

Keysight Technologies

B2200A fA Leakage Switch Mainframe

B2201A 14ch Low Leakage Switch Mainframe



Data Sheet

## Introduction

### Basic functions

The Keysight Technologies, Inc. B2200A fA leakage switch mainframe and B2201A 14ch low leakage mainframe functions:

- Switches DC current, DC voltage, capacitance and LCR meters
- Set and monitor connection status on front panel
- Configured status display with LED matrix display
- Connection setup by light pen
- Controls through GP-IB interface
- Auto ground function
- Self-test, relay function test
- Relay cleaning

## Configuration

### Input (B2200A/B2201A)

- I-V port: 8 triaxial ports (or 4 Kelvin tri-axial ports) low leakage performance
- AUX port: 6 BNC ports dedicated 2 CV ports
- All input ports can use concurrently

### Output (B2210A/B2211A)

- 12 triaxial ports per switch module. Frame can have 4 modules maximum. (Total 48 ports)

### Software

The B2200A and B2201A include a CD-ROM with VXI Plug&Play driver which contains capacitance compensation routine.

General specifications		
Temperature range	Operation:	+5° C to 35° C
	Storage:	–20° C to 70° C
Humidity range	Operation:	+5% to 70% R.H. no condensation (B2200A, B2210A)
	Storage:	< 80% @35° C, < 60% @ 65° C no condensation (B2201A, B2211A)
		< 80% @ 65° C no condensation
Altitude	Operation:	0 m to 2,000 m
	Storage:	0 m to 15,240 m
Regulatory Compliance	Safety:	CSA C22.2 No.1010.1/IEC 1010-1
	EMC:	CISPR 11 Group 1 class A&EN50082-1
Power requirement	90 to 264 V (continuous), 47 to 63 Hz, 2 A/200 VA max	
Number of slots	4 slots for 48 mm height switch module.	
Size	B2200A/B2201A	430 mm W x 320 mm H x 600 mm D
	B2210A/B2211A 3	95 mm W x 48 mm H x 500 mm D
Weight (approx.)	B2200A/B2201A	14.0 kg
	B2210A	4.5 kg
	B2211A	3.5 kg

Number of ports (B2210A, B2211A use with B2200A, B2201A)		
I-V port:	8 triaxial ports (with guard)	
AUX port:	6 BNC ports (2 of CV port)	
Output channel:	12 triaxial ports (with guard), max. 48 ports	

Switch module specifications (Used with mainframe <sup>1</sup> )			
Condition		B2210A	B2211A
Max current rating (A):	I-V port	1.0	1.0
	AUX port	0.5	0.5
Max voltage rating (V):	I-V: (to common)	200	200
	I-V: (to other ch.)	300	300
	AUX: (to common)	100	100
	AUX: (to other ch.)	100	100
Close channel residual resistance (Ω):	I-V port	0.6	0.6
	AUX port	1.5	1.5
Channel isolation resistance (Ω):	I-V port	1x10 <sup>14</sup>	5x10 <sup>13</sup>
	AUX port	1x10 <sup>9</sup>	1x10 <sup>9</sup>

Condition: 23° C ± 5° C, 5% to 60% R.H.

<sup>1</sup> B2200A only supports B2210A fA leakage switch module.  
B2201A only supports B2211 14ch low leakage switch module.  
Mixed configuration is not supported.

**Supplemental characteristics (B2200A/B2210A)<sup>1</sup>**

Offset current	10 fA <sup>2</sup>	I-V port
IM noise (RMS)	0.6 fA <sup>3</sup>	I-V port
Channel crosstalk capacitance	< 1 pF/ch	I-V port
	< 3 pF/ch	AUX port
Offset voltage	< 50 $\mu$ V	I-V port
	< 80 $\mu$ V	AUX port
Settling time <sup>4</sup>	2.0 sec at 50 fA	
Band width (at -3 dB)	30 MHz	AUX port
Guard capacitance	< 145 pF <sup>5</sup>	I-V port
Additional C measurement error	< $\pm 1\% + 0.2$ pF <sup>6</sup>	AUX port

**Supplemental characteristics (B2201A/B2211A)<sup>1</sup>**

Offset current	100 fA <sup>7</sup>	I-V port
IM Noise (RMS)	5 fA <sup>3</sup>	I-V port
Channel crosstalk capacitance	< 0.5 pF/ch	I-V port
	< 3 pF/ch	AUX port
Offset voltage	< 80 $\mu$ V	I-V port
	< 100 $\mu$ V	AUX port
Settling time <sup>4</sup>	2.0 sec at 300 fA	
Band width (at -3 dB)	30 MHz	AUX port
Guard capacitance	< 145 pF <sup>5</sup>	I-V port
Additional C measurement error	< $\pm 1\% + 0.2$ pF <sup>6</sup>	AUX port

- B2200A only supports B2210A fA leakage switch module.  
B2201A only supports B2211 14ch low leakage switch module.  
Mixed configuration is not supported.
- The offset current when zero volts is applied to all input and output channels.  
This measurement is made on a port, 5 seconds after a switching a relay.
- Measured 100 PLC by 4156C when zero volts are applied to all other paths.  
After 10 V applied.
- The guard capacitance of the closed port on input and output ports when 4 modules per frame are installed.
- The additional error using the C-compensation algorithm for Keysight 4284 at 1 kHz to 1 MHz, <1000 pF and 3 m cable.
- The offset current when zero volts is applied to all input and out channels.  
This measurement is made on a port, 60 seconds after a switching a relay.

**Specification condition**

Specification and supplemental characteristics are defined at 23° C  $\pm$  5° C < 60% relative humidity (R.H.)

The supplemental characteristics entries in the following specification are not warranted but they provided useful information about the functions and performances of the instruments.

**Accessories & cables**

Keysight 16443A	Light pen for B2200A/B2201A
Keysight 16494A	Triaxial cable
Keysight 16493K	Kelvin triaxial cable (for input port) (Between 4155/56 series or E5270 series and B2200/2201A input port)
Keysight 16494B	Kelvin triaxial cable (for output port)
Keysight 16494F	CMU input cable
Keysight 16493N	GND cable (Between GND of E5270/41501 and B2201A/B2200A)



Keysight B2200A fA leakage switch mainframe (back panel)