



Model AF2206
Auto-focusing Scanning System

Instruction
Manual

SINO-GALVO (JIANGSU) TECHNOLOGY CO., LTD.

Company Profile

Sino-Galvo (Jiangsu) Technology Co., Ltd. is a high and new technology enterprise located in Zhenjiang, Jiangsu Province with convenient transportation. We specialize in optical galvanometer scanner and its control system's R&D, production and sales, and have established the world-class high performance galvanometer scanner production base of 10000 square meters with more than 200 employees. Our products are widely applied in laser marking, medical beauty, 3D printing, laser cleaning, laser welding, precision cutting, scientific research, and military fields, etc.

The R&D center of Sino-Galvo Technology is located at Zhongguancun high-tech industrial base, Haidian District in Beijing. And we have recruited a group of specialists in electronics, optics, precision mechanics and software controlling since its foundation in 2001. Thanks to the superior technique from national scientific research institutions like Chinese Ministry of Aviation, Sino-Galvo Technology has developed a series of galvanometer scanner and software controlling system with self-independent intellectual property rights after many years of research and development. Relying on the strict quality management systems and perfect production process, we can provide customers with the first-class products and high efficient overall technology solution.

Our products already have got CE, ROHS, FCC and REACH certifications, quality control in accordance with ISO9001 quality system standard, and obtained 23 invention patents as well as multiple intellectual property rights. We have won more than 50% market share of China's middle-to-high end application. Moreover, we exported our products to many countries and regions, including USA, Germany, Russia, Italy, Turkey, Poland, Brazil, South Korea, India, Taiwan, etc.

Depends on the leading technical advantage in laser industry, with the management idea of People-oriented, Innovation by science and technology, Taking customer's demand as center, Sino-Galvo Technology is looking forward to your visit and cooperation, and committed to making a contribution for Chinese nationality brand in laser industry.

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Document Version State

Version	Date	Responsible Person	Remarks
V1.0	2018.08	Ruiguang Jiang	
V2.0	2019.04	Ruiguang Jiang	Rename, control board updating

Special Notice:

1. Before starting up the marking system, please carefully check whether the wiring sequence of DB25 on the scanner housing is connected correctly or not, otherwise the galvanometer scanner cannot work normally or even damage.
2. Two motors and drive boards must be connected according to corresponding serial numbers and cannot be interchangeable, otherwise there will appear self-excitation phenomenon.
3. Please ensure the accuracy of the laser light path output, otherwise it will affect the accuracy of marking, or even it will lead to marking displacement and non-uniform of laser intensity, etc.
4. Please DO NOT adjust potentiometers on driver board or disassemble the galvanometer scanners without authorization.

Chapter 1 Auto-focusing System Introduction

Sino-Galvo's galvanometer motors are designed by adopting the magnet-moving structure, combining the most advanced international photoelectric sensor technology and the PDM control mode, and using the Military-grade processes and technologies.

The model AF2206 galvo scanner has the good running stability, high positioning accuracy, fast marking speed, strong anti-interference ability, the overall performance of AF2206 has reached the international leading level in this field. The advantages are as following:

- Adopted the photoelectric sensors which imported from America, and owned the proprietary intellectual property rights.
- Differential photoelectric sensor for accurate detection of motor rotor position, good linearity, lower drift, high resolution and repeat positioning.
- Accurate load design for 10 mm mirrors, high accuracy of motor assembly, reasonable structure, very small static friction coefficient and zero offset, all ensured the best dynamic characteristics for the whole system.
- Design of overload, over-current and reverse connect protection, makes the system running more reliable.
- This scanner system solved the common problems of motor temperature drift, signal interference and zero drift, etc.
- Auto-focus mode, one key for positioning to the default focus height quickly, improving the operation efficiency.

Chapter 2 AF2206 Technical Parameters

AF2206 Motors & Drive Board Technical Parameters

Motor Specification

Working Temperature	0-45℃
Linearity	99.9%
Setting Time	≤ 0.35ms
Scale Drift	<40PPM/℃
Zero Drift	<15μRad./℃
Long-term Drift Over 8 Hours	<0.5mRad
RMS Current	2.0A
Peak Current	15A(Max)
Maximum Scan Angle	±15°
Storage Temperature	-10 to +60℃
Resolution	12μrad
Repeatability	8μrad
Input Aperture	10.0mm
Beam Displacement	13.4mm
Motor Weight	120g
Frequency	≤1000Hz

Servo Driver Board Specification

Input Voltage	±15VDC
Interface Signal Digital	XY2-100
Position Signal Input Resistance	1KΩ±1%
Position Signal Input Scale Factor	0.33V/°
Position Signal Output Scale Factor	0.33V/°
Working Temperature	0-45℃
Dimension(L×W×H)	75×50×28mm

Auto-focusing Control Parameter

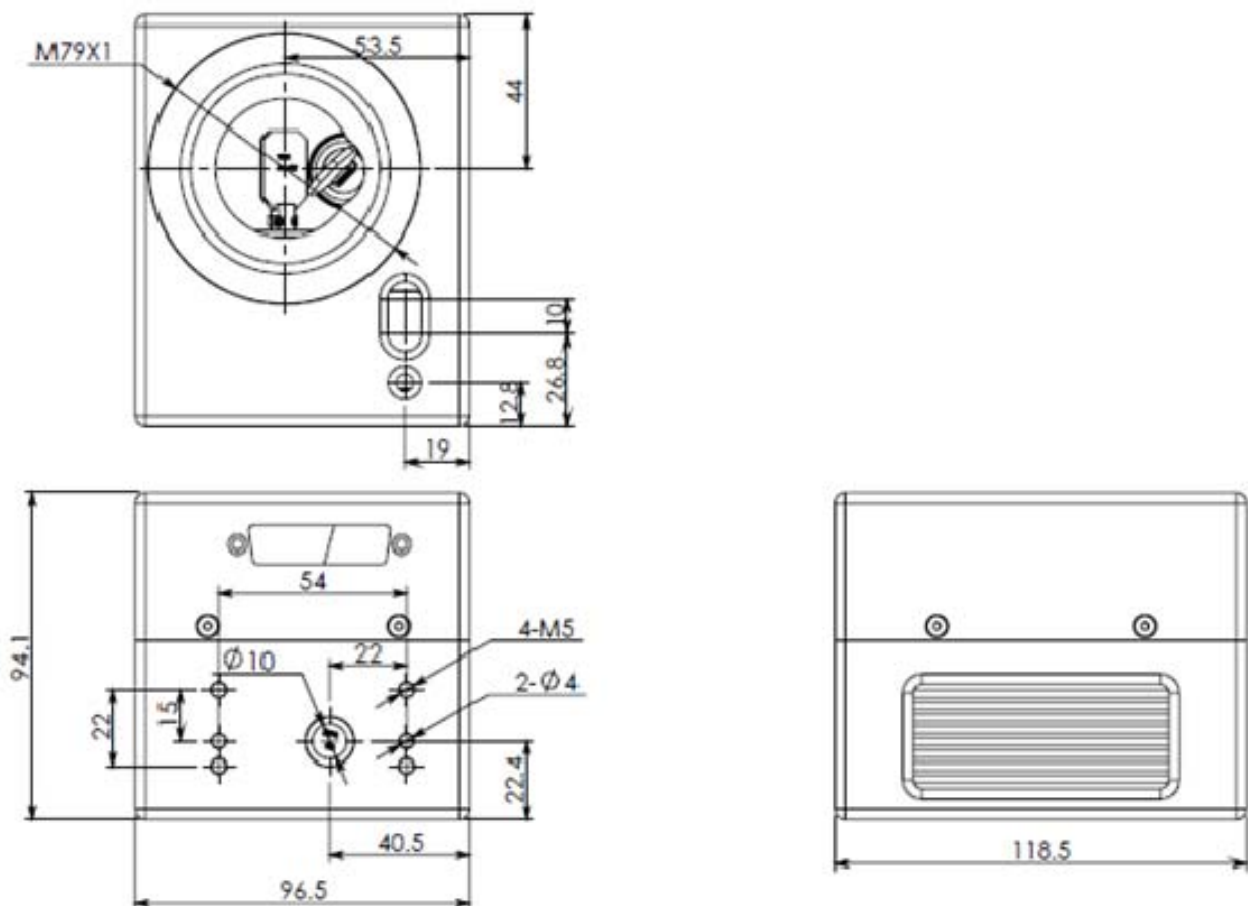
Input Voltage	±15VDC
Distance measuring	Laser measure distance
Measure resolution rate	0.01mm
Measure accuracy	±0.1mm
Laser wavelength	620-690nm
Single measure time	0.25 second
Working temperature	0-45℃

Chapter 3 The Galvanometer Structure and Wiring

3.1 Scanner Housing



3.2 Housing Dimension Drawing



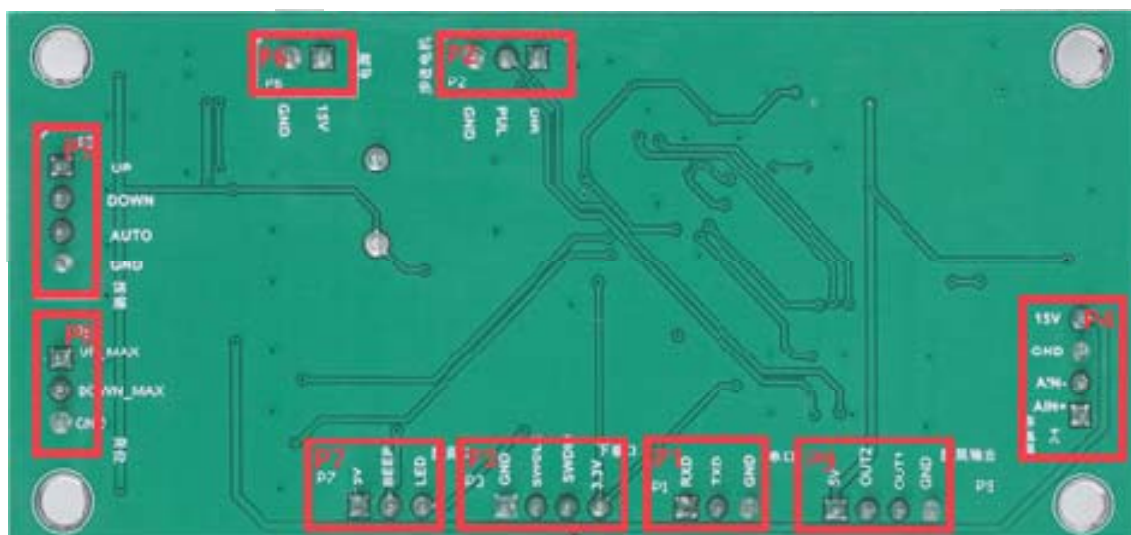
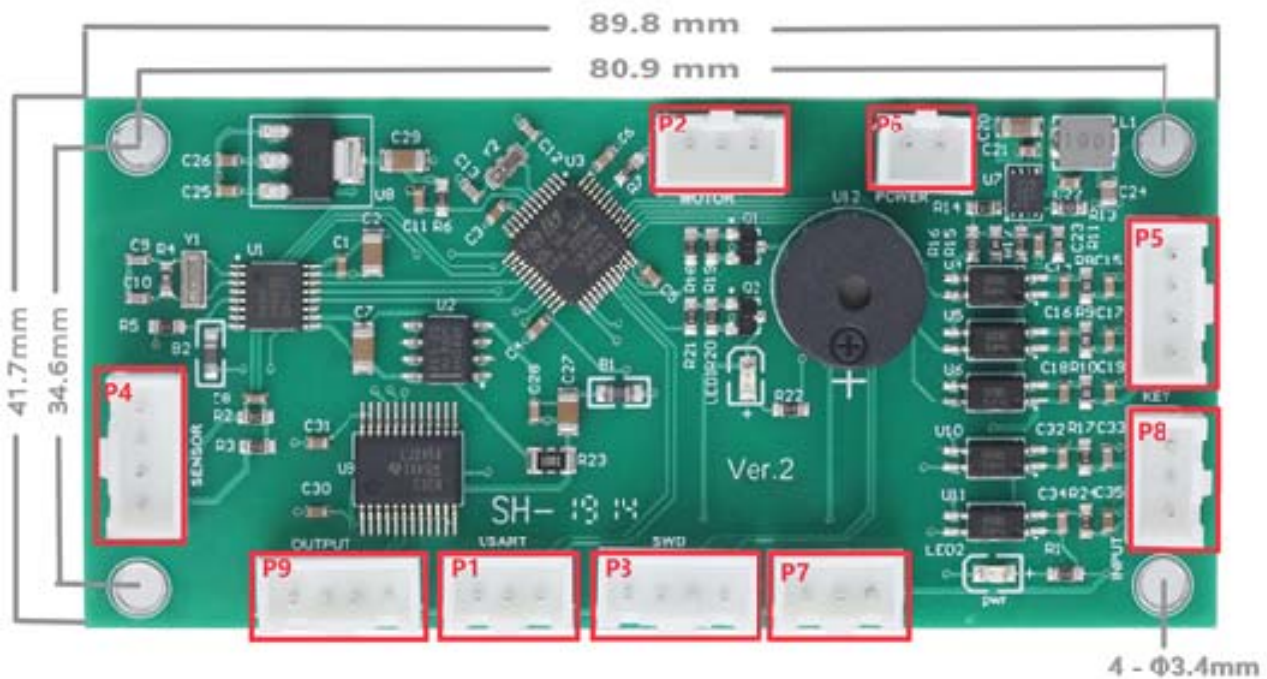
3.3 Auto-focusing System Module

This module sensor is installed inside the housing of galvanometer scanner, the auto-focusing system consists of the range finder module, the stepper motor, the stepper motor driver, the control board and the buttons. The function of stepper motor is to adjust the height of the galvanometer. The buttons are the rising button, the descending button and the auto-focusing button, and the control board card controls the operation of the whole auto-focusing system.

3.4 Auto-focusing Control Board Wiring Connection

P1 is for system parameter setting
P2 is for motor controlling (MOTOR)
P3 is for renew control board program
P4 is for connection of galvo scanner sensor
P5 is for key port

P6 is for the power port (POWER)
P7 is for alarm signal input port
P8 is for position limitation protection
P9 is for extension function



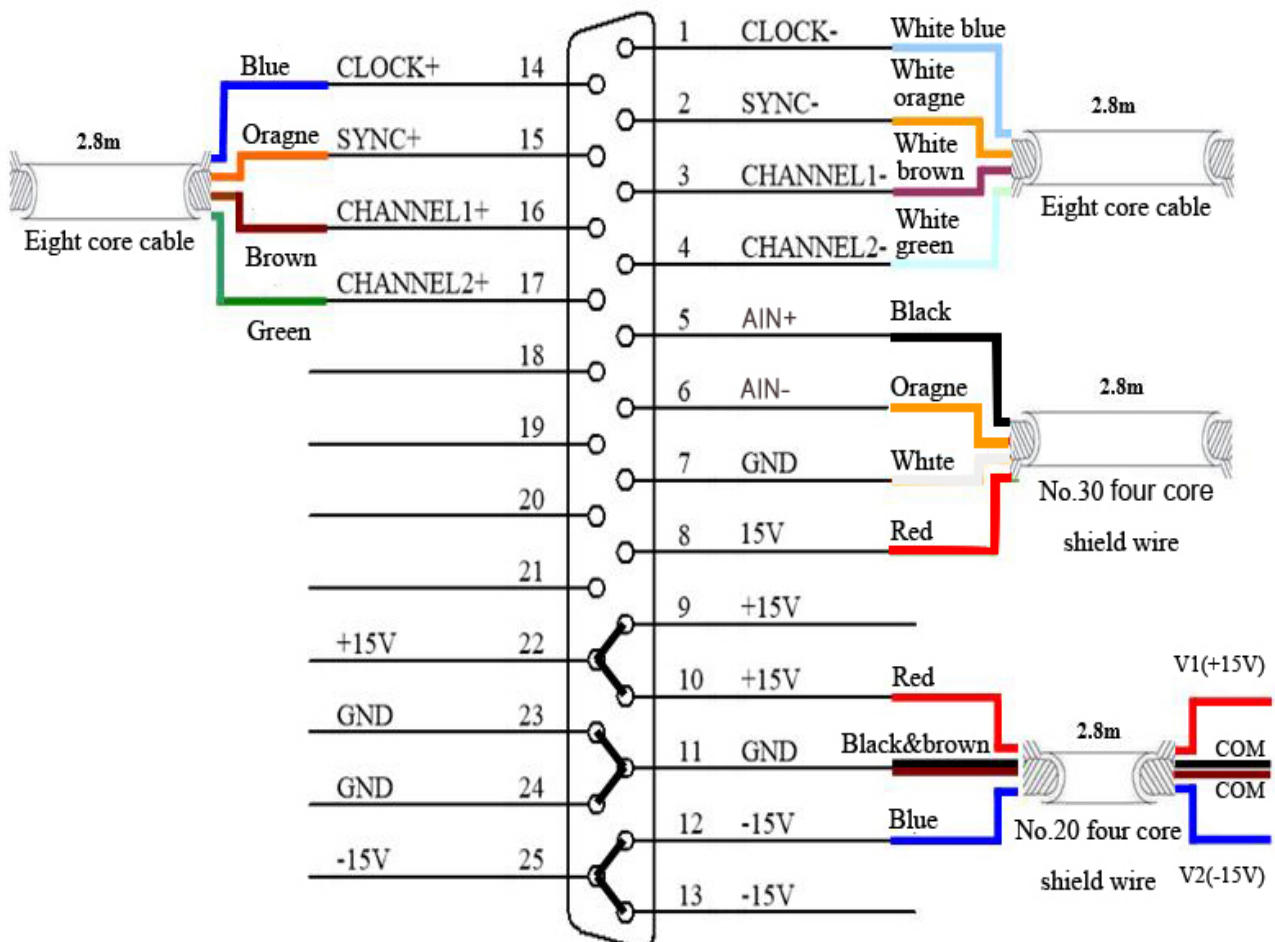
Aut-focusing Control Board Parameter

Pin	Signal Name	Signal Type	Description
P4	AIN+	Connected to P6 of DB25	It is connected with the external connecting wire of the galvanometer to control the auto-focusing sensor
	AIN-	Connected to P5 of DB25	
	GND	Ground connection	
	+15V	Connected to sensor power supply	
P2	DIR stepper motor direction control signal	Connected to stepper motor driver DIR	MOTOR control port, for the MOTOR driver control terminal, providing MOTOR driver pulse signal and direction signal, three pins are GND,DIR,PUL
	PUL stepper motor pulse control signal	Connected to stepper motor driver PUL	
	GND	Ground connection	
P5	UP	Rising up button	Four pins are GND, UP, DOWN, AUTO. The default button pin is high level. If it will be triggered when the level is low.
	DOWN	Descend button	
	AUTO	Auto-focusing button	
	GND	Ground connection	
P1	RXD	Set system parameters	Terminal connected to computer and control board, for changing the system parameters of auto-focusing
	TXD		
	GND		
P6	15V	Connected to power supply	POWER port, providing normal working voltage for the control panel and sensor, the input voltage is 15-24V
	GND		
P7	5V	Alarm interface	Alarm signal port is the output port of the alarm signal, can be connected to the buzzer or LED indicator light by customer, the low level of the alarm signal is effective
	BEEP		
	LED		
P3	GND	Program updating port	This port is for the updating of control board program
	SWCLK		
	SWDIO		
	3.3V		
P8	UP-MAX	Position limitation protection	Rise or decline, if reaching the limit position, system produces a stop signal, then motor move oppositely
	DOWN-MAX		
	GND		
P9	5V	Extension output signal	Extended interface, prepared function, output TTL signal, linkage with other devices
	OUT2		
	OUT1		
	GND		

3.5 Power Supply Wiring Diagram



3.6 The External Digital Wiring for DB25 Connection



Chapter 4 Operation Procedure

- ① First time use the auto-focusing system, connect the wire of the control board, then connect to the computer.
- ② Open the auto-focusing system software, find the corresponding COM of the USB connecting wire (Right click "computer->Management->device manager->find the corresponding COM of the USB-CH340), set the software in the corresponding COM.

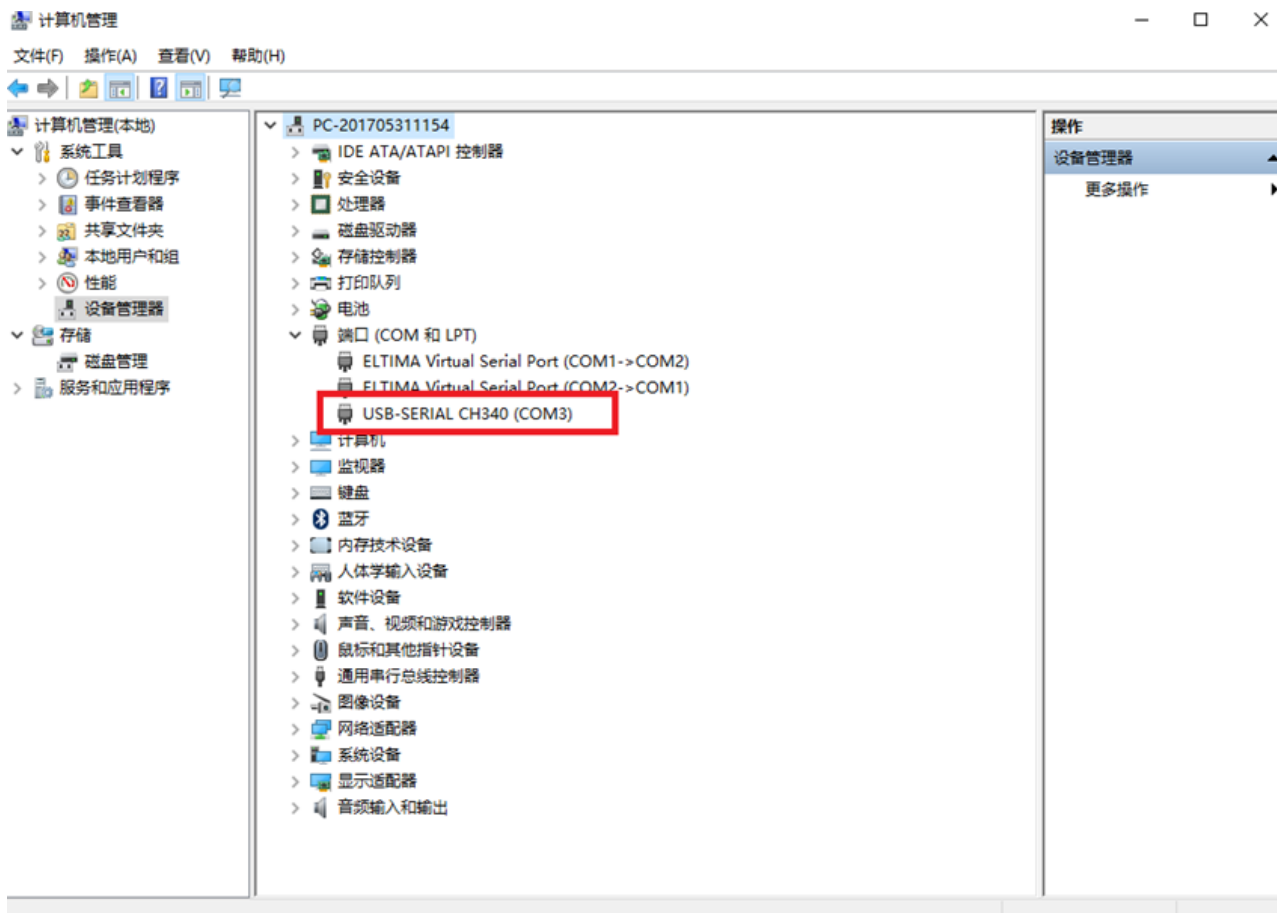


Figure 4-1

- ③ Set Baud Rate 115200, then click the "Open Connection" button. Set Screw Pitch (the screw pitch of the practical screw rod). Motor driver subdivision (according to the physical setting), focal length and speed (divided into 10 gears, 1 fastest, 10 slowest, 1-10 decreasing speed), It is ok if the first Focal Length setting is not accurate. Setting window is in the figure 4-2.

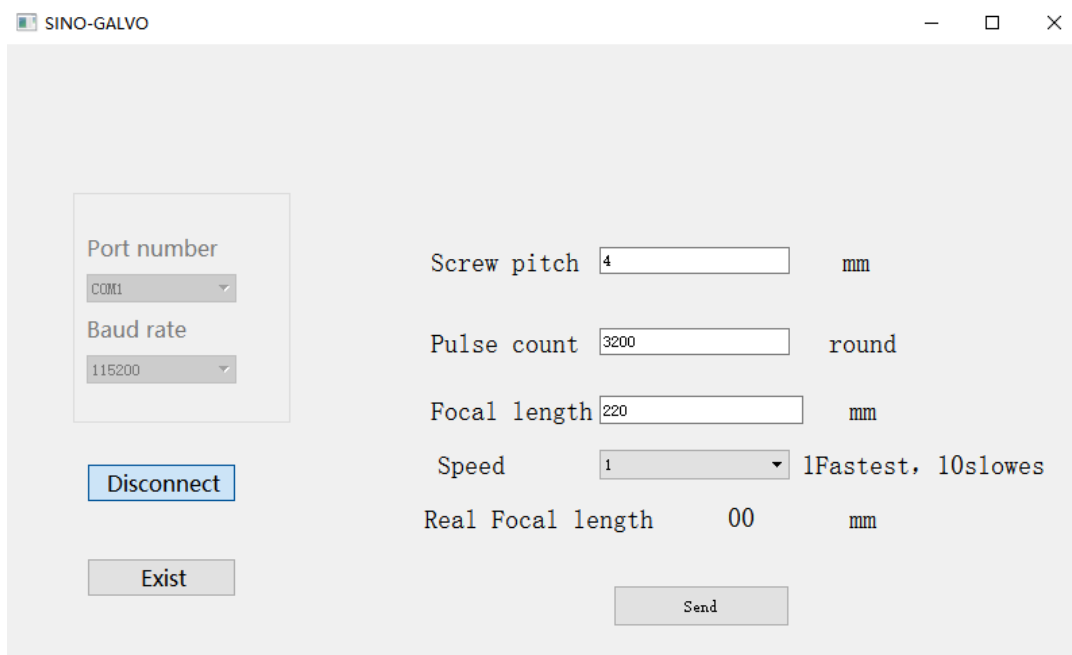


Figure 4-2

- ④ After set the Screw Pitch/Pulse Number(The pulse number that stepping motor need for one round spinning), click the "Send", successfully set window will be showed as Figure 4-3.

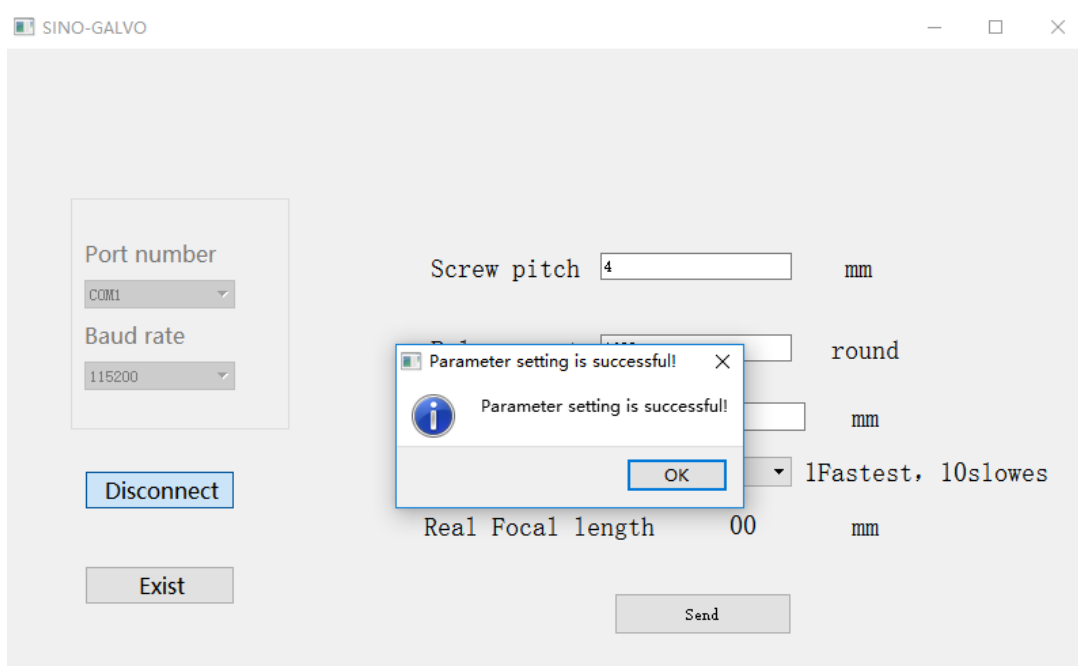


Figure 4-3

⑤ Then determine the exact focal length by setting up/down and testing the marking. The practical distance is shown in the software. (figure 4-4) Record the focal length data when the the marking is correct. Put the practical focal length in the Focal Length blank, click "Send", successfully set window popped up again. The data will be restored in the software. For next using, press the "Auto-focusing" button, the scanner head will automatically move back to the same position.

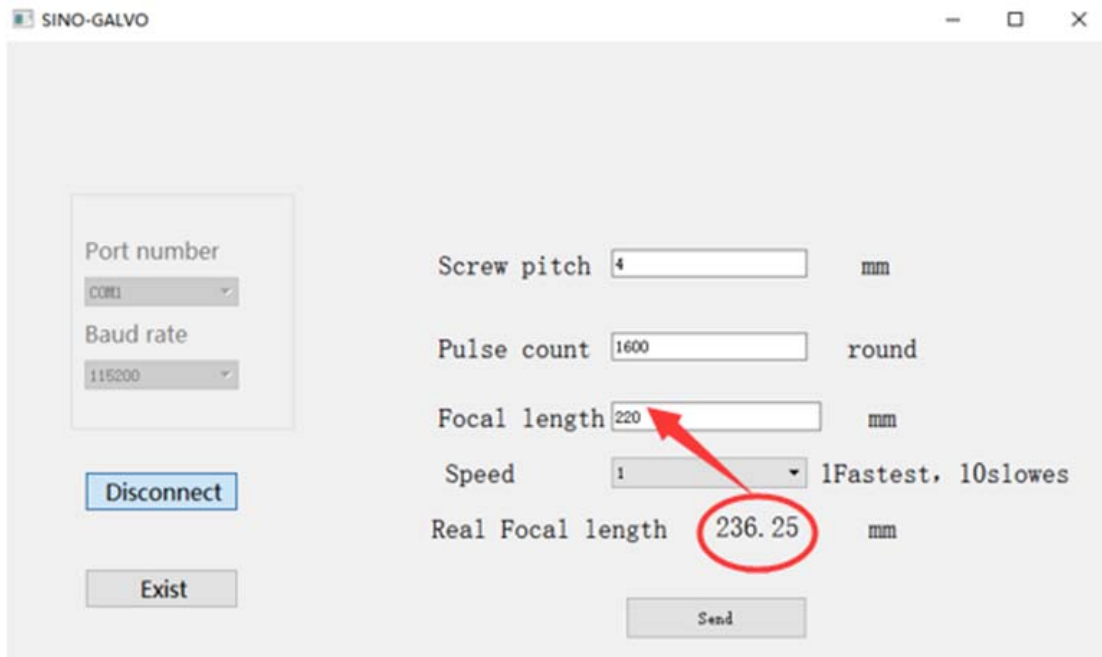


Figure 4-4

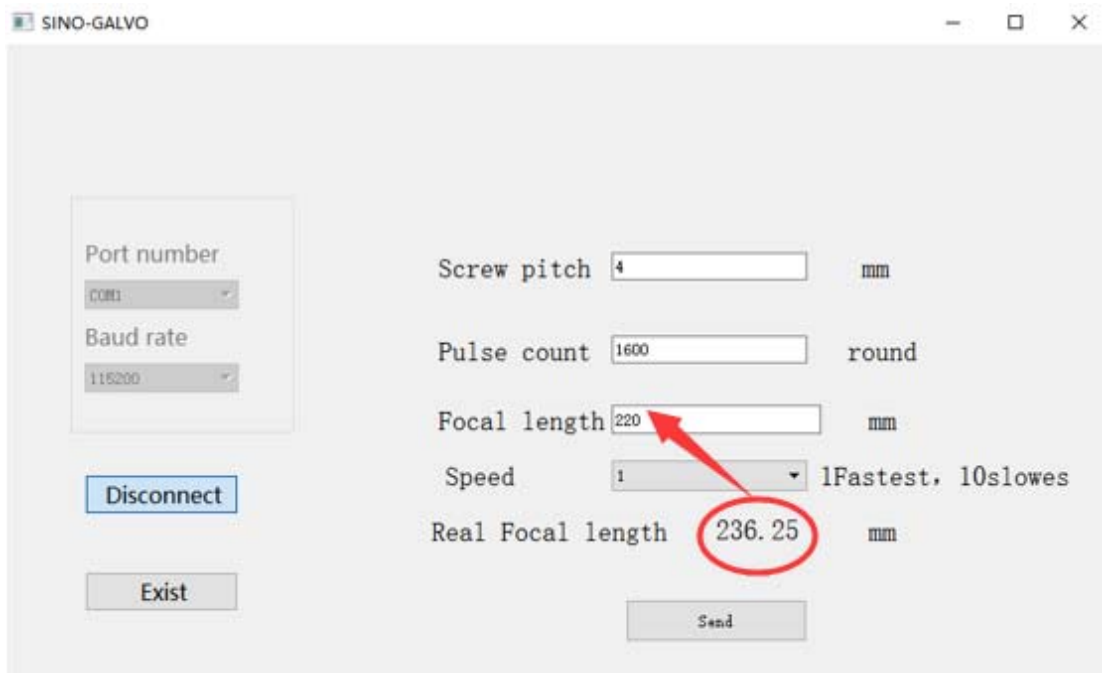


Figure 4-5

Chapter 5 Self-checking and FAQ

Before starting up the whole system, please check carefully to confirm whether there is any problems, such as: plug virtual connection or without connection, two mirrors touched with each other, drive board signal input errors, etc. Only after finishing all checking, then you can turn on the power supply.

Fault phenomenon	Reasons	Solutions
System has no any reactions	No power supply or the circuit did not connect well.	Check if the power supply is connected well
Red light keeps on with "KaBa" sound	Position limitation protection	Check if over input signal amplitude. If the signal is normal, please contact us.
Scan motor swings lightly after turning on	Too much interference or input signal circuit did not connect very well	Check the interference sources and the input signal circuit
Motor squeals after turning on, the drive board and motor overheat	Driver board and motors did not connect well/The mirrors or clips become loosen.	Check the wiring/ the mirrors and clips.
Mirror reflection power is weak	Light path is not aligned well	Align the light path of the marking machine; If the light path is normal, please contact us.
Marking graphics becomes one straight line	One motor can not move normally	Checking the wiring connection between the motors, drive boards and control board
Waves exist in the marking line	Grounding problems/ Surrounded by strong interference sources/The Anti-interference ability of marking control board is poor	Check if the ground connection is well/Check if there is a strong interference source surrounded/ Check the position control signal of marking control board
Marking square becomes rhombus or one side not straight	Abnormal signal output from D/A board.	Replace D/A board, if not solved, please contact us.

If you have any questions, please contact our Technical Services Department:

Service consulting hot-line: 400-055-8805

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