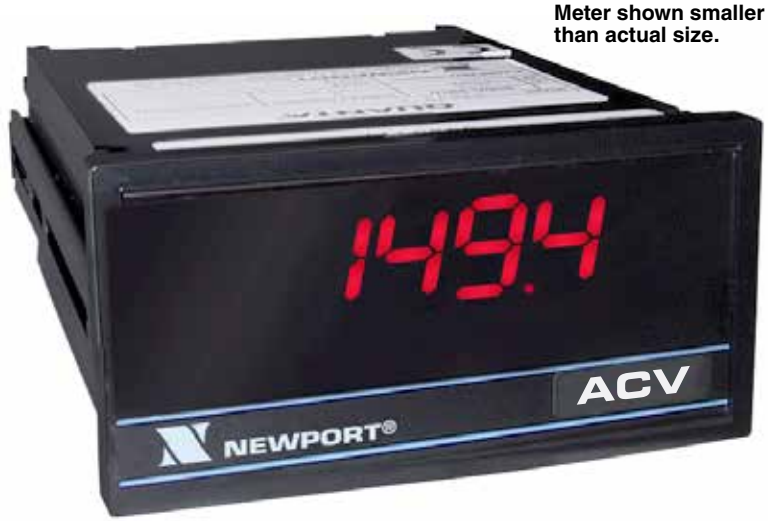
AC True-RMS Voltmeter, Ammeter, Indicator/ Controller

⅛ DIN

Q2000-CDFG Series

- ±1,999 or ±9,999 Count Display Span
- Special Scaling for 5 A Current Transformer
- 1 or 0.1 mV/Count Analog Output
- Front-Panel Accessible Adjustments
- Display Hold and Test
- Screw-Terminal Barrier Strip



Q2000-CVR5
Meter shown smaller than actual size.

The Q2000/Q9000 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 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 can be for any primary current.

An ⅛ DIN case houses each meter. Choose any combination of display type (LED or LCD), operating power, input type and range, analog output, and digital or control outputs.

AC AVG Voltage Inputs — C Series

CODE *	Q2000 Range	Q9000 Range	Input Imped	Q2000 Res	Q9000 Res
CVR2	199.9 mV	99.99 mV	1.1 MΩ	0.1 mV	0.01 mV
CVR3	1.999 V	999.9 mV	1.1 MΩ	1 mV	0.1 mV
CVR4	19.99 V	9.999 V	1.0 MΩ	10 mV	1 mV
CVR5	199.9 V	99.99 V	1.0 MΩ	100 mV	10 mV
CVR6	650 V	650 V	10 MΩ	1 V	100 mV

Full-wave rectified average AC signal, calibrated for sinusoidal input.
***Ordering Example: Q2000-CVR5,** LED 120 Vac, 100 mV/count, 199.9V range for AC AVG voltage input.*

AC AVG Currents Inputs — D Series

CODE *	Q2000 Range	Q9000 Range	Input Imped	Q2000 Res	Q9000 Res
DCR1	19.99 µA	9.999 µA	10 kΩ	0.01 µA	1 nA
DCR2	199.9 µA	99.99 µA	1 kΩ	0.1 µA	10 nA
DCR3	1.999 mA	999.9 µA	100 Ω	1 µA	100 nA
DCR4	19.99 mA	9.999 mA	10 Ω	10 µA	1 µA
DCR5	199.9 mA	99.99 mA	1 Ω	100 µA	10 µA
DCR6	1.999 A	999.9 mA	0.1 Ω	1 mA	100 µA
DCR7	5.00 A*	5.00 A	0.01 Ω	2.5 mA	500 µA

** 50 mV shunt for 5 A current transformer input. Full-wave rectified average AC signal, calibrated for sinusoidal input.*
***Ordering Example: Q2000-DCR4,** LED 120 Vac, 10 µA/count, 19.99 mA range for AC AVG current input.*

AC RMS Voltage Inputs — F Series

CODE *	Q2000 Range	Q9000 Range	Input Imped	Q2000 Res	Q9000 Res
FVR2	199.9 mV	99.99 mV	1.1 MΩ	0.1 mV	0.01 mV
FVR3	1.999 V	999.9 mV	1.1 MΩ	1 mV	0.1 mV
FVR4	19.99 V	9.999 V	1.0 MΩ	10 mV	1 mV
FVR5	199.9 V	99.99 V	1.0 MΩ	100 mV	10 mV
FVR6	650 V	650 V	10 MΩ	1 V	100 mV

Provides true RMS accuracy for non-sinusoidal inputs with a crest factor of 3:1 or less.
***Ordering Example: Q2000-FVR3,** LED 120 Vac, 1 mV/count, 1.999V for AC RMS voltage input.*

AC RMS Currents Inputs — G Series

CODE *	Q2000 Range	Q9000 Range	Input Imped	Q2000 Res	Q9000 Res
GCR1	19.99 µA	9.999 µA	10 kΩ	0.01 µA	1 nA
GCR2	199.9 µA	99.99 µA	1 kΩ	0.1 µA	10 nA
GCR3	1.999 mA	999.9 µA	100 Ω	1 µA	100 nA
GCR4	19.99 mA	9.999 mA	10 Ω	10 µA	1 µA
GCR5	199.9 mA	99.99 mA	1 Ω	100 µA	10 µA
GCR6	1.999 A	999.9 mA	0.1 Ω	1 mA	100 µA
GCR7	5.00 A*	5.00 A	0.01 Ω	2.5 mA	500 µA

** 50 mV shunt for 5 A current transformer input. Provides true RMS accuracy for non-sinusoidal inputs with a crest factor of 3:1 or less.*
***Ordering Example: Q2000-GCR2,** LED 120 Vac, 0.1 µA/count, 199.9 µA for AC RMS current input.*

Specifications

Conversion

Technique: Auto-zero, dual slope, average value

Signal Integration Period: 100 ms, nominal

Reading Rate: 2.5/s, nominal

Display

LED: Red, 14.2 mm (0.56"), 7-segment

LCD: 12.7 mm (0.50"), 7-segment

Power

AC Models: 120, 240 or 24 Vac 10%/ -15%; 49 to 440 Hz

DC Models: 5 Vdc ±5%, 9 to 32 Vdc or 26 to 56 Vdc isolated to 300 Vp

Common Mode

Voltage: 1500 Vp test (354 Vp per IEC spacing)

Rejection (DC to 60 Hz): 120 dB

Environmental

Operating Temperature: 0 to 60°C (32 to 140°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Humidity: 95% RH, non-condensing @ 40°C (104°F)

Accuracy @ 25°C (AC)

Maximum Error:±0.25% of rdg ± 10 counts

Span Tempco: ±0.01% of reading/°C (AC)

Step Response: 1 s to 99.9% of span

Frequency Range for Rated Accuracy: 47 to 1000 Hz

Warmup to Rated Accuracy: 30 min

Accuracy @ 25°C (RMS) (1% to 100% of Full Scale)

Maximum Error, AC Coupling: ±0.25%of reading, ±1 ct (Q2), ±10 cts (Q9), 47 Hz to 1 kHz

Maximum Error, DC Coupling: ±0.25% of reading, ±1 ct (Q2), ±10 cts (Q9), 9 Hz to 1 kHz

Span Tempco: ±0.03% of reading/°C (typical)

Zero Tempco: 0.15 mV/°C (typical)

Step Response: 1 sec to 99.9% of span

Warmup to Rated Accuracy: 30 min

Mechanical

Bezel: 96 W x 48 H x 8 mm D (3.78 x 1.89 x 0.31")

Depth Behind Bezel: 139.8 mm (5.50")

Panel Cutout: 92 W x 45 mm H (3.62 x 1.77")

Weight: 17 oz (480 g)

Case Material: 94V-0 UL-rated polycarbonate

To Order *Visit newportUS.com/q2000_89 for Pricing and Details*

Model No.						Description
Q2	3½-Digit for ±1999 Count					
Q9	4-Digit for ±9999 Count					
	0	0	0	-X		A. Power and Display
	0					LED; 120 Vac (50/60 Hz)
	1					LCD; 120 Vac (50/60 Hz) (Q2000 only)
	2					LED; 240 Vac (50/60 Hz)
	3					LCD; 240 Vac (50/60 Hz) (Q2000 only)
	4					LED; 9 to 32 Vdc, isolated
	5					LCD; 9 to 32 Vdc, isolated (Q2000 only)
	6					LED; 5 Vdc
	7					LCD; 5 Vdc (Q2000 only)
	8					LED; 24 Vac
	9					LCD; 24 Vac (Q2000 only)
	A					LED; 26 to 56 Vdc, isolated
	B					LCD; 26 to 56 Vdc, isolated (Q2000 only)
						B. Analog Outputs
		0				1 mV/count (Q2000) or 0.1 mV (Q9000) (supplied on all units)
		1				0 to 5 Vdc
		2				0 to 10 Vdc
		3				0 to 1 mA (internally driven)
		4				4 to 20 mA (internally driven)
		5				4 to 20 mA (externally driven)
		6				4 to 20 mA (isolated)
						C. Control Outputs
			0			None
			1			Dual setpoint, 10 A relay (SPDT)
			2			Proportional 4 to 20 mA
			3			Proportional/time proportioning, 2 A relay
			4			Parallel BCD, isolated
			5			Single setpoint, 10 A relay (SPDT)
						D. Signal Conditioner Inputs
				-C(*)		AC AVG voltage
				-D(*)		AC AVG current
				-F(*)		AC RMS voltage
				-G(*)		AC RMS current
						Additional Options
					,FS	Custom calibration for DCR7 and GCR7. Specify required full scale display for a 5 A RMS input
					,G	Green LED display
					,BL	Lens without Newport logo in lieu of standard lens

** Refer to chart above for code options.*

***Ordering Example: Q9000-CVR4,** 4 digit, red LED, 120 Vac power, 1mv/count, 9.999 V range for AC AVG voltage.*