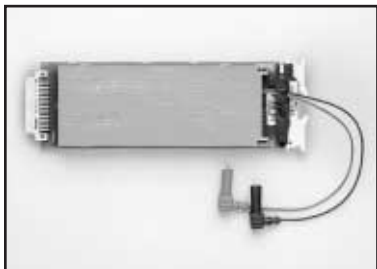


## 2000 Series Scanners



Model 2000-SCAN



Model 2001-SCAN



Model 2001-TCSCAN

### ACCESSORIES AVAILABLE

7401 Type K Thermocouple Wire Kit (100 ft)

See page 235 for descriptions of all accessories.

Keithley has designed three plug-in scanner cards for use with Model 2000, 2001, 2002, and 2010 DMMs. Simply by inserting the appropriate card in the option slot on the DMM's back panel, users can create a multipoint test and measurement system that's well suited to applications involving up to ten measurement points. Combining scan and measurement capabilities in a single instrument reduces the need for extra equipment, eliminates complexities of triggering, timing, and processing issues, and helps reduce test time significantly. Also, since the scanners were designed specifically to work with these DMMs, measurement integrity is assured. For larger ATE applications, the DMMs can be easily combined with Keithley's 7000 Series switch matrices and cards for high-speed, high-accuracy scanning and measurement.

### Model 2000-SCAN Scanner Card

- Ten analog input channels (2-pole)
- Configurable as 4-pole, 5-channel

Model 2000, 2001, 2002, and 2010 DMM users can create an economical ten-channel data logger simply by inserting the Model 2000-SCAN scanner card into the DMM's back panel option slot. Users can multiplex one of ten 2-pole or one of five 4-pole signals into the Model 2000 and/or any combination of 2- or 4-pole signals. Contact potential is typically less than 500nV per contact pair (1 $\mu$ V maximum) for high measurement integrity.

### Model 2001-SCAN Scanner Card

- Ten analog input channels
- Two channels of 2-pole high-speed solid-state switching
- High-speed ratio and delta measurements

The 2001-SCAN is a high-speed multiplexing general-purpose scanner card for use with the 2000, 2001, 2002, or 2010 multimeter. Installing the 2001-SCAN card into the meter transforms it into a high-accuracy, high-speed ten-channel data logger for a wide variety of mixed-signal applications. The card's 500nV–125V signal range makes it well suited for both low and high level signals. Two high-speed solid-state channels make it possible to calculate ratio and delta when used with the 2001, 2002, or 2010.

### Model 2001-TCSCAN Thermocouple Scanner Card

- Nine analog input channels
- Scan up to 43 channels per second
- Built-in temperature reference for thermocouple cold-junction compensation
- Suitable for general-purpose measurements of voltage, resistance, and frequency
- 500nV–125V signal range

When installed in a 2000, 2001, 2002, or 2010 DMM, the Model 2001-TCSCAN provides up to nine channels of cold-junction compensated temperature measurements and/or voltage, resistance, and frequency measurements. When the card is installed in the 2001 or 2002, the DMM will linearize type J, K, E, R, S, B, and T thermocouples automatically. The Model 2000 DMM provides built-in support for J, K, and T-type thermocouples. The Model 2010 has built-in support for J, K, T, and N thermocouples. Readings are output directly in the user's choice of Celsius, Fahrenheit, or Kelvin scales. Total system accuracy is 0.65°C (with Type J TCs). When used with the 2001, 2002, or 2010, the 2001-TCSCAN can also measure temperature directly using 2- or 4-wire RTDs.

### ORDERING INFORMATION

<b>2000-SCAN</b>	10-Channel Scanner Card with Test Leads for Models 2000, 2001, 2002, and 2010 Multimeters
<b>2001-SCAN</b>	10-Channel Scanner Card with Test Leads and two high-speed channels for Models 2000, 2001, 2002, and 2010 Multimeters
<b>2001-TCSCAN</b>	9-Channel Thermocouple/General Purpose Scanner Card with Test Leads for Models 2000, 2001, 2002, and 2010 Multimeters
<b>2000-SCAN-20</b>	See page 46 for a description and specifications for this 20-channel scanner card, used with the 2000-20 DMM.

These products are available with an **Extended Warranty**. See page 635 for complete ordering information.

### QUESTIONS?

1-800-552-1115 (U.S. only)

Call toll free for technical assistance, product support or ordering information, or visit our website at [www.keithley.com](http://www.keithley.com).

# 2000 Series Scanners

## SCANNER OPTION 2000-SCAN

**GENERAL:** 10 channels of 2-pole relay input. All channels configurable to 4-pole.

**CAPABILITIES:** Multiplex one of ten 2-pole or one of five 4-pole signals into DMM.

### INPUTS

#### Maximum Signal Level:

**DC Signals:** 110V DC, 1A switched, 30VA maximum (resistive load).

**AC Signals:** 125V AC rms or 175V AC peak, 100kHz maximum, 1A switched, 62.5VA maximum (resistive load).

**Contact Life:**  $>10^5$  operations at maximum signal level;  $>10^8$  operations cold switching.

**Contact Resistance:**  $<1\Omega$  at end of contact life.

**Actuation Time:** 2.5ms maximum on/off.

#### Contact Potential:

$<\pm 500\text{nV}$  typical per contact,  $1\mu\text{V}$  max.  
 $<\pm 500\text{nV}$  typical per contact pair,  $1\mu\text{V}$  max.

**Connector Type:** Screw terminal, #22 AWG wire size.

**Isolation Between Any Two Terminals:**  $>10^9\Omega$ ,  $<75\text{pF}$ .

**Isolation Between Any Terminal and Earth:**  $>10^9\Omega$ ,  $<150\text{pF}$ .

**Common Mode Voltage:** 350V peak between any terminal and earth.

**Maximum Voltage Between Any Two Terminals:** 200V peak.

**Maximum Voltage Between Any Terminal and Model 2001 Input LO:** 200V peak.

**ENVIRONMENTAL:** Meets all Model 2000 environmental specifications.

**DIMENSIONS, WEIGHT:** 21mm high  $\times$  72mm wide  $\times$  221mm deep (0.83 in.  $\times$  2.83 in.  $\times$  8.7 in.). Adds 0.4kg (10 oz.).

## SCANNER OPTION 2001-SCAN

### GENERAL:

#### 10 Channels:

8 channels of 2-pole relay input.  
2 channels of 2-pole solid-state input.  
All channels configurable to 4-pole.

### CAPABILITIES:

- Multiplex one of ten 2-pole or one of five 4-pole signals into DMM and/or any combination of 2- or 4-pole signals, or
- Two-channel, high-speed multiplexing into the DMM, or
- High-speed ratio or delta measurements.

### FUNCTIONS

(can be mixed from channel to channel)

	DCV, ACV, 4-Wire $\Omega$ , 4-Wire RTD, Frequency	2-Wire $\Omega$ DCI, ACI	2-Wire RTD
Relay Channels:	Yes	Yes*	Yes
Solid State Channels:	Yes	—	—

\* On 2 channels, using user-supplied  $\frac{1}{4}\text{W}$  shunt resistor.

### RELAY INPUTS

#### Maximum Signal Level:

**DC Signals:** 110V DC, 1A switched, 30VA maximum (resistive load).

**AC Signals:** 125V AC rms or 175V AC peak, 100kHz maximum, 1A switched, 62.5VA maximum (resistive load).

**Contact Life:**  $>10^5$  operations at maximum signal level;  $>10^8$  operations cold switching.

**Contact Resistance:**  $<1\Omega$  at end of contact life.

**Actuation Time:** 2.5ms maximum on/off.

### SOLID STATE INPUTS

**Resistance:**  $<275\Omega$  (including 200 $\Omega$  series resistor).

**Maximum Signal Level:** 110V DC, 175V peak AC, 50mA, 100kHz maximum.

**Actuation Time:** 150 $\mu\text{s}$  maximum on, 100 $\mu\text{s}$  maximum off.

### ALL INPUTS

#### Contact Potential:

$<\pm 500\text{nV}$  typical per contact,  $1\mu\text{V}$  max.  
 $<\pm 500\text{nV}$  typical per contact pair,  $1\mu\text{V}$  max.

**Operating Speed:** See Operating Speed section for complete speed specifications.

**Connector Type:** Screw terminal, #22 AWG wire size.

**Isolation Between Any Two Terminals:**  $>10^9\Omega$ ,  $<75\text{pF}$ .

**Isolation Between Any Terminal and Earth:**  $>10^9\Omega$ ,  $<150\text{pF}$ .

**Common Mode Voltage:** 350V peak between any terminal and earth.

**Maximum Voltage Between Any Two Terminals:** 200V peak.

**Maximum Voltage Between Any Terminal and Model 2001 Input LO:** 200V peak.

**ENVIRONMENTAL:** Meets all Model 2001 environmental specifications.

**DIMENSIONS, WEIGHT:** 21mm high  $\times$  72mm wide  $\times$  221mm deep (0.83 in.  $\times$  2.83 in.  $\times$  8.7 in.). Adds 0.4kg (10 oz.).

**SCANNER CONFIGURATION:** Same as 2000-SCAN.

## SCANNER OPTION 2001-TCSCAN

### Thermocouple Accuracy

Thermocouple Type	Range	Default Resolution	Total Absolute Error <sup>1</sup> , 1 Year	
			18°-28°C	0°-18°C & 28°-50°C
J	-100° to 760°C	0.1°C	$\pm 0.65^\circ\text{C}$	$\pm 1.08^\circ\text{C}$
K	-100° to 1372°C	0.1°C	$\pm 0.70^\circ\text{C}$	$\pm 1.32^\circ\text{C}$
T	-100° to 400°C	0.1°C	$\pm 0.68^\circ\text{C}$	$\pm 1.22^\circ\text{C}$
E	-100° to 1000°C	0.1°C	$\pm 0.67^\circ\text{C}$	$\pm 1.11^\circ\text{C}$
R	0° to 1768°C	1.0°C	$\pm 1.31^\circ\text{C}$	$\pm 3.06^\circ\text{C}$
S	0° to 1768°C	1.0°C	$\pm 1.30^\circ\text{C}$	$\pm 3.02^\circ\text{C}$
B	350° to 1820°C	1.0°C	$\pm 1.65^\circ\text{C}$	$\pm 4.14^\circ\text{C}$

<sup>1</sup>When used with Model 2001 Multimeter.

Specifications apply to channels 2-6. Add 0.06°C for each adjacent channel away from channel 6.

Extended range (Types J, K, T, E): -200.0°C to -100.1°C add  $\pm 0.1^\circ\text{C}$ .

Excluding thermocouple error.

**GENERAL:** 9 channels of 2-pole analog input, 1 cold junction sensor.

**FUNCTIONS:** DCV, ACV, 4-wire  $\Omega$ , Thermocouple, 2-wire  $\Omega$ , 4-wire RTD, 2-wire RTD, Frequency (can be mixed from channel to channel).

**THERMOCOUPLE SCAN SPEED:** 25 channels/second @ 0.1°C resolution; 43 channels/second @ 1°C resolution.

**CAPABILITIES:** Multiplex one of nine 2-pole or one of four 4-pole analog signals into Model 2001 DMM and/or any combination of 2- or 4-pole analog signals.

**REFERENCE OUTPUT:**  $+200\mu\text{V}/^\circ\text{C}$

( $+54.63\text{mV}$  at  $0^\circ\text{C}$ ).

### ALL INPUTS

#### Maximum Signal Levels<sup>2</sup>:

**DC:** 110V DC,  $<1\text{A}$  switched, 30VA maximum (resistive load).

**AC:** 125V AC rms or 175V AC peak, 1A switched, 62.5VA maximum (resistive load).

**Contact Life:**  $>10^5$  operations at maximum signal level;  $>10^8$  operations cold switching.

**Contact Resistance<sup>2</sup>:**  $<1\Omega$  at end of contact life.

**Actuation Time:** 2.5ms maximum on/off.

**Contact Potential<sup>3</sup>:**  $<\pm 500\text{nV}$  typical per contact,  $1\mu\text{V}$  max.

**Connector Type:** Screw terminal, #22 AWG wire size (0.062 O.D.).

**Isolation Between Any Two Terminals:**  $>10^9\Omega$ ,  $<75\text{pF}$ .

**Common Mode Voltage:** 350V peak between any terminal and earth.

**Maximum Voltage Between Any Two Terminals:** 110V DC, 125V AC rms.

**DIMENSIONS, WEIGHT:** 21mm high  $\times$  72mm wide  $\times$  221mm deep (0.83 in.  $\times$  2.83 in.  $\times$  8.7 in.). Net weight 283g (10 oz.).

<sup>2</sup>Channels 5 and 10 maximum power = 0.25 VA maximum (factory installed 120 $\Omega$ , 5%,  $\frac{1}{4}\text{W}$  resistors. User may replace with jumper. See note in manual for complete instructions.)

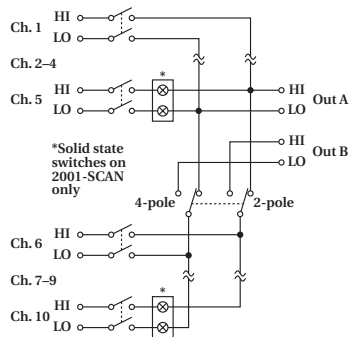
<sup>3</sup>Channels 5 and 10 contact potential =  $\pm 1\mu\text{V}$  typical,  $2\mu\text{V}$  max.

## QUESTIONS?

1-800-552-1115 (U.S. only)

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### Scanner Configuration for Models 2000-SCAN and 2001-SCAN



### Scanner Configuration for Model 2001-TCSCAN

