

# DIGITAL THERMOMETERS

## 2160 Series

### 2160-Series Specifications

**Compatible Thermocouple Types:** J, K, T, E, R, S, B, C\*  
**Measurement Method:** Dual-slope integration over a 100 ms period

**Zero Drift:** None, automatic zero correction

**Reading Rate:** 2.5 readings per sec

**°C to °F Conversion:** Jumper selectable

**Input Connections:** Screw terminals on isothermal connector

**Input Circuit:** Two-wire, isolated

**Input Impedance:** 100 MΩ

**Input Current:** 500 pA

**Source Impedance:** 5 kΩ (5 kΩ causes <0.2°C error with K thermocouple)

**Maximum Input Voltage:** 400V dc or ac peak continuously between inputs or either input and ground

**Maximum Common Mode Voltage:** 400V dc or ac peak

**Common Mode Rejection:** ≥120 dB at 50, 60, 400 Hz ±0.1% with 1 kΩ source impedance unbalance

**Normal Mode Rejection:** ≥60 dB at 50, 60, 400 Hz ±0.1%

**Accuracy**

Thermocouple Type	Applicable Temperature Range	Maximum Error* (±°C)			Applicable Temperature Range °F	Maximum Error* (±°F)		
		Calibration Accuracy	90 Days 20 to 30°C	1 Year 15 to 35°C		Calibration Accuracy	90 Days 60 to 86°F	1 Year 59 to 95°F
J	-200 to 0 0 to 778	1	1.5	1.5	-328 to 32 32 to 1432	1.5	2	2.5
		1	1	1.5		1	1.5	2
K	-200 to 0 0 to 1356	1	1.5	2	-328 to 32 32 to 2472	2	2.5	3
		1	1.5	2		1.5	2.5	3
T	-200 to 0 0 to 400	1	1.5	2	-328 to 32 32 to 752	1.5	2	3.5
		1	1	1		1	1.5	2
E	-200 to 0 0 to 1000	1	1.5	2	-328 to 32 32 to 1832	1.5	2	3.5
		1	1	1.5		1	2	2.5
R	0 to 1778	1.5	2.5	3	32 to 3232	2	4	5
S	0 to 1778	1.5	2	3	32 to 3232	2	3.5	4.5
B	533 to 18	1.5	2	2.5	992 to 3352	2	3.5	4.5
C	0 to 2328	2.5	3.5	4	32 to 3999	4	6	6.5

\*Max. error includes NBS conformity, calibration, span, zero, reference junction, noise and stability, but not thermocouple errors.) Add 0.1°C or 0.2°F for Model 2166A

**Response Time:** ≤2.0 seconds, to rated accuracy

**Linearization:** Digital, 8 selectable programs in LSI ROM

**Reference Junction Compensation**

**20 to 30°C**

J, K, T, E 0.025 degrees/degree

R, S 0.05 degrees/degree

C\* 0.02 degrees/degree

**0 to 20°C, 30 to 50°C**

J, K 0.032 degrees/degree

T, E 0.045 degrees/degree

R, S 0.07 degrees/degree

C\* 0.04 degrees/degree

**Temperature Coefficient:** 0.005% of reading per °C

**Internal Temperature Rise:** 5°C

\* Not an ISA symbol

### 2160-Series General Specifications

**Type of Display:** LED

**Line Operation:** 115V ac ±10%, 50 to 440 Hz, 8W (bench), 4W (panel), 100V ac and 230V ac versions are also available

**Battery Operation:** Option -01 for the 2165A. Eight hours of operation on a full charge. Y2004 Battery Pack for 2166A and 2168A operates for six hours on a full charge, typically.

**External DC Source:** (2166A, 2168A) 11 to 15V dc at 400 mA, Y2004 recommended

**Size, Model 2160A:** 4.8 cm H x 9.6 cm W x 20.5 cm D (1.88 in H x 3.78 in W x 8.05 in D). Conforms to DIN standard

**Size, Models 2165A, 2166A, 2168A:** 6.4 cm H x 21.7 cm W x 25.2 cm D (2.52 in H x 8.55 in W x 9.9 in D)

**Panel Cut-out, 2160A, 2161A, 2162A:** 9.2 cm x 4.5 cm (3.62 in x 1.77 in).

**Weight, Models 2160A & 2170A:** 0.737 kg (1 lb. 10 oz.)

**Weight, Model 2165A:** 1.19 kg (2 lbs. 10 oz.) without batteries, 1.79 kg (3 lbs. 15 oz.) with batteries

**Weight, Models 2166A & 2168A:** 1.35 kg (3 lbs.)

**Temperature:** 0°C to 50°C, operating; 40°C to 60°C with batteries, 40° to 75°C without batteries, non-operating

**Relative Humidity:** ≤90 from 0°C to 35°C and up to ≤80% to 50°C, non-condensing

**Shock and Vibration:** Meets requirements of MIL-Std-810

### Options

#### Rechargeable Batteries (-01)

Used in Models 2165A and 2175A for portable operations, and provides a continuous operating time of 8 hours. The batteries are recharged from line power in either trickle or full charge mode within the instrument.

#### Digital Output Unit (-02)

A field-installable option that provides a parallel BCD digital output equivalent to the displayed measurement data. Output data is solicited by an External Trigger and valid data is insured by Busy and Not Busy outputs. Output is fully buffered TTL; DTL compatible, isolated to 300V. A 6-foot ribbon cable and connector are included.

#### Analog Output Unit (-04)

A field-installable assembly which provides an output voltage proportional to the displayed measurement data. Automatic polarity sensing is provided to ensure that the polarity of the output voltage agrees with the displayed temperature. The output voltage is referenced to the low terminal of the external voltmeter, strip-chart recorder, etc. Linearity is ±0.5% of full scale. A 6-foot pair of wires and connector are included.