

SH Series CO2 Lasers Power Supply

Operation Manual

Sintec Optronics Pte Ltd

50 Bukit Batok Street 23 #07-15 Midview Building, Singapore 659578

Tel: +65 67781866 Fax: +65 65152908

E-mail: sales@SintceOptronics.com or sales@sintecoptronics.com.sg

URL: <http://www.SintecOptronics.com> or <http://www.SintecOptronics.com.sg>

Important: Please read this operation manual carefully before using the laser.

Danger: Invisible laser radiation in operation. Avoid eye or skin exposure to direct or scattered radiation.

Warning: For protection against radiation it is absolutely necessary to wear the goggles with suitable filter.

Attention:

- The electrical voltage of the system reaches high levels and it is essential that the servicing operations are carried out by competent and authorized personnel.
- Any person who uses this system should read this operation manual carefully before operation.
- Never aim the laser beam at people.
- Always stop the free beam with a solid, absorbent and not inflammable object.
- Make sure that all connections should be correct before operation.
- Please check whether the system is properly connected with ground before switching on the power supply.
- During laser operation personnel in the working area must wear suitable protection goggles against wavelength of 1064nm.
- Check that all the optical components are clean, not damaged and properly fixed.

1. Specifications of Laser Tubes

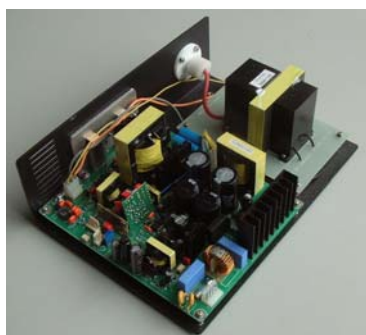


Model	Tube size (mm)	Max. power (W)	Stability (%)	Trigger voltage (kV)	Operation voltage (kV)	Operation current (mA)	Power supply
CO2-SH-200-34	φ34x200	3	<5	5.5	3-3.5	5-6	CO2-SH-P1
CO2-SH-280-34	φ34x280	5	<5	6.5	4-4.5	6-7	CO2-SH-P1
CO2-SH-300-34	φ34x300	8	<5	7	5-5.5	7-9	CO2-SH-P1
CO2-SH-350-34	φ34x350	12	<5	8	6-7	8-12	CO2-SH-P1
CO2-SH-400-34	φ34x400	15	<5	9.5	7.5-8	11-13	CO2-SH-P1
CO2-SH-420-34	φ34x420	16	<5	10	8-9	13-14	CO2-SH-P1
CO2-SH-450-34	φ34x450	18	<5	11	8-9	13-15	CO2-SH-P1
CO2-SH-500-34	φ34x500	21	<5	12	8-9.5	14-16	CO2-SH-P1
CO2-SH-550-34	φ34x550	23	<5	13	9-10	15-17	CO2-SH-P1
CO2-SH-600-50	φ50x600	30	<5	14	10-10.5	15-18	CO2-SH-P1
CO2-SH-800-50	φ50x800	35	<10	18	11-12	18-22	CO2-SH-P1
CO2-SH-850-50	φ50x850	40	<10	18	11-12	18-22	CO2-SH-P1
CO2-SH-1000-50	φ50x1000	50	<10	21	14-15	18-22	CO2-SH-P2
CO2-SH-1200-50	φ50x1200	60	<10	21	14-16	18-22	CO2-SH-P2

- Other specifications:
 1. Beam diameter: 4-5mm;
 2. Beam divergence: <10mrad;
 3. Warranty: >4months
- Option: Suction water pump HQB-3900

2. Specifications of Laser Power Supply

The switching power supplies are specially designed for CO₂ laser tubes. PWM switching mode and current-regulated method are employed. The power supply is suitable for the CO₂ lasers for medical, engraving and cutting applications.



CO2-SH-P1



CO2-SH-P2 (integrated)



CO2-SH-P2 (OEM, back panel)



CO2-SH-P2 (OEM, front panel)

Model		CO2-SH-P1 (DJG107-15/18)	CO2-SH-P2 (DJG107-20/20DN)
Input	Voltage	110V/220VAC±15%, 50Hz	
	Surge	DC220V-28A	
Output	Trigger voltage	25kV	
	Operation voltage	16kV	20kV
	Max. operation current	20mA	25mA
	Over voltage protection	Automatic switch off if >25kV	
	Over current protection	yes	
External control input	Voltage	0-5V, TTL level	
	Minimum pulse width	1ms	
Test	Input terminal vs ground	2000VAC	
	Insulation resistance	>50MΩ	
	Standards	<ul style="list-style-type: none"> • GB4943, UL1950, IEC380 • VDE0871 class B, FCC class B 	
Others	Operation temp.	-10 - +45°C	
	Store temp.	-25 - +75°C	
	Dimension	190×110×260mm	355x244x120mm
	Weight	5kg	10kg

3. Operation of Laser Power Supply

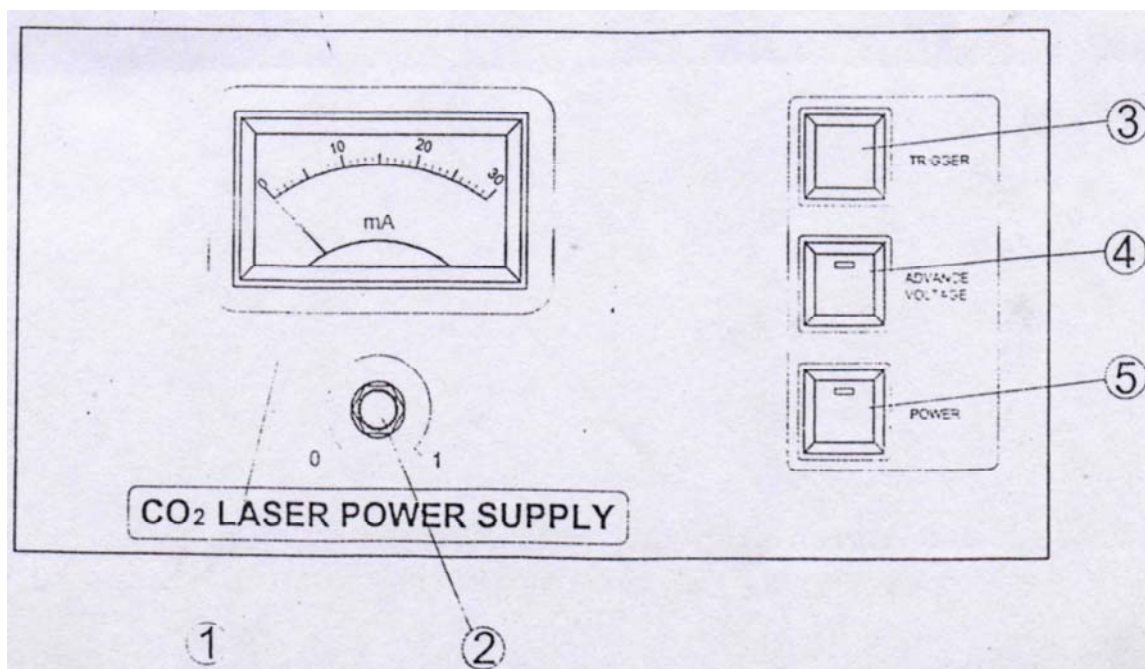
(1) Operation of CO2-SH-P1

Description of Connectors

- J1: electricity 220VAC input
- J2 & JG: high voltage block input
- J3: PIN1 to the cathode of output HV
- J4: PIN2 and PIN3 for testing. When it is short, the laser beam outputs.
- J5: PIN1 and PIN2 for protection use (interlock); PIN3 and PIN4 for TTL control signal input
- J6: potentiometer with $1k\Omega$ resistance. It is used to adjust the discharge current (laser power) of the laser tube.

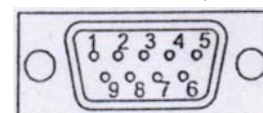
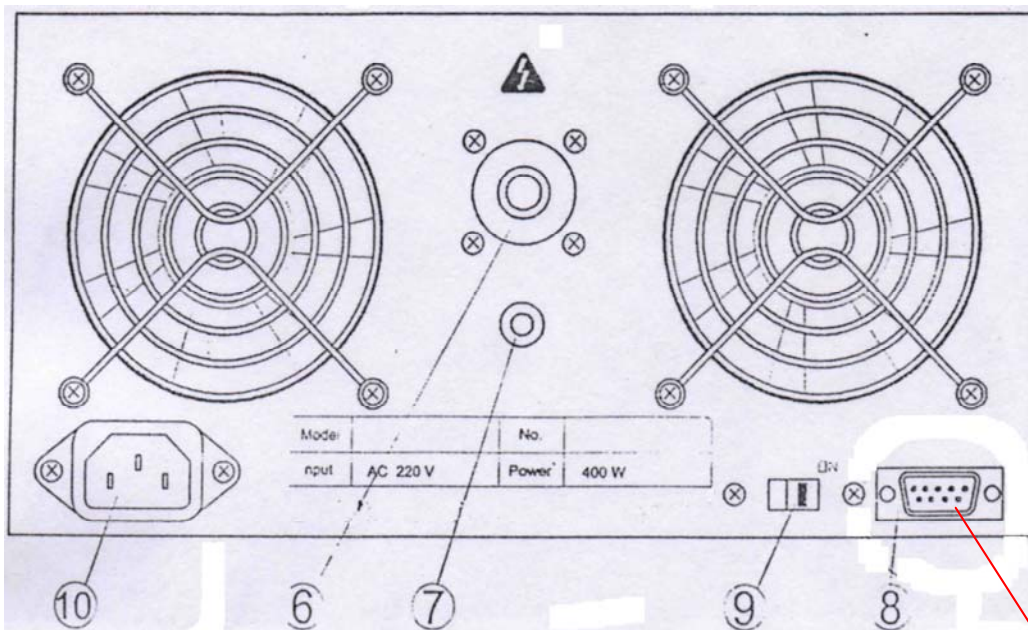
Please refer to the attached circuit schematic for more details.

(2) Operation of Integrated CO2-SH-P2



Front Panel:

- 2) Ampermeter: display the discharge current of the laser tube.
- 3) Current adj.: adjust the discharge current of the laser tube to change the laser power.
- 4) Test button: press the button to output high voltage (HV) to the laser tube (that is laser beam on).
- 5) Pre-ionization button: press the button to make the laser tube have a small current.
- 6) Power switch: switch on/off the electricity input.



Rear Panel:

- 7) HV output (+): HV output to the electrode of the laser tube.
- 8) HV output (-): HV output to the cathode of the laser tube.
- 9) Control I/O: (1) Pins 1 and 2: GATE: TTL control input to control laser beam on/off. High level means on and low level means off. (Pin 1: +; Pin 2: -); (2) Pins 4 and 5: interlock. Pins 4 and 5 are short in normal condition. They may be used for protection purpose. When a problem occurs, the alarm output will switch off the laser power supply by disconnecting the pins.
- 10) Interlock switch.
- 11) Power input: electricity input (220VAC, 50Hz).

Operation Procedures:

- 1) Turn on the power switch.
- 2) If there is no interlock input from Pins 4 and 5 of Control I/O, turn the interlock switch to the position **ON**, press the test button to output laser beam or input a high level (TTL signal) from Pins 1 and 2 of Control I/O to output laser beam. Please adjust the laser current accordingly.
- 3) If there is an interlock input from Pins 4 and 5 of Control I/O, turn the interlock switch to the position **OFF**, press the test button to output laser beam or input a high level (TTL signal) from Pins 1 and 2 of Control I/O to output laser beam. Please adjust the laser current accordingly.

(3) Operation of OEM version CO2-SH-P2

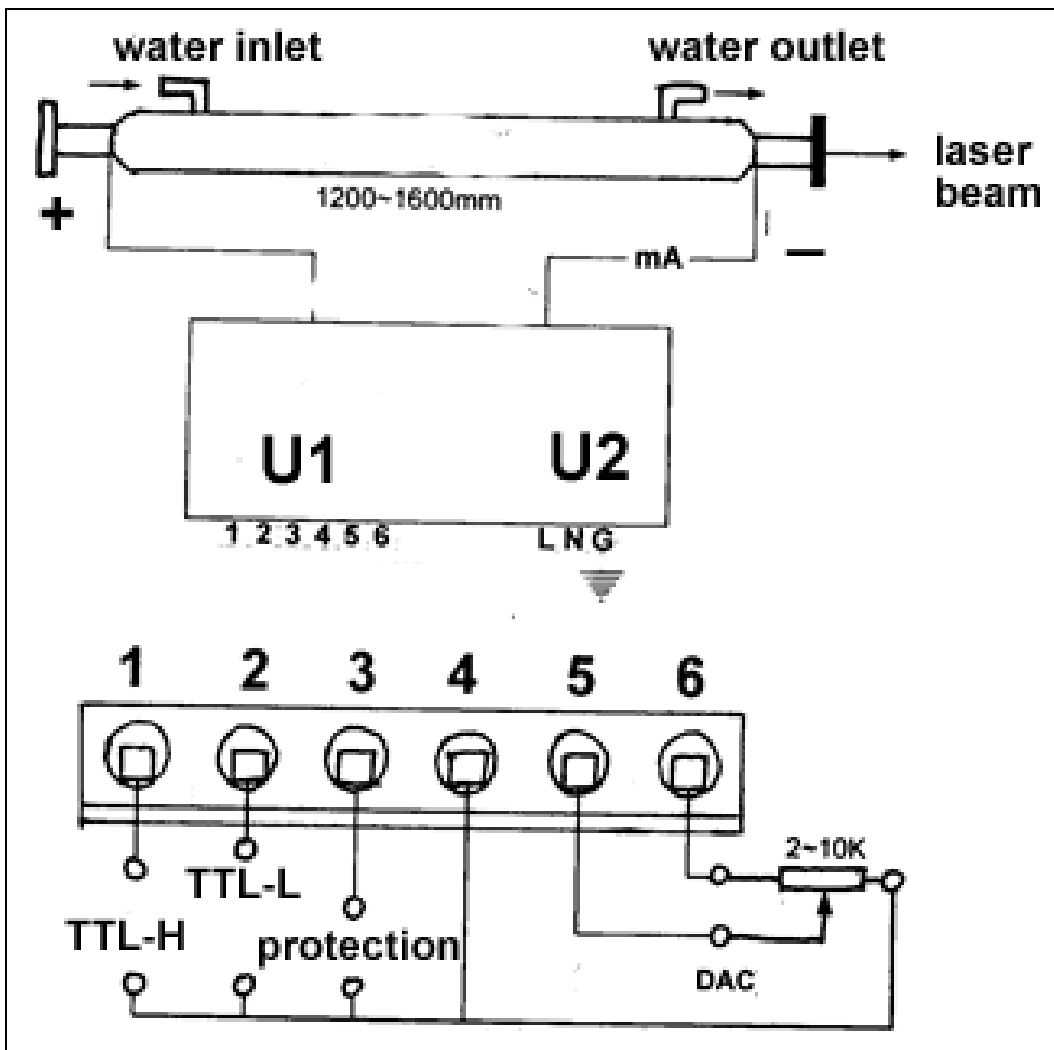


The high voltage is output from the back panel. The red line is positive and the black mount is return point.



The control signals are on the front panel as described as follows:

U1						U2		
1	2	3	4	5	6	1	2	3
TTL-H input	TTL-L input	Protection input	COM	Analog Control input	5V output	L	N	G ground
				DAC		220VAC input		

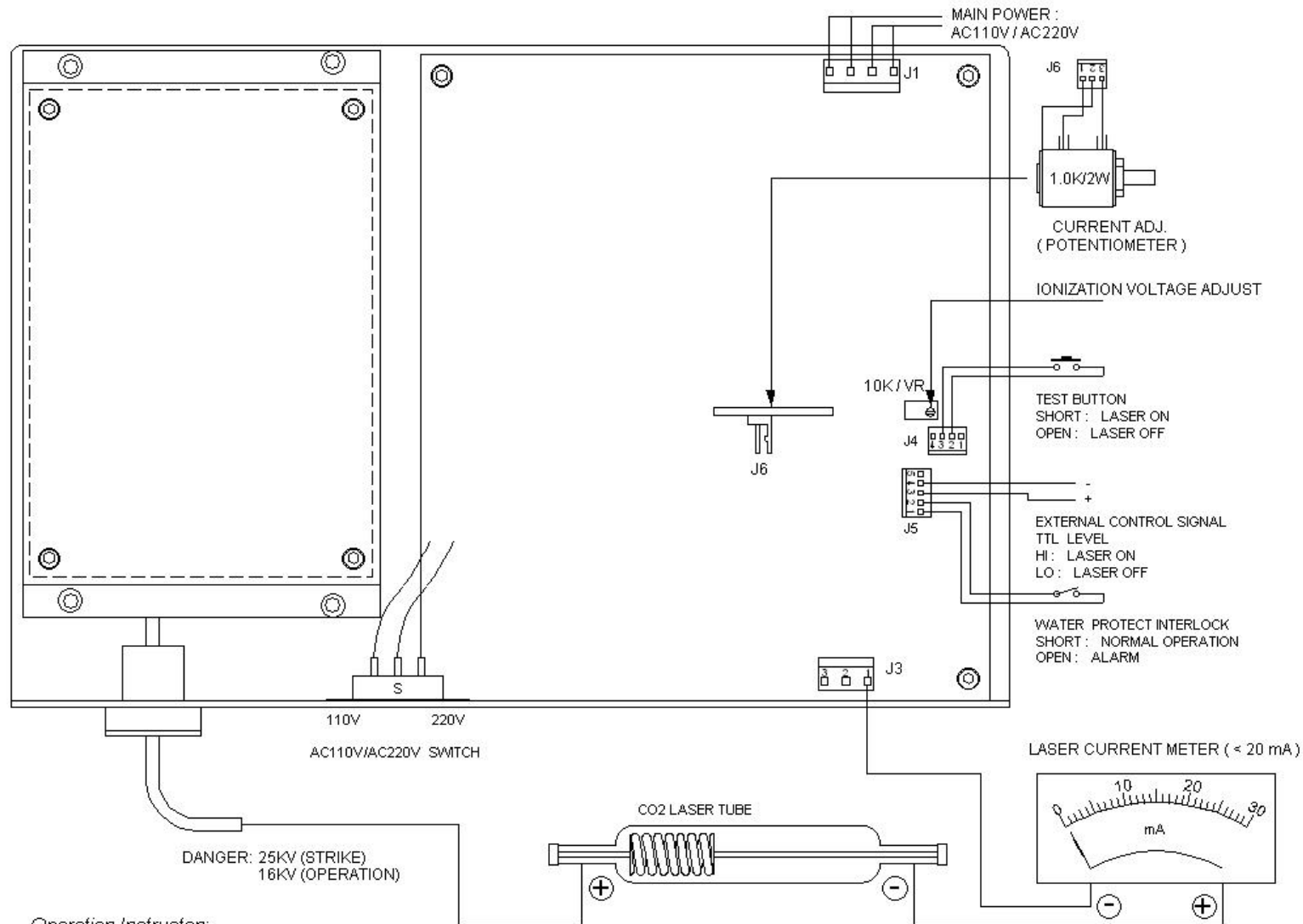


TTL-H input	TTL-L input	Control input (DAC)	Laser output
empty	Low (<0.3)	0-4V	Pmin to Pmax
	High (>3)	0-4V	0
Low (<0.3)	Empty	0-4V	0
High (>3)		0-4V	Pmin to Pmax

Remark:

1. The output power is controlled and adjusted by PIN5. Its input voltage is from 0 to 4VDC.
2. Protection (PIN3): when it is open to PIN4, the power supply is interlocked and there is no laser beam output. Thus it must be shorted for normal operation.
3. When PIN1 is used as beam on/off signal input, the laser beam is on when it is high TTL level. When PIN2 is used as beam on/off signal input, the laser beam is on when it is low TTL level.

Appendix: Circuit of CO2-SH-P1



Operation Instructon:

1. According to local voltage, turn 220VAC/110VAC switch to the corresponding position;
2. Confirm whether the cooling water is properly supplied;
3. To simplify the test procedures, the user may not use external control signal;
4. Initialize the turning potentiometer counter-clockwise (CCW) until the end;
5. Press "test button" and at the same time clockwise turn the potentiometer. The laser current and power will increase;
6. After finishing tests, CCW turn the potentiometer until the end.