

# DIGITAL THERMOMETERS

## 2170 Series

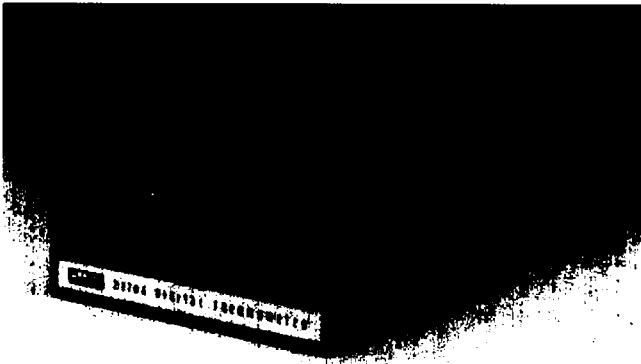
### 2170 Series

All three digital thermometers in the 2170 Series are four-digit instruments and have a resolution of 0.2 degrees, either °F or °C. They will work with thermocouple types J, K, E, or T.

The 2170A, panel-mounting model is enclosed in a metal DIN case and has attached lugs for easy mounting or removal.

The portable bench models are ruggedized for field use. LSI circuit design improves reliability and reduces internal temperature rise.

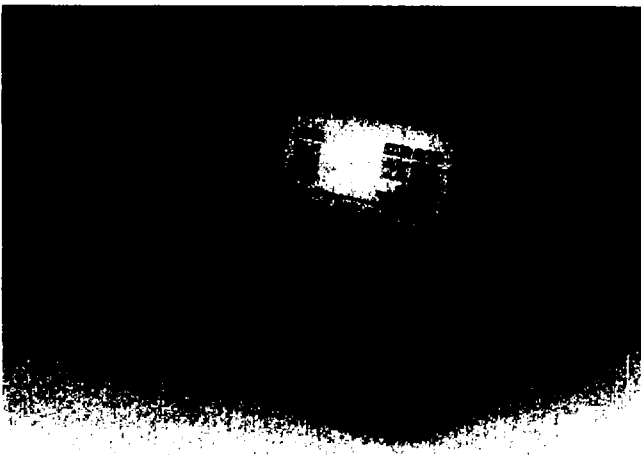
### 2170A Digital Thermometer



2170A

The 2170A is a panel-mounting, four-digit thermocouple thermometer capable of 0.2 degree resolution (°F or °C) over a temperature range of -99.9 to +999.8 degrees (°F or °C). Either a type J, K, T or E thermocouple may be used, but only one for each thermometer. The 2170A is compatible with the 2161A Multipoint Selector and the 2162A Digital Limit Comparator.

### 2175A Digital Thermometer



2175A

The 2175A is a single-point instrument in a rugged, portable bench-mount case with the same specifications as the 2170A. It can be equipped with rechargeable batteries. Pushbutton controls include a power switch (ON-OFF), temperature scale selection (°F, °C), and battery charge (ON-OFF).

### 2176A Digital Thermometer



2176A

The 2176A is the same basic bench-type instrument as the 2175A but with the additional capability of monitoring up to 10 thermocouples (of the same type). Thermocouple channel selection is by means of a 10-position front panel rotary switch. Power is either line voltage or external 12V dc (with Y2004 Battery Pack).

### 2170-Series Specifications

**Compatible Thermocouple Types:** J, K, T, E

**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 or pushbutton 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)

**Overload:** Display flashes when input voltage exceeds full-scale temperature range

**Open Input:** Display flashes to indicate open at input terminals  
**Maximum Input Voltage:** 400V dc or ac peak continuously between inputs on 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%

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

**Linearization:** Digital, with four selectable programs in LSI ROM

**Reference Junction Compensation:**

20 to 30°C

J, K, T, E 0.025 degrees/degree

0 to 20°C, 30°C to 50°C

J, K 0.032 degrees/degree

T, E 0.045 degrees/degree

# DIGITAL THERMOMETERS

## 2170 Series

### Accuracy

Thermocouple Type	Applicable Temperature Range °C	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 68 to 86°F	1 Year 59 to 95°F
J	-99.8 to 0	0.5	1	1.2	-99.8 to 32	0.9	1.6	2.1
	0 to 777.8	0.4	0.7	1.1	32 to 999.8	0.7	1.2	1.6
K	-99.8 to 0	0.7	1.2	1.5	-99.8 to 32	1.1	2.0	2.6
	0 to 999.8	0.5	1.1	1.4	32 to 999.8	1	1.4	1.8
T	-99.8 to 0	0.6	1	1.6	-99.8 to 32	0.9	1.7	2.9
	0 to 400	0.4	0.6	0.9	32 to 752	0.6	1	1.5
E	-99.8 to 0	0.6	1	1.7	-99.8 to 32	0.9	1.7	3.0
	0 to 999.8	0.5	1	1.4	32 to 999.8	0.8	1.3	1.8

\*Max. error includes NBS conformity, calibration, span, zero, reference junction, noise and stability, but not thermocouple errors.) Add 0.1°C and 0.2°F for Model 21766A

### 2170-Series General Specifications

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

**Battery Operation:** 2175A Option -01 for 2175A, eight hours of operation on a full charge. Y2004 Battery Pack operates 2176A for six hours on a full charge, typically.

**External DC Source:** (2176A only) 11 to 15V dc at 400 mA. Y2004 recommended

**Size, Model 2170A:** 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 2175A, & 2176A:** 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, 2170A:** 9.2 cm x 4.5 cm (3.62 in x 1.77 in).

**Weight, Model 2170A:** 0.737 kg (1 lb, 10 oz.)

**Weight, Model 2175A:** 1.19 kg (2 lbs, 10 oz.) without batteries, 1.79 kg (3 lbs, 15 oz.) with batteries

**Weight, Model 2176A:** 1.35 kg (3 lbs.)

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

**Relative Humidity:** ≤90% from 0°C to 35°C, ≤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. A 6-foot pair of wires and connector are included. Linearity is ±0.5% of full scale.

### Models

2170A .....	\$390
2175A .....	495
2176A .....	595

### Options

2160A-01 .....	60
2160A-02 .....	125
2160A-04 .....	175

### Accessories

2161A Multipoint Selector .....	145
2162A Digital Limit Comparator .....	245

See page 152 for more accessory information.