

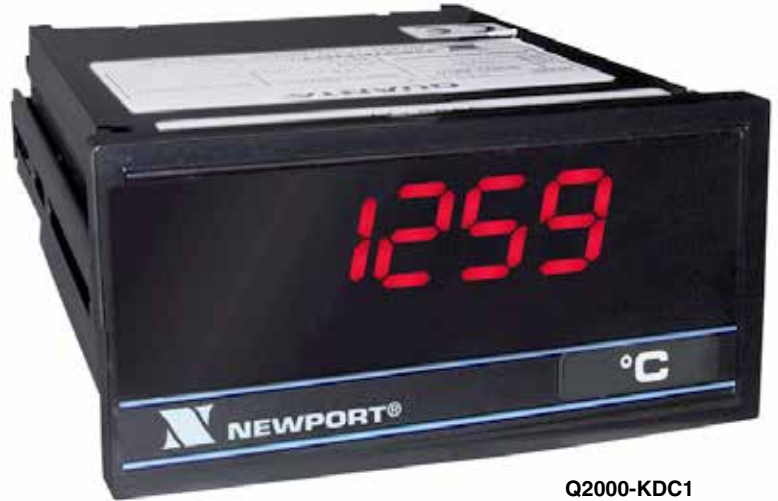
Thermocouple Meters, Indicators/Controllers

1/8 DIN

Q2000-JKT Series



- ✓ -300 to +1,999 or +9,999 Count Display Span
- ✓ Thermocouple Types J, K, T
- ✓ 3½ or 4 Digit Display
- ✓ 1° or 0.1° Resolution
- ✓ Internal Reference Junction
- ✓ Sensor-Break Detection
- ✓ 1 or 0.1 mV/Count Linearized Analog output
- ✓ LED or LCD Display
- ✓ Display Hold and Test
- ✓ Screw-Terminal Barrier Strip



Q2000-KDC1
Meter shown smaller than actual size.

The Q2/9000-J, Q2/9000-K and Q2/9000-T are indicator/controllers for thermocouple Types J, K and T, respectively. They are complete with linearization, cold-junction compensation, and sensor-break detection. Readout is in °C or °F with 1° or 0.1° resolution.

Power and Display Options

Six types of power supplies are available: 120 Vac, 240 Vac, 24 Vac, 5 Vdc, isolated 9 to 32 Vdc and isolated 26 to 56 Vdc.

An LED display is standard, an LCD display is optional and is recommended for viewing in bright ambient light. A NEMA 4 (IP65) splash-proof lens cover is available.

Signal input and power connections are made via a rear barrier terminal strip. The motherboard rear edge connector provides access to hold and test, polarity, clock, and the standard analog output and optional analog outputs.

Analog Output Options

A 1 mV/count or 0.1 mV/count (± 2 V full-scale) analog output is standard and is useful 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 to 5 V dc, 0 to 10 V dc, 0 to 1 mA (source or sink), and 4 to 20 mA (source or sink). The top and bottom of each output range can be scaled to fit a user-selected display span.

Thermocouple Inputs (J, K, T Series)

Code *	Calibration Type	Q2000 Temp Range	Q9000 Temp Range	Q2000 Res	Q9000 Res	Accuracy ($\pm 1/2$ count)	Lead Resist (Max)	Burnout Sense Current
JDC1	J	-40 to 760°C	-40.0 to 760.0°C	1°C	0.1 °C	-40 to 0°C: Note 1 0 to 277°C: $\pm 1.2^\circ\text{C}$ 277 to 760°C: $\pm 0.5\%$ rdg	500	0.5 μA
JDF1	Iron - Constantan	-40 to 1400°F	-40.0 to 999.9°F	1°F	0.1 °F	-40 to 32°F: Note 1 32 to 530°F: $\pm 2.4^\circ\text{F}$ 530 to 1400°F: $\pm 0.5\%$ rdg		
KDC1	K	-40 to 1260°C	-40.0 to 999.9°C	1°C	0.1 °C	-40 to 0°C: Note 2 0 to 277°C: $\pm 1.8^\circ\text{C}$ 277 to 1260°C: $\pm 0.6\%$ rdg	395	
KDF1	CHROMEGA® - ALOMEGA®	-40 to 1999°F	-40.0 to 999.9°F	1°F	0.1 °F	-40 to 32°F: Note 2 32 to 530°F: $\pm 3.0^\circ\text{F}$ 530 to 1999°F: $\pm 0.6\%$ rdg		
TDC1	T	-184 to 371°C	-184.0 to 371.0°C	1°C	0.1 °C	-184 to -59°C: $\pm 1.5\%$ rdg -59 to 93°C: $\pm 1^\circ\text{C}$ 93 to 371°C: $\pm 0.6\%$ rdg	200	
TDF1	Copper - Constantan	-300 to 700°F	-300.0 to 700.0°F	1°F	0.1 °F	-300 to -75°F: $\pm 1.5\%$ rdg -75 to 200°F: $\pm 1.5^\circ\text{F}$ 200 to 700°F: $\pm 0.5\%$ rdg		

Notes 1: -40 to 0°C: $(0.95^\circ\text{C} - 0.083T) \pm (1.2^\circ\text{C} + 0.11T)$ -40 to 32°F: $(0.5^\circ\text{F} - 0.083(T - 32^\circ\text{F})) \pm 1.9^\circ\text{F}$

2: -40 to 0°C: $(0.35^\circ\text{C} - 0.075T) \pm (1.35^\circ\text{C} + 0.1T)$ -40 to 32°F: $(1.65^\circ\text{F} - 0.091T) \pm (1.9^\circ\text{F} + 0.012T)$

Ordering Example: Q2101-KDC1, 3½ digit, LCD, 120 Vac power, 1°C/count, dual setpoint (10 A relay), Type K -40 to 1260°C range.

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.

Specifications

Analog Input

TC types: J, K, T

Calibration: To IPTS-68, as published in NIST monograph 125 (March 1974), ASTM E130-72 or ASA C96.2-1973

Configuration: Single-ended (-TC lead connected to ANA GND)

Input resistance: 100 Mohm

Sensor-break detection: 400 nA current source

Max lead resistance for rated

accuracy: 500 ohm (type J), 395 ohm (type K), 200 ohm (type T)

Zero tempco (cold-junction error):

±0.06 deg/deg

Span tempco, 10°C to 40°C: ±0.01% of reading/°C

Analog-to-Digital Conversion

Input configuration: Single-ended SIG HI (TC +) lead connected to SIG GND through 10ohm

Technique: Dual slope, average value
Signal Integration Period: 100 ms, nominal

Reading Rate: 2.5/s, nominal

Display

Symbols: -1.8.8.8 (Q2000);

8.8.8.8 (Q9000)

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: 120 dB with 250 ohm imbalance

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)

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

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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
				-J(*)	Type J thermocouple
				-K(*)	Type K thermocouple
				-T(*)	Type T thermocouple
					Additional Options
				,G	Green LED display
				,BL	Lens without Newport logo in lieu of standard lens

* Refer to chart on previous page for thermocouple code.

Ordering Example: Q2005-KDF1, 3½ digit, red LED, 120 Vac power, 1 mv/count, single setpoint 10 A relay, Type K -40 to 1999°F range; Q9401-JDC1, 4 digit, red LED, 9 to 32 Vdc power, 0.1 mv/count, dual setpoint 10 A relay, Type J -40 to 760°C range.

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