3 1/2 DIGIT OHMMETER, TRANSMITTER & CONTROLLER
MODEL Q2000O

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 Q2000O 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 (±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

<table>
<thead>
<tr>
<th>INPUT</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19.99 ohm</td>
</tr>
<tr>
<td></td>
<td>199.9 Kohm</td>
</tr>
<tr>
<td></td>
<td>1.999 Kohm</td>
</tr>
<tr>
<td></td>
<td>19.99 Kohm</td>
</tr>
<tr>
<td>Resolution</td>
<td>10 mohm</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>Excitation Current</td>
<td>4.2 mA</td>
</tr>
</tbody>
</table>

**INPUT CONFIGURATION**
- **Connection:** 2- or 4-wire
- **Zero adjustment:** ±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:** ±0.05% of reading ±1 count
- **Span tempco:** ±0.006% of reading/°C
- **Zero tempco:** ±2.5 m/°C ±0.001% of FS/°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 ±5%, non-isolated
- **DC 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:** 94 V-0 UL-rated polycarbonate
4-DIGIT OHMMETER, TRANSMITTERS & CONTROLLERS
MODEL Q9000O

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 Q9000O 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 (±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
<table>
<thead>
<tr>
<th>Range</th>
<th>999.9 ohm</th>
<th>9.999 Kohm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>100 mohm</td>
<td>1 ohm</td>
</tr>
<tr>
<td>Excitation Current</td>
<td>420 µA</td>
<td>42 µA</td>
</tr>
</tbody>
</table>

**INPUT CONFIGURATION**
- Connection: 2- or 4-wire
- Zero adjustment: ±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: ±0.05% of reading ±1 count
- Zero tempco: ±2.5 mohm/°C ±0.001% of FS/°C
- Span tempco: ±0.006% of reading/°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 ±5%, non-isolated
- DC 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: 94 V-0 UL-rated polycarbonate
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: ±(0.1% rdg + 10 counts) at 50 or 60 Hz. ±(0.1% rdg + 40 counts) from 40 Hz to 3 kHz
Max. Error, dc Coupling: ±(0.1% rdg + 10 counts) at 50 or 60 Hz. ±(0.1% rdg + 30 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 ±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

<table>
<thead>
<tr>
<th>INFCAC-(*)</th>
<th>(*)</th>
<th>(*)</th>
<th>(*)</th>
<th>(*)</th>
<th>POWER AND LED COLOR</th>
<th>Price</th>
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</thead>
<tbody>
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<td></td>
<td></td>
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<td>115 Vac power and red LED</td>
<td>$345</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>230 Vac power and red LED</td>
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<tr>
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<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>230 Vac power and green LED</td>
<td>$345</td>
</tr>
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</table>

**CONTROL OUTPUT**
|          |     |     |     |     | No control output | N/C  |
| 0         |     |     |     |     | Two 6 A form “C” relays | $70  |

**ANALOG OUTPUT**
|          |     |     |     |     | 4 to 20 mA or 0 to 10 Vdc | $80  |

**COMMUNICATIONS**
|          |     |     |     |     | No serial output | N/C  |
| 0         |     |     |     |     | Isolated RS-232 | $110 |
| 1         |     |     |     |     | Isolated RS-485 half duplex | $110 |

**INPUT SIGNAL**
|          |     |     |     |     | 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: NFCAC-0100-C5 = 115 Vac power with red display and 2 form “C” relays, $345 + 70 = $415.
Model 2003B and 2004 are high-accuracy AC voltimeters 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 (Vp/Vrms) 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: ±0.1% of reading ±20 counts
Maximum error, 20 Hz to 5 kHz: ±0.3% of reading ±20 counts
Span tempco: ±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**

<table>
<thead>
<tr>
<th>Range Code</th>
<th>204B</th>
<th>2003B</th>
<th>2004</th>
<th>Price</th>
</tr>
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<tbody>
<tr>
<td>VR1</td>
<td>39.99 mV</td>
<td>199.99 mV</td>
<td>39.999 mV</td>
<td>N/C</td>
</tr>
<tr>
<td>VR2</td>
<td>399.99 mV</td>
<td>199.99 mV</td>
<td>399.99 mV</td>
<td>N/C</td>
</tr>
<tr>
<td>VR3</td>
<td>3.999 V</td>
<td>1.9999 mV</td>
<td>3.9999 V</td>
<td>N/C</td>
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<tr>
<td>VR5</td>
<td>399.9 V</td>
<td>199.99 V</td>
<td>399.99 V</td>
<td>N/C</td>
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<tr>
<td>CR1</td>
<td>3.999 µA</td>
<td>199.99 V</td>
<td>3.9999 µA</td>
<td>N/C</td>
</tr>
<tr>
<td>CR2</td>
<td>39.99 µA</td>
<td>199.9 µA</td>
<td>39.999 µA</td>
<td>N/C</td>
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<tr>
<td>CR3</td>
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<td>N/C</td>
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<td>N/C</td>
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<tr>
<td>CR5</td>
<td>39.99 mA</td>
<td>199.99 mA</td>
<td>39.999 mA</td>
<td>N/C</td>
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<tr>
<td>CR7</td>
<td>5 A CT</td>
<td>5 A CT</td>
<td>5 A CT</td>
<td>$40</td>
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**To Order** ( * Complete Model No.) **Prices Shown in U.S. Dollars**

<table>
<thead>
<tr>
<th>Model</th>
<th>DISPLAY</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>204B</td>
<td>(* ) (<em>) (</em>) (<em>) (</em>)</td>
<td>3 3/4 digit</td>
</tr>
<tr>
<td>2003B</td>
<td>(<em>) (</em>) (<em>) (</em>)</td>
<td>4 1/2 digit</td>
</tr>
<tr>
<td>2004</td>
<td>(<em>) (</em>) (<em>) (</em>)</td>
<td>4 3/4 digit</td>
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</tbody>
</table>

**INPUT SIGNAL**
- AVG
- AC AVG “Range Code”
- $155

http://www.newportus.com/Products/ACurrVol/2042004B.htm (2 of 3) [9/1/2000 2:21:02 PM]
<table>
<thead>
<tr>
<th>RMS</th>
<th>TRUE RMS &quot;Range Code&quot;</th>
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<td>(*)</td>
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### POWER

<p>| | | |</p>
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<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>120 Vac, 44/440 Hz</td>
<td>N/C</td>
</tr>
<tr>
<td>C1</td>
<td>240 Vac, 49/440 Hz</td>
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### OUTPUT OPTIONS

<p>| | | |</p>
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<td>F3A</td>
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<td>F3P</td>
<td>Buffered Peak BCD</td>
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<td>F4A</td>
<td>Buffered and isolated BCD</td>
<td>$124</td>
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<tr>
<td>F4M</td>
<td>Addressable F4A</td>
<td>$129</td>
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**Ordering Example:** Model 204B-AVG, VR4, $325 + 155 = $480.
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**

<table>
<thead>
<tr>
<th>Range</th>
<th>199.9 mV</th>
<th>1.999 V</th>
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<tbody>
<tr>
<td>Resolution</td>
<td>100 µV</td>
<td>1 mV</td>
</tr>
<tr>
<td>Maximum input</td>
<td>50 Vp</td>
<td>100 Vp</td>
</tr>
<tr>
<td>Input resistance</td>
<td>1.1 Mohm</td>
<td>1.1 Mohm</td>
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### ANALOG INPUT, Q2000D & Q2000G

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<th>19.99 µA</th>
<th>199.9 µA</th>
<th>1.999 mA</th>
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<tbody>
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<td>1 µA</td>
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<tr>
<td>Maximum input</td>
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<tr>
<td>Input resistance</td>
<td>10 kohm</td>
<td>1 kohm</td>
<td>100 ohm</td>
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<table>
<thead>
<tr>
<th>Range</th>
<th>19.99 mA</th>
<th>199.9 mA</th>
<th>1.999 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>10 µA</td>
<td>100 µA</td>
<td>1 mA</td>
</tr>
<tr>
<td>Maximum input</td>
<td>100 mA</td>
<td>500 mA</td>
<td>2.2 A</td>
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<tr>
<td>Input resistance</td>
<td>10 ohm</td>
<td>1 ohm</td>
<td>0.1 ohm</td>
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<table>
<thead>
<tr>
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<th>199.9 A</th>
<th>1999.9 A</th>
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<tbody>
<tr>
<td>Resolution</td>
<td>10 mA</td>
<td>100 mA</td>
<td>1 A</td>
</tr>
<tr>
<td>Maximum input</td>
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<tr>
<td>Input resistance</td>
<td>0.01ohm</td>
<td>0.01ohm</td>
<td>0.01ohm</td>
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</table>

### ANALOG INPUT, Q9000C & Q9000F

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<th>Range</th>
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<th>999.9 mV</th>
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</thead>
<tbody>
<tr>
<td>Resolution</td>
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<td>100 µV</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>50 Vp</td>
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</tr>
<tr>
<td>Input resistance</td>
<td>1.1 Mohm</td>
<td>1.1 Mohm</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>9999 V</th>
</tr>
</thead>
<tbody>
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<tr>
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<td>1.0 Mohm</td>
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### ANALOG INPUT, Q9000D & Q9000G

<table>
<thead>
<tr>
<th>Range</th>
<th>9.999 µA</th>
<th>99.99 µA</th>
<th>999.9 µA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>1 nA</td>
<td>10 nA</td>
<td>100 nA</td>
</tr>
<tr>
<td>Maximum input</td>
<td>3 mA</td>
<td>10 mA</td>
<td>30 mA</td>
</tr>
<tr>
<td>Input resistance</td>
<td>10 kohm</td>
<td>1 kohm</td>
<td>100 ohm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range</th>
<th>9.999 A</th>
<th>99.99 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>1 mA</td>
<td>10 mA</td>
</tr>
<tr>
<td>Maximum input</td>
<td>5 A CT</td>
<td>5 A CT</td>
</tr>
<tr>
<td>Input resistance</td>
<td>0.01 ohm</td>
<td>0.01 ohm</td>
</tr>
</tbody>
</table>

### ACCURACY at 25°C (AC)

**Maximum Error:** ±0.1% of reading ±10 counts

**Span tempco:** ±0.01% of reading/°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

<table>
<thead>
<tr>
<th>Range Code</th>
<th>True RMS</th>
<th>Input Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVR2</td>
<td>FVR2</td>
<td>199.99 mV</td>
</tr>
<tr>
<td>CVR3</td>
<td>FVR3</td>
<td>1.999 V</td>
</tr>
<tr>
<td>CVR4</td>
<td>FVR4</td>
<td>19.99 V</td>
</tr>
<tr>
<td>CVR5</td>
<td>FVR5</td>
<td>199.9 V</td>
</tr>
<tr>
<td>CVR6</td>
<td>FVR6</td>
<td>650 V</td>
</tr>
<tr>
<td>DCR1</td>
<td>GCR1</td>
<td>19.99 µA</td>
</tr>
<tr>
<td>DCR2</td>
<td>GCR2</td>
<td>199.9 µA</td>
</tr>
<tr>
<td>DCR3</td>
<td>GCR3</td>
<td>1.999 mA</td>
</tr>
<tr>
<td>DCR4</td>
<td>GCR4</td>
<td>19.99 mA</td>
</tr>
<tr>
<td>DCR5</td>
<td>GCR5</td>
<td>199.99 mA</td>
</tr>
<tr>
<td>DCR6</td>
<td>GCR6</td>
<td>1.999 A</td>
</tr>
<tr>
<td>DCR7</td>
<td>GCR7</td>
<td>5 A CT</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Q( * )</th>
<th>(*)</th>
<th>(*)</th>
<th>(*)</th>
<th>POWER AND CASE</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>3 1/2 digit standard case</td>
<td>$210</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3 1/2 digit INFINITY® case</td>
<td>$240</td>
</tr>
<tr>
<td>8</td>
<td></td>
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<td></td>
<td>4 digit INFINITY® case</td>
<td>$250</td>
</tr>
<tr>
<td>9</td>
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<td></td>
<td></td>
<td>4 digit standard case</td>
<td>$280</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>120 Vac (49/440 Hz)</td>
<td>N/C</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>240 Vac (49/440 Hz)</td>
<td>N/C</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>9-32 Vdc (isolated)</td>
<td>$145</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q( * )</th>
<th>(*)</th>
<th>(*)</th>
<th>(*)</th>
<th>ANALOG OUTPUT</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>±1 or ±2 V non-isolated</td>
<td>N/C</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>0-10 Vdc non-isolated</td>
<td>$70</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Non-Isolated 4-20 mA</td>
<td>$70</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>Isolated 4-20 mA</td>
<td>$135</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q( * )</th>
<th>(*)</th>
<th>(*)</th>
<th>(*)</th>
<th>CONTROL OUTPUTS</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>None</td>
<td>N/C</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Dual-setpoint 10 A from “C” relay</td>
<td>$165</td>
</tr>
</tbody>
</table>

To Order ( * Complete Model No.) Prices Shown in U.S. Dollars
## CONTROL OUTPUTS

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC18</td>
<td>IP65/NEMA4 $30 with spring clamp</td>
<td>$30</td>
</tr>
<tr>
<td>SPC4</td>
<td>IP65/NEMA4 30 with screw clamp</td>
<td>$30</td>
</tr>
</tbody>
</table>

---

**Splash Proof Lens Cover**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC18</td>
<td>IP65/NEMA4 $30 with spring clamp</td>
<td>$30</td>
</tr>
<tr>
<td>SPC4</td>
<td>IP65/NEMA4 30 with screw clamp</td>
<td>$30</td>
</tr>
</tbody>
</table>
3 1/2 DIGIT DC VOLTMETER, AMMETER, TRANSMITTER & CONTROLLER
Q2000A (Voltage) & Q2000B (Current)

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

<table>
<thead>
<tr>
<th>Range</th>
<th>±199.9 mV</th>
<th>±1.999 V</th>
<th>±19.99 V</th>
<th>±199.9 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>100 µV</td>
<td>1 mV</td>
<td>10 mV</td>
<td>100 mV</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>130 Vp</td>
<td>250 Vp</td>
<td>250 Vp</td>
<td>250 Vp</td>
</tr>
<tr>
<td>Input resistance</td>
<td>100 Gohm</td>
<td>1 Mohm</td>
<td>1 Mohm</td>
<td>1 Mohm</td>
</tr>
</tbody>
</table>

### ANALOG INPUT Q2000B

<table>
<thead>
<tr>
<th>Range</th>
<th>±19.99 µA</th>
<th>±199.9 µA</th>
<th>±1.999 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>10 nA</td>
<td>100 nA</td>
<td>1 µA</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>3 mA</td>
<td>10 mA</td>
<td>30 mA</td>
</tr>
<tr>
<td>Input resistance</td>
<td>10 kohm</td>
<td>1 kohm</td>
<td>100 kohm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range</th>
<th>±19.99 mA</th>
<th>±199.9 mA</th>
<th>±1.999 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>10 µA</td>
<td>100 µA</td>
<td>1 mA</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>100 mA</td>
<td>500 mA</td>
<td>2.2 A</td>
</tr>
<tr>
<td>Input resistance</td>
<td>10 ohm</td>
<td>1 ohm</td>
<td>0.1 ohm</td>
</tr>
</tbody>
</table>

### 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
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**

<table>
<thead>
<tr>
<th>Range</th>
<th>±99.99 mV</th>
<th>±999.9 mV</th>
<th>±9.999 V</th>
<th>±99.99 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>10 µV</td>
<td>100 µV</td>
<td>1 mV</td>
<td>10 mV</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>130 Vp</td>
<td>250 Vp</td>
<td>250 Vp</td>
<td>250 Vp</td>
</tr>
<tr>
<td>Input resistance</td>
<td>100 Gohm</td>
<td>1 Mohm</td>
<td>1 Mohm</td>
<td>1 Mohm</td>
</tr>
<tr>
<td>Bias current</td>
<td>1 nA</td>
<td>100 pA</td>
<td>10 pA</td>
<td>1 pA</td>
</tr>
</tbody>
</table>

**ANALOG INPUT Q9000B**

<table>
<thead>
<tr>
<th>Range</th>
<th>±9.999 µA</th>
<th>±99.99 µA</th>
<th>±999.9 µA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>1 nA</td>
<td>10 nA</td>
<td>100 nA</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>3 mA</td>
<td>10 mA</td>
<td>30 mA</td>
</tr>
<tr>
<td>Input resistance</td>
<td>10 kohm</td>
<td>1 kohm</td>
<td>100 ohm</td>
</tr>
</tbody>
</table>

**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
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: ±0.006 (R-115 V) ±0.1 V and 50 to 650 V range: ±0.006 (R-230 V) ±1 V
- Span tempco: ±0.01% of reading/°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 ±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 ±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

<table>
<thead>
<tr>
<th>Signal Input</th>
<th>Range</th>
<th>Resolution</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>199.9 Vac</td>
<td>100 Mv</td>
<td>1 V</td>
</tr>
<tr>
<td></td>
<td>650 Vac</td>
<td>650 Vac</td>
<td>650 Vac</td>
</tr>
<tr>
<td>Input resistance</td>
<td>1 M ohm</td>
<td>1 M ohm</td>
<td>1 M ohm</td>
</tr>
<tr>
<td>Bias current</td>
<td>1 pA</td>
<td>1 pA</td>
<td>1 pA</td>
</tr>
<tr>
<td>Configuration</td>
<td>Half-wave average, RMS-calibrated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero</td>
<td>Automatic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>49-440 Hz</td>
<td></td>
<td></td>
</tr>
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</table>

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>201AN-</td>
<td>Standard case</td>
<td>$180</td>
</tr>
<tr>
<td>301AN-</td>
<td>INFINITY® style case</td>
<td>$210</td>
</tr>
</tbody>
</table>

INPUT MEASUREMENT RANGE

| AC5    | 50.0 to 199.9 Vac                  |
| AC6    | 60 to 650 Vac                      |

POWER

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>230 Vac, 50/60/400 Hz</td>
<td>N/C</td>
</tr>
<tr>
<td>C3C</td>
<td>9-32 Vdc, isolated to 300 Vp</td>
<td>$120</td>
</tr>
<tr>
<td>C3E</td>
<td>26-56 Vdc, isolated to 300 Vp</td>
<td>$120</td>
</tr>
</tbody>
</table>

Ordering Example: 201AN-AC5 3 1/2 digit panel meter with standard case and 50 to 199.9 Vac measurement range, $180.
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 ±0.1999 V, ±1.999 V, ±19.99 V and ±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

<table>
<thead>
<tr>
<th></th>
<th>±199.9 V</th>
<th>±1.999 V</th>
<th>±19.99 V</th>
<th>±199.9 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>100 µV</td>
<td>1 mV</td>
<td>10 mV</td>
<td>100 mV</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>130 Vp</td>
<td>130 Vp</td>
<td>250 Vp</td>
<td>250 Vp</td>
</tr>
<tr>
<td>Input Resistance</td>
<td>1 Gohm</td>
<td>1 Gohm</td>
<td>1.1 Mohm</td>
<td>1.0 Mohm</td>
</tr>
<tr>
<td>Bias Current</td>
<td>50 pA</td>
<td>50 pA</td>
<td>5 pA</td>
<td>1 pA</td>
</tr>
</tbody>
</table>

 Configuration: Differential, Bipolar  
 Zero: Automatic  
 Span Adjustment: ±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: ±1 Vp

### ACCURACY AT 25°C

Maximum error: ±0.05% of reading ±1 count  
Span tempco: ±0.01% of reading/°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

<table>
<thead>
<tr>
<th></th>
<th>±200 mV</th>
<th>±2, ±20, ±200 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External reference input</td>
<td>+0.05 to +0.2V</td>
<td>+0.5 to +2.0 V</td>
</tr>
<tr>
<td>Load on reference, std</td>
<td>30.6 kohm</td>
<td>65.3 kohm</td>
</tr>
<tr>
<td>Load on reference, opt</td>
<td>100 Mohm</td>
<td>100 Mohm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>99.9%</td>
<td>99.9%</td>
</tr>
</tbody>
</table>

### 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, ±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 ±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
Model 203A is a low-cost ±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

<table>
<thead>
<tr>
<th>ANAOLG INPUT</th>
<th>±199.9 V</th>
<th>±1.999 V</th>
<th>±19.99 V</th>
<th>±199.9 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>100 µV</td>
<td>1 mV</td>
<td>10 mV</td>
<td>100 mV</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>100 Vp</td>
<td>250 Vp</td>
<td>250 Vp</td>
<td>250 Vp</td>
</tr>
<tr>
<td>Input Resistance</td>
<td>1 Gohm</td>
<td>1 Gohm</td>
<td>1.1 Mohm</td>
<td>1.0 Mohm</td>
</tr>
<tr>
<td>Bias Current</td>
<td>2 nA</td>
<td>2 nA</td>
<td>200 pA</td>
<td>20 pA</td>
</tr>
</tbody>
</table>
Configuration: Bipolar, single-ended
Zero: Automatic
Span Adjustment: ±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: ±0.05% of reading ±1.5 count
Span tempco: ±0.01% of reading/°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

<table>
<thead>
<tr>
<th>Analog input range</th>
<th>±200 mV</th>
<th>±2, ±20, ±200 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>External reference input</td>
<td>+0.05 to +0.4 V</td>
<td>+0.5 to +2.0 V</td>
</tr>
<tr>
<td>Load on reference, std</td>
<td>430 ohm</td>
<td>4.3 kohm</td>
</tr>
<tr>
<td>Load on reference, opt</td>
<td>100 Mohm</td>
<td>100 Mohm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>99.9% ±0.1%</td>
<td>99.9% ±0.1%</td>
</tr>
</tbody>
</table>

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, ±10%
AC frequency: 50/60 Hz
DC voltages: 5 V dc ±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
In its base configuration, Model 204B is a high-accuracy ±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 ±39.99 mV full-scale and provides 10 µV resolution. Extended-range options are available to ±4,999 and ±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
The 05 Option provides a DC signal proportional to the display to drive an X-Y recorder or strip-chart recorder. For additional information, please refer to the Options and Mechanical sections.

**SPECIFICATIONS**

**ANALOG INPUT**

<table>
<thead>
<tr>
<th></th>
<th>±39.99 mV</th>
<th>±399.9 mV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signal Range</strong></td>
<td>±39.99 mV</td>
<td>±399.9 mV</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>10 µV</td>
<td>100 µV</td>
</tr>
<tr>
<td><strong>Input resistance</strong></td>
<td>1 Gohm</td>
<td>1 Gohm</td>
</tr>
<tr>
<td><strong>Bias current</strong></td>
<td>1 nA</td>
<td>1 nA</td>
</tr>
<tr>
<td><strong>Maximum input</strong></td>
<td>100 Vp</td>
<td>100 Vp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>±3.999 mV</th>
<th>±39.99 mV</th>
<th>±399.9 mV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Signal Range</strong></td>
<td>±3.999 mV</td>
<td>±39.99 mV</td>
<td>±399.9 mV</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>1 mV</td>
<td>10 mV</td>
<td>100 mV</td>
</tr>
<tr>
<td><strong>Input resistance</strong></td>
<td>1 Gohm</td>
<td>1.1 Mohm</td>
<td>1.0 Mohm</td>
</tr>
<tr>
<td><strong>Bias current</strong></td>
<td>1 nA</td>
<td>100 pA</td>
<td>10 pA</td>
</tr>
<tr>
<td><strong>Maximum input</strong></td>
<td>100 Vp</td>
<td>250 Vp</td>
<td>500 Vp</td>
</tr>
</tbody>
</table>

**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**: ±0.02% of reading ±1 count
- **Span tempco, 4V range**: ±0.005% of reading/°C
- **Span tempco, other ranges**: ±0.01% of reading ±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**

<table>
<thead>
<tr>
<th>Input range</th>
<th>±40 mV</th>
<th>±400 mV</th>
<th>±4, ±40, ±400 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Voltage</td>
<td>+0.01 to +0.08V</td>
<td>+0.1 to +0.8 V</td>
<td>+1.0 to +3.5 V</td>
</tr>
<tr>
<td>Load on reference, std</td>
<td>47 ohm</td>
<td>471 ohm</td>
<td>4.72 kohm</td>
</tr>
<tr>
<td>Load on reference, opt</td>
<td>100 Mohm</td>
<td>100 Mohm</td>
<td>100 Mohm</td>
</tr>
<tr>
<td>Accuracy w/100 Mohm</td>
<td>99.8% ±0.2%</td>
<td>99.8% ±0.2%</td>
<td>99.8% ±0.2%</td>
</tr>
</tbody>
</table>

**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 ±10% at 60 Hz; 230 V ac ±10% at 50 Hz
DC voltages: 5 V dc ±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
Model 2003B is a 4 1/2 DC voltmeter which provides high-resolution and high-accuracy at very reasonable cost. Display span is ±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

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

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

<table>
<thead>
<tr>
<th>Analog input range</th>
<th>±200 mV</th>
<th>±2. ±20, ±200 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference Voltage</td>
<td>+0.1 to</td>
<td>+1.0 to +2.0 V</td>
</tr>
<tr>
<td>Load on reference, std</td>
<td>170 ohm</td>
<td>1.7 kohm</td>
</tr>
<tr>
<td>Load on reference, opt</td>
<td>1 Gohm</td>
<td>1 Gohm</td>
</tr>
<tr>
<td>Accuracy</td>
<td>99.90%</td>
<td>99.95%</td>
</tr>
</tbody>
</table>

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
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 ±39,999 counts. Extended-range options are available to ±49,999, ±59,999 or ±69,999 counts. Accuracy is 99.99% of reading. Span tempco is ±10 to ±20 ppm of reading/°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

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

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

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

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

**MODEL 215**

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.

**SPECIFICATIONS**

**ANALOG INPUT**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>±199.9 mV</th>
<th>±1.999 V</th>
<th>±19.99 V</th>
<th>±199.9 V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>100 µV</td>
<td>1 mV</td>
<td>10 mV</td>
<td>100 mV</td>
</tr>
<tr>
<td><strong>Maximum Input</strong></td>
<td>130 Vp</td>
<td>130 Vp</td>
<td>150 Vp</td>
<td>330 Vp</td>
</tr>
<tr>
<td><strong>Input Resistance</strong></td>
<td>10 Gohm</td>
<td>10 Gohm</td>
<td>1.1 Mohm</td>
<td>1 Mohm</td>
</tr>
<tr>
<td><strong>Bias Current</strong></td>
<td>50 pA</td>
<td>5 pA</td>
<td>1 pA</td>
<td>1 pA</td>
</tr>
<tr>
<td><strong>NMR at 50/60 Hz</strong></td>
<td>56 dB</td>
<td>56 dB</td>
<td>42 dB</td>
<td>36 dB</td>
</tr>
</tbody>
</table>

**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: ±0.05% of reading ±1 count
Span tempco, standard: ±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 ±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
4 1/2 DIGIT DC VOLTMETER IN 1/16 DIN CASE, 5 V DC POWERED
MODEL 2520 - OPTION 2520-PA

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

NEWPORT PRODUCT INFO

- MANUAL (HTML)
- QUICK START
- MECHANICAL 1/16 DIN Case
- MECHANICAL Connections Diagram
- PRICE

REQUIRES ADOBE ACROBAT - HELP

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

<table>
<thead>
<tr>
<th>Range</th>
<th>±1.9999 V</th>
<th>±19.999 V</th>
<th>±199.99 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>100 mV</td>
<td>1 mV</td>
<td>10 mV</td>
</tr>
<tr>
<td>Input Resistance</td>
<td>1 Gohm</td>
<td>1.1 Mohm</td>
<td>1 Mohm</td>
</tr>
<tr>
<td>Bias Current</td>
<td>10 pA</td>
<td>1 pA</td>
<td>0.1 pA</td>
</tr>
<tr>
<td>Maximum Input</td>
<td>300 Vp</td>
<td>300 Vp</td>
<td>300 Vp</td>
</tr>
</tbody>
</table>
**Configuration:** Bipolar, true-differential

**Zero:** Automatic

**NOISE REJECTION**
- **NMR:** 60 dB at 50/60 Hz
- **CMR:** 86 dB, DC to 60 Hz
- **CMV:** SIG LO to DIG GND ±1 Vp

**ACCURACY AT 25°C**
- **Maximum error:** ±0.01% of reading ±2 counts
- **Span tempco, standard:** (2 V) ±0.005% of reading/°C, (20/200 V) ±0.0025 of reading/°C
- **Span tempco, optional:** (2 V) ±0.001% of reading/°C, (20/200 V) ±0.002% of reading/°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 ±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 (1/8 DIN) case (see Mechanical section for drawings)
- **Weight:** 5 oz (145 g)
- **Case material:** 94V-0 UL-rated polycarbonate

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4 1/2 DIGIT DIFFERENTIAL DC VOLT/MICROVOLTMETER IN 1/16 DIN CASE, 5VDC POWERED
Model 2520 - 4 1/2 Digit DC Voltmeter in 1/16 DIN Case, 5 V DC Powered

2520

4 1/2 digit (± 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.

**INPUT RANGE**

<table>
<thead>
<tr>
<th>Range</th>
<th>Input Range</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>-3</td>
<td>± 1.9999 Vdc</td>
<td>NC</td>
</tr>
<tr>
<td>-4</td>
<td>± 19.999 Vdc</td>
<td>NC</td>
</tr>
<tr>
<td>-5</td>
<td>± 199.99 Vdc</td>
<td>NC</td>
</tr>
<tr>
<td>-PA</td>
<td>± Preamplifier with zero and span adjust</td>
<td>$180.00</td>
</tr>
</tbody>
</table>

**SPAN TEMPCO (TEMPERATURE COEFFICIENT)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Standard (± 0.0075% of reading/°C)</td>
<td>NC</td>
</tr>
<tr>
<td>LT</td>
<td>High-stability (± 0.002% of reading/°C)</td>
<td>$20.00</td>
</tr>
</tbody>
</table>

**UPPER-BOARD OUTPUT OPTIONS**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Character-serial BCD output</td>
<td>NC</td>
</tr>
<tr>
<td>F2M</td>
<td>Parallel BCD output, three-state (mutually exclusive with PA). Includes PCB edge connector</td>
<td>$95.00</td>
</tr>
</tbody>
</table>

**CASE MOUNTING**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Spring clamp</td>
<td>NC</td>
</tr>
<tr>
<td>UC</td>
<td>U-shaped mounting clamp (not compatible with F2M)</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

**ADD-ON OPTIONS**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Green LEDs for display</td>
<td>$10.00</td>
</tr>
<tr>
<td>SPC116-R</td>
<td>NEMA-4 splash-proof lens cover, NEW</td>
<td>$30.00</td>
</tr>
</tbody>
</table>

**MOST POPULAR MODEL**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2520-4</td>
<td>$180.00</td>
</tr>
</tbody>
</table>