

## Tunable Diode Lasers

CNI offer wavelength tunable laser, the output wavelengths can be changed continuously within a certain range. Tunable diode laser is a high-end custom high stability, low noise, narrow linewidth, wavelength tunable product. Mainly used in scientific research and teaching, such as holographic imaging, Raman, atomic clock, coherent detection and so on. Currently it has a line width of less than 0.1nm and a tuning range of 4nm.



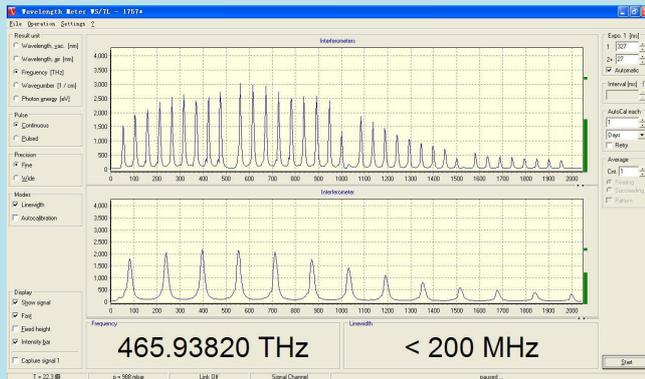
### Optional Models

Model	Tunable Wavelength Band	Output power	Spectral Linewidth
TUN-403~407	403~407 nm	1~30 mW	<0.1 nm
TUN-408~412	408~412 nm	1~30 mW	<0.1 nm
TUN-448~452	448~452 nm	1~10 mW	<0.1 nm
TUN-518~522	518~522 nm	1~10 mW	<0.1 nm
TUN-634~643	634~643 nm	1~10 mW	<0.1 nm
TUN-652~658	652~658 nm	1~10 mW	<0.1 nm

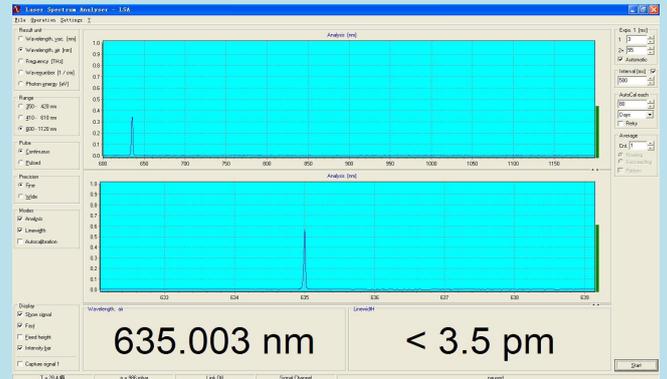
### Specifications

Wavelength range of roughly tuning (nm)	403~407	408~412	448~452	518~522	634~643	652~658
Operating mode	CW					
Output power (mW)	>1, 5, 10, ..., 30		>1, 2, 5, ..., 10			
Power stability (rms, over 4 hours)	<1%, <2%, <3%					
Transverse mode	Near TEM00					
Spectral linewidth (nm)	<0.1					
Beam diameter at the aperture (mm)	~3.0					
Beam divergence, full angle (mrad)	<1.0					
Polarization ratio	>50:1 (>100:1, optional) Horizontal±5 degree					
Warm-up time (minutes)	<5					
Beam height from base plate (mm)	45.5					
Operating temperature (°C)	20~30					
Parameters of customized power supply	Current : 0~150mA					
	TEC: 7~12kΩ					
	PZT voltage: 0~100V					
Expected lifetime (hours)	10000					
Warranty	1 year					

## Measurement Data of TUN-634~643 at 635nm



Measurement results of spectral line width at 635nm

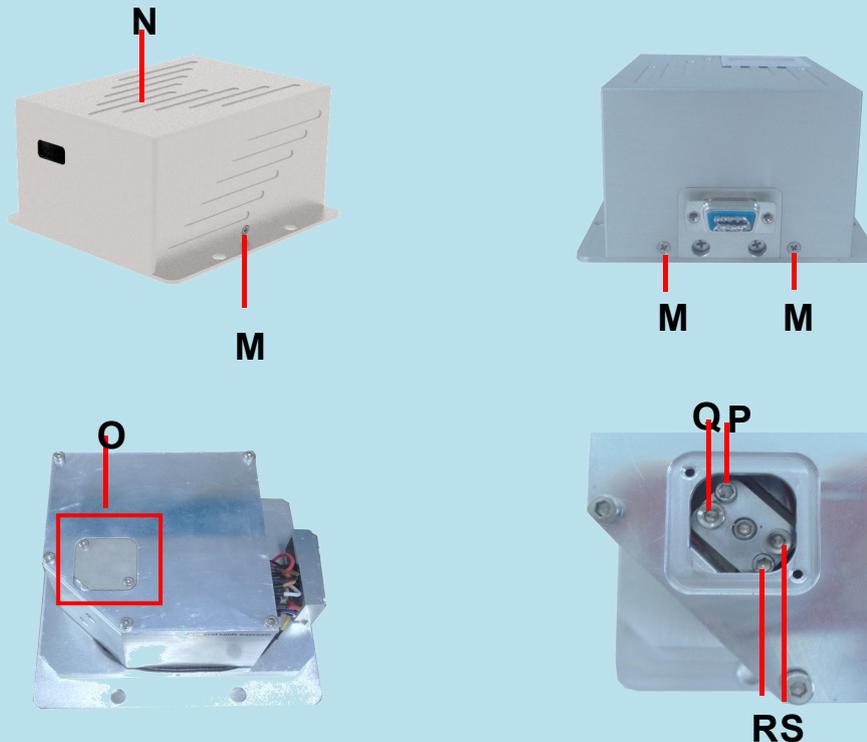


Spectral measurement results of 635nm

## Introduction of laser head

Wavelength tunable refers to as much as possible to keep the working current and temperature constant, adjust the piezoelectric ceramic driving voltage or regulating frame, to achieve wavelength tuning.

- (1) The function of piezoelectric ceramic chip (PZT) is to achieve fine tuning of wavelength, tuning range PM magnitude, different wavelength laser tuning range is different.
- (2) The function of the regulating frame is to realize the wavelength tuning of wide range, the tuning range of nm magnitude, the tuning range of different wavelength lasers is different, and the red wavelength tuning range is slightly larger.

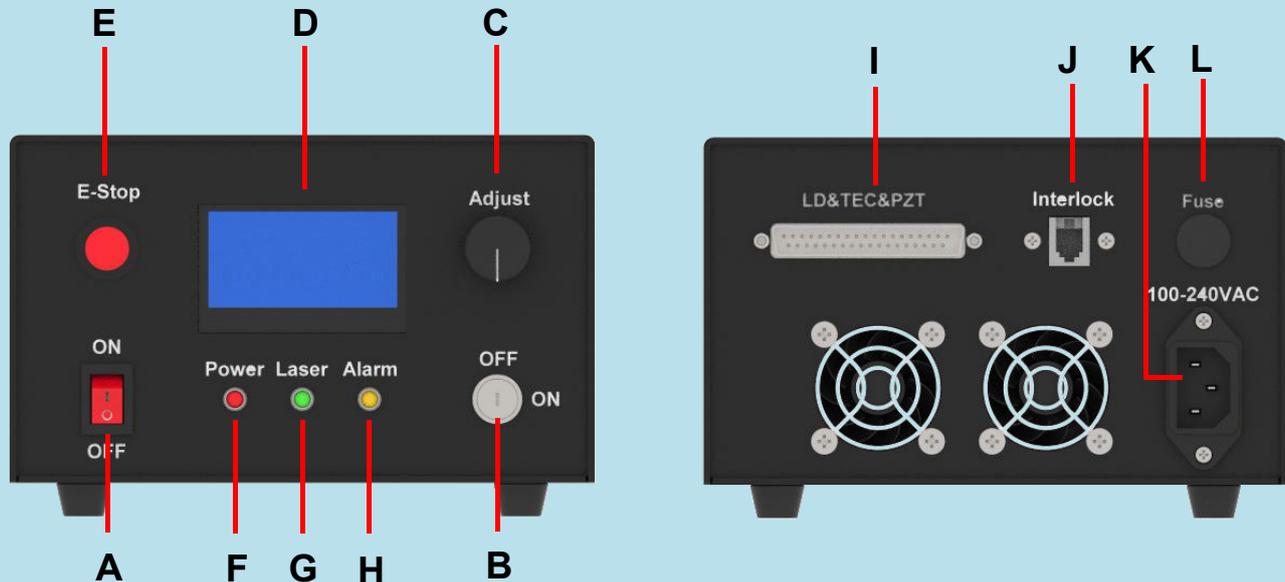


	Name of each part	Function introduction
<b>M</b>	4 screws	<b>Wavelength coarse tuning:</b> First loosen 2 screws on both sides of the case, then loosen 2 screws on back panel. Take off the case of the laser (N).
<b>N</b>	Case of laser	You need to take it off when operating wavelength coarse tuning.
<b>O</b>	Cover	Remove the 2 screws on the cover and open the cover before adjusting bracket.
<b>P</b>	Lock screw 1	Please loosen P before adjusting Q.
<b>Q</b>	Adjustable screw 1	Q and S need to adjust mutually. M2.5 hexagon wrench is needed.
<b>R</b>	Lock screw 2	Please loosen R before adjusting S.
<b>S</b>	Adjustable screw 2	S and Q need to adjust mutually.

Note: Wavelength coarse tuning range is about 9nm.

Except for the screws marked in the instructions, other parts cannot be removed.

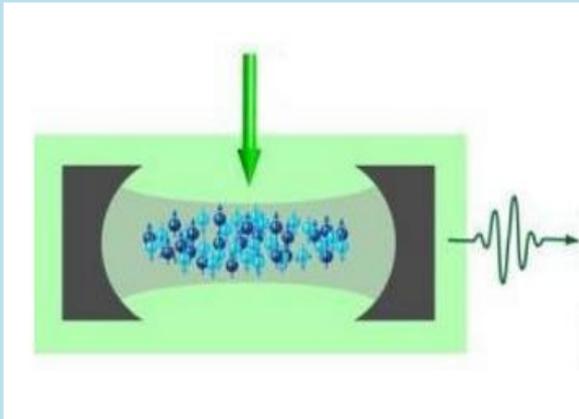
### Introduction of power supply



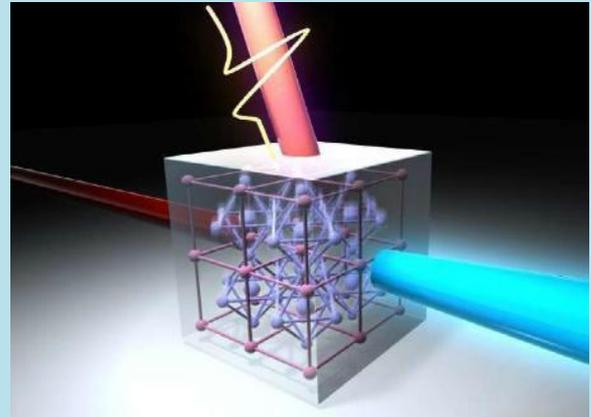
	Name of each part	Function introduction
<b>A</b>	Power switch	Power switch is the main power unit of the power supply, it is switched between “on” and “off”. The power supply will turn off when the power switch is set to "off".
<b>B</b>	Key switch	The laser will turn off when the key switch set to “off”.
<b>C</b>	Knob	Push the knob to switch a parameter. Turn the knob to adjust

		<p>corresponding parameter value.</p> <p><b>1. T-SET menu:</b> Set the internal TEC value. Control the temperature of the laser diode. Turn the knob clockwise to decrease the temperature. The temperature is room temperature when the shipment. It is no need to reset the temperature every time you turn on the laser. Temperature adjustment range: 20~30 °C (please refer to the Temperature and resistance comparison table).</p> <p><b>2. I-SET menu:</b> Set the operating current. Turn the knob clockwise to increase the current. The wavelength gradually gets longer as the current increases during the process of the current increasing. But the wavelength stays locked. Laser rated current is about 67mA, and the regulation precision is 1mA.</p> <p><b>3. V-SET menu:</b> Set the driving voltage of the piezoelectric ceramics (PZT). Piezoelectric ceramics driven DC bias voltage: Turn the knob clockwise to increase the voltage. The voltage adjustment range is 0~100V, and the regulation precision is 1V. This function is to achieve fine wavelength tuning; the continuous scanning range of wavelength is 0.003nm.</p> <p><b>4.</b> The last line of the menu displays the actual value of the menu for the currently selected line. Switched between T-ACT/ I-ACT/ V-ACT. Turn the knob clockwise to increase and turn the knob counter clockwise to decrease.</p>
<b>D</b>	Display	Display set values of temperature, laser current, PZT voltage and the operating value of adjusting parameters.
<b>E</b>	Emergency stop button	If an emergency occurs, press this button to stop the laser. To restart the laser, you need to restart the power switch and key switch to resume work.
<b>F</b>	Power supply indicator	When the power supply is working, the "Power" light up.
<b>G</b>	Laser output indicator	When the laser starts to output, the "Laser" light up.
<b>H</b>	Alarm indicator	If the yellow light "Alarm" is on, please turn off the power switch. After a few minutes, turn on the power switch and key switch again, and the laser will resume to work.
<b>I</b>	Laser head connection and control interface	Connect laser head with power supply by connecting cable. Fix the joint screw after tight fitting.
<b>J</b>	Security lock "interlock"	Unplug the crystal plug, or cut off the shorting stub on the plug. The laser system will stop working. At this time, you need to plug the crystal plug or resuming shorting stub and restart the key switch, then the laser system can be restored to normal working status.
<b>K</b>	Power supply socket	Supply voltage to the power supply. Make sure your local voltage is in the range showed at the back panel (100-240VAC).
<b>L</b>	Fuse	When the power supply does not work (i.e. fan does not turn, "Power" indicator off), it could be a fuse. Need to replace fuse.

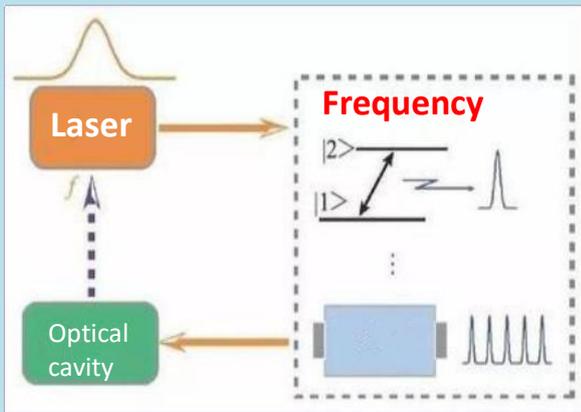
## Applications of tunable diode lasers



Cold atomic physical



Non-linear optics



Study on laser frequency stabilization



Holography

## Optional accessories



Aurora4000 series of high-resolution spectrometers are used for real-time observation of laser wavelength and linewidth



Laser safety is the key important thing during laser operation. CNI offer proper laser goggles that protect from laser damage.

## Tunable Infrared Lasers

CNI offer infrared wavelength tunable laser, the output wavelengths can be changed continuously within a certain range. The series of laser provide a CW output power of about max 2000mW and has a wide tuning range. By controlling the temperature to change the wavelength, the tunable step is 1nm. The customer can order any wavelength range in the list. It is widely used in spectroscopy, remote sensing, medical, etc.



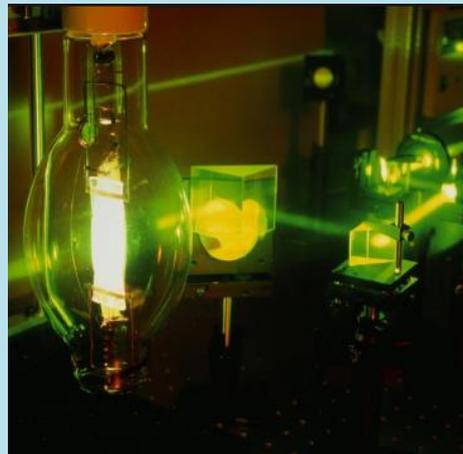
### Optional Models

Model	Tunable Wavelength Band	Output power	Spectral Linewidth
TUN-W-1400~1800	1400~1800 nm	1~2000 mW	<2 nm
TUN-W-2600~4450	2600~4450 nm	1~1000 mW	<2 nm

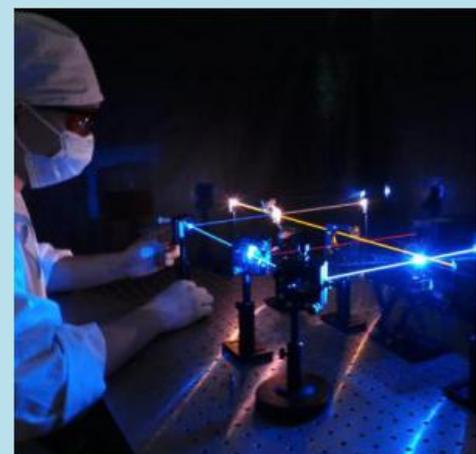
### Applications of tunable infrared laser



Medical



Spectroscopy



Scientific research

## Specifications

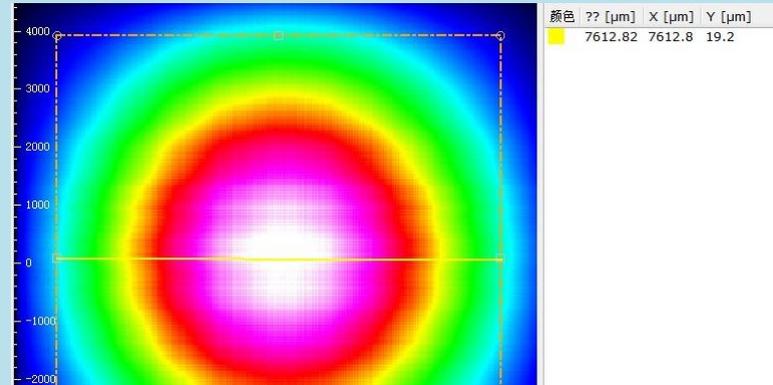
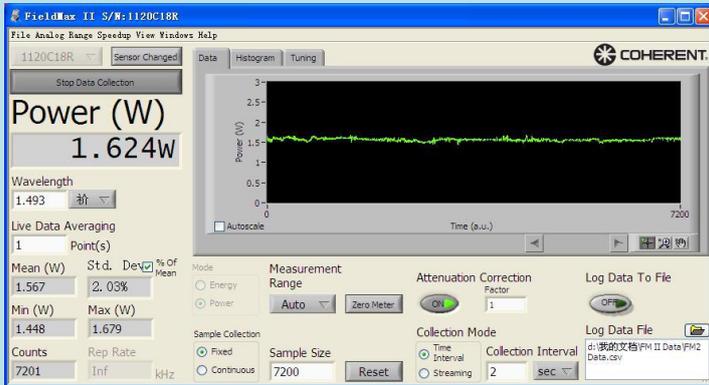
### TUN-W-1400~1800

Wavelength (nm)	1400 ~ 1412	1420 ~ 1430	1435 ~ 1450	1445 ~ 1460	1455 ~ 1475	1495 ~ 1525	1520 ~ 1560	1560 ~ 1615	1623 ~ 1710	1670 ~ 1800
Wavelength deviation(nm)	±10									
Average power (mW)	>1, 100, 200, ..., 1500					>1, 100, 200, ..., 2000				
Operating mode	CW									
Power stability (rms, over 4 hours)	<5%, <10%									
Beam divergence, full angle (mrad)	<8									
Beam diameter at the aperture (1/e2,mm)	<10									
Beam height from base plate (mm)	111.5									
Warm-up time (minutes)	<10									
Operating temperature (°C)	15~30									
Power supply (90-264VAC)	PSU-AOM(3U)									
Expected lifetime (hours)	10000									
Warranty period	1 year									

### TUN-W-2600~4450

Wavelength (nm)	2600 ~ 2950	2820 ~ 3110	3130 ~ 3350	3510 ~ 3690	3600 ~ 3740	3800 ~ 3940	3900 ~ 4060	4050 ~ 4180	4185 ~ 4320	4320 ~ 4450
Wavelength deviation(nm)	± 20									
Average power (mW)	>1, 100, 200, ..., 1000							>1, 100, 200, ..., 800		
Operating mode	CW									
Power stability (rms, over 4 hours)	<5%, <10%									
Beam divergence, full angle (mrad)	<10									
Beam diameter at the aperture (1/e2,mm)	<10									
Beam height from base plate (mm)	111.5									
Warm-up time (minutes)	<10									
Operating temperature (°C)	15~30									
Power supply (90-264VAC)	PSU-AOM(3U)									
Expected lifetime (hours)	10000									
Warranty period	1 year									

### Measurement data

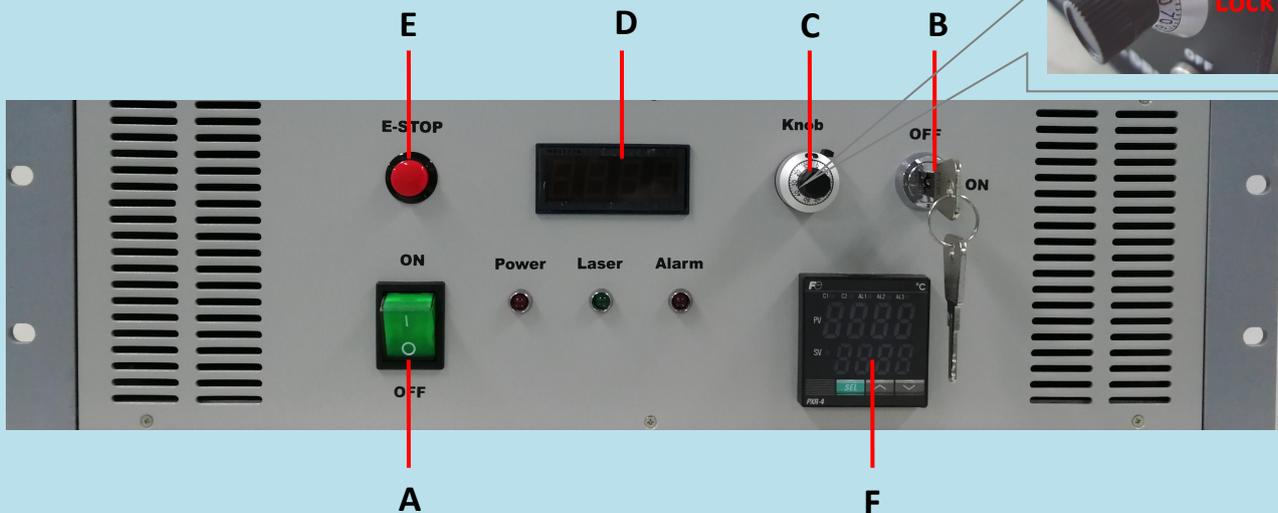


Power stability <3% over 4 hours (By COHERENT Field MaxII)

Beam diameter ~7mm at aperture

### Introduction of power supply

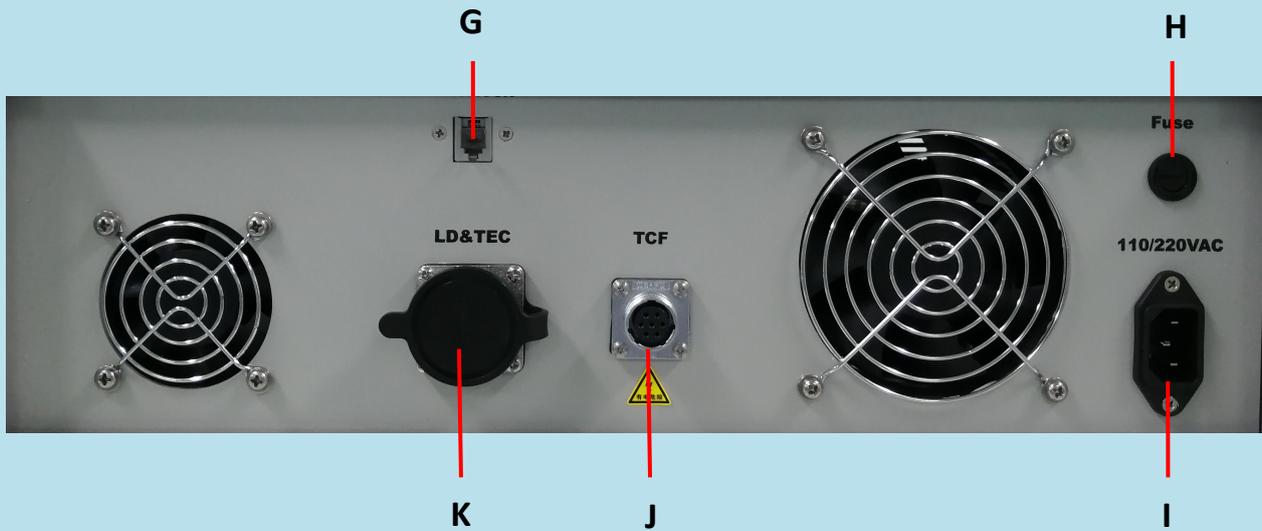
>>Front Panel



	Name of each part	Function introduction
A	Power switch	Power switch is the main power unit of the power supply, it is switched between “on” and “off” . The power supply will turn off when the power switch is set to "off".
B	Key switch	The laser will turn off when the key switch set to “off”.
C	Knob	The knob is fixed on the minimum current position as factory default. Please unlock it before adjusting the knob.Turn the knob clockwise, the output power is increased.

<b>D</b>	Current display	It shows the current as factory default
<b>E</b>	Emergency stop button	If an emergency occurs, press this button to stop the laser. To restart the laser, you need to restart the power switch and key switch to resume work.
<b>F</b>	Temp display	Show Current Settings value SV,and Actual value PV

**>>Front Panel**



	<b>Name of each part</b>	<b>Function introduction</b>
<b>G</b>	Security lock "interlock"	Pull out the crystal plug or disconnect the short wire on the plug(if there are two short wires ,disconnect both of them), laser system will stop working. At this point you must connect the plug or restore short wires, turn off the electronic lock, and then open it, the laser system return to normal working station.
<b>H</b>	Fuse	If the power supply has no function (fan in the driver doesn't work or the red LED-"power" is off), the most possible problem is the fuse broken. Please note to replace the fuse after switching off the key switch and mains power.
<b>I</b>	Power supply socket	Supply voltage to the power supply. Make sure your local voltage is in the range showed at the back panel (100-240VAC).
<b>J</b>	Temperature Input	Control the temperature, change the wavelength.press the "SEL" button, adjust"up or down",change the setting temperature.Every time the temperature changes, you need to turn off the key switch.
<b>K</b>	LD Input	Power for the laser.

## Tunable Ti: Sapphire Laser

CNI offer 770~840nm wavelength tunable laser, the output wavelengths can be changed continuously within a certain range. It has the features of high peak power, high repetition rate, and short pulse duration. The narrowest line width is 40pm by TUN-TiN-770~840. They are widely used in marking, carving, measure, scientific research, and so on.



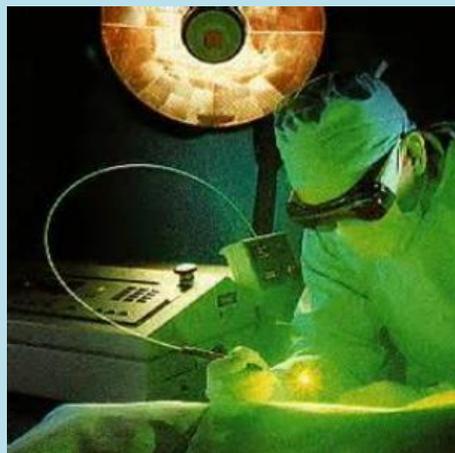
### Optional Models

Model	Tunable Wavelength Band	Output power	Spectral Linewidth	Cooled method
TUN-TiN-770~840	770~840 nm	1~400 mW	<40 pm	Air Cooled
TUN-TiA-770~840	770~840 nm	1~1000 mW	<2 nm	Air Cooled
TUN-Ti-770~840	770~840 nm	1~1300 mW	<2 nm	Water Cooled

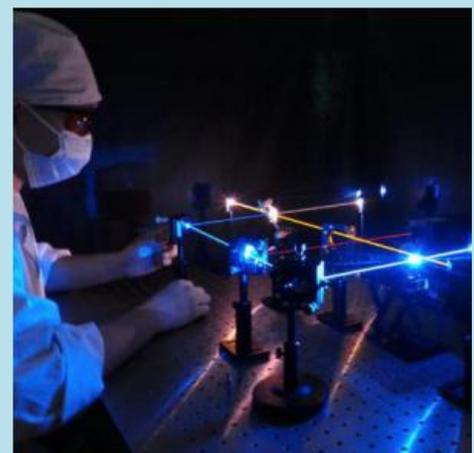
### Applications of Ti: Sapphire laser



Laser marking



Medical treatment



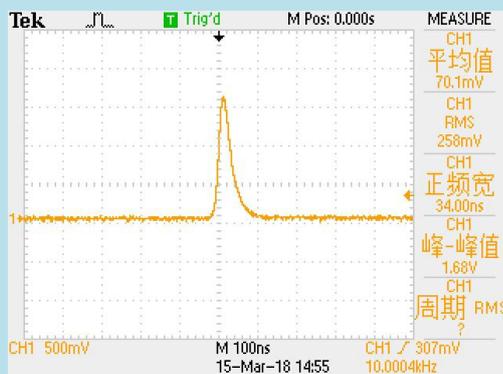
Scientific research

## TUN-TiN-770~840 & TUN-TiA-770~840

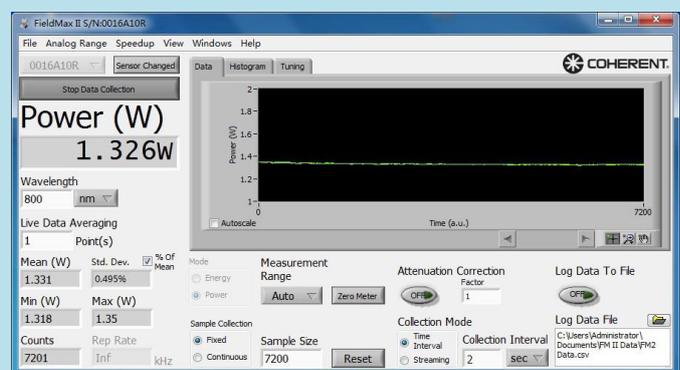


Model	TUN-TiN-770~840	TUN-TiA-770~840
Wavelength (nm)	770-840	
Operating mode	Acousto-Optics Q-switched	
Line width	<40 pm	<2 nm
Average power (mW)	1~400@50KHz	1~1300@50KHz
Pulse duration (ns)	~25 @50KHz&400mW	~25 @50KHz&1300mW
Rep. rate (kHz)	10~50 (customized )	
Single pulse energy (uJ)	8@50kHz	26@50kHz
Peak power (kW)	0.32@ 50kHz	1.1@ 50kHz
Ave power stability (over 4 hours)	<5%, <10%	<5%
Beam divergence, full angle (mrad)	<3.5	
Beam diameter at the aperture (mm)	2	
Beam height from base plate (mm)	119	
Warm-up time (minutes)	<10	
Cooled method	Air Cooled	
Operating temperature (°C)	15~35	
Power supply (220/110VAC)	PSU-AOM(3U)	
Expected lifetime (hours)	10000	
Warranty period	1 year	

### Measurement Data



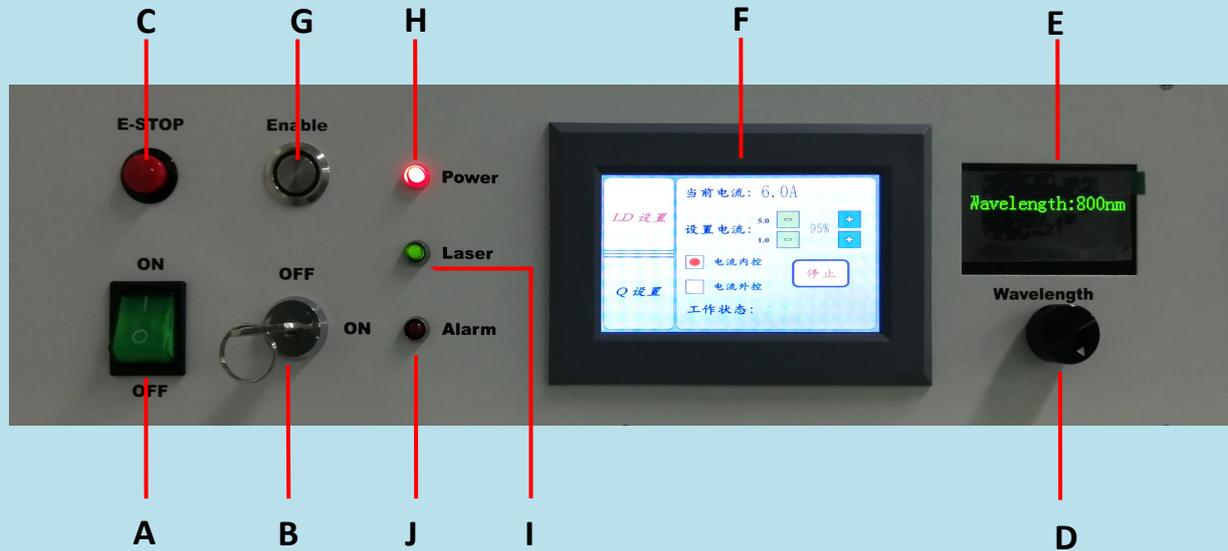
Pulse width 34 ns testing at 10kHz



Power stability < 1% over 4 hours (By COHERENT Field MaxII)

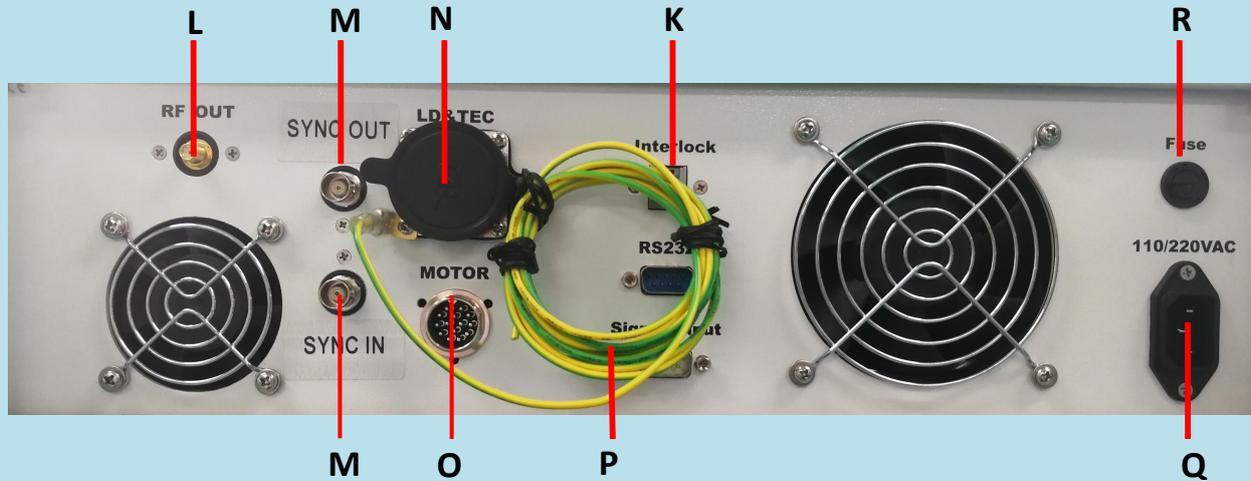
## Introduction of power supply

### >>Front Panel



	Name of each part	Function introduction
<b>A</b>	Power switch	Power switch is the main power unit of the power supply, it is switched between "on" and "off". The power supply will turn off when the power switch is set to "off".
<b>B</b>	Key switch	The laser will turn off when the key switch set to "off".
<b>C</b>	Enable	Enable the switch to be closed at "off"
<b>D</b>	Knob	Adjust wavelength value.
<b>E</b>	Wavelength Display	Displays the current wavelength value
<b>F</b>	Display	LD SETTING shows out the current and working state. You can set the working current, select control mode, Run/Stop mode. Q SETTING shows out the trigger mode, the frequency and duty. You can set the Frequency and Duty, select the Trig mode, Q ON/OFF mode.
<b>G</b>	Emergency stop button	If an emergency occurs, press this button to stop the laser. To restart the laser, you need to restart the power switch and key switch to resume work.
<b>H</b>	Power supply indicator	When the power supply is working, the "Power" light up.
<b>I</b>	Laser output indicator	When the laser starts to output, the "Laser" light up.
<b>J</b>	Alarm indicator	If the yellow light "Alarm" is on, please turn off the power switch. After a few minutes, turn on the power switch and key switch again, and the laser will resume to work.

>>Back Panel



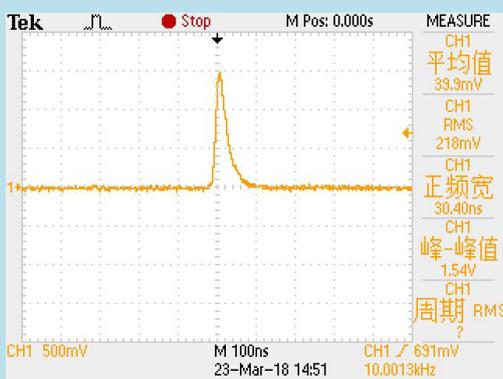
	Name of each part	Function introduction
K	Interlock	Pull out the crystal plug or disconnect the short wire on the plug(if there are two short wires ,disconnect both of them), laser system will stop working. At this point you must connect the plug or restore short wires, turn off the electronic lock, and then open it, the laser system return to normal working station.
L	RF OUT	The laser is connected by RF RF wire
M	SYNC OUT/IN	No need for this laser.
N	LD	Power the laser heads
O	MOTOR	Power supply motor, control motor
P	Ground wire	Connect to the ground for further safety
Q	Power supply socket	Supply voltage to the power supply. Make sure your local voltage is in the range showed at the back panel (100-240VAC).
R	Fuse	if the power supply has no function (fan in the driver doesn't work or the red LED-"power" is off), the most possible problem is the fuse broken. Please note to replace the fuse after switching off the key switch and mains power.

## TUN-Ti-770~840

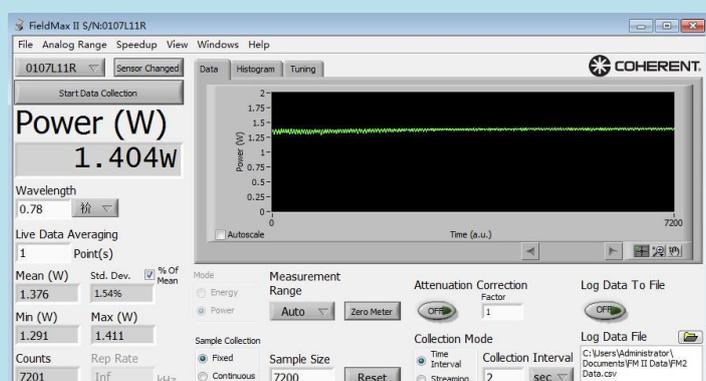


Wavelength (nm)	770-840
Operating mode	Acousto-Optic Q-switched
Average power (mW)	1~1000@10kHz
Pulse duration (ns)	~30 @10kHz&1000mW
Rep. rate (kHz)	10~20 (It is possible to customize other repetition rates)
Single pulse energy ( $\mu$ J)	100
Peak power (kW)	3.3 @10kHz&1000mW
Ave power stability (over 4 hours)	<3%, <5%
Beam divergence, full angle (mrad)	<3.5
Beam diameter at the aperture (1/e <sup>2</sup> , mm)	<9
Beam height from base plate (mm)	61
Warm-up time (minutes)	<10
Cooled method	Water Cooled
Operating temperature (°C)	15~35
Power supply (220/110VAC)	PSU-HPL-Q & PSU-HPL-CW
Expected lifetime (hours)	10000
Warranty period	1 year

### Measurement Data

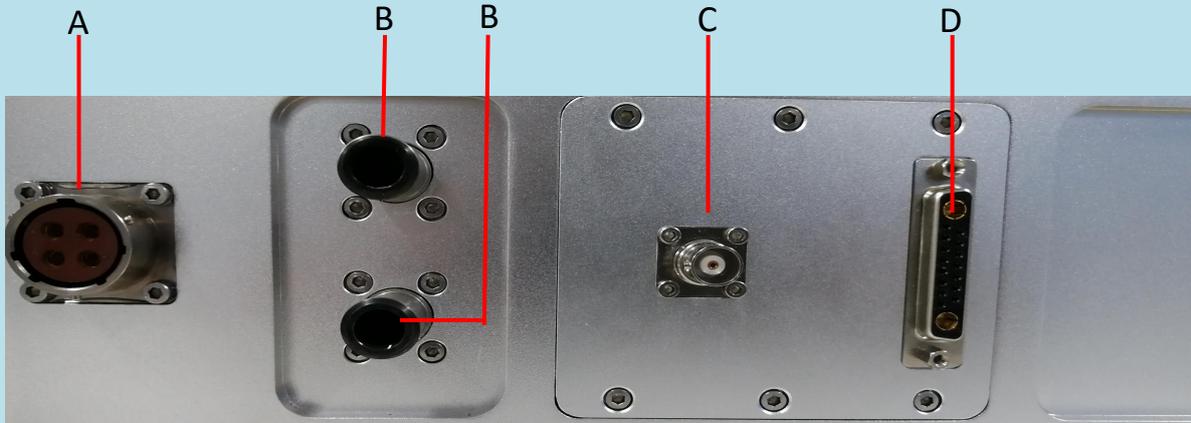


Pulse width 30.4 ns testing at 10kHz



Power stability < 3% over 4 hours (By COHERENT FieldMaxII)

## Introduction of laser head



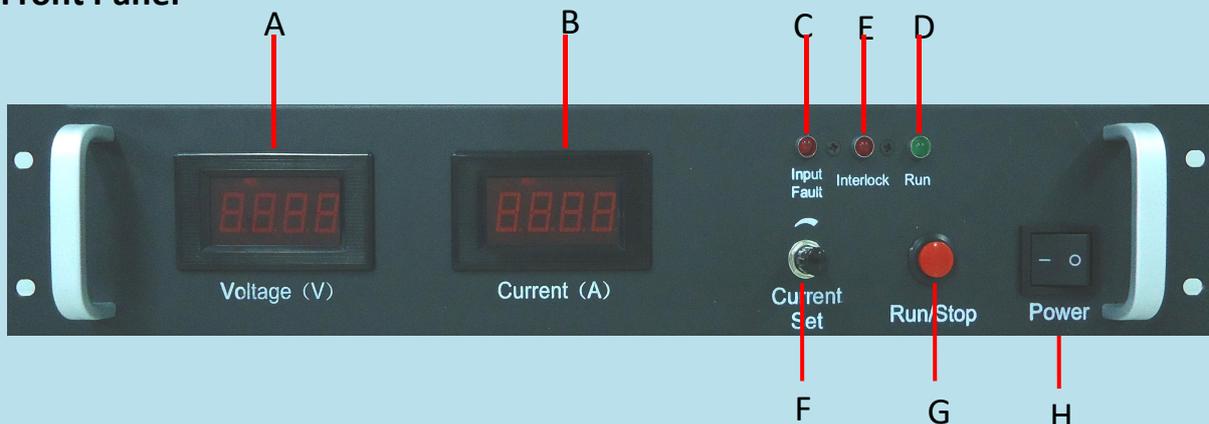
	Name of each part	Function introduction
<b>A</b>	Power Input	The terminal of power input is connected to the power supply of the power supply, While they are disconnected must ensure the input terminal be short.
<b>B</b>	Water Outlet/Inlet	The water channels must be connected to the pipes and ensure the connectors being snapped to firmly connected or water would let out and the laser would be in danger.
<b>C</b>	RF IN	It is connected with the power output on the Q drive power supply and inputs the frequency signal.
<b>D</b>	Motor Control	Power the motor.

## Introduction of power supply

There are two power supplies controls different part of the laser. They need to work together. PSU-HPL-CW is only CW mode, PSU-HPL-Q is only pulse mode.

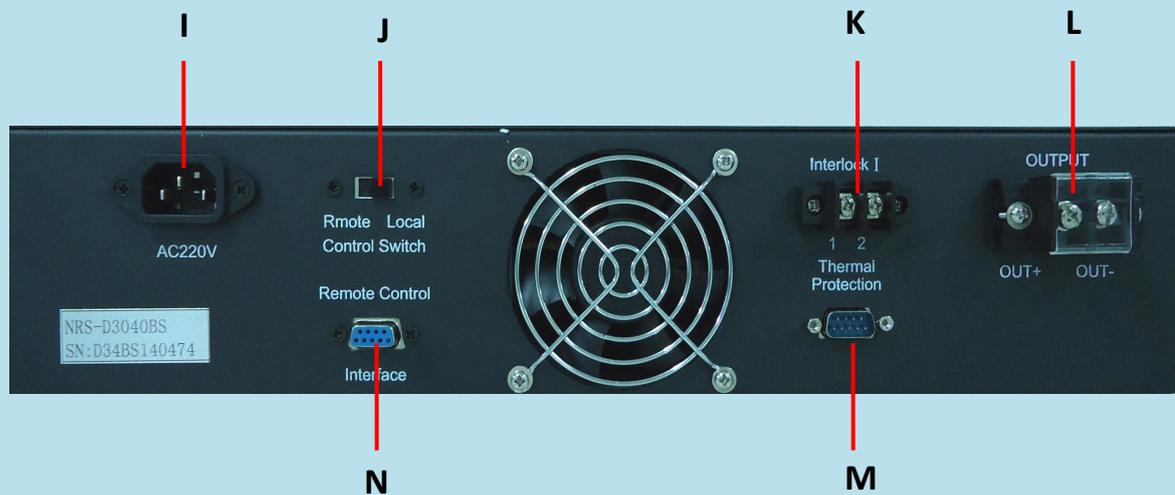
## Panel Description of PSU-H-CW

>>Front Panel



	Name of each part	Function introduction
<b>A</b>	Voltage Meter	The voltage meter shows the output voltage value.It is slightly changed with the output current.
<b>B</b>	Current Meter	The current meter shows the output current value which determines the value of the output laser power.It can be adjustable by the “Current Set” .
<b>C</b>	Input fault indicator	Red light indicates AC power input exceeds the rated range, or the Interlock-I input is in TTL high level or open, or the thermal protection active
<b>D</b>	Output indicator	Green light indicates the power supply’ s power outputs with the “Output Run/Stop” being pushed
<b>E</b>	Interlock indicator	Red light indicates the Interlock input is in TTL high level or open.
<b>F</b>	Current Set Knob	The current value is controlled by rotating the button
<b>G</b>	Output Run/Stop	The laser will turn off when the button set to “Stop”.
<b>H</b>	Power Switch	Power switch is the main power unit of the power supply, it is switched between “on” and “off” . The power supply will turn off when the power switch is set to "off".

**>>Back Panel**

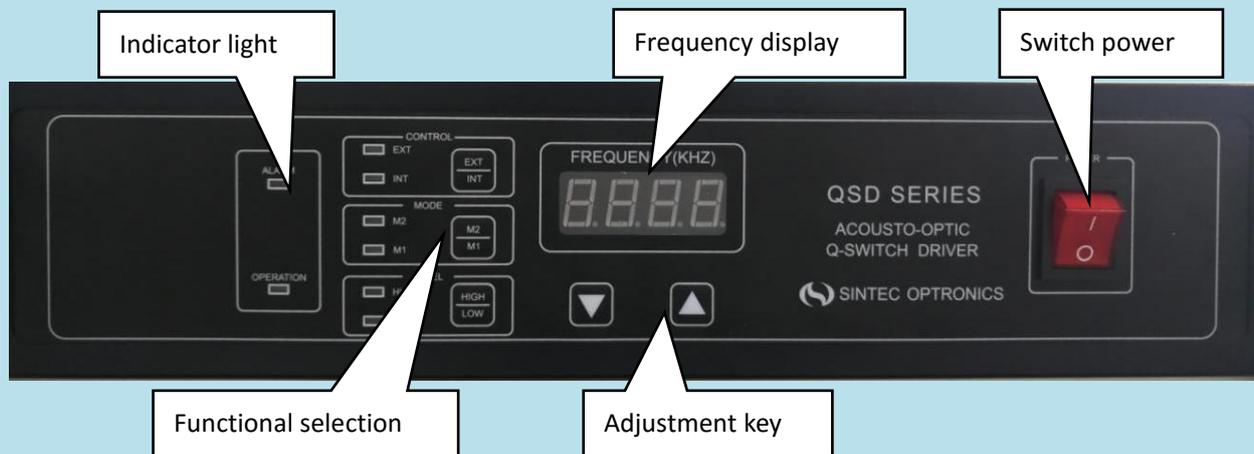


	Name of each part	Function introduction
<b>I</b>	AC Input	Supply voltage to the power supply. Make sure your local voltage is in the range showed at the back panel (100-240VAC).
<b>J</b>	Control Switch	It is the change-over switch between “Rmote” and “Local”.
<b>K</b>	Interlock Protection Input	This connector is designed for connect to interlock output of the cool-water machine. High level (3-5V or open) of those two sets connectors stop the drive output, low level (0V or short) permit the

		drive output.
<b>L</b>	Driver Output Terminals	They are controlled to the “power input” of the laser head
<b>M</b>	Thermal Protection Connector	Use the cable shipped together with the drive to connect the thermal protection connector of the drive with the corresponding connector on the diode module.
<b>N</b>	Remote Control Input	Though the “Remote control input”, the power supply can be controlled by the external equipment.

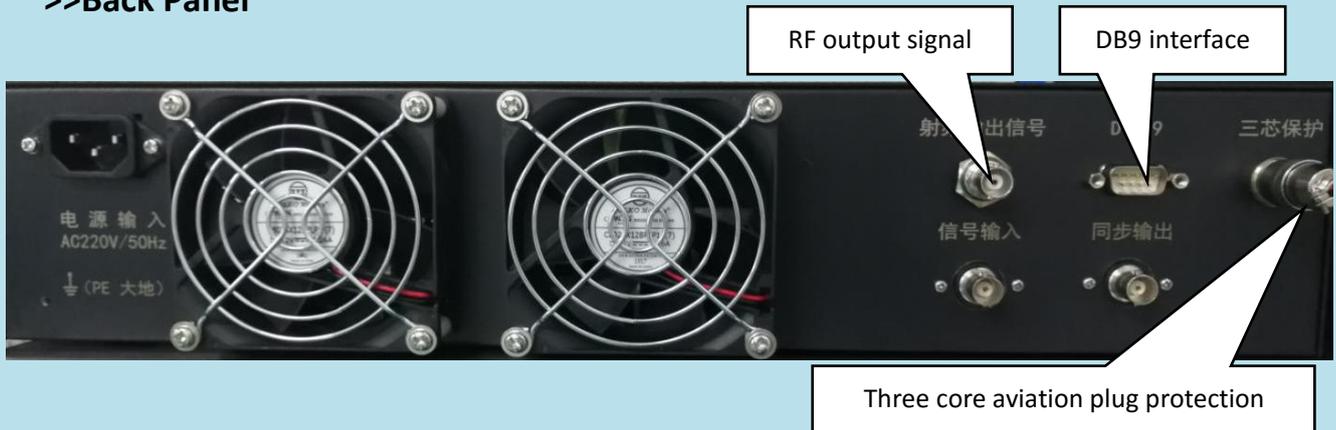
### Panel Description of PSU-HPL-Q

#### >>Front Panel



<b>Indicator light</b>	<b>ALARM</b>	When Q three core thermal protection interface or Q RF output line is not connected normally, it will be on, and the power supply will cut off RF output
	<b>OPERATION</b>	The green light is on when working and off when turning off
<b>Functional selection</b>	<b>CONTROL</b>	INT (internal frequency modulation) EXT (external frequency modulation)
	<b>MODE</b>	M1: 5us (metal marking) M2: no modulation on / off. (non metallic marking)
	<b>LEVEL</b>	Low (usually low level, input marking signal high level effective TTL) High (usually high level, input marking signal low level effective TTL)
<b>Frequency display</b>	The meter only displays the current frequency inside the power supply, and the meter displays 000 in external control	
<b>Adjustment key</b>	Frequency adjustment increase / decrease key, long press to increase / decrease quickly	

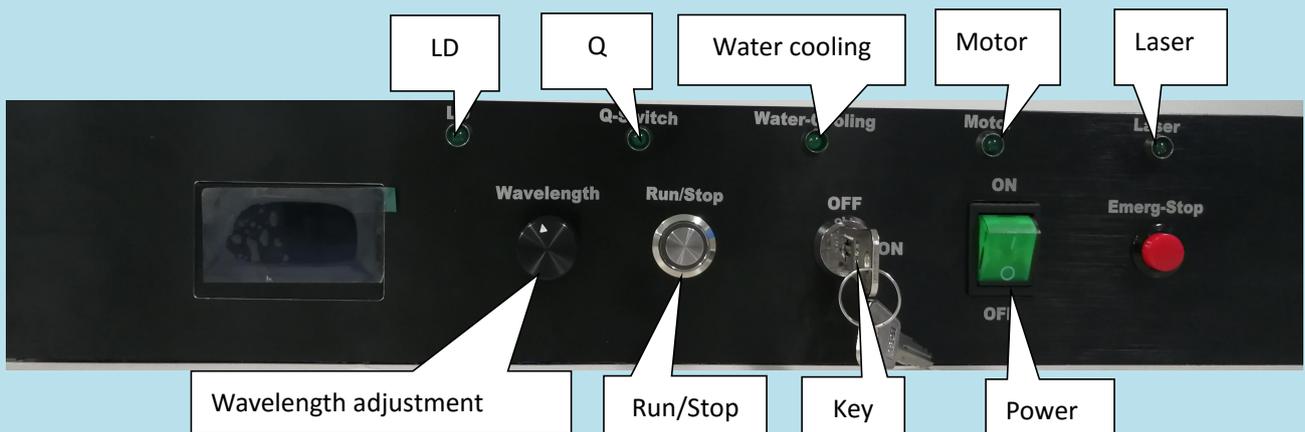
>>Back Panel



<b>RF output signal</b>	Connecting the Q-switch optics on the laser head
<b>DB9 interface</b>	For external trigger signal. Pin 4:External frequency signal+ Pin 5:External frequency signal ground
<b>Aviation plug protection</b>	Pin 1:Ground (shielding layer) Pin 2:Protection signal The protection three core wires shall not be connected wrongly, otherwise the temperature protection effect will be lost

Introduction of Control power box

>>Front Panel

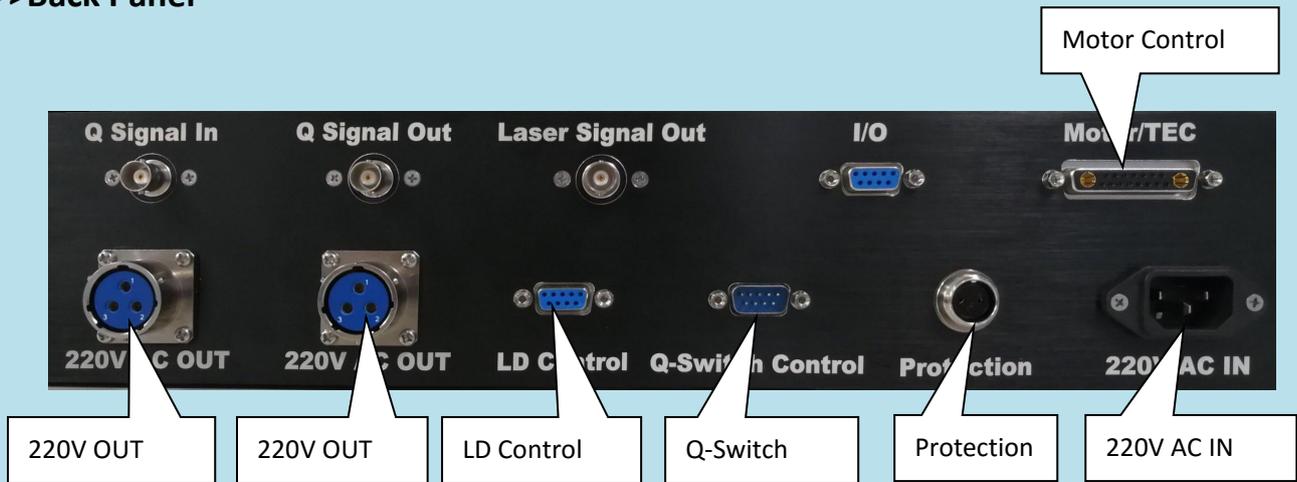


When LD drive, Q drive, water cooling, motor and laser lights are on, it means normal operation.

Wavelength adjustment: Adjust the wavelength range 770-840nm, step size 1nm.

Run/Stop: Control laser output / stop

## >>Back Panel



Each interface is respectively connected with the power supply and laser interface.

Water cooling protection: connect the water cooler for water cooling protection.

## Optional accessories



Aurora4000 series of high-resolution spectrometers are used for real-time observation of laser wavelength and linewidth



Laser safety is the key important thing during laser operation. CNI offer proper laser goggles that protect from laser damage.