



PRECISION · ACCURACY

**VULCAN**

# USER'S MANUAL

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FC-500VC

# Preface

Thank you for choosing a VULCAN FC-500VC. To ensure high cutting quality and optimal productivity, be sure to read this User's Manual thoroughly prior to use.

## WARNING

### Manual

- No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, without the prior written permission of VULCAN Corporation.
- The product specifications and other information in this manual are subject to change without notice.
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- Not with standing the stipulations in the preceding paragraph, VULCAN Corporation assumes no liability for damages resulting from either the use of the information contained herein or the use of the product.

### Cutter

All external data interface cables and connectors must be properly shielded and grounded.

Proper cables and connectors are available from vulcan's authorized dealers or manufacturers of computers or peripherals.

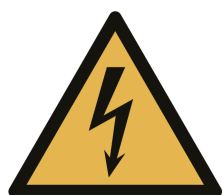
vulcan is not responsible for any interference caused by using cables and connectors other than those recommended or by unauthorized changes or modifications to this equipment.

Unauthorized changes or modifications could void the user's authority to operate the equipment.

- In case of emergency, you can directly press the emergency switch to turn off the machine.  
Turn on the emergency switch, the machine will not move, you need to control the machine movement through software.
- During work, the machine will stop immediately when it encounters a force of 20N.

## Machine Caution Label

The following Warning Label is located on this cutting plotter. Please observe all the warning on the label



Warning; Electricity  
Taking care to avoid coming into contact with electricity



Warning; Sharp element  
Taking care to avoid injury from sharp elements (e.g. needles, blades)



Warning; Crushing of hands  
Taking care to avoid injury to hands when in the vicinity of equipment with closing mechanical parts



## After Turning on the Cutting Plotter

During operations, immediately after completion of operations, and when setting the cutting plotter functions, the carriage, Y bar, will move to the origin position, and other parts which are not fixed, may move suddenly. Do not let your hands, hair, or clothing get too close to the moving parts or within their range of movement. Do not place any foreign objects in or near these areas either. If your hands, hair, clothing, or the like get caught in, or wrapped around moving parts, you may be injured and the machine may be damaged.

## About the words and phrases in this text

- In this instruction manual, the word "cutter" refers to operating the machine and using either the plotting pen or the cutter plunger to cut.
- In this instruction manual, the word "media" refers to paper, roll media, sheet media, or marking film.

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# ***Chapter 1: Product Summary***

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## **Product Summary**

1.1 Machine Specifications

1.2 Accessories List

1.3 Product Introduction

1.4 Control Panel

1.1 Machine Specifications

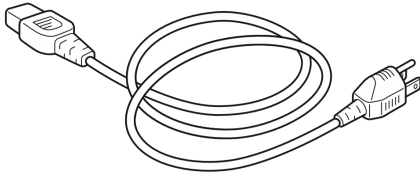
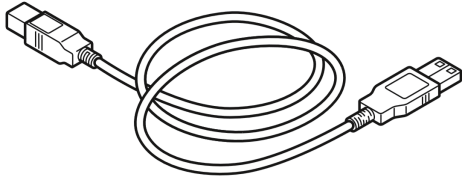
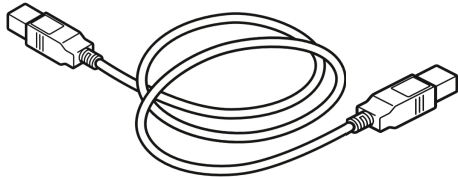
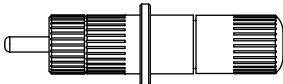
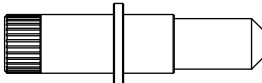
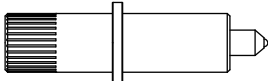

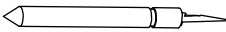
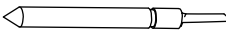





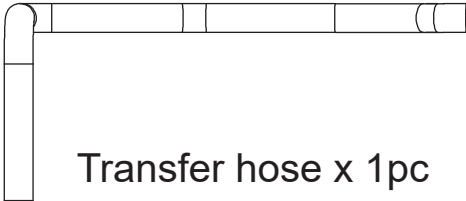
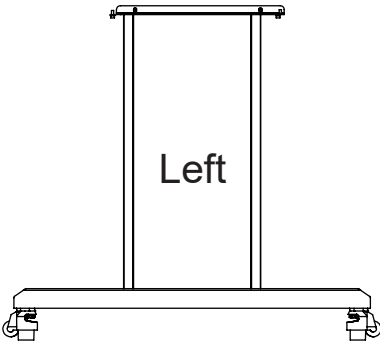
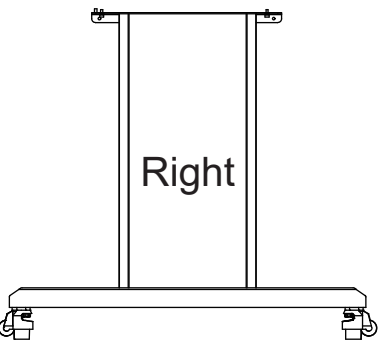
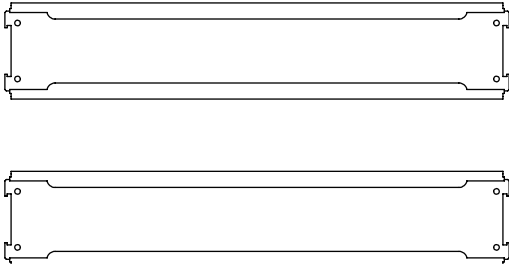
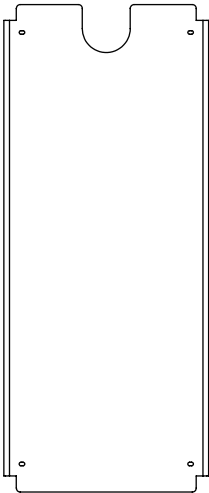
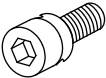

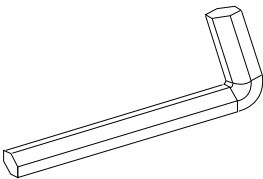
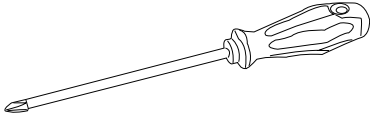
Item	FC-500VC
Configuration	Digital servo system, Flatbed
Media hold-down method	Vacuum suction
Maximum cutting speed	700 mm/s (10 to 700 mm/s )
Cutting pressure	Tool 1: Max. 5.88 N (600 gf) Tool 2: Max. 5.88 N (600 gf)
Minimum character size	Approx. 5 mm square (varies with character font and media)
Repeatability	Max 0.1mm
Standard interfaces	USB2.0 (Full Speed) / U-Flash / Ethernet
Machincial Resolution	0.005 mm (5μm)
Programmable Resolution	HP-GL: 0.025 mm
Memory	32MB
Command sets	HP-GL
Number of tools	2 tools
Tool types	Cutter blade / Pen / Creasing tool
Operating screen	4.3-inch touch LCD
Power supply	100 to 240 V AC, 50/60 Hz (Auto switching)
Power consumption	Max. 150W of machine, Max.400W of pump
Operating environment	Temperature: 10 to 35 degree C , Humidity: 35 to 75% RH (non-condensing)
Guaranteed accuracy environment	Temperature: 16 to 32 degree C, Humidity: 35% to 70% RH (non-condensing)
External Dimensions(mm) (W × D × H)	1100x1150x625mm
Weight	Machina+stand:N/W:68KG G/W:89KG Air pump+shell:N/W:23KG G/W:26KG
Compatible OS	Windows and Mac
Compatible Standards	CE

\*1 : HP-GL is a registered trademark of the US Hewlett Packard Company.

\*2 : It depends on our specified paper and conditions

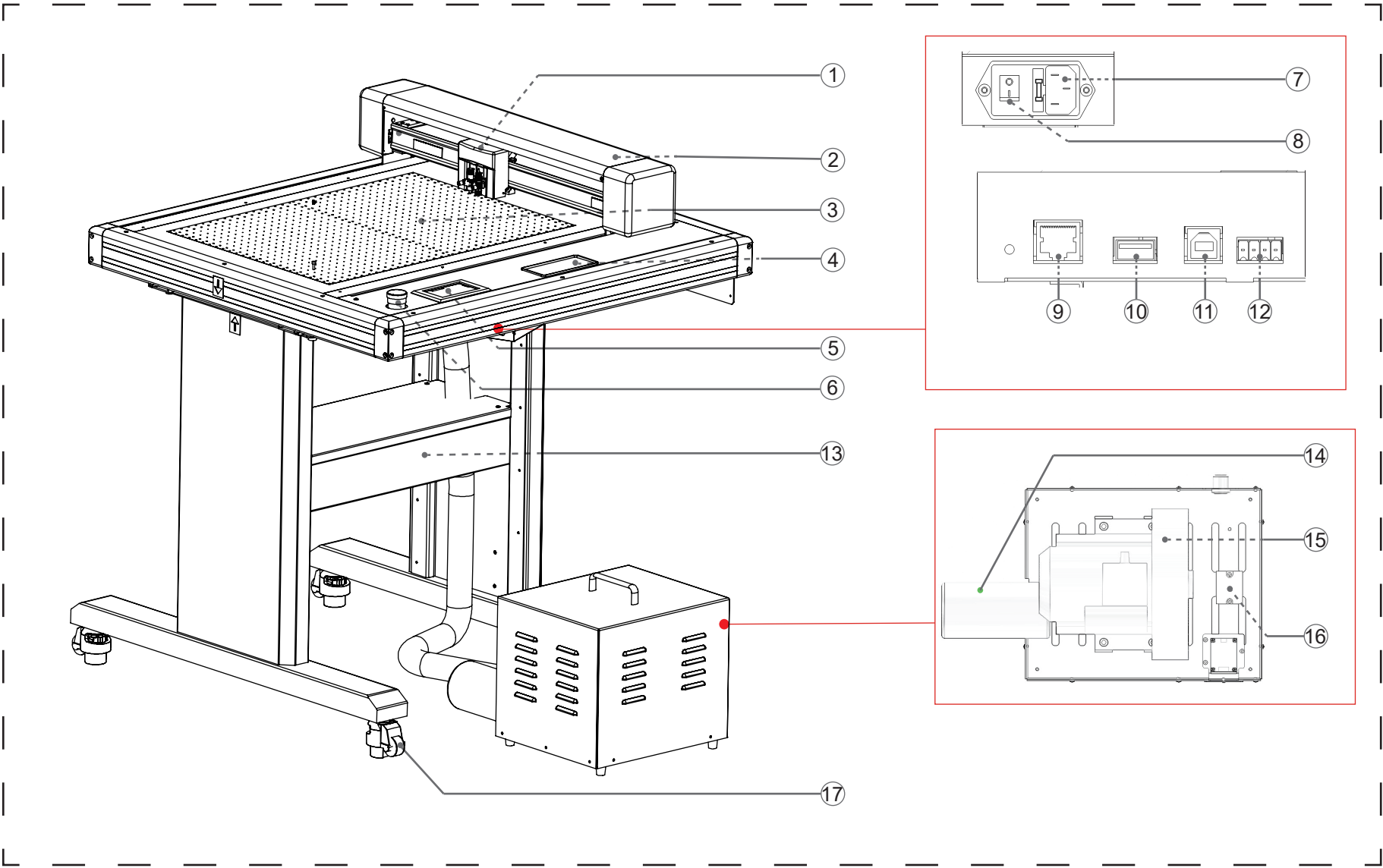
\*3 : The accuracy read with the pattern prepared for this plotter, using the attached pen and coated (glossy) paper

1.2 Accessories List

Accessories for flatbed cutting plotter			
 Power cable x 1pc	 USB cable x 1pc	 Ethernet cable x 1pc	
 Blade holder x 1pc	 Pen calibration tool x 2pcs	 Creasing tool x 1pc  Creasing head x 1pc	
 30°Blade x 1pc  60°Blade x 1pc	 Pen x 5pcs	 Creasing mat x 1pc	
Accessories for air pump			
 Transfer tube x 1set	 Relief value x 1pc	 Silencer x 1pc	 Transfer hose x 1pc
Accessories for floor stand			
 Left  Right Stand legs x 1set	 Beams x 2pcs	 Beam cover x 1pc	
 M6 Hex screw x 12pcs  M4 Phillip screw x 4pcs	 Hex Key x 1pc	 Phillip Screwdriver x 1pc	

\*Other guide for the accessory may be attached.

1.3 Product Introduction



- (1) Tool carriage .....Part to drive the cutter/pen
- (2) Y Bar.....Holds the tool carriage; moves left/right
- (3) Writing panel.....Cutting/Plotting/Creasing work is performed on the panel.
- (4) Storage box.....Placing tools such as knives, holders, pen holders, etc.
- (5) Control panel.....Used to access various cutting plotter functions.
- (6) Emergency stop switch...In an emergency, the power can be cut quickly.
- (7) AC line inlet.....Inlet where the power cable is connected.
- (8) Power switch.....Used to turn the cutting plotter on and off.
- (9) Network (LAN) interface connector  
.....The connector used when connecting this cutting plotter with the network (LAN)interface cable.
- (10) U Disk port .....The port that is used only for the USB memory.
- (11) USB interface connector  
.....Used to connect the cutting plotter to the computer with a USB interface cable.
- (12)Air pump port.....Port that connects the air pump to the machine.
- (13) Stand.....Stand for supporting the machine.
- (14) Silencer.....Reduce the noise of the air pump.
- (15) Air pump..... Adsorption. Fix the material on the platform.
- (16) Regulation module.....Adjust the strength of the wind and the internal pressure of the pump.
- (17) Universal wheel.....Move or fix the machine position.



1.4 Control Panel



Screen (LCD)

- (1) Acceleration display .....Arrow key speeds for carriage control, Fast (x10) / Slow (x1).
- (2) Carriage coordinates.....The coordinates of carriage on the table.
- (3) Arrow keys.....To move carriage to different positions.
- (4) Speed.....Carriage moving speeds (tool1/tool2) during working.
- (5) Force.....Carriage down forces (tool1/tool2) during working.
- (6)Cancel.....Cancel the job after the work is paused.

Control key

- Setting.....Machine calibration and system information.
- Speed/Force ..... To set speed/force of tool1/tool2.
- Vacuum.....To toggle of vacuum suction, ON - fast/stable hold,  
OFF - easy replacement of next item.
- Test cut.....To cut one square and one triangle for testing force of tool1/tool2.
- Pause.....To pause the cutting job when we find anything wrong.
- Files.....To choose file from USB-disk  
(PLT-files saved on USB-disk can be used for direct output).
- Recut.....To repeat last job.
- Move to origin.....Return to origin by pressing the single key.
- Origin.....To set work origin.

# ***Chapter 2: Installation Equipment***

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## **Installation Equipment**

2.1 Stand and Cutter installation

2.2 Air pump installation

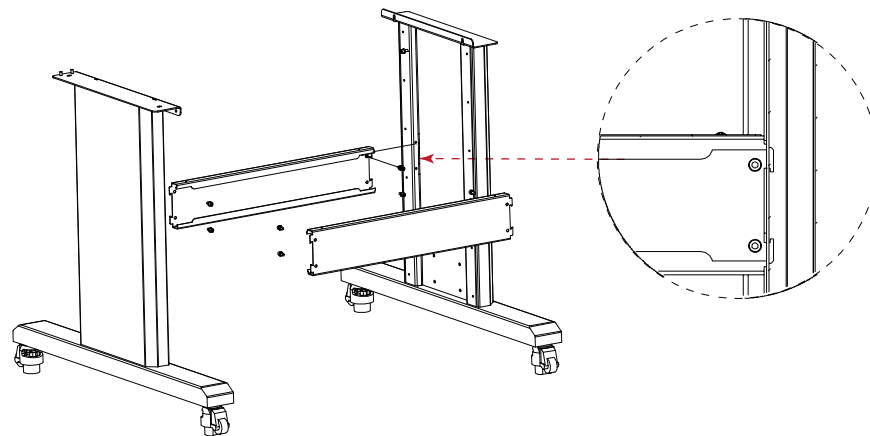
2.3 Use of tools

2.4 Attaching a tool

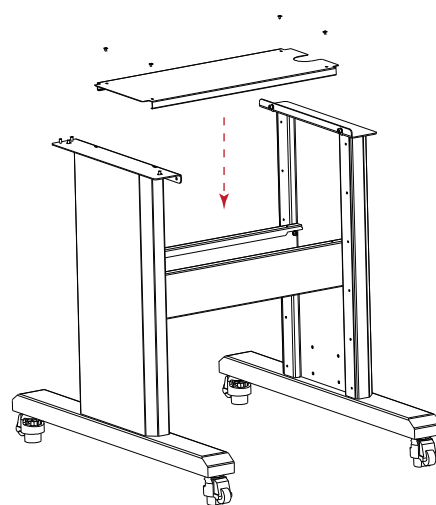
2.5 Connecting to the Computer

## 2.1 Stand and Cutter installation

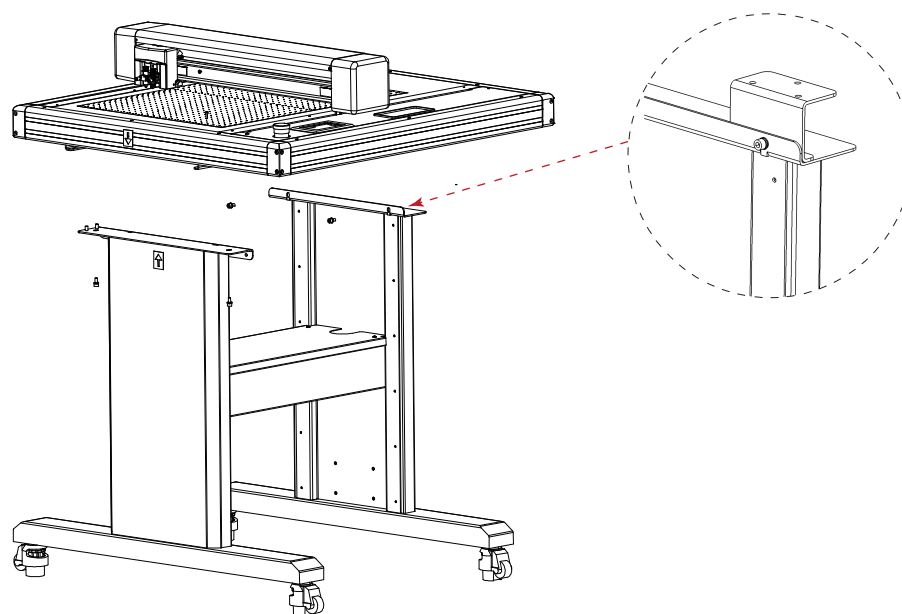
- 1 First, install beams to stand legs, hex screws(8) and hex key be used.



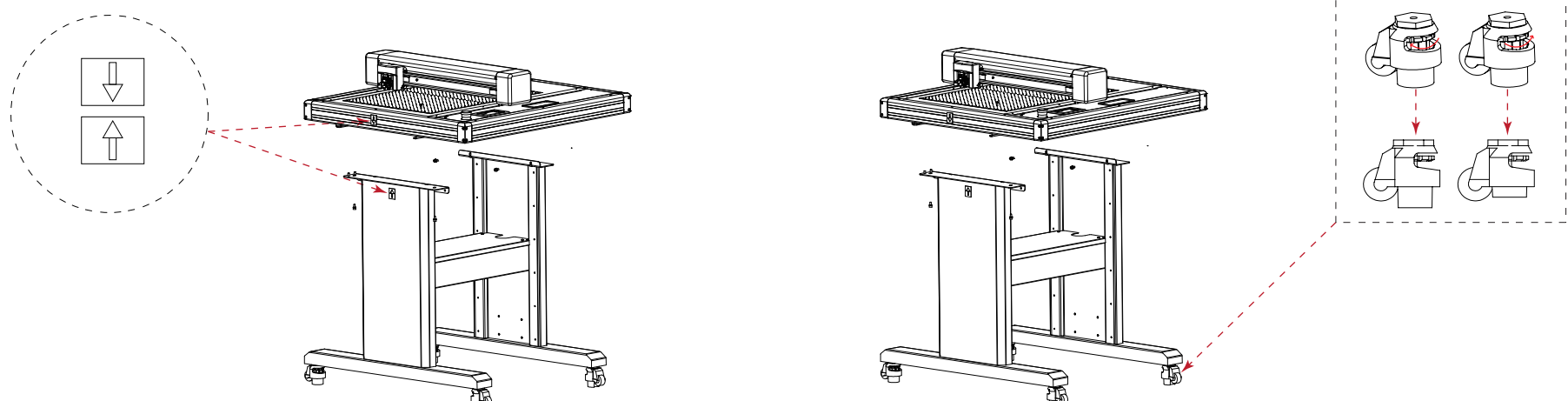
- 2 Second, install beam cover onto beams, phillip screws(4) and phillip screwdriver be used.



- 3 Finally, Put machine on floor stand, hex screws(4) and hex key be used.



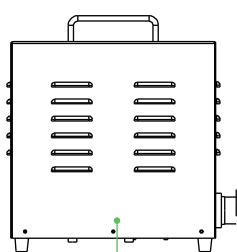
- 4 Note: Please check labels on machine and stand, to ensure correct direction and position.  
The feet of the machine are movable. As shown, turn left and the wheels will be lifted, the feet are fixed. Turn right, the feet are lifted, and the wheels can move.



## 2.2 Air pump installation



The screw pattern of the silencer is very sharp. Wear gloves when installing to prevent scratches.



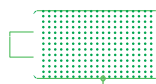
Air pump



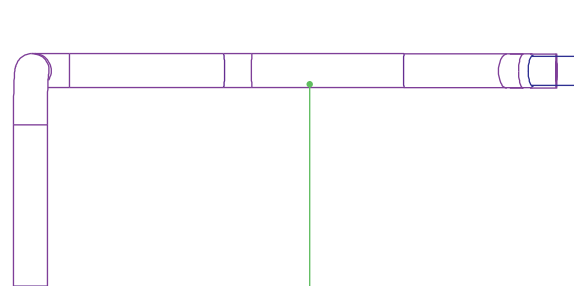
Transfer tube



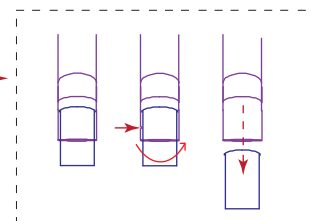
Relief value



Silencer



Transfer hose

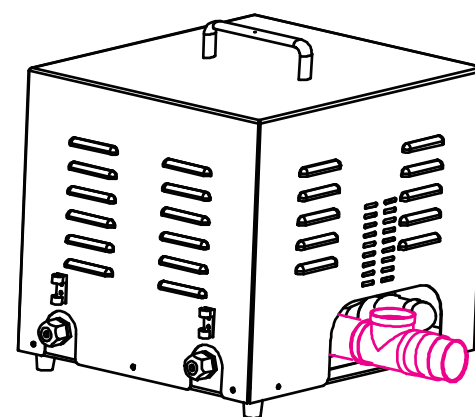
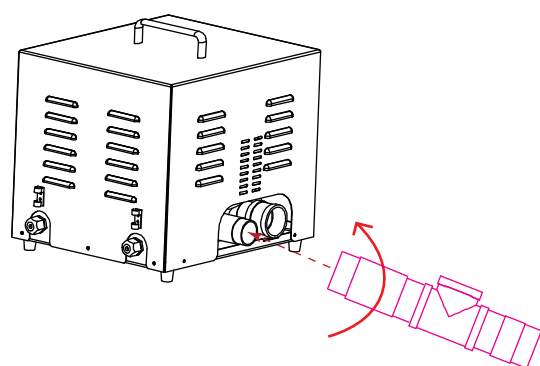


The blue tube is for easy installation of the transfer hose.

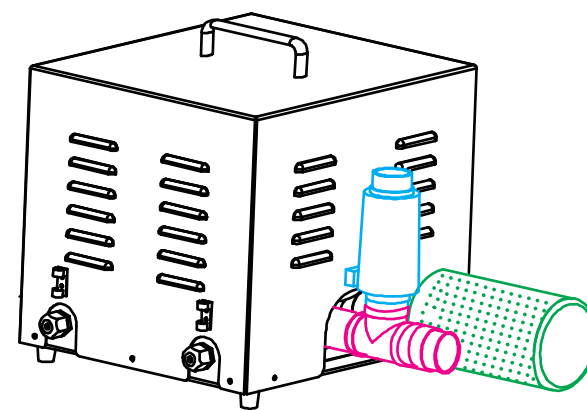
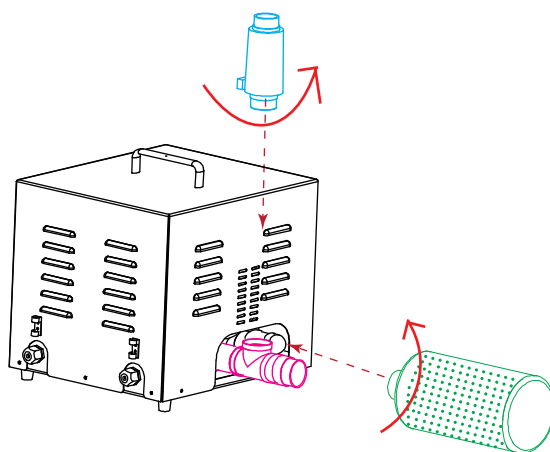
When installing, please unscrew the blue tube.

\* The side is squeezed and remove it by whirl it.

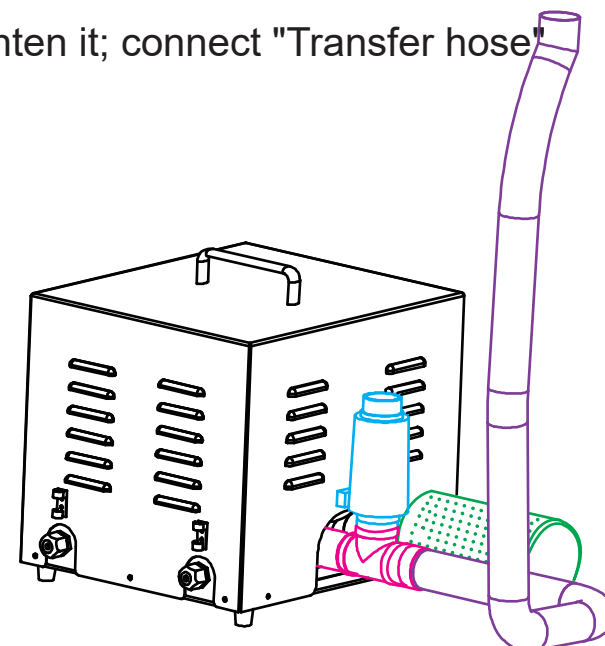
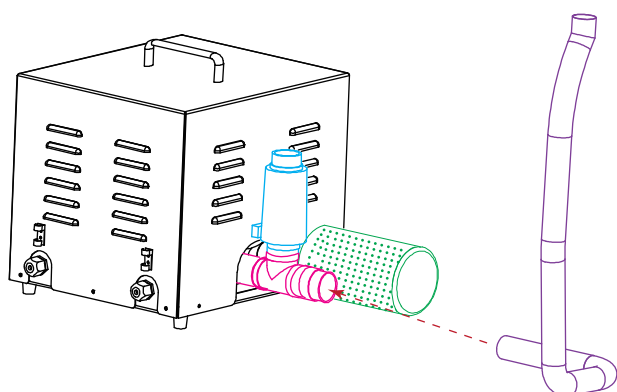
- 1 First, connect "Transfer tube" into "Air pump" and tighten it.



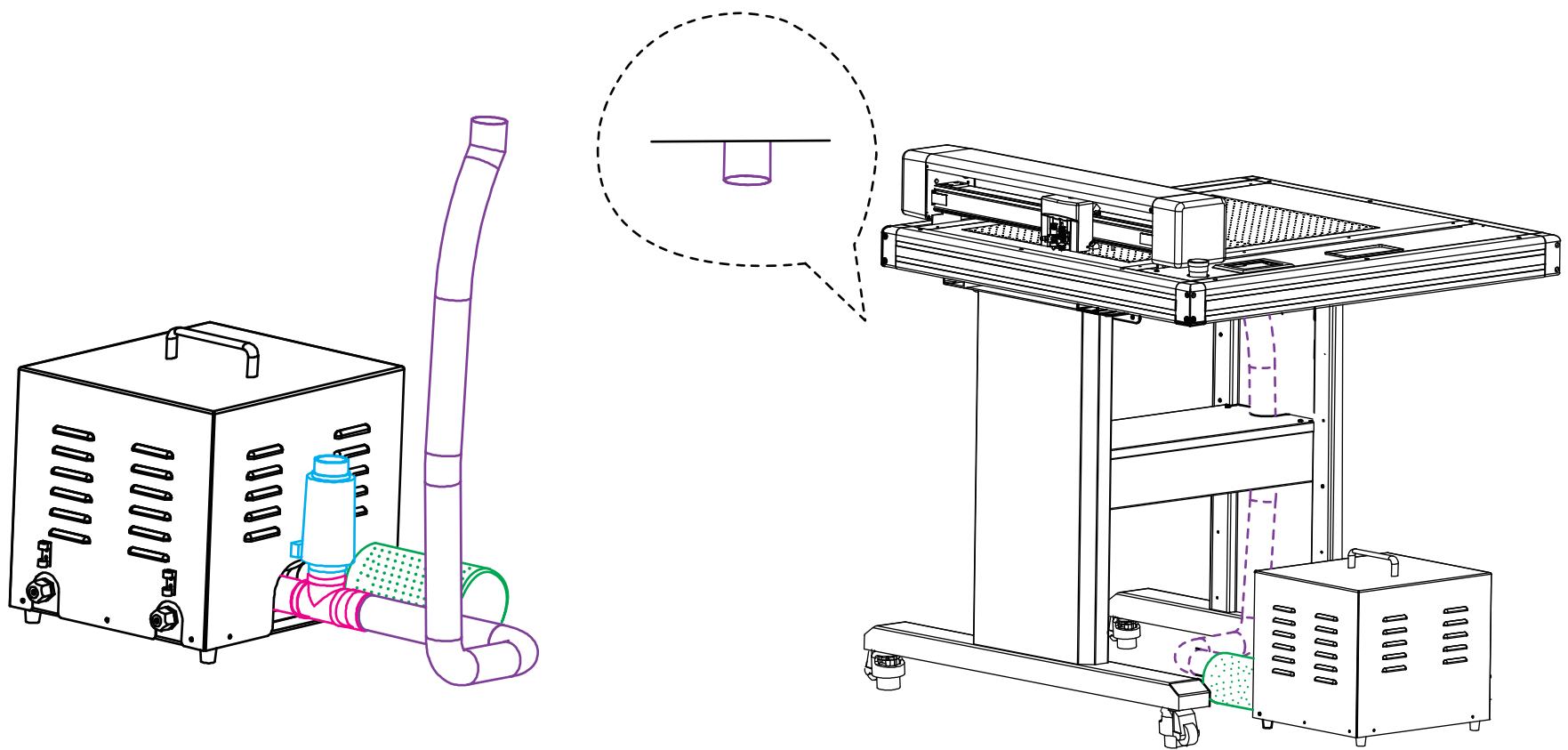
- 2 Second, connect "Relief value" into "Transfer tube (on the top)" and tighten it; connect "Silencer" into "Air pump" and tighten it.



- 3 Finally, Connect "Transfer hose" into "Transfer tube (on the right)" and tighten it; connect "Transfer hose" to machine and tighten it.



- 4 Note: The transfer hose need to be passed through beam cover.

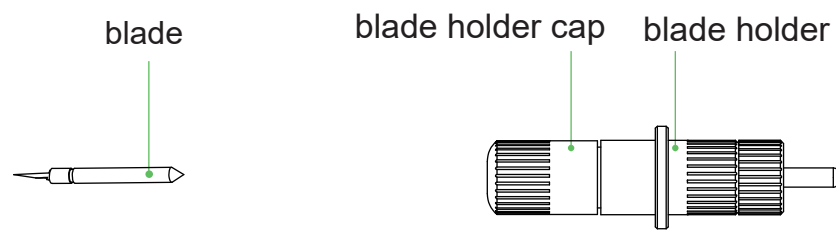


## 2.3 Use of tools



To avoid bodily injury, handle cutter blades with care.

### Blade holder

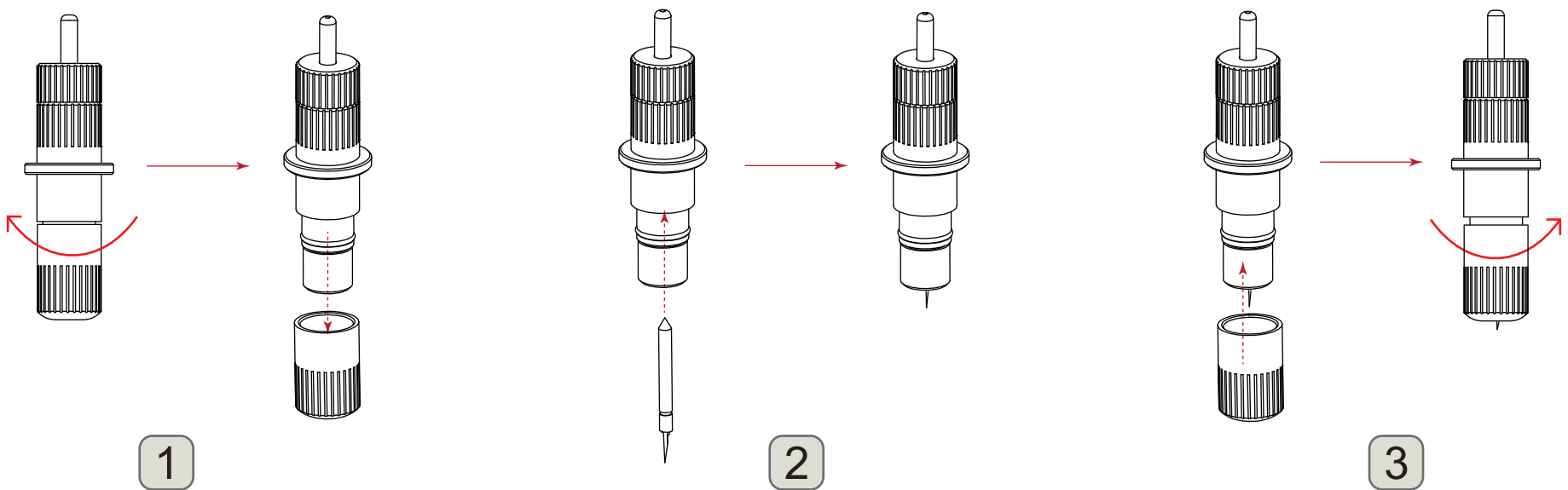


1 First, unscrew the blade holder cap, as shown.

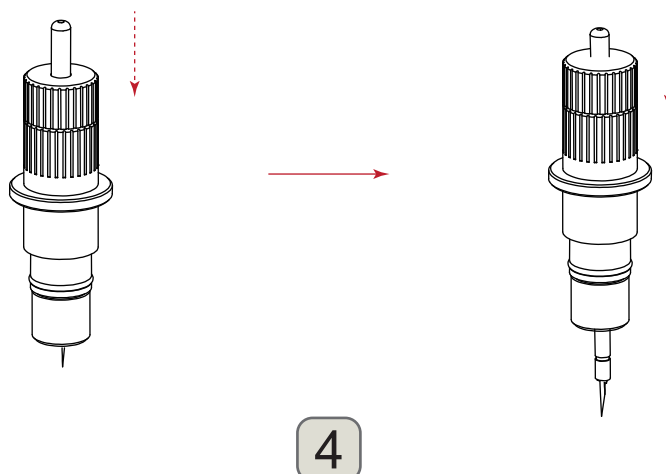
2 Second, place the blade (as shown) into the slot of the blade seat.

3 Finally, screw the blade holder cap to complete the installation and replacement of the blade.

\* The length of the blade is also adjusted by the blade holder cap.



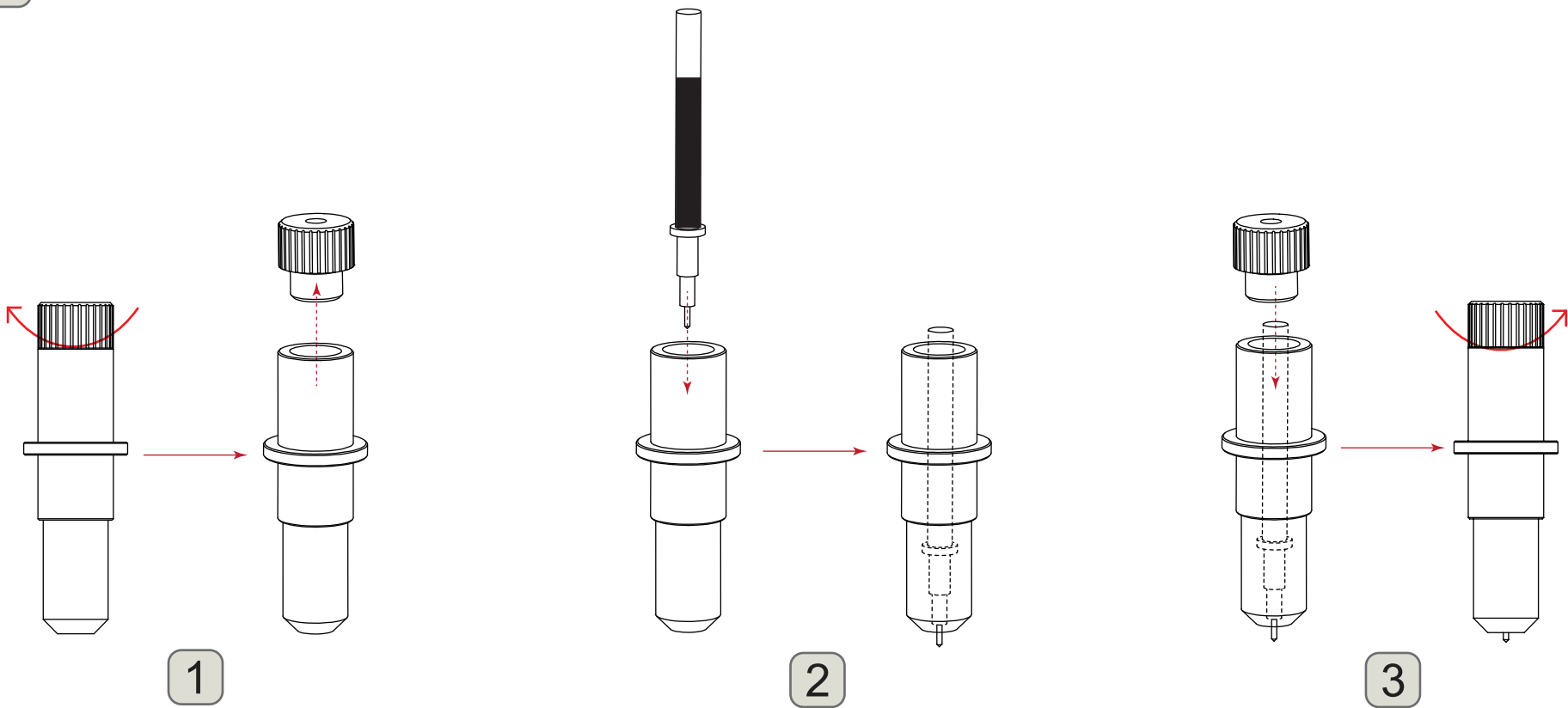
4 Removing the tool. Press the button at the top and the knife will come out.



Pen holder

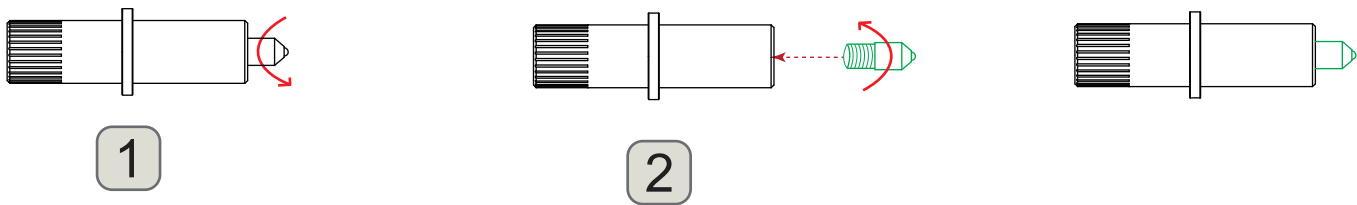


- 1 First,unscrew the Calibration tool cap,as shown.
- 2 Second,place the pen (as shown) into the slot of the pen seat.
- 3 Finally, screw the Calibration tool cap to complete the installation and replacement of the pen.



Creasing tools

- 1 Step1,unscrew old creasing head.
- 2 Step2,Install new creasing head into creasing tool.





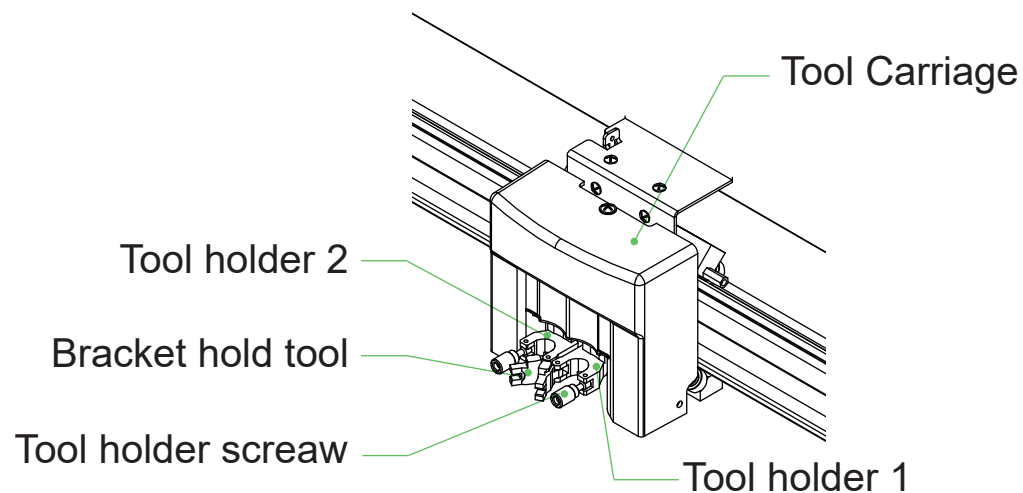
## 2.4 Attaching a tool



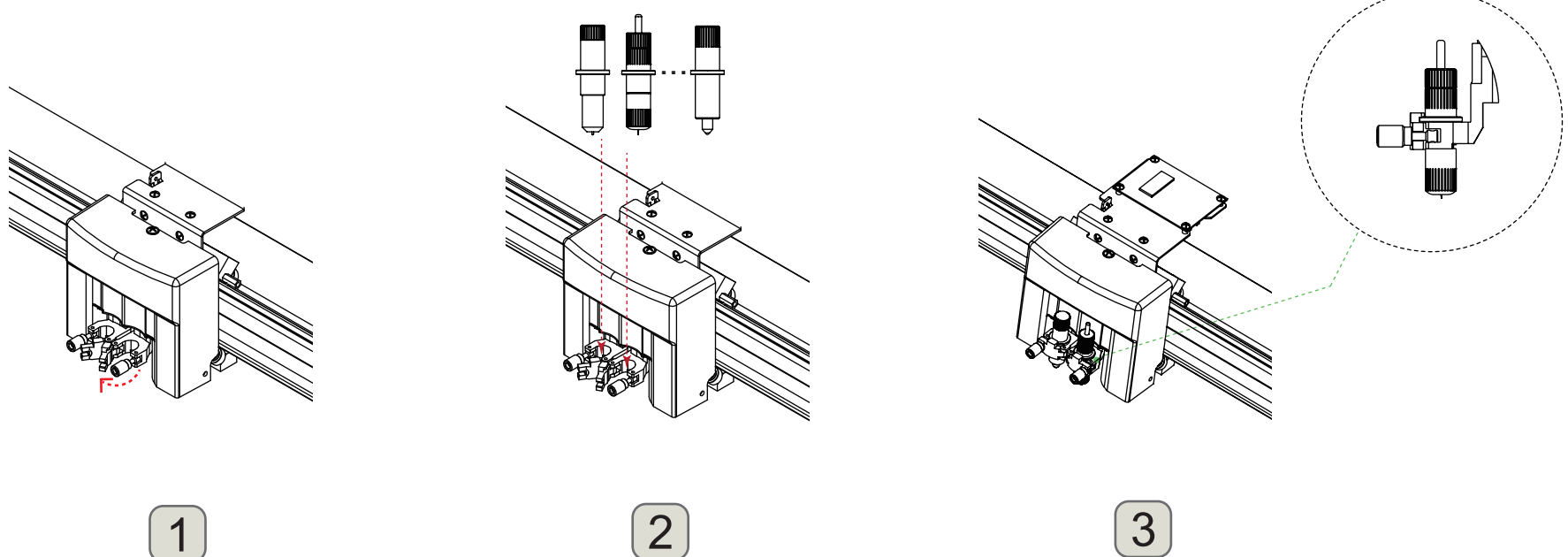
When pushing the tool holder with your fingers, the blade tip may be protruding. Take care not to cut your fingers.

When mounting the tool in the tool holder, please note the following.

- Push the tool all the way into the holder until its flange contacts the upper part of the holder and then tighten the screw firmly.
- To prevent injury, avoid absolutely touching the tool immediately after the cutting plotter is turned on or whenever the tool is moving.



- 1 First, Loosen the tool holder screw. Release tool cover.
- 2 Second, while pushing up the tool holder, push the tool into the holder until the flange of tool completely touches the upper part of the holder.
- 3 Finally, make sure that the tool bracket is engaged on the tool's flange, and then tighten the screw.



- 4 \* Removing the tool  
When removing the tool, turn the tool holder screw counterclockwise to remove the tool.

## 2.5 Connecting to the Computer

Connect the plotter to the computer using the communication cable. Use either the USB interface, network (LAN) interface to connect the plotter to the computer. Select the port depending on the specification of the software to be used and the availability of the interface port on the computer.

Depending on the port used, use either the USB cable (standard accessories), network (LAN) cable (standard accessories) to connect. Use the cables specified by Vulcan, matching the computer that is to be connected

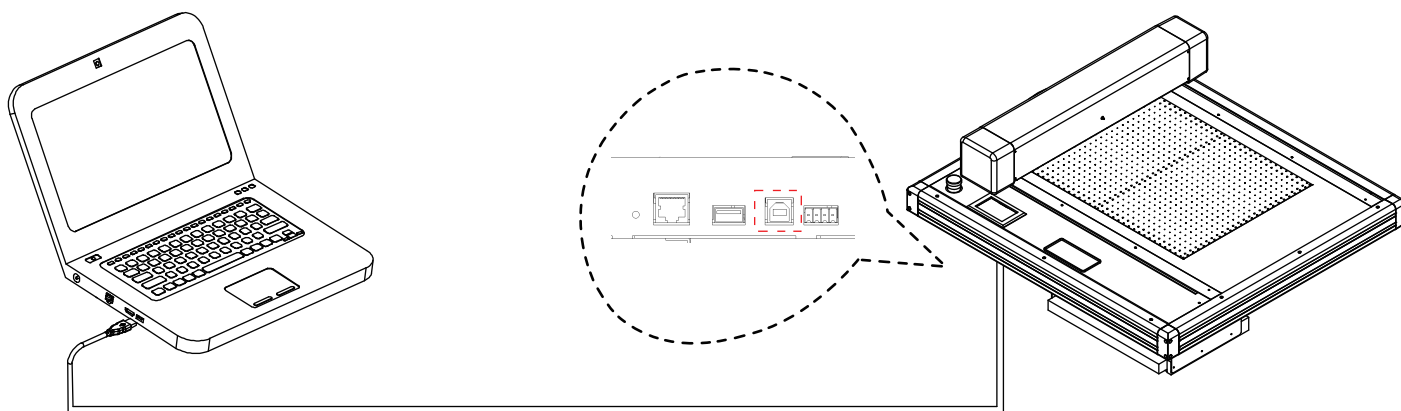


**Make sure that the power switch is turned off ("o" side).**

### Connection via USB interface

Do not perform the followings:

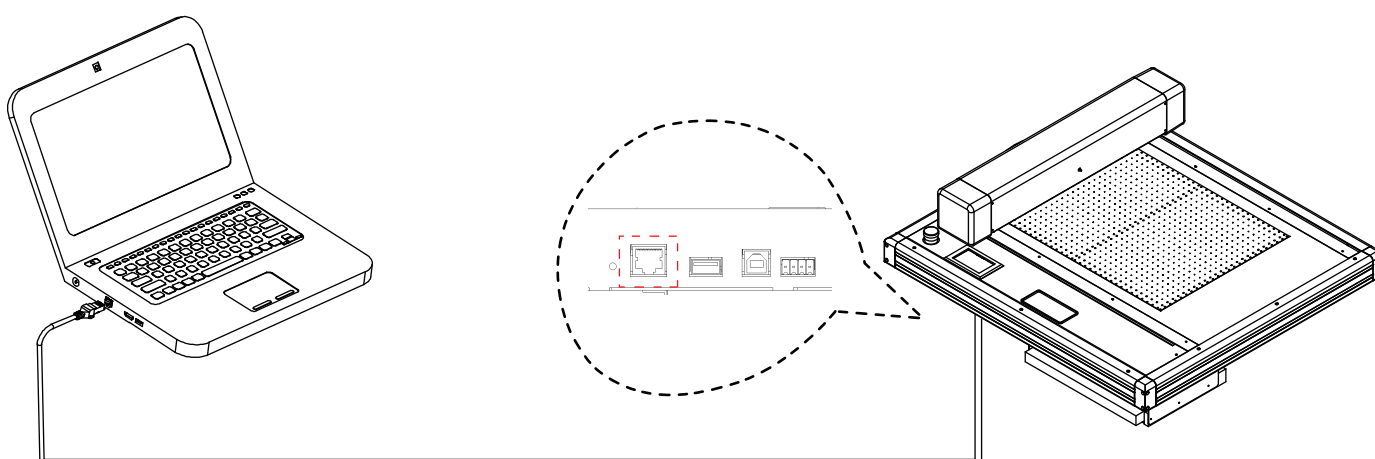
- Do not connect or disconnect the USB cable when the computer or the plotter is performing an initialization routine.
- Do not disconnect the USB cable within a 5-second period of connecting it.
- Do not disconnect the cable during data transfer.
- Do not connect multiple plotters to a single computer using the USB interface.



### Connection via Network (LAN) interface

Supplement

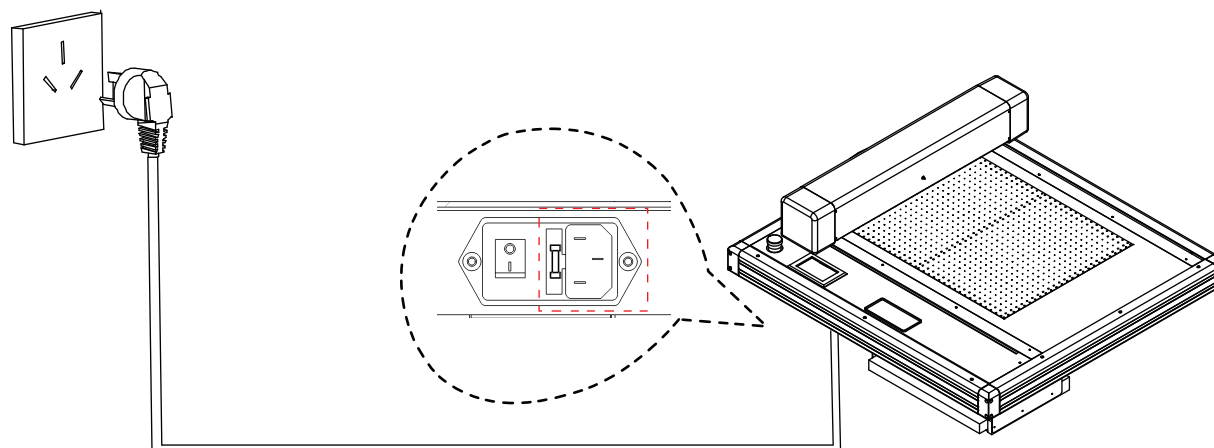
- To use the network (LAN) interface, the environment that can connect the computer to the network must be established.
- temporarily turn off the firewall function during the use, or change the setting if you want to turn off the firewall function, disconnect the network from the internet.



## Connection via power cable

### Supplement

When turning off the power, wait over 10 seconds before turning on it again, otherwise problems may occur with the display.

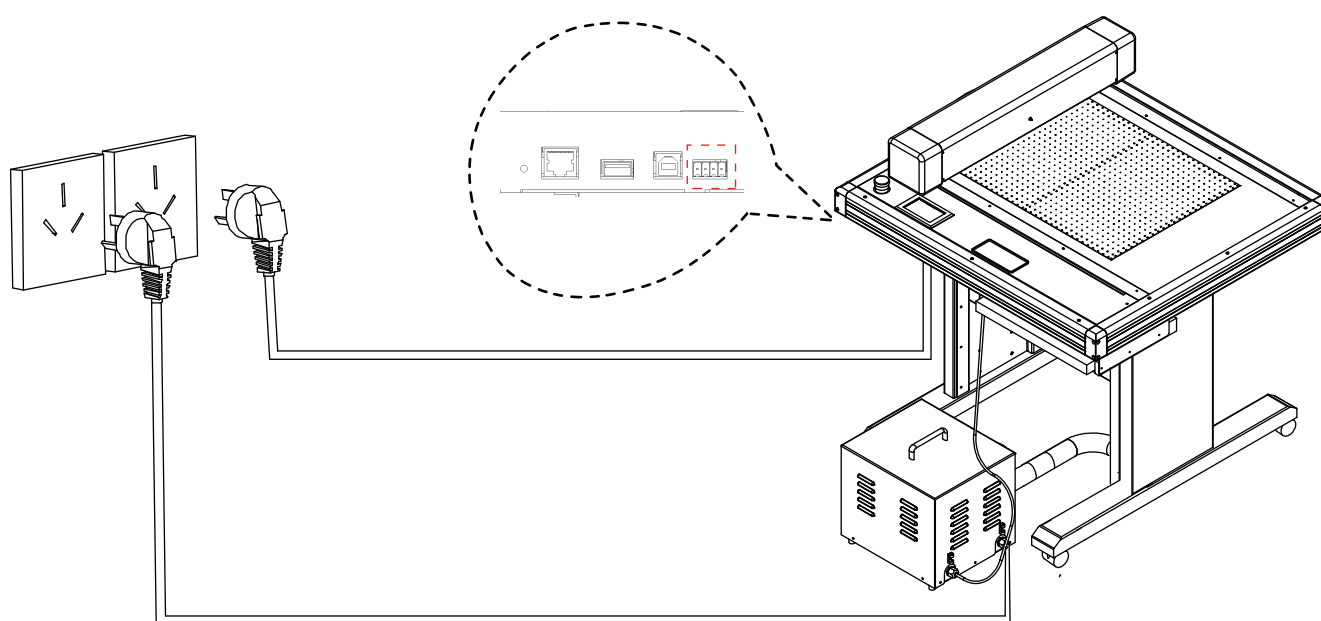


## Connection via Air pump cable

### Supplement

The vacuum pump is supplied as a standard accessory. No other air pump models are available yet.

\* The air pump has 2 wires, one needs to be connected to the machine, and the other is connected to the power.



# ***Chapter 3: Convenient Functions***

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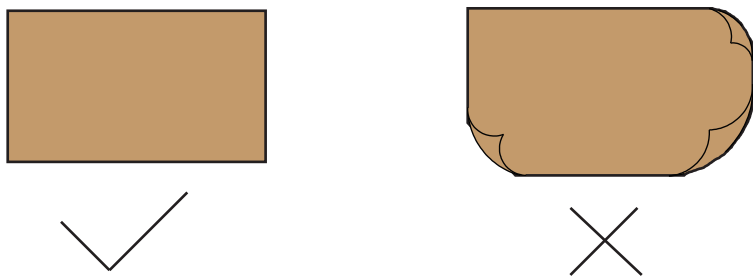
## **Convenient Functions**

- 3.1 Loading the Media
- 3.2 Move the Tool Carriage
- 3.3 Setting the Origin Point
- 3.4 Running Cutting Tests
- 3.5 Stop Cutting
- 3.6 Duplicate Cutting
- 3.7 Offline Output
- 3.8 Settings

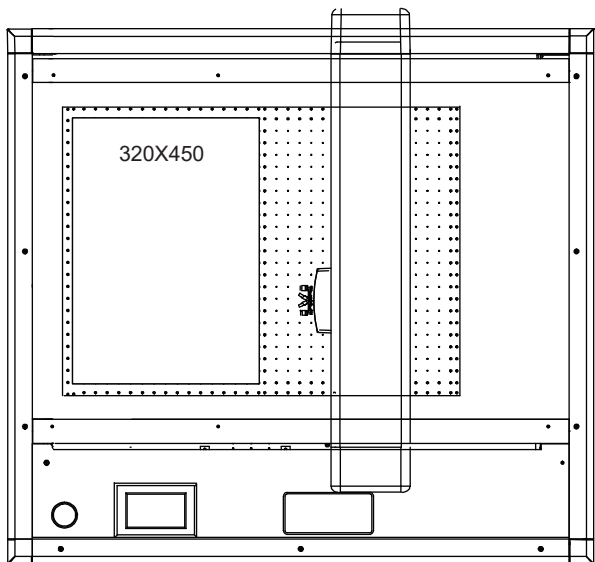
3.1 Loading the Media

Supplement

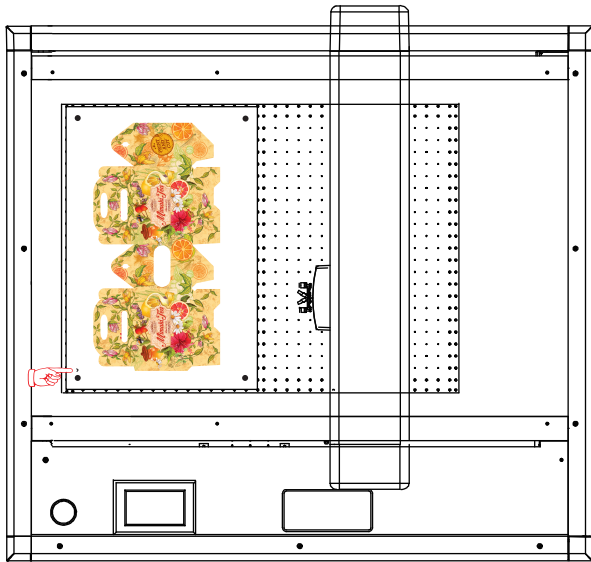
- This plotter is available with a vacuum suction writing panel.
- There are media that cannot be held down by vacuum suction. Please test before use.
- When loading a media that cannot be securely attached using the vacuum suction, reinforce adhesion by using tape on all four sides.
- If the media floats, secure the four corners using a drafting tape. When the media is floating, if the plunger tip (cutter blade or ballpoint pen) has contact with it, it can affect the finish quality. Or, the cutting plotter body might be damaged. Please fix the warping of the media, or do not use the warped media.



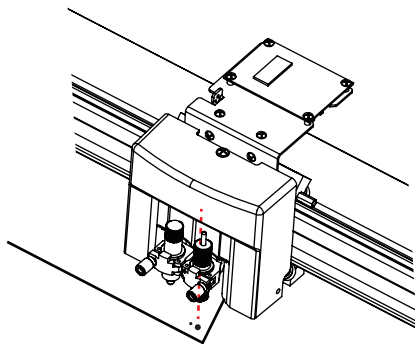
2 Place the media on the writing panel.



(1) Blank media (no mark)



(2) Print media (with mark)  
\*The first mark is not the same as the other three.  
Before work, place move the carriage (tool 1) on the first mark.



3 Turn on the vacuum pump's power supply.



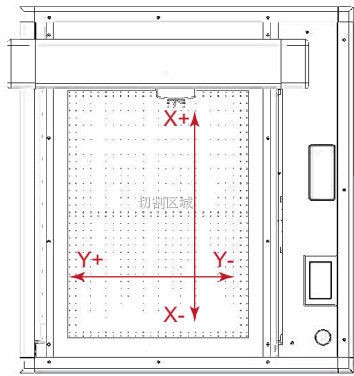
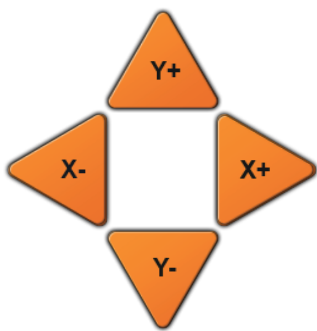
Turn on the switch of air pump.

3.2 Move the Tool Carriage

Tool carriage can be moved manually using the POSITION key. It also can move the tool carriage to the origin, or move it certain distance to keep it away.

Move in Steps Manually

- 1 When there is no file in progress, you can press the button “ ▲▼◀▶ ” to move the tool carriage. Tool carriage will move toward the direction of the pressed POSITION key。

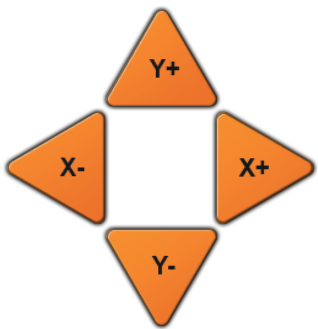


Setting of Step Movement speed

- 1 When there is no file in progress, Press the white number to modify the moving speed. The current speed can be modified to 1 or 10 and there will be a white number in the upper right corner showing the speed value.
- 2 You can press the button “ ▲▼◀▶ ” to move the tool carriage. Tool carriage will move toward the direction of the pressed POSITION key, Movement speed will also change.



Click on the number to modify the movement speed



Move back the Tool Carriag

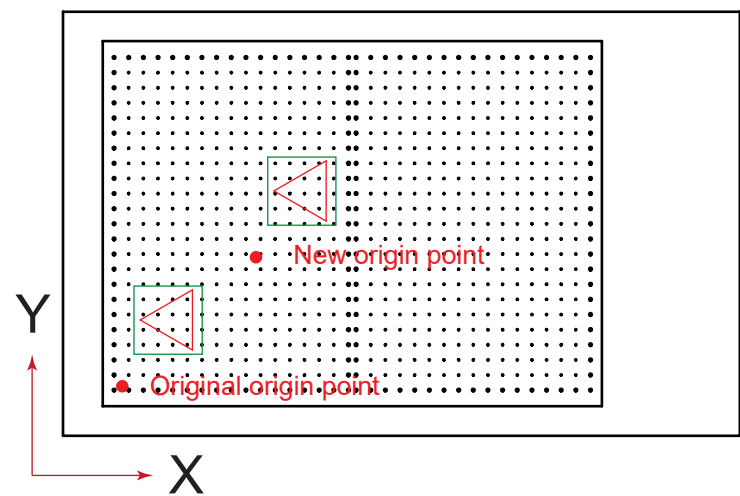
- 1 When the cut is over, the tool carriage will stop at a certain position, then press the “Move to origin” button to return to the original point.  
\* It can be used with "Recut" for “Duplicate Cutting”



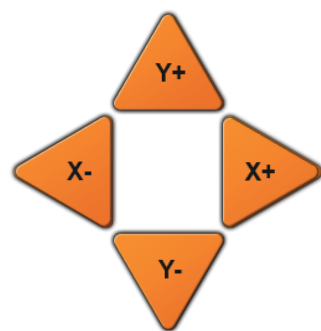


3.3 Setting the Origin Point

Point where the cutting starts is called origin point. The origin point can be set at any location.



- 1 You can press the POSITION button “▲▼◀▶” keys to move the tool to the new origin point.



- 2 Press the “Origin” key. and the new origin has been set.  
The white text in the upper left corner will show the distance of the new origin point from the original origin point.

Distance origin coordinates



Set the origin



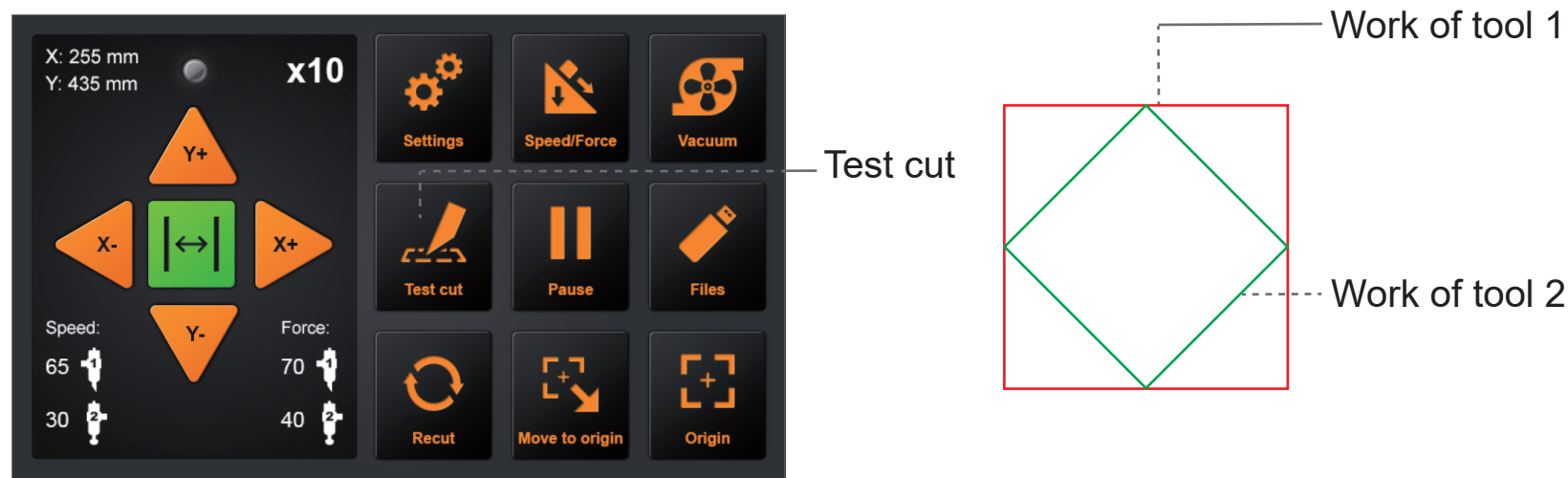
3.4 Running Cutting Tests

 Make sure that the air pump switch is turned on .

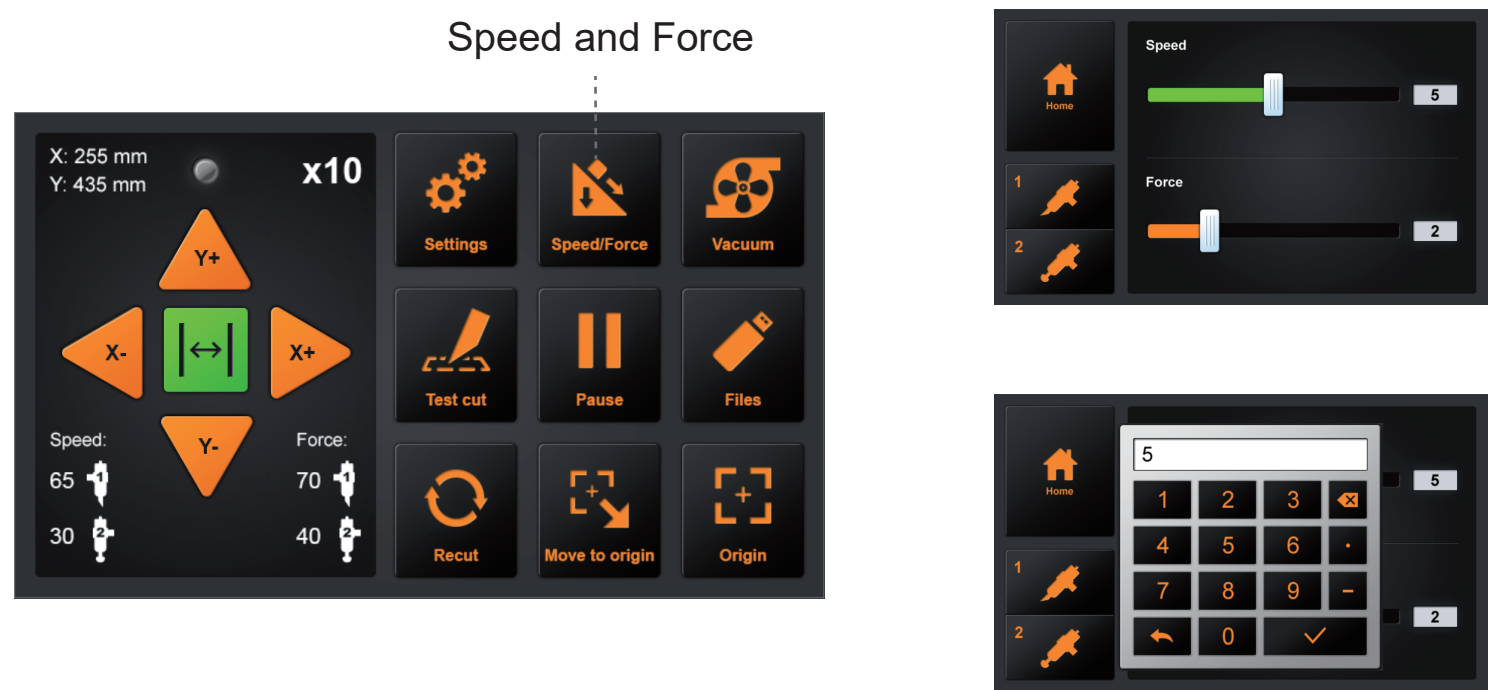
This parameter tests the speed and force of the blade and creasing tools.  
Also test the fit of the cutting line and the creasing line.

Test Speed and Force

- 1 After setting the origin, press the "Test cut" button, the machine will work automatically, Tool1 will work a Square, Tool2 will work a Prismatic.



- 2 If blade holder are placed in the tool holder 1 and creasing tool are plased in the tool holder 2. You can adjust the blade speed and force.Turn on the speed and pressure buttons and adjust.
- \* Click the tool 1 icon to adjust the speed and force of the tool 1.
  - \* Click the tool 2 icon to adjust the speed and force of the tool 2.
  - \* How to adjust the value?  
1: Drag the white button to adjust.  
2: Click on the value, an input will appear, or you can enter the value manually.



Test fit

- 1 If the result of the test is a cut line and a creasing line,then the nodes cannot overlap, it is proved that the “Calibrate cutter size” parameter needs to be modified.Please refer to “3.8” for details.

3.5 Stop Cutting

Normal stop

During the work, if you need to pause and press the "Pause" button. To continue cutting, press the "Start" again.

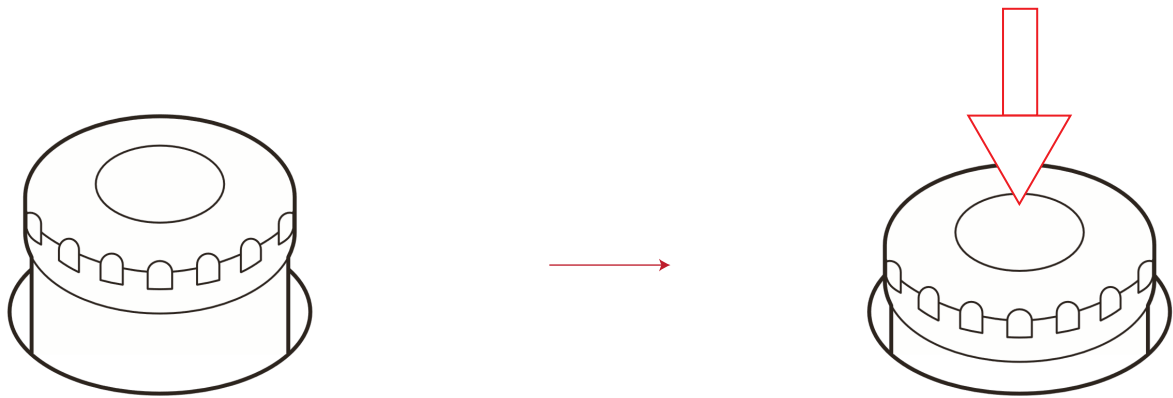


After the work is paused. Press the "Cancel", if you want cancel the job.

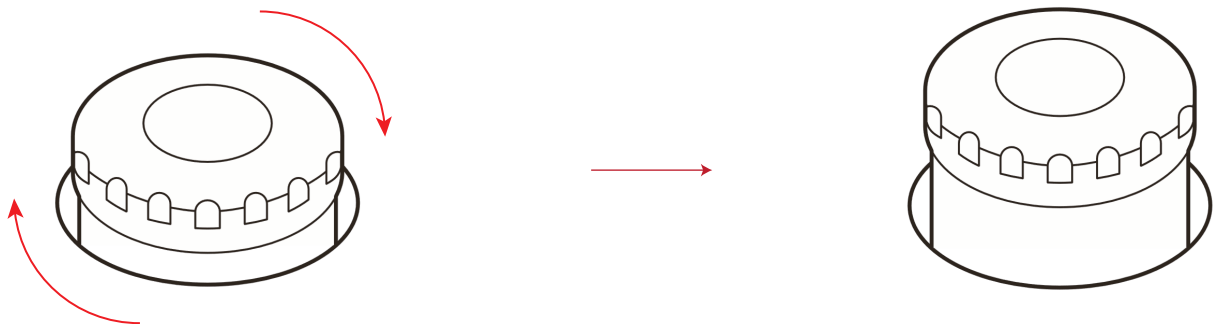


Abnormal stop

During the work, if you encounter an emergency, you can press the emergency stop switch.



Rotate to the left to turn the switch on, then the machine will turn back on. The carriage will return to the "Original origin point" automatically.

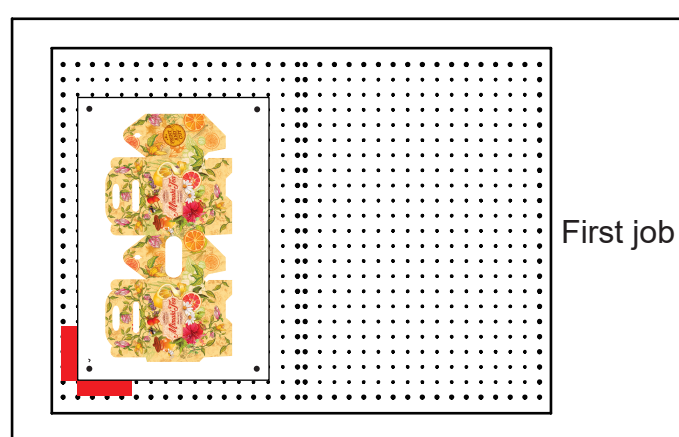
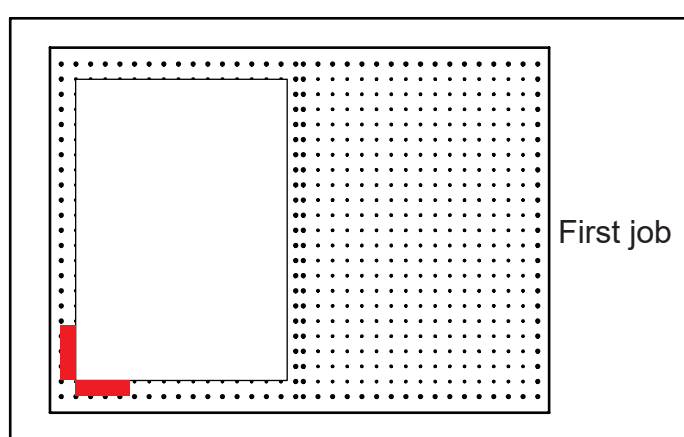


## 3.6 Duplicate Cutting

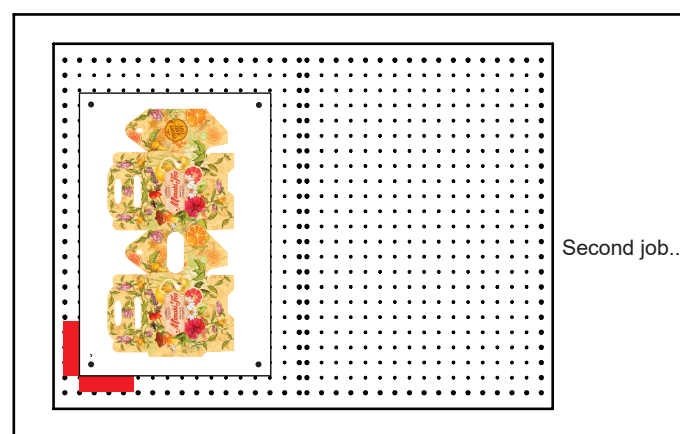
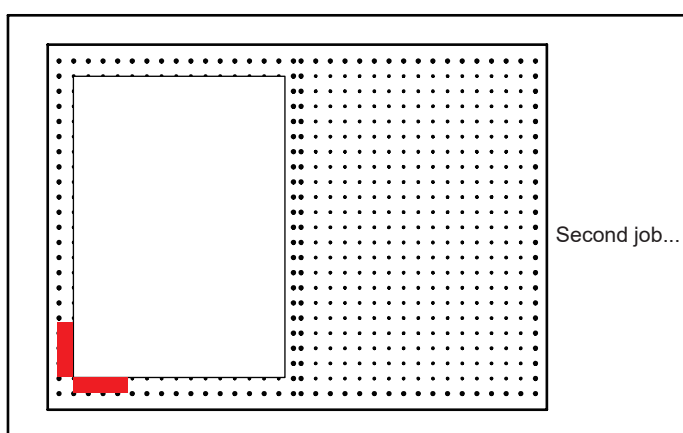
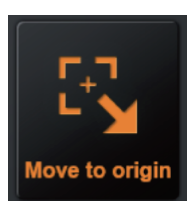
### Supplement

- Do not send new data to plotter while copying. Cutting data in the buffer memory will be cleared.
- It can not copy if data is more than 1 MB because it cannot be stored in the buffer memory of the plotter.
- Watch out that it does not fall out of media when cutting with copy function.
- If the original cutting data to be copied starts away from the origin point, copied cutting will also start away from the origin point. To avoid wasted space, create the cutting data close to the origin point.

- 1 Set the origin, or move the carriage directly above the first mark to determine the origin. then start working.  
\*Do not interrupt data suddenly during transmission.  
\*The position of the placed media can be marked to facilitate the placement of the next media.



- 2 After the first job, remove the media. Place the next media in the first media position. Press "Move to origin" will return to the origin and then press "Recut", the cutter will start repeating the last job.  
\*The error of the marked position cannot exceed 1CM.



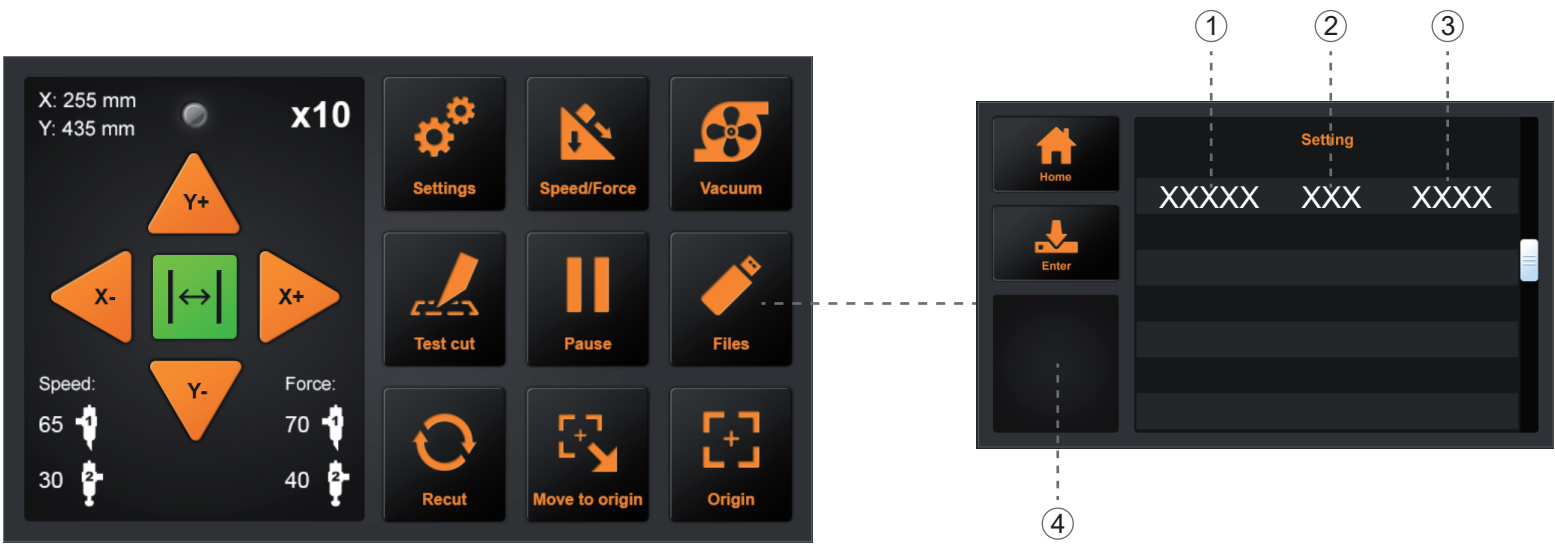
3.7 Offline Output

Dedicated data that was preliminarily created by the application software can be saved in the USB memory and output from the cutting plotter.

Select the data from the menu of the plotter, and then output it in offline

Supplement

- The Windows prohibited characters (¥, \ , / , ; , \* , ? , “ , < , > , | , etc.) cannot be used.
- Limit of the number of display characters is 8 characters.
- Extension is "plt".



- (1) File name                      (2) Data volume                      (3) Create data time
- (4) Preview.....Once the file is selected, click here to see the contents of the file.
- (5) When the file is determined, click “Enter. The cutter will work.

3.8 Settings

Click on the parameter and the Preview box will show the meaning of the parameter.  
Under normal circumstances, these parameters don't need to be modified.  
Please refer to the following instructions If need to modify.



Calibrate Cutter Size

Calibrate Cutter Size: The “Calibrate Cutter Size” is for ensuring cutting sizes same as actual sizes.

How to set the “Calibrate Cutter Size”.

- (1) Press “Calibrate cutter size”,then press “Enter”. 1
- (2) Enter a size in “Draw Rectangle”,then press “Draw”.  
The cutter (tool 1) will draw a rectangle according to the input size. 2
- (3) Use a ruler to measure the rectangle of the draw and input the measurement result to “Measured Rectangle”.
- (4) Press “Calc”.it's finished. The program will automatically calculate the exact value. 3



1



2



3



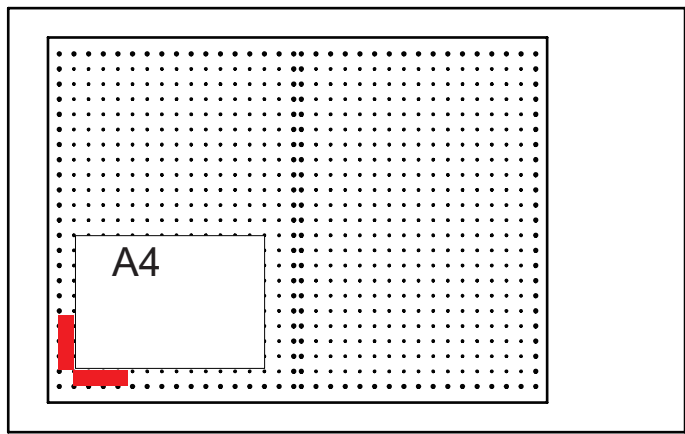
3.8 Settings

Offset Setting

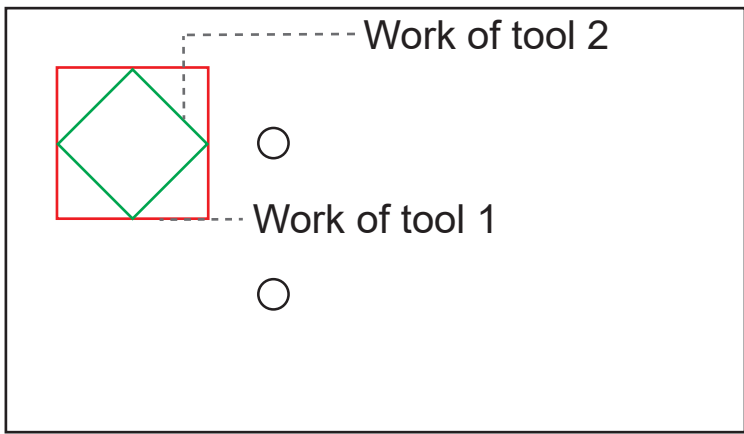
Offset Calibration: The precision of calibration creasing tool and cutting tool.

How to set the “Offset Calibration”.

- (1) Put the A4 paper on the mahcine and Blade holder replaced with pen calibration tool first. 1
- (2) Press “Auto”,then machine will be draw two circle and two tangent square. 2  
Then machine will automatically input the calibrated parameters. 3
- (3) Press“Return”,offset calibration is completed. 4



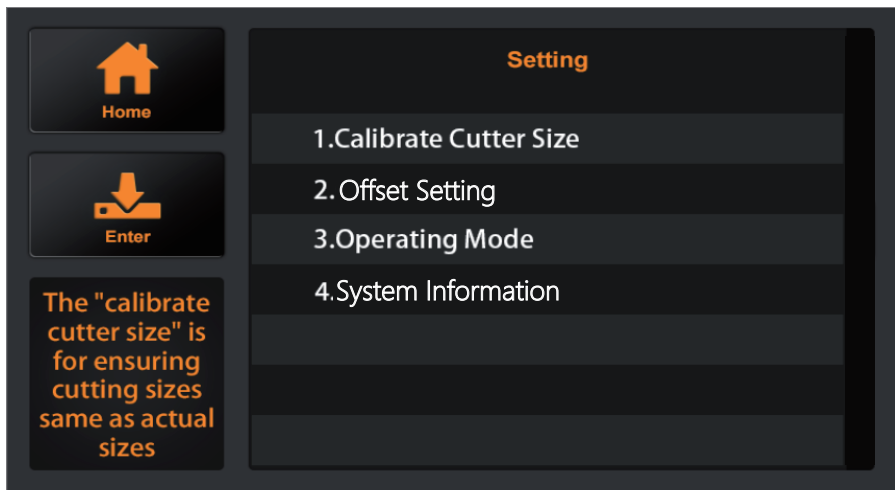
1



2



3



4

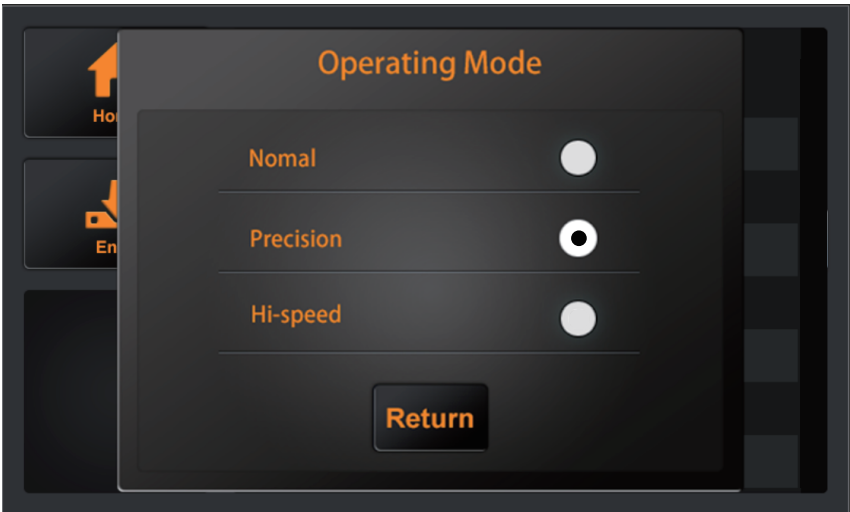
3.8 Settings

Operating Mode



1

Normal:  
Common mode, Perfect speed and precision.



2

Precision:  
It is suitable for high-precision work.  
The accuracy is priority, and the speed will be slowed down.



3

Hi-speed:  
It is suitable for large format work.  
speed will be fast and the precision will decrease.



3.8 Settings

System Information

System informahcine and Machine function upgrade and update.



- Model.....The model of cutter.
- Machine SN ..... The series number of the cutter,every machine has a unique number.
- MB Ver.....The version of the mainboard.
- MB SN.....The series number of the mainboard.
- Cut len.....The mileage the cutter has worked
- IP.....IP address.When connecting via a network cable,  
check that the IP address is same with the computer.
- FW Ver.....The version of firmware.

# ***Chapter 4: Troubleshooting and Maintenance***

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## **Troubleshooting and Maintenance**

4.1 The error information of cutter

4.2 Maintenance

4.3 Exploded drawings and part lists

4.1 The error information of cutter

LCD Display	Cause	Solution
.Please adjust the starting position!(X)	There is not enough space in the X direction when working on the ARMS	Change the material position and reset the starting point.
.Please adjust the starting position!(Y)	There is not enough space in the Y direction when working on the ARMS	Change the material position and reset the starting point.
•Loading...	File loading	
	Interface loading	
•Cutter is busy!	The cutter is working and cannot perform other operations	Perform other operations, after the work is completed,
•Drawing...	The cutter is drawing a calibration file.	
• Oversize!	Working width exceeds the actual working width of the machine	Modify the working size, please pay attention to the actual working size of the cutter.
• Unsuccessful!	Calibration offset job failed	Confirm that the pen holder can write normally, and force of both tools are set to 60g.
•Read file error!	Read file error when work via U disk!	Please try to insert the U disk into the cutter again
•X Motor Error!	Motor Error!	Rest cutter. 1:Check whether the motor is affected by other resistance during operation. 2:Check the motor circuit connection. 3:Replace with new motor.
•Y Motor Error!		
•Image does not fit the machine size!	When using the RESET function, the remaining working size of the cutter is smaller than the size of the document to be cut.	Change the material position and reset the starting point.

4.1 The error information of cutter

LCD Display	Cause	Solution
•X1 Oversize	The job size is larger than the actual working size of the cutter.	Restart cutter 1:Change the material position and reset the origin. 2:File problem,Check the file.
•Y1 Oversize		
•X2 Oversize		Restart cutter 1:Change the material position and reset the origin. 2:Reduce the size of file.
•Y2 Oversize		

## 4.2 Maintenance

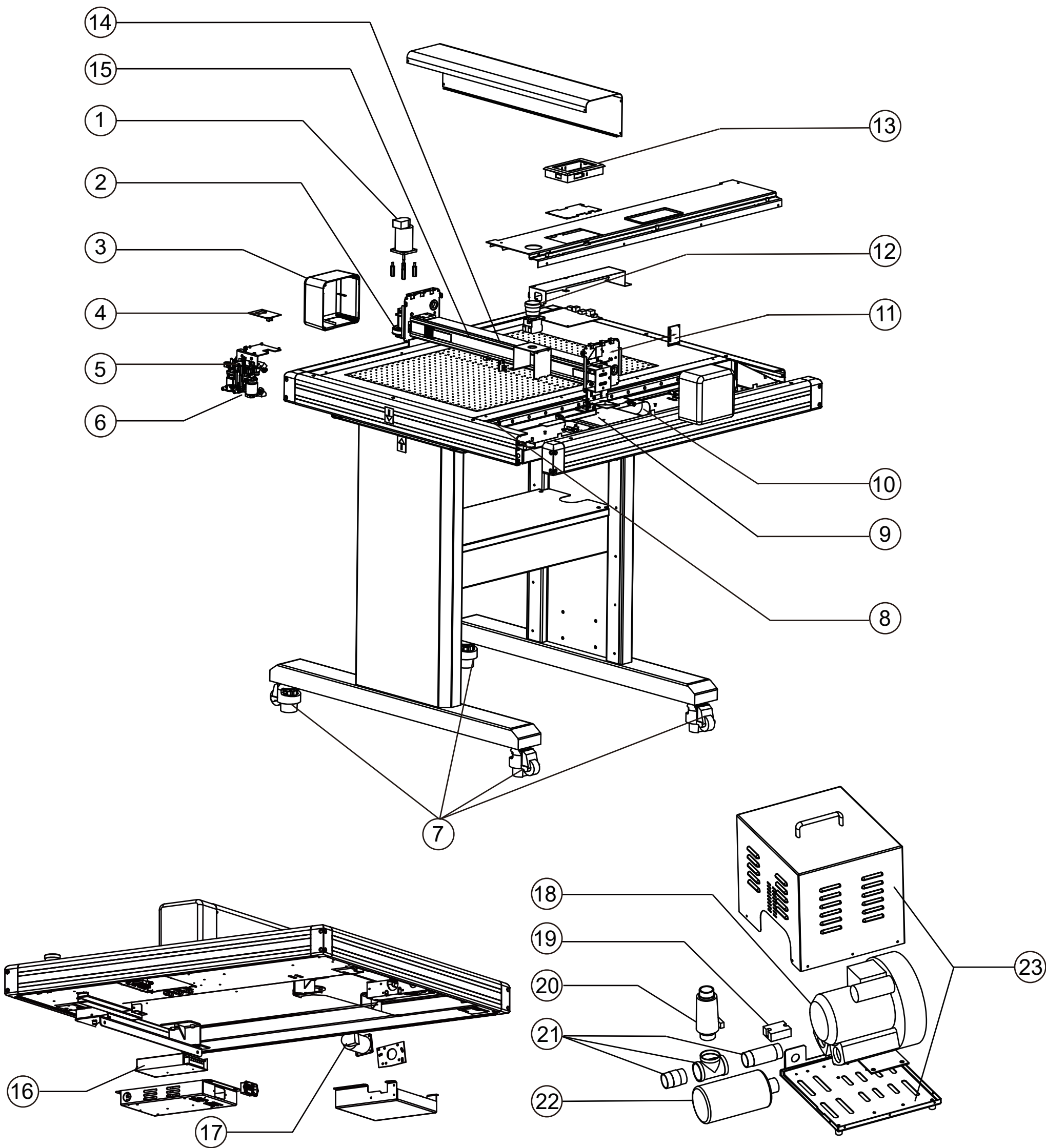
### Daily Maintenance

During the course of daily maintenance be sure to observe the following precautions:

- (1) Never lubricate the mechanisms of the plotter.
- (2) Clean the plotter's casing using a dry cloth that has been moistened in a neutral detergent diluted with water.  
Never use thinner, benzene, alcohol, or similar solvents to clean the casings; they will damage the casing's finish.
- (3) If the writing panel is dirty, please clean using a dry cloth.
  - \* Do not use benzine, thinners, or similar solvents to clean the writing panel.
- (4) When the Y rail sliding surface gets dirty, gently wipe the dirt away with a clean, dry towel.
  - \* The sliding surface has lubricant on it, so be sure not to wipe all the lubricant off as well.

4.3 Exploded drawings and part lists

Exploded drawing for cutter



4.3 Exploded drawings and part lists

Part lists

Item	Part Number	Description
①	FC500VC-001	Servo motor
②	FC500VC-002	Motor belt 230
③	FC500VC-003	Left and right cap
④	FC500VC-004	Carriage board
⑤	FC500VC-005	Carriage
⑥	FC500VC-006	Camera sensor
⑦	FC500VC-007	Wheels
⑧	FC500VC-008	Limit board
⑨	FC500VC-009	Mainboard
⑩	FC500VC-010	X cable (26)
⑪	FC500VC-011	Transfer board
⑫	FC500VC-012	Emergency stop switch
⑬	FC500VC-013	Panel
⑭	FC500VC-014	Y cable (20)
⑮	FC500VC-015	Carriage belt-1490mm
⑯	FC500VC-016	Power supply
⑰	FC500VC-017	Servo motor
⑱	FC500VC-018	Air pump
⑲	FC500VC-019	Relay
⑳	FC500VC-020	Relief value
㉑	FC500VC-021	Transfer tube
㉒	FC500VC-022	Silencer
㉓	FC500VC-023	Air pump house