

# TH1991 | series precision source/measure unit

6 models available



## Performance Characteristics

• TH1991/TH1992 series precision source/measure units can output and measure voltage and current at the same time. The instrument integrates the functions of current source, voltage source, voltmeter and ammeter, and each function can be switched arbitrarily.

TH1991/TH1992 series precision source/measure units can output up to  $\pm 210V$  DC voltage,  $\pm 3A$  DC current and  $\pm 10.5A$  pulse current, minimum  $10fA/100nV$  power supply and measurement resolution, support high-speed sampling, and can generate arbitrary waveforms.

TH1991/TH1992 series precision source/measure unit series adopts 7-inch capacitive touch screen, with Linux operating system as the bottom layer, interactive graphical user interface and various display modes, and built-in diodes, triodes, MOS tubes and IGBTs and other devices. The I/V curve scanning function can complete the IV function test without connecting to the host computer, which can significantly improve the test efficiency.

The TH1991/TH1992 series of precision source/measure units with comprehensive and integrated power and measurement functions are ideal for testing semiconductors, active/passive devices, and a variety of other devices and materials.

The TH1991/TH1992 series of precision source/measure units are widely used in R&D and educational applications, industrial development, testing and manufacturing.

## Application

- Semiconductor, discrete and passive component testing
  - Diodes, Laser Diodes, LEDs
  - Photodetectors, Sensors
  - Field effect transistor, triode
  - ICs (ICs, RFICs, MMICs)
  - Resistors, rheostats, thermistors, switches
- Precision electronics and green energy device testing
  - PV
  - Power semiconductor
  - Battery
  - Car
  - Medical instrument
  - Power and DC Bias Sources for Board Level Testing

## Performance Characteristics

- 7-inch capacitive touch screen, resolution 800×480
- Linux operating system
- Four-quadrant precision power output and measurement
- Single/dual channel output and measurement
- Up to  $\pm 210V$  DC voltage,  $\pm 3A$  DC current/ $\pm 10.5A$  pulse
- $10fA/100nV$  minimum measurement resolution (6 1/2 digits)
- $10fA/100nV$  minimum supply resolution (6 1/2 digits)
- Up to 1,000,000 dots/sec sampling rate
- Arbitrary waveform generation
- List scan function (minimum  $1\mu s$  interval)
- Direct generation of I/V curves of diodes, triodes, MOS tubes and IGBTs

Specification			TH1991C	TH1991B	TH1991A	TH1991	TH1992B	TH1992A	TH1992
Channel			1				2		
Max Output	DC	Voltage	+/- 63V		+/- 210V				
		Current	+/- 1.515A		+/- 3.03A				
	Pulse	N/A		+/- 10.5A		N/A		+/- 10.5A	
Source	Max Digits		5.5 Digit			6.5 Digit		5.5 Digit 6.5 Digit	
	Resolution	Voltage	1μV	1μV	1μV	100nV	1μV	1μV	100nV
		Current	1pA	100fA	1pA	10fA	100fA	1pA	10fA
Measurement	Max Digits		6.5 Digit						
	Resolution	Voltage	100nV						
		Current	100fA	10fA	100fA	10fA	10fA	100fA	10fA
Voltage Range			200mV - 60V		200mV - 200V				
Min Time Interval			50μs	20μs	10μs	1μs	20μs	10μs	1μs

## Size and weight

Shelf volume (mm): 125x132x480

Outline volume (mm): 236x154x526

Net weight: about 6kg (single channel) / 7.5kg (dual channel)

- Research and Education
  - New material research
  - Nanodevice properties
  - Giant magnetoresistance
  - Organic equipment
  - Any precision I/V source or measure

## Features

- 10fA current output and measurement resolution; 100nV voltage output and component resolution
- $\pm 210V$  maximum voltage output;  $\pm 3.03A$  (DC)/ $\pm 10.5A$  (pulse) maximum current output.
- Support DC, pulse, sweep and list output.
- Minimum sampling interval  $1 \mu s$
- Built-in I/V curve sweep function, time-domain waveform scrolling display function
- The pulse width of the pulse output can be as small as  $50 \mu s$
- Both two-wire measurement / four-wire measurement
- The output filter time constant (or cutoff frequency) can be freely set to achieve any frequency response output
- 14-level sorting function, including Grading and Sorting modes.
- Math operation function, moving average filter function, deviation subtraction function
- Semiconductor parameter analysis function to quickly generate characteristic curves of commonly used devices.
- Four basic modes of voltage source, current source, voltmeter, ammeter or resistance meter
- Delta low resistance test method, which can effectively compensate the measurement error caused by thermal electromotive force.

## Performance Characteristics

Model			TH1991C	TH1991B	TH1991A	TH1991	TH1992B	TH1992A	TH1992
Display									
Display			7-inch capacitive touch screen, resolution 800×480						
Key Parameters									
Channel			1	1	1	1	2	2	2
Max Out-put	Voltage		±63V	±210V	±210V	±210V	±210V	±210V	±210V
	Current	DC	±1.515A	±3.03A	±3.03A	±3.03A	±3.03A	±3.03A	±3.03A
		Pulse	-----	-----	±10.5A	±10.5A	-----	±10.5A	±10.5A
Power Source	Max Digits	Digits	5 1/2	5 1/2	5 1/2	6 1/2	5 1/2	5 1/2	6 1/2
	Min Resolution	Voltage	1μV	1μV	1μV	100nV	1μV	1μV	100nV
		Current	1pA	100fA	1pA	10fA	100fA	1pA	10fA
Measurement	Max Digits	Digits	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2
	Min Resolution	Voltage	100nV	100nV	100nV	100nV	100nV	100nV	100nV
		Current	100fA	10fA	100fA	10fA	100fA	100fA	10fA
Voltage Range			2 0 0 m V - 60V	2 0 0 m V - 200V	2 0 0 m V - 200V	2 0 0 m V - 200V	2 0 0 m V - 200V	200mV-200V	200mV-200V
Min Time Interval			50μs	20μs	10μs	1μs	20μs	10μs	1μs
Voltage Source (Accuracy: Reading % + Bias, Noise: peak-to-peak (0.1Hz-10Hz))									
Range	±200mV	Programming Resolution	100nV						
		Accuracy	±(0.015% + 225 μ V)						
	±2V	Programming Resolution	1 μ V						
		Accuracy	±(0.02% + 350 μ V)						
	±20V	Programming Resolution	10 μ V						
		Accuracy	±(0.015% + 5mV)						
	±200V	Programming Resolution	100 μ V						
Accuracy		±(0.015% + 50mV)							
Voltage Mesaurement (Accuracy: Reding %+ Bias)									
Range	±200mV	Measurement Resolution	100nV						
		Accuracy	±(0.015% + 225 μ V)						
	±2V	Measurement Resolution	1 μ V						
		Accuracy	±(0.02% + 350 μ V)						
	±20V	Measurement Resolution	10 μ V						
		Accuracy	±(0.015% + 5mV)						
	±200V	Measurement Resolution	100 μ V						
		Accuracy	±(0.015% + 50mV)						

Current Source (Accuracy: Reading % + Bias, Noise: peak-to-peak (0.1Hz-10Hz))			
Range	± 10nA	Programming Resolution	10fA
		Accuracy	± (0.10% + 50pA)
	± 100nA	Programming Resolution	100fA
		Accuracy	± (0.06% + 100pA)
	± 1 μ A	Programming Resolution	1pA
		Accuracy	± (0.025% + 500pA)
	± 10 μ A	Programming Resolution	10pA
		Accuracy	± (0.025% + 1.5nA)
	± 100 μ A	Programming Resolution	100pA
		Accuracy	± (0.02% + 25nA)
	± 1mA	Programming Resolution	1nA
		Accuracy	± (0.02% + 200nA)
	± 10mA	Programming Resolution	10nA
		Accuracy	± (0.02% + 2.5 μ A)
	± 100mA	Programming Resolution	100nA
		Accuracy	± (0.02% + 20 μ A)
	± 1A	Programming Resolution	1 μ A
		Accuracy	± (0.03% + 1.5mA)
	± 1.5A	Programming Resolution	1 μ A
		Accuracy	± (0.05% + 3.5mA)
	± 3A	Programming Resolution	10 μ A
		Accuracy	± (0.4% + 7mA)
	± 10A (Pulse)	Programming Resolution	10 μ A
		Accuracy	± (0.4% + 25mA)
Current Measurement			
Range	± 10 nA	Measurement Resolution	10fA
		Accuracy	± (0.10 % + 50 pA)
	± 100nA	Measurement Resolution	100fA
		Accuracy	± (0.06% + 100pA)
	± 1 μ A	Measurement Resolution	1pA
		Accuracy	± (0.025% + 500pA)
	± 10 μ A	Measurement Resolution	10pA
		Accuracy	± (0.025% + 1.5nA)
	± 100 μ A	Measurement Resolution	100pA
		Accuracy	± (0.02% + 25nA)
	± 1mA	Measurement Resolution	1nA
		Accuracy	± (0.02% + 200nA)
	± 10mA	Measurement Resolution	10nA
		Accuracy	± (0.02% + 2.5 μ A)
	± 100mA	Measurement Resolution	100nA
		Accuracy	± (0.02% + 20 μ A)
	± 1A	Measurement Resolution	1 μ A
		Accuracy	± (0.03% + 1.5mA)
	± 1.5A	Measurement Resolution	1 μ A
		Accuracy	± (0.05% + 3.5mA)
	± 3A	Measurement Resolution	10 μ A
		Accuracy	± (0.4% + 7mA)
	± 10A	Measurement Resolution	10 μ A
		Accuracy	± (0.4% + 25mA)

Pulse source (pulse width refers to the time from 10% rising edge to 90% falling edge, base level: pulse low level, peak level: pulse high level)			
Minimum programmable pulse width			50 μ s
Pulse width programming resolution			1 μ s
Max Voltage of DC or Pulse	210V	Max Peak Current	0.105A
		Max Base Current	0.105A
		Pulse Width	50 μ s - 99999.9s
		Max Duty Cycle	99.9999%
	21V	Max Peak Current	1.515A
		Max Base Current	1.515A
		Pulse Width	50 μ s - 99999.9s
		Max Duty Cycle	99.9999%
	6V	Max Peak Current	3.03A
		Max Base Current	3.03A
		Pulse Width	50 μ s - 99999.9s
		Max Duty Cycle	99.9999%
Pulse Only	200V	Max Peak Current	1.515A
		Max Base Current	50mA
		Pulse Width	50 μ s - 2.5ms
		Max Duty Cycle	2.5%
	180V	Max Peak Current	1.05A
		Max Base Current	50mA
		Pulse Width	50 μ s - 10ms
		Max Duty Cycle	2.5%
	6V	Max Peak Current	10.5A
		Max Base Current	0.5A
		Pulse Width	50 μ s - 1ms
		Max Duty Cycle	2.5%
Resistance Measurement (Auto resistance measurement mode, 4-wire, 2V range)			
Range	2 Ω	Resolution	1 μ Ω
		Test Current	1 A
		Current Range	1 A
		Total Tolerance	0.2% + 0.00035 Ω
	20 Ω	Resolution	10 μ Ω
		Test Current	100mA
		Current Range	100mA
		Total Tolerance	0.06% + 0.0035 Ω
	200 Ω	Resolution	100 μ Ω
		Test Current	10mA
		Current Range	10mA
		Total Tolerance	0.065% + 0.035 Ω
	2k Ω	Resolution	1m Ω
		Test Current	1mA
		Current Range	1mA
		Total Tolerance	0.06% + 0.35 Ω
	20k Ω	Resolution	10m Ω
		Test Current	100 μ A
		Current Range	100 μ A
		Total Tolerance	0.065% + 3.5 Ω
	200k Ω	Resolution	100m Ω
		Test Current	10 μ A
		Current Range	10 μ A
		Total Tolerance	0.06% + 35 Ω
	2M Ω	Resolution	1 Ω
		Test Current	1 μ A
		Current Range	1 μ A
		Total Tolerance	0.095% + 350 Ω
	20M Ω	Resolution	10 Ω
		Test Current	100nA
		Current Range	100nA
		Total Tolerance	0.18% + 3.5k Ω
	200M Ω	Resolution	10 Ω
		Test Current	10nA
		Current Range	10nA
		Total Tolerance	1.08% + 35k Ω

Interface	RS232C、USB HOST、USB DEVICE、LAN、HANDLER
Environment and Temperature	
Operation temperature and humidity range	23° C±5° C
Storage temperature and humidity range	23° C±5° C
Accuracy guarantees temperature and humidity	23° C±5° C
Preheat time	60 Minutes
Ambient temperature change	30% to 80%RH
Calibration cycle	One year
General Parameter	
Power Supply	90 V to 264 V, 47 Hz to 63 Hz, 250 VA maximum
Power	31.8W
Shelf Size	125mmx132mmx480mm
Dimensions	236mmx154mmx526mm
Weight	About 6kg (Single Channel) / 7.5kg (Dual Channel)