Focus on CNC cutting height control field

HL101

Laser cutting
Servo control system

Operation Manual

VISION：1105



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1.IMPORTANT INFORMATION

1.1 SERVICE ASSISTANCE AND CONTACT INFORMATION

For service assistance, have the following information available:

• HL101 model, part and serial number located on a label

• Type of cutting application you are using

You can contact our at:

TEL: 086-0519-89182619

FOX: 086-0519-89183619

1.2 RECEIVING AND UNPACKING

After receiving the HL101 you should:

• Carefully, unpack and inspect the equipment.

• Compare the received shipment with the packing list.

• Report any damage to the carrier and your representative.

• Store equipment that will not be used in a clean, dry location.

• Take appropriate precautions to prevent moisture, dust and dirt from accumulating in storage and installation areas.

1.3 SAFETY CONSIDERATIONS

Safety practices should not be an after thought. Before installing or servicing the controller, review and follow applicable policies and procedures to ensure worker safety. Machinery must be in a safe state and you must be aware of any additional hazards that can arise.

1.4 PRE-INSTALLATION CONSIDERATIONS

Before installing the HL101:

• Check to be sure that you have all of the required parts.

• Familiarize yourself with the parts of the HL101.

• Check to be sure that the torch lifter motors you are using with the HL101 are within the acceptable range.

• Review the instructions for Configuring the Lifter Mechanics.

1.5 CONFIGURING THE LIFTER MECHANICS

Lifting mechanism's reasonable construction is the important safeguard to ensure the accuracy of location tracking.

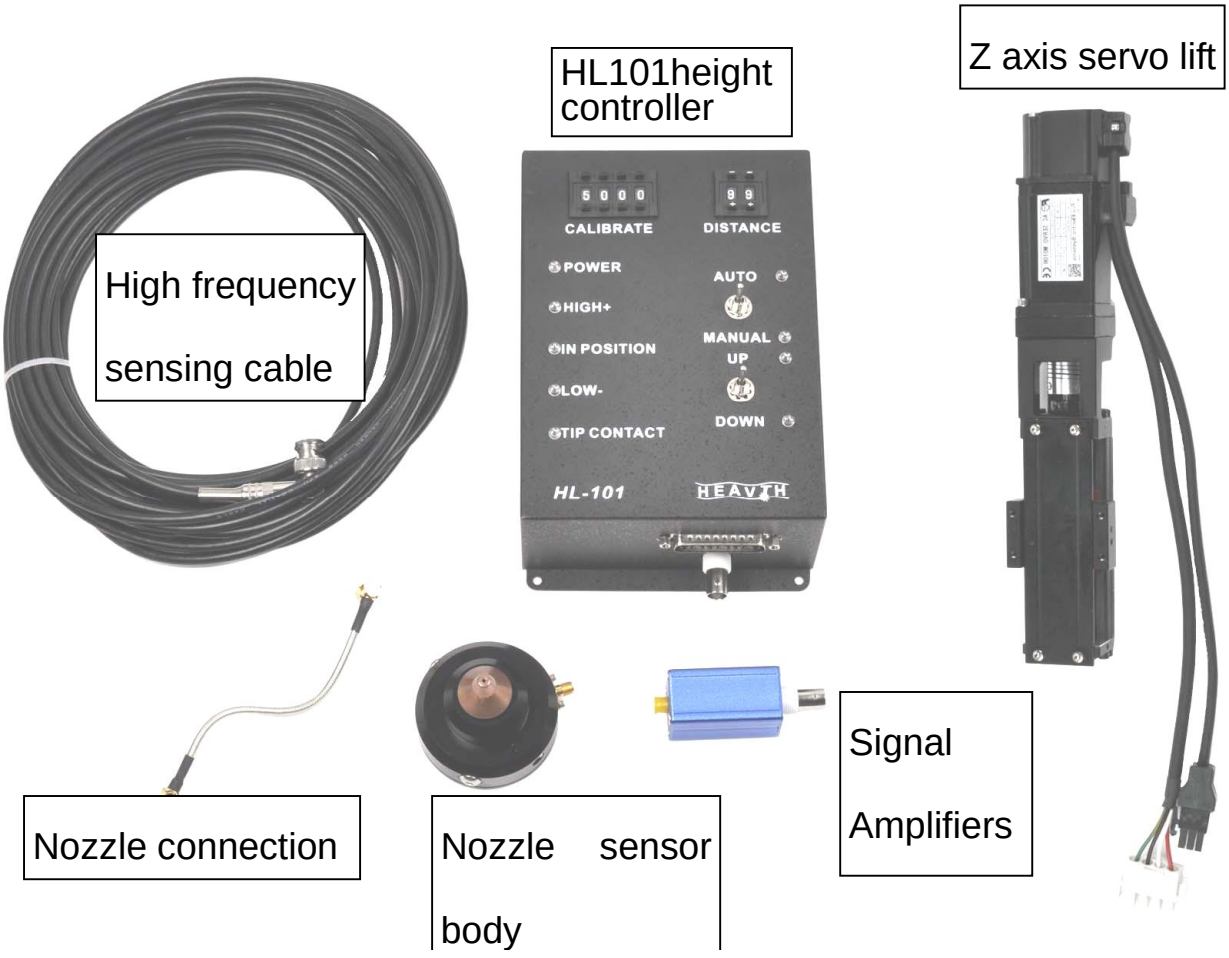
•Select the appropriate servo motor and screw lead, it also has a high operating speed and control accuracy

• rails, sliders, screw's gap as small as possible

• improve quality, the motor rotational's inertia as small as possible

1.6 Related Accessories

HL101 Laser gap Servo control system's accessories and name:



The default configuration includes: HL101 controller,
high-frequency sensor cables, signal amplifiers, cable nozzle.
Other parts of the preparation by the user.

2. Brief Intro

2.1 Summarize

Laser cutting's effectiveness and quality depends on the working distance of the workpiece to the nozzle, automatic control cutting distance, can make you get smooth, high quality kerf, reducing scrapped parts, improve the cutting speed and efficiency.

HL101 laser servo control system allows you to maintain optimum cutting height:

• saving cutting preparation time, HL101 laser servo control system can be quickly adjusted to the appropriate track height.

• Use higher cutting speeds to increase productivity.

• Excellent cutting quality, reduce or eliminate the cutting defective.

• consistency cutting products.

• CNC machine tools to achieve automatic control.

HL101 laser servo control system can bring the following advantages:

• Automatic / manual modes.

• have more gap setting mode, set and modify highly repeatable you want.

• A clearance compensation, temperature compensation.

• servo zero drift suppression.

• A position signal, collision signal and so on to improve the functional interface.

• Use an analog voltage control servo lifting motor.

2.2 HL101 laser servo control system parameters

Supply voltage: DC 24V ± 20%, 2A

Clearance setting range: 0.25-5mm (different nozzles need to be calibrated)

Measurement Repeatability: ± 0.1mm

Temperature drift: <0.5% / ℃ (when in 1mm gap)

Output voltage: 0 ... ± 10VDC, adjustable sensitivity

Response time: <5ms

Host Dimension: 180mm (high) × 130mm (width) × 60mm (depth)

Working conditions:

Cutting head: Operating temperature -10 ℃ ∽100 ℃ (limit temperature 220 ℃);

Electrical box: Operating temperature 0 ℃ ∽50 ℃; no strong electromagnetic interference.

High frequency sensing cable length: 6000mm

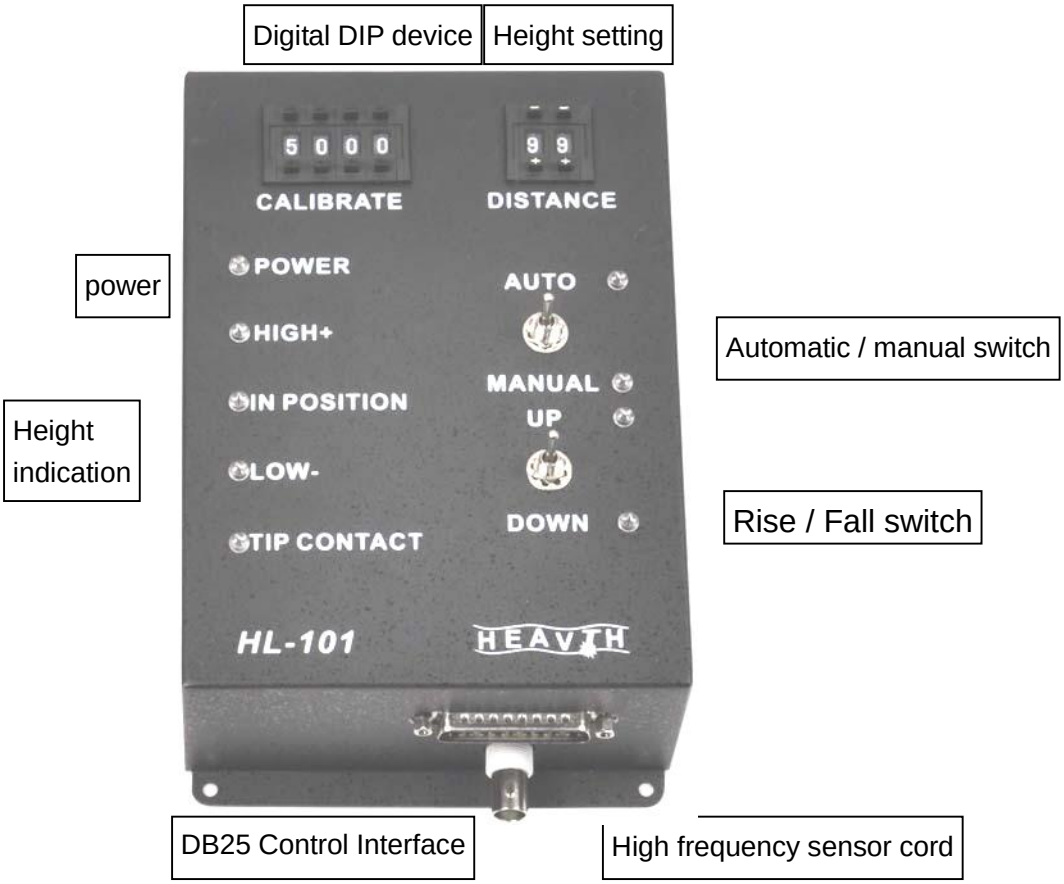
Weight: 0.9 kg control box control box plus probe assembly 1.3 kg

Protection class: IP64, to prevent dust from entering

Installation connectors: DB25, BNC

Installation position: in the high frequency range line, away from heat place with good air convection.

2.3 Controller panel

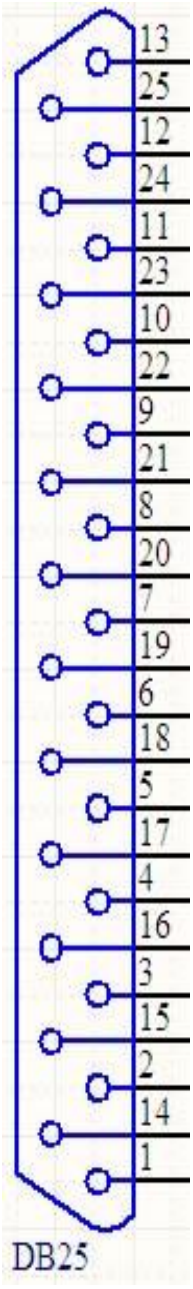


CALIBRATE	Calibration with four DIP switches , For system calibration .see details P10

POWER	DC24V Power indicator
HIGH+	When the lights,, represents the nozzle above the set point. Calibration indicates the need to increase the DIP switch numbers.
IN POSITION	When the lamp is lit, the nozzle is in the set point.
LOW-	When the lights that nozzle below the set point. Calibration indicates the need to reduce the DIP switch numbers.
TIP CONTACT	When the light is said nozzle and the workpiece has contact collision.
DISTANCE	Two dial the code switch, after completion of calibration system is used to set the distance between the nozzle and the workpiece.
AUTO	When the light controller in servo state, real-time tracking distance between nozzle and workpiece.
AUTO/MANUAL Toggle switch	Used to select automatic or manual control.
MANUAL	When the light controller work in manual mode.
UP	Manual up lights.
DOWN	Manually down light.
High frequency sensing line plug	Used to connect to the high frequency sensing line. Controller through high frequency sensing line connected to the capacitance signal amplifier.

Pin number	I/O	function

3 DB25 Control Interface：



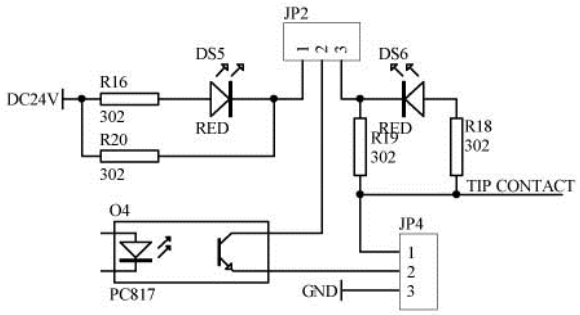
13	output	TIP CONTACT Nozzle in contact with the workpiece collision warning
25	NA	Floating
12	output	IN POSITION To the position signal output
24	input	HEIGHT OFFSET Zero adjustment
11	output	HOLD OUT Servo brake for suppressing servo zero drift
23	GND	GND Analog signal
10	output	ID HEIGHT AMP The nozzle height indicates the output
22	output	HEIGHT COMP Specifies the height of the place output
9	output	POT1
21	input	EX H SET External height setting input
8	input	POT2
20	output	COMMAND Analog electrical signal output
7	input	CNC-UP-LIM Upper limit input
19	input	CNC-DOWN-LIM Lower limit input
6	GND	GND Analog signal
18	input	DOWN drop
5	input	UP rise
17	input	RUN/MANUAL Automatic and manual switching
4	GND	GND Analog signal
16	output	COMMAND Analog electrical signal output
3	GND	GND Analog signal
15	input	Power supply GND
2	input	Power supply DC24V 2A
14	input	Power supply GND
1	input	Power supply DC24V 2A

If you use the controller’s front panel to operate, you only need to connect 25-pin connector Pin # 1 (DC 24V power supply positive), Pin # 14 (Power DC24V negative), Pin # 16 (analog electrical signal output) Pin # 4 (analog electrical signal ground GND).

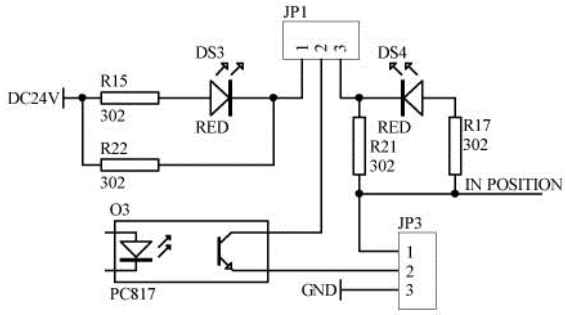
If you would like to use external control and monitoring, please read all of the following signal descriptions of the "User Interface" section.

TIP CONTACT nozzle contact with the workpiece then collision

warning. Dashboard JP2 JP4 connected 1,2 feet, the output is high. JP2 JP4 connected 2,3 feet, the output is low. The maximum current is 10mA. The default connection 2,3 feet.



IN POSITION to the position signal. Output to the position signal when the nozzle reaches the height setted. Dashboard JP1, JP3 connect 1,2 feet, the output is high. JP1 JP3 connect 2,3 feet, the output is low. The maximum current is 10mA. The default connection 2,3 feet.



HEIGHT OFFSET zero adjustment. Change the height，Each ±0.1V corresponding to±0.25mm，Zi=10K，need to change the frequency board JP4 to 1,2 feet to achieve functional.

HOLD OUT servo brake, for suppressing servo zero drift. Dashboard JP5, JP6 simultaneous connections 1,2 feet, the output is high. JP5 JP6 connected 2,3 feet, the output is low. The maximum current is 10mA. The default connection 2,3 feet.

ID HEIGHT AMP nozzle height indication output. Each ± 0.1V corresponds to ± 0.25mm, Zo = 1K,Output cutting head indicate height analog value.

HEIGHT COMP compare height instruction. You can set an arbitrary height, when the nozzle reaches the setted height, that is the output of a switch. can perforation up to the specify height in a non-automatic mode.

EXH SET External Height setting control. Each ± 0.1V corresponds to ± 0.25mm, Zi = 10K, need to change the frequency board JP3 to 1,2 feet to achieve functional.

COMMAND analog electrical signal output

RUN / MANUAL automatic and manual switching. When Panel's AUTO / MANUAL switch hit AUTO, this signal is high (vacant) automatically, analog signal shorted to ground is manual.

CNC-UP-LIM upper bit input. And GND analog signal shorted to ground stops moving upward.

CNC-DOWN-LIM lower limit input. And GND analog signal shorted to ground stops moving downward.
(Recommended servo controller interface to the limit, without connecting here.)

DOWN decline: the analog signal and GND shorted to ground to move down.

UP rise: an analog signal and GND shorted to ground upward.

4 System Calibration

4.1 How to calibrate

Make the cutting workpiece to be ground (earth) before HL101 calibration, will improve the follow-up tracking effect and also work normally (not grounding).

Then place a flat square metal sheet approximately 200mm under the nozzle, And put the nozzle at the center of the metal sheet. Make sure the metal sheet is grounded. By moving the Z axis sliding device set 2.5 mm above the nozzle in the sheet metal.

(With a feeler gauge or other standard tools).Height setting DIP switch above the control panel which on the front of HL101 should be setted to “99”.

RUN/MANUAL switch is “MANUAL”.

Power and preheat 1 to 2 minutes, if HIGH + light up, raise CALIBRATE setting value, until it is only IN the POSITION light. If LOW lights up, lower CALIBRATE setting value, until it is only IN the POSITION light. After the completion of the calibration then HL101 can run.

CALIBRATE is set to change when dialing, it is recommended that the speed is not too fast, single-step toggle. If possible, wait about 10 seconds for each change, let the system fully responsive and stable.

4.2 when need to calibration

After calibration, generally do not need very frequent for calibration. But should recalibrate when the following situations:

a. Initial installation
b. When you switch to a different type nozzle link
c. After replacing or moving coaxial
d. After replacing the longer coax
e. After adjusting nut readjust GJT

4.2 System Operation

Command signal output must first be connected to the Z-axis amplifier and have adjusted the dynamic response of the axis server. All cables must be connected and grounded workpiece. Suppose HL101 has been calibrated. If not, refer to the "Calibration" section above.

Set the RUN/MANUAL switch to "MANUAL". In front of the on/off power supply, it is suggested that always set the system in MANUAL mode. When power on for the first time, HL101 will automatically enter the "MANUAL", but after preheating (about 20 seconds) will automatically switch to the RUN state (if the RUN/MANUAL switch in the "RUN" position). This will lead to the Z

axis sliding device immediately tried to drive to the set point.

Set short to desired level. Open the power supply. The POWER and the MANUAL of LED will light up. At first, the TIP CONTACT may be bright, but will be out soon. HIGH, LOW, and the brightness of interaction IN the POSITION of LED, after about 20 seconds, only one of the three leds will be kept normally on, said the height of the nozzle is above/below/equal to the set.

When ready to start the follow-up tracking, set the RUN/MANUAL switch to "RUN" position. System will automatically drive servo Z axis sliding table, make the nozzle up to the setting height, and stay in this position. Dynamic real-time can also modify the Settings of the short at this moment, make the system run to different heights. When you want to stop the follow-up tracking artifacts, set the RUN/MANUAL switch to "MANUAL" position.

Packing list

HL101 Laser gap Servo control system

No.	Name	Quantity	Remark
1	HL101 controller	1	
2	High frequency sensing cable	1	Default 6000mm
3	Signal Amplifiers	1	
4	Nozzle cable	1	
5	DB-25 Plug	1	
6			
7			
8			

Note: Users receive the goods, please check the box. The case, check the number of items, if any problems promptly contact me.

Packing: _____ Date: _____