

ETC213AC
Auto Screwing robot

Instruction Manual

Table of Contents

I. Safety Instruction	2
II. Summary	3
2.1 Features.....	4
2.2 Alerting signal description	5
III. Connection and Use	6
3.1 Connection	6
3.2 Air pressure show and setting	6
3.2.1 Air pressure show	6
3.2.2 Air pressure setting	6
3.3 port Instruction	7
3.3.1 Pins Instruction of eight-pin Socket.....	7
3.3.2 Pins Instruction of Four-pin Socket	7
3.3.3 Pins Instruction of Five-pin Socket.....	8
3.4 Instruction of Input & Output.....	8
3.4.1 IO Function Definition.....	8
3.4.2 IO Function Instruction.....	9
3.5 Operation of First Time	11
IV. Trouble Shooting.....	12
1.trouble shooting and analysis	12
2.Daily Maintain	13
3. Regular Maintain.....	13

I. Safety Instruction

Caution about the main unit

- Only use this robot with rated voltage and frequency (refer to the trademark back of equipment).
- Don't move the XY table and the top head of feeding solder controller for protect them from damage.
- During processing, don't touch the movable parts.
- Before using, check the heating controller and pressure reduction valve have been fasten reliable.
- Keep the unit dry. Don't use or disconnect the unit with wet hands.
- If urgency event occurs, please press the emergency switch (red) at once, and main unit will cut off the power and stop processing file.

Caution about the power cord

- This machine is equipped with a 3-wires grounding plug and must be plugged into a 3-terminal grounded socket. Do not modify plug or use an ungrounded power socket. If an extension cord is necessary, use only a 3-wire extension cord that provides grounding.
- No use the machine when some parts are damaged, especially the power cord is damaged.

Caution about the teaching pendant

- Do not insert or plug the teaching pendant for protect it from damage. When pulling out the teaching pendant, loosen and remove the fixing screws and then pull out it.
- For protecting teaching pendant from damage, don't fall it or shock it intensively.

II. Summary

This desktop robot is designed for the automating operation for locking screw. It is a fully-automatic and high-resolution locking control system with 3 axes. Besides, this unit provides us easier programming instructions, more parameters, a larger memory space, and a higher speed. It highly improves the productivity effect.



2.1 Features

Table2-1: Main Specification

Power Supply		220VAC
Power Consumption		150W
Number of Controllable Axes		3 axis-type
Moving Range	X axis	250 mm
	Y axis	300 mm
	Z axis	100 mm
Speed Range	X axis	0.1~600 mm/sec
	Y axis	0.1~600 mm/sec
	Z axis	0.1~300 mm/sec
Repeatability	X axis	±0.02 mm
	Y axis	
	Z axis	
Resolution	X axis	±0.01 mm
	Y axis	
	Z axis	
Loading Weight	Working	8 Kg
	Head	2 Kg
Inport air pressure		0.6Mpa

Speed Controlling		handle the speed rising and/or dropping automatically
Storage for Teaching Files		Max. 999 files & Max. 60000 bytes.
Storage for Processing Files		Max.255 files.
Working Ambient	Temp.	0~40℃
	Relative Humidity	20%~90% (no condensation)
Dimension (W*D*H)		395*500*915mm

2.2 Alerting signal description

	Red light	Yellow light	Green light	Type of alarm	Stop type	Type of Relive alarm	restart
Not fetch screw	Bright			Immediately alarm	suspend	recover	can
Turn screw error	Bright			Immediately alarm	suspend	recover	can
Screw mot ready		flicker		Immediately alarm	suspend	recover	can
Normal operation			Bright				
In cease		Bright					

Remark : red light : express alarm lamp, equipment appear abnormal failure;

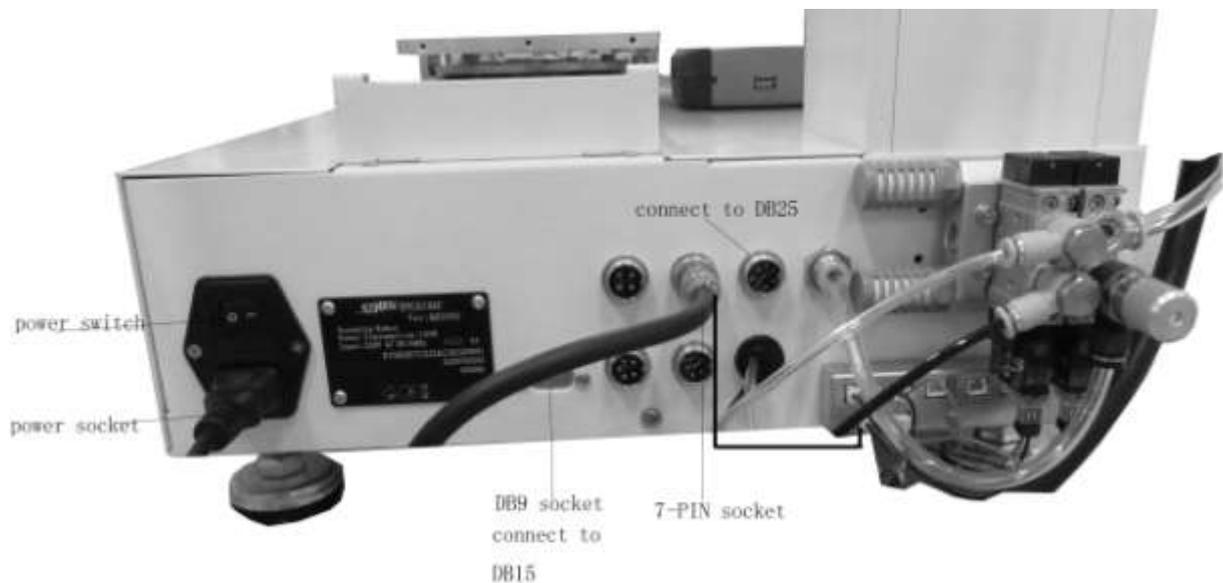
Yellow light : blink express in cease or forced state(manual manipulation), flicker express

starving or stand by state;

Green light : operation indicator light(normal state)

III. Connection and Use

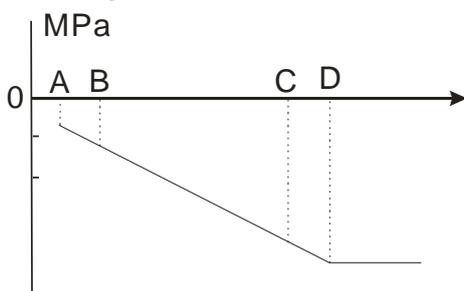
3.1 Connection



3.2 Air pressure show and setting

3.2.1 Air pressure show

- 1、 The value of air pressure showing green, expression assimilate normal;
- 2、 The value of air pressure is greater than upper limit ($>$ “1H”) , showing red, expression assimilate abnormal;
- 3、 The value of air pressure is less than lower limit ($<$ “1L”) ,showing red, expression pipeline blocking, examine and change filter element.



- A: minimum vacuum suction
- B: upper limit value of air pressure(1H)
- C: lower limit value of air pressure(1L)
- D: maximum vacuum suction

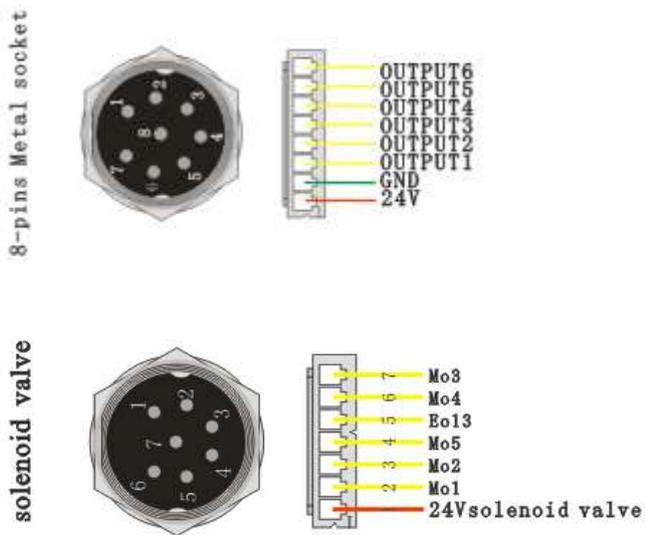
3.2.2 Air pressure setting

- 1、 air pressure bound setting Hi/Lo: press “SET” key, fine “1-H” (output Hi) , “1-L” (output Lo) , press up And down key setting Hi/Lo value.
- 2、 setting range of limit: limit must contain the pressure value not absorb and absorbing.

3.3 port Instruction(refer to drawings)

3.3.1 Pins Instruction of 8-pin and 7-pin Socket

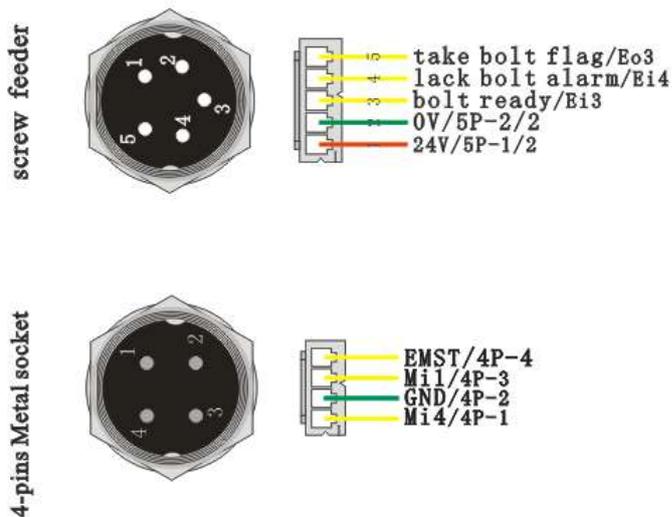
The following list describes the pins function of the eight-pin socket. By the socket it can control the external device.



NOTE: * If the customers need special function, the input and output signal can be set again.

3.3.2 Pins Instruction of 4-pin and 5-pin Socket

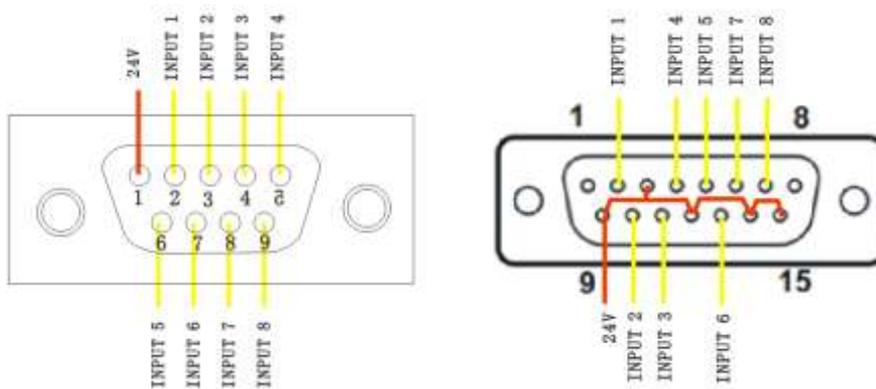
The following list describes the pins function of the four-pin socket.



NOTE: * If the customers need special function, the input and output signal can be set again.

3.3.3 Pins Instruction of DB9 and DB15 Socket

The following list describes the pins function of the four-pin socket.



3.4 Instruction of Input & Output

- The following input interfaces and output interfaces are corresponding to the signal pins which are defined as “Min, Mout, Ein, Eout” at the above socket. Also, it is corresponding to the interface at the “IO Test” displaying window.
- After setting, it can test the function of IO interface at the “IO Test” displaying window.
- The interfaces in following table can be set at the “Input Config” or “Output Config” of “System Config 2” of teaching pendant. It can define the special function for the following input & output interfaces which are corresponding to the above sockets.

3.4.1 IO Function Definition

1. In the “Input Config 2” displaying window, it can set the input interface: Min1~Min4 & Ein1-8 & Ein09~Ein16.

Input Interface	Optional Function
Min1	Origin BTN
Min2	Stop BTN
Min3	--
Min4	Foot BTN
Ein1~Ein8	--, Shortcut 5-259
Ein09~12	--
Ein13	Lack fault
Ein14~16	--
Kin1~4	--

2. In the “Output Config 2” displaying window, it can set the input interface: Mout1~Mout4, Eout09~Eout16.

Output Interface	Optional Function
Mout1~Mout4	--
Eout09~Eout16	--

3. In the teaching pendant, “Eout09~Eout16” are corresponding to the “Eout8+ (0~8)” at the “IO Test” and “Output (point)” displaying window.

Namely, “Eout8+ 1” is the output interface “Eou09”. “Eout8+ 2” is the output interface “Eou10”. “Eout8+ 3” is the output interface “Eou11”, etc.

3.4.2 IO Function Instruction

Function of Input	Function Instruction
--	Not have function.
Origin BTN	Input the reset signal into the unit by corresponding signal pin, and the unit runs the reset (ORG) operation.
Stop BTN	Input the stop signal into the unit by corresponding signal pin, and the unit stops the current operation.
Start BTN	Input the start signal into the unit by corresponding signal pin, and the unit starts to work or pauses the current work.
Foot BTN	Input the foot switch signal into the unit by corresponding signal pin, and the unit runs the foot switch operation, and the function is similar with the “Start BTN”.
Test input-L	Input the signal “breakover ground” into the unit by corresponding signal pin and the unit comes into the testing state (cannot move and only can program).
Test output-H	Input the signal “not breakover ground” into the unit by corresponding signal pin and the unit comes into the testing state (cannot move and only can program).
Lack fault	Input the signal “lack fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Block fault	Input the signal “block fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Temp fault	Input the signal “temp fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Temp/Feed fault	Input the signal “temp/feed fault” into the unit by corresponding signal pin and the unit comes into the process, such as stop working, alarming etc..
Upper CS	Input the signal “cylinder up sensor (in retraction state)” into the unit by corresponding signal pin and the unit judges the position of cylinder whether in retraction state.
Nether CS	Input the signal “cylinder down sensor (in reaching state)” into the unit by corresponding signal pin and the unit judges the position of cylinder whether in reaching state.

Function of Input	Function Instruction
Adj X-Limit	It is effective only when connecting with “9036 tip calibration device” and it is corresponding to the “Ein09”. Input the signal “Adj X-Limit” by “Ein09” to calibrate the X-axis of tip. (Note: only calibrating X/Y/Z at the same time, it can calibrate the tip’s position.)
Adj Y-Limit	It is effective only when connecting with “9036 tip calibration device” and it is corresponding to the “Ein10”. Input the signal “Adj Y-Limit” by “Ein10” to calibrate the Y-axis of tip. (Note: only calibrating X/Y/Z at the same time, it can calibrate the tip’s position.)
Adj Z-Limit	It is effective only when connecting with “9036 tip calibration device” and it is corresponding to the “Ein11”. Input the signal “Adj Z-Limit” by “Ein11” to calibrate the Z-axis of tip. (Note: only calibrating X/Y/Z at the same time, it can calibrate the tip’s position.)
Shortcut	It is corresponding to the shortcut of processing file. The shortcut can be set in the “File Name” displaying window of teaching pendant. It can be use do find the required processing files quickly.
Shortcut1	Min1
Shortcut 2	Min2
Shortcut 3	Min3
Shortcut 4	Min4
Shortcut 5~259	It is corresponding to the “Ein1~Ein8”. Namely, the high & low electrical level of “Ein1~Ein8” can form 255 (1~255) kinds signal. The shortcut (5~259) is the sum of the electrical level digit add 4.

Function of Output	Function Instruction
--	Not have function.
Nozzle 1	Once the nozzle 1 comes to run the program, the output is in conducting state, or else not.
Nozzle 2	Once the nozzle 2 comes to run the program, the output is in conducting state, or else not.
Nozzle 3	Once the nozzle 3 comes to run the program, the output is in conducting state, or else not.
Nozzle 4	Once the nozzle 4 comes to run the program, the output is in conducting state, or else not.
Ready flag	When the unit comes into the normal ready state, the output is in conducting state, namely, once receiving the “START” signal, it comes to run. And it closes the output after running.
Alarm flag	When set the mode as alarming, once it detects the abnormal state, the output is in conducting state, or else not.
Working flag	When the unit comes into the working state, the output is in conducting state, or else not.
WorkEnd flag	After t finishing the process, the output is keeping in conducting state 200ms, or else not.
Cylinder	Once the unit comes to run the cylinder process, the output is in conducting state, control cylinder motion, or else not.
Clean output	Once the unit comes to run the clean process, the output is in conducting state, do the clean (blowing or revolving brush), or else not.

Note:

- *The function settings of input & output don't open to the user. It only operated by Producer Company.*

-
- *It will not give advance information if some functions are changed.*

3.5 Operation of First Time

If using the unit for the first time, user should test the basic functionalities at first.

Step1: Install and Test

Before using, user should properly install and connect the system.

At first, user should test the basic functionalities of the system with the 'Test' function of the teaching pendant.

Test including: Is there any problem with the axes movements towards positive or negative direction?

Step2: Parameters Setting

Properly set the global parameters and other parameters using in the processing.

Remark: Failure to properly set the parameters will cause difficulties in using the system.

Step3: Teaching Program

Program a graphic with teaching pendant. Refer to the instruction manual of the teaching pendant.

Step4: Origin Calibration & Set the Parameters of the Teaching Pendant

1. Origin calibration: User should adjust the start point when a teaching file is created for the first time.
2. Set file parameters.

Step5: Download & Process

1. Download: please refer to instruction manual of the teaching pendant "Teaching File Download".
2. Process: please refer to instruction manual of the teaching pendant "File Processing".

IV. Trouble Shooting

1.trouble shooting and analysis

	Trouble shooting	Reason	Measure
1	The unit can't reset.	Please check if the emergency BTN was pressed or not.	Dismiss the emergency BTN and press the ORG BTN.
2	The z axis unit movement wasn't accurate.	Out of the weight or the speed.	If the unit's accurate decreased, reduce the speed and it will remission . Adjust the verticality or parallelism of the track. Tighten the screws of the tracks.
3	The motor was abnormal.	The board or the motor was bad.	If it was still bad after changed the signal wires of motor, the board doesn't have matter. change the wires of drivers, if the bad one works after changed the wires, it proves the motor was bad, if the normal one doesn't work, it proves the driver is bad.
4	The firmware always displays EMERGENCY STOP PLEASE RESET	Was not reset.	Please dismiss the emergency BTN and reset the unit, if it doesn't work, the relay of the power board was abnormal.
5	The unit is always alarming.	If overcome the trouble it was still alarming, maybe the emergency BTN was bad or the alarm flag wasn't feedback.	Press the emergency BTN and check if power will be cut or not. if the power wasn't cut, the emergency BTN is bad.
8	There were something strange in the lead screw.	1. The bearings was damaged. 2. Lack of lubricating oil.	1. Clean or change the bearings. 2. Add the lubricating oil.

	Trouble shooting	Reason	Measure
9	The lead screw was shaking while moving.	1. The lead screw was bent 2. The lead screw was not concentricity with the motor.	1. Change the lead screw. 2. Adjust the place of the lead screw.
11	The belts slipped.	1. The belts loosen. 2. There were some lubricating oil on the belts.	1. Adjust the motor's place for tightening the belt. 2. Clean the lubricating oil.

2. Daily Maintain

1. Clean the solder and glue after working.
2. Spread lubricant on the screw and track of Z-axis everyday.
3. Must change or clean the tips often.
4. Spread lubricant on the screw and track of X-axis and Y-axis everyday.
5. Don't touch the track for avoiding rust.

3. Regular Maintain

You should maintain the machine about three month, if you always use it. The details is as follow:

1. Take off the cover of X-axis, clean the screw and track, check the screw if loose or not, spread lubricant on the screw and track, move the X-axis for spread more lubricant. Then take on the cover.

2. Take off the cover of Y-axis, clean the screw and track, check the screw if loose or not, spread lubricant on the screw and track, move the Y-axis for spread more lubricant. Check the screw of light sensor. Then take on the cover.

3. Take off the cover of Z-axis, clean the screw and track, check the screw if loose or not, spread lubricant on the screw and track, move the Z-axis for spread more lubricant. Check the screw of light sensor. Then take on the cover.

6. Spread lubricant on the chain and axis.

Check the wires and element if they are normal or not. Clean the control center and check the ports loose or not. Check the switch function.