PRECISION · ACCURACY

VULCAN

USER'S MANUAL

FC-500VC

FC-700VC

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

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NOTICE

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 and Nepata Digital GmbH.

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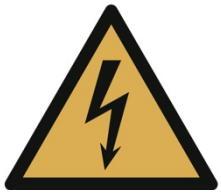
Cutter

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.

Warning labels

The following Warning Label is located on this cutting plotter.
Please observe all the warnings 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
Take care to avoid injury to hands when in the vicinity of equipment with closing mechanical parts

Safety precautions

Before you start operating the machine, please read this manual carefully and make sure you observe all safety precautions. The machine must only be operated by qualified adult persons.

WARNING
In order to avoid human injury:

- During operation do not touch any moving parts like the cutting head, crossbeam or cutter holder
- Make sure no hair is near the machine while it is in operation
- When inserting media, make sure hands and hair are not in the vicinity of possibly moving parts as the machine may start moving when it receives data from the computer
- When changing tools, always make sure the machine is fully switched off to avoid injury
- When changing the blade, please note that blades are extremely sharp and can injure fingers.
- When the emergency stop button is pressed, make sure the emergency situation is fully resolved before releasing the button and that the machine is turned off with the regular power switch.
- Be aware that the machine is strong enough to cause injury to hands and other body parts that are in the working area while the machine is in operation
- The machine is supplied with rolls that can be adjusted to become stable feet. Never place the machine on an uneven surface and always ensure that the rolls are fixed and set to foot mode before switching on the machine
- Use ear covers to protect ears from the vacuum pump noise

- When cutting harder material, protect your eyes with eye protection from small particles that may fly around.

- When cutting material that produces dust, always wear a protective mask

- Only operate the machine, when no children are present.

- In order to avoid electrical shock

- Make sure the machine is always grounded and uses a 3-pin outlet. This applies also to the vacuum pump

- Never use a different power supply than the power supply listed on the machine

- Never open the machine on your own. Always contact the manufacturer first and only open parts of the machine when fully disconnected from power and when advised to do so by technical support

- If the machine shows signs of smoke, fumes, burning smell etc. disconnect it from power immediately

- Make sure the machine is kept away from water, e.g. rain, snow or liquids being spilled over the machine. If the machine is exposed to water, disconnect it from power immediately and contact Vulcan technical support. Do not use the machine anymore

- Make sure no metal parts can enter the machine

- If the power cable shows signs of damage, do not use it anymore and have it replaced by a new power cable

CAUTION
In order to avoid damage to the machine or the area around the machine

- Make sure the machine is only used in the indicated operating conditions with regards to temperature and humidity
- Do not use the machine in direct sunlight
- Do not use the machine in a very humid environment
- Do not use the machine in an area where it is exposed to dust.
- Never put a liquid container on the machine, even when not in operation
- Never apply lubricants to any part of the machine without prior consultation with the Vulcan technical support
- keep clear of the machine with a distance of 100cm on each side to the next object
- Do not move the cutting or crossbeam head manually
- Ensure before operation that you always do a test cut
- If you hear any unexpected sounds from the machine, switch it off immediately and contact Vulcan technical support.
- Do not use the machine in an area with strong vibrations

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.

Definitions

• 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.

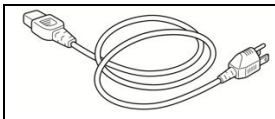
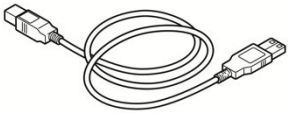
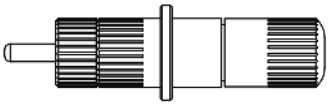
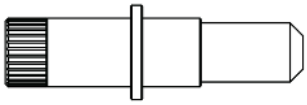
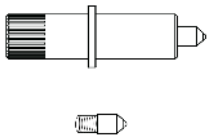
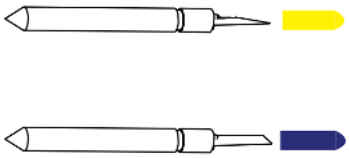
Chapter 1: Product Summary

1.1 Machine Specifications

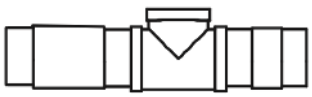
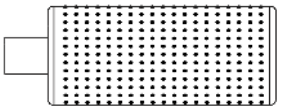
Item	FC-500VC
Configuration	Digital servo system, Flatbed
Media hold-down method	Vacuum suction
Maximum cutting speed	700 mm/s (10 to 700 mm/s)
Cutting pressure	Tool 1: Max. 5.88 N (600 gf) Tool 2: Max. 5.88 N (600 gf)
Minimum character size	Approx. 5 mm square (varies with character font and media)
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

1.2 Scope of delivery

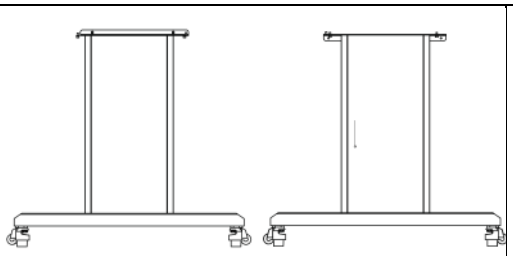
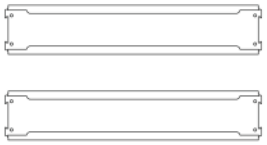
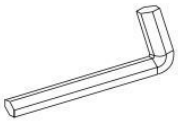
parts for flatbed cutting plotter

 1x Power Cable	 1x USB cable	 1x Ethernet cable
 1x blade holder	 1x pen calibration tool	 1x creasing tool, 1x creasing head
 1x 30° blade 1x 60° blade	 5 x pen	 1x creasing mat

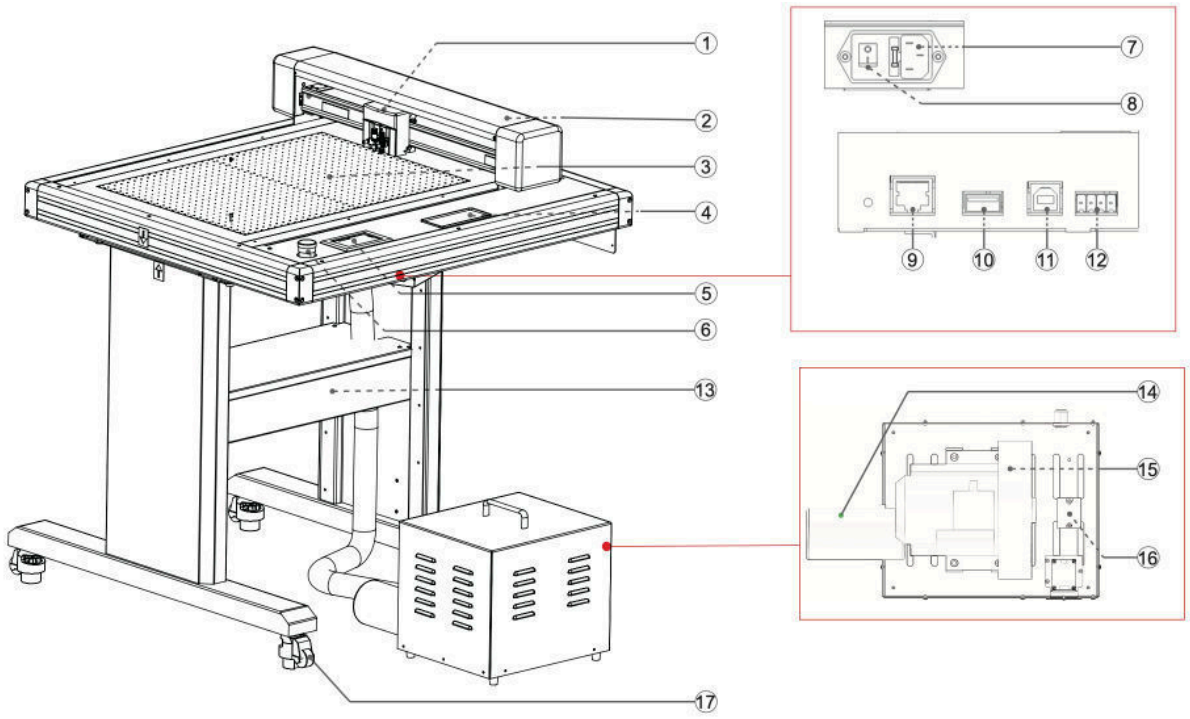
parts for vacuum pump

 1x transfer tube	 1x relief valve	 1x silencer	 1x transfer hose

Parts for stand

 1x left stand 1x right stand	 2x beams	 Beam cover
 12xM6 hex screws 4x M4 philips screws	 1x hex kex	 1x Philips screwdriver

1.3 Product overview



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. Vacuum pump	Hold the media by a vacuum
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

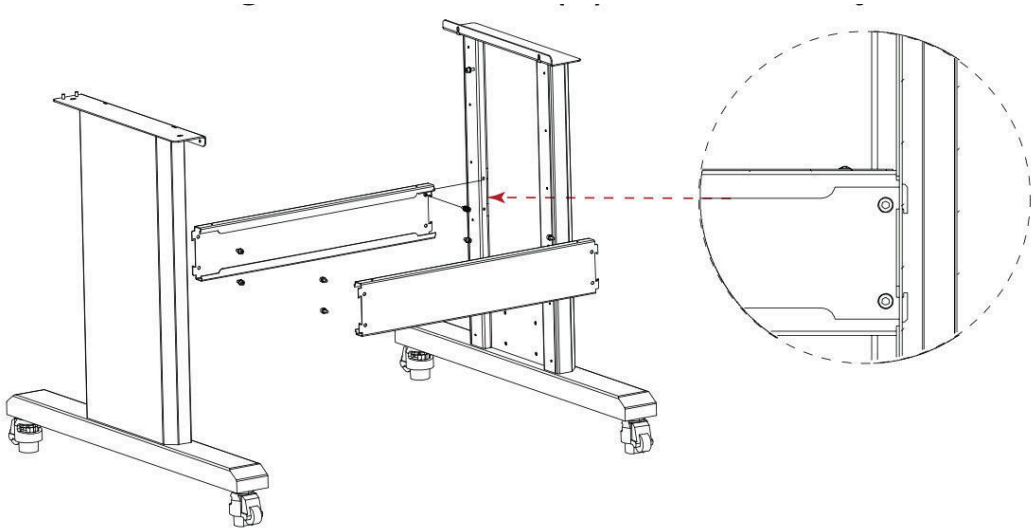
Vacuum	To toggle of vacuum suction, ON – fast/stable hold OFF – easy replacement of next item
Test cut	To cut one square and one triangle for testing force of tool1/tool2.
Pause	To pause the cutting job when we find anything wrong.
Files	To choose file from USB-disk (PLT-files saved on USB-disk can be 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

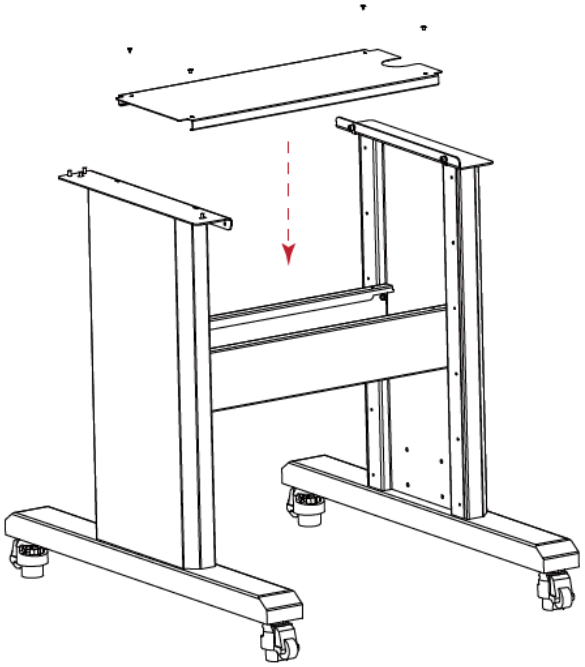
Installation Equipment

2.1 Stand and Cutter installation

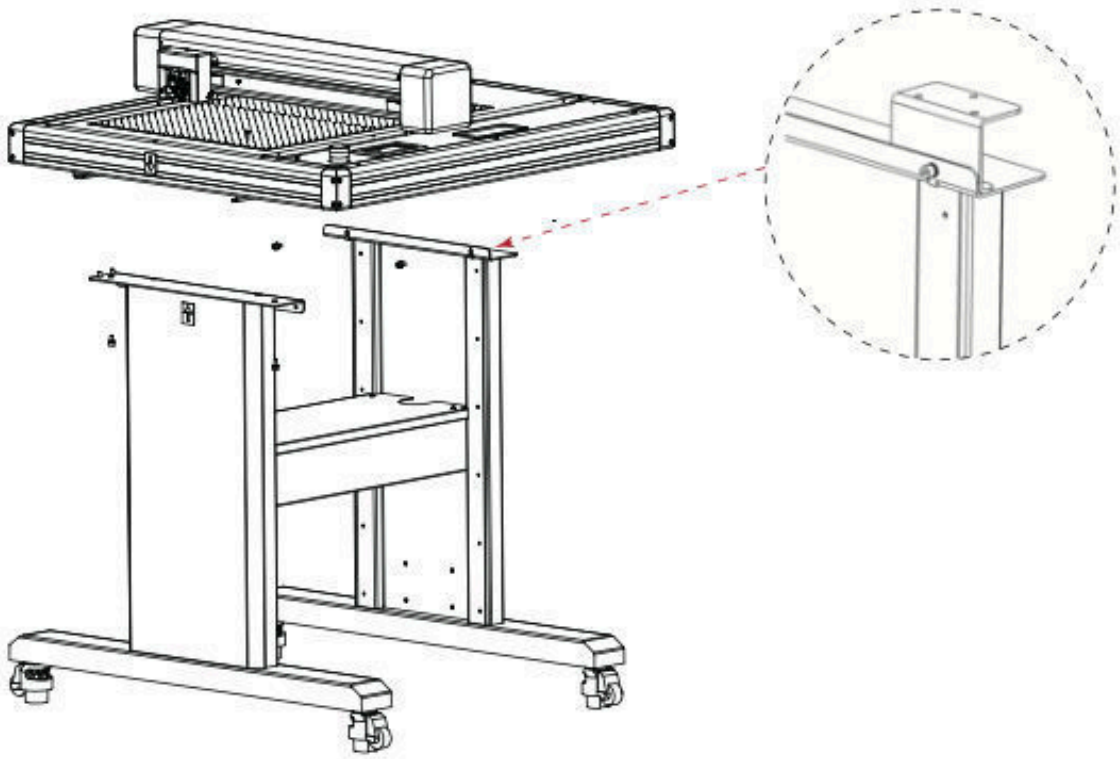
1. Install beams to stand legs with the supplied hex screws



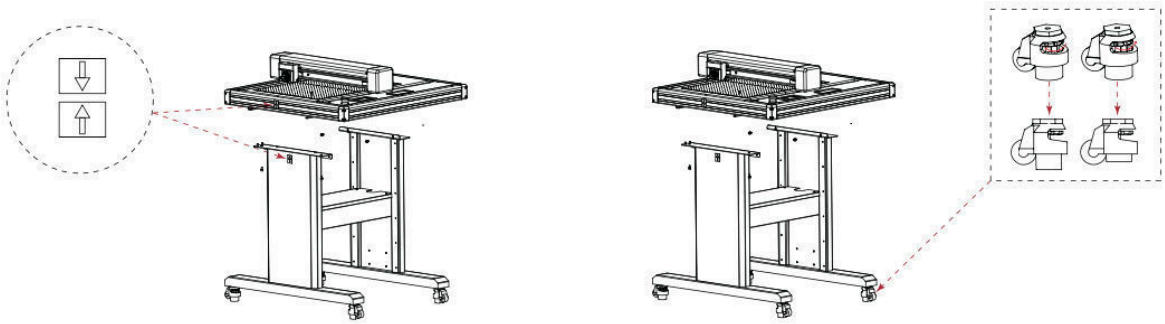
2. Install beam cover onto beams and tighten with the 4 provided Philips screws



3.Put machine on floor stand and tighten with 4 hex screws



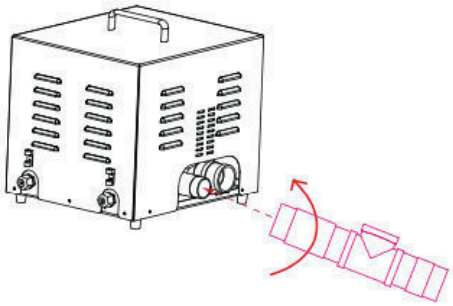
4. Please check labels on machine and stand, to ensure correct direction and positon.The feet of the machine are moveable. As shown,turn left and the wheels will be lifted,the feet are fixed. Turn right, the feet are lifted, and the wheels can move.

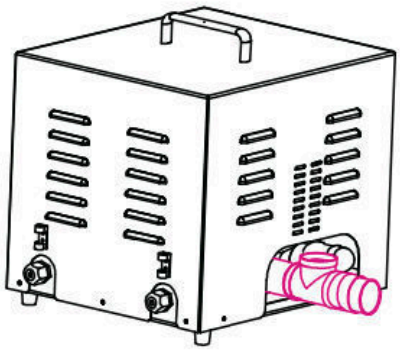


2.2 Air pump installation

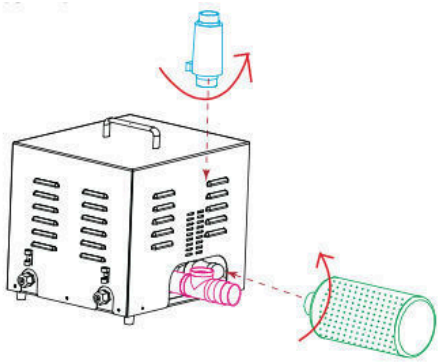
The thread of the silencer is very sharp. Wear gloves when installing to prevent injury.

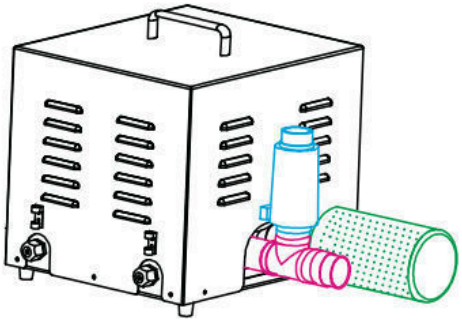
1. Connect “Transfer tube” into “Air pump” and tighten it.



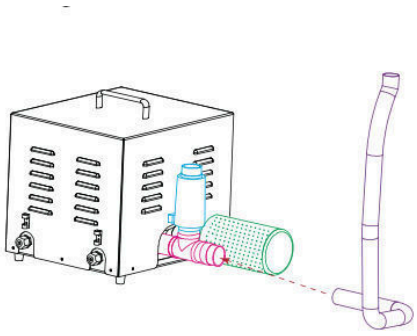


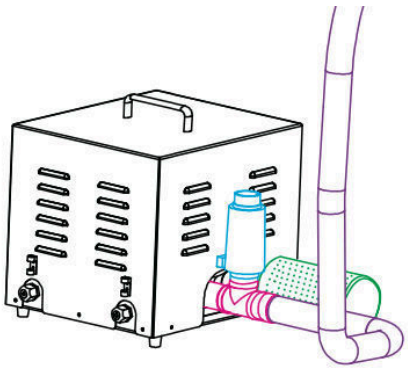
2. Connect “Relief valve” into “Transfer tube (on the top)” and tighten it; connect “Silencer” into “ Air pump” and tighten it.



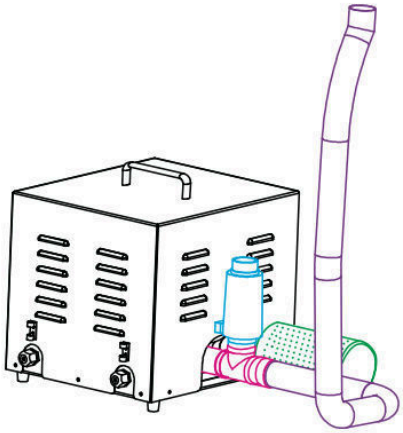


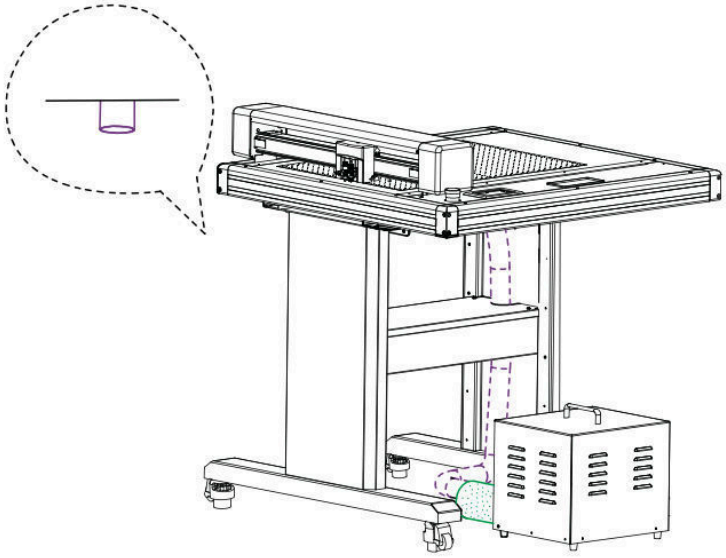
3. Connect “Transfer hose” into “Transfer tube(on the right) and tighten it; connect “Transfer hose” to machine and tighten it.





3. The transfer hose need to be passed through beam cover.

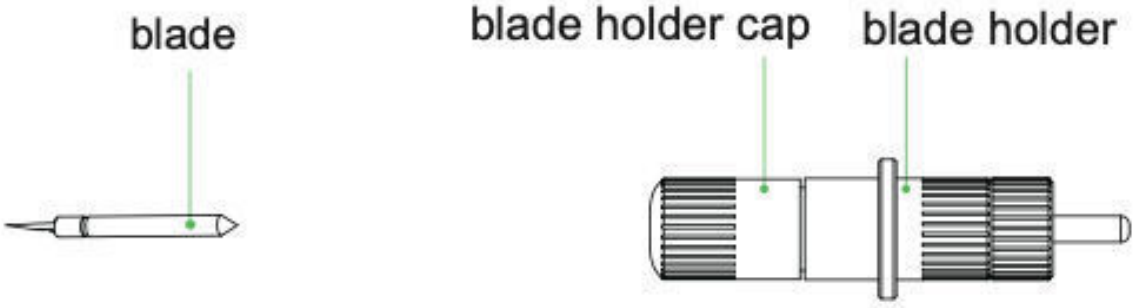




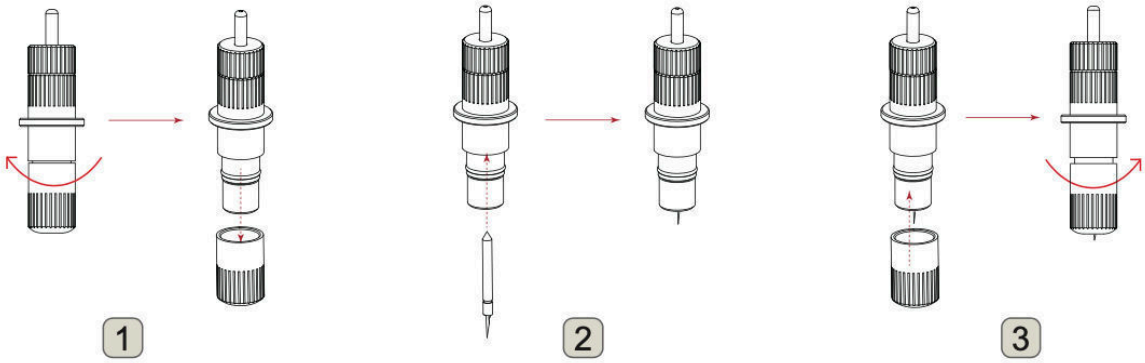
2.3 Use of tools

To avoid injury, handle cutter blades with care.

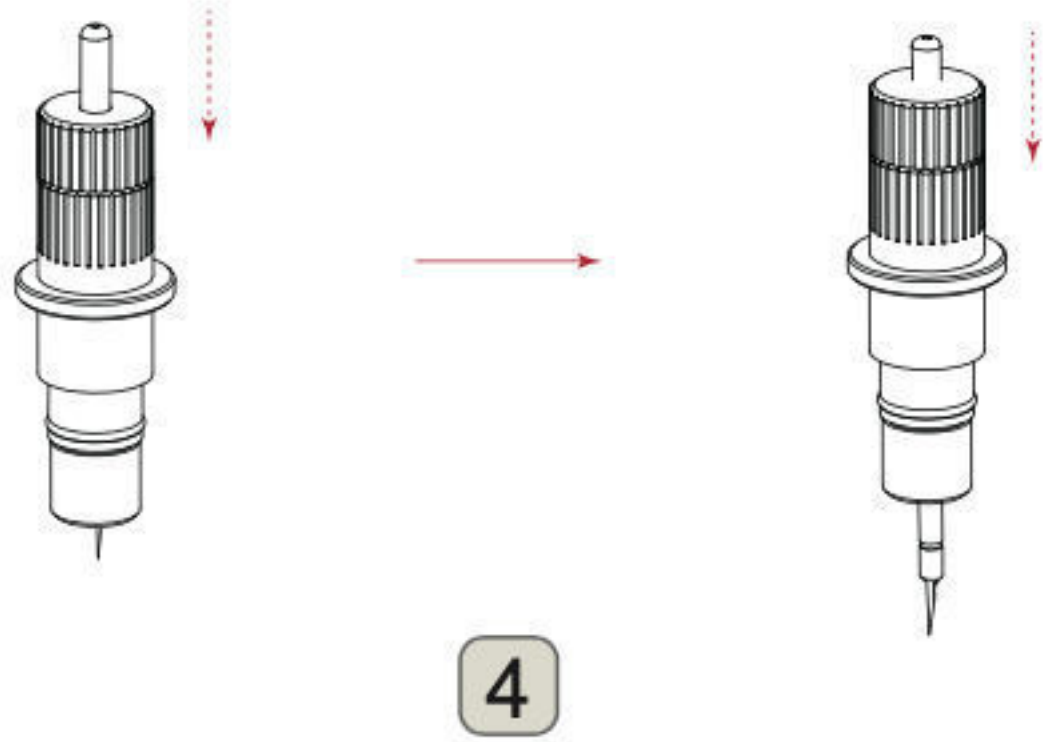
Blade Holder



1. Unscrew the blade holder cap
2. Place the blade into the slot of the blade seat
3. Close and tighten the blade holder cap to complete the installation and replacement of the blade. The length of the blade can be adjusted by using the blade holder cap

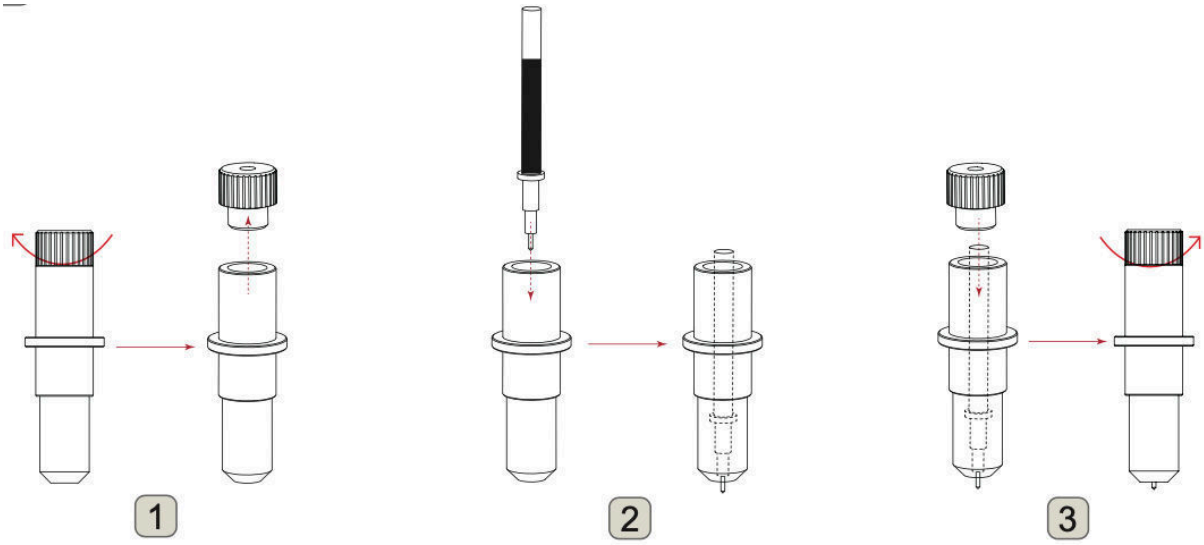


4. To remove the tool.Press the button at the top and the knife will come out.



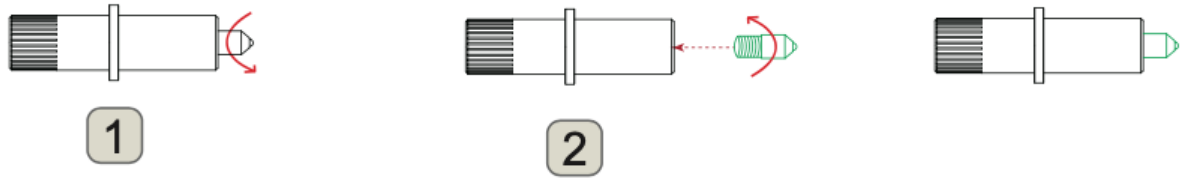
Pen holder

1. First,unscrew the Calibration tool cap,as shown.
2. First,unscrew the Calibration tool cap,as shown.
3. screw the Calibration tool cap to complete the installation and replacement of the pen.



Creasing tool

1. Unscrew old creasing head
2. Install new creasing heat

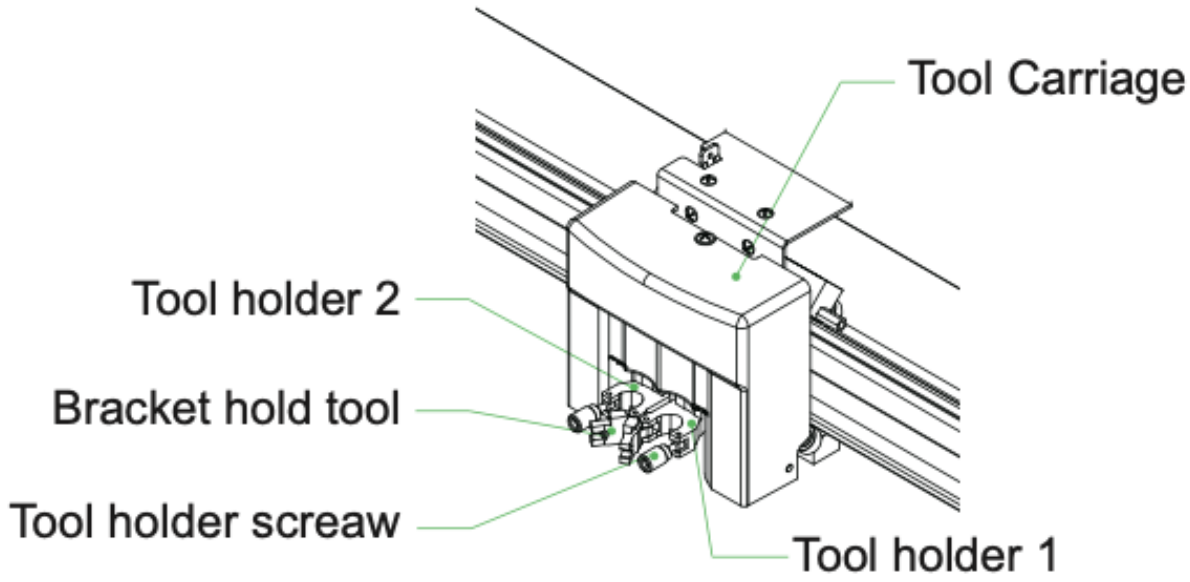


2.4 Attaching a tool

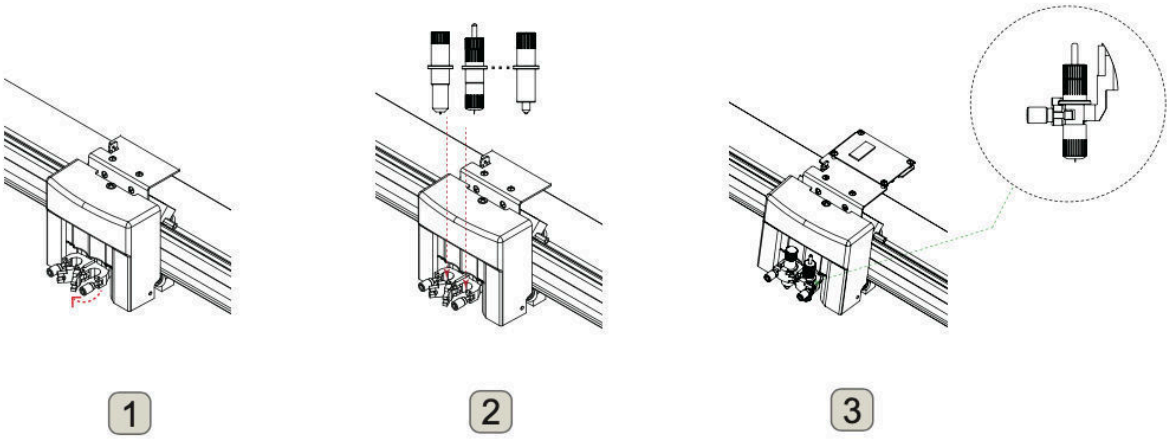
When pushing the tool holder with your fingers, the blade tip may be protruding. Take care not to cut your fingers.

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. 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. 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

Connection via USB interface

Do not perform any of the following:

- 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

- 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,discounnect the network from the internet.
- We recommend to use the USB connection instead of LAN

Connection of power cable

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

Connection of Air pump cable

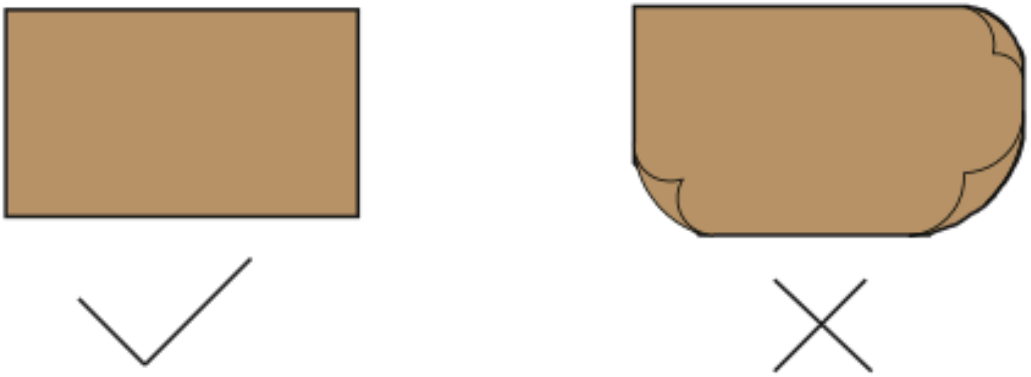
The vacuum pump is supplied as a standard accessory.No other air pump models may be used. The air pump has 2 cables, one needs to be connected to the machine, and the other is connected to the power.

Chapter 3: Operation

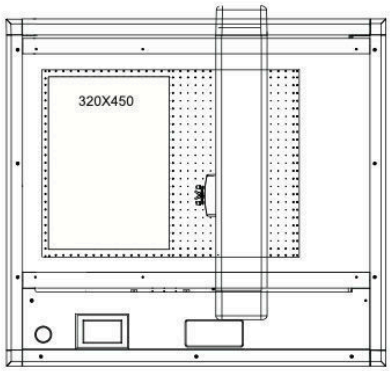
3.1 Loading the Media

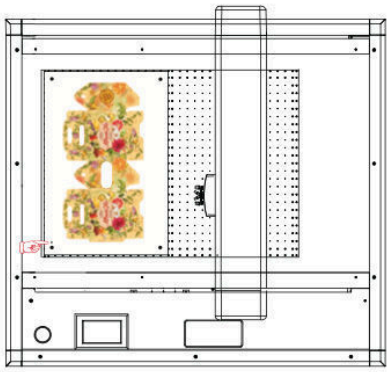
This plotter is available with a vacuum suction flatbed

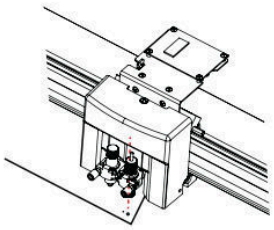
- There are media that cannot be held down by vacuum suction. Please test before use.
- When loading a media that cannot be securely attached using the vacuum duction, reinforce adhesion by using tape on all four sides.
- If the media floats, secure the four corners using a drafting tape. When the media 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.



Place the media on the flatbed

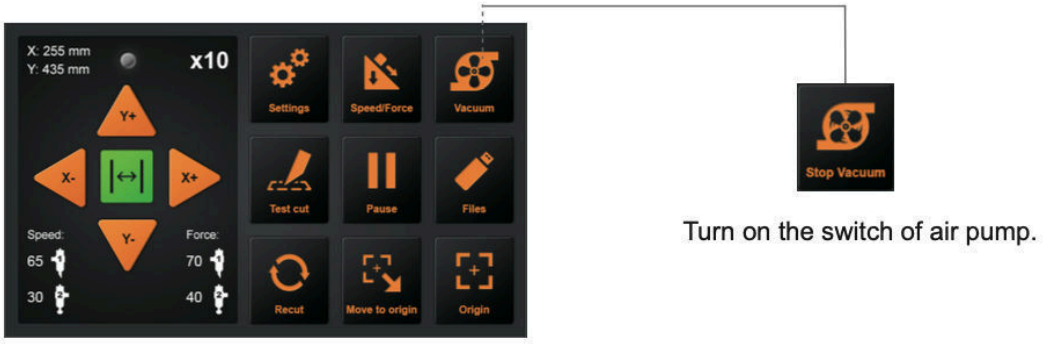






Blank media printed media – place mark below tool 1

Turn on the vacuum pump on the control panel.

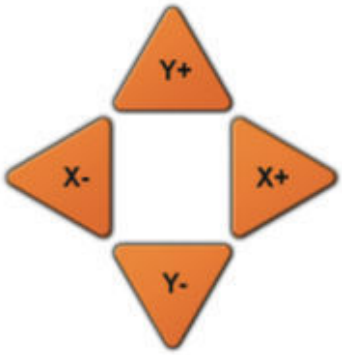


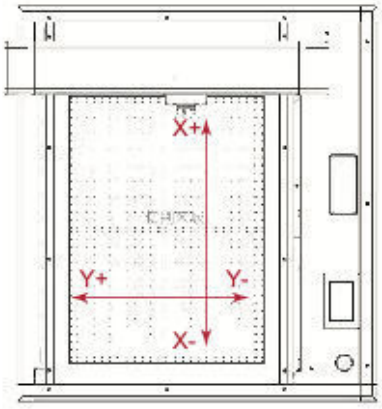
3.2 Move the Tool Carriage

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

When there is no file in progress, you can press the arrow keys to move the tool carriage. Tool carriage will move toward the direction of the pressed arrow key.

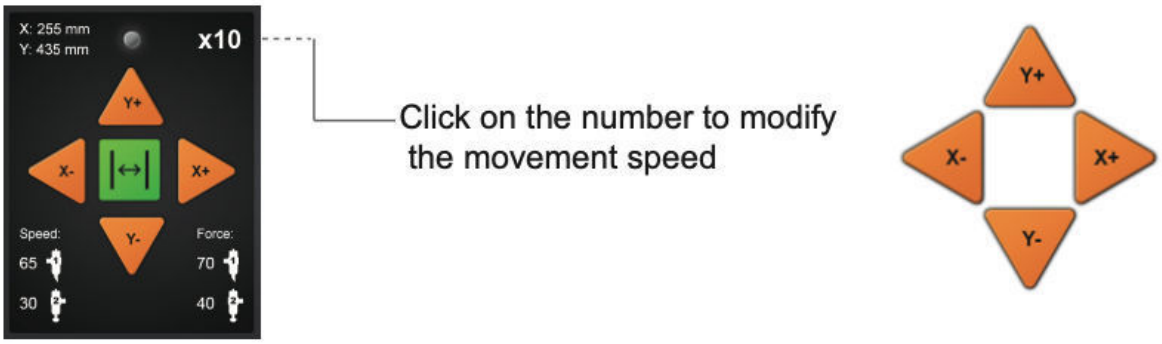




Setting of Step Movement speed

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.

You can press the arrow buttons to move the tool carriage.Tool carriage will move toward the direction of the pressed arrow key,movement speed will also change.

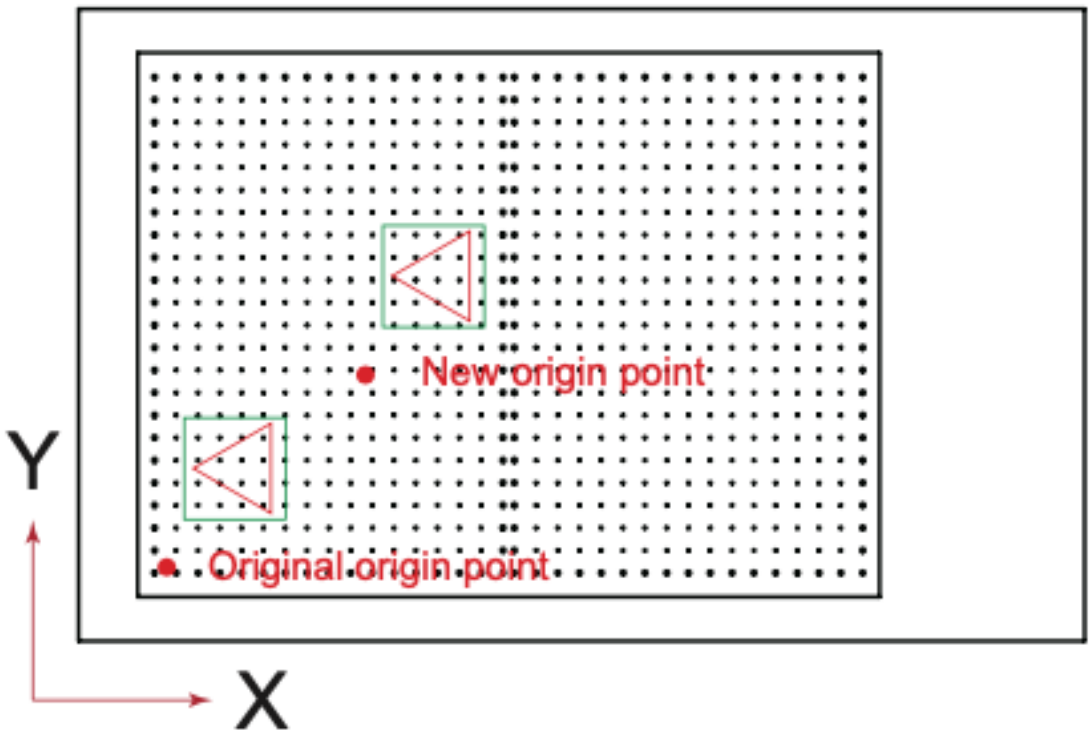


Move back the Tool Carriage

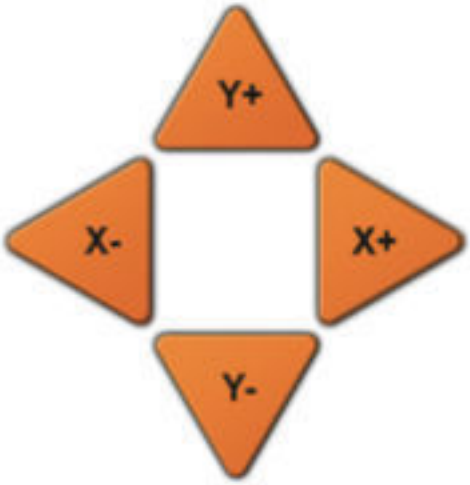
When the cut is over, the tool carriage will stop at a certain position, then press the “Move to origin” button to return to the original point. Press Recut to restart the same cut job.

3.3 Setting the Origin Point

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



Use the arrow keys to move the tool to the desired new origin point



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.

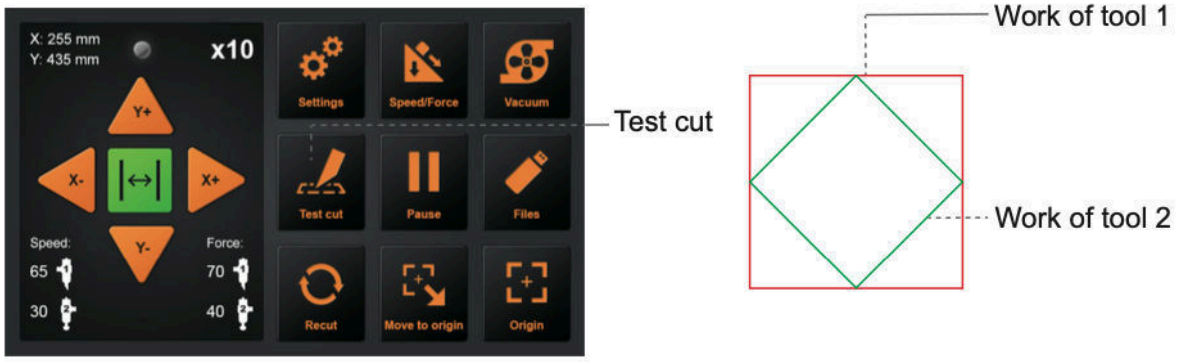
3.4 Cutting Tests

Make sure that the air pump switch is turned on .

This function 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

After setting the origin, press the “Test cut” button, the machine will work automatically, Tool1 will work a Square, Tool2 will work a Prismatic.

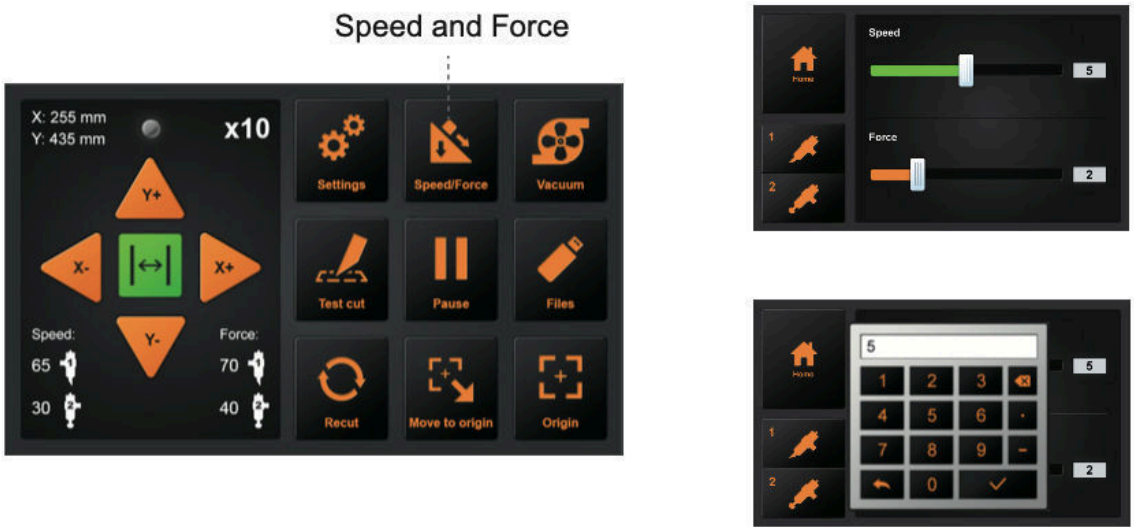


Blade holder is placed in the tool holder 1 and creasing is are plased in the tool holder 2.

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?
Drag the white slider to adjust.
Click on the value, an input will appear, or you can enter the value manually.



Test fit

If the prism and square from the Test-Cut have crossed lines and do not just touch the lines, please refer to 3.8 in order to calibrate cutter size

3.7 Stop Cutting

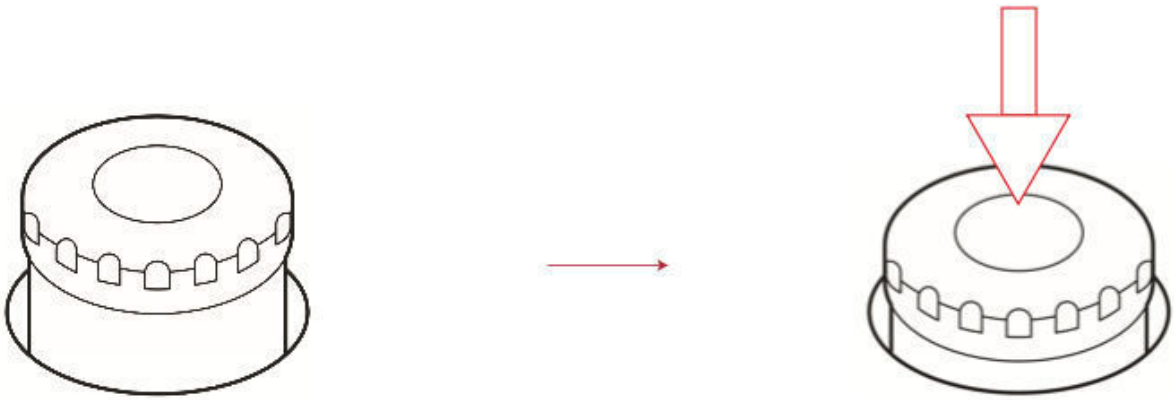
Normal Stop

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 “Cancel”, if you want cancel the job.

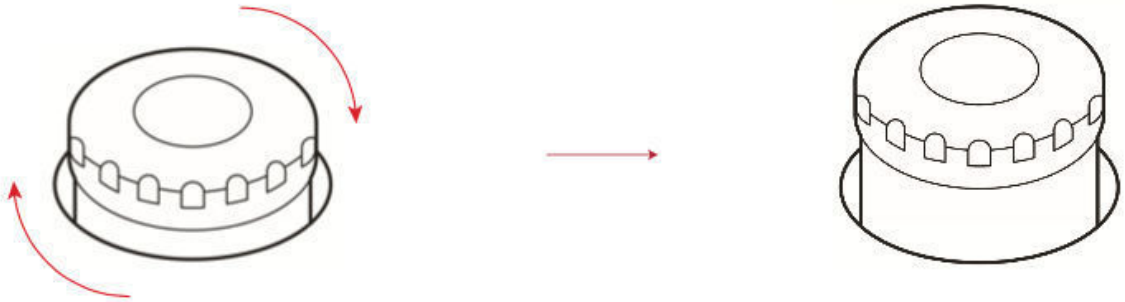
Emergency Stop

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



In order to reset the emergency switch:

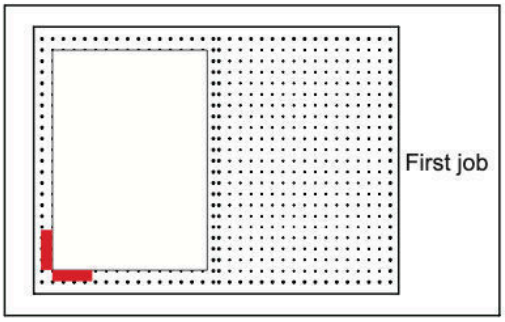
Rotate counter-clockwise to turn the switch on, then the machine will turn back on. The carriage will return to the “Original origin point” automatically. Make sure any emergency situation is fully resolved before resetting the emergency switch

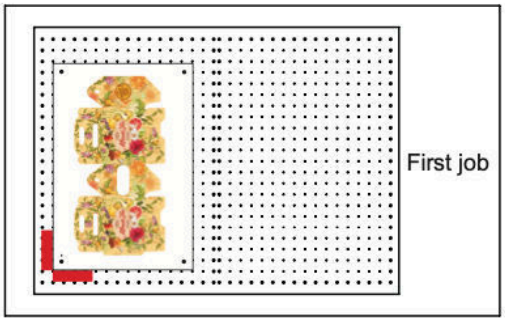


3.6 Recut function

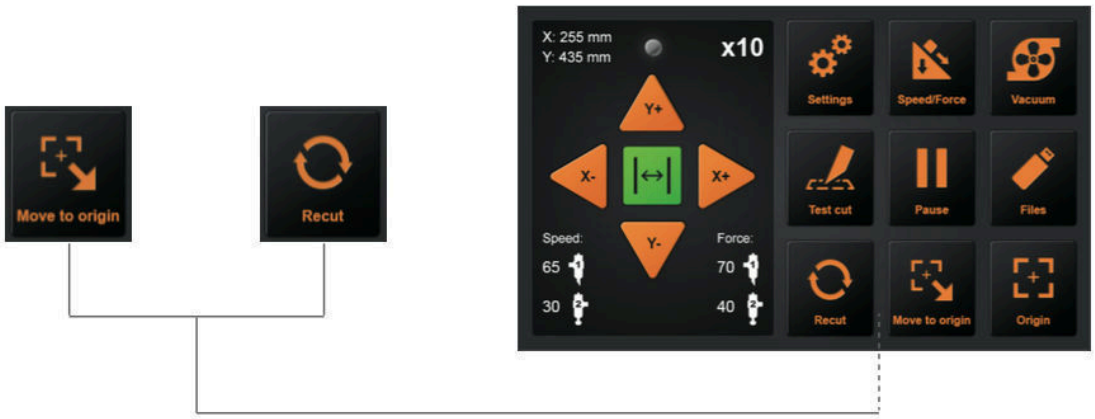
Set the origin, or move the carriage directly above the first mark to determine the origin. Then start working.

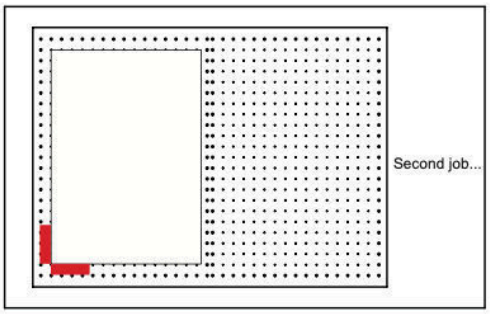
The position of the placed media can be marked to facilitate the placement of the next media.

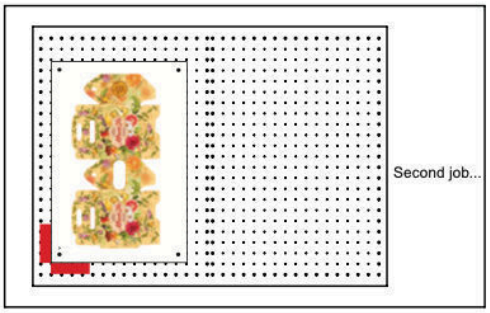




After the first job, remove the media. Place the next media in the first media position.
Press “Move to origin” will return to the origin and then press “Recut”,the cutter will start repeating the last job. The error of the marked position cannot exceed 1cm.







3.7 Offline cutting from USB thumb drive

Cut jobs that were created by the application software can be saved on a USB thumb drive for direct cutting from USB.

Make sure the vacuum pump is switched on before selecting the file.

Select the desired file from the menu of the plotter,

The Windows special characters (¥, \ , /, ;, *, ?, “, <, >, |, etc.) cannot be used.

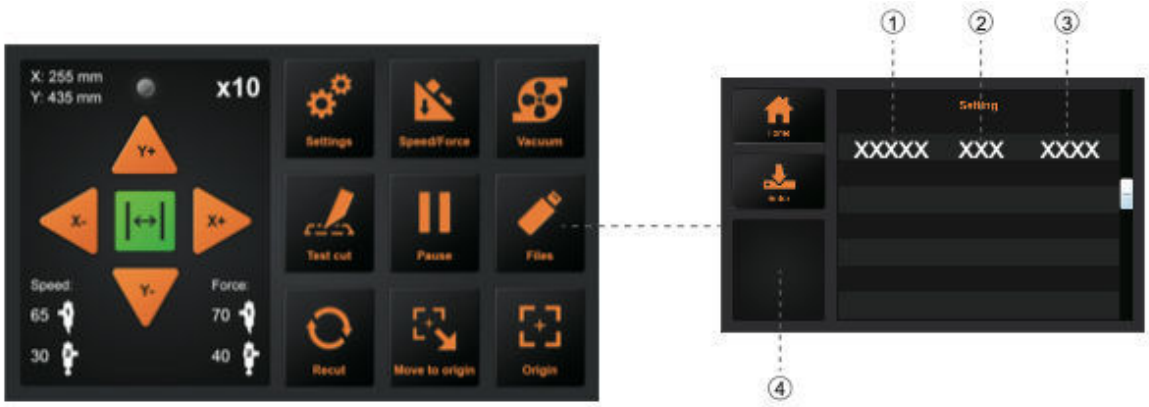
Only 8 characters per file will be displayed

Extension is “plt”.

Click files on the control panel

1. Select the desired PLT file
2. Size
3. Creation Date
4. Preview of the file

Once you press enter the machine will start cutting



3.8 Settings

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

Calibrate cutter size

Over time, some mechanical wear may occur, resulting in reduced precision of the device. In this case calibrating the cutter size will help to re-calibrate the machine with actual dimensions. Make sure you use the pen calibration tool and a white sheet of paper for calibration

1. Press Calibrate cutter size and press Enter
2. Enter a size for a rectangle and press return. The machine will now draw a rectangle with the tool 1.
3. Use a ruler to measure the rectangle that was drawn
4. Enter these dimensions into the Measured Rectangle fields
5. Press Calc to confirm.

The machine is now re-calibrated to deliver precise dimensions

Offset Setting

The offset between the tools and the camera might need to be calibrated occasionally, e.g. when offsets occur.

1. Insert a white A4 paper and the pen calibration tool that came with the machine
2. Press the Auto button – the machine will draw two circles and two rectangles. These will then be captured by the camera to calibrate the offset setting
3. Press return to confirm the measured values

Operating Mode

Normal: regular mode with a balance of speed and precision

Precision mode: slower for high-precision jobs

Hi- Speed: for larger jobs where speed is more important than precision on small cuts

System Information

System information will display information like:

Model
Machine serial number
Mainboard version
Mainboard serial number
Total cut length
IP address when using the network connection
Firmware version

Chapter 4: Troubleshooting and Maintenance

4.1 Error information on LCD display

LCD Display	Cause	Solution
Please adjust the starting position! (X)	There is not enough space in X directions when working with registration marks	Change the material position and reset the starting point
Please adjust the starting position! (Y)	There is not enough space in Y directions when working with registration marks	Change the material position and reset the starting point
Loading…	File Loading Interface Loading	Wait until loading is done
Cutter is busy!	Cutter is working and cannot perform other operations	Wait until work is completed
Drawing	Cutter is drawing a calibration file	Wait until work is completed
Oversize!	Working width exceeds the actual working width of the machine	Modify the working size in the software to match the maximum size of the cutter
Unsuccessful!	Calibration offset job failed	Conform the pen draws possibly and force of both tools is set to 60g
Read file error	Read file error when working via USB	Please re-insert the USB thumb drive
X Motor Error / Y Motor Error	Motor Error!	Reset cutter Check if motor is blocked Check cable connection Replace motor

Image does not fit the machine size	There is not enough space left for this job	Re-adjust origin point to leave enough space for cutting job
X1 Oversize Y1 Oversize X2 Oversize Y2 Oversize	Job size is larger than actual working size of cutter	Restart cutter Change material position and reset origin Reduce file of cut job

4.2 Daily maintenance

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

1 Never lubricate the mechanisms of the plotter.

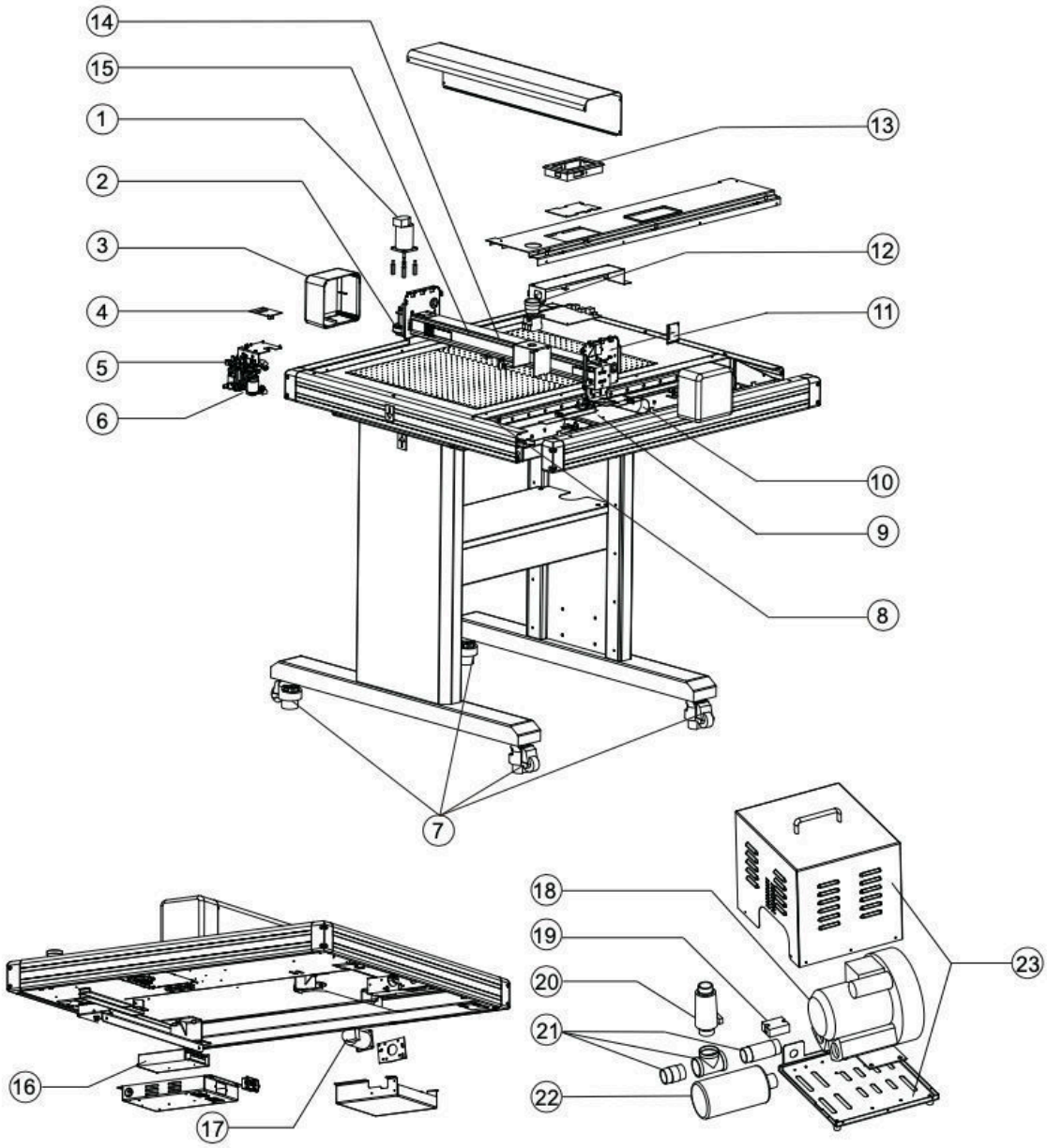
2 Clean the plotter's casing using a dry cloth that has been moistened in a neutral detergent diluted with water.

3 Never use thinner, benzene, alcohol, or similar solvents to clean the casings; they will damage the casings finish.

4 If flatbed is dirty, please clean using a dry cloth. Do not use benzine, thinners, or similar solvents to clean the flatbed

5 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 drawing



Parts list:

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

CE

Statement of Conformity

We herewith declare under sole responsibility that the under „technical data“ mentioned product meet the provisions of the following EC Directives and Harmonized Standards:

EC directives:

2014/35/EC Low Voltage Directive

98/37/EC Directive on machinery (from 2009-12-29: 2006/42/EC)

Standard: EN 60204-1:2006

Oliver Tiedemann

Geschäftsführer

Technische Dokumente bei / Technical documents at: Nepata Vertrieb GmbH, Hochstatt 6-8, 85283 Wolnzach, Germany