

VERVE

USER MANUAL



Foreword

This user manual is briefly describing the operational aspects of the **VERVE** 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** 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

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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		1.1	VERVE	

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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. Machine Overview

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

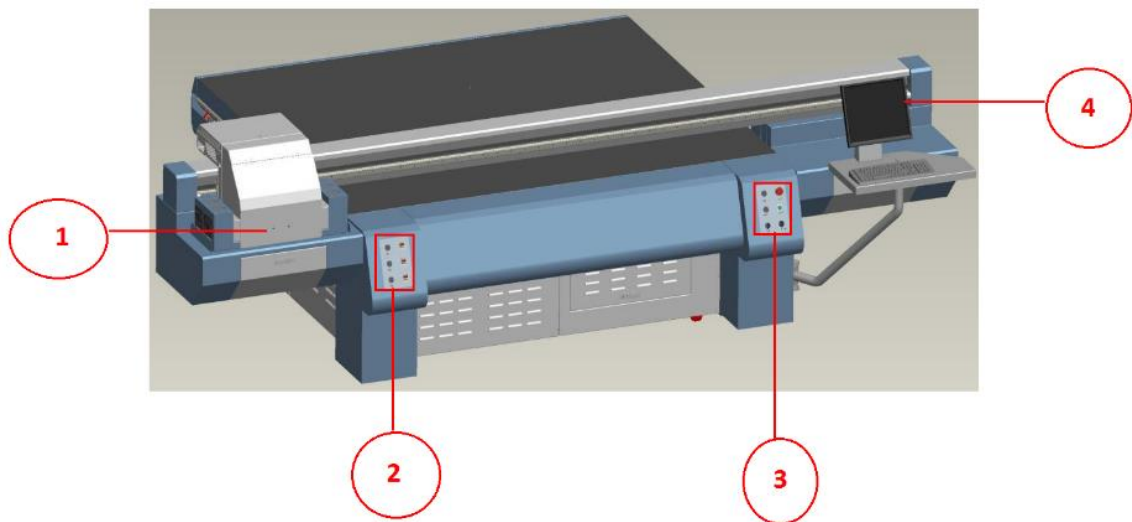


Fig 1: Displaying the Machine Overview

Table 1: Different Parts of the Printer

1. Print Carriage	2. Left Control Panel
3. Right Control Panel	4. Monitor

Description of different parts of the machine is given as follow:

- **Left Control Panel:** Enable to control the Print Bed vacuum using the Pump 1, Pump 2, and Up Vacuum buttons.
- **Right Control Panel:** Consist Power button, Emergency LED Light, Left UV lamp, and Right UV lamp buttons. The description of buttons is given as follow:
 - **Switch (Left Side):** Switch ON/OFF the Left UV Lamp.
 - **Switch (Right Side):** Switch ON/OFF the Right UV Lamp.
 - **Left Switch:** Control the frequency of the left UV Lamp's light for drying prints viz. High, Low, and Medium.
 - **Right Switch:** Control the frequency of the right UV Lamp's light for drying prints viz. High, Low, and Medium.
- **Emergency Stop Buttons:** Use in emergency situations for stopping the printing process.

3. Control Panels

In VERVE, there are two control panels viz. Left and Right. Let's discuss each control panel one by one in the upcoming section.

Left Control Panel

The Left Control Panel is used for controlling and managing Print Bed vacuum using the Pump 1 and Up Vacuum buttons. The Left Control Panel is shown as follow:



Fig 2: Displaying the Left Operational Panel

The description of different buttons available on the Left Control Panel is given as follow:

- **Pump 1:** Switch ON/OFF the Print Bed vacuum to hold the media.
- **Up Vacuum:** Switch ON/OFF the up vacuum to release the vacuum in upward direction.

Right Control Panel

The **Right Control Panel** is used for operating and controlling the functioning of Left and Right UV Lamps. Additionally, you can also ON/OFF the printer using the **Power** button.

The **Right Control Panel** is shown in the image below:

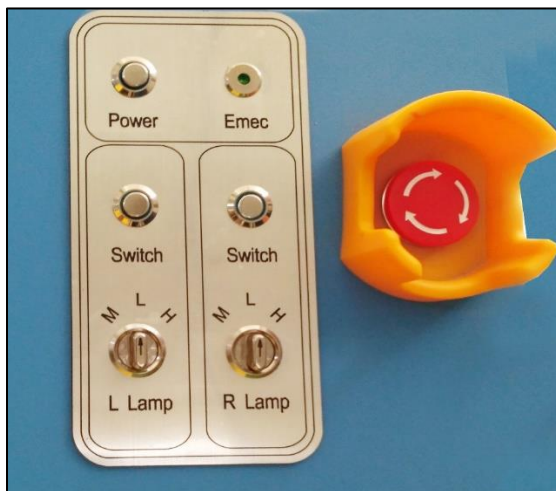


Fig 3: Displaying the Right Operational Panel

The description of different buttons available on the **Right Control Panel** is given as follow:

- **Power:** Switch ON/OFF the printer.
- **Left Lamp Switch:** Switch ON/OFF the Left UV Lamp.
- **Left Lamp Regulator:** Control the frequency of the left UV Lamp's light used for drying the print from left side.
- **Right Lamp Switch:** Switch ON/OFF the Right UV Lamp.
- **Right Lamp Regulator:** Control the frequency of the right UV Lamp's light used for drying the print from right side.

4. Getting Familiar with Printer Manager Interface

The User Interface of the Printer Manager software is shown as below:

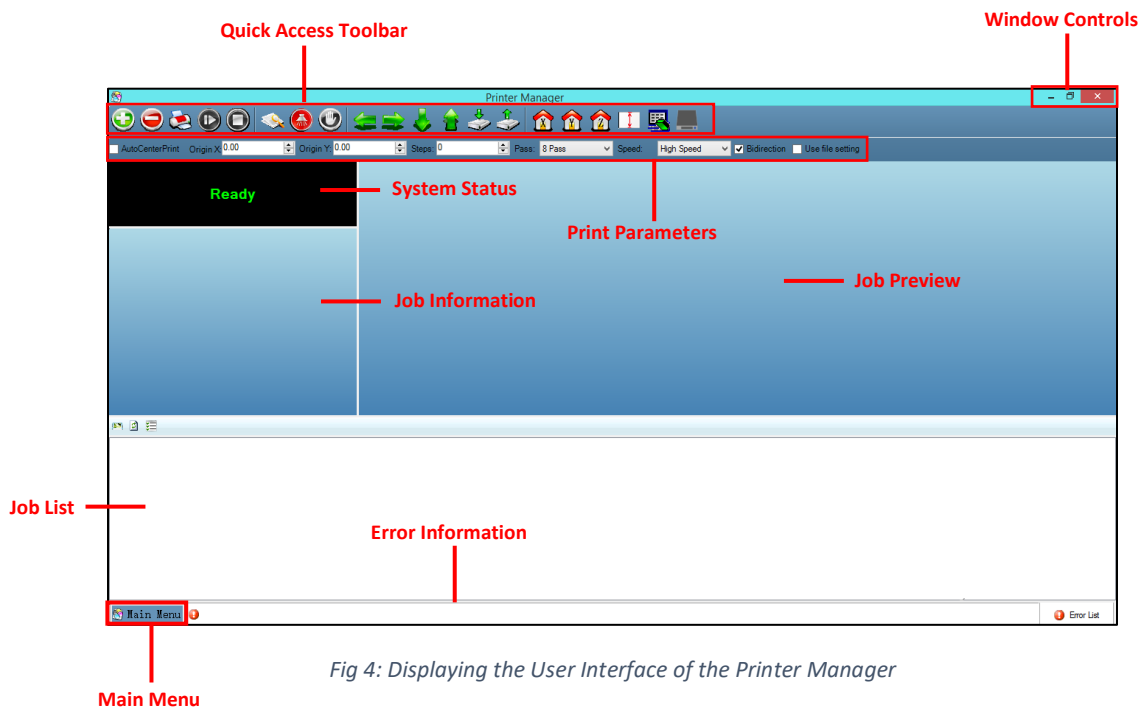


Fig 4: Displaying the User Interface of the Printer Manager

The description of the Printer Manager window is given as below:

- **Window Control:** Use to minimize, resize or close the Printer Manager window.
- **Main Menu:** Consist of several sub menu options viz. Settings, Tools, and also provide variety of functions in well organize manner.
- **Quick Access Toolbar:** Display frequently performed actions like Add Job, Delete Job, Print Job, Pause or resume, Abort job, Check nozzle, Move left, Move right, Move forward, Move backward, Z Move Down, Z Move Up, Move carriage to origin, Move carriage to origin Y, Move carriage to origin Z, Measure Paper Width, Edit job and Roll or Flat, are available as buttons on the Quick access toolbar.
- **Job Information:** Display the properties of the selected job like File Name and Path, Status, Print Size, Print Area, DPI, Pass, and more.
- **Job Preview:** Show the job preview as well as print progress in this area.
- **Job List:** Displays the thumbnail preview of added jobs.
- **Error message:** Displays the system generated error messages.

5. Main Menu Options

The **Main Menu** options are shown in the image below:

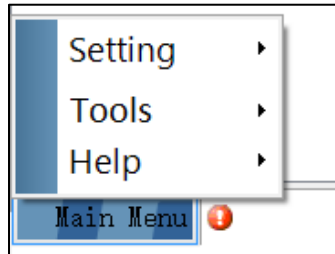


Fig 5: Displaying the Main Menu Options

Setting Menu

The **Setting** menu options are shown in the image below:

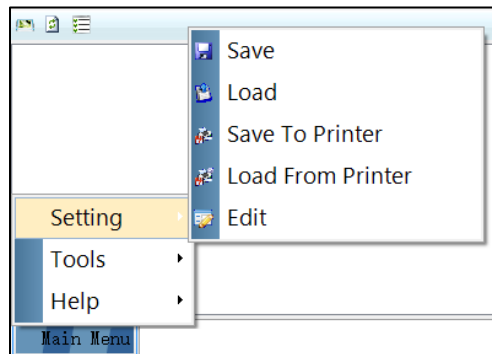


Fig 6: Displaying the Setting Menu Options

- **Save:** Using this option, you can save the default settings of the machine. When you save the settings, an .xml file will be created for further references.
- **Load:** Using this option, you can load the previous saved machine's settings.
- **Save To Printer:** When you clicked on this option, all the current settings get saved in the Main Board of the machine.
- **Load From Printer:** When you clicked on this option, the printer settings get saved from Main Board to the Printer Manager software.
- **Edit:** Using this option, you can edit the previously made settings of Printer. On clicking the Edit option, the Setting window with Printer, Move, Preference, and Calibration tabs appears on the screen.

The **Setting** window with the **Printer** tab is shown in the below image:

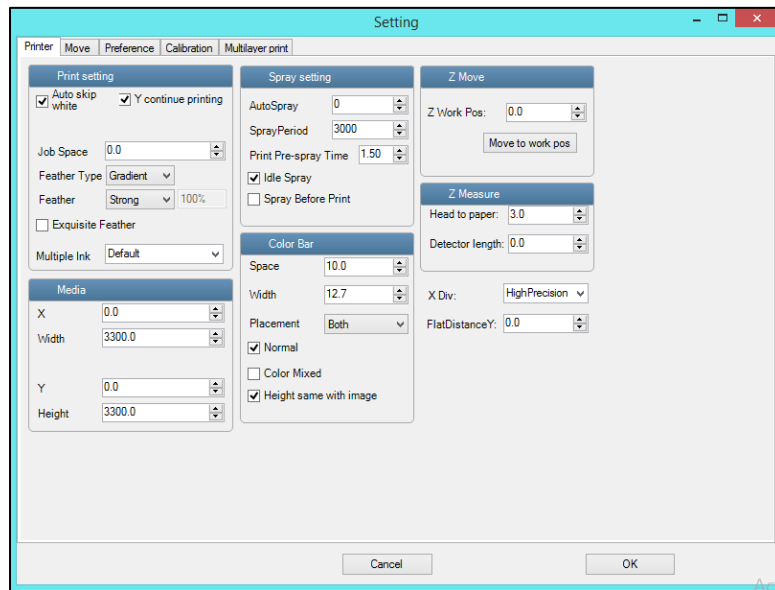


Fig 7: Displaying the Setting Window

The **Move** tab is shown in the image below:

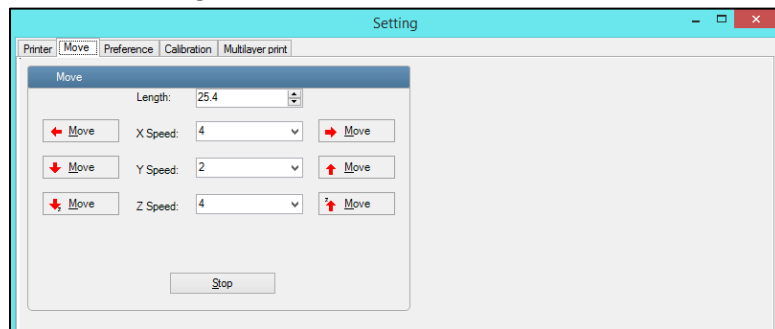


Fig 8: Displaying the Move Tab

The **Preference** Tab is shown in the image below:

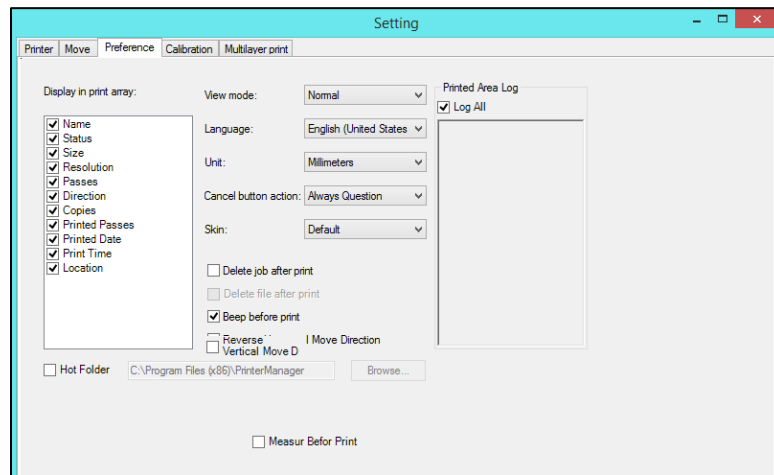


Fig 9: Displaying the Preference Tab

The **Calibration** tab is shown in the image below:

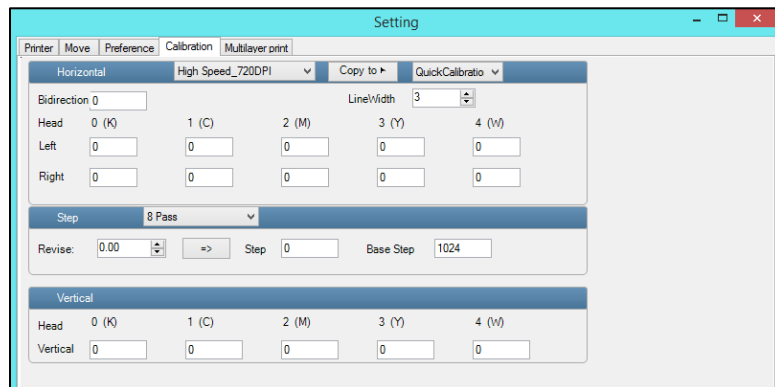


Fig 10: Displaying the Calibration Wizard

The **Multilayer print** tab is shown in the image below:

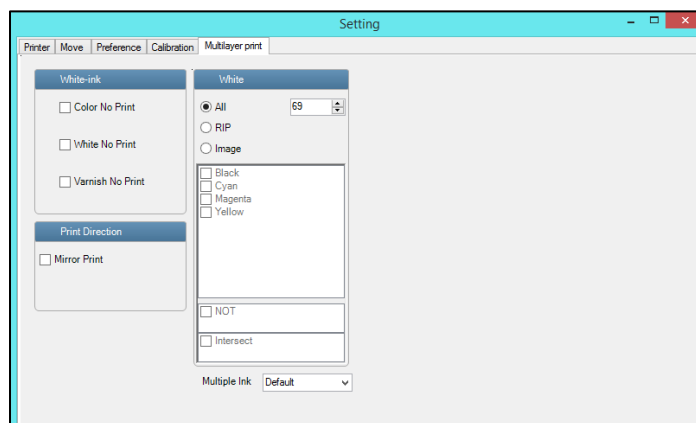


Fig 11: Displaying the Multilayer print

Tools Menu

The **Tools** menu options are shown in the image below:

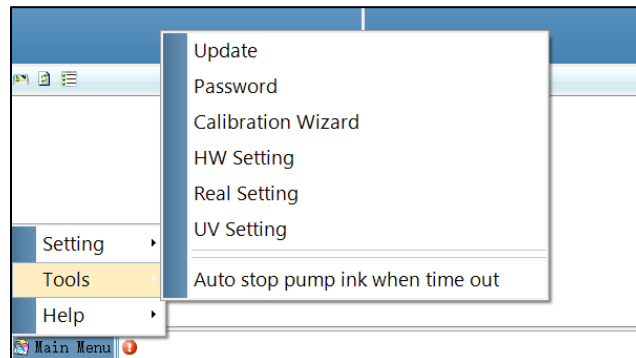


Fig 12: Displaying the Tools Menu Option

- **Update:** This is used for factory purpose for updating software parameters.
- **Password:** This option enables to feed the time password of the printer.
- **DemoPage:** This option displays the bi-direction check output to improve the bi-direction printing capability.
- **Calibration Wizard:** Using this option, you can perform different types of calibration viz. Angle Check, Vertical Check, Nozzle Check, and more. For more details, please read the “**Calibration Wizard**” section carefully.
- **HW Setting:** This is used for factory purpose for updating hardware parameters.
- **Real Setting:** This is used by service engineer for installation setup like feed print head temperature and voltage.
- **UV Setting:** This option helps in controlling and settings different parameters of UV lamp like Switch ON/OFF UV Lamps (Left and Right), distance from head 0, On Left and Right Shutter, and more.

Help Menu

The **Help** menu option is shown in the image below:

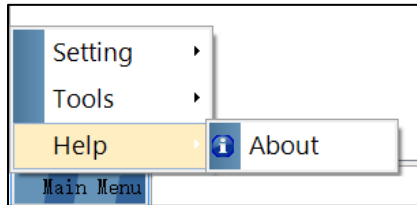


Fig 13: Displaying the Help Menu Option

- **About:** Display a complete details about the Printer Manager software like software version and copyrights. This option also helps in updating the time password.

6. 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 the Waste Bottle.

Step 3: Check Ink Level.

Step 4: Switch ON the printer from MCB and press the **Power** button from the Right Control Panel, as shown below:

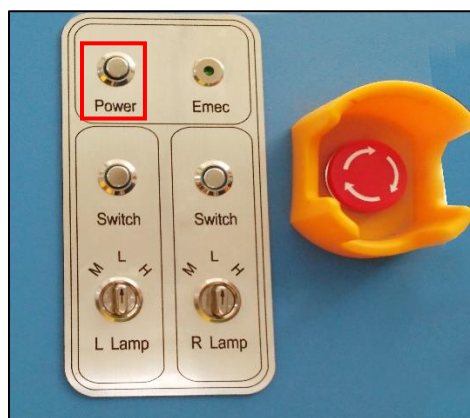


Fig 14: Pressing the Power Button

Note: Release the Emergency switch, if pressed.

Step 5: Load media on the Print Bed.

Step 6: Switch ON the Print Bed vacuum by pressing the **Pump 1** button on the Left Control Panel, as shown below:

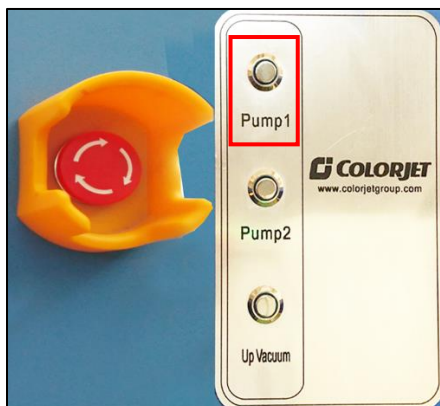


Fig 15: Switch ON Print Bed Vacuum

Step 7: Switch ON the required vacuum chambers by moving the Vacuum Chamber knob, as shown below:



Fig 16: 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 17: Classification of Vacuum Chamber on the Print Bed

Step 8: Open the Printer Manager software to start performing the printing operations.

Step 9: Switch OFF the **Negative Pressure Knobs** of all colors, as shown below:



Fig 18: Displaying the Negative Pressure Knob

Step 10: After 10 seconds, Switch ON all the Negative Pressure Knobs to start the printer.

Step 11: Set the head height by pressing the **Measure paper width** icon on the Quick Access Toolbar, as shown below:



Fig 19: Selecting the Measure Paper Width Option

The **Do you want to measure media?** Window is shown below:

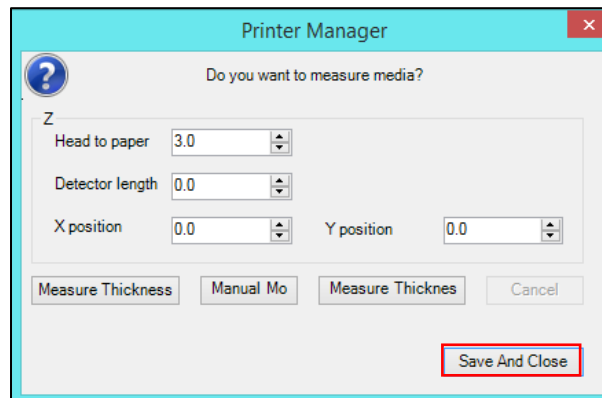


Fig 20: Displaying the Do you want to measure media? Window

To set head height, follow these steps:

- A. Click on the **Measure Thickness** button to start the head height measurement process. For manual processing, set values in Head to paper, Detector length, X position, and Y position fields (Refer to Fig 20).
- B. Click on the **Save And Close** button to save the details and close the current window.

Step 12: Perform purging operation for each color (Refer to Head Purging section under Head Cleaning).

Step 13: Switch ON both UV lamps one by one (Refer to Fig 14). First, switch ON the left UV lamp and after five seconds, switch ON the right UV lamp.

Step 14: Set temperature of both UV lamps to **Low** and wait for ten minutes to attain the required temperature. After waiting, set the temperature of both UV lamps to **Medium** (Refer to Fig 14).

Step 15: Perform Nozzle test.

Now, the printer is ready for printing.

Media Loading

Follow these steps to load the media:

Step 1: Place the media on the Print Bed.

Step 2: Press the **Pump 1** button to switch ON the Print Bed vacuum, as shown below:



Fig 21: Pressing the Pump 2 Button

Step 3: Switch ON the required vacuum chambers by moving the Vacuum Chamber knobs (Refer to Fig 16).

Step 4: Set the head height using the **Measure paper width** icon on the Quick Access Toolbar. (Refer to Head Height Measurement section).

Now, the media gets loaded in the machine.

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 22: Filling the Ink Main Tanks

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



Fig 23: Displaying the Ink Sub Tanks

Switch OFF the Printer

Follow these steps to switch OFF the printer:

Step 1: Perform the Nozzle Test to check Print Head nozzles status.

Step 2: Clean the Print Heads, if required.

Step 3: Close the Printer Manager software.

Step 4: Turn OFF the UV lamps.

Step 5: Turn OFF the Negative Pressure knob.

Step 6: Switch OFF the ink valve.

Step 7: Switch OFF the printer from the main power.

Step 8: Cover the printer.

7. Printing

Nozzle Testing

Before starting with calibration tests, the Print Heads should be checked for blockage. Each Print Head has multiple tiny nozzles through which ink drops emerge and get deposited onto the print medium. Any nozzle blockage can compromise the print quality by forming discolored horizontal streaks or bands.

The good and bad nozzle test results are shown in the image below:

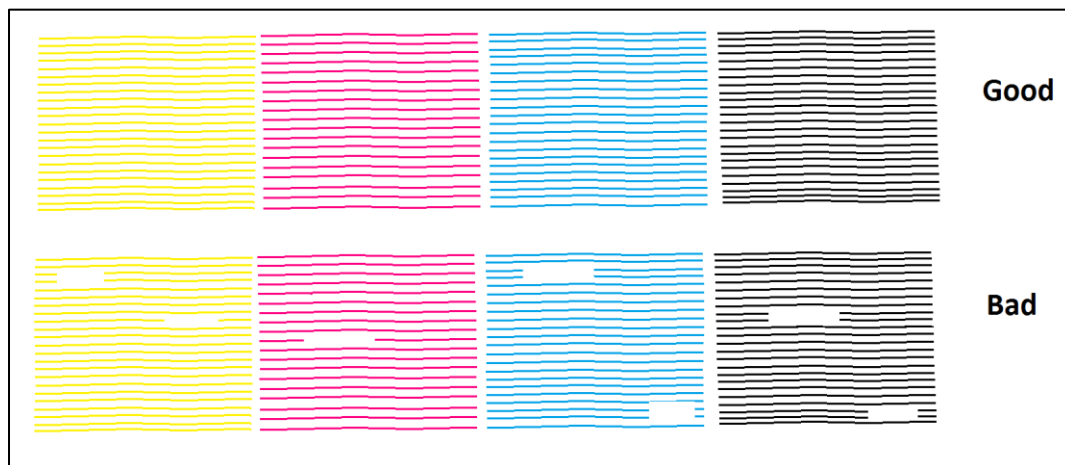


Fig 24: Displaying the Good and Bad Nozzle Test Result

To check the nozzle, click on the **Check Nozzle** icon available on the **Quick Access Toolbar**, as shown below:



Fig 25: Selecting the Check Nozzle Button

In case of blockages, refer to the Head Cleaning section to perform head cleaning before proceeding to other calibration steps.

Print Head Calibration

The Print Head calibration is categorized into the following types:

- **Mechanical Check:** Includes Vertical Check and Angle Check
- **Software Calibration:** Includes Horizontal Calibration and Step Calibration

Let's discuss the above mentioned checks and calibration one by one in details.

Note: Mechanical checks are performed by service engineer, thus these checks and their description are not included in user manual.

Opening the Calibration Wizard

Print Heads should be calibrated to ensure good printing quality. To open the **Calibration Wizard**, *click* on the **Main Menu**→**Tools**→**Calibration Wizard** path, as shown below:

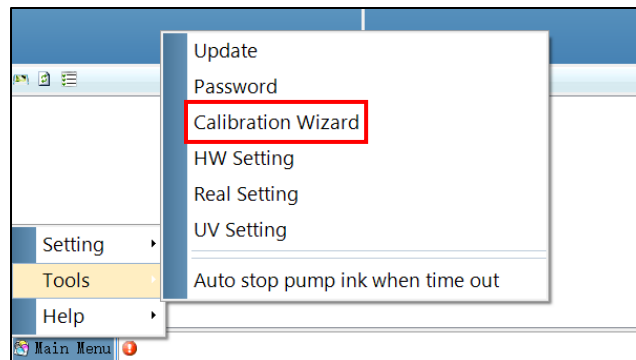


Fig 26: Selecting the Calibration Wizard Option

This should bring up the Calibration Wizard which is shown below:

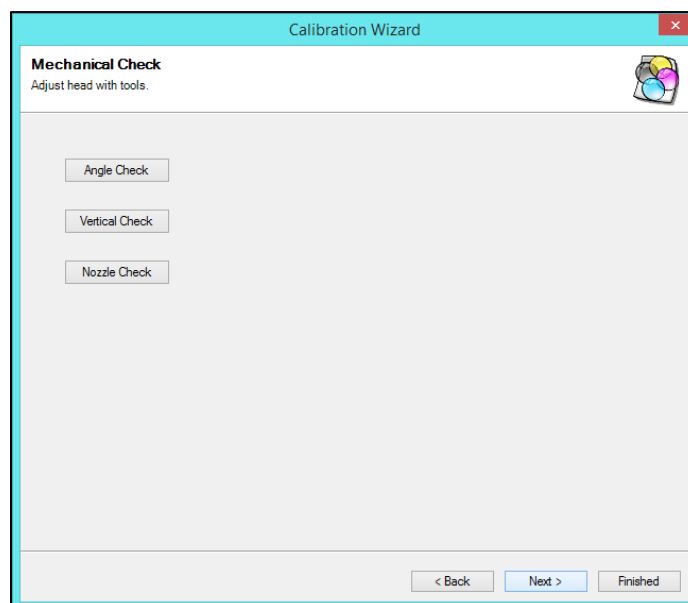


Fig 27: Displaying the Calibration Wizard

When you press the **Next** button, we redirect to the software calibration screen, as shown in the below images:

Fig 28: Displaying the Bidirectional Check in Calibration Wizard

Let's discuss each test and their result one by one in upcoming section. Mechanical checks are performed by Service Engineer, thus these checks are not discussed in the user manual.

Horizontal Calibration

Horizontal Calibration checks the bi-directional, left, and right alignment and corrects it by adding or subtracting the correction value from the default set value. It has to be performed for each print mode, whichever is required. Let's discuss each type of horizontal test one by one.

Bi-direction Calibration

Bi-directional calibration is performed to achieve dot placement accuracy between the "Left to Right" and "Right to Left" print sweeps. If the bi-direction offset value is correct, the Left to Right test print would align accurately with the Right to Left test print at "0" position. In case of error in the Bi-Direction offset, the Left to Right and Right to Left print would align at some other point on the scale.

The **Bi-direction Calibration** result is shown in the image below:

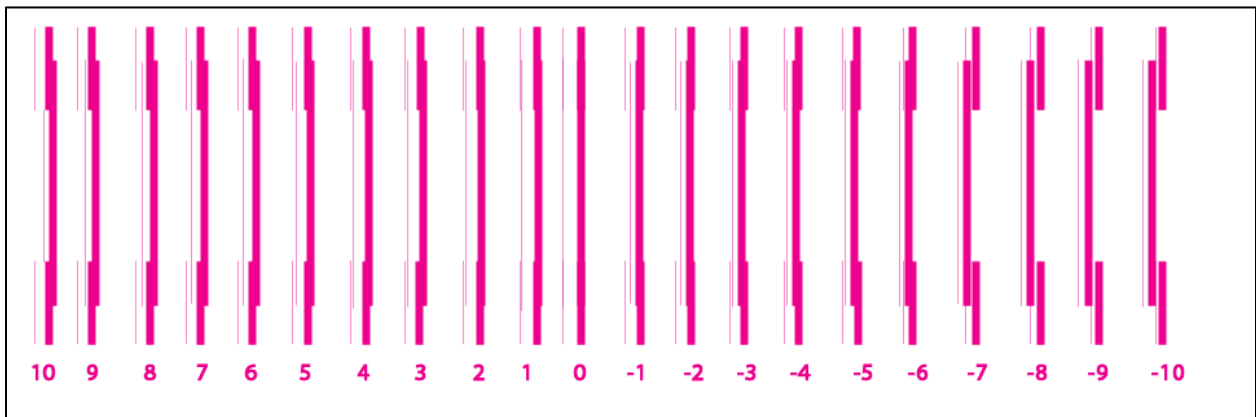


Fig 29: The Bi-Direction Calibration Output

Based on the above figure, you can notice that the Bi-direction Calibration is good at "0" position. The correction value is "0" which means you need not to correct the bi-direction value. Sometimes, the correction value can either be positive or negative. If the correction value is positive, then you need to add it in the current bi-direction adjust value or subtract the same, if negative.

Left to Right and Right to Left Calibrations

Left to Right Calibration is performed to achieve dot placement accuracy of all colors (Black, Cyan, and Yellow) with respect to Magenta during the carriage's left to right print sweep. Similarly, Right to Left calibration is used to achieve dot placement accuracy during the carriage's right to left sweep.

When the position of the test head is correct, then it would align perfectly with the reference color at "0" position, indicating that the error position is "0". If the test Print Head's position saved in the system is inaccurate then it would not align at "0" position, but at some other point on the calibration scale. The position at which the test head aligns perfectly with the reference head, indicates the error in position.

The **Left Calibration** Result is shown in the image below:

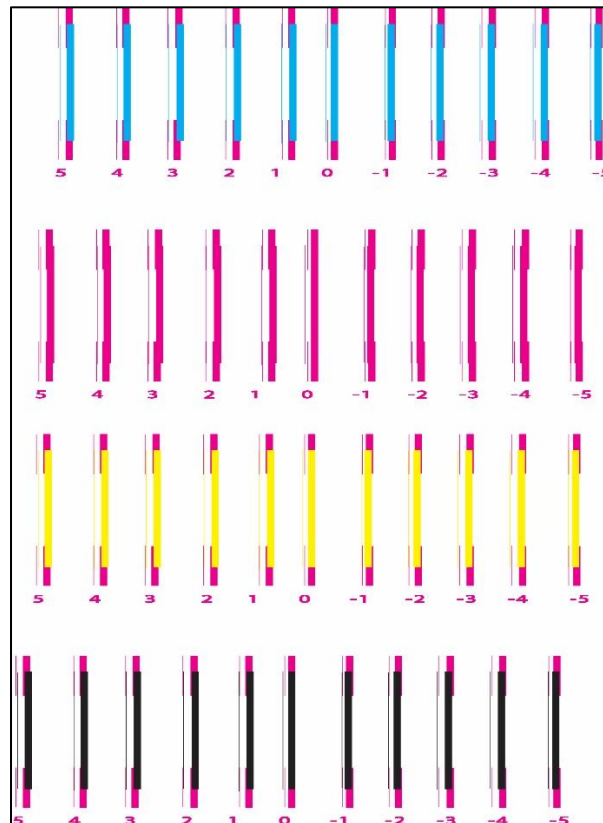


Fig 30: The Horizontal Left Check

The **Right Calibration** Result is shown in the image below:

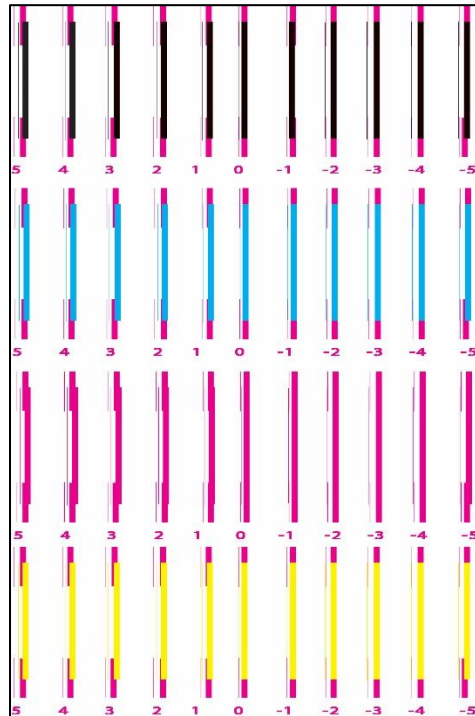


Fig 31: The Horizontal Right Check

Step Calibration

The printer step calibration is performed to verify and correct media feeding. The printer prints a complete image pass by pass. A pass is the horizontal carriage sweep perpendicular to the media movement. After each pass the printer moves the media forward for the next pass. This movement of media is called a step. The distance by which the media is moved is called the step size and it has to be accurate. Step size errors cause horizontal white or dark bands to appear in the print output. Step size needs to be adjusted for multiple factors like thickness and roughness of the print media etc. Step calibration should be used to fine adjust the step size and has to be done for each desired pass.

The **Step Calibration** result image is shown as below:

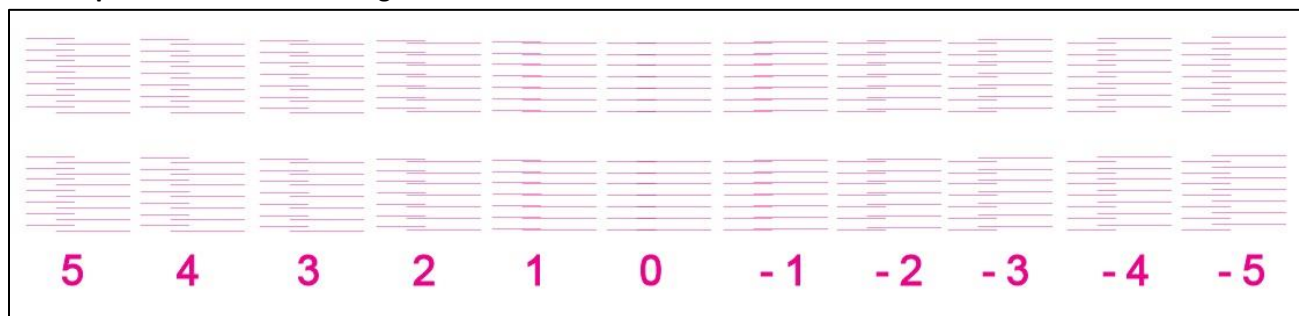


Fig 32: Displaying the Output of the Step Calibration

From the above figure, you get the accurate step adjust correction value. The correction value is either positive or negative. If the value is positive, then add it in the current step adjust value for the Print Head calibration. On the other hand, if the value is negative, then subtract the value from the current step adjust value. From the above, you can conclude that the pattern is corrected at “0” position.

The **Step Calibration** and its parameters are shown in the image below:

Fig 33: The Step Calibration Parameters

Follow these steps to perform step calibration:

Step 1: Select the desired pass from the list and click on the **Print** button (Refer to Fig 36).

Step 2: Feed the correction value in the **Revise** field (the correction value up to two decimal places) (Refer to Fig 36).

Step 3: Click on the => icon (Refer to Fig 36) on the Step Calibration window. The correction value result will be reflected in the **Step** field (Refer to Fig 36). The same step value will also be displayed in the **Steps** field on the **Quick Access Toolbar**.

Setting Print Origin

Follow these steps to set the print origin:

Step 1: If you want to start the printing from home position, then click on the **Move carriage to origin X** and **Move carriage to origin Y** icons on the Quick Access Toolbar, as shown below:



Fig 34: Setting Home Position

Step 2: If you want to start the printing from any position, then X axis and Y axis values in the **Origin X** and **Origin Y** fields, as shown below:



Fig 35: Setting Origin X and Origin Y

Now, the print origin value gets set.

Setting Print Parameters

Using the Printer Manager, you can manually change print preferences as per the printing requirements such as print origin, printing speed, no of steps, pass, and more as shown below:



Fig 36: Displaying the Print Parameters

- **Origin X:** Specify the Carriage initial position at X direction (Horizontally).
- **Origin Y:** Specify the carriage initial position at Y direction (Vertical).
- **Steps:** Remove step size errors from the current print job by specifying number of steps.
- **Pass:** Choose the number of passes with which the print job should be printed. Increasing the number of passes improves the print quality but at the cost of printing time.
- **Speed:** Choose the printing speed like VSD_1 and more.
- **Print Mode:** Set the mode of printing viz. High Speed and High Precision.

Adding Job

There are two ways to add jobs in the Job List area viz. the Add Job button and right click on the Job List area. Let's discuss both the ways one by one.

Follow these steps to add jobs in the Job List area:

Step 1: Click on the **Add Job** button on the **Quick Access Toolbar**, as shown below:



Fig 37: Clicking on the Add Job Button

The **Open** window appears on the screen.

Step 2: Navigate to the location where the image file with extension **“.prt”** and **“.prn”** is stored (Refer to Fig 41).

Step 3: Click on the **Open** button to add the file into the **Job List** area, as shown below:

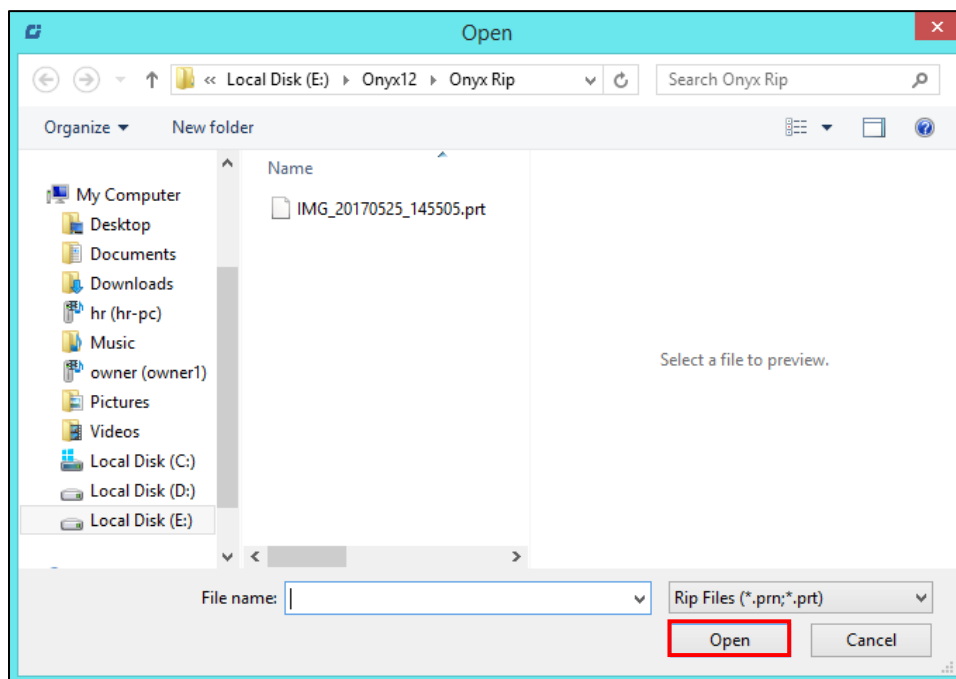


Fig 38: Adding the Job

Now, the selected image appears in the Job List area, as shown below:

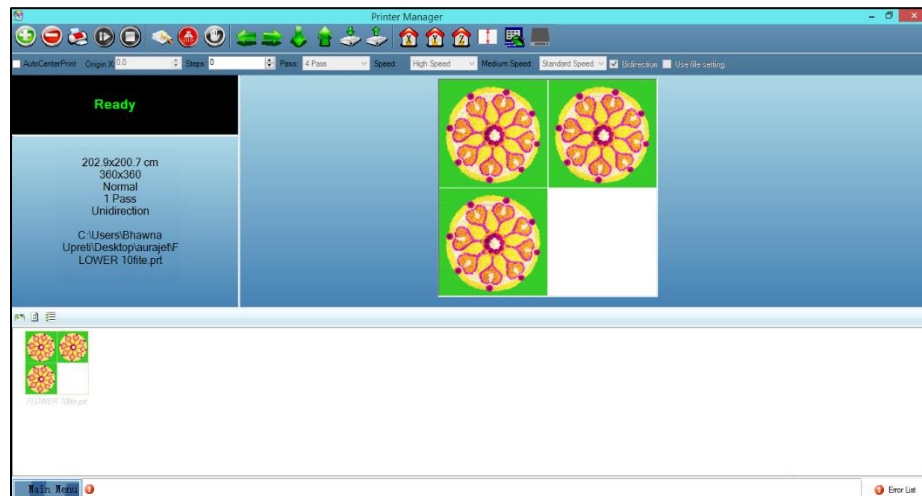


Fig 39: Displaying the Added Job and Their Details

Once a file has been added its information such as file path, size, resolution, and number of passes can be viewed in the Job Information area. User can also add a job simply by right clicking on the Job List area and selecting the **Add Job** option from the context menu, as shown below:

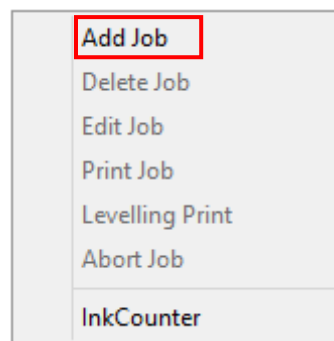


Fig 40: Displaying the Context Menu

On selecting the **Add Job** option, the **Open** window appears and follow the above mentioned steps to add more jobs.

Note: To delete the selected job, *click* on the **Delete job** icon on the **Quick Access Toolbar**.

Editing Job

Follow these steps to edit the selected job:

Step 1: Select the job of which details you want to edit from the **Job List** area.

Step 2: Right-click on the selected job. The context menu appears on the screen.

Step 3: Select on the **Edit Job** option from the context menu, as shown below:

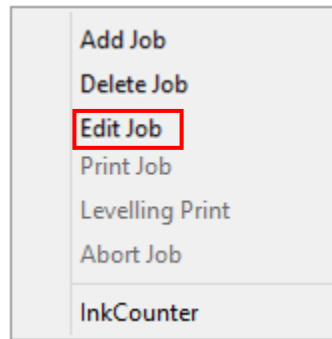


Fig 41: Selecting the Edit Job Option

The **Edit Job Form** appears with the list of options viz. Clip, Reverse Print, and Tile.

Step 4: Select the desired checkbox in front of the Clip, Reverse Print, and Tile options. On clicking to any option, its related parameters get appeared on the right pane and you can edit them as per the requirements. In our case, we have selected the **Clip** checkbox.

Step 5: After making the desired changes, click on the **OK** button to apply the settings, as shown below:

Fig 42: Displaying the Edit Job Form Window

Similarly, you can click on any other option and its related options get enabled in the right pane of the Edit Job form.

Ripping and Printing

Ripping is an independent process which converts a raw image file into the machine readable format and get the file ready for printing. The Rip software supports the tiff, jpeg, eps, psd, bmp file formats. After ripping the image file, the output file will be in **“.prt”** or **“.prn”** file format. Thus, you should first rip the image file before printing and then issue the Print command. While ripping, the color profiles are used to automatically perform the color corrections in the image. Now, you can print an image on the selected media simply by clicking on the **Print Job** button available on the **Quick Access Toolbar**, as shown below:



Fig 43: Selecting the Print Command

After issuing the Print command, the printing gets started and its progress details displays in the Job Information area, as shown below:

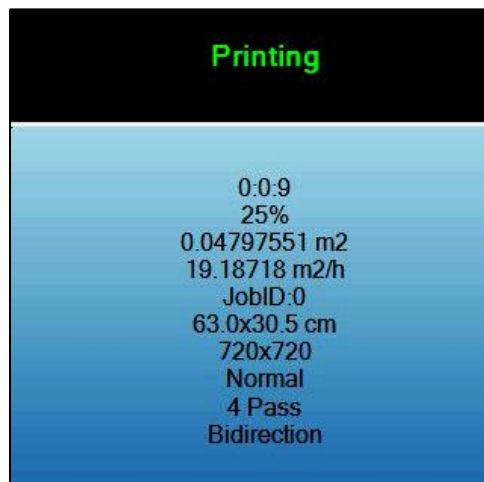


Fig 44: Displaying the Printing Details

Pausing and Canceling Printing

If you find any defect during the printing process, you can immediately pause or cancel the current printing job using the Pause or resume and Abort Job buttons available on the **Quick Access Toolbar** as shown below:



Fig 45: Issuing the Pause or resume Command

Similarly, you can abort the process by right clicking on the selected Job in the Job List area and select the **Abort Job** option from the context menu.

Head Height Measurement

Head Height measurement refers to the process of measuring the distance from head to media. The head height is sensed automatically. If it is not done, then use the Z axis button on the Quick Access Toolbar or Setting window for specifying the distance manually.

Follow these steps to adjust the head height:

Step 1: Click on the **Measure paper height** button on the **Quick Access Toolbar**. The Head height measurement window appears, as shown below:

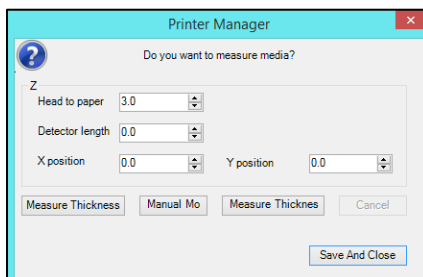


Fig 46: Adjusting Head Height

Step 2: Enter values in the **Head to paper**, **Detector length**, **X position**, and **Y position** fields.

Step 3: Press the **Save And Close** button to save the specified settings. For automatic process, click on the **Measure Thickness** button.

Now, the head height is adjusted as per the media type.

UV Setting

The UV Setting option enables user to control and manage different parameters of both UV lamps viz. Left UV lamp and Right UV lamp. Using the UV window, user can set left and right light setting, enable or disable print to left and print to right options, and most importantly define the range first nozzle as well as initial lead of shutter. To open the UV Setting window, click on the **Main Menu→Tools→UV Setting** path. The **UV Setting** window appears as shown below:

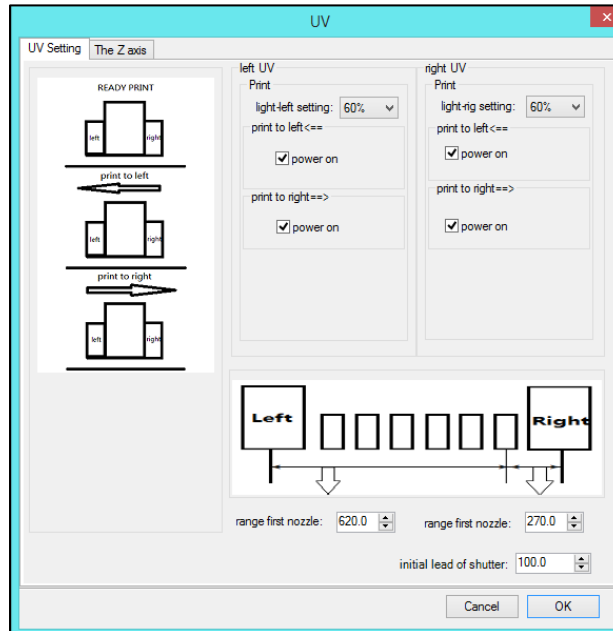


Fig 47: Displaying the UV Setting Window

Feeding Time and Language Passwords

The Password option enables operator to feed time and language passwords of the printer. On clicking **Password** option under the **Tools** menu, the **Password** window appears with two options viz. Time Password and Language Password. The Time Password helps in setting the running time of the printer. On the other hand, the Language Password helps in changing the operational language of the printer.

Follow these steps to change the time and language password of the printer:

Step 1: Click on the **Main Menu**→**Tools**→**Password** path, as shown below:

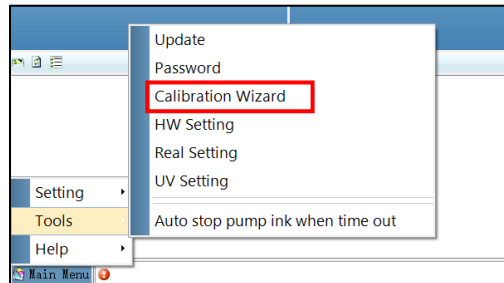


Fig 48: Selecting the Password Option

The **Password** window appears on the screen as shown below:

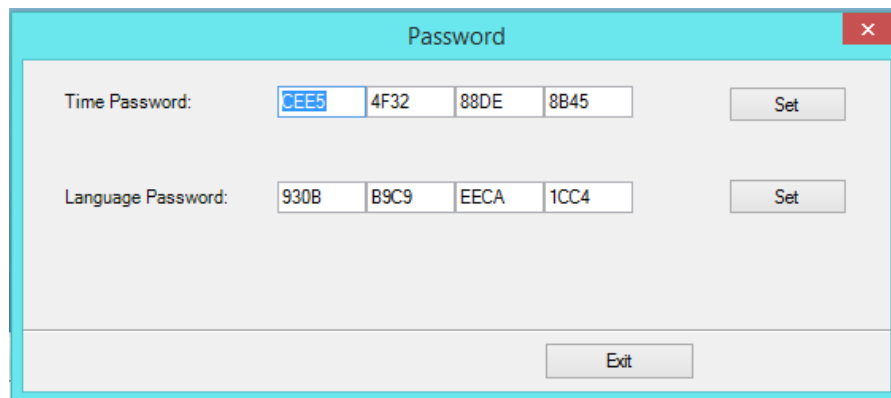


Fig 49: The Password Window

Step 2: Set values in the **Time Password** and **Language Password** fields as per the requirements (Refer to Fig 39).

Step 3: After feeding the passwords, click on the **Set** button in front of both the options (Refer to Fig 39).

Step 4: Click on the **Exit** button to close the **Password** window (Refer to Fig 39).

Note: The length of the password field must be of 16 digits.

8. Head Cleaning

Head Wiping

Head wiping refers to the process in which the head surface area is cleaned with the help of dry tissue paper. Wiping removes ink drops adhering to the print head nozzle surface. Gently touch or wipe with a clean recommended head cleaning tissue on the head's nozzle plate. One should make sure that the tissue is clean, soft, and also does not have any chemicals on it.

The Head Wiping process is shown in the image below:



Fig 50: Wiping the Print Head with a Piece of Cloth

Head Spraying

Head spraying should be performed only when small percentage of nozzles are blocked. This method is preferred over purging as it saves ink. When heads are sprayed all the nozzles are actuated at a high rate which helps in opening up dry nozzles of the printer. To perform head spraying, *click* on the **Spray** icon available under the **Quick Access Toolbar**, as shown in the below figure:



Fig 51: Selecting the Spray Button

Head Purging

Head purging refers to the method in which heads are cleaned by forcing pressurized ink through the nozzles. Follow these steps to start the head purging process:

Step 1: Turn ON the Negative Pressure knob of the color on which user wants to perform the purging, as shown below:



Please make sure that all other colors Negative Pressure knob must be turned OFF.

Step 2: Press the Cleaning button to start the purging process, as shown below:

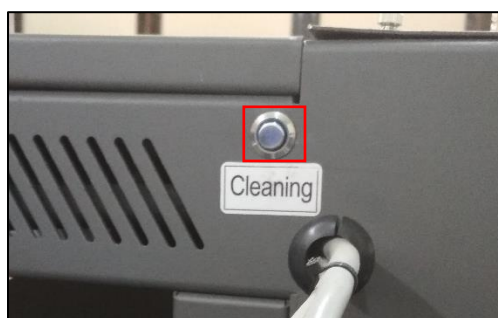


Fig 52: Displaying the Cleaning Button

Now, the Print Heads get cleaned.

9. Maintenance of Machine

Maintenance of Print Head

a. Print Head Using Tips

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 20~28, humidity 55%~80%, dust-free and exhaust condition.
- Don't turn on electricity under ink shortage in the print head, or the heat in print head can't be taken away by ink, will make print head easily damaged.
- Cooling hole on the head carriage can't be jammed, keep the carriage exhausted to ensure the print head with optimum heat abstraction.
- Prevent print head from severe shock, otherwise it will damage the piezoelectric ceramic oscillation in the head.
- Avoid ink spilling on the print head and head cables and if there is ink in the print head, it must be cleaned with flush water.
- Don't use expiry ink and store the ink at favorable environment
- If the printer won't be used for a long time, before pack it, put some protection liquid in the print head.
- 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.

b. Guardianship of print head

Specific monitoring treatment methods are given as follow:

Operations	Remedial Actions
Pre-printing	Test print head to make sure that nozzles are in good condition.
During printing	Use the color option to make sure that all the print heads are always in the good state. In case, broken lines are found, then user should use the cleaning function to improve the quality of printing.
Turn off the printer	After printing, cleaning the surface of the print head by flush, then set up the closing plate and make sure that nozzles should properly contact with the preservative film on the closing plate

Maintenance of Machine Motion Parts

- Clean and lubricate guide rail at least once a week and brush enough low fat lubricating oil onto junction of motion parts.
- Clean and lubricate carriage slider, bearing and gear of withdrawing and feeding cloth system at least once a week.
- Clean raster bar at least once a week, and dip little alcohol with clean cotton cloth to wipe it.
- Regularly clean filter cotton of UV lamp, and replace filter cotton as per machine use frequency; in a short time it is forbidden to turn on and turn off UV lamp too frequently.
- Regularly check whether carriage belt is loose or not.

Details of Machine Maintenance

- Before start printing, operator should perform Nozzle Test to check the status of Print Head nozzles. If there is any blockage, perform the Print Head cleaning process viz. purging and wiping.
- After continuously using the machine for long hours, the Print Head's nozzles surface should be cleaned by wiping with wet cloth/stick and give the guide rail lubricating oil.
- Print Heads should be in good condition after completing the printing job and also kept out from light.
- Weekly clean the machine to remove dust from equipment, clean all transmission parts, and give transmission bearings lubricating oil for long life of a machine.
- Ink system should be thoroughly cleaned every three months in order to keep good printing quality.

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.
- When clean the sensitive devices, like sensors and raster, should wipe by alcohol.
- Use clean cloth to clean up the dust and residual oil on the tracks.

Power System Maintenance

- Ground wire should always be checked whether loose or disconnection.
- Towlines (containing power lines) and data lines should be inspected regularly.
- Zero switch is the base for the start of printing, thus if any liquid flows into the zero switch, it will cause slow response, and also affect the machine working.
- Operators should monitor the power supply system regularly like output voltage of power-supplying, the power potential overheating temperature, ageing of wires, etc.
- Monitor different parts of the machine that generates high heat regularly. For these parts, one should provide and arrange proper ventilation for the same.

Control System Maintenance

a. Static discharge

- The operator must discharge his own electrostatic before touch the electronic components and parts.
- Do not touch the pin connectors and welded joints on circuit boards, integrated circuit boards at pleasure.
- Ensure the sensitivity of the Zero Start switch.

b. Control wiring maintenance

- Check the control wiring system whether loose or disconnected.
- Check high-power output terminals whether loose or disconnected, such as the input and output terminals of air switches, contactors and relays, if loose or poor connection can easily cause damage of control devices and switches.
- Check the power system whether can provide the rated voltage to all parts of the machine.

Encoder System Maintenance

- Before plugging or unplugging Encoder sensor from the interface board, should keep the machine power off.
- Cleared up the ink and dust from the Encoder ruler.
- Ensure the Encoder Sensor is working normally and clean the surface of Encoder Ruler regularly.
- Encoder sensors should avoid shaking and hitting.
- Don't try to replace or separate the Encoder Sensor by yourself and also never change the relative distance.
- Should keep water, ink, oil away from the Encoder ruler.
- Encoder Sensor shouldn't work in corrosion environment, in order to avoid Encoder chromium layer damaged and destroy Encoder Ruler sensitivity.

Ink Supply System Maintenance

- Check for leakage between joint & ink tank and joint & valve seating.
- Check for damages on ink tubes.
- Disk filters should be changed after 3 months or 800 hours working.
- Check Ink impurities in the ink pumps as this will affect the ink supplying.
- Operator shall clean ink sub tanks them regularly.

10. Troubleshooting

Printer Not Initializing

- Encoder scale is having ink stains (print shows vertical color bands)
- Encoder sensor is not cleaned
- Initialization of the wiper and capping station is incomplete or stuck

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
- Front glass door is opened
- 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

Heaters Not Working

- Check if inlet power cord and supply power are connected
- Check the set temperature in the controller

Head Not Firing

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

A Color Ink Not Supply

- Bad or damaged float sensitivity
- Power board fault
- Float power line failure
- Ink sheet failure
- Ink path have disclosure
- No ink in ink box

UV Lamp Not Working

- UV lamp is aged
- Air cooling is not enough
- Power voltage is below 10%
- Trigger is aged

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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