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India's largest manufacturer of digital inkjet printers

VERVE LED

(VLR 2513)

USER MANUAL

EFFICIENT INDIAN ENGINEERING

Foreword

This user manual is briefly describing the operational aspects of the **VERVE LED (VLR 2513)** machine. In this document, the step-wise instructions for handling various aspects of the machine with visual screens are provided for easy and better understanding. It also describes the error messages encountered while working with the machine with appropriate remedial actions required to be taken by the user.

This manual serves as the reference tool which guides their customers how to use or operate the **VERVE LED (VLR 2513)** machine without anyone else assistance. The information provided in this document ensures its uniqueness and language quality. For safe and proper use of the product, please read this manual carefully and follow all the instructions.

Disclaimer

The information and instructions provided in this user manual have been checked for accuracy, uniqueness, and reliability. ColorJet group reserves all the rights to modify and revise this manual as per the company requirements without any prior notice.

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The reference table is shown in the below table:

Doc Type	Doc Code	Version	Machine Name	Date of Issue
User Manual		1	**VERVE LED (VLR 2513)**	

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1. About Document

Purpose

The purpose of this document is to guide and educate the targeted audience about the Printer and its Printer Manager software so that they can easily and effectively handle as well as use it as per their requirements. Additionally, this document also provides step-wise instructions for handling various aspects of the printer and its related software with the help of graphical screens for easy and better understanding. Moreover, the document also describes commonly encountered problems while working with the printer and Printer Manager software with appropriate remedial actions.

Intended Audience

This document is meant for all the users who want to use the Printer for their printing business. Sometimes, the targeted audience has little knowledge about the printer but in most of the cases, targeted audience is much familiar with the terminologies of printer and printing business. Thus, this document is designed to facilitate both types of users.

2. Specifications

VERVE LED VLR-2513		
Printing Technology		Drop-on-demand, Piezo Electric Inkjet
Print Head		Industrial Grade Jetting Assemblies
No. of Print Heads		2 to 8
Media	Size	2.56m X 1.68m
	Thickness	Maximum 100mm
Curing System		Dual UV LED Lamps
Printing Size		2.50 m X 1.22 m
Ink	Type	UV LED Curable Ink
	System	Bulk Ink Refillable System
	Colors	CMYK + W
Printing Resolution (DPI)		Maximum 1200 dpi
Distance Accuracy		Error of less than ±0.3 % of distance travelled, or ±0.3 mm, whichever is greater
Connectivity		High speed USB 2.0
Power Requirements		AC 220 V, 30 A, 50/60 Hz
Dimensions (Printer Only)		4700 x 2660 x 1520 mm (LxWxH)
Dimensions (With Packing)		4830 x 2280 x 1840 mm (LxWxH)
RIP Software		Onyx (Colorjet Edition)
Weight		N.W. 1762, G.W. 1962
Environmental	Power ON	Temperature: 18 to 28°C Humidity: 20 to 60%RH (non-condensing)
	Power OFF	Temperature: 5 to 40°C Humidity: 20 to 80%RH (non-condensing)

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3. Machine Overview

The **Machine Overview** is shown in the image below:

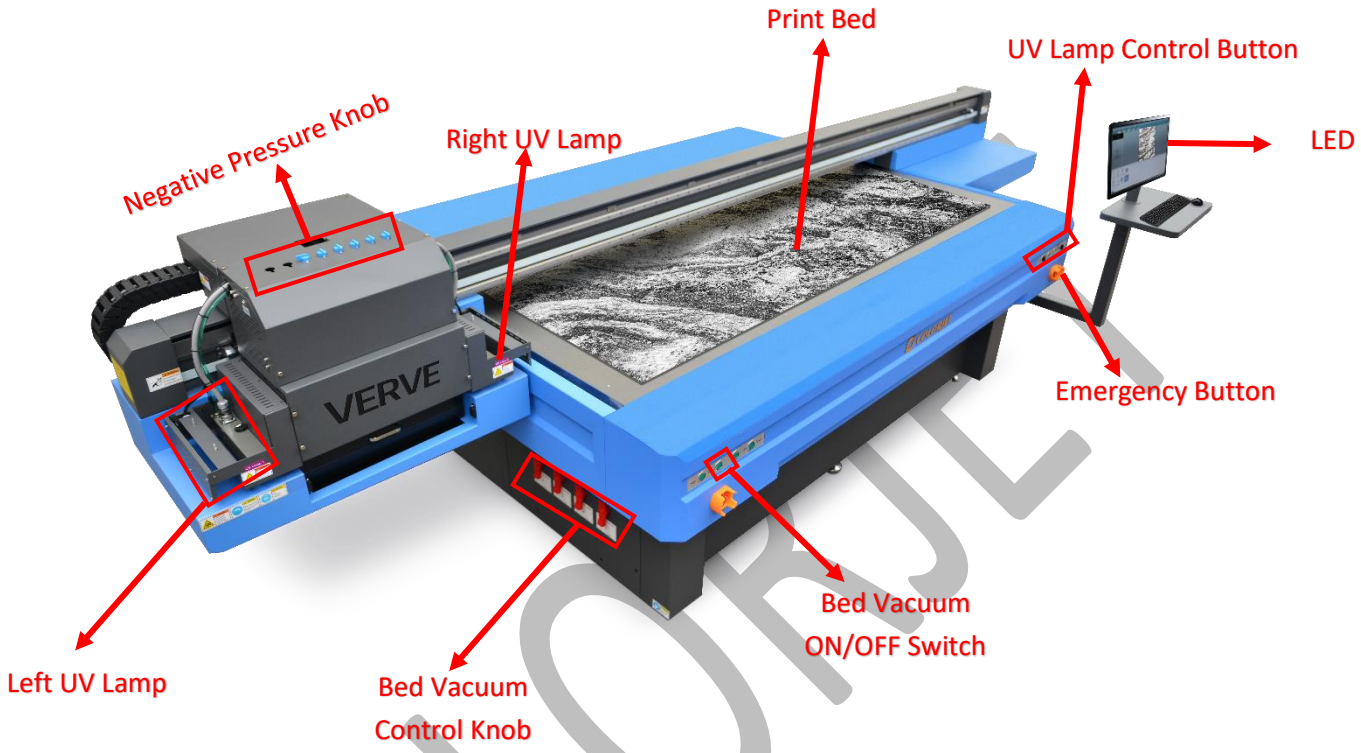

Fig 1: Displaying the Machine View

Table 1: Different Parts of the Machine

1. Left UV Lamp	2. Negative Pressure ON/OFF Knob
3. Right UV Lamp	4. Print Bed
5. UV Lamp Control Button	6. LED
7. Emergency Button	8. Bed Vacuum ON/OFF Button

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4. Getting Familiar with Print Control Center Interface

The **Print Control Center** interface is shown in the image below:

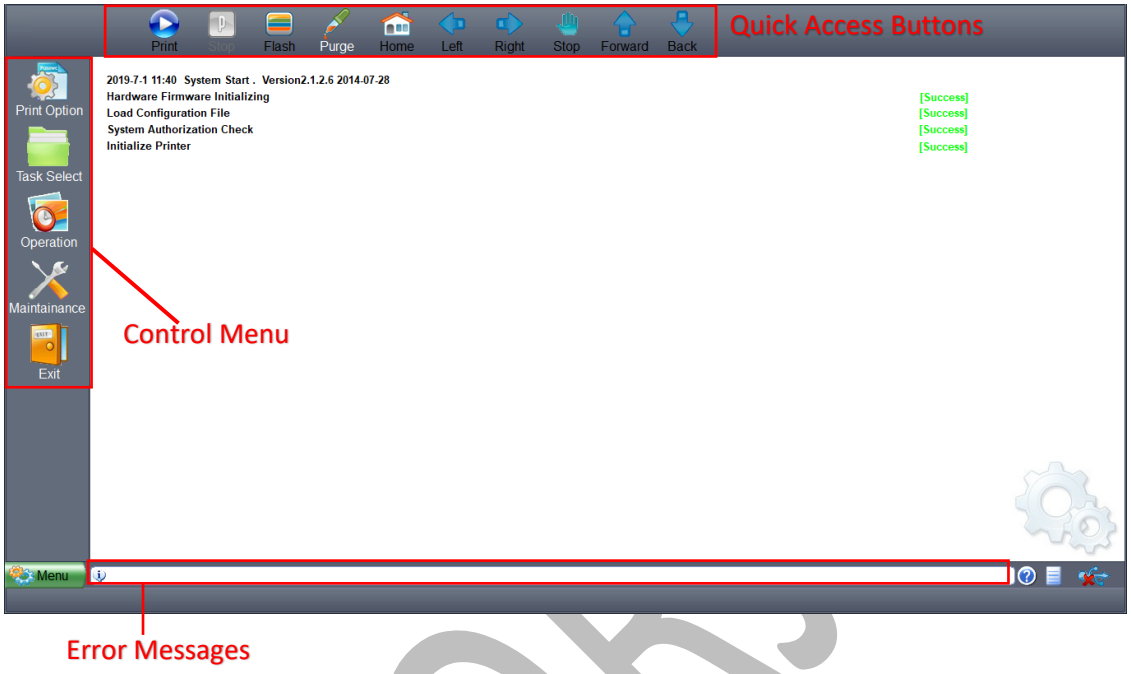


Fig 2: Displaying the ColorJet UV Print Control Center

The description of the **Print Control Center** is given as below:

- **Control Menu:** Consist of several menu or sub menu options viz. Print Option, Task Select, Operation, Maintenance, Help and also provide variety of functions in well organize manner.
- **Quick Access Buttons:** Display frequently performed actions like Print, Stop, Flash, Purge, Home, Left, Right, Stop, Forward and Back.
- **Error Messages:** Displays the system generated error messages.

Setting Carriage and Gantry Position

Carriage and Gantry can be moved using Left, Right, Forward and Back icon on the Quick Access Buttons. The Left and Right buttons enable to set the carriage position. On the other hand, the Forward and Back buttons enable to move gantry in the forward and reverse directions. The control buttons are shown in the image below:

Fig 3: Displaying the Control Arrow Keys

5. Getting Ready for Printing

Switch ON Procedure

Follow these steps to switch ON the printer:

Step 1: Check and maintain the room temperature for smooth printing operations.

Step 2: Check Ink Level.

Step 3: Check Waste Ink Bottle.

Step 4: Release the **Emergency** button, if pressed.

Step 5: Check water level in the Chiller Unit and fill it, if required.

Step 6: Switch ON the Chiller unit, as shown below:

Fig 4: Switch ON UV Lamps

Step 7: Switch ON the printer from the main power and MCB, as shown below:

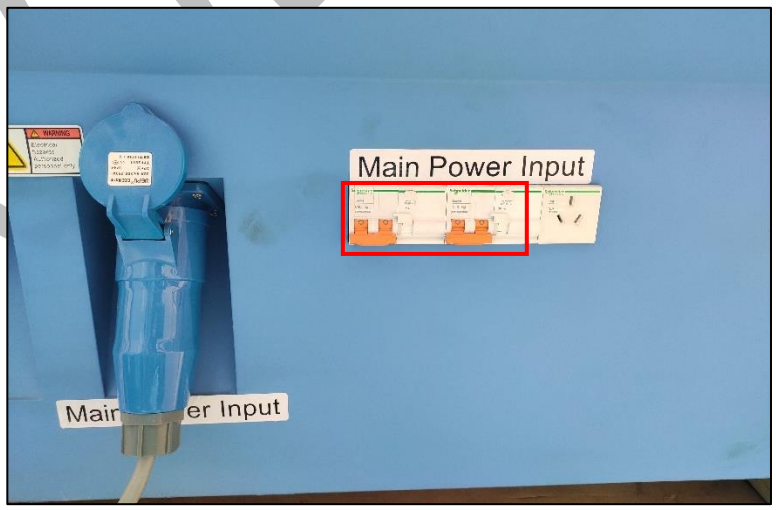
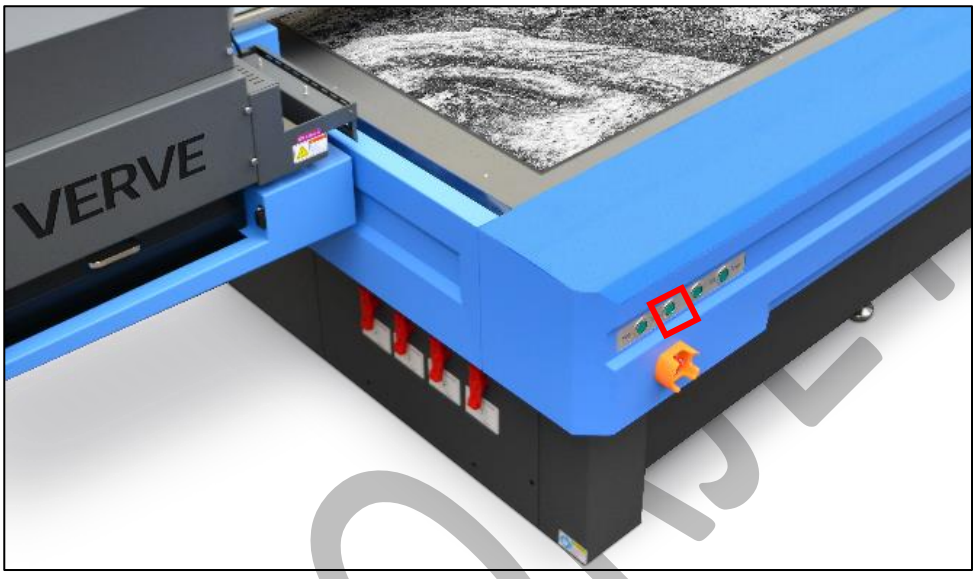


Fig 5: Switch On the Main Power Button

Step 8: To initialize the machine, first open the Print Control Center and get it ready for use. Now, the machine starts initializing automatically. Firstly, the machine initializes the **Z Axis**, then the sequence is **Y Axis→X Axis→ Again Z Axis**.

Step 9: Place the media on the Print Bed.

Step 10: Switch ON the Print Bed vacuum by pressing the **Bed Vacuum** button available on the front left side of the machine, as shown below:



Note:

a. Carriage path must be obstacles free.
b. Ensure that Z height must be enough to move smoothly over the print bed.

Step 11: Switch ON the required vacuum chambers by moving the Vacuum Chamber knob, as shown below:

Fig 6: Switch ON the Vacuum Chamber

Step 12: Press the **Detect Media Height** button to sense the media height (Refer to Fig 11).

Step 13: Turn ON the ink valve of each color in anti-clock direction to open it, as shown below:

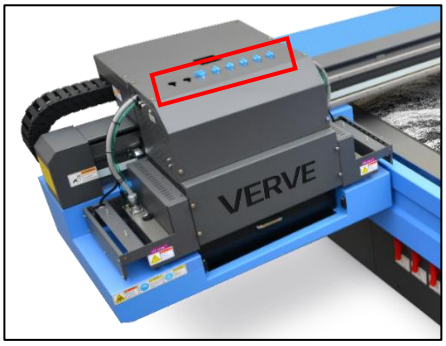
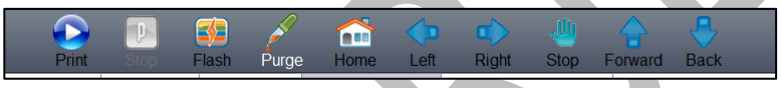


Fig 7: Displaying the Ink Valves

Step 14: Lift the carriage up by pressing the **Lifter Back Zero b**utton on the **Carriage Lifter** tab under the **Maintenance** menu (Refer to Fig 11).

Step 15: Press the **Purging** button (Refer to Fig 11) and clean print heads using the tissue provided with the printer.



Step 16: Bring down the carriage by pressing the **Lifter Move to Print Height** button (Refer to Fig 11)

Step 17: Perform Nozzle test.

Now, printer is ready for printing.

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Loading Media

Follow these steps to load media:

Step 1: Place the media on the Print Bed.

Step 2: Switch ON the Print Bed vacuum by pressing the **Bed Vacuum** button available on the front side of the machine, as shown below:

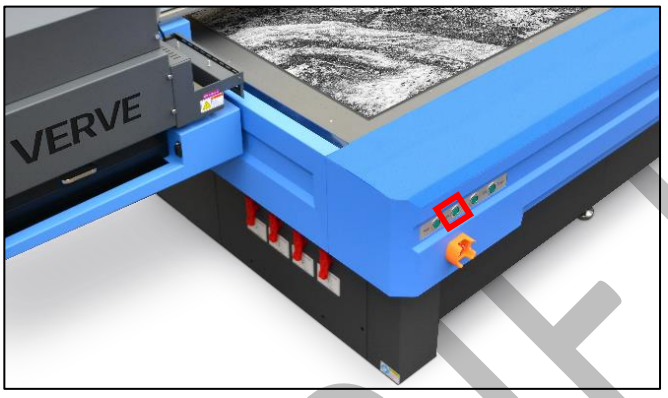

Fig 8: Turning ON the Bed Vacuum Button

Step 3: Switch ON the required vacuum chambers by moving the Vacuum Chamber knob, as shown below:

Fig 9: Switch ON the Vacuum Chamber

The classification of Vacuum Chamber on the Print Bed is shown as below:

Vacuum 3	Vacuum 4
Vacuum 1	Vacuum 2

Fig 10: Classification of Vacuum Chamber on the Print Bed

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Step 4: Set the head height using the **Carriage Lifter** tab, as shown below:

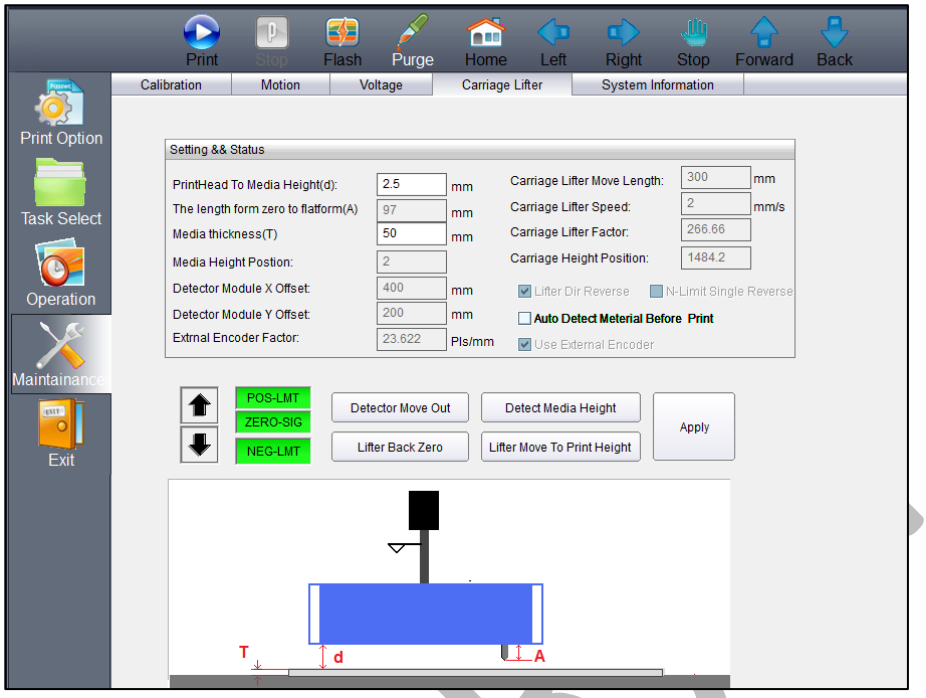


Fig 11: Detecting Head Height

To open the Carriage Lifter screen, click on the **Maintenance** menu and select the **Carriage Lifter** tab. After this, perform the following steps to adjust the head height:

a. Enter the X Offset value in the **Detector X-Offset to PrintPos** field.
b. Enter the Y Offset value in the **Detector Y-Offset to PrintPos** field.
c. After providing offset details, click on the **Apply** button (Refer to Fig 11).
d. Place the media on the print bed.
e. Click on the **Detect Media Height** button to detect head height.

A detailed description of the head height adjustment is given in the **Head Height Adjustment** section.

Ink Filling

Please use the recommended ink in the printer for high printing quality and long life of print and Print Head.

Follow these steps to fill ink in the printer:

Step 1: Switch on the printer.

Step 2: Fill recommended ink in each main ink tank as per the color stickers, as shown below:

Fig 12: The Main Ink Tanks

Note: Main tanks are equipped with ink level sensor which beeps once the ink level goes down.

Step 3: Fix the sub ink tank connectors to the ink refilling pins in the Head Board.

Now, pumps start working and ink start moving in the ink pipes. The ink sub tanks are shown in the below image:

Fig 13: The Sub Ink Tanks with Heaters

The sub ink tanks are equipped with Heaters and float sensors to maintain the temperature of inks and indicate if ink level goes down.

6. Main Menu Description

The **Main Menu** and **its related commands** are shown in the image below:

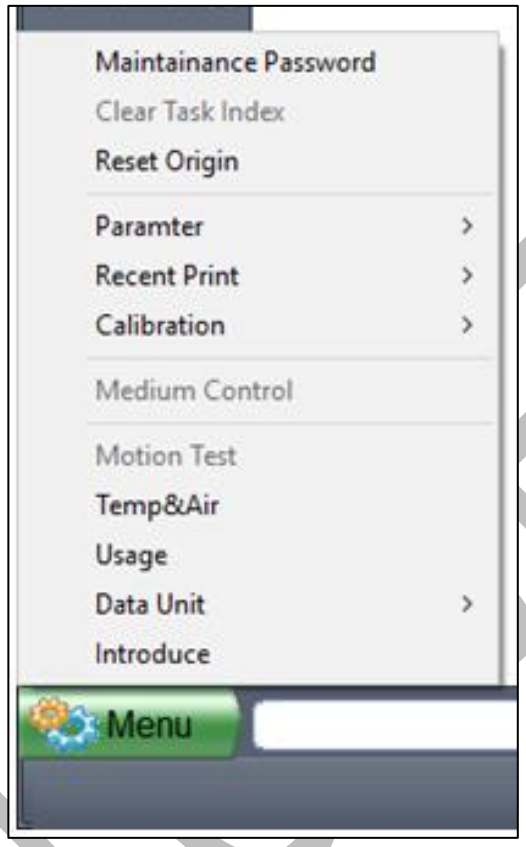


Fig 14: Displaying the Main Menu and Its Related Commands

The description of the Main Menu and its related commands is given as below:

- **Maintainance Password:** Enable to feed and update the Maintainance Password. This can only be done by the service engine.
- **Reset Origin:** Enable to move the carriage to the Home (Zero Position).
- **Parameter:** Using this option, user can **Load To Disk** and **BackUp To Load**.
- **Recent Print:** Issue Print command of recently used files.
- **Calibration:** Perform all types of calibration directly by using this command.
- **Data Unit:** Enable to change data units like mm, inch, etc.

7. Print Control Center Operations

Print Option Menu

On-clicking the **Print Option** button, the following image appears on the screen:

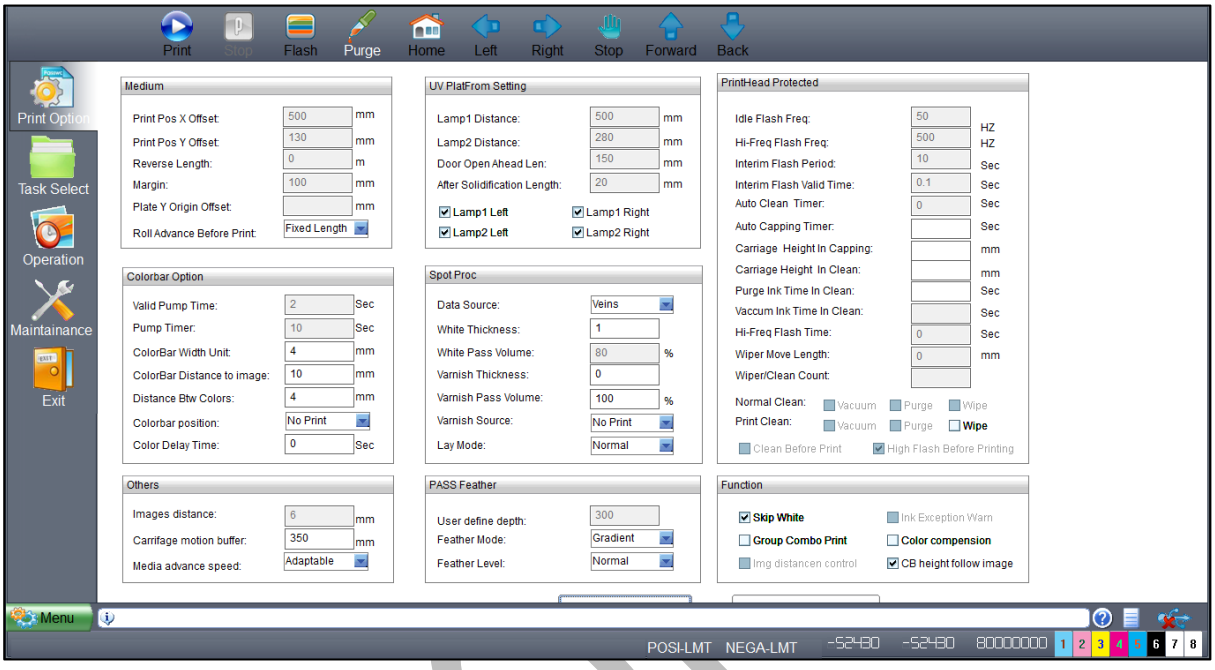


Fig 15: Displaying the Print Option Screen

The description of the Print Option screen is given as below:

- **UV Plat Form Settings:** Allow to enable or disable UV lamps like Lamp1 Left Work, Lamp1 Right Work, and similarly for Lamp 2.
- **Colorbar Option:** Enable users to define the colorbar width, distance from image, distance between colors and colobar position.
- **White Color Settings:** Using the above screen, user can make white color settings like Full, RIP Color and more).
- **Varnish Color Settings:** Enable to define the volume of varnish color and its source (like Full, RIP Data and Valid Image)
- **Pass Feather Settings:** Set feather mode (Even, Shade, and User) and feather level (Small, Normal and Large).
- **Miscellaneous Functions:** User can also perform the following functions:
    - Media Advance speed
    - Skip White
    - Colorbar follow image

White and Varnish Settings

The **White Color** Settings are explained as below:

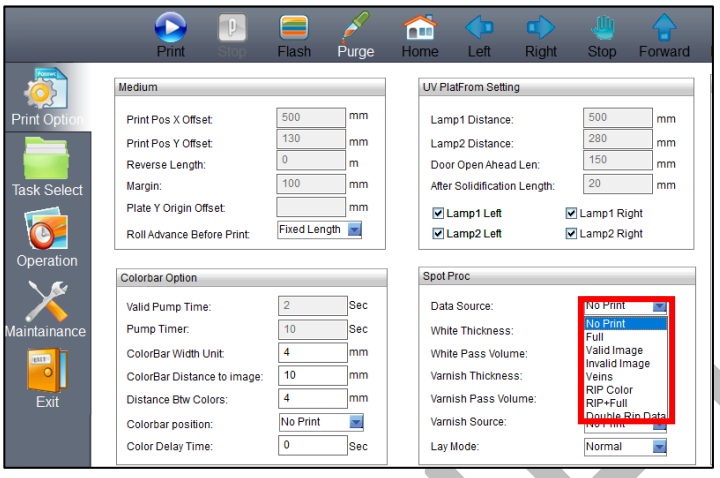


Fig 16: Displaying the White Color Settings

Description of different options for the **White Color** printing:

- **No Print:** No white color is printed.
- **Full:** White will be printed completely all over the image.
- **Valid Image:** White color is printed same as the percentage of CMYK color in the selected image.
- **Invalid Image:** White color is printed where CMYK color is not present in the selected image.
- **RIP Color:** White color is printed as per the RIP file.

The **Varnish Color** settings are shown in the image below:

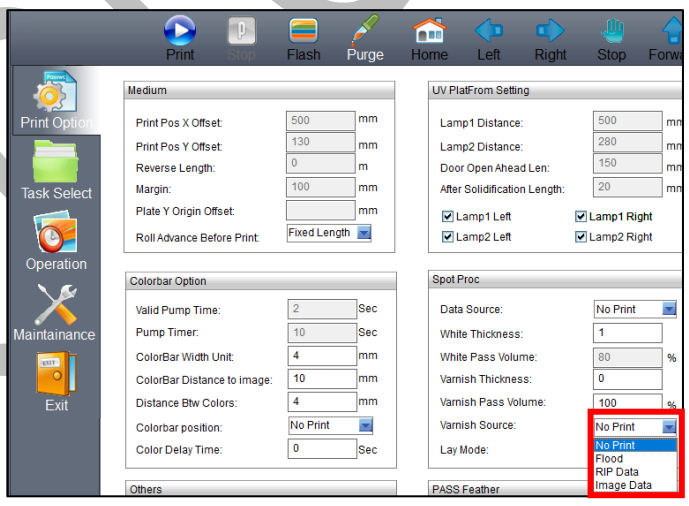
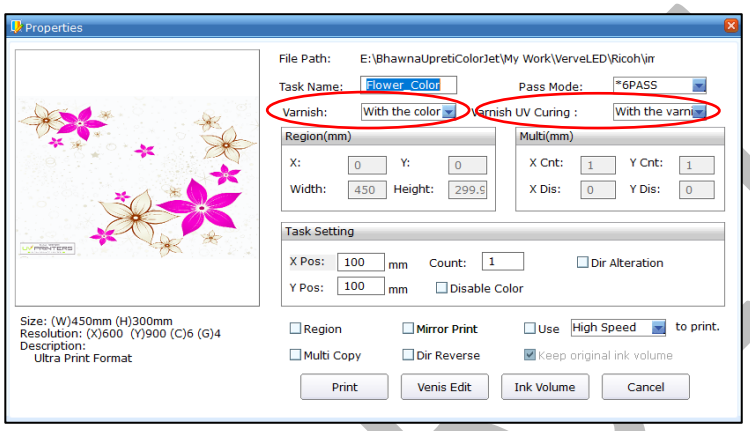


Fig 17: Displaying the Varnish Color Settings

Description of different options for the **Varnish Color** printing:

- **No Print:** No varnish color is printed.
- **RIP Data:** Varnish color is printed as per the RIP file.
- **Flood:** Varnish will be printed completely all over the image.
- **Image Data**: Varnish color is printed same as the percentage of CMYK color in the selected image.

After selecting the desired option for varnish color, select the varnish thickness and curing in the **Varn Thick** and **Varn Curing** list boxes available on the **Properties** dialog box, as shown below:



To enable varnish printing (over color) and curing, desired passes must be selected rather than **"with the color"** or **"with the varnish"**. This process is completed in three steps:

1. Color (With UV)
2. Varnish (Without UV)
3. Curing (Only UV No print)

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Layer Mode

Layer mode defines the sequence and depth of printing with respect to color, white and varnish. To increase the depth of ink layer, select the desire option from the available list. For example, if the layer mode **C+W+V** is selected. This means, the first layer of Color (CMYK) is printed, then White and Varnish is printed in the last. The **Lay Mode** and its related options are shown in the image below:

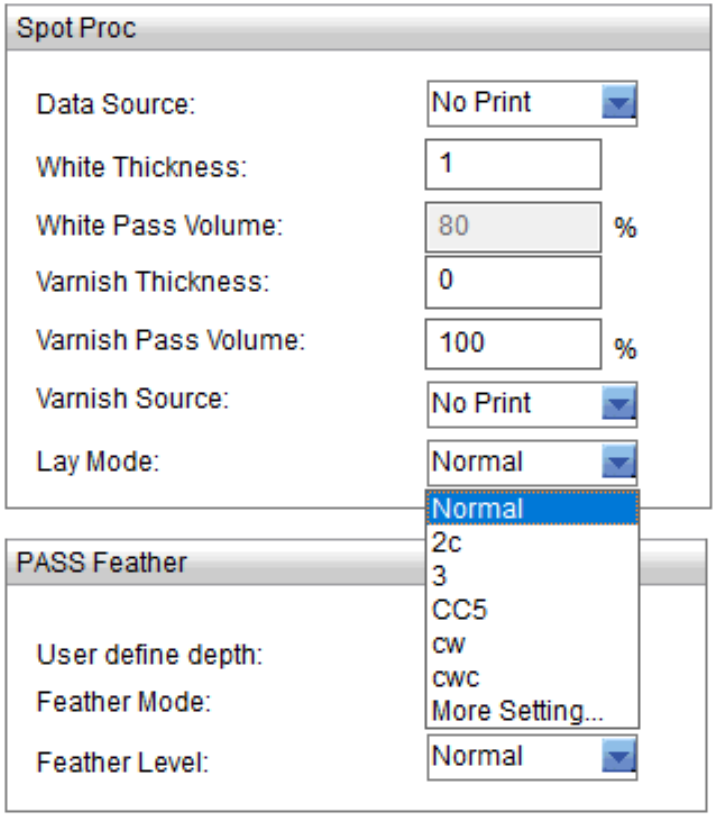

Fig 18: Layer Mode and Its Related Options

Task Select Menu

The **Task Select** button is shown in the image below:

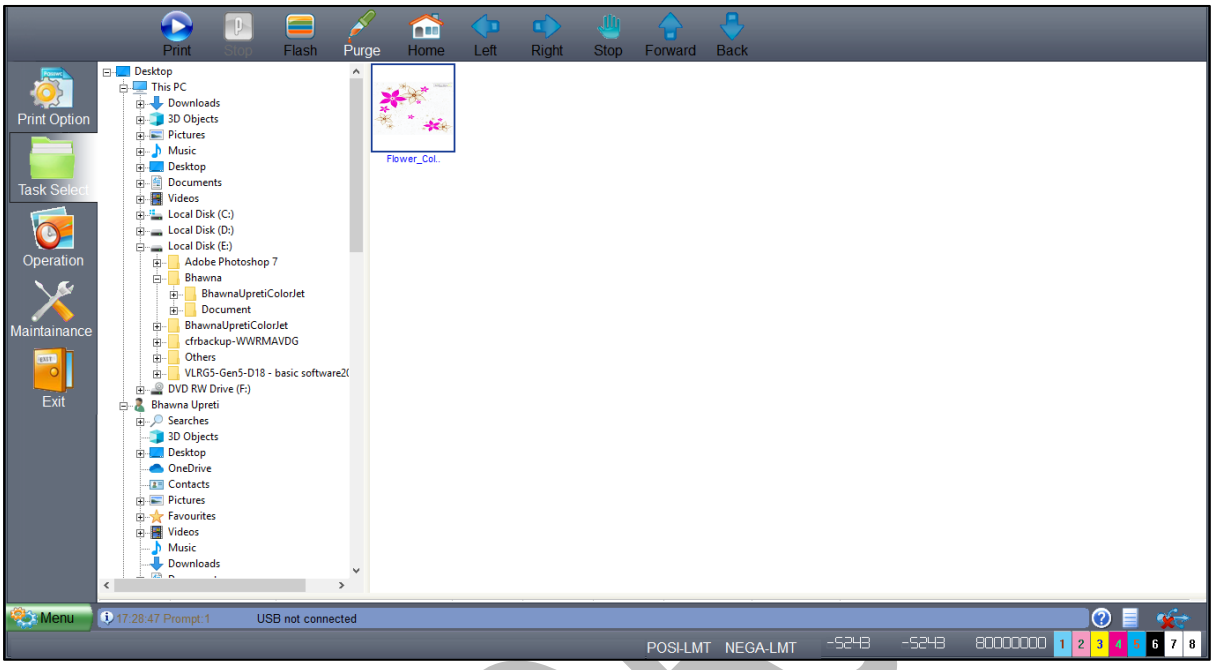

Fig 19: Displaying the Task Select Screen

Follow these steps to open and print a file:

Step 1: After opening the **Task Select** screen, navigate to the location where the printable file is stored (Refer to Fig. 18).

Step 2: Double-click on the image icon. The **Properties** dialog box appears, as shown below:

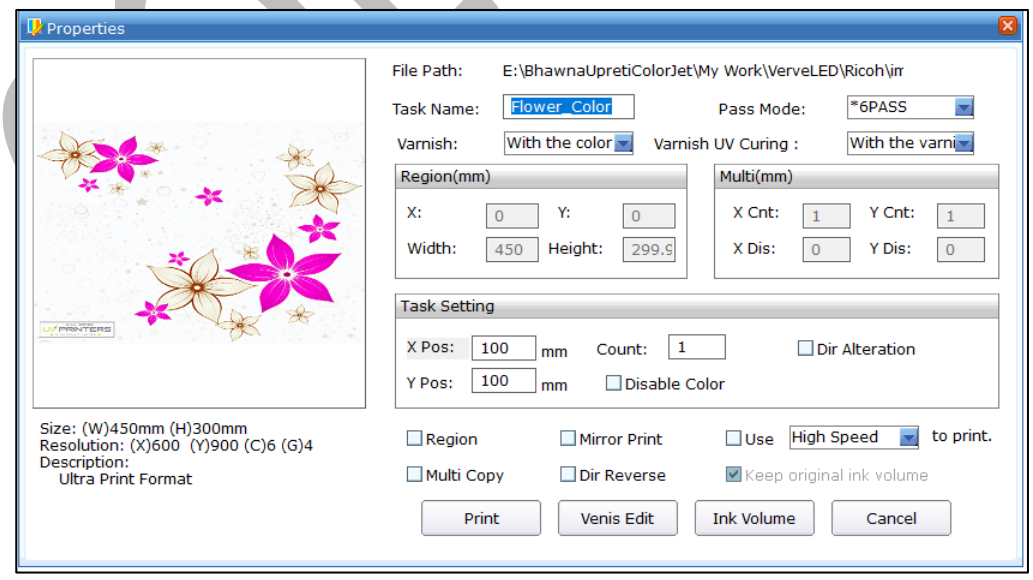

Fig 20: Displaying the Properties Dialog Box

Description of different options in the Properties dialog box:

- **Varnish**: Defines the thickness of varnish color with respect to number of Pass.
- **Varnish UV Curing**: Set curing of varnish color with respect to number of Pass.
- **Region:** Enables to print the selected area of the image. When user select the Region check box, the Region(mm) section gets high-lighted where user needs to specify the X axis, Y axis, height, and Width of the area to print.
- **Multi copy**: Allows user to print multiple copies of the same image. When user select the Multi Copy check box, the Multi (mm) section gets activated where user has to specify total count of images in X axis and Y axis as well as horizontal and vertical distance between images.
- **Ink Volume:** Specify the ink requirements of each color to print the selected image.
- **Dir Reverse (Material Direction):** Specify the printing direction like forward or reverse. By default, the carriage moves in the Forward direction but user can change it in the Reverse using the **Dir Reverse** check box for some applications where print requires white over color.
- **Mirror Print:** Enables or disables mirror print.
- **Speed:** Defines printing speed like Low, Medium and High.

Step 3: Click on the **Print** button to print the selected file. Additionally, user can also make change as per the requirements.

DPI and Passes

VerveLED DPI and passes are given as below:

DPI	Passes
600 x 600	4
600 x 900	6
600 x 1200	8

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Checking the Image Ink Color Volume

Click on the **Ink Volume** button on the Properties dialog box (Refer to Fig 20) to check the requirement of each color ink to print the selected image. The **Image Color Ink Volume** screen appears as shown below:

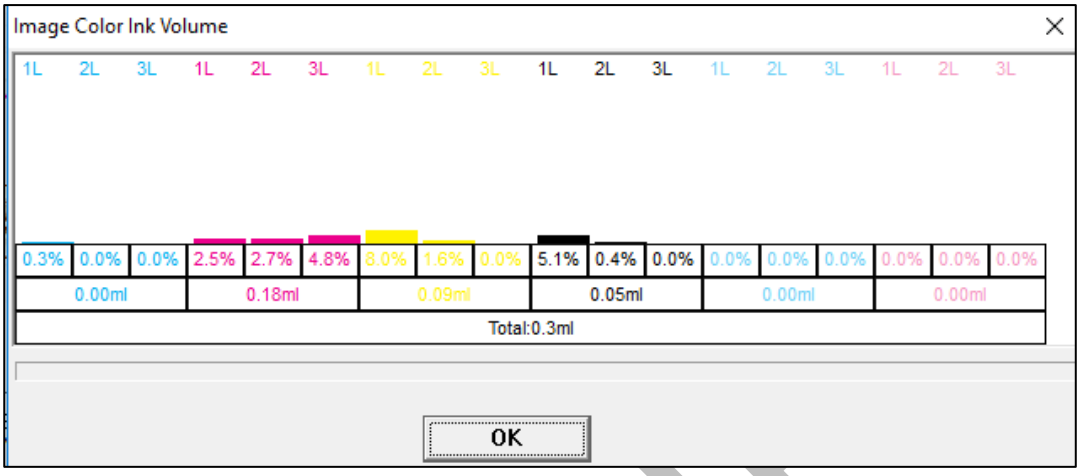

Fig 21: Displaying the Image Color Ink Volume Screen

In the above image, user can easily estimate the ink requirements for the selected image.

Pre-process Varnish Setting

To pre-process varnish setting like Process Mode, Deep Compensation, Threshold, Edge Contraction, click on the **Venis Edit** button (Refer to Fig 20). The **Preprocess Varnish Color** dialog box appears as shown below:

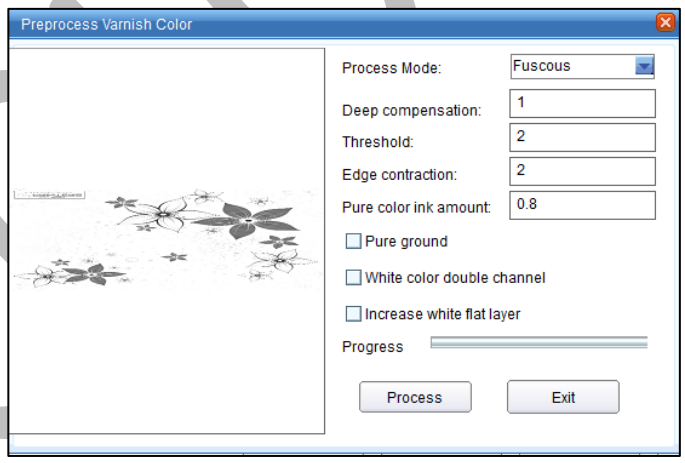

Fig 22: Displaying the Pre-process Varnish Color

Operation Menu

The **Operation Menu** screen is shown in the image below:

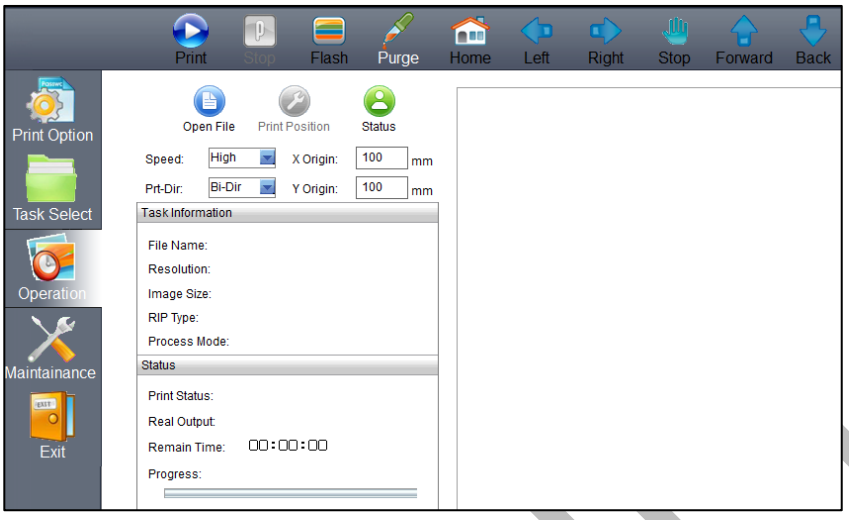

Fig 23: Displaying the Operation Menu

List of options related to the **Operation** menu:

- **Open File:** Open image file for printing.
- **Print Position:** Set print settings like speed, print direction, X origin, and Y origin.
- **Status:** Issue test print command.

Opening an Image File

Follow these steps to open an image file:

Step 1: Click on the **Open File** icon on the **Operation** screen (Refer to Fig 23). The **Open** dialog box appears on the screen, as shown below:

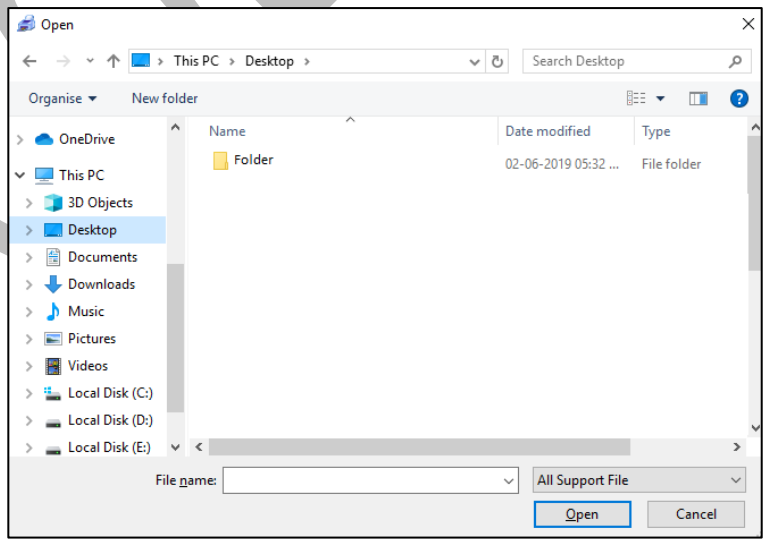

Fig 24: Displaying the Open Dialog Box

Step 2: Select the file by navigating the file location.

Step 3: After selecting the file, click on the **Open** button (Refer to Fig 24). The **Properties** dialog box appears with printing options of the selected image file.

If the image file is opened using the Operation menu, user gets the following benefits:

a) Create printing job queue
b) Prepare image file for ready to print.

Print Position

Print position option enables users to set the printing speed, print direction, X origin and Y origin, as shown below:

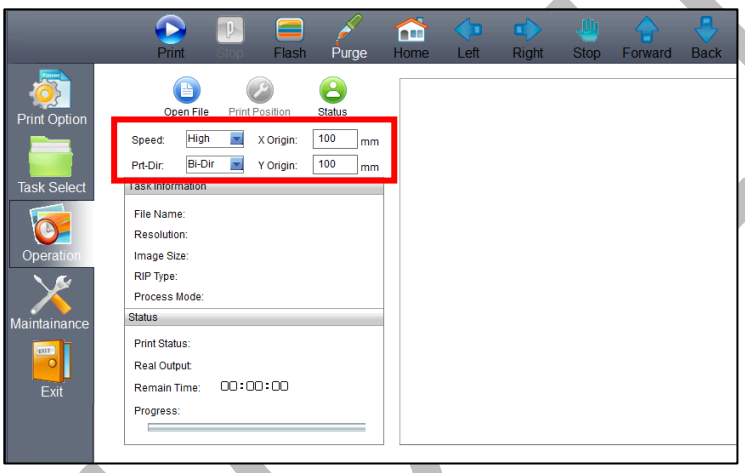

Fig 25: Setting the Print Position

Note: This option enables user to define printing direction like right, left, and bi-direction.

Checking Printing Status

Before giving the nozzle test, user needs to provide the printing parameters like print origin (X and Y), printing direction, and speed. To check the status of print head nozzles, click on the **Status** option under the **Operation** tab (Refer to Fig 25). The **Media Thickness** dialog box appears on the screen where user needs to set the media thickness, print head to media height, and lifter height. After making the desirable changes, click on the **Start Print** button to give the test print, as shown below:

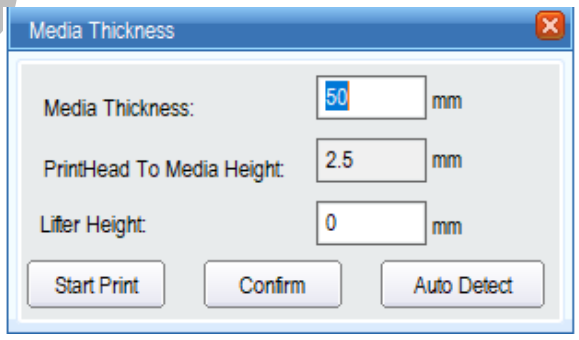

Fig 26: Displaying the Media Thickness Dialog Box

The **Test Result** is shown in the image below:

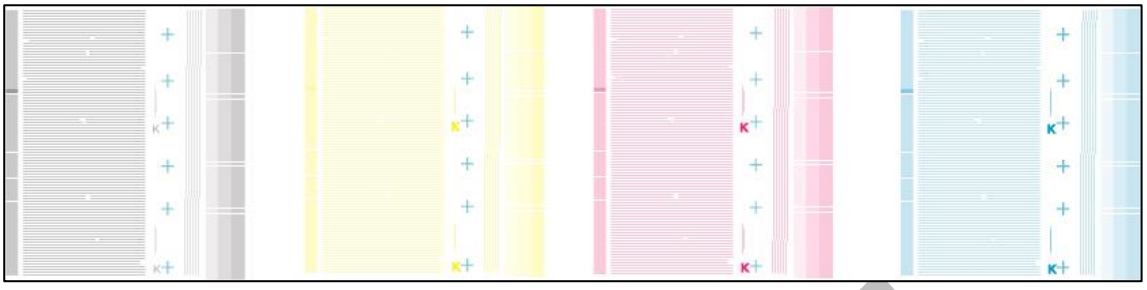

Fig 27: Displaying the Test Result

Note: In case of soft media, user needs to manually feed the value of media thickness, print head to media height, and lifter height by verifying it.

Maintenance Menu

The **Maintenance** menu is shown in the below:

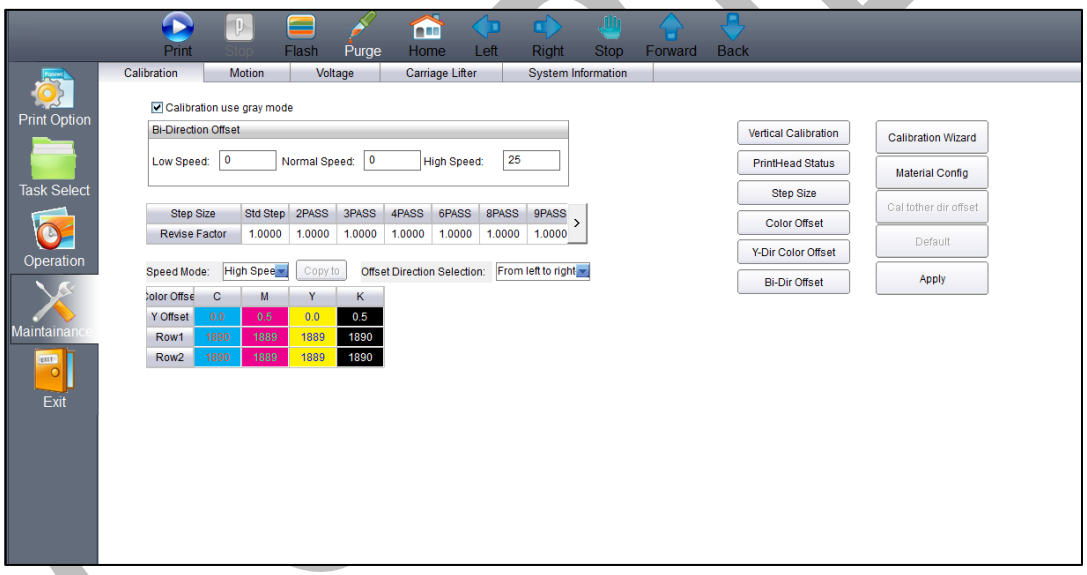

Fig 28: Displaying the Maintenance Menu

The Maintenance menu consists several tabs viz. Calibration, Motion, Voltage, Carriage Lifter, and System Information. Let's see all these menus one by one in the upcoming section.

The **Motion** tab is shown as below:

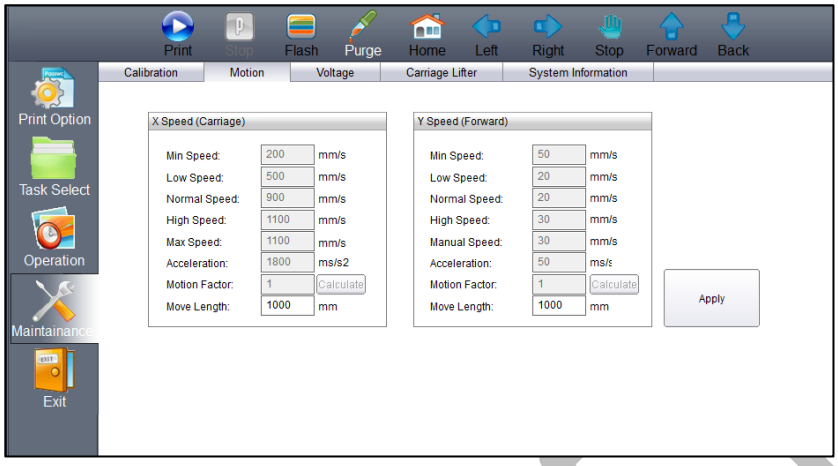

Fig 29: Displaying the Motion Tab

In the above image, user has to provide the value of X and Y Move Length which defines the distance travelled while moving the carriage and gantry manually in a single click of an arrow key (Refer to the marked area).

The **Voltage** tab is shown as below:

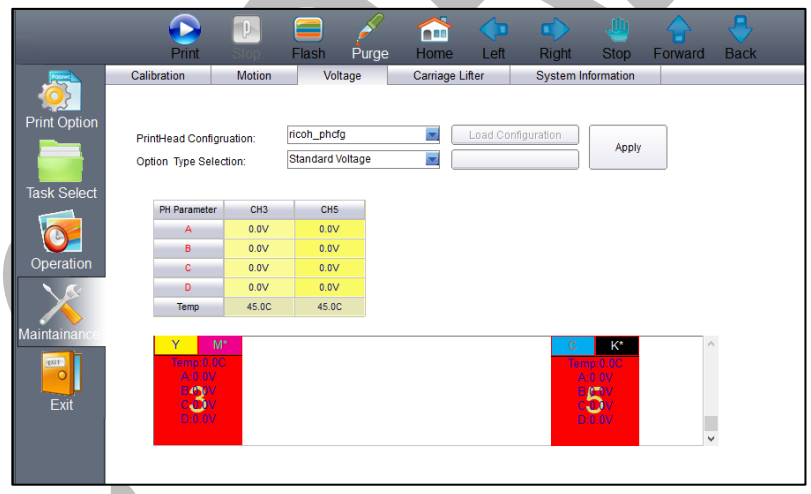

Fig 30: Displaying the Voltage Tab

This section is only used by the service engineer.

The **Carriage Lifter** tab is shown as below:

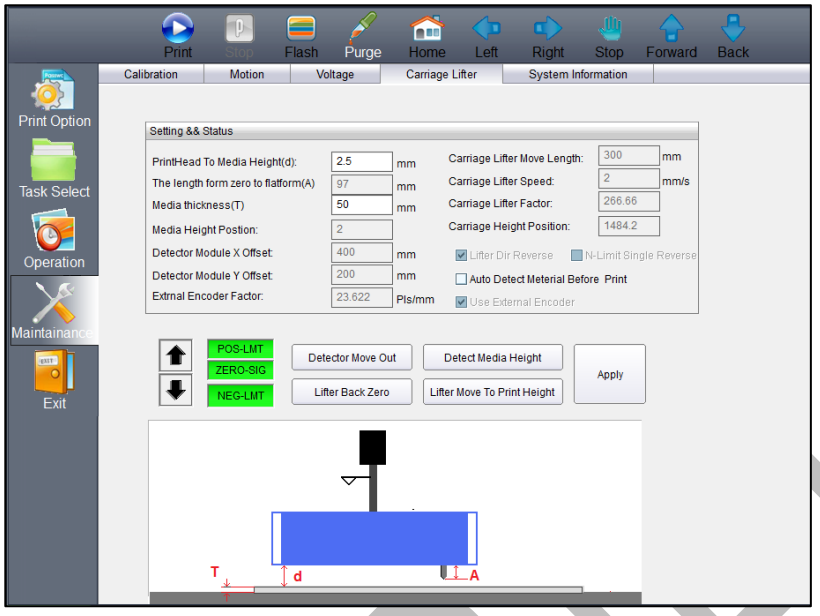

Fig 31: Displaying the Carriage Lifter

The Carriage Lifter tab is used for lifting the carriage in the Up or Down position. Additionally, this tab also helps in detecting the media height.

The **System Information** tab is used to provide a complete set of information about the Print Control Center system installed in user computer. Additionally, user can feed the password before expiry, as shown as below:

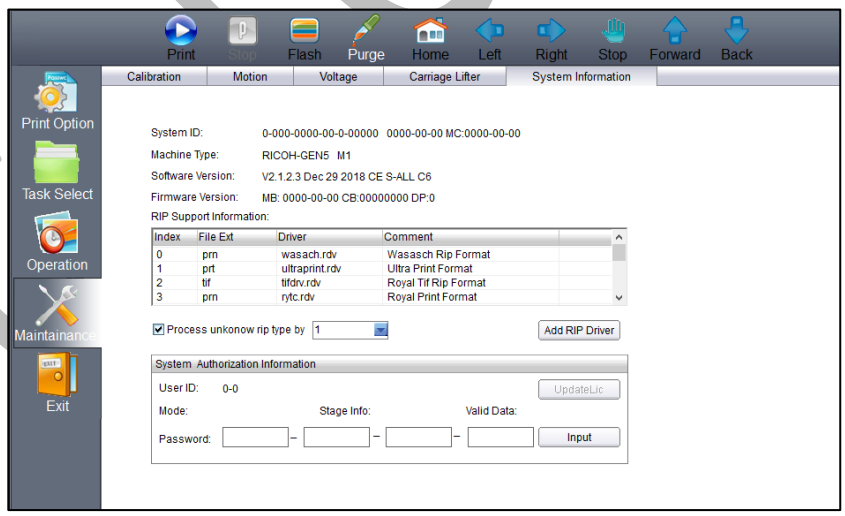

Fig 32: Displaying the System Information Tab

Feeding Password

In VerveLED, there is a hardware key associated with the Main Board. This hardware key is required to run the printer and valid for certain time period. When the time period is completed, printer gets stopped and needs new password to start. For new password, user needs to approach service personnel and enter the password in the given field as shown below:

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8. Head Height Adjustment

Follow these steps to adjust the head height:

Step 1: Click on the **Maintenance** menu (Refer to Fig 33).

Step 2: Click on the **Carriage Lifter** tab of the **Maintenance** menu, as shown below:

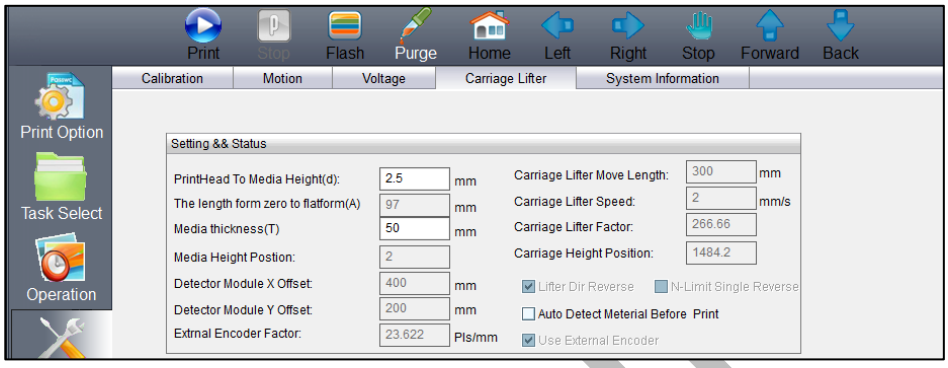

Fig 33: Selecting the Carriage Lifter Tab

Step 3: Here, we can also enter Print Head to Media Height in the given field.

Step 4: Enter Media thickness, if required.

Step 5: Click on the **Detect Media Height** button to start the head height detection process, as shown below:

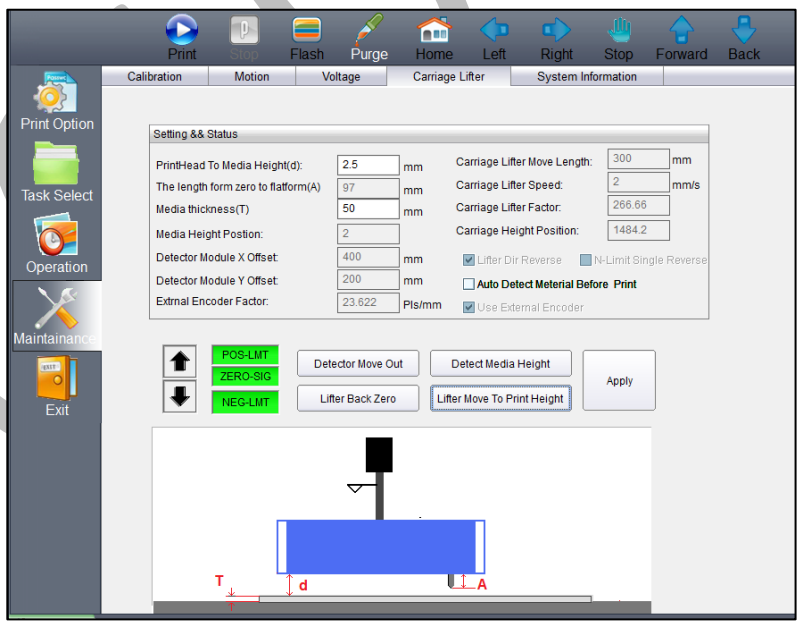

Fig 34: Detecting the Head Height

Step 6: After this, click on the **Apply** button to apply changes if any (refer to Fig 34).

Caution:

- This functionality may not detect soft material.
- Uneven surface may damage the print head.

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9. Machine Calibration

Print Heads should be calibrated to ensure good printing quality. To perform calibration, *click* on the **Maintenance→Calibration** path and then, as shown below:

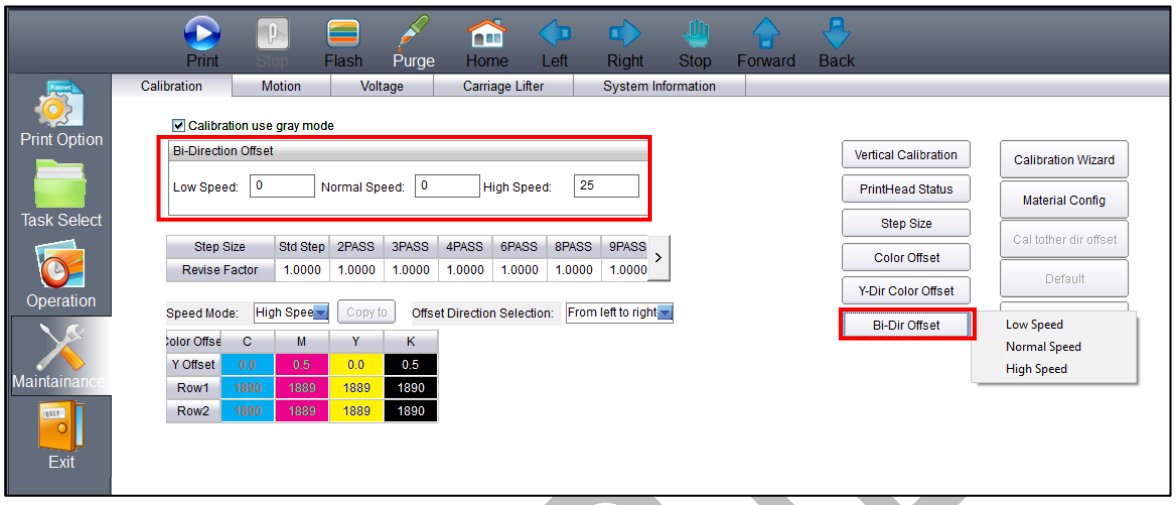
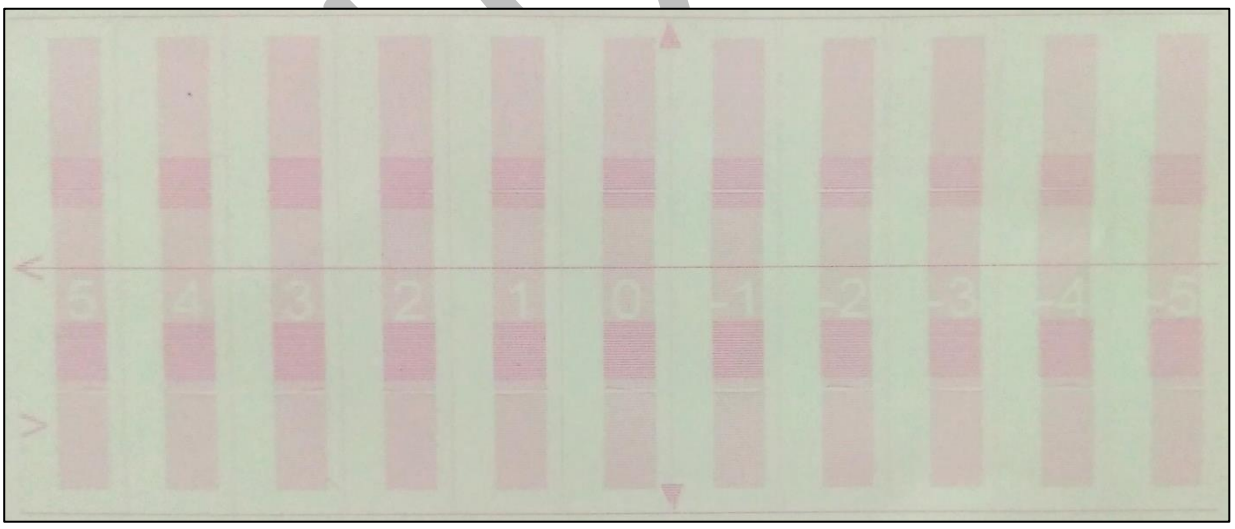


Fig 35: Opening the Calibration Wizard

In the above figure, step and bi-direction calibrations are performed simply by providing data in the given fields. If print head height is altered then user needs to perform bi-direction calibration. For bi-direction, click on the **Bi-Dir Offset** (Refer to Fig 35) and select the speed for which you want to perform the calibration. The **Bi-direction Calibration** result is shown in the image below:



From the above image, user needs to select the value of best aligned pattern and feed (by adding or subtracting in the current value) in the mark field.

10. Head Cleaning

Print Head is a delicate part which needs to be cleaned as per the recommended methods to have long life and to ensure consistent print quality. Below sections give recommended steps to clean the Print Heads.

Head Blotting and Purging

Head blotting refers to the process in which the head surface area is cleaned with the help of cloth. Blotting removes ink drops adhering to the Print Head nozzle surface. Gently touch the surface of print head's nozzle plate with recommended piece of cloth. One should make sure that the cloth is clean and soft.

The Head Blotting process is shown in the image below:

Fig 36: Cleaning the Print Head with a Piece of Cloth

Perform these steps to clean the Print Head:

Step 1: Open the Print Control Center.

Step 2: Select the **Maintenance** menu.

Step 3: Select the **Carriage Lifter** tab.

Step 4: Click on the **Lifter Back Zero/Up Arrow icon** button to lift up the carriage for blotting, as shown below:

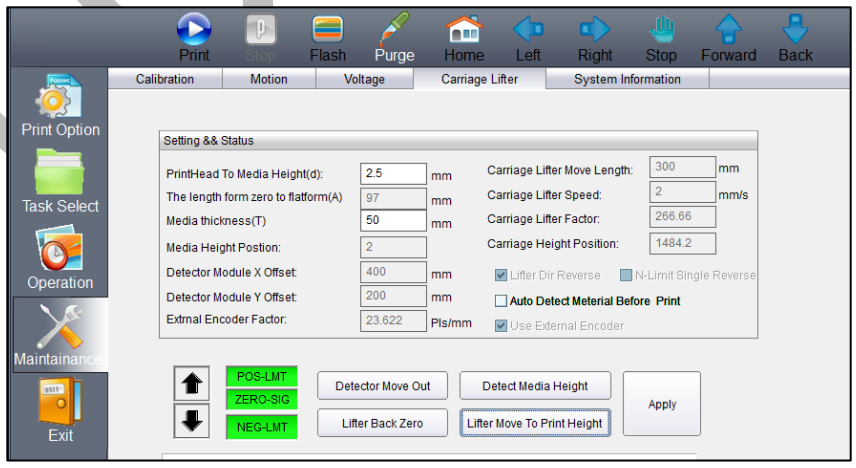


Fig 37: Lifting Up the Carriage

Step 5: Open Ink Valve using the key provided with the printer.

Step 6: Click on the **Purge** button to purge ink (Refer to Fig 37).

Step 7: Spread the cloth tissue on the open palms and insert hands below the print head position, without touching the Nozzle Plate.

Step 8: Gently touch the nozzle plate using the clean and fresh cloth tissue at two different positions.

Note: - **Remember!! NOT TO WIPE**

Step 9: After blotting, remove the tissue **without touching the print head or head plate** as shown below:

Step 10: After blotting inks from heads, click on the **Lifter Move To Print Height** button to reset the height of carriage to printing position (Refer to Fig. 36).

Note: Please strictly follow the below mentioned instructions:

- Avoid using the same cloth to clean the Print Head.
- Cleaning with dry and inferior quality tissue paper will damage the nozzle film by making scars.
- Strictly use recommended cloth (Contact your dealer for cloth).
- Don't clean hard, just absorb the residue inks on nozzle plate.
- Softly touch with a lint free bloating cloth (duly wet by cleaning solvent) by changing the cloth position with respect to nozzle plate.
- Don't apply force while absorbing residue inks with cloth after purging.
- Leaving head plate uncapped for longer duration (3-4 days), while printer off, will block nozzles permanently due to ink solidification.
- Color bar should always be enabled while printing and idle spray should always be enabled for long life of the Print Head.

Head Spraying

Head spraying should be performed to avoid mixing of colors and also may open few blocked nozzles. To perform head spraying, *click* on the **Flash** button available on the **Right Panel**, as shown below:

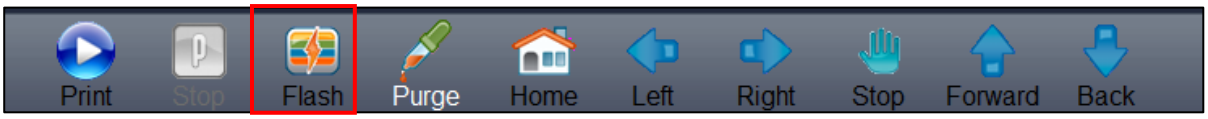


Fig 38: Clicking on the Flash Button

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11. Shutdown Procedure

Follow these steps to shut down the machine:

Step 1: Switch OFF the bed vacuum by clicking on the **Bed Vacuum** button, as shown below:

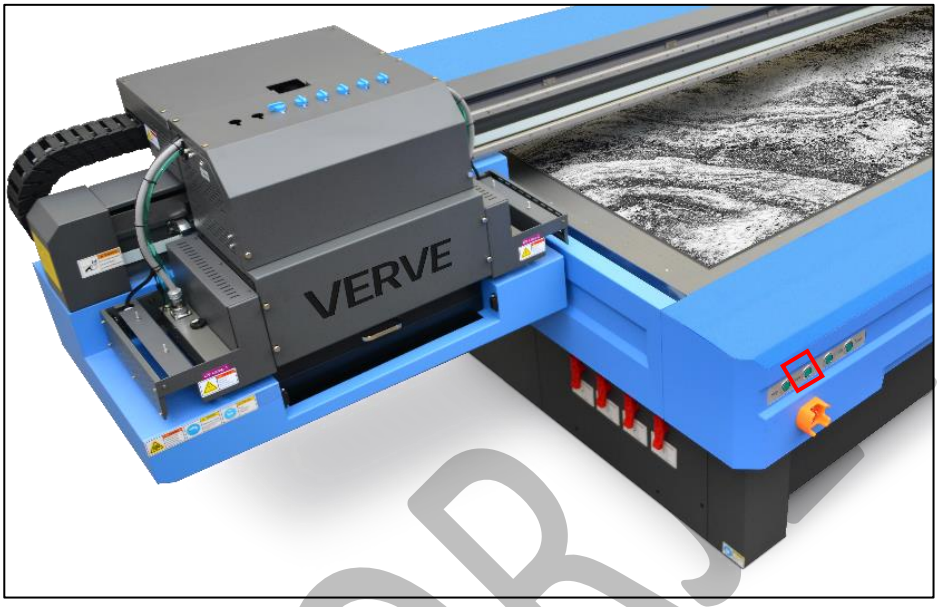

Fig 39: Switch OFF the Bed Vacuum

Step 2: Move the carriage over the print bed and bring down the carriage to the minimum position using the down arrow as shown below:

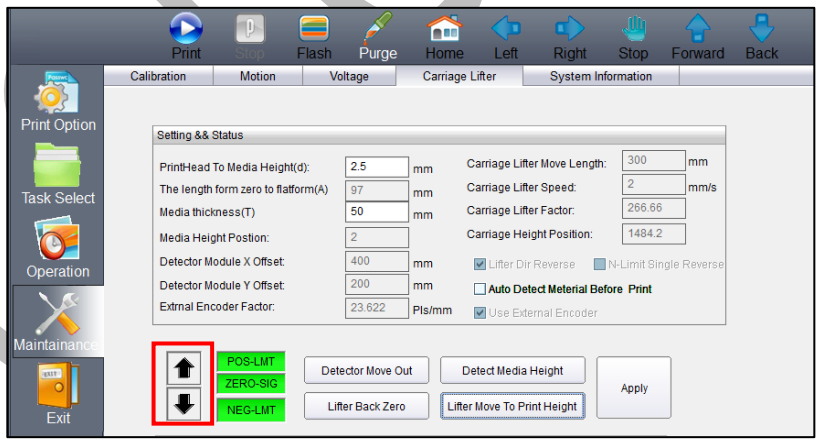

Fig 40: Set the Carriage Position at Minimum Down

Step 3: Switch off the **Chiller Unit** by pressing the OFF button as shown in the below image:

Fig 41: Switch OFF the Chiller Unit

Step 4: Turn off the ink valves

Step 5: Switch OFF the printer from the main power.

Step 6: Turn Off the main switch.

After switch OFF, properly cover the printer to protect from the dust.

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12 . Maintenance

Print Head Maintenance

Print Head is an important and delicate part of the printer. Thus, it must be handled with care to ensure the long life of the machine. Pay attention to potential problems caused by environment, heat and moisture, collision, cleaning etc. For print head maintenance, the following instructions should be taken care:

- Perform the nozzle test daily 2-3 times before printing to monitor the blockage in the head nozzles.
- Use the print head in specified environmental conditions viz. Temperature 20-25 degree Celsius with humidity 55%, dust-free and exhaust condition.
- Avoid ink spilling on the print head and head cables and if there is ink in the print head, it must be wiped dry with clean cloth, and inform engineer
- Avoid head damage due to media and Print Head confliction.
- Color bar should be ON.
- Don't use expiry ink and store the ink at favorable environment.
- Prevent the object or human body with static contact to the print head.
- Print head nozzles should be kept clean, dust free, and also prevent from oxidation.

Maintenance of Machine Motion Parts

- Clean and lubricate guide rail at least once a month and lubricate if required.

Equipment Cleaning

- Turn OFF all power switches to machine while cleaning the machine equipment.
- Avoid splashing liquid and dropping on/in the circuit board or the power line.
- Careful while cleaning the sensitive devices, like sensors and raster.
- Use clean cloth to clean up the dust and residual oil on the tracks.
- Should keep water, ink, oil away from the Encoder scale.

Power System Maintenance

- Ground wire should always be checked whether loose or disconnection.

Control System Maintenance

Static discharge

- The operator must discharge his own electrostatic charge before touching the electronic components and parts.
- Don't touch the pin connectors and welded joints on circuit boards, integrated circuit boards.

Ink Supply System Maintenance

- Check for leakage between joint & ink tank and joint & valve settings.

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- Check for damages on ink tubes.
- Check Ink impurities in the ink tanks as this will affect the ink supplying.

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13. Troubleshooting Guide

Printer Not Initializing

- Encoder scale is having ink stains (print shows vertical color bands)
- Encoder sensor is not cleaned

Printer Manager Not Showing "READY"

- USB cable is not connected to the computer or loose
- USB cable is faulty
- Printer is OFF

Print Stops in Between Printing

- USB cable is loose or faulty
- Open heavy file that can slow down the data transfer
- Ground wire is disconnected
- Encoder scale is having ink stains
- Pulley or belt is slipping
- Ripped file is having error
- Media is finished

Print Margin is Shifting or Junk Printing

- Encoder scale is having ink stains
- Encoder sensor is not clean
- Pulley or belt is slipping
- Data cable is faulty

Print is Blur (Not Sharp)

- Improper printer calibration - bidirectional and step
- Improper head mounting and calibration
- Selection of incorrect resolution
- Wrong speed selection instead of high precision

Lines in Print

- Head nozzles are blocked
- Incorrect feed steps

Print Not Dry

- Check UV lamp settings
- Check intensity of UV lamps

Head Not Firing

- Perform nozzle test and clean heads, if required
- Check if any air lock or no ink in the head pipes
- Check the ink and air pipe for any cuts or loose connection

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A Color Ink Not Supply

- Damaged float sensitivity
- Power board fault
- Float power line failure
- Ink sheet failure
- Ink path have disclosure
- No ink in the main or sub ink tanks

UV Lamp Not Working

- UV lamp is aged
- Check the power of the UV Controller System
- Check the power of the Chiller unit
- Check the coolant level
- Check the coolant pipe, if cut or bend

UV Ink is not Fully Cured

- Lamp power density is small
- Photo initiator in UV ink is not enough
- Curing time is short or environmental temperature is low
- Distance between lamp and media is too far

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