIONS

### ACCURACY FOR AVG at 25°C

**Maximum error, 35 Hz to 2 kHz:**  $\pm 0.1\%$  of reading  $\pm 20$  counts

**Maximum error, 20 Hz to 5 kHz:**  $\pm 0.3\%$  of reading  $\pm 20$  counts

**Span tempco:**  $\pm 0.015\%$  of reading/°C

**Step response:** 1 s

**Warmup to rated accuracy:** 1 hour

**ACCURACY FOR RMS at 25°C (1% to 100% of full-scale)**

**Maximum error, AC coupling**

35 Hz to 5 kHz: ±0.1% of reading ±10 counts

25 Hz to 10 kHz: ±0.2% of reading ±20 counts

23 Hz to 15 kHz: ±0.25% of reading ±30 counts

20 Hz to 20 kHz: ±0.5% of reading ±50 counts

20 Hz to 30 kHz: ±1.0% of reading ±50 counts

**Maximum error, DC coupling**

DC error: ±0.1% of reading ±10 counts

AC error: Same as for AC coupling

Span tempco: ±0.02% of reading/°C

Step response: 1 s

Warmup to rated accuracy: 1 hour

Maximum crest factor at full scale (Vp/Vrms): 3:1

**POWER**

AC voltages: 115 Vac ±10% at 60 Hz; 230 Vac ±10% at 50 Hz

Power consumption: 4.5 W (nominal)

**ENVIRONMENTAL**

Operating temperature: 0 to 50°C (32 to 140°F)

Storage temperature: -40 to +75°C (-40 to 184°F)

Relative humidity: 95% at 40°C (104°F) (non-condensing)

**MECHANICAL**

Dimensions: Newport (1/8 DIN) case

Weight: 17 oz (480 g)

Case material: 94V-0 UL-rated polycarbonate

**INPUT / DISPLAY RANGE**

Range Code	204B	2003B	2004	Price
VR1	39.99 mV	199.99 mV	39.999 mV	N/C
VR2	399.99 mV	199.99 mV	399.99 mV	N/C
VR3	3.999 V	1.9999 mV	3.9999 V	N/C
VR4	39.99 V	19.999 V	39.999 V	N/C
VR5	399.9 V	199.99 V	399.99 V	N/C
CR1	3.999 µA	199.99 V	3.9999 µA	N/C
CR2	39.99 µA	199.99 µA	39.999 µA	N/C
CR3	399.9 µA	1.9999 mA	399.99 µA	N/C
CR4	3.999 mA	19.999 mA	3.9999 mA	N/C
CR5	39.99 mA	199.99 mA	39.999 mA	N/C
CR6	399.9 mA	1.9999 A	399.99 mA	\$15
CR7	5 A CT	5 A CT	5 A CT	\$40

**To Order** ( \* Complete Model No.) *Prices Shown in U.S. Dollars*

Model					DISPLAY	Price
204B	(*)	(*)	(*)	(*)	3 3/4 digit	\$325
2003B	(*)	(*)	(*)	(*)	4 1/2 digit	\$390
2004	(*)	(*)	(*)	(*)	4 3/4 digit	\$425
					<b>INPUT SIGNAL</b>	
	AVG				AC AVG "Range Code"	\$155



	<b>RMS</b>				TRUE RMS "Range Code"	<b>\$155</b>
		( * )			Range Code (from table)	( )
<b>POWER</b>						
			-		120 Vac, 44/440 Hz	<b>N/C</b>
			<b>C1</b>		240 Vac, 49/440 Hz	<b>N/C</b>
<b>OUTPUT OPTIONS</b>						
				<b>F3A</b>	Buffered BCD	<b>\$109</b>
				<b>F3P</b>	Buffered Peak BCD	<b>\$139</b>
				<b>F4A</b>	Buffered and isolated BCD	<b>\$124</b>
				<b>F4M</b>	Addressable F4A	<b>\$129</b>

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**Ordering Example:** Model 204B-AVG, VR4, \$325 + 155 = **\$480**.



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# AC VOLTMETER, AMMETER & CONTROLLER



Q2000-C / Q2000-D

Q8000-C / Q8000-D

Q2000-F / Q2000-G

Q9000-C / Q9000-F

Q9000-D / Q9000-G

## SPECIFICATIONS

- ✓ 9,999-Count Display Span
- ✓ 100 mV to 650 V Ranges
- ✓ 2  $\mu$ A to 1 A Ranges
- ✓ Special Scaling for 5 A Current Transformer
- ✓ 0.1 mV/Count Analog Output
- ✓ Front-Panel Accessible Span Adjustment
- ✓ Bright, 0.56" (14.2 mm) LED Display
- ✓ Display Hold and Test
- ✓ 120/240 Vac, 9-32 Vdc Power
- ✓ Screw-Terminal Barrier Strip
- ✓ 1/8 DIN Case

## OPTIONS

- ✓ Analog Output for User-Selected Span
- ✓ Single-Setpoint 10 A Relay Control
- ✓ Dual-Setpoint 10 A Relay Control
- ✓ Parallel BCD Output, Isolated

### NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) 1/8 DIN (1A) Case
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- [PRICE](#)

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The **QUANTA® AC AVG** voltmeter and ammeter use a precision op-amp rectifier circuit to provide an economical AC-average meter, which is calibrated to display the true-RMS value of sinusoidal signals. The **QUANTA AC RMS** voltmeter and ammeter use an integrated circuit that computes the true-root-mean-square value of complex waveforms. Screw-terminals are provided for AC or DC coupling. AC coupling allows the measurement of the AC component or ripple from a signal with both AC and DC components. DC coupling allows the measurement of true-RMS, including both DC and AC components.

The signal conditioner provides six current ranges, as determined by an internal shunt resistor. In addition, there is a special 5 A range, which allows direct connection to a current transformer (CT) with 5 A secondary, without need for a stepdown transformer. Proper scaling is obtained for primary currents of 10, 100 and 1000 A.

## SPECIFICATIONS

### ANALOG INPUT, Q2000C & Q2000F

Range		199.9 mV	1.999 V
Resolution		100 $\mu$ V	1 mV
Maximum input		50 Vp	100 Vp
Input resistance		1.1 Mohm	1.1 Mohm

<b>Range</b>	19.99 V	199.9 V	650 V
<b>Resolution</b>	10 mV	100 mV	1 V
<b>Maximum input</b>	250 Vp	500 Vp	920 Vp
<b>Input resistance</b>	1.0 Mohm	1.0 Mohm	10 Mohm

**ANALOG INPUT, Q2000D & Q2000G**

<b>Range</b>	19.99 $\mu$ A	199.9 $\mu$ A	1.999 mA
<b>Resolution</b>	10 nA	100 nA	1 $\mu$ A
<b>Maximum input</b>	3 mA	10 mA	30 mA
<b>Input resistance</b>	10 kohm	1 kohm	100ohm

<b>Range</b>	19.99 mA	199.9 mA	1.999 A
<b>Resolution</b>	10 $\mu$ A	100 $\mu$ A	1 mA
<b>Maximum input</b>	100 mA	500 mA	2.2 A
<b>Input resistance</b>	10 ohm	1 ohm	0.1 ohm

<b>Range</b>	19.99 A	199.9 A	1999 A
<b>Resolution</b>	10 mA	100 mA	1 A
<b>Maximum input</b>	5 A CT	5 A CT	5 A CT
<b>Input resistance</b>	0.01ohm	0.01ohm	0.01ohm

**ANALOG INPUT, Q9000C & Q9000F**

<b>Range</b>	99.99 mV	999.9 mV
<b>Resolution</b>	10 $\mu$ V	100 $\mu$ V
<b>Maximum Input</b>	50 Vp	100 Vp
<b>Input Resistance</b>	1.1 Mohm	1.1 Mohm

<b>Range</b>	9.999 V	99.99 V	650.V
<b>Resolution</b>	1 mV	10 mV	100 mV
<b>Maximum Input</b>	250 Vp	500 Vp	920 Vp
<b>Input Resistance</b>	1.0 Mohm	1.0 Mohm	10 Mohm

**ANALOG INPUT, Q9000D & Q9000G**

<b>Range</b>	9.999 $\mu$ A	99.99 $\mu$ A	999.9 $\mu$ A
<b>Resolution</b>	1 nA	10 nA	100 nA
<b>Maximum Input</b>	3 mA	10 mA	30 mA
<b>Input Resistance</b>	10 kohm	1 kohm	100 ohm

<b>Range</b>	9.999 A	99.99 A	999.9 A
<b>Resolution</b>	1 mA	10 mA	100 mA
<b>Maximum Input</b>	5 A CT	5 A CT	5 A CT
<b>Input Resistance</b>	0.01 ohm	0.01 ohm	0.01 ohm

**ACCURACY at 25°C (AC)**Maximum Error:  $\pm 0.1\%$  of reading  $\pm 10$  countsSpan tempco:  $\pm 0.01\%$  of reading/ $^{\circ}$ C (AC)

**Step response:** 1 s to 99.9% of span  
**Frequency range for rated accuracy:** 147 to 1000 Hz  
**Warmup to rated accuracy:** Less than 30 min.

**ACCURACY at 25°C (RMS) (1% to 100% of full scale)**

**Maximum error, AC coupling:** ±0.1% of reading ±10 cts, 47 Hz to 5 kHz  
**Maximum error, DC coupling:** ±0.1% of reading ±10 cts, 9 Hz to 5 kHz  
**Span tempco:** ±0.03% of reading/°C (typ)  
**Zero tempco:** 0.15 mV/°C (typ)  
**Step response:** 1 sec to 99.9% of span  
**Warmup to rated accuracy:** Less than 30 min.

**CONVERSION**

**Technique:** Dual-slope, average-value  
**Signal integration period:** 100 ms  
**Read rate:** 2.5/sz

Range Code		Input Range	
Range Code	True RMS	Q2000 / Q3000	Q9000 / Q8000
CVR2	FVR2	199.99 mV	99.99 mV
CVR3	FVR3	1.999 V	999.9 mV
CVR4	FVR4	19.99 V	9.999 V
CVR5	FVR5	199.9 V	99.99 V
CVR6	FVR6	650 V	650.0 V
DCR1	GCR1	19.99 µA	9.999 µA
DCR2	GCR2	199.9 µA	99.99 µA
DCR3	GCR3	1.999 mA	999.9 µA
DCR4	GCR4	19.99 mA	9.999 mA
DCR5	GCR5	199.99 mA	99.99 mA
DCR6	GCR6	1.999 A	999.9 mA
DCR7	GCR7	5 A CT	5 A CT

**To Order** ( \* Complete Model No.) *Prices Shown in U.S. Dollars*

Q(*)	(*)	(*)	(*)	POWER AND CASE	Price
2				3 1/2 digit standard case	\$210
3				3 1/2 digit INFINITY® case	\$240
8				4 digit INFINITY® case	\$250
9				4 digit standard case	\$280
<b>POWER</b>					
	0			120 Vac (49/440 Hz)	N/C
	2			240 Vac (49/440 Hz)	N/C
	4			9-32 Vdc (isolated)	\$145
<b>ANALOG OUTPUT</b>					
		0		±1 or ±2 V non-isolated	N/C
		2		0-10 Vdc non-isolated	\$70
		4		Non-Isolated 4-20 mA	\$70
		6		Isolated 4-20 mA	\$135
<b>CONTROL OUTPUTS</b>					
			0	None	N/C
			1	Dual-setpoint 10 A from "C" relay	\$165

			4	Isolated BCD (5 V Logic)	\$155
			5	Single-setpoint 10 A from "C" relay	\$125
<b>CONTROL OUTPUTS</b>					
			*	AC AVG "Select Range Code"	\$65
			*	TRUE RMS "Select Range Code"	\$100

**Splash Proof Lens Cover**

Model No.	Description	Price
<b>SPC18</b>	IP65/NEMA4 \$30 with spring clamp	<b>\$30</b>
<b>SPC4</b>	IP65/NEMA4 30 with screw clamp	<b>\$30</b>



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# 3 1/2 DIGIT DC VOLTMETER, AMMETER, TRANSMITTER & CONTROLLER Q2000A (Voltage) & Q2000B (Current)



## NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) 1/8 (1A) DIN Case
- [MECHANICAL](#) Connections Diagram
- [PRICE](#)

REQUIRES ADOBE ACROBAT - [HELP](#)

## QUANTA STANDARD FEATURES

- ✓ ±1,999-count display span
- ✓ ±200 mV to ±200 V ranges (Q2000A)
- ✓ ±20 µA to ±2 A ranges (Q2000B)
- ✓ Front-panel accessible fine-zero and fine-span adjustments
- ✓ 1 mV/count analog output
- ✓ LED or LCD display
- ✓ Automatic polarity
- ✓ Display hold and test
- ✓ 120/240 V ac, 5 V dc, 9-32 V dc or 26-56 V dc power
- ✓ Screw-terminal barrier strip
- ✓ 1/8 DIN case

## OPTIONS

- ✓ Analog output for user-selected span
- ✓ Single-setpoint 10 A relay control
- ✓ Dual-setpoint 10 A relay control
- ✓ 4-20 mA proportional control
- ✓ Time-proportional 2 A solid-state relay control
- ✓ Parallel BCD output, isolated
- ✓ NEMA-4 splash-proof lens cover

The **QUANTA Q2000A and Q2000B** are a high-quality ±1,999-count DC voltmeter and ammeter, respectively. The base meters are digital indicators for use in electrically-noisy industrial environments. With the addition of analog and control outputs, these meters can provide two-wire current-loop signals to a central control room and provide local alarm or control. A 1/8 DIN case with screw terminals for signal and power is standard. A wide range of options are available.

## POWER AND DISPLAY OPTIONS

The QUANTA Q2000A and Q2000B are available with an LED or an LCD display and with six types of meter power: 120 V ac, 240 V ac, 24 V ac, 5 V dc and 9-32 V dc (isolated) and 26-56 V dc (isolated).

## ANALOG OUTPUT OPTIONS

A 1 mV/count (±2 V full-scale) analog output is standard and is ideal for driving a strip-chart recorder. An additional analog output can be provided by an optional vertical plug-in board. Available output signals are 0-5 V dc, 0-10 V dc, 0-1 mA (source or sink) and 4-20 mA (source or sink). The top and bottom of each output range can be scaled to fit a user-selected display span.

## CONTROL OUTPUT OPTIONS

Additional outputs can be provided by a horizontal upper board. Available options include single-setpoint control with one 10 A relay, dual-setpoint control with two 10 A relays, 4-20 mA proportional control (source



or sink), time-proportional 2 A solid-state relay control, and isolated, parallel BCD output. For additional information, please refer to the QUANTA and Mechanical sections.

## SPECIFICATIONS

### ANALOG INPUT Q2000A

<b>Range</b>	±199.9 mV	±1.999 V	±19.99 V	±199.9 V
<b>Resolution</b>	100 µV	1 mV	10 mV	100 mV
<b>Maximum Input</b>	130 Vp	250 Vp	250 Vp	250 Vp
<b>Input resistance</b>	100 Gohm	1 Mohm	1 Mohm	1 Mohm
<b>Bias current</b>	1 nA	100 pA	10 pA	1 pA

### ANALOG INPUT Q2000B

<b>Range</b>	±19.99 µA	±199.9 µA	±1.999 mA
<b>Resolution</b>	10 nA	100 nA	1 µA
<b>Maximum Input</b>	3 mA	10 mA	30 mA
<b>Input resistance</b>	10 kohm	1 kohm	100 kohm

<b>Range</b>	±19.99 mA	±199.9 mA	±1.999 A
<b>Resolution</b>	10 µA	100 µA	1 mA
<b>Maximum Input</b>	100 mA	500 mA	2.2 A
<b>Input resistance</b>	10 ohm	1 ohm	0.1 ohm

### INPUT CONFIGURATION

**Configuration:** Bipolar, single-ended

**Polarity:** Automatic

**Span adjustment:** ±4%

### NOISE REJECTION

**NMR:** 75 dB, 50/60 Hz

**CMR:** 120 dB, DC to 60Hz

**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing

### ACCURACY AT 25°C

**Maximum Error:** ±0.05% of reading ±1 count

**Span tempco:** ±0.01% of reading/°C

**Step response:** 1 s to 99.9% of span

**Warmup to rated accuracy:** 10 min

### CONVERSION

**Technique:** Dual-slope, average-value

**Signal integration period:** 100 ms

**Read rate:** 2.5/s

### DISPLAY

**LED:** 0.56 in (14.2 mm) 7-segment, red

**LCD:** 0.50 in (12.7 mm) 7-segment liquid crystal

**Symbols:** -1.8.8.8

**Decimal point positions:** Three positions selectable by jumpers behind lens or at connector

**Overrange indication:** Three-least significant digits blanked

### POWER

**AC voltages:** 120, 240 or 24 V ac +10%/-15%

**AC frequency:** 49-440 Hz

**DC voltages:** 9-32 V dc, isolated to 300 Vp; 26-56 V dc, isolated to 300 Vp; 5 V dc ±5%, non-isolated

**Power consumption:** 5 W max

**ENVIRONMENTAL**

**Operating temperature:** 0 to 60°C

**Storage temperature:** -40 to +85°C

**Relative humidity:** 95% at 40°C (non-condensing)

**MECHANICAL**

**Dimensions:** Newport DIN1A (1/8 DIN) case (see Mechanical section for drawings)

**Weight:** 17 oz (480 g)

**Case material:** 94V-0 UL-rated polycarbonate



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# 4-DIGIT DC VOLTMETER, AMMETER, TRANSMITTER & CONTROLLER Q9000A (Voltage) & Q9000B (Current)



## NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) 1/8 (1A) DIN Case
- [MECHANICAL](#) Connections Diagram
- [PRICE](#)

 REQUIRES ADOBE ACROBAT - [HELP](#)

## QUANTA STANDARD FEATURES

- ✓ ±9,999-count display span
- ✓ ±100 mV to ±100 V ranges (Q9000A)
- ✓ ±10 µA to ±1 A ranges (Q9000B)
- ✓ Front-panel accessible zero and span adjust
- ✓ 0.1 mV/count analog output
- ✓ Bright, 0.56 in (14.2 mm) LED display
- ✓ Automatic polarity
- ✓ Display hold and test
- ✓ 120/240 V ac, 5 V dc, 9-32 V dc or 26-56 V dc power
- ✓ Screw-terminal barrier strip
- ✓ 1/8 DIN case

## OPTIONS

- ✓ Analog output for user-selected span
- ✓ Single-setpoint 10 A relay control
- ✓ Dual-setpoint 10 A relay control
- ✓ 4-20 mA proportional control
- ✓ Time-proportional 2 A solid-state relay control
- ✓ Parallel BCD output, isolated
- ✓ NEMA-4 splash-proof lens cover

The **QUANTA Q9000A DC voltmeter** and **Q9000B DC ammeter** are ±9,999-count versions of the ±1,999-count Q2000A and Q2000B, respectively. They provide the same features and benefits (but no LCD display option), plus additional resolution required for many applications. A 1/8 DIN case with screw terminals for signal and power is standard. A wide range of options are available.

## POWER OPTIONS

Six types of meter power are available: 120 V ac, 240 V ac, 24 V ac, 5 V dc, isolated 9-32 V dc or 26-56 V dc.

## ANALOG OUTPUT OPTIONS

A 0.1 mV/count (±1 V full-scale) analog output is standard and is ideal for driving a strip-chart recorder. An additional analog output can be provided by an optional vertical plug-in board. Available output signals are 0-5 V dc, 0-10 V dc, 0-1 mA (source or sink), and 4-20 mA (source or sink). The top and bottom of each output range can be scaled to fit a user-selected display span.

## CONTROL OUTPUT OPTIONS

Additional outputs can be provided by a horizontal upper board. Available options include single-setpoint control with one 10 A relay, dual-setpoint control with two 10 A relays, 4-20 mA proportional control (source or sink), time-proportional 2 A solid-state relay control, and isolated, parallel BCD output. For additional information, please refer to the QUANTA and Mechanical sections.

**SPECIFICATIONS****ANALOG INPUT Q9000A**

<b>Range</b>	±99.99 mV	±999.9 mV	±9.999 V	±99.99 V
<b>Resolution</b>	10 µV	100 µV	1 mV	10 mV
<b>Maximum Input</b>	130 Vp	250 Vp	250 Vp	250 Vp
<b>Input resistance</b>	100 Gohm	1 Mohm	1 Mohm	1 Mohm
<b>Bias current</b>	1 nA	100 pA	10 pA	1 pA

**ANALOG INPUT Q9000B**

<b>Range</b>	±9.999 µA	±99.99 µA	±999.9 µA
<b>Resolution</b>	1 nA	10 nA	100 nA
<b>Maximum Input</b>	3 mA	10 mA	30 mA
<b>Input resistance</b>	10 kohm	1 kohm	100 ohm

<b>Range</b>	±9.999 mA	±99.99 mA	±999.9 mA
<b>Resolution</b>	1 µA	10 µA	100 µA
<b>Maximum Input</b>	100 mA	500 mA	2.2 A
<b>Input resistance</b>	10 ohm	1 ohm	0.1 ohm

**INPUT CONFIGURATION****Configuration:** Bipolar, single-ended**Polarity:** Automatic**Span adjustment:** ±4%**NOISE REJECTION****NMR:** 130 dB, 50/60 Hz**CMR:** 120 dB, DC to 60Hz**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing**ACCURACY AT 25°C****Maximum Error:** ±0.05% of reading ±2 counts**Span tempco:** ±0.01% of reading/°C**Step response:** 1 s to 99.9% of span**Warmup to rated accuracy:** 30 min**CONVERSION****Technique:** Dual-slope, average-value**Signal integration period:** 100 ms**Read rate:** 2.5/s**DISPLAY****Type:** 7-segment, red LED**Height:** 0.56 in (14.2 mm)**Symbols:** -8.8.8.8**Decimal points:** Three positions selectable by jumpers behind lens or at connector**0 to ±9,999 counts:** Normal operation**±10,000 to ±19,999 counts:** Four least-significant digits flash reading**Beyond ±19,999 counts:** All four digits flash zeros**POWER****AC voltages:** 120, 240 or 24 V ac +10%/-15%**AC frequency:** 49-440 Hz**DC voltages:** 9-32 V dc, isolated to 300 Vp; 26-56 V dc, isolated to 300 Vp; 5 V dc ±5%, non-isolated**Power consumption:** 5 W max

## ENVIRONMENTAL

**Operating temperature:** 0 to 60°C

**Storage temperature:** -40 to +85°C

**Relative humidity:** 95% at 40°C (non-condensing)

## MECHANICAL

**Dimensions:** Newport DIN1A (1/8 DIN) case (see Mechanical section for drawings)

**Weight:** 17 oz (480 g)

**Case material:** 94V-0 UL-rated polycarbonate



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# 3 1/2 DIGIT AC POWER LINE MONITOR

## 201AN-AC5

- ✓ 50.0 to 199.9 Vac Range (100 mV Resolution)
- ✓ 50 to 650 Vac range (1 V Resolution)
- ✓ Bright, 0.56" (14.2 mm) LED Display
- ✓ Automatic Zero
- ✓ Display Hold and Test
- ✓ Screw-terminal Barrier Strip
- ✓ Short 4.1" (104 mm) Deep 1/8 DIN Case



## OPTIONS

- ✓ Isolated 9-32 Vdc Power
- ✓ Isolated 26-56 Vdc Power



### NEWPORT PRODUCT INFO

- [MANUAL](#)
  - [QUICK START](#)
  - [MECHANICAL](#) 1/8 DIN (2A) Case
  - [MECHANICAL](#) Connections Diagram
  - [PRICE](#)
- [REQUIRES ADOBE ACROBAT - HELP](#)

**Model 201AN-AC** is a low-cost, compact 3 1/2 digit panel meter for AC power line monitoring. It uses a half-wave rectifier calibrated to read the RMS value of sinusoidal signals. Two input ranges are jumper-selectable: 50.0 to 199.9 Vac with 100 mV resolution and accuracy optimized for 115 Vac, and 50 to 650 V with 1 V resolution and accuracy optimized for 230 Vac. The meter fits a standard 1/8 DIN panel cutout 3.62" x 1.77" (92 x 45 mm) and requires a depth of less than 4.1" (104 mm) behind the panel. A screw-terminal barrier strip for signal and power is standard.

## SPECIFICATIONS

### Noise Rejection (AC GND to SIG GND)

**CMR:** 120 dB, DC to 60 Hz

**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing

### Accuracy at 25°C (10% to 100% of full-scale range)

**Maximum error (reading - actual): 50.0 to 199.9 V range:**  $\pm 0.006$  (R-115 V)  $\pm 0.1$  V and **50 to 650 V range:**  $\pm 0.006$  (R-230 V)  $\pm 1$  V

**Span tempco:**  $\pm 0.01\%$  of reading/ $^{\circ}\text{C}$

**Step response:** 1 s

**Warmup to rated accuracy:** 10 min

## ANALOG-TO-DIGITAL CONVERSION

**Technique:** Dual-slope, average-value

**Read rate:** 2.5/s

**Integration period:** 100 ms

## DISPLAY

**Type:** 7-segment, red LED Height: 0.56" (14.2 mm)

**Symbols:** 1.8.8.8

**Decimal points:** Three positions programmable internally or at connector, 10 mA average sink

**Overrange indication:** Three least-significant digits blank



**DIGITAL CONTROLS****HOLD** and **TEST** inputs: TTL or 5 V CMOS compatible**POWER****AC voltages:** 115 or 230 Vac  $\pm 15\%$ **AC frequency:** 49-440 Hz**DC voltages:** 9-32 Vdc, isolated to 300 Vp; 26-56 Vdc, isolated to 300 Vp**Power consumption:** 2.4 W (nominal)**Output voltages:** +4.7 Vdc and -4.6 Vdc  $\pm 5\%$ , 10 mA max**ENVIRONMENTAL****Operating temperature:** 0 to 60°C**Storage temperature:** -40 to +85°C**Relative humidity:** 95% at 40°C (non-condensing)**MECHANICAL****Dimensions:** NEWPORT® DIN2A (short 1/8 DIN) case (See mechanical section for drawings)**Weight:** 14 oz (400 g)**Case material:** 94V-0 UL-rated polycarbonate

Signal Input		
Range	199.9 Vac	650 Vac
Resolution	100 Mv	1 V
Overvoltage protection	650 Vac	650 Vac
Input resistance	1 M ohm	1 M ohm
Bias current	1 pA	1 pA
<b>Configuration:</b> Half-wave average, RMS-calibrated		
<b>Zero:</b> Automatic		
<b>Frequency:</b> 49-440 Hz		

**To Order** ( \* Complete Model No.) *Prices Shown in U.S. Dollars*

Model			Description	Price
201AN-	(*)	(*)	Standard case	\$180
301AN-	(*)	(*)	INFINITY® style case	\$210
<b>INPUT MEASUREMENT RANGE</b>				
	AC5		50.0 to 199.9 Vac	
	AC6		60 to 650 Vac	
<b>POWER</b>				
		-	115 Vac, 50/60/400 Hz	N/C
		C1	230 Vac, 50/60/400 Hz	N/C
		C3C	9-32 Vdc, isolated to 300 Vp	\$120
		C3E	26-56 Vdc, isolated to 300 Vp	\$120

**Ordering Example:** 201AN-AC5 3 1/2 digit panel meter with standard case and 50 to 199.9 Vac measurement range, \$180.

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# LOW-COST, 3 1/2 DIGIT DC VOLTMETERS

## MODEL 201A & 201AN OPTION 201AN-AC / 301AN



### STANDARD FEATURES

- ✓  $\pm 1,999$ -count display span
- ✓  $\pm 200$  mV to  $\pm 200$  Vdc ranges
- ✓ True-differential input with 80 dB CMR
- ✓ 3-wire ratio input
- ✓ Bright, 0.56 in (14.2 mm) LED display
- ✓ Automatic zero and polarity
- ✓ Display hold and test
- ✓ 115/230 Vac power
- ✓ 1/8 DIN case



### OPTIONS

- ✓ Isolated 9-32 Vdc power
- ✓ Isolated 26-56 Vdc power
- ✓ Screw-terminal barrier strip
- ✓ NEMA-4 splash-proof lens cover

#### NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) NEMA-SIZE Case
- [MECHANICAL](#) Connections Diagram
- [PRICE](#)

 REQUIRES ADOBE ACROBAT - [HELP](#)

**Models 201A and 201AN** are two pinout versions of the same low-cost 3 1/2 digit DC voltmeter. They fit a standard 1/8 DIN panel cutout and require a depth of less than 4.1 in (104 mm) behind the panel. With the addition of a screw-terminal barrier strip, they become low-cost, pin-compatible alternatives to the Q2000A and Q2000B in applications where indication-only is required.

### INPUT RANGES

The 201A and 201AN offer voltage ranges of  $\pm 0.1999$  V,  $\pm 1.999$  V,  $\pm 19.99$  V and  $\pm 199.9$  V dc. The input is true-differential, with excellent common-mode noise rejection (CMR). By using an external DC voltage reference, any of these ranges can further be configured for 3-wire ratio measurement with readout from 0 to 1.999.

### TWO PINOUTS

**Model 201A** is pin-compatible with Newport's older Model 201 and is recommended for existing 201 applications.

**Model 201AN** is pin-compatible with Newport's new 202A, 2001A, 2002A Series and is recommended for new applications.

### OPTIONS

The 201A and 201AN can be configured for four voltage input ranges, three decimal-point positions, and high-impedance 3-wire ratio input. Mechanical options include a screw-terminal barrier strip for signal and

power and a splash-proof lens cover which meets NEMA-4 standards.

## SPECIFICATIONS

### ANALOG INPUT

<b>Range</b>	$\pm 199.9$ V	$\pm 1.999$ V	$\pm 19.99$ V	$\pm 199.9$ V
<b>Resolution</b>	100 $\mu$ V	1 mV	10 mV	100 mV
<b>Maximum Input</b>	130 Vp	130 Vp	250 Vp	250 Vp
<b>Input Resistance</b>	1 Gohm	1 Gohm	1.1 Mohm	1.0 Mohm
<b>Bias Current</b>	50 pA	50 pA	5 pA	1 pA

**Configuration:** Differential, Bipolar

**Zero:** Automatic

**Span Adjustment:**  $\pm 5\%$

### NOISE REJECTION

**NMR:** 56 dB, 50/60 Hz

**CMR, AC GND to SIG GND:** 120 dB, DC to 60 Hz

**CMR, SIG LO to SIG GND:** 80 dB, DC to 60 Hz

**CMV, AC GND to SIG GND:** 1500 Vp per HV test, 354 Vp per IEC spacing

**CMV, SIG LO to SIG GND:**  $\pm 1$  Vp

### ACCURACY AT 25°C

**Maximum error:**  $\pm 0.05\%$  of reading  $\pm 1$  count

**Span tempco:**  $\pm 0.01\%$  of reading/ $^{\circ}$ C

**Step response:** 1 s

**Warmup to rated accuracy:** 1 min

### ANALOG-TO-DIGITAL CONVERSION

**Technique:** Dual-slope, average-value

**Polarity:** Automatic

**Signal integration period:** 100 ms

### 3-WIRE RATIO REFERENCE

<b>Analog input range</b>	$\pm 200$ mV	$\pm 2, \pm 20, \pm 200$ V
<b>External reference input</b>	+0.05 to +0.2V	+0.5 to +2.0 V
<b>Load on reference, std</b>	30.6 kohm	65.3 kohm
<b>Load on reference, opt</b>	100 Mohm	100 Mohm
<b>Accuracy</b>	99.9%	99.9%

### DISPLAY

**Type:** 7-segment, red LED

**Height:** 0.56 in (14.2 mm)

**Symbols:** -1.8.8.8

**Decimal points:** Three positions programmable internally or at connector

**Overrange indication:** Three least-significant digits blank

### DIGITAL SIGNALS

**HOLD and TEST inputs:** TTL or 5 V CMOS compatible

### POWER

**AC voltage:** 115 or 230 Vac,  $\pm 15\%$

**AC frequency:** 49-440 Hz

**DC voltages:** 9-32 Vdc, isolated to 300 Vp; 26-56 Vdc, isolated to 300 Vp

**Power consumption:** 2.4 W (nominal)

**Output voltages:** +4.7 Vdc and -4.6 Vdc  $\pm 5\%$ , 10 mA max

### ENVIRONMENTAL

**Operating temperature:** 0 to 60°C

**Storage temperature:** -40 to 85°C

**Relative humidity:** 95% at 40°C (non-condensing)

### MECHANICAL

**Dimensions:** Newport DIN2A (short 1/8 DIN) case (see Mechanical section for drawings)

**Weight:** 14 oz (400 g)

**Case material:** 94V-0 UL-rated polycarbonate



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# 3 1/2 DIGIT DC VOLTMETER WITH BCD OUTPUT MODEL 203A



## STANDARD FEATURES

- ✓ Parallel BCD output
- ✓  $\pm 1,999$ -count display span
- ✓  $\pm 200$  mV to  $\pm 200$  V dc ranges
- ✓ 3-wire ratio input
- ✓ 1500 Vp CMV, 100 db CMR
- ✓ Bright, 0.56 in (14.2 mm) LED display
- ✓ Automatic zero and polarity
- ✓ 115/230 V ac power
- ✓ 1/8 DIN case

## OPTIONS

- ✓ High-impedance 3-wire ratio input
- ✓ Isolated, stored, three-state parallel BCD
- ✓ 5 V dc power
- ✓ Isolated 9-32 V dc power
- ✓ Isolated 26-56 V dc power
- ✓ Screw-terminal barrier strip
- ✓ NEMA-4 splash-proof lens cover
- ✓ NEMA-size case

### NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) 1/16 DIN Case
- [MECHANICAL](#) NEMA-SIZE
- [MECHANICAL](#) Connections Diagram
- [PRICE](#)

 REQUIRES ADOBE ACROBAT - [HELP](#)

**Model 203A** is a low-cost  $\pm 1,999$ -count DC voltmeter with unbuffered, non-isolated parallel BCD output as a standard feature. This output is good for about 1 feet and allows the 203A to be interfaced to a digital comparator (Model 872A) or a printer (Model 820A). For applications which require long cable runs or multiplexing of BCD signals, three-state, isolated, parallel BCD output is available as an option.

## OPTIONS

The meter main assembly can be electrically configured for four input ranges and high-impedance 3-wire ratio input. Upper-board options include three BCD output boards. Mechanical options for the standard 1/8 DIN case include a screw-terminal barrier strip for signal and power and a splash-proof lens cover which meets NEMA-4 standards. A NEMA-size case is optional. For additional information, please refer to the Options and Mechanical sections.

## SPECIFICATIONS

### ANAOLG INPUT

Range	$\pm 199.9$ V	$\pm 1.999$ V	$\pm 19.99$ V	$\pm 199.9$ V
Resolution	100 $\mu$ V	1 mV	10 mV	100 mV
Maximum Input	100 Vp	250 Vp	250 Vp	250 Vp
Input Resistance	1 Gohm	1 Gohm	1.1 Mohm	1.0 Mohm
Bias Current	2 nA	2 nA	200 pA	20 pA

**Configuration:** Bipolar, single-ended

**Zero:** Automatic

**Span Adjustment:**  $\pm 3.1\%$

### NOISE REJECTION

**NMR:** 20 dB, 50/60 Hz

**CMR:** 100 dB, DC to 60 Hz

**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing

### ACCURACY AT 25°C

**Maximum error:**  $\pm 0.05\%$  of reading  $\pm 1.5$  count

**Span tempo:**  $\pm 0.01\%$  of reading/ $^{\circ}\text{C}$

**Step response:** 1 s

**Warmup to rated accuracy:** 1 min

### ANALOG-TO-DIGITAL CONVERSION

**Technique:** Dual-slope, average-value

**Polarity:** Automatic

**Signal integration period:** 3.3 ms

**Read rate:** 4/sec or 0-4/sec with ext control scale

### 3-WIRE RATIO REFERENCE

<b>Analog input range</b>	$\pm 200$ mV	$\pm 2, \pm 20, \pm 200$ V
<b>External reference input</b>	+0.05 to +0.4V	+0.5 to +2.0 V
<b>Load on reference, std</b>	430 ohm	4.3 kohm
<b>Load on reference, opt</b>	100 Mohm	100 Mohm
<b>Accuracy</b>	99.9% $\pm 0.1\%$	99.9% $\pm 0.1\%$

### DISPLAY

**Type:** 7-segment, red LED

**Height:** 0.56 in (14.2 mm)

**Symbols:** -1.8.8.8.8

**Decimal points:** Four positions selectable by jumpers from front panel or at connector, 10 mA sink

**Overrange indication:** Four least-significant digits flash

### DIGITAL SIGNALS

**Output signals:** TTL-compatible

**Input signals:** TTL or 5 V CMOS compatible

### POWER

**AC voltage:** 115 or 230 V ac,  $\pm 10\%$

**AC frequency:** 50/60 Hz

**DC voltages:** 5 V dc  $\pm 5\%$ , non-isolated; 9-32 V dc, isolated to 300 Vp; 26-56 V dc, isolated to 300 Vp

**Power consumption:** 3.5 W (nominal)

### ENVIRONMENTAL

**Operating temperature:** 0 to 50°C

**Storage temperature:** -40 to 75°C

**Relative humidity:** 95% at 40°C (non-condensing)

### MECHANICAL

**Dimensions:** Newport DIN1A (1/8 DIN) case standard, Newport NEMA case optional (see Mechanical section for drawings)

**Case material:** 94V-0 UL-rated polycarbonate



# 3 3/4 DIGIT DC VOLTMETER WITH BCD OUTPUT MODEL 204B - [OPTION AVG/RMS](#)

## 204B



### STANDARD FEATURES

- ✓ Parallel BCD output
- ✓  $\pm 3,999$ -count display span
- ✓  $\pm 40$  mV to  $\pm 400$  V dc ranges
- ✓ 3-wire ratio input
- ✓ 1500 Vp CMV, 120 dB CMR
- ✓ Bright, 0.56 in (14.2 mm) LED display
- ✓ Automatic zero and polarity
- ✓ 115/230 V ac power
- ✓ 1/8 DIN case

### OPTIONS

- ✓  $\pm 4,999$ -count display span
- ✓  $\pm 5,999$ -count display span
- ✓ High-impedance 3-wire ratio input
- ✓ Isolated, stored, three-state parallel BCD
- ✓ IEEE-488 (GPIB) interface
- ✓ Digital setpoint controller
- ✓ Digital peak or valley hold
- ✓ 0.5 mV/count analog output
- ✓ 5 V dc power
- ✓ Isolated 9-32 V dc power
- ✓ Isolated 26-56 V dc power
- ✓ Screw-terminal barrier strip
- ✓ NEMA-4 splash-proof lens cover
- ✓ NEMA-size case



#### NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) 1/8 (1A) Case
- [MECHANICAL](#) NEMA-SIZE
- [MECHANICAL](#) Connections Diagram
- [PRICE](#)

 REQUIRES ADOBE ACROBAT - [HELP](#)

In its base configuration, **Model 204B** is a high-accuracy  $\pm 3,999$ -count DC voltmeter which fills the gap between 3 1/2 and 4 1/2 digit resolution. The most sensitive standard input range is  $\pm 39.99$  mV full-scale and provides 10  $\mu$ V resolution. Extended-range options are available to  $\pm 4,999$  and  $\pm 5,999$  counts. Accuracy is 99.95% of reading.

### BCD OUTPUT STANDARD

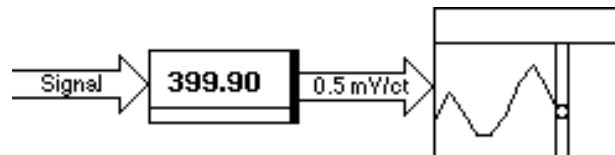
Unbuffered, non-isolated parallel BCD output is a standard feature of the 204B and is implemented on the main circuit board. It is good for about 1 feet and can be used to interface the 204B to a comparator (Model 872A) or a printer (Model 820A). Additional data and control outputs can be provided by an optional upper board.

### OPTIONS

The meter main assembly can be electrically configured for five input ranges, four display spans, a dummy right-hand zero, high-impedance 3-wire ratio input, extended zero adjustment, and optical isolation between analog and digital grounds. Upper-board options include four BCD output boards, an IEEE-488 (GPIB) communications interface, linearized 0.5 mV/count analog output, and a single setpoint controller. Mechanical options for the standard 1/8 DIN case include a screw-terminal barrier strip for signal and power and a splash-proof lens cover which meets NEMA-4 requirements. A NEMA-size case is optional. For

additional information, please refer to the Options and Mechanical sections.

## SPECIFICATIONS



### ANALOG INPUT

<b>Signal Range</b>	$\pm 39.99$ mV	$\pm 399.9$ mV
<b>Resolution</b>	10 $\mu$ V	100 $\mu$ V
<b>Input resistance</b>	1 Gohm	1 Gohm
<b>Bias current</b>	1 nA	1 nA
<b>Maximum input</b>	100 Vp	100 Vp

<b>Signal Range</b>	$\pm 3.999$ mV	$\pm 39.99$ mV	$\pm 399.9$ mV
<b>Resolution</b>	1 mV	10 mV	100 mV
<b>Input resistance</b>	1 Gohm	1.1 Mohm	1.0 Mohm
<b>Bias current</b>	1 nA	100 pA	10 pA
<b>Maximum input</b>	100 Vp	250 Vp	500 Vp

### NOISE REJECTION

**NMR:** 40 dB, 50/60 Hz

**CMR:** 120 dB, DC to 60 Hz

**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing

### ACCURACY AT 25°C

**Maximum error:**  $\pm 0.02\%$  of reading  $\pm 1$  count

**Span tempco, 4V range:**  $\pm 0.005\%$  of reading/ $^{\circ}$ C

**Span tempco, other ranges:**  $\pm 0.01\%$  of reading  $\pm 1$  count

**Step response:** 1 s

**Warmup to rated accuracy:** 1 hour

### ANALOG-TO-DIGITAL CONVERSION

**Technique:** Dual-slope, average value

**Polarity:** Automatic

**Signal integration period:** 50 ms at 60 Hz, 40 ms at 50 Hz

**Read rate:** 3.6/s at full scale

### 3-WIRE RATIO REFERENCE

<b>Input range</b>	$\pm 40$ mV	$\pm 400$ mV	$\pm 4$ , $\pm 40$ , $\pm 400$ V
<b>Reference Voltage</b>	+0.01 to +0.08V	+0.1 to +0.8 V	+1.0 to +3.5 V
<b>Load on reference, std</b>	47 ohm	471 ohm	4.72 kohm
<b>Load on reference, opt</b>	100 Mohm	100 Mohm	100 Mohm
<b>Accuracy w/100 Mohm</b>	99.8% $\pm 0.2\%$	99.8% $\pm 0.2\%$	99.8% $\pm 0.2\%$

### DISPLAY

**Type:** 7-segment, red LED

**Height:** 0.56 in (14.2 mm)

**Symbols:** -8.8.8.8

**Decimal points:** Three positions internally or at connector

**Overrange indication:** Display flashes

### DIGITAL INPUTS

**Output signals:** TTL-compatible

**HOLD input:** TTL or 5 V CMOS compatible  
**BLANKING input:** Open-collector compatible

### POWER

**AC voltages:** 115 V ac  $\pm 10\%$  at 60 Hz; 230 V ac  $\pm 10\%$  at 50 Hz  
**DC voltages:** 5 V dc  $\pm 5\%$ , non-isolated; 9-32 V dc, isolated to 300 Vp; 26-56 V dc, isolated to 300 Vp  
**Power consumption:** 5 W nominal

### ENVIRONMENTAL

**Operating temperature:** 0 to 50°C  
**Storage temperature:** -40 to +75°C  
**Relative humidity:** 95% at 40°C (non-condensing)

### MECHANICAL

**Dimensions:** Newport DIN1A (1/8 DIN) case standard, Newport NEMA-size case optional (see Mechanical section for drawings)  
**Weight:** 17 oz (480 g)  
**Case material:** 94V-0 UL-rated polycarbonate



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# 4 1/2 DIGIT DC VOLTMETER WITH BCD OUTPUT MODEL 2003B - [OPTION AVG/RMS](#)



## NEWPORT PRODUCT INFO

- [MANUAL](#)
- [QUICK START](#)
- [MECHANICAL](#) 1/8 DIN (1A) Case
- [MECHANICAL](#) NEMA-SIZE Case
- [MECHANICAL](#) Connections Diagram
- [PRICE](#)

 REQUIRES ADOBE ACROBAT - [HELP](#)

## STANDARD FEATURES

- ✓ Parallel BCD output
- ✓  $\pm 19,999$ -count display span
- ✓  $\pm 200$  mV to  $\pm 200$  V dc ranges
- ✓  $\pm 0.006\%/^{\circ}\text{C}$  span tempco
- ✓ 1500 V<sub>p</sub> CMV, 100 dB CMR
- ✓ 3-wire ratio input
- ✓ Bright, 0.56 in (14.2 mm) LED display
- ✓ Automatic zero and polarity
- ✓ 115/230 V ac power
- ✓ 1/8 DIN case

## OPTIONS

- ✓ High-impedance 3-wire ratio input
- ✓ Isolated, stored, three-state parallel BCD
- ✓ IEEE-488 (GPIB) interface
- ✓ Digital setpoint controller
- ✓ Digital peak or valley hold
- ✓ Ultra-low span tempco
- ✓ Read rate to 10/s
- ✓ 5 V dc power
- ✓ Screw-terminal barrier strip
- ✓ NEMA-4 splash-proof lens cover
- ✓ NEMA-size case

**Model 2003B** is a 4 1/2 DC voltmeter which provides high-resolution and high-accuracy at very reasonable cost. Display span is  $\pm 19,999$  counts. Accuracy 99.98% of reading. The 2003B also provides exceptional stability and noise rejection. Its conversion circuit uses a crystal oscillator, which is tuned for either 50 or 60 Hz rejection.

## BCD OUTPUT STANDARD

Unbuffered, non-isolated parallel BCD output is a standard feature of the 2003B and is implemented on the main circuit board. It is good for about 1 ft and can be used to interface the 2003B to a comparator (Model 872A) or a printer (Model 820A). Additional data and control outputs can be provided by an optional upper board.

## OPTIONS

The meter main assembly can be electrically configured for four input ranges, high-impedance 3-wire ratio input, high read-rate, and ultra-low span tempco. Upper-board options include four BCD output boards, an IEEE-488 (GPIB) communications interface, and a single-setpoint controller.

Mechanical options for the standard 1/8 DIN case include a screw-terminal barrier strip for signal and power, and a splash-proof lens cover which meets NEMA-4 requirements. A NEMA-size case is optional.

For additional information, please refer to the Options and Mechanical sections.

## SPECIFICATIONS

### ANAOLG INPUT

<b>Range</b>	±199.99 mV	±1.9999 V	±19.999 V	±199.99 V
<b>Resolution</b>	10 µV	100 µV	1 mV	10 mV
<b>Maximum Input</b>	100 Vp	100 Vp	250 Vp	250 Vp
<b>Input Resistance</b>	1 Gohm	1 Gohm	1.1 Mohm	1.0 Mohm
<b>Bias Current</b>	2 nA	2 nA	200 pA	20 pA

**Configuration:** Bipolar, single-ended

**Zero:** Automatic

**Span adjustment:** ±2%

### NOISE REJECTION

**NMR:** 60 dB, 50/60 Hz

**CMR:** 100 dB, DC to 60 Hz

**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing

### ACCURACY AT 25°C

**Maximum error:** ±0.01% of reading ±2 counts ±10 µV

**Span tempco:** ±0.006% of reading/°C standard, ±0.001% of reading/°C optional

**Step Response:** 1 s

**Warmup to rated accuracy:** 1 hour

### ANALOG-TO-DIGITAL CONVERSION

**Technique:** Dual-slope, average-value

**Polarity:** Automatic

**Signal integration period:** 33 ms at 60 Hz, 40 ms at 50 Hz

**Read rate, standard:** 4.3/s at 60 Hz, 3.6/s at 50 Hz

**Read rate, optional:** 10/s at 60 Hz

### 3-WIRE RATIO REFERENCE

<b>Analog input range</b>	±200 mV	±2, ±20, ±200 V
<b>Reference Voltage</b>	+0.1 to +0.2 V	+1.0 to +2.0 V
<b>Load on reference, std</b>	170 ohm	1.7 kohm
<b>Load on reference, opt</b>	1 Gohm	1 Gohm
<b>Accuracy</b>	99.90%	99.95%

### DISPLAY

**Type:** 7-segment, red LED

**Height:** 0.56 in (14.2 mm)

**Symbols:** -1.8.8.8.8

**Decimal points:** Four positions programmable internally or at connector

**Overrange indication:** Display flashes

### DIGITAL SIGNALS

**Output signals:** TTL-compatible

**Input signals:** TTL or 5 V CMOS compatible

### POWER

**AC voltages:** 115 V ac ±10% at 60 Hz; 230 V ac ±10% at 50 Hz

**AC frequency:** 60 Hz standard, 50 Hz optional

**DC voltage:** 5 V dc ±5%

**Power consumption:** 4.5 W (nominal)

## ENVIRONMENTAL

**Operating temperature:** 0 to 50°C

**Storage temperature:** -40 to 75°C

**Relative humidity:** 95% at 40°C (non-condensing)

## MECHANICAL

**Dimensions:** Newport DIN1A (1/16 DIN) case standard, Newport NEMA-size case optional (see Mechanical section for drawings)

**Weight:** 17 oz (480 g)

**Case material:** 94V-0 UL-rated polycarbonate



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# 4 3/4 DIGIT DC VOLTMETER WITH BCD OUTPUT

## MODEL 2004 - [OPTION AVG/RMS](#)



### STANDARD FEATURES

- ✓ Parallel BCD output
- ✓  $\pm 39,999$ -count display span
- ✓  $\pm 400$  mV to  $\pm 400$  V dc ranges
- ✓  $\pm 10$  ppm/ $^{\circ}$ C span tempco (4 V range)
- ✓ 3-wire ratio input
- ✓ 120 dB CMR, 75 dB NMR
- ✓ Bright, 0.56 in (14.2 mm) LED display
- ✓ Automatic zero and polarity
- ✓ 115/230 V ac power
- ✓ 1/8 DIN case

### OPTIONS

- ✓  $\pm 49,999$ -count display span
- ✓  $\pm 59,999$ -count display span
- ✓  $\pm 69,999$ -count display span
- ✓ High-impedance 3-wire ratio input
- ✓ Isolated, stored, three-state parallel BCD
- ✓ IEEE-488 (GPIB) interface
- ✓ Digital setpoint controller
- ✓ Digital peak or valley hold
- ✓ 5 V dc power
- ✓ Screw-terminal barrier strip
- ✓ NEMA-4 splash-proof lens cover
- ✓ NEMA-size case

NEWPORT PRODUCT INFO
• <a href="#">MANUAL</a>
• <a href="#">QUICK START</a>
• <a href="#">MECHANICAL</a> 1/8 DIN (1A) Case
• <a href="#">MECHANICAL</a> NEMA-SIZE Case
• <a href="#">MECHANICAL</a> Connections Diagram
• <a href="#">PRICE</a>
REQUIRES ADOBE ACROBAT - <a href="#">HELP</a>

In its base configuration, Model 2004 is a 4 3/4 digit DC voltmeter which provides exceptionally high resolution, accuracy, and temperature stability. The standard display range is  $\pm 39,999$  counts. Extended-range options are available to  $\pm 49,999$ ,  $\pm 59,999$  or  $\pm 69,999$  counts. Accuracy is 99.99% of reading. Span tempco is  $\pm 10$  to  $\pm 20$  ppm of reading/ $^{\circ}$ C, made possible by precision wirewound resistors. The 2004 also features exceptional noise rejection. Its conversion circuit uses a crystal oscillator, which is tuned for either 50 or 60 Hz rejection.

### BCD OUTPUT STANDARD

Unbuffered, non-isolated parallel BCD output is a standard feature of the 2004 and is implemented on the main circuit board. It is good for about 1 ft and can be used to interface the 2004 to a Model 872A comparator or a Model 820A printer. Additional data and control outputs can be provided by an optional upper-board.

### OPTIONS

The meter main assembly can be electrically configured for four input ranges, four display spans, three round-off modes for display stability, and high-impedance 3-wire ratio input. Upper-board options include four BCD output boards, an IEEE-488 (GPIB) communications interface, and a single-setpoint controller. Mechanical options for the standard 1/8 DIN case include a screw-terminal barrier strip for signal and power

and a splash-proof lens cover which meets NEMA-4 requirements. A NEMA-size case is optional.

## SPECIFICATIONS

### ANAOLG INPUT

<b>Standard Range</b>	±399.99 mV	±3.9999 V	±39.999 V	±399.99 V
<b>Resolution</b>	10 µV	100 µV	1 mV	10 mV
<b>Maximum Input</b>	100 Vp	100 Vp	250 Vp	250 Vp
<b>Input Resistance</b>	1 Gohm	1 Gohm	1.1 Mohm	1.0 Mohm
<b>Bias Current</b>	2 nA	2 nA	200 pA	20 pA
<b>Span tempco/°C</b>	±15 ppm	±10 ppm	±20 ppm	±20 ppm

**Configuration:** Bipolar, single-ended

**Zero:** Automatic

**Span adjustment:** ±1.2%

### NOISE REJECTION

**NMR:** 70 dB, 50/60 Hz

**CMR:** 120 dB, DC to 60 Hz

**CMV:** 1500 Vp per HV test, 354 Vp per IEC spacing

### ACCURACY AT 25°C

**Maximum error:** ±0.005% of reading ±2 counts ±10 µV

**Span tempco:** ±10 to ±20 ppm/°C

**Step Response:** 1 s

**Warmup to rated accuracy:** 1 hour

### ANALOG-TO-DIGITAL CONVERSION

**Technique:** Dual-slope, average-value

**Polarity:** Automatic

**Signal integration period:** 33 ms at 60 Hz, 40 ms at 50 Hz

**Read rate:** 3.3/s at 60 Hz, 2.8/s at 50 Hz

### 3-WIRE RATIO REFERENCE

<b>Analog input range</b>	±400 mV	±4, ±40, ±400 V
<b>Reference Voltage</b>	+0.1 to +0.4 V	+1.0 to +4.0 V
<b>Load on reference, std</b>	260 ohm	2.6 kohm
<b>Load on reference, opt</b>	1 Gohm	1 Gohm
<b>Accuracy</b>	99.95%	99.95%

### DISPLAY

**Type:** 7-segment, red LED

**Height:** 0.56 in (14.2 mm)

**Symbols:** -8.8.8.8.8

**Decimal points:** Four positions programmable internally or at connector

**Overrange indication:** Display flashes

### DIGITAL SIGNALS

**Output signals:** TTL-compatible

**Input signals:** TTL or 5 V CMOS compatible

### POWER

**AC voltages:** 115 V ac ±10% at 60 Hz; 230 V ac ±10% at 50 Hz

**DC voltage:** 5 V dc ±5%

**Power consumption:** 4.5 W (nominal)

### ENVIRONMENTAL

**Operating temperature:** 0 to 50°C

**Storage temperature:** -40 to 75°C

**Relative humidity:** 95% at 40°C (non-condensing)

### MECHANICAL

**Dimensions:** Newport DIN1A (1/16 DIN) case standard, Newport NEMA-size case optional (see Mechanical section for drawings)

**Weight:** 17 oz (480 g)

**Case material:** 94V-0 UL-rated polycarbonate



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# 3 1/2 DIGIT DC VOLTMETER IN 1/16 DIN CASE 5 V DC POWERED MODEL 215



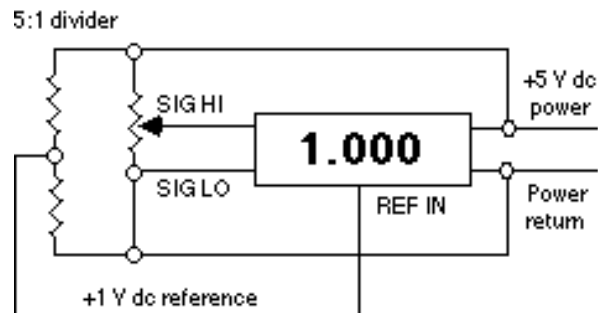
## STANDARD FEATURES

- ✓ ±1,999-count display span
- ✓ ±200 mV to ±200 V dc ranges
- ✓ True-differential input
- ✓ 80 dB CMR
- ✓ 10 G input impedance
- ✓ 3-wire ratio input
- ✓ Bright, .56 in (14.2 mm) LED display
- ✓ Automatic zero and polarity
- ✓ Display hold and test
- ✓ 5 V dc power
- ✓ 1 watt power consumption
- ✓ Low-profile 1/16 DIN case
- ✓ Low cost

### NEWPORT PRODUCT INFO

- [MANUAL \(HTML\)](#)
  - QUICK START
  - [MECHANICAL](#) 1/16 DIN Case
  - [MECHANICAL](#) Connections Diagram
  - [PRICE](#)
- REQUIRES ADOBE ACROBAT - [HELP](#)

**Model 215** is an economical, 5-volt powered, 3 1/2 digit DC voltmeter in a compact 1/16 DIN case. The height of the panel cutout is only 0.88 in (22.2 mm), and the depth behind the panel is only 2.83 in (72 mm). Power consumption is 1 watt at 5 V dc. Low cost, small size and low power consumption at 5 V dc make the 215 ideal for OEM and portable-instrument applications.



**Model 215 used in ratiometric mode. Load excitation and the +1 V dc reference are provided by the same +5 V dc that powers the meter.**

## SPECIFICATIONS

### ANALOG INPUT

Range	±199.9 mV	±1.999 V	±19.99 V	±199.9 V
Resolution	100 µV	1 mV	10 mV	100 mV
Maximum Input	130 Vp	130 Vp	150 Vp	330 Vp
Input Resistance	10 Gohm	10 Gohm	1.1 Mohm	1 Mohm
Bias Current	50 pA	5 pA	1 pA	1 pA
NMR at 50/60 Hz	56 dB	56 dB	42 dB	36 dB

**Configuration:** Bipolar true-differential

**Zero:** Automatic

### COMMON-MODE NOISE REJECTION

**CMR:** 80 dB, DC to 60 Hz

**CMV:** -1 to +2 V for (SIG HI + SIG LO)/2

### ACCURACY AT 25°C

**Maximum error:**  $\pm 0.05\%$  of reading  $\pm 1$  count

**Span tempco, standard:**  $\pm 0.008\%$  of reading /°C

**Warmup to rated accuracy:** 5 s

### ANALOG-TO-DIGITAL CONVERSION

**Technique:** Dual-slope, average-value

**Polarity:** Automatic

**Signal integration period:** 100 ms

**Read rate:** 2.5/sec

**Full-scale step response:** 1.2 s

### 3-WIRE RATIO REFERENCE

**Reference voltage:** 0.5-3.0 V

**Load on reference:** 40 k

### DISPLAY

**Type:** 7-segment, red LED

**Height:** 0.56 in (14.2 mm)

**Symbols:** -1.8.8.8

**Decimal points:** Three positions programmable internally or at connector

**Overrange indication:** Three least-significant digits blank

### DIGITAL INPUTS

**HOLD and TEST inputs:** TTL or 5 V CMOS compatible

### POWER

**Voltage:** 5 V dc  $\pm 5\%$

**Current:** 170 to 230 mA

**Power consumption:** 1 W (nominal)

### ENVIRONMENTAL

**Operating temperature:** 0 to 55°C

**Storage temperature:** -40 to 85°C

**Relative humidity:** 95% at 40°C (non-condensing)

### MECHANICAL

**Dimensions:** Newport DIN3 (1/16 DIN) (see Mechanical section for drawings)

**Weight:** 5oz (145 g)

**Case material:** 94V-0 UL-rated polycarbonate



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**4 1/2 DIGIT DC VOLTMETER IN 1/16 DIN CASE, 5 V DC POWERED**  
**MODEL 2520 - [OPTION 2520-PA](#)**



NEWPORT PRODUCT INFO
• <a href="#">MANUAL (HTML)</a>
• QUICK START
• <a href="#">MECHANICAL</a> 1/16 DIN Case
• <a href="#">MECHANICAL</a> Connections Diagram
• <a href="#">PRICE</a>
REQUIRES ADOBE ACROBAT - <a href="#">HELP</a>

**STANDARD FEATURES**

- ✓ ±19,999-count display span
- ✓ ±2 V to ±200 V dc ranges
- ✓ True-differential input
- ✓ 86 dB CMR
- ✓ 1 G input impedance
- ✓ 1 pA input bias current
- ✓ 3-wire ratio measurement
- ✓ Serial BCD output
- ✓ Bright, .56 in (14.2 mm)
- ✓ LED display
- ✓ Automatic zero and polarity
- ✓ Display hold and test
- ✓ 5 V dc power
- ✓ 1 watt power consumption
- ✓ Low-profile 1/16 DIN case

**OPTIONS**

- ✓ Three-state parallel BCD output
- ✓ ±0.001%/°C span tempco
- ✓ High-impedance 3-wire ratio input

**Model 2520** is an economical 5-volt powered, high-resolution, high-accuracy 4 1/2 digit DC voltmeter in a compact 1/16 DIN case. The height of the panel cutout is only 0.88 in (22.2 mm). The depth behind the panel is only 2.83 in (72 mm). Power consumption is 1 watt at 5 V dc.

Low cost, small size, low power consumption and exceptional power-supply noise rejection make the 2520 ideal for demanding OEM and portable-instrument applications. Non-isolated character-serial BCD output is standard to allow the 2520 to be interfaced to other instrumentation.

**PARALLEL BCD OPTION F2M**

The F2M option is an upper board which converts the meter's serial BCD output to non-isolated, three-state parallel BCD. An address decoder on the board permits the meter's parallel BCD outputs to be enabled by a 4-bit binary address signal for three-state data-busing applications.

**SPECIFICATIONS**

**SIGNAL INPUT**

<b>Range</b>	±1.9999 V	±19.999 V	±199.99 V
<b>Resolution</b>	100	1 mV	10 mV
<b>Input Resistance</b>	1 Gohm	1.1 Mohm	1 Mohm
<b>Bias Current</b>	10 pA	1 pA	0.1 pA
<b>Maximum Input</b>	300 Vp	300 Vp	300 Vp



**Configuration:** Bipolar, true-differential

**Zero:** Automatic

### **NOISE REJECTION**

**NMR:** 60 dB at 50/60 Hz

**CMR:** 86dB, DC to 60 Hz

**CMV:** SIG LO to DIG GND  $\pm 1$  Vp

### **ACCURACY AT 25°C**

**Maximum error:**  $\pm 0.01\%$  of reading  $\pm 2$  counts

**Span tempco, standard:** (2 V)  $\pm 0.005\%$  of reading/ $^{\circ}\text{C}$ , (20/200 V)  $\pm 0.0025$  of reading/ $^{\circ}\text{C}$

**Span tempco, optional:** (2 V)  $\pm 0.001\%$  of reading/ $^{\circ}\text{C}$ , (20/200 V)  $\pm 0.002\%$  of reading/ $^{\circ}\text{C}$

**Step response:** 2 s

**Warmup to rated accuracy:** 0.5 hr

### **ANALOG-TO-DIGITAL CONVERSION**

**Technique:** Dual-slope, average-value

**Polarity:** Automatic

**Signal integration period:** 100 ms

**Read rate:** 2.5/s

### **3-WIRE RATIO REFERENCE**

**Reference voltage:** 0.5-3.0 V

**Load on reference, std:** 40 kohm

**Load on reference, opt:** 2.5/s

### **DISPLAY**

**Type:** 7-segment, red LED

**Height:** 0.56 in (14.2 mm)

**Symbols:** -1.8.8.8.8

**Decimal points:** Four positions programmable internally or at connector

**Overrange indication:** Display flash

### **DIGITAL SIGNALS**

**Output signals:** TTL-compatible

**Hold Input:** TTL or 5 V CMOS compatible

**Blanking Input:** Open-collector compatible

### **POWER**

**Voltage:** 5 V dc  $\pm 5\%$

**Current:** 170 to 230 mA

**Power consumption:** 1 W (nominal)

### **ENVIRONMENTAL**

**Operating temperature:** 0 to 55 $^{\circ}\text{C}$

**Storage temperature:** -40 to +85 $^{\circ}\text{C}$

**Relative humidity:** 95% at 40 $^{\circ}\text{C}$  (non-condensing)

### **MECHANICAL**

**Dimensions:** Newport DIN3 (1/8 DIN) case (see Mechanical section for drawings)

**Weight:** 5 oz (145 g)

**Case material:** 94V-0 UL-rated polycarbonate

## **4 1/2 DIGIT DIFFERENTIAL DC VOLT/MICROVOLTMETER IN 1/16 DIN CASE, 5VDC POWERED**

<b>2520</b>	4 1/2 digit ( $\pm 19,999$ count) 5 Vdc Powered voltmeter available for differential , single-ended, or 3-wire ratio inputs. Standard features include auto-zero, auto polarity, display hold and 1/16 DIN case (92 * 22.2 mm panel cutout). Includes PCB edge connector for power, signal and display hold	<b>\$180.00</b>
-------------	---	-----------------

INPUT RANGE		
<b>-3</b>	$\pm 1.9999$ Vdc	<b>NC</b>
<b>-4</b>	$\pm 19.999$ Vdc	<b>NC</b>
<b>-5</b>	$\pm 199.99$ Vdc	<b>NC</b>
<b>-PA</b>	$\pm$ Preamplifier with zero and span adjust	<b>\$180.00</b>

SPAN TEMPCO (TEMPERATURE COEFFICIENT)		
<b>*</b>	Standard ( $\pm 0.0075\%$ of reading/ $^{\circ}$ C)	<b>NC</b>
<b>LT</b>	High-stability ( $\pm 0.002\%$ of reading/ $^{\circ}$ C)	<b>\$20.00</b>

UPPER-BOARD OUTPUT OPTIONS		
<b>*</b>	Character-serial BCD output	<b>NC</b>
<b>F2M</b>	Parallel BCD output, three-state (mutually exclusive with PA). Includes PCB edge connector	<b>\$95.00</b>

CASE MOUNTING		
<b>*</b>	Spring clamp	<b>NC</b>
<b>UC</b>	U-shaped mounting clamp (not compatible with F2M)	<b>\$4.00</b>

**ADD-ON OPTIONS**

<b>G</b>	Green LEDS for display	<b>\$10.00</b>
<b>SPC116-R</b>	NEMA-4 splash-proof lens cover, NEW	<b>\$30.00</b>

MOST POPULAR MODEL	
<b>2520-4</b>	<b>\$180.00</b>



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