

# Micro Signal Type Tester

## II. TH193X Series Low Noise Precision Power Supply



### Features

- 7-inch capacitive touch screen with 800 x 480 resolution
- Linux operating system, Chinese and English interface
- Four-quadrant precision power output
- Single/dual channel output and measurement
- Up to  $\pm 210\text{V}$  DC voltage,  $\pm 3\text{A}$  DC current/ $\pm 10.5\text{A}$  pulse
- $10\text{fA}/0.1\mu\text{V}$  minimum output resolution (6 1/2 bits)
- $1\text{pA}/10\mu\text{V}$  minimum measurement resolution (4 1/2 bits)
- Supports voltage, current, resistance, and power measurements
- Four basic modes of voltage source, current source, voltmeter, and ammeter
- Minimum sampling interval  $1\mu\text{s}$
- Supports DC, pulse, scanning and list outputs
- Pulse output with a minimum pulse width of  $50\mu\text{s}$
- $1\text{Hz}$ - $10\text{kHz}$  arbitrary waveform generation and list scan function (minimum  $1\mu\text{s}$  interval)
- Flexible programmable output resistance function
- Math operation function, sliding average filter function, deviation deduction function
- 14-speed sorting function with Grading and Sorting modes



RS232	LAN	HANDER	USB HOST	USB DEVICE
standard	standard	standard	standard	standard

### TH193X Series

Shelf volume (mm): 235x132x490

Outline volume (mm): 250x154x530

Net weight: about 8.5kg (single channel) / 10kg (dual channel)

### Applications

- Analog-to-digital converters and digital-to-analog converters
- High-precision analog ICs and circuits
- RF integrated circuits and circuits
- Medical Applications
- Cable/Harness Evaluation
- Voltage Controlled Oscillator (VCO)
- Sensor devices and transducers
- Solar cells and interface circuits
- Electrochemical applications
- Research & Education
- Crystal Oscillators
- Current source for small voltage measurements
- Battery Management Simulator
- Advanced Materials Evaluation

### Specifications

Product Model		TH1931		TH1932		
Display						
Monitor						
7-inch capacitive touch color LCD monitor with 800 x 480 resolution						
Key Indicator						
Channels		1		2		
Max Output	Voltage		$\pm 210\text{V}$			
	Current	DC	$\pm 3.03\text{A}$			
		Pulse	$\pm 10.5\text{A}$			
Power Supply	Max Bits	Bits	6 1/2			
	Min. Resolution	Voltage	0.1 $\mu\text{V}$			
		Current	0.01pA			
	Measurement	Max Bits	Bits	4 1/2		
Min. Resolution		Voltage	10 $\mu\text{V}$			
		Current	1pA			
Voltage Range		0.2V-200V				
Min. Interval Time		1 $\mu\text{s}$				
Voltage Output						
Range	Programming Resolution	Accuracy $\pm$ (% of reading + bias)	DC output voltage or pulse peak/base voltage	Max. Current <sup>1</sup>		Pulse Width <sup>2</sup>
				DC Output	Pulse Output	

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0.2V	100nV	$\pm(0.015\%+225\mu\text{V})$	$0\leq V \leq0.21\text{V}$	$\pm 3.03\text{A}$	$\pm 3.03\text{A}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$
					$\pm 10.5\text{A}$	$50\mu\text{s}\leq t\leq 1\text{ms}$
2V	$1\mu\text{V}$	$\pm(0.015\%+225\mu\text{V})$	$0\leq V \leq 2.1\text{V}$		$\pm 3.03\text{A}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$
				$\pm 10.5\text{A}$	$50\mu\text{s}\leq t\leq 1\text{ms}$	
20V	$10\mu\text{V}$	$\pm(0.015\%+5\text{mV})$	$0\leq V \leq 6\text{V}$	$\pm 3.03\text{A}$	$\pm 3.03\text{A}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$
			$0\leq V \leq 21\text{V}$	$\pm 1.515\text{A}$	$\pm 1.515\text{A}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$
200V	$100\mu\text{V}$	$\pm(0.015\%+50\text{mV})$	$0\leq V \leq 6\text{V}$	$\pm 3.03\text{A}$	$\pm 3.03\text{A}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$
			$0\leq V \leq 21\text{V}$	$\pm 1.515\text{A}$	$\pm 1.515\text{A}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$
			$0\leq V \leq 180\text{V}$	—	$\pm 1.05\text{A}$	$50\mu\text{s}\leq t\leq 10\text{ms}$
			$0\leq V \leq 200\text{V}$	—	$\pm 1.515\text{A}$	$50\mu\text{s}\leq t\leq 2.5\text{ms}$
			$0\leq V \leq 210\text{V}$	$\pm 105\text{mA}$	$\pm 105\text{mA}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$

**Note:**

superscript<sup>1</sup>: Refer to the Limits table section when using channels 1 and 2 for DC outputs or pulsed outputs ( $50\mu\text{s}\leq t\leq t_{\text{max}}$  (= 99.9999ks)).

superscript<sup>2</sup>: For pulses with  $50\mu\text{s}\leq t\leq t_{\text{max}}$ , the maximum duty cycle is 99.9999%.

For pulses with  $50\mu\text{s}\leq t\leq 1\text{ms}$ ,  $50\mu\text{s}\leq t\leq 2.5\text{ms}$  or  $50\mu\text{s}\leq t\leq 10\text{ms}$ , the maximum duty cycle is 2.5%.

**Current Output**

Range	Setting Resolution	Accuracy $\pm$ (% of reading + bias)	DC output current or pulse peak/base current <sup>1,2</sup>	Max. Voltage		Pulse Width <sup>3</sup>	
				DC Output	Pulse Output		
10nA	10fA	$\pm(0.10\%+50\text{pA})$	$0\leq I \leq 10.5\text{nA}$	$\pm 210\text{V}$	$\pm 210\text{V}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$	
100nA	100fA	$\pm(0.06\%+100\text{pA})$	$0\leq I \leq 105\text{nA}$				
$1\mu\text{A}$	1pA	$\pm(0.025\%+500\text{pA})$	$0\leq I \leq 1.05\mu\text{A}$				
$10\mu\text{A}$	10pA	$\pm(0.025\%+1.5\text{nA})$	$0\leq I \leq 10.5\mu\text{A}$				
$100\mu\text{A}$	100pA	$\pm(0.02\%+25\text{nA})$	$0\leq I \leq 105\mu\text{A}$				
1mA	1nA	$\pm(0.02\%+200\text{nA})$	$0\leq I \leq 1.05\text{mA}$				
10mA	10nA	$\pm(0.02\%+2.5\mu\text{A})$	$0\leq I \leq 10.5\text{mA}$				
100mA	100nA	$\pm(0.02\%+20\mu\text{A})$	$0\leq I \leq 105\text{mA}$				
1A	$1\mu\text{A}$	$\pm(0.03\%+1.5\text{mA})$	$0\leq I \leq 105\text{mA}$	$\pm 21\text{V}$	$\pm 21\text{V}$	$50\mu\text{s}\leq t\leq 2.5\text{ms}$	
			$105\text{mA}\leq I \leq 1.05\text{A}$	—	$\pm 200\text{V}$		$50\mu\text{s}\leq t\leq 10\text{ms}$
			$0\leq I \leq 1.05\text{A}$	—	$\pm 180\text{V}$		$50\mu\text{s}\leq t\leq 10\text{ms}$
1.5A	$1\mu\text{A}$	$\pm(0.05\%+3.5\text{mA})$	$0\leq I \leq 105\text{mA}$	$\pm 210\text{V}$	$\pm 210\text{V}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$	
			$105\text{mA}\leq I \leq 1.515\text{A}$	$\pm 21\text{V}$	$\pm 21\text{V}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$	
			$0\leq I \leq 1.515\text{A}$	—	$\pm 200\text{V}$	$50\mu\text{s}\leq t\leq 2.5\text{ms}$	
			$0\leq I \leq 1.05\text{A}$	—	$\pm 180\text{V}$	$50\mu\text{s}\leq t\leq 10\text{ms}$	
3A	$10\mu\text{A}$	$\pm(0.4\%+7\text{mA})$	$0\leq I \leq 105\text{mA}$	$\pm 210\text{V}$	$\pm 210\text{V}$	$50\mu\text{s}\leq t\leq t_{\text{max}}$	
			$105\text{mA}\leq I \leq 1.515\text{A}$	$\pm 21\text{V}$	$\pm 21\text{V}$		
			$1.515\text{A}\leq I \leq 3.03\text{A}$	$\pm 6\text{V}$	$\pm 6\text{V}$		
10A <sup>4</sup>	$10\mu\text{A}$	$\pm(0.4\%+25\text{mA})$ <sup>5</sup>	$0\leq I \leq 10.5\text{A}$	—	$\pm 6\text{V}$	$50\mu\text{s}\leq t\leq 1\text{ms}$	
			$0\leq I \leq 1.515\text{A}$	—	$\pm 200\text{V}$	$50\mu\text{s}\leq t\leq 2.5\text{ms}$	
			$0\leq I \leq 1.05\text{A}$	—	$\pm 180\text{V}$	$50\mu\text{s}\leq t\leq 10\text{ms}$	

**\*Note:**

superscript<sup>1</sup>: Refer to the Limits table section when using channels 1 and 2 for DC outputs or pulsed outputs ( $50\mu\text{s}\leq t\leq t_{\text{max}}$  (= 99.9999ks)).

superscript<sup>2</sup>: The maximum base current is 500mA for pulses with  $50\mu\text{s}\leq t\leq 1\text{ms}$ , and the maximum base current is 50mA for pulses with  $50\mu\text{s}\leq t\leq 2.5\text{ms}$  or  $50\mu\text{s}\leq t\leq 10\text{ms}$ .

superscript<sup>3</sup>: The maximum duty cycle is 99.9999% for pulses with  $50\mu\text{s}\leq t\leq t_{\text{max}}$  and the maximum duty cycle is 2.5% for pulses with  $50\mu\text{s}\leq t\leq 1\text{ms}$ ,  $50\mu\text{s}\leq t\leq 2.5\text{ms}$  or  $50\mu\text{s}\leq t\leq 10\text{ms}$ .

superscript<sup>4</sup>: 10A range for pulse mode only, not for DC mode.

superscript<sup>5</sup>: Measurement speed is 0.01 PLC.

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Voltage Measurement			
Range	Voltage Measurement	Resolution	Accuracy
0.2V	$0 \leq  V  \leq 0.212V$	10 $\mu$ V	$\pm(0.015\% + 225\mu V)$
2V	$0 \leq  V  \leq 2.12V$	100 $\mu$ V	$\pm(0.02\% + 350\mu V)$
20V	$0 \leq  V  \leq 21.2V$	1mV	$\pm(0.015\% + 5mV)$
200V	$0 \leq  V  \leq 212V$	10mV	$\pm(0.015\% + 50mV)$
Current Measurement			
Range	Current Measurement	Resolution	Accuracy
10nA	$0 \leq  I  \leq 10.6nA$	1pA	$\pm(0.10\% + 50pA)$
100nA	$0 \leq  I  \leq 106nA$	10pA	$\pm(0.06\% + 100pA)$
1 $\mu$ A	$0 \leq  I  \leq 1.06\mu A$	100pA	$\pm(0.025\% + 500pA)$
10 $\mu$ A	$0 \leq  I  \leq 10.6\mu A$	1nA	$\pm(0.025\% + 1.5nA)$
100 $\mu$ A	$0 \leq  I  \leq 106\mu A$	10nA	$\pm(0.02\% + 25nA)$
1mA	$0 \leq  I  \leq 1.06mA$	100nA	$\pm(0.02\% + 200nA)$
10mA	$0 \leq  I  \leq 10.6mA$	1 $\mu$ A	$\pm(0.02\% + 2.5\mu A)$
100mA	$0 \leq  I  \leq 106mA$	10 $\mu$ A	$\pm(0.02\% + 20\mu A)$
1A	$0 \leq  I  \leq 1.06A$	100 $\mu$ A	$\pm(0.03\% + 1.5mA)$
1.5A	$0 \leq  I  \leq 1.53A$		$\pm(0.05\% + 3.5mA)$
3A	$0 \leq  I  \leq 3.06A$	1mA	$\pm(0.4\% + 7mA)$
10A <sup>1</sup>	$0 \leq  I  \leq 10.6A$		$\pm(0.4\% + 25mA)$
<b>*Note:</b> <sup>superscript1</sup> For pulse mode, not for DC mode.			
Pulse source (pulse width is 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 $\mu$ s	
Pulse width programming resolution		1 $\mu$ s	
Interface		RS232C,USB HOST,USB DEVICE,LAN,HANDLER	
Environment & Temperature			
Environment		Suitable for indoor equipment	
Temperature of operating condition		0°C - 55°C	
Humidity of operating condition		30% - 80% RH (non-condensing)	
Elevation of operating condition		0 - 2000M (6561ft)	
Temperature of storage condition		30°C - +70°C	
Humidity of storage condition		10% - 90% RH (non-condensing)	
Elevation of storage condition		0 - 4600M (15092ft)	
Warm-up time after power on		$\geq 60$ minutes	
General Indicator			
Power supply		90 V to 264V,47 Hz to 63Hz, maximum	
Power consumption		< 250VA	
Rack mount		215mmx132mmx490mm	
Dimension		235mmx154mmx530mm	
Weight		Approx. 8.5kg (single)/10kg (dual)	
Safety		Class I Safety	
EMC standards		IEC61326-1/EN61326-1	
AS/NZS		CISPR 11	
Insulation resistance		Under the reference working conditions, the insulation resistance between the power terminals and the shell is not less than 50M $\Omega$ ; Under humid and hot transportation conditions, the insulation resistance between the power terminals and the shell is not less than 2M $\Omega$ .	
Dielectric strength		Under the reference working conditions, the power terminals and the shell can withstand the rated voltage of 1.5kV, frequency of 50Hz AC voltage for 1 minute, without breakdown and flying arc phenomenon.	
Leakage current		$\leq 3.5mA$	
Safety certification		CE,cCSA $\mu$ s,C-Tick	