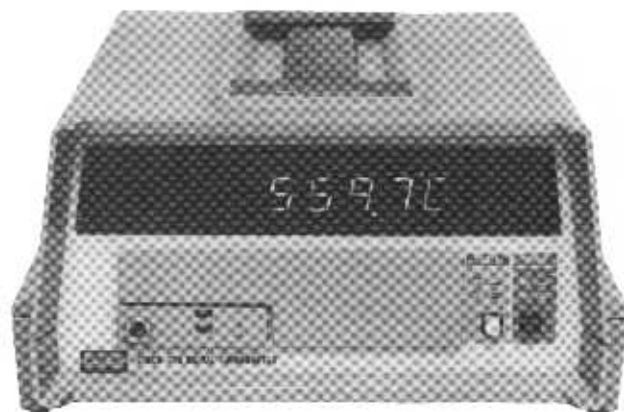


DIGITAL THERMOMETERS

2180A/2189A/2190A



2189A Thermometry System



2180A without Option -006

2180A/2189A/2190A

- 0.01° resolution for the 2180A and 2189A and 0.1° resolution for the 2190A
- Capable of running off of 12V dc or ac line power
- Designed to be integrated with a wide variety of instruments and accessories through an integral latching system
- °C or °F is selectable via a front panel switch
- A full five digit LED display
- An analog/digital output option is available
- The limits option allows peak and valley memory, alarms and delta
- The 2189A consists of a 2180A and a matched platinum RTD probe for greater accuracy
- Six different RTD types are switch selectable. Four platinum, one nickel, one copper (2180A only)
- Ten different thermocouple linearizations are supported including two DIN standards (2190A only)

Fluke's most accurate and versatile general purpose digital thermometers are the 2180A and 2189A for RTDs and the 2190A for thermocouples. State-of-the-art accuracy teams with a large family of options and accessories to let you make precision temperature measurements in the lab or out in the field.

The 2180A RTD Digital Thermometer lets you switch-select one of six different types of RTDs, four platinum, one nickel, and one copper. Resolution is 0.01°.

The 2189A Thermometry System consists of a 2180A that is factory-matched to a precision Y2039 Platinum RTD Probe.

The 2190A Thermocouple Digital Thermometer supports ten different thermocouple types, including two that comply to European DIN standards. Resolution is 0.1°. Take your choice from three different standard combinations of thermocouple types.

Each thermometer features a bright, high resolution LED display with pushbutton selection of Fahrenheit or Celsius readings. Each is capable of being run from either ac line power or external 12V dc, for field portability.

Output Option -002 and Limits Option -006 are usable with any of the three thermometers. Other accessory items electronically connect and stack and latch to the 2180A or 2190A. These include manual multipoints, multiple alarms, a battery pack, and a thermocouple thermometer calibrator. Some are also practical to use with the 2189A.

For automatic scanning, see the section on the 2300A Scanner. A 2020A or 2030A Printer allows you to permanently store data when used with a 2180A or 2190A configured with an output option. Portable temperature logging is available with the factory-tested Temperature Logging Systems — 2382A, 2383A, 2392A, or 2393A.



2190A/2180A with Option -006

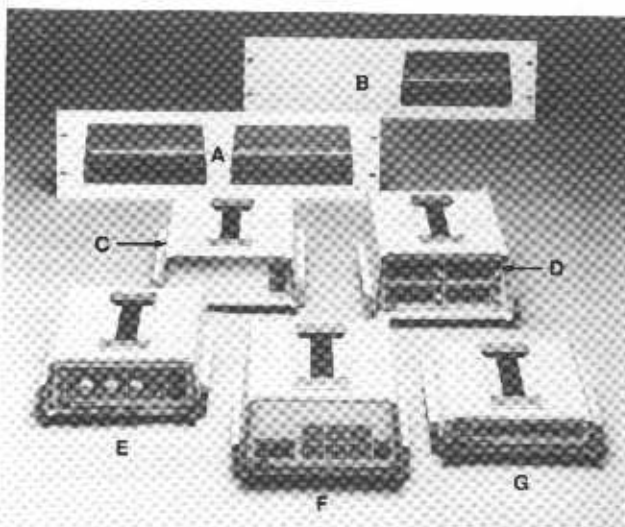
Limits Option (-006)

This option adds three powerful functions to the 2180A and 2190A Thermometers: Alarms, Peak Memory, and Delta. The Alarms function lights an indicator and closes a relay to activate external devices whenever a preset maximum or minimum set-point is exceeded, Peak Memory stores the highest and lowest temperature readings for later recall. And Delta automatically subtracts a thumbwheel setting from the actual measurement and displays the difference.

DIGITAL THERMOMETERS

2180A/2189A/2190A

A Family of Accessories



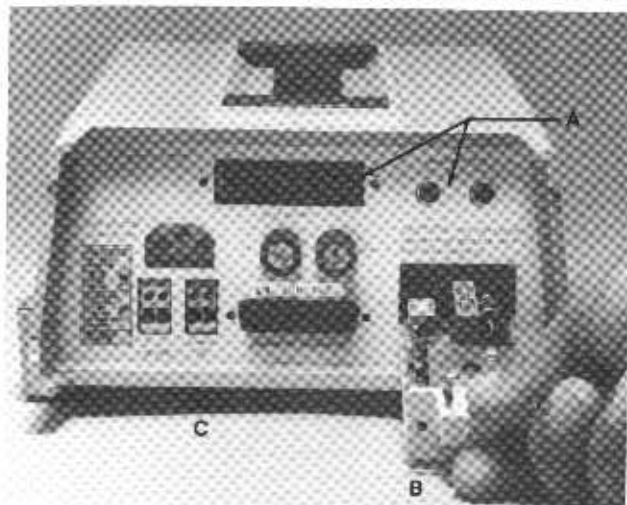
- A — Y2001 Multipoint
B — Y2010 Rack Adapter
C — Y2009 Battery Pack
D — Y2002 Alarms Output

- E — Y2003 Calibrator
F — 1120A Translator
G — Y2000 Multipoint

Output Option (-002)

For recording temperature measurements with a 2180A or 2190A, you can get Output Option -002. It provides both an analog output for chart recorders and a digital output for printers or computers, and may be installed in the field. The digital output is available in four forms, depending on connector pins and cabling used: Parallel ASCII, RS-232-C, TTY current loop, and IEEE-488 (using the Fluke 1120A Translator). The Y2026B RS-232-C Cable Adapter is available to convert the 36-pin PTI connector on the option to a standard 25-pin RS-232-C connector, or the user can wire his own cable to the connector provided.

Option -002 is required when the thermometer is being used with a Fluke 2020A-004 or 2030A Printer unless a 2300A Scanner is used.



Rear view of 2190A showing the [A] Output Option -002 Connector, [B] Y2030 Thermocouple Input Module, and [C] Limits Option -006 Relay Output.

Multipoint Selector (Y2000 & Y2001)

The Y2000 RTD Multipoint Selector (for the 2180A) and the Y2001 Thermocouple Multipoint Selector (for the 2190A) increase the number of points your thermometer can monitor. Connect up to ten sensors to each multipoint selector. Cascade up to ten multipoint selectors for up to 100 measurement points — all using a single 2180A or 2190A Thermometer. Both units have ten pushbuttons to easily access a specific measurement point. To measure or monitor more than one type of RTD or thermocouple, take advantage of internal switching. This allows you to monitor five sensors of one type, five of another. With Output Option -002 installed, the channel number is sent to your printer or computer, too.



Y2000



Y2001

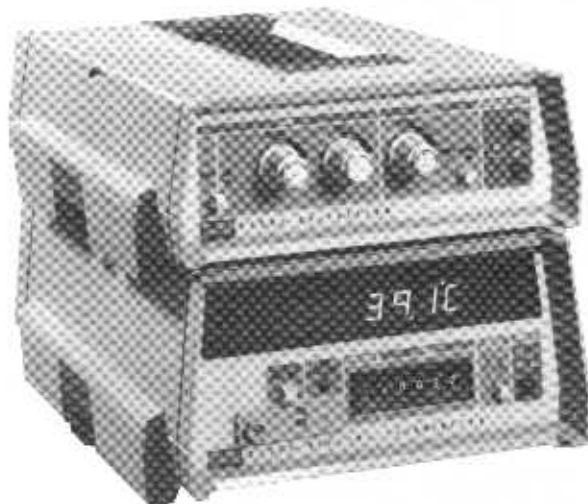
Multiple Limits and Alarms (Y2002)

The Y2002 Alarms Output accessory uses four independent comparator circuits for on/off control as well as alarms. Four sets of thumbwheel switches select a high- or low-limit mode, polarity, and the actual limit value. Each comparator circuit signals out-of-limit conditions via an LED and a reed relay (latching or non-latching).

Thermometer Calibration (Y2003)

The Y2003 Thermometer Calibrator and 2190A Digital Thermocouple Thermometer can be used together to check the accuracy of a thermocouple or millivolt-measuring or recording instrument.

Accurate and completely portable, the Y2003-2190A combination provides a variable voltage output from -10 mV to +90 mV. The output voltage simulates a thermocouple output, so that the reading on the 2190A Thermometer can be compared with a corresponding reading on any other thermocouple thermometer, either analog or digital. In addition, the Y2003 and 2190A can be used to calibrate millivolt chart recorders and digital or analog indicators measuring to 90 mV. Besides being used as a portable calibration system, the Y2003 can be used as a battery pack for the 2190A.



The 2190A/Y2003 Portable Calibration System

DIGITAL THERMOMETERS

2180A/2189A/2190A

Battery Pack (Y2009)

The Y2009 Battery Pack is a rechargeable, self-contained 12V dc nickel-cadmium supply for up to five hours of continuous operation. An indicator light tells you when the batteries are low, while an automatic out-off prevents damage to the cells from excessive discharge.

IEEE-488 Bus Translator (1120A)

The Fluke 1120A Translator configured with Option 2XXXA-522 provides a link to the IEEE-488 bus. Connect either a 2180A or a 2190A to the 1120A and you'll have an inexpensive bus-compatible system. See page 218 and following sections for more information.

Specifications

2190A Thermocouple Thermometer Specifications

Thermocouple Types: Five, switch selectable. Which thermocouple types depends on your choice of microcomputer type. See Accuracy chart below

Resolution: 0.1°C or °F

Input Connection: 2 wires on screw terminal isothermal block

Max Source Impedance: 2 kΩ

Overrange Detection: Flashing display

Open Circuit Detection: Source impedance of 3 kΩ or more causes a flashing "OC"

2190A Accuracy*

Thermocouples		Maximum Error*					
		±Degrees C			±Degrees F		
Type	Applicable Portion of Temperature Range °C	At Cal	90 Days to 30°C	1 Year to 15°C	At Cal	90 Days to 86°F	1 Year to 59°F
Type 1							
J	-128 to 0 0 to 900	0.18	0.19	0.21	0.20	0.23	0.26
K	-132 to 0 0 to 1350	0.18	0.19	0.21	0.30	0.33	0.37
T	-243 to 0 0 to 400	0.18	0.20	0.22	0.30	0.35	0.39
R	0 to 1708	0.31	0.59	0.70	0.47	1.01	1.20
C**	0 to 2471	0.18	0.60	0.75	0.30	1.11	1.37
Type 2							
J	-128 to 0 0 to 900	0.18	0.19	0.21	0.20	0.23	0.26
K	-132 to 0 0 to 1350	0.18	0.19	0.21	0.30	0.33	0.37
E	-252 to 0 0 to 1000	0.18	0.20	0.22	0.30	0.35	0.40
R	0 to 1708	0.31	0.59	0.70	0.47	1.01	1.20
S	0 to 1685	0.22	0.50	0.60	0.38	0.92	1.10
Type 3							
J	-100 to 0	0.18	0.19	0.20	0.30	0.32	0.36
DIN***	0 to 760	0.18	0.28	0.33	0.30	0.52	0.61
K	-50 to 0 0 to 1372	0.18	0.18	0.20	0.20	0.22	0.25
T	-200 to 0 0 to 400	0.18	0.20	0.21	0.30	0.34	0.38
DIN***	0 to 400	0.18	0.22	0.25	0.30	0.41	0.46
B	420 to 1615	0.21	0.52	0.62	0.37	0.96	1.15
R	140 to 1700	0.18	0.46	0.46	0.20	0.74	0.93

* Total instrument accuracy. Does not include Thermocouple errors such as non-conformity to standard curve.

** C designates Tungsten-5% Rhenium vs. Tungsten-26% Rhenium.

*** DIN is a European Standard.

2180A RTD Thermometer Specifications

RTD Types: 100Ω Pt, 385 (DIN), 390, 3916, or 392; 100Ω Ni (DIN); 10Ω Cu; 0 to 999Ω resistance — switch-selectable

Resolution: 100Ω Pt RTDs: 0.01°, autoranging to 0.1° above 204°C; 100Ω Ni RTDs: 0.01°, autoranging to 0.1° above 93°C; 10Ω Cu RTDs: 0.1°

Input Connection: 4-wire screw terminals. Terminals accept 3-wire and 2-wire RTDs at reduced accuracy

RTD Matching: User-performed potentiometer adjustment matches the 2180A to user's RTD to compensate for variations in lead length and resistance at 0°C

Lead Resistance: 4-wire: 200Ω max per lead for both 100Ω and 10Ω RTDs; 3-wire: 2Ω max per lead for 100Ω RTDs, 0.18Ω max per lead for 10Ω RTDs; 2-wire: 0.9Ω max per lead for 100Ω RTDs, 0.09Ω max per lead for 10Ω RTDs

Lead Resistance Error: 4-wire: no error; 3-wire 100Ω RTDs: 0.012° per degree per ohm; 3-wire 10Ω RTDs: 0.12° per degree per ohm; 2-wire 100Ω RTDs: 0.025° per degree per ohm; 2-wire 10Ω RTDs: 0.25° per degree per ohm

2180A Linearizations (Type 2)*

RTD Type	Linearization Coefficients	
100Ω 385 Pt	DIN** 43760 Table	
100Ω 390 Pt	ALPHA*	= 0.0038994
	DELTA*	= 1.494
	A4*	= -0.265668 x 10 ⁻³
	C4*	= -0.205964 x 10 ⁻¹
100Ω 3916 Pt	ALPHA*	= 0.003916
	DELTA*	= 1.505
	A4*	= -0.099668 x 10 ⁻³
	C4*	= -0.271142 x 10 ⁻¹
100Ω 392 Pt	ALPHA*	= 0.0039221
	DELTA*	= 1.493
	A4*	= -0.38668 x 10 ⁻³
	C4*	= +0.192912 x 10 ⁻¹
100Ω 617 Ni	DIN** 43760 Table	
10Ω*** Cu	R0	= 9.042 Ohms
	R25	= 10.005 Ohms
	ALPHA	= 0.004260

* See IPTS 68 equations in NBS Monograph 126. Type 1 no longer available

** European Standard.

*** Contact factory for information on the 2180A/AT for 10 ohm, 3 wire applications

DIGITAL THERMOMETERS

2180A/2189A/2190A

2180A Accuracy (Type 2)*

RTDs		Maximum Error*					
		+Degrees C			±Degrees F		
Type	Applicable Portion of Temperature Range °C	At Cal	90 Days 20°C to 30°C	1 Year 15°C to 35°C	At Cal	90 Days 68°F to 86°F	1 Year 59°F to 95°F
100Ω 385 Pt	-190 to 0	0.043	0.089	0.112	0.076	0.161	0.203
	0 to 204	0.043	0.132	0.173	0.076	0.239	0.314
	-190 to 0 0 to 750	0.11 0.11	0.12 0.26	0.14 0.37	0.18 0.18	0.21 0.46	0.24 0.62
100Ω 390 Pt	-200 to 0	0.009	0.055	0.078	0.015	0.100	0.142
	0 to 204	0.009	0.098	0.139	0.015	0.177	0.252
	-200 to 0 0 to 750	0.08 0.08	0.10 0.23	0.11 0.32	0.13 0.13	0.16 0.41	0.19 0.57
100Ω 3916 Pt	-200 to 0	0.040	0.086	0.109	0.071	0.156	0.198
	0 to 204	0.040	0.13	0.171	0.071	0.234	0.309
	-200 to 0 0 to 750	0.11 0.10	0.12 0.26	0.14 0.34	0.17 0.17	0.21 0.46	0.24 0.62
100Ω 392 Pt	-200 to 0	0.008	0.055	0.078	0.014	0.099	0.141
	0 to 204	0.009	0.098	0.139	0.014	0.177	0.252
	-200 to 0 0 to 750	0.08 0.08	0.10 0.23	0.11 0.32	0.12 0.12	0.16 0.41	0.19 0.57
100Ω 617 Ni	-60 to 0	0.129	0.157	0.172	0.230	0.282	0.308
	0 to 93	0.129	0.176	0.199	0.231	0.317	0.359
	-60 to 0 0 to 177	0.19 0.19	0.20 0.22	0.21 0.25	0.33 0.33	0.35 0.39	0.35 0.44
10Ω Cu	-75 to 0	0.16	0.18	0.19	0.27	0.31	0.34
	0 to 150	0.16	0.20	0.23	0.27	0.35	0.41
Ohms	0 to 196.99	0.005	0.042	0.059	All Units		
	0 to 999.99	0.05	0.22	0.31	In Ohms		

NOTE: Shaded area is 0.01° resolution; unshaded area is 0.1° resolution
* Total instrument accuracy. Does not include RTD probe errors. Valid for 4-wire RTDs only. Microcomputer Type 1 no longer available.

2189A Thermometry System Specifications
Includes Platinum RTD Probe Y2039.

Maximum System Error (±°C)

Temperature °C	At Calibration	90 Days 18°C-28°C Ambient	1 Year 18°C-28°C Ambient
Low Temperature Range...			
-183	(1)	(1)	(1)
-50	0.04	0.08	0.11
0	0.03	0.07	0.09
50	0.05	0.10	0.13
100	0.07	0.12	0.16
150	0.08	0.15	0.20
200	0.09	0.17	0.23
High Temperature Range... Periodic probe exposure*			
204	0.14	0.25	0.27
300	0.18	0.32	0.33
400	0.21	0.39	0.40
480	0.29	0.48	0.50

(1) The system operates down to -183°C but the probe calibration is not verified below -50°C. It is estimated that the accuracy below -50°C is the same as the accuracy at an equal temperature in the positive range. Low temperature calibrations are available as a special.
*Accuracy above 200°C is based on the user performing an Ice Point adjustment in accordance with the following schedule:

Probe Exposure
Temperature Range
200°C to 350°C
350°C to 480°C

Total Exposure Time
Before Adjustment
500 hours
250 hours

Exposure of the Y2039 at high temperatures for long periods of time may cause the probe to change its characteristics and require the accuracy specifications to be degraded. For example, there is a 20% probability that exposure at 480°C for 500 hours will require degrading. It is easy for the user to determine if degrading is necessary by measuring the Ice Point resistance of the probe. The 2189A Instruction Sheet explains this degrading procedure.

Option Specifications

Output Option (-002)

Analog Output

Type: Linearized and isolated

Voltage: 1.0 mV/°C or °F from -425 mV to 4.5V, 5 mA max

Temperature Coefficient: 200 ppm/°C from 25°C

Noise: <100 μV at 100 Hz bandwidth

Accuracy: ±0.1% of reading ±1 mV

Drift: 200 μV/°C from 25°C

Overload or Open Circuit: Zero volts via banana jacks

Digital Output

Types: Four, E.I.A. Standard RS-232-C, TTY current loop, parallel ASCII, and Fluke PTI

Connector: 36-pin AMP "Champ"

Serial Baud Rates: 110, 150, 300, 600, 1200, 2400, 4800, or 9600, switch-selectable

RS-232-C Signals: Transmitted Data, Request to Send, Clear to Send, Data Set Ready, Signal Common

Parallel ASCII Signals: Data: 8 lines; Instrument Address: 4 lines;

Address Valid; Data Valid; Acknowledge; Ground; +5V

TTY Current Loop Signals: Source and controlled sink, 20 mA

Out-of-Limit Signals: Exclamation point transmitted with Option -006 only; not with Y2002

Limits Option (-006)

Limits Function: Lights LED and activates Form A (SPST) reed relay when thumbwheel setpoint is exceeded. Reed relay rated 10 VA, 184V dc or 130V ac rms max. 0.5A max, resistive. Selectable either low (<) or high (>).

Min/Max Function: Continuously stores Min and Max temperature

Delta Function: Displays difference between thumbwheel setpoint and actual temperature

Thumbwheels: 6, for function, sign, and setpoint (+9999). Setpoint resolution is 1°

Accessory Specifications

Y2000 RTD Multipoint Selector



Y2000

Channels: Ten per Y2000, up to ten Y2000s per 2180A. Channel number sent to printer or computer when Output Option -002 is used

RTD Types: Same as 2180A. Two types selectable per Y2000

Power: Supplied by 2180A

Interfacing: Attached 46-cm cable plugs into rear of 2180A or Y2002.

Receptacle accepts cable chained from other Y2000s

Size and Weight: Style A PTI case, 1.4 kg (3.09 lb)

DIGITAL THERMOMETERS

2180A/2189A/2190A

Y2001 Thermocouple Multipoint Selector



Y2001

Channels: Ten per Y2001, up to ten Y2001s per 2190A. Channel number sent to printer or computer when Output Option -002 is used

Thermocouple Types: Same as 2190A. Two types per Y2001

Maximum Voltage Between Channels: 125V ac rms

Power: Supplied by 2190A

Interfacing: Attached 46-cm cable plugs into rear of 2190A or Y2002.

Receptacle accepts cable chained from other Y2001s

Size and Weight: Style A PTI case, 1.6 kg (3.53 lb)

Y2002 Alarms Output



Y2002

Limit Selections: Four sets of thumbwheels. Each set selectable as a $\pm 9999^\circ$ high- or low-limit setpoint

Alarm Indication: LED and reed relay — one for each limit setpoint

Relay Rating: Form C (SPDT), 230VA, 184V dc or 130V ac rms max, 2A max resistive, selectable latching or non-latching

Power: Supplied by 2180A or 2190A

Interfacing: Attached 46-cm cable plugs into rear of thermometer.

Receptacle accepts cable from Y2000 or Y2001

Size and Weight: Style C PTI case, 1.8 kg (3.97 lb)

Y2003 Thermocouple Calibrator and Battery Pack



The 2190A/Y2003
Portable Calibration System

Thermocouple Types: Same as 2190A

Output Voltage: -10 mV to -90 mV, adjustable. Applied at input terminals of 2190A and thermocouple thermometer of less accuracy to be calibrated

Adjustments: Coarse, fine and offset

Battery Pack: Same specifications as Y2009

Interfacing: Attached 46-cm cable plugs into rear of 2190A

Size and Weight: Style B PTI case, 2.6 kg (5.74 lb)

Y2009 Rechargeable Battery Pack



Y2009

Output: 12V dc, 750 mA max

Battery: Ten 1/2-D-size cells in drip-proof case

Operating Time: 5 to 6 hours typical at 25°C on full charge when connected to 2180A or 2190A

Recharge Time: 16 hours typical at 25°C

Charger: Built-in on-off switch, low-battery automatic discharge cut-off

Output Connectors: Rear panel screw terminal block

Operating and Storage Temperature: 0°C to 40°C

Power: 100, 120, 220, or 240V ac $\pm 10\%$ selectable, 50 to 400 Hz; 10W, typical

Size and Weight: Style B PTI case, 2.5 kg (5.52 lb), typical

Y2022 Thermometer Calibration Divider (D in Picture)

Function: Either precision resistor or voltage divider ($\div 10$ or $\div 100$)

Input Voltage: 0-10V dc

Output Impedance: 100 Ω

Precision Resistor: 100 Ω $\pm 0.01\%$, temp coefficient 5 ppm

Y2024 3-Module Power Card (E in Picture)

Connects three PTI-family instruments or accessories to single 120V ac power outlet

Y2026B RS-232-C Cable Adapter (C in Picture)

Function: Routes RS-232-C signals from 36-pin PTI connectors to 25-pin RS-232-C connectors

Connections: Two 36-pin PTI connectors (M and F), two 25-pin RS-232-C connectors (M and F), Y2023 cable supplied

RS-232-C Pin Selections: Slide switches. Select TD on pin 2 or 3; DTR, DSR and CTS, through or pulled up; Scanner busy, through or to CTS

Y2030 Plug-in Module (H in Picture)

Extra plug-in units for 2190A thermocouples. Leave attached to input wire-pair for easy interchange of thermocouple inputs.

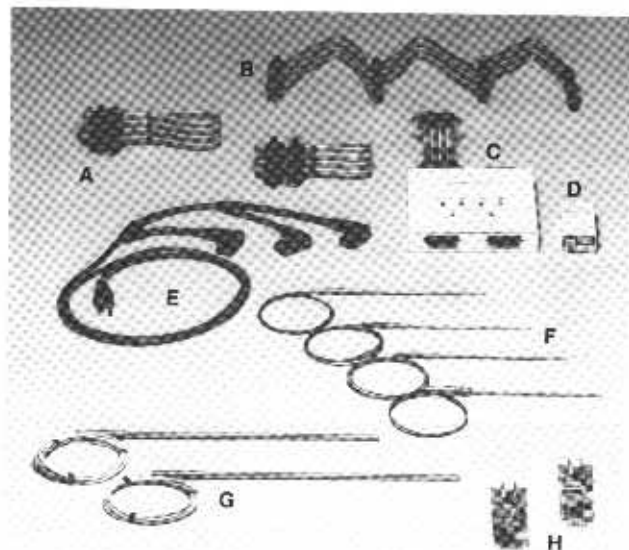
Y2031 Plug-in Module (H in Picture)

Extra plug-in unit for 2180A RTDs. Leave attached to input wires for easy interchange of RTD inputs.

DIGITAL THERMOMETERS

2180A/2189A/2190A

A Family of Accessories



Small accessories shown are: (A) Y7203 and Y7204 PTI Polling Cables, (B) Y2036 3-Module PTI Polling Cable, (C) Y2026 Cable/Adaptor, (D) Y2022 Calibration Divider, (E) Y2024 3-Module Power Cord, (F) P20-Series Thermocouple Probes, (G) Y2037 and Y2039 RTD Probes, (H) Y2030 and Y2031 Plug-in Modules.

Y2036 PTI Polling Cable

Connects up to three PTI-family measurement instruments to 2020A or 2030A Printer

Y2037 Platinum RTD Probe

Resistance: $100\Omega \pm 0.1\Omega$ at 0°C

Temperature Range: -80°C to $+480^\circ\text{C}$

Curve Conformity: $\pm 0.1\%$ of temperature using IPTS 68 with ALPHA = 0.0038994 and DELTA = 1.494

Stability: Periodic usage (20% of time) $\pm 0.03^\circ\text{C}$ if used from 0°C to 200°C and $\pm 0.22^\circ\text{C}$ if used from -80°C to $+480^\circ\text{C}$

Hysteresis: Less than $\pm 0.08^\circ\text{C}$ when using 0°C and 200°C as end points

Immersion Effects: $\pm 0.005^\circ\text{C}$ when going from 4 inches to 10 inches in an ice bath

Transition End Temperature: 150°C maximum

Physical: 316 SS Sheath, 0.25 in diameter x 12 in L; four 6 ft leads #22 AWG stripped and tinned

Handling: Contains strain-free platinum coil. Must be handled with care

Y2039 Platinum RTD Probe

Probe Resistance: $100\Omega \pm 0.1\Omega$ at 0°C

Temperature Range: -183°C to $+480^\circ\text{C}$

Performance Standard: $R_{100}/R_{0^\circ} = 1.3922$, nominal. Conforms to IPTS 68 within 0.03% of temperature from -50°C to 420°C using ALPHA = 0.0039221 and DELTA = 1.493

Resistance Stability: 12 m Ω /year when exposed at 200°C or 20 m Ω in 250 hours when exposed at 480°C measured with probe at 0°C . 4 m Ω = $0.01^\circ\text{C} + 0.004\%$ of temperature

Hysteresis: Less than 0.01°C at 200°C when using 0°C and 420°C as end points

Immersion Effects: The readings shall not vary more than 0.005°C when probe is varied from 4 to 10 inches in an ice bath

Transition End Temperature: 150°C maximum

Time Constant: 8 seconds maximum when tested in flowing water at 3 feet per second

Sheath Material: INCONEL

Size: Diameter 0.64 cm (0.25 in), length 30.5 cm (12 in)

Leads: 4 wires, 6 ft, #22 AWG, ends stripped and tinned

Calibration: Each probe is calibrated at 0°C , 200°C and 420°C . The IPTS 68 constants R0, ALPHA, DELTA and A4 are provided

Handling: Contains strain-free platinum coil. Must be handled with care

PTI Case Dimensions

Style	Height	Width	Depth
A	5.7 cm (2.25 in)	20.5 cm (8.05 in)	32.6 cm (12.85 in)
B	8.2 cm (3.23 in)		
C	10.5 cm (4.13 in)		
D	12.8 cm (5.03 in)		

General Specifications for 2180A/2189A/2190A

Display: $^\circ\text{F}$ or $^\circ\text{C}$, switch-selectable; 7 segment 1.1 cm LEDs

Measurement Method: Dual-slope integration, 100 ms integration time, 3.33 readings/second

Linearization Technique: Segmented 4th order curve fit

Temperature Coefficient: ± 15 ppm/ $^\circ\text{C}$ from 25°C

Stability: 175 ppm/90 days, 200 ppm/year

Common Mode Voltage: 350V dc, 250V rms ac, max

Common Mode Noise Rejection: ≥ 160 dB at 50, 60 and 400 Hz $\pm 0.1\%$ 100 Ω unbalance

Normal Mode Noise Rejection: ≥ 90 dB at 50, 60 and 400 Hz $\pm 0.1\%$

Drift: None, automatic zero correction

Input Impedance: 1000 M Ω at dc

Accessory Connector: 25-pin rear panel receptacle interfaces thermometer to Y2000, Y2001, Y2002, Y2003, and 2300A

Shock and Vibration*: Meets MIL-T-28800C, class 3 specifications

Ambient Temperature: 0°C to 50°C operating, -40°C to 75°C non-operating

Relative Humidity: $\leq 80\%$ from 0°C to 50°C non-condensing

Power: 12V dc or 100, 120, 220, 240V ac $\pm 10\%$, selectable, 50 to 400 Hz; 8W typical

Size: Style C PTI case

Weight: 2.1 kg (4.63 lb)

Included: instruction manual, power cord. Probes are not included

Warranty Period: 1 year

*Also applies to Y2000, Y2001, Y2002, and Y2003

Models

January 1985 prices

RTD Thermometers

2180A Type 2 Linearizations* \$1095

2189A System 1795

*Contact factory for 3-wire 10 Ω copper applications

Thermocouple Thermometer

2190A Type 1 — J, K, T, R, C 1045

2190A Type 2 — J, K, E, R, S 1045

2190A Type 3 — J(DIN), K, T(DIN), B, R 1045

Options***

21X0A-002* Output 395

21X0A-006 Limits 255

2XXXA-522** Personality Card for 1120A 390

Note: Above options are field-installable.

* Required for IEEE-488 compatibility and/or with 2020A-004 or 2030A Printer. However, the option is not required when the thermometer is used with a 2300A Scanner, unless analog output is also needed.

** Required with 1120A Translator for IEEE-488 compatibility. Y7203 or Y7204 Cable also required.

*** All options are customer installable.

DIGITAL THERMOMETERS

2180A/2189A/2190A

Accessories (Also see page 230)

Y2000 Multipoint Selector for RTDs	610
Y2001 Multipoint Selector for Thermocouples	610
Y2002 Alarms Output Module	720
Y2003 Thermocouple Calibrator/Battery Pack	685
Y2009 Battery Pack, Rechargeable	430
Y2022 Thermometer Calibration Divider	125
Y2026B RS-232-C Cable Adapter	170
Y2030 Thermocouple Input Module	90
Y2031 RTD Input Module	90
Y2023 Size C PTI Case w/drawer	125
Y2034 Interconnect	230
Y2024 3-Module Power Cord	20
Y2036 PTI Polling Cable	80
Y2037 RTD Probe 100 Ω 390 PT	260
Y2039 RTD Probe 100 Ω 392 PT	700
Y7203 2-ft 36-pin PTI Cable	45
Y7204 5-ft 36-pin PTI Cable	60

Also see page 181, 2030A Printer/Plotter; page 175, 2300A Scanner and page 218, IEEE-488 Translator.

After-Warranty Service (See page 227)

SC1-2180A, per 90-day interval	112
SC1-2189A, per 90-day interval	132
SC1-2190A, per 90-day interval	100