



TSR2000 Series 3 Axis Dispensing Robot



Hardware Instruction Manual

Congratulations on the purchase of a Techcon Dispensing Robot.

Now that your dispensing system is ready to use, take a few moments to get to know the parts of your dispensing system and software. This manual is designed to help you use the robot as quickly as possible.

At Techcon, we hope you find this product beneficial. If you have any questions, please contact us at the details listed below:

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This manual is designed to provide information about the Techcon robot hardware. Every effort has been made to make this manual as complete and accurate as possible. There is no implied or expressed warranty as to the purpose, suitability or fitness of the information. The information is provided on an as-is basis. Techcon reserves the right to improve and revise its products. This manual specifies and describes the product as it existed at the time of publication. As with any new programming software, a basic understanding of the vocabulary is necessary.

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1. SAFETY INSTRUCTION

SERIOUS WARNING	
	<ul style="list-style-type: none"> ➤ Danger! High voltage! The product poses a risk of electric shock if used in an unsafe manner. ➤ Only authorized personnel should change settings. ➤ Push the red emergency switch for power off in an emergency. ➤ Forbid working while the power wire was damaged. ➤ If the device remains unused for a long period of time remove the power cord out of power socket. ➤ During maintenance and inspection of the machine, remove the power cord from the machine. ➤ Install a Frame Ground to prevent electric shock. ➤ Operate the machine within the manufacturer's specifications (such as payload, speed, operational range, user environment). ➤ Do not plug or unplug cables when the machine is powered on.
	<ul style="list-style-type: none"> ➤ Keep the unit dry. Don't use or disconnect the unit with wet hands. ➤ Keep area around the machine clean, to reduce risks of accidents. ➤ Do not attach or detach the power cord while the power switch of the controller is turned ON. ➤ When people and the machine are working together simultaneously, check for manual safety, especially while the power is ON and during the manual operation.
	<ul style="list-style-type: none"> ➤ During maintenance and inspection of the machine, power off. High voltage, Authorized personnel only. ➤ The machine is not rated to explosion proof specification, do not use in potentially explosive atmospheres.
WARNING	
	<ul style="list-style-type: none"> ➤ Do not move the axis by hand, to avoid damaging the machine. ➤ During processing, don't touch movable parts. ➤ Touching the machine while it is operating may injure the operator or damage the device. Consider using a safety cover. ➤ While the dispense operation is paused, inspect before continuing operation. ➤ Before starting the dispense operation, make sure that there is no person or obstacle in the machine's working area.
	<ul style="list-style-type: none"> ➤ Remove unsecured parts when moving machine location. ➤ Mind head! Attention should be paid to the edges of the machine when moving. ➤ Carry safely to an applicable work area and install the machine on a flat, stable and robust workstation.
<p>0~40°C</p>	<ul style="list-style-type: none"> ➤ The product must be used and/or stored in an suitable environment. ➤ Working ambient temperature is 0~40°C, relative humidity is 20%~90%.



- The equipment is heavy and large, do not stack.
- Before moving and carrying, ensure the axis is secured.
- Install the machine on a flat, stable and robust workstation.



- Regularly inspection and maintenance will ensure durability and performance.
- Operate the machine within the manufacturer's specifications (such as payload, speed, operational range, user environment).
- Before starting a repeat dispense operation, ensure that no obstacle is in the machine's working area.

ATTENTION



- Do not discard the original packaging.
- If the machine is sent back to the manufacturer, reuse original packaging.
- The machine must be placed vertically.
- Keep machine dry.



Caution about the main unit

- Only use this robot with correct rated voltage and frequency (refer to the markings on the back of equipment).
- Do not move the XY base plate and the top head, by hand. This will protect them from damage.
- During operation, do not touch the moving parts.
- Keep the unit dry. Do not use or disconnect the equipment with wet hands.
- If an emergency event occurs, press the emergency switch (red) immediately. The main unit will cut off the power and stop processing the dispensing file.



Caution about the power cord

- This machine is equipped with a 3-wire grounding plug and must be plugged into a 3-terminal grounded socket. Do not modify the plug or use an ungrounded power socket. If an extension cord is necessary, use only a 3-wire extension cord that provides grounding.
- Do not turn on the power of the machine if any parts are damaged, especially if the power cord is damaged.



Caution about the teaching pendant

- Do not connect the teaching pendant during a profile. When disconnecting the teaching pendant, loosen and remove the fixing screws and then pull out it, once the profile has finished.
- For protecting the teaching pendant, from damage, do not drop it on the floor or shake it intensively.

2. SUMMARY

This desktop robot is designed for fast automated dispensing. The robot features a high precision control system with 3 axis (X, Y and Z). This robot provides the operator with easy programming instructions, increased parameters, a larger memory space and a higher speed, which highly improves productivity.



Note: the illustration may have some differences with each application. The dispensing equipment, such as a dispensing valve, syringe, cartridge, etc. are optional.

2.1 Features

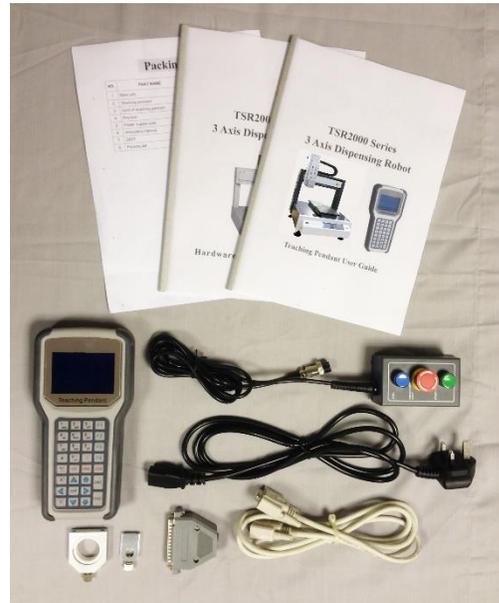
- Comprehensive 3-dimensional drawing support, such as 3-dimensional linear interpolation, capabilities of teaching 3D graphics and user-defined 3D array.
- Capability to save mass files.
- User-defined array function: easy solution for mould deviation. Supports user-defined 3D array. Smoothing functions of changing speed and hi-speed trajectory whilst moving. User-definable speed parameters.
- Group function: this function allows operators to copy, delete, modify, array, and pan multi-points.
- Advanced teaching pendant that supports functions, such as array, group edit, sub-procedure, condition-call procedure etc.
- Unique merge function: easy resolution to process complex multi-layers, irregular array and non-array graphics.
- Multiple processing modes, such as single-step operation, overall processing and automatic loop processing.

2.2 Specifications

Features		TSR2202(E)	TSR2302(E)	TSR2402(E)
Input Voltage		110 VAC, 50/60 Hz		
Input Voltage (E Version)		220 VAC, 50/60 Hz		
Power Consumption		150 W	200 W	200 W
Motor		2-phase stepper		
Drive Mechanism		Belt		
Number of Controllable Axis		3 -Axis		
Moving Range	X axis	200mm	300mm	400mm
	Y axis	200mm	300mm	400mm
	Z axis	50mm	100mm	100mm
Speed Range	X/Y axis	0.1 – 600 mm/sec	0.1 – 800 mm/sec	0.1 – 800 mm/sec
	Z axis	0.1 – 300 mm/sec	0.1 – 300 mm/sec	0.1 – 300 mm/sec
Repeatability Accuracy	X/Y/Z axis	+/- 0.01mm		
Resolution	X/Y/Z axis	0.01mm		
Payload	Tool	5 Kg	8 Kg	8 Kg
	Head	2 Kg	5 Kg	5 Kg
Storage for Processing Files		Max. 255 files, Max. 60000 points		
Processing Files		Max 128 files.		
Working Ambient	Temperature	0~40°C		
	Relative Humidity	20% ~ 90% (no condensation)		
Dimensions (W×D×H)		467 x 320 x 336 mm	653 x 484 x 552 mm	628 x 584 x 650 mm
Unit Weight		23 kg	43 kg	48 kg

* The specifications are subject to change without notice.

2.3 Unpacking and Inspection



Carefully unpack the valve and examine the items contained in the carton. These will include:

- Robot
- Teaching Pendant
- Teaching Pendant Cable
- Keybox
- Power Lead
- Hardware User Guide
- Teach Pendant User Guide
- Syringe Barrel Mounting Kit
- DB37 Connector
- TSR-VCABLE (not shown) connects robot to TS250, TS350 or TS5xxR controllers

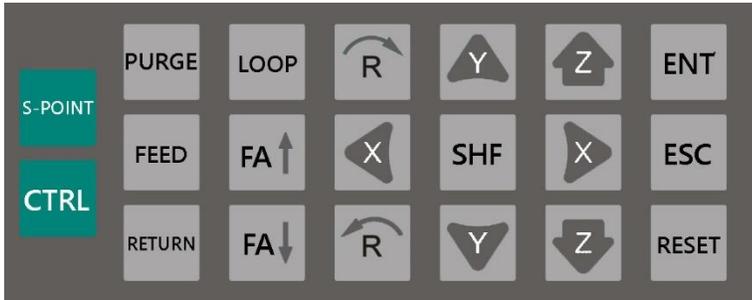
Inspect the unit for any damaged which may have occurred in transit. If such damage has occurred, notify the carrier at once. Claim for damage must be made by the consignee to the carrier and should be reported to the manufacturer.

2.4 Instructions about the Keypad

The keypad, on robot, can be used when the teaching pendant is disconnected.



Caution: when connecting the teaching pendant with the main unit (robot), the buttons on the front panel of the unit are invalid except **START/PAUSE**, **FEED** & **RESET**.



For Further functions and detailed use of the buttons refer to the chapter 5 “off-line operation instruction”.

Button	Function Description	
X← / X→ / Y↑ / Y↓ / Z↑ / Z↓	Control the axis movement	
【S-PONT】	Move the tip to the Calibration point of the processing file. Will move to the first dispense location if no calibration point is programmed.	
【SHF】	Switch point processing speed, 3 level: low, middle, high	
【ENT】	Save the parameters.	
【RESET】	Reset, move the tip to the zero point (0,0,0).	
【LOOP】	Set the loop operating parameters.	
【ESC】	Return to file processing interface but not save the set parameters.	
【FEED】	Manual dispense.	
【RETURN】	N/A	
【CTRL】	N/A	
【FA↑】	N/A	N/A
【FA↓】	N/A	
 / 	Control the R axis' coordinate.	* With R axis type
【START/PAUSE】	Start or pause the processing file.	

2.5 Course of the File Processing

To complete a process file there needs to be three steps: **program-adjust-process**. For detailed operation refer to the “operation manual of the teaching pendant”.

Program: The method of teaching a program.

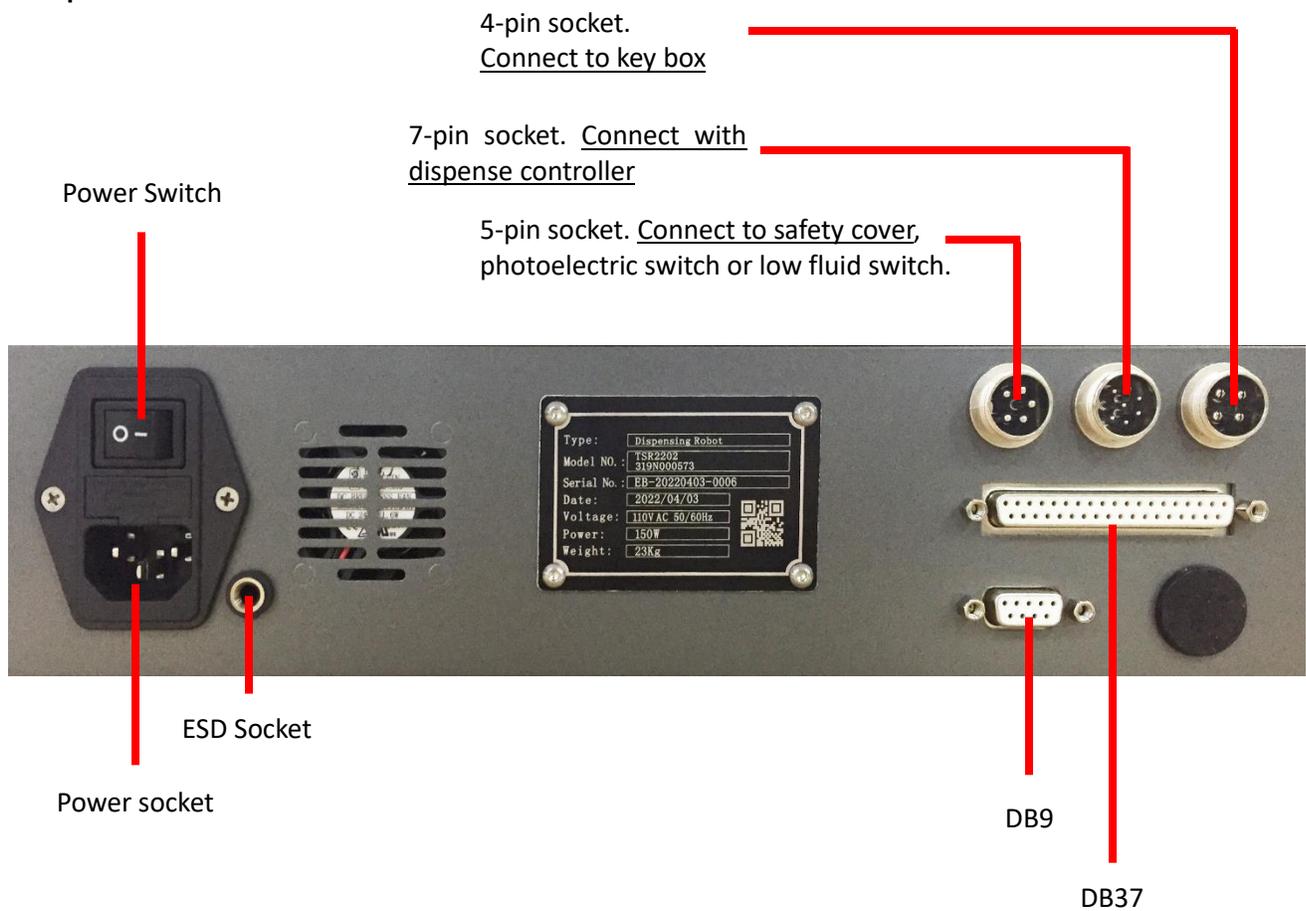
Adjust: Adjusting the programming file, such as origin calibration, slant array, height adjusts, file parameters adjust (including speed, acceleration, delay time, distance etc.)

Process: Download the program file to the system, from the teaching pendant.

The program is now complete and can be initiated.

1. SETUP AND CONNECTION

3.1 Setup



3.1.1 How to Connect a (TS250 or TS350) Syringe Dispenser with Interface Cable

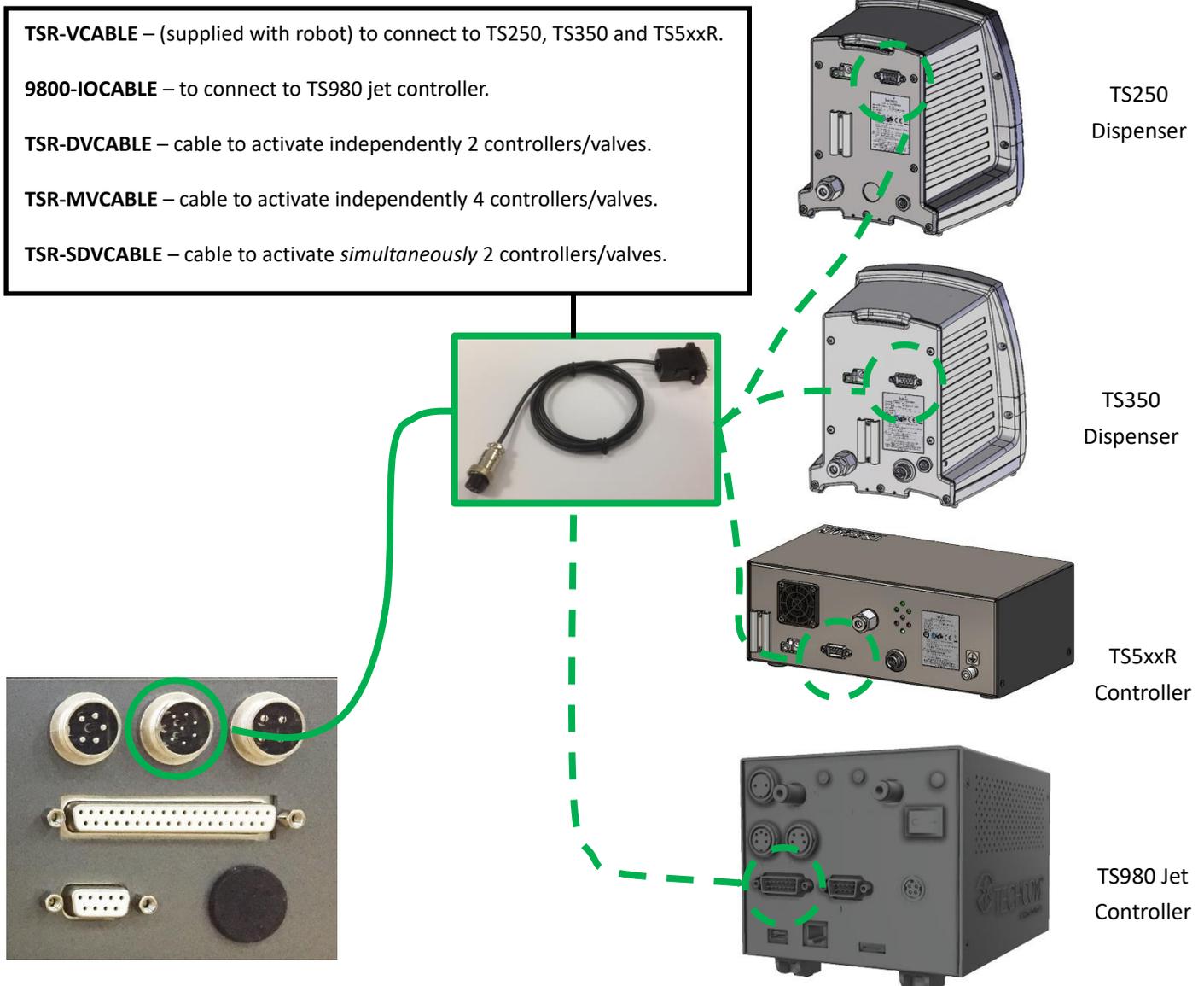
Take the supplied TSR-VCABLE and connect the round female connector to the male 7 pin "OUTPUT" connector on the rear of the robot. Take the opposite end and connect the female 9 pin connector to the DB9 connector on the rear of the TS250 or TS350 Series controllers.

3.1.2 How to Connect a (TS5xxR) Valve Controller with Interface Cable

Take the supplied TSR-VCABLE and connect the round female connector to the male 7 pin "OUTPUT" connector on the rear of the robot. Take the opposite end and connect the female 9 pin connector to the DB9 connector on the rear of the TS500R controller.

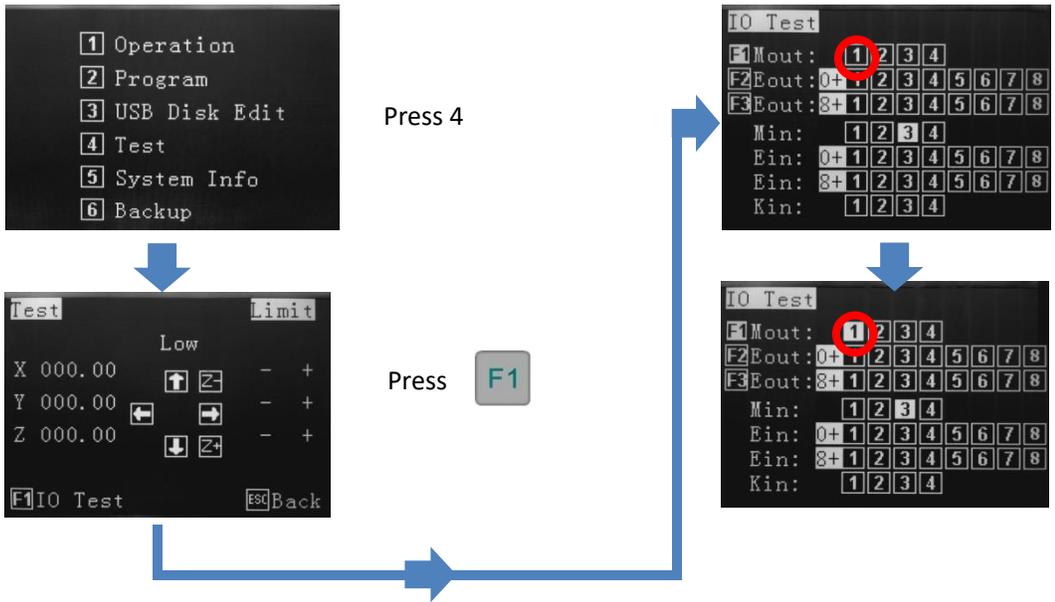
3.1.3 How to Connect a (TS980) Jet Valve Controller with Interface Cable

Take the optional 9800-IOCABLE and connect the round female connector to the male 7 pin "OUTPUT" connector on the rear of the robot. Take the opposite end and connect the male 15 pin connector to the rear of the TS980, jet valve controller, marked I/O.



3.1.4 Testing the Interface Connections

TS250, TS350, TS50xxR and TS980 with TSR-VCABLE and 9800-IOCABLE – 1 Dispense Head in Use



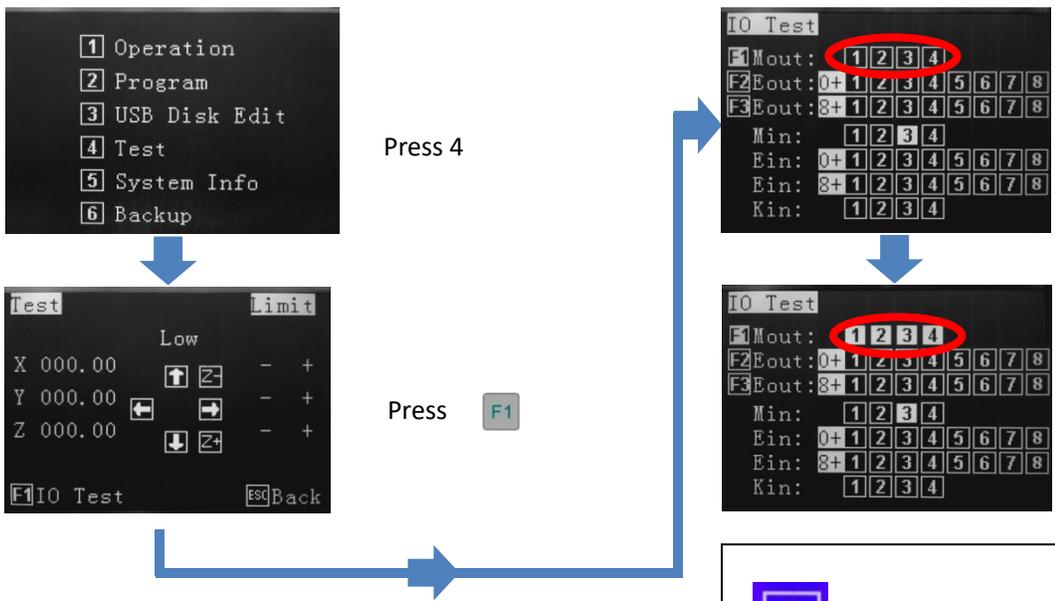
By pressing button 1, the controller will activate. If the system is complete and under pressure, fluid will exit out of the dispense outlet.

Press 1 to turn off output.

To go back to main screen, by continually pressing **ESC**

TS250, TS350 and TS5xxR with TSR-VCABLE – Multiple Dispense Heads in Use

The robot has the capability to operate up to 4 dispensing valves independently, by using a special interface cable. Each valve requires a separate controller to perform this function. Triggering of each I/O signal is set in the editing screen. This example will demonstrate 2 valves dispensing different fluids, through 2 controllers, creating dots. The robots back menu must be configured first and different cable ordered – please refer to teaching pendant user guide instruction.



By pressing buttons 1 through 4, the dispensers/controllers will activate. If the systems are complete and under pressure, fluid will exit out of the dispense outlets.

Press 1 through 4 to turn off outputs.

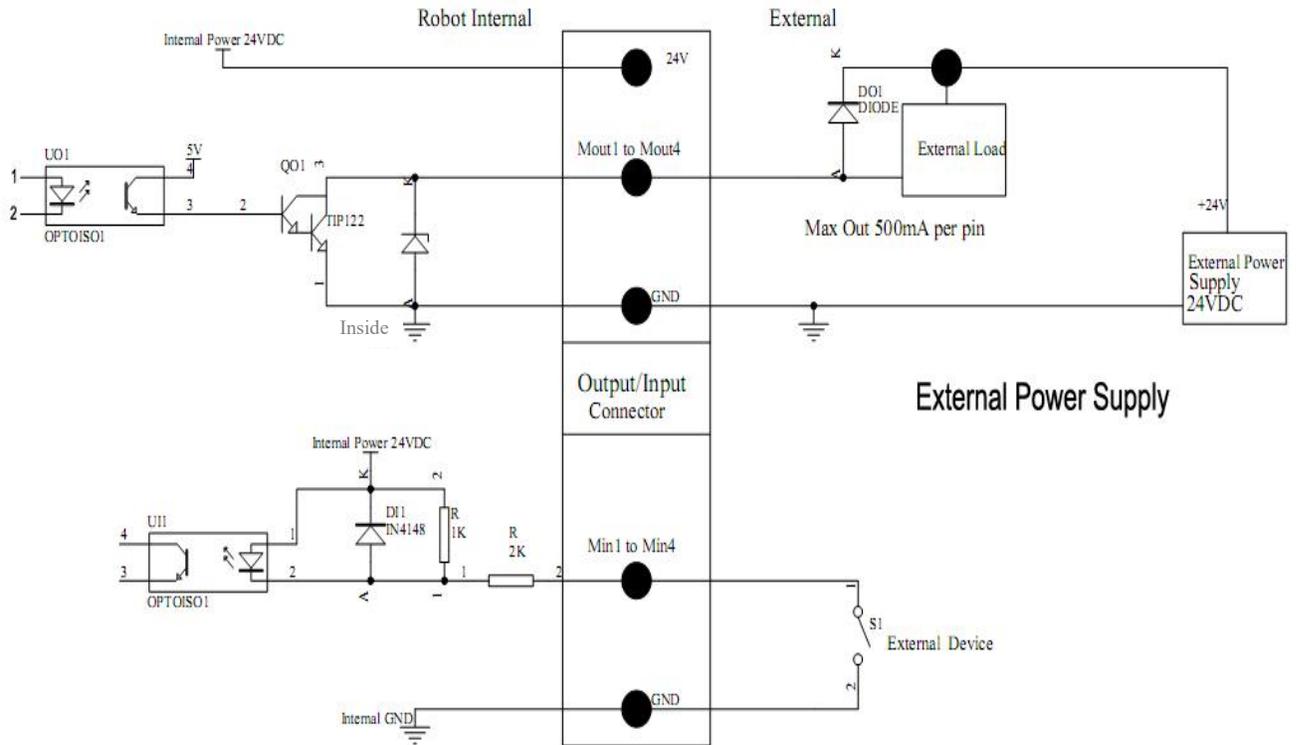
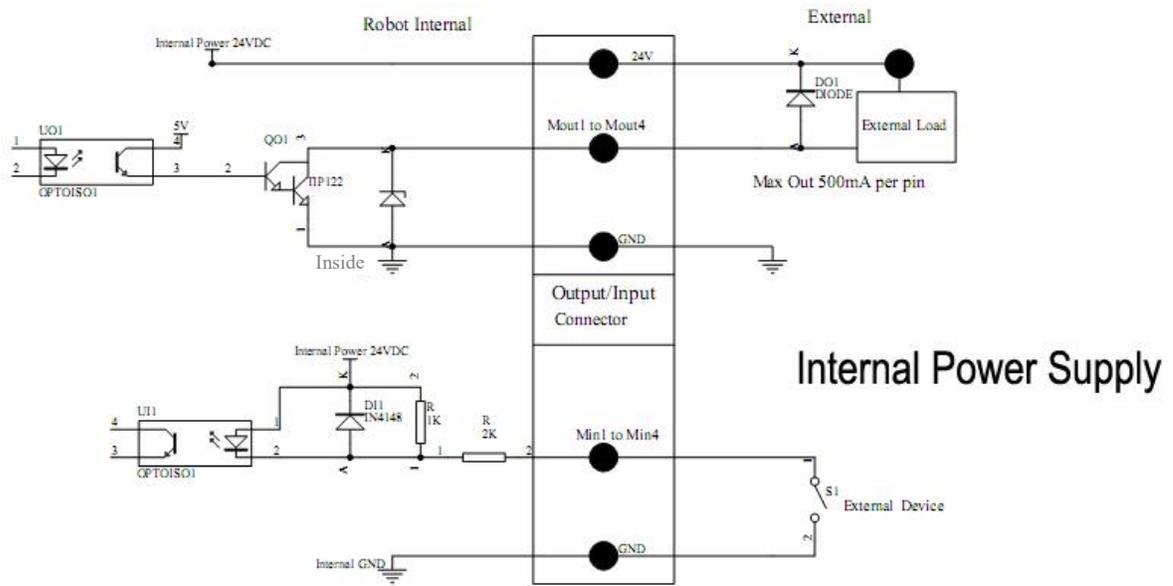
To go back to main screen, keep pressing **ESC**

3 Output **not** activated

3 Output **activated**

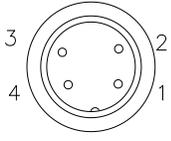
3.2 I/O Socket Instruction

3.2.1 Circuit Diagram of I/O Socket

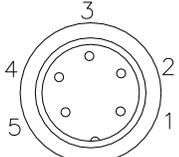


3.2.2 Four Pin Socket (Key Box)

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

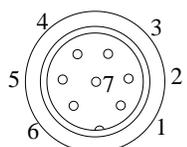
Four-pin socket	Pin No.	Pin name	Pin Instruciton	Application
	1	Min4	Main signal input 4	Connected to "START/STOP" button.
	2	GND	Ground of power supply	GND
	3	Min1	Main signal inputting 1	Connected to reset (ORG) signal
	4	Min2	Main signal inputting 2	Connected emergency stop button

3.2.3 Five Pin Socket (Safety Cover)

Five-pin socket	Pin No.	Pin name	Function
	1	24VDC	24VDC
	2	0V	0V
	3	Min3	Reserve
	4	Ein13	Reserve
	5	Ein14	Reserve

3.2.4 Seven Pin Socket (Controller)

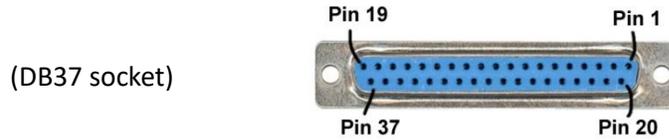
The following list describes the pins function of the seven-pin socket. By the socket, it can control the external device.

Seven-pin socket	Pin No.	Pin name	Function
	1	24VDC	24VDC
	2	0V	0V
	3	Mout1	Reserve
	4	Mout4	Reserve
	5	Ein12	Reserve zero position
	6	Mout2	Reserve
	7	Mout5	Reserve

3.3 Instructions For DB37 Socket

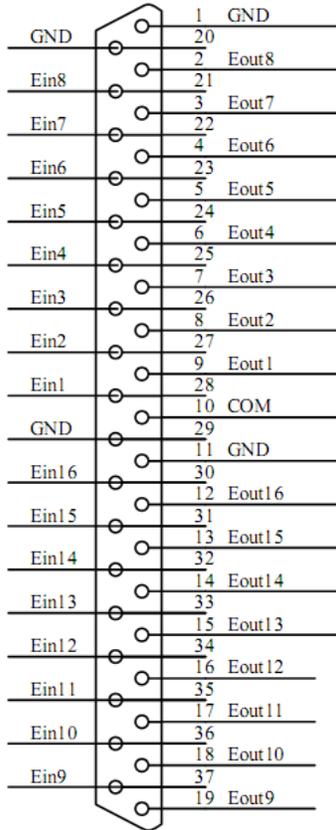
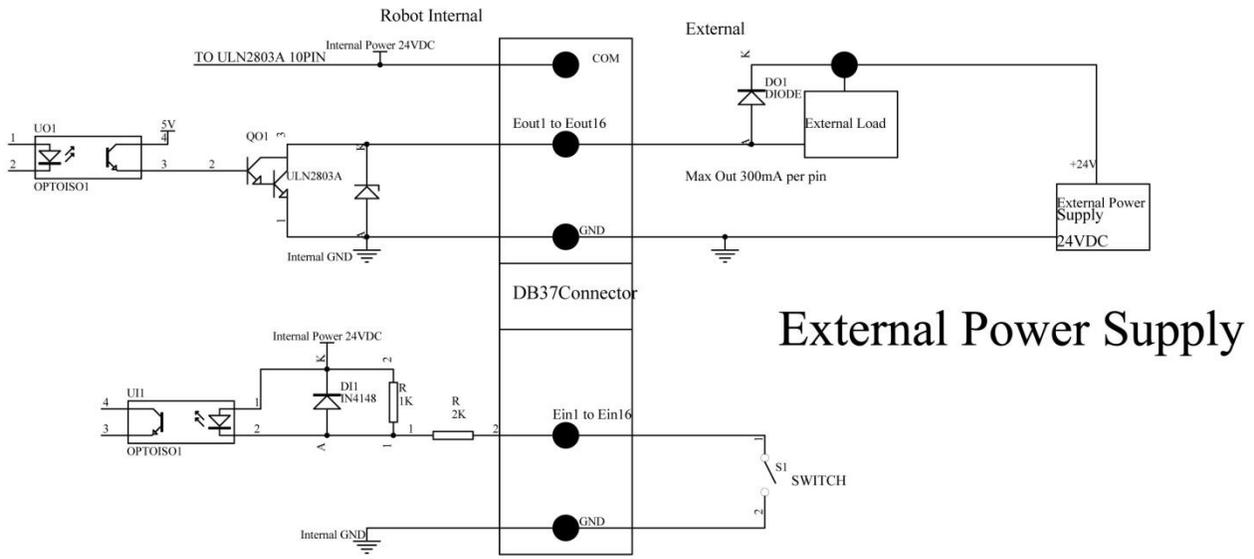
Note: The DB37 socket is an optional fitting and must be ordered separately if required.

3.3.1 Pin Instruction of DB37



NO.	Definition of DB37 pins	Corresponding I/O interface DB37	No.	Definition of DB37 pins	Corresponding I/O interface DB37
1	GND	P01	20	GND	P20
2	Eout8	P02	21	Ein8	P21
3	Eout7	P03	22	Ein7	P22
4	Eout6	P04	23	Ein6	P23
5	Eout5	P05	24	Ein5	P24
6	Eout4	P06	25	Ein4	P25
7	Eout3	P07	26	Ein3	P26
8	Eout2	P08	27	Ein2	P27
9	Eout1	P09	28	Ein1	P28
10	COM	P10	29	GND	P29
11	GND	P11	30	Ein16	P30
12	Eout16	P12	31	Ein15	P31
13	Eout15	P13	32	Ein14	P32
14	Eout14	P14	33	Ein13	P33
15	Eout13	P15	34	Ein12	P34
16	Eout12	P16	35	Ein11	P35
17	Eout11	P17	36	Ein10	P36
18	Eout10	P18	37	Ein9	P37
19	Eout9	P19			

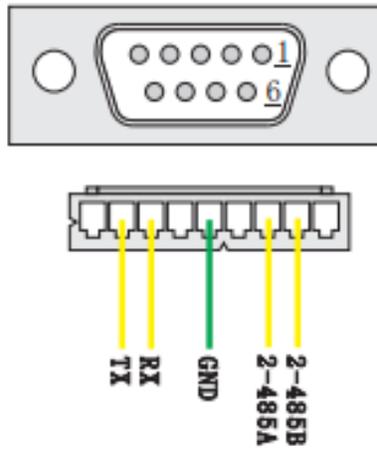
3.3.2 Circuit Diagram of DB37

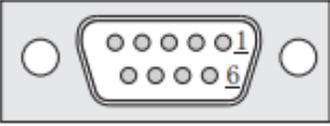


Plug of DB37 (pin type)

Connection of DB37 plug

3.3.3 Pin Instruction of DB9



			
Pins	Function	Pins	Function
1	No connection	6	No connection
2	TX (Transmitter signa)	7	2-485A
3	RX (Receiver signal)	8	2-485B
4	No connection	9	No connection
5	GND (power supply "0V")		

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. It also corresponds to the interface at the “IO Test” display window.
- After setting, the function of IO interface can be tested at the “IO Test” display window.
- The interfaces, in the 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.
- Main board port define list:

Board	Port	Function
Expansion input port	Ein12	7P-5
	Ein13	5P-4
	Ein14	5P-5
Main input port	Min1	Reset button signal
	Min2	Emergency stop button signal
	Min3	5P-3
	Min4	Start/pause button signal
Main output port	Mout1	7P-3
	Mout2	7P-6
	Mout4	7P-4

1.4.1 IO Function Definition

1. In the “Input Config 2” displaying window, the input interfaces can be set:

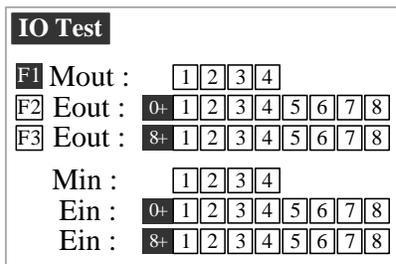
Input Interface	Optional Function
Min1	--, Shortcut1, Origin BTN, safe flag-1, safe flag-2
Min2	--, Shortcut 2, Stop BTN, safe flag-1, safe flag-2
Min3	--, Shortcut 3, Start BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS
Min4	--, Shortcut 4, Foot BTN, safe flag-1, safe flag-2
Min5	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag.
Min6	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag.
Min7	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag.
Min8	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag.
Ein1~Ein8	--, Shortcut 5-259
Ein1	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 5.
Ein2	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 6
Ein3	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 7
Ein4	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 8
Ein5	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 9
Ein6	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 10
Ein7	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 11
Ein8	--, Origin BTN, Stop BTN, Start BTN , Foot BTN, safe flag-1, safe flag-2, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag, shortcut 12
Ein09	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Adj X-Limit, Shortcut 260, Upper CS, Nether CS, pressure flag
Ein10	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Adj X-Limit, Shortcut 261, Upper CS, Nether CS, pressure flag
Ein11	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Adj X-Limit, Shortcut 262, Upper CS, Nether CS, pressure flag
Ein12	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Shortcut 263, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag
Ein13	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Shortcut 264, Lack

Input Interface	Optional Function
	fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag
Ein14	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Shortcut 265, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag
Ein15	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Shortcut 266, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag
Ein16	--, Origin BTN, Stop BTN, Start BTN, Foot BTN, safe flag-1, safe flag-2, Shortcut 267, Lack fault, Block fault, Temp fault, Temp\Feed fault, Upper CS, Nether CS, pressure flag
Kin1	--、 Upper CS, Nether CS
Kin2	--、 Upper CS, Nether CS
Kin3	--、 Upper CS, Nether CS
Kin4	--、 Upper CS, Nether CS

2. In the “Output Config 2” display window, the input interface can be set:

Output Interface	Optional Function
Mout1~Mout4	--, Nozzle 1, Nozzle 2, Nozzle 3, Nozzle 4, Working Flag, Work End Flag, Cylinder, Clean Output
Eout09~Eout16	--, Ready Flag, Alarm Flag, Working Flag, Work End Flag, Cylinder, Clean Output, pause flag, left light flag, right light flag

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 “Eout09”. “Eout8+ 2” is the output interface “Eou10”. “Eout8+ 3” is the output interface “Eout11”, etc.

3.4.2 IO Function Instruction

Function of Input	Function Instruction
--	N/A.
Origin BTN	Input the reset signal into the unit by corresponding signal pin, and the unit will run 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".
Safe flag-1	Input the signal "breakover ground" into the unit by corresponding signal pin and the unit comes into the testing state (cannot move and can only be programmed).
Safe flag-2	Input the signal "not breakover ground" into the unit by corresponding signal pin and the unit comes into the testing state (cannot move and can only be programmed).
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.
Adj X-Limit Adj Y-Limit Adj Z-Limit	It is effective only for the dispensing machine and only when connecting with "tip calibration device". "Adj X-Limit" is corresponding to the "Ein09". Input the signal by "Ein09" to calibrate the X-axis of tip. "Adj Y-Limit" is corresponding to the "Ein10". Input the signal by "Ein10" to calibrate the Y-axis of tip. "Adj Z-Limit" is corresponding to the "Ein11". Input the signal 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" display window of teaching pendant. It can be used 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
--	No 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 setting 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.
Work End flag	After 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.
Pause flag	The condition of pause BTN.
Left light flag	The condition of left light on key box.
Right light flag	The condition of right light on key box.

Note:

- The function settings of input & output cannot be accessed by the operator. It can only be operated by the manufacturer.
- Will not give advanced information if some functions are changed.

1.5 Operation For First Time Use

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

Step 1: Install and Test

The operator should test the basic functionalities of the system with the 'Test' function on the teaching pendant. Test should include if there are any problems with the axis movements towards positive or negative directions.

Step 2: Parameters Setting

Correctly set the global parameters and other parameters being used in the process.

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

Step 3: Teaching Program

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

Step 4: Origin Calibration & Setting the Parameters of the Teaching Pendant

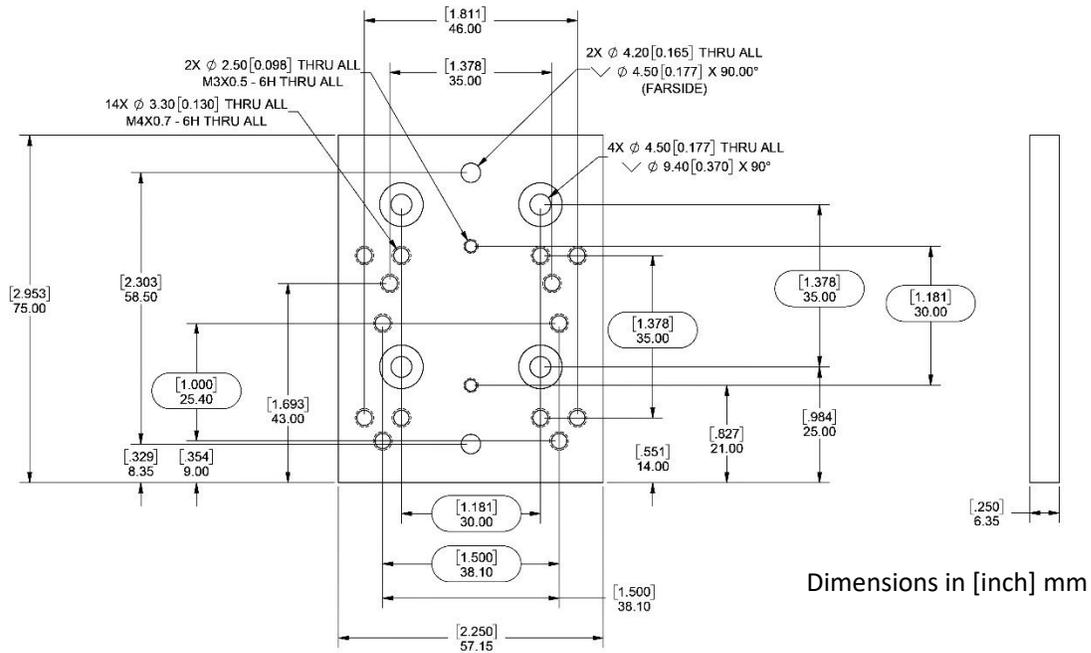
1. Origin calibration: The operator should adjust the start point when a teaching file is created for the first time.
2. Set file parameters.

Step 5: Download & Process

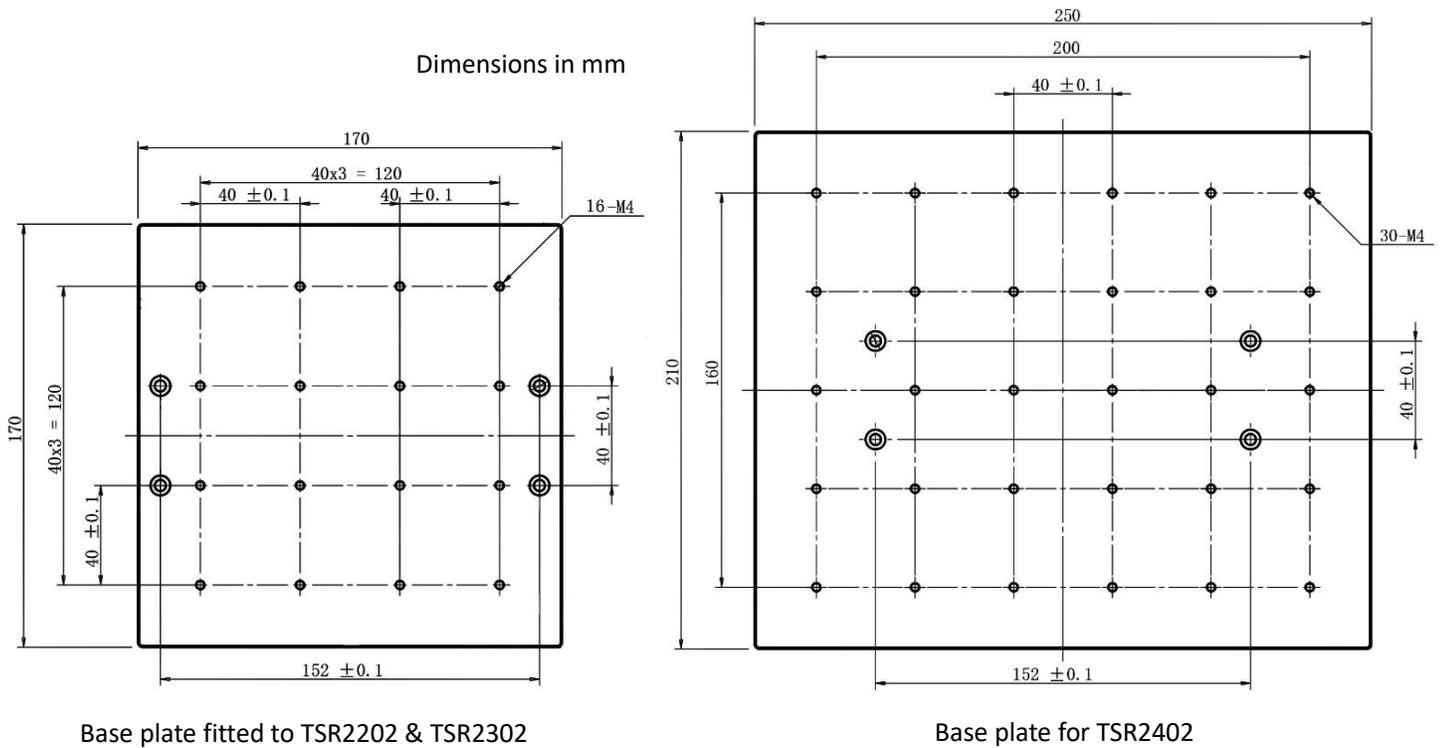
1. Download: refer to instruction manual of the teaching pendant "Teaching File Download".
2. Process: refer to instruction manual of the teaching pendant "File Processing".

4. MOUNTING AND BRACKTRY

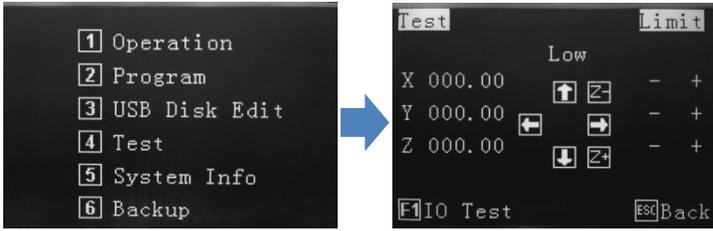
4.1 Tool Plate - Valve Mounting Bracket



4.2 Base Plate – Product Mounting Plate



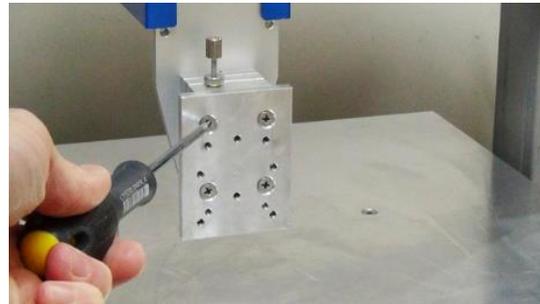
4.3 Syringe Mounting Bracket – Attachment



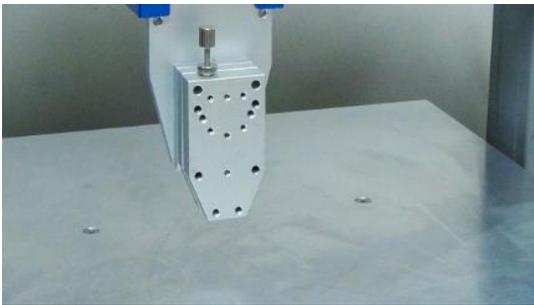
From the main screen, on the teaching pendant, press 4. Use the jog keys to move the head into a central position and lower head until there is sufficient access to the rear of the bracket. Use **SHF** button to change movement speed. Follow instructions below.



1. Move and lower head using teaching pendant.



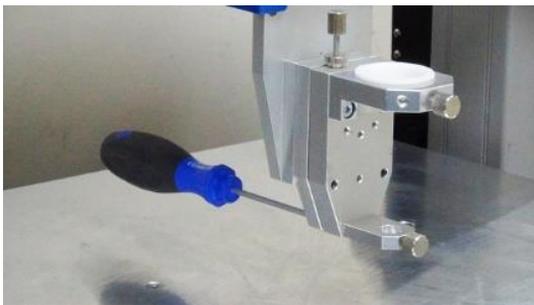
2. Remove mounting plate.



3. Secondary plate should be exposed



4. Attach top bracket.



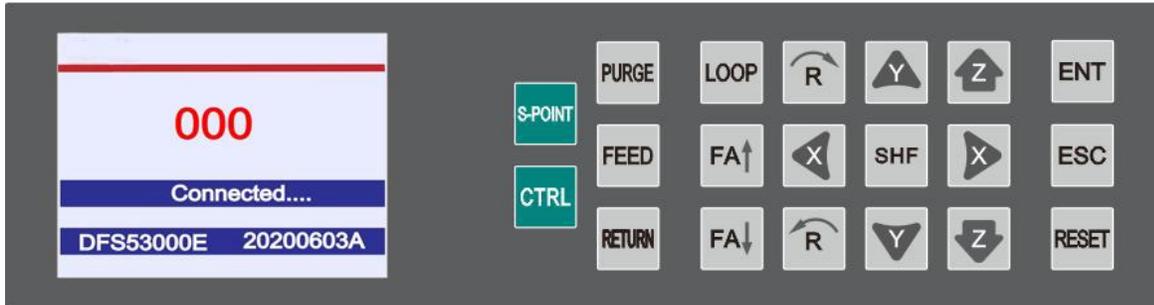
5. Attach bottom bracket from behind.



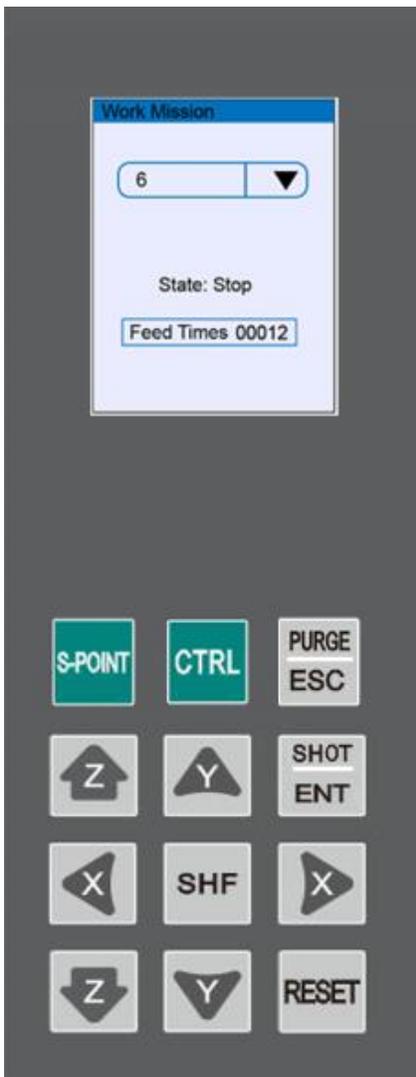
6. Install syringe and lightly tighten thumb screws.

5. OPERATION PANEL INSTRUCTIONS

TSR2302/TSR2302E/TSR2402/TSR2402E Panel



TSR2202/TSR2202E Panel



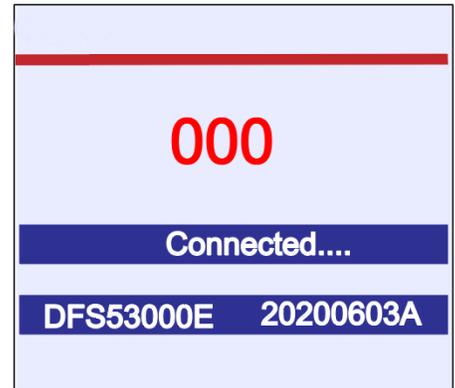
In the operation panel field, the dispensing machine can be controlled manually. On the left side, information is displayed, refer to 5.1 Main Screen (Connected Teach Pendant)

On the right side, all axes can be homed automatically by clicking “**RESET**” and all movement axes can be moved manually by clicking “**X**”, “**Y**”, “**Z**”, “**R**” key. The machine step speed can be adjusted by clicking “**SHF**” key. Click on “**PURGE**” key, the dispensing tip moves to cup position and the purging file will be activated. Press and hold “**FEED**” key to continuously feed.

Press “**S-POINT**” key to move the axis to defined start-point position, refer to 5.5 S-Point Screen. Press “**LOOP**” key to enter into Loop Screen, refer to 5.4.

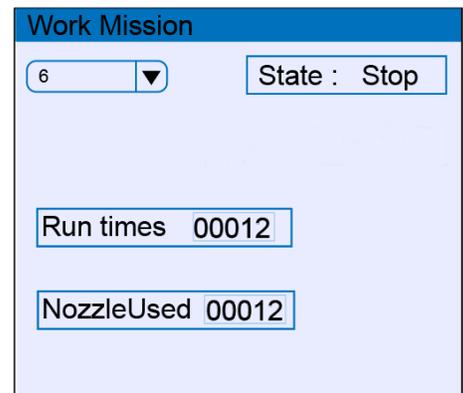
5.1 Main Screen (Connected Teach Pendant)

When the machine and teach pedant are powered, the Main Window will be opened automatically. The communication status and operation panel version are displayed



5.2 Main Screen (Disconnected Teach Pendant)

Disconnect teach pendant line from operation panel and it will automatically enter into **Work Mission** window, see following picture:



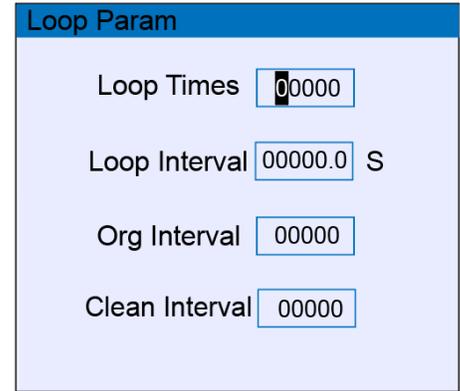
5.3 Work Mission Screen Options

No.	Name	Description
1		1. The current work process file name. 2. Press “Y+” “Y-” key to change the file.
2		Shows the machines current status.
3		Displays the machines operation totalizer.
4		Displays nozzle operation totalizer, press “ENT” button to reset.

5.4 Loop Screen

In the **Work Mission** window, press “**Loop**” key to enter into Loop window.

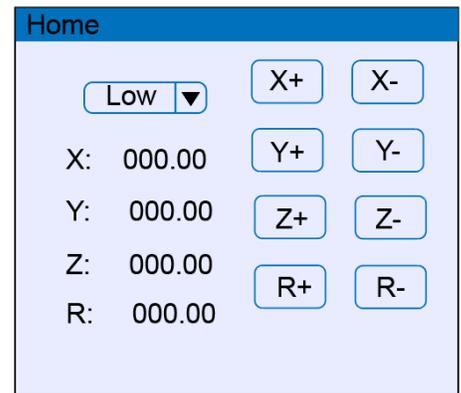
Press “**X+**”, “**X-**” key to change the digital; press “**Y+**”, “**Y-**” key to change the number; press **SHF** key to move the cursor. Press **ENT** key to save, and press **ESC** key to back to **Work Mission** window.



5.5 Home Screen

In the **Work Mission** window, Press “**HOME**” key to enter into Home window.

On the left side, the coordinates are displayed, and you can press the “**SHF**” key to select movement speed (Low/High/Medium) during operating; on the right side, all axis can be moved manually by pressing “**X+**”, “**X-**”, “**Y+**”, “**Y-**”, “**Z+**”, “**Z-**”, “**R+**”, “**R-**” key. Press **ENT** key to save and press **ESC** key to back to **Work Mission** window.



6. TROUBLE SHOOTING AND MAINTENANCE

No.	Malfunction	Possible Reason	Correction
1	The unit can't reset.	Check if the emergency button was pressed or not.	Disengage the emergency button and press the ORG button.
2	The Z axis movement wasn't accurate.	Over weight or over speed.	If the unit's accuracy has decreased, reduce the speed and it will be corrected. Adjust the verticality or parallelism of the track. Tighten the screws of the tracks.
3	The motor was abnormal.	The PCBA or the motor was faulty.	If still not working after replacement, the signal wires of the motor to the board are open circuit. Change the wires of the drivers, if the suspect one works after wires were replaced then the motor was faulty, if the replacement doesn't work, it proves the driver is faulty.
4	The firmware always displays "EMERGENCY STOP PLEASE RESET"	Was not reset.	Disengage the emergency button and reset the unit, if it doesn't work, the relay of the power board was abnormal.
5	The unit is always alarming.	The emergency button is bad or the alarm flag wasn't fed back.	Press the emergency button and check if power will be cut or not. If the power wasn't cut, the emergency button is bad.
8	There is something abnormal in the lead screw.	1. The bearings are damaged. 2. Lack of lubricating oil.	1. Clean or change the bearings. 2. Add the lubricating oil.
9	The lead screw was shaking while moving.	1. The lead screw was bent 2. The lead screw was not concentric with the motor.	1. Change the lead screw. 2. Adjust the position of the lead screw.
11	The belt slipped.	1. The belts loosened. 2. There is some lubricating oil on the belts.	1. Adjust the motor's position for tightening the belt. 2. Clean the lubricating oil.

6.1 Maintenance and Inspection

● Daily check

- 1) Check if there's flammable or explosive items close to the dispensing machine.
- 2) Check if the working voltage is correct.
- 3) Clean the tip, syringe, barrel and dispensing valve regularly. Replace if they are blocked or damaged.
- 4) Check if the airflow is normal.
- 5) Check if zero position of each axis is correct.
- 6) Test the movement and communication performance of dispensing machine.
- 7) Check if the emergency button can be engaged and disengaged normally.
- 8) Check if the air tube is smooth.
- 9) Clean the working environment of dispensing machine.
- 10) Check if the external screws of the dispensing machine are tightened correctly.
- 11) Write down equipment condition in each shift.
- 12) Run a testing program after each shift.

● Daily Maintenance

- 1) Hold the bottom plate of dispensing machine when not moving. Don't hold the X axis, in case of damaging the precision.
- 2) Overweight of platform will damage the equipment.
- 3) Remove the teach pendant line from DB9 socket.
- 4) Do not drop off the teach pendant in case of damage.
- 5) Do not move the X/Y/Z axis by hand when the machine is powered on.
- 6) Do not wet the dispensing machine or pull the power cord.
- 7) Press the emergency stop button in case of any emergency.
- 8) Make the X/Y/Z axis back to zero position every time when replacing components like syringe, valve or re-starting a new process program.
- 9) Check the tip, syringe and adapter regularly. The tip, syringe could be blocked because of the cured adhesive.
- 10) Turn off the dispensing controller when not in use. Turn off the power when not using for long periods of time.
- 11) Use reliable grounding before operation, use power cable with reliable grounding.
- 12) Change the fuse of dispensing machine if it is blown.
- 13) Remove the power cord, remove the cover for fuse.
- 14) Replace the defective fuse with a new one, assemble the cover.

Examination period of machine with power OFF:

Inspecting with power off						
Items	Position	Routine	Monthly	3 months	6 months	12 months
Check screws and structure is fastened.	Screws in the covers	√	√	√	√	√
	Screws in the machine	√	√	√	√	√
	Screws in the axis	√	√	√	√	√
	Motor and reducer screws					√
Check sockets are fastened.	Sockets on the surface of machine	√	√	√	√	√
	Sockets in the machine		√	√	√	√
Check machine for abrasion. Clean dust on the equipment.	Machine appearance	√	√	√	√	√
	External cables		√	√	√	√
Check if dispense is curving or skewing. Repair or send to repair station if necessary.	Machine - every axis position	√	√	√	√	√
Lubrication condition.	Refer to lubrication instruction				√	√

Examination period of machine with power ON:

Inspecting with power on						
Items	Position	Routine	Monthly	3 months	6 months	12 months
Inspecting the working area.	Every axis					√
Shake gently and check whether lines are broken.	External cables				√	√
Press and check whether axis are shaking during MOTOR ON status.	Every axis					√
Inspecting computer interface, including keys, buttons, lights, emergency stop keys and function. If there are touch screens, check whether the function is normal.	Operation Interface, emergency stop button, light house	√	√	√	√	√
Check whether motion and vibration is normal.	Entire	√	√	√	√	√

The period of maintenance

Maintenance part	Maintenance items	Interval	Remarks
Fans.	Make sure fans are working.	Appropriate.	Power on
Emergency stop button.	Check motion.	Appropriate.	Servo start

6.2 Cooling Fan

If cooling fans work abnormally, the temperature will increase and lead to trouble shooting. Cooling fans will work after powering on. Please check fans and flow and ensure the cooling fans are working correctly.

6.3 Emergency Stop Button

The emergency stop button is a safety device, and it must be pressed in hazardous situations. When pressed, the emergency stop button locks in and therefore remains active. The current operating mode is stopped immediately, all movements are stopped; fault and error message appears; the machine cannot be restarted as the button locks in when pressed and thus remains active. After resolving the error, the emergency stop button must be pulled out as acknowledgement.

6.4 Mechanism Maintenance

To keep the machine working normally, continuously and to prolong the lifespan of all the components, it is necessary to maintain it in accordance to the instructions in this user manual.

During the service of machine, it is necessary to maintain it periodically. The periodic maintenance includes shift maintenance, weekly maintenance, monthly maintenance, half-year maintenance, annual maintenance. Problems found in the maintenance can be solved by the operator or authorized person according to specific situation

6.5 Shift Maintenance

Shift maintenance includes routine items, such as routine inspection, adjustment, lubrication, fixture, cleaning and following maintenance items regulated below. Operator should complete shift maintenance independently.

1. Clean the adhesive residue after working.
2. Change or clean the needle often.
3. To avoid rust don't touch the track.

6.6 Regular Maintenance

Weekly maintenance should include all the shift maintenance items. Operator should complete weekly maintenance. Some items of heavy (or difficult) workload can be completed with the help of authorized personnel. Monthly maintenance should include weekly maintenance items.

Between 6 – 12 months running, all the motion parts would have used extensively and the capabilities of other motionless parts will change too. They may require adjustment, maintenance and/or replacement. The task should be completed by authorized personnel at authorized stations according to the advice from facility management technicians.

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 spreading lubricant. Then put the cover back on.
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 X-axis for spreading lubricant. Then put the cover back on.
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 X-axis for spreading lubricant. Then put the cover back on.
4. Belt: check if the belt has loosened. Adjust the belt if it has loosened: firstly, disassemble the fixing screw. Secondly, pull the motor back. Then press the belt at 10N stress at the middle of the belt, bend 10-15mm. Finally fix the screws.
5. Check the linear rail straightness and accuracy. Adjust it if it is abnormal.
6. Replace the worn component.

6.7 Linear Track

1. Lubricate the linear track every 100km walking.
2. Do not over lubricate with grease.
3. Inject the grease into the block. Do not smear the grease on the surface of block
4. Prevent impurities getting into the inside
5. How to inject the grease:
 - ① Stop the unit. Inject into the nozzle 0.7cc/ml grease.
 - ② Push the block for a full rotation so that all the beads can be lubricated.
 - ③ Repeat ①&②, inspect and ensure that grease has adhered to the end of track.

6.8 Ball Screw

1. Inject grease with grease gun by multiple times. Roll the screw spindle half-turn after injecting one time.
2. Finish lubricating with grease, push the block for a full revolution to spread the grease.

6.9 Cleaning

Only use solvents or cleaning agent without hydrocarbons.

7. WARRANTY

Manufacturer warrants this product to the original purchaser for a period of one (1) year from date of purchase to be free from defects in material and workmanship, but not against damages by misuse, negligence, accident, faulty installations and instructions. Manufacturer will repair or replace (at factory's option), free of charge, any component of the equipment thus found to be defective, on return of the component, "PREPAID" to the factory during the warranty period. In no event shall any liability or obligation of the Manufacturer arising from this warranty exceed the purchase price of the equipment. This warranty is only valid if the defective product is returned as a complete assembly without physical damage. The Manufacturer's liability, as stated herein, cannot be altered or enlarged except by a written statement signed by an officer of the company. In no event shall the Manufacturer be liable for consequential or incidental damages. A return authorization is required from Techcon prior to shipping a defective unit to the factory.

Manufacturer reserves the right to make engineering product modifications without notice. All returns must be issued with a Returns Authorization number, prior to return. Send warranty returns to:



Techcon Corporate Headquarters,
10800 Valley View Street, Cypress, 90630, USA.
Tel: 1-714-230-2398, Fax: 1-714-828-2001
E-mail: [OEMorders@okinternational.com](mailto: OEMorders@okinternational.com)

Techcon European Corporate Office,
Eagle Close, Chandler's Ford Industrial Estate,
Eastleigh, Hampshire, SO53 4NF, UK.
Tel: +44 2380 489 100, Fax: +44 2380 489 109
E-mail: [europe-orders@okinternational.com](mailto: europe-orders@okinternational.com)

Or visit www.techcon.com