



PRODUCT MANUAL

SENSEFUTURE TECHNOLOGIES CO., LTD.

SenseFuture Technologies Co., Ltd.

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Company Culture



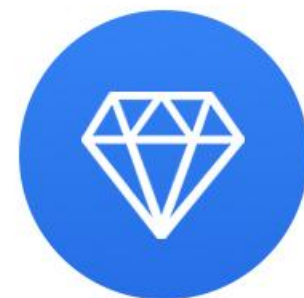
/ Business Mission

Striving for the Bright Future of Precision Optoelectronic Measurement.



/ Corporate Vision

Becoming a Sustainable Business.



/ Core Values

Sincerity, Integrity, Growth



/ Business Philosophy

Original Aspiration Shapes the Future, Innovation Creates Value,
Sharing Enhance Cohesion



/ Development Outlook

An Appropriate Development in the Security.



/ Talent View

For Those With Virtue and Talent, Exceptive Admission by Highly;
For Those With Virtue but Lacking Talent, Cultivating Them to be Talents;
For Those With Talent but Without Virtue, Employment Shall be Limited;
For Those Without Either Virtue or Talent, Never be admitted to us.

Company Profile

SenseFuture Technologies Co., Ltd.

SenseFuture Technologies Co., Ltd. is a high-tech enterprise incubated by the Shenzhen Institute for Technology Innovation,NIM,committed to Striving for the Bright Future of Precision Optoelectronic Measurement.We boasts core team members with PhD and Master's degrees from prestigious institutions such as Tsinghua University,it has secured millions of yuan in an-gel-round funding.

SenseFuture possesses self-developed, world-leading core technologies in three key areas: High-precision temperature control technology, sub-μA low-noise current driving method, and the proprietary SpectMaster™ laser spectroscopy detection algorithm.Adhering to the dual-drive approach of market demand and technological capability, we provide customers with high-quali-ty and high-efficiency products and solutions.

Research Capability

Shenzhen Institute for Technology Innovation, NIM Incubation Base



SITI, NIM is a pioneering research institution established through strategic collaboration between China's State Administration for Market Regulation and the Shenzhen Municipal Government. Developed with top-tier planning and construction standards, it has been designated as:

- A Key Scientific Innovation Project under Shenzhen's 14th Five-Year Plan
- A Strategic Engine to position Shenzhen as China's high-tech hub

Dr. Yang Lei Founder of the Company

Dr. Yang obtained his Ph.D. in Precision Instrumentation from Tsinghua University in 2019, specializing in gas detection technology research. He served as the second principal investigator for an international cooperation project under China's Ministry of Science and Technology. His scholarly work includes approximately 20 publications in prestigious international journals including Physical Review Letters and Optics Express, along with over 30 patent applications and granted patents. He serves as an external thesis advisor for Tsinghua University's Master of Engineering Management (MEM) program. His distinguished honors include being recognized as a Shenzhen High-Level Reserve Talent.



Prof. Zhang Jintao Senior Consultant

Prof. Zhang, Chief Researcher at the National Institute of Metrology, China (NIM), is a globally renowned temperature metrology expert. His groundbreaking research on acoustic gas thermometry for determining the fundamental temperature standard (Boltzmann constant) has produced results adopted by CODATA for temperature standard redefinition. Notably invited to present plenary reports at both the World Temperature Symposium and the Royal Society's "Implementing the New Kelvin" conference.



Technological Innovation

Three Core Technologies

High-Precision Temperature Control Technology

Sub- μ A Low-noise Current Driving Method

SpectMaster™ Laser Spectroscopy Detection Algorithm

Certificate Overview



Utility Model Patent Certificate



Design Patent Certificate



Computer Software Copyright Registration Certificate



Quality Management System Certification

Business Qualification



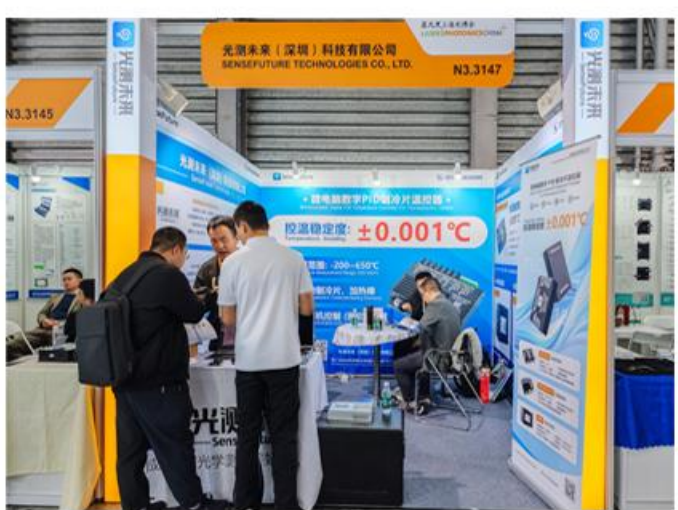
Guangming Intelligent Manufacturing Industry Association



Shenzhen Sensors and Intelligent Instrumentation Industry Association



Shenzhen Optics & Optoelectronics Industry Association



2025.03
Laser World of Photonics China



2025.05
The 8th National Academic Forum on Laser Spectroscopy Technology



2025.06
Laser World of Photonics



2025.09
The 26th China International Optoelectronic Exposition (CIOE 2025)



The 7th Shenzhen International Semiconductor Exhibition (SEMI-e 2025)

Exhibition Overview



2024.04
The 7th National Academic Forum on Laser Spectroscopy Technology



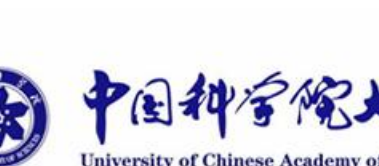
2024.05
The 2nd Shenzhen International Ecological Environment Monitoring Industry Expo



2024.09
The 25th China International Optoelectronic Exposition (CIOE 2024)

2024.11
The 17th International Forum for China On-line Analytical Instrument Application and Development Expo

Business Partners



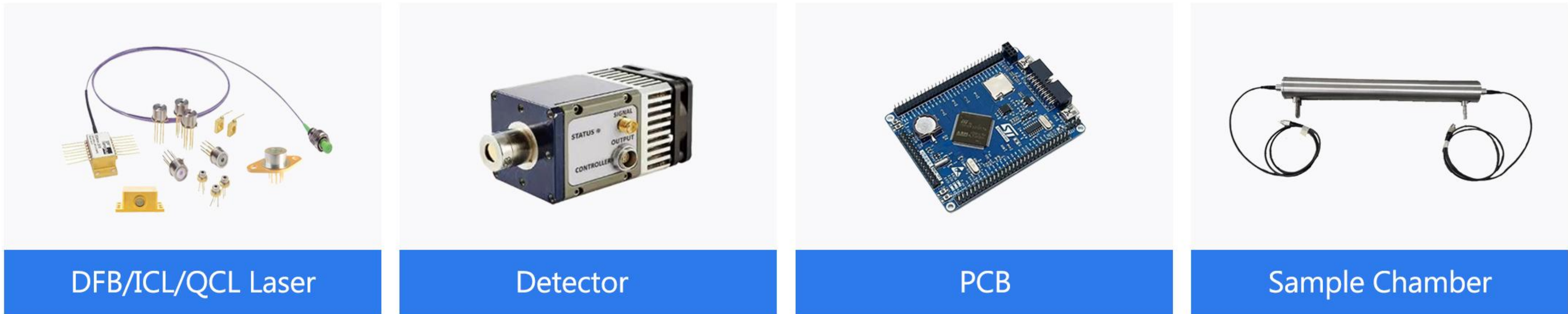
TEC103

- Single-channel
- Stability: ±0.001°C



Applications

The TEC103 series is primarily utilized for temperature measurement and regulation in optical components, such as lasers, detectors, and small sample chambers.



Features

Temperature Measurement:

- Resolution: 0.1 mK
- Long-term Stability: <1 mK over 24h

Temperature Control:

- Stability: ±0.001°C
- Output Modes: Configurable bipolar/unipolar
- Ramp Rate Limit: Adjustable maximum temperature change rate

Control & Connectivity:

- Supports NTC thermistor input
- Full UART Command Set
- Open-Platform Architecture

Design Features:

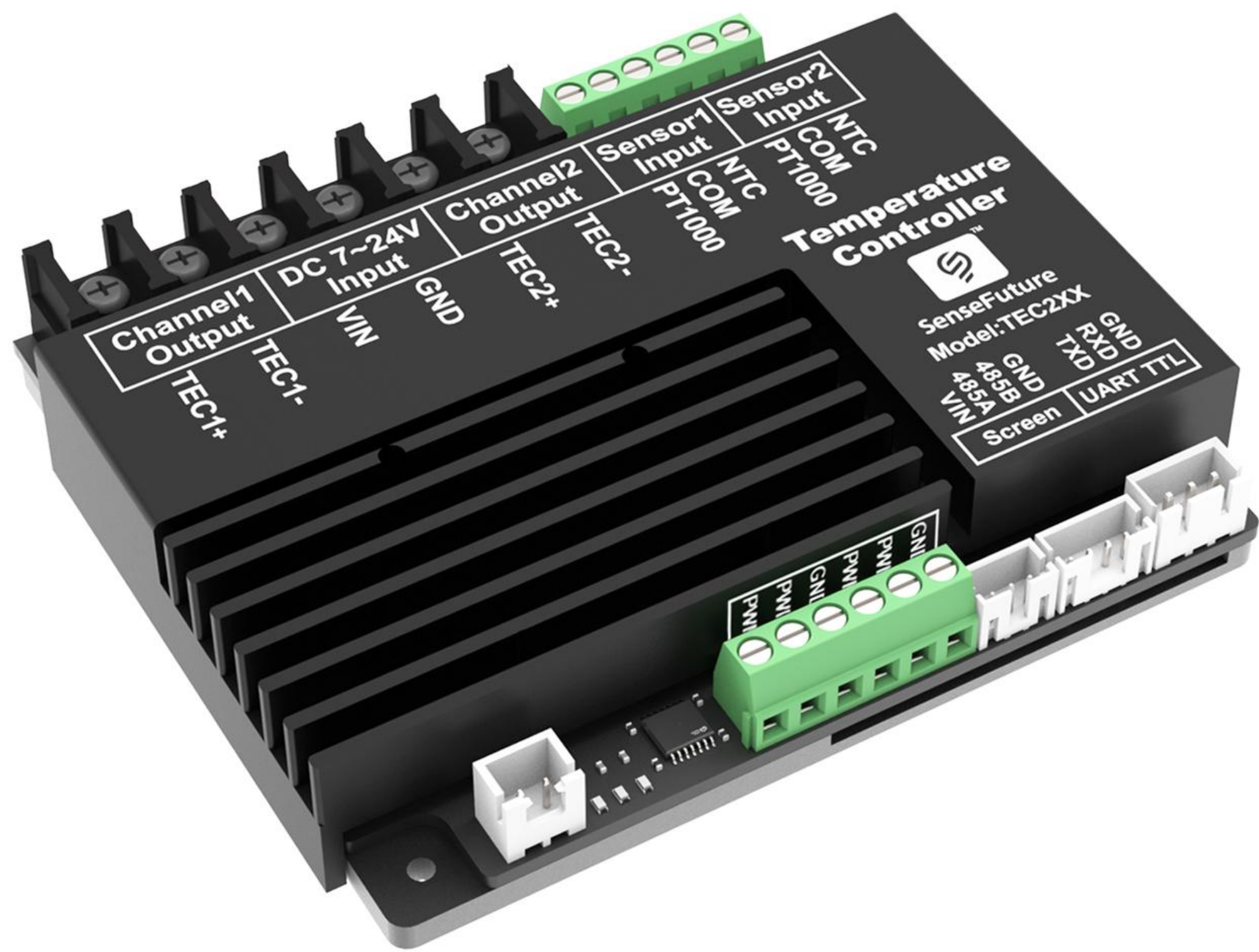
- Chip-scale Integration: Optimized for PCB layout
- Overheat Protection: Reliable board-level safety
- Parameter Configuration: On-screen or PC software control

Product Parameters

Parameters & Models	TEC103L	TEC103
Sensor Support	NTC	
Temperature Measurement Range	-220~1000°C	
Measurement Sensitivity	0.001°C	0.0001°C
Optimal Temperature Control Stability	±0.001°C	±0.001°C
Ambient Temp Drift	0.0001°C/°C	
Communication	TTL UART Interface (supports ASCII communication protocol) RS485 Interface (supports both Modbus and ASCII protocols)	
Power Supply	7~24V	
Output Polarity	Bidirectional, Unidirectional, or Command-Controlled Selectable	
Channels	1	
Max Output Voltage	±90% of Vin (configurable)	
Output Current Range	0~±3A	
Output Current Limits	±4A	
Operating Temp Range	-55~60°C	
Operating Humidity Range	0~98%RH	
Heat Dissipation	No additional cooling required	
PCB Overheat Protection	Yes	
Power-off Memory	Yes	
PID Parameters	User-adjustable	
Dimensions	46.5*39.0*9.6mm	
Weight	≈30g	


TEC207/215

- Dual-Channel
- Stability: ±0.001°C




Applications


The TEC-207/215 series temperature controllers are primarily designed for temperature measurement and control in large sample chambers.




Sensor Module



Optical Path



PCB



Internal Components

Features

Temperature Measurement:

- Resolution: 0.1 mK
- Long-term Drift: <0.001°C over 24h

Temperature Control:

- Stability: ±0.001°C
- Output Modes: Configurable bipolar/unipolar
- Ramp Rate Limit: Adjustable maximum temperature change rate

Sensor & Output:

- Supported Sensor: NTC/PT100/PT1000
- High-power Output:
Single-channel: 24V/15A max
Dual-channel combined: 30A max

Protection & Control:

- Communication Interfaces: TTL UART & RS485
- Protocols: ASCII & Modbus (open-platform)
- Additional Support: Solid-state relay (SSR) compatibility
- Parameter Configuration: On-screen or PC software control

Product Parameters

Parameters & Models	TEC207L	TEC207	TEC215L	TEC215
Sensor Support	NTC/PT100/PT1000			
Temperature Measurement Range	-220~1000°C			
Measurement Sensitivity	0.001°C	0.0001°C	0.001°C	0.0001°C
Optimal Temperature Control Stability	±0.01°C	±0.001°C	±0.01°C	±0.001°C
Ambient Temp Drift	0.0001°C/°C			
Communication	TTL UART Interface (supports ASCII communication protocol) RS485 Interface (supports both Modbus and ASCII protocols)			
Power Supply	7~24V			
Output Polarity	Bidirectional, Unidirectional, or Command-Controlled Selectable			
Channels	2			
Max Output Voltage	±90% of Vin (configurable)			
Output Current Range	0~±7A per Channel		0~±15A per Channel 0~±80A (Solid-State Relay)	
Output Current Limits	±10A		±20A	
Operating Temp Range	-55~60°C			
Operating Humidity Range	0~98%RH			
Heat Dissipation	No additional cooling required			
PCB Overheat Protection	Yes			
Power-off Memory	Yes			
PID Parameters	User-adjustable			
Dimensions	94.3*79.5*20.5mm			
Weight	≈240g			

VCS

• Current Noise: RMS <1μA



Applications

VCS is primarily used for low-noise current driving of lasers, allowing adjustment of laser driving current by varying the input voltage.



Features

- Ultra-Low Noise: <1μA RMS current noise
- High Voltage Output: Up to 23V (supports DFB/VCSEL/ICL/QCL lasers)
- High Current Output: Up to 1A (covers most low-power lasers)
- Adjustable Current Limit: Potentiometer-controlled for laser protection
- Remote Control: Enable/disable output & real-time current monitoring
- Stable Bias Current: Ultra-stable output with modulation capability

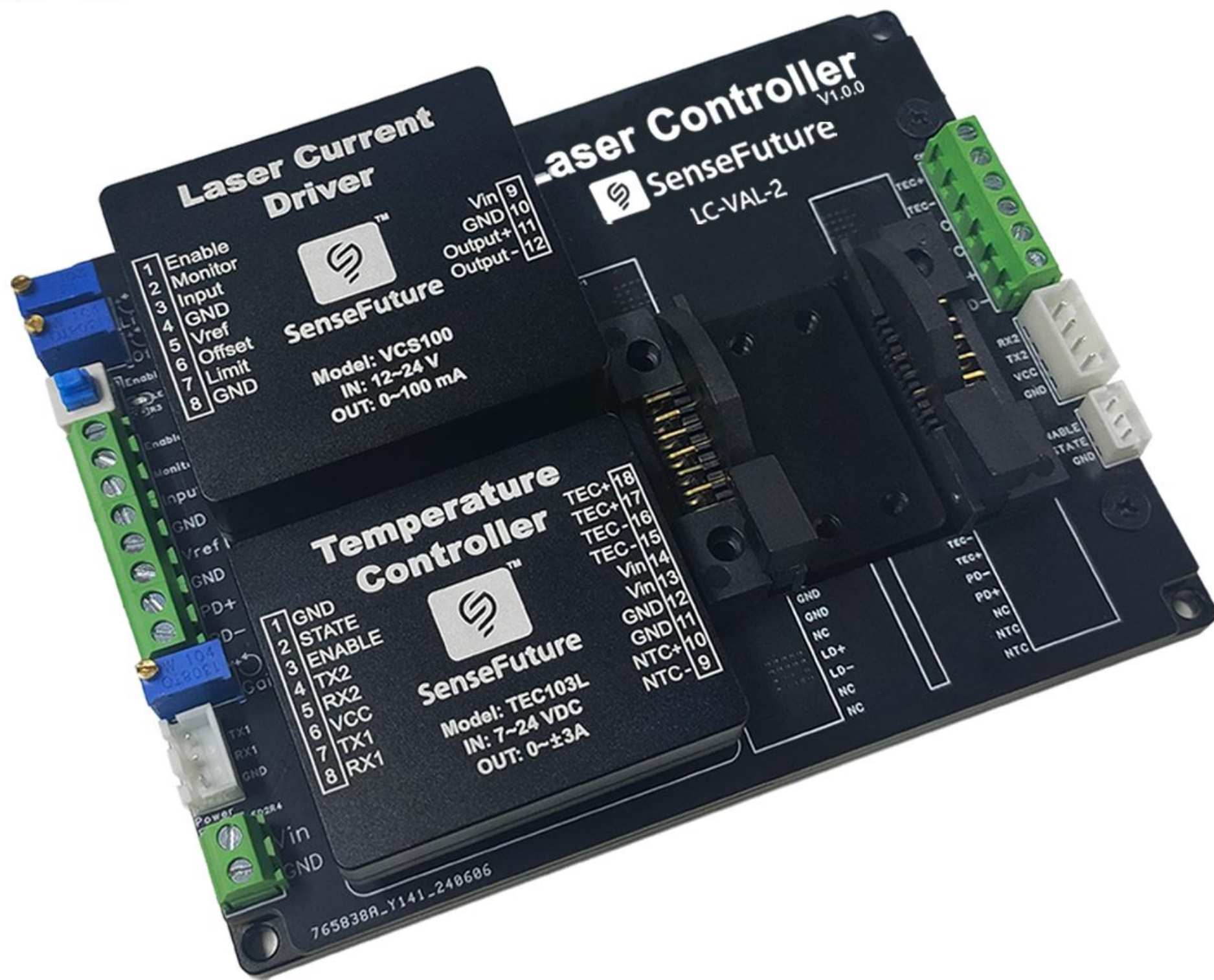
Product Parameters

Parameters & Models	VCS100	VCS250	VCS500	VCS1000
Current-to-Voltage Ratio	20mA/V	50mA/V	100mA/V	200mA/V
Maximum Output Current	100mA	250mA	500mA	1000mA
Supply Voltage	12~24V			
Output Voltage / Compliance Voltage	Supply Voltage-1 V			
Current Noise	<0.9μA			
	<50ppm/°C			
Leakage Current	2mA			
Setting Rise/Fall Time	800/600ns			
Modulation Depth	90%@1MHz			
Bandwidth (3dB)	2MHz			
Modulation Input Voltage Range	0~5V			
Input Pin Impedance	10MΩ			
Remote Enable Voltage Input	Output Enable: High Level (>2V, I>5mA) Output Disable: Low Level (<2V)			
Current Monitor Ratio	50V/A	20V/A	10V/A	2V/A
Operating Temp Range	-20~60°C			-20~35°C
Operating Humidity Range	0~98%RH			
Heat Dissipation	No additional cooling required			
Dimensions	47.5*42.8*19.5mm		47.5*42.8*32.2mm	
Weight	≈50g		≈100g	

Laser Driver Board

LC

- Current Noise: RMS <1μA
- Stability: ±0.001°C



Applications

LC Laser Driver Board is designed for driving all types of lasers (e.g., VCSEL, DBR, DFB, LD, ICL, QCL) up to 1000mA. The laser drive current can be adjusted by varying the input voltage.



DFB Laser



ICL/QCL Laser



LD Laser

Features

Modular Design:

- Block-based architecture allows flexible configuration of temperature control modules and current drivers.
- Compatible with all low-power lasers: VCSEL, DBR, DFB, LD, ICL, QCL, etc.

Ultra-High Temperature Stability:

- ±0.001°C temperature control precision.

Ultra-Low Noise Current Output:

- RMS current noise <1μA.

High Power Output: • Maximum output: 23V/1A.

Comprehensive Protection: • Adjustable current limit for laser safety.

High-Speed Modulation: • Supports current modulation up to 2MHz.

Protection & Control:

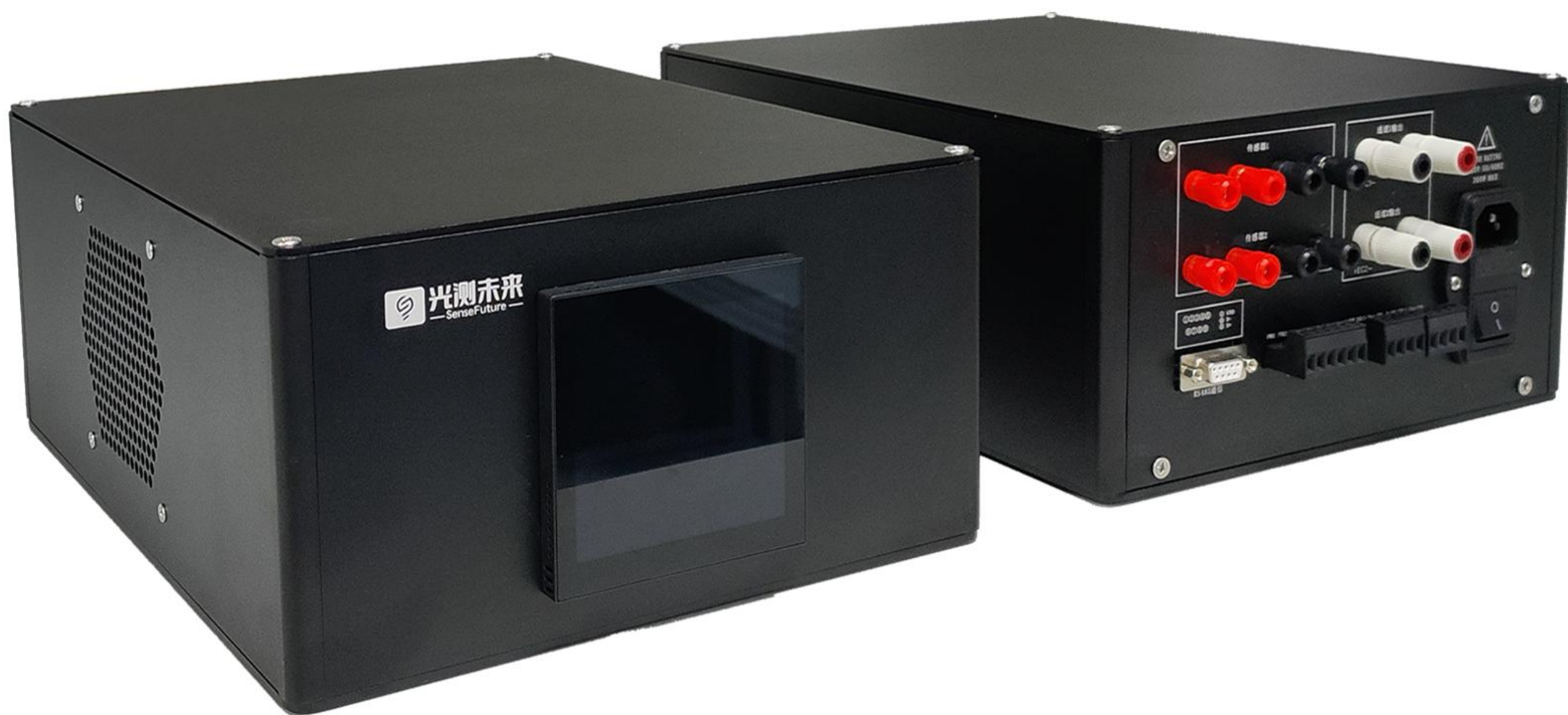
- Remote enable/disable control.
- Real-time output current monitoring.
- Integrated photodiode (PD) monitor.

Product Parameters

Parameters & Models	LC100mA-0.001°C-1
Maximum Output Current	100mA (Matching with VCS100) 250mA (Matching with VCS250) 500mA (Matching with VCS500) 1000mA (Matching with VCS1000)
Supply Voltage	12~24V
Maximum Output Voltage/Compliance Voltage	Vin-1V
Current Noise	<1μA
Adjustment Rise/Fall Time	800/500ns
Modulation Depth	90%@500kHz
Bandwidth	2MHz
Modulation Input Voltage	0~5V
Input Pin Impedance	>1MΩ
Current Temperature Drift	<20ppm/°C
Maximum TEC Output Current	±3A
Maximum TEC Output Voltage	Vin×90% V
Temperature Stability	±0.01°C (Matching with TEC103L) ±0.001°C (Matching with TEC103)
Operating Temp Range	-15~60°C (Matching with VCS100/250/500) -15~35°C (Matching with VCS1000)
Operating Humidity Range	0~98%RH
Heat Dissipation	No additional cooling required
Dimensions	121.0*93.0*28.0mm (Matching with VCS100) 111.2*93.0*30.4mm (Matching with VCS250/500/1000)
Weight	—— (Matching with VCS100) —— (Matching with VCS250/500/1000)


HTC207/215

- Dual-Channel
- Stability: $\pm 0.001^{\circ}\text{C}$




Applications


The HTC Series PID Temperature Controller is specifically designed for high-precision temperature measurement and control applications across various industries.




Sensor Module



Optical Path



PCB



Internal Components

Features

Temperature Measurement:

- Resolution: 0.1 mK
- Long-term Drift: $<0.001^{\circ}\text{C}$ over 24h

Temperature Control:

- Stability: $\pm 0.001^{\circ}\text{C}$
- Output Modes: Configurable bipolar/unipolar
- Ramp Rate Limit: Adjustable maximum temperature change rate

Sensor & Output:

- Supported Sensor: NTC/PT/CCR
- High-power Output:
Onboard Drivers: 24V/15A per channel
Supports external solid-state relay for ultra-high current output

Protection & Control:

- Communication Interfaces: TTL UART & RS485
- Protocols: ASCII & Modbus (open-platform)
- Parameter Configuration: On-screen or PC software control

Product Parameters

Parameters & Models	HTC207L	HTC207	HTC215L	HTC215
Sensor Support	NTC/PT/CCR			
Temperature Measurement Range	-200~850℃			
Measurement Sensitivity	0.001℃	0.0001℃	0.001℃	0.0001℃
Optimal Temperature Control Stability	±0.01℃	±0.001℃	±0.01℃	±0.001℃
Ambient Temp Drift	0.0001℃/℃			
Communication	TTL UART Interface (supports ASCII communication protocol) RS485 Interface (supports both Modbus and ASCII protocols)			
Power Supply	AC180~264V, 47~63Hz			
Output Polarity	Bidirectional, Unidirectional, or Command-Controlled Selectable			
Channels	2			
Max Output Voltage	±90% of Vin (configurable)			
Output Current Range	0~±7A per Channel		0~±15A per Channel 0~±80A (Solid-State Relay)	
Output Current Limits	±10A		±20A	
Operating Temp Range	-55~60℃			
Operating Humidity Range	0~98%RH			
Heat Dissipation	No additional cooling required			
PCB Overheat Protection	Yes			
Power-off Memory	Yes			
PID Parameters	User-adjustable			
Dimensions	340*240*128mm			
Weight	≈4000g			

TEB

- Temperature Range: 13°C ~ 60°C
- Stability: ±0.005°C



Applications

TEB Constant Temperature Chamber provides customers with a high-precision thermal environment (±0.005°C) during product R&D phases. This system enables placement of temperature-sensitive components including optical elements, PCBs, sample chambers, sensors, or entire instruments within the controlled space, thereby enhancing research accuracy and facilitating thermal impact analysis on critical components.

Standard Resistor

Optical Path

Sample Chamber

Internal Components

Features

- Easy to Use: Plug-and-play operation with PC software connectivity for real-time monitoring.
- Customizable Foam Chamber: Users can modify openings (includes a hole-cutting tool).
- High Precision Control: Typical temperature stability of ±0.005°C.
- Wide Temperature Range: Broadly adjustable setpoint range.

Product Parameters

Parameters	Min	Typ	Max
24h Temperature Stability	/	±0.005@30°C	±0.01°C
Temperature Setting Range	13~60°C@25°C		
Internal Temperature Gradient	0.15°C		
Internal Air Temperature Stability (Ambient temperature 25±2°C)	±0.02@30°C		
Power Requirements	AC 220V		
Power Consumption	<102W		
Operating Temp Range	-15°C	Room Temperature	60°C
Operating Humidity Range	0%RH	/	98%RH When cooling in high-humidity environments (>80%RH), the chamber's internal heat sinks are prone to condensation formation.
Over-Temperature Protection	Yes		
Power-off Memory	Yes		
PID Parameters	User-adjustable		
External Dimensions	560*460*390mm		
Internal Dimensions	500*380*340mm A fan protrudes at the exact center of the interior with dimensions of 90*90*53mm		
Construction Material	High-Performance Expanded Polypropylene (EPP) Foam		
Weight	≈7000g		

**Original Aspiration Determines the Future,
Innovation Creates Value,
Sharing Unites Hearts.**

**Looking forward to achieving win-win
cooperation with you!**

